IEC/EN 60 898-1					
Clause	Requirement + Test	Result - Remark			Verdict
		#47	#48	#49	
		81,6 A	63,8 A	51,0 A	
		#50	#51	#52	
		40,8 A	25,5 A	15,3 A	
		#53	#54	#55	
		10,2 A	5,10 A	2,55 A	
	opening time not less than 1 s or more than				P
	- 60 s	#47	#48	#49	P
		11 s	11 s	9 s	
		#50	#51	#52	
		15 s	13 s	14 s	
		#53	#54	#55	
		17 s	19 s	17 s	
	- 120 s	#44	#45	#46	P
		17 s	21 s	21 s	
9.10.2.2	☒ For circuit-breakers of the D – Type				P
	Moreover the C.B. shall perform following test:				P
9.10.1.2	Test current 2,55 In (A) starting from cold for:	#33	#34	#35	P
		127,5 A	102,0 A	81,6 A	
		#36	#37	#38	
		63,8 A	51,0 A	40,8 A	
		#39	#40	#41	
		25,5 A	15,3 A	10,2 A	
		#42	#43		
		5,10 A	2,55 A		
	opening time not less than 1 s or more than				P
	- 60 s	#35	#36	#37	P
		9 s	12 s	12 s	
		#38	#39	#40	
		15 s	13 s	11 s	
		#41	#42	#43	
		13 s	15 s	20 s	
	- 120 s	#33	#34		P
		16 s	19 s		

ВЕРНО С ОРИГИНАЛА

IEC/EN 60 898-1			
Clause	Requirement + Test	Result - Remark	Verdict
	TESTS „E_3“		N/A
9.12.11.4.4	**Test: E_3 (Test at making and breaking capacity on a individual pole (Icn1)**		N/A

ВЯРНО С ОРИГИНАЛА

IEC/EN 60 898-1			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX C (NORMATIVE)

replace table C.1 by:

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

Test sequence		Clause or subclause	Test (or inspection)
A		6 8.1.1 8.1.2 9.3 8.1.3 8.1.6 9.4 9.5 9.6 9.14 8.1.3 9.15 9.16	Marking General Mechanism Indelibility of marking Clearance and creepage distances (external parts only) Non-interchangeability Reliability of screws, current-carrying parts and connections Reliability of terminals for external conductors Protection against electric shock Resistance to heat Clearances and creepage distances (internal parts) Resistance to abnormal heat and to fire Resistance to rusting
B		9.7 9.8 9.9	Dielectric properties Temperature-rise 28-day test
C	C_1	9.11 9.12.11.2.1 9.12.12	Mechanical and electrical endurance Performance at reduced short-circuit currents Verification of the circuit-breaker after short-circuit tests
	C_2	9.12.11.2.2 9.12.12	Short-circuit test for verifying the suitability of circuit-breakers for use in IT systems Verification of the circuit-breaker after short-circuit tests
D	D_0	9.10	Tripping characteristic
	D_1	9.13 9.12.11.3 9.12.12	Resistance to mechanical shock and impact Short-circuit performance at 1 500 A Verification of circuit-breaker after short-circuit tests
E	E_1	9.12.11.4.2 and 9.12.12	Service short-circuit capacity (I_{cs}) Verification of circuit-breaker after short-circuit tests
	E_2	9.12.11.4.3 and 9.12.12	Performance at rated short-circuit capacity (I_{cn}) Verification of circuit-breaker after short-circuit tests
	E_3	9.12.11.4.4 and 9.12.12	Performance at rated making and breaking capacity (I_{cn1}) on an individual pole of multipole circuit-breakers Verification of circuit-breaker after short-circuit tests
NOTE With the agreement of the manufacturer the same samples may be used for more than one test sequence.			

ВЯРНО С ОРИГИНАЛА

IEC/EN 60 898-1			
Clause	Requirement + Test	Result - Remark	Verdict

replace table C.2 by:

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

Test sequence		Number of samples	Minimum number of samples which shall pass the test [a) b)]	Maximum number of samples for repeated tests [c)]
A		1	1	--
B		3	2	3
C	C_1	3	2 [e)]	3
	C_2 [f)]	3	2 [e)]	3
D		3	2 [e)]	3
E_1		3 + 3 [d)]	2 [e)] + 2 [d), e)]	3 + 4 [d)]
E_2		3 + 4 [d)]	2 [e)] + 3 [d), e)]	3 + 4 [d)]
E_3		3	2 [e)]	3

a) In total, a maximum of two 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 results shall be acceptable.

d) Supplementary samples in the case of single-pole circuit-breakers rated 230/400 V or 240/415 V (see table 1).

e) All samples shall meet the test requirements of 9.12.10, 9.12.11.2, 9.12.11.3 and 9.12.11.4, as appropriate.

f) For this sequence read "number of protected poles" instead of "number of samples". In total a maximum of three test sequences may be repeated.

ВЯРНО С ОРИГИНАЛА

IEC/EN 60 898-1			
Clause	Requirement + Test	Result - Remark	Verdict

replace table C.3 by:

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

Test sequence		Number of samples depending on number of poles [a]			
		One pole [b]	Two poles [c]	Three poles [d]	Four poles [e]
A		1 max. rated In	1 [g),j)] max. rated In	1 [i)] max. rated In	1 [i)] max. rated In
B		3 max. rated In	3 [g)] max. rated In	3 max. rated In	3 max. rated In
C	C_1	3 max. rated In	3 [g)] max. rated In	3 max. rated In	3 max. rated In
C	C_2	3 max. rated In	2 max. rated In for 2 protected poles, or 3 max. rated In for one protected pole	1 max. rated In	1 max. rated In
$D_0 + D_1$		3 max. rated In	3 [h)] max. rated In	3 max. rated In	3 max. rated In
D_0		1 of all other rated In			
E_1		3+3 [f)] max. rated In 3+3 [f)] min. rated In	3 max. rated In 3 min. rated In	3 max. rated In 3 min. rated In	3 max. rated In 3 min. rated In
E_2		3+4 [f)] max. rated In 3+4 [f)] min. rated In	3 max. rated In 3 min. rated In	3 max. rated In 3 min. rated In	3 max. rated In 3 min. rated In
E_3		k)	3 [j)] max. rated In	3 [j)] max. rated In	3 [j)] max. rated In

a) If a test is to be repeated according to the acceptance criteria of C.2, a new set of samples is used for the relevant test sequence. In repeated tests all results shall be satisfactory.
b) If only multipole circuit-breakers are submitted, this column applies to the set of samples having the smallest number of poles (instead of the relevant column).
c) Applicable to two-pole circuit-breakers whether with two protected poles or with one protected pole.
d) This series is omitted when four-pole circuit-breakers are also tested.
e) Also applicable to circuit-breakers with three protected poles and a neutral pole.
f) Supplementary samples in case of single-pole circuit-breakers of 5.3.1.4.
g) This test sequence is omitted when three-pole or four-pole circuit-breakers have been tested.
h) This test sequence shall be omitted for two-pole circuit breakers with two protected poles, when three-pole or four-pole circuit-breakers have been tested.
i) When multipole circuit-breakers are submitted, a maximum of four screw-type terminals for external conductors are subjected to the tests of 9.5, i.e. two supply and two load terminals.
j) If each pole of the multipole is identical to the individual pole tested in E2, this test is omitted. If not this test is carried out on an individual protected pole, taken at random, of the circuit-breaker with the highest number of poles
k) Covered by test sequence E2

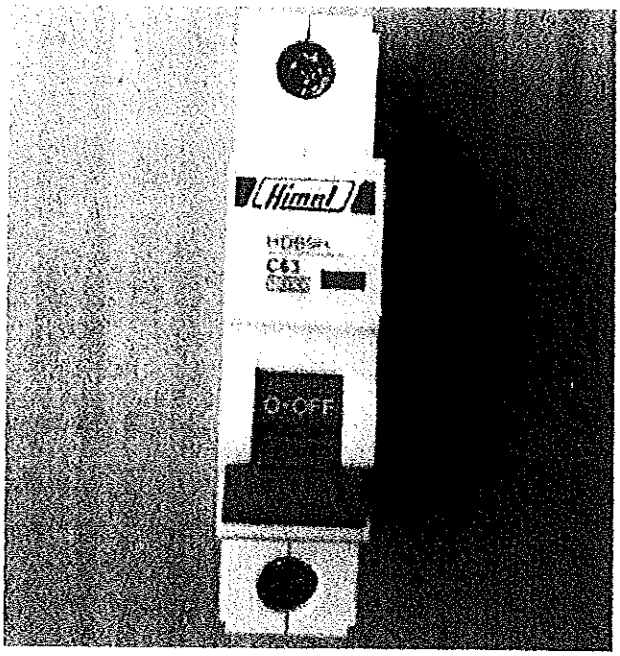
ВЯРНО С ОРИГИНАЛА

IEC/EN 60 898-1			
Clause	Requirement + Test	Result - Remark	Verdict

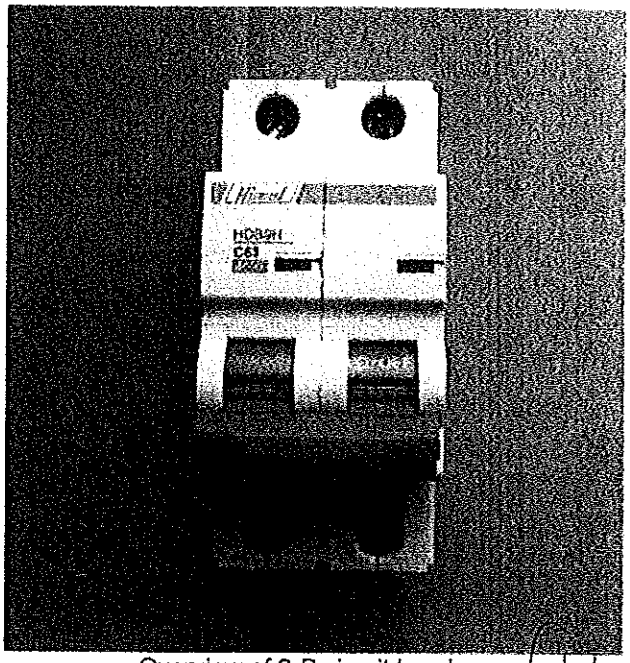
	Annex ZC (normative)	P
	EN 60 898-1 **Special national conditions**	P
	For the countries in which the relevant special national conditions apply these provisions are normative, for other countries they are informative.	P
J.1	**Austria, Czech Republic, Denmark, Germany, Netherlands, Norway and Switzerland**	N/A
	The upper limit of current for use of screw less terminals is 16 A	N/A
J.3.3	**Austria, Belgium, Denmark, France, Germany, Italy, Portugal, Spain, Sweden, Switzerland, and United Kingdom**	N/A
	Only universal screwless type terminals are accepted.	N/A
K1	**BELGIUM, FRANCE, ITALY, PORTUGAL, SPAIN, AND UNITED KINGDOM**	N/A
	The use of circuit-breakers with flat quick-connect terminations for rated currents up to and including 20 A is accepted.	N/A
K.8.2.2	**BELGIUM, FRANCE, ITALY, PORTUGAL, SPAIN, AND UNITED KINGDOM**	N/A
	The use for rated currents up to and including 20 A	N/A

ВЯРНО С ОРИГИНАЛА

Photos:

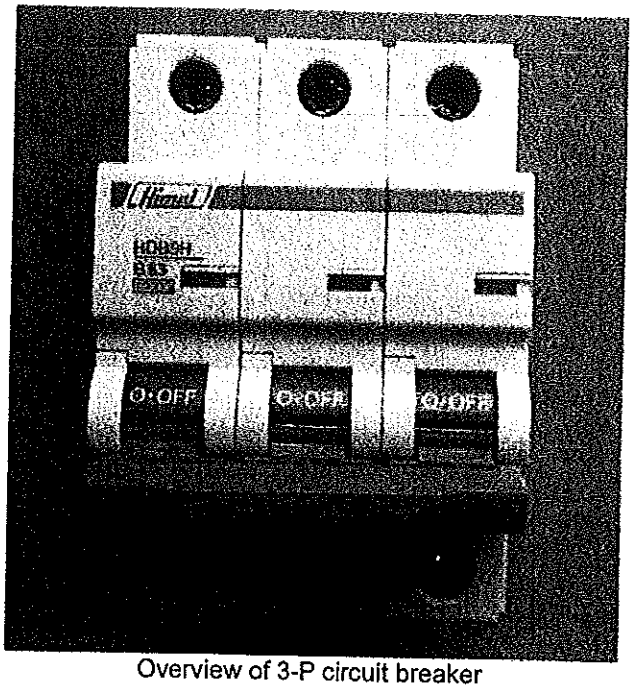


Overview of 1-P circuit breaker

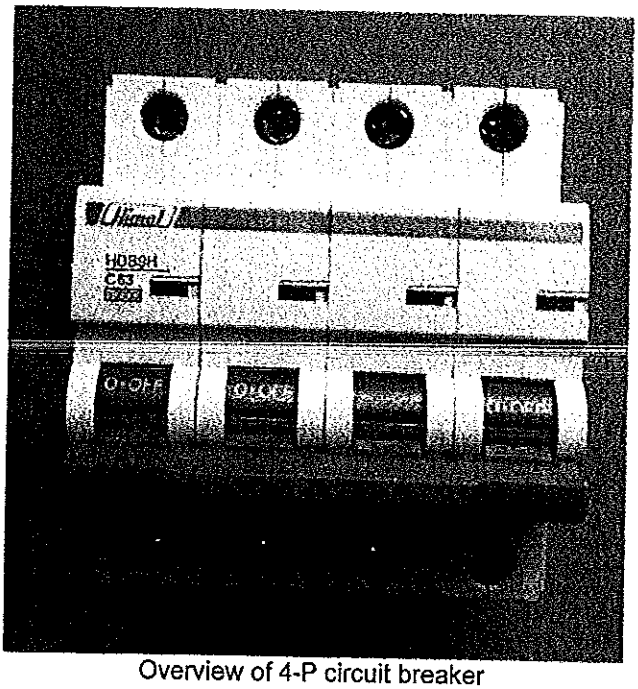


Overview of 2-P circuit breaker

ВЯРНО С ОРИГИНАЛА

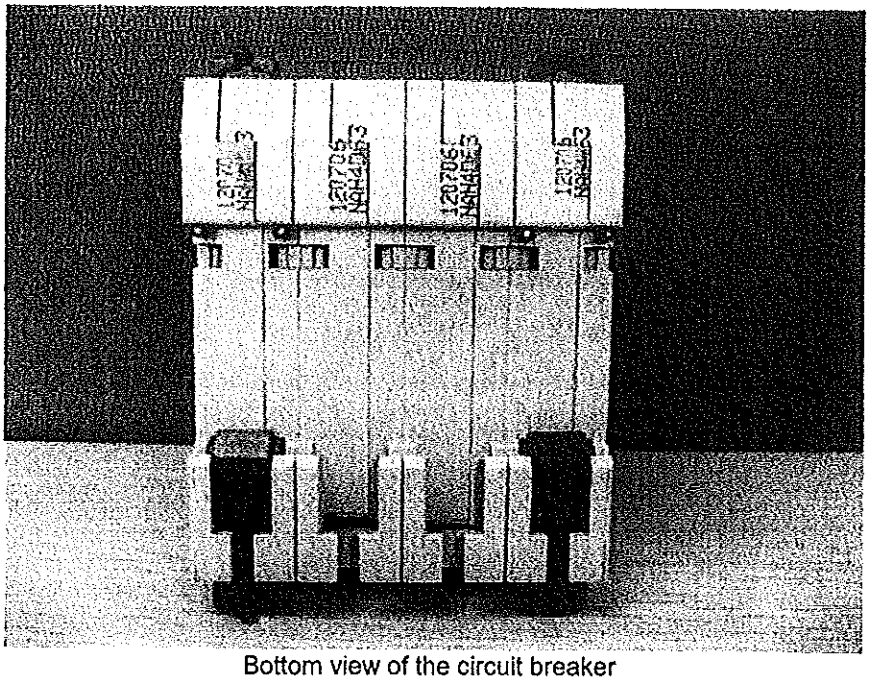


Overview of 3-P circuit breaker

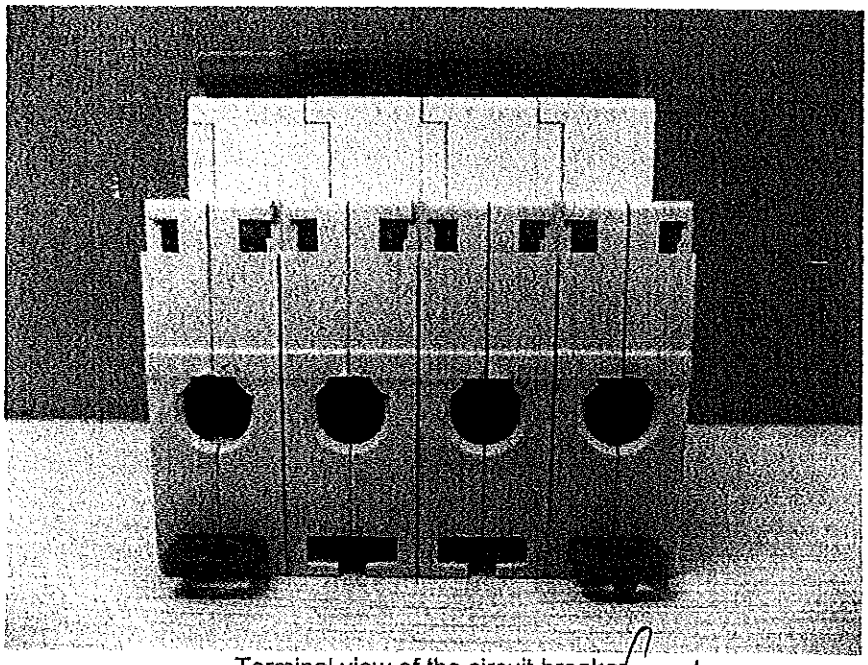


Overview of 4-P circuit breaker

ВЯРНО С ОРИГИНАЛА



Bottom view of the circuit breaker



Terminal view of the circuit breaker

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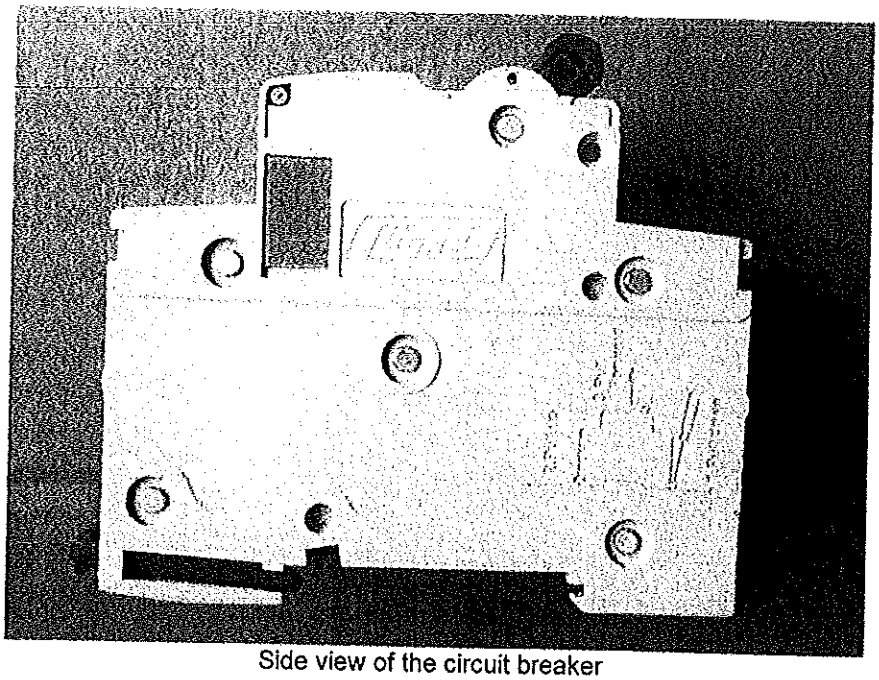

Side view of the circuit breaker

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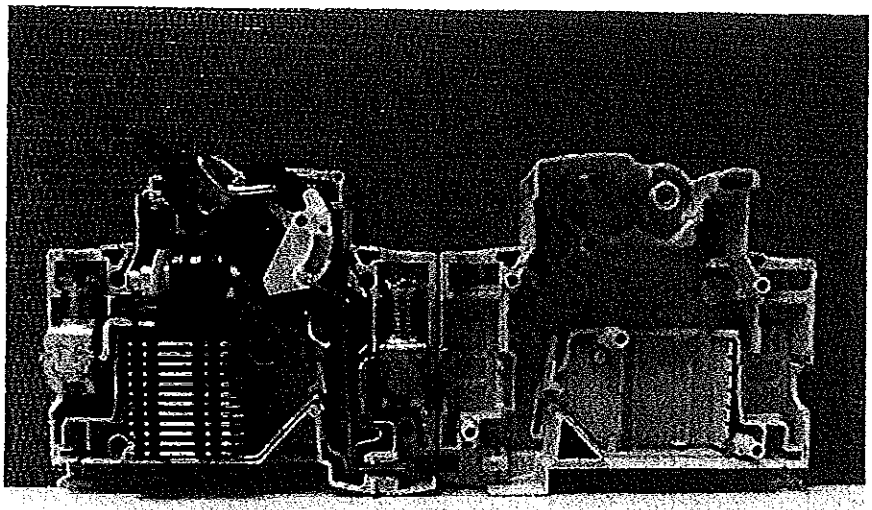
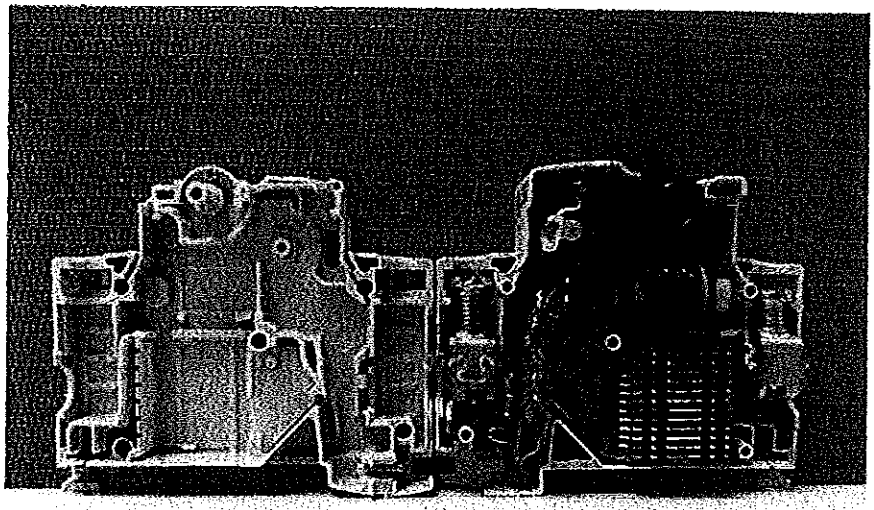


Open view, D63



Open view, D63

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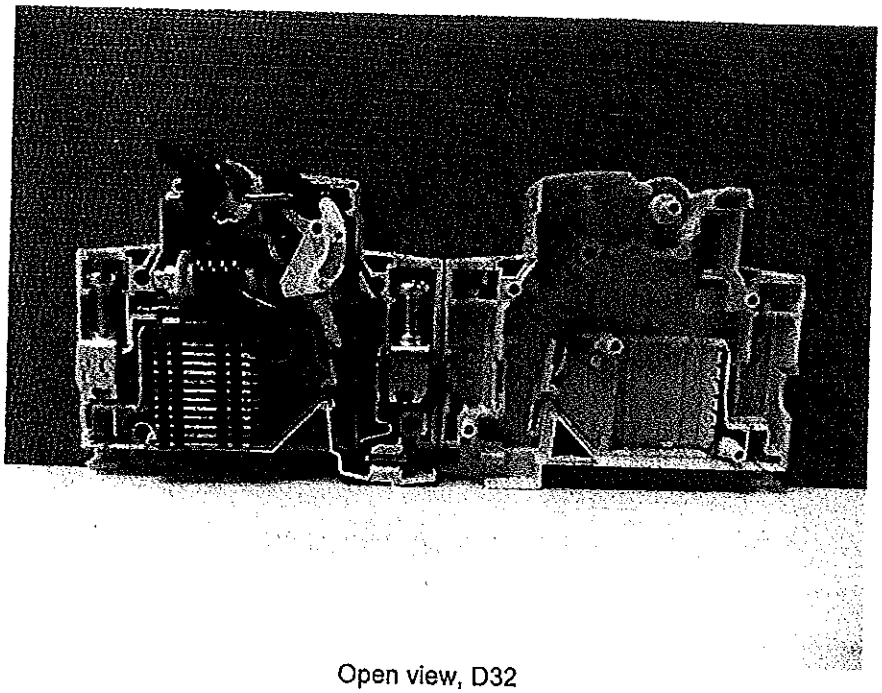
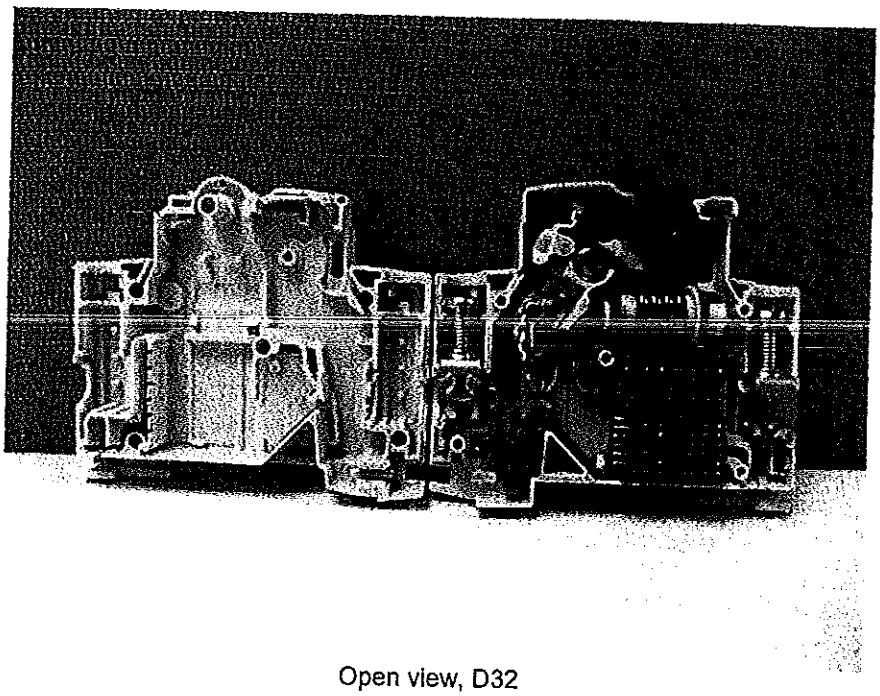


Open view, D32



Open view, D32

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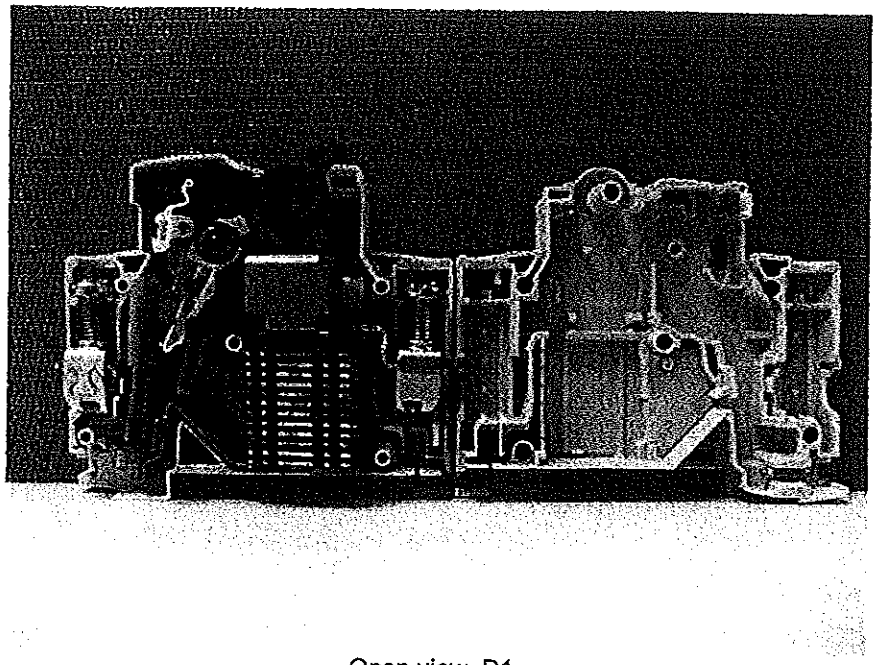
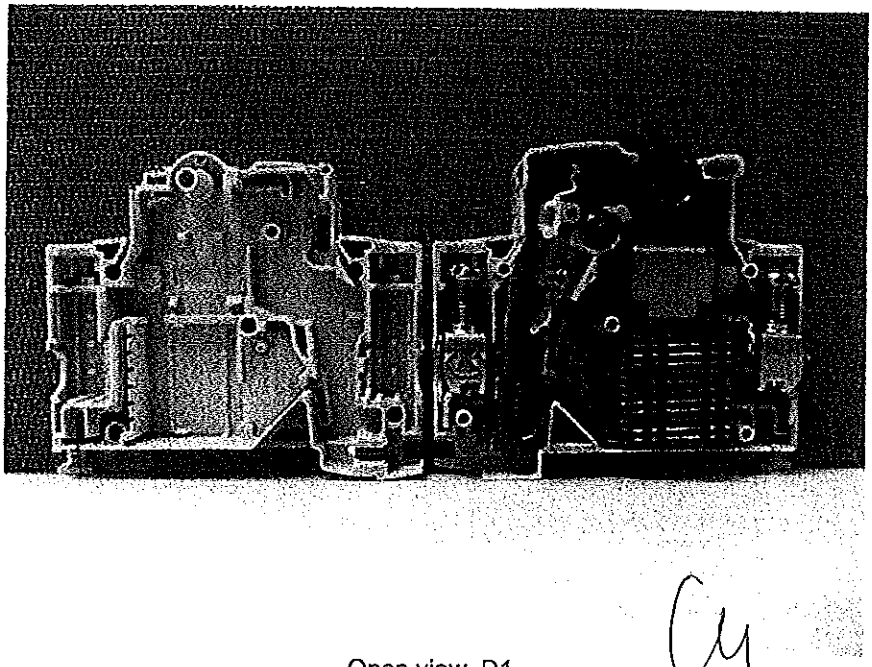


Open view, D1



Open view, D1

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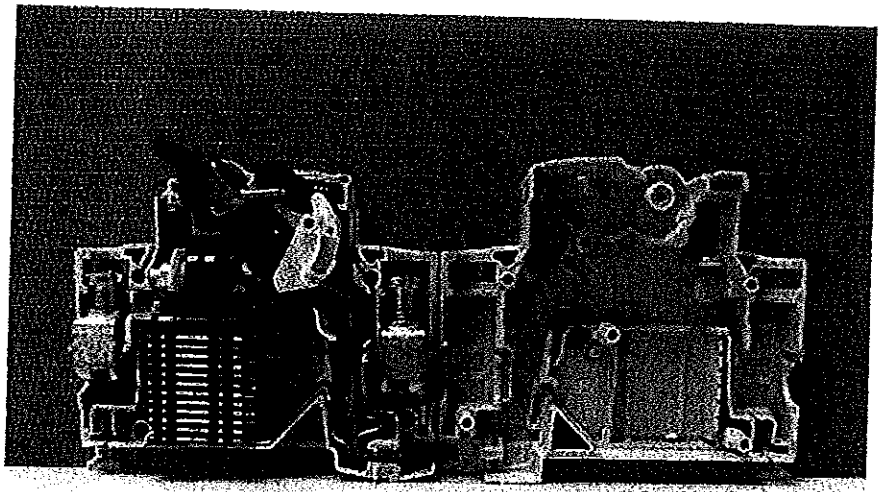
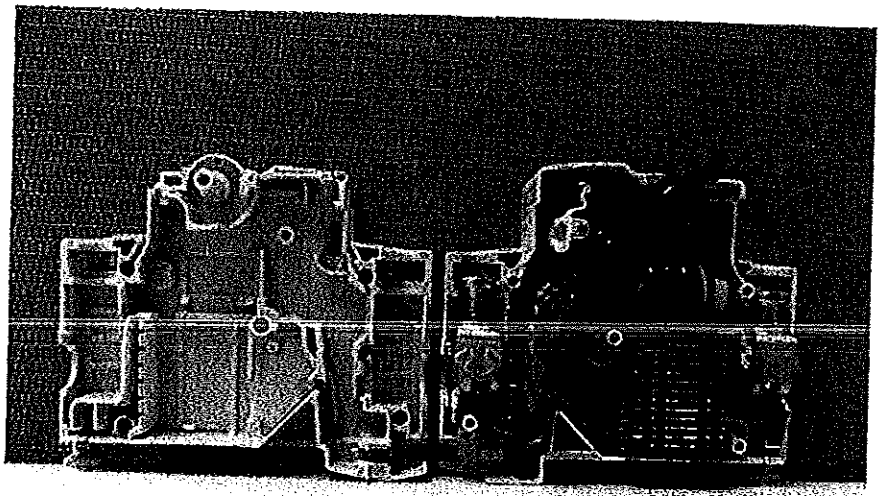


Open view, C63



Open view, C63

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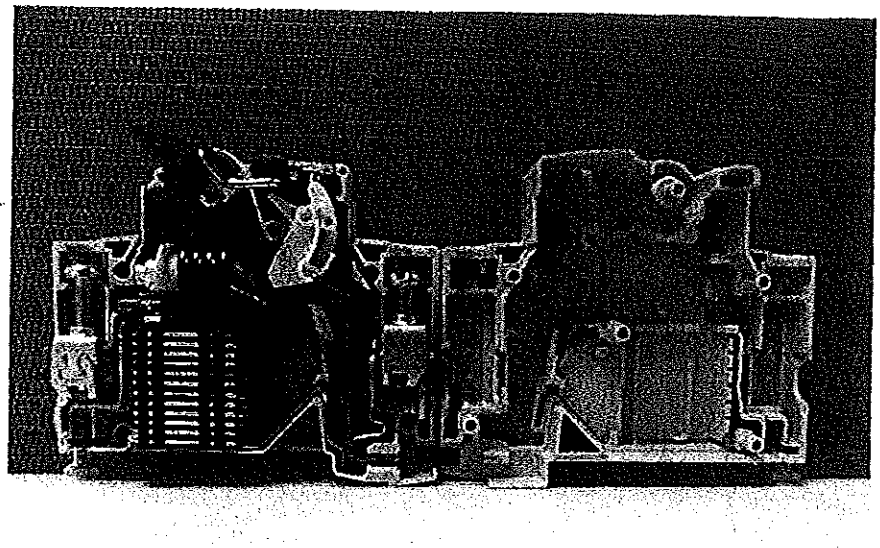
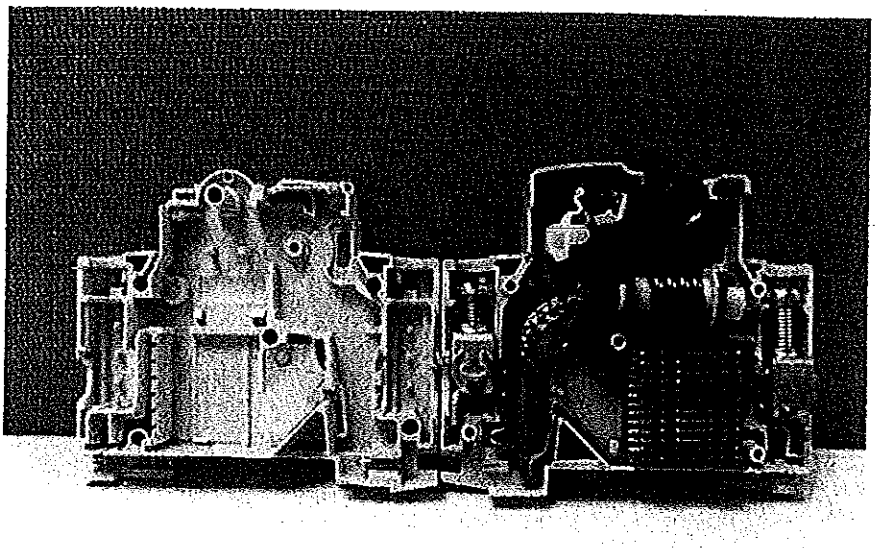


Open view, C32



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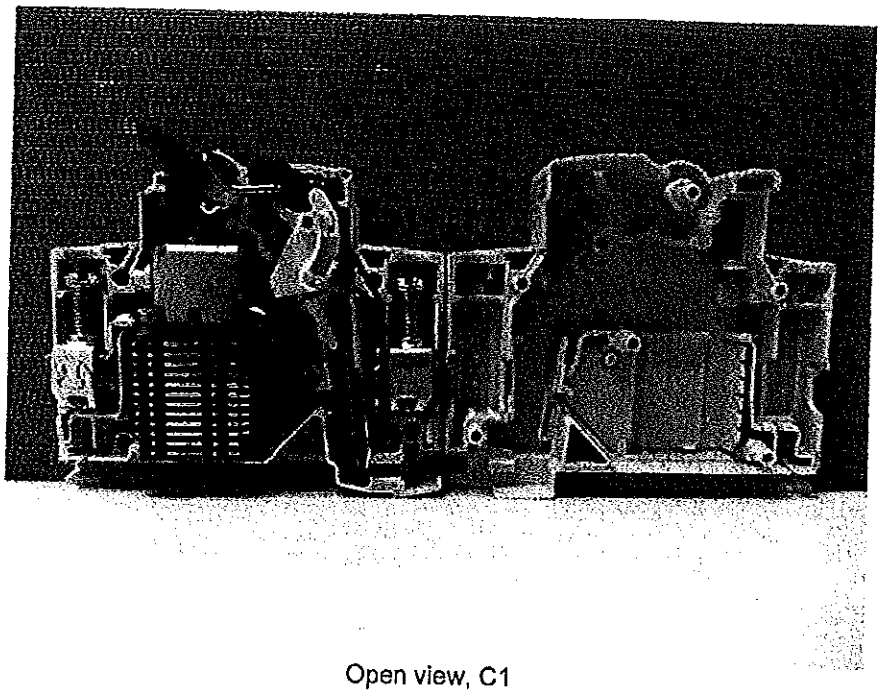
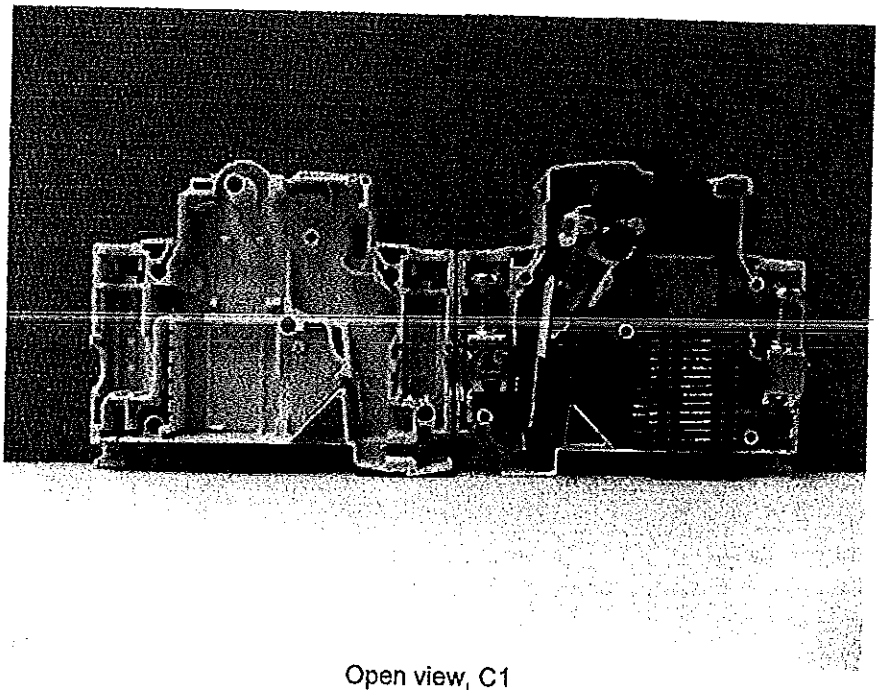


Open view, C1



Open view, C1

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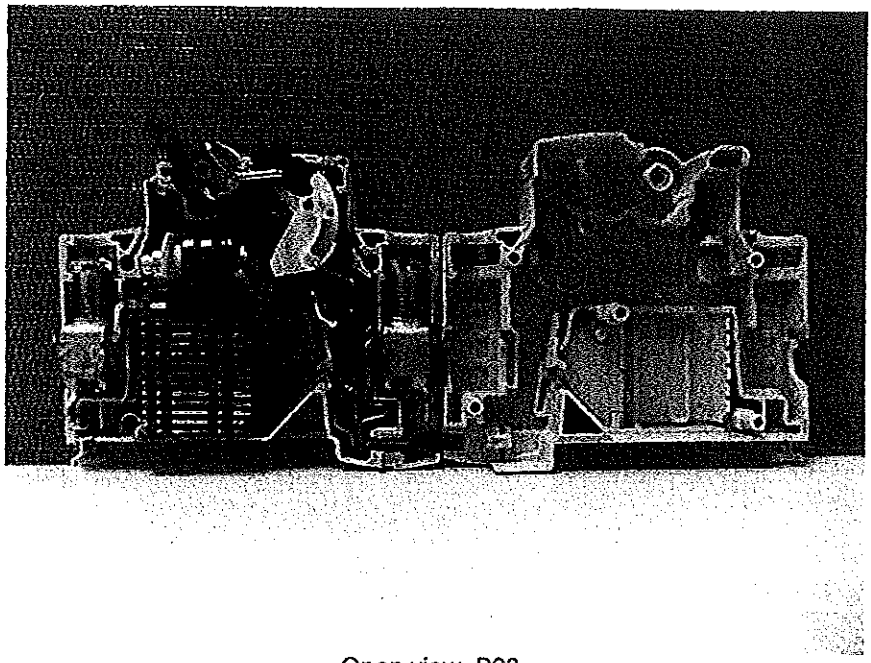
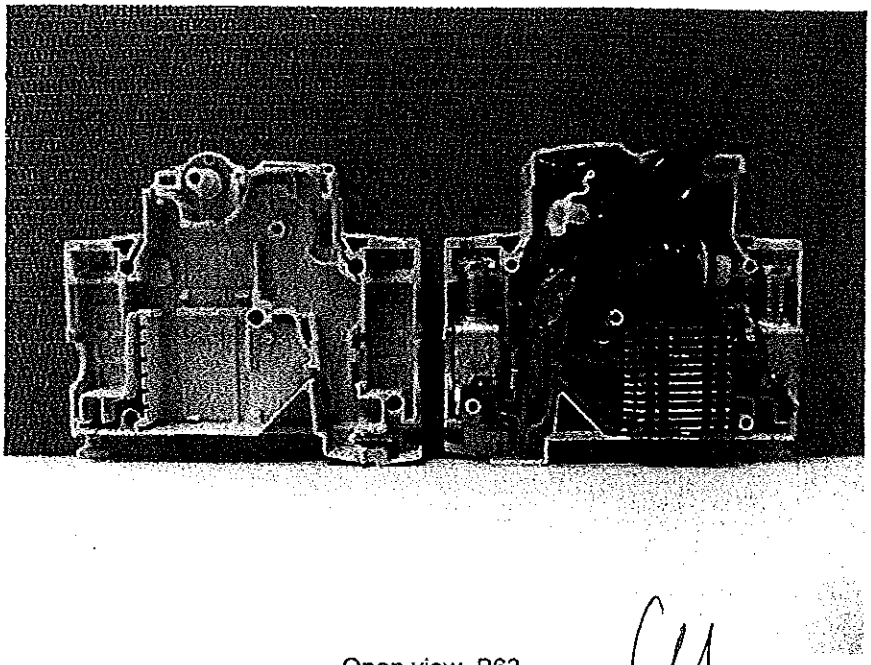


Open view, B63



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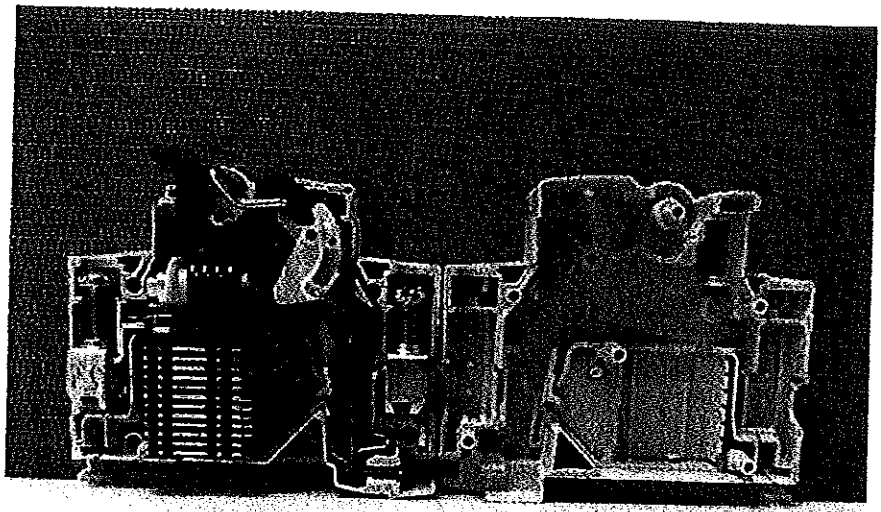

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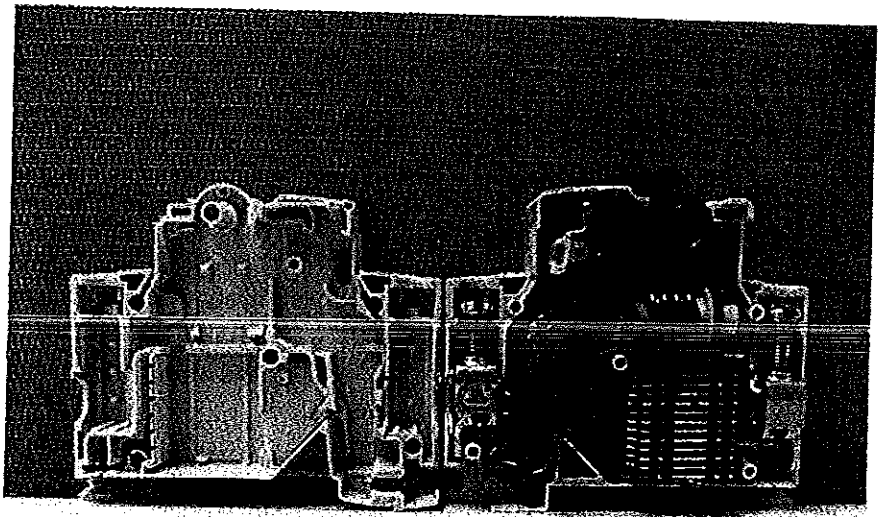

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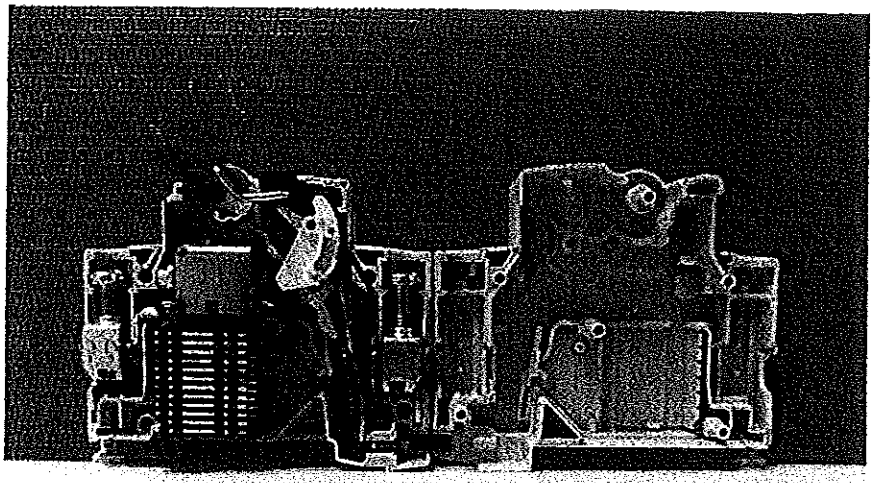

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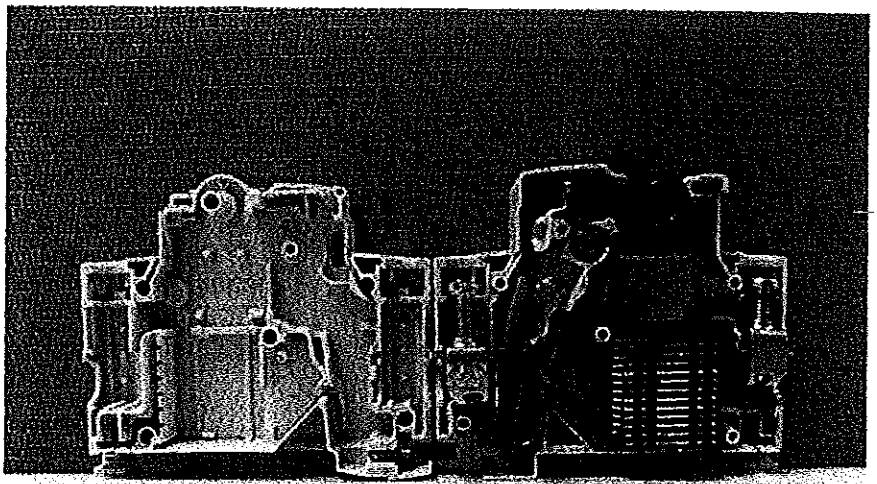

Open view, B1

ВЯРНО С ОРИГИНАЛА

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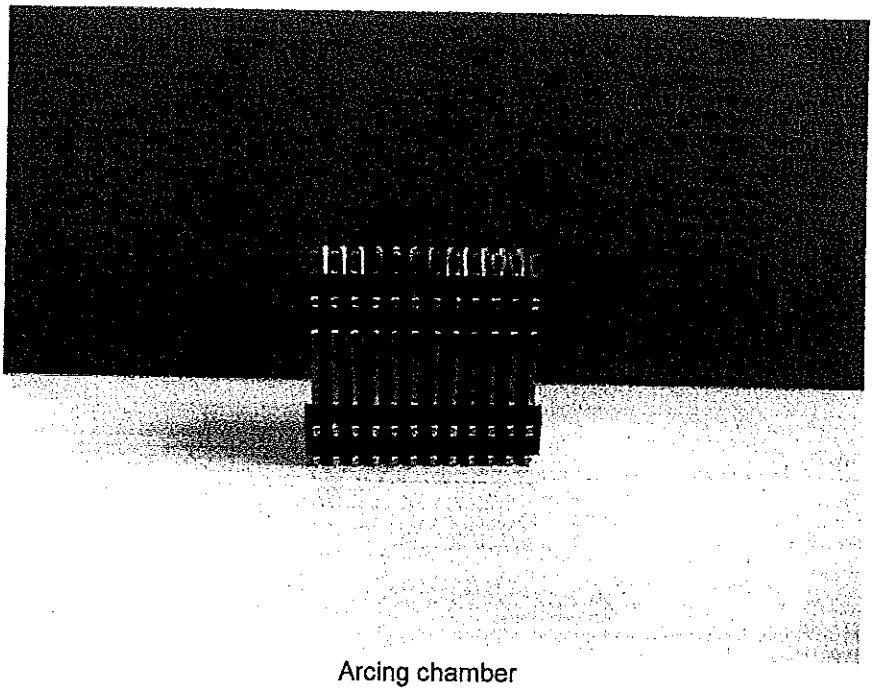
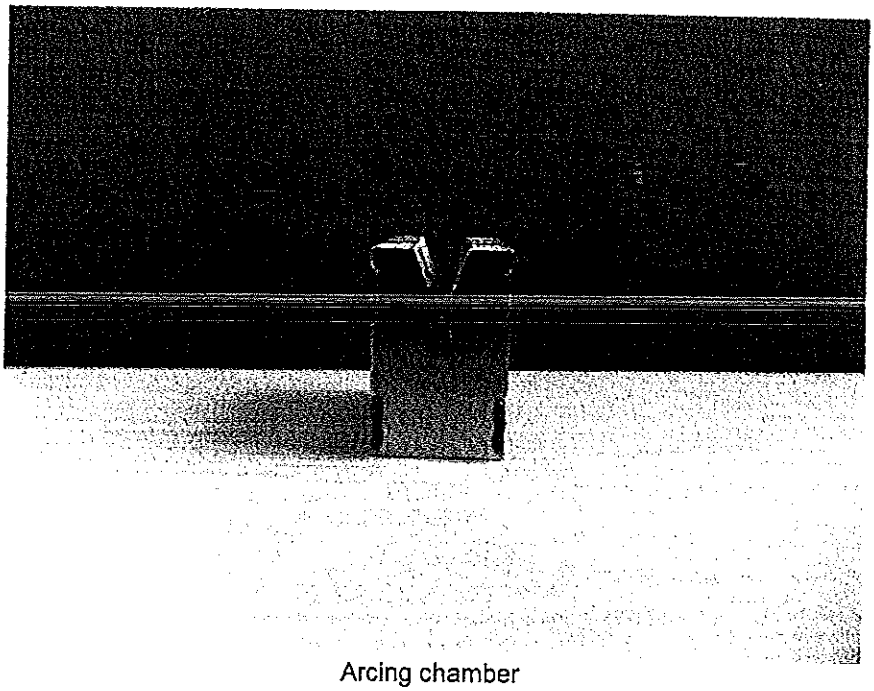
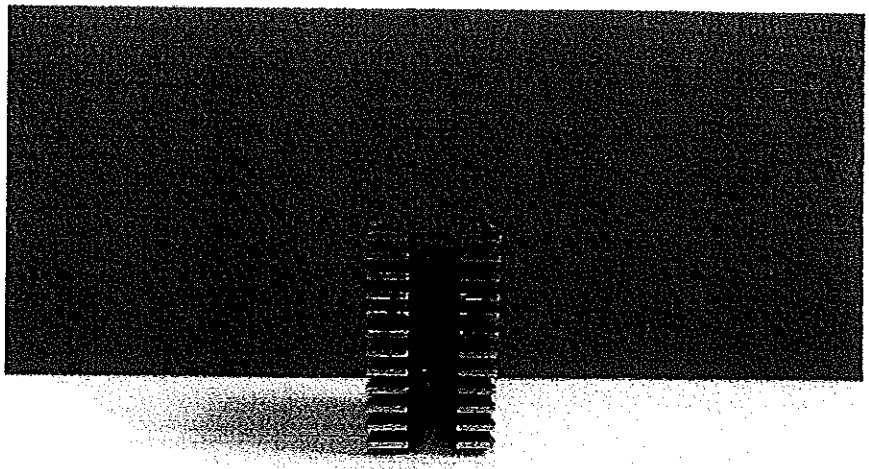


Arcing chamber

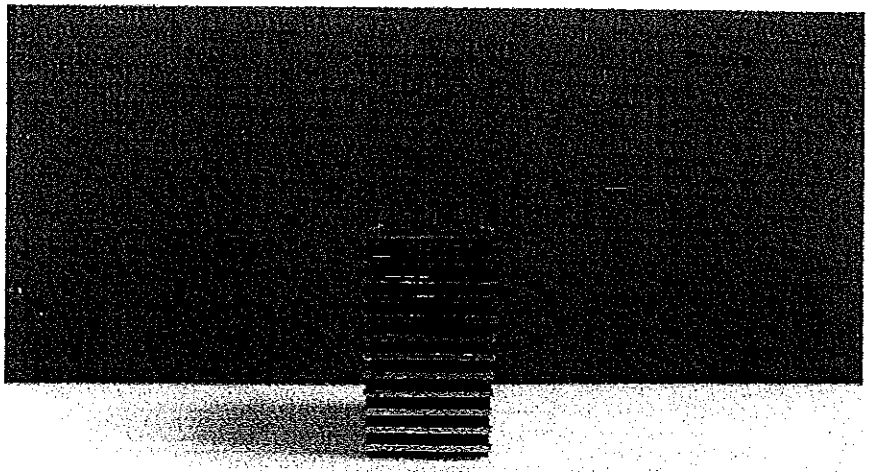


Arcing chamber

ВЯРНО С ОРИГИНАЛА



Arcing chamber



Arcing chamber

ВЯРНО С ОРИГИНАЛА

ACM OOD

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9009 Варна, ул. „Уста Колю Фичето" №25Б, ет.2, тел.:052/511559, факс:052/505051, E-mail: office-vn@acm-bg.com

Декларация за съответствие

Наименование на издаващата организация:
„АСМ" ООД
Адрес на издаващата организация:
гр. София, п.к. 1000,
ул. "Стефан Караджа", №7, вх.Б, ет.1, офис.14,
Телефон: 02/9874960, 9874970, факс: 02/9874980,
E-mail: office@acm-bg.com, Web: www.acm-bg.com
Производител: Delixi Electric Ltd.

Предмет на декларацията:
Автоматичен Прекъсвач МИНИ, НН, тип HDB2

Предметът на декларацията, описан по-горе, е в съответствие с изискванията на следните приложими български и международни стандарти и нормативно-технически документи и на техните валидни изменения и поправки или еквиваленти:

Документ №	Заглавие	Издание/ Дата на издаване
БДС EN 60898-1:2006	„Електрически принадлежности. Автоматични прекъсвачи за защита срещу свръхтокове на битови и други подобни уредби. Част 1: Автоматични прекъсвачи за работа с променливо напрежение (IEC 60898-1:2002, с промени)"	10.08.2006
БДС EN 60898-1:2003/A1:2006	„Електрически принадлежности. Автоматични прекъсвачи за защита срещу свръхтокове на битови и други подобни уредби. Част 1: Автоматични прекъсвачи за работа с променливо напрежение (IEC 60898-1:2003/A1:2003)"	10.08.2006
БДС EN 60898-1:2003/A11:2006	„Електрически принадлежности. Автоматични прекъсвачи за защита срещу свръхтокове на битови и други подобни уредби. Част 1: Автоматични прекъсвачи за работа с променливо напрежение"	10.08.2006
БДС EN 60947-2:2006	„Комутационни апарати за ниско напрежение. Част 2: Автоматични прекъсвачи (IEC 60947-2:2006)"	27.12.2006
БДС EN 60947-2:2006/A1:2009	„Комутационни апарати за ниско напрежение. Част 2: Автоматични прекъсвачи"	30.09.2009

и са съобразени със съществените изисквания за безопасно използване на електрически съоръжения и не застрашават живота и здравето на хората, домашните животни или вещите.

Специфични изисквания: Да се спази инструкцията за монтаж, придружаваща изделието.
Допълнителна информация:
В случай на несъгласувано изменение на продуктите, тази декларация губи валидност.

гр. София
17.07. 2015 г.

Ангел Ангелов
Управител

Test Report issued under the responsibility of:

TEST REPORT
IEC 60947-2
Low-voltage switchgear and controlgear - Part 2: Circuit-breakers

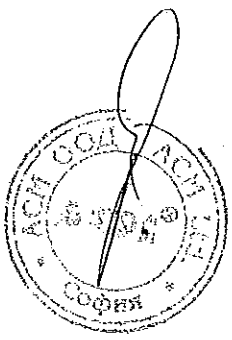
Report Reference No. ..... :	SH11090550-001
Date of issue ..... :	February 07, 2012
Total number of pages	131
Testing Laboratory ..... :	Intertek Testing Services Shanghai
Address ..... :	Building No.86, 1198 Qinzhou Road (North), Shanghai 200233, China
Applicant's name ..... :	HIMEL TECHNOLOGY, S.L.
Address ..... :	Calle Bac de Roda, No. 52, edificio A 08019 BARCELONA Spain
Test specification:	
Standard ..... :	☒ IEC 60947-2:2006 (4th Edition) + A1: 2009
	☒ EN 60947-2:2006 + A1: 2009
Test procedure ..... :	CB & S
Non-standard test method ..... :	N/A
Test Report Form No. ..... :	IEC60947_2F
Test Report Form(s) Originator ..... :	KEMA Quality BV
Master TRF ..... :	Dated 2010-01

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.

Test item description ..... :	Moulded case circuit-breakers
Trade Mark ..... :	Himel
Manufacturer ..... :	DELIXI ELECTRIC LTD / Delixi High Tech Industrial Park, Liushi Town, Yueqing City, Zhejiang Province, China 325604
Model/Type reference ..... :	HDB2
Ratings ..... :	U_e= 240V~(1P)
	In = 63, 80, 100, 125A

ВЕРНО С ОРИГИНАЛА

Testing procedure and testing location:	
☒ **Testing Laboratory:**	Intertek Testing Services Shanghai
Testing location/ address.....:	Building No.86, 1198 Qinzhou Road (North), Shanghai 200233, China
☒ **Associated Laboratory:**	Inspection Center of Products' Quality of Low Voltage Electric Apparatus in Zhejiang Province
Testing location/ address.....:	West Zhonghuan Road, Jiaxing City, Zhejiang Province, P.R.China
Tested by (name + signature).....:	Vincent Yang Vincent Yang
Approved by (+ signature) .....:	Jim Hua Jim Hua
☐ Testing procedure: TMP	
Tested by (name + signature).....:	
Approved by (+ signature) .....:	
Testing location/ address.....:	
☐ Testing procedure: WMT	
Tested by (name + signature).....:	
Witnessed by (+ signature).....:	
Approved by (+ signature) .....:	
Testing location/ address.....:	
☐ Testing procedure: SMT	
Tested by (name + signature).....:	
Approved by (+ signature) .....:	
Supervised by (+ signature).....:	
Testing location/ address.....:	
☐ Testing procedure: RMT	
Tested by (name + signature).....:	
Approved by (+ signature) .....:	
Supervised by (+ signature).....:	
Testing location/ address.....:	



ВЯРНО С ОРИГИНАЛА

Summary of testing:

Number of tests for test procedure, according to table 9a and table 10

No. of poles	In(A)	Test sequence and number of samples									
		I	II	III	IV	V	Combined	Annex B	Annex C	Annex H	Annex M
1P	125	1+1[a]	1	1	-	-	-	-	-	-	-
1P	63	-	1	1	-	-	-	-	-	-	-
2P	125	1+1[a]	1	1	-	-	-	-	-	-	-
2P	63	-	1	1	-	-	-	-	-	-	-
3P	125	1[b]	-	1[b]	-	-	-	-	-	-	-
3P	63	-	-	1[b]	-	-	-	-	-	-	-
4P	125	1+1[a]	1	1+1[c]	-	-	-	-	-	-	-
4P	63	-	1	1+1[c]	-	-	-	-	-	-	-

Note:

a) This sample only tested to clause 8.3.3.1 to verify instantaneous of $8,5I_n$.
b) Test Sequence in Amend.1 of IEC 60947-2.
c) Tested on the fourth pole and its adjacent pole.

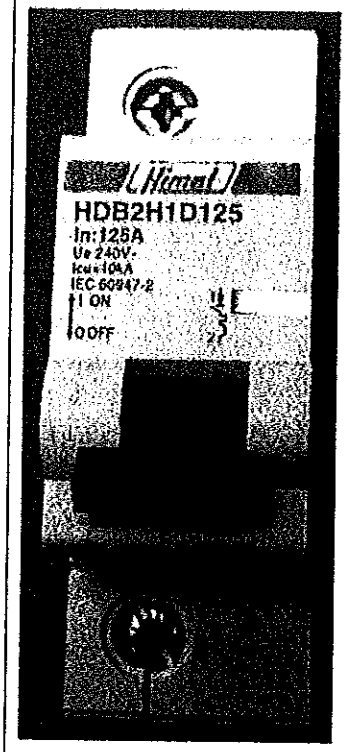
Tests performed (name of test and test clause):		**Testing location:**
8.3.3.1	Tripping limits and characteristics	ACTL
8.3.3.2	Dielectric properties	ACTL
8.3.3.3	Operational performance capability	ACTL
8.3.3.4	Overload performance	ACTL
8.3.3.5	Verification of dielectric withstand	ACTL
8.3.3.6	Verification of temperature rise	ACTL
8.3.3.7	Verification of overload releases	ACTL
8.3.3.8	Verification of undervoltage and shunt releases (if applicable)	CBTL
8.3.3.9	Verification of main contact position (for circuit breakers suitable for isolation)	CBTL
8.3.4.1	Service short-circuit breaking capacity	ACTL
8.3.4.2	Verification of operational capability	ACTL
8.3.4.3	Verification of dielectric withstand	ACTL
8.3.4.4	Verification of temperature rise	ACTL
8.3.4.5	Verification of overload releases	ACTL
8.3.5.1	Verification of overload releases	ACTL
8.3.5.2	Ultimate short-circuit breaking capacity	ACTL
8.3.5.3	Verification of dielectric withstand	ACTL
8.3.5.4	Verification of overload releases	ACTL

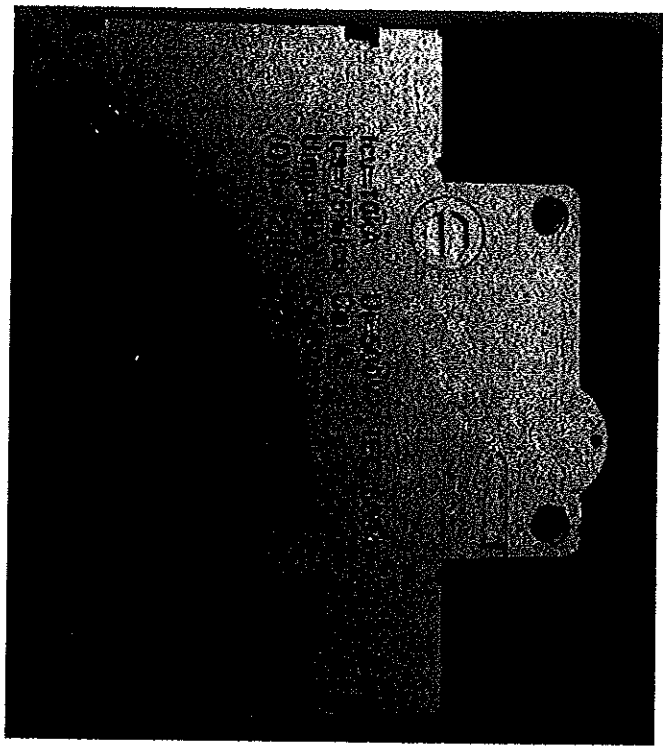
ВЯРНО С ОРИГИНАЛА

Summary of compliance with National Differences:

N/A

Copy of marking plate:





ВЯРНО С ОРИГИНАЛА

Test item particulars: test item vs. test requirements	
3. Classification	
3.1. Utilization category: (A or B). ....:	A
3.2. Interruption medium: (air, vacuum, gas Break)....:	air
3.3. Design: (open construction, moulded case)..... .....:	Moulded case
3.4. Method of controlling the operation mechanism: (dependent manual, independent manual, dependent power, independent power) ....:	Independent manual
3.5. Suitability for isolation: (suitable, not -suitable)..... .....:	Suitable
3.6. Provision for maintenance: (maintainable, non maintainable)....:	Non-maintainable
3.7. Method of installation: (fixed, plug in, withdrawable:	Fixed
3.8. Degree of protection: (IP code) ....:	IP20
4.7. Type of release (thermo-magnetic / electronic) ....:	Thermo-magnetic
4.8. Integral fuses (integrally fused circuit-breakers) Type and characteristics of SCPD....:	N/A
7.3 Electromagnetic compatibility (EMC) Environment A or B....:	N/A
Circuit-breaker for use on phase-earthed systems....:	N/A
Circuit-breaker for use in IT systems....:	Yes
Rated and limiting values, main circuit ....:	
- rated operational voltage: Ue (V)....:	240V~
- rated insulation voltage: Ui (V)....:	500
- rated impulse withstand voltage: Uimp (kV)....:	6kV
- rated operational current: Ie (A)....:	63, 80, 100, 125
- kind of current....:	AC
- conventional free air thermal current: Ith (A)....:	63, 80, 100, 125
- conventional enclosed thermal current: Ithe (A) ....:	N/A
- current rating for four-pole circuit-breakers: (A)....:	N/A
- number of poles....:	1
- rated frequency: (Hz)....:	50/60
- integral fuses (rated values) ....:	N/A
Rated duty :	
- eight-hour duty....:	N/A
- uninterrupted duty: Iu (A)....:	63, 80, 100, 125
Short-circuit characteristic :	
rated short-time making capacity: Icm (kA)....:	N/A

ВЯРНО С ОРИГИНАЛА

rated ultimate short-circuit breaking capacity: Icu (kA) . .....:	10
rated service short-circuit breaking capacity: Ics (kA).....:	7,5
rated short-time withstand current: Icw (kA/s).....:	17
Control circuits :	
Electrical control circuits :	
- kind of current: (AC, DC) .....:	N/A
- rated frequency: (Hz) .....:	N/A
- rated control circuit voltage: Uc (nature, frequency, V) ....:	N/A
- rated control supply voltage: Us (nature, frequency V) ....:	N/A
Air supply control circuits: (pneumatic or electro-pneumatic) :	
- rated pressure and its limit .....:	N/A
- volumes of air, at atmospheric pressure, required for each closing and each opening operation.....:	N/A
Auxiliary circuits :	
Rated and limiting values, auxiliary circuits .....:	N/A
- rated operational voltage Ue (V).....:	N/A
- rated insulation voltage: Ui (V).....:	N/A
- rated operational current: Ie (A).....:	N/A
- kind of current.....:	N/A
- rated frequency: (Hz) .....:	N/A
- number of circuits .....:	N/A
- number and kind of contact elements .....:	N/A
- rated uninterrupted current: Iu (A) .....:	N/A
- utilization category: (AC, DC, current and voltage) .....:	N/A
Short-circuit characteristic :	
- Rated conditional short-circuit current (kA).....:	N/A
- kind of protective device .....:	N/A

ВЯРНО С ОРИГИНАЛА

Releases :	
1) shunt release	N/A
2) Over-current release	
a) instantaneous	Yes
b) definite time delay	N/A
c) inverse time delay	Yes
- independent of previous load	N/A
- dependent on previous load; (for example thermal type release)	Yes
3) Undervoltage release (for opening)	N/A
4) Other releases	N/A
Characteristics :	
1) Shunt release and undervoltage release (for opening)	
- rated control circuit voltage: Uc (nature, frequency, V)	N/A
- kind of current	N/A
- rated frequency: (if AC)	N/A
2) Over-current release	
- rated current	63, 80, 100, 125A
- kind of current	AC
- rated frequency: (if AC)	50/60Hz
- current setting (or range of settings)	Inverse time delay: I_n Instantaneous: $8,5I_n$, $12I_n$
- time settings (or range of settings)	Inverse time delay: $1,05I_n$: ≥1h, $1,30I_n$: <1h (for I_n≤63A) Inverse time delay: $1,05I_n$: ≥2h, $1,30I_n$: <2h (for I_n>63A) Instantaneous: $0,8x8,5I_n$: ≥0,2s, $1,2x8,5I_n$: <0,2s Instantaneous: $0,8x12I_n$: ≥0,2s, $1,2x12I_n$: <0,2s

ВЯРНО С ОРИГИНАЛА

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Classification of installation and use..... :	Installed by rail
Supply Connection..... :	N/A
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..... :	December 16, 2011
Date (s) of performance of tests..... :	From December 20, 2011 to January 18, 2012

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.

This test report is valid only being read together with the test reports of SH11090550-002, -003, -004.

General product information:

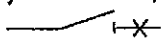
U_e= 240V~(1P), 415V~(2P, 3P, 4P)

In= 63, 80, 100, 125A,

I_{cu}= 10kA, I_{cs}=7,5kA

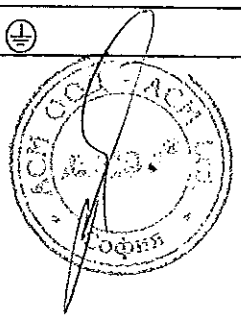
Utilization category: A

ВЯРНО С ОРИГИНАЛА

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
5.2	MARKING		
a)	The following data shall be marked on the circuit-breaker itself or on a name plate or nameplates attached to the circuit-breaker, and located in a place such that they are visible and legible when the circuit-breaker is installed.		
	- rated current:	63, 80, 100, 125A	P
	- suitability for isolation, if applicable, with the symbol 		P
	- indication of the open and closed position: with O and I respectively, if symbols are used	I-ON and O-OFF	P
b)	Marking on equipment not needed to be visible after mounting:		
	- manufacturer's name or trademark		P
	- type designation or serial number	HDB2	P
	- IEC 60947-2 if the manufacturer claims compliance with this standard.	IEC/EN60947-2	P
	- utilization category	A	P
	- rated operational voltage(s) Ue	240V~	P
	- Circuit-breaker for use in IT systems: Circuit-breaker for which all values of rated voltage have not been tested according to annex H or are not covered by such testing, shall be identified by the symbol  which shall be marked on the circuit-breaker immediately following these values of rated voltage		P
	- value (or range) of the rated frequency and/or the indication DC (or symbol)	50/60Hz	P
	- rated service short-circuit breaking capacity. Ics	7,5kA	P
	- rated ultimate short-circuit breaking capacity. Icu	10kA	P
	- rated short-time withstand current, (Icw) and associated short-time delay, for utilization category B		N/A
	- line and load terminals, unless their connection is immaterial	"1,2"	P
	- neutral pole terminals, if applicable, by the letter N		N/A
	- protective earth terminal, where applicable, by the symbol acc. 7.1.9.3 of part 1		N/A
	- ref. temperature for non-compensated thermal releases, if different from 30°C		N/A

ВЯРНО С ОРИГИНАЛА

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
c)	Marked on the circuit-breaker as specified in item b), or shall be made available in the manufacturer's published information:		
	- rated short-circuit making capacity (Icm) (if higher than specified in 4.3.5.1)		N/A
	- rated insulation voltage. (Ui) if higher than the maximum rated operational voltage)	500V	P
	- rated impulse withstand voltage (Uimp), when declared.	6kV	P
	- pollution degree if other than 3		N/A
	- conventional enclosed thermal current (Ithe) if different from the rated current:		N/A
	- IP Code, where applicable:		N/A
	- minimum enclosure size and ventilation data (if any) to which marked ratings apply:		N/A
	- details of minimum distance between circuit-breaker and earthed metal parts for circuit-breaker intended for use without enclosure:		N/A
	- r.m.s sensing if applicable, according to F.4.1.1		N/A
	- suitability for environment A or B		N/A
d)	The following data concerning the opening and closing devices of the circuit-breaker shall be placed either on their own nameplates or on the nameplate of the circuit-breaker:		
	- rated control circuit voltage of the closing device, and rated frequency for AC:		N/A
	- rated control circuit voltage of the shunt release and/or of the under-voltage release, and rated frequency:		N/A
	- rated current of indirect over-current releases:		N/A
	- number and type of auxiliary contacts and kind of current, rated frequency (if AC) and rated voltages of the auxiliary switches, if different from those of the main circuit.		N/A
e)	Terminal shall be clearly and permanently identified in acc. with IEC 60445 and annex L :		
	- line terminal	"1"	P
	- load terminal	"2"	P
	- neutral pole terminal "N"		N/A
	- protective earth terminal ⏚		N/A



ВЯРНО С ОРИГИНАЛА

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	- terminal of coils (A/B)		N/A
	- terminal of shunt release (B)		N/A
	- terminals of under-voltage release (D)		N/A
	- terminals of interlocking electromagnets (E)		N/A
	- terminals of indicated light devices (X)		N/A
	- terminals of contact elements for switching devices (no)		N/A
7.1	CONSTRUCTION		
7.1.1	Withdrawable circuit-breaker		N/A
	In the disconnected position (main- and auxiliary circuits)		
	Isolating distances for circuit-breaker suitable for isolating warranted:		N/A
	Mechanism fitted with a reliable indicating device with indicates the position of the isolating contacts.		N/A
	Mechanism fitted with interlocks which only permit the isolating contacts to be separate or re-closed when main contacts are open		N/A
	Mechanism fitted with interlock, which only permit the main contacts to be closed when the isolating contacts are fully closed.		N/A
	Mechanism fitted with interlock, which only permit the main contacts to be closed when in disconnected position.		N/A
	The isolating distances between the isolating contacts cannot be inadvertently reduced.		N/A
7.1.2.1 part 1	Resistance to abnormal heat and fire		P
7.1.3 part 1	Current-carrying parts and their connection		P
7.1.4	Clearances and creepage distances:		
	For circuit-breakers for which the manufacturer has declared a value of rated impulse withstand voltage. (Uimp.)		
	Clearances distances:		
	- Uimp is given as:	6kV	
	- max. value of rated operational voltage to earth	-	
	- nominal voltage of supply system:	240V	

ВЯРНО С ОРИГИНАЛА

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	- overvoltage category:	IV	
	- pollution degree:	3	
	- field-in or homogeneous:	Field-in	
	- minimum clearances (mm):	3,0	
	- measured clearances (mm):	3,4	P
	Creepage distances:		
	- rated insulation voltage UI (V)	500	
	- pollution degree	3	
	- comparative tracking index (V)	175	
	- material group	IIIa	
	- minimum creepage distances (mm)	8	
	- measured creepage distances (mm)	12	P
7.1.5 part 1	Actuator		
7.1.5.1 part 1	Insulation		
	The actuator of the equipment shall be insulated from the live parts for the rated insulation voltage and, if applicable, the rated impulse withstand voltage		P
	If it is made of metal, it shall be capable of being satisfactorily connected to a protective conductor unless it is provided with additional reliable insulation		N/A
	If it is made of or covered by insulating material, any internal metal part, which might become accessible in the event of insulation failure, shall also be insulated from live parts for the rated insulation voltage		N/A
7.1.5.2	Direction of movement		
	The direction of operation for actuators of devices shall normally conform to IEC 60447.		P
	Where devices cannot conform to these requirements, e.g. due to special applications or alternative mounting positions, they shall be clearly marked such that there is no doubt as to the "I" and "O" positions and the direction of operation		N/A

ВЯРНО С ОРИГИНАЛА

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
7.1.6 part 1	Indication of contact position		
7.1.6.1 part 1	Indicating means		
	When an equipment is provided with means for indicating the closed and open positions, these positions shall be unambiguous and clearly indicated		P
	This is done by means of a position indicating device (see 2.3.18)		P
	If symbols are used, they shall indicate the closed and open position respectively, in accordance with IEC 60417-2:		
	- 60417-2-IEC-5007 I On (power)	On	P
	- 60417-2-IEC-5007 O Off (power)	Off	P
	For equipment operated by means of two push-buttons, only the push-button designated for the opening operation shall be red or marked with the symbol "O"		N/A
	Red colour shall not be used for any other push-button		N/A
	The colours of other push-buttons, illuminated push-buttons and indicator lights shall be in accordance with IEC 60073		N/A
7.1.6.2 part 1	Indication by the actuator		
	When the actuator is used to indicate the position of the contacts, it shall automatically take up or stay, when released, in the position corresponding to that of the moving contacts; in this case, the actuator shall have two distinct rest positions corresponding to those of the moving contacts, but for automatic opening a third distinct position of the actuator may be provided		P
7.1.7	Additional safety requirements for equipment suitable for isolation		
7.1.7.1	Additional constructional requirements for equipment suitable for isolation (Ue > 50 V):		
	Equipment suitable for isolation shall provide in the open position an isolation distance in acc. with the requirements necessary to satisfy the isolating function. Indication of the main contacts shall be provide by one or more of the following means:		
	- the position of the actuator		P
	- a separate mechanical indicator		P
	- visibility of the moving contacts		N/A
	When means are provided or to lock the equipment in the open position, locking only be possible when contacts are in the open position		N/A

ВЯРНО С ОРИГИНАЛА

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Actuator front-plate fitted to the equipment in a manner which ensures correct contact position indication and locking		N/A
	The indicated open position is the only position in which the specified isolation distances between the contacts is ensured.		P
	- minimum clearances across open contacts (see Table XIII, Part 1) (mm) :	3.0	
	- measured clearances (mm) :	3.4	P
	- test Uimp across gap (kV) :	6,2	P
7.1.7.2	Supplementary requirements for equipment with provision for electrical interlocking with contactors or circuit-breakers:		
	auxiliary switch shall be rated according to IEC 60 947-5-1		N/A
	If equipment suitable for isolation is provided with an auxiliary switch for the purpose of electrical interlocking with contactor (s) or circuit-breaker(s) and intended to be used in motor circuits, the following requirements shall apply unless the equipment is rated for AC-23 utilization category		N/A
	The time interval between the opening of the contacts of the auxiliary switch and the contacts of the main poles shall be sufficient to ensure that the associated contactor or circuit-breaker interrupts the current before the main poles of the equipment open		N/A
	Unless otherwise stated in the manufacturer's technical literature, the time interval shall be not less than 20 ms when the equipment is operated according to the manufacturer instructions		N/A
	Compliance shall be verified by measuring the time interval between the instant of opening of the auxiliary switch and the instant of opening of the main poles under no-load conditions when the equipment is operated according to the manufacturer's instructions		N/A
	During the closing operation the contacts of the auxiliary switch shall close after or simultaneously with the contacts of the main poles		N/A
	A suitable opening time interval may also be provided by an intermediate position (between the ON and OFF position) at which the interlocking contact(s) is (are) open and the main poles remain closed		N/A

ВЯРНО С ОРИГИНАЛА

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
7.1.7.3	Supplementary requirements for equipment provided with means for padlocking the open position:		
	the locking means shall be designed in such a way that it cannot be removed with the appropriate padlock(s) installed		N/A
	Alternatively, the design may provide padlockable means to prevent access to the actuator		N/A
	test force F applied to the actuator in an attempt to operate to the closed position (N) :		N/A
	rated impulse withstand voltage (kV) :		N/A
	test Uimp on open main contacts at the test force		N/A
7.1.8	Terminals		
7.1.8.1	All parts of terminals which maintain contact and carry current shall be of metal having adequate mechanical strength		P
	Terminal connections shall be such that necessary contact pressure is maintained		P
	Terminals shall be so constructed that the conductor is clamped between suitable surfaces without damage to the conductor and terminal		P
	Terminal shall not allow the conductor to be displaced or to be displaced themselves in a manner detrimental to the operator of equipment and the insulation voltage shall not be reduced below the rated value		P
7.1.8.2	Connection capacity		
	type of conductors :	Rigid-solid or stranded or flexible cable	P
	minimum cross-sectional area of conductor (mm^2) :	16	P
	maximum cross-sectional area of conductor (mm^2) :	50	P
	number of conductors simultaneously connectable to the terminal :	1 for $16mm^2$ 1 for $50mm^2$	P
7.1.8.3	Connection		
	terminals for connection to external conductors shall be readily accessible during installation		P
	clamping screws and nuts shall not serve to fix any other component		P
7.1.8.4	Terminal identification and marking		
	terminal intended exclusively for the neutral conductor		N/A

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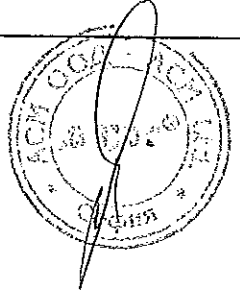
IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	protective earth terminal		N/A
	other terminals	"1", "2"	P
7.1.9 part 1	Additional requirements for equipment provided with a neutral pole		
	When equipment is provided with a pole intended only for connecting the neutral, this pole shall be clearly identified to that effect by the letter N (see 7.1.7.4.).		N/A
	A switched neutral pole shall break not before and shall make not after the other poles		N/A
	For equipment having a value of conventional thermal current (free air or enclosed, see 4.3.2.1 and 4.3.2.2) not exceeding 63 A, this value shall be identical for all poles		N/A
	For higher conventional thermal current values, the neutral pole may have a value of conventional thermal current different from that of the other poles, but not less than half that value or 63 A, whichever is the higher		N/A
	if a pole with an appropriate making and breaking capacity is used as a neutral pole, then all poles, incl. the neutral pole, shall operate substantially together.		N/A
7.1.10	Provisions for protective earthing		
7.1.10.1	The exposed conductive parts (e.g. chassis, framework and fixed parts of metal enclosures) other than those which cannot constitute a danger shall be electrically interconnected and connected to a protective earth terminal for connection to an earth electrode or to an external protective conductor		N/A
part 1	This requirement can be met by the normal structural parts providing adequate electrical continuity and applies whether the equipment is used on its own or incorporated in an assembly		N/A
	Exposed conductive parts are considered not to constitute a danger if they cannot be touched on large areas or grasped with the hand or if they are of small size (approximately 50 mm x 50 mm) or are so located as to exclude any contact with live parts		N/A
7.1.10.2 part 1	Protective earth terminal		
	The protective earth terminal shall be readily accessible and so placed that the connection of the equipment to the earth electrode or to the protective conductor is maintained when the cover or any other removable part is removed		N/A



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Clause	Requirement + Test	Result - Remark	Verdict
	The protective earth terminal shall be suitably protected against corrosion		N/A
	In the case of equipment with conductive structures, enclosures, etc., means shall be provided, if necessary, to ensure electrical continuity between the exposed conductive parts the equipment and the metal sheathing of connecting conductors		N/A
	The protective earth terminal shall have no other function, except when it is intended to be connected to a PEN conductor (see 2.1.1.5 – Note). In this case, it shall also have the function of a neutral terminal in addition to meeting the requirements applicable to the protective earth terminal		N/A
7.1.10.3	Protective earth terminal marking and identification		
	The protective earth terminal shall be clearly and permanently identified by its marking		N/A
	The identification shall be achieved by colour (green-yellow mark) or by the notation PE, or PEN, as applicable, in accordance with IEC 60445, subclause 5.3, or, in the case of PEN, by a graphical symbol for use on equipment		N/A
	Graphical symbol to be used: 60417-2-IEC-5019 ⏚ Protective earth (ground) in accordance with IEC 60417-2		N/A
7.1.11	Enclosure for equipment		
7.1.11.1	Design		
	The enclosure, when it is opened: all parts requiring access for installation and maintenance are readily accessible		N/A
	Sufficient space shall be provided inside the enclosure		N/A
	The fixed parts of a metal enclosure shall be electrically connected to the other exposed conductive parts of the equipment and connected to a terminal which enables them to be earthed or connected to a protective conductor		N/A
	Under no circumstances shall a removable metal part of the enclosure be insulated from the part carrying the earth terminal when the removable part is in place		N/A
	The removable parts of the enclosure shall be firmly secured to the fixed parts by a device such that they cannot be accidentally loosened or detached owing to the effects of operation of the equipment or vibrations		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	When an enclosure is so designed as to allow the covers to be opened without the use of tools, means shall be provided to prevent loss of the fastening devices		N/A
	If the enclosure is used for mounting push-buttons, it shall not be possible to remove the buttons from the outside of the enclosure		N/A
7.1.11.2	Insulation		
	If, in order to prevent accidental contact between a metallic enclosure and live parts, the enclosure is partly or completely lined with insulating material, then this lining shall be securely fixed to the enclosure		N/A
7.1.12	Degree of protection of enclosed equipment		
	Degree of protection.	IP20	
	Test for first characteristic.	IP2X	
	Test for first numeral .....:	1 **2** 3 4 5 6	P
	Test for second characteristic	IPX0	
	Test for second numeral .....:	1 2 3 4 5 6 7 8	N/A
7.1.13 part 1	Conduit pull-out, torque and bending with metallic conduits		
	Polymeric enclosures of equipment, whether integral or not, provided with threaded conduit entries, intended for the connection of extra heavy duty, rigid threaded metal conduits complying with IEC 60981, shall withstand the stresses occurring during its installation such as pull-out, torque, bending		N/A

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IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
7.2	Performance requirements		
7.2.1	Operating condition		
7.2.1.1	Closing		
	For a circuit-breaker to be closed safely on to the making current corresponding to its rated short-circuit making capacity, it is essential that it should be operated with the same speed and the same firmness as during the type test for proving the short-circuit making capacity		P
7.2.1.1.1	Dependent manual closing		
	For a circuit-breaker having a dependent manual closing mechanism, it is not possible to assign a short-circuit making capacity rating irrespective of the conditions of mechanical operation		N/A
	Such a circuit-breaker should not be used in circuits having a prospective peak making current exceeding 10 kA		N/A
	However, this does not apply in the case of a circuit-breaker having a dependent manual closing mechanism and incorporating an integral fast-acting opening release which causes the circuit-breaker to break safely, irrespective of the speed and firmness with which it is closed on to prospective peak currents exceeding 10 kA; in this case, a rated short-circuit making capacity can be assigned		N/A
7.2.1.1.2	Independent manual closing		
	A circuit-breaker having an independent manual closing mechanism can be assigned a short-circuit making capacity rating irrespective of the conditions of mechanical operation		P
7.2.1.1.3	Dependent power closing		
	At 110% of the rated control supply voltage, the closing operation performed on no-load shall not cause any damage to the circuit-breaker.		N/A
	At 85% of the rated control supply voltage, the closing operation shall be performed when the current established by the circuit-breaker is equal to its rated making capacity within the limits allowed by the operation of its relays or releases and, if a maximum time is stated for the closing operation, in a time not exceeding this maximum time limit.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
7.2.1.1.4	Independent power closing		
	A circuit-breaker having an independent power closing operation can be assigned a rated short-circuit making capacity irrespective of the conditions of power closing		N/A
	Means for charging the operating mechanism, as well as the closing control components, shall be capable of operating in accordance with the manufacturer's specification		N/A
7.2.1.1.5	Stored energy closing		
	Capable ensuring closing of the circuit-breaker in any condition between no-load and its rated making capacity		N/A
	- when the stored energy is retained within the circuit-breaker, a device is provided which indicates when the storing mechanism is fully charged.		N/A
	- means for charging the operating mechanism and closing control components operates when auxiliary supply voltage is between 85% and 110% of the rated control supply voltage.		N/A
	- not possible for the moving contacts to move from the open position, unless the charge is sufficient for satisfactory completion of the closing operation.		N/A
	- by manually operated circuit-breaker is the direction of operation indicated. (not for circuit-breaker with an independent manual closing operation.)		N/A
	- For trip free circuit-breaker it shall not be possible to maintain the contacts in the touching or closed position when the release is in the position to trip the circuit-breaker.		N/A
7.2.1.2	Opening		
7.2.1.2.1	Circuit-breakers which open automatically shall be trip-free and, unless otherwise agreed between manufacturer and user, shall have their energy for the tripping operation stored prior to the completion of the closing operation		
7.2.1.2.2	Opening by undervoltage releases		
7.2.1.3. a part 1	Operating voltage		
	An under-voltage relay or release, when associated with a switching device, shall operate to open the equipment even on a slowly falling voltage within the range between 70% and 35% of its rated voltage		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	An under-voltage relay or release shall prevent the closing of the equipment when the supply voltage is below 35% of the rated voltage of the relay or release; it shall permit closing of the equipment at supply voltages equal to or above 85% of its rated value		N/A
	Unless otherwise stated in the relevant product standard, the upper limit of the supply voltage shall be 110% of its rated value		N/A
7.2.1.3. b part 1	Operating time		
	For a time-delay under-voltage relay or release, the time-lag shall be measured from the instant when the voltage reaches the operating value until the instant when the relay or release actuates the tripping device of the equipment		N/A
7.2.1.2.3	Opening by shunt releases		N/A
7.2.1.4 part 1	Limits of operation of shunt releases		
	A shunt release for opening shall cause tripping under all operating conditions of an equipment when the supply voltage of the shunt release measured during the tripping operation remains between 70% and 110% of the rated control supply voltage and, if a.c., at the rated frequency		N/A
7.2.1.5 part 1	Limits of operation of current operated relays and released		
	Limits of operation of current operated relays and releases shall be stated in the relevant product standard		N/A
7.2.1.2.4	Opening by over-current releases		
a)	Opening under short-circuit conditions		
	The short-circuit release shall cause tripping of the circuit-breaker with an accuracy of 20% of the tripping current value of the current setting for all values of the current setting of the short-circuit current release		P
	Where necessary for over-current co-ordination the manufacturer shall provide information (usually curves) showing		N/A
	- maximum cut-off (let-through) peak current as a function of prospective current (r.m.s. symmetrical)		N/A
	- I^2t characteristics for circuit-breakers of utilization category A and, if applicable, B for circuit-breakers with instantaneous override (see note to 8.3.5)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
b)	Opening under overload conditions		
1)	Instantaneous or definite time-delay operation		N/A
	The release shall cause tripping of the circuit-breaker with an accuracy of ± 10% of the tripping current value of the current setting for all values of current setting of the overload release		N/A
2)	Inverse time-delay operation		
	At the reference temperature and at 1,05 times the current setting with the conventional non-tripping current, the opening release being energized on all poles, tripping shall not occur in less than the conventional time from the cold state, i.e. with the circuit-breaker at the reference temperature		P
	Moreover, when at the end of the conventional time the value of current is immediately raised to 1,30 times the current setting, i.e. with the conventional tripping current, tripping shall then occur in less than the conventional time later		P
	If a release is declared by the manufacturer as substantially independent of ambient temperature, the current values of table 6 shall apply within the temperature band declared by the manufacturer, within a tolerance of 0,3%/K		N/A
	The width of the temperature band shall be at least 10 K on either side of the reference temperature		N/A
7.2.4.2	Operational performance capability		
7.2.4.2 part 1	The operational performance off-load for which the tests are made with the control circuits energized and the main circuit not energized, in order to demonstrate that the equipment meets the operating conditions specified at the upper and lower limits of supply voltage and/or pressure specified for the control circuit during closing and opening operations		N/A
	The operational performance on-load during which the equipment shall make and break the specified current corresponding, where relevant, to its utilization category for the number of operations stated in the relevant product standard		P

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Clause	Requirement + Test	Result - Remark	Verdict
8	TESTS		
8.2.4	Mechanical properties of terminals		
	Mechanical strength of terminals		
	maximum cross-sectional area of conductor (mm²) :	50	
	diameter of thread (mm) :	6,8	
	torque (Nm) :	3,5	
	5 times on 2 separate clamping units		P
	Testing for damage to and accidental loosening of conductor (flexion test)		
	conductor of the smallest cross-sectional area (mm²) :	16	
	number of conductors of the smallest cross section :	2	
	diameter of bushing hole (mm) :	13,0	
	height between the equipment and the platen :	300	
	mass at the conductor(s) (kg) :	2,9	
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		P
	Pull-out test		
	force (N) :	100	
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		P
	conductor of the largest cross-sectional area (mm²) :	50	
	number of conductors of the largest cross section :	1	
	diameter of bushing hole (mm) :	15,9	
	height between the equipment and the platen :	343	
	mass at the conductor(s) (kg) :	9,5	
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		P
	Pull-out test		
	force (N) :	236	
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		P
	conductor of the largest and smallest cross-sectional area (mm²) :	16 / 50	

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Clause	Requirement + Test	Result - Remark	Verdict
	number of conductors of the smallest cross section, number of conductors of the largest cross section :	1 / 1	
	diameter of bushing hole (mm) :	13,0 / 15,9	
	height between the equipment and the platen :	300 / 343	
	mass at the conductor(s) (kg) :	2,9 / 9,5	
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		P
	Pull-out test		
	force (N) :	100 / 236	
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		P

8.3.3	TEST SEQUENCE I: GENERAL PERFORMANCE CHARACTERISTICS - 2 samples: 1P, 125A, Instantaneous: $8,5I_n/12I_n$			
8.3.3.1	Tripping limits and characteristic			
8.3.3.1.2	Opening under short-circuit conditions			
	Manufacturer's name or trademark	DELIXI ELECTRIC		
	Type designation or serial number	HDB2		
	Sample no:	I-1	I-2	
	Rated operational voltage: Ue (V)	240		
	Rated current: In (A)	125		
	Ambient temperature 10-40 °C :	30°C		P
	Value of the tripping current declared by the manufacturer for a single pole, at which value they shall operate.	8,5In	12 In	P
	Range of adjustable setting current. (A)			N/A
	Time delay stated by the manufacturer, in the case of definite time delay releases.			N/A
	Electromagnetic overcurrent releases			
	Test current: 80% of the rated, ~~or **minimum** adjustable setting current~~: (A)	850	1200	P

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Clause	Requirement + Test	Result - Remark		Verdict
	Operating time: >0,2s in case of instantaneous releases: L1-L2: / L1-L3: / L2-L3: N-Lx:	>0,2s - - -	>0,2s - - -	P
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: / L1-L3: / L2-L3: / N-Lx:			N/A
	Test current: 120% of the rated, ~~or minimum adjustable setting current~~: (A)	1275	1800	P
	Operating time: <0,2s in case of instantaneous releases: L1-L2: / L1-L3: / L2-L3: / N-Lx:	41ms - - -	31ms - - -	P
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: / L1-L3: / L2-L3: / N-Lx:			N/A
	Test current: 80% of the **maximum** adjustable setting current: (A)			N/A
	Operating time: >0,2s in case of instantaneous releases: L1-L2: / L1-L3: / L2-L3: / N-Lx:			N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: / L1-L3: / L2-L3: / N-Lx:			N/A
	Test current: 120% of the **maximum** adjustable setting current: (A)			N/A
	Operating time: <0,2s in case of instantaneous releases: L1-L2: / L1-L3: / L2-L3: / N-Lx:			N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3: N-Lx:		N/A
	Test current: tripping current declared for single pole operation (A)		N/A
	Operating time: <0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3: N-Lx:		N/A
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3: N-Lx:		N/A
	Electronic overcurrent releases		
	For circuit-breakers with an electronic overcurrent release, the operation of the short-circuit releases shall be verified by one test only on each pole individually.		N/A
	Test current: 80% of the rated, or **minimum** adjustable setting current: (A)		N/A
	Operating time: >0,2s in case of instantaneous releases: L1: L2: L3: N:		N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases: L1: L2: L3: N:		N/A
	Test current: 120% of the rated, or **minimum** adjustable setting current: (A)		N/A
	Operating time: <0,2s in case of instantaneous releases: L1: L2: L3: N:		N/A

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IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases: L1: L2: L3: N:		N/A
	Test current: 80% of the **maximum** adjustable setting current: (A)		N/A
	Operating time: >0,2s in case of instantaneous releases: L1: L2: L3: N:		N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases: L1: L2: L3: N:		N/A
	Test current: 120% of the **maximum** adjustable setting current: (A)		N/A
	Operating time: <0,2s in case of instantaneous releases: L1: L2: L3: N:		N/A
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases: L1: L2: L3: N:		N/A
8.3.3.1.3	Opening under overload conditions		
a)	Instantaneous or definite time-delay releases		
	Manufacturer's name or trademark		
	Type designation or serial number		
	Sample no:		
	Rated operational voltage: Ue (V)		
	Rated current: In (A)		
	Ambient temperature 10-40 °C :		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Value of the tripping current declared by the manufacturer for a single pole, at which value they shall operate.		N/A
	Range of adjustable setting current. (A)		N/A
	Time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 90% of the rated, or minimum adjustable setting current: (A)		N/A
	Operating time: >0,2s in case of instantaneous releases:		N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 90% of the maximum adjustable setting current: (A)		N/A
	Operating time: >0,2s in case of instantaneous releases		N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 110% of the rated, or minimum adjustable setting current: (A) circuit-breaker with neutral pole: 1,2x110% (A)		N/A
	Operating time: <0,2s in case of instantaneous releases:		N/A
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 110% of the maximum adjustable setting current: (A) circuit-breaker with neutral pole: 1,2x110% (A)		N/A
	Operating time: <0,2s in case of instantaneous releases		N/A
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
b)	Inverse time delay releases		
	Manufacturer's name or trademark	[redacted]	
	Type designation or serial number	HDB2	
	Sample no:	I-1 I-2	

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IEC 60947-2				
Clause	Requirement + Test	Result - Remark		Verdict
	Rated operational voltage: Ue (V)	240		
	Rated current: In (A)	125		
	For releases dependent of ambient air temperature: Reference temperature	30°C		
	Test ambient temperature (°C)	29		
	For releases dependent on ambient air temperature, the operating characteristics shall be verified at the reference temperature, the release being energized on all phase poles. If the test made at a different ambient temperature, a correction shall be made in accordance with the manufacturer's correction temperature/current data			P
	For thermal-magnetic releases independent of ambient temperature: Tests shall be made at 30°C and 20°C or 40°C, the release being energized on all phase poles			N/A
	For electronic releases, the operating characteristic shall be verified at the ambient temperature of the test room (see 6.1.1 of IEC 60947-1), the release being energised on all phase poles.			N/A
	Test ambient air temperature:	30°C		P
	Range of adjustable setting current: (A)			N/A
	Releases, dependent of ambient air temperature: Reference temperature (°C)	30°C		P
	Thermal Magnetic releases, independent of ambient air temperature: at 30°C			N/A
	Test current: 105% of the rated, ~~or minimum adjustable setting current~~: (A)	132	132	P
	Conventional non-tripping time: 1h when In < 63A, 2h when In > 63 A	>2h	>2h	P
	Test current: 130% of the rated, ~~or minimum adjustable setting current:~~ (A)	163	163	P
	For circuit-breakers having an identified neutral pole provided with an overload release (see 8.3.3.1.1), the test current at the conventional tripping current shall be multiplied by the factor 1,2.			N/A
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A	10min57s	2min40s	P
	Test current: 105% of the **maximum** adjustable setting current: (A)			N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Conventional non-tripping time: 1h when In < 63A, 2h when In > 63 A		N/A
	Test current: 130% of the **maximum** adjustable setting current: (A)		N/A
	For circuit-breakers having an identified neutral pole provided with an overload release (see 8.3.3.1.1), the test current at the conventional tripping current shall be multiplied by the factor 1,2.		N/A
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A		N/A
	Thermal Magnetic releases, independent of ambient air temperature: at 20°C or 40°C		
	Test ambient air temperature:		N/A
	Test current: 105% of the rated, or **minimum** adjustable setting current: (A)		N/A
	Conventional non-tripping time: 1h when In < 63A, 2h when In > 63 A		N/A
	Test current: 130% of the rated, or **minimum** adjustable setting current: (A)		N/A
	For circuit-breakers having an identified neutral pole provided with an overload release (see 8.3.3.1.1), the test current at the conventional tripping current shall be multiplied by the factor 1,2.		N/A
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A		N/A
	Test current: 105% of the **maximum** adjustable setting current: (A)		N/A
	Conventional non-tripping time: 1h when In < 63A, 2h when In > 63 A		N/A
	Test current: 130% of the **maximum** adjustable setting current: (A)		N/A
	For circuit-breakers having an identified neutral pole provided with an overload release (see 8.3.3.1.1), the test current at the conventional tripping current shall be multiplied by the factor 1,2.		N/A
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A		N/A
	An additional test, at a current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer		
	Releases, dependent of ambient air temperature: Reference temperature (°C)		N/A
	Releases, independent of ambient air temperature: at 30°C		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Test ambient air temperature:		N/A
	Test current: at current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer. % at the rated, or minimum adjustable setting current: (% or A)		N/A
	Tripping time acc. time/current characteristic of the releases conform to the curves provided by the manufacturer. (within the stated tolerances)		N/A
	Releases, independent of ambient air temperature: at 20°C or 40°C		
	Test ambient air temperature:		N/A
	Test current: at current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer. % at the rated, or minimum adjustable setting current: (% or A)		N/A
	Tripping time acc. time/current characteristic of the releases conform to the curves provided by the manufacturer. (within the stated tolerances)		N/A
8.3.3.1.4	Additional test for definite time-delay releases		
a)	Time delay		
	Test is made at a current equal to 1,5 times the current setting. If the test current overlaps with another tripping characteristic (e.g. an instantaneous tripping characteristic), the trip setting and the test current shall be reduced as necessary to prevent premature tripping.		
	overload releases: (all phase poles loaded)		N/A
	for circuit-breakers having an identified neutral pole provided with an overload release, the test current for this release shall be 1,5 times the current setting;		N/A
	short-circuit releases		N/A
	Electromagnetic release: two poles in series carrying the test current, using successively all possible combinations of poles having a short-circuit release.		N/A
	Electronic releases: on one pole chosen at random.		N/A
	Test current: 1,5 times of the rated, or **minimum** adjustable setting current: (A)		N/A
	Operating time, overload releases: (s)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Time-delay: between the limits stated by the manufacturer:		N/A
	Operating time, short-circuit releases (electromagnetic): (s) L1-L2: L1-L3: L2-L3:		N/A
	Time-delay: between the limits stated by the manufacturer:		N/A
	Operating time, short-circuit releases (electronic): (s) L1: L2: L3:		N/A
	Time-delay: between the limits stated by the manufacturer:		N/A
	Test current: 1,5 times of the **maximum** adjustable setting current: (A)		N/A
	Operating time, overload releases: (s)		N/A
	Time-delay: between the limits stated by the manufacturer:		N/A
	Operating time, short-circuit releases (electromagnetic): (s) L1-L2: L1-L3: L2-L3:		N/A
	Time-delay: between the limits stated by the manufacturer:		N/A
	Operating time, short-circuit releases (electronic): (s) L1: L2: L3:		N/A
	Time-delay: between the limits stated by the manufacturer:		N/A
b)	Non-tripping duration		
	Firstly, the test current equal to 1,5 times the current setting is maintained for a time interval equal to the non-tripping duration stated by the manufacturer.		
	Then, the current is reduced to the rated current and maintained at this value for twice the time-delay stated by the manufacturer. The circuit-breaker shall not trip.		
	overload releases: (all phase poles loaded)		N/A
	for circuit-breakers having an identified neutral pole provided with an overload release, the test current for this release shall be 1,5 times the current setting;		N/A
	short-circuit releases		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Electromagnetic release: two poles in series carrying the test current, using successively all possible combinations of poles having a short-circuit release.		N/A
	Electronic releases: on one pole chosen at random.		N/A
	Test current: 1,5 times of the **minimum** adjustable setting current: (A)		N/A
	non-tripping duration stated by the manufacturer for overload release: (s)		N/A
	non-tripping duration stated by the manufacturer for short-circuit release thermal magnetic: (s)		N/A
	non-tripping duration stated by the manufacturer for short-circuit release electronic: (s)		N/A
	Time duration of current when reduced to the rated current: shall be twice the delay-time stated by the manufacturer: (s)		N/A
	Rated current		N/A
	Operating time, overload releases: the circuit-breaker does not trip:		N/A
	Operating time, short-circuit releases (electromagnetic), shall not trip: (s) L1-L2: L1-L3: L2-L3:		N/A
	Operating time, short-circuit releases (electronic), shall not trip: (s) L1: L2: L3:		N/A
	Test current: 1,5 times of **maximum** adjustable setting current: (A)		N/A
	non-tripping duration stated by the manufacturer for overload release: (s)		N/A
	non-tripping duration stated by the manufacturer for short-circuit release thermal magnetic: (s)		N/A
	non-tripping duration stated by the manufacturer for short-circuit release electronic: (s)		N/A
	Time duration of current when reduced to the rated current: shall be twice the delay-time stated by the manufacturer: (s)		N/A
	Rated current		N/A
	Operating time, overload releases: the circuit-breaker does not trip:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Operating time, short-circuit releases (electromagnetic), shall not trip: (s) L1-L2: L1-L3: L2-L3:		N/A
	Operating time, short-circuit releases (electronic), shall not trip: (s) L1: L2: L3:		N/A
8.3.3.2	Test of dielectric properties, impulse withstand voltage (Uimp indicated):		
8.3.3.4 part1	The 1,2/50µs impulse voltage shall be applied five times for each polarity at intervals of 1s minimum		
	- rated impulse withstand voltage (kV) :	6	P
	- sea level of the laboratory:	5m	P
	- test Uimp main circuits (kV) :	4,8	P
	- test Uimp auxiliary circuits (kV) :		N/A
	- test Uimp control circuits (kV) :		N/A
	- test Uimp on open main contacts (equipment suitable for isolating) (kV) :	6,2	P
a)	Application of test voltage		
	i) Between all terminals of the main circuit connected together (incl. control and auxiliary circuits connected to the main circuit) and the enclosure or mounting plate, with the contacts in all normal positions of operation.		P
	ii) Between each pole of the main circuit and the other poles connected together and to the enclosure or mounting plate, with the contacts in all normal positions of operation.		N/A
	iii) Between each control and auxiliary circuit not normally connected to the main circuit and: - the main circuit		N/A
	- other circuits		N/A
	- exposed conductive parts		N/A
	- enclosure of mounting plate		N/A
	iv) equipment suitable for isolation		P
	equipment not suitable for isolation		N/A
	- no unintentional disruptive discharge during the test's		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Test of dielectric properties, dielectric withstand voltage (Uimp not indicated):		
	- rated insulation voltage (V) :	500	P
	- main circuits, test voltage for 1 min (V)	1890	P
	- auxiliary circuits, test voltage for 1 min (V)		N/A
	- control circuits, test voltage for 1 min (V)		N/A
8.3.3.2.2	Application of test voltage		
1)	with circuit-breaker in the closed position		
	- between all live parts of all poles connected together and the frame of the circuit-breaker .		P
	- between each pole and all the other poles connected to the frame of the circuit-breaker		N/A
2)	with the circuit-breaker in the open position and, additionally, in the tripped position, if any.		
	- between all live parts of all poles connected together and the frame of the circuit-breaker.		P
	- between the terminals of one side connected together and the terminals of the other side connected together.		P
b)	Control and auxiliary circuits		
1)	- between all the control and auxiliary circuits which are not normally connected to the main circuit, connected together, and the frame of the circuit-breaker.		N/A
2)	- where appropriate, between each part of the control an auxiliary circuits which may be isolated from the other parts during normal operation and all the other parts connected together.		N/A
	No unintentional disruptive discharge during the tests		P
8.3.3.2	For circuit-breaker suitable for isolation, the leakage current shall be measured through each pole with the contacts in the open position, at a test voltage of 1,1 Ue, and shall not exceed 0,5mA.	264V $4{,}74 \times 10^{-3}$ mA	P
8.3.3.3	Mechanical operation and operational performance capability		
8.3.3.3.2	Construction and mechanical operation		
a)	Construction		
	A withdrawable circuit-breaker shall be checked for the requirements stated in 7.1.1		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	A circuit-breaker with stored energy operation shall be checked for compliance with 7.2.1.1.5, regarding the charge indicator and the direction of operation of manual energy storing		N/A
b)	Mechanical operation		
	A circuit-breaker with dependent power operation shall comply with the requirements stated in 7.2.1.1.3		N/A
	A circuit-breaker with dependent power operation shall operate with the operating mechanism charged to the minimum and maximum limits stated by the manufacturer		N/A
	A circuit-breaker with stored energy operation shall comply with the requirements stated in 7.2.1.5 with the auxiliary supply voltage at 85% and 110% of the rated control supply voltage.		N/A
	It shall also be verified that the moving contacts cannot be moved from the open position when the operating mechanism is charged to slightly below the full charge as evidenced by the indicating device		N/A
	For a trip-free circuit-breaker it shall not be possible to maintain the contacts in the touching or closed position when the tripping release is in the position to trip the circuit-breaker		N/A
	If the closing and opening times of a circuit-breaker are stated by the manufacturer, such times shall comply with the stated values		N/A
c)	Undervoltage releases		
	Undervoltage releases shall comply with the requirements of 7.2.1.3 of Part 1. For this purpose, the release shall be fitted to a circuit-breaker having the maximum current rating for which the release is suitable		N/A
i)	Drop out voltage		
	It shall be verified that the release operates to open the circuit-breaker between the voltage limits specified		N/A
	The voltage shall be reduced from rated voltage at a rate to reach 0 V in approximately 30 s		N/A
	The test for the lower limit is made without current in the main circuit and without previous heating of the release coil		N/A
	In the case of a release with a range of rated voltages, this test applies to the maximum voltage of the range		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	The test for the upper limit is made starting from a constant temperature corresponding to the application of rated control supply voltage to the release and rated current in the main poles of the circuit-breaker		N/A
	This test may be combined with the temperature-rise test of 8.3.3.6		N/A
	In the case of a release with a range of rated voltages, this test is made at both the minimum and maximum rated control supply voltages		N/A
ii)	Test for limits of operation		
	Starting with the circuit-breaker open, at the temperature of the test room, and with the supply voltage at 30% rated maximum control supply voltage, it shall be verified that the circuit-breaker cannot be closed by the operation of the actuator		N/A
	When the supply voltage is raised to 85% of the minimum control supply voltage, it shall be verified that the circuit-breaker can be closed by the operation of the actuator		N/A
iii)	Performance under overvoltage conditions		
	With the circuit-breaker closed and without current in the main circuit, it shall be verified that the undervoltage release will withstand the application of 110% rated control supply voltage for 4 h without impairing its functions		N/A
d)	Shunt releases		
	Shunt releases shall comply with the requirements of 7.2.1.4 of Part 1. For this purpose, the release shall be fitted to a circuit-breaker having the maximum rated current for which the release is suitable		N/A
	It shall be verified that the release will operate to open the circuit-breaker at 70% rated control supply voltage when tested at an ambient temperature of + 55 °C ± 2 °C without current in the main poles of the circuit-breaker		N/A
	In the case of a release having a range of rated control supply voltages, the test voltage shall be 70% of the minimum rated control supply voltage		N/A
8.3.3.3.3	Operational performance capability without current.		
	Type designation or serial number	HDB2	
	Sample no:	I-2	
	Rated current In (A)	125	

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Clause	Requirement + Test	Result - Remark	Verdict
	Rated operational voltage: Ue (V)	240	
	Rated control supply voltage of closing mechanism: Uc (V)	-	
	Rated control supply voltage of shunt releases: Uc (V)	-	
	Rated control supply voltage undervoltage releases: Uc (V)	-	
	Ambient temperature 10-40 °C :	28°C	P
	Number of operating cycles per hour	120	P
	Number of cycles without current (total) (closing mechanism energized at the rated Uc)		N/A
	Number of cycles without current (without releases)	7000	P
	Applied voltage: closing mechanism (V)		N/A
	10% of total cycles for circuit-breaker with fitted shunt release: (50% at the beginning- and 50% at the end of the test.) Energized at the rated Uc		N/A
	Applied voltage: shunt releases (V)		N/A
	10% of total cycles for circuit-breaker with undervoltage releases: (50% at the beginning- and 50% at the end of the test.) Energized at the minimum rated Uc		N/A
	10 cycles without applied voltage at the undervoltage releases. (Shall not possible to close the circuit-breaker.)		N/A
	Applied voltage: undervoltage releases (V)		N/A
	Electrical components do not exceed the value indicated in tab. 7.		N/A
8.3.3.3.4	Operational performance capability with current.		
	Rated current: In (A)	125	
	Maximum rated operational voltage: Ue (V)	240	
	Conductor cross-sectional area (mm²) :	50	P
	Number of operating cycles per hour	120	P
	Number of cycles with current (total) (closing mechanism energized at the rated Uc)	1000	P
	Applied voltage: closing mechanism (V)		N/A

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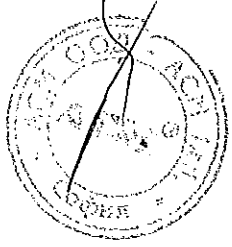
Clause	Requirement + Test	Result - Remark	Verdict
	For circuit-breaker fitted with adjustable releases, test shall be made with the overload setting at maximum and short-circuit setting at minimum.		N/A
	Conditions, make/break operations:		
	- test voltage U/Ue = 1,0 (V) .....L1: .....L2: L3:	245 - -	P
	- test current I/Ie = 1,0 (A) .....L1: .....L2: L3:	126 - -	P
	- power factor/~~time constant:~~	0,82	P
	- frequency: (Hz)	50	P
	- on-time (ms):	276	P
	- off-time (s):	30	P
	Electrical components do not exceed the value indicated in tab. 7.		P
8.3.3.3.5	Additional test of operational performance capability without current for withdrawable circuit-breaker.		
	Number of operations cycles : 100		N/A
	After test, the isolating contacts, withdrawable mechanism and interlocks shall be suitable for further service.		N/A
8.3.3.4	Overload performance		
	this test applies to circuit-breaker of rated current up to and including 630 A		
	Type designation or serial number	HDB2	
	Sample no:	I-2	
	Rated current In (A)	125	
	Rated operational voltage: Ue (V)	240	
	Rated control supply voltage of closing mechanism: Uc (V)	-	
	Rated control supply voltage of shunt releases: Uc (V)	-	
	Rated control supply voltage undervoltage releases: Uc (V)	-	
	Ambient temperature 10-40 °C :	28	P
	Number of operating cycles per hour	120	P
	Maximum rated operational voltage: Ue (V)	240	P



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Clause	Requirement + Test	Result - Remark	Verdict
	Number of cycles with current (total) (closing mechanism energized at the rated Uc)	12	P
	Applied voltage: closing mechanism (V)		N/A
	For circuit-breaker fitted with adjustable releases, test shall be made with the overload/short-circuit settings at maximum.		N/A
	Conditions, overload operations:		
	- test voltage U/Ue = 1,05 (V) .....L1: .....L2: L3:	254 - -	P
	- test current AC/~~DC~~: I/Ie = 6,0/~~2,5~~ (A) .....L1: .....L2: L3:	 752 - -	P
	- power factor/~~time constant~~:	0,48	P
	- Number of cycles manually opened: 9	9	P
	- Number of cycles automatically opened by an overload release: 3	3	P
	- frequency: (Hz)	50	P
	- on-time max 2s:	<2s	P
8.3.3.5	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V for 5 seconds	1000V	P
	- no breakdown or flashover		P
	For circuit-breaker suitable for isolation, the leakage current shall be measured through each pole with the contacts in the open position, at a test voltage of 1,1 Ue, and shall not exceed 2 mA.	264V $5{,}40 \times 10^{-3}$mA	P
8.3.3.6	Verification of temperature-rise		
	- the values of temperature-rise do not exceed those specified in tab. 7.		P
	Temperature rise of main circuit terminals ≤ 80 K (K) :	64	P
	conductor cross-sectional area (mm^2) :	50	P
	test current Ie (A) :	125	P
8.3.3.7	Verification of overload releases		
	Test current: 1.45 times the value of their current setting at the reference temperature: (A)	181	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A	1min46s	P
8.3.3.8	Verification of undervoltage and shunt releases		
	Circuit-breaker fitted with undervoltage releases. The release shall not operate at 70% of the minimum control supply voltage -		N/A
	and shall operate at 35% of the maximum control supply voltage.		N/A
	Circuit-breaker fitted with shunt releases. The release shall operate at 70% of the minimum rated control supply voltage. Test made at room temperature.		N/A
8.3.3.9	Verification of the main contact position for circuit-breakers for isolation		
	actuating force for opening (N) ..... :	5	—
	test force with blocked main contacts for 10 s (N) . :	50	—
	Dependent power operation		N/A
	Supply voltage of 110% of rated voltage (V).....:		N/A
	Three attempts of 5 s to operate the equipment at intervals of 5 min.		N/A
	Independent power operation		N/A
	Three attempts to operate the equipment by the stored energy.		N/A
	Lock ability of driving mechanism in OFF-position at test force and blocked main contacts ..... :		N/A
	Position indicator does not show OFF-position after capture of test force at blocked main contacts		P

8.3.4	TEST SEQUENCE II (Ics): - 1 sample: 1P, 125A		
8.3.4.1	Test of rated service short-circuit breaking capacity		
	Test sequence of operation: O – t – CO – t – CO		
	Type designation or serial number	HDB2	
	Sample no:	II-1	
	Rated current: In (A)	125	
	Rated operational voltage: Ue (V)	240	
	Rated service short-circuit breaking capacity: (kA)	7,5	

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Clause	Requirement + Test	Result - Remark	Verdict
	Rated control supply voltage of closing mechanism: Uc (V)		
	Rated control supply voltage of shunt release: Uc (V)		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		N/A
	closing mechanism energized with 85% at the rated Uc: (V)		N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.		P
	Test made in free air:		P
	Distances of the metallic screen's: (all sides)	Back: 0mm Front: 0mm Top: 45mm Botton: 45mm Left: 10mm Right: 10mm	P
	The characteristics of the metallic screen:		
	- woven wire mesh		N/A
	- perforated metal		P
	- expanded metal		N/A
	- ratio hole area/total area: 0,45-0,65	0,50	P
	- size of hole: <30mm^2	25	P
	- finish: bare or conductive plating	Bare	P
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		N/A
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long		P
	Circuit is earthed at: (load-star- or supply-star point)	supply-star	P
	Conductor cross-sectional area (mm²) :	50	P
	If terminals unmarked: line connected at: (underside/upside)		N/A
	Tightening torques: (Nm)	3,5	N/A
	Test sequence of operation: O – t – CO – t – CO		P
	- test voltage U/Ue = 1,05 (V).....L1: .....L2: L3:	256	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- r.m.s. test current AC/~~DC~~: (kA) .....L1: .....L2: L3:	7,54 - -	P
	power factor/time constant :	0,47	P
	- Factor "n"	1,7	P
	- peak test current (kA) :	10,7	P
	Test sequence "O"		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	7,5 - -	P
	- Joule integral I^2dt (kA^2s) .....L1: .....L2: L3:	192 - -	P
	Pause, t: (min)	3	P
	Test sequence "CO"		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	5,2 - -	P
	- Joule integral I^2dt (kA^2s) .....L1: .....L2: L3:	125 - -	P
	Pause, t: (min)	3	P
	Test sequence "CO"		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	5,8 - -	P
	- Joule integral I^2dt (kA^2s) .....L1: .....L2: L3:	88 - -	P
	Melting of the fusible element	No	P
	Holes in the PE-sheet for test sequence "O"	No	P
	Cracks observed	No	P
8.3.4.2	Operational performance capability with current.		
	Rated current: In (A)	125	
	Maximum rated operational voltage: Ue (V)	240	
	Conductor cross-sectional area (mm^2) :	50	
	Number of operating cycles per hour	120	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Number (5% of the number given in column 4, tab. 8) of cycles with current (total) (closing mechanism energized at the rated Uc)	50	P
	Applied voltage: closing mechanism (V)		N/A
	For circuit-breaker fitted with adjustable releases, test shall be made with the overload setting at maximum and short-circuit setting at minimum.		P
	Conditions, make/break operations:		
	- test voltage U/Ue = 1,0 (V) .....L1: .....L2: L3:	246 - -	P
	- test current I/Ie = 1,0 (A) .....L1: .....L2: L3:	128 - -	P
	- power factor/time constant:	0,78	P
	- frequency: (Hz)	50	P
	- on-time (ms):	500	P
	- off-time (s):	30	P
8.3.4.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V	1000V	P
	- no breakdown or flashover		P
	- the leaking current for circuit-breaker suitable for isolation: (<2mA / 1.1 Ue)	265V $3,47x10^{-3}$mA	P
8.3.4.4	Verification of temperature-rise		
	- the values of temperature-rise do not exceed those specified in tab. 7.		P
	Temperature rise of main circuit terminals. ≤ 80 K (K) :	44	P
	conductor cross-sectional area (mm²) :	50	P
	test current Ie (A) :	125	P
8.3.4.5	Verification of overload releases		
	Test current: 1.45 times the value of their current setting at the reference temperature: (A)	181	P
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A	1min31s	P

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Clause	Requirement + Test	Result - Remark	Verdict
8.3.4	TEST SEQUENCE II (Ics): - 1 sample: 1P, 63A		
8.3.4.1	Test of rated service short-circuit breaking capacity		
	Test sequence of operation: O – t – CO – t – CO		
	Type designation or serial number	HDB2	
	Sample no:	II-2	
	Rated current: In (A)	63	
	Rated operational voltage: Ue (V)	240	
	Rated service short-circuit breaking capacity: (kA)	7,5	
	Rated control supply voltage of closing mechanism: Uc (V)		
	Rated control supply voltage of shunt release: Uc (V)		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		N/A
	closing mechanism energized with 85% at the rated Uc: (V)		N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.		P
	Test made in free air:		P
	Distances of the metallic screen's: (all sides)	Back: 0mm Front: 0mm Top: 45mm Botton: 45mm Left: 10mm Right: 10mm	P
	The characteristics of the metallic screen:		
	- woven wire mesh		N/A
	- perforated metal		P
	- expanded metal		N/A
	- ratio hole area/total area: 0,45-0,65	0,50	P
	- size of hole: <30mm^2	25	P
	- finish: bare or conductive plating	Bare	P
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		N/A
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long		P

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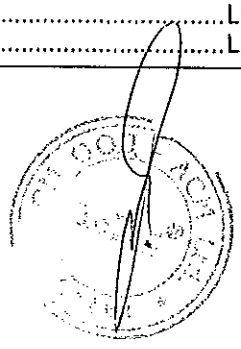
Clause	Requirement + Test	Result - Remark	Verdict
	Circuit is earthed at: (load-star- or supply-star point)	supply-star	P
	Conductor cross-sectional area (mm²) :	16	P
	If terminals unmarked: line connected at: (underside/upside)		N/A
	Tightening torques: (Nm)	3,5	N/A
	Test sequence of operation: O – t – CO – t – CO		P
	- test voltage U/Ue = 1,05 (V).....L1: .....L2: L3:	256 - -	P
	- r.m.s. test current AC/~~DC~~: (kA).....L1: .....L2: L3:	7,54 - -	P
	power factor/time constant :	0,47	P
	- Factor "n"	1,7	P
	- peak test current (kA) :	10,7	P
	Test sequence "O"		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	5,9 - -	P
	- Joule integral I²dt (kA²s) .....L1: .....L2: L3:	100 - -	P
	Pause, t: (min)	3	P
	Test sequence "CO"		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	5,7 - -	P
	- Joule integral I²dt (kA²s) .....L1: .....L2: L3:	138 - -	P
	Pause, t: (min)	3	P
	Test sequence "CO"		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	5,8 - -	P
	- Joule integral I²dt (kA²s) .....L1: .....L2: L3:	145 - -	P



IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Melting of the fusible element	No	P
	Holes in the PE-sheet for test sequence "O"	No	P
	Cracks observed	No	P
8.3.4.2	Operational performance capability with current.		
	Rated current: In (A)		
	Maximum rated operational voltage: Ue (V)		
	Conductor cross-sectional area (mm²) :		
	Number of operating cycles per hour		N/A
	Number (5% of the number given in column 4, tab. 8) of cycles with current (total) (closing mechanism energized at the rated Uc)		N/A
	Applied voltage: closing mechanism (V)		N/A
	For circuit-breaker fitted with adjustable releases, test shall be made with the overload setting at maximum and short-circuit setting at minimum.		N/A
	Conditions, make/break operations:		
	- test voltage U/Ue = 1,0 (V) .....L1: .....L2: L3:	- - -	N/A
	- test current I/Ie = 1,0 (A) .....L1: .....L2: L3:	- - -	N/A
	- power factor/time constant:		N/A
	- frequency: (Hz)		N/A
	- on-time (ms):		N/A
	- off-time (s):		N/A
8.3.4.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V	1000V	P
	- no breakdown or flashover		P
	- the leaking current for circuit-breaker suitable for isolation: (<2mA / 1.1 Ue)	265V $3{,}26 \times 10^{-3}$mA	P
8.3.4.4	Verification of temperature-rise		
	- the values of temperature-rise do not exceed those specified in tab. 7.		N/A

ВЯРНО С ОРИГИНАЛА

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Temperature rise of main circuit terminals. ≤ 80 K (K) :		N/A
	conductor cross-sectional area (mm²) :		N/A
	test current Ie (A) :		N/A
8.3.4.5	Verification of overload releases		
	Test current: 1.45 times the value of their current setting at the reference temperature: (A)	91,4	P
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A	40s	P

8.3.5	TEST SEQUENCE III (Icu) - 1 sample: 1P, 125A		
	Rated ultimate short-circuit breaking		
	Except where the combined test sequence applies, this test sequence applies to circuit-breaker of utilization category A and to circuit-breaker of utilization B having a rated ultimate short-circuit breaking capacity higher than the rated short-time withstand current.		
	For circuit-breakers of utilization B having a rated short-time withstand current equal to their rated ultimate short-circuit breaking capacity, this test sequence need not be made, since, in this case, the ultimate short-circuit breaking capacity, is verified when carrying out test sequence IV.		
	For integrally fused circuit-breakers, test sequence V applies in place of this sequence.		
	Type designation or serial number	HDB2	
	Sample no:	III-1	
	Rated current: In (A)	125	
	Rated operational voltage: Ue (V)	240	
	Rated ultimate short-circuit breaking capacity: (kA)	10	
	Rated control supply voltage of closing mechanism: Uc (V)		
	Rated control supply voltage of shunt release: Uc (V)		

ВЯРНО С ОРИГИНАЛА

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	This test sequence need not be made when Icu = Ics		
8.3.5.1	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		
	Time specified by the manufacturer:	≤8min	P
	- Operation time: (s) .....L1: .....L2: .....L3: ..... N :	160s - - -	P
8.3.5.2	Test of rated ultimate short-circuit breaking capacity		
	The test sequence of operations is O – t – CO		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		N/A
	closing mechanism energized with 85% at the rated Uc: (V)		N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.		P
	Test made in free air:		P
	Distances of the metallic screen's: (all sides)	Back: 0mm Front: 0mm Top: 45mm Botton: 45mm Left: 10mm Right: 10mm	P
	The characteristics of the metallic screen:		
	- woven wire mesh		N/A
	- perforated metal		P
	- expanded metal		N/A
	- ratio hole area/total area: 0,45-0,65	0,50	P
	- size of hole: <30mm^2	25	P
	- finish: bare or conductive plating	Bare	P
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		N/A
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long		P
	Circuit is earthed at: (load-star- or supply-star point)	Supply-star	P
	Conductor cross-sectional area (mm²):	50	P

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IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	If terminals unmarked: line connected at: (underside/upside)		N/A
	Tightening, torques: (Nm)	3,5	P
	Test sequence of operation: O – t – CO		P
	- test voltage U/Ue = 1,05 (V) .....L1: .....L2: L3:	256 - -	P
	- r.m.s. test current AC/~~DC~~: (kA).....L1: .....L2: L3:	10,4 - -	P
	power factor/time constant :	0,48	P
	- Factor "n"	1,7	P
	- peak test current (kAmax) :	18,0	P
	Test sequence "O"		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	7,7 - -	P
	- Joule integral I^2dt (kA^2s) .....L1: .....L2: L3:	199 - -	P
	Pause, t: (min)	3	P
	Test sequence "CO"		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	7,2 - -	P
	- Joule integral I^2dt (kA^2s) .....L1: .....L2: L3:	192 - -	P
	Melting of the fusible element	No	P
	Holes in the PE-sheet for test sequence "O"	No	P
	Cracks observed	No	P
8.3.5.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V for 5 seconds	1000	P
	- no breakdown or flashover		P
	- the leaking current for circuit-breaker suitable for isolation: (<6mA / 1,1 Ue)	265V $6,24x10^{-3}$mA	P

ВЯРНО С ОРИГИНАЛА

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
8.3.5.4	Verification of overload releases		
	The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		
	Time specified by the manufacturer:		N/A
	- Operation time: (s) .....L1: .....L2: .....L3: .....N :	110 - - -	P
8.3.5	TEST SEQUENCE III (Icu) - 1 sample: 1P, 63A		
	Rated ultimate short-circuit breaking		
	Except where the combined test sequence applies, this test sequence applies to circuit-breaker of utilization category A and to circuit-breaker of utilization B having a rated ultimate short-circuit breaking capacity higher than the rated short-time withstand current.		
	For circuit-breakers of utilization B having a rated short-time withstand current equal to their rated ultimate short-circuit breaking capacity, this test sequence need not be made, since, in this case, the ultimate short-circuit breaking capacity, is verified when carrying out test sequence IV.		
	For integrally fused circuit-breakers, test sequence V applies in place of this sequence.		
	Type designation or serial number	HDB2	
	Sample no:	III-2	
	Rated current: In (A)	63	
	Rated operational voltage: Ue (V)	240	
	Rated ultimate short-circuit breaking capacity: (kA)	10	
	Rated control supply voltage of closing mechanism: Uc (V)		
	Rated control supply voltage of shunt release: Uc (V)		

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IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	This test sequence need not be made when Icu = Ics		
8.3.5.1	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		
	Time specified by the manufacturer:	⩽8min	P
	- Operation time: (s) .....L1: .....L2: .....L3: ..... N :	59 - - -	P
8.3.5.2	Test of rated ultimate short-circuit breaking capacity		
	The test sequence of operations is O – t – CO		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		N/A
	closing mechanism energized with 85% at the rated Uc: (V)		N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.		P
	Test made in free air:		P
	Distances of the metallic screen's: (all sides)	Back: 0mm Front: 0mm Top: 45mm Botton: 45mm Left: 10mm Right: 10mm	P
	The characteristics of the metallic screen:		
	- woven wire mesh		N/A
	- perforated metal		P
	- expanded metal		N/A
	- ratio hole area/total area: 0,45-0,65	0,50	P
	- size of hole: <30mm^2	25	P
	- finish: bare or conductive plating	Bare	P
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		N/A
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long		P
	Circuit is earthed at: (load-star- or supply-star point)	Supply-star	P
	Conductor cross-sectional area (mm^2) :	16	P

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Clause	Requirement + Test	Result - Remark	Verdict
	If terminals unmarked: line connected at: (underside/upside)		N/A
	Tightening, torques: (Nm)	3,5	P
	Test sequence of operation: O – t – CO		P
	- test voltage U/Ue = 1,05 (V) .....L1: .....L2: L3:	256 - -	P
	- r.m.s. test current AC/~~DC~~: (kA).....L1: .....L2: L3:	10,4 - -	P
	power factor/time constant :	0,48	P
	- Factor "n"	1,7	P
	- peak test current (kAmax) :	18,0	P
	Test sequence "O"		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	6,4 - -	P
	- Joule integral I^2dt (kA^2s) .....L1: .....L2: L3:	139 - -	P
	Pause, t: (min)	3	P
	Test sequence "CO"		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	5,6 - -	P
	- Joule integral I^2dt (kA^2s) .....L1: .....L2: L3:	158 - -	P
	Melting of the fusible element	No	P
	Holes in the PE-sheet for test sequence "O"	No	P
	Cracks observed	No	P
8.3.5.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V for 5 seconds	1000	P
	- no breakdown or flashover		P
	- the leaking current for circuit-breaker suitable for isolation: (<6mA / 1,1 Ue)	265V $4,28x10^{-3}$mA	P

ВЯРНО С ОРИГИНАЛА

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
8.3.5.4	Verification of overload releases		
	The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		
	Time specified by the manufacturer:		N/A
	- Operation time: (s) .....L1: .....L2: .....L3: .....N :	43 - - -	P
8.3.6	TEST SEQUENCE IV		
	Rated short-time withstand current		
	Except where the combined test sequence applies, this test sequence applies to circuit-breakers of utilization category B and to those circuit-breaker of category A covered by note 3 of table 4, and comprises the following tests:		
	Where integrally fused circuit-breaker are of utilization category B, they shall meet the requirements of this sequence.		
	Type designation or serial number		
	Sample no:		
	Rated current: In (A)		
	Rated operational voltage: Ue (V)		
	Rated short-time withstand current: (kA/s)		
	Rated frequency: (Hz)		
8.3.6.1	Verification of overload releases		
	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		
	Time specified by the manufacturer:		N/A
	- Operation time: (s) .....L1: .....L2: .....L3: .....N :		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
8.3.6.2	Test of rated short-time withstand current.		
	For this test, any over-current release, including the instantaneous override, if any, likely to operate during the test, shall be rendered inoperative.		
	- test frequency: (Hz)		N/A
	- duration of the test: (s)		N/A
	- test frequency: (Hz)		N/A
	- power factor / time constant (ms):		N/A
	- factor "n"		N/A
	- test voltage: (V) .....L1: .....L2: L3:		N/A
	- r.m.s. test current: (kA) .....L1: .....L2: L3:		N/A
	- highest peak current: (kA)		N/A
8.3.6.3	Verification of temperature-rise		
	- the values of temperature-rise do not exceed those specified in tab. 7.		N/A
	Temperature rise of main circuit terminals. ≤ 80 K (K) :		N/A
	conductor cross-sectional area (mm²) :		N/A
	test current Ie (A) :		N/A
8.3.6.4	Test of short-circuit breaking capacity at the max. short-time withstand current.		
	Rated short-time withstand current: (kA/s)		
	Test sequence: O – t – CO		
	max. available time setting of the short–time delay short-circuit release. (s)		N/A
	- test voltage U/Ue = 1,05 (V) .....L1: .....L2: L3:		N/A
	- r.m.s. test current AC/DC: (A) .....L1: .....L2: L3:		N/A
	- test frequency: (Hz)		N/A
	- power factor / time constant (ms):		N/A
	- factor "n"		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Test sequence "O"		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:		N/A
	- Joule integral I^2dt (A^2s) .....L1: .....L2: L3:		N/A
	Pause, t: (min)		N/A
	- the circuit-breaker shall remain closed for the short-time corresponding to the max. available time setting of the short–time delay short-circuit release and -		N/A
	- the instantaneous override, if any, shall not operate.		N/A
	-pause: t (s)		N/A
	Test sequence "CO"		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:		N/A
	- Joule integral I^2dt (A^2s) .....L1: .....L2: L3:		N/A
	Pause, t: (min)		N/A
	- the circuit-breaker shall remain closed for the short-time corresponding to the max. available time setting of the short–time delay short-circuit release and -		N/A
	- the instantaneous override, if any, shall not operate.		N/A
	- if the circuit-breaker has a making current release, this requirement does not apply to the CO operation, if the prospective current exceeds the pre-determined value, since it will then operate.		N/A
8.3.6.5	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V		N/A
	- no breakdown or flashover		N/A
	- For circuit-breaker suitable for isolation, the leakage current shall be measured through each pole with the contacts in the open position, at a test voltage of 1,1 Ue, and shall not exceed 2 mA.		N/A
8.3.6.6	Verification of overload releases		

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Clause	Requirement + Test	Result - Remark	Verdict
	The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the maximum value stated by the manufacturer for twice the value of the current setting, at the reference temperature, on a pole singly.		
	Time specified by the manufacturer:		
	- Operation time: (s) .....L1: .....L2: .....L3: ..... N :		N/A
8.3.7	TEST SEQUENCE V		
	Performance of integrally fused circuit-breakers		
	STAGE 1		
	Type designation or serial number		
	Sample no:		
	Rated current: In (A)		
	Rated operational voltage: Ue (V)		
	Value of prospective current equal to the selectivity limit current, as declared by the manufacturer. (kA)		
	Type of integrated fuses (all details)		
	Rated control supply voltage of closing mechanism: Uc (V)		
	Rated control supply voltage of shunt release: Uc (V)		
8.3.7.1	Short-circuit at the selectivity limit current		
	Test sequences "O"		
	Fuses shall be fitted		N/A
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		
	closing mechanism energized with 85% at the rated Uc: (V)		N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.		N/A
	Test made in free air:		N/A
	Distances of the metallic screen's: (all sides)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	The characteristics of the metallic screen:		
	- woven wire mesh		N/A
	- perforated metal		N/A
	- expanded metal		N/A
	- ratio hole area/total area: 0,45-0,65		N/A
	- size of hole: <30mm^2		N/A
	- finish: bare or conductive plating		N/A
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		N/A
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long		N/A
	Circuit is earthed at: (load-star- or supply-star point)		N/A
	Conductor cross-sectional area (mm²) :		N/A
	If terminals unmarked: line connected at: (underside/upside)		N/A
	Tightening torques: (Nm)		N/A
	- test voltage U/Ue = 1,05 (V) .....L1: .....L2: L3:		N/A
	- r.m.s. test current AC/DC: (A) .....L1: .....L2: L3:		N/A
	power factor/time constant :		N/A
	- factor "n"		N/A
	- peak test current (Amax) :		N/A
	Test sequence "O"		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:		N/A
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:		N/A
	- fuses shall still intact .....L1: .....L2: L3:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
8.3.7.2	Verification of temperature-rise		
	- the values of temperature-rise do not exceed those specified in tab. 7.		N/A
	Temperature rise of main circuit terminals. ≤ 80 K (K) :		N/A
	conductor cross-sectional area (mm²) :		N/A
	test current Ie (A) :		N/A
8.3.7.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V		N/A
	- no breakdown or flashover		N/A
	- the leaking current for circuit-breaker suitable for isolation: (<2mA / 1,1 Ue)		N/A
	STAGE 2		
	Type designation or serial number		
	Sample no:		
	Rated current: In (A)		
	Rated operational voltage: Ue (V)		
	1.1 time the value of prospective current equal to the selectivity limit current, as declared by the manufacturer. (kA)		
	Type of integrated fuses (all details)		
	Rated control supply voltage of closing mechanism: Uc (V)		
	Rated control supply voltage of shunt release: Uc (V)		
8.3.7.4	Verification of overload releases		N/A
	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		
	Time specified by the manufacturer:		
	- Operation time: (s) .....L1: .....L2: .....L3: ..... N :		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
8.3.7.5	Short-circuit at 1,1 times the take-over current		
8.3.7.1	Short-circuit at the selectivity limit current		
	Test sequences "O"		
	Fuses shall be fitted		N/A
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		
	closing mechanism energized with 85% at the rated Uc: (V)		N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.		N/A
	Test made in free air:		N/A
	Distances of the metallic screen's: (all sides)		N/A
	The characteristics of the metallic screen:		
	- woven wire mesh		N/A
	- perforated metal		N/A
	- expanded metal		N/A
	- ratio hole area/total area: 0,45-0,65		N/A
	- size of hole: <30mm^2		N/A
	- finish: bare or conductive-plating		N/A
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		N/A
	Fuse "F": copper wire: diameter 0.8 mm, 50 mm long		N/A
	Circuit is earthed at: (load-star- or supply-star point)		N/A
	Conductor cross-sectional area (mm²) :		N/A
	If terminals unmarked: line connected at: (underside/upside)		N/A
	Tightening torques: (Nm)		N/A
	1.1 time the value of prospective current equal to the selectivity limit current, as declared by the manufacturer. (kA)		
	- test voltage U/Ue = 1,05 (V) .....L1: .....L2: L3:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- r.m.s. test current AC/DC: (A) .....L1: .....L2: L3:		N/A
	power factor/time constant :		N/A
	- factor "n"		N/A
	- peak test current (Amax) :		N/A
	Test sequence "O"		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:		N/A
	- Joule integral I^2dt (A^2s) .....L1: .....L2: L3:		N/A
	- at least two of the fuses shall have blown .....L1: .....L2: L3:		N/A
8.3.7.6	Short-circuit at rated ultimate short-circuit breaking capacity		
	Type designation or serial number		
	Sample no:		
	Rated current: In (A)		
	Rated operational voltage: Ue (V)		
	Rated ultimate short-circuit breaking capacity. (kA)		
	Type of integrated fuses (all details)		
	Rated control supply voltage of closing mechanism: Uc (V)		
	Rated control supply voltage of shunt release: Uc (V)		
	Test sequences: O – t – CO		
	Fuses shall be fitted		N/A
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		
	closing mechanism energized with 85% at the rated Uc: (V)		N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Test made in free air:		N/A
	Distances of the metallic screen's: (all sides)		N/A
	The characteristics of the metallic screen:		
	- woven wire mesh		N/A
	- perforated metal		N/A
	- expanded metal		N/A
	- ratio hole area/total area: 0,45-0,65		N/A
	- size of hole: <30mm^2		N/A
	- finish: bare or conductive plating		N/A
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		N/A
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long		N/A
	Circuit is earthed at: (load-star- or supply-star point)		N/A
	Conductor cross-sectional area (mm²) :		N/A
	If terminals unmarked: line connected at: (underside/upside)		N/A
	Tightening torques: (Nm)		N/A
	- test voltage U/Ue = 1,05 (V) .....L1: .....L2: L3:		N/A
	- r.m.s. test current AC/DC: (A) .....L1: .....L2: L3:		N/A
	power factor/time constant :		N/A
	- factor "n"		N/A
	- peak test current (A) :		N/A
	Test sequence "O"		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:		N/A
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:		N/A
	Pause: t (s)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	new fitted fuses		N/A
	Test sequence "CO"		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:		N/A
	- Joule integral I^2dt (A^2s) .....L1: .....L2: L3:		N/A
8.3.7.7	Verification of dielectric withstand		
	- equal twice time rated operational voltage with a minimum of 1000 V (new fuses fitted)		N/A
	- no breakdown or flashover		N/A
	- the leaking current for circuit-breaker suitable for isolation: (< 6mA / 1,1 Ue)		N/A
8.3.7.8	Verification of overload releases		
	The operation of overload releases shall be verified at 2.5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		
	Time specified by the manufacturer:		
	- Operation time: (s) .....L1: .....L2: .....L3: .....N :		N/A
8.3.8	TEST SEQUENCE VI: Combined test sequence		
	At the discretion of, or in agreement with the manufacturer, this sequence may be applied to circuit-breaker of utilization cat. B:		
	Type designation or serial number		N/A
	Sample no:		N/A
	Rated current: In (A)		N/A
	Rated operational voltage: Ue (V)		N/A
	Rated short-time withstand current: (kA/s)		N/A
	Rated frequency: (Hz)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
8.3.8.1	Verification of overload releases		
	The operation of overload releases shall be verified twice times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		
	Time specified by the manufacturer:		
	- Operation time: (s) .....L1: .....L2: .....L3: .....N :		N/A
8.3.8.2	Test of rated short-time withstand current.		
	For this test, any over-current release, including the instantaneous override, if any, likely to operate during the test, shall be rendered inoperative.		
	- test frequency: (Hz)		N/A
	- duration of the test: (s)		N/A
	- test frequency: (Hz)		N/A
	- power factor / time constant (ms):		N/A
	- factor "n"		N/A
	- test voltage: (V) .....L1: .....L2: L3:		N/A
	- r.m.s. test current: (kA) .....L1: .....L2: L3:		N/A
	- highest peak current: (kA)		N/A
8.3.8.3	Test of rated service short-circuit breaking capacity		
	At the highest voltage applicable to the rated short-time current.		
	Test sequence of operation: O – t – CO – t – CO		
	Type designation or serial number		
	Sample no:		
	Rated current: In (A)		
	Rated operational voltage: Ue (V)		
	Rated service short-circuit breaking capacity: (kA)		
	Rated control supply voltage of closing mechanism: Uc (V)		

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Clause	Requirement + Test	Result - Remark	Verdict
	Rated control supply voltage of shunt release: Uc (V)		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		
	closing mechanism energized with 85% at the rated Uc: (V)		N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.		N/A
	Test made in free air:		N/A
	Distances of the metallic screen's: (all sides)		N/A
	The characteristics of the metallic screen:		
	- woven wire mesh		N/A
	- perforated metal		N/A
	- expanded metal		N/A
	- ratio hole area/total area: 0,45-0,65		N/A
	- size of hole: <30mm^2		N/A
	- finish: bare or conductive plating		N/A
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		N/A
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long		N/A
	Circuit is earthed at: (load-star- or supply-star point)		N/A
	Conductor cross-sectional area (mm^2) :		N/A
	If terminals unmarked: line connected at: (underside/upside)		N/A
	Tightening torques: (Nm)		N/A
	Test sequence of operation: O – t – CO – t – CO		N/A
	The highest voltage applicable to the rated short-time current.		N/A
	- test voltage U/Ue = 1,05 (V) .....L1: .....L2: L3:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- r.m.s. test current AC/DC: (A) .....L1: .....L2: L3:		N/A
	power factor/time constant :		N/A
	- Factor "n"		N/A
	- peak test current (A) :		N/A
	Test sequence "O"		
	- max. let-through current: (kApeak .....L1: .....L2: L3:		N/A
	- Joule integral I^2dt (A^2s) .....L1: .....L2: L3:		N/A
	Pause, t: (min)		N/A
	Test sequence "CO"		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:		N/A
	- Joule integral I^2dt (A^2s) .....L1: .....L2: L3:		N/A
	Pause, t: (min)		N/A
	Test sequence "CO"		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:		N/A
	- Joule integral I^2dt (A^2s) .....L1: .....L2: L3:		N/A
	The circuit-breaker shall remain closed for the short-time corresponding to the max. available time setting of the short-time delay short-circuit release.		N/A
	During this test the instantaneous override shall not operate		N/A
	- and the making current release shall operate		N/A
8.3.8.4	Operational performance capability with current.		
	Rated current: In (A)		N/A
	Maximum rated operational voltage: Ue (V)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Conductor cross-sectional area (mm²) :		N/A
	Number of operating cycles per hour		N/A
	Number (5% of the number given in column 4, tab. 8) of cycles with current (total) (closing mechanism energized at the rated Uc)		N/A
	Applied voltage: closing mechanism (V)		N/A
	For circuit-breaker fitted with adjustable releases, test shall be made with the overload setting at maximum and short-circuit setting at minimum.		N/A
	Conditions, make/break operations:		N/A
	- test voltage U/Ue = 1,0 (V).....L1: .....L2: L3:		N/A
	- test current I/Ie = 1,0 (A) .....L1: .....L2; L3:		N/A
	- power factor/time constant:		N/A
	- frequency: (Hz)		N/A
	- on-time (ms):		N/A
	- off-time (s):		N/A
8.3.8.5	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V		N/A
	- no breakdown or flashover		N/A
	- the leaking current for circuit-breaker suitable for isolation: (<2mA / 1,1 Ue)		N/A
8.3.8.6	Verification of temperature-rise		
	- the values of temperature-rise do not exceed the those specified in tab. 7.		N/A
	Temperature rise of main circuit terminals. ≤ 80 K (K) :		N/A
	conductor cross-sectional area (mm²) :		N/A
	test current Ie (A) :		N/A
8.3.8.7	Verification of overload releases		
	Test current: 1,45 times the value of their current setting at the reference temperature: (A)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A		N/A
	The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		
	Time specified by the manufacturer:		
	- Operation time: (s) .....L1: .....L2: .....L3: ..... N :		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
Annex B	Circuit-breakers incorporating residual current protection		
B.3	Classification		
B.3.1	Classification according to the method of operation of the residual current function		
B.3.1.1	CBR functionally independent of line voltage		
B.3.1.2	CBR functionally dependent on line voltage		
B.3.1.2.1	Opening automatically in the case of failure of the line voltage with or without delay.		
B.3.1.2.2	Not opening automatically in the case of failure of line voltage.		
B.3.2	Classification according to the possibility of adjusting the residual operating current		
B.3.2.1	CBR with single rated residual operating current		
B.3.2.2	CBR with multiple settings of residual operating current	Fixed steps/continuous	
B.3.3	Classification according to time-delay of the residual current function		
B.3.3.1	CBR without time-delay: non-time-delayed type		
B.3.3.2	CBR with time-delay: time-delayed type		
B.3.3.2.1	CBR with non-adjustable time-delay		
B.3.3.2.2	CBR with adjustable time-delay	Fixed steps/continuous	
B.3.4	Classification according to behaviour in presence of a d.c. component	CBR of type AC / type A	
B.4	Characteristics of CBRs concerning their residual current function		
B.4.1.1	Rated residual operating current ($I\Delta n$)		
B.4.1.2	Rated residual non-operating current ($I\Delta no$)		
B.4.1.3	Rated residual short-circuit making and breaking capacity ($I\Delta m$)		
B.4.2	Preferred and limiting values		
	Preferred values of the rated residual operating current ($I\Delta n$)		
	Limiting value of the non-operating overcurrent in the case of a single-phase load in a multiphase circuit		
B.4.2.4	Operating characteristics		
	The value of the rated voltage of the voltage source of CBRs		

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Clause	Requirement + Test	Result - Remark	Verdict
	For a time-delay type, the limiting non-actuating time is defined at 2 $I\Delta n$ and shall be declared by the manufacturer.		N/A
	For CBR's having a limiting non-actuating time higher than 0,06 s, the manufacturer shall declare the maximum break time at $I\Delta n$, 2 $I\Delta n$, 5 $I\Delta n$, and 10 $I\Delta n$.		N/A
	In the case of a CBR having an inverse current/time characteristic, the manufacturer shall state the residual current/break time characteristic.		N/A
B.4.3	Value of the rated residual short-circuit making and breaking capacity ($I\Delta m$)		
	The minimum value of $I\Delta m$ is 25 % of I_{cu}.		N/A
B.5.	Marking		
	Data according B.5. section a) shall be marked on integral CBRs (see B.1.1), in addition to the marking specified in 5.2, and be clearly visible in the installed position		N/A
	Data according B.5. section b) shall be marked on r.c. units and be clearly visible in the installed Position		N/A
	Data according B.5. section c) shall be marked on r.c. units and be visible after assembly with the circuit-breaker:		N/A
	Data according B.5.section d) shall be marked on integral CBRs or r.c. units, as applicable, or made available in the manufacturer's literature:		N/A
	Data according section B.5. section e) shall be made available in the manufacturer's literature:		N/A
B.8.	Tests		
	This clause specifies tests for CBRs having a rated residual operating current $I\Delta n$ up to and including 30 A.		
	The applicability of the tests specified in this clause when $I\Delta n$ > 30 A is subject to agreement between manufacturer and user.		
	The instruments for the measurement of the residual current shall be at least class 0,5 (see IEC 60051) and shall show (or permit to determine) the true r.m.s. value.		N/A
	The instruments for the measurement of time shall have a relative error not greater than 10 % of the measured value.		N/A
B.8.1.1	Tests to be made during the test sequences of clause 8		

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Clause	Requirement + Test	Result - Remark	Verdict
B.8.1.1.1	Operational performance capability		
	During the operating cycles with current a third of the breaking operations shall be performed by actuating the test device, and a further third by applying a residual current of value IΔn (or, if applicable, of the lowest setting of the residual operating current) to any one pole.		N/A
	In the case of a reset-CBR, it is not possible to reclose the CBR after tripping without the intentional resetting action. This verification shall take place at the beginning and at the end of the operational performance capability test with current		N/A
	No failure to trip shall be admitted.		N/A
B.8.1.1.2	Verification of the withstand capability to short-circuit currents		
B.8.1.1.2.1	Rated service short-circuit breaking capacity (test sequence II)		
	Following the tests of 8.3.4, verification of the correct operation of the CBR in case of residual current shall be performed in accordance with B.8.2.4.1.		
B.8.2.4.1	Verification of operating in case of steady increase of the residual current (figure B.1)		
	Increase the residual current from 0,2 IΔn to IΔn in 30 sec. Required: value between IΔno and IΔn		N/A
	Min. setting IΔn.(mA): Interm. setting IΔn.(mA): Max. setting IΔn.(mA):		N/A
B.8.1.1.2.2	Rated ultimate short-circuit breaking capacity (test sequence III)		
	The correct operation of the overload releases of 8.3.5.1 and 8.3.5.4 by two-pole tests, on all possible combinations of phase poles in turn		N/A
	Following the tests of 8.3.5, verification of the correct operation of the CBR shall be performed in accordance with B.8.2.4.3.		N/A
B.8.2.4.3	Verification of operating in case of a sudden appearance of the residual current (figure B.1)		
	A residual current is sudden appear on the CBR of IΔn Required : no value exceeds the specified limiting value of Table B1 (300 ms) or Table B2 (500 ms) and a non actuating time of 60 ms		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	A residual current is sudden appear on the CBR of 2 IΔn Required : no value exceeds the specified limiting value of Table B1 (150 ms) or Table B2 (200 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	A residual current is sudden appear on the CBR of ☐ 5 IΔn or ☐ 0,25 A Required : no value exceeds the specified limiting value of Table B1 (40ms) or Table B2 (150 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	A residual current is sudden appear on the CBR of ☐10 IΔn or ☐ 0,5 A Required : no value exceeds the specified limiting value of Table B1 (40 ms) or Table B2 (150 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
B.8.1.1.2.3	Rated short-time withstand current (test sequence IV or test sequence VI (combined)		
	a) Behaviour during rated short-time withstand current test No tripping shall occur during the test of 8.3.6.2 or 8.3.8.2, as applicable.		N/A
	b) Verification of overload releases test sequence IV For the purpose of verifying the correct operation of the overload releases in accordance with 8.3.6.1 and 8.3.6.6, the single pole tests specified in 8.3.5.1 shall be replaced by two-pole tests, made on all possible combinations of phase poles in turn.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	b) Verification of overload releases for combined test sequence. For the purpose of verifying the correct operation of the overload releases in accordance with 8.3.8.1, the single pole test specified in 8.3.5.1 shall be replaced by two-pole tests made on all possible combinations of phase poles in turn.		N/A
	b) For the purpose of verifying the correct operation of overload releases in accordance with 8.3.8.6, the test specified in 8.3.3.7 shall be made using a three-phase supply.		N/A
	c) Verification of the residual current tripping device Following the tests of 8.3.6 or 8.3.8, as applicable, verification of the residual current tripping device shall be performed in accordance with B.8.2.4.3.		N/A
B.8.2.4.3	Verification of operating in case of a sudden appearance of the residual current (figure B.1)		
	A residual current is sudden appear on the CBR of IΔn Required : no value exceeds the specified limiting value of Table B1 (300 ms) or Table B2 (500 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	A residual current is sudden appear on the CBR of 2 IΔn Required : no value exceeds the specified limiting value of Table B1 (150 ms) or Table B2 (200 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	A residual current is sudden appear on the CBR of ☐ 5 IΔn or ☐ 0,25 A Required : no value exceeds the specified limiting value of Table B1 (40ms) or Table B2 (150 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	A residual current is sudden appear on the CBR of ☐10 IΔn or ☐ 0,5 A Required : no value exceeds the specified limiting value of Table B1 (40 ms) or Table B2 (150 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
B.8.1.1.2.4	Integrally fused circuit-breakers (test sequence V)		
	For the purpose of verifying the correct operation of the overload releases, the single-pole tests specified in 8.3.7.4 and 8.3.7.8 shall be replaced by two-pole tests, on all possible combinations of phase poles in turn, the test conditions being as specified in 8.3.7.4 and 8.3.7.8 but applicable to two poles.		N/A
	Following the tests of 8.3.7, verification of the correct operation of the CBR shall be performed in accordance with B.8.2.4.3.		N/A
B.8.2.4.3	Verification of operating in case of a sudden appearance of the residual current (figure B.1)		
	A residual current is sudden appear on the CBR of IΔn Required : no value exceeds the specified limiting value of Table B1 (300 ms) or Table B2 (500 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	A residual current is sudden appear on the CBR of 2 IΔn Required : no value exceeds the specified limiting value of Table B1 (150 ms) or Table B2 (200 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	A residual current is sudden appear on the CBR of ☐ 5 IΔn or ☐ 0,25 A Required : no value exceeds the specified limiting value of Table B1 (40ms) or Table B2 (150 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	A residual current is sudden appear on the CBR of ☐10 IΔn or ☐ 0,5 A Required : no value exceeds the specified limiting value of Table B1 (40 ms) or Table B2 (150 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
B.8.1.1.2.5	Test sequence VI (combined)		
	Following the tests of 8.3.8, verification of the correct operation of the CBR shall be performed in accordance with B.8.2.4.3.		N/A
B.8.2.4.3	Verification of operating in case of a sudden appearance of the residual current (figure B.1)		
	A residual current is sudden appear on the CBR of IΔn Required : no value exceeds the specified limiting value of Table B1 (300 ms) or Table B2 (500 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	A residual current is sudden appear on the CBR of 2 IΔn Required : no value exceeds the specified limiting value of Table B1 (150 ms) or Table B2 (200 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	A residual current is sudden appear on the CBR of ☐ 5 IΔn or ☐ 0,25 A Required : no value exceeds the specified limiting value of Table B1 (40ms) or Table B2 (150 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	A residual current is sudden appear on the CBR of ☐10 IΔn or ☐ 0,5 A Required : no value exceeds the specified limiting value of Table B1 (40 ms) or Table B2 (150 ms) and a non actuating time of 60 ms		N/A

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	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
B I	Test sequence B I		
	Tests shall be made at the following values of voltage applied to the relevant terminals: - 0,85 times the minimum rated voltage for the tests specified in B.8.2.4 and B.8.2.5.1; - 1,1 times the maximum rated voltage for the tests specified in B.8.2.5.2.		N/A
	CBRs with more than one rated frequency or a range of rated frequencies shall be tested in each case at the highest and lowest rated frequency. However, for CBRs rated at 50 Hz and 60 Hz, tests at 50 Hz or 60 Hz are considered to cover the requirements.		N/A
B.8.2.4	Off-load test at 20 °C ± 5 °C		
B.8.2.4.1	Verification of operating in case of steady increase of the residual current (figure B.1)		N/A
	Increase the residual current from 0,2 IΔn to IΔn in 30 sec. Required: value between IΔno and IΔn		N/A
	Min. setting IΔn.(mA): Interm. setting IΔn.(mA): Max. setting IΔn.(mA):		N/A
B.8.2.4.2	Verification of operating in case of closing on residual current (figure B.1)		
	The CBR is closes on IΔn or each specified setting Required : no value exceeds the specified limiting value of Table B1 (300 ms) or Table B2 (500 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
B.8.2.4.3	Verification of operating in case of a sudden appearance of the residual current (figure B.1)		
	A residual current is sudden appear on the CBR of IΔn Required : no value exceeds the specified limiting value of Table B1 (300 ms) or Table B2 (500 ms) and a non actuating time of 60 ms		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	A residual current is sudden appear on the CBR of 2 IΔn Required : no value exceeds the specified limiting value of Table B1 (150 ms) or Table B2 (200 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	A residual current is sudden appear on the CBR of ☐ 5 IΔn or ☐ 0,25 A Required : no value exceeds the specified limiting value of Table B1 (40ms) or Table B2 (150 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	A residual current is sudden appear on the CBR of ☐10 IΔn or ☐ 0,5 A Required : no value exceeds the specified limiting value of Table B1 (40 ms) or Table B2 (150 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
B.8.2.4.4	Verification of the limiting non-operating time of time delayed type CBRs		
	A residual current is sudden appear on the CBR of 2 IΔn for a time declared by the manufacturer Required : The CBR shall not operate		N/A
	Min. setting IΔn. Min. setting time delay (ms): Min. setting IΔn. Max. setting time delay (ms):		N/A
B.8.2.5	Tests at the temperature limits		
	General		
	Minimum temperature (°C)		
	Maximum temperature (°C)		N/A
B.8.2.5.1	Verification of operating in case of a sudden appearance of the residual current at –5°C or minimum temperature limit		

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Clause	Requirement + Test	Result - Remark	Verdict
	A residual current is sudden appear on the CBR of IΔn Required : no value exceeds the specified limiting value of Table B1 (300 ms) or Table B2 (500 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	A residual current is sudden appear on the CBR of 2 IΔn Required : no value exceeds the specified limiting value of Table B1 (150 ms) or Table B2 (200 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	A residual current is sudden appear on the CBR of ☐ 5 IΔn or ☐ 0,25 A Required : no value exceeds the specified limiting value of Table B1: (40ms) or Table B2 (150 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	A residual current is sudden appear on the CBR of ☐10 IΔn or ☐ 0,5 A Required : no value exceeds the specified limiting value of Table B1 (40 ms) or Table B2 (150 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	Verification of the limiting non-operating time of time delayed type CBRs at –5°C or minimum temperature limit		
	A residual current is sudden appear on the CBR of 2 IΔn for a time declared by the manufacturer Required : The CBR shall not operate		N/A
	Min. setting IΔn. Min. setting time delay (ms): Min. setting IΔn. Max. setting time delay (ms):		N/A
B.8.3.5.2	Verification of operating in case of a sudden appearance of the residual current at +40°C		

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Clause	Requirement + Test	Result - Remark	Verdict
	A residual current is sudden appear on the CBR of IΔn Required : no value exceeds the specified limiting value of Table B1 (300 ms) or Table B2 (500 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	A residual current is sudden appear on the CBR of 2 IΔn Required : no value exceeds the specified limiting value of Table B1 (150 ms) or Table B2 (200 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	A residual current is sudden appear on the CBR of ☐ 5 IΔn or ☐ 0,25 A Required : no value exceeds the specified limiting value of Table B1 (40ms) or Table B2 (150 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	A residual current is sudden appear on the CBR of ☐10 IΔn or ☐ 0,5 A Required : no value exceeds the specified limiting value of Table B1 (40 ms) or Table B2 (150 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	A residual current is sudden appear on the CBR of 2 IΔn for a time declared by the manufacturer Required : The CBR shall not operate		N/A
	Min. setting IΔn. Min. setting time delay (ms): Min. setting IΔn. Max. setting time delay (ms):		N/A
B.8.3	Verification of dielectric properties		
B.8.3.3.2	Verification of rated impuls withstand voltage		
	rated impulse withstand voltage		

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Clause	Requirement + Test	Result - Remark	Verdict
	test impulse voltage (see table 12 part 1)		
	test impulse voltage for isolating (see table 14 part 1)		
B.8.4	Verification of the operation of the test device at the limits of the rated voltage		
	For CBRs having an adjustable time-delay the test is made at the maximum setting of time-delay:	_____ s	
B.8.4.a	Setting IΔn or minimum setting of IΔn	_____ A	
	Test voltage (1,1 x Ue max)	_____ V	
	Number of operations	25	
	Interval time	5 s	
	Tripping	☐ Yes / ☐ No	N/A
B.8.4.b	Setting IΔn or maximum setting of IΔn	_____ A	
	Test voltage (0,85 x Ue min)	_____ V	
	Number of operations	3	
	Interval time	5 s	
	Tripping	☐ Yes / ☐ No	N/A
B.8.4.c	Setting IΔn or minimum setting of IΔn	_____ A	
	Test voltage (1,1 x Ue max)	_____ V	
	Number of operations	1	
	Operating means of the test device held in close position	5 s	
	Tripping	☐ Yes / ☐ No	N/A
B.8.5	Verification of the limiting value of non-operating current under overcurrent conditions, in case of a single phase load.		
	Setting IΔn or minimum setting of IΔn if adjustable	_____ A	
	Test current equal to the lower value of: ☐ 6 x In or ☐ 80 % of the maximum short-circuit release current setting	_____ A	
	Test voltage: ☐ rated voltage or ☐ any convenient voltage	_____ V	
	Test frequency	_____ Hz	

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Clause	Requirement + Test	Result - Remark	Verdict
	Power factor (0,5)	———	
	Current flow time	2 s	
	Interval time	60 s	
	Calibration plot number	———	
	No tripping / change of state		N/A
B.8.6	Resistance against unwanted tripping due to surge currents resulting from impulse voltages		
B.8.6.1	Verification of the resistance to unwanted tripping in case of loading of the network capacitance		
	Current surge test for CBR (0,5 µs / 100kHz ring wave test)		
	One pole of the CBR is submitted to 10 applications of a surge current according to the following requirements:		
	- peak value: 200 A + 10/0%		
	- virtual front time: 0,5 µs ± 30%		
	- period of the following oscillatory wave: 10 µs ± 20%		
	- each successive peak: about 60% of the preceding peak		
	The polarity shall be inverted after every two applications		
	The interval between two consecutive applications shall be about 30 s		
	During the test the CBR shall not trip:	-	N/A
B.8.6.2	Verification of the resistance to unwanted tripping in case of flashover without follow-on current.		
	Verification of behaviour at surge current up to 250 A (8/20 µs surge current test)		
	One pole of the CBR is submitted to 10 applications of a surge current according to the following requirements:		
	- peak value: 250 A + 10/0%		
	- virtual front time: 8 µs ± 20%		
	- virtual time to half value: 20 µs ± 20%		
	- peak of reverse current:: less than 30% of peak value		
	The polarity shall be inverted after every two applications		

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Clause	Requirement + Test	Result - Remark	Verdict
	The interval between two consecutive applications shall be about 30 s		
	During the test the CBR shall not trip:		N/A
B.8.7	Verification of the behaviour in case of an earth fault current comprising a d.c. component.		
	Type A CBR		
	For CBRs the operation of which depends on a voltage source the test are made at 1,1 and 0,85 times the rated voltage of the voltage source (Us).		
B.8.7.2.1	Verification of operation in case of a continuous rise of a residual pulsating direct current		
	Rated voltage	_____ V	
	- steady increase from zero to: 1,4 IΔn for IΔn > 0,015 A with 1,4 IΔn/30 A/s (mA)	_____ mA	
	- steady increase from zero to: 2 IΔn for IΔn ≤ 0,015 A with 2 IΔn/30 A/s (mA)	_____ mA	
	- angle = 0 (+/-) :		
	- angle = 90 (+/-) :		
	- angle = 135 (+/-) :		
	No value exceeds the relevant specified limiting values		N/A
B.8.7.2.2	Verification of operation in case of a suddenly appearing residual pulsating direct current		
	Verification of the correct operation in case of suddenly appearing residual pulsating direct currents by closing S2 (angle = 0°)		
	Rated voltage	_____ V	
	RCCB's with IΔn > 0,015 A:		
	- maximum break time (ms) at: 1,4 IΔn (+/-) :		
	- maximum break time (ms) at: 2,8 IΔn (+/-) :		
	- maximum break time (ms) at: 7 IΔn (+/-) :		
	- maximum break time (ms) at: 14 IΔn (+/-) :		
	No value exceeds the relevant specified limiting value		N/A
	RCCB's with IΔn ≤ 0,015 A:		N/A
	- maximum break time (ms) at: 2 IΔn (+/-) :		
	- maximum break time (ms) at: 4 IΔn (+/-) :		

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Clause	Requirement + Test	Result - Remark	Verdict
	- maximum break time (ms) at: 10IΔn (+/-) :		
	- maximum break time (ms) at: 20 IΔn (+/-) :		
	No value exceeds the relevant specified limiting value		N/A
B.8.7.2.3	Verification of operation with load at reference temperature		
	Rated voltage	_____ **V**	
B.8.7.2.1	- steady increase from zero to: 1,4 IΔn for IΔn > 0,015 A with 1,4 IΔn/30 A/s (mA)	_____ **mA**	
	- steady increase from zero to: 2 IΔn for IΔn ≤ 0,015 A with 2 IΔn/30 A/s (mA)	_____ **mA**	
	- angle = 0 (+/-) :		
	- angle = 90 (+/-) :		
	- angle = 135 (+/-) :		
	No value exceeds the relevant specified limiting values		N/A
B.8.7.2.2	Verification of operation in case of a suddenly appearing residual pulsating direct current		
	Verification of the correct operation in case of suddenly appearing residual pulsating direct currents by closing S2 (angle = 0°)		
	Rated voltage	_____ V	
	RCCB's with IΔn > 0,015 A:		
	- maximum break time (ms) at: 1,4 IΔn (+/-) :		
	- maximum break time (ms) at: 2,8 IΔn (+/-) :		
	- maximum break time (ms) at: 7 IΔn (+/-) :		
	- maximum break time (ms) at: 14 IΔn (+/-) :		
	No value exceeds the relevant specified limiting value		N/A
	RCCB's with IΔn ≤ 0,015 A:		N/A
	- maximum break time (ms) at: 2 IΔn (+/-) :		
	- maximum break time (ms) at: 4 IΔn (+/-) :		
	- maximum break time (ms) at: 10IΔn (+/-) :		
	- maximum break time (ms) at: 20 IΔn (+/-) :		
	No value exceeds the relevant specified limiting value		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
B.8.7.2.4	Verification of operation of a residual pulsating direct current superimposed by a smooth direct current of 6 mA.		
	Rated voltage	_____ V	
	- steady increase from zero to: 1,4 IΔn for IΔn > 0,015 A with 1,4 IΔn/30 A/s (mA) + 6 mA	_____ mA	
	-steady increase from zero to: 2 IΔn for IΔn ≤ 0,015 A with 2 IΔn/30 A/s (mA) + 6 mA	_____ mA	
	- angle = 0 (+/-) :		
	No value exceeds the relevant specified limiting values		N/A
B.8.8	Verification of the behaviour of CBRs functionally dependent on line voltage classified under B.3.1.2.1		
	For CBRs having an adjustable residual operating current, the test is made at the lowest setting.		
	For CBRs with an adjustable time-delay, the test is made at any one of the time-delay settings.		
B.8.8.1	Determination of the limiting value of the line voltage		
	A voltage equal to the rated voltage is applied to the line terminals of the CBR and is then progressively lowered to zero over a time period corresponding to the longer of the two values given hereinafter until automatic opening occurs: – about 30 s; – a period long enough with respect to the delayed opening of the CBR, if any (see B.7.2.11).		
	Three measurements are made. All the values shall be less than 0,85 times the minimum rated voltage of the CBR.		N/A
	A residual current is sudden appear on the CBR of IΔn (_____ mA) at a value just above highest measured value Required : no value exceeds the specified limiting value of Table B1: 300 ms		N/A
	For any value of voltage less than the lowest value measured, it is not be possible to close the CBR by manual operating means.		N/A
B.8.8.2	Verification of the automatic opening in the case of failure of the line voltage		
	The CBR being closed, a voltage equal to its rated voltage, or, In the case of a range of rated voltages, any one of the rated voltages is applied to its line terminals. The voltage is then switched off. The CBR shall trip. The time interval between the switching off and the opening of the main contacts is measured.		N/A
	for CBRs opening without delay no value shall exceed 0,2 s;		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	for CBRs opening with delay the maximum and minimum values shall be situated within the range indicated by the manufacturer.		N/A
B.8.9	Verification of the behaviour of CBRs functionally dependent on line voltage in the case of failure of line voltage		
	For CBRs having an adjustable residual operating current, the test is made at the lowest setting. For CBRs having an adjustable time-delay the test is made at any one of the time-delay settings.		N/A
B.8.9.1	Case of loss of one phase in a 3-phase system (for 3-pole and 4-pole CBRs)		
	The CBR is connected according to figure B.3 and is supplied on the line side at 0,85 times the rated voltage, or, in the case of a range of rated voltages, at 0,85 times the lowest value of rated voltage.		N/A
	Verification with one phase is switched off		N/A
B.8.2.4.3	Verification of operating in case of a sudden appearance of the residual current		
	A residual current is sudden appear on the CBR of IΔn Required: no value exceeds the specified limiting value of Table B1: (300 ms) or Table B2 (500 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	A residual current is sudden appear on the CBR of 2 IΔn Required : no value exceeds the specified limiting value of Table B1 (150 ms) or Table B2 (200 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	A residual current is sudden appear on the CBR of ☐ 5 IΔn or ☐ 0,25 A Required : no value exceeds the specified limiting value of Table B1 (40ms) or Table B2 (150 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	A residual current is sudden appear on the CBR of ☐10 IΔn or ☐ 0,5 A Required : no value exceeds the specified limiting value of Table B1 (40 ms) or Table B2 (150 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	Verification with other phase switched off		
B.8.2.4.3	Verification of operating in case of a sudden appearance of the residual current (figure B.1)		
	A residual current is sudden appear on the CBR of IΔn Required : no value exceeds the specified limiting value of Table B1 (300 ms) or Table B2 (500 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	A residual current is sudden appear on the CBR of 2 IΔn Required : no value exceeds the specified limiting value of Table B1 (150 ms) or Table B2 (200 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	A residual current is sudden appear on the CBR of ☐ 5 IΔn or ☐ 0,25 A Required : no value exceeds the specified limiting value of Table B1 (40ms) or Table B2 (150 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	A residual current is sudden appear on the CBR of ☐10 IΔn or ☐ 0,5 A Required : no value exceeds the specified limiting value of Table B1 (40 ms) or Table B2 (150 ms) and a non actuating time of 60 ms		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	Test is repeated with resistor connected to other two phases in turn.		N/A
B.8.9.2	Case of voltage drop due to an overcurrent resulting from a low impedance fault to earth		
	The CBR is connected according to figure B.3 and is supplied on the line side with the rated voltage or, in the case of a range of rated voltages, with the lowest rated voltage.		
	The supply is switched off. The CBR shall not trip.		N/A
	With supply connected the voltage is reduced as follows: a) for CBRs for use with a three-phase supply: to 70 % of the lowest rated voltage;		
	b) for CBRs for use with a single phase supply: to 85 V applied as follows: – for single-pole and two-pole CBRs: between poles; – for three-pole and four-pole CBRs, declared as suitable for use with a single-phase supply (see B.5 e)): between each combination of two poles, connected according to the manufacturer's specification.		
	A current of value $I\Delta n$ is then applied to a) and/or b), as applicable. The CBR shall trip.		N/A
BII	Test sequence BII		
B.8.10	Verification of the residual short-circuit making and breaking capacity		
	Where applicable, the CBR is adjusted at the lowest setting of residual operating current and at the maximum setting of time-delay.		
	If the CBR has more than one value of I_{cu}, each one having a corresponding value of $I\Delta m$, the test is made at the maximum value of $I\Delta m$, at the corresponding phase-to-neutral voltage.		
	maximum value of $I\Delta m$		
	Type designation or serial number		
	Sample no:		
	Point of test circuit which is directly earthed:		
	Grid distance "a" (mm):		

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Clause	Requirement + Test	Result - Remark	Verdict
	Fine wire diameter (mm):		
	Prospective current (A):		
	Prospective current obtained (A):		
	Power factor / ratio *n*:		
	Power factor / ratio *n* obtained:		
	Plot no.		
	Test sequence: O-t-CO		
	I^2t (kA^2s); Ip (kA):	O operation: Ip :_____kA I^2t; _____kA^2s Plot no. _____	
		CO operation: Ip :_____kA I^2t; _____kA^2s Plot no.: _____	
	If tested at separate testing station see report		
	During tests no endangering of operator, no permanent arcing, no flashover and no melting of fuse F		N/A
B.8.10.3	Conditions of the CBR after test		
	After the tests no damage impairing further use		N/A
	Dielectric strength test of the main circuit at test voltage of 2 Un for 5 s:		
	Test voltage		N/A
	Making and breaking its rated current at its maximum rated operational voltage.		N/A
B.8.10.3.2	The CBR shall be capable of performing satisfactorily the tests specified in B.8.2.4.3, but at a value of 1,25 IΔn and without measurement of break time. The test is made on any one pole, taken at random.		N/A
	If the CBR has an adjustable residual operating current, the test is made at the lowest setting, at a current of a value of 1,25 times that setting.		N/A
B.8.10.3.3	Where applicable the CBR shall also be submitted to the test of B.8.2.4.4.		N/A
B.8.2.4.4	Verification of the limiting non-operating time of time delayed type CBRs		

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Clause	Requirement + Test	Result - Remark	Verdict
	A residual current is sudden appear on the CBR of 2 IΔn for a time declared by the manufacturer Required : The CBR shall not operate		N/A
	Min. setting IΔn. Min. setting time delay (ms): Min. setting IΔn. Max. setting time delay (ms):		N/A
B.8.10.3.4	CBRs functionally dependent on line voltage shall also satisfy the tests of B.8.8 or B.8.9, as applicable.		N/A
B III	Test sequence B III		
B.8.11	Verification of the effects of environmental conditions		
	The test is carried out according to IEC 60068-2-30.		
	The upper temperature shall be 55 °C ± 2 °C (variant 1) and the number of cycles shall be – 6 for IΔn > 1 A – 28 for IΔn≤1 A		
	At the end of the cycles the CBR shall be capable of complying with the tests of B.8.2.4.3, but with a residual operating current of 1,25 IΔn and without measurement of break time. Only one verification need be made.		N/A
	Where applicable the CBR shall also comply with the test of B.8.2.4.4. Only one verification need be made.		N/A
B.8.2.4.4	Verification of the limiting non-operating time of time delayed type CBRs		
	A residual current is sudden appear on the CBR of 2 IΔn for a time declared by the manufacturer Required : The CBR shall not operate		N/A
	Min. setting IΔn. Min. setting time delay (ms): Min. setting IΔn. Max. setting time delay (ms):		N/A
B.8.12	Verification of electromagnetic compatibility (EMC)		
	See report:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
Annex C	Individual pole short-circuit test sequence		
	Circuit-breaker for use on phase-earthed systems		
C.2	Test of individual pole short-circuit breaking capacity		
	A short-circuit test is made with a value of prospective current (Isu) equal to 25% of the ultimate rated short-circuit breaking capacity (Icu)		
	Type designation or serial number		
	Sample no:		
	Rated current: In (A)		
	Rated operational voltage: Ue (V)		
	Rated ultimate short-circuit breaking capacity: (kA)		
	Rated control supply voltage of closing mechanism: Uc (V)		
	Rated control supply voltage of shunt release: Uc (V)		
	The test sequence of operations is O – t - CO		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		N/A
	closing mechanism energized with 85% at the rated Uc: (V)		N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.		N/A
	Test made in free air:		N/A
	Distances of the metallic screen's: (all sides)		N/A
	The characteristics of the metallic screen:		
	- woven wire mesh		N/A
	- perforated metal		N/A
	- expanded metal		N/A
	- ratio hole area/total area: 0,45-0,65		N/A
	- size of hole: <30mm^2		N/A
	- finish: bare or conductive plating		N/A
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		N/A

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	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long		N/A
	Circuit is earthed at: (load-star- or supply-star point)		N/A
	Conductor cross-sectional area (mm²):		N/A
	If terminals unmarked: line connected at: (underside/upside)		N/A
	Tightening torques: (Nm)		N/A
	Test sequence of operation: O – t – CO		N/A
	Test circuit according figure: 9		N/A
	- test voltage U/Ue = 1,05 (V) .....L1: .....L2: L3:		N/A
	short-circuit test current (Isu): equal to 25% of the ultimate rated short-circuit breaking capacity (Icu)		N/A
	- r.m.s. test current AC/DC: (A):		N/A
	power factor/time constant:		N/A
	- Factor "n"		N/A
	- peak test current (Amax):		N/A
	Test sequence "O" L1		
	- max. let-through current: (kApeak) L1:		N/A
	- Joule integral I²dt (A²s) L1:		N/A
	Pause, t: (min)		N/A
	Test sequence "CO" L1		
	- max. let-through current: (kApeak) L1:		N/A
	- Joule integral I²dt (A²s) L1:		N/A
	Test sequence "O" L2		
	- max. let-through current: (kApeak) L2:		N/A
	- Joule integral I²dt (A²s) L2:		N/A
	Pause, t: (min)		N/A
	Test sequence "CO" L2		
	- max. let-through current: (kApeak) L2:		N/A
	- Joule integral I²dt (A²s) L2:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Test sequence "O" L3		
	- max. let-through current: (kApeak) L3:		N/A
	- Joule integral I²dt (A²s) L3:		N/A
	Pause, t: (min)		N/A
	Test sequence "CO" L3		
	- max. let-through current: (kApeak) L3:		N/A
	- Joule integral I²dt (A²s) L3:		N/A
	Melting of the fusible element		N/A
	Holes in the PE-sheet for test sequence "O"		N/A
	Cracks observed		N/A
C.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V		N/A
	- no breakdown or flashover		N/A
C.4	Verification of overload releases		
	The operation of overload releases shall be verified at 2.5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		
	Time specified by the manufacturer:		
	- Operation time: (s) .....L1: .....L2: .....L3: .....N:		N/A
Annex F	Additional tests for circuit-breakers with electronic over-current protection		
F4 and F5	Verification of electromagnetic compatibility (EMC)		
	See report:		N/A
F6	Suitability for multiple frequencies		N/A
	The tests shall be performed at each rated frequency or, when a range of rated frequencies is declared, at the lowest and the highest rated frequencies.		N/A
F.6.2	Tests shall be performed on any pair of phase-poles chosen at random at any convenient voltage. Under-voltage releases, if any, shall either be energized or disabled. All other auxiliaries shall be disconnected during the test.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	The short-time and instantaneous trip current settings shall each, if relevant, be adjusted to 2,5 times the current setting. If this setting is not available, the next closest higher setting shall be used.		
	A current of 0,95 times the conventional non-tripping current (see Table 6) is applied for a time equal to 10 times the tripping time which corresponds to 2,0 times the current setting.		
	Immediately following the test of a), a current of 1,05 times the conventional tripping current (see Table 6) is applied.		
	A further test starting from the cold state is made at 2,0 times the current setting.		
	For each test frequency, the overload tripping characteristics shall comply with the following requirements: – for test a) no tripping shall occur; – for test b) tripping shall occur within the conventional time (see Table 6); – for test c) tripping shall occur within 1,1 times the maximum and 0,9 times the minimum values of the manufacturer's stated time-current characteristic.		N/A
F.7.	Dry heat test		
F.7.1	The test shall be performed on the circuit-breaker in accordance with 7.2.2 at the maximum rated current for a given frame size, on all phase poles, at an ambient temperature of 40 °C	In= _____ A	
	The duration of the test, once temperature equilibrium is reached, shall be 168 h		
	Tightening torques applied to the terminals shall be in accordance with the manufacturers' instructions. In absence of such instructions, table 4 of IEC 60947-1 shall apply	Torque= _____ Nm	
	As an alternative, the test may be performed as follows:		
	- measure and record the highest temperature rise of the air surrounding the electronic components, during the temperature rise verification of test sequence 1	Ambient temperature during temperature rise test: _____ °C	
	- install the electronic controls in the chamber		
	- supply the electronic controls which there input energizing value		
	- adjust the temperature of the test chamber to a value of 40 K above the temperature rise recorded for the surrounding the electronic components and	Chamber temperature: ____°C	

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Clause	Requirement + Test	Result - Remark	Verdict
	maintain this temperature for 168 h		
	Test carried out.....:	☐ normal ☐ alternative	
F.7.2	Test results		
	The circuit-breaker and the electronic controls shall meet the following requirements:		
	- no tripping of the circuit-breaker shall occur		N/A
	- no operating of the electronic controls which would cause the circuit-breaker to trip shall occur		N/A
F.7.3	Verification of the overload releases		
	Following the test F.7.1, the operation of the overload releases of the circuit-breaker shall be verified in accordance with 7.2.1.2.4, item b).	I test: ____ A Ambient temperature: ____ °C	N/A
7.2.1.2.4	Opening by over-current releases		
b)	Opening under overload conditions		
1)	Instantaneous or definite time-delay operation		N/A
	The release shall cause tripping of the circuit-breaker with an accuracy of + 10% of the tripping current value of the current setting for all values of current setting of the overload release		N/A
2)	Inverse timer-delay operation		
	At the reference temperature and at 1,05 times the current setting with the conventional non-tripping current, the opening release being energized on all poles, tripping shall not occur in less than the conventional time from the cold state, i.e. with the circuit-breaker at the reference temperature		N/A
	Moreover, when at the end of the conventional time the value of current is immediately raised to 1,30 times the current setting, i.e. with the conventional tripping current, tripping shall then occur in less than the conventional time later		N/A
	If a release is declared by the manufacturer as substantially independent of ambient temperature, the current values of table 6 shall apply within the temperature band declared by the manufacturer, within a tolerance of 0,3%/K		N/A
	The width of the temperature band shall be at least 10 K on either side of the reference temperature		N/A
F.8.	Damp heat test		

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IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
F.8.1	Test procedure		
	The test shall be performed according to IEC 60068-2-30 (12 +12 hours cycle)		
	Test Db temperature cycle between 25°C and upper temperature		
	The upper temperature shall be 55°C ± 2 °C (variant 1) and number of cycles shall be six.		
	The relative humidity is maintained at a high level at the upper temperature		
	The test may be performed with only the electronic controls in the test chamber		
	Test result.....:		N/A
F.8.2	Verification of the overload releases		
	Following the test F.8.1, the operation of the overload releases of the circuit-breaker shall be verified in accordance with 7.2.1.2.4, item b).	I test: ____ A Ambient temperature: ____°C	N/A
7.2.1.2.4	Opening by over-current releases		
b)	Opening under overload conditions		
1)	Instantaneous or definite time-delay operation		N/A
	The release shall cause tripping of the circuit-breaker with an accuracy of + 10% of the tripping current value of the current setting for all values of current setting of the overload release		N/A
2)	Inverse timer-delay operation		
	At the reference temperature and at 1,05 times the current setting with the conventional non-tripping current, the opening release being energized on all poles, tripping shall not occur in less than the conventional time from the cold state, i.e. with the circuit-breaker at the reference temperature		N/A
	Moreover, when at the end of the conventional time the value of current is immediately raised to 1,30 times the current setting, i.e. with the conventional tripping current, tripping shall then occur in less than the conventional time later		N/A
	If a release is declared by the manufacturer as substantially independent of ambient temperature, the current values of table 6 shall apply within the temperature band declared by the manufacturer, within a tolerance of 0,3%/K		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	The width of the temperature band shall be at least 10 K on either side of the reference temperature		N/A
F.9.	Temperature variation cycles at a specified rate of change		
F.9.1	Test conditions		
	Each design of electronic controls shall be submitted to temperature variation cycles in according with figure F.15		
	The rise and fall of temperature during the rate of variation shall be 1 K/min ± 0,2 K/min.		
	Their temperature, once reached, shall be maintained for at least 2 h.		
	The number of cycles shall be 28.		
F.9.2	Test procedure		
	The test shall be carried out according IEC 60068-2-14.		
	For the these test, the electronic controls may be mounted inside the circuit-breaker or separately.		
	The electronic controls shall be energized to simulate service conditions.		
	Where the electronics controls are mounted inside the circuit-breaker, the main circuit shall not be energized.		
F.9.3	Test results		
	The electronic controls shall meet the following requirement.		N/A
	No operation of the electronic controls which would cause the circuit-breaker to trip during the 28 cycles shall occur.		N/A
F.9.4	Verification of overload releases		
	Following the test F.8.1, the operation of the overload releases of the circuit-breaker shall be verified in accordance with 7.2.1.2.4, item b).	I test: ____ A Ambient temperature: ____°C	N/A
7.2.1.2.4	Opening by over-current releases		
b)	Opening under overload conditions		N/A
1)	Instantaneous or definite time-delay operation		N/A
	The release shall cause tripping of the circuit-breaker with an accuracy of + 10% of the tripping current value of the current setting for all values of current setting of the overload release		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
2)	Inverse timer-delay operation		
	At the reference temperature and at 1,05 times the current setting with the conventional non-tripping current, the opening release being energized on all poles, tripping shall not occur in less than the conventional time from the cold state, i.e. with the circuit-breaker at the reference temperature		N/A
	Moreover, when at the end of the conventional time the value of current is immediately raised to 1,30 times the current setting, i.e. with the conventional tripping current, tripping shall then occur in less than the conventional time later		N/A
	If a release is declared by the manufacturer as substantially independent of ambient temperature, the current values of table 6 shall apply within the temperature band declared by the manufacturer, within a tolerance of 0,3%/K		N/A
	The width of the temperature band shall be at least 10 K on either side of the reference temperature		N/A

Annex H	Individual pole short-circuit test sequence		
	Circuit-breaker for use in IT systems		
H.2	Test of individual pole short-circuit breaking capacity		
	A short-circuit test is made on the individual poles of a multipole circuit-breaker at a value of prospective current (I_{IT}) equal to 1,2 times the maximum setting of the short-time delay release tripping current or, in the absence of such a release, 1,2 time the max. setting of the tripping current of the instantaneous release, or, where relevant 1,2 times the maximum setting of the definite time delay release tripping current, but not less than 500 A nor exceeding 50kA.		
	Type designation or serial number		
	Sample no:		
	Rated current: In (A)		
	Rated operational voltage: Ue (V)		
	Rated ultimate short-circuit breaking capacity: (kA)		
	Rated control supply voltage of closing mechanism: Uc (V)		
	Rated control supply voltage of shunt release: Uc (V)		

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Clause	Requirement + Test	Result - Remark	Verdict
	The test sequence of operations is O – t - CO		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		N/A
	closing mechanism energized with 85% at the rated Uc: (V)		N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.		N/A
	Test made in free air:		N/A
	Distances of the metallic screen's: (all sides)		N/A
	The characteristics of the metallic screen:		
	- woven wire mesh		N/A
	- perforated metal		N/A
	- expanded metal		N/A
	- ratio hole area/total area: 0,45-0,65		N/A
	- size of hole: <30mm^2		N/A
	- finish: bare or conductive plating		N/A
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		N/A
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long		N/A
	Circuit is earthed at: (load-star- or supply-star point)		N/A
	Conductor cross-sectional area (mm²):		N/A
	If terminals unmarked: line connected at: (underside/upside)		N/A
	Tightening torques: (Nm)		N/A
	Test sequence of operation: O – t – CO		N/A
	Test circuit according figure: 9		N/A
	- test voltage U/Ue = 1,05 (V) .....L1: .....L2: L3:		N/A
	Short-circuit test current (I_{IT}): equal to 1,2 times the max. setting of the short-time delay release tripping current,		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	or, in the absence of such a release, 1,2 time the max. setting of the tripping current of the instantaneous release,		N/A
	or, where relevant 1,2 times the max. setting of the definite time delay release tripping current, but not exceeding 50kA.		N/A
	- r.m.s. test current AC/DC: (A)		N/A
	power factor/time constant:		N/A
	- Factor "n"		N/A
	- peak test current (Amax) :		N/A
	Test sequence "O" L1		
	- max. let-through current: (kApeak) L1:		N/A
	- Joule integral I^2dt (A^2s) L1:		N/A
	Pause, t: (min)		N/A
	Test sequence "CO" L1		
	- max. let-through current: (kApeak) L1:		N/A
	- Joule integral I^2dt (A^2s) L1:		N/A
	Test sequence "O" L2		
	- max. let-through current: (kApeak) L2:		N/A
	- Joule integral I^2dt (A^2s) L2:		N/A
	Pause, t: (min)		N/A
	Test sequence "CO" L2		
	- max. let-through current: (kApeak) L2:		N/A
	- Joule integral I^2dt (A^2s) L2:		N/A
	Test sequence "O" L3		
	- max. let-through current: (kApeak) L3:		N/A
	- Joule integral I^2dt (A^2s) L3:		N/A
	Pause, t: (min)		N/A
	Test sequence "CO" L3		
	- max. let-through current: (kApeak) L3:		N/A
	- Joule integral I^2dt (A^2s) L3:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	For 4-pole circuit-breakers with a protected neutral pole, the test voltage for that pole shall be phase-to-phase voltage divided by √3. This test is applicable only where the construction of the protected neutral pole differs from that of the phase poles.		N/A
	Test sequence "O" N		
	- max. let-through current: (kApeak) ..... N:		N/A
	- Joule integral I^2dt (A^2s) ..... N:		N/A
	Pause, t: (min)		N/A
	Test sequence "CO" N		
	- max. let-through current: (kApeak) ..... N:		N/A
	- Joule integral I^2dt (A^2s) ..... N:		N/A
	Melting of the fusible element		N/A
	Holes in the PE-sheet for test sequence "O"		N/A
	Cracks observed		N/A
H.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V		N/A
	- no breakdown or flashover		N/A
H.4	Verification of overload releases		
	The operation of overload releases shall be verified at 2.5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		
	Time specified by the manufacturer:		N/A
	- Operation time: (s) .....L1: .....L2: .....L3: ..... N :		N/A
H.5	Marking		
	Circuit-breaker for which all values of rated voltage have not been tested according to this annex or are not covered by such testing, shall be identified by the symbol ⊗ which shall be market on the circuit-breaker immediately following these values of rated voltage		N/A

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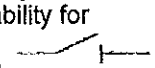
Clause	Requirement + Test	Result - Remark	Verdict
Annex J	Electromagnetic compatibility (EMC) – Requirements and test methods for circuit-breakers		
	See report:		N/A
Annex L	Circuit-breakers not fulfilling the requirements for overcurrent protection		
L.3	Classification		
	- class X: with integral non-adjustable instantaneous short-circuit releases for self-protection; - class Y: without integral short-circuit releases.		
L.4	Rated values		
	Rated current: In (A)		
	Rated conditional short-circuit current (Icc)		
L.5	Product information		
	A CBI shall be marked according to 5.2, as relevant, except that the symbol of suitability for isolation, if applicable, shall be  , replacing the symbol shown in the second dashed item of 5.2 a).		
	for 5.2, item a): with the symbol according to the classification:		
	for 5.2, item c): with the following items: rated conditional short-circuit-current (Icc); the OCPD, if specified.		
L.6	Constructional and performance requirements		
	A CBI, being derived from the equivalent circuit-breaker (see L.2.1), complies with all the applicable construction and performance requirements of Clause 7, except 7.2.1.2.4. NOTE A CBI may additionally comply with IEC 60947-3 and be marked accordingly.		
L.7	Tests		
L.7.2.2	OCPD specified		
L.7.2.2.2	Verification of Icc		
	The test shall be made with a prospective current equal to *Icc* of the CBI.		
	Each test shall consist of a O – t – CO sequence of operations made in accordance with 8.3.5.2, the CO operation being made by closing the CBI.		
	After each operation, the CBI shall be manually closed and opened three times.		

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Clause	Requirement + Test	Result - Remark	Verdict
L.7.2.2.3	Verification of dielectric withstand		
	Following the test of L.7.2.2.2, the dielectric withstand shall be verified in accordance with 8.3.5.3		
L.7.2.3	OCPD not specified		
L.7.2.3.2	Verification of Icc		
	The test shall be made with a prospective current equal to *Icc* of the CBI.		
	Each test shall consist of a O – t – CO sequence of operations made in accordance with 8.3.5.2, the CO operation being made by closing the CBI.		
	During the test, the current shall be maintained for three cycles and then disconnected at the power supply.		
	After each operation, the CBI shall be manually closed and opened three times.		
L.7.2.3.3	Verification of dielectric withstand		
	Following the test of L.7.2.3.2, the dielectric withstand shall be verified in accordance with 8.3.5.3		

Annex M	Modular residual current devices (without integral current breaking device)		
M.8.3	Operating characteristics		
	Type designation or serial number		
	Sample no:		
	Rated current: In (A)		
	Rated operational voltage: Ue (V)		
	Rated frequency (Hz)		
	Terminal type or through conductor type		
	MRCD with sensing means and processing device combined or separate	Combined/separate	
	MRCD with voltage source		
	Operating automatically in case of failure of the voltage source.	Yes/no	
	Rated insulation voltage (*Ui*)		

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Clause	Requirement + Test	Result - Remark	Verdict
	Rated impulse withstand voltage (*U*imp)		
	Characteristics of the voltage source of MRCDs		
	Rated values of the voltage source of MRCDs (*U*s)		
	Rated values of the frequencies of the voltage source of MRCDs		
	Rated insulation voltage (*U*i)		
	Rated impulse withstand voltage (*U*imp)		
M.4.1.3	Characteristics of auxiliary contacts		
M.4.2	Characteristics of MRCDs concerning their residual current function		
M.4.2.2	Operating characteristic in case of residual current with d.c. component		
	Type AC MRCD		
	Type A MRCD		
	Type B MRCD		
M.4.3	Behaviour under short-circuit conditions		
	Rated conditional short-circuit current (*I*cc)		
	Rated conditional residual short-circuit current (*I*Δc)		
	Rated short-time withstand current (*I*cw)		
	Rated residual short-time withstand current (*I*Δw)		
	Peak withstand current		
M.4.4	Preferred and limiting values		
	Preferred values of the rated residual operating current (*I*Δn)		
	Minimum value of the rated residual non-operating current (*I*Δno)		
	Limiting value of the non-operating overcurrent in the case of a single-phase load in a multiphase circuit		
	Preferred values of rated voltage of the voltage source of MRCDs		
	Compliance with constructional requirements		N/A
MI	Test sequence MI		
M.8.3.4.2	Verification of operating in case of steady increase of the residual current (figure M.1)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Increase the residual current from 0,2 IΔn to IΔn in 30 sec. Required: value between 0,2 IΔn and IΔn		N/A
	Min. setting IΔn.(mA): Interm. setting IΔn.(mA): Max. setting IΔn.(mA):		N/A
M.8.3.4.3	Verification of operating in case of closing on residual current (figure M.2)		
	The MRCD is closes on IΔn or each specified setting Required : no value exceeds the specified limiting value of Table B1 (300 ms) or Table B2 (500 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
M.8.3.4.4	Verification of operating in case of a sudden appearance of the residual current (figure M.2 and M3)		
	A residual current is sudden appear on the MRCD of IΔn Required : no value exceeds the specified limiting value of Table B1 (300 ms) or Table B2 (500 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	A residual current is sudden appear on the MRCD of 2 IΔn Required : no value exceeds the specified limiting value of Table B1 (150 ms) or Table B2 (200 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	A residual current is sudden appear on the MRCD of ☐ 5 IΔn or ☐ 0,25 A Required : no value exceeds the specified limiting value of Table B1 (40ms) or Table B2 (150 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	A residual current is sudden appear on the MRCD of ☐10 IΔn or ☐ 0,5 A Required : no value exceeds the specified limiting value of Table B1 (40 ms) or Table B2 (150 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	A residual current is sudden appear on the MRCD of IΔn: 5 A Required : no value exceeds the specified limiting value of Table B1 (40 ms)		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	A residual current is sudden appear on the MRCD of IΔn: 10 A Required : no value exceeds the specified limiting value of Table B1 (40 ms) or Table B2 (150 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	A residual current is sudden appear on the MRCD of IΔn: 20 A Required : no value exceeds the specified limiting value of Table B1 (40 ms) or Table B2 (150 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	A residual current is sudden appear on the MRCD of IΔn: 50 A Required : no value exceeds the specified limiting value of Table B1 (40 ms) or Table B2 (150 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	A residual current is sudden appear on the MRCD of IΔn: 100 A Required : no value exceeds the specified limiting value of Table B1 (40 ms) or Table B2 (150 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	A residual current is sudden appear on the MRCD of IΔn: 200 A Required : no value exceeds the specified limiting value of Table B1 (40 ms) or Table B2 (150 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	A residual current is sudden appear on the MRCD of IΔn: 500 A Required : no value exceeds the specified limiting value of Table B1 (40 ms) or Table B2 (150 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
M.8.3.4.5	Verification of the limiting non-operating time of time delayed type MRCDs (figure M3)		
	A residual current is sudden appear on the MRCD of 2 IΔn for a time declared by the manufacturer Required : The MRCD shall not operated		N/A
	Min. setting IΔn. Min. setting time delay (ms): Min. setting IΔn. Max. setting time delay (ms):		N/A
M.8.3.5	Tests at the temperature limits		
M.8.3.5.1	General (clause B.8.2.5 applies)		
	Minimum temperature (°C)		
	Maximum temperature (°C)		
M.8.3.5.2	Verification of operating in case of a sudden appearance of the residual current at –5°C or minimum temperature limit (figure M.2 and M3)		

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Clause	Requirement + Test	Result - Remark	Verdict
	A residual current is sudden appear on the MRCD of IΔn Required : no value exceeds the specified limiting value of Table B1 (300 ms) or Table B2 (500 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	A residual current is sudden appear on the MRCD of 2 IΔn Required : no value exceeds the specified limiting value of Table B1 (150 ms) or Table B2 (200 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	A residual current is sudden appear on the MRCD of ☐ 5 IΔn or ☐ 0,25 A Required : no value exceeds the specified limiting value of Table B1 (40ms) or Table B2 (150 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	A residual current is sudden appear on the MRCD of ☐10 IΔn or ☐ 0,5 A Required : no value exceeds the specified limiting value of Table B1 (40 ms) or Table B2 (150 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	Verification of the limiting non-operating time of time delayed type MRCDs at –5°C or minimum temperature limit (figure M3)		N/A
	A residual current is sudden appear on the MRCD of 2 IΔn for a time declared by the manufacturer Required : The MRCD shall not operated		N/A
	Min. setting IΔn. Min. setting time delay (ms): Min. setting IΔn. Max. setting time delay (ms):		N/A
M.8.3.5.3	Verification of operating in case of a sudden appearance of the residual current at +40°C (figure M.2 and M3)		

ВЯРНО С ОРИГИНАЛА

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IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	A residual current is sudden appear on the MRCD of IΔn Required : no value exceeds the specified limiting value of Table B1 (300 ms) or Table B2 (500 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	A residual current is sudden appear on the MRCD of 2 IΔn Required : no value exceeds the specified limiting value of Table B1 (150 ms) or Table B2 (200 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	A residual current is sudden appear on the MRCD of ☐ 5 IΔn or ☐ 0,25 A Required : no value exceeds the specified limiting value of Table B1 (40ms) or Table B2 (150 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	A residual current is sudden appear on the MRCD of ☐10 IΔn or ☐ 0,5 A Required : no value exceeds the specified limiting value of Table B1 (40 ms) or Table B2 (150 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	A residual current is sudden appear on the MRCD of 2 IΔn for a time declared by the manufacturer Required : The MRCD shall not operated		N/A
	Min. setting IΔn. Min. setting time delay (ms): Min. setting IΔn. Max. setting time delay (ms):		N/A
M.8.4.	Verification of dielectric properties		
M.8.4.1	Verification of rated impuls withstand voltage		
	rated impulse withstand voltage		

ВЯРНО С ОРИГИНАЛА

ACM OOD

1000 София, ул. "Стефан Караджа" №7, вх. Б, ет. 1, ап. 14, тел.: 02/9874960, 9874970, факс: 02/9874980, E-mail: office@acm-bg.com
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ИНСТРУКЦИЯ ЗА СЪХРАНЕНИЕ И СКЛАДИРАНЕ

При складиране и съхранение на предложената комутационна апаратура е необходимо да се спазват следните изисквания:

1. Да се спазват температурните граници за съхранение на продукта, отбелязани върху етикета на всяко изделие.

2. Изделията да се съхраняват в оригиналната опаковка на производителя.

3. Изделията да се съхраняват в закрити складови помещения.

4. Да се предпазват от механични и химически увреждания.

5. Монтажът да се извършва в съответствие с инструкциите и указанията на производителя.

6. Повредите, причинени не по вина на доставчика, като лош транспорт, лошо съхранение, неправилна експлоатация, природни стихии, неспазване на указанията за правилен монтаж се отстраняват за сметка на клиента.

7. Гаранцията не се отнася за повреди, причинени от други средства, лица и вещи.

гр. София
14.07.2015 г.

Ангел Ангелов
/управител/

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АСМ ООД

1000 София, ул. "Стефан Караджа" №7, вх. Б, ет. 1, ап. 14, тел.: 02/9874960, 9874970, факс: 02/9874980, E-mail: office@acm-bg.com
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ИНСТРУКЦИЯ ЗА СЪХРАНЕНИЕ И СКЛАДИРАНЕ

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гр. София
14.07.2015 г.

Ангел Ангелов
/Управител/

1000 София, ул. "Стефан Караджа" №7, вх. Б, ет. 1, ап. 14, тел.: 02/9874960, 9874970, факс: 02/9874980, E-mail: office@acm-bg.com
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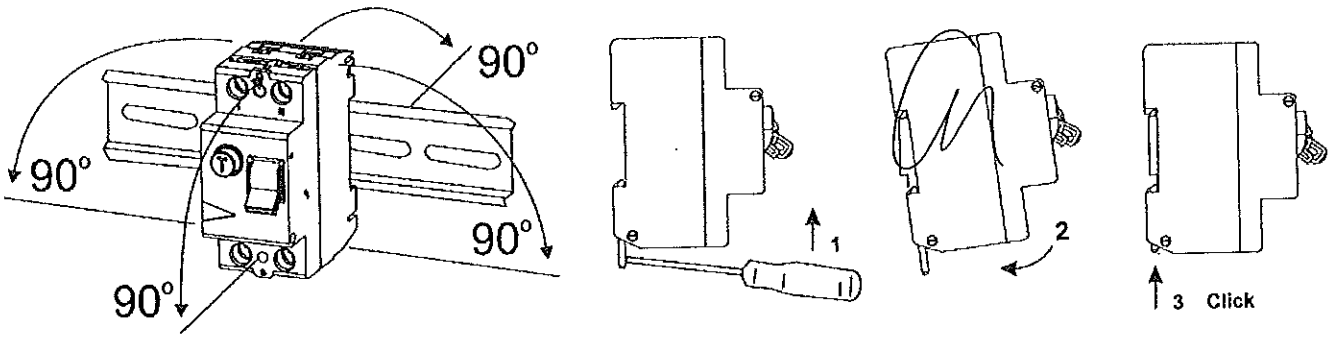
ИНСТРУКЦИЯ ЗА МОНТАЖ

Начин на монтаж:

- Бързо захващане със заключваща се позиция на DIN шина съгласно EN 50022
- Хоризонтален или вертикален монтаж
- Монтажът на изделията се извършва само от обучени електроспециалисти.

Комутационната апаратура, производство на фирма Деликси Електрик Лтд се монтира съгласно приложената по-долу схема:

Схема за монтаж



Забележка: Въртящият момент на затягане на клемовите съоръжения е 2,5Nm за HDB9H и 5,5Nm за HDB2.

гр. София
14.07.2015 г.

Ангел Ангелов
/Управител/

ACM OOD

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ИНСТРУКЦИЯ ЗА ОБСЛУЖВАНЕ И ПОДДЪРЖАНЕ

Продуктите, производство на фирма Деликси Електрик Лтд е необходимо да се използват съгласно посочените по-долу инструкции за правилна експлоатация:

1. Инсталиране на продуктите се извършва съгласно инструкциите за монтаж на производителя.

2. При възникнали проблеми, които не са описани в инструкцията или необходимост от допълнителна информация се обърнете към специалистите на доставчика.

3. Привеждане в експлоатация на изделията се извършва само от обучени електроспециалисти.

4. Изделията, производство на фирма Деликси трябва да се съхраняват в закрити помещения при следните условия:

   * температура на въздуха - от -15 до +40 °C;
   * относителна влажност до 90% при 20 °C;
   * отсъствие на агресивни примеси в околната среда.

5. Повредите, причинени не по вина на доставчика, като лош транспорт, лошо съхранение, неправилна експлоатация, неизправност в електрическата мрежа, природни стихии, неспазване на указанията за правилен монтаж се отстраняват за сметка на клиента.

6. Доставчикът /Производителят/ не носи отговорност в случаи на повреда, възникнала като резултат от неправилен монтаж.

7. Гаранцията не се отнася до повреди, причинени от други средства и уреди.

гр. София
14.07.2015 г.

Ангел Ангелов
/Управител/

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Point of test circuit which is directly earthed:		
	Grid distance "a" (mm):		
	Prospective current (A):		
	Prospective current obtained (A):		
	Power factor / ratio *n*:		
	Power factor / ratio *n* obtained:		
	Plot no.		
	Test sequence: O		
	I^2t (kA^2s); Ip (kA):	Ip :_____kA I^2t; _____kA^2s Test duration: _____ms Plot no. _____	
	If tested at separate testing station see report	No.: _____ of _____ testing station _____	
	During tests no endangering of operator, no permanent arcing, no flashover and no melting of fuse F		N/A
	After the tests no damage impairing further use		N/A
8.3.3.5	Dielectric strength test of the main circuit at test voltage of 2 Un for 1 min:		
	Test voltage	-	N/A
B.8.10.3.2	The RCCB shall trip with a test current of 1,25 IΔn (ms) in minimum setting:	I test: _____ mA trip time: ____ ms	N/A
M.8.12.3	Verification of automatic opening in case of voltage source failure		
	Source voltage (Us)	Max Us: _____ V ☐ac ☐ dc	
		Min Us: _____ V ☐ac ☐dc	
	Adjustable residual current setting	_____ mA (lowest)	
	Adjustable time-delay setting	_____ s	
	Time period	Max 1 s or max. 1 s+time delay setting	N/A
	Time period to automatic opening		N/A

ВЯРНО С ОРИГИНАЛА

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	No value exceeds the relevant specified limiting value		N/A
	The polyethylene sheet shows no holes		N/A
M.III	Test sequence MIII		
M.8.15	Verification of effects of environmental conditions		
	Type designation or serial number		
	Sample no:		
B.8.10.3.2	The RCCB shall trip with a test current of 1,25 IΔn (ms) in minimum setting:	I test: _____ mA trip time: ____ ms	N/A
M.IV	Test sequence MIV		
M.8.16	Verification of electromagnetic compatibility		
	See report		N/A
Annex N	Electromagnetic compatibility (EMC) – Additional requirements and test methods for devices not covered by Annexes B, F and M		N/A
	See report		N/A
Annex O	Instantaneous trip circuit-breakers (ICB)		N/A
O.3.1	Rated current (In)		
O.3.2	Rated short-circuit making capacity		
O.3.3	Rated short-circuit breaking capacities		
	ICBs may be assigned rated short-circuit breaking capacities different to the equivalent circuitbreaker. NOTE ICBs may be assigned a rated short-circuit breaking capacity equal to or greater than I_{cu} of the equivalent circuit-breaker when associated with specified motor starters or overload relays, and tested according to the relevant clauses of IEC 60947-4-1 (see O.6.2).		N/A
O.4	Product information		
	An ICB shall be marked according to 5.2 as relevant.		N/A

ВЯРНО С ОРИГИНАЛА

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Rated short-circuit making and breaking capacities shall be marked, where applicable (see O.6.1.1). When the ICB is only rated for short-circuit performance in association with a motor starter or overload relay (see O.6.2), the short-circuit ratings of the association shall not be marked on the ICB.		N/A
	for 5.2, item a), add the marking "ICB";		N/A
	for 5.2, item b), add the rated instantaneous short-circuit current settings I_i (see 2.20) (actual values or multiples of rated current).		N/A
O.5	Constructional and performance requirements		
	An ICB, being derived from the equivalent circuit-breaker (see O.2.1), complies with all the applicable construction and performance requirements of Clause 7, except 7.2.1.2.4, item b).		N/A
O.6	Tests		
O.6.1	O.6.1 Test sequence of the ICB alone		
	The tests of this subclause are not required if – the short-circuit characteristics of the short-circuit releases and the main current paths of the ICB are the same as those of the equivalent circuit-breaker, or – the ICB is only rated and tested as an association (see O.6.2).		N/A
O.6.1.2	Test sequences		
	Tests shall be made according to sequences II and III of this standard without the verification of overload releases.		N/A
O.6.1.3	Verification of short-circuit releases		
	Following the test of O.6.1.2, a tripping test is made in accordance with 8.3.3.1.2 on each phase pole in turn, at the maximum setting of the rated instantaneous short-circuit current. The test is made at the value of the tripping current declared by the manufacturer for individual poles . The ICB shall trip.		N/A
O.6.2	ICB associated with a specified protected device (i.e. motor starter or overload relay)		

ВЯРНО С ОРИГИНАЛА

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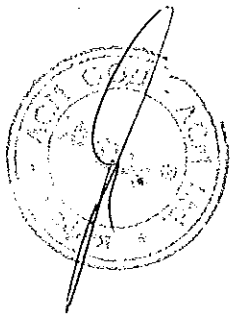
IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	The applicable test requirements for these associations are covered in the relevant sections of IEC 60947-4-1, specifically the following clauses: – co-ordination with short-circuit protective devices; – additional requirements for combination starters and protected starters suitable for isolation; – performance under short-circuit conditions; – co-ordination at the crossover current between the starter and associated SCPD. NOTE The symbol SCPD in IEC 60947-4-1 applies to various short-circuit protective devices, including the ICB.		N/A



ВЯРНО С ОРИГИНАЛА

IEC 60947-2

TABLE: TEMPERATURE RISE MEASUREMENTS				
temperature rise dT of part:		phase	dT (K)	required dT (K)
For clause 8.3.3.6 (125A, 1P)				
1	Terminals for external connections	Max for all	64	80
2	Enclosure	Max for all	38	50
3	Non-metallic handle	Max for all	18	35
For clause 8.3.4.4 (125A, 1P)				
1	Terminals for external connections	Max for all	44	80

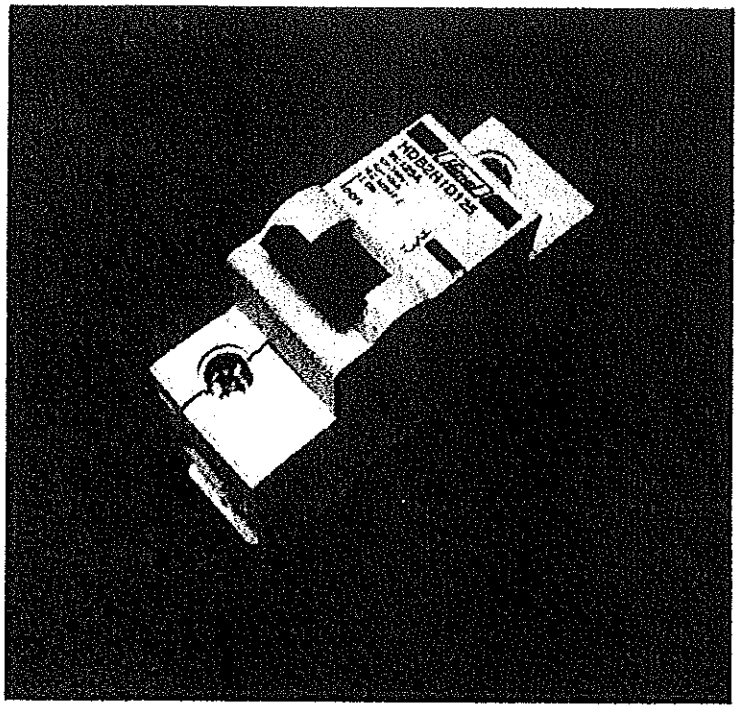
TABLE: THREADED PART TORQUE TEST			
threaded part identification	diameter of thread (mm)	column number (I, II, or III)	applied torque (Nm)
Terminal screw	6,8	II	3,5
supplementary information:			

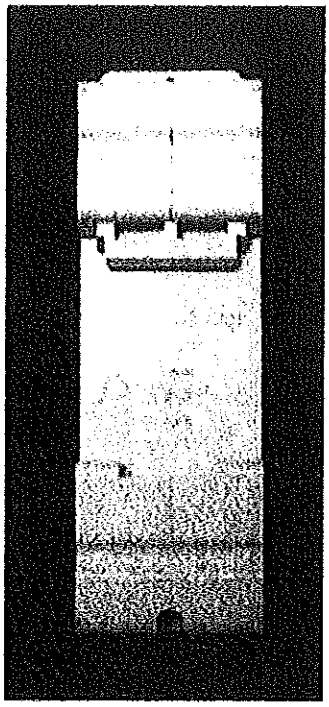
TABLE: GLOW WIRE TEST							
Part	Colour	Thick (mm)	Temp. °C	burning after t (s)	drops	support burning	Comments
Enclosure	Grey	2,5	960	2	No	No	OK
Non-metallic mechanical parts	Brown	2,0	960	-	No	No	OK
	Red	2,0	650	-	No	No	OK
	White	2,5	960	-	No	No	OK
Handle	Black	2,0	650	-	No	No	OK
supplementary information:							

ВЯРНО С ОРИГИНАЛА

IEC 60947-2

Photos of samples:





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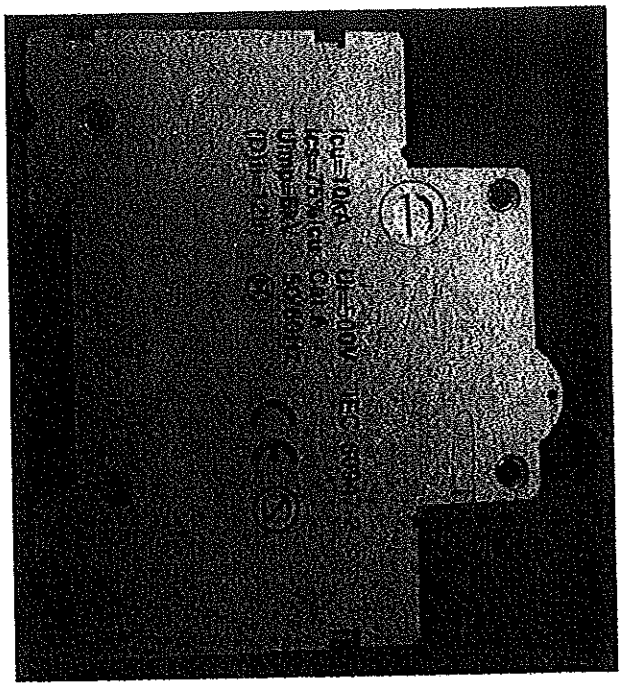
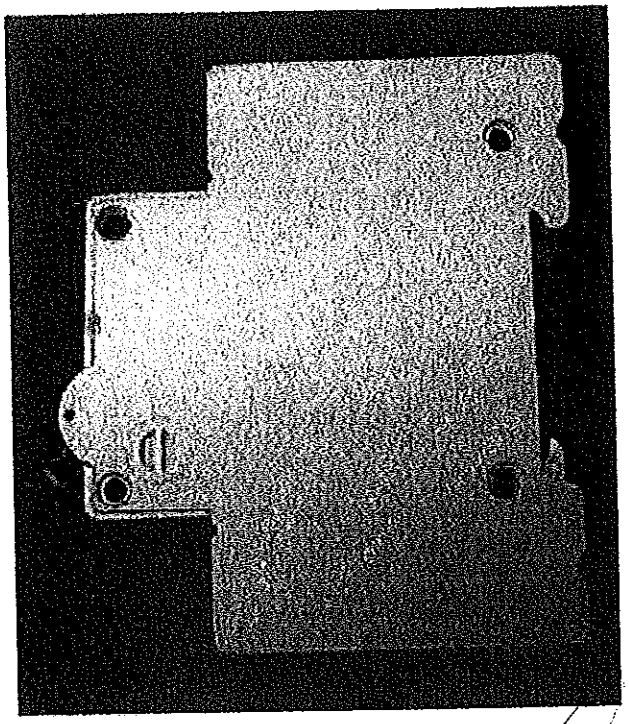
Photos of samples:





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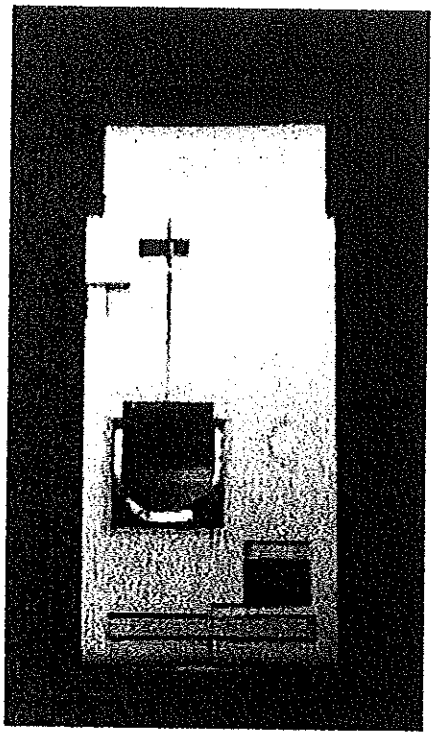
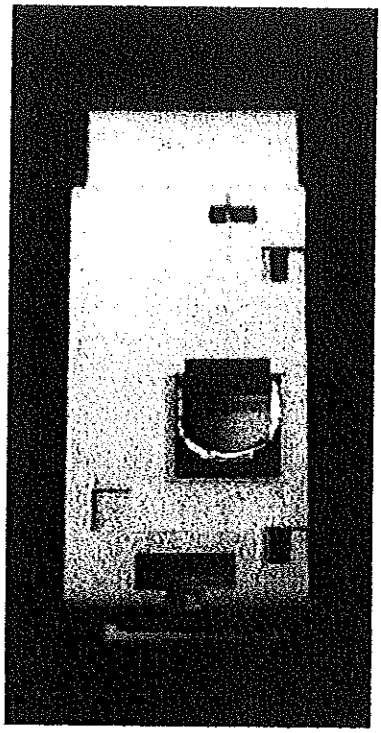
IEC 60947-2

Photos of samples:





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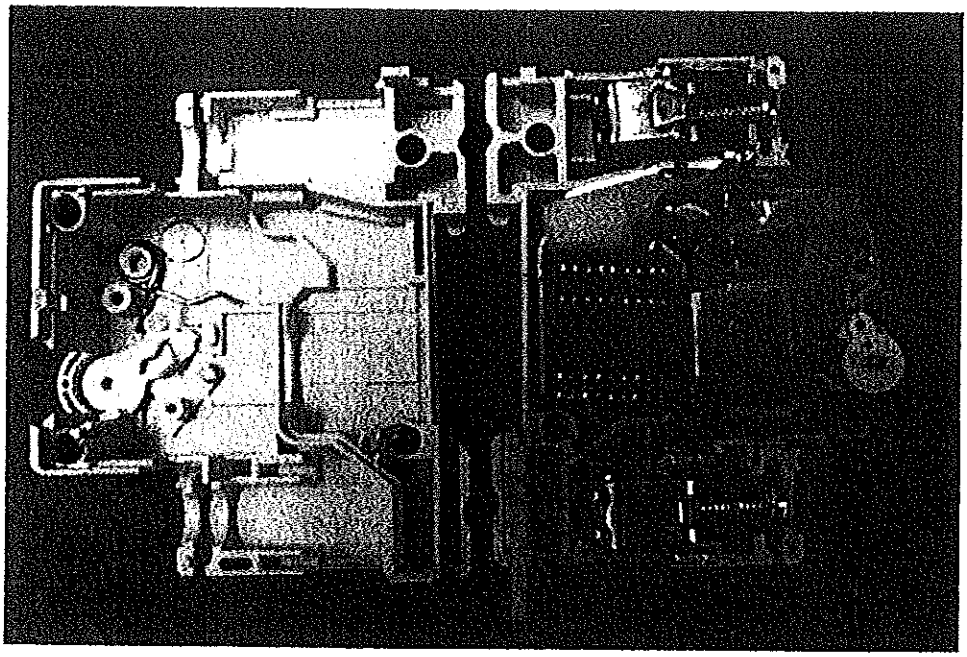
IEC 60947-2

Photos of samples:



ВЯРНО С ОРИГИНАЛА

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Test Report issued under the responsibility of:

TEST REPORT
IEC 60947-2
Low-voltage switchgear and controlgear - Part 2: Circuit-breakers

Report Reference No. ..... :	SH11090550-002
Date of issue ..... :	February 07, 2012
Total number of pages	58
Testing Laboratory ..... :	Intertek Testing Services Shanghai
Address ..... :	Building No.86, 1198 Qinzhou Road (North), Shanghai 200233, China
Applicant's name ..... :	HIMEL TECHNOLOGY, S.L.
Address ..... :	Calle Bac de Roda, No. 52, edificio A 08019 BARCELONA Spain
Test specification:	
Standard ..... :	☒ IEC 60947-2:2006 (4th Edition) + A1: 2009
	☒ EN 60947-2:2006 + A1: 2009
Test procedure ..... :	CB & S
Non-standard test method ..... :	N/A
Test Report Form No. ..... :	IEC60947_2F
Test Report Form(s) Originator ..... :	KEMA Quality BV
Master TRF ..... :	Dated 2010-01

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.

Test item description ..... :	Moulded case circuit-breakers
Trade Mark ..... :	CHIMEL
Manufacturer ..... :	DELIXI ELECTRIC LTD / Delixi High Tech Industrial Park, Liushi Town, Yueqing City, Zhejiang Province, China 325604
Model/Type reference ..... :	HDB2
Ratings ..... :	U_e= 415V~(2P)
	In = 63, 80, 100, 125A

ВЯРНО С ОРИГИНАЛА

Testing procedure and testing location:	
☒ **Testing Laboratory:**	Intertek Testing Services Shanghai
Testing location/ address.....:	Building No.86, 1198 Qinzhou Road (North), Shanghai 200233, China
☒ **Associated Laboratory:**	Inspection Center of Products' Quality of Low Voltage Electric Apparatus in Zhejiang Province
Testing location/ address.....:	West Zhonghuan Road, Jiaxing City, Zhejiang Province, P.R.China
Tested by (name + signature).....:	Vincent Yang
Approved by (+ signature) .....:	Jim Hua
☐ Testing procedure: TMP	
Tested by (name + signature).....:	
Approved by (+ signature) .....:	
Testing location/ address.....:	
☐ Testing procedure: WMT	
Tested by (name + signature).....:	
Witnessed by (+ signature).....:	
Approved by (+ signature) .....:	
Testing location/ address.....:	
☐ Testing procedure: SMT	
Tested by (name + signature).....:	
Approved by (+ signature) .....:	
Supervised by (+ signature).....:	
Testing location/ address.....:	
☐ Testing procedure: RMT	
Tested by (name + signature).....:	
Approved by (+ signature) .....:	
Supervised by (+ signature).....:	
Testing location/ address.....:	

ВЯРНО С ОРИГИНАЛА

Summary of testing:

Number of tests for test procedure, according to table 9a and table 10

No. of poles	In(A)	Test sequence and number of samples									
		I	II	III	IV	V	Combined	Annex B	Annex C	Annex H	Annex M
1P	125	1+1[a]	1	1	-	-	-	-	-	-	-
1P	63	-	1	1	-	-	-	-	-	-	-
2P	125	1+1[a]	1	1	-	-	-	-	-	-	-
2P	63	-	1	1	-	-	-	-	-	-	-
3P	125	1[b]	-	1[b]	-	-	-	-	-	-	-
3P	63	-	-	1[b]	-	-	-	-	-	-	-
4P	125	1+1[a]	1	1+1[c]	-	-	-	-	-	-	-
4P	63	-	1	1+1[c]	-	-	-	-	-	-	-

Note:

a) This sample only tested to clause 8.3.3.1 to verify instantaneous of $8,5I_n$,
b) Test Sequence in Amend.1 of IEC 60947-2.
c) Tested on the fourth pole and its adjacent pole.

Tests performed (name of test and test clause):		**Testing location:**
8.3.3.1	Tripping limits and characteristics	ACTL
8.3.3.2	Dielectric properties	ACTL
8.3.3.3	Operational performance capability	ACTL
8.3.3.4	Overload performance	ACTL
8.3.3.5	Verification of dielectric withstand	ACTL
8.3.3.6	Verification of temperature rise	ACTL
8.3.3.7	Verification of overload releases	ACTL
8.3.3.8	Verification of undervoltage and shunt releases (if applicable)	CBTL
8.3.3.9	Verification of main contact position (for circuit breakers suitable for isolation)	CBTL
8.3.4.1	Service short-circuit breaking capacity	ACTL
8.3.4.2	Verification of operational capability	ACTL
8.3.4.3	Verification of dielectric withstand	ACTL
8.3.4.4	Verification of temperature rise	ACTL
8.3.4.5	Verification of overload releases	ACTL
8.3.5.1	Verification of overload releases	ACTL
8.3.5.2	Ultimate short-circuit breaking capacity	ACTL
8.3.5.3	Verification of dielectric withstand	ACTL
8.3.5.4	Verification of overload releases	ACTL

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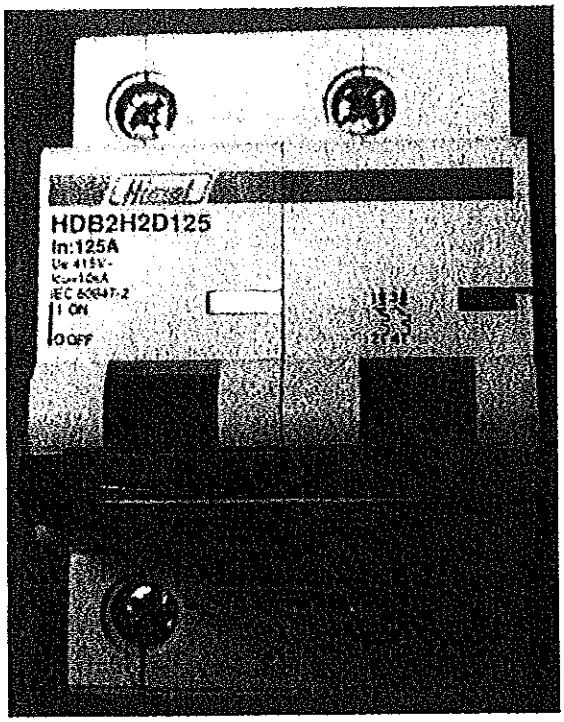
Summary of compliance with National Differences:

N/A

Copy of marking plate:



ВЯРНО С ОРИГИНАЛА

Test item particulars: test item vs. test requirements	
3. Classification	
3.1. Utilization category: (A or B).	A
3.2. Interruption medium: (air, vacuum, gas Break).....	air
3.3. Design: (open construction, moulded case).....	Moulded case
3.4. Method of controlling the operation mechanism: (dependent manual, independent manual, dependent power, independent power)	Independent manual
3.5. Suitability for isolation: (suitable, not -suitable).....	Suitable
3.6. Provision for maintenance: (maintainable, non maintainable).....	Non-maintainable
3.7. Method of installation: (fixed, plug in, withdrawable:	Fixed
3.8. Degree of protection: (IP code)	IP20
4.7. Type of release (thermo-magnetic / electronic)	Thermo-magnetic
4.8. Integral fuses (integrally fused circuit-breakers) Type and characteristics of SCPD.....	N/A
7.3 Electromagnetic compatibility (EMC) Environment A or B.....	N/A
Circuit-breaker for use on phase-earthed systems.....	N/A
Circuit-breaker for use in IT systems.....	Yes
Rated and limiting values, main circuit	
- rated operational voltage: Ue (V).....	415V~
- rated insulation voltage: Ui (V).....	500
- rated impulse withstand voltage: Uimp (kV).....	6kV
- rated operational current: Ie (A).....	63, 80, 100, 125
- kind of current	AC
- conventional free air thermal current: Ith (A).....	63, 80, 100, 125
- conventional enclosed thermal current: Ithe (A)	N/A
- current rating for four-pole circuit-breakers: (A).....	N/A
- number of poles	2
- rated frequency: (Hz)	50/60
- Integral fuses (rated values)	N/A
Rated duty :	
- eight-hour duty	N/A
- uninterrupted duty: Iu (A)	63, 80, 100, 125
Short-circuit characteristic :	
rated short-time making capacity: Icm (kA).....	N/A

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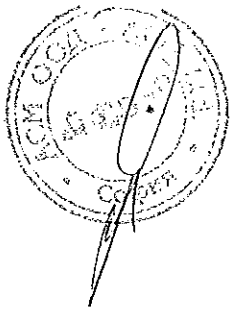
rated ultimate short-circuit breaking capacity: Icu (kA) . .....:	10
rated service short-circuit breaking capacity: Ics (kA).....:	7,5
rated short-time withstand current: Icw (kA/s).....:	17
Control circuits :	
Electrical control circuits :	
- kind of current: (AC, DC) .....:	N/A
- rated frequency: (Hz) .....:	N/A
- rated control circuit voltage: Uc (nature, frequency, V) ....:	N/A
- rated control supply voltage: Us (nature, frequency V) ....:	N/A
Air supply control circuits: (pneumatic or electro-pneumatic) :	
- rated pressure and its limit .....:	N/A
- volumes of air, at atmospheric pressure, required for each closing and each opening operation.....:	N/A
Auxiliary circuits :	
Rated and limiting values, auxiliary circuits.....:	N/A
- rated operational voltage Ue (V).....:	N/A
- rated insulation voltage: Ui (V).....:	N/A
- rated operational current: Ie (A).....:	N/A
- kind of current .....:	N/A
- rated frequency: (Hz) .....:	N/A
- number of circuits .....:	N/A
- number and kind of contact elements .....:	N/A
- rated uninterrupted current: Iu (A) .....:	N/A
- utilization category: (AC, DC, current and voltage) .....:	N/A
Short-circuit characteristic :	
- Rated conditional short-circuit current (kA) .....:	N/A
- kind of protective device .....:	N/A



ВЯРНО С ОРИГИНАЛА

Releases :	
1) shunt release	N/A
2) Over-current release	
a) instantaneous	Yes
b) definite time delay	N/A
c) inverse time delay	Yes
- independent of previous load	N/A
- dependent on previous load; (for example thermal type release)	Yes
3) Undervoltage release (for opening)	N/A
4) Other releases	N/A
Characteristics :	
1) Shunt release and undervoltage release (for opening)	
- rated control circuit voltage: Uc (nature, frequency, V)	N/A
- kind of current	N/A
- rated frequency: (if AC)	N/A
2) Over-current release	
- rated current	63, 80, 100, 125A
- kind of current	AC
- rated frequency: (if AC)	50/60Hz
- current setting (or range of settings)	Inverse time delay: I_n Instantaneous: $8,5I_n$, $12I_n$
- time settings (or range of settings)	Inverse time delay: $1,05I_n$: ≥1h, $1,30I_n$: <1h (for I_n≤63A) Inverse time delay: $1,05I_n$: ≥2h, $1,30I_n$: <2h (for I_n>63A) Instantaneous: $0,8x8,5I_n$: ≥0,2s, $1,2x8,5I_n$: <0,2s Instantaneous: $0,8x12I_n$: ≥0,2s, $1,2x12I_n$: <0,2s

ВЯРНО С ОРИГИНАЛА

Classification of installation and use..... :	Installed by rail
Supply Connection..... :	N/A
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..... :	December 16, 2011
Date (s) of performance of tests..... :	From December 20, 2011 to January 18, 2012

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.

This test report is valid only being read together with the test reports of SH11090550-001, -003, -004.

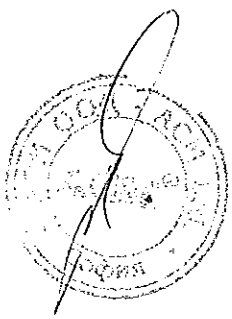
General product information:

U_e= 240V~(1P), 415V~(2P, 3P, 4P)

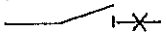
In= 63, 80, 100, 125A,

I_{cu}= 10kA, I_{cs}=7,5kA

Utilization category: A

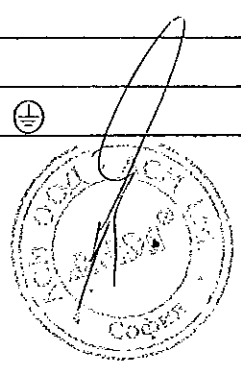


ВЯРНО С ОРИГИНАЛА

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
5.2	MARKING		
a)	The following data shall be marked on the circuit-breaker itself or on a name plate or nameplates attached to the circuit-breaker, and located in a place such that they are visible and legible when the circuit-breaker is installed.		
	- rated current:	63, 80, 100, 125A	P
	- suitability for isolation, if applicable, with the symbol 		P
	- indication of the open and closed position: with O and I respectively, if symbols are used	I-ON and O-OFF	P
b)	Marking on equipment not needed to be visible after mounting:		
	- manufacturer's name or trademark		P
	- type designation or serial number	HDB2	P
	- IEC 60947-2 if the manufacturer claims compliance with this standard.	IEC/EN60947-2	P
	- utilization category	A	P
	- rated operational voltage(s) Ue	415V~	P
	- Circuit-breaker for use in IT systems: Circuit-breaker for which all values of rated voltage have not been tested according to annex H or are not covered by such testing, shall be identified by the symbol Ⓗ which shall be marked on the circuit-breaker immediately following these values of rated voltage	Ⓗ	P
	- value (or range) of the rated frequency and/or the indication DC (or symbol)	50/60Hz	P
	- rated service short-circuit breaking capacity. Ics	7,5kA	P
	- rated ultimate short-circuit breaking capacity. Icu	10kA	P
	- rated short-time withstand current, (Icw) and associated short-time delay, for utilization category B		N/A
	- line and load terminals, unless their connection is immaterial	"1, 3", "2, 4"	P
	- neutral pole terminals, if applicable, by the letter N		N/A
	- protective earth terminal, where applicable, by the symbol acc. 7.1.9.3 of part 1		N/A
	- ref. temperature for non-compensated thermal releases, if different from 30°C		N/A

ВЯРНО С ОРИГИНАЛА

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
c)	Marked on the circuit-breaker as specified in item b), or shall be made available in the manufacturer's published information:		
	- rated short-circuit making capacity (Icm) (if higher than specified in 4.3.6.1)		N/A
	- rated insulation voltage. (Ui) if higher than the maximum rated operational voltage)	500V	P
	- rated impulse withstand voltage (Uimp), when declared.	6kV	P
	- pollution degree if other than 3		N/A
	- conventional enclosed thermal current (Ithe) if different from the rated current:		N/A
	- IP Code, where applicable:		N/A
	- minimum enclosure size and ventilation data (if any) to which marked ratings apply:		N/A
	- details of minimum distance between circuit-breaker and earthed metal parts for circuit-breaker intended for use without enclosure:		N/A
	- r.m.s sensing if applicable, according to F.4.1.1		N/A
	- suitability for environment A or B		N/A
d)	The following data concerning the opening and closing devices of the circuit-breaker shall be placed either on their own nameplates or on the nameplate of the circuit-breaker:		
	- rated control circuit voltage of the closing device, and rated frequency for AC:		N/A
	- rated control circuit voltage of the shunt release and/or of the under-voltage release, and rated frequency:		N/A
	- rated current of indirect over-current releases:		N/A
	- number and type of auxiliary contacts and kind of current, rated frequency (if AC) and rated voltages of the auxiliary switches, if different from those of the main circuit.		N/A
e)	Terminal shall be clearly and permanently identified in acc. with IEC 60445 and annex L :		
	- line terminal	"1, 3"	P
	- load terminal	"2, 4"	P
	- neutral pole terminal "N"		N/A
	- protective earth terminal ⏚		N/A



ВЯРНО С ОРИГИНАЛА

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	- terminal of coils (A/B)		N/A
	- terminal of shunt release (B)		N/A
	- terminals of under-voltage release (D)		N/A
	- terminals of interlocking electromagnets (E)		N/A
	- terminals of indicated light devices (X)		N/A
	- terminals of contact elements for switching devices (no)		N/A
7.1	CONSTRUCTION		
7.1.1	Withdrawable circuit-breaker		N/A
	In the disconnected position (main- and auxiliary circuits)		
	Isolating distances for circuit-breaker suitable for isolating warranted:		N/A
	Mechanism fitted with a reliable indicating device with indicates the position of the isolating contacts.		N/A
	Mechanism fitted with interlocks which only permit the isolating contacts to be separate or re-closed when main contacts are open		N/A
	Mechanism fitted with interlock, which only permit the main contacts to be closed when the isolating contacts are fully closed.		N/A
	Mechanism fitted with interlock, which only permit the main contacts to be closed when in disconnected position.		N/A
	The isolating distances between the isolating contacts cannot be inadvertently reduced.		N/A
7.1.2.1 part 1	Resistance to abnormal heat and fire		P
7.1.3 part 1	Current-carrying parts and their connection		P
7.1.4	Clearances and creepage distances:		
	For circuit-breakers for which the manufacturer has declared a value of rated impulse withstand voltage. (Uimp.)		
	Clearances distances:		
	- Uimp is given as:	6kV	
	- max. value of rated operational voltage to earth	-	
	- nominal voltage of supply system:	415V	

ВЯРНО С ОРИГИНАЛА

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	- overvoltage category:	IV	
	- pollution degree:	3	
	- field-in or homogeneous:	Field-in	
	- minimum clearances (mm):	3,0	
	- measured clearances (mm):	3,4	P
	Creepage distances:		
	- rated insulation voltage Ui (V)	500	
	- pollution degree	3	
	- comparative tracking index (V)	175	
	- material group	IIIa	
	- minimum creepage distances (mm)	8	
	- measured creepage distances (mm)	12	P
7.1.5 part 1	Actuator		
7.1.5.1 part 1	Insulation		
	The actuator of the equipment shall be insulated from the live parts for the rated insulation voltage and, if applicable, the rated impulse withstand voltage		P
	If it is made of metal, it shall be capable of being satisfactorily connected to a protective conductor unless it is provided with additional reliable insulation		N/A
	If it is made of or covered by insulating material, any internal metal part, which might become accessible in the event of insulation failure, shall also be insulated from live parts for the rated insulation voltage		N/A
7.1.5.2	Direction of movement		
	The direction of operation for actuators of devices shall normally conform to IEC 60447.		P
	Where devices cannot conform to these requirements, e.g. due to special applications or alternative mounting positions, they shall be clearly marked such that there is no doubt as to the "I" and "O" positions and the direction of operation		N/A

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IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
7.1.6 part 1	Indication of contact position		
7.1.6.1 part 1	Indicating means		
	When an equipment is provided with means for indicating the closed and open positions, these positions shall be unambiguous and clearly indicated		P
	This is done by means of a position indicating device (see 2.3.18)		P
	If symbols are used, they shall indicate the closed and open position respectively, in accordance with IEC 60417-2:		
	- 60417-2-IEC-5007 **I** On (power)	On	P
	- 60417-2-IEC-5007 **O** Off (power)	Off	P
	For equipment operated by means of two push-buttons, only the push-button designated for the opening operation shall be red or marked with the symbol "O"		N/A
	Red colour shall not be used for any other push-button		N/A
	The colours of other push-buttons, illuminated push-buttons and indicator lights shall be in accordance with IEC 60073		N/A
7.1.6.2 part 1	Indication by the actuator		
	When the actuator is used to indicate the position of the contacts, it shall automatically take up or stay, when released, in the position corresponding to that of the moving contacts; in this case, the actuator shall have two distinct rest positions corresponding to those of the moving contacts, but for automatic opening a third distinct position of the actuator may be provided		P
7.1.7	Additional safety requirements for equipment suitable for isolation		
7.1.7.1	Additional constructional requirements for equipment suitable for isolation (Ue > 50 V):		
	Equipment suitable for isolation shall provide in the open position an isolation distance in acc. with the requirements necessary to satisfy the isolating function. Indication of the main contacts shall be provide by one or more of the following means:		
	- the position of the actuator		P
	- a separate mechanical indicator		P
	- visibility of the moving contacts		N/A
	When means are provided or to lock the equipment in the open position, locking only be possible when contacts are in the open position		N/A

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IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Actuator front-plate fitted to the equipment in a manner which ensures correct contact position indication and locking		N/A
	The indicated open position is the only position in which the specified isolation distances between the contacts is ensured.		P
	- minimum clearances across open contacts (see Table XIII, Part 1) (mm) :	3,0	
	- measured clearances (mm) :	3,4	P
	- test Uimp across gap (kV) :	6,2	P
7.1.7.2	Supplementary requirements for equipment with provision for electrical interlocking with contactors or circuit-breakers:		
	auxiliary switch shall be rated according to IEC 60 947-5-1		N/A
	If equipment suitable for isolation is provided with an auxiliary switch for the purpose of electrical interlocking with contactor (s) or circuit-breaker(s) and intended to be used in motor circuits, the following requirements shall apply unless the equipment is rated for AC-23 utilization category		N/A
	The time interval between the opening of the contacts of the auxiliary switch and the contacts of the main poles shall be sufficient to ensure that the associated contactor or circuit-breaker interrupts the current before the main poles of the equipment open		N/A
	Unless otherwise stated in the manufacturer's technical literature, the time interval shall be not less than 20 ms when the equipment is operated according to the manufacturer instructions		N/A
	Compliance shall be verified by measuring the time interval between the instant of opening of the auxiliary switch and the instant of opening of the main poles under no-load conditions when the equipment is operated according to the manufacturer's instructions		N/A
	During the closing operation the contacts of the auxiliary switch shall close after or simultaneously with the contacts of the main poles		N/A
	A suitable opening time interval may also be provided by an intermediate position (between the ON and OFF position) at which the interlocking contact(s) is (are) open and the main poles remain closed.		N/A

ВЯРНО С ОРИГИНАЛА

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
7.1.7.3	Supplementary requirements for equipment provided with means for padlocking the open position:		
	the locking means shall be designed in such a way that it cannot be removed with the appropriate padlock(s) installed		N/A
	Alternatively, the design may provide padlockable means to prevent access to the actuator		N/A
	test force F applied to the actuator in an attempt to operate to the closed position (N) :		N/A
	rated impulse withstand voltage (kV) :		N/A
	test Uimp on open main contacts at the test force		N/A
7.1.8	Terminals		
7.1.8.1	All parts of terminals which maintain contact and carry current shall be of metal having adequate mechanical strength		P
	Terminal connections shall be such that necessary contact pressure is maintained		P
	Terminals shall be so constructed that the conductor is clamped between suitable surfaces without damage to the conductor and terminal		P
	Terminal shall not allow the conductor to be displaced or to be displaced themselves in a manner detrimental to the operator of equipment and the insulation voltage shall not be reduced below the rated value		P
7.1.8.2	Connection capacity		
	type of conductors :	Rigid-solid or stranded or flexible cable	P
	minimum cross-sectional area of conductor (mm^2) :	16	P
	maximum cross-sectional area of conductor (mm^2) :	50	P
	number of conductors simultaneously connectable to the terminal :	2 for 16mm^2 1 for 50mm^2	P
7.1.8.3	Connection		
	terminals for connection to external conductors shall be readily accessible during installation		P
	clamping screws and nuts shall not serve to fix any other component		P
7.1.8.4	Terminal identification and marking		
	terminal intended exclusively for the neutral conductor		N/A

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IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	protective earth terminal		N/A
	other terminals	"1, 3", "2, 4"	P
7.1.9 part 1	Additional requirements for equipment provided with a neutral pole		
	When equipment is provided with a pole intended only for connecting the neutral, this pole shall be clearly identified to that effect by the letter N (see 7.1.7.4.).		N/A
	A switched neutral pole shall break not before and shall make not after the other poles		N/A
	For equipment having a value of conventional thermal current (free air or enclosed, see 4.3.2.1 and 4.3.2.2) not exceeding 63 A, this value shall be identical for all poles		N/A
	For higher conventional thermal current values, the neutral pole may have a value of conventional thermal current different from that of the other poles, but not less than half that value or 63 A, whichever is the higher		N/A
	if a pole with an appropriate making and breaking capacity is used as a neutral pole, then all poles, incl. the neutral pole, shall operate substantially together.		N/A
7.1.10	Provisions for protective earthing		
7.1.10.1	The exposed conductive parts (e.g. chassis, framework and fixed parts of metal enclosures) other than those which cannot constitute a danger shall be electrically interconnected and connected to a protective earth terminal for connection to an earth electrode or to an external protective conductor		N/A
part 1	This requirement can be met by the normal structural parts providing adequate electrical continuity and applies whether the equipment is used on its own or incorporated in an assembly		N/A
	Exposed conductive parts are considered not to constitute a danger if they cannot be touched on large areas or grasped with the hand or if they are of small size (approximately 50 mm x 50 mm) or are so located as to exclude any contact with live parts		N/A
7.1.10.2 part 1	Protective earth terminal		
	The protective earth terminal shall be readily accessible and so placed that the connection of the equipment to the earth electrode or to the protective conductor is maintained when the cover or any other removable part is removed		N/A

ВЯРНО С ОРИГИНАЛА

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	The protective earth terminal shall be suitably protected against corrosion		N/A
	In the case of equipment with conductive structures, enclosures, etc., means shall be provided, if necessary, to ensure electrical continuity between the exposed conductive parts the equipment and the metal sheathing of connecting conductors		N/A
	The protective earth terminal shall have no other function, except when it is intended to be connected to a PEN conductor (see 2.1.1.5 – Note). In this case, it shall also have the function of a neutral terminal in addition to meeting the requirements applicable to the protective earth terminal		N/A
7.1.10.3	Protective earth terminal marking and identification		
	The protective earth terminal shall be clearly and permanently identified by its marking		N/A
	The identification shall be achieved by colour (green-yellow mark) or by the notation PE, or PEN, as applicable, in accordance with IEC 60445, subclause 5.3, or, in the case of PEN, by a graphical symbol for use on equipment		N/A
	Graphical symbol to be used: 60417-2-IEC-5019 ⏚ Protective earth (ground) in accordance with IEC 60417-2		N/A
7.1.11	Enclosure for equipment		
7.1.11.1	Design		
	The enclosure, when it is opened: all parts requiring access for installation and maintenance are readily accessible		N/A
	Sufficient space shall be provided inside the enclosure		N/A
	The fixed parts of a metal enclosure shall be electrically connected to the other exposed conductive parts of the equipment and connected to a terminal which enables them to be earthed or connected to a protective conductor		N/A
	Under no circumstances shall a removable metal part of the enclosure be insulated from the part carrying the earth terminal when the removable part is in place		N/A
	The removable parts of the enclosure shall be firmly secured to the fixed parts by a device such that they cannot be accidentally loosened or detached owing to the effects of operation of the equipment or vibrations		N/A

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IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	When an enclosure is so designed as to allow the covers to be opened without the use of tools, means shall be provided to prevent loss of the fastening devices		N/A
	If the enclosure is used for mounting push-buttons, it shall not be possible to remove the buttons from the outside of the enclosure		N/A
7.1.11.2	Insulation		
	If, in order to prevent accidental contact between a metallic enclosure and live parts, the enclosure is partly or completely lined with insulating material, then this lining shall be securely fixed to the enclosure		N/A
7.1.12	Degree of protection of enclosed equipment		
	Degree of protection.	IP20	
	Test for first characteristic.	IP2X	
	Test for first numeral .....:	1 **2** 3 4 5 6	P
	Test for second characteristic	IPX0	
	Test for second numeral .....:	1 2 3 4 5 6 7 8	N/A
7.1.13 part 1	Conduit pull-out, torque and bending with metallic conduits		
	Polymeric enclosures of equipment, whether integral or not, provided with threaded conduit entries, intended for the connection of extra heavy duty, rigid threaded metal conduits complying with IEC 60981, shall withstand the stresses occurring during its installation such as pull-out, torque, bending		N/A

ВЯРНО С ОРИГИНАЛА

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
7.2	Performance requirements		
7.2.1	Operating condition		
7.2.1.1	Closing		
	For a circuit-breaker to be closed safely on to the making current corresponding to its rated short-circuit making capacity, it is essential that it should be operated with the same speed and the same firmness as during the type test for proving the short-circuit making capacity		P
7.2.1.1.1	Dependent manual closing		
	For a circuit-breaker having a dependent manual closing mechanism, it is not possible to assign a short-circuit making capacity rating irrespective of the conditions of mechanical operation		N/A
	Such a circuit-breaker should not be used in circuits having a prospective peak making current exceeding 10 kA		N/A
	However, this does not apply in the case of a circuit-breaker having a dependent manual closing mechanism and incorporating an integral fast-acting opening release which causes the circuit-breaker to break safely, irrespective of the speed and firmness with which it is closed on to prospective peak currents exceeding 10 kA; in this case, a rated short-circuit making capacity can be assigned		N/A
7.2.1.1.2	Independent manual closing		
	A circuit-breaker having an independent manual closing mechanism can be assigned a short-circuit making capacity rating irrespective of the conditions of mechanical operation		P
7.2.1.1.3	Dependent power closing		
	At 110% of the rated control supply voltage, the closing operation performed on no-load shall not cause any damage to the circuit-breaker.		N/A
	At 85% of the rated control supply voltage, the closing operation shall be performed when the current established by the circuit-breaker is equal to its rated making capacity within the limits allowed by the operation of its relays or releases and, if a maximum time is stated for the closing operation, in a time not exceeding this maximum time limit.		N/A

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IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
7.2.1.1.4	Independent power closing		
	A circuit-breaker having an independent power closing operation can be assigned a rated short-circuit making capacity irrespective of the conditions of power closing		N/A
	Means for charging the operating mechanism, as well as the closing control components, shall be capable of operating in accordance with the manufacturer's specification		N/A
7.2.1.1.5	Stored energy closing		
	Capable ensuring closing of the circuit-breaker in any condition between no-load and its rated making capacity		N/A
	- when the stored energy is retained within the circuit-breaker, a device is provided which indicates when the storing mechanism is fully charged.		N/A
	- means for charging the operating mechanism and closing control components operates when auxiliary supply voltage is between 85% and 110% of the rated control supply voltage.		N/A
	- not possible for the moving contacts to move from the open position, unless the charge is sufficient for satisfactory completion of the closing operation.		N/A
	- by manually operated circuit-breaker is the direction of operation indicated. (not for circuit-breaker with an independent manual closing operation.)		N/A
	- For trip free circuit-breaker it shall not be possible to maintain the contacts in the touching or closed position when the release is in the position to trip the circuit-breaker.		N/A
7.2.1.2	Opening		
7.2.1.2.1	Circuit-breakers which open automatically shall be trip-free and, unless otherwise agreed between manufacturer and user, shall have their energy for the tripping operation stored prior to the completion of the closing operation		
7.2.1.2.2	Opening by undervoltage releases		
7.2.1.3. a part 1	Operating voltage		
	An under-voltage relay or release, when associated with a switching device, shall operate to open the equipment even on a slowly falling voltage within the range between 70% and 35% of its rated voltage		N/A

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IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	An under-voltage relay or release shall prevent the closing of the equipment when the supply voltage is below 35% of the rated voltage of the relay or release; it shall permit closing of the equipment at supply voltages equal to or above 85% of its rated value		N/A
	Unless otherwise stated in the relevant product standard, the upper limit of the supply voltage shall be 110% of its rated value		N/A
7.2.1.3. b part 1	Operating time		
	For a time-delay under-voltage relay or release, the time-lag shall be measured from the instant when the voltage reaches the operating value until the instant when the relay or release actuates the tripping device of the equipment		N/A
7.2.1.2.3	Opening by shunt releases		N/A
7.2.1.4 part 1	Limits of operation of shunt releases		
	A shunt release for opening shall cause tripping under all operating conditions of an equipment when the supply voltage of the shunt release measured during the tripping operation remains between 70% and 110% of the rated control supply voltage and, if a.c., at the rated frequency		N/A
7.2.1.5 part 1	Limits of operation of current operated relays and released		
	Limits of operation of current operated relays and releases shall be stated in the relevant product standard		N/A
7.2.1.2.4	Opening by over-current releases		
a)	Opening under short-circuit conditions		
	The short-circuit release shall cause tripping of the circuit-breaker with an accuracy of 20% of the tripping current value of the current setting for all values of the current setting of the short-circuit current release		P
	Where necessary for over-current co-ordination the manufacturer shall provide information (usually curves) showing		N/A
	- maximum cut-off (let-through) peak current as a function of prospective current (r.m.s. symmetrical)		N/A
	- I^2t characteristics for circuit-breakers of utilization category A and, if applicable, B for circuit-breakers with instantaneous override (see note to 8.3.5)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
b)	Opening under overload conditions		
1)	Instantaneous or definite time-delay operation		N/A
	The release shall cause tripping of the circuit-breaker with an accuracy of ± 10% of the tripping current value of the current setting for all values of current setting of the overload release		N/A
2)	Inverse time-delay operation		
	At the reference temperature and at 1,05 times the current setting with the conventional non-tripping current, the opening release being energized on all poles, tripping shall not occur in less than the conventional time from the cold state, i.e. with the circuit-breaker at the reference temperature		P
	Moreover, when at the end of the conventional time the value of current is immediately raised to 1,30 times the current setting, i.e. with the conventional tripping current, tripping shall then occur in less than the conventional time later		P
	If a release is declared by the manufacturer as substantially independent of ambient temperature, the current values of table 6 shall apply within the temperature band declared by the manufacturer, within a tolerance of 0,3%/K		N/A
	The width of the temperature band shall be at least 10 K on either side of the reference temperature		N/A
7.2.4.2	Operational performance capability		
7.2.4.2 part 1	The operational performance off-load for which the tests are made with the control circuits energized and the main circuit not energized, in order to demonstrate that the equipment meets the operating conditions specified at the upper and lower limits of supply voltage and/or pressure specified for the control circuit during closing and opening operations		N/A
	The operational performance on-load during which the equipment shall make and break the specified current corresponding, where relevant, to its utilization category for the number of operations stated in the relevant product standard		P

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IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
8	TESTS		
8.2.4	Mechanical properties of terminals		
	Mechanical strength of terminals		
	maximum cross-sectional area of conductor (mm²) :	50	
	diameter of thread (mm) :	6,8	
	torque (Nm) :	3,5	
	5 times on 2 separate clamping units		P
	Testing for damage to and accidental loosening of conductor (flexion test)		
	conductor of the smallest cross-sectional area (mm²) :	16	
	number of conductors of the smallest cross section :	2	
	diameter of bushing hole (mm) :	13,0	
	height between the equipment and the platen :	300	
	mass at the conductor(s) (kg) :	2,9	
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		P
	Pull-out test		
	force (N) :	100	
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		P
	conductor of the largest cross-sectional area (mm²) :	50	
	number of conductors of the largest cross section :	1	
	diameter of bushing hole (mm) :	15,9	
	height between the equipment and the platen :	343	
	mass at the conductor(s) (kg) :	9,5	
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		P
	Pull-out test		
	force (N) :	236	
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		P
	conductor of the largest and smallest cross-sectional area (mm²) :	16 / 50	

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IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	number of conductors of the smallest cross section, number of conductors of the largest cross section :	1 / 1	
	diameter of bushing hole (mm) :	13,0 / 15,9	
	height between the equipment and the platen :	300 / 343	
	mass at the conductor(s) (kg) :	2,9 / 9,5	
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		P
	Pull-out test		
	force (N) :	100 / 236	
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		P

8.3.3	TEST SEQUENCE I: GENERAL PERFORMANCE CHARACTERISTICS - 2 samples: 2P, 125A, Instantaneous: $8,5I_n/12I_n$			
8.3.3.1	Tripping limits and characteristic			
8.3.3.1.2	Opening under short-circuit conditions			
	Manufacturer's name or trademark	[redacted]		
	Type designation or serial number	HDB2		
	Sample no:	I-1	I-2	
	Rated operational voltage: Ue (V)	415		
	Rated current: In (A)	125		
	Ambient temperature 10-40 °C :	30°C		
	Value of the tripping current declared by the manufacturer for a single pole, at which value they shall operate.	8,5In	12 In	P
	Range of adjustable setting current. (A)			N/A
	Time delay stated by the manufacturer, in the case of definite time delay releases.			N/A
	Electromagnetic overcurrent releases			
	Test current: 80% of the rated, ~~or minimum adjustable setting current~~: (A)	850	1200	P

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Clause	Requirement + Test	Result - Remark		Verdict
	Operating time: >0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3: N-Lx:	>0,2s - - -	>0,2s - - -	P
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3: N-Lx:			N/A
	Test current: 120% of the rated, ~~or minimum adjustable setting current~~: (A)	1275	1800	P
	Operating time: <0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3: N-Lx:	37ms - - -	24 ms - - -	P
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3: N-Lx:			N/A
	Test current: 80% of the **maximum** adjustable setting current: (A)			N/A
	Operating time: >0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3: N-Lx:			N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3: N-Lx:			N/A
	Test current: 120% of the **maximum** adjustable setting current: (A)			N/A
	Operating time: <0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3: N-Lx:			N/A

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IEC 60947-2				
Clause	Requirement + Test	Result - Remark		Verdict
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3: N-Lx:			N/A
	Test current: tripping current declared for single pole operation (A)	1275	1800	P
	Operating time: < 0,2 s in case of instantaneous release: L1: L2: L3: N:	59ms 78ms- - -	37ms 65ms - -	P
	Operating time: < twice time delay stated by manufacturer in case of definite time delay releases L1: L2: L3: N:			N/A
	Electronic overcurrent releases			
	For circuit-breakers with an electronic overcurrent release, the operation of the short-circuit releases shall be verified by one test only on each pole individually.			N/A
	Test current: 80% of the rated, or **minimum** adjustable setting current: (A)			N/A
	Operating time: >0,2s in case of instantaneous releases: L1: L2: L3: N:			N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases: L1: L2: L3: N:			N/A
	Test current: 120% of the rated, or **minimum** adjustable setting current: (A)			N/A
	Operating time: <0,2s in case of instantaneous releases: L1: L2: L3: N:			N/A

ВЯРНО С ОРИГИНАЛА

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases: L1: L2: L3: N:		N/A
	Test current: 80% of the **maximum** adjustable setting current: (A)		N/A
	Operating time: >0,2s in case of instantaneous releases: L1: L2: L3: N:		N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases: L1: L2: L3: N:		N/A
	Test current: 120% of the **maximum** adjustable setting current: (A)		N/A
	Operating time: <0,2s in case of instantaneous releases: L1: L2: L3: N:		N/A
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases: L1: L2: L3: N:		N/A
8.3.3.1.3	Opening under overload conditions		
a)	Instantaneous or definite time-delay releases		
	Manufacturer's name or trademark		
	Type designation or serial number		
	Sample no:		
	Rated operational voltage: Ue (V)		
	Rated current: In (A)		
	Ambient temperature 10-40 °C :		N/A

ВЯРНО С ОРИГИНАЛА

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Value of the tripping current declared by the manufacturer for a single pole, at which value they shall operate.		N/A
	Range of adjustable setting current. (A)		N/A
	Time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 90% of the rated, or minimum adjustable setting current: (A)		N/A
	Operating time: >0,2s in case of instantaneous releases:		N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 90% of the maximum adjustable setting current: (A)		N/A
	Operating time: >0,2s in case of instantaneous releases		N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 110% of the rated, or minimum adjustable setting current: (A) circuit-breaker with neutral pole: 1,2x110% (A)		N/A
	Operating time: <0,2s in case of instantaneous releases:		N/A
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 110% of the maximum adjustable setting current: (A) circuit-breaker with neutral pole: 1,2x110% (A)		N/A
	Operating time: <0,2s in case of instantaneous releases		N/A
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
b)	Inverse time delay releases		
	Manufacturer's name or trademark	DELIXI ELECTRIC	
	Type designation or serial number	HDB2	
	Sample no:	I-1 I-2	

ВЯРНО С ОРИГИНАЛА

IEC 60947-2				
Clause	Requirement + Test	Result - Remark		Verdict
	Rated operational voltage: Ue (V)	415		
	Rated current: In (A)	125		
	For releases dependent of ambient air temperature: Reference temperature	30°C		P
	Test ambient temperature (°C)	29		P
	For releases dependent on ambient air temperature, the operating characteristics shall be verified at the reference temperature, the release being energized on all phase poles. If the test made at a different ambient temperature, a correction shall be made in accordance with the manufacturer's correction temperature/current data			P
	For thermal-magnetic releases independent of ambient temperature: Tests shall be made at 30°C and 20°C or 40°C, the release being energized on all phase poles			N/A
	For electronic releases, the operating characteristic shall be verified at the ambient temperature of the test room (see 6.1.1 of IEC 60947-1), the release being energised on all phase poles.			N/A
	Test ambient air temperature:	30°C		P
	Range of adjustable setting current: (A)			N/A
	Releases, dependent of ambient air temperature: Reference temperature (°C)	30°C		P
	Thermal Magnetic releases, independent of ambient air temperature: at 30°C			N/A
	Test current: 105% of the rated, ~~or **minimum adjustable setting current**~~: (A)	132	132	P
	Conventional non-tripping time: 1h when In < 63A, 2h when In > 63 A	>2h	>2h	P
	Test current: 130% of the rated, ~~or **minimum adjustable setting current:**~~ (A)	163	163	P
	For circuit-breakers having an identified neutral pole provided with an overload release (see 8.3.3.1.1), the test current at the conventional tripping current shall be multiplied by the factor 1,2.			N/A
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A	2min34s	5min40s	P
	Test current: 105% of the **maximum** adjustable setting current: (A)			N/A

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IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Conventional non-tripping time: 1h when In < 63A, 2h when In > 63 A		N/A
	Test current: 130% of the **maximum** adjustable setting current: (A)		N/A
	For circuit-breakers having an identified neutral pole provided with an overload release (see 8.3.3.1.1), the test current at the conventional tripping current shall be multiplied by the factor 1,2.		N/A
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A		N/A
	Thermal Magnetic releases, independent of ambient air temperature: at 20°C or 40°C		
	Test ambient air temperature:		N/A
	Test current: 105% of the rated, or **minimum** adjustable setting current: (A)		N/A
	Conventional non-tripping time: 1h when In < 63A, 2h when In > 63 A		N/A
	Test current: 130% of the rated, or **minimum** adjustable setting current: (A)		N/A
	For circuit-breakers having an identified neutral pole provided with an overload release (see 8.3.3.1.1), the test current at the conventional tripping current shall be multiplied by the factor 1,2.		N/A
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A		N/A
	Test current: 105% of the **maximum** adjustable setting current: (A)		N/A
	Conventional non-tripping time: 1h when In < 63A, 2h when In > 63 A		N/A
	Test current: 130% of the **maximum** adjustable setting current: (A)		N/A
	For circuit-breakers having an identified neutral pole provided with an overload release (see 8.3.3.1.1), the test current at the conventional tripping current shall be multiplied by the factor 1,2.		N/A
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A		N/A
	An additional test, at a current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer		
	Releases, dependent of ambient air temperature: Reference temperature (°C)		N/A
	Releases, independent of ambient air temperature: at 30°C		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Test ambient air temperature:		N/A
	Test current: at current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer. % at the rated, or minimum adjustable setting current: (% or A)		N/A
	Tripping time acc. time/current characteristic of the releases conform to the curves provided by the manufacturer. (within the stated tolerances)		N/A
	Releases, independent of ambient air temperature: at 20°C or 40°C		
	Test ambient air temperature:		N/A
	Test current: at current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer. % at the rated, or minimum adjustable setting current: (% or A)		N/A
	Tripping time acc. time/current characteristic of the releases conform to the curves provided by the manufacturer. (within the stated tolerances)		N/A
8.3.3.1.4	Additional test for definite time-delay releases		
a)	Time delay		
	Test is made at a current equal to 1,5 times the current setting. If the test current overlaps with another tripping characteristic (e.g. an instantaneous tripping characteristic), the trip setting and the test current shall be reduced as necessary to prevent premature tripping.		
	overload releases: (all phase poles loaded)		N/A
	for circuit-breakers having an identified neutral pole provided with an overload release, the test current for this release shall be 1,5 times the current setting;		N/A
	short-circuit releases		N/A
	Electromagnetic release: two poles in series carrying the test current, using successively all possible combinations of poles having a short-circuit release.		N/A
	Electronic releases: on one pole chosen at random.		N/A
	Test current: 1,5 times of the rated, or **minimum** adjustable setting current: (A)		N/A
	Operating time, overload releases: (s)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Time-delay: between the limits stated by the manufacturer:		N/A
	Operating time, short-circuit releases (electromagnetic): (s) L1-L2: L1-L3: L2-L3:		N/A
	Time-delay: between the limits stated by the manufacturer:		N/A
	Operating time, short-circuit releases (electronic): (s) L1: L2: L3:		N/A
	Time-delay: between the limits stated by the manufacturer:		N/A
	Test current: 1,5 times of the **maximum** adjustable setting current: (A)		N/A
	Operating time, overload releases: (s)		N/A
	Time-delay: between the limits stated by the manufacturer:		N/A
	Operating time, short-circuit releases (electromagnetic): (s) L1-L2: L1-L3: L2-L3:		N/A
	Time-delay: between the limits stated by the manufacturer:		N/A
	Operating time, short-circuit releases (electronic): (s) L1: L2: L3:		N/A
	Time-delay: between the limits stated by the manufacturer:		N/A
b)	Non-tripping duration		
	Firstly, the test current equal to 1,5 times the current setting is maintained for a time interval equal to the non-tripping duration stated by the manufacturer.		
	Then, the current is reduced to the rated current and maintained at this value for twice the time-delay stated by the manufacturer. The circuit-breaker shall not trip.		
	overload releases: (all phase poles loaded)		N/A
	for circuit-breakers having an identified neutral pole provided with an overload release, the test current for this release shall be 1,5 times the current setting;		N/A
	short-circuit releases		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Electromagnetic release: two poles in series carrying the test current, using successively all possible combinations of poles having a short-circuit release.		N/A
	Electronic releases: on one pole chosen at random.		N/A
	Test current: 1,5 times of the **minimum** adjustable setting current: (A)		N/A
	non-tripping duration stated by the manufacturer for overload release: (s)		N/A
	non-tripping duration stated by the manufacturer for short-circuit release thermal magnetic: (s)		N/A
	non-tripping duration stated by the manufacturer for short-circuit release electronic: (s)		N/A
	Time duration of current when reduced to the rated current: shall be twice the delay-time stated by the manufacturer: (s)		N/A
	Rated current		N/A
	Operating time, overload releases: the circuit-breaker does not trip:		N/A
	Operating time, short-circuit releases (electromagnetic), shall not trip: (s) L1-L2: L1-L3: L2-L3:		N/A
	Operating time, short-circuit releases (electronic), shall not trip: (s) L1: L2: L3:		N/A
	Test current: 1,5 times of **maximum** adjustable setting current: (A)		N/A
	non-tripping duration stated by the manufacturer for overload release: (s)		N/A
	non-tripping duration stated by the manufacturer for short-circuit release thermal magnetic: (s)		N/A
	non-tripping duration stated by the manufacturer for short-circuit release electronic: (s)		N/A
	Time duration of current when reduced to the rated current: shall be twice the delay-time stated by the manufacturer: (s)		N/A
	Rated current		N/A
	Operating time, overload releases: the circuit-breaker does not trip:		N/A

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IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Operating time, short-circuit releases (electromagnetic), shall not trip: (s) L1-L2: L1-L3: L2-L3:		N/A
	Operating time, short-circuit releases (electronic), shall not trip: (s) L1: L2: L3:		N/A
8.3.3.2	Test of dielectric properties, Impulse withstand voltage (Uimp indicated):		
8.3.3.4 part1	The 1,2/50µs impulse voltage shall be applied five times for each polarity at intervals of 1s minimum		
	- rated impulse withstand voltage (kV) :	6	P
	- sea level of the laboratory:	5m	P
	- test Uimp main circuits (kV) :	5,8	P
	- test Uimp auxiliary circuits (kV) :		N/A
	- test Uimp control circuits (kV) :		N/A
	- test Uimp on open main contacts (equipment suitable for isolating) (kV) :	6,2	P
a)	Application of test voltage		
	i) Between all terminals of the main circuit connected together (incl. control and auxiliary circuits connected to the main circuit) and the enclosure or mounting plate, with the contacts in all normal positions of operation.		P
	ii) Between each pole of the main circuit and the other poles connected together and to the enclosure or mounting plate, with the contacts in all normal positions of operation.		P
	iii) Between each control and auxiliary circuit not normally connected to the main circuit and: - the main circuit		N/A
	- other circuits		N/A
	- exposed conductive parts		N/A
	- enclosure of mounting plate		N/A
	iv) equipment suitable for isolation		P
	equipment not suitable for isolation		N/A
	- no unintentional disruptive discharge during the test's		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Test of dielectric properties, dielectric withstand voltage (Uimp not indicated):		
	- rated insulation voltage (V) :	500	P
	- main circuits, test voltage for 1 min (V)	1890	P
	- auxiliary circuits, test voltage for 1 min (V)		N/A
	- control circuits, test voltage for 1 min (V)		N/A
8.3.3.2.2	Application of test voltage		
1)	with circuit-breaker in the closed position		
	- between all live parts of all poles connected together and the frame of the circuit-breaker .		P
	- between each pole and all the other poles connected to the frame of the circuit-breaker		P
2)	with the circuit-breaker in the open position and, additionally, in the tripped position, if any.		
	- between all live parts of all poles connected together and the frame of the circuit-breaker.		P
	- between the terminals of one side connected together and the terminals of the other side connected together.		P
b)	Control and auxiliary circuits		
1)	- between all the control and auxiliary circuits which are not normally connected to the main circuit, connected together, and the frame of the circuit-breaker.		N/A
2)	- where appropriate, between each part of the control an auxiliary circuits which may be isolated from the other parts during normal operation and all the other parts connected together.		N/A
	No unintentional disruptive discharge during the tests		P
8.3.3.2	For circuit-breaker suitable for isolation, the leakage current shall be measured through each pole with the contacts in the open position, at a test voltage of 1,1 Ue, and shall not exceed 0,5mA.	457V 1,04x10^{-3}mA(Maximum)	P
8.3.3.3	Mechanical operation and operational performance capability		
8.3.3.3.2	Construction and mechanical operation		
a)	Construction		
	A withdrawable circuit-breaker shall be checked for the requirements stated in 7.1.1		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	A circuit-breaker with stored energy operation shall be checked for compliance with 7.2.1.1.5, regarding the charge indicator and the direction of operation of manual energy storing		N/A
b)	Mechanical operation		
	A circuit-breaker with dependent power operation shall comply with the requirements stated in 7.2.1.1.3		N/A
	A circuit-breaker with dependent power operation shall operate with the operating mechanism charged to the minimum and maximum limits stated by the manufacturer		N/A
	A circuit-breaker with stored energy operation shall comply with the requirements stated in 7.2.1.5 with the auxiliary supply voltage at 85% and 110% of the rated control supply voltage.		N/A
	It shall also be verified that the moving contacts cannot be moved from the open position when the operating mechanism is charged to slightly below the full charge as evidenced by the indicating device		N/A
	For a trip-free circuit-breaker it shall not be possible to maintain the contacts in the touching or closed position when the tripping release is in the position to trip the circuit-breaker		N/A
	If the closing and opening times of a circuit-breaker are stated by the manufacturer, such times shall comply with the stated values		N/A
c)	Undervoltage releases		
	Undervoltage releases shall comply with the requirements of 7.2.1.3 of Part 1. For this purpose, the release shall be fitted to a circuit-breaker having the maximum current rating for which the release is suitable		N/A
i)	Drop out voltage		
	It shall be verified that the release operates to open the circuit-breaker between the voltage limits specified		N/A
	The voltage shall be reduced from rated voltage at a rate to reach 0 V in approximately 30 s		N/A
	The test for the lower limit is made without current in the main circuit and without previous heating of the release coil		N/A
	In the case of a release with a range of rated voltages, this test applies to the maximum voltage of the range		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	The test for the upper limit is made starting from a constant temperature corresponding to the application of rated control supply voltage to the release and rated current in the main poles of the circuit-breaker		N/A
	This test may be combined with the temperature-rise test of 8.3.3.6		N/A
	In the case of a release with a range of rated voltages, this test is made at both the minimum and maximum rated control supply voltages		N/A
ii)	Test for limits of operation		
	Starting with the circuit-breaker open, at the temperature of the test room, and with the supply voltage at 30% rated maximum control supply voltage, it shall be verified that the circuit-breaker cannot be closed by the operation of the actuator		N/A
	When the supply voltage is raised to 85% of the minimum control supply voltage, it shall be verified that the circuit-breaker can be closed by the operation of the actuator		N/A
iii)	Performance under overvoltage conditions		
	With the circuit-breaker closed and without current in the main circuit, it shall be verified that the undervoltage release will withstand the application of 110% rated control supply voltage for 4 h without impairing its functions		N/A
d)	Shunt releases		
	Shunt releases shall comply with the requirements of 7.2.1.4 of Part 1. For this purpose, the release shall be fitted to a circuit-breaker having the maximum rated current for which the release is suitable		N/A
	It shall be verified that the release will operate to open the circuit-breaker at 70% rated control supply voltage when tested at an ambient temperature of + 55 °C ± 2 °C without current in the main poles of the circuit-breaker		N/A
	In the case of a release having a range of rated control supply voltages, the test voltage shall be 70% of the minimum rated control supply voltage		N/A
8.3.3.3.3	Operational performance capability without current.		
	Type designation or serial number	HDB2	
	Sample no:	I-2	
	Rated current In (A)	125	

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Clause	Requirement + Test	Result - Remark	Verdict
	Rated operational voltage: Ue (V)	415	
	Rated control supply voltage of closing mechanism: Uc (V)	-	
	Rated control supply voltage of shunt releases: Uc (V)	-	
	Rated control supply voltage undervoltage releases: Uc (V)	-	
	Ambient temperature 10-40 °C :	30°C	P
	Number of operating cycles per hour	120	P
	Number of cycles without current (total) (closing mechanism energized at the rated Uc)		N/A
	Number of cycles without current (without releases)	7000	P
	Applied voltage: closing mechanism (V)		N/A
	10% of total cycles for circuit-breaker with fitted shunt release: (50% at the beginning- and 50% at the end of the test.) Energized at the rated Uc		N/A
	Applied voltage: shunt releases (V)		N/A
	10% of total cycles for circuit-breaker with undervoltage releases: (50% at the beginning- and 50% at the end of the test.) Energized at the minimum rated Uc		N/A
	10 cycles without applied voltage at the undervoltage releases. (Shall not possible to close the circuit-breaker.)		N/A
	Applied voltage: undervoltage releases (V)		N/A
	Electrical components do not exceed the value indicated in tab. 7.		N/A
8.3.3.3.4	Operational performance capability with current.		
	Rated current: In (A)	125	
	Maximum rated operational voltage: Ue (V)	415	
	Conductor cross-sectional area (mm²) :	50	P
	Number of operating cycles per hour	120	P
	Number of cycles with current (total) (closing mechanism energized at the rated Uc)	1000	P
	Applied voltage: closing mechanism (V)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	For circuit-breaker fitted with adjustable releases, test shall be made with the overload setting at maximum and short-circuit setting at minimum.		N/A
	Conditions, make/break operations:		
	- test voltage U/Ue = 1,0 (V) .....L1: .....L2: L3:	420 420 -	P
	- test current I/Ie = 1,0 (A) .....L1: .....L2: L3:	128 128 -	P
	- power factor/~~time constant:~~	0,78	P
	- frequency: (Hz)	50	P
	- on-time (ms):	400	P
	- off-time (s):	30	P
	Electrical components do not exceed the value indicated in tab. 7.		P
8.3.3.3.5	Additional test of operational performance capability without current for withdrawable circuit-breaker.		
	Number of operations cycles : 100		N/A
	After test, the isolating contacts, withdrawable mechanism and interlocks shall be suitable for further service.		N/A
8.3.3.4	Overload performance		
	this test applies to circuit-breaker of rated current up to and including 630 A		
	Type designation or serial number	HDB2	
	Sample no:	I-2	
	Rated current In (A)	125	
	Rated operational voltage: Ue (V)	415	
	Rated control supply voltage of closing mechanism: Uc (V)	-	
	Rated control supply voltage of shunt releases: Uc (V)	-	
	Rated control supply voltage undervoltage releases: Uc (V)	-	
	Ambient temperature 10-40 °C :	30°C	P
	Number of operating cycles per hour	120	P
	Maximum rated operational voltage: Ue (V)	415	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Number of cycles with current (total) (closing mechanism energized at the rated Uc)	12	P
	Applied voltage: closing mechanism (V)		N/A
	For circuit-breaker fitted with adjustable releases, test shall be made with the overload/short-circuit settings at maximum.		N/A
	Conditions, overload operations:		
	- test voltage U/Ue = 1,05 (V) .....L1: .....L2: L3:	440 440 -	P
	- test current AC/~~DC~~: I/Ie = 6,0/~~2,5~~ (A) .....L1: .....L2: L3:	 752 752 -	P
	- power factor/~~time constant~~:	0,46	P
	- Number of cycles manually opened: 9	9	P
	- Number of cycles automatically opened by an overload release: 3	3	P
	- frequency: (Hz)	50	P
	- on-time max 2s:	<2s	P
8.3.3.5	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V for 5 seconds	1000V	P
	- no breakdown or flashover		P
	For circuit-breaker suitable for isolation, the leakage current shall be measured through each pole with the contacts in the open position, at a test voltage of 1,1 Ue, and shall not exceed 2 mA.	457V $1{,}92 \times 10^{-3}$mA(maximum)	P
8.3.3.6	Verification of temperature-rise		
	- the values of temperature-rise do not exceed those specified in tab. 7.		P
	Temperature rise of main circuit terminals ≤ 80 K (K) :	49	P
	conductor cross-sectional area (mm²) :	50	P
	test current Ie (A) :	125	P
8.3.3.7	Verification of overload releases		
	Test current: 1.45 times the value of their current setting at the reference temperature: (A)	181	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A	2min38s	P
8.3.3.8	Verification of undervoltage and shunt releases		
	Circuit-breaker fitted with undervoltage releases. The release shall not operate at 70% of the minimum control supply voltage -		N/A
	and shall operate at 35% of the maximum control supply voltage.		N/A
	Circuit-breaker fitted with shunt releases. The release shall operate at 70% of the minimum rated control supply voltage. Test made at room temperature.		N/A
8.3.3.9	Verification of the main contact position for circuit-breakers for isolation		
	actuating force for opening (N) ..... :	12	—
	test force with blocked main contacts for 10 s (N) . :	50	—
	Dependent power operation		N/A
	Supply voltage of 110% of rated voltage (V)..... :		N/A
	Three attempts of 5 s to operate the equipment at intervals of 5 min.		N/A
	Independent power operation		N/A
	Three attempts to operate the equipment by the stored energy.		N/A
	Lock ability of driving mechanism in OFF-position at test force and blocked main contacts ..... :		N/A
	Position Indicator does not show OFF-position after capture of test force at blocked main contacts		P

8.3.4	TEST SEQUENCE II (Ics): 1 sample: 2P, 125A		
8.3.4.1	Test of rated service short-circuit breaking capacity		
	Test sequence of operation: O – t – CO – t – CO		
	Type designation or serial number	HDB2	
	Sample no:	II-1	
	Rated current: In (A)	125	
	Rated operational voltage: Ue (V)	415	
	Rated service short-circuit breaking capacity: (kA)	7,5	

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Clause	Requirement + Test	Result - Remark	Verdict
	Rated control supply voltage of closing mechanism: Uc (V)		
	Rated control supply voltage of shunt release: Uc (V)		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		N/A
	closing mechanism energized with 85% at the rated Uc: (V)		N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.		P
	Test made in free air:		P
	Distances of the metallic screen's: (all sides)	Back: 0mm Front: 0mm Top: 45mm Botton: 45mm Left: 10mm Right: 10mm	P
	The characteristics of the metallic screen:		
	- woven wire mesh		N/A
	- perforated metal		P
	- expanded metal		N/A
	- ratio hole area/total area: 0,45-0,65	0,50	P
	- size of hole: <30mm^2	25	P
	- finish: bare or conductive plating	Bare	P
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		N/A
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long		P
	Circuit is earthed at: (load-star- or supply-star point)	supply-star	P
	Conductor cross-sectional area (mm²) :	50	P
	If terminals unmarked: line connected at: (underside/upside)		N/A
	Tightening torques: (Nm)	3,5	N/A
	Test sequence of operation: O – t – CO – t – CO		P
	- test voltage U/Ue = 1,05 (V).....L1: .....L2: L3:	440 440 -	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- r.m.s. test current AC/~~DC~~: (kA) .....L1: .....L2: L3:	7,54 7,54 -	P
	power factor/time constant :	0,48	P
	- Factor "n"	1,7	P
	- peak test current (kA) :	14,4	P
	Test sequence "O"		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	4,02 4,02 -	P
	- Joule integral I^2dt (kA^2s) .....L1: .....L2: L3:	34,2 34,2 -	P
	Pause, t: (min)	3	P
	Test sequence "CO"		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	6,98 6,98 -	P
	- Joule integral I^2dt (kA^2s) .....L1: .....L2: L3:	159 159 -	P
	Pause, t: (min)	3	P
	Test sequence "CO"		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	6,57 6,57 -	P
	- Joule integral I^2dt (kA^2s) .....L1: .....L2: L3:	94,9 94,9 -	P
	Melting of the fusible element	No	P
	Holes in the PE-sheet for test sequence "O"	No	P
	Cracks observed	No	P
8.3.4.2	Operational performance capability with current.		
	Rated current: In (A)	125	
	Maximum rated operational voltage: Ue (V)	415	
	Conductor cross-sectional area (mm^2) :	50	
	Number of operating cycles per hour	120	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Number (5% of the number given in column 4, tab. 8) of cycles with current (total) (closing mechanism energized at the rated Uc)	50	P
	Applied voltage: closing mechanism (V)		N/A
	For circuit-breaker fitted with adjustable releases, test shall be made with the overload setting at maximum and short-circuit setting at minimum.		N/A
	Conditions, make/break operations:		
	- test voltage U/Ue = 1,0 (V) .....L1: .....L2: L3:	418 418 -	P
	- test current I/Ie = 1,0 (A) .....L1: .....L2: L3:	126 126 -	P
	- power factor/time constant:	0,79	P
	- frequency: (Hz)	50	P
	- on-time (ms):	400	P
	- off-time (s):	30	P
8.3.4.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V	1000V	P
	- no breakdown or flashover		P
	- the leaking current for circuit-breaker suitable for isolation: (<2mA / 1.1 Ue)	457V $7{,}94 \times 10^{-3}$mA(maximum)	P
8.3.4.4	Verification of temperature-rise		
	- the values of temperature-rise do not exceed those specified in tab. 7.		P
	Temperature rise of main circuit terminals. ≤ 80 K (K) :	74	P
	conductor cross-sectional area (mm²) :	50	P
	test current Ie (A) :	125	P
8.3.4.5	Verification of overload releases		
	Test current: 1.45 times the value of their current setting at the reference temperature: (A)	181	P
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A	9s	P

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Clause	Requirement + Test	Result - Remark	Verdict
8.3.4	TEST SEQUENCE II (Ics): 1 sample: 2P, 63A		
8.3.4.1	Test of rated service short-circuit breaking capacity		
	Test sequence of operation: O – t – CO – t – CO		
	Type designation or serial number	HDB2	
	Sample no:	II-2	
	Rated current: In (A)	63	
	Rated operational voltage: Ue (V)	415	
	Rated service short-circuit breaking capacity: (kA)	7,5	
	Rated control supply voltage of closing mechanism: Uc (V)		
	Rated control supply voltage of shunt release: Uc (V)		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		N/A
	closing mechanism energized with 85% at the rated Uc: (V)		N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.		P
	Test made in free air:		P
	Distances of the metallic screen's: (all sides)	Back: 0mm Front: 0mm Top: 45mm Botton: 45mm Left: 10mm Right: 10mm	P
	The characteristics of the metallic screen:		
	- woven wire mesh		N/A
	- perforated metal		P
	- expanded metal		N/A
	- ratio hole area/total area: 0,45-0,65	0,50	P
	- size of hole: <30mm^2	25	P
	- finish: bare or conductive plating	Bare	P
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		N/A
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Circuit is earthed at: (load-star- or supply-star point)	supply-star	P
	Conductor cross-sectional area (mm²) :	16	N/A
	If terminals unmarked: line connected at: (underside/upside)		N/A
	Tightening torques: (Nm)	3,5	N/A
	Test sequence of operation: O – t – CO – t – CO		P
	- test voltage U/Ue = 1,05 (V).....L1: .....L2: L3:	440 440 -	P
	- r.m.s. test current AC/~~DC~~: (kA).....L1: .....L2: L3:	7,54 7,54 -	P
	power factor/time constant :	0,48	P
	- Factor "n"	1,7	P
	- peak test current (kA) :	14,4	P
	Test sequence "O"		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	5,26 5,26 -	P
	- Joule integral I^2dt (kA^2s) .....L1: .....L2: L3:	53,1 53,1 -	P
	Pause, t: (min)	3	P
	Test sequence "CO"		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	4,21 4,21 -	P
	- Joule integral I^2dt (kA^2s) .....L1: .....L2: L3:	32,5 32,5 -	P
	Pause, t: (min)	3	P
	Test sequence "CO"		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	5,41 5,41 -	P
	- Joule integral I^2dt (kA^2s) .....L1: .....L2: L3:	67,2 67,2 -	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Melting of the fusible element	No	P
	Holes in the PE-sheet for test sequence "O"	No	P
	Cracks observed	No	P
8.3.4.2	Operational performance capability with current.		
	Rated current: In (A)		
	Maximum rated operational voltage: Ue (V)		
	Conductor cross-sectional area (mm^2) :		
	Number of operating cycles per hour		N/A
	Number (5% of the number given in column 4, tab. 8) of cycles with current (total) (closing mechanism energized at the rated Uc)		N/A
	Applied voltage: closing mechanism (V)		N/A
	For circuit-breaker fitted with adjustable releases, test shall be made with the overload setting at maximum and short-circuit setting at minimum.		N/A
	Conditions, make/break operations:		
	- test voltage U/Ue = 1,0 (V) .....L1: .....L2: L3:		N/A
	- test current I/Ie = 1,0 (A) .....L1: .....L2: L3:		N/A
	- power factor/time constant:		N/A
	- frequency: (Hz)		N/A
	- on-time (ms):		N/A
	- off-time (s):		N/A
8.3.4.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V	1000V	P
	- no breakdown or flashover		P
	- the leaking current for circuit-breaker suitable for isolation: (<2mA / 1.1 Ue)	457V $6,71x10^{-3}$mA(maximum)	P
8.3.4.4	Verification of temperature-rise		
	- the values of temperature-rise do not exceed those specified in tab. 7.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Temperature rise of main circuit terminals. ≤ 80 K (K) :		N/A
	conductor cross-sectional area (mm²) :		N/A
	test current Ie (A) :		N/A
8.3.4.5	Verification of overload releases		
	Test current: 1.45 times the value of their current setting at the reference temperature: (A)	91,4	P
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A	3min10s	P
8.3.5	TEST SEQUENCE III (Icu) -1 sample: 2P, 125A		
	Rated ultimate short-circuit breaking		
	Except where the combined test sequence applies, this test sequence applies to circuit-breaker of utilization category A and to circuit-breaker of utilization B having a rated ultimate short-circuit breaking capacity higher than the rated short-time withstand current.		
	For circuit-breakers of utilization B having a rated short-time withstand current equal to their rated ultimate short-circuit breaking capacity, this test sequence need not be made, since, in this case, the ultimate short-circuit breaking capacity, is verified when carrying out test sequence IV.		
	For integrally fused circuit-breakers, test sequence V applies in place of this sequence.		
	Type designation or serial number	HDB2	
	Sample no:	III-1	
	Rated current: In (A)	125	
	Rated operational voltage: Ue (V)	415	
	Rated ultimate short-circuit breaking capacity: (kA)	10	
	Rated control supply voltage of closing mechanism: Uc (V)		
	Rated control supply voltage of shunt release: Uc (V)		

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Clause	Requirement + Test	Result - Remark	Verdict
	This test sequence need not be made when Icu = Ics		
8.3.5.1	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		
	Time specified by the manufacturer:	⩽8min	P
	- Operation time: (s) .....L1: .....L2: .....L3: .....N :	2min21s 1min40s - -	P
8.3.5.2	Test of rated ultimate short-circuit breaking capacity		
	The test sequence of operations is O – t – CO		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		N/A
	closing mechanism energized with 85% at the rated Uc: (V)		N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.		P
	Test made in free air:		P
	Distances of the metallic screen's: (all sides)	Back: 0mm Front: 0mm Top: 45mm Botton: 45mm Left: 10mm Right: 10mm	P
	The characteristics of the metallic screen:		
	- woven wire mesh		N/A
	- perforated metal		P
	- expanded metal		N/A
	- ratio hole area/total area: 0,45-0,65	0,50	P
	- size of hole: <30mm^2	25	P
	- finish: bare or conductive plating	Bare	P
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		N/A
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long		P
	Circuit is earthed at: (load-star- or supply-star point)	Supply-star	P
	Conductor cross-sectional area (mm²) :	50	P

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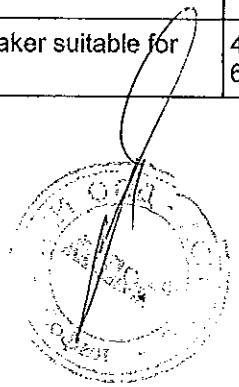
Clause	Requirement + Test	Result - Remark	Verdict
	If terminals unmarked: line connected at: (underside/upside)		N/A
	Tightening, torques: (Nm)	3,5	P
	Test sequence of operation: O – t – CO		P
	- test voltage U/Ue = 1,05 (V) .....L1: .....L2: L3:	438 438 -	P
	- r.m.s. test current AC/~~DC~~: (kA) .....L1: .....L2: L3:	10,2 10,2 -	P
	power factor/time constant :	0,49	P
	- Factor "n"	1,7	P
	- peak test current (kAmax) :	18,2	P
	Test sequence "O"		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	8,8 6,9 -	P
	- Joule integral I^2dt (kA^2s) .....L1: .....L2: L3:	389 246 -	P
	Pause, t: (min)	3	P
	Test sequence "CO"		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	8,0 6,7 -	P
	- Joule integral I^2dt (kA^2s) .....L1: .....L2: L3:	281 197 -	P
	Melting of the fusible element	No	P
	Holes in the PE-sheet for test sequence "O"	No	P
	Cracks observed	No	P
8.3.5.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V for 5 seconds	1000	P
	- no breakdown or flashover		P
	- the leaking current for circuit-breaker suitable for isolation: (<6mA / 1,1 Ue)	458V $6,24x10^{-3}$mA(maximum)	P



ВЯРНО С ОРИГИНАЛА

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
8.3.5.4	Verification of overload releases		
	The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		
	Time specified by the manufacturer:		N/A
	- Operation time: (s) .....L1: .....L2: .....L3: ..... N :	1min26s 1min11s - -	P
8.3.5	TEST SEQUENCE III (Icu) -1 sample: 2P, 63A		
	Rated ultimate short-circuit breaking		
	Except where the combined test sequence applies, this test sequence applies to circuit-breaker of utilization category A and to circuit-breaker of utilization B having a rated ultimate short-circuit breaking capacity higher than the rated short-time withstand current.		
	For circuit-breakers of utilization B having a rated short-time withstand current equal to their rated ultimate short-circuit breaking capacity, this test sequence need not be made, since, in this case, the ultimate short-circuit breaking capacity, is verified when carrying out test sequence IV.		
	For integrally fused circuit-breakers, test sequence V applies in place of this sequence.		
	Type designation or serial number	HDB2	
	Sample no:	III-2	
	Rated current: In (A)	63	
	Rated operational voltage: Ue (V)	415	
	Rated ultimate short-circuit breaking capacity: (kA)	10	
	Rated control supply voltage of closing mechanism: Uc (V)		
	Rated control supply voltage of shunt release: Uc (V)		

ВЯРНО С ОРИГИНАЛА

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IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	This test sequence need not be made when Icu = Ics		
8.3.5.1	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		
	Time specified by the manufacturer:	≤8min	P
	- Operation time: (s) .....L1: .....L2: .....L3: ..... N :	60s 43s - -	P
8.3.5.2	Test of rated ultimate short-circuit breaking capacity		
	The test sequence of operations is O – t – CO		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		N/A
	closing mechanism energized with 85% at the rated Uc: (V)		N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.		P
	Test made in free air:		P
	Distances of the metallic screen's: (all sides)	Back: 0mm Front: 0mm Top: 45mm Botton: 45mm Left: 10mm Right: 10mm	P
	The characteristics of the metallic screen:		
	- woven wire mesh		N/A
	- perforated metal		P
	- expanded metal		N/A
	- ratio hole area/total area: 0,45-0,65	0,50	P
	- size of hole: <30mm^2	25	P
	- finish: bare or conductive plating	Bare	P
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		N/A
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long		P
	Circuit is earthed at: (load-star- or supply-star point)	Supply-star	P
	Conductor cross-sectional area (mm^2) :	16	P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	If terminals unmarked: line connected at: (underside/upside)		N/A
	Tightening, torques: (Nm)	3,5	P
	Test sequence of operation: O – t – CO		P
	- test voltage U/Ue = 1,05 (V) .....L1: .....L2: L3:	438 438 -	P
	- r.m.s. test current AC/~~DC~~: (kA).....L1: .....L2: L3:	10,2 10,2 -	P
	power factor/time constant :	0,49	P
	- Factor "n"	1,7	P
	- peak test current (kAmax) :	18,2	P
	Test sequence "O"		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	6,2 6,6 -	P
	- Joule integral I^2dt (kA^2s) .....L1: .....L2: L3:	154 177 -	P
	Pause, t: (min)	3	P
	Test sequence "CO"		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	5,4 4,8 -	P
	- Joule integral I^2dt (kA^2s) .....L1: .....L2: L3:	140 129 -	P
	Melting of the fusible element	No	P
	Holes in the PE-sheet for test sequence "O"	No	P
	Cracks observed	No	P
8.3.5.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V for 5 seconds	1000	P
	- no breakdown or flashover		P
	- the leaking current for circuit-breaker suitable for isolation: (<6mA / 1,1 Ue)	458V $9,11x10^{-3}$mA(maximum)	P

ВЯРНО С ОРИГИНАЛА

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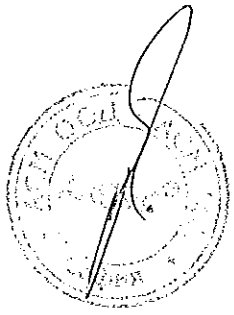
IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
8.3.5.4	Verification of overload releases		
	The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		
	Time specified by the manufacturer:		N/A
	- Operation time: (s) .....L1: .....L2: .....L3: ..... N :	42s 30s - -	P



ВЯРНО С ОРИГИНАЛА

IEC 60947-2

TABLE: TEMPERATURE RISE MEASUREMENTS				
temperature rise dT of part:		phase	dT (K)	required dT (K)
For clause 8.3.3.6 (125A, 2P)				
1	Terminals for external connections	Max for all	49	80
2	Enclosure	Max for all	32	50
3	Non-metallic handle	Max for all	5	35
For clause 8.3.4.4 (125A, 2P)				
1	Terminals for external connections	Max for all	52	80

TABLE: THREADED PART TORQUE TEST			
threaded part identification	diameter of thread (mm)	column number (I, II, or III)	applied torque (Nm)
Terminal screw	6,8	II	3,5
supplementary information:			

TABLE: GLOW WIRE TEST							
Part	Colour	Thick (mm)	Temp. °C	burning after t (s)	drops	support burning	Comments
Enclosure	Grey	2,5	960	2	No	No	OK
Non-metallic mechanical parts	Brown	2,0	960	-	No	No	OK
	Red	2,0	650	-	No	No	OK
	White	2,5	960	-	No	No	OK
Handle	Black	2,0	650	-	No	No	OK
supplementary information:							

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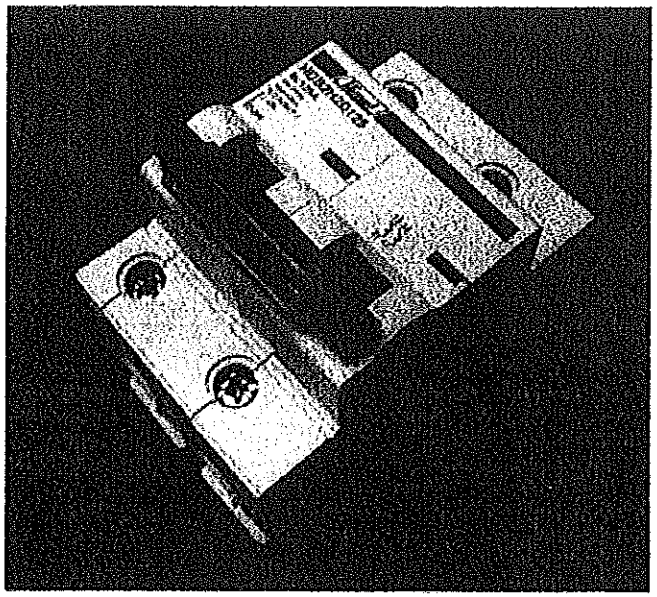
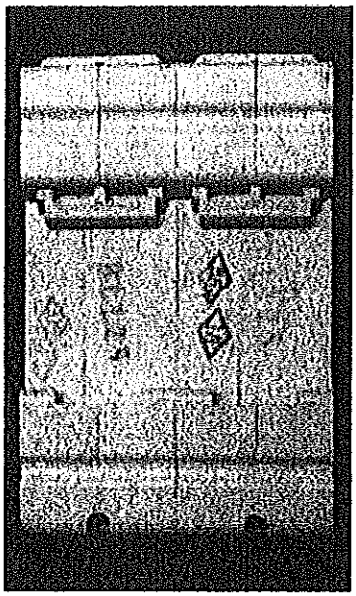
Photos of samples:





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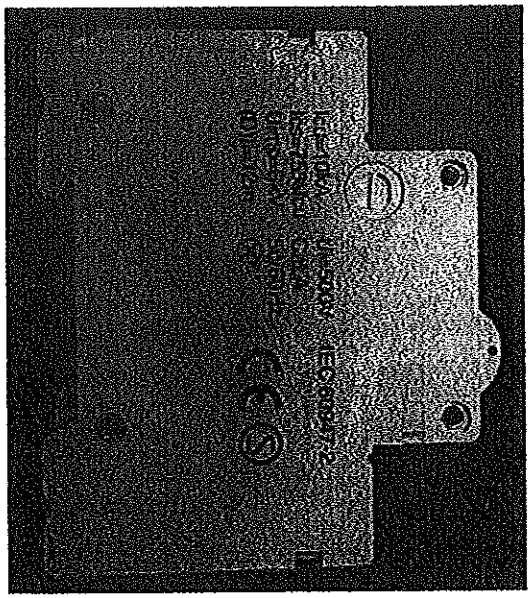
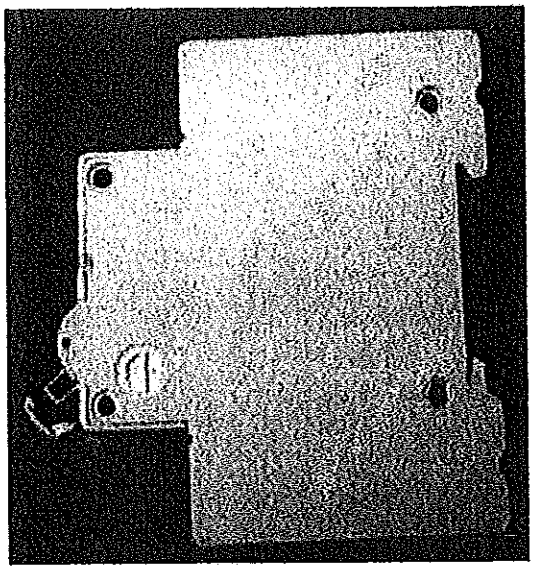
Photos of samples:





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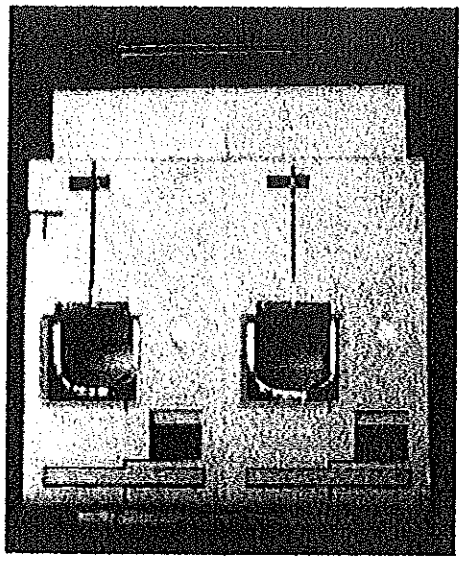
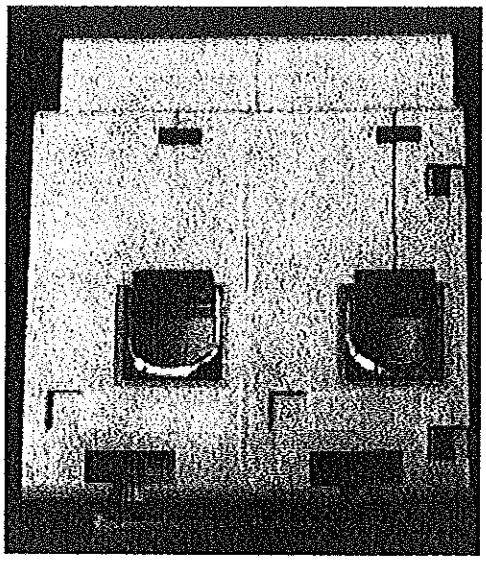
Photos of samples:





ВЯРНО С ОРИГИНАЛА

Test Report issued under the responsibility of:

TEST REPORT
IEC 60947-2
Low-voltage switchgear and controlgear - Part 2: Circuit-breakers

Report Reference No. ..... :	SH11090550-003
Date of issue ..... :	February 07, 2012
Total number of pages	51
Testing Laboratory ..... :	Intertek Testing Services Shanghai
Address ..... :	Building No.86, 1198 Qinzhou Road (North), Shanghai 200233, China
Applicant's name ..... :	DELIXI ELECTRIC LTD
Address ..... :	Delixi High Tech Industrial Park, Liushi Town, Yueqing City, Zhejiang Province, China 325604
Test specification:	
Standard ..... :	☒ IEC 60947-2:2006 (4th Edition) + A1: 2009
	☒ EN 60947-2:2006 + A1: 2009
Test procedure ..... :	CB & S
Non-standard test method ..... :	N/A
Test Report Form No. ..... :	IEC60947_2F
Test Report Form(s) Originator ..... :	KEMA Quality BV
Master TRF ..... :	Dated 2010-01

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.

Test item description ..... :	Moulded case circuit-breakers
Trade Mark ..... :	CHINT
Manufacturer ..... :	Same as applicant
Model/Type reference ..... :	HDB2
Ratings ..... :	U_e= 415V~(3P)
	In = 63, 80, 100, 125A

ВЯРНО С ОРИГИНАЛА

Testing procedure and testing location:	
☒ **Testing Laboratory:**	Intertek Testing Services Shanghai
Testing location/ address.....:	Building No.86, 1198 Qinzhou Road (North), Shanghai 200233, China
☒ **Associated Laboratory:**	Inspection Center of Products' Quality of Low Voltage Electric Apparatus in Zhejiang Province
Testing location/ address.....:	West Zhonghuan Road, Jiaxing City, Zhejiang Province, P.R.China
Tested by (name + signature).....:	Vincent Yang Vincent Yang
Approved by (+ signature) .....:	Jim Hua
☐ Testing procedure: TMP	
Tested by (name + signature).....:	
Approved by (+ signature) .....:	
Testing location/ address.....:	
☐ Testing procedure: WMT	
Tested by (name + signature).....:	
Witnessed by (+ signature).....:	
Approved by (+ signature) .....:	
Testing location/ address.....:	
☐ Testing procedure: SMT	
Tested by (name + signature).....:	
Approved by (+ signature) .....:	
Supervised by (+ signature).....:	
Testing location/ address.....:	
☐ Testing procedure: RMT	
Tested by (name + signature).....:	
Approved by (+ signature) .....:	
Supervised by (+ signature).....:	
Testing location/ address.....:	

ВЯРНО С ОРИГИНАЛА

Summary of testing:

Number of tests for test procedure, according to table 9a and table 10

No. of poles	In(A)	Test sequence and number of samples									
		I	II	III	IV	V	Combined	Annex B	Annex C	Annex H	Annex M
1P	125	1+1[a]	1	1	-	-	-	-	-	-	-
1P	63	-	1	1	-	-	-	-	-	-	-
2P	125	1+1[a]	1	1	-	-	-	-	-	-	-
2P	63	-	1	1	-	-	-	-	-	-	-
3P	125	1[b]	-	1[b]	-	-	-	-	-	-	-
3P	63	-	-	1[b]	-	-	-	-	-	-	-
4P	125	1+1[a]	1	1+1[c]	-	-	-	-	-	-	-
4P	63	-	1	1+1[c]	-	-	-	-	-	-	-

Note:

a) This sample only tested to clause 8.3.3.1 to verify instantaneous of $8,5I_n$,
b) Test Sequence in Amend.1 of IEC 60947-2.
c) Tested on the fourth pole and its adjacent pole.

Tests performed (name of test and test clause):		Testing location:
8.3.3.1	Tripping limits and characteristics	ACTL
8.3.3.2	Dielectric properties	ACTL
8.3.3.3	Operational performance capability	ACTL
8.3.3.4	Overload performance	ACTL
8.3.3.5	Verification of dielectric withstand	ACTL
8.3.3.6	Verification of temperature rise	ACTL
8.3.3.7	Verification of overload releases	ACTL
8.3.3.8	Verification of undervoltage and shunt releases (if applicable)	CBTL
8.3.3.9	Verification of main contact position (for circuit breakers suitable for isolation)	CBTL
8.3.4.1	Service short-circuit breaking capacity	ACTL
8.3.4.2	Verification of operational capability	ACTL
8.3.4.3	Verification of dielectric withstand	ACTL
8.3.4.4	Verification of temperature rise	ACTL
8.3.4.5	Verification of overload releases	ACTL
8.3.5.1	Verification of overload releases	ACTL
8.3.5.2	Ultimate short-circuit breaking capacity	ACTL
8.3.5.3	Verification of dielectric withstand	ACTL
8.3.5.4	Verification of overload releases	ACTL

ВЯРНО С ОРИГИНАЛА

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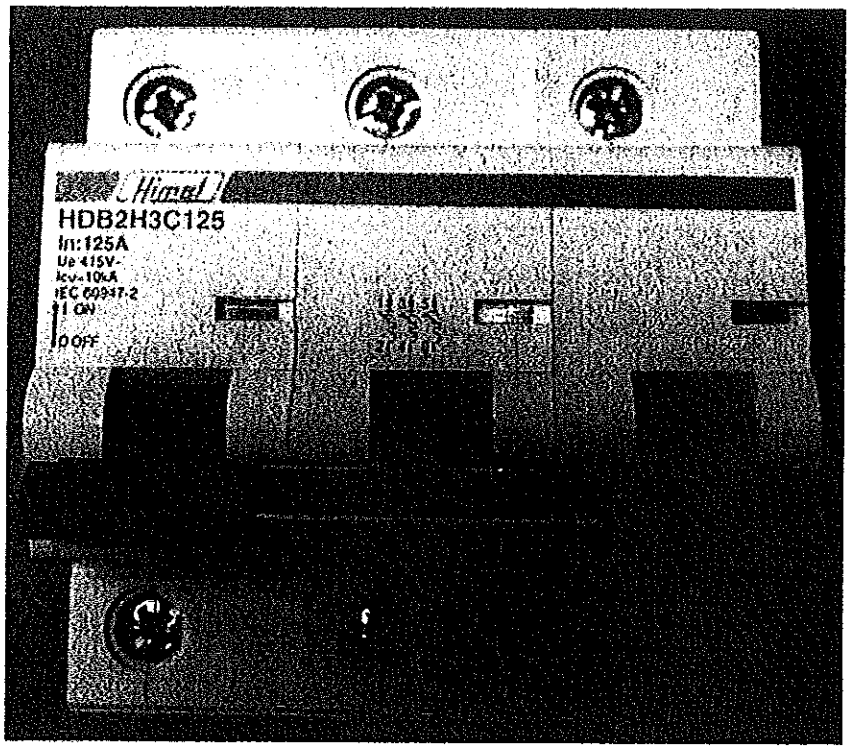
Summary of compliance with National Differences:

N/A

Copy of marking plate:



ВЯРНО С ОРИГИНАЛА

Test item particulars: test item vs. test requirements	
3. Classification	
3.1. Utilization category: (A or B). ..... :	A
3.2. Interruption medium: (air, vacuum, gas Break)..... :	air
3.3. Design: (open construction, moulded case)..... .....:	Moulded case
3.4. Method of controlling the operation mechanism: (dependent manual, independent manual, dependent power, independent power) ..... :	Independent manual
3.5. Suitability for Isolation: (suitable, not -suitable)..... .....:	Suitable
3.6. Provision for maintenance: (maintainable, non maintainable)..... :	Non-maintainable
3.7. Method of installation: (fixed, plug in, withdrawable:	Fixed
3.8. Degree of protection: (IP code) ..... :	IP20
4.7. Type of release (thermo-magnetic / electronic) ..... :	Thermo-magnetic
4.8. Integral fuses (integrally fused circuit-breakers) Type and characteristics of SCPD..... :	N/A
7.3 Electromagnetic compatibility (EMC) Environment A or B..... :	N/A
Circuit-breaker for use on phase-earthed systems..... :	N/A
Circuit-breaker for use in IT systems..... :	Yes
Rated and limiting values, main circuit ....:	
- rated operational voltage: Ue (V)..... :	415V~
- rated insulation voltage: Ui (V)..... :	500
- rated impulse withstand voltage: Uimp (kV)..... :	6kV
- rated operational current: Ie (A)..... :	63, 80, 100, 125
- kind of current..... :	AC
- conventional free air thermal current: Ith (A)..... :	63, 80, 100, 125
- conventional enclosed thermal current: Ithe (A) ..... :	N/A
- current rating for four-pole circuit-breakers: (A)..... :	N/A
- number of poles..... :	3
- rated frequency: (Hz)..... :	50/60
- integral fuses (rated values)..... :	N/A
Rated duty :	
- eight-hour duty..... :	N/A
- uninterrupted duty: Iu (A)..... :	63, 80, 100, 125
Short-circuit characteristic :	
rated short-time making capacity: Icm (kA)..... :	N/A

ВЯРНО С ОРИГИНАЛА

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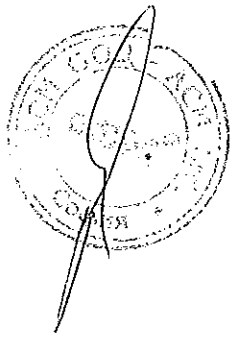
rated ultimate short-circuit breaking capacity: Icu (kA) . .....:	10
rated service short-circuit breaking capacity: Ics (kA).....:	7,5
rated short-time withstand current: Icw (kA/s).....:	17
Control circuits :	
Electrical control circuits :	
- kind of current: (AC, DC) .....:	N/A
- rated frequency: (Hz) .....:	N/A
- rated control circuit voltage: Uc (nature, frequency, V) ....:	N/A
- rated control supply voltage: Us (nature, frequency V) ....:	N/A
Air supply control circuits: (pneumatic or electro-pneumatic) :	
- rated pressure and its limit .....:	N/A
- volumes of air, at atmospheric pressure, required for each closing and each opening operation.....:	N/A
Auxiliary circuits :	
Rated and limiting values, auxiliary circuits .....:	N/A
- rated operational voltage Ue (V).....:	N/A
- rated insulation voltage: Ui (V).....:	N/A
- rated operational current: Ie (A).....:	N/A
- kind of current .....:	N/A
- rated frequency: (Hz) .....:	N/A
- number of circuits .....:	N/A
- number and kind of contact elements .....:	N/A
- rated uninterrupted current: Iu (A) .....:	N/A
- utilization category: (AC, DC, current and voltage) .....:	N/A
Short-circuit characteristic :	
- Rated conditional short-circuit current (kA).....:	N/A
- kind of protective device .....:	N/A



ВЯРНО С ОРИГИНАЛА

Releases :	
1) shunt release	N/A
2) Over-current release	
a) instantaneous	Yes
b) definite time delay	N/A
c) inverse time delay	Yes
- independent of previous load	N/A
- dependent on previous load; (for example thermal type release)	Yes
3) Undervoltage release (for opening)	N/A
4) Other releases	N/A
Characteristics :	
1) Shunt release and undervoltage release (for opening)	
- rated control circuit voltage: Uc (nature, frequency, V)	N/A
- kind of current	N/A
- rated frequency: (if AC)	N/A
2) Over-current release	
- rated current	63, 80, 100, 125A
- kind of current	AC
- rated frequency: (if AC)	50/60Hz
- current setting (or range of settings)	Inverse time delay: I_n Instantaneous: $8,5I_n$, $12I_n$
- time settings (or range of settings)	Inverse time delay: $1,05I_n$: ≥1h, $1,30I_n$: <1h (for I_n≤63A) Inverse time delay: $1,05I_n$: ≥2h, $1,30I_n$: <2h (for I_n>63A) Instantaneous: $0,8x8,5I_n$: ≥0,2s, $1,2x8,5I_n$: <0,2s Instantaneous: $0,8x12I_n$: ≥0,2s, $1,2x12I_n$: <0,2s

ВЯРНО С ОРИГИНАЛА

Classification of installation and use..... :	Installed by rail
Supply Connection..... :	N/A

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..... :	December 16, 2011
Date (s) of performance of tests..... :	From December 20, 2011 to January 18, 2012

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.

This test report is valid only being read together with the test reports of SH11090550-001, -002, -004.

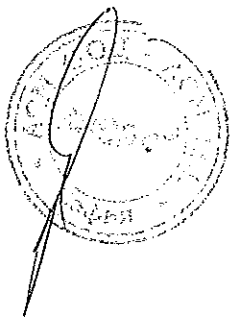
General product information:

U_e= 240V~(1P), 415V~(2P, 3P, 4P)

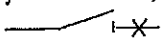
In= 63, 80, 100, 125A,

I_{cu}= 10kA, I_{cs}=7,5kA

Utilization category: A



ВЯРНО С ОРИГИНАЛА

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
5.2	MARKING		
a)	The following data shall be marked on the circuit-breaker itself or on a name plate or nameplates attached to the circuit-breaker, and located in a place such that they are visible and legible when the circuit-breaker is installed.		
	- rated current:	63, 80, 100, 125A	P
	- suitability for isolation, if applicable, with the symbol 		P
	- indication of the open and closed position: with O and I respectively, if symbols are used	I-ON and O-OFF	P
b)	Marking on equipment not needed to be visible after mounting:		
	- manufacturer's name or trademark		P
	- type designation or serial number	HDB2	P
	- IEC 60947-2 if the manufacturer claims compliance with this standard.	IEC/EN60947-2	P
	- utilization category	A	P
	- rated operational voltage(s) Ue	415V~	P
	- Circuit-breaker for use in IT systems: Circuit-breaker for which all values of rated voltage have not been tested according to annex H or are not covered by such testing, shall be identified by the symbol Ⓗ which shall be marked on the circuit-breaker immediately following these values of rated voltage	Ⓗ	P
	- value (or range) of the rated frequency and/or the indication DC (or symbol)	50/60Hz	P
	- rated service short-circuit breaking capacity. Ics	7,5kA	P
	- rated ultimate short-circuit breaking capacity. Icu	10kA	P
	- rated short-time withstand current, (Icw) and associated short-time delay, for utilization category B		N/A
	- line and load terminals, unless their connection is immaterial	"1, 3, 5", "2, 4, 6"	P
	- neutral pole terminals, if applicable, by the letter N		N/A
	- protective earth terminal, where applicable, by the symbol acc. 7.1.9.3 of part 1		N/A
	- ref. temperature for non-compensated thermal releases, if different from 30°C		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
c)	Marked on the circuit-breaker as specified in item b), or shall be made available in the manufacturer's published information:		
	- rated short-circuit making capacity (Icm) (if higher than specified in 4.3.5.1)		N/A
	- rated insulation voltage. (Ui) if higher than the maximum rated operational voltage)	500V	P
	- rated impulse withstand voltage (Uimp), when declared.	6kV	P
	- pollution degree if other than 3		N/A
	- conventional enclosed thermal current (Ithe) if different from the rated current:		N/A
	- IP Code, where applicable:		N/A
	- minimum enclosure size and ventilation data (if any) to which marked ratings apply:		N/A
	- details of minimum distance between circuit-breaker and earthed metal parts for circuit-breaker intended for use without enclosure:		N/A
	- r.m.s sensing if applicable, according to F.4.1.1		N/A
	- suitability for environment A or B		N/A
d)	The following data concerning the opening and closing devices of the circuit-breaker shall be placed either on their own nameplates or on the nameplate of the circuit-breaker:		
	- rated control circuit voltage of the closing device, and rated frequency for AC:		N/A
	- rated control circuit voltage of the shunt release and/or of the under-voltage release, and rated frequency:		N/A
	- rated current of indirect over-current releases:		N/A
	- number and type of auxiliary contacts and kind of current, rated frequency (if AC) and rated voltages of the auxiliary switches, if different from those of the main circuit.		N/A
e)	Terminal shall be clearly and permanently identified in acc. with IEC 60445 and annex L :		
	- line terminal	"1, 3, 5"	P
	- load terminal	"2, 4, 6"	P
	- neutral pole terminal "N"		N/A
	- protective earth terminal		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- terminal of coils (A/B)		N/A
	- terminal of shunt release (B)		N/A
	- terminals of under-voltage release (D)		N/A
	- terminals of interlocking electromagnets (E)		N/A
	- terminals of indicated light devices (X)		N/A
	- terminals of contact elements for switching devices (no)		N/A
7.1	CONSTRUCTION		
7.1.1	Withdrawable circuit-breaker		N/A
	In the disconnected position (main- and auxiliary circuits)		
	Isolating distances for circuit-breaker suitable for isolating warranted:		N/A
	Mechanism fitted with a reliable indicating device with indicates the position of the isolating contacts.		N/A
	Mechanism fitted with interlocks which only permit the isolating contacts to be separate or re-closed when main contacts are open		N/A
	Mechanism fitted with interlock, which only permit the main contacts to be closed when the isolating contacts are fully closed.		N/A
	Mechanism fitted with interlock, which only permit the main contacts to be closed when in disconnected position.		N/A
	The isolating distances between the isolating contacts cannot be inadvertently reduced.		N/A
7.1.2.1 part 1	Resistance to abnormal heat and fire		P
7.1.3 part 1	Current-carrying parts and their connection		P
7.1.4	Clearances and creepage distances:		
	For circuit-breakers for which the manufacturer has declared a value of rated impulse withstand voltage. (Uimp.)		
	Clearances distances:		
	- Uimp is given as:	6kV	
	- max. value of rated operational voltage to earth	-	
	- nominal voltage of supply system:	415V	

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Clause	Requirement + Test	Result - Remark	Verdict
	- overvoltage category:	IV	
	- pollution degree:	3	
	- field-in or homogeneous:	Field-in	
	- minimum clearances (mm):	3,0	
	- measured clearances (mm):	3,4	P
	Creepage distances:		
	- rated insulation voltage UI (V)	500	
	- pollution degree	3	
	- comparative tracking index (V)	175	
	- material group	IIIa	
	- minimum creepage distances (mm)	8	
	- measured creepage distances (mm)	12	P
7.1.5 part 1	Actuator		
7.1.5.1 part 1	Insulation		
	The actuator of the equipment shall be insulated from the live parts for the rated insulation voltage and, if applicable, the rated impulse withstand voltage		P
	If it is made of metal, it shall be capable of being satisfactorily connected to a protective conductor unless it is provided with additional reliable insulation		N/A
	If it is made of or covered by insulating material, any internal metal part, which might become accessible in the event of insulation failure, shall also be insulated from live parts for the rated insulation voltage		N/A
7.1.5.2	Direction of movement		
	The direction of operation for actuators of devices shall normally conform to IEC 60447.		P
	Where devices cannot conform to these requirements, e.g. due to special applications or alternative mounting positions, they shall be clearly marked such that there is no doubt as to the "I" and "O" positions and the direction of operation		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
7.1.6 part 1	Indication of contact position		
7.1.6.1 part 1	Indicating means		
	When an equipment is provided with means for indicating the closed and open positions, these positions shall be unambiguous and clearly indicated		P
	This is done by means of a position indicating device (see 2.3.18)		P
	If symbols are used, they shall indicate the closed and open position respectively, in accordance with IEC 60417-2:		
	- 60417-2-IEC-5007 I On (power)	On	P
	- 60417-2-IEC-5007 O Off (power)	Off	P
	For equipment operated by means of two push-buttons, only the push-button designated for the opening operation shall be red or marked with the symbol "O"		N/A
	Red colour shall not be used for any other push-button		N/A
	The colours of other push-buttons, illuminated push-buttons and indicator lights shall be in accordance with IEC 60073		N/A
7.1.6.2 part 1	Indication by the actuator		
	When the actuator is used to indicate the position of the contacts, it shall automatically take up or stay, when released, in the position corresponding to that of the moving contacts; in this case, the actuator shall have two distinct rest positions corresponding to those of the moving contacts, but for automatic opening a third distinct position of the actuator may be provided		P
7.1.7	Additional safety requirements for equipment suitable for isolation		
7.1.7.1	Additional constructional requirements for equipment suitable for isolation (Ue > 50 V):		
	Equipment suitable for isolation shall provide in the open position an isolation distance in acc. with the requirements necessary to satisfy the isolating function. Indication of the main contacts shall be provide by one or more of the following means:		
	- the position of the actuator		P
	- a separate mechanical indicator		P
	- visibility of the moving contacts		N/A
	When means are provided or to lock the equipment in the open position, locking only be possible when contacts are in the open position		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Actuator front-plate fitted to the equipment in a manner which ensures correct contact position indication and locking		N/A
	The indicated open position is the only position in which the specified isolation distances between the contacts is ensured.		P
	- minimum clearances across open contacts (see Table XIII, Part 1) (mm) :	3,0	
	- measured clearances (mm) :	3,4	P
	- test Uimp across gap (kV) :	6,2	P
7.1.7.2	Supplementary requirements for equipment with provision for electrical interlocking with contactors or circuit-breakers:		
	auxiliary switch shall be rated according to IEC 60 947-5-1		N/A
	If equipment suitable for isolation is provided with an auxiliary switch for the purpose of electrical interlocking with contactor (s) or circuit-breaker(s) and intended to be used in motor circuits, the following requirements shall apply unless the equipment is rated for AC-23 utilization category		N/A
	The time interval between the opening of the contacts of the auxiliary switch and the contacts of the main poles shall be sufficient to ensure that the associated contactor or circuit-breaker interrupts the current before the main poles of the equipment open		N/A
	Unless otherwise stated in the manufacturer's technical literature, the time interval shall be not less than 20 ms when the equipment is operated according to the manufacturer instructions		N/A
	Compliance shall be verified by measuring the time interval between the instant of opening of the auxiliary switch and the instant of opening of the main poles under no-load conditions when the equipment is operated according to the manufacturer's instructions		N/A
	During the closing operation the contacts of the auxiliary switch shall close after or simultaneously with the contacts of the main poles		N/A
	A suitable opening time interval may also be provided by an intermediate position (between the ON and OFF position) at which the interlocking contact(s) is (are) open and the main poles remain closed		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
7.1.7.3	Supplementary requirements for equipment provided with means for padlocking the open position:		
	the locking means shall be designed in such a way that it cannot be removed with the appropriate padlock(s) installed		N/A
	Alternatively, the design may provide padlockable means to prevent access to the actuator		N/A
	test force F applied to the actuator in an attempt to operate to the closed position (N) :		N/A
	rated impulse withstand voltage (kV) :		N/A
	test Uimp on open main contacts at the test force		N/A
7.1.8	Terminals		
7.1.8.1	All parts of terminals which maintain contact and carry current shall be of metal having adequate mechanical strength		P
	Terminal connections shall be such that necessary contact pressure is maintained		P
	Terminals shall be so constructed that the conductor is clamped between suitable surfaces without damage to the conductor and terminal		P
	Terminal shall not allow the conductor to be displaced or to be displaced themselves in a manner detrimental to the operator of equipment and the insulation voltage shall not be reduced below the rated value		P
7.1.8.2	Connection capacity		
	type of conductors :	Rigid-solid or stranded or flexible cable	P
	minimum cross-sectional area of conductor (mm^2) :	16	P
	maximum cross-sectional area of conductor (mm^2) :	50	P
	number of conductors simultaneously connectable to the terminal :	2 for 16mm^2 1 for 50mm^2	P
7.1.8.3	Connection		
	terminals for connection to external conductors shall be readily accessible during installation		P
	clamping screws and nuts shall not serve to fix any other component		P
7.1.8.4	Terminal identification and marking		
	terminal intended exclusively for the neutral conductor		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	protective earth terminal		N/A
	other terminals	"1, 3, 5", "2, 4, 6"	P
7.1.9 part 1	Additional requirements for equipment provided with a neutral pole		
	When equipment is provided with a pole intended only for connecting the neutral, this pole shall be clearly identified to that effect by the letter N (see 7.1.7.4.).		N/A
	A switched neutral pole shall break not before and shall make not after the other poles		N/A
	For equipment having a value of conventional thermal current (free air or enclosed, see 4.3.2.1 and 4.3.2.2) not exceeding 63 A, this value shall be identical for all poles		N/A
	For higher conventional thermal current values, the neutral pole may have a value of conventional thermal current different from that of the other poles, but not less than half that value or 63 A, whichever is the higher		N/A
	if a pole with an appropriate making and breaking capacity is used as a neutral pole, then all poles, incl. the neutral pole, shall operate substantially together.		N/A
7.1.10	Provisions for protective earthing		
7.1.10.1	The exposed conductive parts (e.g. chassis, framework and fixed parts of metal enclosures) other than those which cannot constitute a danger shall be electrically interconnected and connected to a protective earth terminal for connection to an earth electrode or to an external protective conductor		N/A
part 1	This requirement can be met by the normal structural parts providing adequate electrical continuity and applies whether the equipment is used on its own or incorporated in an assembly		N/A
	Exposed conductive parts are considered not to constitute a danger if they cannot be touched on large areas or grasped with the hand or if they are of small size (approximately 50 mm x 50 mm) or are so located as to exclude any contact with live parts		N/A
7.1.10.2 part 1	Protective earth terminal		
	The protective earth terminal shall be readily accessible and so placed that the connection of the equipment to the earth electrode or to the protective conductor is maintained when the cover or any other removable part is removed		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	The protective earth terminal shall be suitably protected against corrosion		N/A
	In the case of equipment with conductive structures, enclosures, etc., means shall be provided, if necessary, to ensure electrical continuity between the exposed conductive parts the equipment and the metal sheathing of connecting conductors		N/A
	The protective earth terminal shall have no other function, except when it is intended to be connected to a PEN conductor (see 2.1.1.5 – Note). In this case, it shall also have the function of a neutral terminal in addition to meeting the requirements applicable to the protective earth terminal		N/A
7.1.10.3	Protective earth terminal marking and identification		
	The protective earth terminal shall be clearly and permanently identified by its marking		N/A
	The identification shall be achieved by colour (green-yellow mark) or by the notation PE, or PEN, as applicable, in accordance with IEC 60445, subclause 5.3, or, in the case of PEN, by a graphical symbol for use on equipment		N/A
	Graphical symbol to be used: 60417-2-IEC-5019 ⏚ Protective earth (ground) in accordance with IEC 60417-2		N/A
7.1.11	Enclosure for equipment		
7.1.11.1	Design		
	The enclosure, when it is opened: all parts requiring access for installation and maintenance are readily accessible		N/A
	Sufficient space shall be provided inside the enclosure		N/A
	The fixed parts of a metal enclosure shall be electrically connected to the other exposed conductive parts of the equipment and connected to a terminal which enables them to be earthed or connected to a protective conductor		N/A
	Under no circumstances shall a removable metal part of the enclosure be insulated from the part carrying the earth terminal when the removable part is in place		N/A
	The removable parts of the enclosure shall be firmly secured to the fixed parts by a device such that they cannot be accidentally loosened or detached owing to the effects of operation of the equipment or vibrations		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	When an enclosure is so designed as to allow the covers to be opened without the use of tools, means shall be provided to prevent loss of the fastening devices		N/A
	If the enclosure is used for mounting push-buttons, it shall not be possible to remove the buttons from the outside of the enclosure		N/A
7.1.11.2	Insulation		
	If, in order to prevent accidental contact between a metallic enclosure and live parts, the enclosure is partly or completely lined with insulating material, then this lining shall be securely fixed to the enclosure		N/A
7.1.12	Degree of protection of enclosed equipment		
	Degree of protection.	IP20	
	Test for first characteristic.	IP2X	
	Test for first numeral .....:	1 **2** 3 4 5 6	P
	Test for second characteristic	IPX0	
	Test for second numeral .....:	1 2 3 4 5 6 7 8	N/A
7.1.13 part 1	Conduit pull-out, torque and bending with metallic conduits		
	Polymeric enclosures of equipment, whether integral or not, provided with threaded conduit entries, intended for the connection of extra heavy duty, rigid threaded metal conduits complying with IEC 60981, shall withstand the stresses occurring during its installation such as pull-out, torque, bending		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
7.2	Performance requirements		
7.2.1	Operating condition		
7.2.1.1	Closing		
	For a circuit-breaker to be closed safely on to the making current corresponding to its rated short-circuit making capacity, it is essential that it should be operated with the same speed and the same firmness as during the type test for proving the short-circuit making capacity		P
7.2.1.1.1	Dependent manual closing		
	For a circuit-breaker having a dependent manual closing mechanism, it is not possible to assign a short-circuit making capacity rating irrespective of the conditions of mechanical operation		N/A
	Such a circuit-breaker should not be used in circuits having a prospective peak making current exceeding 10 kA		N/A
	However, this does not apply in the case of a circuit-breaker having a dependent manual closing mechanism and incorporating an integral fast-acting opening release which causes the circuit-breaker to break safely, irrespective of the speed and firmness with which it is closed on to prospective peak currents exceeding 10 kA; in this case, a rated short-circuit making capacity can be assigned		N/A
7.2.1.1.2	Independent manual closing		
	A circuit-breaker having an independent manual closing mechanism can be assigned a short-circuit making capacity rating irrespective of the conditions of mechanical operation		P
7.2.1.1.3	Dependent power closing		
	At 110% of the rated control supply voltage, the closing operation performed on no-load shall not cause any damage to the circuit-breaker.		N/A
	At 85% of the rated control supply voltage, the closing operation shall be performed when the current established by the circuit-breaker is equal to its rated making capacity within the limits allowed by the operation of its relays or releases and, if a maximum time is stated for the closing operation, in a time not exceeding this maximum time limit.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
7.2.1.1.4	Independent power closing		
	A circuit-breaker having an independent power closing operation can be assigned a rated short-circuit making capacity irrespective of the conditions of power closing		N/A
	Means for charging the operating mechanism, as well as the closing control components, shall be capable of operating in accordance with the manufacturer's specification		N/A
7.2.1.1.5	Stored energy closing		
	Capable ensuring closing of the circuit-breaker in any condition between no-load and its rated making capacity		N/A
	- when the stored energy is retained within the circuit-breaker, a device is provided which indicates when the storing mechanism is fully charged.		N/A
	- means for charging the operating mechanism and closing control components operates when auxiliary supply voltage is between 85% and 110% of the rated control supply voltage.		N/A
	- not possible for the moving contacts to move from the open position, unless the charge is sufficient for satisfactory completion of the closing operation.		N/A
	- by manually operated circuit-breaker is the direction of operation indicated. (not for circuit-breaker with an independent manual closing operation.)		N/A
	- For trip free circuit-breaker it shall not be possible to maintain the contacts in the touching or closed position when the release is in the position to trip the circuit-breaker.		N/A
7.2.1.2	Opening		
7.2.1.2.1	Circuit-breakers which open automatically shall be trip-free and, unless otherwise agreed between manufacturer and user, shall have their energy for the tripping operation stored prior to the completion of the closing operation		
7.2.1.2.2	Opening by undervoltage releases		
7.2.1.3. a part 1	Operating voltage		
	An under-voltage relay or release, when associated with a switching device, shall operate to open the equipment even on a slowly falling voltage within the range between 70% and 35% of its rated voltage		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	An under-voltage relay or release shall prevent the closing of the equipment when the supply voltage is below 35% of the rated voltage of the relay or release; it shall permit closing of the equipment at supply voltages equal to or above 85% of its rated value		N/A
	Unless otherwise stated in the relevant product standard, the upper limit of the supply voltage shall be 110% of its rated value		N/A
7.2.1.3. b part 1	Operating time		
	For a time-delay under-voltage relay or release, the time-lag shall be measured from the instant when the voltage reaches the operating value until the instant when the relay or release actuates the tripping device of the equipment		N/A
7.2.1.2.3	Opening by shunt releases		N/A
7.2.1.4 part 1	Limits of operation of shunt releases		
	A shunt release for opening shall cause tripping under all operating conditions of an equipment when the supply voltage of the shunt release measured during the tripping operation remains between 70% and 110% of the rated control supply voltage and, if a.c., at the rated frequency		N/A
7.2.1.5 part 1	Limits of operation of current operated relays and released		
	Limits of operation of current operated relays and releases shall be stated in the relevant product standard		N/A
7.2.1.2.4	Opening by over-current releases		
a)	Opening under short-circuit conditions		
	The short-circuit release shall cause tripping of the circuit-breaker with an accuracy of 20% of the tripping current value of the current setting for all values of the current setting of the short-circuit current release		P
	Where necessary for over-current co-ordination the manufacturer shall provide information (usually curves) showing		N/A
	- maximum cut-off (let-through) peak current as a function of prospective current (r.m.s. symmetrical)		N/A
	- I^2t characteristics for circuit-breakers of utilization category A and, if applicable, B for circuit-breakers with instantaneous override (see note to 8.3.5)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
b)	Opening under overload conditions		
1)	Instantaneous or definite time-delay operation		N/A
	The release shall cause tripping of the circuit-breaker with an accuracy of ± 10% of the tripping current value of the current setting for all values of current setting of the overload release		N/A
2)	Inverse time-delay operation		
	At the reference temperature and at 1,05 times the current setting with the conventional non-tripping current, the opening release being energized on all poles, tripping shall not occur in less than the conventional time from the cold state, i.e. with the circuit-breaker at the reference temperature		P
	Moreover, when at the end of the conventional time the value of current is immediately raised to 1,30 times the current setting, i.e. with the conventional tripping current, tripping shall then occur in less than the conventional time later		P
	If a release is declared by the manufacturer as substantially independent of ambient temperature, the current values of table 6 shall apply within the temperature band declared by the manufacturer, within a tolerance of 0,3%/K		N/A
	The width of the temperature band shall be at least 10 K on either side of the reference temperature		N/A
7.2.4.2	Operational performance capability		
7.2.4.2 part 1	The operational performance off-load for which the tests are made with the control circuits energized and the main circuit not energized, in order to demonstrate that the equipment meets the operating conditions specified at the upper and lower limits of supply voltage and/or pressure specified for the control circuit during closing and opening operations		N/A
	The operational performance on-load during which the equipment shall make and break the specified current corresponding, where relevant, to its utilization category for the number of operations stated in the relevant product standard		P

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Clause	Requirement + Test	Result - Remark	Verdict
8	TESTS		
8.2.4	Mechanical properties of terminals		
	Mechanical strength of terminals		
	maximum cross-sectional area of conductor (mm²) :	50	
	diameter of thread (mm) :	6,8	
	torque (Nm) :	3,5	
	5 times on 2 separate clamping units		P
	Testing for damage to and accidental loosening of conductor (flexion test)		
	conductor of the smallest cross-sectional area (mm²) :	16	
	number of conductors of the smallest cross section :	2	
	diameter of bushing hole (mm) :	13,0	
	height between the equipment and the platen :	300	
	mass at the conductor(s) (kg) :	2,9	
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		P
	Pull-out test		
	force (N) :	100	
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		P
	conductor of the largest cross-sectional area (mm²) :	50	
	number of conductors of the largest cross section :	1	
	diameter of bushing hole (mm) :	15,9	
	height between the equipment and the platen :	343	
	mass at the conductor(s) (kg) :	9,5	
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		P
	Pull-out test		
	force (N) :	236	
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		P
	conductor of the largest and smallest cross-sectional area (mm²) :	16 / 50	

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Clause	Requirement + Test	Result - Remark	Verdict
	number of conductors of the smallest cross section, number of conductors of the largest cross section :	1 / 1	
	diameter of bushing hole (mm) :	13,0 / 15,9	
	height between the equipment and the platen :	300 / 343	
	mass at the conductor(s) (kg) :	2,9 / 9,5	
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		P
	Pull-out test		
	force (N) :	100 / 236	
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		P

8.3.3	TEST SEQUENCE I: GENERAL PERFORMANCE CHARACTERISTICS - 1 samples: 3P, 125A		
8.3.3.1	Tripping limits and characteristic		
8.3.3.1.2	Opening under short-circuit conditions		
	Manufacturer's name or trademark	DELIXI ELECTRIC	
	Type designation or serial number	HDB2	
	Sample no:	I-1	
	Rated operational voltage: Ue (V)	415	
	Rated current: In (A)	125	
	Ambient temperature 10-40 °C :		
	Value of the tripping current declared by the manufacturer for a single pole, at which value they shall operate.		N/A
	Range of adjustable setting current. (A)		N/A
	Time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Electromagnetic overcurrent releases		
	Test current: 80% of the rated, ~~or minimum adjustable setting current~~: (A)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Operating time: >0,2s in case of instantaneous releases: L1-L2: / L1-L3: / L2-L3: / N-Lx:	- / - / - / -	N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: / L1-L3: / L2-L3: / N-Lx:		N/A
	Test current: 120% of the rated, ~~or minimum adjustable setting current~~: (A)		N/A
	Operating time: <0,2s in case of instantaneous releases: L1-L2: / L1-L3: / L2-L3: / N-Lx:	- / - / - / -	N/A
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: / L1-L3: / L2-L3: / N-Lx:		N/A
	Test current: 80% of the **maximum** adjustable setting current: (A)		N/A
	Operating time: >0,2s in case of instantaneous releases: L1-L2: / L1-L3: / L2-L3: / N-Lx:		N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: / L1-L3: / L2-L3: / N-Lx:		N/A
	Test current: 120% of the **maximum** adjustable setting current: (A)		N/A
	Operating time: <0,2s in case of instantaneous releases: L1-L2: / L1-L3: / L2-L3: / N-Lx:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3: N-Lx:		N/A
	Test current: tripping current declared for single pole operation (A)		N/A
	Operating time: < 0,2 s in case of instantaneous release: L1: L2: L3: N:	- - - -	N/A
	Operating time: < twice time delay stated by manufacturer in case of definite time delay releases L1: L2: L3: N:		N/A
	Electronic overcurrent releases		
	For circuit-breakers with an electronic overcurrent release, the operation of the short-circuit releases shall be verified by one test only on each pole individually.		N/A
	Test current: 80% of the rated, or **minimum** adjustable setting current: (A)		N/A
	Operating time: >0,2s in case of instantaneous releases: L1: L2: L3: N:		N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases: L1: L2: L3: N:		N/A
	Test current: 120% of the rated, or **minimum** adjustable setting current: (A)		N/A
	Operating time: <0,2s in case of instantaneous releases: L1: L2: L3: N:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases: L1: L2: L3: N:		N/A
	Test current: 80% of the **maximum** adjustable setting current: (A)		N/A
	Operating time: >0,2s In case of instantaneous releases: L1: L2: L3: N:		N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases: L1: L2: L3: N:		N/A
	Test current: 120% of the **maximum** adjustable setting current: (A)		N/A
	Operating time: <0,2s In case of instantaneous releases: L1: L2: L3: N:		N/A
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases: L1: L2: L3: N:		N/A
8.3.3.1.3	Opening under overload conditions		
a)	Instantaneous or definite time-delay releases		
	Manufacturer's name or trademark		
	Type designation or serial number		
	Sample no:		
	Rated operational voltage: Ue (V)		
	Rated current: In (A)		
	Ambient temperature 10-40 °C:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Value of the tripping current declared by the manufacturer for a single pole, at which value they shall operate.		N/A
	Range of adjustable setting current. (A)		N/A
	Time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 90% of the rated, or minimum adjustable setting current: (A)		N/A
	Operating time: >0,2s in case of instantaneous releases:		N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 90% of the maximum adjustable setting current: (A)		N/A
	Operating time: >0,2s in case of instantaneous releases		N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 110% of the rated, or minimum adjustable setting current: (A) circuit-breaker with neutral pole: 1,2x110% (A)		N/A
	Operating time: <0,2s in case of instantaneous releases:		N/A
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 110% of the maximum adjustable setting current: (A) circuit-breaker with neutral pole: 1,2x110% (A)		N/A
	Operating time: <0,2s in case of instantaneous releases		N/A
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
b)	Inverse time delay releases		
	Manufacturer's name or trademark	[redacted]	
	Type designation or serial number		
	Sample no:		

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Clause	Requirement + Test	Result - Remark	Verdict
	Rated operational voltage: Ue (V)		
	Rated current: In (A)		
	For releases dependent of ambient air temperature: Reference temperature		N/A
	Test ambient temperature (°C)		N/A
	For releases dependent on ambient air temperature, the operating characteristics shall be verified at the reference temperature, the release being energized on all phase poles. If the test made at a different ambient temperature, a correction shall be made in accordance with the manufacturer's correction temperature/current data		N/A
	For thermal-magnetic releases independent of ambient temperature: Tests shall be made at 30°C and 20°C or 40°C, the release being energized on all phase poles		N/A
	For electronic releases, the operating characteristic shall be verified at the ambient temperature of the test room (see 6.1.1 of IEC 60947-1), the release being energised on all phase poles.		N/A
	Test ambient air temperature:		N/A
	Range of adjustable setting current: (A)		N/A
	Releases, dependent of ambient air temperature: Reference temperature (°C)		N/A
	Thermal Magnetic releases, independent of ambient air temperature: at 30°C		N/A
	Test current: 105% of the rated, ~~or minimum adjustable setting current~~: (A)		N/A
	Conventional non-tripping time: 1h when In < 63A, 2h when In > 63 A		N/A
	Test current: 130% of the rated, ~~or minimum adjustable setting current~~: (A)		N/A
	For circuit-breakers having an identified neutral pole provided with an overload release (see 8.3.3.1.1), the test current at the conventional tripping current shall be multiplied by the factor 1,2.		N/A
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A		N/A
	Test current: 105% of the **maximum** adjustable setting current: (A)		N/A

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IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Conventional non-tripping time: 1h when In < 63A, 2h when In > 63 A		N/A
	Test current: 130% of the **maximum** adjustable setting current: (A)		N/A
	For circuit-breakers having an identified neutral pole provided with an overload release (see 8.3.3.1.1), the test current at the conventional tripping current shall be multiplied by the factor 1,2.		N/A
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A		N/A
	Thermal Magnetic releases, independent of ambient air temperature: at 20°C or 40°C		
	Test ambient air temperature:		N/A
	Test current: 105% of the rated, or **minimum** adjustable setting current: (A)		N/A
	Conventional non-tripping time: 1h when In < 63A, 2h when In > 63 A		N/A
	Test current: 130% of the rated, or **minimum** adjustable setting current: (A)		N/A
	For circuit-breakers having an identified neutral pole provided with an overload release (see 8.3.3.1.1), the test current at the conventional tripping current shall be multiplied by the factor 1,2.		N/A
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A		N/A
	Test current: 105% of the **maximum** adjustable setting current: (A)		N/A
	Conventional non-tripping time: 1h when In < 63A, 2h when In > 63 A		N/A
	Test current: 130% of the **maximum** adjustable setting current: (A)		N/A
	For circuit-breakers having an identified neutral pole provided with an overload release (see 8.3.3.1.1), the test current at the conventional tripping current shall be multiplied by the factor 1,2.		N/A
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A		N/A
	An additional test, at a current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer		
	Releases, dependent of ambient air temperature: Reference temperature (°C)		N/A
	Releases, independent of ambient air temperature: at 30°C		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Test ambient air temperature:		N/A
	Test current: at current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer. % at the rated, or minimum adjustable setting current: (% or A)		N/A
	Tripping time acc. time/current characteristic of the releases conform to the curves provided by the manufacturer. (within the stated tolerances)		N/A
	Releases, independent of ambient air temperature: at 20°C or 40°C		
	Test ambient air temperature:		N/A
	Test current: at current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer. % at the rated, or minimum adjustable setting current: (% or A)		N/A
	Tripping time acc. time/current characteristic of the releases conform to the curves provided by the manufacturer. (within the stated tolerances)		N/A
8.3.3.1.4	Additional test for definite time-delay releases		
a)	Time delay		
	Test is made at a current equal to 1,5 times the current setting. If the test current overlaps with another tripping characteristic (e.g. an instantaneous tripping characteristic), the trip setting and the test current shall be reduced as necessary to prevent premature tripping.		
	overload releases: (all phase poles loaded)		N/A
	for circuit-breakers having an identified neutral pole provided with an overload release, the test current for this release shall be 1,5 times the current setting;		N/A
	short-circuit releases		N/A
	Electromagnetic release: two poles in series carrying the test current, using successively all possible combinations of poles having a short-circuit release.		N/A
	Electronic releases: on one pole chosen at random.		N/A
	Test current: 1,5 times of the rated; or **minimum** adjustable setting current: (A)		N/A
	Operating time, overload releases: (s)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Time-delay: between the limits stated by the manufacturer:		N/A
	Operating time, short-circuit releases (electromagnetic): (s) L1-L2: L1-L3: L2-L3:		N/A
	Time-delay: between the limits stated by the manufacturer:		N/A
	Operating time, short-circuit releases (electronic): (s) L1: L2: L3:		N/A
	Time-delay: between the limits stated by the manufacturer:		N/A
	Test current: 1,5 times of the **maximum** adjustable setting current: (A)		N/A
	Operating time, overload releases: (s)		N/A
	Time-delay: between the limits stated by the manufacturer:		N/A
	Operating time, short-circuit releases (electromagnetic): (s) L1-L2: L1-L3: L2-L3:		N/A
	Time-delay: between the limits stated by the manufacturer:		N/A
	Operating time, short-circuit releases (electronic): (s) L1: L2: L3:		N/A
	Time-delay: between the limits stated by the manufacturer:		N/A
b)	Non-tripping duration		
	Firstly, the test current equal to 1,5 times the current setting is maintained for a time interval equal to the non-tripping duration stated by the manufacturer.		
	Then, the current is reduced to the rated current and maintained at this value for twice the time-delay stated by the manufacturer. The circuit-breaker shall not trip.		
	overload releases: (all phase poles loaded)		N/A
	for circuit-breakers having an identified neutral pole provided with an overload release, the test current for this release shall be 1,5 times the current setting:		N/A
	short-circuit releases		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Electromagnetic release: two poles in series carrying the test current, using successively all possible combinations of poles having a short-circuit release.		N/A
	Electronic releases: on one pole chosen at random.		N/A
	Test current: 1,5 times of the **minimum** adjustable setting current: (A)		N/A
	non-tripping duration stated by the manufacturer for overload release: (s)		N/A
	non-tripping duration stated by the manufacturer for short-circuit release thermal magnetic: (s)		N/A
	non-tripping duration stated by the manufacturer for short-circuit release electronic: (s)		N/A
	Time duration of current when reduced to the rated current: shall be twice the delay-time stated by the manufacturer: (s)		N/A
	Rated current		N/A
	Operating time, overload releases: the circuit-breaker does not trip:		N/A
	Operating time, short-circuit releases (electromagnetic), shall not trip: (s) L1-L2: L1-L3: L2-L3:		N/A
	Operating time, short-circuit releases (electronic), shall not trip: (s) L1: L2: L3:		N/A
	Test current: 1,5 times of **maximum** adjustable setting current: (A)		N/A
	non-tripping duration stated by the manufacturer for overload release: (s)		N/A
	non-tripping duration stated by the manufacturer for short-circuit release thermal magnetic: (s)		N/A
	non-tripping duration stated by the manufacturer for short-circuit release electronic: (s)		N/A
	Time duration of current when reduced to the rated current: shall be twice the delay-time stated by the manufacturer: (s)		N/A
	Rated current		N/A
	Operating time, overload releases: the circuit-breaker does not trip:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Operating time, short-circuit releases (electromagnetic), shall not trip: (s) L1-L2: L1-L3: L2-L3:		N/A
	Operating time, short-circuit releases (electronic), shall not trip: (s) L1: L2: L3:		N/A
8.3.3.2	Test of dielectric properties, impulse withstand voltage (Uimp indicated):		
8.3.3.4 part1	The 1,2/50µs impulse voltage shall be applied five times for each polarity at intervals of 1s minimum		
	- rated impulse withstand voltage (kV) :	6kV	P
	- sea level of the laboratory:	5m	P
	- test Uimp main circuits (kV) :	5,8	P
	- test Uimp auxiliary circuits (kV) :		N/A
	- test Uimp control circuits (kV) :		N/A
	- test Uimp on open main contacts (equipment suitable for isolating) (kV) :	6,2	P
a)	Application of test voltage		
	i) Between all terminals of the main circuit connected together (incl. control and auxiliary circuits connected to the main circuit) and the enclosure or mounting plate, with the contacts in all normal positions of operation.		P
	ii) Between each pole of the main circuit and the other poles connected together and to the enclosure or mounting plate, with the contacts in all normal positions of operation.		P
	iii) Between each control and auxiliary circuit not normally connected to the main circuit and: - the main circuit		N/A
	- other circuits		N/A
	- exposed conductive parts		N/A
	- enclosure of mounting plate		N/A
	iv) equipment suitable for isolation		P
	equipment not suitable for isolation		N/A
	- no unintentional disruptive discharge during the test's		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Test of dielectric properties, dielectric withstand voltage (Uimp not indicated):		
	- rated insulation voltage (V) :	500	P
	- main circuits, test voltage for 1 min (V)	1890	P
	- auxiliary circuits, test voltage for 1 min (V)		N/A
	- control circuits, test voltage for 1 min (V)		N/A
8.3.3.2.2	Application of test voltage		
1)	with circuit-breaker in the closed position		
	- between all live parts of all poles connected together and the frame of the circuit-breaker .		P
	- between each pole and all the other poles connected to the frame of the circuit-breaker		P
2)	with the circuit-breaker in the open position and, additionally, in the tripped position, if any.		
	- between all live parts of all poles connected together and the frame of the circuit-breaker.		P
	- between the terminals of one side connected together and the terminals of the other side connected together.		P
b)	Control and auxiliary circuits		
1)	- between all the control and auxiliary circuits which are not normally connected to the main circuit, connected together, and the frame of the circuit-breaker.		N/A
2)	- where appropriate, between each part of the control an auxiliary circuits which may be isolated from the other parts during normal operation and all the other parts connected together.		N/A
	No unintentional disruptive discharge during the tests		P
8.3.3.2	For circuit-breaker suitable for isolation, the leakage current shall be measured through each pole with the contacts in the open position, at a test voltage of 1,1 Ue, and shall not exceed 0,5mA.	457V $6{,}52 \times 10^{-3}$mA(Maximum)	P
8.3.3.3	Mechanical operation and operational performance capability		
8.3.3.3.2	Construction and mechanical operation		
a)	Construction		
	A withdrawable circuit-breaker shall be checked for the requirements stated in 7.1.1		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	A circuit-breaker with stored energy operation shall be checked for compliance with 7.2.1.1.5, regarding the charge indicator and the direction of operation of manual energy storing		N/A
b)	Mechanical operation		
	A circuit-breaker with dependent power operation shall comply with the requirements stated in 7.2.1.1.3		N/A
	A circuit-breaker with dependent power operation shall operate with the operating mechanism charged to the minimum and maximum limits stated by the manufacturer		N/A
	A circuit-breaker with stored energy operation shall comply with the requirements stated in 7.2.1.5 with the auxiliary supply voltage at 85% and 110% of the rated control supply voltage.		N/A
	It shall also be verified that the moving contacts cannot be moved from the open position when the operating mechanism is charged to slightly below the full charge as evidenced by the indicating device		N/A
	For a trip-free circuit-breaker it shall not be possible to maintain the contacts in the touching or closed position when the tripping release is in the position to trip the circuit-breaker		N/A
	If the closing and opening times of a circuit-breaker are stated by the manufacturer, such times shall comply with the stated values		N/A
c)	Undervoltage releases		
	Undervoltage releases shall comply with the requirements of 7.2.1.3 of Part 1. For this purpose, the release shall be fitted to a circuit-breaker having the maximum current rating for which the release is suitable		N/A
i)	Drop out voltage		
	It shall be verified that the release operates to open the circuit-breaker between the voltage limits specified		N/A
	The voltage shall be reduced from rated voltage at a rate to reach 0 V in approximately 30 s		N/A
	The test for the lower limit is made without current in the main circuit and without previous heating of the release coil		N/A
	In the case of a release with a range of rated voltages, this test applies to the maximum voltage of the range		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	The test for the upper limit is made starting from a constant temperature corresponding to the application of rated control supply voltage to the release and rated current in the main poles of the circuit-breaker		N/A
	This test may be combined with the temperature-rise test of 8.3.3.6		N/A
	In the case of a release with a range of rated voltages, this test is made at both the minimum and maximum rated control supply voltages		N/A
ii)	Test for limits of operation		
	Starting with the circuit-breaker open, at the temperature of the test room, and with the supply voltage at 30% rated maximum control supply voltage, it shall be verified that the circuit-breaker cannot be closed by the operation of the actuator		N/A
	When the supply voltage is raised to 85% of the minimum control supply voltage, it shall be verified that the circuit-breaker can be closed by the operation of the actuator		N/A
iii)	Performance under overvoltage conditions		
	With the circuit-breaker closed and without current in the main circuit, it shall be verified that the undervoltage release will withstand the application of 110% rated control supply voltage for 4 h without impairing its functions	CU	N/A
d)	Shunt releases		
	Shunt releases shall comply with the requirements of 7.2.1.4 of Part 1. For this purpose, the release shall be fitted to a circuit-breaker having the maximum rated current for which the release is suitable		N/A
	It shall be verified that the release will operate to open the circuit-breaker at 70% rated control supply voltage when tested at an ambient temperature of + 55 °C ± 2 °C without current in the main poles of the circuit-breaker		N/A
	In the case of a release having a range of rated control supply voltages, the test voltage shall be 70% of the minimum rated control supply voltage		N/A
8.3.3.3.3	Operational performance capability without current.		
	Type designation or serial number	HDB2	
	Sample no:	I-1	
	Rated current In (A)	125	

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Clause	Requirement + Test	Result - Remark	Verdict
	Rated operational voltage: Ue (V)	415	
	Rated control supply voltage of closing mechanism: Uc (V)	-	
	Rated control supply voltage of shunt releases: Uc (V)	-	
	Rated control supply voltage undervoltage releases: Uc (V)	-	
	Ambient temperature 10-40 °C :	28°C	P
	Number of operating cycles per hour	120	P
	Number of cycles without current (total) (closing mechanism energized at the rated Uc)		N/A
	Number of cycles without current (without releases)	7000	P
	Applied voltage: closing mechanism (V)		N/A
	10% of total cycles for circuit-breaker with fitted shunt release: (50% at the beginning- and 50% at the end of the test.) Energized at the rated Uc		N/A
	Applied voltage: shunt releases (V)		N/A
	10% of total cycles for circuit-breaker with undervoltage releases: (50% at the beginning- and 50% at the end of the test.) Energized at the minimum rated Uc		N/A
	10 cycles without applied voltage at the undervoltage releases. (Shall not possible to close the circuit-breaker.)		N/A
	Applied voltage: undervoltage releases (V)		N/A
	Electrical components do not exceed the value indicated in tab. 7.		N/A
8.3.3.3.4	Operational performance capability with current.		
	Rated current: In (A)	125	
	Maximum rated operational voltage: Ue (V)	415	
	Conductor cross-sectional area (mm²) :	50	P
	Number of operating cycles per hour	120	P
	Number of cycles with current (total) (closing mechanism energized at the rated Uc)	1000	P
	Applied voltage: closing mechanism (V)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	For circuit-breaker fitted with adjustable releases, test shall be made with the overload setting at maximum and short-circuit setting at minimum.		N/A
	Conditions, make/break operations:		
	- test voltage U/Ue = 1,0 (V) .....L1: .....L2: L3:	418 418 418	P
	- test current I/Ie = 1,0 (A) .....L1: .....L2: L3:	125 125 125	P
	- power factor/~~time constant:~~	0,81	P
	- frequency: (Hz)	50	P
	- on-time (ms):	379	P
	- off-time (s):	30	P
	Electrical components do not exceed the value indicated in tab. 7.		P
8.3.3.3.5	Additional test of operational performance capability without current for withdrawable circuit-breaker.		
	Number of operations cycles : 100		N/A
	After test, the isolating contacts, withdrawable mechanism and interlocks shall be suitable for further service.		N/A
8.3.3.4	Overload performance		
	this test applies to circuit-breaker of rated current up to and including 630 A		
	Type designation or serial number	HDB2	
	Sample no:	I-1	
	Rated current In (A)	125	
	Rated operational voltage: Ue (V)	415	
	Rated control supply voltage of closing mechanism: Uc (V)	-	
	Rated control supply voltage of shunt releases: Uc (V)	-	
	Rated control supply voltage undervoltage releases: Uc (V)	-	
	Ambient temperature 10-40 °C :	28°C	P
	Number of operating cycles per hour	120	P
	Maximum rated operational voltage: Ue (V)	415	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Number of cycles with current (total) (closing mechanism energized at the rated Uc)	12	P
	Applied voltage: closing mechanism (V)		N/A
	For circuit-breaker fitted with adjustable releases, test shall be made with the overload/short-circuit settings at maximum.		N/A
	Conditions, overload operations:		
	- test voltage U/Ue = 1,05 (V) .....L1: .....L2: L3:	440 440 440	P
	- test current AC/~~DC~~: I/Ie = 6,0/~~2,5~~ (A) .....L1: .....L2: L3:	 762 762 762	P
	- power factor/~~time constant~~:	0,47	P
	- Number of cycles manually opened: 9	9	P
	- Number of cycles automatically opened by an overload release: 3	3	P
	- frequency: (Hz)	50	P
	- on-time max 2s:	<2s	P
8.3.3.5	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V for 5 seconds	1000V	P
	- no breakdown or flashover		P
	For circuit-breaker suitable for isolation, the leakage current shall be measured through each pole with the contacts in the open position, at a test voltage of 1,1 Ue, and shall not exceed 2 mA.	457V $10{,}3x10^{-3}$mA(maximum)	P
8.3.3.6	Verification of temperature-rise		
	- the values of temperature-rise do not exceed those specified in tab. 7.		P
	Temperature rise of main circuit terminals ≤ 80 K (K) :	75	P
	conductor cross-sectional area (mm^2) :	50	P
	test current Ie (A) :	125	P
8.3.3.7	Verification of overload releases		
	Test current: 1.45 times the value of their current setting at the reference temperature: (A)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A		N/A
8.3.3.8	Verification of undervoltage and shunt releases		
	Circuit-breaker fitted with undervoltage releases. The release shall not operate at 70% of the minimum control supply voltage -		N/A
	and shall operate at 35% of the maximum control supply voltage.		N/A
	Circuit-breaker fitted with shunt releases. The release shall operate at 70% of the minimum rated control supply voltage. Test made at room temperature.		N/A
8.3.3.9	Verification of the main contact position for circuit-breakers for isolation		
	actuating force for opening (N) .....:		—
	test force with blocked main contacts for 10 s (N) . :		—
	Dependent power operation		N/A
	Supply voltage of 110% of rated voltage (V).....:		N/A
	Three attempts of 5 s to operate the equipment at intervals of 5 min.		N/A
	Independent power operation		N/A
	Three attempts to operate the equipment by the stored energy.		N/A
	Lock ability of driving mechanism in OFF-position at test force and blocked main contacts ..... :		N/A
	Position indicator does not show OFF-position after capture of test force at blocked main contacts		P

ВЯРНО С ОРИГИНАЛА

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
8.3.5	TEST SEQUENCE III (Icu) -1 sample: 3P, 125A		
	Rated ultimate short-circuit breaking		
	Except where the combined test sequence applies, this test sequence applies to circuit-breaker of utilization category A and to circuit-breaker of utilization B having a rated ultimate short-circuit breaking capacity higher than the rated short-time withstand current.		
	For circuit-breakers of utilization B having a rated short-time withstand current equal to their rated ultimate short-circuit breaking capacity, this test sequence need not be made, since, in this case, the ultimate short-circuit breaking capacity, is verified when carrying out test sequence IV.		
	For integrally fused circuit-breakers, test sequence V applies in place of this sequence.		
	Type designation or serial number	HDB2	
	Sample no:	III-1	
	Rated current: In (A)	125	
	Rated operational voltage: Ue (V)	415	
	Rated ultimate short-circuit breaking capacity: (kA)	10	
	Rated control supply voltage of closing mechanism: Uc (V)		
	Rated control supply voltage of shunt release: Uc (V)		
	This test sequence need not be made when Icu = Ics		
8.3.5.1	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		
	Time specified by the manufacturer:	⩽8min	P
	- Operation time: (s) .....L1: .....L2: .....L3: ..... N :	1min34s 2min07s 1min01s -	P
8.3.5.2	Test of rated ultimate short-circuit breaking capacity		
	The test sequence of operations is O – t – CO		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		N/A

ВЯРНО С ОРИГИНАЛА

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	closing mechanism energized with 85% at the rated Uc: (V)		N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.		P
	Test made in free air:		P
	Distances of the metallic screen's: (all sides)	Back: 0mm Front: 0mm Top: 45mm Botton: 45mm Left: 10mm Right: 10mm	P
	The characteristics of the metallic screen:		
	- woven wire mesh		N/A
	- perforated metal		P
	- expanded metal		N/A
	- ratio hole area/total area: 0,45-0,65	0,50	P
	- size of hole: <30mm^2	25	P
	- finish: bare or conductive plating	Bare	P
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		N/A
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long		P
	Circuit is earthed at: (load-star- or supply-star point)	Supply-star	P
	Conductor cross-sectional area (mm²) :	50	P
	If terminals unmarked: line connected at: (underside/upside)		N/A
	Tightening, torques: (Nm)	3,5	P
	Test sequence of operation: O – t – CO		P
	- test voltage U/Ue = 1,05 (V) .....L1: .....L2: L3:	440 440 440	P
	- r.m.s. test current AC/~~DC~~: (kA).....L1: .....L2: L3:	10,3 10,3 10,3	P
	power factor/time constant :	0,47	P
	- Factor "n"	1,7	P
	- peak test current (kAmax) :	16,7	P

ВЯРНО С ОРИГИНАЛА

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IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Test sequence "O"		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	6,64 7,40 5,60	P
	- Joule integral I^2dt (kA^2s) .....L1: .....L2: L3:	165 283 67,6	P
	Pause, t: (min)	3	P
	Test sequence "CO"		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	6,39 5,38 6,92	P
	- Joule integral I^2dt (kA^2s) .....L1: .....L2: L3:	97,0 117 245	P
	Melting of the fusible element	No	P
	Holes in the PE-sheet for test sequence "O"	No	P
	Cracks observed	No	P
8.3.5.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V for 5 seconds	1000	P
	- no breakdown or flashover		P
	- the leaking current for circuit-breaker suitable for isolation: (<6mA / 1,1 Ue)	457V $8,64x10^{-3}$mA(maximum)	P
8.3.5.4	Verification of overload releases		
	The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		
	Time specified by the manufacturer:		N/A
	- Operation time: (s) .....L1: .....L2: .....L3: ..... N :	39s 43s 41s -	P

ВЯРНО С ОРИГИНАЛА

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
8.3.5	TEST SEQUENCE III (Icu) -1 sample: 2P, 63A		
	Rated ultimate short-circuit breaking		
	Except where the combined test sequence applies, this test sequence applies to circuit-breaker of utilization category A and to circuit-breaker of utilization B having a rated ultimate short-circuit breaking capacity higher than the rated short-time withstand current.		
	For circuit-breakers of utilization B having a rated short-time withstand current equal to their rated ultimate short-circuit breaking capacity, this test sequence need not be made, since, in this case, the ultimate short-circuit breaking capacity, is verified when carrying out test sequence IV.		
	For integrally fused circuit-breakers, test sequence V applies in place of this sequence.		
	Type designation or serial number	HDB2	
	Sample no:	III-2	
	Rated current: In (A)	63	
	Rated operational voltage: Ue (V)	415	
	Rated ultimate short-circuit breaking capacity: (kA)	10	
	Rated control supply voltage of closing mechanism: Uc (V)		
	Rated control supply voltage of shunt release: Uc (V)		
	This test sequence need not be made when Icu = Ics		
8.3.5.1	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		
	Time specified by the manufacturer:	⩽8min	P
	- Operation time: (s) .....L1: .....L2: .....L3: ..... N :	2min21s 2min43 1min55s -	P
8.3.5.2	Test of rated ultimate short-circuit breaking capacity		
	The test sequence of operations is O – t – CO		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		N/A

ВЯРНО С ОРИГИНАЛА

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	closing mechanism energized with 85% at the rated Uc: (V)		N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.		P
	Test made in free air:		P
	Distances of the metallic screen's: (all sides)	Back: 0mm Front: 0mm Top: 45mm Botton: 45mm Left: 10mm Right: 10mm	P
	The characteristics of the metallic screen:		
	- woven wire mesh		N/A
	- perforated metal		P
	- expanded metal		N/A
	- ratio hole area/total area: 0,45-0,65	0,50	P
	- size of hole: <30mm^2	25	P
	- finish: bare or conductive plating	Bare	P
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		N/A
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long		P
	Circuit is earthed at: (load-star- or supply-star point)	Supply-star	P
	Conductor cross-sectional area (mm²) :	16	P
	If terminals unmarked: line connected at: (underside/upside)		N/A
	Tightening, torques: (Nm)	3,5	P
	Test sequence of operation: O – t – CO		P
	- test voltage U/Ue = 1,05 (V) .....L1: .....L2: L3:	440 440 440	P
	- r.m.s. test current AC/~~DC~~: (kA) .....L1: .....L2: L3:	10,3 10,3 10,3	P
	power factor/time constant :	0,47	P
	- Factor "n"	1,7	P
	- peak test current (kAmax) :	16,7	P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Test sequence "O"		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	5,88 7,18 6,56	P
	- Joule integral I^2dt (kA^2s) .....L1: .....L2: L3:	105 192 93,7	P
	Pause, t: (min)	3	P
	Test sequence "CO"		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	4,42 6,06 5,56	P
	- Joule integral I^2dt (kA^2s) .....L1: .....L2: L3:	78,6 166 72,8	P
	Melting of the fusible element	No	P
	Holes in the PE-sheet for test sequence "O"	No	P
	Cracks observed	No	P
8.3.5.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V for 5 seconds	1000	P
	- no breakdown or flashover		P
	- the leaking current for circuit-breaker suitable for isolation: (<6mA / 1,1 Ue)	457V $8,71x10^{-3}$mA(maximum)	P
8.3.5.4	Verification of overload releases		
	The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		
	Time specified by the manufacturer:		N/A
	- Operation time: (s) .....L1: .....L2: .....L3: .....N :	56s 57s 43s -	P

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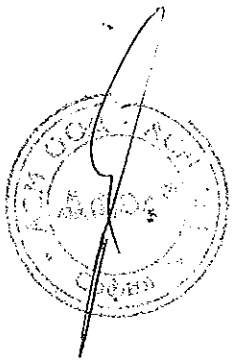
TABLE: TEMPERATURE RISE MEASUREMENTS				
temperature rise dT of part:		phase	dT (K)	required dT (K)
For clause 8.3.3.6 (125A, 3P)				
1	Terminals for external connections	Max for all	75	80
2	Enclosure	Max for all	44	50
3	Non-metallic handle	Max for all	22	35
For clause 8.3.4.4 (125A, 3P)				
1	Terminals for external connections	Max for all	N/A	80

TABLE: THREADED PART TORQUE TEST			
threaded part identification	diameter of thread (mm)	column number (I, II, or III)	applied torque (Nm)
Terminal screw	6,8	II	3,5
supplementary information:			

TABLE: GLOW WIRE TEST							
Part	Colour	Thick (mm)	Temp. °C	burning after t (s)	drops	support burning	Comments
Enclosure	Grey	2,5	960	2	No	No	OK
Non-metallic mechanical parts	Brown	2,0	960	-	No	No	OK
	Red	2,0	650	-	No	No	OK
	White	2,5	960	-	No	No	OK
Handle	Black	2,0	650	-	No	No	OK
supplementary information:							

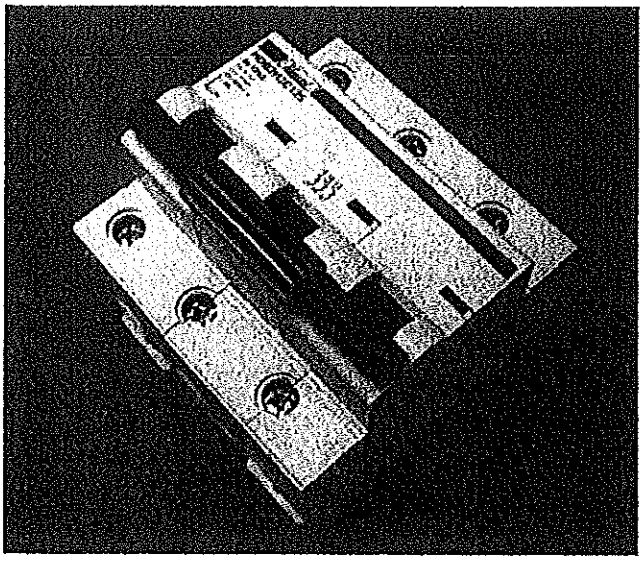


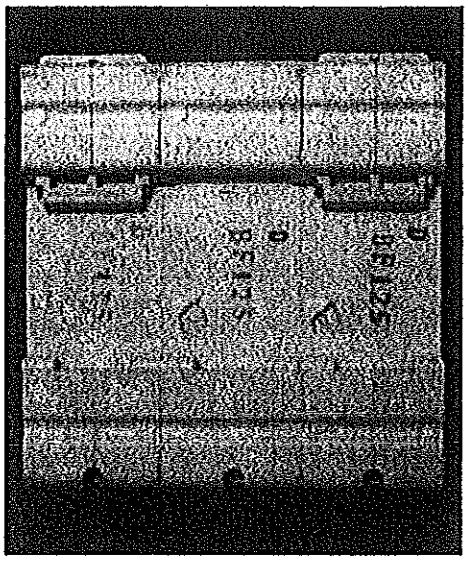
ВЯРНО С ОРИГИНАЛА

ИИ8

IEC 60947-2

Photos of samples:





ВЯРНО С ОРИГИНАЛА

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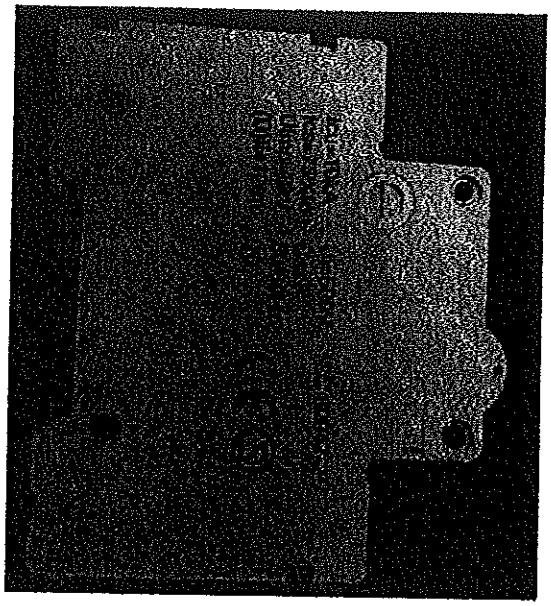
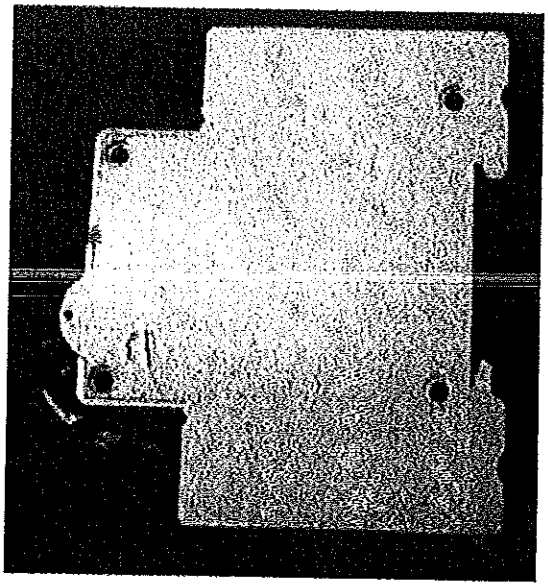
Photos of samples:

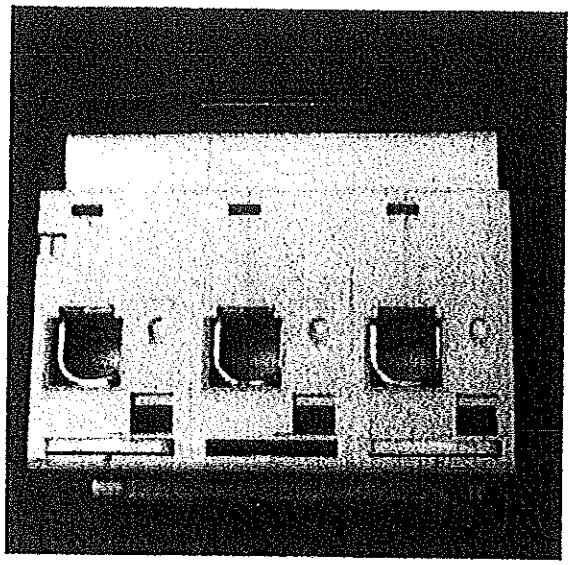


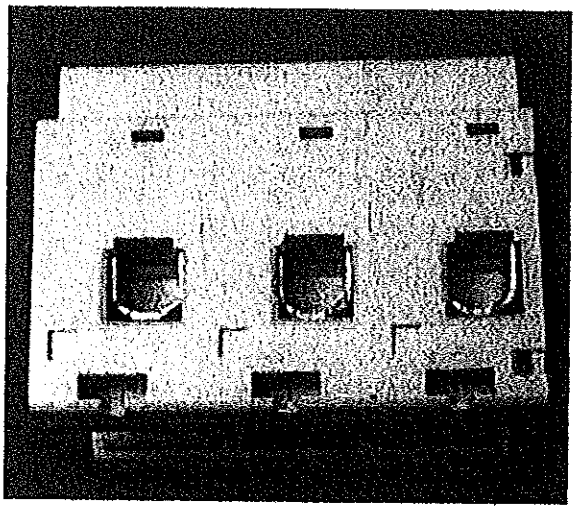


ВЯРНО С ОРИГИНАЛА

IEC 60947-2

Photos of samples:





ВЯРНО С ОРИГИНАЛА

Testing procedure and testing location:	
☒ **Testing Laboratory:**	Intertek Testing Services Shanghai
Testing location/ address.....:	Building No.86, 1198 Qinzhou Road (North), Shanghai 200233, China
☒ **Associated Laboratory:**	Inspection Center of Products' Quality of Low Voltage Electric Apparatus in Zhejiang Province
Testing location/ address.....:	West Zhonghuan Road, Jiaxing City, Zhejiang Province, P.R.China
Tested by (name + signature).....:	Vincent Yang Vincent Yang
Approved by (+ signature) .....:	Jim Hua
☐ Testing procedure: TMP	
Tested by (name + signature).....:	
Approved by (+ signature) .....:	
Testing location/ address.....:	
☐ Testing procedure: WMT	
Tested by (name + signature).....:	
Witnessed by (+ signature).....:	
Approved by (+ signature) .....:	
Testing location/ address.....:	
☐ Testing procedure: SMT	
Tested by (name + signature).....:	
Approved by (+ signature) .....:	
Supervised by (+ signature).....:	
Testing location/ address.....:	
☐ Testing procedure: RMT	
Tested by (name + signature).....:	
Approved by (+ signature) .....:	
Supervised by (+ signature).....:	
Testing location/ address.....:	

Summary of testing:

Number of tests for test procedure, according to table 9a and table 10

No. of poles	In(A)	Test sequence and number of samples									
		I	II	III	IV	V	Combined	Annex B	Annex C	Annex H	Annex M
1P	125	1+1[a]	1	1	-	-	-	-	-	-	-
1P	63	-	1	1	-	-	-	-	-	-	-
2P	125	1+1[a]	1	1	-	-	-	-	-	-	-
2P	63	-	1	1	-	-	-	-	-	-	-
3P	125	1[b]	-	1[b]	-	-	-	-	-	-	-
3P	63	-	-	1[b]	-	-	-	-	-	-	-
4P	125	1+1[a]	1	1+1[c]	-	-	-	-	-	-	-
4P	63	-	1	1+1[c]	-	-	-	-	-	-	-

Note:

a) This sample only tested to clause 8.3.3.1 to verify instantaneous of $8,5I_n$.
b) Test Sequence in Amend.1 of IEC 60947-2.
c) Tested on the fourth pole and its adjacent pole.

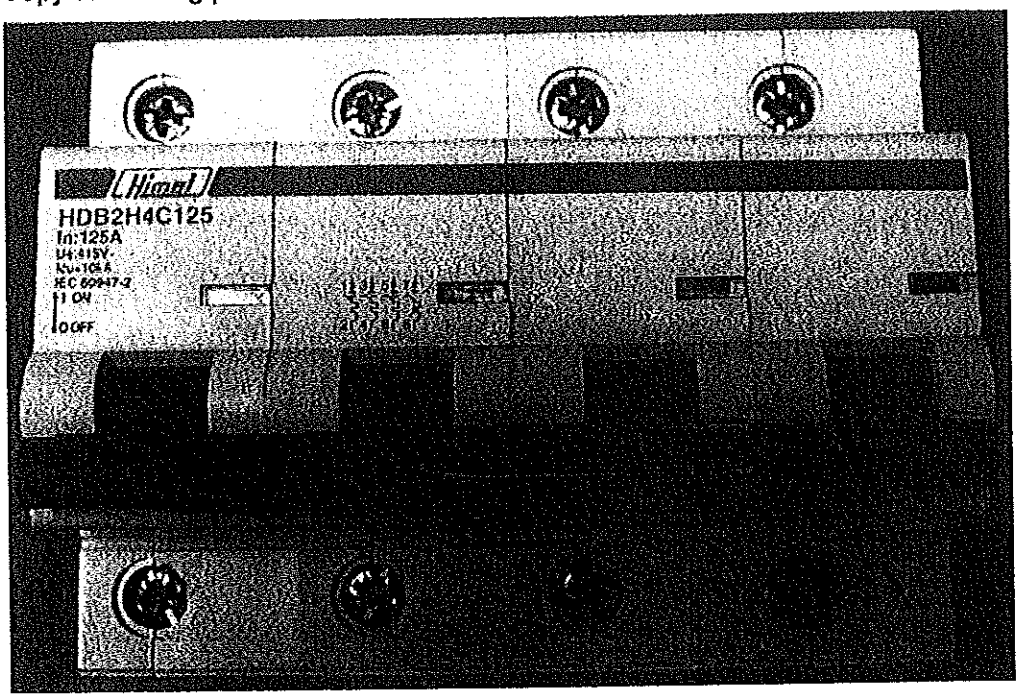
Tests performed (name of test and test clause):		**Testing location:**
8.3.3.1	Tripping limits and characteristics	ACTL
8.3.3.2	Dielectric properties	ACTL
8.3.3.3	Operational performance capability	ACTL
8.3.3.4	Overload performance	ACTL
8.3.3.5	Verification of dielectric withstand	ACTL
8.3.3.6	Verification of temperature rise	ACTL
8.3.3.7	Verification of overload releases	ACTL
8.3.3.8	Verification of undervoltage and shunt releases (if applicable)	CBTL
8.3.3.9	Verification of main contact position (for circuit breakers suitable for isolation)	CBTL
8.3.4.1	Service short-circuit breaking capacity	ACTL
8.3.4.2	Verification of operational capability	ACTL
8.3.4.3	Verification of dielectric withstand	ACTL
8.3.4.4	Verification of temperature rise	ACTL
8.3.4.5	Verification of overload releases	ACTL
8.3.5.1	Verification of overload releases	ACTL
8.3.5.2	Ultimate short-circuit breaking capacity	ACTL
8.3.5.3	Verification of dielectric withstand	ACTL
8.3.5.4	Verification of overload releases	ACTL

ВЯРНО С ОРИГИНАЛА

Summary of compliance with National Differences:

N/A

Copy of marking plate:



ВЕРНО С ОРИГИНАЛА

Test item particulars: test item vs. test requirements	
3. Classification	
3.1. Utilization category: (A or B). ..... :	A
3.2. Interruption medium: (air, vacuum, gas Break)..... :	air
3.3. Design: (open construction, moulded case)..... ..... :	Moulded case
3.4. Method of controlling the operation mechanism: (dependent manual, independent manual, dependent power, independent power) ..... :	Independent manual
3.5. Suitability for isolation: (suitable, not -suitable)..... ..... :	suitable
3.6. Provision for maintenance: (maintainable, non maintainable)..... :	Non-maintainable
3.7. Method of installation: (fixed, plug in, withdrawable:	Fixed
3.8. Degree of protection: (IP code) ..... :	IP20
4.7. Type of release (thermo-magnetic / electronic) ..... :	Thermo-magnetic
4.8. Integral fuses (integrally fused circuit-breakers) Type and characteristics of SCPD..... :	N/A
7.3 Electromagnetic compatibility (EMC) Environment A or B..... :	N/A
Circuit-breaker for use on phase-earthed systems..... :	N/A
Circuit-breaker for use in IT systems..... :	Yes
Rated and limiting values, main circuit .... :	
- rated operational voltage: Ue (V)..... :	415V~
- rated insulation voltage: Ui (V)..... :	500
- rated impulse withstand voltage: Uimp (kV)..... :	6kV
- rated operational current: Ie (A)..... :	63, 80, 100, 125
- kind of current ..... :	AC
- conventional free air thermal current: Ith (A)..... :	63, 80, 100, 125
- conventional enclosed thermal current: Ithe (A) ..... :	N/A
- current rating for four-pole circuit-breakers: (A)..... :	63, 80, 100, 125
- number of poles ..... :	4
- rated frequency: (Hz) ..... :	50/60
- integral fuses (rated values) ..... :	N/A
Rated duty :	
- eight-hour duty ..... :	N/A
- uninterrupted duty: Iu (A) ..... :	63, 80, 100, 125
Short-circuit characteristic :	
rated short-time making capacity: Icm (kA)..... :	N/A

rated ultimate short-circuit breaking capacity: Icu (kA) . .....:	10
rated service short-circuit breaking capacity: Ics (kA).....:	7,5
rated short-time withstand current: Icw (kA/s).....:	17
Control circuits :	
Electrical control circuits :	
- kind of current: (AC, DC) .....:	N/A
- rated frequency: (Hz) .....:	N/A
- rated control circuit voltage: Uc (nature, frequency, V) ....:	N/A
- rated control supply voltage: Us (nature, frequency V) ....:	N/A
Air supply control circuits: (pneumatic or electro-pneumatic) :	
- rated pressure and its limit .....:	N/A
- volumes of air, at atmospheric pressure, required for each closing and each opening operation.....:	N/A
Auxiliary circuits :	
Rated and limiting values, auxiliary circuits .....:	N/A
- rated operational voltage Ue (V).....:	N/A
- rated insulation voltage: Ui (V).....:	N/A
- rated operational current: Ie (A).....:	N/A
- kind of current.....:	N/A
- rated frequency: (Hz).....:	N/A
- number of circuits .....:	N/A
- number and kind of contact elements.....:	N/A
- rated uninterrupted current: Iu (A).....:	N/A
- utilization category: (AC, DC, current and voltage).....:	N/A
Short-circuit characteristic :	
- Rated conditional short-circuit current (kA).....:	N/A
- kind of protective device .....:	N/A

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Releases :	
1) shunt release	N/A
2) Over-current release	
a) instantaneous	Yes
b) definite time delay	N/A
c) inverse time delay	Yes
- independent of previous load	N/A
- dependent on previous load; (for example thermal type release)	Yes
3) Undervoltage release (for opening)	N/A
4) Other releases	N/A
Characteristics :	
1) Shunt release and undervoltage release (for opening)	
- rated control circuit voltage: Uc (nature, frequency, V)	N/A
- kind of current	N/A
- rated frequency: (if AC)	N/A
2) Over-current release	
- rated current	63, 80, 100, 125
- kind of current	AC
- rated frequency: (if AC)	50/60Hz
- current setting (or range of settings)	Inverse time delay: I_n Instantaneous: $8,5I_n$, $12I_n$
- time settings (or range of settings)	Inverse time delay: $1,05I_n$: ≥1h, $1,30I_n$: <1h (for I_n≤63A) Inverse time delay: $1,05I_n$: ≥2h, $1,30I_n$: <2h (for I_n>63A) Instantaneous: $0,8x8,5I_n$: ≥0,2s, $1,2x8,5I_n$: <0,2s Instantaneous: $0,8x12I_n$: ≥0,2s, $1,2x12I_n$: <0,2s

ВЯРНО С ОРИГИНАЛА

Classification of installation and use..... :	Installed by rail
Supply Connection..... :	N/A
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..... :	December 16, 2011
Date (s) of performance of tests..... :	From December 20, 2011 to January 18, 2012

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.

This test report is valid only being read together with the test reports of SH11090550-001, -002, -003.

General product information:

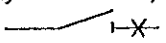
U_e= 240V~(1P), 415V~(2P, 3P, 4P)

In= 63, 80, 100, 125A

I_{cu}= 10kA, I_{cs}=7,5kA

Utilization category: A

ВЯРНО С ОРИГИНАЛА

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
5.2	MARKING		
a)	The following data shall be marked on the circuit-breaker itself or on a name plate or nameplates attached to the circuit-breaker, and located in a place such that they are visible and legible when the circuit-breaker is installed.		
	- rated current:	63, 80, 100, 125A	P
	- suitability for isolation, if applicable, with the symbol 		P
	- indication of the open and closed position: with O and I respectively, if symbols are used	I-ON and O-OFF	P
b)	Marking on equipment not needed to be visible after mounting:		
	- manufacturer's name or trademark		P
	- type designation or serial number	HDB2	P
	- IEC 60947-2 if the manufacturer claims compliance with this standard.	IEC/EN60947-2	P
	- utilization category	A	P
	- rated operational voltage(s) Ue	415V~	P
	- Circuit-breaker for use in IT systems: Circuit-breaker for which all values of rated voltage have not been tested according to annex H or are not covered by such testing, shall be identified by the symbol ⊗ which shall be marked on the circuit-breaker immediately following these values of rated voltage	⊗	P
	- value (or range) of the rated frequency and/or the indication DC (or symbol)	50/60Hz	P
	- rated service short-circuit breaking capacity. Ics	7,5kA	P
	- rated ultimate short-circuit breaking capacity. Icu	10kA	P
	- rated short-time withstand current, (Icw) and associated short-time delay, for utilization category B		N/A
	- line and load terminals, unless their connection is immaterial	"1, 3, 5, 7", "2, 4, 6, 8"	P
	- neutral pole terminals, if applicable, by the letter N		N/A
	- protective earth terminal, where applicable, by the symbol acc. 7.1.9.3 of part 1		N/A
	- ref. temperature for non-compensated thermal releases, if different from 30°C		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
c)	Marked on the circuit-breaker as specified in item b), or shall be made available in the manufacturer's published information:		
	- rated short-circuit making capacity (Icm) (if higher than specified in 4.3.5.1)		N/A
	- rated insulation voltage. (Ui) if higher than the maximum rated operational voltage)	500V	P
	- rated impulse withstand voltage (Uimp), when declared.	6kV	P
	- pollution degree if other than 3		N/A
	- conventional enclosed thermal current (Ithe) if different from the rated current:		N/A
	- IP Code, where applicable:		N/A
	- minimum enclosure size and ventilation data (if any) to which marked ratings apply:		N/A
	- details of minimum distance between circuit-breaker and earthed metal parts for circuit-breaker intended for use without enclosure:		N/A
	- r.m.s sensing if applicable, according to F.4.1.1		N/A
	- suitability for environment A or B		N/A
d)	The following data concerning the opening and closing devices of the circuit-breaker shall be placed either on their own nameplates or on the nameplate of the circuit-breaker:		
	- rated control circuit voltage of the closing device, and rated frequency for AC:		N/A
	- rated control circuit voltage of the shunt release and/or of the under-voltage release, and rated frequency:		N/A
	- rated current of indirect over-current releases:		N/A
	- number and type of auxiliary contacts and kind of current, rated frequency (if AC) and rated voltages of the auxiliary switches, if different from those of the main circuit.		N/A
e)	Terminal shall be clearly and permanently identified in acc. with IEC 60445 and annex L :		
	- line terminal	"1, 3, 5, 7"	P
	- load terminal	"2, 4, 6, 8"	P
	- neutral pole terminal "N"		N/A
	- protective earth terminal		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- terminal of coils (A/B)		N/A
	- terminal of shunt release (B)		N/A
	- terminals of under-voltage release (D)		N/A
	- terminals of interlocking electromagnets (E)		N/A
	- terminals of indicated light devices (X)		N/A
	- terminals of contact elements for switching devices (no)		N/A
7.1	CONSTRUCTION		
7.1.1	Withdrawable circuit-breaker		N/A
	In the disconnected position (main- and auxiliary circuits)		
	Isolating distances for circuit-breaker suitable for isolating warranted:		N/A
	Mechanism fitted with a reliable indicating device with indicates the position of the isolating contacts.		N/A
	Mechanism fitted with interlocks which only permit the isolating contacts to be separate or re-closed when main contacts are open		N/A
	Mechanism fitted with interlock, which only permit the main contacts to be closed when the isolating contacts are fully closed.		N/A
	Mechanism fitted with interlock, which only permit the main contacts to be closed when in disconnected position.		N/A
	The isolating distances between the isolating contacts cannot be inadvertently reduced.		N/A
7.1.2.1 part 1	Resistance to abnormal heat and fire		P
7.1.3 part 1	Current-carrying parts and their connection		P
7.1.4	Clearances and creepage distances:		
	For circuit-breakers for which the manufacturer has declared a value of rated impulse withstand voltage. (Uimp.)		
	Clearances distances:		
	- Uimp is given as:	6kV	
	- max. value of rated operational voltage to earth	-	
	- nominal voltage of supply system:	415V	

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Clause	Requirement + Test	Result - Remark	Verdict
	- overvoltage category:	IV	
	- pollution degree:	3	
	- field-in or homogeneous:	Field-in	
	- minimum clearances (mm):	3,0	
	- measured clearances (mm):	3,4	P
	Creepage distances:		
	- rated insulation voltage Ui (V)	500	
	- pollution degree	3	
	- comparative tracking index (V)	175	
	- material group	IIIa	
	- minimum creepage distances (mm)	8	
	- measured creepage distances (mm)	12	P
7.1.5 part 1	Actuator		
7.1.5.1 part 1	Insulation		
	The actuator of the equipment shall be insulated from the live parts for the rated insulation voltage and, if applicable, the rated impulse withstand voltage		P
	If it is made of metal, it shall be capable of being satisfactorily connected to a protective conductor unless it is provided with additional reliable insulation		N/A
	If it is made of or covered by insulating material, any internal metal part, which might become accessible in the event of insulation failure, shall also be insulated from live parts for the rated insulation voltage		N/A
7.1.5.2	Direction of movement		
	The direction of operation for actuators of devices shall normally conform to IEC 60447.		P
	Where devices cannot conform to these requirements, e.g. due to special applications or alternative mounting positions, they shall be clearly marked such that there is no doubt as to the "I" and "O" positions and the direction of operation		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
7.1.6 part 1	Indication of contact position		
7.1.6.1 part 1	Indicating means		
	When an equipment is provided with means for indicating the closed and open positions, these positions shall be unambiguous and clearly indicated		P
	This is done by means of a position indicating device (see 2.3.18)		P
	If symbols are used, they shall indicate the closed and open position respectively, in accordance with IEC 60417-2:		
	- 60417-2-IEC-5007 I On (power)	On	P
	- 60417-2-IEC-5007 O Off (power)	Off	P
	For equipment operated by means of two push-buttons, only the push-button designated for the opening operation shall be red or marked with the symbol "O"		N/A
	Red colour shall not be used for any other push-button		N/A
	The colours of other push-buttons, illuminated push-buttons and indicator lights shall be in accordance with IEC 60073		N/A
7.1.6.2 part 1	Indication by the actuator		
	When the actuator is used to indicate the position of the contacts, it shall automatically take up or stay, when released, in the position corresponding to that of the moving contacts; in this case, the actuator shall have two distinct rest positions corresponding to those of the moving contacts, but for automatic opening a third distinct position of the actuator may be provided		P
7.1.7	Additional safety requirements for equipment suitable for isolation		
7.1.7.1	Additional constructional requirements for equipment suitable for isolation (Ue > 50 V):		
	Equipment suitable for isolation shall provide in the open position an isolation distance in acc. with the requirements necessary to satisfy the isolating function. Indication of the main contacts shall be provide by one or more of the following means:		
	- the position of the actuator		P
	- a separate mechanical indicator		P
	- visibility of the moving contacts		N/A
	When means are provided or to lock the equipment in the open position, locking only be possible when contacts are in the open position		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Actuator front-plate fitted to the equipment in a manner which ensures correct contact position indication and locking		N/A
	The indicated open position is the only position in which the specified isolation distances between the contacts is ensured.		P
	- minimum clearances across open contacts (see Table XIII, Part 1) (mm) :	3,0	
	- measured clearances (mm) :	3,4	P
	- test Uimp across gap (kV) :	6,2	P
7.1.7.2	Supplementary requirements for equipment with provision for electrical interlocking with contactors or circuit-breakers:		
	auxiliary switch shall be rated according to IEC 60 947-5-1		N/A
	If equipment suitable for isolation is provided with an auxiliary switch for the purpose of electrical interlocking with contactor (s) or circuit-breaker(s) and intended to be used in motor circuits, the following requirements shall apply unless the equipment is rated for AC-23 utilization category		N/A
	The time interval between the opening of the contacts of the auxiliary switch and the contacts of the main poles shall be sufficient to ensure that the associated contactor or circuit-breaker interrupts the current before the main poles of the equipment open		N/A
	Unless otherwise stated in the manufacturer's technical literature, the time interval shall be not less than 20 ms when the equipment is operated according to the manufacturer instructions		N/A
	Compliance shall be verified by measuring the time interval between the instant of opening of the auxiliary switch and the instant of opening of the main poles under no-load conditions when the equipment is operated according to the manufacturer's instructions		N/A
	During the closing operation the contacts of the auxiliary switch shall close after or simultaneously with the contacts of the main poles		N/A
	A suitable opening time interval may also be provided by an intermediate position (between the ON and OFF position) at which the interlocking contact(s) is (are) open and the main poles remain closed		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
7.1.7.3	Supplementary requirements for equipment provided with means for padlocking the open position:		
	the locking means shall be designed in such a way that it cannot be removed with the appropriate padlock(s) installed		N/A
	Alternatively, the design may provide padlockable means to prevent access to the actuator		N/A
	test force F applied to the actuator in an attempt to operate to the closed position (N) :		N/A
	rated impulse withstand voltage (kV) :		N/A
	test Uimp on open main contacts at the test force		N/A
7.1.8	Terminals		
7.1.8.1	All parts of terminals which maintain contact and carry current shall be of metal having adequate mechanical strength		P
	Terminal connections shall be such that necessary contact pressure is maintained		P
	Terminals shall be so constructed that the conductor is clamped between suitable surfaces without damage to the conductor and terminal		P
	Terminal shall not allow the conductor to be displaced or to be displaced themselves in a manner detrimental to the operator of equipment and the insulation voltage shall not be reduced below the rated value		P
7.1.8.2	Connection capacity		
	type of conductors :	Rigid-solid or stranded or flexible cable	P
	minimum cross-sectional area of conductor (mm^2) :	16	P
	maximum cross-sectional area of conductor (mm^2) :	50	P
	number of conductors simultaneously connectable to the terminal :	2 for 16mm^2 1 for 50mm^2	P
7.1.8.3	Connection		
	terminals for connection to external conductors shall be readily accessible during installation		P
	clamping screws and nuts shall not serve to fix any other component		P
7.1.8.4	Terminal identification and marking		
	terminal intended exclusively for the neutral conductor		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	protective earth terminal		N/A
	other terminals	"1, 3, 5, 7", "2, 4, 6, 8"	P
7.1.9 part 1	Additional requirements for equipment provided with a neutral pole		
	When equipment is provided with a pole intended only for connecting the neutral, this pole shall be clearly identified to that effect by the letter N (see 7.1.7.4.).		N/A
	A switched neutral pole shall break not before and shall make not after the other poles		N/A
	For equipment having a value of conventional thermal current (free air or enclosed, see 4.3.2.1 and 4.3.2.2) not exceeding 63 A, this value shall be identical for all poles		N/A
	For higher conventional thermal current values, the neutral pole may have a value of conventional thermal current different from that of the other poles, but not less than half that value or 63 A, whichever is the higher		N/A
	if a pole with an appropriate making and breaking capacity is used as a neutral pole, then all poles, incl. the neutral pole, shall operate substantially together.		N/A
7.1.10	Provisions for protective earthing		
7.1.10.1	The exposed conductive parts (e.g. chassis, framework and fixed parts of metal enclosures) other than those which cannot constitute a danger shall be electrically interconnected and connected to a protective earth terminal for connection to an earth electrode or to an external protective conductor		N/A
part 1	This requirement can be met by the normal structural parts providing adequate electrical continuity and applies whether the equipment is used on its own or incorporated in an assembly		N/A
	Exposed conductive parts are considered not to constitute a danger if they cannot be touched on large areas or grasped with the hand or if they are of small size (approximately 50 mm x 50 mm) or are so located as to exclude any contact with live parts		N/A
7.1.10.2 part 1	Protective earth terminal		
	The protective earth terminal shall be readily accessible and so placed that the connection of the equipment to the earth electrode or to the protective conductor is maintained when the cover or any other removable part is removed		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	The protective earth terminal shall be suitably protected against corrosion		N/A
	In the case of equipment with conductive structures, enclosures, etc., means shall be provided, if necessary, to ensure electrical continuity between the exposed conductive parts the equipment and the metal sheathing of connecting conductors		N/A
	The protective earth terminal shall have no other function, except when it is intended to be connected to a PEN conductor (see 2.1.1.5 – Note). In this case, it shall also have the function of a neutral terminal in addition to meeting the requirements applicable to the protective earth terminal		N/A
7.1.10.3	Protective earth terminal marking and identification		
	The protective earth terminal shall be clearly and permanently identified by its marking		N/A
	The identification shall be achieved by colour (green-yellow mark) or by the notation PE, or PEN, as applicable, in accordance with IEC 60445, subclause 5.3, or, in the case of PEN, by a graphical symbol for use on equipment		N/A
	Graphical symbol to be used: 60417-2-IEC-5019 ⏚ Protective earth (ground) in accordance with IEC 60417-2		N/A
7.1.11	Enclosure for equipment		
7.1.11.1	Design		
	The enclosure, when it is opened: all parts requiring access for installation and maintenance are readily accessible		N/A
	Sufficient space shall be provided inside the enclosure		N/A
	The fixed parts of a metal enclosure shall be electrically connected to the other exposed conductive parts of the equipment and connected to a terminal which enables them to be earthed or connected to a protective conductor		N/A
	Under no circumstances shall a removable metal part of the enclosure be insulated from the part carrying the earth terminal when the removable part is in place		N/A
	The removable parts of the enclosure shall be firmly secured to the fixed parts by a device such that they cannot be accidentally loosened or detached owing to the effects of operation of the equipment or vibrations		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	When an enclosure is so designed as to allow the covers to be opened without the use of tools, means shall be provided to prevent loss of the fastening devices		N/A
	If the enclosure is used for mounting push-buttons, it shall not be possible to remove the buttons from the outside of the enclosure		N/A
7.1.11.2	Insulation		
	If, in order to prevent accidental contact between a metallic enclosure and live parts, the enclosure is partly or completely lined with insulating material, then this lining shall be securely fixed to the enclosure		N/A
7.1.12	Degree of protection of enclosed equipment		
	Degree of protection.	IP20	
	Test for first characteristic.	IP2X	
	Test for first numeral .....:	1 **2** 3 4 5 6	P
	Test for second characteristic	IPX0	
	Test for second numeral .....:	1 2 3 4 5 6 7 8	N/A
7.1.13 part 1	Conduit pull-out, torque and bending with metallic conduits		
	Polymeric enclosures of equipment, whether integral or not, provided with threaded conduit entries, intended for the connection of extra heavy duty, rigid threaded metal conduits complying with IEC 60981, shall withstand the stresses occurring during its installation such as pull-out, torque, bending		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
7.2	Performance requirements		
7.2.1	Operating condition		
7.2.1.1	Closing		
	For a circuit-breaker to be closed safely on to the making current corresponding to its rated short-circuit making capacity, it is essential that it should be operated with the same speed and the same firmness as during the type test for proving the short-circuit making capacity		P
7.2.1.1.1	Dependent manual closing		
	For a circuit-breaker having a dependent manual closing mechanism, it is not possible to assign a short-circuit making capacity rating irrespective of the conditions of mechanical operation		N/A
	Such a circuit-breaker should not be used in circuits having a prospective peak making current exceeding 10 kA		N/A
	However, this does not apply in the case of a circuit-breaker having a dependent manual closing mechanism and incorporating an integral fast-acting opening release which causes the circuit-breaker to break safely, irrespective of the speed and firmness with which it is closed on to prospective peak currents exceeding 10 kA; in this case, a rated short-circuit making capacity can be assigned		N/A
7.2.1.1.2	Independent manual closing		
	A circuit-breaker having an independent manual closing mechanism can be assigned a short-circuit making capacity rating irrespective of the conditions of mechanical operation		P
7.2.1.1.3	Dependent power closing		
	At 110% of the rated control supply voltage, the closing operation performed on no-load shall not cause any damage to the circuit-breaker.		N/A
	At 85% of the rated control supply voltage, the closing operation shall be performed when the current established by the circuit-breaker is equal to its rated making capacity within the limits allowed by the operation of its relays or releases and, if a maximum time is stated for the closing operation, in a time not exceeding this maximum time limit.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
7.2.1.1.4	Independent power closing		
	A circuit-breaker having an independent power closing operation can be assigned a rated short-circuit making capacity irrespective of the conditions of power closing		N/A
	Means for charging the operating mechanism, as well as the closing control components, shall be capable of operating in accordance with the manufacturer's specification		N/A
7.2.1.1.5	Stored energy closing		
	Capable ensuring closing of the circuit-breaker in any condition between no-load and its rated making capacity		N/A
	- when the stored energy is retained within the circuit-breaker, a device is provided which indicates when the storing mechanism is fully charged.		N/A
	- means for charging the operating mechanism and closing control components operates when auxiliary supply voltage is between 85% and 110% of the rated control supply voltage.		N/A
	- not possible for the moving contacts to move from the open position, unless the charge is sufficient for satisfactory completion of the closing operation.		N/A
	- by manually operated circuit-breaker is the direction of operation indicated. (not for circuit-breaker with an independent manual closing operation.)		N/A
	- For trip free circuit-breaker it shall not be possible to maintain the contacts in the touching or closed position when the release is in the position to trip the circuit-breaker.		N/A
7.2.1.2	Opening		
7.2.1.2.1	Circuit-breakers which open automatically shall be trip-free and, unless otherwise agreed between manufacturer and user, shall have their energy for the tripping operation stored prior to the completion of the closing operation		
7.2.1.2.2	Opening by undervoltage releases		
7.2.1.3. a part 1	Operating voltage		
	An under-voltage relay or release, when associated with a switching device, shall operate to open the equipment even on a slowly falling voltage within the range between 70% and 35% of its rated voltage		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	An under-voltage relay or release shall prevent the closing of the equipment when the supply voltage is below 35% of the rated voltage of the relay or release; it shall permit closing of the equipment at supply voltages equal to or above 85% of its rated value		N/A
	Unless otherwise stated in the relevant product standard, the upper limit of the supply voltage shall be 110% of its rated value		N/A
7.2.1.3. b part 1	Operating time		
	For a time-delay under-voltage relay or release, the time-lag shall be measured from the instant when the voltage reaches the operating value until the instant when the relay or release actuates the tripping device of the equipment		N/A
7.2.1.2.3	Opening by shunt releases		N/A
7.2.1.4 part 1	Limits of operation of shunt releases		
	A shunt release for opening shall cause tripping under all operating conditions of an equipment when the supply voltage of the shunt release measured during the tripping operation remains between 70% and 110% of the rated control supply voltage and, if a.c., at the rated frequency		N/A
7.2.1.5 part 1	Limits of operation of current operated relays and released		
	Limits of operation of current operated relays and releases shall be stated in the relevant product standard		N/A
7.2.1.2.4	Opening by over-current releases		
a)	Opening under short-circuit conditions		
	The short-circuit release shall cause tripping of the circuit-breaker with an accuracy of 20% of the tripping current value of the current setting for all values of the current setting of the short-circuit current release		P
	Where necessary for over-current co-ordination the manufacturer shall provide information (usually curves) showing		N/A
	- maximum cut-off (let-through) peak current as a function of prospective current (r.m.s. symmetrical)		N/A
	- I^2t characteristics for circuit-breakers of utilization category A and, if applicable, B for circuit-breakers with instantaneous override (see note to 8.3.5)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
b)	Opening under overload conditions		
1)	Instantaneous or definite time-delay operation		N/A
	The release shall cause tripping of the circuit-breaker with an accuracy of ± 10% of the tripping current value of the current setting for all values of current setting of the overload release		N/A
2)	Inverse time-delay operation		
	At the reference temperature and at 1,05 times the current setting with the conventional non-tripping current, the opening release being energized on all poles, tripping shall not occur in less than the conventional time from the cold state, i.e. with the circuit-breaker at the reference temperature		P
	Moreover, when at the end of the conventional time the value of current is immediately raised to 1,30 times the current setting, i.e. with the conventional tripping current, tripping shall then occur in less than the conventional time later		P
	If a release is declared by the manufacturer as substantially independent of ambient temperature, the current values of table 6 shall apply within the temperature band declared by the manufacturer, within a tolerance of 0,3%/K		N/A
	The width of the temperature band shall be at least 10 K on either side of the reference temperature		N/A
7.2.4.2	Operational performance capability		
7.2.4.2 part 1	The operational performance off-load for which the tests are made with the control circuits energized and the main circuit not energized, in order to demonstrate that the equipment meets the operating conditions specified at the upper and lower limits of supply voltage and/or pressure specified for the control circuit during closing and opening operations		N/A
	The operational performance on-load during which the equipment shall make and break the specified current corresponding, where relevant, to its utilization category for the number of operations stated in the relevant product standard		P

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Clause	Requirement + Test	Result - Remark	Verdict
8	TESTS		
8.2.4	Mechanical properties of terminals		
	Mechanical strength of terminals		
	maximum cross-sectional area of conductor (mm²) :	50	
	diameter of thread (mm) :	6,8	
	torque (Nm) :	3,5	
	5 times on 2 separate clamping units		P
	Testing for damage to and accidental loosening of conductor (flexion test)		
	conductor of the smallest cross-sectional area (mm²) :	16	
	number of conductors of the smallest cross section :	2	
	diameter of bushing hole (mm) :	13,0	
	height between the equipment and the platen :	300	
	mass at the conductor(s) (kg) :	2,9	
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		P
	Pull-out test		
	force (N) :	100	
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		P
	conductor of the largest cross-sectional area (mm²) :	50	
	number of conductors of the largest cross section :	1	
	diameter of bushing hole (mm) :	15,9	
	height between the equipment and the platen :	343	
	mass at the conductor(s) (kg) :	9,5	
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		P
	Pull-out test		
	force (N) :	236	
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		P
	conductor of the largest and smallest cross-sectional area (mm²) :	16 / 50	

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Clause	Requirement + Test	Result - Remark		Verdict
	number of conductors of the smallest cross section, number of conductors of the largest cross section :	1 / 1		
	diameter of bushing hole (mm) :	13,0 / 15,9		
	height between the equipment and the platen :	300 / 343		
	mass at the conductor(s) (kg) :	2,9 / 9,5		
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit			P
	Pull-out test			
	force (N) :	100 / 236		
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit			P
8.3.3	TEST SEQUENCE I: GENERAL PERFORMANCE CHARACTERISTICS - 2 samples: 4P, 125A, Instantaneous: $8,5I_n/12I_n$			
8.3.3.1	Tripping limits and characteristic			
8.3.3.1.2	Opening under short-circuit conditions			
	Manufacturer's name or trademark	DELIXI ELECTRIC		
	Type designation or serial number	HDB2		
	Sample no:	I-1	I-2	
	Rated operational voltage: Ue (V)	415		
	Rated current: In (A)	125		
	Ambient temperature 10-40 °C :	30°C		P
	Value of the tripping current declared by the manufacturer for a single pole, at which value they shall operate.	8,5In	12 In	P
	Range of adjustable setting current. (A)			N/A
	Time delay stated by the manufacturer, in the case of definite time delay releases.			N/A
	Electromagnetic overcurrent releases			
	Test current: 80% of the rated, ~~or minimum adjustable setting current~~: (A)	850	1200	P

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Clause	Requirement + Test	Result - Remark		Verdict
	Operating time: >0,2s in case of instantaneous releases: L1-L2: L1-L3: L1-L4: L2-L3: L2-L4: L3-L4:	 >0,2s >0,2s >0,2s >0,2s >0,2s >0,2s	 >0,2s >0,2s >0,2s >0,2s >0,2s >0,2s	P
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3: N-Lx:			N/A
	Test current: 120% of the rated, ~~or minimum adjustable setting current~~: (A)	1275	1800	P
	Operating time: <0,2s in case of instantaneous releases: L1-L2: L1-L3: L1-L4: L2-L3: L2-L4: L3-L4:	 44ms 41ms 33ms 31ms 35ms 32ms	 29ms 31ms 34ms 30ms 33ms 38ms	P
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3: N-Lx:			N/A
	Test current: 80% of the **maximum** adjustable setting current: (A)			N/A
	Operating time: >0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3: N-Lx:			N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3: N-Lx:			N/A
	Test current: 120% of the **maximum** adjustable setting current: (A)			N/A

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Clause	Requirement + Test	Result - Remark		Verdict
	Operating time: <0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3: N-Lx:			N/A
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3: N-Lx:			N/A
	Test current: tripping current declared for single pole operation (A)	1275	1800	P
	Operating time: < 0,2 s in case of instantaneous release: L1: L2: L3: L4:	59ms 48ms 39ms 36ms	42ms 37ms 52ms 35ms	P
	Operating time: < twice time delay stated by manufacturer in case of definite time delay releases L1: L2: L3: N:			N/A
	Electronic overcurrent releases			
	For circuit-breakers with an electronic overcurrent release, the operation of the short-circuit releases shall be verified by one test only on each pole individually.			N/A
	Test current: 80% of the rated, or **minimum** adjustable setting current: (A)			N/A
	Operating time: >0,2s in case of instantaneous releases: L1: L2: L3: N:			N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases: L1: L2: L3: N:			N/A
	Test current: 120% of the rated, or **minimum** adjustable setting current: (A)			N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Operating time: <0,2s in case of instantaneous releases: L1: L2: L3: N:		N/A
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases: L1: L2: L3: N:		N/A
	Test current: 80% of the **maximum** adjustable setting current: (A)		N/A
	Operating time: >0,2s in case of instantaneous releases: L1: L2: L3: N:		N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases: L1: L2: L3: N:		N/A
	Test current: 120% of the **maximum** adjustable setting current: (A)		N/A
	Operating time: <0,2s in case of instantaneous releases: L1: L2: L3: N:		N/A
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases: L1: L2: L3: N:		N/A
8.3.3.1.3	Opening under overload conditions		
a)	Instantaneous or definite time-delay releases		
	Manufacturer's name or trademark		
	Type designation or serial number		
	Sample no:		
	Rated operational voltage: Ue (V)		

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Clause	Requirement + Test	Result - Remark	Verdict
	Rated current: In (A)		
	Ambient temperature 10-40 °C :		N/A
	Value of the tripping current declared by the manufacturer for a single pole, at which value they shall operate.		N/A
	Range of adjustable setting current. (A)		N/A
	Time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 90% of the rated, or minimum adjustable setting current: (A)		N/A
	Operating time: >0,2s in case of instantaneous releases:		N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 90% of the maximum adjustable setting current: (A)		N/A
	Operating time: >0,2s in case of instantaneous releases		N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 110% of the rated, or minimum adjustable setting current: (A) circuit-breaker with neutral pole: 1,2x110% (A)		N/A
	Operating time: <0,2s in case of instantaneous releases:		N/A
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 110% of the maximum adjustable setting current: (A) circuit-breaker with neutral pole: 1,2x110% (A)		N/A
	Operating time: <0,2s in case of instantaneous releases		N/A
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
b)	Inverse time delay releases		
	Manufacturer's name or trademark		

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Clause	Requirement + Test	Result - Remark		Verdict
	Type designation or serial number	HDB2		
	Sample no:	I-1	I-2	
	Rated operational voltage: Ue (V)	415		
	Rated current: In (A)	125		
	For releases dependent of ambient air temperature: Reference temperature	30°C		P
	Test ambient temperature (°C)	30		P
	For releases dependent on ambient air temperature, the operating characteristics shall be verified at the reference temperature, the release being energized on all phase poles. If the test made at a different ambient temperature, a correction shall be made in accordance with the manufacturer's correction temperature/current data			P
	For thermal-magnetic releases independent of ambient temperature: Tests shall be made at 30°C and 20°C or 40°C, the release being energized on all phase poles			N/A
	For electronic releases, the operating characteristic shall be verified at the ambient temperature of the test room (see 6.1.1 of IEC 60947-1), the release being energised on all phase poles.			N/A
	Test ambient air temperature:	30°C		P
	Range of adjustable setting current: (A)			N/A
	Releases, dependent of ambient air temperature: Reference temperature (°C)	30°C		P
	Thermal Magnetic releases, independent of ambient air temperature: at 30°C			N/A
	Test current: 105% of the rated, ~~or minimum adjustable setting current~~: (A)	132	132	P
	Conventional non-tripping time: 1h when In < 63A, 2h when In > 63 A	>2h	>2h	P
	Test current: 130% of the rated, ~~or minimum adjustable setting current:~~ (A)	163	163	P
	For circuit-breakers having an identified neutral pole provided with an overload release (see 8.3.3.1.1), the test current at the conventional tripping current shall be multiplied by the factor 1,2.			N/A
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A	8min	1min50s	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Test current: 105% of the **maximum** adjustable setting current: (A)		N/A
	Conventional non-tripping time: 1h when In < 63A, 2h when In > 63 A		N/A
	Test current: 130% of the **maximum** adjustable setting current: (A)		N/A
	For circuit-breakers having an identified neutral pole provided with an overload release (see 8.3.3.1.1), the test current at the conventional tripping current shall be multiplied by the factor 1,2.		N/A
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A		N/A
	Thermal Magnetic releases, independent of ambient air temperature: at 20°C or 40°C		
	Test ambient air temperature:		N/A
	Test current: 105% of the rated, or **minimum** adjustable setting current: (A)		N/A
	Conventional non-tripping time: 1h when In < 63A, 2h when In > 63 A		N/A
	Test current: 130% of the rated, or **minimum** adjustable setting current: (A)		N/A
	For circuit-breakers having an identified neutral pole provided with an overload release (see 8.3.3.1.1), the test current at the conventional tripping current shall be multiplied by the factor 1,2.		N/A
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A		N/A
	Test current: 105% of the **maximum** adjustable setting current: (A)		N/A
	Conventional non-tripping time: 1h when In < 63A, 2h when In > 63 A		N/A
	Test current: 130% of the **maximum** adjustable setting current: (A)		N/A
	For circuit-breakers having an identified neutral pole provided with an overload release (see 8.3.3.1.1), the test current at the conventional tripping current shall be multiplied by the factor 1,2.		N/A
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A		N/A
	An additional test, at a current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer		
	Releases, dependent of ambient air temperature: Reference temperature (°C)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Releases, independent of ambient air temperature: at 30°C		N/A
	Test ambient air temperature:		N/A
	Test current: at current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer. % at the rated, or minimum adjustable setting current: (% or A)		N/A
	Tripping time acc. time/current characteristic of the releases conform to the curves provided by the manufacturer. (within the stated tolerances)		N/A
	Releases, independent of ambient air temperature: at 20°C or 40°C		
	Test ambient air temperature:		N/A
	Test current: at current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer. % at the rated, or minimum adjustable setting current: (% or A)		N/A
	Tripping time acc. time/current characteristic of the releases conform to the curves provided by the manufacturer. (within the stated tolerances)		N/A
8.3.3.1.4	Additional test for definite time-delay releases		
a)	Time delay		
	Test is made at a current equal to 1,5 times the current setting. If the test current overlaps with another tripping characteristic (e.g. an instantaneous tripping characteristic), the trip setting and the test current shall be reduced as necessary to prevent premature tripping.		
	overload releases: (all phase poles loaded)		N/A
	for circuit-breakers having an identified neutral pole provided with an overload release, the test current for this release shall be 1,5 times the current setting;		N/A
	short-circuit releases		N/A
	Electromagnetic release: two poles in series carrying the test current, using successively all possible combinations of poles having a short-circuit release.		N/A
	Electronic releases: on one pole chosen at random.		N/A
	Test current: 1,5 times of the rated, or minimum adjustable setting current: (A)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Operating time, overload releases: (s)		N/A
	Time-delay: between the limits stated by the manufacturer:		N/A
	Operating time, short-circuit releases (electromagnetic): (s) L1-L2: L1-L3: L2-L3:		N/A
	Time-delay: between the limits stated by the manufacturer:		N/A
	Operating time, short-circuit releases (electronic): (s) L1: L2: L3:		N/A
	Time-delay: between the limits stated by the manufacturer:		N/A
	Test current: 1,5 times of the **maximum** adjustable setting current: (A)		N/A
	Operating time, overload releases: (s)		N/A
	Time-delay: between the limits stated by the manufacturer:		N/A
	Operating time, short-circuit releases (electromagnetic): (s) L1-L2: L1-L3: L2-L3:		N/A
	Time-delay: between the limits stated by the manufacturer:		N/A
	Operating time, short-circuit releases (electronic): (s) L1: L2: L3:		N/A
	Time-delay: between the limits stated by the manufacturer:		N/A
b)	Non-tripping duration		
	Firstly, the test current equal to 1,5 times the current setting is maintained for a time interval equal to the non-tripping duration stated by the manufacturer.		
	Then, the current is reduced to the rated current and maintained at this value for twice the time-delay stated by the manufacturer. The circuit-breaker shall not trip.		
	overload releases: (all phase poles loaded)		N/A
	for circuit-breakers having an identified neutral pole provided with an overload release, the test current for this release shall be 1,5 times the current setting;		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	short-circuit releases		N/A
	Electromagnetic release: two poles in series carrying the test current, using successively all possible combinations of poles having a short-circuit release.		N/A
	Electronic releases: on one pole chosen at random.		N/A
	Test current: 1,5 times of the **minimum** adjustable setting current: (A)		N/A
	non-tripping duration stated by the manufacturer for overload release: (s)		N/A
	non-tripping duration stated by the manufacturer for short-circuit release thermal magnetic: (s)		N/A
	non-tripping duration stated by the manufacturer for short-circuit release electronic: (s)		N/A
	Time duration of current when reduced to the rated current: shall be twice the delay-time stated by the manufacturer: (s)		N/A
	Rated current		N/A
	Operating time, overload releases: the circuit-breaker does not trip:		N/A
	Operating time, short-circuit releases (electromagnetic), shall not trip: (s) L1-L2: L1-L3: L2-L3:		N/A
	Operating time, short-circuit releases (electronic), shall not trip: (s) L1: L2: L3:		N/A
	Test current: 1,5 times of **maximum** adjustable setting current: (A)		N/A
	non-tripping duration stated by the manufacturer for overload release: (s)		N/A
	non-tripping duration stated by the manufacturer for short-circuit release thermal magnetic: (s)		N/A
	non-tripping duration stated by the manufacturer for short-circuit release electronic: (s)		N/A
	Time duration of current when reduced to the rated current: shall be twice the delay-time stated by the manufacturer: (s)		N/A
	Rated current		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Operating time, overload releases: the circuit-breaker does not trip:		N/A
	Operating time, short-circuit releases (electromagnetic), shall not trip: (s) L1-L2: L1-L3: L2-L3:		N/A
	Operating time, short-circuit releases (electronic), shall not trip: (s) L1: L2: L3:		N/A
8.3.3.2	Test of dielectric properties, impulse withstand voltage (Uimp indicated):		
8.3.3.4 part1	The 1,2/50µs impulse voltage shall be applied five times for each polarity at intervals of 1s minimum		
	- rated impulse withstand voltage (kV) :	6	P
	- sea level of the laboratory:	5m	P
	- test Uimp main circuits (kV) :	5,8	P
	- test Uimp auxiliary circuits (kV) :		N/A
	- test Uimp control circuits (kV) :		N/A
	- test Uimp on open main contacts (equipment suitable for isolating) (kV) :	6,2	P
a)	Application of test voltage		
	i) Between all terminals of the main circuit connected together (incl. control and auxiliary circuits connected to the main circuit) and the enclosure or mounting plate, with the contacts in all normal positions of operation.		P
	ii) Between each pole of the main circuit and the other poles connected together and to the enclosure or mounting plate, with the contacts in all normal positions of operation.		P
	iii) Between each control and auxiliary circuit not normally connected to the main circuit and: - the main circuit		N/A
	- other circuits		N/A
	- exposed conductive parts		N/A
	- enclosure of mounting plate		N/A
	iv) equipment suitable for isolation		P
	equipment not suitable for isolation		N/A
	- no unintentional disruptive discharge during the test's		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Test of dielectric properties, dielectric withstand voltage (Uimp not indicated):		
	- rated insulation voltage (V) :	500	P
	- main circuits, test voltage for 1 min (V)	1890	P
	- auxiliary circuits, test voltage for 1 min (V)		N/A
	- control circuits, test voltage for 1 min (V)		N/A
8.3.3.2.2	Application of test voltage		
1)	with circuit-breaker in the closed position		
	- between all live parts of all poles connected together and the frame of the circuit-breaker .		P
	- between each pole and all the other poles connected to the frame of the circuit-breaker		P
2)	with the circuit-breaker in the open position and, additionally, in the tripped position, if any.		
	- between all live parts of all poles connected together and the frame of the circuit-breaker.		P
	- between the terminals of one side connected together and the terminals of the other side connected together.		P
b)	Control and auxiliary circuits		
1)	- between all the control and auxiliary circuits which are not normally connected to the main circuit, connected together, and the frame of the circuit-breaker.		N/A
2)	- where appropriate, between each part of the control an auxiliary circuits which may be isolated from the other parts during normal operation and all the other parts connected together.		N/A
	No unintentional disruptive discharge during the tests		P
8.3.3.2	For circuit-breaker suitable for isolation, the leakage current shall be measured through each pole with the contacts in the open position, at a test voltage of 1,1 Ue, and shall not exceed 0,5mA.	457V $0{,}95 \times 10^{-3}$mA(Maximum)	P
8.3.3.3	Mechanical operation and operational performance capability		
8.3.3.3.2	Construction and mechanical operation		
a)	Construction		
	A withdrawable circuit-breaker shall be checked for the requirements stated in 7.1.1		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	A circuit-breaker with stored energy operation shall be checked for compliance with 7.2.1.1.5, regarding the charge indicator and the direction of operation of manual energy storing		N/A
b)	Mechanical operation		
	A circuit-breaker with dependent power operation shall comply with the requirements stated in 7.2.1.1.3		N/A
	A circuit-breaker with dependent power operation shall operate with the operating mechanism charged to the minimum and maximum limits stated by the manufacturer		N/A
	A circuit-breaker with stored energy operation shall comply with the requirements stated in 7.2.1.5 with the auxiliary supply voltage at 85% and 110% of the rated control supply voltage.		N/A
	It shall also be verified that the moving contacts cannot be moved from the open position when the operating mechanism is charged to slightly below the full charge as evidenced by the indicating device		N/A
	For a trip-free circuit-breaker it shall not be possible to maintain the contacts in the touching or closed position when the tripping release is in the position to trip the circuit-breaker		N/A
	If the closing and opening times of a circuit-breaker are stated by the manufacturer, such times shall comply with the stated values		N/A
c)	Undervoltage releases		
	Undervoltage releases shall comply with the requirements of 7.2.1.3 of Part 1. For this purpose, the release shall be fitted to a circuit-breaker having the maximum current rating for which the release is suitable		N/A
i)	Drop out voltage		
	It shall be verified that the release operates to open the circuit-breaker between the voltage limits specified		N/A
	The voltage shall be reduced from rated voltage at a rate to reach 0 V in approximately 30 s		N/A
	The test for the lower limit is made without current in the main circuit and without previous heating of the release coil		N/A
	In the case of a release with a range of rated voltages, this test applies to the maximum voltage of the range		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	The test for the upper limit is made starting from a constant temperature corresponding to the application of rated control supply voltage to the release and rated current in the main poles of the circuit-breaker		N/A
	This test may be combined with the temperature-rise test of 8.3.3.6		N/A
	In the case of a release with a range of rated voltages, this test is made at both the minimum and maximum rated control supply voltages		N/A
ii)	Test for limits of operation		
	Starting with the circuit-breaker open, at the temperature of the test room, and with the supply voltage at 30% rated maximum control supply voltage, it shall be verified that the circuit-breaker cannot be closed by the operation of the actuator		N/A
	When the supply voltage is raised to 85% of the minimum control supply voltage, it shall be verified that the circuit-breaker can be closed by the operation of the actuator		N/A
iii)	Performance under overvoltage conditions		
	With the circuit-breaker closed and without current in the main circuit, it shall be verified that the undervoltage release will withstand the application of 110% rated control supply voltage for 4 h without impairing its functions		N/A
d)	Shunt releases		
	Shunt releases shall comply with the requirements of 7.2.1.4 of Part 1. For this purpose, the release shall be fitted to a circuit-breaker having the maximum rated current for which the release is suitable		N/A
	It shall be verified that the release will operate to open the circuit-breaker at 70% rated control supply voltage when tested at an ambient temperature of + 55 °C ± 2 °C without current in the main poles of the circuit-breaker		N/A
	In the case of a release having a range of rated control supply voltages, the test voltage shall be 70% of the minimum rated control supply voltage		N/A
8.3.3.3.3	Operational performance capability without current.		
	Type designation or serial number	HDB2	
	Sample no:	I-2	
	Rated current In (A)	125	

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