Test Report issued under the responsibility of:

TÜVRheinland®

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

Report Reference No. ..... :	**28220270 001**
Date of issue ..... :	2013-12-10
Total number of pages	173
CB Testing Laboratory ..... :	**TÜV Rheinland InterCert Kft., MEEI Division**
Address ..... :	H-1132 Budapest, Váci út 48/A-B., Hungary
Applicant's name ..... :	Schneider Electric
Address ..... :	3700 Sixth Street SW, 52404 Cedar Rapids, Iowa, USA
Test specification:	
Standard ..... :	IEC 60947-2:2006 (Fourth Edition) + A1: 2009 + A2: 2013
Test procedure ..... :	CB scheme
Non-standard test method……..:	N/A
Test Report Form No. ..... :	IEC60947_2G
Test Report Form(s) Originator..... :	DEKRA Certification BV
Master TRF ..... :	Dated 2013-11

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

Test item description ..... :	Family of Molded Case Circuit Breakers
Trade Mark ..... :	SQUARE D or Schneider Electric
Manufacturer ..... :	same as Applicant
Model/Type reference ..... :	Powerpact HD, HG, HJ, HL with thermal-magnetic release
Ratings ..... :	Ue: 220/240, 380/415, 500/525 V AC Ie: 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100, 110, 125, 150 A

Testing procedure and testing location:		
☒	**CB Testing Laboratory:**	**TÜV Rheinland InterCert Kft., MEEI Division**
Testing location/ address.....:	H-1132 Budapest, Váci út 48/A-B., Hungary	
Tested by (name + signature).....:	Sándor Kalocsai	
Approved by (name + signature) .....:	Peter Nagy	
☐	**Testing procedure: TMP**	
Testing location/ address.....:	-	
Tested by (name + signature).....:		
Approved by (name + signature) .....:		
☐	**Testing procedure: WMT**	
Testing location/ address.....:	-	
Tested by (name + signature).....:		
Witnessed by (name + signature) ....:		
Approved by (name + signature) .....:		
☐	**Testing procedure: SMT**	
Testing location/ address.....:	-	
Tested by (name + signature).....:		
Approved by (name + signature) .....:		
Supervised by (name + signature)...:		

List of Attachments:

Photos, tables with detailed heating results included at the end of the report.

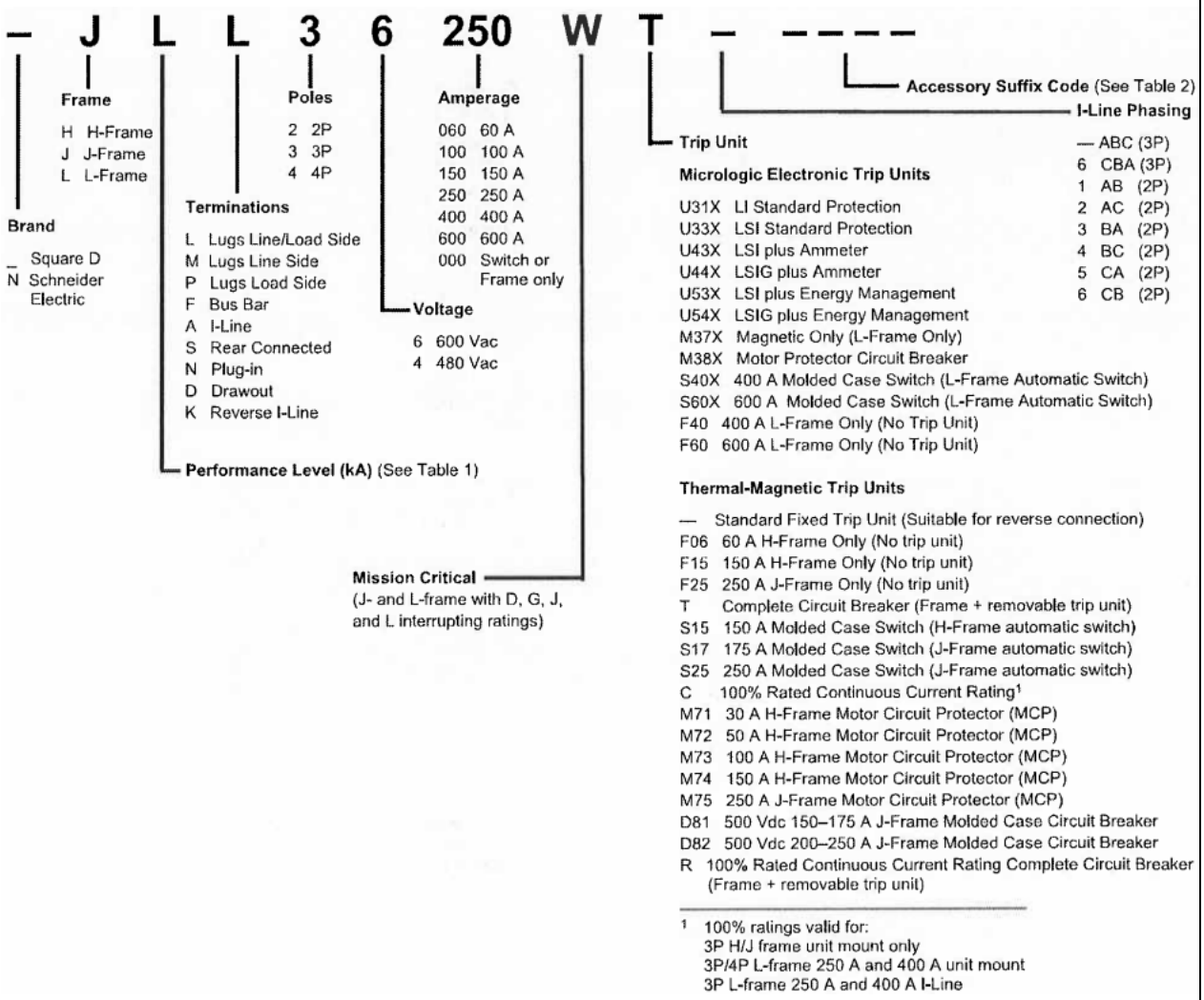
Summary of testing:

All applicable tests were performed and ended with positive result.

Sample No.	Type	SEQUENCE	In(A)	V	kA	Phases under test
#01	HDL36150	I	150	AC525	-	L1-L2-L3
#02 (F2)	HJL36150	I	150	AC525	-	L1-L2-L3
#03 (F2)	HDL26150	I	150	AC525	-	L1-L2
#06	HJL36150M74	I	150	AC525	-	L1-L2-L3
#07	HGL36150	II	150	AC240	65	L1-L2-L3
#08	HLL36150	II	150	AC240	125	L1-L2-L3
#09	HDN36150	II	150	AC240	65	L1-L2-L3
#10	HJD36150	II	150	AC240	125	L1-L2-L3
#11	HLL36150M74	II	150	AC240	125	L1-L2-L3
#12	HDL26150	III	150	AC240	65	L1-L2
#13	HJL26150	III	150	AC240	125	L1-L2
#14	HJL26015	III	15	AC240	125	L1-L2
#15	HJL26150	III	150	AC440	100	L1-L2
#16	HJL26150	III	150	AC525	50	L1-L2
#17	HDL36150	II, III	150	AC240	65	L1-L2-L3
#18	HJL36150	II, III	150	AC240	125	L1-L2-L3
#19	HJL36150	II, III	15	AC240	125	L1-L2-L3
#20	HJL36150	II, III	150	AC440	100	L1-L2-L3
#21 (F1)	HJL36150	II, III	150	AC525	50	L1-L2-L3
#26	HJL36150M74	II, III	150	AC240	125	L1-L2-L3
#27	HJL36030M71	II, III	30	AC240	125	L1-L2-L3
#28	HJL36150M74	II, III	150	AC440	100	L1-L2-L3
#29	HJL36150M74	II, III	150	AC525	50	L1-L2-L3
#30	HDL36150	H	150	AC525	1,56	L1-L2-L3
#31	HJL36150M74	H	150	AC525	2,03	L1-L2-L3

During the tests, IEC 60947-1:2007 (Ed5) and its amendment A1:2010 were taken into account.

Type nomenclature:



In case of alternative test programs for circuit breakers with a different number of poles, the following program is used: (N/A)

☐ Programme 1 (three pole fully tested)

☐ Programme 2 (four pole fully tested)

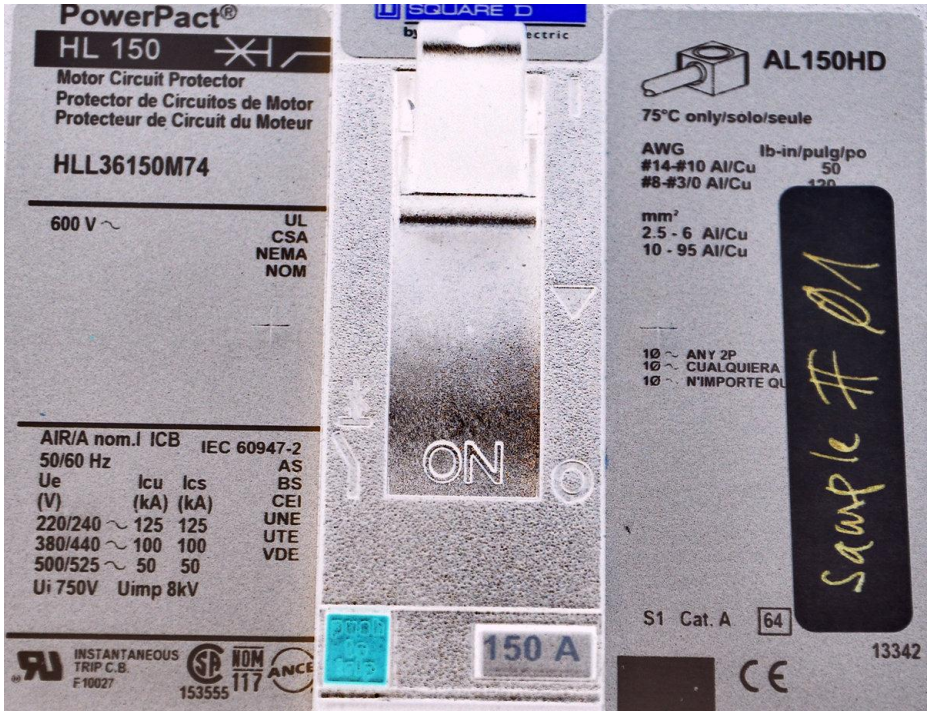
☐ Alternative program not applicable

Tests performed (name of test and test clause):	**Testing location:**
see Summary of testing, 3rd page **Test reults are based on STIEE CB report No. C009-CB2006CQC-10030**	**TÜV Rheinland InterCert Kft., MEEI Division** H-1132 Budapest, Váci út 48/A-B., Hungary (Clauses 5.2, partially 7.1) **Shanghai Testing & Inspection Institute for Electrical Equipment (STIEE)** 505 Wu Ning Road, Shanghai 200063, P.R. China (all other clauses)

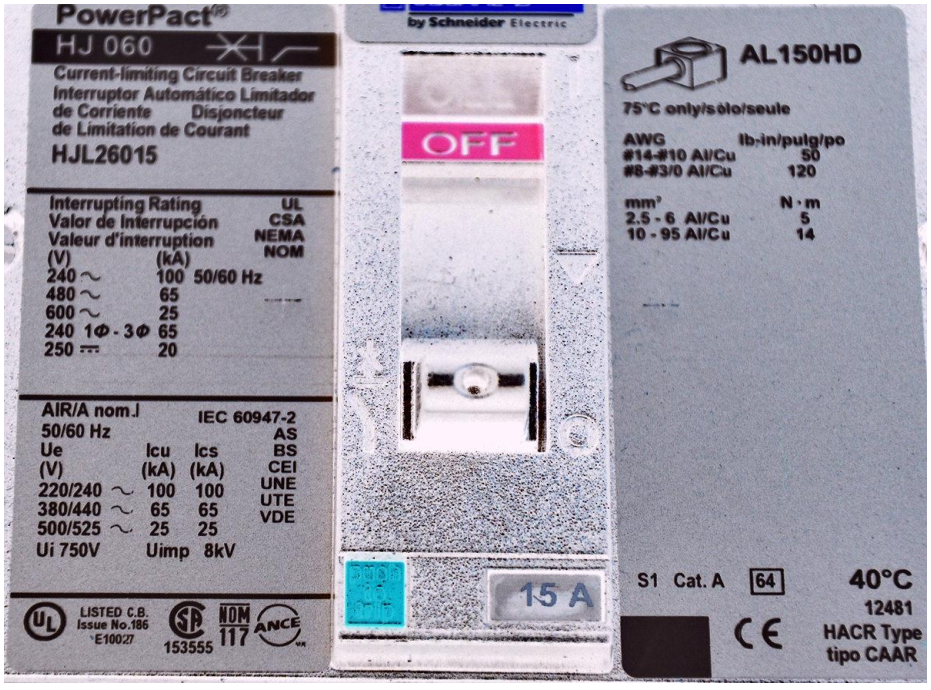
Summary of compliance with National Differences

List of countries addressed: (N/A)

Copy of marking plate:
(representative samples)



(HL 150 typ)



(HJ 060 typ)

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 operation independent power operation
3.5. Suitability for insulation: (suitable, not -suitable) ... . :	Suitable
3.6. Provision for maintenance: (maintainable, non-maintainable)..... :	Non maintainable
3.7. Method of installation: (fixed, plug in, withdrawable ..... :	Fixed, plug in, withdrawable
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) ..... :	AC220/240V, AC380/440V, AC500/525
- rated insulation voltage: Ui (V) ..... :	750V
- rated impulse withstand voltage: Uimp (kV) ..... :	8kV
- rated operational current: Ie (A) ..... :	15A, 20A, 25A, 30A, 35A, 40A, 45A, 50A, 60A, 70A, 80A, 90A, 100A, 110A, 125A, 150A (with thermal-magnetic release)
- kind of current ..... :	AC
- conventional free air thermal current: Ith (A) ..... :	15A, 20A, 25A, 30A, 35A, 40A, 45A, 50A, 60A, 70A, 80A, 90A, 100A, 110A, 125A, 150A (with thermal-magnetic release)
- conventional enclosed thermal current: Ithe (A)..... :	N/A
- current rating for four-pole circuit-breakers: (A) ..... :	N/A
- number of poles..... :	2P, 3P (with thermal-magnetic release)
- rated frequency: (Hz)..... :	50Hz
- integral fuses (rated values)..... :	N/A

Rated duty :	
- eight-hour duty.....:	N/A
- uninterrupted duty: Iu (A).....:	15A, 20A, 25A, 30A, 35A, 40A, 45A, 50A, 60A, 70A, 80A, 90A, 100A, 110A, 125A, 150A (with thermal-magnetic release)
Short-circuit characteristic :	
rated short-time making capacity: Icm (kA) .....:	HD: 52,5kA (AC220/240V), 36kA (AC380/440V), 28kA (AC500/525V), HG: 143kA (AC220/240V), 73,5kA (AC380/440V), 36kA (AC500/525V), HJ: 220kA (AC220/240V), 143kA (AC380/440V), 52,5kA (AC500/525V), HL: 275kA (AC220/240V), 220kA (AC380/440V), 105kA (AC500/525V),
rated ultimate short-circuit breaking capacity: Icu (kA). .....:	HD: 25kA (AC220/240V), 18kA (AC380/440V), 14kA (AC500/525V), HG: 65kA (AC220/240V), 35kA (AC380/440V), 18kA (AC500/525V), HJ: 100kA (AC220/240V), 65kA (AC380/440V), 25kA (AC500/525V), HL: 125kA (AC220/240V), 100kA (AC380/440V), 50kA (AC500/525V)
rated service short-circuit breaking capacity: Ics (kA).....:	100%Icu
rated short-time withstand current: Icw (kA/s) .....:	N/A
Control circuits : Electrical control circuits :	
- kind of current: (AC, DC).....:	AC, DC
- rated frequency: (Hz).....:	50Hz
- rated control circuit voltage: Uc (nature, frequency, V) ...:	AC24 to 600V, 50Hz; DC12 to 250V
- rated control supply voltage: Us (nature, frequency V) ...:	AC24 to 600V, 50Hz; DC12 to 250V
Air supply control circuits: (pneumatic or electro-pneumatic) :	N/A

- 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 .....:	
- rated operational voltage Ue (V) .....:	AC240 to 690V; DC24/48V, DC240V, DC380V
- rated insulation voltage: Ui (V) .....:	750V
- rated operational current: Ie (A) .....:	AC: 6A; DC: 2,5A, 0,5A, 0,3A
- kind of current .....:	AC, DC
- rated frequency: (Hz).....:	50Hz
- number of circuits .....:	4
- number and kind of contact elements.....:	4 OF
- rated uninterrupted current: Iu (A).....:	6A
- utilization category: (AC, DC, current and voltage) .....:	AC-12, DC-12
Short-circuit characteristic :	
- Rated conditional short-circuit current (kA) .....:	1kA
- kind of protective device.....:	NT00-10

Releases :	
1) shunt release	Yes
2) Over-current release	Yes
a) instantaneous	Yes
b) definite time delay	N/A
c) inverse time delay	Yes (for thermal-magnetic release)
- independent of previous load	N/A
- dependent on previous load; (for example thermal type release)	Yes
3) Undervoltage release (for opening)	Yes
4) Other releases	N/A
Characteristics :	
1) Shunt release and undervoltage release (for opening)	Yes
- rated control circuit voltage: Uc (nature, frequency, V)	AC24 to 600V, 50Hz; DC12 to 250V
- kind of current	AC, DC
- rated frequency: (if AC)	50Hz
2) Over-current release	Yes
- rated current	15A, 20A, 25A, 30A, 35A, 40A, 45A, 50A, 60A, 70A, 80A, 90A, 100A, 110A, 125A, 150A
- kind of current	AC
- rated frequency: (if AC)	50Hz
- current setting (or range of settings)	Instantaneous: thermal-magnetic release: 550A (In=15~30A), 625 (In=35~50A), 1125A (In=60~90A), 1300A (In=100~150A) Inverse time delay: thermal magnetic release: In
- time settings (or range of settings)	N/A

Classification of installation and use..... :	Molded case circuit-breaker for fixed installations
Supply Connection ..... :	screw-type terminals
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 .....:	2013-11-04
Date (s) of performance of tests .....:	2013-11-04 … 2013-12-10

General remarks:

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.
"(See Enclosure #)" refers to additional information appended to the report.
"(See appended table)" refers to a table appended to the report.
Throughout this report a ☒ comma / ☐ point is used as the decimal separator.

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

The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided ..... :	☐ Yes ☒ Not applicable

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

Manufacturer ..... :	same as Applicant
Name and address of factory (ies) ..... :	Schneider Electric 4800 Paris Road, 65202 Columbia, Missouri, USA

General product information:

Powerpact HD, HG, HJ, HL (with thermal-magnetic release)
Ue: AC220/240V, AC 380/440V, AC AC500/525V
In: 15A, 20A, 25A, 30A, 35A, 40A, 45A, 50A, 60A, 70A, 80A, 90A, 100A, 110A, 125A, 150A
HD: Ics=Icu=25kA (AC220/240V), Ics=Icu=18kA (AC380/440V), Ics=Icu=14kA (AC500/525V)
HG: Ics=Icu=65kA (AC220/240V), Ics=Icu=35kA (AC380/440V), Ics=Icu=18kA (AC500/525V)
HJ: Ics=Icu=100kA (AC220/240V), Ics=Icu=65kA (AC380/440V), Ics=Icu=25kA (AC500/525V)
HL: Ics=Icu=125kA (AC220/240V), Ics=Icu=100kA (AC380/440V), Ics=Icu=50kA (AC500/525V)

Utilization category: A
2P, 3P

Remark: The type HD and HG are exactly same, just the mark different.
The type HJ and HL are exactly same, just the mark is different.

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:		P
	- suitability for isolation, if applicable, with the symbol 	Suitability for isolation	P
	- indication of the open and closed position: with ○ and I respectively, if symbols are used		P
b)	Marking on equipment not needed to be visible after mounting:		
	- manufacturer's name or trademark	SQUARE D	P
	- type designation or serial number		P
	- IEC 60947-2 if the manufacturer claims compliance with this standard.	IEC 60947-2	P
	- utilization category	Cat A	P
	- rated operational voltage(s) Ue	AC220/240v, AC380/440V, AC500/525V	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	Suitable for IT systems	P
	- value (or range) of the rated frequency and/or the indication DC (or symbol)		P
	- rated service short-circuit breaking capacity. Ics	HD: 25kA (AC220/240V), 18kA (AC380/440V), 14kA (AC500/525V), HG: 65kA (AC220/240V), 35kA (AC380/440V), 18kA (AC500/525V), HJ: 100kA (AC220/240V), 65kA (AC380/440V), 25kA (AC500/525V), HL: 125kA (AC220/240V), 100kA (AC380/440V), 50kA (AC500/525V),	P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	- rated ultimate short-circuit breaking capacity. Icu	HD: 25kA (AC220/240V), 18kA (AC380/440V), 14kA (AC500/525V), HG: 65kA (AC220/240V), 35kA (AC380/440V), 18kA (AC500/525V), HJ: 100kA (AC220/240V), 65kA (AC380/440V), 25kA (AC500/525V), HL: 125kA (AC220/240V), 100kA (AC380/440V), 50kA (AC500/525V),	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		N/A
	- 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	40 °C	P
	- range of the current setting (Ir) of adjustable overload release		N/A
	- value / range of the rated instantaneous short-circuit current setting (Ii), fixed or adjustable	thermal-magnetic release: 550A (In=15~30A), 625A (In=35~50A), 1125A (In=60~90A), 1300A (In=100~150A	P
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)	750V	P
	- rated impulse withstand voltage (Uimp), when declared.	8kV	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:	IP20	
	- minimum enclosure size and ventilation data (if any) to which marked ratings apply:		N/A

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	- details of minimum distance between circuit-breaker and earthed metal parts for circuit-breaker intended for use without enclosure:	Back: 0mm Fromt: 14,3mm Top: 102mm Bottom: 102mm Left: 25,4mm Right: 25,4mm	P
	- r.m.s sensing if applicable, according to F.4.1.1		N/A
	- suitability for environment A or B	A	P
	- minimum cable cross-section, if different from Table 9 of IEC 60947-1, for ratings ≤ 20 A according to rated ultimate short-circuit breaking capacity Icu;		N/A
	- values of tightening torque for the circuit-breaker terminals.	14 Nm	P
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:		P
	- rated control circuit voltage of the shunt release and/or of the under-voltage release, and rated frequency:		P
	- 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.		P
e)	Terminal shall be clearly and permanently identified in acc. with IEC 60445 and annex L :		
	- line terminal		N/A
	- load terminal		N/A
	- neutral pole terminal ”N”		N/A
	- protective earth terminal ⏚		N/A
	- terminal of coils (A/B)		N/A
	- terminal of shunt release (B)		P
	- terminals of under-voltage release (D)		P
	- terminals of interlocking electromagnets (E)		N/A
	- terminals of indicated light devices (X)		N/A
	- terminals of contact elements for switching devices (no)		P
7.1	CONSTRUCTION		
7.1.1	Withdrawable circuit-breaker		P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	In the disconnected position (main- and auxiliary circuits)		
	Isolating distances for circuit-breaker suitable for isolating warranted:		P
	Mechanism fitted with a reliable indicating device with indicates the position of the isolating contacts.		P
	Mechanism fitted with interlocks which only permit the isolating contacts to be separate or re-closed when main contacts are open		P
	Mechanism fitted with interlock, which only permit the main contacts to be closed when the isolating contacts are fully closed.		P
	Mechanism fitted with interlock, which only permit the main contacts to be closed when in disconnected position.		P
	The isolating distances between the isolating contacts cannot be inadvertently reduced.		P
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:	8kV	
	- max. value of rated operational voltage to earth	AC300V	
	- nominal voltage of supply system:	AC250V	
	- overvoltage category:	IV	
	- pollution degree:	3	
	- field-in or homogeneous:	Inhomogeneous	
	- minimum clearances (mm):	8	
	- measured clearances (mm):	9,16	P
	Creepage distances:		
	- rated insulation voltage Ui (V)	750V	
	- pollution degree	3	
	- comparative tracking index (V)	425V (Base: Zytel FR82G33V1) 550V (Base: Ultramid A3X2G5) 200V (Auxiliary cover: Xantar G2F-23R)	

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	- material group	II (Base: Zytel FR82G33V1) II (Base: Ultramid A3X2G5) IIIa (Auxiliary cover: Xantar G2F-23R)	
	- minimum creepage distances (mm)	12,5	
	- measured creepage distances (mm)	15,4	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		P
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		P
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		N/A
	This is done by means of a position indicating device (see 2.3.18)		N/A
	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)		P
	- 60417-2-IEC-5007 **O** Off (power)		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

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	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		N/A
	- 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
	Actuator front-plate fitted to the equipment in a manner which ensures correct contact position indication and locking		P
	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) :		
	- measured clearances (mm) :		N/A
	- test Uimp across gap (kV) :		N/A
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

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	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
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

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Clause	Requirement + Test	Result - Remark	Verdict
	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 :	Stranded, solid and flexible	P
	minimum cross-sectional area of conductor (mm²) :	2,5mm^2	P
	maximum cross-sectional area of conductor (mm²) :	50mm^2	P
	number of conductors simultaneously connectable to the terminal :	1	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
	protective earth terminal		N/A
	other terminals		N/A
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

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Clause	Requirement + Test	Result - Remark	Verdict

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
	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

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Clause	Requirement + Test	Result - Remark	Verdict

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
	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 2x 3 4 5 6	P
	Test for second characteristic	IPXX	

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Clause	Requirement + Test	Result - Remark	Verdict
	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
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

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Clause	Requirement + Test	Result - Remark	Verdict

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
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		P
	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		P
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

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Clause	Requirement + Test	Result - Remark	Verdict

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		P
	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		P
	Unless otherwise stated in the relevant product standard, the upper limit of the supply voltage shall be 110% of its rated value		P
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		
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		P
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

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Clause	Requirement + Test	Result - Remark	Verdict

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
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

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Clause	Requirement + Test	Result - Remark	Verdict
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		P
	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
8	**TESTS**		
8.2.4	Mechanical properties of terminals		
	Mechanical strength of terminals		
	maximum cross-sectional area of conductor (mm²) :	50mm^2	
	diameter of thread (mm) :	6mm	
	torque (Nm) :	6,6	
	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) :		
	number of conductors of the smallest cross section :		
	diameter of bushing hole (mm) :		
	height between the equipment and the platen :		
	mass at the conductor(s) (kg) :		
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		N/A
	Pull-out test		
	force (N) :		
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		N/A
	conductor of the largest cross-sectional area (mm²) :		
	number of conductors of the largest cross section :		
	diameter of bushing hole (mm) :		
	height between the equipment and the platen :		

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Clause	Requirement + Test	Result - Remark	Verdict
	mass at the conductor(s) (kg) :		
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		N/A
	Pull-out test		
	force (N) :		
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		N/A
	conductor of the largest and smallest cross-sectional area (mm²) :		
	number of conductors of the smallest cross section, number of conductors of the largest cross section :		
	diameter of bushing hole (mm) :		
	height between the equipment and the platen :		
	mass at the conductor(s) (kg) :		
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		N/A
	Pull-out test		
	force (N) :		
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		N/A
8.3.3	**TEST SEQUENCE I: GENERAL PERFORMANCE CHARACTERISTICS**		
8.3.3.1	Tripping limits and characteristic		
8.3.3.1.2	Opening under short-circuit conditions		
	Manufacturer's name or trademark	SQUARE D	
	Type designation or serial number	**HDL36150**	
	Sample no:	#01	
	Rated operational voltage: Ue (V)	AC525V	
	Rated current: In (A)	150A	
	Ambient temperature 10-40 °C :	25	P
	Value of the tripping current declared by the manufacturer for a single pole, at which value they shall operate.	1560A	
	Range of adjustable setting current. (A)	1300A	
	Time delay stated by the manufacturer, in the case of definite time delay releases.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Electromagnetic over current releases		
	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: 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)	1,04	P
	Operating time: >0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3: N-Lx:	>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 **maximum** adjustable setting current: (A)	1,56	P
	Operating time: <0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3: N-Lx:	22ms 26ms 19ms	P

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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)	1,56	P
	Operating time: < 0,2 s in case of instantaneous release: L1: L2: L3: N:	30ms 25ms 29ms	P
	Operating time: < twice time delay stated by manufacturer in case of definite time delay releases L1: L2: L3: N:		N/A
	Electronic over current releases		
	For circuit-breakers with an electronic over current 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
	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

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Clause	Requirement + Test	Result - Remark	Verdict
	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	SQUARE D	
	Type designation or serial number	**HDL36150**	
	Sample no:	#01	
	Rated operational voltage: Ue (V)	AC525V	
	Rated current: In (A)	150A	
	For releases dependent of ambient air temperature: Reference temperature	40 °C	P
	Test ambient temperature (°C)	40 °C	P

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Clause	Requirement + Test	Result - Remark	Verdict
	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:	40	P
	Range of adjustable setting current: (A)	150	P
	Releases, dependent of ambient air temperature: Reference temperature (°C)	40	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)		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)	158	P
	Conventional non-tripping time: 1h when In < 63A, 2h when In > 63 A	>2h	P
	Test current: 130% of the **maximum** adjustable setting current: (A)	195	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	27min	P

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Clause	Requirement + Test	Result - Remark	Verdict
	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)	40	P
	Releases, independent of ambient air temperature: at 30°C		N/A
	Test ambient air temperature:		
	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)	300%In=450A	P
	Tripping time acc. time/current characteristic of the releases conform to the curves provided by the manufacturer. (within the stated tolerances)	2min11s	P

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Clause	Requirement + Test	Result - Remark	Verdict

	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
	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

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Clause	Requirement + Test	Result - Remark	Verdict
	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
	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

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Clause	Requirement + Test	Result - Remark	Verdict
	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
	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) :	8kV	
	- sea level of the laboratory:	Sea level	
	- test Uimp main circuits (kV) :	9,8kV	

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Clause	Requirement + Test	Result - Remark	Verdict
	- test Uimp auxiliary circuits (kV) :	-	
	- test Uimp control circuits (kV) :	9,8kV	
	- test Uimp on open main contacts (equipment suitable for isolating) (kV) :	12,3kV	
a)	Application of test voltage		P
	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		P
	- other circuits		P
	- exposed conductive parts		P
	- enclosure of mounting plate		P
	iv) equipment suitable for isolation		P
	equipment not suitable for isolation		N/A
	- no unintentional disruptive discharge during the test's		P
	Test of dielectric properties, dielectric withstand voltage (Uimp not indicated):		
	- rated insulation voltage (V) :	750v	
	- main circuits, test voltage for 1 min (V)	3000v	
	- auxiliary circuits, test voltage for 1 min (V)	-	
	- control circuits, test voltage for 1 min (V)	3000v	
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

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Clause	Requirement + Test	Result - Remark	Verdict
	- 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.		P
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.		P
	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.		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
	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

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Clause	Requirement + Test	Result - Remark	Verdict
	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		P
i)	Drop out voltage		
	It shall be verified that the release operates to open the circuit-breaker between the voltage limits specified		P
	The voltage shall be reduced from rated voltage at a rate to reach 0 V in approximately 30 s		P
	The test for the lower limit is made without current in the main circuit and without previous heating of the release coil		P
	In the case of a release with a range of rated voltages, this test applies to the maximum voltage of the range		P
	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		P
	This test may be combined with the temperature-rise test of 8.3.3.6		P
	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		P
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		P
	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		P
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		P

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Clause	Requirement + Test	Result - Remark	Verdict

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		P
	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		P
	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		P
8.3.3.3.3	Operational performance capability without current.		
	Type designation or serial number	**HDL36150**	
	Sample no:	#01	
	Rated current In (A)	150A	
	Rated operational voltage: Ue (V)	AC525V	
	Rated control supply voltage of closing mechanism: Uc (V)	AC220~240V	
	Rated control supply voltage of shunt releases: Uc (V)	AC220~240V	
	Rated control supply voltage undervoltage releases: Uc (V)	AC220~240V	
	Ambient temperature 10-40 °C :	30	P
	Number of operating cycles per hour	120	P
	Number of cycles without current (total) (closing mechanism energized at the rated Uc)	7000	P
	Number of cycles without current (without releases)		N/A
	Applied voltage: closing mechanism (V)	AC240V	P
	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		P
	Applied voltage: shunt releases (V)	AC240V	P
	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		P

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Clause	Requirement + Test	Result - Remark	Verdict
	10 cycles without applied voltage at the undervoltage releases. (Shall not possible to close the circuit-breaker.)		P
	Applied voltage: undervoltage releases (V)	AC220V	P
	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)	150A	
	Maximum rated operational voltage: Ue (V)	AC525V	
	Conductor cross-sectional area (mm²) :	50mm^2	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)	AC240V	P
	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:	526 526 526	P
	- test current I/Ie = 1,0 (A).....L1: .....L2: L3:	152 152 153	P
	- power factor/time constant:	0,82	P
	- frequency: (Hz)	50	P
	- on-time (ms):	247	P
	- off-time (s):	29,7	P
	Electrical components do not exceed the value indicated in tab. 7.		N/A
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	**HDL36150**	

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Clause	Requirement + Test	Result - Remark	Verdict
	Sample no:	#01	
	Rated current In (A)	150A	
	Rated operational voltage: Ue (V)	AC525V	
	Rated control supply voltage of closing mechanism: Uc (V)	AC220~240V	
	Rated control supply voltage of shunt releases: Uc (V)	AC22~240V	
	Rated control supply voltage undervoltage releases: Uc (V)	AC220~240V	
	Ambient temperature 10-40 °C :	30	P
	Number of operating cycles per hour	120	P
	Maximum rated operational voltage: Ue (V)	AC525V	P
	Number of operating cycles per hour	120	P
	Number of cycles with current (total) (closing mechanism energized at the rated Uc)	12	P
	Applied voltage: closing mechanism (V)	AC240V	P
	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:	556 556 556	P
	- test current AC/DC: I/Ie = 6,0/2.5 (A) .....L1: .....L2: L3:	902 902 903	P
	- power factor/time constant:	0,52	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:	1,13	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	1050 V Leakage current <0,01mA	P
	- no breakdown or flashover	Yes	P

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Clause	Requirement + Test	Result - Remark	Verdict
	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.		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) :	See table: temperature rise measurement	P
	conductor cross-sectional area (mm²) :	50	P
	test current Ie (A) :	150	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)	218	P
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A	12min11s	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 -		P
	and shall operate at 35% of the maximum control supply voltage.		P
	Circuit-breaker fitted with shunt releases. The release shall operate at 70% of the minimum rated control supply voltage. Test made at room temperature.		P
8.3.3.9	Verification of the main contact position for circuit-breakers for isolation		P
	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		P
	Three attempts to operate the equipment by the stored energy.		P
	Lock ability of driving mechanism in OFF-position at test force and blocked main contacts .....:		P
	Position indicator does not show OFF-position after capture of test force at blocked main contacts		P

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Clause	Requirement + Test	Result - Remark	Verdict

8.3.3	**TEST SEQUENCE I: GENERAL PERFORMANCE CHARACTERISTICS**		
8.3.3.1	Tripping limits and characteristic		
8.3.3.1.2	Opening under short-circuit conditions		
	Manufacturer's name or trademark	SQUARE D	
	Type designation or serial number	**HJL36150**	
	Sample no:	#02(F2)	
	Rated operational voltage: Ue (V)	AC525V	
	Rated current: In (A)	150A	
	Ambient temperature 10-40 °C :	15	P
	Value of the tripping current declared by the manufacturer for a single pole, at which value they shall operate.	1560A	
	Range of adjustable setting current. (A)	1300A	
	Time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Electromagnetic over current releases		
	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: 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

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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: 80% of the **maximum** adjustable setting current: (A)	1,04	P
	Operating time: >0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3: N-Lx:	>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 **maximum** adjustable setting current: (A)	1,56	P
	Operating time: <0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3: N-Lx:	26ms 19ms 23ms	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: tripping current declared for single pole operation (A)	1,56	P
	Operating time: < 0,2 s in case of instantaneous release: L1: L2: L3: N:	19ms 22ms 18ms	P
	Operating time: < twice time delay stated by manufacturer in case of definite time delay releases L1: L2: L3: N:		N/A
	Electronic over current releases		

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Clause	Requirement + Test	Result - Remark	Verdict
	For circuit-breakers with an electronic over current 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
	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

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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
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
	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

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Clause	Requirement + Test	Result - Remark	Verdict
	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	SQUARE D	
	Type designation or serial number	**HJL36150**	
	Sample no:	#02(F2)	
	Rated operational voltage: Ue (V)	AC525V	
	Rated current: In (A)	150A	
	For releases dependent of ambient air temperature: Reference temperature	40 °C	P
	Test ambient temperature (°C)	40 °C	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		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:		
	Range of adjustable setting current: (A)	150	
	Releases, dependent of ambient air temperature: Reference temperature (°C)	40	P

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Clause	Requirement + Test	Result - Remark	Verdict
	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)	158	P
	Conventional non-tripping time: 1h when In < 63A, 2h when In > 63 A	>2h	P
	Test current: 130% of the **maximum** adjustable setting current: (A)	195	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	1min21s	P
	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

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Clause	Requirement + Test	Result - Remark	Verdict
	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)	40	P
	Releases, independent of ambient air temperature: at 30°C		N/A
	Test ambient air temperature:		
	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)	300%In=450A	P
	Tripping time acc. time/current characteristic of the releases conform to the curves provided by the manufacturer. (within the stated tolerances)	52s	P
	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

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Clause	Requirement + Test	Result - Remark	Verdict
	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
	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

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Clause	Requirement + Test	Result - Remark	Verdict

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
	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

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Clause	Requirement + Test	Result - Remark	Verdict
	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
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) :	8kV	
	- sea level of the laboratory:	Sea level	
	- test Uimp main circuits (kV) :	9,8kV	
	- test Uimp auxiliary circuits (kV) :	-	
	- test Uimp control circuits (kV) :	-	
	- test Uimp on open main contacts (equipment suitable for isolating) (kV) :	12,3kV	
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

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Clause	Requirement + Test	Result - Remark	Verdict
	iv) equipment suitable for isolation		P
	equipment not suitable for isolation		N/A
	- no unintentional disruptive discharge during the test's		P
	Test of dielectric properties, dielectric withstand voltage (Uimp not indicated):		
	- rated insulation voltage (V) :	750v	
	- main circuits, test voltage for 1 min (V)	3000v	
	- auxiliary circuits, test voltage for 1 min (V)	-	
	- control circuits, test voltage for 1 min (V)	-	
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.		P
	- 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.	<0,03mA	P

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Clause	Requirement + Test	Result - Remark	Verdict

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
	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

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Clause	Requirement + Test	Result - Remark	Verdict
	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
	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	**HJL36150**	

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Clause	Requirement + Test	Result - Remark	Verdict
	Sample no:	#02(F2)	
	Rated current In (A)	150A	
	Rated operational voltage: Ue (V)	AC525V	
	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 :	12	P
	Number of operating cycles per hour	120	P
	Number of cycles without current (total) (closing mechanism energized at the rated Uc)	7000	P
	Number of cycles without current (without releases)		N/A
	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)	150A	
	Maximum rated operational voltage: Ue (V)	AC525V	
	Conductor cross-sectional area (mm²) :	50mm^2	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:	526 526 526	P
	- test current I/Ie = 1,0 (A).....L1: .....L2: L3:	152 152 153	P
	- power factor/time constant:	0,82	P
	- frequency: (Hz)	50	P
	- on-time (ms):	102	P
	- off-time (s):	29,8	P
	Electrical components do not exceed the value indicated in tab. 7.		N/A
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	**HJL36150**	
	Sample no:	#02(F2)	
	Rated current In (A)	150A	
	Rated operational voltage: Ue (V)	AC525V	
	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 :	12	P
	Number of operating cycles per hour	120	P
	Maximum rated operational voltage: Ue (V)	AC525V	P
	Number of operating cycles per hour	120	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:	552 552 552	P
	- test current AC/DC: I/Ie = 6,0/2.5 (A) .....L1: .....L2: L3:	 902 902 903	P
	- power factor/time constant:	0,52	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:	0,981	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	1050 V Leakage current <0,01mA	P
	- no breakdown or flashover	Yes	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.		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) :	See table: temperature rise measurement	P
	conductor cross-sectional area (mm²) :	50	P
	test current Ie (A) :	150	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)	218	P
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A	47s	P

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Clause	Requirement + Test	Result - Remark	Verdict

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		P
	actuating force for opening (N) .....:	30	—
	test force with blocked main contacts for 10 s (N) .:	100	—
	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

8.3.3	**TEST SEQUENCE I: GENERAL PERFORMANCE CHARACTERISTICS**		
8.3.3.1	Tripping limits and characteristic		
8.3.3.1.2	Opening under short-circuit conditions		
	Manufacturer's name or trademark	SQUARE D	
	Type designation or serial number	**HDL26150**	
	Sample no:	#03(F2)	
	Rated operational voltage: Ue (V)	AC525V	
	Rated current: In (A)	150A	
	Ambient temperature 10-40 °C :	15	P
	Value of the tripping current declared by the manufacturer for a single pole, at which value they shall operate.	1560A	
	Range of adjustable setting current. (A)	1300A	

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Clause	Requirement + Test	Result - Remark	Verdict
	Time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Electromagnetic over current releases		
	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: 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)	1,04	P
	Operating time: >0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3: N-Lx:	>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 **maximum** adjustable setting current: (A)	1,56	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:	21ms - -	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: tripping current declared for single pole operation (A)	1,56	P
	Operating time: < 0,2 s in case of instantaneous release: L1: L2: L3: N:	31ms 28ms -	P
	Operating time: < twice time delay stated by manufacturer in case of definite time delay releases L1: L2: L3: N:		N/A
	Electronic over current releases		
	For circuit-breakers with an electronic over current 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
	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

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Clause	Requirement + Test	Result - Remark	Verdict
	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	SQUARE D	
	Type designation or serial number	**HDL26150**	
	Sample no:	#03(F2)	
	Rated operational voltage: Ue (V)	AC525V	
	Rated current: In (A)	150A	
	For releases dependent of ambient air temperature: Reference temperature	40 °C	P
	Test ambient temperature (°C)	40 °C	P

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Clause	Requirement + Test	Result - Remark	Verdict
	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:	40	P
	Range of adjustable setting current: (A)	150	P
	Releases, dependent of ambient air temperature: Reference temperature (°C)	40	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)		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)	158	P
	Conventional non-tripping time: 1h when In < 63A, 2h when In > 63 A	>2h	P
	Test current: 130% of the **maximum** adjustable setting current: (A)	195	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

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Clause	Requirement + Test	Result - Remark	Verdict
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A	6min57s	P
	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)	40	P
	Releases, independent of ambient air temperature: at 30°C		N/A
	Test ambient air temperature:		
	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)	300%In=450A	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Tripping time acc. time/current characteristic of the releases conform to the curves provided by the manufacturer. (within the stated tolerances)	1min03s	P
	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
	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

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Clause	Requirement + Test	Result - Remark	Verdict
	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
	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

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Clause	Requirement + Test	Result - Remark	Verdict
	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
	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

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Clause	Requirement + Test	Result - Remark	Verdict

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) :	8kV	
	- sea level of the laboratory:	Sea level	
	- test Uimp main circuits (kV) :	9,8kV	
	- test Uimp auxiliary circuits (kV) :	-	
	- test Uimp control circuits (kV) :	-	
	- test Uimp on open main contacts (equipment suitable for isolating) (kV) :	12,3kV	
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
	Test of dielectric properties, dielectric withstand voltage (Uimp not indicated):		
	- rated insulation voltage (V) :	750v	
	- main circuits, test voltage for 1 min (V)	3000v	
	- auxiliary circuits, test voltage for 1 min (V)	-	
	- control circuits, test voltage for 1 min (V)	-	

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Clause	Requirement + Test	Result - Remark	Verdict

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.		P
	- 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.	<0,03mA	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
	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

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Clause	Requirement + Test	Result - Remark	Verdict
	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
	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

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Clause	Requirement + Test	Result - Remark	Verdict
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	**HDL26150**	
	Sample no:	#03(F2)	
	Rated current In (A)	150A	
	Rated operational voltage: Ue (V)	AC525V	
	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 :	12	P
	Number of operating cycles per hour	120	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Number of cycles without current (total) (closing mechanism energized at the rated Uc)	7000	P
	Number of cycles without current (without releases)		N/A
	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)	150A	
	Maximum rated operational voltage: Ue (V)	AC525V	
	Conductor cross-sectional area (mm²) :	50mm^2	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
	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:	526 526 -	P
	- test current I/Ie = 1,0 (A).....L1: .....L2: L3:	152 152 -	P
	- power factor/time constant:	0,82	P
	- frequency: (Hz)	50	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- on-time (ms):	142	P
	- off-time (s):	29,8	P
	Electrical components do not exceed the value indicated in tab. 7.		N/A
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	HDL26150	
	Sample no:	#03(F2)	
	Rated current In (A)	150A	
	Rated operational voltage: Ue (V)	AC525V	
	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 :	12	P
	Number of operating cycles per hour	120	P
	Maximum rated operational voltage: Ue (V)	AC525V	P
	Number of operating cycles per hour	120	P
	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:	552 552 -	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- test current AC/DC: I/Ie = 6,0/2.5 (A) .....L1: .....L2: L3:	 902 902 -	P
	- power factor/time constant:	0,52	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:	0,975	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	1050 V Leakage current <0,01mA	P
	- no breakdown or flashover	Yes	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.		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) :	See table: temperature rise measurement	P
	conductor cross-sectional area (mm²) :	50	P
	test current Ie (A) :	150	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)	218	P
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A	5min47s	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

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Clause	Requirement + Test	Result - Remark	Verdict

8.3.3.9	Verification of the main contact position for circuit-breakers for isolation		P
	actuating force for opening (N) .....:	30	—
	test force with blocked main contacts for 10 s (N) .:	100	—
	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

8.3.3	**TEST SEQUENCE I: GENERAL PERFORMANCE CHARACTERISTICS**		
8.3.3.1	Tripping limits and characteristic		
8.3.3.1.2	Opening under short-circuit conditions		
	Manufacturer's name or trademark	SQUARE D	
	Type designation or serial number	**HJL36150M74**	
	Sample no:	#06	
	Rated operational voltage: Ue (V)	AC525V	
	Rated current: In (A)	150A	
	Ambient temperature 10-40 °C :	25	P
	Value of the tripping current declared by the manufacturer for a single pole, at which value they shall operate.	418A~2028A	
	Range of adjustable setting current. (A)	348A~1690A	
	Time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Electromagnetic over current releases		
	Test current: 80% of the rated, or **minimum** adjustable setting current: (A)	278	P
	Operating time: >0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3: N-Lx:	 >0,2s >0,2s >0,2s	P

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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: 120% of the rated, or **minimum** adjustable setting current: (A)	418	P
	Operating time: <0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3: N-Lx:	15ms 22ms 20ms	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)	1,35	P
	Operating time: >0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3: N-Lx:	>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 **maximum** adjustable setting current: (A)	2,03	P
	Operating time: <0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3: N-Lx:	21ms 25ms 22ms	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: tripping current declared for single pole operation (A)	2,03	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Operating time: < 0,2 s in case of instantaneous release: L1: L2: L3: N:	30ms 32ms 29ms	P
	Operating time: < twice time delay stated by manufacturer in case of definite time delay releases L1: L2: L3: N:		N/A
	Electronic over current releases		
	For circuit-breakers with an electronic over current 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
	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

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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: 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
	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

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Clause	Requirement + Test	Result - Remark	Verdict
	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		
	Type designation or serial number		
	Sample no:		
	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

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Clause	Requirement + Test	Result - Remark	Verdict
	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:		
	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
	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

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Clause	Requirement + Test	Result - Remark	Verdict
	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
	Test ambient air temperature:		
	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

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Clause	Requirement + Test	Result - Remark	Verdict

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
	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

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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 (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
	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

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Clause	Requirement + Test	Result - Remark	Verdict
	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
	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) :	8kV	
	- sea level of the laboratory:	Sea level	
	- test Uimp main circuits (kV) :	9,8kV	
	- test Uimp auxiliary circuits (kV) :	-	
	- test Uimp control circuits (kV) :	-	
	- test Uimp on open main contacts (equipment suitable for isolating) (kV) :	12,3kV	
a)	Application of test voltage		P
	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

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Clause	Requirement + Test	Result - Remark	Verdict
	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
	Test of dielectric properties, dielectric withstand voltage (Uimp not indicated):		
	- rated insulation voltage (V) :	750v	
	- main circuits, test voltage for 1 min (V)	3000v	
	- auxiliary circuits, test voltage for 1 min (V)	-	
	- control circuits, test voltage for 1 min (V)	-	
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.		P
	- 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

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Clause	Requirement + Test	Result - Remark	Verdict
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.	<0,03mA	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
	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

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Clause	Requirement + Test	Result - Remark	Verdict

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
	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

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Clause	Requirement + Test	Result - Remark	Verdict

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	**HJL36150M74**	
	Sample no:	#06	
	Rated current In (A)	150A	
	Rated operational voltage: Ue (V)	AC525V	
	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	P
	Number of operating cycles per hour	120	P
	Number of cycles without current (total) (closing mechanism energized at the rated Uc)	7000	P
	Number of cycles without current (without releases)		N/A
	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

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Clause	Requirement + Test	Result - Remark	Verdict
	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)	150A	
	Maximum rated operational voltage: Ue (V)	AC525V	
	Conductor cross-sectional area (mm²) :	50mm^2	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
	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 operations:		
	- test voltage U/Ue = 1,0 (V) .....L1: .....L2: L3:	526 526 526	P
	- test current I/Ie = 6,0 (A).....L1: .....L2: L3:	902 902 903	P
	- power factor/time constant:	0,36	P
	Conditions, break operations:		
	- test voltage U/Ue = 0,17 (V) .....L1: .....L2: L3:	90 90 90	P
	- test current I/Ie = 6,0 (A).....L1: .....L2: L3:	152 152 153	P
	- power factor/time constant:	0,37	P
	- frequency: (Hz)	50	P
	- on-time (ms):	172	P
	- off-time (s):	29,8	P
	Electrical components do not exceed the value indicated in tab. 7.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

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	**HJL36150M74**	
	Sample no:	#06	
	Rated current In (A)	150A	
	Rated operational voltage: Ue (V)	AC525V	
	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 :	12	P
	Number of operating cycles per hour	120	P
	Maximum rated operational voltage: Ue (V)	AC525V	P
	Number of operating cycles per hour	120	P
	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.		P
	Conditions, overload operations:		
	- test voltage U/Ue = 1,05 (V) .....L1: .....L2: L3:	 556 556 556	P
	- test current AC/DC: I/Ie = 6,0/2.5 (A) .....L1: .....L2: L3:	 902 902 903	P
	- power factor/time constant:	0,52	P
	- Number of cycles manually opened: 9	9	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- Number of cycles automatically opened by an overload release: 3	3	P
	- frequency: (Hz)	50	P
	- on-time max 2s:	1,14	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	1050 V Leakage current <0,01mA	P
	- no breakdown or flashover	Yes	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.		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) :	See table: temperature rise measurement	P
	conductor cross-sectional area (mm²) :	50	P
	test current Ie (A) :	150	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
	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		P
	actuating force for opening (N) .....:	30	—
	test force with blocked main contacts for 10 s (N) .:	150	—
	Dependent power operation		N/A
	Supply voltage of 110% of rated voltage (V)……:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	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):**		
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	**HGL36150**	
	Sample no:	#07	
	Rated current: In (A)	150A	
	Rated operational voltage: Ue (V)	AC240V	
	Rated service short-circuit breaking capacity: (kA)	65kA	
	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: 14,3mm Top: 102mm Bottom:102mm Left: 25,4mm Right: 25,4mm	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		P

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Clause	Requirement + Test	Result - Remark	Verdict
	- size of hole: <30mm^2		P
	- finish: bare or conductive plating		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)	Load-star	P
	Conductor cross-sectional area (mm²) :	50	P
	If terminals unmarked: line connected at: (underside/upside)	Underside	P
	Tightening torques: (Nm)	6,0	P
	Test sequence of operation: O – t – CO – t – CO		P
	- test voltage U/Ue = 1,05 (V) ..... L1: ..... L2: L3:	252 252 252	P
	- r.m.s. test current AC/DC: (A) ..... L1: ..... L2: L3:	 65,3 65,0 65,2	P
	power factor/time constant :	0,19	P
	- Factor ”n”	2,2	P
	- peak test current (A) :	145	P
	Test sequence ”O”		
	- max. let-through current: (kApeak) ..... L1: ..... L2: L3:	13,7 9,87 13,5	P
	- Joule integral I²dt (A²s) ..... L1: ..... L2: L3:	244 139 220	P
	Pause, t: (min)	3	P
	Test sequence ”CO”		
	- max. let-through current: (kApeak) ..... L1: ..... L2: L3:	11,2 13,2 11,4	P
	- Joule integral I²dt (A²s) ..... L1: ..... L2: L3:	188 184 158	P
	Pause, t: (min)	3	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Test sequence ”CO”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	9,80 7,55 14,0	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	85,1 78,6 247	P
	Melting of the fusible element	No	P
	Damage to insulation on conductors	No	P
	Holes in the PE-sheet for test sequence ”O”		P
	Cracks observed	No	P
8.3.4.2	Operational performance capability with current.		
	Rated current: In (A)	150A	
	Maximum rated operational voltage: Ue (V)	AC240V	
	Conductor cross-sectional area (mm²) :	50 mm^2	
	Number of operating cycles per hour	120	P
	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:	242 242 242	P
	- test current I/Ie = 1,0 (A).....L1: .....L2: L3:	152 152 152	P
	- power factor/time constant:	0,81	P
	- frequency: (Hz)	50	P
	- on-time (ms):	240	P
	- off-time (s):	29,8	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

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Clause	Requirement + Test	Result - Remark	Verdict
	- the leaking current for circuit-breaker suitable for isolation: (<2mA / 1.1 Ue)	<0,01mA	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) :	See table: temperature rise measurement	P
	conductor cross-sectional area (mm²) :	50	P
	test current Ie (A) :	150	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)	218	P
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A	3min23s	P
8.3.4	**TEST SEQUENCE II (Ics):**		
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	**HLL36150**	
	Sample no:	#08	
	Rated current: In (A)	150A	
	Rated operational voltage: Ue (V)	AC240V	
	Rated service short-circuit breaking capacity: (kA)	125kA	
	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: 14,3mm Top: 102mm Bottom:102mm Left: 25,4mm Right: 25,4mm	P

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Clause	Requirement + Test	Result - Remark	Verdict

	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		P
	- size of hole: <30mm^2		P
	- finish: bare or conductive plating		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)	Load-star	P
	Conductor cross-sectional area (mm²) :	50	P
	If terminals unmarked: line connected at: (underside/upside)	Underside	P
	Tightening torques: (Nm)	6,0	P
	Test sequence of operation: O – t – CO – t – CO		P
	- test voltage U/Ue = 1,05 (V) ..... L1: ..... L2: L3:	252 252 252	P
	- r.m.s. test current AC/DC: (A) ..... L1: ..... L2: L3:	 125 126 125	P
	power factor/time constant :	0,19	P
	- Factor ”n”	2,2	P
	- peak test current (A) :	281	P
	Test sequence ”O”		
	- max. let-through current: (kApeak) ..... L1: ..... L2: L3:	13,5 7,06 9,35	P
	- Joule integral I²dt (A²s) ..... L1: ..... L2: L3:	183 35,6 80,3	P
	Pause, t: (min)	3	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Test sequence ”CO”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	5,97 13,9 9,64	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	35,5 204 84,5	P
	Pause, t: (min)	3	P
	Test sequence ”CO”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	9,93 13,2 4,16	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	106 178 13,7	P
	Melting of the fusible element	No	P
	Damage to insulation on conductors	No	P
	Holes in the PE-sheet for test sequence ”O”		P
	Cracks observed	No	P
8.3.4.2	Operational performance capability with current.		
	Rated current: In (A)	150A	
	Maximum rated operational voltage: Ue (V)	AC240V	
	Conductor cross-sectional area (mm²) :	50 mm^2	
	Number of operating cycles per hour	120	P
	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:	242 242 242	P
	- test current I/Ie = 1,0 (A).....L1: .....L2: L3:	152 152 152	P
	- power factor/time constant:	0,81	P
	- frequency: (Hz)	50	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- on-time (ms):	240	P
	- off-time (s):	29,8	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)	<0,01mA	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) :	See table: temperature rise measurement	P
	conductor cross-sectional area (mm²) :	50	P
	test current Ie (A) :	150	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)	218	P
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A	30min16s	P

8.3.4	**TEST SEQUENCE II (Ics):**		
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	**HDN36150**	
	Sample no:	#09	
	Rated current: In (A)	150A	
	Rated operational voltage: Ue (V)	AC240V	
	Rated service short-circuit breaking capacity: (kA)	65kA	
	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

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Clause	Requirement + Test	Result - Remark	Verdict
	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: 14,3mm Top: 102mm Bottom:102mm Left: 25,4mm Right: 25,4mm	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		P
	- size of hole: <30mm^2		P
	- finish: bare or conductive plating		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)	Load-star	P
	Conductor cross-sectional area (mm²) :	50	P
	If terminals unmarked: line connected at: (underside/upside)	Underside	P
	Tightening torques: (Nm)	6,0	P
	Test sequence of operation: O – t – CO – t – CO		P
	- test voltage U/Ue = 1,05 (V) ..... L1: ..... L2: L3:	 252 252 252	P
	- r.m.s. test current AC/DC: (A) ..... L1: ..... L2: L3:	 65,3 65,0 65,2	P
	power factor/time constant :	0,19	P
	- Factor "n"	2,2	P
	- peak test current (A) :	145	P
	Test sequence "O"		
	- max. let-through current: (kApeak) ..... L1: ..... L2: L3:	 12,1 14,1 12,3	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	214 190 181	P
	Pause, t: (min)	3	P
	Test sequence ”CO”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	11,7 10,7 11,6	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	251 123 170	P
	Pause, t: (min)	3	P
	Test sequence ”CO”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	10,1 10,9 13,2	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	192 189 284	P
	Melting of the fusible element	No	P
	Damage to insulation on conductors	No	P
	Holes in the PE-sheet for test sequence ”O”		P
	Cracks observed	No	P
8.3.4.2	Operational performance capability with current.		
	Rated current: In (A)	150A	
	Maximum rated operational voltage: Ue (V)	AC240V	
	Conductor cross-sectional area (mm²) :	50 mm^2	
	Number of operating cycles per hour	120	P
	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:	242 242 242	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- test current I/Ie = 1,0 (A).....L1: .....L2: L3:	152 152 152	P
	- power factor/time constant:	0,81	P
	- frequency: (Hz)	50	P
	- on-time (ms):	241	P
	- off-time (s):	29,8	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)	<0,01mA	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) :	See table: temperature rise measurement	P
	conductor cross-sectional area (mm²) :	50	P
	test current Ie (A) :	150	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)	218	P
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A	28s	P

8.3.4	**TEST SEQUENCE II (Ics):**		
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	**HJD36150**	
	Sample no:	#10	
	Rated current: In (A)	150A	
	Rated operational voltage: Ue (V)	AC240V	
	Rated service short-circuit breaking capacity: (kA)	125kA	
	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.		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: 14,3mm Top: 102mm Bottom:102mm Left: 25,4mm Right: 25,4mm	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		P
	- size of hole: <30mm^2		P
	- finish: bare or conductive plating		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)	Load-star	P
	Conductor cross-sectional area (mm²) :	50	P
	If terminals unmarked: line connected at: (underside/upside)	Underside	P
	Tightening torques: (Nm)	6,0	P
	Test sequence of operation: O – t – CO – t – CO		P
	- test voltage U/Ue = 1,05 (V) ..... L1: ..... L2: L3:	 252 252 252	P
	- r.m.s. test current AC/DC: (A) ..... L1: ..... L2: L3:	 125 126 125	P
	power factor/time constant :	0,19	P
	- Factor "n"	2,2	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- peak test current (A) :	281	P
	Test sequence ”O”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	10,6 7,74 10,0	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	188 75,5 92,6	P
	Pause, t: (min)	3	P
	Test sequence ”CO”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	10,3 10,9 11,9	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	208 156 186	P
	Pause, t: (min)	3	P
	Test sequence ”CO”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	11,2 10,9 12,6	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	185 172 183	P
	Melting of the fusible element	No	P
	Damage to insulation on conductors	No	P
	Holes in the PE-sheet for test sequence ”O”		P
	Cracks observed	No	P
8.3.4.2	Operational performance capability with current.		
	Rated current: In (A)	150A	
	Maximum rated operational voltage: Ue (V)	AC240V	
	Conductor cross-sectional area (mm²) :	50 mm^2	
	Number of operating cycles per hour	120	P
	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

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Clause	Requirement + Test	Result - Remark	Verdict
	Conditions, make/break operations:		
	- test voltage U/Ue = 1,0 (V) .....L1: .....L2: L3:	242 242 242	P
	- test current I/Ie = 1,0 (A).....L1: .....L2: L3:	152 152 152	P
	- power factor/time constant:	0,81	P
	- frequency: (Hz)	50	P
	- on-time (ms):	230	P
	- off-time (s):	29,8	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)	<0,01mA	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) :	See table: temperature rise measurement	P
	conductor cross-sectional area (mm²) :	50	P
	test current Ie (A) :	150	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)	218	P
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A	9s	P

8.3.4	**TEST SEQUENCE II (Ics):**		
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	**HLL36150M74**	
	Sample no:	#11	
	Rated current: In (A)	150A	
	Rated operational voltage: Ue (V)	AC240V	

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Clause	Requirement + Test	Result - Remark	Verdict
	Rated service short-circuit breaking capacity: (kA)	125kA	
	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: 14,3mm Top: 102mm Bottom:102mm Left: 25,4mm Right: 25,4mm	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		P
	- size of hole: <30mm^2		P
	- finish: bare or conductive plating		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)	Load-star	P
	Conductor cross-sectional area (mm²) :	50	P
	If terminals unmarked: line connected at: (underside/upside)	Underside	P
	Tightening torques: (Nm)	6,0	P
	Test sequence of operation: O – t – CO – t – CO		P
	- test voltage U/Ue = 1,05 (V) .....L1: .....L2: L3:	252 252 252	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- r.m.s. test current AC/DC: (A) .....L1: .....L2: L3:	 125 126 125	P
	power factor/time constant :	0,19	P
	- Factor ”n”	2,2	P
	- peak test current (A) :	281	P
	Test sequence ”O”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	6,51 14,2 7,46	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	52,0 194 44,6	P
	Pause, t: (min)	3	P
	Test sequence ”CO”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	14,4 7,13 8,22	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	212 43,0 69,7	P
	Pause, t: (min)	3	P
	Test sequence ”CO”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	9,64 13,5 4,69	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	99,9 185 17,8	P
	Melting of the fusible element	No	P
	Damage to insulation on conductors	No	P
	Holes in the PE-sheet for test sequence ”O”		P
	Cracks observed	No	P
8.3.4.2	Operational performance capability with current.		
	Rated current: In (A)	150A	
	Maximum rated operational voltage: Ue (V)	AC240V	
	Conductor cross-sectional area (mm²) :	50 mm^2	
	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:	242 242 242	P
	- test current I/Ie = 1,0 (A).....L1: .....L2: L3:	152 152 152	P
	- power factor/time constant:	0,81	P
	- frequency: (Hz)	50	P
	- on-time (ms):	230	P
	- off-time (s):	29,8	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)	<0,01mA	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) :	See table: temperature rise measurement	P
	conductor cross-sectional area (mm²) :	50	P
	test current Ie (A) :	150	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)		N/A
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

8.3.4	**TEST SEQUENCE II/III (Ics=Icu):**		
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	**HDL36150**	
	Sample no:	#17	
	Rated current: In (A)	150A	
	Rated operational voltage: Ue (V)	AC240V	
	Rated service short-circuit breaking capacity: (kA)	65kA	
	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: 14,3mm Top:102mm Bottom:102mm Left: 25,4mm Right: 25,4mm	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		P
	- size of hole: <30mm^2		P
	- finish: bare or conductive plating		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)	Load-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)	Underside	P
	Tightening torques: (Nm)	6,0	P
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:	≤500s	P
	- Operation time: (s) .....L1: .....L2: .....L3: ..... N :	3min15s 3min36s 3min21s	P
8.3.4.1	Test of rated service short-circuit breaking capacity		
	Test sequence of operation: O – t – CO – t – CO		P
	- test voltage U/Ue = 1,05 (V) .....L1: .....L2: L3:	252 252 252	P
	- r.m.s. test current AC/DC: (A) .....L1: .....L2: L3:	 65,3 65,0 65,2	P
	power factor/time constant :	0,19	P
	- Factor ”n”	2,2	P
	- peak test current (A) :	145	P
	Test sequence ”O”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	12,8 10,0 10,9	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	253 129 176	P
	Pause, t: (min)	3	P
	Test sequence ”CO”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	10,7 11,4 10,9	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	150 199 122	P
	Pause, t: (min)	3	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Test sequence ”CO”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	10,9 4,93 11,5	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	120 14,4 161	P
	Melting of the fusible element	No	P
	Damage to insulation on conductors	No	P
	Holes in the PE-sheet for test sequence ”O”		P
	Cracks observed	No	P
8.3.4.2	Operational performance capability with current.		
	Rated current: In (A)	150A	
	Maximum rated operational voltage: Ue (V)	AC240V	
	Conductor cross-sectional area (mm²) :	50 mm^2	
	Number of operating cycles per hour	120	P
	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:	242 242 242	P
	- test current I/Ie = 1,0 (A).....L1: .....L2: L3:	152 152 152	P
	- power factor/time constant:	0,81	P
	- frequency: (Hz)	50	P
	- on-time (ms):	160	P
	- off-time (s):	29,8	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

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Clause	Requirement + Test	Result - Remark	Verdict
	- the leaking current for circuit-breaker suitable for isolation: (<2mA / 1,1 Ue)	<0,01mA	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) :	See table: temperature rise measurement	P
	conductor cross-sectional area (mm²) :	50	P
	test current Ie (A) :	150	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)	218	P
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A	2min56s	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:	≤500s	P
	- Operation time: (s) .....L1: .....L2: .....L3: ..... N :	1min40s 1min52s 1min37s	P
8.3.4	**TEST SEQUENCE II/III (Ics=Icu):**		
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	**HJL36150**	
	Sample no:	#18	
	Rated current: In (A)	150A	
	Rated operational voltage: Ue (V)	AC240V	
	Rated service short-circuit breaking capacity: (kA)	125kA	
	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
	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: 14,3mm Top:102mm Bottom:102mm Left: 25,4mm Right: 25,4mm	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		P
	- size of hole: <30mm^2		P
	- finish: bare or conductive plating		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)	Load-star	P
	Conductor cross-sectional area (mm²) :	50	P
	If terminals unmarked: line connected at: (underside/upside)	Underside	P
	Tightening torques: (Nm)	6,0	P
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:	≤500s	P
	- Operation time: (s) ..... L1: ..... L2: ..... L3: ..... N :	3min26s 3min55s 3min41s	P
8.3.4.1	Test of rated service short-circuit breaking capacity		
	Test sequence of operation: O – t – CO – t – CO		P

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Clause	Requirement + Test	Result - Remark	Verdict
	- test voltage U/Ue = 1,05 (V) .....L1: .....L2: L3:	252 252 252	P
	- r.m.s. test current AC/DC: (A) .....L1: .....L2: L3:	 125 126 125	P
	power factor/time constant :	0,19	P
	- Factor ”n”	2,2	P
	- peak test current (A) :	281	P
	Test sequence ”O”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	12,2 11,7 12,4	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	176 193 154	P
	Pause, t: (min)	3	P
	Test sequence ”CO”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	10,8 11,3 9,21	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	139 223 95,5	P
	Pause, t: (min)	3	P
	Test sequence ”CO”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	9,95 8,06 12,7	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	136 129 192	P
	Melting of the fusible element	No	P
	Damage to insulation on conductors	No	P
	Holes in the PE-sheet for test sequence ”O”		P
	Cracks observed	No	P
8.3.4.2	Operational performance capability with current.		
	Rated current: In (A)	150A	
	Maximum rated operational voltage: Ue (V)	AC240V	

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Clause	Requirement + Test	Result - Remark	Verdict
	Conductor cross-sectional area (mm²) :	50 mm^2	
	Number of operating cycles per hour	120	P
	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:	242 242 242	P
	- test current I/Ie = 1,0 (A).....L1: .....L2: L3:	152 152 152	P
	- power factor/time constant:	0,81	P
	- frequency: (Hz)	50	P
	- on-time (ms):	160	P
	- off-time (s):	29,8	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)	<0,01mA	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) :	See table: temperature rise measurement	P
	conductor cross-sectional area (mm²) :	50	P
	test current Ie (A) :	150	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)	218	P
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A	21min21s	P

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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:	≤500s	P
	- Operation time: (s) .....L1: .....L2: .....L3: ..... N :	1min39s 1min36s 1min21s	P
8.3.4	**TEST SEQUENCE II/III (Ics=Icu):**		
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	**HJL36015**	
	Sample no:	#19	
	Rated current: In (A)	15A	
	Rated operational voltage: Ue (V)	AC240V	
	Rated service short-circuit breaking capacity: (kA)	125kA	
	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: 14,3mm Top:102mm Bottom:102mm Left: 25,4mm Right: 25,4mm	P
	The characteristics of the metallic screen:		
	- woven wire mesh		N/A
	- perforated metal		P
	- expanded metal		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- ratio hole area/total area: 0,45-0,65		P
	- size of hole: <30mm^2		P
	- finish: bare or conductive plating		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)	Load-star	P
	Conductor cross-sectional area (mm²) :	2,5	P
	If terminals unmarked: line connected at: (underside/upside)	Underside	P
	Tightening torques: (Nm)	6,0	P
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:	≤170s	P
	- Operation time: (s) .....L1: .....L2: .....L3: ..... N :	50s 52s 50s	P
8.3.4.1	Test of rated service short-circuit breaking capacity		
	Test sequence of operation: O – t – CO – t – CO		P
	- test voltage U/Ue = 1,05 (V) .....L1: .....L2: L3:	252 252 252	P
	- r.m.s. test current AC/DC: (A) .....L1: .....L2: L3:	 125 126 125	P
	power factor/time constant :	0,19	P
	- Factor ”n”	2,2	P
	- peak test current (A) :	281	P
	Test sequence ”O”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	12,0 10,7 10,4	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	274 105 124	P
	Pause, t: (min)	3	P
	Test sequence ”CO”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	5,47 11,1 12,7	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	81,6 218 167	P
	Pause, t: (min)	3	P
	Test sequence ”CO”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	11,1 11,3 11,7	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	176 137 192	P
	Melting of the fusible element	No	P
	Damage to insulation on conductors	No	P
	Holes in the PE-sheet for test sequence ”O”		P
	Cracks observed	No	P
8.3.4.2	Operational performance capability with current.		
	Rated current: In (A)	15A	
	Maximum rated operational voltage: Ue (V)	AC240V	
	Conductor cross-sectional area (mm²) :	2,5 mm^2	
	Number of operating cycles per hour	120	P
	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:	242 242 242	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- test current I/Ie = 1,0 (A)..... L1: ..... L2: L3:	15,2 15,2 15,2	P
	- power factor/time constant:	0,81	P
	- frequency: (Hz)	50	P
	- on-time (ms):	160	P
	- off-time (s):	29,8	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)	<0,01mA	P
8.3.4.4	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
8.3.4.5	Verification of overload releases		
	Test current: 1,45 times the value of their current setting at the reference temperature: (A)	21,8	P
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A	18s	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:	≤170s	P
	- Operation time: (s) ..... L1: ..... L2: ..... L3: ..... N :	19s 18s 17s	P

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Clause	Requirement + Test	Result - Remark	Verdict

8.3.4	**TEST SEQUENCE II/III (Ics=Icu):**		
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	**HJL36150**	
	Sample no:	#20	
	Rated current: In (A)	150A	
	Rated operational voltage: Ue (V)	AC440V	
	Rated service short-circuit breaking capacity: (kA)	100kA	
	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: 14,3mm Top:102mm Bottom:102mm Left: 25,4mm Right: 25,4mm	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		P
	- size of hole: <30mm^2		P
	- finish: bare or conductive plating		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)	Load-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)	Underside	P
	Tightening torques: (Nm)	6,0	P
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:	≤500s	P
	- Operation time: (s) .....L1: .....L2: .....L3: ..... N :	3min17s 3min26s 3min28s	P
8.3.4.1	Test of rated service short-circuit breaking capacity		
	Test sequence of operation: O – t – CO – t – CO		P
	- test voltage U/Ue = 1,05 (V) .....L1: .....L2: L3:	464 464 464	P
	- r.m.s. test current AC/DC: (A) .....L1: .....L2: L3:	 100 100 101	P
	power factor/time constant :	0,20	P
	- Factor ”n”	2,2	P
	- peak test current (A) :	221	P
	Test sequence ”O”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	15,1 17,1 15,3	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	357 320 282	P
	Pause, t: (min)	3	P
	Test sequence ”CO”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	10,3 17,9 8,83	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	129 358 73,3	P
	Pause, t: (min)	3	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Test sequence ”CO”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	9,57 18,2 9,69	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	118 378 89,1	P
	Melting of the fusible element	No	P
	Damage to insulation on conductors	No	P
	Holes in the PE-sheet for test sequence ”O”		P
	Cracks observed	No	P
8.3.4.2	Operational performance capability with current.		
	Rated current: In (A)	150A	
	Maximum rated operational voltage: Ue (V)	AC440V	
	Conductor cross-sectional area (mm²) :	50 mm^2	
	Number of operating cycles per hour	120	P
	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:	442 442 442	P
	- test current I/Ie = 1,0 (A).....L1: .....L2: L3:	152 152 152	P
	- power factor/time constant:	0,81	P
	- frequency: (Hz)	50	P
	- on-time (ms):	160	P
	- off-time (s):	29,8	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

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Clause	Requirement + Test	Result - Remark	Verdict
	- the leaking current for circuit-breaker suitable for isolation: (<2mA / 1,1 Ue)	<0,01mA	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) :	See table: temperature rise measurement	P
	conductor cross-sectional area (mm²) :	50	P
	test current Ie (A) :	150	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)	218	P
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A	4min37s	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:	≤500s	P
	- Operation time: (s) .....L1: .....L2: .....L3: ..... N :	1min30s 1min34s 1min51s	P
8.3.4	**TEST SEQUENCE II/III (Ics=Icu):**		
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	**HJL36150**	
	Sample no:	#21(F1)	
	Rated current: In (A)	150A	
	Rated operational voltage: Ue (V)	AC525V	
	Rated service short-circuit breaking capacity: (kA)	50kA	
	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
	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: 14,3mm Top:102mm Bottom:102mm Left: 25,4mm Right: 25,4mm	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		P
	- size of hole: <30mm^2		P
	- finish: bare or conductive plating		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)	Load-star	P
	Conductor cross-sectional area (mm²) :	50	P
	If terminals unmarked: line connected at: (underside/upside)	Underside	P
	Tightening torques: (Nm)	6,0	P
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:	≤500s	P
	- Operation time: (s) ..... L1: ..... L2: ..... L3: ..... N :	3min47s 4min11s 3min32s	P
8.3.4.1	Test of rated service short-circuit breaking capacity		
	Test sequence of operation: O – t – CO – t – CO		P

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Clause	Requirement + Test	Result - Remark	Verdict
	- test voltage U/Ue = 1,05 (V) .....L1: .....L2: L3:	556 556 556	P
	- r.m.s. test current AC/DC: (A) .....L1: .....L2: L3:	 50,6 50,2 50,4	P
	power factor/time constant :	0,25	P
	- Factor ”n”	2,1	P
	- peak test current (A) :	106	P
	Test sequence ”O”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	15,8 13,2 8,81	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	373 316 207	P
	Pause, t: (min)	3	P
	Test sequence ”CO”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	15,5 12,7 8,29	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	369 189 103	P
	Pause, t: (min)	3	P
	Test sequence ”CO”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	10,7 9,86 16,3	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	134 181 452	P
	Melting of the fusible element	No	P
	Damage to insulation on conductors	No	P
	Holes in the PE-sheet for test sequence ”O”		P
	Cracks observed	No	P
8.3.4.2	Operational performance capability with current.		
	Rated current: In (A)	150A	
	Maximum rated operational voltage: Ue (V)	AC525V	

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Clause	Requirement + Test	Result - Remark	Verdict
	Conductor cross-sectional area (mm²) :	50 mm^2	
	Number of operating cycles per hour	120	P
	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:	528 528 528	P
	- test current I/Ie = 1,0 (A).....L1: .....L2: L3:	152 152 152	P
	- power factor/time constant:	0,81	P
	- frequency: (Hz)	50	P
	- on-time (ms):	160	P
	- off-time (s):	29,8	P
8.3.4.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V	1050V	P
	- no breakdown or flashover		P
	- the leaking current for circuit-breaker suitable for isolation: (<2mA / 1,1 Ue)	<0,01mA	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) :	See table: temperature rise measurement	P
	conductor cross-sectional area (mm²) :	50	P
	test current Ie (A) :	150	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)	218	P
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A	1min24s	P

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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:	≤500s	P
	- Operation time: (s) .....L1: .....L2: .....L3: ..... N :	2min14s 1min46s 2min23s	P

8.3.4	**TEST SEQUENCE II/III (Ics=Icu):**		
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	**HJL36150M74**	
	Sample no:	#26	
	Rated current: In (A)	150A	
	Rated operational voltage: Ue (V)	AC240V	
	Rated service short-circuit breaking capacity: (kA)	125kA	
	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.		P
	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: 14,3mm Top:102mm Bottom:102mm Left: 25,4mm Right: 25,4mm	P
	The characteristics of the metallic screen:		
	- woven wire mesh		N/A
	- perforated metal		P
	- expanded metal		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- ratio hole area/total area: 0,45-0,65		P
	- size of hole: <30mm^2		P
	- finish: bare or conductive plating		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)	Load-star	P
	Conductor cross-sectional area (mm²) :	50	P
	If terminals unmarked: line connected at: (underside/upside)	Underside	P
	Tightening torques: (Nm)	6,0	P
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:		N/A
	- Operation time: (s) .....L1: .....L2: .....L3: ..... N :		N/A
8.3.4.1	Test of rated service short-circuit breaking capacity		
	Test sequence of operation: O – t – CO – t – CO		P
	- test voltage U/Ue = 1,05 (V) .....L1: .....L2: L3:	252 252 252	P
	- r.m.s. test current AC/DC: (A) .....L1: .....L2: L3:	 125 126 125	P
	power factor/time constant :	0,19	P
	- Factor ”n”	2,2	P
	- peak test current (A) :	281	P
	Test sequence ”O”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	6,76 14,0 7,16	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	58,0 190 39,8	P
	Pause, t: (min)	3	P
	Test sequence ”CO”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	13,3 8,82 6,59	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	193 69,6 41,4	P
	Pause, t: (min)	3	P
	Test sequence ”CO”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	12,0 4,19 12,1	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	138 9,27 172	P
	Melting of the fusible element	No	P
	Damage to insulation on conductors	No	P
	Holes in the PE-sheet for test sequence ”O”		P
	Cracks observed	No	P
8.3.4.2	Operational performance capability with current.		
	Rated current: In (A)	150A	
	Maximum rated operational voltage: Ue (V)	AC240V	
	Conductor cross-sectional area (mm²) :	50 mm^2	
	Number of operating cycles per hour	120	P
	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:	242 242 242	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- test current I/Ie = 1,0 (A).....L1: .....L2: L3:	152 152 152	P
	- power factor/time constant:	0,81	P
	- frequency: (Hz)	50	P
	- on-time (ms):	160	P
	- off-time (s):	29,8	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)	<0,01mA	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) :	See table: temperature rise measurement	P
	conductor cross-sectional area (mm²) :	50	P
	test current Ie (A) :	150	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)		N/A
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A		N/A
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 :		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

8.3.4	**TEST SEQUENCE II/III (Ics=Icu):**		
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	**HJL36030M71**	
	Sample no:	#27	
	Rated current: In (A)	30A	
	Rated operational voltage: Ue (V)	AC240V	
	Rated service short-circuit breaking capacity: (kA)	125kA	
	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.		P
	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: 14,3mm Top:102mm Bottom:102mm Left: 25,4mm Right: 25,4mm	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		P
	- size of hole: <30mm^2		P
	- finish: bare or conductive plating		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)	Load-star	P
	Conductor cross-sectional area (mm²) :	6,0	P

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Clause	Requirement + Test	Result - Remark	Verdict
	If terminals unmarked: line connected at: (underside/upside)	Underside	P
	Tightening torques: (Nm)	6,0	P
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:		N/A
	- Operation time: (s) .....L1: .....L2: .....L3: ..... N :		N/A
8.3.4.1	Test of rated service short-circuit breaking capacity		
	Test sequence of operation: O – t – CO – t – CO		P
	- test voltage U/Ue = 1,05 (V) .....L1: .....L2: L3:	252 252 252	P
	- r.m.s. test current AC/DC: (A) .....L1: .....L2: L3:	 125 126 125	P
	power factor/time constant :	0,19	P
	- Factor ”n”	2,2	P
	- peak test current (A) :	281	P
	Test sequence ”O”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	8,07 5,39 11,9	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	60,1 27,8 144	P
	Pause, t: (min)	3	P
	Test sequence ”CO”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	7,84 5,88 12,3	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	53,6 34,9 154	P
	Pause, t: (min)	3	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Test sequence ”CO”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	6,90 10,8 4,07	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	61,9 123 15,0	P
	Melting of the fusible element	No	P
	Damage to insulation on conductors	No	P
	Holes in the PE-sheet for test sequence ”O”		P
	Cracks observed	No	P
8.3.4.2	Operational performance capability with current.		
	Rated current: In (A)	30A	
	Maximum rated operational voltage: Ue (V)	AC240V	
	Conductor cross-sectional area (mm²) :	6,0 mm^2	
	Number of operating cycles per hour	120	P
	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:	242 242 242	P
	- test current I/Ie = 1,0 (A).....L1: .....L2: L3:	30,2 30,2 30,2	P
	- power factor/time constant:	0,81	P
	- frequency: (Hz)	50	P
	- on-time (ms):	160	P
	- off-time (s):	29,8	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

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Clause	Requirement + Test	Result - Remark	Verdict
	- the leaking current for circuit-breaker suitable for isolation: (<2mA / 1,1 Ue)	<0,01mA	P
8.3.4.4	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
8.3.4.5	Verification of overload releases		
	Test current: 1,45 times the value of their current setting at the reference temperature: (A)		N/A
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A		N/A
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 :		N/A
8.3.4	**TEST SEQUENCE II/III (Ics=Icu):**		
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	**HJL36150M74**	
	Sample no:	#28	
	Rated current: In (A)	150A	
	Rated operational voltage: Ue (V)	AC440V	
	Rated service short-circuit breaking capacity: (kA)	100kA	
	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
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		P
	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: 14,3mm Top:102mm Bottom:102mm Left: 25,4mm Right: 25,4mm	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		P
	- size of hole: <30mm^2		P
	- finish: bare or conductive plating		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)	Load-star	P
	Conductor cross-sectional area (mm²) :	50	P
	If terminals unmarked: line connected at: (underside/upside)	Underside	P
	Tightening torques: (Nm)	6,0	P
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:		N/A
	- Operation time: (s) .....L1: .....L2: .....L3: ..... N :		N/A
8.3.4.1	Test of rated service short-circuit breaking capacity		
	Test sequence of operation: O – t – CO – t – CO		P

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Clause	Requirement + Test	Result - Remark	Verdict
	- test voltage U/Ue = 1,05 (V) .....L1: .....L2: L3:	464 464 464	P
	- r.m.s. test current AC/DC: (A) .....L1: .....L2: L3:	 100 100 101	P
	power factor/time constant :	0,20	P
	- Factor ”n”	2,2	P
	- peak test current (A) :	221	P
	Test sequence ”O”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	18,2 8,71 10,3	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	369 71,7 134	P
	Pause, t: (min)	3	P
	Test sequence ”CO”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	10,8 17,7 8,72	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	150 367 73,7	P
	Pause, t: (min)	3	P
	Test sequence ”CO”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	5,23 13,0 17,6	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	22,3 195 336	P
	Melting of the fusible element	No	P
	Damage to insulation on conductors	No	P
	Holes in the PE-sheet for test sequence ”O”		P
	Cracks observed	No	P
8.3.4.2	Operational performance capability with current.		
	Rated current: In (A)	150A	
	Maximum rated operational voltage: Ue (V)	AC440V	

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Clause	Requirement + Test	Result - Remark	Verdict
	Conductor cross-sectional area (mm²) :	50 mm^2	
	Number of operating cycles per hour	120	P
	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:	442 442 442	P
	- test current I/Ie = 1,0 (A).....L1: .....L2: L3:	152 152 152	P
	- power factor/time constant:	0,81	P
	- frequency: (Hz)	50	P
	- on-time (ms):	160	P
	- off-time (s):	29,8	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)	<0,01mA	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) :	See table: temperature rise measurement	P
	conductor cross-sectional area (mm²) :	50	P
	test current Ie (A) :	150	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)		N/A
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A		N/A

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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 :		N/A

8.3.4	**TEST SEQUENCE II/III (Ics=Icu):**		
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	**HJL36150M74**	
	Sample no:	#29	
	Rated current: In (A)	150A	
	Rated operational voltage: Ue (V)	AC525V	
	Rated service short-circuit breaking capacity: (kA)	50kA	
	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.		P
	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: 14,3mm Top:102mm Bottom:102mm Left: 25,4mm Right: 25,4mm	P
	The characteristics of the metallic screen:		
	- woven wire mesh		N/A
	- perforated metal		P
	- expanded metal		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- ratio hole area/total area: 0,45-0,65		P
	- size of hole: <30mm^2		P
	- finish: bare or conductive plating		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)	Load-star	P
	Conductor cross-sectional area (mm²) :	50	P
	If terminals unmarked: line connected at: (underside/upside)	Underside	P
	Tightening torques: (Nm)	6,0	P
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:		N/A
	- Operation time: (s) .....L1: .....L2: .....L3: ..... N :		N/A
8.3.4.1	Test of rated service short-circuit breaking capacity		
	Test sequence of operation: O – t – CO – t – CO		P
	- test voltage U/Ue = 1,05 (V) .....L1: .....L2: L3:	556 556 556	P
	- r.m.s. test current AC/DC: (A) .....L1: .....L2: L3:	 50,6 50,2 50,7	P
	power factor/time constant :	0,24	P
	- Factor ”n”	2,1	P
	- peak test current (A) :	106	P
	Test sequence ”O”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	13,7 7,92 16,9	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	183 141 425	P
	Pause, t: (min)	3	P
	Test sequence ”CO”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	12,4 17,4 6,43	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	177 340 37,1	P
	Pause, t: (min)	3	P
	Test sequence ”CO”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	15,6 15,7 11,5	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	427 253 188	P
	Melting of the fusible element	No	P
	Damage to insulation on conductors	No	P
	Holes in the PE-sheet for test sequence ”O”		P
	Cracks observed	No	P
8.3.4.2	Operational performance capability with current.		
	Rated current: In (A)	150A	
	Maximum rated operational voltage: Ue (V)	AC525V	
	Conductor cross-sectional area (mm²) :	50 mm^2	
	Number of operating cycles per hour	120	P
	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:	528 528 528	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- test current I/Ie = 1,0 (A).....L1: .....L2: L3:	152 152 152	P
	- power factor/time constant:	0,81	P
	- frequency: (Hz)	50	P
	- on-time (ms):	160	P
	- off-time (s):	29,8	P
8.3.4.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V	1050V	P
	- no breakdown or flashover		P
	- the leaking current for circuit-breaker suitable for isolation: (<2mA / 1,1 Ue)	<0,01mA	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) :	See table: temperature rise measurement	P
	conductor cross-sectional area (mm²) :	50	P
	test current Ie (A) :	150	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)		N/A
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A		N/A
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 :		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

8.3.5	**TEST SEQUENCE III (Icu)**		
	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	**HDL26150**	
	Sample no:	#12	
	Rated current: In (A)	150A	
	Rated operational voltage: Ue (V)	AC240V	
	Rated ultimate short-circuit breaking capacity: (kA)	65kA	
	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:	≤500s	P
	- Operation time: (s) ..... L1: ..... L2: ..... L3: ..... N :	4min15s 4min08s -	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

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Clause	Requirement + Test	Result - Remark	Verdict
	Test made in free air:		P
	Distances of the metallic screen's: (all sides)	Back: 0mm Front: 14,3mm Top:102mm Bottom:102mm Left: 25,4mm Right: 25,4mm	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		P
	- size of hole: <30mm^2		P
	- finish: bare or conductive plating		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)	Load-star	P
	Conductor cross-sectional area (mm²) :	50	P
	If terminals unmarked: line connected at: (underside/upside)	Underside	P
	Tightening, torques: (Nm)	6,0	P
	Test sequence of operation: O – t – CO		P
	- test voltage U/Ue = 1,05 (V) .....L1: .....L2: L3:	252 252 -	P
	- r.m.s. test current AC/DC: (A).....L1: .....L2: L3:	65,3 65,3 -	P
	power factor/time constant :	0,20	P
	- Factor "n"	2,2	P
	- peak test current (Amax) :	144	P
	Test sequence "O"		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	10,6 10,6 -	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	127 127 -	P
	Pause, t: (min)	3	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Test sequence ”CO”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	11,1 11,1 -	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	139 139 -	P
	Melting of the fusible element	No	P
	Damage to insulation on conductors	No	P
	Holes in the PE-sheet for test sequence ”O”		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	1000V	P
	- no breakdown or flashover		P
	- the leaking current for circuit-breaker suitable for isolation: (<6mA / 1,1 Ue)	<0,01mA	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:	≤500s	P
	- Operation time: (s) .....L1: .....L2: .....L3: ..... N :	2min45s 2min11s -	P

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Clause	Requirement + Test	Result - Remark	Verdict

8.3.5	**TEST SEQUENCE III (Icu)**		
	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	**HJL26150**	
	Sample no:	#13	
	Rated current: In (A)	150A	
	Rated operational voltage: Ue (V)	AC240V	
	Rated ultimate short-circuit breaking capacity: (kA)	125kA	
	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:	≤500s	P
	- Operation time: (s) ..... L1: ..... L2: ..... L3: ..... N :	4min32s 4min12s -	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

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Clause	Requirement + Test	Result - Remark	Verdict
	Test made in free air:		P
	Distances of the metallic screen's: (all sides)	Back: 0mm Front: 14,3mm Top:102mm Bottom:102mm Left: 25,4mm Right: 25,4mm	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		P
	- size of hole: <30mm^2		P
	- finish: bare or conductive plating		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)	Load-star	P
	Conductor cross-sectional area (mm²) :	50	P
	If terminals unmarked: line connected at: (underside/upside)	Underside	P
	Tightening, torques: (Nm)	6,0	P
	Test sequence of operation: O – t – CO		P
	- test voltage U/Ue = 1,05 (V) .....L1: .....L2: L3:	252 252 -	P
	- r.m.s. test current AC/DC: (A).....L1: .....L2: L3:	125 125 -	P
	power factor/time constant :	0,20	P
	- Factor "n"	2,2	P
	- peak test current (Amax) :	276	P
	Test sequence "O"		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	9,52 9,52 -	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	287 287 -	P
	Pause, t: (min)	3	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Test sequence ”CO”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	11,8 11,8 -	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	153 153 -	P
	Melting of the fusible element	No	P
	Damage to insulation on conductors	No	P
	Holes in the PE-sheet for test sequence ”O”		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	1000V	P
	- no breakdown or flashover		P
	- the leaking current for circuit-breaker suitable for isolation: (<6mA / 1,1 Ue)	<0,01mA	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:	≤500s	P
	- Operation time: (s) .....L1: .....L2: .....L3: ..... N :	2min01s 1min50s -	P

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Clause	Requirement + Test	Result - Remark	Verdict

8.3.5	**TEST SEQUENCE III (Icu)**		
	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	**HJL26015**	
	Sample no:	#14	
	Rated current: In (A)	15A	
	Rated operational voltage: Ue (V)	AC240V	
	Rated ultimate short-circuit breaking capacity: (kA)	125kA	
	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:	≤170s	P
	- Operation time: (s) .....L1: .....L2: .....L3: ..... N :	50s 49s -	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

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Clause	Requirement + Test	Result - Remark	Verdict
	Test made in free air:		P
	Distances of the metallic screen's: (all sides)	Back: 0mm Front: 14,3mm Top:102mm Bottom:102mm Left: 25,4mm Right: 25,4mm	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		P
	- size of hole: <30mm^2		P
	- finish: bare or conductive plating		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)	Load-star	P
	Conductor cross-sectional area (mm²) :	2,5	P
	If terminals unmarked: line connected at: (underside/upside)	Underside	P
	Tightening, torques: (Nm)	6,0	P
	Test sequence of operation: O – t – CO		P
	- test voltage U/Ue = 1,05 (V) .....L1: .....L2: L3:	252 252 -	P
	- r.m.s. test current AC/DC: (A).....L1: .....L2: L3:	125 125 -	P
	power factor/time constant :	0,20	P
	- Factor "n"	2,2	P
	- peak test current (Amax) :	276	P
	Test sequence "O"		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	6,60 6,60 -	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	71,6 71,6 -	P
	Pause, t: (min)	3	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Test sequence ”CO”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	7,34 7,34 -	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	91,9 91,9 -	P
	Melting of the fusible element	No	P
	Damage to insulation on conductors	No	P
	Holes in the PE-sheet for test sequence ”O”		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	1000V	P
	- no breakdown or flashover		P
	- the leaking current for circuit-breaker suitable for isolation: (<6mA / 1,1 Ue)	<0,01mA	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:	≤170s	P
	- Operation time: (s) .....L1: .....L2: .....L3: ..... N :	20s 20s -	P

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Clause	Requirement + Test	Result - Remark	Verdict

8.3.5	**TEST SEQUENCE III (Icu)**		
	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	**HJL26015**	
	Sample no:	#15	
	Rated current: In (A)	150A	
	Rated operational voltage: Ue (V)	AC440V	
	Rated ultimate short-circuit breaking capacity: (kA)	100kA	
	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:	≤500s	P
	- Operation time: (s) ..... L1: ..... L2: ..... L3: ..... N :	4min19s 4min09s -	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

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Clause	Requirement + Test	Result - Remark	Verdict
	Test made in free air:		P
	Distances of the metallic screen's: (all sides)	Back: 0mm Front: 14,3mm Top:102mm Bottom:102mm Left: 25,4mm Right: 25,4mm	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		P
	- size of hole: <30mm^2		P
	- finish: bare or conductive plating		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)	Load-star	P
	Conductor cross-sectional area (mm²) :	50	P
	If terminals unmarked: line connected at: (underside/upside)	Underside	P
	Tightening, torques: (Nm)	6,0	P
	Test sequence of operation: O – t – CO		P
	- test voltage U/Ue = 1,05 (V) .....L1: .....L2: L3:	464 464 -	P
	- r.m.s. test current AC/DC: (A).....L1: .....L2: L3:	102 102 -	P
	power factor/time constant :	0,19	P
	- Factor "n"	2,2	P
	- peak test current (Amax) :	224	P
	Test sequence "O"		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	12,3 12,3 -	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	264 264 -	P
	Pause, t: (min)	3	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Test sequence ”CO”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	13,4 13,4 -	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	342 342 -	P
	Melting of the fusible element	No	P
	Damage to insulation on conductors	No	P
	Holes in the PE-sheet for test sequence ”O”		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	1000V	P
	- no breakdown or flashover		P
	- the leaking current for circuit-breaker suitable for isolation: (<6mA / 1,1 Ue)	<0,01mA	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:	≤500s	P
	- Operation time: (s) .....L1: .....L2: .....L3: ..... N :	2min09s 2min16s -	P

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Clause	Requirement + Test	Result - Remark	Verdict

8.3.5	**TEST SEQUENCE III (Icu)**		
	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	**HJL26015**	
	Sample no:	#16	
	Rated current: In (A)	150A	
	Rated operational voltage: Ue (V)	AC525V	
	Rated ultimate short-circuit breaking capacity: (kA)	50kA	
	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:	≤500s	P
	- Operation time: (s) ..... L1: ..... L2: ..... L3: ..... N :	3min50s 4min01s -	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

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Clause	Requirement + Test	Result - Remark	Verdict
	Test made in free air:		P
	Distances of the metallic screen's: (all sides)	Back: 0mm Front: 14,3mm Top:102mm Bottom:102mm Left: 25,4mm Right: 25,4mm	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		P
	- size of hole: <30mm^2		P
	- finish: bare or conductive plating		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)	Load-star	P
	Conductor cross-sectional area (mm²) :	50	P
	If terminals unmarked: line connected at: (underside/upside)	Underside	P
	Tightening, torques: (Nm)	6,0	P
	Test sequence of operation: O – t – CO		P
	- test voltage U/Ue = 1,05 (V) .....L1: .....L2: L3:	556 556 -	P
	- r.m.s. test current AC/DC: (A).....L1: .....L2: L3:	50,6 50,6 -	P
	power factor/time constant :	0,25	P
	- Factor "n"	2,1	P
	- peak test current (Amax) :	106	P
	Test sequence "O"		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	11,2 11,2 -	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	251 251 -	P
	Pause, t: (min)	3	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Test sequence ”CO”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	11,9 11,9 -	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	216 216 -	P
	Melting of the fusible element	No	P
	Damage to insulation on conductors	No	P
	Holes in the PE-sheet for test sequence ”O”		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	1050V	P
	- no breakdown or flashover		P
	- the leaking current for circuit-breaker suitable for isolation: (<6mA / 1,1 Ue)	<0,01mA	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:	≤500s	P
	- Operation time: (s) .....L1: .....L2: .....L3: ..... N :	1min53s 2min16s -	P
8.3.6	**TEST SEQUENCE IV**		**N/A**
	Rated short-time withstand current		N/A
8.3.7	**TEST SEQUENCE V**		**N/A**
	Performance of integrally fused circuit-breakers		N/A
8.3.8	**TEST SEQUENCE VI: Combined test sequence**		**N/A**

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Clause	Requirement + Test	Result - Remark	Verdict

Annex B	**Circuit-breakers incorporating residual current protection**	**N/A**

Annex C	**Individual pole short-circuit test sequence**	**N/A**
	Circuit-breaker for use on phase-earthed systems	N/A

Annex F	**Additional tests for circuit-breakers with electronic over-current protection**		**N/A**
F4 and F5	Verification of electromagnetic compatibility (EMC)		N/A
	See report:	-	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	**HDL36150**	
	Sample no:	#30	
	Rated current: In (A)	150A	
	Rated operational voltage: Ue (V)	AC525V	
	Rated ultimate short-circuit breaking capacity: (kA)	1,56kA	
	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.		P
	Test made in free air:		P
	Distances of the metallic screen's: (all sides)	Back: 0mm Front: 14,3mm Top:102mm Bottom:102mm Left: 25,4mm Right: 25,4mm	P

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Clause	Requirement + Test	Result - Remark	Verdict

	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		P
	- size of hole: <30mm^2		P
	- finish: bare or conductive plating		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)	Load-star	N/A
	Conductor cross-sectional area (mm²):	50	P
	If terminals unmarked: line connected at: (underside/upside)	Underside	P
	Tightening torques: (Nm)	6,0	P
	Test sequence of operation: O – t – CO		P
	Test circuit according figure: 9		P
	- test voltage U/Ue = 1,05 (V) ..... L1: ..... L2: L3:	556 556 556	P
	Short-circuit test current (I_{IT}): equal to 1,2 times the max. setting of the short-time delay release tripping current,		N/A
	or, in the absence of such a release, 1,2 time the max. setting of the tripping current of the instantaneous release,	1,56kA	P
	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)	1,56	P
	power factor/time constant:	0,90	P
	- Factor ”n”	1,42	P
	- peak test current (Amax) :	2,23	P
	Test sequence ”O” L1		
	- max. let-through current: (kApeak) L1:	1,45	P
	- Joule integral I²dt (A²s) L1:	14,1	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Pause, t: (min)	3	P
	Test sequence ”CO” L1		
	- max. let-through current: (kApeak) L1:	2,18	P
	- Joule integral I²dt (A²s) L1:	26,2	P
	Test sequence ”O” L2		
	- max. let-through current: (kApeak) L2:	2,22	P
	- Joule integral I²dt (A²s) L2:	26,4	P
	Pause, t: (min)	3	P
	Test sequence ”CO” L2		
	- max. let-through current: (kApeak) L2:	2,16	P
	- Joule integral I²dt (A²s) L2:	25,7	P
	Test sequence ”O” L3		
	- max. let-through current: (kApeak) L3:	2,21	P
	- Joule integral I²dt (A²s) L3:	26,2	P
	Pause, t: (min)	3	P
	Test sequence ”CO” L3		
	- max. let-through current: (kApeak) L3:	2,06	P
	- Joule integral I²dt (A²s) L3:	22	P
	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 I²dt (A²s) .....N:		N/A
	Pause, t: (min)		N/A
	Test sequence ”CO” N		
	- max. let-through current: (kApeak) .....N:		N/A
	- Joule integral I²dt (A²s) .....N:		N/A
	Melting of the fusible element	No	P
	Damage to insulation on conductors	No	P
	Holes in the PE-sheet for test sequence ”O”		P
	Cracks observed	No	P

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Clause	Requirement + Test	Result - Remark	Verdict

H.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V	1050V	P
	- no breakdown or flashover		P
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 :	1min59s 2min09s 2min01s	P
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

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	**HJL36150M74**	
	Sample no:	#31	
	Rated current: In (A)	150A	
	Rated operational voltage: Ue (V)	AC525V	
	Rated ultimate short-circuit breaking capacity: (kA)	2,03kA	
	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.		P
	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: 14,3mm Top:102mm Bottom:102mm Left: 25,4mm Right: 25,4mm	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		P
	- size of hole: <30mm^2		P
	- finish: bare or conductive plating		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)	Load-star	N/A
	Conductor cross-sectional area (mm²):	50	P
	If terminals unmarked: line connected at: (underside/upside)	Underside	P
	Tightening torques: (Nm)	6,0	P
	Test sequence of operation: O – t – CO		P
	Test circuit according figure: 9		P
	- test voltage U/Ue = 1,05 (V) ..... L1: ..... L2: L3:	556 556 556	P
	Short-circuit test current (I_{IT}): equal to 1,2 times the max. setting of the short-time delay release tripping current,		N/A
	or, in the absence of such a release, 1,2 time the max. setting of the tripping current of the instantaneous release,	2,03kA	P

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Clause	Requirement + Test	Result - Remark	Verdict
	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)	2,04	P
	power factor/time constant:	0,90	P
	- Factor ”n”	1,42	P
	- peak test current (Amax) :	2,90	P
	Test sequence ”O” L1		
	- max. let-through current: (kApeak) L1:	2,79	P
	- Joule integral I²dt (A²s) L1:	153	P
	Pause, t: (min)	3	P
	Test sequence ”CO” L1		
	- max. let-through current: (kApeak) L1:	2,78	P
	- Joule integral I²dt (A²s) L1:	114	P
	Test sequence ”O” L2		
	- max. let-through current: (kApeak) L2:	2,79	P
	- Joule integral I²dt (A²s) L2:	152	P
	Pause, t: (min)	3	P
	Test sequence ”CO” L2		
	- max. let-through current: (kApeak) L2:	2,76	P
	- Joule integral I²dt (A²s) L2:	117	P
	Test sequence ”O” L3		
	- max. let-through current: (kApeak) L3:	2,79	P
	- Joule integral I²dt (A²s) L3:	152	P
	Pause, t: (min)	3	P
	Test sequence ”CO” L3		
	- max. let-through current: (kApeak) L3:	2,81	P
	- Joule integral I²dt (A²s) L3:	152	P
	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 I²dt (A²s) .....N:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Pause, t: (min)		N/A
	Test sequence ”CO” N		
	- max. let-through current: (kApeak) .....N:		N/A
	- Joule integral I²dt (A²s) .....N:		N/A
	Melting of the fusible element	No	P
	Damage to insulation on conductors	No	P
	Holes in the PE-sheet for test sequence ”O”		P
	Cracks observed	No	P
H.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V	1050V	P
	- no breakdown or flashover		P
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
Annex J	**Electromagnetic compatibility (EMC) – Requirements and test methods for circuit-breakers**		**N/A**
	See report:	**-**	N/A
Annex L	**Circuit-breakers not fulfilling the requirements for overcurrent protection**		**N/A**
Annex M	**Modular residual current devices (without integral current breaking device)**		**N/A**

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Clause	Requirement + Test	Result - Remark	Verdict

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**

	TABLE: Heating Test	P

Thermocouple Locations, sample No.	max. temperature measured, (^{o}C)	max. temperature limit, (^{o}C)
#01	L1 / L2 / L3	
Line terminal	41 / 45 / 47	80
Load terminal	46 / 54 / 42	80
Non-metallic handle	6	35
Non-metallic enclosure	35	50
Non-metallic back	32	60
#02(F2)	L1 / L2 / L3	
Line terminal	59 / 63 / 60	80
Load terminal	55 / 58 / 48	80
Non-metallic handle	11	35
Non-metallic enclosure	25	50
Non-metallic back	31	60
#03(F2)	L1 / L2	
Line terminal	40 / 44	80
Load terminal	43 / 48	80
Non-metallic handle	10	35
Non-metallic enclosure	22	50
Non-metallic back	27	60
#06	L1 / L2 / L3	
Line terminal	62 / 56 / 52	80
Load terminal	53 / 57 / 55	80
Non-metallic handle	9	35
Non-metallic enclosure	27	50
Non-metallic back	32	60
#07	L1 / L2 / L3	
Line terminal	49 / 55 / 53	80
Load terminal	54 / 56 / 52	80
#08	L1 / L2 / L3	
Line terminal	45 / 51 / 49	80
Load terminal	49 / 49 / 46	80

Thermocouple Locations, sample No.	max. temperature measured, (°C)	max. temperature limit, (°C)
#09	L1 / L2 / L3	
Line terminal	37 / 39 / 37	80
Load terminal	38 / 43 / 42	80
#10	L1 / L2 / L3	
Line terminal	33 / 37 / 37	80
Load terminal	29 / 32 / 28	80
#11	L1 / L2 / L3	
Line terminal	50 / 54 / 49	80
Load terminal	51 / 52 / 46	80
#17	L1 / L2 / L3	
Line terminal	42 / 47 / 44	80
Load terminal	45 / 49 / 45	80
#18	L1 / L2 / L3	
Line terminal	41 / 44 / 42	80
Load terminal	44 / 48 / 48	80
#20	L1 / L2 / L3	
Line terminal	44 / 47 / 44	80
Load terminal	45 / 47 / 40	80
#21(F1)	L1 / L2 / L3	
Line terminal	59 / 54 / 59	80
Load terminal	52 / 53 / 56	80
#26	L1 / L2 / L3	
Line terminal	37 / 41 / 38	80
Load terminal	45 / 45 / 42	80
#28	L1 / L2 / L3	
Line terminal	37 / 44 / 42	80
Load terminal	33 / 36 / 35	80
#29	L1 / L2 / L3	
Line terminal	38 / 41 / 39	80
Load terminal	38 / 39 / 43	80

	TABLE: Glow-wire measurements					P
No.	Description	Temperature (°C)	Burning after (s)	Drops	Support burning	Verdict
1	Base (Zytel FR82G33V1)	960	4,8	No	No	P
2	Base (Ultramid A3X2G5)	960	1,5	No	No	P
3	Auxiliary Cover (Xantar G2F-23R)	650	0	No	No	P

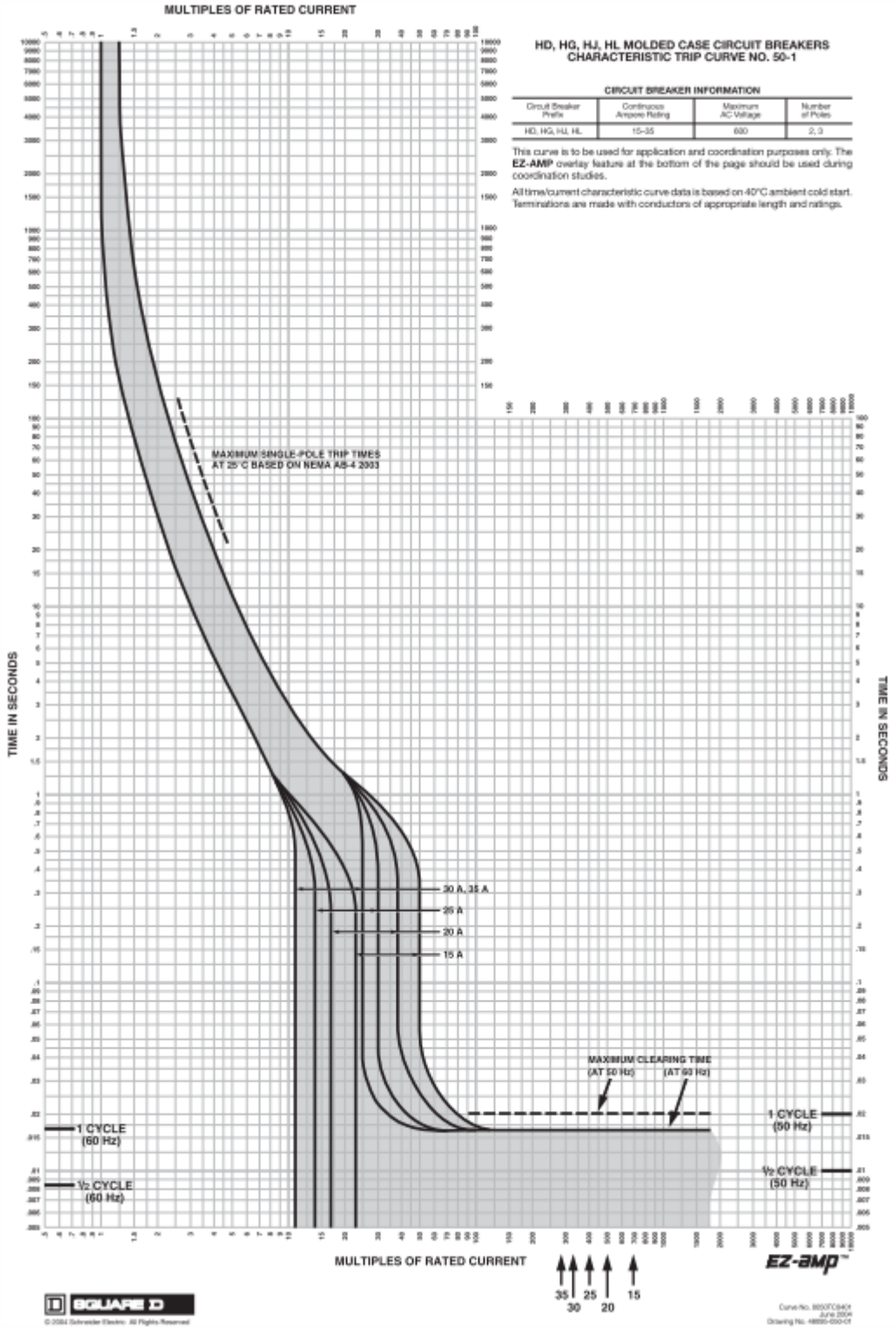
	TABLE: CTI measurements					P
No.	Description	Drops (No.)	Impress (mm)	Current (A)	Result	Verdict
1	Base (Zytel FR82G33V1)	50	4,0	1,0	CTI 425	P
2	Base (Ultramid A3X2G5)	50	4,0	1,0	CTI 550	P
3	Auxiliary Cover (Xantar G2F-23R)	50	4,0	1,0	CTI 200	P

List of test equipment used at the TMP/WMT Laboratory:

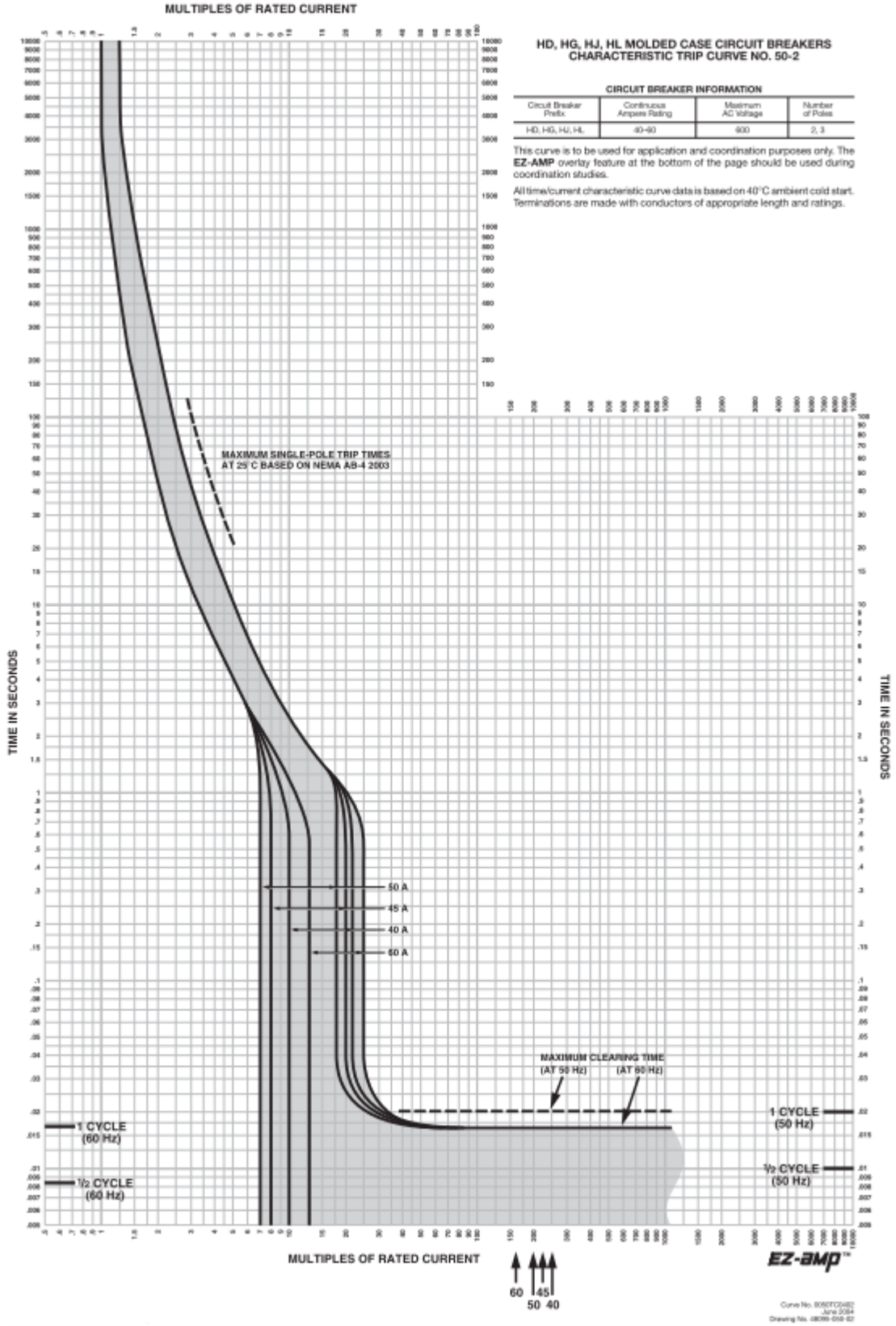
N/A

Time current characteristics

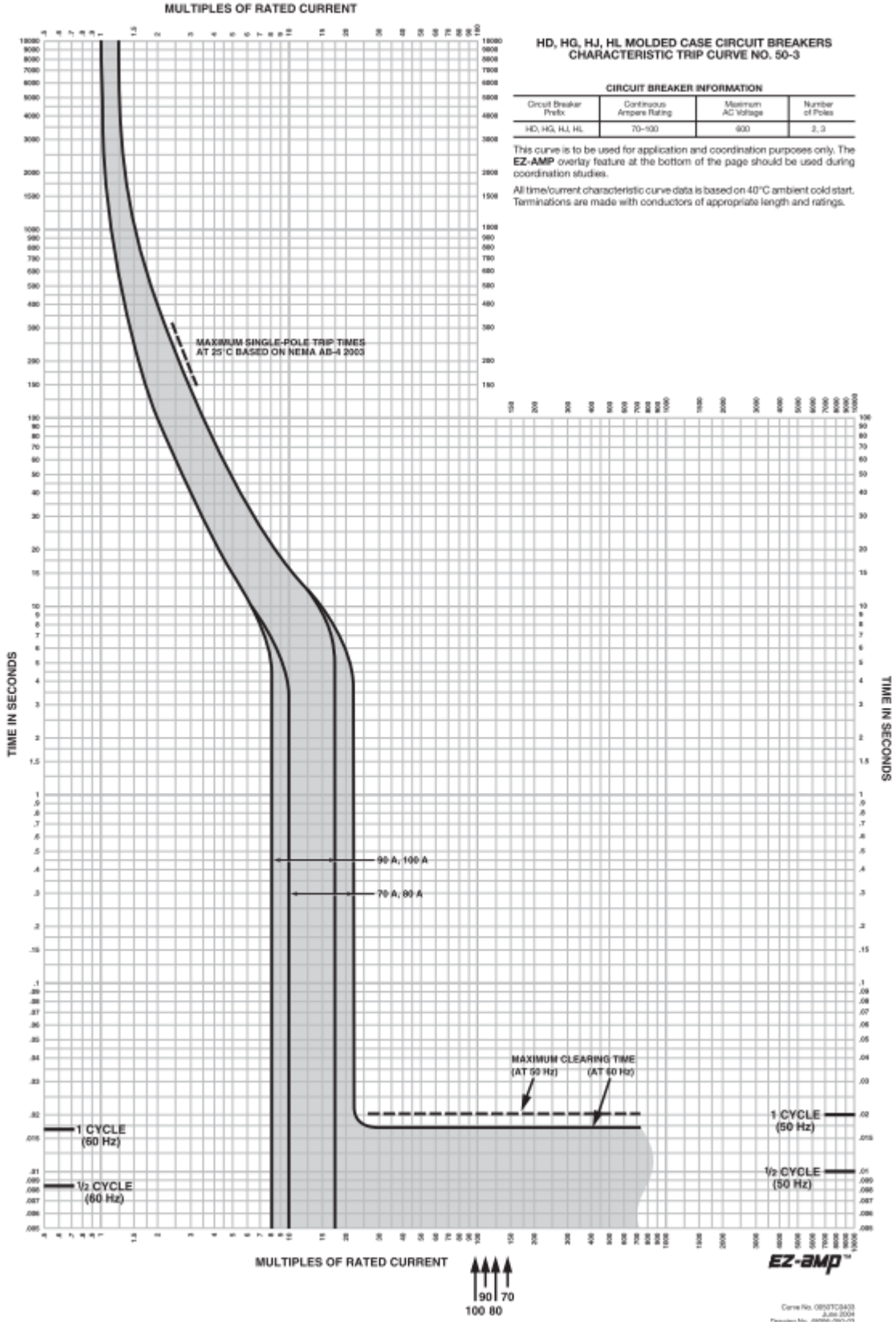
H-Frame 15–35 A (HD, HG, HJ, and HL) Thermal-Magnetic Trip



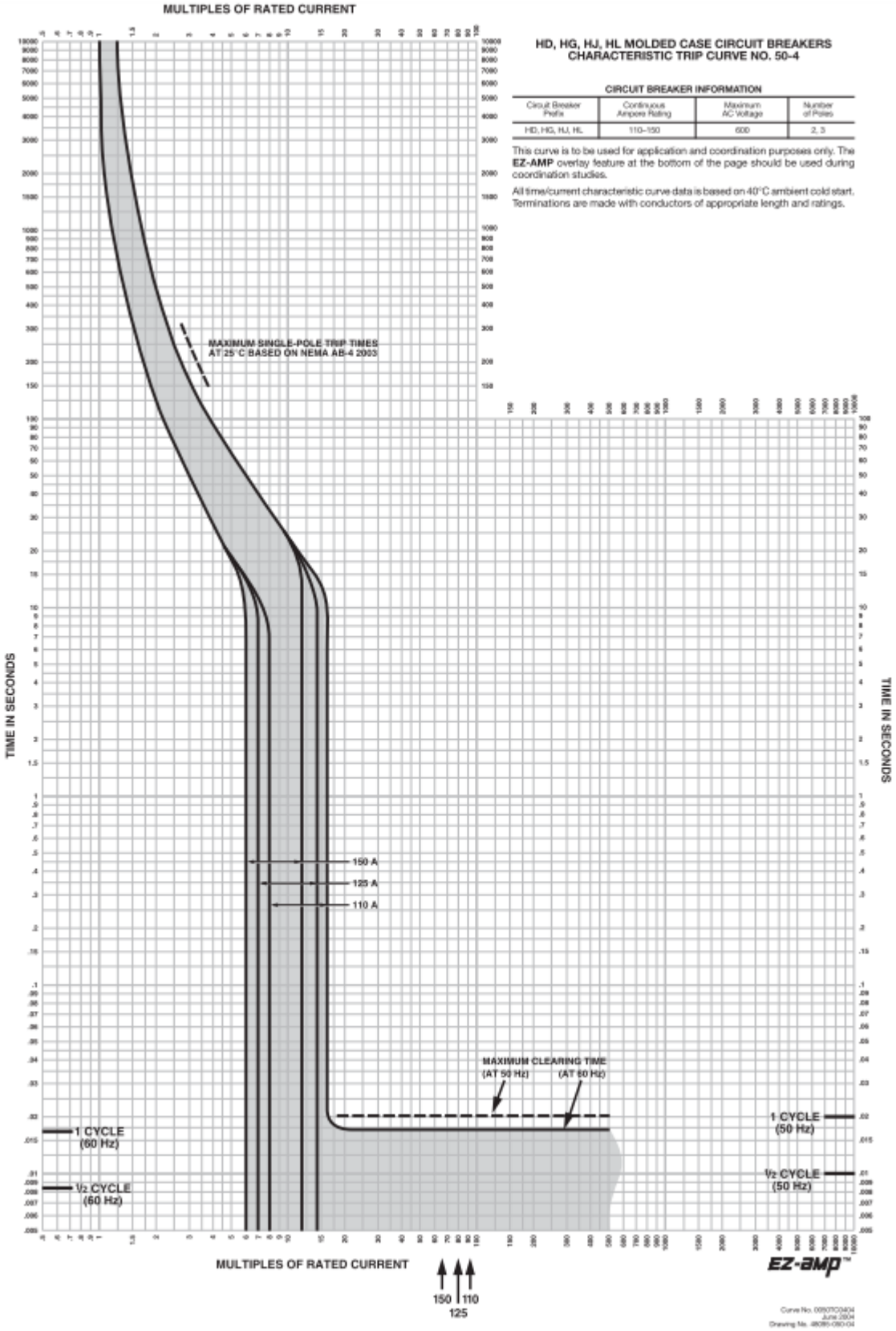
H-Frame 40–60 A (HD, HG, HJ, and HL) Thermal-Magnetic Trip



H-Frame 70–100 A (HD, HG, HJ, and HL) Thermal-Magnetic Trip



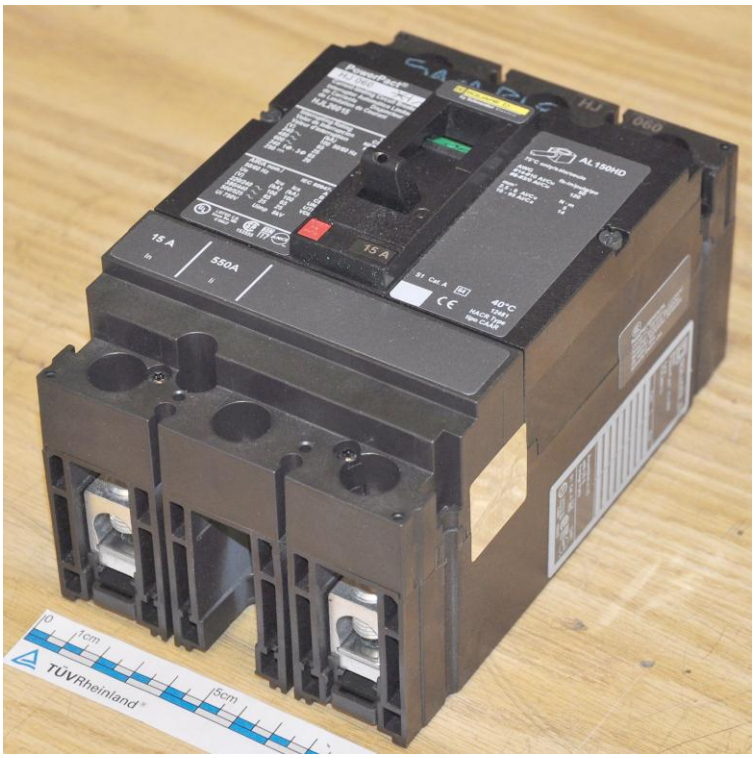
H-Frame 110–150 A (HD, HG, HJ, and HL) Thermal-Magnetic Trip



Photographs

(representative samples)

HJL26015



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END OF TEST REPORT