Test Report issued under the responsibility of:

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

Report Number. .....:	2111990014
Date of issue .....:	2021-12-28
Total number of pages.....	87 pages
Name of Testing Laboratory preparing the Report.....:	**Zhejiang Fangyuan Test Group CO., Ltd. Guangqiong Rd, Jiaxing City, Zhejiang Province. P.R. China**
Applicant's name .....:	**ZHEJIANG GEYA ELECTRICAL CO., LTD**
Address .....:	**Wenzhou Bridge Industral Zone, Beibaixiang Twon, Yueqing City, Zhejiang Province, China 325603**
Test specification:	
Standard .....:	IEC 60947-2:2016, AMD1:2019
Test procedure .....:	CB Scheme
Non-standard test method .....:	N/A
Test Report Form No. .....:	IEC60947_2J
Test Report Form(s) Originator ....:	DEKRA Certification B.V.
Master TRF.....:	Dated 2020-03-31

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Test item description ..... :	**DC Circuit Breaker**
Trade Mark(s)..... :	GEYA
Manufacturer ..... :	**ZHEJIANG GEYA ELECTRICAL CO., LTD** **Wenzhou Bridge Industral Zone, Beibaixiang Twon, Yueqing City, Zhejiang Province, China 325603**
Model/Type reference ..... :	**GYM9H-DC**
Ratings ..... :	**See pages 7 to 10**

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

☒	**CB Testing Laboratory:**	**Zhejiang Fangyuan Test Group CO., Ltd.**	
Testing location/ address.....:		**Guangqiong Rd, Jiaxing City, Zhejiang Province. P.R. China**	
Tested by (name, function, signature).....:		Zhu Minghua-Testing engineer	zhu ming hua
Approved by (name, function, signature)...:		Wang Guozhong-Technical manager	Wang Guo zhong
☐	**Testing procedure: CTF Stage 1:**		
Testing location/ address.....:			
Tested by (name, function, signature):			
Approved by (name, function, signature)...:			
☐	**Testing procedure: CTF Stage 2:**		
Testing location/ address.....:			
Tested by (name + signature) .....:			
Witnessed by (name, function, signature)..:			
Approved by (name, function, signature)...:			
☐	**Testing procedure: CTF Stage 3:**		
☐	**Testing procedure: CTF Stage 4:**		
Testing location/ address.....:			
Tested by (name, function, signature):			
Witnessed by (name, function, signature)..:			
Approved by (name, function, signature)...:			
Supervised by (name, function, signature) :			

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

Summary of testing:

-Standard used:

IEC 60947-2:2016+A1:2019 IEC 60947-1:2007 + A1:2010 + A2:2014

EN 60947-2:2017+A1:2020 EN 60947-1:2007 + A1:2011 + A2:2014

-The samples are satisfy the clauses examined

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

☐ **Programme 1 (three pole fully tested)**

☐ **Programme 2 (four pole fully tested)**

☒ **Alternative program not applicable**

Tests performed (name of test and test clause):

No. of poles	Type	Test sequence															
		I	II/III	8.3.9	III	IV	V	VI	Annex								Compliance with constructional requirements
									B	C	F	H	J	L	M	N	P	
2P	63A	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1
DC440V	6A	-	1+1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1P	63A	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1*
DC220V	6A	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

***Only clause 5.2**

Testing location:

Zhejiang Fangyuan Test Group CO., Ltd.

Guangqiong Rd, Jiaxing City, Zhejiang Province. P.R. China

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

☐ **The product fulfils the requirements of _____ (insert standard number and edition and delete the text in parenthesis, leave it blank or delete the whole sentence, if not applicable)**

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

(may be required by the product standard or client)

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

Procedure number, issue date and title:

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

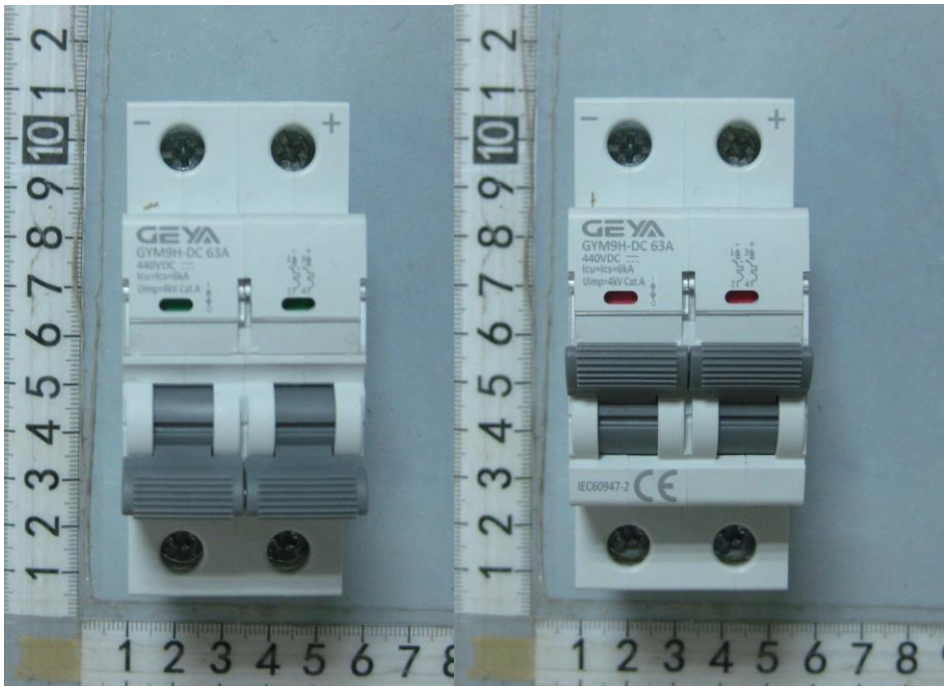
☒ **Statement not required by the standard used for type testing**

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

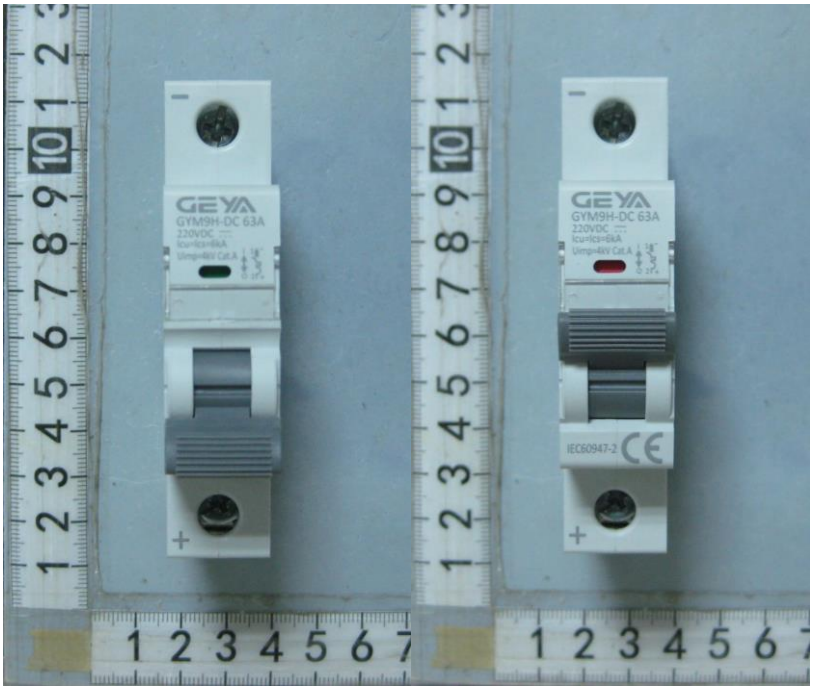
Copy of marking plate:

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.

2P 63A



1P 63A



Test item particulars: test item vs. test requirements	
3. Classification	
3.1. Selectivity 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, stored energy operation).....:	Dependent manual
3.5. Suitability for isolation: (suitable, not suitable)..... .....:	Suitable
3.6. Provision for maintenance: (maintainable, non-maintainable).....:	Non-maintainable
3.7. Method of installation: (fixed, plug-in, withdrawable.....:	Fixed
3.8. Degree of protection of enclosure: (IP code).....:	IP20 for front cover
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 .....:	N/A
Rated and limiting values, main circuit ....:	
- rated operational voltage: U_e (V).....:	DC 220V(1P); DC 440V(2P)
- rated insulation voltage: U_i (V) .....:	440V
- rated impulse withstand voltage: U_{imp} (kV) .....:	4kV
- rated current: I_n (A) .....:	6A; 10A; 16A; 20A; 25A; 32A; 40A; 50A; 63A
- kind of current .....:	DC
- conventional free air thermal current: I_{th} (A).....:	63A
- conventional enclosed thermal current: I_{the} (A).....:	N/A
- current rating for four-pole circuit-breakers: (A).....:	N/A
- number of poles.....:	1P;2P
- rated frequency: (Hz).....:	N/A
- integral fuses (rated values).....:	N/A
Rated duty :	
- eight-hour duty.....:	N/A
- uninterrupted duty: I_u (A).....:	Same as In

Short-circuit characteristic :	
rated short-time making capacity: I_{cm} (kA) .....:	N/A
rated ultimate short-circuit breaking capacity: I_{cu} (kA) .. ..:	Icu=6kA
rated service short-circuit breaking capacity: I_{cs} (kA).....:	Ics=6kA
rated short-time withstand current: I_{cw} (kA/s) .....:	N/A
Control circuits :	
Electrical control circuits :	
- kind of current: (AC, DC) .....:	N/A
- rated frequency: (Hz) .....:	N/A
- rated control circuit voltage: U_c (nature, frequency, V) ....:	N/A
- rated control supply voltage: U_s (nature, frequency V) ....:	N/A
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 .....:	N/A
- rated operational voltage U_e (V) .....:	N/A
- rated insulation voltage: U_i (V) .....:	N/A
- rated operational current: I_e (A) .....:	N/A
- kind of current .....:	N/A
- rated frequency: (Hz) .....:	N/A
- number of circuits .....:	N/A
- number and kind of contact elements .....:	N/A
- rated uninterrupted current: I_u (A).....:	N/A
- utilization category: (AC, DC, current and voltage) .....:	N/A
Short-circuit characteristic :	
- Rated conditional short-circuit current (kA).....:	N/A
- kind of protective device .....:	N/A

Releases :	
1) shunt release ..... :	N/A
2) Over-current release..... :	Yes
a) instantaneous..... :	Yes
b) definite time delay..... :	N/A
c) inverse time delay..... :	Yes
- independent of previous load ..... :	N/A
- dependent on previous load; (for example thermal type release)..... :	Yes
3) Undervoltage release (for opening) ..... :	N/A
4) Closing releases ..... :	N/A
5) Other releases ..... :	N/A
Characteristics :	
1) Shunt release and undervoltage release (for opening), and closing release ..... : ..... :	N/A
- rated control circuit voltage: U_c (nature, frequency, V) .... :	N/A
- kind of current ..... :	N/A
- rated frequency: (if AC) ..... :	N/A
2) Over-current release..... :	Yes
- rated current..... :	6A; 10A; 16A; 20A; 25A; 32A; 40A; 50A; 63A
- kind of current ..... :	DC
- rated frequency: (if AC) ..... :	N/A
- current setting (or range of settings) ..... :	Inverse time delay(Ir): Fixed Instantaneous tripping(Ii):8In
- time settings (or range of settings)..... :	Inverse time delay:Fixed Instantaneous triping:Fixed

Test item particulars..... :	DC Circuit Breaker
Classification of installation and use..... :	On rail
Supply Connection..... :	Pillar terminals for copper conductors
..... :	
Possible test case verdicts:	
- test case does not apply to the test object..... :	N/A
- test object does meet the requirement..... :	P (Pass)
- test object does not meet the requirement..... :	F (Fail)
Testing..... :	
Date of receipt of test item ..... :	2021-07-01
Date (s) of performance of tests ..... :	2021-07-01 to 2021-12-24

General remarks:

"(See Enclosure #)" refers to additional information appended to the report.
"(See appended table)" refers to a table appended to the report.

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

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

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

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

Name and address of factory (ies) ..... :	ZHEJIANG GEYA ELECTRICAL CO., LTD Wenzhou Bridge Industral Zone, Beibaixiang Twon, Yueqing City, Zhejiang Province, China 325603

General product information and other remarks:

Ue: DC220V(1P);DC440V(2P)
Utilization category: A
Ie:6A; 10A; 16A; 20A; 25A; 32A; 40A; 50A; 63A
Ics=Icu=6kA
Ui= 440V
Uimp=4kV
IP20 for front cover
Pollution degree: 2
Reference temperature: 30°C
Distance for metal screen:
Back:0mm Front:0mm; Top:50mm Botton:50mm; Left:0mm Right:0mm(values declared by client)

Product references list

	1P	2P
63A	GYM9H-DC 1P 63A	GYM9H-DC 2P 63A
50A	GYM9H-DC 1P 50A	GYM9H-DC 2P 50A
40A	GYM9H-DC 1P 40A	GYM9H-DC 2P 40A
32A	GYM9H-DC 1P 32A	GYM9H-DC 2P 32A
25A	GYM9H-DC 1P 25A	GYM9H-DC 2P 25A
20A	GYM9H-DC 1P 20A	GYM9H-DC 2P 20A
16A	GYM9H-DC 1P 16A	GYM9H-DC 2P 16A
10A	GYM9H-DC 1P 10A	GYM9H-DC 2P 10A
6A	GYM9H-DC 1P 06A	GYM9H-DC 2P 06A

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

5.2	**MARKING** **2P 63A**		
	Visible from the front when the circuit-breaker is installed as in service and actuator is accessible:		
1.1	- rated current (I_n):	63A	P
1.2	- suitability for isolation, if applicable, with the symbol 		P
1.3	- indication of the open and closed position: with ○ and I respectively, if symbols are used	I O	P
	Marked on the circuit-breaker:		
2.1	- manufacturer's name or trade mark	GEYA	P
2.2	- type designation or catalogue reference	GYM9H-DC	P
2.3	- IEC 60947-2, if the manufacturer claims compliance with this standard.	IEC 60947-2	P
2.4	- selectivity category A or B	Cat. A	P
2.5	- rated operational voltage(s) U_e	440V DC ⎓	P
2.6	- unsuitability for IT systems, if applicable, with the symbol 		N/A
2.7	-rated impulse withstand voltage (U_{imp});	Uimp=4kV	P
2.8	- value (or range) of the rated frequency and/or the indication “d.c” (or the symbol ⎓)	DC ⎓	P
2.9	- rated service short-circuit breaking capacity (I_{cs}) at the corresponding rated voltage (Ue)	Icu=Ics=6kA	P
2.10	- rated ultimate short-circuit breaking capacity (I_{cu}) at the corresponding rate voltage (Ue)	Icu=Ics=6kA	P
2.11	- rated short-time withstand current (Icw) and associated short-time delay, for selectivity category B		N/A
2.12	- range of the current setting (I_r) of the adjustable overload release (may be displayed)	Fixed	N/A
2.13	- range of the rated instantaneous short-circuit current setting (I_i), for adjustable overload releases (may be displayed)	Fixed	N/A
2.14	- ref. temperature for non-compensated thermal releases, if different from 30 °C		N/A

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
2.15	- terminals identification, according to 7.1.8.4 of IEC 60947-1:2007:		P
	- terminal of coils (A/B)		N/A
	- terminal of shunt release (C)		N/A
	- terminals of under-voltage release (D)		N/A
	- terminals of interlocking electromagnets (E)		N/A
	- terminals of indicated light devices (X)		N/A
	- terminals of contact elements for switching devices (no.)		N/A
2.16	- line and load terminals, if applicable		N/A
2.17	- neutral pole terminals, if applicable, by the letter N		N/A
2.18	- protective earth terminal, where applicable, by the symbol ⏚ (see 7.1.10.3 of part 1)		N/A
	Provided in the manufacture's literature:		
3.1	- rated short-circuit making capacity (I_{cm}), if higher than that specified in 4.3.6.1		N/A
3.2	- rated insulation voltage. (U_i), if higher than the maximum rated operational voltage	440V	P
3.3	- pollution degree if other than 3	2	P
3.4	- conventional enclosed thermal current (I_{the}) if different from the rated current:		N/A
3.5	- IP Code, where applicable:	IP20 for front cover	P
3.6	- minimum enclosure size and ventilation data (if any) to which marked ratings apply:		N/A
3.7	- details of minimum distance between circuit-breaker and earthed metal parts for circuit-breaker intended for use without enclosure:	Up / Down: 50mm/50mm Left / Right: 0mm/0mm Front / Back: 0mm/0mm	P
3.8	- suitability for environment A or B per annex J, as applicable		N/A
3.9	- RMS sensing, if applicable, accordance with F.4.1.1		N/A
3.10	- 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 I_{cu}	Same as Table 9 of IEC 60947-1	N/A
3.11	- values of tightening torque for the circuit-breaker terminals.	2,0Nm	P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
3.12	- current derating for terminals and connections, if applicable		N/A
	Marked on the auxiliaries or on the circuit-breaker, if marking space is sufficient; additionally, data shall be made available in the manufacturer's literature:		
4.1	- for closing releases (see 2.23) and/or motor-operators, rated control circuit voltage, kind of current and rated frequency for a.c		N/A
4.2	- rated control circuit voltage of the shunt release and/or of the under-voltage release (or of the no-voltage release), kind of current and rated frequency for a.c:		N/A
4.3	- rated current of indirect over-current releases:		N/A
4.4	- number and type of auxiliary contacts, rated operational currents at the rated operational voltages, and rated frequency for a.c.		N/A

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

5.2	**MARKING** **1P 63A**		
	Visible from the front when the circuit-breaker is installed as in service and actuator is accessible:		
1.1	- rated current (I_n):	63A	P
1.2	- suitability for isolation, if applicable, with the symbol 		P
1.3	- indication of the open and closed position: with ○ and I respectively, if symbols are used	I O	P
	Marked on the circuit-breaker:		
2.1	- manufacturer's name or trade mark	GEYA	P
2.2	- type designation or catalogue reference	GYM9H-DC	P
2.3	- IEC 60947-2, if the manufacturer claims compliance with this standard.	IEC 60947-2	P
2.4	- selectivity category A or B	Cat. A	P
2.5	- rated operational voltage(s) U_e	220V DC ⎓	P
2.6	- unsuitability for IT systems, if applicable, with the symbol 		N/A
2.7	-rated impulse withstand voltage (U_{imp});	Uimp=4kV	P
2.8	- value (or range) of the rated frequency and/or the indication “d.c” (or the symbol ⎓)	DC ⎓	P
2.9	- rated service short-circuit breaking capacity (I_{cs}) at the corresponding rated voltage (Ue)	Icu=Ics=6kA	P
2.10	- rated ultimate short-circuit breaking capacity (I_{cu}) at the corresponding rate voltage (Ue)	Icu=Ics=6kA	P
2.11	- rated short-time withstand current (Icw) and associated short-time delay, for selectivity category B		N/A
2.12	- range of the current setting (I_r) of the adjustable overload release (may be displayed)	Fixed	N/A
2.13	- range of the rated instantaneous short-circuit current setting (I_i), for adjustable overload releases (may be displayed)	Fixed	N/A
2.14	- ref. temperature for non-compensated thermal releases, if different from 30 °C		N/A

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
2.15	- terminals identification, according to 7.1.8.4 of IEC 60947-1:2007:		P
	- terminal of coils (A/B)		N/A
	- terminal of shunt release (C)		N/A
	- terminals of under-voltage release (D)		N/A
	- terminals of interlocking electromagnets (E)		N/A
	- terminals of indicated light devices (X)		N/A
	- terminals of contact elements for switching devices (no.)		N/A
2.16	- line and load terminals, if applicable		N/A
2.17	- neutral pole terminals, if applicable, by the letter N		N/A
2.18	- protective earth terminal, where applicable, by the symbol ⏚ (see 7.1.10.3 of part 1)		N/A
	Provided in the manufacture's literature:		
3.1	- rated short-circuit making capacity (I_{cm}), if higher than that specified in 4.3.6.1		N/A
3.2	- rated insulation voltage. (U_i), if higher than the maximum rated operational voltage	440V	P
3.3	- pollution degree if other than 3	2	P
3.4	- conventional enclosed thermal current (I_{the}) if different from the rated current:		N/A
3.5	- IP Code, where applicable:	IP20 for front cover	P
3.6	- minimum enclosure size and ventilation data (if any) to which marked ratings apply:		N/A
3.7	- details of minimum distance between circuit-breaker and earthed metal parts for circuit-breaker intended for use without enclosure:	Up / Down: 50mm/50mm Left / Right: 0mm/0mm Front / Back: 0mm/0mm	P
3.8	- suitability for environment A or B per annex J, as applicable		N/A
3.9	- RMS sensing, if applicable, accordance with F.4.1.1		N/A
3.10	- 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 I_{cu}	Same as Table 9 of IEC 60947-1	N/A
3.11	- values of tightening torque for the circuit-breaker terminals.	2,0Nm	P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
3.12	- current derating for terminals and connections, if applicable		N/A
	Marked on the auxiliaries or on the circuit-breaker, if marking space is sufficient; additionally, data shall be made available in the manufacturer's literature:		
4.1	- for closing releases (see 2.23) and/or motor-operators, rated control circuit voltage, kind of current and rated frequency for a.c		N/A
4.2	- rated control circuit voltage of the shunt release and/or of the under-voltage release (or of the no-voltage release), kind of current and rated frequency for a.c:		N/A
4.3	- rated current of indirect over-current releases:		N/A
4.4	- number and type of auxiliary contacts, rated operational currents at the rated operational voltages, and rated frequency for a.c.		N/A

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

7.1	**CONSTRUCTION** **2P 63A**		
7.1.2 part 1	Materials		
7.1.2.2	Glow wire testing		
	The requirements of 7.1.2 of IEC 60947:2007/AMD1:2010/AMD2:2014 do not apply to parts with a mass lower than 2 g (insignificant mass, in accordance with 3.14 of IEC 60695-2-11:2014). For products containing a plurality of small parts, the total mass of non-tested parts located in close proximity to each other shall not exceed 10 g. Proximity shall be based on engineering judgment that takes into consideration the risk of propagation of fire.		P
	The suitability of materials used is verified by making tests on ..... : or	~~- the equipment~~ - sections taken from the equipment ~~- samples of identical material having representative thickness~~	P
	- providing data from the insulating material supplier fulfilling the requirements according to IEC 60695-2-12		N/A
	Glow-wire test according to IEC 60695-2-10 and IEC 60695-2-11		
	Parts made of insulating material necessary to retain current-carrying parts in position: test temperature 960 °C for main circuit		P
	No visible flame and no sustained glowing		P
	Flames and glowing extinguish within 30 s		P
	No ignition of the tissue paper		P
	Parts made of insulating material necessary to retain current-carrying parts in position: test temperature 850 °C for other circuits		N/A
	No visible flame and no sustained glowing		N/A
	Flames and glowing extinguish within 30 s		N/A
	No ignition of the tissue paper		N/A
	Parts of insulating material not necessary to retain current-carrying parts in position, even though in contact with them: test temperature 650 °C		P
	No visible flame and no sustained glowing		P
	Flames and glowing extinguish within 30 s		P
	No ignition of the tissue paper		P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
7.1.2.3	Test based on flammability category		
	For parts of insulating materials, hot wire ignition and, where applicable, arc ignition tests as specified in 8.2.1.1.2, shall be made based on flammability category		N/A
	Tests on materials are made in accordance with Annex M		N/A
	The hot wire ignition (HWI) and arc ignition (AI) test value requirements related to the material flammability category shall conform to Table M.1 or M.2		N/A
	Alternatively, the manufacturer may provide data from the insulating material supplier fulfilling the requirements given in Annex M		N/A
7.1.3 part 1	Current-carrying parts and their connections		
	Current-carrying parts have the necessary mechanical strength and current-carrying capacity for their intended use		P
	For electrical connections, no contact pressure is transmitted through insulating material other than ceramic or other material with characteristics not less suitable, unless there is sufficient resiliency in the metallic parts to compensate for any possible shrinkage or yielding of the insulation material		P
7.1.5 part 1	Actuator		
7.1.5.1	Insulation		
	The actuator of the equipment shall be insulated from the live parts for the rated insulation voltage and, if applicable, the rated impulse withstand voltage		P
	If it is made of metal, it shall be capable of being satisfactorily connected to a protective conductor unless it is provided with additional reliable insulation		N/A
	If it is made of or covered by insulating material, any internal metal part, which might become accessible in the event of insulation failure, shall also be insulated from live parts for the rated insulation voltage		N/A
7.1.5.2	Direction of movement		
	The direction of operation for actuators of devices shall normally conform to IEC 60447.		P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	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	Indicating means		
	When an equipment is provided with means for indicating the closed and open positions, these positions shall be unambiguous and clearly indicated		P
	This is done by means of a position indicating device (see 2.3.18)		P
	If symbols are used, they shall indicate the closed and open position respectively, in accordance with IEC 60417-2:		
	- 60417-2-IEC-5007 **I** On (power)		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
	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	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
7.1.8 part 1	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

IEC 60947-2			
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 :	Rigid and flexible	P
	minimum cross-sectional area of conductor (mm^2) :	1mm^2	P
	maximum cross-sectional area of conductor (mm^2) :	16mm^2	P
	number of conductors simultaneously connectable to the terminal :	1 for 16mm^2 1 for 1mm^2	P
7.1.8.3	Connection		
	terminals for connection to external conductors shall be readily accessible during installation		P
	clamping screws and nuts shall not serve to fix any other component		P
7.1.8.4	Terminal identification and marking		
	terminal intended exclusively for the neutral conductor		N/A
	protective earth terminal		N/A
	other terminals		P
7.1.10 part 1	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
	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

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	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	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
7.1.11 part 1	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		P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	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 part 1	Degree of protection of enclosed equipment		
	Degree of protection.	IP20 for front cover	
	Test for first characteristic.	IP2X	
	Test for first numeral (1, 2, 3, 4, 5, 6).....:	This clause is for enclosed equipment and is not applicable to this product. However, the test was conducted on the front cover of the product with positive result	P
	Test for second characteristic	IPX0	
	Test for second numeral (1, 2, 3, 4, 5, 6, 7, 8).....:		N/A

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
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
7.1.2	Withdrawable circuit-breaker		N/A
	In the disconnected position (main- and auxiliary circuits)		
	Isolating distances for circuit-breaker suitable for isolating comply with the requirements specified for the isolating function		N/A
	Mechanism fitted with a reliable indicating device with indicates the position of the isolating contacts.		N/A
	Mechanism fitted with interlocks which only permit the isolating contacts to be separate or re-closed when main contacts are open		N/A
	Mechanism fitted with interlock, which only permit the main contacts to be closed when the isolating contacts are fully closed.		N/A
	Mechanism fitted with interlock, which only permit the main contacts to be closed when in disconnected position.		N/A
	In disconnected position, the isolating distances between the isolating contacts cannot be inadvertently reduced.		N/A
7.1.3	Additional requirements for circuit-breakers suitable for isolation		P
7.1.7 part 1	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		N/A
	- a separate mechanical indicator		P
	- visibility of the moving contacts		N/A
	When means are provided or to lock the equipment in the open position, locking only be possible when contacts are in the open position		N/A

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Actuator front-plate fitted to the equipment in a manner which ensures correct contact position indication and locking		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) :	3	
	- measured clearances (mm) :	4,93	P
	- test Uimp across gap (kV) :	6,2	P
7.1.7.2	Supplementary requirements for equipment with provision for electrical interlocking with contactors or circuit-breakers:		
	auxiliary switch shall be rated according to IEC 60 947-5-1		N/A
	If equipment suitable for isolation is provided with an auxiliary switch for the purpose of electrical interlocking with contactor (s) or circuit-breaker(s) and intended to be used in motor circuits, the following requirements shall apply unless the equipment is rated for AC-23 utilization category		N/A
	The time interval between the opening of the contacts of the auxiliary switch and the contacts of the main poles shall be sufficient to ensure that the associated contactor or circuit-breaker interrupts the current before the main poles of the equipment open		N/A
	Unless otherwise stated in the manufacturer's technical literature, the time interval shall be not less than 20 ms when the equipment is operated according to the manufacturer instructions		N/A
	Compliance shall be verified by measuring the time interval between the instant of opening of the auxiliary switch and the instant of opening of the main poles under no-load conditions when the equipment is operated according to the manufacturer's instructions		N/A
	During the closing operation the contacts of the auxiliary switch shall close after or simultaneously with the contacts of the main poles		N/A
	A suitable opening time interval may also be provided by an intermediate position (between the ON and OFF position) at which the interlocking contact(s) is (are) open and the main poles remain closed		N/A

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
7.1.7.3	Supplementary requirements for equipment provided with means for padlocking the open position:		
	the locking means shall be designed in such a way that it cannot be removed with the appropriate padlock(s) installed		N/A
	Alternatively, the design may provide padlockable means to prevent access to the actuator		N/A
	test force F applied to the actuator in an attempt to operate to the closed position (N) :		N/A
	rated impulse withstand voltage (kV) :		N/A
	test Uimp on open main contacts at the test force		N/A
	If the tripped position is not the indicated open position, it should be clearly identified.		
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:	4kV	
	- max. value of rated operational voltage to earth	300V	
	- nominal voltage of supply system:	440~220V	
	- overvoltage category:	III	
	- pollution degree:	2	
	- field-in or homogeneous:	Inhomogeneous	
	- minimum clearances (mm):	3mm	
	- measured clearances (mm):	See TABLE : Clearance And Creepage Distance Measurements	P
	Creepage distances:		
	- rated insulation voltage Ui (V)	440V	
	- pollution degree	2	
	- comparative tracking index (V)	175V	
	- material group	IIIa	
	- minimum creepage distances (mm)	4mm	
	- measured creepage distances (mm)	See TABLE : Clearance And Creepage Distance Measurements	P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
7.1.5	Requirements for the safety of the operator		
	There shall be no path or opening which allows incandescent particles to be discharged from the area of the manual operating means:		P
7.1.7	Additional requirements for equipment provided with a neutral pole		
7.1.9 part 1	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, may operate substantially together.		N/A
7.1.8	Digital inputs and outputs for use with programmable logic controllers (PLCs)		
	Compliant with Annex S of IEC 60947-1:2007		N/A
	Annex S does not apply to digital inputs and outputs dedicated to devices other than PLCs		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
7.2.1.1.2	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		P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	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		P
7.2.1.1.3	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		N/A
7.2.1.1.4	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
7.2.1.1.5	Independent power closing		
	A circuit-breaker having an independent power closing operation can be assigned a rated short-circuit making capacity irrespective of the conditions of power closing		N/A
	Means for charging the operating mechanism, as well as the closing control components, shall be capable of operating in accordance with the manufacturer’s specification		N/A
7.2.1.1.6	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

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	- means for charging the operating mechanism and closing control components operates when auxiliary supply voltage is between 85% and 110% of the rated control supply voltage.		N/A
	- not possible for the moving contacts to move from the open position, unless the charge is sufficient for satisfactory completion of the closing operation.		N/A
	- by manually operated circuit-breaker is the direction of operation indicated. (not for circuit-breaker with an independent manual closing operation.)		N/A
	- For trip free circuit-breaker it shall not be possible to maintain the contacts in the touching or closed position when the release is in the position to trip the circuit-breaker.		N/A
7.2.1.2	Opening		
7.2.1.2.1	Circuit-breakers which open automatically shall be trip-free and, unless otherwise agreed between manufacturer and user, shall have their energy for the tripping operation stored prior to the completion of the closing operation		
7.2.1.2.2	Opening by undervoltage releases		
7.2.1.3. part 1	Limits of operation of under-voltage relays and releases		
7.2.1.3. a	Operating voltage		
	An under-voltage relay or release, when associated with a switching device, shall operate to open the equipment even on a slowly falling voltage within the range between 70% and 35% of its rated voltage		N/A
	An under-voltage relay or release shall prevent the closing of the equipment when the supply voltage is below 35% of the rated voltage of the relay or release; it shall permit closing of the equipment at supply voltages equal to or above 85% of its rated value		N/A
	Unless otherwise stated in the relevant product standard, the upper limit of the supply voltage shall be 110% of its rated value		N/A
7.2.1.3. b	Operating time		
	For a time-delay under-voltage relay or release, the time-lag shall be measured from the instant when the voltage reaches the operating value until the instant when the relay or release actuates the tripping device of the equipment		N/A
7.2.1.2.3	Opening by shunt releases		N/A

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
7.2.1.4 part 1	Limits of operation of shunt releases		
	A shunt release for opening shall cause tripping under all operating conditions of an equipment when the supply voltage of the shunt release measured during the tripping operation remains between 70% and 110% of the rated control supply voltage and, if a.c., at the rated frequency		N/A
7.2.1.2.4	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 $\pm$ 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

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	If a release is declared by the manufacturer as substantially independent of ambient temperature, the current values of table 6 shall apply within the temperature band declared by the manufacturer, within a tolerance of 0,3%/K		N/A
	The width of the temperature band shall be at least 10 K on either side of the reference temperature		N/A
7.2.4.2	Operational performance capability		
7.2.4.2 part 1	The operational performance off-load for which the tests are made with the control circuits energized and the main circuit not energized, in order to demonstrate that the equipment meets the operating conditions specified at the upper and lower limits of supply voltage and/or pressure specified for the control circuit during closing and opening operations		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

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

8	**TESTS** **2P 63A**		
8.2.1 part 1	Materials		
8.2.1.1	Test of resistance to abnormal heat and fire		
8.2.1.1.1	Glow wire test (on equipment)		
	The glow-wire test according to IEC 60695-2-10 and IEC 60695-2-11 are performed on		
	the equipment; or		N/A
	sections taken from the equipment; or		P
	any parts of identical material having representative thickness		N/A
8.2.1.1.2	Flammability, hot wire ignition and arc ignition tests (on materials)		
	flammability test, in accordance with IEC 60695-11-10;		N/A
	hot wire ignition (HWI) test, as described in Annex M;		N/A
	arc ignition (AI) test, as described in Annex M.		N/A
8.2.4 part 1	Mechanical properties of terminals		
	Mechanical strength of terminals		
	maximum cross-sectional area of conductor (mm^2) :	16mm^2	
	diameter of thread (mm) :	M5	
	torque (Nm) :	2,2Nm	
	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 (mm^2) :	1mm^2	
	number of conductors of the smallest cross section :	1	
	diameter of bushing hole (mm) :	6,5mm	
	height between the equipment and the platen :	260mm	
	mass at the conductor(s) (kg) :	0,4kg	
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit	No slip out and break	P
	Pull-out test		
	force (N) :	35N	

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		P
	conductor of the largest cross-sectional area (mm²) :	16mm²	
	number of conductors of the largest cross section :	1	
	diameter of bushing hole (mm) :	13mm	
	height between the equipment and the platen :	300mm	
	mass at the conductor(s) (kg) :	2,9kg	
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit	No slip out and break	P
	Pull-out test		
	force (N) :	100N	
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		P
	conductor of the largest and smallest cross-sectional area (mm²) :	16mm²/1mm²	
	number of conductors of the smallest cross section, number of conductors of the largest cross section :	1 1	
	diameter of bushing hole (mm) :	13mm/6,5mm	
	height between the equipment and the platen :	300mm/260mm	
	mass at the conductor(s) (kg) :	2,9kg/0,4kg	
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit	No slip out and break	P
	Pull-out test		
	force (N) :	100N/30N	
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		P

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

8.3.3	**TEST SEQUENCE I: GENERAL PERFORMANCE CHARACTERISTICS** **#14 2P 63A** **#11 1P 63A**			
8.3.3.2	Test of tripping limits and characteristic			
8.3.3.2.2	Short circuit releases			
	Sample no:	#14	#11	
	Rated operational voltage: Ue (V)	DC 440V	DC 220V	
	Rated current: In (A)	63A		
	Ambient temperature 10-40 °C :	30°C		P
	Value of the tripping current declared by the manufacturer for a single pole, at which value they shall operate.	8In		P
	Range of adjustable setting current. (A)			N/A
	Time delay stated by the manufacturer, in the case of definite time delay releases.			N/A
	Electromagnetic over current releases			
	Test current: 80% of the rated, or **minimum** adjustable setting current: (A)	404A	404A	P
	Operating time: >0,2s in case of instantaneous releases: L1-L2: L1-L3: L1-L4: L2-L3: L2-L4: L3-L4: L1:	0,2s - - - - - -	- - - - - - 0,2s	P
		non -tripping		
	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)	605A	605A	P

IEC 60947-2				
Clause	Requirement + Test	Result - Remark		Verdict
	Operating time: <0,2s in case of instantaneous releases: L1-L2: L1-L3: L1-L4: L2-L3: L2-L4: L3-L4: L1:	 15ms - - - - - -	 - - - - - - 14ms	P
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3: N-Lx:			N/A
	Test current: 80% of the **maximum** adjustable setting current: (A)			N/A
	Operating time: >0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3: N-Lx:			N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3: N-Lx:			N/A
	Test current: 120% of the **maximum** adjustable setting current: (A)			N/A
	Operating time: <0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3: N-Lx:			N/A
	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)	605A	-	P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Operating time: < 0,2 s in case of instantaneous release: L1: L2: L3: N:	 16ms 15ms - -	 - - - -	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

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Operating time: >0,2s in case of instantaneous releases: L1: L2: L3: N:		N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases: L1: L2: L3: N:		N/A
	Test current: 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
8.3.3.2.3	Overload releases		
a)	Instantaneous or definite time-delay releases		
	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

IEC 60947-2				
Clause	Requirement + Test	Result - Remark		Verdict
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases.			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			
	Sample no:	#14	#11	
	Rated operational voltage: Ue (V)	DC440V	DC220V	
	Rated current: In (A)	63A		
	For releases dependent of ambient air temperature: Reference temperature	30°C		P
	Test ambient temperature (°C)	30°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

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	For thermal-magnetic releases independent of ambient temperature: Tests shall be made at 30°C and 20°C or 40°C, the release being energized on all phase poles		N/A
	For electronic releases, the operating characteristic shall be verified at the ambient temperature of the test room (see 6.1.1 of IEC 60947-1), the release being energised on all phase poles.		N/A
	Test ambient air temperature:	30°C	P
	Range of adjustable setting current: (A)		N/A
	Releases, dependent of ambient air temperature: Reference temperature (°C)	30°C	P
	Thermal Magnetic releases, independent of ambient air temperature: at 30°C		N/A
	Test current: 105% of the rated, or **minimum** adjustable setting current: (A)	66,2A / 66,2A	P
	Conventional non-tripping time: 1h when In < 63A, 2h when In > 63 A	1h / 1h non-tripping	P
	Test current: 130% of the rated, or **minimum** adjustable setting current: (A)	81,9A / 82,0A	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	192s / - / 98s	P
	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

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

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	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
8.3.3.2.4	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)L L2: L3:		N/A

IEC 60947-2			
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)L 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

IEC 60947-2			
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
	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

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
8.3.3.3	Test of dielectric properties, impulse withstand voltage:		
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) :	4kV	P
	- sea level of the laboratory:	Sea level	P
	- test Uimp main circuits (kV) :	4,8kV	P
	- test Uimp auxiliary circuits (kV) :		N/A
	- test Uimp control circuits (kV) :		N/A
	- test Uimp on open main contacts (equipment suitable for isolating) (kV) :	6,2kV	P
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.	This item is not suitable for #11	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, power frequency withstand voltage:		
	- rated insulation voltage (V) :	440V	P
	- main circuits, test voltage for 1 min (V)	DC 2670V	P
	- auxiliary circuits, test voltage for 1 min (V)		N/A
	- control circuits, test voltage for 1 min (V)		N/A

IEC 60947-2			
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	This item is not suitable for #11	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
(i)	the normal positions of operation include the tripped position, if any;		P
(ii)	circuits incorporating solid-state devices connected to the main circuit shall be disconnected for the test;		N/A
(iii)	circuit-breakers not declared as suitable for isolation shall be tested with the test voltage applied across the poles of the main circuit, the line terminals being connected together and the load terminals being connected together.		N/A
(iv)	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
(v)	circuit-breakers having a rated insulation voltage greater than 1 000 V a.c. shall be tested at a voltage of Ui + 1 200 V a.c. r.m.s. or 2 Ui whichever is the greater		N/A

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
(vi)	withdrawable circuit-breakers shall be subject to verification of impulse withstand voltage and shall be applied between the withdrawable unit's main contacts and their associated fixed contacts, in the disconnected position.		N/A
8.3.3.4	Mechanical operation and operational performance capability		
8.3.3.4.2	Construction and mechanical operation		
8.3.3.4.2.1	Construction		
	A withdrawable circuit-breaker shall be checked for the requirements stated in 7.1.2		N/A
	A circuit-breaker with stored energy operation shall be checked for compliance with 7.2.1.1.6, regarding the charge indicator and the direction of operation of manual energy storing		N/A
8.3.3.4.2.2	Mechanical operation		
	A circuit-breaker with dependent power operation shall comply with the requirements stated in 7.2.1.1.4		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 7.2.1.6 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
8.3.3.4.2.3	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

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
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 8.3.3.7		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
8.3.3.4.2.4	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

IEC 60947-2				
Clause	Requirement + Test	Result - Remark		Verdict
	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
8.3.3.4.3	Operational performance capability without current.			
	Type designation or serial number catalogue reference	GYM9H-DC		
	Sample no:	#14	#11	
	Rated current In (A)	63A		
	Rated operational voltage: Ue (V)	DC 440V	DC 220V	
	Rated control supply voltage of closing releases: Uc (V)			
	Rated control supply voltage of shunt releases: Uc (V)			
	Rated control supply voltage undervoltage releases: Uc (V)			
	Ambient temperature 10-40 °C :	20°C	22°C	P
	Number of operating cycles per hour	120cycles		P
	Number of cycles without current (total) (closing releases energized at the rated Uc)			N/A
	Number of cycles without current (without releases)	8500 cycles		P
	Applied voltage of closing releases (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 attempts to close the breaker without applied voltage at the undervoltage releases. (Shall not possible to close the circuit-breaker.)			N/A

IEC 60947-2				
Clause	Requirement + Test	Result - Remark		Verdict
	Applied voltage: undervoltage releases (V)			N/A
	In the case of circuit-breakers fitted with electrical or pneumatic closing devices, these devices shall be supplied at their rated control supply voltage or at their rated pressure.			N/A
	Precautions shall be taken to ensure that the temperature rises of the electrical components do not exceed the value indicated in tab. 7.			P
8.3.3.4.4	Operational performance capability with current.			
	Rated current: In (A)	63A		
	Maximum rated operational voltage: Ue (V)	DC 440V	DC 220V	
	Conductor cross-sectional area (mm^2) :	$16mm^2$	$16mm^2$	P
	Number of operating cycles per hour	120 cycles		P
	Number of cycles with current (total) (closing releases energized at the rated Uc)	1500 cycles		P
	Applied voltage: closing releases (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:			P
	- test voltage U/Ue = 1,0 (V) .....L1: .....L2: L3:	DC 442V - -	DC 223V - -	P
	- test current I/Ie = 1,0 (A).....L1: .....L2: L3:	64,5A - -	64,1A - -	P
	- power factor/time constant:	2,08	2,03	P
	- frequency: (Hz)			N/A
	- on-time (ms):	300ms		P
	- off-time (s):	30s		P
	In the case of circuit-breakers fitted with electrical or pneumatic closing devices, these devices shall be supplied at their rated control supply voltage or at their rated pressure.			N/A
	Precautions shall be taken to ensure that the temperature rises of the electrical components do not exceed the value indicated in tab. 7.			P
8.3.3.4.5	Additional test of operational performance capability without current for withdrawable circuit-breaker.			
	Number of operations cycles : 100			N/A

IEC 60947-2				
Clause	Requirement + Test	Result - Remark		Verdict
	After test, the isolating contacts, withdrawable mechanism and interlocks shall be suitable for further service.			N/A
8.3.3.5	Overload performance			
	this test applies to circuit-breaker of rated current up to and including 630 A			
	Type designation or serial number catalogue reference	GYM9H-DC		
	Sample no:	#14	#11	
	Rated current In (A)	63A		
	Rated operational voltage: Ue (V)	DC 440V	DC 220V	
	Rated control supply voltage of closing releases: Uc (V)			
	Rated control supply voltage of shunt releases: Uc (V)			
	Rated control supply voltage undervoltage releases: Uc (V)			
	Ambient temperature 10-40 °C :	25°C	23°C	P
	Maximum rated operational voltage: Ue (V)	DC 440V	DC 220V	P
	Number of operating cycles per hour	120cycles		P
	Number of cycles with current (total) (closing releases energized at the rated Uc)	12+3 cycles		P
	Applied voltage: closing releases (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:			P
	- test voltage U/Ue = 1,05 (V) .....L1: .....L2: L3:	468V - -	236V - -	P
	- test current AC/DC: I/Ie = 6,0/2.5 (A) .....L1: .....L2: L3:	159A - -	159A - -	P
	- power factor/time constant:	2,56	2,53	P
	- Number of cycles manually opened: 9			N/A
	- Number of cycles automatically opened by an overload release: 3			N/A

IEC 60947-2				
Clause	Requirement + Test	Result - Remark		Verdict
	for circuit-breakers having a short-circuit release of a maximum setting less than the test current			
	all 12 operations automatic			N/A
	If the testing means do not withstand the let-through energy occurring during the automatic operation			
	– 12 manual operations – three additional operations with automatic opening, made at any convenient voltage			P
	- frequency: (Hz)			N/A
	- on-time max 2s:			P
	Operating rate if different from Table 8			N/A
8.3.3.6	Verification of dielectric withstand			
	- equal to twice the rated operational voltage with a minimum of 1000 V for 5 seconds	DC 1415V	DC 1415V	P
	- no breakdown or flashover			P
	For circuit-breaker suitable for isolation, the leakage current shall be measured through each pole with the contacts in the open position, at a test voltage of 1,1 Ue, and shall not exceed 2 mA.			P
8.3.3.7	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) :	Max.64K	Max.59K	P
	conductor cross-sectional area (mm^2) :	$16mm^2$	$16mm^2$	P
	test current Ie (A) :	63A	63A	P
8.3.3.8	Verification of overload releases			
	Test current: 1.45 times the value of their current setting at the reference temperature: (A)	91,4A	91,4A	P
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A	119s	58s	P
8.3.3.9	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

IEC 60947-2				
Clause	Requirement + Test	Result - Remark		Verdict
	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
8.3.3.10	Verification of the main contact position for circuit-breakers for isolation			P
	actuating force for opening (N) ..... :	15,3N	11,4N	—
	test force with blocked main contacts for 10 s (N) :	50N	50N	—
	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

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

8.3.4	**TEST SEQUENCE II (Ics): Rated service short-circuit breaking capacity**	N/A

8.3.4	**TEST SEQUENCE II/III (Ics=Icu):** **#13 1P 63A**		
8.3.4.2	Test of rated service short-circuit breaking capacity		
	Test sequence of operation: O – t – CO – t – CO		
	Type designation or catalogue reference	GYM9H-DC	
	Sample no:	#13	
	Rated current: In (A)	63A	
	Corresponding rated voltage: Ue (V)	DC 220V	
	Rated service short-circuit breaking capacity: (kA)	6kA	
	Rated control supply voltage of closing releases: Uc (V)		
	Rated control supply voltage of shunt release: Uc (V)		
	Rated control supply voltage of undervoltage releases: Uc (V)		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		N/A
	Closing releases 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)	Up / Down: 50mm Left / Right: 0mm Front / Back: 0mm	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

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	- 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)	Supply-star point	P
	Conductor cross-sectional area (mm^2) :	16mm^2 1mm^2	P
	If terminals unmarked: line connected at: (underside/upside)		N/A
	Tightening torques: (Nm)	2,0 Nm	P
8.3.5.2	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:	0s≤tripping time≤180s	P
	- Operation time: (s) .....L1: .....L2: .....L3: ..... N :	45s - - -	P
8.3.4.2	Test of rated service short-circuit breaking capacity		P
	Test sequence of operation: O – t – CO – t – CO		P
	- test voltage U/Ue = 1,05 (V) .....L1: .....L2: L3:	DC 236V - -	P
	- r.m.s. test current AC/DC: (A) .....L1: .....L2: L3:	 6,10kA - -	P
	power factor/time constant :	5,04	P
	- Factor ”n”		N/A
	- peak test current (A) :		N/A
	Test sequence ”O”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	1,94 - -	P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	6,99k - -	P
	Pause, t: (min)	3min	P
	Test sequence ”CO”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	2,00 - -	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	8,98k - -	P
	Pause, t: (min)	3min	P
	Test sequence ”CO”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	2,08 - -	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	11,1k - -	P
	Melting of the fusible element	No melting	P
	Damage to insulation on conductors	No damage	P
	Holes in the PE-sheet for test sequence ”O”	No holes	P
	Cracks observed	No	P
8.3.4.3	Operational performance capability with current.		
	Rated current: In (A)	63A	
	Maximum rated operational voltage: Ue (V)	DC 220V	
	Conductor cross-sectional area (mm²) :	16mm²	
	Number of operating cycles per hour	120cycles	P
	Number (5% of the number given in column 4, tab. 8) of cycles with current (total) (closing releases energized at the rated Uc)	75cycles	P
	Applied voltage: closing releases (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

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Conditions, make/break operations:		
	- test voltage U/Ue = 1,0 (V) .....L1: .....L2: L3:	DC 224V - -	P
	- test current I/Ie = 1,0 (A).....L1: .....L2: L3:	63,5A - -	P
	- power factor/time constant:	2,10	P
	- frequency: (Hz)		N/A
	- on-time (ms):	300ms	P
	- off-time (s):	30s	P
8.3.4.4	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V	DC 1415V	P
	- no breakdown or flashover		P
	- the leaking current for circuit-breaker suitable for isolation: (<2mA / 1,1 Ue)		P
8.3.4.5	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) :	Max.58K	P
	conductor cross-sectional area (mm^2) :	$16mm^2$	P
	test current Ie (A) :	63A	P
8.3.4.6	Verification of overload releases		
	Test current: 1,45 times the value of their current setting at the reference temperature: (A)	91,4A	P
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A	54s	P
8.3.5.5	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:	0s≤tripping time≤180s	P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	- Operation time: (s) .....L1: .....L2: .....L3: ..... N :	29s - - -	P
8.3.4	**TEST SEQUENCE II/III (Ics=Icu):** **#10 1P 6A**		
8.3.4.2	Test of rated service short-circuit breaking capacity		
	Test sequence of operation: O – t – CO – t – CO		
	Type designation or catalogue reference	GYM9H-DC	
	Sample no:	#10	
	Rated current: In (A)	6A	
	Corresponding rated voltage: Ue (V)	DC 220V	
	Rated service short-circuit breaking capacity: (kA)	6kA	
	Rated control supply voltage of closing releases: Uc (V)		
	Rated control supply voltage of shunt release: Uc (V)		
	Rated control supply voltage of undervoltage releases: Uc (V)		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		N/A
	Closing releases 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)	Up / Down: 50mm Left / Right: 0mm Front / Back: 0mm	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

IEC 60947-2			
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)	Supply-star point	P
	Conductor cross-sectional area (mm²) :	1mm^2	P
	If terminals unmarked: line connected at: (underside/upside)		N/A
	Tightening torques: (Nm)	2,0 Nm	P
8.3.5.2	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:	0s≤tripping time≤180s	P
	- Operation time: (s) .....L1: .....L2: .....L3: ..... N :	41s - -	P
8.3.4.2	Test of rated service short-circuit breaking capacity		P
	Test sequence of operation: O – t – CO – t – CO		P
	- test voltage U/Ue = 1,05 (V) .....L1: .....L2: L3:	DC 264V - - (Required by the client)	P
	- r.m.s. test current AC/DC: (A) .....L1: .....L2: L3:	 10,4kA - - (Required by the client)	P
	power factor/time constant :	5,21	P
	- Factor ”n”		N/A
	- peak test current (A) :		N/A

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Test sequence ”O”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	1,73 - -	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	4,55k - -	P
	Pause, t: (min)	3min	P
	Test sequence ”CO”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	1,80 - -	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	5,45k - -	P
	Pause, t: (min)	3min	P
	Test sequence ”CO”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	1,91 - -	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	5,25k - -	P
	Melting of the fusible element	No melting	P
	Damage to insulation on conductors	No damage	P
	Holes in the PE-sheet for test sequence ”O”	No holes	P
	Cracks observed	No	P
8.3.4.3	Operational performance capability with current.		
	Rated current: In (A)		
	Maximum rated operational voltage: Ue (V)		
	Conductor cross-sectional area (mm²) :		
	Number of operating cycles per hour		N/A
	Number (5% of the number given in column 4, tab. 8) of cycles with current (total) (closing releases energized at the rated Uc)		N/A
	Applied voltage: closing releases (V)		N/A

IEC 60947-2			
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:		N/A
	- test current I/Ie = 1,0 (A).....L1: .....L2: L3:		N/A
	- power factor/time constant:		N/A
	- frequency: (Hz)		N/A
	- on-time (ms):		N/A
	- off-time (s):		N/A
8.3.4.4	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V	DC 1415V	P
	- no breakdown or flashover		P
	- the leaking current for circuit-breaker suitable for isolation: (<2mA / 1,1 Ue)		P
8.3.4.5	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 (mm^2) :		N/A
	test current Ie (A) :		N/A
8.3.4.6	Verification of overload releases		
	Test current: 1,45 times the value of their current setting at the reference temperature: (A)	8,70A	P
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A	69s	P

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

8.3.5.5	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:	0s≤tripping time≤180s	P
	- Operation time: (s) .....L1: .....L2: .....L3: ..... N :	30s - - -	P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
8.3.4	**TEST SEQUENCE II/III (Ics=Icu):** **#16 2P 63A**		
8.3.4.2	Test of rated service short-circuit breaking capacity		
	Test sequence of operation: O – t – CO – t – CO		
	Type designation or catalogue reference	GYM9H-DC	
	Sample no:	#16	
	Rated current: In (A)	63A	
	Corresponding rated voltage: Ue (V)	DC 440V	
	Rated service short-circuit breaking capacity: (kA)	6kA	
	Rated control supply voltage of closing releases: Uc (V)		
	Rated control supply voltage of shunt release: Uc (V)		
	Rated control supply voltage of undervoltage releases: Uc (V)		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		N/A
	Closing releases 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)	Up / Down: 50mm Left / Right: 0mm Front / Back: 0mm	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

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		N/A
	Fuse ”F”: copper wire: diameter 0,8 mm, 50 mm long		P
	Circuit is earthed at: (load-star- or supply-star point)	Supply-star point	P
	Conductor cross-sectional area (mm^2) :	$16mm^2$	P
	If terminals unmarked: line connected at: (underside/upside)		N/A
	Tightening torques: (Nm)	2,0 Nm	P
8.3.5.2	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:	0s≤tripping time≤180s	P
	- Operation time: (s) .....L1: .....L2: .....L3: ..... N :	70s 65s - -	P
8.3.4.2	Test of rated service short-circuit breaking capacity		P
	Test sequence of operation: O – t – CO – t – CO		P
	- test voltage U/Ue = 1,05 (V) .....L1: .....L2: L3:	DC 446V - -	P
	- r.m.s. test current AC/DC: (A) .....L1: .....L2: L3:	 6,10kA - -	P
	power factor/time constant :	5,04	P
	- Factor ”n”		N/A
	- peak test current (A) :		N/A
	Test sequence ”O”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	2,46 - -	P
	- Joule integral I^2dt (A^2s) .....L1: .....L2: L3:	10,2k - -	P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Pause, t: (min)	3min	P
	Test sequence ”CO”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	2,62 - -	P
	- Joule integral I^2dt (A^2s) .....L1: .....L2: L3:	13,7k - -	P
	Pause, t: (min)	3min	P
	Test sequence ”CO”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	2,68 - -	P
	- Joule integral I^2dt (A^2s) .....L1: .....L2: L3:	17,7k - -	P
	Melting of the fusible element	No melting	P
	Damage to insulation on conductors	No damage	P
	Holes in the PE-sheet for test sequence ”O”	No holes	P
	Cracks observed	No	P
8.3.4.3	Operational performance capability with current.		
	Rated current: In (A)	63A	
	Maximum rated operational voltage: Ue (V)	DC 440V	
	Conductor cross-sectional area (mm^2) :	16mm^2	
	Number of operating cycles per hour	120cycles	P
	Number (5% of the number given in column 4, tab. 8) of cycles with current (total) (closing releases energized at the rated Uc)	75cycles	P
	Applied voltage: closing releases (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:	DC 442V - -	P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	- test current I/Ie = 1,0 (A).....L1: .....L2: L3:	64,5A - -	P
	- power factor/time constant:	2,10	P
	- frequency: (Hz)		N/A
	- on-time (ms):	300ms	P
	- off-time (s):	30s	P
8.3.4.4	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V	DC 1415V	P
	- no breakdown or flashover		P
	- the leaking current for circuit-breaker suitable for isolation: (<2mA / 1,1 Ue)		P
8.3.4.5	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) :	Max.61K	P
	conductor cross-sectional area (mm²) :	16mm²	P
	test current Ie (A) :	63A	P
8.3.4.6	Verification of overload releases		
	Test current: 1,45 times the value of their current setting at the reference temperature: (A)	91,4A	P
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A	61s	P
8.3.5.5	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:	0s≤tripping time≤180s	P
	- Operation time: (s) .....L1: .....L2: .....L3: ..... N :	49s 43s - -	P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
8.3.4	**TEST SEQUENCE II/III (Ics=Icu):** **#17 2P 6A**		
8.3.4.2	Test of rated service short-circuit breaking capacity		
	Test sequence of operation: O – t – CO – t – CO		
	Type designation or catalogue reference	GYM9H-DC	
	Sample no:	#17	
	Rated current: In (A)	6A	
	Corresponding rated voltage: Ue (V)	DC 440V	
	Rated service short-circuit breaking capacity: (kA)	6kA	
	Rated control supply voltage of closing releases: Uc (V)		
	Rated control supply voltage of shunt release: Uc (V)		
	Rated control supply voltage of undervoltage releases: Uc (V)		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		N/A
	Closing releases 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)	Up / Down: 50mm Left / Right: 0mm Front / Back: 0mm	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

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		N/A
	Fuse ”F”: copper wire: diameter 0,8 mm, 50 mm long		P
	Circuit is earthed at: (load-star- or supply-star point)	Supply-star point	P
	Conductor cross-sectional area (mm^2) :	$1mm^2$	P
	If terminals unmarked: line connected at: (underside/upside)		N/A
	Tightening torques: (Nm)	2,0 Nm	P
8.3.5.2	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:	0s≤tripping time≤180s	P
	- Operation time: (s) .....L1: .....L2: .....L3: ..... N :	63s 58s -	P
8.3.4.2	Test of rated service short-circuit breaking capacity		P
	Test sequence of operation: O – t – CO – t – CO		P
	- test voltage U/Ue = 1,05 (V) .....L1: .....L2: L3:	DC 446V - -	P
	- r.m.s. test current AC/DC: (A) .....L1: .....L2: L3:	 6,10kA - -	P
	power factor/time constant :	5,04	P
	- Factor ”n”		N/A
	- peak test current (A) :		N/A
	Test sequence ”O”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	1,55 - -	P
	- Joule integral I^2dt (A^2s) .....L1: .....L2: L3:	3,08k - -	P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Pause, t: (min)	3min	P
	Test sequence ”CO”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	1,52 - -	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	2,67k - -	P
	Pause, t: (min)	3min	P
	Test sequence ”CO”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	1,670 - -	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	3,29k - -	P
	Melting of the fusible element	No melting	P
	Damage to insulation on conductors	No damage	P
	Holes in the PE-sheet for test sequence ”O”	No holes	P
	Cracks observed	No	P
8.3.4.3	Operational performance capability with current.		
	Rated current: In (A)		
	Maximum rated operational voltage: Ue (V)		
	Conductor cross-sectional area (mm²) :		
	Number of operating cycles per hour		N/A
	Number (5% of the number given in column 4, tab. 8) of cycles with current (total) (closing releases energized at the rated Uc)		N/A
	Applied voltage: closing releases (V)		N/A
	For circuit-breaker fitted with adjustable releases, test shall be made with the overload setting at maximum and short-circuit setting at minimum.		N/A
	Conditions, make/break operations:		
	- test voltage U/Ue = 1,0 (V) .....L1: .....L2: L3:		N/A

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	- test current I/Ie = 1,0 (A).....L1: .....L2: L3:		N/A
	- power factor/time constant:		N/A
	- frequency: (Hz)		N/A
	- on-time (ms):		N/A
	- off-time (s):		N/A
8.3.4.4	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V	DC 1415V	P
	- no breakdown or flashover		P
	- the leaking current for circuit-breaker suitable for isolation: (<2mA / 1,1 Ue)		P
8.3.4.5	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
8.3.4.6	Verification of overload releases		
	Test current: 1,45 times the value of their current setting at the reference temperature: (A)	8,70A	P
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A	52s	P
8.3.5.5	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:	0s≤tripping time≤180s	P
	- Operation time: (s) .....L1: .....L2: .....L3: ..... N :	45s 40s - -	P

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

8.3.4	**TEST SEQUENCE II/III (Ics=Icu):** **#5 2P 6A**		
8.3.4.2	Test of rated service short-circuit breaking capacity		
	Test sequence of operation: O – t – CO – t – CO		
	Type designation or catalogue reference	GYM9H-DC	
	Sample no:	#5	
	Rated current: In (A)	6A	
	Corresponding rated voltage: Ue (V)	DC 440V	
	Rated service short-circuit breaking capacity: (kA)	6kA	
	Rated control supply voltage of closing releases: Uc (V)		
	Rated control supply voltage of shunt release: Uc (V)		
	Rated control supply voltage of undervoltage releases: Uc (V)		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		N/A
	Closing releases 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)	Up / Down: 50mm Left / Right: 0mm Front / Back: 0mm	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

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		N/A
	Fuse ”F”: copper wire: diameter 0,8 mm, 50 mm long		P
	Circuit is earthed at: (load-star- or supply-star point)	Supply-star point	P
	Conductor cross-sectional area (mm^2) :	$1mm^2$	P
	If terminals unmarked: line connected at: (underside/upside)		N/A
	Tightening torques: (Nm)	2,0 Nm	P
8.3.5.2	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:	0s≤tripping time≤180s	P
	- Operation time: (s) .....L1: .....L2: .....L3: ..... N :	63s 58s -	P
8.3.4.2	Test of rated service short-circuit breaking capacity		P
	Test sequence of operation: O – t – CO – t – CO		P
	- test voltage U/Ue = 1,05 (V) .....L1: .....L2: L3:	DC 530V - - (Required by the client)	P
	- r.m.s. test current AC/DC: (A) .....L1: .....L2: L3:	 10,2kA - - (Required by the client)	P
	power factor/time constant :	5,16	P
	- Factor ”n”		N/A
	- peak test current (A) :		N/A
	Test sequence ”O”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	2,52 - -	P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	7,00k - -	P
	Pause, t: (min)	3min	P
	Test sequence ”CO”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	2,57 - -	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	8,41k - -	P
	Pause, t: (min)	3min	P
	Test sequence ”CO”		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	2,70 - -	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	17,3k - -	P
	Melting of the fusible element	No melting	P
	Damage to insulation on conductors	No damage	P
	Holes in the PE-sheet for test sequence ”O”	No holes	P
	Cracks observed	No	P
8.3.4.3	Operational performance capability with current.		
	Rated current: In (A)		
	Maximum rated operational voltage: Ue (V)		
	Conductor cross-sectional area (mm²) :		
	Number of operating cycles per hour		N/A
	Number (5% of the number given in column 4, tab. 8) of cycles with current (total) (closing releases energized at the rated Uc)		N/A
	Applied voltage: closing releases (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

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Conditions, make/break operations:		
	- test voltage U/Ue = 1,0 (V) .....L1: .....L2: L3:		N/A
	- test current I/Ie = 1,0 (A).....L1: .....L2: L3:		N/A
	- power factor/time constant:		N/A
	- frequency: (Hz)		N/A
	- on-time (ms):		N/A
	- off-time (s):		N/A
8.3.4.4	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V	DC 1415V	P
	- no breakdown or flashover		P
	- the leaking current for circuit-breaker suitable for isolation: (<2mA / 1,1 Ue)		P
8.3.4.5	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 (mm^2) :		N/A
	test current Ie (A) :		N/A
8.3.4.6	Verification of overload releases		
	Test current: 1,45 times the value of their current setting at the reference temperature: (A)	8,70A	P
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A	117s	P
8.3.5.5	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:	0s≤tripping time≤180s	P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	- Operation time: (s) .....L1: .....L2: .....L3: ..... N :	40s 38s - -	P
8.3.6	**TEST SEQUENCE IV (Icw): Rated short-time withstand current**		N/A
8.3.7	**TEST SEQUENCE V: Performance of integrally fused circuit-breakers**		N/A
8.3.8	**TEST SEQUENCE VI: Combined test sequence**		N/A

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
8.3.9	**Critical d.c. load current test** **#12 1P 63A**		
	This test applies only to circuit-breakers with d.c. ratings.		
	The test shall be made at the maximum operational d.c. voltage (Ue max) assigned by the manufacturer to the circuit-breaker.	220V DC	P
	Ue max :	220V DC	P
	For circuit-breakers fitted with adjustable releases, the test shall be made with the releases set at the maximum.		N/A
	Direction of current flow as specified by manufacturer		
	Direction of current flow as specified by manufacturer as indicated by the polarity and line/load marking:		P
	The circuit-breaker is closed and opened 5 times:		P
	Direction of current flow is not specified by manufacturer		
	5 operations in the forward direction and 5 in the reverse direction		N/A
	During each CO cycle, the circuit-breaker shall remain closed for a time sufficient to ensure that the full current is established, but not exceeding 2 s.		P
	Time constant operational performance	2ms	P
	Number of operating cycles per hour	120 cycles per hour	P
	Arcing time during the test (shall not exceed 1 s)		P
	Test currents to find critical d.c. load current		
	The test current values shall be: 4 A, 8 A, 16 A, 32 A and 63 A d.c., with ± 10 % tolerance, but not exceeding the rated current		P
	the critical value is determined by taking the maximum mean arcing time, for each direction of current if applicable		P
	The highest and lowest values of test current shall demonstrate shorter mean arcing times than the critical value		P
	the range of test currents (upwards or downwards) to find the critical value		P
	No critical value of current is found		N/A
	Forward direction		
	Critical value	32A	P
	Maximum mean arcing time	14,3ms	P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Reversed direction		
	Critical value :		N/A
	Maximum mean arcing time		N/A
	Operational performance verification of 50 operations with critical current.		
	Conductor cross-sectional area (mm²).....:	16mm²	P
	Direction of critical current flow :		P
	Conditions operational performance		
	- test voltage U/Ue = 1,0 (V) .....:	224V DC	P
	- critical test current (A).....:	32,2A	P
	- time constant.....:	2,09ms	P
	- on-time (ms) .....:	280ms	P
	- off-time (s) .....:	30s	P
8.3.3.6	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1415 Vdc for 5 seconds		P
	- no breakdown or flashover		P
	For circuit-breaker suitable for isolation, the leakage current shall be measured through each pole with the contacts in the open position, at a test voltage of 1,1 Ue, and shall not exceed 2 mA.		P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
8.3.9	**Critical d.c. load current test** **#15 2P 63A**		
	This test applies only to circuit-breakers with d.c. ratings.		
	The test shall be made at the maximum operational d.c. voltage (Ue max) assigned by the manufacturer to the circuit-breaker.	440V DC	P
	Ue max :	440V DC	P
	For circuit-breakers fitted with adjustable releases, the test shall be made with the releases set at the maximum.		N/A
	Direction of current flow as specified by manufacturer		
	Direction of current flow as specified by manufacturer as indicated by the polarity and line/load marking:		P
	The circuit-breaker is closed and opened 5 times:		P
	Direction of current flow is not specified by manufacturer		
	5 operations in the forward direction and 5 in the reverse direction		N/A
	During each CO cycle, the circuit-breaker shall remain closed for a time sufficient to ensure that the full current is established, but not exceeding 2 s.		P
	Time constant operational performance	2ms	P
	Number of operating cycles per hour	120 cycles per hour	P
	Arcing time during the test (shall not exceed 1 s)		P
	Test currents to find critical d.c. load current		
	The test current values shall be: 4 A, 8 A, 16 A, 32 A and 63 A d.c., with ± 10 % tolerance, but not exceeding the rated current		P
	the critical value is determined by taking the maximum mean arcing time, for each direction of current if applicable		P
	The highest and lowest values of test current shall demonstrate shorter mean arcing times than the critical value		P
	the range of test currents (upwards or downwards) to find the critical value		P
	No critical value of current is found		N/A
	Forward direction		
	Critical value	16A	P
	Maximum mean arcing time	177ms	P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Reversed direction		
	Critical value :		N/A
	Maximum mean arcing time		N/A
	Operational performance verification of 50 operations with critical current.		
	Conductor cross-sectional area (mm²).....:	16mm²	P
	Direction of critical current flow :		P
	Conditions operational performance		
	- test voltage U/Ue = 1,0 (V) .....:	442V DC	P
	- critical test current (A).....:	16,6A	P
	- time constant.....:	2,01ms	P
	- on-time (ms) .....:	400ms	P
	- off-time (s) .....:	30s	P
8.3.3.6	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1415 Vdc for 5 seconds		P
	- no breakdown or flashover		P
	For circuit-breaker suitable for isolation, the leakage current shall be measured through each pole with the contacts in the open position, at a test voltage of 1,1 Ue, and shall not exceed 2 mA.		P
Annex B	**Circuit-breakers incorporating residual current protection**		N/A
Annex C	**Individual pole short-circuit test sequence**		N/A
Annex D	**Additional requirements for circuit-breakers intended for connection of aluminium conductors**		N/A
Annex F	**Additional tests for circuit-breakers with electronic over-current protection**		N/A
Annex H	**Individual pole short-circuit test sequence**		N/A
Annex J	**Electromagnetic compatibility (EMC) – Requirements and test methods for circuit-breakers**		N/A
Annex L	**Circuit-breakers not fulfilling the requirements for overcurrent protection**		N/A

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
Annex M	**Modular residual current devices (without integral current breaking device)**		N/A
Annex N	**Electromagnetic compatibility (EMC) – Additional requirements and test methods for devices not covered by Annexes B, F and M**		N/A
Annex O	**Instantaneous trip circuit-breakers (ICB)**		N/A
Annex P	**DC circuit-breakers for use in photovoltaic (PV) applications**		N/A

Clasue 8.3.3.7	**TABLE : Heating Test #14 2P 63A**		**P**
	Test voltage (V) .....:	**-**	**—**
	Ambient (˚C).....:	**20,5**	**—**

Thermocouple Locations	**Max. temperature measured, (˚C)**	**Max. temperature limit, (˚C)**
Terminal for external connections	64K	80K
Manual operating means(non-metallic)	14K	35K
Parts intended to be touched but not hand-held (non-metallic)	35K	50K
Parts which need not be touched for normal operation(non-metallic)	41K	60K
Supplementary information:N/A		

Clasue 8.3.3.7	**TABLE : Heating Test #11 1P 63A**		**P**
	Test voltage (V) .....:	**-**	**—**
	Ambient (˚C).....:	**24,7**	**—**

Thermocouple Locations	**Max. temperature measured, (˚C)**	**Max. temperature limit, (˚C)**
Terminal for external connections	59K	80K
Manual operating means(non-metallic)	13K	35K
Parts intended to be touched but not hand-held (non-metallic)	30K	50K
Parts which need not be touched for normal operation(non-metallic)	37K	60K
Supplementary information:N/A		

	TABLE: Heating test, resistance method	**N/A**

Clasue 8.3.3.3	TABLE : Dielectric Strength #14 2P 63A	P

Test voltage applied between:	Test potential applied (V)	Breakdown / flashover (Yes/No)
Between all the terminals of the main circuit connected together (including the control and auxiliary circuits connected to the main circuit) and the enclosure or mounting plate, with the contacts in all normal positions of operation	DC 2670V	No
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	DC 2670V	No
For equipment suitable for isolation, across the poles of the main circuit, the line terminals being connected together and the load terminals connected together	DC 2670V	No
Supplementary information:N/A		

Clasue 8.3.3.3	TABLE : Dielectric Strength #11 1P 63A	P

Test voltage applied between:	Test potential applied (V)	Breakdown / flashover (Yes/No)
Between all the terminals of the main circuit connected together (including the control and auxiliary circuits connected to the main circuit) and the enclosure or mounting plate, with the contacts in all normal positions of operation	DC 2670V	No
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	-	-
For equipment suitable for isolation, across the poles of the main circuit, the line terminals being connected together and the load terminals connected together	DC 2670V	No
Supplementary information:N/A		

	TABLE: Electrical Data (in normal conditions)	N/A

	TABLE: Power Input Deviation	N/A

	TABLE: insulation resistance measurements	N/A

	TABLE: Impact Resistance	N/A

	TABLE 15: Clearance And Creepage Distance Measurements					P
clearance cl and creepage distance dcr at/of:	**Up (V)**	**U r.m.s. (V)**	**Required cl (mm)**	**cl (mm)**	**required dcr (mm)**	**dcr (mm)**
between live parts which are separated when the main contacts are in the open position	/	/	3	4,93	4	8,27
between live parts of different polarity	/	/	3	16,4	4	26,5
between live parts and other accessible metal parts	/	/	3	6,16	4	6,16
between live parts metal frames supporting flush-type circuit-breakers	/	/	3	6,94	4	6,94
Supplementary information:N/A						

	TABLE: Distance Through Insulation Measurements	N/A

	TABLE: Ball Pressure Test of Thermoplastics	N/A

	TABLE: Needle- flame test (NFT)	N/A

	TABLE : Glow wire test	**P**
	Parts made of insulating material necessary to retain current-carrying parts in position: test temperature 960 °C	
	No visible flame and no sustained glowing	N/A
	Flames and glowing extinguish within 30 s	P
	No ignition of the tissue paper	P
	Parts of insulating material not necessary to retain current-carrying parts in position, even though in contact with them: test temperature 650 °C	
	No visible flame and no sustained glowing	P
	Flames and glowing extinguish within 30 s	N/A
	No ignition of the tissue paper	P

	TABLE : Threaded Part Torque Test			**P**
Threaded part identification	**Diameter of thread (mm)**	**Column number (I, II, or III)**	**Applied torque (Nm)**	
Screw	M5	II	2,0	
Supplementary information:N/A				

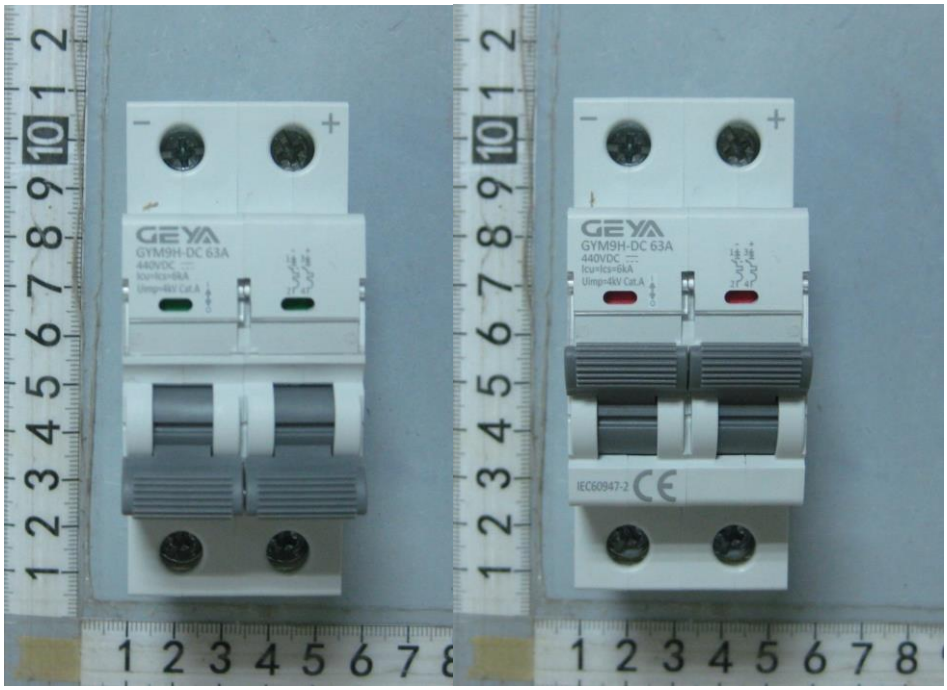
	TABLE: Over-voltage and Under-voltage Test	**N/A**

	TABLE: Critical components information	**N/A**

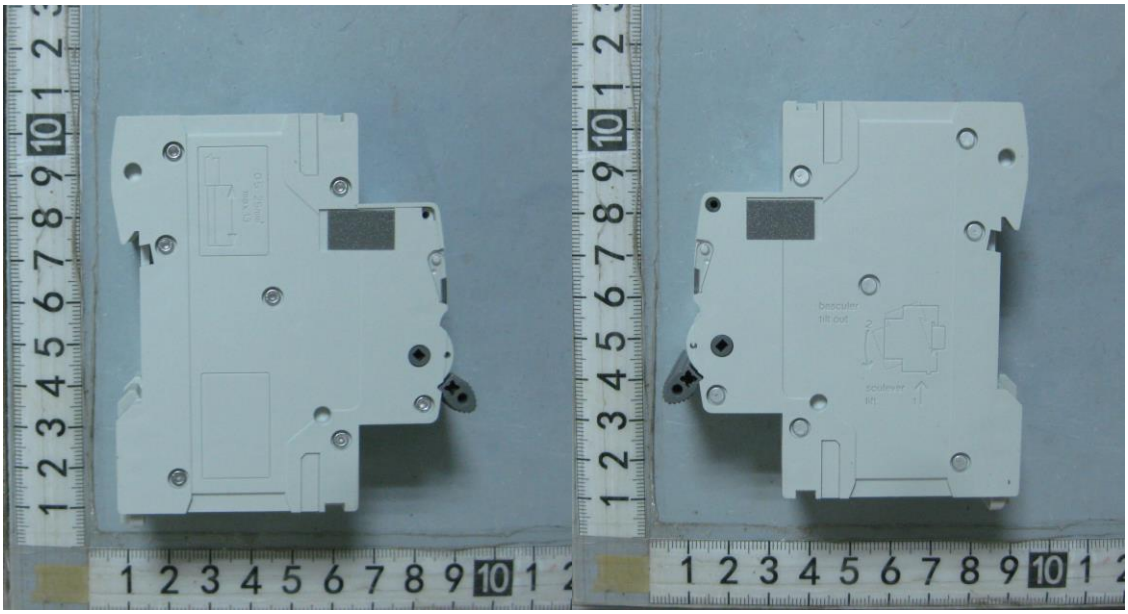
Photographs

2P 63A

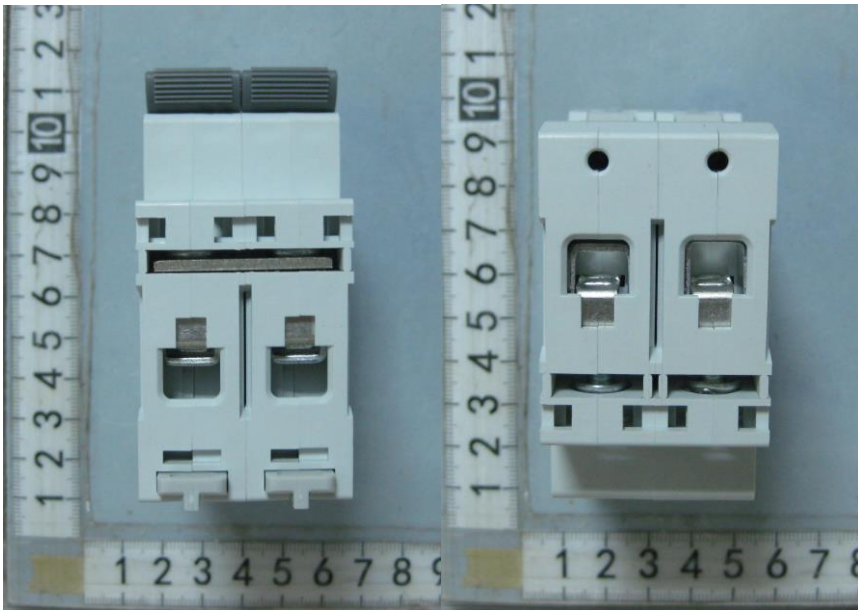
Over View



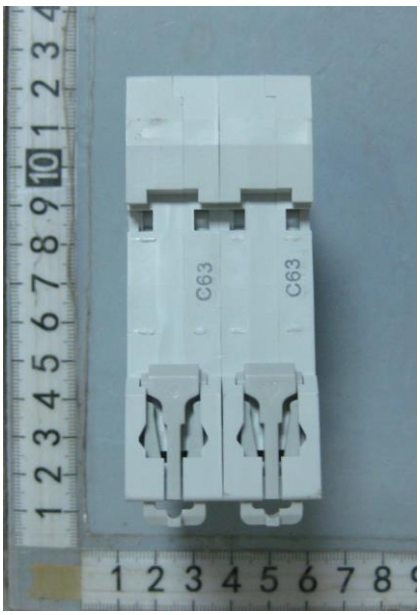
Side View



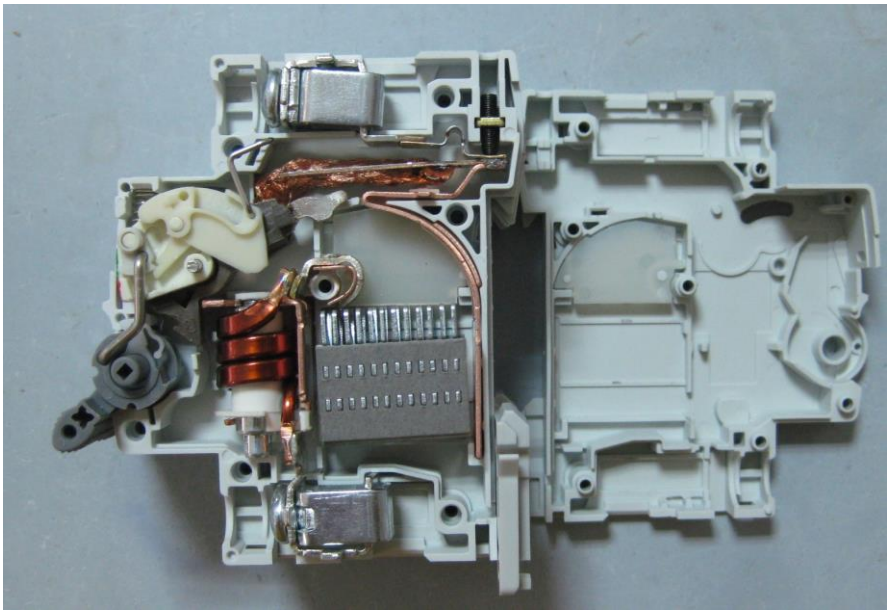
Side View



Bottom View

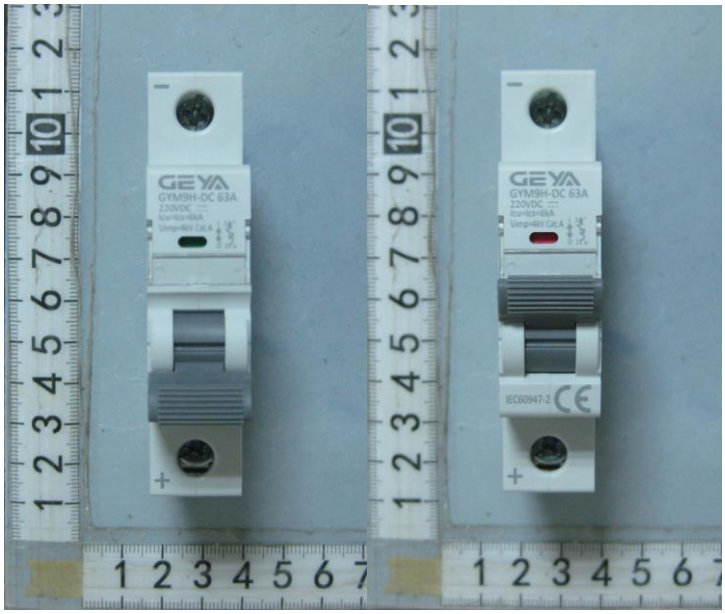


Inside View

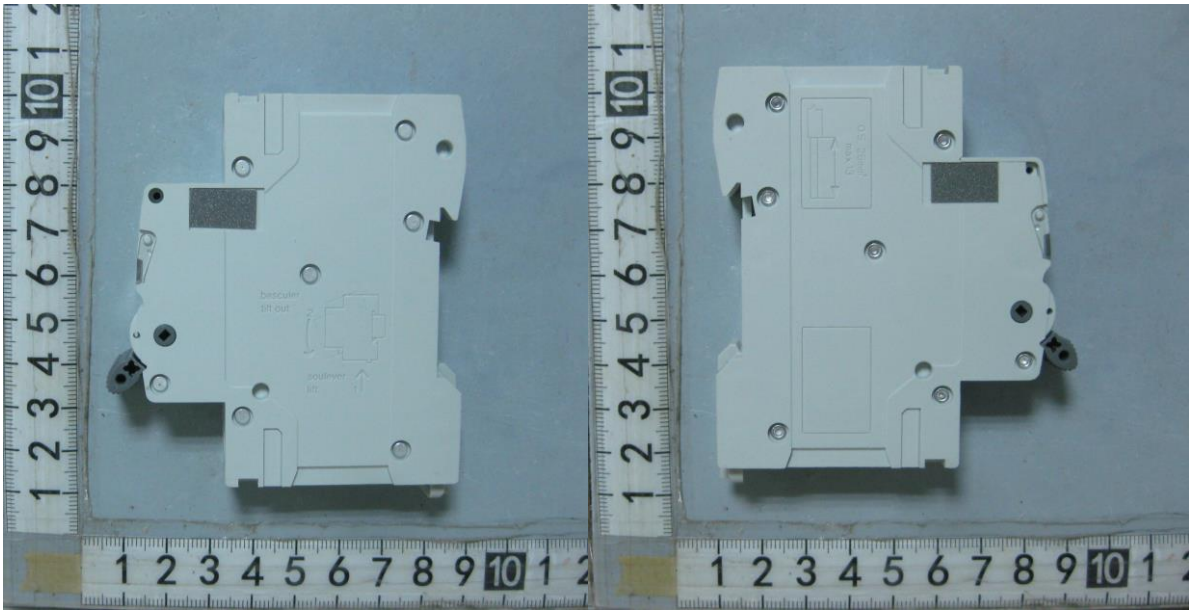


1P 63A

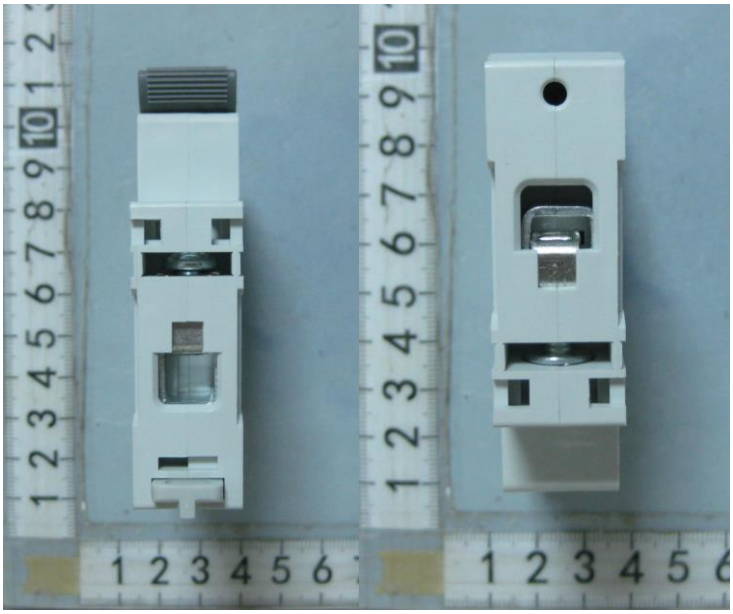
Over View



Side View



Side View



Bottom View