

TEST REPORT

EN 60947-1:2021

EN 60947-2:2025

Low voltage equipment Part 1: General rules

Low-Voltage Switchgear and Controlgear Part 2: Circuit-Breakers

Report Reference No.....: WUX251231005S04

Tested by (name+signature).....: Candy Zheng

Approved by (name+signature).....: Tony Bi

Date of issue.....: January 27, 2026

Total number of pages.....: 120 Pages



Testing Laboratory.....: Shenzhen Wuxiang Testing (Group) Co., Ltd.

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Applicant's name.....: Wenzhou Yijie Electric Co., Ltd

Address.....: 4th Floor, No. 3808 Binhai 3rd Road, Tianhe Street, Longwan District, Wenzhou City, Zhejiang Province, China

Manufacturer.....: Same as applicant

Address.....:

Factory.....: Same as applicant

Address.....:

Test specification:

Standard.....: EN 60947-1:2021

EN 60947-2:2025

Test procedure.....: CE-LVD

Non-standard test method.....: N/A

Test Report Form No :	IEC 60947-2
Test Report Form(s) Originator..... :	GTS
Master TRF..... :	Dated 2007-05
Test item description :	Smart Switch
Trade Mark..... :	ETTROIT
Manufacturer..... :	Wenzhou Yijie Electric Co., Ltd
Manufacturer address..... :	4th Floor, No. 3808 Binhai 3rd Road, Tianhe Street, Longwan District, Wenzhou City, Zhejiang Province, China
Model/Type reference..... :	ETWF4007 ETWF4008, ETWF4009, ETWF4010, ETWF4011, ETWF4021, ETZB4007, ETZB4008, ETZB4009, ETZB4010, ETZB4011, ETZB4021
Ratings..... :	Input: 240V 50/60Hz 10A

Particulars: Test item vs. test requirements	
3. Classification	
3.1 Utilization category: (A or B)	A
3.2 Interruption medium: (air, vacuum, gas Break)	Air
3.3 Design: (open construction, moulded case)	Moulded case
3.4 Method of controlling the operation	Independent manual operation
(dependent manual operation, independent manual operation, dependent power operation, independent power operation)	
3.5 Suitability for insulation: (suitable, not-suitable)	Suitable
3.6 Provision for maintenance: (maintainable, non maintainable)	Maintainable
3.7 Method of installation: (fixed, plug in, withdrawable)	Fixed
3.8 Integral fuse (integrally fused circuit-breakers)	N/A
4.8 Integral fuse (integrally fused circuit-breakers) Type and characteristics of SCPD	N/A
4.9 Switch overvoltage: (when Uimp is declared)	
7.3 Electromagnetic compatibility (EMC)	
Environment A or B	B

Circuit-breaker for use in IT systems:	P
Rated an limiting value, main circuit:	
-rated operational voltage: $U_e(V)$	
-rated insulation voltage: $U_i(V)$	
-rated impulse withstand voltage: $U_{imp}(kV)$	
-rated operational current: $I_e(A)$	
-kind of current	AC
-conventional free air thermal current: $I_{th}(A)$	
-conventional enclosed thermal current: $I_{the}(A)$	N/A
-conventional rating for four-pole circuit-breaker: (A)	N/A
-number of pole	
-rated frequency: (Hz)	N/A
-integral fuse(rated values)	N/A
-suitability for environment (A or B)	A
Rated duty	
-eight-hour duty	N/A
-uninterrupted duty: $I_u(A)$	
Short-circuit charactersitic	
Rated short-time making capacitor: $I_{cm}(kA)$	
Rated ultimate short-circuit breaking capacity: $I_{cu}(kA)$	
Rated service short-circuit breaking capacity: $I_{cs}(kA)$	100% I_{cu}
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
Air supply control circuits: (pneumatic or electro-pneumatic):	
-rated control supply voltage: U_s (nature, frequency V):	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	Auxiliary circuits:
Rated and limiting values	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: I_{en} (kA).....	N/A
Co-ordination of short-circuit protective devices :	
-kind of protective device.....	N/A
Release	
1) shunt release	N/A
2) Over current release	See Remarks
a) instantaneous:	P
b) definite time delay	N/A
c) inverse time delay	P
-independent of previous load	N/A
dependent on previous load; (for example thermal type release)	P
3) Undervoltage release (for opening)	N/A
4) Other releases	N/A
Characteristics:	
1) Shunt release and undervoltage release (for opening)	
-rated control circuit voltage: U_c (nature, frequency, V)	N/A
kind of current	N/A
-rated frequency: (if AC)	N/A

2) Overcurrent release1	:
- rated current	10A
- kind of current	:A.C.
- rated frequency: (if AC)	:N/A
-current setting (or range of settings)	:10 In
-time setting (or range of settings)	:N/A

Test case verdicts

Test item does meet the requirement	P(ass)
Test item does not meet the requirement	F(ail)
Test case does not apply to the test object.....	N(.A.)

Testing

Date of receipt of test item.....	January 04,2026
Date(s) of performance of test.....	January 04,2026 to January 20,2026
.....	

General remarks

This test report shall not be reproduced except in full without the written approval of the testing laboratory.

The test results presented in this report relate only to the item tested. "(see remark #)" refers to a remark appended to the report.

"(see appended table)" refers to a table appended to the report. Throughout this report a comma is used as the decimal separator.

General product information:

Subject	Smart Switch
Type designation	ETWF4007 In:250A Ue:AC240V Icu:10A Ics:10A
Frame size	/
Number of poles	N/A
Rated frequency	50/60Hz
Rated operational voltage	Ue AC240V
Rated insulation voltage	N/A
Rated impulse withstand voltage	6kV
Suitability for isolation	Yes
Rated current	N/A

Rated ultimate short-circuit breaking capacity	10A
Rated service short-circuit breaking capacity	10A
Utilization category	A
Type of tripping device	Thermal magnetic
Instantaneous release:	Magnetic
Current setting (or range of settings)	
Time setting (or range of setting)	N/A
Inverse time-delay release	Thermal magnetic (Bi-metal)
Current setting (or range of settings)	10In
Time setting (or range of settings)	N/A
Release dependent on ambient air temperature	Yes
Reference temperature	40 °C
Dimension of specimen	/
Dimension of metal screen	/

Copy of marking plate:

Smart Switch

Model: ETWF4007

ETWF4008, ETWF4009, ETWF4010, ETWF4011,
ETWF4021, ETZB4007, ETZB4008, ETZB4009,
ETZB4010, ETZB4011, ETZB4021

In: 10A

Ue: AC 240V

Icu: 10A

Ics: 10A

Wenzhou Yijie Electric Co., Ltd

Made in China



Summary of testing:

When determining the test conclusion, the Measurement Uncertainty of test has been considered.

This test report includes attachment 1- Photo Document (4 pages).

EN 60947-5-1			
Clause	Requirement – Test	Result - Remark	Verdict
5.2	MARKING		
5.2.1	Data shall be preferably marked on the equipment:		-
	a - manufacturer's name or trademark		P
	b - type designation or serial number		P
	Data shall be included on the nameplate, or on the equipment, or in the manufacturer's published literature:		P
	c - number of this standard	EN 60947-5-1	P
	d - rated operational voltages		P
	e - utilization category and rated operational currents, at the rated operational voltages of the control circuit device		P
	f - rated insulation voltage:		P
	g - rated impulse withstand voltage		P
	h - switching overvoltages, if applicable		N
	i - IP code, in case of enclosed control circuit device		N
	j - pollution degree		N
	k - type and maximum ratings of short-circuit protective device		N
	l - conditional short-circuit current if less than 1000 A		N
	m - suitability for isolation, where applicable, with the symbol 07-13-06 of EN60617-7		N
	n - indication of contact elements of same polarity		N
5.2.2	Terminal identification and marking	(see 7.1.7.4 of EN60947-1)	P
	Clearly and permanently identified according EN60445 and Annex L, unless superseded by relevant standard.		P
	Neutral terminal identified by letter :		P
	Protective earth terminal identified by letter		P

5.2.3	Functional markings		P
	Actuators may be identified by symbols in the form of engravings, but if a stop button carries any symbol engraved or marked this symbol shall be a circle or oval		P
	Letters or words may used where space is available		P
5.2.4	Emergency stop		N
	Control switches intended to be used as "stop" control for emergency use shall be coloured red and in case of a push-button, be of mushroom shape		N
5.2.5	Operating diagram		P
	As rotary switches may have multiplicity of contacts elements and a multiplicity of actuator positions, it necessary that the manufacturer indicates the relationship between the actuator positions and the associated contact elements position		P
5.2.5.1	The position indication shall be clear, and the associated text or symbols shall be indelible and easily legible		P
5.2.5.2	Terminal markings for operating diagrams		P
	Terminal markings shall be clearly identifiable with respect to the operating diagram		P
5.2.6	Time delay markings		N
	The manufacturer shall indicate, for each time- delay contact element, the characteristic of the delay, according to 2.4.1.1 or 2.4.1.2		N
5.3	Instructions for installation, operation and maintenance		P
	The manufacture shall specify, in his documents or catalogues:		P
	- the conditions for installation, operation and maintenance, if any, of the equipment during operation and after a fault		P

	- the specify the measures to be taken with regard to EMC, if any,		P
	- equipment only suitable in environment A shall provided with the following notice		P
	- if necessary, the instructions for transport, installation and operation of the equipment shall indicate the measures that are particular importance for the proper and correct installation, commissioning and operation of the equipment.		P

6	Normal service, mounting and transport conditions		
6.1.1	Ambient temperature		P
	Ambient air temperature does not exceed +40 °C and its average over 24 hours does not exceed +35°C and the lower limit is –5°C		P
6.1.2	Altitude of side of installation does not exceed 2000m		P
6.1.3.1	Relative humidity does not exceed 50 % at max temp +40 °C, higher rel. hum may at lower temperatures e.g. 90% at +20 °C		P
6.1.3.2	Pollution degree		P
	Unless otherwise stated, equipment for: - industrial use shall have a degree 3, depending upon micro-environment - household and similar shall have degree 2		P
6.1.4	Shock and vibration		P

	Under consideration		P
6.2	Conditions during transport and storage		P
	Under consideration		P
6.3	Mounting		P
	According manufacturer's instruction	See user manual	P
6.3.1	Mounting of single hole mounted devices		P
	Dimensions according Table 2		P
6.3.1.1	Location of key recess(if any)		P
	Dimensions according Table 3		P
6.3.1.2	Range of panel thickness		P
	The device shall be capable of being mounted on any thickness between 1 and 6 mm		P
6.3.1.3	Grouping of devices		P
	The distances a between the mounting centres in the same row and b between the centre lines of the rows shall be not less than those given in table 3. Distances a and b may be interchanged		P
7.1	CONSTRUCTION		-
7.1.1	Materials		P
7.1.2	Current-carrying parts and their connection		P
	No contact pressure through insulating materials		P
7.1.3	Clearances		P
	Clause 7.1.3 of EN60947 applies		-
	Rated impulse withstand voltage	(see test sequence I)	-
	Case B (mm)	Required :..... mm	-

	Case A (mm)	Required :..... mm	-
		Measured: mm	-
	Creepage distances		-
	Pollution degree		
	Comparative tracking index (V)		-
	Material group	III	-
	Rated insulation voltage Ui (V)		-
	Minimum creepage distances (mm)		-
	Measured creepage distances (mm)		-
	In case Uimp is not indicated, clearances and creepage distances in according with Annex D		-
7.1.4	Actuator		-
7.1.4.1	Insulation		P
7.1.4.2	Direction		P
7.1.4.3	Actuating force (or moment) :		P
7.1.4.4	Limitation of rotation (of rotary switch)		P
7.1.4.5	Emergency stop		N
7.1.5	Indication of the contact position		N
7.1.5.1	Indication means		P
7.1.5.2	Indication by the actuator		P
7.1.6	Conditions for control switches suitable for isolation		P
7.1.7	Class II control circuit devices		P

	Not provided with means for protective earthing and insulated by encapsulation,	See annex F	P
7.1.8	Requirements for control devices with integrally connected cables	See annex G	P
7.1.11	Degree of protection of enclosed equipment		-
	Degree of protection	IP20	P
	Test for first characteristic		P

EN 60947-5-1			
Clause	Requirement – Test	Result - Remark	Verdict
	Test for first numeral:	☐ 1: ☒ 2: ☐ 3: ☐ 4: ☐ 5: ☐ 6:	-
	Test for second characteristic		-
	Test for second numeral:	☐ 1: ☐ 2: ☐ 3: ☐ 4: ☐ 5: ☐ 6: ☐ 7: ☐ 8:	-
7.2	Performance requirements		-
	Subclauses 7.2.1.1 and 7.2.2 of EN60947-1 apply with the following additions:		-
7.2.1.2	Limits of operation of contactor relays		-
	The limits of operation for contactor relays shall be in accordance with EN60947-4-1	See clause 8.3.3.2	P
7.2.3	Dielectric properties		P
	Subclause 7.2.3 of EN60947-1 applies with the following addition	See clause 8.3.3.4	P
	For class II control circuit devices insulated by encapsulation	See Annex F	P
7.2.4	Ability to make and break under normal and abnormal load conditions		P
7.2.4.1	Making and breaking capacities		P
	Making and breaking capacities under normal conditions as state in table 4	See clause 8.3.3.5.2	P
	Making and breaking capacities under abnormal conditions as state in table 5	See clause 8.3.3.5.3	P
7.2.4.2	Vacant		P
7.2.4.3	Durability		P
	Sub-clause 7.2.4.3 of EN60947-1 applies with the following additions:		P
	Mechanical durability	See Annex C	P

	Electrical durability	See Annex C	P
7.2.5	Conditional short-circuit current		P
	The switching element shall withstand the stresses resulting from short-circuit current under the conditions specified in 8.3.4		P
7.2.6	Switching overvoltage		P
	Subclause 7.2.6 of EN60947-1 applies		P
7.2.7	Additional requirements for control switches suitable for isolation		P
	Control switches suitable for isolation shall be tested according to 8.3.3.4 of EN60947-1 with a value of test voltage as specified in Table 14 or EN60947-1 corresponding to the rated impuls withstand voltage Uimp declared by the manufacturer.		P
	Other additional requirements applicable to such control switches are under consideration		P
7.3	Electromagnetic compatibility (EMC)		P
	Subclause 7.3 of EN60947-1 applies unless otherwise specified in this standard		P

8.3.1.a	TEST SEQUENCE I (sample No. 1)		P
Test No. 1	- operating limits of contactor relays (8.3.3.2), if applicable		N
Test No. 2	- temperature rise (Clause 8.3.3.3.)		P
Test No. 3	- dielectric properties (Clause 8.3.3.4)		P
Test No. 4	- mechanical properties of terminals (8.2.4 of EN60947-1		N
8.3.3.2	Operating limits of contactor relays		N
9.3.3.2.1	Power-operated equipment:		N
8.2.1.2.1	Electromagnetic contactors and starters		N
	rated control supply voltage U_s		N
	frequency		N
	declared ambient temperature(>40 °C) for 100% U_s		N
	limits of close satisfactorily at any value between 85% and 110% of rated control supply voltage U_s		N

	limits of drop out and open fully are: 75% to 20% for a.c. and 75% to 10% for		N
	ambient temperature(-5 °C) for 100% Us		N
	limits of close satisfactorily at any value between 85% and 110% of rated control supply voltage Us		N
	Limits of drop out and open fully are: 75% to 20% for a.c. and 75% to 10% for		N
8.2.1.2.2	Contactors and starters with electronically controlled electromagnet		N
	Rated control supply voltage Us		N
	Frequency		N
	Declared ambient temperature(>40 °C) for 100% Us		N
	Limits of close satisfactorily at any value between 85% and 110% of rated control supply voltage Us		N
	Limits of drop out and open fully are: 75% to 20% for a.c. and 75% to 10% for		N
	Ambient temperature(-5 °C) for 100% Us		N
	Limits of close satisfactorily at any value between 85% and 110% of rated control supply voltage Us		N
	Limits of drop out and open fully are: 75% to 20% for a.c. and 75% to 10% for		N
8.2.1.2.3	Electro-pneumatic contactors and starters		N
	Rated air supply		N
	Declared ambient temperature(>40 °C) for 100% of the rated air supply pressure(Bar)		N
	Limits of close satisfactorily at any value between 85% and 110% of rated air supply pressure(Bar)		N
	Limits of drop out and open fully are: 75% to 10% of rated air supply		N

	Ambient temperature(-5 °C) for 100% of the rated air supply pressure(Bar)		N
	Limits of close satisfactorily at any value between 85% and 110% of rated air supply		N
	Limits of drop out and open fully are: 75% to 10% for the rated air supply		N
8.3.3.3	Temperature rise		N
	ambient temperature 10-40		N
	test enclosure W x H x D (mm x mm x		N
	material of		N
	NO-contacts, test conditions:		N
	- rated operational current I _e		N
	- cable cross-section		N
	- temperature rise of NO terminals	See table 1	N
	NC-contacts, test conditions:		N
	- rated operational current I _e		N
	- cable cross-section		N
	- temperature rise of NC terminals	See table 1	N
	Coils and electromagnets, test conditions:		N
	- rated control supply voltage U _s		N
	- Class of insulating	E	N
	- temperature rise of coil and electromagnets	See table 1	N
8.3.3.4	Test of dielectric properties, impulse withstand voltage (U_{imp} indicated):		P
	- verification by measurement of clearances instead of testing		P
	- rated impulse withstand voltage		P
	- test U _{imp} auxiliary circuits		P
	Test of dielectric properties, dielectric withstand voltage (U _{imp} not indicated):		P
	- rated insulation voltage		P
	- control and auxiliary circuits, test voltage (V) for 5		P
8.2.4	Mechanical properties of terminals		P
8.2.4.2	Mechanical strength of terminals		P

	maximum cross-sectional area of conductor (mm ²)		-
	diameter of thread		-
	torque		-
	5 times on 2 separate clamping units		P
8.2.4.3	Testing for damage to and accidental loosening of conductor (flexion test)		-
	conductor of the smallest cross-sectional area (mm ²)		-
	number of conductor of the smallest cross section		—
	diameter of bushing hole		—
	height between the equipment and the platen (mm)		—

EN 60947-5-1			
Clause	Requirement – Test	Result - Remark	Verdict
	mass at the conductor(s) (kg)		—
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		-
8.2.4.4	Pull-out test		P
	force (N)		—
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		P
	Flexion test		-
	conductor of the largest cross-sectional area (mm ²)		-
	number of conductor of the largest cross-section :		—
	diameter of bushing hole (mm)		—
	height between the equipment and the platen (mm)		—
	mass at the conductor(s) (kg)		—
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		
	Pull-out test		P
	force (N)		—
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		P
	Flexion test		-
	conductor of the largest and smallest cross-sectional area		—
	number of conductor of the smallest cross sectional, number of conductor of the largest cross		—
	diameter of bushing hole (mm)		—
	height between the equipment and the platen (mm)		—
	mass at the conductor(s) (kg)		—

EN 60947-5-1			
Clause	Requirement – Test	Result - Remark	Verdict
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		P
	Pull-out test		P
	force		—
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		P

8.3.1.a	TEST SEQUENCE II (sample No. 2)		-
Test No. 1	- Making and breaking capacities of switching elements under normal conditions (8.3.3.5.2)		P
Test No. 2	- Dielectric verification (8.3.3.5.5.b)		P
8.3.3.5	TEST SEQUENCE II		P
8.3.3.5.2	Making and breaking capacities of switching elements under normal conditions		P
	contact element (figure / form)		-
	contact polarity		-
	utilization		-
	rated operational voltage U_e		-
	rated operational current I_e (A) or power		-
Test No.1	- test voltage $U/U_e = 1,1$		-
	- power factor/time		-
	- make operations: test current I/I_e		-
	- break operations: test current I/I_e		-
	- a.c. test: Inductor shunted by a resistor taking 3% of the total power consumed - d.c. test: test current increase from zero to steady-state value within limits of figure 9		-
	- on-time		-
	- operating cycles per	6	-
	- number of operating	50	P
	- test voltage $U/U_e = 1,0$		P
	- power factor/time		P
	- make operations: test current I/I_e		P
	- break operations: test current I/I_e		P
Test No. 2	- on-time		P
	- operating cycles per	Rapidly	P
	- number of operating	10	P
Test No. 3	- on-time		P
	- operating cycles per	60	P
	- number of operating	990	P

Test No. 4	- on-time		P
	- operating cycles per	6	P
	- number of operating	5000	P
	Behaviour and condition during and after the test:		P
	- no electrical or mechanical failures		P
	- no contact welding or prolonged arcing		P
	- no blowing of the fusible element in the earth circuit		P
	Dielectric verification:		-
	dielectric test voltage (V) 2 xUe with a min.of 1000V.....		P

8.3.1.a	TEST SEQUENCE III (sample No. 3)		P
Test No. 1	- Making and breaking capacities of switching elements under abnormal conditions (8.3.3.5.3)		P
Test No. 2	- Dielectric verification (8.3.3.5.5.b)		P
8.3.3.5	TEST SEQUENCE III		
8.3.3.5.3	Making and breaking capacities of switching elements under abnormal conditions:		-
	contact element (figure / form)		P
	contact polarity		-
	utilization		—
	rated operational voltage U_e		—
	rated operational current I_e (A) or power		—
	Conditions, make/break operations:		P
	- test voltage $U/U_e = 1,1$		—
	- power factor/time		—
	- make operations: test current I/I_e		—
	- break operations: test current I/I_e		—
	- a.c. test: Inductor shunted by a resistor taking 3% of the total power consumed - d.c. test: test current increase from zero to steady-state value within limits of figure 9		P
	- on-time		—
	- operating cycles per	6	—
	- number of operating	10	P
	Behaviour and condition during and after the test:		P
	- no electrical or mechanical failures		P
	- no contact welding or prolonged arcing		P
	- no blowing of the fusible element in the earth circuit		P
	Dielectric verification:		P
	dielectric test voltage (V) $2 \times U_e$ with min.of 1000V.....		P

8.3.1.	TEST SEQUENCE IV (sample No. 4)	-
Test No. 1	- Performance under conditional short-circuit current (8.3.4)	P
Test No. 2	- Dielectric verification (8.3.3.5.5.b)	P

	TEST SEQUENCE IV	-
8.3.4	Performance under conditional short-circuit current	P
	contact element (figure / form)	-
	contact polarity	-
	type of	Fuse gL/gG
	ratings of	—
	prospective current (min- 1	—
	test voltage (V) $U/U_e = 1,1$	—
	r.m.s. test current obtained	—
	power factor (max. 0,7)	-
	first CO operation by closing the separate making switch: test $(I_p / I^2dt (A /$	—
	time interval between test (min. 3	—
	second CO operation by closing the separate making switch: test $(I_p / I^2dt (A /$	—
	time interval between test (min. 3	—
	third making operation to closed switching elements: test I^2dta	—
	Behaviour of the equipment during the test:	P
	switching elements open by the normal actuating system	P
	Dielectric verification:	P
	dielectric test voltage (V) $2 \times U_e$ with min.of 1000V.....	P

8.3.1.	TEST SEQUENCE V (sample No. 5)		P
Test No. 1	- Degree of protection of enclosed control circuit-devices (Annex C of EN60947- 1)		P
Test No. 2	- Verification of actuation force or moment (8.2.5)		P
8.3.4	TEST SEQUENCE V		P
	Degree of protection of enclosed control circuit-devices		P
	The enclosed control circuit devices shall comply with the requirements of Annex C of		P
	Verification of actuation force or moment		P
8.2.5	When required in 7.1.4.3, the minimum actuating force or moment shall be tested during sequence V of 8.3.1. The performance shall be as stated in 7.1.4.3		-
7.1.4.3	Actuating force (or moment)		P
	The force (or moment) required to operate the the actuator shall be compatible with the intended application, taking into account the size of the actuator, the type of enclosure or panel, the environment of the installation and the use for which it is intended		P
	The minimum starting force (or moment) shall be sufficiently large to prevent inadvertent operation; e.g. push-buttons and rotary switches to be used with enclosures complying with degrees of protection IPX5 or IPX6 shall not become actuated when hit by the jet of water applied during the test of the enclosed equipment.		P

8.3.1.	TEST SEQUENCE VI (sample No. 6)		-
Test No. 1	- Measurement of clearances and creepage distances, if applicable (7.1.3)		P
Test No. 2	- Verification of limitation of rotation of a rotary switch (8.2.6)		P
8.3.4	TEST SEQUENCE VI		P
	Measurement of clearances and creepage distances, if applicable (7.1.3)		P
	Clearances and creepage distances according Annex D	See clause 7.1.3	P
	Verification of limitation of rotation of a rotary switch (8.2.6)		P
8.2.6	When this test is required in 7.1.4.4, it shall be tested during sequence VI of 8.3.1 The test sample shall be mounted according to the manufacturers instructions		P
7.1.4.4	Limitation of rotation (of a rotary switch)		P
	When actuators with limited or unidirectional movement are used, they shall be fitted with robust means of limitation, capable of withstanding five times the actual maximum actuating		P
8.2.6	The operating moment shall be measured five times and the maximum value recorded.		P
	The maximum moment value, multiplied by five, shall be applied to the actuator by forcing it against the means of limitation. The moment shall be applied for 10 s.		P
	Means of limitation has not moved, become loose or prevented the actuator's normal		P

	Annex C of EN60947-1		-
Annex C	Degree of protection of enclosed control circuit-devices		P
C.1	Scope		-
	This annex applies to degrees of protection of enclosed switchgear and control gear at rated voltages not exceeding 1000 V a.c. or 1500 V		-
C.2	Object		-
	Clause 2 of EN60529 applies with additional requirements of this annex		-
C.3	Definitions		-
	Clause 3 of EN60529 applies except that "Enclosure" is replaced by the following:		-
	"A part providing a specified degree of protection of equipment against certain external influences and a specified degree of protection against approach to or contact with live parts and moving parts"		-
C.4	Designation		-
	Clause 4 of EN60529 applies except for letters H, M and S		P
C.5	Degrees of protection against access to hazardous parts and against ingress of solid foreign objects indicated by the first characteristic		-
	Clause 5 of EN60529 applies		P
C.6	Degrees of protection against ingress of water indicated by the second characteristic numeral		
	Clause 6 of EN60529 applies		-
C.7	Degrees of protection against access to hazardous parts indicated by the additional letter		P
	Clause 7 of EN60529 applies		P
C.8	Supplementary letters		P
	Clause 8 of EN60529 applies		P
C.9	Examples of designations with IP Code		P
	Clause 9 of EN60529 applies		P
C.10	Marking		-
	Clause 10 of EN60529 applies with the following addition:		P

EN 60947-5-1			
Clause	Requirement – Test	Result - Remark	Verdict
	If the IP Code is designated for one mounting position only, it shall be indicated by the symbol 0623 of ISO 7000 placed next to the IP Code specifying this position of the equipment, e.g. vertical		P
C.11	General requirements for the tests		-
C.11.1	Clause 11.1 of EN60529 applies		P
C.11.2	Clause 11.2 of EN60529 applies with the following additions:		P
	All tests are made in the unenergized state		P
	Certain devices(e.g. exposed faces of push- buttons) can be verified by		P
	The temperature of the test sample shall not deviate from the actual temperature by more than 5 K		P
	Where equipment is mounted in an empty enclosure which already has an IP code the following requirements apply:		P
	a) For IP1X to IP4X and additional letters A to D This shall be verified by inspection and compliance with the enclosure manufacturer's instructions		P
	b) For IP6X dust test This shall be verified by inspection and compliance with the enclosure manufacturer's instructions		P
	c) For IP5X dust test and IP1X to IP8X water tests Testing of the enclosed equipment is only required where the ingress of dust or water may impair the operation of the equipment		P
C.11.3	Subclause 11.3 of EN60529 applies with the following addition:		P
	Drain and ventilating holes are treated as normal openings		P
C.11.4	Clause 11.4 of EN60529 applies		P
C.11.5	Where an empty enclosure is used as a component of an enclosed equipment, Clause		P
C.12	Degrees of protection against access to hazardous parts indicated by the first characteristic numeral		-
	Clause 12 of EN60529 applies except for 12.3.2		N

C.13	Degrees of protection against ingress of solid foreign objects indicated by the first characteristic numeral	N
	Clause 13 of EN60529 applies except for	N
C.13.4	Dust test for first characteristic numerals 5 and 6	N
	Enclosed equipment having a degree of protection IP5X shall be tested according to category 2 of 13.4 of EN60 529	N
	Enclosed equipment having a degree of protection IP6X shall be tested according to category 1 of 13.4 of EN60 529	N
C.13.5.2	Acceptance conditions for first characteristic numeral 5	N
	The following text to be added:	N
	Where dust deposits could raise as to the correct functioning and safety of the equipment, a preconditioning and a dielectric test shall be conducted as follows:	N
	The preconditioning, after dust test, shall be verified by test Ca: damp heat, steady state, according to EN60068-2-3, under the following conditions.	N
	The equipment shall be prepared so that the dust deposits are subjected to the test by leaving open the lid and/or removing parts, where possible without the aid of tool	N
	Before being placed in the chamber the equipment shall be stored at room temperature at least 4 h before the test	N
	The test duration shall be 24 consecutive hours	N
	After this period the equipment is to be removed from the chamber within 15 min and submitted to a power-frequency dielectric test for 1 min, the value being 2 U _{max} with a	N
C.14	Tests for protection against ingress of water indicated by the second characteristic numeral	N
C.14.1	Clause 14.1 of EN60529 applies	N
C.14.2	Clause 14.2 of EN60529 applies	N
C.14.3	Clause 14.3 of EN60529 applies with following addition:	N
	The equipments then submitted to a power-frequency dielectric test for 1 min, the value being 2 U _{max} with a minimum of 1000 V	N
C.15	Tests for protection against access to hazardous parts indicated by additional letter	N
	Clause 15.1 of EN60529 applies	N
C.16	Summary of responsibilities of relevant technical committees	N

EN 60947-5-1			
Clause	Requirement – Test	Result - Remark	Verdict
	Special tests ----- Durability tests		-
C.1.1	Durability declaration		-
	The special durability tests described in this annex are conducted at the discretion of the manufacturer		-
	Declared number of operating cycles by the manufacturer:		-
	- mechanical		-
	- electrical		-
C.1.2	Test procedures		-
	As stated in 8.3.2.1 and at a rate equal or higher than that declared by the manufacturer		-
	The moving parts of the device shall reach their maximum operating positions in both directions, as recommended by the		-
C.1.2.2	Single 8 test		-
	Eight control circuit devices shall be tested to the declared number of operating cycles		-
	If the number of failed devices does not exceed two, the test is considered passed		-
C.1.2.3	Double 3 test		-
	Three control circuit devices shall be tested to the declared number of operating cycles		-
	The test is considered passed if there is no failure, and failed if there is more than one		-
	Should there be only one failure, then three additional control devices are tested to the declared number of operating cycles and providing there is no additional failure, the test is considered passed.		-
C.1.3	Failure criteria		-
	During the tests described in C.2.2 and C.3.2, there shall be no electrical and/or mechanical failures		-
	Following the tests, the switching element shall pass the dielectric test of 8.3.3.4 with a rated test voltage equal to 2 Ue with a minimum of		-
C.2	Mechanical durability		-

C.2.1	General		-
	The mechanical durability of a control circuit device is defined as the number of no-load operating cycles which will be attained or exceeding by 90 % of all devices tested without repair or replacement of any part.		P
C.2.2	Test procedures		-
	Test are carried out according to C.1.2.		P
	During the test, periodically the contacts shall be checked at any voltage and current, selected by the manufacturer, and there shall	(see C.1.3)	P
C.3	Electrical durability		-
C.3.1	General		-
	Electrical durability of a control device is defined as the number of on-load operating cycles which will be attained or exceeded by 90% of all devices tested, without repair or replacement of any part		P
C.3.2	Test procedures		-
	Electrical durability tests are carried out by operating the device under the conditions defined in table C.1, in accordance with C.3.2.1 for a.c. or with c.3.2.2. for d.c		-
	Each mechanical operation cycle shall include an interruption of the test current		P
	The ON- duration of the current shall not more 50% and not-less than 10% of an operating		P
	If the test circuit shown in figure C.1 is used, the ON-duration of current at 10 times I_e shall not cause overheating		P
	Alternatively these test may be performed on the actual load for which the control switch is intended		P
C.3.2.1	AC test		-
	Used circuit:		-
	The circuit to be used as shown in fig C.1:		-
	- Making circuit consisting air-cored inductor, in series with resistor, power factor of 0,7		P
	- Breaking circuit consisting air-cored inductor, in series with resistor, parallel damping resistor in which flows 3 % of breaking current, power factor of 0,4		P

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	If the contact element has a bounce time less than 3 ms, the test may be made with the simplified circuit shown in Figure C.2		P
C.3.2.2	D.C Tests		P
	Used inductor		P
	The circuit to be used as shown in fig C.1:		-
	- circuit consisting air-cored inductor, in series with resistor, parallel damping resistor across the complete circuit in which flows 1 % of test current power factor of T 0,95 or		P
	-circuit consisting iron-cored inductor, in series with resistor, power factor of T0,95 T 0,95 = 6 x P for P< 50 W		P

	Annex D		-
Annex D	Clearance and creepage distances of control circuit devices		P
D3	General		-
D3.1		See clause 7.1.3	-

	Annex E		-
Annex E	Items subject to agree between manufacturer and user		-
	Annex J of EN60947-1 applies, as far as covered by clauses and of this standard, with the following additions		-
5.2.5	Relationship between the positions of the actuator of rotary switches and the associated contact element positions in the operating diagram (indication by the		P
5.2.6	Characteristics of the delay of time contact elements with adjustable delay of contactors relays (indication by		P
6.1.1	Choice of connecting conductors for position switches with direct opening action		P
8.3.1	Test sequences made on one sample only (at manufacturer's request)		P
8.3.4.3	Conditional short-circuit current test:		P

	- adjustment of the test current if the prospective current is different from 1000 A (to be specified by the manufacturer)		P
	- power factor of the test circuit less than 0,5 (with manufacturer's consent)		P

	Annex F	-

Annex F	Class II control circuit devices insulated by encapsulation Requirements and tests	-
F.1	General	P
	This annex specifies constructional requirements and tests for class II control circuit devices or parts of devices in which insulation of class II according to EN61140 is achieved by encapsulation	P
	All non-encapsulated parts shall have clearances and creepage distances double to those specified in 7.1.3	P
F.5	Marking	-
	Control devices according to this annex shall be marked with the following symbol	P
F.7	Instructional and functional requirements	-
F.7.1	Choice of compound	-
	The compound shall be chosen so that the encapsulated control devices comply with the tests defined in F.8.	P
F.7.2	Adhesion of the compound	-
	The adhesion of the compound shall be sufficient to prevent the ingress of moisture between the compound and all encapsulated parts and to prevent movement of the encapsulated portion of cable if any.	-
	Compliance shall be verified by tests of F.8.2.5 and F.8.1.2.2.	P
F.7.3	Dielectric properties	-
	Sub-clause 7.2.3 applies with the following changes:	-

	For the verification of the impulse withstand voltage, the test voltage U_{imp} shall be the next higher category of the maximum rated operational voltage in the first column of Table 11A of EN60947-1		P
	For verification of the power frequency withstand voltage, the test voltage shall be the sum of the voltage stated in Table 12A of EN60947-1 plus 1000 V.		P
F.8	Tests		-
F.8.1	Kind of tests		-
F.8.1.1	General		-
	Subclause 8.1.1 of EN60947-1 applies		P
F.8.1.2	Type test		-
	The following sequence of 6 tests shall be applied to each of 3 samples in the specified order		-
F.8.1.2.1	Dielectric tests in new conditions		-
	Subclause 8.3.3.4 of EN60947-1 applies with the exception that the values of voltages shall be applied between the stripped joined ends of the cable or the shorted terminals and any point of the surface (or metallic foil on the surface) of the encapsulated device (see fig 8.3.3.4 of EN60947-1)		-
	No breakdown of the insulation shall occur		P
F.8.1.2.2	Cable tests (if applicable)		-
	Control circuit devices provided with integrally connected cables shall comply with the requirements of Annex G		P
F.8.1.2.3	Rapid change of temperature test		-
	Test Na shall be performed in accordance with EN60068-2-14 with the following values:		-
	T_a and T_b are the minimum and the maximum temperatures stated in f.2.3		-
	Transition time t_2	$t_2 = 2$ to 3 min	-
	Number of cycles	5	-
	Exposure time t_1	$t_1 = 3$ h	-
	After the test no visible damage shall be observed		-
F.8.1.2.4	Impact test		-

	The test is performed as follow:		-
	Three impacts of 0,5 Joule shall be applied near the centre of the largest surface or the longest axis (for cylindrical shape) of the encapsulated		-
	The impacts are provided by dropping a steel ball of 0,25 kg from a height of 0,20 m		-
	The support is considered sufficiently rigid if its displacement under the impact energy is lower than 0,1 mm		-
	After the test no visible damage shall be observed		-
F.8.1.2.5	Damp heat, cyclic		-
	Test Db shall be performed in accordance with EN60068-2-30 with the following values:	-	-
	Upper temperature	-	-
	Number of cycles	-	-
	Variant	-	-
	After the test no visible damage shall be observed		-
F.8.1.2.6	Dielectric test after stresses		-
	Test of dielectric properties, dielectric withstand voltage (Uimp not indicated):		-
	- rated insulation voltage (V) - test voltage (V) for 5 sec		P
	Leakage current measurements at 1,1 Ui		P

	Annex G	-

Annex G	Additional requirements for control circuit devices with integrally connected cables	-
G.1	General	-
	This annex gives additional requirements applying to control circuit devices with integrally connected cables for electrical connection to other equipment and / or to the	-

	The cable integrally connected to such control devices is not considered replaceable by the user.		P
	This annex states the constructional and performance requirements for the cable, the cable anchorage and the cable		-
G.7	Constructional and performance requirements		-
G.7.1	Constructional requirements		-
G.7.1.1	Cable material		-
	The control device shall provided with flexible cable of appropriate voltage, current and temperature rating and environmental		P
G.7.1.2	Cable anchorage		-
	The cable anchorage shall be such that a force being applied to the cable is not transmitted to electrical connections integral		P
	Movement of the cable intro or out of the control circuit device shall not cause damage to the connection or internal parts of the		P
G.7.1.3	Cable entrance sealing means		-
	A sealing means shall provided at the cable entrance to the control circuit device suitable for the degree of protection or internal parts of the device		P
G.7.2	Performance requirements		-
	The cable and the cable entrance sealing means shall be capable of withstanding the tests given in G.8		P
G.8	Tests		-
	The purpose of these tests is to ensure integrity of the cable anchorage during handling and installation. Once installed, the control circuit device and cable should be fixed relative to each other		-
G.8.1	Type test		-
	The following sequence of four test shall be performed on a representative sample in the specified order		-
G.8.1.1	Pull test		-
	The cable shall be subjected to a steady pull along the axis of the cable entry, applied to the insulating jacket of the cable for a duration of 1 min		-

	The pull force for a cable diameter greater than or equal to 8 mm	F= 160 N	P
	The pull force for cable diameters of less than 8 mm shall be of a value of 20 times the external cable diameter		P
G.8.1.2	Torque test		-
	The cable shall be subjected to a torque of 0,1 Nm or limited to the value giving an angle of torque of 360°		-
	The torque shall be applied clockwise and then counter-clockwise for 1 min, to the cable at a distance of 100 mm from the control circuit device entrance		P
G.8.1.3	Push test		-
	The push force shall be applied along the axis of the cable as close as possible to the cable entrance		-
	The force is increased to 20 N. The force shall be applied for 1 min for each time and with 1 min pause between applications		P
	After the tests, no visible damage of the cable entrance sealing means and no displacement of the cable shall be observed		P
G.8.1.4	Bend test		-
	The cable shall beloaded and bent in the following manner:		-
	a) suspend a 3 kg mass by attaching it to the cable, 1 m from the cable entrance and with the axis of the cable entrance vertical		P
	b) tilt the control circuit device 90° to cause a 90° bend in the cable, maintaining that position for 1 min		P
	c) tilt the contral device 90° in the opposite direction relative to vertical so as to cause an opposite 90° bend in the cable, maintaining the posisiton for a duration of 1 min.		P
G.8.2	Results to be obtained		-
	There shall be no damage to the cable, cable sealing means, cable entrance or the electrical connecting means of the control		P
	This will be verified by visual examination and verification of compliance with the stated IP designation	See 7.1. 11	P

	Annex H	-

Annex H	Additional requirements for semiconductor switching elements for control circuit devices	P
H.3	Classification	P
H.3.1	Semiconductor switching elements	P
	1) Utilization categories (see 4.4. and H.4.2)	P
	2) Electrical ratings based on utilization categories (see annex A)	P
H.5	Product information	-
	The following information shall be given by the manufacturer:	-
	Clause 5.1 applies with the following additions:	-
	Basic rated values and utilization	-
	a) Voltage drop (H.7.1.1)	-
	b) Minimum operational current	-
	c) Off-state current	-
	d) Making and breaking capacities	-
	e) Conditional short-circuit current	-
	f) Electromagnetic compability, EMC	-
H.8	Tests	-
H.8.1	Type test	-
	Subclause 8.1.2 applies with the following additions:	-
H.8.2	Voltage drop (U_d)	-
	The voltage drop is measured across the active output of the switching element in the ON state and carrying the current range of I_m and I_o at an ambient temperature of $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$ and at rated frequency.	-
	The measurement is performed with the circuit in figure H.2, with the switch S closed. The loads shall be resistive and R_2 is adjusted to obtain the test current with the supply	-

	Voltage drop at I_m		-
	Voltage drop at I_e		-
	The measured voltage drop exceed not the specified value in H.7.1.1		P
H.8.3	Minimum operational current (I_m)		-
	The test is performed with the switching element connected to a test circuit shown in fig H.2. With supply voltage (U_e), the switch open and the switching element in ON-state conduction, the resistive load R_1 is adjusted to obtain the current I_m		-
	The measured value shall be according to H.7.1.2		P
H.8.4	OFF-state current (I_r)		-
	With the circuit in Figure H.2, and the S switch closed, the load R_2 is adjusted to obtain the rated operational current (I_e) when the highest supply voltage (U_e) is connected to the circuit. The switching element is then turned off and the OFF-state current is measured.		-
	The measured value shall be according to H.7.1.3		P
H.8.5	Making and breaking capacities		-
	Subclause 8.3.3.5 applies		-
8.3.3.5.2	Making and breaking capacities of switching elements under normal conditions		P
	contact element (figure / form)		-
	contact polarity		-
	utilization		-
	rated operational voltage U_e		-
	rated operational current I_e (A) or power		-
Test No.1	- test voltage $U/U_e = 1,1$		-
	- power factor/time		-
	- make operations: test current I/I_e		-
	- break operations: test current I/I_e		-

	- a.c. test: Inductor shunted by a resistor taking 3% of the total power consumed - d.c. test: test current increase from zero to steady-state value within limits of figure 9		-
	- on-time		-
	- operating cycles per	6	-
	- number of operating	50	P
	- test voltage $U/U_e = 1,0$		P
	- power factor/time		P
	- make operations: test current I/I_e		P
	- break operations: test current I/I_e		P
Test No.	- on-time		P
	- operating cycles per	Rapidly	P
	- number of operating	10	P
Test No.	- on-time		P
	- operating cycles per	60	P
	- number of operating	990	P
Test No.	- on-time		P
	- operating cycles per	6	P
	- number of operating	5000	P
	Behaviour and condition during and after the test:		-
	- no electrical or mechanical failures		P
	- no contact welding or prolonged arcing		P
	- no blowing of the fusible element in the earth circuit		-
	Dielectric verification:		-
	dielectric test voltage (V) $2 \times U_e$ with a min. of 1000V.....		P
8.3.3.5.3	Making and breaking capacities of switching elements under abnormal conditions:		-
	contact element (figure / form)		P

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	contact polarity		P
	utilization		—
	rated operational voltage U_e		—
	rated operational current I_e (A) or power		—
	Conditions, make/break operations:		
	- test voltage $U/U_e = 1,1$		—
	- power factor/time		—
	- make operations: test current I/I_e		—
	- break operations: test current I/I_e		—

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Clause	Requirement – Test	Result - Remark	Verdict
	- a.c. test: Inductor shunted by a resistor taking 3% of the total power consumed - d.c. test: test current increase from zero to steady-state value within limits of figure 9		P
	- on-time		—
	- operating cycles per	6	—
	- number of operating	10	P
	Behaviour and condition during and after the		P
	- no electrical or mechanical failures		P
	- no contact welding or prolonged arcing		P
	- no blowing of the fusible element in the earth circuit		P
	Dielectric verification:		P
	dielectric test voltage (V) 2 xUe with min.of 1000V.....		P
H.8.6	Performance under short-circuit conditions		-
8.3.4	Performance under conditional short-circuit current		P
	contact element (figure / form)		-
	contact polarity		-
	Maximum cable length	2 m	-
	type of	Fuse gL/gG	—
	ratings of		—
	prospective current (min- 1		—
	test voltage (V) 1,1 x		—
	r.m.s. test current obtained		—
	power factor (0,5- 0,7) / T _{0,95}		P
	first CO operation by closing the separate making switch: test (I _p / I ² dt (A /		—

	time interval between test (min. 3		—
	second CO operation by closing the separate making switch: test (I_p / I^2dt (A /		—
	time interval between test (min. 3		—
	third CO operation by closing the separate making switch: test (I_p / I^2dt (A / A^2s)		—
8.3.4.4	Condition of the switching element after the test		-
	switching elements open by the normal actuating system		P
	Dielectric verification:		-
	dielectric test voltage (V) $2 \times U_e$ with min.of 1000V.....		P
H.8.7	Verification of electromagnetic compability		-
H.8.7.1	General		-
	Emission and immunity tests are type tests and shall be carried out under the following common conditions		-
	The switching element is mounted in free air connected to a load corresponding to the rated operational current (I_e) and is supplied with its rated operational voltage (U_e), or the maximum voltage of its voltage range		-
	The connecting leads shall be 2 m length		-
	The tests shall be performed: a) with the switching element in the ON-state b) with the switching element in the OFF-state		-
H.8.7.2	Immunity		-
H.8.7.2.1	General		-
	Performance criteria are based on the acceptance criteria in table 24 of		P
H.8.7.2.2	Electrostatic discharges		-
	The test shall be performed according to EN61000-4-2 and Table H.1		P
H.8.7.2.3	Radiated radio-frequency electromagnetic fields		-

	The test shall be performed according to EN61000-4-3 and Table H.1		P
H.8.7.2.4	Electrical fast transients/bursts		-
	The test shall be performed according to EN61000-4-4 and Table H.1, with the connecting leads of the device placed in the		P
H.8.7.2.5	Surges		-
	The test shall be performed according to EN61000-4-5 and Table H.1, with the following additional requirements in order to simplify the test procedure without impairing the validity of the verification of the EMC requirements:		-
	- the switching element is powered during the test - the tes impulse shall be applied: - a) between terminals intended to be connected to the power supply - b) between each output terminal and each terminal intended to be connected to the power supply		-
	Three positive and three negative impulses shall be applied between each two points at intervals of not less than 5 s		P
H.8.7.2.6	Conducted disturbances induced by radio-frequency fields		-
	The test shall be performed according to EN61000-4-6 and Table H.1.		P
H.8.7.2.7	Power-frequency magnetic fields		-
	The test shall be performed according to EN61000-4-8 and Table H.1. Applicable only to equipment cantaining devices susceptible to power-frequence magnetic fields		P
H.8.7.2.8	Voltage dips and interruptions		-
	The test shall be performed according to EN61000-4-11 and Table H.1. Applicable only to a.c. switching elements		P
H.8.7.3	Emission		-
	The test shall be performed under worst case conditions according to CISPR 11 Group 1, Class A, and 7.3.3.2 of EN60947-1		P

	These limits are given for switching elements exclusively intended for use in industrial environment A. When they can be used in domestic environment B, the following notice shall be included in the instructions for use		P
	Annex J		-

Annex J	Special requirements for Push Buttons and indicating towers		-
J.3	Classification		-
	Push Buttons may be classified by:		-
	rated electrical power		-
	colour		-
	Fixing hole diameter		-
	Means of connection		-
	Nature of current and frequency		-
	Type of lamp socket		-
J.4	Characteristics		-
J.4.1	Rated operational voltage of an Push Button		-
J.4.2	Rated thermal power of an Push Button		-
J.4.3	Rated values of the lamp		-
J.5	Product information		-
	a - manufacturer's name or trademark		-
	b - type designation or serial number		-
	c – the following markings shall appear on the Push Button		-
	1 rated voltage of Push Button		-
	2 rated voltage of the lamp		-
	3 rated power of the lamp or its type designation, or rated current for a LED		-
J.6	Normal service, mounting and transport conditions		-
	There are no supplementary requirements		N

J.7	Constructional and performance requirements		-
	Clause 7 applies with the following additions		P
J.7.1.12	Push Buttons with build-in transformers		-
	The transformer shall have separate windings		-
	It is assumed that this condition is fulfilled if the Push Button passes the test described in 8.3.3.4.1		-
J.7.1.13	Colour of the lens		-
	It is recommended that the colour of the lens be chosen among those mentioned in EN60073 and also in Publication No. 2 of the International Commission of Illumination (CIE)		P
	The colour shall be remain essentially unchanged in spirit of the adverse environment, including the effect of ultra-violet light		P
	Colours used for identification shall bright and easily distinguishable		P
J.7.2.1.6	Limits of operation		-
	The limit value of the supply voltage at the terminals of the Push Button shall be 1,1, times the rated operational voltage		P
	This requirement is verified only for Push Buttons with built-in transformer according the test described in J.8.3.3.3		P
J.7.2.5.1	Short-circuit withstandability of build-in transformer		-
	The transformer shall be able to withstand the short-circuit of its secondary winding.		P
	It is assumed that this condition is fulfilled if the Push Button passes the test described in		P
J.8	Tests		-
J.8.3	Tests for Push Buttons and indicator towers		-
	The tests are type tests. No additional test (routine test or special test) is described in this annex		P
	Each of the tests in J 8.3.3.3, -3.4, -4, and j.8.4 shall be made on new apparatus		P
J.8.3.3.3	Temperature-rise test		-
	a) If the Push Button has the same rated thermal power (see J.4.2) regardless of mounting conditions , a single test is made in an insulated enclosure.		P

	b) If the rated thermal power (see J.4.2) is dependent on themounting conditions, two tests are made: - on a steel plate, and - in an insulated enclosure		P
	c) Mounting on a steel plate Five Push Buttons fitted with green lenses are fixed in accordance with the following diagram on a steel plate 2 mm thick, painted black		P
	The plate is located vertically on a table and the Push Buttons are supplied at their rated		P
	The duration of the test shall besuch that a steady-state temperature is reached		P
	d) Mounting in a insulating enclosure The test deccribed in item c) is carried out again. With the lights into an enclosure of insulating material, such as bakelite-coated paper 2 mm thick		P
	The plate is located vertically on a table and the Push Buttons are supplied at their rated		P
	The duration of the test shall besuch that a steady-state temperature is reached		P
	Results obtained on the follow points:		P
	- on the body of the Push Button		P
	- on the terminals		P
	- on the accessible part of the lens		P
	f) For indicating towers, an arrangement of 5 units shall be mounting in vertical position. The shall be loaded maximum power of the lanp at the nominal voltage		P
	The duration of the test shall besuch that a steady-state temperature is reached		P
	- on the accessible part of the centre lens of the tower		P
	None of the corresponding temperature rises exceed the limits of 7.2.2 of		P
J.8.3.3.4	Dielectric tests		-
	Clause 8.3.3.4 applies		P
J.8.3.3.4.	Push Buttons with build-in transformers		-
	Two additional dielectric tests shall be made, the duration of each being 1 min		P

	- between the primary and secondary windings of the transformer with the test voltage value specified in 8.3.3.4		P
	- between the secondary windings of the transformer and the frame of the Push Button with a test voltage of 1000 V		P
J.8.3.4	Short-circuit test (on built-in transformer, if any)		-
	The test are made under the following conditions:		P
	- primary voltage: $1,1 \times U_e$		P
	- ambient air temperature: $20\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$		P
	- duration: 1 h		P
	The transformer shall be short-circuit by a conductor of negligible impedance		P
	After the test and after cooling to ambient, temperature, the transformer withstand the dielectric test defined in		P
J.8.3.3.4.	Push Buttons with build-in transformers		-
	Two additional dielectric tests shall be made, the duration of each being 1 min		P
	- between the primary and secondary windings of the transformer with the test voltage value specified in 8.3.3.4		P
	- between the secondary windings of the transformer and the frame of the Push Button with a test voltage of 1000 V		P
J.8.4	Shock and vibration		-
J.8.4.1	Direct mounting		P
J.8.4.1.1	General		P
	An indicating tower with five signaling units shall be mounted as stated by the manufacturer without extension poles and the upper three units powered at the rated voltage		P
	The test shall be performed as follows		P
J.8.4.1.2	Shock		-
	In accordance with EN60068-2-27 with the follow conditions		P
	Six shocks applied in each direction along three perpendicular axes (a total of 36 shocks:	- pulse shape :half-sine - peak acceleration: $15\text{ }g_n$ - duration of pulse: 11 ms	P
J.8.4.1.3	Vibration		-

	In accordance with EN60068-2-6 with the following conditions, along three mutually perpendicular axes:	- frequency range:10 to 55 Hz - amplitude: 0,5 mm - sweep cycle duration: 5 min - duration at resonant frequency or at 55 Hz: 30 min in each of the 3 axes (90 min in total)	P
J.8.4.2	Indirect support mounting		P
	If the product literature includes other allowable mounting conditions (e.g. pole mounting), the manufacturer shall state the severity level for shock and vibration tests at which the requirements of J.8.4.3 are met		-
J.8.4.3	Results to be obtained		-
	After the tests, no visible damage shall be observed and the signaling shall not be impaired		P
J.8.5	Degree of protection for indicating towers		-
	If the manufacturer declares a degree of protection, the test shall be conducted according to Annex C of EN60947-1 with all removable parts equipped as in normal		P

	Annex K	-
Annex K	Special requirements for control switches with direct opening action	-
K.1	General	-
K.1.1	Scope	-
	All control switches with direct opening action shall also comply with the relevant requirements of the standard and, where applicable. To those given in Annexes F, G, H and/or J	-
K.3	Classification	-
	There are two types of control switches with direct opening action:	-
K4	Characteristics	-
K.4.3.1.2	Rated insulation voltage (= 250 V)	P
K.4.3.2.1	Conventional free air thermal current (= 10 A)	P
K.4.4	Utilization categories for switching elements (AC-15 or DC-13)	P

K.5	Product information		-
	Clause 5 is applies with the following additions		-
K.5.2	Marking		-
K.5.2.7	Every contact element with direct action shall be marked on the out side by the symbol		-
K.5.2.8	Electrical separation for change-over contact element		-
	Change-over contact elements with four terminal shall be indelibly and legibly marked with the relevant form Zap or Zebu as state in Figure 4.		-
K.5.2	Additional product information		-
K.5.4.1	Actuator travel and operation force		-
	The manufacturer shall state the following		-
	a) the minimum direct opening force		-
	b) the minimum force to achieve direct opening action of all break contacts		-
	c) the maximum travel including travel beyond the minimum travel position		-
	d) for limit switches only the maximum speed of actuation		-
	e)for limit switches only the maximum frequency of actuation		-
	These statements shall appear in the marking or on the circuit diagram or other documents		P
K.5.4.2	Short-circuit protection		-
	Type of short-circuit protective device shall stated either as marking on the switch or in the installation instruction		P
K.6	Normal service, mounting and transport conditions		-
	Clause 6 applies, with the following additions:		P
K.6.1.1	Ambient air temperature		-
\	Subclause 6.1.1 of EN60947-1 applies, except for position switches with direct opening action, for which the upper and lower limits of temperature are respectively +70 °C and +25 °C, and the average temperature, measured over a period of 24 h, does not		P
K.7	Constructional and performance requirements		-
	Clause 7 applies with following additions:		-
K.7.1.4.3.	Robustness of the actuating system		-

	The actuating system shall pass the test described in K.8.3.7		P
K.7.1.4.3.	Directness of the opening action		-
	The control switch with direct opening action shall pass the tests K.8.3.4, K.8.3.5 and K.8.3.7 without any deformation that would reduce the impulse voltage withstand across the contact gap.		P
K.1.4.5	Automatic opening of called operated control switches		-
	In case of failure of the cable or its anchorage automatic return to open position		P
K.7.1.4.6	Conditions for direct opening action		-
	Parts of travel that separates the contacts, shall have no resilient member (springs) between the moving contacts and the point of the actuator to which the actuating force is		P
K.7.1.4.6.	Contact elements types		-
	Control switches with direct opening action may provided with snap-on or dependent action contact elements		P
	Break-contact shall be electrically separated from each other and from the operating make- contact element		P

EN 60947-5-1			
Clause	Requirement – Test	Result - Remark	Verdict
	If C or Za change-over contact elements, only 1 contact element shall be used, and in case of Zebu change-over, both may be used		P
K.7.1.5.3	Actuator travel indication		-
	In order to facilitate the setting-up of the switch actuator in relation to the external operating means, the switch may include means for indicating the minimum travel		P
K8	Tests		-
	In addition to clause 8, and Annex, the following applies		-
K.8.3.1	Test sequences		-
	Clause 8.3.1 applies with the following additions:		-
			-
	TEST SEQUENCE VII (Sample 7)		-
	Mechanical operation of position switches with direct opening action		-
K.8.3.5	Test no.1 - Mechanical operation of position switches at limits of temperature.		-
K.8.3.6	Test no.2 – Verification of direct opening action		-
			-
K.8.3.5	Mechanical operation of position switches at limits of temperature.		P
	The position switch shall be conditioned at 70°C for 8		P
	After 8 hours the contact shall be loaded with the maximum rated operational current for 10		P
	The contact then be operated 10 times by the application of the force stated by the manufacturer		P
	The test shall be repeated, the switch shall be conditioned at - 25 °C for 8		P
	The contact then be operated 10 times by the application of the force stated by the manufacturer		P
K8.3.6	Verification of direct opening action		-

	Impulse voltage test over the open position of the contacts at 2500 V or for position switches for isolation in accordance with table 14 of EN60 947-1 or as declared Uimp by the		P
	5 positive and 5 negative impulses are applied		P
	TEST SEQUENCE VIII (Sample 8)		-
K.8.3.7	Verification of robustness of the actuating system		-
K.8.3.7	Verification of robustness of the actuating system		-
	Closed break contact(s) shall be loaded with a force F1 of 10		P
	Stated openings force shall be applied to the actuator through the direct opening travel ... :		P
	After the test the actuating system and / or contacts shall remain functional..... :		P
	Impulse voltage test in accordance with K.8.3.6		-
	Impulse voltage test over the open position of the contacts at 2500 V or for position switches for isolation in accordance with table 14 of EN60 947-1 or as declared Uimp by the		P
	5 positive and 5 negative impulses are applied		P
K.8.3.4	Performance under conditional short circuit current		-
	Subclause 8.3.4 applies with the following additions:		-
K.3.4.2.1	Verification of the conditional short-circuit current samples 4, 9 10		-
	The test shall be made as state in .3.4.2, except that the current is made by a positive opening contact and not by the additional switching device and the test is made on each of the tree devices by making the current three times by the same contact element in a single phase		-
	For type 2 control switches, the contact element shall be chosen at random		-
	Performance under conditional short-circuit current		-
	contact element (figure / form)		-
	contact polarity		-

	type of		—
	ratings of		-
	prospective current (min- 1		-
	test voltage (V) $U/U_e = 1,1$		-
	r.m.s. test current obtained		-
	power factor (max. 0,7)		-
	Sample 4		-
	first C operation by closing the switch element (I_p / I^2dt (A / A ² s)		P
	time interval between test (min. 3 min)		-
	second C operation by closing the switch element (I_p / I^2dt (A / A ² s)		P
	time interval between test (min. 3 min)		-
	third C operation by closing the switch element: (I_p / I^2dt (A / A ² s)		P
	Sample 9		-
	first C operation by closing the switch element (I_p / I^2dt (A / A ² s)		P
	time interval between test (min. 3 min)		-
	second C operation by closing the switch element (I_p / I^2dt (A / A ² s)		P
	time interval between test (min. 3 min)		-
	third C operation by closing the switch element: (I_p / I^2dt (A / A ² s)		P
	Sample 10		-
	first C operation by closing the switch element (I_p / I^2dt (A / A ² s)		P
	time interval between test (min. 3 min)		-
	second C operation by closing the switch element (I_p / I^2dt (A / A ² s)		P
	time interval between test (min. 3 min)		-

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	third C operation by closing the switch element: (I_p / I^2dt (A / A ² s)):		P
	After the test the actuating system and / or contacts shall remain functional..... :		P
	Impulse voltage test in accordance with K.8.3.6		-
	Impulse voltage test over the open position of the contacts at 2500 V or for position switches for isolation in accordance with table 14 of EN60 947-1 or as declared U _{imp} by the		-
	5 positive and 5 negative impulses are applied		P

EN 60947-5-1			
Clause	Requirement – Test	Result - Remark	Verdict
Annex L			-

Annex L	Special requirements for mechanically linked contact elements		-
L.1	General		-
	This annex applies to mechanically linked auxiliary contact elements included in control circuit devices where actuating force is provided internally, such as contactor relays		-
	Linkage between the auxiliary and main contacts is not covered by this annex		-
L.5	Product information		-
	Clause 5 applies with the following addition		-
L.5.2.7	Mechanically linked contact elements identification and marking		-
	Mechanically linked contact elements shall be clearly identified:		-
	- on the control circuit device itself; - or in the manufacturers documentation - or both		P
	The mechanical linkage shall be identified in circuit diagrams by a double parallel line connecting a filled circle on each of the mechanically linked contact symbols.		-
	If the devices containing some or all mechanically linked contacts are marked, the symbol shown shall be used		P
L.7	Constructional and performance requirements		-
	Clause 7 applies with the following addition:		P
L.7.1.9	Requirements for mechanically linked contact elements		-
	While any of the n Make contact element(s) is closed, none of the m Break contacts element(s) shall be closed		P
	While any of the m Break contact element(s) is closed, none of the n Make contacts element(s) shall be closed		P
L.8	Tests		-
	Clause 8 applies with following addition:		P
L.8.4.	Special test for mechanically linked contact elements		P
	This special test shall be carried out on a sample of (m+n) products where m is the number of break contacts elements and n is the number of make elements		-
	A different sample is used for each test		P

	The test shall be carried out on products in new and clean condition		-
	The test procedure shall be as follows:		P
	a) test of NC contact:		P
	1) the NC contact elements shall be maintained in the closed position e.g. by welding or gluing each point of contact (e.g. for double breaking contact, welding is done at the two contact points) The thickness of welding or gluing shall be such that the distance between contacts is not modified by more than 0,02 mm		P
	2)an actuating force shall be applied by energising the operating coil at 110 % of its rated voltage		P
	3) while applying the force, an impulse test voltage of 2,5 kV (1,2/50 μ s at sea level; correction should be made according to table 12 of IEC60947-1 shall be applied across every NC contact. There shall be no disruptive		P
	b) test of NO contact:		-
	1) the NO contact elements shall be maintained in the closed position e.g. by welding or gluing each point of contact (e.g. for double breaking contact, welding is done at the two contact points) The thickness of welding or gluing shall be such that the distance between contacts is not modified by more than 0,02 mm		P
	2)an actuating force shall be applied by de- energising the operating coil		P
	3) while applying the force, an impulse test voltage of 2,5 kV (1,2/50 μ s at sea level; correction should be made according to table 12 of IEC60947-1 shall be applied across every NO contact. There shall be no disruptive		P

EN IEC 60947-2			
Clause	Requirement - test	Result-Remark	Verdict
5.2	MARKING		-
a)	The following data shall be marked on the circuit-breaker itself or on a name plate or nameplates attached to the circuit-breaker, and located in a place such that they are visible and legible when the circuit-breaker is installed.		-
	- rated current:		N
	- suitability for isolation, if applicable, with the symbol Λ -"	Compliance	P
	- indication of the open and closed position: with O and I respectively, if symbols are used	Compliance	P
b)	Marking on equipment not needed to be visible after mounting:		-
	- manufacturer's name or trademark		P
	- type designation or serial number	ETWF4007 2P In: 10A Ue:AC240V Icu:10A Ics:10A	P
	- IEC 60947-2 if the manufacturer compliance with this standard.		P
	- utilization category	A	P
	- rated operational voltage(s) Ue	550	P
	- Circuit-breaker for use in IT systems: Circuit-breaker for which all values of rated voltage have not been tested according to annex H or are not covered by such testing, shall be identified by the symbol® which shall be market on the circuit-breaker immediately following these values of	Compliance	P
	- value (or range) of the rated frequency and/or the indication DC (or symbol)	AC	N/A
	- rated service short-circuit breaking capacity. Ics		P
	- rated ultimate short-circuit breaking capacity. Icu	10A	P
	- rated short-time withstand current, (I _{ew}) and associated short-time delay, for utilization category B	-	N/A
	- line and load terminals, unless their connection is immaterial	-	N/A
	-neutralpoleterminals,ifapplicable,bytheletter N	-	N/A
	- protective earth terminal, where applicable, by the symbol acc. 7.1.9.3 of part 1	-	N/A

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EN IEC 60947-2			
Clause	Requirement - test	Result-Remark	Verdict
	- ref. temperature for non-compensated thermal releases, if different from 30°C	40 °C	P
c)	Marked on the circuit-breaker as specified in item b), or shall be made available in the manufacturer's published information:		-
	- rated short-circuit making capacity (I _{cm}) (if higher than specified in 4.3.5.1		P
	- rated insulation voltage. (U _i) if higher than the maximum rated operational voltage)		P
	- rated impulse withstand voltage (U _{imp}), when declared.		P
	- pollution degree if other than 3	-	N/A
	- conventional enclosed thermal current (I _{the}) if different from the rated current:	-	N/A
	- IP Code, where applicable:	IP20	P
	- minimum enclosure size and ventilation data (if any) to which marked ratings apply:	-	N/A
	- details of minimum distance between circuit-breaker and earthed metal parts for circuit-breaker intended for use without	Compliance	P
	- r.m.s sensing if applicable, according to F.4.1.1	-	N/A
	- suitability for environment A or B	A	P
d)	The following data concerning the opening and closing devices of the circuit-breaker shall be placed either on their own nameplates or on the nameplate of the circuit- breaker:		-
	- rated control circuit voltage of the closing device, and rated frequency for AC:	-	N/A
	- rated control circuit voltage of the shunt release and/or of the under-voltage release, and rated frequency:	-	N/A
	- rated current of indirect over-current releases:	-	N/A
	- number and type of auxiliary contacts and kind of current, rated frequency (if AC) and rated voltages of the auxiliary switches, if different from those of the main circuit.		N/A
e)	Terminal shall be clearly and permanently identified in acc. with IEC 60445 and annex L:		-
	- line terminal	-	N/A
	- load terminal	-	N/A
	- neutral pole terminal "N"	-	N/A
	- protective earth terminal ®	-	N/A
	- terminal of coils (A/B)	-	N/A
7.1	CONSTRUCTION		
7.1.1	Withdrawable circuit-breaker	-	N/A
	In the disconnected position (main- and auxiliary circuits)		-

EN IEC 60947-2			
Clause	Requirement - test	Result-Remark	Verdict
	Isolating distances for circuit-breaker suitable for isolating warranted:	-	N/A
	Mechanism fitted with a reliable indicating device with indicates the position of the isolating contacts.	-	N/A
	Mechanism fitted with interlocks witch only permit the isolating contacts to be separate or re-closed when main contacts are open	-	N/A
	Mechanism fitted with interlock witch only permit the main contacts to be closed when the isolating contacts are fully closed.	-	N/A
	Mechanism fitted with interlock witch only permit the main contacts to be closed when in disconnected position.	-	N/A
	The isolating distances between the isolating contacts cannot be inadvertently reduced.	-	N/A
7.1.1.1	Resistance to abnormal heat and fire	650 °C 960 °C	P
7.1.2	Current-carrying parts and their connection	Compliance	P
7.1.3	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:		-
	- max. value of rated operational voltage to earth		-
	- nominal voltage of supply system:		-
	- overvoltage category:	IV	-
	- pollution degree:	3	-
	- field-in or homogeneous:	Inhomogeneous	-
	- minimum clearances (mm):	6 mm	-
	- measured clearances (mm):	11,4 mm	P
	Creepage distances:		-
	- rated insulation voltage Ui (V)		-
	- pollution degree	3	-
	- comparative tracking index (V)		-
	- material group		-
	Minimum creepage distances (mm)	12,1 mm	-
	Measured creepage distances (mm)	12,1mm	P
7.1.4	Actuator		-
7.1.4.1	Insulation		-

EN IEC 60947-2			
Clause	Requirement - test	Result-Remark	Verdict
	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	Compliance	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	Compliance	P
7.1.4.2	Direction of movement		-
	The direction of operation for actuators of devices shall normally conform to IEC 60447.	Compliance	P
	Where devices cannot conform to these requirements, e.g. due to special applications or alternative mounting positions, they shall be clearly marked such that there is no doubt as to the "I" and "O" positions and the direction of operation	Compliance	P
7.1.5	Indication of contact position		-
7.1.5.1	Indicating means		-
	When an equipment is provided with means for indicating the closed and open positions, these positions shall be unambiguous and clearly indicated	Compliance	P
	This is done by means of a position indicating device (see 2.3.18)	Compliance	P
	If symbols are used, they shall indicate the closed and open position respectively, in accordance with IEC 60417-2:		-
	- 60417-2-IEC-5007 1 On (power)	Compliance	P
	- 60417-2-IEC-5007 O Off (power)	Compliance	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
7.1.5.2	Indication by the actuator		

EN IEC 60947-2			
Clause	Requirement - test	Result-Remark	Verdict
	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	On position Off position Trip position	P
7.1.6	Additional safety requirements for equipment suitable for isolation		-
7.1.6.1	Additional constructional requirements for equipment suitable for isolation ($U_e > 50$ 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 provided by one or more of the following means:		-
	- the position of the actuator	Compliance	P
	- a separate mechanical indicator	-	N/A
	- visibility of the moving contacts	-	N/A
	When means are provided or to lock the equipment in the open position, locking only be possible when contacts are in the open position	-	N/A
	Actuator front-plate fitted to the equipment in a manner which ensures correct contact position indication and locking	-	N/A
	The indicated open position is the only position in which the specified isolation distances between the contacts is ensured.	Compliance	P
	- minimum clearances across open contacts (see Table XIII, Part I) (mm):	6 mm	
	- measured clearances (mm):	11,4 mm	P
	- test U_{imp} across gap (kV):		P
7.1.6.2	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		N/A

EN IEC 60947-2			
Clause	Requirement - test	Result-Remark	Verdict
	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's instructions		N/A
	Compliance shall be verified by measuring the time interval between the instant of opening of the auxiliary switch and the instant of opening of the main poles under no-load conditions when the equipment is operated according to the manufacturer's instructions		N/A
	During the closing operation the contacts of the auxiliary switch shall close after or simultaneously with the contacts of the main poles	-	N/A
	A suitable opening time interval may also be provided by an intermediate position (between the ON and OFF position) at which the interlocking contact(s) is (are) open and the main poles remain closed		N/A
7.1.6.3	Supplementary requirements for equipment provided with means for padlocking the open position:		-
	the locking means shall be designed in such a way that it cannot be removed with the appropriate padlock(s) installed	-	N/A
	Alternatively, the design may provide padlockable means to prevent access to the actuator	-	N/A
	test force F applied to the actuator in an attempt to operate to the closed position (N):	-	N/A
	rated impulse withstand voltage (kV):	-	N/A
	test Uimp on open main contacts at the test force	-	N/A
7.1.7	Terminals		-
7.1.7.1	All parts of terminals which maintain contact and carry current shall be of metal having adequate mechanical strength	Compliance	P
	Terminal connections shall be such that necessary contact pressure is maintained	Compliance	P
	Terminals shall be so constructed that the conductor is clamped between suitable surfaces without damage to the conductor and terminal	Compliance	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	Compliance	P
7.1.7.2	Connection capacity		-

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EN IEC 60947-2			
Clause	Requirement - test	Result-Remark	Verdict
	type of conductors:	Flexible and stranded type	P
	minimum cross-sectional area of conductor (mm ²):	10mm ² or 8AWG [40 A]	P
	maximum cross-sectional area of conductor (mm ²):	120mm ² or 250kcmil [125 A]	P
	number of conductors simultaneously connectable to the terminal:	1	P
7.1.7.3	Connection		
	terminals for connection to external conductors shall be readily accessible during installation	Compliance	P
	clamping screws and nuts shall not serve to fix any other component	Compliance	P
7.1.7.4	Terminal identification and marking		-
	terminal intended exclusively for the neutral conductor	-	N/A
	protective earth terminal	-	N/A
	other terminals	-	N/A
7.1.8	Additional requirements for equipment provided with a neutral pole		
	When an 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 a appropriate making and breaking capacity is used as a neutral pole, then all poles, incl. the neutral pole, shall operate substantially together.		N/A
7.1.9	Provisions for protective earthing		
7.1.9.1	The exposed conductive parts (e.g. chassis, framework and fixed parts of metal enclosures) other than those which cannot constitute a danger shall be electrically interconnected and connected to a protective earth terminal for connection to an earth electrode or to an external protective conductor		N/A
part 1	This requirement can be met by the normal structural parts providing adequate electrical continuity and applies whether the equipment is used on its own or incorporated in an assembly		N/A

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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
7.1.9.2	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
7.1.9.3	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
7.1.10	Enclosure for equipment		-
7.1.10.1	Design		-
	The enclosure, when it is opened: all parts requiring access for installation and maintenance are readily accessible	-	N/A
	Sufficient space shall be provided inside the enclosure	-	N/A
	The fixed parts of a metal enclosure shall be electrically connected to the other exposed conductive parts of the equipment and connected to a terminal which enables them to be earthed or connected to a protective conductor		N/A

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Clause	Requirement - test	Result-Remark	Verdict
	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 front of the enclosure	-	N/A
7.1.10.2	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
7.1.11	Degree of protection of enclosed equipment		-
	Degree of protection.	IP20	-
	Test for first characteristic.	IPXX	-
	Test for first numeral	1 2 3 4	N/A
	Test for second characteristic	IPXX	-
	Test for second numeral	1 2 3 4 5	N/A
7.1.12	Conduit pull-out, torque and bending with metallic conduits		-
	Polymeric enclosures of equipment, whether integral or not, provided with threaded conduit entries, intended for the connection of extra heavy duty, rigid threaded metal conduits complying with IEC 60981, shall withstand the stresses occurring during its installation such as pull-out, torque, bending		N/A
7.2	Performance requirements		-
7.2.1	Operating condition		-
7.2.1.1	Closing		-

EN IEC 60947-2			
Clause	Requirement - test	Result-Remark	Verdict
	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	Compliance	P
7.2.1.1.1	Dependent manual closing		-
	For a circuit-breaker having a dependent manual closing mechanism, it is not possible to assign a short-circuit making capacity rating irrespective of the conditions of mechanical operation		N/A
	Such a circuit-breaker should not be used in circuits having a prospective peak making current exceeding 10 kA	-	N/A
	However, this does not apply in the case of a circuit-breaker having a dependent manual closing mechanism and incorporating an integral fast-acting opening release which causes the circuit-breaker to break safely, irrespective of the speed and firmness with which it is closed on to prospective peak current exceeding 10 kA; in this case, a rated short-circuit making capacity can be assigned		N/A
7.2.1.1.2	Independent manual closing		-
	A circuit-breaker having an independent manual closing mechanism can be assigned a short-circuit making capacity rating irrespective of the conditions of mechanical operation	Compliance	P
7.2.1.1.3	Dependent power closing		-
	At 110% of the rated control supply voltage, the closing operation performed on no-load shall not cause any damage to the circuit-breaker.	-	N/A
	At 85% of the rated control supply voltage, the closing operation shall be performed when the current established by the circuit-breaker is equal to its rated making capacity within the limits allowed by the operation of its relays or releases and, if a maximum time is stated for the closing operation, in a time not exceeding this maximum time limit.		N/A
7.2.1.1.4	Independent power closing		
	A circuit-breaker having an independent power closing operation can be assigned a rated short-circuit making capacity irrespective of the conditions of power closing		N/A
	Means for charging the operating mechanism, as well as the closing control components, shall be capable of operating in accordance with the manufacturer's specification		N/A
7.2.1.1.5	Stored energy closing		-
	Capable ensuring closing of the circuit-breaker in any condition between no-load and its rated making capacity	-	N/A

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Clause	Requirement - test	Result-Remark	Verdict
	- when the stored energy is retained within the circuit-breaker, a device is provided which indicates when the storing mechanism is fully charged.	-	N/A
	- means for charging the operating mechanism and closing control components operates when auxiliary supply voltage is between 85% and 110% of the rated control supply voltage.		N/A
	- not possible for the moving contacts to move from the open position, unless the charge is sufficient for satisfactory completion of the closing operation.	-	N/A
	- by manually operated circuit-breaker is the direction of operation indicated,		N/A
	(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		N/A
7.2.1.2.2	Opening by undervoltage releases		-
7.2.1.3.	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.	Operating time		-
	For a time-delay under-voltage relay or release, the time-lag shall be measured from the instant when the voltage reaches the operating value until the instant when the relay or release actuates the tripping device of the equipment		N/A
7.2.1.2.3	Opening by shunt releases	-	N/A
7.2.1.4	Limits of operation of shunt releases		-

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Clause	Requirement - test	Result-Remark	Verdict
	A shunt release for opening shall cause tripping under all operating conditions of an equipment		N/A
	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		
7.2.1.5	Limits of operation of current operated relays and releases		-
	Limits of operation of current operated relays and releases shall be stated in the relevant product standard	-	N/A
7.2.1.2.4	Opening by over-current releases		-
a)	Opening under short-circuit conditions		-
	The short-circuit release shall cause tripping of the circuit-breaker with an accuracy of 20% of the tripping current value of the current setting for all values of the current setting of the short-circuit current release	Compliance	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)	Compliance	P
	- I_2t characteristics for circuit-breakers of utilization category A and, if applicable, B for circuit-breakers with instantaneous override (see not to 8.3.5)	Compliance	P
b)	Opening under overload conditions		-
1)	Instantaneous or definite time-delay operation	-	N/A
	The release shall cause tripping of the circuit-breaker with an accuracy of +10% of the tripping current value of the current setting for all values of current setting of the overload release		N/A
2)	Inverse timer-delay operation		-
	At the reference temperature and at 1,05 times the current setting with the conventional non-tripping current, the opening release being energized on all poles, tripping shall not occur in less than the conventional time from the cold state, i.e. with the circuit-breaker at the reference temperature	Compliance	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	Compliance	P
	If a release is declared by the manufacturer as substantially independent of ambient temperature, the current values of table 6 shall apply within the temperature band declared by the manufacturer, within a tolerance of 0,3%/K	Compliance	P

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Clause	Requirement - test	Result-Remark	Verdict
	The width of the temperature band shall be at least 10 K on either side of the reference temperature	Compliance	P
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	Compliance	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	Compliance	P
8	TESTS		-
8.2.4	Mechanical properties of terminals		-
	Mechanical strength of terminals		-
	maximum cross-sectional area of conductor (mm ²):	-	-
	diameter of thread (mm):	8	-
	torque (Nm):	6	-
	5 times on 2 separate clamping units Nm	6,6	P
	Testing for damage to and accidental loosening of conductor (flexion test)		-
	conductor of the smallest cross-sectional area (mm ²):	-	-
	number of conductor of the smallest cross section :	-	-
	diameter of bushing hole (mm):	-	-
	height between the equipment and the platen :	-	-
	mass at the conductor(s) (kg):	-	-
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit	-	N/A
	Pull-out test		-
	force (N):		-
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit	-	N/A
	conductor of the largest cross-sectional area (mm ²):	-	-
	number of conductor of the largest cross section:	-	-
	diameter of bushing hole (mm):	-	-
	height between the equipment and the platen :	-	-
	mass at the conductor(s) (kg):	-	-
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit	-	N/A
	Pull-out test		-

EN IEC 60947-2			
Clause	Requirement - test	Result-Remark	Verdict
	force (N):	-	-
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit	-	N/A
	conductor of the largest and smallest cross-sectional area (mm ²):	-	-
	number of conductor of the smallest cross section, number of conductor of the largest cross section:	-	-
	diameter of bushing hole (mm):	-	-
	height between the equipment and the platen :	-	-
	mass at the conductors) (kg):	-	-
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit	-	N/A
	Pull-out test		-
	force (N):	-	-
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit	-	N/A
8.3.3	TEST SEQUENCE I: GENERAL PERFORMANCE CHARACTERISTICS		-
8.3.3.1	Tripping limits and characteristic		-
8.3.3.1.2	Opening under short-circuit conditions		-
	Manufacturer's name or trademark	Wenzhou Yijie Electric Co., Ltd	-
	Type designation or serial number	ETWF4007 2P In: 10A Ue: AC240V Icu: 10A Ics: 10A	-
	Sample no:		-
	Rated operational voltage: Ue (V)		-
	Rated current: In (A)		-
	Ambient temperature 10-40 °C :	25 °C	P
	Value of the tripping current declared by the manufacturer for a single pole, at which value they shall operate.		P
	Range of adjustable setting current. (A)	(I _m =5~10xI _r)	P
	Time delay stated by the manufacturer, in the case of definite time delay releases.	-	N/A
	Test current: 80% of the rated, or minimum adjustable setting current: (A)		P

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Clause	Requirement - test	Result-Remark	Verdict
	Operating time: >0,2s in case of instantaneous releases: L1-L2: 12.1.4.	L1-L2: >0.1 s	P
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: 12.1.4.		N/A
	Test current: 80% of the maximum adjustable setting current: (A)	2000 A(I _m =10x r)	P
	Operating time: >0,2s in case of instantaneous releases: L1-L2: 12.1.4.	L1-L2: >0.3 s	P
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: 11.1.3.		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: 12.1.4.	L1-L2: 0.0275 s , 12.1.4: 0.0256 s	P
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: 11.1.3.		N/A
	Test current: 120% of the maximum adjustable setting current: (A)	3000 A(I _m =10x r)	P
	Operating time: <0,2s in case of instantaneous releases: L1-L2: 12.1.4.	L1-L2: 0.0248 s	P
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: 11.1.3. + 12.1.3.		N/A
	Test current: tripping current declared for single pole operation (A)		P
	Operating time: < 20 ms in case of instantaneous release: L1: 12.		N/A

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Clause	Requirement - test	Result-Remark	Verdict
	Operating time: < twice time delay stated by manufacturer in case of definite time delay releases L1: L2:		N/A
8.3.3.1.3	Opening under overload conditions		-
a)	Instantaneous or definite time-delay releases		-
	Manufacturer's name or trademark	-	-
	Type designation or serial number	-	-
	Sample no:	-	-
	Rated operational voltage: Ue (V)	-	-
	Rated current: In (A)	-	-
	Ambient temperature 10-40 °C :	-	N/A
	Value of the tripping current declared by the manufacturer for a single pole, at witch value they shall operate.	-	N/A
	Range of adjustable setting current. (A)	-	N/A
	Time delay stated by the manufacturer, in the case of definite time delay releases.	-	N/A
	Test current: 90% of the rated, or minimum adjustable setting current: (A)	-	N/A
	Operating time: >0,2s in case of instantaneous releases:	-	N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay	-	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)	-	N/A
	Operating time: <0,2s in case of instantaneous releases	-	N/A
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases.	-	N/A
b)	Inverse time delay releases		-
	Manufacturer's name or trademark	Wenzhou Yijie Electric Co., Ltd	-

EN IEC 60947-2			
Clause	Requirement - test	Result-Remark	Verdict
	Type designation or serial number	ETWF4007 2P In: 10A Ue:AC240V Icu:10A Ics:10A	-
	Sample no:	Smart Switch BREAKER	-
	Rated operational voltage: Ue (V)	AC 240 V	-
	Rated current: In (A)	10A	-
	For releases dependent of ambient air temperature: Referencetemperature	40 °C	P
	Test ambient temperature (°C)	25 °C	P
	Iftestmadeatadifferenceambienttemperature: Acc. Manufacturer's correction	See Remarks	P
	Range of adjustable setting current: (A)	0,8/ 0,9/1,0 x In	P
	For releases independent of ambient temperature: Test made at 30°C and/or at 20/40°C	-	N/A
	Test ambient air temperature:	-	N/A
	Releases, dependent of ambient air temperature: Reference	40 °C	P
	Releases, independent of ambient airtemperature: at30°C	-	N/A
	Test current: 105% of the rated, or minimum adjustable setting current: (A)		P
	Conventional non-tripping time: 1h when In < 63A, 2h when In > 63 A	2h	P
	Test current: 130% of the rated, or minimum adjustable setting current: (A)		P
	Conventional tripping time:	40495s	P
	Test current: 105% of the maximum adjustable setting current: (A)		P
	Conventional non-tripping time: 1 h when In < 63A, 2h when In > 63 A	2 h	P
	Test current: 130% of the maximum adjustable setting current: (A)		P
	Conventional tripping time:	129s	P
	Releases, independent of ambient airtemperature: at 20°C or40°C		-
	Test ambient air temperature:	-	N/A
	Test current: 105% of the rated, or minimum adjustable setting current: (A)	-	N/A

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Clause	Requirement - test	Result-Remark	Verdict
	Conventional non-tripping time: 1h when $I_n < 63A$, 2h when $I_n > 63A$	-	N/A
	Test current: 130% of the rated, or minimum adjustable setting current: (A)	-	N/A
	Conventional tripping time:	-	N/A
	Test current: 105% of the maximum adjustable setting current: (A)	-	N/A
	Conventional non-tripping time: 1 h when $I_n < 63A$, 2h when $I_n > 63A$	-	N/A
	Test current: 130% of the maximum adjustable setting current: (A)	-	N/A
	Conventional tripping time:	-	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, independent of ambient airtemperature: at 30°C	-	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		P
	Tripping time acc. Time/current characteristic of the releases conform to the curves provided by the manufacturer, (within the stated tolerances)	107 s (0,8 I_n) 91 s (1,0 I_n)	P
	Releases, independent of ambient airtemperature: at 20°C or 40°C		-
	Test ambient air temperature:	-	N/A
	Test current: at current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer. % at the rated or minimum adjustable setting		N/A
	Tripping time acc. Time/current characteristic of the releases conform to the curves provided by the manufacturer, (within the stated tolerances)	-	N/A
8.3.3.1.4	Additional test for definite time-delay releases		-
a)	Time delay		-
	Test is made at a current equal to 1,5 times the current setting		-
	overload releases: (all phase poles loaded)	-	N/A
	short-circuit releases:		N/A
	twopolesinseriescarryingthetestcurrent,using successively all possible combinations of poles having a short-circuitrelease.		-
	Test current: 1,5 times of the rated, or minimum adjustable setting current: (A)	-	N/A

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Clause	Requirement - test	Result-Remark	Verdict
	Operating time, overload releases: (s)	-	N/A
	Time-delay: between the limits stated by the manufacturer:	-	N/A
	Operating time, short-circuit releases: (s) L1-L2: L1-L3: L2-L3:	-	N/A
	Time-delay: between the limits stated by the manufacturer:	-	N/A
	Test current: 1,5 times of the maximum adjustable setting current: (A)	-	N/A
	Operating time, overload releases: (s)	-	N/A
	Time-delay: between the limits stated by the manufacturer:	-	N/A
	Operating time, short-circuit releases: (s) L1-L2: L1-L3: 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.		-
	overload releases: (all phase poles loaded)	-	N/A
	short-circuit releases: two poles in series carrying the test current, using successively all possible combinations of poles		N/A
	Test current: 1,5 times of the rated, or minimum adjustable setting current: (A)	-	N/A
	Time interval: non-tripping duration stated by the manufacturer: (s)	-	N/A
	Operating time, overload releases: the circuit-breaker does not trip:	-	N/A
	Operating time, short-circuit releases: the circuit-breaker does not trip: L1-L2:		N/A
	Test current: 1,5 times of maximum adjustable setting current: (A)	-	N/A
	Time interval: non-tripping duration stated by the manufacturer: (s)	-	N/A
	Operating time, overload releases: the circuit-breaker does not trip:	-	N/A
	Operating time, short-circuit releases: the circuit-breaker does not trip: L1-L2: L1-L3:		N/A
	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.		-
	Test current: of the rated, or minimum adjustable setting current: (A)	-	N/A

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Clause	Requirement - test	Result-Remark	Verdict
	Time interval: twice the delay-time stated by the manufacturer: (s)	-	N/A
	Operating time, overload releases: the circuit-breaker does not trip:	-	N/A
	Operating time, short-circuit releases: the circuit-breaker does not trip: L1-L2:		N/A
	Test current: maximum adjustable setting current: (A)	-	N/A
	Operating time, overload releases: the circuit-breaker does not trip:	-	N/A
	Operating time, short-circuit releases: the circuit-breaker does not trip: L1-L2:		N/A
8.3.3.2	Test of dielectric properties, impulse withstand voltage (U _{imp} indicated):		-
8.3.3.4 part	The 1,2/50 μs impulse voltage shall be applied five times for each polarity at intervals of 1 s minimum		-
	- rated impulse withstand voltage (kV):		P
	- sea level of the laboratory:	200 m	P
	- test U _{imp} main circuits (kV):		P
	- test U _{imp} auxiliary circuits (kV):	-	N/A
	- test U _{imp} control circuits (kV):	-	N/A
	- test U _{imp} on open main contacts (equipment suitable for isolating) (kV):		P
a)	Application of test voltage		-
	i) Between all terminals of the main circuit connected together (incl. control and auxiliary circuits connected to the main circuit) and the enclosure or mounting plate, with the contacts in all normal positions of operation.	Compliance	P
	ii) Between all terminals 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.	compliance	P
	iii) Between each control and auxiliary circuit not normally connected to the main circuit and: - the main circuit	Compliance	P
	- other circuits	-	N/A
	- exposed conductive parts	-	N/A
	- enclosure of mounting plate	-	N/A
	iv) equipment suitable for isolation	Compliance	P
	equipment not suitable for isolation	-	N/A
	- no unintentional disruptive discharge during the test's	Compliance	P
	Test of dielectric properties, dielectric withstand voltage (U _{imp} not indicated):		-
	- rated insulation voltage (V) :	-	N/A
	- main circuits, test voltage for 1 min (V)	-	N/A
	- auxiliary circuits, test voltage for 1 min (V)	-	N/A
	- control circuits, test voltage for 1 min (V)	-	N/A
8.3.3.2.2	Application of test voltage		-

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Clause	Requirement - test	Result-Remark	Verdict
1)	with circuit-breaker in the closed position		-
	- between all live parts of all poles connected together and the frame of the circuit-breaker.	-	N/A
	- between each pole and all the other poles connected to the frame of the circuit-breaker	-	N/A
2)	with the circuit-breaker in the open position and, additionally, in the tripped position, if any.	-	N/A
	- between all live parts of all poles connected together and the frame of the circuit-breaker.	-	N/A
	- between the terminals of one side connected together and the terminals of the other side connected together.	-	N/A
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 and 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 test's	-	N/A
8.3.3.2	For circuit-breaker suitable for isolation, the leakage current shall be measured through each pole with the contacts in the open position, at a test voltage of $1,1 U_e$, and shall not exceed 0,5mA.		N/A
8.3.3.3	Mechanical operation and operational		-
8.3.3.3.2	Construction and mechanical operation		-
a)	Construction		-
	A withdrawable circuit-breaker shall be checked for the requirements stated in 7.1.1	-	N/A
	A circuit-breaker with stored energy operation shall be checked for compliance with 7.2.1.1.5, regarding the charge indicator and the direction of operation of manual energy storing		N/A
b)	Mechanical operation		-
	A circuit-breaker with dependent power operation shall comply with the requirements stated in 7.2.1.1.3	-	N/A
	A circuit-breaker with dependent power operation shall operate with the operating mechanism charged to the minimum and maximum limits stated by the manufacturer		N/A
	A circuit-breaker with stored energy operation shall comply with the requirements stated in 7.2.1.5 with the auxiliary supply voltage at 85%		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		N/A

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Clause	Requirement - test	Result-Remark	Verdict
	below the full charge as evidenced by the indicating device		
	For a trip-free circuit-breaker it shall not be possible to maintain the contacts in the touching or closed position when the tripping release is in the position to trip the circuit-breaker		N/A
	If the closing and opening times of a circuit-breaker are stated by the manufacturer, such times shall comply with the stated values	-	N/A
c)	Undervoltage releases		-
	Undervoltage releases shall comply with the requirements of 7.2.1.3 of Part 1. For this purpose, the release shall be fitted to a circuit-breaker having the maximum current rating for which the release is suitable		N/A
i)	Drop out voltage		-
	It shall be verified that the release operates to open the circuit-breaker between the voltage limits specified	-	N/A
	The voltage shall be reduced from rated voltage at a rate to reach 0 V in approximately 30 s	-	N/A
	The test for the lower limit is made without current in the main circuit and without previous heating of the release coil	-	N/A
	In the case of a release with a range of rated voltages, this test applies to the maximum voltage of the range	-	N/A
	The test for the upper limit is made starting from a constant temperature corresponding to the application of rated control supply voltage to the release and rated current in the main poles of the circuit-breaker		N/A
	This test may be combined with the temperature-rise test of 8.3.3.6	-	N/A
	In the case of a release with a range of rated voltages, this test is made at both the minimum and maximum rated control supply voltages	-	N/A
ii)	Test for limits of operation		
	Starting with the circuit-breaker open, at the temperature of the test room, and with the supply voltage at 30% rated maximum control supply voltage, it shall be verified that the circuit-breaker cannot be closed by the operation of the actuator		N/A
	When the supply voltage is raised to 85% of the minimum control supply voltage, it shall be verified that the circuit-breaker can be closed by the operation of the actuator		N/A
iii)	Performance under overvoltage conditions		-
	With the circuit-breaker closed and without current in the main circuit, it shall be verified that the undervoltage release will withstand the application of 110% rated control supply voltage for 4 h without impairing its functions		N/A
d)	Shunt releases		-

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Clause	Requirement - test	Result-Remark	Verdict
	Shunt releases shall comply with the requirements of 7.2.1.4 of Part		N/A
	purpose, the release shall be fitted to a circuit-breaker having the maximum rated current for which the release is suitable		
	It shall be verified that the release will operate to open the circuit-breaker at 70% rated control supply voltage when tested at an ambient temperature of + 55 °C + 2 °C without current in the main poles of the circuit-breaker		N/A
	In the case of a release having a range of rated control supply voltages, the test voltage shall be 70% of the minimum rated control supply voltage	-	N/A
8.3.3.3.3	Operational performance capability without current.		-
	Type designation or serial number	ETWF4007 2P In: 10A Ue: AC240V Icu: 10A Ics: 10A	-
	Sample no:		-
	Rated current In (A)		-
	Rated operational voltage: Ue (V)		-
	Rated control supply voltage of closing mechanism: Uc (V)	-	-
	Rated control supply voltage of shunt releases: Uc (V)	-	-
	Rated control supply voltage undervoltage releases: Uc (V)	-	-
	Ambient temperature 10-40 °C :	25 °C	P
	Number of operating cycles per hour	120 cycles per hour	P
	Number of cycles without current (total) (closing mechanism energized at the rated Uc)	-	N/A
	Number of cycles without current (without releases)	7000 cycles	P
	Applied voltage: closing mechanism (V)	-	N/A
	10% of total cycles for circuit-breaker with fitted shunt release: (50% at the beginning- and 50% at the end of the test.)		N/A
	Applied voltage: shunt releases (V)	-	N/A

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Clause	Requirement - test	Result-Remark	Verdict
	10% of total cycles for circuit-breaker with undervoltage releases: (50% at the beginning- and 50% at the end of the test.)		N/A
	10 cycles without applied voltage at the undervoltage releases.	-	N/A
	Applied voltage: undervoltage releases (V)	-	N/A
	Electrical components do not exceed the value indicated in tab. 7.	Compliance	P
8.3.3.3.4	Operational performance capability with current.		-
	Rated current: I_n (A)	0,5A	-
	Maximum rated operational voltage: U_e (V)	24V	-
	Conductor cross-sectional area (mm^2):	10 mm^2 (8 AWG)	P
	Number of operating cycles per hour	120 cycles per hour	P
	Number of cycles with current (total) (closing mechanism energized at the rated U_c)	1000 cycles	P
	Applied voltage: closing mechanism (V)		P
	For circuit-breaker fitted with adjustable releases, test shall be made with the overload setting at maximum and short-circuit setting at minimum.	-	N/A
	Conditions, make/break operations:		
	- test voltage $U/U_e = 1,0$ (V) L1:	L1 :	P
	L3:	L2 :	-
	- test current $I/I_e = 1,0$ (A) L1:	L1 :	P
	L3:	L3 :	-
	- power factor/time constant:		N/A
	- frequency: (Hz)		N/A
	- on-time (ms):	1000 ms	P
	- off-time (s):	25 s	P
	Electrical components do not exceed the value indicated in tab. 7.	Compliance	P
8.3.3.3.5	Additional test of operational performance capability without current for withdrawable circuit-breaker.		
	Number of operations cycles : 100	-	N/A
	After test, the isolating contacts, withdrawable mechanism and interlocks shall be suitable for further service.	-	N/A
8.3.3.4	Overload performance		-
	this test applies to circuit-breaker of rated current up to and including 630 A		-
	Type designation or serial number		-
	Sample no:		-
	Rated current I_n (A)		-
	Rated operational voltage: U_e (V)		-
	Rated control supply voltage of closing mechanism: U_c (V)	-	-

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Clause	Requirement - test	Result-Remark	Verdict
	Rated control supply voltage of shunt releases: U_c (V)	-	-
	Rated control supply voltage undervoltage releases: U_c (V)	-	-
	Ambient temperature 10-40 °C :	25 °C	P
	Number of operating cycles per hour	120 cycles per hour	P
	Maximum rated operational voltage: U_e (V)		P
	Number of operating cycles per hour		N/A
	Number of cycles with current (total) (closing mechanism energized at the rated U_c)	-	N/A
	Applied voltage: closing mechanism (V)	-	N/A
	For circuit-breaker fitted with adjustable releases, test shall be made with the overload/short-circuit settings at maximum.	-	N/A
	Conditions, overload operations:		-
	- test voltage $U/U_e = 1,05$ (V) L1: L2:	L1 : L2 :	P
	- test current AC/DC: $I/I_e = 6,0/2.5$ (A) L1: L2:	L1 : L2 :	P
	L3:	L3 :	
	- power factor/time constant:		N/A
	- Number of cycles manually opened: 9	12	P
	- Number of cycles automatically opened by an overload release: 3	3 (at the lower voltage)	P
	- frequency: (Hz)		N/A
	- on-time max 2s:	1 s	P
8.3.3.5	Verification of dielectric withstand		-
	- equal to twice the rated operational voltage with a minimum of 1000 V		P
	- no breakdown or flashover	No	P
	- the leaking current for circuit-breaker suitable for isolation: ($<2\text{mA}/1.1 U_e$)	$< 5\mu\text{A}$ /	P
8.3.3.6	Verification of temperature-rise		
	- the values of temperature-rise do not exceed the those specified in tab. 7.	See table	P
	Temperature rise of main circuit terminals < 80 K (K):	63,7 K	P
	conductor cross-sectional area (mm^2):	120 mm^2 (250 kcmil)	P
	test current I_e (A):		P
8.3.3.7	Verification of overload releases		
	Test current: 1.45 times the value of their current setting at the reference temperature: (A)		P
	Conventional tripping time:	256 s	P
8.3.3.8	Verification of undervoltage and shunt releases		-
	Circuit-breaker fitted with undervoltage releases. The release shall not operate at 70% of the minimum control supply voltage -		N/A
	and shall operate at 35% of the maximum control supply voltage.	-	N/A

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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
8.3.3.9	Verification of the main contact position for circuit-breakers for isolation		-
	actuating force for opening (N).....	91,1 N	-
	test force with blocked main contacts for 10 s (N).:	273,4 N	-
	Dependent power operation		-
	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		-
	Three attempts to operate the equipment by the stored energy.	-	N/A
	Lockability 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	Compliance	P
8.3.4	TEST SEQUENCE II (Ics):		P
8.3.4.1	Test of rated service short-circuit breaking capacity		-
	Test sequence of operation: O -1 - CO -1 - CO		-
	Type designation or serial number	-	-
	Sample no:	-	-
	Rated current: In (A)	-	-
	Rated operational voltage: Ue (V)	-	-
	Rated service short-circuit breaking capacity: (kA)	-	-
	Rated control supply voltage of closing mechanism: Uc (V)	-	-
	Rated control supply voltage of shunt release: Uc (V)	-	-
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.	-	N/A
	closing mechanism energized with 85% at the rated Uc: (V)	-	N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.	-	N/A
	Test made in free air:	-	N/A
	Distances of the metallic screen's: (all sides)	-	N/A
	The characteristics of the metallic screen:		
	- woven wire mesh	-	N/A
	- perforated metal	-	N/A
	- expanded metal	-	N/A
	- ratio hole area/total area: 0,45-0,65	-	N/A
	- size of hole: <30mm ²	-	N/A
	- finish: bare or conductive plating	-	N/A

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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":	-	N/A
	Circuit is earthed at: (load-star- or supply-star point)	-	N/A
	Conductor cross-sectional area (mm ²):	-	N/A
	If terminals unmarked:	-	N/A
	Tightening torques: (Nm)	-	N/A
	Test sequence of operation: O -1 - CO -1 - CO	-	-
	- test voltage U/Ue = 1,05 (V)	-	N/A
	- L1:		
	- L3:		-
	- r.m.s. test current AC/DC: (A)		N/A
	- L2:		-
	- L3:		-
	power factor/time constant:	-	N/A
	- Factor "n"	-	N/A
	- peak test current (A):	-	N/A
	Test sequence "O"		-
	- max. let-through current: (kA _{peak}) L1:	-	N/A
	L3:		-
	-Joule integral I ² dt(A ² s)	-	N/A
	L1:		
	L3:		-
	Pause, t: (min)	-	N/A
	Test sequence "CO"		
	- max. let-through current: (kA _{peak}) L1:	-	N/A
	L3:		-
	-Joule integral I ² dt(A ² s)	-	N/A
	L1:		
	L3:		-
	Pause, t: (min)	-	N/A
	Test sequence "CO"		
	max. let-through current: (kA _{peak}) L1:	-	N/A
	L3:		-

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Clause	Requirement - test	Result-Remark	Verdict
	Joule integral $I^2dt(A^2s)$	-	N/A
	L1:		
	L3:		-
	Melting of the fusible element	-	N/A
	Holes in the PE-sheet for test sequence "O"	-	N/A
	Cracks observed	-	N/A
8.3.4.2	Operational performance capability with current.		-
	Rated current: I_n (A)	-	-
	Maximum rated operational voltage: U_e (V)	-	-
	Conductor cross-sectional area (mm^2):	-	-
	Number of operating cycles per hour	-	N/A
	Number (5% of the number given in column 4, tab. 8) of cycles with current (total)	-	N/A
	Applied voltage: closing mechanism (V)	-	N/A
	For circuit-breaker fitted with adjustable releases, test shall be made with the overload setting at maximum and short-circuit setting at minimum.	-	N/A
	Conditions, make/break operations:		-
	- test voltage $U/U_e = 1,0$ (V)	-	N/A
	L1:		
	L3:		-
	-testcurrent $I/I_e = 1,0$ (A)	-	N/A
	L1:		
	L3:		-
	- power factor/time constant:	-	N/A
	- frequency: (Hz)	-	N/A
	- on-time (ms):	-	N/A
	- off-time (s):	-	N/A
	Electrical components do not exceed the value indicated in tab. 7.	-	N/A
8.3.4.3	Verification of dielectric withstand		-
	- equal to twice the rated operational voltage with a minimum of 1000 V	-	N/A
	- no breakdown or flashover	-	N/A
	- the leaking current for circuit-breaker suitable for isolation: ($<2mA/1.1 U_e$)	-	N/A
8.3.4.4	Verification of temperature-rise		-
	- the values of temperature-rise do not exceed the those specified in tab. 7.	-	N/A
	Temperature rise of main circuit terminals. < 80 K (K):	-	N/A
	conductor cross-sectional area (mm^2):	-	N/A
	test current I_e (A):	-	N/A
8.3.4.5	Verification of overload releases		-
	Test current: 1.45 times the value of their current setting at the reference temperature: (A)	-	N/A

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Clause	Requirement - test	Result-Remark	Verdict
	Conventional tripping time: <1 h when $I_n < 63A$, <2h when $I_n > 63 A$	-	N/A
8.3.4	TEST SEQUENCE II/III ($I_{cs}=I_{cu}$):		-
8.3.4.1	Test, of rated service short-circuit breaking capacity		-
	Test sequence of operation: O -1 - CO -1 - CO		-
	Type designation or serial number		-
	Sample no:		-
	Rated current: I_n (A)		-
	Rated operational voltage: U_e (V)		-
	Rated service short-circuit breaking capacity: (kA)		-
	Rated control supply voltage of closing mechanism: U_c (V)	-	-
	Rated control supply voltage of shunt release: U_c (V)	-	-
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.	Compliance	P
	closing mechanism energized with 85% at the rated U_c : (V)	-	N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.	Compliance	P
	Test made in free air:	Compliance	P
	Distances of the metallic screen's: (all sides)		P
	The characteristics of the metallic screen:		
	- woven wire mesh	-	N/A
	- perforated metal	Compliance	P
	- expanded metal	-	N/A
	- ratio hole area/total area: 0,45-0,65	0,55	P
	- size of hole: <30mm ²	28 mm ²	P
	- finish: bare or conductive plating	Compliance	P
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:	-	N/A
	Fuse "F":	Compliance	P
	Circuit is earthed at: (load-star- or supply-star point)	Load-star	P
	Conductor cross-sectional area (mm ²):	120 mm ² (250 kcmil)	P
	If terminals unmarked:	upside	P
	Tightening torques: (Nm)	6,0 Nm	P
	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:	80-600 s	P

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Clause	Requirement - test	Result-Remark	Verdict
	Operation time: (s) L1:	L1 :266s	P
	Test sequence of operation: O -1 - CO -1 - CO		-
	test voltage U/Ue = 1,05 (V) L1:	L1 :DC 577.5 V L2 :DC 577.5 V	P
	r.m.s. test current AC/DC: (A) L1:	L1 :205200 A	P
8.3.5.1	L1:	L1: 205200 A	-
	power factor/time constant:	0,18	P
	- Factor "n"	2,2	P
	- peak test current (A):	457800 A	P
	Test sequence "O"		
	max. let-through current: (kApeak) L1:	L1 :2,8 kApeak	P
	L3:	L3: 16,8 kApeak	-
	-Joule integral $I^2dt(A^2s)$		-
	L1:	L1 :67,8 kA ² s	P
	L2:	L2 : 328,9 kA ² s	-
	L3:	L3: 128,9 kA ² s	-
	Pause, t: (min)	3 min	P
	Test sequence "CO"		-
	max. let-through current: (kApeak) L1:	L1 : 18,9 kApeak	P
	Joule integral $I^2dt(A^2s)$ L1:	L1 :196,1 kA ² s L2:338,3 kA ² s	P
	Pause, t: (min)	3 min	P
	Test sequence "CO"		
	- max. let-through current: (kApeak) L1:	L1 :8,1 kApeak	P
	L2:	L2 : 21,4 kA peak	
	- Joule integral $I^2dt(A^2s)$ L1:	L1 :19,9 kA ² s L2:315,4kA ² s	P
	Melting of the fusible element	No	P
	Holes in the PE-sheet for test sequence "O"	No	P
	Cracks observed	No	P
8.3.4.2	Operational performance capability with current.		-
	Rated current: In (A)		-
	Maximum rated operational voltage: Ue (V)		-
	Conductor cross-sectional area (mm ²):	120 mm ² (250 kcmil)	-
	Number of operating cycles per hour	120 cycles per hour	P
	Number (5% of the number given in column 4, tab. 8) of cycles with current (total)	50 cycles	P

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Clause	Requirement - test	Result-Remark	Verdict
	Applied voltage: closing mechanism (V)		P
	For circuit-breaker fitted with adjustable releases, test shall be made with the overload setting at maximum and short-circuit setting at minimum.	-	N/A
	Conditions, make/break operations:		-
	- test voltage $U/U_e = 1,0$ (V) L1: L2:		P
	-testcurrent $I/I_e = 1,0$ (A) L1: L2:		P
	- power factor/time constant:		N/A
	- frequency: (Hz)		N/A
	- on-time (ms):	1000 ms	P
	- off-time (s):	29 s	P
	Electrical components do not exceed the value indicated in tab. 7.	-	N/A
8.3.4.3	Verification of dielectric withstand		-
	- equal to twice the rated operational voltage with a minimum of 1000 V	1000 V	P
	- no breakdown or flashover	No	P
	- the leaking current for circuit-breaker suitable for isolation: ($<2\text{mA}/1,1 U_e$)	$< 5 \text{ uA} / \text{DC } 605 \text{ V}$	P
8.3.4.4	Verification of temperature-rise		-
	- the values of temperature-rise do not exceed the those specified in tab. 7.	See Remarks	P
	Temperature rise of main circuit terminals. $< 80 \text{ K}$ (K):	60,8K	P
	conductor cross-sectional area (mm^2):	120 mm^2 (250 kcmil)	P
	test current I_e (A):		P
8.3.4.5	Verification of overload releases		-
	Test current: 1,45 times the value of theircurrent setting at the reference temperature: (A)		P
	Conventional tripping time:	300 s	P
8.3.5.4	Verification of overload releases		-
	The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately.		-
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		-
	Time specified by the manufacturer:	80-600 s	P
	- Operation time: (s) L1: L2:	L1:142s L2:152s	P

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Clause	Requirement - test	Result-Remark	Verdict
8.3.4	TEST SEQUENCE II/III (Ics=Icu):		-
8.3.4.1	Test of rated service short-circuit breaking capacity		-
	Test sequence of operation: O -1 - CO -1 - CO		-
	Type designation or serial number		-
	Sample no:		-
	Rated current: In (A)		-
	Rated operational voltage: Ue (V)		-
	Rated service short-circuit breaking capacity: (kA)		-
	Rated control supply voltage of closing mechanism: Uc (V)	-	-
	Rated control supply voltage of shunt release: Uc (V)	-	-
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.	Compliance	P
	closing mechanism energized with 85% at the rated Uc: (V)	-	N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.	Compliance	P
	Test made in free air:	Compliance	P
	Distances of the metallic screen's: (all sides)		P
	The characteristics of the metallic screen:		
	- woven wire mesh	-	N/A
	- perforated metal	Compliance	P
	- expanded metal	-	N/A
	- ratio hole area/total area: 0,45-0,65	0,55	P
	- size of hole: <30mm ²	28 mm ²	P
	- finish: bare or conductive plating	Compliance	P
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:	-	N/A
	Fuse "F":	Compliance	P
	Circuit is earthed at: (load-star- or supply-star point)	Load-star	P
	Conductor cross-sectional area (mm ²):	10 mm ² (8 AWG)	P
	If terminals unmarked: line connected at: (underside/upside)	Upside	P
	Tightening torques: (Nm)	6,0 Nm	P
	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		-
8.3.5.1	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:	80-600 s	P
	- Operation time: (s) L1:		P

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Clause	Requirement - test	Result-Remark	Verdict
	L2:	L2:158s	-
	Test sequence of operation: O -1 - CO -1 - CO		-
	- test voltage U/Ue = 1,05 (V) L1:	L1 :577.5 V	P
	- r.m.s. test current AC/DC: (A) L1:		P
	L2:	L2:203800 A	-
	power factor/time constant:		N/A
	- Factor "n"	2,2	P
	- peak test current (A):	457800 A	P
	Test sequence "O"		
	- max. let-through current: (kApeak) L1:	L1 :12,3 kApeak	P
	- Joule integral $I^2dt(A^2s)$ L1:	L1 : 36,7 kA ² s L2:482,2 kA ² s	P
	Pause, t: (min)	3 min	P
	Test sequence "CO"		
	- max. let-through current: (kApeak) L1:	L1 : 11,5 kApeak	P
	- Joule integral $I^2dt(A^2s)$ L1:	L1 : 162,6 kA ² s L2: 85,9 kA ² s	P
	Pause, t: (min)	3 min	P
	Test sequence "CO"		
	- max. let-through current: (kApeak) L1:	L1 : 6,3 kApeak L2:15,1 kApeak	P
	-Joule integral $I^2dt(A^2s)$ L1:	L1 : 77,8 kA ² s L2:210,8 kA ² s	P
	Melting of the fusible element	No	P
	Holes in the PE-sheet for test sequence "O"	No	P
	Cracks observed	No	P
8.3.4.2	Operational performance capability with current.		-
	Rated current: In (A)	-	-
	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)	-	N/A
	Applied voltage: closing mechanism (V)	-	N/A

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Clause	Requirement - test	Result-Remark	Verdict
	For circuit-breaker fitted with adjustable releases, test shall be made with the overload setting at maximum and short-circuit setting at minimum.	-	N/A
	Conditions, make/break operations:		-
	- test voltage $U/U_e = 1,0$ (V) L1: L2:	-	N/A
	-testcurrent $I/I_e = 1.0$ (A) L1: L2:	-	N/A
	- power factor/time constant:	-	N/A
	- frequency: (Hz)	-	N/A
	- on-time (ms):	-	N/A
	- off-time (s):	-	N/A
	Electrical components do not exceed the value indicated in tab. 7.	-	N/A
8.3.4.3	Verification of dielectric withstand		-
	- equal to twice the rated operational voltage with a minimum of 1000 V		P
	- no breakdown or flashover	No	P
	- the leaking current for circuit-breaker suitable for isolation: ($<2\text{mA}/1,1 U_e$)	$< 5 \mu\text{A}$	P
8.3.4.4	Verification of temperature-rise		
	- the values of temperature-rise do not exceed the those specified in tab. 7.	-	N/A
	Temperature rise of main circuit terminals. $< 80 \text{ K}$ (K):	-	N/A
	conductor cross-sectional area (mm^2):	-	N/A
	test current I_e (A):	-	N/A
8.3.4.5	Verification of overload releases		
	Test current: 1,45 times the value of their current setting at the reference temperature: (A)		P
	Conventional tripping time:		P
8.3.5.4	Verification of overload releases		-
	The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately.		-
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		-
	Time specified by the manufacturer:	80-600 s	P
	- Operation time: (s) L1: L2:	L1:99s L2:65s	P
8.3.4	TEST SEQUENCE II/III ($I_{cs}=I_{cu}$):		-
8.3.4.1	Test of rated service short-circuit breaking capacity		-
	Test sequence of operation: O -1 - CO -1 - CO		-
	Type designation or serial number		-
	Sample no:		-

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Clause	Requirement - test	Result-Remark	Verdict
	Rated current: In (A)		-
	Rated operational voltage: Ue (V)		-
	Rated service short-circuit breaking capacity: (kA)		-
	Rated control supply voltage of closing mechanism: Uc (V)	-	-
	Rated control supply voltage of shunt release: Uc (V)	-	-
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.	Compliance	P
	closing mechanism energized with 85% at the rated Uc: (V)	-	N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.	Compliance	P
	Test made in free air:	Compliance	P
	Distances of the metallic screen's: (all sides)		P
	The characteristics of the metallic screen:		-
	- woven wire mesh	-	N/A
	- perforated metal	Compliance	P
	- expanded metal	-	N/A
	- ratio hole area/total area: 0,45-0,65	0,55	P
	- size of hole: <30mm ²	28 mm ²	P
	- finish: bare or conductive plating	Compliance	P
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:	-	N/A
	Fuse "F":	Compliance	P
	Circuit is earthed at: (load-star- or supply-star point)	Load-star	P
	Conductor cross-sectional area (mm ²):	120 mm ² (250 kcmil)	P
	If terminals unmarked:	upside	P
	Tightening torques: (Nm)	6,0 Nm	P
8.3.5.1	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		-
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		-
	Time specified by the manufacturer:	80-600s	P
	- Operation time: (s) L1:	L1 :256s	P
	Test sequence of operation: O -1 - CO -1 - CO		-
	- test voltage U/Ue = 1,05 (V) L1:	L1 : not recorded L2: not recorded	P
	- r.m.s. test current AC/DC: (A) L1:		P
	 L2:		-
	 L3:		-
	power factor/time constant:		N/A
	- Factor "n"	2,0	P

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Clause	Requirement - test	Result-Remark	Verdict
	Conditions, make/break operations:		-
	- test voltage $U/U_e = 1,0$ (V) L1: L2:		P
	-test current $I/I_e = 1.0$ (A) L1: L2:		P
	- power factor/time constant:		N/A
	- frequency: (Hz)		N/A
	- on-time (ms):	1000 ms	P
	- off-time (s):	29 s	P
	Electrical components do not exceed the value indicated in tab. 7.	-	N/A
8.3.4.3	Verification of dielectric withstand		-
	- equal to twice the rated operational voltage with a minimum of 1000 V		P
	- no breakdown or flashover	No	P
	- the leaking current for circuit-breaker suitable for isolation: ($<2\text{mA}/1,1 U_e$)	200 uA	P
8.3.4.4	Verification of temperature-rise		
	- the values of temperature-rise do not exceed the those specified in tab. 7.	See Remarks	P
	Temperature rise of main circuit terminals. < 80 K (K):	64,0 K	P
	conductor cross-sectional area (mm^2):	120 mm^2 (250 kcmil)	P
	test current I_e (A):		P
8.3.4.5	Verification of overload releases		
	Test current: 1,45 times the value of their current setting at the reference temperature: (A)		P
	Conventional tripping time:		P
8.3.5.4	Verification of overload releases		-
	The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately.		-
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		-
	Time specified by the manufacturer:	80-600s	P
	- Operation time: (s) L1:	L1 : 136s L2:158s	P
8.3.4	TEST SEQUENCE II/III ($I_{cs}=I_{cu}$):		-
8.3.4.1	Test of rated service short-circuit breaking capacity		-
	Test sequence of operation: O -1 - CO -1 - CO		
	Type designation or serial number		-
	Sample no:		-
	Rated current: I_n (A)		-

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Clause	Requirement - test	Result-Remark	Verdict
	Rated operational voltage: Ue (V)		-
	Rated service short-circuit breaking capacity: (kA)		-
	Rated control supply voltage of closing mechanism: Uc (V)	-	-
	Rated control supply voltage of shunt release: Uc (V)	-	-
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.	Compliance	P
	closing mechanism energized with 85% at the rated Uc: (V)	-	N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.	Compliance	P
	Test made in free air:	Compliance	P
	Distances of the metallic screen's: (all sides)		P
	The characteristics of the metallic screen:		
	- woven wire mesh	-	N/A
	- perforated metal	Compliance	P
	- expanded metal	-	N/A
	- ratio hole area/total area: 0,45-0,65	0,55	P
	- size of hole: <30mm ²	28 mm ²	P
	- finish: bare or conductive plating	Compliance	P
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:	-	N/A
	Fuse "F":	Compliance	P
	Circuit is earthed at: (load-star- or supply-star point)	Load-star	P
	Conductor cross-sectional area (mm ²):	120 mm ² (250 kcmil)	P
	If terminals unmarked:	Underside	P
	Tightening torques: (Nm)	6,0 Nm	P
8.3.5.1	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		-
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		-
	Time specified by the manufacturer:	80-600s	P
	- Operation time: (s)		P
	L1:	L1: 600s	
	L2:	L2: 233s	
	Test sequence of operation: O -1 - CO -1 - CO		-
	- test voltage U/Ue = 1,05 (V)		P
	L1:	L1 : not recorded	
	- r.m.s. test current AC/DC: (A) L1:		P
	L2:		-
	L3:		-
	power factor/time constant:		N/A

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Clause	Requirement - test	Result-Remark	Verdict
	- Factor "n"	2,2	P
	- peak test current (A):		P
	Test sequence "O"		-
	- max. let-through current: (kA _{peak}) L1:		P
	- Joule integral $I^2dt(A^2s)$ L1: L2:		P
	Pause, t: (min)	3 min	P
	Test sequence "CO"		-
	- max. let-through current: (kA _{peak}) L1:		P
	- Joule integral $I^2dt(A^2s)$ L1:		P
	Pause, t: (min)	3 min	P
	Test sequence "CO"		
	- max. let-through current: (kA _{peak}) L1:		P
	- Joule integral $I^2dt(A^2s)$ L1: L2:		P
	Melting of the fusible element	No	P
	Holes in the PE-sheet for test sequence "O"	No	P
	Cracks observed	No	P
8.3.4.2	Operational performance capability with current.		-
	Rated current: I _n (A)		-
	Maximum rated operational voltage: U _e (V)		-
	Conductor cross-sectional area (mm ²):	120 mm ² (250 kcmil)	-
	Number of operating cycles per hour	120 cycles per hour	P
	Number (5% of the number given in column 4, tab.	50 cycles	P
	(closing mechanism energized at the rated U _c)		
	Applied voltage: closing mechanism (V)		P
	For circuit-breaker fitted with adjustable releases, test shall be made with the overload setting at maximum and short-circuit setting at minimum.	-	N/A
	Conditions, make/break operations:		
	- test voltage U/U _e = 1,0 (V) L1: L2:		P

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Clause	Requirement - test	Result-Remark	Verdict
	-testcurrent I/le = 1,0 (A) L1: L2:		P
	- power factor/time constant:		N/A
	- frequency: (Hz)		N/A
	- on-time (ms):	1000 ms	P
	- off-time (s):	29 s	P
	Electrical components do not exceed the value indicated in tab. 7.	-	N/A
8.3.4.3	Verification of dielectric withstand		-
	- equal to twice the rated operational voltage with a minimum of 1000 V	1000 V	P
	- no breakdown or flashover	No	P
	- the leaking current for circuit-breaker suitable for isolation: (<2mA/1,1 Ue)		P
8.3.4.4	Verification of temperature-rise		
	- the values of temperature-rise do not exceed the those specified in tab. 7.	See Remarks	P
	Temperature rise of main circuit terminals. < 80 K (K):	65,5 K	P
	conductor cross-sectional area (mm ²):	120 mm ² (250 kcmil)	P
	test current Ie (A):		P
8.3.4.5	Verification of overload releases		
	Test current: 1,45 times the value of their current setting at the reference temperature: (A)	362.5 A	P
	Conventional tripping time:	165s	P
8.3.5.4	Verification of overload releases		-
	The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately.		-
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		-
	Time specified by the manufacturer:	80-600 s	P
	- Operation time: (s) L1: L2:	L1: 123s L2: 132s	P
8.3.5	TEST SEQUENCE III (Icu)		-
	Rated ultimate short-circuit breaking		-
	Except where the combined test sequence applies, this test sequence applies to circuit-breaker of utilization category A and to circuit-breaker of utilization B having a rated ultimate short-circuit breaking capacity		-

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Clause	Requirement - test	Result-Remark	Verdict
	For circuit-breakers of utilization B having a rated short-time withstand current equal to their rated ultimate short-circuit breaking capacity, this test sequence need not be made, since, in this case, the ultimate short-circuit breaking capacity, is verified when carrying out test sequence IV.		-
	For integrally fused circuit-breakers, test sequence V applies in place of this sequence.		-
	Type designation or serial number		-
	Sample no:		-
	Rated current: In (A)		-
	Rated operational voltage: Ue (V)		-
	Rated ultimate short-circuit breaking capacity: (kA)		-
	Rated control supply voltage of closing mechanism: Uc (V)	-	-
	Rated control supply voltage of shunt release: Uc (V)	-	-
	This test sequence need not be made when $I_{cu} = I_{cs}$		-
8.3.5.1	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		-
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		-
	Time specified by the manufacturer:	-	N/A
	- Operation time: (s) L1: L2:	-	N/A
8.3.5.2	Test of rated ultimate short-circuit breaking capacity		-
	The test sequence of operations is O - 1 - CO		-
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.	-	N/A
	closing mechanism energized with 85% at the rated Uc: (V)	-	N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.	-	N/A
	Test made in free air:	-	N/A
	Distances of the metallic screen's: (all sides)	-	N/A
	The characteristics of the metallic screen:		-
	- woven wire mesh	-	N/A
	- perforated metal	-	N/A
	- expanded metal	-	N/A
	- ratio hole area/total area: 0,45-0,65	-	N/A
	- size of hole: $<30\text{mm}^2$	-	N/A
	- finish: bare or conductive plating	-	N/A

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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":	-	N/A
	Circuit is earthed at: (load-star- or supply-star point)	-	N/A
	Conductor cross-sectional area (mm ²):	-	N/A
	If terminals unmarked:	-	N/A
	Tightening, torques: (Nm)	-	N/A
	Test sequence of operation: O -1 - CO		-
	- test voltage U/Ue = 1,05 (V) L1:	-	N/A
	- r.m.s. test current AC/DC: (A) L1:	-	N/A
	power factor/time constant:	-	N/A
	- Factor "n"	-	N/A
	- peak test current (Amax):	-	N/A
	Test sequence "O"		-
	- max. let-through current: (kA _{peak}) L1:	-	N/A
	L2:		-
	-Joule integral $I^2dt(A^2s)$ L1:	-	N/A
	L2:		N/A
	Pause, t: (min)	-	N/A
	Test sequence "CO"		
	- max. let-through current: (kA _{peak}) L1:	-	N/A
	L2:		-
	-Joule integral $I^2dt(A^2s)$ L1:	-	N/A
	L2:		
	Melting of the fusible element	-	N/A
	Holes in the PE-sheet for test sequence "O"	-	N/A
	Cracks observed	-	N/A
8.3.5.3	Verification of dielectric withstand		-
	- equal to twice the rated operational voltage with a minimum of 1000 V	-	N/A
	- no breakdown or flashover	-	N/A
	- the leaking current for circuit-breaker suitable for isolation: (<6mA/1,1 Ue)	-	N/A
8.3.5.4	Verification of overload releases		-
	The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately.		-

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Clause	Requirement - test	Result-Remark	Verdict
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		-
	Time specified by the manufacturer:	-	N/A
	- Operation time: (s) L1: L2:	-	N/A
8.3.6	TEST SEQUENCE IV		-
	Rated short-time withstand current		-
	Except where the combined test sequence applies, this test sequence applies to circuit-breakers of utilization category B and to those circuit-breaker of category A covered by note 3 of table 4, and comprises the following tests:		-
	Where integrally fused circuit-breaker are of utilization category B, they shall meet the requirements of this sequence.		-
	Type designation or serial number		-
	Sample no:		-
	Rated current: In (A)		-
	Rated operational voltage: Ue (V)		-
	Rated short-time withstand current: (kA/s)		-
	Rated frequency: (Hz)		-
8.3.6.1	Verification of overload releases		-
	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		-
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		-
	Time specified by the manufacturer:	-	N/A
	- Operation time: (s) L1: L2:	-	N/A
8.3.6.2	Test of rated short-time withstand current.		-
	For this test, any over-current release, including the instantaneous override, if any, likely to operate during the test, shall be rendered inoperative.		-
	- test frequency: (Hz)	-	N/A
	- duration of the test: (s)	-	N/A
	- test frequency: (Hz)	-	N/A
	- power factor / time constant (ms):	-	N/A
	- factor "n"	-	N/A
	- test voltage: (V) L1: L2:	-	N/A

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Clause	Requirement - test	Result-Remark	Verdict
	r.m.s. test current: (kA) L1: L2:	-	N/A
	- highest peak current: (kA)	-	N/A
8.3.6.3	Verification of temperature-rise	-	-
	- the values of temperature-rise do not exceed the those specified in tab. 7.	-	N/A
	Temperature rise of main circuit terminals. < 80 K (K):	-	N/A
	conductor cross-sectional area (mm ²):	-	N/A
	test current I _e (A):	-	N/A
8.3.6.4	Test of short-circuit breaking capacity at the max. short-time withstand current.		-
	Rated short-time withstand current: (kA/s)		-
	Test sequence: O -1 - CO		-
	max. available time setting of the short-time delay short-circuit release, (s)	-	N/A
	- test frequency: (Hz)	-	N/A
	- power factor / time constant (ms):	-	N/A
	- factor "n"	-	N/A
	Test sequence "O"		
	-testvoltage: (V) L1: L2:	-	N/A
	- r.m.s. test current: (kA) L1: L2:	-	N/A
	- highest peak current: (kA)	-	N/A
	- the circuit-breaker shall remain closed for the short-time corresponding to the max. available time setting of the short-time delay short-circuit release and -		N/A
	- the instantaneous override, if any, shall not operate.	-	N/A
	-pause: t (s)	-	N/A
	Test sequence "CO"		
	- test voltage: (V) L1: L2:	-	N/A
	- r.m.s. test current: (kA) L1: L2:	-	N/A
	- highest peak current: (kA)	-	N/A
	- the circuit-breaker shall remain closed for the short-time corresponding to the max. available time setting of the short-time delay short-circuit release and -		N/A
	- the instantaneous override, if any, shall not operate.	-	N/A

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Clause	Requirement - test	Result-Remark	Verdict
	- if the circuit-breaker has a making current release, this requirement does not apply to the CO operation, if the prospective current exceeds the pre-determined value, since it will then operate.		N/A
8.3.6.5	Verification of dielectric withstand	•	-
	- equal to twice the rated operational voltage with a minimum of 1000 V	-	-
	- no breakdown or flashover	-	N/A
8.3.6.6	Verification of overload releases	-	N/A
	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		-
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		-
	Time specified by the manufacturer:		-
	- Operation time: (s) L1: L2:	-	N/A
8.3.7	TEST SEQUENCE V		-
	Performance of integrally fused circuit-breakers		-
	STAGE 1		-
	Type designation or serial number	-	-
	Sample no:	-	-
	Rated current: In (A)	-	-
	Rated operational voltage: Ue (V)	-	-
	Value of prospective current equal to the selectivity limit current, as declared by the manufacturer. (kA)	-	-
	Type of integrated fuses (all details)	-	-
	Rated control supply voltage of closing mechanism: Uc (V)	-	-
	Rated control supply voltage of shunt release: Uc (V)	-	-
8.3.7.1	Short-circuit at the selectivity limit current		-
	Test sequences "O"		-
	Fuses shall be fitted	-	N/A
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.	-	-
	closing mechanism energized with 85% at the rated Uc: (V)	-	N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.	-	N/A
	Test made in free air:	-	N/A
	Distances of the metallic screen's: (all sides)	-	N/A
	The characteristics of the metallic screen:		
	- woven wire mesh	-	N/A
	- perforated metal	-	N/A
	- expanded metal	-	N/A

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Clause	Requirement - test	Result-Remark	Verdict
	- ratio hole area/total area: 0,45-0,65	-	N/A
	- size of hole: <30mm ²	-	N/A
	- finish: bare or conductive plating	-	N/A
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:	-	N/A
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long	-	N/A
	Circuit is earthed at: (load-star- or supply-star point)	-	N/A
	Conductor cross-sectional area (mm ²):	-	N/A
	If terminals unmarked: line connected at: (underside/upside)	-	N/A
	Tightening torques: (Nm)	-	N/A
	- test voltage U/Ue = 1,05 (V) L1: L2:	-	N/A
	- r.m.s. test current AC/DC: (A) L1: L2:	-	N/A
	power factor/time constant:	-	N/A
	- factor "n"	-	N/A
	- peak test current (Amax):	-	N/A
	Test sequence "O"		
	- max. let-through current: (kA _{peak}) L1:	-	N/A
	-Joule integral I ² dt(A ² s) L1:	-	N/A
	- fuses shall still intact L1:	-	N/A
8.3.7.2	Verification of temperature-rise		-
	- the values of temperature-rise do not exceed the those specified in tab. 7.	-	N/A
	Temperature rise of main circuit terminals. < 80 K (K):	-	N/A
	conductor cross-sectional area (mm ²):	-	N/A
	test current I _e (A):	-	N/A
8.3.7.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V	-	N/A
	- no breakdown or flashover	-	N/A
	STAGE 2		-
	Type designation or serial number	-	-
	Sample no:	-	-
	Rated current: I _n (A)	-	-

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Clause	Requirement - test	Result-Remark	Verdict
	Rated operational voltage: Ue (V)	-	-
	1.1 time the value of prospective current equal to the selectivity limit current, as declared by the manufacturer. (kA)	-	-
	Type of integrated fuses (all details)	-	-
	Rated control supply voltage of closing mechanism: Uc (V)		-
	Rated control supply voltage of shunt release: Uc (V)		-
8.3.7.4	Verification of overload releases	-	N/A
	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		-
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		-
	Time specified by the manufacturer:		
	- Operation time: (s) L1: L2:	-	N/A
8.3.7.5	Short-circuit at 1,1 times the take-over current		-
8.3.7.1	Short-circuit at the selectivity limit current		-
	Test sequences "O"		-
	Fuses shall be fitted	-	N/A
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.	-	
	closing mechanism energized with 85% at the rated Uc: (V)	-	N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.	-	N/A
	Test made in free air:	-	N/A
	Distances of the metallic screen's: (all sides)	-	N/A
	The characteristics of the metallic screen:		
	- woven wire mesh	-	N/A
	- perforated metal	-	N/A
	- expanded metal	-	N/A
	- ratio hole area/total area: 0,45-0,65	-	N/A
	- size of hole: <30mm ²	-	N/A
	- finish: bare or conductive plating	-	N/A
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:	-	N/A
	Fuse "F": copper wire: diameter 0.8 mm, 50 mm long	-	N/A
	Circuit is earthed at: (load-star- or supply-star point)	-	N/A
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.	-	-

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Clause	Requirement - test	Result-Remark	Verdict
	closing mechanism energized with 85% at the rated U_c : (V)	-	N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.	-	N/A
	Test made in free air:	-	N/A
	Distances of the metallic screen's: (all sides)	-	N/A
	The characteristics of the metallic screen:		-
	- woven wire mesh	-	N/A
	- perforated metal	-	N/A
	- expanded metal	-	N/A
	- ratio hole area/total area: 0,45-0,65	-	N/A
	- size of hole: $<30\text{mm}^2$	-	N/A
	- finish: bare or conductive plating	-	N/A
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:	-	N/A
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long	-	N/A
	Circuit is earthed at: (load-star- or supply-star point)	-	N/A
	Conductor cross-sectional area (mm^2):	-	N/A
	If terminals unmarked: line connected at: (underside/upside)	-	N/A
	Tightening torques: (Nm)	-	N/A
	- test voltage $U/U_e = 1,05$ (V) L1: L2:	-	N/A
	- r.m.s. test current AC/DC: (A) L1: L2:	-	N/A
	power factor/time constant:	-	N/A
	- factor "n"	-	N/A
	- peak test current (A):	-	N/A
	Test sequence "O"		
	- max. let-through current: (kA_{peak}) L1: L2:	-	N/A
8.3.8	Combined test sequence		-
	At the discretion of, or in agreement with the manufacturer, this sequence may be applied to circuit-breaker of utilization cat. B:		-
	Type designation or serial number	-	N/A
	Sample no:	-	N/A
	Rated current: I_n (A)	-	N/A
	Rated operational voltage: U_e (V)	-	N/A
	Rated short-time withstand current: (kA/s)	-	N/A
	Rated frequency: (Hz)	-	N/A
8.3.8.1	Verification of overload releases		-

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Clause	Requirement - test	Result-Remark	Verdict
	The operation of overload releases shall be verified twice times the value of their current setting on each pole separately.		-
	The operating time shall not exceed the max.		-
	value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		
	Time specified by the manufacturer:		-
	- Operation time: (s) L1:	-	N/A
8.3.8.2	Test of rated short-time withstand current.		-
	For this test, any over-current release, including the instantaneous override, if any, likely to operate during the test, shall be rendered inoperative.		-
	- test frequency: (Hz)	-	N/A
	- duration of the test: (s)	-	N/A
	- test frequency: (Hz)	-	N/A
	- power factor / time constant (ms):	-	N/A
	- factor "n"	-	N/A
	- test voltage: (V) L1: L2:	-	N/A
	- r.m.s. test current: (kA) L1:	-	N/A
	L2:		N/A
	L3:		N/A
	- highest peak current: (kA)	-	N/A
8.3.8.3	Test of rated service short-circuit breaking capacity		-
	At the highest voltage applicable to the rated short-time current.		-
	Test sequence of operation: O -1 - CO -1 - CO		-
	Type designation or serial number		-
	Sample no:		-
	Rated current: In (A)		-
	Rated operational voltage: Ue (V)		-
	Rated service short-circuit breaking capacity: (kA)		-

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Clause	Requirement - test	Result-Remark	Verdict
	Rated control supply voltage of closing mechanism: U_c (V)		-
	Rated control supply voltage of shunt release: U_c (V)		-
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.	-	-
	closing mechanism energized with 85% at the rated U_c : (V)	-	N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.	-	N/A
	Test made in free air:	-	N/A
	Distances of the metallic screen's: (all sides)	-	N/A
	The characteristics of the metallic screen:		
	- woven wire mesh	-	N/A
	- perforated metal	-	N/A
	- expanded metal	-	N/A
	- ratio hole area/total area: 0,45-0,65	-	N/A
	- size of hole: <30mm ²	-	N/A
	- finish: bare or conductive plating	-	N/A
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:	-	N/A
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long	-	N/A
	Circuit is earthed at: (load-star- or supply-star point)	-	N/A
	Conductor cross-sectional area (mm ²):	-	N/A
	If terminals unmarked: line connected at: (underside/upside)	-	N/A
	Tightening torques: (Nm)	-	N/A
	Test sequence of operation: O -1 - CO -1 - CO		
	The highest voltage applicable to the rated short-time current.	-	N/A
	- test voltage $U/U_e = 1,05$ (V) L1:	-	N/A

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Clause	Requirement - test	Result-Remark	Verdict
	L2:		
	- r.m.s. test current AC/DC: (A) L1: L2:		N/A
	power factor/time constant:	-	N/A
	- Factor "n"	-	N/A
	- peak test current (A):	-	N/A
	Test sequence "O"		
	- max. let-through current: (kA _{peak}) L1: L2:	-	N/A
	- Joule integral $I^2dt(A^2s)$ L1: L2:	-	N/A
	Pause, t: (min)	-	N/A
	Test sequence "CO"		
	- max. let-through current: (kA _{peak}) L1: L2:	-	N/A
	- Joule integral $I^2dt(A^2s)$ L1: L2:	-	N/A
	L3:		-
	Pause, t: (min)	-	N/A
	Test sequence "CO"		
	- max. let-through current: (kA _{peak}) L1: L2:	-	N/A
	-Joule integral $I^2dt(A^2s)$ L1: L2:	-	N/A

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Clause	Requirement - test	Result-Remark	Verdict
	The circuit-breaker shall remain closed for the short-time corresponding to the max. available time setting of the short-time delay short-circuit release.	-	N/A
	During this test the instantaneous override shall not operate	-	N/A
	- and the making current release shall operate	-	-
8.3.8.4	Operational performance capability with current.		-
	Rated current: I_n (A)	-	N/A
	Maximum rated operational voltage: U_e (V)	-	N/A
	Conductor cross-sectional area (mm^2):	-	N/A
	Number of operating cycles per hour	-	N/A
	Number (5% of the number given in column 4, tab. 8) of cycles with current (total) (closing mechanism energized at the rated U_c)	-	N/A
	Applied voltage: closing mechanism (V)	-	N/A
	For circuit-breaker fitted with adjustable releases, test shall be made with the overload setting at maximum and short-circuit setting at minimum.	-	N/A
	Conditions, make/break operations:	-	N/A
	- test voltage $U/U_e = 1,0$ (V) L1: L2:	-	N/A
	-testcurrent $I/I_e = 1,0$ (A) L1: L2:	-	N/A
	- power factor/time constant:	-	N/A
	- frequency: (Hz)	-	N/A
	- on-time (ms):	-	N/A
	- off-time (s):	-	N/A

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Clause	Requirement - test	Result-Remark	Verdict
	Electrical components do not exceed the value indicated in tab. 7.	-	N/A
8.3.8.5	Verification of dielectric withstand		-
	- equal to twice the rated operational voltage with a minimum of 1000 V	-	-
	- no breakdown or flashover	-	N/A
	- the leaking current for circuit-breaker suitable for isolation: (<2mA/1,1 Ue)	-	N/A
8.3.8.7	Verification of temperature-rise		-
	- the values of temperature-rise do not exceed the those specified in tab. 7.	-	N/A
	Temperature rise of main circuit terminals. < 80 K (K):	-	N/A
	conductor cross-sectional area (mm ²):	-	N/A
	test current Ie (A):	-	N/A
8.3.8.7	Verification of overload releases		
	Test current: 1,45 times the value of their current setting at the reference temperature: (A)	-	N/A
	Conventional tripping time: <1 h when In < 63A, <2h when In > 63 A	-	N/A
	The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately.		-
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		-
	Time specified by the manufacturer:		-
	- Operation time: (s) L1: L2: L3:	-	N/A
Annex C	Individual pole short-circuit test sequence		-
	Circuit-breaker for use on phase-earthed systems		-
C.2	Test of individual pole short-circuit breaking capacity		-

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Clause	Requirement - test	Result-Remark	Verdict
	A short-circuit test is made with a value of prospective current (I _{su}) equal to 25% of the ultimate rated short-circuit breaking capacity (I _{eu})		-
	Type designation or serial number		-
	Sample no:		-
	Rated current: I _n (A)		-
	Rated operational voltage: U _e (V)		-
	Rated ultimate short-circuit breaking capacity: (kA)		-
	Rated control supply voltage of closing mechanism: U _c (V)		-
	Rated control supply voltage of shunt release: U _c (V)		-
	The test sequence of operations is O -1 - CO		-
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.	-	N/A
	closing mechanism energized with 85% at the rated U _c : (V)	-	N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.	-	N/A
	Test made in free air:	-	N/A
	Distances of the metallic screen's: (all sides)	-	N/A
	The characteristics of the metallic screen:		
	- woven wire mesh	-	N/A
	- perforated metal	-	N/A
	- expanded metal	-	N/A
	- ratio hole area/total area: 0,45-0,65	-	N/A
	- size of hole: <30mm ²	-	N/A
	- finish: bare or conductive plating	-	N/A
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:	-	N/A

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Clause	Requirement - test	Result-Remark	Verdict
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long	-	N/A
	Circuit is earthed at: (load-star- or supply-star point)	-	N/A
	Conductor cross-sectional area (mm ²):	-	N/A
	If terminals unmarked: line connected at: (underside/upside)	-	N/A
	Tightening torques: (Nm)	-	N/A
	Test sequence of operation: O -1 - CO		-
	Test circuit according figure: 9	-	N/A
	test voltage U/U _e = 1,05 (V) L1: L2: L3	L1: L2: L3	N/A
	short-circuit test current (I _{su}): equal to 25% of the ultimate rated short-circuit breaking capacity (I _{eu})	-	N/A
	- r.m.s. test current AC/DC: (A):	-	N/A
	power factor/time constant:	-	N/A
	- Factor "n"	-	N/A
	- peak test current (A _{max}):	-	N/A
	Test sequence "O" L1		
	- max. let-through current: (kA _{peak}).....	 L1:	N/A
	- Joule integral I ² dt (A ² s)	L1:	N/A
	Pause, t: (min)	-	N/A
	Test sequence "CO" L1		
	- max. let-through current: (kA _{peak}).....	L1:	N/A
	- Joule integral I ² dt (A ² s)	 L1:	N/A
	Test sequence "O" L2		
	- max. let-through current: (kA _{peak}).....	L2:	N/A

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Clause	Requirement - test	Result-Remark	Verdict
	- Joule integral I^2dt (A ² s)	L2:	N/A
	Pause, t: (min)	-	N/A
	Test sequence "CO" L2		
	- max. let-through current: (kA _{peak}).....	L2:	N/A
	- Joule integral I^2dt (A ² s)	L2:	N/A
	Test sequence "O" L3		
	- max. let-through current: (kA _{peak}).....	L3:	N/A
	- Joule integral I^2dt (A ² s)	 L3:	N/A
	Pause, t: (min)	-	N/A
	Test sequence "CO" L3		
	- max. let-through current: (kA _{peak}) L3:	-	N/A
	- Joule integral I^2dt (A ² s) L3:	-	N/A
	Melting of the fusible element	-	N/A
	Holes in the PE-sheet for test sequence "O"	-	N/A
	Cracks observed	-	N/A
C.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V	-	N/A
	- no breakdown or flashover	-	N/A
C.4	Verification of overload releases		-
	The operation of overload releases shall be verified at 2.5 times the value of their current setting on each pole separately.		-
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		-
	Time specified by the manufacturer:		-
	- Operation time: (s) L1:	-	N/A
	 L2:		
	 L3:		

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Clause	Requirement - test	Result-Remark	Verdict
Annex H	Individual pole short-circuit test sequence		-
	Circuit-breaker for use in IT systems		-
H.2	Test of individual pole short-circuit breaking capacity		-
	A short-circuit test is made on the individual poles of a multipole circuit-breaker at a value of prospective current (I_{p}) equal to 1,2 times the max. setting of the short-time delay release tripping current or, in the absence of such a release, 1,2 time the max. setting of the tripping current of the instantaneous release, or, where relevant 1,2 times the max. setting of the definite time delay release tripping current, but not exceeding 50kA.		-
	Type designation or serial number		-
	Sample no:		-
	Rated current: I_n (A)		-
	Rated operational voltage: U_e (V)		-
	Rated ultimate short-circuit breaking capacity: (kA)		-
	Rated control supply voltage of closing mechanism: U_c (V)	-	-
	Rated control supply voltage of shunt release: U_c (V)	-	-
	or, where relevant 1,2 times the max. setting of the definite time delay release tripping current, but not exceeding 50kA.	-	N/A
	- r.m.s. test current AC/DC: (A)		N/A
	power factor/time constant:		N/A
	- Factor "n"	1,46	P
	- peak test current (A_{max}):		P
	Test sequence "O" L1		
	- max. let-through current: (kA_{peak}).....I 1-		P
	- Joule integral I^2dt (A^2s) I 1-		P
	Pause, t: (min)	3 min	P
	Test sequence "CO" L1		

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Clause	Requirement - test	Result-Remark	Verdict
	- max. let-through current: (kA _{peak}).....IV		P
	- Joule integral $I^2 dt$ (A ² s).....I	147,2 kA ² s	P
	Test sequence "O" L2		-
	- max. let-through current: (kA _{peak}).....I?-		P
	- Joule integral $I^2 dt$ (A ² s) I?-	156,0 kA ² s	P
	Pause, t: (min)	3 min	P
	Test sequence "CO" L2		
	- max. let-through current: (kA _{peak}).....I?-		P
	- Joule integral $I^2 dt$ (A ² s) I?-	156,1 kA ² s	P
	Test sequence "O" L3		
	- max. let-through current: (kA _{peak}).....IS		P
	- Joule integral $I^2 dt$ (A ² s) IS		P
	Pause, t: (min)	3 min	P
	Test sequence "CO" L3		-
	- max. let-through current: (kA _{peak}).....I 3*		P
	- Joule integral $I^2 dt$ (A ² s) I 3"		P
	Melting of the fusible element	No	P
	Holes in the PE-sheet for test sequence "O"	No	P
	Cracks observed	No	P
H.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V		P
	- no breakdown or flashover	No	P
	- the leaking current for circuit-breaker suitable for isolation: (<6mA/1,1 U _e)	10 uA	P
H.4	Verification of overload releases		-
	The operation of overload releases shall be verified at 2.5 times the value of their current setting on each pole separately.		-

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Clause	Requirement - test	Result-Remark	Verdict
	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:	80 - 600 s	P
	- Operation time: (s) L1: L2:	L1 :128s L2:128 s	P
H.5	Marking		-
	Circuit-breaker for which all values of rated voltage have not been tested according to this annex or are not covered by such testing, shall be identified by	Compliance	P
	the symbol which shall be marked on the circuit-breaker immediately following these values of rated voltage		-

TABLE: temperature rise measurements				
temperature rise dT of part:		phase	dT(K)	required dT (K)
1	Terminals of line side	L1	42,7	80
2	Terminals of line side	L3	42,7	80
3	Terminals of line side	L2	43,1	80
4	Terminals of line side	L4	42,9	80
5	Terminals of load side	L8	47,2	80
6	Parts, which need not to be touched (non-metallic)		52,3	60
7	Parts intended to be touched (non-metallic)		36,1	50
8	Manual operating means (non-metallic)		23,3	35
9	Ambient temperature			24,5 °C

Remarks:

ANNEX 1: components						
object/part No.	code	manufacturer/ trademark	type/model	technical data	standard	mark(s) of conformity
PCB		Goldenmax international technology LTD.	FR-4	V-0	UL94	UL E134893
Relay		Zhejiang Meishuo Electric Technology Co., Ltd	MPF	5V/0.2W 16A/250V	UL	UL E313266 TUV:R50332 928
Fusing		Zhangzhou Shenghua Ou Electronic Technology Co., Ltd.	RXF	47R/1W	SJ/T 11611-2016	UL E492937
WIFI		Hangzhou Tuya Information Technology Co., Ltd	T34			Test with appliance
Base		CGN Juner New Materials Co., Ltd.	PC	V-0, 120° C, Min. thickness: 1.5mm	UL	Test with appliance UL E45329
Cover		CGN Juner New Materials Co., Ltd.	PC	V-0, 120° C, Min. thickness: 1.5mm	UL	Test with appliance UL E45329

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Attachment 1- Photo Documentation

Photo 1



Photo2



Photo 3



Photo 4

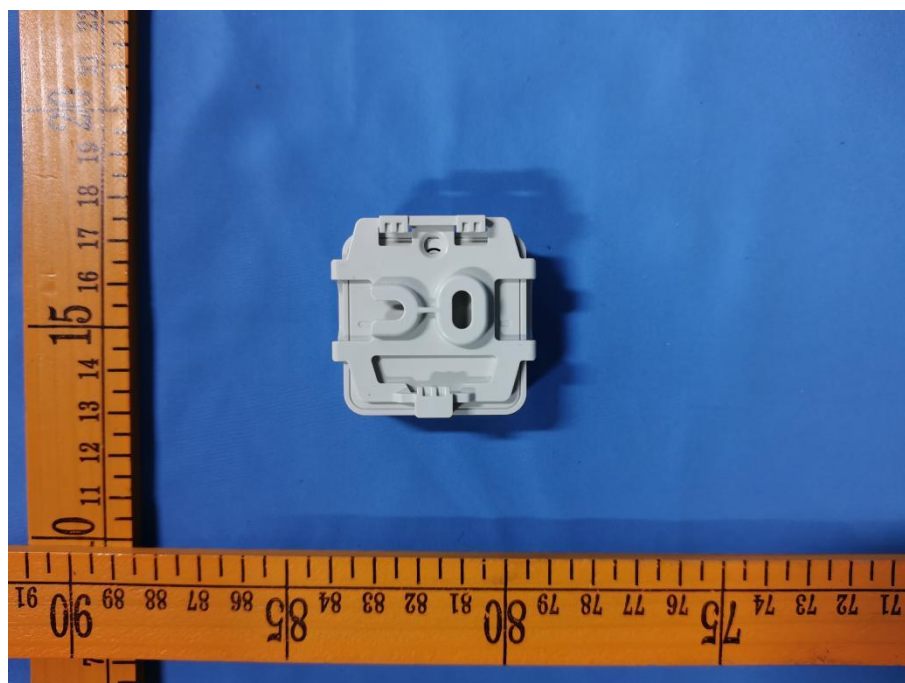
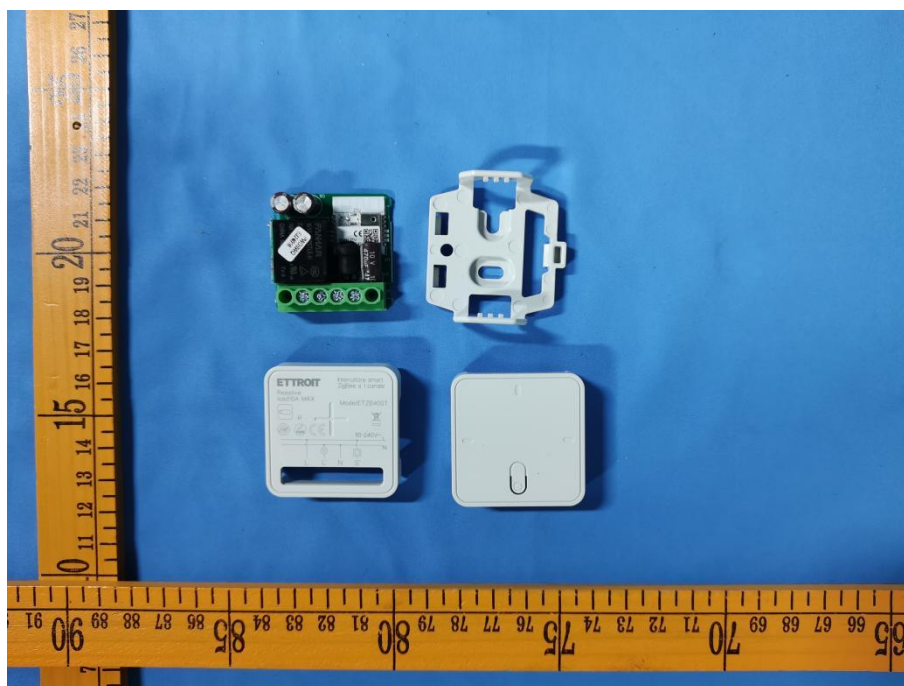


Photo 5



Photo 6



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Photo 7

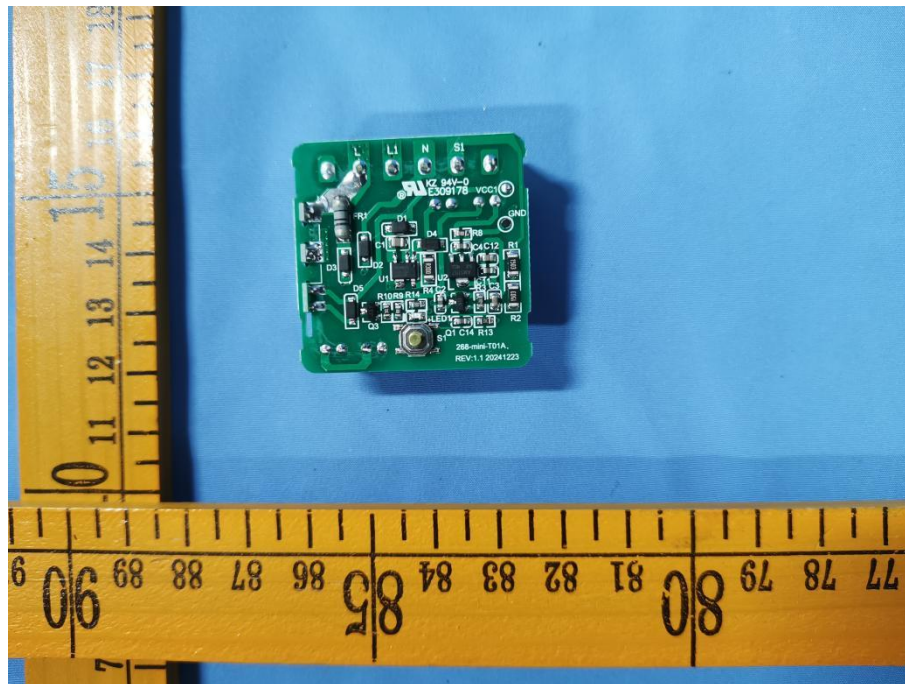
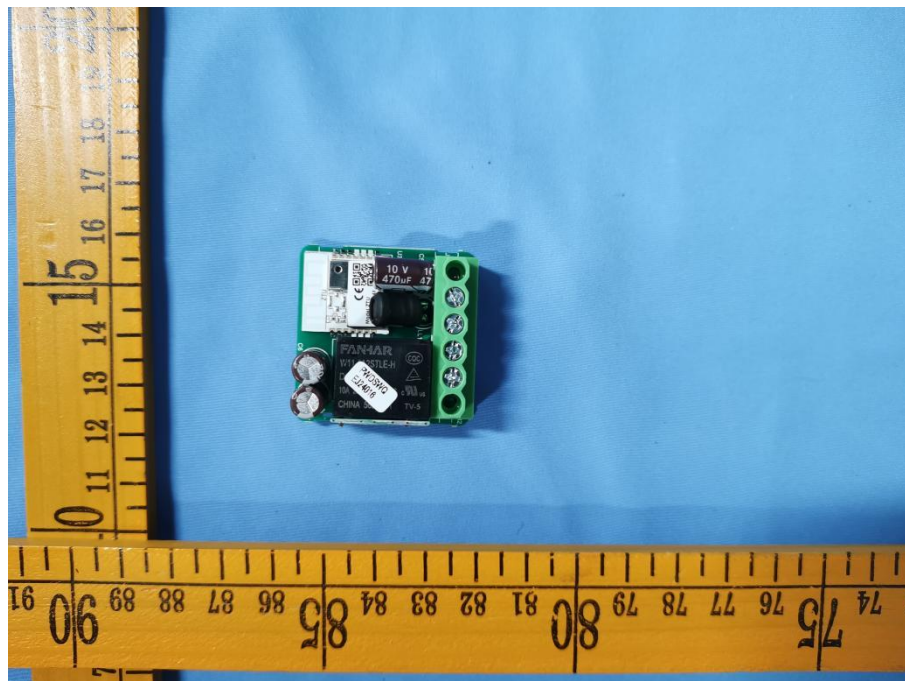


Photo 8



*****END OF REPORT*****

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