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TEST REPORT

IEC 60947-4-1

Low-voltage switchgear and controlgear –

Part 4-1: Contactors and motor-starters –

Electromechanical contactors and motor-starters

Report reference No: Y191799E

Tested by (name + signature) .....:	Lechen Hu (胡乐晨)	
Approved by (name + signature).....:	Xiaomu Ye（叶小木）	

Date of issue :Jan. 06, 2019

Standard: Partial clause of IEC 60947-4-1:2009 (Third Edition) + A1:2012

Test conclusion :	Refer to the content of the report.
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Applicant's name .....:	Zhejiang Changcheng Trading Co., Ltd.
Address .....:	CNC HIGH-TECH INDUSTRIAL ZONE, NORTH OF BAIXIANG YUEQING, ZHEJIANG,P.R.CHINA 325603

Test item description

Trademark .....:	CNC
Manufacturer	Zhejiang Changcheng Trading Co., Ltd.
Model and/or type reference .....:	CJX2s-09/CJX2s-12/CJX2s-18

General remarks

This report is not valid without official seal and signatures.
The test results presented in this report relate only to the object tested.
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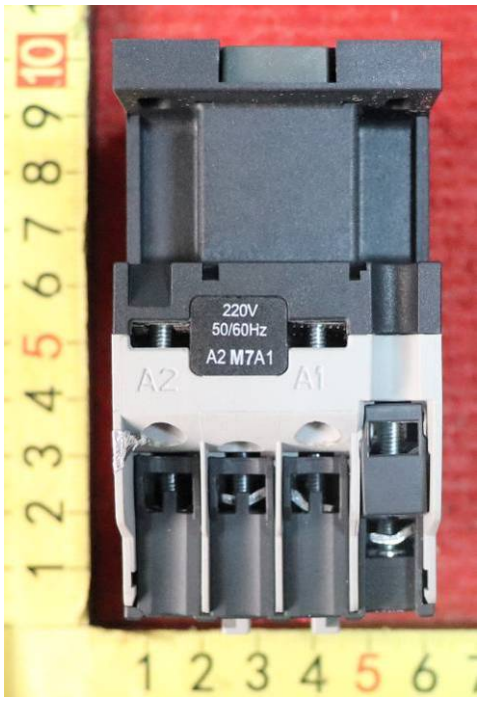
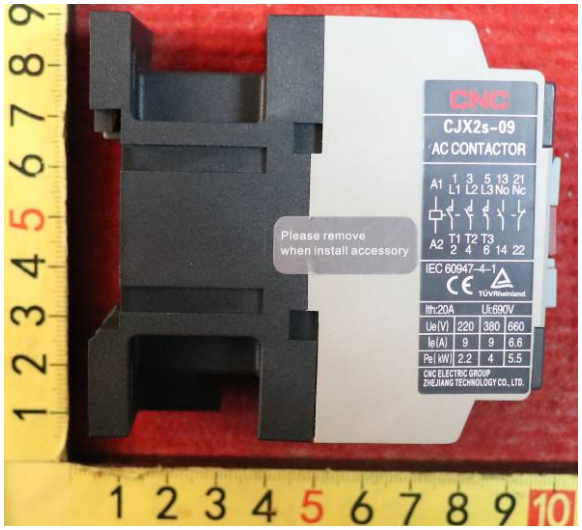
#1





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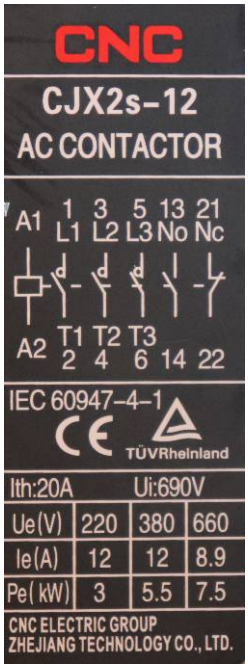

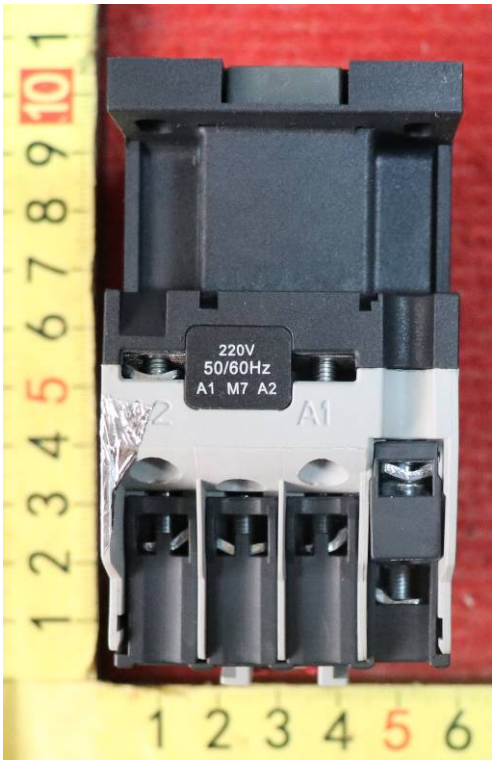

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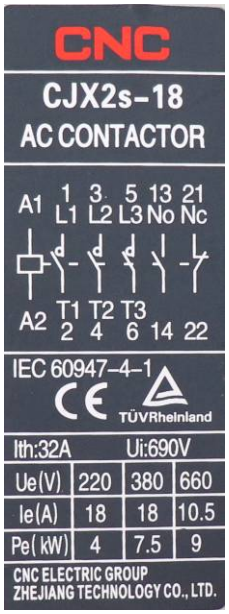

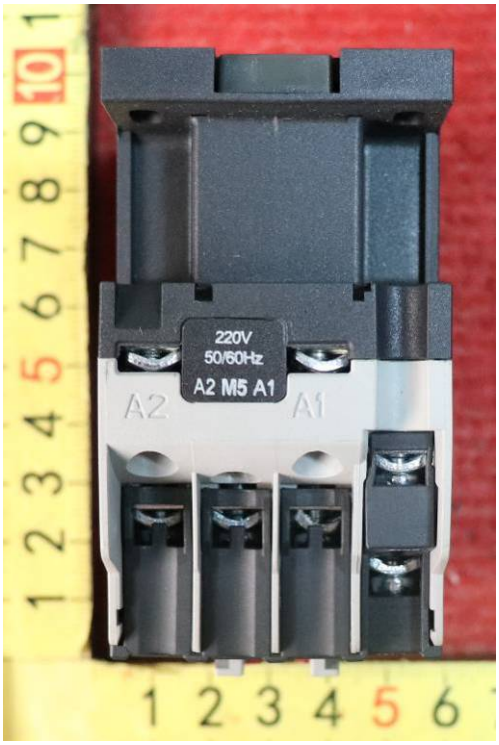

Test items particulars :	
- kind of equipment.....:	contactor
- number of poles.....:	3P
- kind of current (a.c. or d.c.) .....:	a.c
- interrupting medium.....:	air
- method of operation .....:	electromagnetic
- method of control.....:	non-automatic
- method of change-over for particular types of starters.....:	N/A
- method of connecting for particular types of starters .....:	N/A
- rated frequency .....:	☒ 50 Hz ☒ 60 Hz
- rated duties.....:	
-Utilization category.....:	AC-3
Rated and limiting values, main circuit	
Rated voltages	
- rated operational voltage Ue (V) .....:	220V/380V/660V
- rated stator operational voltage Ues (V) .....:	N/A
- rated rotor operational voltage Uer (V).....:	N/A
- rated insulation voltage Ui (V).....:	690V
- rated stator insulation voltage Uis (V).....:	N/A
- rated rotor insulation voltage Uir (V) .....:	N/A
- rated impulse withstand voltage Uimp(kV)...:	6kV
- rated starting voltage of an auto-transformer starter .....:	N/A
Currents or powers	
- conventional free air thermal current Ith (A).:	9A/12A/18A
- conventional enclosed thermal current Ithe (A) .....:	N/A
- conventional stator thermal current Iths (A) :	N/A
- conventional rotor thermal current Ithr (A) ..:	N/A
- rated operational current Ie (A) or rated operational powers .....:	20A/20A/32A
- rated stator operational current Ies (A) or rated stator operational powers .....:	N/A
- rated rotor operational current Ier (A) .....:	N/A
- rated uninterrupted current Iu (A).....:	N/A
Normal load and overload characteristics	
- ability to withstand motor switching overload currents.....:	N/A
-rated making capacity .....:	N/A
-rated breaking capacity .....:	N/A
-conventional operational performance.....:	N/A
Starting and stopping characteristics of starters	
-service conditions for starters .....:	N/A

Rated conditional short-circuit current	
- rated prospective short-circuit current "r" (kA) .....:	N/A
- rated conditional short-circuit current Iq (kA):	N/A
-type of co-ordination .....:	N/A
-Pole impedance of a contactor (Z) .....:	N/A
Control circuits	
The characteristics of electronic control circuits	
- kind of current.....:	a.c
- rated frequency if a.c. .....:	☒ 50 Hz ☒ 60 Hz
- rated control circuit voltage Uc (nature: a.c. / d.c.)	N/A
- rated control supply voltage Us (nature: a.c. / d.c.) .....:	220V
Rated and limiting values of air supply control circuit	
- rated pressure .....:	N/A
- volumes of air .....:	N/A
Auxiliary circuits	
- rated operational voltage Ue (V) .....:	N/A
- rated insulation voltage: Ui (V) .....:	N/A
- rated operational current: Ie (A) .....:	N/A
- kind of current.....:	N/A
- rated frequency: (Hz).....:	N/A
- number of circuits .....:	N/A
- number and kind of contact elements .....:	N/A
- rated uninterrupted current: Iu (A).....:	N/A
- utilization category: (AC, DC, current and voltage) .....:	N/A
Short-circuit characteristic	
- Rated conditional short-circuit current (kA)..:	N/A
- kind of protective device.....:	N/A
Test case verdicts	
Test case does not apply to the test object ...:	N/A
Test item does meet the requirement .....:	P(ass)
Test item does not meet the requirement .....:	Testing
Testing	
Date of receipt of test item .....:	Dec. 26, 2019
Date(s) of performance of test .....:	Dec. 31, 2019
General product information	

IEC 60947-4-1			
Clause	Requirement + Test	Result - Remark	Verdict
		#1(CJX2s-09)	
9.3.1	Compliance with performance requirements		
a)	TEST SEQUENCE 1		
	- verification of temperature rise (Clause 9.3.3.3.)		
	- verification of operation and operating limits (Clause 9.3.3.1 and 9.3.3.2)		
	- verification of dielectric properties (Clause 9.3.3.4)		
9.3.3.3	Temperature rise		
	Sub clause 8.3.3.3. of part 1 applies		
	ambient temperature 10-40 °C .....:	+22,3°C	P
	Contactor		
	test enclosure W x H x D (mm x mm x mm) .....:		N/A
	material of enclosure .....:		N/A
9.3.3.3.4	Main circuits, test conditions:		
	Sub clause 8.3.3.3.4 of part 1 applies with following addition		
	loaded as stated in 8.2.2.4		P
	- setting of the maximum current setting.....:		N/A
	- setting overload relay.....:		N/A
	- conventional thermal current Ith (A) .....:	20,0A	P
	- conventional enclosed thermal current Ithe (A) .:		N/A
	- for equipment intended for utilization category AC-6b, the test current for the temperature rise test shall be equal to 1,35 times Ie (the rated capacitive current).		N/A
	- cable/busbar cross-section (mm²) / (mm) .....:	2,5mm²/1mm	P
	- temperature rise of main circuit terminals (K) ....:	< 65 K see page 49	P
9.3.3.3.5	Control circuit, test conditions:		
	Sub clause 8.3.3.3.5. of part 1 applies with following addition		
	The temperature rise shall be measures during the test of 9.3.3.3.4		
	- conventional thermal current Ith (A) at their rated voltage.....:		N/A
	- conventional enclosed thermal current Ithe (A) .:		N/A
	- cable/busbar cross-section (mm²) / (mm) .....:		N/A

	- temperature rise of control circuit (K) .....:	<_____ K see page ____	N/A
9.3.3.3.6	Coils and electromagnets circuit, test conditions:		
	The coil with the highest power consumption, for a given frequency a.c. or d.c., according to 9.3.3.2.1.2.2 is deemed to be representative for all coils, for the same contactor, and shall be used for the temperature rise test.		
	a) Uninterrupted and eight-hour duty windings (8.2.2.6.1)		
	The temperature rise shall be measures during the test of 9.3.3.3.4		P
	- rated control supply voltage Us (V) .....:	220V~	P
	- class of insulating material .....:	B	P
	- uninterrupted or eight-hour duty windings	Uninterrupted	P
	- temperature rise of control circuit terminals (K) .:	< 110 K see page 49	P
	b) Intermittent duty windings (8.2.2.6.2)		
	- no current flowing though the main circuit		P
	- rated control supply voltage Us (V) .....:	220V~	P
	- class of insulating material .....:	B	P
	- intermittent duty class .....:	3	P
	- close open operating cycle .....:	1200s	P
	- on-load factor .....:	40%	P
	- temperature rise of control circuit terminals (K) .:	< 110 K see page 49	P
	c) temporary or periodic duty (8.2.2.6.3)		
	- no current flowing though the main circuit		N/A
	- rated control supply voltage Us (V) .....:		N/A
	- class of insulating material .....:		N/A
	- close open operating cycle .....:		N/A
	- on-load time .....:		N/A
	- temperature rise of control circuit terminals (K) .:	< ____ K see page ____	N/A
9.3.3.3.7	Auxiliary circuit, test conditions:		
	Normally loaded with their maximum rated operational current at any convenient voltage		
	The temperature rise shall be measures during the test of 9.3.3.3.4		
	- conventional thermal current Ith (A).....:	10,0A	P
	- conventional enclosed thermal current Ithe (A) .:		N/A
	- cable/busbar cross-section (mm²) / (mm) .....:	1,5mm²/1mm	P
	- cable cross-section (mm²) .....:		N/A

	- temperature rise of auxiliary circuit terminals (K) .....:	< 65K see page 49	P
9.3.3.3.8	Starting resistors for rheostatic rotor starters test conditions:		
	Normally loaded with their current value I_m		N/A
	Number of starts per hour .....:		N/A
	Rated duty .....:		N/A
	Starting characteristic	see page _____	N/A
	- cable/busbar cross-section (mm²) / (mm) .....:		N/A
	- cable cross-section (mm²) .....:		N/A
	- temperature rise of starting resistor terminals (K) .....:	See table 3 of part 1	N/A
	- temperature rise of starting resistor enclosure (K)	See table 3 of part 1	N/A
	- temperature rise of issuing air (K)	See table 3 of part 1	N/A
9.3.3.3.9	Auto-transformers for two-step auto-transformers starters		
	Normally loaded with max. Starting current multiplied with 0,8 x $^{\text{starting voltage}}/_{Ue}$		N/A
	Number of starts per hour .....:		N/A
	Rated duty .....:		N/A
	Starting characteristic.....:	see page _____	N/A
	- cable/busbar cross-section (mm²) / (mm) .....:		N/A
	Temperature rise of:		N/A
	- windings (K), See table 5 (+15 K).....:		N/A
	- operating means (K) , See table 3 of part 1.....:		N/A
	- parts intended to be touched but not hand held (K) , See table 3 of part 1		N/A
	- parts which need not be touched during normal operation (K) , See table 3 of part 1		N/A
9.3.3	Performance under no load, normal load and overload conditions		
9.3.3.1	Operation		
	For starter only:		
	reference ambient temperature(i.e. +20 °C) :		N/A
	Rated full load current (A) :		N/A

	No tripping after 3 operations when stator has reached thermal equilibrium at minimum and maximum settings		N/A
	For overload relay with combined stop and reset actuating mechanism only		N/A
	With closed contactor, the resetting mechanism shall be operated and this shall cause the contactor drop out		N/A
	For overload relay with either a reset or separate stop and reset mechanism only		N/A
	With closed contactor and resetting mechanism in the reset position, the tripping mechanism shall be operated and the contactor shall have been caused to drop out		N/A
9.3.3.2	Operating limits		
9.3.3.2.1	Power-operated equipment:		
8.2.1.2.1	Electromagnetic contactors and starters		
	Rated control supply voltage Us (V) .....:	220V~	P
	Frequency (Hz) .....:	50Hz	P
	Declared ambient temperature(>40 °C) for 100% Us .....:		N/A
	Limits of close satisfactorily at any value between 85% and 110% of rated control supply voltage Us .....:		P
	Limits of drop out and open fully are: 75% to 20% for a.c. and 75% to 10% for d.c. .....:		P
	Ambient temperature(-5 °C) for 100% Us		N/A
	Drop out test method		N/A
	Limits of drop out and open fully are: 75% to 20% for a.c. and 75% to 10% for d.c.....:		N/A
8.2.1.2.2	Contactors and starters with electronically controlled electromagnet		
	Rated control supply voltage Us (V) .....:		N/A
	Frequency (Hz) .....:		N/A
	Declared ambient temperature(>40 °C) for 100% Us		N/A
	Limits of close satisfactorily at any value between 85% and 110% of rated control supply voltage Us .....:		N/A
	Limits of drop out and open fully are: 75% to 20% for a.c. and 75% to 10% for d.c. .....:		N/A

	Ambient temperature(-5 °C) for 100% Us		N/A
	Drop out test method		N/A
	Limits of drop out and open fully are: 75% to 20% for a.c. and 75% to 10% for d.c.....:		N/A
8.2.1.2.3	Electro-pneumatic contactors and starters		
	Rated air supply pressure (Bar) .....:		N/A
	Declared ambient temperature(>40 °C) for 100% of the rated air supply pressure (Bar)		N/A
	Limits of close satisfactorily at any value between 85% and 110% of rated air supply pressure (Bar):		N/A
	Limits of drop out and open fully are: 75% to 10% of rated air supply pressure(Bar) .....:		N/A
	Ambient temperature(-5 °C) for 100% of the rated air supply pressure(Bar)		N/A
	Limits of close satisfactorily at any value between 85% and 110% of rated air supply pressure(Bar:		N/A
	Limits of drop out and open fully are: 75% to 10% for the rated air supply pressure(Bar) .....:		N/A
8.2.1.2.4	Capacitive drop out test		
	A capacitor shall be inserted in series in the supply circuit U_s, the total length of the connecting conductors being ≤ 3 m.		N/A
	The capacitor is short-circuit by a switch of negligible impedance.		N/A
	The supply voltage shall then be adjusted to 110 % U_s.....:		N/A
	The value of the capacitor shall be calculated: C (nF) = 30 + 200000 / (f x U_s) .....:	_____nF	N/A
	Verification of the drop out of the contactor when the switch is operated to the open position.....:		N/A
9.3.3.2.1.2	Coil power consumption		
	A contactor coil is evaluated for both holding power and pick-up power		
	In the case where different coils cover a range of voltages, 5 coils shall be tested		N/A

	The coil with the lowest rated control supply voltage Us, the coil with the highest rated control supply voltage Us, plus 3 coils deemed to be representative of the coils with the highest calculated hold power at the discretion of the manufacturer		N/A
	The test shall be performed at ambient temperature +23 °C ± 3 °C	+23 °C	P
	The test shall be made without any load in the main and auxiliary circuits		P
	The coil shall be supplied with the rated control supply voltage Us and at the rated frequency		P
	For a given coil, where a voltage range is declared, the test shall be made at the highest voltage at the respective frequency		N/A
	The measured values shall be obtained with a r.m.s. measurement method covering at least a bandwidth from 0 Hz to 10 kHz and the resulting power values shall be given within a measurement uncertainty better than 5 %		P
9.3.3.2.1.2 .2	Holding power for conventional and electronically controlled electromagnet		
	The current measurement I(i) of the coil shall be performed after the coil has been energized and has reached a stable temperature		P
	The holding power consumption is defined as follows		
	Sh(i) = Us(i) × I(i) [VA] for a.c. controlled contactor	7,70VA 7,70VA 7,70VA 7,48VA 7,70VA	P
	Pc(i) = Us(i) × I(i) [W] for d.c. controlled contactor		N/A
	The published value shall be equal to the average value of the 5 tested coils		P
	Sh = Σ (Us(i) × I(i)) / 5 [VA] respectively Pc = Σ (Us(i) × I(i)) / 5 [W]	7,66VA	P
9.3.3.2.1.2 .3	Pick-up power for a.c. controlled contactor or d.c. controlled contactor with separate pick-up and hold-on windings		

	The pick-up measurement shall be performed directly after the measurement of the hold current (see 9.3.3.2.1.2.2)		P
	The current measurement I(i) of the coil shall be performed immediately after the coil has been de-energized, the contactor has been held in the Off position and re-energized		P
	The pick-up power consumption is defined as follows		
	Sp(i) = Us × I(i) [VA] for a.c. controlled contactor	14,52VA 26,84VA 191,84VA 22,66VA 15,18VA	P
	Pp(i) = Us × I(i) [W] for d.c. controlled contactor with separate pick-up and hold windings		N/A
	The published value shall be equal to the average value of the 5 tested coils		P
	Sp = Σ (Us(i) × I(i)) / 5 [VA] respectively Pp = Σ (Us(i) × I(i)) / 5 [W]	54,41VA	P
9.3.3.2.1.3	Pole impedance		
	The pole impedance shall be determined during the test and with the conditions given in 9.3.3.3.4.		N/A
	The test in an enclosure is not deemed necessary even if the contactor can be used in an individual enclosure		N/A
	The voltage drop Ud shall be measured between the line and load terminals (terminals included) of the contactor preferably at the same time the temperature rise is measured		N/A
	The impedance per pole is defined as follows		
	Z = Ud / Ith [Ω]		N/A
	Care should be taken that voltage drop measurement does not significantly affect the temperature rise nor affect significantly the impedance		N/A
9.3.3.2.2	Relays and releases		
8.2.1.3	a) Operation of under-voltage relays and releases		

	When associated with a switching device, the release shall be fitted to the switching device having the maximum current rating for which the release is suitable		N/A
	1) Drop-out voltage		
	Rated control supply voltage(U)..... :		N/A
	Frequency (Hz)..... :		N/A
	Limits of drop out and fully open at slowly falling voltage are 70 % and 35 % of the rated voltage .... :		N/A
	The voltage shall be reduced from rated control supply voltage at a rate to reach 0 V in approximately 30 s		N/A
	The test for the lower limit is made without previous heating of the release coil		N/A
	In the case of a release with a range of rated control supply voltage, this test applies to the maximum voltage of the range		N/A
	When associated with a switching device, the test for the lower limit is made without current in the main circuit		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.		N/A
	This test may be combined with the temperature-rise test of 9.3.3.3.		N/A
	In the case of a release with a range of rated control supply voltage, this test is made at the minimum rated control supply voltage		N/A
	2) Test for limits of operation when associated with a switching device		
	Starting with the main circuit open, at the temperature of the test room, and with the supply voltage at 35 % rated maximum control supply voltage, it shall be verified that the switching device cannot be closed by the operation of its actuator		N/A
	When the supply voltage is raised to 85 % of the minimum control supply voltage, it shall be verified that the switching device can be closed by the operation of its actuator		N/A
	3) Performance under over-voltage conditions		
	When associated with a switching device, the test is made without current in the main circuit.		N/A
	The test at 110 % of the rated supply voltage shall be made for 30 min or until the temperature has reached thermal equilibrium and without impairing its functions. Verification shall be made according 2) above		N/A
8.2.1.4	b) Shunt-coil operated releases		

	When associated with a switching device, the release shall be fitted to the switching device having the maximum rated current for which the release is suitable		N/A
	Tripping of shunt release measured during the tripping operation between 70 % and 110 % of the rated control supply voltage and if a.c. at rated frequency ..... :		N/A
8.2.1.5	Limits of operation of current sensing relays and releases		
8.2.1.5.1	Limits of operation of time-delay overload relays when all poles are energized		
8.2.1.5.1.1	Common requirements		
	type of time-delay overload relay ..... :		N/A
	trip class ..... :		N/A
	current setting ..... :		N/A
	ambient temperature °C) ..... :		N/A
	test enclosure W x H x D (mm x mm x mm) ..... :		N/A
	cable/busbar cross-section (mm²) / (mm) ..... :		N/A
	ambient temperature: - 5°C ..... :		N/A
	a) at A times of current setting, tripping shall not occur in less than 2 h starting from the cold state; test current ..... :	No tripping; ……A	N/A
	b) when the current is subsequently raised to B times the current setting, tripping shall occur in less than 2 h; test current ..... :	Tripping; …..A	N/A
	c) for class 2, 3, 5 and 10 A overload relays energized at *C* times the current setting, tripping shall occur in less than 2 min starting from thermal equilibrium, at the current setting, in accordance with 9.3.3 of IEC 60034-1; for class 10 A overload relays, for ambient air temperature –5 °C or below, the manufacturer may declare a longer tripping time but not longer than 2 times the values required for 20 °C	Class; ____ Tripping current___ A Trip-time: ____ s	N/A
	d) for class 10, 20 , 30 and 40 overload relays energized at C times the current, tripping shall occur in less than 4, 8 or 12 min, starting from thermal equilibrium at the current setting; class; test current; tripping time .....:	Class; ____ Tripping current___ A Trip-time: ____ s	N/A

	e) at D times the current setting, tripping shall occur within the limits given in Table 2 for the appropriate trip class and tolerance band, starting from the cold state; test current; tripping time Tp (s) .....:	Class; ____ Tripping current___ A Trip-time: ____ s	N/A
	ambient temperature: + 20 °C .....:		N/A
	a) at A times of current setting, tripping shall not occur in less than 2 h starting from the cold state; test current .....:	Test current: ____ A	N/A
	b) when the current is subsequently raised to B times the current setting, tripping shall occur in less than 2 h; test current .....:	Test current Trip time: ____s	N/A
	c) for class 2, 3, 5 and 10A overload relays energized at C times the current, tripping shall occur in less than 2 min, starting from thermal equilibrium at the current setting; test current ..... :	Test current Trip time: ____s	N/A
	d) for class 10, 20 , 30 and 40 overload relays energized at C times the current, tripping shall occur in less than 4, 8 or 12 min, starting from thermal equilibrium at the current setting; class; test current; tripping time .....:	Test current Trip time: ____s	N/A
	e) at D times the current setting, tripping shall occur within the limits given in Table 2 for the appropriate trip class and tolerance band, starting from the cold state; test current; tripping time Tp (s) .....:	Class; ____ Tripping current___ A Trip-time: ____ s	N/A
	ambient temperature: + 40 °C .....:		N/A
	a) at A times of current setting, tripping shall not occur in less than 2 h starting from the cold state; test current .....:	Test current: ____ A	N/A
	b) when the current is subsequently raised to B times the current setting, tripping shall occur in less than 2 h; test current .....:	Test current Trip time: ____s	N/A
	c) for class 2, 3, 5 and 10A overload relays energized at C times the current, tripping shall occur in less than 2 min, starting from thermal equilibrium at the current setting; test current .....:	Test current Trip time: ____s	N/A

	d) for class 10, 20 or 30 overload relays energized at C times the current, tripping shall occur in less than 4, 8 or 12 min, starting from thermal equilibrium at the current setting; class; test current; tripping time .....:	Test current Trip time: ____s	N/A
	e) at D times the current setting, tripping shall occur within the tripping time (s) < Tp <, starting from the cold state; test current; tripping time Tp (s) .....:	Class; ____ Tripping current___ A Trip-time: ____ s	N/A
8.2.1.5.1.2	Thermal memory test verification		
	Unless the manufacturer has specified that the device does not contain thermal memory, electronic overload relays shall fulfil the following requirements(see figure 8)		N/A
	Apply a current equal to Ie until the device has reached the thermal equilibrium	Ie = _____ A	N/A
	Interrupt a current for a duration of 2 x *Tp* (see Table 2) with a relative tolerance of 10% (where *Tp* is the time measured at the *D* current according to Table 3).	*Tp* = _____ *A* *D* = _____ A Measured time *Tp* = ____ s	N/A
	Apply a current equal to 7,2 x *Ie*	I test = _____ A	N/A
	The relay shall trip within 50% of the time *TP*	Trip time = _____ s	N/A
8.2.1.5.2	Limits of operation of three-pole time-delay overload relays energized on two poles:		
	ambient temperature (°C) .....:		N/A
	In case of overload relays having an adjustable current setting, the characteristics shall apply both when the relay is carrying the current associated with the maximum setting and when the relay is carrying the current associated with the minimum setting		N/A
	a) the relay energized on three poles, at A times the current setting, tripping shall not occur in less than 2 h, starting from the cold state; test current		N/A
	b) when the value of the current flowing in two poles is increased to B times the current setting and the third pole de-energized, tripping shall occur in less than 2 h; current value; test current		N/A
8.2.1.5.3	Limits of operation of instantaneous magnetic overload relays		
	For all values of the current setting, instantaneous magnetic overload relays shall trip with an accuracy of ± 10% of the value of the published current value corresponding to the current setting		N/A
	Magnetic settings……. :		N/A
	Accuracy ± 10% of the value……..:		N/A

8.2.1.5.4	Limits of operation of under-current relays and releases for automatic change over		
8.2.1.5.4.1	e) Limits of operation under-current relays		
	Under-current relays or release, when associated with a switching device, shall operate to open the switching device within 90% to 110 % of the set time when the current during run is below 0,9 times the under-current setting in all poles	Under current setting:_____A Test current:_____A Set time:_____s Measured:_____s	N/A
8.2.1.5.4.2	f) Limits of operation of automatic change over by under-current relays		
	- for star-delta starters from star to delta, and - for auto-transformer starters from the starting to the ON position		N/A
	The lowest drop-out of an under-current relay shall be not greater than 1,5, times the actual current setting of the overload relay which is active in the starting or star connection.	Lowest drop-out:…….A / Actual current setting: …..A = ≤ 1,5 times	N/A
	The under-current real shall be able to carry any value of current , from its lowest current setting to stalled current in the starting position or the star connection, for the tripping times determined by the overload relays at its highest current setting		N/A
8.2.1.5.5.	g) Stall relays		
	The limits of operation shall be verified accordance with cl. 8.2.1.5.5		N/A
	For currents sensing stall relays , the verification shall be made for the minimum and for the maximum set current values and for the minimum and maximum stall inhibit time(four settings)		N/A
	For stall relays operating in conjunction with a rotation sensing mean, the verification shall be made for the minimum and maximum stall inhibit time. The sensor can be simulated by an appropriate signal on the sensor input of the stall relay		N/A
	a) current sensing relays		N/A
	minimum current setting / minimum set stall inhibit time Test current 1,2 times	_____ A _____ s Trip time = _____s	N/A
	minimum current setting / maximum set stall inhibit time Test current 1,2 times	_____ A _____ s Trip time = _____s	N/A
	maximum current setting / minimum set stall inhibit time Test current 1,2 times	_____ A _____ s Trip time = _____s	N/A

	maximum current setting / maximum set stall inhibit time Test current 1,2 times	_____ A _____ s Trip time = _____s	N/A
	b) rotation sensing relays: an input signal indicating no rotation exits		N/A
	minimum set stall inhibit time	_____ s Trip time = _____s	N/A
	maximum set stall inhibit time	_____ s Trip time = _____s	N/A
8.2.1.5.6.	h) Jam relays		
	The limits of operation shall be verified accordance with cl. 8.2.1.5.6		N/A
	The verification shall be made for the minimum and for the maximum set current values and for the minimum and maximum stall inhibit time (four settings)		N/A
	For each of the four settings, the test shall be made under the following conditions:		N/A
	- apply a test current of 95% of the set current value. The jam relay shall not trip		N/A
	- increase the test current to 120 % of the set current value. The jam relay shall trip according to the requirements given in 8.2.1.5.6		N/A
	minimum current setting / minimum set stall inhibit time Test current 95 % of set value	 _____ s _____ A no trip	N/A
	minimum current setting / minimum set stall inhibit time Test current increase to 1,2 times	_____ A _____ s Trip time = _____s	N/A
	minimum current setting / maximum set stall inhibit time Test current 95 % of set value	_____ s _____ A no trip	N/A
	minimum current setting / maximum set stall inhibit time Test current 1,2 times	_____ A _____ s Trip time = _____s	N/A
	maximum current setting / minimum set stall inhibit time Test current 95 % of set value	_____ s _____ A no trip	N/A
	maximum current setting / minimum set stall inhibit time Test current 1,2 times	_____ A _____ s Trip time = _____s	N/A
	maximum current setting / maximum set stall inhibit time Test current 95 % of set value	_____ s _____ A no trip	N/A

	maximum current setting / maximum set stall inhibit time Test current 1,2 times	_____ A _____ s Trip time = _____s	N/A
9.3.3.4	Test of dielectric properties, impulse withstand voltage (Uimp indicated):		
	- verification by measurement of clearances instead of testing		P
	Any actuator of insulating material and any integral non-metallic enclosure of equipment intended to be used without an additional enclosure shall be covered by a metal foil and connected to the frame or the mounting plate.		P
	Tests are also carried out according Annex R of IEC 60947-1, Ed. 5, application of the metal foil for dielectric testing on accessible parts during operation or adjustment		P
	Terminal holes covered	☐ yes ☐ no	N/A
	- rated impulse withstand voltage (V) .....:	6kV	P
	- test Uimp main circuits (kV) .....:	7,3kV	P
	- test Uimp auxiliary circuits (kV) .....:	4,8kV	P
	Test of dielectric properties, dielectric withstand voltage (Uimp not indicated):		
	- rated insulation voltage (V) .....:	690V	P
	- main circuits, test voltage for 5 s (V) .....:	1890V; 5s	P
	- control and auxiliary circuits, test voltage for 5 s (V) .....:	1890V; 5s	P
	- circuits of equipment include devices such as motors, instruments ect, test voltage for 5 s (V) ..:		N/A
	Equipment suitable for isolation		
	The leakage current shall be measured through each pole with the contacts in open position (< 0,5 mA)	1,1 times U_e= ___V	N/A

IEC 60947-4-1			
Clause	Requirement + Test	Result - Remark	Verdict
		#2(CJX2s-12)	
9.3.1	Compliance with performance requirements		
a)	TEST SEQUENCE 1		
	- verification of temperature rise (Clause 9.3.3.3.)		
	- verification of operation and operating limits (Clause 9.3.3.1 and 9.3.3.2)		
	- verification of dielectric properties (Clause 9.3.3.4)		
9.3.3.3	Temperature rise		
	Sub clause 8.3.3.3. of part 1 applies		
	ambient temperature 10-40 °C .....:	+21,9°C	P
	Contactor		
	test enclosure W x H x D (mm x mm x mm) .....:		N/A
	material of enclosure .....:		N/A
9.3.3.3.4	Main circuits, test conditions:		
	Sub clause 8.3.3.3.4 of part 1 applies with following addition		
	loaded as stated in 8.2.2.4		P
	- setting of the maximum current setting.....:		N/A
	- setting overload relay.....:		N/A
	- conventional thermal current Ith (A) .....:	20,0A	P
	- conventional enclosed thermal current Ithe (A) .:		N/A

	- for equipment intended for utilization category AC-6b, the test current for the temperature rise test shall be equal to 1,35 times Ie (the rated capacitive current).		N/A
	- cable/busbar cross-section (mm²) / (mm) .....:	2,5mm²/1mm	P
	- temperature rise of main circuit terminals (K) ....:	< 65 K see page 50	P
9.3.3.3.5	Control circuit, test conditions:		
	Sub clause 8.3.3.3.5. of part 1 applies with following addition		
	The temperature rise shall be measures during the test of 9.3.3.3.4		
	- conventional thermal current Ith (A) at their rated voltage.....:		N/A
	- conventional enclosed thermal current Ithe (A) .:		N/A
	- cable/busbar cross-section (mm²) / (mm) .....:		N/A
	- temperature rise of control circuit (K) .....:	<_____ K see page ____	N/A
9.3.3.3.6	Coils and electromagnets circuit, test conditions:		
	The coil with the highest power consumption, for a given frequency a.c. or d.c., according to 9.3.3.2.1.2.2 is deemed to be representative for all coils, for the same contactor, and shall be used for the temperature rise test.		
	a) Uninterrupted and eight-hour duty windings (8.2.2.6.1)		
	The temperature rise shall be measures during the test of 9.3.3.3.4		P
	- rated control supply voltage Us (V) .....:	220V~	P
	- class of insulating material .....:	B	P
	- uninterrupted or eight-hour duty windings	Uninterrupted	P
	- temperature rise of control circuit terminals (K) .:	< 110 K see page 50	P
	b) Intermittent duty windings (8.2.2.6.2)		
	- no current flowing though the main circuit		P
	- rated control supply voltage Us (V) .....:	220V~	P
	- class of insulating material .....:	B	P
	- intermittent duty class .....:	3	P
	- close open operating cycle .....:	1200s	P
	- on-load factor .....:	40%	P
	- temperature rise of control circuit terminals (K) .:	< 110 K see page 50	P
	c) temporary or periodic duty (8.2.2.6.3)		

	- no current flowing though the main circuit		N/A
	- rated control supply voltage Us (V) .....:		N/A
	- class of insulating material .....:		N/A
	- close open operating cycle .....:		N/A
	- on-load time .....:		N/A
	- temperature rise of control circuit terminals (K) .:	< ____ K see page ____	N/A
9.3.3.3.7	Auxiliary circuit, test conditions:		
	Normally loaded with their maximum rated operational current at any convenient voltage		
	The temperature rise shall be measures during the test of 9.3.3.3.4		
	- conventional thermal current Ith (A).....:	10,0A	P
	- conventional enclosed thermal current Ithe (A) .:		N/A
	- cable/busbar cross-section (mm²) / (mm) .....:	1,5mm²/1mm	P
	- cable cross-section (mm²) .....:		N/A
	- temperature rise of auxiliary circuit terminals (K) .....:	< 65K see page 50	P
9.3.3.3.8	Starting resistors for rheostatic rotor starters test conditions:		
	Normally loaded with their current value I_m		N/A
	Number of starts per hour .....:		N/A
	Rated duty .....:		N/A
	Starting characteristic	see page _____	N/A
	- cable/busbar cross-section (mm²) / (mm) .....:		N/A
	- cable cross-section (mm²) .....:		N/A
	- temperature rise of starting resistor terminals (K) .....:	See table 3 of part 1	N/A
	- temperature rise of starting resistor enclosure (K)	See table 3 of part 1	N/A
	- temperature rise of issuing air (K)	See table 3 of part 1	N/A
9.3.3.3.9	Auto-transformers for two-step auto-transformers starters		
	Normally loaded with max. Starting current multiplied with 0,8 x $^{\text{starting voltage}}/_{Ue}$		N/A
	Number of starts per hour .....:		N/A

	Rated duty.....:		N/A
	Starting characteristic.....:	see page _____	N/A
	- cable/busbar cross-section (mm²) / (mm) .....:		N/A
	Temperature rise of:		N/A
	- windings (K), See table 5 (+15 K).....:		N/A
	- operating means (K) , See table 3 of part 1.....:		N/A
	- parts intended to be touched but not hand held (K) , See table 3 of part 1		N/A
	- parts which need not be touched during normal operation (K) , See table 3 of part 1		N/A
9.3.3	Performance under no load, normal load and overload conditions		
9.3.3.1	Operation		
	For starter only:		
	reference ambient temperature(i.e. +20 °C) :		N/A
	Rated full load current (A) :		N/A
	No tripping after 3 operations when stator has reached thermal equilibrium at minimum and maximum settings		N/A
	For overload relay with combined stop and reset actuating mechanism only		N/A
	With closed contactor, the resetting mechanism shall be operated and this shall cause the contactor drop out		N/A
	For overload relay with either a reset or separate stop and reset mechanism only		N/A
	With closed contactor and resetting mechanism in the reset position, the tripping mechanism shall be operated and the contactor shall have been caused to drop out		N/A
9.3.3.2	Operating limits		
9.3.3.2.1	Power-operated equipment:		
8.2.1.2.1	Electromagnetic contactors and starters		
	Rated control supply voltage Us (V) .....:	220V~	P
	Frequency (Hz) .....:	50Hz	P
	Declared ambient temperature(>40 °C) for 100% Us.....:		N/A
	Limits of close satisfactorily at any value between 85% and 110% of rated control supply voltage Us .....:		P

	Limits of drop out and open fully are: 75% to 20% for a.c. and 75% to 10% for d.c. .....:		P
	Ambient temperature(-5 °C) for 100% Us		N/A
	Drop out test method		N/A
	Limits of drop out and open fully are: 75% to 20% for a.c. and 75% to 10% for d.c.....:		N/A
8.2.1.2.2	Contactors and starters with electronically controlled electromagnet		
	Rated control supply voltage Us (V) .....:		N/A
	Frequency (Hz) .....:		N/A
	Declared ambient temperature(>40 °C) for 100% Us		N/A
	Limits of close satisfactorily at any value between 85% and 110% of rated control supply voltage Us .....:		N/A
	Limits of drop out and open fully are: 75% to 20% for a.c. and 75% to 10% for d.c. .....:		N/A
	Ambient temperature(-5 °C) for 100% Us		N/A
	Drop out test method		N/A
	Limits of drop out and open fully are: 75% to 20% for a.c. and 75% to 10% for d.c.....:		N/A
8.2.1.2.3	Electro-pneumatic contactors and starters		
	Rated air supply pressure (Bar) .....:		N/A
	Declared ambient temperature(>40 °C) for 100% of the rated air supply pressure (Bar)		N/A
	Limits of close satisfactorily at any value between 85% and 110% of rated air supply pressure (Bar):		N/A
	Limits of drop out and open fully are: 75% to 10% of rated air supply pressure(Bar) .....:		N/A
	Ambient temperature(-5 °C) for 100% of the rated air supply pressure(Bar)		N/A
	Limits of close satisfactorily at any value between 85% and 110% of rated air supply pressure(Bar:		N/A
	Limits of drop out and open fully are: 75% to 10% for the rated air supply pressure(Bar) .....:		N/A
8.2.1.2.4	Capacitive drop out test		
	A capacitor shall be inserted in series in the supply circuit U_s, the total length of the connecting conductors being ≤ 3 m.		N/A

	The capacitor is short-circuit by a switch of negligible impedance.		N/A
	The supply voltage shall then be adjusted to 110 % U_s.....:		N/A
	The value of the capacitor shall be calculated: C (nF) = 30 + 200000 / (f x U_s) .....:	_____nF	N/A
	Verification of the drop out of the contactor when the switch is operated to the open position.....:		N/A
9.3.3.2.1.2	Coil power consumption		
	A contactor coil is evaluated for both holding power and pick-up power		
	In the case where different coils cover a range of voltages, 5 coils shall be tested		N/A
	The coil with the lowest rated control supply voltage Us, the coil with the highest rated control supply voltage Us, plus 3 coils deemed to be representative of the coils with the highest calculated hold power at the discretion of the manufacturer		N/A
	The test shall be performed at ambient temperature +23 °C ± 3 °C	+23 °C	P
	The test shall be made without any load in the main and auxiliary circuits		P
	The coil shall be supplied with the rated control supply voltage Us and at the rated frequency		P
	For a given coil, where a voltage range is declared, the test shall be made at the highest voltage at the respective frequency		N/A
	The measured values shall be obtained with a r.m.s. measurement method covering at least a bandwidth from 0 Hz to 10 kHz and the resulting power values shall be given within a measurement uncertainty better than 5 %		P
9.3.3.2.1.2 .2	Holding power for conventional and electronically controlled electromagnet		
	The current measurement I(i) of the coil shall be performed after the coil has been energized and has reached a stable temperature		P
	The holding power consumption is defined as follows		

	Sh(i) = Us(i) × I(i) [VA] for a.c. controlled contactor	7,26VA 7,26VA 7,26VA 7,26VA 7,26VA	P
	Pc(i) = Us(i) × I(i) [W] for d.c. controlled contactor		N/A
	The published value shall be equal to the average value of the 5 tested coils		P
	Sh = Σ (Us(i) × I(i)) / 5 [VA] respectively Pc = Σ (Us(i) × I(i)) / 5 [W]	7,26VA	P
9.3.3.2.1.2.3	Pick-up power for a.c. controlled contactor or d.c. controlled contactor with separate pick-up and hold-on windings		
	The pick-up measurement shall be performed directly after the measurement of the hold current (see 9.3.3.2.1.2.2)		P
	The current measurement I(i) of the coil shall be performed immediately after the coil has been de-energized, the contactor has been held in the Off position and re-energized		P
	The pick-up power consumption is defined as follows		
	Sp(i) = Us × I(i) [VA] for a.c. controlled contactor	15,40VA 23,76VA 28,82VA 12,10VA 12,76VA	P
	Pp(i) = Us × I(i) [W] for d.c. controlled contactor with separate pick-up and hold windings		N/A
	The published value shall be equal to the average value of the 5 tested coils		P
	Sp = Σ (Us(i) × I(i)) / 5 [VA] respectively Pp = Σ (Us(i) × I(i)) / 5 [W]	18,57VA	P
9.3.3.2.1.3	Pole impedance		
	The pole impedance shall be determined during the test and with the conditions given in 9.3.3.3.4.		N/A
	The test in an enclosure is not deemed necessary even if the contactor can be used in an individual enclosure		N/A

	The voltage drop Ud shall be measured between the line and load terminals (terminals included) of the contactor preferably at the same time the temperature rise is measured		N/A
	The impedance per pole is defined as follows		
	Z = Ud / Ith [Ω]		N/A
	Care should be taken that voltage drop measurement does not significantly affect the temperature rise nor affect significantly the impedance		N/A
9.3.3.2.2	Relays and releases		
8.2.1.3	a) Operation of under-voltage relays and releases		
	When associated with a switching device, the release shall be fitted to the switching device having the maximum current rating for which the release is suitable		N/A
	1) Drop-out voltage		
	Rated control supply voltage(U)..... :		N/A
	Frequency (Hz)..... :		N/A
	Limits of drop out and fully open at slowly falling voltage are 70 % and 35 % of the rated voltage .... :		N/A
	The voltage shall be reduced from rated control supply voltage at a rate to reach 0 V in approximately 30 s		N/A
	The test for the lower limit is made without previous heating of the release coil		N/A
	In the case of a release with a range of rated control supply voltage, this test applies to the maximum voltage of the range		N/A
	When associated with a switching device, the test for the lower limit is made without current in the main circuit		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.		N/A
	This test may be combined with the temperature-rise test of 9.3.3.3.		N/A
	In the case of a release with a range of rated control supply voltage, this test is made at the minimum rated control supply voltage		N/A
	2) Test for limits of operation when associated with a switching device		

	Starting with the main circuit open, at the temperature of the test room, and with the supply voltage at 35 % rated maximum control supply voltage, it shall be verified that the switching device cannot be closed by the operation of its actuator		N/A
	When the supply voltage is raised to 85 % of the minimum control supply voltage, it shall be verified that the switching device can be closed by the operation of its actuator		N/A
	3) Performance under over-voltage conditions		
	When associated with a switching device, the test is made without current in the main circuit.		N/A
	The test at 110 % of the rated supply voltage shall be made for 30 min or until the temperature has reached thermal equilibrium and without impairing its functions. Verification shall be made according 2) above		N/A
8.2.1.4	b) Shunt-coil operated releases		
	When associated with a switching device, the release shall be fitted to the switching device having the maximum rated current for which the release is suitable		N/A
	Tripping of shunt release measured during the tripping operation between 70 % and 110 % of the rated control supply voltage and if a.c. at rated frequency ..... :		N/A
8.2.1.5	Limits of operation of current sensing relays and releases		
8.2.1.5.1	Limits of operation of time-delay overload relays when all poles are energized		
8.2.1.5.1.1	Common requirements		
	type of time-delay overload relay ..... :		N/A
	trip class ..... :		N/A
	current setting ..... :		N/A
	ambient temperature °C) ..... :		N/A
	test enclosure W x H x D (mm x mm x mm) ..... :		N/A
	cable/busbar cross-section (mm²) / (mm) ..... :		N/A
	ambient temperature: - 5°C ..... :		N/A
	a) at A times of current setting, tripping shall not occur in less than 2 h starting from the cold state; test current ..... :	No tripping; ……A	N/A
	b) when the current is subsequently raised to B times the current setting, tripping shall occur in less than 2 h; test current ..... :	Tripping; …..A	N/A

	c) for class 2, 3, 5 and 10 A overload relays energized at *C* times the current setting, tripping shall occur in less than 2 min starting from thermal equilibrium, at the current setting, in accordance with 9.3.3 of IEC 60034-1; for class 10 A overload relays, for ambient air temperature –5 °C or below, the manufacturer may declare a longer tripping time but not longer than 2 times the values required for 20 °C	Class; ____ Tripping current___ A Trip-time: ____ s	N/A
	d) for class 10, 20 , 30 and 40 overload relays energized at C times the current, tripping shall occur in less than 4, 8 or 12 min, starting from thermal equilibrium at the current setting; class; test current; tripping time .....:	Class; ____ Tripping current___ A Trip-time: ____ s	N/A
	e) at D times the current setting, tripping shall occur within the limits given in Table 2 for the appropriate trip class and tolerance band, starting from the cold state; test current; tripping time Tp (s) .....:	Class; ____ Tripping current___ A Trip-time: ____ s	N/A
	ambient temperature: + 20 °C .....:		N/A
	a) at A times of current setting, tripping shall not occur in less than 2 h starting from the cold state; test current .....:	Test current: ____ A	N/A
	b) when the current is subsequently raised to B times the current setting, tripping shall occur in less than 2 h; test current .....:	Test current Trip time: ____s	N/A
	c) for class 2, 3, 5 and 10A overload relays energized at C times the current, tripping shall occur in less than 2 min, starting from thermal equilibrium at the current setting; test current ..... :	Test current Trip time: ____s	N/A
	d) for class 10, 20 , 30 and 40 overload relays energized at C times the current, tripping shall occur in less than 4, 8 or 12 min, starting from thermal equilibrium at the current setting; class; test current; tripping time .....:	Test current Trip time: ____s	N/A

	e) at D times the current setting, tripping shall occur within the limits given in Table 2 for the appropriate trip class and tolerance band, starting from the cold state; test current; tripping time Tp (s) .....:	Class; ____ Tripping current___ A Trip-time: ____ s	N/A
	ambient temperature: + 40 °C .....:		N/A
	a) at A times of current setting, tripping shall not occur in less than 2 h starting from the cold state; test current .....:	Test current: ____ A	N/A
	b) when the current is subsequently raised to B times the current setting, tripping shall occur in less than 2 h; test current .....:	Test current Trip time: ____s	N/A
	c) for class 2, 3, 5 and 10A overload relays energized at C times the current, tripping shall occur in less than 2 min, starting from thermal equilibrium at the current setting; test current .....:	Test current Trip time: ____s	N/A
	d) for class 10, 20 or 30 overload relays energized at C times the current, tripping shall occur in less than 4, 8 or 12 min, starting from thermal equilibrium at the current setting; class; test current; tripping time .....:	Test current Trip time: ____s	N/A
	e) at D times the current setting, tripping shall occur within the tripping time (s) < Tp <, starting from the cold state; test current; tripping time Tp (s) .....:	Class; ____ Tripping current___ A Trip-time: ____ s	N/A
8.2.1.5.1.2	Thermal memory test verification		
	Unless the manufacturer has specified that the device does not contain thermal memory, electronic overload relays shall fulfil the following requirements(see figure 8)		N/A
	Apply a current equal to Ie until the device has reached the thermal equilibrium	Ie = _____ A	N/A
	Interrupt a current for a duration of 2 x *Tp* (see Table 2) with a relative tolerance of 10% (where *Tp* is the time measured at the *D* current according to Table 3).	*Tp* = _____ *A* *D* = _____ A Measured time *Tp* = ____ s	N/A
	Apply a current equal to 7,2 x *Ie*	I test = _____ A	N/A
	The relay shall trip within 50% of the time *TP*	Trip time = _____ s	N/A
8.2.1.5.2	Limits of operation of three-pole time-delay overload relays energized on two poles:		
	ambient temperature (°C) .....:		N/A

	In case of overload relays having an adjustable current setting, the characteristics shall apply both when the relay is carrying the current associated with the maximum setting and when the relay is carrying the current associated with the minimum setting		N/A
	a) the relay energized on three poles, at A times the current setting, tripping shall not occur in less than 2 h, starting from the cold state; test current		N/A
	b) when the value of the current flowing in two poles is increased to B times the current setting and the third pole de-energized, tripping shall occur in less than 2 h; current value; test current		N/A
8.2.1.5.3	Limits of operation of instantaneous magnetic overload relays		
	For all values of the current setting, instantaneous magnetic overload relays shall trip with an accuracy of ± 10% of the value of the published current value corresponding to the current setting		N/A
	Magnetic settings……. :		N/A
	Accuracy ± 10% of the value……..:		N/A
8.2.1.5.4	Limits of operation of under-current relays and releases for automatic change over		
8.2.1.5.4.1	e) Limits of operation under-current relays		
	Under-current relays or release, when associated with a switching device, shall operate to open the switching device within 90% to 110 % of the set time when the current during run is below 0,9 times the under-current setting in all poles	Under current setting:_____A Test current:_____A Set time:_____s Measured:_____s	N/A
8.2.1.5.4.2	f) Limits of operation of automatic change over by under-current relays		
	- for star-delta starters from star to delta, and - for auto-transformer starters from the starting to the ON position		N/A
	The lowest drop-out of an under-current relay shall be not greater than 1,5, times the actual current setting of the overload relay which is active in the starting or star connection.	Lowest drop-out:…….A / Actual current setting: …..A = ≤ 1,5 times	N/A
	The under-current real shall be able to carry any value of current , from its lowest current setting to stalled current in the starting position or the star connection, for the tripping times determined by the overload relays at its highest current setting		N/A
8.2.1.5.5.	g) Stall relays		
	The limits of operation shall be verified accordance with cl. 8.2.1.5.5		N/A

	For currents sensing stall relays , the verification shall be made for the minimum and for the maximum set current values and for the minimum and maximum stall inhibit time(four settings)		N/A
	For stall relays operating in conjunction with a rotation sensing mean, the verification shall be made for the minimum and maximum stall inhibit time. The sensor can be simulated by an appropriate signal on the sensor input of the stall relay		N/A
	a) current sensing relays		N/A
	minimum current setting / minimum set stall inhibit time Test current 1,2 times	_____ A _____ s Trip time = _____s	N/A
	minimum current setting / maximum set stall inhibit time Test current 1,2 times	_____ A _____ s Trip time = _____s	N/A
	maximum current setting / minimum set stall inhibit time Test current 1,2 times	_____ A _____ s Trip time = _____s	N/A
	maximum current setting / maximum set stall inhibit time Test current 1,2 times	_____ A _____ s Trip time = _____s	N/A
	b) rotation sensing relays: an input signal indicating no rotation exits		N/A
	minimum set stall inhibit time	_____ s Trip time = _____s	N/A
	maximum set stall inhibit time	_____ s Trip time = _____s	N/A
8.2.1.5.6.	h) Jam relays		
	The limits of operation shall be verified accordance with cl. 8.2.1.5.6		N/A
	The verification shall be made for the minimum and for the maximum set current values and for the minimum and maximum stall inhibit time (four settings)		N/A
	For each of the four settings, the test shall be made under the following conditions:		N/A
	- apply a test current of 95% of the set current value. The jam relay shall not trip		N/A
	- increase the test current to 120 % of the set current value. The jam relay shall trip according to the requirements given in 8.2.1.5.6		N/A
	minimum current setting / minimum set stall inhibit time Test current 95 % of set value	 _____ s _____ A no trip	N/A

	minimum current setting / minimum set stall inhibit time Test current increase to 1,2 times	_____ A _____ s Trip time = _____s	N/A
	minimum current setting / maximum set stall inhibit time Test current 95 % of set value	_____ s _____ A no trip	N/A
	minimum current setting / maximum set stall inhibit time Test current 1,2 times	_____ A _____ s Trip time = _____s	N/A
	maximum current setting / minimum set stall inhibit time Test current 95 % of set value	_____ s _____ A no trip	N/A
	maximum current setting / minimum set stall inhibit time Test current 1,2 times	_____ A _____ s Trip time = _____s	N/A
	maximum current setting / maximum set stall inhibit time Test current 95 % of set value	_____ s _____ A no trip	N/A
	maximum current setting / maximum set stall inhibit time Test current 1,2 times	_____ A _____ s Trip time = _____s	N/A
9.3.3.4	Test of dielectric properties, impulse withstand voltage (Uimp indicated):		
	- verification by measurement of clearances instead of testing		P
	Any actuator of insulating material and any integral non-metallic enclosure of equipment intended to be used without an additional enclosure shall be covered by a metal foil and connected to the frame or the mounting plate.		P
	Tests are also carried out according Annex R of IEC 60947-1, Ed. 5, application of the metal foil for dielectric testing on accessible parts during operation or adjustment		P
	Terminal holes covered	☐ yes ☐ no	N/A
	- rated impulse withstand voltage (V) .....:	6kV	P
	- test Uimp main circuits (kV) .....:	7,3kV	P
	- test Uimp auxiliary circuits (kV) .....:	4,8kV	P
	Test of dielectric properties, dielectric withstand voltage (Uimp not indicated):		
	- rated insulation voltage (V) .....:	690V	P

	- main circuits, test voltage for 5 s (V) .....:	1890V; 5s	P
	- control and auxiliary circuits, test voltage for 5 s (V) .....:	1890V; 5s	P
	- circuits of equipment include devices such as motors, instruments ect, test voltage for 5 s (V) ..:		N/A
	Equipment suitable for isolation		
	The leakage current shall be measured through each pole with the contacts in open position (< 0,5 mA)	1,1 times U_e= ___V	N/A

IEC 60947-4-1			
Clause	Requirement + Test	Result - Remark	Verdict
		#3(CJX2s-18)	
9.3.1	Compliance with performance requirements		
a)	TEST SEQUENCE 1		
	- verification of temperature rise (Clause 9.3.3.3.)		
	- verification of operation and operating limits (Clause 9.3.3.1 and 9.3.3.2)		
	- verification of dielectric properties (Clause 9.3.3.4)		
9.3.3.3	Temperature rise		
	Sub clause 8.3.3.3. of part 1 applies		
	ambient temperature 10-40 °C .....:	+21,9°C	P
	Contactor		
	test enclosure W x H x D (mm x mm x mm) .....:		N/A
	material of enclosure .....:		N/A
9.3.3.3.4	Main circuits, test conditions:		
	Sub clause 8.3.3.3.4 of part 1 applies with following addition		
	loaded as stated in 8.2.2.4		P
	- setting of the maximum current setting.....:		N/A
	- setting overload relay.....:		N/A
	- conventional thermal current Ith (A) .....:	32,0A	P
	- conventional enclosed thermal current Ithe (A) .:		N/A
	- for equipment intended for utilization category AC-6b, the test current for the temperature rise test shall be equal to 1,35 times Ie (the rated capacitive current).		N/A
	- cable/busbar cross-section (mm²) / (mm) .....:	6mm²/1mm	P
	- temperature rise of main circuit terminals (K) ....:	< 65 K see page 51	P
9.3.3.3.5	Control circuit, test conditions:		
	Sub clause 8.3.3.3.5. of part 1 applies with following addition		
	The temperature rise shall be measures during the test of 9.3.3.3.4		
	- conventional thermal current Ith (A) at their rated voltage.....:		N/A
	- conventional enclosed thermal current Ithe (A) .:		N/A
	- cable/busbar cross-section (mm²) / (mm) .....:		N/A

	- temperature rise of control circuit (K) .....:	<_____ K see page ____	N/A
9.3.3.3.6	Coils and electromagnets circuit, test conditions:		
	The coil with the highest power consumption, for a given frequency a.c. or d.c., according to 9.3.3.2.1.2.2 is deemed to be representative for all coils, for the same contactor, and shall be used for the temperature rise test.		
	a) Uninterrupted and eight-hour duty windings (8.2.2.6.1)		
	The temperature rise shall be measures during the test of 9.3.3.3.4		P
	- rated control supply voltage Us (V) .....:	220V~	P
	- class of insulating material .....:	B	P
	- uninterrupted or eight-hour duty windings	Uninterrupted	P
	- temperature rise of control circuit terminals (K) .:	< 110 K see page 51	P
	b) Intermittent duty windings (8.2.2.6.2)		
	- no current flowing though the main circuit		P
	- rated control supply voltage Us (V) .....:	220V~	P
	- class of insulating material .....:	B	P
	- intermittent duty class .....:	3	P
	- close open operating cycle .....:	1200s	P
	- on-load factor .....:	40%	P
	- temperature rise of control circuit terminals (K) .:	< 110 K see page 51	P
	c) temporary or periodic duty (8.2.2.6.3)		
	- no current flowing though the main circuit		N/A
	- rated control supply voltage Us (V) .....:		N/A
	- class of insulating material .....:		N/A
	- close open operating cycle .....:		N/A
	- on-load time .....:		N/A
	- temperature rise of control circuit terminals (K) .:	< ____ K see page ____	N/A
9.3.3.3.7	Auxiliary circuit, test conditions:		
	Normally loaded with their maximum rated operational current at any convenient voltage		
	The temperature rise shall be measures during the test of 9.3.3.3.4		
	- conventional thermal current Ith (A).....:	10,0A	P
	- conventional enclosed thermal current Ithe (A) .:		N/A
	- cable/busbar cross-section (mm²) / (mm) .....:	1,5mm²/1mm	P
	- cable cross-section (mm²) .....:		N/A

	- temperature rise of auxiliary circuit terminals (K) .....:	< 65K see page 51	P
9.3.3.3.8	Starting resistors for rheostatic rotor starters test conditions:		
	Normally loaded with their current value I_m		N/A
	Number of starts per hour .....:		N/A
	Rated duty .....:		N/A
	Starting characteristic	see page _____	N/A
	- cable/busbar cross-section (mm²) / (mm) .....:		N/A
	- cable cross-section (mm²) .....:		N/A
	- temperature rise of starting resistor terminals (K) .....:	See table 3 of part 1	N/A
	- temperature rise of starting resistor enclosure (K)	See table 3 of part 1	N/A
	- temperature rise of issuing air (K)	See table 3 of part 1	N/A
9.3.3.3.9	Auto-transformers for two-step auto-transformers starters		
	Normally loaded with max. Starting current multiplied with 0,8 x $^{\text{starting voltage}}/_{Ue}$		N/A
	Number of starts per hour .....:		N/A
	Rated duty .....:		N/A
	Starting characteristic.....:	see page _____	N/A
	- cable/busbar cross-section (mm²) / (mm) .....:		N/A
	Temperature rise of:		N/A
	- windings (K), See table 5 (+15 K).....:		N/A
	- operating means (K) , See table 3 of part 1.....:		N/A
	- parts intended to be touched but not hand held (K) , See table 3 of part 1		N/A
	- parts which need not be touched during normal operation (K) , See table 3 of part 1		N/A
9.3.3	Performance under no load, normal load and overload conditions		
9.3.3.1	Operation		
	For starter only:		
	reference ambient temperature(i.e. +20 °C) :		N/A
	Rated full load current (A) :		N/A

	No tripping after 3 operations when stator has reached thermal equilibrium at minimum and maximum settings		N/A
	For overload relay with combined stop and reset actuating mechanism only		N/A
	With closed contactor, the resetting mechanism shall be operated and this shall cause the contactor drop out		N/A
	For overload relay with either a reset or separate stop and reset mechanism only		N/A
	With closed contactor and resetting mechanism in the reset position, the tripping mechanism shall be operated and the contactor shall have been caused to drop out		N/A
9.3.3.2	Operating limits		
9.3.3.2.1	Power-operated equipment:		
8.2.1.2.1	Electromagnetic contactors and starters		
	Rated control supply voltage Us (V) .....:	220V~	P
	Frequency (Hz) .....:	50Hz	P
	Declared ambient temperature(>40 °C) for 100% Us .....:		N/A
	Limits of close satisfactorily at any value between 85% and 110% of rated control supply voltage Us .....:		P
	Limits of drop out and open fully are: 75% to 20% for a.c. and 75% to 10% for d.c. .....:		P
	Ambient temperature(-5 °C) for 100% Us		N/A
	Drop out test method		N/A
	Limits of drop out and open fully are: 75% to 20% for a.c. and 75% to 10% for d.c.....:		N/A
8.2.1.2.2	Contactors and starters with electronically controlled electromagnet		
	Rated control supply voltage Us (V) .....:		N/A
	Frequency (Hz) .....:		N/A
	Declared ambient temperature(>40 °C) for 100% Us		N/A
	Limits of close satisfactorily at any value between 85% and 110% of rated control supply voltage Us .....:		N/A
	Limits of drop out and open fully are: 75% to 20% for a.c. and 75% to 10% for d.c. .....:		N/A

	Ambient temperature(-5 °C) for 100% Us		N/A
	Drop out test method		N/A
	Limits of drop out and open fully are: 75% to 20% for a.c. and 75% to 10% for d.c.....:		N/A
8.2.1.2.3	Electro-pneumatic contactors and starters		
	Rated air supply pressure (Bar) .....:		N/A
	Declared ambient temperature(>40 °C) for 100% of the rated air supply pressure (Bar)		N/A
	Limits of close satisfactorily at any value between 85% and 110% of rated air supply pressure (Bar):		N/A
	Limits of drop out and open fully are: 75% to 10% of rated air supply pressure(Bar) .....:		N/A
	Ambient temperature(-5 °C) for 100% of the rated air supply pressure(Bar)		N/A
	Limits of close satisfactorily at any value between 85% and 110% of rated air supply pressure(Bar:		N/A
	Limits of drop out and open fully are: 75% to 10% for the rated air supply pressure(Bar) .....:		N/A
8.2.1.2.4	Capacitive drop out test		
	A capacitor shall be inserted in series in the supply circuit U_s, the total length of the connecting conductors being ≤ 3 m.		N/A
	The capacitor is short-circuit by a switch of negligible impedance.		N/A
	The supply voltage shall then be adjusted to 110 % U_s.....:		N/A
	The value of the capacitor shall be calculated: C (nF) = 30 + 200000 / (f x U_s) .....:	_____nF	N/A
	Verification of the drop out of the contactor when the switch is operated to the open position.....:		N/A
9.3.3.2.1.2	Coil power consumption		
	A contactor coil is evaluated for both holding power and pick-up power		
	In the case where different coils cover a range of voltages, 5 coils shall be tested		N/A

	The coil with the lowest rated control supply voltage Us, the coil with the highest rated control supply voltage Us, plus 3 coils deemed to be representative of the coils with the highest calculated hold power at the discretion of the manufacturer		N/A
	The test shall be performed at ambient temperature +23 °C ± 3 °C	+23 °C	P
	The test shall be made without any load in the main and auxiliary circuits		P
	The coil shall be supplied with the rated control supply voltage Us and at the rated frequency		P
	For a given coil, where a voltage range is declared, the test shall be made at the highest voltage at the respective frequency		N/A
	The measured values shall be obtained with a r.m.s. measurement method covering at least a bandwidth from 0 Hz to 10 kHz and the resulting power values shall be given within a measurement uncertainty better than 5 %		P
9.3.3.2.1.2.2	Holding power for conventional and electronically controlled electromagnet		
	The current measurement I(i) of the coil shall be performed after the coil has been energized and has reached a stable temperature		P
	The holding power consumption is defined as follows		
	Sh(i) = Us(i) × I(i) [VA] for a.c. controlled contactor	7,48VA 7,48VA 7,48VA 7,48VA 7,48VA	P
	Pc(i) = Us(i) × I(i) [W] for d.c. controlled contactor		N/A
	The published value shall be equal to the average value of the 5 tested coils		P
	Sh = Σ (Us(i) × I(i)) / 5 [VA] respectively Pc = Σ (Us(i) × I(i)) / 5 [W]	7,48VA	P
9.3.3.2.1.2.3	Pick-up power for a.c. controlled contactor or d.c. controlled contactor with separate pick-up and hold-on windings		

	The pick-up measurement shall be performed directly after the measurement of the hold current (see 9.3.3.2.1.2.2)		P
	The current measurement I(i) of the coil shall be performed immediately after the coil has been de-energized, the contactor has been held in the Off position and re-energized		P
	The pick-up power consumption is defined as follows		
	Sp(i) = Us × I(i) [VA] for a.c. controlled contactor	16,50VA 21,56VA 15,18VA 9,46VA 15,18VA	P
	Pp(i) = Us × I(i) [W] for d.c. controlled contactor with separate pick-up and hold windings		N/A
	The published value shall be equal to the average value of the 5 tested coils		P
	Sp = Σ (Us(i) × I(i)) / 5 [VA] respectively Pp = Σ (Us(i) × I(i)) / 5 [W]	15,58VA	P
9.3.3.2.1.3	Pole impedance		
	The pole impedance shall be determined during the test and with the conditions given in 9.3.3.3.4.		N/A
	The test in an enclosure is not deemed necessary even if the contactor can be used in an individual enclosure		N/A
	The voltage drop Ud shall be measured between the line and load terminals (terminals included) of the contactor preferably at the same time the temperature rise is measured		N/A
	The impedance per pole is defined as follows		
	Z = Ud / Ith [Ω]		N/A
	Care should be taken that voltage drop measurement does not significantly affect the temperature rise nor affect significantly the impedance		N/A
9.3.3.2.2	Relays and releases		
8.2.1.3	a) Operation of under-voltage relays and releases		

	When associated with a switching device, the release shall be fitted to the switching device having the maximum current rating for which the release is suitable		N/A
	1) Drop-out voltage		
	Rated control supply voltage(U)..... :		N/A
	Frequency (Hz)..... :		N/A
	Limits of drop out and fully open at slowly falling voltage are 70 % and 35 % of the rated voltage .... :		N/A
	The voltage shall be reduced from rated control supply voltage at a rate to reach 0 V in approximately 30 s		N/A
	The test for the lower limit is made without previous heating of the release coil		N/A
	In the case of a release with a range of rated control supply voltage, this test applies to the maximum voltage of the range		N/A
	When associated with a switching device, the test for the lower limit is made without current in the main circuit		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.		N/A
	This test may be combined with the temperature-rise test of 9.3.3.3.		N/A
	In the case of a release with a range of rated control supply voltage, this test is made at the minimum rated control supply voltage		N/A
	2) Test for limits of operation when associated with a switching device		
	Starting with the main circuit open, at the temperature of the test room, and with the supply voltage at 35 % rated maximum control supply voltage, it shall be verified that the switching device cannot be closed by the operation of its actuator		N/A
	When the supply voltage is raised to 85 % of the minimum control supply voltage, it shall be verified that the switching device can be closed by the operation of its actuator		N/A
	3) Performance under over-voltage conditions		
	When associated with a switching device, the test is made without current in the main circuit.		N/A
	The test at 110 % of the rated supply voltage shall be made for 30 min or until the temperature has reached thermal equilibrium and without impairing its functions. Verification shall be made according 2) above		N/A
8.2.1.4	b) Shunt-coil operated releases		

	When associated with a switching device, the release shall be fitted to the switching device having the maximum rated current for which the release is suitable		N/A
	Tripping of shunt release measured during the tripping operation between 70 % and 110 % of the rated control supply voltage and if a.c. at rated frequency ..... :		N/A
8.2.1.5	Limits of operation of current sensing relays and releases		
8.2.1.5.1	Limits of operation of time-delay overload relays when all poles are energized		
8.2.1.5.1.1	Common requirements		
	type of time-delay overload relay ..... :		N/A
	trip class ..... :		N/A
	current setting ..... :		N/A
	ambient temperature °C) ..... :		N/A
	test enclosure W x H x D (mm x mm x mm) ..... :		N/A
	cable/busbar cross-section (mm²) / (mm) ..... :		N/A
	ambient temperature: - 5°C ..... :		N/A
	a) at A times of current setting, tripping shall not occur in less than 2 h starting from the cold state; test current ..... :	No tripping; ……A	N/A
	b) when the current is subsequently raised to B times the current setting, tripping shall occur in less than 2 h; test current ..... :	Tripping; …..A	N/A
	c) for class 2, 3, 5 and 10 A overload relays energized at *C* times the current setting, tripping shall occur in less than 2 min starting from thermal equilibrium, at the current setting, in accordance with 9.3.3 of IEC 60034-1; for class 10 A overload relays, for ambient air temperature –5 °C or below, the manufacturer may declare a longer tripping time but not longer than 2 times the values required for 20 °C	Class; ____ Tripping current___ A Trip-time: ____ s	N/A
	d) for class 10, 20 , 30 and 40 overload relays energized at C times the current, tripping shall occur in less than 4, 8 or 12 min, starting from thermal equilibrium at the current setting; class; test current; tripping time .....:	Class; ____ Tripping current___ A Trip-time: ____ s	N/A

	e) at D times the current setting, tripping shall occur within the limits given in Table 2 for the appropriate trip class and tolerance band, starting from the cold state; test current; tripping time Tp (s) .....:	Class; ____ Tripping current___ A Trip-time: ____ s	N/A
	ambient temperature: + 20 °C .....:		N/A
	a) at A times of current setting, tripping shall not occur in less than 2 h starting from the cold state; test current .....:	Test current: ____ A	N/A
	b) when the current is subsequently raised to B times the current setting, tripping shall occur in less than 2 h; test current .....:	Test current Trip time: ____s	N/A
	c) for class 2, 3, 5 and 10A overload relays energized at C times the current, tripping shall occur in less than 2 min, starting from thermal equilibrium at the current setting; test current ..... :	Test current Trip time: ____s	N/A
	d) for class 10, 20 , 30 and 40 overload relays energized at C times the current, tripping shall occur in less than 4, 8 or 12 min, starting from thermal equilibrium at the current setting; class; test current; tripping time .....:	Test current Trip time: ____s	N/A
	e) at D times the current setting, tripping shall occur within the limits given in Table 2 for the appropriate trip class and tolerance band, starting from the cold state; test current; tripping time Tp (s) .....:	Class; ____ Tripping current___ A Trip-time: ____ s	N/A
	ambient temperature: + 40 °C .....:		N/A
	a) at A times of current setting, tripping shall not occur in less than 2 h starting from the cold state; test current .....:	Test current: ____ A	N/A
	b) when the current is subsequently raised to B times the current setting, tripping shall occur in less than 2 h; test current .....:	Test current Trip time: ____s	N/A
	c) for class 2, 3, 5 and 10A overload relays energized at C times the current, tripping shall occur in less than 2 min, starting from thermal equilibrium at the current setting; test current .....:	Test current Trip time: ____s	N/A

	d) for class 10, 20 or 30 overload relays energized at C times the current, tripping shall occur in less than 4, 8 or 12 min, starting from thermal equilibrium at the current setting; class; test current; tripping time .....:	Test current Trip time: ____s	N/A
	e) at D times the current setting, tripping shall occur within the tripping time (s) < Tp <, starting from the cold state; test current; tripping time Tp (s) .....:	Class; ____ Tripping current___ A Trip-time: ____ s	N/A
8.2.1.5.1.2	Thermal memory test verification		
	Unless the manufacturer has specified that the device does not contain thermal memory, electronic overload relays shall fulfil the following requirements(see figure 8)		N/A
	Apply a current equal to Ie until the device has reached the thermal equilibrium	Ie = _____ A	N/A
	Interrupt a current for a duration of 2 x *Tp* (see Table 2) with a relative tolerance of 10% (where *Tp* is the time measured at the *D* current according to Table 3).	*Tp* = _____ *A* *D* = _____ A Measured time *Tp* = ____ s	N/A
	Apply a current equal to 7,2 x *Ie*	I test = _____ A	N/A
	The relay shall trip within 50% of the time *TP*	Trip time = _____ s	N/A
8.2.1.5.2	Limits of operation of three-pole time-delay overload relays energized on two poles:		
	ambient temperature (°C) .....:		N/A
	In case of overload relays having an adjustable current setting, the characteristics shall apply both when the relay is carrying the current associated with the maximum setting and when the relay is carrying the current associated with the minimum setting		N/A
	a) the relay energized on three poles, at A times the current setting, tripping shall not occur in less than 2 h, starting from the cold state; test current		N/A
	b) when the value of the current flowing in two poles is increased to B times the current setting and the third pole de-energized, tripping shall occur in less than 2 h; current value; test current		N/A
8.2.1.5.3	Limits of operation of instantaneous magnetic overload relays		
	For all values of the current setting, instantaneous magnetic overload relays shall trip with an accuracy of ± 10% of the value of the published current value corresponding to the current setting		N/A
	Magnetic settings……. :		N/A
	Accuracy ± 10% of the value……..:		N/A

8.2.1.5.4	Limits of operation of under-current relays and releases for automatic change over		
8.2.1.5.4.1	e) Limits of operation under-current relays		
	Under-current relays or release, when associated with a switching device, shall operate to open the switching device within 90% to 110 % of the set time when the current during run is below 0,9 times the under-current setting in all poles	Under current setting:_____A Test current:_____A Set time:_____s Measured:_____s	N/A
8.2.1.5.4.2	f) Limits of operation of automatic change over by under-current relays		
	- for star-delta starters from star to delta, and - for auto-transformer starters from the starting to the ON position		N/A
	The lowest drop-out of an under-current relay shall be not greater than 1,5, times the actual current setting of the overload relay which is active in the starting or star connection.	Lowest drop-out:…….A / Actual current setting: …..A = ≤ 1,5 times	N/A
	The under-current real shall be able to carry any value of current , from its lowest current setting to stalled current in the starting position or the star connection, for the tripping times determined by the overload relays at its highest current setting		N/A
8.2.1.5.5.	g) Stall relays		
	The limits of operation shall be verified accordance with cl. 8.2.1.5.5		N/A
	For currents sensing stall relays , the verification shall be made for the minimum and for the maximum set current values and for the minimum and maximum stall inhibit time(four settings)		N/A
	For stall relays operating in conjunction with a rotation sensing mean, the verification shall be made for the minimum and maximum stall inhibit time. The sensor can be simulated by an appropriate signal on the sensor input of the stall relay		N/A
	a) current sensing relays		N/A
	minimum current setting / minimum set stall inhibit time Test current 1,2 times	_____ A _____ s Trip time = _____s	N/A
	minimum current setting / maximum set stall inhibit time Test current 1,2 times	_____ A _____ s Trip time = _____s	N/A
	maximum current setting / minimum set stall inhibit time Test current 1,2 times	_____ A _____ s Trip time = _____s	N/A

	maximum current setting / maximum set stall inhibit time Test current 1,2 times	_____ A _____ s Trip time = _____s	N/A
	b) rotation sensing relays: an input signal indicating no rotation exits		N/A
	minimum set stall inhibit time	_____ s Trip time = _____s	N/A
	maximum set stall inhibit time	_____ s Trip time = _____s	N/A
8.2.1.5.6.	h) Jam relays		
	The limits of operation shall be verified accordance with cl. 8.2.1.5.6		N/A
	The verification shall be made for the minimum and for the maximum set current values and for the minimum and maximum stall inhibit time (four settings)		N/A
	For each of the four settings, the test shall be made under the following conditions:		N/A
	- apply a test current of 95% of the set current value. The jam relay shall not trip		N/A
	- increase the test current to 120 % of the set current value. The jam relay shall trip according to the requirements given in 8.2.1.5.6		N/A
	minimum current setting / minimum set stall inhibit time Test current 95 % of set value	 _____ s _____ A no trip	N/A
	minimum current setting / minimum set stall inhibit time Test current increase to 1,2 times	_____ A _____ s Trip time = _____s	N/A
	minimum current setting / maximum set stall inhibit time Test current 95 % of set value	_____ s _____ A no trip	N/A
	minimum current setting / maximum set stall inhibit time Test current 1,2 times	_____ A _____ s Trip time = _____s	N/A
	maximum current setting / minimum set stall inhibit time Test current 95 % of set value	_____ s _____ A no trip	N/A
	maximum current setting / minimum set stall inhibit time Test current 1,2 times	_____ A _____ s Trip time = _____s	N/A
	maximum current setting / maximum set stall inhibit time Test current 95 % of set value	_____ s _____ A no trip	N/A

	maximum current setting / maximum set stall inhibit time Test current 1,2 times	_____ A _____ s Trip time = _____s	N/A
9.3.3.4	Test of dielectric properties, impulse withstand voltage (Uimp indicated):		
	- verification by measurement of clearances instead of testing		P
	Any actuator of insulating material and any integral non-metallic enclosure of equipment intended to be used without an additional enclosure shall be covered by a metal foil and connected to the frame or the mounting plate.		P
	Tests are also carried out according Annex R of IEC 60947-1, Ed. 5, application of the metal foil for dielectric testing on accessible parts during operation or adjustment		P
	Terminal holes covered	☐ yes ☐ no	N/A
	- rated impulse withstand voltage (V) .....:	6kV	P
	- test Uimp main circuits (kV) .....:	7,3kV	P
	- test Uimp auxiliary circuits (kV) .....:	4,8kV	P
	Test of dielectric properties, dielectric withstand voltage (Uimp not indicated):		
	- rated insulation voltage (V) .....:	690V	P
	- main circuits, test voltage for 5 s (V) .....:	1890V; 5s	P
	- control and auxiliary circuits, test voltage for 5 s (V) .....:	1890V; 5s	P
	- circuits of equipment include devices such as motors, instruments ect, test voltage for 5 s (V) ..:		N/A
	Equipment suitable for isolation		
	The leakage current shall be measured through each pole with the contacts in open position (< 0,5 mA)	1,1 times U_e= ___V	N/A

9.3.3.3.4	TABLE: Heating Test #1		P
	Test voltage (V) .....:	N/A	
	Ambient (^{o}C) .....:	22,3 ^{o}C	

Thermocouple Locations	max. temperature measured, (K)	max. temperature limit, (K)
Main circuit terminals	52,0	65
Enclosure	22,7	40
Auxiliary circuit terminals	26,9	65
Supplementary information: N/A		

	TABLE: Heating test, resistance method #1				P
	Test voltage (V)..... :	220V			
	Ambient, t_1 (°C) ..... :	22,4 ^{o}C			
	Ambient, t_2 (°C) ..... :	22,2 ^{o}C			
Temperature rise of winding	R_1 (Ω)	R_2 (Ω)	ΔT (K)	Max. ΔT (K)	
Uninterrupted and eight-hour duty windings	655	807	59,8	110	
Supplementary information: N/A					

	TABLE: Heating test, resistance method #1				P
	Test voltage (V)..... :	220V			
	Ambient, t_1 (°C) ..... :	22,2 ^{o}C			
	Ambient, t_2 (°C) ..... :	22,4 ^{o}C			
Temperature rise of winding	R_1 (Ω)	R_2 (Ω)	ΔT (K)	Max. ΔT (K)	
Intermittent duty windings	655	746	35,5	110	
Supplementary information: N/A					

9.3.3.3.4	TABLE: Heating Test #2		P
	Test voltage (V) .....:	N/A	
	Ambient (°C) .....:	21,9 °C	

Thermocouple Locations	max. temperature measured, (K)	max. temperature limit, (K)
Main circuit terminals	44,9	65
Enclosure	22,6	40
Auxiliary circuit terminals	27,9	65
Supplementary information: N/A		

	TABLE: Heating test, resistance method #2				P
	Test voltage (V)..... :	220V			
	Ambient, t_1 (°C) ..... :	22,2 °C			
	Ambient, t_2 (°C) ..... :	22,3 °C			
Temperature rise of winding	R_1 (Ω)	R_2 (Ω)	ΔT (K)	Max. ΔT (K)	
Uninterrupted and eight-hour duty windings	670	829	60,8	110	
Supplementary information: N/A					

	TABLE: Heating test, resistance method #2				P
	Test voltage (V)..... :	220V			
	Ambient, t_1 (°C) ..... :	22,2 °C			
	Ambient, t_2 (°C) ..... :	22,4 °C			
Temperature rise of winding	R_1 (Ω)	R_2 (Ω)	ΔT (K)	Max. ΔT (K)	
Intermittent duty windings	670	772	38,9	110	
Supplementary information: N/A					

9.3.3.3.4	TABLE: Heating Test #3		P
	Test voltage (V) .....:	N/A	
	Ambient (^{o}C) .....:	21,9 ^{o}C	

Thermocouple Locations	max. temperature measured, (K)	max. temperature limit, (K)
Main circuit terminals	47,6	65
Enclosure	23,7	40
Auxiliary circuit terminals	25,6	65
Supplementary information: N/A		

	TABLE: Heating test, resistance method #3				P
	Test voltage (V)..... :	220V			
	Ambient, t_1 (°C) ..... :	22,5 ^{o}C			
	Ambient, t_2 (°C) ..... :	22,3 ^{o}C			
Temperature rise of winding	R_1 (Ω)	R_2 (Ω)	ΔT (K)	Max. ΔT (K)	
Uninterrupted and eight-hour duty windings	660	821	62,9	110	
Supplementary information: N/A					

	TABLE: Heating test, resistance method #3				P
	Test voltage (V)..... :	220V			
	Ambient, t_1 (°C) ..... :	22,4 ^{o}C			
	Ambient, t_2 (°C) ..... :	22,2 ^{o}C			
Temperature rise of winding	R_1 (Ω)	R_2 (Ω)	ΔT (K)	Max. ΔT (K)	
Intermittent duty windings	660	759	38,7	110	
Supplementary information: N/A					