

AT 1529

IEC SYSTEM FOR MUTUAL RECOGNITION OF TEST CERTIFICATES FOR ELECTRICAL EQUIPMENT (IECEE) CB **SCHEME**

SYSTEME CEI D'ACCEPTATION MUTUELLE DE CERTIFICATS D'ESSAIS DES EQUIPEMENTS ELECTRIQUES (IECEE) METHODE OC

CB TEST CERTIFICATE CERTIFICAT D'ESSAI OC

Product Produit

Name and address of the applicant Nom et adresse du demandeur

Name and address of the manufacturer Nom et adresse du fabricant

Name and address of the factory Nom et adresse de l'usine

Ratings and principal characteristics Valeurs nominales et caractéristiques principales

Trademark (if any) Marque de fabrique (si elle existe)

Model / Type Ref. Ref. de type

Additional information (if necessary) Information complémentaire (si nécessaire)

A sample of the product was tested and found to be in conformity with Un échantillon de ce produit a été essayé et

a été considéré conforme à la

As shown in the Test Report Ref. No. which forms part of this Certificate

Comme indiqué dans le Rapport d'essais numéro de référence qui constitue partie de ce Certificat

Motor-Starter

Benedict GmbH 1220 Wien, Lieblgasse 7, Austria

Benedict GmbH 1220 Wien, Lieblgasse 7, Austria

Benedict GmbH 1220 Wien, Lieblgasse 7, Austria

AC 690 V; 50-60 Hz; AC1 see page 1 of test reports AC 400 V; 50-60 Hz; AC 3 see page 1 of test reports AC 240 V; 50-60 Hz; AC15 see page 1 of test reports

Ω, Benedikt & Jäger

K1-09Dxx/-K2-09Axx/-12Axx/-16Axx/-23Axx/-30Axx + U12/16xxx K85Axx/-110Axx + U85x

IEC 60947-4-1(ed.2);am1

2.03.00356.1.0-K109/B&J, -K209/B&J, -K212/B&J, -K216/B&J, -K223/B&J, -K230/B&J, -K85/B&J, -K110/B&J

This CB Test Certificate is issued by the National Certification Body Ce Certificat d'essai OC est établi par l'Organisme National de Certification

AUSTRIAN ELECTROTECHNICAL ASSOCIATION
/ // A-1190 Vien, Kahlenberger Str. 2A

Dipl.-Ing. W. Martin

Date: 2004-02-25





inetter

TEST REPORT EN 60 947-4-1

Low-voltage switchgear and controlgear

Part 4: Contactors and motor-starters

Section 1: Electromechanical contactors and motor-starters

Report reference No.

2.03.00356.1.0-K109/B&J

Tested by (+ signature).....: Ing.J.Ainetter

Approved by (+ signature): Ing.K.Farthofer

Date of issue: 02.02.2004

Testing laboratory: Österreichische Forschungs- und Prüfzentrum Arsenal

Ges.m.b.H

Testing location.....: as above

Applicant Benedict GmbH (Ω Benedikt & Jäger)

Address..... A – 1220 Vienna, Lieblaasse 7

Standard EN 60 947-4-1:2000-11

Test Report Form No. 69474-1A

Master TRF.....: reference No. 69474-1A, dated 95-07

Copyright blank test report....: the bodies participating in the Committee of Certification

Bodies (CCB) and/or the CENELEC Certification

Agreement (CCA).

Test procedure: CB-scheme

Procedure deviation: N.A.

Non-standard test method: N.A.

Type of test object: Motor-Starter

Trademark Ω, Benedikt & Jäger

Model/type reference : K1-09Dxx + U12/16xxx

Manufacturer.....: Ω Benedikt & Jäger

Rating: AC1

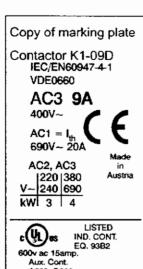
20A 690V 50-60Hz

AC3/AC4

9A 400V 50-60Hz

AC15

3A 240V 50-60Hz

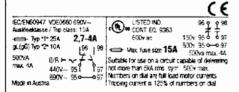


Aux. Cont.
A600 Q600

v max. | 120 | 240 | 480 | 600
hp 3ph | 1.5 | 3 | 5 | 7.5
hp 1ph | 0.5 | 1.5 | - |
14AWG - 18AWG WIRE
60/75°C Cu only
TIGHT. TOROUE 9 lb.-in.
SUITABLE FOR USE ON
A CIRCUIT OF DELIVERING SOOORMS SYM. AMP.
600 VOLTS AC MAXIMUM
MAX. FUSE SIZE 30 AMP.

Overload Relay

U12/16E 4



U12/16EM



U12/16U 4



U12/16A 4

EC/EN60947 VDE0660 690V	LISTED IND.	96 o o 98
Ausiöseklasse / Trip class: 104	CONT. EQ. 9383	≠ +
€ Typ 11.25A 2.7-4A	900V ac	ـــــ95 ـــــــ
\$4(\$G) Typ -2-10A 95 198	← Max. fuse size 15Å	500va max 4A
Hand 690V 0/8	Sustable for use on a circuit ca	pable of derivering
Hand 690V~ 95 Auto 600VA max 4A	not more than 5kA rms. sym.	
	Numbers on dial are full load in	notor currents
Made in Austria	Tripping current is 125% of nex	rrbers on dial

--

U12/16EQ 4

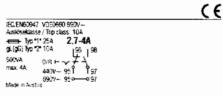
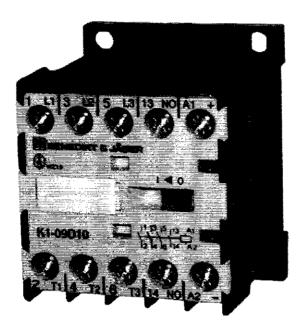
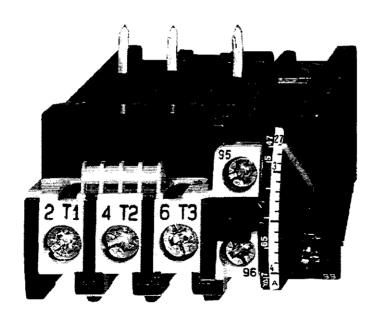


Photo:

K1-09D10



Overload Relay U12/16E



	the state of the s
Test item particulars:	
- method of operation	Magnetic
- switching positions	ON-OFF
- number of polesContactor:	3 Main 1 Aux
- kind of current	AC
- number of phases	3
- rated frequency (Hz)	50-60
- number of positions of main contacts:	2
Rated and limiting values, main circuit:	
- rated operational voltage Ue (V):	690
- rated insulation voltage Ui (V):	690
- rated impulse withstand voltage Uimp (kV):	8
- conventional free air thermal current lth (A):	20
- conventional enclosed thermal current Ithe (A):	20
- rated operational current le (A):	20
- rated uninterrupted lu (A):	20
- utilization category:	AC1, AC3, AC4
Short-circuit characteristic:	
- rated prospective short-circuit current "r" (kA):	1
- rated conditional short-circuit current Iq (kA):	1
Rated and limiting values, auxiliary circuits:	For Contactor
- rated operational voltage (V)::	240
- rated frequency (Hz):	50-60
- number of circuits:	1
- number and kind of contact elements:	1 NO or 1 NC
Co-ordination of short-circuit protective devices:	Type "1"
- kind of protective device:	Fuse
Possible test case verdicts:	
- test case does not apply to the test object:	N(.A.)
- test object does meet the requirement:	P(ass)
- test object does not meet the requirement:	F(ail)

General remarks:

"(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.

The test results presented in this report relate only to the object tested.

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

- 1) Based on the decision of the applicant, some of the tests of Test Sequences I and II may have been performed under more severe conditions than required in the stanard. In case of, relevant values for equipment under test are stated in test report.
- 2) Relevant tests have been performed with or without 'snap on auxiliary contact block' Typ 'HK' or 'HKM'.
- 3) The test item is corresponding to the requirements of IEC 60947-4-1 Ed. 2.0 (2000-11) + A1 (2002-09).

```
Ordering key:
Contactor
K1-09D x x
       I I >>>: 0, 1 : Number of NC auxiliary contacts
       I>>>> : 0, 1 : Number of NO auxiliary contacts
Overload Relay
U12/16 x x x
       | | | >>>>
                     : Setting range 0.12 - 0.18 / 0.18 - 0.27 / 0.27 - 0.4 / 0.4 - 0.6 /
       11
                              0.6 - 0.9 / 0.8 - 1.2 / 1.2 - 1.8 / 1.8 - 2.7 /
                              2,7-4 / 4-6 / 6-9A
       11
       1.1
                      : M ... With additional quick trip up to 4A (optional)
       | | >>>>
                      : Q ... Thermic quick trip up to 14A (optional)
       >>>>
                      : U ... Change over auxiliary contacts
                      : A ... Change over auxiliary contacts with autom. Reset
                      : E ... 1 NC and 1 NO auxiliary contact
Control Circiut Voltage:
6 - 550V
               50Hz
6 - 600 V
               60Hz
12 - 250V
               DC
```

	EN 60 947-4-1		
Clause	Requirement - Test	Result - Remark	Verdict
		·····	
6.2	MARKING:		
	Data shall be preferably marked on the equipmen	t:	P
	c - number of this standard (IEC/EN60947-4-1)	IEC947-4-1	P
	k - IP code, in case of an enclosed equipment	-	N
	Data shall be included on the nameplate, or on the	e equipment, or in the	
	manufacturer's published literature:		
	d - rated operational voltages	690V	P
	e – utilization category and rated operational	AC1 20A, 690V	Р
	currents (or rated powers), at the rated	AC3	
	operational voltages of the equipment	AC4 9A, 400V	
		Contactor AC15 3A, 240V	
	f - either the value of the rated frequency/ies, or	50-60Hz	P
	the indication d.c. (or symbol)		
	g - rated duty with the indication of the class of		N
	intermittent duty, if any		
	Associated values:		
	h - rated marking and breaking capacities (these	AC1, AC3, AC4, AC15	Р
	indications may be replaced, where applicable,		
	by the indication of the utilization category)		
	Safety an installation:		
	i - rated insulation voltage	690V	P
	j - rated impulse withstand voltage	8 kV	P
	I - pollution degree	3	P
	m - rated conditional short-circuit current and type	of co-ordination of contactor or	Р
	starter and type, current rating and characteristics	of the associated SCPD:	
	m - rated conditional short-circuit current of the	1 kA	P
	combination starter or the protected starter	Type '1' 25A fuse gL/gG	_
	n – switching overvoltages	≤ 8 kV	P
	Control circuits: Contactor		
	The following information concerning control circuits shall be placed either on the		
	coil or on the equipment:		

	EN 60 947-4-1		
Clause	Requirement – Test	Result - Remark	Verdict
	o - rated control circuit voltage (Uc), nature of	6-550V 50Hz / 6-600V 60Hz	Р
	current and rated frequency	12-250V =	
	p - if necessary, nature of current, rated	Us = Uc	Р
	frequency and rated control supply voltages (Us)		
	Auxiliary circuits: Contactor		
	r - ratings of auxiliary circuits	AC15 3A, 240V	Р
	Overload relays and releases:		
!	s - characteristics according to 5.7	Р	Р

8.1	CONSTRUCTION: Overload relay		
8.1.1	Materials		Р
	Resistance to abnormal heat and fire		Р
	-parts retain current-carrying parts: 850 / 960°C	Housing (black)	Р
	- other: 650°C	Cover (grey)	Р
8.1.2	Current-carrying parts and their connection	l	Р
8.1.3	Clearances		Р
	Uimp is given as:	8kV	Р
	- max. value of rated operational voltage to earth :		1 1 2 2 2 2 2 2 2 2
		600V	1
	- nominal voltage of supply system	400 / 690V	
	- overvoltage category	IV	*** **********************************
	- pollution degree	1	### A STATE OF THE PROPERTY OF
	- field-in or homogeneous		
	- minimum clearances (mm)	8	
	- measured clearances (mm)	≥10	
	Uimp is not given:		N
	- rated insulation voltage Ui (V)		
	- le		
	- minimum clearances L-L/L-A (mm)		77 - 37 -7 2
	- measured clearances L-L/L-A (mm)		
	Creepage distances		

	EN 60 947-4-1		
Clause	Requirement – Test	Result - Remark	Verdict
	1	0.127	
	Uimp is given as:	8 kV	7 188 1 m.
	- material group or CTI		
	- minimum creepage distances (mm)		
	- measured creepage distances (mm)	≥ 12,5	izer) <u>T. yzémiliff.</u> A
	Uimp is not given:		N
	- material column a or b		2 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
	- minimum creepage distances (mm)		
	- measured creepage distances (mm)		
8.1.4	Actuator		N
8.1.4.1	Insulation		N
8.1.4.2	Direction		N
8.1.4.3	Mounting		N
8.1.5	Indication of contact position		N
8.1.5.1	Indication means		N
8.1.5.2	Indication by the actuator		N
8.1.6	Additional safety requirements for equipment with		N
	isolating function		
8.1.7	Terminals		Р
8.1.7.1	All parts of terminals which maintain contact and	(see 8.2.4 below)	Р
	carry current shall be of metal having adequate		
	mechanical strength		
	Terminal connections shall be such that	(see 8.2.4 below)	Р
	necessary contact pressure is maintained		
	Terminals shall be so constructed that the	(see 8.2.4 below)	Р
	conductor is clamped between suitable surfaces		
	without damage to the conductor and terminal		
	Terminal shall not allow the conductor to be	(see 8.2.4 below)	Р
	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		
8.2.4	Mechanical properties of terminals:	Overload	Р

	EN 60 947-4-1		
Clause	Requirement – Test	Result - Remark	Verdict
8.2.4.2	Mechanical strength of terminals		Р
	maximum cross-sectional area of conductor	6	
	(mm²)		
	diameter of thread (mm)	M4	
	torque (Nm)	1,2	
	5 times on 2 separate clamping units		P
8.2.4.3	Testing for damage to and accidental loosening of	conductor (flexion test)	P
	conductor of the smallest cross-sectional area	0,5	
	(mm²)		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	number of conductor of the smallest cross	1	The second secon
	section		
	diameter of bushing hole (mm)	6,4	
	height between the equipment and the platen	260	1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -
	(mm)		
	mass at the conductor(s) (kg)	0,3	and the second s
	135 continuous revolutions: the conductor shall		P
	neither slip out of the terminal nor break near the		
	clamping unit		
8.2.4.4	Pull-out test		Р
	force (N)	30	
	1 min, the conductor shall neither slip out of the		Р
	terminal nor break near the clamping unit		
	Flexion test		Р
	conductor of the largest cross-sectional area	6	# 100 mm 1
	(mm²)		Was assessed to the second
	number of conductor of the largest cross-	1	**************************************
	sectional		
	diameter of bushing hole (mm)		
	height between the equipment and the platen	279	
	(mm)	1	1 TA. 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	mass at the conductor(s) (kg)		

	EN 60 947-4-1	T	
Clause	Requirement – Test	Result - Remark	Verdict
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the		Р
	clamping unit		-
•	Pull-out test		P
	force (N)	80	
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		Р
	Flexion test	· · · · · · · · · · · · · · · · · · ·	Р
	conductor of the largest and smallest cross- sectional area (mm²):	2,5 // 0,5 6 // 1,5 flex	
	number of conductor of the smallest cross sectional, number of conductor of the largest cross sectional	1 // 1 1 // 1	
	diameter of bushing hole (mm)	9,5 // 6,4 9,5 // 6,4	
	height between the equipment and the platen	279 // 260 279 // 260	
	mass at the conductor(s) (kg)	0,7 // 0,3 1,4 // 0,4	
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		Р
	Pull-out test		Р
	force (N)	50 // 30 80 // 30	
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		Р
8.1.7.2	Connecting capacity	1	P
J. 1	type of conductors	Rigid Flexible	781 E 1
	minimum cross-sectional area of conductor (mm²)	0,75 0,5	
	maximum cross-sectional area of conductor (mm²)	6 4	
	number of conductors simultaneously	Acc. Manuf. Instr.	Annual
	connectable to the terminal	2 2	1.15

	EN 60 947-4-1		
Clause	Requirement - Test	Result - Remark	Verdict
8.2.4	Mechanical properties of terminals:	Contactor	
8.2.4.2	Mechanical strength of terminals		
	maximum cross-sectional area of conductor	2,5	
	(mm²)		
	diameter of thread (mm)	М 3,5	/
	torque (Nm)	0,8	
	5 times on 2 separate clamping units		Р
8.2.4.3	Testing for damage to and accidental loosening or	f conductor (flexion test)	
	conductor of the smallest cross-sectional area	0,5	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	(mm²)		The state of the s
	number of conductor of the smallest cross	2	A Company of the Comp
	section		
	diameter of bushing hole (mm)	6,4	
	height between the equipment and the platen	260	A Maria and a mari
	(mm)		The state of the s
	mass at the conductor(s) (kg)	0,3	And the state of t
	135 continuous revolutions: the conductor shall		Р
	neither slip out of the terminal nor break near the		
	clamping unit		
8.2.4.4	Pull-out test		
	force (N)	30	
	1 min, the conductor shall neither slip out of the		P
	terminal nor break near the clamping unit		
	Flexion test		
	conductor of the largest cross-sectional area	2,5	1
	(mm²)		
	number of conductor of the largest cross-	2	
	sectional		= 13.7.2
	diameter of bushing hole (mm)	9,5	
	height between the equipment and the platen	279	
	(mm)		
	mass at the conductor(s) (kg)	0,7	

	EN 60 947-4-1			
Clause	Requirement – Test	Result - Remark	,	Verdict
	135 continuous revolutions: the conductor shall			P
	neither slip out of the terminal nor break near the			
	clamping unit			
	Pull-out test		. 	
	force (N)	50		
	1 min, the conductor shall neither slip out of the			P
	terminal nor break near the clamping unit			
	Flexion test			
	conductor of the largest and smallest cross-	2,5	0,5	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	sectional area (mm²):			The second secon
	number of conductor of the smallest cross	1	1	TOTAL AND THE PROPERTY OF THE
	sectional, number of conductor of the largest			and the second s
	cross sectional			Company Annual Compan
	diameter of bushing hole (mm)	9,5	6,4	**************************************
	height between the equipment and the platen	279	260	
	(mm):			A STATE OF THE STA
	mass at the conductor(s) (kg):	0,7	0,3	
	135 continuous revolutions: the conductor shall			Р
	neither slip out of the terminal nor break near the			
	clamping unit			
	Pull-out test			
	force (N)	50	30	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	1 min, the conductor shall neither slip out of the			Р
	terminal nor break near the clamping unit			
8.1.7.2	Connecting capacity			Р
	type of conductors	Rigiđ	Flexible	### 1
	minimum cross-sectional area of conductor	0,5	0,5	
	(mm²):			A company
	maximum cross-sectional area of conductor	2,5	2,5	
	(mm²):		·	
	number of conductors simultaneously	Acc. Manuf. Instr.		
	connectable to the terminal	2	2	

	EN 60 947-4-1		,
Clause	Requirement – Test	Result - Remark	Verdict
8.1.7.3	Connection		Р
	terminals for connection to external conductors shall be readily accessible during installation		Р
	clamping screws and nuts shall not serve to fix any other component		Р
8.1.7.4	Terminal identification and marking		Р
	terminal intended exclusively for the neutral conductor		N
	protective earth terminal		N
	other terminals		Р
	- Main circuit::	2T1, 4T2, 6T3	
	- Auxiliary circuit	95-96, 97-98, 13-14, 21-22,	
		A1, A2	
8.1.8	Additional requirements for equipment provided with a neutral pole		N
	marking of neutral pole		N
	The switched neutral pole shall not break before		N
	and shall not make after the other poles		
	Conventional thermal current of neutral pole		N
8.1.9	Provisions for protective earthing		N
8.1.9.1	The exposed conductive parts shall be electrically interconnected and connected to a protective earth terminal		N
8.1.9.2	The protective earth terminal shall be readily accessible		N
	The protective earth terminal shall be suitably protected against corrosion		N
	The electrical continuity between the exposed conductive parts of the protective earth terminal and the metal sheathing of connecting conductors		N
	The protective earth terminal shall have no other functions		N

EN 60 947-4-1			
Clause	Requirement – Test	Result - Remark	Verdict
8.1.9.3	Protective earth terminal marking and		N
	identification		
8.1.10	Enclosure for equipment		N
8.1.10.1	Design	. <u>.</u>	N
	The enclosure, when it is opened: all parts		N
	requiring access for installation and maintenance		
	are readily accessible		
	Sufficient space shall be provided inside the		N
"	enclosure		
	The fixed parts of a metal enclosure shall be		N
	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		
	Under no circumstances shall a removable metal		N
	part of the enclosure be insulated from the part		
	carrying the earth terminal when the removable		
	part is in place		
	The removable parts of the enclosure shall be		N
	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		
	When an enclosure is so designed as to allow the		N
	covers to be opened without the use of tools,		
	means shall be provided to prevent loss of the		
	fastening devices		
8.1.10.2	Insulation		N

EN 60 947-4-1				
Clause	Requirement – Test	Result - Remark	Verdict	
	If, in order to prevent accidental contact between		N	
	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			
8.1.11	Degree of protection of enclosed equipment		N	
	Degree of protection:	IP	N	
	Test for first characteristic		N	
	Test for first numeral:	1:		
		2:	1	
		3:		
		4:		
		5:		
		6:	And and an analysis of the second of the sec	
	Test for second characteristic		N	
	Test for second numeral	1:	### 1	
		2:	The second secon	
		3:		
		4:		
		5:	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
		6:		
		7:	The second secon	
		8:	The second secon	

9.3.1.a	TEST SEQUENCE I	
9.3.3.3	Temperature rise	Р
	ambient temperature 10-40 °C	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	Contactor	N
	test enclosure W x H x D (mm x mm x mm):	
	material of enclosure:	
	Main circuits, test conditions:	N

	EN 60 947-4-1	ı	
Clause	Requirement – Test	Result - Remark	Verdict
		1	La ver aveign
	- conventional thermal current lth (A)		
	- conventional enclosed thermal current Ithe (A) .:		
	- cable/busbar cross-section (mm²) / (mm):		When the special control of the special contr
	- temperature rise of main circuit terminals (K):	<	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	Auxiliary circuit, test conditions:		P
	- rated operation current le (A)	10	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	- cable cross-section (mm²)	1,5	The second code of the code of
	- temperature rise of auxiliary circuit terminals	≤ 40	
	(K)		1
	Coils and electromagnets, test conditions:	AC DC	P
	- rated control supply voltage Us (V)	240 24	1 1 1 1 1 1 1 1 1 1
	- Class of insulating material	F F	The second secon
	- temperature rise of coil and electromagnets (K) :	≤ 68 ≤ 5	58
	Starter Tested wi	th setting range 6 – 9 A	, , , , , , , , , , , , , , , , , , ,
	test enclosure W x H x D (mm x mm x mm):	None	*** *** *** *** *** *** *** *** *** **
	material of enclosure	-	
	Main circuits, test conditions: *Tested with 9A beca	ause of max. Power	P
	consumption of Overload Relay		
	- conventional thermal current lth (A)	9 (20*)	
	- cable/busbar cross-section (mm²) / (mm):	1,5 mm²	
	- temperature rise of main circuit terminals (K):	≤ 62	A second
	Overload relay, auxiliary circuit, test conditions:		P
	- rated operation current le (A)	4	
	- cable cross-section (mm²):	1	1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
	- temperature rise of auxiliary circuit terminals	≤ 44	1
	(K)		
9.3.3.2	Operating limits		
9.3.3.2.1	Power-operated equipment:	AC DC	Р
	rated control supply voltage Us (V)	240 24	
	frequency (Hz)	50 DC	48.1.74

	EN 60 947-4-1				
Clause	Requirement – Test	Result - Remark	Verdict		
r		r	<u> </u>		
	limits of close satisfactorily at any value between	80 74	Р		
	85% and 110% of rated control supply voltage				
	Us				
	limits of drop out and open fully are: 75% to 20%	36 27	P		
	for a.c. and 75% to 10% for d.c.				
9.3.3.2.2	Relays and releases Setting Re	ange 6 – 9 A	Р		
	Conditions for thermal and time-delay magnetic ov	erload relays only:	р		
	type of time-delay overload relay	Thermal, Temp. compensated	The second secon		
	trip class	10A			
	current settingl _{set} :	6 A 9 A	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
	ambient temperature (°C)	24	1		
	test enclosure W x H x D (mm x mm x mm):	None			
	cable/busbar cross-section (mm²) / (mm):	1,5			
	at A (1,05) times of current setting, tripping shall	6,3 A 9,45 A	1		
	not occur in less than 2 h starting from the cold		The second secon		
	state; test current	 No tripping No tripping	1		
	When the current is subsequently raised to B	7,2 A 10,8 A	1		
	(1,2) times the current setting, tripping shall occur				
	in less than 2 h; test current min:sec :	1:20 3:40	7		
	for class 10A overload relays energized at C (1,5)	9 A 13,5 A			
	times the current, tripping shall occur in less than				
	2 min, starting from thermal equilibrium at the		1		
	current setting; test currentmin:sec :	0:21 0:17			
	for class 10, 20 or 30 overload relays energized	N			
	at C times the current, tripping shall occur in less		9 40 1 119 119 119 119 119 119 119 119 119		
	than 2, 8 or 12 min, starting from thermal				
	equilibrium at the current setting; class; test				
	current; tripping time		A SHOWN		
	at D (7,2) times the current setting, tripping shall	43,2 A 64,8 A	77.		
	occur within the tripping time (s) $2 < Tp \le 10$,				
	starting from the cold state; test current; tripping				
	time Tp (s)	5,2 4,6			

EN 60 947-4-1				
Clause	Requirement – Test	Result - Rema	ark	Verdict
	Ambient temperature. F 90			
	Ambient temperature: - 5 °C	604	0.45.4	
	at A (1,05) times of current setting, tripping shall	6,3 A	9,45 A	
	not occur in less than 2 h starting from the cold	Na 4-in-i	NI- +	
	state; test current		No tripping	
	When the current is subsequently raised to B	7,2 A	10,8 A	
	(1,2) times the current setting, tripping shall occur	0-05	0-40	
	in less than 2 h; test current min:sec :		2:40	
	for class 10A overlod relays energized at C (1,5)	9 A	13,5 A	
	times the current, tripping shall occur in less than			
	2 min, starting from thermal equilibrium at the			A 100 101 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	current setting; test currentmin:sec :		0:40	**************************************
	for class 10, 20 or 30 overload relays energized	N		
	at C times the current, tripping shall occur in less			
	than 2, 8 or 12 min, starting from thermal			The state of the s
	equilibrium at the current setting; class; test			Annual Community of the
	current; tripping time	ĺ		***
	at D (7,2) times the current setting, tripping shall	43,2 A	64,8A	7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	occur within the tripping time (s) 2 < Tp ≤ 10s			CALL STATE OF THE
	tarting from the cold state; test current; tripping			
	time Tp (s)	5,6	4,7	W
	Ambient temperature: + 40 °C			2 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	at A (1,05) times of current setting, tripping shall	6,3 A	9,45 A	VV
	not occur in less than 2 h starting from the cold			The second secon
	state; test current	No tripping	No tripping	
	When the current is subsequently raised to B	7,2 A	10,8 A	
	(1,2) times the current setting, tripping shall occur			
	in less than 2 h; test currentmin:sec :	1:10	4:55	V
	for class 10A overload relays energized at C (1,5)	9 A	13,5 A	
	times the current, tripping shall occur in less than	:		7
	2 min, starting from thermal equilibrium at the			
	current setting; test current min:sec :	0:11	0:27	

	EN 60 947-4-1		
Clause	Requirement - Test	Result - Remark	Verdict
	for class 10, 20 or 30 overload relays energized	N	
	at C times the current, tripping shall occur in less		
	than 2, 8 or 12 min, starting from thermal		
	equilibrium at the current setting; class; test		
	current; tripping time		
	at D (7,2) times the current setting, tripping shall	43,2 A 64,8 A	
	occur within the tripping time (s) 2 < Tp ≤ 10		
	starting from the cold state; test current; tripping		
	time Tp (s)	5 4,8	
	Limits of operation of three-pole thermal overload	relays energized on two poles:	P
	ambient temperature (°C)	24	
	the relay energized on three poles, at A (1 / 0,9)	6 A / 5,4 A 9 A / 8,1 A	
	times the current setting, tripping shall not occur		
	in less than 2 h, starting from the cold state:		
	_	No tripping No tripping	
	when the value of the current flowing in two poles	6,9 A / 0 A 10,35 A / 0 A	V
	is increased to B (1,15) times the current setting		A CONTROL OF THE CONT
	and the third pole deenergized, tripping shall		2 1 2 2 2 2 2 2 2 2
	occur in less than 2 h min:sec :	1:25 0:40	Was and a second
9.3.3.2.2		ange 1,8 – 2,7 A *** Q ***	Р
	Conditions for thermal and time-delay magnetic ov		р
	type of time-delay overload relay	Thermal, Temp. compensated	
	trip class	10A	
	current settinglset:		- 10 Ways 10 mg
	ambient temperature (°C)	24	
•	test enclosure W x H x D (mm x mm x mm):	None	
	cable/busbar cross-section (mm²) / (mm):		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	at A (1,05) times of current setting, tripping shall	1,89 A 2,84 A	
	not occur in less than 2 h starting from the cold	2,07 A	
	not obodi in less than 2 if starting from the cold	No tripping No tripping	

EN 60 947-4-1				
Clause	Requirement – Test	Result - Rema	ark	Verdict
		<u> </u>		
	When the current is subsequently raised to B	2,16 A	3,24 A	
	(1,2) times the current setting, tripping shall occur			
	in less than 2 h; test current min:sec :	1:45	3:25	1.7 m
	for class 10A overload relays energized at C (1,5)	2,7 A	4,05 A	Avia di
	times the current, tripping shall occur in less than			
	2 min, starting from thermal equilibrium at the			
	current setting; test current min:sec :	0:17	0:28	
	for class 10, 20 or 30 overload relays energized	N		The second secon
	at C times the current, tripping shall occur in less			Manual Ma
	than 2, 8 or 12 min, starting from thermal			
	equilibrium at the current setting; class; test			The second secon
	current; tripping time:			11.68 1 14.18
	at D (7,2) times the current setting, tripping shall	12,96 A	19,44 A	
	occur within the tripping time (s) 2 < Tp ≤ 10,			Within a series of series
	starting from the cold state; test current; tripping			A control of the cont
	time Tp (s):	3,2	3,0	1 1 1 1 1 1 1 1 1 1
	Ambient temperature: - 5 °C			
	at A (1,05) times of current setting, tripping shall	1,89 A	2,84 A	
	not occur in less than 2 h starting from the cold			The second secon
	state; test current	No tripping	No tripping	
	When the current is subsequently raised to B	2,16 A	3,24 A	
	(1,2) times the current setting, tripping shall occur			1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
	in less than 2 h; test current min:sec :	5:20	4:55	1000 (
	for class 10A overlod relays energized at C (1,5)	2,7 A	4,05 A	The state of the s
	times the current, tripping shall occur in less than	,		The second secon
	2 min, starting from thermal equilibrium at the			
	current setting; test currentmin:sec :	0:25	0:52	
	for class 10, 20 or 30 overload relays energized	N		1
	at C times the current, tripping shall occur in less	' '		
	than 2, 8 or 12 min, starting from thermal			The state of the s
	equilibrium at the current setting; class; test			
	current; tripping time			

	EN 60 947-4-1				
Clause	Requirement – Test	Result - Remar	•k	Verdict	
		Τ			
	at D (7,2) times the current setting, tripping shall	12,96 A	19,44A		
	occur within the tripping time (s) 2 < Tp ≤ 10s			The second secon	
	tarting from the cold state; test current; tripping			1	
	time Tp (s)	3,3	3,1	Annual An	
	Ambient temperature: + 40 °C				
	at A (1,05) times of current setting, tripping shall	1,89 A	2,84 A		
	not occur in less than 2 h starting from the cold			The state of the s	
	state; test current	No tripping	No tripping	A STATE OF THE STA	
	When the current is subsequently raised to B	2,16 A	3,24 A	A	
	(1,2) times the current setting, tripping shall occur			A Bergs " 2 A V " 1990 P 1990	
	in less than 2 h; test current min:sec :	0:30	0:45		
	for class 10A overload relays energized at C (1,5)	2,7 A	4,05 A	### **********************************	
	times the current, tripping shall occur in less than				
	2 min, starting from thermal equilibrium at the			The second of th	
	current setting; test currentmin:sec :	0:07	0:22	On Installation of the Control of th	
	for class 10, 20 or 30 overload relays energized	N		V Share San	
	at C times the current, tripping shall occur in less			And in a company of the company of t	
	than 2, 8 or 12 min, starting from thermal			**************************************	
	equilibrium at the current setting; class; test				
	current; tripping time				
	at D (7,2) times the current setting, tripping shall	12,96 A	19,44 A		
	occur within the tripping time (s) 2 < Tp ≤ 10			The second secon	
	starting from the cold state; test current; tripping			1 1 1 1 1 1 1 1 1 1	
	time Tp (s)	3,1	2,9	Section 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
	Limits of operation of three-pole thermal overload	relays energized	on two poles:	Р	
	ambient temperature (°C)	23	·	**************************************	
	the relay energized on three poles, at A (1 / 0,9)		2,7 A / 2,43 A	1 2 2 2 2 2 2 2 2 2	
	times the current setting, tripping shall not occur	, , , , , , , , , , , , , , , , , , , ,	,, ,	**************************************	
	in less than 2 h, starting from the cold state			A STATE OF THE STA	
		No tripping	No tripping		

	EN 60 947-4-1				
Clause	Requirement - Test	Result - Remark	Verdict		
	when the value of the current flowing in two poles is increased to B (1,15) times the current setting	2,07 A / 0 A 3,11 A / 0 A			
	and the third pole deenergized, tripping shall occur in less than 2 hmin:sec:				
9.3.3.4	Test of dielectric properties, impulse withstand vol verification by measurement of clearances instead of testing	tage (Uimp indicated):	N N		
	- rated impulse withstand voltage (V):	8000			
	- test Uimp main circuits (kV)	9,8 / 7	Р		
	- test Uimp auxiliary circuits (kV)	9,8 / 7	Р		
	Test of dielectric properties, dielectric withstand vo	1	N		
	- rated insulation voltage (V)		N		
	- control and auxiliary circuits, test voltage for 1 min (V)		N		

9.3.3.5	TEST SEQUENCE II		
	Making and breaking capacity		
	utilization category	AC1	A STATE OF THE STA
	rated operational voltage Ue (V)		NAME AND ADDRESS OF THE PARTY O
	rated operational current le (A) or power (kW):		
	Conditions, make/break operations AC-1 only:		Р
·	- test voltage U/Ue = 1,05 (V)	L1: 730	The second secon
		L2: 729	
		L3: 729	
	- test current I/le = 1,5 (A)	L1: 38	
		L2: 38	
		L3: 38,5	
	- power factor/time constant	L1: 0,78	
		L2: 0,78	
		L3: 0,79	

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Clause	Requirement – Test	Result - Remark	Verdict
		·	
	- on-time (ms)	160	
	- off-time (s)		
	- number of make/break operations:	50	P
	Behaviour and condition during and after the test:		Р
	- no permanent arcing		Р
	- no flash-over between poles		P
	- no blowing of the fusible element in the earth		Р
	circuit		
	- no welding of the contacts		Р
	- the contacts shall operate when the contactor or		Р
	starter is switched by the applicable method of		
	control		
	Operational performance capability:		Р
	utilization category (AC-3 or AC-4)	AC4	
	rated operational voltage Ue (V)		100 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	rated operational current le (A) or power (kW):		
	Conditions, make operations AC3/AC4 only:		Р
	- test voltage U/Ue = 1,05 (V):	L1: 420	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
		L2: 421	
		L3: 421	
	- test current I/Ie = (A):	L1: 108	
		L2: 110	*** *** *** *** *** *** *** *** *** **
		L3: 108	
	- power factor/time constant:	L1: 0,45	
		L2: 0,45	
		L3: 0,45	
	- on-time (ms)	100	
	- off-time (s)		
	- number of make operations		P
	Characteristic of transient recovery voltage for AC		Р
	oscillatory frequency (kHz)		

	EN 60 947-4-1	Ŧ···	
Clause	Requirement – Test	Result - Remark	Verdict
	1	T	<u> </u>
	Measured oscillatory frequency (kHz)	L1: 39	
		L2: 38	
		L3: 38	
	Factor y:	L1: 1,1	
		L2: 1,1	
		L3: 1,1	
	Behaviour and condition during and after the test:		P
:	- no permanent arcing	Р	P
	- no flash-over between poles	Р	Р
	- no blowing of the fusible element in the earth	Р	Р
	circuit		
	- no welding of the contacts	Р	Р
	- the contacts shall operate when the contactor or	Р	Р
	starter is switched by the applicable method of		
	control		
	Operational performance capability:		
	utilization category	AC4	
	rated operational voltage Ue (V)		No what was a second se
	rated operational current le (A) or power (kW):		
	Conditions, make/break operations AC3 / AC4 onl	•	P
	- test voltage U/Ue = 1,05 (V)		
	- test voltage 0/0e = 1,00 (v)	L2: 420	## def of the formation of the first of the
		L3: 420	
	test surrent I/Is = (A)		
	- test current I/Ie = (A)		*** *** *** *** *** *** *** *** *** **
		L2: 55	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
		L3: 55	
<u> </u>	- power factor/time constant	l .	
		L2: 0,47	
		L3: 0,47	
	- on-time (ms)		1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
	- off-time (s)		· · · · ·
	- number of make/break operations	6000	P

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Clause	Requirement – Test	Result - Remark	Verdict
	Characteristic of transient recovery voltage for AC-	-3 and AC-4 only:	P
	oscillatory frequency (kHz)		1
	Measured oscillatory frequency (kHz)	L1: 34	
		L2: 33,5	
		L3: 34	
	Factor y	L1: 1,1	
		L2: 1,1	
		L3: 1,1	_
	Behaviour and condition during and after the test:		Р
· .	- no permanent arcing	Р	Р
	- no flash-over between poles	Р	P
	- no blowing of the fusible element in the earth	Р	Р
	circuit		
	- no welding of the contacts	Р	Р
	- the contacts shall operate when the contactor or	P	P
	starter is switched by the applicable method of		
	control		
8.3.3.6	Operational performance capability:		
	utilization category:	AC1	
	rated operational voltage (V):	690	
	rated operational current le (A) or power (kW):		
	Test conditions for make/break operations AC-1 or	nly:	Р
	test voltage (V):	L1: 730	
		L2: 728	
		L3: 730	
	test current (A)	L1: 38	Company Comp
		L2: 38	
		L3: 38,5	**************************************
	power factor/time constant		
•		L2: 0,78	
		L3: 0,79	
	- on-time (ms)	160	

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Clause	Requirement - Test	Result - Remark	Verdict
	- off-time (s)	2,3	
	- number of operating cycles	}	Р
8.3.3.6.6	Behaviour and condition during and after the test:		Р
	- no permanent arcing		Р
	- no flash-over between poles		P
	- no blowing of the fusible element in the earth		Р
	- no welding of the contacts		Р
	- the contacts shall operate when the contactor or starter is switched by the applicable method of control		Р
	Dielectric verification:		P
	test voltage (2 Ue + 1000 V) for 1 min (V):	2380	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

9.3.4	TEST SEQUENCE III		
	Performance under short-circuit conditions		
9.3.4.2.1	Test at de prospective current "r": U12/16 0,	.4 -0,6A	
	Represents settin	g ranges up to 9A	
	type of SCPD	Siemens Diazed gL / gG	
	ratings of SCPD, co-ordination type 1	25A / 500V	
	ratings of SCPD, co-ordination type 2	-	
	rated operational current le (A) AC-3	9A	
	prospective current "r" (kA):	1	
	test voltage (V):		Company of the state of the sta
		L2: 424	
		L3: 425	
	r.m.s. test current (A):	L1: 1053	
		L2: 1087	No.
		L3: 1062	

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Clause	Requirement – Test	Result - Remark	Verdict
	1		
	peak current (A)		
		L2: 1457	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
		L3: 1378	
	power factor	0,95	
	1. one breaking operation of SCPD with all the	L1: 1750 A2s / 807A	-
	switching devices closed prior to the test I ² dta	L2: 2180 A2s / 887 A	
	(A2s) /peak current I (A)	L3: 1860 A2s / 903 A	3 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	2. one breaking operation of SCPD by closing the	L1: 108 A2s / 270 A	
	contactor or starter on to the short-circuit l2dta	L2: 695 A2s / 586 A	77'11'1 11'11'11'11'11'11'11'11'11'11'11'1
	(A²s) /peak current I (A)	L3: 884 A2s / 601 A	
	Behaviour of the equipment during the test		Р
	Both types of co-ordination (all devices):		Р
	A - the fault current has been successfully		Р
	interrupted by the SCPD or the combination		
	starter and the fuse or fusible element, or solid		
	connection between the enclosure and supply		
	shall not have melted		ļ
	B - the door or cover of the enclosure has not		Р
	been blown open and it is possible to open the		
	door or cover		
	C - there is no damage to the conductors or		Р
	terminals and the conductors have not been		
	separated from the terminals		
	D - there is no cracking or breaking of an		Р
	insulating base to the extent that the integrity of		
	mounting of a live part is impaired		
	Both types of co-ordination (combination starters a	and protected starters only):	N
	E - the circuit breaker or the switch is capable of		N
	being opened manually by its operating means		
	F - neither end of the SCPD is completely		N
	separated from its mounting means to an		
	exposed conductive part		

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Clause	Requirement – Test Result - Remark	Verdict		
	T			
	G - if a circuit breaker with rated ultimate short-circuit breaking capacity less t	han N		
	the rated conditional short-circuit current assigned to the combination or			
	protected starter is employed, the circuit breaker shall be tested to trip:			
	1) circuit breaker with instantaneous trip relays or	N		
	releases, at 120% of the trip current			
	circuit breaker with overload relays or	N		
	releases, at 250% of the rated current of the			
	circuit breaker			
	Type 1 co-ordination (all devices):	Р		
	H - there has been no discharge of parts beyond P	P		
l	the enclosure. The starter may be inoperative			
	after each operation			
	Type 1 co-ordination (combination and protected starters only):	Р		
	I - dielectric verification test voltage (2 Ue) for 1380	What is a second of the second		
	1 min (V)			
	Type 2 co-ordination (all devices):	N		
	J - no damage to the overload relay or other parts	N		
	has occurred, except that welding of contactor or			
	starter contacts is permitted, if they are easily			
	separated without significant deformation			
	K - the tripping of the overload relay shall be	N		
	conform to the published tripping characteristics,			
	before and after the test			
	L - dielectric verification test voltage (2 Ue) for			
	1 min (V)	5 - 1111 25 - 4 weep - 1		
9.3.4.2.2	Test at the rated conditional short-circuit current "Ig" ≤ SCC "r"	N		
	type of SCPD			
	ratings of SCPD, co-ordination type 1			
	ratings of SCPD, co-ordination type 2	2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
	rated operational current le (A) AC-3			
	prospective current "Iq" (kA)			

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Clause	Requirement – Test	Result - Remark	Verdict
	test voltage (V):	L1:	The state of the s
		L2:	The state of the
		L3:	1
	r.m.s. test current (A):	L1:	
		L2:	
		L3:	
	peak current (A):	L1:	
		L2:	The state of the s
		L3:	
	power factor		
	1. one breaking operation of SCPD with all the	L1:	
	switching devices closed prior to the test I2dta	L2:	The second secon
	(A ² s)	L3:	2. Afficial and of the formula of the control of th
	2. one breaking operation of SCPD by closing the	L1:	The state of the s
	contactor or starter on to the short-circuit	L2:	The Act of Control of the Control of
		L3:	
	3. one breaking operation of SCPD by closing the	L1:	
	switching device on to the short-circuit	L2:	
		L3:	The state of the s
	Behaviour of the equipment during the test		N
	Both types of co-ordination (all devices):		N
	A - the fault current has been successfully		N
	interrupted by the SCPD or the combination		
	starter and the fuse or fusible element, or solid		
	connection between the enclosure and supply		
	shall not have melted		
	B - the door or cover of the enclosure has not		N
	been blown open and it is possible to open the		
	door or cover		
	C - there is no damage to the conductors or		N
	terminals and the conductors have not been		
	separated from the terminals		

Requirement – Test	Result - Remark	Verdict
	•	Verdict
		-
D - there is no cracking or breaking of an		N
insulating base to the extent that the integrity of		
mounting of a live part is impaired		
Both types of co-ordination (combination starters ar	nd protected starters only):	N
E - the circuit breaker or the switch is capable of		N
being opened manually by its operating means		
F - neither end of the SCPD is completely		N
separated from its mounting means to an		
exposed conductive part		
G - if a circuit breaker with rated ultimate short-circu	uit breaking capacity less than	N
the rated conditional short-circuit current assigned t	to the combination or	
protected starter is employed, the circuit breaker sh	all be tested to trip:	
circuit breaker with instantaneous trip relays or		N
releases, at 120% of the trip current		
2) circuit breaker with overload relays or		N
releases, at 250% of the rated current of the		
circuit breaker		
Type 1 co-ordination (all devices):		N
		N
	arters only):	N
	artoro orny).	
	(4.18) · · · · · · · · · · · · · · · · · · ·	N
		N
		,
1		
		N
		14
	mounting of a live part is impaired Both types of co-ordination (combination starters as E - the circuit breaker or the switch is capable of being opened manually by its operating means F - neither end of the SCPD is completely separated from its mounting means to an exposed conductive part G - if a circuit breaker with rated ultimate short-circuit rated conditional short-circuit current assigned protected starter is employed, the circuit breaker short-circuit breaker with instantaneous trip relays or releases, at 120% of the trip current 2) circuit breaker with overload relays or releases, at 250% of the rated current of the circuit breaker Type 1 co-ordination (all devices): H - there has been no discharge of parts beyond the enclosure. The starter may be inoperative after each operation	insulating base to the extent that the integrity of mounting of a live part is impaired Both types of co-ordination (combination starters and protected starters only): E - the circuit breaker or the switch is capable of being opened manually by its operating means F - neither end of the SCPD is completely separated from its mounting means to an exposed conductive part G - if a circuit breaker with rated ultimate short-circuit breaking capacity less than the rated conditional short-circuit current assigned to the combination or protected starter is employed, the circuit breaker shall be tested to trip: 1) circuit breaker with instantaneous trip relays or releases, at 120% of the trip current 2) circuit breaker with overload relays or releases, at 250% of the rated current of the circuit breaker Type 1 co-ordination (all devices): H - there has been no discharge of parts beyond the enclosure. The starter may be inoperative after each operation Type 1 co-ordination (combination and protected starters only): I - dielectric verification test voltage (2 Ue) for 1 min (V)

EN 60 947-4-1				
Clause	Requirement – Test	Result - Remark	Verdict	
			= '00, 0 = draili	
	L - dielectric verification test voltage	e (2 Ue) for		
	1 min (V)		7 7 7 F	

9.3.5	TEST SEQUENCE IV: (APPLICABLE FOR CONTACTORS ONLY) Overload current withstand capability of contactors:		P P
	ambient temperature (°C):	25	
	rated operational current le (A) max. AC-3:	9	
	test current (le) (A)	72	
	duration of test: 10 s	10s	
	After the test, the contactor shall be substantially	P	Р
	in the same condition as before the test (visual		
	inspection)		

TABLE: temperature rise measurements	s		P
temperature rise dT of part:	WE No.	्रवा (१९	Required dT
			2 (s) 2 (s)
Main Terminals Contactor (9A)	1	35	65
	3	42	65
	5	38	65
Main Terminal Overload Relay (9A)	2	60	65
	4	61	65
	6	62	65
Auxilixary Terminals Contactor (10A)	13	40	65
	14	40	65
Auxiliary Terminal Overload Relay (4A)	95	44	65
	96	40	65
Coil: 240V 50Hz		68	135
24V DC		58	135

EN 60 947-4-1				
Clause	Requirement – Test	Result - Rer	nark	Verdict
		-		

EN 60 947-4-1			
Clause	Requirement – Test	Result - Remark	Verdict
	EN 00 047 5 4		
2225	EN 60 947-5-1		
8.3.3.5.3	Making and breaking capacities of switching elem-	ents under abnormal	P
	conditions:	1	
	utilization category	1	100 No. 100 No
	rated operational voltage Ue (V)		1
	rated operational current le (A) or power (kW):	3	The second secon
	Conditions, make/break operations:	1	**************************************
	- test voltage U/Ue = 1,1 (V)	L1: 266	The state of the s
		L2: -	The state of the
		L3: -	A Shibhandhan IIII a sa s
	- power factor/time constant	L1: 0,29	FACE
		L2: -	
		L3: -	
1	- make operations: test current I/le (A)	L1: 61	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
		L2: -	
		L3: -	
	- break operations: test current I/Ie (A)	L1: 61	
		L2: -	
		L3: -	The state of the s
	- on-time (ms)	300	THE STATE OF THE S
	- operating cycles per minute	6	
	- number of operating cycles	10	P
	Behaviour and condition during and after the test:		Р
	- no electrical or mechanical failures		Р
	- no contact welding or prolonged arcing		P
	- no blowing of the fusible element in the earth		P
	circuit		
	Dielectric verification:		Р
	dielectric test voltage (V)	2000	Р

EN 60 947-4-1				
Clause	Requirement – Test	Result - Remark	Verdict	

EN 60 947-5-1				
8.3.3.5	TEST SEQUENCE III			
8.3.3.5.2	Making and breaking capacities of switching elements under normal conditions		Р	
	utilization category	T		
	rated operational voltage Ue (V)		100 100	
	rated operational current le (A) or power (kW):			
	Conditions, make/break operations:		P	
		1.4.000* (040.**		
	- test voltage U/Ue = 1,1 (V)	L1: 266* / 242 **		
	* 50 operation at 266V	L2:		
	** 6000 operations at 242V	L3:		
	- power factor/time constant	L1: 0,29	7 Aug 1	
		L2: -		
		L3: -	No. No.	
	- make operations: test current I/Ie (A)	L1: 61		
		L2: -		
		L3: -		
	- break operations: test current I/le (A)			
	, , , , , , , , , , , , , , , , , , , ,	L2: -		
		L3:		
	- on-time (ms) *50 oper. / **6000 oper:			
	- operating cycles per minute			
	- number of operating cycles	10000	<u> </u>	
	Behaviour and condition during and after the test:	<u> </u>	P	
	- no electrical or mechanical failures		Р	
	- no contact welding or prolonged arcing		P	
	- no blowing of the fusible element in the earth		P	
	circuit			
	Dielectric verification:		Р	
	dielectric test voltage (V):	2000	Р	
	utilization category:		The state of the s	
	rated operational voltage Ue (V)			

	EN 60 947-4-1				
Clause	Requirement - Test	Result - Remark	Verdict		

	EN 60 947-5-1		1
8.3.4	TEST SEQUENCE IV		
	Performance under conditional short-circuit curren	t	P
	type of SCPD	Siemens Diazed gL / gG	The control of the
	ratings of SCPD	20A / 500V	A Company of the comp
	prospective current (kA)	1	The second secon
	test voltage (V) U/Ue = 1,1 (V)	L1: 277	### ##################################
		L2: 275	An advantage of the control of the c
		L3: 276	1
	r.m.s. test current (A)	L1: 1010	
		L2: 1050	
		L3: 1020	
	power factor (max. 0,7)	0,7	
	first making operation to closed switching	L1: 1010 A2s / 760A	The second secon
	elements: test I²dta (A²s) / I _D (A)	L2: 1010 A2s / 760 A	Company of the compan
		L3: 950 A2s / 880 A	Topics and the second s
	time interval between test (min. 3 min):		
	second making operation to closed switching	L1: 1090 A2s / 710 A	
	elements: test I²dta (A²s) / 1 _D (A)	L2: 910 A ² s / 850 A	
	, , , , ,	L3: 780 A2s / 710 A	
	time interval between test (min. 3 min)		
		L1: 870 A2s / 780 A	A STATE OF THE STA
	elements: test I²dta (A²s) / I _D (A)	!	
		L3: 880 A ² s / 790 A	11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	Behaviour of the equipment during the test:		Р
	switching elements open by the normal actuating		Р
	system		
	Dielectric verification:		Р
	dielectric test voltage (V)	2000	Р



TEST REPORT EN 60 947-4-1

Low-voltage switchgear and controlgear

Part 4: Contactors and motor-starters

Section 1: Electromechanical contactors and motor-starters

Report reference No..:

2.03.00356.1.0-K209/B&J

Tested by (+ signature).....: Ing.J.Ainetter Approved by (+ signature): Ing.K.Farthofer

Date of issue: 02.02.2004

Testing laboratory Österreichische Forschungs- und Prüfzentrum Arsenal

Ges.m.b.H

Address..... : A - 1031 Vienna, Faradaygasse 3

Testing location.....: as above

Applicant Benedict GmbH (Ω Benedikt & Jäger)

Address..... A – 1220 Vienna, Lieblgasse 7

Standard EN 60 947-4-1:2000-11

Test Report Form No.: 69474-1A

Master TRF.....: reference No. 69474-1A, dated 95-07

Copyright blank test report: the bodies participating in the Committee of Certification

Bodies (CCB) and/or the CENELEC Certification

Agreement (CCA).

Test procedure: CB-scheme

Procedure deviation.....: N.A. Non-standard test method: N.A.

Type of test object: Motor-Starter

Trademark Ω, Benedikt & Jäger

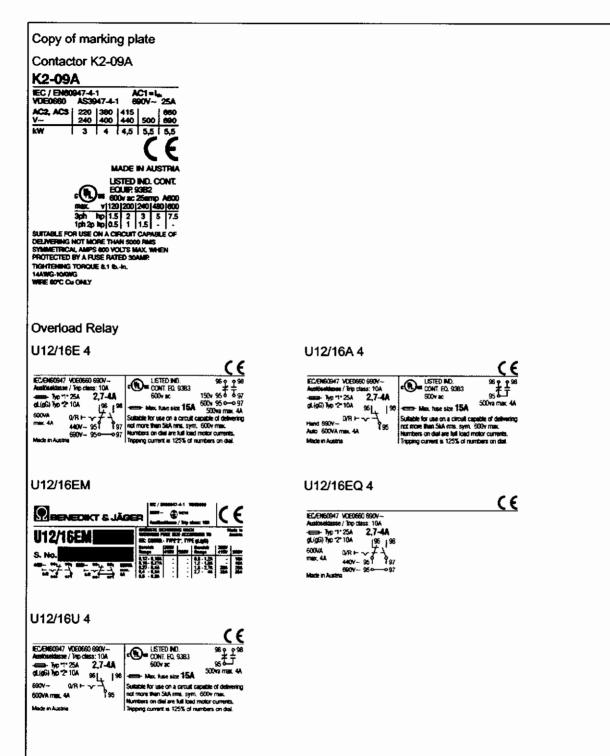
Model/type reference: Kx2-09Axx + U12/16xxx

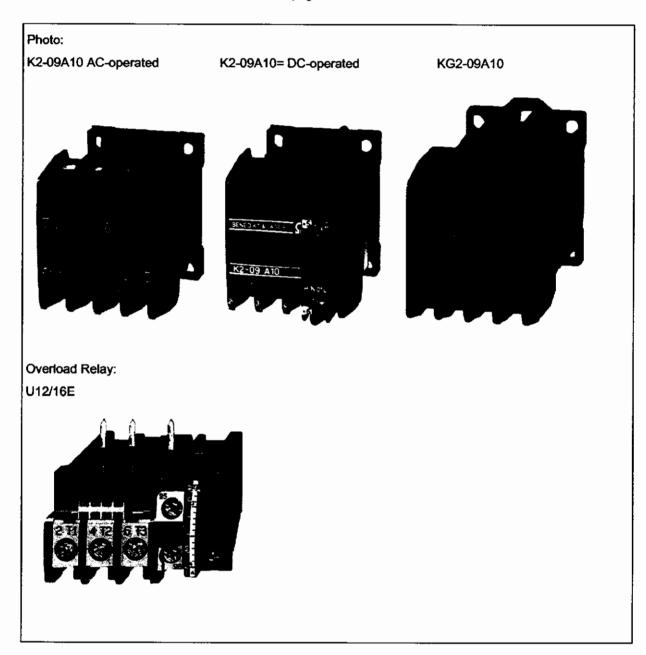
Manufacturer.....: Ω Benedikt & Jäger

Rating: AC1 20A 690V 50-60Hz

AC3/AC4 10A 400V 50-60Hz

AC15 12A 240V 50-60Hz





Test item particulars:	
- method of operation:	Magnetic
- switching positions:	ON-OFF
- number of polesContactor:	3 Main 1 Aux
- kind of current:	AC
- number of phases:	3
- rated frequency (Hz)	50-60
- number of positions of main contacts:	2
Rated and limiting values, main circuit:	
- rated operational voltage Ue (V):	690
- rated insulation voltage Ui (V):	690
- rated impulse withstand voltage Uimp (kV):	8
- conventional free air thermal current lth (A):	20
- conventional enclosed thermal current Ithe (A):	20
- rated operational current le (A):	20
- rated uninterrupted lu (A):	20
- utilization category:	AC1, AC3, AC4
Short-circuit characteristic:	
- rated prospective short-circuit current "r" (kA):	1
- rated conditional short-circuit current lq (kA):	1
Rated and limiting values, auxiliary circuits:	For Contactor
- rated operational voltage (V):	240
- rated frequency (Hz):	50-60
- number of circuits:	1
- number and kind of contact elements:	1 NO or 1 NC
Co-ordination of short-circuit protective devices:	Type "1"
- kind of protective device:	Fuse: 25A up to 11A AC3/AC4
	63A from 10A AC3/AC4
Possible test case verdicts:	
- test case does not apply to the test object:	N(.A.)
- test object does meet the requirement:	P(ass)
- test object does not meet the requirement:	F(ail)

General remarks:

"(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.

The test results presented in this report relate only to the object tested.

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- 1) Based on the decision of the applicant, some of the tests of Test Sequences I and II may have been performed under more severe conditions than required in the stanard. In case of, relevant values for equipment under test are stated in test report.
- 2) Relevant tests have been performed with or without 'snap on auxiliary contact block' Typ 'HN' or 'HA'.
- 3) The test item is corresponding to the requirements of IEC 60947-4-1 Ed. 2.0 (2000-11) + A1 (2002-09).

```
Ordering key:
Contactor
Kx2-09A x x
        | |>>>
                     : 0, 1 : Number of NC auxiliary contacts
        |>>>>
                     : 0, 1 : Number of NO auxiliary contacts
                     : G : DC coil supply (optional)
|>>>>
Overload Relay
U12/16 x x x
                     : Setting range 0.12 - 0.18 / 0.18 - 0.27 / 0.27 - 0.4 / 0.4 - 0.6 /
       | | | >>>>
       1 1
                              0.6-0.9 / 0.8-1.2 / 1.2-1.8 / 1.8-2.7 /
                              2.7-4 / 4-6 / 6-9 / 8-11 / 10-14 A
       11
       11
       | | >>>>
                      : M ... With additional quick trip up to 4A (optional)
                      : Q ... Thermic quick trip up to 14A (optional)
       [>>>>
                      : U ... Change over auxiliary contacts
                      : A ... Change over auxiliary contacts with autom. Reset
                      : E ... 1 NC and 1 NO auxiliary contact
Control Circiut Voltage:
6 - 550V
               50Hz
6 - 600V
               60Hz
12 - 250V
               DC *
       12V up to 24V: Double Winding Coil with Late Break Contact in series to coil.
       25V up to 250V: Dropping Resistor with Late Break Contact in series to coil.
       KG - type: Without Late Break Contact
```

	EN 60 947-4-1		
Clause	Requirement - Test	Result - Remark	Verdict
6.2	MARKING:		
	Data shall be preferably marked on the equipment	:	Р
	c - number of this standard (IEC/EN60947-4-1)	IEC947-4-1	P
	k - IP code, in case of an enclosed equipment	-	N
	Data shall be included on the nameplate, or on the manufacturer's published literature:	equipment, or in the	
	d - rated operational voltages	690V	Р
	e – utilization category and rated operational	AC1 20A, 690V	Р
	currents (or rated powers), at the rated	AC3	
	operational voltages of the equipment	AC4 10A, 400V	
		Contactor AC15 12A, 240V	
	f - either the value of the rated frequency/ies, or	50-60Hz	P
	g - rated duty with the indication of the class of		N
	intermittent duty, if any		
	Associated values:	,	
	h - rated marking and breaking capacities (these	AC1, AC3, AC4, AC15	Р
	indications may be replaced, where applicable,		
	by the indication of the utilization category)		
	Safety an installation:		
	i - rated insulation voltage	690V	P
	j - rated impulse withstand voltage	8 kV	P
	I – pollution degree	3	Р
	m - rated conditional short-circuit current and type starter and type, current rating and characteristics		Р
	m - rated conditional short-circuit current of the	1 kA	P
		Type '1' 63A/25A fuse gL/gG	F
	combination starter or the protected starter	T	P
	n – switching overvoltages ≤ 8 kV		<u> </u>
	Control circuits: Contactor The following information concerning control circuits shall be placed either on the		

EN 60 947-4-1			
Clause	Requirement - Test	Result - Remark	Verdict
	a retard control circuit voltage (Us) return of	C 550V 501 - 4 C 600V 601 -	1 5
	o - rated control circuit voltage (Uc), nature of current and rated frequency	6-550V 50Hz / 6-600V 60Hz 12-250V =	P
	p - if necessary, nature of current, rated	Us = Uc	Р
	frequency and rated control supply voltages (Us) Auxiliary circuits: Contactor		
	r - ratings of auxiliary circuits	AC15 12A, 240V	Р
	Overload relays and releases:		
	s - characteristics according to 5.7	Р	Р

8.1	CONSTRUCTION: Overload relay		
8.1.1	Materials		Р
	Resistance to abnormal heat and fire		Р
	-parts retain current-carrying parts: 850 / 960°C	Housing (black)	Р
	- other: 650°C	Cover (grey)	Р
8.1.2	Current-carrying parts and their connection		Р
8.1.3	Clearances		Р
- (1)	Uimp is given as:	8kV	P
	- max. value of rated operational voltage to earth :		1907 1907 1907
		600V	
	- nominal voltage of supply system:	400 / 690V	
	- overvoltage category:	IV	And the second of the second o
	- pollution degree:	3	And the second s
	- field-in or homogeneous:	Inhomogeneous	The state of the s
	- minimum clearances (mm)	8	3.9°
	- measured clearances (mm)	≥10	Signal of the state of the stat
	Uimp is not given:		N
	- rated insulation voltage Ui (V)	1	
	- le		Jan. 1
	- minimum clearances L-L/L-A (mm)		
	- measured clearances L-L/L-A (mm)		- 10 mm in the control of the contro
	Creepage distances		

	EN 60 947-4-1		
Clause	Requirement – Test	Result - Remark	Verdict
			1
	Uimp is given as:	8 kV	
	- material group or CTI	Min. III b	434
	- minimum creepage distances (mm)	10	
	- measured creepage distances (mm)	≥ 12,5	2000 mar hali an o sa bh' leis sealachd bhair
	Uimp is not given:		N
	- material column a or b		
	- minimum creepage distances (mm):		Similaritima a manastra confraenzario distalla
_	- measured creepage distances (mm)		
8.1.4	Actuator		N
8.1.4.1	Insulation		N
8.1.4.2	Direction		N
8.1.4.3	Mounting		N
8.1.5	Indication of contact position		N
8.1.5.1	Indication means		N
8.1.5.2	Indication by the actuator		N
8.1.6	Additional safety requirements for equipment with		N
	isolating function		
8.1.7	Terminals		Р
8.1.7.1	All parts of terminals which maintain contact and	(see 8.2.4 below)	Р
	carry current shall be of metal having adequate		
	mechanical strength		
	Terminal connections shall be such that	(see 8.2.4 below)	Р
	necessary contact pressure is maintained		
	Terminals shall be so constructed that the	(see 8.2.4 below)	P
	conductor is clamped between suitable surfaces		
	without damage to the conductor and terminal		
	Terminal shall not allow the conductor to be	(see 8.2.4 below)	P
	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		
8.2.4	Mechanical properties of terminals:	Overload	Р

	EN 60 947-4-1		
Clause	Requirement – Test	Result - Remark	Verdict
8.2.4.2	Mechanical strength of terminals		Р
	maximum cross-sectional area of conductor (mm²)	6	
	diameter of thread (mm)	M4	and the second s
	torque (Nm)	1,2	The second secon
	5 times on 2 separate clamping units		Р
8.2.4.3	Testing for damage to and accidental loosening of	f conductor (flexion test)	P
	conductor of the smallest cross-sectional area (mm²)	0,5	
	number of conductor of the smallest cross section	1	
	diameter of bushing hole (mm)		
	height between the equipment and the platen	260	
	mass at the conductor(s) (kg)		
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		Р
8.2.4.4	Pull-out test		Р
	force (N)	30	September 1
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		Р
	Flexion test	* ***	Р
	conductor of the largest cross-sectional area (mm²)	6	See See
	number of conductor of the largest cross- sectional	1	Shu,
	diameter of bushing hole (mm)	9,5	84011
-	height between the equipment and the platen (mm)	279	
	mass at the conductor(s) (kg)	1,4	A Samuel Comments

	EN 60 947-4-1			
Clause	Requirement – Test	Result - Ren	nark	Verdict
F		γ		
	135 continuous revolutions: the conductor shall			P
	neither slip out of the terminal nor break near the			
	clamping unit			
	Pull-out test			Р
	force (N)	80		
	1 min, the conductor shall neither slip out of the			P
	terminal nor break near the clamping unit			
	Flexion test	Overlo	ad	Р
	conductor of the largest and smallest cross-	2,5 // 0,5	6 // 1,5	
	sectional area (mm²):			
	number of conductor of the smallest cross	1 // 1	1 // 1	
	sectional, number of conductor of the largest			
	cross sectional:			
	diameter of bushing hole (mm)	9,5 // 6,4	9,5 // 6,4	
	height between the equipment and the platen	279 // 260	279 // 260	
	(mm):			
	mass at the conductor(s) (kg):	0,7 // 0,3	1,4 // 0,4	The state of the s
	135 continuous revolutions: the conductor shall			P
	neither slip out of the terminal nor break near the			
	clamping unit			
	Pull-out test			Р
	force (N)	50 // 30	80 // 30	Carlos
	1 min, the conductor shall neither slip out of the			Р
	terminal nor break near the clamping unit			
8.1.7.2	Connecting capacity			Р
	type of conductors:	Rigid	Flexible	63.00 35.00
	minimum cross-sectional area of conductor	0,75	0,5	y.
	(mm²):			
	maximum cross-sectional area of conductor	6	4	
	(mm²)			
	number of conductors simultaneously	Acc. Manuf.	Instr.	An and a second
	connectable to the terminal:	2	2	

	EN 60 947-4-1		
Clause	Requirement – Test	Result - Remark	Verdict
8.2.4	Mechanical properties of terminals:	Contactor	
8.2.4.2	Mechanical strength of terminals		
	maximum cross-sectional area of conductor (mm²)	4	
	diameter of thread (mm)	M 3,5	Angle of the second
	torque (Nm)	0,8	the state of the s
	5 times on 2 separate clamping units		P
8.2.4.3	Testing for damage to and accidental loosening of	f conductor (flexion test)	
	conductor of the smallest cross-sectional area (mm²)	0,75	
-	number of conductor of the smallest cross section	2	
	diameter of bushing hole (mm)	6,4	
	height between the equipment and the platen	260	40 - 12 - 12 - 12 - 12 - 12 - 12 - 12 - 1
	mass at the conductor(s) (kg)	1	
	135 continuous revolutions: the conductor shall		Р
	neither slip out of the terminal nor break near the clamping unit		
8.2.4.4	Pull-out test		
	force (N)	30	11.14 4. 12.4
10.00	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		Р
	Flexion test	•	
	conductor of the largest cross-sectional area (mm²)	4	
	number of conductor of the largest cross- sectional	2	and the second
	diameter of bushing hole (mm)		
	height between the equipment and the platen (mm)	279	
		0,9	Service and the service and th

	EN 60 947-4-1			
Clause	Requirement – Test	Result - Remark		Verdict
	1			·
	135 continuous revolutions: the conductor shall			P
	neither slip out of the terminal nor break near the			
	clamping unit			
	Pull-out test			
	force (N)	60		and the second second
	1 min, the conductor shall neither slip out of the			Р
	terminal nor break near the clamping unit			
	Flexion test	Contactor		
	conductor of the largest and smallest cross-	4 // 2,5	1,5 // 0,5	a was
	sectional area (mm²)			
	number of conductor of the smallest cross	1 // 1	1 // 1	
	sectional, number of conductor of the largest			
	cross sectional			
•	diameter of bushing hole (mm)	9,5	6,4	
	height between the equipment and the platen	279	260	
	(mm):			
	mass at the conductor(s) (kg)	0,9 // 0,7	0,4	
	135 continuous revolutions: the conductor shall			Р
	neither slip out of the terminal nor break near the			
	clamping unit			
	Pull-out test			
	force (N)	60 // 50	40 // 30	And the second
	1 min, the conductor shall neither slip out of the			Р
	terminal nor break near the clamping unit			
8.1.7.2	Connecting capacity			P
	type of conductors	Rigid	Flexible	
	minimum cross-sectional area of conductor	0,75	0,75	
	(mm²)			
	maximum cross-sectional area of conductor	4	2,5	
	(mm²)			and a second second
	number of conductors simultaneously	Acc. Manuf. Instr.		Section 1997
	connectable to the terminal	2	2	Salah Garagan

	EN 60 947-4-1	1	1
Clause	Requirement – Test	Result - Remark	Verdict
8.1.7.3	Connection		Р
	terminals for connection to external conductors		Р
	shall be readily accessible during installation		
	clamping screws and nuts shall not serve to fix		P
	any other component		ļ
8.1.7.4	Terminal identification and marking	T	Р
	terminal intended exclusively for the neutral		N
	conductor		
	protective earth terminal		N
	other terminals		Р
	- Main circuit::	2T1, 4T2, 6T3	
	- Auxiliary circuit	95-96, 97-98, 13-14, 21-22,	
		A1, A2	
8.1.8	Additional requirements for equipment provided w	ith a neutral pole	N
	marking of neutral pole		N
	The switched neutral pole shall not break before		N
	and shall not make after the other poles		
	Conventional thermal current of neutral pole		N
8.1.9	Provisions for protective earthing	·•	N
8.1.9.1	The exposed conductive parts shall be electrically		N
	interconnected and connected to a protective		
	earth terminal		
8.1.9.2	The protective earth terminal shall be readily		N
	accessible		
	The protective earth terminal shall be suitably		N
	protected against corrosion		
	The electrical continuity between the exposed		N
	conductive parts of the protective earth terminal		
	and the metal sheathing of connecting		
	conductors		
	The protective earth terminal shall have no other		N
	functions		

	EN 60 947-4-1		
Clause	Requirement – Test	Result - Remark	Verdict
8.1.9.3	Protective earth terminal marking and		N
0.1.0.0	identification		"
8.1.10	Enclosure for equipment		N
8.1.10.1	Design		N
	The enclosure, when it is opened: all parts		N
	requiring access for installation and maintenance		Ì
	are readily accessible		
	Sufficient space shall be provided inside the		N
	enclosure		
	The fixed parts of a metal enclosure shall be		N
	electrically connected to the other exposed		
	conductive parts of the equipment and connected		İ
	to a terminal which enables them to be earthed or		
	connected to a protective conductor		
	Under no circumstances shall a removable metal		N
	part of the enclosure be insulated from the part		
	carrying the earth terminal when the removable		
	part is in place		
	The removable parts of the enclosure shall be		N
	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		
	When an enclosure is so designed as to allow the		N
	covers to be opened without the use of tools,		
	means shall be provided to prevent loss of the		
	fastening devices		
3.1.10.2	Insulation		N

	EN 60 947-4-1		
Clause	Requirement – Test	Result - Remark	Verdict
	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		N
8.1.11	Degree of protection of enclosed equipment		N
0.1.11	Degree of protection:	IP .	N
	Test for first characteristic		N
	Test for first numeral:	1:	de janjani Rojani se nadakanan na na labara
		2:	
		3:	
		4:	i de la calenda
		5:	State State State State State
<u></u>		6:	
	Test for second characteristic		N Special
	Test for second numeral:	1: 2:	
		3:	
		4:	
		5:	
		6:	AN AND THE STATE OF THE STATE O
		7:	
		8:	

9.3.1.a	TEST SEQUENCE I	
9.3.3.3	Temperature rise Type AC and DC	-KG P
	ambient temperature 10-40 °C25	and the second second second second second
	Contactor	N
	test enclosure W x H x D (mm x mm x mm):	- 18 m - 18 m - 18 m -
	material of enclosure	and the state of t
	Main circuits, test conditions:	N

	EN 60 947-4-1		
Clause	Requirement – Test	Result - Remark	Verdict
			eray or the
	- conventional thermal current lth (A)		Long May 17 Sec.
	- conventional enclosed thermal current lthe (A) .:		And the second of the second o
	- cable/busbar cross-section (mm²) / (mm):		
	- temperature rise of main circuit terminals (K):	<	Same and the state of the same
	Auxiliary circuit, test conditions:		Р
	- rated operation current le (A)	16	
	- cable cross-section (mm²)	2,5	ather wester a track of the same
	- temperature rise of auxiliary circuit terminals	≤ 43	
	(K)		and and the state of the state
	Coils and electromagnets, test conditions:	AC DC Type KG	Р
	- rated control supply voltage Us (V):	240 220	
	- Class of insulating material:	F F	:
	- temperature rise of coil and electromagnets (K) :	≤ 76 ≤ 66	- · · · · · ·
	Starter Tested with setting range 10 – 14 A		graph on the second sec
	test enclosure W x H x D (mm x mm x mm):	175 x 115 x 115	
	material of enclosure:	Metal	Carlotte Commence
	Main circuits, test conditions: *Tested with 14A bea	cause of max. Power	P
	consumption of Overload Relay		
	- conventional thermal current lth (A)	14 (20*)	1961s
	- cable/busbar cross-section (mm²) / (mm):		100 mg
	- temperature rise of main circuit terminals (K):		
	Overload relay, auxiliary circuit, test conditions:		Р
	- rated operation current le (A)	4	\$75 / \$5 / 4 / \$850 /
	- cable cross-section (mm²)	1	Salar Salar
	- temperature rise of auxiliary circuit terminals	≤ 44	artisma dand on
	(K)		
9.3.3.2	Operating limits		
9.3.3.2.1	Power-operated equipment:	AC DC Type KG	Р
	rated control supply voltage Us (V)	240 220	
	frequency (Hz)	50 DC	

EN 60 947-4-1				
Clause	Requirement – Test	Result - Remark	Verdict	
		1	1	
	limits of close satisfactorily at any value between	80 81	Р	
	85% and 110% of rated control supply voltage			
	Us			
	limits of drop out and open fully are: 75% to 20%	47 23	P	
	for a.c. and 75% to 10% for d.c			
9.3.3.3	Temperature rise T	ype DC	Р	
	ambient temperature 10-40 °C	25	ig a characharacharacharacharacharacharach	
	Contactor		N	
	test enclosure W x H x D (mm x mm x mm):			
	material of enclosure			
	Main circuits, test conditions:		N	
	- conventional thermal current lth (A)			
	- conventional enclosed thermal current Ithe (A) .:		e e e e e e e e e e e e e e e e e e e	
	- cable/busbar cross-section (mm²) / (mm):		The state of the s	
	- temperature rise of main circuit terminals (K):	<	and the second s	
	Auxiliary circuit, test conditions:		Р	
	- rated operation current le (A)	16	19.4 22.4	
	- cable cross-section (mm²)	2,5	100	
	- temperature rise of auxiliary circuit terminals	≤ 43	1600 1600 1600 1600 1600 1600 1600 1600	
	(K)		And the second s	
	Coils and electromagnets, test conditions:	DC	Р	
	- rated control supply voltage Us (V)	220 24		
	- Class of insulating material	F F	Agents	
	- temperature rise of coil and electromagnets (K):	≤ 40 ≤ 64	700 1 274 Nov.	
			s significan	
	Starter Tested w	ith setting range 10 - 14 A		
	test enclosure W x H x D (mm x mm x mm)	175 x 115 x 115		
	material of enclosure			
	Main circuits, test conditions: *Tested with 14A because of max. Power		Р	
	consumption of Overload Relay			
	- conventional thermal current ith (A)	14 (20*)		
	- cable/busbar cross-section (mm²) / (mm)			

	EN 60 947-4-1		
Clause	Requirement - Test	Result - Remark	Verdict
			90.80 May 1
	- temperature rise of main circuit terminals (K):	≤62	to a fifty for the same of the
<u> </u>	Overload relay, auxiliary circuit, test conditions:	· · ·	Р
	- rated operation current le (A)		
	- cable cross-section (mm²)	1	
	- temperature rise of auxiliary circuit terminals (K)	≤ 40	
9.3.3.2	Operating limits		
9.3.3.2.1	Power-operated equipment:	DC	Р
	rated control supply voltage Us (V)	220 24	. The same
	frequency (Hz)	DC DC	a service contribution of the contribution of
	limits of close satisfactorily at any value between	69 70	P
	85% and 110% of rated control supply voltage		
	Us		
	limits of drop out and open fully are: 75% to 20%	31 38	Р
	for a.c. and 75% to 10% for d.c		
9.3.3.2.2	Relays and releases Setting Range 10 – 14 A		
	Conditions for thermal and time-delay magnetic overload relays only:		
	type of time-delay overload relay	Thermal, Temp. compensated	Alice April
	trip class	10A	50.7% 12.83 20.00
	current settingl _{set} :	10 A 14 A	
	ambient temperature (°C)	25	Angel Sales and Sales and
	test enclosure W x H x D (mm x mm x mm):	175 x 115 x 115	and the second
	cable/busbar cross-section (mm²) / (mm):	2,5	Section 1
	at A (1,05) times of current setting, tripping shall	10,5 A 14,7 A	Andrews Supplement
	not occur in less than 2 h starting from the cold		and the
	state; test current	No tripping No tripping	
	When the current is subsequently raised to B	12 A 16,8 A	
	(1,2) times the current setting, tripping shall occur		
	in less than 2 h; test current min:sec :	3:55 0:43	CONTRACTOR OF THE STATE OF THE

	EN 60 947-4-1				
Clause	Requirement – Test	Result - Rem	ark	Verdict	
	for class 10A overload relays energized at C (1,5) times the current, tripping shall occur in less than	15 A	21 A		
	2 min, starting from thermal equilibrium at the current setting; test currentmin:sec :		0:08	and harden and a second and	
	for class 10, 20 or 30 overload relays energized at C times the current, tripping shall occur in less than 2, 8 or 12 min, starting from thermal equilibrium at the current setting; class; test current; tripping time	N			
	at D (7,2) times the current setting, tripping shall occur within the tripping time (s) 2 < Tp ≤ 10, starting from the cold state; test current; tripping	72 A	100,8 A		
	time Tp (s)	2,1	2,5		
	at A (1,05) times of current setting, tripping shall not occur in less than 2 h starting from the cold state; test current	10,5 A No tripping	14,7 A No tripping		
	When the current is subsequently raised to B (1,2) times the current setting, tripping shall occur in less than 2 h; test currentmin:sec:	12 A	16,8 A		
	for class 10A overlod relays energized at C (1,5) times the current, tripping shall occur in less than 2 min, starting from thermal equilibrium at the	15 A	1:45 21 A		
	current setting; test currentmin:sec: for class 10, 20 or 30 overload relays energized at C times the current, tripping shall occur in less than 2, 8 or 12 min, starting from thermal	0:36 N	0:12	Section 1	
	equilibrium at the current setting; class; test current; tripping time			Specifically appearance for an investor of forms	

	EN 60 947-4-1			
Clause	Requirement – Test	Result - Rem	ark	Verdict
	at D (7,2) times the current setting, tripping shall occur within the tripping time (s) 2 < Tp ≤ 10s tarting from the cold state; test current; tripping	72 A	100,8A	
	time Tp (s)	2,1	2,0	
	Ambient temperature: + 40 °C			
	at A (1,05) times of current setting, tripping shall not occur in less than 2 h starting from the cold	10,5 A	14,7 A	Author Helps
	state; test current	No tripping	No tripping	
	When the current is subsequently raised to B (1,2) times the current setting, tripping shall occur	12 A	16,8 A	
	in less than 2 h; test current min:sec :	0:50	0:12	
	for class 10A overload relays energized at C (1,5) times the current, tripping shall occur in less than 2 min, starting from thermal equilibrium at the	15 A	21 A	
	current setting; test currentmin:sec :	0:08	0:05	
	for class 10, 20 or 30 overload relays energized at C times the current, tripping shall occur in less than 2, 8 or 12 min, starting from thermal equilibrium at the current setting; class; test current; tripping time	N		
	at D (7,2) times the current setting, tripping shall occur within the tripping time (s) 2 < Tp ≤ 10 starting from the cold state; test current; tripping	72 A	100,8 A	
	time Tp (s)	2	2,2	No. 100
	Limits of operation of three-pole thermal overload	relays energize	ed on two poles:	Р
	ambient temperature (°C)	25		Marian Salah
	the relay energized on three poles, at A (1 / 0,9) times the current setting, tripping shall not occur in less than 2 h, starting from the cold state	10 A / 9 A	14 A / 12,6 A	
	in 1655 than 2 it, starting from the cold state	No tripping	No tripping	isso. Bolikari Alderide stradi siru ummunu sistemi kina

	EN 60 947-4-1			_
Clause	Requirement – Test	Result - Rema	ark	Verdict
	when the value of the current flowing in two poles is increased to B (1,15) times the current setting and the third pole deenergized, tripping shall occur in less than 2 h min:sec:		16,1 A / 0 A 0:24	
9.3.3.4	Test of dielectric properties, impulse withstand vol		cated):	Р
	- verification by measurement of clearances instead of testing			N
	- rated impulse withstand voltage (V)	8000		and the second second second second
	- test Uimp main circuits (kV):	9,8 / 7		P
	- test Uimp auxiliary circuits (kV):	9,8 / 7		Р
	Test of dielectric properties, dielectric withstand vo	ltage (Uimp no	t indicated):	N
	- rated insulation voltage (V)			را و المنافعة
	- main circuits, test voltage for 1 min (V):			N
	- control and auxiliary circuits, test voltage for 1 min (V)			N

9.3.3.5	TEST SEQUENCE II		
	Making and breaking capacity		
	utilization category	AC1	
	rated operational voltage Ue (V)	690	2 annications
	rated operational current le (A) or power (kW):	20A	1 3 3 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4
	Conditions, make/break operations AC-1 only:		Р
	- test voltage U/Ue = 1,05 (V):	L1: 725	
		L2: 730	Sie ag
		L3: 730	da.
	- test current I/ie = 1,5 (A):	L1: 38	
		L2: 38	
		L3: 38	A. Approximately
	- power factor/time constant:	L1: 0,78	
		L2: 0,78	
		L3: 0,79	

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Clause	Requirement – Test	Result - Remark	Verdict
	on time (ms)	160	
	- on-time (ms)		8.002/05 7.01
	- off-time (s)		
	- number of make/break operations	150	P P
	Behaviour and condition during and after the test:		P
	- no permanent arcing		<u>Р</u>
	- no flash-over between poles		P
	- no blowing of the fusible element in the earth circuit	,	P
	- no welding of the contacts		Р
	- the contacts shall operate when the contactor or		Р
	starter is switched by the applicable method of		
	control		
	Operational performance capability:		Р
	utilization category (AC-3 or AC-4)	AC4	
	rated operational voltage Ue (V)	400V	
	rated operational current le (A) or power (kW):	10A	ماسيدي والمراجع والمستعدد والمستعدد والمستعدد والمستعدد والمستعدد والمستعدد والمستعدد والمستعدد والمستعدد
	Conditions, make operations AC3/AC4 only:		Р
	- test voltage U/Ue = 1,05 (V)	L1: 426	7000000000000000000000000000000000000
		L2: 425	
		L3: 427	See Secretary
	- test current I/Ie = (A):	L1: 192	
		L2: 193	
		L3: 192	76-17-18-18-18-18-18-18-18-18-18-18-18-18-18-
	- power factor/time constant	L1: 0,4	14.5 88.86
		L2: 0,4	e especialista Professional Professional
		L3: 0,41	
	- on-time (ms)		1. 1.
-	- off-time (s):	10	
	- number of make operations:	50	Р
	Characteristic of transient recovery voltage for AC	-3 and AC-4 only:	Р
	oscillatory frequency (kHz)		

EN 60 947-4-1			
Clause	Requirement – Test	Result - Remark	Verdict
			<u> </u>
	Measured oscillatory frequency (kHz)	L1: 47	
		L2: 48	
		L3: 48	
	Factor y	L1: 1,1	
		L2: 1,1	
		L3: 1,1	
	Behaviour and condition during and after the test:		Р
	- no permanent arcing	Р	Р
	- no flash-over between poles	Р	Р
	- no blowing of the fusible element in the earth	Р	Р
	circuit		
	- no welding of the contacts	Р	P
	- the contacts shall operate when the contactor or	•	P
	starter is switched by the applicable method of	•	
	control		
	Operational performance capability:		
	utilization category:	AC4	
	rated operational voltage Ue (V)		
	rated operational current le (A) or power (kW):		
•	Conditions, make/break operations AC3 / AC4 only		Р
	- test voltage U/Ue = 1,05 (V)		1 (A)
	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	L2: 425	
		L3: 428	
	- test current I/Ie = (A):		
	(v)	L2: 60	
		L3: 60	
	- power factor/time constant	L1: 0,45	
	- power ractor/unite constant	L2: 0,45	\$5.00 m
		•	2 (2) (2) (3) (4) (4) (4) (4) (4) (4) (4) (4) (4) (4
	4	L3: 0,45	
	- on-time (ms)		25 P. 25 S
	- off-time (s)	4	is Sensitivities and a sense

	EN 60 947-4-1		
Clause	Requirement – Test	Result - Remark	Verdict
		···	
	Characteristic of transient recovery voltage for AC	-3 and AC-4 only:	Р
	oscillatory frequency (kHz)		The state of the s
	Measured oscillatory frequency (kHz)	L1: 37,5	
		L2: 38	
		L3: 38	
	Factor y:	L1: 1,1	
		L2: 1,1	
		L3: 1,1	
	Behaviour and condition during and after the test:		Р
. 06 00	- no permanent arcing	P	P
	- no flash-over between poles	P	Р
	- no blowing of the fusible element in the earth	Р	Р
	circuit		
	- no welding of the contacts	Р	Р
	- the contacts shall operate when the contactor or	Р	P
	starter is switched by the applicable method of		
	control		
8.3.3.6	Operational performance capability:		
	utilization category:	AC1	E
	rated operational voltage (V)	690	
	rated operational current le (A) or power (kW):	20A	
	Test conditions for make/break operations AC-1 or	nly:	Р
	test voltage (V)	L1: 725	67
		L2: 730	
		L3: 730	a partiti
	test current (A)	I	War in the second
		L2: 38	
		L3: 38	
	power factor/time constant		n e
		L2: 0,79	1884 (1884) 1884 (1884)
		L3: 0,79	
	- on-time (ms)		

	EN 60 947-4-1				
Clause	Requirement – Test	Result - Remark	Verdict		
	- off-time (s)	23			
	- number of operating cycles:		P		
3.3.3.6.6	Behaviour and condition during and after the test:		Р		
	- no permanent arcing		Р		
	- no flash-over between poles		Р		
	- no blowing of the fusible element in the earth		Р		
	- no welding of the contacts		Р		
	the contacts shall operate when the contactor or starter is switched by the applicable method of control		Р		
	Dielectric verification:	•	Р		
	test voltage (2 Ue + 1000 V) for 1 min (V):	2380			

9.3.4	TEST SEQUENCE III		
	Performance under short-circuit conditions		
9.3.4.2.1	Test at de prospective current "r": U12/16 0	,4 -0,6A	
	Represents settin	ng ranges up to 11A	
	type of SCPD	Siemens Diazed gL / gG	
	ratings of SCPD, co-ordination type 1	25A / 500V	
	ratings of SCPD, co-ordination type 2	ľ	
	rated operational current le (A) AC-3		
	prospective current "r" (kA)		3
	test voltage (V)	1	
		L2: 423	
		L3: 425	2011. 201
	r.m.s. test current (A)	L1: 1053	* **
	, ,	L2: 1087	
		L3: 1062	

	EN 60 947-4-1	Τ-	
Clause	Requirement - Test	Result - Remark	Verdict
			
	peak current (A)	L1: 1457	
		L2: 1457	
		L3: 1378	Marketon and American
	power factor	0,95	
	1. one breaking operation of SCPD with all the	L1: 1750 A2s / 807A	George B. Co. A.
	switching devices closed prior to the test I2dta	L2: 2180 A2s / 887 A	ermanning och som
	(A2s) /peak current I (A):	L3: 1860 A2s / 903 A	125 July 2000 100 100 100 100 100 100 100 100 10
	2. one breaking operation of SCPD by closing the	L1: 108 A2s / 270 A	Andrew James
	contactor or starter on to the short-circuit I²dta	L2: 695 A2s / 586 A	
	(A2s) /peak current I (A)	L3: 884 A2s / 601 A	8.000 Jan 518
	Behaviour of the equipment during the test	- 100 100 201	Р
	Both types of co-ordination (all devices):		Р
	A - the fault current has been successfully		Р
	interrupted by the SCPD or the combination		
	starter and the fuse or fusible element, or solid		
	connection between the enclosure and supply		
	shall not have melted		
	B - the door or cover of the enclosure has not		P
	been blown open and it is possible to open the		
	door or cover		
	C - there is no damage to the conductors or		Р
	terminals and the conductors have not been		
	separated from the terminals		
	D - there is no cracking or breaking of an		Р
	insulating base to the extent that the integrity of		'
	mounting of a live part is impaired		
	Both types of co-ordination (combination starters a	nd protected starters only):	N
	E - the circuit breaker or the switch is capable of	na protocioù cianero ciny).	N
	being opened manually by its operating means		"
			N
	F - neither end of the SCPD is completely		l N
	separated from its mounting means to an exposed conductive part		

	EN 60 947-4-1	-	,
Clause	Requirement – Test	Result - Remark	Verdict
	G - if a circuit breaker with rated ultimate short-circuit the rated conditional short-circuit current assigned	•	N
	protected starter is employed, the circuit breaker s	shall be tested to trip:	
	1) circuit breaker with instantaneous trip relays or		N
	releases, at 120% of the trip current		
	2) circuit breaker with overload relays or		N
	releases, at 250% of the rated current of the		
	circuit breaker		
	Type 1 co-ordination (all devices):		Р
	H - there has been no discharge of parts beyond	Р	P
	the enclosure. The starter may be inoperative		
	after each operation		
	Type 1 co-ordination (combination and protected s	starters only):	Р
	I - dielectric verification test voltage (2 Ue) for	1380	
	1 min (V):		
9.3.4.2.1	Test at de prospective current "r": U12/16 13 -18A		
	Represents setting ranges higher 10A		
	type of SCPD	Siemens Diazed gL / gG	and the second
_	ratings of SCPD, co-ordination type 1:	63A / 500V	
	ratings of SCPD, co-ordination type 2:	-	
	rated operational current le (A) AC-3	10A	
	prospective current "r" (kA)	1	
	test voltage (V):	L1: 424	
		L2: 423	
		L3: 425	
	r.m.s. test current (A):	L1: 1053	
		L2: 1087	
		L3: 1062	
	peak current (A)	L1: 1457	Services Services
		L2: 1457	
		L3: 1378	
	power factor	0,95	

	EN 60 947-4-1		1
Clause	Requirement – Test	Result - Remark	Verdict
		Т	
	1. one breaking operation of SCPD with all the	L1: 20,8 kA2s / 1330 A	A Comment
	switching devices closed prior to the test I ² dta	L2: 19,6 kA2s / 1283 A	
	(A2s) /peak current I (A)	L3: 23 kA2s / 1210 A	
	2. one breaking operation of SCPD by closing the	L1: 22,1 kA2\$ / 1260 A	yanan ma
	contactor or starter on to the short-circuit I2dta	L2: 19,5 kA2s / 1283 A	
	(A²s) /peak current I (A)	L3: 21,4 kA2s / 1306 A	Section 1
	Behaviour of the equipment during the test		P
<u></u>	Both types of co-ordination (all devices):		Р
	A - the fault current has been successfully		P
	interrupted by the SCPD or the combination		
	starter and the fuse or fusible element, or solid		
	connection between the enclosure and supply		
181 f	shall not have melted		
	B - the door or cover of the enclosure has not		Р
	been blown open and it is possible to open the		
	door or cover		
	C - there is no damage to the conductors or		P
	terminals and the conductors have not been		
	separated from the terminals		
	D - there is no cracking or breaking of an		Р
	insulating base to the extent that the integrity of		
	mounting of a live part is impaired		
	Both types of co-ordination (combination starters a	nd protected starters only):	N
	E - the circuit breaker or the switch is capable of		N
	being opened manually by its operating means		
	F - neither end of the SCPD is completely		N
	separated from its mounting means to an		
	exposed conductive part		
	G - if a circuit breaker with rated ultimate short-circ	uit breaking capacity less than	N
	the rated conditional short-circuit current assigned	• • •	
	protected starter is employed, the circuit breaker si		

	EN 60 947-4-1		
Clause	Requirement - Test	Result - Remark	Verdict
			1
	1) circuit breaker with instantaneous trip relays or		N
***	releases, at 120% of the trip current		
	2) circuit breaker with overload relays or		N
	releases, at 250% of the rated current of the		
	circuit breaker		
	Type 1 co-ordination (all devices):	•	Р
	H - there has been no discharge of parts beyond	Р	Р
	the enclosure. The starter may be inoperative		
	after each operation		
	Type 1 co-ordination (combination and protected s	starters only):	Р
	I - dielectric verification test voltage (2 Ue) for	1380	
	1 min (V)		
	Type 2 co-ordination (all devices):		N
	J - no damage to the overload relay or other parts		N
	has occurred, except that welding of contactor or		
	starter contacts is permitted, if they are easily		
	separated without significant deformation		
	K - the tripping of the overload relay shall be		N
	conform to the published tripping characteristics,		
	before and after the test		
	L - dielectric verification test voltage (2 Ue) for		
	1 min (V)		Significant Control of the Control o
9.3.4.2.2	Test at the rated conditional short-circuit current "I	g" ≤ SCC "r"	N
	type of SCPD		
	ratings of SCPD, co-ordination type 1		
	ratings of SCPD, co-ordination type 2		Section -
	rated operational current le (A) AC-3		Gosta
	prospective current "Iq" (kA)		¥2
	test voltage (V)	L1:	no.
		L2:	
		L3:	

	EN 60 947-4-1		
Clause	Requirement – Test	Result - Remark	Verdict
			CPCTASSIVED L. C. COPT
	r.m.s. test current (A)	L1:	A Company
		L2:	
		L3:	m. see
	peak current (A)	L1:	Topical Marie Const.
		L2:	
		L3:	in the state of th
	power factor		Appendix and the first of the second section is
	1. one breaking operation of SCPD with all the	L1:	San
	switching devices closed prior to the test I2dta	L2:	
	(A²s)	L3:	
	2. one breaking operation of SCPD by closing the	L1:	
İ	contactor or starter on to the short-circuit:	L2:	
	<u>.</u>	L3:	
	3. one breaking operation of SCPD by closing the	L1:	
	switching device on to the short-circuit:	L2:	
		L3:	Marking and the day and
	Behaviour of the equipment during the test		N
	Both types of co-ordination (all devices):		N
	A - the fault current has been successfully		N
	interrupted by the SCPD or the combination		
	starter and the fuse or fusible element, or solid		
	connection between the enclosure and supply		
	shall not have melted		
	B - the door or cover of the enclosure has not		N
	been blown open and it is possible to open the		
	door or cover		
	C - there is no damage to the conductors or		N
	terminals and the conductors have not been		
	separated from the terminals		
	D - there is no cracking or breaking of an		N
	insulating base to the extent that the integrity of		
	mounting of a live part is impaired		

EN 60 947-4-1			
Clause	Requirement – Test Result - Remark	Verdict	
		,	
	Both types of co-ordination (combination starters and protected starters only):	N	
	E - the circuit breaker or the switch is capable of	N	
	being opened manually by its operating means		
	F - neither end of the SCPD is completely	N	
	separated from its mounting means to an		
	exposed conductive part		
	G - if a circuit breaker with rated ultimate short-circuit breaking capacity less than	N	
	the rated conditional short-circuit current assigned to the combination or		
	protected starter is employed, the circuit breaker shall be tested to trip:		
	1) circuit breaker with instantaneous trip relays or	N	
	releases, at 120% of the trip current		
	2) circuit breaker with overload relays or	N	
	releases, at 250% of the rated current of the		
	circuit breaker		
	Type 1 co-ordination (all devices):	N	
	H - there has been no discharge of parts beyond	N	
	the enclosure. The starter may be inoperative		
	after each operation		
	Type 1 co-ordination (combination and protected starters only):	N	
	I - dielectric verification test voltage (2 Ue) for		
	1 min (V)	4.3460	
	Type 2 co-ordination (all devices):	N	
	J - no damage to the overload relay or other parts	N	
	has occurred, except that welding of contactor or		
	starter contacts is permitted, if they are easily		
	separated without significant deformation		
	K - the tripping of the overload relay shall be	N	
	conform to the published tripping characteristics,	•	
	before and after the test		
	L - dielectric verification test voltage (2 Ue) for		
	1 min (V)		

		EN 60 947-4-1		
Clause	Requirement - Test		Result - Remark	Verdict

9.3.5	TEST SEQUENCE IV: (APPLICABLE FOR CONT	TACTORS ONLY)	Р
	Overload current withstand capability of contactors:		Р
	ambient temperature (°C)	25	
	rated operational current le (A) max. AC-3	10	the second second of the second
	test current (le) (A)		
	duration of test: 10 s	10s	79.417
	After the test, the contactor shall be substantially	Р	Р
	in the same condition as before the test (visual		
	inspection)		

TABLE:	temperature rise m	easurements			P
Main Terminals Cor	itactor (14A)		1	51	65
			3	57	65
			5	57	65
Main Terminal Overk	oad Relay (14A)		2	53	65
			4	62	65
			6	57	65
Auxilixary Terminals	Contactor (16A)		13	43	65
			14	42	65
Auxiliary Terminal Ov	verload Relay (4A)		95	44	65
· · ·			96	40	65
Coil:	240V	50Hz		76	135
**	24V + 10%	DC		64	135
	220V + 10%	DC		40	135
Type: KG	220V	DC		66	135

	EN 60 947-4-1		· · · · · · · · · · · · · · · · · · ·
Clause	Requirement – Test	Result - Remark	Verdict
	EN 60 947-5-1		<u> </u>
8.3.3.5.3	Making and breaking capacities of switching elements under abnormal		P
	conditions:	T	
	utilization category	AC15	
	rated operational voltage Ue (V)	240	
	rated operational current le (A) or power (kW):	12	CALL OF THE SE
	Conditions, make/break operations:		St. And Market 1970, 1977 - Controller on Market
	- test voltage U/Ue = 1,1 (V)	L1: 266	18.4
		L2: -	
		L3: -	
	- power factor/time constant	L1: 0,31	
		L2: -	A STATE OF THE STA
		L3: -	e production of the control of the c
	- make operations: test current I/Ie (A)	L1: 123	
		L2: -	
		L3: -	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	- break operations: test current I/Ie (A)	L1: 123	Service Control
		L2: -	
		L3: -	
	- on-time (ms)	300	Aprilia Aprilia
	- operating cycles per minute:	6	
	- number of operating cycles	10	Р
	Behaviour and condition during and after the test:		Р
	- no electrical or mechanical failures		Р
	- no contact welding or prolonged arcing		Р
	- no blowing of the fusible element in the earth		P
	circuit		
	Dielectric verification:		Р
	dielectric test voltage (V)	2000	P

EN 60 947-4-1					
Clause	Requirement – Test	Result - Remark	Verdict		

	EN 60 947-5-1		
8.3.3.5	TEST SEQUENCE III		
8.3.3.5.2	Making and breaking capacities of switching elements under normal conditions		
	utilization category	AC15	
	rated operational voltage Ue (V)	240	A. Paris
	rated operational current le (A) or power (kW):	12	44.46.5 (T. 10.26.1)
	Conditions, make/break operations:		Р
	- test voltage U/Ue = 1,1 (V)	L1: 266* / 242 **	A Who was a second
	* 50 operation at 266V	L2:	
	** 6000 operations at 242V	L3:	
	- power factor/time constant	L1: 0,31	
		L2: -	
		L3: -	- Company of the Section of the Sect
	- make operations: test current I/Ie (A)	L1: 123	
		L2: -	
		L3:	
	- break operations: test current I/Ie (A)	L1: 13	
		L2: -	
		L3:	Salahan .
	- on-time (ms) *50 oper. / **6000 oper	160 * / 300**	List.
	- operating cycles per minute	15	
	- number of operating cycles	6050	Р
	Behaviour and condition during and after the test:	· · · · · · · · · · · · · · · · · · ·	P
	- no electrical or mechanical failures		Р
	- no contact welding or prolonged arcing		Р
	- no blowing of the fusible element in the earth		Р
	circuit		
	Dielectric verification:		Р
	dielectric test voltage (V)	2000	Р
	utilization category		
	rated operational voltage Ue (V)		Sec. May be

EN 60 947-4-1				
Clause	Requirement – Test		Result - Remark	Verdict

	EN 60 947-5-1		
8.3.4	TEST SEQUENCE IV		
	Performance under conditional short-circuit curren	t	Р
	type of SCPD	Siemens Diazed gL / gG	and the second s
	ratings of SCPD	25A / 500V	Salah Salah Salah Salah Salah Salah Salah Salah Salah Salah Salah Salah Salah Salah Salah Salah Salah Salah Sa Salah Salah Sa
	prospective current (kA)	1	
	test voltage (V) U/Ue = 1,1 (V):	L1: 277	All the second second
		L2: 275	
		L3: 276	and the second s
	r.m.s. test current (A):	L1: 1010	
		L2: 1050	
		L3: 1020	
	power factor (max. 0,7)	0,7	
	first making operation to closed switching	L1: 1650 A2s / 770A	
	elements: test I²dta (A²s) / I _D (A):	L2: 2880 A2s / 830 A	
		L3: 2850 A2s / 1090 A	Section 1
	time interval between test (min. 3 min)		
	second making operation to closed switching	L1: 1430 A2s / 700 A	and the second
	elements: test I²dta (A²s) / I _D (A):	L2: 2900 A2s / 830 A	
		L3: 2860 A2s / 1080 A	
	time interval between test (min. 3 min):		<u> </u>
	third making operation to closed switching	L1: 2910 A2s / 1030 A	16.000 ·
	elements: test I²dta (A²s) / I _D (A):	L2: 2540 A2s / 975 A	
		L3: 830 A2s / 545 A	<u> </u>
	Behaviour of the equipment during the test:		Р
	switching elements open by the normal actuating		Р
	system		
	Dielectric verification:		Р
	dielectric test voltage (V)	2000	Р



TEST REPORT EN 60 947-4-1

Low-voltage switchgear and controlgear

Part 4: Contactors and motor-starters

Section 1: Electromechanical contactors and motor-starters

Report reference No.

2.03.00356.1.0-K212/B&J

Tested by (+ signature).....: Ing.J.Ainetter

Approved by (+ signature): Ing.K.Farthofer

Date of issue.....: 02.02.2004

Testing laboratory: Österreichische Forschungs- und Prüfzentrum Arsenal

Ges.m.b.H

Address...... : A – 1031 Vienna, Faradaygasse 3

Testing location.....: as above

Applicant.....: Benedict GmbH (Ω Benedikt & Jäger)

Address...... : A – 1220 Vienna, Lieblgasse 7

Standard: EN 60 947-4-1:2000-11

Test Report Form No.: 69474-1A

Master TRF.....: reference No. 69474-1A, dated 95-07

Copyright blank test report....: the bodies participating in the Committee of Certification

Bodies (CCB) and/or the CENELEC Certification

Agreement (CCA).

Test procedure : CB-scheme

Procedure deviation: N.A.

Non-standard test method: N.A.

Type of test object: Motor-Starter

Trademark Ω, Benedikt & Jäger

Model/type reference : Kx2-12Axx + U12/16xxx

Manufacturer.....: Ω Benedikt & Jäger

Rating: AC1

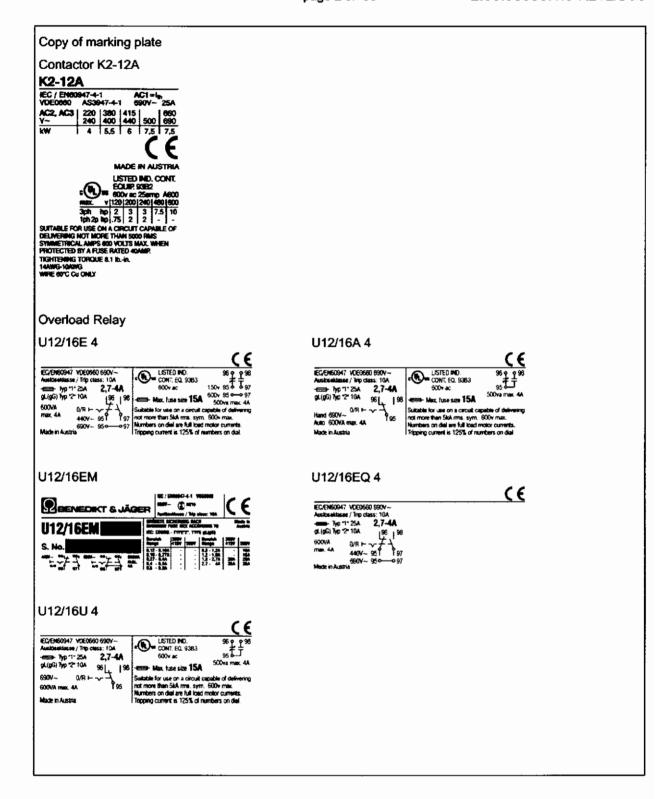
25A 690V 50-60Hz

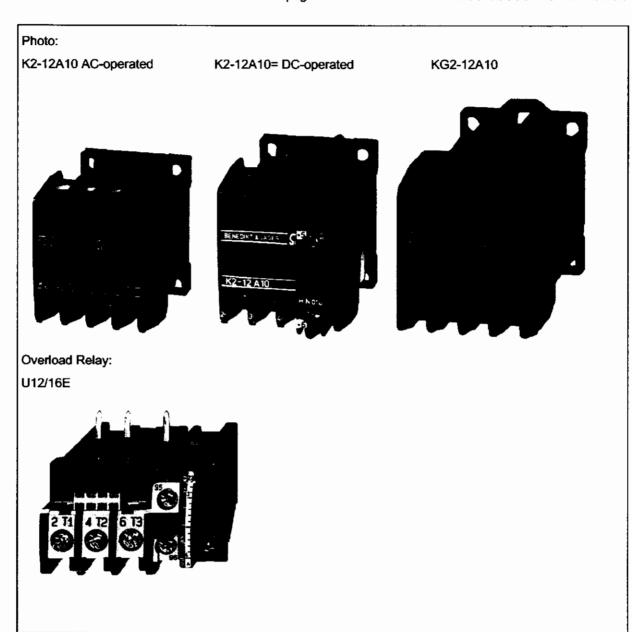
AC3/AC4

12A 400V 50-60Hz

AC15

12A 240V 50-60Hz





Test item particulars:	
- method of operation:	Magnetic
- switching positions:	ON-OFF
- number of polesContactor:	3 Main 1 Aux
- kind of current:	AC
- number of phases:	3
- rated frequency (Hz)::	50-60
- number of positions of main contacts:	2
Rated and limiting values, main circuit:	
- rated operational voltage Ue (V):	690
- rated insulation voltage Ui (V):	690
- rated impulse withstand voltage Uimp (kV):	8
- conventional free air thermal current Ith (A):	25
- conventional enclosed thermal current Ithe (A):	25
- rated operational current le (A):	25
- rated uninterrupted Iu (A):	25
- utilization category:	AC1, AC3, AC4
Short-circuit characteristic:	
- rated prospective short-circuit current "r" (kA):	1
- rated conditional short-circuit current lq (kA):	1
Rated and limiting values, auxiliary circuits:	For Contactor
- rated operational voltage (V):	240
- rated frequency (Hz):	50-60
- number of circuits:	1
- number and kind of contact elements:	1 NO or 1 NC
Co-ordination of short-circuit protective devices:	Type "1"
- kind of protective device:	Fuse: 25A up to 11A AC3/AC4
	63A higher than 10A AC3/AC4
Possible test case verdicts:	
- test case does not apply to the test object:	N(.A.)
- test object does meet the requirement:	P(ass)
- test object does not meet the requirement:	F(ail)

General remarks:

"(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.

The test results presented in this report relate only to the object tested.

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- 1) Based on the decision of the applicant, some of the tests of Test Sequences I and II may have been performed under more severe conditions than required in the stanard. In case of, relevant values for equipment under test are stated in test report.
- 2) Relevant tests have been performed with or without 'snap on auxiliary contact block' Typ 'HN' or 'HA'.
- 3) The test item is corresponding to the requirements of IEC 60947-4-1 Ed. 2.0 (2000-11) + A1 (2002-09).

```
Ordering key:
Contactor
Kx2-12A x x
        1 |>>>
                     : 0, 1 : Number of NC auxiliary contacts
        |>>>>
                      : 0, 1 : Number of NO auxiliary contacts
|>>>>
                      : G : DC coil supply (optional)
Overload Relay
U12/16 x x x
       i | | >>>>
                     : Setting range 0.12 - 0.18 / 0.18 - 0.27 / 0.27 - 0.4 / 0.4 - 0.6 /
       1 1
                              0.6 - 0.9 / 0.8 - 1.2 / 1.2 - 1.8 / 1.8 - 2.7 /
       11
                              2.7-4 / 4-6 / 6-9 / 8-11 / 10-14 A
       11
       1 | >>>>
                      : M ... With additional quick trip up to 4A (optional)
                      : Q ... Thermic quick trip up to 14A (optional)
       |>>>>
                      : U ... Change over auxiliary contacts
                      : A ... Change over auxiliary contacts with autom. Reset
                      : E ... 1 NC and 1 NO auxiliary contact
Control Circiut Voltage:
6 - 550V
               50Hz
6 - 600V
               60Hz
12 - 250V
               DC *
       12V up to 24V: Double Winding Coil with Late Break Contact in series to coil.
       25V up to 250V: Dropping Resistor with Late Break Contact in series to coil.
       KG - type: Without Late Break Contact
```

	EN 60 947-4-1		
Clause	Requirement – Test	Result - Remark	Verdict
6.2	MARKING	-	
6.2	MARKING:		
	Data shall be preferably marked on the equipmen		P
	c - number of this standard (IEC/EN60947-4-1)	IEC947-4-1	P
	k - IP code, in case of an enclosed equipment	-	N
	Data shall be included on the nameplate, or on the	e equipment, or in the	
	manufacturer's published literature:	1	
	d - rated operational voltages	690V	<u> </u>
	e – utilization category and rated operational	AC1 25A, 690V	P
	currents (or rated powers), at the rated	AC3	
	operational voltages of the equipment	AC4 12A, 400V	
		Contactor AC15 12A, 240V	
	f - either the value of the rated frequency/ies, or	50-60Hz	Р
	the indication d.c. (or symbol)		
	g - rated duty with the indication of the class of		N
	intermittent duty, if any		
	Associated values:	T	
	h - rated marking and breaking capacities (these	AC1, AC3, AC4, AC15	Р
	indications may be replaced, where applicable,		
	by the indication of the utilization category)		
	Safety an installation:		
	i - rated insulation voltage	690V	Р
	j - rated impulse withstand voltage	8 kV	Р
	I – pollution degree	3	P
	m - rated conditional short-circuit current and type	of co-ordination of contactor or	Р
	starter and type, current rating and characteristics of the associated SCPD:		
	m - rated conditional short-circuit current of the	1 kA	Р
	combination starter or the protected starter	Type '1' 63A/25A fuse gL/gG	
	n – switching overvoltages	≤ 8 kV	Р
	Control circuits: Contactor		
	The following information concerning control circuits shall be placed either on the		
	coil or on the equipment:		

EN 60 947-4-1			
Clause	Requirement - Test	Result - Remark	Verdict
	o - rated control circuit voltage (Uc), nature of	6-550V 50Hz / 6-600V 60Hz	₽
	current and rated frequency	12-250V =	
	p - if necessary, nature of current, rated	Us = Uc	Р
	frequency and rated control supply voltages (Us)		
	Auxiliary circuits: Contactor		
	r - ratings of auxiliary circuits	AC15 12A, 240V	Р
	Overload relays and releases:		
	s - characteristics according to 5.7	P	Р

8.1	CONSTRUCTION: Overload relay		
8.1.1	Materials		P
	Resistance to abnormal heat and fire		Р
	-parts retain current-carrying parts: 850 / 960°C	Housing (black)	Р
	- other: 650°C	Cover (blue)	Р
8.1.2	Current-carrying parts and their connection		Р
8.1.3	Clearances		P
	Uimp is given as:	8kV	Р
	- max. value of rated operational voltage to earth :		
		600V	
	- nominal voltage of supply system:	400 / 690V	
	- overvoltage category:		
	- pollution degree:	3	
	- field-in or homogeneous:	Inhomogeneous	
	- minimum clearances (mm):	8	
	- measured clearances (mm):	≥10	
	Uimp is not given:	N	
	~ rated insulation voltage Ui (V)		
	- le:		Maria Maria
	- minimum clearances L-L/L-A (mm):		
	- measured clearances L-L/L-A (mm):		
	Creepage distances		

	EN 60 947-4-1		
Clause	Requirement – Test	Result - Remark	Verdict
<u></u>	Uimp is given as:	8 kV	
	- material group or CTI:	Min. III b	
	- minimum creepage distances (mm)	10	
	- measured creepage distances (mm):	≥ 12,5	<i>**</i> *=***
	Uimp is not given:		N
	- material column a or b:		
	- minimum creepage distances (mm):		
	- measured creepage distances (mm)		
8.1.4	Actuator		N
8.1.4.1	Insulation		N
8.1.4.2	Direction		N
8.1.4.3	Mounting		N
8.1.5	Indication of contact position		N
8.1.5.1	Indication means		N
8.1.5.2	Indication by the actuator		N
8.1.6	Additional safety requirements for equipment with		N
	isolating function		
8.1.7	Terminals		Р
8.1.7.1	All parts of terminals which maintain contact and	(see 8.2.4 below)	P
	carry current shall be of metal having adequate		ļ
	mechanical strength		
	Terminal connections shall be such that	(see 8.2.4 below)	P
	necessary contact pressure is maintained		
	Terminals shall be so constructed that the	(see 8.2.4 below)	P
	conductor is clamped between suitable surfaces		
	without damage to the conductor and terminal		
	Terminal shall not allow the conductor to be	(see 8.2.4 below)	P
	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		
8.2.4	Mechanical properties of terminals:	Overload	Р

	EN 60 947-4-1		
Clause	Requirement – Test	Result - Remark	Verdict
	I		
8.2.4.2	Mechanical strength of terminals	1	Р
	maximum cross-sectional area of conductor (mm²)	6	
	diameter of thread (mm)		
	torque (Nm)		
	5 times on 2 separate clamping units		Р
8.2.4.3	Testing for damage to and accidental loosening of	f conductor (flexion test)	Р
	conductor of the smallest cross-sectional area (mm²)	0,5	
	number of conductor of the smallest cross section	1	
	diameter of bushing hole (mm)	1	
	height between the equipment and the platen	260	
	mass at the conductor(s) (kg)		
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		P
8.2.4.4	Pull-out test	•	Р
	force (N)	30	
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		Р
	Flexion test		Р
	conductor of the largest cross-sectional area (mm²)	6	
	number of conductor of the largest cross- sectional	1	
	diameter of bushing hole (mm)	ľ	200
	height between the equipment and the platen (mm)	279	
	mass at the conductor(s) (kg)	1,4	19 to 18 to

	EN 60 947-4-1			
Clause	Requirement – Test	Result - Rem	nark	Verdict
			•	
	135 continuous revolutions: the conductor shall			Р
ļ	neither slip out of the terminal nor break near the			
	clamping unit			
	Pull-out test			Р
	force (N)	80		erania area desa Era
	1 min, the conductor shall neither slip out of the			Р
	terminal nor break near the clamping unit			
	Flexion test	Overloa	ad	P
	conductor of the largest and smallest cross-	2,5 // 0,5	6 // 1,5	
	sectional area (mm²):			
	number of conductor of the smallest cross	1 // 1	1 // 1	
	sectional, number of conductor of the largest			
	cross sectional			
	diameter of bushing hole (mm)	9,5 // 6,4	9,5 // 6,4	
	height between the equipment and the platen	279 // 260	279 // 260	
	(mm):			2.75
	mass at the conductor(s) (kg)	0,7 // 0,3	1,4 // 0,4	7.4
	135 continuous revolutions: the conductor shall			P
	neither slip out of the terminal nor break near the			
	damping unit			
	Pull-out test			Р
	force (N)	50 // 30	80 // 30	
	1 min, the conductor shall neither slip out of the			P
	terminal nor break near the clamping unit			
8.1.7.2	Connecting capacity			Р
	type of conductors:	Rigid	Flexible	
	minimum cross-sectional area of conductor	0,75	0,5	
	(mm²):			
	maximum cross-sectional area of conductor	6	4	
	(mm²):			
	number of conductors simultaneously	Acc. Manuf.	Instr.	
	connectable to the terminal:	2	2	1.25

	EN 60 94	17-4-1	
Clause	Requirement - Test	Result - Remark	Verdict
024	Machanian proportion of torminate.	011	

8.2.4	Mechanical properties of terminals:	Contactor		
8.2.4.2	Mechanical strength of terminals			
	maximum cross-sectional area of conductor (mm²)	4	i pulti	
	diameter of thread (mm):	M 3,5		
	torque (Nm)	0,8	2	
	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 (mm²)	0,75		
	number of conductor of the smallest cross section	2		
	diameter of bushing hole (mm)	6,4		
	height between the equipment and the platen (mm):	260		
	mass at the conductor(s) (kg)	0,4		
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		Р	
8.2.4.4	Pull-out test			
	force (N)	30		
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		Р	
	Flexion test			
	conductor of the largest cross-sectional area (mm²)	4		
	number of conductor of the largest cross- sectional	2		
	diameter of bushing hole (mm)	9,5	San San San San San San San San San San	
	height between the equipment and the platen (mm)	279		
	mass at the conductor(s) (kg):	0,9		

EN 60 947-4-1				
Clause	Requirement – Test	Result - Remark		Verdict
.		1		1
	135 continuous revolutions: the conductor shall			P
	neither slip out of the terminal nor break near the			
•	clamping unit			
	Pull-out test			
	force (N)	60		
	1 min, the conductor shall neither slip out of the			P
	terminal nor break near the clamping unit			
	Flexion test	Contactor		
	conductor of the largest and smallest cross-	4 // 2,5	1,5 // 0,5	4-1-1-27
	sectional area (mm²):	1	-	100
	number of conductor of the smallest cross	1 // 1	1 // 1	
	sectional, number of conductor of the largest	:		merk and the second
	cross sectional			
	diameter of bushing hole (mm)		6,4	
	height between the equipment and the platen	279	260	
	(mm)			3.48 000
	mass at the conductor(s) (kg)		0,4	S. Carlotte
	135 continuous revolutions: the conductor shall			Р
	neither slip out of the terminal nor break near the			
	clamping unit			1
	Pull-out test			
	force (N)	60 // 50	40 // 30	
	1 min, the conductor shall neither slip out of the		10 // 00	Р
	terminal nor break near the clamping unit			,
8.1.7.2	Connecting capacity			Р
	type of conductors	Rigid	Flexible	
	minimum cross-sectional area of conductor	0,75	0,75	
	(mm²):		0,10	gall.
	maximum cross-sectional area of conductor	4	2,5	
	(mm²)		-,0	
	number of conductors simultaneously	Acc. Manuf. Instr.		Called the seal of the
	connectable to the terminal:	2	2	Maria de la compansión de la compansión de la compansión de la compansión de la compansión de la compansión de

	EN 60 947-4-1		
Clause	Requirement – Test	Result - Remark	Verdict
8.1.7.3	Connection		P
	terminals for connection to external conductors shall be readily accessible during installation		Р
	clamping screws and nuts shall not serve to fix any other component		Р
8.1.7.4	Terminal identification and marking		P
	terminal intended exclusively for the neutral conductor		N
	protective earth terminal		N
	other terminals		Р
	- Main circuit::	2T1, 4T2, 6T3	
	- Auxiliary circuit	95-96, 97-98, 13-14, 21-22,	
		A1, A2	:
8.1.8	Additional requirements for equipment provided wi	th a neutral pole	N
	marking of neutral pole		N
	The switched neutral pole shall not break before		N
	and shall not make after the other poles		
	Conventional thermal current of neutral pole		N
8.1.9	Provisions for protective earthing		N
8.1.9.1	The exposed conductive parts shall be electrically interconnected and connected to a protective earth terminal		N
8.1.9.2	The protective earth terminal shall be readily accessible		N
	The protective earth terminal shall be suitably protected against corrosion		N
	The electrical continuity between the exposed conductive parts of the protective earth terminal and the metal sheathing of connecting conductors		N
	The protective earth terminal shall have no other functions		N

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Clause	Requirement – Test	Result - Remark	Verdict
	1_		<u> </u>
8.1.9.3	Protective earth terminal marking and		N
	identification		
3.1.10	Enclosure for equipment		N N
3.1.10.1	Design	1	N
	The enclosure, when it is opened: all parts		N
	requiring access for installation and maintenance		
	are readily accessible		
	Sufficient space shall be provided inside the		N
	enclosure		
	The fixed parts of a metal enclosure shall be		N
	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		
	Under no circumstances shall a removable metal		N
	part of the enclosure be insulated from the part		
	carrying the earth terminal when the removable		
	part is in place		
	The removable parts of the enclosure shall be		N
	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		
	When an enclosure is so designed as to allow the		N
	covers to be opened without the use of tools,		
	means shall be provided to prevent loss of the		
	fastening devices		
3.1.10.2	Insulation		N

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Clause	Requirement – Test	Result - Remark	Verdict
	If, in order to prevent accidental contact between a metallic enclosure and live parts, the enclosure is partly or completely lined with insulating		N
	material, then this lining shall be securely fixed to the enclosure		
8.1.11	Degree of protection of enclosed equipment		N
	Degree of protection	IP	N
	Test for first characteristic		N
	Test for first numeral:	1:	
		2:	
		3:	
		4:	1279 TOP
		5:	
		6:	
	Test for second characteristic		N
	Test for second numeral	1:	an e
		2:	
		3:	
		4:	
		5:	
		6:	
		7:	
		8:	

9.3.1.a	TEST SEQUENCE I	
9.3.3.3	Temperature rise Type AC and DC - KG	Р
	ambient temperature 10-40 °C 25	32.
	Contactor	N
	test enclosure W x H x D (mm x mm x mm):	
	material of enclosure:	
	Main circuits, test conditions:	N

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Clause	Requirement – Test	Result - Remark	Verdict
		T	E985500 - 10
	- conventional thermal current Ith (A)		
	- conventional enclosed thermal current Ithe (A) .:		
	- cable/busbar cross-section (mm²) / (mm)		
	- temperature rise of main circuit terminals (K):	<	
	Auxiliary circuit, test conditions:		Р
	- rated operation current le (A)	16	200 Sept.
_	- cable cross-section (mm²)	2,5	
	- temperature rise of auxiliary circuit terminals	≤ 43	
	(K)		
	Coils and electromagnets, test conditions:	AC DC Type KG	P
	- rated control supply voltage Us (V)	240 220	
	- Class of insulating material	F F	
	- temperature rise of coil and electromagnets (K) :	≤ 76 ≤ 66	
	Starter Tested w	ith setting range 10 – 14 A	
	test enclosure W x H x D (mm x mm x mm):	175 x 115 x 115	
	material of enclosure:	Metai	
	Main circuits, test conditions: *Tested with 14A be	cause of max. Power	Р
	consumption of Overload Relay		
	- conventional thermal current lth (A):	14 (25*)	
	- cable/busbar cross-section (mm²) / (mm):	2,5 mm²	
	- temperature rise of main circuit terminals (K):	≤ 62	
	Overload relay, auxiliary circuit, test conditions:		Р
	- rated operation current le (A)	4	
	- cable cross-section (mm²)	1	600
	- temperature rise of auxiliary circuit terminals	≤ 40	
	(K)		
9.3.3.2	Operating limits		
9.3.3.2.1	Power-operated equipment:	AC DC Type KG	Р
	rated control supply voltage Us (V)	240 220	25.55 Sec. 35.55
	frequency (Hz)	50 DC	San San San San San San San San San San

	EN 60 947-4-1	1	1
Clause	Requirement – Test	Result - Remark	Verdict
	limits of close satisfactorily at any value between	80 81	P
	85% and 110% of rated control supply voltage		
	Us		
	limits of drop out and open fully are: 75% to 20%	47 23	Р
	for a.c. and 75% to 10% for d.c.		
9.3.3.3	Temperature rise T	ype DC	P
	ambient temperature 10-40 °C	25	
	Contactor		N
	test enclosure W x H x D (mm x mm x mm):		And the second s
	material of enclosure		a and a
	Main circuits, test conditions:		N
	- conventional thermal current lth (A)		
	- conventional enclosed thermal current Ithe (A) .:		The control of the
•	- cable/busbar cross-section (mm²) / (mm):		(2000) 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	- temperature rise of main circuit terminals (K):		A 1804 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	Auxiliary circuit, test conditions:		P
	- rated operation current le (A)	16	
	- cable cross-section (mm²)		
	- temperature rise of auxiliary circuit terminals	≤ 43	
	(K)		
3 - B1885	Coils and electromagnets, test conditions:	DC	P
	- rated control supply voltage Us (V)		
	- Class of insulating material	1	
	- temperature rise of coil and electromagnets (K) :	≤ 40 ≤ 64	
	Starter Tested w	ith setting range 10 – 14 A	
	test enclosure W x H x D (mm x mm x mm):	175 x 115 x 115	*
	material of enclosure		1933 Marie Marie Marie (1941)
	Main circuits, test conditions: *Tested with 14A be	cause of max. Power	Р
	consumption of Overload Relay		
	- conventional thermal current Ith (A):	14 (25*)	i dingi s
	- cable/busbar cross-section (mm²) / (mm):		

	EN 60 947-4-1			
Clause	Requirement – Test	Result - Remark	<	Verdict
	- temperature rise of main circuit terminals (K):	≤ 62		
	Overload relay, auxiliary circuit, test conditions:	1		ρ
	- rated operation current le (A)	4		
	- cable cross-section (mm²)	1		
	- temperature rise of auxiliary circuit terminals (K)	≤ 40		
9.3.3.2	Operating limits			
9.3.3.2.1	Power-operated equipment:	DC		Р
	rated control supply voltage Us (V):	220	24	
	frequency (Hz)	DC	DC	
	limits of close satisfactorily at any value between	69	70	Р
	85% and 110% of rated control supply voltage			
	Us:			
	limits of drop out and open fully are: 75% to 20%	31	38	Р
	for a.c. and 75% to 10% for d.c			
9.3.3.2.2	Relays and releases Setting Ra	ange 10 – 14 A		Р
	Conditions for thermal and time-delay magnetic overload relays only:			р
	type of time-delay overload relay:	Thermal, Temp.	compensated	
	trip class	10A		
	current setting	T	14 A	
	ambient temperature (°C)			
	test enclosure W x H x D (mm x mm x mm):	175 x 115 x 115	5	210
	cable/busbar cross-section (mm²) / (mm):	2,5		
	at A (1,05) times of current setting, tripping shall	10,5 A	14,7 A	
	not occur in less than 2 h starting from the cold			
	state; test current:	No tripping	No tripping	
	When the current is subsequently raised to B	12 A	16,8 A	
	(1,2) times the current setting, tripping shall occur			
	in less than 2 h; test current min:sec :	İ	0:43	

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Clause	Requirement – Test	Result - Rem	ark	Verdict	
	for class 10A overload relays energized at C (1,5) times the current, tripping shall occur in less than	15 A	21 A		
	2 min, starting from thermal equilibrium at the				
	for class 10, 20 or 20 availand relays energized	0:22 N	0:08		
	for class 10, 20 or 30 overload relays energized at C times the current, tripping shall occur in less than 2, 8 or 12 min, starting from thermal	N			
	equilibrium at the current setting; class; test current; tripping time				
	at D (7,2) times the current setting, tripping shall occur within the tripping time (s) 2 < Tp ≤ 10, starting from the cold state; test current; tripping	72 A	100,8 A		
	time Tp (s)	2,1	2,5		
	Ambient temperature: - 5 °C				
	at A (1,05) times of current setting, tripping shall not occur in less than 2 h starting from the cold	10,5 A	14,7 A		
	state; test current	No tripping	No tripping		
	When the current is subsequently raised to B (1,2) times the current setting, tripping shall occur	12 A	16,8 A		
	in less than 2 h; test current min:sec :	22:10	1:45		
	for class 10A overlod relays energized at C (1,5) times the current, tripping shall occur in less than 2 min, starting from thermal equilibrium at the	15 A	21 A		
	current setting; test currentmin:sec :	0:36	0:12		
	for class 10, 20 or 30 overload relays energized	N			
	at C times the current, tripping shall occur in less				
	than 2, 8 or 12 min, starting from thermal				
	equilibrium at the current setting; class; test				
	current; tripping time	l		And the State of the State of the State of	

EN 60 947-4-1				
Clause	Requirement – Test	Result - Rem	ark	Verdict
	at D (7,2) times the current setting, tripping shall occur within the tripping time (s) 2 < Tp ≤ 10s	72 A	100,8A	
	tarting from the cold state; test current; tripping time Tp (s)	2,1	2,0	
	at A (1,05) times of current setting, tripping shall	10,5 A	14,7 A	200
	not occur in less than 2 h starting from the cold state; test current	No tripping	No tripping	
	When the current is subsequently raised to B (1,2) times the current setting, tripping shall occur	12 A	16,8 A	
	in less than 2 h; test currentmin:sec: for class 10A overload relays energized at C (1,5) times the current, tripping shall occur in less than 2 min, starting from thermal equilibrium at the	0:50 15 A	0:12 21 A	
	current setting; test currentmin:sec :	0:08	0:05	
	for class 10, 20 or 30 overload relays energized at C times the current, tripping shall occur in less than 2, 8 or 12 min, starting from thermal equilibrium at the current setting; class; test current; tripping time	N		
	at D (7,2) times the current setting, tripping shall occur within the tripping time (s) 2 < Tp ≤ 10 starting from the cold state; test current; tripping	72 A	100,8 A	
	time Tp (s) Limits of operation of three-pole thermal overload	2 relavs energize	2,2 ed on two poles:	P
	ambient temperature (°C)			
	the relay energized on three poles, at A (1 / 0,9) times the current setting, tripping shall not occur in less than 2 h, starting from the cold state:	10 A / 9 A	14 A / 12,6 A	
		No tripping	No tripping	Sandan

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Clause	Requirement – Test	Result - Remark	Verdict		
	when the value of the current flowing in two poles is increased to B (1,15) times the current setting and the third pole deenergized, tripping shall occur in less than 2 h min:sec:				
9.3.3.4	Test of dielectric properties, impulse withstand vol		P		
	- verification by measurement of clearances instead of testing		N		
	- rated impulse withstand voltage (V)	8000			
	- test Uimp main circuits (kV):	9,8 / 7	Р		
	- test Uimp auxiliary circuits (kV):	9,8 / 7	Р		
	Test of dielectric properties, dielectric withstand vo	oltage (Uimp not indicated):	N		
	- rated insulation voltage (V):				
	- main circuits, test voltage for 1 min (V)		N		
	- control and auxiliary circuits, test voltage for 1 min (V)		N		

9.3.3.5	TEST SEQUENCE II		
	Making and breaking capacity		
•	utilization category	AC1	
	rated operational voltage Ue (V)		
	rated operational current le (A) or power (kW):	25A	<u> </u>
	Conditions, make/break operations AC-1 only:		Р
	- test voltage U/Ue = 1,05 (V)	L1: 725	
		L2: 730	
		L3: 730	
	- test current I/Ie = 1,5 (A):	L1: 38	
		L2: 38	
		L3: 38	W.S. salak
	- power factor/time constant:	L1: 0,78	
		L2: 0,78	
		L3: 0,79	

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Clause	Requirement – Test	Result - Remark	Verdict
		T	**************************************
	- on-time (ms)		
 -	- off-time (s)	9,8	
	- number of make/break operations	50	P
	Behaviour and condition during and after the test:		Р
	- no permanent arcing		P
	- no flash-over between poles		Р
	- no blowing of the fusible element in the earth circuit		Р
	- no welding of the contacts		Р
	- the contacts shall operate when the contactor or		Р
	starter is switched by the applicable method of		
	control		
	Operational performance capability:		Р
	utilization category (AC-3 or AC-4)	AC4	Section of the sectio
	rated operational voltage Ue (V)	400V	
	rated operational current le (A) or power (kW):	12A	
	Conditions, make operations AC3/AC4 only:		Р
	- test voltage U/Ue = 1,05 (V)	L1: 426	
		L2: 425	
		L3: 427	
. –	- test current I/Ie = (A)	L1: 192	
		L2: 193	*
	<u> </u>	L3: 192	
	- power factor/time constant	L1: 0,4	
		L2: 0,4	
		L3: 0,4	
7.0	- on-time (ms)	100	
	- off-time (s)	10	The Charles of the Charles of the Charles
	- number of make operations	50	Р
	Characteristic of transient recovery voltage for AC	-3 and AC-4 only:	Р
	oscillatory frequency (kHz)		

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Clause	Requirement – Test	Result - Remark	Verdict
	1	1	
	Measured oscillatory frequency (kHz)	L1: 47,5	
		L2: 48	
		L3: 48	
	Factor y	L1: 1,1	
		L2: 1,1	
		L3: 1,1	
	Behaviour and condition during and after the test:	·	P
	- no permanent arcing	Р	Р
	- no flash-over between poles	Р	Р
	- no blowing of the fusible element in the earth	Р	Р
	circuit		_
	- no welding of the contacts	Р	Р
	- the contacts shall operate when the contactor or	Р	Р
	starter is switched by the applicable method of		
	control		
	Operational performance capability:		
	utilization category	AC4	
	rated operational voltage Ue (V):	400	
	rated operational current le (A) or power (kW):	12A	
	Conditions, make/break operations AC3 / AC4 only	y:	Р
	- test voltage U/Ue = 1,05 (V):	L1: 430	
		L2: 429	
		L3: 430	
·	- test current I/Ie = (A):	L1: 99	
	\\	L2: 101	Supp. Av.
		L3: 99	90 A C
	- power factor/time constant	L1: 0,42	
		L2: 0,42	
		L3: 0,42	Constant of the Constant of th
	- on-time (ms)	100	1,00 mm
	- off-time (s)		
	- number of make/break operations:	6000	Р

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Clause	Requirement – Test	Result - Remark	Verdict
	Characteristic of transient recovery voltage for AC	-3 and AC-4 only:	Р
	oscillatory frequency (kHz)		May 1 William and State Control of the Control of t
	Measured oscillatory frequency (kHz)	L1: 37,5	
		L2: 38	
		L3: 38	
	Factor y:	L1: 1,1	
		L2: 1,1	
. 7. 60		L3: 1,1	
	Behaviour and condition during and after the test:		Р
	- no permanent arcing	Р	Р
	- no flash-over between poles	P	P
	- no blowing of the fusible element in the earth	P	Р
	circuit		
	- no welding of the contacts	Р	Р
	- the contacts shall operate when the contactor or	Р	Р
	starter is switched by the applicable method of		
	control		
8.3.3.6	Operational performance capability:	7	
	utilization category:	AC1	
	rated operational voltage (V):		
	rated operational current le (A) or power (kW):		
	Test conditions for make/break operations AC-1 or		Р
	test voltage (V)		
		L2: 730	
		L3: 730	
	test current (A)		×
		L2: 38	
		L3: 38	
	power factor/time constant	L1: 0,78	8
		L2: 0,79	Control of the Contro
		L3: 0,79	
	- on-time (ms)	160	

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Clause	Requirement - Test	Result - Remark	Verdict
	- off-time (s):	2,3	
	- number of operating cycles:	6000	Р
8.3.3.6.6	Behaviour and condition during and after the test:		Р
	- no permanent arcing		Р
	- no flash-over between poles		Р
	- no blowing of the fusible element in the earth		Р
	- no welding of the contacts		Р
	the contacts shall operate when the contactor or starter is switched by the applicable method of control		Р
	Dielectric verification:		Р
	test voltage (2 Ue + 1000 V) for 1 min (V):	2380	10-10-10-10-10-10-10-10-10-10-10-10-10-1

9.3.4	TEST SEQUENCE HI		
	Performance under short-circuit conditions		
9.3.4.2.1	Test at de prospective current "r": U12/16 0	,4 -0,6A	
	Represents setting	ng ranges up to 11A	
	type of SCPD	Siemens Diazed gL / gG	
	ratings of SCPD, co-ordination type 1	25A / 500V	
	ratings of SCPD, co-ordination type 2	-	
	rated operational current le (A) AC-3	12A	
	prospective current "r" (kA)	1	
	test voltage (V)	L1: 424	
		L2: 423	2.144 34.1
		L3: 425	
	r.m.s. test current (A)	L1: 1053	
		L2: 1087	
		L3: 1062	

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Clause	Requirement – Test	Result - Remark	Verdict	
		Γ΄	th committee	
	реак current (A)	L1: 1457	state of the	
		L2: 1457		
		L3: 1378	4	
	power factor	0,95	, . w	
	1. one breaking operation of SCPD with all the	L1: 1750 A2s / 807A		
	switching devices closed prior to the test l2dta	L2: 2180 A2s / 887 A		
	(A2s) /peak current I (A)	L3: 1860 A2s / 903 A		
	2. one breaking operation of SCPD by closing the	L1: 108 A2s / 270 A		
	contactor or starter on to the short-circuit I²dta	L2: 695 A2s / 586 A		
	(A2s) /peak current I (A)	L3: 884 A2s / 601 A	فتناط مستنجان والمرابعة	
	Behaviour of the equipment during the test		P	
	Both types of co-ordination (all devices):		Р	
	A - the fault current has been successfully		Р	
	interrupted by the SCPD or the combination			
	starter and the fuse or fusible element, or solid			
	connection between the enclosure and supply			
	shall not have melted			
	B - the door or cover of the enclosure has not		Р	
	been blown open and it is possible to open the			
	door or cover			
	C - there is no damage to the conductors or		Р	
	terminals and the conductors have not been			
	separated from the terminals			
	D - there is no cracking or breaking of an		P	
	insulating base to the extent that the integrity of			
	mounting of a live part is impaired			
	Both types of co-ordination (combination starters a	nd protected starters only):	N	
	E - the circuit breaker or the switch is capable of	protect cantors orny).	N	
	being opened manually by its operating means			
			N	
	F - neither end of the SCPD is completely		IN .	
	separated from its mounting means to an exposed conductive part			

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Clause	Requirement – Test	Result - Remark	Verdict	
	G - if a circuit breaker with rated ultimate short-circuithe rated conditional short-circuit current assigned to	• , .	N	
	protected starter is employed, the circuit breaker sha			
	1) circuit breaker with instantaneous trip relays or		N	
	releases, at 120% of the trip current			
	2) circuit breaker with overload relays or		N	
	releases, at 250% of the rated current of the			
	circuit breaker			
	Type 1 co-ordination (all devices):	<u>.</u>	Р	
	H - there has been no discharge of parts beyond	P	P	
	the enclosure. The starter may be inoperative			
	after each operation			
	Type 1 co-ordination (combination and protected sta	arters only):	Р	
	I - dielectric verification test voltage (2 Ue) for 1 min (V)	1380		
9.3.4.2.1	Test at de prospective current "r": U12/16 13 -18A			
	Represents setting ranges higher 10A			
	type of SCPD	Siemens Diazed gL / gG	Section 1	
	ratings of SCPD, co-ordination type 1	63A / 500V		
	ratings of SCPD, co-ordination type 2		<u> 1865 - </u>	
	rated operational current le (A) AC-3	12A		
	prospective current "r" (kA)	1	90 % **********************************	
	test voltage (V)	L1: 424	15, 425 15, 245	
		L2: 423		
		L3: 425		
	r.m.s. test current (A)	L1: 1053		
		L2: 1087	N ₁ · ·	
		L3: 1062		
	peak current (A)i	L1: 1457	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	
		L2: 1457		
		L3: 1378		
	power factor (0,95		

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Clause	Requirement – Test	Result - Remark	Verdict
	1. one breaking operation of SCPD with all the	L1: 20,8 kA2s / 1330 A	
	switching devices closed prior to the test l2dta	L2: 19,6 kA2s / 1283 A	Market State
	(A ² s) /peak current I (A)	•	All Control of the Co
	2. one breaking operation of SCPD by closing the		Carlos de la carlo
	contactor or starter on to the short-circuit l²dta	L2: 19,5 kA ² s / 1283 A	
	(A ² s) /peak current I (A)		
		160. 21,4 NA 97 1000 A	Р
	Behaviour of the equipment during the test		P
	Both types of co-ordination (all devices):		
	A - the fault current has been successfully		P
	interrupted by the SCPD or the combination		
	starter and the fuse or fusible element, or solid		
	connection between the enclosure and supply		
	shall not have melted		
	B - the door or cover of the enclosure has not		P
	been blown open and it is possible to open the		
	door or cover		
	C - there is no damage to the conductors or		Р
	terminals and the conductors have not been		
	separated from the terminals		
	D - there is no cracking or breaking of an		Р
	insulating base to the extent that the integrity of		
	mounting of a live part is impaired		
	Both types of co-ordination (combination starters a	ind protected starters only):	N
	E - the circuit breaker or the switch is capable of		N
	being opened manually by its operating means		
	F - neither end of the SCPD is completely		N
	separated from its mounting means to an		
	exposed conductive part		-
	G - if a circuit breaker with rated ultimate short-circ	cuit breaking capacity less than	N
	the rated conditional short-circuit current assigned	to the combination or	
	protected starter is employed, the circuit breaker s	hall be tested to trip:	

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Clause	Requirement – Test	Result - Remark	Verdict
	1) circuit breaker with instantaneous trip relays or		N
	releases, at 120% of the trip current		
	2) circuit breaker with overload relays or		N
	releases, at 250% of the rated current of the		
	circuit breaker		
	Type 1 co-ordination (all devices):		Р
	H - there has been no discharge of parts beyond	Р	Р
	the enclosure. The starter may be inoperative		
	after each operation		
	Type 1 co-ordination (combination and protected s	tarters only):	Р
	I - dielectric verification test voltage (2 Ue) for	1380	4-1-1-1
	1 min (V)		a comment of the comm
	Type 2 co-ordination (all devices):		N
	J - no damage to the overload relay or other parts		N
	has occurred, except that welding of contactor or		
	starter contacts is permitted, if they are easily		
	separated without significant deformation		
	K - the tripping of the overload relay shall be		N
	conform to the published tripping characteristics,		
	before and after the test		1304 Sect - 12 - 13
	L - dielectric verification test voltage (2 Ue) for		an.
	1 min (V)		
9.3.4.2.2	Test at the rated conditional short-circuit current "le	q" ≤ SCC "r"	N
	type of SCPD		Section 1
	ratings of SCPD, co-ordination type 1		100 May 1 mg 1420 May 1 mg 1420 May 1 mg
	ratings of SCPD, co-ordination type 2		
	rated operational current le (A) AC-3		
	prospective current "Iq" (kA):		
	test voltage (V):		V 2 30 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
		L2:	
		L3:	

01	EN 60 947-4-1		
Clause	Requirement – Test	Result - Remark	Verdict
			of the second
	r.m.s. test current (A)		
		L2:	444
		L3:	William Parker and State of the Control of the Cont
	peak current (A)		
		L2:	
		L3:	
	power factor		englerate de la compa
	one breaking operation of SCPD with all the	L1:	
	switching devices closed prior to the test I²dta	L2:	
	(A ² s)	L3:	
	2. one breaking operation of SCPD by closing the	L1:	and the second
	contactor or starter on to the short-circuit:	L2:	
		L3:	
	3. one breaking operation of SCPD by closing the	L1:	
	switching device on to the short-circuit:	L2:	
		L3:	angely, and a special control of
	Behaviour of the equipment during the test		N
	Both types of co-ordination (all devices):		N
	A - the fault current has been successfully		N
	interrupted by the SCPD or the combination		
	starter and the fuse or fusible element, or solid		
	connection between the enclosure and supply		
	shall not have melted		
	B - the door or cover of the enclosure has not		N
	been blown open and it is possible to open the		
	door or cover		
	C - there is no damage to the conductors or		N
	terminals and the conductors have not been		
	separated from the terminals		
	D - there is no cracking or breaking of an		N
	insulating base to the extent that the integrity of		
	mounting of a live part is impaired		

	EN 60 947-4-1	
Clause	Requirement – Test Result - Remai	rk Verdict
	Both types of co-ordination (combination starters and protected sta	arters only): N
	E - the circuit breaker or the switch is capable of	N
	being opened manually by its operating means	
	F - neither end of the SCPD is completely	N
	separated from its mounting means to an	
	exposed conductive part	
	G - if a circuit breaker with rated ultimate short-circuit breaking cap	pacity less than N
	the rated conditional short-circuit current assigned to the combinat	tion or
	protected starter is employed, the circuit breaker shall be tested to	trip:
	1) circuit breaker with instantaneous trip relays or	N
	releases, at 120% of the trip current	
	2) circuit breaker with overload relays or	N
	releases, at 250% of the rated current of the	
	circuit breaker	
	Type 1 co-ordination (all devices):	N
	H - there has been no discharge of parts beyond	N
	the enclosure. The starter may be inoperative	
	after each operation	
	Type 1 co-ordination (combination and protected starters only):	N
	I - dielectric verification test voltage (2 Ue) for	
	1 min (V)	and the same of th
	Type 2 co-ordination (all devices):	N
	J - no damage to the overload relay or other parts	N
	has occurred, except that welding of contactor or	
	starter contacts is permitted, if they are easily	
	separated without significant deformation	
	K - the tripping of the overload relay shall be	N
	conform to the published tripping characteristics,	
	before and after the test	
	L - dielectric verification test voltage (2 Ue) for	2 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	1 min (V)	

		EN 60 947-4-1		
Clause	Requirement – Test		Result - Remark	Verdict

9.3.5	TEST SEQUENCE IV: (APPLICABLE FOR CONTACTORS ONLY) Overload current withstand capability of contactors:		Р
	ambient temperature (°C)	25	
	rated operational current le (A) max. AC-3	12	
	test current (le) (A):	96	
	duration of test: 10 s:	10s	
	After the test, the contactor shall be substantially	Р	Р
	in the same condition as before the test (visual		
	inspection)		

	temperature rise m	easurements			Р
and the same of th					
<u> </u>				200402	A STATE OF THE STA
Main Terminals Contactor (14A)		1	51	65	
			3	57	65
			5	57	65
Main Terminal Overload Relay (14A)			2	53	65
			4	62	65
			6	57	65
Auxilixary Terminals Contactor (16A)			13	43	65
		·	14	42	65
Auxiliary Terminal O	verload Relay (4A)		95	44	65
			96	40	65
Coil:	240V	50Hz		76	135
	24V + 10%	DC		64	135
···	220V + 10%	DC		40	135
Type: KG	220V	DC		66	135

	EN 60 947-4-1		
Clause	Requirement – Test	Result - Remark	Verdict
	EN 60 947-5-1		
8.3.3.5.3	Making and breaking capacities of switching elem conditions:	Р	
	utilization category	AC15	
	rated operational voltage Ue (V)		. XX
	rated operational current le (A) or power (kW)	: 12	
	Conditions, make/break operations:	•	
	- test voltage U/Ue = 1,1 (V)	: L1: 266	
		L2: -	
		L3: -	
	- power factor/time constant	L1: 0,31	
		L2: -	
		L3: -	
	- make operations: test current I/le (A)	L1: 123	
		L2: -	5 14 15 15 15 15 15 15 15 15 15 15 15 15 15
		L3: -	
	- break operations: test current I/Ie (A)	L1: 123	
		L2: -	Mac.
		L3: -	
	- on-time (ms)	300	
	- operating cycles per minute	6	
	- number of operating cycles	10	P
	Behaviour and condition during and after the test:	P	
	- no electrical or mechanical failures		Р
	- no contact welding or prolonged arcing		Р
	- no blowing of the fusible element in the earth		Р
	Circuit Piclostic verification		
<u> </u>	Dielectric verification:	0000	P P
	dielectric test voltage (V)	2000	P

EN 60 947-4-1				
Clause	Requirement - Test		Result - Remark	Verdict

	EN 60 947-5-1		
8.3.3.5	TEST SEQUENCE III		
8.3.3.5.2	Making and breaking capacities of switching elements under normal conditions		
	utilization category:	AC15	
	rated operational voltage Ue (V)	240	
	rated operational current le (A) or power (kW):	12	and the second second second second
	Conditions, make/break operations:		Р
	- test voltage U/Ue = 1,1 (V)	L1: 266* / 242 **	ار در این این این این این این این این این این
	* 50 operation at 266V	L2:	A Section of
	** 6000 operations at 242V:	L3:	
	- power factor/time constant:	L1: 0,31	
		L2: -	
		L3: -	
	- make operations: test current I/le (A):	L1: 123	
		L2: -	
		L3:	
	- break operations: test current I/Ie (A)	L1: 13	Acquire .
		L2: -	
		L3:	Signature State Control of State Control
	- on-time (ms) *50 oper. / **6000 oper	160 * / 300**	Andrews and
	- operating cycles per minute:	15	
	- number of operating cycles:	6050	P
	Behaviour and condition during and after the test:	<u> </u>	Р
	- no electrical or mechanical failures		P
	- no contact welding or prolonged arcing		Р
	- no blowing of the fusible element in the earth		P
	circuit		
	Dielectric verification:		Р
	dielectric test voltage (V)	2000	Р
	utilization category		till talk av der av same same
	rated operational voltage Ue (V)		4 4 4 5 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

EN 60 947-4-1				
Clause	Requirement – Test		Result - Remark	Verdict

	EN 60 947-5-1		
8.3.4	TEST SEQUENCE IV		
	Performance under conditional short-circuit current		Р
	type of SCPD	Siemens Diazed gL / gG	ر با در المنظم المادي المنظم المادي المنظم المادي المنظم المادي المنظم المنظم المنظم المنظم المنظم المنظم الم
	ratings of SCPD	25A / 500V	i de la composición del composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la compos
	prospective current (kA)	1	er de l'assesse de l'elle d'access
	test voltage (V) U/Ue = 1,1 (V)	L1: 277	
		L2: 275	
		L3: 276	The second second
	r.m.s. test current (A):	L1: 1010	
		L2: 1050	
		L3: 1020	and a comment of the
	power factor (max. 0,7)	0,7	
	first making operation to closed switching	L1: 1650 A2s / 770A	
	elements: test I²dta (A²s) / I _D (A):	L2: 2880 A2s / 830 A	
		L3: 2850 A2s / 1090 A	
	time interval between test (min. 3 min):		
	second making operation to closed switching	L1: 1430 A2s / 700 A	
	elements: test I²dta (A²s) / I _D (A):	L2: 2900 A2s / 830 A	
		L3: 2860 A2s / 1080 A	
	time interval between test (min. 3 min):		W. Aka
	third making operation to closed switching	L1: 2910 A2s / 1030 A	de la companya de la
	elements: test I²dta (A²s) / I _D (A):	L2: 2540 A2s / 975 A	Sangager . Sangaran . Sangaran . Sangaran . Sangaran . Sangaran .
		L3: 830 A2s / 545 A	<u> </u>
	Behaviour of the equipment during the test:		P
	switching elements open by the normal actuating		Р
	system		
	Dielectric verification:		P
	dielectric test voltage (V)	2000	Р



Frette

TEST REPORT EN 60 947-4-1

Low-voltage switchgear and controlgear

Part 4: Contactors and motor-starters

Section 1: Electromechanical contactors and motor-starters

Report reference No.

2.03.00356.1.0-K216/B&J

Tested by (+ signature).....: Ing.J.Ainetter Approved by (+ signature): Ing.K.Farthofer

Date of issue: 02.02.2004

Testing laboratory: Österreichische Forschungs- und Prüfzentrum Arsenal

Ges.m.b.H

Address...... : A – 1031 Vienna, Faradaygasse 3

Testing location....: as above

Applicant: Benedict GmbH (Ω Benedikt & Jäger)

Address...... : A – 1220 Vienna, Lieblgasse 7

Standard: EN 60 947-4-1:2000-11

Test Report Form No.: 69474-1A

Master TRF.....: reference No. 69474-1A, dated 95-07

Copyright blank test report: the bodies participating in the Committee of Certification

Bodies (CCB) and/or the CENELEC Certification

Agreement (CCA).

Test procedure: CB-scheme

Procedure deviation N.A. Non-standard test method: N.A.

Type of test object: Motor-Starter

Trademark: Ω, Benedikt & Jäger

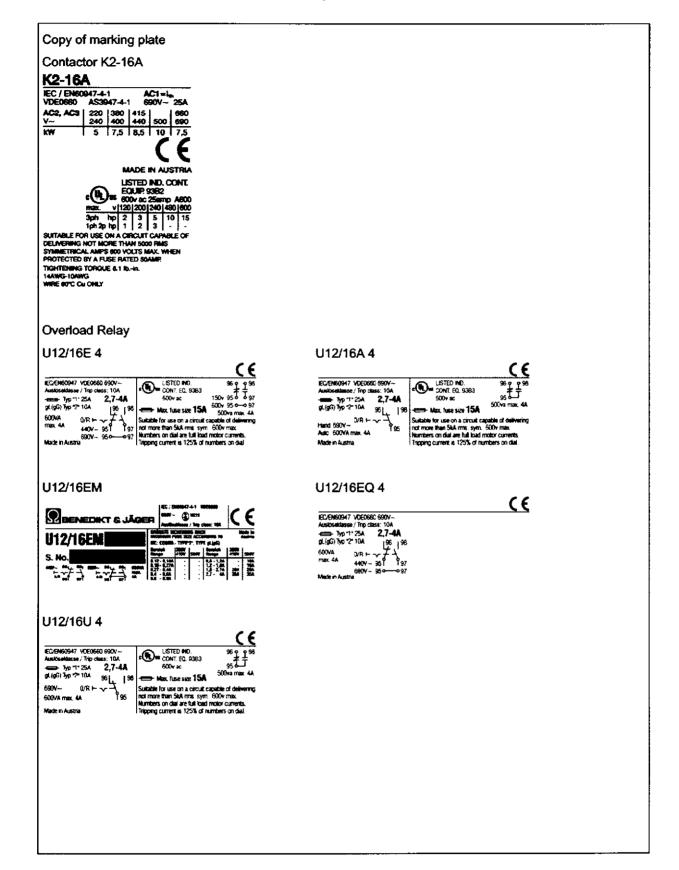
Model/type reference: Kx2-16Axx + U12/16xxx

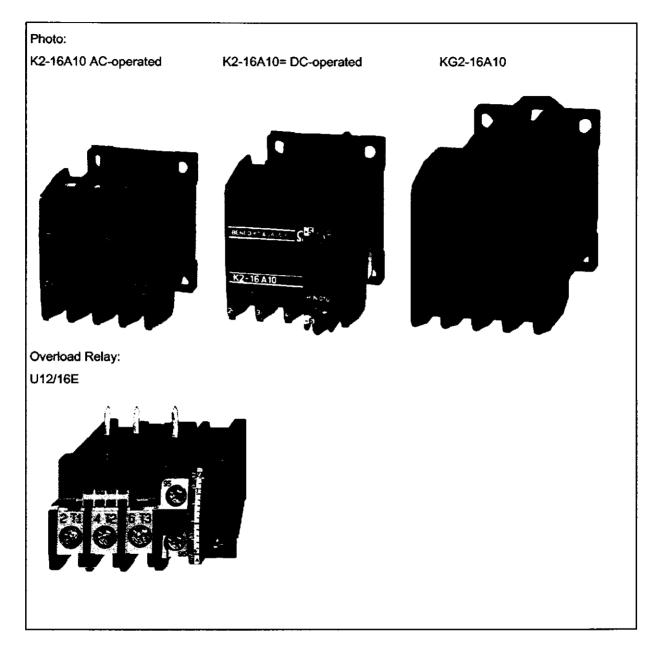
Manufacturer.....: Ω Benedikt & Jäger

Rating: AC1 25A 690V 50-60Hz

> AC3/AC4 16A 400V 50-60Hz

> AC15 12A 240V 50-60Hz





Test item particulars:	
- method of operation:	Magnetic
- switching positions:	ON-OFF
- number of polesContactor:	3 Main 1 Aux
- kind of current:	AC
- number of phases:	3
- rated frequency (Hz):	50-60
- number of positions of main contacts:	2
Rated and limiting values, main circuit:	
- rated operational voltage Ue (V):	690
- rated insulation voltage Ui (V):	690
- rated impulse withstand voltage Uimp (kV):	8
- conventional free air thermal current lth (A):	25
- conventional enclosed thermal current Ithe (A):	25
- rated operational current le (A):	25
- rated uninterrupted lu (A):	25
- utilization category:	AC1, AC3, AC4
Short-circuit characteristic:	
- rated prospective short-circuit current "r" (kA):	1
- rated conditional short-circuit current lq (kA):	1
Rated and limiting values, auxiliary circuits:	For Contactor
- rated operational voltage (V):	240
- rated frequency (Hz):	50-60
- number of circuits:	1
- number and kind of contact elements:	1 NO or 1 NC
Co-ordination of short-circuit protective devices:	Type "1"
- kind of protective device:	Fuse: 25A up to 11A AC3/AC4
	63A higher than 10A AC3/AC4
Possible test case verdicts:	
- test case does not apply to the test object:	N(.A.)
- test object does meet the requirement:	P(ass)
- test object does not meet the requirement:	F(ail)

General remarks:

"(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.

The test results presented in this report relate only to the object tested.

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

- 1) Based on the decision of the applicant, some of the tests of Test Sequences I and II may have been performed under more severe conditions than required in the stanard. In case of, relevant values for equipment under test are stated in test report.
- 2) Relevant tests have been performed with or without 'snap on auxiliary contact block' Typ 'HN' or 'HA'.
- 3) The test item is corresponding to the requirements of IEC 60947-4-1 Ed. 2.0 (2000-11) + A1 (2002-09).

```
Ordering key:
Contactor
Kx2-16A x x
        | |>>>
                      : 0, 1 : Number of NC auxiliary contacts
                      : 0, 1 : Number of NO auxiliary contacts
        | >>>>
 |>>>>
                      : G : DC coil supply (optional)
Overload Relay
U12/16 x x x
       |||>>>>
                    : Setting range 0.12 - 0.18 / 0.18 - 0.27 / 0.27 - 0.4 / 0.4 - 0.6 /
       1.1
                              0.6 - 0.9 / 0.8 - 1.2 / 1.2 - 1.8 / 1.8 - 2.7 /
       1.1
                              2,7-4 / 4-6 / 6-9 / 8-11 / 10-14 / 13-18 A
       1.1
       | | >>>>
                      : M ... With additional quick trip up to 4A (optional)
                      : Q ... Thermic quick trip up to 14A (optional)
       L>>>>
                       : U ... Change over auxiliary contacts
                       : A ... Change over auxiliary contacts with autom. Reset
                       : E ... 1 NC and 1 NO auxiliary contact
Control Circiut Voltage:
6 - 550V
               50Hz
6 - 600V
               60Hz
12 - 250V
               DC *
       12V up to 24V: Double Winding Coil with Late Break Contact in series to coil.
       25V up to 250V: Dropping Resistor with Late Break Contact in series to coil.
       KG - type: Without Late Break Contact
```

EN 60 947-4-1				
Clause	Requirement – Test	Result - Remark	Verdict	
6.2	MARKING:			
0.2				
	Data shall be preferably marked on the equipment		P	
	c - number of this standard (IEC/EN60947-4-1)	IEC947-4-1	Р	
	k - IP code, in case of an enclosed equipment	-	N	
	Data shall be included on the nameplate, or on the manufacturer's published literature:	e equipment, or in the		
	d - rated operational voltages	690V	Р	
	e – utilization category and rated operational	AC1 25A, 690V	Р	
	currents (or rated powers), at the rated	AC3		
	operational voltages of the equipment	AC4 16A, 400V		
		Contactor AC15 12A, 240V		
	f - either the value of the rated frequency/ies, or	50-60Hz	Р	
	the indication d.c. (or symbol)			
	g - rated duty with the indication of the class of		N	
	intermittent duty, if any			
	Associated values:			
	h - rated marking and breaking capacities (these	AC1, AC3, AC4, AC15	Р	
	indications may be replaced, where applicable,			
	by the indication of the utilization category)			
	Safety an installation:			
	i - rated insulation voltage	690V	Р	
	j - rated impulse withstand voltage	8 kV	Р	
	I – pollution degree	3	Р	
	m - rated conditional short-circuit current and type	of co-ordination of contactor or	Р	
	starter and type, current rating and characteristics	of the associated SCPD:		
	m - rated conditional short-circuit current of the	1 kA	P	
	combination starter or the protected starter	Type '1' 63A/25A fuse gL/gG		
	n – switching overvoltages	≤ 8 kV	Р	
	Control circuits: Contactor			
	The following information concerning control circu	its shall be placed either on the		
	coil or on the equipment:			

	EN 60 947-4-1				
Clause	Requirement – Test	Result - Remark	Verdict		
		,			
	o - rated control circuit voltage (Uc), nature of	6-550V 50Hz / 6-600V 60Hz	Р		
	current and rated frequency	12-250V =	,		
	p - if necessary, nature of current, rated	Us = Uc	P		
	frequency and rated control supply voltages (Us)				
	Auxiliary circuits: Contactor				
	r - ratings of auxiliary circuits	AC15 12A, 240V	Р		
	Overload relays and releases:				
	s - characteristics according to 5.7	P	Р		

8.1	CONSTRUCTION: Overload relay	_	
8.1.1	Materials		Р
	Resistance to abnormal heat and fire		P
	-parts retain current-carrying parts: 850 / 960°C	Housing (black)	Р
	- other: 650°C	Cover (grey)	Р
8.1.2	Current-carrying parts and their connection		Р
8.1.3	Clearances		Р
	Uimp is given as:	8k∨	Р
	- max. value of rated operational voltage to earth	:	
		600V	
	- nominal voltage of supply system	: 400 / 690V	
	- overvoltage category		
	- pollution degree	: 3	
	- field-in or homogeneous		
	- minimum clearances (mm)	: 8	
	- measured clearances (mm)	: ≥10	
	Uimp is not given:		N
	- rated insulation voltage Ui (V)	:	
	- le	1	
	- minimum clearances L-L/L-A (mm)		
	- measured clearances L-L/L-A (mm)		1 1 1 1 1 1 1 1 1 1
	Creepage distances		

	EN 60 947-4-1				
Clause	Requirement – Test	Result - Remark	Verdict		
	T				
	Uimp is given as:	8 kV	The state of the s		
	- material group or CTI		The state of the s		
	- minimum creepage distances (mm)				
	- measured creepage distances (mm)	≥ 12,5	The state of the s		
	Uimp is not given:	<u></u>	N		
	- material column a or b		The state of the s		
	- minimum creepage distances (mm)		And the second s		
	- measured creepage distances (mm)				
8.1.4	Actuator		N		
8.1.4.1	Insulation		N		
8.1.4.2	Direction		N		
8.1.4.3	Mounting		N		
8.1.5	Indication of contact position		N		
8.1.5.1	Indication means		N		
8.1.5.2	Indication by the actuator		N		
8.1.6	Additional safety requirements for equipment with		N		
	isolating function				
8.1.7	Terminals		Р		
8.1.7.1	All parts of terminals which maintain contact and	(see 8.2.4 below)	Р		
	carry current shall be of metal having adequate				
	mechanical strength				
	Terminal connections shall be such that	(see 8.2.4 below)	Р		
	necessary contact pressure is maintained				
	Terminals shall be so constructed that the	(see 8.2.4 below)	Р		
	conductor is clamped between suitable surfaces				
	without damage to the conductor and terminal				
	Terminal shall not allow the conductor to be	(see 8.2.4 below)	Р		
	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				
8.2.4	Mechanical properties of terminals:	Overload	Р		

EN 60 947-4-1		
Requirement – Test	Result - Remark	Verdict
Mechanical strength of terminals		P
maximum cross-sectional area of conductor	6	
(mm²)		
diameter of thread (mm)	M4	
torque (Nm)	1,2	
5 times on 2 separate clamping units		Р
Testing for damage to and accidental loosening of	f conductor (flexion test)	Р
conductor of the smallest cross-sectional area	0,5	Company Comp
(mm²)		
number of conductor of the smallest cross	1	
section		
diameter of bushing hole (mm)	6,4	
height between the equipment and the platen	260	Silica of the second of the se
mass at the conductor(s) (kg)	0,3	A CONTROL OF THE CONT
135 continuous revolutions: the conductor shall		Р
neither slip out of the terminal nor break near the		
clamping unit		
Pull-out test		Р
force (N)	30	- 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1
		Р
· ·		
		Р
	6	
		The state of the s
	1	West of the second seco
	1	
		1

		The state of the s
(*************************************		
	Mechanical strength of terminals maximum cross-sectional area of conductor (mm²) diameter of thread (mm) torque (Nm) 5 times on 2 separate clamping units Testing for damage to and accidental loosening of conductor of the smallest cross-sectional area (mm²) number of conductor of the smallest 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 force (N) 1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit Flexion test conductor of the largest cross-sectional area (mm²) number of conductor of the largest cross-sectional diameter of bushing hole (mm) height between the equipment and the platen	Requirement – Test Result - Remark

_	EN 60 947-4-1		··· 1
Clause	Requirement – Test	Result - Remark	Verdict
·		T	
	135 continuous revolutions: the conductor shall		P
	neither slip out of the terminal nor break near the		
	clamping unit		
	Pull-out test		Р
	force (N)	80	- 1 1 1 1 1 1 1 1 1 1
	1 min, the conductor shall neither slip out of the		P
	terminal nor break near the clamping unit		
	Flexion test	Overload	Р
	conductor of the largest and smallest cross-	2,5 // 0,5 6 // 1,5	The state of the s
	sectional area (mm²)		**************************************
	number of conductor of the smallest cross	1//1 1//1	**************************************
	sectional, number of conductor of the largest		A Change (An Article)
	cross sectional		**************************************
	diameter of bushing hole (mm)		Acceptable of the second of th
	height between the equipment and the platen	279 // 260 279 // 260	Min believe we revene -
	(mm)		
	mass at the conductor(s) (kg)		
	135 continuous revolutions: the conductor shall	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Р
	neither slip out of the terminal nor break near the		'
	clamping unit		
	Pull-out test		Р
	force (N)	50 // 30 80 // 30	
	1 min, the conductor shall neither slip out of the	30 // 30 80 // 30	P
	terminal nor break near the clamping unit		
8.1.7.2			P
0.1.7.2	Connecting capacity		
	type of conductors	Rigid Flexible	TW
	minimum cross-sectional area of conductor	0,75 0,5	
	(mm²)		
	maximum cross-sectional area of conductor	6 4	**************************************
	(mm²)		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	number of conductors simultaneously	Acc. Manuf. Instr.	The second secon
	connectable to the terminal	2 2	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

EN 60 947-4-1				
Clause	Requirement – Test	Result - Remark	Verdict	
8.2.4	Mechanical properties of terminals:	Contactor		
8.2.4.2	Mechanical strength of terminals			
	maximum cross-sectional area of conductor	4	*** *** *** *** *** *** *** *** *** **	
	(mm²)		-	
	diameter of thread (mm)	M 3,5	**************************************	
	torque (Nm)	0,8		
	5 times on 2 separate clamping units		Р	
8.2.4.3	Testing for damage to and accidental loosening of	conductor (flexion test)		
	conductor of the smallest cross-sectional area	0,75	The second secon	
	(mm²)			
	number of conductor of the smallest cross	2		
	section		Temporary Temp	
	diameter of bushing hole (mm)	6,4		
	height between the equipment and the platen	260		
	(mm)	1		
	mass at the conductor(s) (kg):	0,4		
	135 continuous revolutions: the conductor shall		P	
	neither slip out of the terminal nor break near the			
	clamping unit			
8.2.4.4	Pull-out test	Т		
	force (N)	30	100 100 100 100 100 100 100 100 100 100	
	1 min, the conductor shall neither slip out of the		P	
	terminal nor break near the clamping unit			
	Flexion test	Т		
	conductor of the largest cross-sectional area	4		
	(mm²):			
	number of conductor of the largest cross-	2		
	sectional		**************************************	
	diameter of bushing hole (mm)	9,5	1	
	height between the equipment and the platen	279		
	(mm):		1	
	mass at the conductor(s) (kg)	0,9	1	

	EN 60 947-4-1			
Clause	Requirement - Test	Result - Remark		Verdict
	135 continuous revolutions: the conductor shall			P
	neither slip out of the terminal nor break near the			
	clamping unit			
	Pull-out test			:
	force (N)	60		1 1 1 1 1 1 1 1 1 1
	1 min, the conductor shall neither slip out of the			Р
	terminal nor break near the clamping unit			
	Flexion test	Contactor		
	conductor of the largest and smallest cross-	4 // 2,5	1,5 // 0,5	
	sectional area (mm²):			
-	number of conductor of the smallest cross	1 // 1	1 // 1	991 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	sectional, number of conductor of the largest			
	cross sectional			NEW ANALYS AND ANALYS
	diameter of bushing hole (mm)	9,5	6,4	
	height between the equipment and the platen	279	260	
	(mm)			
	mass at the conductor(s) (kg)	0,9 // 0,7	0,4	
	135 continuous revolutions: the conductor shall			Р
	neither slip out of the terminal nor break near the			
	clamping unit			
	Pull-out test			
,	force (N)	60 // 50	40 // 30	
	1 min, the conductor shall neither slip out of the			Р
	terminal nor break near the clamping unit			
8.1.7.2	Connecting capacity			Р
	type of conductors	Rigid	Flexible	
	minimum cross-sectional area of conductor	0,75	0,75	
	(mm²):	1	3,. 2	Mill 1 2 3 3 2 3 3 3 3 3 3
	maximum cross-sectional area of conductor	4	2,5	
	(mm²):		_,,	
	number of conductors simultaneously	Acc. Manuf. Instr.		
	connectable to the terminal		2	The state of the s

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Clause	Requirement – Test	Result - Remark	Verdict
8.1.7.3	Connection		Р
	terminals for connection to external conductors shall be readily accessible during installation		Р
	clamping screws and nuts shall not serve to fix any other component		Р
8.1.7.4	Terminal identification and marking		Р
	terminal intended exclusively for the neutral conductor		N
	protective earth terminal		N
	other terminals		Р
	- Main circuit::	2T1, 4T2, 6T3	
	- Auxiliary circuit	95-96, 97-98, 13-14, 21-22,	
		A1, A2	
8.1.8	Additional requirements for equipment provided wi	ith a neutral pole	N
	marking of neutral pole		N
	The switched neutral pole shall not break before		N
	and shall not make after the other poles		
	Conventional thermal current of neutral pole		N
8.1.9	Provisions for protective earthing		N
8.1.9.1	The exposed conductive parts shall be electrically interconnected and connected to a protective earth terminal		N
8.1.9.2	The protective earth terminal shall be readily accessible		N
	The protective earth terminal shall be suitably protected against corrosion		N
	The electrical continuity between the exposed conductive parts of the protective earth terminal and the metal sheathing of connecting conductors		N
	The protective earth terminal shall have no other functions		N

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Clause	Requirement – Test	Result - Remark	Verdict		
	·				
8.1.9.3	Protective earth terminal marking and		N		
	identification				
8.1.10	Enclosure for equipment		N		
8.1.10.1	Design		N		
	The enclosure, when it is opened: all parts		N		
	requiring access for installation and maintenance				
	are readily accessible				
	Sufficient space shall be provided inside the		N		
	enclosure				
	The fixed parts of a metal enclosure shall be		N		
	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				
	Under no circumstances shall a removable metal		N		
	part of the enclosure be insulated from the part				
	carrying the earth terminal when the removable				
	part is in place				
	The removable parts of the enclosure shall be		N		
	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				
	When an enclosure is so designed as to allow the		N		
	covers to be opened without the use of tools,				
	means shall be provided to prevent loss of the				
	fastening devices				
8.1.10.2	Insulation		N		

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Clause	Requirement – Test	Result - Remark	Verdict
-		F	
	If, in order to prevent accidental contact between		N
	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		
8.1.11	Degree of protection of enclosed equipment		N
	Degree of protection	IP	N
	Test for first characteristic		N .
	Test for first numeral:	1:	
		2:	
	:	3:	Hoofe The Control of the Control of
		4:	West West
!		5:	TAMES TO THE PROPERTY OF THE P
		6:	
	Test for second characteristic	_	N
	Test for second numeral	1:	
		2:	
		3:	
		4:	
		5:	
		6:	
		7:	
		8:	

9.3.1.a	TEST SEQUENCE I			
9.3.3.3	Temperature rise Ty	pe AC	and DC - KG	Р
	ambient temperature 10-40 °C	25		**************************************
	Contactor			N
	test enclosure W x H x D (mm x mm x mm)			Authority of the control of the cont
	material of enclosure			
	Main circuits, test conditions:			N

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Clause	Requirement – Test	Result - Remark	Verdict
	- conventional thermal current Ith (A)		When the second
	- conventional enclosed thermal current Ithe (A) .:		*** *** *** *** *** *** *** *** *** **
	- cable/busbar cross-section (mm²) / (mm):		**************************************
	- temperature rise of main circuit terminals (K):	<	A transfer of the property of
	Auxiliary circuit, test conditions:		P
	- rated operation current le (A)	16	William I management of the control
	- cable cross-section (mm²):	2,5	And the second s
	- temperature rise of auxiliary circuit terminals	≤ 43	The second secon
	(K)		
	Coils and electromagnets, test conditions:	AC DC Type KG	Р
	- rated control supply voltage Us (V)	240 220	
	- Class of insulating material	F F	A AND THE STATE OF
	- temperature rise of coil and electromagnets (K) :	≤ 76 ≤ 66	
	Starter Tested wi	ith setting range 13 – 18 A	
	test enclosure W x H x D (mm x mm x mm):	175 x 115 x 115	
	material of enclosure:	Metal	
	Main circuits, test conditions: *Tested with 16A bea	cause of max. Power	Р
	consumption of Overload Relay		
	- conventional thermal current lth (A):	16 (25*)	
	- cable/busbar cross-section (mm²) / (mm):	2,5 mm²	
	- temperature rise of main circuit terminals (K):	≤ 59	
	Overload relay, auxiliary circuit, test conditions:		Р
	- rated operation current le (A)	4	
	- cable cross-section (mm²)	1	
	- temperature rise of auxiliary circuit terminals	≤ 43	
	(K):		The second secon
9.3.3.2	Operating limits		
9.3.3.2.1	Power-operated equipment:	AC DC Type KG	Р
	rated control supply voltage Us (V):	240 220	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	frequency (Hz)	50 DC	The second secon

	EN 60 947-4-1		
Clause	Requirement – Test	Result - Remark	Verdict
1		[
	limits of close satisfactorily at any value between	80 81	P
	85% and 110% of rated control supply voltage		
	Us:		
	limits of drop out and open fully are: 75% to 20%	47 23	P
	for a.c. and 75% to 10% for d.c.		
9.3.3.3	Temperature rise T	ype DC	P
	ambient temperature 10-40 °C	25	and the specific states of the specific state
	Contactor		. N
	test enclosure W x H x D (mm x mm x mm):		The control of the
	material of enclosure		National Control of the Control of t
	Main circuits, test conditions:		N
	- conventional thermal current lth (A)		
	- conventional enclosed thermal current Ithe (A) .:		
	- cable/busbar cross-section (mm²) / (mm):		
	- temperature rise of main circuit terminals (K):		
	Auxiliary circuit, test conditions:		Р
	- rated operation current le (A)	16	
	- cable cross-section (mm²)	2,5	
	- temperature rise of auxiliary circuit terminals	≤ 43	
	(K)		
	Coils and electromagnets, test conditions:	DC	Р
	- rated control supply voltage Us (V)	220 24	
	- Class of insulating material		
	- temperature rise of coil and electromagnets (K):		
			The state of the s
	Starter Tested w	ith setting range 13 – 18 A	
	test enclosure W x H x D (mm x mm x mm):	175 x 115 x 115	
	material of enclosure		3 mg/defile 7 d. 7 d. 7 d. 7 d. 7 d. 7 d. 7 d. 7 d
	Main circuits, test conditions: *Tested with 16A be	· · · · · · · · · · · · · · · · · · ·	Р
	consumption of Overload Relay		
	- conventional thermal current lth (A)	16 (25*)	
	- cable/busbar cross-section (mm²) / (mm)		The second secon

	EN 60 947-4-1		
Clause	Requirement - Test	Result - Remark	Verdict
	- temperature rise of main circuit terminals (K):	≤ 59	
	Overload relay, auxiliary circuit, test conditions:		Р
	- rated operation current le (A)	4	
	- cable cross-section (mm²)	1	
	- temperature rise of auxiliary circuit terminals (K)	≤ 43	
9.3.3.2	Operating limits		
9.3.3.2.1	Power-operated equipment:	DC	Р
	rated control supply voltage Us (V):	220 24	
	frequency (Hz)	DC DC	The second secon
	limits of close satisfactorily at any value between	69 70	Р
	85% and 110% of rated control supply voltage Us		
	limits of drop out and open fully are: 75% to 20% for a.c. and 75% to 10% for d.c.	31 38	Р
9.3.3.2.2		ange 13 – 18 A	Р
	Conditions for thermal and time-delay magnetic overload relays only:		
	type of time-delay overload relay:		
	trip class		
	current settingl _{set} :		
	ambient temperature (°C)	25	
	test enclosure W x H x D (mm x mm x mm):	175 x 115 x 115	
	cable/busbar cross-section (mm²) / (mm):	2,5	
	at A (1,05) times of current setting, tripping shall	13,65 A 18,9 A	
	not occur in less than 2 h starting from the cold		
	state; test current	No tripping No tripping	The second secon
	When the current is subsequently raised to B (1,2) times the current setting, tripping shall occur	15,6 A 21,6 A	
	in less than 2 h; test currentmin:sec :		1

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Clause	Requirement – Test	Result - Rema	rk	Verdict
	for class 10A overload relays energized at C (1,5)	19,5 A	27 A	
	times the current, tripping shall occur in less than			The second secon
	2 min, starting from thermal equilibrium at the			The second secon
	current setting; test currentmin:sec:	0:31	0:18	244 (A.A.)
	for class 10, 20 or 30 overload relays energized	N		The state of the s
	at C times the current, tripping shall occur in less			1 The second sec
	than 2, 8 or 12 min, starting from thermal			A second
	equilibrium at the current setting; class; test			1
	current; tripping time			Martin
	at D (7,2) times the current setting, tripping shall	93,6 A	129,6 A	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	occur within the tripping time (s) $2 \le Tp \le 10$,			
	starting from the cold state; test current; tripping	į		
	time Tp (s)	2,5	2,3	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1
	Ambient temperature: - 5 °C			
	at A (1,05) times of current setting, tripping shall	13,65 A	18,9 A	
	not occur in less than 2 h starting from the cold			
	state; test current	No tripping	No tripping	
	When the current is subsequently raised to B	15,6 A	21,6 A	
	(1,2) times the current setting, tripping shall occur			
	in less than 2 h; test current min:sec :	28:35	2:25	
	for class 10A overlod relays energized at C (1,5)	19,5 A	27 A	
	times the current, tripping shall occur in less than			
	2 min, starting from thermal equilibrium at the			
	current setting; test current min:sec :	1:07	0:27	Section 1
	for class 10, 20 or 30 overload relays energized	N		
	at C times the current, tripping shall occur in less			- Company of the Comp
	than 2, 8 or 12 min, starting from thermal			The state of the s
	equilibrium at the current setting; class; test			**************************************
Ĺ	current; tripping time			1

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Clause	Requirement – Test	Result - Rema	rk	Verdict
	at D (7,2) times the current setting, tripping shall occur within the tripping time (s) $2 < Tp \le 10s$	93,6 A	129,6A	
	tarting from the cold state; test current; tripping time Tp (s)	3,1	2,6	
	Ambient temperature: + 40 °C	13,65 A	18,9 A	
	state; test current	No tripping	No tripping	- 1
:	When the current is subsequently raised to B (1,2) times the current setting, tripping shall occur	15,6 A	21,6 A	
	in less than 2 h; test current min:sec :	1:10	1:15	
	for class 10A overload relays energized at C (1,5) times the current, tripping shall occur in less than 2 min, starting from thermal equilibrium at the	19,5 A	27 A	
	current setting; test current min:sec:	0:15	0:10	
	for class 10, 20 or 30 overload relays energized at C times the current, tripping shall occur in less than 2, 8 or 12 min, starting from thermal equilibrium at the current setting; class; test current; tripping time	N		
	at D (7,2) times the current setting, tripping shall occur within the tripping time (s) $2 < Tp \le 10$ starting from the cold state; test current; tripping time Tp (s)	93,6 A 2,9	129,6 A 2,1	
	Limits of operation of three-pole thermal overload	relays energized	d on two poles:	Р
	ambient temperature (°C)		·	
	the relay energized on three poles, at A (1 / 0,9) times the current setting, tripping shall not occur in less than 2 h, starting from the cold state:	13 A / 11,7 A		
		No tripping	No tripping	

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Clause	Requirement – Test	Result - Remark	Verdict
	when the value of the current flowing in two poles is increased to B (1,15) times the current setting and the third pole deenergized, tripping shall occur in less than 2 h min:sec:		
9.3.3.4	Test of dielectric properties, impulse withstand vol		P
	- verification by measurement of clearances instead of testing		N
	- rated impulse withstand voltage (V)	8000	
	- test Uimp main circuits (kV):	9,8 / 7	Р
	- test Uimp auxiliary circuits (kV)	9,8 / 7	Р
	Test of dielectric properties, dielectric withstand vo	oltage (Uimp not indicated):	N
	- rated insulation voltage (V)		The second secon
	- main circuits, test voltage for 1 min (V)		N
	- control and auxiliary circuits, test voltage for 1 min (V)		N

9.3.3.5	TEST SEQUENCE II		
	Making and breaking capacity		
	utilization category:	AC1	1
	rated operational voltage Ue (V)	690	
	rated operational current le (A) or power (kW):	25A	*** **********************************
	Conditions, make/break operations AC-1 only:		Р
	- test voltage U/Ue = 1,05 (V):	L1: 725	
		L2: 730	
		L3: 730	
	- test current I/Ie = 1,5 (A):	L1: 38	A second of the control of the contr
		L2: 38	1
		L3: 38	###
	- power factor/time constant:	L1: 0,78	10 10 10 10 10 10 10 10
		L2: 0,78	1
		L3: 0,79	1 to be seen to th

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Clause	Requirement – Test	Result - Remark	Verdict
	<u> </u>		
	- on-time (ms)	160	Maria 2007
	- off-time (s)	9,8	
	- number of make/break operations:	50	Р
	Behaviour and condition during and after the test:	•	Р
	- no permanent arcing		P
	- no flash-over between poles		Р
	- no blowing of the fusible element in the earth		Р
	circuit		
	- no welding of the contacts		Р
	- the contacts shall operate when the contactor or		Р
	starter is switched by the applicable method of		
	control		
	Operational performance capability:		Р
	utilization category (AC-3 or AC-4)	AC4	
	rated operational voltage Ue (V)		The state of the s
	rated operational current le (A) or power (kW):		
	Conditions, make operations AC3/AC4 only:	•	Р
	- test voltage U/Ue = 1,05 (V)	L1: 426	
	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	L2: 425	
		L3: 427	
	- test current I/Ie = (A)		
	, , , , , , , , , , , , , , , , , , , ,	L2: 193	
		L3: 192	
	- power factor/time constant		The state of the
		L2: 0,4	** *** *** *** *** *** *** *** *** ***
		L3: 0,4	
	- on-time (ms)	100	The state of the s
	- off-time (s)	10	1 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 -
	- number of make operations		P
	Characteristic of transient recovery voltage for AC		Р
	oscillatory frequency (kHz)		

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Clause	Requirement – Test	Result - Remark	Verdict
	<u> </u>	· · · · · · · · · · · · · · · · · · ·	· · · · ·
	Measured oscillatory frequency (kHz)	L1: 47	
		L2: 48	
		L3: 48	
	Factor y:	L1: 1,1	
		L2: 1,1	
		L3: 1,1	
	Behaviour and condition during and after the test:		Р
	- no permanent arcing	P	P
	- no flash-over between poles	P	Р
	- no blowing of the fusible element in the earth	P	Р
	circuit		
	- no welding of the contacts	Р	Р
	- the contacts shall operate when the contactor or	Р	P
	starter is switched by the applicable method of		
	control		
	Operational performance capability:		
	utilization category:	AC4	
	rated operational voltage Ue (V)	400	
	rated operational current le (A) or power (kW):		
	Conditions, make/break operations AC3 / AC4 onl		Р
	- test voltage U/Ue = 1,05 (V)		
		L2: 429	
		L3: 430	
	- test current I/Ie = (A)		
	\ \frac{1}{2}	L2: 101	
		L3: 99	
	- power factor/time constant:	L1: 0,42	
	,	L2: 0,42	
	-	L3: 0,42	
	- on-time (ms)		
	- off-time (s)		The second secon
	- number of make/break operations		P

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Clause	Requirement – Test	Result - Remark	Verdict
	Characteristic of transient recovery voltage for AC	-3 and AC-4 only:	P
	oscillatory frequency (kHz)		
	Measured oscillatory frequency (kHz)	L1: 38	
		L2: 38	
		L3: 39	
	Factor y:	L1: 1,1	
		L2: 1,1	
		L3: 1,1	
	Behaviour and condition during and after the test:		P
	- no permanent arcing	Р	Р
	- no flash-over between poles	Р	Р
	- no blowing of the fusible element in the earth	Р	Р
	circuit		
	- no welding of the contacts	Р	Р
	- the contacts shall operate when the contactor or	P .	Р
	starter is switched by the applicable method of		
	control		
8.3.3.6	Operational performance capability:		
	utilization category	AC1	The state of the
	rated operational voltage (V)	690	
	rated operational current le (A) or power (kW):	1	
	Test conditions for make/break operations AC-1 or		Р
	test voltage (V)		
		L2: 730	
		L3: 730	
	test current (A)		The second secon
		L2: 38	
		L3: 38	1
	power factor/time constant	·	*** **********************************
		L2: 0,79	
		L3: 0,79	
	- on-time (ms)	160	

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Clause	Requirement – Test	Result - Remark	Verdict		
	- off-time (s)	2,3			
	- number of operating cycles	6000	Р		
8.3.3.6.6	Behaviour and condition during and after the test:		Р		
	- no permanent arcing		Р		
	- no flash-over between poles		Р		
	- no blowing of the fusible element in the earth		P		
	circuit				
	- no welding of the contacts		P		
	- the contacts shall operate when the contactor or		P		
	starter is switched by the applicable method of				
	control				
	Dielectric verification:		Р		
	test voltage (2 Ue + 1000 V) for 1 min (V)	2380	1		

9.3.4	TEST SEQUENCE III		
	Performance under short-circuit conditions		
9.3.4.2.1	Test at de prospective current "r": U12/16 0	,4 -0,6A	
	Represents settin	ng ranges up to 11A	
	type of SCPD:	Siemens Diazed gL / gG	
	ratings of SCPD, co-ordination type 1:		
	ratings of SCPD, co-ordination type 2		
	rated operational current le (A) AC-3		
	prospective current "r" (kA)		
	test voltage (V)		*** *** *** *** *** *** *** *** *** **
		L2: 423	
		L3: 425	" - Avenue - Marie - M
	r.m.s. test current (A)	L1: 1053	
	, , , , , , , , , , , , , , , , , , , ,	L2: 1087	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
		L3: 1062	

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Clause	Requirement – Test	Result - Remark	Verdict
	pook ourrent (A)	1.4.4457	135h
	peak current (A):		A harmonia and a second and a s
		L2: 1457	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	power factor	L3: 1378 0,95	Maria in a rate and a second
	one breaking operation of SCPD with all the	L1: 1750 A2s / 807A	
	1	i e	
	switching devices closed prior to the test I²dta	L2: 2180 A²s / 887 A	2 V
	(A²s) /peak current I (A)		
	2. one breaking operation of SCPD by closing the		The second secon
	contactor or starter on to the short-circuit I²dta	L2: 695 A2s / 586 A	**************************************
	(A ² s) /peak current I (A)	L3: 884 A2s / 601 A	
	Behaviour of the equipment during the test		P
	Both types of co-ordination (all devices):	T	P
	A - the fault current has been successfully		Р
	interrupted by the SCPD or the combination		
	starter and the fuse or fusible element, or solid		
	connection between the enclosure and supply		
	shall not have melted		
	B - the door or cover of the enclosure has not		Р
	been blown open and it is possible to open the		i .
	door or cover		
	C - there is no damage to the conductors or	:	P
	terminals and the conductors have not been		
	separated from the terminals		
	D - there is no cracking or breaking of an		Р
	insulating base to the extent that the integrity of		
	mounting of a live part is impaired		
	Both types of co-ordination (combination starters a	and protected starters only):	N
	E - the circuit breaker or the switch is capable of		N
	being opened manually by its operating means		
-	F - neither end of the SCPD is completely		N
	separated from its mounting means to an	:	
	exposed conductive part		

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Clause	Requirement – Test	Result - Remark	Verdict		
			·-		
	G - if a circuit breaker with rated ultimate short-circ	cuit breaking capacity less than	N		
	the rated conditional short-circuit current assigned to the combination or				
	protected starter is employed, the circuit breaker s	hall be tested to trip:			
	1) circuit breaker with instantaneous trip relays or		N		
	releases, at 120% of the trip current				
	2) circuit breaker with overload relays or		N		
	releases, at 250% of the rated current of the				
	circuit breaker				
<u> </u>	Type 1 co-ordination (all devices):	, , , , , , , , , , , , , , , , , , ,	Р		
	H - there has been no discharge of parts beyond	Р	Р		
	the enclosure. The starter may be inoperative				
	after each operation				
	Type 1 co-ordination (combination and protected s	tarters only):	Р		
	I - dielectric verification test voltage (2 Ue) for	1380	Marian Company		
	1 min (V)				
9.3.4.2.1	Test at de prospective current "r": U12/16 13 -18A				
	Represents setting ranges higher 10A				
	type of SCPD	Siemens Diazed gL / gG			
	ratings of SCPD, co-ordination type 1	63A / 500V			
	ratings of SCPD, co-ordination type 2	-			
	rated operational current le (A) AC-3				
	prospective current "r" (kA)				
	test voltage (V)		NAME OF THE PARTY		
		L2: 423			
		L3: 425			
	r.m.s. test current (A):		*** A Annie SAT. I am a Annie		
	, ´	L2: 1087			
		L3: 1062			
	peak current (A)		V September 1994 A Sept		
	, , ,	L2: 1457			
		L3: 1378			
	power factor	0,95			

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Clause	Requirement – Test	Result - Remark	Verdict
		Ι	10 september 10 se
	1. one breaking operation of SCPD with all the	L1: 20,8 kA2s / 1330 A	The state of the s
	switching devices closed prior to the test I2dta	L2: 19,6 kA2s / 1283 A	**************************************
	(A ² s) /peak current I (A)	L3: 23 kA2s / 1210 A	The second secon
	2. one breaking operation of SCPD by closing the	L1: 22,1 kA2s / 1260 A	
	contactor or starter on to the short-circuit I2dta	L2: 19,5 kA2s / 1283 A	A CONTROL OF THE CONT
	(A2s) /peak current I (A)	L3: 21,4 kA2s / 1306 A	Hart and a particular and a state of the sta
	Behaviour of the equipment during the test		Р
	Both types of co-ordination (all devices):	*	Р
	A - the fault current has been successfully		Р
	interrupted by the SCPD or the combination		
	starter and the fuse or fusible element, or solid		
	connection between the enclosure and supply		
	shall not have melted		
	B - the door or cover of the enclosure has not		Р
	been blown open and it is possible to open the		
	door or cover		
	C - there is no damage to the conductors or		Р
	terminals and the conductors have not been		
	separated from the terminals		
	D - there is no cracking or breaking of an		P
	insulating base to the extent that the integrity of		
	mounting of a live part is impaired		
	Both types of co-ordination (combination starters a	and protected starters only):	N
	E - the circuit breaker or the switch is capable of		N
	being opened manually by its operating means	1	
-	F - neither end of the SCPD is completely		N
	separated from its mounting means to an		
	exposed conductive part		
	G - if a circuit breaker with rated ultimate short-circ	cuit breaking capacity less than	N
	the rated conditional short-circuit current assigned to the combination or		
	protected starter is employed, the circuit breaker s		

	EN 60 947-4-1		
Clause	Requirement - Test	Result - Remark	Verdict
	1) circuit breaker with instantaneous trip relays or		N
	releases, at 120% of the trip current		
	2) circuit breaker with overload relays or		N
	releases, at 250% of the rated current of the		
	circuit breaker		
	Type 1 co-ordination (all devices):		Р
	H - there has been no discharge of parts beyond	Р	P
	the enclosure. The starter may be inoperative		
	after each operation		
	Type 1 co-ordination (combination and protected s	starters only):	Р
	I - dielectric verification test voltage (2 Ue) for	1380	A Comment of the Comm
	1 min (V)		
	Type 2 co-ordination (all devices):		N
	J - no damage to the overload relay or other parts		N
	has occurred, except that welding of contactor or		
	starter contacts is permitted, if they are easily		
	separated without significant deformation		
	K - the tripping of the overload relay shall be		N
	conform to the published tripping characteristics,		
	before and after the test		
	L - dielectric verification test voltage (2 Ue) for		
	1 min (V):		
9.3.4.2.2	Test at the rated conditional short-circuit current "I	lq" ≤ SCC "r"	N
	type of SCPD		
	ratings of SCPD, co-ordination type 1		
	ratings of SCPD, co-ordination type 2		The second secon
	rated operational current le (A) AC-3		10
	prospective current "Iq" (kA)		A construction of the cons
	test voltage (V)		
		L2:	
		L3:	

EN 60 947-4-1				
Requirement – Test	Result - Remark	Verdict		
r.m.s. test current (A):	L1:			
	L2:			
	L3:			
peak current (A)	L1:			
	L2:			
	L3:			
power factor				
one breaking operation of SCPD with all the	L1:			
switching devices closed prior to the test I2dta	L2:			
(A²s)	L3:	A 2		
2. one breaking operation of SCPD by closing the	L1:			
contactor or starter on to the short-circuit	L2:			
	L3:	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
3. one breaking operation of SCPD by closing the	L1:	The second secon		
	L3:			
Behaviour of the equipment during the test		N		
		N		
		N		
		N		
		N		
_		"		
		N		
	r.m.s. test current (A)	r.m.s. test current (A)		

	EN 60 947-4-1		
Clause	Requirement – Test Resul	t - Remark	Verdict
	Both types of co-ordination (combination starters and pro	tected starters only):	N
	E - the circuit breaker or the switch is capable of		N
	being opened manually by its operating means		
!	F - neither end of the SCPD is completely		N
	separated from its mounting means to an		
	exposed conductive part		
	G - if a circuit breaker with rated ultimate short-circuit bre	aking capacity less than	N
	the rated conditional short-circuit current assigned to the	combination or	
	protected starter is employed, the circuit breaker shall be	tested to trip:	
	1) circuit breaker with instantaneous trip relays or		N
	releases, at 120% of the trip current		
	2) circuit breaker with overload relays or		N
	releases, at 250% of the rated current of the		
	circuit breaker		
	Type 1 co-ordination (all devices):		N
	H - there has been no discharge of parts beyond		N
	the enclosure. The starter may be inoperative		
	after each operation		
	Type 1 co-ordination (combination and protected starters	only):	N
	I - dielectric verification test voltage (2 Ue) for		A Company of the Comp
	1 min (V):		
	Type 2 co-ordination (all devices):		N
	J - no damage to the overload relay or other parts		N
	has occurred, except that welding of contactor or		
	starter contacts is permitted, if they are easily		
	separated without significant deformation		
	K - the tripping of the overload relay shall be		N
	conform to the published tripping characteristics,		
	before and after the test		
	L - dielectric verification test voltage (2 Ue) for		
	1 min (V)		The state of the s

EN 60 947-4-1				
Clause	Requirement – Test	Result - Remark	Verdict	

9.3.5	TEST SEQUENCE IV: (APPLICABLE FOR CONTA	ACTORS ONLY)	Р
	Overload current withstand capability of contactors:		Р
	ambient temperature (°C)	25	Control of the contro
	rated operational current le (A) max. AC-3	16	
	test current (le) (A) 1	128	Programme Control Cont
	duration of test: 10 s	10s	
	After the test, the contactor shall be substantially	•	Р
	in the same condition as before the test (visual		
	inspection)		

	TABLE:	temperature rise me	easurements			Р
tempera	ture rise dT (of period		ar (k)	Required dT	
						(K)
Main Terminals Contactor (16A)			1	51	65	
				3	54	65
				5	58	65
Main Te	rminal Overlo	oad Relay (16A)		2	59	65
				4	54	65
				6	51	65
Auxilixar	y Terminals	Contactor (16A)		13	43	65
				14	42	65
Auxiliary	Terminal Ov	verload Relay (4A)		95	44	65
				96	40	65
Coil:		240V	50Hz		76	135
		24V + 10%	DC		64	135
		220V + 10%	DC		40	135
	Type: KG	220V	DC		66	135

EN 60 947-4-1				
Clause	Requirement – Test	Result - Remark	Verdict	
	EN 60 947-5-1			
8.3.3.5.3	Making and breaking capacities of switching element	ents under abnormal	P	
	conditions:		ANT COMPANY	
	utilization category	AC15	1	
	rated operational voltage Ue (V)	240	1	
	rated operational current le (A) or power (kW):	12	1	
	Conditions, make/break operations:			
	- test voltage U/Ue = 1,1 (V):	L1: 266	Aque	
		L2: -	The state of the s	
		L3: -		
	- power factor/time constant	L1: 0,31		
		L2: -		
		L3: -		
	- make operations: test current I/le (A)	L1: 123		
		L2: -		
		L3: -		
	- break operations: test current I/le (A)			
	, , , , , , , , , , , , , , , , , , , ,	L2: -		
		L3: -		
н	- on-time (ms)			
	- operating cycles per minute			
	- number of operating cycles		Р	
	Behaviour and condition during and after the test:	110	P	
	- no electrical or mechanical failures		P	
			-	
	- no contact welding or prolonged arcing		P	
	- no blowing of the fusible element in the earth		P	
	circuit			
	Dielectric verification:		P	
	dielectric test voltage (V)	2000	P	

EN 60 947-4-1				
Clause	Requirement – Test	Result - Remark	Verdict	

EN 60 947-5-1					
8.3.3.5	TEST SEQUENCE III				
8.3.3.5.2	Making and breaking capacities of switching elements under normal conditions				
	utilization category	AC15	A CONTROL OF THE PROPERTY OF T		
	rated operational voltage Ue (V)	240	The second secon		
	rated operational current le (A) or power (kW):	12	The second secon		
	Conditions, make/break operations:				
	- test voltage U/Ue = 1,1 (V)	L1: 266* / 242 **	And a second sec		
	* 50 operation at 266V	L2:	SALES INTERPOLATION OF SHELL AND THE SHELL A		
	** 6000 operations at 242V:	L3:	Comment of the commen		
	- power factor/time constant:	L1: 0,31			
		L2: -	A CONTRACTOR OF THE PROPERTY O		
		L3: -	** The second se		
	- make operations: test current I/Ie (A)	L1: 123			
		L2: -			
		L3: -			
	- break operations: test current I/Ie (A)	L1: 13			
		L2: -			
		L3:			
	- on-time (ms) *50 oper. / **6000 oper:	160 * / 300**			
	- operating cycles per minute	15			
	- number of operating cycles:	6050	Р		
	Behaviour and condition during and after the test:		Р		
	- no electrical or mechanical failures		Р		
	- no contact welding or prolonged arcing		Р		
	- no blowing of the fusible element in the earth		Р		
	circuit				
	Dielectric verification:		P		
	dielectric test voltage (V)	2000	Р		
	utilization category		117. 107. 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
	rated operational voltage Ue (V)		The state of the s		

		EN 60 947-4-1		
Clause	Requirement – Test		Result - Remark	Verdict

	EN 60 947-5-1		
8.3.4	TEST SEQUENCE IV		
	Performance under conditional short-circuit curren	Р	
	type of SCPD:	Siemens Diazed gL / gG	
	ratings of SCPD:	25A / 500V	
	prospective current (kA):	1	
	test voltage (V) U/Ue = 1,1 (V):	L1: 277	
		L2: 275	
		L3: 276	7.44
	r.m.s. test current (A):	L1: 1010	
		L2: 1050	
		L3: 1020	2-7-1 max
	power factor (max. 0,7)	0,7	
	first making operation to closed switching	L1: 1650 A2s / 770A	All and a second
	elements: test I²dta (A²s) / I _D (A)	L2: 2880 A2s / 830 A	To be a second of the second o
		L3: 2850 A2s / 1090 A	**************************************
	time interval between test (min. 3 min):		The second secon
	second making operation to closed switching	L1: 1430 A2s / 700 A	**************************************
	elements: test I²dta (A²s) / I _D (A):	L2: 2900 A²s / 830 A	A Committee of the Comm
		L3: 2860 A2s / 1080 A	West
	time interval between test (min. 3 min):		
	third making operation to closed switching	L1: 2910 A2s / 1030 A	Company of the compan
	elements: test l²dta (A²s) / I _D (A):	L2: 2540 A2s / 975 A	TO THE PARTY OF TH
		L3: 830 A2s / 545 A	1
	Behaviour of the equipment during the test:		Р
	switching elements open by the normal actuating		Р
	System Dielectric verification:		Р
	dielectric test voltage (V)	2000	P



inetter

TEST REPORT EN 60 947-4-1

Low-voltage switchgear and controlgear

Part 4: Contactors and motor-starters

Section 1: Electromechanical contactors and motor-starters

Report reference No.

2.03.00356.1.0-K223/B&J

Tested by (+ signature).....: Ing.J.Ainetter Approved by (+ signature): Ing.K.Farthofer

Date of issue: 02.02.2004

Ges.m.b.H

Address...... : A – 1031 Vienna, Faradaygasse 3

Testing location....: as above

Applicant: Benedict GmbH (Ω Benedikt & Jäger)

Address..... : A – 1220 Vienna, Lieblgasse 7

Standard: EN 60 947-4-1:2000-11

Test Report Form No. 69474-1A

Master TRF......: reference No. 69474-1A, dated 95-07

Copyright blank test report....: the bodies participating in the Committee of Certification

Bodies (CCB) and/or the CENELEC Certification

Agreement (CCA).

Test procedure: CB-scheme

Procedure deviation: N.A.

Non-standard test method: N.A.

Type of test object: Motor-Starter

Trademark: Ω, Benedikt & Jäger

Model/type reference : K2-23Axx + U12/16xxx

Manufacturer.....: Ω Benedikt & Jäger

Rating: AC1

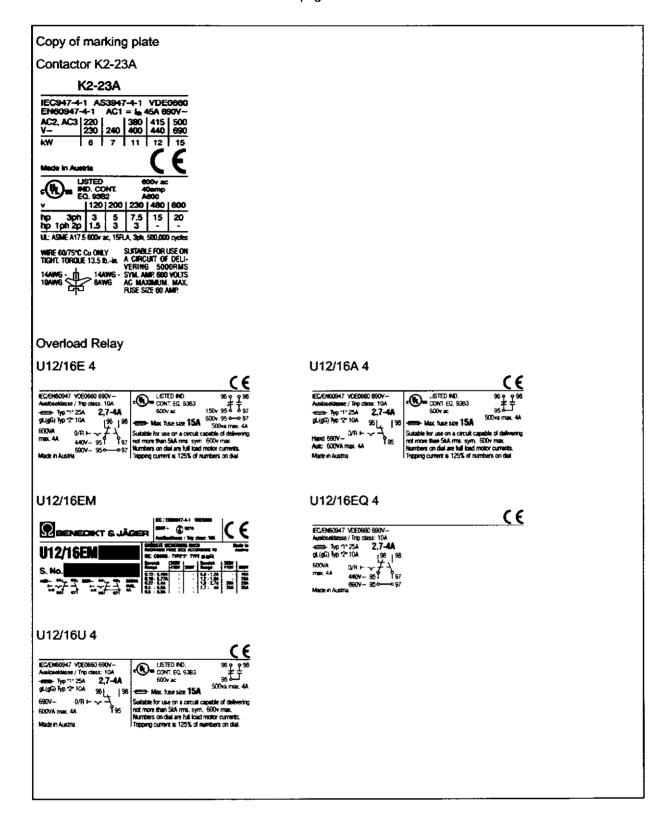
45A 690V 50-60Hz

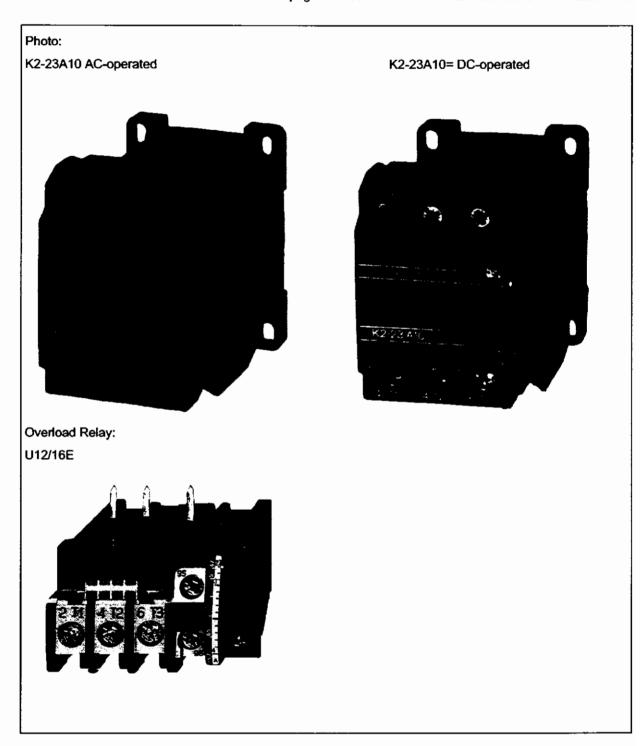
AC3/AC4

23A 400V 50-60Hz

AC15

12A 240V 50-60Hz





Test item particulars:	
- method of operation:	Magnetic
- switching positions:	ON-OFF
- number of polesContactor:	3 Main 1 Aux
- kind of current:	AC
- number of phases:	3
- rated frequency (Hz):	50-60
- number of positions of main contacts:	2
Rated and limiting values, main circuit:	
- rated operational voltage Ue (V):	690
- rated insulation voltage Ui (V):	690
- rated impulse withstand voltage Uimp (kV):	8
- conventional free air thermal current lth (A):	45
- conventional enclosed thermal current Ithe (A)	45
- rated operational current le (A):	45
- rated uninterrupted Iu (A)	45
- utilization category	AC1, AC3, AC4
Short-circuit characteristic	
- rated prospective short-circuit current "r" (kA):	3
- rated conditional short-circuit current lq (kA):	3
Rated and limiting values, auxiliary circuits:	For Contactor
- rated operational voltage (V):	240
- rated frequency (Hz):	50-60
- number of circuits:	1
- number and kind of contact elements:	1 NO or 1 NC
Co-ordination of short-circuit protective devices:	Type "1"
- kind of protective device:	Fuse
Possible test case verdicts:	
- test case does not apply to the test object:	N(.A.)
- test object does meet the requirement:	P(ass)
- test object does not meet the requirement:	F(ail)

General remarks:

"(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.

The test results presented in this report relate only to the object tested.

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- 1) Based on the decision of the applicant, some of the tests of Test Sequences I and II may have been performed under more severe conditions than required in the stanard. In case of, relevant values for equipment under test are stated in test report.
- 2) Relevant tests have been performed with or without 'snap on auxiliary contact block' Typ 'HN' or 'HA'.
- 3) The test item is corresponding to the requirements of IEC 60947-4-1 Ed. 2.0 (2000-11) + A1 (2002-09).

```
Ordering key:
Contactor
K2-23A x x
       | |>>>
                    : 0, 1 : Number of NC auxiliary contacts
        1>>>>
                     : 0, 1 : Number of NO auxiliary contacts
Overload Relay
U12/16 x x x
       : Setting range 0.12 - 0.18 / 0.18 - 0.27 / 0.27 - 0.4 / 0.4 - 0.6 /
       11
                             0.6 - 0.9 / 0.8 - 1.2 / 1.2 - 1.8 / 1.8 - 2.7 /
       | |
                              2,7-4 / 4-6 / 6-9 / 8-11 / 10-14 / 13-18 /
                              17 - 23 / 22 - 30 A
       11
       1.1
                      : M ... With additional quick trip up to 4A (optional)
       | | >>>>
                      : Q ... Thermic quick trip up to 14A (optional)
       1>>>>
                      : U ... Change over auxiliary contacts
                      : A ... Change over auxiliary contacts with autom. Reset
                      : E ... 1 NC and 1 NO auxiliary contact
Control Circiut Voltage:
6 - 550V
               50Hz
6 - 600 V
               60Hz
12 - 250V
               DC
       With Late Break Contact in series to coil.
```

		EN 60 947-4-1		
Clause	Requirement – Test		Result - Remark	Verdict

6.2	MARKING:		
	Data shall be preferably marked on the equipment:		
	c - number of this standard (IEC/EN60947-4-1)	IEC947-4-1	Р
	k - IP code, in case of an enclosed equipment	-	N
	Data shall be included on the nameplate, or on the manufacturer's published literature:	e equipment, or in the	
	d - rated operational voltages	690V	Р
	e – utilization category and rated operational	AC1 45A, 690V	Р
	currents (or rated powers), at the rated	AC3	
	operational voltages of the equipment	AC4 23A, 400V	
		Contactor AC15 12A, 240V	
	f - either the value of the rated frequency/ies, or the indication d.c. (or symbol)	50-60Hz	P
	g - rated duty with the indication of the class of intermittent duty, if any		N
	Associated values:		
	h - rated marking and breaking capacities (these indications may be replaced, where applicable, by the indication of the utilization category)	AC1, AC3, AC4, AC15	Р
	Safety an installation:		
	i - rated insulation voltage	690V	P
	j - rated impulse withstand voltage	8 kV	Р
	I – pollution degree	3	Р
	m - rated conditional short-circuit current and type starter and type, current rating and characteristics		Р
	m - rated conditional short-circuit current of the	3 kA	Р
	combination starter or the protected starter	Type '1' 80A fuse gL/gG	
	n – switching overvoltages	≤8 kV	Р
	Control circuits: Contactor		
	The following information concerning control circu coil or on the equipment:	its shall be placed either on the	

EN 60 947-4-1				
Clause	Requirement - Test	Result - Remark	Verdict	
	o - rated control circuit voltage (Uc), nature of	6-550V 50Hz / 6-600V 60Hz	Р	
	current and rated frequency	12-250V =		
	p - if necessary, nature of current, rated	Us = Uc	Р	
	frequency and rated control supply voltages (Us)			
	Auxiliary circuits: Contactor			
	r - ratings of auxiliary circuits	AC15 12A, 240V	Р	
	Overload relays and releases:			
	s - characteristics according to 5.7	P	Р	

8.1	CONSTRUCTION: Overload relay		
8.1.1	Materials		P
	Resistance to abnormal heat and fire		Р
	-parts retain current-carrying parts: 850 / 960°C	Housing (black)	Р
	- other: 650°C		N
8.1.2	Current-carrying parts and their connection		Р
8.1.3	Clearances		Р
	Uimp is given as:	8kV	Р
	- max. value of rated operational voltage to earth :		
		600V	
	- nominal voltage of supply system	400 / 690V	
	- overvoltage category	IV	
	- pollution degree		
	- field-in or homogeneous	1	
	- minimum clearances (mm)		
	- measured clearances (mm)		
	Uimp is not given:		N
	- rated insulation voltage Ui (V)		
	- le		
	- minimum clearances L-L/L-A (mm)		
	- measured clearances L-L/L-A (mm)	1	
	Creepage distances	1	

	EN 60 947-4-1		
Clause	Requirement – Test	Result - Remark	Verdict
	T		1
	Uimp is given as:	8 kV	11011 - 11011
	- material group or CTI	Min. III b	1
	- minimum creepage distances (mm)	10	
	- measured creepage distances (mm)	≥ 12,5	
	Uimp is not given:		N
	- material column a or b		
	- minimum creepage distances (mm)		Section 1 - Control of the Control o
	- measured creepage distances (mm)		
8.1.4	Actuator		N
8.1.4.1	Insulation		N
8.1.4.2	Direction		N
8.1.4.3	Mounting		N
8.1.5	Indication of contact position		N
8.1.5.1	Indication means		N
8.1.5.2	Indication by the actuator		N
8.1.6	Additional safety requirements for equipment with		N
	isolating function		
8.1.7	Terminals		P
8.1.7.1	All parts of terminals which maintain contact and	(see 8.2.4 below)	P
	carry current shall be of metal having adequate		
	mechanical strength		
	Terminal connections shall be such that	(see 8.2.4 below)	Р
	necessary contact pressure is maintained		
	Terminals shall be so constructed that the	(see 8.2.4 below)	P
	conductor is clamped between suitable surfaces		
	without damage to the conductor and terminal		
	Terminal shall not allow the conductor to be	(see 8.2.4 below)	P
	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		
8.2.4	Mechanical properties of terminals:	Overload	Р

	EN 60 947-4-1		
Clause	Requirement – Test	Result - Remark	Verdict
8.2.4.2	Mechanical strength of terminals		P
	maximum cross-sectional area of conductor (mm²)	6	
	diameter of thread (mm)		The second secon
	torque (Nm)	1,2	Company Comp
	5 times on 2 separate clamping units		Р
8.2.4.3	Testing for damage to and accidental loosening of	conductor (flexion test)	P
	conductor of the smallest cross-sectional area (mm²)	0,5	The second secon
	number of conductor of the smallest cross	1	1
	diameter of bushing hole (mm)	6,4	
	height between the equipment and the platen	260	
	mass at the conductor(s) (kg)		100 - 100 -
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		Р
8.2.4.4	Pull-out test	Р	
	force (N)	30	and the appropriate to the control of the control o
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		Р
	Flexion test	•	P
	conductor of the largest cross-sectional area (mm²)	6	
	number of conductor of the largest cross-	1	
	diameter of bushing hole (mm)	9,5	11 of 18 11 11 11 11 11 11 11 11 11 11 11 11
	height between the equipment and the platen (mm)	279	
	mass at the conductor(s) (kg)	1,4	**************************************

	EN 60 947-4-1			
Clause	Requirement – Test	Result - Rem	nark	Verdict
	135 continuous revolutions: the conductor shall			P
	neither slip out of the terminal nor break near the			
	clamping unit			
	Pull-out test	<u> </u>		Р
	force (N)	80		
	1 min, the conductor shall neither slip out of the			Р
	terminal nor break near the clamping unit			
	Flexion test	Overloa	ad	Р
	conductor of the largest and smallest cross-	2,5 // 0,5	6 // 1,5	7 / M 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	sectional area (mm²)	1 ' '	0 // 1,0	And the second s
	number of conductor of the smallest cross	1 // 1	1 // 1	
	sectional, number of conductor of the largest	" '	• // •	**************************************
	cross sectional			Segment of the property of the company of the compa
	diameter of bushing hole (mm)		9,5 // 6,4	
	height between the equipment and the platen	279 // 260	279 // 260	
	(mm)		213 11 200	
	mass at the conductor(s) (kg)		1,4 // 0,4	
	135 continuous revolutions: the conductor shall	0,7 77 0,0	1,4 // 0,4	P
	neither slip out of the terminal nor break near the			'
į	clamping unit			
	Pull-out test			Р
	force (N)	50 // 30	80 // 30	A-rate
	1 min, the conductor shall neither slip out of the	00 11 00	00 11 00	Р
	terminal nor break near the clamping unit			'
8.1.7.2	Connecting capacity		***************************************	P
02	type of conductors	Rigid	Flexible	101 (March 10 10 10 10 10 10 10 10 10 10 10 10 10
	minimum cross-sectional area of conductor	0,75	0,5	C
	(mm²)	1 '	0,5	
	maximum cross-sectional area of conductor	6	4	
	(mm²)		4	1
		Acc. Manuf.	loote	
	number of conductors simultaneously connectable to the terminal	Acc. manur.		The second secon
	Toomiectable to the terminal	14	2	

	EN 60 947-4-1		
Clause	Requirement – Test	Result - Remark	Verdict
8.2.4	Mechanical properties of terminals:	Contactor	
8.2.4.2	Mechanical strength of terminals		
	maximum cross-sectional area of conductor (mm²)	10	
	diameter of thread (mm)		
	torque (Nm)		And Andrew Control of the Control of
	5 times on 2 separate clamping units	1,2	P
8.2.4.3	Testing for damage to and accidental loosening of	f conductor (flexion test)	
0.2. 1.0	conductor of the smallest cross-sectional area (mm²)	1,5	
	number of conductor of the smallest cross section	2	
	diameter of bushing hole (mm)	6,4	A STATE OF THE STA
	height between the equipment and the platen (mm)	260	
	mass at the conductor(s) (kg)		
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		Р
8.2.4.4	Pull-out test		
	force (N)	40	
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		Р
	Flexion test		
	conductor of the largest cross-sectional area (mm²)	10	
	number of conductor of the largest cross-	1	The content of the
	diameter of bushing hole (mm)	9,5	A construction of the cons
	height between the equipment and the platen (mm)	279	
	mass at the conductor(s) (kg)	2	The state of the s

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Clause	Requirement - Test	Result - Remark	<u>-</u> .	Verdict
				T
	135 continuous revolutions: the conductor shall			P
	neither slip out of the terminal nor break near the			
	clamping unit	<u> </u>		<u> </u>
	Pull-out test	T		***************************************
	force (N)	90		
	1 min, the conductor shall neither slip out of the			P
	terminal nor break near the clamping unit	<u></u>		ļ
	Flexion test	Contactor		
	conductor of the largest and smallest cross-	10 // 2,5	6 // 1,5	
	sectional area (mm²):			7 / AA
	number of conductor of the smallest cross	1 // 1	1 // 1	10014y
	sectional, number of conductor of the largest			1
	cross sectional			Table 1 Table
	diameter of bushing hole (mm)	9,5	9,5 / 6,4	
	height between the equipment and the platen	279	279 / 260	
	(mm):			
	mass at the conductor(s) (kg)	2 // 0,7	1,4 / 0,4	
	135 continuous revolutions: the conductor shall			P
	neither slip out of the terminal nor break near the			
	clamping unit			
	Pull-out test			
	force (N)	90 // 50	80 // 40	
	1 min, the conductor shall neither slip out of the			P
	terminal nor break near the clamping unit			
8.1.7.2	Connecting capacity			Р
	type of conductors	Rigid	Flexible	
	minimum cross-sectional area of conductor	2,5	1,5	
	(mm²):			
	maximum cross-sectional area of conductor	10	6	The second secon
	(mm²):			The second secon
	number of conductors simultaneously	Acc. Manuf. Instr.		
	connectable to the terminal	2	2	WA CONTROL OF THE CON

	EN 60 947-4-1	1	
Clause	Requirement – Test	Result - Remark	Verdict
8.1.7.3	Connection		P
	terminals for connection to external conductors		P
	shall be readily accessible during installation		'
	clamping screws and nuts shall not serve to fix		Р
	any other component		'
8.1.7.4	Terminal identification and marking		Р
_	terminal intended exclusively for the neutral		N
	conductor		
	protective earth terminal		N
	other terminals		P
	- Main circuit::	2T1, 4T2, 6T3	
	- Auxiliary circuit	95-96, 97-98, 13-14, 21-22,	
		A1, A2	
8.1.8	Additional requirements for equipment provided wi	ith a neutral pole	N
	marking of neutral pole		N
	The switched neutral pole shall not break before		N
	and shall not make after the other poles		
	Conventional thermal current of neutral pole		N
8.1.9	Provisions for protective earthing		N
8.1.9.1	The exposed conductive parts shall be electrically		N
	interconnected and connected to a protective		
	earth terminal		
8.1.9.2	The protective earth terminal shall be readily		N
	accessible		
	The protective earth terminal shall be suitably		N
	protected against corrosion		
	The electrical continuity between the exposed		N
	conductive parts of the protective earth terminal		
	and the metal sheathing of connecting		
	conductors		
	The protective earth terminal shall have no other		N
	functions		

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Clause	Requirement – Test	Result - Remark	Verdict	
		T		
8.1.9.3	Protective earth terminal marking and		N	
	identification			
8.1.10	Enclosure for equipment		N	
8.1.10.1	Design	1	N	
	The enclosure, when it is opened: all parts		N	
	requiring access for installation and maintenance			
	are readily accessible			
	Sufficient space shall be provided inside the		N	
	enclosure			
	The fixed parts of a metal enclosure shall be		N	
	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			
	Under no circumstances shall a removable metal		N	
	part of the enclosure be insulated from the part			
	carrying the earth terminal when the removable			
-	part is in place			
	The removable parts of the enclosure shall be		N	
	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			
	When an enclosure is so designed as to allow the		N	
	covers to be opened without the use of tools,			
	means shall be provided to prevent loss of the			
	fastening devices			
8.1.10.2	Insulation		N	

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Clause	Requirement - Test	Result - Remark	Verdict
	ff, in order to prevent accidental contact between		N
	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		
8.1.11	Degree of protection of enclosed equipment	_	N
	Degree of protection:	IP	N
	Test for first characteristic		N
	Test for first numeral:	1:	TOTAL
		2:	Profess 1
		3:	
		4:	
		5:	
		6:	Adjustant and a second and a se
	Test for second characteristic		N
	Test for second numeral	1:	
		2:	
		3:	
		4:	1
		5:	1
		6:	
		7:	**************************************
		8:	Hamelous and the part of the control

9.3.1.a	TEST SEQUENCE I			
9.3.3.3	Temperature rise	Type AC	DC	Р
	ambient temperature 10-40 °C	24		Charge Wage
	Contactor			N
	test enclosure W x H x D (mm x mm x mm)	:		
	material of enclosure			
<u></u>	Main circuits, test conditions:			N

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Clause	Requirement – Test	Result - Remark	Verdict
	- conventional thermal current Ith (A)		**************************************
	- conventional enclosed thermal current Ithe (A) .:		The second secon
	- cable/busbar cross-section (mm²) / (mm):		And the state of t
	- temperature rise of main circuit terminals (K):	<	100 100 100 100 100 100 100 100 100 100
	Auxiliary circuit, test conditions:		Р
	- rated operation current le (A)	16	The second secon
	- cable cross-section (mm²)	2,5	A STORM TO THE STO
	- temperature rise of auxiliary circuit terminals	≤ 37	The second secon
	(K)		The second secon
	Coils and electromagnets, test conditions:	AC DC	Р
	- rated control supply voltage Us (V)	240 24	The second secon
	- Class of insulating material:	F F	
	- temperature rise of coil and electromagnets (K) :	≤ 71 ≤ 55	1
	Starter Tested wi	th setting range 22 – 30 A	and a supplied the second seco
		an setting range 22 - 30 A	i
	test enclosure W x H x D (mm x mm x mm):		The Control of Control
		Open Type	The state of the s
	test enclosure W x H x D (mm x mm x mm):	Open Type None	P
	test enclosure W x H x D (mm x mm x mm): material of enclosure	Open Type None	P
	test enclosure W x H x D (mm x mm x mm): material of enclosure	Open Type None cause of max. Power	P
	test enclosure W x H x D (mm x mm x mm): material of enclosure	Open Type None cause of max. Power 30 (45*)	P
	test enclosure W x H x D (mm x mm x mm): material of enclosure	Open Type None cause of max. Power 30 (45*) 6 mm²	P
	test enclosure W x H x D (mm x mm x mm): material of enclosure	Open Type None cause of max. Power 30 (45*) 6 mm²	P
	test enclosure W x H x D (mm x mm x mm): material of enclosure	Open Type None cause of max. Power 30 (45*) 6 mm² ≤ 65	
	test enclosure W x H x D (mm x mm x mm): material of enclosure	Open Type None cause of max. Power 30 (45*) 6 mm² ≤ 65	
	test enclosure W x H x D (mm x mm x mm): material of enclosure	Open Type None cause of max. Power 30 (45*) 6 mm² ≤ 65	
	test enclosure W x H x D (mm x mm x mm): material of enclosure	Open Type None cause of max. Power 30 (45*) 6 mm² ≤ 65 4 1 ≤ 40	
9.3.3.2	test enclosure W x H x D (mm x mm x mm): material of enclosure	Open Type None cause of max. Power 30 (45*) 6 mm² ≤ 65 4 1 ≤ 40	
9.3.3.2	test enclosure W x H x D (mm x mm x mm): material of enclosure	Open Type None cause of max. Power 30 (45*) 6 mm² ≤ 65 4 1 ≤ 40	
	test enclosure W x H x D (mm x mm x mm): material of enclosure	Open Type None cause of max. Power 30 (45*) 6 mm² ≤ 65 4 1 ≤ 40	P

	EN 60 947-4-1		
Clause	Requirement – Test	Result - Remark	Verdict
		1	1
	limits of close satisfactorily at any value between	76 64	Р
	85% and 110% of rated control supply voltage		
	Us		
	limits of drop out and open fully are: 75% to 20%	53 33	Р
	for a.c. and 75% to 10% for d.c.		
9.3.3.2.2	Relays and releases Setting R	ange 22 – 30 A	Р
	Conditions for thermal and time-delay magnetic ov	erload relays only:	р
	type of time-delay overload relay:	Thermal, Temp. compensated	1 1 1 1 1 1 1 1 1 1
	trip class:	10A	The state of the s
	current settingl _{set} :	22 A 30 A	
	ambient temperature (°C):	24	
	test enclosure W x H x D (mm x mm x mm):	None	The second secon
	cable/busbar cross-section (mm²) / (mm):	6	
	at A (1,05) times of current setting, tripping shall	23,1 A 31,5 A	
	not occur in less than 2 h starting from the cold		Section 1. Section 1.
	state; test current	No tripping No tripping	The control of the
	When the current is subsequently raised to B	26,4 A 36 A	1
	(1,2) times the current setting, tripping shall occur		And the second s
	in less than 2 h; test currentmin:sec :	7:15 2:30	The second secon
	for class 10A overload relays energized at C (1,5)	33 A 45 A	
	times the current, tripping shall occur in less than		The second content of the second content o
	2 min, starting from thermal equilibrium at the		State State
	current setting; test currentmin:sec :	0:45 0:15	The second secon
	for class 10, 20 or 30 overload relays energized	N	A CONTROL OF THE PROPERTY OF T
	at C times the current, tripping shall occur in less	1	
	than 2, 8 or 12 min, starting from thermal		*** ***
	equilibrium at the current setting; class; test		
	current; tripping time		1
	at D (7,2) times the current setting, tripping shall	158,4 A 216 A	1
	occur within the tripping time (s) $2 < Tp \le 10$,		
	starting from the cold state; test current; tripping		
	time Tp (s)	2,3 2,1	

	EN 60 947-4-1			
Clause	Requirement – Test	Result - Rema	ark	Verdict
	Ambient temperature: - 5 °C			**************************************
	at A (1,05) times of current setting, tripping shall	23,1 A	31,5 A	The state of the s
	not occur in less than 2 h starting from the cold			
	state; test current	No tripping	No tripping	W
	When the current is subsequently raised to B	26,4 A	36 A	
	(1,2) times the current setting, tripping shall occur			
	in less than 2 h; test currentmin:sec :	25:10	1:20	The state of the s
	for class 10A overlod relays energized at C (1,5)	33 A	45 A	Age die aus James Transport
	times the current, tripping shall occur in less than			The state of the s
<u> </u>	2 min, starting from thermal equilibrium at the			
	current setting; test current min:sec :	1:04	0:20	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	for class 10, 20 or 30 overload relays energized	N		
	at C times the current, tripping shall occur in less			
	than 2, 8 or 12 min, starting from thermal			
	equilibrium at the current setting; class; test			We will be a second of the sec
	current; tripping time			7 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -
	at D (7,2) times the current setting, tripping shall	158,4 A	216A	LA LINE Who a surface And
	occur within the tripping time (s) 2 < Tp ≤ 10s			Angel S S S S S S S S S S S S S S S S S S S
	tarting from the cold state; test current; tripping			1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	time Tp (s):	2,8	2,1	, A
	Ambient temperature: + 40 °C			
	at A (1,05) times of current setting, tripping shall	23,1 A	31,5 A	7 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -
	not occur in less than 2 h starting from the cold			A programmer
	state; test current	No tripping	No tripping	250000 for 10000 for 10000 for 10000 for 10000 for 10
:	When the current is subsequently raised to B	26,4 A	36 A	7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	(1,2) times the current setting, tripping shall occur			
	in less than 2 h; test current min:sec :	3:40	3:20	X
	for class 10A overload relays energized at C (1,5)	33 A	45 A	
	times the current, tripping shall occur in less than			
	2 min, starting from thermal equilibrium at the			1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	current setting; test current min:sec :	0:20	0:28	

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Clause	Requirement - Test	Result - Remark	Verdict
Г		T	F1 - 12 (1.27)
	for class 10, 20 or 30 overload relays energized	N	
	at C times the current, tripping shall occur in less		100 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	than 2, 8 or 12 min, starting from thermal		
	equilibrium at the current setting; class; test		
	current; tripping time		
	at D (7,2) times the current setting, tripping shall	158,4 A 216 A	
	occur within the tripping time (s) $2 < Tp \le 10$		
	starting from the cold state; test current; tripping		
	time Tp (s)	2,2 2,4	
	Limits of operation of three-pole thermal overload	relays energized on two poles:	P
	ambient temperature (°C)	25	
	the relay energized on three poles, at A (1 / 0,9)	22 A / 19,8 A 30 A / 27 A	The state of the s
	times the current setting, tripping shall not occur		The state of the s
	in less than 2 h, starting from the cold state:		
		No tripping No tripping	Topicological and the second s
	when the value of the current flowing in two poles	25,3 A / 0 A 34,5 A / 0 A	The second secon
	is increased to B (1,15) times the current setting		The state of the s
	and the third pole deenergized, tripping shall		A C VIII CONTROL OF CO
	occur in less than 2 h min:sec :	0:20 0:11	
9.3.3.4	Test of dielectric properties, impulse withstand vol	tage (Uimp indicated):	Р
	- verification by measurement of clearances		N
	instead of testing		
	- rated impulse withstand voltage (V):	8000	Annual Control of the
	- test Uimp main circuits (kV)	9,8 / 7	Р
	- test Uimp auxiliary circuits (kV)	9,8 / 7	Р
	Test of dielectric properties, dielectric withstand vo		N
	- rated insulation voltage (V)		*** *** *** *** *** *** *** *** *** **
	- main circuits, test voltage for 1 min (V)		N
	- control and auxiliary circuits, test voltage for		N
	1 min (V)		'
	1	1	

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Clause	Requirement Test	Result - Remark	Verdict
	T		
9.3.3.5	TEST SEQUENCE II		
	Making and breaking capacity	I	Section 1. Section 1.
	utilization category	AC1	
	rated operational voltage Ue (V)	690	O
	rated operational current le (A) or power (kW):	45A	**************************************
	Conditions, make/break operations AC-1 only:		Р
	- test voltage U/Ue = 1,05 (V)	L1: 740	
		L2: 740	
		L3: 738	The state of the
	- test current I/Ie = 1,5 (A):	L1: 78	The content of the
		L2: 77	
		L3: 78	MENTER TO THE PROPERTY OF THE
	- power factor/time constant:	L1: 0,83	
		L2: 0,82	
		L3: 0,83	
	- on-time (ms)	160	
	- off-time (s):	9,8	
	- number of make/break operations:	50	Р
	Behaviour and condition during and after the test:		Р
	- no permanent arcing		Р
	- no flash-over between poles		Р
	- no blowing of the fusible element in the earth		Р
	circuit		1
	- no welding of the contacts		Р
	- the contacts shall operate when the contactor or		Р
	starter is switched by the applicable method of		
	control		
	Operational performance capability:		Р
	utilization category (AC-3 or AC-4)	AC4	1
	rated operational voltage Ue (V)	<u> </u>	The state of the s
	rated operational current le (A) or power (kW):		
	Conditions, make operations AC3/AC4 only:	20/1	P

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Clause	Requirement – Test	Result - Remark	Verdict
			
	- test voltage U/Ue = 1,05 (V):	L1: 425	
		L2: 424	The second secon
		L3: 425	
	- test current I/Ie = (A):	L1: 364	### April 1997 1997
		L2: 364	
		L3: 363	
	- power factor/time constant:	L1: 0,45	200 000 000 000 000 000 000 000 000 000
		L2: 0,44	
		L3: 0,45	
	- on-time (ms)	100	
	- off-time (s)	10	And the second s
	- number of make operations:	50	Р
	Characteristic of transient recovery voltage for AC	-3 and AC-4 only:	Р
	oscillatory frequency (kHz)		
	Measured oscillatory frequency (kHz)	ł	
		L2: 54	
		L3: 53	
	Factor y	L1: 1,1	
		L2: 1,1	
		L3: 1,1	
	Behaviour and condition during and after the test:		Р
	- no permanent arcing	Р	Р
	- no flash-over between poles	Р	P
	- no blowing of the fusible element in the earth	Р	Р
	circuit		
	- no welding of the contacts	Р	Р
	- the contacts shall operate when the contactor or	Р	Р
	starter is switched by the applicable method of		
	control		
	Operational performance capability:		
	utilization category	AC4	1
	rated operational voltage Ue (V)	400	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

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Clause	Requirement – Test	Result - Remark	Verdict
	rated operational current le (A) or power (kW):	23A	
	Conditions, make/break operations AC3 / AC4 only	y:	Р
	- test voltage U/Ue = 1,05 (V)	L1: 424	
		L2: 422	
		L3: 425	
	- test current I/Ie = (A):	L1: 180	
		L2: 181	
		L3: 180	
	- power factor/time constant:	L1: 0,4	*** *** *** *** *** *** *** *** *** **
		L2: 0,4	The second secon
		L3: 0,4	The state of the s
	- on-time (ms)	100	The state of the s
	- off-time (s)	4	Of minutes and min
	- number of make/break operations:	6000	Р
	Characteristic of transient recovery voltage for AC	-3 and AC-4 only:	Р
	oscillatory frequency (kHz):		With the second
	Measured oscillatory frequency (kHz)	L1: 45,5	
		L2: 46	
		L3: 46	
	Factor y	L1: 1,1	
		L2: 1,1	
		L3: 1,1	
	Behaviour and condition during and after the test:		Р
	- no permanent arcing	Р	P
	- no flash-over between poles	Р	P
	- no blowing of the fusible element in the earth	P	P
	circuit		
	- no welding of the contacts	Р	P
	- the contacts shall operate when the contactor or	Р	P
	starter is switched by the applicable method of		
	control		
8.3.3.6	Operational performance capability:		

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Clause	Requirement – Test	Result - Remark	Verdict	
	utilization category	AC1		
	rated operational voltage (V)	690		
	rated operational current le (A) or power (kW):	45A		
	Test conditions for make/break operations AC-1 or	nly:	Р	
	test voltage (V)	L1: 725		
		L2: 730		
		L3: 730		
	test current (A):	L1: 52		
		L2: 53		
		L3: 53		
	power factor/time constant:	L1: 0,82	The state of the s	
		L2: 0,81		
		L3: 0,80	And the second s	
	- on-time (ms)	160		
	- off-time (s):	2,3	The state of the s	
	- number of operating cycles	6000	P	
8.3.3.6.6	Behaviour and condition during and after the test:		P	
	- no permanent arcing		P	
	- no flash-over between poles		P	
	- no blowing of the fusible element in the earth		Р	
	circuit			
	- no welding of the contacts		Р	
	- the contacts shall operate when the contactor or		Р	
	starter is switched by the applicable method of			
	control			
	Dielectric verification:		Р	
	test voltage (2 Ue + 1000 V) for 1 min (V)	2380		

9.3.4	TEST SEQUENCE III	
	Performance under short-circuit conditions	
9.3.4.2.1	Test at de prospective current "r": U12/16 22 -30A	

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Clause	Requirement – Test	Result - Remark	Verdict
	type of SCPD	Siemens NH00 gL / gG	1 " " " " " " " " " " " " " " " " " " "
	ratings of SCPD, co-ordination type 1	80A / 500V	100 110 110 110 110 110 110 110 110 110
	ratings of SCPD, co-ordination type 2		
	rated operational current le (A) AC-3		
	prospective current "r" (kA)		
	test voltage (V)		
	3	L2: 543	Comment of the commen
		L3: 545	And X : X : X : X : X : X : X : X : X : X
	r.m.s. test current (A)	L1: 3040	And the second s
		L2: 3090	
		L3: 3110	
	peak current (A)	L1: 4350	Open
	, , ,	L2: 4360	William (1997) (
		L3: 3910	
	power factor	0,9	
	1. one breaking operation of SCPD with all the	L1: 20,1 kA2s / 2930A	
	switching devices closed prior to the test I2dta	L2: 23,6 kA2s / 2930 A	
	(A2s) /peak current I (A)	L3: 20,0 kA2s / 3450 A	
	2. one breaking operation of SCPD by closing the	L1: 18,6 kA2s / 2850 A	The second secon
	contactor or starter on to the short-circuit I²dta	L2: 23,5 kA2s / 2850 A	
	(A2s) /peak current I (A)	L3: 21,3 kA2s / 3445 A	
	Behaviour of the equipment during the test		Р
	Both types of co-ordination (all devices):		Р
	A - the fault current has been successfully		Р
	interrupted by the SCPD or the combination		
	starter and the fuse or fusible element, or solid		
	connection between the enclosure and supply		
	shall not have melted		
	B - the door or cover of the enclosure has not		Р
	been blown open and it is possible to open the		
	door or cover		

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Clause	Requirement - Test	Result - Remark	Verdict
	C - there is no damage to the conductors or		Р
	terminals and the conductors have not been		
	separated from the terminals		
	D - there is no cracking or breaking of an		Р
	insulating base to the extent that the integrity of		
	mounting of a live part is impaired		
	Both types of co-ordination (combination starters a	and protected starters only):	N
	E - the circuit breaker or the switch is capable of		N
	being opened manually by its operating means		
	F - neither end of the SCPD is completely		N
	separated from its mounting means to an		
	exposed conductive part		
	G - if a circuit breaker with rated ultimate short-circ	cuit breaking capacity less than	N
	the rated conditional short-circuit current assigned	to the combination or	
	protected starter is employed, the circuit breaker s	hall be tested to trip:	
	1) circuit breaker with instantaneous trip relays or		N
	releases, at 120% of the trip current		
	2) circuit breaker with overload relays or		N
	releases, at 250% of the rated current of the		
	circuit breaker		
	Type 1 co-ordination (all devices):		Р
	H - there has been no discharge of parts beyond	P	Р
	the enclosure. The starter may be inoperative		
	after each operation		
	Type 1 co-ordination (combination and protected s	starters only):	Р
	I - dielectric verification test voltage (2 Ue) for	1380	
:	1 min (V)		
	Type 2 co-ordination (all devices):		N
	J - no damage to the overload relay or other parts		N
	has occurred, except that welding of contactor or		
	starter contacts is permitted, if they are easily		
	separated without significant deformation		

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Clause	Requirement – Test	Result - Remark	Verdict	
				
	K - the tripping of the overload relay shall be		N	
	conform to the published tripping characteristics,			
	before and after the test			
	L - dielectric verification test voltage (2 Ue) for			
	1 min (V)			
9.3.4.2.2	Test at the rated conditional short-circuit current "I	g" ≤ SCC "r"	N	
	type of SCPD			
	ratings of SCPD, co-ordination type 1		Agev.	
	ratings of SCPD, co-ordination type 2			
	rated operational current le (A) AC-3		A A A A A A A A A A A A A A A A A A A	
	prospective current "Iq" (kA)			
	test voltage (V)		- Additional Control of the Control	
		L2:		
		L3:	The second secon	
	r.m.s. test current (A)	* '	The second secon	
	This test out on the table	L2:		
		L3:	The second secon	
	peak current (A)		**************************************	
	peak current (A)	L2:		
		L3:	The second secon	
	nouse feater	1.3.		
·-·····	power factor		* * ** *******************************	
	1. one breaking operation of SCPD with all the	L1:		
	switching devices closed prior to the test l²dta	L2:	A second principle of the seco	
	(A²s)		Normal Control of the	
	2. one breaking operation of SCPD by closing the		7,000 (1 min)	
	contactor or starter on to the short-circuit		** ** ** ** ** ** ** ** ** ** ** ** **	
		L3:	The second secon	
	3. one breaking operation of SCPD by closing the	L1:	The second secon	
	switching device on to the short-circuit:	L2:	*** *** *** *** *** *** *** *** *** **	
		L3:	7 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	
	Behaviour of the equipment during the test		N	
	Both types of co-ordination (all devices):		N	

	EN 60 947-4-1	
Clause	Requirement – Test Result - Remark	Verdict
	A - the fault current has been successfully	N
	interrupted by the SCPD or the combination	
	starter and the fuse or fusible element, or solid	
	connection between the enclosure and supply	
	shall not have melted	
	B - the door or cover of the enclosure has not	N
	been blown open and it is possible to open the	
	door or cover	
	C - there is no damage to the conductors or	N
	terminals and the conductors have not been	
	separated from the terminals	
	D - there is no cracking or breaking of an	N
	insulating base to the extent that the integrity of	
	mounting of a live part is impaired	
	Both types of co-ordination (combination starters and protected starters only):	N
	E - the circuit breaker or the switch is capable of	N
	being opened manually by its operating means	
	F - neither end of the SCPD is completely	N
	separated from its mounting means to an	
	exposed conductive part	
	G - if a circuit breaker with rated ultimate short-circuit breaking capacity less than	N
	the rated conditional short-circuit current assigned to the combination or	
	protected starter is employed, the circuit breaker shall be tested to trip:	
	circuit breaker with instantaneous trip relays or	N
	releases, at 120% of the trip current	
	2) circuit breaker with overload relays or	N
	releases, at 250% of the rated current of the	
	circuit breaker	
	Type 1 co-ordination (all devices):	N
	H - there has been no discharge of parts beyond	N
	the enclosure. The starter may be inoperative	
	after each operation	

	EN 60 947-4-1		
Clause	Requirement – Test	Result - Remark	Verdict
	Type 1 co-ordination (combination and protected	starters only):	N
	I - dielectric verification test voltage (2 Ue) for 1 min (V)		
	Type 2 co-ordination (all devices):		N
	J - no damage to the overload relay or other parts has occurred, except that welding of contactor or starter contacts is permitted, if they are easily separated without significant deformation		N
	K - the tripping of the overload relay shall be conform to the published tripping characteristics, before and after the test		N
	L - dielectric verification test voltage (2 Ue) for		

9.3.5	TEST SEQUENCE IV: (APPLICABLE FOR CONT	Р	
	Overload current withstand capability of contactors:		P
	ambient temperature (°C):	25	
	rated operational current le (A) max. AC-3:	23	
	test current (le) (A):	184	
	duration of test: 10 s	10s	
	After the test, the contactor shall be substantially	Р	Р
	in the same condition as before the test (visual		
	inspection)		

TABLE: temperature rise measurements			P
temperature rise dT of part.	NO.	1 1 1 1 1 1 1 1 1 1	Required dT
Main Terminals Contactor (30A)	1	60	65
	3	60	65
	5	65	65

		EN 60 947-4	-1					
Clause	Requirement – Test		Result - Ren	Result - Remark				
Main Terr	Main Terminal Overload Relay (30A) 2 63 65							
			4	63	65			
			6	63	65			
Auxilixary	Terminals Contactor (16A)		13	48	65			
			14	48	65			
Auxiliary	Terminal Overload Relay (4A)		95	40	65			
			96	35	65			
Call	040)/	5011-			105			
Coil:	240V 24V + 10%	50Hz DC		71 55	135 135			

	EN 60 947-4-1		
Clause	Requirement – Test	Result - Remark	Verdict
		• •	
	EN 60 947-5-1		1
8.3.3.5.3	Making and breaking capacities of switching elem	ents under abnormal	P
	conditions:		
	utilization category	AC15	
	rated operational voltage Ue (V)	240	
	rated operational current le (A) or power (kW)	12	No.
	Conditions, make/break operations:		
	- test voltage U/Ue = 1,1 (V)	L1: 266	And 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
		L2: -	
		L3: -	
	- power factor/time constant	L1: 0,31	
		L2: -	1999 1997
		L3: -	
	- make operations: test current I/le (A)	L1: 123	Yes - Value -
		L2: -	
		L3: -	
	- break operations: test current I/Ie (A)	L1: 123	
		L2: -	A
		L3: -	
	- on-time (ms)	300	
	- operating cycles per minute		
	- number of operating cycles		Р
	Behaviour and condition during and after the test:		Р
	- no electrical or mechanical failures		Р
	- no contact welding or prolonged arcing		Р
	- no blowing of the fusible element in the earth		Р
	circuit		
	Dielectric verification:	•	P
	dielectric test voltage (V)	2000	Р

		EN 60 947-4-1		
Clause	Requirement – Test		Result - Remark	Verdict

	EN 60 947-5-1		
8.3.3.5	TEST SEQUENCE III		
8.3.3.5.2	Making and breaking capacities of switching elements under normal conditions		
	utilization category	AC15	
•	rated operational voltage Ue (V)	240	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	rated operational current le (A) or power (kW):		The state of the s
·	Conditions, make/break operations:		P
	- test voltage U/Ue = 1,1 (V)	L1: 266* / 242 **	*** A ***
	* 50 operation at 266V	L2:	
	** 6000 operations at 242V:	L3:	100 mm 1 mm 1 mm 1 mm 1 mm 1 mm 1 mm 1
		L1: 0,31	1100
		L2: -	***
		L3: -	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	- make operations: test current I/Ie (A)	L1: 123	
		L2: -	The second secon
		L3: -	
	- break operations: test current I/le (A)	L1: 13	The state of the s
		L2: -	
		L3:	
	- on-time (ms) *50 oper. / **6000 oper	160 * / 300**	WA
	- operating cycles per minute:		**************************************
	- number of operating cycles:		Р
	Behaviour and condition during and after the test:		Р
	- no electrical or mechanical failures		Р
	- no contact welding or prolonged arcing		Р
	- no blowing of the fusible element in the earth		Р
	circuit		
	Dielectric verification:		Р
	dielectric test voltage (V)	2000	Р
	utilization category	1	**************************************
	rated operational voltage Ue (V)	i	

EN 60 947-4-1				
Clause	Requirement – Test	Result - Remark	Verdict	

	EN 60 947-5-1		
8.3.4	TEST SEQUENCE IV Performance under conditional short-circuit current		
			P
	type of SCPD	Siemens Diazed gL / gG	
	ratings of SCPD:	25A / 500V	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	prospective current (kA):	1	
	test voltage (V) U/Ue = 1,1 (V):	L1: 277	
		L2: 275	
		L3: 276	**************************************
	r.m.s. test current (A):	L1: 1010	
		L2: 1050	1
		L3: 1020	A 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	power factor (max. 0,7)	0,7	
	first making operation to closed switching	L1: 1650 A2s / 770A	1
	elements: test I²dta (A²s) / I _D (A):	L2: 2880 A2s / 830 A	- 17 - 18 - 18 - 18 - 18 - 18 - 18 - 18
		L3: 2850 A2s / 1090 A	
	time interval between test (min. 3 min)		7
	second making operation to closed switching	L1: 1430 A2s / 700 A	*** **********************************
	elements: test I²dta (A²s) / I _D (A)	L2: 2900 A2s / 830 A	The state of the s
		L3: 2860 A2s / 1080 A	
	time interval between test (min. 3 min):		
	third making operation to closed switching	L1: 2910 A2s / 1030 A	
	elements: test I²dta (A²s) / I _D (A)	L2: 2540 A ² s / 975 A	
		L3: 830 A2s / 545 A	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	Behaviour of the equipment during the test:		Р
	switching elements open by the normal actuating system		Р
	Dielectric verification:		Р
	dielectric test voltage (V)	2000	Р



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TEST REPORT EN 60 947-4-1

Low-voltage switchgear and controlgear

Part 4: Contactors and motor-starters

Section 1: Electromechanical contactors and motor-starters

Report reference No. : 2.03.00356.1.0-K230/B&J

Tested by (+ signature).....: Ing.J.Ainetter
Approved by (+ signature): Ing.K.Farthofer
Date of issue.....: 02.02.2004

Testing laboratory : Österreichische Forschungs- und Prüfzentrum Arsenal

Ges.m.b.H

Address...... : A - 1031 Vienna, Faradaygasse 3

Testing location....: as above

Address..... : A – 1220 Vienna, Lieblgasse 7

Standard: EN 60 947-4-1:2000-11

Test Report Form No. 69474-1A

Master TRF.....: reference No. 69474-1A, dated 95-07

Copyright blank test report....: the bodies participating in the Committee of Certification

Bodies (CCB) and/or the CENELEC Certification

Agreement (CCA).

Test procedure: CB-scheme

Procedure deviation.....: N.A. Non-standard test method: N.A.

Type of test object: Motor-Starter

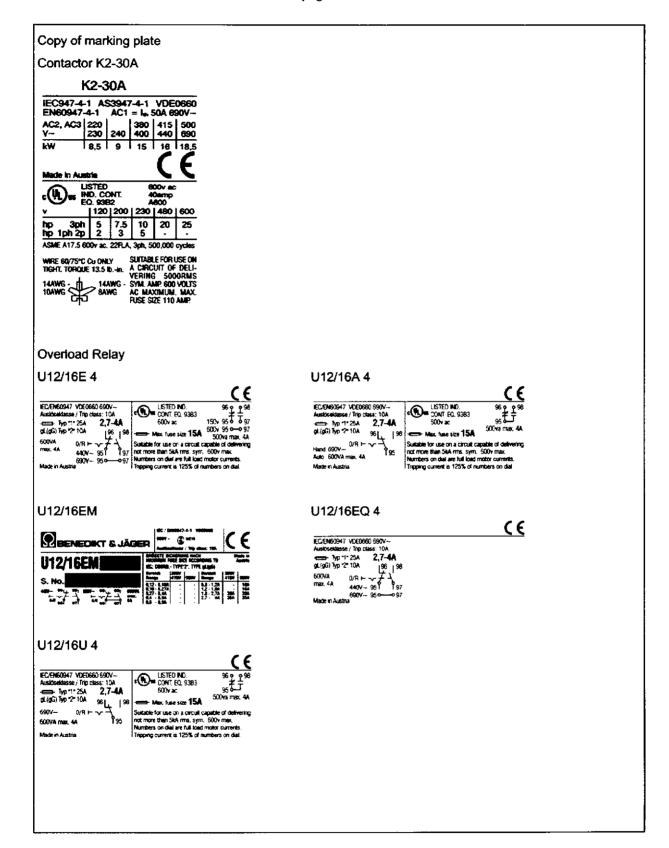
Trademark: Ω, Benedikt & Jäger Model/type reference: K2-30Axx + U12/16xxx

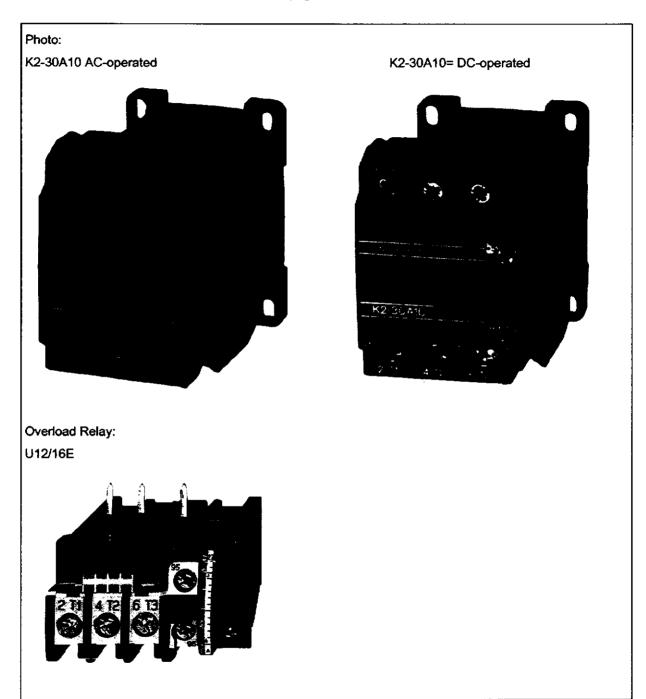
Manufacturer.....: Ω Benedikt & Jäger

Rating : AC1 50A 690V 50-60Hz

AC3/AC4 30A 400V 50-60Hz

AC15 12A 240V 50-60Hz





	· · · · · · · · · · · · · · · · · · ·
Test item particulars:	
- method of operation:	Magnetic
- switching positions	ON-OFF
- number of polesContactor:	3 Main 1 Aux
- kind of current:	AC
- number of phases	3
- rated frequency (Hz)	50-60
- number of positions of main contacts	2
Rated and limiting values, main circuit	
- rated operational voltage Ue (V):	690
- rated insulation voltage Ui (V):	690
- rated impulse withstand voltage Uimp (kV):	8
- conventional free air thermal current lth (A):	50
- conventional enclosed thermal current Ithe (A):	50
- rated operational current le (A):	50
- rated uninterrupted lu (A):	50
- utilization category:	AC1, AC3, AC4
Short-circuit characteristic:	
- rated prospective short-circuit current "r" (kA):	3
- rated conditional short-circuit current Iq (kA):	3
Rated and limiting values, auxiliary circuits:	For Contactor
- rated operational voltage (V):	240
- rated frequency (Hz)	50-60
- number of circuits	1
- number and kind of contact elements:	1 NO or 1 NC
Co-ordination of short-circuit protective devices:	Type "1"
- kind of protective device:	Fuse
Possible test case verdicts:	
- test case does not apply to the test object:	N(.A.)
- test object does meet the requirement:	P(ass)
- test object does not meet the requirement:	F(ail)

General remarks:

"(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.

The test results presented in this report relate only to the object tested.

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- 1) Based on the decision of the applicant, some of the tests of Test Sequences I and II may have been performed under more severe conditions than required in the stanard. In case of, relevant values for equipment under test are stated in test report.
- 2) Relevant tests have been performed with or without 'snap on auxiliary contact block' Typ 'HN' or 'HA'.
- 3) The test item is corresponding to the requirements of IEC 60947-4-1 Ed. 2.0 (2000-11) + A1 (2002-09).

```
Ordering key:
Contactor
K2-30A x x
       | |>>>
                     : 0, 1 : Number of NC auxiliary contacts
       | >>>>
                     : 0, 1 : Number of NO auxiliary contacts
Overload Relay
U12/16 x x x
       | | | >>>>
                      : Setting range 0.12 - 0.18 / 0.18 - 0.27 / 0.27 - 0.4 / 0.4 - 0.6 /
       11
                              0.6 - 0.9 / 0.8 - 1.2 / 1.2 - 1.8 / 1.8 - 2.7 /
                              2,7-4 / 4-6 / 6-9 / 8-11 / 10-14 / 13-18 /
       11
                              17 - 23 / 22 - 30 A
       1.1
       1.1
       | | >>>>
                      : M ... With additional quick trip up to 4A (optional)
                      : Q ... Thermic quick trip up to 14A (optional)
       |>>>>
                      : U ... Change over auxiliary contacts
                      : A ... Change over auxiliary contacts with autom. Reset
                      : E ... 1 NC and 1 NO auxiliary contact
Control Circiut Voltage:
6 ~ 550V
               50Hz
6 - 600 V
               60Hz
12 - 250V
               DC
       With Late Break Contact in series to coil.
```

EN 60 947-4-1			
Clause	Requirement – Test	Result - Remark	Verdict
6.2	MARKING:		
	Data shall be preferably marked on the equipmen	t:	Р
	c - number of this standard (IEC/EN60947-4-1)	IEC947-4-1	Р
	k - IP code, in case of an enclosed equipment	_	N
	Data shall be included on the nameplate, or on the	e equipment, or in the	
	manufacturer's published literature:		
	d - rated operational voltages	690V	Р
	e – utilization category and rated operational	AC1 50A, 690V	Р
	currents (or rated powers), at the rated	AC3	
	operational voltages of the equipment	AC4 30A, 400V	
		Contactor AC15 12A, 240V	
	f - either the value of the rated frequency/ies, or	50-60Hz	Р
	the indication d.c. (or symbol)		
	g - rated duty with the indication of the class of		N
	intermittent duty, if any		
	Associated values:		
	h - rated marking and breaking capacities (these	AC1, AC3, AC4, AC15	Р
	indications may be replaced, where applicable,		
	by the indication of the utilization category)		
	Safety an installation:		
	i - rated insulation voltage	690V	Р
	j - rated impulse withstand voltage	8 kV	Р
	l – pollution degree	3	Р
	m - rated conditional short-circuit current and type	of co-ordination of contactor or	Р
	starter and type, current rating and characteristics	of the associated SCPD:	
m - rated conditional short-circuit current of the		3 kA	P
	combination starter or the protected starter	Type '1' 80A fuse gL/gG	
	n – switching overvoltages	≤ 8 kV	₽
	Control circuits: Contactor		
	The following information concerning control circu	its shall be placed either on the	
	coil or on the equipment:		

	EN 60 947-4-1			
Clause	Requirement - Test	Result - Remark	Verdict	
	o - rated control circuit voltage (Uc), nature of	6-550V 50Hz / 6-600V 60Hz	Р	
	current and rated frequency	12-250V =		
	p - if necessary, nature of current, rated	Us = Uc	Р	
	frequency and rated control supply voltages (Us)			
	Auxiliary circuits: Contactor			
	r - ratings of auxiliary circuits	AC15 12A, 240V	Р	
	Overload relays and releases:			
	s - characteristics according to 5.7	Р	Р	

8.1	CONSTRUCTION: Overload relay		
8.1.1	Materials		Р
	Resistance to abnormal heat and fire		Р
	-parts retain current-carrying parts: 850 / 960°C	Housing (black)	P
	- other: 650°C		N
8.1.2	Current-carrying parts and their connection		Р
8.1.3	Clearances		Р
	Uimp is given as:	8kV	Р
	- max. value of rated operational voltage to earth		
		600V	The state of the s
	- nominal voltage of supply system	400 / 690V	
	- overvoltage category	IV	
	- pollution degree	3	
	- field-in or homogeneous	Inhomogeneous	
,	- minimum clearances (mm)	8	
·	- measured clearances (mm)	≥10	
	Uimp is not given:		N
	- rated insulation voltage Ui (V)		
. =	- le		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	- minimum clearances L-L/L-A (mm)		
	- measured clearances L-L/L-A (mm)		
	Creepage distances		

EN 60 947-4-1			
Clause	Requirement – Test	Result - Remark	Verdict
	Uimp is given as:	8 kV	anguariti = .
	- material group or CTI	Min. III b	
	- minimum creepage distances (mm)	10	The second secon
	- measured creepage distances (mm)	≥ 12,5	
	Uimp is not given:		N
_	- material column a or b		
	- minimum creepage distances (mm)		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	- measured creepage distances (mm)		
8.1.4	Actuator		N
8.1.4.1	Insulation		N
8.1.4.2	Direction		N
8.1.4.3	Mounting		N
8.1.5	Indication of contact position		N
8.1.5.1	Indication means		N
8.1.5.2	Indication by the actuator		N
8.1.6	Additional safety requirements for equipment with		N
-	isolating function		
8.1.7	Terminals	•	Р
8.1.7.1	All parts of terminals which maintain contact and	(see 8.2.4 below)	Р
	carry current shall be of metal having adequate	,	
	mechanical strength		
	Terminal connections shall be such that	(see 8.2.4 below)	Р
	necessary contact pressure is maintained		
	Terminals shall be so constructed that the	(see 8.2.4 below)	P
	conductor is clamped between suitable surfaces		
	without damage to the conductor and terminal		
	Terminal shall not allow the conductor to be	(see 8.2.4 below)	Р
	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		
8.2.4	Mechanical properties of terminals:	Overload	P

EN 60 947-4-1			
Clause	Requirement – Test	Result - Remark	Verdict
8.2.4.2	Mechanical strength of terminals		P
	maximum cross-sectional area of conductor (mm²)	6	
	diameter of thread (mm)	M4	The second secon
	torque (Nm)	1,2	
	5 times on 2 separate clamping units		Р
8.2.4.3	Testing for damage to and accidental loosening of	conductor (flexion test)	Р
	conductor of the smallest cross-sectional area (mm²)	0,5	1
	number of conductor of the smallest cross	1	The state of the
	diameter of bushing hole (mm)	6,4	
	height between the equipment and the platen (mm)	260	
	mass at the conductor(s) (kg)		
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		P
8.2.4.4	Pull-out test		Р
	force (N)	30	The second secon
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		Р
	Flexion test		Р
	conductor of the largest cross-sectional area (mm²)	6	
	number of conductor of the largest cross-	1	
	diameter of bushing hole (mm)	9,5	**************************************
	height between the equipment and the platen (mm)	279	
	mass at the conductor(s) (kg)	1,4	

	EN 60 947-4-1			
Clause	Requirement – Test	Result - Rem	ark	Verdict
		1		1
	135 continuous revolutions: the conductor shall			Р
	neither slip out of the terminal nor break near the			
	clamping unit			
	Pull-out test			Р
	force (N)	80		
	1 min, the conductor shall neither slip out of the			Р
	terminal nor break near the clamping unit			
	Flexion test	Overloa	ad	Р
	conductor of the largest and smallest cross-	2,5 // 0,5	6 // 1,5	
	sectional area (mm²)			
	number of conductor of the smallest cross	1 // 1	1 // 1	
	sectional, number of conductor of the largest			
	cross sectional			
	diameter of bushing hole (mm)		9,5 // 6,4	
	height between the equipment and the platen	279 // 260	279 // 260	
ļ	(mm)			
	mass at the conductor(s) (kg)		1,4 // 0,4	
	135 continuous revolutions: the conductor shall			Р
	neither slip out of the terminal nor break near the			
	clamping unit			
	Pull-out test			Р
	force (N)	50 // 30	80 // 30	
	1 min, the conductor shall neither slip out of the			Р
	terminal nor break near the clamping unit			
8.1.7.2	Connecting capacity			Р
	type of conductors	Rigid	Flexible	
	minimum cross-sectional area of conductor	0,75	0,5	
	(mm²):	1	-,-	
	maximum cross-sectional area of conductor	6	4	
	(mm²)			
	number of conductors simultaneously	Acc. Manuf, I	nstr.	
	connectable to the terminal:		2	
		1		<u> </u>

	EN 60 947-4-1			
Clause	Requirement – Test	Result - Remark	Verdict	
8.2.4	Mechanical properties of terminals:	Contactor		
8.2.4.2	Mechanical strength of terminals			
	maximum cross-sectional area of conductor	10		
	(mm²)			
	diameter of thread (mm)	M 4		
	torque (Nm)	1,2		
	5 times on 2 separate clamping units		Р	
8.2.4.3	Testing for damage to and accidental loosening of	f conductor (flexion test)		
	conductor of the smallest cross-sectional area	1,5		
	(mm²)		F2.66_2****	
	number of conductor of the smallest cross	2	to and the second secon	
	section			
	diameter of bushing hole (mm)	6,4		
	height between the equipment and the platen	260	The state of the s	
	(mm)		The state of the s	
	mass at the conductor(s) (kg)	0,4		
	135 continuous revolutions: the conductor shall		Р	
	neither slip out of the terminal nor break near the			
	clamping unit			
8.2.4.4	Pull-out test			
	force (N)	40	The second secon	
	1 min, the conductor shall neither slip out of the		Р	
	terminal nor break near the clamping unit			
	Flexion test	·		
	conductor of the largest cross-sectional area	10	1	
	(mm²)			
	number of conductor of the largest cross-	1		
	sectional	***************************************		
	diameter of bushing hole (mm)	9,5	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
	height between the equipment and the platen	279		
	(mm)			
	mass at the conductor(s) (kg)	2		

	EN 60 947-4-1		= 11	•
Clause	Requirement – Test	Result - Remark		Verdict
	135 continuous revolutions: the conductor shall			P
	neither slip out of the terminal nor break near the			
	clamping unit			
	Pull-out test			
	force (N)	90		
	1 min, the conductor shall neither slip out of the			P
	terminal nor break near the clamping unit			
	Flexion test	Contactor		
	conductor of the largest and smallest cross-	10 // 2,5	6 // 1,5	**************************************
	sectional area (mm²)			2 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
	number of conductor of the smallest cross	1//1	1 // 1	1
	sectional, number of conductor of the largest			
	cross sectional			Commence of the commence of th
	diameter of bushing hole (mm)	9,5	9,5 / 6,4	Type Addition 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	height between the equipment and the platen	279	279 / 260	Market Sin Land Spring
	(mm)			7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	mass at the conductor(s) (kg)	2 // 0,7	1,4 / 0,4	
	135 continuous revolutions: the conductor shall			Р
	neither slip out of the terminal nor break near the			
	clamping unit			
	Pull-out test			
	force (N)	90 // 50	80 // 40	
	1 min, the conductor shall neither slip out of the			Р
	terminal nor break near the clamping unit			1
8.1.7.2	Connecting capacity			Р
	type of conductors	Rigid	Flexible	The second secon
	minimum cross-sectional area of conductor	2,5	1,5	
	(mm²):		•	and the property of the control of t
	maximum cross-sectional area of conductor	10	6	1
	(mm²)			# 1
	number of conductors simultaneously	Acc. Manuf. Instr.	-	
	connectable to the terminal	2	2	The second of th

	EN 60 947-4-1		
Clause	Requirement – Test	Result - Remark	Verdict
			,
8.1.7.3	Connection		P
	terminals for connection to external conductors		Р
	shall be readily accessible during installation		
	clamping screws and nuts shall not serve to fix		P
	any other component		
8.1.7.4	Terminal identification and marking		P
	terminal intended exclusively for the neutral		N
	conductor		
	protective earth terminal		N
	other terminals		Р
	- Main circuit::	2T1, 4T2, 6T3	
	- Auxiliary circuit	95-96, 97-98, 13-14, 21-22,	
		A1, A2	
8.1.8	Additional requirements for equipment provided wi	ith a neutral pole	N
	marking of neutral pole		N
	The switched neutral pole shall not break before		N
	and shall not make after the other poles		
	Conventional thermal current of neutral pole		N
8.1.9	Provisions for protective earthing		N
8.1.9.1	The exposed conductive parts shall be electrically		N
	interconnected and connected to a protective		
	earth terminal		
8.1.9.2	The protective earth terminal shall be readily		N
	accessible		
	The protective earth terminal shall be suitably		N
	protected against corrosion		
	The electrical continuity between the exposed		N
	conductive parts of the protective earth terminal		
	and the metal sheathing of connecting		
	conductors		
	The protective earth terminal shall have no other		N
	functions	<u> </u>	

EN 60 947-4-1			
Clause	Requirement – Test	Result - Remark	Verdict
8.1.9.3	Protective earth terminal marking and		N
	identification		
8.1.10	Enclosure for equipment		N
8.1.10.1	Design		N
	The enclosure, when it is opened: all parts		N
	requiring access for installation and maintenance		
	are readily accessible		
	Sufficient space shall be provided inside the		N
	enclosure		
	The fixed parts of a metal enclosure shall be		N
	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		
	Under no circumstances shall a removable metal		N
	part of the enclosure be insulated from the part		
	carrying the earth terminal when the removable		
	part is in place		
	The removable parts of the enclosure shall be		N
	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		
	When an enclosure is so designed is to allow the		N
	covers to be opened without the use of tools,		
	means shall be provided to prevent loss of the		
	fastening devices		
8.1.10.2	Insulation		N

	EN 60 947-4-1			
Clause	Requirement – Test	Result - Remark	Verdict	
	If, in order to prevent accidental contact between		N	
	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			
8.1.11	Degree of protection of enclosed equipment	I	N	
	Degree of protection:	IP	N	
	Test for first characteristic		N	
	Test for first numeral:	1:		
		2:	To the same of the	
		3:	1	
		4:		
		5:		
<u> </u>		6:		
	Test for second characteristic	,	N	
	Test for second numeral	1:		
		2:		
		3:		
		4:		
		5:		
		6:		
		7:		
		8:		

9.3.1.a	TEST SEQUENCE I			
9.3.3.3	Temperature rise	Type AC	DC	Р
	ambient temperature 10-40 °C	24		
	Contactor			N
	test enclosure W x H x D (mm x mm x mm):		
	material of enclosure			
	Main circuits, test conditions:			N

	EN 60 947-4-1		
Clause	Requirement – Test	Result - Remark	Verdict
			L
	- conventional thermal current lth (A)		
	- conventional enclosed thermal current Ithe (A) .:		State and Control of the Control of
	- cable/busbar cross-section (mm²) / (mm):		The state of the s
	- temperature rise of main circuit terminals (K):	<	
	Auxiliary circuit, test conditions:		P
	- rated operation current le (A)	16	The second secon
	- cable cross-section (mm²):	2,5	
	- temperature rise of auxiliary circuit terminals	≤ 37	
	(K)		2 Week 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	Coils and electromagnets, test conditions:	AC DC	P
	- rated control supply voltage Us (V)	240 2	24
	- Class of insulating material	F F	
	- temperature rise of coil and electromagnets (K) :	≤ 71 ≤	£ 55
	Starter Tested wi	th setting range 22 – 30 A	
	test enclosure W x H x D (mm x mm x mm):	Open Type	
	material of enclosure:	None	
	Main circuits, test conditions: *Tested with 30A beconsumption of Overload Relay	cause of max. Power	Р
	- conventional thermal current lth (A)	30 (45*)	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	- cable/busbar cross-section (mm²) / (mm):		The second secon
	- temperature rise of main circuit terminals (K):	1	
	Overload relay, auxiliary circuit, test conditions:		Р
	- rated operation current le (A)	4	
	- cable cross-section (mm²)	T-:-	
	- temperature rise of auxiliary circuit terminals	≤ 40	THE PROPERTY OF THE PROPERTY O
	(K)		Margin War W
9.3.3.2	Operating limits		
9.3.3.2.1	Power-operated equipment:	AC DC	P
	rated control supply voltage Us (V)	240 2	24
	frequency (Hz)		DC

	EN 60 947-4-1				
Clause	Requirement – Test	Result - Remark	Verdict		
	limits of close satisfactorily at any value between	76 64	Р		
	85% and 110% of rated control supply voltage				
	Us:				
	limits of drop out and open fully are: 75% to 20%	53 33	Р		
	for a.c. and 75% to 10% for d.c.				
9.3.3.2.2	Relays and releases Setting Re	ange 22 - 30 A	Р		
	Conditions for thermal and time-delay magnetic ov	erload relays only:	р		
	type of time-delay overload relay	Thermal, Temp. compensated			
	trip class	10A			
	current settingl _{set} :	22 A 30 A			
	ambient temperature (°C)	24			
	test enclosure W x H x D (mm x mm x mm):	None			
	cable/busbar cross-section (mm²) / (mm):	6			
į Į	at A (1,05) times of current setting, tripping shall	23,1 A 31,5 A	1 1 1 1 1 1 1 1 1 1		
	not occur in less than 2 h starting from the cold	- - -	The second of th		
	state; test current	No tripping No tripping			
	When the current is subsequently raised to B	26,4 A 36 A			
	(1,2) times the current setting, tripping shall occur				
	in less than 2 h; test current min:sec :	7:15 2:30			
	for class 10A overload relays energized at C (1,5)	33 A 45 A			
	times the current, tripping shall occur in less than				
	2 min, starting from thermal equilibrium at the				
	current setting; test currentmin:sec :	0:45 0:15			
	for class 10, 20 or 30 overload relays energized	N			
	at C times the current, tripping shall occur in less				
	than 2, 8 or 12 min, starting from thermal				
	equilibrium at the current setting; class; test		1		
	current; tripping time				
	at D (7,2) times the current setting, tripping shall	158,4 A 216 A	1		
	occur within the tripping time (s) $2 < Tp \le 10$,		AA V		
	starting from the cold state; test current; tripping				
	time Tp (s)	2,3 2,1			

	EN 60 947-4-1			
Clause	Requirement – Test	Result - Rema	ark	Verdict
				No.
	Ambient temperature: - 5 °C			
	at A (1,05) times of current setting, tripping shall	23,1 A	31,5 A	
	not occur in less than 2 h starting from the cold			1
	state; test current	No tripping	No tripping	
	When the current is subsequently raised to B	26,4 A	36 A	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	(1,2) times the current setting, tripping shall occur			And the second s
	in less than 2 h; test currentmin:sec :	25:10	1:20	1
	for class 10A overlod relays energized at C (1,5)	33 A	45 A	A Company of the Comp
	times the current, tripping shall occur in less than			Company of the compan
	2 min, starting from thermal equilibrium at the			A
	current setting; test currentmin:sec :	1:04	0:20	7 Marin 1, 7 Marin 1,
	for class 10, 20 or 30 overload relays energized	N		27 Marie 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
	at C times the current, tripping shall occur in less			
	than 2, 8 or 12 min, starting from thermal			
	equilibrium at the current setting; class; test			
	current; tripping time:			
	at D (7,2) times the current setting, tripping shall	158,4 A	216A	
	occur within the tripping time (s) 2 < Tp ≤ 10s			
	tarting from the cold state; test current; tripping			\$\text{\$\tex{\$\text{\$\texit{\$\texitt{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$
	time Tp (s)	2,8	2,1	
	Ambient temperature: + 40 °C			
	at A (1,05) times of current setting, tripping shall	23,1 A	31,5 A	
	not occur in less than 2 h starting from the cold			
_	state; test current:	No tripping	No tripping	
	When the current is subsequently raised to B	26,4 A	36 A	
	(1,2) times the current setting, tripping shall occur			
	in less than 2 h; test current min:sec :	3:40	3:20	
	for class 10A overload relays energized at C (1,5)	33 A	45 A	1
	times the current, tripping shall occur in less than			
	2 min, starting from thermal equilibrium at the			1 1 1 1 1 1 1 1 1 1
	current setting; test current min:sec :	0:20	0:28	

	EN 60 947-4-1		
Clause	Requirement – Test	Result - Remark	Verdict
	for class 10, 20 or 30 overload relays energized	N	
	at C times the current, tripping shall occur in less		
	than 2, 8 or 12 min, starting from thermal		
	equilibrium at the current setting; class; test		
	current; tripping time:		
	at D (7,2) times the current setting, tripping shall	158,4 A 216 A	
	occur within the tripping time (s) $2 < Tp \le 10$	2.07.	
	starting from the cold state; test current; tripping		A Company of the comp
	time Tp (s)	2,2 2,4	PART TO THE PART T
	Limits of operation of three-pole thermal overload		Р
	ambient temperature (°C)	25	The state of the s
	the relay energized on three poles, at A (1 / 0,9)	22 A / 19,8 A 30 A / 27 A	
	times the current setting, tripping shall not occur		Section 1 of the control of the cont
	in less than 2 h, starting from the cold state:		
		No tripping No tripping	Marine Communication of
	when the value of the current flowing in two poles		pro transfer () v v v v v v v v v v v v v v v v v v
	is increased to B (1,15) times the current setting		
	and the third pole deenergized, tripping shall		
	occur in less than 2 h min:sec :	0:20 0:11	The second secon
9.3.3.4	Test of dielectric properties, impulse withstand vol	•	P
	- verification by measurement of clearances		N
	instead of testing		
	- rated impulse withstand voltage (V)	8000	
	- test Uimp main circuits (kV)		P
	- test Uimp auxiliary circuits (kV)		P
	Test of dielectric properties, dielectric withstand vo		N
	- rated insulation voltage (V)		
	- main circuits, test voltage for 1 min (V)		N
	- control and auxiliary circuits, test voltage for		N
	1 min (V)		

	EN 60 947-4-1	I	1
Clause	Requirement – Test	Result - Remark	Verdict
9.3.3.5	TEST SEQUENCE II		
	Making and breaking capacity		/ :
	utilization category	AC1	
	rated operational voltage Ue (V)	690	The state of the s
	rated operational current le (A) or power (kW):	50A	The state of the s
	Conditions, make/break operations AC-1 only:		Р
	- test voltage U/Ue = 1,05 (V)	L1: 740	THE CONTRACTOR OF THE CONTRACT
		L2: 740	A
		L3: 738	1
	- test current I/Ie = 1,5 (A)	L1: 78	The second secon
		L2: 77	The state of the s
		L3: 78	1
	- power factor/time constant:	L1: 0,83	1
		L2: 0,82	
		L3: 0,83	
	- on-time (ms)	160	
	- off-time (s)	9,8	
	- number of make/break operations	50	Р
	Behaviour and condition during and after the test:		Р
	- no permanent arcing		P
	- no flash-over between poles		Р
	- no blowing of the fusible element in the earth		Р
	circuit		
	- no welding of the contacts		P
	- the contacts shall operate when the contactor or		Р
	starter is switched by the applicable method of		
	control		
	Operational performance capability:		Р
	utilization category (AC-3 or AC-4)	AC4	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	rated operational voltage Ue (V)		
	rated operational current le (A) or power (kW):	1	
	Conditions, make operations AC3/AC4 only:		Р

	EN 60 947-4-1		
Clause	Requirement – Test	Result - Remark	Verdict
		T	
	- test voltage U/Ue = 1,05 (V):	L1: 425	
		L2: 424	
		L3: 425	1 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 -
	- test current I/Ie = (A)	L1: 364	
		L2: 364	
		L3: 363	
	- power factor/time constant:	L1: 0,45	
		L2: 0,44	
		L3: 0,45	1 1 1 1 1 1 1 1 1 1
	- on-time (ms)	100	
	- off-time (s)	•	
	- number of make operations		Р
	Characteristic of transient recovery voltage for AC		P
	oscillatory frequency (kHz)	}	2
	Measured oscillatory frequency (kHz)	1	
	moderate commutary frequency (kt 12)	L2: 54	
		L3: 53	
	Factor y		
	1 doi:01 y	L2: 1,1	
		L3: 1,1	
	Robovious and condition during and offer the test	123. 1,1	Р
	Behaviour and condition during and after the test:	<u></u>	
	- no permanent arcing	P	P
	- no flash-over between poles	P	P
	- no blowing of the fusible element in the earth	P	P
	circuit	_	
	- no welding of the contacts	P	P
	- the contacts shall operate when the contactor or	P	P
	starter is switched by the applicable method of		
	control		
	Operational performance capability:		77.0 0.000
	utilization category	AC4	The state of the
	rated operational voltage Ue (V):	400	

	EN 60 947-4-1			
Clause	Requirement – Test	Result - Remark	Verdict	
	rated operational current le (A) or power (kW):	30A		
	Conditions, make/break operations AC3 / AC4 only	<i>f</i> :	Р	
	- test voltage U/Ue = 1,05 (V)	L1: 424		
		L2: 422	The state of the s	
		L3: 425	The state of the s	
	- test current I/Ie = (A)	L1: 180	and the start of t	
		L2: 181	A Shall at	
		L3: 180		
	- power factor/time constant:	L1: 0,4	The state of the s	
		L2: 0,4	The state of the s	
		L3: 0,4	The second secon	
	- on-time (ms)	100		
	- off-time (s)	4	Applications of the control of the c	
	- number of make/break operations:	6000	Р	
	Characteristic of transient recovery voltage for AC-	-3 and AC-4 only:	Р	
	oscillatory frequency (kHz)			
	Measured oscillatory frequency (kHz)	L1: 45,5		
		L2: 46		
		L3: 46		
	Factor y:	L1: 1,1		
		L2: 1,1		
		L3: 1,1		
	Behaviour and condition during and after the test:		Р	
	- no permanent arcing	P	Р	
	- no flash-over between poles	P	Р	
	- no blowing of the fusible element in the earth	Р	P	
	circuit			
	- no welding of the contacts	P	Р	
	- the contacts shall operate when the contactor or	P	Р	
	starter is switched by the applicable method of			
	control			
8.3.3.6	Operational performance capability:			

	EN 60 947-4-1	1	
Clause	Requirement – Test	Result - Remark	Verdict
			· · · · · · · · · · · · · · · · · · ·
	utilization category	AC1	
	rated operational voltage (V)	690	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	rated operational current le (A) or power (kW):	50A	
	Test conditions for make/break operations AC-1 or	nly:	P
	test voltage (V):	L1: 725	
		L2: 730	
		L3: 730	
	test current (A):	L1: 52	
		L2: 53	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
		L3: 53	
	power factor/time constant:	L1: 0,82	
		L2: 0,81	
		L3: 0,80	
	- on-time (ms)	160	
	- off-time (s)		
	- number of operating cycles	1	Р
8.3.3.6.6	Behaviour and condition during and after the test:		Р
	- no permanent arcing		Р
	- no flash-over between poles		P
	- no blowing of the fusible element in the earth		P
	circuit		
	- no welding of the contacts		P
	- the contacts shall operate when the contactor or		Р
	starter is switched by the applicable method of		
	control		
	Dielectric verification:		Р
	test voltage (2 Ue + 1000 V) for 1 min (V)	2380	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

9.3.4	TEST SEQUENCE III	
	Performance under short-circuit conditions	
9.3.4.2.1	Test at de prospective current "r": U12/16 22 -30A	

EN 60 947-4-1				
Clause	Requirement – Test	Result - Remark	Verdict	
	type of SCPD	Siemens NH00 gL / gG		
	ratings of SCPD, co-ordination type 1	80A / 500V	7.99 When I can	
	ratings of SCPD, co-ordination type 2	-	American	
	rated operational current le (A) AC-3	30A		
	prospective current "r" (kA):	3	W	
	test voltage (V):	L1: 545		
		L2: 543	7 7	
		L3: 545		
	r.m.s. test current (A)	L1: 3040	A 100 A 100	
		L2: 3090	required (s) The Land Access and the Land Acc	
		L3: 3110		
	peak current (A)	L1: 4350		
		L2: 4360	Service and a se	
		L3: 3910	The state of the s	
	power factor	0,9		
	1. one breaking operation of SCPD with all the	L1: 20,1 kA2s / 2930A	1	
	switching devices closed prior to the test I2dta	L2: 23,6 kA2s / 2930 A		
	(A²s) /peak current I (A)	L3: 20,0 kA2s / 3450 A		
	2. one breaking operation of SCPD by closing the	L1: 18,6 kA2s / 2850 A	The state of the s	
	contactor or starter on to the short-circuit I2dta	L2: 23,5 kA2s / 2850 A	And the second s	
	(A²s) /peak current I (A)	L3: 21,3 kA2s / 3445 A	1	
	Behaviour of the equipment during the test		P	
	Both types of co-ordination (all devices):		P	
	A - the fault current has been successfully		P	
	interrupted by the SCPD or the combination			
	starter and the fuse or fusible element, or solid			
	connection between the enclosure and supply			
	shall not have melted	_		
	B - the door or cover of the enclosure has not		Р	
	been blown open and it is possible to open the			
	door or cover			

	EN 60 947-4-1		
Clause	Requirement – Test	Result - Remark	Verdict
			,
	C - there is no damage to the conductors or		Р
	terminals and the conductors have not been		
	separated from the terminals		
	D - there is no cracking or breaking of an		Р
	insulating base to the extent that the integrity of		
	mounting of a live part is impaired	11-10-10-10-1	
	Both types of co-ordination (combination starters a	and protected starters only):	N
	E - the circuit breaker or the switch is capable of		N
	being opened manually by its operating means		
	F - neither end of the SCPD is completely		N
	separated from its mounting means to an		
	exposed conductive part		
	G - if a circuit breaker with rated ultimate short-circ	cuit breaking capacity less than	N
	the rated conditional short-circuit current assigned	to the combination or	
	protected starter is employed, the circuit breaker s	hall be tested to trip:	
	1) circuit breaker with instantaneous trip relays or		N
	releases, at 120% of the trip current		
	2) circuit breaker with overload relays or		N
	releases, at 250% of the rated current of the		
	circuit breaker		
	Type 1 co-ordination (all devices):	110.	Р
	H - there has been no discharge of parts beyond	P	Р
	the enclosure. The starter may be inoperative		
	after each operation		
	Type 1 co-ordination (combination and protected s	tarters only):	Р
	I - dielectric verification test voltage (2 Ue) for	1380	
	1 min (V)		
	Type 2 co-ordination (all devices):		N
	J - no damage to the overload relay or other parts		N
	has occurred, except that welding of contactor or		
	starter contacts is permitted, if they are easily		
	separated without significant deformation		

	EN 60 947-4-1		
Clause	Requirement – Test	Result - Remark	Verdict
		1	1
	K - the tripping of the overload relay shall be		N
	conform to the published tripping characteristics,		
	before and after the test		
	L - dielectric verification test voltage (2 Ue) for		
	1 min (V)	:	
9.3.4.2.2	Test at the rated conditional short-circuit current "	lq" ≤ SCC "r"	N
	type of SCPD	:	
	ratings of SCPD, co-ordination type 1	:	1
	ratings of SCPD, co-ordination type 2		The second secon
	rated operational current le (A) AC-3		
	prospective current "Iq" (kA)		
	test voltage (V)		
	1555 151655 (1)	L2:	
		L3:	And the second s
	r.m.s. test current (A)		The second secon
	T.M.S. test current (A)	L2:	1
	Total August (A)	L3:	The state of the
	peak current (A)		
		L2:	
		L3:	The second secon
	power factor	<u></u>	and the second s
	one breaking operation of SCPD with all the	L1:	
	switching devices closed prior to the test I2dta	L2:	
	(A²s)	: L3:	The second secon
	2. one breaking operation of SCPD by closing the	L1:	1
	contactor or starter on to the short-circuit	: L2:	
		L3:	*** *** *** *** *** *** *** *** *** **
	3. one breaking operation of SCPD by closing the	L1:	
	switching device on to the short-circuit	: L2:	
		L3:	
	Behaviour of the equipment during the test		N
	Both types of co-ordination (all devices):		N

Clause	EN 60 947-4-1 Requirement – Test Result - Remark	Verdict
Jiause	Result - Result - Remark	Verdice
	A - the fault current has been successfully	N
	interrupted by the SCPD or the combination	
	starter and the fuse or fusible element, or solid	
	connection between the enclosure and supply	
	shall not have melted	
	B - the door or cover of the enclosure has not	N
	been blown open and it is possible to open the	
	door or cover	
	C - there is no damage to the conductors or	N
	terminals and the conductors have not been	
	separated from the terminals	
	D - there is no cracking or breaking of an	N
	insulating base to the extent that the integrity of	
	mounting of a live part is impaired	
	Both types of co-ordination (combination starters and protected starters or	nly): N
	E - the circuit breaker or the switch is capable of	N
	being opened manually by its operating means	
	F - neither end of the SCPD is completely	N
	separated from its mounting means to an	
	exposed conductive part	
	G - if a circuit breaker with rated ultimate short-circuit breaking capacity les	ss than N
	the rated conditional short-circuit current assigned to the combination or	
	protected starter is employed, the circuit breaker shall be tested to trip:	
	1) circuit breaker with instantaneous trip relays or	N
	releases, at 120% of the trip current	
	2) circuit breaker with overload relays or	N
	releases, at 250% of the rated current of the	
	circuit breaker	
	Type 1 co-ordination (all devices):	N
	H - there has been no discharge of parts beyond	N
	the enclosure. The starter may be inoperative	
	after each operation	

EN 60 947-4-1			
Clause	Requirement – Test	Verdict	
	Type 1 co-ordination (combination and protected st	arters only):	N
	I - dielectric verification test voltage (2 Ue) for 1 min (V)		
	Type 2 co-ordination (all devices):		N
	J - no damage to the overload relay or other parts has occurred, except that welding of contactor or starter contacts is permitted, if they are easily separated without significant deformation		N
	K - the tripping of the overload relay shall be		N

conform to the published tripping characteristics,

L - dielectric verification test voltage (2 Ue) for

before and after the test

9.3.5	TEST SEQUENCE IV: (APPLICABLE FOR CONT	TACTORS ONLY)	Р
	Overload current withstand capability of contactors:		Р
	ambient temperature (°C)	25	11
	rated operational current le (A) max. AC-3:	30	
	test current (le) (A)	240	
	duration of test: 10 s	10s	
	After the test, the contactor shall be substantially	P	P
	in the same condition as before the test (visual		
	inspection)		

TABLE: temperature rise measurements			Р
temperature rise dT of part:			Required dT (K)
Main Terminals Contactor (30A)	1	60	65
	3	60	65
	5	65	65

		EN 60 947-4	-1		
Clause	Requirement – Test		Result - Ren	nark	Verdict
Main Terr	ninal Overload Relay (30A)		2	63	65
			4	63	65
			6	63	65
Auxilixary	Terminals Contactor (16A)		13	48	65
			14	48	65
Auxiliary	Terminal Overload Relay (4A)		95	40	65
-			96	35	65
Coil:	240V	50Hz		71	135
	24V + 10%	DC		55	135
	-				

	EN 60 947-4-1		
Clause	Requirement – Test	Result - Remark	Verdict
	EN 60 947-5-1		
8.3.3.5.3	Making and breaking capacities of switching elements	ents under abnormal	P
	conditions:	T	100 mm v 1 mm v 1 mm v 1 mm
	utilization category	AC15	- Apr
	rated operational voltage Ue (V)	240	1
	rated operational current le (A) or power (kW):	12	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	Conditions, make/break operations:		
	- test voltage U/Ue = 1,1 (V)	L1: 266	
		L2: -	
		L3: -	
	- power factor/time constant:	L1: 0,31	
		L2: -	
		L3: -	
	- make operations: test current I/Ie (A)	L1: 123	
		L2: -	
		L3: -	
	- break operations: test current I/Ie (A)	L1: 123	
		L2: -	
		L3: -	
	- on-time (ms)	300	
	- operating cycles per minute	6	
	- number of operating cycles	10	P
	Behaviour and condition during and after the test:		Р
	- no electrical or mechanical failures		Р
	- no contact welding or prolonged arcing		Р
	- no blowing of the fusible element in the earth		P
	circuit		
	Dielectric verification:		P
	dielectric test voltage (V)	2000	P

EN 60 947-4-1			
Clause	Requirement - Test	Result - Remark	Verdict

	EN 60 947-5-1		
8.3.3.5	TEST SEQUENCE III		
8.3.3.5.2	Making and breaking capacities of switching elements under normal conditions		
	utilization category	AC15	
	rated operational voltage Ue (V)		The second secon
	rated operational current le (A) or power (kW):		1
	Conditions, make/break operations:		Р
	- test voltage U/Ue = 1,1 (V)	L1: 266* / 242 **	
	* 50 operation at 266V	L2:	
	** 6000 operations at 242V	L3:	
	- power factor/time constant:	L1: 0,31	
		L2: -	
		L3: -	
	- make operations: test current I/Ie (A)	L1: 123	**************************************
		L2: -	
		L3: -	a commence of the commence of
	- break operations: test current I/Ie (A)	L1: 13	
		L2: -	
		L3:	
	- on-time (ms) *50 oper. / **6000 oper	160 * / 300**	" A STATE OF THE S
	- operating cycles per minute	15	
	- number of operating cycles	6050	Р
	Behaviour and condition during and after the test:		Р
	- no electrical or mechanical failures		Р
	- no contact welding or prolonged arcing		Р
	- no blowing of the fusible element in the earth		Р
	circuit		
	Dielectric verification:		Р
	dielectric test voltage (V)	2000	Р
	utilization category		
	rated operational voltage Ue (V)		

EN 60 947-4-1			
Clause	Requirement – Test	Result - Remark	Verdict

	EN 60 947-5-1		
8.3.4	Performance under conditional short-circuit current		
			Р
	type of SCPD	Siemens Diazed gL / gG	
	ratings of SCPD	1	
	prospective current (kA)	1	
	test voltage (V) U/Ue = 1,1 (V)	L1: 277	
		L2: 275	
		L3: 276	
	r.m.s. test current (A):	L1: 1010	
		L2: 1050	
		L3: 1020	
_	power factor (max. 0,7)	0,7	
	first making operation to closed switching	L1: 1650 A2s / 770A	
	elements: test I²dta (A²s) / I _D (A):	L2: 2880 A2s / 830 A	1
		L3: 2850 A2s / 1090 A	
	time interval between test (min. 3 min)		
	second making operation to closed switching	L1: 1430 A2s / 700 A	A consequence of the consequence
	elements: test I²dta (A²s) / I _D (A)	L2: 2900 A2s / 830 A	
		L3: 2860 A2s / 1080 A	
	time interval between test (min. 3 min)		- 1 Andrews - 1 An
	third making operation to closed switching	L1: 2910 A2s / 1030 A	
	elements: test I²dta (A²s) / I _D (A)	L2: 2540 A2s / 975 A	1
		L3: 830 A2s / 545 A	1.00 A 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	Behaviour of the equipment during the test:		Р
	switching elements open by the normal actuating		Р
	system		
	Dielectric verification:		Р
	dielectric test voltage (V)	2000	Р



Finette

TEST REPORT EN 60 947-4-1

Low-voltage switchgear and controlgear

Part 4: Contactors and motor-starters

Section 1: Electromechanical contactors and motor-starters

Report reference No.

2.03.00356.1.0-K85/B&J

Tested by (+ signature).....: Ing.J.Ainetter

Approved by (+ signature): Ing.K.Farthofer Date of issue.....: 02.02.2004

Testing laboratory: Österreichische Forschungs- und Prüfzentrum Arsenal

Ges.m.b.H

Address...... : A – 1031 Vienna, Faradaygasse 3

Testing location....: as above

Applicant.....: Benedict GmbH (Ω Benedikt & Jäger)

Address.....: A – 1220 Vienna, Lieblgasse 7

Standard EN 60 947-4-1:2000-11

Test Report Form No. : 69474-1A

Master TRF.....: reference No. 69474-1A, dated 95-07

Copyright blank test report....: the bodies participating in the Committee of Certification

Bodies (CCB) and/or the CENELEC Certification

Agreement (CCA).

Test procedure: CB-scheme

Procedure deviation: N.A.

Non-standard test method: N.A.

Type of test object: Motor-Starter

Trademark Ω, Benedikt & Jäger

Model/type reference: K85Axx + U85x

Manufacturer.....: Ω Benedikt & Jäger

Rating: AC1

150A 690V 50-60Hz

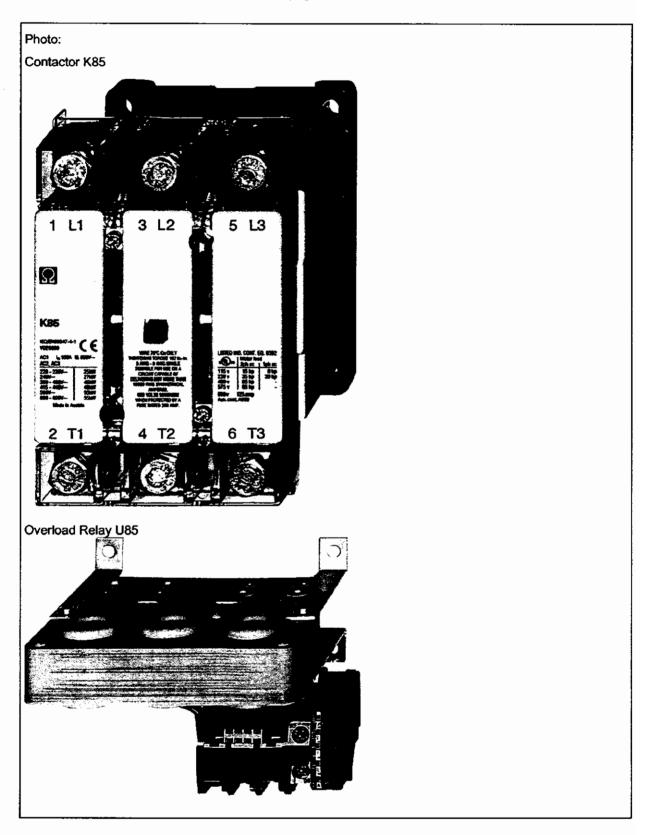
AC3/AC4

85A 400V 50-60Hz

AC15

12A 240V 50-60Hz

Copy of marking plate Contactor K85A **K85** IEC/EN60947-4-1 VDE0660 WIRE 75°C Cu ONLY
TIGHTENING TORQUE 162 Ib.-in.
3 AWG - 0 AWG SINGLE
SUITABLE FOR USE ON A CIRCUIT
CAPABLE OF DELIVERING NOT
MORE THAN 10000 RMS
SYMMETRICAL AMPERES,
600 VOLTS MAXIMUM
WHEN PROTECTED BY A
FUSE RATED 300 AMP. AC1 In 150A U 850V~ AC2, AC3 LISTED IND. CONT. EQ. 9382 Motor load 3ph ac | 1ph ac 220 - 230V--240V~ 380 - 400V~ 415 - 440V~ 15 hp 35 hp 65 hp 85 hp 8 hp 20 hp 45kW 49kW 55kW 55kW 500V~ 575 v 660 - 690V~ 600v 125 amp Aux. cont. A600 Made in Austria T2 T3 Overload Relay U85 90 **9**98 IEC/EN60947 VDE0660 750V~ LISTED IND. c(VL)us CONT. EQ. 93B3 Auslöseklasse / Trip class: 10A 150v 95 T T 97 600v ac entspr. Leitung 60-90A ME20 600v 95 -- 97 Fuse size 196 | 98 adequate to conductor max. 300A 500va max. 4A 600VA Suitable for use on a circuit capable of delivering max. 4A **1**97 not more than 10kA rms. sym. 600v max. 440V~ 95 Y Numbers on dial are full load motor currents. Made in 690V~ 950-**-0**97 Tripping current is 125% of numbers on dial. Austria



Test item particulars:	
- method of operation:	Magnetic
- switching positions:	ON-OFF
- number of polesContactor:	3 Main 4 Aux
- kind of current:	AC
- number of phases:	3
- rated frequency (Hz):	50-60
- number of positions of main contacts:	2
Rated and limiting values, main circuit:	
- rated operational voltage Ue (V):	690
- rated insulation voltage Ui (V):	690
- rated impulse withstand voltage Uimp (kV):	8
- conventional free air thermal current lth (A):	150
- conventional enclosed thermal current Ithe (A):	150
- rated operational current le (A):	150
- rated uninterrupted lu (A):	150
- utilization category::	AC1, AC3
Short-circuit characteristic:	
- rated prospective short-circuit current "r" (kA):	5
- rated conditional short-circuit current lq (kA):	5
Rated and limiting values, auxiliary circuits:	For Contactor
- rated operational voltage (V):	240
- rated frequency (Hz):	50-60
- number of circuits:	Max. 4
- number and kind of contact elements:	2 NO and 2 NC
Co-ordination of short-circuit protective devices:	Type "1"
- kind of protective device:	Fuse
Possible test case verdicts:	
- test case does not apply to the test object:	N(.A.)
- test object does meet the requirement:	P(ass)
- test object does not meet the requirement:	F(ail)

General remarks:

"(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.

The test results presented in this report relate only to the object tested.

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- 1) Based on the decision of the applicant, some of the tests of Test Sequences I and II may have been performed under more severe conditions than required in the stanard. In case of, relevant values for equipment under test are stated in test report.
- 2) The test item is corresponding to the requirements of IEC 60947-4-1 Ed. 2.0 (2000-11) + A1 (2002-09).

Ordering key:

Contactor

K85A x x x

|||>>>>

: = : DC Supply (optional)

||>>>>

: 0, 1, 2, 3, 4 : Number of NC auxiliary contacts

: 0, 1, 2, 3, 4 : Number of NO auxiliary contacts

Overload Relay

U85 x

I>>>> : Setting range 60 - 90 / 80 - 120 A

Control Circiut Voltage:

6 - 550V

50Hz

6 - 600V

60Hz

12 - 250V

DC

With Late Break Contact in series to coil.

	EN 60 947-4-1		
Clause	Requirement – Test	Result - Remark	Verdict
6.2	MARKING:		
	Data shall be preferably marked on the equipment:		
	c - number of this standard (IEC/EN60947-4-1)	IEC947-4-1	Р
	k - IP code, in case of an enclosed equipment		N
	Data shall be included on the nameplate, or on the	e equipment, or in the	
	manufacturer's published literature:		
	d - rated operational voltages	690V	P
	e – utilization category and rated operational	AC1 150A, 690V	P
	currents (or rated powers), at the rated	AC3 85A, 400V	
	operational voltages of the equipment	Contactor AC15 12A, 240V	
	f - either the value of the rated frequency/ies, or	50-60Hz	Р
	the indication d.c. (or symbol)		
	g - rated duty with the indication of the class of		N
	intermittent duty, if any		
	Associated values:		,
	h - rated marking and breaking capacities (these	AC1, AC3, AC15	Р
	indications may be replaced, where applicable,		
	by the indication of the utilization category)		
	Safety an installation:		
	i - rated insulation voltage	690V	Р
	j - rated impulse withstand voltage	8 kV	Р
	I – pollution degree	3	Р
	m - rated conditional short-circuit current and type	of co-ordination of contactor or	Р
	starter and type, current rating and characteristics	of the associated SCPD:	
	m - rated conditional short-circuit current of the	5 kA	P
	combination starter or the protected starter	Type '1' 250A fuse gL/gG	
	n – switching overvoltages	≤ 8 kV	Р
	Control circuits: Contactor		
	The following information concerning control circuits shall be placed either on the		
	coil or on the equipment:		
	o - rated control circuit voltage (Uc), nature of	6-550V 50Hz / 6-600V 60Hz	Р
	current and rated frequency	12-250V =	

	EN 60 947-4-1				
Clause	Requirement – Test	Result - Remark	Verdict		
	p - if necessary, nature of current, rated	Us = Uc	Р		
	frequency and rated control supply voltages (Us) Auxiliary circuits: Contactor)			
	r - ratings of auxiliary circuits	AC15 12A, 240V	Р		
	Overload relays and releases:				
	s - characteristics according to 5.7	P	P		

8.1	CONSTRUCTION: Overload relay		
8.1.1	Materials		Р
	Resistance to abnormal heat and fire		Р
	-parts retain current-carrying parts: 850 / 960°C	Housing (black)	₽
	- other: 650°C	Cover (grey)	N
8.1.2	Current-carrying parts and their connection		Р
8.1.3	Clearances		Р
	Uimp is given as:	8kV	Р
	- max. value of rated operational voltage to earth :	600V	
	- nominal voltage of supply system		
	- overvoltage category	: IV	
	- pollution degree	3	
	- field-in or homogeneous	Inhomogeneous	
	- minimum clearances (mm)	8	
	- measured clearances (mm)	: ≥10	
	Uimp is not given:	· · · · · ·	N
	- rated insulation voltage Ui (V)		
	- le	:	ALCOHOL: SELECTION
	- minimum clearances L-L/L-A (mm)		<u> </u>
	- measured clearances L-L/L-A (mm)	:	
	Creepage distances		
	Uimp is given as:	8 kV	

	EN 60 947-4-1		,
Clause	Requirement – Test	Result - Remark	Verdict
		<u> </u>	
	- material group or CTI	Min. III b	
	- minimum creepage distances (mm)	10	1723
	- measured creepage distances (mm)	≥ 12,5	
	Uimp is not given:	T	N
	- material column a or b		
	- minimum creepage distances (mm)		
	- measured creepage distances (mm)		
8.1.4	Actuator		N
8.1.4.1	Insulation		N
8.1.4.2	Direction		N
8.1.4.3	Mounting		N
8.1.5	Indication of contact position		N
8.1.5.1	Indication means		N
8.1.5.2	Indication by the actuator		N
8.1.6	Additional safety requirements for equipment with		N
	isolating function		
8.1.7	Terminals		Р
8.1.7.1	All parts of terminals which maintain contact and	(see 8.2.4 below)	P
	carry current shall be of metal having adequate		
	mechanical strength		
	Terminal connections shall be such that	(see 8.2.4 below)	Р
	necessary contact pressure is maintained		
	Terminals shall be so constructed that the	(see 8.2.4 below)	P
	conductor is clamped between suitable surfaces		
	without damage to the conductor and terminal		
	Terminal shall not allow the conductor to be	(see 8.2.4 below)	P
	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		
8.2.4	Mechanical properties of terminals:	Contactor	
8.2.4.2	Mechanical strength of terminals		

	EN 60 947-4-1		
Clause	Requirement – Test	Result - Remark	Verdict
		1	
	maximum cross-sectional area of conductor	70	g opening en
	(mm²):		
	diameter of thread (mm):	M 8	
	torque (Nm)	3,5	
	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	10	
	(mm²):		
	number of conductor of the smallest cross	1	=
	section		
	diameter of bushing hole (mm)	9,5	3 2 2 2 3
	height between the equipment and the platen	279	
	(mm):		
	mass at the conductor(s) (kg):	2	
	135 continuous revolutions: the conductor shall		Р
	neither slip out of the terminal nor break near the		
	clamping unit		
8.2.4.4	Pull-out test	· · · · · · · · · · · · · · · · · · ·	
	force (N)	90	
	1 min, the conductor shall neither slip out of the		Р
	terminal nor break near the clamping unit		
	Flexion test		
	conductor of the largest cross-sectional area	70	
	(mm²):		
	number of conductor of the largest cross-	1	
	sectional		
	diameter of bushing hole (mm)	19,1	8 -2
	height between the equipment and the platen	368	
	(mm):		
	mass at the conductor(s) (kg)	14	7.9 4

	EN 60 947-4-1			
Clause	Requirement – Test	Result - Remark		Verdict
				
	135 continuous revolutions: the conductor shall			P
	neither slip out of the terminal nor break near the			
-	clamping unit			
	Pull-out test			
	force (N)	285		N ame (c
	1 min, the conductor shall neither slip out of the			Р
	terminal nor break near the clamping unit			
	Flexion test	Contactor		
	conductor of the largest and smallest cross-	10	70	
	sectional area (mm²):			
	number of conductor of the smallest cross	1	1	
	sectional, number of conductor of the largest			
	cross sectional			
	diameter of bushing hole (mm)	9,5	19,1	- 6
	height between the equipment and the platen	279	368	
	(mm)			
	mass at the conductor(s) (kg):	2	14	
	135 continuous revolutions: the conductor shall			Р
	neither slip out of the terminal nor break near the			
	clamping unit			
	Pull-out test			
	force (N)	90	285	
	1 min, the conductor shall neither slip out of the			Р
	terminal nor break near the clamping unit			
8.1.7.2	Connecting capacity			Р
	type of conductors:	Semi Rigid	Flexible	
	minimum cross-sectional area of conductor	10	16	
	(mm²):			
	maximum cross-sectional area of conductor	70	50	
	(mm²):			
	number of conductors simultaneously	Acc. Manuf. Instr.		
	connectable to the terminal	2	2	

	EN 60 947-4-1		
Clause	Requirement – Test	Result - Remark	Verdict
8.1.7.3	Connection		Р
	terminals for connection to external conductors shall be readily accessible during installation		Р
	clamping screws and nuts shall not serve to fix		Р
8.1.7.4	Terminal identification and marking	I	Р
	terminal intended exclusively for the neutral conductor		N
	protective earth terminal		N
	other terminals - Main circuit:: - Auxiliary circuit	- 95-96, 97-98, 13-14, 21- 22, 31-32, 43-44, A1, A2	P
8.1.8	Additional requirements for equipment provided wi		N
	marking of neutral pole		N
	The switched neutral pole shall not break before and shall not make after the other poles		N
	Conventional thermal current of neutral pole		N
8.1.9	Provisions for protective earthing		N
8.1.9.1	The exposed conductive parts shall be electrically interconnected and connected to a protective earth terminal		N
8.1.9.2	The protective earth terminal shall be readily accessible		N
	The protective earth terminal shall be suitably protected against corrosion		N
	The electrical continuity between the exposed conductive parts of the protective earth terminal and the metal sheathing of connecting conductors		N
	The protective earth terminal shall have no other functions		N

EN 60 947-4-1				
Clause	Requirement - Test	Result - Remark	Verdict	
8.1.9.3	Protective earth terminal marking and	I	N	
0.1.5.5	identification		"	
8.1.10	Enclosure for equipment		N	
8.1.10.1	Design		N	
	The enclosure, when it is opened: all parts		N	
	requiring access for installation and maintenance			
	are readily accessible			
	Sufficient space shall be provided inside the		N	
	enclosure			
	The fixed parts of a metal enclosure shall be		N	
	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			
	Under no circumstances shall a removable metal		N	
	part of the enclosure be insulated from the part			
	carrying the earth terminal when the removable			
	part is in place			
	The removable parts of the enclosure shall be		N	
	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			
	When an enclosure is so designed as to allow the		N	
	covers to be opened without the use of tools,			
	means shall be provided to prevent loss of the			
	fastening devices			
3.1.10.2	Insulation		N	

	EN 60 947-4-1				
Clause	Requirement – Test	Result - Remark	Verdict		
	If, in order to prevent accidental contact between		N		
	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				
8.1.11	Degree of protection of enclosed equipment		N		
	Degree of protection	IP	N		
	Test for first characteristic		N		
	Test for first numeral:	1:			
		2:			
		3:			
		4:			
		5:	45.00		
		6:			
	Test for second characteristic		N		
	Test for second numeral:	1:			
		2:			
		3:			
		4:			
		5:			
		6:			
		7:			
		8:			

9.3.1.a	TEST SEQUENCE I			
9.3.3.3	Temperature rise	ype AC	DC	Р
	ambient temperature 10-40 °C	25		<u> Marking and a sainte</u>
	Contactor			N
	test enclosure W x H x D (mm x mm x mm)	350 x 175 x 145		Miles Yes
	material of enclosure	Metal		
	Main circuits, test conditions: * Tested with 170)A		N

	EN 60 947-4-1		
Clause	Requirement – Test	Result - Remark	Verdict
	- conventional thermal current lth (A)	150	
	- conventional enclosed thermal current Ithe (A) .:		
	- cable/busbar cross-section (mm²) / (mm):		200
	- temperature rise of main circuit terminals (K):		
	Auxiliary circuit, test conditions:		Р
	- rated operation current le (A)	16	
	- cable cross-section (mm²)		
	- temperature rise of auxiliary circuit terminals	≤ 42	Appendix solve
	(K)		
	Coils and electromagnets, test conditions:	AC DC	P
	- rated control supply voltage Us (V)		
	- Class of insulating material temperature rise of coil and electromagnets (K) :		
	Starter Tested wi	th setting range 60 – 90 A	
	test enclosure W x H x D (mm x mm x mm):	Open Type	- 14
	material of enclosure:	None	100
	Main circuits, test conditions: *AC1 rating 150A tes	sted with 170A	Р
	- conventional thermal current lth (A)	150 *	-
	- cable/busbar cross-section (mm²) / (mm):	50 / 70* mm²	
	- temperature rise of main circuit terminals (K):	≤ 60	
		Temp. Rise on Contactor	
		terminals only. Worst Case	
		AC1 150A (Tested with 170A)	
		istead of AC3 85A	
	Overload relay, auxiliary circuit, test conditions:		Р
	- rated operation current le (A)	4	
	- cable cross-section (mm²):	1	20 S
	- temperature rise of auxiliary circuit terminals	≤ 40	
9.3.3.2	Operating limits		and the second section of the second
9.3.3.2.1	Power-operated equipment:	AC DC	Р

	EN 60 947-4-1			
Clause	Requirement - Test	Result - Remark		Verdict
		· · · · · · · · · · · · · · · · · · ·		
	rated control supply voltage Us (V)	240	24	
	frequency (Hz)	50	DC	
	limits of close satisfactorily at any value between	76	65	Р
	85% and 110% of rated control supply voltage			
	Us			
	limits of drop out and open fully are: 75% to 20%	57	25	P
	for a.c. and 75% to 10% for d.c			
9.3.3.2.2	Relays and releases Setting R	ange 60 – 90 A		Р
	Conditions for thermal and time-delay magnetic ov	erload relays only:		р
	type of time-delay overload relay	Thermal, Temp.		
		Compensated wit	h current	
		Transformer		tari o
	trip class	20		
	current settinglset:	60 A 9	0 A	
	ambient temperature (°C)	24		
	test enclosure W x H x D (mm x mm x mm):	None		
	cable/busbar cross-section (mm²) / (mm):			
	at A (1,05) times of current setting, tripping shall	63 A 9	4,5 A	
	not occur in less than 2 h starting from the cold			
	state; test current	No tripping N	lo tripping	
	When the current is subsequently raised to B	72 A 1	A 80	
	(1,2) times the current setting, tripping shall occur			
	in less than 2 h; test current min:sec :	1:55 1	:15	
	for class 10A overload relays energized at C (1,5)			
	times the current, tripping shall occur in less than			
	2 min, starting from thermal equilibrium at the			
	current setting; test current min:sec :	N		
	for class 10, 20 or 30 overload relays energized	90 A 1	35 A	Magical and Special
	at C times the current, tripping shall occur in less			X Mark
	than 2, 8 or 12 min, starting from thermal			100
	equilibrium at the current setting; class; test			
	current; tripping time min:sec :	0:15 0	:11	

	EN 60 947-4-1			
Clause	Requirement – Test	Result - Rem	ark	Verdict
				The introduction of the state o
	at D (7,2) times the current setting, tripping shall	432 A	648 A	
	occur within the tripping time (s) $6 < Tp \le 20$,			
	starting from the cold state; test current; tripping			
	time Tp (s)	13	19	
	Ambient temperature: - 5 °C			
	at A (1,05) times of current setting, tripping shall	63 A	94,5 A	
	not occur in less than 2 h starting from the cold			
	state; test current	No tripping	No tripping	
	When the current is subsequently raised to B	72 A	108 A	Marine Salah
	(1,2) times the current setting, tripping shall occur			
	in less than 2 h; test current min:sec :	15:40	2:55	
	for class 10A overlod relays energized at C (1,5)			
	times the current, tripping shall occur in less than			
	2 min, starting from thermal equilibrium at the			
	current setting; test currentmin:sec :	N		
	for class 10, 20 or 30 overload relays energized	90	135 A	
	at C times the current, tripping shall occur in less			
	than 2, 8 or 12 min, starting from thermal			
	equilibrium at the current setting; class; test			
	current; tripping timemin:sec :	0:55	0:40	
	at D (7,2) times the current setting, tripping shall	432 A	648 A	
	occur within the tripping time (s) 6 < Tp ≤ 20s			
	tarting from the cold state; test current; tripping			
	time Tp (s):	16	20	
	Ambient temperature: + 40 °C			
	at A (1,05) times of current setting, tripping shall	63 A	94,5 A	
	not occur in less than 2 h starting from the cold			
	state; test current	No tripping	No tripping	2
	When the current is subsequently raised to B	72 A	108 A	
	(1,2) times the current setting, tripping shall occur			SOPPE STATE OF THE
	in less than 2 h; test current min:sec :	1:20	1:30	A SHAREST STORES

	EN 60 947-4-1	Ī		T
Clause	Requirement – Test	Result - Rema	ark	Verdict
		1		
	for class 10A overload relays energized at C (1,5)			
	times the current, tripping shall occur in less than			
	2 min, starting from thermal equilibrium at the			
	current setting; test current min:sec :	N		
	for class 10, 20 or 30 overload relays energized	90 A	135 A	2 4
	at C times the current, tripping shall occur in less			
	than 2, 8 or 12 min, starting from thermal			
	equilibrium at the current setting; class; test			
	current; tripping time min:sec :	0:12	0:40	
	at D (7,2) times the current setting, tripping shall	432 A	648 A	
	occur within the tripping time (s) 6 < Tp ≤ 20			
	starting from the cold state; test current; tripping			
	time Tp (s)	15	19	
	Limits of operation of three-pole thermal overload	relays energize	d on two poles:	Р
	ambient temperature (°C):	25		ilia. S
	the relay energized on three poles, at A (1 / 0,9)	64 A / 54 A	90 A / 81 A	76.00 Z F14.
	times the current setting, tripping shall not occur			
	in less than 2 h, starting from the cold state:			
		No tripping	No tripping	
	when the value of the current flowing in two poles	69 A / 0 A	103,5 A / 0 A	
	is increased to B (1,15) times the current setting			
	and the third pole deenergized, tripping shall			
	occur in less than 2 h min:sec :	1:30	0:55	
9.3.3.4	Test of dielectric properties, impulse withstand volt	tage (Uimp indi	cated):	Р
	- verification by measurement of clearances			N
	instead of testing			
	- rated impulse withstand voltage (V)	8000		
	- test Uimp main circuits (kV)			Р
	- test Uimp auxiliary circuits (kV)		<u></u>	Р
	Test of dielectric properties, dielectric withstand vo		t indicated):	N
	- rated insulation voltage (V)			
	- main circuits, test voltage for 1 min (V):			N

EN 60 947-4-1				
Clause	Requirement – Test	Result - Remark	Verdict	
	- control and auxiliary circuits, test voltage for		N	
			I	

9.3.3.5	TEST SEQUENCE II		
	Making and breaking capacity		
	utilization category:	AC1	
	rated operational voltage Ue (V)	690	
	rated operational current le (A) or power (kW):	150A	
	Conditions, make/break operations AC-1 only:		Р
	- test voltage U/Ue = 1,05 (V)	L1: 740	
		L2: 739	
		L3: 739	
	- test current I/ie = 1,5 (A):	L1: 262	
	, ,	L2: 262	
		L3: 263	
	- power factor/time constant	L1: 0,8	
	1	L2: 0,79	
		L3: 0,8	
	- on-time (ms)	160	
	- off-time (s)		
	- number of make/break operations:	50	Р
	Behaviour and condition during and after the test:		P
	- no permanent arcing		Р
	- no flash-over between poles		Р
	- no blowing of the fusible element in the earth		Р
	circuit		
	- no welding of the contacts		Р
	- the contacts shall operate when the contactor or		Р
	starter is switched by the applicable method of		
	control		
	Operational performance capability:	I	Р

	EN 60 947-4-1			
Clause	Requirement – Test	Result - Remark	Verdict	
		[
	utilization category (AC-3 or AC-4)			
	rated operational voltage Ue (V)	400V	pint of the Assessment and Assessment	
	rated operational current le (A) or power (kW):	85A		
	Conditions, make operations AC3/AC4 only:	<u> </u>	P	
	- test voltage U/Ue = 1,05 (V):	L1: 426		
		L2: 423		
		L3: 425		
	- test current I/Ie = (A):	L1: 1115		
		L2: 1114		
		L3: 1115		
	- power factor/time constant:	L1: 0,32		
		L2: 0,32		
		L3: 0,31	20.0	
	- on-time (ms):	100		
	- off-time (s):	30		
	- number of make operations:		Р	
	Characteristic of transient recovery voltage for AC		Р	
	oscillatory frequency (kHz)			
	Measured oscillatory frequency (kHz)			
		L2: 68		
		L3: 67		
	Factor y	L1: 1,1		
-		L2: 1,1		
		L3: 1,1		
	Behaviour and condition during and after the test:		Р	
	- no permanent arcing	P	Р	
	- no flash-over between poles	Р	Р	
	- no blowing of the fusible element in the earth circuit	P	Р	
	- no welding of the contacts	Р	P	

	EN 60 947-4-1		
Clause	Requirement – Test	Result - Remark	Verdict
		T	
	- the contacts shall operate when the contactor or	P	Р
	starter is switched by the applicable method of		
	control		
	Operational performance capability:	T	
	utilization category	AC3	
	rated operational voltage Ue (V)	400	2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	rated operational current le (A) or power (kW):	85A	
	Conditions, make/break operations AC3 / AC4 only	y:	Р
	- test voltage U/Ue = 1,05 (V)	L1: 425	
		L2: 424	
		L3: 426	
	- test current I/ie = (A):	L1: 221	
		L2: 222	
		L3: 221	
	- power factor/time constant:	L1: 0,32	, 4.46 1.46
		L2: 0,33	
		L3: 0,33	
	- on-time (ms):	100	
	- off-time (s):	4	
	- number of make/break operations:	6000	Р
	Characteristic of transient recovery voltage for AC-	-3 and AC-4 only:	Р
	oscillatory frequency (kHz):		
	Measured oscillatory frequency (kHz)	L1: 49	
		L2: 48	
		L3: 48	
	Factor y	L1: 1,1	
		L2: 1,1	
		L3: 1,1	
	Behaviour and condition during and after the test:		P
	- no permanent arcing	P	P
	- no flash-over between poles	Р	Р

	EN 60 947-4-1		
Clause	Requirement - Test	Result - Remark	Verdict
	- no blowing of the fusible element in the earth	P	Р
	circuit		
	- no welding of the contacts	Р	Р
	- the contacts shall operate when the contactor or	Р	P
	starter is switched by the applicable method of		
	control		
8.3.3.6	Operational performance capability:		
	utilization category	AC1	200
	rated operational voltage (V)	690	
	rated operational current le (A) or power (kW):	150A	
	Test conditions for make/break operations AC-1 or	nly:	Р
	test voltage (V):	L1: 740	
		L2: 739	
		L3: 739	
	test current (A):	L1: 172	
		L2: 172	100
		L3: 173	
	power factor/time constant:	L1: 0,81	
		L2: 0,8	
		L3: 0,81	(Alberto
	- on-time (ms)	160	22-82
	- off-time (s):	4,8	
	- number of operating cycles:	6000	P
8.3.3.6.6	Behaviour and condition during and after the test:		Р
	- no permanent arcing		Р
	- no flash-over between poles		Р
	- no blowing of the fusible element in the earth		Р
	circuit		
	- no welding of the contacts		P
	- the contacts shall operate when the contactor or		Р
	starter is switched by the applicable method of		
	control		

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Clause	Requirement – Test	Result - Remark	Verdict	
	Dielectric verification:		Р	
			<u> </u>	

9.3.4	TEST SEQUENCE III		
	Performance under short-circuit conditions		
9.3.4.2.1	Test at de prospective current "r":		
	type of SCPD	Siemens NH2 gL / gG	- 22
	ratings of SCPD, co-ordination type 1:	250A / 500V	
	ratings of SCPD, co-ordination type 2:	-	
	rated operational current le (A) AC-3	85A	
	prospective current "r" (kA):	5	
	test voltage (V):	L1: 421	
		L2: 421	
		L3: 423	
	r.m.s. test current (A):	L1: 5010	
		L2: 5070	
		L3: 5090	
	peak current (A):	L1: 7440	
		L2: 7920	
		L3: 6180	
	power factor	0,7	The space of the state of the s
	1. one breaking operation of SCPD with all the	L1: 473 kA2s / 6700A	
	switching devices closed prior to the test I2dta	L2: 529 kA2s / 6570 A	
	(A²s) /peak current I (A)	L3: 549 kA2s / 5700 A	
	2. one breaking operation of SCPD by closing the	L1: 474 kA2s / 6335 A	
	contactor or starter on to the short-circuit I²dta	L2: 465 kA2s / 6730 A	
	(A²s) /peak current I (A)	L3: 558 kA2s / 6890 A	
	Behaviour of the equipment during the test		P
	Both types of co-ordination (all devices):		Р

	EN 60 947-4-1		
Clause	Requirement – Test	Result - Remark	Verdict
	A - the fault current has been successfully		Р
	interrupted by the SCPD or the combination		
	starter and the fuse or fusible element, or solid		
	connection between the enclosure and supply		
	shall not have melted		
	B - the door or cover of the enclosure has not		Р
	been blown open and it is possible to open the		
	door or cover		
	C - there is no damage to the conductors or		P
	terminals and the conductors have not been		
	separated from the terminals		
	D - there is no cracking or breaking of an		Р
	insulating base to the extent that the integrity of		
	mounting of a live part is impaired		
	Both types of co-ordination (combination starters a	and protected starters only):	N
	E - the circuit breaker or the switch is capable of		N
	being opened manually by its operating means		
	F - neither end of the SCPD is completely		N
	separated from its mounting means to an		
	exposed conductive part		
	G - if a circuit breaker with rated ultimate short-circ	cuit breaking capacity less than	N
	the rated conditional short-circuit current assigned	to the combination or	
	protected starter is employed, the circuit breaker s	hall be tested to trip:	
	circuit breaker with instantaneous trip relays or		N
	releases, at 120% of the trip current		
	2) circuit breaker with overload relays or		N
	releases, at 250% of the rated current of the		
	circuit breaker		
	Type 1 co-ordination (all devices):		Р
	H - there has been no discharge of parts beyond	Ρ	Р
	the enclosure. The starter may be inoperative		
	after each operation		

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Clause	Requirement – Test	Result - Remark	Verdict	
	Type 1 co-ordination (combination and protected s	tarters only):	Р	
	I - dielectric verification test voltage (2 Ue) for	1380		
	1 min (V)	1		
	Type 2 co-ordination (all devices):	1	N	
	J - no damage to the overload relay or other parts		N	
	has occurred, except that welding of contactor or			
	starter contacts is permitted, if they are easily			
	separated without significant deformation			
	K - the tripping of the overload relay shall be		N	
	conform to the published tripping characteristics,			
	before and after the test			
	L - dielectric verification test voltage (2 Ue) for			
	1 min (V)			
9.3.4.2.2	Test at the rated conditional short-circuit current "le	g" ≤ SCC *r"	N	
	type of SCPD			
	ratings of SCPD, co-ordination type 1			
	ratings of SCPD, co-ordination type 2			
	rated operational current le (A) AC-3			
	prospective current "Iq" (kA):			
	test voltage (V):	L1:		
		L2:	4 200	
	1	L3:		
	r.m.s. test current (A):	L1:		
		L2:		
		L3:		
	peak current (A):	L1:		
		L2:		
		L3:		
	power factor			
	1. one breaking operation of SCPD with all the	L1:		
	switching devices closed prior to the test I²dta	L2:	en compa	
	(A²s)	L3:		

	EN 60 947-4-1				
Clause	Requirement – Test	Result - Remark	Verdict		
		ı			
	2. one breaking operation of SCPD by closing the	L1:			
	contactor or starter on to the short-circuit:	L2:			
		L3:			
	3. one breaking operation of SCPD by closing the	L1:			
	switching device on to the short-circuit:	L2:			
		L3:			
	Behaviour of the equipment during the test		N		
	Both types of co-ordination (all devices):		N		
	A - the fault current has been successfully		N		
ļ	interrupted by the SCPD or the combination				
	starter and the fuse or fusible element, or solid				
	connection between the enclosure and supply				
	shall not have melted				
	B - the door or cover of the enclosure has not		N		
	been blown open and it is possible to open the				
	door or cover				
	C - there is no damage to the conductors or		N		
	terminals and the conductors have not been				
	separated from the terminals				
	D - there is no cracking or breaking of an		N		
	insulating base to the extent that the integrity of				
	mounting of a live part is impaired				
	Both types of co-ordination (combination starters a	ind protected starters only):	N		
	E - the circuit breaker or the switch is capable of		N		
	being opened manually by its operating means				
	F - neither end of the SCPD is completely		N		
	separated from its mounting means to an				
	exposed conductive part				
	G - if a circuit breaker with rated ultimate short-circ	cuit breaking capacity less than	N		
	the rated conditional short-circuit current assigned	to the combination or			
	protected starter is employed, the circuit breaker s	hall be tested to trip:			

	EN 60 947-4-1		
Clause	Requirement - Test	Result - Remark	Verdict
	circuit breaker with instantaneous trip relays or releases, at 120% of the trip current		N
	2) circuit breaker with overload relays or releases, at 250% of the rated current of the circuit breaker		N
	Type 1 co-ordination (all devices):		N
	H - there has been no discharge of parts beyond the enclosure. The starter may be inoperative after each operation		N
	Type 1 co-ordination (combination and protected s	starters only):	N
	I - dielectric verification test voltage (2 Ue) for 1 min (V)		
	Type 2 co-ordination (all devices):	•	N
	J - no damage to the overload relay or other parts has occurred, except that welding of contactor or starter contacts is permitted, if they are easily separated without significant deformation		N
	K - the tripping of the overload relay shall be conform to the published tripping characteristics, before and after the test		N
	L - dielectric verification test voltage (2 Ue) for 1 min (V)		

9.3.5	TEST SEQUENCE IV: (APPLICABLE FOR CONTACTORS ONLY)	P
	Overload current withstand capability of contactors:	Р
	ambient temperature (°C)	
	rated operational current le (A) max. AC-3 85	
	test current (ie) (A)	
	duration of test: 10 s	20.2

	EN 60 947-4-1				
Clause	Requirement – Test	Result - Remark	Verdict		
	After the test, the contactor shall be substantially in the same condition as before the test (visual inspection)	Р	Р		

	TABLE: temperature rise me	easurements			Р
Main Term	inals Contactor (170A)		1	58	70
			3	59	70
			5	60	70
			4	59	70
Auxilixary T	Terminals Contactor (16A)		13	41	65
			14	42	65
			43	40	65
Auxiliary Te	erminal Overload Relay (4A)		95	40	65
			96	35	65
Coil:	240V	50Hz		70	135
	24V + 10%	DC		60	135

	EN 60 947-4-1		····
Clause	Requirement – Test	Result - Remark	Verdict
	EN 60 947-5-1		· · · · · · · · · · · · · · · · · · ·
8.3.3.5.3	Making and breaking capacities of switching elements under abnormal		
	conditions:		
	utilization category:	AC15	
	rated operational voltage Ue (V)		
•	rated operational current le (A) or power (kW):		
	Conditions, make/break operations:		
	- test voltage U/Ue = 1,1 (V):	L1: 266	
		L2: -	
		L3: -	
	- power factor/time constant:	L1: 0,31	
		L2: -	
		L3: -	
	- make operations: test current I/le (A):	L1: 123	
		L2: -	
		L3: -	
	- break operations: test current I/le (A)		
		L2: -	
		L3: -	
	- on-time (ms)		
	- operating cycles per minute		
	- number of operating cycles	[10	P
	Behaviour and condition during and after the test:		P
	- no electrical or mechanical failures		Р
	- no contact welding or prolonged arcing		P
	- no blowing of the fusible element in the earth circuit		٢
	Dielectric verification:		Р
	dielectric test voltage (V)	2000	P
		1	<u> </u>

	EN 60 947-4-1			
Clause	Requirement – Test		Result - Remark	Verdict

	EN 60 947-5-1		1
8.3.3.5	TEST SEQUENCE III		
8.3.3.5.2	Making and breaking capacities of switching elements under normal conditions		
	utilization category	AC15	
	rated operational voltage Ue (V)	240	
	rated operational current le (A) or power (kW):	12	
<u> </u>	Conditions, make/break operations:		Р
	- test voltage U/Ue = 1,1 (V)	L1: 266* / 242 **	
	* 50 operation at 266V	L2:	
	** 6000 operations at 242V	L3:	40.00
	- power factor/time constant:	L1: 0,31	5 3 miles
		L2: -	
		L3: -	
	- make operations: test current I/Ie (A):	L1: 123	
		L2: -	
		L3: -	
	- break operations: test current I/Ie (A)	L1: 13	
		L2: -	
		L3:	
	- on-time (ms) *50 oper. / **6000 oper	160 * / 300**	
	- operating cycles per minute:		
	- number of operating cycles:		Р
	Behaviour and condition during and after the test:		Р
	- no electrical or mechanical failures		Р
	- no contact welding or prolonged arcing		Р
	- no blowing of the fusible element in the earth		Р
	circuit		
	Dielectric verification:	ı	Р
	dielectric test voltage (V)	2000	P
	utilization category		
	rated operational voltage Ue (V)		

"	EN 60 947-4-1		
Clause	Requirement – Test	Result - Remark	Verdict

	EN 60 947-5-1		
8.3.4	TEST SEQUENCE IV		
	Performance under conditional short-circuit current		
	type of SCPD	Siemens Diazed gL / gG	A = A
	ratings of SCPD	25A / 500V	
	prospective current (kA)		
	test voltage (V) U/Ue = 1,1 (V)	L1: 277	
		L2: 275	
		L3: 276	0000 24
	r.m.s. test current (A)	L1: 1010	en trump de se
		L2: 1050	
		L3: 1020	
,	power factor (max. 0,7)	0,7	
	first making operation to closed switching	L1: 1650 A2s / 770A	
	elements: test I²dta (A²s) / I _D (A)	L2: 2880 A2s / 830 A	
		L3: 2850 A²s / 1090 A	
	time interval between test (min. 3 min)		
	second making operation to closed switching	L1: 1430 A2s / 700 A	
	elements: test I²dta (A²s) / I _D (A)	L2: 2900 A2s / 830 A	
		L3: 2860 A²s / 1080 A	
	time interval between test (min. 3 min)		
	third making operation to closed switching	L1: 2910 A2s / 1030 A	
	elements: test l²dta (A²s) / I _D (A):	L2: 2540 A2s / 975 A	
		L3: 830 A2s / 545 A	
	Behaviour of the equipment during the test:		Р
	switching elements open by the normal actuating		Р
	system		
	Dielectric verification:		Р
	dielectric test voltage (V)	2000	Р



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TEST REPORT EN 60 947-4-1

Low-voltage switchgear and controlgear

Part 4: Contactors and motor-starters

Section 1: Electromechanical contactors and motor-starters

Report reference No.

2.03.00356.1.0-K110/B&J

Tested by (+ signature).....: Ing.J.Ainetter
Approved by (+ signature): Ing.K.Farthofer

Date of issue: 02.02.2004

Ges.m.b.H

Address...... : A – 1031 Vienna, Faradaygasse 3

Testing location.....: as above

Applicant: Benedict GmbH (Ω Benedikt & Jäger)

Address...... : A – 1220 Vienna, Lieblgasse 7

Standard: EN 60 947-4-1:2000-11

Test Report Form No. 69474-1A

Master TRF.....: reference No. 69474-1A, dated 95-07

Copyright blank test report: the bodies participating in the Committee of Certification

Bodies (CCB) and/or the CENELEC Certification

Agreement (CCA).

Test procedure: CB-scheme

Procedure deviation.....: N.A. Non-standard test method: N.A.

Type of test object: Motor-Starter

Trademark: Ω , Benedikt & Jäger

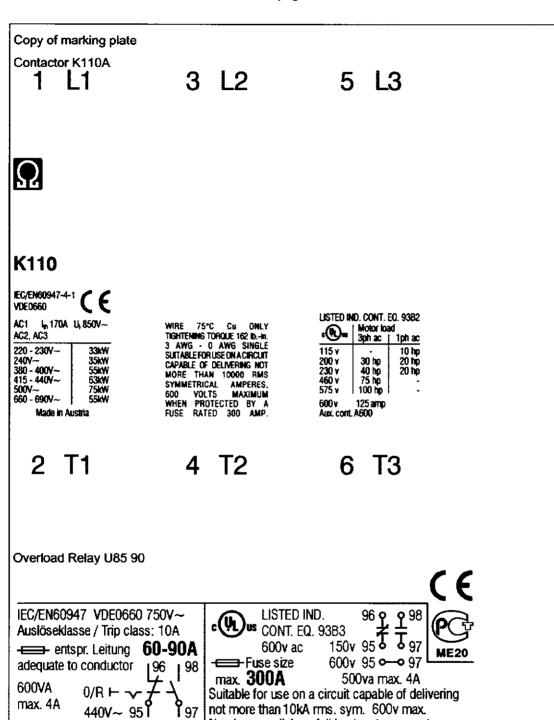
Model/type reference: K110Axx + U85x

Manufacturer.....: Ω Benedikt & Jäger

Rating: AC1 170A 690V 50-60Hz

AC3/AC4 110A 400V 50-60Hz

AC15 12A 240V 50-60Hz



Numbers on dial are full load motor currents.

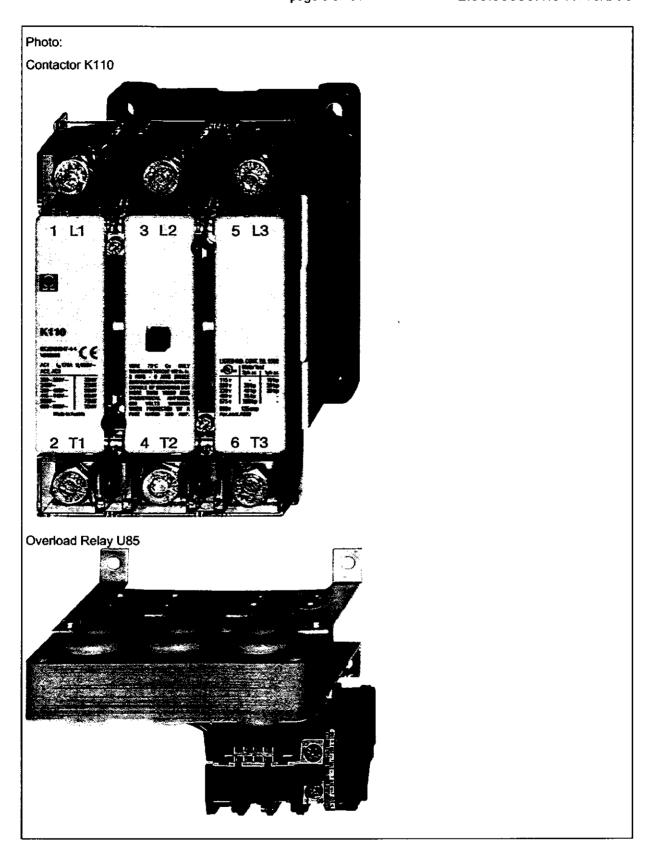
Tripping current is 125% of numbers on dial.

Made in

Austria

690V~ 95 ~

-097



Test item particulars:	
- method of operation	Magnetic
- switching positions:	ON-OFF
- number of polesContactor:	3 Main 4 Aux
- kind of current:	AC
- number of phases	3
- rated frequency (Hz)	50-60
- number of positions of main contacts	2
Rated and limiting values, main circuit:	
- rated operational voltage Ue (V):	690
- rated insulation voltage Ui (V):	690
- rated impulse withstand voltage Uimp (kV):	8
- conventional free air thermal current lth (A):	170
- conventional enclosed thermal current Ithe (A):	170
- rated operational current le (A):	170
- rated uninterrupted Iu (A):	170
- utilization category:	AC1, AC3
Short-circuit characteristic:	
- rated prospective short-circuit current "r" (kA):	5
- rated conditional short-circuit current Iq (kA):	5
Rated and limiting values, auxiliary circuits:	For Contactor
- rated operational voltage (V):	240
- rated frequency (Hz):	50-60
- number of circuits:	Max. 4
- number and kind of contact elements:	2 NO and 2 NC
Co-ordination of short-circuit protective devices:	Type "1"
- kind of protective device:	Fuse
Possible test case verdicts:	
- test case does not apply to the test object:	N(.A.)
- test object does meet the requirement:	P(ass)
- test object does not meet the requirement:	F(ail)

General remarks:

"(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.

The test results presented in this report relate only to the object tested.

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

- 1) Based on the decision of the applicant, some of the tests of Test Sequences I and II may have been performed under more severe conditions than required in the stanard. In case of, relevant values for equipment under test are stated in test report.
- 2) The test item is corresponding to the requirements of IEC 60947-4-1 Ed. 2.0 (2000-11) + A1 (2002-09).

Ordering key:

Contactor

K110A x x x

I I I >>>> := : DC Supply (optional)

1 1 >>>> : 0, 1, 2, 3, 4 : Number of NC auxiliary contacts

1>>>>

: 0, 1, 2, 3, 4 : Number of NO auxiliary contacts

Overload Relay

U85 x

I >>>> : Setting range 60 - 90 / 80 - 120 A

Control Circiut Voltage:

6 - 550V

50Hz

6 - 600V

60Hz

12 - 250V

DC

With Late Break Contact in series to coil.

	EN 60 947-4-1		
Clause	Requirement – Test	Result - Remark	Verdict
6.2	MARKING:		
	Data shall be preferably marked on the equipment	:	Р
	c - number of this standard (IEC/EN60947-4-1)	IEC947-4-1	Р
	k - IP code, in case of an enclosed equipment		N
	Data shall be included on the nameplate, or on the	e equipment, or in the	
	manufacturer's published literature:		
	d - rated operational voltages	690V	Р
	e – utilization category and rated operational	AC1 170A, 690V	Р
	currents (or rated powers), at the rated	AC3 110A, 400V	
	operational voltages of the equipment	Contactor AC15 12A, 240V	
	f - either the value of the rated frequency/ies, or	50-60Hz	Р
• • • • • • • • • • • • • • • • • • • •	the indication d.c. (or symbol)		
	g - rated duty with the indication of the class of		N
	intermittent duty, if any		
	Associated values:		
	h - rated marking and breaking capacities (these	AC1, AC3, AC15	Р
	indications may be replaced, where applicable,	:	
	by the indication of the utilization category)		
	Safety an installation:		
	i - rated insulation voltage	690V	Р
	j - rated impulse withstand voltage	8 kV	Р
	I – pollution degree	3	Р
	m - rated conditional short-circuit current and type of co-ordination of contactor or		P
	starter and type, current rating and characteristics	of the associated SCPD:	
	m - rated conditional short-circuit current of the	5 kA	₽
	combination starter or the protected starter	Type '1' 250A fuse gL/gG	
	n – switching overvoltages	≤ 8 kV	P
	Control circuits: Contactor		
	The following information concerning control circuit	its shall be placed either on the	
	coil or on the equipment:	T	
	o - rated control circuit voltage (Uc), nature of	6-550V 50Hz / 6-600V 60Hz	Р
	current and rated frequency	12-250V =	

	EN 60 947-4-1		
Clause	Requirement – Test	Result - Remark	Verdict
	p - if necessary, nature of current, rated	Us = Uc	Р
	frequency and rated control supply voltages (Us)		
	Auxiliary circuits: Contactor		
	r - ratings of auxiliary circuits	AC15 12A, 240V	Р
	Overload relays and releases:		
	s - characteristics according to 5.7	P	P

8.1	CONSTRUCTION: Overload relay		
8.1.1	Materials		Р
	Resistance to abnormal heat and fire		Р
	-parts retain current-carrying parts: 850 / 960°C	Housing (black)	Р
		Cover (grey)	
	- other: 650°C		N
8.1.2	Current-carrying parts and their connection		P
8.1.3	Clearances		P
	Uimp is given as:	8kV	Р
	- max. value of rated operational voltage to earth :		Table 1 and
		600V	
	- nominal voltage of supply system:	400 / 690V	
	- overvoltage category:	IV	
	- pollution degree	3	
	- field-in or homogeneous	Inhomogeneous	
	- minimum clearances (mm):	8	
	- measured clearances (mm)	≥10	The second secon
	Uimp is not given:		N
	- rated insulation voltage Ui (V):		**************************************
	- le:		
	- minimum clearances L-L/L-A (mm):		
	- measured clearances L-L/L-A (mm):		
	Creepage distances		
	Uimp is given as:	8 kV	

EN 60 947-4-1					
Clause	Requirement – Test	Result - Remark	Verdict		
	meterial group or CT!	. Main III h	W W		
	- material group or CTI		2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2		
	- minimum creepage distances (mm)		A 1		
	- measured creepage distances (mm)	: [2 12,5	7 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2		
	Uimp is not given: - material column a or b				
	- minimum creepage distances (mm) - measured creepage distances (mm)		and a second of the second of		
8.1.4	Actuator		N		
8.1.4.1	Insulation		N N		
8.1.4.2	Direction		N N		
8.1.4.3	Mounting		N		
8.1.5	Indication of contact position		N N		
8.1.5.1	Indication means		N		
8.1.5.2	Indication hearis		N		
8.1.6	Additional safety requirements for equipment with		N N		
0.1.0	isolating function		'`		
8.1.7	Terminals		P		
8.1.7.1	All parts of terminals which maintain contact and	(see 8.2.4 below)	P		
	carry current shall be of metal having adequate	(000 0.2// 00.0/			
	mechanical strength				
	Terminal connections shall be such that	(see 8.2.4 below)	Р		
	necessary contact pressure is maintained				
	Terminals shall be so constructed that the	(see 8.2.4 below)	Р		
	conductor is clamped between suitable surfaces				
	without damage to the conductor and terminal				
	Terminal shall not allow the conductor to be	(see 8.2.4 below)	P		
	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				
8.2.4	Mechanical properties of terminals:	Contactor			
8.2.4.2	Mechanical strength of terminals				

	EN 60 947-4-1		
Clause	Requirement – Test	Result - Remark	Verdict
	· ·		E · · · · · · · · · · · · · · · · · · ·
	maximum cross-sectional area of conductor	70	
	(mm²)		1 1 1 1 1 1 1 1 1 1
	diameter of thread (mm)	М 8	
	torque (Nm)	3,5	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	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 (mm²)	10	
	number of conductor of the smallest cross	1	Section Continue
	diameter of bushing hole (mm)	9,5	The control of the
	height between the equipment and the platen	279	1
	(mm)		1
	mass at the conductor(s) (kg)	2	And the second s
	135 continuous revolutions: the conductor shall	:	P
	neither slip out of the terminal nor break near the		
0044	clamping unit		:
8.2.4.4	Pull-out test	100	The second secon
	force (N)	90	P
	1 min, the conductor shall neither slip out of the		
	terminal nor break near the clamping unit	Į.	
		70	
	conductor of the largest cross-sectional area (mm²):		
	number of conductor of the largest cross-	1	A second
	sectional		William Control of the Control of th
	diameter of bushing hole (mm)	19,1	*** The second of the second o
	height between the equipment and the platen	368	
	mass at the conductor(s) (kg)		

	EN 60 947-4-1	T		
Clause	Requirement – Test	Result - Remark		Verdict
				-
	135 continuous revolutions: the conductor shall			P
	neither slip out of the terminal nor break near the			
	clamping unit			
	Pull-out test			
	force (N):	285		
	1 min, the conductor shall neither slip out of the			P
	terminal nor break near the clamping unit			
	Flexion test	Contactor		
	conductor of the largest and smallest cross-	10	70	And the second s
	sectional area (mm²):			** ***********************************
- "-	number of conductor of the smallest cross	1	1	7 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	sectional, number of conductor of the largest			A CONTROL OF THE CONT
	cross sectional			
	diameter of bushing hole (mm)		19,1	
	height between the equipment and the platen	279	368	A Section of the sect
	(mm):			
	mass at the conductor(s) (kg):	2	14	The state of the s
	135 continuous revolutions: the conductor shall			Р
	neither slip out of the terminal nor break near the			
	clamping unit			
	Pull-out test			
	force (N)	90	285	
	1 min, the conductor shall neither slip out of the			Р
	terminal nor break near the clamping unit			
8.1.7.2	Connecting capacity			Р
	type of conductors	Semi Rigid	Flexible	To a constant and the c
	minimum cross-sectional area of conductor	10	16	
	(mm²):	į	10	
	maximum cross-sectional area of conductor	70	50	- 7 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1
	(mm²)	1	30	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
		Acc. Manuf. Instr.		Mar 111111 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	number of conductors simultaneously connectable to the terminal:	Acc. Manut. Instr.	2	

	EN 60 947-4-1	1	
Clause	Requirement – Test	Result - Remark	Verdict
8.1.7.3	Connection		P
0.1.7.0	terminals for connection to external conductors		P
	shall be readily accessible during installation		
	clamping screws and nuts shall not serve to fix		Р
	any other component		
8.1.7.4	Terminal identification and marking		Р
	terminal intended exclusively for the neutral		N
	conductor		
	protective earth terminal		N
	other terminals		P
	- Main circuit::	-	
	- Auxiliary circuit	95-96, 97-98, 13-14, 21- 22,	
		31-32, 43-44, A1, A2	
8.1.8	Additional requirements for equipment provided w	ith a neutral pole	N
	marking of neutral pole		N
	The switched neutral pole shall not break before		N
	and shall not make after the other poles		
	Conventional thermal current of neutral pole		N
8.1.9	Provisions for protective earthing		N
8.1.9.1	The exposed conductive parts shall be electrically		N
	interconnected and connected to a protective		
	earth terminal		
8.1.9.2	The protective earth terminal shall be readily		N
	accessible		
	The protective earth terminal shall be suitably		N
	protected against corrosion		
	The electrical continuity between the exposed		N
	conductive parts of the protective earth terminal		
	and the metal sheathing of connecting		
	conductors		
	The protective earth terminal shall have no other		N
	functions		

	EN 60 947-4-1				
Clause	Requirement – Test	Result - Remark	Verdict		
8.1.9.3	Protective earth terminal marking and identification		N		
8.1.10	Enclosure for equipment	•	N		
8.1.10.1	Design		N		
	The enclosure, when it is opened: all parts requiring access for installation and maintenance are readily accessible		N		
	Sufficient space shall be provided inside the enclosure		N		
	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		
	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		
	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		
	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		
8.1.10.2	Insulation		N		

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Clause	Requirement – Test	Result - Remark	Verdict	
	If, in order to prevent accidental contact between		N	
	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			
8.1.11	Degree of protection of enclosed equipment		N	
	Degree of protection	IP	N	
	Test for first characteristic	,	N	
	Test for first numeral:	1:	**************************************	
		2:		
		3:		
		4:	A	
		5:	And the second s	
		6:	### Compared to 1	
	Test for second characteristic		N	
	Test for second numeral:	1:		
		2:		
		3:		
		4:		
		5:		
		6:		
		7:		
		8:		

9.3.1.a	TEST SEQUENCE I			
9.3.3.3	Temperature rise	ype AC	DC	Р
	ambient temperature 10-40 °C	25		William Swarp
	Contactor			N
	test enclosure W x H x D (mm x mm x mm)	350 x 175 x 145		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	material of enclosure	Metal		
	Main circuits, test conditions:			N

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Clause	Requirement – Test	Result - Remark	Verdict
	- conventional thermal current lth (A)	170	A man and a man
	- conventional enclosed thermal current Ithe (A) .:	170	
	- cable/busbar cross-section (mm²) / (mm):	70	AND AND STATE OF THE STATE OF T
	- temperature rise of main circuit terminals (K):	≤ 60	W//
	Auxiliary circuit, test conditions:		Р
	- rated operation current le (A)	16	A STATE OF THE STA
	- cable cross-section (mm²)	2,5	And A chart a second se
-	- temperature rise of auxiliary circuit terminals	≤ 42	The state of the s
	(K)		1
	Coils and electromagnets, test conditions:	AC DC	Р
	- rated control supply voltage Us (V)	240 24	William Willia
	- Class of insulating material	F F	And the second s
	- temperature rise of coil and electromagnets (K):	≤ 70 ≤ 60	
			All and the second seco
	Starter Tested wi	th setting range 80 – 120 A	
	test enclosure W x H x D (mm x mm x mm):	Open Type	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	material of enclosure	None	The state of the s
	Main circuits, test conditions:		Р
	- conventional thermal current Ith (A)	170	111 1146 114 114 114 114 114 114 114 114
	- cable/busbar cross-section (mm²) / (mm):	70 mm²	
	- temperature rise of main circuit terminals (K):	≤ 60	- 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1
		Temp. Rise on Contactor	Hard Committee C
		terminals only. Worst Case	"Mail Selection of the Control of th
		AC1 170A istead of AC3 110A	1
	Overload relay, auxiliary circuit, test conditions:	.	Р
	- rated operation current le (A)	4	The state of the s
	- cable cross-section (mm²):	1	- d - Common of American Common
	- temperature rise of auxiliary circuit terminals	≤ 40	9990
	(K)		*** **********************************
9.3.3.2	Operating limits		
9.3.3.2.1	Power-operated equipment:	AC DC	Р
	rated control supply voltage Us (V)	240 24	A Company of the Comp

	EN 60 947-4-1		
Clause	Requirement – Test	Result - Remark	Verdict
		,	
	frequency (Hz)	50 DC	Will and the second
	limits of close satisfactorily at any value between	73 65	Р
	85% and 110% of rated control supply voltage		İ
	Us		
	limits of drop out and open fully are: 75% to 20%	57 25	Р
	for a.c. and 75% to 10% for d.c		
9.3.3.2.2	Relays and releases Setting R	ange 80 – 120 A	Р
	Conditions for thermal and time-delay magnetic ov	rerload relays only:	р
	type of time-delay overload relay:	Thermal, Temp.	The second secon
		Compensated with current	**************************************
		Transformer	out of helphon
	trip class	20	The state of the s
	current settingl _{set} :	80 A 120 A	The second secon
	ambient temperature (°C)	24	Applications of the control of the c
	test enclosure W x H x D (mm x mm x mm):	None	
	cable/busbar cross-section (mm²) / (mm)		
	at A (1,05) times of current setting, tripping shall	84 A 126 A	A 1
	not occur in less than 2 h starting from the cold		The state of the s
	state; test current	No tripping No tripping	
	When the current is subsequently raised to B	96 A 144 A	
	(1,2) times the current setting, tripping shall occur		
	in less than 2 h; test currentmin:sec :	3:20 2:35	
	for class 10A overload relays energized at C (1,5)		
	times the current, tripping shall occur in less than		*** The second s
	2 min, starting from thermal equilibrium at the		and the second s
	current setting; test currentmin:sec :	N_	*** *** *** *** *** *** *** *** *** **
	for class 10, 20 or 30 overload relays energized	120 A 180 A	AND THE PROPERTY OF THE PROPER
	at C times the current, tripping shall occur in less		
	than 2, 8 or 12 min, starting from thermal		
	equilibrium at the current setting; class; test		F. 1. 1
	current; tripping timemin:sec :	0:20 0:23	

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Clause	Requirement – Test	Result - Rema	ark	Verdict	
				1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
	at D (7,2) times the current setting, tripping shall	576 A	864 A		
	occur within the tripping time (s) $6 \le Tp \le 20$,	į		The state of the s	
	starting from the cold state; test current; tripping]		11 (1 m) (1	
	time Tp (s)	10	14		
	Ambient temperature: - 5 °C			A A SAME OF THE SA	
	at A (1,05) times of current setting, tripping shall	84 A	126 A	A to a second and	
	not occur in less than 2 h starting from the cold				
	state; test current	No tripping	No tripping	Anna Adamana Tilana	
	When the current is subsequently raised to B	96 A	144 A	The second secon	
	(1,2) times the current setting, tripping shall occur			1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
	in less than 2 h; test current min:sec :	28:00	3:45	**************************************	
	for class 10A overlod relays energized at C (1,5)			1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
	times the current, tripping shall occur in less than			1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
	2 min, starting from thermal equilibrium at the			A TOTAL CONTROL OF THE PROPERTY OF THE PROPERT	
	current setting; test current min:sec :	N			
	for class 10, 20 or 30 overload relays energized	120	180 A		
	at C times the current, tripping shall occur in less				
	than 2, 8 or 12 min, starting from thermal				
	equilibrium at the current setting; class; test			And the second s	
	current; tripping timemin:sec :	1:15	1:35		
	at D (7,2) times the current setting, tripping shall	576 A	864 A	7 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	
	occur within the tripping time (s) 6 < Tp ≤ 20s			A STATE OF THE STA	
	tarting from the cold state; test current; tripping				
	time Tp (s)	13	16		
:	Ambient temperature: + 40 °C				
	at A (1,05) times of current setting, tripping shall	84 A	126 A		
	not occur in less than 2 h starting from the cold				
	state; test current:	No tripping	No tripping		
	When the current is subsequently raised to B	96 A	144 A	1	
	(1,2) times the current setting, tripping shall occur				
	in less than 2 h; test currentmin:sec :	2:40	1:45		

	EN 60 947-4-1		
Clause	Requirement – Test	Result - Remark	Verdict
			an a summer and the s
	for class 10A overload relays energized at C (1,5)		**************************************
	times the current, tripping shall occur in less than		
	2 min, starting from thermal equilibrium at the		Y 1 % 1
	current setting; test current min.sec :	N	
	for class 10, 20 or 30 overload relays energized	120 A 180 A	A second
	at C times the current, tripping shall occur in less		
	than 2, 8 or 12 min, starting from thermal		
	equilibrium at the current setting; class; test		2 1 1 1 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2
	current; tripping time min:sec :	0:17 0:55	
	at D (7,2) times the current setting, tripping shall	576 A 864 A	
	occur within the tripping time (s) $6 < Tp \le 20$		The state of the s
	starting from the cold state; test current; tripping		** Taylor (1997) ** Tay
	time Tp (s)	12 15	
	Limits of operation of three-pole thermal overload	relays energized on two pole	es: P
	ambient temperature (°C)	25	
	the relay energized on three poles, at A (1 / 0,9)	80 A / 72 A 120 A / 108	ЗА 💮 💳 💮
	times the current setting, tripping shall not occur		
	in less than 2 h, starting from the cold state:		
		No tripping No tripping	
	when the value of the current flowing in two poles	92 A / 0 A 138 A / 0 A	
	is increased to B (1,15) times the current setting		
	and the third pole deenergized, tripping shall		
	occur in less than 2 h min:sec :	1:45 1:15	
9.3.3.4	Test of dielectric properties, impulse withstand vol	tage (Uimp indicated):	P
	- verification by measurement of clearances		N
	instead of testing		
	- rated impulse withstand voltage (V)	8000	
	- test Uimp main circuits (kV):	9,8 / 7	Р
	- test Uimp auxiliary circuits (kV)		Р
	Test of dielectric properties, dielectric withstand vo	•	N
	- rated insulation voltage (V)	<u> </u>	10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	- main circuits, test voltage for 1 min (V)		N

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Clause	Requirement – Test	Result - Remark	Verdict	
	- control and auxiliary circuits, test voltage for		N	
	1 min (V)			

9.3.3.5	TEST SEQUENCE II		
	Making and breaking capacity		
	utilization category	AC1	And the second s
	rated operational voltage Ue (V):	690	
<u>.</u>	rated operational current le (A) or power (kW):	170A	A CONTROL OF THE CONT
	Conditions, make/break operations AC-1 only:		Р
	- test voltage U/Ue = 1,05 (V):	L1: 740	
		L2: 739	
		L3: 739	
	- test current I/Ie = 1,5 (A):	L1: 262	
		L2: 262	
		L3: 263	
	- power factor/time constant:	L1: 0,8	
		L2: 0,79	
		L3: 0,8	
	- on-time (ms):	160	
	- off-time (s)	9,8	
	- number of make/break operations:	50	Р
	Behaviour and condition during and after the test:		Р
	- no permanent arcing		Р
	- no flash-over between poles		Р
	- no blowing of the fusible element in the earth		Р
	circuit		
	- no welding of the contacts		Р
	- the contacts shall operate when the contactor or		Р
	starter is switched by the applicable method of		
	control		
	Operational performance capability:		Р

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Clause	Requirement – Test	Result - Remark	Verdict		
	utilization category (AC-3 or AC-4)	AC3	10 20 20 20 20 20 20 20 20 20 20 20 20 20		
	rated operational voltage Ue (V)	400V	20		
	rated operational current le (A) or power (kW):	110A			
	Conditions, make operations AC3/AC4 only:		Р		
	- test voltage U/Ue = 1,05 (V):	L1: 426			
		L2: 423	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
		L3: 425			
	- test current I/Ie = (A):	L1: 1115			
		L2: 1114			
		L3: 1115			
	- power factor/time constant:	L1: 0,32			
		L2: 0,32			
		L3: 0,31			
	- on-time (ms)	100			
	- off-time (s)	30	We are a second content of the con		
	- number of make operations:	50	P		
	Characteristic of transient recovery voltage for AC	-3 and AC-4 only:	P		
	oscillatory frequency (kHz):		$\begin{array}{cccccccccccccccccccccccccccccccccccc$		
	Measured oscillatory frequency (kHz):	L1: 67			
		L2: 68			
		L3: 67			
	Factor y:	L1: 1,1			
		L2: 1,1			
		L3: 1,1			
	Behaviour and condition during and after the test:		Р		
	- no permanent arcing	Р	Р		
	- no flash-over between poles	Р	Р		
	- no blowing of the fusible element in the earth	Р	Р		
	circuit				
	- no welding of the contacts	Р	Р		

	EN 60 947-4-1		
Clause	Requirement – Test	Result - Remark	Verdict
		1	
	- the contacts shall operate when the contactor or	P	P
	starter is switched by the applicable method of		
	control		
	Operational performance capability:		
	utilization category	AC3	
	rated operational voltage Ue (V)	400	Sanitaria de la companya del companya del companya de la companya del la companya de la companya
	rated operational current le (A) or power (kW):	110A	
	Conditions, make/break operations AC3 / AC4 only	y:	Р
	- test voltage U/Ue = 1,05 (V):	L1: 425	
		L2: 424	
	. 1	L3: 426	
	- test current I/Ie = (A)	L1: 221	
	,	L2: 222	
		L3: 221	St. 10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	- power factor/time constant		
•	F	L2: 0,33	*** *** *** *** *** *** *** *** *** **
		L3: 0,33	
	- on-time (ms)		
	- off-time (s)	1	
	- number of make/break operations:		Р
	Characteristic of transient recovery voltage for AC		Р
	oscillatory frequency (kHz)	diants 4 only.	
	Measured oscillatory frequency (kHz)	11:49	Villen Market College
	moduled dodnatory mediciney (M12)	L2: 48	
		L3: 48	
	Factor y	L1: 1,1	
	1 door y	L2: 1,1	
		L3: 1,1	
	Behaviour and condition during and after the test:	LU. 1, I	P
	- no permanent arcing	P	P
	- no flash-over between poles	P	P

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Clause	Requirement – Test	Result - Remark	Verdict
	- no blowing of the fusible element in the earth	P	Р
	circuit		
	- no welding of the contacts	Р	P
	- the contacts shall operate when the contactor or	P	Р
	starter is switched by the applicable method of		
	control		
8.3.3.6	Operational performance capability:	1	
	utilization category	AC1	
	rated operational voltage (V)	690	The second secon
	rated operational current le (A) or power (kW):	170A	
	Test conditions for make/break operations AC-1 or	nly:	Р
	test voltage (V)	L1: 740	
		L2: 739	
		L3: 739	
	test current (A)	L1: 172	
		L2: 172	
		L3: 173	The second secon
	power factor/time constant:	L1: 0,81	
		L2: 0,8	2×1 × 1
		L3: 0,81	
	- on-time (ms):	160	The state of the s
	- off-time (s)	4,8	
	- number of operating cycles:	6000	Р
8.3.3.6.6	Behaviour and condition during and after the test:		Р
	- no permanent arcing		P
	- no flash-over between poles		Р
	- no blowing of the fusible element in the earth		Р
	circuit		
	- no welding of the contacts		Р
	- the contacts shall operate when the contactor or		Р
	starter is switched by the applicable method of		
	control		

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Clause	Requirement – Test	Result - Remark	Verdict	
,				
	Dielectric verification:		P	
	test voltage (2 Ue + 1000 V) for 1 min (V)	. 2222		

9.3.4	TEST SEQUENCE III		
	Performance under short-circuit conditions		
9.3.4.2.1	Test at de prospective current "r":		
	type of SCPD	Siemens NH2 gL / gG	
	ratings of SCPD, co-ordination type 1	250A / 500V	
	ratings of SCPD, co-ordination type 2	-	
	rated operational current le (A) AC-3:	85A	
	prospective current "r" (kA):	5	
	test voltage (V):	L1: 421	
		L2: 421	
		L3: 423	
	r.m.s. test current (A):	L1: 5010	
		L2: 5070	
		L3: 5090	
	peak current (A):	L1: 7440	
		L2: 7920	
		L3: 6180	
	power factor	0,7	
	1. one breaking operation of SCPD with all the	L1: 473 kA2s / 6700A	
	switching devices closed prior to the test l²dta	L2: 529 kA2s / 6570 A	
	(A²s) /peak current I (A)	L3: 549 kA2s / 5700 A	
	2. one breaking operation of SCPD by closing the	L1: 474 kA2s / 6335 A	1 1985
	contactor or starter on to the short-circuit I²dta	L2: 465 kA2s / 6730 A	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	(A²s) /peak current I (A)	L3: 558 kA2s / 6890 A	**************************************
	Behaviour of the equipment during the test		Р
	Both types of co-ordination (all devices):		Р

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Clause	Requirement – Test	Result - Remark	Verdict
	A - the fault current has been successfully		Р
	interrupted by the SCPD or the combination		
	starter and the fuse or fusible element, or solid		
	connection between the enclosure and supply		
	shall not have melted		
	B - the door or cover of the enclosure has not		Р
	been blown open and it is possible to open the		
	door or cover		
	C - there is no damage to the conductors or		Р
	terminals and the conductors have not been		
	separated from the terminals		
	D - there is no cracking or breaking of an		Р
	insulating base to the extent that the integrity of		
	mounting of a live part is impaired		
	Both types of co-ordination (combination starters a	and protected starters only):	N
	E - the circuit breaker or the switch is capable of		N
	being opened manually by its operating means		
	F - neither end of the SCPD is completely		N
	separated from its mounting means to an		
	exposed conductive part		
	G - if a circuit breaker with rated ultimate short-circ	cuit breaking capacity less than	N
	the rated conditional short-circuit current assigned	to the combination or	
	protected starter is employed, the circuit breaker sl	hall be tested to trip:	
	circuit breaker with instantaneous trip relays or		N
	releases, at 120% of the trip current		
-	2) circuit breaker with overload relays or		N
	releases, at 250% of the rated current of the		
	circuit breaker		
	Type 1 co-ordination (all devices):		Р
	H - there has been no discharge of parts beyond	Р	P
	the enclosure. The starter may be inoperative		
	after each operation		

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Clause	Requirement - Test	Result - Remark	Verdict	
	Type 1 co-ordination (combination and protected s	starters only):	Р	
	I - dielectric verification test voltage (2 Ue) for	1380		
	1 min (V):			
	Type 2 co-ordination (all devices):		N	
	J - no damage to the overload relay or other parts		N	
	has occurred, except that welding of contactor or			
	starter contacts is permitted, if they are easily			
_	separated without significant deformation			
	K - the tripping of the overload relay shall be		N	
	conform to the published tripping characteristics,			
	before and after the test			
	L - dielectric verification test voltage (2 Ue) for			
_	1 min (V)			
9.3.4.2.2	Test at the rated conditional short-circuit current "I	q" ≤ SCC "r"	N	
:	type of SCPD			
	ratings of SCPD, co-ordination type 1		The content of the	
	ratings of SCPD, co-ordination type 2		Variable Variable	
	rated operational current le (A) AC-3			
	prospective current "Iq" (kA)			
	test voltage (V)	L1:		
		L2:	2000 2000 2000 2000 2000 2000 2000 200	
		L3:		
	r.m.s. test current (A)	L1:		
		L2:		
		L3:	Compared Compared	
	peak current (A)	L1:		
		L2:	1	
		L3:		
	power factor			
	one breaking operation of SCPD with all the	L1:		
	switching devices closed prior to the test I2dta	L2:		
	(A²s)	L3:		

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Clause	Requirement – Test	Result - Remark	Verdict	
			· · · · · · · · · · · · · · · · · · ·	
	2. one breaking operation of SCPD by closing the	L1:	a management of	
	contactor or starter on to the short-circuit:	L2:	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	
		L3:	2 An 1911	
	3. one breaking operation of SCPD by closing the	L1:		
	switching device on to the short-circuit	L2:	The second secon	
		L3:	WALL STATE OF THE	
	Behaviour of the equipment during the test		N	
	Both types of co-ordination (all devices):		N	
	A - the fault current has been successfully		N	
	interrupted by the SCPD or the combination			
	starter and the fuse or fusible element, or solid			
	connection between the enclosure and supply			
	shall not have melted			
	B - the door or cover of the enclosure has not		N	
	been blown open and it is possible to open the			
	door or cover			
	C - there is no damage to the conductors or		N	
	terminals and the conductors have not been			
	separated from the terminals			
	D - there is no cracking or breaking of an		N	
	insulating base to the extent that the integrity of			
	mounting of a live part is impaired			
	Both types of co-ordination (combination starters a	nd protected starters only):	N	
	E - the circuit breaker or the switch is capable of		N	
	being opened manually by its operating means			
	F - neither end of the SCPD is completely		N	
	separated from its mounting means to an			
	exposed conductive part			
	G - if a circuit breaker with rated ultimate short-circ	uit breaking capacity less than	N	
	the rated conditional short-circuit current assigned	to the combination or		
	protected starter is employed, the circuit breaker s	hall be tested to trip:		

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Clause	Requirement – Test	Result - Remark	Verdict
	1) circuit breaker with instantaneous trip relays or releases, at 120% of the trip current		N
	circuit breaker with overload relays or releases, at 250% of the rated current of the circuit breaker		N
	Type 1 co-ordination (all devices):		N
	H - there has been no discharge of parts beyond the enclosure. The starter may be inoperative after each operation		N
	Type 1 co-ordination (combination and protected s	starters only):	N
	I - dielectric verification test voltage (2 Ue) for 1 min (V)		
•	Type 2 co-ordination (all devices):		N
	J - no damage to the overload relay or other parts has occurred, except that welding of contactor or starter contacts is permitted, if they are easily separated without significant deformation		N
	K - the tripping of the overload relay shall be conform to the published tripping characteristics, before and after the test		N
	L - dielectric verification test voltage (2 Ue) for 1 min (V)		

9.3.5	TEST SEQUENCE IV: (APPLICABLE FOR CONTACTORS ONLY	r) P
	Overload current withstand capability of contactors:	Р
	ambient temperature (°C)	7 2 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	rated operational current le (A) max. AC-3	
	test current (le) (A)	
	duration of test: 10 s	

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Clause	Clause Requirement - Test Result - Remark				
-11-1	After the test, the contactor shall be substantially	Р	Р		
	in the same condition as before the test (visual inspection)				

Т	ABLE: temperature rise m	easurements			Р
temperature n	se dT of part.		No.	OT (K)	Required dT
Main Termina	als Contactor (170A)	Total Control	1	58	70
			3	59	70
			5	60	70
			4	59	70
Auxilixary Ten	minals Contactor (16A)		13	41	65
			14	42	65
			43	40	65
Auxiliary Term	ninal Overload Relay (4A)		95	40	65
			96	35	65
Coil:	240V	50Hz		70	135
	24V + 10%	DC		60	135

Clause	EN 60 947-4-1	B II. B I	1 1/2 1/2 1/2
Clause	Requirement – Test	Result - Remark	Verdict
	EN 60 947-5-1		
8.3.3.5.3	Making and breaking capacities of switching elementary conditions:	ents under abnormal	Р
	utilization category	AC15	
	rated operational voltage Ue (V)		
	rated operational current le (A) or power (kW):	7	
	Conditions, make/break operations:		
	- test voltage U/Ue = 1,1 (V)	L1: 266	
		L2: -	
		L3: -	
	- power factor/time constant:	L1: 0,31	
		L2: -	
		L3: -	
	- make operations: test current I/Ie (A):	L1: 123	
		L2: -	** ** ** ** ** ** ** ** ** ** ** ** **
		L3: -	- The second of the second of
	- break operations: test current I/le (A):	L1: 123	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
		L2: -	
		L3: -	The control of the
	- on-time (ms)	300	
	- operating cycles per minute	6	*** *** *** *** *** *** *** *** *** **
	- number of operating cycles	10	Р
	Behaviour and condition during and after the test:		Р
	- no electrical or mechanical failures		Р
	- no contact welding or prolonged arcing		Р
	- no blowing of the fusible element in the earth		Р
	Dielectric verification:		Р
	dielectric test voltage (V)	2000	Р

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Clause	Requirement – Test	Result - Remark	Verdict

·	EN 60 947-5-1		
8.3.3.5	TEST SEQUENCE III		
8.3.3.5.2	Making and breaking capacities of switching elements under normal conditions		
	utilization category	AC15	
	rated operational voltage Ue (V)	240	
	rated operational current le (A) or power (kW):	·	a madalati. Dami la ni
	Conditions, make/break operations:		Р
	- test voltage U/Ue = 1,1 (V)	L1: 266* / 242 **	
	* 50 operation at 266V	L2:	
	** 6000 operations at 242V:	L3:	
•	- power factor/time constant	L1: 0,31	
		L2: -	
		L3: -	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	- make operations: test current I/Ie (A)	L1: 123	
		L2: -	
		L3: -	The state of the s
	- break operations: test current I/Ie (A)	L1: 13	In A A Sub-Management of the sub-management
		L2: -	The second secon
		L3:	The state of the s
	- on-time (ms) *50 oper. / **6000 oper:	160 * / 300**	
	- operating cycles per minute	15	
	- number of operating cycles	6050	Р
	Behaviour and condition during and after the test:		Р
	- no electrical or mechanical failures		Р
	- no contact welding or prolonged arcing		Р
	- no blowing of the fusible element in the earth		Р
	circuit		
	Dielectric verification:		Р
	dielectric test voltage (V)	2000	Р
	utilization category		
	rated operational voltage Ue (V)		

		EN 60 947-4-1		
Clause	Requirement – Test		Result - Remark	Verdict

	EN 60 947-5-1	***	
8.3.4	TEST SEQUENCE IV		
	Performance under conditional short-circuit current		
	type of SCPD:	Siemens Diazed gL / gG	
	ratings of SCPD		1
	prospective current (kA):	1	1 1 2 2 2 2 2 2 2 2
	test voltage (V) U/Ue = 1,1 (V):	L1: 277	The same of the sa
		L2: 275	Autor Control of Contr
		L3: 276	La Milla Andreag garren en en en en en en en en en en en en e
	r.m.s. test current (A):	L1: 1010	F and Anapper 1 5 of 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
		L2: 1050	The second secon
		L3: 1020	One age and a second and a seco
	power factor (max. 0,7)	0,7	
	first making operation to closed switching	L1: 1650 A2s / 770A	
	elements: test I²dta (A²s) / I _D (A)	L2: 2880 A2s / 830 A	100 100 100 100 100 100 100 100 100 100
		L3: 2850 A2s / 1090 A	FF of the second
	time interval between test (min. 3 min)		
	second making operation to closed switching	L1: 1430 A2s / 700 A	100 100 100 100 100 100 100 100 100 100
	elements: test I²dta (A²s) / I _D (A)	L2: 2900 A2s / 830 A	
		L3: 2860 A2s / 1080 A	
	time interval between test (min. 3 min)		
	third making operation to closed switching	L1: 2910 A2s / 1030 A	
	elements: test I²dta (A²s) / I _D (A)	L2: 2540 A2s / 975 A	
		L3: 830 A2s / 545 A	
	Behaviour of the equipment during the test:		Р
	switching elements open by the normal actuating		Р
	system		
==	Dielectric verification:		Р
	dielectric test voltage (V)	2000	Р