

IEC SYSTEM FOR CONFORMITY TESTING  
AND CERTIFICATION OF ELECTRICAL  
EQUIPMENT (IECEE)  
CB SCHEME

SYSTÈME CEI D'ESSAIS DE CONFORMITÉ  
ET DE CERTIFICATION DES ÉQUIPEMENTS  
ÉLECTRIQUES (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*

Rating and principal characteristics  
*Valeurs nominales et caractéristiques  
principales*

Trade mark (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 form part of this certificate  
*comme indiqué dans le Rapport d'essais  
numéro de référence  
qui constitue une partie de ce certificat*

**Contacteur relais and auxiliary contact blocks**

**Benedikt & Jäger  
A-1221 Wien, Liebgasse 7**

**Benedikt & Jäger  
A-1221 Wien, Liebgasse 7**

**Benedikt & Jäger  
A-1221 Wien, Liebgasse 7**

**AC 690 V, 50-60 Hz; AC1 10 A**

**Ω, Benedikt & Jäger  
Brand Names: see page 1 of test report**

**K3-07.., HB.., LH.. (see page 1 of test report)**

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**IEC 60947-5-1:1997/A1:1999+A2:1999**

**CTI-CB 433-1; -2**

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

Date: 2001-12-14

Austrian Electrotechnical Association  
A-1190 Wien, Kahlenberger Str. 2a





Österreichischer Verband für Elektrotechnik  
30110  
Prof. Dr. W. Martin  
ÖVE

Dipl.-Ing. W. Martin  
Head of Dept. Testing & Certification

<b>TEST REPORT</b>	
<b>IEC 60 947-5-1</b>	
<b>Low-voltage switchgear and controlgear</b>	
<b>Part 5: Control circuit devices and switching elements</b>	
<b>Section 1: Electromechanical control circuit devices</b>	
Report reference No.	: CTI CB 433-1
Tested by (+ signature)	: J. Wolf
Approved by (+ signature)	: H. Bachl
Date of issue	: 2001-12-12
Testing laboratory	: CTI-Vienna
Address	: A – 1210 Vienna, Einzingerasse 4
Testing location	: as above
Applicant	: Benedikt & Jäger
Address	: A – 1221 Vienna, Lieblgasse 7
Standard	: IEC 60 947-5-1:1997 +A1:1999-04 +A2:1999-10
Test Report Form No.	: 69475-1A
Master TRF	: reference No. 947-5-1A, dated 95-09
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	: Auxiliary Contact Block
Trademark 1	: $\Omega$ , <b>Benedikt &amp; Jäger</b>
Trademark 2	: SCHRACK
Trademark 3	: IMO
Model/type reference 1	: <b>HB..</b> <b>LH..</b>
Model/type reference 2	: HB..                              LH..
Model/type reference 3	: MCAS-..                      A69-0001.
Manufacturer	: Benedikt & Jäger
Rating	: 10A                              10A
	690V                              690V
	50-60Hz                      50-60Hz

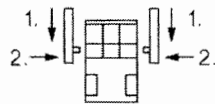
Copy of marking plate

HB

 **HB11**  
 IEC/EN60947-5-1  
 VDE0660  
 AC1 = I<sub>th</sub>  
 690V~ 10A 



AC15  

V~	220	380	MADE IN
	240	415	AUSTRIA
A	3	2	



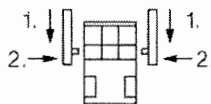
600v ac 10amp  
 A600 Q600

MCAS

 **MCAS-11**  
 IEC/EN60947-5-1  
 VDE0660  
 AC1 = I<sub>th</sub>  
 690V~ 10A 


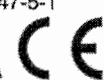
AC15  

V~	220	380	MADE IN
	240	415	AUSTRIA
A	3	2	



600v ac 10amp  
 A600 Q600

LH



 **LH11**  
 IEC/EN60947-5-1  
 VDE0660  
 AC1 = I<sub>th</sub>  
 690V~ 10A 

AC15  

V~	220	380
	240	415
A	3	2

600v ac 10amp  
 A600 Q600  
 MADE IN AUSTRIA

A69-0001

 **A69-0001**  
 IEC/EN60947-5-1  
 VDE0660  
 AC1 = I<sub>th</sub>  
 690V~ 10A 

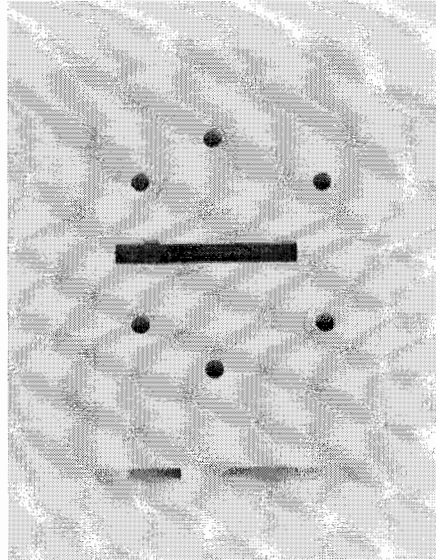
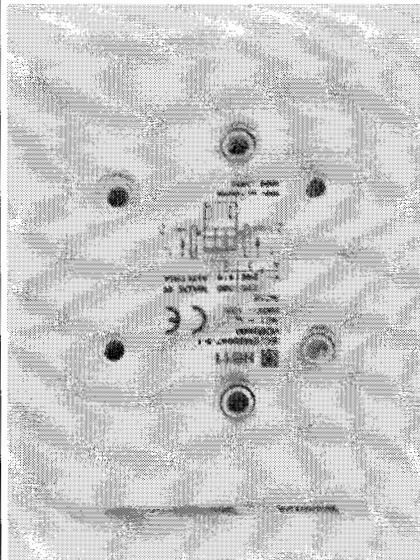
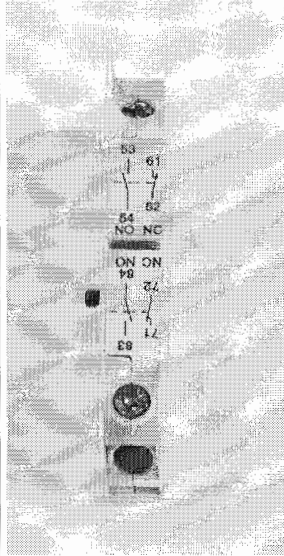
AC15  

V~	220	380
	240	415
A	3	2

600v ac 10amp  
 A600 Q600  
 MADE IN AUSTRIA

Photo:

LH11 represents all other Brands and Types



Test item particulars	: Auxiliary Contact Block	
- method of operation.....	: Mechanically coupled with basic device	
- switching positions.....	: ON-OFF	
- number of circuits.....	: 2	
- kind of current.....	: AC	
- number and kind of contact elements.....	: 1 NC and/or 1 NO	
- 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).....	: 10	: 10
- conventional enclosed thermal current Ithe (A).....	: 10	: 10
- rated operational current Ie (A).....	: 10	: 10
- rated uninterrupted Iu (A).....	: 10	: 10
- utilization category.....	: AC1	
Short-circuit characteristic.....	:	
- rated conditional short-circuit current (kA).....	: 1	
Co-ordination of short-circuit protective devices.....	:	
- kind of protective device.....	: Fuse 20A gL/gG	
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)	

Ordering key:													
HB	1	1											
			>	>	>	>	>	>	>	>	>	>	0, 1 : Number of NC auxiliary contacts
		>	>	>	>	>	>	>	>	>	>	>	0, 1 : Number of NO auxiliary contacts
	>	>	>	>	>	>	>	>	>	>	>	>	HB : Used for K3-24...74 contactors
													LH : Used for LT switches

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.

The present Test Report is not valid as a Test Report according to a Mutual Recognition Agreement (i.e. IECEE-CB, CCA, ENEC, KEYMARK,...) unless appended to a corresponding Certificate issued by a National Certification Body, signatory to the relevant Scheme.

**1) The auxiliary contact block HB.. is designed to be coupled with following types of contactors:**

**K3-24A... (covered CB/AT 1285)**

**K3-32A... (covered CB/AT 1285)**

**K3-40A... (covered CB/AT 1285)**

**K3-50A... (covered CB/AT 1285)**

**K3-62A... (covered CB/AT 1285)**

**K3-74A... (covered CB/AT 1285)**

**2) The auxiliary contact block LH.. is designed to be coupled with following types of switch disconnectors:**

**LT30 (covered CB/AT 1178)**

**LT40 (covered CB/AT 1178)**

**LT50 (covered CB/AT 1178)**

**LT70 (covered CB/AT 1178)**

**3) Internal parts of HB11 and LH11 are identical. All tests are performed in combination with K3-24A.. and K3-50A..**

**4) According to the request of the manufacturer only utilization category AC1 according to IEC 60947-4-1 has been tested.**

IEC 60 947-5-1			
Clause	Requirement – Test	Result - Remark	Verdict

5.2	MARKING		
	Data shall be preferably marked on the equipment:		P
	a - manufacturer's name or trademark	Ω , Benedikt & Jäger	P
	b - type designation or serial number	HB.. LH..	P
	Data shall be included on the nameplate, or on the equipment, or in the manufacturer's published literature:		P
	c - number of this standard	IEC 60947-5-1	P
	d - rated operational voltages	690V	P
	e - utilization category and rated operational currents, at the rated operational voltages of the control circuit device	AC1 ( see remark on page 5 ) 10A 10A 690V	P
	f - rated insulation voltage .....	690V	P
	g - rated impulse withstand voltage	6kV	P
	h - switching overvoltages, if applicable	≤ 6 kV	P
	i - IP code, in case of enclosed control circuit device	-	N
	j - pollution degree	3	P
	k - type and maximum ratings of short-circuit protective device	Fuse Fuse 20A gL(gG) 20A gL (gG)	P
	l - conditional short-circuit current if less than 1000 A	-	N
	m - suitability for isolation, where applicable		N
	n – indication of contact elements of same polarity		N

7.1	CONSTRUCTION		
7.1.1	Materials		P
7.1.2	Current-carrying parts and their connection		P
7.1.3	Clearances		P
	U <sub>imp</sub> is given as:	6kV	P
	- max. value of rated operational voltage to earth :	600V	—
	- nominal voltage of supply system .....	400 / 690V	—
	- overvoltage category .....	III	—

IEC 60 947-5-1			
Clause	Requirement – Test	Result - Remark	Verdict
	- pollution degree .....	3	—
	- field in- or homogeneous .....	Inhomogeneous	—
	- minimum clearances (mm) .....	5,5	—
	- measured clearances (mm) .....	≥ 5,5	—
	Uimp is not given:		N
	- rated insulation voltage Ui (V) .....		—
	- Ie .....		—
	- minimum clearances L-L/L-A (mm) .....		—
	- measured clearances L-L/L-A (mm) .....		—
	Creepage distances		P
	Uimp is given as: 6 kV		P
	- material group or CTI .....	Min. II	—
	- minimum creepage distances (mm) .....	9	—
	- measured creepage distances (mm) .....	≥ 9	—
	Uimp is not given:		N
	- material column a or b .....		—
	- minimum creepage distances (mm) .....		—
	- measured creepage distances (mm)		N
7.1.4	Actuator		N
7.1.4.1	Insulation		N
7.1.4.2	Direction		N
7.1.4.3	Actuating force (or moment) .....		N
7.1.4.4	Limitation of rotation (of rotary switch)		N
7.1.4.5	Emergency stop		N
7.1.5	Indication of the contact position		N
7.1.5.1	Indication means		N
7.1.5.2	Indication by the actuator		N
7.1.6	Conditions for control switches suitable for isolation		N
7.1.7	Class II control circuit devices		N
7.1.8	Control devices with integrally connected cables		N
7.1.11	Degree of protection of enclosed equipment		N



IEC 60 947-5-1			
Clause	Requirement – Test	Result - Remark	Verdict
	Degree of protection .....	IP	N
<b>8.3.1.a</b>	<b>TEST SEQUENCE I</b>		
8.3.3.3	Temperature rise	HB11 + K3-50	P
	ambient temperature 10-40 °C .....	23	—
	test enclosure W x H x D (mm x mm x mm) .....	355 x 175 x 145	—
	material of enclosure .....	Steel	—
	NO-contacts, test conditions:		P
	- rated operational current I <sub>e</sub> (A) .....	10	—
	- cable cross-section (mm <sup>2</sup> ) .....	1,5	—
	- temperature rise of NO terminals (K) .....	≤ 42	—
	NC-contacts, test conditions:		P
	- rated operational current I <sub>e</sub> (A) .....	10	—
	- cable cross-section (mm <sup>2</sup> ) .....	1,5	—
	- temperature rise of NC terminals (K) .....	≤ 42	—
	Coils and electromagnets, test conditions:		N
	- rated control supply voltage U <sub>s</sub> (V) .....	-	—
	- Class of insulating material .....		—
	- temperature rise of coil and electromagnets (K) :	<	—
8.3.3.2	Operating limits		N
8.3.3.2.1	Power-operated equipment:		N
	ambient temperature (°C) .....		—
	rated control supply voltage U <sub>s</sub> (V) .....	-	—
	frequency (Hz) .....	-	—
	limits of close satisfactorily at any value between 85% and 110% of rated control supply voltage U <sub>s</sub> :		N
	limits of drop out and open fully are: 75% to 20% for a.c. and 75% to 10% for d.c. ....		N
8.3.3.4	Test of dielectric properties, impulse withstand voltage (U <sub>imp</sub> indicated):		
	- verification by measurement of clearances instead of testing	Yes	P
	- rated impulse withstand voltage (V) .....	6000	—

IEC 60 947-5-1				
Clause	Requirement – Test	Result - Remark		Verdict
	- test Uimp auxiliary circuits (kV) .....			N
	Test of dielectric properties, dielectric withstand voltage:			P
	- rated insulation voltage (V) .....	690		—
	- control and auxiliary circuits, test voltage (V) for 1 min .....	2500		P
8.2.4	Mechanical properties of terminals			P
8.2.4.2	Mechanical strength of terminals			P
	maximum cross-sectional area of conductor (mm <sup>2</sup> ) .....	2,5 solid	2,5 flex	—
	diameter of thread (mm) .....	M 3,5		—
	torque (Nm) .....	0,8		—
	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 (mm <sup>2</sup> ) .....	1 solid	1 flex	—
	number of conductor of the smallest cross section .....	1	1	—
	diameter of bushing hole (mm) .....	6,4	6,4	—
	height between the equipment and the platen (mm) .....	260	260	—
	mass at the conductor(s) (kg) .....	0,4	0,4	—
	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			P
	force (N) .....	35	35	—
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit			P
	Flexion test			P
	conductor of the largest cross-sectional area (mm <sup>2</sup> ) .....	2,5 solid	2,5 flex	—
	number of conductor of the largest cross-section :	1	1	—

IEC 60 947-5-1			
Clause	Requirement – Test	Result - Remark	Verdict
	diameter of bushing hole (mm) .....	9,5                      9,5	—
	height between the equipment and the platen (mm) .....	279                      279	—
	mass at the conductor(s) (kg) .....	0,7                      0,7	—
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		P
	Pull-out test		P
	force (N) .....	50                      50	—
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		P
	Flexion test		P
	conductor of the largest and smallest cross- sectional area (mm <sup>2</sup> ) .....	1 // 2,5 solid      1 // 2,5 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) .....	6,4 // 9,5              6,4 // 9,5	—
	height between the equipment and the platen (mm) .....	260 // 279              260 // 279	—
	mass at the conductor(s) (kg) .....	0,4 // 0,7              0,4 // 0,7	—
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		P
	Pull-out test		P
	force (N) .....	35 // 50                      35 // 50	—
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		P
<b>8.3.3.5</b>	<b>TEST SEQUENCE II</b>		
	Making and breaking capacity		P
	utilization category .....	AC-1 ( see remark on page 5 )	—

IEC 60 947-5-1			
Clause	Requirement – Test	Result - Remark	Verdict
	rated operational voltage $U_e$ (V) .....	690	—
	rated operational current $I_e$ (A) or power (kW) .....	10A	—
	Conditions, make/break operations AC-1 only:	NO-contact      NC-contact	P
	- test voltage $U/U_e = 1,05$ (V) .....	L1: 730 L2: 730 L3: -	—
	- test current $I/I_e$ (A) .....	L1: 16 L2: 16 L3: -	—
	- power factor/time constant .....	L1: 0,84 L2: 0,84 L3: -	—
	- on-time (ms) .....	200	—
	- off-time (s) .....	10	—
	- number of make/break operations .....	50                      50	P
	Behaviour and condition during and after the test:		P
	- no permanent arcing		P
	- no flashover between poles		P
	- no blowing of the fusible element in the earth circuit		P
	- no welding of the contacts		P
	- the contacts shall operate when the contactor or starter is switched by the applicable method of control		P
8.3.3.6	Operational performance capability:	NO-contact      NC-contact	P
	utilization category .....	AC-1 ( see remark on page 5 )	—
	rated operational voltage $U_e$ (V) .....	690	—
	rated operational current $I_e$ (A) or power (kW) .....	10A	—
	Test conditions for make/break operations AC-1 only:		P
	- test voltage $U/U_e = 1,05$ (V) .....	L1: 725 L2: 725 L3: -	—

IEC 60 947-5-1			
Clause	Requirement – Test	Result - Remark	Verdict
	- test current I/le (A) .....	L1: 10,5 L2: 10,5 L3: -	—
	- power factor/time constant .....	L1: 0,82 L2: 0,82 L3: -	—
	- on-time (ms) .....	200	—
	- off-time (s) .....	11	—
	- number of make/break operations .....	6000                  6000	P
8.3.3.6.6	Behaviour and condition during and after the test:		P
	- no permanent arcing		P
	- no flashover between poles		P
	- no blowing of the fusible element in the earth circuit		P
	- no welding of the contacts		P
	- the contacts shall operate when the contactor or starter is switched by the applicable method of control		P
	Dielectric verification:		P
	test voltage (V) (2 Ue /min. 1000 V) for 1 min .....	1380	—
8.3.3.5.3	Making and breaking capacities of switching elements under abnormal conditions:		N
	utilization category .....		—
	rated operational voltage Ue (V) .....		—
	rated operational current Ie (A) or power (kW) .....		—
<b>8.3.3.5</b>	<b>TEST SEQUENCE III</b>		
8.3.3.5.2	Making and breaking capacities of switching elements under normal conditions		N
<b>8.3.4</b>	<b>TEST SEQUENCE IV</b>		
	Performance under conditional short-circuit current HB	NO-contact                  NC-contact	P
	type of SCPD .....	Fuse Diazed	—

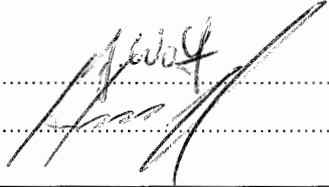
IEC 60 947-5-1			
Clause	Requirement – Test	Result - Remark	Verdict
	ratings of SCPD .....	20gL(gG)	—
	prospective current (kA) .....	1	—
	test voltage (V) U/U <sub>e</sub> = 1,1 (V) .....	L1: 436 L2: - L3: -	—
	r.m.s. test current (A) .....	L1: 1.095 L2: - L3: -	—
	power factor (max. 0,7)	0,7	P
	first making operation to closed switching elements: test I <sup>2</sup> dta (A <sup>2</sup> s) / I <sub>D</sub> (A) .....	L1: ≤ 199A <sup>2</sup> s      ≤ 199A <sup>2</sup> s ≤ 414A            ≤ 414A L2: - L3: -	—
	time interval between test (min. 3 min) .....	3 min	—
	second making operation to closed switching elements: test I <sup>2</sup> dta (A <sup>2</sup> s) / I <sub>D</sub> (A) .....	L1: ≤ 199A <sup>2</sup> s      ≤ 199A <sup>2</sup> s ≤ 414A            ≤ 414A L2: - L3: -	—
	time interval between test (min. 3 min) .....	3 min	—
	third making operation to closed switching elements: test I <sup>2</sup> dta (A <sup>2</sup> s) / I <sub>D</sub> (A) .....	L1: ≤ 199A <sup>2</sup> s      ≤ 199A <sup>2</sup> s ≤ 414A            ≤ 414A L2: - L3: -	—
	Behaviour of the equipment during the test:		P
	switching elements open by the normal actuating system		P
	Dielectric verification:		P
	dielectric test voltage (V)	1.380	P

IEC 60 947-5-1			
Clause	Requirement – Test	Result - Remark	Verdict

TABLE: temperature rise measurements			
temperature rise dT of part:	phase	dT (K)	Required dT (K)
HB11 NO-contacts 53		42	65
63		42	65
NO contacts have the same spring force as NC contacts.			





<b>TEST REPORT</b> <b>IEC 60 947-5-1</b> <b>Low-voltage switchgear and controlgear</b> <b>Part 5: Control circuit devices and switching elements</b> <b>Section 1: Electromechanical control circuit devices</b>		
Report reference No. :	CTI CB 433-2	
Tested by (+ signature) .....	J. Wolf	
Approved by (+ signature).....	H. Bachl	
Date of issue .....	2001-12-12	
Testing laboratory .....	CTI-Vienna	
Address.....	A – 1210 Vienna, Einzingerasse 4	
Testing location.....	as above	
Applicant .....	Benedikt & Jäger	
Address.....	A – 1221 Vienna, Lieblgasse 7	
Standard .....	IEC 60 947-5-1:1997 +A1:1999-04 +A2:1999-10	
Test Report Form No. ....	69475-1A	
Master TRF.....	reference No. 947-5-1A, dated 95-09	
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.....	Contactor Relais	
Trademark 1 .....	Ω , <b>Benedikt &amp; Jäger</b>	
Trademark 2 .....	SCHRACK	
Trademark 3 .....	IMO	
Model/type reference 1 .....	<b>K3-07A...</b>	<b>K3-07D...</b>
Model/type reference 2 .....	LA3007..	-
Model/type reference 3 .....	MCR07-S...	-
Manufacturer.....	Benedikt & Jäger	
Rating.....	20A	10A
	690V	690V
	50-60Hz	50-60Hz


Copy of marking plate

K3-07A, LA3007, MCR07-S

AC15 400V~ **4A**

IEC / EN60947-4-1	AC1= $I_{th}$	
VDE0660 AS3947-4-1	690V~ 20A	
IEC / EN60947-5-1	AC15	
AS3947-5-1	V~	A
MADE IN AUSTRIA	220-240	12
	380-440	4
	500	3
	660-690	1



 LISTED IND. CONT.  
 EQUIP. 93B3  
 600v ac 20amp  
 A600  
 TIGHTENING TORQUE 8.1 lb.-in.  
 14AWG-10AWG  
 WIRE 60°C Cu ONLY

K3-07D

AC15 400V~ **2A**

IEC / EN60947-4-1	AC1= $I_{th}$	
VDE0660 AS3947-4-1	690V~ 10A	
IEC / EN60947-5-1	AC15	
AS3947-5-1	V~	A
MADE IN AUSTRIA	220-240	4
	380-440	2
	500	1,2
	660-690	0,6




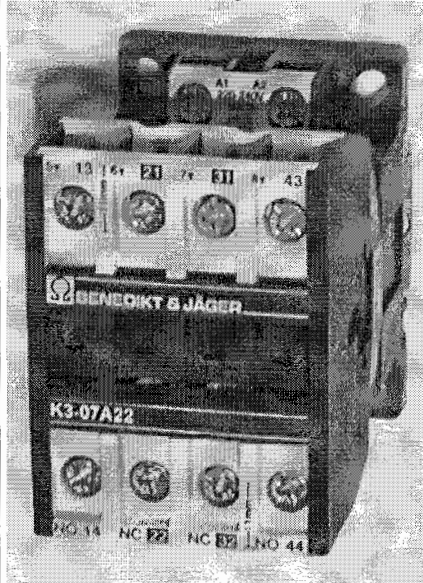
 LISTED IND. CONT.  
 EQUIP. 93B3  
 600v ac 10amp  
 A600  
 TIGHTENING TORQUE 8.1 lb.-in.  
 14AWG-10AWG  
 WIRE 60°C Cu ONLY

Photo:

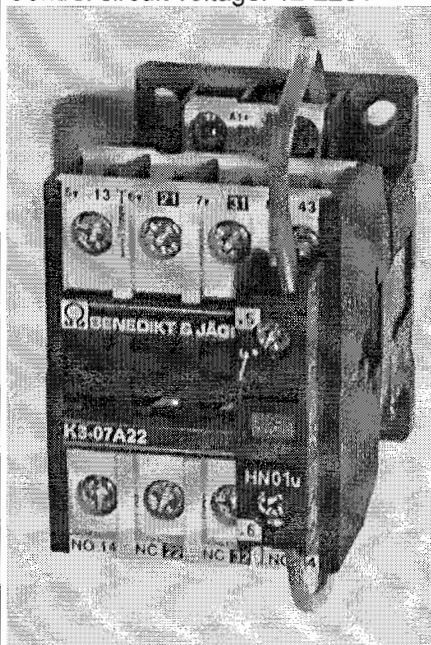
K3-07A (AC-operated) represents all other Brands and Types

Control circuit voltage: 5-550V 50Hz      6-600V 60Hz



K3-07A (DC-operated) represents all other Brands and Types

Control circuit voltage: 12-220V =



Test item particulars	: Contactor Relais	
	K03-07A	K03-07D
- method of operation.....	: Magnetic	
- switching positions.....	: ON-OFF	
- number of circuits .....	: 4	
- kind of current.....	: AC	
- number and kind of contact elements .....	: Max. 4 NC or 4 NO	
- 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) .....	: 20	10
- conventional enclosed thermal current Ithe (A) .....	: 20	10
- rated operational current Ie (A).....	: 20	10
- rated uninterrupted Iu (A).....	: 20	10
- utilization category .....	: AC1	
Short-circuit characteristic .....	:	
- rated conditional short-circuit current (kA).....	: 1	
Co-ordination of short-circuit protective devices.....	:	
- kind of protective device .....	: Fuse	
	25A gL/gG	20A gL/gG
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.

The present Test Report is not valid as a Test Report according to a Mutual Recognition Agreement (i.e. IECEE-CB, CCA, ENEC, KEYMARK,...) unless appended to a corresponding Certificate issued by a National Certification Body, signatory to the relevant Scheme.

**1) According to the request of the manufacturer only utilization category AC1 according to IEC 60947-4-1 has been tested.**

**2) All the requirements for the coils of the contactor relais are covered by CB/AT 1285 ( contactors K3 )**

Ordering key:

K3	-	07	A	x	x	x		x													
									>	>	>	>	>	>	>	>	>	>	>	>	230,... : Control Circuit Designation(e.g. 230)
							>	>	>	>	>	>	>	>	>	>	>	>	>	>	/ = : AC / DC operated
						>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	0...4 : Number of NC auxiliary contacts
					>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	0...4 : Number of NO auxiliary contacts
				>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	A, D : Screw type terminals + rating

IEC 60 947-5-1			
Clause	Requirement – Test	Result - Remark	Verdict
<b>5.2</b>	<b>MARKING</b>		
	Data shall be preferably marked on the equipment:		P
	a - manufacturer's name or trademark	Ω , Benedikt & Jäger	P
	b - type designation or serial number	K3-07A... K3-07D...	P
	Data shall be included on the nameplate, or on the equipment, or in the manufacturer's published literature:		P
	c - number of this standard	IEC 60947-5-1	P
	d - rated operational voltages	690V	P
	e - utilization category and rated operational currents, at the rated operational voltages of the control circuit device	AC1 ( see remark on page 5 ) 20A      10A 690V	P
	f - rated insulation voltage .....	690V	P
	g - rated impulse withstand voltage	8kV	P
	h - switching overvoltages, if applicable	≤ 8 kV	P
	i - IP code, in case of enclosed control circuit device	-	N
	j - pollution degree	3	P
	k - type and maximum ratings of short-circuit protective device	Fuse      Fuse 25A gL(gG) 20A gL (gG)	P
	l - conditional short-circuit current if less than 1000 A	-	N
	m - suitability for isolation, where applicable		N
	n – indication of contact elements of same polarity		N

<b>7.1</b>	<b>CONSTRUCTION</b>		
7.1.1	Materials		P
7.1.2	Current-carrying parts and their connection		P
7.1.3	Clearances		P
	U <sub>imp</sub> is given as:	8kV	P
	- max. value of rated operational voltage to earth :	600V	—
	- nominal voltage of supply system .....	400 / 690V	—
	- overvoltage category .....	IV	—

IEC 60 947-5-1			
Clause	Requirement – Test	Result - Remark	Verdict
	- pollution degree .....	3	—
	- field in- or homogeneous .....	Inhomogeneous	—
	- minimum clearances (mm) .....	8	—
	- measured clearances (mm) .....	≥ 10,2	—
	Uimp is not given:		N
	- rated insulation voltage Ui (V) .....		—
	- Ie .....		—
	- minimum clearances L-L/L-A (mm) .....		—
	- measured clearances L-L/L-A (mm) .....		—
	Creepage distances		P
	Uimp is given as:	8 kV	P
	- material group or CTI .....	Min. IIIb	—
	- minimum creepage distances (mm) .....	10	—
	- measured creepage distances (mm) .....	≥ 10,2	—
	Uimp is not given:		N
	- material column a or b .....		—
	- minimum creepage distances (mm) .....		—
	- measured creepage distances (mm)		N
7.1.4	Actuator		N
7.1.4.1	Insulation		N
7.1.4.2	Direction		N
7.1.4.3	Actuating force (or moment) .....		N
7.1.4.4	Limitation of rotation (of rotary switch)		N
7.1.4.5	Emergency stop		N
7.1.5	Indication of the contact position		N
7.1.5.1	Indication means		N
7.1.5.2	Indication by the actuator		N
7.1.6	Conditions for control switches suitable for isolation		N
7.1.7	Class II control circuit devices		N
7.1.8	Control devices with integrally connected cables		N
7.1.11	Degree of protection of enclosed equipment		N

IEC 60 947-5-1			
Clause	Requirement – Test	Result - Remark	Verdict
	Degree of protection .....	IP	N
<b>8.3.1.a</b>	<b>TEST SEQUENCE I</b>		
8.3.3.3	Temperature rise		P
	ambient temperature 10-40 °C .....	22	—
	test enclosure W x H x D (mm x mm x mm) .....	175 x 115 x 115	—
	material of enclosure .....	Steel	—
	<b>NO-contacts, test conditions:</b>	<b>K3-07A40</b> <b>K3-07D40</b>	P
	- rated operational current I <sub>e</sub> (A) .....	20                      10	—
	- cable cross-section (mm <sup>2</sup> ) .....	2,5	—
	- temperature rise of NO terminals (K) .....	≤ 50                      ≤ 37	—
	Auxiliary circuit, test conditions:		P
	HA10 auxiliary blocks	2x                      2x	
	- rated operation current I <sub>e</sub> (A) .....	16	—
	- cable cross-section (mm <sup>2</sup> ) .....	2,5	—
	- temperature rise of auxiliary circuit terminals (K) :	≤ 50                      ≤ 48	—
	<b>NC-contacts, test conditions:</b>	<b>K3-07A04</b> <b>K3-07D04</b>	P
	- rated operational current I <sub>e</sub> (A) .....	20                      10	—
	- cable cross-section (mm <sup>2</sup> ) .....	2,5	—
	- temperature rise of NC terminals (K) .....	≤ 48                      ≤ 36	—
	Auxiliary circuit, test conditions:		P
	HA01 auxiliary blocks	2x                      2x	
	- rated operation current I <sub>e</sub> (A) .....	16	—
	- cable cross-section (mm <sup>2</sup> ) .....	2,5	—
	- temperature rise of auxiliary circuit terminals (K) :	≤ 48                      ≤ 42	—
	Coils and electromagnets, test conditions:		P
	- rated control supply voltage U <sub>s</sub> (V) .....	220-240V 50Hz	—
	- Class of insulating material .....	F	—
	- temperature rise of coil and electromagnets (K) :	≤ 53                      ≤ 52	—
	( only for tests with NO-contacts )		
8.3.3.2	Operating limits		P
8.3.3.2.1	Power-operated equipment:		P



IEC 60 947-5-1				
Clause	Requirement – Test	Result - Remark		Verdict
	ambient temperature (°C) .....	22		—
	rated control supply voltage $U_s$ (V) .....	220-240V		—
	frequency (Hz) .....	50Hz		—
	limits of close satisfactorily at any value between 85% and 110% of rated control supply voltage $U_s$ :	154-264V 70-110%	157-264V 71-110%	P
	limits of drop out and open fully are: 75% to 20% for a.c. and 75% to 10% for d.c. ....	90V 41%	93V 42%	P
8.3.3.4	Test of dielectric properties, impulse withstand voltage ( $U_{imp}$ indicated):			P
	- verification by measurement of clearances instead of testing	Yes		P
	- rated impulse withstand voltage (V) .....	8000		—
	- test $U_{imp}$ auxiliary circuits (kV) .....			N
	Test of dielectric properties, dielectric withstand voltage :			P
	- rated insulation voltage (V) .....	690		—
	- control and auxiliary circuits, test voltage (V) for 1 min .....	2500		P
8.2.4	Mechanical properties of terminals	<b>"auxiliary contact terminals"</b>		P
8.2.4.2	Mechanical strength of terminals			P
	maximum cross-sectional area of conductor (mm <sup>2</sup> ) .....	6 solid	4 flex	—
	diameter of thread (mm) .....	M 3,5		—
	torque (Nm) .....	0,8		—
	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 (mm <sup>2</sup> ) .....	2,5 solid	1,5 flex	—
	number of conductor of the smallest cross section .....	1	1	—
	diameter of bushing hole (mm) .....	9,5	6,4	—
	height between the equipment and the platen (mm) .....	279	260	—
	mass at the conductor(s) (kg) .....	0,7	0,4	—

IEC 60 947-5-1				
Clause	Requirement – Test	Result - Remark		Verdict
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit			P
8.2.4.4	Pull-out test			P
	force (N) .....	50	40	—
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit			P
	Flexion test			P
	conductor of the largest cross-sectional area (mm <sup>2</sup> ) .....	6 solid	4 flex	—
	number of conductor of the largest cross-section :	1	1	—
	diameter of bushing hole (mm) .....	9,5	9,5	—
	height between the equipment and the platen (mm) .....	279	279	—
	mass at the conductor(s) (kg) .....	1,4	0,9	—
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit			P
	Pull-out test			P
	force (N) .....	80	60	—
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit			P
	Flexion test			P
	conductor of the largest and smallest cross-sectional area (mm <sup>2</sup> ) .....	2,5 // 6 solid	1,5 // 4 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 // 9,5	6,4 // 9,5	—
	height between the equipment and the platen (mm) .....	279 // 279	260 // 279	—
	mass at the conductor(s) (kg) .....	0,7 // 1,4	0,4 // 0,9	—

IEC 60 947-5-1			
Clause	Requirement – Test	Result - Remark	Verdict
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		P
	Pull-out test		P
	force (N) .....	50 // 80                      40 // 60	—
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		P
8.2.4	Mechanical properties of terminals <b>"coil terminals"</b>		P
8.2.4.2	Mechanical strength of terminals		P
	maximum cross-sectional area of conductor (mm <sup>2</sup> ) .....	2,5 solid                      2,5 flex	—
	diameter of thread (mm) .....	M 3,5	—
	torque (Nm) .....	0,8	—
	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 (mm <sup>2</sup> ) .....	1 solid                      1 flex	—
	number of conductor of the smallest cross section .....	1                                      1	—
	diameter of bushing hole (mm) .....	6,4                                      6,4	—
	height between the equipment and the platen (mm) .....	260                                      260	—
	mass at the conductor(s) (kg) .....	0,4                                      0,4	—
	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		P
	force (N) .....	35                                      35	—
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		P
	Flexion test		P

IEC 60 947-5-1				
Clause	Requirement – Test	Result - Remark		Verdict
	conductor of the largest cross-sectional area (mm <sup>2</sup> ) .....	2,5 solid	2,5 flex	—
	number of conductor of the largest cross-section :	1	1	—
	diameter of bushing hole (mm) .....	9,5	9,5	—
	height between the equipment and the platen (mm) .....	279	279	—
	mass at the conductor(s) (kg) .....	0,7	0,7	—
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit			P
	Pull-out test			P
	force (N) .....	50	50	—
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit			P
	Flexion test			P
	conductor of the largest and smallest cross-sectional area (mm <sup>2</sup> ) .....	1 // 2,5 solid	1 // 2,5 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) .....	6,4 // 9,5	6,4 // 9,5	—
	height between the equipment and the platen (mm) .....	260 // 279	260 // 279	—
	mass at the conductor(s) (kg) .....	0,4 // 0,7	0,4 // 0,7	—
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit			P
	Pull-out test			P
	force (N) .....	35 // 50	35 // 50	—
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit			P

IEC 60 947-5-1			
Clause	Requirement – Test	Result - Remark	Verdict
<b>8.3.3.5</b>	<b>TEST SEQUENCE II</b>		
	Making and breaking capacity	K3-07A      K3-07D	P
	utilization category .....	AC-1 ( see remark on page 5 )	—
	rated operational voltage Ue (V) .....	690	—
	rated operational current Ie (A) or power (kW) .....	20A      10A	—
	Conditions, make/break operations AC-1 only:		P
	- test voltage U/Ue = 1,05 (V) .....	L1: 728      730 L2: 728      730 L3: 728      730	—
	- test current I/Ie (A) .....	L1: 32      16 L2: 32      16 L3: 32      16	—
	- power factor/time constant .....	L1: 0,79      0,84 L2: 0,79      0,84 L3: 0,79      0,84	—
	- on-time (ms) .....	200      200	—
	- off-time (s) .....	10      10	—
	- number of make/break operations .....	50      50	P
	Behaviour and condition during and after the test:		P
	- no permanent arcing		P
	- no flashover between poles		P
	- no blowing of the fusible element in the earth circuit		P
	- no welding of the contacts		P
	- the contacts shall operate when the contactor or starter is switched by the applicable method of control		P
<b>8.3.3.6</b>	<b>Operational performance capability:</b>	K3-07A      K3-07D	P
	utilization category .....	AC-1 ( see remark on page 5 )	—
	rated operational voltage Ue (V) .....	690	—
	rated operational current Ie (A) or power (kW) .....	20A      10A	—
	Test conditions for make/break operations AC-1 only:		P

IEC 60 947-5-1			
Clause	Requirement – Test	Result - Remark	Verdict
	- test voltage $U/U_e = 1,05$ (V) .....	L1: 725      725 L2: 725      725 L3: 725      725	—
	- test current $I/I_e$ (A) .....	L1: 22      10,5 L2: 22      10,5 L3: 22      10,5	—
	- power factor/time constant .....	L1: 0,85      0,82 L2: 0,85      0,82 L3: 0,85      0,82	—
	- on-time (ms) .....	200      200	—
	- off-time (s) .....	4      10	—
	- number of make/break operations .....	6000      6000	P
8.3.3.6.6	Behaviour and condition during and after the test:		P
	- no permanent arcing		P
	- no flashover between poles		P
	- no blowing of the fusible element in the earth circuit		P
	- no welding of the contacts		P
	- the contacts shall operate when the contactor or starter is switched by the applicable method of control		P
	Dielectric verification:		P
	test voltage (V) ( $2 U_e$ /min. 1000 V) for 1 min .....	1380	—
8.3.3.5.3	Making and breaking capacities of switching elements under abnormal conditions:		N
	utilization category .....		—
	rated operational voltage $U_e$ (V) .....		—
	rated operational current $I_e$ (A) or power (kW) .....		—
<b>8.3.3.5</b>	<b>TEST SEQUENCE III</b>		
8.3.3.5.2	Making and breaking capacities of switching elements under normal conditions		N

IEC 60 947-5-1			
Clause	Requirement – Test	Result - Remark	Verdict
<b>8.3.4</b>	<b>TEST SEQUENCE IV</b>		
	Performance under conditional short-circuit current	<b>K3-07A40</b> <b>K3-07A04</b> NO-contact      NC-contact	P
	type of SCPD .....	Fuse Diazed	—
	ratings of SCPD .....	25A gL(gG)	—
	prospective current (kA) .....	1	—
	test voltage (V) $U/U_e = 1,1$ (V) .....	L1: 436 L2: - L3: -	—
	r.m.s. test current (A) .....	L1: 1.095 L2: - L3: -	—
	power factor (max. 0,7)	0,7	P
	first making operation to closed switching elements: test $I^2dta$ ( $A^2s$ ) / $I_D$ (A) .....	L1: $\leq 199A^2s$ $\leq 199A^2s$ $\leq 414A$ $\leq 414A$ L2: - L3: -	—
	time interval between test (min. 3 min) .....	3 min	—
	second making operation to closed switching elements: test $I^2dta$ ( $A^2s$ ) / $I_D$ (A) .....	L1: $\leq 199A^2s$ $\leq 199A^2s$ $\leq 414A$ $\leq 414A$ L2: - L3: -	—
	time interval between test (min. 3 min) .....	3 min	—
	third making operation to closed switching elements: test $I^2dta$ ( $A^2s$ ) / $I_D$ (A) .....	L1: $\leq 199A^2s$ $\leq 199A^2s$ $\leq 414A$ $\leq 414A$ L2: - L3: -	—
	Behaviour of the equipment during the test:		P
	switching elements open by the normal actuating system		P
	Dielectric verification:		P
	dielectric test voltage (V)	1.380	P

IEC 60 947-5-1			
Clause	Requirement – Test	Result - Remark	Verdict
	Performance under conditional short-circuit current	<b>K3-07D40</b> <b>K3-07D04</b> NO-contact      NC-contact	P
	type of SCPD .....	Fuse Diazed	—
	ratings of SCPD .....	20A gL(gG)	—
	prospective current (kA) .....	1	—
	test voltage (V) U/Ue = 1,1 (V) .....	L1: 436 L2: - L3: -	—
	r.m.s. test current (A) .....	L1: 1.095 L2: - L3: -	—
	power factor (max. 0,7)	0,7	P
	first making operation to closed switching elements: test $I^2dta$ (A <sup>2</sup> s) / $I_D$ (A) .....	L1: $\leq 199A^2s$ $\leq 199A^2s$ $\leq 414A$ $\leq 414A$ L2: - L3: -	—
	time interval between test (min. 3 min) .....		—
	second making operation to closed switching elements: test $I^2dta$ (A <sup>2</sup> s) / $I_D$ (A) .....	L1: $\leq 199A^2s$ $\leq 199A^2s$ $\leq 414A$ $\leq 414A$ L2: - L3: -	—
	time interval between test (min. 3 min) .....	3 min	—
	third making operation to closed switching elements: test $I^2dta$ (A <sup>2</sup> s) / $I_D$ (A) .....	L1: $\leq 199A^2s$ $\leq 199A^2s$ $\leq 414A$ $\leq 414A$ L2: - L3: -	—
	Behaviour of the equipment during the test:		P
	switching elements open by the normal actuating system		P
	Dielectric verification:		P
	dielectric test voltage (V)	1.380	P



IEC 60 947-5-1			
Clause	Requirement – Test	Result - Remark	Verdict

TABLE: temperature rise measurements				
temperature rise dT of part:		phase	dT (K) NO / NC	Required dT (K)
<b>Terminals K3-07A40 / 04 230VAC</b>	1		48 / 44	65
	2		50 / 45	65
	3		48 / 47	65
	4		49 / 46	65
	5		50 / 48	65
	6		47 / 43	65
	7		47 / 43	65
	8		45 / 44	65
Terminals of auxiliary contacts	13/11		46 / 45	65
	24/22		47 / 48	65
	34/32		50 / 41	65
	43/41		47 / 45	65
Enclosure inside			24 / 19	
Coil		240V/50Hz	53K / ---	135
<b>Terminals K3-07D40 / 04 230VAC</b>	1		32 / 31	65
	2		35 / 30	65
	3		35 / 33	65
	4		35 / 35	65
	5		37 / 36	65
	6		34 / 35	65
	7		32 / 33	65
	8		34 / 34	65
Terminals of auxiliary contacts	13/11		45 / 41	65
	24/22		48 / 42	65
	34/32		45 / 41	65
	43/41		46 / 41	65
Enclosure inside			25 / 16	
Coil		240V/50Hz	52K / ---	135