General Catalogue

Quality made in AUSTRIA

D946E201

BENEDICT GMBH

www.benedict.at

Index

General

Test Authorities, Registration Mark, Approvals

Low voltage switchgear from Benedict GmbH is built and tested to national and international specifications. All devices suit all important specifications without any test obligation, like VDE, BS and also relative to IEC Recommendations and to European Standards like IEC 947 and EN 60947.
It is for this reason of our Low voltage switchgear is used all over the world. In order to provide special versions, limitations to the max. voltages, currents and power ratings or special markings are sometimes necessary.

Quality Control System

Since November 1991 Benedict GmbH has been certified according to the quality control system **ÖNORM EN ISO 29001**. The target of the ISO-certification is, to grant the customer the quality of the performance of his supplier, who is audited in accordance with this standard.

CE-Marking CE

The manufacturer has to sign his products with the CE-Marking. With the CE-Marking the manufacturer confirms the accordance with the different EEC Directives. The CE-Marking is absolutely necessary to sell the products in the EEC.
Below you find the EEC Directives concerning our products.
Low Voltage Directive 2006/95/EC
EMC Directive 2004/108/EC
RoHS + WEEE 2002/95/EC + "002/96/EC

Country	**North America**	**Russia**	**China**
State deputy or private examination (state admitted)	UL Canada, USA	EAC	CCC
Label marking of examination boards	c UL us Listed c UL us Component	EAC	CCC
Duty of approvals	all switchgear	all switchgear	all switchgear

Explanations for choice and supply of low voltage switchgear in Canada and USA

Marking of auxiliary contacts
At several devices in UL-data are two voltages for auxiliary contacts mentioned (e. g.: 600 volts at same potential, 150 volts at different potentials). That means, if the voltage is higher than 150 volts, the control voltage applied to input terminals must be at the same potential.

Low voltage switchgear for auxiliary circuits (e. g. contactor relays, control units, auxiliary contacts in general) usually approved for "Heavy Duty" or "Standard Duty" UL and besides these marked with the admissible max. voltage or with short codes (see table).

Marking of auxiliary contacts according to CSA and UL	Max. rated values per pole Voltage V	Current Make A	 Break A	Cont. Current A	Contact Rating Code Designation
Heavy Duty (HD or HVY DTY)	AC 120 AC 240 AC 480 AC 600	60 30 15 12	6 3 1,5 1,2	10 10 10 10	A150 A300 A600 A600
	DC 125 DC 250 DC 600	2,2 1,1 0,4	2,2 1,1 0,4	10 10 10	N150 N300 N600
Standard Duty (SD or STD DTY)	AC 120 AC 240 AC 480 AC 600	30 15 7,5 6	3 1,5 0,75 0,6	5 5 5 5	B150 B300 B600 B600
	DC 125 DC 250 DC 600	1,1 0,55 0,2	1,1 0,55 0,2	5 5 5	P150 P300 P600
-	AC 120 AC 240 AC 480 AC 600	15 7,5 3,75 3	1,5 0,75 0,375 0,3	2,5 2,5 2,5 2,5	C150 C300 C600 C600
	DC 125 DC 250 DC 600	0,55 0,27 0,1	0,55 0,27 0,1	2,5 2,5 2,5	Q150 Q300 Q600
-	AC 120 AC 240	3,6 1,8	0,6 0,3	1 1	D150 D300
	DC 125 DC 250	0,22 0,11	0,22 0,11	1 1	R150 R300
-	AC 120	1,8	0,3	0,5	E150

Discernment at UL-Standards

Recognized Component Industrial Control Equipment	**Listed Industrial Control Equipment**
UL issues yellow "Guide cards" with Guide- and File-No.	UL issues white "Guide cards" with Guide- and File-No.
Devices have permission to be marked with on the label c UL us	Devices have to be marked with the "UL-Listing Mark" c UL us
Devices as components approved for "factory wiring": devices for employment in control panels, when they are selected, mounted and wired according to the charging conditions by skilled worker.	Devices approved for "field wiring", a) devices for employment in control panels, when they are mounted and wired by skilled worker. b) devices for retail in USA
Valid UL-Standards: UL 508 "Standard for Industrial Control Equipment" (partly limited)	Valid UL-Standards: UL 508 "Standard for Industrial Control Equipment" (unlimited)

Are devices approved as "Listed Equipment" c UL us the approval is also valid for using as "Recognized Component" c UL us.

Approvals

Country	North America		Switzerland	Europe	Russia EAC	China	CENELEC CB-Certificates
	UL		SEV				
Type	c UL us	c UL us		CE	EAC	CCC	
Micro Contactor Relays, Micro Contactors K0, Micro Reversing Contactors and Accessories							
K0-04D..	o	-	-	o	-	-	-
K0-05D..	o	-	-	o	-	o	-
K0W05D..	o	-	-	o	-	o	-
Mini Contactor Relays, Mini Contactors, Mini Reversing Contactors K1 and Accessories							
K1-07D..(=)	o	-	-	o	o	-	o
K1-07L..(=)	-	o	-	o	o	-	o
K1-07F..(=)	-	o	-	o	o	-	-
K1-09D..(=)	o	-	-	o	o	o	o
K1-09L..(=)	-	o	-	o	o	o	o
K1-09F..(=)	-	o	-	o	o	o	-
K1-12D..(=)	o	-	-	o	o	o	-
K1W09D01(=)	o	-	-	o	o	o	-
K1W12D01(=)	o	-	-	o	o	o	-
K1W09L01(=)	-	o	-	o	o	o	-
HK.., HKM..	o	-	-	o	o	-	o
RC-K1	o	-	-	o	o	-	-
Contactor Relays, Contactors Series K3							
K3-07ND..(=)	o	-	-	o	o	-	-
K3-10N..(=)	o	-	o	o	o	o	o
K3-14N..(=)	o	-	o	o	o	o	o
K3-18N..(=)	o	-	o	o	o	o	o
K3-22N..(=)	o	-	o	o	o	o	o
K3-24A..(=)	o	-	o	o	o	o	o
K3-32A..(=)	o	-	o	o	o	o	o
K3-40A..(=)	o	-	o	o	o	o	o
K3-50A..(=)	o	-	o	o	o	o	o
K3-62A..(=)	o	-	o	o	o	o	o
K3-74A..(=)	o	-	o	o	o	o	o
K3-90A..(=)	o	-	-	o	o	o	-
K3-115A..(=)	o	-	-	o	o	o	-
K3-151A..(=)	o	-	-	o	o	-	-
K3-176A..(=)	o	-	-	o	o	-	-
K3-210A..(=)	x	-	-	o	o	-	-
K3-260A..(=)	x	-	-	o	o	-	-
K3-316A..(=)	x	-	-	o	o	-	-
K3-450A..(=)	o	-	-	o	o	-	-
K3-550A..(=)	o	-	-	o	o	-	-
K3-700A..(=)	o	-	-	o	o	-	-
K3-860A..(=)	o	-	-	o	o	-	-
K3-1000A..(=)	-	-	-	o	o	-	-
K3-1200A..(=)	o	-	-	o	o	-	-
Contactor Relays, Contactors DC operated Series KG3							
KG3-07..	o	-	-	o	o	-	o
KG3-10.., -14..	o	-	-	o	o	-	o
KG3-18.., -22..	o	-	-	o	o	-	o
KG3-24.., -32..	o	-	-	o	o	-	o
KG3-40..	o	-	-	o	o	-	o
Capacitor Contactors Series K3							
K3-18K..	o	-	-	o	o	o	o
K3-24K..	o	-	-	o	o	o	o
K3-32K..	o	-	-	o	o	o	o
K3-50K..	o	-	-	o	o	o	o
K3-62K..	o	-	-	o	o	o	o
K3-74K..	o	-	-	o	o	o	o
K3-90K..	o	-	-	o	o	o	-
K3-115K..	o	-	-	o	o	o	-
Aux. Contacts							
HN.., HTN..	o	-	-	o	o	o	o
HA..	o	-	-	o	o	-	o
HB..	o	-	-	o	o	o	o
K2-DK, K2-SK	o	-	-	o	o	-	-
HKA.., HKT..	o	-	-	o	o	-	-
HKF22	-	-	-	o	o	-	-

o approved in standard version x pending - not provided to be tested

Approvals

Country	North America		Switzerland	Europe	Russia EAC	China	CENELEC CB-Certificates
	UL		SEV				
Typ	c UL us	c UL us		CE	EAC	CCC	
Accessories							
K2-T..E, -A	-	-	-	o	o	-	-
K2-TP	o	-	-	o	o	-	-
K2-L	o	-	-	o	o	-	-
K2-IN.	o	-	-	o	o	-	-
K2-UN.	o	-	-	o	o	-	-
K2-IM	-	-	-	o	o	-	-
K2-E	o	-	-	o	o	-	-
VG-K2	-	-	-	o	o	-	-
RC-K3	o	-	-	o	o	-	-
Reversing Contactors Series K3NWU							
K3NWU-10	o	-	-	o	o	-	-
K3NWU-14	o	-	-	o	o	-	-
K3NWU-18	o	-	-	o	o	-	-
K3NWU-22	o	-	-	o	o	-	-
K3WU-24	o	-	-	o	o	-	-
K3WU-32	o	-	-	o	o	-	-
K3WU-40	o	-	-	o	o	-	-
D.O.L Starters							
P1..	o	-	-	o	o	-	-
Thermal Overload Relays							
U3/32	o	-	-	o	o	-	o
U3/42	o	-	-	o	o	-	o
U3/74	o	-	-	o	o	-	o
U12/16E	o	-	-	o	o	-	o
U12/16A	-	-	-	o	o	-	o
U12/16EM	-	-	-	o	o	-	o
U12/16EQ	-	-	-	o	o	-	o
U32	o	-	-	o	o	-	o
U60	o	-	-	o	o	-	o
U85	o	-	-	o	o	-	o
U180	x	-	-	o	o	-	-
U320	x	-	-	o	o	-	-
U800	-	-	-	o	o	-	-
Modular Contactors							
R20	o	-	o	o	o	-	o
R25	o	-	o	o	o	-	o
R40	o	-	o	o	o	-	o
R63	o	-	o	o	o	-	o
R40, R63 2-polig	-	-	-	o	o	-	o
RH11	o	-	-	o	o	-	o
Push Buttons							
B(C,K,S)3/4/5D	o	-	-	o	o	-	o
Contactor Relays and Contactors Series K3 (RAST 5)							
K3-10/14/18/22NR	o	-	-	o	o	o	o
Contactors for DC-Loads							
K3DC-20 bis 80	o	-	-	o	o	-	o
K3DC-100	-	-	-	o	o	-	o
K3PV-30 bis 60	-	-	-	o	o	-	o
K3PV-80	o	-	-	o	o	-	o
K3PV-100	-	-	-	o	o	-	o
K3PV-150 bis 450	o	-	-	o	o	-	o
Main Contactors Series K3							
K3-10/14/18/22NBD	-	-	-	o	o	-	o

o approved in standard version x pending - not provided to be tested

Approvals

Country	North America		Switzerland	Europe	Russia EAC	China	CENELEC CB-Certificates
	UL		SEV				
Typ							
Motor Protection Circuit Breakers Series M4-..							
M4-32T	o	-	-	o	o	-	-
M4-32R	o	-	-	o	o	-	-
M4-63R	o	-	-	o	o	-	-
M4-100R	o	-	-	o	o	-	-
Zubehör							
M4 HQ	o	-	-	o	o	-	-
M4 HS	o	-	-	o	o	-	-
M4 MA	o	-	-	o	o	-	-
M4 M	o	-	-	o	o	-	-
M4 U	o	-	-	o	o	-	-
M4 A	o	-	-	o	o	-	-
Motor Protection Circuit Breakers Series MU25A-..							
MU25A	o	-	-	o	-	-	-
Accessories							
MU25A-PS	o	-	-	o	-	-	-
MU25A-PV	o	-	-	o	-	-	-
MU25A-A	o	-	-	o	-	-	-
MU25A-U	o	-	-	o	-	-	-
Mini DC-Isolators							
LSM(O)16/25/32/38	o	-	-	-	o	-	-
DC-Switch Disconnectors, 2, 2+2, 4 pole							
LS16/20/25/32	o	-	-	o	o	o	o
LS40/55/65	o	-	-	o	o	o	o
DC-Switch Disconnectors, 3+2, 4+2, 6, 8 pole							
LS16/20/25/32	o	-	-	o	o	o	-
LS40/55/65	o	-	-	o	o	o	-
AC-Main Switches							
LTS20/25/32/40	o	-	-	o	o	-	o
LTS63/80	o	-	-	o	o	-	o
LTS85/100/125	o	-	-	o	o	-	o
AC-Cam Switches							
M4H	o	-	-	o	o	-	o
M10	o	-	-	o	o	-	o
M10H(D)	o	-	-	o	o	-	o
M20	o	-	-	o	o	-	o
N33F	o	-	-	o	o	-	o
N40	o	-	-	o	o	-	o
N60	o	-	-	o	o	-	o
N61	o	-	-	o	o	-	o
N80	o	-	-	o	o	-	o
N100	o	-	-	o	o	-	o
N200	o	-	-	o	o	-	o
L400	o	-	-	o	o	-	o

o approved in standard version x pending - not provided to be tested

c UL us - and c TÜV us - Guide- and File-No.

These data are important for UL-inspectors.

Devices	Guide-No.				File-No.
	c UL us		c TÜV us		
	Canada	USA	Canada	USA	
Contactors	NLDX7	NLDX	NLDX8	NLDX2	E41502
Revering Contactors	NLDX7	NLDX	-	-	E41502
Contactor Relays, Accessories	NKCR7	NKCR	NKCR8	NKCR2	E66273
Thermal Overload Relays	NKCR7	NKCR	-	-	E66273
Cam Switches	NLRV7	NLRV	-	-	E129916
Circuit Breakers as Manual Motor Controller	NLRV7	NLRV	-	-	E129916
Circuit Breakers as Combination Motor Controller	NKJH7	NKJH	-	-	E197641
Bus Bar Assemblies	NLRV7	NLRV	-	-	E129916
Accessories for Circuit Breakers	NKCR7	NKCR	-	-	E66273

Technical Information

Degree of protection acc. to IEC 60947-1

Protection ratings are prefixed by the internationally agreed letters IP followed by two digits.

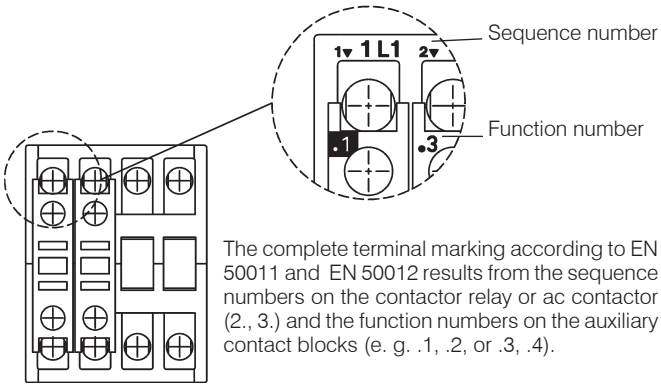
1 st digit: Pertains to solid objects
2 nd digit: Pertains to water.

1 st digit	Short description	Definition
1	Protected against solid objects greater than 50 mm	Excludes solid objects exceeding 50 mm in diameter and protects against contact with live and moving parts by a large body surface such as a hand (but not against deliberate access).
2L	Protected against solid objects greater than 12,5 mm and against contact by standard test finger	Excludes solid objects exceeding 12,5 mm in diameter and protects against contact with live and moving parts by a standard test finger or similar objects not exceeding 80 mm in length.
3	Protected against solid objects	Excludes solid objects exceeding 2,5 mm in diameter or thickness. greater than 2,5mm
4	Protected against solid objects greater than 1 mm	Excludes solid objects exceeding 1 mm in diameter or thickness.
5	Dust protected	Prevents ingress of dust in quantities and locations that would interfere with the intended operation of the equipment.
6	Dust tight	Prevents ingress of dust.

2 nd digit	Short description	Definition
1	Protected against dripping water	Dripping water (vertically falling drops) shall have no harmful effect.
2	Protected against dripping water when tilted up to 15°	Vertically dripping water shall have no harmful effect when the enclosure is tilted at any angle up to 15° from its normal position.
3	Protected against spraying water	Water falling as a spray at an angle up to 60° from the vertical shall have no harmful effect.
4	Protected against splashing water	Water splashed against the enclosure from any direction shall have no harmful effect.
5	Protected against water jets	Water protected by a nozzle against the enclosure from any direction shall have no harmful effect.
6	Protected against heavy seas	Water from heavy seas or water projected in powerful jets shall not enter the enclosure in harmful quanties.
7	Protected against the effects of immersion	Ingress of water in a harmful quantity shall not be possible when the enclosure is immersed in water under standard conditions of pressure and time.
8	Protected against submersion	No ingress of water.

Terminal markings acc. to EN50011

Auxiliary contacts of AC contactors and contacts of contactor relays and thermal overload relays are particularly marked. The terminal markings of normally-open contacts are printed as positive figures, they of normally-closed contacts as negative figures.
This gives a clear indication of the function of the contacts.
The figure below illustrates the determination of terminal markings for contactors with auxiliary contact blocks.



The complete terminal marking according to EN 50011 and EN 50012 results from the sequence numbers on the contactor relay or ac contactor (2., 3.) and the function numbers on the auxiliary contact blocks (e. g. .1, .2, or .3, .4).

Resistance to climatic conditions acc. to IEC60068

Open-type devices are climate-resistant in the constant climate according to IEC60068-2-78 (this is a climate with an ambient temperature of 40°C and an atmospheric humidity of 90 to 95%).
Enclosed devices are climate-resistant in an alternating climate according to IEC 68-2-30 (this is a moist alternating climate with a 24-hour cycle between climates with an ambient temperature of 25°C, and an atmospheric humidity of 95 to 100% and an ambient temperature of 40°C, and an atmospheric humidity of 90 to 96% in the presence of condensation during rises in temperature).
Data are valid up to an altitude of 2000m above sea level.

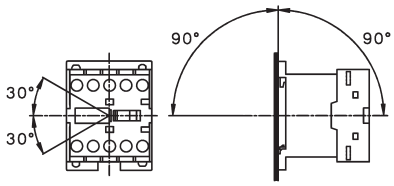
Short circuit protection

Back up fuses should be used to protect contactors and starters against short circuits. For starters the device with the smaller admissible fuse at the main and at the control circuit (contactor or thermal overload) determines the fuse size.
After a short circuit devices have to be checked for correct operation.
Disconnect power before proceeding with any work on the equipment!

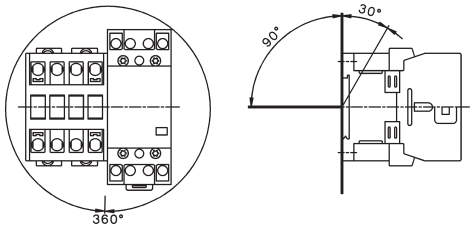
Technical Information

Mounting positions of contactors

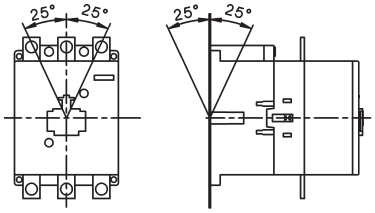
K0-.. / K1-..



K(G)3-07.. to K3-115.., R20-.. to R63-..



K3-151.. to K3-1200..
K3DC-20.. to K3DC-100..
K3PV-12.. to K3PV-450..



Terminal screws

Devices Type	Kind of connection Screw with washer	Screw with clamp box	Screw w. nut	Screw driver	Tightening torque Nm	lb. inch
Micro Contactors, all conductors						
K0-..	M2,5	- - -		Pz1	0.6 - 0,8	5 - 7
Mini Contactors, all conductors						
K1-..	M3,5	- - -		Pz2	0,8 - 1,4	7 - 12
Contactor Relays, all conductors						
K(G)3-07..	M3,5	- - -		Pz2	0,8 - 1,4	7 - 12
Contactors						
Main conductor						
K(G)3-10.. bis K3-22..	M3,5	- - -		Pz2	0,8 - 1,4	7 - 12
K(G)3-24.. bis K3-40..	-	M5 - -		Pz2	2,5 - 3	22 - 26
K3-50.. bis K3-74..	-	M6 - -		Pz3	3,5 - 4,5	31 - 40
K2-23, -30, -37A00-40	M4	- - -		Pz2	1,2 - 1,8	11 - 16
K2-45, -60A00-40	-	M6 - -		Pz3	3,5 - 4,5	31 - 40
K3-90, K3-115	-	- M8 -		4mm hex socket	4 - 6,5	35 - 57
K3-116.. bis K3-176..	-	- - M8			17	150
K3-210.. bis K3-316..	-	- - M10			35	315
K3-450.. bis K3-700..	-	- - M12			60	540
K3-860..	-	- - M14			75	675
K3-1000.., K3-1200..	-	- - M12			60	540
Auxiliary conductor						
K(G)3-10 bis K3-22	M3,5	- - -		Pz2	0,8 - 1,4	7 - 12
Coil conductor						
K(G)3-10 bis K3-1200	M3,5	- - -		Pz2	0,8 - 1,4	7 - 12
Accessories						
HK, HKM	M3,5	- - -		Pz2	0,8 - 1,4	7 - 12
HA, HN, K2-.., HB..	M3,5	- - -		Pz2	0,8 - 1,4	7 - 12
Thermal Overload Relays						
Main conductor						
U12/16	M4	- - -		Pz2	1,2 - 1,8	11 - 16
U3/32	M3,5	- - -		Pz2	0,8 - 1,4	7 - 12
U3/42	M5	- - -		Pz2	2,5 - 3	22 - 26
U3/74	-	M6 - -		Pz3	3,5 - 4,5	31 - 40
UAT21	-	M4 - -		Size 3, 4	1,2 - 1,8	11 - 16
UAT22	-	M4 - -		Size 3, 4	1,2 - 1,8	11 - 16
UAT23	-	M5 - -		Size 3, 4, 5	2,5 - 3	22 - 26
Auxiliary conductor						
All devices	M3,5	- - -		Pz2	0,8 - 1,4	7 - 12
Contactors for Distribution Boards						
Conductors						
R20, R25	-	M3,5 - -		Pz1	0,8 - 1,4	7 - 12
R40, R63	-	M5 - -		Pz2	2,5 - 3	22 - 26
K1R	M3,5	- - -		Pz2	0,8 - 1,4	7 - 12
Coil conductor						
R20, R25	-	M3 - -		Pz1	0,6 - 1,2	5 - 11
R40, R63 (2pole / 4 pole)	-	M3 - -		Pz1	0,6 - 1,2	5 - 11
K1R	M3,5	- - -		Pz2	0,8 - 1,4	7 - 12
RH11	-	M3 - -		Pz1	0,6 -1,2	5 - 11

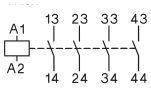
Micro Contactors

Micro Contactor Relays 4-pole

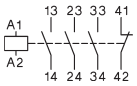
AC Operated

Ratings Therm.			Contacts [2]				**Type**		Coil voltage [1]		
					Distinc. Number	Additional Contact		**24**	24V 50/60Hz		
								230	220-240V 50Hz/60Hz		
AC15		Rated Current									
230V **A**	400V A	I_{th} A	NO	NC	acc. to EN50011	Blocks Type	↓			Pack pcs.	Weight kg/pc.
4-pole, with Screw Terminals											
3	1,5	5	4	-	40E	-	**K0-04D40 . . .**			10	0,07
3	1,5	5	3	1	31E	-	**K0-04D31 . . .**			10	0,07
3	1,5	5	2	2	22E	-	**K0-04D22 . . .**			10	0,07

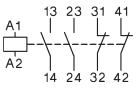
K0-04D40



K0-04D31



K0-04D22



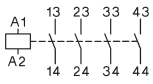
1) Other coil voltages see page 16.
2) Contacts suitable for electronic circuits, according to EN947-5-4 for rated voltage 24V DC (test ratings 17V DC, 5mA). Mirror contacts acc. IEC60947-4-1 Annex F.

Micro Contactor Relays 4-pole

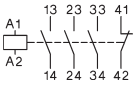
DC Operated

Ratings Therm.			Contacts [2]		Distinc. Number	Additional Contact	**Type**	= 24 Coil voltage [1] 24V=DC		
AC15		Rated Current								
230V	400V	I_{th}	NO	NC	acc. to	Blocks	↓		Pack	Weight
A	A	A			EN50011	Type			pcs.	kg/pc.
4-pole, with Screw Terminals										
3	1,5	5	4	-	40E	-	**K0-04D40= . . .**		10	0,09
3	1,5	5	3	1	31E	-	**K0-04D31= . . .**		10	0,09
3	1,5	5	2	2	22E	-	**K0-04D22= . . .**		10	0,09

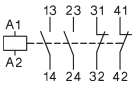
K0-04D40



K0-04D31



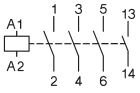
K0-04D22



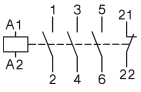
1) Other coil voltages on request.
2) Contacts suitable for electronic circuits, according to EN947-5-4 for rated voltage 24V DC (test ratings 17V DC, 5mA). Mirror contacts acc. IEC60947-4-1 Annex F.

Power Ratings		Rated Current	Aux. Contacts[2] Built-in		Additional	**Type**	Coil voltage [1]	Pack	Weight
						24	24V 50/60Hz		
						230	220-240V 50Hz/60Hz		
AC2, AC3		AC1							
380V									
400V	660V								
415V	690V	440V			Blocks			Pack	Weight
kW	kW	A	NO	NC	Type	↓		pcs.	kg/pc.
3-pole, with Screw Terminals									
2,2	-	12	1	-	-	**K0-05D10 . . .**		10	0,07
2,2	-	12	-	1	-	**K0-05D01 . . .**		10	0,07
4-pole, With Screw Terminals									
2,2	-	12	-	-	-	**K0-05D00-40 . . .**		10	0,07

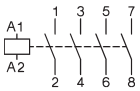
K0-05D10



K0-05D01



K0-05D00-40



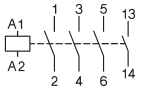
1) Other coil voltages see page 16.
2) Contacts suitable for electronic circuits, according to EN947-5-4 for rated voltage 24V DC (test ratings 17V DC, 5mA). Mirror contacts acc. IEC60947-4-1 Annex F.

Micro Contactors

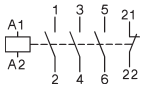
DC Operated

Power Ratings		Rated Current	Aux. Contacts [2] Built-in		Additional	Type	Coil voltage [1]	Pack	Weight
AC2, AC3		AC1				= **24**	24V= DC	pcs.	kg/pc.
380V									
400V	660V								
415V	690V	440V			Blocks				
kW	kW	A	NO	NC	Type				
3-pole, with Screw Terminals									
2,2	-	12	1	-	-	**K0-05D10= . . .**		10	0,09
2,2	-	12	-	1	-	**K0-05D01= . . .**		10	0,09
4-pole, With Screw Terminals									
2,2	-	12	-	-	-	**K0-05D00-40= . . .**		10	0,09

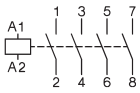
K0-05D10



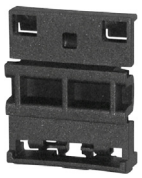
K0-05D01



K0-05D00-40



Snap-On Adapter

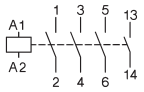


For Type	Specification	Type	Pack pcs..	Weight kg/pc.
K0	Snap on Adapter for K0 for snap-on mounting of contactor K0 on 35mm DIN-rail acc. DIN EN 50022	P1039	10	0,0061

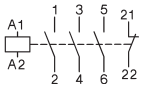
1) Other coil voltages on request..
2) Contacts suitable for electronic circuits, according to EN947-5-4 for rated voltage 24V DC (test ratings 17V DC, 5mA). Mirror contacts acc. IEC60947-4-1 Annex F.

Power Ratings		Rated Current	Aux. Contacts[2] Built in		Additional	**Type**		Coil voltage [1]	Pack	Weight
							24	24V 50/60Hz		
							230	220-240V 50Hz/60Hz		
AC2, AC3		AC1								
380V										
400V	660V									
415V	690V	440V								
kW	kW	A	NO	NC	Type				pcs.	kg/pc.
3-pole, with Solder Pins Ø1,15 for Printed Circuit Applications										
2,2	-	9	1	-	-	**K0-05L10 . . .**			10	0,07
2,2	-	9	-	1	-	**K0-05L01 . . .**			10	0,07
4-pole, with Solder Pins Ø1,15 for Printed Circuit Applications										
2,2	-	9	-	-	-	**K0-05L00-40 . . .**			10	0,07

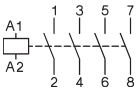
K0-05L10



K0-05L01



K0-05L00-40



Coil voltages for AC operated contactors

Suffix to contactor type e.g. K0-05D10 24	Voltage Marking at the coil for 50Hz V	for 60Hz V	Rated Control Voltage U_s range for 50Hz min. V	max. V	for 60Hz min. V	max. V
12	12	12	11	12	12	12
24	**24**	**24**	**22**	**24**	**24**	**24**
42	42	42	38,5	42	42	42
48	48	48	48	50	48	52
90	100	100	90	100	100	105
95	95-100	105-110	95	100	105	110
100	100	110-115	100	105	110	115
105	105-110	115-120	105	110	115	120
110	110-115	120-125	110	115	120	125
180	200	200	185	200	200	210

Suffix to contactor type e.g. K0-05D10 230	Voltage Marking at the coil for 50Hz V	for 60Hz V	Rated Control Voltage U_s range for 50Hz min. V	max. V	for 60Hz min. V	max. V
200	200	200-220	195	205	200	220
210	205-215	220-230	205	215	220	230
220	210-220	220-240	210	220	220	240
230	**220-230**	**230-250**	**220**	**230**	**230**	**250**
240	230-240		230	240	250	260

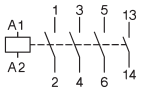
Standard voltages in bold type letters
Operating range of magnet-coils: 0,85 x U_s (min. value of rated control voltage) up to 1,1 x U_s (max. value of rated control voltage)

Coil not exchangeable

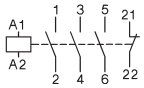
1) Other coil voltages see above table.
2) Contacts suitable for electronic circuits, according to EN947-5-4 for rated voltage 24V DC (test ratings 17V DC, 5mA). Mirror contacts acc. IEC60947-4-1 Annex F.

Power Ratings		Rated Current	Aux. Contacts[2] Built in		Additional	**Type**	= **24**	Coil voltage [1] 24V= DC		
AC2, AC3		AC1								
380V										
400V	660V									
415V	690V	440V								
kW	kW	A	NO	NC	Type				Pack pcs.	Weight kg/pc.
3-pole, with Solder Pins Ø1,15 for Printed Circuit Applications										
2,2	-	9	1	-	-	**K0-05L10 . . .**			10	0,07
2,2	-	9	-	1	-	**K0-05L01 . . .**			10	0,07
4-pole, with Solder Pins Ø1,15 for Printed Circuit Applications										
2,2	-	9	-	-	-	**K0-05L00-40 . . .**			10	0,07

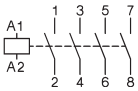
K0-05L10



K0-05L01



K0-05L00-40



1) Other coil voltages on request..
2) Contacts suitable for electronic circuits, according to EN947-5-4 for rated voltage 24V DC (test ratings 17V DC, 5mA). Mirror contacts acc. IEC60947-4-1 Annex F.

Micro Reversing Contactors, Mechanical Interlocked AC Operated

Power Ratings AC2, AC3		Rated Current AC1	Aux. Contacts[2] Built-in		Additional on left hand side Contactor	on right hand side Contactor	Type	Coil voltage [1]	Pack pcs.	Weight kg/pc.
380V								**24** 24V 50/60Hz		
400V	660V							**230** 220-240V 50Hz/60Hz		
415V	690V	440V			K1	K2				
kW	kW	A	NO	NC	Type	Type				

3-pole, with Screw Terminals

2,2	-	12	-	2	-	-	**K0W05D01MC . . .**	1	0,14
2,2	-	12	2	-	-	-	**K0W05D10MC . . .**	1	0,14

4-pole, with Screw Terminals

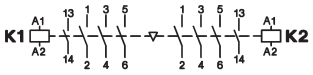
2,2	-	12	-	-	-	-	**K0W05D00-40MC . . .**	1	0,14

3-pole, with Solder Pins Ø1,15 for Printed Circuit Applications

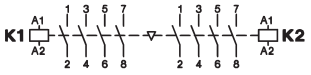
2,2	-	xxx[3]	-	2	-	-	**K0W05L01MC . . .**	1	0,14
2,2	-	xxx[3]	2	-	-	-	**K0W05L10MC . . .**	1	0,14

K0W05D01MC

K0W05D10MC



K0W05D00-40MC



Reversing Starter Connector

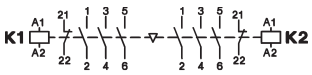
For Reversing Starter Types, incl. Coil Connector	Type	Pack pcs.	Weight kg/pc.
K0W05D..MC	**K0W-VB**	1	0,01

1) Other coil voltages see page 16.
2) Contacts suitable for electronic circuits, according to EN947-5-4 for rated voltage 24V DC (test ratings 17V DC, 5mA). Mirror contacts acc. IEC60947-4-1 Annex F.
3) Data on request.

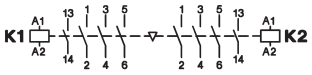
Micro Reversing Contactors, Mechanical Interlocked DC Operated

Power Ratings AC2, AC3 **380V** **400V** 660V **415V** 690V **kW** kW	Rated Current AC1 440V A	Aux. Contacts[2] Built-in NO	NC	Additional on left hand side Contactor K1 Type	on right hand side Contactor K2 Type	**Type** = **24**	Coil voltage [1] 24V= DC Pack pcs.	Weight kg/pc.
3-pole, with Screw Terminals								
								
2,2 -	12	-	2	-	-	**K0W05D01MC . . .**	1	0,14
2,2 -	12	2	-	-	-	**K0W05D10MC . . .**	1	0,14
4-pole, with Screw Terminals								
								
2,2 -	12	-	-	-	-	**K0W05D00-40MC . . .**	1	0,14
3-pole, with Solder Pins Ø1,15 for Printed Circuit Applications								
2,2 -	xxx[3]	-	2	-	-	**K0W05L01MC . . .**	1	0,14
2,2 -	xxx[3]	2	-	-	-	**K0W05L10MC . . .**	1	0,14

K0W05D01MC



K0W05D10MC



K0W05D00-40MC

1) Other coil voltages on request..
2) Contacts suitable for electronic circuits, according to EN947-5-4 for rated voltage 24V DC (test ratings 17V DC, 5mA). Mirror contacts acc. IEC60947-4-1 Annex F.
3) Data on request.

Micro Contactors

Data according to IEC 60947-4-1, VDE 0660, EN 60947-4-1

Main Contacts		Type	**K0-05D..**	**K0-05L..**
Rated insulation voltage U_i		V AC	440 [1]	440 [1]
Making capacity I_{eff}	at U_e = 440V AC	A	65	65
Breaking capacity I_{eff} cosφ = 0,65	400V AC	A	50	50
Utilization category AC1 **Switching of resistive load**				
Rated operational current I_e (=I_{th}) at 40°C, open		**A**	**12**	**9**
Rated operational power of three-phase resistive loads 50-60Hz, cosφ = 1	230V	kW	4,7	3,5
	240V	kW	4,8	3,7
	400V	kW	8,3	3,3
	415V	kW	8,6	6,4
	440V	kW	9,0	6,8
Rated operational current I_e (=I_{th}) at 60°C, enclosed		A	8	6
Rated operational power of three-phase resistive loads 50-60Hz, cosφ = 1	230V	kW	3,1	2,3
	240V	kW	3,3	2,4
	400V	kW	5,5	4,1
	415V	kW	5,7	4,3
	440V	kW	6,0	4,5
Minimum cross-section of conductor at load with I_e (=I_{th})		mm^2	1,5	-
Utilization category AC2 and AC3 **Switching of three-phase motors**				
Rated operational current I_e open and enclosed	220V	A	6,2	6,2
	230V	A	6,2	6,2
	240V	A	5,6	5,6
	380-400V	**A**	**5**	**5**
	415-440V	A	5	5
Rated operational power of three-phase motors 50-60Hz	220-240V	kW	1,5	1,5
	380-440V	**kW**	**2,2**	2,2
Utilization category AC4 **Switching of squirrel cage motors, inching**				
Rated operational current I_e open and enclosed	220V	A	4,9	4,9
	230V	A	4,9	4,9
	240V	A	4,1	4,1
	380-400V	**A**	**3,5**	**3,5**
	415-440V	A	3,5	3,5
Rated operational power of three-phase motors 50-60Hz	220-240V	kW	1,1	1,1
	380-440V	**kW**	**1,5**	1,5
Utilization category AC5a **Switching of gas discharge lamps** Rated operational current I_e per pole at 220/230V				
Fluorescent lamps, uncompensated and serial compensated		A	6	6
parallel compensated		A	0,5	0,5
dual-connection		A	9	9
Metal halide lamps[2], uncompensated		A	6	6
parallel compensated		A	0,5	0,5
Mercury-vapour lamps[3], uncompensated		A	9	9
parallel compensated		A	0,5	0,5
Mixed light lamps[4]		A	9	9
LED-Lamps consider the inrush current of the lamp ballast and cosφ of the lamp	max. lamps per pole ($I_{nLED} \leq I_{th}$) =		inrush current of contactor / inrush current of lamp/EVG	
max inrush current of contactor		A	91	91
Utilization category AC5b **Switching of incandescent lamps**[5] Rated operational current I_e per pole at 220/230V		A	3	3

1) Suitable for: earthed-neutral systems, overvoltage category I to III, pollution degree 3 (standard-industry): U_{imp} = 4kV. Data for other conditions on request.
2) Metal halide lamps and sodium-vapour lamps (high- and low-pressure lamps)
3) High-pressure lamps
4) Blended lamps, containing a mercury high-pressure unit and a tungsten helix in a flourescent glass bulb (daylight lamps)
5) Current inrush approx. 16 x Ie

Micro Contactors

Data according to IEC 60947-4-1, VDE 0660, EN 60947-4-1

Main Contacts			Type	K0-05D..	K0-05L..
Utilization category DC1					
Switching of resistive load	1 pole	24V	A	12	9
Time constant L/R ≤1ms		60V	A	12	9
Rated operational current I_e		110V	A	2	2
		180V	A	0,6	0,6
		220V	A	0,4	0,4
	3 poles in series	24V	A	12	9
		60V	A	12	9
		110V	A	12	9
		180V	A	12	9
		220V	A	8	8
Utilization category DC3 and DC5					
Switching of shunt motors	1 pole	24V	A	12	9
and series motors		60V	A	4	4
Time constant L/R ≤15ms		110V	A	1	1
Rated operational current I_e		180V	A	0,5	0,5
		220V	A	0,3	0,3
	3 Pole in Serie	24V	A	12	9
		60V	A	12	9
		110V	A	6	6
		180V	A	4	4
		220V	A	1	1
Maximum ambient temperature					
Operation		open	°C	-40 to +60 (+90) [1]	
		enclosed	°C	-40 to +40	
with therminal overload relay		open	°C	-25 to +60	
		enclosed	°C	-25 to +40	
Storage			°C	-50 to +90	
Short circuit protection					
for contactors without thermal overload relay					
Rated short circuit current		"r" / "Iq"	kA	1	1
Coordination-type "1" according to IEC 947-4-1					
Contact welding without hazard of persons					
max. fuse size		gL (gG)	A	32	32
Coordination-type “2” according to IEC 947-4-1					
Light contact welding accepted					
max. fuse size		gL (gG)	A	-	-
Contact welding not accepted					
max. fuse size		gL (gG)	A	-	-
For contactors with thermal overload relay the device with the smaller admissible backup fuse (contactor or thermal overload relay) determines the fuse size.					
Cable cross-sections					
for contactors					
main connector		solid or stranded	mm^2	0,5 - 1,5	Solder Connector
		flexible	mm^2	0,5 - 1,5	Ø 1,15
		flexible with multicore cable end	mm^2	0,5 - 1,5	
Cables per clamp				2	-
		solid or stranded	AWG	20 - 14	-
Frequency of operation z		without load	1/h	10000	10000
contactors without therminal oberload relay		AC3, I_e	1/h	600	600
		AC4, I_e	1/h	120	120
		DC3, I_e	1/h	600	600
Mechanical life		AC operated	S x10^6	3	3
		DC operated	S x10^6	4	4
Short time current		10s-current	A	50	50
Power loss per pole		at I_e/AC3 400V	W	0,2	0,2
Resistance to shock according to IEC 68-2-27					
Shock time 20ms sine-wave					
AC operated		NO	g	2,5	2,5
		NC	g	2,5	2,5

1) With reduced control voltage range 0,9 up to 1,0 x U_s and with reduced rated current I_e /AC1 according to I_e /AC3.

Micro Contactors

Data according to IEC 60947-5-1, VDE 0660, EN 60947-5-1

Auxiliary Contacts		Type	**K0-04D.. K0-05D..**	**K0-04L.. K0-05L..**
Rated insulation voltage	**U_i**	VAC	440 [1]	440 [1]
Thermal rated current I_{th} to 440V				
Ambient temperature	40°C	A	5	5
	60°C	A	3	3
Verlustleistung pro Pol	bei I_{th}	W	0,25	0,25
Utilization category AC15				
Rated operational currrent I_e	220-240V	A	3	3
	380-415V	A	1,5	1,5
	440V	A	1	1
Utilization category DC13				
Rated operational current I_e	24V	A	2	2
	60V	A	1,6	1,6
	110V	A	0,3	0,3
	180V	A	0,2	0,2
	220V	A	0,05	0,05
Maximum ambient temperature				
Operation	open	°C	-40 to +60 (+90) [2]	
	enclosed	°C	-40 to +40	
Storage		°C	-40 to +90	
Short circuit protection				
short-circuit current 1kA,				
contact welding not accepted				
max. fuse size	gL (gG)	A	10	10
For contactors with thermal overload relay the device with the smaller admissible control fuse (contactor or thermal overload relay) determines the fuse size.				
Power consumption of coils				
AC operated	inrush	VA	9	9
	sealed	VA	4	4
		W	1,8	1,8
DC operated	inrush	W	2,5	2,5
	sealed	W	2,5	2,5
Operation rage of coils				
in multiples of control voltage U_s		AC	0,85 - 1,1	0,85 - 1,1
		DC	0,8 - 1,1	0,8 - 1,1
Switching time at control voltage U_s ±10% [3] [4]				
AC operated	make time	ms	13 - 18	13 - 18
	release time	ms	5 - 10	5 - 10
	arc duration	ms	10 - 15	10 - 15
DC operated	make time	ms	10 - 40	10 - 40
	release time	ms	2 - 10	2 - 10
	arc duration	ms	10 - 15	10 - 15
Cablecross-section				
all connectors	solid	mm^2	0,5 - 1,5	Solder Connector
	flexible	mm^2	0,5 - 1,5	Ø 1,15
	flexible with multicore cable end	mm^2	0,5 - 1,5	
Clamps per pole			2	-
	solid or stranded	AWG	20 - 14	-

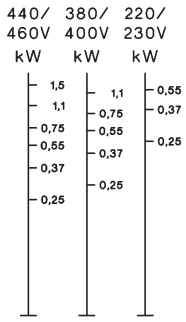
1) Suitable at 690V for: earthed-neutral systems, overvoltage category I to III, pollution degree 3 (standard-industry): U_{imp} = 4kV. Data for other conditions on request.
2) With reduced control voltage range 0,9 up to 1,0 x U_s and with reduced thermal rated current I_{th} to I_e /AC15.
3) Summary switching time = release time + arc duration.
4) Release time of NC make time of NO increase when suppressor units for voltage peak protection are used (Varistor, RC-units, Diode units).
5) Data on request.

Micro Contactors for North America

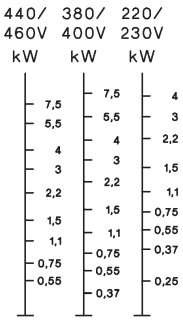
Data according to UL508

Main Contacts (cULus)		Type	**K0-05D.. K0W05D01..**	**K0-04D..**	**K0-05L..**	**K0-04L..**
Rated operational current "General Use"		A	12	5	9	5
Rated operational power of three motors at 60Hz (3ph)	110-120V	hp	½	-	½	-
	200-208V	hp	1	-	1	-
	220-240V	hp	1	-	1	-
	277V	hp	1½	-	1½	-
Rated operational power of AC motors at 60Hz (1ph)	110-120V	hp	⅛	-	⅛	-
	200-208V	hp	⅓	-	½	-
	220-240V	hp	½	-	¾	-
Fuse / Short-circuit current		A/kA	30/5	-	30/5	-
Rated voltage		VAC	480	480	480	480
Auxiliary Contacts (cULus)	heavy pilot duty	AC	B300	B300	B300	B300
	standard pilot duty	DC	R300	R300	R300	R300

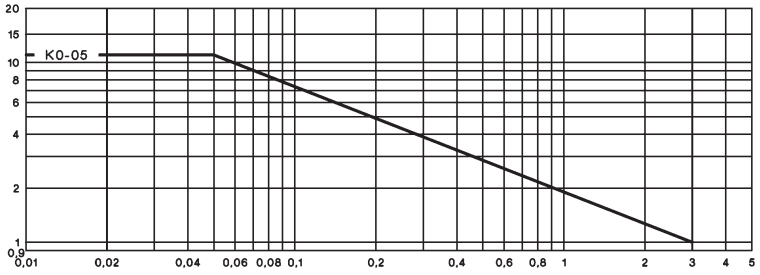
Motor Rating
P_n = AC4



Motor Rating
P_n = AC3



Breaking Current
I_a (= I_e = AC1)
A



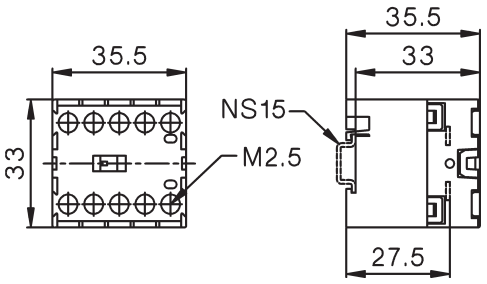
Millions of Operations

Micro Contactors

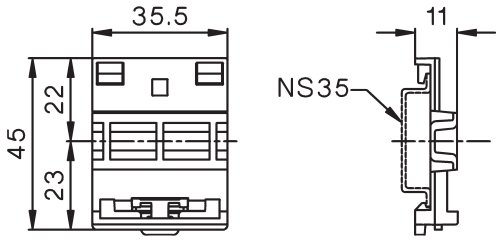
Dimensions

AC or DC operated
with screw terminals

K0-04D.. (=)
K0-05D.. (=)

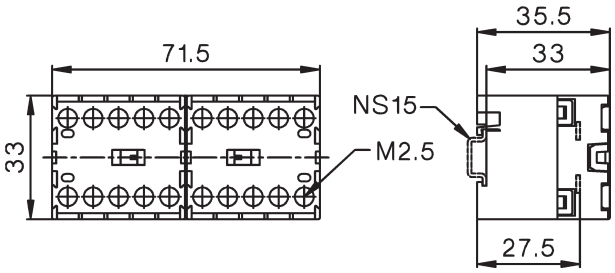


Snap-On Adapter P1039

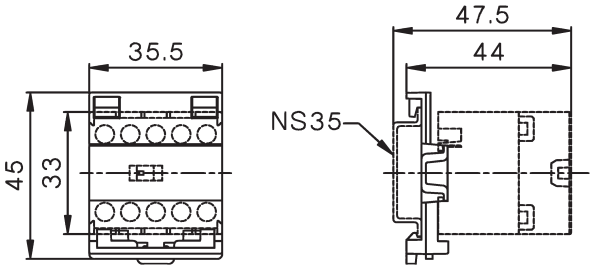


Reversing Contactors
with screw terminals

K0W05D..MC

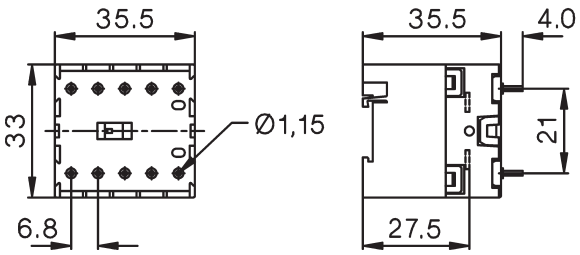


K0-..D.. with Snap-On Adapter P1039



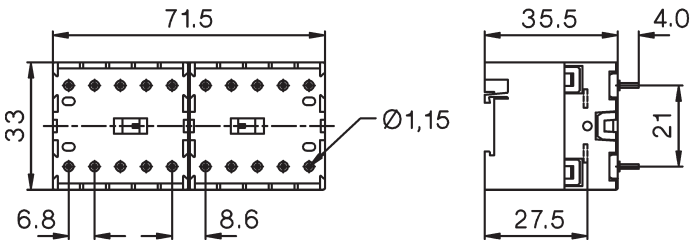
AC or DC operated
with solder connections

K0-04L.. (=)
K0-05L.. (=)



Reversing Contactors
with solder connections

K0W05L..MC



Mini Contactors

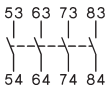
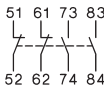
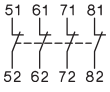
Mini Contactor Relays 4-pole — AC Operated

Ratings AC15 230V A	400V A	Rated Current I_{th} A	Therm. NO	Therm. NC	Contacts [2] Distinc. Number acc. to EN50011	Additional Contact Blocks Type	Type	Coil voltage [1]	Pack pcs.	Weight kg/pc.
								24 24V 50/60Hz		
								230 220-230V 50Hz		
								24VS 24V 50/60Hz w. protection [3]		
								230VS 220-230V 50Hz w. protection [3]		
								24VM 24V 50/60Hz 24V= DC [3]		
								230VM 220-240V 50/60Hz 220V= DC [3]		
4-pole, With Screw Terminals										
3	2	10	4	-	40E	1 HK..	**K1-07D40 . . .**		10	0,16
3	2	10	3	1	31E	1 HK..	**K1-07D31 . . .**		10	0,16
3	2	10	2	2	22E	1 HK..	**K1-07D22 . . .**		10	0,16

Auxiliary Contact Blocks For Contactor Relays [4]

Ratings AC15 230V A	400V A	Thermal Rated Current A	Contacts [2] NO	Contacts [2] NC	Type	Pack pcs.	Weight kg/pc.
3	2	10	1	1	**HK11**	10	0,04
3	2	10	-	2	**HK02**	10	0,04
3	2	10	2	-	**HK20**	10	0,04
3	2	10	4	-	**HK40**	10	0,04
3	2	10	2	2	**HK22**	10	0,04
3	2	10	-	4	**HK04**	10	0,04

Aux. Contact Blocks [4]

	HK11	HK02	HK20	HK40	HK22	HK04
Wiring Diagrams						

Distinc. Number according to EN50011
for Contactor Relay with Auxiliary Contact Block

K1-07D40	**51E**	**42E**	**60E**	**80E**	**62E**	**44E**
K1-07D31	42Y	33Y	51Y	71Y	53Y	35Y
K1-07D22	33Y	24Y	42Y	62Y	44Y	26Y

Preferable combinations with distinctive letter "**..E**" according to DIN EN 50011

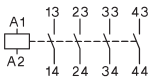
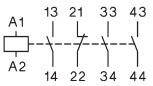
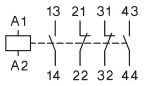
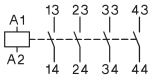
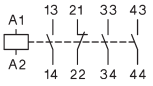
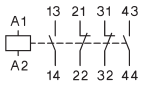
1) Other coil voltages see page 30

2) Contacts suitable for electronic circuits, according to EN947-5-4 for rated voltage 24V DC (test ratings 17V DC, 5mA)

Mirror contacts acc. IEC60947-4-1 Annex F...

3) with built-in coil suppressor (varistor)

4) Auxiliary Contact Blocks with NO and NC contacts for DC operated Contactor Relays have linked contacts...

Type	Coil voltage [1]	Contacts [2] NO	NC	Distinc. Number acc. to EN50011	Additional Contact Blocks Type	Pack pcs.	Weight kg/pc.	Wiring Diagrams
	24 24V= DC **24VS** 24V= DC with protection [2]							
4-pole, With Screw Terminals, Coil 2,5W								
								
K1-07D40= ...		4	-	40E	1 HK..	10	0,19	
K1-07D31= ...		3	1	31E	1 HK..	10	0,19	
K1-07D22= ...		2	2	22E	1 HK..	10	0,19	
4-pole, With Screw Terminals, Coil 1,5W, 19 to 30V DC with suppressor [3]								
								
K1-07D40= 24VR		4	-		-	10	0,20	
K1-07D31= 24VR		3	1		-	10	0,20	
K1-07D22= 24VR		2	2		-	10	0,20	

1) Other coil voltages on request

2) Contacts suitable for electronic circuits, according to EN947-5-4 for rated voltage 24V DC (test ratings 17V DC, 5mA)

Mirror contacts acc. IEC60947-4-1 Annex F...

Linked contacts acc. IEC60947-5-1 Annex L...

3) with integrated coil suppressor (Transient Voltage Suppressor Diode)

Mini Contactors — AC Operated

Power Ratings AC2, AC3 380V 400V 415V kW		Rated Current AC1 690V A	Aux. Contacts[2] Built-in NO	NC	Additional Type	Type	Pack pcs.	Weight kg/pc.
3-pole, With Screw Terminals								
4	4	20	1	-	1 HKM..	**K1-09D10 . . .**	10	0,16
5,5	5,5	20	1	-	1 HKM..	**K1-12D10 . . .**	10	0,16
4	4	20	-	1	1HK..	**K1-09D01 . . .**	10	0,16
5,5	5,5	20	-	1	1HK..	**K1-12D01 . . .**	10	0,16
4-pole, With Screw Terminals								
4	4	20	-	-	1HK..	**K1-09D00-40 . . .**	10	0,16
5,5	5,5	20	-	-	1HK..	**K1-12D00-40 . . .**	10	0,16

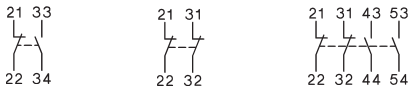
Coil voltage [1]
24 24V 50/60Hz
230 220-230V 50Hz
24VS 24V 50/60Hz w. protection [3]
230VS 220-230V 50Hz w. protection [3]
24VM 24V 50/60Hz 24V= DC [3]
230VM 220-240V 50/60Hz 220V= DC [3]

Auxiliary Contact Blocks for Contactors K1-..[4]

Ratings AC15 230V A	400V A	Thermal Rated Current A	Contacts [2] NO	NC	Type	Pack pcs.	Weight kg/pc.
3	2	10	1	1	**HKM11**	10	0,04
3	2	10	-	2	**HKM02**	10	0,04
3	2	10	2	2	**HKM22**	10	0,04

Aux. Contact Blocks [4]

Wiring Diagrams



	HKM11	HKM02	HKM22				
Contactors with Auxiliary Contact Block Contacts according to EN50012 K1-..D10	**21**	**12**	**32**	**-**	**-**	**-**	**-**
Contacts according to DIN EN50005							
K1-..D01	-	-	-	12	03	41	23
K1-..D00-40	-	-	-	11	02	40	22

Prefer combinations according to EN50012

Suppressor Units for Contactors K1-..

Voltage Range V		Type	Pack pcs.	Weight kg/pc.
12 - 48V AC/DC	1600nF / 22 Ohm	**RC-K1 24**	10	0,01
48 - 127V AC/DC	680nF / 270 Ohm	**RC-K1 110**	10	0,01
110 - 250V AC/DC	220nF / 2200 Ohm	**RC-K1 230**	10	0,01

1) Other coil voltages see page 30
2) Contacts suitable for electronic circuits, according to EN947-5-4 for rated voltage 24V DC (test ratings 17V DC, 5mA)

Mirror contacts acc. IEC60947-4-1 Annex F...

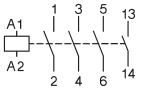
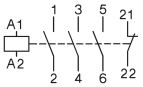
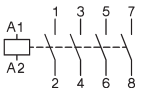
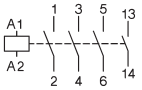
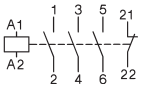
3) with built-in coil suppressor (varistor)
4) Auxiliary Contact Blocks with NO and NC contacts for DC operated Contactor Relays have linked contacts..

DC Solenoid Operated

Type

Coil voltage [1]
24 24V= DC
24VS 24V= DC with protection [3]

Aux. Contacts [2]
Built in NO | Additional NC

Type	Built in NO	Additional NC	Additional	Additional Overload Relay see page114 Type	Pack pcs.	Weight kg/pc.	Wiring Diagrams
3-pole, With Screw Terminals, Coil 2,5W							
K1-09D10= . . .	1	-	1 HKM..	U12/16..K1	10	0,19	
K1-12D10= . . .	1	-	1 HKM..	U12/16..K1	10	0,19	
K1-09D01= . . .	-	1	1 HK..	U12/16..K1	10	0,19	
K1-12D01= . . .	-	1	1 HK..	U12/16..K1	10	0,19	
4-pole, With Screw Terminals, Coil 2,5W							
K1-09D00-40= . . .	-	-	-	U12/16..K1	10	0,19	
K1-12D00-40= . . .	-	-	-	U12/16..K1	10	0,19	
3-pole, With Screw Terminals, Coil 1,5W, 19 to 30V DC with suppressor [3]							
K1-09D10=24VR	1	-	-	U12/16..K1	10	0,20	
K1-09D01= 24VR -	-	1	-	U12/16..K1	10	0,20	

1) Other coil voltages on request

2) Contacts suitable for electronic circuits, according to EN947-5-4 for rated voltage 24V DC (test ratings 17V DC, 5mA)

Mirror contacts acc. IEC60947-4-1 Annex F...

3) with integrated coil suppressor (Transient Voltage Suppressor Diode)

Power Ratings		Rated Current	Aux. Contacts[2] Built in		Additional	**Type**	Coil voltage [1]		
							24 24V 50/60Hz		
							230 220-230V 50Hz		
							24VS 24V 50/60Hz w. protection[2]		
							230VS 220-230V 50Hz w. protection[2]		
							24VM 24V 50/60Hz 24V DC		
							230VM 220-240V 50/60Hz 220V DC		
AC2, AC3		AC1						Pack	Weight
380V									
400V	660V								
415V	690V	690V							
kW	kW	A	NO	NC	Type			pcs.	kg/pc.

3-pole, with Fast On Tab Connectors 1 x 6,3mm or 2 x 2,8mm

4	4	16	1	-	1 HKM..	**K1-09F10 . . .**	10	0,16
4	4	16	-	1	1 HK..	**K1-09F01 . . .**	10	0,16

3-pole, with Solder Pins Ø1,15 for Printed Circuit Applications

4	4	16	1	-	-	**K1-09L10 . . .**	10	0,16
4	4	16	-	1	-	**K1-09L01 . . .**	10	0,16

4-pole, with Solder Pins Ø1,15 for Printed Circuit Applications

4	4	16	-	-	-	**K1-09L00-40 . . .**	10	0,16

Coil voltages for AC operated contactors

Suffix to contactor type e.g. K1-09D10 24	Voltage Marking at the coil for 50Hz V	for 60Hz V	Rated Control Voltage U_s range for 50Hz min. V	max. V	for 60Hz min. V	max. V
12	12	12	11	12	12	12
24	**24**	**24**	**22**	**24**	**24**	**24**
42	42	42	38,5	42	42	42
48	48	48	48	50	48	52
90	100	100	90	100	100	105
95	95-100	105-110	95	100	105	110
100	100	110-115	100	105	110	115
105	105-110	115-120	105	110	115	120
110	110-115	120-125	110	115	120	125
180	200	200	185	200	200	210

Suffix to contactor type e.g. K1-09D10 230	Voltage Marking at the coil for 50Hz V	for 60Hz V	Rated Control Voltage U_s range for 50Hz min. V	max. V	for 60Hz min. V	max. V
200	200	200-220	195	205	200	220
210	205-215	220-230	205	215	220	230
220	210-220	220-240	210	220	220	240
230	**220-230**	**230-250**	**220**	**230**	**230**	**250**
240	230-240	240-260	230	240	240	260
400	380-400	400-440	380	400	400	440
500	475-500	520-545	475	500	520	545
550	525-550	600	525	550	570	600

Standard voltages in bold type letters
Operating range of magnet-coils: 0,85 x U_s (min. value of rated control voltage) up to 1,1 x U_s (max. value of rated control voltage)

Coil not exchangeable

1) Other coil voltages see page 28
2) Contacts suitable for electronic circuits, according to EN947-5-4 for rated voltage 24V DC (test ratings 17V DC, 5mA) Mirror contacts acc. IEC60947-4-1 Annex F.
3) with built-in coil suppressor (varistor)

DC Solenoid Operated

Type

Coil voltage [1]
24 24V= DC
24VS 24V= DC with protection [3]

Aux. Contacts [2]
Built in: NO | NC
Additional

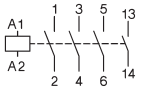
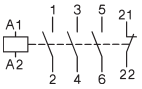
Additional Overload Relay see pages 115, 117 Type

Pack pcs.

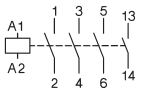
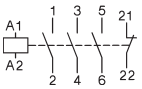
Weight kg/pc.

Wiring Diagrams

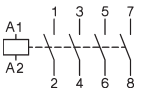
3-pole, with Fast On Tab Connectors 1 x 6,3mm or 2 x 2,8mm

Type	NO	NC	Additional	Additional Overload Relay	Pack pcs.	Weight kg/pc.	Wiring Diagrams
K1-09F10= . . .	1	-	1 HKM..	[4]	10	0,19	
K1-09F01= . . .	-	1	1 HK..	[4]	10	0,19	

3-pole, with Solder Pins Ø1,15 for Printed Circuit Applications

Type	NO	NC	Additional	Additional Overload Relay	Pack pcs.	Weight kg/pc.	Wiring Diagrams
K1-09L10= . . .	1	-	-	-	10	0,19	
K1-09L01= . . .	-	1	-	-	10	0,19	

4-pole, with Solder Pins Ø1,15 for Printed Circuit Applications

Type	NO	NC	Additional	Additional Overload Relay	Pack pcs.	Weight kg/pc.	Wiring Diagrams
K1-09L00-40= . . .	-	-	-	-	10	0,19	

1) Other coil voltages on request
2) Contacts suitable for electronic circuits, according to EN947-5-4 for rated voltage 24V DC (test ratings 17V DC, 5mA) Mirror contacts acc. IEC60947-4-1 Annex F.
3) with integrated coil suppressor (Transient Voltage Suppressor Diode)
4) U12/16E K3 with U12SMK3 for single mounting

Mini Reversing Contactors, Mechanical Interlocked AC Operated

Power Ratings AC2, AC3 380V 400V 415V kW	660V 690V kW	Rated Current AC1 690V A	Aux. Contacts[2] Built-in NO	NC	Additional on left hand side Contactor K1 Type	on right hand side Contactor K2 Type	Type	Coil voltage [1]	Pack pcs.	Weight kg/pc.
								24 24V 50/60Hz		
								230 220-230V 50Hz		
								24VS 24V 50/60Hz w. protection [3]		
								230VS 220-230V 50Hz w. prot. [3]		
								24VM 24V 50/60Hz 24V DC		
								230VM 220-240V 50/60Hz 220V DC		

3-pole, with Screw Terminals

4	4	20	-	2	HKM11V	HKM11X	**K1W09D01MC . . .**	1	0,32
5,5	5,5	20	-	2	HKM11V	HKM11X	**K1W12D01MC . . .**	1	0,32
4	4	20	2	-	-	HKM..	**K1W09D10MC . . .**	1	0,32
5,5	5,5	20	2	-	-	HKM..	**K1W12D10MC . . .**	1	0,32

4-pole, with Screw Terminals

4	4	20	-	-	-	HKM..	**K1W09D00-40MC . .**	1	0,32
5,5	5,5	20	-	-	-	HKM..	**K1W12D00-40MC . .**	1	0,32

3-pole, with Solder Pins Ø1,15 for Printed Circuit Applications

4	4	16	-	2	-	-	**K1W09L01MC . . .**	1	0,32
4	4	16	2	-	-	-	**K1W09L10MC . . .**	1	0,32

Auxiliary Contact Blocks for Mini Reversing Contactors K1-..

Ratings AC15 230V A	400V A	Thermal Rated Current A	Contacts [2] NO	NC	Type	Pack pcs.	Weight kg/pc.
3	2	10	1	1	**HKM11V**	10	0,04
3	2	10	1	1	**HKM11X**	10	0,04

Aux. Contact BlocksAux. Contact Blocks	HKM11V	HKM11X
Wiring Diagrams		

Reversing Starter Connector

For Reversing Starter Types, incl. Coil Connector	Type	Pack pcs.	Weight kg/pc.
K1W09D..MC, K1W12D..MC	**K1W-VB**	1	0,01

1) Other coil voltages see page 30
2) Contacts suitable for electronic circuits, according to EN947-5-4 for rated voltage 24V DC (test ratings 17V DC, 5mA) Mirror contacts acc. IEC60947-4-1 Annex F.
3) with built-in coil suppressor (varistor)

Type

Coil voltage [1]
24 24V= DC
24VS 24V= DC with protection [2]

Additional Overload Relay see page114 Type

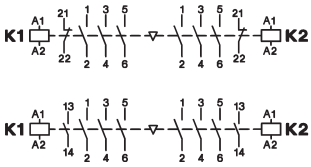
Pack pcs.

Weight kg/pc.

Wiring Diagrams

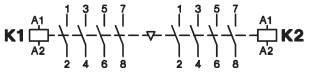
3-pole, with Screw Terminals

K1W09D01MC= . . .	U12/16..K1	1	0,32
K1W12D01MC= . . .	U12/16..K1	1	0,32
K1W09D10MC= . . .	U12/16..K1	1	0,32
K1W12D10MC= . . .	U12/16..K1	1	0,32



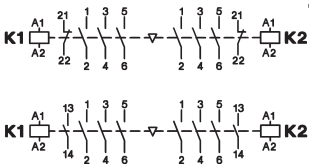
4-pole, with Screw Terminals

K1W09D00-40MC= . .	U12/16..K1	1	0,32
K1W12D00-40MC= . .	U12/16..K1	1	0,32



3-pole, with Solder Pins Ø1,15 for Printed Circuits Applications

K1W09L01MC= . . .	-	1	0,32
K1W09L10MC= . . .	-	1	0,32



1) Other coil voltages on request
2) with integrated coil suppressor (Transient Voltage Suppressor Diode)

Mini Contactors

Data according to IEC 947-4-1, VDE 0660, EN 60947-4-1

Main Contacts		Type	K1-09D..	K1-09F..	K1-09L..	K1-12D..
Rated insulation voltage U_i		V AC	690 [1]	690 [1]	690 [2]	690 [1]
Making capacity I_{eff}	at U_e = 690V AC	A	165	165	165	165
Breaking capacity I_{eff}	400V AC	A	100	100	100	100
cosφ = 0,65	500V AC	A	90	90	90	90
	690V AC	A	80	80	80	80
Utilization category AC1						
Switching of resistive load						
Rated operational current I_e (=I_{th}) at 40°C, open		**A**	**20**	**16**	**16**	**20**
Rated operational power of three-phase resistive loads	230V	kW	7,9	6	6	7,9
50-60Hz, cosφ = 1	240V	kW	8,3	6,5	6,5	8,3
	400V	kW	13,8	11	11	13,8
	415V	kW	14,3	11,5	11,5	14,3
Rated operational current I_e (=I_{the}) at 60°C, enclosed		A	16	12	12	16
Rated operational power of three-phase resistive loads	230V	kW	6,3	4,5	4,5	6,3
50-60Hz, cosφ = 1	240V	kW	6,7	5	5	6,7
	400V	kW	11	8	8	11
	415V	kW	11,5	8,5	8,5	11,5
Minimum cross-section of conductor at load with I_e (=I_{th})		mm^2	2,5	2,5	-	2,5
Utilization category AC2 and AC3						
Switching of three-phase motors						
Rated operational current I_e	220V	A	12	12	12	15
open and enclosed	230V	A	11,5	11,5	11,5	14,5
	240V	A	11	11	11	14
	380-400V	**A**	**9**	**9**	**9**	**12**
	415-440V	A	8	8	8	11
	500V	A	7	7	7	9
	660-690V	A	5	5	5	6,5
Rated operational power of three-phase motors	220-240V	kW	3	3	3	4
50-60Hz	**380-440V**	**kW**	**4**	**4**	**4**	**5,5**
	500-690V	kW	4	4	4	5,5
Utilization category AC4						
Switching of squirrel cage motors, inching						
Rated operational current I_e	220V	A	12	12	12	15
open and enclosed	230V	A	11,5	11,5	11,5	14,5
	240V	A	11	11	11	14
	380-400V	**A**	**9**	**9**	**9**	**12**
	415-440V	A	8	8	8	11
	500V	A	7	7	7	9
	660-690V	A	5	5	5	6,5
Rated operational power of three-phase motors	220-240V	kW	3	3	3	4
50-60Hz	**380-440V**	**kW**	**4**	**4**	**4**	**5,5**
	500-690V	kW	4	4	4	5,5
Utilization category AC5a						
Switching of gas discharge lamps						
Rated operational current I_e						
per pole at 220/230V						
Fluorescent lamps,						
uncompensated and serial compensated		A	10	10	10	10
parallel compensated		A	2	2	2	2
dual-connection		A	16	16	16	16
Metal halide lamps[3],						
uncompensated		A	10	10	10	10
parallel compensated		A	2	2	2	2
Mercury-vapour lamps[4],						
uncompensated		A	16	16	16	16
parallel compensated		A	2	2	2	2
Mixed light lamps[5]		A	16	16	16	16
LED-Lamps						
consider the inrush current of the lamp ballast and cosφ of the lamp	max. lamps per pole ($I_{nLED} \le I_{th}$)	=	$\frac{\text{inrush current of contactor}}{\text{inrush current of lamp/EVG}}$			
max inrush current of contactor		A	233	233	233	233
Utilization category AC5b Switching of incandescent lamps [6]						
Rated operational current I_e						

1) Suitable at 690V for: earthed-neutral systems, overvoltage category I to IV, pollution degree 3 (standard-industry): U_{imp} = 8kV. Data for other conditions on request.
2) Suitable at 690V for pollution degree 2, U_{imp} = 6kV.
Pollution degree 3 U_i = 690V non-tracking of the printed circuit CTI ≥600
Pollution degree 3 U_i = 500V non-tracking of the printed circuit CTI ≥400
Pollution degree 3 U_i = 400V non-tracking of the printed circuit CTI ≥100
3) Metal halide lamps and sodium-vapour lamps (high- and low-pressure lamps)
4) High-pressure lamps
5) Blended lamps, containing a mercury high-pressure unit and a tungsten helix in a flourescent glass bulb (daylight lamps)
6) Current inrush approx. 16 x I_e

Mini Contactors

Data according to IEC 947-4-1, VDE 0660, EN 60947-4-1

Main Contacts			Type	K1-09D..	K1-09F..	K1-09L..	K1-12D..
Utilization category DC1							
Switching of resistive load	1 pole	24V	A	20	16	16	20
Time constant L/R ≤1ms		60V	A	20	16	16	20
Rated operational current I_e		110V	A	5	5	5	5
		220V	A	0,6	0,6	0,6	0,6
	3 poles in series	24V	A	20	20	20	20
		60V	A	20	20	20	20
		110V	A	20	20	20	20
		220V	A	16	16	16	16
Utilization category DC3 and DC5							
Switching of shunt motors	1 pole	24V	A	20	16	16	20
and series motors		60V	A	5	5	5	5
Time constant L/R ≤15ms		110V	A	1	1	1	1
Rated operational current I_e		220V	A	0,15	0,15	0,15	0,15
	3 poles in series	24V	A	20	16	16	20
		60V	A	20	16	16	20
		110V	A	20	16	16	20
		220V	A	2	2	2	2
Maximum ambient temperature							
Operation		open	°C	-40 to +60 (+90) [1]			
		enclosed	°C	-40 to +40			
with thermal overload relay		open	°C	-25 to +60			
		enclosed	°C	-25 to +40			
Storage			°C	-50 to +90			
Short circuit protection for contactors without O/L relay							
Rated short circuit current		"r" / "Iq"	kA	3	3	3	3
Coordination-type "1" according to IEC 947-4-1							
Contact welding without hazard of persons							
max. fuse size		gL (gG)	A	40	40	40	40
Coordination-type “2” according to IEC 947-4-1							
Light contact welding accepted							
max. fuse size		gL (gG)	A	25	25	25	25
Contact welding not accepted							
max. fuse size		gL (gG)	A	10	10	10	10
For contactors with thermal overload relay the device with the smaller admissible backup fuse (contactor or thermal overload relay) determines the fuse size.							
Cable cross-sections							
for contactors without thermal overload relay							
main connector		solid or stranded	mm^2	0,5 - 2,5	Fast on	Solder connector	0,5 - 2,5
		flexible	mm^2	0,5 - 2,5	1x 6,3 x 0,8	Ø 1,15	0,5 - 2,5
		flexible with multicore cable end	mm^2	0,5 - 1,5	or		0,5 - 1,5
Cables per clamp				2	2x 2,8 x 0,8	-	2
		solid or stranded	AWG	18 - 14			18 - 14
Frequency of operations z		without load	1/h	10000	10000	10000	10000
Contactors without thermal overload relay		AC3, I_e	1/h	600	600	600	700
		AC4, I_e	1/h	120	120	120	150
		DC3, I_e	1/h	600	600	600	700
Mechanical life	AC operated		S x 10^6	5	5	5	5
	DC operated		S x 10^6	15	15	15	15
Short time current		10s-current	A	96	96	96	120
Power loss per pole		at I_e/AC3 400V	W	0,15	0,15	0,15	0,25
Resistance to shock according to IEC 68-2-27							
Shock time 20ms sine-wave							
AC operated		NO	g	5	5	5	5
		NC	g	5	5	5	5
DC operated		NO	g	8	8	8	8
		NC	g	6	6	6	6

1) With reduced control voltage range 0,9 up to 1,0 x U_s and with reduced rated current I_e /AC1according to I_e /AC3

Mini Contactors

Data according to IEC 947-5-1, VDE 0660, EN 60947-5-1

Auxiliary Contacts		Type	**K1-07D.. K1-09D.. K1-12D..**	**K1-07D..=(VM) K1-09D..=(VM) K1-12D..=(VM)**	**K1-07D..= 24VR K1-09D..= 24VR**	**K1-09F..=(VM)**	**K1-07L..=(VM) K1-09L..=(VM)**	**HK..**
Rated insulation voltage U_i		V AC	690 [1]	690 [1]	690 [1]	690 [1]	690 [2]	690 [1]
Thermal rated current I_{th} to 690V								
Ambient temperature	40°C	A	10	10	10	10	10	10
	60°C	A	6	6	6	6	6	6
Power loss per pole	at I_{th}	W	0,5	0,5	0,5	0,5	0,5	0,5
Utilization category AC15								
Rated operational current I_e	220-240V	A	3	3	3	3	3	3
	380-415V	A	2	2	2	2	2	2
	440V	A	1,6	1,6	1,6	1,6	1,6	1,6
	500V	A	1,2	1,2	1,2	1,2	1,2	1,2
	660-690V	A	0,6	0,6	0,6	0,6	0,6	0,6
Utilization category DC13								
Rated operational current I_e	60V	A	2	2	2	2	2	2
	110V	A	0,4	0,4	0,4	0,4	0,4	0,4
	220V	A	0,1	0,1	0,1	0,1	0,1	0,1
Maximum ambient temperature								
Operation	open	°C			-40 to +60 (+90) [3]			
	enclosed	°C			-40 to +40			
Storage		°C			-40 to +90			
Short circuit protection short-circuit current 1kA, contact welding not accepted max. fuse size	gL (gG)	A	20	20	20	20	20	20
For contactors with thermal overload relay the device with the smaller admissible control fuse (contactor or thermal overload relay) determines the fuse size.								
Power consumption of coils								
AC operated	inrush	VA	25	-	-	25	25	-
	sealed	VA	4 - 5	-	-	4 - 5	4 - 5	-
		W	1,2	-	-	1,2	1,2	-
DC operated	inrush	W	-	2,5	1,5	2,5	2,5	-
and ...VM (AC/DC)	sealed	W	-	2,5	1,5	2,5	2,5	-
Operation range of coils in multiples of control voltage U_s			0,85 - 1,1	0,8 - 1,1	19 - 30V DC	0,85 - 1,1	0,85 - 1,1	-
Switching time at control voltage U_s ±10% [4] [5]								
AC operated	make time	ms	15 - 19	-	-	15 - 19	15 - 19	-
	release time	ms	8 - 25	-	-	8 - 25	8 - 25	-
	arc duration	ms	10 -15	-	-	10 -15	10 -15	-
DC operated	make time	ms	-	15 - 50	15 - 50	15 - 50	15 - 50	-
	release time	ms	-	8 - 25	8 - 25	8 - 25	8 - 25	-
	arc duration	ms	-	10 -15	10 -15	10 -15	10 -15	-
Cable cross-section								
all connectors	solid	mm²	0,5 - 2,5	0,5 - 2,5	0,5 - 2,5	Fast on	Solder connector	0,5 - 2,5
	flexible	mm²	0,5 - 2,5	0,5 - 2,5	0,5 - 2,5	1x 6,3 x 0,8	Ø 1,15	0,5 - 2,5
	flexible with multicore cable end	mm²	0,5 - 1,5	0,5 - 1,5	0,5 - 1,5	or		0,5 - 1,5
						2x 2,8 x 0,8		
Clamps per pole			2	2	2	-	-	2
	solid or stranded	AWG	18 - 14	18 - 14	18 - 14			18 - 14

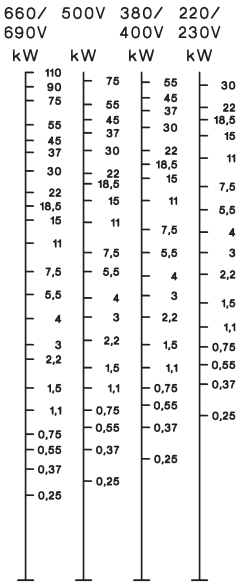
1) Suitable at 690V for: earthed-neutral systems, overvoltage category I to IV, pollution degree 3 (standard-industry): U_{imp} = 8kV.
Data for other conditions on request.
2) Suitable at 690V for pollution degree 2, U_{imp} = 6kV.
Pollution degree 3 U_i = 690V non-tracking of the printed circuit CTI ≥600
Pollution degree 3 U_i = 500V non-tracking of the printed circuit CTI ≥400
Pollution degree 3 U_i = 400V non-tracking of the printed circuit CTI ≥100
3) With reduced control voltage range 0,9 up to 1,0 x U_s and with reduced thermal rated current I_{th} to I_e /AC15
4) Summary switching time = release time + arc duration
5) Release time of NC make time of NO increase when suppressor units for voltage peak protection are used (Varistor, RC-units, Diode units).

Mini Contactors for North America

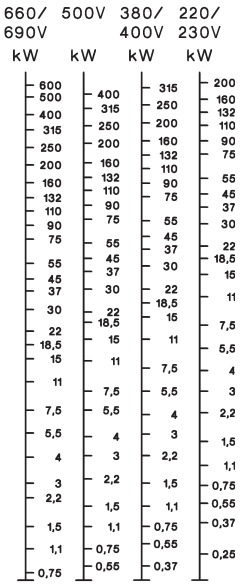
Data according to UL508

Main Contacts (cULus)		Type	**K1-09D.. K1W09D01**	**K1-09F..**	**K1-09L..**	**K1-07D..**	**K1-12D.. K1W12D01**	**HK..**
Rated operational current "General Use"		A	15	15	20	10	20	10
Rated operational power of three-phase motors at 60Hz (3ph)	110-120V	hp	1½	1½	1½	-	2	-
	200-208V	hp	3	3	3	-	3	-
	220-240V	hp	3	3	3	-	3	-
	440-480V	hp	5	5	5	-	7½	-
	550-600V	hp	7½	7½	7½	-	10	-
Rated operational power of of AC motors at 60Hz (1ph)	110-120V	hp	½	½	½	-	¾	-
	200-208V	hp	1	1	1	-	1½	-
	220-240V	hp	1½	1½	1½	-	2	-
Fuse / Short-circuit current		A/kA	30/5	30/5	30/5	-	30/5	-
Rated voltage		V AC	600	600	600 [1]	600	600	600
Auxiliary Contacts (cULus)	heavy pilot duty	AC	A600	A600	A600	A600	A600	A600
	standard pilot duty	DC	Q600	Q600	Q600	Q600	Q600	Q600

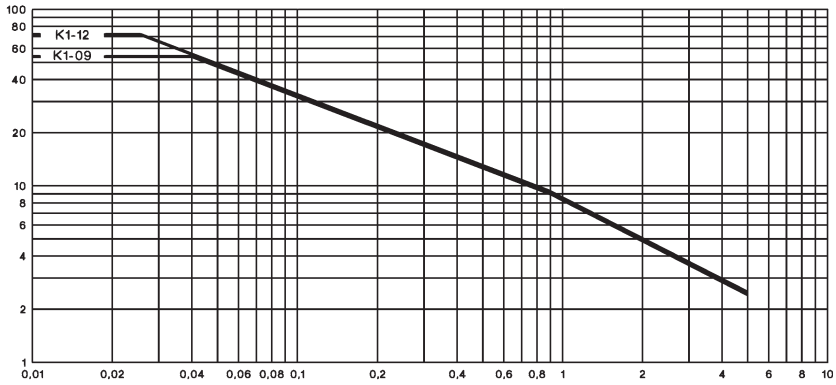
Motor Rating
P_n = AC4



Motor Rating
P_n = AC3



Breaking Current
I_a (= I_e = AC1)
A



Millions of Operations

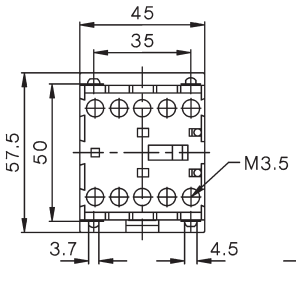
1) Pollution degree	CTI - PWB	U_i
2	≥ 100	600V
3	≥ 400	480V
3	100 - 400	240V

Mini Contactors

Dimensions

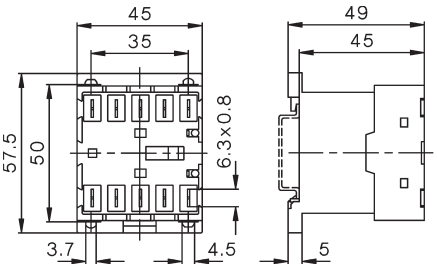
AC and DC operated
with screw terminals

K1-07D..
K1-09D..
K1-12D..

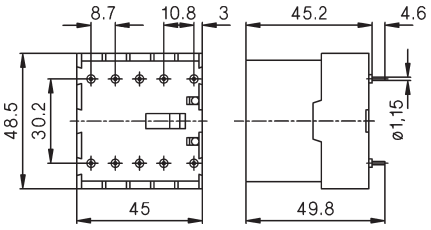


with fast on terminals

K1-07F..
K1-09F..

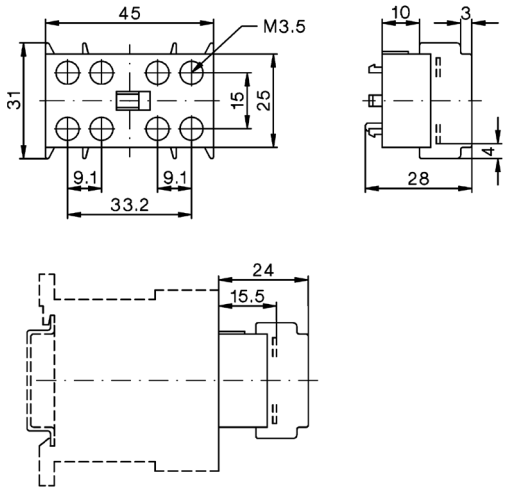


AC and DC operated
with solder connections
K1-07L..
K1-09L..



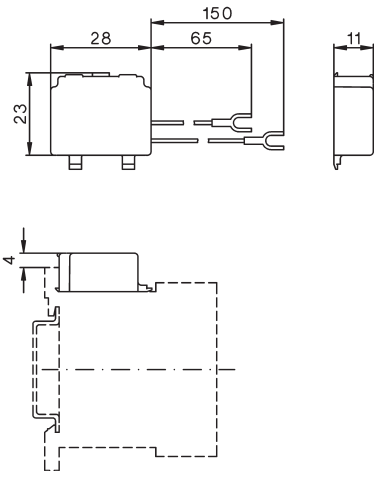
Auxiliary Contact Blocks

HK..



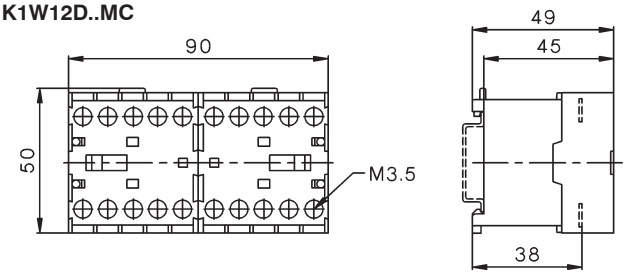
Suppressor Units

RC-K1



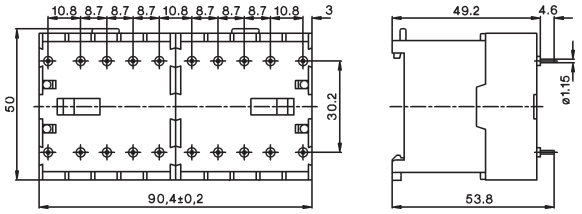
Reversing Contactors

K1W09D..MC
K1W12D..MC

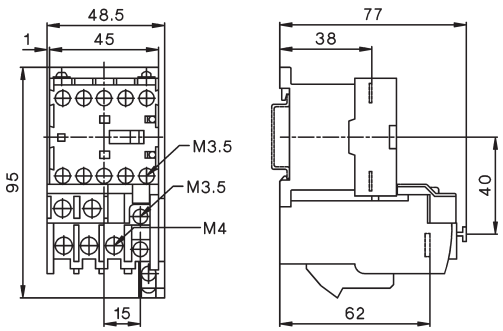


Reversing Contactors

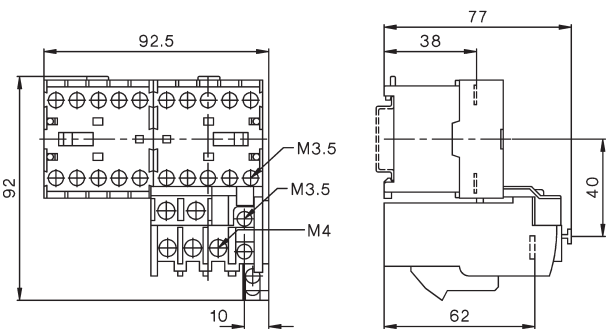
K1W09L..MC



K1-09 + U12/16.. K1
K1-12



K1W09D..MC + U12/16E K1
K1W09D..MC + U12/16E K1



Contactor Relays

Contactor Relays

AC Operated

Ratings AC15 230V A	400V A	Therm. Rated Current I_{th} A	Contacts Built-in NO	NC	Distinc. Number acc. to EN50011	Additional Contact Blocks Type	Type	Pack pcs.	Weight kg/pc.
4-pole, contacts suitable for electronic circuits according to EN947-5-4[2]									
4	2	10	4	-	40E	max. 4	**K3-07ND40 . . .**	1	0,22
4	2	10	3	1	31E	HN..	**K3-07ND31 . . .**	1	0,22
4	2	10	2	2	22E	max. 2	**K3-07ND22 . . .**	1	0,22
4	2	10	-	4	04E	HB..	**K3-07ND04 . . .**	1	0,22

Coil voltage [1]
24 24V 50/60Hz
110 110V 50Hz 110-120V 60Hz
230 220-240V 50Hz 230-264V 60Hz
400 380-415V 50Hz 400-440V 60Hz

Auxiliary Contact Blocks [3]

Ratings AC15 230V A	400V A	Thermal Rated Current A	Contacts [2] NO	NC	EM	LB	Type	Pack pcs.	Weight kg/pc.
1-pole, contacts suitable for electronic circuits according to EN947-5-4[2]									
3	2	10	1	-	-	-	**HN10**	10	0,02
3	2	10	-	1	-	-	**HN01**	10	0,02
3	2	10	-	-	1	-	**HN10U**	10	0,02
3	2	10	-	-	-	1	**HN01U**	10	0,02
1-pole, for high switching capacity									
6	3	25	1	-	-	-	**HA10**	10	0,03
6	3	25	-	1	-	-	**HA01**	10	0,03

Accessories see pages 52 - 55.

1) Other coil voltages see page 57
2) Contacts suitable for electronic circuits, according to EN947-5-4 for rated voltage 24V DC (test ratings 17V DC, 5mA) Mirror contacts acc. IEC60947-4-1 Annex F.
3) Technical Data see page 62

DC Operated

Type

Coil voltage [1]
24 24V DC
48 48V DC
110 110V DC
220 220V DC

Contacts Built-in: NO, NC

Distinc. Number acc. to EN50011

Additional Contact Blocks Type

Pack pcs.

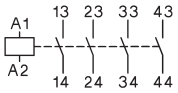
Weight kg/pc.

Wiring Diagrams

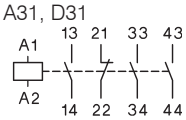
3W Coil power, for high switching capacity [3]

	NO	NC	EN50011	Additional Contact Blocks Type	Pack pcs.	Weight kg/pc.
KG3-07A40 . . .	4	-	40E	max. 4	1	0,53
KG3-07A31 . . .	3	1	31E	HN..	1	0,53
KG3-07A22 . . .	2	2	22E	or	1	0,53
KG3-07A04 . . .	-	4	04E	HA..	1	0,53

A40, D40



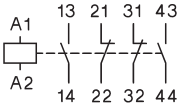
A31, D31



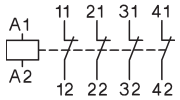
3W Coil power, for electronic circuits [2)3)]

	NO	NC	EN50011	Additional Contact Blocks Type	Pack pcs.	Weight kg/pc.
KG3-07D40 . . .	4	-	40E	max. 4	1	0,53
KG3-07D31 . . .	3	1	31E	HN..	1	0,53
KG3-07D22 . . .	2	2	22E		1	0,53
KG3-07D04 . . .	-	4	04E		1	0,53

A22, D22



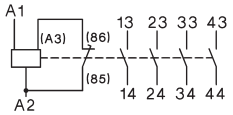
A04, D04



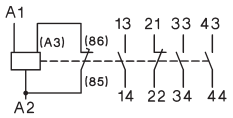
with double winding coil, for electronic circuits [2)]

	NO	NC	EN50011	Additional Contact Blocks Type	Pack pcs.	Weight kg/pc.
K3-07ND40= . . .	4	-	40E	max. 3	1	0,25
K3-07ND31= . . .	3	1	31E	HN..	1	0,25
K3-07ND22= . . .	2	2	22E	max. 2	1	0,25
K3-07ND04= . . .	-	4	04E	HB..	1	0,25

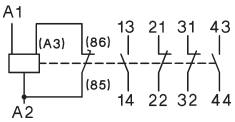
ND40=



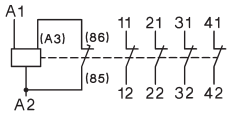
ND31=



ND22=



ND04=



1) Other coil voltages on request
2) Contacts suitable for electronic circuits, according to EN947-5-4 for rated voltage 24V DC (test ratings 17V DC, 5mA) Mirror contacts acc. IEC60947-4-1 Annex F.
3) with integrated coil suppressor (Transient Voltage Suppressor Diode)

Contactor Relays

Data according to IEC 947-5-1, VDE 0660, EN 60947-5-1

		Type	K3-07ND	K3-07ND=	KG3-07A	KG3-07D
Rated insulation voltage U_i [1]		V AC	690	690	690	690
Thermal rated current I_{th} to 690V						
Ambient temperature	40°C	A	10	10	20	10
	60°C	A	6	6	16	6
Frequency of operations z		1/h	10000	10000	10000	10000
Mechanical life		S x 10^6	10	10	10	50
Utilization category AC15						
Rated operational	220-240V	A	4	4	12	4
current I_e	380-415V	A	2	2	4	2
	440V	A	1,6	1,6	4	1,6
	500V	A	1,2	1,2	3	1,2
	660-690V	A	0,6	0,6	1	0,6
Utilization category DC13						
Rated operational	24-60V	A	3,5	3,5	8	3,5
current I_e	110V	A	0,5	0,5	1	0,5
per pole	220V	A	0,1	0,1	0,1	0,1
Power consumption of coils						
AC operated	inrush	VA	30 - 45	-	-	-
	sealed	VA	7 - 10	-	-	-
		W	2,6 - 3	-	-	-
DC operated	inrush	W	-	75	3	3
	sealed	W	-	2	3	3
Operation range of coils						
in multiples of control voltage U_s			0,85 - 1,1	0,8 - 1,1	0,8 - 1,1	0,8 - 1,1
Switching time at control voltage $U_s \pm 10\%$						
	make time	ms	8 - 16	8 - 16	65 - 85	65 - 85
	release time	ms	5 - 13	5 - 13	20 - 30 [3]	20 - 30 [3]
Maximum ambient temperature						
Operation	open	°C	-40 to +60 (+90) [2]			
	enclosed	°C	-40 to +40			
Storage		°C	-40 to +90			
Short circuit protection						
short-circuit current 1kA,						
contact welding not accepted						
max. fuse size	gL (gG)	A	20	20	25	20
Cable cross-section						
Connector	solid	mm^2	0,75 - 6			
	flexible	mm^2	1 - 4			
	flexible with multicore cable end	mm^2	0,75 - 4			
Magnet coil	solid	mm^2	0,75 - 2,5			
	flexible	mm^2	0,75 - 2,5			
	flexible with multicore cable end	mm^2	0,5 - 1,5			
Clamps per pole			2			
Connector	solid	AWG	18 - 10			
	flexible	AWG	18 - 10			
Clamps per pole			2			
Magnet coil	solid	AWG	14 - 12			
	flexible	AWG	18 - 12			
Clamps per pole			2			

Data according to UL508

Rated operational current "General Use"		A	10	10	20	10
Rated operational voltage	max.	V AC	600	600	600	600
Auxiliary Contacts	heavy pilot duty		A600	A600	A600	A600

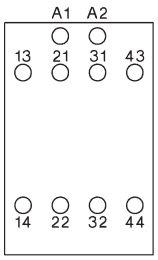
1) Suitable at 690V for: earthed-neutral systems, overvoltage category I to IV, pollution degree 3 (standard-industry): U_{imp} = 8kV. Data for other conditions on request.
2) With reduced control voltage range 0,9 up to 1,0 x U_s and with reduced thermal rated current I_{th} according to I_e /AC15
3) with built-in coil suppressor

Contactor Relays

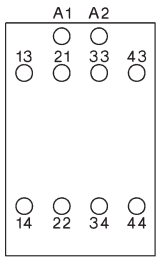
Position of Terminals

AC operated

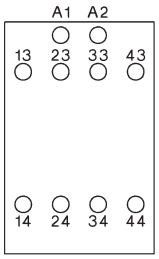
K3-07ND22



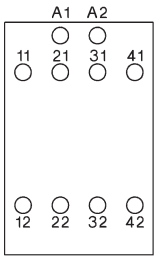
K3-07ND31



K3-07ND40

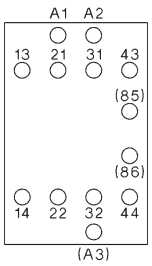


K3-07ND04



DC operated with double wound coil

K3-07ND22=



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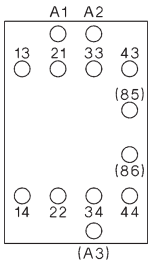
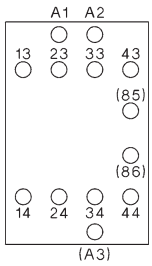
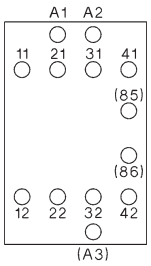


K3-07ND40=

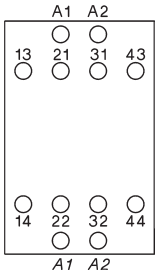


K3-07ND04=

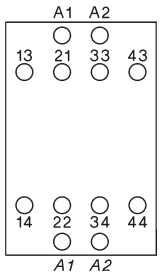


DC solenoid operated

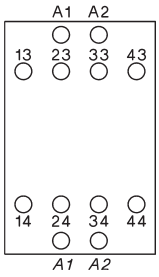
KG3-07A22
KG3-07D22



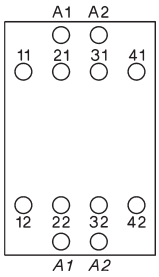
KG3-07A31
KG3-07D31



KG3-07A40
KG3-07D40



KG3-07A04
KG3-07D04

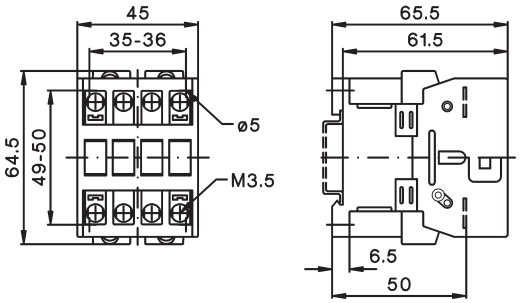


Contactor Relays

Dimensions

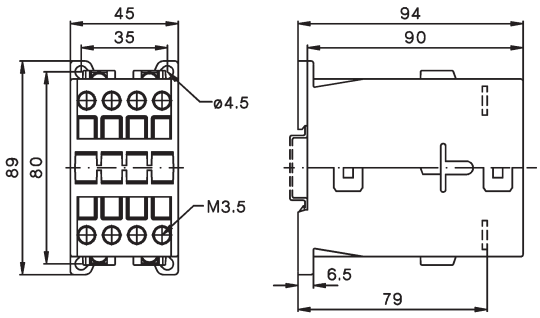
AC operated

K3-07ND..



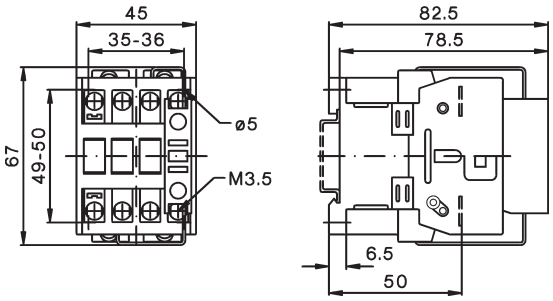
DC solenoid operated

KG3-07..



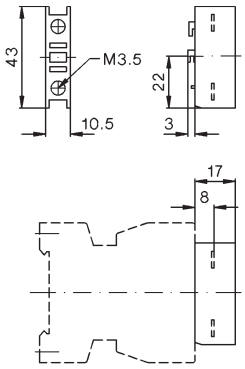
DC operated with double winding coil

K3-07ND.. =

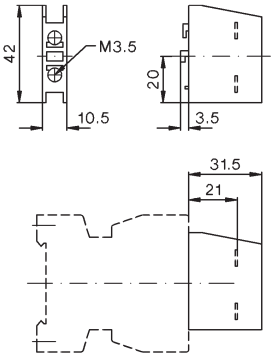


Auxiliary contact blocks

HN10, HN01



HA10, HA01

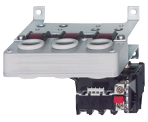


Contactors

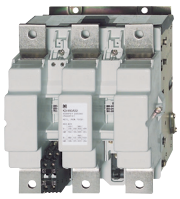
Contactors 3-pole

- **Up to 1200A AC3**
- **Up to 1350A AC1**
- **DIN-rail mounting up to AC3 115A**
- **International Approvals**
- **Data according to IEC 947 / EN 60947**




Ratings												
AC3	**400V**	**Motor**	**10A**	**14A**	**18A**	**22A**	**24A**	**32A**	**40A**	**50A**	**62A**	**74A**	**90A**	**115A**
		380-400V	**4kW**	**5,5kW**	**7,5kW**	**11kW**	**11kW**	**15kW**	**18,5kW**	**22kW**	**30kW**	**37kW**	**45kW**	**55kW**
		660-690V	5,5kW	7,5kW	10kW	10kW	15kW	18,5kW	18,5kW	30kW	37kW	45kW	55kW	55kW
AC1	690V at 40°C		25A	25A	32A	32A	50A	65A	80A	110A	120A	130A	160A	200A
Type		**K3-**	**10ND10**	**14ND10**	**18ND10**	**22ND10**	**24A00**	**32A00**	**40A00**	**50A00**	**62A00**	**74A00**	**90A00**	**115A00**
Auxiliary contacts			1NO	1NO	1NO	1NO	-	-	-	-	-	-		
Type		**K3-**	**10ND01**	**14ND01**	**18ND01**	**22ND01**								
Auxiliary contacts			1NC	1NC	1NC	1NC								
Cable cross-section														
Solid		mm^2	0,75 - 6				1,5 - 25			4 - 50			10 - 120	
Flexible		mm^2	1 - 4				2,5 - 16			10 - 35			10 - 95	
Auxiliary contact														
I_{th}	40°C	A	10				-			-			-	
AC15	230V	A	3				-			-			-	
	400V	A	2				-			-			-	
Power consumption of coils	Inrush VA		33 - 45				90 - 115			140 - 165			280	
	hold VA		7 - 10				9 - 13			13 - 18			5	
Operation range of coils			0,85 - 1,1				0,85 - 1,1			0,85 - 1,1			0,85 - 1,1	
Mounting			35mm DIN-rail or base										2x DIN-rail or base	
Additional aux. contact blocks Front mounting contacts		**Type**	**HN10** 1NO f. low level switching		**HN01** 1NC f. low level switching		**HA10** 1NO 25A I_{th}			**HA01** 1NC 25A I_{th}	max. 4 HN.. or 4 HA..		max. 7 HN.. or 7 HA..	
Additional aux. contact blocks Side mounting contacts		**Type**	**HB11-1** 1NO+1NC f. low level switching			max. 2 HB..	**HB11** 1NO+1NC f. low level switching			**HB02** 2NC f. low level switching		max. 2 HB..		
Overload Relay (thermal) Single phase protection Temperature compensation Trip and alarm contacts														
Type			**U3/32**							**U3/74**			**U85**	
			U12/16..K3				**U3/42**							
Number of Setting Ranges			16		16		4			5			2	
from			0,12 - 30A		0,12 - 32A		10 - 42A			20 - 74A			60 - 120A	
Busbar sets			-		-		-			-			-	






150A	**175A**	**210A**	**260A**	**315A**	**450A**	**550A**	**700A**	**860A**	**1000A**	**1200A**
75kW 90kW	**90kW** 110kW	**110kW** 160kW	**132kW** 210kW	**160kW** 250kW	**250kW** 375kW	**300kW** 475kW	**400kW** 630kW	**500kW** 700kW	**580kW** 850kW	**680kW** 1000kW
250A	300A	350A	450A	600A	700A	800A	1000A	1100A	1200A	1350A
151A00	**176A00**	**210A00**	**260A00**	**316A00**	**450A22**	**550A22**	**700A22**	**860A22**	**1000A12**	**1200A12**
-	-	-	-	-	2NO+2NC	2NO+2NC	2NO+2NC	2NO+2NC	1NO+2NC	1NO+2NC
2 x 16-120 2 x 16-120		busbar 30x6	busbar 30x6	busbar 30x6	busbar 30x5	busbar 40x6	busbar 50x8	busbar 50x8	busbar 50x10	busbar 50x10
- - -		- - -			10 3 2				10 3 2	
350 5 0,85 - 1,1	350 5	360 5	360 5 0,85 - 1,1	360 5	800-950 9-11	800-950 9-11	1350-1600 21-25 0,85 - 1,1	1350-1600 21-25	2400 70	2400 70 0,85-1,1
base										

HKT11 1NO+1NC **HKT22** 2NO+2NC
max. 1 pc.

HKF22
2NO+2NC
max. 1 pc.

HKB11
1NO+1NC
max. 2 pcs.

HKA11
1NO+1NC
max. 2 pcs.

- - - - - -

U180

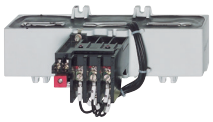
1
120 - 180A

integrated

U320

2
144 - 320A

integrated



U800

3
240 - 800A

SU840/550 | SU840/860

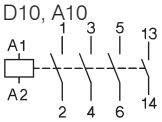
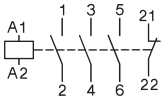
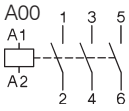
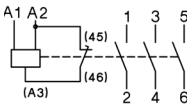
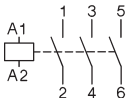
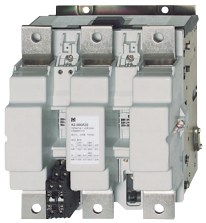
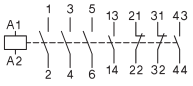
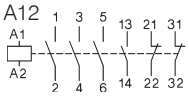
Contactors 3-pole

AC Operated

Ratings AC2, AC3 380V 400V 415V kW	660V 690V kW	Rated Current AC1 690V A	Aux. Contacts Built-in NO	NC	Additional see page 53 Typ	Type	Coil voltage [1] 24 24V 50/60Hz 110 110V 50/60Hz 230 220-240V 50Hz 400 380-415V 50Hz	Pack pcs.	Weight kg/pc.
4	5,5	25	1	-	max. 4	**K3-10ND10 . . .**		1	0,23
4	5,5	25	-	1	HN.. or HA..	**K3-10ND01 . . .**		1	0,23
5,5	7,5	25	1	-	and 2 HB..	**K3-14ND10 . . .**		1	0,23
5,5	7,5	25	-	1		**K3-14ND01 . . .**		1	0,23
7,5	10	32	1	-		**K3-18ND10 . . .**		1	0,23
7,5	10	32	-	1		**K3-18ND01 . . .**		1	0,23
11	10	32	1	-		**K3-22ND10 . . .**		1	0,23
11	10	32	-	1		**K3-22ND01 . . .**		1	0,23
11	15	50	-	-	max. 4	**K3-24A00 . . .**		1	0,48
15	18,5	65	-	-	HN.. or	**K3-32A00 . . .**		1	0,48
18,5	18,5	80	-	-	HA.. and 2 HB..	**K3-40A00 . . .**		1	0,48
22	30	110	-	-	max. 4 (3)[4]	**K3-50A00 . . .**		1	0,85
30	37	120	-	-	HN.. or	**K3-62A00 . . .**		1	0,85
37	45	130	-	-	HA.. and 2 HB..	**K3-74A00 . . .**		1	0,85
45	55	160	-	-	max. 7	**K3-90A00 . . .** [2] / VS [3]		1	2,2
55	55	200	-	-	HN.. or HA.. and 2 HB..	**K3-115A00 . . .** [2] / VS [3]		1	2,2
75	110	250	-	-	1 HKT..	**K3-151A00 . . .** [2]		1	4
90	132	300	-	-	and 2 HKA11	**K3-176A00 . . .** [2]		1	4
110	160	350	-	-		**K3-210A00 . . .** [2]		1	7,2
132	210	450	-	-		**K3-260A00 . . .** [2]		1	7,2
160	250	600	-	-		**K3-316A00 . . .** [2]		1	7,2
250	375	700	2	2	1 HKF22	**K3-450A22 . . .** [2]		1	13
300	475	800	2	2		**K3-550A22 . . .** [2]		1	13,5
400	630	1000	2	2		**K3-700A22 . . .** [2]		1	26,5
500	700	1100	2	2		**K3-860A22 . . .** [2]		1	27,6
580	850	1200	1	2	2 HKB11	**K3-1000A12 . . .**		1	49
680	1000	1350	1	2		**K3-1200A12 . . .**		1	53

1) Coil voltage range and other coil voltages see page 57.
2) Type for AC- and DC-operating: e.g.: 230: 220-240V 50/60Hz and 220V DC (with integrated coil suppressor).
3) Type 230VS for AC-operating 220-240V 50Hz (with integrated coil suppressor).
4) max. 3 HN.. or HA.. for DC-operated Contactors..

DC Operated

Type	Coil voltage [1]	Coil power inrush/ hold W/W	Additional Overload Relay see page 114 Type	Pack pcs.	Weight kg/pc.	Wiring Diagram Coil Circuits see page 59 Terminal Markings
	24 24V DC **48** 48V DC **110** 110V DC **220** 110V DC					
						
KG3-10A10 . . . [5]		3/3	U3/32	1	0,53	D10, A10 
KG3-10A01 . . . [5]		3/3	U12/16E U12/16EQ	1	0,53	
KG3-14A10 . . . [5]		3/3	UAT21	1	0,53	
KG3-14A01 . . . [5]		3/3		1	0,53	
KG3-18A10 . . . [5]		3/3		1	0,53	D01, A01 
KG3-18A01 . . . [5]		3/3		1	0,53	
KG3-22A10 . . . [5]		3/3		1	0,53	
KG3-22A01 . . . [5]		3/3		1	0,53	
						
KG3-24A00 . . . [5]		4/4	U3/32	1	0,57	A00 
KG3-32A00 . . . [5]		4/4	U3/42	1	0,57	
KG3-40A00 . . . [5]		4/4	UAT..	1	0,57	
						A00= 
K3-50A00= . . .		200/6	U3/74	1	0,9	
K3-62A00= . . .		200/6		1	0,9	
K3-74A00= . . .		200/6		1	0,9	
						
K3-90A00 . . . [2]		280/5	U85	1	2,2	A00 
K3-115A00 . . . [2]		280/5		1	2,3	
						
K3-151A00 . . . [2]		350/5	U180	1	4	
K3-176A00 . . . [2]		350/5		1	4	
K3-210A00 . . . [2]		360/5	U320	1	7,2	
K3-260A00 . . . [2]		360/5		1	7,2	
K3-316A00 . . . [2]		360/5		1	7,2	
						
K3-450A22 . . . [2]		800/10	U800	1	13	A22 
K3-550A22 . . . [2]		800/10	+SU840/550	1	13,5	
K3-700A22 . . . [2]		1500/20	U800	1	26,5	
K3-860A22 . . . [2]		1500/20	+SU840/860	1	27,6	
K3-1000A12= . . .		2100/60		1	49	A12 
K3-1200A12= . . .		2100/60		1	53	

1) Other coil voltages on request.
2) Type for AC- and DC-operating: e.g.: 24: 24V 50/60Hz and 24V DC (with integrated coil suppressor).
5) With integrated coil suppressor.

Contactors 3-pole

DC operated with dual-wound coil

Ratings AC2 AC3 **380V** **400V** **415V** **kW**		Rated Current AC1 690V A	Aux. Contacts Built-in NO	NC	Additional see page 53 Type	**Type**	Coil voltage [1] **24** 24V= DC **48** 48V= DC **110** 110V= DC **220** 220V= DC	Pack pcs.	Weight kg/pc.	Wiring Diagram
4	5,5	25	1	-	max. 3	**K3-10ND10= ...**		1	0,25	D10=
4	5,5	25	-	1	HN.. or HA..	**K3-10ND01= ...**		1	0,25	
5,5	7,5	25	1	-	and 2 HB..	**K3-14ND10= ...**		1	0,25	
5,5	7,5	25	-	1		**K3-14ND01= ...**		1	0,25	
7,5	10	32	1	-		**K3-18ND10= ...**		1	0,25	D01=
7,5	10	32	-	1		**K3-18ND01= ...**		1	0,25	
11	10	32	1	-		**K3-22ND10= ...**		1	0,25	
11	10	32	-	1		**K3-22ND01= ...**		1	0,25	
11	15	50	-	-	max. 3	**K3-24A00= ...**		1	0,55	A00=
15	18,5	65	-	-	HN.. or HA.. and 2 HB..	**K3-32A00= ...**		1	0,55	
18,5	18,5	80	-	-		**K3-40A00= ...**		1	0,55	

1) Other coil voltages on request.

Capacitor Switching Contactors

for use with reactive or non-reactive capacitor banks

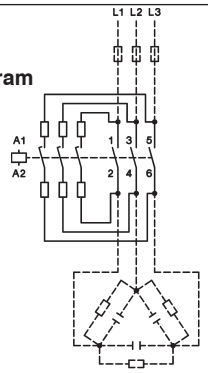
Rated Operational Power at 50/60Hz Ambient Temperature 50°C			60°C			Aux. Contacts Built-in Add.			**Type**		
380V	415V	660V	380V	415V	660V					Coil voltage [1]	
400V	440V	690V	400V	440V	690V				**230**	220-240V 50Hz	
kVAr	kVAr	kVAr	kVAr	kVAr	kVAr	NO	NC	pcs.	↓	Pack pcs.	Weight kg/pc.
0-**12,5**	0-13	0-20	0-12,5	0-13	0-20	1	-	1 [2]	**K3-18NK10 . . .**	1	0,34
0-**12,5**	0-13	0-20	0-12,5	0-13	0-20	-	1	1 [2]	**K3-18NK01 . . .**	1	0,34
0-**12,5**	0-13	0-20	0-12,5	0-13	0-20	1	-	1 [2]	**K3-18NBK10 . . .**	1	0,40
10-**20**	10,5-22	17-33	10-20	10,5-22	17-33	-	-	3 [3]	**K3-24K00 . . .**	1	0,62
10-**25**	10,5-27	17-41	10-25	10,5-27	17-41	-	-	3 [3]	**K3-32K00 . . .**	1	0,62
20-**33,3**	23-36	36-55	20-33,3	23-36	36-55	-	-	3 [3]	**K3-50K00 . . .**	1	1,0
20-**50**	23-53	36-82	20-50	23-53	36-82	-	-	3 [3]	**K3-62K00 . . .**	1	1,0
20-**75**[4]	23-75[4]	36-120[4]	20-60	23-64	36-100	-	-	3 [3]	**K3-74K00 . . .**	1	1,0
33-**80**	36-82	57-120	33-75	36-77	57-120	-	-	6 [5]	**K3-90K00 . . .** / VS [7]	1	2,3
33-**100**[6]	36-103[6]	57-148[6]	33-90[6]	36-93[6]	57-148[6]	-	-	6 [5]	**K3-115K00 . . .** / VS [7]	1	2,3

Specification: Contactors K3-..K are suitable for switching low-inductive and low loss capacitors in capacitor banks (IEC70 and 831, VDE 0560) without and with reactors.
Capacitor switching contactors are fitted with early make contacts and damping resistors, to reduce the value of make current $<70 \times I_e$.
Operating Conditions: Capacitor switching contactors are protected against contact welding for a prospective making current of $200 \times I_e$.

Technical Data acc. to IEC 947-4-1, IEC 947-5-1, EN 60947-4-1, EN 60947-5-1, VDE 0660

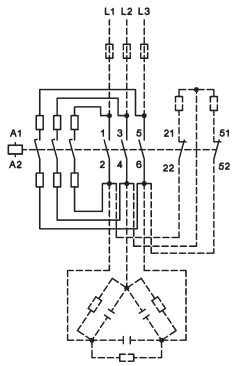
Type			**K3-18NK**	**K3-18NBK** [8]	**K3-24K**	**K3-32K**	**K3-50K**	**K3-62K**	**K3-74K**	**K3-90K**	**K3-115K**
Max. frequency of operations z		1/h	120	120	120	120	120	120	80	80	80
Contact life non reactive cap. banks		S x 10^3	250	250	150	150	150	150	120	120	120
reactive cap. banks		S x 10^3	400	400	300	300	300	300	200	200	200
Rated operational current I_e	at 50°C	A	**0-18**	**0-18**	**14-28**	**14-36**	**30-48**	**30-72**	**30-108**	**50-115**	**50-144**
AC6b	at 60°C	A	**0-18**	**0-18**	**14-28**	**14-36**	**30-48**	**30-72**	**30-87**	**50-108**	**50-130**
Rated operational current I_{th}	at 50°C	A	32	45	45	60	100	110	120	155	190
AC1	at 60°C	A	32	40	40	55	90	100	110	145	170
Overload factor	at 50°C	%	78	150	60	67	108	53	11	35	32
acc. to EN 61921: 30% min.	at 60°C	%	78	122	43	53	88	39	26	34	31
Fuses gL (gG)	from / to	A	35 / 63	35 / 63	50 / 80	63 / 100	80 / 160	125 / 160	160/200	160/200	160/250

Typical Circuit Diagram



Wiring Diagram for Quick Discharge Resistors
Make sure that the current of the discharge resistors is not higher than the rated current (AC1) of the auxiliary contacts.

Mounting instructions:
In the area of capacitor switching contacts, difficulty inflammable and self-extinguishing materials shall be used only, because abnormal temperatures within the area of the resistor spirals cannot be excluded.



1) Coil voltage range and non-standard coil voltages see page 57.
2) 1 HN.. or HA.. snap-on.
3) 2HB.. for side mounting and 1 HN.. or HA.. snap-on.
4) Consider the max. thermal current of the contactor K3-74A: I_{th} 130A.
5) 2 HB.. on the left or right side and 4 HN.. or HA.. snap-on.
6) Consider the min. cross-section of conductor at max. load.
7) Type 230 for AC- and DC-operating 220-240V 50/60Hz and 220V DC (with integrated coil suppressor).
Type 230VS for AC-operating 220-240V 50Hz (with integrated coil suppressor).
8) Cable cross sections: 2,5 - 16mm².

Rated Current AC1 A	Ratings AC1 400V kW NO	NC	AC2 AC3 380V 400V 415V kW NO	NC	Aux. Contacts Additional see page 53	Type	Coil voltage [2] 24 24V 50/60Hz 110 110V 50/60Hz 230 220-240V 50Hz 400 380-415V 50Hz = 24 24V= DC [3]	Pack pcs.	Weight kg/pc.	Wiring Diagram
25	-	17,5	-	4	max. 4 [3]	**K3-10NA00-40 . . .** [3]		1	0,23	A00-40
25	**25**	17,5 [6]	17,5 [6]	4 [6]	HN.. or	**K3-10NA00-22 . . .** [3]		1	0,23	
-	**25**	-	17,5	4	HA..	**K3-10NA00-04 . . .** [3]		1	0,23	
					and 2 HB..					
25	-	17,5	-	5,5		**K3-14NA00-40 . . .** [3]		1	0,23	
25	**25**	17,5 [6]	17,5 [6]	5,5 [6]		**K3-14NA00-22 . . .** [3]		1	0,23	
-	**25**	-	17,5	5,5		**K3-14NA00-04 . . .** [3]		1	0,23	
32	-	22	-	7,5		**K3-18NA00-40 . . .** [3]		1	0,23	A00-22
32	**32**	22 [6]	22 [6]	7,5 [6]		**K3-18NA00-22 . . .** [3]		1	0,23	
-	**32**	-	22	7,5		**K3-18NA00-04 . . .** [3]		1	0,23	
32	-	22	-	11		**K3-22NA00-40 . . .** [3]		1	0,23	
50	-	34,5	-	11	max. 4 [3]	**K3-24A00-40 . . .** [3]		1	0,65	A00-04
50		34,5	27,5	11	HN..	**K3-24A00-22 . . .** [3]		1	0,65	
-	**40**	-	27,5	11	or HA..	**K3-24A00-04 . . .** [3]		1	0,65	
					and 2 HB..					
65	-	45	-	15		**K3-32A00-40 . . .** [3]		1	0,65	
65	**50**	45	34,5	15		**K3-32A00-22 . . .** [3]		1	0,65	
-	**50**	-	34,5	15		**K3-32A00-04 . . .** [3]		1	0,65	
80	-	55,4	-	18,5		**K3-40A00-40 . . .** [3]		1	0,65	
80	**65**	55,4	45	18,5		**K3-40A00-22 . . .** [3]		1	0,65	
-	**65**	-	45	18,5		**K3-40A00-04 . . .** [3]		1	0,65	
110	-	62	-	22	max. 6 [5]	**K3-50A00-40 . . .** [5]		1	1,1	
120	-	69	-	30	HN.. or	**K3-62A00-40 . . .** [5]		1	1,1	
130	-	78	-	37	HA..	**K3-74A00-40 . . .** [5]		1	1,1	
					and 2 HB..					
135	-	94	-	45	1 HKT..	**K3-96A00-40 . . .** [4]		1	2,42	
125	**125**	85 [6]	85 [6]	30	+	**K3-96A00-22 . . .** [4]		1	2,42	
125	-	-	85	30	2 HKA11	**K3-96A00-04 . . .** [4]		1	2,42	
200	-	139	-	55		**K3-116A00-40 . . .** [4]		1	4,7	
250	-	173	-	75		**K3-151A00-40 . . .** [4]		1	4,7	
300	-	208	-	90		**K3-176A00-40 . . .** [4]		1	4,7	
350	-	242	-	110		**K3-210A00-40 . . .** [4]		1	8	
450	-	310	-	132		**K3-260A00-40 . . .** [4]		1	8	
600	-	415	-	160		**K3-316A00-40 . . .** [4]		1	8	

Terminal Blocks for contactors K(G)3-07.. to K3-115.. and K2-..

Specification	Thermal Current I_{th} A	**Type**	Pack pcs.	Weight kg/pc.
2 terminals interconnected	26	**K2-DK**	10	0,02
2 terminals insulated	26	**K2-SK**	10	0,02

1) Other coil voltages on request.
2) Coil voltage range and non-standard coil voltages see page 57.
3) DC operated with dual-wound coil, max. 3 additional aux. contacts.
4) With integrated coil suppressor (AC/DC coil).
5) DC operated with dual-wound coil, max. 5 additional aux. contacts.
6) Ratings for 3 poles in use.

Auxiliary Contact Blocks for contactors K(G)3-07.. to K3-115.., type HN.. for low level switching [1]

Rated Operational Current AC15 230V A	AC15 400V A	AC1 690V A	Contacts NO	NC	EM	LB	Type	Pack pcs.	Weight kg/pc.
3	2	10	1	-	-	-	**HN10**	10	0,02
3	2	10	-	1	-	-	**HN01**	10	0,02
3	2	10	-	-	1	-	**HN10U**	10	0,02
3	2	10	-	-	-	1	**HN01U**	10	0,02
6	3	25	1	-	-	-	**HA10**	10	0,03
6	3	25	-	1	-	-	**HA01**	10	0,03

Auxiliary Contact Blocks for contactors K3-.., for low level switching [1] [3]

Rated Operational Current AC15 230V A	AC15 400V A	AC1 690V A	mounting: 1 HB.. on left side and 1 HB.. on right side	Contacts NO	NC	Type	Pack pcs.	Weight kg/pc.
3	2	10	for K3-10 to K3-22	1	1	**HB11-1**	10	0,02
3	2	10	for K3-24 to K3-115	1	1	**HB11**	10	0,02
3	2	10	for K3-24 to K3-115	-	2	**HB02**	10	0,02

Auxiliary Contact Blocks for contactors K3-41.., K3-96.., K3-116.. to K3-1200.., for low level switching [1]

Rated Operational Current AC15 230V A	AC15 400V A	AC1 690V A	For contactors	Contacts NO	NC	Type	Pack pcs.	Weight kg/pc.
3	2	10	K3-116 to K3-316 top	1	1	**HKT11**	1	0,04
3	2	10	K3-116 to K3-316 top	2	2	**HKT22**	1	0,05
3	2	10	K3-116 to K3-316 outside	1	1	**HKA11**	1	0,05
6	3	16	K3-450 to K3-860 [2]	2 [2]	2	**HKF22**	1	0,12
6	3	16	K3-1000, K3-1200 inside	1	1	**HKB11**	1	0,17

Snap-on Momentary Contacts for K(G)3-07.. to K3-115.. for low level switching[1]

Rated Operational Current AC15 230V A	AC15 400V A	AC1 690V A	Specification	Contacts NO	NC	Type	Pack pcs.	Weight kg/pc.
3	2	10	manual operated	1	-	**HTN10**	10	0,02
3	2	10	manual operated	-	1	**HTN01**	10	0,02

Electronic Timer

for mounting on DIN-rail, Control voltage 24-240V AC/DC, 1 changeover contact
OFF-delay without auxiliary voltage
Replace Pneumatic Timer K2-TP.. and K2-TA

5 Functions in one device	4 Time ranges in one device s	Rated Current AC1 250V A	Type	Pack pcs.	Weight kg/pc.
ON-delay, OFF-delay, Single shot trailing edge, Single shot leding edge, Single shot leading and trailing edge	0,1 - 1, 1 - 10, 6 - 60 a. 18 - 180	5	**K3-T180 240**	1	0,085

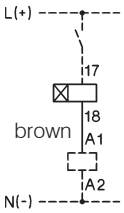
1) Contacts suitable for electronic circuits, according to IEC60947-5-4 for rated voltage 24V DC. (test ratings 17V DC, 5mA) Mirror contacts acc. IEC60947-4-1 Annex F.
Technical data see page 80.
2) Contact travel of make contacts adjustable, see page 81.
3) Except K3-96A00..

Electronic Timer On-delay for contactors K(G)3-07.. to K3-115.. and K2-..

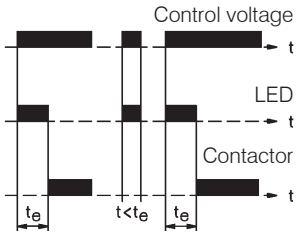
Timer will be connected with the contactor coil, can be snapped onto the contactor and occupies 2 add-on spaces. Contactor switches On-delay.

Operational Voltage V	Time Range s	Rated Current AC15 A	**Type**	Pack pcs.	Weight kg/pc.
24 - 60V AC/DC	1 - 30	0,75	**K2-TE30 60**	1	0,08
100 - 250V AC/DC	1 - 30	0,75	**K2-TE30 250**	1	0,08
24 - 60V AC/DC	10 - 180	0,75	**K2-TE180 60**	1	0,08
100 - 250V AC/DC	10 - 180	0,75	**K2-TE180 250**	1	0,08
24 - 60V AC/DC	30 - 600	0,75	**K2-TE600 60**	1	0,08
100 - 250V AC/DC	30 - 600	0,75	**K2-TE600 250**	1	0,08

Wiring Diagram



Timing Chart



Operation Range	0,8 - 1,1 x U_s
Time repeat accuracy	≤1%
Recovery time (typical)	50ms
Voltage Drop after the time delay t_e (Control voltage 24V: use contactor with 20V-coil)	<3V
Max. inrush current (peak value)	25A <10ms
Duty Cycle	100%
Ambient temperature	-40° - +60°C
Short circuit protection	2A

Latch for contactors K(G)3-07.. to K3-74.. and K2-..

with NC aux. contact
duty cycle 10%, max. 30 sec. AC / max. 20 sec. DC
power consumption max. 35VA

Type

	Coil voltage
24	22-26V 50/60Hz
110	100-120V 50/60Hz
230	210 -250V 50/60Hz
400	360-440V 50/60Hz

For Contactors		Pack pcs.	Weight kg/pc.
K3-07 to K3-22, K2-07 to K2-16	**K2-L22 . . .**	1	0,08
K3-24 to K3-40, K2-23 to K2-37, KG3-10 to KG3-40	**K2-L40 . . .**	1	0,08
K3-50 to K3-74, K2-45 to K2-60	**K2-L74 . . .**	1	0,08

Technical data see page 74
Latch / Magnetic latch for Contactors K3-151 to K3-1200 on request

Indicator Units for contactors K(G)3-07.. to K3-115.. and K2-..

Specifications	Voltage Range	**Type**	Pack pcs.	Weight kg/pc.
Coil Current Indicator, green (LED)	24 - 660V AC/DC	**K2-ING**	10	0,02
Coil Current Indicator, red (LED)	24 - 660V AC/DC	**K2-INR**	10	0,02
To connect in series with the contactor coil. In case of coil interruption the indication goes out. Voltage drop appr. 2 volts				
Voltage Indicator, clear (glow-disc. l.)	220 - 415V AC/DC	**K2-UN**	10	0,02
Voltage Indicator, red (LED)	24 - 120V AC/DC	**K2-UNR**	10	0,02
To connect parallel to the contactor coil. In case of applied voltage the indication also lights at coil interruption.				

Snap-On Adapter

For Type	Specification	**Type**	Pack pcs.	Weight kg/pc.
K2-DK, K2-SK, K2-TE, K2-TA K2-F, K2-RF K2-IN., K2-UN.	for snap-on mounting of accessories on 35mm DIN-rail acc. DIN EN 50022	**K2-SM**	10	0,009

Additional 4th Poles for contactors K3-450.. to K3-1200

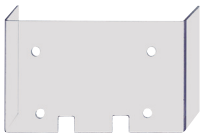
For Ccontactors	Thermal Current I_{th} A	Type	Pack pcs.	Weight kg/pc.
K3-450, K3-550	**800**	**NP800**	1	1,4
K3-700, K3-860	**1000**	**NP1000**	1	1,6
K3-1000, K3-1200	**1000**	**NP1001**	1	1,6

Mechanical Interlocks

Interlocks contactor with contactor Type	Type	Mounting	Type	Pack pcs.	Weight kg/pc.
K3-07 to K3-40 KG3-07 to KG3-22 KG3-24 to KG3-40 K2-07 to K2-37	K3-07 to K3-40 KG3-07 to KG3-22 KG3-24 to KG3-40 K2-07 to K2-37	horizontal	**LG10889** [1]	10	0,006
K3-24 to K3-74 K2-23 to K2-60	K3-50 to K3-74 K2-45 to K2-60	horizontal	**LG10890** [1]	1	0,010
K3-90, K3-115	K3-90, K3-115	horizontal	**LG11478** [1]	1	0,010
K65 to K110	K65 to K110	horizontal	**LG8511**	1	0,076
K3-116 to K3-316	K3-116 to K3-316	horizontal	**LG11223H**	1	0,06
K3-315 to K3-550	K3-315 to K3-550	horizontal	**LG10400H**	1	0,8
K3-315 to K3-550	K3-315 to K3-550	vertical	**LG10400V**	1	0,8
K3-450, K3-550	K3-700, K3-860	horizontal	**LG10399H**	1	1,6
K3-450, K3-550	K3-700, K3-860	vertical	**LG10399V**	1	0,9
K3-700, K3-860	K3-700, K3-860	horizontal	**LG10402H**	1	1,5
K3-700, K3-860	K3-700, K3-860	vertical	**LG10402V**	1	0,9
K3-700, K3-860	K3-1000, K3-1200	horizontal	**LG10401H**	1	1,9
K3-700, K3-860	K3-1000, K3-1200	vertical	**LG10401V**	1	1,6
K3-1000, K3-1200	K3-1000, K3-1200	horizontal	**LG10403H**	1	1,8
K3-1000, K3-1200	K3-1000, K3-1200	vertical	**LG10403V**	1	1,5

1) clamps for mounting incl.

Terminal Covers for terminal protection according to DIN 57106, VBG 4



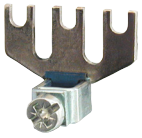
For Contactors	Specification	Type	Pack pcs.	Weight kg/pc.
K65 to K110 (spare part)	for 6 terminals	**LG9333**	1	0,045
K3-151, K3-176 3-pole	for 3 terminals	**LG10404**	1	0,12
K3-116 to K3-176 4-pole	for 4 terminals	**LG104044**	1	0,14
K3-210, K3-260, K3-316	for 3 terminals	**LG11457**	1	0,14
K3-200	for 3 terminals	**LG10405**	1	0,18
K3-315, K3-450	for 3 terminals	**LG10406**	1	0,28
K3-550	for 3 terminals	**LG10407**	1	0,34
K3-700	for 3 terminals	**LG10408**	1	0,39
K3-860	for 3 terminals	**LG10409**	1	0,49

Additional Terminals

For Contactors	Cable Cross-sections to clamp mm² solid or stranded	flexible	flex. with multi-core cable end	Type	Pack pcs.	Weight kg/pc.
Additional Terminal Single Pole, with fingertouch protection						
K(G)3-10 to K(G)3-22 K2-09 to K2-16	0,75 - 10	0,75 - 6	0,75 - 6	**LG9339N**	6	0,009
K3-151 to K3-176		16 - 120 + 16 - 95		**LG11224**	1	0,10

1) Inclusively mounting clamps

Parallel Connectors



For Contactors	Cable Cross-sections to clamp mm² solid or stranded	flexible	flex. with multi-core cable end	Type	Pack pcs.	Weight kg/pc.
Parallel Connectors, 3 Poles Parallel						
Current-carrying capacity: 2,5 x AC1-value of the contactor						
K(G)3-10 to K(G)3-22	terminal hole for screw M5			**LG9241**	50	0,004
K2-09 to K2-16						
K2-23 to K2-37	4 - 35	6 - 25	4 - 25	**LG5587**	10	0,022
Parallel Connectors, 4 Poles Parallel						
Current-carrying capacity: 3,2 x AC1-value of the contactor						
K(G)3-10 to K(G)3-22	terminal hole for screw M5			**LG7360**	10	0,006
K2-09 to K2-16						

Suppressor Units

Voltage Range V	Mounting		Type	Pack pcs.	Weight kg/pc.
RC-units for contactors K3-07 - K3-74					
12 - 48V AC/DC	to snap	1600nF / 22 Ohm	**RC-K3N 24**	10	0,01
48 - 127V AC/DC	on the	680nF / 270 Ohm	**RC-K3N 110**	10	0,01
110 - 230V AC/DC	contactor	220nF / 2200 Ohm	**RC-K3N 230**	10	0,01
230 - 415V AC/DC		120nF / 620 Ohm	**RC-K3N 400**	10	0,01
RC-units for contactors K3-07 - K3-74 and reversing contactors K3NWU10 - K3WU74					
12 - 48V AC/DC	to snap	1600nF / 22 Ohm	**RC-K3NW 24**	10	0,01
48 - 127V AC/DC	on the	680nF / 270 Ohm	**RC-K3NW 110**	10	0,01
110 - 230V AC/DC	contactor	220nF / 2200 Ohm	**RC-K3NW 230**	10	0,01
230 - 415V AC/DC		120nF / 620 Ohm	**RC-K3NW 400**	10	0,01

Mounting Parts

Description	For Type	Specification	Type	Pack pcs.	Weight kg/pc.
 **Clamp, no distance**	K3-07 to K3-115 K2-07 to K2-37	To join contactors without distance, 2 pieces required	**P426-1**	50	0,001
 **Clamp, 7mm distance**	K3-07 to K3-115 K2-07 to K2-37	To join contactors with 7mm distance, 2 pieces required	**P418-1**	10	0,002
Clamp, 12mm distance	K3-07 to K3-115 K2-07 to K2-37	To join contactors with 12mm distance, 2 pieces required	**P807-1**	10	0,002
Clamp asymmetric	K3-07 to K3-40 with K3-50 to K3-74	To join contactors with 12mm distance, 2 pieces required	**P785-1**	10	0,002
 **Retention clamp**	K3-10 to K3-74	To close contactors	**P725**		

Marking System for contactors K3-07.. to K3-115.., K2-.. and aux. contact blocks HN and HA

Description	Specification	Type	Pack pcs.	Weight kg/100pc
Marking Plate	2-section without marking, divisible	**P487-1**	100	0,025
Marking Plate	3-section without marking, divisible	**P971-1**	100	0,038
Marking Plate	4-section without marking, divisible	**P245-1**	100	0,050
Marking Plate	marked, choice of K1...K32	**P245-K..**	100	0,013

Coil voltages for AC operated contactors

Type-suffix for coil-types K6/.. to K45/...
for contactor-types K3-07.. to K3-74

Suffix to contactor type	to coil type	Voltage Marking at the coil for 50Hz V	for 60Hz V	Rated Control Voltage U_s range for 50Hz min. V	max. V	for 60Hz min. V	max. V
6	41.6	6		6	6,6	6,6	7,3
6,6	41.6,6	6,6		6,6	7,3	7,3	8
7,3	41.7,3	7,3		7,3	8	8	9
8	41.8	8		8	9	9	10
9	41.9	9		9	10	10	11
10	41.10	10		10	11	11	12
11	41.11	11	12	11	12	12	13,2
12	41.12	12		12	13,2	13,2	14,5
13,2	41.13	13,2		13,2	14,5	14,5	16
14,5	41.14	14,5		14,5	16	16	18
16	41.16	16		16	18	18	20
18	41.18	18		18	20	20	22
20	41.20	20		20	22	22	24
24	**4.24**	**24**	**24**	**22**	**24**	**24**	**27**
25	41.25	25		24	27	27	30
27	41.27	27	32	27	30	30	33
32	41.32	32	36	30	33	33	36
33	41.33	36	36	33	36	36	39
36	41.36	36	42	36	39	39	42
40	41.40	42	42	39	42	42	47
42	**4.42**	**42**	**48**	**42**	**47**	**47**	**52**
48	41.48	48	48	44	48	48	52
55	41.55	55	60	52	58	58	65
60	41.60	60		58	65	65	72
65	41.65	65		65	72	72	80
75	41.75	75		72	80	80	90
85	41.85	85		80	90	90	100
90	41.90	100	100	90	100	100	110
110	**4.110**	**110**	**110-120**	**100**	**110**	**110**	**122**
115	41.115	115	125	110	122	122	135
127	41.127	127		122	135	135	150
140	41.140	140		135	150	150	165
150	41.150	150		150	165	165	180
165	41.165	165	180-208	165	180	180	208
180	41.180	180-210[1]	200-240[1]	180	210[1]	200	240[1]
190R[2]	41.190	200-240	200-240	200	240	200	240
200	41.200	**200**-230[1]	220-240	200	230[1]	220	240
230	**4.230**	**220-240**	**230-264**	**220**	**240**	**230**	**264**
254	41.254	254	277	240	264	264	290
270	41.270	270		264	290	290	315
300	41.300	300		290	315	315	345
320	41.320	320		315	345	345	380
345	41.345	345-400[1]	380-440[1]	345	400[1]	380	440[1]
390R[2]	41.390	400-480	400-480	400	480	400	480
400	**4.400**	**380-415**	**400-440**	**380**	**415**	**400**	**460**
415	41.415	415-440	440-480	400	440	440	480
440	41.440	440-480	480-500	440	480	480	530
480	41.480	480-500	530-580	480	530	530	580
500	41.500	500-550	550-600	500	550	550	600
550	41.550	550-600	600	550	600	600	(650)

Type-suffix for coil-types K85/... and K110/...
for contactor-types K85 to K110

Suffix to contactor type	to coil type	Voltage Marking at the coil for 50Hz V	for 60Hz V	Rated Control Voltage U_s range for 50Hz min. V	max. V	for 60Hz min. V	max. V
20	4.20	20	24	20	22	24	26
24	4.24	24		24	27	29	32
42	4.42	42		42	47	50	56
110	4.110	110-120		110	122	132	146
230	**4.230**	**220-240**	**277**	**220**	**240**	**264**	**288**
400	4.400	380-415	460-480	380	415	455	498

Type-suffix for coil-types K3-1200/..
for contactor-types K3-1000.. to K3-1200..

110	4.110	110-115	-	110	115	110	115
230	**4.230**	**220-230**	**-**	**220**	**230**	**220**	**230**
400	**4.400**	**380-400**	**-**	**380**	**400**	**380**	**400**
440	4.440	440	-	440	440	440	440

Coil voltages for AC and DC operated contactors

Type-suffix for coil-types K3-115/.. to K3-860/..
for contactor-types K3-90.. to K3-860..

Suffix to contactor type	to coil type	Voltage Marking at the coil for 50/60Hz V	for DC V	Rated Control Voltage U_s range for 50Hz min. V	max. V	for 60Hz min. V	max. V
24	4.24	24	24	22	24	22	24
48	4.48	48	48	44	48	44	48
110	4.110	110-120	110	110	120	110	120
230	**4.230**	**220-240**	**220**	**220**	**240**	**220**	**240**
400	**4.400**	**380-415**	**-**	**380**	**415**	**380**	**415**

Coil voltages for AC operated contactors

Type-suffix for coil-types K3-115/..AC
for contactor-types K3-90..AC to K3-115..AC

Suffix to contactor type	to coil type	Voltage Marking at the coil for 50Hz V	for 60Hz V	Rated Control Voltage U_s range for 50Hz min. V	max. V	for 60Hz min. V	max. V
110AC	**4.110AC**	110-122	132-146	110	122	132	146
230AC	**4.230AC**	**220-240**	**277**	**220**	**240**	**264**	**288**

Other coil voltages on request

Operating range of magnet-coils: 0,85 x U_s (min. value of rated control voltage) up to 1,1 x U_s (max. value of rated control voltage)

With reduced control voltage range 0,9 up to 1,0 x U_s at ambient temperature 60 - 90°C.

Standard voltages in bold type letters.

1) Operating range of magnet-coils: 0,85 x U_s (min. value of rated control voltage) up to 1,05 x U_s (max. value of rated control voltage).
2) Reduction of mechanical life to 10% of normal life. It is not admissible as a spare coil in a contactor for different coil voltages.

Spare Coils for AC operated contactors

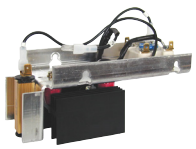
For Contactors		Type	Coil voltage [1]	Pack pcs.	Weight kg/pc.
		4.24	24V 50Hz		
		4.42	42V 50Hz		
		4.110	110V 50Hz		
		41.180	180V 50Hz, 220V 60Hz		
		4.230	220-240V 50Hz		
		4.400	380-415V 50Hz		
K3-07N.. up to K3-22N..		**K10N/ . . .EUR**		1	0,053
K3-07.. up to K3-22..		**K3-6/ . . .**		10	0,040
K2-07.. up to K2-16..		**K6/ . . .**		10	0,040
K3-24.. up to K3-40..		**K24/ . . .**		1	0,085
K2-23.. up to K2-37..		**K23/ . . .**		1	0,085
K3-50.. up to K3-74..	**3 pole contactor**	**K45/ . . .**		1	0,110
K3-50.. up to K3-74..	**4 pole contactor**	**K50/ . . .**		1	0,110
K85.., K110..		**K110/ . . .**		1	0,220
K3-90.., K3-115.. (AC/DC coil)		**K115/ . . .**		1	0,230

For Contactors		Type	Coil voltage [1]	pcs.	kg/pc.
		4.110	110V 50Hz, 110-115V 60Hz		
		4.230	220-230V 50Hz		
		4.400	380-400V 50Hz		
K3-150.., K3-175..		**K3-175/ . . .**		1	0,38
K3-1000.., K3-1200..	without feeder group [2]	**K3-1200/ . . .**		1	3,12

Spare Coils for AC and DC operated contactors

For Contactors		Type	Coil voltage [1]	pcs.	kg/pc.
		4.24	24V 50/60Hz / 24V DC		
		4.110	110-120V 50/60Hz / 110V DC		
		4.230	220-240V 50/60Hz / 220V DC		
		4.400	380-415V 50/60Hz		
K3-90.., K3-115..	with feeder group	**K3-115/ . . .**		1	0,30
K3-151.., K3-176..	with feeder group	**K3-176/ . . .**		1	0,68
K3-210.., K3-316..	with feeder group	**K3-316/ . . .**		1	0,68
K3-450.., K3-550..	without feeder group [2]	**K3-550/ . . .**		1	1,63
K3-700.., K3-860..	without feeder group [2]	**K3-860/ . . .**		1	2,44

Spare Feeder Groups for contactors K3-450.. to K3-860..



In case of changing control voltage, change coil and feeder group too

For Contactors	for coils	Type	Coil voltage [1]	Pack pcs.	Weight kg/pc.
		110	110-120V 50/60Hz / 110V DC		
		230	220-240V 50/60Hz / 220V DC		
		400	380-415V 50/60Hz		
K3-450.., K3-550..	K3-550/4...	**K3-550/FG . . .**		1	0,33
K3-700.., K3-860..	K3-860/4..	**K3-860/FG . . .**		1	0,54

1) Coil voltage range and non-standard coil voltages see page 57.
2) In case of changing control voltage, change coil and feeder group too.

Spare Coils for DC operated contactors

For Contactors	Aux. Contact Block for dual-wound coil	Type (47.24 24V DC; 47.48 48V DC; 47.110 110V DC; 47.220 220V DC)	Pack pcs.	Weight kg/pc.
K3-07N..= up to K3-22N..=	HN01U	**K10N/ . . .**	1	0,052
K3-07..= up to K3-22..=	HN01U	**K3-6/ . . .**	1	0,042
K2-07..= up to K2-16..=	HN01U	**K6/ . . .**	1	0,042
K3-24..= up to K3-40..=	HN01U	**K24/ . . .**	1	0,090
K2-23..= up to K2-37..=	HN01U	**K23/ . . .**	1	0,090
K3-50..= up to K3-74..= **3 pole contactor**	HN01Z	**K45/ . . .**	1	0,115
K3-50..= up to K3-74..= **4 pole contactor**	HN01Z	**K50/ . . .**	1	0,115
K85..=, K110..=	-	**K110/ . . .**	1	0,225
K3-90.., K3-115.. (AC/DC coil)	-	see page 58	1	0,230

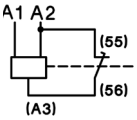
For Contactors	Type (43.110 110V DC; 43.220 220V DC)	Pack pcs.	Weight kg/pc.
K3-1000..=, K3-1200..= without feeder group [2]	**K3-1200/ . . .**	1	3,12

Wiring Diagrams for Coil Circuit

AC operated,

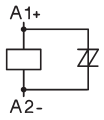
K3-07..
up to **K110..**

DC operated
with dual-wound coil
K3-07..=
up to **K3-22..=**

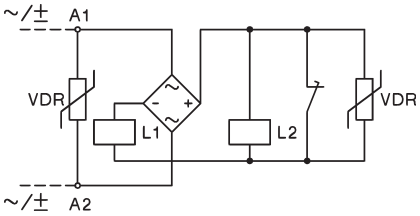


DC operated

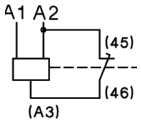
KG3..



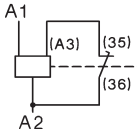
AC and DC operated
with dual-wound coil
K3-90A00, K3-115A00
K3-151A00, K3-176A00
K3-210A00 to K3-316A00



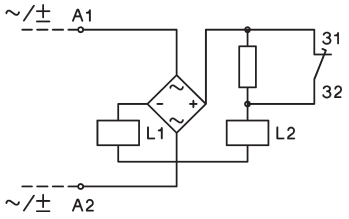
K3-24..=
to
K3-74..=



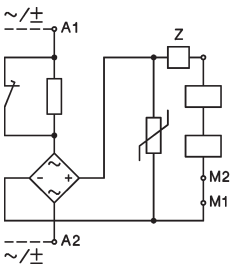
K85..=
K110..=



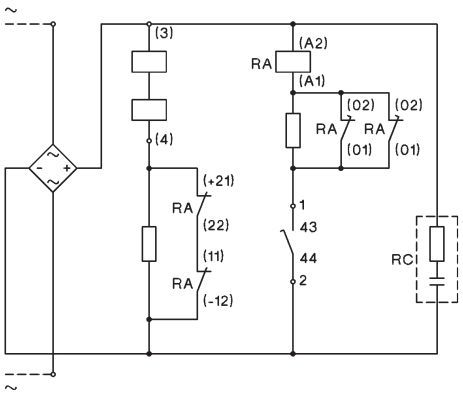
AC and DC operated
with series resistor
K3-200A21
K3-315A21



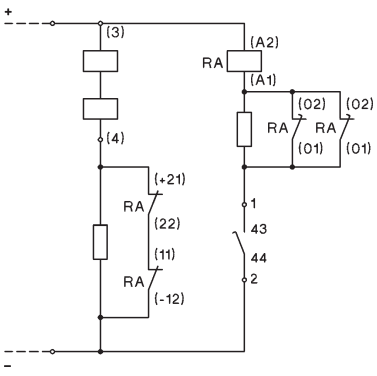
AC and DC operated
with series resistor
K3-450.. up to **K3-860..**



DC operated
with DC coil
K3-1000.., K3-1200..



AC operated
with DC coil
K3-1000.., K3-1200..



Adjustable dropout operating time for K3-450.. to K3-860..:
150-200ms: Wiring see above (delivery standard)
500-1000ms: Jumper device "Z"
approx. 20ms: Special wiring see package folder

Contactor K3-1000.., K3-1200..:
For control voltages up to 125V
NC contacts 21-22 and 11-12 are connected parallel,
for higher voltages contacts are connected in series (delivery standard).

1) Other coil voltages on request.
2) In case of changing control voltage, change coil and feeder group too.

Spare Contacts

Main Contacts for Contactors	**Type**	Pack pcs.	Weight kg/pc.
K85..	**EK85/1**	3	0,235
K110..	**EK110/1**	3	0,275
K3-150..	**EK3-150/10**	1	0,32
K3-151..	**EK3-151/10**	1	0,16
K3-175..	**EK3-175/10**	1	0,32
K3-176..	**EK3-176/10**	1	0,16
K3-200..	**EK3-200/10**	1	0,18
K3-210..	**EK3-210/10**	1	0,18
K3-260..	**EK3-260/10**	1	0,30
K3-315..	**EK3-315/10**	1	0,34
K3-316..	**EK3-316/10**	1	0,34
K3-450..	**EK3-450/10**	1	0,35
K3-550..	**EK3-550/10**	1	0,35
K3-700..	**EK3-700/10**	1	0,85
K3-860..	**EK3-860/10**	1	1,0
K3-1000..	**EK3-1000/10**	1	1,4
K3-1200..	**EK3-1200/10**	1	1,4

Approximate Values for three-phase Motors

Motor Full Load Currents

Approximate values of motor F.L.C. and minimum "slow blow" respectively "gL" short-circuit fuse

Motor rating		Range acc. to BS for 415V			220-230V Motor	fuse size motor start		240V Motor	fuse size motor start		**380-400V** Motor	fuse size motor start		415V Motor	fuse size motor start		500V Motor	fuse size motor start		660-690V Motor	fuse size motor start	
					I_n	D.O.L.	YD	I_n	D.O.L.	YD	I_n	D.O.L.	YD	I_n	D.O.L.	YD	I_n	D.O.L.	YD	I_n	D.O.L.	YD
kW	PS~hp	hp	cosφ	%	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
0,06	0,08	-	0,7	59	0,38	1	1	0,35	1	1	**0,22**	1	1	-	-	-	0,16	1	1	-	-	-
0,09	0,12	-	0,7	60	0,55	2	2	0,5	2	2	**0,33**	1	1	-	-	-	0,24	1	1	-	-	-
0,12	0,16	-	0,7	61	0,76	2	2	0,68	2	2	**0,42**	2	2	-	-	-	0,33	1	1	-	-	-
0,18	0,24	-	0,7	61	1,1	2	2	1	2	2	**0,64**	2	2	-	-	-	0,46	1	1	-	-	-
0,25	0,34	-	0,7	62	1,4	4	2	1,38	4	2	**0,88**	2	2	-	-	-	0,59	2	2	-	-	-
0,37	0,5	-	0,72	64	2,1	4	4	1,93	4	4	**1,22**	4	2	-	-	-	0,85	2	2	0,7	2	2
0,55	0,75	-	0,75	69	2,7	4	4	2,3	4	4	**1,5**	4	2	-	-	-	1,2	4	2	0,9	2	2
0,75	1	1	0,8	74	3,3	6	4	3,1	6	4	**2**	4	4	2	4	4	1,48	4	2	1,1	2	2
1,1	1,5	1,5	0,83	77	4,9	10	6	4,1	6	6	**2,6**	4	4	2,5	4	4	2,1	4	4	1,5	4	2
1,5	2	2	0,83	78	6,2	10	10	5,6	10	10	**3,5**	6	4	3,5	6	4	2,6	4	4	2	4	4
2,2	3	3	0,83	81	8,7	16	10	7,9	16	10	**5**	10	6	5	10	6	3,8	6	6	2,9	6	4
2,5	3,4	-	0,83	81	9,8	16	16	8,9	16	10	**5,7**	10	10	-	-	-	4,3	6	6	-	-	-
3	4	4	0,84	81	11,6	20	16	10,6	20	16	**6,6**	16	10	6,5	16	10	5,1	10	10	3,5	6	4
3,7	5	5	0,84	82	14,2	25	20	13	25	16	**8,2**	16	10	7,5	16	10	6,2	16	10	-	-	-
4	5,5	-	0,84	82	15,3	25	20	14	25	20	**8,5**	16	10	-	-	-	6,5	16	10	4,9	10	6
5,5	7,5	7,5	0,85	83	20,6	35	25	18,9	35	25	**11,5**	20	16	11	20	16	8,9	16	10	6,7	16	10
7,5	10	10	0,86	85	27,4	35	35	24,8	35	35	**15,5**	25	20	14	25	16	11,9	20	16	9	16	10
8	11	-	0,86	85	28,8	50	35	26,4	35	35	**16,7**	25	20	-	-	-	12,7	20	16	-	-	-
11	15	15	0,86	87	39,2	63	50	35,3	50	50	**22**	35	25	21	35	25	16,7	25	20	13	25	16
12,5	17	-	0,86	87	43,8	63	50	40,2	63	50	**25**	35	35	-	-	-	19	35	25	-	-	-
15	20	20	0,86	87	52,6	80	63	48,2	80	63	**30**	50	35	28	35	35	22,5	35	25	17,5	25	20
18,5	25	25	0,86	88	64,9	100	80	58,7	80	63	**37**	63	50	35	50	50	28,5	50	35	21	35	25
20	27	-	0,86	88	69,3	100	80	63,4	80	80	**40**	63	50	-	-	-	30,6	50	35	-	-	-
22	30	30	0,87	89	75,2	100	80	68	100	80	**44**	63	50	40	63	50	33	50	50	25	35	35
25	34	-	0,87	89	84,4	125	100	77,2	100	100	**50**	80	63	-	-	-	38	63	50	-	-	-
30	40	40	0,87	90	101	125	125	92,7	125	100	**60**	80	63	55	80	63	44	63	50	33	50	35
37	50	50	0,87	90	124	160	160	114	160	125	**72**	100	80	66	100	80	54	80	63	42	63	50
40	54	-	0,87	90	134	160	160	123	160	160	**79**	100	100	-	-	-	60	80	63	-	-	-
45	60	60	0,88	91	150	200	160	136	200	160	**85**	125	100	80	100	100	64,5	100	80	49	63	63
51	70	-	0,88	91	168	200	200	154	200	200	**97**	125	100	-	-	-	73,7	100	80	-	-	-
55	75	-	0,88	91	181	250	200	166	200	200	**105**	160	125	-	-	-	79	125	100	60	80	63
59	80	80	0,88	91	194	250	250	178	250	200	**112**	160	125	105	160	125	85,3	125	100	-	-	-
75	100	100	0,88	91	245	315	250	226	315	250	**140**	200	160	135	200	160	106	160	125	82	125	100
90	125	125	0,88	92	292	400	315	268	315	315	**170**	250	200	165	200	200	128	160	160	98	125	125
110	150	150	0,88	92	358	500	400	327	400	400	**205**	250	250	200	250	250	156	200	200	118	160	125
129	175	175	0,88	92	420	500	500	384	500	400	**242**	315	250	230	315	250	184	250	200	-	-	-
132	180	-	0,88	92	425	500	500	393	500	500	**245**	315	250	-	-	-	186	250	200	140	200	160
147	200	200	0,88	93	472	630	630	432	630	500	**273**	315	315	260	315	315	207	250	250	-	-	-
160	220	-	0,88	93	502	630	630	471	630	630	**295**	400	315	-	-	-	220	315	250	170	200	200
184	250	250	0,88	93	590	800	630	541	630	630	**340**	400	400	325	400	400	259	315	315	-	-	-
200	270	-	0,88	93	626	800	800	589	800	630	**370**	500	400	-	-	-	278	315	315	215	250	250
220	300	300	0,88	93	700	1000	800	647	800	800	**408**	500	500	385	500	400	310	400	400	-	-	-
250	340	-	0,88	93	803	1000	1000	736	1000	800	**460**	630	500	-	-	-	353	500	400	268	315	315
257	350	350	0,88	93	826	1000	1000	756	1000	800	**475**	630	630	450	630	500	363	500	400	-	-	-
295	400	400	0,88	93	948	1250	1000	868	1000	1000	**546**	800	630	500	630	630	416	500	500	-	-	-
315	430	-	0,88	93	990	1250	1250	927	1250	1000	**580**	800	630	-	-	-	445	630	500	337	400	400
355	483	-	0,89	95	-	-	-	-	-	-	**636**	800	800	-	-	-	483	630	630	366	500	400
400	545	-	0,89	96	-	-	-	-	-	-	**710**	1000	800	-	-	-	538	630	630	410	500	500

The motor F.L.C. be valid for standard internal and surface cooled three-pole motors with 1500 min^{-1}. The fuses values be valid for the motor F.L.C. shown in the table and D.O.L.-start: starting current max. 6x motor F.L.C., starting time max. 5s; star-delta-start: starting current max. 2x motor F.L.C., starting time max. 15s

For motors with higher F.L.C., higher starting current and / or longer starting time, larger short-circuit fuses are required.
The maximum admissible value is dependent on the switchgear respectively thermal overload relay.

Approximate values of motor F.L.C. according to CSA and UL

Motor rating	Motor F.L.C. at 110-120V			Motor F.L.C. at 220-240V[1)]			Motor F.L.C. at 440-480V			Motor F.L.C. at 550-600V		
	1-phase	2-phase	3-phase	1-phase	2-phase	3-phase	1-phase	2-phase	3-phase	1-phase	2-phase	3-phase
hp	A	A	A	A	A	A	A	A	A	A	A	A
1/2	9.8	4.0	4.4	4.9	2.0	2.2	2.5	1.0	1.1	2.0	0.8	0.9
3/4	13.8	4.8	6.4	6.9	2.4	3.2	3.5	1.2	1.6	2.8	1.0	1.3
1	16.0	6.4	8.4	8.0	3.2	4.2	4.0	1.6	2.1	3.2	1.3	1.7
1-1/2	20.0	9.0	12.0	10.0	4.5	6.0	5.0	2.3	3.0	4.0	1.8	2.4
2	24.0	11.8	13.6	12.0	5.9	6.8	6.0	3.0	3.4	4.8	2.4	2.7
3	34.0	16.6	19.2	17.0	8.3	9.6	8.5	4.2	4.8	6.8	3.3	3.9
5	56.0	26.4	30.4	28.0	13.2	15.2	14.0	6.6	7.6	11.2	5.3	6.1
7-1/2	80.0	38.0	44.0	40.0	19.0	22.0	21.0	9.0	11.0	16.0	8.0	9.0
10	100.0	48.0	56.0	50.0	24.0	28.0	26.0	12.0	14.0	20.0	10.0	11.0
15	135.0	72.0	84.0	68.0	36.0	42.0	34.0	18.0	21.0	27.0	14.0	17.0
20	-	94.0	108.0	88.0	47.0	54.0	44.0	23.0	27.0	35.0	19.0	22.0
25	-	118.0	136.0	110.0	59.0	68.0	55.0	29.0	34.0	44.0	24.0	27.0
30	-	138.0	160.0	136.0	69.0	80.0	68.0	35.0	40.0	54.0	28.0	32.0
40	-	180.0	208.0	176.0	90.0	104.0	88.0	45.0	52.0	70.0	36.0	41.0
50	-	226.0	260.0	216.0	113.0	130.0	108.0	56.0	65.0	86.0	45.0	52.0
60	-	-	-	-	133.0	145.0	-	67.0	77.0	-	53.0	62.0
75	-	-	-	-	166.0	192.0	-	83.0	96.0	-	66.0	77.0
100	-	-	-	-	218.0	248.0	-	109.0	124.0	-	87.0	99.0
125	-	-	-	-	-	312.0	-	135.0	156.0	-	108.0	125.0
150	-	-	-	-	-	360.0	-	156.0	180.0	-	125.0	144.0
200	-	-	-	-	-	480.0	-	208.0	240.0	-	167.0	192.0
250	-	-	-	-	-	602.0	-	-	302.0	-	-	242.0
300	-	-	-	-	-	-	-	-	361.0	-	-	289.0
350	-	-	-	-	-	-	-	-	414.0	-	-	336.0
400	-	-	-	-	-	-	-	-	477.0	-	-	382.0
500	-	-	-	-	-	-	-	-	590.0	-	-	472.0

1) Determine the motor current for 200V and 208V by increasing the values for 220-240V at 200V about 15% and for 208V about 10%.

Contactors

Data according to IEC 947-4-1, EN 60947-4-1, VDE 0660

Main Contacts		Type	**K(G)3-10**	**K(G)3-14**	**K(G)3-18**	**K(G)3-22**	**K(G)3-24**	**K(G)3-32**	**K(G)3-40**	**K3-50**	**K3-62**	**K3-74**
Rated insulation voltage U_i [1]		V AC	690	690	690	690	690	690	690	830	830	830
Making capacity I_{eff}	at U_e = 690V AC	A	200	200	200	200	400	500	500	700	900	900
	1000V AC	A	-	-	-	-	-	-	-	-	-	-
Breaking capacity I_{eff}	400V AC	A	180	180	200	200	380	400	400	600	800	800
K3-10 to K3-22 cosφ= 0,65	500V AC	A	150	150	180	180	300	370	370	500	700	700
K3-24 to K3-1200 cosφ= 0,35	690V AC	A	100	100	150	150	260	340	340	400	500	500
	1000V AC	A	-	-	-	-	-	-	-	-	-	-
Utilization category AC1												
Switching of resistive load												
Rated operational current I_e (=I_{th})	690V	**A**	**25**	**25**	**32**	**32**	**50**	**65**	**80**	**110**	**120**	**130**
at 40°C, open												
Rated operational power	220V	kW	9,5	9,5	12,2	12,2	19,0	24,7	30,4	41,9	45,7	49,5
of three-phase resistive loads	230V	kW	9,9	9,9	12,7	12,7	19,9	25,9	31,8	43,8	47,7	51,7
50-60Hz, cosφ= 1	240V	kW	10,4	10,4	13,3	13,3	20,8	27,0	33,2	45,7	49,8	54,0
	380V	kW	16,4	16,4	21,0	21,0	32,9	42,7	52,6	72,3	78,9	85,5
	400V	kW	17,3	17,3	22,1	22,1	34,6	45,0	55,4	76,1	83,0	90,0
	415V	kW	17,9	17,9	23,0	23,0	35,9	46,7	57,4	79,0	86,2	93,3
	440V	kW	19,0	19,0	24,4	24,4	38,1	49,5	60,9	83,7	91,3	99,0
	500V	kW	21,6	21,6	27,7	27,7	43,3	56,2	69,2	95,2	103,8	112,5
	660V	kW	28,5	28,5	36,5	36,5	57,1	74,2	91,3	125,6	137,0	148,4
	690V	kW	29,8	29,8	38,2	38,2	59,7	77,6	95,5	131,3	143,2	155,2
	1000V	kW	-	-	-	-	-	-	-	-	-	
Rated operational current I_e (=I_{th})	690V	A	25	25	32	32	40	55	65	90	100	110
at 40°C, inside the enclosure 60°C												
Rated operational power	220V	kW	9,5	9,5	12,2	12,2	15,2	20,9	24,7	34,3	38,1	41,9
of three-phase resistive loads	230V	kW	9,9	9,9	12,7	12,7	15,9	21,9	25,9	35,8	39,8	43,8
50-60Hz, cosφ= 1	240V	kW	10,4	10,4	13,3	13,3	16,6	22,8	27,0	37,4	41,5	45,7
	380V	kW	16,4	16,4	21,0	21,0	26,3	36,2	42,7	59,2	65,7	72,3
	400V	kW	17,3	17,3	22,1	22,1	27,7	38,1	45,0	62,3	69,2	76,1
	415V	kW	17,9	17,9	23,0	23,0	28,7	39,5	46,7	64,6	71,8	79,0
	440V	kW	19,0	19,0	24,4	24,4	30,4	41,9	49,5	68,5	76,1	83,7
	500V	kW	21,6	21,6	27,7	27,7	34,6	47,6	56,2	77,9	86,5	95,2
	660V	kW	28,5	28,5	36,5	36,5	45,7	62,8	74,2	102,8	114,2	125,6
	690V	kW	29,8	29,8	38,2	38,2	47,7	65,7	77,6	107,4	119,4	131,3
	1000V	kW	-	-	-	-	-	-	-	-	-	
Minimum cross-section of conductor												
at load with I_e (=I_{th})		mm^2	4	4	6	6	10	16	25	35	50	50
Utilization category AC2 and AC3												
Switching of three-phase motors												
Rated operational current I_e	220V	A	12	15	18	22	24	32	40	50	63	74
open and enclosed	230V	A	11,5	14,5	18	22	24	32	40	50	62	74
	240V	A	11	14	18	22	24	32	40	50	62	74
	380-400V	**A**	**10**	**14**	**18**	**22**	**24**	**32**	**40**	**50**	**62**	**74**
	415V	A	9	14	18	22	23	30	40	50	62	74
	440V	A	9	14	18	22	23	30	40	50	62	74
	500V	A	8,9	11,9	15	15	22,5	28,5	28,5	44	54	64,5
	660-690V	A	6,7	9	12	12	17,5	21	21	33	42	49
	1000V	A	-	-	-		-	-	-	-	-	-
Rated operational power	220-230V	kW	3	4	5	6	6	8,5	11	12,5	18,5	22
of three-phase motors	240V	kW	3	4	5	7	7	9	11,5	13,5	19	23
50-60Hz	**380-400V**	**kW**	**4**	**5,5**	**7,5**	**11**	**11**	**15**	**18,5**	**22**	**30**	**37**
	415V	kW	4,5	6	8,5	12	12	16	20	24	33	40
	440V	kW	4,5	6	8,5	12	12	16	20	24	33	40
	500V	kW	5,5	7,5	10	10	15	18,5	18,5	30	37	45
	660-690V	kW	5,5	7,5	10	10	15	18,5	18,5	30	37	45
	1000V	kW	-	-	-	-	-	-	-	-	-	-

1) Suitable at 690V for: earthed-neutral systems, overvoltage category I to IV, pollution degree 3 (standard-industry): U_{imp} = 8kV.
Data for other conditions on request.

Contactors

Data according to IEC 947-4-1, EN 60947-4-1, VDE 0660

Type	K3-90	K3-115	K3-116	K3-151	K3-176	K3-210	K3-260	K3-316	K3-450	K3-550	K3-700	K3-860	K3-1000	K3-1200
V AC	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	690	690	690	690
A	1100	1200	1200	1500	2000	2100	2600	3200	4500	5500	7000	8600	10000	12000
A	540	600	600	720	840	1020	1200	1500	2400	3000	-	-	-	-
A	950	1100	1000	1200	1500	1600	2100	2600	4500	5500	7000	8000	8000	10000
A	850	1000	1000	1200	1500	1600	2100	2600	4500	5500	7000	8000	8000	10000
A	600	600	800	1000	800	1200	1900	2300	3200	4400	5600	6900	7000	8000
A	450	450	400	500	600	700	850	1000	-	-	-	-	-	-
A	**160**	**200**	**200**	**250**	**300**	**350**	**450**	**600**	**700**	**800**	**1000**	**1100**	**1200**	**1350**
kW	60	76	76	95	114	133	171	228	266	304	381	419	457	514
kW	63	79	79	99	119	139	179	238	279	318	398	438	478	537
kW	66	83	83	103	124	145	187	249	291	332	415	457	498	561
kW	105	131	131	165	197	230	296	394	460	526	658	724	789	888
kW	110	138	138	173	208	242	311	415	485	554	692	762	831	935
kW	115	143	143	179	215	251	323	430	503	574	718	790	862	970
kW	121	152	152	190	228	266	342	456	533	609	762	838	914	1028
kW	138	173	173	216	260	303	389	518	606	692	866	952	1039	1169
kW	182	228	228	285	343	400	514	684	800	914	1143	1257	1371	1543
kW	191	239	239	298	358	418	537	715	836	955	1195	1314	1434	1613
kW	221	277	216	345	415	433	546	727	692	911	-	-	-	-
A	145	170	170	180	200	280	360	400	550	600	800	875	960	1080
kW	55	64	64	68	76	106	137	152	209	228	304	333	365	411
kW	57	67	67	71	79	111	143	159	219	239	318	348	382	430
kW	59	70	70	74	83	116	150	166	228	249	332	363	399	448
kW	95	111	111	118	131	184	237	263	362	395	526	575	631	710
kW	100	117	117	124	138	193	249	277	381	415	554	606	665	748
kW	104	122	122	129	143	201	259	287	395	431	575	628	690	776
kW	110	129	129	137	152	213	274	304	419	457	609	666	731	823
kW	125	147	147	155	173	242	312	346	476	519	692	757	831	935
kW	165	194	194	205	228	320	412	457	628	685	914	1000	1097	1234
kW	173	202	202	215	239	334	430	478	657	717	956	1045	1147	1290
kW	166	187	216	277	346	388	499	554	692	866	-	-	-	-
mm^2	95	120	95	95	120	240	2x150	2x(30x6)	2x(40x5)	2x(50x5)	2x(60x5)	2x(60x6)	2x(60x6)	2x(60x8)
A	90	115	115	150	175	210	260	315	450	550	700	860	1000	1200
A	90	115	115	150	175	210	260	315	450	550	700	860	1000	1200
A	90	115	115	150	175	210	260	315	450	550	700	860	1000	1200
A	**90**	**115**	**115**	**150**	**175**	**210**	**260**	**315**	**450**	**550**	**700**	**860**	**1000**	**1200**
A	90	115	115	150	175	210	260	315	450	550	700	860	1000	1200
A	90	115	115	150	175	210	260	315	450	550	700	860	1000	1200
A	79	79	115	150	175	210	260	315	450	550	700	860	1000	1200
A	60	60	100	120	140	150	180	240	400	500	630	700	860	1000
A	45	45	45	60	70	85	100	125	200	250	-	-	-	-
kW	25	33	30	40	50	60	75	90	132	175	225	280	325	390
kW	27	35	35	45	55	65	80	100	140	185	235	290	335	400
kW	**45**	**55**	**55**	**75**	**90**	**110**	**132**	**160**	**250**	**300**	**400**	**500**	**580**	**680**
kW	49	63	59	80	95	115	140	180	257	315	415	515	600	710
kW	49	63	63	85	100	125	150	190	270	335	450	530	630	750
kW	55	55	75	90	100	132	160	210	300	375	500	600	720	850
kW	55	55	90	110	132	132	160	210	375	500	630	700	850	1000
kW	55	55	55	75	90	110	132	160	280	355	-	-	-	-

Contactors

Data according to IEC 947-4-1, EN 60947-4-1, VDE 0660

Main Contacts	Type	**K(G)3-10**	**K(G)3-14**	**K(G)3-18**	**K(G)3-22**	**K(G)3-24**	**K(G)3-32**	**K(G)3-40**	**K3-50**	**K3-62**	**K3-74**
Utilization category AC4											
Switching of squirrel cage motors, inching											
Rated operational current I_e 220V	A	12	15	18	18	24	30	40	50	63	63
open and enclosed 230V	A	11,5	14,5	18	18	24	30	40	50	62	62
240V	A	11	14	18	18	24	32	40	50	62	62
380-400V	**A**	**10**	**14**	**18**	**18**	**24**	**32**	**40**	**50**	**62**	**62**
415V	A	9	14	18	18	23	30	37	45	60	60
440V	A	9	14	18	18	23	30	37	45	55	55
500V	A	9	12	16	16	17,5	21	21	33	42	42
660V	A	7	9	9	9	17	20	20	31	40	40
690V	A	6,5	8,5	8,5	8,5	17	20	20	31	40	40
1000V	A	-	-	-	-	-	-	-	-	-	-
Rated operational power 220-230V	kW	3	4	5	5	6	8,5	11	12,5	18,5	18,5
of three-phase motors 240V	kW	3	4	5	5	7	9	11,5	13,5	19	19
50-60Hz **380-400V**	**kW**	**4**	**5,5**	**7,5**	**7,5**	**11**	**15**	**18,5**	**22**	**30**	**30**
415V	kW	4,5	6	8,5	8,5	12	16	20	24	33	33
440V	kW	4,5	6	8,5	8,5	12	16	20	24	33	33
500V	kW	5,5	7,5	10	10	15	18,5	18,5	30	37	37
660-690V	kW	5,5	7,5	10	10	15	18,5	18,5	30	37	37
1000V	kW	-	-	-	-	-	-	-	-	-	-
Utilization category AC5a											
Switching of gas discharge lamps											
Rated operational current I_e											
per pole at 220/230V											
Fluorescent lamps,											
uncompensated and serial compensated	A	20	20	25	25	40	52	64	88	96	104
parallel compensated	A	7	9	9	9	18	22	22	30	40	40
dual-connection	A	22,5	22,5	28	28	45	58	72	98	108	117
Metal halide lamps[1],											
uncompensated	A	12	15	19	19	30	39	48	66	72	78
parallel compensated	A	7	9	9	9	18	22	22	30	40	40
Mercury-vapour lamps[2],											
uncompensated	A	22,5	25	28	28	45	58	72	99	108	117
parallel compensated	A	7	9	9	9	18	22	22	30	40	40
Mixed light lamps[3]	A	20	20	25	25	40	52	64	88	96	104
LED-Lamps consider the inrush current of the lamp ballast and cosφ of the lamp.		max. lamps per pole ($I_{nLED} \leq I_{th}$)				=	inrush current of contactor / inrush current of lamp/EVG				
max inrush current of contactor	A	282	282	282	282	564	705	705	987	1269	1268
Utilization category AC5b											
Switching of incandescent lamps [4]											
Rated operational current I_e											
per pole at 220/230V	A	12,5	12,5	12,5	12,5	25	31	31	43	56	56

1) Metal halide lamps and sodium-vapour lamps (high- and low-pressure lamps)
2) High-pressure lamps
3) Blended lamps, containing a mercury high-pressure unit and a tungsten helix in a flourescent glass bulb (daylight lamps)
4) Current inrush approx. 16 x I_e

Contactors

Data according to IEC 947-4-1, EN 60947-4-1, VDE 0660

Type	K3-90	K3-115	K3-151	K3-176	K3-210	K3-260	K3-316	K3-450	K3-550	K3-700	K3-860	K3-1000	K3-1200
A	85	98	55	63	85	100	120	150	180	230	280	340	400
A	85	98	55	63	85	100	120	150	180	230	280	340	400
A	85	98	55	63	85	100	120	150	180	230	280	340	400
A	**85**	**85**	**55**	**63**	**85**	**100**	**120**	**150**	**180**	**230**	**280**	**340**	**400**
A	85	85	55	63	85	100	120	150	180	230	280	340	400
A	85	85	55	63	85	100	120	150	180	230	280	340	400
A	85	85	-	-	-	-	-	-	-	-	-	-	-
A	60	60	-	-	-	-	-	-	-	-	-	-	-
A	57,5	57,5	-	-	-	-	-	-	-	-	-	-	-
A	-	-	-	-	-	-	-	-	-	-	-	-	-
kW	25	30	15	18,5	25	30	37	45	51	68	80	110	132
kW	27	32	15,5	19	26	31	38	47	53	71	83	115	137
kW	**45**	**45**	**25**	**30**	**45**	**55**	**63**	**75**	**90**	**120**	**150**	**185**	**220**
kW	49	49	25	33	45	55	65	80	100	132	160	200	230
kW	49	49	30	34	48	55	67	85	100	132	160	200	230
kW	55	55	25	30	55	65	75	100	110	150	185	220	257
kW	55	55	25	30	55	65	75	100	110	150	185	220	257
kW	-	-	-	-	-	-	-	-	-	-	-	-	-
A	100	120	120	140	180	220	280	360	450	570	700	850	1000
A	55	70	85	100	130	160	200	300	360	460	550	660	800
A	112	144	120	140	180	220	280	360	450	570	700	850	1000
A	85	90	95	110	140	180	230	300	380	490	610	750	890
A	55	70	75	85	110	140	170	260	300	400	480	580	700
A	112	144	120	140	180	220	280	360	450	570	700	850	1000
A	55	70	75	85	110	140	170	260	300	400	480	580	700
A	100	120	100	120	160	200	250	320	400	500	600	700	800
	max. lamps per pole ($I_{nLED} \leq I_{th}$)			=		$\frac{\text{inrush current of contactor}}{\text{inrush current of lamp/EVG}}$							
A	1551	1692	2115	2820	2961	3666	4512	6345	7755	9870	12126	14100	16920
A	69	75	100	120	160	190	220	260	315	440	500	560	630

Contactors

Data according to IEC 947-4-1, EN 60947-4-1, VDE 0660

Main Contacts		Type	K(G)3-10	K(G)3-14	K(G)3-18	K(G)3-22	K(G)3-24	K(G)3-32	K(G)3-40	K3-50	K3-62	K3-74
Utilization category AC6a												
Transformer primary switching												
at inrush		n	30	30	30	30	30	30	30	30	30	30
Rated operational current I_e	400V	A	4,5	5,5	7,5	7,5	10,5	13,5	13,5	20	27	33
Rated operational power	220-230V	kVA	1,8	2,2	3	3	4,2	5,4	5,4	8	10,7	13
dependent on inrush n	240V	kVA	1,9	2,3	3,1	3,1	4,3	5,6	5,6	8,3	11,2	13,5
	380-400V	kVA	3,1	3,8	5,2	5,2	7,3	9,3	9,3	13,5	18,5	22,5
For different inrush-factors x	415-440V	kVA	3,4	4,2	5,7	5,7	8	10,2	10,2	15	20,5	25
use the following formula:	500V	kVA	3,9	4,8	6,5	6,5	9	11,5	11,5	17	23	28
Px=Pn*(n/x)	660-690V	kVA	5,4	6,5	9	9	12,5	16	16	24	32	39
Utilization category AC6b												
Switching of three-phase capacitors												
Maximum inrush current (peak value) as multiple k of the capacitor rated current		k	35	25	20	20	25	25	25	25	25	20
Rated operational current I_e	500V	A	8	12	15,5	15,5	23	32	32	45	60	70
Rated operational current	220-230V	kVAr	3	4,5	6	6	8,5	12	12	17	24	28
(sinφ=1)	240V	kVAr	3,5	5	6,5	6,5	9,5	13	13	18,5	25	29
	380-400V	kVAr	5	7,5	10	10	15	20	20	29	39	46
For different multiples x	415-440V	kVAr	5,5	8	11	11	16	22	22	32	43	50
use the following formula:	500V	kVAr	7	10	13	13	20	26	26	39	50	58
Px=Pk*(k/x)	660-690V	kVAr	7	10	13	13	20	26	26	40	50	58
Switching of reactive capacitor banks												
Rated operational current I_e	690V	A	8	13	18	20	28	36	42	48	72	108 [1]
Rated operational power	220-230V	kVAr	2,9	5	7	7,5	11	14	16	20	28	33
	240V	kVAr	3,1	5,4	7	8	11	14	17	20	28	36
	380-400V	kVAr	5	9	12,5	13	20	25	27,5	33,3	50	75 [1]
	415-440V	kVAr	5,5	9,5	13	14	22	27	30	36	53	75 [1]
	500V	kVAr	6	11	15	17	25	30	36	40	60	75
	660-690V	kVAr	8	15	20	22	33	41	48	55	82	100
	1000V	kVAr	-	-	-	-	-	-	-	-	-	-
Utilization category DC1												
Switching of resistive load												
Time constant L/R ≤1ms												
Rated operational current I_e	1 pole 24V	A	20	25	32	32	50	65	80	110	120	130
	60V	A	20	25	32	32	50	65	80	110	120	130
	110V	A	6	6	6	6	10	10	10	12	12	12
	220V	A	0,8	0,8	0,8	0,8	1,4	1,4	1,4	1,4	1,4	1,4
	3 poles in series 24V	A	20	25	32	32	50	65	80	110	120	130
	60V	A	20	25	32	32	50	65	80	110	120	130
	110V	A	20	25	32	32	50	65	80	110	120	130
	220V	A	16	20	20	20	30	35	35	63	80	80
Utilization category DC3 and DC5												
Switching of shunt motors and series motors												
Time constant L/R ≤15ms												
Rated operational current I_e	1 pole 24V	A	20	25	32	32	50	65	80	110	120	130
	60V	A	6	6	6	6	30	30	30	60	60	60
	110V	A	1,2	1,2	1,2	1,2	1,8	1,8	1,8	1,8	1,8	1,8
	220V	A	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,25	0,25	0,25
	3 poles in series 24V	A	20	25	32	32	50	65	80	110	120	130
	60V	A	20	25	32	32	40	40	40	80	80	80
	110V	A	20	20	20	20	40	40	40	80	80	80
	220V	A	2,5	2,5	2,5	2,5	4	4	4	5	5	5

1) Consider resistive load (I_{th}). see page 62

Contactors

Data according to IEC 947-4-1, EN 60947-4-1, VDE 0660

Type	K3-90	K3-115	K3-151	K3-176	K3-210	K3-260	K3-316	K3-450	K3-550	K3-700	K3-860	K3-1000	K3-1200
n	30	30	30	30	30	30	30	30	30	30	30	30	30
A	38	50	65	80	90	120	142	203	248	315	390	450	540
kVA	15	20	25	30	34	45	54	77	95	120	148	170	200
kVA	15,5	20,5	27	33	37	50	59	80	100	130	160	185	220
kVA	26	34	45	55	60	80	95	140	170	210	270	310	370
kVA	29	38	46	57	63	85	100	145	175	220	280	320	380
kVA	33	43	55	69	75	100	120	170	210	270	330	380	460
kVA	45	60	56	69	100	135	160	200	250	320	350	500	600
k	20	20	20	20	25	20	20	20	20	20	20	20	20
A	87	100	120	155	195	225	255	300	370	440	520	680	760
kVAr	33	38	45	60	75	90	100	115	145	170	200	260	290
kVAr	36	42	52	62	78	94	104	120	150	175	205	270	300
kVAr	57	65	80	100	130	155	170	200	250	300	350	450	500
kVAr	60	70	95	110	135	165	175	210	260	310	360	465	520
kVAr	70	80	100	130	170	194	220	260	320	380	450	590	660
kVAr	70	80	100	130	170	194	220	260	320	380	450	590	660
A	115	144	115	140	200	225	250	330	420	550	600	680	760
kVAr	45	55	43	53	76	85	95	125	160	209	228	260	290
kVAr	45	55	45	55	80	90	100	130	170	220	240	280	310
kVAr	80	100	75	90	130	145	160	210	270	350	390	440	480
kVAr	100	120	80	100	140	160	170	230	290	380	420	470	530
kVAr	105	125	95	120	170	190	210	280	350	450	500	570	640
kVAr	120	148	125	150	200	230	260	350	450	600	650	700	800
kVAr	160	200	155	200	300	340	400	500	650	-	-	-	-
A	160	200	-	-	-	-	-	-	-	-	-	-	-
A	160	200	-	-	-	-	-	-	-	-	-	-	-
A	20	25	-	-	-	-	-	-	-	-	-	-	-
A	2	2,5	-	-	-	-	-	-	-	-	-	-	-
A	160	200	200	250	350	400	450	600	760	1000	1100	1200	1350
A	160	200	200	250	350	400	450	600	760	1000	1100	1200	1350
A	160	200	150	170	250	280	315	400	480	560	630	800	900
A	100	160	80	100	150	180	200	250	315	400	450	500	600
A	160	200	-	-	-	-	-	-	-	-	-	-	-
A	85	110	-	-	-	-	-	-	-	-	-	-	-
A	2	2,5	-	-	-	-	-	-	-	-	-	-	-
A	0,5	0,5	-	-	-	-	-	-	-	-	-	-	-
A	160	200	-	-	-	-	-	-	-	-	-	-	-
A	100	110	-	-	-	-	-	-	-	-	-	-	-
A	100	110	-	-	-	-	-	-	-	-	-	-	-
A	7	8	-	-	-	-	-	-	-	-	-	-	-

Contactors

Data according to IEC 947-4-1, EN 60947-4-1, VDE 0660

Main Contacts		Type	**K(G)3-10**	**K(G)3-14**	**K(G)3-18**	**K(G)3-22**	**K(G)3-24**	**K(G)3-32**	**K(G)3-40**	**K3-50**	**K3-62**	**K3-74**
Maximum ambient temperature												
Operation	open	°C	-40 to +60 (+90) [1]									
	enclosed	°C	-40 to +40									
with thermal overload relay	open	°C	-25 to +60									
enclosed		°C	-25 to +40									
Storage		°C	-50 to +90									
Short circuit protection without O/L relay												
Rated short circuit current	"r" / "Iq"	kA	10	10	10	10	10	10	10	10	10	10
Coordination-type "1" according to IEC 947-4-1												
Contact welding without hazard of persons												
max. fuse size	gL (gG)	A	63	63	63	63	100	100	100	160	160	160
Coordination-type “2” according to IEC 947-4-1												
Light contact welding accepted												
max. fuse size	gL (gG)	A	25	35	35	35	50	50	50	100	125	125
Contact welding not accepted												
max. fuse size	gL (gG)	A	16	16	16	16	25	35	35	50	63	63
For contactors with thermal overload relay the device with the smaller admissible backup fuse (contactor or thermal overload relay) determines the fuse size.												
Cable cross-sections												
for contactors without thermal overload relay												
1 cable per clamp												
main connector	solid or stranded	mm²	0,75 - 6				1,5 - 25			4 - 50		
	flexible	mm²	1 - 4				2,5 - 16			10 - 35		
	flexible with multicore cable end	mm²	0,75 - 4				1,5 - 16			6 - 35		
2 cables per clamp												
	solid or stranded	mm²	6+(1-6) / 4+(0,75-4) 2,5+(0,75-2,5) / 1,5+(0,75-1,5)				16+(2,5-16) / 10+(4-16) 6+(4-16) / 4+(2,5-16)			50+4 / 35+6 / 25+(6-16) 16+(6-16) / 10+(6-16)		
	flexible	mm²	6+(1,5-4) / 4+(1-4) 2,5+(0,75-2,5) / 1,5+(0,75-1,5)				16+(2,5-6) / 10+(4-10) 6+(4-16) / 4+(2,5-16)			50+(4-10) / 35+(4-16) 25+(4-25) / 16+(4-16)		
1 cable per clamp												
main connector	solid	AWG	18 - 10				16 - 10			12 - 10		
	flexible	AWG	18 - 10				14 - 4			10 - 0		
2 cables per clamp												
	solid	AWG	10+(16-10) / 12+(18-12) 14+(18-14) / 16+(18-16)				10+(16-10) / 12+(18-12) 14+(18-14) / 16+(18-16)			10+(12-10) / 12+12		
	flexible	AWG	10+(14-10) / 12+(18-12) 14+(18-14) / 16+(18-16)				4+(18-12) / 6+(18-8) 8+(18-8) / 10+(18-12)			1+(12-10) / 2+(8-12) 3+(12-8) / 4+(10-6)		
Frequency of operations z												
Contactors without thermal overload relay												
	without load	1/h	10000				7000			7000		
	AC3, I_e	1/h	600				600			400		
	AC4, I_e	1/h	120				120			120		
	DC3, I_e	1/h	600				600			400		
Mechanical life												
AC operated	S x 10^6		10				10			10		
DC operated	S x 10^6		10				10			10		
DC-solenoid operated (KG3)	S x 10^6		50				50			-		
Short time current	10s-current	A	96	120	144	176	184	240	296	450	504	592
	120s-current	A	42	52	58	66	80	97	110	195	203	222
Power loss per pole	at I_e/AC3 400V	W	0,21	0,35	0,5	0,75	0,7	1,3	2	2,2	3,9	5,5
contact resistance		mOhm	2,1	1,8	1,5	1,5	1,2	1,2	1,2	1	1	1
Resistance to shock acc. to IEC 60068-2-27												
Shock time 20ms sine-wave	NO	g	10	10	10	10	8	8	8	8	8	8
	NC	g	6	6	6	6	-	-	-	-	-	-

1) With reduced control voltage range 0,9 up to 1,0 x U_s and with reduced rated current I_e /AC1, no deratings for I_e /AC3 values.

Contactors

Data according to IEC 947-4-1, EN 60947-4-1, VDE 0660

Type	K3-90	K3-115	K3-116	K3-151	K3-176	K3-210	K3-260	K3-316	K3-450	K3-550	K3-700	K3-860	K3-1000	K3-1200
°C	-40 bis +60 (+90)[1]		-25 to +55 (+70)[2]											
°C	-40 to +40		-25 to +40											
°C	-25 to +60		-25 to +55											
°C	-25 to +40		-25 to +40											
°C	-50 to +90		-55 to +80											
kA	10	10	10	10	10	10	10	10	18	18	30	30	30	42
A	250	250	200	250	315	400	450	500	630	630	800	1000	1000	1250
A	160	200	160	200	250	315	400	400	500	560	-	-	-	-
A	100	125	125	160	200	250	315	-	-	-	-	-	-	-
mm²	0,5 - 16	10 - 16	busbar 18 x 4 screw M8			busbar 25 x 6 screw M10			busbar 30 x 5 screw M10	busbar 40 x 6 screw M12	busbar 50 x 8 screw M12	busbar 50 x 8 screw M14	busbar 50 x 10 screw 2 x M12	
mm²	0,5 - 70 (95)	25 - 95 (120)												
mm²	0,5 - 70	10 - 95												
mm²	0,5 - 95 + 10 - 120													
mm²														
mm²	0,5 - 70 + 25 - 95													
AWG	18 - 10	-												
AWG	18 - 3/0	8 - 4/0												
AWG	-													
AWG	18 - 3/0 + 8 - 4/0													
1/h	3000		1200			1200			1200				300	
1/h	300		240			150			50				20	
1/h	120		-			-			25				-	
1/h	300		-			-			-				-	
S x 10⁶	5		10			5			5				5 [3]	
S x 10⁶	5		10			5			5				5 [3]	
S x 10⁶	-		-			-			-				-	
A	680	880	920	1200	1400	1800	2200	2600	3600	4400	5600	6900	8000	9600
A	275	330	410	500	575	800	900	1000	1400	1750	2200	2600	3000	3600
W	4,8	7,9	7,9	9	11	8	11	14,9	26,3	33,3	49	59,2	60	72
mOhm	0,6	0,5	0,5	0,4	0,35	0,18	0,16	0,15						
g	7	7	-	-	-	-	-	-	-	-	-	-	-	-
g	5	5	-	-	-	-	-	-	-	-	-	-	-	-

1) With reduced control voltage range 0,9 up to 1,0 x U_s and with reduced rated current I_e /AC1, no deratings for I_e /AC3 values.
2) With reduced control voltage range 1,0 x U_s and with reduced rated current I_e /AC1 no deratings for I_e /AC3 values.
3) After each 1x10⁶ operations magnetic core and built-in auxiliary contact block must be changed.

Contactors

Data according to IEC 947-4-1, EN 60947-4-1, VDE 0660

Auxiliary Contacts		Type	**K(G)3-10**	**K(G)3-14**	**K(G)3-18**	**K(G)3-22**	**K(G)3-24**	**K(G)3-32**	**K(G)3-40**	**K3-50**	**K3-62**	**K3-74**
Rated insulation voltage U_i [1]		V~	690				-			-		
Thermal rated current I_{th} to 690V												
Ambient temperature	40°C	A	10		(16)[5]		-			-		
	60°C	A	6		(12)[5]		-			-		
Utilization category AC15												
Rated operational current I_e	220-240V	A	3		(12)[5]		-			-		
	380-415V	A	2		(4)[5]		-			-		
	440V	A	1,6		(4)[5]		-			-		
	500V	A	1,2		(3)[5]		-			-		
	660-690V	A	0,6		(1)[5]		-			-		
Utilization category DC13												
Rated operational current I_e	60V	A	3,5		(8)[5]		-			-		
	110V	A	0,5		(1)[5]		-			-		
	220V	A	0,1				-			-		
Short circuit protection short-circuit current 1kA, contact welding not accepted			For contactors with thermal overload relay the device with the smaller admissible control fuse (contactor or thermal overload relay) determines the fuse.									
max. fuse size	gL (gG)	A	20		(25)[5]		-			-		
Control Circuit												
Power consumption of coils												
AC operated	inrush	VA	33-45				90-115			140-165		
	sealed	VA	7-10				9-13			13-18		
		W	2,6-3				2,7-4			5,4-7		
DC operated	inrush	W	75				140			200		
double winding coil	sealed	W	2				2			6		
DC solenoid operated	inrush	W	3				4			-		
(KG3)	sealed	W	3				4			-		
Operation range of coils in multiples of control voltage U_s												
	AC operated		0,85-1,1				0,85-1,1			0,85-1,1		
	DC operated		0,8-1,1				0,8-1,1			0,8-1,1		
Switching time at control voltage U_s ±10% [2] [3]												
AC operated	make time	ms	8-16				10-25			12-28		
	release time	ms	5-13				8-15			8-15		
	arc duration	ms	10-15				10-15			10-15		
DC operated	make time	ms	8-12				10-20			12-23		
double winding coil	release time	ms	8-13				10-15			10-18		
	arc duration	ms	10-15				10-15			10-15		
DC solenoid operated	make time	ms	65 - 85				65 - 85			-		
(KG3)	release time	ms	20 - 30 [4]				20 - 30 [4]			-		
	arc duration	ms	10-15				10-15			-		
Cable cross-section												
Auxiliary connector	solid	mm²	0,75-6				-			-		
	flexible	mm²	1-4				-			-		
	flexible with multicore cable end	mm²	0,75-4				-			-		
Magnet coil	solid	mm²	0,75-2,5				0,75-2,5			0,75-2,5		
	flexible	mm²	0,5-2,5				0,5-2,5			0,5-2,5		
	flexible with multicore cable end	mm²	0,5-1,5				0,5-1,5			0,5-1,5		
Clamps per pole			2				2			2		
Auxiliary connector	solid	AWG	18 - 10				-			-		
	flexible	AWG	18 - 10				-			-		
Magnet coil	solid	AWG	14 - 12				14 - 12			14 - 12		
	flexible	AWG	18 - 12				18 - 12			18 - 12		
Clamps per pole			2				2			2		

1) Suitable for: earthed-neutral systems, overvoltage category I to IV, pollution degree 3 (standard-industry): U_{imp} = 8kV. Data for other conditions on request
2) Total breaking time = release time + arc duration
3) Values for delay of the release time of the make contact and the make time of the break contact will be increased, if magnet coils are protected against voltage peaks (varistor, RC-unit, diode-unit)
4) with built-in coil suppressor 5) for contactors KG3-..A.. only

Contactors

Data according to IEC 947-4-1, EN 60947-4-1, VDE 0660

Type	K3-90 K3-115	K3-116 K3-151 K3-176	K3-210 K3-260 K3-316	K3-450 K3-550	K3-700 K3-860	K3-1000 K3-1200
V~	-	-	-	690	690	690
A	-	-	-	10	10	10
A	-	-	-	-	-	-
-	-	-	-	-	-	-
A	-	-	-	3	3	3
A	-	-	-	2	2	2
A	-	-	-	1,5	1,5	1,5
A	-	-	-	1,5	1,5	1,5
A	-	-	-	1	1	1
A	-	-	-	-	-	-
A	-	-	-	1	1	1
A	-	-	-	0,5	0,5	0,5
A	-	-	-	10	10	10
VA	165-220	350	360	800-950	1350-1600	2400
VA	2,5-5	5	5	9-11	21-25	70
W	2,5-5	5	5	9-11	21-25	70
W	250	350	360	700-850	1300-1550	2100
W	5	5	5	8-10	18-22	60
W	-	-	-	-	-	-
W	-	-	-	-	-	-
	0,85-1,1	0,85-1,1	0,85-1,1	0,85-1,1		0,85-1,1
	0,8-1,1	0,85-1,1	0,85-1,1	0,85-1,1		0,85-1,1
ms	20-35	30-60	40-60	50-100		50-100
ms	35-50	30-80	15-45	150-200 / 500-1000[1]		25-50
ms	10-15		-	-		-
ms	20-35	30-60	40-60	-		-
ms	35-50	30-80	15-45	-		-
ms	10-15	-	-	-		-
ms	-	-	-	-		-
ms	-	-	-	-		-
ms	-	-	-	-		-
mm²	-	-	-	0,75-2,5		0,75-2,5
mm²	-	-	-	0,75-2,5		0,75-2,5
mm²	-	-	-	-		-
mm²	0,75-2,5	1-2,5	1-2,5	1-2,5		1-2,5
mm²	0,5-2,5	1-2,5	1-2,5	1-2,5		1-2,5
mm²	0,5-1,5	-	-	-		-
	2	2	2	2		2
AWG	-	-	-	16 - 12		16 - 12
AWG	-	-	-	16 - 12		16 - 12
AWG	14 - 12	16 - 12	16 - 12	16 - 12		16 - 12
AWG	18 - 12	16 - 12	16 - 12	16 - 12		16 - 12
	2	2	2	2		2

1) Normal or delayed drop is adjustable

Contactors

Data according to IEC 947-4-1, EN 60947-4-1, VDE 0660

Main Contacts		Type	**K2-09**	**K2-12**	**K2-16**	**K2-23**	**K2-30**	**K2-37**	**K2-45**	**K2-60**	**K85**	**K110**
Rated insulation voltage U_i [1]		V~	690	690	690	690	690	690	690	690	750	750
Making capacity I_{eff} at U_e = 690V~		A	200	200	200	400	500	500	700	900	1100	1200
Breaking capacity I_{eff}	400V~	A	180	180	200	380	400	400	600	800	950	1100
K2-09 to K2-16 cosφ = 0,65	500V AC	A	150	150	180	300	370	370	500	700	850	1100
K2-23 to K3-1200 cosφ = 0,35	690V AC	A	100	100	150	260	340	340	400	500	600	600
	1000V~	A	-	-	-	-	-	-	-	-	-	-
Utilization category AC1												
Switching of resistive load												
Rated operational current I_e (=I_{th})		**A**	**25**	**25**	**25**	**45**	**50**	**50**	**80**	**100**	**150**	**170**
at 40°C, open												
Rated operational power	220V	kW	9,5	9,5	9,5	17	19	19	30	38	57	64
of three-phase resistive loads	230V	kW	10	10	10	18	20	20	31,5	40	59	67
50-60Hz, cosφ = 1	240V	kW	10,5	10,5	10,5	18,5	20,5	20,5	33	41	62	70
	380V	kW	16,5	16,5	16,5	29,5	33	33	52	65	98	111
	400V	kW	17,5	17,5	17,5	31	34,5	34,5	55	69	103	117
	415V	kW	18	18	18	32	36	36	57	71	107	122
	440V	kW	19	19	19	34	38	38	61	76	114	129
	500V	kW	21,5	21,5	21,5	39	43	43	69	86	130	147
	660V	kW	28,5	28,5	28,5	51	57	57	91	114	171	194
	690V	kW	29,5	29,5	29,5	53,5	60	60	95	119	179	203
Rated operational current I_e (=I_{the})		A	20	25	25	35	40	40	63	80	100	125
at 60°C, enclosed												
Rated operational power	220V	kW	7,5	9,5	9,5	13	15	15	24	30	38	47
of three-phase resistive loads	230V	kW	8	10	10	13,5	16	16	25	31,5	40	49
50-60Hz, cosφ = 1	240V	kW	8	10,5	10,5	14,5	16,5	16,5	26	33	41	52
	380V	kW	13	16,5	16,5	23	26	26	41	52	65	82
	400V	kW	13,5	17,5	17,5	24	27,5	27,5	43	55	69	86
	415V	kW	14	18	18	25	28,5	28,5	45	57	71	89
	440V	kW	15	19	19	26,5	30	30	48	61	71	95
	500V	kW	17	21,5	21,5	30	34	34	54	69	86	116
	660V	kW	22,5	28,5	28,5	40	45	45	72	91	114	142
	690V	kW	23,5	29,5	29,5	42	48	48	75	95	119	149
Minimum cross-section of conductor												
at load with I_e (=I_{th})		mm^2	4	4	4	10	10	10	25	35	50	70
Utilization category AC2 and AC3												
Switching of three-phase motors												
Rated operational current I_e	220V	A	12	15	18	23	30	37	45	63	85	110
open and enclosed	230V	A	11,5	14,5	17,5	23	30	37	45	61	85	110
	240V	A	11	14	17	23	30	37	45	60	85	110
	380-400V	**A**	**10**	**12**	**16**	**23**	**30**	**37**	**45**	**60**	**85**	**110**
	415-440V	A	9	12	16	23	30	37	45	60	85	110
	500V	A	9	12	16	23	30	30	45	55	85	110
	660V	A	7	9	9	17,5	21	21	33	42	60	60
	690V	A	6,5	8,5	8,5	17	20	20	31	40	58	58
Rated operational power	220-230V	kW	3	4	5	6	8,5	11	12,5	18,5	25	33
of three-phase motors	240V	kW	3	4	5	7	9	11,5	13,5	19	27	35
50-60Hz	**380-400V**	**kW**	**4**	**5,5**	**7,5**	**11**	**15**	**18,5**	**22**	**30**	**45**	**55**
	415V	kW	4,5	6	8,5	12	16	20	24	33	49	63
	440V	kW	4,5	6	8,5	12	16	20	24	33	49	63
	500V	kW	5,5	7,5	10	15	18,5	18,5	30	37	55	55
	660-690V	kW	5,5	7,5	7,5	15	18,5	18,5	30	37	55	55

1) Suitable at 690V for: earthed-neutral systems, overvoltage category I to IV, pollution degree 3 (standard-industry): U_{imp} = 8kV.
Data for other conditions on request.

Contactors

Data according to IEC 947-4-1, EN 60947-4-1, VDE 0660

Main Contacts		Type	K2-09	K2-12	K2-16	K2-23	K2-30	K2-37	K2-45	K2-60	K85	K110
Utilization category AC4												
Switching of squirrel cage motors, inching												
Rated operational current I_e	220V	A	12	15	16	23	30	37	45	63	85	98
open and enclosed	230V	A	11,5	14,5	16	23	30	37	45	61	85	98
	240V	A	11	14	16	23	30	37	45	60	85	98
	380-400V	**A**	**10**	**12**	**16**	**23**	**30**	**37**	**45**	**60**	**85**	**85**
	415V	A	9	12	16	21	28	37	45	60	85	85
	440V	A	9	12	16	21	28	37	45	60	85	85
	500V	A	9	12	16	17	23	23	45	55	85	85
	660V	A	7	9	9	13	17	17	33	42	60	60
	690V	A	6,5	8,5	8,5	12,5	16,5	16,5	31	40	57,5	57,5
Rated operational power	220-230V	kW	3	4	5	6	8,5	11	12,5	18,5	25	30
of three-phase motors	240V	kW	3	4	5	7	9	11,5	13,5	19	27	32
50-60Hz	**380-400V**	**kW**	**4**	**5,5**	**7,5**	**11**	**15**	**18,5**	**22**	**30**	**45**	**45**
	415-440V	kW	4,5	6	8,5	11	15	20	24	33	49	49
	500V	kW	5,5	7,5	10	11	15	15	30	37	55	55
	660-690V	kW	5,5	7,5	7,5	11	15	15	30	37	55	55
Utilization category AC5a												
Switching of gas discharge lamps												
Rated operational current I_e												
per pole at 220/230V												
Fluorescent lamps, uncompensated		A	20	20	20	35	40	40	65	85	100	120
Fluorescent lamps, compensated		A	7	9	9	18	22	22	30	40	55	70
Fluorescent lamps, dual-connection		A	22,5	22,5	22,5	41	45	45	72	90	112	144
Metal-halide lamps[1], uncompensated		A	12	15	15	28	30	30	50	62	85	90
Metal-halide lamps[1], compensated		A	7	9	9	18	22	22	30	40	55	70
Mercury-vapour lamps[2], uncompensated		A	22,5	25	25	41	45	45	72	90	112	144
Mercury-vapour lamps[2], compensated		A	7	9	9	18	22	22	30	40	55	70
Mixed light lamps[3]		A	20	20	20	35	40	40	65	85	100	120
Utilization category AC5b												
Switching of incandescent lamps[4]												
Rated operational current I_e												
per pole at 220/230V		A	12,5	12,5	12,5	25	31	31	43	56	69	75
Utilization category AC6a												
Transformer primary switching												
at inrush		n	30	30	30	30	30	30	30	30	30	30
Rated operational current I_e	400V	A	4,5	5,5	7,5	10,5	13,5	13,5	20	27	38	50
Rated operational power	220-230V	kVA	1,8	2,2	3	4,2	5,4	5,4	8	10,7	15	20
dependent on inrush n	240V	kVA	1,9	2,3	3,1	4,3	5,6	5,6	8,3	11,2	15,5	20,5
	380-400V	kVA	3,1	3,8	5,2	7,3	9,3	9,3	13,5	18,5	26	34
For different inrush-factors x	415-440V	kVA	3,4	4,2	5,7	8	10,2	10,2	15	20,5	29	38
use the following formula:	500V	kVA	3,9	4,8	6,5	9	11,5	11,5	17	23	33	43
Px=Pn*(n/x)	660-690V	kVA	5,4	6,5	9	12,5	16	16	24	32	45	60
Utilization category DC1												
Switching of resistive load												
Time constant L/R ≤1ms	1 pole 24V	A	20	25	25	45	50	50	80	100	150	170
Rated operational current I_e	60V	A	20	25	25	45	50	50	80	100	150	170
	110V	A	6	6	6	10	10	10	12	12	20	25
	220V	A	0,8	0,8	0,8	1,4	1,4	1,4	1,4	1,4	2	2,5
	2 poles in series 24V	A				45	50	50				
	60V	A				45	50	50				
	110V	A				45	50	50				
	220V	A				10	10	10				
	3 poles in series 24V	A	20	25	25	45	50	50	80	100	150	170
	60V	A	20	25	25	45	50	50	80	100	150	170
	110V	A	20	25	25	45	50	50	80	100	150	170
	220V	A	16	20	20	30	35	35	63	80	100	160

1) Metal halide lamps and sodium-vapour lamps (high- and low-pressure lamps)
2) High-pressure lamps
3) Blended lamps, containing a mercury high-pressure unit and a tungsten helix in a flourescent glass bulb (daylight lamps)
4) Current inrush approx. 16 x I_e
5) With central compensation pay attention to the current inrush (capacitor switching contactors)

Contactors

Data according to IEC 947-4-1, EN 60947-4-1, VDE 0660

Main Contacts		Type	**K2-09**	**K2-12**	**K2-16**	**K2-23**	**K2-30**	**K2-37**	**K2-45**	**K2-60**	**K85**	**K110**
Utilization category DC3 and DC5 Switching of shunt motors and series motors												
Time constant L/R ≤15ms	1 pole 24V	A	20	25	25	45	50	50	80	100	150	170
Rated operational current I_e	60V	A	6	6	6	30	30	30	60	60	85	110
	110V	A	1,2	1,2	1,2	1,8	1,8	1,8	1,8	1,8	2	2,5
	220V	A	0,2	0,2	0,2	0,2	0,2	0,2	0,25	0,25	0,5	0,5
	2 poles in series 24V	A				45	50	50				
	60V	A				45	50	50				
	110V	A				30	30	30				
	220V	A				1,8	1,8	1,8				
	3 poles in series 24V	A	20	25	25	45	50	50	80	100	150	170
	60V	A	20	25	25	40	40	40	80	80	100	110
	110V	A	20	20	20	40	40	40	80	80	100	110
	220V	A	2,5	2,5	2,5	4	4	4	5	5	7	8
Maximum ambient temperature												
Operation	open	°C					-40 to +60 (+90) [1]					
	enclosed	°C					-40 to +40					
with thermal overload relay	open	°C					-25 to +60					
enclosed		°C					-25 to +40					
Storage		°C					-50 to +90					
Short circuit protection for contactors without thermal overload relay												
Coordination-type "1" according to IEC 947-4-1 Contact welding without hazard of persons												
max. fuse size	gL (gG)	A	63	63	63	80	80	80	160	160	250	250
Coordination-type “2” according to IEC 947-4-1 Light contact welding accepted												
max. fuse size	gL (gG)	A	25	35	35	50	50	50	100	125	160	200
Contact welding not accepted												
max. fuse size	gL (gG)	A	16	16	16	25	35	35	50	63	100	125
For contactors with thermal overload relay the device with the smaller admissible backup fuse (contactor or thermal overload relay) determines the fuse size.												
Cable cross-sections for contactors without thermal overload relay												
main connector	solid or stranded	mm²		0,75 - 4			1,5-10 + 1,5-6			4 - 35 [2]		10 - 70 [2]
	flexible	mm²		0,75 - 2,5			1,5-6 + 1,5-4			6 - 25 [2]		10 - 70 [2]
	flexible with multicore cable end	mm²		0,5 - 2,5			1,5-6 + 1,5-4			4 - 25		10 - 35
Cables per clamp				2			1+1			1		1
main connector	solid	AWG		14 - 10			14 - 10 + 14 - 10			10		10
	flexible	AWG		18 - 10			14 - 8 + 14 - 10			10 - 2		6 - 0
Cables per clamp				2			1+1			1		1
Frequency of operations z Contactors without thermal overload relay												
	without load	1/h		10000			7000			7000		3000
	AC3, I_e	1/h		600			600			400		300
	AC4, I_e	1/h		120			120			120		120
	DC3, I_e	1/h		600			600			400		300
Mechanical life												
AC operated		S x 10^6		10			10			10		5
DC operated with economy resistor		S x 10^6		10			10			10		5
Short time current	10s-current	A	96	120	144	184	240	296	360	504	680	880
Power loss per pole	at I_e/AC3 400V	W	0,21	0,26	0,4	0,63	1,1	1,7	1,8	3,6	4,3	6,0
Resistance to shock acc. to IEC 68-2-27												
Shock time 20ms sine-wave	NO	g	10	10	10	8	8	8	8	8	7	7
	NC	g	6	6	6	5	5	5	-	-	5	5

1) With reduced control voltage range 0,9 up to 1,0 x U_s and with reduced rated current I_e /AC1according to I_e /AC3
2) Maximum cable cross-section with prepared conductor

Contactors

Data according to IEC 947-4-1, EN 60947-4-1, VDE 0660

Auxiliary Contacts		Type	K2-09	K2-12	K2-16	K2-23	K2-30	K2-37	K2-45	K2-60	K85	K110
Rated insulation voltage U_i [1]		V AC		690			690		-		690	
Thermal rated current I_{th} to 690V												
Ambient temperature	40°C	A		16			16		-		16	
	60°C	A		12			12		-		12	
Utilization category AC15												
Rated operational current I_e	220-240V	A		12			12		-		12	
	380-415V	A		4			4		-		6	
	440V	A		4			4		-		6	
	500V	A		3			3		-		4	
	660-690V	A		1			1		-		2	
Utilization category DC13												
Rated operational current I_e	60V	A		8			8		-		8	
	110V	A		1			1		-		1	
	220V	A		0,1			0,1		-		0,1	
Short circuit protection short-circuit current 1kA, contact welding not accepted max. fuse size	gL (gG)	A		25			-		-		25	
For contactors with thermal overload relay the device with the smaller admissible control fuse (contactor or thermal overload relay) determines the fuse.												
Control Circuit												
Power consumption of coils												
AC operated	inrush	VA		33-45			90-115		140-165		280-350	350-420
	sealed	VA		7-10			9-13		13-18		16-23	23-29
		W		2,6-3			2,7-4		5,4-7		4-6	6-7,3
DC operated	inrush	W		75			140		200		170	320
with economic circuit	sealed	W		2			2		6		2	4
Operation range of coils in multiples of control voltage U_s												
AC operated				0,85-1,1			0,85-1,1		0,85-1,1		0,85-1,1	
DC operated				0,8-1,1			0,8-1,1		0,8-1,1		0,8-1,1	
Switching time at control voltage U_s ±10% [2] [3]												
AC operated	make time	ms		8-16			10-25		12-28		13-30	
	release time	ms		5-13			8-15		8-15		8-15	
	arc duration	ms		10-15			10-15		10-15		10-15	
DC operated	make time	ms		8-12			10-20		12-23		20-30	
with AC magnet system	release time	ms		8-13			10-15		10-18		10-18	
	arc duration	ms		10-15			10-15		10-15		10-15	
Cable cross-section												
Auxiliary connector	solid	mm²		0,75-4			-		-		0,75-2,5	
	flexible	mm²		0,75-2,5			-		-		0,75-2,5	
	flexible with multicore cable end	mm²		0,5-2,5			-		-		0,5-1,5	
Magnet coil	solid	mm²		0,75-2,5			0,75-2,5		0,75-2,5		0,75-2,5	
	flexible	mm²		0,5-2,5			0,5-2,5		0,5-2,5		0,5-2,5	
	flexible with multicore cable end	mm²		0,5-1,5			0,5-1,5		0,5-1,5		0,5-1,5	
Clamps per pole				2			2		2		2	

1) Suitable for: earthed-neutral systems, overvoltage category I to IV, pollution degree 3 (standard-industry): U_{imp} = 8kV. Data for other conditions on request
2) Total breaking time = release time + arc duration
3) Values for delay of the release time of the make contact and the make time of the break contact will be increased, if magnet coils are protected against voltage peaks (varistor, RC-unit, diode-unit)

Contactors for North America

Data according to UL508

Main Contacts (cULus)		Type	**K(G)3-10**	**K(G)3-14**	**K(G)3-18**	**K(G)3-22**	**K(G)3-24**	**K(G)3-32**	**K(G)3-40**	**K3-50**	**K3-62**	**K3-74**
Rated operational current "General Use"	NO	A	25	25	30	30	50	65	80	110	120	130
	NC	A	25	25	30	30	40	50	65	-	-	-
Motor DOL 3-phase at 60Hz												
Rated operational power	110-120V	hp	1½	2	2	3	5	5	7½	10	10	10
	200V	hp	3	3	5	5	7½	10	10	15	20	25
	220-240V	hp	3	3	7½	7½	10	10	15	20	25	30
	277V	hp	3	5	7½	7½	7½	10	15	20	25	30
	380-415V	hp	5	5	10	10	10	15	20	25	30	40
	440-480V	hp	5	7½	10	15	15	20	25	30	40	50
	550-600V	hp	7½	10	15	20	20	25	30	40	50	50
Motor DOL 1-phase at 60Hz												
Rated operational power of AC motors at 60Hz (1ph)	110-120V	hp	½	¾	1	1½	1½	2	3	3	5	7½
	200V	hp	1	1,5	2	3	3	5	7½	7½	10	15
	220-240V	hp	1½	2	3	3	5	5	7½	10	15	15
	277V	hp	2	3	3	5	5	7½	10	10	15	15
	380-415V	hp	3	3	5	5	5	7½	10	15	20	20
	440-480V	hp	3	5	5	7½	7½	10	15	20	25	25
	550-600V	hp	3	5	7½	10	10	15	20	25	30	30
Motor DOL 3-phase according to **ASME A17.5** Rated operational current	600V	A	-	-	-	-	15	22	-	27	37	-
Rated operational power of 3-phase motors for elevators (500.000 operations)	110-120V	hp	-	-	-	-	2	3	-	3	5	-
	200V	hp	-	-	-	-	3	5	-	7½	10	-
	220-240V	hp	-	-	-	-	5	7½	-	7½	10	-
	440-480V	hp	-	-	-	-	10	15	-	20	25	-
	550-600V	hp	-	-	-	-	10	20	-	25	30	-
Rated current 2 series contacts	600V	A	-	-	-	20,5	22	27	34	44	52	60
Fuse Class RK5 / Short-circuit current		A/kA	50/5	50/5	70/5	90/5	90/5	125/5	175/5	200/5	250/5	300/5
Fuse Class T / Short-circuit current		A/kA	45/100	50/100	70/100	90/100	110/100	150/100	150/100	175/100	175/100	175/100
Rated voltage		V	600	600	600	600	600	600	600	600	600	600
Auxiliary Contacts (cULus)			A600	A600	A600	A600	-	-	-	-	-	-

Main Contacts (cULus)		Type	**K2-09**	**K2-12**	**K2-16**	**K2-23**	**K2-30**	**K2-45**	**K2-60**	**K85**	**K110**
Rated operational current "General Use"		A	25	25	25	40	40	72	90	125	150
Motor DOL 3-phase at 60Hz Rated operational power	110-120V	hp	1½	2	2	3	5	-	-	15	-
	200V	hp	2	3	3	5	7½	10	15	-	30
	220-240V	hp	3	3	5	7½	10	15	20	35	40
	440-480V	hp	5	7½	10	15	20	30	40	65	75
	550-600V	hp	7½	10	15	20	25	40	50	85	100
Motor DOL 1-phase at 60Hz Rated operational power	110-120V	hp	½	¾	1	1½	2	3	5	8	10
	200V	hp	1	2	2	3	3	5	7½	-	20
	220-240V	hp	1½	2	3	3	5	7½	10	20	20
Fuse / Short-circuit current		A/kA	30/5	40/5	50/5	60/5	110/5	175/5	175/5	-	300/5
Rated voltage		V	600	600	600	600	600	600	600	600	600
Auxiliary Contacts (cULus)			A600	A600	A600	A600	A600	-	-	A600	A600

Contactors for North America

Data according to UL508

Type	K3-90	K3-115	K3-116	K3-151	K3-176	K3-210	K3-260	K3-316	K3-450	K3-550	K3-700	K3-860	K3-1000	K3-1200
A	160	200	150	180	220	250	300	350	420	520	700	810	-	1215
A	-	-	-	-	-	-	-	-	-	-	-	-	-	-
hp	15	20	-	-	-	-	-	-	-	-	-	-	-	
hp	25	35	30	40	50	60	75	100	125	150	200	250	-	450
hp	35	40	40	50	60	75	100	125	125	150	250	300	-	450
hp	-	-	-	-	-	-	-	-	-	-	-	-	-	-
hp	50	60	-	-	-	-	-	-	-	-	-	-	-	-
hp	65	75	75	100	125	150	200	250	250	350	500	600	-	900
hp	85	100	100	125	150	200	250	300	250	350	500	600	-	900
hp	8	10	10	15	25	-	-	-	-	-	-	-	-	-
hp	15	20	20	-	-	-	-	-	-	-	-	-	-	-
hp	20	25	-	25	30	40	50	50	-	-	-	-	-	-
hp	20	25	-	-	-	-	-	-	-	-	-	-	-	-
hp	30	40	-	-	-	-	-	-	-	-	-	-	-	-
hp	40	50	-	-	-	-	-	-	-	-	-	-	-	-
hp	50	60	-	-	-	-	-	-	-	-	-	-	-	-
A	-	-	-	-	-	-	-	-	-	-	-	-	-	-
hp	-	-	-	-	-	-	-	-	-	-	-	-	-	-
hp	-	-	-	-	-	-	-	-	-	-	-	-	-	
hp	-	-	-	-	-	-	-	-	-	-	-	-	-	-
hp	-	-	-	-	-	-	-	-	-	-	-	-	-	-
hp	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A/kA	300/10	300/10	225/10	300/10	350/10	400/18	500/18	500/18	1200/18	1200/18	2000/30	2000/30	-	2000/42
A/kA	300/100 [3]	300/100 [3]	-	-	-	-	-	-	-	-	-	-	-	-
V	600	600	600	600	600	600	600	600	600	600	600	600	-	600
	-	-	-	-	-	-	-	-	A600	A600	A600	A600	-	A600

Main Contacts (cULus)	Type	K3-18NK	K3-18NBK	K3-24K	K3-32K	K3-50K	K3-62K	K3-74K	K3-90K	K3-115K
Rated operational power of 3-phase cap. banks 110-120V at 60Hz (3ph)	kVAr	0-3,5	0-3,5	3-5,5	3-7	6,5-10	6,5-15	6,5-18 [1]	10-24	10-28 [2]
200V	kVAr	0-6	0-6	4,5-10	4,5-12,5	10-16,7	10-25	10-32 [1]	17-40	17-46 [2]
220-240V	kVAr	0-7	0-7	5,5-11	5,5-15	12,5-20	12,5-30	12,5-36 [1]	20-47	20-56 [2]
440-480V	kVAr	0-15	0-15	11,5-25	11,5-30	25-40	25-60	25-72 [1]	40-95	40-114 [2]
550-600V	kVAr	0-18	0-18	14,5-30	14,5-35	31-50	31-75	31-90 [1]	50-120	50-143 [2]
Fuse Class RK5 / Short-circuit current	A/kA	70/5	70/5	90/5	125/5	200/5	250/5	300/5	300/10	300/10
Fuse Class T / Short-circuit current	A/kA	80/100	80/100	110/100	150/100	175/100	175/100	175/100	300/100 [3]	300/100 [3]
Rated voltage	V	600	600	600	600	600	600	600	600	600
Auxiliary Contacts (cULus)		A600	A600	-	-	-	-	-	-	-

1) Consider the max. thermal current of the contactor K3-74A: I_{th} 130A
2) Consider the min. cross-section of conductor at max. load
3) Class T and Class RK1

Contactors

Data according to IEC 947-4-1, EN 60947-4-1, VDE 0660

Contact Life

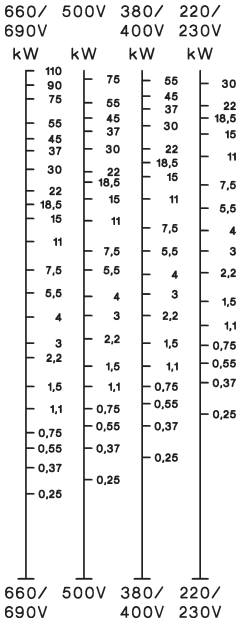
For selection of the suitable contactor-type according to supply voltage, power rating and application (utilization category AC1, AC3 or AC4) use contact life characteristic diagram.
For the most common supply voltages four scales of power ratings P_n are provided for each utilization category.
Select contactor-type according to utilization category **AC3** (breaking current $I_a = I_e$) using the **motor rating** scales to the right, according to utilization category **AC4** (breaking current $I_a = 6 \times I_e$) using the **motor rating** scales to the left. [1]
Select contactor-type according to utilization category **AC1** (breaking current $I_a = I_e$/AC1) using the **breaking current** scale. [1]

For contactors frequently used under AC3/AC4-mixed service conditions calculate contact life with the formula:

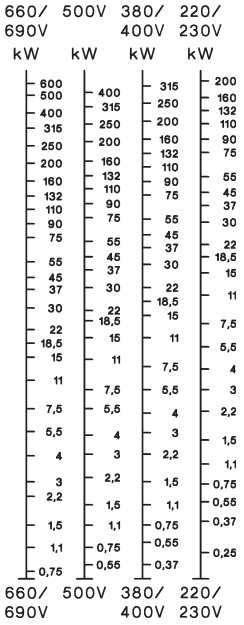
$$M = \frac{AC3}{1 + \frac{\%AC4}{100} X \left(\frac{AC3}{AC4} - 1 \right)}$$

M = Contact life (switching cycles) for AC3/AC4-mixed operations
AC3 = Contact life (switching cycles) for AC3 operations (normal switching conditions). Breaking current I_a = rated motor current I_n.
AC4 = Contact life (switching cycles) for AC4 operations (inching).
Breaking current I_a = multiples of rated motor current I_n.
%AC4 = Percents of AC4-operations related to the total cycles.

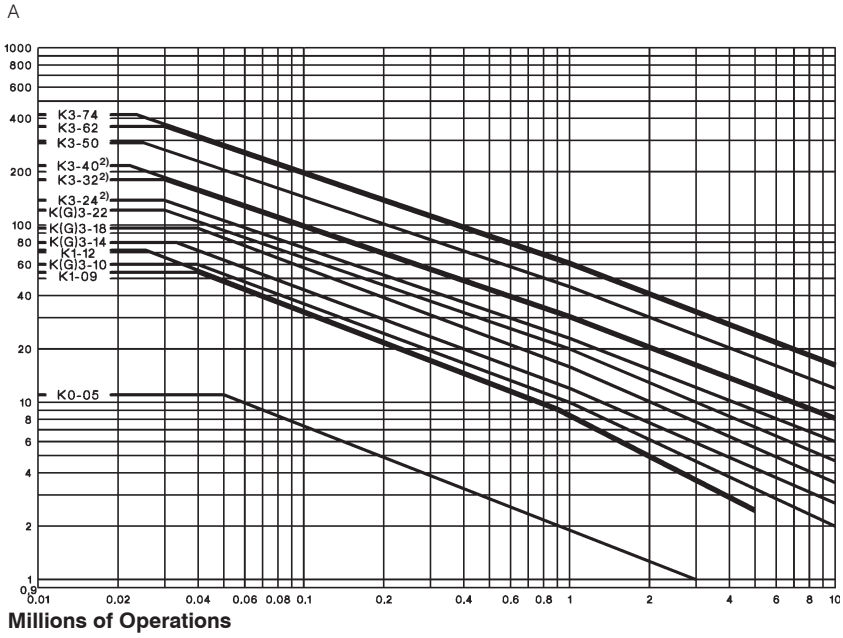
Motor Rating
P_n = AC4



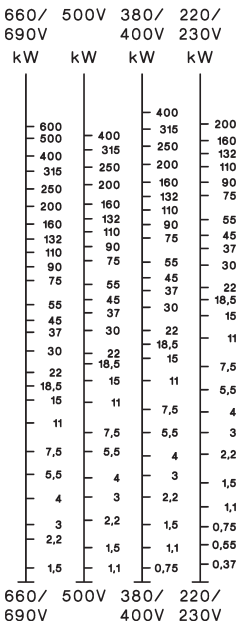
Motor Rating
P_n = AC3



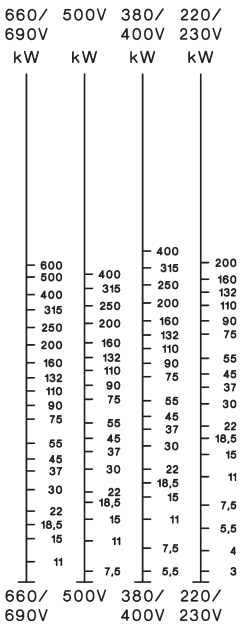
Breaking Current
I_a (= I_e = AC1)



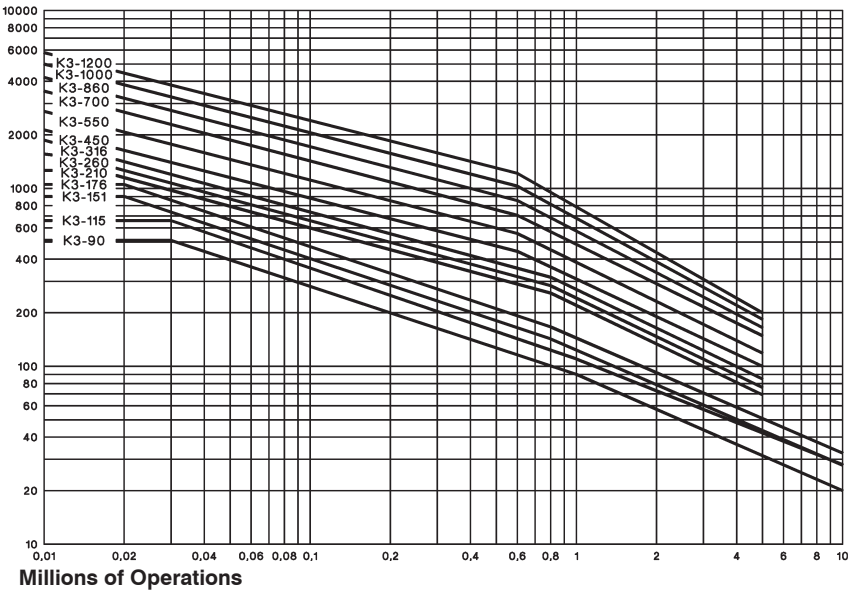
Motor Rating
P_n = AC4



Motor Rating
P_n = AC3



Breaking Current
I_a (= I_e = AC1)



1) Pay attention to the approved rated values of the selected contactor according to the national approvals.
2) Valid for NO contacts. NC contacts minus 50 %.

Contactors

Utilization Categories

For easier choice of devices and in order to make the comparison of different products simplier are utilization categories for contactors and motor-starters according to IEC 947-4-1 and VDE 0660 Part 102, for control circuit devices and switching elements according to IEC 947-5-1 and VDE 0660 Part 200 determind. The table offers different utilization categories, typical applications and assorted test conditions.

Type of current	Category	Typical applications	Rated operational current	Test conditions for the number of on-load operating cycles						Test conditions for making and breaking capacities					
				Make			Break			Make			Break		
				I/I_e	U/U_e	cosφ	I_c/I_e	U_r/U_e	cosφ	I/I_e	U/U_e	cosφ	I_c/I_e	U_r/U_e	cosφ
Alternating Current	**AC1**	Non-inductive or slightly inductive loads resistance furnaces	all values	1	1	0,95	1	1	0,95	1,5	1,05	0,8	1,5	1,05	0,8
	AC2	Slip-ring motors: starting, switching off	all values	2,5	1	0,65	2,5	1	0,65	4	1,05	0,65	4	1,05	0,65
	AC3	Squirrel-cage motors: starting, switching off motors during running	$I_e \leq$ 17A 17A< $I_e \leq$ 100A $I_e >$ 100A	6 6 6	1 1 1	0,65 0,35 0,35	1 1 1	0,17 0,17 0,17	0,65 0,35 0,35	10 10 10	1,05 1,05 1,05	0,45 0,45 0,35	8 8 8	1,05 1,05 1,05	0,45 0,45 0,35
	AC4	Squirrel-cage motors: starting, plugging, inching	$I_e \leq$ 17A 17A< $I_e \leq$ 100A $I_e >$ 100A	6 6 6	1 1 1	0,65 0,35 0,35	6 6 6	1 1 1	0,65 0,35 0,35	12 12 12	1,05 1,05 1,05	0,45 0,45 0,35	10 10 10	1,05 1,05 1,05	0,45 0,45 0,35
	AC5a	Switching of electric discharge lamp controls	all values	-	-	-	-	-	-	3	1,05	0,45	3	1,05	0,45
	AC5b	Switching of incandescent lamps	all values	-	-	-	-	-	-	1,5	1,05	1)	4	1,05	1)
	AC6a	Switching of transformers	$I_e \leq$ 100A $I_e >$ 100A	- -	- -	- -	- -	- -	- -	4,5 4,5	1,05 1,05	0,45 0,35	3,6 3,6	1,05 1,05	0,45 0,35
	AC6b	Switching of capacitors	-	-	-	-	-	-	-	2)			2)		
	AC7a	Slightly inductive loads in household appliances and similar applications	all values	-	-	-	-	-	-	1,5	1,05	0,8	1,5	1,05	0,8
	AC7b	Motor loads for household applications	$I_e \leq$ 100A $I_e >$ 100A	- -	- -	- -	- -	- -	- -	8 8	1,05 1,05	0,45 0,35	6 6	1,05 1,05	0,45 0,35
	AC8a	Hermetic refrigerant compressor motor control with manual resetting of overload releases	$I_e \leq$ 100A $I_e >$ 100A	- -	- -	- -	- -	- -	- -	6 6	1,05 1,05	0,45 0,35	6 6	1,05 1,05	0,45 0,35
	AC8b	Hermetic refrigerant compressor motor control with automatic resetting of overload releases	$I_e \leq$ 100A $I_e >$ 100A	- -	- -	- -	- -	- -	- -	6 6	1,05 1,05	0,45 0,35	6 6	1,05 1,05	0,45 0,35
	AC12	Control of resistive loads and solid state loads with isolation by opto couplers	all values	-	-	-	-	-	-	1	1	0,9	1	1	0.9
	AC13	Control of solid state loads with transformer isolation	all values	-	-	-	-	-	-	10	1,1	0,65	1,1	1,1	0,65
	AC14	Control of small electromagnetic loads (≤72VA)	-	-	-	-	-	-	-	6	1,1	0,7	6	1,1	0,7
	AC15	Control of electromagnetic load (>72VA)	-	10	1	0,7	1	1	0,4	10	1,1	0,3	10	1,1	0,3
				Make		L/R	Break		L/R	Make		L/R	Break		L/R
				I/I_e	U/U_e	[ms]	I_c/I_e	U_r/U_e	[ms]	I/I_e	U/U_e	[ms]	I_c/I_e	U_r/U_e	[ms]
Direct Current	**DC1**	Non-inductive or slightly inductive loads resistance furnaces	all values	1	1	1	1	1	1	1,5	1,05	1	1,5	1,05	1
	DC3	Shunt-motors: starting, plugging, inching dynamic braking of d.c. motors	all values	2,5	1	2	2,5	1	2	4	1,05	2,5	4	1,05	2,5
	DC5	Series-motors: starting, plugging, inching dynamic braking of d.c. motors	all values	2,5	1	7,5	2,5	1	7,5	4	1,05	15	4	1,05	15
	DC6	Switching of incandescent lamps	all values	-	-	-	-	-	-	1,5	1,05	1)	4	1,05	1)
	DC12	Control of resistive loads and solid state loads with isolation by opto couplers	all values	-	-	-	-	-	-	1	1	1	1	1	1
	DC13	Control of electromagnets	all values	1	1	≤300	1	1	≤300	1,1	1,1	≤300	1,1	1,1	≤300
	DC14	Control of electromagnetic loads having economy resistors in circuit	all values	-	-	-	-	-	-	10	1,1	15	10	1,1	15

1) Test with incandescent lamps
2) Test conditions according to standard

Accessories

Data according to IEC 947-5-1, EN 60947-5-1, VDE 0660

Type			HN	HTN	HA	HB	HKT	HKA	HKF HKB	K2-DK K2-SK	K2-L [2]
Rated insulation voltage U_i [1]		V AC	690	690	690	690	690	690	690	690	690
Thermal rated current I_{th} to bis 690V											
Ambient temperature	max. 40°C	A	10	10	25	10	10	10	16	26	10
	max. 60°C	A	6	6	20	6	-	-	-	-	6
Frequency of operations z		1/h	3000	-	3000	3000	-	-	-	-	3000
Mechanical life		S x 10^6	10	10	10	10	-	-	-	-	10
Power loss per pole at I_e/AC1		W	0,5	0,5	1,5	0,5	-	-	-	-	-
Utilization category AC15											
Rated operational	220-240V	A	3	3	6	3	3	3	3	-	3
current I_e	380-400V	A	2	2	3	2	2	2	2	-	2
	440V	A	1,6	1,6	2	1,6	1,5	1,5	1,5	-	1,6
	500V	A	1,2	1,2	2	1,2	1,5	1,5	1,5	-	1
	660-690V	A	0,6	0,6	1	0,6	1	1	1	-	0,5
Utilization category DC13											
Rated operational	24V	A	2	2	8	2	5	4	6	-	2
current I_e	48V	A	2	2	8	2	2	1,5	3	-	2
	60V	A	2	2	8	2	-	-	-	-	2
	110V	A	0,4	0,4	1	0,4	0,8	0,5	1	-	0,4
	220V	A	0,1	0,1	0,1	0,1	0,4	0,2	0,5	-	0,1
Short circuit protection short-circuit current 1kA, contact welding not accepted max. fuse size	gL (gG)	A	20	20	25	20	10	10	10	-	10
For contactors with thermal overload relay or auxiliary contacts the device with the smaller admissible control fuse (contactor or thermal overload relay) determines the fuse size.											
Cable cross-sections											
solid or stranded		mm^2	0,75-2,5	0,75-2,5	0,75-2,5	0,75-2,5	0,75-2,5	0,75-2,5	0,75-2,5	0,75-2,5	0,75-2,5
flexible		mm^2	0,75-2,5	0,75-2,5	0,75-2,5	0,75-2,5	0,75-2,5	0,75-2,5	0,75-2,5	0,75-2,5	0,75-2,5
flexible with multicore cable end		mm^2	0,5-1,5	0,5-1,5	0,5-1,5	0,5-1,5	0,5-1,5	0,5-1,5	0,5-1,5	0,5-1,5	0,5-1,5
solid		AWG	14 - 12	14 - 12	14 - 12	14 - 12	14 - 12	14 - 12	14 - 12	14 - 12	14 - 12
flexible		AWG	18 - 12	18 - 12	18 - 12	18 - 12	18 - 12	18 - 12	18 - 12	18 - 12	18 - 12
Cables per clamp			2	2	2	2	2	2	2	2	2

Data according to CSA, UL and CUL

Type			HN	HTN	HA	HB..	HKA, HKT HKF	K2-DK K2-SK	K2-L [2]
Rated operational current "General Use"		A	10	10	16	10	10	-	-
Rated operational voltage	max.	V AC	600	600	600	600	600	-	600
Auxiliary Contacts			A600	A600	A600	A600	A600	-	Intermittent duty

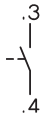
1) Suitable for: earthed-neutral systems, overvoltage category I to IV, pollution degree 3 (standard-industry): U_{imp} = 8kV. Data for other conditions on request.
2) Command duration min. 30ms, 10% duty cycle, max. 30 sec.

Contactors and Accessories

Wiring diagrams

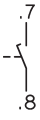
Auxiliary contact blocks

HN10
HA10



HN01
HA01

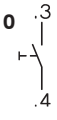
HN10U



HN01U

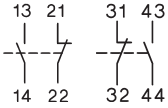
Snap-on momentary contact blocks

HTN10

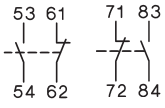


HTN01

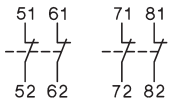
HKS11
HKA11



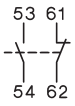
HB11-1
HB11



HB02

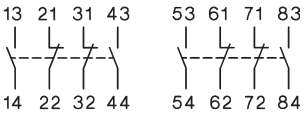


HKT11

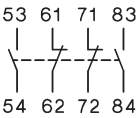


HB11, HB02:
Correct terminal marking is given by mounting.

HKF22



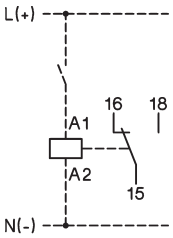
HKT22



Indicator units

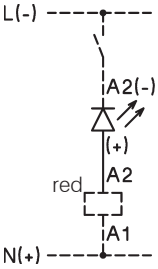
Electronic timer

K3-T180 240



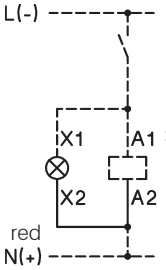
Coil current indicator

K2-ING
K2-INR



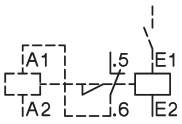
Voltage indicator

K2-UN
K2-UNR



Latch

K2-L..

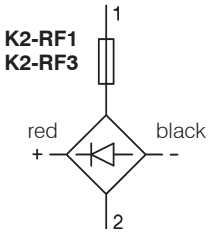


Fuse holder

K2-F

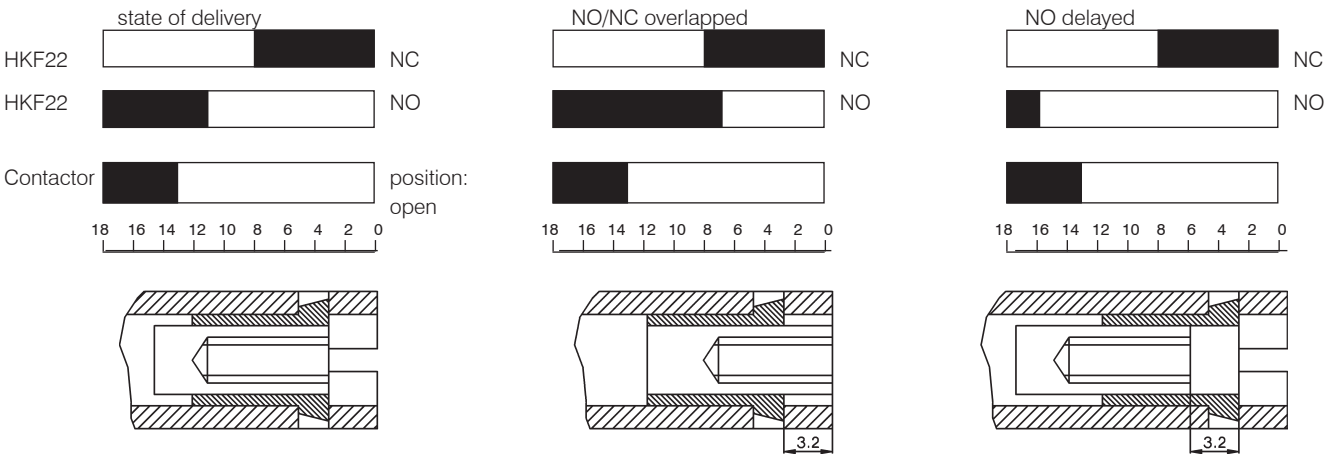
with rectifier

K2-RF1
K2-RF3



Colours mentioned in wiring diagram refer to the outgoing connection wires of the device.

Regulation of switch position of aux. contakt block HKF22 for contactors K3-450 to K3-860



Standard position of regulation screw

Regulation screw position (unscrew by 4 turns)

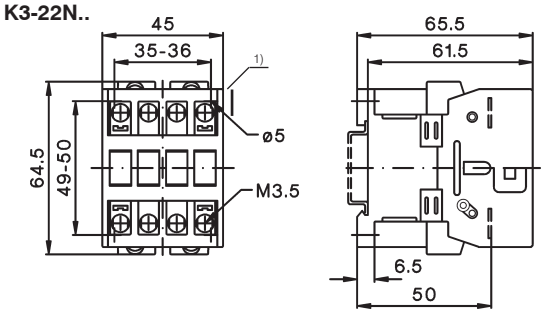
Regulation screw position (screw by 4 turns)

Contactors

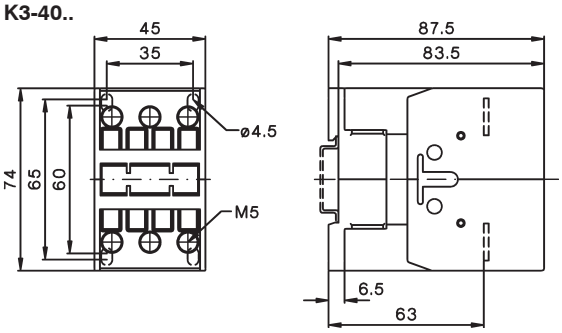
Dimensions

AC operated

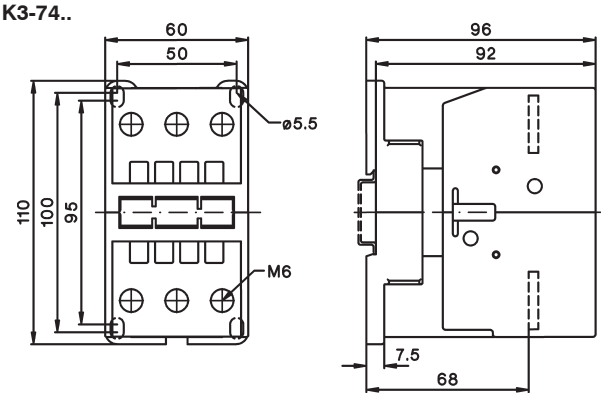
K3-10N..
K3-14N..
K3-18N..
K3-22N..



K3-24..
K3-32..
K3-40..

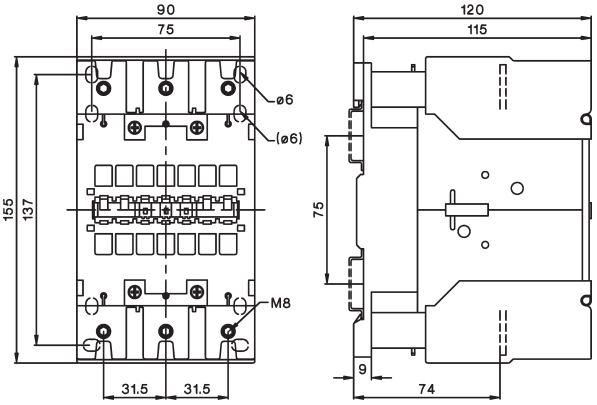


K3-50..
K3-62..
K3-74..



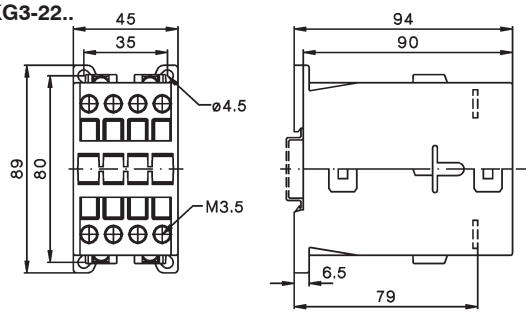
AC and DC operated

K3-90..
K3-115..

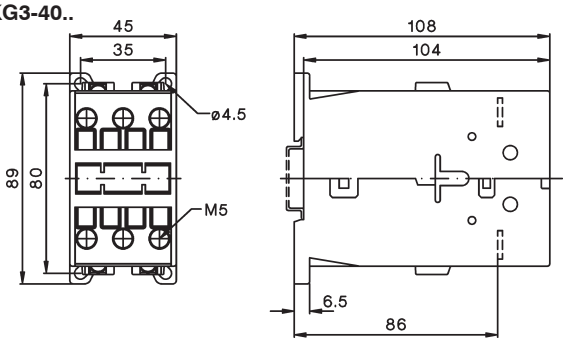


DC operated

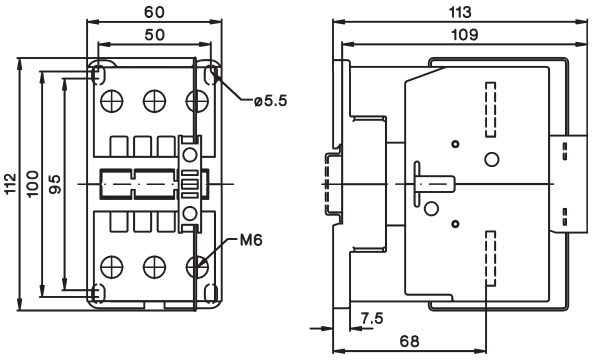
KG3-10..
KG3-14..
KG3-18..
KG3-22..



KG3-24..
KG3-32..
KG3-40..



K3-50..=
K3-62..=
K3-74..=



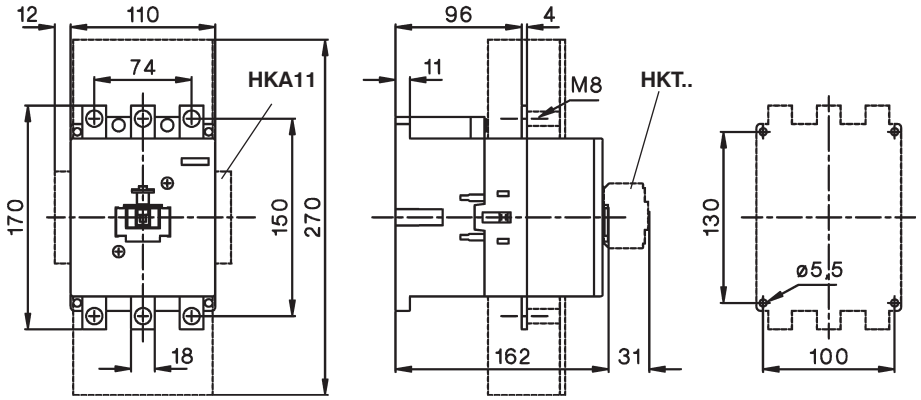
1) Minimum side distance to conductive parts for coil voltage:

500V	U_{imp}=6kV	2mm
660-690V	U_{imp}=8kV	4,5mm

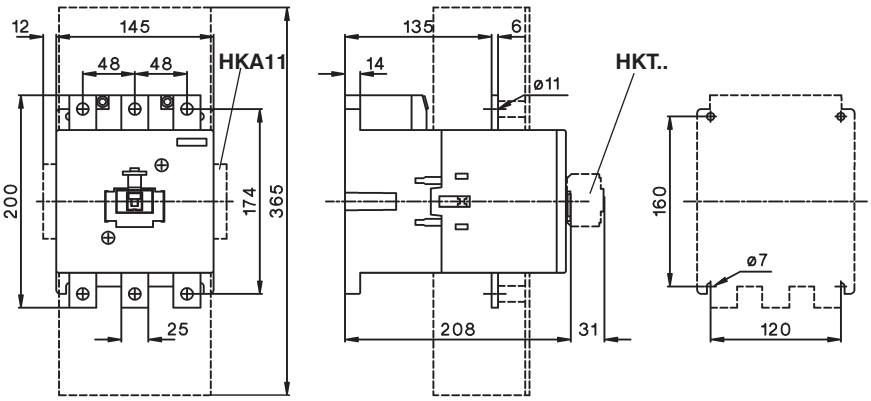
Contactors

Dimensions, AC operated, DC operated

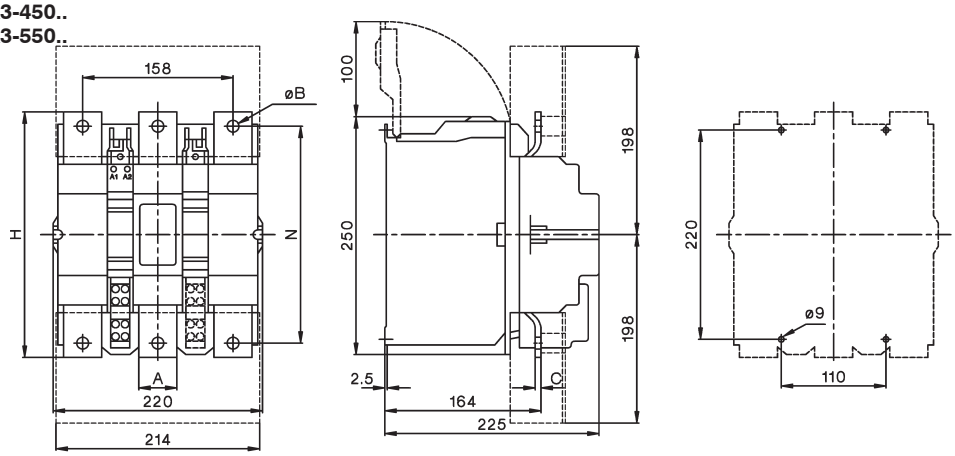
K3-151..
K3-176..



K3-210..
K3-260..
K3-316..

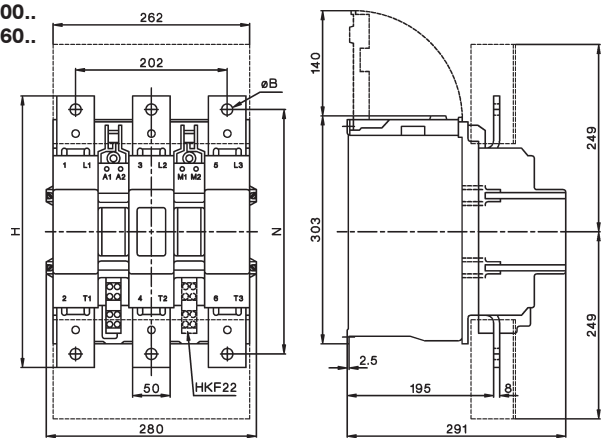


K3-450..
K3-550..



Type	A	B	C	H	N
K3-450	40	10,5	4	233	206
K3-550	40	12,5	6	258	228

K3-700..
K3-860..



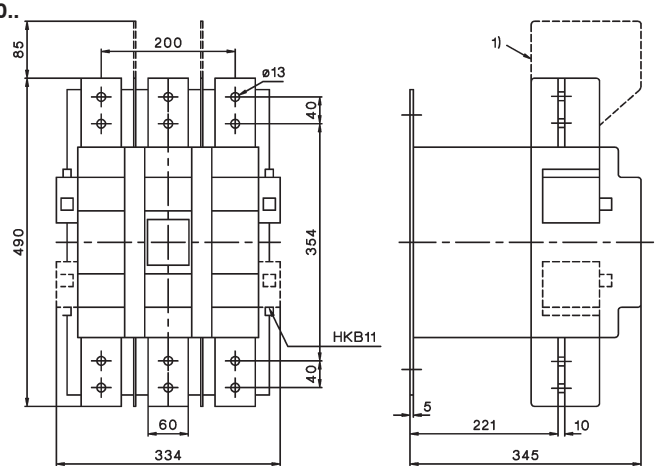
Type	B	H	N
K3-700	13	310	277
K3-860	15	361	325

Contactors

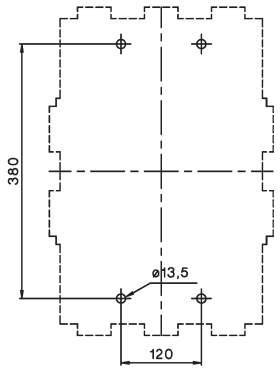
Dimensions

AC operated, DC operated

K3-1000..
K3-1200..

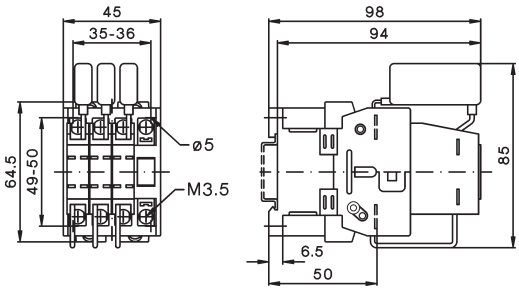


1) nur für K3-1200 in UL-Ausführung

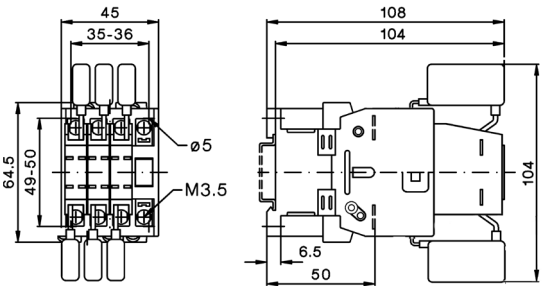


Capacitor Switching Contactors, AC operated

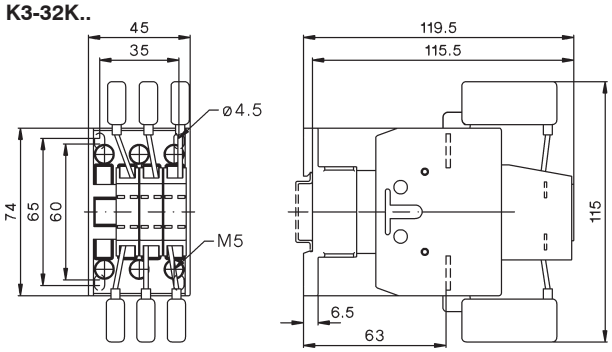
K3-18NK..



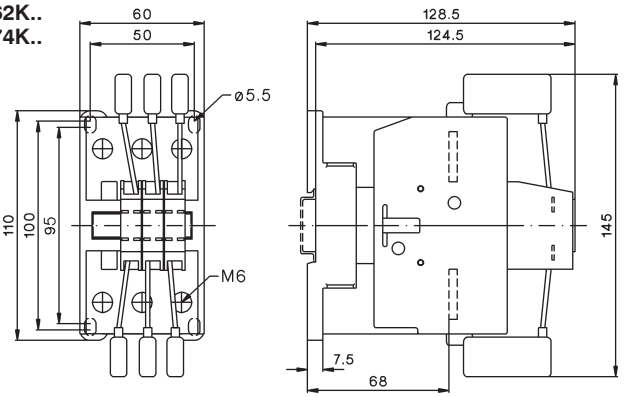
K3-18NBK..



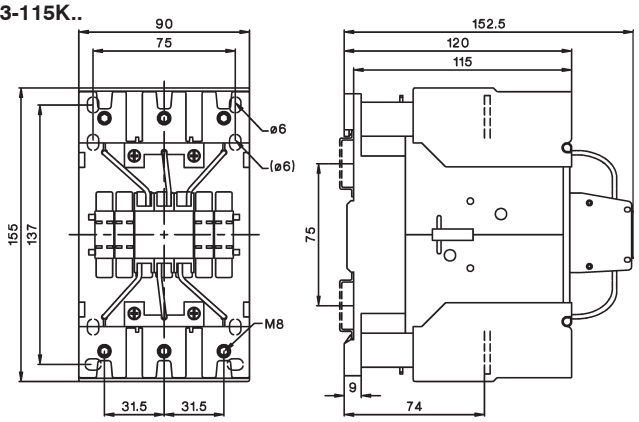
K3-24K..
K3-32K..



K3-50K..
K3-62K..
K3-74K..



K3-90K..
K3-115K..

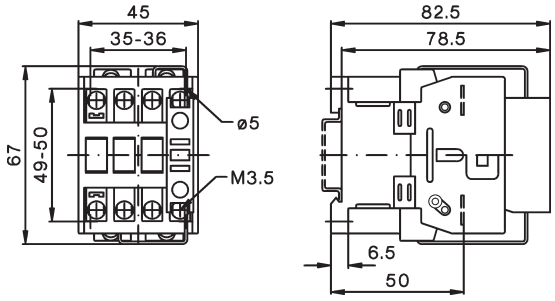


Contactors

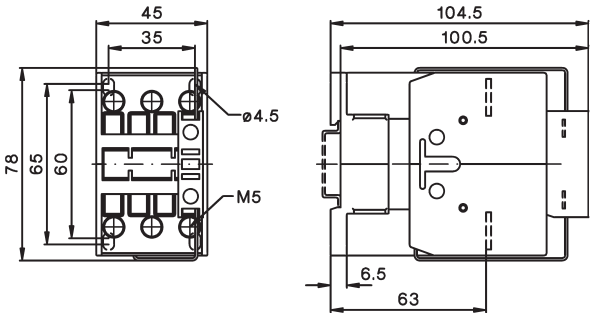
Dimensions

Contactors DC operated

K3-10N..=
K3-14N..=
K3-18N..=
K3-22N..=

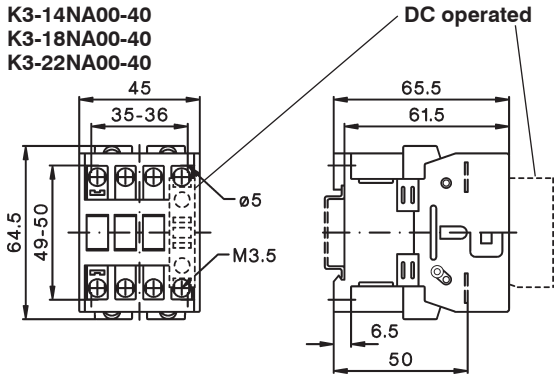


K3-24..=
K3-32..=
K3-40..=

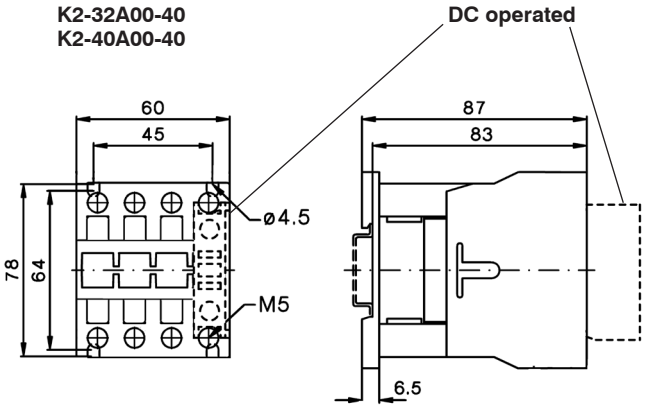


Contactors 4-pole, AC operated / DC operated

K3-10NA00-40
K3-14NA00-40
K3-18NA00-40
K3-22NA00-40

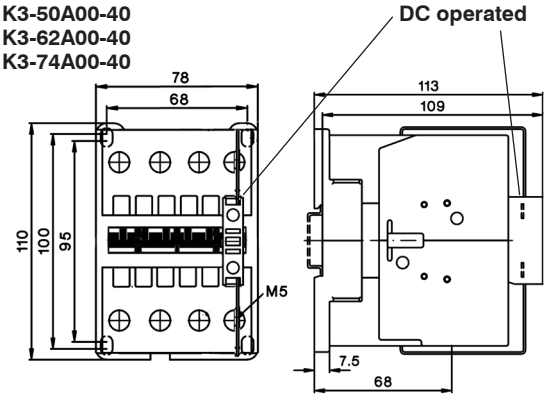


K3-24A00-40
K2-32A00-40
K2-40A00-40

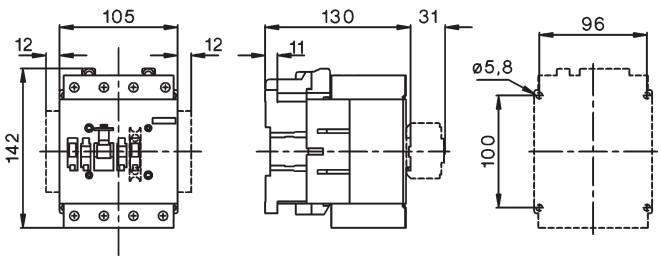


Contactors 4-pole, AC operated / DC operated

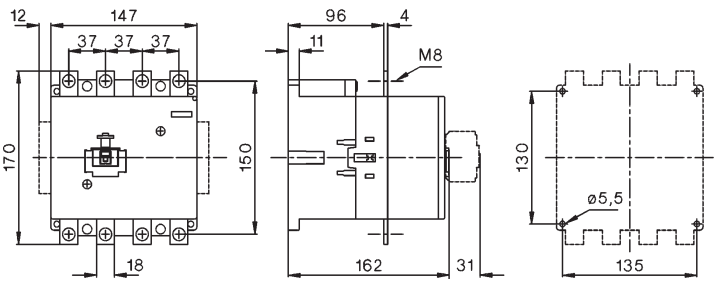
K3-50A00-40
K3-62A00-40
K3-74A00-40



K3-96A00-40



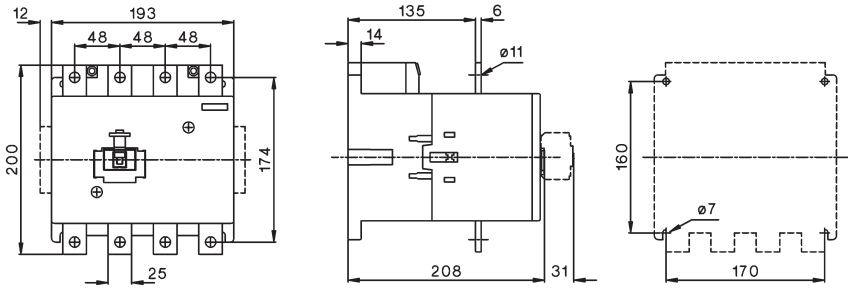
K3-116A00-40
K3-151A00-40



Contactors

Contactors 4-pole, AC and DC operated

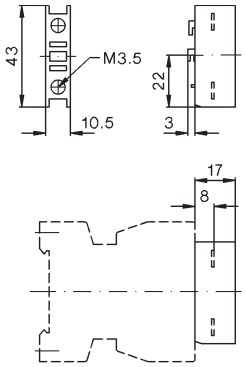
K3-210A00-40
K3-260A00-40
K3-316A00-40



Dimensions Accessories

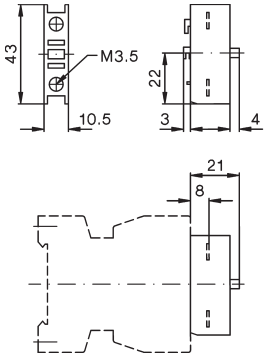
Aux. cont. blocks, terminal blocks

HN10, HN01 K2-SK, K2-DK



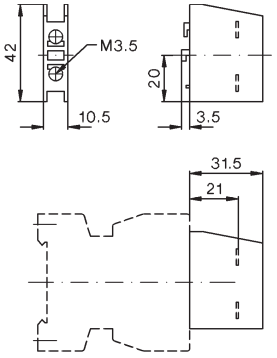
Snap-on momentary cont. blocks

HTN10, HTN01

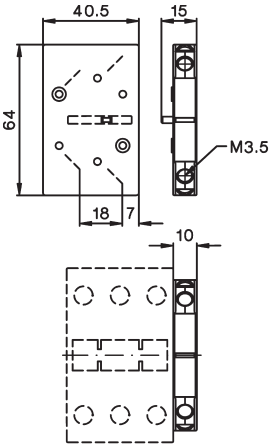


Auxiliary contact blocks

HA10, HA01

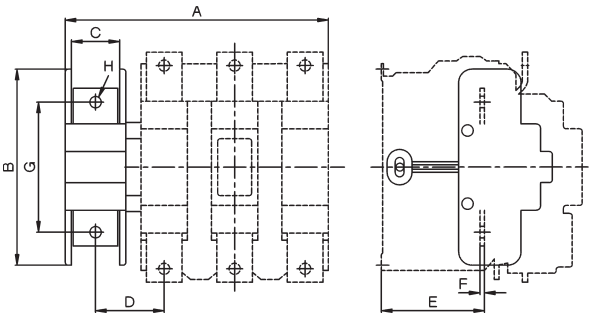


HB11-1, HB11, HB02



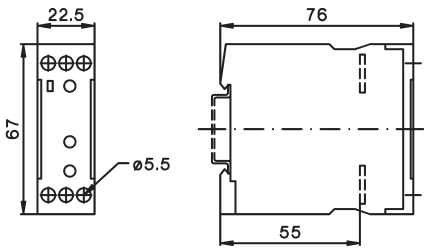
4. pole for contactors K3-200 to K3-1200

Type	A	B	C	D	E	F	G	H
NP175	223	148	26	52	98	5	122	M8
NP350	223	148	26	52	98	5	122	M8
NP325	262	148	26	55	116	5	122	M10
NP500	294	220	53	72	138	5	152	M12
NP760	294	220	53	72	138	5	152	M12
NP501	348	220	53	73	145	5	152	M12
NP1000	348	220	53	73	145	8	152	M12
NP1001	410	220	53	110	157	8	152	M12



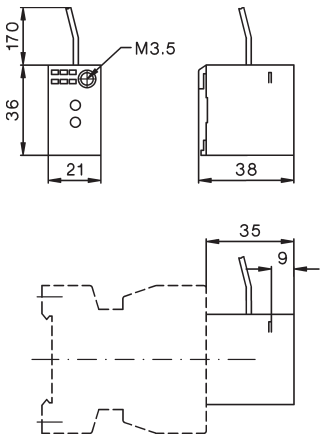
Electronic timer

K3-T180 240



Electronic timer on-delay

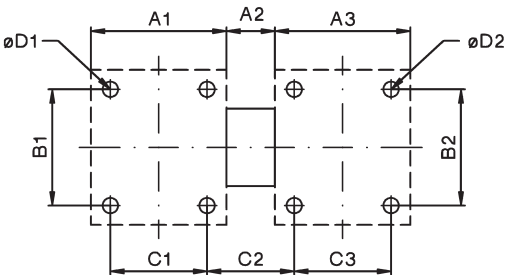
K2-TE..



Contactors

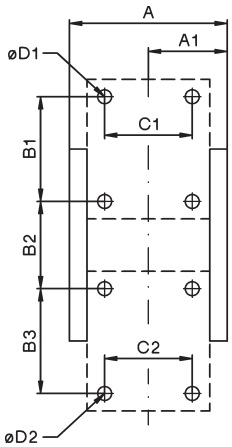
Dimensions Accessories

Mechanical interlocks

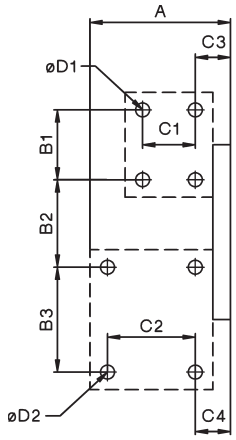


Type	Contactor 1	Contactor 2	A1	A2	A3	B1	B2	C1	C2	C3	D1	D2	
LG10889	K3-07 to K3-40	K3-07 to K3-40	45	7	45	50	50	35	17	35	4,5	4,5	
LG10889	KG3-07 to KG3-22	KG3-07 to KG3-22	45	7	45	80	50	35	17	35	4,5	4,5	
LG10889	KG3-24 to KG3-40	KG3-22 to KG3-40	45	7	45	80	50	35	17	35	4,5	4,5	
LG10890	K3-50 to K3-74	K3-24 to K3-40	60	12	55	100	65	50	22	45	5,5	4,5	
LG10890	K3-50 to K3-74	K3-50 to K3-74	60	12	60	100	100	50	22	50	5,5	5,5	
LG11478	K3-90 to K3-115	K3-90 to K3-115	90	12	90	100	100	75	27	75	5,5	5,5	
LG8511	K65 - K110	K65 - K110	90	12	90	100	100	75	27	75	6	6	
LG11223H	K3-151, -176	K3-151, -176	110	30	110	130	130	100	40	100	6	6	3-pole contactor
LG11223H	K3-116,-151, -176	K3-116,-151, -176	147	30	147	130	130	135	42	135	6	6	4-pole contactor
LG11223H	K3-210, -260, -316	K3-210, -260, -316	145	30	145	160	160	120	55	120	6	6	3-pole contactor
LG11223H	K3-210, -260, -316	K3-210, -260, -316	193	30	193	160	160	170	55	170	6	6	4-pole contactor
LG10400H	K3-450, K3-550	K3-450, K3-550	220	42	220	220	220	110	152	110	9	9	
LG10402H	K3-700, -860	K3-700, -860	280	32	280	280	280	175	137	175	11	11	
LG10403H	K3-1000, -1200	K3-1000, -1200	334	46	334	380	380	120	260	120	13,5	13,5	
LG10399H	K3-450, -550	K3-700, -860	220	37	280	220	280	110	144,5	175	9	11	
LG10401H	K3-700, -860	K3-1000, -1200	280	73	334	280	380	175	232,5	120	11	13,5	

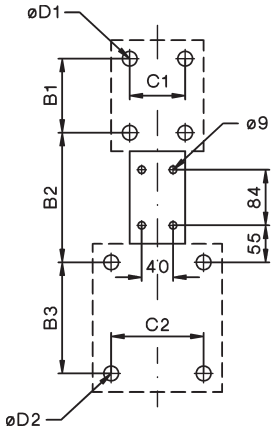
LG10400V, LG10402V



LG10399V



LG10403V, LG10401V



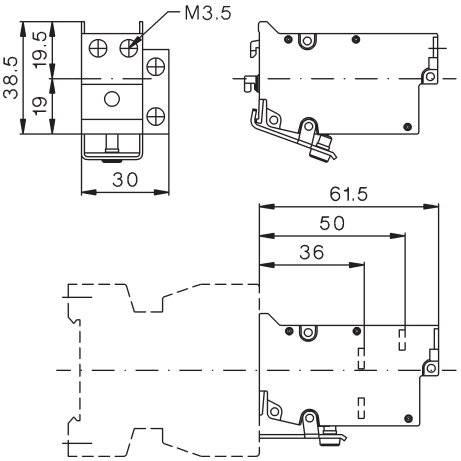
Type	Contactor 1	Contactor 2	A	A1	B1	B2	B3	C1	C2	C3	C4	D1	D2
LG10400V	K3-315 - K3-550	K3-315 - K3-550	250	134	220	94	220	110	110	-	-	9	9
LG10402V	K3-700, -860	K3-700, -860	302	162	280	200	280	175	175	-	-	11	11
LG10403V	K3-1000, -1200	K3-1000, -1200	-	-	380	280	380	120	120	-	-	13,5	13,5
LG10399V	K3-450, -550	K3-700, -860	302	-	220	150	280	110	175	51	74,5	9	11
LG10401V	K3-700, -860	K3-1000, -1200	-	-	280	240	380	175	120	-	-	11	13,5

Contactors

Dimensions Accessories

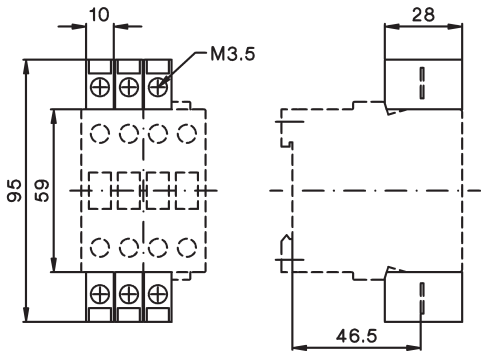
Latch

K2-L..



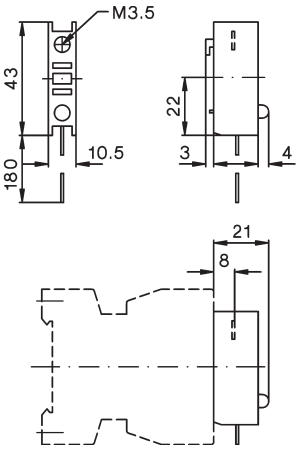
Contactors with additional terminals

LG9339N (2 x 3 pieces)
for K3-10N. to K3-22N.



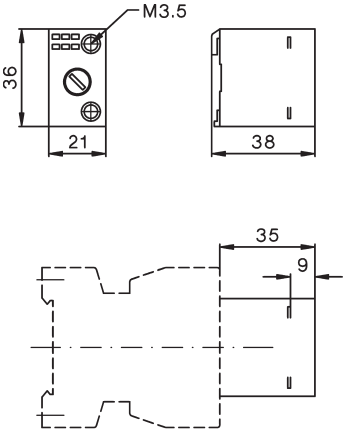
Indicator units

K2-ING, K2-INR
K2-UN, K2-UNR



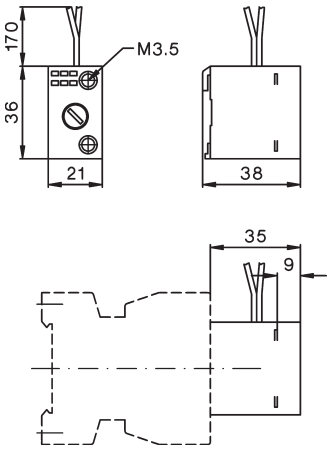
Fuse holder

K2-RF



Fuse holder with rectifier

K2-RF1
K2-RF3

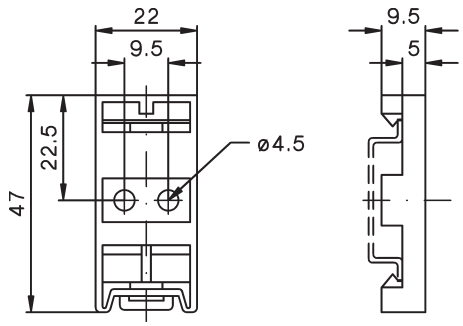


Contactors

Dimensions Accessories

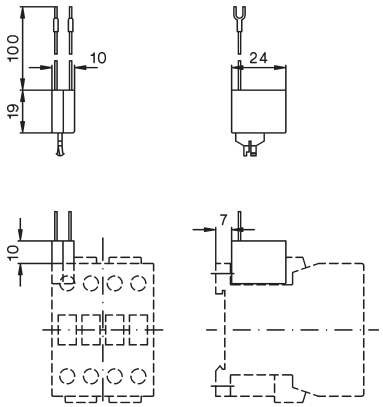
Snap-on adapter

K2-SM

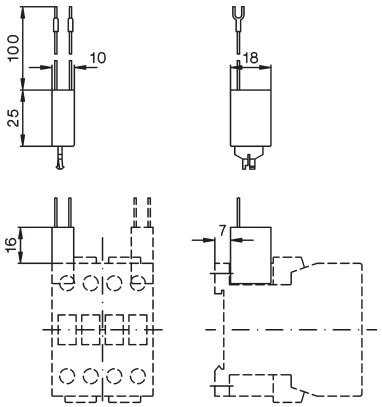


Suppressor units

RC-K3N ..

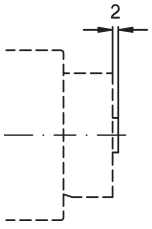


RC-K3NW ..



Marking systems

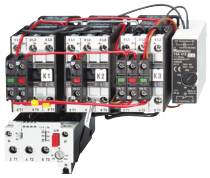
marking label
P487-1 or **P245-.**



Motor Starters

Star-Delta Starters Open Type

AC Operated

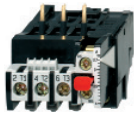


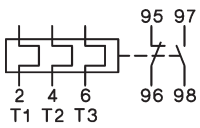
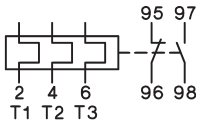
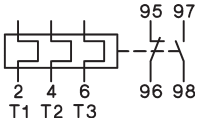
Ratings AC3 380V 400V 415V 500V kW	kW	660V 690V kW	Rated Current AC3 400V A	order separately Overload Relay Type	Type 230 400 ↓	Coil voltage [1] 220-240V 50Hz 380-415V 50Hz Pack pcs.	Weight kg/pc.
7,5	7,5	11	16	U3/32 U12/16E K3	**K3NY15 . . .**	1	0,9
15	18,5	15	30		**K3NY26 . . .**	1	0,9
22	30	22	45	U3/42	**K3Y40 . . .**	1	1,4
30	37	30	60		**K3Y52 . . .**	1	1,8
45	55	45	85	U3/74	**K3Y80 . . .**	1	3,5
55	75	55	109		**K3Y100 . . .**	1	3,7
75	90	90	150	U85	**K3Y140 . . .**	1	6,6
110	132	110	205		**K3Y200 . . .**	1	7
132	160	160	240	U180	**K3Y240 . . .**	1	15
160	180	180	300		**K3Y300 . . .**	1	15

Star-delta starters are wired to accept thermal overload relay. The thermal overload relay has to be ordered separately. For full load current setting use the YD-dial of thermal overload relay.

Ordering Example: Star-Delta Starter, open type, rated AC3 at 400V 205A rated control voltage 230V 50Hz - **Order Type: K3Y200 230 + U85 120**

Thermal Overload Relays



Rated Motor Current A		Type	Pack pcs.	Weight kg/pc.	Wiring Diagram
For Star-Delta Starters K3NY15.. to K3Y40..					
7	- 10,5	**U12/16E 6 K3**	1	0,10	
10,5	- 15,5	**U12/16E 9 K3**	1	0,10	
14	- 19	**U12/16E 11 K3**	1	0,10	
18	- 24	**U12/16E 14 K3**	1	0,10	
23	- 31	**U12/16E 18 K3**	1	0,10	
					manual reset
For Star-Delta Starters K3NY15.. to K3Y52..					
7	- 10,5	**U3/32 6**	1	0,14	
10,5	- 15,5	**U3/32 9**	1	0,14	
14	- 19	**U3/32 11**	1	0,14	
18	- 24	**U3/32 14**	1	0,14	
23	- 31	**U3/32 18**	1	0,14	
30	- 41	**U3/32 24**	1	0,14	
40	- 55	**U3/32 32**	1	0,14	manual and auto reset
For Star-Delta Starters K3Y40.., K3Y52..					
24	- 35	**U3/42 20**	1	0,30	
35	- 48	**U3/42 28**	1	0,30	
48	- 73	**U3/42 42**	1	0,30	
					manual and auto reset

1) Coil voltage range and other coil voltages see page 100

Components for Combinations						Auxiliary Contacts			Free Space for		
Line Contactor	Delta Contactor	Star Contactor	Electronic Timer	Mechanical Interlock between	Star-Delta Starter Connector	Built-in for use on Contactor			Aux. Contact Blocks on Contactor		
						Line	Delta	Star	Line	Delta	Star
K1	K2	K3	K4	K2 and K3		K1	K2	K3	K1	K2	K3
Type	Type	Type	Type	Type	Type	NO/NC	NO/NC	NO/NC	HN.. or HA..		
K3-10ND01 + HN10	K3-10ND01	K3-10ND10 + HN10 + HN01	Y9A	LG10889	K3NY-VB10	-	-	-	3	4	2
K3-18ND01 + HN10	K3-18ND01	K3-14ND10 + HN10 + HN01	Y9A	LG10889	K3NY-VB10	-	-	-	3	4	2
K3-24A00 + HN10 + HN01	K3-24A00 + HN01	K3-24A00 + 2HN10 + HN01	Y9A	LG10889	K3Y-VB24	-	-	-	2	3	1
K3-32A00 + HN10 + HN01	K3-32A00 + HN01	K3-24A00 + 2HN10 + HN01	Y9A	LG10889	K3Y-VB24	-	-	-	2	3	1
K3-50A00 + HN01 + HN10	K3-50A00 + HN01	K3-32A00 + 2HN10 + HN01	Y9A	LG10890	-	-	-	-	2	3	1
K3-62A00 + HN01 + HN10	K3-62A00 + HN01	K3-50A00 + 2HN10 + HN01	Y9A	LG10890	-	-	-	-	2	3	1
K3-90A00 + HN01 + HN10	K3-90A00 + HN01	K3-90A00 + 2HN10 + HN01	Y9AL	LG11478	-	-	-	-	5	6	4
K3-115A00 + HN01 + HN10	K3-115A00 + HN01	K3-90A00 + 2HN10 + HN01	Y9AL	LG11478	-	-	-	-	5	6	4
K3-151A00 + HKT11	K3-151A00 + HKT11	K3-151A00 + HKT22	Y9AL	LG11223H	-	-	1/-	-/1	2	1	1
K3-176A00 + HKT11	K3-176A00 + HKT11	K3-151A00 + HKT22	Y9AL	LG11223H	-	-	1/-	-/1	2	1	1

Applications

The star-delta starting method is only practicable in such cases where the motor windings are connected in delta configuration for normal operation and the torque which is needed during the starting period is not higher than approx. 30% of the rated torque. The starting current drawn from the line will be approx. 2 to 2,7 times the rated motor current.

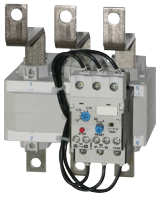
Time setting

The transition from start (star configuration) to normal operation (delta configuration) should be after the motor achieves practically full rotational speed. The use of star-delta timer Y9A with a dwell period of approx. 25ms provides a careful operation of motor and drive equipment.

Thermal Overload Relays

Rated Motor Current A		Type	Pack pcs.	Weight kg/pc.	Wiring Diagram
For Star-Delta Starters K3Y80.., K3Y100..					
35	- 48	**U3/74 28**	1	0,40	
48	- 73	**U3/74 42**	1	0,40	
70	- 90	**U3/74 52**	1	0,40	
90	-112	**U3/74 65**	1	0,40	manual and auto reset

For Star-Delta Starters K3Y140.., K3Y200..					
104	-156	**U85 90**	1	0,90	
140	-207	**U85 120**	1	0,90	manual reset



For Star-Delta Starters K3Y240.., K3Y300..					
208	- 312	**U180 180**	1	1,5	manual and auto reset

Star-Delta Starters Enclosed Type

AC Operated

Ratings AC3			Rated Current	Optional Extras	Wired to accept Overload Relay	**Type**	Coil voltage [1]		
380V						**230**	220-240V 50Hz		
400V		660V	AC3			**400**	380-415V 50Hz		
415V	500V	690V	400V			↓		Pack	Weight
kW	kW	kW	A		Type			pcs.	kg/pc.

Plastic Enclosed, protected to IP65

7,5	7,5	11	16	ST	U3/32	**K3NY15P . . .**	1	1,8
15	18,5	15	30	ST		**K3NY26P . . .**	1	1,8
22	30	22	45	ST, H	U3/42	**K3Y40P . . .**	1	3,8
30	37	30	60	ST, H		**K3Y52P . . .**	1	4,2
45	55	45	85	ST, H	U3/74	**K3Y80P . . .**	1	5,9
55	75	55	109	ST, H		**K3Y100P . . .**	1	8,7

Sheet Steel Enclosed, protected to IP54

7,5	7,5	11	16	ST,H	U3/32	**K3NY15B . . .**	1	2,8
15	18,5	15	30	ST, H		**K3NY26B . . .**	1	2,8
22	30	22	45	ST, H	U3/42	**K3Y40B . . .**	1	4,8
30	37	30	60	ST, H		**K3Y52B . . .**	1	5,2
45	55	45	85	ST, H	U3/74	**K3Y80B . . .**	1	15
55	75	55	109	ST, H		**K3Y100B . . .**	1	15
75	90	90	150	ST, H	U85	**K3Y140B . . .**	1	22
110	132	110	205	ST, H		**K3Y200B . . .**	1	22

1) Coil voltage range and other coil voltages see page 100

Type-suffix for optional extras

Start-Stop Push Buttons		**. . . . . .T . . .**
Selector Switch		**. . . . . .W . . .**
Typical wiring diagrams see page 103-106		
Control Circuit Fuse	<250V (1 piece)	**. . . . . .ST . . .**
	>250V (2 pieces)	**. . . . . .ST . . .**
Run Hour Meter		**. . . . . .H . . .**

Ordering Example: Star-Delta Starter, steel sheet enclosed, with selector switch and run hour meter rated AC3 at 400V 82A, rated control voltage 230V 50Hz - **Order Type: K3Y80BWH 230 + U3/74 52**

Enclosures for Star Delta Starter

for Starter	accept Overload Relay	**Type**	Pack pcs.	Weight kg/pc.
Plastic IP65				
K3NY15, K3NY26	U3/32	**K3Y26P-G3**	1	1,0
K3Y40, K3Y52	U3/42, U3/32	**K3Y40/52P-G3**	1	2,4
Sheet Steel IP54				
K3NY15, K3NY26	U3/32	**K3Y26B-G3**	1	3,4
K3Y40, K3Y52	U3/42, U3/32	**K3Y40/52B-G3**	1	3,4

Star-Delta Starter Connector

For Star-Delta Starter Types	Type	Pack pcs.	Weight kg/pc.
K3NY15, K3NY26	**K3NY-VB10**	1	0,02
K3Y40, K3Y52	**K3Y-VB24**	1	0,03

Additional Terminals

For Star-Delta Starter Types Line Conn. Line Contactor	Motor Conn. Overload Relay	Cable cross-section mm²	Type	Pack pcs.	Weight kg/pc.
Single pole with Fingertouch Protection					
K3NY15, K3NY26	U12/16	0,75 - 10 solid 0,75 - 6 flex.	**LG9339**	6	0,009
Three-pole with Fingertouch Protection					
	U3/42	4 - 35 strand. 4 - 25 flex.	**LG7559**	1	0,052

Electronic Timers for Star-Delta Starters[1)]

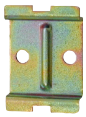
Rated Control Voltage V	Time Range s	Delay Time ms	Rated Current AC15 250V A	400V A	Type	Pack pcs.	Weight kg/pc.
24 - 60V AC/DC	1 - 20 [2)]	20 - 25	5	5	**Y9A 60**	1	0,075
110 - 415V AC/DC	1 - 20 [2)]	20 - 25	5	5	**Y9A 415**	1	0,075
24 - 60V AC/DC	1 - 20 [2)]	40 - 80	5	5	**Y9AL 60**	1	0,075
110 - 415V AC/DC	1 - 20 [2)]	40 - 80	5	5	**Y9AL 415**	1	0,075

Time repeat accuracy	± 1%
Minimum interval between operations	2s
Short circuit protection	4A gl (gG)

Power consumption at		
	24V	0,2VA
	60V	5VA
	220-240V	2VA
	380-415V	7VA

1) not suitable for contactors K3-450 - K3-1200
2) - 20% / + 30%

Mounting Bar



Specification	Type	Pack pcs.	Weight kg/pc.
For screw mounting of electronic timer Y9..	**LG7735**	10	0,09

Star-Delta Starters in Special Versions

Starters for Longer Starting Time

For longer starting times the thermal overload relay is mounted on delta-contactor. The motor is not protected in Y-connection. The timer used for this starter-type is the type Y91A, time range is 10 to 60s.
Principal wiring diagram see page 104.

Ordering Example: K3Y**L**52 230

Starters with two Thermal Overload Relays on request

Basic circuit diagram see page 104

Reversing Contactors with Mechanical Interlock — AC Operated

Ratings AC3 **380V** **400V** **415V** **kW**	500V kW	Rated Current 660V 690V kW	Vorbereitet für Einbau AC3 400V A	Wired to accept Overload Relay page 120 Type	**Type** **110** **230** **400** ↓ Coil voltage [1] 110V 50Hz 220-240V 50Hz 380-415 50Hz	Pack pcs.	Weight kg/pc.
Open Type							
4	5,5	5,5	10	U3/32 U12/16E K3	**K3NWU10 . . .**	1	0,6
7,5	10	7,5	18		**K3NWU18 . . .**	1	0,6
11	15	15	24	U3/42	**K3WU24 . . .**	1	1,2
15	18,5	18,5	32		**K3WU32 . . .**	1	1,4
18,5	18,5	18,5	40		**K3WU40**	1	1,4
22	30	30	50	U3/74	**K3WU50 . . .**	1	2,5
30	37	37	62		**K3WU62 . . .**	1	2,5
37	45	45	74		**K3WU74 . . .**	1	2,5

Sheet Steel Enclosed, protected to IP54							
4	5,5	5,5	10	U3/32	**K3NWU10B . . .**	1	3,9
7,5	10	7,5	18		**K3NWU18B . . .**	1	4,1
11	15	15	24	U3/42	**K3WU24B . . .**	1	4,5
15	18,5	18,5	32		**K3WU32B . . .**	1	4,7
22	30	30	50	U3/74	**K3WU50B . . .**	1	7,1
30	37	37	62		**K3WU62B . . .**	1	7,1

Reversing Starter Connector

For Reversing Starter Types	**Type**	Pack pcs.	Weight kg/pc.
K3NWU10, K3NWU18	**K3NW-VB10**	1	0,02
K3WU24, K3WU32	**K3W-VB24**	1	0,025

1) Other coil voltages see page 57

Components for Combinations Left Hand Side Contactor	Right Hand Side Contactor	Mechanical Interlock	Reversing Starter Connector	Auxiliary Contacts Built-in for use on Contactor		Free Space for Aux. Contact Blocks on Contactor	
K1 Type	K2 Type	Type	Type	K1 NO/NC	K2 NO/NC	K1 HN.. or HA..	K2
K3-10ND10 + HN01	K3-10ND10 + HN01	LG10889	K3NW-VB10	-	-	3	3
K3-18ND10 + HN01	K3-18ND10 + HN01	LG10889	K3NW-VB10	-	-	3	3
K3-24A00 + HN10 + HN01	K3-24A00 + HN10 + HN01	LG10889	K3W-VB24	-	-	2	2
K3-32A00 + HN10 + HN01	K3-32A00 + HN10 + HN01	LG10889	K3W-VB24	-	-	2	2
K3-40A00 + HN10 + HN01	K3-40A00 + HN10 + HN01	LG10889	K3W-VB24	-	-	2	2
K3-50A00 + HN10 + HN01	K3-50A00 + HN10 + HN01	LG10890	-	-	-	2	2
K3-62A00 + HN10 + HN01	K3-62A00 + HN10 + HN01	LG10890	-	-	-	2	2
K3-74A00 + HN10 + HN01	K3-74A00 + HN10 + HN01	LG10890	-	-	-	2	2
K3-10ND10 + HN01	K3-10ND10 + HN01	LG10889	K3NW-VB10	-	-	3	3
K3-18ND10 + HN01	K3-18ND10 + HN01	LG10889	K3NW-VB10	-	-	3	3
K3-24A00 + HN10 + HN01	K3-24A00 + HN10 + HN01	LG10889	K3W-VB24	-	-	2	2
K3-32A00 + HN10 + HN01	K3-32A00 + HN10 + HN01	LG10889	K3W-VB24	-	-	2	2
K3-50A00 + HN10 + HN01	K3-50A00 + HN10 + HN01	LG10890	-	-	-	2	2
K3-62A00 + HN10 + HN01	K3-62A00 + HN10 + HN01	LG10890	-	-	-	2	2

Pole Changing Starters

AC Operated

Open Type

Ratings AC3 380V 400V 415V kW			Rated Current AC3 400V A	Wired to accept Overload Relay page 120 Type	Type 230 400 ↓	Coil voltage [1] 220-240V 50Hz 380-415 50Hz Pack pcs.	Weight kg/pc.
7,5	10	10	18	2 x U3/32 2 x U12/16E K3	**K3NPU18 . . .**	1	1,0
11	15	15	24		**K3NPU24 . . .**	1	1,5
15	18,5	18,5	32	2 x U3/32	**K3PU32 . . .**	1	1,9
22	30	30	50	2 x U3/74	**K3PU50 . . .**	1	3,9
30	37	37	62		**K3PU62 . . .**	1	3,9

Sheet Steel Enclosed, protected to IP54

7,5	10	7,5	18	2x U3/32	**K3NPU18B . . .**	1	1,0
11	15	15	24		**K3NPU24B . . .**	1	1,5
15	18,5	18,5	32		**K3PU32B . . .**	1	1,9

Ordering Example: Pole Changing Starter, open version, rated AC3 at 400V 28A and 15A, control voltage 230V 50Hz
Order Type: **K3PU32 230 + U3/32 32 + U3/32 18**

Pole Changing Starters for Star-Delta Operation on request

1) Other coil voltages see page 57

Components for Combinations			Free Space for Aux. Contact Blocks on Contactor		
High Speed	Low Speed	Star Contactor	High Speed	Low Speed	Star
K1 Type	K2 Type	K3 Type	K1	K2	K3
			HN.. or HA..		
K3-18ND01 + 2 x HN10	K3-18ND01 + HN10	K3-14ND01	2	3	4
K3-24A00 + HN01 + 2 x HN10	K3-24A00 + HN01 + HN10	K3-18ND01	1	2	4
K3-32A00 + HN01 + 2 x HN10	K3-32A00 + HN01 + HN10	K3-24A00 + HN01	1	2	3
K3-50A00 + HN01 + 2 x HN10	K3-50A00 + HN01 + HN10	K3-32A00 + HN01	1	2	3
K3-62A00 + HN01 + 2 x HN10	K3-62A00 + HN01 + HN10	K3-50A00 + HN01	1	2	3
K3-18ND01 + 2 x HN10	K3-18ND01 + HN10	K3-14ND01	2	3	4
K3-24A00 + HN01 + 2 x HN10	K3-24A00 + HN01 + HN10	K3-18ND01	1	2	4
K3-32A00 + HN01 + 2 x HN10	K3-32A00 + HN01 + HN10	K3-24A00 + HN01	1	2	3

Star-Delta Starters

Data according to IEC 947-4-1, VDE 0660, EN 60947-4-1

Type			K3NY15	K3NY26	K3Y40	K3Y52	K3Y80	K3Y100	K3Y140	K3Y200	K3Y240	K3Y300
Main Contacts												
Rated insulation voltage U_i [1]		V AC	690	690	690	690	690	690	690	690	690	690
Frequency of operations z AC3, I_e		1/h						15				
Change-over time max. (Y-step)		s						20 (Type K3YL ... 60)				
Utilization category AC3												
Switching of three-phase motors												
Rated operational	220-230V	A	16	30	45	60	85	109	150	205	240	300
current I_e	240V	A	16	30	45	60	85	109	150	205	240	300
	380-400V	**A**	**16**	**30**	**45**	**60**	**85**	**109**	**150**	**205**	240	300
	415-440V	A	15	30	45	60	85	109	150	205	240	300
	500V	A	15	30	45	60	85	95	150	205	190	240
	660-690V	A	13	17	30	36	57	72	103	118	147	180
Rated operational power	220-230V	kW	4	7,5	11	15	22	30	45	55	75	90
of three-phase motors	240V	kW	5,5	11	15	18,5	22	30	45	55	75	90
50-60Hz	**380-400V**	**kW**	**7,5**	**15**	**22**	**30**	**45**	**55**	**75**	**110**	**132**	**160**
	415-440V	kW	7,5	15	22	30	45	55	75	110	140	170
	500V	kW	7,5	18,5	30	37	55	75	90	132	132	180
	660-690V	kW	11	15	22	30	45	55	90	110	132	180
Cable cross-sections												
Line	solid or stranded	mm^2	1,5 - 6 [2]		1,5 - 16		10 - 70 [3]		10 - 120		busbar	
	flexible	mm^2	1,5 - 4 [2]		1,5 - 16		16 - 50 [3]		10 - 95		18x5	
	flexible with multicore cable end	mm^2	1,5 - 4 [2]		1,5 - 16		10 - 35		10 - 95		M8	
Motor												
	solid or stranded	mm^2	1,5 - 6		1,5 - 16		4 - 35 [3]		10 - 120		busbar	
	flexible	mm^2	1,5 - 4		1,5 - 16		6 - 25 [3]		10 - 95		18x5	
	flexible with multicore cable end	mm^2	1,5 - 4		1,5 - 16		4 - 25		10 - 95		M8	
Power consumption of the combination												
	inrush and change-over	VA	55		130		183		560		700	
	sealed	VA	20		26		36		10		10	
		W	6		8		14		10		10	

Coil Voltage Ranges and Non Standard Voltages for Star-Delta Starters

K3NY15.. to K3Y100..

Suffix to Star-Delta Starter type e.g. K3Y80 **400**	Rated Control Voltage U_s range for 50Hz min. V	max. V	range for 60Hz min. V	max. V
24	24	24	24	27
42	42	47	47	52
110	100	110	110	122
180	180	210	200	240
230	**220**	**240**	**230**	**264**
400	**380**	**415**	**400**	**415**

K3Y140, to K3Y300..

Suffix to Star-Delta Starter type e.g. K3Y300 **230**	Rated Control Voltage U_s range for 50Hz min. V	max. V	range for 60Hz min. V	max. V	for DC V
24	24	24	24	24	24
48	48	48	48	48	48
110	110	120	110	120	110
230	**220**	**240**	**220**	**240**	**220**
400	**380**	**415**	**380**	**415**	**-**

Standard voltages in bold type letters

1) Suitable for: earthed-neutral systems, overvoltage category I to IV, pollution degree 3 (standard-industry): U_{imp} = 8kV.
Data for other conditions on request.
2) Additional terminals see page 95
3) Maximum cable cross-section with prepared conductor

Reversing Starters

Data according to IEC 947-4-1, VDE 0660, EN 60947-4-1

Type			K3NWU10	K3NWU18	K3WU24	K3WU32	K3WU50	K3WU62	K3WU74
Main Contacts									
Rated insulation voltage U_i [1]		V AC	690	690	690	690	690	690	690
Utilization category AC3									
Switching of three-phase motors									
Rated operational current I_e	220V	A	12	18	23	30	45	63	
	230V	A	11,5	18	24	32	50	62	74
	240V	A	11	18	24	32	50	62	74
	380-400V	**A**	**10**	**18**	**24**	**32**	**50**	**62**	**74**
	415-440V	A	9	18	23	30	50	62	74
	500V	A	9	16	23	30	45	60	74
	660-690V	A	6,5	8,5	17	20	31	40	40
Rated operational power	220-230V	kW	3	5	6	8,5	12,5	18,5	
of three-phase motors	240V	kW	3	5	7	9	13,5	19	23
50-60Hz	**380-400V**	**kW**	**4**	**7,5**	**11**	**15**	**22**	**30**	**37**
	415-440V	kW	4,5	8,5	12	16	24	33	40
	500V	kW	5,5	10	15	18,5	30	37	45
	660-690V	kW	5,5	10	15	18,5	30	37	45
Cable cross-sections									
Line	solid or stranded	mm^2	0,75 - 6		1,5 - 25		4 - 50		
	flexible	mm^2	1 - 4		2,5 - 16		6 - 35		
	flexible with multicore cable end	mm^2	0,75 - 4		1,5 - 16		6 - 35		
Cables per clamp			1		1		1		
Power consumption of the combination									
inrush and change-over		VA	33 - 45		90 - 115		140 - 185		
sealed		VA	7 - 10		9 - 13		13 - 18		
		W	2,6 - 3		2,7 - 4		5,4 - 7		

Technical Data according to UL508

Main Contacts (cULus)		Type	KNW3-10	KNW3-18	KW3-24	KW3-32	KW3-40
Rated operational power	110-120V	hp	1½	2	5	5	7½
of three-phase motors	200V	hp	3	5	7½	10	10
at 60Hz (3ph)	220-240V	hp	3	7½	10	10	15
	277V	hp	3	7½	7½	10	15
	380-415V	hp	5	10	10	15	20
	440-480V	hp	5	10	15	20	25
	550-600V	hp	7½	15	20	25	30
Fuse / Short-circuit current		A/kA	30/5	50/5	90/5	125/5	175/5
Rated voltage		V	600	600	600	600	600
Auxiliary Contacts (cULus)			A600	A600	A600	A600	A600
Cable cross-sections							
for main connectors	solid	AWG	18 - 10		16 - 10		
	flexible	AWG	18 - 10		14 - 4		
Cables per clamp			1		1		

1) Suitable for: earthed-neutral systems, overvoltage category I to IV, pollution degree 3 (standard-industry): U_{imp} = 8kV. Data for other conditions on request.

Pole Changing Starters

Data according to IEC 947-4-1, VDE 0660, EN 60947-4-1

Type			K3NPU18	K3NPU24	K3PU32	K3PU50	K3PU62
Main Contacts							
Rated insulation voltage U_i [1]		V AC	690	690	690	690	690
Utilization category AC3							
Switching of three-phase motors							
Rated operational current I_e	220V	A	18	23	30	45	63
	230V	A	17,5	23	30	45	60
	240V	A	17	23	30	45	60
	380-400V	**A**	**16**	**23**	**30**	**45**	**60**
	415V	A	16	23	30	45	60
	440V	A	16	23	30	45	60
	500V	A	16	23	30	45	55
	660V	A	9	17,5	21	33	42
	690V	A	8,5	17	20	31	40
Rated operational power	220-230V	kW	5	6	8,5	12,5	18,5
of three-phase motors	240V	kW	5	7	9	13,5	19
50-60Hz	**380-400V**	**kW**	**7,5**	**11**	**15**	**22**	**30**
	415-440V	kW	8,5	12	16	24	33
	500V	kW	10	15	18,5	30	37
	660-690V	kW	7,5	15	18,5	30	37
Cable cross-sections							
Line	solid or stranded	mm²	0,75 - 6	1,5 - 25		4 - 50	
	flexible	mm²	1 - 4	2,5 - 16		6 - 35	
	flexible with multicore cable end	mm²	0,75 - 4	1,5 - 16		6 - 35	
Cables per clamp			1	1		1	
Power consumption of the combination							
	inrush and change-over	VA	55	128		178	
	sealed	VA	20	26		31	
		W	6	8		11	

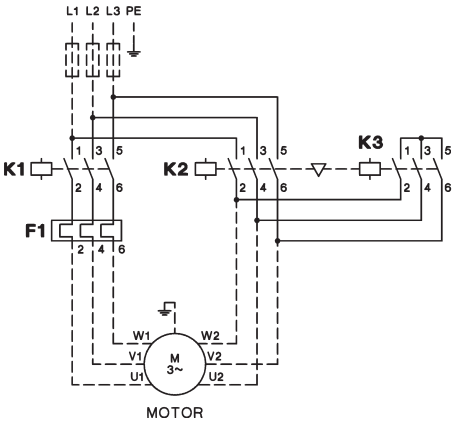
1) Suitable for: earthed-neutral systems, overvoltage category I to IV, pollution degree 3 (standard-industry): U_{imp} = 8kV. Data for other conditions on request.

Star-Delta Starters

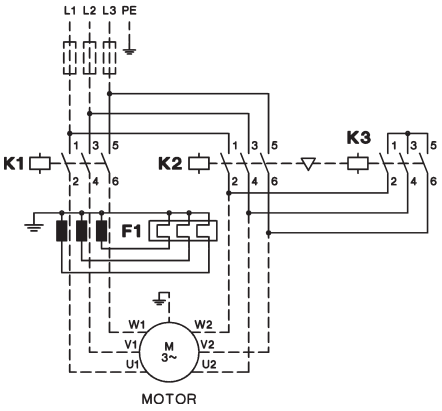
Wiring Diagrams Main Circuit

Terminal markings of contactors and relays according to DIN EN 50012
Connections shown in main and circuits as broken lines are not included.

K3NY15 to K3Y100
with thermal overload relay U3/.. or U12/16

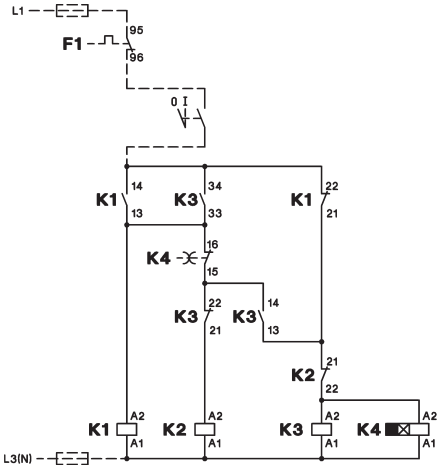


K3Y140 to K3Y300
with thermal overload relay U85 or U180

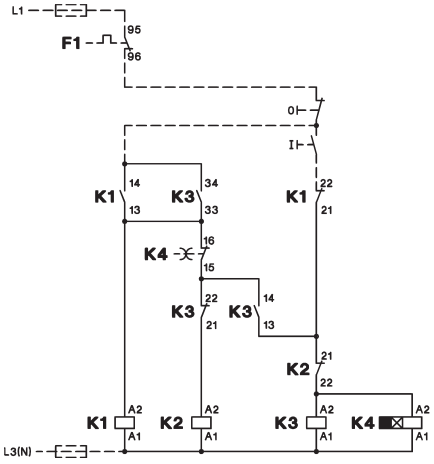


Wiring Diagrams Control Circuit

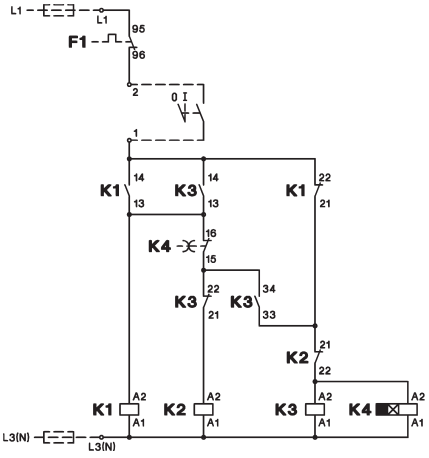
K3NY15 to K3Y52
operating with control switch



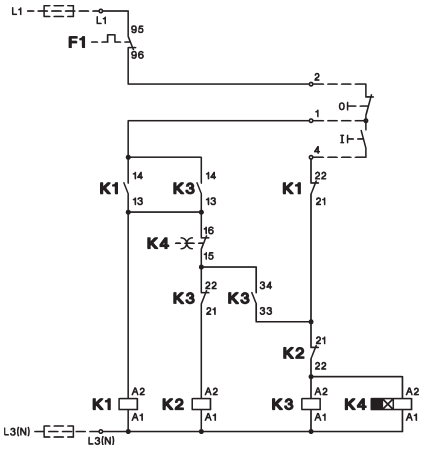
K3NY15 to K3Y52
operating with push buttons



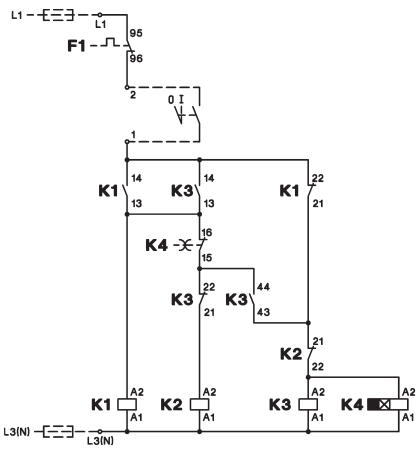
K3Y80 to K3Y200
operating with control switch



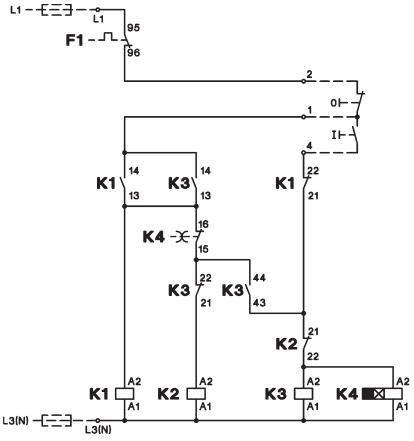
K3Y80 to K3Y200
operating with push buttons



K3Y240 to K3Y300
operating with control switch



K3Y240 to K3Y300
operating with push buttons

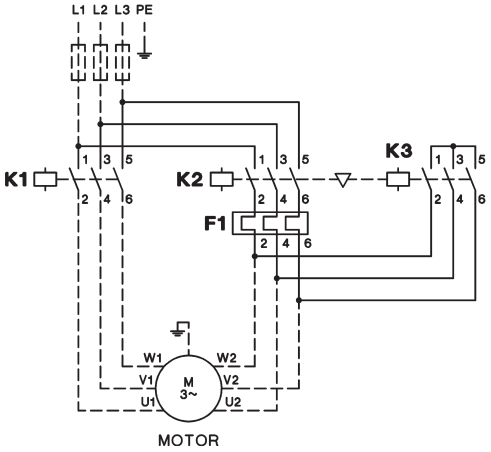


Star-Delta Starters

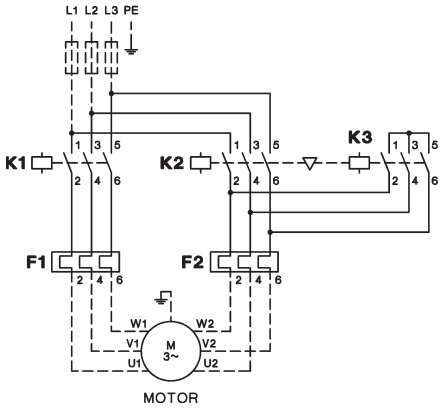
Wiring Diagrams Main Circuit

Terminal markings of contactors and relays according to DIN EN 50012
Connections shown in main and control circuits as broken lines are not included.

K3YL..
Typical circuit diagram

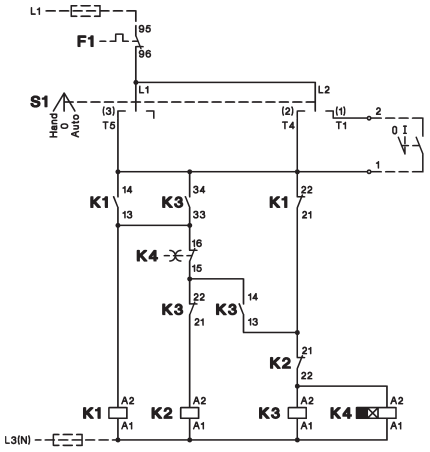


K3Y.. with 2 Thermal Overload Relays
Typical circuit diagram

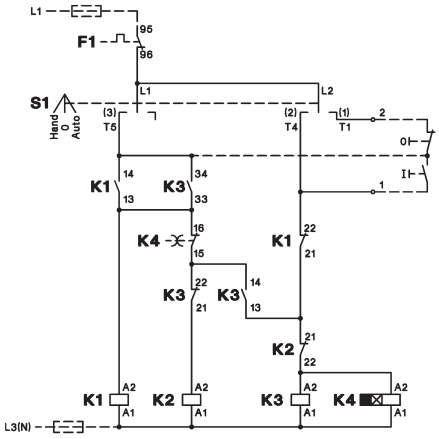


Wiring Diagrams Control Circuit

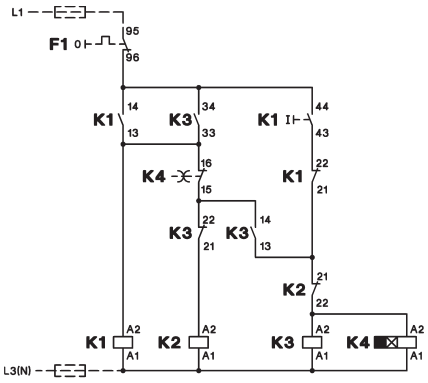
with selector switch
K3Y..W
Typical circuit diagram
operating with control switch



Typical circuit diagram
operating with push buttons



with push buttons
K3Y..T
Typical circuit diagram

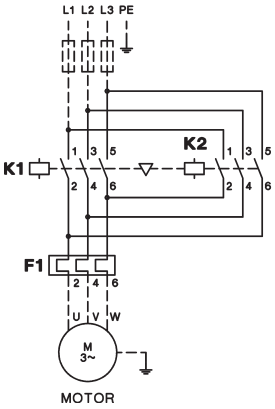


Reversing Contactors

Wiring Diagrams Main Circuit

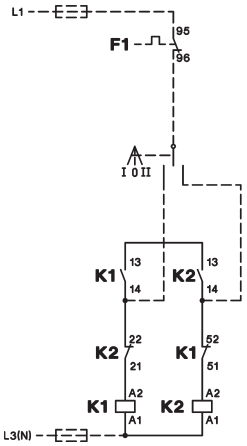
Terminal markings of contactors and relays according to DIN EN 50012
Connections shown in main and control circuits as broken lines are not included.

K3NWU10 to K3WU74
with thermal overload relay U3/32, U3/42 or U3/74

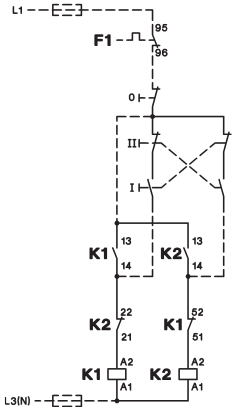


Wiring Diagrams Control Circuit

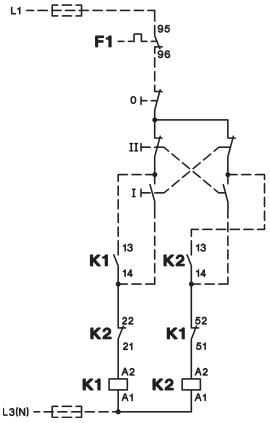
K3NWU10 to K3WU32
operating with control switch



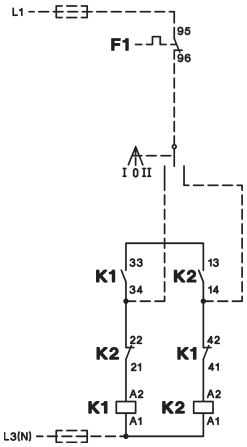
operating with push buttons
Reversing over off-position



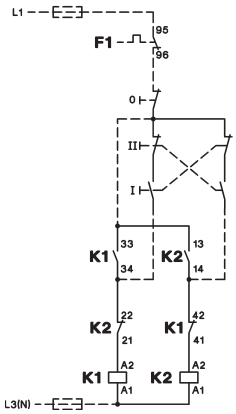
Reversing direct



K3WU50, K3WU62, K3WU74
operating with control switch



operating with push buttons

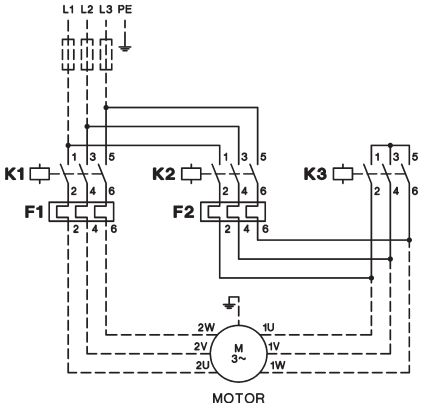


Pole Changing Starters

Wiring Diagrams

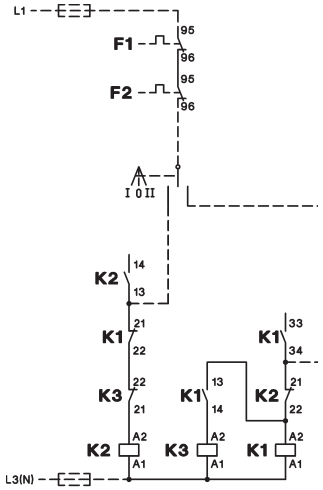
Terminal markings of contactors and relays according to DIN EN 50012
Connections shown in main and control circuits as broken lines are not included.

Main Circuit

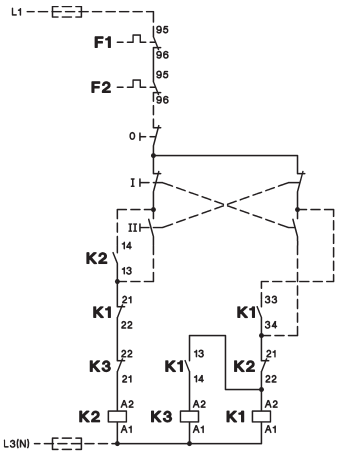


Principal Control Circuit Wiring Diagram

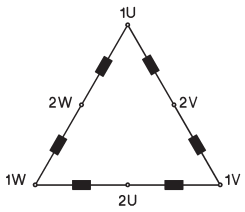
operating with control switch

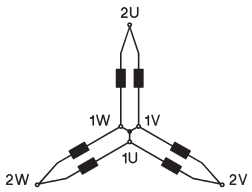


operating with push buttons

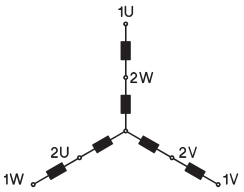


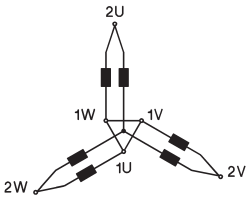
	Low speed	High speed
Operation	Delta	Double-Star
Speed relation	1	2
Power relation	1	1,5 - 1,8





	Low speed	High speed
Operation	Star	Double-Star
Speed relation	1	2
Power relation	0,3	1



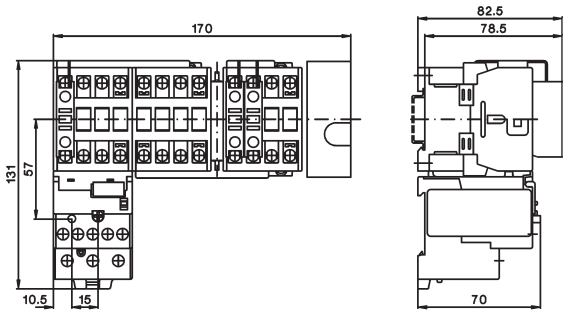


Star-Delta Starters

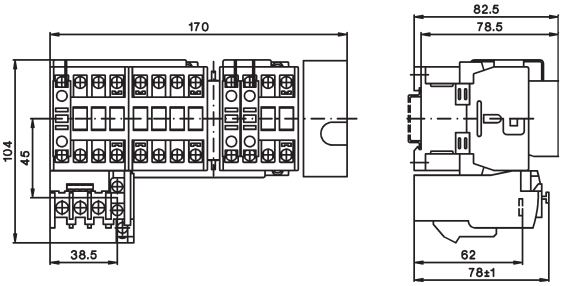
Dimensions

Star-Delta Starters, AC operated, open type

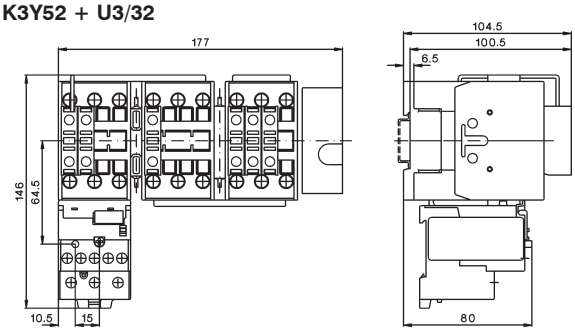
K3NY15 + U3/32
K3NY26



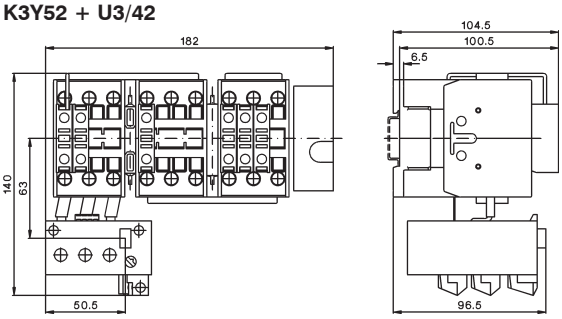
K3NY15 + U12/16E G3
K3NY26



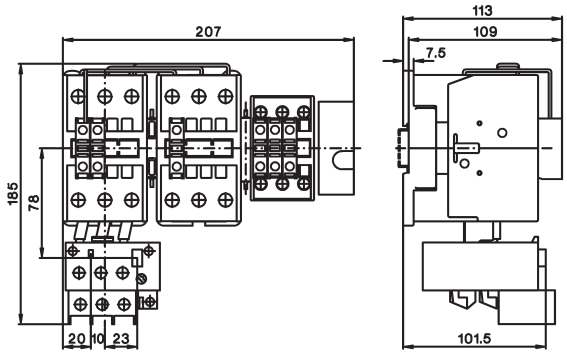
K3Y40 + U3/32
K3Y52 + U3/32



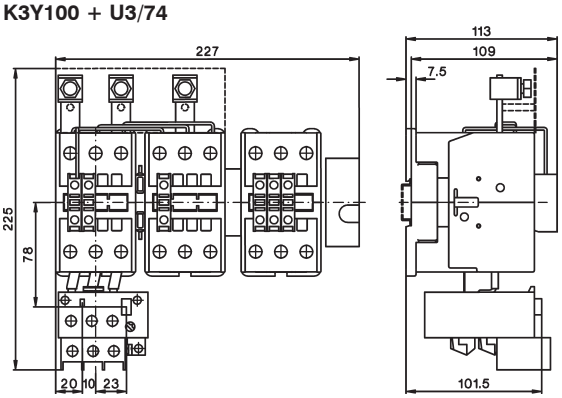
K3Y40 + U3/42
K3Y52 + U3/42



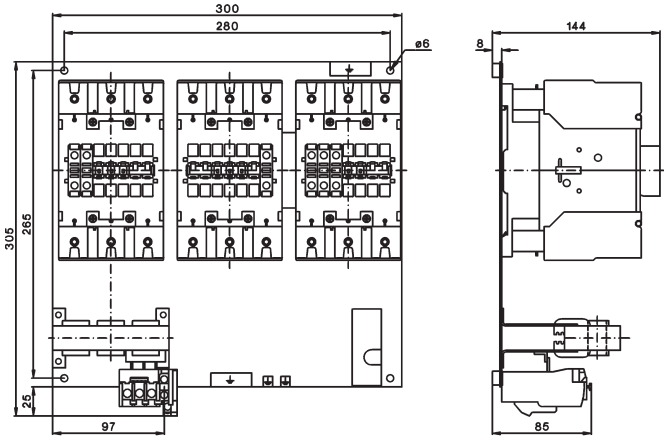
K3Y80 + U3/74



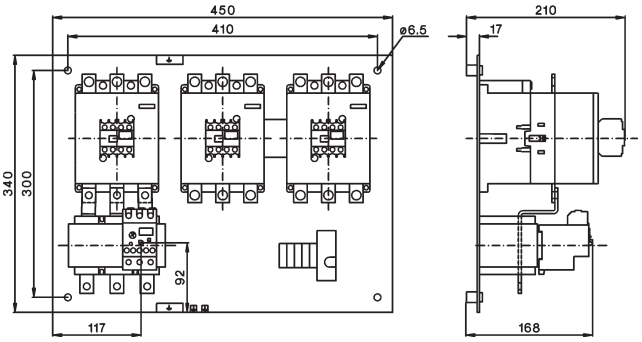
K3Y100 + U3/74



K3Y140 + U85
K3Y200



K3Y240 + U180 + SU180/176
K3Y300

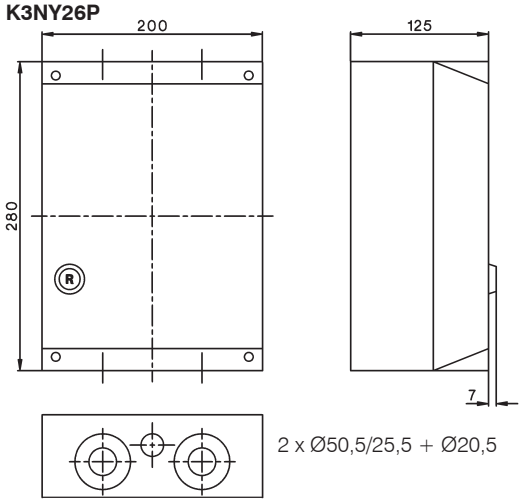


Star-Delta Starters

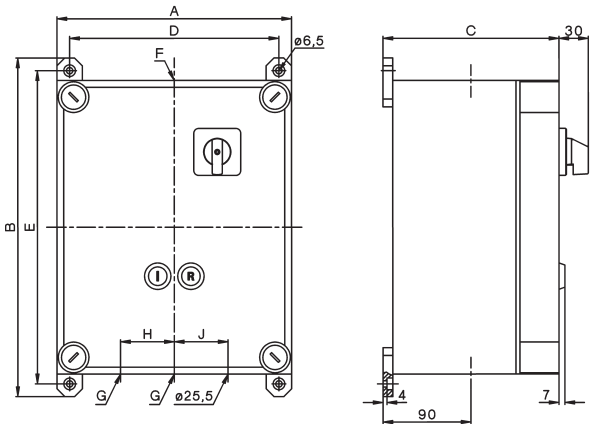
Dimensions

Star-Delta Starters, plastic enclosed, protected to IP65

K3NY26P



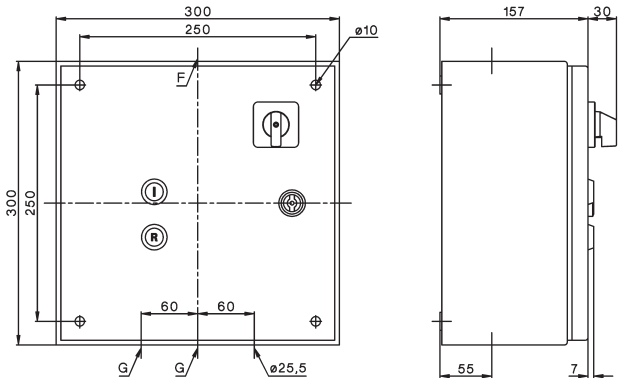
K3Y40P to K2Y100P



Type	A	B	C	D	E	Ø F	Ø G	H	J
K3Y40P	300	346	180	272	320	6,5	32,5	32,5	60	60
K3Y52P	300	346	180	272	320	6,5	32,5	32,5	60	60
K3Y80P	300	446	180	272	420	6,5	40,5	40,5	70	70
K3Y100P	300	446	180	272	420	6,5	50,5	40,5	70	70

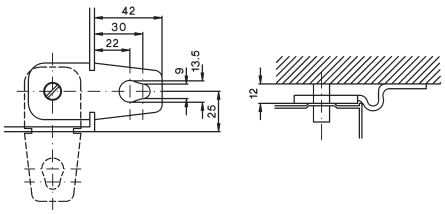
Star-Delta Starters, sheet steel enclosed, protected to IP54

K3Y26B to K3Y52B

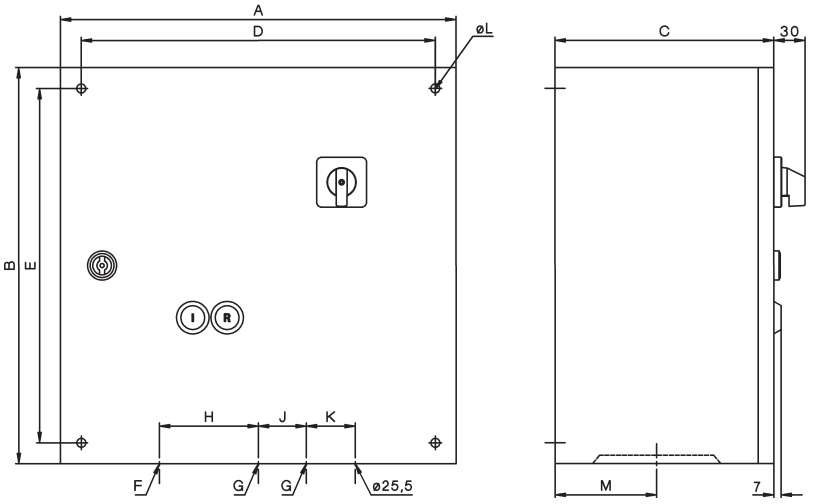


Type	Ø F	Ø G
K3NY26B	25,5	25,5
K3Y40B	32,5	32,5
K3Y52B	32,5	32,5

Mounting by included fixing link



K3Y80B to K2Y200B



Type	A	B	C	D	E	L	M
K3Y80B	380	380	210	340	340	8,7	65
K3Y100B	380	380	210	340	340	8,7	65
K3Y140B	380	600	210	560	340	8,7	65
K3Y200B	380	600	210	560	340	8,7	65

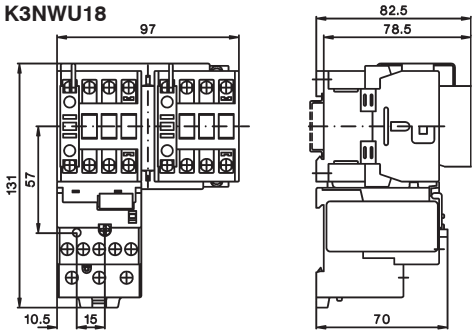
Type	Ø F	Ø G	H	J	K
K3Y80B	40,5	40,5	70	70	60
K3Y100B	50,5	40,5	80	70	60
K3Y140B	50,5	50,5	80	80	70
K3Y200B	50,5	50,5	80	80	70

Reversing Contactors

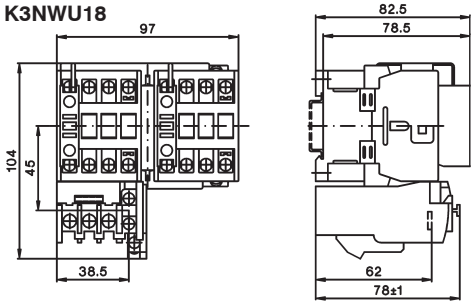
Dimensions

Reversing Starters, AC operated, open type

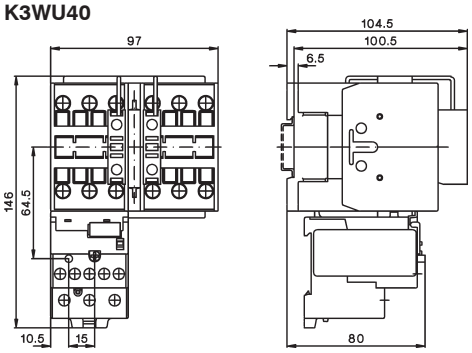
K3NWU10 + U3/32
K3NWU18



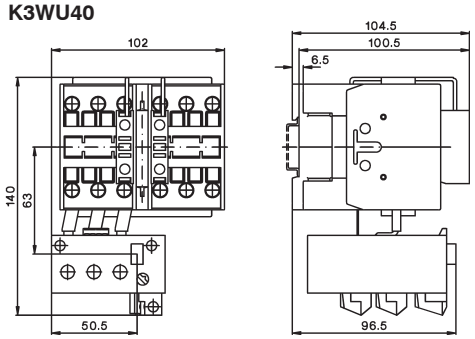
K3NWU10 + U12/16E G3
K3NWU18



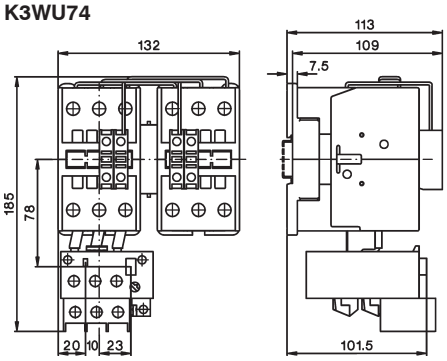
K3WU24 + U3/32
K3WU32
K3WU40



K3WU24 + U3/42
K3WU32
K3WU40

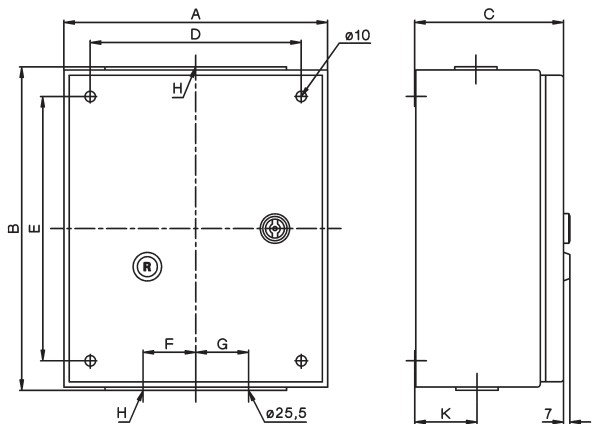


K3WU50 + U3/74
K3WU62
K3WU74

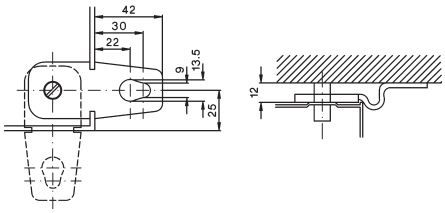


Reversing Contactors, sheet steel enclosed, protected to IP54

Type	A	B	C	D	E	F	G	H	K
K3NWU18B	300	300	150	250	250	30	30	Ø25,5	41
K3WU24B	300	300	150	250	250	30	30	Ø32,5	41
K3WU32B	300	300	150	250	250	30	30	Ø32,5	41
K3WU50B	300	300	150	250	250	40	40	Ø32,5	59
K3WU62B	300	300	150	250	250	40	40	Ø32,5	59



Mounting by included fixing link

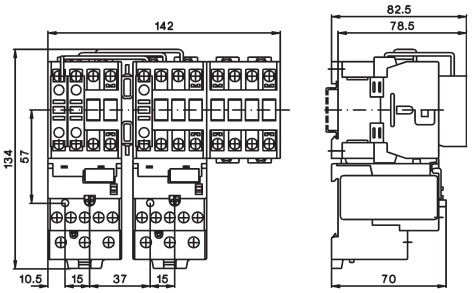


Pole Changing Starters

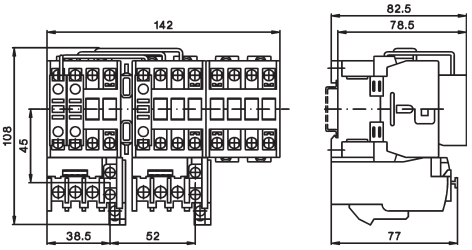
Dimensions

Pole Changing Starters, AC operated, open type

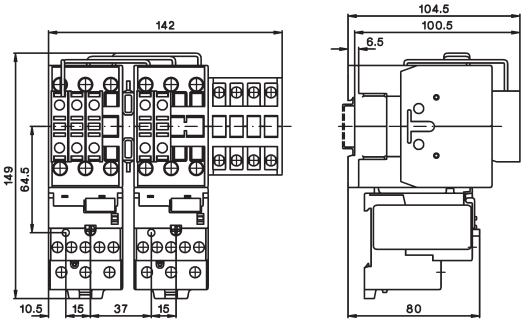
K3NPU18 + 2x U3/32



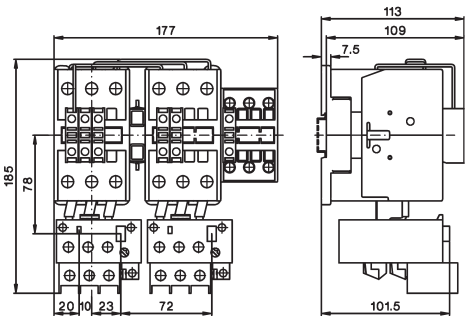
K3NPU18 + 2x U12/16



K3PU24 +2x U3/32
K3PU32



K3PU50 + 2x U3/74
K3PU62

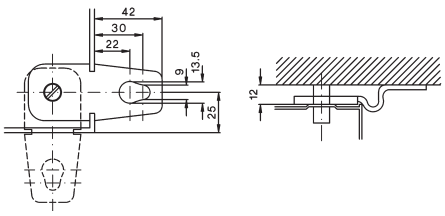


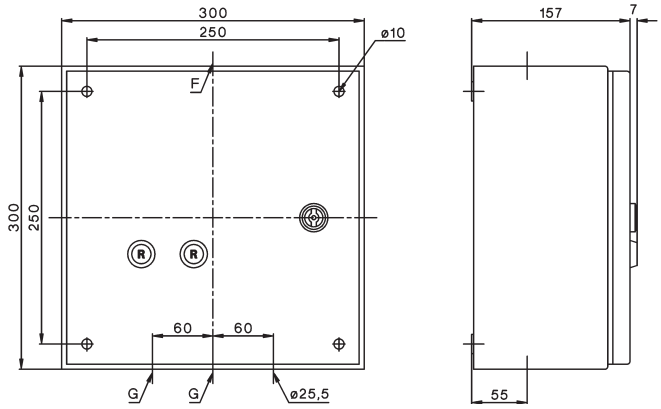
Pole Changing Starters, sheet steel enclosed, protected to IP54

K3NPU18B to K3PU32B

Type	Ø F	Ø G
K3NPU18B	25,5	25,5
K3PU24B	32,3	32,5
K3PU32B	32,3	32,5

Mounting by included fixing link





D.O.L. Starters

D.O.L. Starters In Plastic Enclosure

Ratings AC3 at **380V** **400V** **415V** **kW**	Included Contactor Type	Free Space f. Aux. Cont. HN.. pcs.	**order extra** Overload Relay Type	Protec- tion Degree	Conduit Entries	**Type** Coil voltage [1] **230** 220-240V 50Hz 230-264V 60Hz **400** 380-415V 50Hz 400-440V 60Hz ↓	Pack pcs.	Weight kg/pc.

D.O.L. Starters with Start-Stop/Reset Push Buttons

4	K3-10ND10	2	U12/16 K3	IP65	Ø 20,5mm	**P1T10 . . .**	1	0,6
7,5	K3-18ND10	2	U12/16 K3	IP65	Ø 20,5mm	**P1T18 . . .**	1	0,6
11	K3-22ND10	2	U12/16 K3	IP65	Ø 20,5mm	**P1T22 . . .**	1	0,6

D.O.L. Starters with Selector Switch

4	K3-10ND10	2	U12/16 K3	IP65	Ø 20,5mm	**P1W10 . . .**	1	0,6
7,5	K3-18ND10	2	U12/16 K3	IP65	Ø 20,5mm	**P1W18 . . .**	1	0,6
11	K3-22ND10	2	U12/16 K3	IP65	Ø 20,5mm	**P1W22 . . .**	1	0,6

D.O.L. Starters with Selector Switch and Pneumatic Switch for moist rooms

7,5	K3-18ND10	2	U12/16 K3	IP65	Ø 20,5mm	**P1W18P . . .**	1	0,6

Push button and tube on request

Ordering Example: D.O.L. Starter with selector switch, plastic enclosed, rated AC3 at 400V 15,5A, rated control voltage 230V 50Hz **- Order Type: P1W18 230** + **U12/16E 18 K3**

Pneumatic Button

	P1LT	1

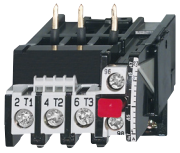
Air Pressure Hose

Length 5m	**P1LS-5**	1

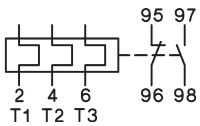
Pneumatic Switch

for refill of D.O.L. Starter P1W.. to P1W..P	**P1-LDR**	1	0,02

Thermal Overload Relays



Setting range A	**Type**	Pack pcs.	Weight kg/pc.
0,12 - **0,18**	**U12/16E 0,18 K3**	1	0,10
0,18 - **0,27**	**U12/16E 0,27 K3**	1	0,10
0,27 - **0,4**	**U12/16E 0,4 K3**	1	0,10
0,4 - **0,6**	**U12/16E 0,6 K3**	1	0,10
0,6 - **0,9**	**U12/16E 0,9 K3**	1	0,10
0,8 - **1,2**	**U12/16E 1,2 K3**	1	0,10
1,2 - **1,8**	**U12/16E 1,8 K3**	1	0,10
1,8 - **2,7**	**U12/16E 2,7 K3**	1	0,10
2,7 - **4**	**U12/16E 4 K3**	1	0,10
4 - **6**	**U12/16E 6 K3**	1	0,10
6 - **9**	**U12/16E 9 K3**	1	0,10
8 - **11**	**U12/16E 11 K3**	1	0,10
10 - **14**	**U12/16E 14 K3**	1	0,10
13 - **18**	**U12/16E 18 K3**	1	0,10
17 - **23**	**U12/16E 23 K3**	1	0,10
22 - **30**	**U12/16E 30 K3**	1	0,13



manual reset

Overload Relays with Quick Tripping Characteristic see page 120,121

Technical data see contactors page 62 and thermal overload relays page 125
1) Non-standard coil voltages see page 57

Enclosures for Contactors

Suitable for contactor	Protection Degree	Conduit Entries Top	Bottom	Type	Pack pcs.	Weight kg/pc.
K3-07.. to K3-22.. **K3-24..**[1] **to K3-40..**[1]	IP65 Type 4X	2 x Ø 20,5mm	2 x Ø 20,5mm	**P1**	1	0,35

with Reset Button

Suitable for contactor	Protection Degree	Conduit Entries Top	Bottom	Type	Pack pcs.	Weight kg/pc.
K3-10.. to K3-22.. **+U12/16.. K3**	IP65	2 x Ø 20,5mm	2 x Ø 20,5mm	**P1R**	1	0,35

with Selector Switch

Suitable for contactor	Protection Degree	Conduit Entries Top	Bottom	Type	Pack pcs.	Weight kg/pc.
K3-10.. to K3-22.. **+U12/16.. K3**	IP65	2 x Ø 20,5mm	2 x Ø 20,5mm	**P1W**	1	0,35

with Start-Stop Push Button

Suitable for contactor	Protection Degree	Conduit Entries Top	Bottom	Type	Pack pcs.	Weight kg/pc.
K3-10.. to K3-22.. **+U12/16.. K3**	IP65	2 x Ø 20,5mm	2 x Ø 20,5mm	**P1T**	1	0,35

Indicator Units

Specifications	Voltage Range	Type	Pack pcs.	Weight kg/pc.
Coil Current Indicator, green (LED)	24 - 660V AC/DC	**K2-ING**	10	0,02
Coil Current Indicator, red (LED)	24 - 660V AC/DC	**K2-INR**	10	0,02
To be connected in series with the contactor coil. In case of coil interruption the indicator goes out. Voltage drop approx. 2 volts				
Voltage Indicator, clear (glow-disc. l.)	220 - 415V AC/DC	**K2-UN**	10	0,02
Voltage Indicator, red (LED)	24 - 120V AC/DC	**K2-UNR**	10	0,02
To be connected parallel to the contactor coil. In case of applied voltage the indicator also lights at coil interruption.				

Lens Caps For Indicator Units

Lens cap transparent	**LG9743T**	10	0,005
Lens cap red	**LG9743R**	10	0,005
Lens cap green	**LG9743GR**	10	0,005

Mounting instructions see page 118

Heating Element

Specifications	Voltage Range Power Consumption	Type	Pack pcs.	Weight kg/pc.
To avoid condensed water on places where high humidity is given together with alterations of ambient temperature	380 - 415V, 1,5W 220 - 240V, 1,5W	**K2-HR** **K2-HR 230**	10 10	0,02 0,02

Additional Terminals, Start Contact

Specification	Cable Cross-sections to clamp mm² solid or stranded	flexible	flexib. w. multi-core cable end	Type	Pack pcs.	Weight kg/pc.
Neutral Terminal	2 x 0,75-4	2 x 0,75-2,5	2 x 0,5-2,5	**LG9744**	10	0,009

Start Contact	for contactor K3-10 to K3-22	to be snapped on top of the auxiliary contact	**LG9319-K3**	10	0,03

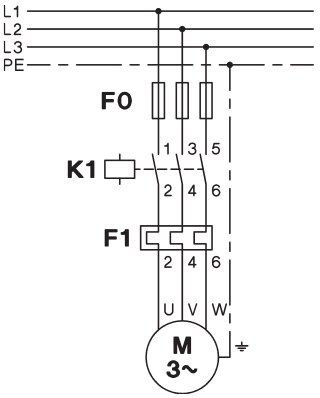
[1] without auxiliary contact blocks

D.O.L. Starters

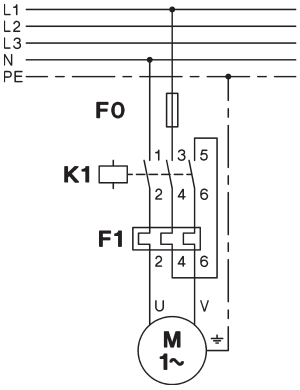
Wiring Diagrams Main Circuit

All fuses F0 shown in the main circuits are not included.
Terminal markings according to EN 50012

P1...
with overload relay U12/16.. K3



Wiring for single phase motors



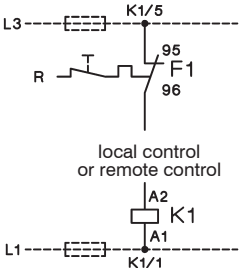
Wiring Diagrams Control Circuit

D.O.L. Starters P1 with standard coil voltages (see page 94) are supplied with connectors between main circuit and control circuit.

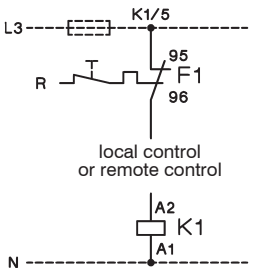
Coil connectors
Coils for **380-415V 50Hz** and **400-440V 60Hz**: The starter is supplied with control circuit connectors between terminals1 (L1) and 5 (L3).
Coils for **220-240V 50Hz** and **230-264V 60Hz**: The starter is supplied with control circuit connectors between terminals 95 and 5 (L3). Connect neutral wire to terminal A1.
Coils for **other voltages**: Without connectors between supply and control circuit. Connect supply to terminals A1 and 95.

Separate coil supply
Coils for **380-415V 50Hz** and **400-440V 60Hz**: Remove connectors A1-1 and 95-5, connect supply to terminals A1 and 95.
Coils for **220-240V 50Hz** and **230-264V 60Hz**: Remove connectors 95-5 connect supply to terminals A1 and 95.
Coils for **other voltages**: Connect supply to terminals A1 and 95.

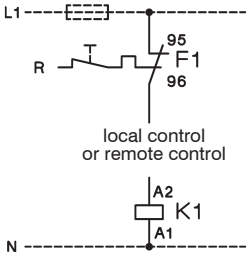
Coil phase to phase
(380-415V 50Hz)



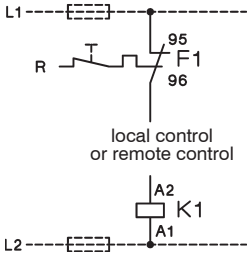
Coil phase to neutral
(220-240V 50Hz)



Coil phase to phase

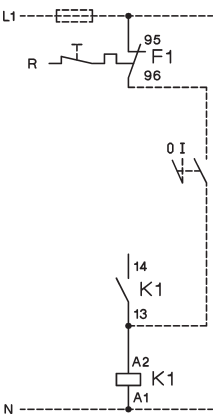


Coil phase to neutral

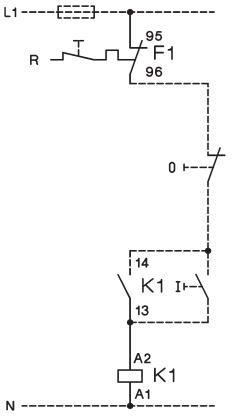


D.O.L. Starters with remote control

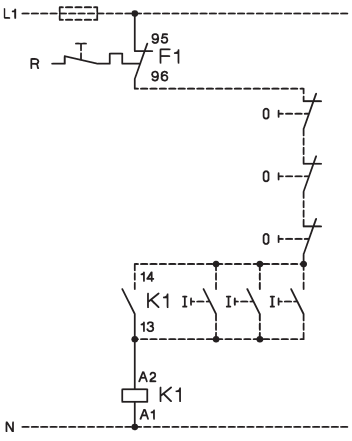
P1..
Remote 2-wire (switch) control



Remote 3-wire (push button) control



Remote start-stop control
(3 control stations)



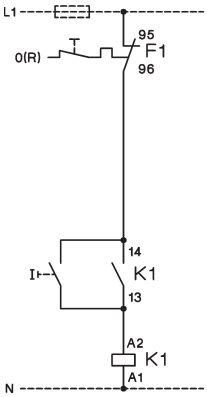
D.O.L. Starters

Wiring Diagrams Control Circuits

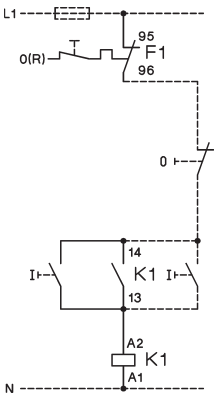
Typical circuit diagram (for separate coil supply, control circuit connected between L1 and N)
Terminal markings according to EN 50012

D.O.L. Starters with Start-Stop/Reset Push Buttons

P1T10, P1T18, P1T22
with overload relay U12/16.. K3

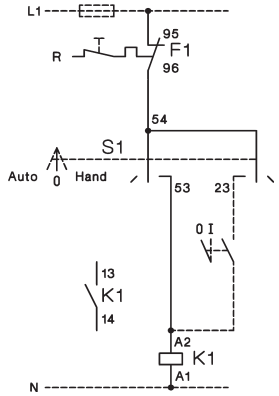


P1T10, P1T18, P1T22
with external push buttons

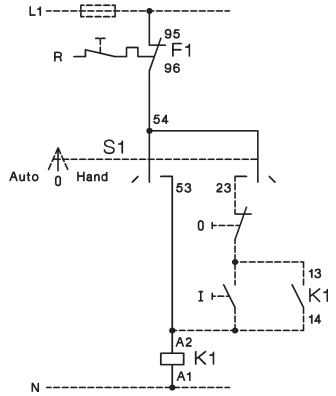


D.O.L. Starters with Selector Switch

P1W10, P1W18, P1W22
with external control switch

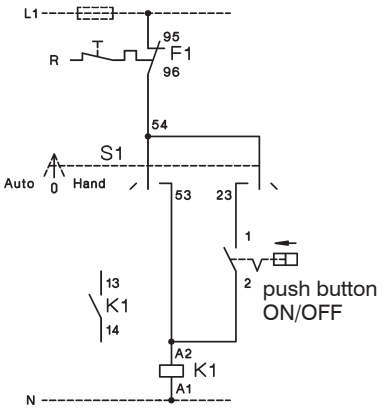


P1W10, P1W18, P1W22
with external push buttons



D.O.L. Starters with Selector Switch and Pneumatic Switch for Swimmingpool Control Gear and for use in Moist Rooms P1W18P

with overload relay U12/16.. K3

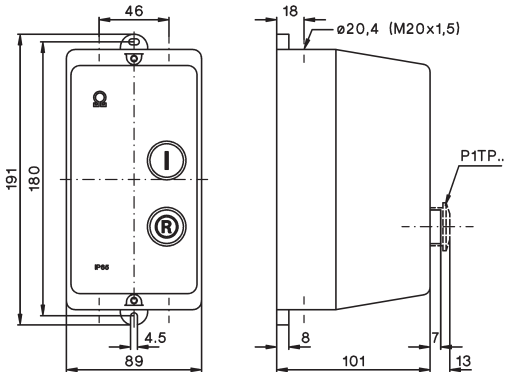


D.O.L. Starters

Dimensions

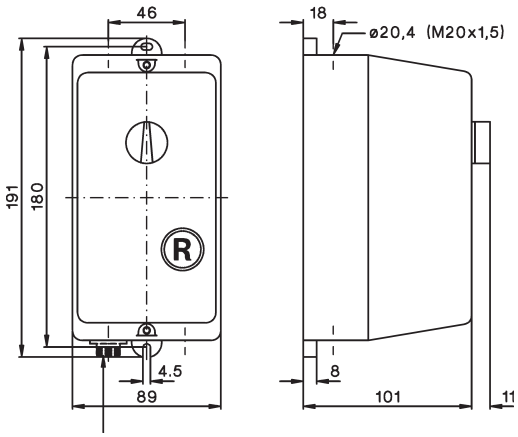
D.O.L. Starters with Start-Stop/Reset Push Buttons, Plastic Enclosed

P1T.., P1TP..



D.O.L. Starters with Selector Switch, Plastic Enclosed

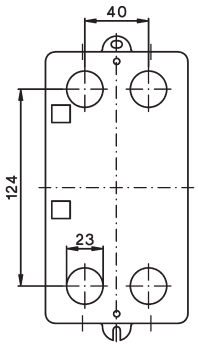
P1W.., P1W18P



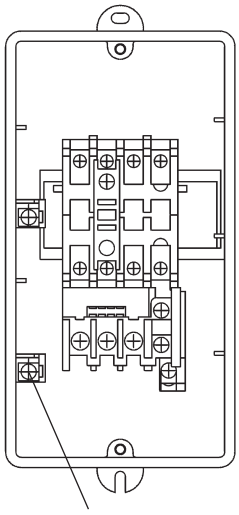
P1W18P: plug-in for air tube inside diameter 3mm

Rear Conduit Entries

knockouts
4 x Ø 23



Neutral Terminal LG9744



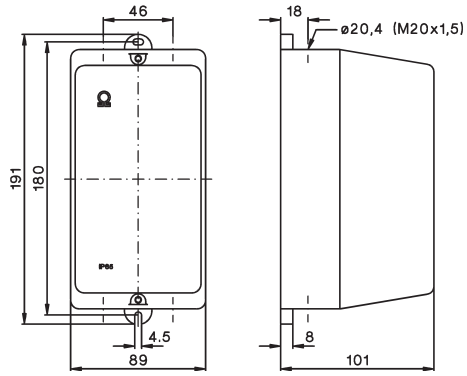
LG9744

Enclosures

Dimensions

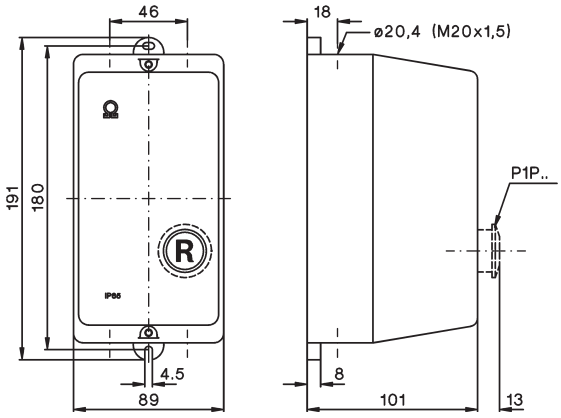
Enclosures for Contactors

P1



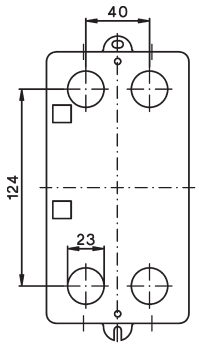
Enclosures for D.O.L. Starters

P1R, P1P



Rear Conduit Entries

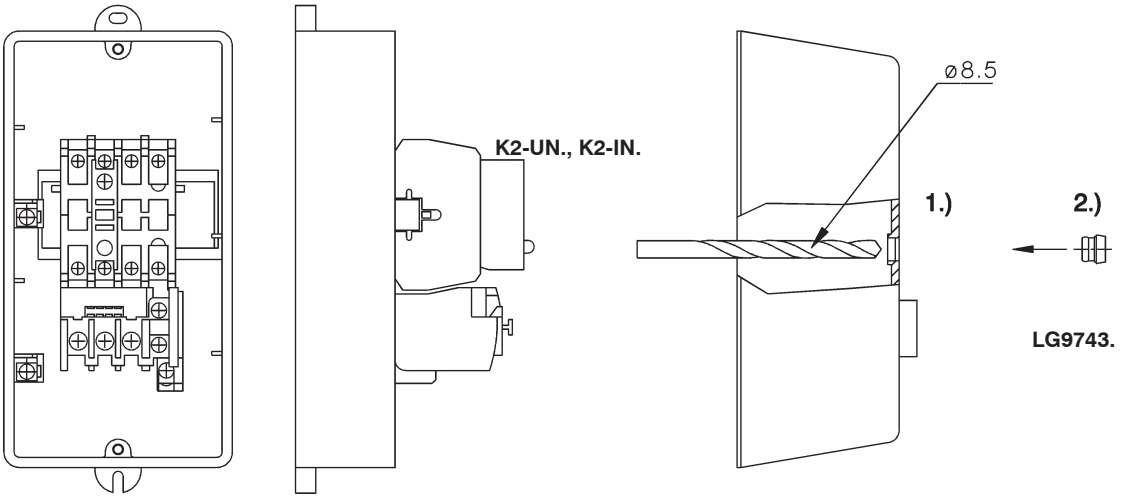
knockouts
4 x Ø 23



D.O.L. Starters

Mounting and Wiring Instructions

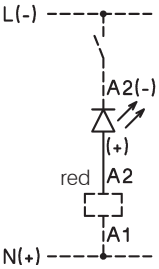
Indicators and Lens Caps for D.O.L. Starters P1



Wiring Examples

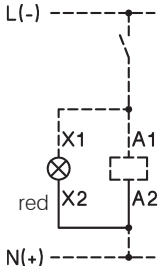
Coil Current Indicator

K2-ING
K2-INR



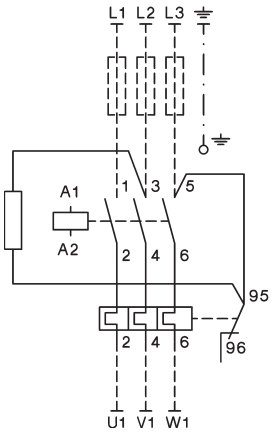
Voltage Indicator

K2-UN
K2-UNR

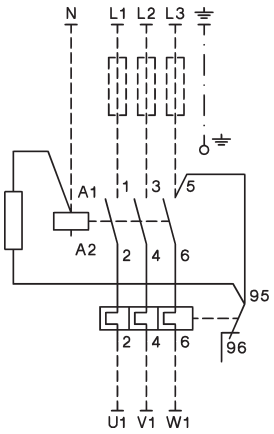


Heating Element

K2-HR

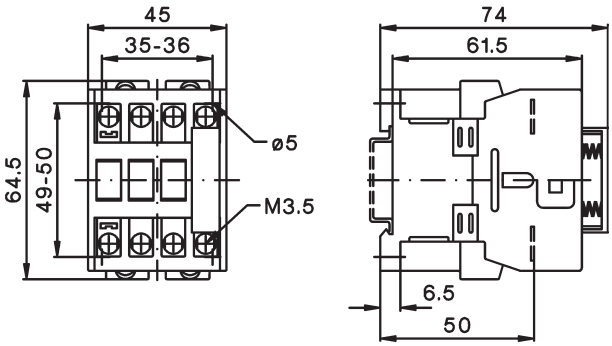


K2-HR 230



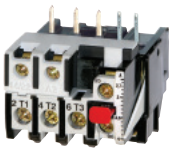
Colour mentioned in wiring diagrams refer to the outgoing connection wire of the device.

Start Contact LG9319-K3 for K3-10ND10 up to K3-22ND10



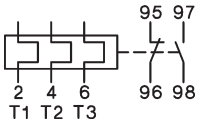
Thermal Overload Relays

Thermal Overload Relays for plug-in mounting

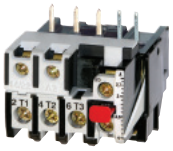


With Manual Reset, for contactors K1-..

Setting Range D.O.L. (A)					Type	Pack pcs.	Weight kg/pc.
0,12	- **0,18**		-		**U12/16E 0,18 K1**	1	0,10
0,18	- **0,27**		-		**U12/16E 0,27 K1**	1	0,10
0,27	- **0,4**		-		**U12/16E 0,4 K1**	1	0,10
0,4	- **0,6**		-		**U12/16E 0,6 K1**	1	0,10
0,6	- **0,9**		-		**U12/16E 0,9 K1**	1	0,10
0,8	- **1,2**		-		**U12/16E 1,2 K1**	1	0,10
1,2	- **1,8**		-		**U12/16E 1,8 K1**	1	0,10
1,8	- **2,7**		-		**U12/16E 2,7 K1**	1	0,10
2,7	- **4**		-		**U12/16E 4 K1**	1	0,10
4	- **6**	7	-	10,5	**U12/16E 6 K1**	1	0,10
6	- **9**	10,5	-	15,5	**U12/16E 9 K1**	1	0,10
8	- **11**	14	-	19	**U12/16E 11 K1**	1	0,10
10	- **14**	18	-	24	**U12/16E 14 K1**	1	0,10

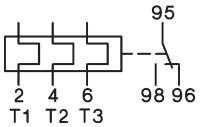


manual reset

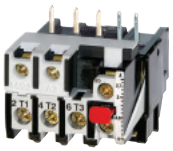


With Auto Reset, for contactors K1-..

Setting Range D.O.L. (A)					Type	Pack pcs.	Weight kg/pc.
0,12	- **0,18**		-		**U12/16A 0,18 K1**	1	0,10
0,18	- **0,27**		-		**U12/16A 0,27 K1**	1	0,10
0,27	- **0,4**		-		**U12/16A 0,4 K1**	1	0,10
0,4	- **0,6**		-		**U12/16A 0,6 K1**	1	0,10
0,6	- **0,9**		-		**U12/16A 0,9 K1**	1	0,10
0,8	- **1,2**		-		**U12/16A 1,2 K1**	1	0,10
1,2	- **1,8**		-		**U12/16A 1,8 K1**	1	0,10
1,8	- **2,7**		-		**U12/16A 2,7 K1**	1	0,10
2,7	- **4**		-		**U12/16A 4 K1**	1	0,10
4	- **6**	7	-	10,5	**U12/16A 6 K1**	1	0,10
6	- **9**	10,5	-	15,5	**U12/16A 9 K1**	1	0,10
8	- **11**	14	-	19	**U12/16A 11 K1**	1	0,10
10	- **14**	18	-	24	**U12/16A 14 K1**	1	0,10

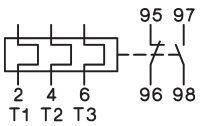


auto reset
or manual reset



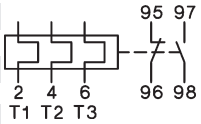
With Quick Tripping Characteristic for EEx e motors and submersible pumps, f. contactors K1-..

Setting Range D.O.L. (A)					Type	Pack pcs.	Weight kg/pc.
0,4	- **0,6**		-		**U12/16EQ 0,6 K1**	1	0,10
0,6	- **0,9**		-		**U12/16EQ 0,9 K1**	1	0,10
0,8	- **1,2**		-		**U12/16EQ 1,2 K1**	1	0,10
1,2	- **1,8**		-		**U12/16EQ 1,8 K1**	1	0,10
1,8	- **2,7**		-		**U12/16EQ 2,7 K1**	1	0,10
2,7	- **4**		-		**U12/16EQ 4 K1**	1	0,10
4	- **6**	7	-	10,5	**U12/16EQ 6 K1**	1	0,10
6	- **9**	10,5	-	15,5	**U12/16EQ 9 K1**	1	0,10
8	- **11**	14	-	19	**U12/16EQ 11 K1**	1	0,10

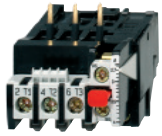


manual reset

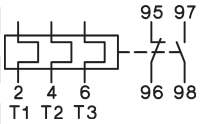
Thermal Overload Relays for plug-in mounting

Setting Range D.O.L. (A)	Setting Range Y/Δ (A)	Type	Pack pcs.	Weight kg/pc.	Wiring Diagram
With Manual Reset, for contactors K(G)3-10.. to K(G)3-22.. ..					
0,12 - **0,18**	-	**U12/16E 0,18 K3**	1	0,10	
0,18 - **0,27**	-	**U12/16E 0,27 K3**	1	0,10	
0,27 - **0,4**	-	**U12/16E 0,4 K3**	1	0,10	
0,4 - **0,6**	-	**U12/16E 0,6 K3**	1	0,10	
0,6 - **0,9**	-	**U12/16E 0,9 K3**	1	0,10	
0,8 - **1,2**	-	**U12/16E 1,2 K3**	1	0,10	
1,2 - **1,8**	-	**U12/16E 1,8 K3**	1	0,10	
1,8 - **2,7**	-	**U12/16E 2,7 K3**	1	0,10	
2,7 - **4**	-	**U12/16E 4 K3**	1	0,10	
4 - **6**	7 - 10,5	**U12/16E 6 K3**	1	0,10	
6 - **9**	10,5 - 15,5	**U12/16E 9 K3**	1	0,10	
8 - **11**	14 - 19	**U12/16E 11 K3**	1	0,10	
10 - **14**	18 - 24	**U12/16E 14 K3**	1	0,10	
13 - **18**	23 - 31	**U12/16E 18 K3**	1	0,10	
17 - **23**	30 - 40	**U12/16E 23 K3**	1	0,10	
22 - **30**	38 - 52	**U12/16E 30 K3**	1	0,13	

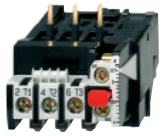
manual reset



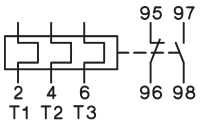
With **quick Tripping Characteristic** for EEx e motors and under water pumps

0,4 - **0,6**	-	**U12/16EQ 0,6 K3**	1	0,10	
0,6 - **0,9**	-	**U12/16EQ 0,9 K3**	1	0,10	
0,8 - **1,2**	-	**U12/16EQ 1,2 K3**	1	0,10	
1,2 - **1,8**	-	**U12/16EQ 1,8 K3**	1	0,10	
1,8 - **2,7**	-	**U12/16EQ 2,7 K3**	1	0,10	
2,7 - **4**	-	**U12/16EQ 4 K3**	1	0,10	
4 - **6**	7 - 10,5	**U12/16EQ 6 K3**	1	0,10	
6 - **9**	10,5 - 15,5	**U12/16EQ 9 K3**	1	0,10	
8 - **11**	14 - 19	**U12/16EQ 11 K3**	1	0,10	
10 - **14**	18 - 24	**U12/16EQ 14 K3**	1	0,10	

manual reset

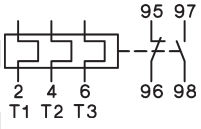


For contactors K(G)3-10.. to K(G)3-40A..

0,12 - **0,18**	-	**U3/32 0,18**	1	0,14	
0,18 - **0,27**	-	**U3/32 0,27**	1	0,14	
0,27 - **0,4**	-	**U3/32 0,4**	1	0,14	
0,4 - **0,6**	-	**U3/32 0,6**	1	0,14	
0,6 - **0,9**	-	**U3/32 0,9**	1	0,14	
0,8 - **1,2**	-	**U3/32 1,2**	1	0,14	
1,2 - **1,8**	-	**U3/32 1,8**	1	0,14	
1,8 - **2,7**	-	**U3/32 2,7**	1	0,14	
2,7 - **4**	-	**U3/32 4**	1	0,14	
4 - **6**	7 - 10,5	**U3/32 6**	1	0,14	
6 - **9**	10,5 - 15,5	**U3/32 9**	1	0,14	
8 - **11**	14 - 19	**U3/32 11**	1	0,14	
10 - **14**	18 - 24	**U3/32 14**	1	0,14	
13 - **18**	23 - 31	**U3/32 18**	1	0,14	
17 - **24**	30 - 41	**U3/32 24**	1	0,14	
23 - **32**	40 - 55	**U3/32 32**	1	0,14	

manual and auto reset

For contactors K(G)3-24A.. to K(G)3-40A ..

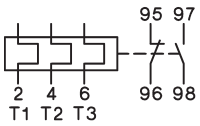
10 - **14**	18 - 24	**U3/42 14**	1	0,30	
14 - **20**	24 - 35	**U3/42 20**	1	0,30	
20 - **28**	35 - 48	**U3/42 28**	1	0,30	
28 - **42**	48 - 73	**U3/42 42**	1	0,30	

manual and auto reset

Thermal Overload Relays for plug-in mounting

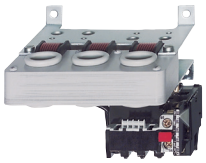
Setting Range D.O.L. (A)		Setting Range Y/Δ (A)		Type	Pack pcs.	Weight kg/pc.
For contactors K3-50A.. to K3-74A..						
20	- **28**	35	- 48	**U3/74 28**	1	0,40
28	- **42**	48	- 73	**U3/74 42**	1	0,40
40	- **52**	70	- 90	**U3/74 52**	1	0,40
52	- **65**	90	- 112	**U3/74 65**	1	0,40
60	- **74**	104	- 128	**U3/74 74**	1	0,40

Wiring Diagram



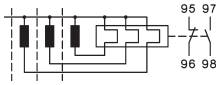
manual and auto reset

Thermal Overload Relays for separate mounting



Setting Range D.O.L. (A)		Setting Range Y/Δ (A)		Type	Pack pcs.	Weight kg/pc.
For contactors K3-90, K3-115, K85, K110						
60	- **90**	104	- 156	**U85 90**	1	0,90
80	- **120**	140	- 207	**U85 120**		

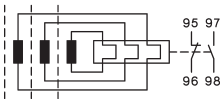
Wiring Diagram



manual reset

For contactors K3-151.. and K3-176.., busbars included

120	- **180**	208	- 312	**U180 180**	1	1,5

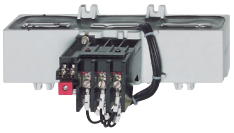


manual and auto reset

For contactors K3-210.. up to K3-316.., busbars included

144	- **216**	250	- 374	**U320 216**	1	1,8
216	- **320**	374	- 554	**U320 320**		

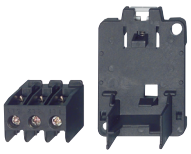
For contactors K3-315.. , K3-450.. , K3-550.. , K3-700.. , K3-860..



240	- **360**	416	- 623	**U800 360**	1	4,1
360	- **540**	623	- 935	**U800 540**	1	4,1
540	- **800**	935	- 1385	**U800 800**	1	4,1

Accessories

for overload relays	for contactors	Type	Pack set	Weight kg/set
Busbar Sets				
U800	K3-450.. , K3-550..	**SU840/550**	1	1,7
U800	K3-700.. , K3-860..	**SU840/860**	1	2,1



Cable Cross-section (mm^2) overload relay	solid or stranded	flexible	Type	Pack pcs.	Weight kg/pc.
for Single Mounting U12/16..K3 Base for DIN-rail mounting plus terminals					
U12/16..K3	0,75 - 6	0,75 - 4	**U12SM K3**	1	0,035

for Single Mounting U3/32 Additional Terminals with fingertouch protection
(U3/32 relays have base for DIN rail mounting integrated)

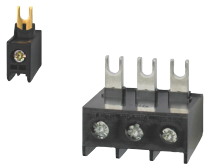
U3/32	0,75 - 6	0,75 - 4	**U3/32SM**	1	0,035

for Single Mounting U3/42 or U3/74 Base for DIN-rail mounting

U3/42, U3/74	-	-	**U3/42G**	1	0,030

for Single Mounting U3/42 or U3/74 Connecting Wire Set (3 pcs.)

U3/42, U3/74	150mm length $10mm^2$	**LG5830-4**	1	0,060
U3/42, U3/74	250mm length $10mm^2$	**LG5830-2**	1	0,100



Additional Terminals with fingertouch protection

1-pole f. U12/16, U3/32	0,75 - 10	0,75 - 6	**LG9339**	1	0,009
3-pole for U3/42	4 - 35	6 - 25	**LG7559**	1	0,052

Thermal Overload Relays, tripping times for selection to motors of protection degree EEx e

Relays With Standard Tripping Characteristic

Setting Range A	**A**	Tripping time depending on the multiple of the current setting from cold condition (tolerance ±20% of the tripping time) I_A/I_N 3	I_A/I_N 4	I_A/I_N 5	I_A/I_N 6	I_A/I_N 7,2	I_A/I_N 8
U3/32 ..		s	s	s	s	s	s
0,12 -	**0,18**	16,1	9,6	6,8	5,3	4,2	3,7
0,18 -	**0,27**	16,6	9,7	6,7	5,2	4,1	3,6
0,27 -	**0,4**	19,4	11,4	7,9	6,1	4,7	4,2
0,4 -	**0,6**	18,7	10,9	7,6	5,9	4,6	4,0
0,6 -	**0,9**	19,2	11,2	7,7	5,9	4,6	4,1
0,8 -	**1,2**	20,8	12,3	8,5	6,6	5,2	4,6
1,2 -	**1,8**	25,5	14,1	9,8	7,6	5,9	5,2
1,8 -	**2,7**	26,6	15,6	10,9	8,3	6,5	5,7
2,7 -	**4**	22,7	13,6	9,5	7,4	5,8	5,1
4 -	**6**	22,2	13,3	9,3	7,1	5,6	4,9
6 -	**9**	20,4	11,9	8,2	6,1	4,7	4,0
8 -	**11**	20,9	11,8	7,9	5,7	4,3	3,5
10 -	**14**	21,3	11,7	7,4	5,1	3,7	3,0
13 -	**18**	21,2	12,1	8,0	6,2	4,6	4,1
17 -	**24**	20,4	12,0	8,6	6,3	4,5	3,7
23 -	**32**	20,2	10,2	6,7	4,7	3,4	2,8
U3/42		s	s	s	s	s	s
10 -	**14**	21,8	11,4	7,0	5,0	3,7	2,8
14 -	**20**	22,4	11,2	6,7	4,5	3,2	2,4
20 -	**28**	21,8	10,8	6,5	4,5	3,3	2,5
28 -	**42**	25,2	13,3	8,0	5,5	4,0	3,1
U3/74		s	s	s	s	s	s
20 -	**28**	21,8	10,8	6,5	4,5	3,3	2,5
28 -	**42**	25,2	13,3	8,0	5,5	4,0	3,1
40 -	**52**	18,3	9,2	5,6	3,9	2,8	2,2
52 -	**65**	17,8	8,7	5,2	3,4	2,5	1,9
U85 ..		s	s	s	s	s	s
60 -	**90**	19,5	13,5	11,0	10,0	9,5	8,5
80 -	**120**	18,0	11,0	10,0	9,0	8,5	8,0
U840 ..		s	s	s	s	s	s
260 -	**360**	23,3	14,1	10,0	7,6	6,1	5,4
340 -	**480**	23,0	13,8	9,6	7,6	6,1	5,4
440 -	**620**	20,5	12,4	9,0	7,0	5,5	5,0
560 -	**800**	21,0	12,5	9,0	7,0	5,6	5,2
U12/16E(A) ..		s	s	s	s	s	s
0,12 -	**0,18**	18,5	10,4	7,2	5,5	4,3	3,6
0,18 -	**0,27**	16,7	9,8	6,5	5,0	4,1	3,5
0,27 -	**0,4**	19,4	12,1	8,2	5,9	4,9	4,2
0,4 -	**0,6**	18,7	11,2	8,0	6,0	4,9	4,1
0,6 -	**0,9**	19,7	11,6	8,1	6,1	4,9	4,2
0,8 -	**1,2**	22,9	13,6	10,0	7,3	6,0	5,2
1,2 -	**1,8**	22,2	13,2	9,2	7,6	5,8	5,3
1,8 -	**2,7**	23,0	13,7	9,3	7,6	5,7	5,1
2,7 -	**4**	24,0	14,4	9,9	7,8	5,9	5,1
4 -	**6**	24,7	13,8	9,9	7,3	5,6	4,8
6 -	**9**	22,0	13,4	8	5,7	4,1	3,5
8 -	**11**	17,4	9,2	5,9	4,1	2,9	2,3
10 -	**14**	26,4	12,9	7,6	5,2	3,5	2,8
13 -	**18**	14,7	7,7	4,8	3,2	2,3	1,7
17 -	**23**	16,2	8,4	5,0	3,6	2,4	1,8
22 -	**30**	16,8	8,5	5,0	3,6	2,3	1,9

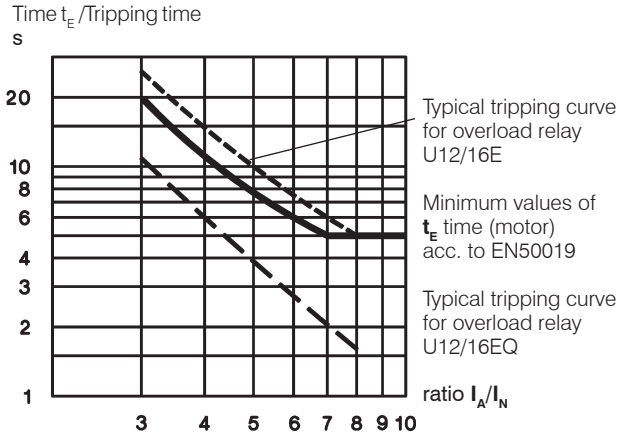
Relays With Quick Tripping Characteristic

preferably for motors with short t_E time and for submersible pumps

Setting Range A	**A**	Tripping time depending on the multiple of the current setting from cold condition (tolerance ±20% of the tripping time) I_A/I_N 3	I_A/I_N 4	I_A/I_N 5	I_A/I_N 6	I_A/I_N 7,2	I_A/I_N 8
U12/16EQ ..		s	s	s	s	s	s
0,4 -	**0,6**	13,6	8,4	5,9	4,2	3,3	3,0
0,6 -	**0,9**	13,8	7,8	5,2	4,1	3,2	2,7
0,8 -	**1,2**	13,1	7,5	5,2	3,9	3,1	2,7
1,2 -	**1,8**	14,6	8,7	6,0	4,6	3,6	3,2
1,8 -	**2,7**	13,5	7,6	5,3	3,9	3,1	2,7
2,7 -	**4**	11,0	6,0	4,1	2,6	1,7	1,4
4 -	**6**	9,6	5,3	3,3	2,3	1,6	1,3
6 -	**9**	10,2	5,4	3,4	2,3	1,6	1,3
8 -	**11**	12,0	6,2	3,9	2,5	1,8	1,3
10 -	**14**	12,8	6,6	4,0	2,6	1,8	1,4

All tripping times of overload relays U12/16EQ are shorter than the minimum values of the $\mathbf{t_E}$ time for motors of protection degree EEx e acc. to EN 50019 and therefore are suitable for all motors of protection degree EEx e. For these overload relays the selection on basis of tripping curves is thereby not necessary.

When selecting a standard overload, refer to the tripping curve. Determine the values of the starting current ratio $\mathbf{I_A/I_N}$ and the time $\mathbf{t_E}$ which is marked on the label of the motor. The overload must trip within the $\mathbf{t_E}$ time, which means that the tripping curve from cold condition must be (20% due to tolerance) below the co-ordination point $\mathbf{I_A/I_N}$ and the time $\mathbf{t_E}$.
$\mathbf{I_A}$ = Starting current of motor $\mathbf{I_N}$ = Rated current of motor
$\mathbf{t_E}$ = $\mathbf{t_E}$-time of motor



Example of selection for thermal overload relay:
Technical data of a motor protection EEx e
P_N = 1,5kW I_N = 3,6A I_A/I_N = 5 t_E time = 8s

1) U12/16E 4 (2,7 - 4A)
Tripping time at 5 x I_N = 9,9s
9,9s + 20% tolerance = **11,9s >** $t_{E\ Motor}$ = **8**s
The device U12/16E 4 is **not suitable**.

2) **U12/16EQ 4** (2,7 - 4A)
Tripping time at 5 x I_N = 4,1s
4,1s + 20% tolerance = **4,9s <** $t_{E\ Motor}$ = **8**s
The device U12/16EQ 4 is therefore suitable for motor protection

Thermal Overload Relays

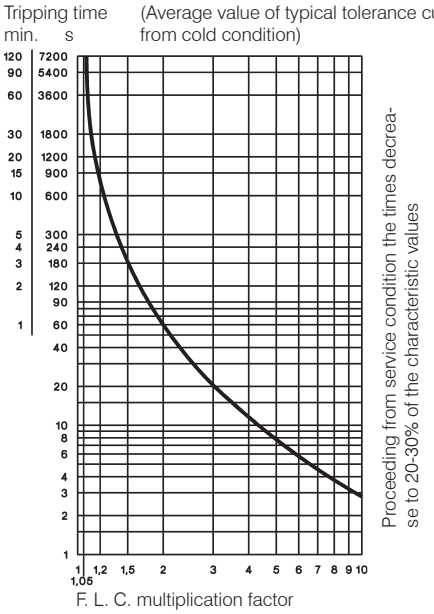
Fuses for U3/32, U3/42, U3/74, U12/16E, U85, U180, U320 and U800

Type	Setting Range DOL A	Setting Range Y/Δ A	Max. Fuse Size According to Coordination-type "2" 1) quick A	"2" 1) slow, gL(gG) A	"1" 1) slow, gL(gG) A	"1" 1) aM A	Fuse UL A	SCCR kA
U3/32	0,12 - **0,18**	-	0,5 2)	0,5 2)	25	-	15	5
(U12/16E)	0,18 - **0,27**	-	1,0 2)	1,0 2)	25	-	15	5
	0,27 - **0,4**	-	2	2	25	-	15	5
	0,4 - **0,6**	-	2	2	25	-	15	5
	0,6 - **0,9**	-	4	4	25	-	15	5
	0,8 - **1,2**	-	4	4	25	2	15	5
	1,2 - **1,8**	-	6	6	25	2	15	5
	1,8 - **2,7**	-	10	10	25	4	15	5
	2,7 - **4**	-	16	10	25	4	15	5
	4 - **6**	7 - 10,5	20	16	25	6	15	5
	6 - **9**	10,5 - 15,5	35	25	35	10	25	5
	8 - **11**	14 - 19	35	25	35	16	30	5
	10 - **14**	18 - 24	50	35	63	16	40	5
	13 - **18**	23 - 31	50	35	63	20	50	5
	17 - **(23)24**	30 - (40)41	63	50	63	25	60	5
	(22)23 - **(30)32**	(38)40 - (52)55	80	63	80	35	70	5
U3/42	10 - **14**	18 - 24	50	35	80	16	40	5
	14 - **20**	24 - 35	63	50	80	25	60	5
	20 - **28**	35 - 48	80	63	80	35	80	5
	28 - **42**	48 - 73	100	80	150	50	110	5
U3/74	20 - **28**	35 - 48	100	80	150	35	80	5
	28 - **42**	48 - 73	125	100	150	50	110	5
	40 - **52**	70 - 90	160	100	150	63	200	5
	52 - **65**	90 - 112	160	125	150	80	250	10
	60 - **74**	104 - 128	160	125	150	80	250	10
U85	60 - **90**	104 - 156					300	10
	80 -**120**	140 - 207					-	10
U180, U320	all ranges		For short circuit protecting overload relays with current transformer use fuse according to the contactor of the combination.				-	-
U800	all ranges						-	-

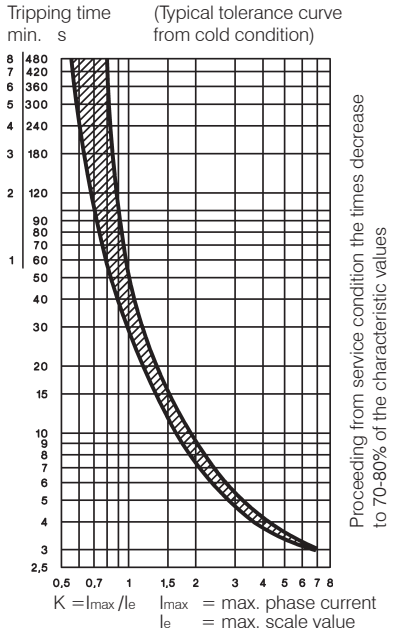
Tripping Characteristics for U3/32, U3/42, U3/74 and U12/16E

Detailed tripping times for each range see table page 124

with three-phase load



with two-pole load



1) Coordination-type according to IEC 947-4-1:
"2": Light contact welding accepted. Thermal overload relay must not be damaged.
"1": Welding of contactor and damage of the thermal overload relay allowed.

2) Miniature fuse

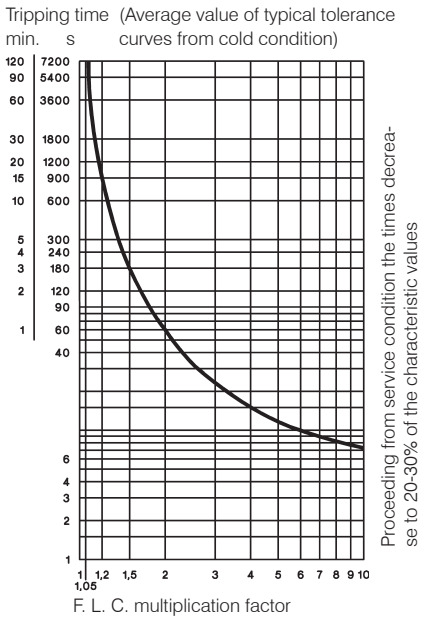
3) Suitable for use on a capability of delivering not more than

Thermal Overload Relays

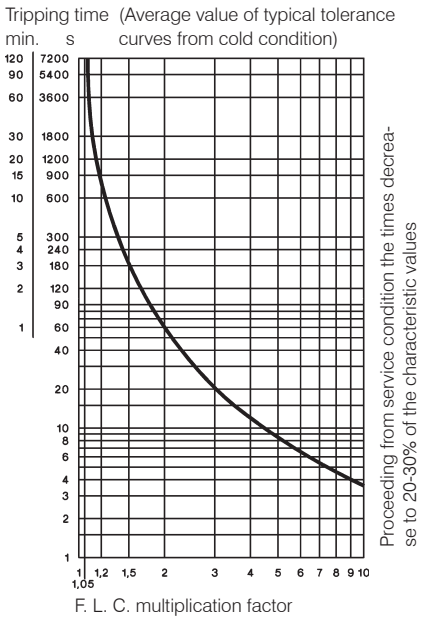
Tripping Characteristics for U85, U180, U320, and U800

Detailed tripping times for each range of U85 see table page 124

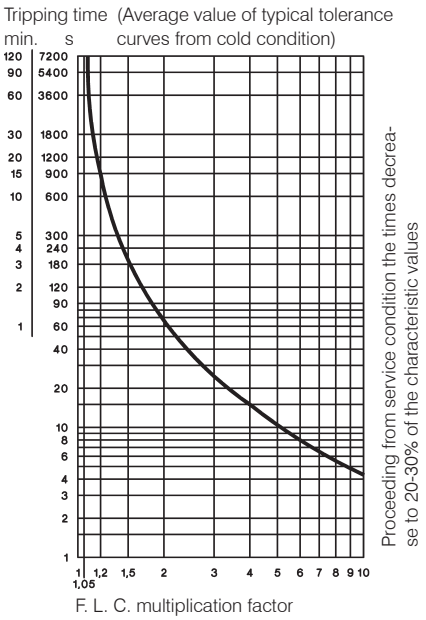
U85 with three-phase load



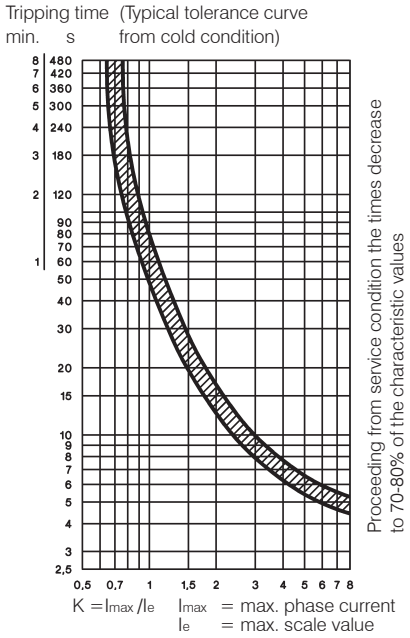
U180, U320 with three-phase load



U800 with three-phase load

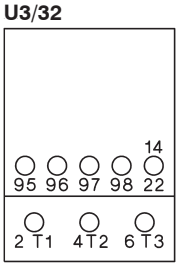


U85 with two-pole load

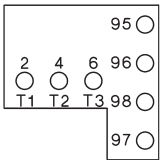


Position of Terminals

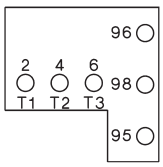
U3/32



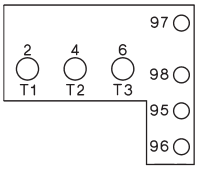
U12/16E, U12/16EM, U12/16EQ



U12/16A



U3/42, U3/74



Thermal Overload Relays in Special Version

Fuse for U12/16EQ

Setting Range A	Maximum Fuse Acc. to Coordination-type "2" [1] quick A	slow, gL(gG) A	"1" [1] slow, gL(gG) A
0,4 - **0,6**	2	2	25
0,6 - **0,9**	4	4	25
0,8 - **1,2**	4	4	25
1,2 - **1,8**	6	6	25
1,8 - **2,7**	10	10	25
2,7 - **4**	16	10	25
4 - **6**	20	16	25
6 - **9**	35	25	35
8 - **11**	35	25	35
10 - **14**	50	35	63

Fuse for U12/16EM

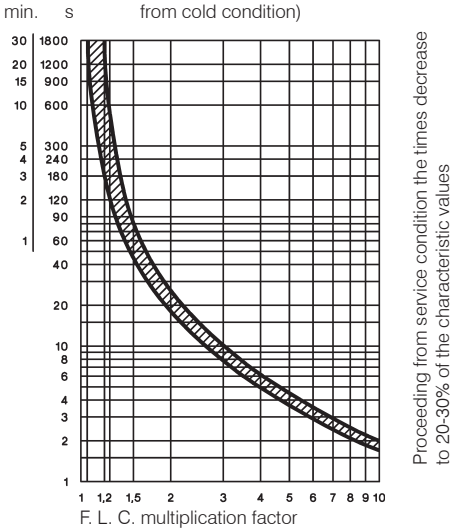
Setting Range A	Maximum Fuse Acc. to Coordination-type "2" [1] 380-400V slow, gL(gG) A	500V slow, gL(gG) A	660-690V slow, gL(gG) A
0,12 - **0,18**	none	none	on request
0,18 - **0,27**	none	none	on request
0,27 - **0,4**	none	none	on request
0,4 - **0,6**	none	none	on request
0,6 - **0,9**	none	none	on request
0,8 - **1,2**	none	10	on request
1,2 - **1,8**	none	16	on request
1,8 - **2,7**	20	20	on request
2,7 - **4**	35	35	on request

Tripping Characteristic for U12/16EQ

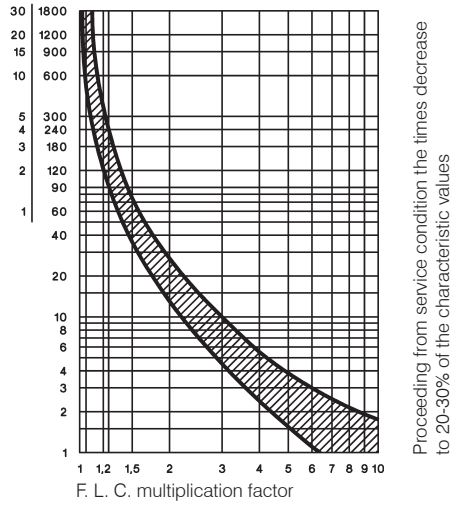
Detailed tripping times for each range see table page 124

with three-phase load

range 0,4-0,6 to 1,8-2,7A

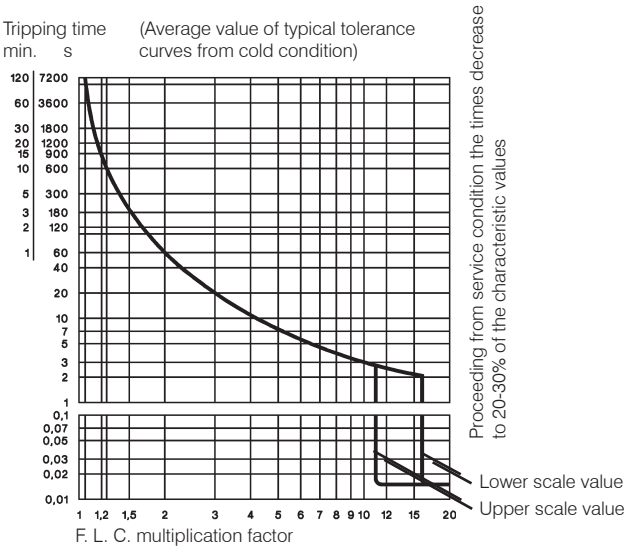


range 2,7-4 to 10-14A



Tripping Characteristic for U12/16EM

with three-phase load



1) Coordination-type according to IEC 947-4-1:
"2": Light contact welding accepted. Thermal overload relay must not be damaged.
"1": Welding of contactor and damage of the thermal overload relay allowed.

Thermal Overload Relays

Data according to IEC 947-4-1, IEC 947-5-1, VDE 0660, EN 60947-4-1, EN 60947-5-1

Type			U3/32	U12/16 [6]	U3/42	U3/74	U85	U180	U320	U800
Rated insulation voltage U_i [1]		V~	690	690	690	690	750	1000	1000	1000
Permissible ambient temperature										
operation	open	°C			-25 to +60					-25 to +55
storage		°C			-50 to +70					-40 to +70
Trip class according to IEC 947-4-1		10A	10A	10A	10A	10A	20	10A	10A	10
Cable cross-section										
main connector	solid or stranded	mm²	0,75-6	0,75-6+0,75-2,5 [2]	0,75-10	4-35 [2]	[3]	[7]	-	[7]
	flexible	mm²	1-4	0,75-4+0,5-2,5 [2]	0,75-6	6-25 [2]				
	flexible with multicore cable end	mm²	0,75-4	0,5-2,5+0,5-1,5	0,75-6	4-25				
Cables per clamp	number		2	1+1	2	1				
auxiliary connector	solid	mm²			0,75-2,5 [2]					1-2,5 [2]
	flexible	mm²			0,5-2,5 [2]					1-2,5 [2]
	flexible with multicore cable end	mm²			0,5-1,5					1-2,5 [2]
Cables per clamp	number				2					2

Type			U3/32	U12/16A	U12/16E U12/16EM	U12/16EQ	U3/42 U3/74	U85	U180 U320	U800
Auxiliary contacts										
Rated insulation voltage U_i [1]										
same potential		V~	690	690	690	690	690	690	690	500
different potential		V~	440	-	440	440	250	440	440	500
Utilization category AC15										
Rated operational	24V	A	3	4	5	5	4	5	3	4 [5]
current I_e	230V	A	2	2,5	3	3	2,5	3	2	2,5
	400V	A	1	1,5	2	2	1,5	2	1	1,5
	690V	A	0,5	0,6	0,6	0,6	0,6	0,6	0,5	0,6
Utilization category DC13										
Rated operational	24V	A	1	1,2	1,2	1,2	1,2	1,2	1	1,2
current I_e	110V	A	0,15	0,15	0,15	0,15	0,15	0,15	0,15	0,15
	220V	A	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1
Short circuit prot. (without welding 1kA)										
highest fuse rating	gL (gG)	A	4	4	6	6	6	6	4	6

Type		U3/32	U12/16	U12/16E	U3/42	U3/42	U3/74	U3/74	U85
Setting range		all	to 23A	22 - 30A	to 28A	28 - 42A	to 52A	52 - 65A	all
Power loss per current path (max.)									
minimum setting value	W	1,1	1,1	1,7	1,3	1,3	2,0	2,9	1,1
maximum setting value	W	2,3	2,3	3,7	2,6	3,3	3,7	4,5	2,5

Data according to cULus

Type		U3/32	U12/16A	U12/16E	U3/42	U3/74	U85
Rated insulation voltage	V~	600	600	600	600	600	600
Rated current	A	32	23	23	42	75	85
Auxiliary contacts							
Rated voltage							
same potential	V~	600	600	600	600	600	600
different potential	V~	150	-	150	150	150	150
Switching capacity AC	VA	500	500	500	600	600	600
of aux. contacts	A	2	3	4	4	4	4

Temperature Compensation

In case of higher ambient temperature use the following formula:
(Ambient temperature - 20) x 0,125 = correction factor in % of the full load motor current

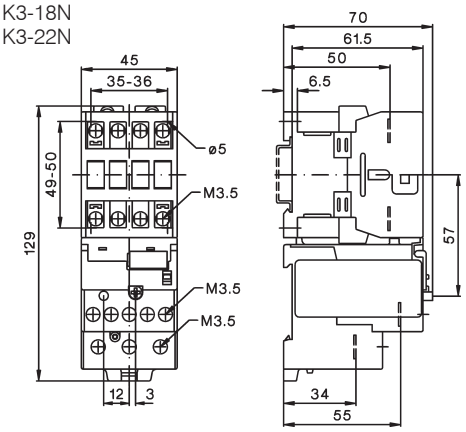
Example: Ambient temperature 70°C, full load motor current 7A
(70 - 20) x 0,125 = 6,25%
Setting value: 7A + 6,25% = 7,44A

1) Suitable for: earthed-neutral systems, overvoltage category I to III, pollution degree 3 (standard-industry): U_{imp} = 4kV (at 440V), 6kV (at 690V). Data for other conditions on request.
2) Maximum cable cross-section with prepared conductor
3) Without terminals, suitable for bushing one connector 70mm² (stranded) per phase
4) Switching capacity of the start contact: AC15 300VA, max. 1,5A, DC13 (max. 220V) 30W, max. 1,5A
5) Switching capacity of the make contact: AC15 400VA, max. 1,7A, DC13 (max. 220V) 10W, max. 1A
6) U12/16E 30: Cable cross-section for main connector like type U3/42, one connector only
7) Busbar sets see accessories page 123

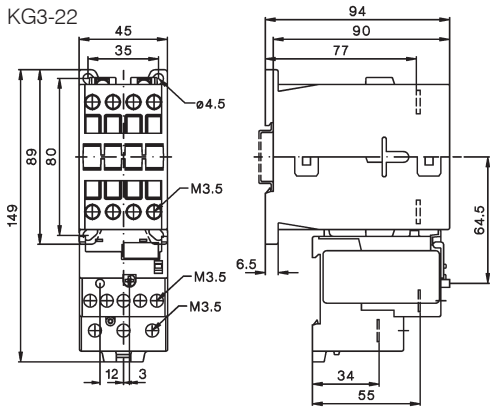
Thermal Overload Relays

Dimensions

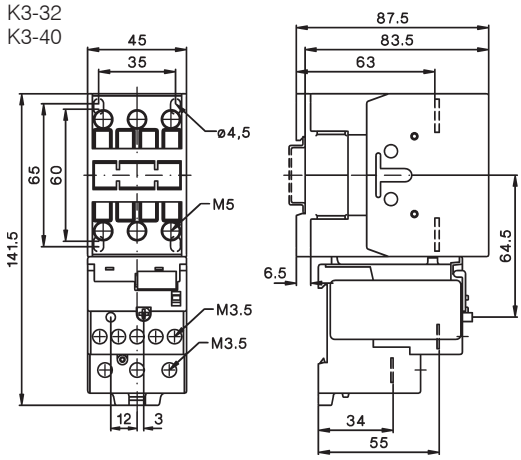
K3-10N + **U3/32**
K3-14N
K3-18N
K3-22N



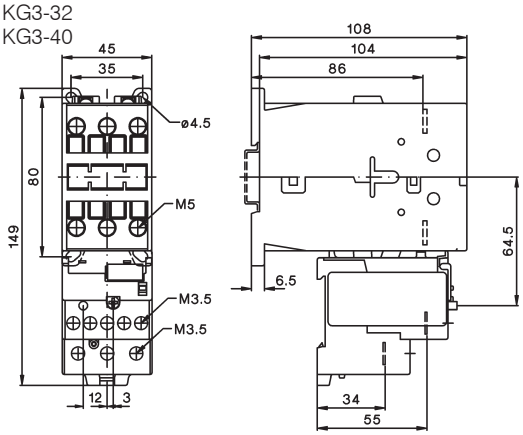
KG3-10 + **U3/32**
KG3-14
KG3-18
KG3-22



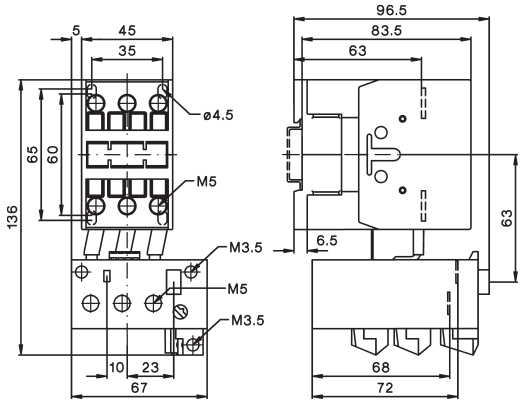
K3-24 + **U3/32**
K3-32
K3-40



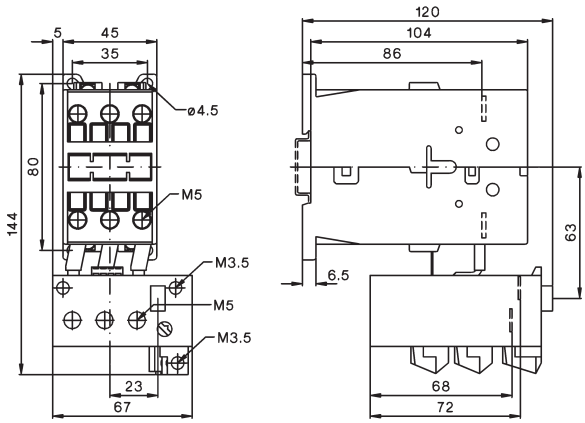
KG3-24 + **U3/32**
KG3-32
KG3-40



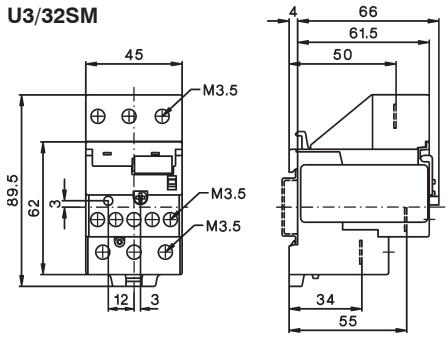
K3-24 + **U3/42**
K3-32
K3-40



KG3-24 + **U3/42**
KG3-32
KG3-40

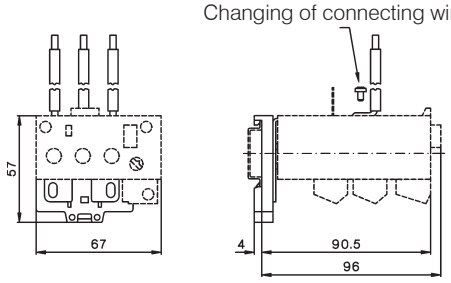


U3/32SM



U3/42G +LG5830-.

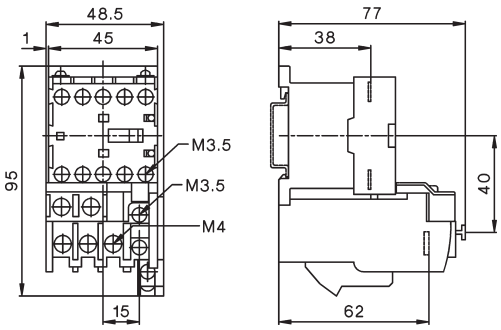
Changing of connecting wire with 1,8Nm



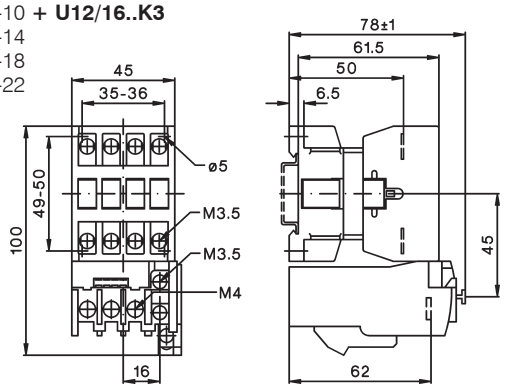
Thermal Overload Relays

Dimensions

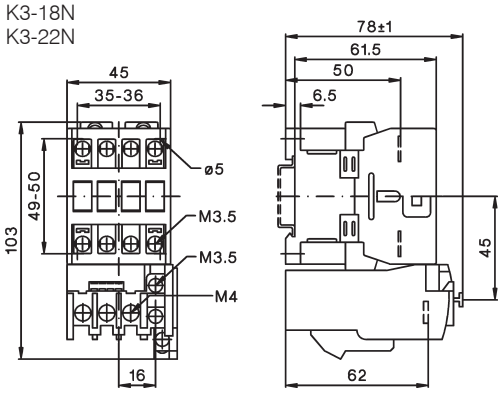
K1-09 + **U12/16.. K1**
K1-12



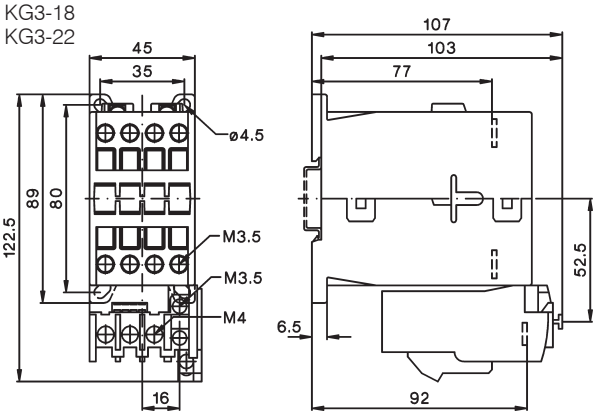
K3-10 + **U12/16..K3**
K3-14
K3-18
K3-22



K3-10N + **U12/16..K3**
K3-14N
K3-18N
K3-22N

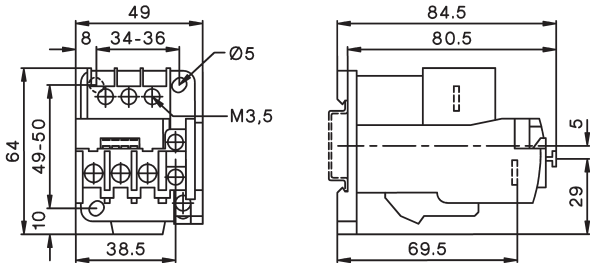


KG3-10 + **U12/16..K3**
KG3-14
KG3-18
KG3-22

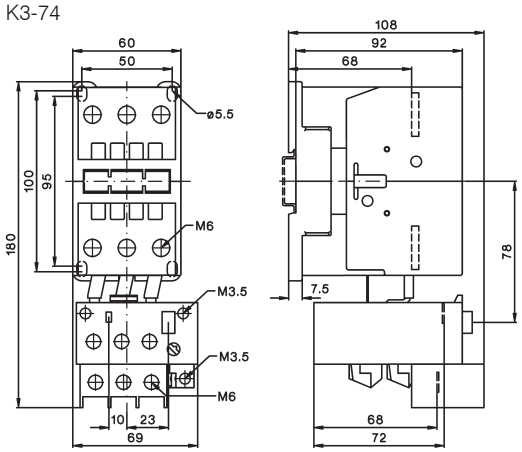


U12SM K3

U12/16..K3 + U12SM K3 for snap-on 35mm DIN-rail according to DIN EN50022 and screw mounting (single mounting)



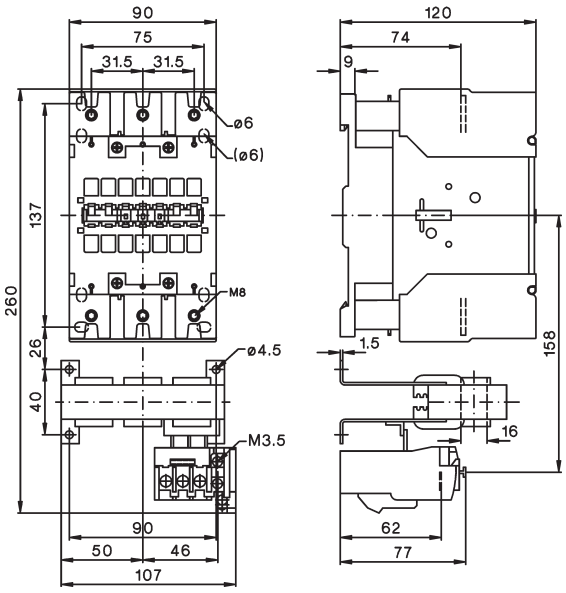
K3-50 + **U3/74**
K3-62
K3-74



Thermal Overload Relays

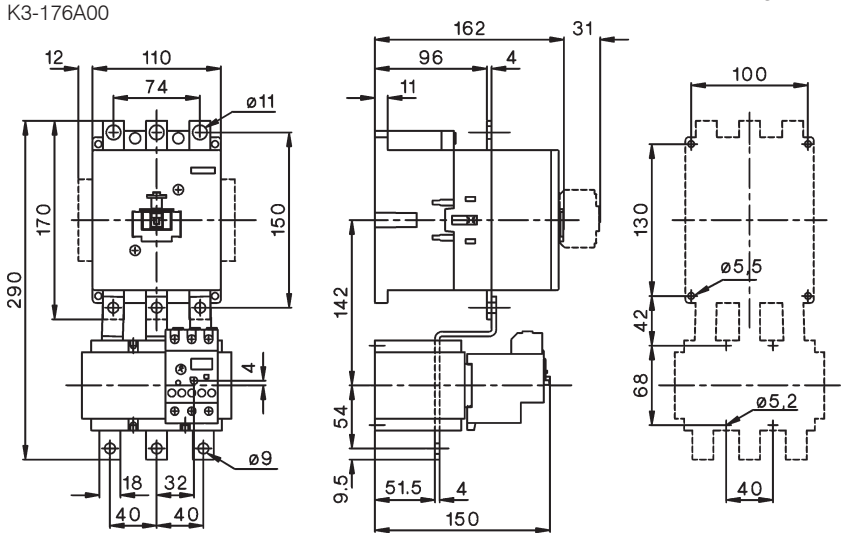
Dimensions

K3-90A + **U85**
K3-115A



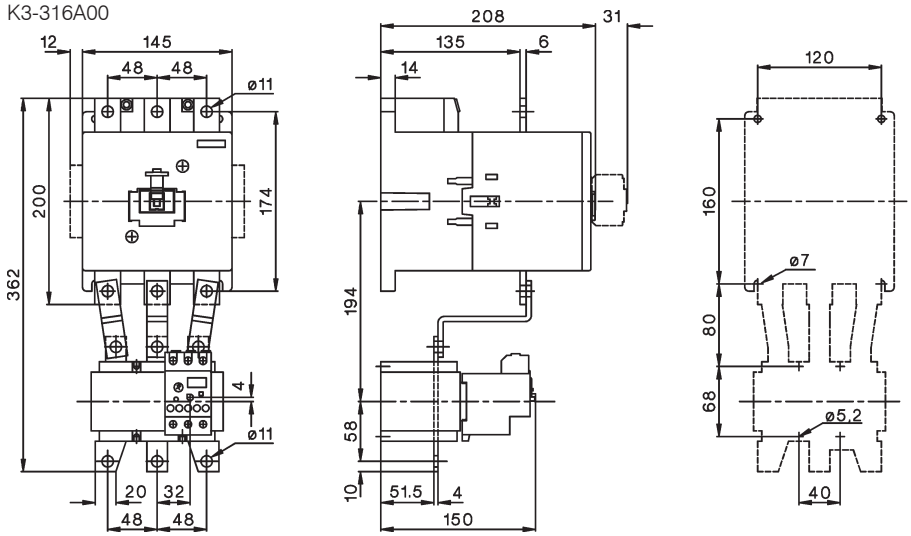
K3-151A00 + **U180**
K3-176A00

Mounting holes



K3-210A00 + **U320**
K3-260A00
K3-316A00

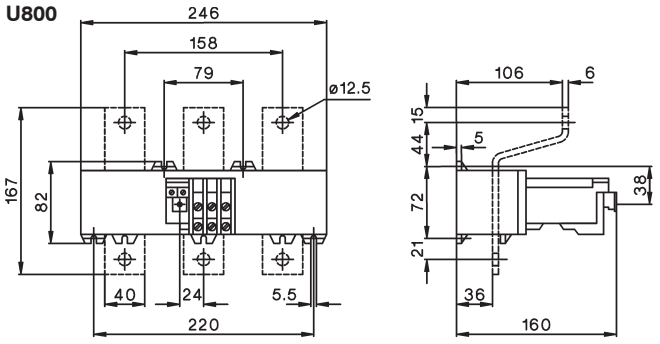
Mounting holes

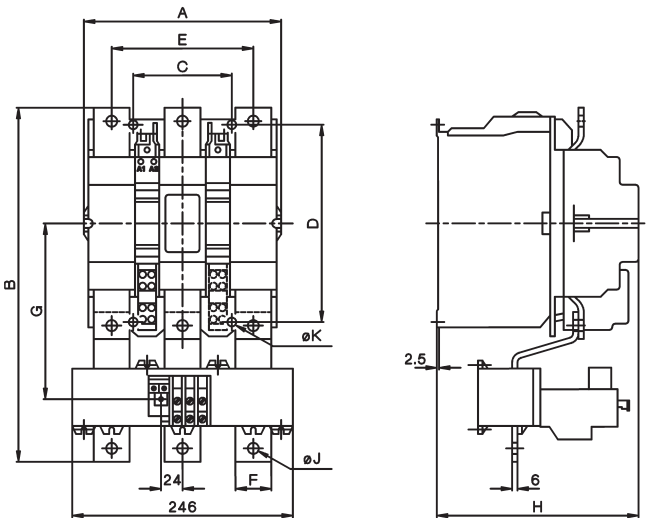


Thermal Overload Relays

Dimensions

U800





U800 with	A	B	C	D	E	F	G	H	J	K
K3-450	220	372	110	220	158	40	185	225	12,5	9
K3-550	220	395	110	220	158	40	196	225	12,5	9
K3-700	280	487	175	280	202	50	257	291	14,5	11
K3-860	280	540	175	280	202	50	280	291	14,5	11

Modular Contactors, low noise

Rated Current Heating Power AC1 at

AC1 1-phase 3-phase
400V 230V 400V
A kW kW

Type coil voltage

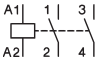
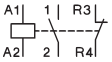
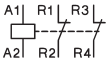
24 24V 50/60Hz
230 220-240V 50Hz, 230-264V 60Hz

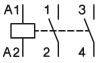
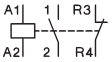
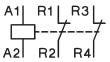
Pack pcs. | Weight kg/pc. | Wiring Diagram

One-pole 1 module (17,5mm), AC-operated (low noise)

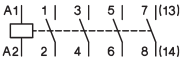
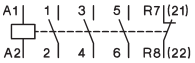
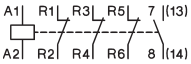
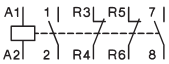
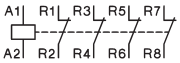
20	4,6	-	**R20-10 24**	12	0,12	
20	4,6	-	**R20-10 230**	12	0,12	

Two-pole 1 module (17,5mm), AC-operated (low noise)

20	4,6	-	**R20-20 24**	12	0,12	
20	4,6	-	**R20-20 230**	12	0,12	
20	4,6	-	**R20-11 24**	12	0,12	
20	4,6	-	**R20-11 230**	12	0,12	
20	4,6	-	**R20-02 24**	12	0,12	
20	4,6	-	**R20-02 230**	12	0,12	

25	5,5	-	**R25-20 24**	12	0,14	
25	5,5	-	**R25-20 230**	12	0,14	
25	5,5	-	**R25-11 24**	12	0,14	
25	5,5	-	**R25-11 230**	12	0,14	
25	5,5	-	**R25-02 24**	12	0,14	
25	5,5	-	**R25-02 230**	12	0,14	

Four-pole 2 modules (35mm) [1], AC-operated (low noise)

25	5,7	17	**R25-40 24**	6	0,21	
25	5,7	17	**R25-40 230**	6	0,21	
25	5,7	17	**R25-31 24**	6	0,21	
25	5,7	17	**R25-31 230**	6	0,21	
25	5,7	17	**R25-13 24**	6	0,21	
25	5,7	17	**R25-13 230**	6	0,21	
25	5,7	-	**R25-22 24**	6	0,21	
25	5,7	-	**R25-22 230**	6	0,21	
25	5,7	17	**R25-04 24**	6	0,21	
25	5,7	17	**R25-04 230**	6	0,21	

1) Sealable with Sealing Cover P721, available aux. contact block RH11(see page 136)

Modular Contactors, hum free

Rated Current Heating Power AC1 at

AC1 1-phase 3-phase
400V 230V 400V
A kW kW

Type coil voltage

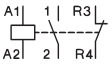
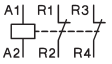
24VM 24V 50/60Hz, 24V DC
230VM 220-240V 50/60Hz, 220V DC

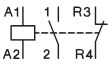
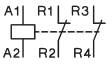
Pack pcs. | Weight kg/pc. | Wiring Diagram

One-pole 1 module (17,5mm), AC/DC-operated (hum free)

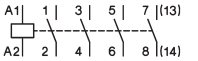
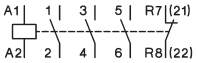
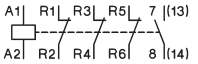
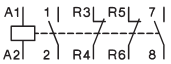
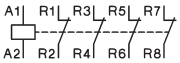
20	4,6	-	**R20-10 24VM**	12	0,12	
20	4,6	-	**R20-10 230VM**	12	0,12	

Two-pole 1 module (17,5mm), AC/DC-operated (hum free)

20	4,6	-	**R20-20 24VM**	12	0,12	
20	4,6	-	**R20-20 230VM**	12	0,12	
20	4,6	-	**R20-11 24VM**	12	0,12	
20	4,6	-	**R20-11 230VM**	12	0,12	
20	4,6	-	**R20-02 24VM**	12	0,12	
20	4,6	-	**R20-02 230VM**	12	0,12	

25	5,5	-	**R25-20 24VM**	12	0,14	
25	5,5	-	**R25-20 230VM**	12	0,14	
25	5,5	-	**R25-11 24VM**	12	0,14	
25	5,5	-	**R25-11 230VM**	12	0,14	
25	5,5	-	**R25-02 24VM**	12	0,14	
25	5,5	-	**R25-02 230VM**	12	0,14	

Four-pole 2 modules (35mm) [1], AC/DC-operated (hum free)

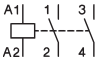
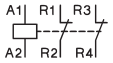
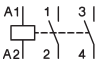
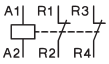
25	5,7	17	**R25-40 24VM**	6	0,21	
25	5,7	17	**R25-40 230VM**	6	0,21	
25	5,7	17	**R25-31 24VM**	6	0,21	
25	5,7	17	**R25-31 230VM**	6	0,21	
25	5,7	17	**R25-13 24VM**	6	0,21	
25	5,7	17	**R25-13 230VM**	6	0,21	
25	5,7	-	**R25-22 24VM**	6	0,21	
25	5,7	-	**R25-22 230VM**	6	0,21	
25	5,7	17	**R25-04 24VM**	6	0,21	
25	5,7	17	**R25-04 230VM**	6	0,21	

1) Sealable with Sealing Cover P721, available aux. contact block RH11(see page 136)

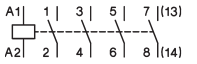
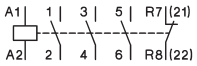
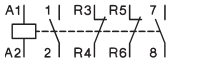
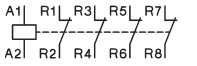
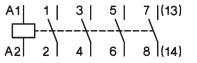
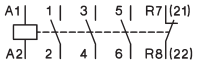
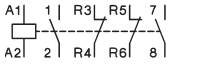
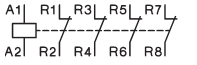
Modular Contactors, low noise

Rated Heating Power			**Type**		coil voltage			
Current AC1 at				**24**	24V 50/60Hz			
AC1	1-phase	3-phase		**230**	220-240V 50Hz, 230-264V 60Hz			
400V	230V	400V				Pack	Weight	
A	kW	kW		↓		pcs.	kg/pc.	Wiring Diagram

Two-pole 2 modules (35mm), AC-operated (low noise)

40	9	-	**R40-20 24**	6	0,23	
40	9	-	**R40-20 230**	6	0,23	
40	9	-	**R40-02 24**	6	0,23	
40	9	-	**R40-02 230**	6	0,23	
63	14,3	-	**R63-20 24**	6	0,23	
63	14,3	-	**R63-20 230**	6	0,23	
63	14,3	-	**R63-02 24**	6	0,23	
63	14,3	-	**R63-02 230**	6	0,23	

Four-pole 3 modules (52,5mm) [1], AC-operated (low noise)

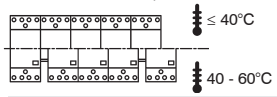
40	9	27,5	**R40-40 24**	4	0,35	
40	9	27,5	**R40-40 230**	4	0,35	
40	9	27,5	**R40-31 24**	4	0,35	
40	9	27,5	**R40-31 230**	4	0,35	
40	9	-	**R40-22 24**	4	0,35	
40	9	-	**R40-22 230**	4	0,35	
40	9	27,5	**R40-04 24**	4	0,35	
40	9	27,5	**R40-04 230**	4	0,35	
63	14,3	43	**R63-40 24**	4	0,36	
63	14,3	43	**R63-40 230**	4	0,36	
63	14,3	43	**R63-31 24**	4	0,36	
63	14,3	43	**R63-31 230**	4	0,36	
63	14,3	-	**R63-22 24**	4	0,36	
63	14,3	-	**R63-22 230**	4	0,36	
63	14,3	43	**R63-04 24**	4	0,36	
63	14,3	43	**R63-04 230**	4	0,36	

Auxiliary Contact Block ½ module (8,8mm) [2]

for contactor R25, R40, R63 (4p.) max. 1 piece
for contactor R40 and R63 (2p.) max. 1 piece

Rated current **AC15** 400V A	AC15 400V A	AC1 400V A	for contactor	**Type**	Pack pcs.	Weight kg/pc.	Wiring Diagram
3	2	10	R25 [3], R40, R63	**RH11**	3	0,026	
3	2	10	R25-..**VM** (4p.)	**RH11-1**	3	0,026	

Accessories

	Type	Pack pcs.	Weight kg/pc.
RC-unit 2x for R20.. to R63.. for 12V to 250V AC 220nF / 100 Ohm not for R20-.., R25-..VM	**RC-R 230**	2	0,05
Spacing piece ½ module (8,8mm) for R20.. to R63.. for ambient temperature >40°C 	**P730**	10	0,012
Sealing cover for R25.. (4p.)	**P721**	10	0,002
Sealing cover for R40.., R63..	**P690**	10	0,003

1) Sealable with Sealing Cover P690, available aux. contact block RH11
2) Contacts suitable for electronic circuits, according to IEC60947-5-4 for rated voltage 24V DC (test ratings 17V DC, 5mA). Mirror contacts acc. IEC60947-4-1 Annex F.
3) AC-operated R25-.., 4-pole

Modular Contactors

Switching of lamps

Lamp Type	Power W	Current A	Capacitors µF	Max. lamps per pole at 230V 50Hz and max. 60°C **R20..**	**R25..**	**R40..**	**R63..**
Incandescent lamps (AC5b)	60	0,27	-	36	50	92	129
	100	0,45	-	21	30	55	77
	200	0,91	-	10	15	27	38
	300	1,36	-	7	10	19	26
	500	2,27	-	4	6	11	16
	1000	4,5	-	2	3	6	8
Fluorescent lamps uncompensated or serial compensated (AC5a)	11	0,16	1,3	60	75	210	310
	18	0,37	2,7	25	30	90	140
	24	0,35	2,5	25	30	90	140
	36	0,43	3,4	20	25	70	140
	58	0,67	5,3	14	17	45	70
	65	0,67	5,3	13	16	40	65
	85	0,8	5,3	11	14	35	60
Fluorescent lamps dual-connection (AC5a)	11	0,07	-	2 x 100	2 x 110	2 x 220	2 x 250
	18	0,11	-	2 x 50	2 x 55	2 x 130	2 x 200
	24	0,14	-	2 x 40	2 x 44	2 x 110	2 x 160
	36	0,22	-	2 x 30	2 x 33	2 x 70	2 x 100
	58	0,35	-	2 x 20	2 x 22	2 x 45	2 x 70
	65	0,35	-	2 x 15	2 x 16	2 x 40	2 x 60
	85	0,47	-	2 x 10	2 x 11	2 x 30	2 x 40
Fluorescent lamps parallel compensated (AC5a)	11	0,09	2	33	43	67	107
	18	0,13	2	25	32	50	80
	24	0,16	3	25	32	50	80
	36	0,27	4	22	32	50	80
	58	0,45	7	14	18	36	46
	65	0,5	7	14	18	36	46
	85	0,6	8	12	16	33	44
Fluorescent lamps with electronic fluorescent lamp ballast (AC5a)	18	0,09	-	40	40	100	150
	36	0,16	-	20	20	52	75
	58	0,25	-	15	15	30	55
	80	0,4	-	7	10	20	30
	2 x 18	0,17	-	20	20	50	60
	2 x 28	0,25	-	15	15	37	45
	2 x 36	0,32	-	10	10	25	30
	2 x 58	0,49	-	7	7	15	20
	2 x 80	0,7	-	4	4	8	10
Transformers for metal halid low voltage lamps (AC5a)	20	0,09	-	40	52	110	174
	50	0,22	-	20	24	50	80
	75	0,33	-	13	16	35	54
	100	0,43	-	10	12	27	43
	150	0,65	-	7	9	19	29
	200	0,87	-	5	5	14	23
	300	1,3	-	3	4	9	14
Mercury-vapour lamps (high-pressure lamps), uncompensated e. g. HQL, HPL (AC5a)	50	0,61	-	16	21	38	55
	80	0,8	-	12	16	29	40
	125	1,15	-	8	11	20	28
	250	2,15	-	4	6	11	15
	400	3,25	-	3	4	7	10
	700	5,4	-	1	2	4	6
	1000	7,5	-	1	1	3	4
Mercury-vapour lamps (high-pressure lamps), compensated e. g. HQL, HPL (AC5a)	50	0,28	7	14	18	36	50
	80	0,41	8	12	16	31	44
	125	0,65	10	10	13	25	35
	250	1,22	18	5	7	14	19
	400	1,95	25	4	5	10	14
	700	3,45	45	2	3	6	8
	1000	4,8	60	1	2	4	6

Modular Contactors

Switching of lamps

Lamp Type	Power W	Current A	Capacitors µF	Max. lamps per pole at 230V 50Hz and max. 60°C **R20..**	**R25..**	**R40..**	**R63..**
Metal halide lamps uncompensated e. g. HQI, HPI, CDM (AC5a)	35	0,53	-	22	24	57	65
	70	1	-	12	14	30	35
	150	1,8	-	6	8	17	18
	250	3	-	4	5	10	12
	400	3,5	-	3	4	8	10
	1000	9,5	-	1	1	3	4
	2000	16,5	-	-	-	2	2
400V per pole	2000	10,5	-	-	-	2	2
	3500	18	-	-	-	1	1
Metal halide lamps compensated e. g. HQI, HPI, CDM (AC5a)	35	0,25	6	16	21	42	58
	70	0,45	12	8	11	21	29
	150	0,75	20	5	7	13	18
	250	1,5	33	3	4	9	11
	400	2,1	35	2	4	9	10
	1000	5,8	95	1	1	3	4
	2000	11,5	148	-	-	2	2
400V per pole	2000	6,6	58	-	-	3	4
	3500	11,6	100	-	-	2	3
Metal halide lamps with electronic fluorescent with electronic fluorescent lamp ballast (e. g.: PCI) 50-125 x $I_{n\ lamp}$ for 0,6ms (AC5a)	20	0,1	integrated	9	9	18	20
	28	0,15	integrated	-	-	-	18
	35	0,2	integrated	6	6	11	13
	70	0,36	integrated	5	5	10	12
	150	0,7	integrated	4	4	8	10
Sodium-vapour lamps (low pressure lamps), uncompensated (AC5a)	35	1,5	-	7	9	22	30
	55	1,5	-	7	9	22	30
	90	2,4	-	4	6	13	19
	135	3,3	-	3	4	10	14
	150	3,3	-	3	4	10	14
	180	3,3	-	3	4	10	14
	200	3,3	-	3	4	10	14
Sodium-vapour lamps (low pressure lamps), compensated (AC5a)	35	0,31	20	5	6	15	18
	55	0,42	20	5	6	15	18
	90	0,63	30	3	4	10	12
	135	0,94	45	2	3	7	8
	150	1	40	2	3	8	9
	180	1,16	40	2	3	8	9
	200	1,32	25	-	-	10	12
Sodium-vapour lamps (high pressure lamps), uncompensated (AC5a)	150	1,8	-	5	8	17	22
	250	3	-	4	5	10	13
	330	3,7	-	3	4	8	10
	400	4,7	-	2	3	6	8
	1000	10,3	-	1	1	3	4
Sodium-vapour lamps (high pressure lamps), compensated (AC5a)	150	0,83	20	5	7	20	25
	250	1,5	33	3	4	12	15
	330	2	40	2	3	10	13
	400	2,4	48	2	2	8	12
	1000	6,3	106	1	1	4	6
Sodium-vapour lamps (high pressure lamps) with serial electronic (e. g.: PCI) 50-125 x I_{nlamp} for 0,6ms (AC5a)	20	0,1	integrated	9	9	18	20
	35	0,2	integrated	6	6	11	13
	70	0,36	integrated	5	5	10	12
	150	0,7	integrated	4	4	8	10

LED-Lamps
consider the inrush current of the lamp ballast and the cosϕ of the lamp

max. inrush current of contactor [A] — 195A | 233A | 424A | 565A

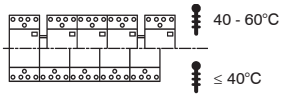
$$\frac{\text{inrush current of contactor}}{\text{inrush current of lamp/EVG}} = \text{max. lamps per pole at 230V 50Hz and max. 60°C } (I_{nLED} \le I_{th})$$

Modular Contactors

Data according to IEC60 947-4-1, IEC 60947-5-1, VDE 0660-5-1

Type			2-pole R20 (VM) [7]	2-pole R25 (VM) [7]	2-pole R40	2-pole R63	4-pole R25 (VM) [7]	4-pole R40	4-pole R63	RH11
Main Contacts [4] [5] [6]										
Rated insulation voltage U_i [1]		**V~**	**440**	**440**	**440**	**440**	**440**	**440**	**440**	**440**
Rated operation voltage U_e		V~	440	440	440	440	440	440	440	440
Frequency of operations z AC1, AC3		1/h	300	300	600	600	300	600	600	600
Mechanical life		S x 10^6	1	1	1	1	1	1	1	1
Utilization category AC1 / AC7a										
Switching of resistive load										
Rated operational current I_e ($=I_{th}$)										
open	at 60°C	A	20	25	40	63	25	40	63	-
Contact life		S x 10^6	0,1	0,1	0,1	0,1	0,1	0,1	0,1	-
Minimum Switch Voltage		V/mA	24/100	24/100	24/100	24/100	24/100	24/100	24/100	17/5
Short time current	10s-current	A	72	72	216	240	72	216	240	-
Power loss per pole at I_e/AC1		W	2	3	3	7	2	3	7	0,5
Utilization category AC2 and AC3 / AC7b										
Switching of three-phase motors										
Rated operational current I_e		A	-	-	-	-	9	27	30	-
Rated operational power										
of three-phase motors	220V	kW	-	-	-	-	2,2	7,5	8	-
50-60Hz	230-240V	kW	-	-	-	-	2,5	8	8,5	-
	380-415V	kW	-	-	-	-	4	12,5	15	-
2-pole motors	230V	kW	1,1 [2]	1,3	2,6	5	-	-	-	-
Contact life		S x 10^6	0,15	0,15	0,15	0,15	0,15	0,15	0,15	-
Power consumption of coils										
AC operated	inrush	VA	7 - 9	7 - 9	20 - 25	20 - 25	20 - 25	33 - 45	33 - 45	-
	sealed	VA	2,2 - 4,2	2,2 - 4,2	4 - 6	4 - 6	4 - 6	6 - 8	6 - 8	-
		W	0,8 - 1,6	0,8 - 1,6	1,5 - 2,5	1,5 - 2,5	1,5 - 2,5	2 - 3,3	2 - 3,3	-
AC and DC-operated		W	2 - 3	2 - 3	-	-	3 - 4	-	-	-
Operation range of coils										
in multiples of control voltage U_s (-40° – +40°C)			0,85 - 1,1	0,85 - 1,1	0,85 - 1,1	0,85 - 1,1	0,85 - 1,1	0,85 - 1,1	0,85 - 1,1	-
Noise level (operation)										
acc. to EN ISO 3744										
from front, distance 0,5 m		dB	16 (0) [7]	16 (0) [7]	8	8	8 (0) [7]	< 4	< 4	-

Type			R20	R25 (2p.)	R25 (4p.)	R25-..VM	R40 (2p./4p.)	R63 (2p./4p.)	RH11
Maximum ambient temperature									
Operation	open	°C				-40 to + 60			
	enclosed	°C				-40 to + 40			
Storage		°C				-50 to + 90			
Short circuit protection									
max. fuse Coordination-type "1"gL (gG)		A	35	35	35	35	63	80	-
Rated short circuit current	"r"	kA	3	3	3	3	3	3	-
	"Iq"	kA	3	3	10	10	10	10	-
Switching time at control voltage U_s ±10%									
	make time	ms	7 - 16	7 - 16	9 - 15	17 - 50	11 - 15	11 - 15	-
	release time	ms	6 - 12	6 - 12	4 - 8	17 - 23	6 - 13	6 - 13	-
	arc duration	ms	10 - 15	10 - 15	10 - 15	10 - 15	10 - 15	10 - 15	-
Cable cross-sections									
Main connector	solid or stranded	mm²	1,5 - 10	1,5 - 10	1,5 - 10	1,5 - 10	2,5 - 25	2,5 - 25	0,5 - 2,5 [3]
	flexible	mm²	1,5 - 6	1,5 - 6	1,5 - 6	1,5 - 6	2,5 - 16	2,5 - 16	0,5 - 2,5 [3]
	flexible with multicore cable end	mm²	1,5 - 6	1,5 - 6	1,5 - 6	1,5 - 6	2,5 - 16	2,5 - 16	0,5 - 1,5
Clamps per pole			1	1	1	1	1	1	2
Magnetic coil	solid or stranded	mm²	0,75 - 2,5	0,75 - 2,5	0,75 - 2,5	0,75 - 2,5	0,75 - 2,5	0,75 - 2,5	-
	flexible	mm²	0,5 - 2,5	0,5 - 2,5	0,5 - 2,5	0,5 - 2,5	0,5 - 2,5	0,5 - 2,5	-
	flexible with multicore cable end	mm²	0,5 - 1,5	0,5 - 2,5	0,5 - 1,5	0,5 - 1,5	0,5 - 1,5	0,5 - 1,5	-
Clamps per pole			1	1	1	1	1	1	-
Auxiliary Contacts [4] [5] [6]									
Rated insulation voltage U_i [1]		V AC	-	-	440	440	440	440	440
Thermal rated current I_{th}	40°C	A	-	-	25	25	40	63	10
Ambient temperature	60°C	A	-	-	25	25	40	63	6



1) Suitable for: earthed-neutral systems, overvoltage category I to III, pollution degree 3 (standard-industry): U_{imp} = 4kV.
2) AC7b motor 2-pole 230V 1,1kW
3) Maximum cable cross-section with prepared conductor
4) Rated frequency 50/60Hz
5) Max. occ. switching overvoltage <4kV
6) Duty cycle: 100%
7) 0 dB for contactors type "VM" (AC/DC operated)

Modular Contactors

Data according to IEC60 947-4-1, IEC 60947-5-1, VDE 0660-5-1

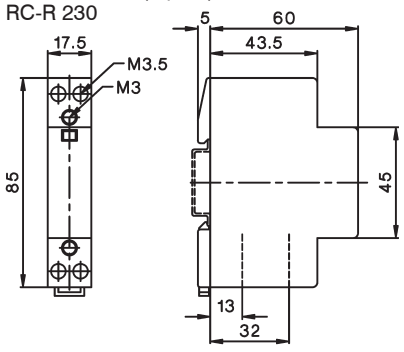
Type			R20	R25 (2p.)	R25 (4p.)	R25-..VM	R40 (2p./4p.)	R63 (2p./4p.)	RH11
Utilization category AC15									
Rated operational	220-240V	A	-	-	3	3	3	3	3
current I_e	380-415V	A	-	-	2	2	2	2	2
	440V	A	-	-	1,6	1,6	1,6	1,6	1,6
Utilization category DC13									
Rated operational	24-60V	A	-	-	2	2	2	2	2
current I_e	110V	A	-	-	0,4	0,4	0,4	0,4	0,4
per pole	220V	A	-	-	0,1	0,1	0,1	0,1	0,1
Short circuit protection									
short-circuit current 1kA,									
contact welding not accepted									
max. fuse size	gL (gG)	A	-	-	10	10	10	10	10

Data according to UL508

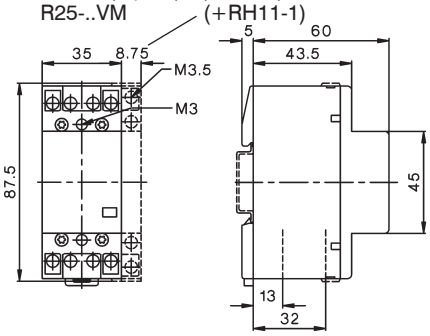
Main Contacts (cULus)		Type	R20	R25 (2p.)	R25 (4p.)	R40 (2p./4p.)	R63 (2p./4p.)	RH11
Rated operational current "General Use"		A	20	25	25	40	63	10
Rated operational power of three-phase motors	110-120V	hp	-	-	1	2	3	-
at 60Hz (3ph)	200-208V	hp	-	-	2	5	7½	-
	220-240V	hp	-	-	3	7½	10	-
	265-277V	hp	-	-	3	7½	10	-
Rated operational power of of AC motors	110-120V	hp	½	½	½	1	1½	-
at 60Hz (1ph)	200-208V	hp	1	1	1	2	3	-
	220-240V	hp	1½	1 ½	1½	3	5	-
	265-277V	hp	1½	2	2	3	5	-
Fuses		A	40	40	40	80	80	-
Suitable for use on a capability of delivering not more than	rms	A	5000	5000	5000	5000	5000	-
		V	300	300	300	300	300	300
Rated operation voltage		V~	300	300	300	300	300	300
Auxiliary Contacts (cULus)	heavy pilot duty	AC	-	-	-	-	-	C300

Dimensions

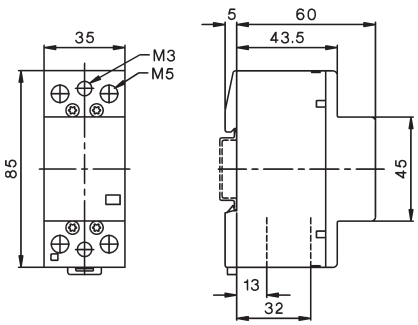
R20-.., R25-.. (2-pole)
RC-R 230



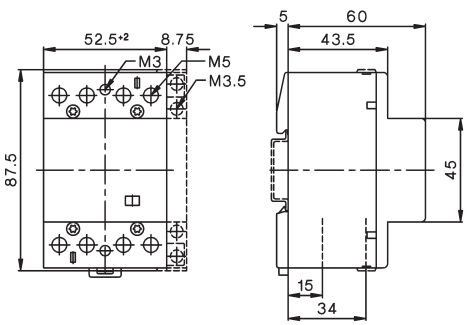
R25-.. (4-pole) (+RH11)
R25-..VM (+RH11-1)



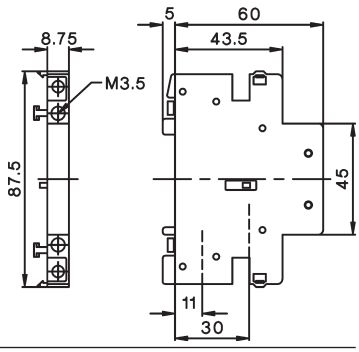
R40-.. (2-pole)
R63-.. (2-pole)



R40-.. (4-pole) (+RH11)
R63-.. (4-pole) (+RH11)

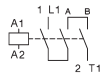
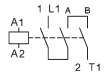
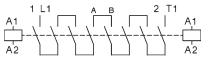
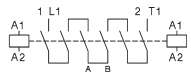
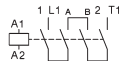
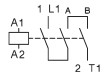
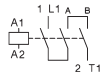


Aux. contact block
RH11, RH11-1



Contactors for DC-Switching

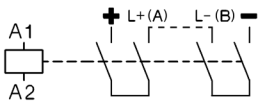
AC-operated

Rated Operational Current DC1 600V	1000V	1200V	Additional Aux. Contacts	Type	Coil voltage [1] 230 220-230V 50Hz, 240V 60Hz Pack pcs.	Weight kg/pcs.	Wiring diagram
20A	-	-	2 HKA11	**K3DC-20A00 ...**	1	0,5	
50A	-	-	+1 HKT.	**K3DC-48A00 ...**	1	0,5	
60A	30A	-	2 HKA11	**K3DC-60A00...**	1	1,2	
80A	60A	-	+1 HKT.	**K3DC-80A00 ...**	1	1,2	
100A	-	-		**K3DC-100A00 ...**	1	1,8	
12A	12A	6A	2 HKA11 +2 HKT.	**K3PV-12A00 ...**	1	0,8	
30A	30A	-	2 HKA11	**K3PV-30A00 ...**	1	0,9	
60A	60A	-	+2 HKT.	**K3PV-60A00 ...**	1	0,9	
80A	80A	-	2 HKA11	**K3PV-80A00 ...**	1	1,5	
100A	100A	-	+1 HKT.	**K3PV-100A00 ...**[2) 3)]	1	2,3	
150A	150A	-	2 HKA11	**K3PV-150A00 ...**[2) 3)]	1	5	
200A	200A	-	+1 HKT.	**K3PV-200A00 ...**[2) 3)]	1	5	
240A	240A	-		**K3PV-240A00 ...**[2) 3)]	1	5	
300A	300A	-	2 HKA11	**K3PV-300A00 ...**[2) 3)]	1	7,5	
400A	400A	-	+1 HKT.	**K3PV-400A00 ...**[2) 3)]	1	7,5	
450A	450A	-		**K3PV-450A00 ...**[2) 3)]	1	7,5	

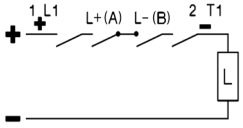
Contactors for DC-Switching for PV-installations, as remote controlled fire protection defeat device

In most Photovoltaic-installations, the switch disconnectors according to IEC 60364-7-712 are integrated in the DC/AC-inverter.
So the wires between solar-panels and inverter are continuosly under voltage.
According to ÖVE-R11-1: 2013, Photovoltaic-installations must have a fire protection defeat device.
For this purpose, BENEDICT contactors for DC-switching, used as a fire protection defeat device, can switch off the Photovoltaic-installation with a remote controlled fire brigade Emergency-Stop-button.

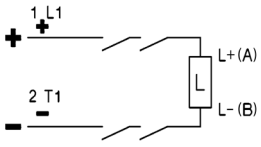
Switch diagram (4 contacts)



Connection diagram1-pole:
connect L+(A) and L-(B) (jumper attached)



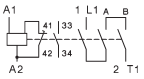
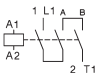
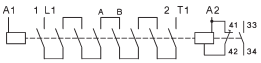
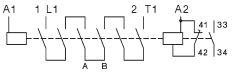
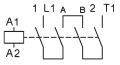
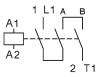
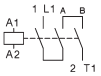
Connection diagram 2-pole:
don´t use attached jumper



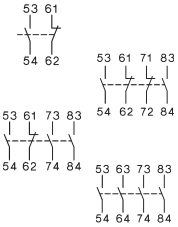
1) Other coil voltages from 24 to 600V AC, on request
2) Type for AC- and DC-operating: e.g.: 230: 220-240V 50/60Hz and 220V=
3) With integrated coil suppressor

Contactors for DC-Switching

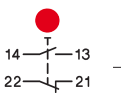
DC-operated

	Type	Coil voltage [1] **24** 24V= DC	Aux.Contacts build in NO	NC	additional Type	Pack pcs.	Weight kg/pcs.	Wiring diagram
	**K3DC-20A10= ...**[5]		1	-	1 HKA11	1	0,5	
	K3DC-48A10= ...[5]		1	-	+1 HKT.	1	0,5	
	**K3DC-60A00= ...**[5]		-	-	1 HKA11	1	1,2	
	K3DC-80A00= ...[5]		-	-	+1 HKT.	1	1,2	
	K3DC-100A00= ...		-	-		1	1,8	
	**K3PV-12A10=**		1	-	1 HKA11 +2 HKT.	1	0,85	
	**K3PV-30A10= ...**[5]		1	-	1 HKA11	1	0,95	
	K3PV-60A10= ...[5]		1	-	+2 HKT.	1	0,95	
	**K3PV-80A00= ...**[5]		-	-	2 HKA11	1	1,5	
	K3PV-100A00 ...[2] [5]		-	-	+1 HKT.	1	2,3	
	**K3PV-150A00 ...**[2] [5]		-	-	2 HKA11	1	5	
	K3PV-200A00 ...[2] [5]		-	-	+1 HKT.	1	5	
	K3PV-240A00 ...[2] [5]		-	-		1	5	
	**K3PV-300A00 ...**[2] [5]		-	-	2 HKA11	1	7,5	
	K3PV-400A00 ...[2] [5]		-	-	+1 HKT.	1	7,5	
	K3PV-450A00 ...[2] [5]		-	-		1	7,5	

Auxiliary Contact Blocks for contactors K3DC-.. and K3PV-.., for low level switching[4]

	Rated Operational Current **AC15** **230V** A	AC15 400V A	AC1 690V A	for contactors	Type	Pack pcs.	Weight kg/pcs.	Wiring diagrams
	**3**	2	10	K3DC, K3PV-.. top	**HKT11**	1	0,04	
	3	2	10	K3DC, K3PV-.. top	**HKT22**	1	0,05	
	3	2	10	K3DC, K3PV-.. top	**HKT31**	1	0,05	
	3	2	10	K3DC, K3PV-.. top	**HKT40**	1	0,05	
	**3**	2	10	K3DC, K3PV-.. side	**HKA11**	1	0,05	

Accessories

	**Fire Brigade-EMERGENCY STOP key operated button** Ø40mm, according to EN418, unlock by key	**BG10P44S3-11 +SK**	1	0,22	 3)

1) Other coil voltages from 24 to 250V DC, on request
2) Type for AC- and DC-operating: e.g.: 24: 24V 50/60Hz and 24V=
3) → opener positive opening acc. IEC/EN60947-5-1
4) Contacts suitable for electronic circuits, according to IEC60947-5-4 for rated voltage 24V DC (test ratings 17V DC, 5mA) Mirror contacts acc. IEC60947-4-1 Annex F. Technical data see page 78
5) With integrated coil suppressor

Technical Data

Data according to IEC 60947-4-1, VDE 0660

Type			K3DC-20..	K3DC-48..	K3DC-60..	K3DC-80..	K3DC-100..	K3PV-12..	K3PV-30..	K3PV-60..	K3PV-80..	K3PV-100..	K3PV-150..	K3PV-200..	K3PV-240..	K3PV-300..	K3PV-400..	K3PV-450..
Rated insulation voltage		V=	600	600	1000	1000	600	1200	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
U_{imp}		kV	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
poles in series			3	3	3	3	3	8	6	6	4	4	3	3	3	3	3	3
DC1	600V dc	I_e A	20	50	60	80	100	12	30	60	80	100	150	200	240	300	400	450
DC1	1000V dc	I_e A	-	-	30	60	-	12	30	60	80	100	150	200	240	300	400	450
DC1	1200V dc	I_e A	-	-	-	-	-	6	-	-	-	-	-	-	-	-	-	-
DC3/5	310V dc	I_e A	-	-	-	40	60	-	15	24	40	90	125	170	200	230	270	300
DC3/5	460V dc	I_e A	-	-	-	-	-	-	15	24	40	40	125	170	200	230	270	300
DC3/5	600V dc	I_e A	-	-	-	-	-	-	-	-	-	-	50	60	75	120	160	200
Main pole resistance		m0hm	1,8	1,8	1,4	1,2	1	2,2	1,8	1,8	1,2	1	0,5	0,5	0,35	0,15	0,15	0,15
poles in series resistance		m0hm	5,4	5,4	4,2	3,6	3	17,6	10,8	10,8	4,8	4	1,5	1,5	1,1	0,5	0,5	0,5
Mechanical life		10^6	10										10			8		
Protection degree			IP20										IP00 / IP20 [1]			IP00 / IP20 [1]		
Main poles																		
Cable cross sections		mm^2	2 x 1,5 - 10		2,5 - 35		4 - 35 +4-50	2x 1,5-2,5		2 x 1,5 - 10	2,5-35	4 - 35 +4 - 50	Busbar 18 x 4 Screw M8			Busbar 25 x 6 Screw M10		
Tightening torque		Nm	2,3 - 2,7		5 - 6		8 - 9,6	1,4 -1,6		2,3 - 2,7	5 - 6	8 - 9,6	17 - 20			35 - 42		
Mounting			DIN-rail or screw				screws	DIN-rail or screws				Screws	Screws			Screws		
Operating range of coils		Uc	0,85 - 1,1															
Power consumption of coils																		
AC	inrush	VA	90		250			180			250		350			360		
	sealed	VA/W	9 / 3		18 / 4			18 / 6			18 / 4		5 / 5			6 / 6		
DC	inrush	W	120		230			230			230		350			360		
	sealed	W	2		4			5			4		5			6		
Switching time																		
AC	make time	ms	10 - 25		12 - 30		12 - 30	10 - 25			12 - 30	15 - 50	30 - 60			40 - 60		
	realease time	ms	6 - 18		6 - 15		6 - 15	6 - 18			6 - 15	30 - 80	30 - 80			40 - 60		
DC	make time	ms	15 - 25		15 - 25		20 - 30	15 - 25			15 - 25	15 - 50	30 - 60			40 - 60		
	realease time	ms	40 - 70		10 - 25		10 - 25	40 - 70			10 - 25	30 - 80	30 - 80			40 - 60		
Maximum ambient temperature																		
Operation		°C	-40 to+40 (+70) [2]															
Storage		°C	-40 to+70															
Short circuit protection for contactors																		
Coordination-type „1“ max. fuse size gPV																		
	600VDC	A	63	80	-	-	160	-	-	-	-	-	160	200	250	-	-	-
	1000VDC	A	-	-	-	-	-	12	63	100	-	160	160	200	250	315	400	500
Coordination-type „2“ max. fuse size gPV																		
	600VDC	A	50	63	80	100	125	-	-	-	100	-	-	-	-	-	-	-
	1000VDC	A	-	-	80	100	-	-	50	80	100	125	-	-	-	-	-	-
Short-circuit current		kA	3	3	3	3	5	3	3	3	5	5	10	10	10	10	10	10

Data acc. to UL60947-4-1 LISTED

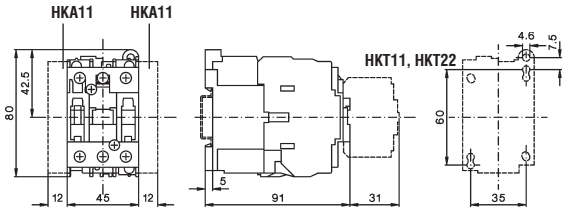
Type		K3DC-20..	K3DC-48..	K3DC-60..	K3DC-80..	K3PV-80..	K3PV-150..	K3PV-200..	K3PV-240..	K3PV-300..	K3PV-400..	K3PV-450..
General Use I_e [A]	600V DC	20	40	60	80	80	130	160	200	300	330	360
	1000V DC	-	-	30	60	80	130	160	200	300	330	360
Motor Control I_e [A]	220-240V DC	12	20	38	55	72	89	106	140	173	206	255
	500V DC	12	16	34	51	67	83	99	123	164	205	246
	550-600V DC	12	16	38	46	61	90	111	148	185	222	294
	Fuse PK5	12	12	75	90	90	125	150	175	300	350	400
	max. short circuit current [kA]	5	5	5	5	5	10	10	10	10	10	10
	Voltage DC [V]	600	600	600	600	600	600	600	600	600	600	600

1) IP20 with terminal lug

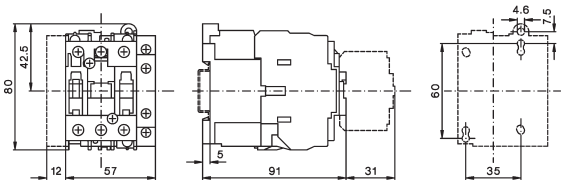
2) > 40° ... 1% / C° de-rating (eg. at 60°C 20% de-rating)

Dimensions

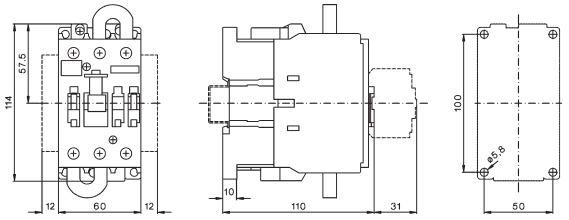
K3DC-20A00, K3DC-48A00



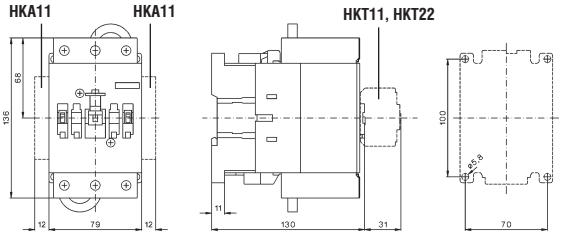
K3DC-20A10=, K3DC-48A10=



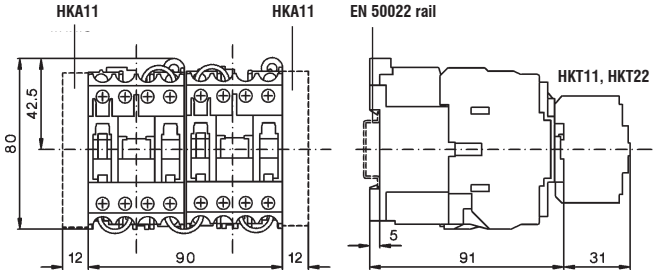
K3DC-60A00(=), K3DC-80A00(=)



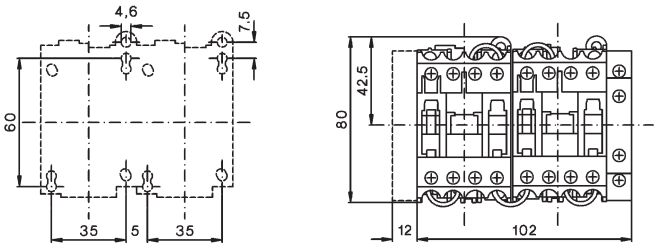
K3DC-100A00(=)



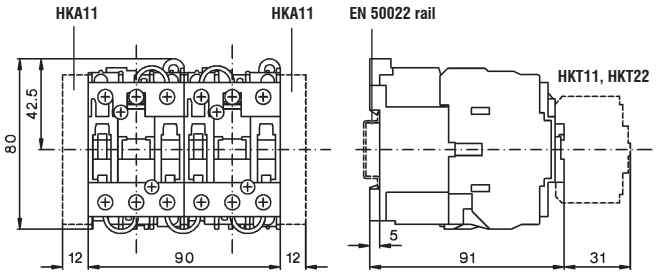
K3PV-12A00



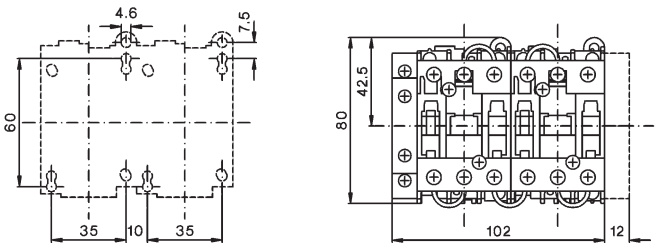
K3PV-12A10=



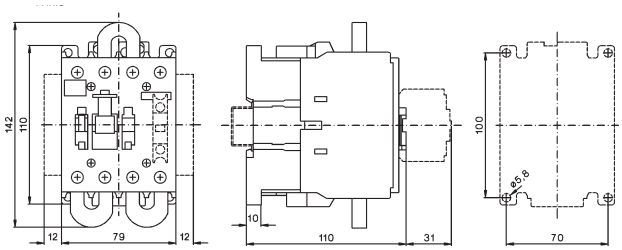
K3PV-30A00, K3PV-60A00



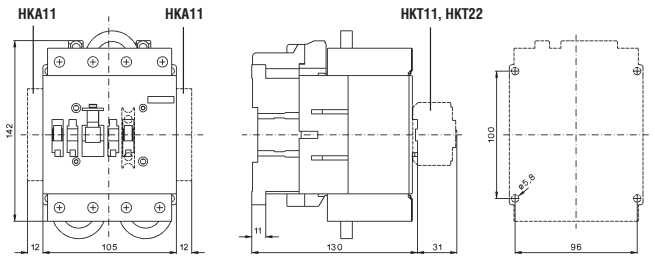
K3PV-30A10=, K3PV-60A10=



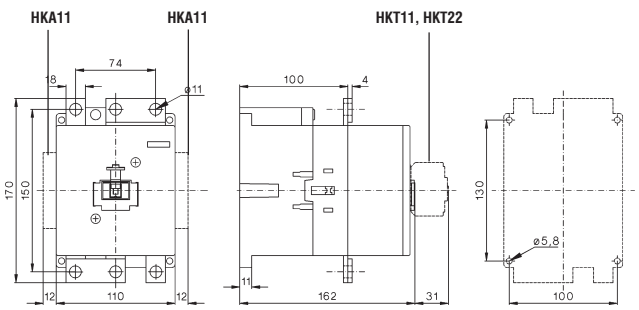
K3PV-80A00(=)



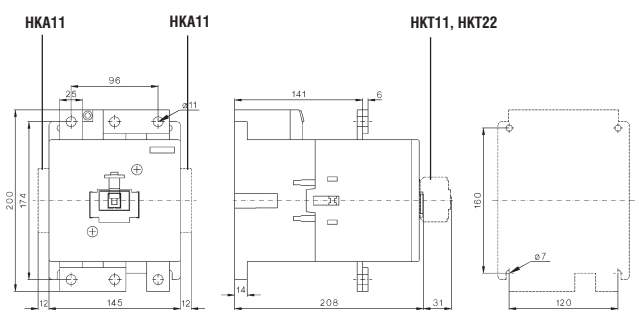
K3PV-100A00(=)



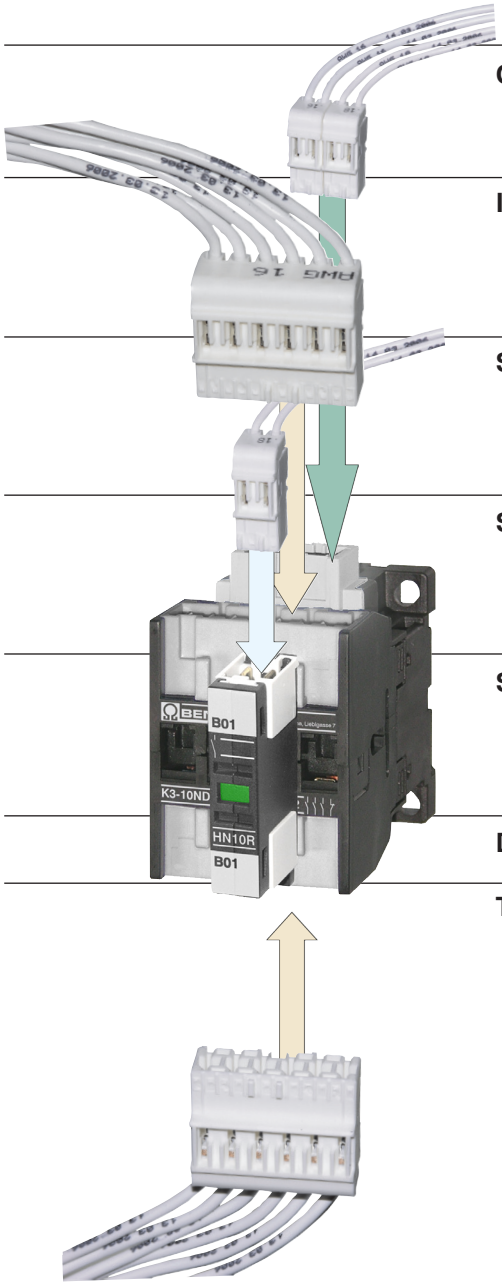
K3PV-150A00(=), K3PV-200A00(=), K3PV-240A00(=)



K3PV-300A00(=), K3PV-400A00(=), K3PV -450A00(=)

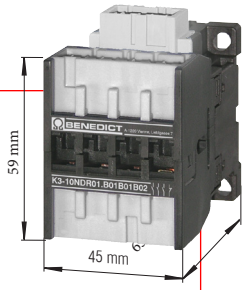


Index Page



RAST 5 - exclusiv for OEM-Partner

5 mm pitch connector system

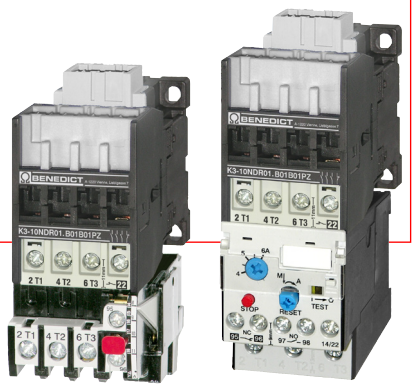


Advantages RAST 5 - Technology

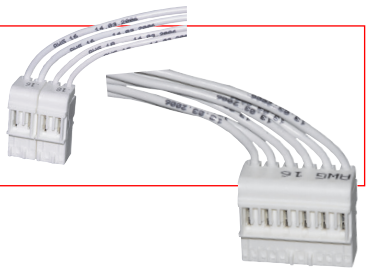
- Time saving installation
- Easy assembly without tools
- Tailor-made sockets, custom - designed codes
- Ambient temperatures up to +90°C/194°F
- Smallest sizes
- Plug technology up to 32 A / 415 V
- color coding for power ratings
- color coding for coil voltages

RAST 5 - Accessories

Combining switchgears with plug-in connections and screw connections



Contactors are available for plugs of many different producers



Contactors, RAST 5

AC operated

Contactor Relays

Ratings AC2, AC3 380V 400V 415V kW	220V 230V kW	240V kW	Rated-Current AC1 415V A	Auxilliary Contacts built in NO	NC	Auxilliary Contacts snap on HN10R..	Type	Coil Voltage	Code Housing Coil	Code Housing IN (L)	Code Housing OUT (T)	Pack pcs.	Weight kg/pc.
-	-	-	10	4	-	2	**K3-07NDR40**					1	0,23
-	-	-	10	2	2	2	**K3-07NDR22**					1	0,23

Contactors

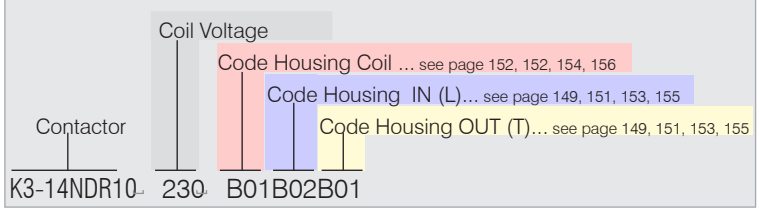
4	3	3	25	1	-	2	**K3-10NDR10**					1	0,23
4	3	3	25	-	1	2	**K3-10NDR01**					1	0,23
5,5	4	4	25	1	-	2	**K3-14NDR10**					1	0,23
5,5	4	4	25	-	1	2	**K3-14NDR01**					1	0,23
7,5	5	5	32	1	-	2	**K3-18NDR10**					1	0,23
7,5	5	5	32	-	1	2	**K3-18NDR01**					1	0,23
11	6	7	32	1	-	2	**K3-22NDR10**					1	0,23
11	6	7	32	-	1	2	**K3-22NDR01**					1	0,23

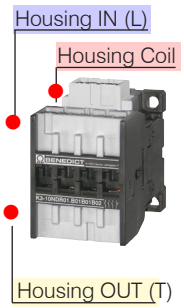
Auxilliary

Auxilliary Contact Blocks

for Contactors	AC15 230V A	I_{th} A	Contacts NO	NC	Type	Pack pcs.	Weight kg/pc.
K3-..R..	3	10	1	-	**HN10R**	10	0,02
K3-..R..	3	10	-	1	**HN01R**	10	0,02

Order Example for Contactors:





Technical data are subject to change without notice

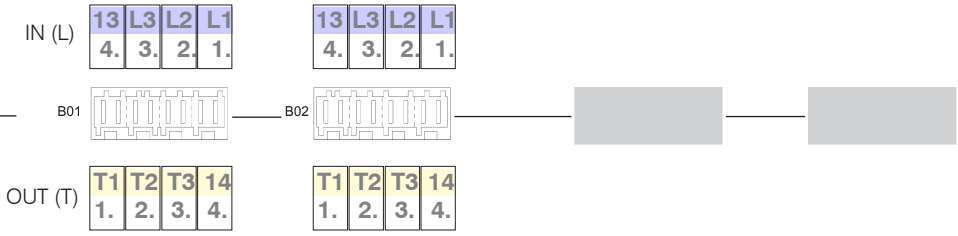
Contactors, RAST 5 Combinations
AC operated

Motor AC2, AC3 380V 400V 415V kW	AC3 400V 415V A	for Overload Relays U12/16E.. and U3/32...	Type	Coil Voltage	Code Housing Coil	Code Housing IN (L)	Screw Connection OUT (T)	Pack pcs.	Weight kg/pcs.
Contactors for Overload Relays									
									
4	10	U12/16E 0,18-..23 K3 and U3/32 0,18-..32	**K3-10NDR10**	. . .		. .	**.PZ**	1	0,23
4	10	U12/16E 0,18-..23 K3 and U3/32 0,18-..32	**K3-10NDR01**	. . .		. .	**.PZ**	1	0,23
									
5,5	14	U12/16E 0,18-..23 K3 and U3/32 0,18-..32	**K3-14NDR10**	. . .		. .	**.PZ**	1	0,23
5,5	14	U12/16E 0,18-..23 K3 and U3/32 0,18-..32	**K3-14NDR01**	. . .		. .	**.PZ**	1	0,23
									
7,5	18	U12/16E 0,18-..23 K3 and U3/32 0,18-..32	**K3-18NDR10**	. . .		. .	**.PZ**	1	0,23
7,5	18	U12/16E 0,18-..23 K3 and U3/32 0,18-..32	**K3-18NDR01**	. . .		. .	**.PZ**	1	0,23
									
11	22	U12/16E 0,18-..23 K3 and U3/32 0,18-..32	**K3-22NDR10**	. . .		. .	**.PZ**	1	0,23
11	22	U12/16E 0,18-..23 K3 and U3/32 0,18-..32	**K3-22NDR01**	. . .		. .	**.PZ**	1	0,23

Pozidriv . . . PZ
Torx . . . . . TX

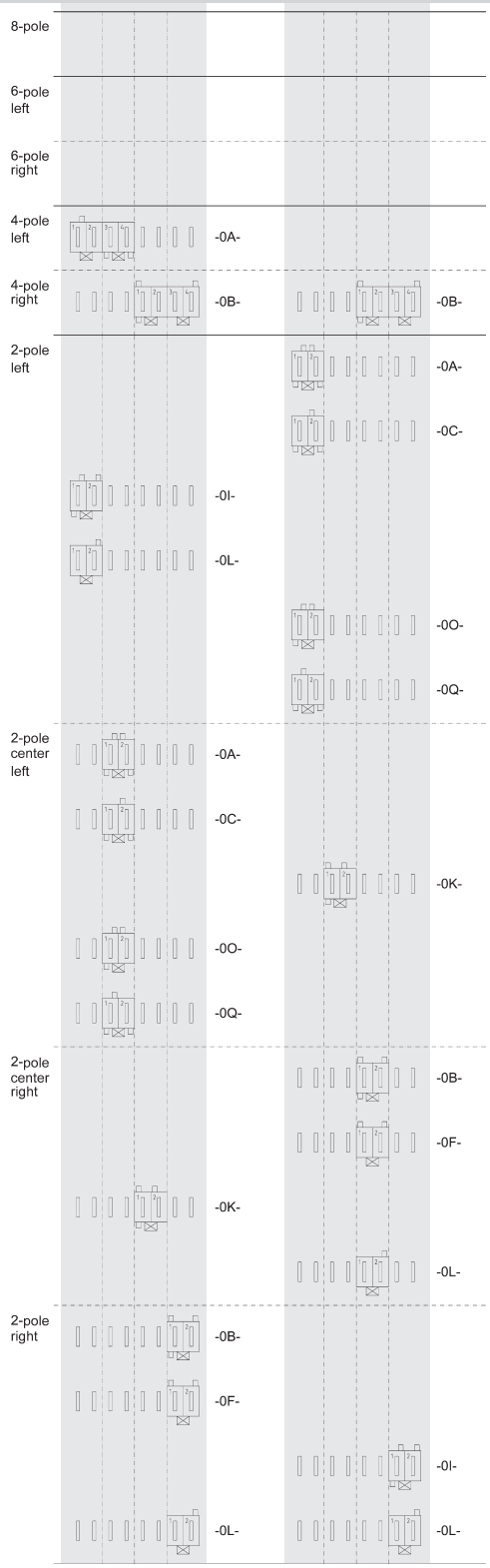
Selection of Contactor-Housings for Standard plugs acc. **Industry Standard RAST 5**

Contactor Housings



Code Contactor-Housings — **B01** — **B02** — **B03** — **B04** further housings on request

Standard plugs acc. Industry Standard RAST 5

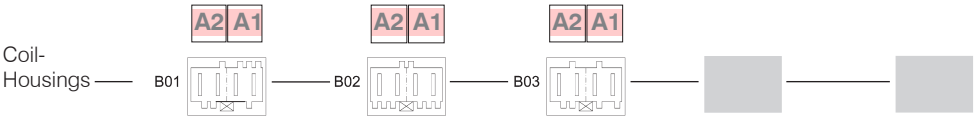


Order Example for Contactors:

Contactor — Coil Voltage — Code Housing Coil ...see page 150, 152, 154, 156 — Code Housing IN (L)... see page 149, 151, 153, 155 — Code Housing OUT (T)...see page 149, 151, 153, 155

K3-14NR10 ␣ 230 ␣ B01 B02 B01

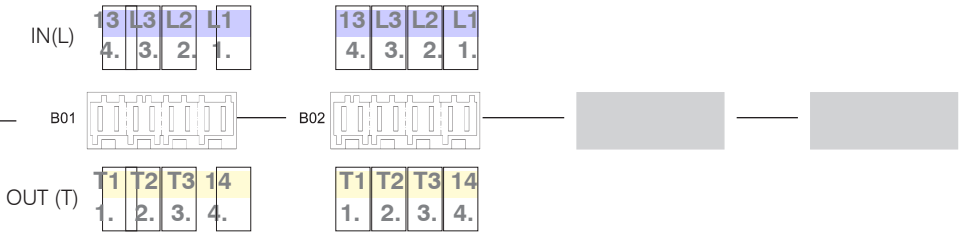
Selection of Coil-Housings for Standard plugs acc. **Industry Standard RAST 5**



Code	Coil-Housings	B01	B02	B03	B04	B05	further housings on request
Standard plugs acc. Industry Standard RAST 5	4-pole						
	3-pole left	-0B-	-0K-				
	3-pole right	-0C-	-0A-	-0H-			
			-0I-				
	2-pole center	-0I-	-0A-	-0B-			
		-0L-	-0C-	-0E-			
			-0O-	-0L-			
			-0Q-	-0M-			
				-0P-			

Selection of Contactor-Housings for Standard plugs acc. **System Stocko RAST 5**

Contactor Housings



Code Contactor-Housings	B01	B02	B03	B04	further housings on request

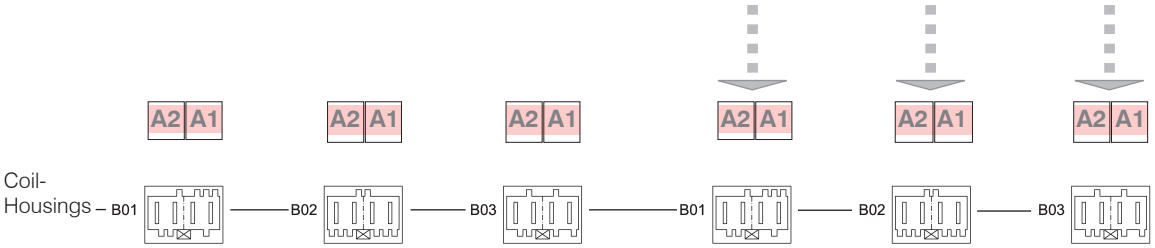
Standard plugs acc. System Stocko RAST 5

	B01	B02
8-pole		-31-
6-pole left	-34-	-34-
		-35-
	-38-	-38-
		-50-
	-65-	-65-
	-1F-	-1F-
6-pole right	-34-	-34-
	-35-	
	-38-	-38-
	-50-	
	-65-	-65-
	-1F-	
4-pole left		-14-
	-16-	
		-53-
	-60-	-60-
	-73-	
	-75-	
4-pole right		-10-
	-60-	-60-
2-pole	see... Industry Standard RAST 5	

Order Example for Contactors:

Contactor	Coil Voltage	Code Housing Coil ...see page 150, 152, 154, 156	Code Housing IN (L)... see page 149, 151, 153, 155	Code Housing OUT (T)...see page 149, 151, 153, 155
K3-14NR10␣	230␣	B01	B02	B01

Selection of Coil-Housings for Standard plugs acc. **System Stocko RAST 5**



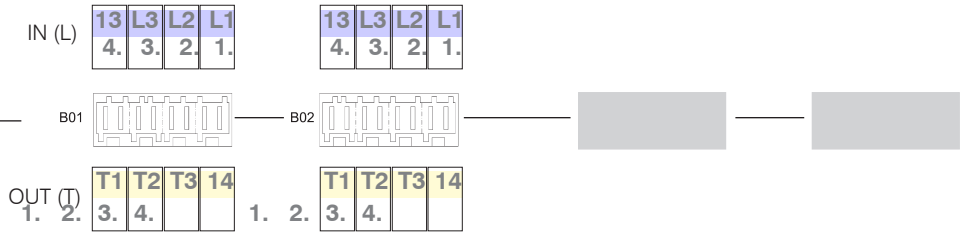
Code Coil-Housings

Standard plugs acc. System Stocko RAST 5

	B01	B02	B03	B01	B02	B03
4-pole	-42-			3-pole right	-02-	-02-
		-64-				-03-
	-78-	-78-	-78-		-04-	
	-79-		-79-			-18-
3-pole left			-01-	-19-		
			-05-	-21-		
			-12-			-28-
		-16-		-47-		
			-30-		-52-	-52-
			-32-		-53-	
	-33-					-64-
			-35-		-66-	
	-36-			-71-		
		-40-				-73-
			-44-		-74-	
			-48-		-75-	-75-
	-49-			2-pole center	see... Industry Standard RAST 5	
	-51-					
	-72-	-72-	-72-			
		-75-	-75-			

Selection of Contactor-Housings for Standard plugs acc. **System Tyco RAST 5**

Contactor Housings



Code Contactor-Housings — B01 — B02 — B03 — B04 further housings on request

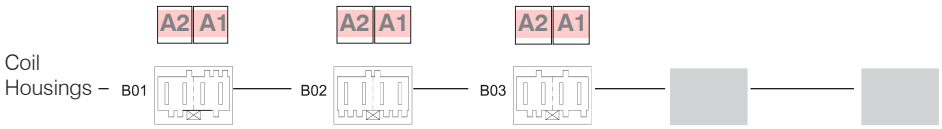
Standard plugs acc. System Tyco RAST 5

	B01	B02
8-pole		
6-pole left	928151-6	
	2-928344-6	
6-pole right		
4-pole left	928344-4	
		4-928344-4
4-pole right		
2-pole left		928344-2
		3-964951-2
	2-964951-2	
	928343-2	
		964951-2
		4-928344-2
2-pole center left	928344-2	
	3-964951-2	
	4-928344-2	
2-pole center right		2-928344-2
		928343-2
2-pole right	2-928344-2	
		2-964951-2
	928343-2	928343-2

Order Example for Contactors:

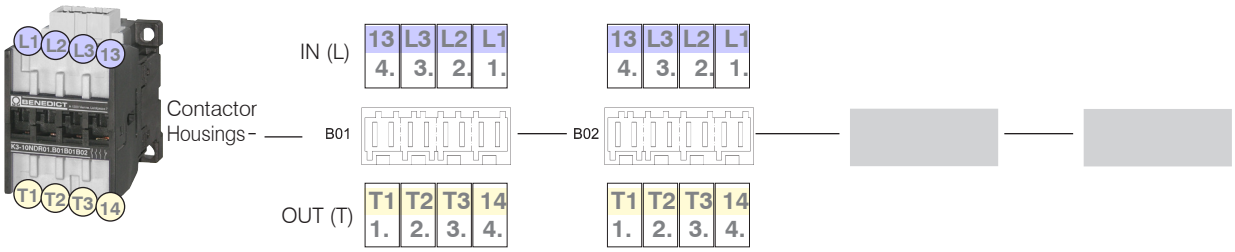
Contactor	Coil Voltage	Code Housing Coil ...see page 150, 152, 154, 156	Code Housing IN (L)... see page 149, 151, 153, 155	Code Housing OUT (T)...see page 149, 151, 153, 155
K3-14NR10	230	B01	B02	B01

Selection of Coil-Housings for Standard plugs acc. **System Tyco RAST 5**



Code Coil-Housings	B01	B02	B03	B04	B05	further housings on request
Standard plugs acc. System Lumberg RAST 5						
4-pole						
3-pole left						
3-pole right		928344-3				
2-pole center		928344-2	2-928344-2			
		3-964951-2	6-928344-2			
	2-964951-2					
	928343-2		928343-2			
		964951-2				
		4-928344-2				

Selection of Contactor-Housings for Standard plugs acc. **System Lumberg RAST 5**



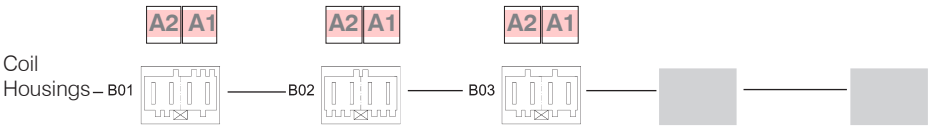
Code Contactor-Housings	B01	B02	B03	B04 further housings on request
Standard plugs acc. System Lumberg RAST 5				
8-pole				
6-pole left		-10-		
6-pole right				
4-pole left	-01-			
4-pole right	-02-	-02-		
2-pole left	-09-	-01-, -03-		
2-pole center left	-01-, -03-	-10-		
2-pole center right	-10-	-02-, -06-		
2-pole right	-02-, -06-	-09-		

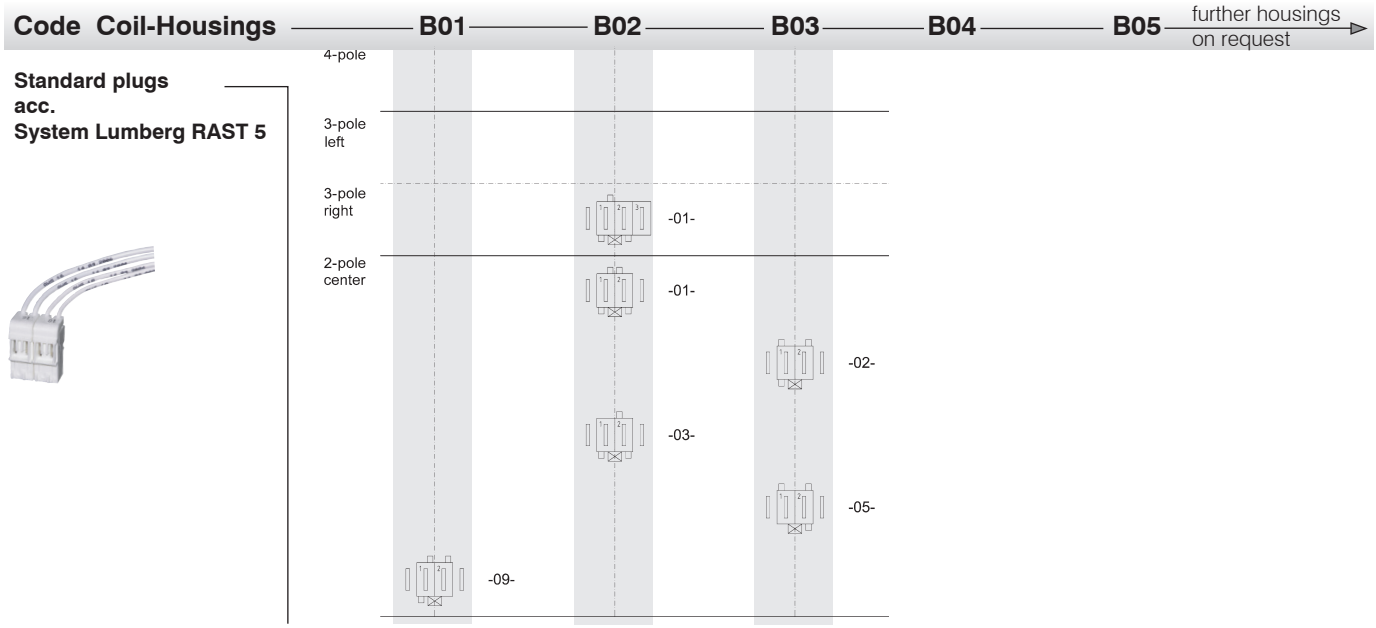
Order Example for Contactors:

Contactor — Coil Voltage — Code Housing Coil ...see page 150, 152, 154, 156 — Code Housing IN (L)... see page 149, 151, 153, 155 — Code Housing OUT (T)...see page 149, 151, 153, 155

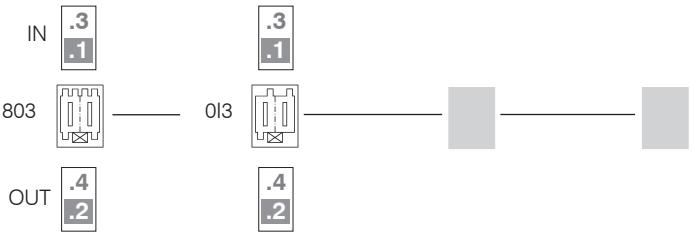
K3-14NR10 230 B01 B02 B01

Selection of Coil-Housings for Standard plugs acc. **System Lumberg RAST 5**





Auxilliary Contact Block-Housings



Code Auxilliary-Contact Block-Housings — **803** — **0I3** — further housings on request

2-pole

Standard plugs acc. Industry Standard RAST 5

	803	0I3
-0A-	✓	
-0B-	✓	
-0C-	✓	
-0D-	✓	
-0E-	✓	
-0F-	✓	
-0G-	✓	
-0H-	✓	
-0I-	✓	✓ -0I-
-0K-	✓	
-0L-	✓	✓ -0L-
-0M-	✓	
-0N-	✓	
-0O-	✓	
-0P-	✓	
-0Q-	✓	
-80-	✓	

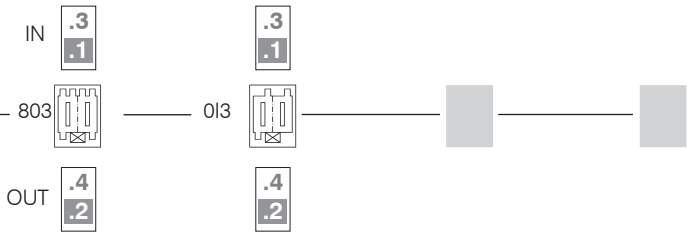
Order Example for Aux. Contact Blocks:

HN10R . 80 30 I3

- HN10R — Auxilliary Contact Block
- 80 — Code Aux. Block Housing IN (1,3)
- 30 — Code Aux. Block Housing OUT (2,4)
- I3 — Code Aux. Block Housing

Selection of Auxiliary Contact Block-Housings for Standard plugs acc. **System Stocko RAST 5**

Auxilliary Contact Block-Housings

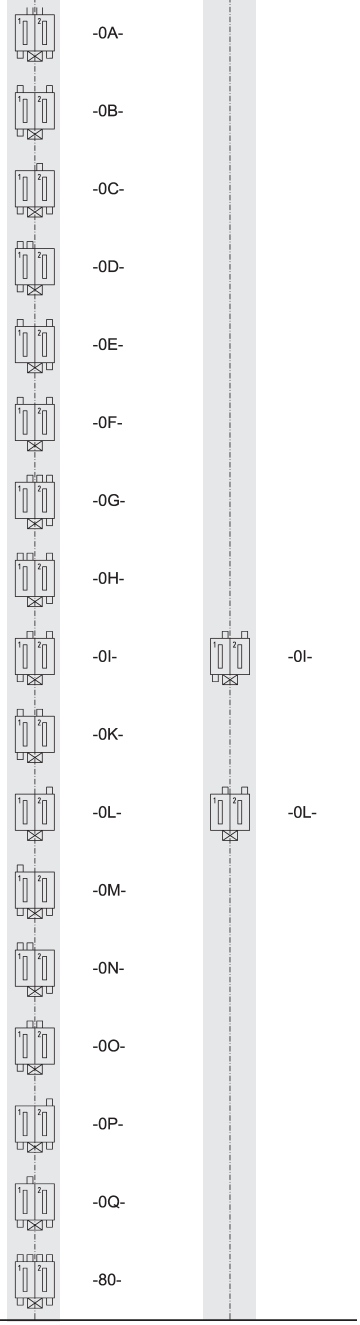


Code Auxilliary-Contact Block-Housings

803 — 0I3 — further housings on request

Standard plugs acc. System Stocko RAST 5

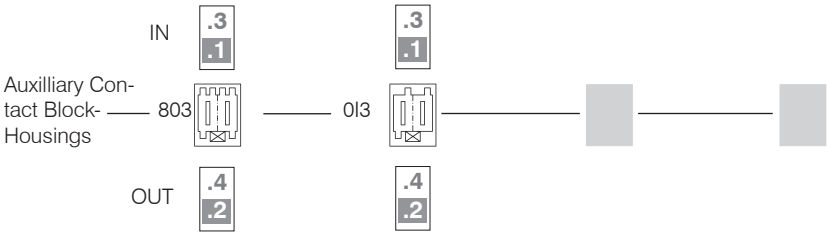
2-pole



Order Example for Aux. Contact Blocks:

HN10R 8030I3

– Auxilliary Contact Block
– Code Aux. Block Housing IN (1,3)
– Code Aux. Block Housing OUT (2,4)



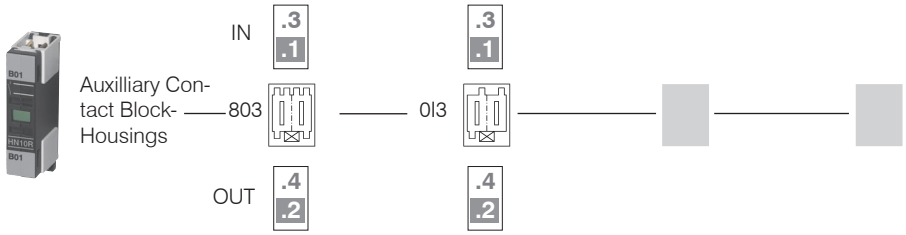
Code Auxilliary-Contact Block-Housings	803	0I3	further housings on request
Standard plugs acc. System Tyco RAST 5	2-pole		
	928344-2		
	2-928344-2		
	3-964951-2		
	6-928344-2		
	5-928344-2		
	3-928344-2		
	2-964951-2	2-964951-2	
	928343-2	928343-2	
	964951-2		
	4-928344-2		

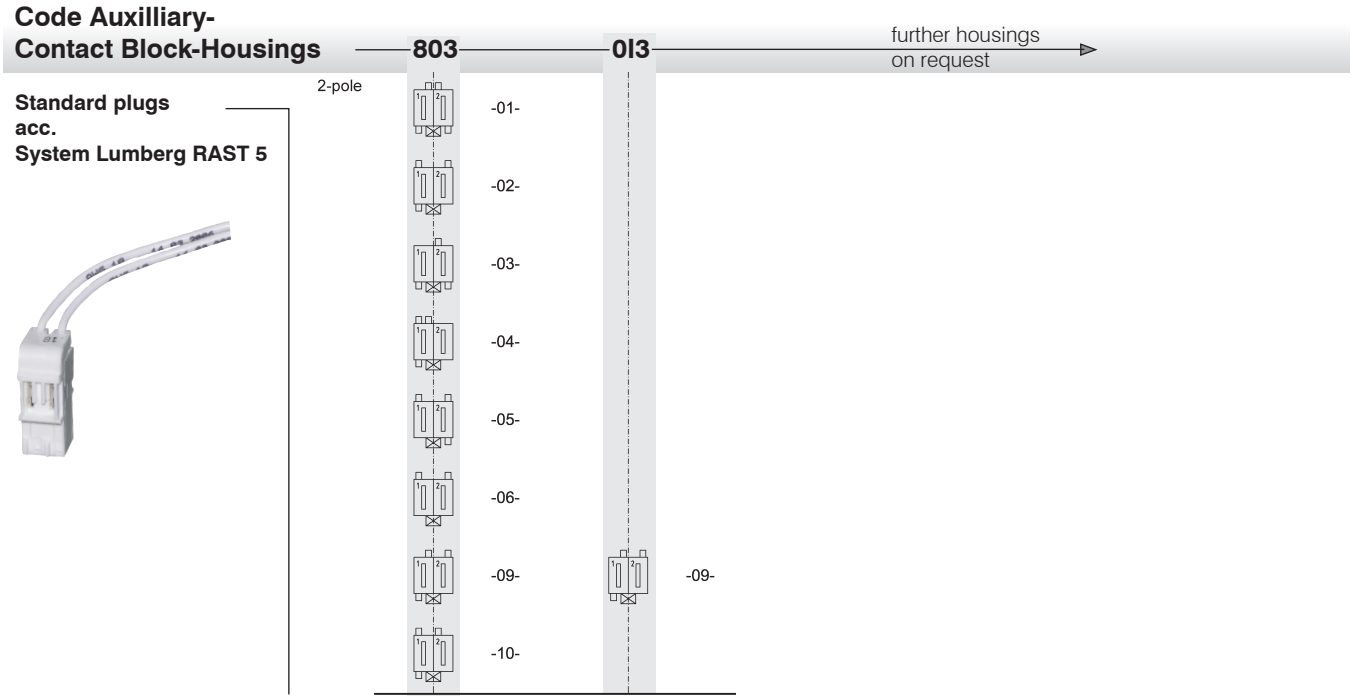
Order Example for
Aux. Contact Blocks:

HN10R . 8030I3

- HN10R – Auxilliary Contact Block
- 8 – Code Aux. Block Housing IN (1,3)
- 0 – Code Aux. Block Housing OUT (2,4)
- 3 – Code Aux. Block Housing IN (1,3)
- I – Code Aux. Block Housing OUT (2,4)

Selection of Auxiliary Contact Block-Housings for Standard plugs acc. **System Lumberg RAST 5**





Order Example for
Aux. Contact Blocks:

HN10R 8030I3
– Auxilliary Contact Block
– Code Aux. Block Housing IN (1,3)
– Code Aux. Block Housing OUT (2,4)

Data acc. to IEC 60947-4-1, VDE 0660

Main Contacts		Type	K3-07NDR	K3-10NDR	K3-14NDR	K3-18NDR	K3-22NDR
Rated insulation voltage U_i [1]		V~	415	415	415	415	415
Making capacity I_{eff}	at U_e = 415V~	A	-	200	200	200	200
Breaking capcity I_{eff} cosφ= 0,65	at U_e = 415V~	A	-	180	180	200	200
Utilization category AC1							
Switching of resistive load							
Rated operational current I_e (=I_{th}) at 40°C, open	415V	**A**	**10**	**25**	**25**	**32**	**32**
Rated operation power	220V	kW	-	9,5	9,5	12,2	12,2
of three-phase resistive loads	230V	kW	-	9,9	9,9	12,7	12,7
50-60Hz, cosφ = 1	240V	kW	-	10,4	10,4	13,3	13,3
	380V	kW	-	16,4	16,4	21,0	21,0
	400V	kW	-	17,3	17,3	22,1	22,1
	415V	kW	-	17,9	17,9	23,0	23,0
Rated operational current I_e (=I_{th}) at 60°C, enclosed	415V	A	6	25	25	32	32
Rated operational power	220V	kW	-	9,5	9,5	12,2	12,2
of three-phase resistive loads	230V	kW	-	9,9	9,9	12,7	12,7
50-60Hz, cosφ = 1	240V	kW	-	10,4	10,4	13,3	13,3
	380V	kW	-	16,4	16,4	21,0	21,0
	400V	kW	-	17,3	17,3	22,1	22,1
	415V	kW	-	17,9	17,9	23,0	23,0
Minimum cross-section of conductor at load with I_e (=I_{th})		mm²	2 x 1,5 [2]	2 x 1,5 [2]	2 x 1,5 [2]	2 x 2,5 [2]	2 x 2,5 [2]
Utilization category AC2 and AC3							
Switching of three-phase motors							
Rated operational current I_e	220V	A	-	12	15	18	22
open and enclosed	230V	A	-	11,5	14,5	18	22
	240V	A	-	11	14	18	22
	380-400V	**A**	**-**	**10**	**14**	**18**	**22**
	415V	A	-	9	14	18	22
Rated operational power	220-230V	kW	-	3	4	5	6
of three-phase motors	240V	kW	-	3	4	5	7
50-60Hz	**380-400V**	**kW**	**-**	**4**	**5,5**	**7,5**	**11**
	415V	kW	-	4,5	6	8,5	12

Auxilliary Contacts

Rated insulation voltage U_i		V~	415	415	415	415	415
Thermal rated current I_{th} up to 415V							
Ambient temperature	40°C	A	10	10	10	10	10
	60°C	A	6	6	6	6	6
Utilization category AC15							
Rated operational current I_e	220-240V	A	3	3	3	3	3
	380-415V	A	2	2	2	2	2
Utilization categoryDC13							
Rated operational current I_e	60V	A	3,5	3,5	3,5	3,5	3,5
	110V	A	0,5	0,5	0,5	0,5	0,5
	220V	A	0,1	0,1	0,1	0,1	0,1
Short circuit protection	gL (gG)	A	20	20	20	20	20

1)Suitable for: earthed -neutral systems, overvoltage category I to III, pollution degree 3 (Industry-Standard): U_{imp} = 4kV.
Data for other conditions on request.

Data acc. to IEC 60947-4-1, VDE 0660

Main Contacts		Type	K3-07NDR	K3-10NDR	K3-14NDR	K3-18NDR	K3-22NDR
Maximum ambient temperature							
Operation	open	°C			-40 up to +60 (+90) [1]		
	enclosed	°C			-40 up to +40		
with thermal overload relay	open	°C			-25 up to +60		
	enclosed	°C			-25 up to +40		
Storage		°C			-50 up to +90		
Short circuit protection without thermal O/L relay							
Rated short circuit current	„r“	kA	1	3	3	3	3
	„Iq“	kA	-	-	-	-	-
Coordination-Type „1“ acc. to IEC 947-4-1, Contact welding without hazard of persons							
max. fuse size	gL (gG)	A	20	63	63	63	63
Coordination-Type “2” acc. to IEC 947-4-1, light Contact welding accepted							
max. fuse size	gL (gG)	A		25	35	35	35
Contact welding not accepted							
max. fuse size	gL (gG)	A		16	16	16	16
for Contactors with thermal overload relay the device with the smaller admissible backup fuse (contactor or thermal overload relay) determines the fuse size.							
Frequency of operations z							
Contactors without thermal overload relay							
	without load	1/h	10000	10000	10000	10000	10000
	AC3, I_e	1/h		600	600	600	600
	AC4, I_e	1/h		120	120	120	120
	DC3, I_e	1/h		600	600	600	600
Mechanical life							
AC-operated		S x 10^6	10	10	10	10	10
DC-operated		S x 10^6	10	10	10	10	10
Short time current	10sec.-current	A		96	120	144	176
Power loss per pole	at I_e/AC3 400V	W		0,21	0,35	0,5	0,75
Resistance to shock acc. to IEC 68-2-27							
Shock time 20ms sine-wave	NO	g			10		
	NC	g			6		
Control Circuit							
Power consumption of coils							
AC operated	inrush	VA			33-45		
	sealed	VA			7-10		
		W			2,6-3		
DC operated	inrush	W			75		
	sealed	W			2		
Operating range of coils in multiples of control voltage U_s							
	AC operated				0,85-1,1		
	DC operated				0,8-1,1		
Switching time at control voltage U_s ±10% [2] [3]							
AC operated	make time	ms			8-16		
	release time	ms			5-13		
	arc duration	ms			10-15		
DC operated	make time	ms			8-12		
	release time	ms			8-13		
	arc duration	ms			10-15		

1) With reduced control voltage range 0,9 bis 1,0 x U_s and with reduced rated current I_e /AC1, no deratings for I_e /AC3 values.
2) Total breaking time = release time + arc duration
3) Values for delay of the release time of the make contact and the make time of the break contact will be increased, if magnet coils are protected with coil suppressor (Varistor, RC-Unit, Diode-Unit).

Data acc. to UL508

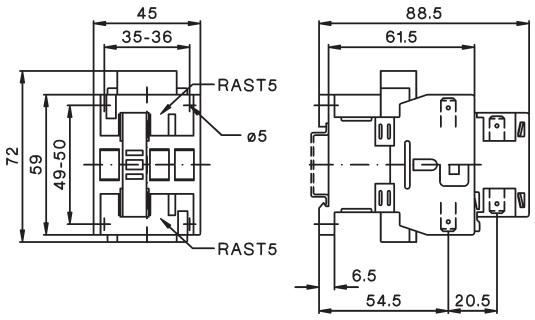
Main Contacts (cULus)		Type	K3-10NDR	K3-14NDR	K3-18NDR	K3-22NDR
Bemessungsbetriebsstrom „General Use“		A	25	25	30	30
Motor DOL 3-phase at 60Hz						
Rated operational current	415V	A	10	14	18	22
Rated operational power	110-120V	hp	1½	2	2	3
	200-208V	hp	3	3	5	5
	220-240V	hp	3	3	5	5
	265-277V	hp	3	5	7½	7½
	380-415V	hp	5	5	10	10
Motor DOL 1-phase at 60Hz						
Rated operational current	415V	A	10	14	18	22
Rated operational power	110-120V	hp	½	¾	1	1½
of AC motor at 60Hz (1ph)	200-208V	hp	1	1½	2	3
	220-240V	hp	1½	2	3	3
	265-277V	hp	2	3	3	3
	380-415V	hp	3	3	5	5
Fuses		A	30	40	50	50
Suitable for use on a capability						
of delivering not more than (SCCR)	rms	A	5000	5000	5000	5000
		V	415	415	415	415
Auxilliary Contacts (cULus)			A300	A300	A300	A300

Accessories
Data acc. to IEC 60947-5-1, VDE 0660

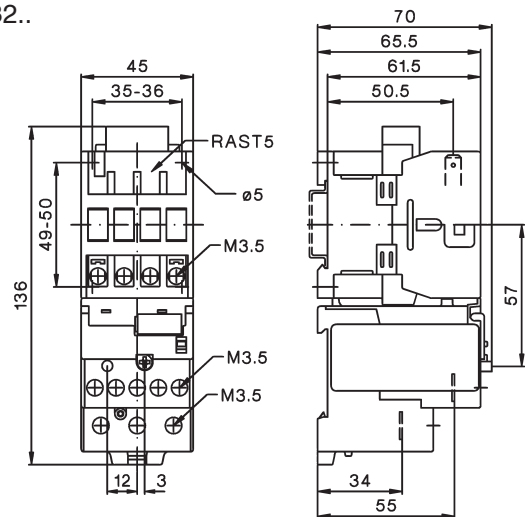
Auxilliary Contacts		Type	HN10R	HN01R
Rated insulation voltage U_i		V~	415	415
Thermal rated current I_{th} up to 415V				
Ambient temperature	max. 40°C	A	10	10
	max. 60°C	A	6	6
Frequency of operations z		1/h	3000	3000
Mechanical life		S x 10^6	10	10
Power loss per pole at I_e/AC1		W	0,5	0,5
Utilization category AC15				
Rated operational	220-240V	A	3	3
betriebsstrom I_e	380-415V	A	2	2
Utilization category DC13				
Bemessungs-	60V	A	2	2
current I_e	110V	A	0,4	0,4
	220V	A	0,1	0,1
Short circuit protection				
short circuit current 1kA,				
contact welding not accepted				
max. fuse size	gL (gG)	A	20	20
Data acc. to UL508				
Rated operational current		A	10	10
„General Use“				
Rated operational voltage	max.	V~	300	300
Auxiliary Contacts			A300	A300

Dimensions

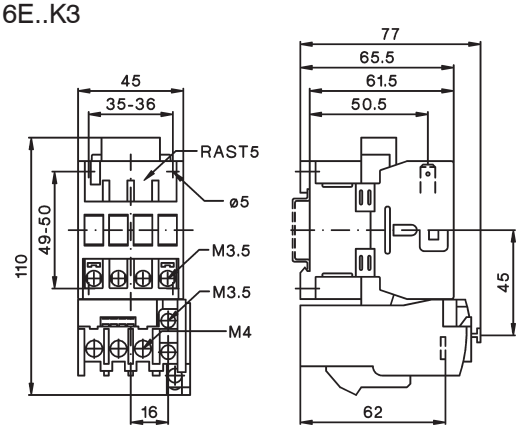
K3-..NDR.. +HN..R



K3-..NDR.....PZ + U3/32..



K3-..NDR.....PZ + U12/16E..K3



Technical data are subject to change without notice