General

Quality Control System

Since November 1991 Benedikt & Jäger 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.

Attached you find the EEC Directives concerning our products.
Low Voltage Directive (73/23/EEC)
EMC Directive (89/336/EEC)
Declarations of Conformity art. no. D586.. on request.

Test Authorities, Registration Mark, Approvals

Benedikt & Jäger Low voltage switchgear 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 Benedikt & Jäger 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.

Benedikt & Jäger Low voltage switchgear is also suitable for applications in marine environments.
They are classified in "Lloyd`s Register of Shipping" and in the "Maritime Register of Shipping" (GUS). The "American Bureau of Shipping" does not claim a general approval for single components, the complete electrical equipment on board has to be approved. The devices should have UL- and CSA-approvals. Further information for Guide-No. and File-No. (CSA, UL) you will find on page 4.
For approved values see technical data of the devices.

Country	**Canada**	**USA**	**Switzer-land**	**Den-mark**	**Norway**	**Sweden**	**Finland**	**Poland**	**Slowa-kia**	**Czech**	**Hun-garia**
State deputy or private examination (state admitted)	CSA UL	UL	SEV	DEMKO	NEMKO	SEMKO	SETI	SEP	SKTC	EZU	MEEI
Label marking of examination boards	1)										
Duty of approvals	All switchgear	or Approval of switchgear commendable	No approval since 1. 1. 1994 Our devices are according to the harmonised European Standards e.g. EN 60947 (IEC 947, VDE 0660) and can be used generally								
Specification	UL is authorised for approvals acc. to Canadian Standards		Marking with approbation label is no longer necessary								

1) CSA-approvals are replaced by UL-approvals valid for USA and Canada. From 1. 1. 2000 switchgear will be marked with the combined approval.

UL-mark c UL us or c UL us only.

Explanations for choice and supply of low voltage switchgears 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	60	6	10	A150
	AC 240	30	3	10	A300
	AC 480	15	1,5	10	A600
	AC 600	12	1,2	10	A600
	DC 125	2,2	2,2	10	N150
	DC 250	1,1	1,1	10	N300
	DC 600	0,4	0,4	10	N600
Standard Duty (SD or STD DTY)	AC 120	30	3	5	B150
	AC 240	15	1,5	5	B300
	AC 480	7,5	0,75	5	B600
	AC 600	6	0,6	5	B600
	DC 125	1,1	1,1	5	P150
	DC 250	0,55	0,55	5	P300
	DC 600	0,2	0,2	5	P600
-	AC 120	15	1,5	2,5	C150
	AC 240	7,5	0,75	2,5	C300
	AC 480	3,75	0,375	2,5	C600
	AC 600	3	0,3	2,5	C600
	DC 125	0,55	0,55	2,5	Q150
	DC 250	0,27	0,27	2,5	Q300
	DC 600	0,1	0,1	2,5	Q600
-	AC 120	3,6	0,6	1	D150
	AC 240	1,8	0,3	1	D300
	DC 125	0,22	0,22	1	R150
	DC 250	0,11	0,11	1	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) UL 486 "Standard for Wire Connectors and Soldering Lugs"

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

Approvals

Country	USA, Canada		Switzerland	Europe	Russia GOST	Register of Shipping			CENELEC CB-Certificates
Type	UL		SEV	CE		Great Britain LRS	GUS MRS	Italy RINA	
Mini Contactors, Reversing Contactors K1 and Accessories									
K1-07D..(=)	o	-	o	o	o	-	-	-	o
K1-07L..(=)	-	o	o	o	o	-	-	-	o
K1-07F..(=)	-	o	-	o	-	-	-	-	-
K1-09D..(=)	o	-	o	o	o	-	-	-	o
K1-09L..(=)	-	o	o	o	o	-	-	-	o
K1-09F..(=)	-	o	-	o	-	-	-	-	-
K1-12D..(=)	o	-	-	o	-	-	-	-	-
K1W09D01(=)	o	-	-	o	-	-	-	-	-
K1W12D01(=)	o	-	-	o	-	-	-	-	
K1W09L01(=)	-	o	-	o	-	-	-	-	-
HK.., HKM..	o	-	o	o	-	-	-	-	o
RC-K1	o	-	-	o	-	-	-	-	-
Contactor Relays Series K3 and KG2									
K3-07A..(=)	o	-	o	o	-	-	-	-	-
K3-07D..(=)	o	-	o	o	-	-	-	-	-
KG3-07..	o	-	-	o	-	-	-	-	o
KG2-07A..	o	-	o	o	o	o	-	-	o
KG2-07D..	-	-	o	o	o	-	-	-	o
Contactors Series K3 and K									
K3-10A..(=)	o	-	o	o	o	-	-	-	o
K3-14A..(=)	o	-	o	o	o	-	-	-	o
K3-18A..(=)	o	-	o	o	o	-	-	-	o
K3-22A..(=)	o	-	o	o	o	-	-	-	o
K3-24A..(=)	o	-	o	o	o	-	-	-	o
K3-32A..(=)	o	-	o	o	o	-	-	-	o
K3-40A..(=)	o	-	o	o	o	-	-	-	o
K3-50A..(=)	o	-	o	o	o	-	-	-	o
K3-62A..(=)	o	-	o	o	o	-	-	-	o
K3-74A..(=)	o	-	o	o	o	-	-	-	o
K85A..(=)	o	-	o	o	o	o	o	-	o
K110A..(=)	o	-	o	o	o	o	o	-	o
K3-151A..(=)	o	-	-	o	-	-	-	-	-
K3-176A..(=)	o	-	-	o	-	-	-	-	-
K3-200A..(=)	-	-	-	o	-	-	-	o	-
K3-315A..(=)	-	-	-	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	-
AC Operated Contactors, Series KG3									
KG3-10..	o	-	-	o	-	-	-	-	o
KG3-14..	o	-	-	o	-	-	-	-	o
KG3-18..	o	-	-	o	-	-	-	-	o
KG3-22..	o	-	-	o	-	-	-	-	o
Capacitor Contactors Series K3									
K3-18K..	o	-	-	o	o	-	-	-	o
K3-24K..	o	-	-	o	o	-	-	-	o
K3-32K..	o	-	-	o	o	-	-	-	o
K3-50K..	o	-	-	o	o	-	-	-	o
K3-62K..	o	-	-	o	o	-	-	-	o
K3-74K..	o	-	-	o	o	-	-	-	o
Aux. contacts									
HN.., HTN..	o	-	o	o	o	o	-	-	o
HA..	o	-	o	o	o	o	o	-	o
HB11	o	-	o	o	o	-	-	-	o
K2-DK, K2-SK	o	-	-	o	-	-	-	-	-
HKA.., HKT..	-	-	-	o	-	-	-	-	-
HKF22	-	-	-	o	-	-	-	-	-

o In standard version approved x In test - Not provided for test till now

Approvals

Country	USA, Canada		Switzerland	Europe	Russia	Register of Shipping			CENELEC
	UL		SEV		GOST				CB-Certificates
Type	c UL us	c FC us		CE		Great Britain LRS	GUS MRS	Italy RINA	
Accessories									
K2-T..E, -A	-	-	-	o	-	-	-	-	-
K2-TP	o	-	-	o	-	-	-	-	-
K2-L	o	-	-	o	-	-	-	-	-
K2-IN.	o	-	-	o	-	-	-	-	-
K2-UN.	o	-	-	o	-	-	-	-	-
K2-IM	-	-	-	o	-	-	-	-	-
K2-E	o	-	-	o	-	-	-	-	-
VG-K2	-	-	-	o	-	-	-	-	-
RC-K3	o	-	-	o	-	-	-	-	-
Reversing Contactors , Serie KW3									
KW3-10	o	-	-	o	-	-	-	-	-
KW3-14	o	-	-	o	-	-	-	-	-
KW3-18	o	-	-	o	-	-	-	-	-
KW3-22	o	-	-	o	-	-	-	-	-
KW3-24	o	-	-	o	-	-	-	-	-
KW3-32	o	-	-	o	-	-	-	-	-
KW3-40	o	-	-	o	-	-	-	-	-
KW3-50	-	-	-	o	-	-	-	-	-
KW3-62	-	-	-	o	-	-	-	-	-
KW3-74	-	-	-	o	-	-	-	-	-
KW85	o	-	-	o	-	-	-	-	-
KW110	o	-	-	o	-	-	-	-	-
D.O.L. Starters									
P1..	o	-	-	o	-	-	-	-	-
Thermal Overload Relays									
U3/32	x	-	o	o	o	-	-	-	o
U3/42	o	-	o	o	o	-	-	-	o
U3/74	o	-	o	o	o	-	-	-	o
U12/16E	o	-	o	o	o	o	o	-	o
U12/16A	-	-	o	o	o	o	o	-	o
U12/16EM	-	-	o	o	o	-	-	-	o
U12/16EQ	-	-	o	o	o	-	-	-	o
U32	o	-	-	o	o	o	o	-	o
U60	o	-	-	o	o	o	o	-	o
U85	o	-	o	o	o	o	o	-	o
U205	-	-	-	o	-	-	-	-	-
U310	-	-	-	o	-	-	-	-	-
U840	-	-	-	o	-	-	-	-	-
U1250	-	-	-	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
K1R	-	-	o	o	o	-	-	-	o
RH11	o	-	-	o	o	-	-	-	o

o In standard version approved x In test - Not provided for test till now

(UL)- and (FC)- Guide- and File-No.

These data are important for UL-inspecting engineers.

Devices	c UL us		Guide-No. c FC us		File-No.
	Kanada	USA	Kanada	USA	
Contactors	NLDX7	NLDX	NLDX8	NLDX2	E41502
Reversing Contactors	NLDX7	NLDX	-	-	E41502
Control Relays, Accessories	NKCR7	NKCR	NKCR8	NKCR2	E66273
Thermal Overload Relays	NKCR7	NKCR	-	-	E66273
Cam Switches	NLRV7	NLRV	-	-	
Circuit Breakers M3.. as Manual Motor Controller	NLRV7	NLRV	-	-	E129916
Circuit Breakers M3.. as Combination Motor Controller	NKJH7	NKJH	-	-	E197641
M3 Bus Bar Assemblies	NLRV7	NLRV	-	-	E129916
M3 Accessories	NKCR7	NKCR	-	-	E66273

Technical Information

Degree of protection acc. to EN/IEC 60947-1

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

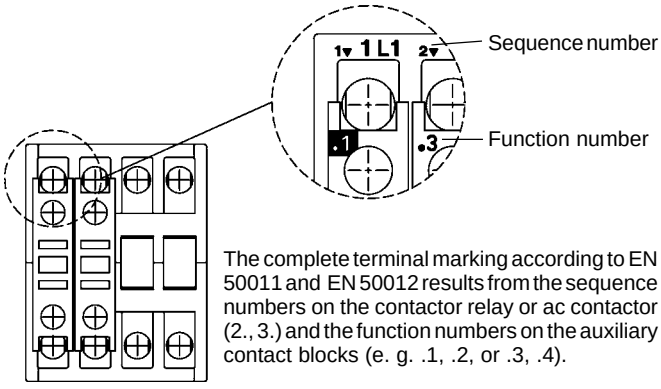
1 st digit: Pertains to solid objects
2 nd digit: Pertains to water.

1 st digit	Short description	Definition
1 body	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 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 greater than 2,5mm	Excludes solid objects exceeding 2,5 mm in diameter or thickness.
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 conditionsm acc. to IEC 68

Open-type devices are climate-resistant in the constant climate according to IEC 68-2-3 (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.

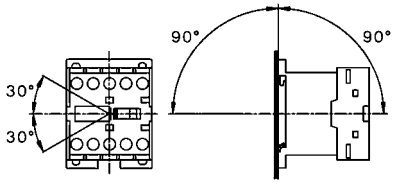
Short circuit protection

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!

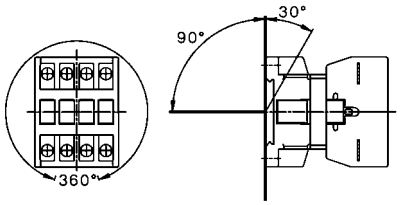
Technical Information

Mounting positions of contactors

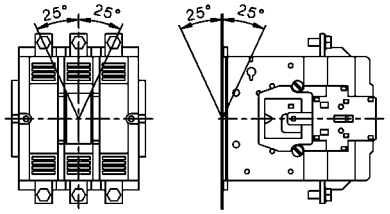
K1-07 to K1-12



K3-07 to K3-74, K85 to K110



K3-150.. to K3-1200..



Terminal screws

Devices Type	Kind of connection Screw with washer	Screw with clamp box
Mini Contactors		
All conductors		
K1-..	M3,5	-
Contactor Relays		
All conductors		
K3-07	M3,5	-
Contactors		
Main conductor		
KG2-..	M3,5	-
K3-10.. to K3-22..	M3,5	-
K3-24.. to K3-40..	-	M5
K3-50.. to K3-74..	-	M6
K85, 110,	-	M8
Auxiliary conductor		
K3-10 to K3-22	M3,5	-
K85, K110, KG2-..	M3,5	-
Coil conductor		
K3-10 to K110, KG2-.	M3,5	-
Accessories		
HK, HKM	M3,5	-
HA, HN, K2-..	M3,5	-

Devices Type	Kind of connection Screw with washer	Screw with clamp box
Thermal Overload Relays		
Main conductor		
U12/16	M4	-
U3/32	M3,5	-
U3/42	M5	-
U3/74	-	M6
UAT21	-	M4
UAT22	-	M4
UAT23	-	M5
Auxiliary conductor		
All devices	M3,5	-
Contactors for Distribution Boards		
Conductors		
R20, R25	-	M3,5
R40, R63	-	M5
K1R	M3,5	-
Coil conductor		
R20 to R63	-	M3
K1R	M3,5	-

Terminal screws in relation to screwdriver sizes and tightening torques

Terminal screws Version	Size	Pozidriv	Screw driver	Tightening torque Nm	lb. inch
Screw with Pozidriv and slot	M3	Pz 1	Size 1	0,6 - 1,2	5 - 11
	M3,5 [1)]	Pz 1	Size 1	0,8 - 1,4	7 - 12
	M3,5	Pz 2	Size 2, 3	0,8 - 1,4	7 - 12
	M4	Pz 2	Size 3, 4	1,2 - 1,8	11 - 16
	M5	Pz 2	Size 3, 4, 5	2,5 - 3	22 - 26
	M6	Pz 3	Size 4, 5	3,5 - 4,5	31 - 40
Screw or nut with hexagonal-head	M8	-	-	6 - 10	53 - 88

1) Modular contactors R20, R25

Mini Contactor Relays 4-pole — AC Operated

Contacts NO	Contacts NC	Distinc. Number acc. to DIN EN 50011	Ratings AC15 230V A	Ratings AC15 400V A	Thermal Rated Current I_{th} A	Type 24 230 ↓	Coil voltage 1) 24V 50/60Hz 220-230V 50Hz	Pack pcs.	Weight kg/pc.
4-pole, With Screw Terminals									
4	-	40E	**3**	2	10	**K1-07D40 24** **K1-07D40 230**		10	0,16
3	1	31E	**3**	2	10	**K1-07D31 24** **K1-07D31 230**		10	0,16
2	2	22E	**3**	2	10	**K1-07D22 24** **K1-07D22 230**		10	0,16

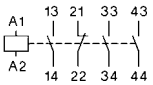
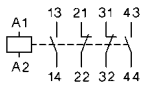
1) Other coil voltages see page 13

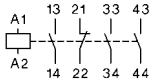
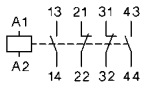
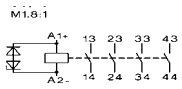
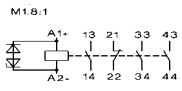
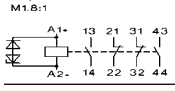
DC Solenoid Operated

Contacts NO	Contacts NC	Distinc. Number acc. to DIN EN 50011	Ratings AC15 230V A	Ratings AC15 400V A	Thermal Rated Current I_{th} A	Type Coil 24V DC 2,5W	Pack pcs.	Weight kg/pc.
4-pole, With Screw Terminals								
4	-	40E	**3**	2	10	**K1-07D40= 24**	10	0,19
3	1	31E	**3**	2	10	**K1-07D31= 24**	10	0,19
2	2	22E	**3**	2	10	**K1-07D22= 24**	10	0,19
Interface Contactor Relay w. coil suppressor						**Coil 19 to 30V DC** 1,5W		
4	-	40E	**3**	2	10	**K1-07D40= 24VR**	10	0,20
3	1	31E	**3**	2	10	**K1-07D31= 24VR**	10	0,20
2	2	22E	**3**	2	10	**K1-07D22= 24VR**	10	0,20

Auxiliary Contact Blocks For Contactor Relays K1-07

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

Wiring Diagrams	Distinc. Number acc. to DIN EN 50011	Auxiliary Contact Blocks Type	NO	NC	Contactor Relay with Auxiliary Contact Block Distinc. Number according to DIN EN 50011	NO	NC	Contacts suitable for Electronic Circuits according to DIN 19240 for rated voltage 24V DC (test ratings 17V DC, 5mA) Positively guided contacts
	40E	HK11	1	1	51E	5	1	Preferable combinations with distinctive letter "E" according to DIN EN 50011
		HK02	0	2	42E	4	2	
		HK40	4	0	80E	8	0	
		HK22	2	2	62E	6	2	
	31E	HK11	1	1	42Y	4	2	
		HK02	0	2	33Y	3	3	
		HK40	4	0	71Y	7	1	
		HK22	2	2	53Y	5	3	
	22E	HK11	1	1	33Y	3	3	
		HK02	0	2	24Y	2	4	
		HK40	4	0	62Y	6	2	
		HK22	2	2	44Y	4	4	

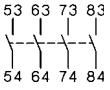
Wiring Diagrams	Distinc. Number acc. to DIN EN 50011	Auxiliary Contact Blocks Type	NO	NC	Contactor Relay with Auxiliary Contact Block Distinc. Number according to DIN EN 50011	NO	NC	
	40E	HK11	1	1	51E	5	1	Preferable combinations with distinctive letter "E" according to DIN EN 50011
		HK02	0	2	42E	4	2	
		HK40	4	0	80E	8	0	
		HK22	2	2	62E	6	2	
	31E	HK11	1	1	42Y	4	2	
		HK02	0	2	33Y	3	3	
		HK40	4	0	71Y	7	1	
		HK22	2	2	53Y	5	3	
	22E	HK11	1	1	33Y	3	3	
		HK02	0	2	24Y	2	4	
		HK40	4	0	62Y	6	2	
	40E	Cannot be used with auxiliary contact blocks						
	31E	Cannot be used with auxiliary contact blocks						
	22E	Cannot be used with auxiliary contact blocks						

Wiring Diagrams

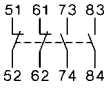
HK11

HK02

HK40



HK22



Contacts suitable for Electronic Circuits according to DIN 19240 for rated voltage 24V DC (test ratings 17V DC, 5mA) Positively guided contacts

Mini Contactors

AC Operated

Ratings AC2, AC3 380V 400V 415V kW			Rated Current AC3 400V A	AC1 690V A	Aux. Contacts NO	NC	Accept Overload Relay see Page 104 Type	Type 24 230 24VS 230VS ↓	Coil voltage [1] 24V 50/60Hz 220-230V 50Hz 24V 50/60Hz w. protection [2] 220-230V 50Hz w. protect. [2]	Pack pcs.	Weight kg/pc.
3-pole, With Screw Terminals											
4	4	4	9	20	1	-	U12/16..K1	**K1-09D10 . . .**		10	0,16
5,5	5,5	5,5	12	20	1	-	U12/16..K1	**K1-12D10 . . .**		10	0,16
4	4	4	9	20	-	1	U12/16..K1	**K1-09D01 . . .**		10	0,16
5,5	5,5	5,5	12	20	-	1	U12/16..K1	**K1-12D01 . . .**		10	0,16
4-pole, With Screw Terminals											
4	4	4	9	20	-	-	U12/16..K1	**K1-09D00-40 . . .**		10	0,16
5,5	5,5	5,5	12	20	-	-	U12/16..K1	**K1-12D00-40 . . .**		10	0,16

1) Other coil voltages see page 13

2) with built-in coil suppressor (varistor)

DC Solenoid Operated

Ratings AC2, AC3 400V 415V kW			Rated Current AC3 400V A	AC1 690V A	Aux. Contacts NO	NC	Accept Overload Relay Page 104 Type	Type 24 24VS ↓	Coil voltage 24V DC 2,5W 24V DC w. protection [3]	Pack pcs.	Weight kg/pc.
3-pole, With Screw Terminals											
4	4	4	9	20	1	-	U12/16..K1	**K1-09D10= . . .**		10	0,19
5,5	5,5	5,5	12	20	1	-	U12/16..K1	**K1-12D10= . . .**		10	0,19
4	4	4	9	20	-	1	U12/16..K1	**K1-09D01= . . .**		10	0,19
5,5	5,5	5,5	12	20	-	1	U12/16..K1	**K1-12D01= . . .**		10	0,19
Interface Contactor, 3-pole w. coil suppressor [3]								**Coil 19 to 30V DC** 1,5W			
4	4	4	9	20	1	-	U12/16..K1	**K1-09D10= 24VR**		10	0,20
4	4	4	9	20	-	1	U12/16..K1	**K1-09D01= 24VR**		10	0,20

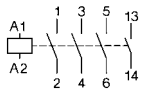
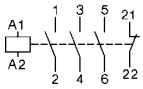
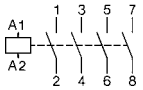
3) with built-in coil suppressor (diode with zener diode)

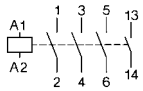
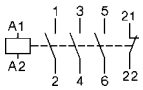
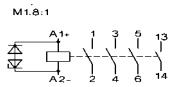
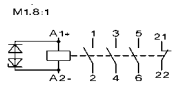
Auxiliary Contact Blocks for Contactors K1-09D10 and K1-12D10

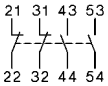
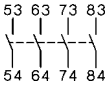
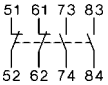
Contacts NO	NC	Ratings AC15 230V A	400V A	Thermal Rated Current A	Type	Price	Pack pcs.	Weight kg/pc.
1	1	**3**	2	10	**HKM11**		10	0,04
-	2	**3**	2	10	**HKM02**		10	0,04
2	2	**3**	2	10	**HKM22**		10	0,04

Suppressor Units for Contactors K1-..D..

Voltage Range V	Mounting	Type	Pack pcs.	Weight kg/pc.
12 - 48V AC/DC	to snap on the contactor	**RC-K1 24**	10	0,01
48 - 127V AC/DC	to snap on the contactor	**RC-K1 110**	10	0,01
110 - 230V AC/DC	to snap on the contactor	**RC-K1 230**	10	0,01

Wiring Diagrams	Distinc. Number acc. to DIN EN 50012	Auxiliary Contact Blocks Type	NO	NC	Contactor with Auxiliary Contact Block Distinc. Number according to DIN EN 50012	NO	NC	Contacts suitable for Electronic Circuits according to DIN 19240 for rated voltage 24V DC (test ratings 17V DC, 5mA) Positively guided contacts
	10	HKM11	1	1	21	2	1	Prefer combinations according to DIN EN 50012
		HKM02	0	2	12	1	2	
		HKM22	2	2	32	3	2	
	01	HK11	1	1	-	1	2	Contacts according to DIN EN 50005
		HK02	0	2	-	0	3	
		HK40	4	0	-	4	1	
		HK22	2	2	-	2	3	
	00	HK11	1	1	-	1	1	Contacts according to DIN EN 50005
		HK02	0	2	-	0	2	
		HK40	4	0	-	4	0	
		HK22	2	2	-	2	2	

Wiring Diagrams	Distinc. Number acc. to DIN EN 50012	Auxiliary Contact Blocks Type	NO	NC	Contactor with Auxiliary Contact Block Distinc. Number according to DIN EN 50012	NO	NC	
	10	HKM11	1	1	21	2	1	Prefer combinations according to DIN EN 50012
		HKM02	0	2	12	1	2	
		HKM22	2	2	32	3	2	
	01	HK11	1	1	-	1	2	Contacts according to DIN EN 50005
		HK02	0	2	-	0	3	
		HK40	4	0	-	4	1	
		HK22	2	2	-	2	3	
	10	Cannot be used with auxiliary contact blocks						
	01	Cannot be used with auxiliary contact blocks						

Wiring Diagrams							Contacts suitable for Electronic Circuits according to DIN 19240 for rated voltage 24V DC (test ratings 17V DC, 5mA) Positively guided contacts
HKM11	HKM02	HKM22	HK11	HK02	HK40	HK22	
							

Mini Contactors

AC Operated

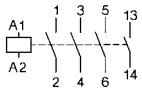
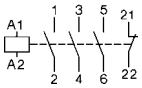
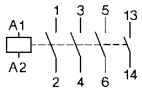
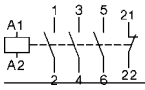
Ratings AC2, AC3 380V 400V 415V kW	500V kW	660V 690V kW	Rated Current AC3 400V A	AC1 690V A	Aux. Contacts NO	NC	Type	Coil voltage [1] 24 / 230 / 24VS / 230VS	Pack pcs.	Weight kg/pc.
3-pole, With Fast On Tab Connectors 1 x 6,3mm or 2 x 2,8mm										
4	4	4	9	16	1	-	**K1-09F10 . . .**	24V 50/60Hz / 220-230V 50Hz / 24V 50/60Hz w. protection [2] / 220-230V 50Hz w. protect. [2]	10	0,16
4	4	4	9	16	-	1	**K1-09F01 . . .**		10	0,16
3-pole, With Solder Pins Ø1,15 For Printed Circuits Applications										
4	4	4	9	16	1	-	**K1-09L10 . . .**		10	0,16
4	4	4	9	16	-	1	**K1-09L01 . . .**		10	0,16

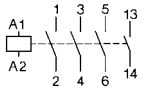
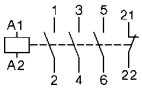
1) Other coil voltages see page 13
2) with built-in coil suppressor (varistor)

DC Solenoid Operated

Ratings AC2, AC3 380V 400V 415V kW	500V kW	660V 690V kW	Rated Current AC3 400V A	AC1 690V A	Aux. Contacts NO	NC	Type	Coil voltage 24 / 24VS	Pack pcs.	Weight kg/pc.
3-pole, With Solder Pins Ø1,15 For Printed Circuits Applications										
4	4	4	9	16	1	-	**K1-09L10= ...**	24V DC 2,5W / 24V DC w. protection [3]	10	0,19
4	4	4	9	16	-	1	**K1-09L01= ...**		10	0,19

3) with built-in coil suppressor (diode with zener diode)

Wiring Diagrams	Distinc. Number acc. to DIN EN 50012	Auxiliary Contact Blocks Type	NO	NC	Contactor with Auxiliary Contact Block Distinc. Number according to DIN EN 50012	NO	NC	Contacts suitable for Electronic Circuits according to DIN 19240 for rated voltage 24V DC (test ratings 17V DC, 5mA) Positively guided contacts
	10	HKM11	1	1	21	2	1	Prefer combinations according to DIN EN 50012
		HKM02	0	2	12	1	2	
		HKM22	2	2	32	3	2	
	01	HK11	1	1	-	1	2	Contacts according to DIN EN 50005
		HK02	0	2	-	0	3	
		HK40	4	0	-	4	1	
		HK22	2	2	-	2	3	
	10	Cannot be used with auxiliary contact blocks						
	01	Cannot be used with auxiliary contact blocks						

Wiring Diagrams	Distinc. Number acc. to DIN EN 50012	
	10	Cannot be used with auxiliary contact blocks
	01	Cannot be used with auxiliary contact blocks

Coils For AC Operated Contactors K1..

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	210-220	195	205	210	220
210	205-215	220-230	205	215	220	230
220	210-220	230-240	210	220	230	240
230	**220-230**	**240**	**220**	**230**	**240**	**250**
240	230-240		230	240	250	260
400	380-400	440	380	400	415	440
500	475-500	520-545	475	500	520	545
550	525-550	600	525	550	570	600

Standard voltages in bold type letters
Coil not exchangeable

Mini Reversing Contactors, Mechanical Interlocked — AC Operated

Ratings AC2, AC3 380V 400V 415V kW			Rated Current AC3 400V A	AC1 690V A	Aux. Contacts NO	NC	Accept Overload Relay see Page 104 Type	Type	Coil voltage [1] 24 24V 50/60Hz; 230 220-230V 50Hz; 24VS 24V 50/60Hz w. protection [2]; 230VS 220-230V 50Hz w. protect. [2]	Pack pcs.	Weight kg/pc.
Screw Terminals											
											
4	4	4	9	20	-	1	U12/16..K1	**K1W09D01M . . .**		1	0,32
5,5	5,5	5,5	12	20	-	1	U12/16..K1	**K1W12D01M . . .**		1	0,32
4	4	4	9	20	1	-	U12/16..K1	**K1W09D10M . . .**		1	0,32
5,5	5,5	5,5	12	20	1	-	U12/16..K1	**K1W12D10M . . .**		1	0,32
4	4	4	9	20	-	-	U12/16..K1	**K1W09D00-40M . .**		1	0,32
5,5	5,5	5,5	12	20	-	-	U12/16..K1	**K1W12D00-40M . .**		1	0,32
Solder Pins Ø1,15 For Printed Circuits Applications											
											
4	4	4	9	16	-	1	-	**K1W09L01M . . .**		1	0,32
4	4	4	9	16	1	-	-	**K1W09L10M . . .**		1	0,32

1)Non-standard coil voltages see page 13
2) with built-in coil suppressor (varistor)

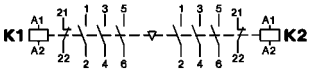
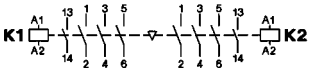
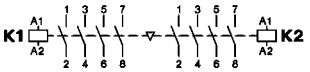
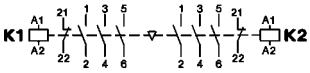
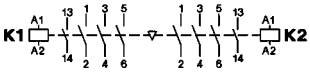
DC Solenoid Operated

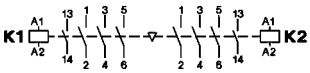
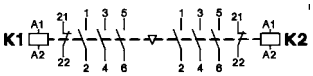
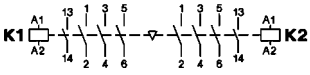
Ratings AC2, AC3 380V 400V 415V kW			Rated Current AC3 400V A	AC1 690V A	Aux. Contacts NO	NC	Accept Overload Relay see Page 104 Type	Type	Coil voltage 24V DC 2,5W; 24VS 24V DC w. protection [3]	Pack pcs.	Weight kg/pc.
3-pole, With Screw Terminals											
											
4	4	4	9	20	-	1	U12/16..K1	**K1W09D01M= . . .**		1	0,38
5,5	5,5	5,5	12	20	-	1	U12/16..K1	**K1W12D01M= . . .**		1	0,38
4	4	4	9	20	1	-	U12/16..K1	**K1W09D10M= . . .**		1	0,38
5,5	5,5	5,5	12	20	1	-	U12/16..K1	**K1W12D10M= . . .**		1	0,38
3-pole, With Solder Pins Ø1,15 For Printed Circuits Applications											
											
4	4	4	9	16	-	1	_	**K1W09L01M= . . .**		1	0,38
4	4	4	9	16	1	-	_	**K1W09L10M= . . .**		1	0,38

3) with built-in coil suppressor (diode with zener diode)

Auxiliary Contact Blocks For Reversing Contactors K1W09D, K1W12D

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

Wiring Diagrams	Distinc. Number of the contactors according to DIN EN 50012	Auxiliary Contact Blocks suitable for left hand side Contactor K1			right hand side Contactor K2			Contacts suitable for Electronic Circuits according to DIN 19240 for rated voltage 24V DC (test ratings 17V DC, 5mA) Positively guided contacts
		Type	NO	NC	Type	NO	NC	
	01	HKM11V	1	1	HKM11X	1	1	
	10	no no no			HKM11 HKM02 HKM22	1 0 2	1 2 2	
	00	no no no			HKM11 HKM02 HKM22	1 0 2	1 2 2	
	01	-			-			
	10	-			-			

Wiring Diagrams	Distinc. Number of the contactors according to DIN EN 50012	Auxiliary Contact Blocks suitable for left hand side Contactor K1			right hand side Contactor K2		
		Type	NO	NC	Type	NO	NC
	01	HKM11V	1	1	HKM11X	1	1
	10	no no no			HKM11 HKM02 HKM22	1 0 2	1 2 2
	01	-			-		
	10	-			-		

Wiring Diagrams

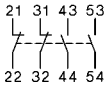
HKM11V

HKM11X

HKM11

HKM02

HKM22



Contacts suitable for Electronic Circuits according to DIN 19240 for rated voltage 24V DC (test ratings 17V DC, 5mA) Positively guided contacts

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})		mm²	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

1) Suitable at 690V for: earthed-neutral systems, overvoltage category I to IV, pollution degree 3 (standard-industry): Uimp = 8kV.
Data for other conditions on request.
2) Suitable at 690V for pollution degree 2, Uimp = 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

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 thermal overload relay							
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		mm²	0,5 - 2,5	Fast on	Solder connector	0,5 - 2,5
	flexible		mm²	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	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..= K1-09D..= K1-12D..=**	**K1-07D..= 24VR K1-09D..= 24VR**	**K1-09F..**	**K1-07L.. K1-09L..**	**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	-	-	-
sealed	W	-	2,5	1,5	-	-	-
Operation range of coils				19 - 30V DC			
in multiples of control voltage U_s		0,85 - 1,1	0,8 - 1,1		0,85 - 1,1	0,85 - 1,1	-
Switching time at control voltage U_s ±10% [4] [5]							
AC operated make time	ms	15 - 25	-	-	15 - 25	15 - 25	-
release time	ms	8 - 25	-	-	8 - 25	8 - 25	-
arc duration	ms	10 -15	-	-	10 -15	10 -15	-
DC operated make time	ms	-	15 - 19	15 - 19	-	-	-
release time	ms	-	8 - 25	8 - 25	-	-	-
arc duration	ms	-	10 -15	10 -15	-	-	-
Cable cross-section							
all connectors solid	mm^2	0,75 - 2,5	0,75 - 2,5	0,75 - 2,5	Fast on	Solder connector	0,75 - 2,5
flexible	mm^2	0,75 - 2,5	0,75 - 2,5	0,75 - 2,5	1x 6,3 x 0,8	Ø 1,15	0,75 - 2,5
flexible with multicore cable end	mm^2	0,5 - 1,5	0,5 - 1,5	0,5 - 1,5	or		0,5 - 2,5
					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): Uimp = 8kV.
Data for other conditions on request.
2) Suitable at 690V for pollution degree 2, Uimp = 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	110-120V	hp	1½	1½	1½	-	2	-
at 60Hz (3ph)	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	110-120V	hp	½	½	½	-	¾	-
at 60Hz (1ph)	200-208V	hp	1	1	1	-	1½	-
	220-240V	hp	1½	1½	1½	-	2	-
Fuses		A	30	30	30	-	30	-
Suitable for use on a capability of delivering not more than rms		A	5000	5000	5000	-	5000	-
		V	600	600	600	-	600	-
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

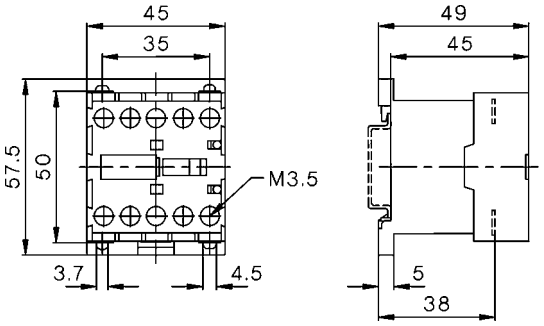
1) Pollution degree	CTI - PWB	U_i
2	≥ 100	600V
3	≥ 400	480V
3	100 - 400	240V

Mini Contactors

Dimensions

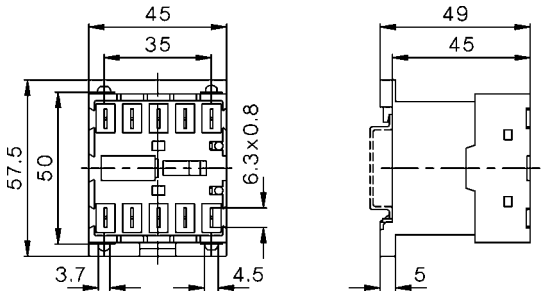
AC and DC operated
with screw terminals

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



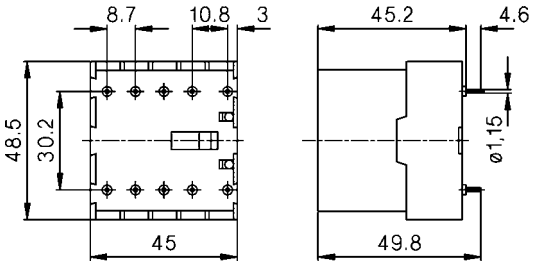
with fast on terminals

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



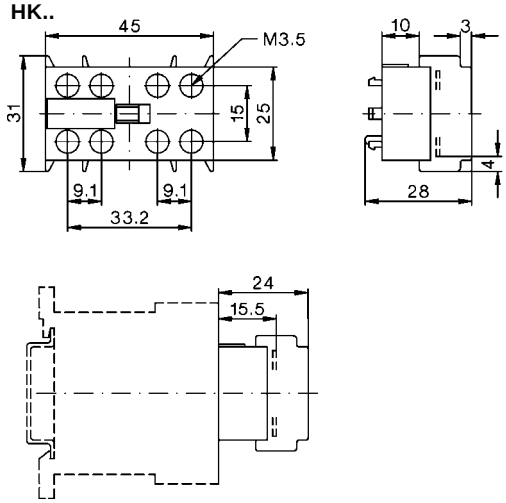
AC and DC operated
with solder connections

K1-07L..
K1-09L..



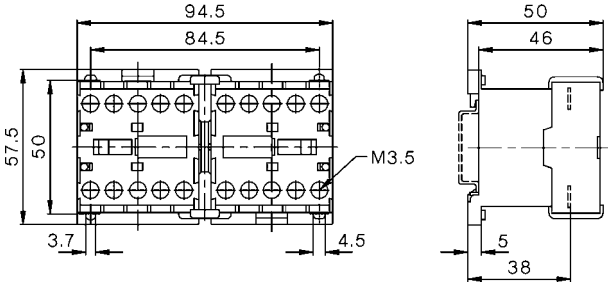
Auxiliary Contact Blocks

HK..

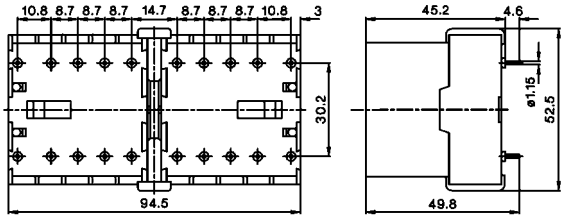


Reversing Contactors

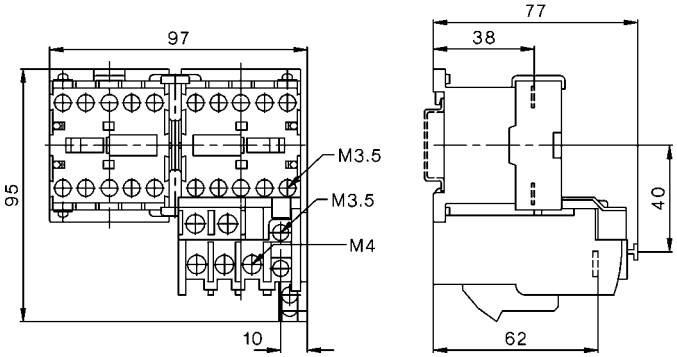
K1W09D..
K1W12D..



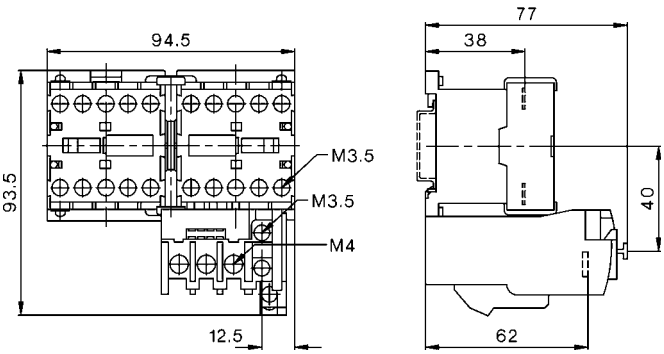
K1W09L..



K1W09D.. + U12/16E K1
K1W12D.. + U12/16E K1



K1W09D.. + U12/16E
K1W12D.. + U12/16E



Contactor Relays

AC Operated

Contacts NO	Contacts NC	Distinc. Number acc. to DIN EN 50011	Additional Auxiliary Contacts Type	Ratings AC15 230V A	Ratings AC15 400V A	Thermal Rated Current I_{th} A	Type	Coil voltage [1] 24 / 110 / 230 / 400	Pack pcs.	Weight kg/pc.
								24V 50/60Hz 110V 50Hz 110-120V 60Hz 220-240V 50Hz 240V 60Hz 380-415V 50Hz		
4-pole, for high switching capacity										
4	-	40E	max. 4	**12**	4	20	**K3-07A40 . . .**		1	0,22
3	1	31E	HN..	**12**	4	20	**K3-07A31 . . .**		1	0,22
2	2	22E	or	**12**	4	20	**K3-07A22 . . .**		1	0,22
-	4	04E	HA..	**12**	4	20	**K3-07A04 . . .**		1	0,22
4-pole, contacts suitable for electronic circuits according to DIN 19240[2]										
4	-	40E	max. 4	**4**	2	10	**K3-07D40 . . .**		1	0,22
3	1	31E	HN..	**4**	2	10	**K3-07D31 . . .**		1	0,22
2	2	22E		**4**	2	10	**K3-07D22 . . .**		1	0,22
-	4	04E		**4**	2	10	**K3-07D04 . . .**		1	0,22

1) Other coil voltages see page 40
2) Test ratings 17V DC, 5mA

Auxiliary Contact Blocks

Contacts NO	Contacts NC	Contacts EM	Contacts LB	Ratings AC15 230V A	Ratings AC15 400V A	Thermal Rated Current A	Type	Pack pcs.	Weight kg/pc.
1-pole, contacts suitable for electronic circuits according to DIN 19240[2]									
1	-	-	-	**3**	2	10	**HN10**	10	0,02
-	1	-	-	**3**	2	10	**HN01**	10	0,02
-	-	1	-	**3**	2	10	**HN10U**	10	0,02
-	-	-	1	**3**	2	10	**HN01U**	10	0,02
1-pole, for high switching capacity									
1	-	-	-	**6**	4	25	**HA10**	10	0,03
-	1	-	-	**6**	4	25	**HA01**	10	0,03

2) Test ratings 17V DC, 5mA
Technical data see page 62

Accessories see page 34 - 38

Contacts NO	Contacts NC	Distinc. Number acc. to DIN EN 50011	Additional Auxiliary Contacts Type	**Ratings** AC15 **230V A**	400V A	Thermal Rated Current I_{th} A	**Type** **24** **60** **110** **220** ↓	Coil voltage [1] 24V= DC 60V= DC 110V= DC 220V= DC	Pack pcs.	Weight kg/pc.
			3W Coil power, for high switching capacity, with coil suppressor							
4	-	40E	max. 4	**12**	4	20	**KG3-07A40 . . .**		1	0,53
3	1	31E	HN..	**12**	4	20	**KG3-07A31 . . .**		1	0,53
2	2	22E	or	**12**	4	20	**KG3-07A22 . . .**		1	0,53
-	4	04E	HA..	**12**	4	20	**KG3-07A04 . . .**		1	0,53
			3W Coil power, for electronic circuits acc. to DIN 19240[2], with coil suppressor							
4	-	40E	max. 4	**4**	2	10	**KG3-07D40 . . .**		1	0,53
3	1	31E	HN..	**4**	2	10	**KG3-07D31 . . .**		1	0,53
2	2	22E		**4**	2	10	**KG3-07D22 . . .**		1	0,53
-	4	04E		**4**	2	10	**KG3-07D04 . . .**		1	0,53
			with double winding coil, for high switching capacity							
4	-	40E	max. 3	**12**	4	20	**K3-07A40= . . .**		1	0,25
3	1	31E	HN..	**12**	4	20	**K3-07A31= . . .**		1	0,25
2	2	22E	or	**12**	4	20	**K3-07A22= . . .**		1	0,25
-	4	04E	HA..	**12**	4	20	**K3-07A04= . . .**		1	0,25
			with double winding coil, for electronic circuits acc. to DIN 19240[2]							
4	-	40E	max. 3	**4**	2	10	**K3-07D40= . . .**		1	0,25
3	1	31E	HN..	**4**	2	10	**K3-07D31= . . .**		1	0,25
2	2	22E		**4**	2	10	**K3-07D22= . . .**		1	0,25
-	4	04E		**4**	2	10	**K3-07D04= . . .**		1	0,25
			6,5W Coil power, for high switching capacity							
4	-	40E	max. 4	**12**	4	20	**KG2-07A40 . . .**		1	0,58
3	1	31E	HN..	**12**	4	20	**KG2-07A31 . . .**		1	0,58
2	2	22E	oder	**12**	4	20	**KG2-07A22 . . .**		1	0,58
-	4	04E	HA..	**12**	4	20	**KG2-07A04 . . .**		1	0,58
			6,5W Coil power, for electronic circuits acc. to DIN 19240[2]							
4	-	40E	max. 4	**4**	2	10	**KG2-07D40 . . .**		1	0,58
3	1	31E	HN..	**4**	2	10	**KG2-07D31 . . .**		1	0,58
2	2	22E		**4**	2	10	**KG2-07D22 . . .**		1	0,58
-	4	04E		**4**	2	10	**KG2-07D04 . . .**		1	0,58

1) Other coil voltages see page 40
2) Test ratings 17V DC, 5mA

Accessories see page 34 - 38

Contactor Relays

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

		Type	K3-07A	K3-07D	K3-07A=	K3-07D=	KG3-07A	KG3-07D	KG2-07A	KG2-07D
Rated insulation voltage U_i [1]		V AC	690	690	690	690	690	690	690	690
Thermal rated current I_{th} to 690V										
Ambient temperature	40°C	A	20	10	20	10	20	10	20	10
	60°C	A	16	6	16	6	16	6	16	6
Frequency of operations z		1/h	10000	10000	10000	10000	10000	10000	10000	10000
Mechanical life		S x 10^6	10	10	10	10	50	50	50	50
Utilization category AC15										
Rated operational	220-240V	A	12	4	12	4	12	4	12	4
current I_e	380-415V	A	4	2	4	2	4	2	4	2
	440V	A	4	1,6	4	1,6	4	1,6	4	1,6
	500V	A	3	1,2	3	1,2	3	1,2	3	1,2
	660-690V	A	1	0,6	1	0,6	1	0,6	1	0,6
Utilization category DC13										
Rated operational	24-60V	A	8	3,5	8	3,5	8	3,5	8	3,5
current I_e	110V	A	1	0,5	1	0,5	1	0,5	1	0,5
per pole	220V	A	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1
Power consumption of coils										
AC operated	inrush	VA	30 - 45	30 - 45	-	-	-	-	-	-
	sealed	VA	7 - 10	7 - 10	-	-	-	-	-	-
		W	2,6 - 3	2,6 - 3	-	-	-	-	-	-
DC operated	inrush	W	-	-	75	75	3	3	6,5	6,5
	sealed	W	-	-	2	2	3	3	6,5	6,5
Operation range of coils in multiples of control voltage U_s			0,85 - 1,1	0,85 - 1,1	0,8 - 1,1	0,8 - 1,1	0,8 - 1,1	0,8 - 1,1	0,8 - 1,1	0,8 - 1,1
Switching time at control voltage U_s±10%										
	make time	ms	8 - 16	8 - 16	8 - 16	8 - 16	65 - 85	65 - 85	25 - 35	25 - 35
	release time	ms	5 - 13	5 - 13	5 - 13	5 - 13	20 - 30 [3]	20 - 30 [3]	8 - 12	8 - 12
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	25	20	25	20	25	20	25	20
Cable cross-section										
Connector	solid	mm^2	0,75 - 6						0,75 - 4	
	flexible	mm^2	1 - 4						0,75 - 2,5	
flexible with multicore cable end		mm^2	0,75 - 4						0,5 - 2,5	
Magnet coil	solid	mm^2	0,75 - 2,5						0,75 - 2,5	
	flexible	mm^2	0,75 - 2,5						0,75 - 2,5	
flexible with multicore cable end		mm^2	0,5 - 1,5						0,5 - 1,5	
Clamps per pole			2						2	
Connector	solid	AWG	18 - 10						14 - 10	
	flexible	AWG	18 - 10						18 - 10	
Clamps per pole			2						2	
Magnet coil	solid	AWG	14 - 12						14 - 12	
	flexible	AWG	18 - 12						18 - 12	
Clamps per pole			2						2	

Data according to UL508

Rated operational current "General Use"		A	20	10	20	10	-	-	16	-
Rated operational voltage	max.	V AC	600	600	600	600	-	-	600	-
Auxiliary Contacts			A600 hpd	A600 hpd	A600 hpd	A600 hpd	-	-	A600 hpd	-

1) Suitable at 690V for: earthed-neutral systems, overvoltage category I to IV, pollution degree 3 (standard-industry): Uimp = 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

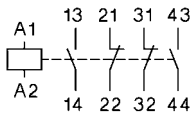
Contactor Relays

Wiring Diagrams

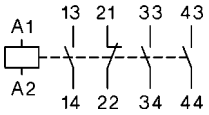
Terminal markings according to DIN EN 50011

AC operated, DC solenoid operated with double wound coil

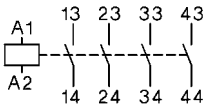
K3-07A22
K3-07D22
KG3-07A22
KG3-07D22
KG2-07A22
KG2-07D22



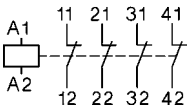
K3-07A31
K3-07D31
KG3-07A31
KG3-07D31
KG2-07A31
KG2-07D31



K3-07A40
K3-07D40
KG3-07A40
KG3-07D40
KG2-07A40
KG2-07D40



K3-07A04
K3-07D04
KG3-07A04
KG3-07D04
KG2-07A04
KG2-07D04



DC operated with double wound coil

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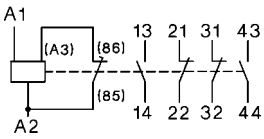

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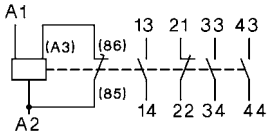

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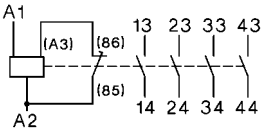

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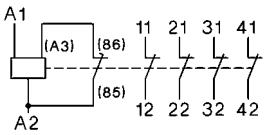
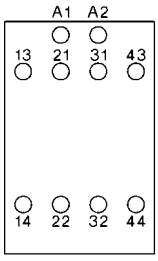


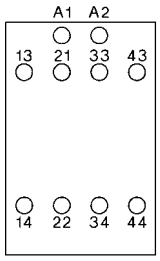
Position of Terminals

AC operated

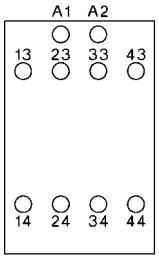
K3-07A22
K3-07D22



K3-07A31
K3-07D31



K3-07A40
K3-07D40



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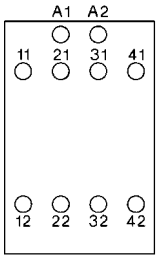
K3-07D04



DC operated with double wound coil

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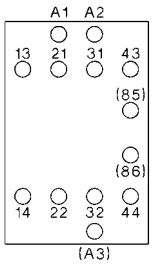

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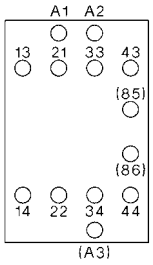

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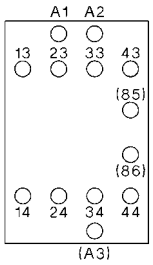

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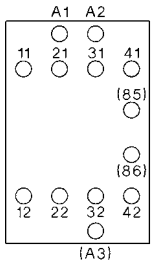
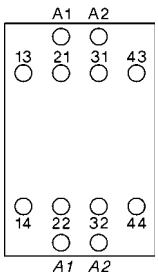
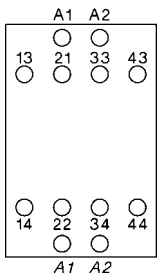


DC solenoid operated

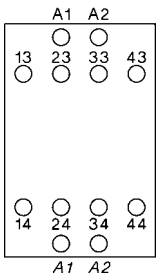
KG3-07A22
KG3-07D22



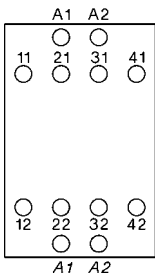
KG3-07A31
KG3-07D31



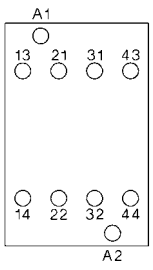
KG3-07A40
KG3-07D40



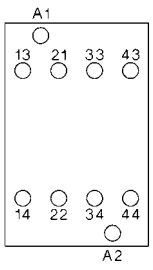
KG3-07A04
KG3-07D04



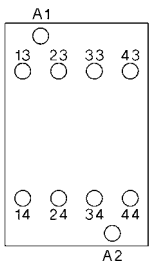
KG2-07A22
KG2-07D22



KG2-07A31
KG2-07D31



KG2-07A40
KG2-07D40



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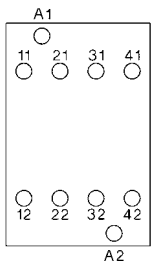
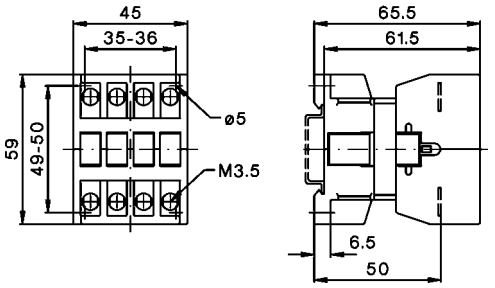


Contactor Relays

Dimensions

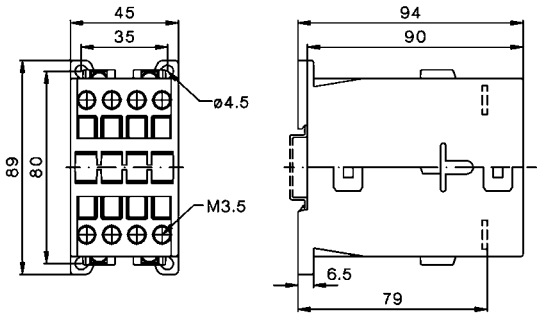
AC operated

K3-07



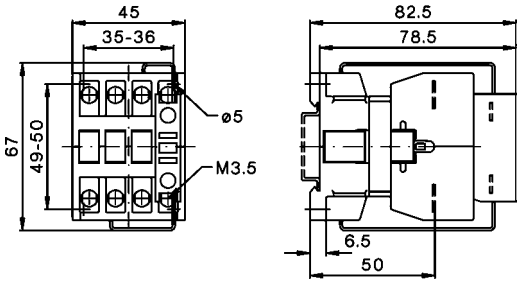
DC solenoid operated

KG3-07



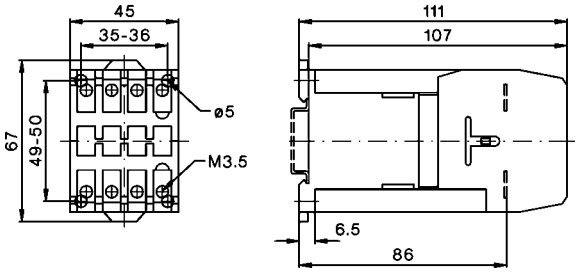
DC operated with double wound coil

K3-07=



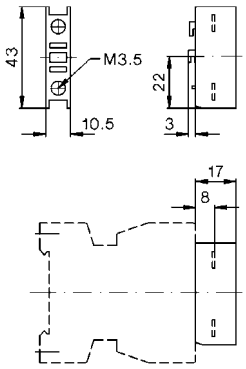
DC solenoid operated

KG2-07

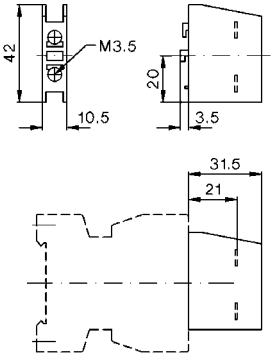


Auxiliary contact blocks

HN10, HN01



HA10, HA01



Contactors 3-pole

- **Up to 1200A AC3**
- **Up to 1350A AC1**
- **DIN-rail mounting up to AC3 74A**
- **International Approvals**
- **Data according to IEC 947 / EN 60947**

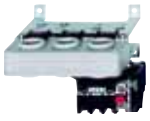


Ratings										
AC3	**400V**	**Motor**	**10A**	**14A**	**18A**	**22A**	**24A**	**32A**	**40A**	**50A**	**62A**	**74A**
	380-400V		**4kW**	**5,5kW**	**7,5kW**	**11kW**	**11kW**	**15kW**	**18,5kW**	**22kW**	**30kW**	**37kW**
	660-690V		5,5kW	7,5kW	10kW	10kW	15kW	18,5kW	18,5kW	30kW	37kW	45kW
AC1	690V at 40°C		25A	25A	32A	32A	50A	65A	80A	110A	120A	130A
Type			**K3-10A10**	**K3-14A10**	**K3-18A10**	**K3-22A10**	**K3-24A00**	**K3-32A00**	**K3-40A00**	**K3-50A00**	**K3-62A00**	**K3-74A00**
Auxiliary contacts			1NO	1NO	1NO	1NO	-	-	-	-	-	-
Type			**K3-10A01**	**K3-14A01**	**K3-18A01**	**K3-22A01**						
Auxiliary contacts			1NC	1NC	1NC	1NC						
Cable cross-section												
Solid		mm^2	0,75 - 6				1,5 - 25			4 - 50		
Flexible		mm^2	1 - 4				2,5 - 16			10 - 35		
Cables per clamp			2				1 + 1			1 + 1		
Auxiliary contact												
I_{th}	40°C	A	16				-			-		
AC15	230V	A	12				-			-		
	400V	A	4				-			-		
Power consumption of coils		Inrush VA	33 - 45				90 - 115			140 - 165		
		hold VA	7 - 10				9 - 13			13 - 18		
		Operation range of coils	0,85 - 1,1				0,85 - 1,1			0,85 - 1,1		
Mounting			35mm 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 HA..
Additional aux. contact blocks Side mounting contacts		**Type**	-	-	-	-	 **HB11** 1NO+1NC **HB02** 2NC f. low level switching					max. 2 HB..
Overload Relay (thermal) Single phase protection Temperature compensation Trip and alarm contacts												
Type			**U3/32** **U12/16** ( )				**U3/42**			**U3/74**		
			Setting Ranges U3/32, U12/16				Setting Ranges			Setting Ranges		
			0,12 - 0,18A		1,8 - 2,7A		10 - 14A			20 - 28A		
			0,18 - 0,27A		2,7 - 4A		14 - 20A			28 - 42A		
			0,27 - 0,4A		4 - 6A		20 - 28A			40 - 52A		
			0,4 - 0,6A		6 - 9A		28 - 42A			52 - 65A		
			0,6 - 0,9A		8 - 11A					60 - 74A		
			0,8 - 1,2A		10 - 14A							
			1,2 - 1,8A		13 - 18A							
			17 - (23)24A		(22)23 - (30)32A							





85A	**110A**	**150A**	**175A**	**210A**	**315A**	**450A**	**550A**	**700A**	**860A**	**1000A**	**1200A**
45kW 55kW	**55kW** 55kW	**75kW** 90kW	**90kW** 110kW	**110kW** 132kW	**160kW** 210kW	**250kW** 375kW	**300kW** 475kW	**400kW** 630kW	**500kW** 700kW	**580kW** 850kW	**680kW** 1000kW
150A	170A	230A	250A	350A	450A	600A	760A	1000A	1100A	1200A	1350A
K85A22 2NO+2NC	**K110A22** 2NO+2NC	**K3-151A00** -	**K3-176A00** -	**K3-200A21** 2NO+1NC	**K3-315A21** 2NO+1NC	**K3-450A22** 2NO+2NC	**K3-550A22** 2NO+2NC	**K3-700A22** 2NO+2NC	**K3-860A22** 2NO+2NC	**K3-1000A12** 1NO+2NC	**K3-1200A12** 1NO+2NC
10-70 16-50 1	10-70 16-50 1	busbar 20x5 1	busbar 20x6 1	busbar 22x4 1	busbar 25x5 1	busbar 30x5 2	busbar 40x6 2	busbar 50x8 2	busbar 50x8 2	busbar 50x10 2	busbar 50x10 2
16 12 6		- - -		10 3 2		10 3 2				10 3 2	
350 - 420 23 - 29 0,85 - 1,1		350 18	350 18	700 20	700 20	950 11	950 11	1600 25	1600 25	2400 70	2100 60
		0,85 - 1,1				0,85 - 1,1				0,85 - 1,1	
base											
-	-	**HKT11** 1NO+ 1NC **HKT22** 2NO + 2NC max. 1 pc.		**HKF22** 2NO + 2NC	max. 1 Stk. max. 1 pc.					**HKB11** 1NO + 1NC max. 2 pcs.	
-	-	**HKA11** 1NO+ 1NC max. 2 pcs.		-	-	-	-	-	-	-	-





U85	**U205**	**U310**	**U840**	**U1250**
Setting Ranges 60 - 90A 80 - 120A	Setting Ranges 100 - 150A 140 - 220A	Setting Range 220 - 310A incl. busbars for K3-315	Setting Ranges 260 - 360A 340 - 480A 440 - 620A 560 - 800A	Setting Range 700 - 1250A
	Busbar sets		**Busbar sets**	
	SU205/176 SU205/176	SU205/200 SU205/315	SU840/550 SU840/550 SU840/860 SU840/860	

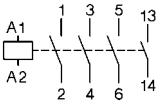
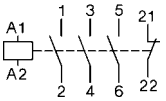
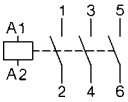
	Ratings AC2, AC3 380V 400V 415V kW	500V kW	660V 690V kW	Rated Current AC1 690V A	Aux. Contacts Built-in NO	NC	Additional see page 34 Type	Type 24 110 230 400 ▼	Coil voltage [1] 24V 50/60Hz 110V 50Hz 220-240V 50H. 380-415V 50H.	Pack pcs.	Weight kg/pc.
	**4**	5,5	5,5	25	1	-	max. 4 HN.. or HA..	**K3-10A10 . . .**		1	0,23
	4	5,5	5,5	25	-	1		**K3-10A01 . . .**		1	0,23
	5,5	7,5	7,5	25	1	-		**K3-14A10 . . .**		1	0,23
	5,5	7,5	7,5	25	-	1		**K3-14A01 . . .**		1	0,23
	7,5	10	10	32	1	-		**K3-18A10 . . .**		1	0,23
	7,5	10	10	32	-	1		**K3-18A01 . . .**		1	0,23
	11	10	10	32	1	-		**K3-22A10 . . .**		1	0,23
	11	10	10	32	-	1		**K3-22A01 . . .**		1	0,23
	**11**	15	15	50	-	-	max. 4 HN.. or HA.. + 2HB..	**K3-24A00 . . .**		1	0,48
	15	18,5	18,5	65	-	-		**K3-32A00 . . .**		1	0,48
	18,5	18,5	18,5	80	-	-		**K3-40A00 . . .**		1	0,48
	**22**	30	30	110	-	-	max. 4 HN.. or HA.. + 2HB..	**K3-50A00 . . .**		1	0,85
	30	37	37	120	-	-		**K3-62A00 . . .**		1	0,85
	37	45	45	130	-	-		**K3-74A00 . . .**		1	0,85

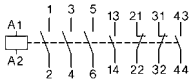
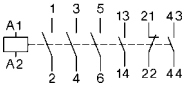
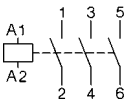
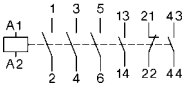
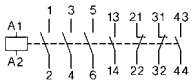
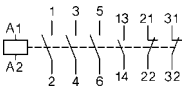
	AC2, AC3 380V 415V kW	500V kW	660V 690V kW	AC1 690V A	Aux. Contacts Built-in NO	NC	Additional Type	Type 230 400 ▼	Coil voltage [1] 220-230V 50Hz 380-400V 50H.	Pack pcs.	Weight kg/pc.
	**45**	55	55	150	2	2	-	**K85A22 . . .**		1	1,8
	55	75	55	170	2	2	-	**K110A22 . . .**		1	1,9
 with integrated coil suppressor	**75**	90	110	230	-	-	1x HKT.. + 2x HKA11	**K3-151A00 . . .**		1	4
	90	110	132	250	-	-		**K3-176A00 . . .**		1	4
	110	132	132	350	2	1	1x HKF22	**K3-200A21 . . .**		1	7,3
	160	210	210	450	2	1		**K3-315A21 . . .**		1	12,8
	**250**	300	375	600	2	2	1x HKF22	**K3-450A22 . . .**		1	13
	300	375	475	760	2	2		**K3-550A22 . . .**		1	13,5
	400	500	630	1000	2	2		**K3-700A22 . . .**		1	26,5
	500	600	700	1100	2	2		**K3-860A22 . . .**		1	27,6
	580	720	850	1200	1	2	2x HKB11	**K3-1000A12 . . .**		1	49
	680	850	1000	1350	1	2		**K3-1200A12 . . .**		1	53

1) Coil voltage range and other coil voltages see page 40

Accept Overload Relay see on page 102 - 103

DC Operated

Type 24 60 110 220 ▼	Coil voltage 24V DC 60V DC 110V DC 220V DC	Coil power inrush/ hold W/W	Aux. Contacts Built-in NO	 NC	Additional see page 34 Type	Weight kg/pc.	Accept Overload Relay see page 102 Type	Addit. Fourth Pole see page 34 Type	Wiring Diagram Coil Circuits see page 41 Terminal Markings
 with integrated coil suppressor									
KG3-10A10 . . .		3/3	1	-	max. 4 HN.. or HA..	0,53	U3/32	-	... A00
KG3-10A01 . . .		3/3	-	1		0,53		-	
KG3-14A10 . . .		3/3	1	-		0,53		-	
KG3-14A01 . . .		3/3	-	1		0,53		-	
KG3-18A10 . . .		3/3	1	-		0,53		-	... A01
KG3-18A01 . . .		3/3	-	1		0,53		-	
KG3-22A10 . . .		3/3	1	-		0,53	U12/16E U12/16A	-	
KG3-22A01 . . .		3/3	-	1		0,53	U12/16EQ	-	
 with coil suppressor									
KG3-24A00 . . .		4/4	-	-	max. 3 HN.. or HA.. + 2HB..	0,57	U3/32 U3/42	-	... A00
KG3-32A00 . . .		4/4	-	-		0,57		-	
KG3-40A00 . . .		4/4	-	-		0,57	UAT21 UAT22 UAT23	-	
									
K3-50A00= . . .		200/6	-	-	max. 3 HN.. or HA.. + 2HB..	0,9	U3/74	-	
K3-62A00= . . .		200/6	-	-		0,9		-	
K3-74A00= . . .		200/6	-	-		0,9	UAT23 U60 U85	-	

Type 110 220 ▼	Coil voltage 110V DC 220V DC	Coil power W/W	Aux. Contacts Built-in NO	 NC	Additional Type	Weight kg/pc.	Accept Overload Relay Type	Addit. Fourth Pole Type	... A22
									
K85A21= . . .		170/2	2	1	-	1,8	U85	-	... A21
K110A21= . . .		340/4	2	1	-	1,9		-	
 with integrated coil suppressor									
K3-151A00 . . . [1]		350/5	-	-	1HKT.. + 2HKA11	4	U205 +SU205/176	-	... A00
K3-176A00 . . . [1]		350/5	-	-		4		-	
K3-200A21 . . . [1]		700/20	2	1	1HKF22	7,3	U205 +SU205/200	NP175 NP350	... A21
K3-315A21 . . . [1]		700/20	2	1		12,8	U205+SU.. U310	NP325 NP500	
									
K3-450A22 . . . [1]		800/10	2	2	1HKF22	13	U840 +SU840/550	NP325 NP500 NP760	... A22
K3-550A22 . . . [1]		800/10	2	2		13,5			
K3-700A22 . . . [1]		1500/20	2	2	1HKF22	26,5	U840 +SU840/860	NP501 NP1000	
K3-860A22 . . . [1]		1500/20	2	2		27,6			
K3-1000A12= . . .		2100/60	1	2	2HKB11	49	U1250	NP1001	... A12
K3-1200A12= . . .		2100/60	1	2		53			

1) Contactors K3-151A00 **230** to K3-860A22 **230** can be used at **220V DC**

Contactors 3-pole

DC Operated

	Ratings AC2 AC3 **380V** **400V** **415V** **kW**			Rated Current 690V A	Aux. Contacts Built-in NO	NC	Additional see page 34 Type	Type **24** **60** **110** **220** ↓	Coil voltage [1] 24V= DC 60V= DC 110V= DC 220V= DC	Pack pcs.	Weight kg/pc.
	with doouble winding coil [2]										
	**4**	5,5	5,5	25	1	-	max. 3 HN.. or HA..	**K3-10A10= . . .**		1	0,25
	4	5,5	5,5	25	-	1		**K3-10A01= . . .**		1	0,25
	5,5	7,5	7,5	25	1	-		**K3-14A10= . . .**		1	0,25
	5,5	7,5	7,5	25	-	1		**K3-14A01= . . .**		1	0,25
	7,5	10	10	32	1	-		**K3-18A10= . . .**		1	0,25
	7,5	10	10	32	-	1		**K3-18A01= . . .**		1	0,25
	11	10	10	32	1	-		**K3-22A10= . . .**		1	0,25
	11	10	10	32	-	1		**K3-22A01= . . .**		1	0,25
	with doouble winding coil [2]										
	**11**	15	15	50	-	-	max. 3 HN.. or HA..	**K3-24A00= . . .**		1	0,55
	15	18,5	18,5	65	-	-		**K3-32A00= . . .**		1	0,55
	18,5	18,5	18,5	80	-	-		**K3-40A00= . . .**		1	0,55

1) other coil voltages on request
2) Pay attention to the higher inrush power consumption, see page 52

Contactors 4-pole

AC Operated

	Ratings AC2, AC3 **380V** **400V** 415V kW	AC1 **400V** kW	Rated Current AC1 690V A	Aux. Contacts Built-in NO	NC	Additional see page 34 Type	Type **24** **110** **230** **400** ↓	Coil voltage [3] 24V 50/60Hz 110V 50Hz 220-240V 50Hz 380-415V 50Hz	Pack pcs.	Weight kg/pc.
	4	**17,5**	25	-	-	max. 4 HN.. or HA..	**K3-10A00-40 . . .**		1	0,22
	5,5	**17,5**	25	-	-		**K3-14A00-40 . . .**		1	0,22
	7,5	**22**	32	-	-		**K3-18A00-40 . . .**		1	0,22
	11	**22**	32	-	-		**K3-22A00-40 . . .**		1	0,22
	11	**31**	45	-	-	max. 4 HN.. or HA..	**K2-23A00-40 . . .**		1	0,65
	15	**34,5**	50	-	-		**K2-30A00-40 . . .**		1	0,65
	18,5	**34,5**	50	-	-		**K2-37A00-40 . . .**		1	0,65
	22	**55**	80	-	-	max. 4 HN.. or HA..	**K2-45A00-40 . . .**		1	1,1
	30	**69**	100	-	-		**K2-60A00-40 . . .**		1	1,1
	55	**139**	200	-	-	1HKT.. + 2xHKA11	**K3-116A00-40 . . .**		1	4,7
	75	**159**	230	-	-		**K3-151A00-40 . . .**		1	4,7
	90	**173**	250	-	-		**K3-176A00-40 . . .**		1	4,7

3) Coil voltage range and non-standard coil voltages see page 40

Latch for Contactors 4-pole see page 36

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** **Coil Voltage 220-240V 50Hz** ▼	Pack	Weight
380V **400V** **kVAr**	415V 440V kVAr	660V 690V kVAr	380V 400V kVAr	415V 440V kVAr	660V 690V kVAr	NO	NC	pcs.		pcs.	kg/pc.
0-**12,5**	0-13	0-20	0-12,5	0-13	0-20	1	-	1 [1)]	**K3-18K10 230**	1	0,34
0-**12,5**	0-13	0-20	0-12,5	0-13	0-20	-	1	1 [1)]	**K3-18K01 230**	1	0,34
10-**20**	10,5-22	17-33	10-20	10,5-22	17-33	-	-	3 [2)]	**K3-24K00 230**	1	0,62
10-**25**	10,5-27	17-41	10-25	10,5-27	17-41	-	-	3 [2)]	**K3-32K00 230**	1	0,62
20-**33,3**	23-36	36-55	20-33,3	23-36	36-55	-	-	3 [2)]	**K3-50K00 230**	1	1,0
20-**50**	23-53	36-82	20-50	23-53	36-82	-	-	3 [2)]	**K3-62K00 230**	1	1,0
20-**75** [3)]	23-75 [3)]	36-120 [3)]	20-60	23-64	36-100	-	-	3 [2)]	**K3-74K00 230**	1	1,0

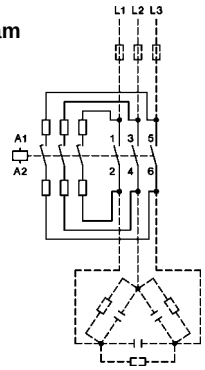
1) 1 HN.. or HA.. snap-on
2) 2HB.. for side mounting and 1 HN.. or HA.. snap-on
3) Consider the max. thermal current of the contactor K3-74A: I_{th} 130A

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 x I_e.
Operating Conditions: Capacitor switching contactors are protected against contact welding for a prospective making current of 200 x I_e.

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

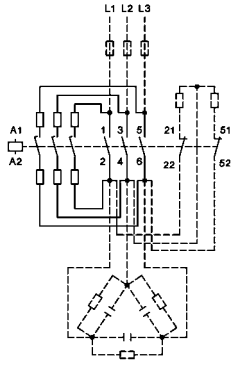
Type			**K3-18K**	**K3-24K**	**K3-32K**	**K3-50K**	**K3-62K**	**K3-74K**
Max. frequency of operations z		1/h	120	120	120	120	120	80
Contact life		S x 10^3	250	150	150	150	150	120
Rated operational current I_e	at 50°C	A	0-18	14-28	14-36	30-48	30-72	30-108
	at 60°C	A	0-18	14-28	14-36	30-48	30-72	30-87
Fuses gL (gG)	from / to	A	35 / 63	50 / 80	63 / 100	80 / 160	125 / 160	160/200

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 contactors, difficulty inflammable and self-extinguishing materials may be used only, because abnormal temperatures within the area of the resistance spirals cannot be excluded.



Auxiliary Contact Blocks

Rated Operational Current **AC15** **230V** A	AC1 400V A	AC1 690V A	For Contactors	Contacts NO	NC	**Type**	Pack pcs.	Weight kg/pc.
6	4	25	K3-10.. to K3-74..	-	1	**HA01**	10	0,03
3	2	10	K3-24.. to K3-74..	1	1	**HB11**	10	0,02
3	2	10	for side mounting	-	2	**HB02**	10	0,02
3	2	10	K3-10.. to K3-74..	1	-	**HN10**	10	0,02
3	2	10	K3-10.. to K3-74..	-	1	**HN01**	10	0,02

Technical data see page 62

Auxiliary Contact Blocks for contactors K(G)3-07.. to K3-74.., 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	4	25	1	-	-	-	**HA10**	10	0,03
6	4	25	-	1	-	-	**HA01**	10	0,03

1) suitable according to DIN 19240 (test ratings 17V DC, 5mA)Technical data see page 62

Auxiliary Contact Block for contactors K3-07.. to K3-74.., type HN.. for low level switching [1)]

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		1	1	**HB11**	10	0,02
3	2	10		-	2	**HB02**	10	0,02

Auxiliary Contact Blocks for contactors K3-150.. to K3-1200

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	K3-151, K3-176 top	1	1	**HKT11**	1	0,04
3	2	10	K3-151, K3-176 top	2	2	**HKT22**	1	0,05
3	2	10	K3-151, K3-176 outside	1	1	**HKA11**	1	0,05
3	2	10	K3-150, K3-175 inside	1	1	**HKS11**	1	0,08
3	2	10	K3-150, K3-175 outside	1	1	**HKS11A**	1	0,05
3	2	10	K3-200A22 - K3-860A22 [2)]	2 [2)]	2	**HKF22**	1	0,12
3	2	10	K3-1000, K3-1200 inside	1	1	**HKB11**	1	0,17

2) Contact travel of make contacts adjustable, see page 63

Technical data see page 62

Snap-on Momentary Contacts for K(G)3-07.. to K3-74.. and K(G)2-.., 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

1) suitable according to DIN 19240 (test ratings 17V DC, 5mA)Technical data see page 62

Additional 4. Poles for contactors K3-150.. to K3-1200

For Ccontactors	Thermal Current I_{th} A	Type	Pack pcs.	Weight kg/pc.
K3-150, K3-175	**125**	**NP120**	1	0,2
K3-150, K3-175	**250**	**NP250**	1	0,6
K3-200	**175**	**NP175**	1	0,6
K3-200	**350**	**NP350**	1	0,7
K3-315, K3-450, K3-550	**325**	**NP325**	1	0,7
K3-315, K3-450, K3-550	**500**	**NP500**	1	1,3
K3-450, K3-550	**760**	**NP760**	1	1,4
K3-700, K3-860	**500**	**NP501**	1	1,3
K3-700, K3-860	**1000**	**NP1000**	1	1,6
K3-1000, K3-1200	**1000**	**NP1001**	1	1,6

Pneumatic Timer for contactors K(G)3-07.. to K(G)3-40.. and K(G)2-07 to KG()2-16

Timer must be snapped onto the contactor, mechanically operated by the contactor and occupies 4 add-on spaces. The contacts of the timer switch delayed tothe contacts of the contactor.

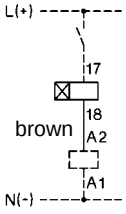
Function	Time Range s	Contacts NO	NC	NO	NC	Type	Pack pcs.	Weight kg/pc.
On-delay	0,1 - 40	1	1	-	-	**K2-TP40DE**	1	0,09
On-delay	10 - 180	1	1	-	-	**K2-TP180DE**	1	0,09
Off-delay	0,1 - 40	-	-	1	1	**K2-TP40IA**	1	0,09
Off-delay	10 - 180	-	-	1	1	**K2-TP180IA**	1	0,09

Electronic Timer On-delay for contactors K(G)3-07.. to K3-74.. and K(G)2-..

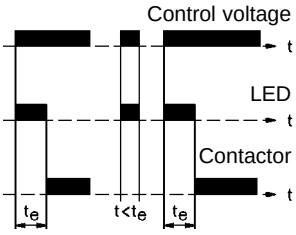
Timer will be connected with the contactor coil, can be snapped onto the contactor and occupies 2 add-on spaces. Contactor switches On-delay.

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



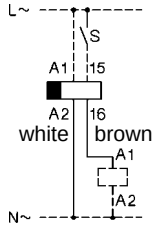
Operation Range	0,8 - 1,1 x U_s
Time repeat accuracy	≤1%
Recovery time (typical)	50ms
Voltage Drop after the time delay t_e (Control voltage 24V: use contactor with 20V-coil)	<3V
Max. inrush current (peak value)	25A <10ms
Duty Cycle	100%
Ambient temperature	-40° - +60°C
Short circuit protection	2A

Electronic Timer Off-delay for contactors K(G)3-07.. to K3-74.. and K(G)2-..

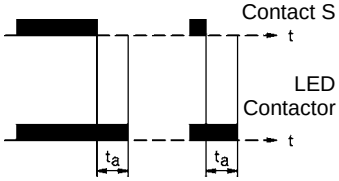
Timer will be connected with the contactor coil, can be snapped onto the contactor and occupies 2 add-on spaces. Contactor switches Off-delay.

Operational Voltage V	Time Range s	Rated Current AC15 A	Type	Pack pcs.	Weight kg/pc.
24 - 60V AC	1 - 30	0,75	**K2-TA30 60**	1	0,08
100 - 120V AC	1 - 30	0,3	**K2-TA30 120**	1	0,08
200 - 250V AC	1 - 30	0,15	**K2-TA30 250**	1	0,08
24 - 60V AC	10 - 180	0,75	**K2-TA180 60**	1	0,08
100 - 120V AC	10 - 180	0,3	**K2-TA180 120**	1	0,08
200 - 250V AC	10 - 180	0,15	**K2-TA180 250**	1	0,08
24 - 60V AC	30 - 600	0,75	**K2-TA600 60**	1	0,08
100 - 120V AC	30 - 600	0,3	**K2-TA600 120**	1	0,08
200 - 250V AC	30 - 600	0,15	**K2-TA600 250**	1	0,08

Wiring Diagram



Timing Chart



Operation Range	0,8 - 1,1 x U_s		
Time repeat accuracy	≤1%		
Min. start time	15ms		
Recovery time (typical)	15ms		
Voltage Drop	<0,7V		
Max. inrush current (peak value)	25A <10ms		
Duty Cycle	100%		
Ambient temperature	-40° - +40°C		
Short circuit protection	2A		
Utilization Category AC15	24 - 60V	100 - 120V	200 - 250V
	0,75A	0,3A	0,15A

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	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	0,010
K65 to K110	K65 to K110	horizontal	**LG8511**	1	0,076
K3-151, K3-176	K3-151, K3-176	horizontal	**LG11223H**	1	0,06
K3-150 and K3-175	K3-150 and K3-175	horizontal	**LG10397H**	1	0,08
K3-200	K3-200	horizontal	**LG10398H**	1	0,55
K3-200	K3-200	vertical	**LG10398V**	1	0,65
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 to K3-1200	K3-1000 to K3-1200	horizontal	**LG10403H**	1	1,8
K3-1000 to K3-1200	K3-1000 to K3-1200	vertical	**LG10403V**	1	1,5

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

with NC aux. contact

power consumption max. 30VA

Type

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 62
Latch for Contactors K3-200 to K3-860 on request

Additional Terminals, 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.
Additional Terminal Single Pole, with fingertouch protection						
K3-10 to K3-22 K(G)2-09 to K(G)2-16	0,75 - 10	0,75 - 6	0,75 - 6	**LG9339**	6	0,009
K3-151 bis K3-176		16 - 120	+ 16 - 95	**LG11224**	1	0,10
Additional Terminal Single Pole, set with 3 pieces						
K3-50 to K3-74, K2-45, K2-60	4 - 35	6 - 25	4 - 25	**LG9030**	1	0,052
K3-50 to K3-74 K2-45, K2-60	10 - 70	16 - 50	10 - 35	**LG9357**	1	0,170
K85, K110	10 - 70	16 - 50	10 - 35	**LG9031**	1	0,170
K85, K110	busbar 20x4 with screw M8			**LG9032**	1	0,170
Parallel Connectors, 3 Poles Parallel						
Current-carrying capacity: 2,5 x AC1-value of the contactor						
K3-10 to K3-22 K(G)2-09 to K(G)2-16	terminal hole for screw M5			**LG9241**	50	0,004
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						
K3-10 to K3-22 K(G)2-09 to K(G)2-16	terminal hole for screw M5			**LG7360**	10	0,006

Terminal Blocks for contactors K(G)3-07.. to K3-74.. and K(G)2-..

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

Indicator Units for contactors K(G)3-07.. to K3-74.. and K(G)2-..

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.				

Fuse Holders for contactors K(G)3-07.. to K3-74.. and K(G)2-..

Specifications	Rated Voltage	Type	Pack pcs.	Weight kg/pc.
Fuse holder for fuse 5x20mm (max. 6,3A)	250V AC	**K2-F**	1	0,02
with built-in rectifier 1A	250V AC	**K2-RF1**	1	0,03
with built-in rectifier 3A	250V AC	**K2-RF3**	1	0,03
Fuses are not included.				

Suppressor Units

Voltage Range V	Mounting	Type	Pack pcs.	Weight kg/pc.
Varistor for contactors K3-07 to K2-22, K2-07 to K2-16				
12 - 24V AC/DC	to snap on to coil terminals	**K2-E24**	10	0,01
24 - 48V AC/DC	to snap on to coil terminals	**K2-E48**	10	0,01
110 - 230V AC/DC	to snap on to coil terminals	**K2-E230**	10	0,01
250 - 415V AC/DC	to snap on to coil terminals	**K2-E400**	10	0,01
Varistor for contactors K3-07 to K3-74, K(G)2-07 to K2-60				
12 - 24V AC/DC	to snap on the contactor	**VG-K2/24**	10	0,02
24 - 48V AC/DC	to snap on the contactor	**VG-K2/48**	10	0,02
110 - 230V AC/DC	to snap on the contactor	**VG-K2/230**	10	0,02
250 - 415V AC/DC	to snap on the contactor	**VG-K2/400**	10	0,02
RC-units for contactors K3-07 - K3-74, K(G)2-09 - K2-60				
12 - 48V AC/DC	to snap on the contactor	**RC-K3 24**	10	0,01
48 - 127V AC/DC	to snap on the contactor	**RC-K3 110**	10	0,01
110 - 230V AC/DC	to snap on the contactor	**RC-K3 230**	10	0,01
RC-unit for contactors K1-07 to K3-40				
110 - 230V AC/DC	between DIN-rail and contactor	**RCS-022/230**	1	0,036
RC-units for contactors K1-07 to K110				
24 - 48V AC/DC	universal (fixing band, adhesive strip)	**RC-AD22/48**	5	0,02
110 - 250V AC/DC	universal (fixing band, adhesive strip)	**RC-AD047/230**	5	0,02
250 - 415V AC	universal (fixing band, adhesive strip)	**RC-AD047/400**	5	0,02
Zener Diode Unit for contactors K65, K85 and K110				
24 - 48V DC	universal (fixing band, adhesive strip)	**LG-ADZ/24**	10	0,02
Diode Unit for contactors K65, K85 and K110				
24 - 230V DC	universal (fixing band, adhesive strip)	**LG-A03**	10	0,02

Interface for contactors K3-07.. to K3-74.. and K2-07.. to K2-60..

Input Voltage U_e	Power Consumption	Rated Current I_e AC15 250V AC	400V AC	Type	Pack pcs.	Weight kg/pc.
24V DC Amplifier element for contactor control by programmable controller	0,35W	0,75A	0,5A	**K2-IM**	1	0,03

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
K3-150 bis K3-176	for 3 terminals	**LG10404**	1	0,12
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

Mounting Parts

Description	For Type	Specification	Type	Pack pcs.	Weight kg/pc.
Clamp, no distance	K3-07 to K3-74 K2-07 to K2-37	To join contactors without distance, 2 pieces required	**P426-1**	50	0,001
Clamp, 7mm distance	K3-07 to K3-74 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 K3-74 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 - K3-74	To join contactors with 12mm distance, 2 pieces required	**P785-1**	10	0,002
Snap-On Adapter	K2-DK, K2-.N K2-TE, K2-TA K2-F, K2-RF	for snap-on mounting of accessories on 35mm DIN-rail acc. DIN EN 50022	**K2-SM**	10	0,009

Marking Systems for contactors K3-07.. to K3-74.., K(G)2-.. 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	4-section without marking, divisible	**P245-1**	100	0,050
Marking Plate	marked, choice of K1...K32	**P245-K..**	100	0,013
Label Holder	for max. 3 snap-on labels LG9337-..	**P527-1**	1	0,012
Snap-on Labels	for use with label holder type P527-1 without marking, 1 strip (10 pcs.)	**LG9337**	10(x10)	0,080
Snap-on Labels	for use with label holder type P527-1 marked, choice of K, 0 to 9, 1 strip (10 pcs.)	**LG9337-.**	10(x10)	0,080

Standard 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		
K3-07.. 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.., K2-45.., K2-60..	**K45/ . . .**		1	0,110
K65.., K85..	**K85/ . . .**		1	0,215
K110..	**K110/ . . .**		1	0,220

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

Coil voltage range and non-standard coil voltages see page 40

Standard 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		
K3-151.., K3-176..		**K3-176/ . . .**		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

For Contactors		Type	Coil voltage [1]	pcs.	kg/pc.
		47.24	24V 50/60Hz / 24V DC		
		47.110	110-120V 50/60Hz / 110V DC		
		47.230	220-240V 50/60Hz / 220V DC		
		47.400	380-415V 50/60Hz		
K3-200A21	without feeder group [2]	**K3-200/ . . .**		1	0,56
K3-315A21	without feeder group [2]	**K3-315/ . . .**		1	1,45

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

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) Other coil voltages on request

Coils for AC operated contactors

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

Suffix to contactor type e..g. K3-10A10 24	**to coil type** e.g. K6/**4.24**	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
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
31	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	200-240	180	210	200	240
200	41.200	200-230[1)]	220-240	200	230[1)]	220	240
230	**4.230**	**220-240**	**240**	**220**	**240**	**240**	**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)]
400	**4.400**	**380-415**	**415-440**	**380**	**415**	**415**	**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		550	600		

Type-suffix for coil-types K85/... and K110/...
for contactor-types K65 to K110

Suffix to contactor type e.g. K85A22 24	**to coil type** e.g.: K85/**4.24**	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
6	41.6	6		6	6,6	7,2	7,9
6,6	41.6,6	6,6		6,6	7,3	7,9	8,8
7,3	41.7,3	7,3		7,3	8	8,8	9,6
8	41.8	8		8	9	9,6	10,8
9	41.9	9		9	10	10,8	12
10	41.10	10		10	11	12	13,2
11	41.11	11		11	12	13,2	14,4
12	41.12	12		12	13,2	14,4	15,8
13,2	41.13	13,2		13,2	14,5	15,8	17,4
14,5	41.14	14,5		14,5	16	17,4	19,2
16	41.16	16		16	18	19,2	21,6
18	41.18	18	24	18	20	21,6	24
20	**4.20**	**20**	**24**	**20**	**22**	**24**	**26**
22	41.22	22		22	24	26	29
24	**4.24**	**24**		**24**	**27**	**29**	**32**
27	41.27	27	32	27	30	32	36
32	41.32	32	36	30	33	36	40
33	41.33	36	42	33	36	40	43
36	41.36	36		36	39	43	47
39	41.39	42	48	39	42	47	50
42	**4.42**	**42**		**42**	**47**	**50**	**56**
48	41.48	48	60	47	52	56	62
55	41.55	55		52	58	62	70
60	41.60	60		58	65	70	78
65	41.65	65		65	72	78	86
75	41.75	75		72	80	86	96
85	41.85	85		80	90	96	108
90	41.90	90	110-120	90	100	108	120
100	41.100	100	125	100	110	120	132
110	**4.110**	**110-120**		**110**	**122**	**132**	**146**
127	41.127	127		122	135	146	162
140	41.140	140		135	150	162	180
150	41.150	150		150	165	180	198
165	41.165	165	200-208	165	180	198	208
180	41.180	180-200	208-240	180	200	208	240
200	41.200	200-230[1)]	240-260	200	230[1)]	240	264
230	**4.230**	**220-240**	**277**	**220**	**240**	**264**	**288**
254	41.254	254		240	264	288	317
270	41.270	270		264	290	317	348
300	41.300	300		290	315	348	380
320	41.320	320	380-415	315	345	380	415
345	41.345	345-400[1)]	415-440	345	400[1)]	415	455
400	**4.400**	**380-415**	**460-480**	**380**	**415**	**455**	**498**
415	41.415	415-440	480-500	400	440	480	528
440	41.440	440-480	550-575	440	480	528	575
480	41.480	480-500	575-600	480	530	575	630
500	41.500	500-550	600-660	500	550	600	660
24FR	42.24FR	24	24	20	24	24	28
110FR	42.110FR	110	110	92	110	110	132

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)

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)

Coils for contactors K3-151.. to K3-1200..

Suffix to contactor type	Suffix to coil type	Voltage Marking at the coil for 50/60Hz V	Voltage Marking at the coil for DC V	Rated Control Voltage U_s range for 50Hz min. V	Rated Control Voltage U_s range for 50Hz max. V	Rated Control Voltage U_s range for 60Hz min. V	Rated Control Voltage U_s range for 60Hz max. V
Contactors K3-151.. to K3-315.. and Coils K3-176/.. to K3-315/..							
24	4.24	24	24	24	24	24	24
48	4.48	48	48	48	48	48	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**
Contactors K3-1000.. to K3-1200.. and Coils 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

Suffix to contactor type	Suffix to coil type	Voltage Marking at the coil for 50/60Hz V	Voltage Marking at the coil for DC V	Rated Control Voltage U_s range for 50Hz min. V	Rated Control Voltage U_s range for 50Hz max. V	Rated Control Voltage U_s range for 60Hz min. V	Rated Control Voltage U_s range for 60Hz max. V
Contactors K3-450.. to K3-860.. and Coils K3-550/.., K3-860/..							
24	4.24	24	24	24	24	24	24
48	4.48	48	48	48	48	48	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**
440	4.440	440-480	-	440	480	440	480

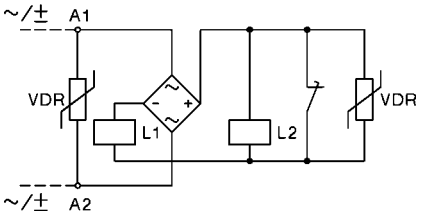
Standard voltages in bold type letters
Operating range of magnet-coils: 0,85 x U_s (min. value of rated control voltage) up to 1,1 x U_s (max. value of rated control voltage)

Wiring Diagrams Coil Circuit

AC operated,

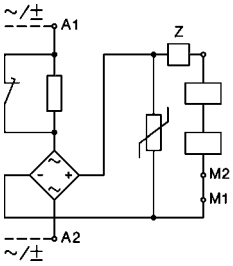
K3-07..
bis K110..

AC and DC operated
with double winding coil
K3-151A00
K3-176A00

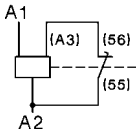


AC and DC operated
with series resistor

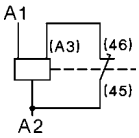
K3-450.. bis K3-860..



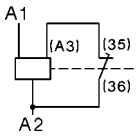
DC operated
with double winding coil
K3-07..=
bis K3-22..=



K3-24..=
bis
K3-74..=

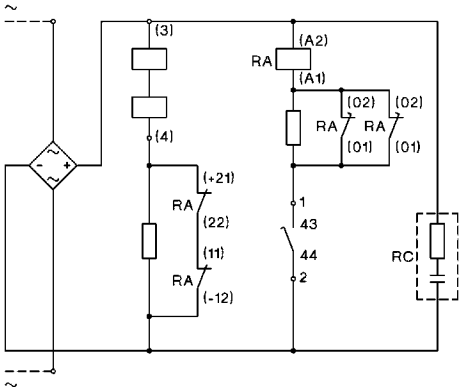


K85..=
K110..=



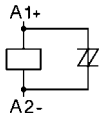
DC operated
with DC coil

K3-1000.., K3-1200..

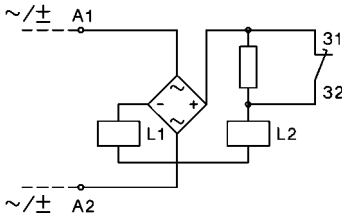


DC operated

KG3..

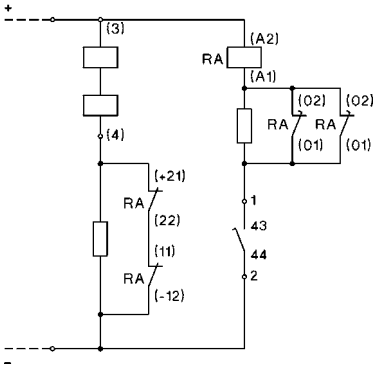


AC and DC operated
with series resistor
K3-200A21
K3-315A21



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).

Standard Coils for DC operated contactors

For Contactors	Aux. Contact Block for double wound coil	Type 47.24 / 47.110 / 47.220 ↓	Coil voltage [1] 24V DC / 110V DC / 220V DC	Pack pcs.	Weight kg/pc.
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..=	HN01X	**K24/ . . .**		1	0,090
K2-23..= up to K2-37..=	HN01X	**K23/ . . .**		1	0,090
K3-50..= up to K3-74..=, K2-45..=, K2-60..=	HN01Z	**K45/ . . .**		1	0,115
K65..=, K85..=	-	**K85/ . . .**		1	0,220
K110..=	-	**K110/ . . .**		1	0,225

For Contactors			Type 43.110 / 43.220 ▼	Coil voltage 110V DC / 220V DC	pcs.	kg/pc.
K3-1000..=, K3-1200..=	without feeder	group [2]	**K3-1200/ . . .**		1	3,12

Standard Coils for DC solenoid operated contactors

For Contactors	Type 4.24 / 4.110 / 4.220 ↓	Coil voltage [1] 24V DC / 110V DC / 220V DC	Pack pcs.	Weight kg/pc.
KG2-07.., up to KG2-16..	**KG2/ . . .**		1	0,185

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.
K65..	**EK65/1**	3	0,230
K85..	**EK85/1**	3	0,235
K110..	**EK110/1**	3	0,275
K3-151..	**EK3-151/10**	1	?
K3-176..	**EK3-176/10**	1	?
K3-150..	**EK3-150/10**	1	0,32
K3-175..	**EK3-175/10**	1	0,32
K3-200..	**EK3-200/10**	1	0,18
K3-315..	**EK3-315/10**	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 according to BS for 415V			220-230V Motor	Value of fusing at motor start		240V Motor	Value of fusing at motor start		**380-400V** Motor	Value of fusing at motor start		415V Motor	Value of fusing at motor start		500V Motor	Value of fusing at motor start		660-690V Motor	Value of fusing at motor start	
					F.L.C.	D.O.L.	YD	F.L.C.	D.O.L.	YD	F.L.C.	D.O.L.	YD	F.L.C.	D.O.L.	YD	F.L.C.	D.O.L.	YD	F.L.C.	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	690	690	690
Making capacity I_{eff} at U_e = 690V AC		A	200	200	200	200	400	500	500	700	900	900
Breaking capacity I_{eff}	400V AC	A	180	180	200	200	380	400	400	600	800	800
K1-09 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_{the})	690V	A	25	25	32	32	40	55	65	90	100	110
at 60°C, enclosed												
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})		mm²	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	30	40	50	63	74
open and enclosed	230V	A	11,5	14,5	18	22	24	30	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	7	9	9	9	17,5	21	21	33	42	42
	660-690V	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	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): Uimp = 8kV.
Data for other conditions on request.

Contactors

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

Type	K85	K110	K3-151	K3-176	K3-200	K3-315	K3-450	K3-550	K3-700	K3-860	K3-1000	K3-1200
V AC	750	750	1000	1000	690	690	1000	1000	690	690	690	690
A	1100	1200	1500	1800	1700	3200	4500	5500	7000	8600	10000	12000
A	950	1100	1200	1400	1600	2600	4500	5500	7000	8000	8000	10000
A	850	1000	1200	1400	1600	2600	4500	5500	7000	8000	8000	10000
A	600	600	700	800	1200	2300	3200	4400	5600	6900	7000	8000
A	-	-	-	-	-	-	-	-	-	-	-	-
A	**150**	**170**	**230**	**250**	**350**	**450**	**700**	**760**	**1000**	**1100**	**1200**	**1350**
kW	57	64	87	95	133	171	266	289	381	419	457	514
kW	59	67	91	99	139	179	279	302	398	438	478	537
kW	62	70	95	103	145	187	291	315	415	457	498	561
kW	98	111	151	164	230	296	460	500	658	724	789	888
kW	103	117	159	173	242	311	485	526	692	762	831	935
kW	107	122	165	179	251	323	503	546	718	790	862	970
kW	114	129	175	190	266	342	533	579	762	838	914	1028
kW	130	147	199	216	303	389	606	658	866	952	1039	1169
kW	171	194	262	285	400	514	800	868	1143	1257	1371	1543
kW	179	203	274	298	418	537	836	908	1195	1314	1434	1613
kW	-	-	277	346	-	-	692	866	-	-	-	-
A	100	125	180	200	280	400	550	600	800	875	960	1080
kW	38	47	68	76	106	152	209	228	304	333	365	411
kW	40	49	71	79	111	159	219	239	318	348	382	430
kW	41	52	74	83	116	166	228	249	332	363	399	448
kW	65	82	118	131	184	263	362	395	526	575	631	710
kW	69	86	124	138	193	277	381	415	554	606	665	748
kW	71	89	129	143	201	287	395	431	575	628	690	776
kW	71	95	137	152	213	304	419	457	609	666	731	823
kW	86	108	155	173	242	346	476	519	692	757	831	935
kW	114	142	205	228	320	457	628	685	914	1000	1097	1234
kW	119	149	215	239	334	478	657	717	956	1045	1147	1290
kW	-	-	277	346	-	-	692	866	-	-	-	-
mm²	50	70	95	120	185	2x(30x5)	2x(40x5)	2x(50x5)	2x(60x5)	2x(60x6)	2x(60x6)	2x(60x8)
A	85	110	150	175	210	315	450	550	700	860	1000	1200
A	85	110	150	175	210	315	450	550	700	860	1000	1200
A	85	110	150	175	210	315	450	550	700	860	1000	1200
A	**85**	**110**	**150**	**175**	**210**	**315**	**450**	**550**	**700**	**860**	**1000**	**1200**
A	85	110	150	175	210	315	450	550	700	860	1000	1200
A	85	110	150	175	210	315	450	550	700	860	1000	1200
A	60	60	150	175	210	315	450	550	700	860	1000	1200
A	57,5	57,5	120	140	150	240	400	500	630	700	860	1000
A	-	-	60	70	-	-	200	250	-	-	-	-
kW	25	33	40	50	60	90	132	175	225	280	325	390
kW	27	35	45	55	65	100	140	185	235	290	335	400
kW	**45**	**55**	**75**	**90**	**110**	**160**	**250**	**300**	**400**	**500**	**580**	**680**
kW	49	63	80	95	115	180	257	315	415	515	600	710
kW	49	63	85	100	125	190	270	335	450	530	630	750
kW	55	75	90	100	132	210	300	375	500	600	720	850
kW	55	55	110	132	132	210	375	500	630	700	850	1000
kW	-	-	75	90	-	-	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	45
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	45
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	45
Mixed light lamps[3]		A	20	20	25	25	40	52	64	88	96	104
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 Ie

Contactors

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

Type	K85	K110	K3-151	K3-176	K3-200	K3-315	K3-450	K3-550	K3-700	K3-860	K3-1000	K3-1200
A	85	98	55	63	85	120	150	180	230	280	340	400
A	85	98	55	63	85	120	150	180	230	280	340	400
A	85	98	55	63	85	120	150	180	230	280	340	400
A	**85**	**85**	**55**	**63**	**85**	**120**	**150**	**180**	**230**	**280**	**340**	**400**
A	85	85	55	63	85	120	150	180	230	280	340	400
A	85	85	55	63	85	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	37	45	51	68	80	110	132
kW	27	32	15,5	19	26	38	47	53	71	83	115	137
kW	**45**	**45**	**25**	**30**	**45**	**63**	**75**	**90**	**120**	**150**	**185**	**220**
kW	49	49	25	33	45	65	80	100	132	160	200	230
kW	49	49	30	34	48	67	85	100	132	160	200	230
kW	55	55	25	30	55	75	100	110	150	185	220	257
kW	55	55	25	30	55	75	100	110	150	185	220	257
kW	-	-	-	-	-	-	-	-	-	-	-	-
A	100	120	120	140	180	280	360	450	570	700	850	1000
A	55	70	85	100	120	200	300	360	460	550	660	800
A	112	144	120	140	180	280	360	450	570	700	850	1000
A	85	90	95	110	140	230	300	380	490	610	750	890
A	55	70	75	85	110	170	260	300	400	480	580	700
A	112	144	120	140	180	280	360	450	570	700	850	1000
A	55	70	75	85	110	170	260	300	400	480	580	700
A	100	120	100	120	160	250	320	400	500	600	700	800
A	69	75	100	120	160	220	260	315	440	500	560	630

Contactors

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

Main Contacts		Type	K3-10	K3-14	K3-18	K3-22	K3-24	K3-32	K3-40	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 power	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
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 44

Contactors

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

Type	K85	K110	K3-151	K3-176	K3-200	K3-315	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
A	38	50	65	80	90	142	203	248	315	390	450	540
kVA	15	20	25	30	34	54	77	95	120	148	170	200
kVA	15,5	20,5	27	33	37	59	80	100	130	160	185	220
kVA	26	34	45	55	60	95	140	170	210	270	310	370
kVA	29	38	46	57	63	100	145	175	220	280	320	380
kVA	33	43	55	69	75	120	170	210	270	330	380	460
kVA	45	60	56	69	100	160	200	250	320	350	500	600
k	20	20	20	20	15	20	20	20	20	20	20	20
A	87	100	120	155	195	255	300	370	440	520	680	760
kVAr	33	38	45	60	75	100	115	145	170	200	260	290
kVAr	36	42	52	62	78	104	120	150	175	205	270	300
kVAr	57	65	80	100	130	170	200	250	300	350	450	500
kVAr	60	70	95	110	135	175	210	260	310	360	465	520
kVAr	70	80	100	130	170	220	260	320	380	450	590	660
kVAr	70	80	100	130	170	220	260	320	380	450	590	660
A	98	105	115	140	200	250	330	420	550	600	680	760
kVAr	35	40	43	53	76	95	125	160	209	228	260	290
kVAr	39	43	45	55	80	100	130	170	220	240	280	310
kVAr	68	75	75	90	130	160	210	270	350	390	440	480
kVAr	71	77	80	100	140	170	230	290	380	420	470	530
kVAr	85	90	95	120	170	210	280	350	450	500	570	640
kVAr	110	120	125	150	200	260	350	450	600	650	700	800
A	150	170	-	-	-	-	-	-	-	-	-	-
A	150	170	-	-	-	-	-	-	-	-	-	-
A	20	25	-	-	-	-	-	-	-	-	-	-
A	2	2,5	-	-	-	-	-	-	-	-	-	-
A	150	170	200	250	350	450	600	760	1000	1100	1200	1350
A	150	170	200	250	350	450	600	760	1000	1100	1200	1350
A	150	170	150	170	250	315	400	480	560	630	800	900
A	100	160	80	100	150	200	250	315	400	450	500	600
A	150	170	-	-	-	-	-	-	-	-	-	-
A	85	110	-	-	-	-	-	-	-	-	-	-
A	2	2,5	-	-	-	-	-	-	-	-	-	-
A	0,5	0,5	-	-	-	-	-	-	-	-	-	-
A	150	170	-	-	-	-	-	-	-	-	-	-
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												
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	63	80	80	80	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	10000	10000	10000	7000	7000	7000	7000	7000	7000
	AC3, I_e	1/h	600	600	600	600	600	600	600	400	400	400
	AC4, I_e	1/h	120	120	120	120	120	120	120	120	120	120
	DC3, I_e	1/h	600	600	600	600	600	600	600	400	400	400
Mechanical life												
AC operated	S x 10^6		10	10	10	10	10	10	10	10	10	10
DC operated	S x 10^6		10	10	10	10	10	10	10	10	10	10
DC-solenoid operated (KG3)	S x 10^6		50	50	50	50	50	50	50	-	-	-
Short time current	10s-current	A	96	120	144	176	184	240	296	360	504	592
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
Resistance to shock acc. to IEC 68-2-27												
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 /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

Type	K85	K110	K3-151	K3-176	K3-200	K3-315	K3-450	K3-550	K3-700	K3-860	K3-1000	K3-1200
°C	-40 to +60 (+90) [1]		-25 to +55 (+70) [3]									
°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									
A	250	250	250	315	400	500	630	630	800	1000	1000	1250
A	160	200	200	250	315	400	500	560	-	-	-	-
A	100	125	160	200	250	315	-	-	-	-	-	-
mm²	10 - 70 [2]	10 - 70 [2]	18 x 4	18 x 4	22 x 4	busbar 25 x 5	busbar 30 x 5	busbar 40 x 6	busbar 50 x 8	busbar 50 x 8	busbar 50 x 10	busbar 50 x 10
mm²	16 - 50 [2]	16 - 50 [2]	screw	screw	screw	screw	screw	screw	screw	screw	screws	screws
mm²	10 - 35	10 - 35	M8	M8	M8	M10	M10	M12	M12	M14	2 x M12	2 x M12
	1	1	-	-	-	-	-	-	-	-	-	-
mm²												
mm²												
AWG	10	10										
AWG	6 - 0	6 - 0										
	1	1										
AWG												
AWG												
1/h	3000	3000	1200	1200	1200	1200	1200	1200	1200	1200	300	300
1/h	300	300	-	-	-	-	-	-	-	-	-	-
1/h	120	120	-	-	-	-	-	-	-	-	-	-
1/h	300	300	-	-	-	-	-	-	-	-	-	
S x 10^6	5	5	10	10	8	5	5	5	5	5	5 [4]	5 [4]
S x 10^6	5	5	10	10	8	5	5	5	5	5	5 [4]	5 [4]
S x 10^6	-	-	-	-	-	-	-	-	-	-	-	-
A	680	880	1200	1400	1800	2600	3600	4400	5600	6900	8000	9600
W	4,3	6,0	8	11	8	15,9	26,3	33,3	49	59,2	60	72
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 /AC1according to I_e /AC3
2) Maximum cable cross-section with prepared conductor
3) With reduced control voltage range 1,0 x U_s and with reduced rated current I_e /AC1according to I_e /AC3
4) After each 1x10^6 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	690	690	690	-	-	-	-	-	-
Thermal rated current I_{th} to 690V												
Ambient temperature	40°C	A	16	16	16	16	-	-	-	-	-	-
	60°C	A	12	12	12	12	-	-	-	-	-	-
Utilization category AC15												
Rated operational current I_e	220-240V	A	12	12	12	12	-	-	-	-	-	-
	380-415V	A	4	4	4	4	-	-	-	-	-	-
	440V	A	4	4	4	4	-	-	-	-	-	-
	500V	A	3	3	3	3	-	-	-	-	-	-
	660-690V	A	1	1	1	1	-	-	-	-	-	-
Utilization category DC13												
Rated operational current I_e	60V	A	8	8	8	8	-	-	-	-	-	-
	110V	A	1	1	1	1	-	-	-	-	-	-
	220V	A	0,1	0,1	0,1	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	25	25	25	25	-	-	-	-	-	-
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		
	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		
	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				-			-		
(KG3)	release time	ms	20 - 30 [4]				-			-		
	arc duration	ms	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): Uimp = 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

Contactors

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

Type	K85	K110	K3-151	K3-176	K3-200	K3-315	K3-450	K3-550	K3-700	K3-860	K3-1000	K3-1200
V~	690	690	690	690	690	690	690	690	690	690	690	690
A	16	16	10	10	10	10	10	10	10	10	10	10
A	12	12	-	-	-	-	-	-	-	-	-	-
A	12	12	3	3	3	3	3	3	3	3	3	3
A	6	6	2	2	2	2	2	2	2	2	2	2
A	6	6	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5
A	4	4	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5
A	2	2	1	1	1	1	1	1	1	1	1	1
A	8	8	-	-	-	-	-	-	-	-	-	-
A	1	1	0,5	0,5	1	1	1	1	1	1	1	1
A	0,1	0,1	0,2	0,2	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5
A	25	25	10	10	10	10	10	10	10	10	10	10
VA	280-350	350-420	350	350	700	700	800-950	800-950	1350-1600	1350-1600	2400	2400
VA	16 -23	23 -29	5	5	20	20	9-11	9-11	21-25	21-25	70	70
W	4-6	6-7,3	-	-	-	-	-	-	-	-	-	-
W	170	320	350	350	700	700	700-850	700-850	1300-1550	1300-1550	2100	2100
W	2	4	5	5	20	20	8-10	8-10	18-22	18-22	60	60
W	-	-	-	-	-	-	-	-	-	-	-	-
W	-	-	-	-	-	-	-	-	-	-	-	-
	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	
	0,8-1,1		0,85-1,1	0,85-1,1	0,85-1,1	0,85-1,1	0,85-1,1				0,85-1,1	
ms	13-30		30-60	30-60	40-60	40-60	50-100				50-100	
ms	8-15		30-80	30-80	15-45	15-30	150-200 / 500-1000[1)]				25-50	
ms	10-15			-	-	-	-				-	
ms	20-30		30-60	30-60	40-60	40-60	-				-	
ms	10-18		30-80	30-80	15-45	15-30	-				-	
ms	10-15		-	-	-	-	-				-	
ms	-	-	-	-	-	-	-	-	-	-	-	-
ms	-	-	-	-	-	-	-	-	-	-	-	-
ms	-	-	-	-	-	-	-	-	-	-	-	-
mm²	0,75-2,5		-		0,75-2,5		0,75-2,5				0,75-2,5	
mm²	0,75-2,5		-		0,75-2,5		0,75-2,5				0,75-2,5	
mm²	0,5-1,5		-		-		-				-	
mm²	0,75-2,5		1-2,5				1-2,5				1-2,5	
mm²	0,5-2,5		1-2,5				1-2,5				1-2,5	
mm²	0,5-1,5		-				-				-	
	2		2				2				2	
AWG	14 - 12		-		16 - 12		16 - 12				16 - 12	
AWG	18 - 12		-		16 - 12		16 - 12				16 - 12	
AWG	14 - 12		16 - 12				16 - 12				16 - 12	
AWG	18 - 12		16 - 12				16 - 12				16 - 12	
	2		2				2				2	

Contactors

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

Main Contacts		Type	**K(G)2-09**	**K(G)2-12**	**K(G)2-16**	**K2-23**	**K2-30**	**K2-37**	**K2-45**	**K2-60**
Rated insulation voltage U_i [1]		V AC	690	690	690	690	690	690	690	690
Making capacity I_{eff}	at U_e = 690V AC	A	200	200	200	400	500	500	700	900
Breaking capacity I_{eff}	400V AC	A	180	180	200	380	400	400	600	800
K1-09 to K2-16	cosφ = 0,65 500V AC	A	150	150	180	300	370	370	500	700
K2-23 to K3-1200	cosφ = 0,35 690V AC	A	100	100	150	260	340	340	400	500
	1000V AC	A	-	-	-	-	-	-	-	-
Utilization category AC1										
Switching of resistive load										
Rated operational current I_e (=I_{th})		**A**	**25**	**25**	**25**	**45**	**50**	**50**	**80**	**100**
at 40°C, open										
Rated operational power	220V	kW	9,5	9,5	9,5	17	19	19	30	38
of three-phase resistive loads	230V	kW	10	10	10	18	20	20	31,5	40
50-60Hz, cosφ = 1	240V	kW	10,5	10,5	10,5	18,5	20,5	20,5	33	41
	380V	kW	16,5	16,5	16,5	29,5	33	33	52	65
	400V	kW	17,5	17,5	17,5	31	34,5	34,5	55	69
	415V	kW	18	18	18	32	36	36	57	71
	440V	kW	19	19	19	34	38	38	61	76
	500V	kW	21,5	21,5	21,5	39	43	43	69	86
	660V	kW	28,5	28,5	28,5	51	57	57	91	114
	690V	kW	29,5	29,5	29,5	53,5	60	60	95	119
Rated operational current I_e (=I_{the})		A	20	25	25	35	40	40	63	80
at 60°C, enclosed										
Rated operational power	220V	kW	7,5	9,5	9,5	13	15	15	24	30
of three-phase resistive loads	230V	kW	8	10	10	13,5	16	16	25	31,5
50-60Hz, cosφ = 1	240V	kW	8	10,5	10,5	14,5	16,5	16,5	26	33
	380V	kW	13	16,5	16,5	23	26	26	41	52
	400V	kW	13,5	17,5	17,5	24	27,5	27,5	43	55
	415V	kW	14	18	18	25	28,5	28,5	45	57
	440V	kW	15	19	19	26,5	30	30	48	61
	500V	kW	17	21,5	21,5	30	34	34	54	69
	660V	kW	22,5	28,5	28,5	40	45	45	72	91
	690V	kW	23,5	29,5	29,5	42	48	48	75	95
Minimum cross-section of conductor										
at load with I_e (=I_{th})		mm²	4	4	4	10	10	10	25	35
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
open and enclosed	230V	A	11,5	14,5	17,5	23	30	37	45	61
	240V	A	11	14	17	23	30	37	45	60
	380-400V	**A**	**10**	**12**	**16**	**23**	**30**	**37**	**45**	**60**
	415-440V	A	9	12	16	23	30	37	45	60
	500V	A	9	12	16	23	30	30	45	55
	660V	A	7	9	9	17,5	21	21	33	42
	690V	A	6,5	8,5	8,5	17	20	20	31	40
Rated operational power	220-230V	kW	3	4	5	6	8,5	11	12,5	18,5
of three-phase motors	240V	kW	3	4	5	7	9	11,5	13,5	19
50-60Hz	**380-400V**	**kW**	**4**	**5,5**	**7,5**	**11**	**15**	**18,5**	**22**	**30**
	415V	kW	4,5	6	8,5	12	16	20	24	33
	440V	kW	4,5	6	8,5	12	16	20	24	33
	500V	kW	5,5	7,5	10	15	18,5	18,5	30	37
	660-690V	kW	5,5	7,5	7,5	15	18,5	18,5	30	37

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

Contactors

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

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

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 Ie
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	K(G)2-09	K(G)2-12	K(G)2-16	K2-23	K2-30	K2-37	K2-45	K2-60
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	25	45	50	50	80	100
	60V	A	6	6	6	30	30	30	60	60
	110V	A	1,2	1,2	1,2	1,8	1,8	1,8	1,8	1,8
	220V	A	0,2	0,2	0,2	0,2	0,2	0,2	0,25	0,25
3 poles in series	24V	A	20	25	25	45	50	50	80	100
	60V	A	20	25	25	40	40	40	80	80
	110V	A	20	20	20	40	40	40	80	80
	220V	A	2,5	2,5	2,5	4	4	4	5	5
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
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
Contact welding not accepted										
max. fuse size	gL (gG)	A	16	16	16	25	35	35	50	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										
main connector	solid or stranded	mm²	0,75 - 4			1,5-10 + 1,5-6			4 - 35 [2]	
	flexible	mm²	0,75 - 2,5			1,5-6 + 1,5-4			6 - 25 [2]	
	flexible with multicore cable end	mm²	0,5 - 2,5			1,5-6 + 1,5-4			4 - 25	
Cables per clamp			2			1+1			1	
main connector	solid	AWG	14 - 10			14 - 10 + 14 - 10			10	
	flexible	AWG	18 - 10			14 - 8 + 14 - 10			10 - 2	
Cables per clamp			2			1+1			1	
Frequency of operations z										
Contactors without thermal overload relay										
	without load	1/h	10000	10000	10000	7000	7000	7000	7000	7000
	AC3, I_e	1/h	600	600	600	600	600	600	400	400
	AC4, I_e	1/h	120	120	120	120	120	120	120	120
	DC3, I_e	1/h	600	600	600	600	600	600	400	400
Mechanical life										
AC operated		S x 10^6	10	10	10	10	10	10	10	10
DC operated with economy resistor		S x 10^6	10	10	10	10	10	10	10	10
DC solenoid operated (KG2-..)		S x 10^6	50	50	50	-	-	-	-	-
Short time current	10s-current	A	96	120	144	184	240	296	360	504
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
Resistance to shock acc. to IEC 68-2-27										
Shock time 20ms sine-wave	NO	g	10	10	10	8	8	8	8	8
	NC	g	6	6	6	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	K(G)2-09	K(G)2-12	K(G)2-16	K2-23	K2-30	K2-37	K2-45	K2-60
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	4	-	-	-	-	-
	440V	A	4	4	4	-	-	-	-	-
	500V	A	3	3	3	-	-	-	-	-
	660-690V	A	1	1	1	-	-	-	-	-
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	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	33-45	33-45	90-115	90-115	90-115	140-165	140-165
	sealed	VA	7-10	7-10	7-10	9-13	9-13	9-13	13-18	13-18
		W	2,6-3	2,6-3	2,6-3	2,7-4	2,7-4	2,7-4	5,4-7	5,4-7
DC operated	inrush	W	75	75	75	140	140	140	200	200
w. econ. circuit up to 24/above 24V	sealed	W	2 / 7	2 / 7	2 / 7	2	2	2	6	6
DC solenoid operated (KG2-..)	inrush	W	6,5	6,5	6,5	-	-	-	-	-
	sealed	W	6,5	6,5	6,5	-	-	-	-	-
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	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	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	8-16	8-16	10-25	10-25	10-25	12-28	12-28
	release time	ms	5-13	5-13	5-13	8-15	8-15	8-15	8-15	8-15
	arc duration	ms	10-15	10-15	10-15	10-15	10-15	10-15	10-15	10-15
DC operated	make time	ms	8-12	8-12	8-12	10-20	10-20	10-20	12-23	12-23
with AC magnet system	release time	ms	8-13	8-13	8-13	10-15	10-15	10-15	10-18	10-18
	arc duration	ms	10-15	10-15	10-15	10-15	10-15	10-15	10-15	10-15
Cable cross-section										
Auxiliary connector	solid	mm²	0,75-4	0,75-4	0,75-4	-	-	-	-	-
	flexible	mm²	0,75-2,5	0,75-2,5	0,75-2,5	-	-	-	-	-
	flexible with multicore cable end	mm²	0,5-2,5	0,5-2,5	0,5-2,5	-	-	-	-	-
Magnet coil	solid	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	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	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	0,5-1,5	0,5-1,5	0,5-1,5	0,5-1,5
Clamps per pole			2	2	2	2	2	2	2	2

1) Suitable for: earthed-neutral systems, overvoltage category I to IV, pollution degree 3 (standard-industry): Uimp = 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	K3-24	K3-32	K3-40	K3-50	K3-62	K3-74
Rated operational current "General Use"		A	25	25	30	30	50	65	80	110	120	130
Motor DOL 3-phase at 60Hz												
Rated operational current	600V	A	10	14	18	22	22	27	34	44	52	66
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 current	600V	A	10	14	18	22	22	27	34	44	52	66
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-phasig entspr. **ANSI 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	-	-	-	-	22	27	-	44	52	66
Fuses		A	30	40	50	50	90	125	175	175	225	250
Suitable for use on a capability of delivering not more than (SCCR)	rms	A	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000
		V	600	600	600	600	600	600	600	600	600	600
Auxiliary Contacts (cULus)			A600	A600	A600	A600	-	-	-	-	-	-

Main Contacts (cULus)		Type	KG2-09	KG2-12	KG2-16	K2-23	K2-30	K2-45	K2-60
Rated operational current "General Use"		A	25	25	25	40	40	72	90
Motor DOL 3-phase at 60Hz									
Rated operational power	110-120V	hp	1½	2	2	3	5	-	-
	200V	hp	2	3	3	5	7½	10	15
	220-240V	hp	3	3	5	7½	10	15	20
	440480V	hp	5	7½	10	15	20	30	40
	550-600V	hp	7½	10	15	20	25	40	50
Motor DOL 1-phase at 60Hz									
Rated operational power	110-120V	hp	½	¾	1	1½	2	3	5
	200V	hp	1	2	2	3	3	5	7½
	220-240V	hp	1½	2	3	3	5	7½	10
Fuses		A	30	40	50	60	110	175	175
Suitable for use on a capability of delivering not more than (SCCR)	rms	A	5000	5000	5000	5000	5000	5000	5000
		V	600	600	600	600	600	600	600
Auxiliary Contacts (cULus)			A600	A600	A600	A600	A600	-	-

Contactors for North America

Data according to UL508

Type	K85	K110	K3-151	K3-176	K3-200	K3-315	K3-450	K3-550	K3-700	K3-860	K3-1000	K3-1200
A	125	125	180	220	-	-	420	520	700	810	-	1215
A	85	99	125	150	-	-	300	400	550	700	-	1000
hp	15	-	-	-	-	-	-	-	-	-	-	-
hp	-	30	40	50	-	-	125	150	200	250	-	450
hp	35	40	50	60	-	-	125	150	250	300	-	450
hp	-	-	-	-	-	-	-	-	-	-	-	-
hp	-	-	-	-	-	-	-	-	-	-	-	-
hp	65	75	100	125	-	-	250	350	500	600	-	900
hp	85	100	125	150	-	-	250	350	500	600	-	900
A	85	99	125	150	-	-	-	-	-	-	-	-
hp	8	10	15	25	-	-	-	-	-	-	-	-
hp	-	20	-	-	-	-	-	-	-	-	-	-
hp	20	20	25	30	-	-	-	-	-	-	-	-
hp	-	-	-	-	-	-	-	-	-	-	-	-
hp	-	-	-	-	-	-	-	-	-	-	-	-
hp	-	50	-	-	-	-	-	-	-	-	-	-
hp	-	60	-	-	-	-	-	-	-	-	-	-
A	-	62	-	-	-	-	-	-	-	-	-	-
hp	-	10	-	-	-	-	-	-	-	-	-	-
hp	-	20	-	-	-	-	-	-	-	-	-	-
hp	-	20	-	-	-	-	-	-	-	-	-	-
hp	-	40	-	-	-	-	-	-	-	-	-	-
hp	-	60	-	-	-	-	-	-	-	-	-	-
A	85	99	-	-	-	-	-	-	-	-	-	-
A	-	300	300	350	-	-	1200	1200	2000	2000	-	2000
A	10000	10000	10000	10000	-	-	18000	18000	30000	30000	-	42000
V	600	600	600	600	-	-	600	600	600	600	-	600
	A600	A600	-	-	-	-	A600	A600	A600	A600	-	A600

Main Contacts (cULus)		Type	K3-18K	K3-24K	K3-32K	K3-40K	K3-50K	K3-62K	K3-74K
Rated operational power of 3-phase capacitor banks at 60Hz (3ph)	110-120V	kVAr	0-3,5	3-5,5	3-7	3-8	6,5-10	6,5-15	6,5-18 [1]
	200V	kVAr	0,5-6	4,5-10	4,5-12,5	4,5-13,5	10-16,7	10-25	10-32 [1]
	220-240V	kVAr	0-7	5,5-11	5,5-15	5,5-16,5	12,5-20	12,5-30	12,5-36 [1]
	440-480V	kVAr	0-15	11,5-25	11,5-30	11,5-33	25-40	25-60	25-72 [1]
	550-600V	kVAr	0-18	14,5-30	14,5-35	14,5-41	31-50	31-75	31-90 [1]
Fuses		A	50	90	125	175	175	225	250
Suitable for use on a capability of delivering not more than (SCCR)	rms	A	5000	5000	5000	5000	5000	5000	5000
		V	600	600	600	600	600	600	600
Auxiliary Contacts (cULus)			A600	-	-	-	-	-	-

1) Consider the max. thermal current of the contactor K3-74A: I_{th} 130A

Contactors

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

Contact Life

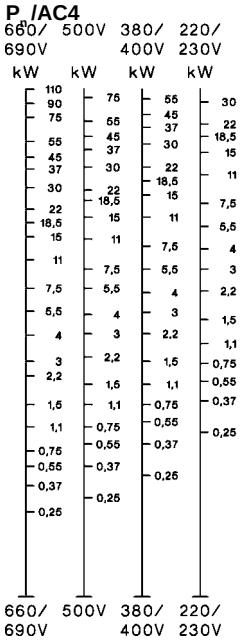
For selection of the suitable contactor-type according to supply voltage, power rating and application (utilization category AC1, AC3 or AC4) use contact life characteristic diagram.
For the most common supply voltages four scales of power ratings P_n are provided for each utilization category.
Select 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:

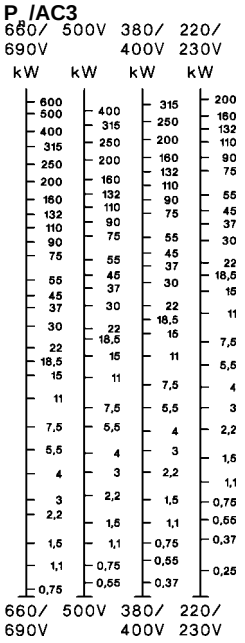
$$M = \frac{AC3}{1 + \frac{\%AC4}{100} \times \left(\frac{AC3}{AC4} - 1 \right)}$$

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.

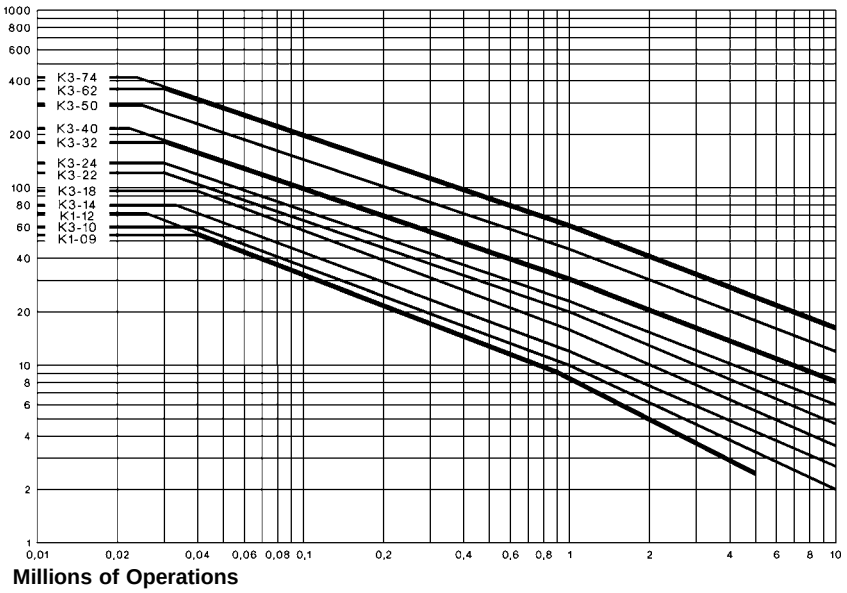
Motor Rating P_n/AC4



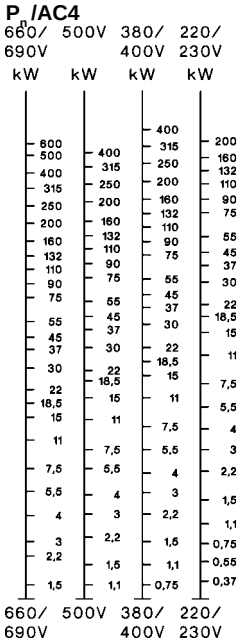
Motor Rating P_n/AC3



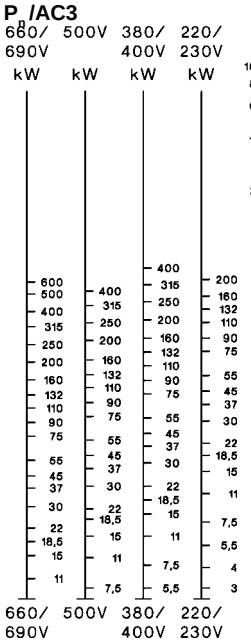
Breaking Current I_a (= I_e/AC1)



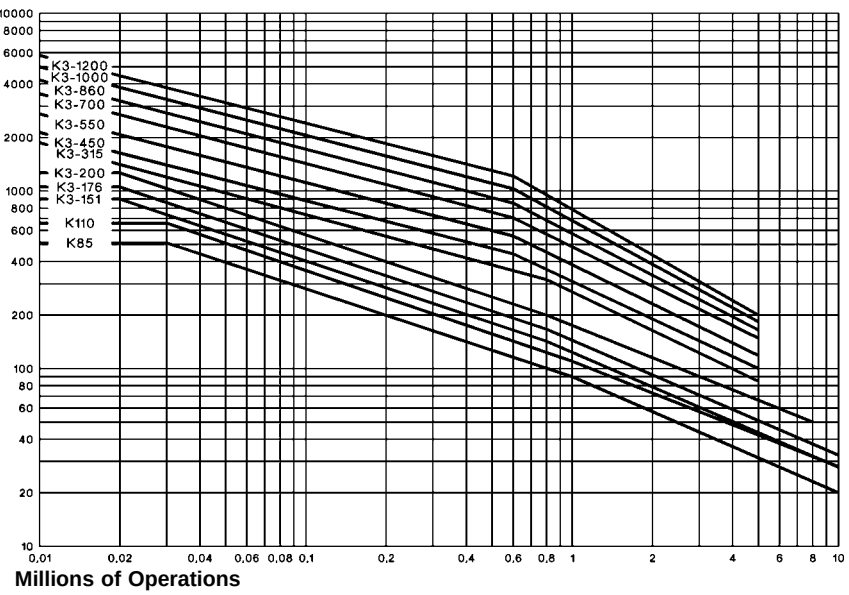
Motor Rating P_n/AC4



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

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	6	1	0,65	1	0,17	0,65	10	1,05	0,45	8	1,05	0,45
			17A< $I_e \leq$ 100A	6	1	0,35	1	0,17	0,35	10	1,05	0,45	8	1,05	0,45
			$I_e >$ 100A	6	1	0,35	1	0,17	0,35	10	1,05	0,35	8	1,05	0,35
	AC4	Squirrel-cage motors: starting, plugging, inching	$I_e \leq$ 17A	6	1	0,65	6	1	0,65	12	1,05	0,45	10	1,05	0,45
			17A< $I_e \leq$ 100A	6	1	0,35	6	1	0,35	12	1,05	0,45	10	1,05	0,45
			$I_e >$ 100A	6	1	0,35	6	1	0,35	12	1,05	0,35	10	1,05	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	-	-	-	-	-	-	4,5	1,05	0,45	3,6	1,05	0,45
			$I_e >$ 100A	-	-	-	-	-	-	4,5	1,05	0,35	3,6	1,05	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	-	-	-	-	-	-	8	1,05	0,45	6	1,05	0,45
			$I_e >$ 100A	-	-	-	-	-	-	8	1,05	0,35	6	1,05	0,35
	AC8a	Hermetic refrigerant compressor motor control with manual resetting of overload releases	$I_e \leq$ 100A	-	-	-	-	-	-	6	1,05	0,45	6	1,05	0,45
			$I_e >$ 100A	-	-	-	-	-	-	6	1,05	0,35	6	1,05	0,35
	AC8b	Hermetic refrigerant compressor motor control with automatic resetting of overload releases	$I_e \leq$ 100A	-	-	-	-	-	-	6	1,05	0,45	6	1,05	0,45
			$I_e >$ 100A	-	-	-	-	-	-	6	1,05	0,35	6	1,05	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 [ms]	Break		L/R [ms]	Make		L/R [ms]	Break		L/R [ms]
				I/I_e	U/U_e		I_c/I_e	U_r/U_e		I/I_e	U/U_e		I_c/I_e	U_r/U_e	
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

U_e Rated operational voltage, U Voltage before make, U_r Recovery voltage, I_e Rated operational current, I Current make, I_c Current broken

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

Accessories

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

Type			HN	HTN	HA	HB	HKT HKA	HKF HKB	K2-DK K2-SK	K2-TP	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 690V											
Ambient temperature	max. 40°C	A	10	10	25	10	10	16	26	10	-
	max. 60°C	A	6	6	20	6	-	-	-	-	-
Frequency of operations z		1/h	3000	-	3000	3000	-	-	-	1200	3000
Mechanical life		S x 10^6	10	10	10	10	-	-	-	1	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	-	4	-
current I_e	380-400V	A	2	2	3	2	2	2	-	3	-
	440V	A	1,6	1,6	2	1,6	1,5	1,5	-	2	
	500V	A	1,2	1,2	2	1,2	1,5	1,5	-	2	-
	660-690V	A	0,6	0,6	1	0,6	1	1	-	2	-
Utilization category DC13											
Rated operational	60V	A	2	2	8	2	-	-	-	2,5	-
current I_e	110V	A	0,4	0,4	1	0,4	0,5	0,5	-	1,5	-
	220V	A	0,1	0,1	0,1	0,1	0,2	0,2	-	0,2	-
Short circuit protection											
short-circuit current 1kA,											
contact welding not accepted											
max. fuse size	gL (gG)	A	20	20	25	20	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	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	1-2,5	0,75-2,5	
	flexible	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	0,75-2,5	0,75-2,5	
	flexible with multicore cable end	mm²	0,5-1,5	0,5-1,5	0,5-1,5	0,5-1,5	0,5-1,5	0,5-1,5	0,75-2,5	0,5-1,5	
Cables per clamp			2	2	2	2	2	2	2	2	

Data according to CSA, UL and CUL

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

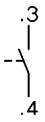
1) Suitable for: earthed-neutral systems, overvoltage category I to IV, pollution degree 3 (standard-industry): Uimp = 8kV. Data for other conditions on request.
2) Command duration min. 30ms, 10% duty cycle, max. 30 eec.

Contactors and Accessories

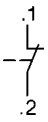
Wiring diagrams

Auxiliary contact blocks

HN10
HA10

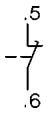


HN01
HA01



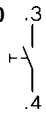
HN10U

HN01U

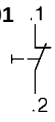


Snap-on momentary contact blocks

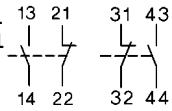
HTN10



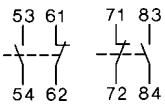
HTN01



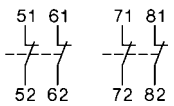
HKS11
HKA11



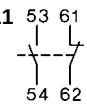
HB11
HKS11A



HB02

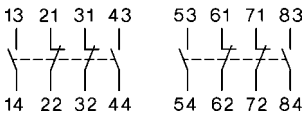


HKT11



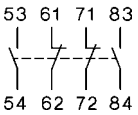
HB11, HKS11A, HB02:
Correct terminal marking is given by mounting.

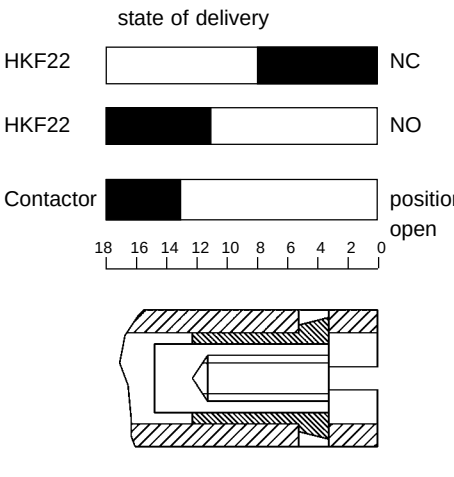
HKF22



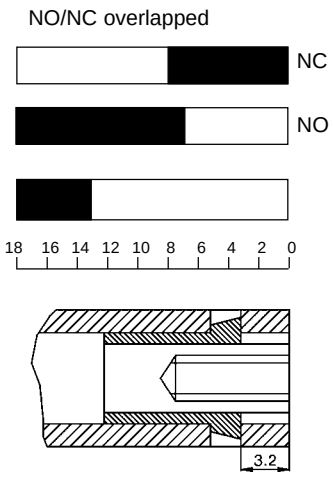
HKF22: NO contacts position related to the main poles can be regulated by user screwing or unscrewing the adjustable screw.

HKT22

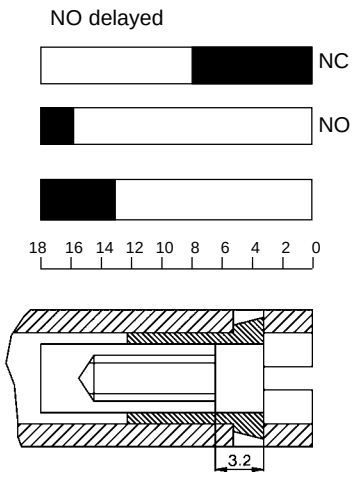




Standard position of regulation screw



Regulation screw position (unscrew by 4 turns)

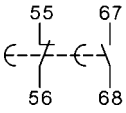


Regulation screw position (screw by 4 turns)

Pneumatic timer

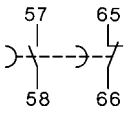
on-delayed

K2-TP..E



off-delayed

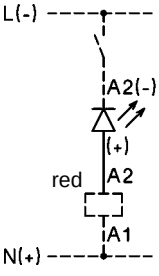
K2-TP..A



Indicator units

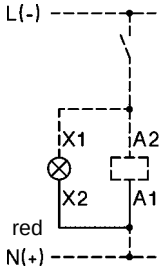
Coil current indicator

K2-ING
K2-INR



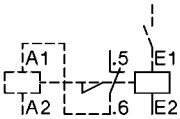
Voltage indicator

K2-UN
K2-UNR



Latch

K2-L..

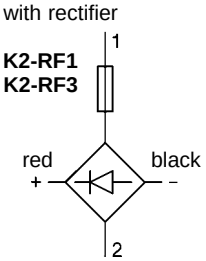


Fuse holder

K2-F

with rectifier

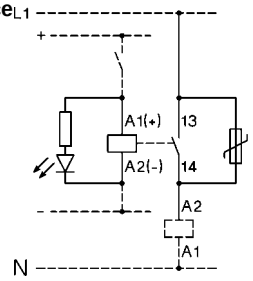
K2-RF1
K2-RF3



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

Interface

K2-IM

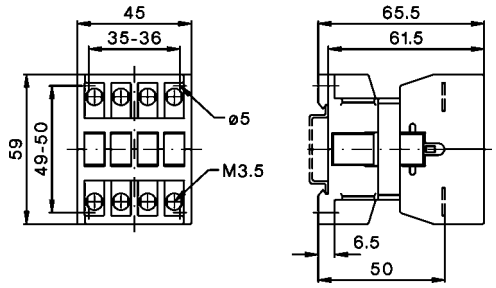


Contactors

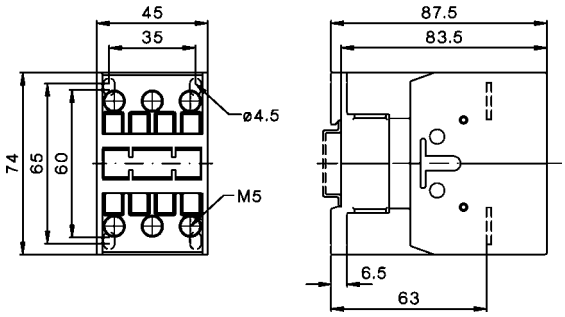
Dimensions

AC operated

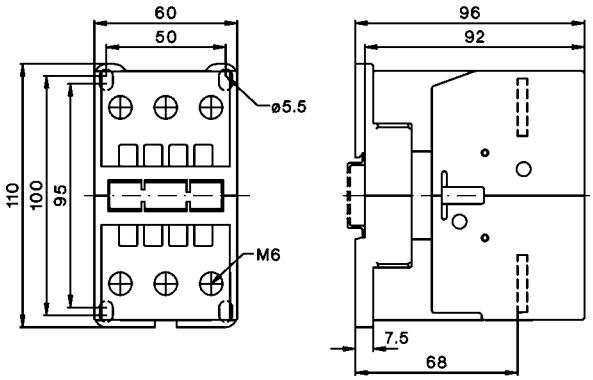
K3-10..
K3-14..
K3-18..
K3-22..



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

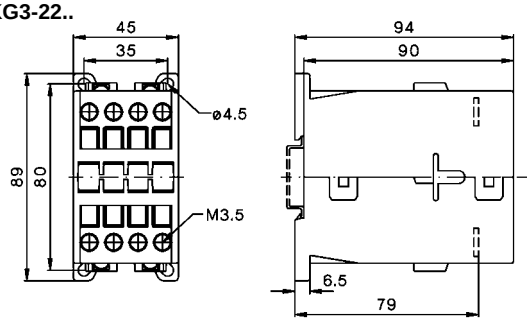


K3-50..
K3-62..
K3-74..

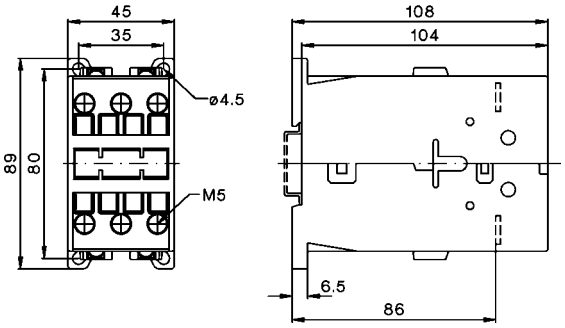


DC operated

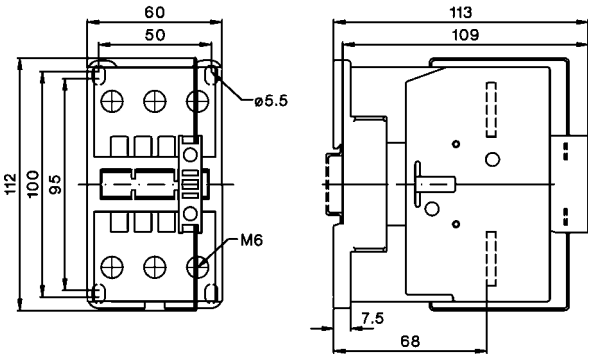
KG3-10..
KG3-14..
KG3-18..
KG3-22..



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

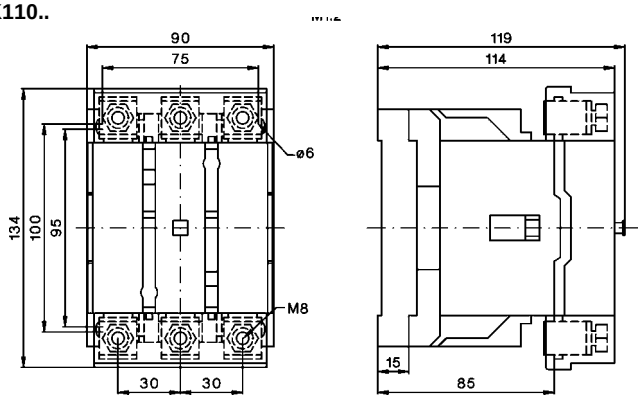


K3-50..=
K3-62..=
K3-74..=



AC and DC operated

K85..
K110..

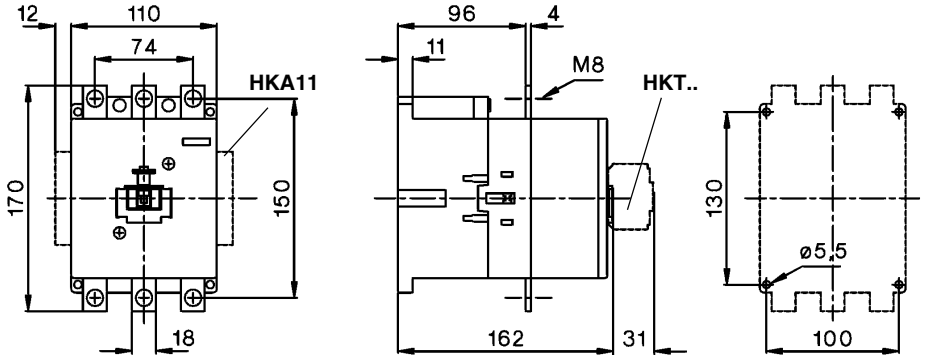


Contactors

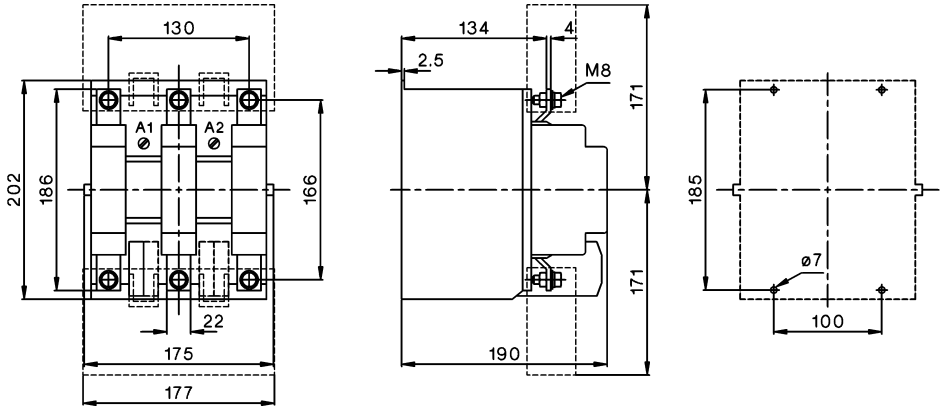
Dimensions

AC operated, DC operated

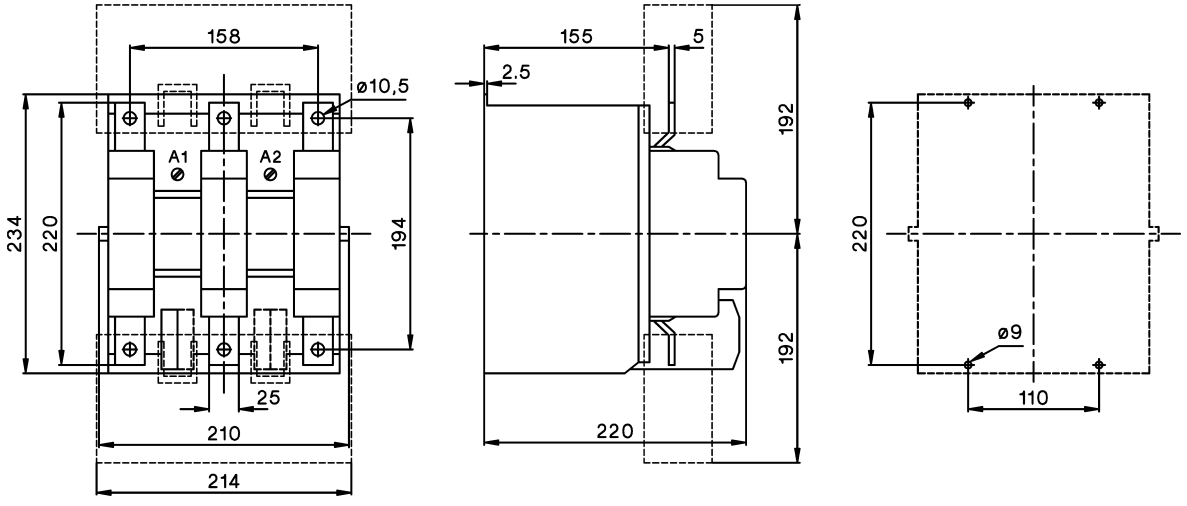
K3-151..
K3-176..



K3-200..



K3-315..

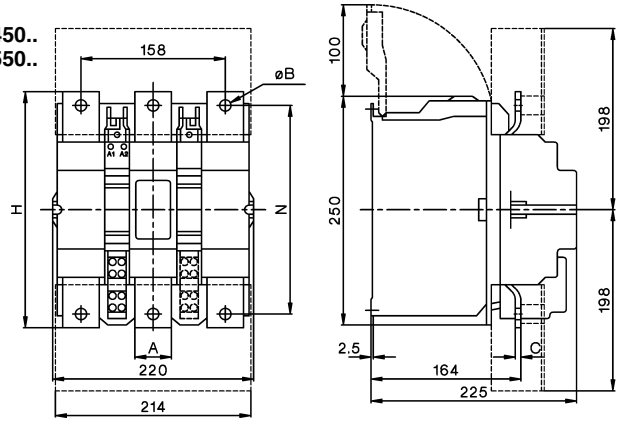


Contactors

Dimensions

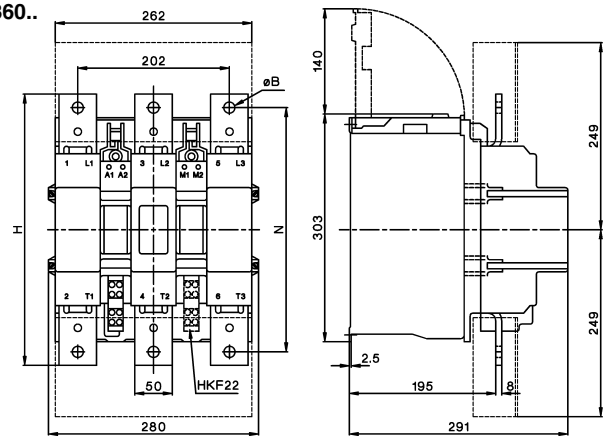
AC and DC operated

K3-450..
K3-550..



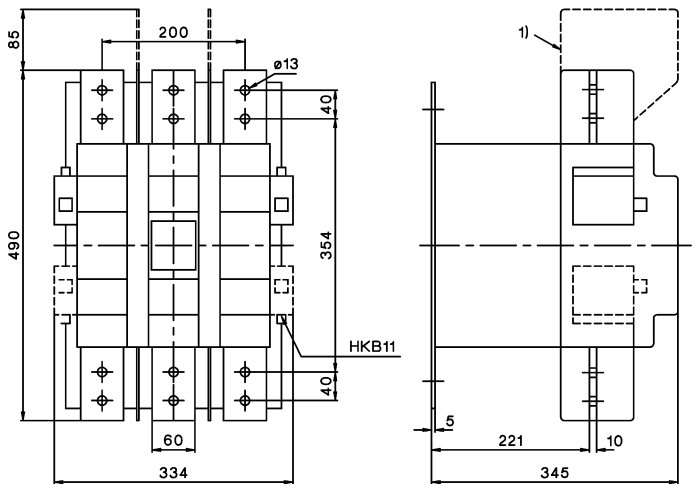
Type	A	B	C	H	N
K3-450	30	10,5	5	233	206
K3-550	40	12,5	6	258	228

K3-700..
K3-860..

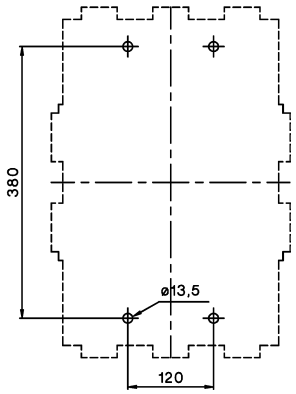


Type	B	H	N
K3-700	13	310	277
K3-860	15	361	325

K3-1000..
K3-1200..

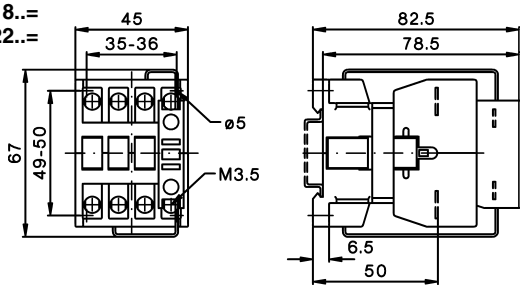


1) for K3-1200 in UL conformity application only

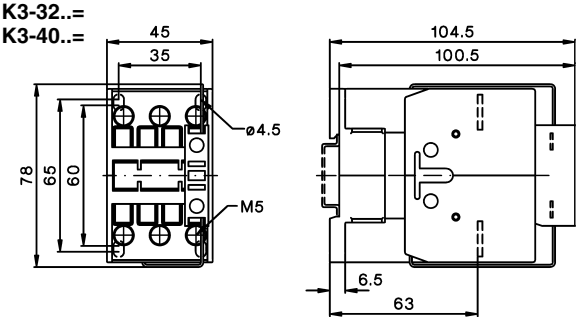


Contactors DC operated

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



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

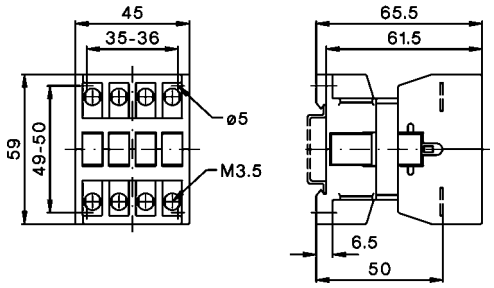


Contactors

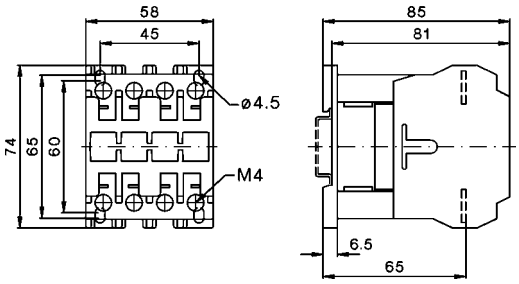
Dimensions

Contactors 4-pole, AC operated

K3-10A00-40
K3-14A00-40
K3-18A00-40
K3-22A00-40

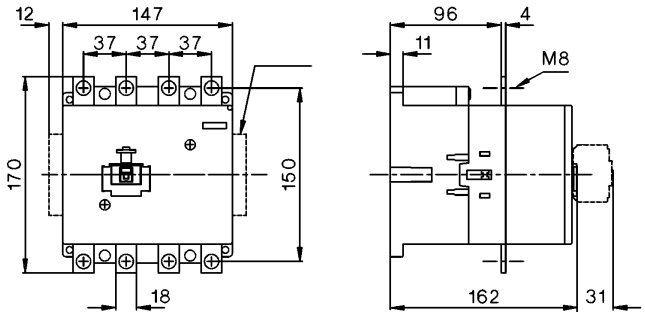


K2-23A00-40
K2-30A00-40
K2-37A00-40



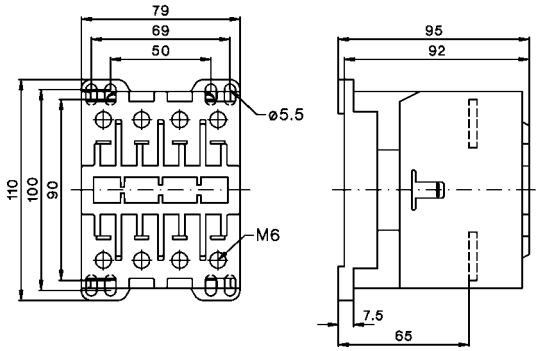
Contactors 4-pole, AC operated

K3-116A00-40
K3-151A00-40
K3-176A00-40



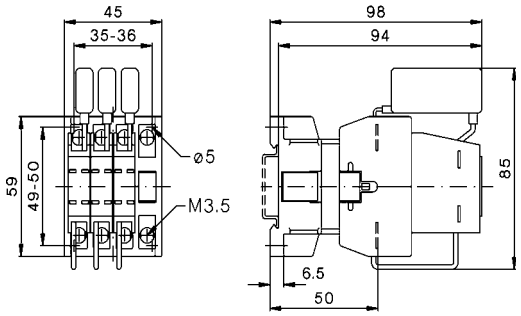
Contactors 4-pole, AC operated

K2-45A00-40
K2-60A00-40



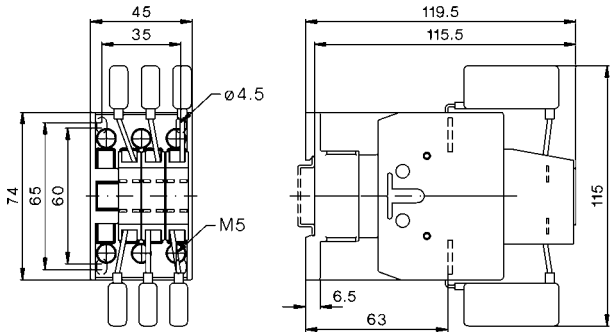
Capacitor switching contactors, AC operated

K3-18K..

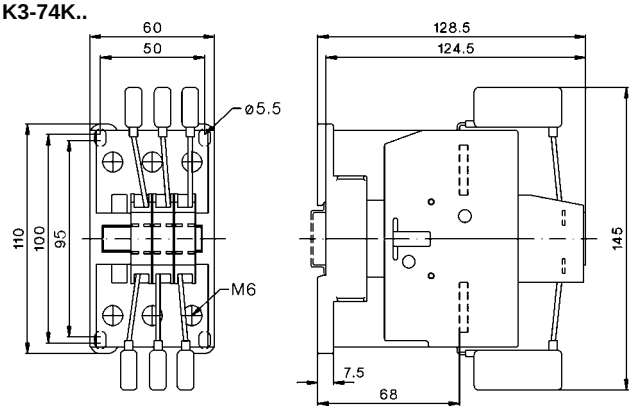


Capacitor switching contactors, AC operated

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



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

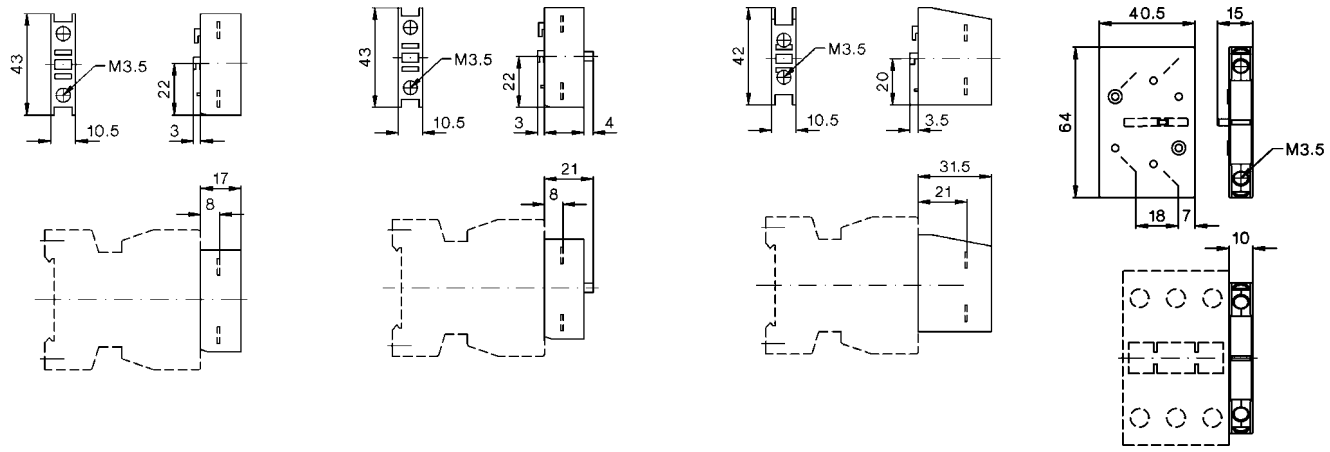


Contactors

Dimensions Accessories

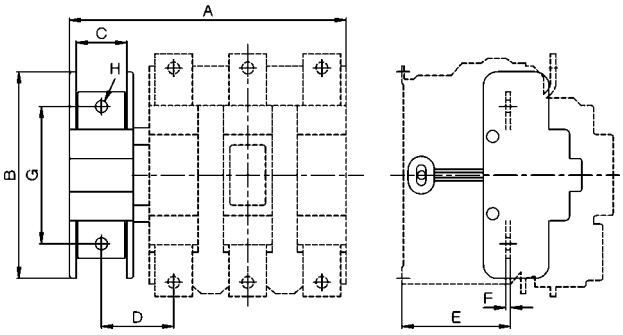
Aux. cont. blocks, terminal blocks **Snap-on momentary cont. blocks** **Auxiliary contact blocks**

HN10, HN01 K2-SK, K2-DK **HTN10, HTN01** **HA10, HA01** **HB11**



4. pole for contactors K3..

Type	A	B	C	D	E	F	G	H
NP120	168	102	21	46	48	3	76	M8
NP250	185	148	26	60	89	5	122	M8
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 on-delay

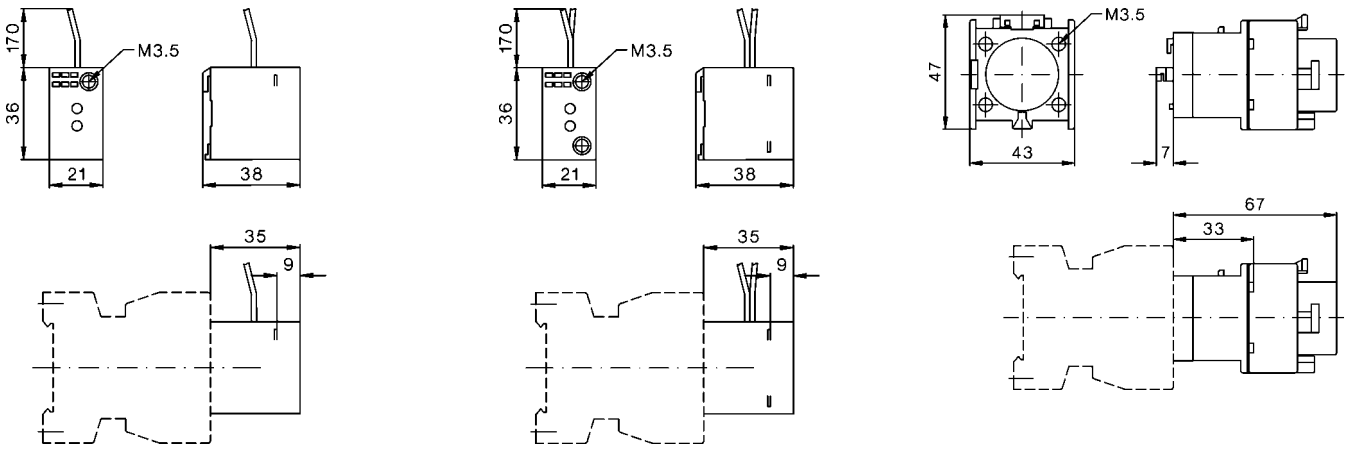
K2-TE..

Electronic timer off-delay

K2-TA..

Pneumatic timer

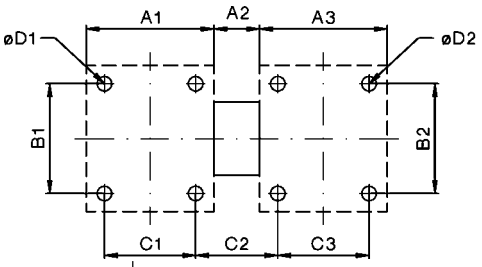
K2-TP



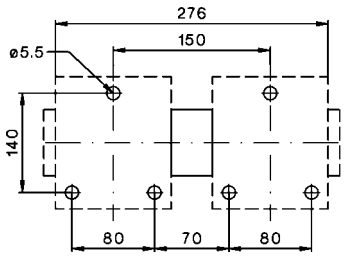
Contactors

Dimensions Accessories

Mechanical interlocks

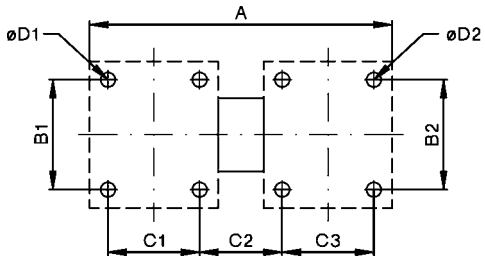


LG10397H



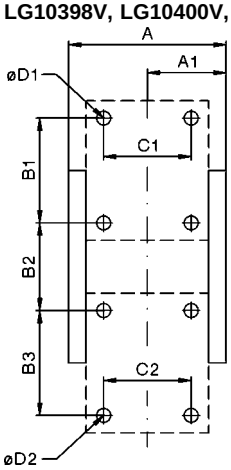
Type	Contactor 1	Contactor 2	A1	A2	A3	B1	B2	C1	C2	C3	D1	D2
LG10889	K3-07 to K3-40	K3-07 to K3-40	45	7	45	50	50	35	17	35	4,5	4,5
LG10889	KG3-07 to KG3-22	KG3-07 to KG3-22	45	7	45	80	50	35	17	35	4,5	4,5
LG10889	KG3-24 to KG3-40	KG3-22 to KG3-40	45	7	45	80	50	35	17	35	4,5	4,5
LG10889	K2-09, -12, -16	K2-09, -12, -16	45	7	45	50	50	35	17	35	4,5	4,5
LG10890	K3-50 bis K3-74	K3-24 bis K3-40	60	12	55	100	65	50	22	45	5,5	4,5
LG10890	K3-50 bis K3-74	K3-50 bis K3-74	60	12	60	100	100	50	22	50	5,5	5,5
LG8511	K65 - K110	K65 - K110	90	12	90	100	100	75	27	75	6	6

LG10398H to LG10403H

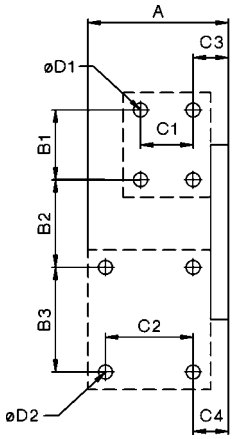


Type	Contactor 1	Contactor 2	A	B1	B2	C1	C2	C3	D1	D2	
LG11223H	K3-151, -176	K3-151, -176	250	130	130	100	40	100	6	6	3-pole contactor
LG11223H	K3-116,-151, -176	K3-116,-151, -176	324	130	130	135	42	135	6	6	4-pole contactor
LG10398H	K3-200	K3-200	400	185	185	100	124,5	100	7	7	
LG10400H	K3-315 - K3-550	K3-315 - K3-550	482	220	220	110	152	110	9	9	
LG10402H	K3-700, -860	K3-700, -860	592	280	280	175	137	175	11	11	
LG10403H	K3-1000, -1200	K3-1000, -1200	714	380	380	120	260	120	13,5	13,5	
LG10399H	K3-450, -550	K3-700, -860	537	220	280	110	144,5	175	9	11	
LG10401H	K3-700, -860	K3-1000, -1200	687	280	380	175	232,5	120	11	13,5	

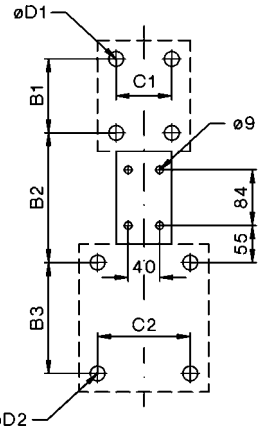
LG10398V, LG10400V, LG10402V



LG10399V



LG10403V, LG10401V



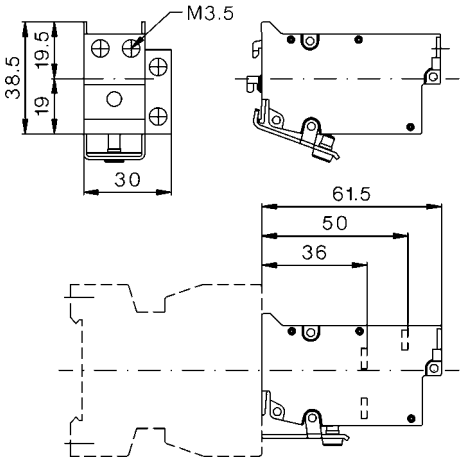
Type	Contactor 1	Contactor 2	A	A1	B1	B2	B3	C1	C2	C3	C4	D1	D2
LG10398V	K3-200	K3-200	217	118	185	85	185	100	100	-	-	7	7
LG10400V	K3-315 - K3-550	K3-315 - K3-550	250	134	220	94	220	110	110	-	-	9	9
LG10402V	K3-700, -860	K3-700, -860	302	162	280	200	280	175	175	-	-	11	11
LG10403V	K3-1000, -1200	K3-1000, -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

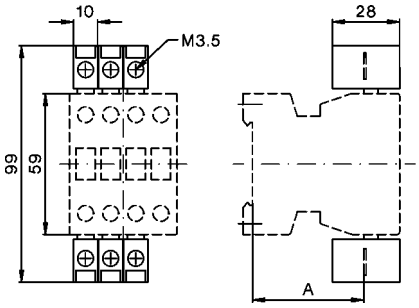
K2-L..



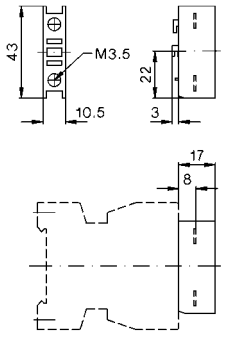
Contactors with additional terminals

LG9339 (2 x 3 pieces)

Contactor	A
K3-10A to K3-22A	40
KG2-09A to KG2-16A	86

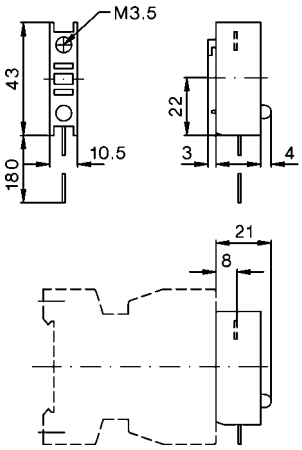


K2-DK, K2-SK



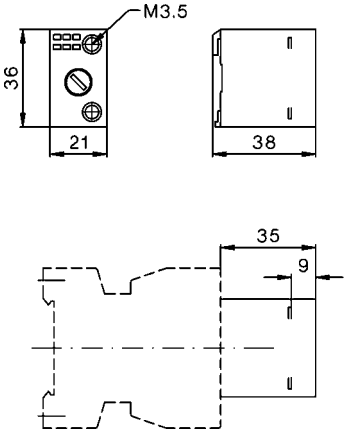
Indicator units

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



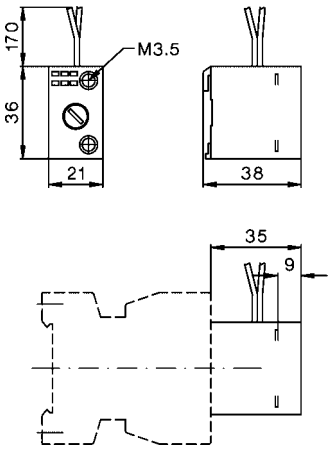
Fuse holder

K2-RF



Fuse holder with rectifier

K2-RF1
K2-RF3

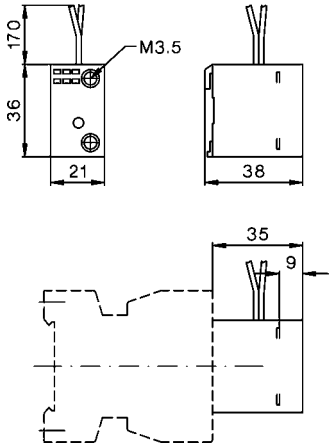


Contactors

Dimensions Accessories

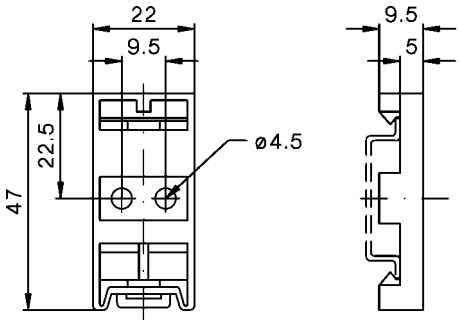
Interface

K2-IM



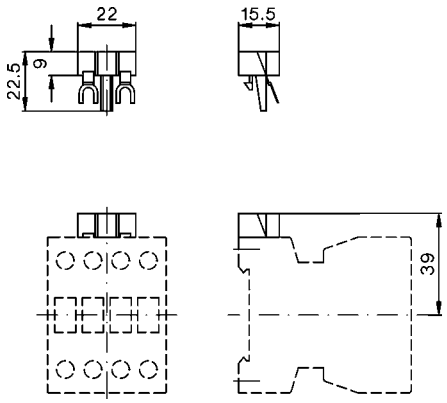
Snap-on adapter

K2-SM

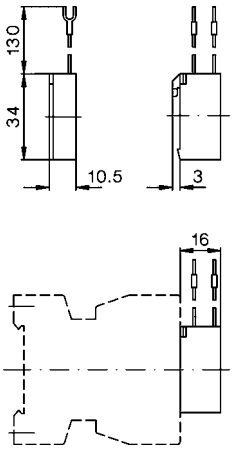


Suppressor units

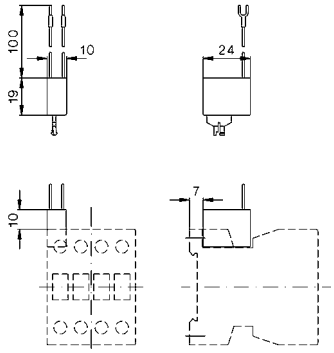
K2-E..



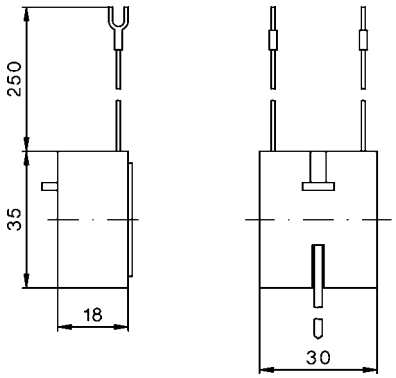
VG-K2/..



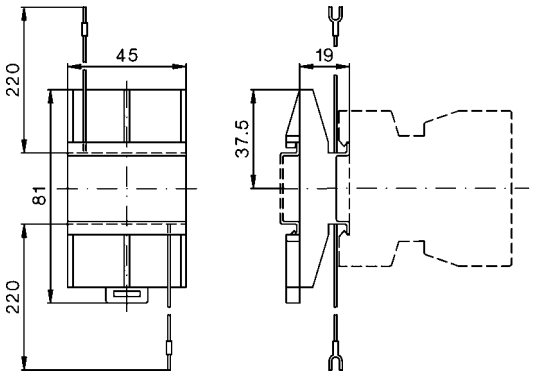
RC-K3 ..



RC-AD.., LG-ADZ.., LG-A03

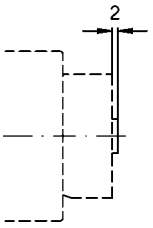


RCS..

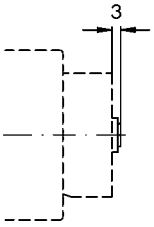


Marking systems

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



label holder **P527-1** with
snap-on labels **LG9337**

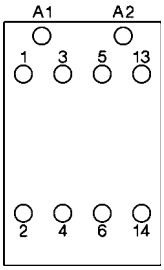


Contactors

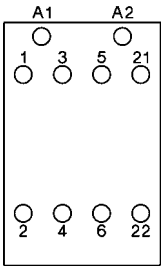
Position of terminals

AC operated

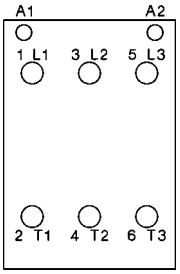
K3-10A10 bis
K3-22A10
K3-18K10



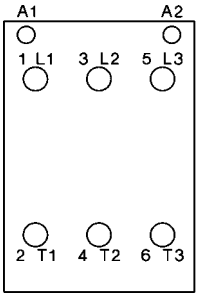
K3-10A01 bis
K3-22A10
K3-18K01



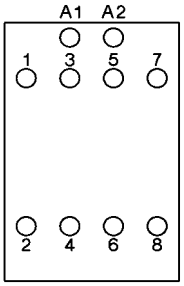
K3-24A00, K3-24K00
K3-32A00, K3-32K00
K3-40A00



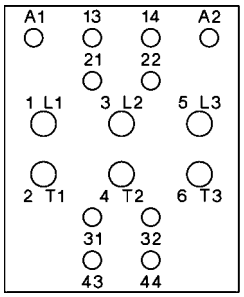
K3-50A00, K3-50K00
K3-62A00, K3-62K00
K3-74A00, K3-74K00



K3-10A00-40 to
K3-22A00-40
K2-23A00-40 to
K2-60A00-40

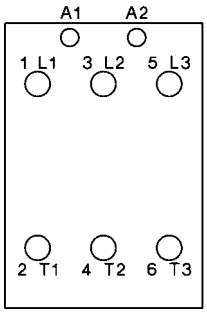


K85A22
K110A22

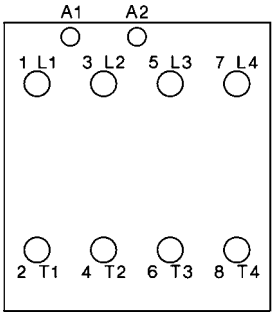


AC and DC operated

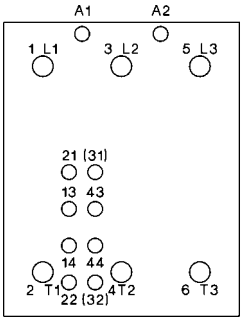
K3-151A00
K3-176A00



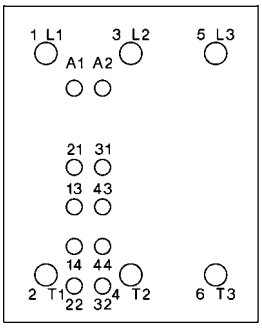
K3-151A00-40
K3-176A00-40



K3-200A21
K3-315A21

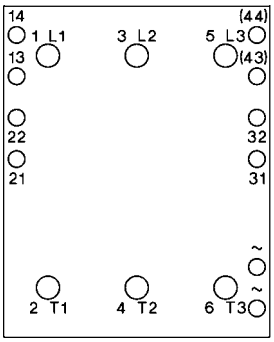


K3-450A22 to
K3-860A22



AC operated

K3-1000A12
K3-120A12



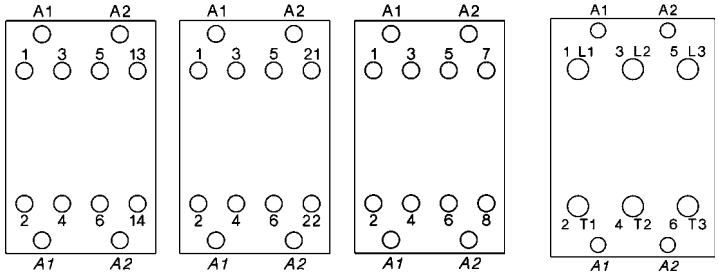
DC solenoid operated

KG3-10A10
KG3-14A10
KG3-18A10
KG3-22A10

KG3-10A01
KG3-14A01
KG3-18A01
KG3-22A01

KG3-10A00-40
KG3-14A00-40
KG3-18A00-40
KG3-22A00-40

KG3-24A00
KG3-32A00
KG3-40A00



DC operated

K3-10A10=
K3-14A10=
K3-18A10=
K3-22A10=

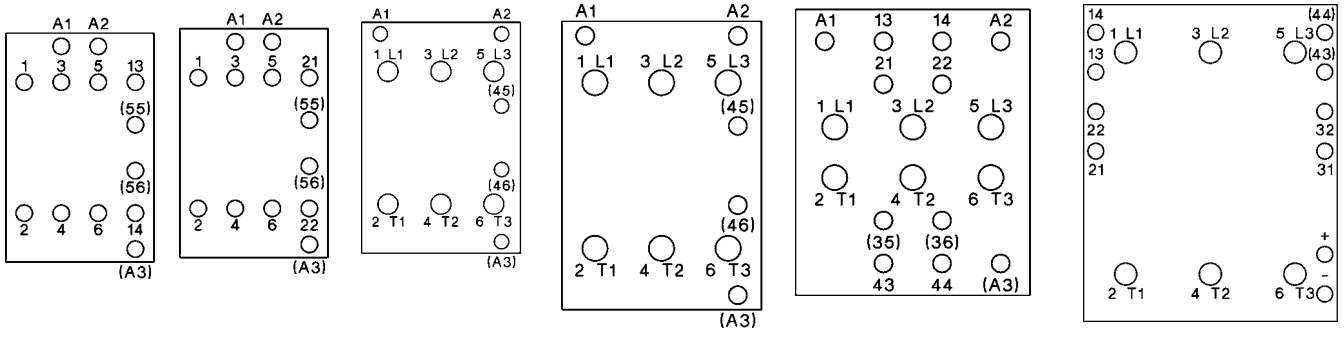
K3-10A01=
K3-14A01=
K3-18A01=
K3-22A01=

K3-24A00=
K3-32A00=
K3-40A00=

K3-50A00=
K3-62A00=
K3-74A00=

K85A21=
K110A21=

K3-1000A12=
K3-1200A12=



Star-Delta Starters Open Type — AC Operated

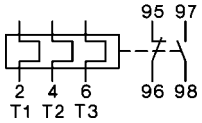
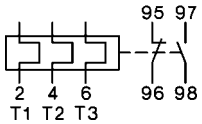
Ratings AC3 380V 400V 415V kW	500V kW	660V 690V kW	Rated Current AC3 400V A	Wired to accept Overload Relay Relay Type	Type 230 400 ↓	Coil voltage [1] 220-240V 50Hz 380-415V 50Hz	Pack pcs.	Weight kg/pc.
7,5	7,5	11	16	U3/32 U12/16	**K3Y15 . . .**		1	0,9
15	18,5	15	30	U3/32 U12/16	**K3Y26 . . .**		1	0,9
22	30	22	45	U3/42	**K3Y40 . . .**		1	1,4
30	37	30	60	U3/42	**K3Y52 . . .**		1	1,8
45	55	45	85	U3/74	**K3Y80 . . .**		1	3,5
55	75	55	109	U3/74	**K3Y100 . . .**		1	3,7
AC3 380V 415V kW	500V kW	690V kW	AC3 400V A	Wired to accept Overload Relay Type	Type 230 ↓	Coil voltage [1] 220-230V 50Hz		
75	90	90	150	U85	**K2Y140 230**		1	5,5
110	132	110	205	U85	**K2Y200 230**		1	5,7
150	160	170	285	U205	**K3Y250 . . .**		1	15
200	220	250	363	U205	**K3Y315 . . .**		1	19

1) Coil voltage range and other coil voltages see page 82

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: K2Y200 230 + U85 120**

Thermal Overload Relays

Rated Motor Current A			Type	Price	Pack pcs.	Weight kg/pc.
For Star-Delta Starters K3Y15.. to K3Y52..						
7	- 10,5		**U3/32 6**		1	0,10
10,5	- 15,5		**U3/32 9**		1	0,10
14	- 19		**U3/32 11**		1	0,10
18	- 24		**U3/32 14**		1	0,10
23	- 31		**U3/32 18**		1	0,10
30	- 41		**U3/32 24**		1	0,10
40	- 55		**U3/32 32**		1	0,13
For Star-Delta Starters K3Y40.., K3Y52..						
18	- 24		**U3/42 14**		1	0,30
24	- 35		**U3/42 20**		1	0,30
35	- 48		**U3/42 28**		1	0,30
48	- 73		**U3/42 42**		1	0,30

hand- and auto reset

hand- and auto reset

Components for Combinations Line Contactor K1 Type	Delta Contactor K2 Type	Star Contactor K3 Type	Electronic Timer K4 Type	Mechanical Interlock between K2 and K3 Type	Auxiliary Contacts Built-in for use on Contactor Line K1 NO/NC	Delta K2 NO/NC	Star K3 NO/NC	Free Space for Aux. Contact Blocks on Contactor Line K1 HN.. or HA..	Delta K2	Star K3
K3-10A01 + HN10	K3-10A01	K3-10A10 + HN10 + HN01	Y9A	LG10889	-	-	-	3	4	2
K3-18A01 + HN10	K3-18A01	K3-14A10 + HN10 + HN01	Y9A	LG10889	-	-	-	3	4	2
K3-24A00 + HN10 + HN01	K3-24A00 + HN01	K3-18A10 + HN10 + HN01	Y9A	LG10889	-	-	-	2	3	2
K3-32A00 + HN10 + HN01	K3-32A00 + HN01	K3-24A00 + 2HN10 + HN01	Y9A	LG10889	-	-	-	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
K85A22	K85A22	K85A22	Y9A	LG8511	1/1	2/1	-/1	-	-	-
K110A22	K110A22	K85A22	Y9A	LG8511	1/1	2/1	-/1	-	-	-
K3-176A00 + HKA11	K3-176A00 + HKA11	K85A22	Y9A	-	-	1/-	-/1	1	1	-
K3-200A21	K3-200A21	K110A22	Y9A	-	1/-	2/-	-/1	1	1	-

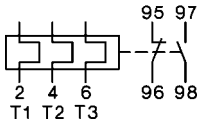
Applications

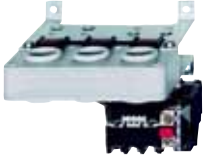
The star-delta starting method is only practicable in such cases where the motor windings are connected in delta configuration for normal operation and the torque which is needed during the starting period is not higher than approx. 30% of the rated torque. The starting current drawn from the line will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

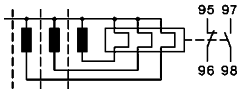
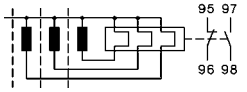
Time setting

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.
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
	hand- and auto reset			



For Star-Delta Starters K2Y140.., K2Y200..				
104 -156 140 -207	 hand reset	**U85 90** **U85 120**	1 1	0,90 0,90
For Star-Delta Starters K3Y250.., K3Y315..				
175 - 260 240 - 380		**U205 150** **U205 210**	1 1	1,5 1,5
Busbar sets for U205 with K3Y250 for U205 with K3Y315	hand reset	**SU205/176** **SU205/200**	1 1	0,6 0,7

Star-Delta Starters Enclosed Type — AC Operated

Ratings AC3 380V 400V 415V kW	500V kW	660V 690V kW	Rated Current AC3 400V A	Optional Extras	Wired to accept Overload Relay Type	Type 230 400 ↓	Coil voltage [1] 220-240V 50Hz 380-415V 50Hz Order No.	Pack pcs.	Weight kg/pc.
Plastic Enclosed, protected to IP65									
									
15	18,5	15	30	ST	U3/32 U12/16	**K3Y26P . . .**		1	1,8
22	30	22	45	ST, H	U3/42	**K3Y40P . . .**		1	3,8
30	37	30	60	ST, H	U3/42	**K3Y52P . . .**		1	4,2
45	55	45	85	ST, H	U3/74	**K3Y80P . . .**		1	5,9
55	75	55	109	ST, H	U3/74	**K3Y100P . . .**		1	8,7
75	90	90	150	ST, H	U85	**K2Y140P . . .**		1	8,9
Sheet Steel Enclosed, protected to IP54									
									
15	18,5	15	30	ST, H	U3/32 U12/16	**K3Y26B . . .**		1	4,8
22	30	22	45	ST, H	U3/42	**K3Y40B . . .**		1	4,8
30	37	30	60	ST, H	U3/42	**K3Y52B . . .**		1	5,2
45	55	45	85	ST, H	U3/74	**K3Y80B . . .**		1	15
55	75	55	109	ST, H	U3/74	**K3Y100B . . .**		1	15
75	90	90	150	ST, H	U85	**K2Y140B . . .**		1	22
110	132	110	205	ST, H	U85	**K2Y200B . . .**		1	22

1) Coil voltage range and other coil voltages see page 80

Type-suffix for optional extras

Start-Stop Push Buttons		**. . . . . .T . . .**
Selector Switch		**. . . . . .W . . .**
Typical wiring diagrams see page 86		
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				
				
K3Y15, K3Y26	U3/32, U12/16	**K3Y26P-G3**	1	1,0
K3Y40, K3Y52	U3/42, U3/32	**K3Y40/52P-G3**	1	2,4
Sheet Steel IP54				
K3Y15, K3Y26	U3/32, U12/16	**K3Y26B-G3**	1	3,4
K3Y40, K3Y52	U3/42, U3/32	**K3Y40/52B-G3**	1	3,4

Additional Terminals

For Star-Delta Starter Types Line Conn. Line Contactor	 Motor Conn. Overload Relay	Cable cross-section mm²	**Type**	**Order No.**	Pack pcs.	Weight kg/pc.
Single pole with Fingertouch Protection						
K3Y15, K3Y26	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

Rated Control Voltage V	Time Range s	Delay Time ms	Rated Current AC15 230V A	 400V A	**Type**	**Order No.**	Pack pcs.	Weight kg/pc.
24 - 60V AC	1 - 20	20 - 25	6	4	**Y9A 60**		1	0,075
110 - 415V AC	1 - 20	20 - 25	6	4	**Y9A 415**		1	0,075
24 - 60V AC	10 - 60	40 - 60	6	4	**Y91A 60**		1	0,075
110 - 415V AC	10 - 60	40 - 60	6	4	**Y91A 415**		1	0,075

Time repeat accuracy	± 1%	Power consumption at	24V	0,2VA
			60V	5VA
Minimum interval between operations	2s			
			220-240V	2VA
Short circuit protection	4A gl (gG)		380-415V	7VA

Mounting Bar

Specification	**Type**	**Order No.**	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 86.

Ordering Example: K3Y**L**52S 230

Starters with two Thermal Overload Relays on request

Principal wiring diagram see page 86

Reversing Contactors with Mechanical Interlock — AC Operated

Ratings AC3 **380V** **400V** **415V** **kW**	500V kW	660V 690V kW	Rated Current AC3 400V A	Wired to accept Overload Relay page 102 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 U12/16	**K3WU10 . . .**	1	0,6
7,5	10	10	18	U3/32 U12/16	**K3WU18 . . .**	1	0,6
11	15	15	24	U3/42	**K3WU24 . . .**	1	1,2
15	18,5	18,5	32	U3/42	**K3WU32 . . .**	1	1,4
22	30	30	50	U3/74	**K3WU50 . . .**	1	2,5
30	37	37	62	U3/74	**K3WU62 . . .**	1	2,5
37	45	45	74	U3/74	**K3WU74 . . .**	1	2,5
45	55	55	85	U85	**KWU85 . . .**	1	5,3
55	75	55	110	U85	**KWU110 . . .**	1	5,6

Sheet Steel Enclosed, protected to IP54							
4	5,5	5,5	10	U3/32 U12/16	**K3WU10B . . .**	1	3,9
7,5	10	10	18	U3/32 U12/16	**K3WU18B . . .**	1	4,1
11	15	15	24	U3/42	**K3WU24B . . .**	1	4,5
15	18,5	18,5	32	U3/42	**K3WU32B . . .**	1	4,7
22	30	30	50	U3/74	**K3WU50B . . .**	1	7,1
30	37	37	62	U3/74	**K3WU62B . . .**	1	7,1

1) Other coil voltages see page 40

Components for Combinations Left Hand Side Contactor	Right Hand Side Contactor	Mechanical Interlock	Auxiliary Contacts Built-in for use on Contactor		Free Space for Aux. Contact Blocks on Contactor	
K1 Type	K2 Type	Type	K1 NO/NC	K2 NO/NC	K1 HN.. or HA..	K2
K3-10A10 + HN01	K3-10A10 + HN01	LG10889	-	-	3	3
K3-18A10 + HN01	K3-18A10 + HN01	LG10889	-	-	3	3
K3-24A00 + HN10 + HN01	K3-24A00 + HN10 + HN01	LG10889	-	-	2	2
K3-32A00 + HN10 + HN01	K3-32A00 + HN10 + HN01	LG10889	-	-	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
K85A22	K85A22	LG8511	1/1	1/1	-	-
K110A22	K110A22	LG8511	1/1	1/1	-	-
K3-10A10 + HN01	K3-10A10 + HN01	LG10889	-	-	3	3
K3-18A10 + HN01	K3-18A10 + HN01	LG10889	-	-	3	3
K3-24A00 + HN10 + HN01	K3-24A00 + HN10 + HN01	LG10889	-	-	2	2
K3-32A00 + HN10 + HN01	K3-32A00 + HN10 + HN01	LG10889	-	-	2	2
K3-50A00 + HN10 + HN01	K3-50A00 + HN10 + HN01	LG10890	-	-	2	2
K3-62A00 + HN10 + HN01	K3-62A00 + HN10 + HN01	LG10890	-	-	2	2

Reversing Contactors for North America — AC Operated

Ratings AC3 **380V** **400V** **415V** **kW**	500V kW	660V 690V kW	Rated Current AC3 400V A	Wired to accept Overload Relay page 102 Type	**Type** **230** **400** ↓	Coil voltage [1] 220-240V 50Hz 380-415V 50Hz Pack pcs.	Weight> kg/pc.
Open Type							
4	5,5	5,5	10	U3/32 U12/16	**KW3-10 . . .**	1	0,6
7,5	10	7,5	18	U3/32 U12/16	**KW3-18 . . .**	1	0,6
11	15	15	24	U3/42	**KW3-24 . . .**	1	1,2
15	18,5	18,5	32	U3/42	**KW3-32 . . .**	1	1,4
22	30	30	50	U3/74	**KW3-50 . . .**	1	2,5
30	37	37	62	U3/74	**KW3-62 . . .**	1	2,5
37	45	45	74	U3/74	**KW3-74 . . .**	1	2,5
55	75	55	110	U85	**KW110 . . .**	1	5,6

Pole Changing Starters — AC Operated

Ratings AC3 at **380V** **400V** **415V** **kW**	500V kW	660V 690V kW	Rated Current AC3 400V A	Wired to accept Overload Relay page 102 Type	**Type** **230** **400** ↓	Coil voltage [1] 220-240V 50Hz 380-415V 50Hz Pack pcs.	Weight> kg/pc.
Open Type							
7,5	10	7,5	18	2 x U3/32 2 x U12/16	**K3PU18 . . .**	1	1,0
11	15	15	24	2 x U3/32 2 x U12/16	**K3PU24 . . .**	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	2 x U3/74	**K3PU62 . . .**	1	3,9
Sheet Steel Enclosed, protected to IP54							
7,5	10	7,5	18	2 x U3/32 2 x U12/16	**K3PU18B . . .**	1	1,0
11	15	15	24	2 x U3/32	**K3PU24B . . .**	1	1,5
15	18,5	18,5	32	2 x U3/32	**K3PU32B . . .**	1	1,9

1) Other coil voltages see page 40

Ordering Example: Pole Changing Starter, open version, rated AC3 at 400V 28A and 15A, control voltage 230V 50Hz
Order Type: **K3PU32 230 + U32 28 + U12/16E 18**

Pole Changing Starters for Star-Delta Operation on request

Components for Combinations			Auxiliary Contacts		Free Space for	
Left Hand Side Contactor	Right Hand Side Contactor	Mechanical Interlock	Built-in for use on Contactor		Aux. Contact Blocks on Contactor	
K1 Type	K2 Type	Type	K1 NO/NC	K2 NO/NC	K1 HN.. or HA..	K2
K3-10A01	K3-10A01	LG10889	-	-	4	4
K3-18A01	K3-18A01	LG10889	-	-	4	4
K3-24A00 + HN01	K3-24A00 + HN01	LG10889	-	-	3	3
K3-32A00 + HN01	K3-32A00 + HN01	LG10889	-	-	3	3
K3-50A00 + HN01	K3-50A00 + HN01	LG10890	-	-	3	3
K3-62A00 + HN01	K3-62A00 + HN01	LG10890	-	-	3	3
K3-74A00 + HN01	K3-74A00 + HN01	LG10890	-	-	3	3
K110A22	K110A22	LG8511	2/1	2/1	-	-

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 HN.. or HA..	K2	K3
K3-18A01 + 2 x HN10	K3-18A01 + HN10	K3-14A10	2	3	4
K3-24A00 + HN01 + 2 x HN10	K3-24A00 + HN01 + HN10	K3-18A10	1	2	4
K3-32A00 + HN01 + 2 x HN10	K3-32A00 + HN01 + HN10	K3-24A00 + HN10	1	2	3
K3-50A00 + HN01 + 2 x HN10	K3-50A00 + HN01 + HN10	K3-32A00 + HN10	1	2	3
K3-62A00 + HN01 + 2 x HN10	K3-62A00 + HN01 + HN10	K3-50A00 + HN10	1	2	3
K3-18A01 + 2 x HN10	K3-18A01 + HN10	K3-14A10	2	3	4
K3-24A00 + HN01 + 2 x HN10	K3-24A00 + HN01 + HN10	K3-18A10	1	2	4
K3-32A00 + HN01 + 2 x HN10	K3-32A00 + HN01 + HN10	K3-24A00 + HN10	1	2	3

Star-Delta Starters

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

Type			K3Y15	K3Y26	K3Y40	K3Y52	K3Y80	K3Y100	K2Y140	K2Y200	K3Y250	K3Y315
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	285	363
current I_e	240V	A	16	30	45	60	85	109	150	205	285	363
	380-400V	**A**	**16**	**30**	**45**	**60**	**85**	**109**	**150**	**205**	285	363
	415-440V	A	15	30	45	60	85	109	150	205	285	363
	500V	A	15	30	45	60	85	95	150	205	240	330
	660-690V	A	13	17	30	36	57	72	103	118	180	255
Rated operational power	220-230V	kW	4	7,5	11	15	22	30	45	55	90	110
of three-phase motors	240V	kW	5,5	11	15	18,5	22	30	45	55	90	110
50-60Hz	**380-400V**	**kW**	**7,5**	**15**	**22**	**30**	**45**	**55**	**75**	**110**	**150**	**200**
	415-440V	kW	7,5	15	22	30	45	55	75	110	160	200
	500V	kW	7,5	18,5	30	37	55	75	90	132	160	220
	660-690V	kW	11	15	22	30	45	55	90	110	170	250
Cable cross-sections												
Line	solid or stranded	mm²	1,5 - 6 [2]		1,5 - 16		10 - 70 [3]		busbar		busbar	busbar
	flexible	mm²	1,5 - 4 [2]		1,5 - 16		16 - 50 [3]		20x4		18x5	22x5
	flexible with multicore cable end	mm²	1,5 - 4 [2]		1,5 - 16		10 - 35		M8		M8	M10
Motor												
	solid or stranded	mm²	1,5 - 6		1,5 - 16		4 - 35 [3]		10 - 70 [3]		busbar	busbar
	flexible	mm²	1,5 - 4		1,5 - 16		6 - 25 [3]		16 - 50 [3]		18x5	22x5
	flexible with multicore cable end	mm²	1,5 - 4		1,5 - 16		4 - 25		10 - 35		M8	M10
Power consumption of the combination												
	inrush and change-over	VA	55	55	130	130	183	183	375	450	670	1170
	sealed	VA	20	20	26	26	36	36	46	58	240	132
		W	6	6	8	8	14	14	12	15	-	-

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

K3Y15.. 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**	**240**	**264**
400	**380**	**415**	**415**	**415**

Standard voltages in bold type letters

K2Y140, K2Y200..

Suffix to Star-Delta Starter type e.g. K2Y200 **230**	Rated Control Voltage U_s range for 50Hz min. V	max. V	range for 60Hz min. V	max. V
24	24	27	29	32
42	42	47	50	56
110	110	122	132	146
180	180	200	208	240
230	**220**	**240**	**264**	**288**
400	**380**	**415**	**-**	**-**

Standard voltages in bold type letters

K3Y250, K3Y315..

Suffix to Star-Delta Starter type e.g. K3Y250 **230**	Rated Control Voltage U_s range for 50Hz min. V	max. V	range for 60Hz min. V	max. V
230	**220**	**230**	**-**	**-**
400	**380**	**400**	**-**	**-**

1) Suitable for: earthed-neutral systems, overvoltage category I to IV, pollution degree 3 (standard-industry): Uimp = 8kV. Data for other conditions on request.
2) Additional terminals see page 77
3) Maximum cable cross-section with prepared conductor

Reversing Starters

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

Type			K3WU10	K3WU18	K3WU24	K3WU32	K3WU50	K3WU62	KWU85	KWU110
Main Contacts										
Rated insulation voltage U_i [1]		V AC	690	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	85	110
	230V	A	11,5	17,5	23	30	45	60	85	110
	240V	A	11	17	23	30	45	60	85	110
	380-400V	**A**	**10**	**16**	**23**	**30**	**45**	**60**	**85**	**110**
	415-440V	A	9	16	23	30	45	60	85	110
	500V	A	9	16	23	30	45	55	85	110
	660-690V	A	7	9	17,5	21	33	42	60	60
Rated operational power	220-230V	kW	3	5	6	8,5	12,5	18,5	25	33
of three-phase motors	240V	kW	3	5	7	9	13,5	19	27	35
50-60Hz	**380-400V**	**kW**	**4**	**7,5**	**11**	**15**	**22**	**30**	**45**	**55**
	415-440V	kW	4,5	8,5	12	16	24	33	49	63
	500V	kW	5,5	10	15	18,5	30	37	55	75
	660-690V	kW	5,5	7,5	15	18,5	30	37	55	55
Cable cross-sections										
Line	solid or stranded	mm²	0,75 - 6		1,5 - 25		4 - 50		10 - 70	
	flexible	mm²	1 - 4		2,5 - 16		6 - 35		16 - 50	
	flexible with multicore cable end	mm²	0,75 - 4		1,5 - 16		6 - 35		10 - 35	
Cables per clamp			1		1		1		1	
Power consumption of the combination										
	inrush and change-over	VA	33 - 45		90 - 115		140 - 185		350 - 420	
	sealed	VA	7 - 10		9 - 13		13 - 18		23 - 29	
		W	2,6 - 3		2,7 - 4		5,4 - 7		6 - 7,3	

Technical Data according to UL508

Main Contacts (cULus)		Type	KW3-10	KW3-18	KW3-24	KW3-32	KW3-50	KW3-62	KW3-74	KW110
Rated operational power	110-120V	hp	1½	2	5	5	10	10	10	-
of three-phase motors	200V	hp	3	5	7½	10	15	20	25	30
at 60Hz (3ph)	220-240V	hp	3	7½	10	10	20	25	30	40
	277V	hp	3	7½	7½	10	20	25	30	-
	380-415V	hp	5	10	10	15	25	30	40	-
	440-480V	hp	5	10	15	20	30	40	50	75
	550-600V	hp	7½	15	20	25	40	50	50	100
Fuses		A	30	50	90	125	175	225	250	300
Suitable for use on a capability										
of delivering not more than	rms	A	5000	5000	5000	5000	5000	5000	5000	10000
		V	600	600	600	600	600	600	600	600
Auxiliary Contacts (cULus)			A600	A600	A600	A600	A600	A600	A600	A600
Cable cross-sections										
for main connectors	solid	AWG	18 - 10		16 - 10		12 - 10		10	
	flexible	AWG	18 - 10		14 - 4		10 - 6		6 - 0	
Cables per clamp			1		1		1		1	

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

Pole Changing Starters

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

Type			K3PU18	K3PU24	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 - 4 [2]	1,5 - 10 [2]	1,5 - 10 [2]	4 - 35 [2]	4 - 35 [2]
	flexible	mm²	0,75 - 2,5	1,5 - 6	1,5 - 6	6 - 25 [2]	6 - 25 [2]
	flexible with multicore cable end	mm²	0,5 - 2,5	1,5 - 6	1,5 - 6	4 - 25	4 - 25
Motor	solid or stranded	mm²	0,75 - 6 [2]	0,75 - 6 [2]	0,75 - 10 [2]	4 - 35 [2]	4 - 35 [2]
(high speed)	flexible	mm²	0,75 - 4 [2]	0,75 - 4 [2]	0,75 - 6	6 - 25 [2]	6 - 25 [2]
	flexible with multicore cable end	mm²	0,5 - 2,5	0,5 - 2,5	0,75 - 6	4 - 25	4 - 25
Motor	solid or stranded	mm²	0,75 - 6 [2]	0,75 - 6 [2]	0,75 - 6 [2]	4 - 35 [2]	4 - 35 [2]
(low speed)	flexible	mm²	0,75 - 4 [2]	0,75 - 4 [2]	0,75 - 4 [2]	6 - 25 [2]	6 - 25 [2]
	flexible with multicore cable end	mm²	0,5 - 2,5	0,5 - 2,5	0,5 - 2,5	4 - 25	4 - 25
Power consumption of the combination							
	inrush and change-over	VA	55	125	128	178	178
	sealed	VA	20	23	26	31	31
		W	6	7	8	11	11

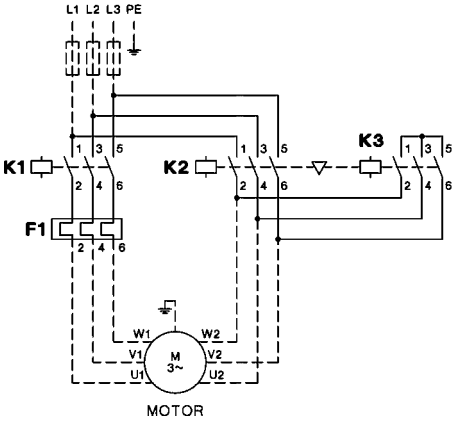
1) Suitable for: earthed-neutral systems, overvoltage category I to IV, pollution degree 3 (standard-industry): Uimp = 8kV. Data for other conditions on request.

Star-Delta Starters

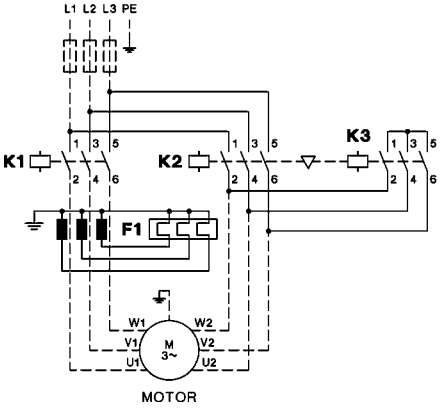
Wiring Diagrams Main Circuit

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

K3Y15 to K3Y100
with thermal overload relay U3/.. or U12/16

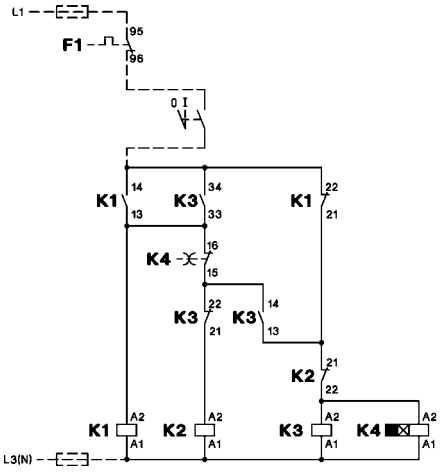


K2Y140 to K3Y315
with thermal overload relay U85 or U205

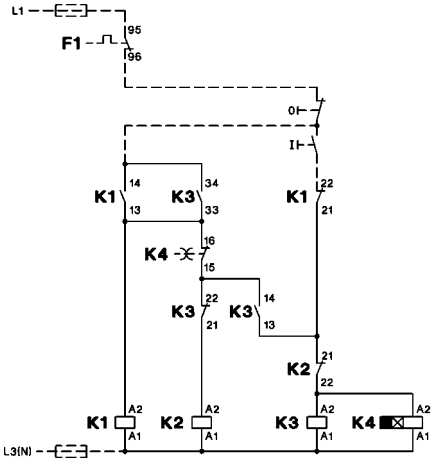


Wiring Diagrams Control Circuit

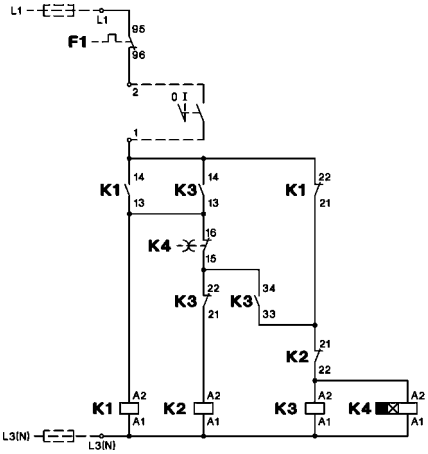
K3Y15 to K3Y52
operating with control switch



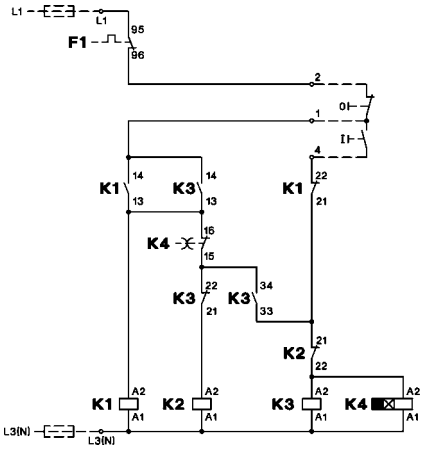
K3Y15 to K3Y52
operating with push buttons



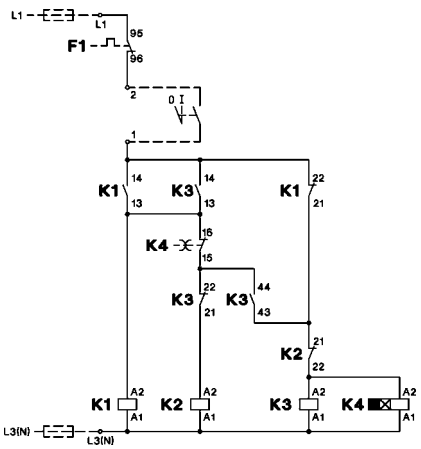
K3Y80, K3Y100
operating with control switch



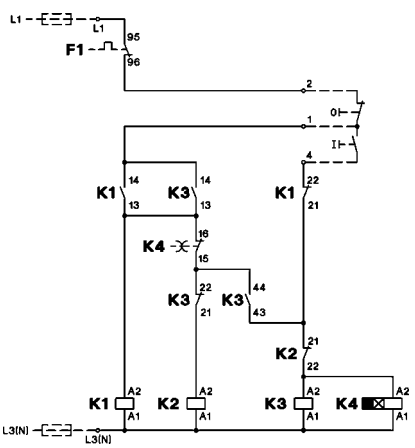
K3Y80, K3Y100
operating with push buttons



K2Y140 to K3Y315
operating with control switch



K2Y140 to K3Y315
operating with push buttons

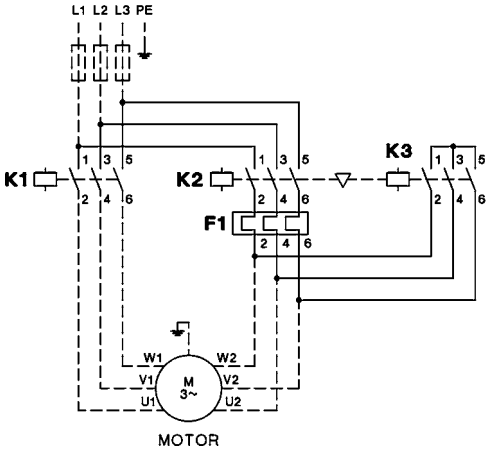


Star-Delta Starters

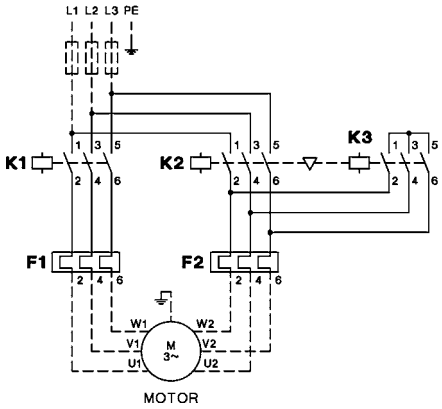
Wiring Diagrams Main Circuit

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

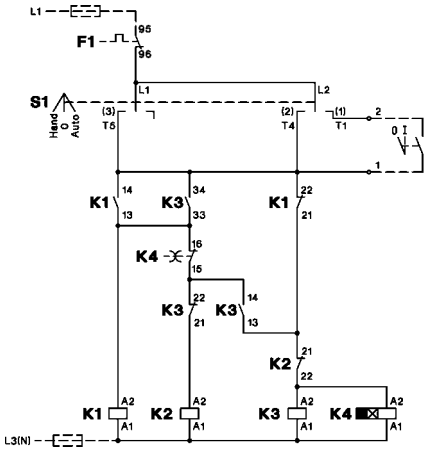


K3Y.. with 2 Thermal Overload Relays
Typical circuit diagram

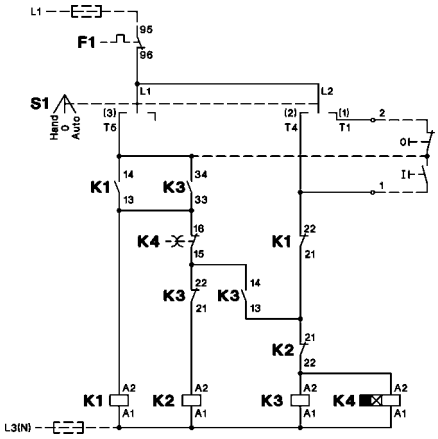


Wiring Diagrams Control Circuit

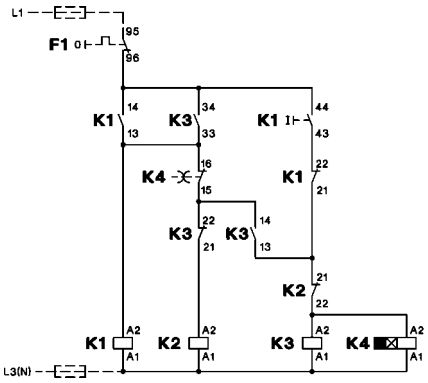
with selector switch
K3Y..W
Typical circuit diagram
operating with control switch



Typical circuit diagram
operating with push buttons



with push buttons
K3Y..T
Typical circuit diagram

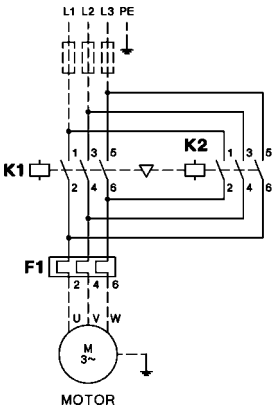


Reversing Contactors

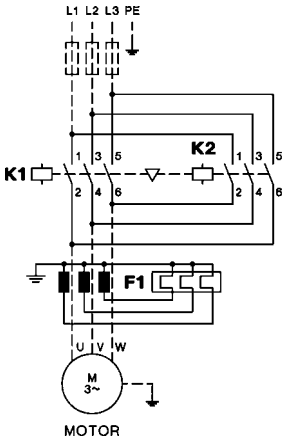
Wiring Diagrams Main Circuit

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

K3WU10 to K3WU74
with thermal overload relay U3/32, U3/42 or U3/74

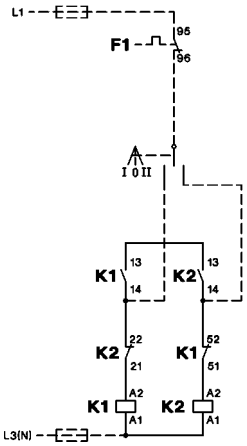


KWU85, KWU110
with thermal overload relay U85

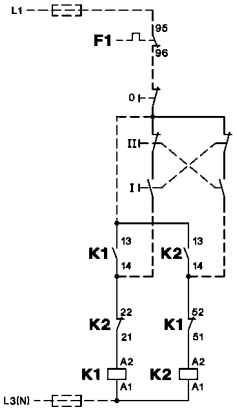


Wiring Diagrams Control Circuit

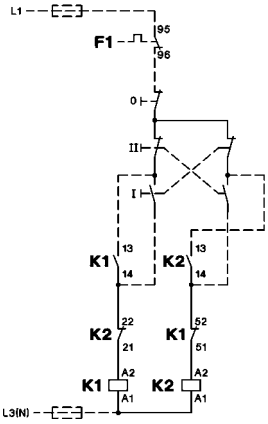
K3WU10 to K3WU32
operating with control switch



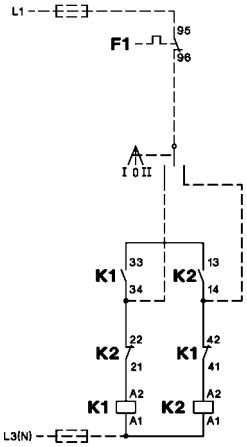
operating with push buttons
Reversing over off-position



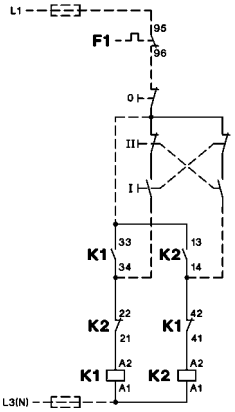
Reversing direct



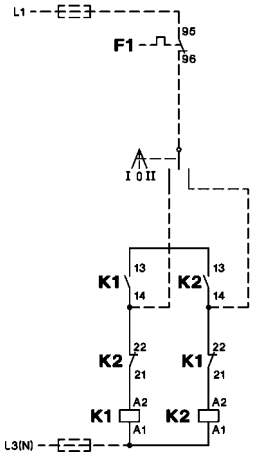
K3WU50, K3WU62, K3WU74
operating with control switch



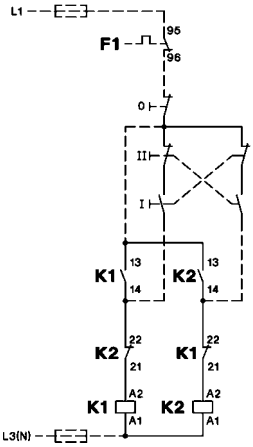
operating with push buttons



KWU85, KWU110
operating with control switch



operating with push buttons

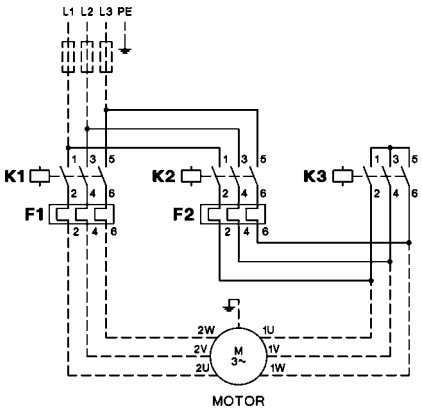


Pole Changing Starters

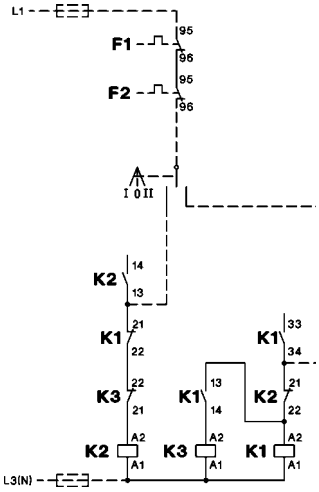
Wiring Diagrams

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

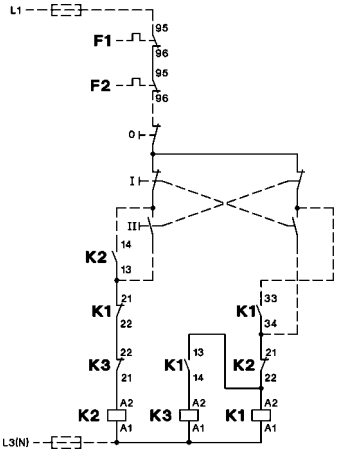
Main Circuit



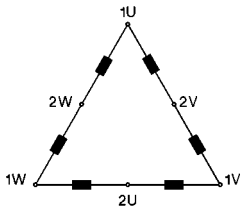
Principal Control Circuit Wiring Diagram
operating with control switch

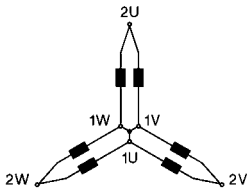


operating with push buttons

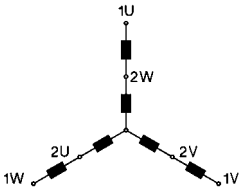


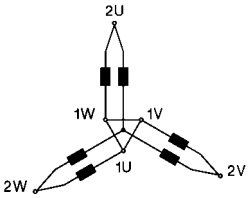
	Low speed	High speed
Operation	Delta	Double-Star
Speed relation	1	2
Power relation	1	1,5 - 1,8





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



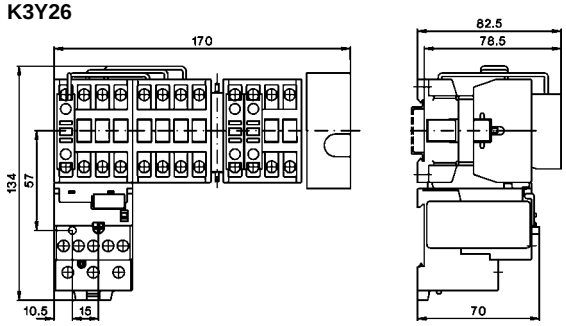


Star-Delta Starters

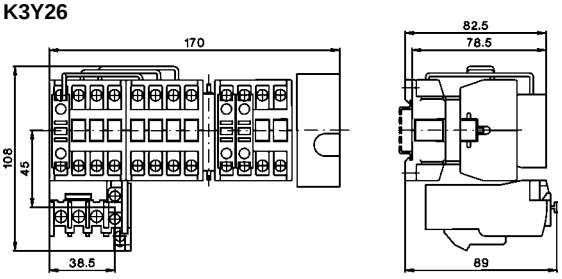
Dimensions

Star-Delta Starters, AC operated, open type

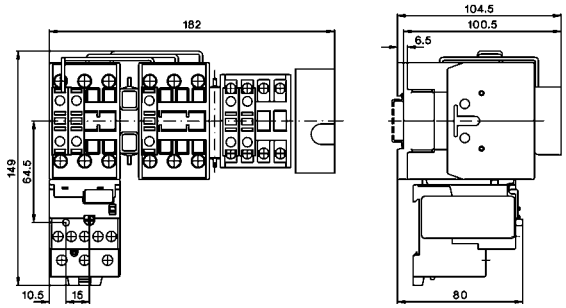
K3Y15 + U3/32
K3Y26



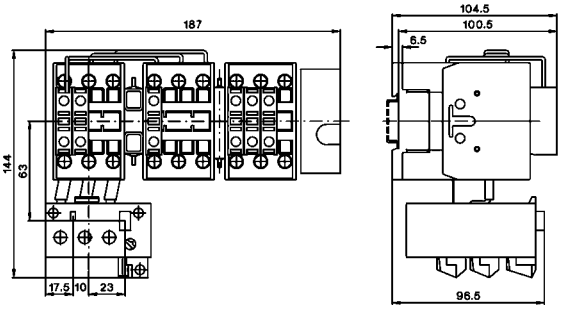
K3Y15 + U12/16
K3Y26



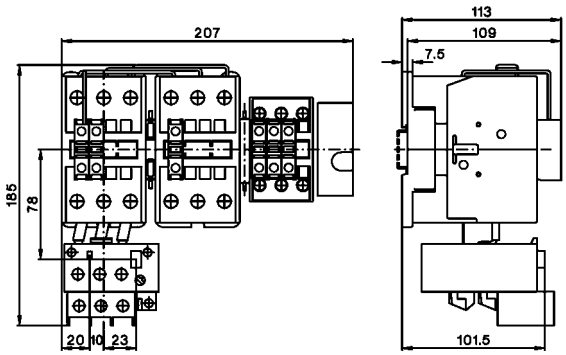
K3Y40 + U3/32



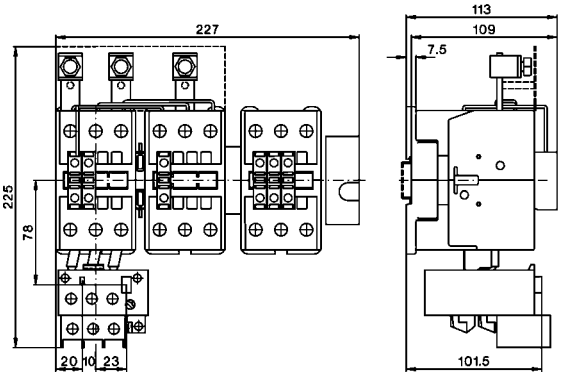
K3Y52 + U3/42



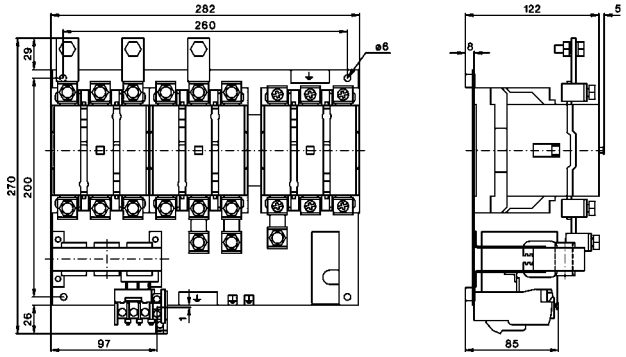
K3Y80 + U3/74



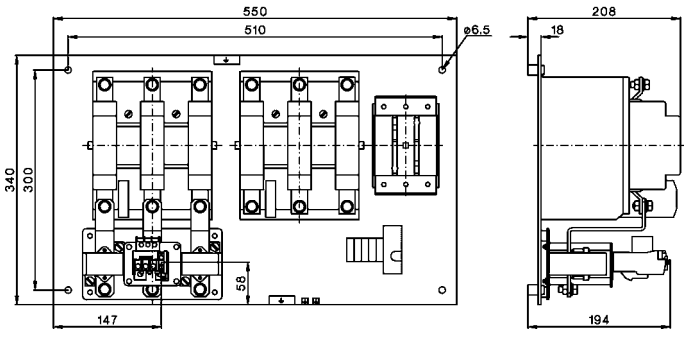
K3Y100 + U3/74



K2Y140 + U85
K2Y200



K3Y250 + U205
K3Y315

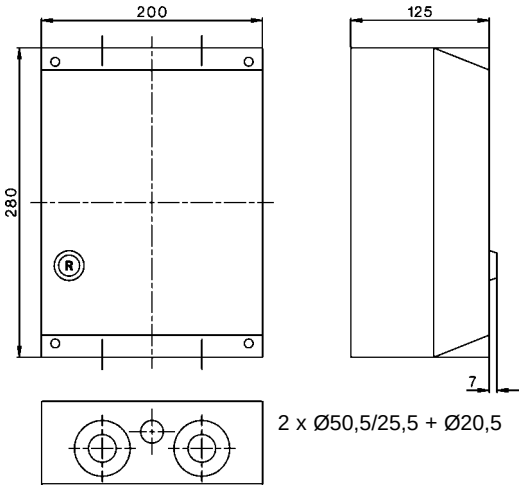


Star-Delta Starters

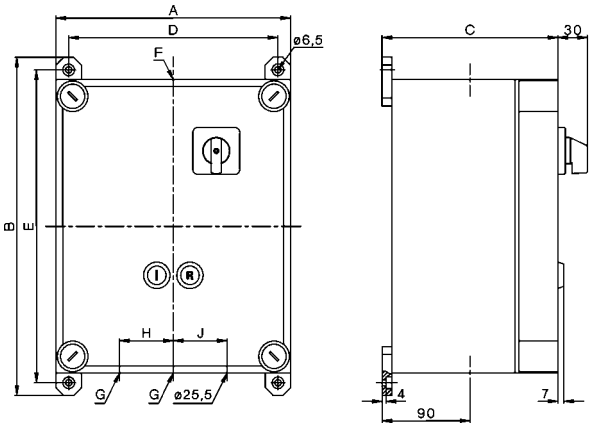
Dimensions

Star-Delta Starters, plastic enclosed, protected to IP65

K3Y26P



K3Y40P to K2Y140P



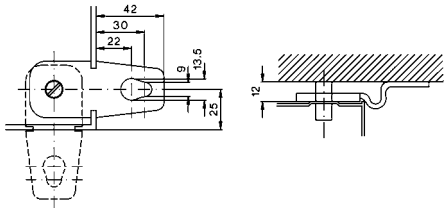
Type	A	B	C	D	E	Ø F	Ø G	H	J
K3Y40P	300	346	180	272	320	6,5	32,5	32,5	60	60
K3Y52P	300	346	180	272	320	6,5	32,5	32,5	60	60
K3Y80P	300	446	180	272	420	6,5	40,5	40,5	70	70
K3Y100P	300	446	180	272	420	6,5	50,5	40,5	70	70
K2Y140P	300	446	180	272	420	6,5	63,5	50,5	80	80

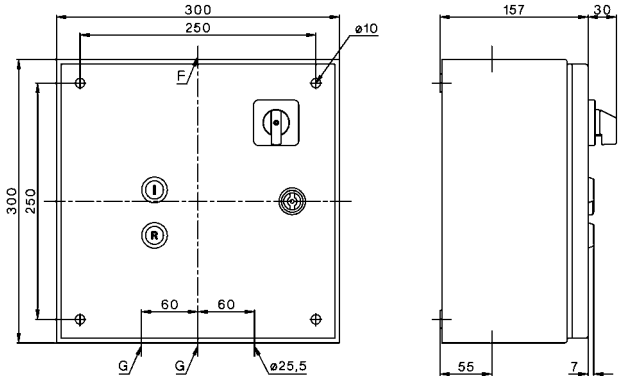
Star-Delta Starters, sheet steel enclosed, protected to IP54

K3Y26B to K3Y52B

Type	Ø F	Ø G
K3Y26B	25,5	25,5
K3Y40B	32,5	32,5
K3Y52B	32,5	32,5

Mounting by included fixing link

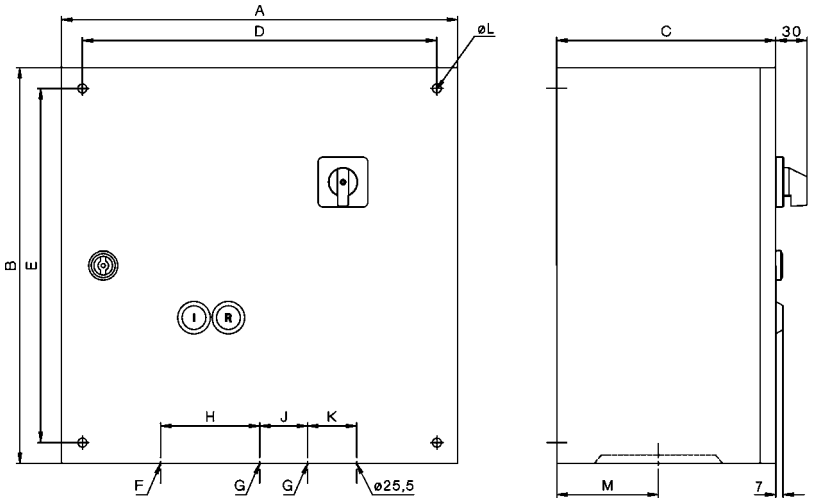




K3Y80B to K2Y200B

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
K2Y140B	380	600	210	560	340	8,7	65
K2Y200B	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
K2Y140B	50,5	50,5	80	80	70
K2Y200B	50,5	50,5	80	80	70

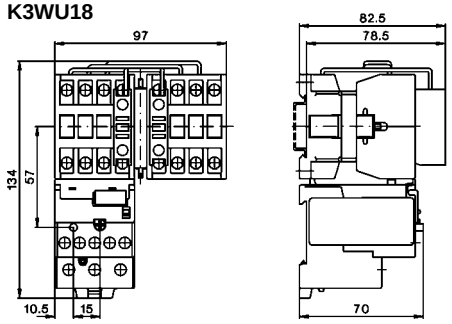


Reversing Contactors

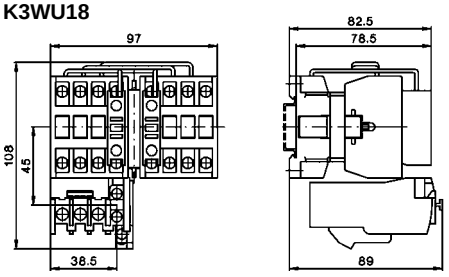
Dimensions

Reversing Starters, AC operated, open type

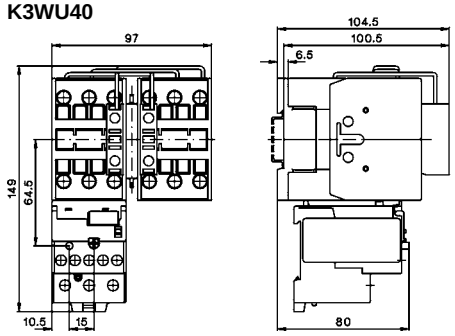
K3WU10 + U3/32
K3WU18



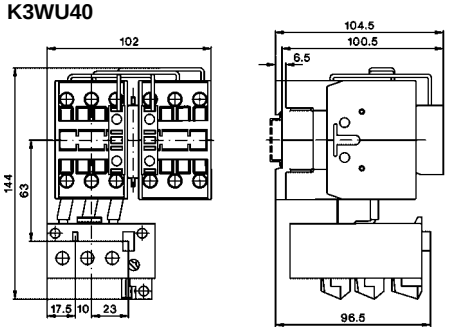
K3WU10 + U12/16
K3WU18



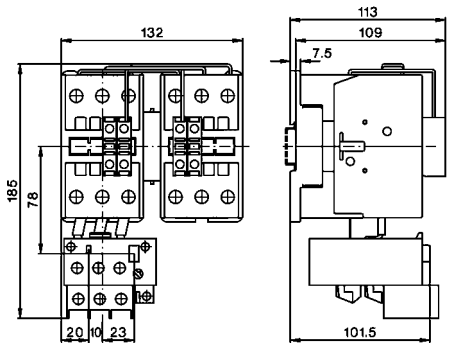
K3WU24 + U3/32
K3WU32
K3WU40



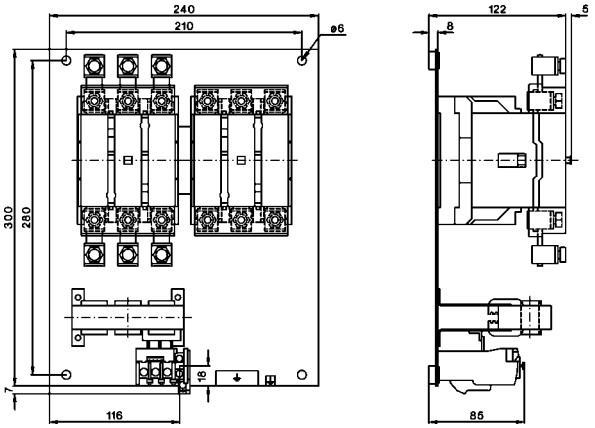
K3WU24 + U3/42
K3WU32
K3WU40



K3WU50 + U3/74
K3WU62
K3WU74

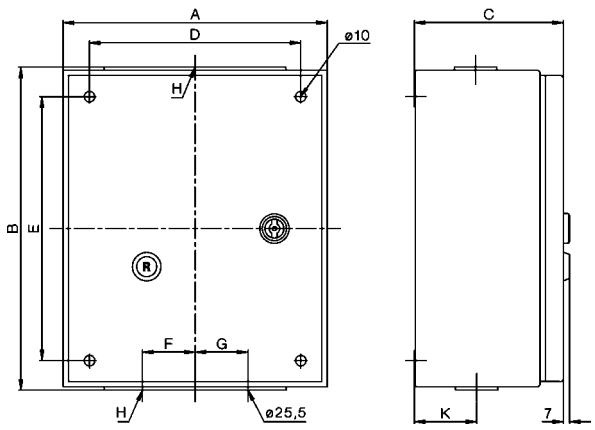


KWU85 + U85
KWU110

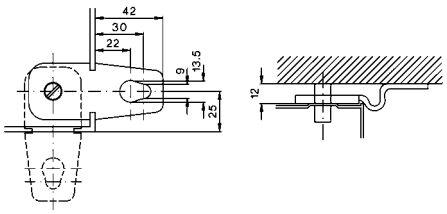


Reversing Contactors, sheet steel enclosed, protected to IP54

Type	A	B	C	D	E	F	G	H	K
K3WU18B	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

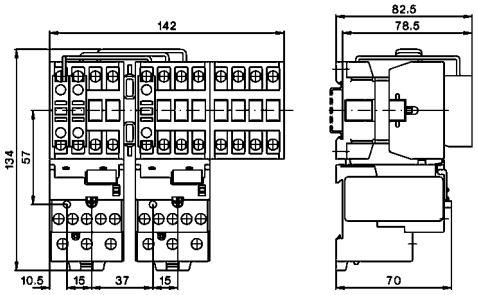


Pole Changing Starters

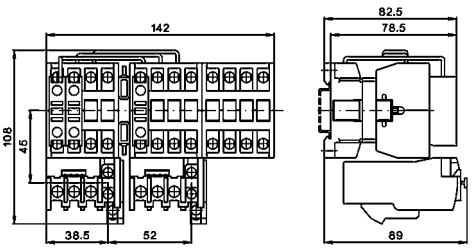
Dimensions

Pole Changing Starters, AC operated, open type

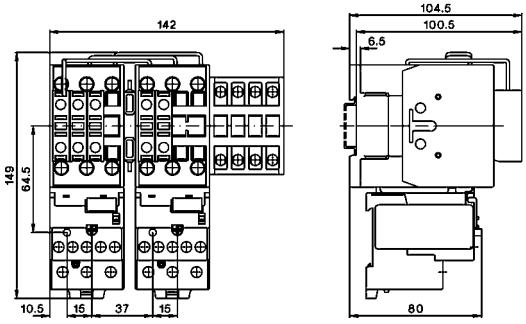
K3PU18 + 2x U3/32



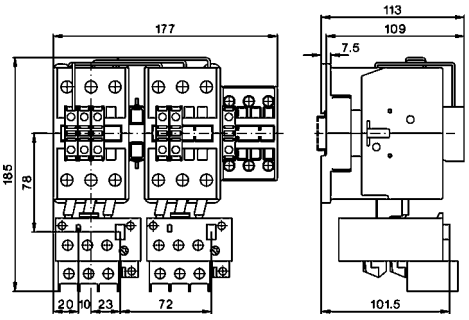
K3PU18 + 2x U12/16



K3PU24 + U3/32
K3PU32



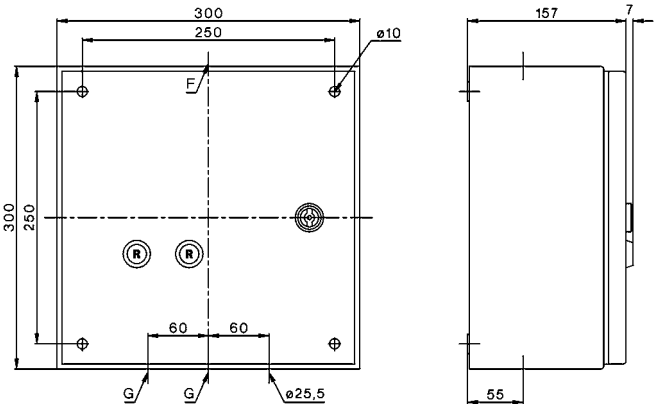
K3PU50 + 2x U3/74
K3PU62



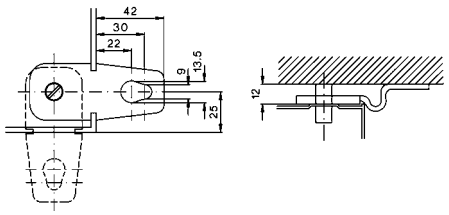
Pole Changing Starters, sheet steel enclosed, protected to IP54

K3PU18B to K3PU32B

Type	Ø F	Ø G
K3PU18B	25,5	25,5
K3PU24B	32,3	32,5
K3PU32B	32,3	32,5



Mounting by included fixing link



D.O.L. Starters In Plastic Enclosure

Ratings AC3 at 380V 400V 415V kW	Included Contactor Type	Free Space f. Aux. Cont. HN.. pcs.	Wired to accept Overload Relay Type	Protection Degree	Conduit Entries	Type 230 400 ↓	Coil voltage [1] 220-240V 50Hz 240V 60Hz 380-415V 50Hz 415-440V 60H. Pack pcs.	Weight kg/pc.

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

4	K2-09A10	2	U12/16	IP65	Ø 20,5mm	**P1T09 . . .**	1	0,6
7,5	K2-16A10	2	U12/16	IP65	Ø 20,5mm	**P1T16 . . .**	1	0,6
11	K2-23A10	3	U12/16	IP55	M32 + M25	**K2U23PT . . .**	1	1,3
15	K2-30A10	3	U12/16	IP55	M32 + M25	**K2U30PT . . .**	1	1,3

D.O.L. Starters With Selector Switch

4	K2-09A10	2	U12/16	IP65	Ø 20,5mm	**P1W09 . . .**	1	0,6
7,5	K2-16A10	2	U12/16	IP65	Ø 20,5mm	**P1W16 . . .**	1	0,6
11	K2-23A10	2	U12/16	IP54	M32 + M25	**K2U23PW . . .**	1	1,3
15	K2-30A10	2	U12/16	IP54	M32 + M25	**K2U30PW . . .**	1	1,3

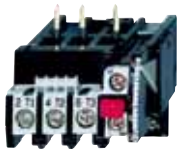
D.O.L. Starters With Selector Switch And Pneumatic Switch for moist rooms

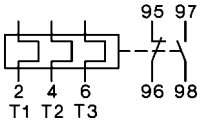
7,5	K2-16A10	2	U12/16	IP65	Ø 20,5mm	**P1W16P . . .**	1	0,6
	Push button and tube on request							

1) Non-standard coil voltages see page 40

Ordering Example: D.O.L. Starter with selector switch, plastic enclosed, rated AC3 at 400V 15,5A, rated control voltage 230V 50Hz **- Order Type: P1W16 230** + **U12/16E 18**

Thermal Overload Relays





hand reset

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

Overload Relays With Quick Tripping Characteristic for submersible pumps see page 104

Technical data see contactors page 54 and thermal overload relays page 106

Enclosures For Contactors

Suitable for contactor	Protection Degree	Conduit Entries Top	Conduit Entries Bottom	Type	Pack pcs.	Weight kg/pc.
K2-07.. to K2-16.. **K3-07.. to K3-22..** **K2-23..**[1] **to K2-37..**[1] **K3-24..**[1] **to K3-40..**[1]	IP65	2 x Ø 20,5mm	2 x Ø 20,5mm	**P1**	1	0,35
K2-23..[1], **K2-30..**[1]	IP55	M32 + M25	M32 + M25	**K30P**	1	0,7
K2-45..[1], **K2-60..**[1] **K3-50..**[1], **K3-62..**[1]	IP55	M32 + M25	M32 + M25	**K45/60P**	1	0,8

[1] without auxiliary contact blocks

Enclosures For D.O.L. Starters with reset button

Suitable for contactor	Protection Degree	Conduit Entries Top	Conduit Entries Bottom	Type	Pack pcs.	Weight kg/pc.
K2-09.. to K2-16.. **+U12/16**	IP65	2 x Ø 20,5mm	2 x Ø 20,5mm	**P1R**	1	0,35
K2-23.., K2-30.. **+U12/16 or U32**	IP55	M32 + M25	M32 + M25	**KU30P**	1	0,7

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

	Type	Pack pcs.	Weight kg/pc.
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 100

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	**K2-HR**	10	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
Earth Terminal	2,5-16	1,5-10	1,5-10	**LG9750**	10	0,052

Mounting instructions see page 100

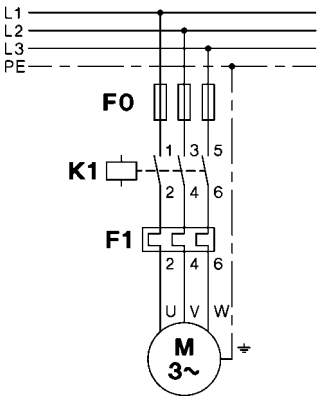
			Type	Pack pcs.	Weight kg/pc.
Start Contact	for contactor K2-09 to K2-16	to be snapped on top of the auxiliary contact	**LG9319**	10	0,03

D.O.L. Starters

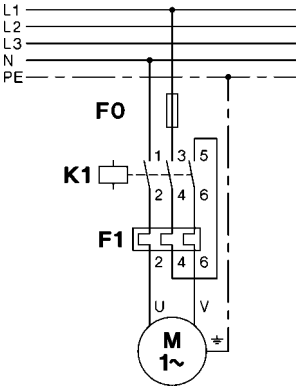
Wiring Diagrams Main Circuit

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

P1.09 to K2U30
with overload relay U12/16 or U32



Wiring for single phase motors



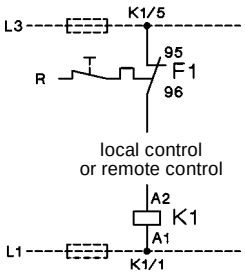
Wiring Diagrams Control Circuit

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

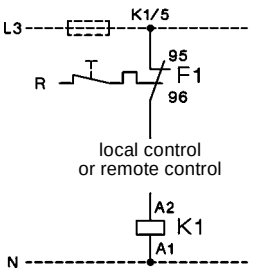
Coil connectors
Coils for **380-415V 50Hz** and **415-440V 60Hz**: The starter is supplied with control circuit connectors between terminals1 (L1) and 5 (L3).
Coils for **220-240V 50Hz** and **240V 60Hz**: The starter is supplied with control circuit connectors between terminals 95 and 5 (L3). Connect 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 **415-440V 60Hz**: Remove connectors A1-1 and 95-5, connect supply to terminals A1 and 95.
Coils for **220-240V 50Hz** and **240V 60Hz**: Remove connectors 95-5 connect supply to terminals A1 and 95.
Coils for **other voltages**: Connect supply to terminals A1 and 95.

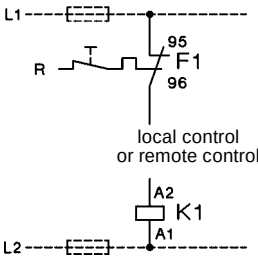
Coil phase to phase
(380-415V 50Hz)



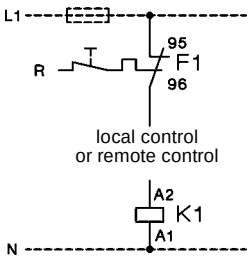
Coil phase to neutral
(220-240V 50Hz)



Coil phase to phase



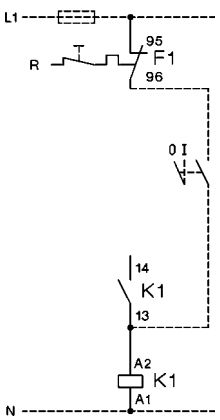
Coil phase to neutral



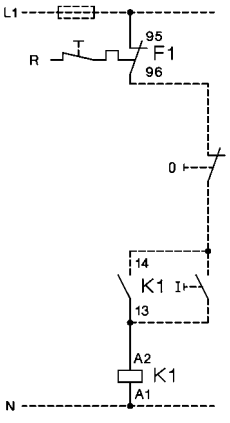
D.O.L. Starters K2U23 and K2U30 are supplied without connectors between main circuit and control circuit.

D.O.L. Starters with remote control

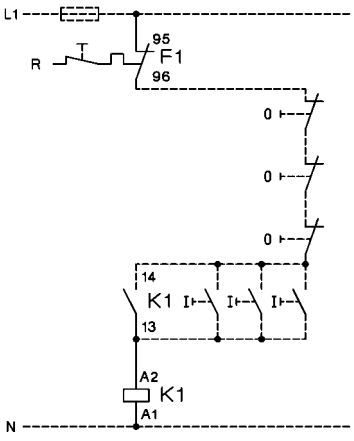
P1.09 to K2U30
Remote 2-wire (switch) control



Remote 3-wire (push button) control



Remote start-stop control
(3 control stations)



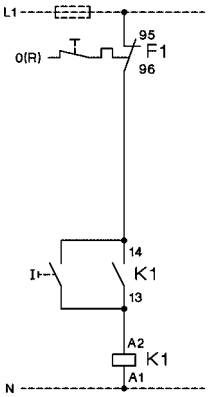
D.O.L. Starters

Wiring Diagrams Control Circuits

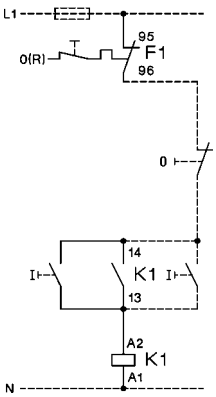
Typical circuit diagram (for separate coil supply, control circuit connected between L1 and N)
Terminal markings according to EN 50012

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

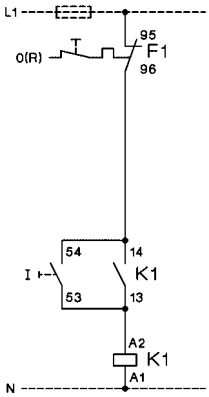
P1T09, P1T16
with overload relay U12/16



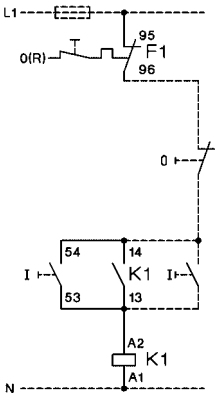
P1T09, P1T16
with external push buttons



K2U23PT, K2U30PT
with overload relay U12/16

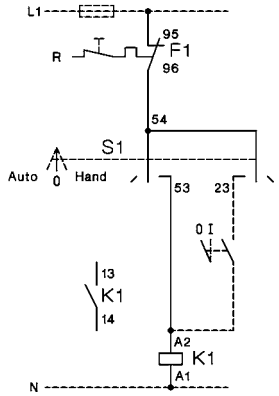


K2U23PT, K2U30PT
with external push buttons

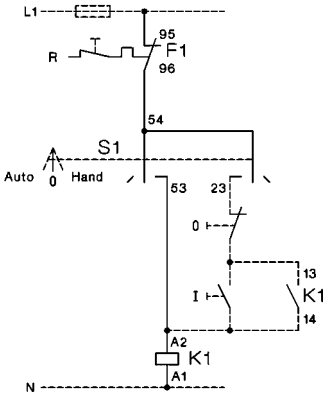


D.O.L. Starters with Selector Switch

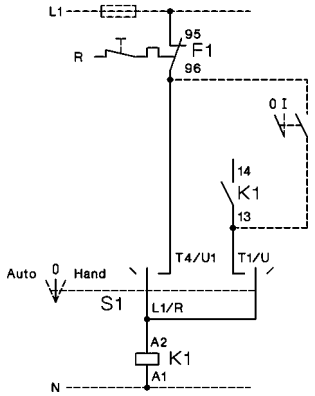
P1W09, P1W16
with external control switch



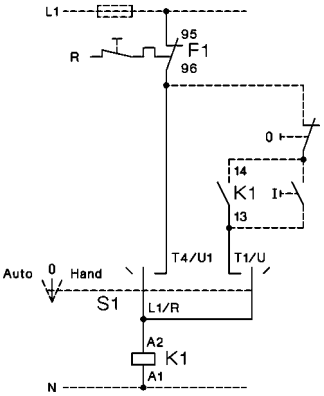
P1W09, P1W16
with external push buttons



K2U23PW, KU30PW
with external control switch

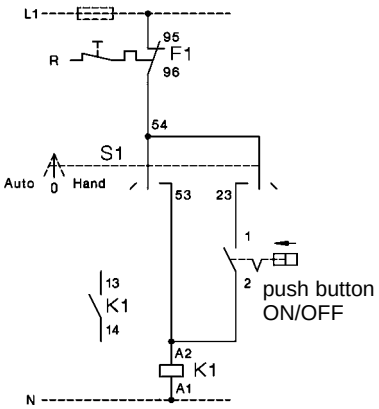


K2U23PW, KU30PW
with external push buttons



D.O.L. Starters with Selector Switch and Pneumatic Switch for Swimmingpool Control Gear and for use in Moist Rooms P1W16P

with overload relay U12/16

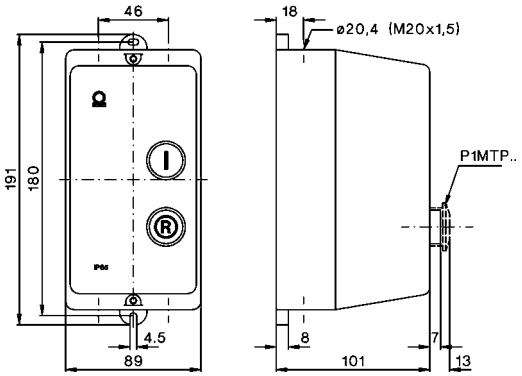


D.O.L. Starters

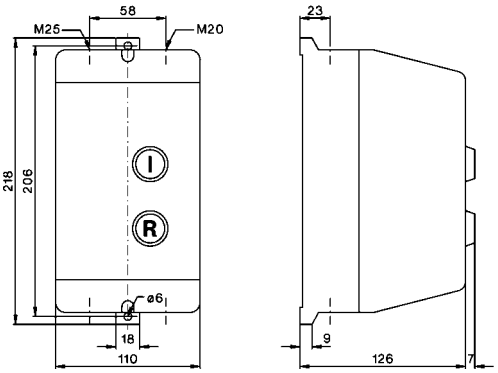
Dimensions

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

P1T.., P1TP..

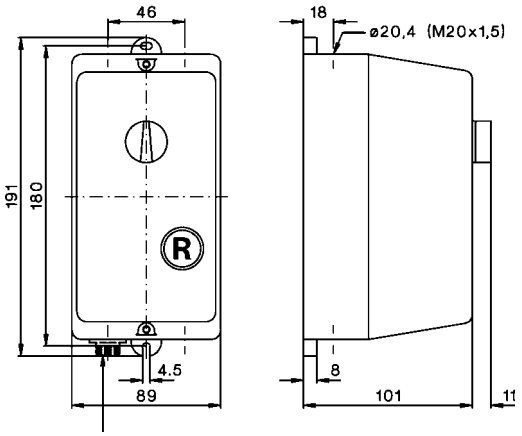


K2U23PT, K2U30PT

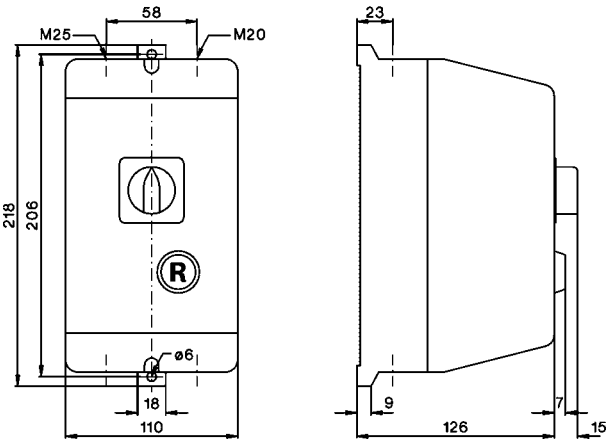


D.O.L. Starters with Selector Switch, Plastic Enclosed

P1W.., P1W16P



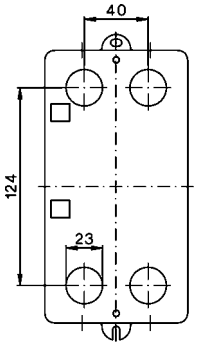
K2U23PW, K2U30PW



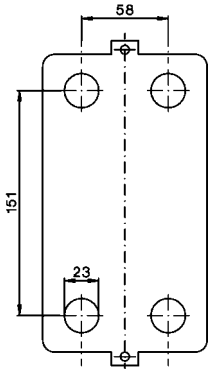
P1W16P: plug-in for air tube inside diameter 3mm

Rear Conduit Entries

knockouts
4 x Ø 23



knockouts
4 x Ø 23

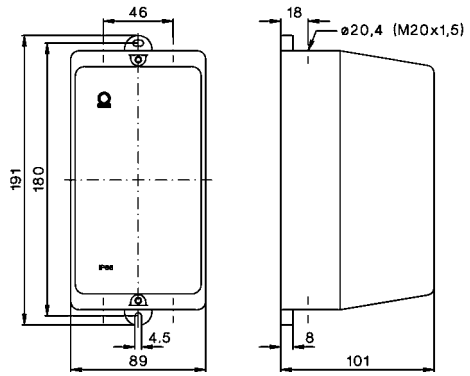


Enclosures

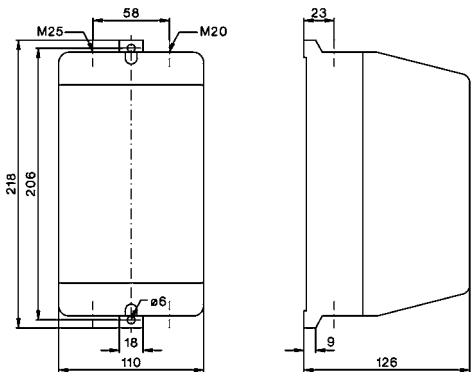
Dimensions

Enclosures for Contactors

P1

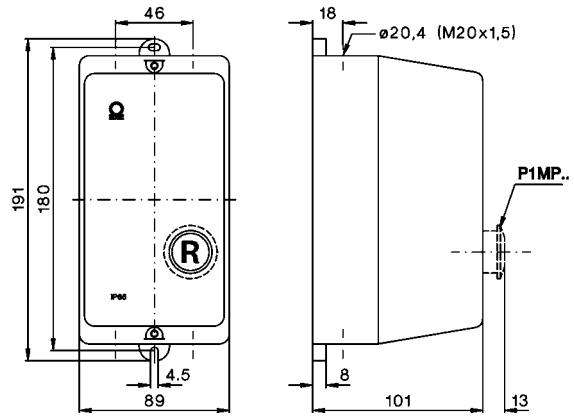


K30P
K45/60P

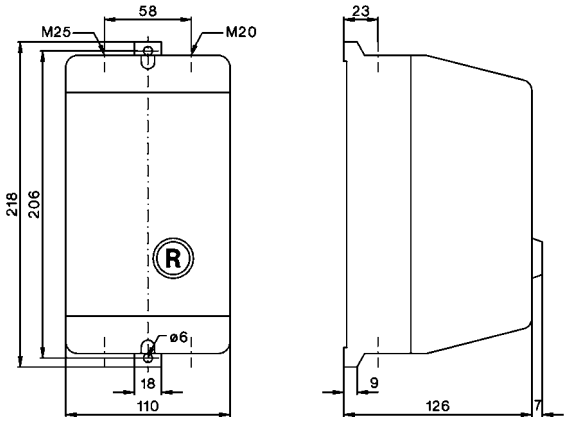


Enclosures for D.O.L. Starters

P1R, P1P

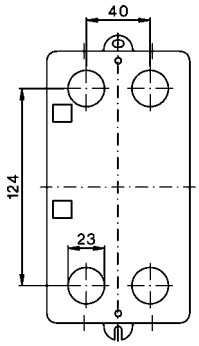


KU30P

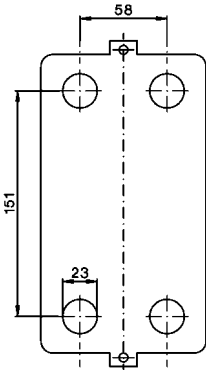


Rear Conduit Entries

knockouts
4 x Ø 23



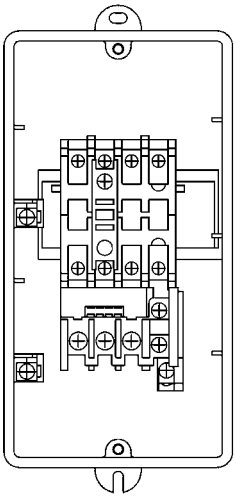
knockouts
4 x Ø 23

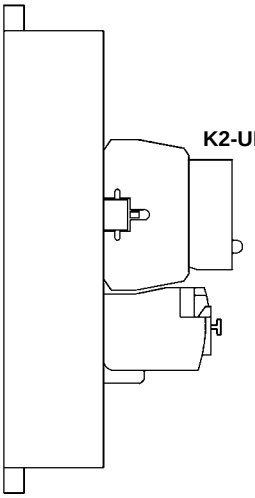


D.O.L. Starters

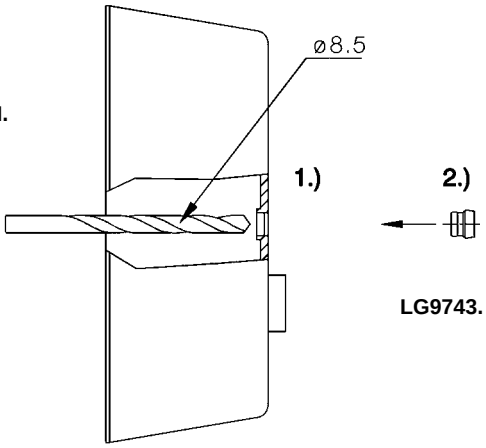
Mounting and Wiring Instructions

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





K2-UN., K2-IN.

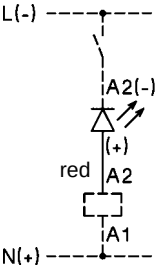


LG9743.

Wiring Examples

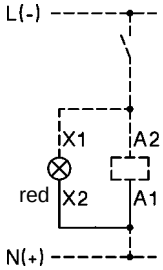
Coil Current Indicator

K2-ING
K2-INR



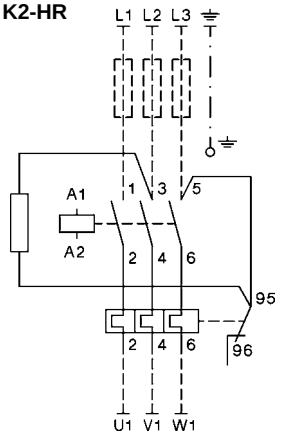
Voltage Indicator

K2-UN
K2-UNR



Heating Element

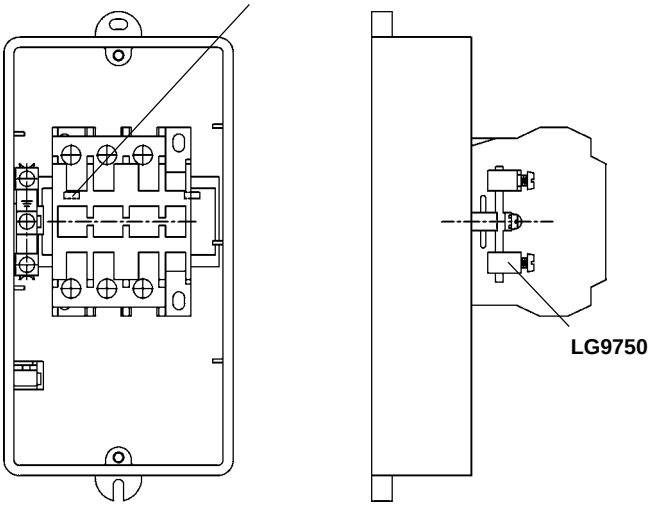
K2-HR



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

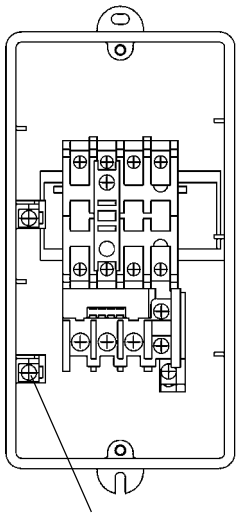
Earth Terminal LG9750 for K2-23 and K2-30 in Enclosure P1

for K2-23 and K2-30 remove spacing piece



LG9750

Neutral Terminal LG9744

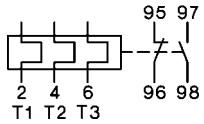


LG9744

Thermal Overload Relays for plug-in mounting

For contactors K3-10A.. to K3-40A..

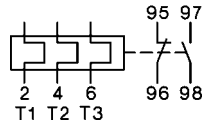
Setting Range D.O.L. (A)	Setting Range Y/Δ (A)	Type	Pack pcs.	Weight kg/pc.
0,12 - **0,18**	-	**U3/32 0,18**	1	0,14
0,18 - **0,27**	-	**U3/32 0,27**	1	0,14
0,27 - **0,4**	-	**U3/32 0,4**	1	0,14
0,4 - **0,6**	-	**U3/32 0,6**	1	0,14
0,6 - **0,9**	-	**U3/32 0,9**	1	0,14
0,8 - **1,2**	-	**U3/32 1,2**	1	0,14
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 K3-24A.. to K3-40A ..

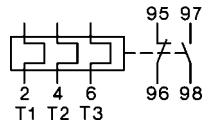
Setting Range D.O.L. (A)	Setting Range Y/Δ (A)	Type	Pack pcs.	Weight kg/pc.
10 - **14**	18 - 24	**U3/42 14**	1	0,30
14 - **20**	24 - 35	**U3/42 20**	1	0,30
20 - **28**	35 - 48	**U3/42 28**	1	0,30
28 - **42**	48 - 73	**U3/42 42**	1	0,30



manual and auto reset,

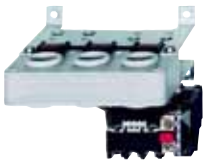
For contactors K3-50A.. to K3-74A..

Setting Range D.O.L. (A)	Setting Range Y/Δ (A)	Type	Pack pcs.	Weight kg/pc.
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



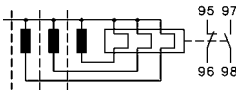
manual and auto reset

Thermal Overload Relays for separate mounting



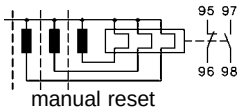
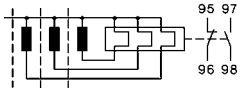
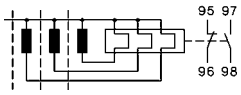
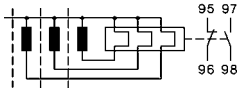
For contactors K85.. , K110.. , K3-151..

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



manual reset

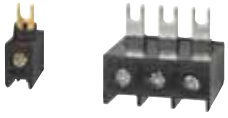
Thermal Overload Relays for separate mounting

Setting Range D.O.L. (A)	Setting Range YΔ (A)		Type	Pack pcs.	Weight kg/pc.
For contactors K3-151.. up to K3-315..					
100 - **150**	175 - 260		**U205 150**	1	1,5
140 - 220	240 - 380		**U205 210**	1	1,5
	busbar sets see accessories	manual reset			
For contactors K3-315.., busbars included					
220 - **310**	380 - 535		**U310 310**	1	1,8
	hand- and auto reset				
For contactors K3-315.. , K3-450.. , K3-550.. , K3-700.. , K3-860..					
260 - **360**	450 - 620		**U840 360**	1	4,1
340 - **480**	590 - 830		**U840 480**	1	4,1
440 - **620**	760 -1070		**U840 620**	1	4,1
560 - **800**	970 -1385		**U840 800**	1	4,1
	busbar sets see accessories	manual and auto reset			
For contactors K3-1000.. , K3-1200..					
700 -**1000**	1200 -1730		**U1250 1000**	1	7,0
875 -1250	1510 -2160		**U1250 1000**	1	7,0
	busbars must be installed by user	manual and auto reset			

Accessories

for overload relays	for contactors		Type	Pack set	Weight kg/set
Busbar Sets					
U205	K3-151.. , K3-176..		**SU205/176**	1	0,6
U205	K3-150.. , K3-175..		**SU205/175**	1	0,6
U205	K3-200..		**SU205/200**	1	0,7
U205	K3-315..		**SU205/315**	1	0,8
U840	K3-315.. , K3-450.. , K3-550..		**SU840/550**	1	1,7
U840	K3-700.. , K3-860..		**SU840/860**	1	2,1
U1250	K3-1000.. , K3-1200..	busbars must be installed by user			

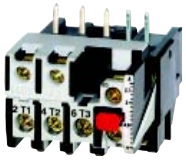
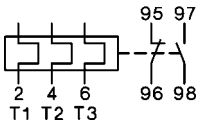
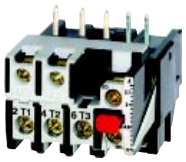
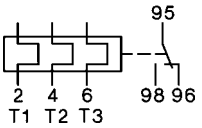
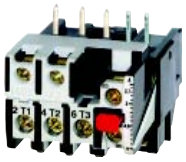
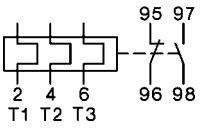
for overload relay	Cable Cross-section to clamp ($mm^{2)}$) solid or stranded	flexible	flex. with multi-core cable end	Type	Pack pcs.	Weight kg/pc.
Sets for Single Mounting for DIN-rail mounting						
U3/32	0,75 - 6	0,75 - 4	0,5 - 4	**U3/32SM**	1	0,035
U12/16	0,75 - 6	0,75 - 4	0,5 - 4	**U12SM**	1	0,035
U3/42, U3/74	-	-	-	**U3/42G**	1	0,030
Connecting Wire Set for U3/42, U3/74 with Single Mounting						
U3/42, U3/74	150mm long $10mm^2$			**LG5830-4**	1	0,060
U3/42, U3/74	250mm long $10mm^2$			**LG5830-2**	1	0,100



Additional Terminals with fingertouch protection						
3-pole for U3/42	4 - 35	6 - 25	4 - 25	**LG7559**	1	0,052
1-pole for U3/32 U12/16	0,75 - 10	0,75 - 6	0,75 - 6	**LG9339**	1	0,009

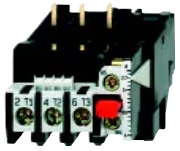
Marking System				
Snap-on Labels	for U12/16 to U205, marked choice of F, 0 to 9, 1 strip (10 pcs)	**LG9337-..**	10	0,008

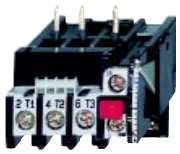
Thermal Overload Relays With Special Designs

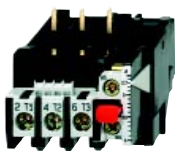
Setting Range D.O.L. (A)	Setting Range Y/Δ (A)		Type	Pack pcs.	Weight kg/pc.
With Manual Reset, for contactors K1-..					
0,12 - **0,18**	-		**U12/16E 0,18 K1**	1	0,10
0,18 - **0,27**	-		**U12/16E 0,27 K1**	1	0,10
0,27 - **0,4**	-		**U12/16E 0,4 K1**	1	0,10
0,4 - **0,6**	-		**U12/16E 0,6 K1**	1	0,10
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
With Auto Reset, for contactors K1-..					
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
With Quick Tripping Characteristic for EEx e motors and submersible pumps, f. contactors K1-..					
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
10 - **14**	18 - 24		**U12/16EQ 14 K1**	1	0,10
With Slow Tripping Characteristic for heavy duty starting with long run up times For separate mounting, suitable for all contactors					
0,8 - **1,2**	1,2 - 2,1		**UAT21 1,2**	1	1,0
1,2 - **1,8**	2,1 - 3,1		**UAT21 1,8**	1	1,0
1,6 - **2,4**	2,8 - 4,2		**UAT21 2,4**	1	1,0
2,4 - **3,7**	4,2 - 6,4		**UAT21 3,7**	1	1,0
3,7 - **5,7**	6,4 - 9,9		**UAT21 5,7**	1	1,0
5,3 - **8,2**	9,2 - 14,2		**UAT21 8,2**	1	1,0
8 - **12**	13,9 - 20,1		**UAT21 12**	1	1,0
12 - **18**	20,1 - 31,2		**UAT21 18**	1	1,0
16 - **24**	27,7 - 41,6		**UAT22 24**	1	1,1
24 - **37**	41,6 - 64		**UAT23 37**	1	1,3
32 - **49**	55,4 - 85		**UAT23 49**	1	1,3
48 - **72**	83 - 125		**UAT23 72**	1	1,3

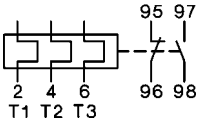
Thermal Overload Relays With Special Designs

Setting Range D.O.L. (A)	Y/Δ (A)		Type	Pack pcs.	Weight kg/pc.
With Manual Reset, for contactors K(G)3-10.. to K(G)3-22.. , K2-09.. to K2-37..					
0,12 - **0,18**	-		**U12/16E 0,18**	1	0,10
0,18 - **0,27**	-		**U12/16E 0,27**	1	0,10
0,27 - **0,4**	-		**U12/16E 0,4**	1	0,10
0,4 - **0,6**	-		**U12/16E 0,6**	1	0,10
0,6 - **0,9**	-		**U12/16E 0,9**	1	0,10
0,8 - **1,2**	-		**U12/16E 1,2**	1	0,10
1,2 - **1,8**	-		**U12/16E 1,8**	1	0,10
1,8 - **2,7**	-		**U12/16E 2,7**	1	0,10
2,7 - **4**	-		**U12/16E 4**	1	0,10
4 - **6**	7 - 10,5		**U12/16E 6**	1	0,10
6 - **9**	10,5 - 15,5		**U12/16E 9**	1	0,10
8 - **11**	14 - 19		**U12/16E 11**	1	0,10
10 - **14**	18 - 24		**U12/16E 14**	1	0,10
13 - **18**	23 - 31		**U12/16E 18**	1	0,10
17 - **23**	30 - 40		**U12/16E 23**	1	0,10
22 - **30**	38 - 52		**U12/16E 30**	1	0,13
With Auto Reset, for contactors K(G)3-10.. to K(G)3-22.. , K2-09.. to K2-37..					
0,12 - **0,18**	-		**U12/16A 0,18**	1	0,10
0,18 - **0,27**	-		**U12/16A 0,27**	1	0,10
0,27 - **0,4**	-		**U12/16A 0,4**	1	0,10
0,4 - **0,6**	-		**U12/16A 0,6**	1	0,10
0,6 - **0,9**	-		**U12/16A 0,9**	1	0,10
0,8 - **1,2**	-		**U12/16A 1,2**	1	0,10
1,2 - **1,8**	-		**U12/16A 1,8**	1	0,10
1,8 - **2,7**	-		**U12/16A 2,7**	1	0,10
2,7 - **4**	-		**U12/16A 4**	1	0,10
4 - **6**	7 - 10,5		**U12/16A 6**	1	0,10
6 - **9**	10,5 - 15,5		**U12/16A 9**	1	0,10
8 - **11**	14 - 19		**U12/16A 11**	1	0,10
10 - **14**	18 - 24		**U12/16A 14**	1	0,10
13 - **18**	23 - 31		**U12/16A 18**	1	0,10
17 - **23**	30 - 40		**U12/16A 23**	1	0,10
Mit **flinker Auslösecharakteristik**, für Schütze K(G)3-10.. bis K(G)3-22.. , K2-09.. bis K2-37..					
0,4 - **0,6**	-		**U12/16EQ 0,6**	1	0,10
0,6 - **0,9**	-		**U12/16EQ 0,9**	1	0,10
0,8 - **1,2**	-		**U12/16EQ 1,2**	1	0,10
1,2 - **1,8**	-		**U12/16EQ 1,8**	1	0,10
1,8 - **2,7**	-		**U12/16EQ 2,7**	1	0,10
2,7 - **4**	-		**U12/16EQ 4**	1	0,10
4 - **6**	7 - 10,5		**U12/16EQ 6**	1	0,10
6 - **9**	10,5 - 15,5		**U12/16EQ 9**	1	0,10
8 - **11**	14 - 19		**U12/16EQ 11**	1	0,10
10 - **14**	18 - 24		**U12/16EQ 14**	1	0,10
With Magnetic Quick Tripping and manual reset For contactors K(G)3-10.. to K(G)3-22.. , K2-09.. to K2-37..					
0,12 - **0,18**	-		**U12/16EM 0,18**	1	0,10
0,18 - **0,27**	-		**U12/16EM 0,27**	1	0,10
0,27 - **0,4**	-		**U12/16EM 0,4**	1	0,10
0,4 - **0,6**	-		**U12/16EM 0,6**	1	0,10
0,6 - **0,9**	-		**U12/16EM 0,9**	1	0,10
0,8 - **1,2**	-		**U12/16EM 1,2**	1	0,10
1,2 - **1,8**	-		**U12/16EM 1,8**	1	0,10
1,8 - **2,7**	-		**U12/16EM 2,7**	1	0,10
2,7 - **4**	-		**U12/16EM 4**	1	0,10

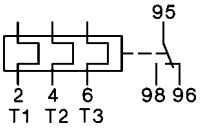




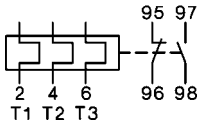




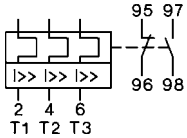
manual reset



manual and auto reset



manual reset



manual reset
magnetic quick tripping

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
U205 ..		s	s	s	s	s	s
100 -	**150**	34,0	26,0	24,0	20,5	19,0	18,0
140 -	**210**	30,0	24,0	21,0	18,5	17,0	16,0
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

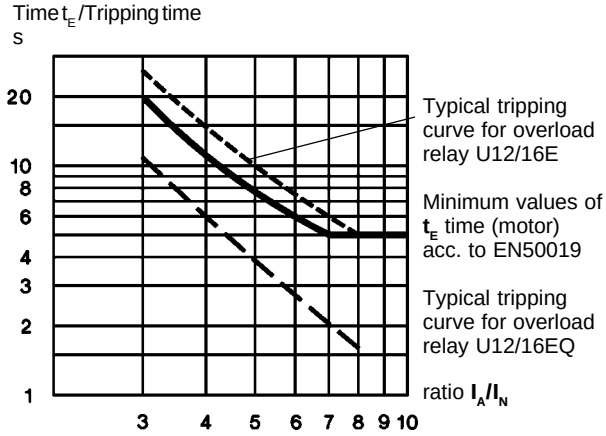
preferably for motors with short t_E time
and for submersible pumps

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 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 I_A/I_N and the time t_E which is marked on the label of the motor. The overload must trip within the t_E time, which means that the tripping curve from cold condition must be (20% due to tolerance) below the co-ordination point I_A/I_N and the time t_E.

I_A = Starting current of motor I_N = Rated current of motor
$t_E = t_E$-time of motor



Labels of tripping curves for each setting range, sized 148x105mm (self-adhesive) are available on request.
Order No. D588, specify type and setting range.

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, U310, U205, U840 and U1250

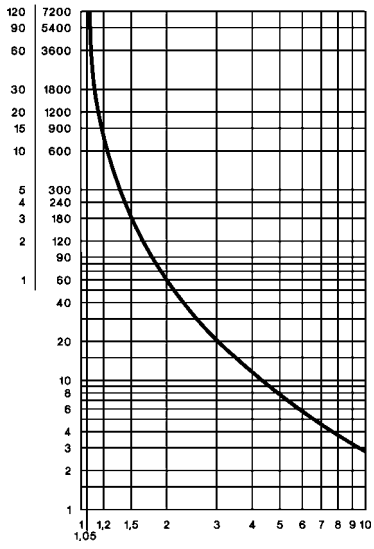
Type	Setting Range DOL A	Setting Range Y/Δ A	Max. Fuse Size According to Coordination-type "2" [1] quick A	"2" [1] slow, gL(gG) A	"1" [1] slow, gL(gG) A	"1" [1] aM A	Fuse UL A	SCCR kA
U3/32	0,12 - **0,18**	-	0,5 [2]	0,5 [2]	25	-	15	5
(U12/16E)	0,18 - **0,27**	-	1,0 [2]	1,0 [2]	25	-	15	5
	0,27 - **0,4**	-	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
U205, U310	all ranges		For short circuit protecting overload relays with current transformer use fuse according to the				-	-
U840, U1250	all ranges		contactor of the combination.				-	-

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

Detailed tripping times for each range see table page 106

with three-phase load

Tripping time
min. s



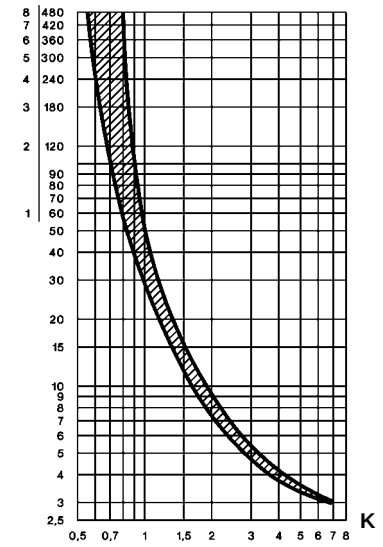
F. L. C. multiplication factor

Average value of typical tolerance curves from cold condition

Proceeding from service condition the times decrease to 20-30% of the characteristic values

with two-pole load

Tripping time
min. s



Typical tolerance curve from cold condition

Proceeding from service condition the times decrease to 70-80% of the characteristic values

$K = I_{max} / I_e$

I_{max} = max. phase current
I_e = max. scale value

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

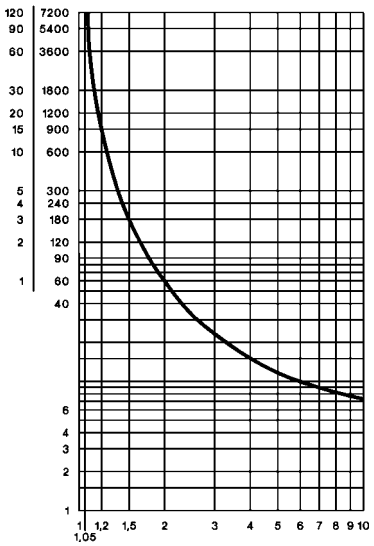
Thermal Overload Relays

Tripping Characteristics for U85, U205, U310, U840 and U1250

Detailed tripping times for each range of U85 and U205 see table page 106

U85 with three-phase load

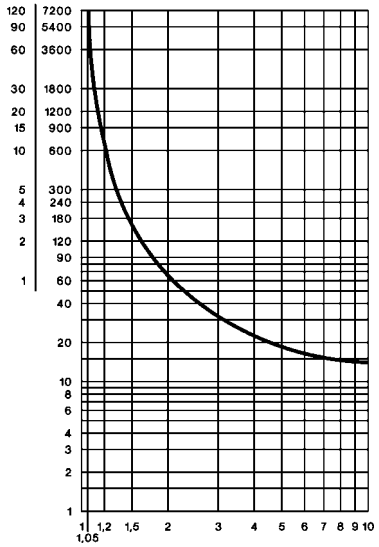
Tripping time
min. s



F. L. C. multiplication factor

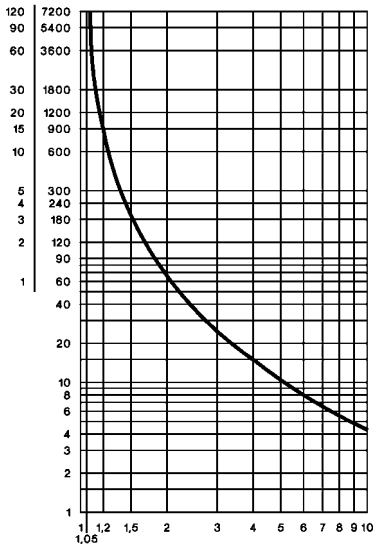
U205 with three-phase load

Tripping time
min. s



U310, U840 with three-phase load

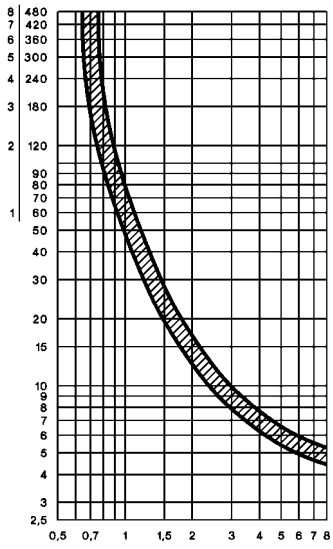
Tripping time
min. s



Average value of typical tolerance curves from cold condition
Proceeding from service condition the times decrease to 20-30% of the characteristic values

U85 with two-pole load

Tripping time
min. s



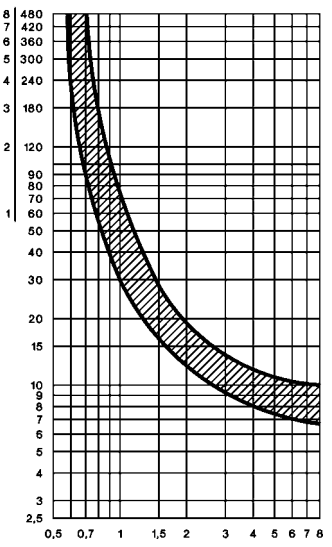
$K = I_{max} / I_e$

I_{max} = maximum phase current

I_e = maximum scale value

U205 with two-pole load

Tripping time
min. s



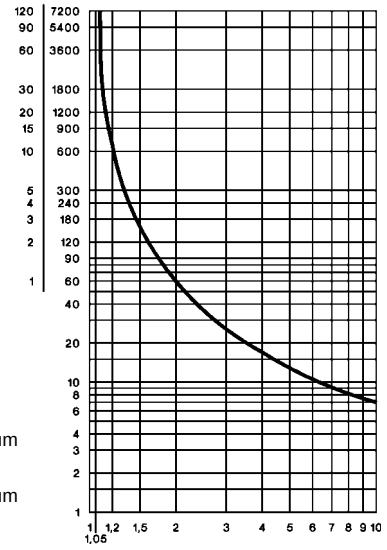
$K = I_{max} / I_e$

I_{max} = maximum phase current

I_e = maximum scale value

U1250 with three-phase load

Tripping time
min. s



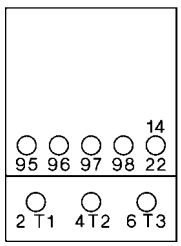
F. L. C. multiplication factor

Typical tolerance curve from cold condition
Proceeding from service condition the times decrease to 70-80% of the characteristic values

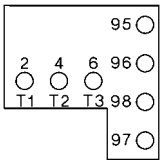
Proceeding from service condition the times decrease to 20-30% of the characteristic values

Position of Terminals

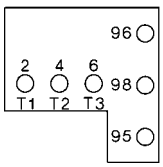
U3/32



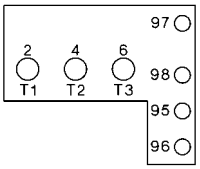
U12/16E, U12/16EM, U12/16EQ



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

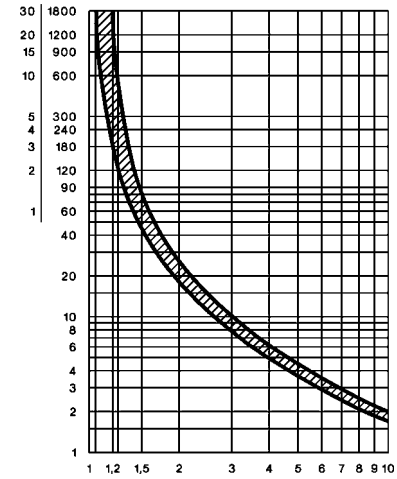
Setting Range A	Maximum Fuse Acc. to Coordination-type "2" [1] 380-400V slow, gL(gG) A	500V slow, gL(gG) A	660-690V slow, gL(gG) A
0,12 - **0,18**	none	none	on request
0,18 - **0,27**	none	none	on request
0,27 - **0,4**	none	none	on request
0,4 - **0,6**	none	none	on request
0,6 - **0,9**	none	none	on 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 106

with three-phase load

Tripping time min. s — range 0,4-0,6 to 1,8-2,7A

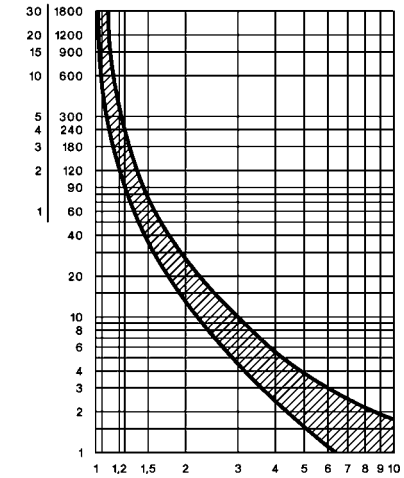


Typical tolerance curve from cold condition

Proceeding from service condition the times decrease to 20-30% of the characteristic values

F. L. C. multiplication factor

Tripping time min. s — range 2,7-4 to 10-14A



Average value of typical tolerance curves from cold condition

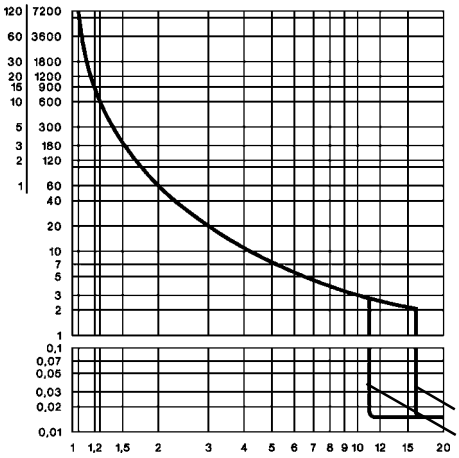
Proceeding from service condition the times decrease to 20-30% of the characteristic values

F. L. C. multiplication factor

Tripping Characteristic for U12/16EM

with three-phase load

Tripping time min. s



Average value of typical tolerance curves from cold condition

Proceeding from service condition the times decrease to 20-30% of the characteristic values

F. L. C. multiplication factor

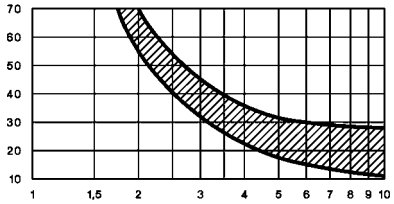
Fuse for UAT21, UAT22, UAT23

For short circuit protecting thermal overload relays with current transformer use fuse according to the contactor of the combination.

Tripping characteristic for UAT21, UAT22, UAT23

with three-phase load

Tripping time in s



Average value of typical tolerance curves from cold condition

Proceeding from service condition the times decrease to 20-30% of the characteristic values

F. L. C. multiplication factor

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	U205	U310	U840	U1250	UAT21	UAT22	UAT23
Rated insulation voltage U_i [1]		V~	690	690	690	690	750	690	1000	1000	690	690	690	690
Permissible ambient temperature														
operation	open	°C			-25 to +60					-25 to +55			-25 to +60	
storage		°C			-50 to +70					-40 to +70			-50 to +70	
Trip class according to IEC 947-4-1			10A	10A	10A	10A	20	20	10	10	10	30	30	30
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)	-	0,5-10	0,5-16	0,5-25
	flexible	mm²	1-4	0,75-4 + 0,5-2,5 [2]	0,75-6	6-25 [2]						0,5-6	0,5-10	0,5-16
	flexible with multicore cable end	mm²	0,75-4	0,5-2,5 + 0,5-1,5	0,75-6	4-25						0,5-6	0,5-10	0,5-16
Cables per clamp	number		2	1+1	2	1						1	1	1
auxiliary connector	solid	mm²			0,75-2,5 [2]					1-2,5 [2]			0,75-2,5 [2]	
	flexible	mm²			0,5-2,5 [2]					1-2,5 [2]			0,5-2,5 [2]	
	flexible with multicore cable end	mm²			0,5-1,5					1-2,5 [2]			0,5-1,5	
Cables per clamp	number				2					2			2	

Type			U3/32	U12/16A	U12/16E U12/16EM	U12/16EQ	U3/42 U3/74	U85 U205	U310 U840 U1250	UAT21 UAT22 UAT23
Auxiliary contacts										
Rated insulation voltage U_i [1]										
same potential		V~	690	690	690	690	690	690	500	690
different potential		V~	440	-	440	440	250	440	500	440
Utilization category AC15										
Rated operational	24V	A	3	4	5	5	4	5	4 [5]	5
current I_e	230V	A	2	2,5	3	3	2,5	3	2,5	3
	400V	A	1	1,5	2	2	1,5	2	1,5	2
	690V	A	0,5	0,6	0,6	0,6	0,6	0,6	0,6	0,6
Utilization category DC13										
Rated operational	24V	A	1	1,2	1,2	1,2	1,2	1,2	1,2	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	6	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	U12/16EQ	U3/42	U3/74	U85
Rated insulation voltage	V~	600	600	600	600	600	600	600
Rated current	A	32	23	23	23	42	74	85
Auxiliary contacts								
Rated voltage								
same potential	V AC	600	600	600	600	600	600	600
different potential	V~	150	-	150	150	150	150	150
Switching capacity AC	VA	500	500	500	500	600 [8]	600 [8]	600
of aux. contacts	A	2	3	4	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

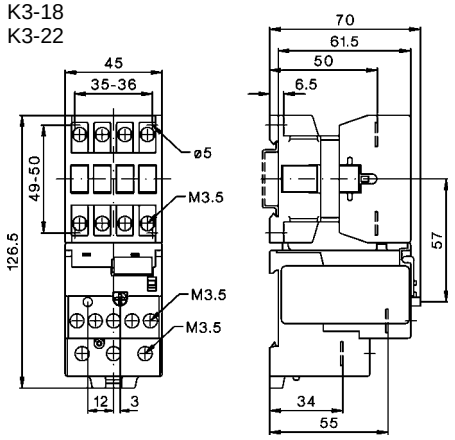
Example: Ambient temperature 70°C, full load motor current 7A
(70 - 20) x 0,125 = 6,25%
Setting value: 7A + 6,25% = 7,44A

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 103
8) Switching capacity of the start contact: 300VA, max. 2A

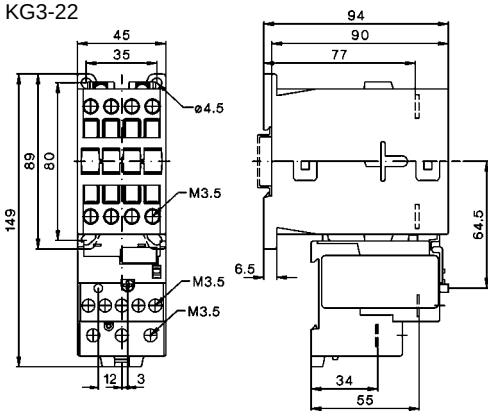
Thermal Overload Relays

Dimensions

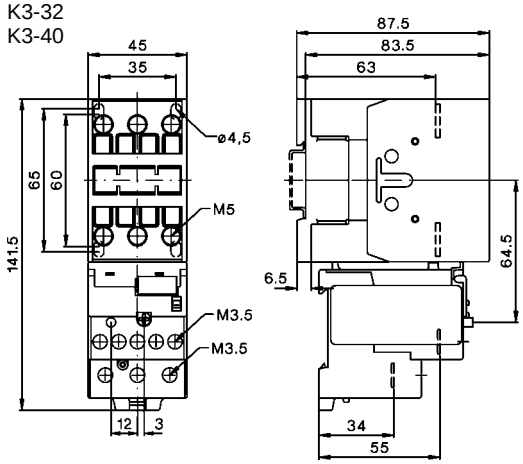
K3-10 **+ U3/32**
K3-14
K3-18
K3-22



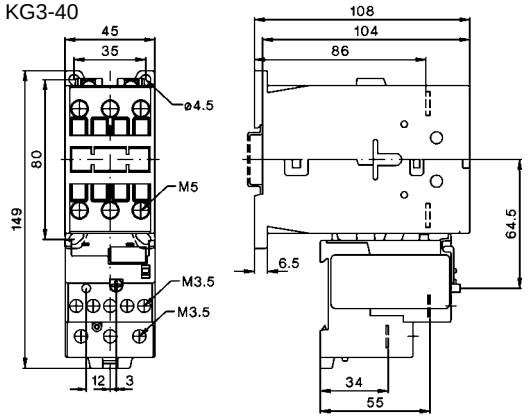
KG3-10 **+ U3/32**
KG3-14
KG3-18
KG3-22



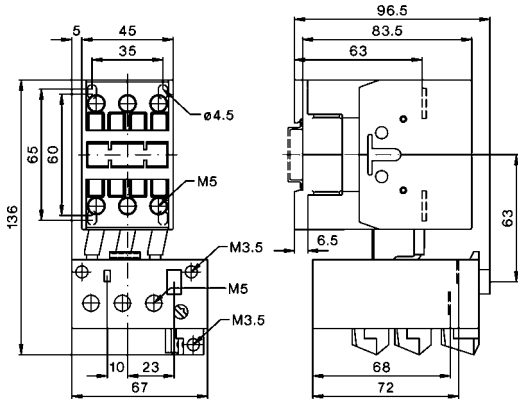
K3-24 **+ U3/32**
K3-32
K3-40



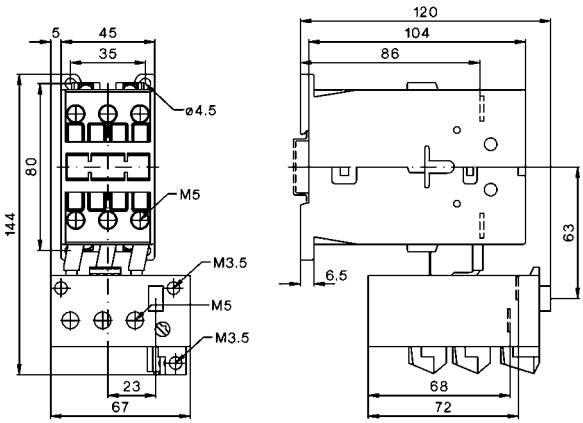
KG3-24 **+ U3/32**
KG3-32
KG3-40



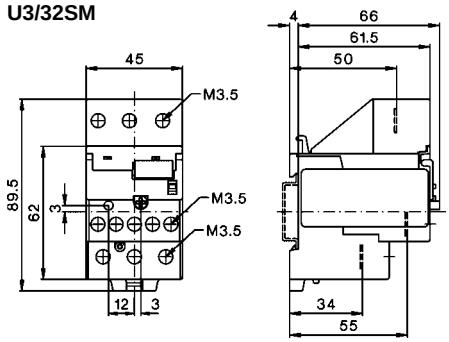
K3-24 **+ U3/42**
K3-32
K3-40



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

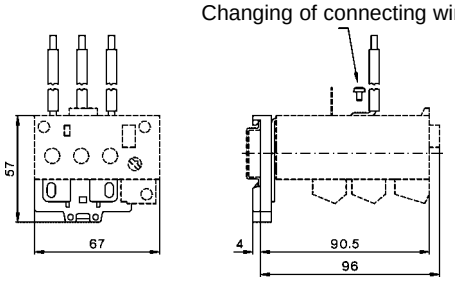


U3/32SM



U3/42G +LG5830-.

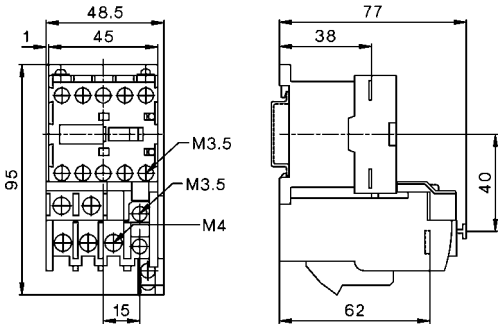
Changing of connecting wire with 1,8Nm



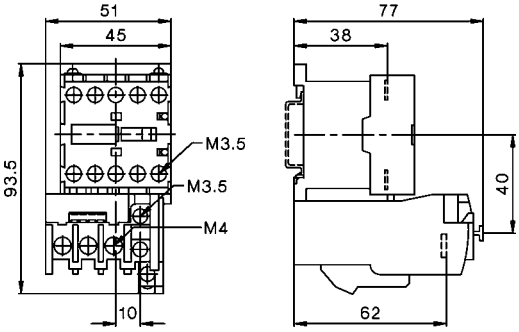
Thermal Overload Relays

Dimensions

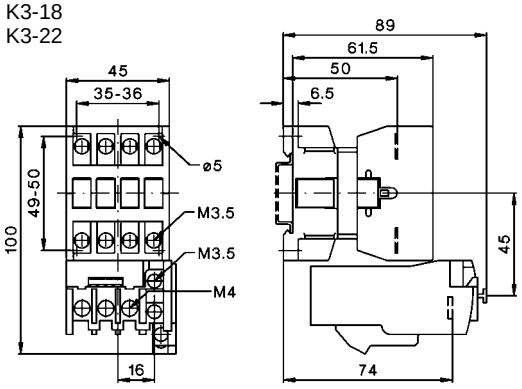
K1-09 **+ U12/16.. K1**
K1-12



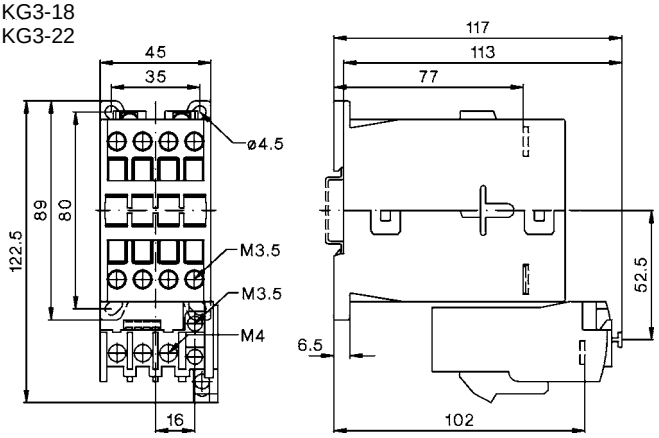
K1-09 **+ U12/16E**
K1-12



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

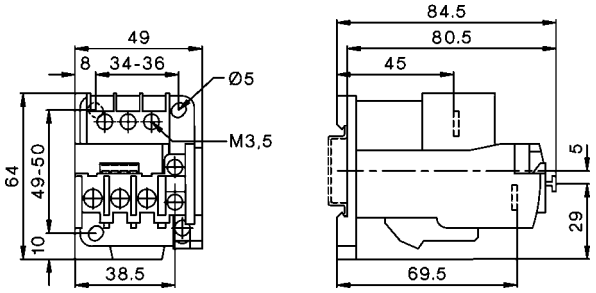


KG3-10 **+ U12/16**
KG3-14
KG3-18
KG3-22

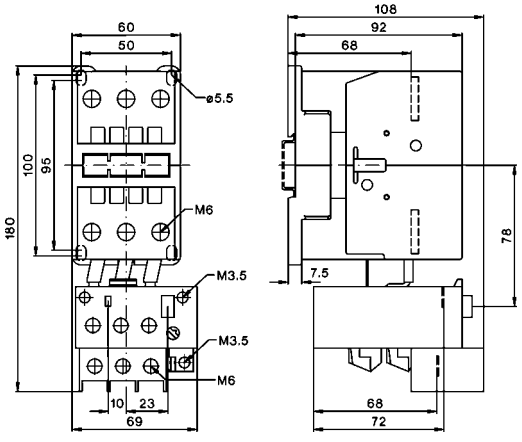


U12SM

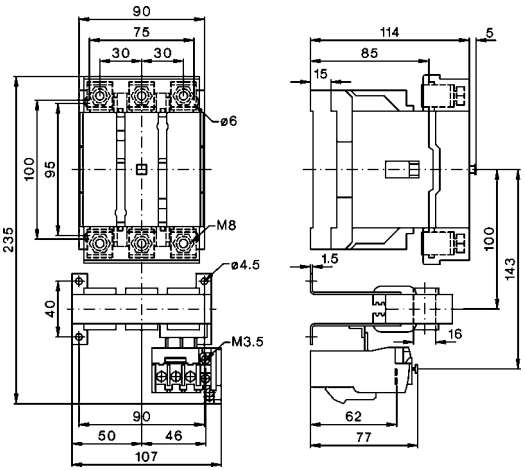
U12/16 + U12SM for snap-on 35mm DIN-rail according to DIN EN50022 and screw mounting (single mounting)



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



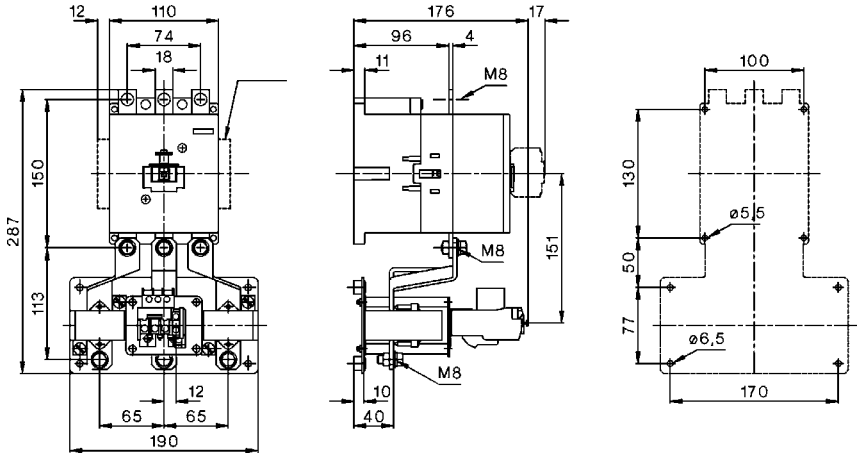
K85 **+ U85**
K110



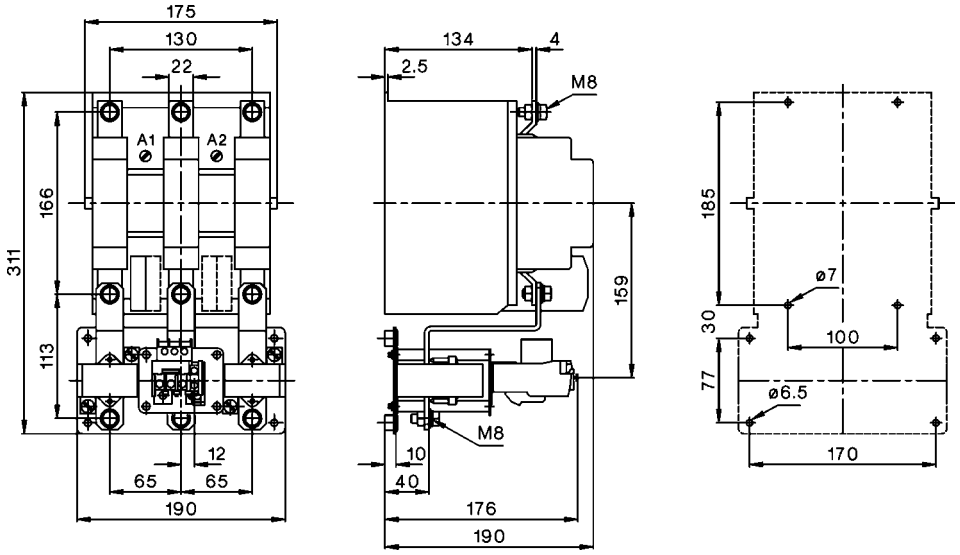
Thermal Overload Relays

Dimensions

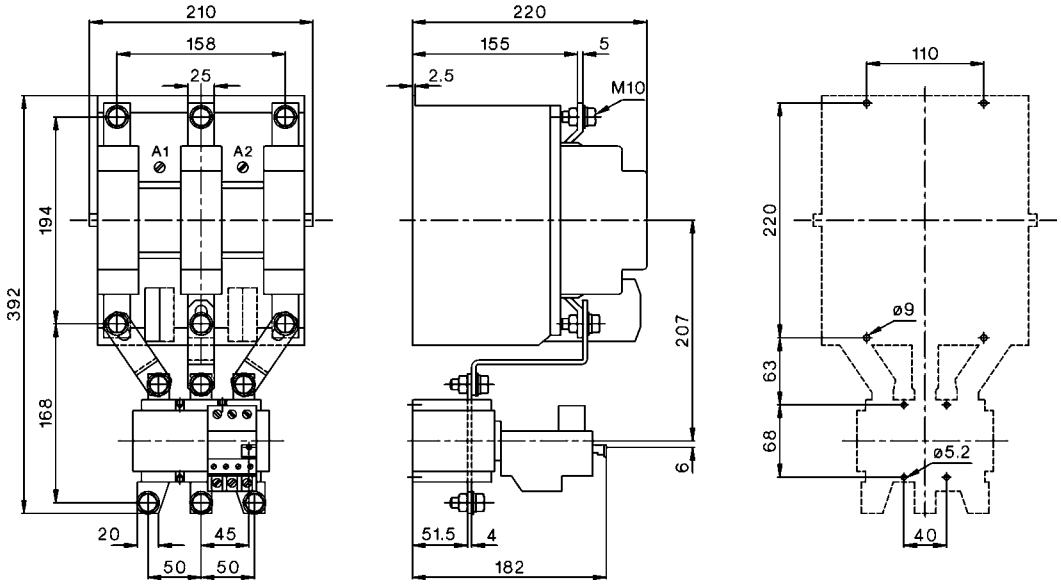
K3-151A **+ U205 + SU205/176**
K3-176A



K3-200A21 **+ U205 + SU205/200**



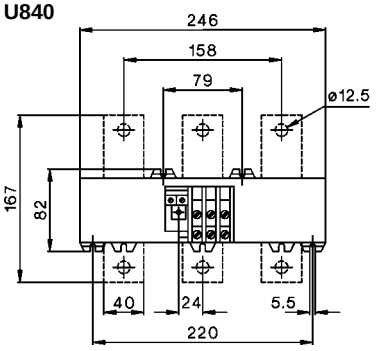
K3-315A22 **+ U310**

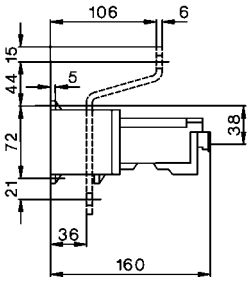


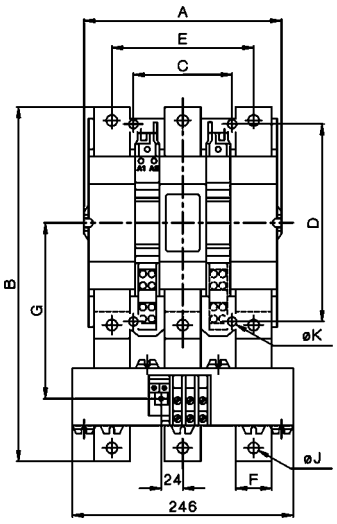
Thermal Overload Relays

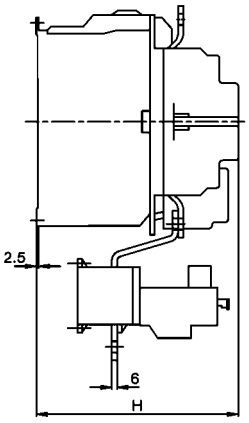
Dimensions

U840



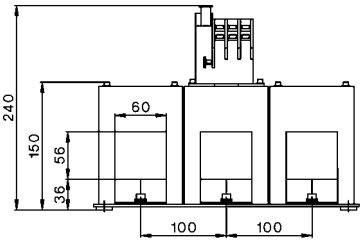


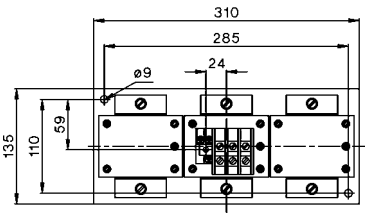




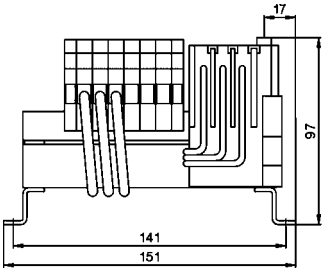
U840 with	A	B	C	D	E	F	G	H	J	K
K3-315	210	366	110	220	158	40	179	220	12,5	9
K3-450	220	372	110	220	158	40	185	225	12,5	9
K3-550	220	395	110	220	158	40	196	225	12,5	9
K3-700	280	487	175	280	202	50	257	291	14,5	11
K3-860	280	540	175	280	202	50	280	291	14,5	11

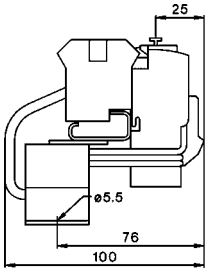
U1250



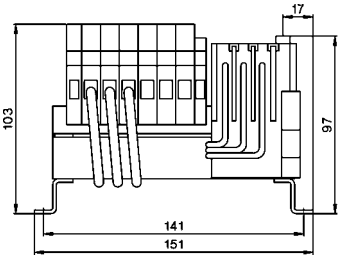


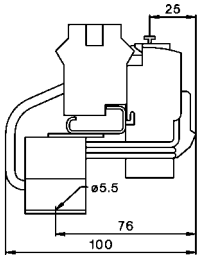
UAT21





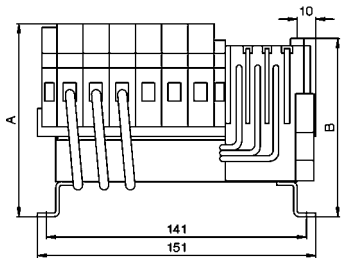
UAT22

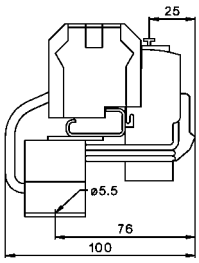




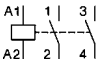
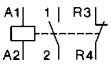
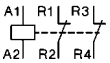
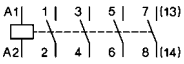
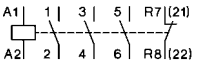
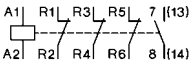
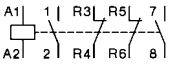
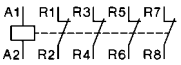
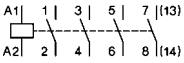
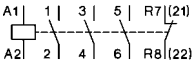
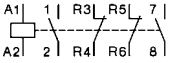
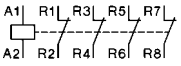
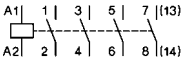
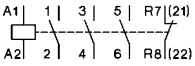
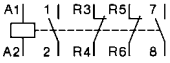
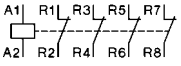
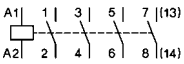
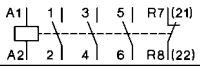
UAT23

Type	Setting Range	A	B
UAT23 37	23-37A	105,5	97,5
UAT23 49	32-49A	94	86
UAT23 72	48-72A	94	86





Modular Contactors

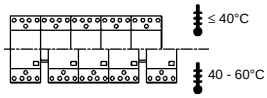
Rated Current AC1 at **AC1** **400V** **A**	Heating Power AC1 230V kW	3 AC 400V kW	Wiring Diagram	**Type** **24** **230** ↓	coil voltage 24V 50/60Hz 220-240V 50Hz	Pack pcs.	Weight kg/pc.
One-pole 1 module (17,5mm)							
							
20	4,6	**-**		**R20-10 24**		12	0,13
20	4,6	**-**		**R20-10 230**		12	0,13
Two-pole 1 module (17,5mm)							
20	4,6	**-**		**R20-20 24**		12	0,13
20	4,6	**-**		**R20-20 230**		12	0,13
20	4,6	**-**		**R20-11 24**		12	0,13
20	4,6	**-**		**R20-11 230**		12	0,13
20	4,6	**-**		**R20-02 24**		12	0,13
20	4,6	**-**		**R20-02 230**		12	0,13
Four-pole 2 modules (35mm) [1]							
							
25	5,7	17		**R25-40 24**		6	0,22
25	5,7	17		**R25-40 230**		6	0,22
25	5,7	17		**R25-31 24**		6	0,22
25	5,7	17		**R25-31 230**		6	0,22
25	5,7	17		**R25-13 24**		6	0,22
25	5,7	17		**R25-13 230**		6	0,22
25	5,7	-		**R25-22 24**		6	0,22
25	5,7	-		**R25-22 230**		6	0,22
25	5,7	17		**R25-04 24**		6	0,22
25	5,7	17		**R25-04 230**		6	0,22
Four-pole 3 modules (52,5mm) [1]							
							
40	9	27,5		**R40-40 24**		4	0,36
40	9	27,5		**R40-40 230**		4	0,36
40	9	27,5		**R40-31 24**		4	0,36
40	9	27,5		**R40-31 230**		4	0,36
40	9	-		**R40-22 24**		4	0,36
40	9	-		**R40-22 230**		4	0,36
40	9	27,5		**R40-04 24**		4	0,36
40	9	27,5		**R40-04 230**		4	0,36
							
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
Four-pole, solenoid operated, width 45mm, sealable							
							
20	4,6	13,8		**K1R40 230**		10	0,21
20	4,6	13,8		**K1R31 230**		10	0,21

1) Sealable with Sealing Cover (see page 117)

Auxiliary Contact Block ½ module (8,8mm) for contactor R25, R40, R63 (max. 1pc.)

Rated Operational Current **AC15** AC15 AC1 **230V** 400V 690V A A A			Wiring Diagram	**Type**	Pack pcs.	Weight kg/pc.
3	2	10		**RH11**	3	0,026

Accessories

Description	for contactors	**Type**	Pack pcs.	Weight kg/pc.
RC-unit for 12V to 250V AC	2x R20.. to R63..	**RC-R 230**	1	0,05
Spacing piece ½ module (8,8mm) for ambient temperature >40°C 	R20.. to R63..	**P730**	10	0,012
Sealing cover Sealing cover	R25.. R40.., R63..	**P721** **P690**	10 10	0,002 0,003

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..	K1R
Incandescent lamps	60	0,27	-	22	28	58	85	28
	100	0,45	-	13	17	35	51	17
	200	0,91	-	7	8	17	25	8
	300	1,36	-	4	5	11	16	5
	500	2,27	-	3	3	7	10	3
	1000	4,5	-	1	1	3	5	1
Fluorescent lamps uncompensated or serial compensated	11	0,16	-	60	75	210	310	60
	18	0,37	2,7	25	30	90	140	25
	24	0,35	2,5	25	30	90	140	25
	36	0,43	3,4	20	25	70	140	20
	58	0,67	5,3	14	17	45	70	14
	65	0,67	5,3	13	16	40	65	13
	85	0,8	-	11	14	35	60	11
Fluorescent lamps dual-connection	11	0,07	-	2 x 100	2 x 110	2 x 220	2 x 250	2 x 100
	18	0,11	-	2 x 50	2 x 55	2 x 130	2 x 200	2 x 50
	24	0,14	-	2 x 40	2 x 44	2 x 110	2 x 160	2 x 40
	36	0,22	-	2 x 30	2 x 33	2 x 70	2 x 100	2 x 30
	58	0,35	-	2 x 20	2 x 22	2 x 45	2 x 70	2 x 20
	65	0,35	-	2 x 15	2 x 16	2 x 40	2 x 60	2 x 15
	85	0,47	-	2 x 10	2 x 11	2 x 30	2 x 40	2 x 10
Fluorescent lamps parallel compensated	11	0,16	2,0	30	30	100	140	30
	18	0,37	2,0	20	20	70	90	20
	24	0,35	3,0	15	15	55	75	15
	36	0,43	4,5	10	10	38	51	10
	58	0,67	7,0	6	6	25	30	6
	65	0,67	7,0	5	5	24	28	5
	85	0,8	8,0	4	4	18	23	4
Fluorescent lamps with serial electronic	18	0,09	-	40	40	100	150	40
	36	0,16	-	20	20	50	75	20
	58	0,25	-	15	15	30	55	15
	2 x 18	0,17	-	2 x 20	2 x 20	2 x 50	2 x 60	2 x 20
	2 x 36	0,32	-	2 x 10	2 x 10	2 x 25	2 x 30	2 x 10
	2 x 58	0,49	-	2 x 7	2 x 7	2 x 15	2 x 20	2 x 7
Transformers for metal halid low voltage lamps	20		-	40	52	110	174	40
	50		-	20	24	50	80	20
	75		-	13	16	35	54	13
	100		-	10	12	27	43	10
	150		-	7	9	19	29	7
	200		-	5	5	14	23	5
	300		-	3	4	9	14	3
Mercury-vapour lamps (high-pressure lamps), uncompensated e. g. HQL, HPL	50	0,61	-	16	18	38	55	16
	80	0,8	-	12	14	28	40	12
	125	1,15	-	8	9	20	28	8
	250	2,15	-	4	5	11	15	4
	400	3,25	-	3	4	7	10	3
	700	5,4	-	1	2	4	6	1
	1000	7,5	-	1	1	3	4	1
Mercury-vapour lamps (high-pressure lamps), compensated e. g. HQL, HPL	50	0,28	7	7	7	32	46	7
	80	0,41	8	5	5	25	35	5
	125	0,65	10	3	3	16	22	3
	250	1,22	18	2	2	8	12	2
	400	1,95	25	1	1	5	7	1
	700	3,45	45	1	1	3	4	1
	1000	4,8	60	-	-	2	3	-

Modular Contactors

Switching of lamps

Lamp Type	Power W	Current A	Capacitors mF	Max. lamps per pole at 230V 50Hz and max. 60°C **R20..**	**R25..**	**R40..**	**R63..**	**K1R**
Metal halide lamps	35	0,53	-	22	24	45	65	22
uncompensated	70	1	-	12	14	24	35	12
e. g. HQI, HPI, CDM	150	1,8	-	6	8	13	18	6
	250	3	-	4	5	8	12	4
	400	3,5	-	3	4	6	10	3
	1000	9,5	-	1	1	2	4	1
	2000	16,5	-	-	-	1	2	-
400V per pole	2000	10,5	-	-	-	1	2	-
	3500	18	-	-	-	-	1	-
Metal halide lamps	35	0,25	6	8	8	38	50	8
compensated	70	0,45	12	4	4	20	28	4
e. g. HQI, HPI, CDM	150	0,75	20	2	2	12	17	2
	250	1,5	33	1	1	7	10	1
	400	2,1	35	1	1	5	7	1
	1000	5,8	95	-	-	2	3	-
	2000	11,5	148	-	-	1	1	-
400V pro Pol	2000	6,6	58	-	-	1	2	-
	3500	11,6	100	-	-	-	1	-
Metal halide lamps	20	0,1	integrated	9	9	18	20	9
with serial electronic	35	0,2	integrated	6	6	11	13	6
(e. g.: PCI)	70	0,36	integrated	5	5	10	12	5
50-125 x I_{nLampe} for 0,6ms	150	0,7	integrated	4	4	8	10	4
Sodium-vapour lamps	35	1,5	-	7	9	22	30	7
(low pressure lamps),	55	1,5	-	7	9	22	30	7
uncompensated	90	2,4	-	4	6	13	19	4
	135	3,5	-	3	4	10	13	3
	150	3,3	-	3	4	10	13	3
	180	3,3	-	3	4	10	13	3
	200	3,3	-	3	4	10	13	3
Sodium-vapour lamps	35	0,31	20	3	3	12	16	3
(low pressure lamps),	55	0,42	20	2	2	8	14	2
compensated	90	0,63	30	1	1	5	9	1
	135	0,94	45	1	1	3	6	1
	150	1	40	1	1	3	6	1
	180	1,16	40	1	1	2	5	1
	200	1,32	25	-	-	2	4	-
Sodium-vapour lamps	150	1,8	-	5	6	11	22	5
(high pressure lamps),	250	3	-	4	5	7	13	4
uncompensated	330	3,7	-	3	4	6	10	3
	400	4,7	-	2	2	5	8	2
	1000	10,3	-	1	1	2	4	1
Sodium-vapour lamps	150	0,83	20	2	2	7	14	2
(high pressure lamps),	250	1,5	33	1	1	4	8	1
compensated	330	2	40	1	1	3	6	1
	400	2,4	48	1	1	2	5	1
	1000	6,3	106	-	-	1	2	-
Sodium-vapour lamps	20	0,1	integrated	9	9	18	20	9
(high pressure lamps)	35	0,2	integrated	6	6	11	13	6
with serial electronic	70	0,36	integrated	5	5	10	12	5
(e. g.: PCI)	150	0,7	integrated	4	4	8	10	4
50-125 x I_{nLampe} for 0,6ms								

Modular Contactors

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

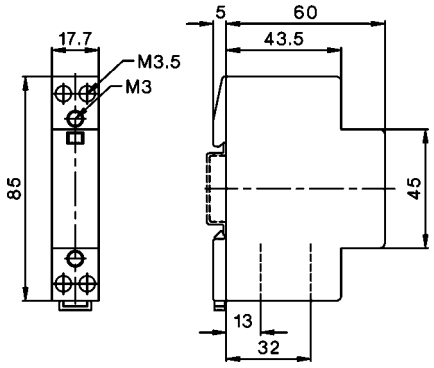
Type			R20..	R25..	R40..	R63..	K1R..	RH11
Main Contacts								
Rated insulation voltage U_i		**V AC**	**440** [2]	**440** [2]	**440** [2]	**440** [2]	**690** [1]	**440** [2]
Rated operation voltage U_e		V AC	250	440	440	440	690	440
Frequency of operations z AC1, AC3		1/h	300	300	600	600	600	600
Mechanical life		S x 10^6	1	1	1	1	5	1
Utilization category AC1								
Rated operational current I_e (=I_{th})								
open	at 60°C	A	20	25	40	63	20	-
Contact life		S x 10^6	0,1	0,1	0,1	0,1	0,2	-
Minimum Switch Voltage		V/mA	24/100	24/100	24/100	24/100	24/100	17/5
Short time current	10s-current	A	72	72	216	240	96	-
Power loss per pole at I_e/AC1		W	2	2	3	7	1	0,5
Utilization category AC3								
Switching of three-phase motors								
Rated operational current I_e		A	-	9	27	30	12	-
Rated operational power								
of three-phase motors	220V	kW	-	2,2	7,5	8	3	-
50-60Hz	230-240V	kW	1,1 [4]	2,5	8	8,5	3	-
	380-415V	kW	-	4	12,5	15	4	-
Contact life		S x 10^6	-	0,15	0,15	0,15	0,9	-
Power consumption of coils								
AC operated	inrush	VA	7 - 9	14 - 18	33 - 45	33 - 45	3 - 3,5	-
	sealed	VA	2,2 - 4,2	4,4 - 8,4	7	7	3 - 3,5	-
		W	0,8 - 1,6	1,6 - 3,2	2,6	2,6	3 - 3,5	-
Operation range of coils								
in multiples of control voltage U_s (-40 to +40°C)			0,85 - 1,1	0,85 - 1,1	0,85 - 1,1	0,85 - 1,1	0,85 - 1,1	-
Short circuit protection								
Coordination-type "1"								
according to IEC 947-4-1								
max. fuse size	gL (gG)	A	35	35	63	80	35	-
Cable cross-sections								
Main connector	solid or stranded	mm²	1,5 - 10	1,5 - 10	2,5 - 25	2,5 - 25	0,5 - 2,5 [3]	0,5 - 2,5 [3]
	flexible	mm²	1,5 - 6	1,5 - 6	2,5 - 16	2,5 - 16	0,5 - 2,5 [3]	0,5 - 2,5 [3]
	flexible with multicore cable end	mm²	1,5 - 6	1,5 - 6	2,5 - 16	2,5 - 16	0,5 - 1,5	0,5 - 1,5
Clamps per pole			1	1	1	1	2	2
Magnetic coil	solid or stranded	mm²	0,75 - 2,5	0,75 - 2,5	0,75 - 2,5	0,75 - 2,5	0,5 - 2,5 [3]	-
	flexible	mm²	0,5 - 2,5	0,5 - 2,5	0,5 - 2,5	0,5 - 2,5	0,5 - 2,5 [3]	-
	flexible with multicore cable end	mm²	0,5 - 1,5	0,5 - 1,5	0,5 - 1,5	0,5 - 1,5	0,5 - 1,5	-
Clamps per pole			1	1	1	1	2	-
Auxiliary Contacts								
Rated insulation voltage U_i [1]		**V AC**	-	-	-	-	-	**440** [2]
Thermal rated current I_{th}	40°C	A	-	-	-	-	-	10
Ambient temperature	60°C	A	-	-	-	-	-	6
Utilization category AC15								
Rated operational	220-240V	A	-	-	-	-	-	3
current I_e	380-415V	A	-	-	-	-	-	2
	440V	A	-	-	-	-	-	1,6
Utilization category DC13								
Rated operational	24-60V	A	-	-	-	-	-	2
current I_e	110V	A	-	-	-	-	-	0,4
per pole	220V	A	-	-	-	-	-	0,1
Short circuit protection								
short-circuit current 1kA,								
contact welding not accepted								
max. fuse size	gL (gG)	A	-	-	-	-	-	10
Switching time at control voltage U_s ±10%								
	make time	ms	7 - 16	9 - 15	11 - 15	11 - 15	15 - 19	
	release time	ms	6 - 12	4 - 8	6 - 13	6 - 13	8 - 25	
	arc duration	ms	10 - 15	10 - 15	10 - 15	10 - 15	10 - 15	

1) Suitable for: earthed-neutral systems, overvoltage category I to IV, pollution degree 3 (standard-industry): Uimp = 8kV.
2) Suitable for: earthed-neutral systems, overvoltage category I to III, pollution degree 3 (standard-industry): Uimp = 4kV.
3) Maximum cable cross-section with prepared conductor 4) AC5b motor 2-pole 230V 1,1kW

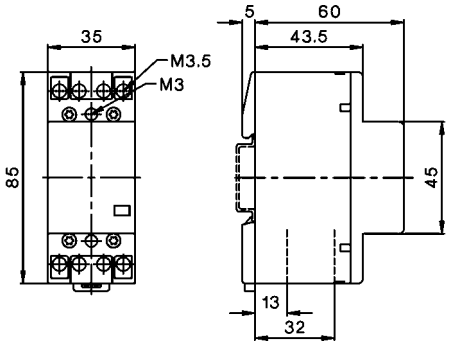
Modular Contactors

Dimensions

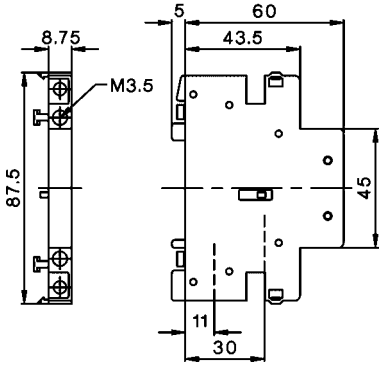
R20-..
RC-R 230



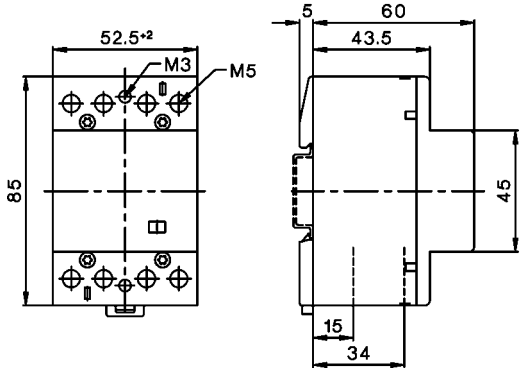
R25-..



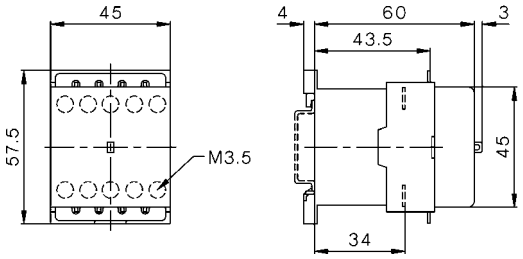
Aux. contact block
RH11



R40-..
R63-..



K1R40
K1R31



Mini Contactors for North America

Data according to UL508

Main Contacts (cULus)		Type	**R20**	**R25**	**R40**	**R63**	**RH11**	
Rated operational current "General Use"		A	20	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	1	1½	-	
at 60Hz (1ph)	200-208V	hp	1	1	2	3	-	
	220-240V	hp	1½	1½	3	5	-	
	265-277V	hp	1½	2	3	5	-	
Fuses (Sicherungen)		A	40	40	80	80	-	
Suitable for use on a capability of delivering not more than	rms	A	5000	5000	5000	5000	-	
		V	300	300	300	300	300	
Nennspannung		V~	300	300	300	300	300	
Auxiliary Contacts (cULus)	heavy pilot duty	AC	AC	-	-	-	-	C300

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