Mini Contactors

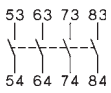
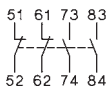
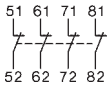
Mini Contactor Relays 4-pole — AC Operated

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

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

Auxiliary Contact Blocks For Contactor Relays

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

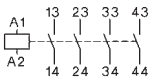
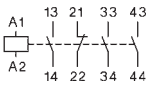
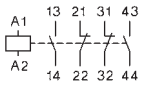
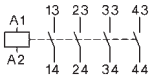
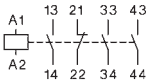
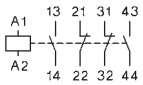
Aux. Contact Blocks	HK11	HK02	HK20	HK40	HK22	HK04
Wiring Diagrams						

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

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

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

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

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

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

Mini Contactors — AC Operated

Power Ratings AC2, AC3 380V 400V 415V kW	660V 690V kW	Rated Current AC1 690V A	Aux. Contacts[2] Built-in NO	NC	Additional Type	Type	Pack pcs.	Weight kg/pc.
3-pole, With Screw Terminals								
4	4	20	1	-	1 HKM..	**K1-09D10 . . .**	10	0,16
5,5	5,5	20	1	-	1 HKM..	**K1-12D10 . . .**	10	0,16
4	4	20	-	1	1HK..	**K1-09D01 . . .**	10	0,16
5,5	5,5	20	-	1	1HK..	**K1-12D01 . . .**	10	0,16
4-pole, With Screw Terminals								
4	4	20	-	-	1HK..	**K1-09D00-40 . . .**	10	0,16
5,5	5,5	20	-	-	1HK..	**K1-12D00-40 . . .**	10	0,16

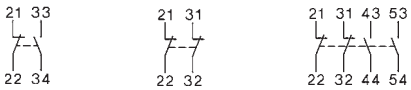
Coil voltage [1]
24 24V 50/60Hz
230 220-230V 50Hz
24VS 24V 50/60Hz w. protection[3]
230VS 220-230V 50Hz w. protection[3]
24VM 24V 50/60Hz 24V= DC
230VM 220-240V 50/60Hz 220V= DC

Auxiliary Contact Blocks for Contactors K1-..

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

Aux. Contact Blocks — HKM11 | HKM02 | HKM22

Wiring Diagrams



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

Prefer combinations according to EN50012

Suppressor Units for Contactors K1-..

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

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

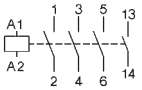
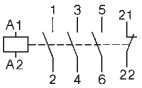
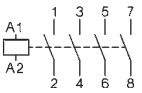
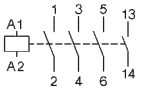
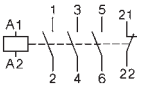
DC Solenoid Operated

Type

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

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

Additional Overload Relay see page114 Type

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

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

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

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

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

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

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

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

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

Coil voltages for AC operated contactors

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

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

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

Coil not exchangeable

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

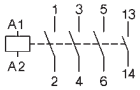
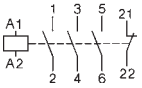
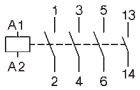
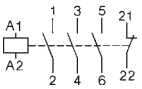
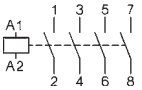
DC Solenoid Operated

Type

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

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

Additional Overload Relay see pages 115, 117

Type	Built in NO	Built in NC	Additional		Pack pcs.	Weight kg/pc.	Wiring Diagrams
3-pole, with Fast On Tab Connectors 1 x 6,3mm or 2 x 2,8mm							
							
K1-09F10= . . .	1	-	1 HKM..	[4]	10	0,19	
K1-09F01= . . .	-	1	1 HK..	[4]	10	0,19	
3-pole, with Solder Pins Ø1,15 for Printed Circuit Applications							
							
K1-09L10= . . .	1	-	-	-	10	0,19	
K1-09L01= . . .	-	1	-	-	10	0,19	
4-pole, with Solder Pins Ø1,15 for Printed Circuit Applications							
K1-09L00-40= . . .	-	-	-	-	10	0,19	

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

Mini Reversing Contactors, Mechanical Interlocked AC Operated

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

3-pole, with Screw Terminals

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

4-pole, with Screw Terminals

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

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

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

Auxiliary Contact Blocks for Mini Reversing Contactors K1-..

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

Aux. Contact BlocksAux. Contact Blocks	HKM11V	HKM11X
Wiring Diagrams		

Reversing Starter Connector

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

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

DC Solenoid Operated

Type

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

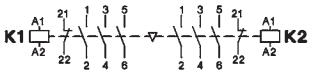
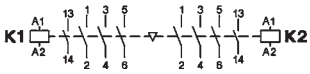
Additional Overload Relay see page114 Type

Pack pcs.

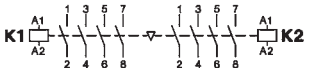
Weight kg/pc.

Wiring Diagrams

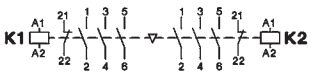
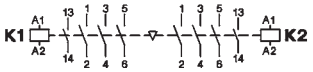
3-pole, with Screw Terminals

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

4-pole, with Screw Terminals

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

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

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

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

Mini Contactors

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

Main Contacts		Type	K1-09D..	K1-09F..	K1-09L..	K1-12D..
Rated insulation voltage U_i		V AC	690 [1]	690 [1]	690 [2]	690 [1]
Making capacity I_{eff}	at U_e = 690V AC	A	165	165	165	165
Breaking capacity I_{eff}	400V AC	A	100	100	100	100
cosφ = 0,65	500V AC	A	90	90	90	90
	690V AC	A	80	80	80	80
Utilization category AC1						
Switching of resistive load						
Rated operational current I_e (=I_{th}) at 40°C, open		**A**	**20**	**16**	**16**	**20**
Rated operational power of three-phase resistive loads	230V	kW	7,9	6	6	7,9
50-60Hz, cosφ = 1	240V	kW	8,3	6,5	6,5	8,3
	400V	kW	13,8	11	11	13,8
	415V	kW	14,3	11,5	11,5	14,3
Rated operational current I_e (=I_{the}) at 60°C, enclosed		A	16	12	12	16
Rated operational power of three-phase resistive loads	230V	kW	6,3	4,5	4,5	6,3
50-60Hz, cosφ = 1	240V	kW	6,7	5	5	6,7
	400V	kW	11	8	8	11
	415V	kW	11,5	8,5	8,5	11,5
Minimum cross-section of conductor at load with I_e (=I_{th})		mm^2	2,5	2,5	-	2,5
Utilization category AC2 and AC3						
Switching of three-phase motors						
Rated operational current I_e	220V	A	12	12	12	15
open and enclosed	230V	A	11,5	11,5	11,5	14,5
	240V	A	11	11	11	14
	380-400V	**A**	**9**	**9**	**9**	**12**
	415-440V	A	8	8	8	11
	500V	A	7	7	7	9
	660-690V	A	5	5	5	6,5
Rated operational power of three-phase motors	220-240V	kW	3	3	3	4
50-60Hz	**380-440V**	**kW**	**4**	**4**	**4**	**5,5**
	500-690V	kW	4	4	4	5,5
Utilization category AC4						
Switching of squirrel cage motors, inching						
Rated operational current I_e	220V	A	12	12	12	15
open and enclosed	230V	A	11,5	11,5	11,5	14,5
	240V	A	11	11	11	14
	380-400V	**A**	**9**	**9**	**9**	**12**
	415-440V	A	8	8	8	11
	500V	A	7	7	7	9
	660-690V	A	5	5	5	6,5
Rated operational power of three-phase motors	220-240V	kW	3	3	3	4
50-60Hz	**380-440V**	**kW**	**4**	**4**	**4**	**5,5**
	500-690V	kW	4	4	4	5,5
Utilization category AC5a						
Switching of gas discharge lamps						
Rated operational current I_e						
per pole at 220/230V						
Fluorescent lamps,						
uncompensated and serial compensated		A	10	10	10	10
parallel compensated		A	2	2	2	2
dual-connection		A	16	16	16	16
Metal halide lamps[3],						
uncompensated		A	10	10	10	10
parallel compensated		A	2	2	2	2
Mercury-vapour lamps[4],						
uncompensated		A	16	16	16	16
parallel compensated		A	2	2	2	2
Mixed light lamps[5]		A	16	61	16	16
LED-Lamps						
consider the inrush current of the lamp ballast and cosφ of the lamp	max. lamps per pole ($I_{nLED} \le I_{th}$) =		inrush current of contactor / inrush current of lamp/EVG			
max inrush current of contactor		A	233	233	233	233
Utilization category AC5b Switching of incandescent lamps [6]						
Rated operational current I_e						
per pole at 220/230V		A	8	8	8	8

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

Mini Contactors

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

Main Contacts			Type	K1-09D..	K1-09F..	K1-09L..	K1-12D..
Utilization category DC1							
Switching of resistive load	1 pole	24V	A	20	16	16	20
Time constant L/R ≤1ms		60V	A	20	16	16	20
Rated operational current I_e		110V	A	5	5	5	5
		220V	A	0,6	0,6	0,6	0,6
	3 poles in series	24V	A	20	20	20	20
		60V	A	20	20	20	20
		110V	A	20	20	20	20
		220V	A	16	16	16	16
Utilization category DC3 and DC5							
Switching of shunt motors	1 pole	24V	A	20	16	16	20
and series motors		60V	A	5	5	5	5
Time constant L/R ≤15ms		110V	A	1	1	1	1
Rated operational current I_e		220V	A	0,15	0,15	0,15	0,15
	3 poles in series	24V	A	20	16	16	20
		60V	A	20	16	16	20
		110V	A	20	16	16	20
		220V	A	2	2	2	2
Maximum ambient temperature							
Operation		open	°C	-40 to +60 (+90) [1]			
		enclosed	°C	-40 to +40			
with thermal overload relay		open	°C	-25 to +60			
		enclosed	°C	-25 to +40			
Storage			°C	-50 to +90			
Short circuit protection							
for contactors without 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	2,5	2,5	-
and ...VM (AC/DC)	sealed	W	-	2,5	1,5	2,5	2,5	-
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 - 19	-	-	15 - 19	15 - 19	-
	release time	ms	8 - 25	-	-	8 - 25	8 - 25	-
	arc duration	ms	10 -15	-	-	10 -15	10 -15	-
DC operated	make time	ms	-	15 - 25	15 - 25	15 - 25	15 - 25	-
	release time	ms	-	8 - 25	8 - 25	8 - 25	8 - 25	-
	arc duration	ms	-	10 -15	10 -15	10 -15	10 -15	-
Cable cross-section								
all connectors	solid	mm²	0,5 - 2,5	0,5 - 2,5	0,5 - 2,5	Fast on	Solder connector	0,5 - 2,5
	flexible	mm²	0,5 - 2,5	0,5 - 2,5	0,5 - 2,5	1x 6,3 x 0,8	Ø 1,15	0,5 - 2,5
	flexible with multicore cable end	mm²	0,5 - 1,5	0,5 - 1,5	0,5 - 1,5	or		0,5 - 1,5
						2x 2,8 x 0,8		
Clamps per pole			2	2	2	-	-	2
	solid or stranded	AWG	18 - 14	18 - 14	18 - 14			18 - 14

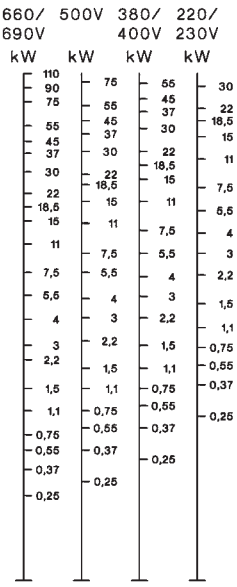
1) Suitable at 690V for: earthed-neutral systems, overvoltage category I to IV, pollution degree 3 (standard-industry): U_{imp} = 8kV.
Data for other conditions on request.
2) Suitable at 690V for pollution degree 2, U_{imp} = 6kV.
Pollution degree 3 U_i = 690V non-tracking of the printed circuit CTI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

Mini Contactors for North America

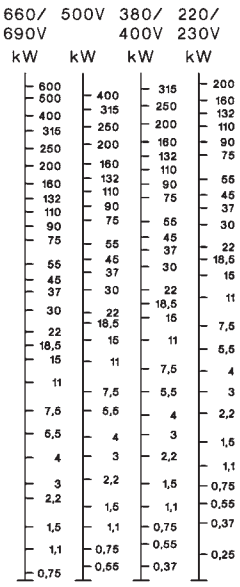
Data according to UL508

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

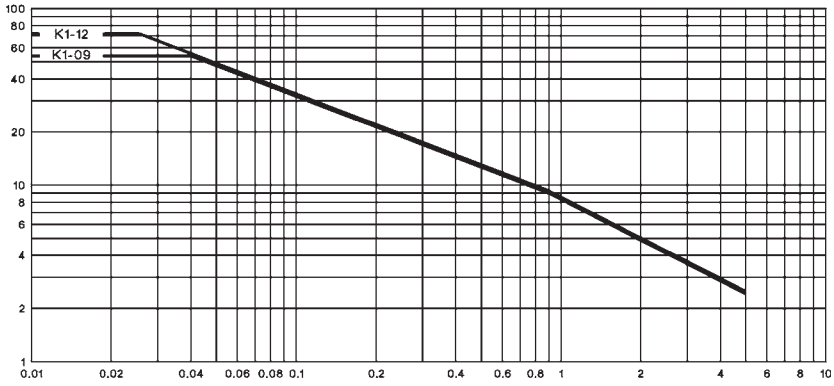
Motor Rating
P_n = AC4



Motor Rating
P_n = AC3



Breaking Current
I_a (= I_e = AC1)
A



Millions of Operations

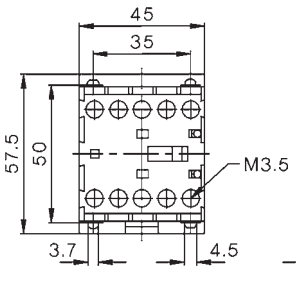
1) Pollution degree	CTI - PWB	U_i
2	≥ 100	600V
3	≥ 400	480V
3	100 - 400	240V

Mini Contactors

Dimensions

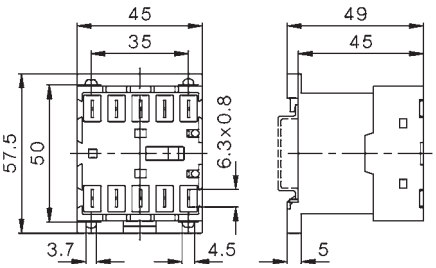
AC and DC operated
with screw terminals

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

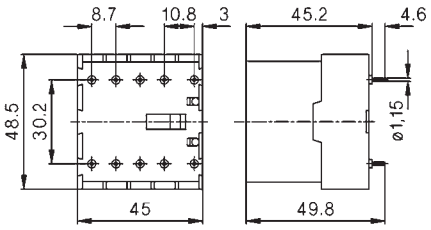


with fast on terminals

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

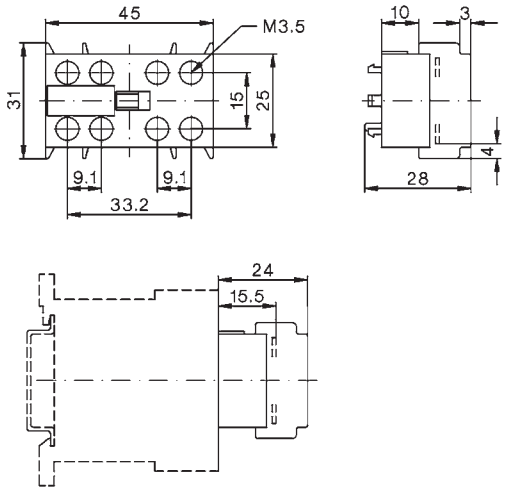


AC and DC operated
with solder connections
K1-07L..
K1-09L..



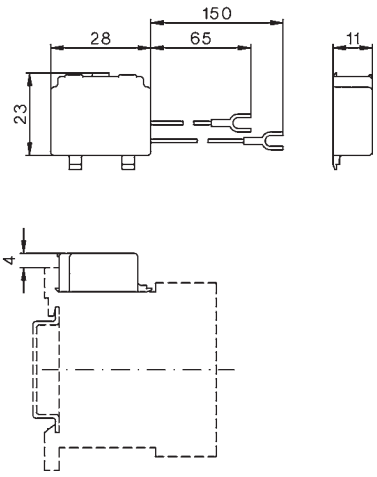
Auxiliary Contact Blocks

HK..



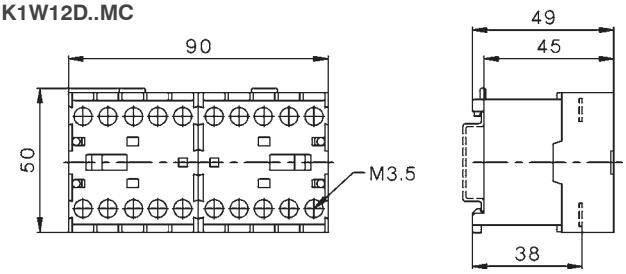
Suppressor Units

RC-K1



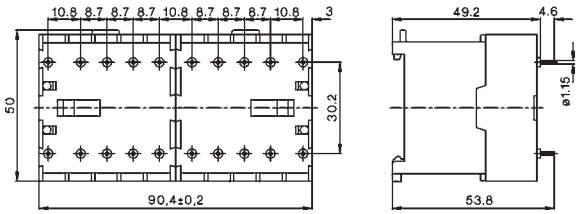
Reversing Contactors

K1W09D..MC
K1W12D..MC

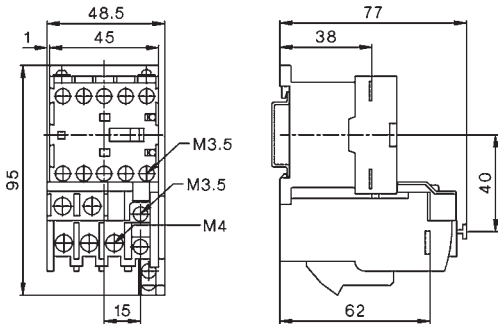


Reversing Contactors

K1W09L..MC



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



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