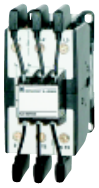
Capacitor Switching Contactors

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 230	Coil voltage [1] 220-240V 50Hz	
380V 400V kVAr	415V 440V kVAr	660V 690V kVAr	380V 400V kVAr	415V 440V kVAr	660V 690V kVAr	NO	NC	pcs.		Pack pcs.	Weight kg/pc.
0-**12,5**	0-13	0-20	0-12,5	0-13	0-20	1	-	1 [2]	**K3-18K10** . . .	1	0,34
0-**12,5**	0-13	0-20	0-12,5	0-13	0-20	-	1	1 [2]	**K3-18K01** . . .	1	0,34
10-**20**	10,5-22	17-33	10-20	10,5-22	17-33	-	-	3 [3]	**K3-24K00** . . .	1	0,62
10-**25**	10,5-27	17-41	10-25	10,5-27	17-41	-	-	3 [3]	**K3-32K00** . . .	1	0,62
20-**33,3**	23-36	36-55	20-33,3	23-36	36-55	-	-	3 [3]	**K3-50K00** . . .	1	1,0
20-**50**	23-53	36-82	20-50	23-53	36-82				**K3-62K00** . . .		
20-**75**[4]	23-75[4]	36-120[4]	20-60	23-64	36-100				**K3-74K00** . . .		
33-**80**	36-82	57-120	33-75	36-77	57-120	-	-	6 [5]	**K3-90K00** . . .	1	2,3
33-**100**[6]	36-103[6]	57-148[6]	33-90[6]	36-93[6]	57-148[6]	-	-	6 [5]	**K3-115K00** . . .	1	2,3

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

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

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

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

1) Coil voltage range and non-standard coil voltages see page 3
2) 1 HN.. or HA.. snap-on
3) 2HB.. for side mounting and 1 HN.. or HA.. snap-on
4) Consider the max. thermal current of the contactor K3-74A: I_{th} 130A
5) 2 HB.. on the left or right side and 4 HN.. or HA.. snap-on
6) Consider the min. cross-section of conductor at max. load

Contactors

for use with 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.	**230** ↓		pcs.	kg/pc.
												
5	5,5	8	5	5,5	8	1	-	4 [1]	**K3-10A10** . . .		1	0,23
9	9,5	15	**9**	9,5	15	1	-	4 [1]	**K3-14A10** . . .		1	0,23
												
12,5	13	20	12,5	13	20	1	-	4 [1]	**K3-18A10** . . .		1	0,23
13	14	22	13	14	22	1	-	4 [1]	**K3-22A10** . . .		1	0,23
												
20	22	33	20	22	33	-	-	6 [2]	**K3-24A00** . . .		1	0,48
25	27	41	25	27	41				**K3-32A00** . . .			
27,5	30	48	27,5	30	48				**K3-40A00** . . .			
33,3	36	55	33,3	36	55	-	-	6 [2]	**K3-50A00** . . .		1	0,85
50	53	82	50	53	82				**K3-62A00** . . .			
75 [3]	75 [3]	100	60	64	100				**K3-74A00** . . .			
												
80	82	120	75	77	120	-	-	9 [4]	**K3-90A00** . . .		1	2,2
100 [5]	103 [5]	148 [5]	90 [5]	93 [5]	148 [5]	-	-	9 [4]	**K3-115A00** . . .		1	2,2

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.. bis K3-115..	-	1	**HA01**	10	0,03
								
3	2	10	K3-24.. bis K3-115..	1	1	**HB11**	10	0,02
3	2	10	für seitlichen Anbau	-	2	**HB02**	10	0,02
								
3	2	10	K3-18.. bis K3-115..	1	-	**HN10**	10	0,02
3	2	10	K3-18.. bis K3-115..	-	1	**HN01**	10	0,02

Coil Voltages and Voltage Ranges for capacitor switching contactors

Suffix to contactor type e.g. K3-18K10 24	for contactor-Type K3-10.. to K3-74.. 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
24	24	24	22	24	24	27
48	48	48	44	48	48	52
110	110	110-120	100	110	110	122
180	180-210	200-240	180	210	200	240
230	**220-240**	**230-264**	**220**	**240**	**230**	**264**
400	380-415	400-440	380	415	400	460

Suffix to contactor type z.B.: K3-90K00 230	for contactor-Type K3-90.. to K3-115.. Voltage Marking at the coil for 50/60Hz V	for DC V	Rated Control Voltage U_s range for 50Hz min. V	max. V	for 60Hz min. V	max. V
24	24	24	22	24	22	24
48	48	48	44	48	44	48
110	110-120	110	110	120	110	120
200	200-220	200	200	220	200	220
230	**220-240**	**220**	**220**	**240**	**220**	**240**
400	380-415	-	380	415	380	415

1) 4 HN.. or HA.. snap-on
2) 2 HB.. on the left or right side and 4 HN.. or HA.. snap-on
3) Consider the max. thermal current: I_{th} 130A
4) 2 HB.. on the left or right side and 7 HN.. or HA.. snap-on
5) Consider the min. cross-section of conductor at max. load

Capacitor Switching Contactors

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

Main Contacts		Type	K3-18K	K3-24K	K3-32K	K3-50K	K3-62K	K3-74K	K3-90K	K3-115K
Utilization category AC6b Switching of non-reaktive and reactiv 3-phase capacitor banks										
Ambient temperature ≤50°C										
Rated operational current I_e	690V	A	0-18	14-28	14-36	30-48	30-72	30-108 [1]	50-115	50-144 [2]
Rated operational power	220-240V	kVAr	0-7	5-11	5-14	12-20	12-28	12-33	20-45	20-55 [2]
	380-400V	kVAr	0-12,5	10-20	10-25	20-33,3	20-50	20-75 [1]	33-80	33-100 [2]
	415-440V	kVAr	0-13	10,5-22	10,5-27	23-36	23-53	23-75 [1]	36-82	36-103 [2]
	500V	kVAr	0-15	12-25	12-30	26-40	26-60	26-75	43-100	43-120 [2]
	525V	kVAr	0-15	12-25	12-32	26-43	26-64	26-80	45-105	45-125 [2]
	660-690V	kVAr	0-20	17-33	17-41	36-55	36-82	36-120	57-120	57-148 [2]
	1000V	kVAr	-	-	-	-	-	-	85-160	85-200 [2]
Ambient temperature ≤60°C										
Rated operational current I_e	690V	A	0-18	14-28	14-36	30-48	30-72	30-87	50-108	50-130 [2]
Rated operational power	220-240V	kVAr	0-7	5-11	5-14	12-20	12-28	12-30	20-40	20-50 [2]
	380-400V	kVAr	0-12,5	10-20	10-25	20-33,3	20-50	20-60	33-75	33-90 [2]
	415-440V	kVAr	0-13	10,5-22	10,5-27	23-36	23-53	23-64	36-77	36-93 [2]
	500V	kVAr	0-15	12-25	12-30	26-40	26-60	26-70	43-90	43-110 [2]
	525V	kVAr	0-15	12-25	12-32	26-43	26-64	26-75	45-95	45-115 [2]
	660-690V	kVAr	0-20	17-33	17-41	36-55	36-82	36-100	57-120	57-148 [2]
	1000V	kVAr	-	-	-	-	-	-	85-150	85-180 [2]

Contactors

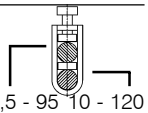
Data according to IEC 947-4-1, EN 60947-4-1, VDE 0660

Main Contacts		Type	K3-10	K3-14	K3-18	K3-22	K3-24	K3-32	K3-40	K3-50	K3-62	K3-74	K3-90	K3-115
Utilization category AC6b Switching of reactive capacitor banks														
Ambient temperature ≤50°C														
Rated operational current I_e	690V	A	8	13	18	20	28	36	42	48	72	108 [1]	115	144 [2]
Rated operational power	220-240V	kVAr	2,9	5	7	7,5	11	14	16	20	28	33	45	55 [2]
	380-400V	kVAr	5	9	12,5	13	20	25	27,5	33,3	50	75 [1]	80	100 [2]
	415-440V	kVAr	5,5	9,5	13	14	22	27	30	36	53	75 [1]	82	103 [2]
	500V	kVAr	6	11	15	17	25	30	36	40	60	75	100	125 [2]
	525V	kVAr	6	11	15	17	25	32	36	43	64	80	105	125 [2]
	660-690V	kVAr	8	15	20	22	33	41	48	55	82	120	120	148 [2]
	1000V	kVAr	-	-	-	-	-	-	-	-	-	-	160	200 [2]
Ambient temperature ≤60°C														
Rated operational current I_e	690V	A	8	13	18	20	28	36	42	48	72	87	108	130 [2]
Rated operational power	220-240V	kVAr	2,9	5	7	7,5	11	14	16	20	28	30	40	50 [2]
	380-400V	kVAr	5	9	12,5	13	20	25	27,5	33,3	50	60	75	90 [2]
	415-440V	kVAr	5,5	9,5	13	14	22	27	30	36	53	64	77	93 [2]
	500V	kVAr	6	11	15	17	25	30	36	40	60	70	90	110 [2]
	525V	kVAr	6	11	15	17	25	32	36	43	64	75	95	115 [2]
	660-690V	kVAr	8	15	20	22	33	41	48	55	82	100	120	148 [2]
	1000V	kVAr	-	-	-	-	-	-	-	-	-	-	150	180 [2]

1) Consider the max. thermal current: I_{th} 130A
2) Consider the min. cross-section of conductor at max. load

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	K3-90	K3-115
Rated insulation voltage U_i [1]		V AC	690	690	690	690	690	690	690	690	690	690	1000	1000
Rated operational current I_e (=I_{th}) at 40°C, open 690V		**A**	**25**	**25**	**32**	**32**	**50**	**65**	**80**	**110**	**120**	**130**	**160**	**200**
Maximum ambient temperature														
Operation	open	°C	-40 to +60 (+90) [2]											
	enclosed	°C	-40 to +40											
Storage		°C	-50 to +90											
Short circuit protection														
Coordination-type "1" acc. to IEC 947-4-1														
Contact welding without hazard of persons														
fuse size	from gL (gG)	A	35	35	35	35	50	63	63	80	125	160	160	160
	to gL (gG)	A	63	63	63	63	80	100	100	160	160	200	200	250
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			0,5 - 95	10 - 120
	flexible	mm²	1 - 4				2,5 - 16			10 - 35			0,5 - 70	25 - 95
	flexible with multicore cable end	mm²	0,75 - 4				1,5 - 16			6 - 35			0,5 - 70	10 - 95
2 cables per clamp													top	below
	solid or stranded	mm²	6+(1-6) / 4+(0,75-4)				16+(2,5-6) / 10+(4-10)			50+4 / 35+6 / 25+(6-16)			0,5-95 +	10-120
			2,5+(0,75-2,5) / 1,5+(0,75-1,5)				6+(4-6) / 4+(2,5-4)			16+(6-16) / 10+(6-16)				
	flexible	mm²	6+(1,5-6) / 4+(1-4)				16+(2,5-6) / 10+(4-10)			50+(4-10) / 35+(4-16)			0,5-70 +	10-95
			2,5+(0,75-2,5) / 1,5+(0,75-1,5)				6+(4-6) / 4+(2,5-4)			25+(4-25) / 16+(4-16)				
Cables per clamp			2				2			2			1+1	
Screw / screw driver			M3,5 / Pz2				M5 / Pz2			M6 / Pz3			M8 / 4mm-inbus	
Tightening torque		Nm/*lb.inch*	0,8-1,4 / *7-12*				2,5-3 / *22-26*			3,5-4,5 / *31-40*			4-6,5 / *35-57*	
for main connector	solid	AWG	18 - 10				16 - 10			12 - 10			-	
	flexible	AWG	18 - 10				14 - 4			10 - 0			-	
Cables per clamp			2				1			1			-	
													top	below
	solid	AWG	10+(16-10) / 12+(18-12)				10+(16-10) / 12+(18-12)			10+(12-10) / 12+12			18-10	-
			14+(18-14) / 16+(18-16)				14+(18-14) / 16+(18-16)							
	flexible	AWG	10+(14-10) / 12+(18-12)				4+(18-12) / 6+(18-8)			1+(12-10) / 2+(8-12)			18-3/0	8-4/0
			14+(18-14) / 16+(18-16)				8+(18-8) / 10+(18-12)			3+(12-8) / 4+(10-6)				
Cables per clamp			2				2			2			1+1	
Mechanical life														
AC operated		S x 10^6	10				10			10			5	
DC operated		S x 10^6	10				10			10			5	
Short time current	10s-current	A	96	120	144	176	184	240	296	360	504	592	680	880
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	4,3	6,0
Auxiliary Contacts														
Rated insulation voltage U_i [1]		V~	690				-			-			-	
Thermal rated current I_{th} to 690V														
Ambient temperature	40°C	A	16				-			-			-	
	60°C	A	12				-			-			-	
Utilization category AC15	220-240V	A	12				-			-			-	
Rated operational	380-415V	A	4				-			-			-	
current I_e	440V	A	4				-			-			-	
	500V	A	3				-			-			-	
	660-690V	A	1				-			-			-	
Utilization category DC13	60V	A	8				-			-			-	
Rated operational	110V	A	1				-			-			-	
current I_e	220V	A	0,1				-			-			-	
Short circuit protection														
short-circuit current 1kA, contact welding not accepted														
max. fuse size	gL (gG)	A	25				-			-			-	

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 rated current I_e /AC1according to I_e /AC3

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

		Type	K3-10	K3-14	K3-18	K3-22	K3-24	K3-32	K3-40	K3-50	K3-62	K3-74	K3-90	K3-115
Control Circuit														
Power consumption of coils														
AC operated	inrush	VA		33-45				90-115			140-165			190-280
	sealed	VA		7-10				9-13			13-18			2,5-5
		W		2,6-3				2,7-4			5,4-7			2,5-5
DC operated	inrush	W		75				140			200			190-280
	sealed	W		2				2			6			2,5-5
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
DC operated				0,8-1,1				0,8-1,1			0,8-1,1			0,8-1,1
Switching time														
at control voltage U_s ±10% [1) 2)]														
AC operated	make time	ms		8-16				10-25			12-28			20-35
	release time	ms		5-13				8-15			8-15			35-50
	arc duration	ms		10-15				10-15			10-15			10-15
DC operated	make time	ms		8-12				10-20			12-23			20-35
	release time	ms		8-13				10-15			10-18			35-50
	arc duration	ms		10-15				10-15			10-15			10-15
Cable cross-section														
Auxiliary connector	solid	mm²		0,75-6				-			-			-
	flexible	mm²		1-4				-			-			-
flexible with multicore cable end		mm²		0,75-4				-			-			-
Magnet coil	solid	mm²		0,75-2,5				0,75-2,5			0,75-2,5			0,75-2,5
	flexible	mm²		0,5-2,5				0,5-2,5			0,5-2,5			0,5-2,5
flexible with multicore cable end		mm²		0,5-1,5				0,5-1,5			0,5-1,5			0,5-1,5
Clamps per pole				2				2			2			2
Screw / screw driver				M3,5 / Pz2				M3,5 / Pz2			M3,5 / Pz2			M3,5 / Pz2
Tightening torque		Nm/*lb.inch*		0,8-1,4 / *7-12*				0,8-1,4 / *7-12*			0,8-1,4 / *7-12*			0,8-1,4 / *7-12*
Auxiliary connector	solid	AWG		18 - 10-				-			-			-
	flexible	AWG		18 - 10				-			-			-
Magnet coil	solid	AWG		14 - 12				14 - 12			14 - 12			14 - 12
	flexible	AWG		18 - 12				18 - 12			18 - 12			18 - 12
Clamps per pole				2				2			2			2

Capacitor Switching Contactors for North America

Data according to UL508

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

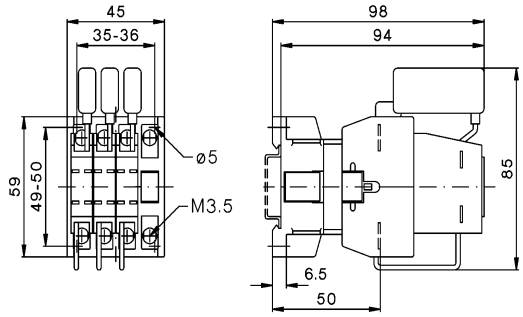
1) Total breaking time = release time + arc duration
2) Values for delay of the release time of the make contact and the make time of the break contact will be increased, if magnet coils are protected against voltage peaks (varistor, RC-unit, diode-unit)
3) Consider the max. thermal current of the contactor K3-74A: I_{th} 130A
4) Consider the min. cross-section of conductor at max. load
5) Class T and Class RK1

Contactors

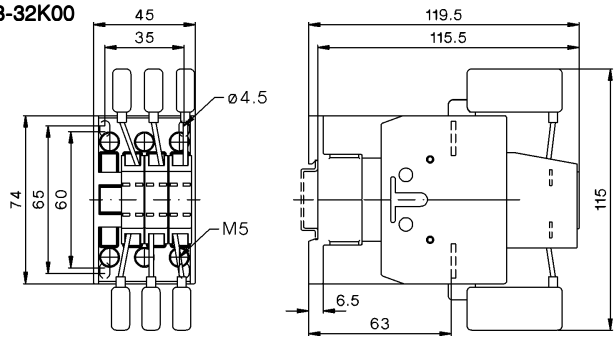
Dimensions

Capacitor switching contactors, AC operated

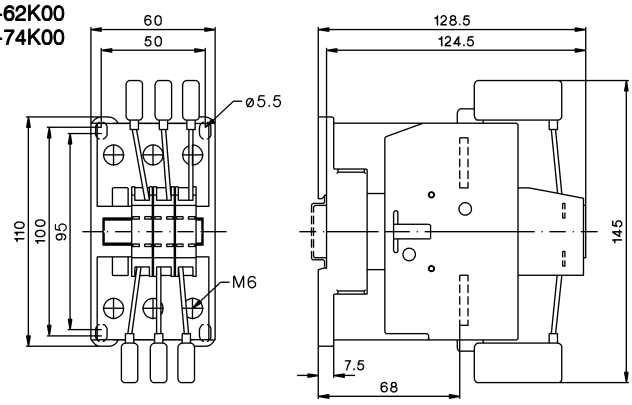
K3-18K..



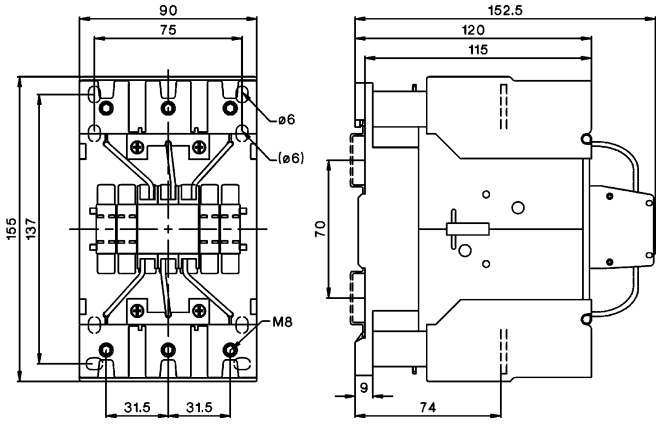
K3-24K00
K3-32K00



K3-50K00
K3-62K00
K3-74K00

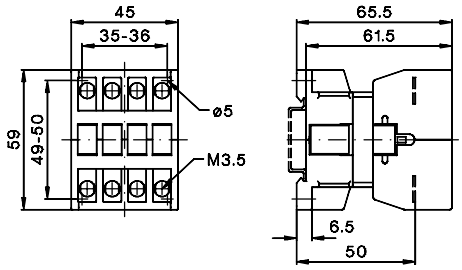


K3-90K00
K3-115K00

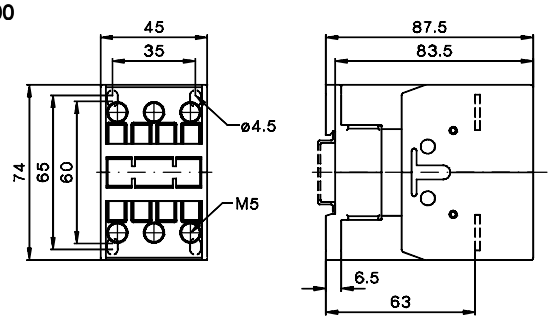


Contactors AC-operated

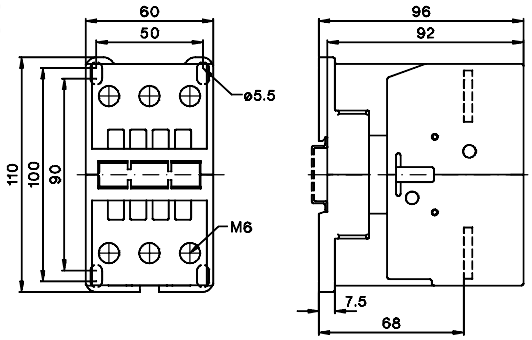
K3-10A10
K3-14A10
K3-18A10
K3-22A10



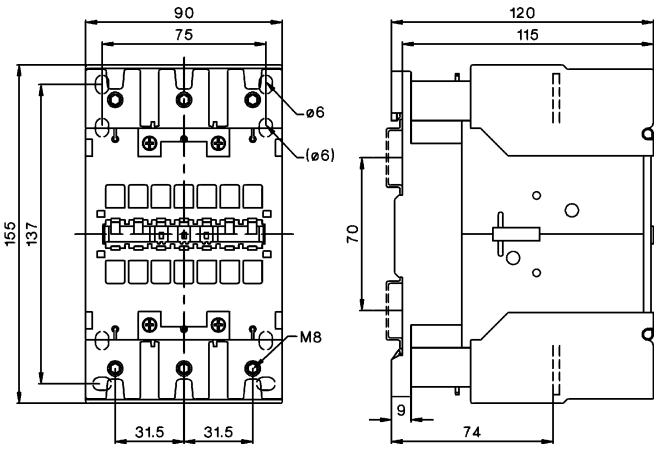
K3-24A00
K3-32A00
K3-40A00



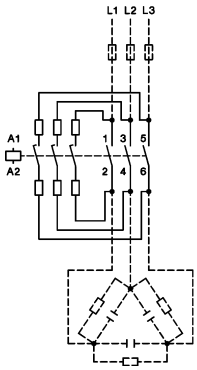
K3-50A00
K3-62A00
K3-74A00



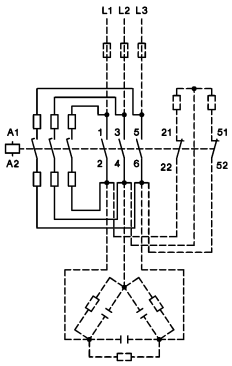
K3-90A00
K3-115A00



Typical Circuit Diagram of Capacitor Switching Contactors



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

Contactor operation at direct switching of capacitors

Theoretic view of function

Make

In case of the pre-contacts during make, the current peaks are attenuate by resistor wires.
These current peaks would weld the main-contacts of contactor and they are also not good for the capacitors.

The total resistance of the resistor wires is mostly ohmic, the inductive one can be ignored.
The looking like a coil is only a case of construction.

The single controlled pre-contacts are increasing the safety of operating, in opposite of contamination during operation.

Operation:

During operation the resistor wires are not getting warmer, because they are not in the circuit.

Break:

Important: these contactors can be used for both installations, because the pre-contacts have no function during break, thus means that the peaks of the break-over voltage (power) of the chokes can´t make any damage.

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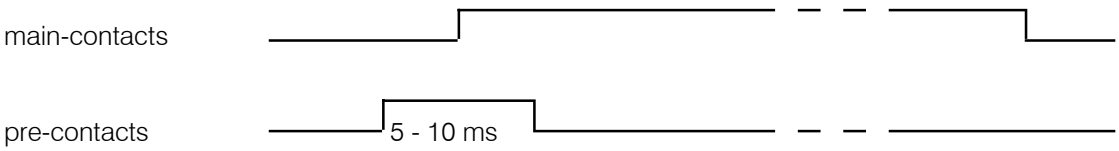
Description

Function diagram

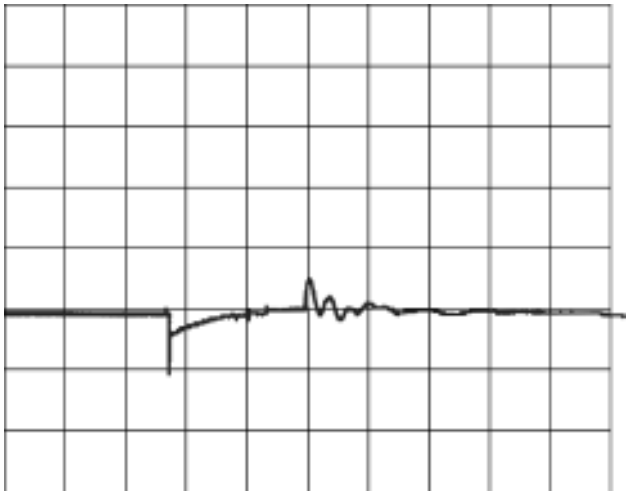


Practical function - oscillogram

make with pre-contacts (B&J\Oszi11)

K3-18K 12.5kVAr (18A / 400V)

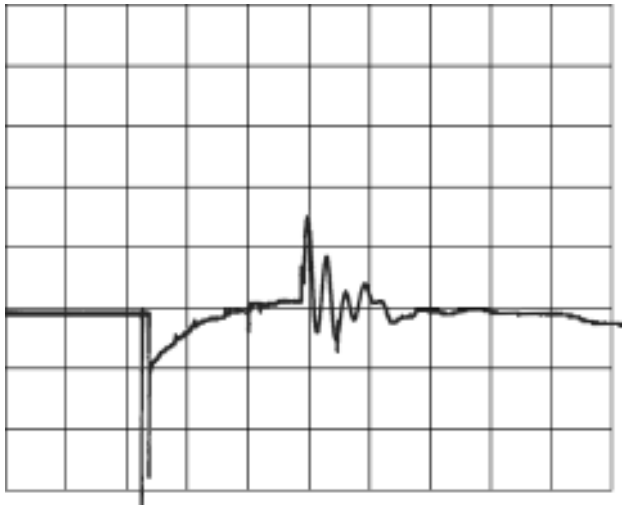
vertical: **250A** / div horizontal: 1ms / div



make with pre-contacts (B&J\Oszi10)

K3-18K 12.5kVAr (18A / 400V)

vertical: **100A** / div horizontal: 1ms / div



Description:

The difference of the diagrams is the current scale only.

First current peak due to make of pre-contacts.

Second current peak due to building-up the main-circuit with noteable lower amplitude as the first and not so steep, that means lower frequency.

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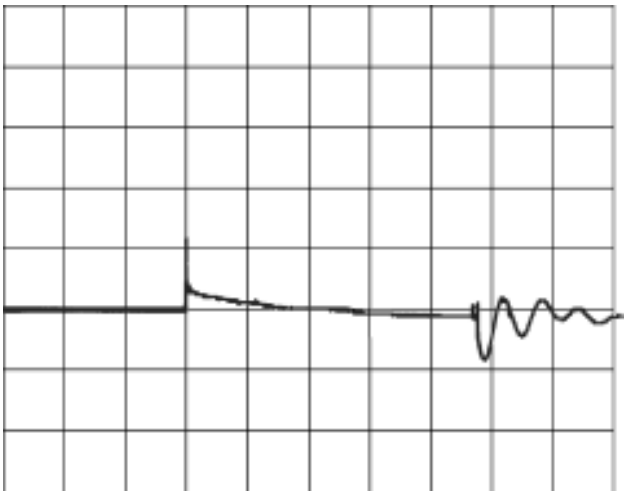
Description

make **with** pre-contacts (B&J\Oszi13)

K3-18K 12.5kVAr (18A / 400V)

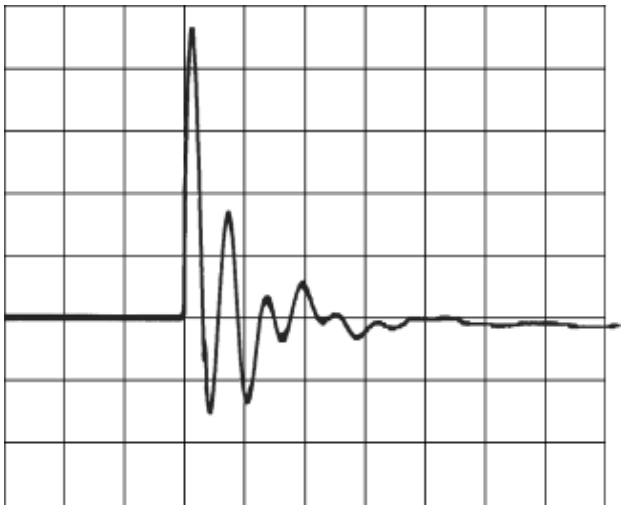
vertical: 250A / div horizontal: 0.5ms / div



make **without** pre-contacts (B&J\Oszi12)

K3-18A 12.5kVAr (18A / 400V)

vertical: 250A / div horizontal: 0.5ms / div



The right picture shows a make current peak without pre-contacts with about 1200A with high power in opposite to 280A with low power (power = integrated area).
Of course, the contactors endure a few switches without pre-contacts.

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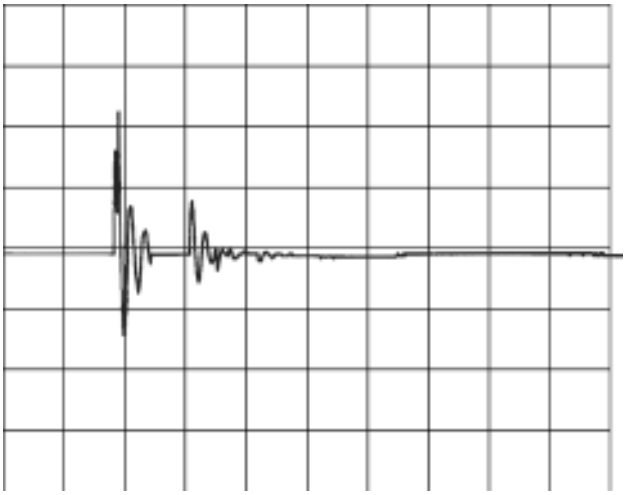
Switching of capacitor banks at different conditions

make **without** pre-contacts (B&J\Oszi16)
without chokes

K3-62A 50kVAr (72A / 690V)

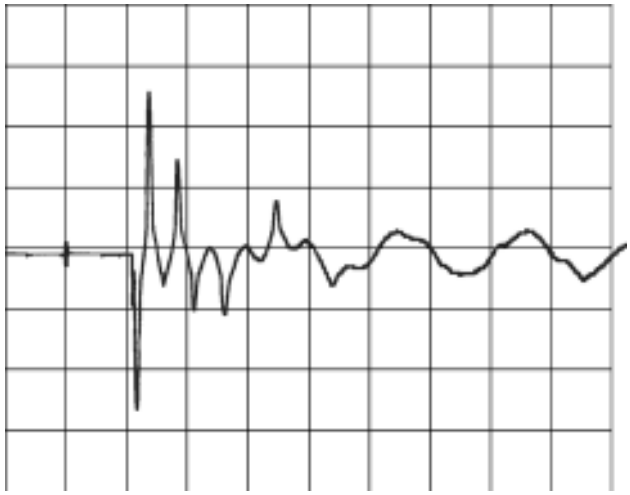
vertical: **2000A** / divhorizontal: 0.625ms / div



make **without** pre-contacts (B&J\Oszi15)
with chokes

K3-62A 50kVAr (72A / 690V)

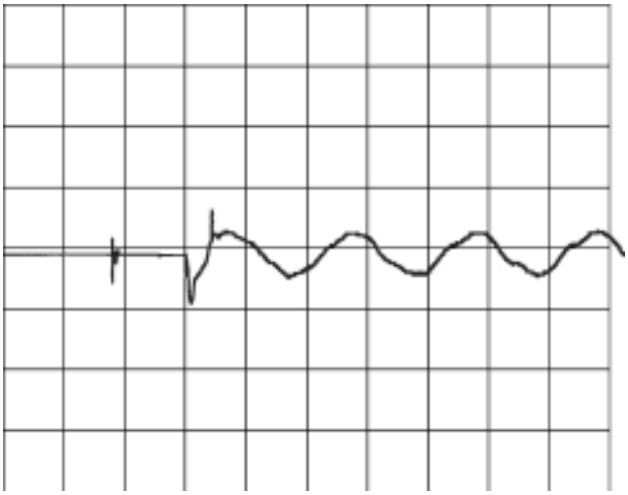
vertical: **200A** / div horizontal: 10ms / div



make **with** pre-contacts (B&J\Oszi14)
with chokes

K3-62K 50kVAr (72A / 690V)

vertical: **200A** / div horizontal: 10ms / div



The make current peak without pre-contacts and without chokes is higher than 4000A.

This peak can be reduced by the influence of chokes to approx. 500A.

In the last case we see the influce of chokes and pre-contacts of the "capacitor contactor". The peak is reduced to approx. 200A.

Also the sinus-weave is very clear by the influence of chokes because you have reduced harmonic frequences.

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Notice:

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