

Main Contactors





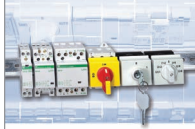

acc. to IEC 947 / EN 60947



Quality made in



D1025E181

<p>Contactors Motor-Starter</p>  <p>BENEDICT www.benedict.at</p>	<p>Mini-Contactors Contactors Overload Relays Compacitor Switching Contactors Motor-Starters Modular Contactors</p> <p>Catalogue D677E..</p>	<p>Circuit Breakers</p>  <p>BENEDICT www.benedict.at</p>	<p>M4-32T.. up to 32A M4-32R.. up to 32A M4-63R.. up to 63A M4-100R.. up to 100A</p> <p>Catalogue D795E..</p>
<p>Switches</p>  <p>BENEDICT www.benedict.at</p>	<p>On-Off-Switches Changeover Switches Motor Switches Step Switches Main Switches Modular Switches Key Operated Switches</p> <p>Catalogue D371E..</p>	<p>Main Switches</p>  <p>BENEDICT www.benedict.at</p>	<p>Emergency Off Main Switches On-Off-Switches Add-On-Module</p> <p>Catalogue D656E..</p>
<p>Capacitor Switching Contactors</p>  <p>BENEDICT www.benedict.at</p>	<p>Contactors for reactive and non reactive capacitor banks</p> <p>Catalogue D385E..</p>	<p>Manual Motorstarter</p>  <p>BENEDICT www.benedict.at</p>	<p>MU25A up to 32A</p> <p>Auxiliary Contact Blocks Trip Alarm Auxiliary Switches Busbar Connectors Enclosure</p> <p>Catalogue D509E..</p>
<p>Push Buttons</p>  <p>BENEDICT www.benedict.at</p>	<p>Push Buttons Emergency Stop Key Operated Rotary Switches Rotary Knobs Illuminated Push Buttons Assembled Stations</p> <p>Catalogue D580E..</p>	<p>Modular- Contactors</p>  <p>BENEDICT www.benedict.at</p>	<p>Modular Contactors Accessories Emergency Off Switches Main Switches On-Off Switches Control Switches</p> <p>Catalogue D681E..</p>
<p>DC-Switchgear for Photovoltaic</p>  <p>BENEDICT www.benedict.at</p>	<p>Main Switches On-Off-Switches Contactors for DC-Switching</p> <p>Catalogue D911E..</p>	<p>Low Voltage Control Gear</p>  <p>BENEDICT www.benedict.at</p>	<p>Contactors D.O.L. Starter Overload Relays Manual Motor Starter Main Switches Cam Switches Push Buttons Emergency Stop</p> <p>Catalogue D651E..</p>



Main Contactors (AC or DC operated)

4 - 5



Main Contactors Accessories

6 - 8



Coil voltages, spare coils
Technical Data
Dimensions

9 - 10
11 - 20
21 - 24

Main Contactors

- Switch AC1 loads up to 52A
- Space saving design, large box terminals
- International approbations
- AC- or DC- operated



Ratings AC3 400V Motor 380-400V 660-690V AC1 690V at 40°C	10A 18A 4kW 7,5kW 5,5kW 10kW 45A 52A	
Type Aux. Contacts	K3-10NB10 K3-18NB10 1S 1S	
Cable cross sections solid or stranded mm ² flexible mm ²	2,5 - 16 2,5 - 10	
Aux. Contact I _{th} 40°C A AC15 230V A 400V A	10 3 2	
Consumption of coils Inrush VA Sealed VA Operation range of coils	33 - 45 7 - 10 0,85 - 1,1	
Mounting	35mm DIN-rail mounting or base mounting	
Aux. contacts Front mounting contacts Type	HN10 HN01 HA10 HA01 1NO 1NC 1NO 1NC f. low level f. low level 25A I _{th} 25A I _{th} switching switching 	max. 4 HN.. or 4 HA..

Main Contactors 3-pole

AC Operated



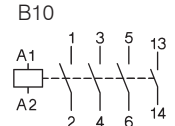
Ratings AC2, AC3 380V 400V 660V 415V 690V	Rated Current	Aux. Contacts built in Additional	Type
	AC1		
	690V		

Coil voltages ¹⁾
24 24V 50/60Hz
110 110V 50/60Hz
190 200-240V 50/60Hz
230 220-240V 50Hz
400 380-415V 50Hz

kW	kW	A	NO	NC	Type
4	5,5	45	1	-	max. 4
7,5	10	52	1	-	HN.. or HA..

Type	Pack pcs.	Weight kg/pc.
K3-10NB10 ...	1	0,23
K3-18NB10 ...	1	0,23

Wiring Diagram



Main Contactors 4-pole

AC Operated



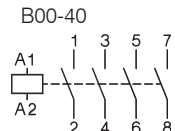
Ratings AC2, AC3 380V 400V 660V 415V 690V	Rated Current	Aux. Contacts built in Additional	Type
	AC1		
	690V		

Coil voltages ¹⁾
24 24V 50/60Hz
110 110V 50/60Hz
190 200-240V 50/60Hz
230 220-240V 50Hz
400 380-415V 50Hz

kW	kW	A	NO	NC	Type
4	5,5	45	-	-	max. 4
7,5	10	52	-	-	HN.. or HA

Type	Pack pcs.	Weight kg/pc.
K3-10NB00-40 ...	1	0,23
K3-18NB00-40 ...	1	0,23

Wiring Diagram



Main Contactors 3-pole

DC Operated with double winding coil



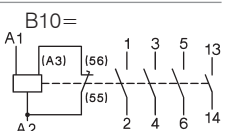
Ratings AC2, AC3 380V 400V 660V 415V 690V	Rated Current	Aux. Contacts built in Additional	Type
	AC1		
	690V		

Coil voltages ¹⁾
24 24V= DC
48 48V= DC
110 110V= DC
220 220V= DC

kW	kW	A	NO	NC	Type
4	5,5	45	1	-	max. 3
7,5	10	52	1	-	HN.. or HA..

Type	Pack pcs.	Weight kg/pc.
K3-10NB10= ...	1	0,25
K3-18NB10= ...	1	0,25

Wiring Diagram



Main Contactors 4-pole

DC Operated with double winding coil



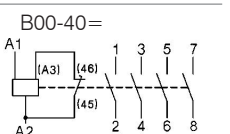
Ratings AC2, AC3 380V 400V 660V 415V 690V	Rated Current	Aux. Contacts built in Additional	Type
	AC1		
	690V		

Coil voltages ¹⁾
24 24V= DC
48 48V= DC
110 110V= DC
220 220V= DC

kW	kW	A	NO	NC	Type
4	5,5	45	-	-	max. 3
7,5	10	52	-	-	HN.. or HA..

Type	Pack pcs.	Weight kg/pc.
K3-10NB00-40= ...	1	0,25
K3-18NB00-40= ...	1	0,25

Wiring Diagram



1) Coil voltage ranges and non-standard coil voltages see page 7

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



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

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



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

Electronic Timer

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



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

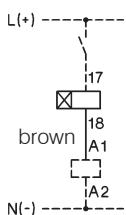
Electronic Timer On-delay for contactors K(G)3-07.. to K3-115.. and K2-..

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

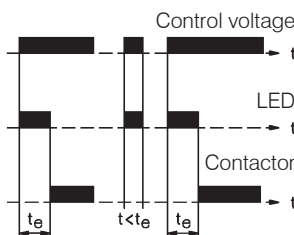


Operational Voltage V	Time Range s	Rated Current AC15 A	Type	Pack pcs.	Weight kg/pc.
24 - 60V AC/DC	1 - 30	0,75	K2-TE30 60	1	0,08
100 - 250V AC/DC	1 - 30	0,75	K2-TE30 250	1	0,08
24 - 60V AC/DC	10 - 180	0,75	K2-TE180 60	1	0,08
100 - 250V AC/DC	10 - 180	0,75	K2-TE180 250	1	0,08
24 - 60V AC/DC	30 - 600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

Wiring Diagram



Timing Chart



Operation Range

Time repeat accuracy
Recovery time (typical)

$0,8 - 1,1 \times U_s$
 $\leq 1\%$
50ms

Voltage Drop after the time delay t_e
(Control voltage 24V: use contactor with 20V-coil)
Max. inrush current (peak value)

$< 3V$
25A $< 10ms$

Duty Cycle

Ambient temperature
Short circuit protection

100%
 $-40^\circ - +60^\circ C$
2A

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

Interface



Input Voltage U _e	Power Consumption	Rated Current I _e AC15		Type	Pack pcs.	Weight kg/pc.
24V DC	0,35W	0,75A	0,5A	K2-IM	1	0,03

Amplifier element for contactor control by programmable controller

Fuse Holders



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

Rectifier with Fuse Holder

Specifications	Rated Voltage	Type	Pack pcs.	Weight kg/pc.
with built-in rectifier 1A	250V AC	K2-RF1	1	0,03
with built-in rectifier 3A	250V AC	K2-RF3	1	0,03

Latch



Specifications	Rated Voltage	Type	Pack pcs.	Weight kg/pc.
with NC aux. contact duty cycle 10%, max. 30 sec. AC / max. 20 sec. DC power consumption max. 30VA		Coil voltage 24 22-26V 50/60Hz 110 100-120V 50/60Hz 230 210 -250V 50/60Hz 400 360-440V 50/60Hz		
For Contactors		↓		
K3-10NB10 to K3-18NB10		K2-L22 . . .	1	0,08

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 connect in series with the contactor coil. In case of coil interruption the indication goes out. Voltage drop appr. 2 volts				
Voltage Indicator , clear (glow-disc. l.)	220 - 415V AC/DC	K2-UN	10	0,02
Voltage Indicator , red (LED)	24 - 120V AC/DC	K2-UNR	10	0,02
To connect parallel to the contactor coil. In case of applied voltage the indication also lights at coil interruption.				

Snap-On Adapter



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

Mechanical Interlocks



Interlocks contactor with contactor Type	Mounting Type	Type	Pack pcs.	Weight kg/pc.	
K3-10NB to K3-18NB	K3-10NB to K3-18NB	horizontal	LG10889 ¹⁾	10	0,006

1) Inclusively mounting clamps

Suppressor Units



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

RC-units for contactors and reversing starters

12 - 48V AC/DC	to snap	1600nF / 22 Ohm	RC-K3NW 24	10	0,01
48 - 127V AC/DC	on the	680nF / 270 Ohm	RC-K3NW 110	10	0,01
110 - 230V AC/DC	contactor	220nF / 2200 Ohm	RC-K3NW 230	10	0,01
230 - 415V AC/DC		120nF / 620 Ohm	RC-K3NW 400	10	0,01

Mounting Parts



Description	For Type	Specification	Type	Pack pcs.	Weight kg/pc.
Clamp, no distance	K3-10NB/18NB	To join contactors without distance, 2 pieces required	P426-1	50	0,001



Clamp, 7mm distance	K3-10NB/18NB	To join contactors with 7mm distance, 2 pieces required	P418-1	10	0,002
--------------------------------	--------------	---------------------------------------------------------------	---------------	----	-------

Clamp, 12mm distance	K3-10NB/18NB	To join contactors with 12mm distance, 2 pieces required	P807-1	10	0,002
---------------------------------	--------------	----------------------------------------------------------------	---------------	----	-------



Retention clamp	K3-10NB/18NB	To close contactors	P725		
------------------------	--------------	---------------------	-------------	--	--

Marking System



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

Coil voltages for AC operated contactors

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

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

Standard voltages in bold type letters.

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

Spare Coils for AC operated contactors



For Contactors
K3-10NB to K3-18NB

Type	Coil voltage ¹⁾
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

	Pack pcs.	Weight kg/pc.
K10N/...EUR	1	0,053

Spare Coils for DC operated contactors



For Contactors

Aux. Contact Block
for double winding coil

Type	Coil voltage ¹⁾
47.24	24V DC
47.48	48V DC
47.110	110V DC
47.220	220V DC

	Pack pcs.	Weight kg/pc.
K10N/...	1	0,052

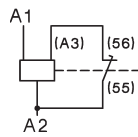
K3-10NB.. = up to K3-18NB.. = HN01U

Wiring Diagrams for Coil Circuit

AC operated



DC operated
with double winding coil



Main Contactors

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

Main Contacts	Type	K3-10NB	K3-18NB
Rated insulation voltage U_i ¹⁾	V AC	690	690
Making capacity I_{eff} at $U_e = 690V$ AC	A	200	200
Breaking capacity I_{eff} 400V AC	A	180	200
K3-10 to K3-22 $\cos\phi = 0,65$ 500V AC	A	150	180
K3-24 to K3-1200 $\cos\phi = 0,35$ 690V AC	A	100	150
Utilization category AC1			
Switching of resistive load			
Rated operational current $I_e (=I_{th})$ at 40°C , open	690V A	45	52
Rated operational power of three-phase resistive loads 50-60Hz, $\cos\phi = 1$	230V kW	17,9	20,7
	400V kW	31,1	36
	440V kW	34,2	39,6
	500V kW	38,9	45
	690V kW	53,7	62,1
Rated operational current $I_e (=I_{th})$ at 60°C , enclosed	690V A	35	40
Rated operational power of three-phase resistive loads 50-60Hz, $\cos\phi = 1$	230V kW	13,9	15,9
	400V kW	24,2	27,7
	440V kW	26,6	30,4
	500V kW	30,3	34,6
	690V kW	41,8	47,8
Rated operational current $I_e (=I_{th})$ at 75°C , open	690V A	32	37
Rated operational current $I_e (=I_{th})$ at 90°C , open	690V A	27	32
Minimum cross-section of conductor at load with $I_e (=I_{th})$	mm ²	10	10

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.

Main Contactors

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

Main Contacts		Type	K3-10NB	K3-18NB
Utilization category AC4				
Switching of squirrel cage motors, inching				
Rated operational current I_e	220V	A	12	18
open and enclosed	230V	A	11,5	18
	240V	A	11	18
	380-400V	A	10	18
	415V	A	9	18
	440V	A	9	18
	500V	A	9	16
	660V	A	7	9
	690V	A	6,5	8,5
Rated operational power of three-phase motors	220-230V	kW	3	5
50-60Hz	240V	kW	3	5
	380-400V	kW	4	7,5
	415V	kW	4,5	8,5
	440V	kW	4,5	8,5
	500V	kW	5,5	10
	660-690V	kW	5,5	10
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	25
parallel compensated		A	7	9
dual-connection		A	22,5	28
Metal halide lamps ¹⁾ , uncompensated		A	12	19
parallel compensated		A	7	9
Mercury-vapour lamps ²⁾ , uncompensated		A	22,5	28
parallel compensated		A	7	9
Mixed light lamps ³⁾		A	20	25
LED-Lamps				
consider the inrush current of the lamp ballast and $\cos \phi$ of the lamp.			max. lamps per pole ($I_{nLED} \leq I_{th}$) = $\frac{\text{inrush current of contactor}}{\text{inrush current of lamp/EVG}}$	
max inrush current of contactor		A	282	282
Utilization category AC5b				
Switching of incandescent lamps⁴⁾				
Rated operational current I_e per pole at 220/230V		A	12,5	12,5

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 fluorescent glass bulb (daylight lamps)

4) Current inrush approx. $16 \times I_e$


Main Contactors

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

Main Contacts	Type	K3-10NB	K3-18NB
Utilization category AC6a			
Transformer primary switching			
at inrush	n	30	30
Rated operational current I_e	400V A	4,5	7,5
Rated operational power	220-230V kVA	1,8	3
dependent on inrush n	240V kVA	1,9	3,1
	380-400V kVA	3,1	5,2
For different inrush-factors x	415-440V kVA	3,4	5,7
use the following formula:	500V kVA	3,9	6,5
$P_x = P_n * (n/x)$	660-690V kVA	5,4	9
Utilization category AC6b			
Switching of three-phase capacitors			
Maximum inrush current (peak value)			
as multiple k of the capacitor rated current			
Rated operational current I_e	k	35	20
	500V A	8	15,5
Rated operational current	220-230V kVAr	3	6
($\sin\phi \rightarrow 1$)	240V kVAr	3,5	6,5
	380-400V kVAr	5	10
For different multiples x	415-440V kVAr	5,5	11
use the following formula:	500V kVAr	7	13
$P_x = P_k * (k/x)$	660-690V kVAr	7	13
Switching of reactive capacitor banks			
Rated operational current I_e	690V A	8	18
Rated operational power	220-230V kVAr	2,9	7
	240V kVAr	3,1	7
	380-400V kVAr	5	12,5
	415-440V kVAr	5,5	13
	500V kVAr	6	15
	660-690V kVAr	8	20
Utilization category DC1			
Switching of resistive load			
Time constant $L/R \leq 1ms$			
Rated operational current I_e	1 pole 24V A	45	52
	60V A	45	52
	110V A	6	6
	220V A	0,8	0,8
	3 poles in series 24V A	20	32
	60V A	20	32
	110V A	20	32
	220V A	16	20
Utilization category DC3 and DC5			
Switching of shunt motors and series motors			
Time constant $L/R \leq 15ms$			
Rated operational current I_e	1 pole 24V A	45	52
	60V A	6	6
	110V A	1,2	1,2
	220V A	0,2	0,2
	3 poles in series 24V A	45	52
	60V A	45	52
	110V A	45	52
	220V A	2,5	2,5

Main Contactors

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

Main Contacts	Type	K3-10NB	K3-18NB
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
Cable cross-sections			
for contactors without thermal overload relay			
1 cable per clamp			
main connector	solid or stranded	mm ²	2,5 - 16
	flexible	mm ²	2,5 - 10
	flexible with multicore cable end	mm ²	2,5 - 10
2 cables per clamp			
	solid or stranded	mm ²	16+(1,5-2,5) / 10+(1,5-6) / 6+(1,5-10) / 4+(1,5-10)
	flexible	mm ²	16+(1,5-2,5) / 10+(1,5-4) / 6+(1,5-6)
			
1 cable per clamp			
main connector	solid	AWG	18 - 10
	flexible	AWG	16 - 6
2 cables per clamp			
	solid	AWG	10+(14-12) / 12+(14-10) / 14+(14-10)
	flexible	AWG	6+(18-12) / 10+(18-10) / 12+(18-6) / 14+(18-6)
Frequency of operations z			
Contactors without thermal overload relay			
	without load	1/h	10000
	AC3, I _e	1/h	600
	AC4, I _e	1/h	120
	DC3, I _e	1/h	600
Mechanical life			
AC operated	S x 10 ⁶		10
DC operated	S x 10 ⁶		10
DC-solenoid operated (KG3)	S x 10 ⁶		50
Short time current			
	10s-current	A	96
	120s-current	A	42
Power loss per pole			
contact resistance	at I _n /AC3 400V	W	4
		mOhm	2
			3,5
			1,4
Resistance to shock acc. to IEC 60068-2-27			
Shock time 20ms sine-wave	NO	g	10
	NC	g	6
			10
			6

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

Main Contactors

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

Auxiliary Contacts	Type	K3-10NB	K3-18NB
Rated insulation voltage U_i ¹⁾	V~	690	
Thermal rated current I_{th} to 690V			
Ambient temperature	40°C A	10	
	60°C A	6	
Utilization category AC15			
Rated operational current I_e	220-240V A	3	
	380-415V A	2	
	440V A	1,6	
	500V A	1,2	
	660-690V A	0,6	
Utilization category DC13			
Rated operational current I_e	60V A	3,5	
	110V A	0,5	
	220V A	0,1	
Short circuit protection short-circuit current 1kA, contact welding not accepted max. fuse size	gL (gG) A	20	
Control Circuit Power consumption of coils			
AC operated	inrush VA	33-45	
	sealed VA	7-10	
	W	2,6-3	
DC operated	inrush W	75	
double winding coil	sealed W	2	
Operation range of coils in multiples of control voltage U_s			
	AC operated	0,85-1,1	
	DC operated	0,8-1,1	
Switching time at control voltage $U_s \pm 10\%$ ^{2) 3)}			
AC operated	make time ms	8-16	
	release time ms	5-13	
	arc duration ms	10-15	
DC operated	make time ms	8-12	
double winding coil	release time ms	8-13	
	arc duration ms	10-15	
Cable cross-section			
Auxiliary connector	solid mm ²	2,5-16	
	flexible mm ²	2,5-10	
	flexible with multicore cable end mm ²	2,5-10	
Magnet coil	solid mm ²	0,75-2,5	
	flexible mm ²	0,5-2,5	
	flexible with multicore cable end mm ²	0,5-1,5	
Clamps per pole		2	
Auxiliary connector	solid AWG	18 - 10	
	flexible AWG	16 - 6	
Magnet coil	solid AWG	14 - 12	
	flexible AWG	18 - 12	
Clamps per pole		2	

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

2) Total breaking time = release time + arc duration

3) Values for delay of the release time of the make contact and the make time of the break contact will be increased, if magnet coils are protected against voltage peaks (varistor, RC-unit, diode-unit)

4) with built-in coil suppressor 5) for contactors KG3-...A.. only

Main Contactors for North America

Data according to UL508

Main Contacts (cULus)		Type	K3-10NB	K3-18NB
Rated operational current "General Use"		A	45	52
Motor DOL 3-phase at 60Hz				
Rated operational current	600V	A	10	18
Rated operational power	110-120V	hp	1½	2
	200V	hp	3	5
	220-240V	hp	3	7½
	277V	hp	3	7½
	380-415V	hp	5	10
	440-480V	hp	5	10
	550-600V	hp	7½	15
Motor DOL 1-phase at 60Hz				
Rated operational current	600V	A	10	18
Rated operational power of AC motors at 60Hz (1ph)	110-120V	hp	½	1
	200V	hp	1	2
	220-240V	hp	1½	3
	277V	hp	2	3
	380-415V	hp	3	5
	440-480V	hp	3	5
	550-600V	hp	3	7½
Fuse Class RK5 / Short-circuit current	A/kA		50/5	70/5
Fuse Class T / Short-circuit current	A/kA		45/100	70/100
Rated voltage	V		600	600
Auxiliary Contacts (cULus)			A600	A600

Main Contactors

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 $I_a = I_n$) using the **motor rating** scales to the right, according to utilization category **AC4** (breaking current $I_a = 6 \times I_n$) using the **motor rating** scales to the left. ¹⁾

Select contactor-type according to utilization category **AC1** (breaking current $I_a = I_n/AC1$) using the **breaking current** scale. ¹⁾

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

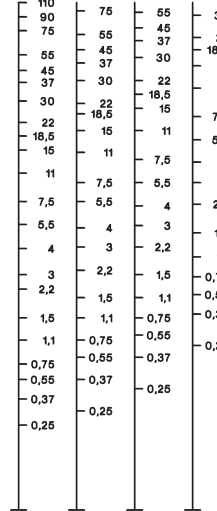
$$M = \frac{AC3}{1 + \frac{\%AC4}{100} \times \left(\frac{AC3}{AC4} - 1 \right)}$$

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 $P_n = AC4$

660/ 500V 380/ 220/
690V 400V 230V

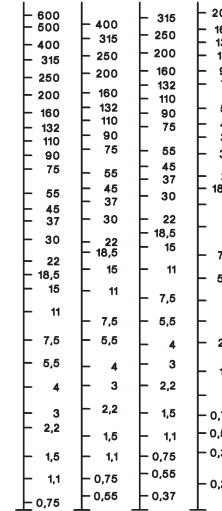
kW kW kW kW



Motor Rating $P_n = AC3$

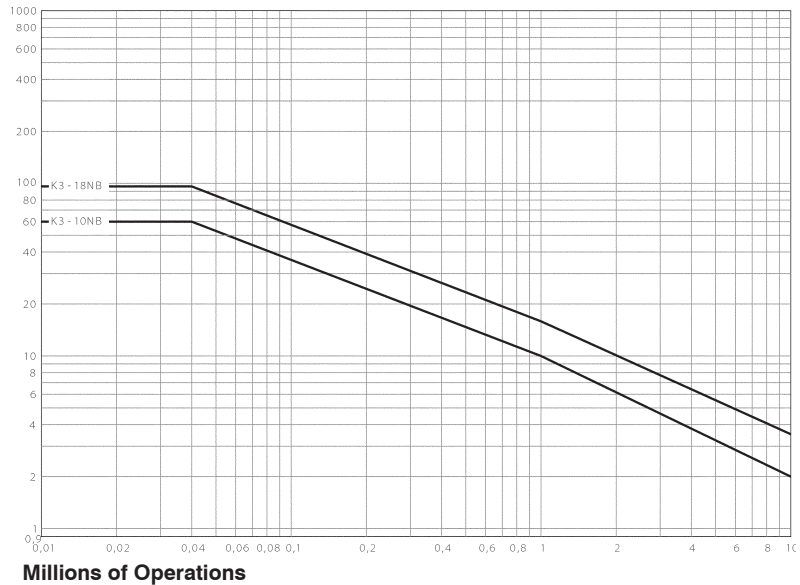
660/ 500V 380/ 220/
690V 400V 230V

kW kW kW kW



Breaking Current $I_a (= I_e = AC1)$

A



1) Achten Sie auf die genehmigten Werte des ausgewählten Schützes entsprechend den nationalen Genehmigungen.

Main Contactors

Utilization Categories

For easier choice of devices and in order to make the comparison of different products simpler 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 determined. 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_e/I_e	U/U_e	cos	I_e/I_e	U/U_e	cos	I_e/I_e	U/U_e	cos	I_e/I_e	U/U_e	cos
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	17A < I_e/I_e < 17A I_e/I_e > 100A	6 1 0,65 6 1 0,35 6 1 0,35	1 0,17 0,65 1 0,17 0,35 1 0,17 0,35	10 1,05 0,45 10 1,05 0,45 10 1,05 0,35	8 1,05 0,45 8 1,05 0,45 8 1,05 0,35								
	AC4	Squirrel-cage motors: starting, plugging, inching	17A < I_e/I_e < 17A I_e/I_e > 100A	6 1 0,65 6 1 0,35 6 1 0,35	6 1 0,65 6 1 0,35 6 1 0,35	12 1,05 0,45 12 1,05 0,45 12 1,05 0,35	10 1,05 0,45 10 1,05 0,45 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/I_e < 100A I_e/I_e > 100A	- - - - - -	- - - - - -	4,5 1,05 0,45 4,5 1,05 0,35	3,6 1,05 0,45 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/I_e < 100A I_e/I_e > 100A	- - - - - -	- - - - - -	8 1,05 0,45 8 1,05 0,35	6 1,05 0,45 6 1,05 0,35								
	AC8a	Hermetic refrigerant compressor motor control with manual resetting of overload releases	I_e/I_e < 100A I_e/I_e > 100A	- - - - - -	- - - - - -	6 1,05 0,45 6 1,05 0,35	6 1,05 0,45 6 1,05 0,35								
	AC8b	Hermetic refrigerant compressor motor control with automatic resetting of overload releases	I_e/I_e < 100A I_e/I_e > 100A	- - - - - -	- - - - - -	6 1,05 0,45 6 1,05 0,35	6 1,05 0,45 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 ($\leq 72VA$)	-	-	-	-	-	-	-	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	
Direct Current				Make I_e/I_e	U/U_e	L/R [ms]	Break I_e/I_e	U/U_e	L/R [ms]	Make I_e/I_e	U/U_e	L/R [ms]	Break I_e/I_e	U/U_e	L/R [ms]
	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 947-5-1, EN 60947-5-1, VDE 0660

Type		HN	HA	K2-DK K2-SK	K2-TP	K2-L ²⁾
Rated insulation voltage U_i ¹⁾	V AC	690	690	690	690	690
Thermal rated current I_{th} to bis 690V Ambient temperature	max. 40°C	A	10	25	26	10
	max. 60°C	A	6	20	-	-
						6
Frequency of operations z	1/h	3000	3000	-	1200	3000
Mechanical life	S x 10 ⁶	10	10	-	1	10
Power loss per pole at $I_e/AC1$	W	0,5	1,5	-	-	-
Utilization category AC15						
Rated operational current I_e	220-240V	A	3	6	-	4
	380-400V	A	2	3	-	3
	440V	A	1,6	2	-	2
	500V	A	1,2	2	-	2
	660-690V	A	0,6	1	-	2
						3
						2
						1,6
						1
						0,5
Utilization category DC13						
Rated operational current I_e	60V	A	2	8	-	2,5
	110V	A	0,4	1	-	1,5
	220V	A	0,1	0,1	-	0,2
						2
						0,4
						0,1
Short circuit protection short-circuit current 1kA, contact welding not accepted max. fuse size						
	gL (gG)	A	20	25	-	10
						10
For contactors with thermal overload relay or auxiliary contacts the device with the smaller admissible control fuse (contactor or thermal overload relay) determines the fuse size.						
Cable cross-sections						
solid or stranded	mm ²		0,75-2,5	0,75-2,5	0,75-2,5	1-2,5
	mm ²		0,75-2,5	0,75-2,5	0,75-2,5	0,75-2,5
	mm ²		0,5-1,5	0,5-1,5	0,5-1,5	0,75-2,5
flexible with multicore cable end						0,5-1,5
solid	AWG		14 - 12	14 - 12	14 - 12	14 - 12
	AWG		18 - 12	18 - 12	18 - 12	18 - 12
Cables per clamp						
			2	2	2	2

Data according to CSA, UL and CUL

Type		HN	HA	K2-DK K2-SK	K2-TP	K2-L ²⁾
Rated operational current "General Use"	A	10	16	-	10	-
Rated operational voltage	max. V AC	600	600	-	600	600
Auxiliary Contacts		A600	A600	-	A600	Intermittent duty

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

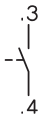
2) Command duration min. 30ms, 10% duty cycle, max. 30 ecc.

Main Contactors and Accessories

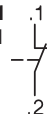
Wiring diagrams

Auxiliary contact blocks

HN10
HA10



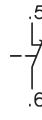
HN01
HA01



HN10U
HA10U

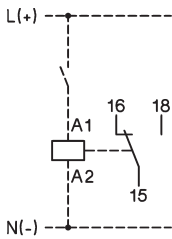


HN01U
HA01U



Electronic timer

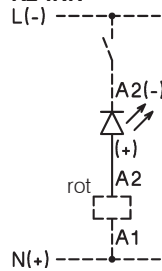
K3-T180 240



Indicator units

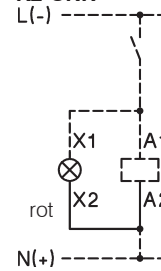
Coil current indicator

K2-ING
K2-INR



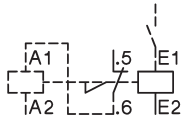
Voltage indicator

K2-UN
K2-UNR



Mechanical latch

K2-L..



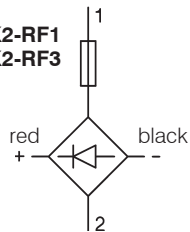
Fuse holder

K2-F



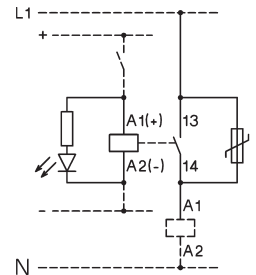
with rectifier

K2-RF1
K2-RF3



Interface

K2-IM

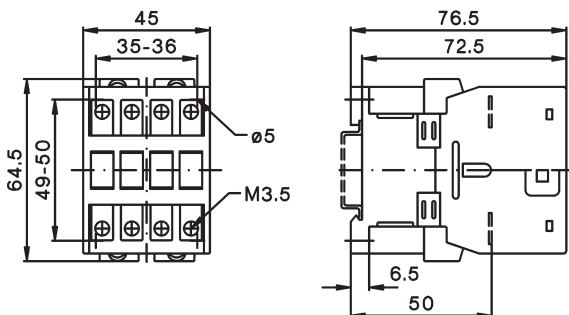


Colours mentioned in wiring diagram refer to the outgoing connection wires of the device.

Dimensions of Main Contactors

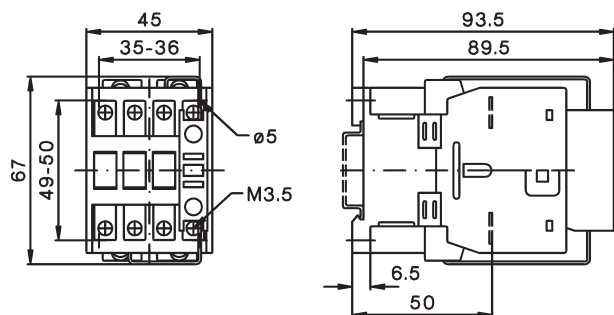
Main Contactors AC operated

K3-10NB..
K3-18NB..



Main Contactors DC operated

K3-10NB..=
K3-18NB..=

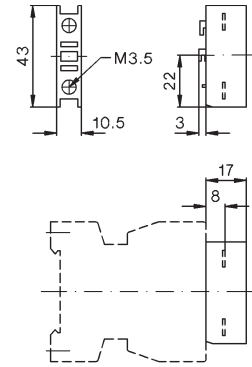


Main Contactors

Dimensions Accessories

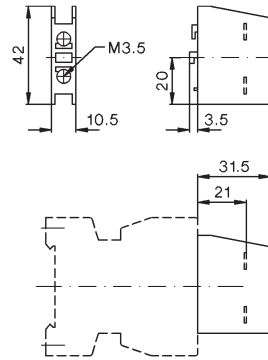
Aux. cont. blocks Terminal blocks

HN10, HN01 K2-SK, K2-DK



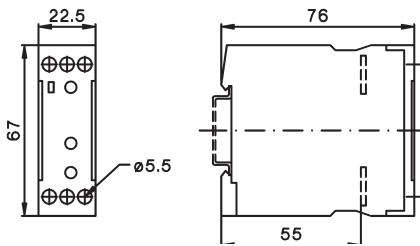
Aux. cont. blocks

HA10, HA01



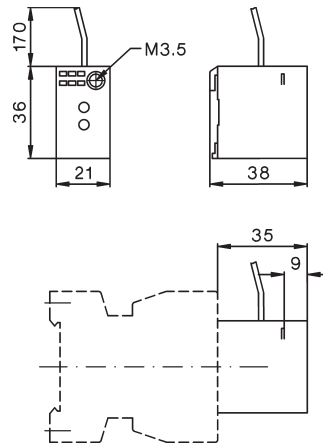
Electronic timer

K3-T180 240



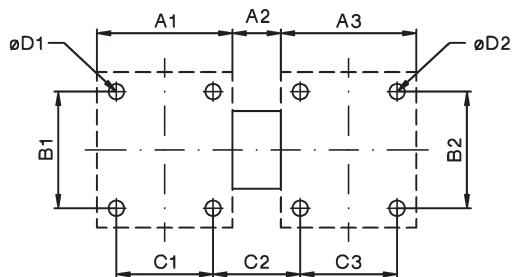
Electronic timer on-delay

K2-TE..



Mechanical interlock

LG10889



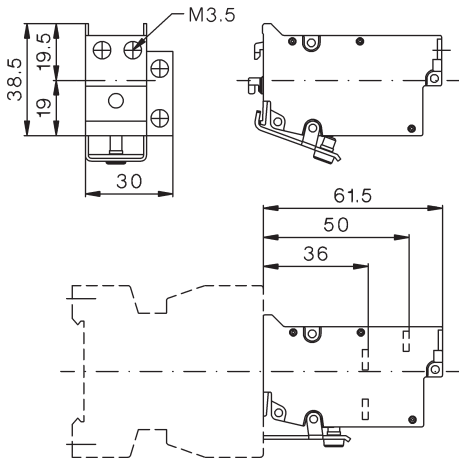
Typ	Schütz 1	Schütz 2	A1	A2	A3	B1	B2	C1	C2	C3	D1	D2
LG10889	K3-10NB/18NB	K3-10NB/18NB	45	7	45	50	50	35	17	35	4,5	4,5

Main Contactors

Dimensions Accessories

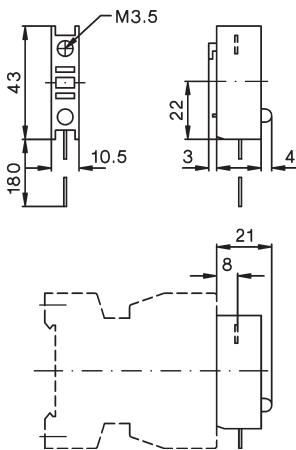
Mechanical latch

K2-L...



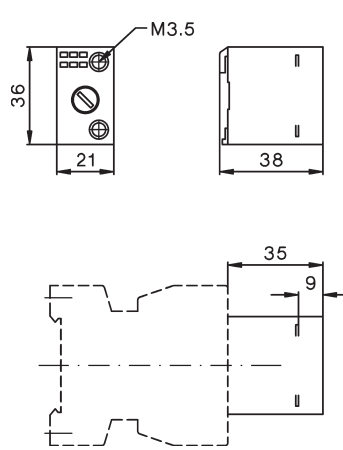
Indicator unit

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



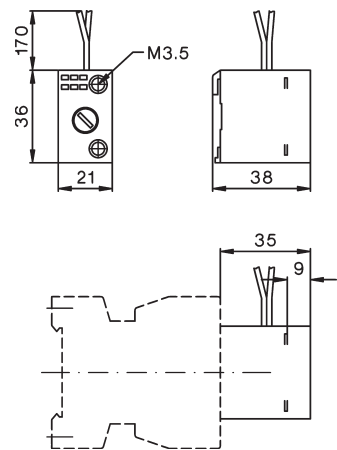
Fuse holder

K2-RF



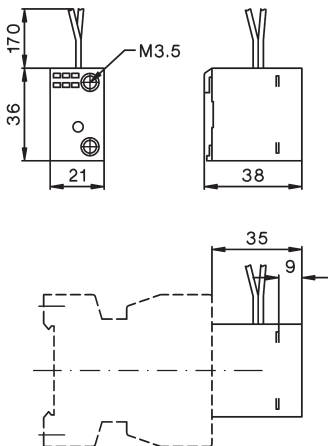
Fuse holder with rectifier

K2-RF1 K2-RF3



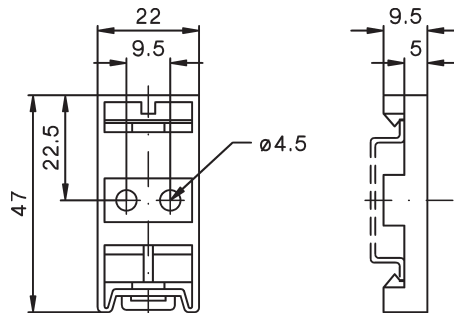
Interface

K2-IM



DIN rail adapter

K2-SM

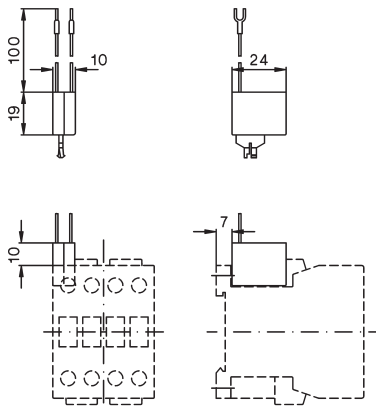


Main Contactors

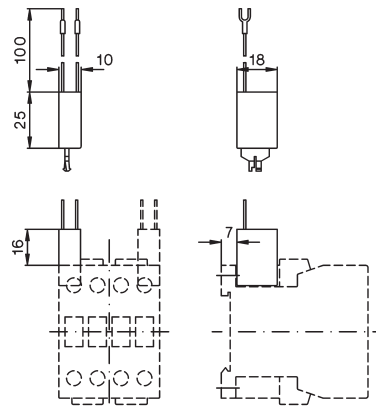
Dimension Accessories

Suppressor unit

RC-K3N ..

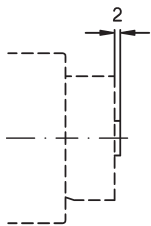


RC-K3NW ..



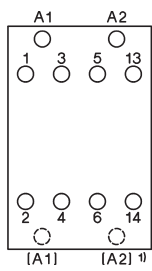
Marking system

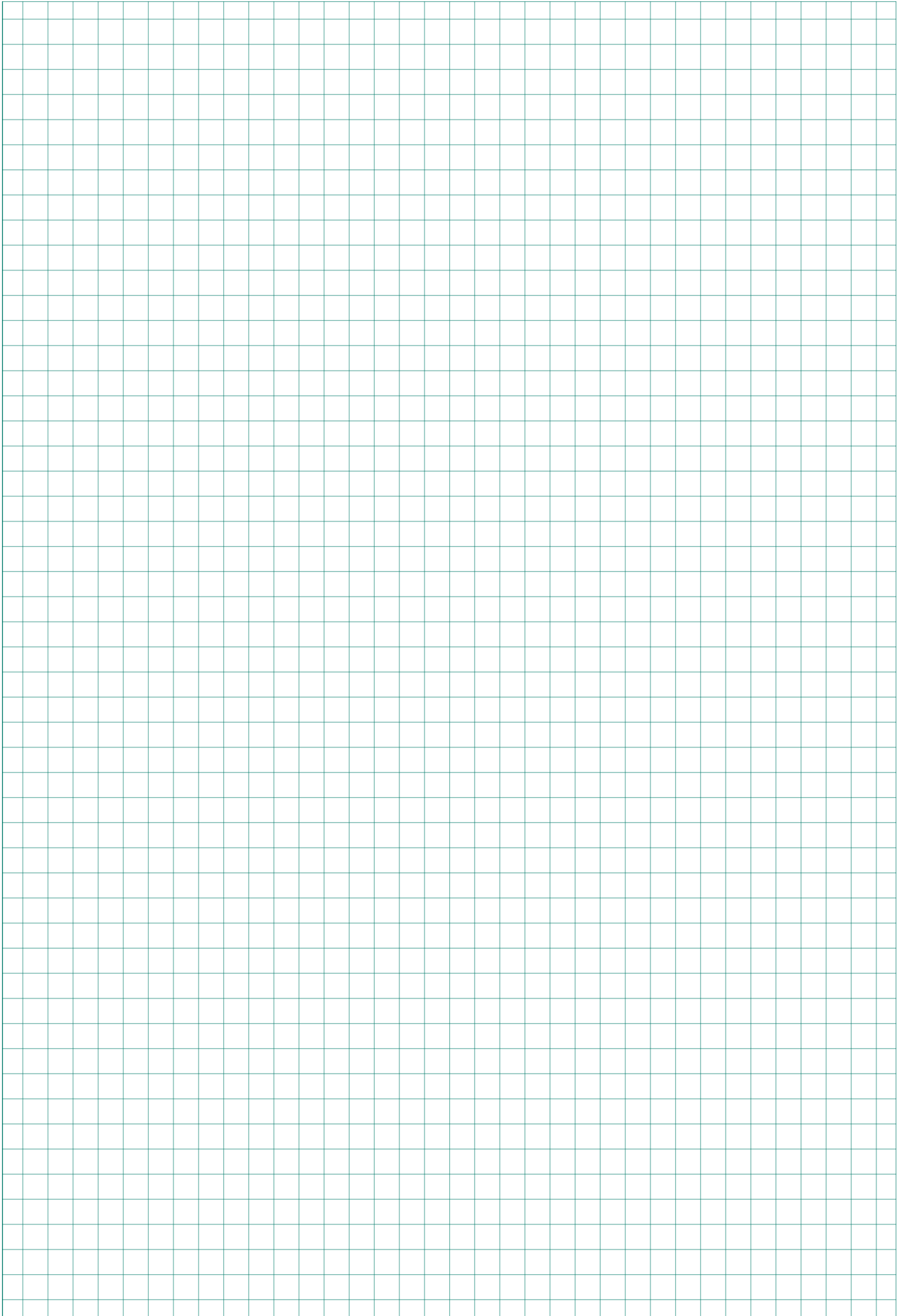
Marking label
P487-1 or P245-



Position of terminals

K3-10NB10
K3-18NB10







Quality made in 

D1025E181



Lieblgasse 7, A-1220 Wien
Telefon: +43 1 251 51- 0
Fax: +43 1 251 51-89
e-mail: sales@benedict.at
www.benedict.at

