

Contactors

Contactors

Iskra's magnetic contactor product line is UL listed and rated to control motors from 3HP to 50HP. A full compliment of accessories are available, including directly mounted overload relays

Maximum Horsepower Rating - UL				KW Rating IEC				Coil Voltage	3-poles, Open Type of Contactor
3 phase AC-3 Ratings				1 phase		AC-3			
200 V	230 V	460 V	575 V	115 V	230 V	380 VAC	660 VAC	60 Hz	
1 1/2	3	5	7 1/2	1/2	1 1/2	5 1/2	5 1/2	240	K07M-10-M7
								120	K07M-10-F7
								24	K07M-10-B7
3	3	5	7 1/2	1	2	4	5 1/2	240	KNL9-10-M7
								120	KNL9-10-F7
								24	KNL9-10-B7
3	3	5	7 1/2	1	2	4	7 1/2	240	KNL12-10-M7
								120	KNL12-10-F7
								24	KNL12-10-B7
5	5	7 1/2	10	1 1/2	3	5 1/2	7 1/2	240	KNL16-10-M7
								120	KNL16-10-F7
								24	KNL16-10-B7
7 1/2	7 1/2	15	15	2	3	11	11	240	KNL22-00-M7
								120	KNL22-00-F7
								24	KNL22-00-B7
10	10	20	20	2	5	15	15	240	KNL30-00-M7
								120	KNL30-00-F7
								24	KNL30-00-B7
10	15	25	30	3	7 1/2	22	30	240	KNL43-11-M7
								120	KNL43-11-F7
								24	KNL43-11-B7
15	20	30	40	5	10	30	40	240	KNL63-11-M7
								120	KNL63-11-F7
								24	KNL63-11-B7
20	25	40	50	5	10	37	45	240	KNL75-11-M7
								120	KNL75-11-F7
								24	KNL75-11-B7



Mini contactors are used for switching electric motors and other resistive, inductive and capacitive loads.

For universal switching:

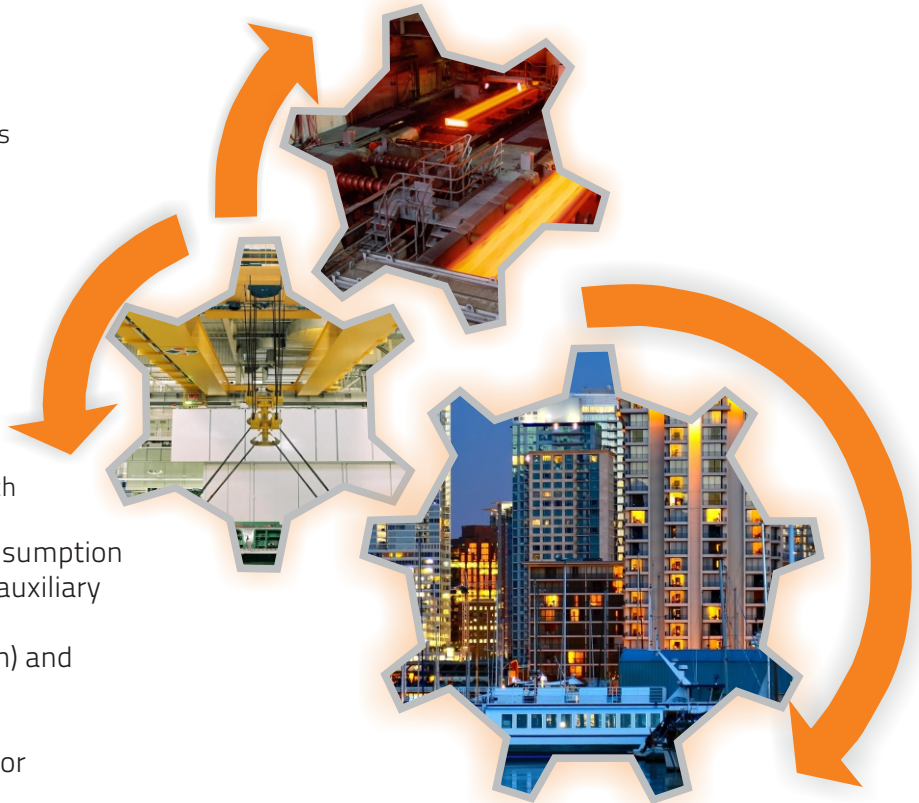
- AC induction motors
- Building automation systems
- Applications include use in control panels

Advanced operation:

- Control combinations

Other benefits:

- A wide variety of snap-on auxiliary switch blocks and accessories
- AC or real DC coil with low power consumption
- High contact reliability for main and auxiliary contacts
- Two contactor widths: 1.38 in (35 mm) and 1.77 in (45 mm)
- Degree of protection IP 20
- K07F version for fast-on connection or K07X contactors with soldering pins
- Possibility of direct connection of the BR 7 bimetal relay for protection against overload and in case of phase failure
- Version with all four main contacts (Sp4)
- Wide range of control voltages is available



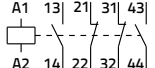
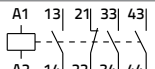
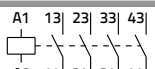
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Power relays

General Use acc. to UL 60947-5-1 (4-pole, 1.38 in widths)

AC

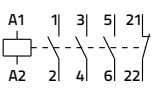
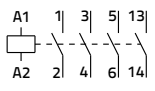
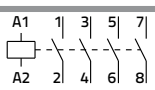
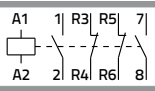
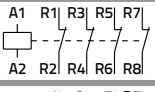
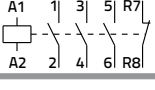
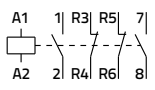
Type	Rated current I _e	Control voltage 60 Hz	Wiring diagram	Ordering No.	Weight (g/lbs)	Packaging (pcs)
K03C-22	4 A	240 V		30.041.156	160/0.352	10
K03C-22	4 A	120 V		30.041.111	160/0.352	10
K03C-22	4 A	24 V		30.040.307	160/0.352	10
K03C-31	4 A	240 V		30.041.155	160/0.352	10
K03C-31	4 A	120 V		30.041.112	160/0.352	10
K03C-31	4 A	24 V		30.040.306	160/0.352	10
K03C-40	4 A	240 V		30.041.154	160/0.352	10
K03C-40	4 A	120 V		30.041.113	160/0.352	10
K03C-40	4 A	24 V		30.040.310	160/0.352	10



Motor contactors

General Use acc. to UL 60947-5-1 (4-pole, 1.77 in widths)

AC

Type	Rated current I _e	Control voltage 60 Hz	Wiring diagram	Ordering No.	Weight (g/lbs)	Packaging (pcs)
K07M-01	11.3 A	240 V		30.041.172	180/0.397	10
K07M-01	11.3 A	120 V		30.041.117	180/0.397	10
K07M-01	11.3 A	24 V		30.040.743	180/0.397	10
K07MF-01	11.3 A	240 V		30.041.192	180/0.397	10
K07MF-01	11.3 A	120 V		30.041.129	180/0.397	10
K07MF-01	11.3 A	24 V		30.040.196	180/0.397	10
K07MX-01	11.3 A	240 V		30.041.319	180/0.397	10
K07MX-01	11.3 A	120 V		30.041.390	180/0.397	10
K07MX-01	11.3 A	24 V		30.041.320	180/0.397	10
K07M-10	11.3 A	240 V			30.041.173	180/0.397
K07M-10	11.3 A	120 V	30.041.118		180/0.397	10
K07M-10	11.3 A	24 V	30.040.700		180/0.397	10
K07MF-10	11.3 A	240 V	30.041.193		180/0.397	10
K07MF-10	11.3 A	120 V	30.041.130		180/0.397	10
K07MF-10	11.3 A	24 V	30.041.314		180/0.397	10
K07MX-10	11.3 A	240 V	30.041.322		180/0.397	10
K07MX-10	11.3 A	120 V	30.041.391		180/0.397	10
K07MX-10	11.3 A	24 V	30.041.148		180/0.397	10
K07M-10/Sp4	11.3 A	240 V			30.041.146	180/0.397
K07M-10/Sp4	11.3 A	120 V		30.041.107	180/0.397	10
K07M-10/Sp4	11.3 A	24 V		30.041.045	180/0.397	10
K07M-22/Sp4	10 A	240 V		30.041.176	180/0.397	10
K07M-22/Sp4	10 A	120 V		30.041.392	180/0.397	10
K07M-22/Sp4	10 A	24 V		30.041.076	180/0.397	10
K07M-04/Sp4	11.3 A	240 V		30.041.177	180/0.397	10
K07M-04/Sp4	11.3 A	120 V		30.041.394	180/0.397	10
K07M-04/Sp4	11.3 A	24 V		30.041.060	180/0.397	10
K07M-01/Sp4	11.3 A	240 V		30.041.175	180/0.397	10
K07M-01/Sp4	11.3 A	120 V		30.041.284	180/0.397	10
K07M-01/Sp4	11.3 A	24 V		30.041.308	180/0.397	10
K07MF-22	10 A	240 V		30.041.310	180/0.397	10
K07MF-22	10 A	120 V		30.041.395	180/0.397	10
K07MF-22	10 A	24 V		30.041.311	180/0.397	10
K07MX-22	10 A	240 V		30.041.316	180/0.397	10
K07MX-22	10 A	120 V		30.041.393	180/0.397	10
K07MX-22	10 A	24 V		30.041.317	180/0.397	10



Tags in title:

- M** - motor contactor
- Sp4** - version with all four main contacts
- F** - contactor for fast-on connection
- X** - contactor with soldering pins

Motor contactors

General Use acc. to UL 60947-4-1 (4-pole, 1.77 in widths)

DC

Type	Rated current I _e	Control voltage	Wiring diagram	Ordering No.	Weight (g/lbs)	Packaging (pcs)
K07MG-01	11.3 A	220 V		30.040.098	220/0.485	10
K07MG-01	11.3 A	48 V		30.040.097	220/0.485	10
K07MG-01	11.3 A	24 V		30.040.095	220/0.485	10
K07MGX-01	11.3 A	220 V		30.041.344	220/0.485	10
K07MGX-01	11.3 A	48 V		30.041.345	220/0.485	10
K07MGX-01	11.3 A	24 V		30.041.069	220/0.485	10
K07MG-10	11.3 A	220 V		30.040.094	220/0.485	10
K07MG-10	11.3 A	48 V		30.040.093	220/0.485	10
K07MG-10	11.3 A	24 V		30.040.091	220/0.485	10
K07MGX-10	11.3 A	220 V		30.040.092	220/0.485	10
K07MGX-10	11.3 A	48 V		30.041.346	220/0.485	10
K07MGX-10	11.3 A	24 V		30.041.090	220/0.485	10
K07MG-10/Sp4	11.3 A	220 V		30.041.068	220/0.485	10
K07MG-10/Sp4	11.3 A	48 V		30.041.287	220/0.485	10
K07MG-10/Sp4	11.3 A	24 V		30.040.703	220/0.485	10
K07MG-22/Sp4	10 A	220 V		30.041.243	220/0.485	10
K07MG-22/Sp4	10 A	48 V		30.041.339	220/0.485	10
K07MG-22/Sp4	10 A	24 V		30.041.105	220/0.485	10
K07MG-04/Sp4	11.3 A	220 V		30.041.340	220/0.485	10
K07MG-04/Sp4	11.3 A	48 V		30.041.341	220/0.485	10
K07MG-04/Sp4	11.3 A	24 V		30.041.140	220/0.485	10
K07MG-01/Sp4	11.3 A	220 V		30.041.070	220/0.485	10
K07MG-01/Sp4	11.3 A	48 V		30.041.342	220/0.485	10
K07MG-01/Sp4	11.3 A	24 V		30.041.343	220/0.485	10









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- X** - contactor with soldering pins
- G** - DC contactor

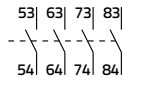
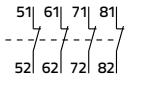
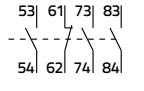
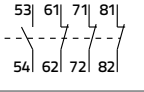
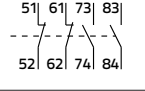
Snap-on auxiliary switch blocks

General Use acc. to UL 60947-5-1 (2-pole)

Type	Rated current I _n	Wiring diagram	Ordering No.	Weight (g/lbs)	Packaging (pcs)
ND2C-20	6 A		38.421.982	20/0.044	60
ND2C-02	6 A		38.421.984	20/0.044	60
ND2C-11	6 A		38.421.983	20/0.044	60
ND2M-20	6 A		38.423.465	20/0.044	60
ND2M-02	6 A		38.421.981	20/0.044	60
ND2M-11	6 A		38.421.980	20/0.044	60



General Use acc. to UL 60947-5-1 (4-pole)

Type	Rated current I _n	Wiring diagram	Ordering No.	Weight (g/lbs)	Packaging (pcs)
ND4C-40	6 A		38.421.975	36/0.079	40
ND4C-04	6 A		38.421.979	36/0.079	40
ND4C-31	6 A		38.421.976	36/0.079	40
ND4C-13	6 A		38.421.978	36/0.079	40
ND4C-22	6 A		38.421.977	36/0.079	40



Miniature contactors - Accessories

Snap-on auxiliary switch blocks

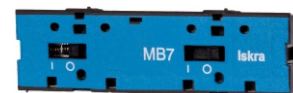
General Use acc. to UL 60947-5-1 (4-pole)

Type	Rated current I_n	Wiring diagram	Ordering No.	Weight (g/lbs)	Packaging (pcs)
ND4M-40	6 A		38.423.466	36/0.079	40
ND4M-04	6 A		38.423.467	36/0.079	40
ND4M-31	6 A		38.421.972	36/0.079	40
ND4M-13	6 A		38.421.974	36/0.079	40
ND4M-22	6 A		38.421.973	36/0.079	40



Mechanical interlock

Type	Ordering No.	Weight (g/lbs)	Packaging (pcs)
MB7	38.422.210	12/0.026	10

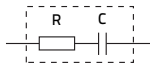


Adapter for pin connection

Type	Ordering No.	Weight (g/lbs)	Packaging (pcs)
LB7	38.552.323	16/0.035	10



RC suppressor

Type	Control voltage U_c	Wiring diagram	Ordering No.	Weight (g/lbs)	Packaging (pcs)
RC1-K0X	12 - 48 V		30.017.070	16/0.035	10
RC2-K0X	48 - 250 V		30.017.071	16/0.035	10
RC3-K0X	250 - 380 V		30.017.072	16/0.035	10
RC4-K0X	380 - 600 V		30.017.073	16/0.035	10



DI suppressor (for DC contactors)

Type	Control voltage U_c	Wiring diagram	Ordering No.	Weight (g/lbs)	Packaging (pcs)
DI-K0X	6 - 250 V		30.017.080	16/0.035	10



Rigid connecting kits

Type	Description	Ordering No.	Weight (g/lbs)	Packaging (pcs)
WK 1.1	For reversing switch, suitable for contactors: 2.2-5.5 kW (for miniature contactors K03, K07) (max. current 16 A)	655200013000	26/0.057	1
WK 1.2	For star-delta starters, suitable for contactors: 2.2-5.5 kW (for miniature contactors K03, K07) (max. current 16 A), 5 terminals in line (3 main terminals, 1 auxiliary terminal, 1 coil terminal)	655200017000	18/0.039	1



BR7 thermal overload relay

up to 12.5 A for K07 contactors

Type	Setting range (A)	Max. backup fuse for Coordination 1 (A)	Ordering No.	Weight (g)	Packaging (pcs)
BR7-0.16	0.1 - 0.16		786.050.567.000	100/0.220	1
BR7-0.25	0.16 - 0.25		786.050.568.000	100/0.220	1
BR7-0.4	0.25 - 0.4		786.050.569.000	100/0.220	1
BR7-0.5	0.35 ... 0.5	2	786.050.570.000	100/0.220	1
BR7-0.63	0.45 ... 0.63	2	786.050.571.000	100/0.220	1
BR7-0.8	0.55 ... 0.8		786.050.572.000	100/0.220	1
BR7-1	0.75 ... 1		786.050.573.000	100/0.220	1
BR7-1.3	0.9 ... 1.3		786.050.574.000	100/0.220	1
BR7-1.6	1.1 ... 1.6		786.050.575.000	100/0.220	1
BR7-2	1.4 ... 2	6	786.050.576.000	100/0.220	1
BR7-2.5	1.6 ... 2.5	10	786.050.577.000	100/0.220	1
BR7-3.2	2.3 ... 3.2		786.050.578.000	100/0.220	1
BR7-4	2.9 ... 4		786.050.579.000	100/0.220	1
BR7-4.8	3.5 ... 4.8		786.050.580.000	100/0.220	1
BR7-6.3	4.5 ... 6.3	20	786.050.581.000	100/0.220	1
BR7-7.5	5.5 ... 7.5		786.050.582.000	100/0.220	1
BR7-10	7.2 ... 10		786.050.583.000	100/0.220	1
BR7-12.5	9 ... 12.5		786.050.584.000	100/0.220	1



Description of the operating means:

- **OFF:** NC contact 95-96 is opened while the pushbutton is pressed and held.
- **RESET:** both contacts (NO and NC) return to the normal position (contact 95-96 closes and 97-98 opens). Automatic (A) or manual (H) operation.
- **TEST:** both contacts (NO and NC) change state from the normal state (contact 95-96 opens, contact 97-98 closes) until RESET push-button is pressed (manual mode) or the TEST lever is held (automatic mode).

Ordering data

Standard control voltages and designations (AC)

V	24	42	48	120	240	380/415	440	500
60 Hz	B7	D7	E7	F7	M7	Q7	R7	S7

Standard control voltages and designations (DC)

V	12	24	48	60	72	110	125	220
	JD	BD	ED	ND	SD	FD	GD	MD

K07M - 01 - M7



Note:

The type designation and control voltage are stated when ordering the contactors. When ordering snap-on auxiliary switch blocks, only the type is stated.

Example: ND4M-22



Technical characteristics

Dimensions



TECHNICAL DATA

	Type	Symbol	Unit	K07M K07MF K07MX	K07MG K07MGF K07MGX
	GENERAL	Standards			IEC/EN 60947-5-1, IEC 60947-4-1, UL 508
Approvals				CE, UL, CSA, EAC	
Module width			mm/in	45/1.77	
Number of poles				4	
Degree of protection				IP20	
Pollution degree				3	
Climatic conditions				95 % relative humidity	
Ambient temperature:					
open			°C/°F	-20 ... +60/-4 ... 140	
closed			°C/°F	-20 ... +45/-4 ... 113	
Storage temperature			°C/°F	-30 ... +80/-22 ... 176	
Maximum altitude			m	2,000	
U _i and U _e is reduced for 1.2 % and I _e for 0.4 % for every additional 100 m					
Number of contactors or switches side-by-side: ≤40 °C (40 ... 55) °C				no limitation	
Noise level (operation)			dB	30	20
Maximum operating frequency with no load			op. c./h	3,000	
Mechanical endurance			op. c.	10,000,000	
Weight		g/lbs	170/0.374	215/0.473	
Contact reliability			≥17 V; ≥50 mA		
Power dissipation per pole		W	1.2	90.4	
Overload current withstand capability - 10 s			90.4	90.4	
Maximum back-up fuse for short-circuit protection gL and gG: coordination type 2		A	25		
Rated insulation voltage	U _i	V	690		
Rated impulse withstand voltage	U _{imp}	kV	6		
Rated operational voltage	U _e	V	690		
Rated frequency	f	Hz	50/60		
Thermal current	I _{th}	A	20		
Rated operational current for AC-1, AC-7a and AC-21	I _e	A	20		
Operational power for AC-1, AC-7a and AC-21:					
single-phase 230 V	P _e	kW	4.4		
three-phase 230 V			7.5		
three-phase 400 V			13		
three-phase 500 V			17.5		
three-phase 690 V			22		
Maximum operating frequency for AC-1, AC-7a and AC-21		op. c./h	600		
Electrical endurance for AC-1, AC-7a and AC-21		op. c.	200,000		
Rated operational current for AC-3, AC-3e, AC-7b and AC-23 (at 400 V)	I _e	A	11.3	11.3	
Operational power for AC-3, AC-3e, AC-7b and AC-23:					
single-phase 230 V	P _e	kW	1.1		
three-phase 230 V			3		
three-phase 400 V			5.5		
three-phase 500 V			5.5		
three-phase 690 V			5.5		
Maximum operating frequency for AC-3, AC-3e, AC-7b and AC-23		op. c./h	600		
Electrical endurance for AC-3, AC-3e, AC-7b and AC-23		op. c.	1,000,000		
Rated operational current for AC-4 (at 400 V)	I _e	A	5	5	
Operational power for AC-4:					
three-phase 230 V	P _e	kW	0.75		
three-phase 400 V			2.2		
three-phase 500 V			1.5		
three-phase 690 V			1.5		
Maximum operating frequency for AC-4		op. c./h	300		
Electrical endurance for AC-4		op. c.	100,000		
Rated motor power according to standards UL and CSA:					
single-phase 115 V	P _e	HP	1/2		
single-phase 230 V			1.5		
three-phase 230 V			3		
three-phase 460 V			5		
three-phase 575 V			7.5		

* It applies for AC-3e

Miniature contactors -

K07M, K07MF, K07MX, K07MG, K07MGF, K07MGX



TECHNICAL DATA

	Type	Symbol	Unit	K07M K07MF K07MX	K07MG K07MGF K07MGX	
MAIN CIRCUIT	Switching of capacitors AC-6b and AC-7c (at 230 V)	C	μF	30		
	Maximum operating frequency for AC-6b and AC-7c		op. c./h	600		
	Electrical endurance for AC-6b and AC7c		op. c.	100,000		
	Terminal capacity: rigid (solid and stranded) flexible	S	mm ² / AWG	0.75 ... 2.5/18 ... 14 0.5 ... 2.5/20 ... 14		
	Length of removed wire insulation		mm/in	10/0.394		
	Screw			M3.5		
	Screw head			PZ2		
Tightening torque		Nm/lb-in	1.2/10.62			
AUXILIARY CIRCUIT	Power dissipation per pole		W	1.2		
	Maximum back-up fuse for short-circuit protection gL and gG: coordination type 2			20		
	Rated insulation voltage	U _i	V	690		
	Rated operational current for AC-15: single-phase 230 V single-phase 400 V single-phase 500 V single-phase 690 V	I _e	A	6 4 2 1		
	Maximum operating frequency for AC-15		op. c./h	1,200		
	Electrical endurance for AC-15		op. c.	1,000,000		
	Rated operational current for DC-13: 1 pole ... 24 V DC/110 V DC		A	4 / 0.25		
	Maximum operating frequency for DC-13		op. c./h	1,200		
	Terminal capacity: rigid (solid and stranded) flexible	S	mm ² / AWG	0.75 ... 2.5/18 ... 14 0.5 ... 2.5/20 ... 14		
	Length of removed wire insulation		mm/in	10/0.394		
	Screw			M3.5		
	Screw head			PZ2		
	Tightening torque		Nm/lb-in	1.2/10.62		
	COIL	Range of control voltage for switch-on	U _c	%	85 ... 110	
		Range of control voltage for drop out	U _c	%	20 ... 75	10 ... 75
Kind of voltage				AC	DC	
Standard control voltages		U _c	V	2)	3)	
Frequency of AC control voltage		f	Hz	60	/	
Control mode				remote control with U _c		
Coil consumption: switch-on operation			VA/W	/ 3	39/34 8.1/4	
Delays: make brake			ms	25 ... 30 10 ... 25	10 ... 15 5 ... 10	
Terminal capacity: rigid (solid and stranded) flexible			mm ² / AWG	0.75 ... 2.5/18 ... 14 0.5 ... 2.5/20 ... 14		
Length of removed wire insulation			mm/in	10/0.394		
Screw				M3.5		
Screw head				PZ2		
Tightening torque		Nm/lb-in	1.2/10.62			
SAFETY	MTTF - Mean time to failure MTTF = 1/λ = B10/(0.1 n _{op})	AC-1 AC-3	h	5,000 25,000		
	MTTF _d - Mean time to failure dangerous MTTF _d = 1/λ _d = B10 _d /(0.1 n _{op})	AC-1 AC-3	h	6,666 33,333		
	B10 - Number of operating cycles until 10 % of devices fail	AC-1 AC-3	op. c.	150,000 750,000		
	B10 _d - Number of operating cycles until 10 % of device dangerous B10 _d = B10/ratio of dangerous failures	AC-1 AC-3	op. c.	200,000 1,000,000		
	λ - Failure rate λ = (0.1 n _{op})/B10	AC-1 AC-3	1/h	0.0002 0.00004		
	λ _d - Failure rate dangerous λ _d = (0.1 n _{op})/B10 _d	AC-1 AC-3	1/h	0.00015 0.00003		
	Ratio of dangerous failures		%	75		
	n _{op} - Operating cycles (operating cycles/h)		op. c./h	300		

2) 6,12,24,42,48,120,240,380/415,440/460,500,690 V

3) 6,12,24,48,60,72,110,125,220,250 V

TECHNICAL DATA

		Symbol	Unit	K03C
GENERAL	Type			K03C
	Standards			IEC/EN 60947-5-1, UL 508
	Approvals			CE, UL, CSA, EAC
	Module width		mm/in	35/1.38
	Number of poles			4
	Degree of protection			IP20
	Pollution degree			3
	Climatic conditions			95 % relative humidity
	Ambient temperature: open		°C/°F	-20 ... +60/-4 ... 140
	closed			-20 ... +45/-4 ... 113
	Storage temperature		°C/°F	-30 ... +80/-22 ... 176
	Maximum altitude <i>U_i</i> and <i>U_e</i> is reduced for 1.2 % and <i>I_e</i> for 0.4 % for every additional 100 m		m	2,000
	Number of contactors or switches side-by-side: <40 °C (40 ... 55) °C			no limitation
	Noise level (operation)		dB	30
	Maximum operating frequency with no load		op. c./h	3.000
	Mechanical endurance		op. c.	10.000.000
Weight		g/lbs	160/0.352	
MAIN CIRCUIT	Contact reliability			≥17 V; ≥50 mA
	Maximum back-up fuse for short-circuit protection gL and gG: coordination type 2		A	25
	Rated insulation voltage	<i>U_i</i>	V	690
	Rated impulse withstand voltage	<i>U_{imp}</i>	kV	6
	Rated operational voltage	<i>U_e</i>	V	690
	Rated frequency	<i>f</i>	Hz	50/60
	Thermal current	<i>I_{th}</i>	A	20
	Rated operational current for AC-1, AC-7a and AC-21	<i>I_e</i>	A	20
	Rated operational current for AC-15: single-phase 230 V	<i>I_e</i>	A	6
	single-phase 400 V			4
	single-phase 500 V			2
	single-phase 690 V			1
	Maximum operating frequency for AC-15		op. c./h	1,200
	Electrical endurance for AC-15		op. c.	1,000,000
	Rated operational current for DC-13: 1 pole ... 24 V DC/110 V DC		A	4 / 0.25
	Maximum operating frequency for DC-13		op. c./h	1,200
	Terminal capacity: rigid (solid and stranded)	S	mm ² / AWG	0.75 ... 2.5/18 ... 14
	flexible			0.5 ... 2.5/20 ... 14
	Length of removed wire insulation		mm/in	10/0.394
	Screw			M3.5
	Screw head			PZ2
	Tightening torque		Nm/lb-in	1.2/10.62
	COIL	Range of control voltage for switch-on	<i>U_c</i>	%
Range of control voltage for drop out		<i>U_c</i>	%	20 ... 75
Kind of voltage				AC
Standard control voltages		<i>U_c</i>	V	1)
Frequency of AC control voltage		<i>f</i>	Hz	60
Control mode				remote control with <i>U_c</i>
Coil consumption: switch-on			VA/W	39/34
operation				8.1/4
Delays: make			ms	10 ... 15
brake				6 ... 15
Terminal capacity: rigid (solid and stranded)			mm ² / AWG	0.75 ... 2.5/18 ... 14
flexible				0.5 ... 2.5/20 ... 14
Length of removed wire insulation			mm/in	10/0.394
Screw				M3.5
Screw head			PZ2	
Tightening torque		Nm/lb-in	1.2/10.62	

1) 6,12,24,42,48,120,240,380/415,440/460,550 V

TECHNICAL DATA

Type	Symbol	Unit	K03C	
SAFETY	MTTF - Mean time to failure $MTTF = 1/\lambda = B10/(0.1 n_{op})$	AC-15 DC-13	h	12,500 10,000
	MTTF _d - Mean time to failure dangerous $MTTF_d = 1/\lambda_d = B10_d/(0.1 n_{op})$	AC-15 DC-13	h	16,666 13,333
	B10 - Number of operating cycles until 10 % of devices fail	AC-15 DC-13	op. c.	750,000 600,000
	B10 _d - Number of operating cycles until 10 % of device dangerous $B10_d = B10/\text{ratio of dangerous failures}$	AC-15 DC-13	op. c.	1,000,000 800,000
	λ - Failure rate $\lambda = (0.1 n_{op})/B10$	AC-15 DC-13	1/h	0.00008 0.0001
	λ_d - Failure rate dangerous $\lambda_d = (0.1 n_{op})/B10_d$	AC-15 DC-13	1/h	0.00006 0.000075
	Ratio of dangerous failures		%	75
	n_{op} - Operating cycles (operating cycles/h)		op. c./h	600

Electrical endurance

Diagram 1

Electrical endurance of contactor relays and auxiliary contacts of motor contactors

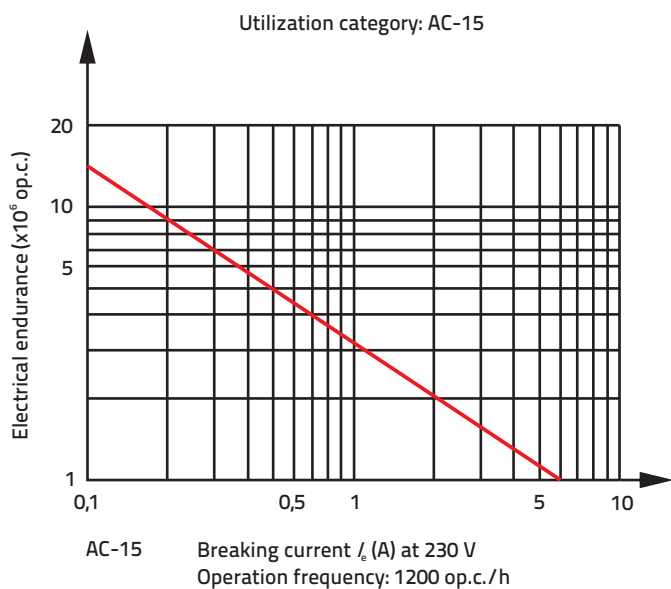
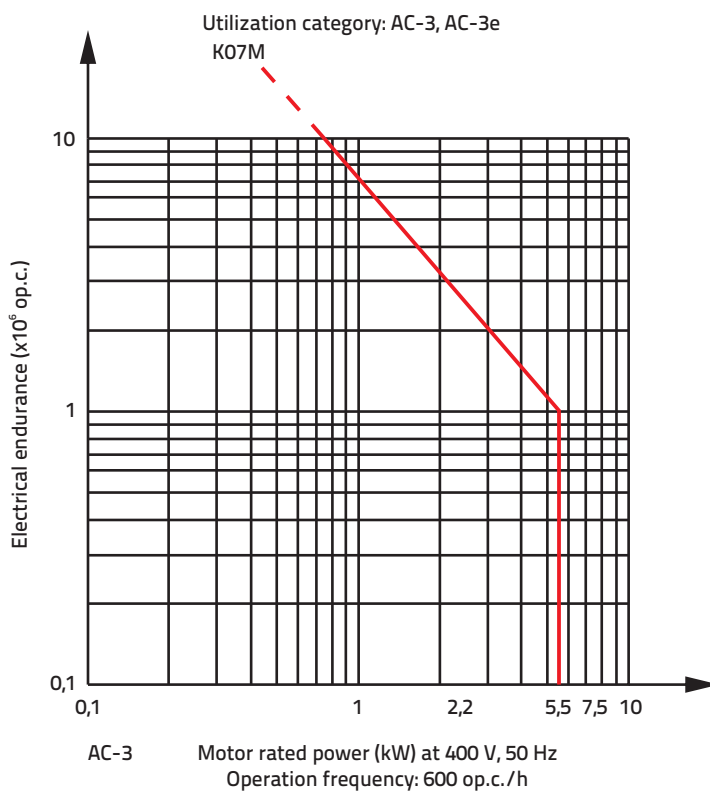
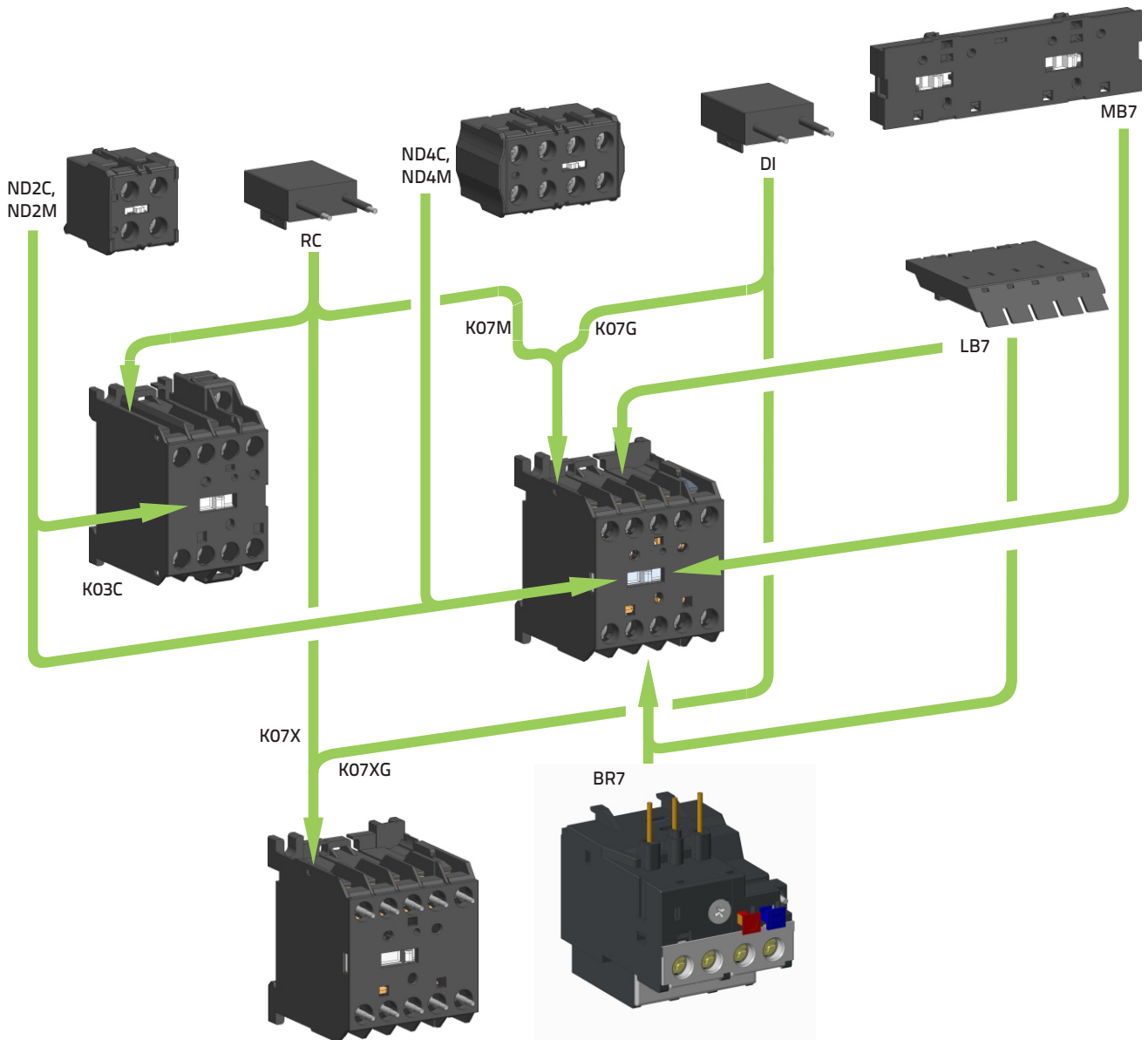


Diagram 2

Electrical endurance of main contacts of motor contactors



Mounting positions of accessories



Miniature contactors - Accessories



Snap-on auxiliary switch blocks

TECHNICAL DATA

	Type	Symbol	Unit	ND2C ND2M	ND4C ND4M	
GENERAL	Standards			IEC/EN 60947-5-1, VDE 0660, UL 508		
	Approvals			CE, UL, CSA		
	Module width			1	2	
	Number of poles			2	4	
	Degree of protection			IP20		
	Pollution degree			3		
	Maximum altitude <i>U_i</i> and <i>U_e</i> is reduced for 1.2 % and <i>I_e</i> for 0.4 % for every additional 100 m		m	2,000		
	Maximum operating frequency with no load		op. c./h	3,000		
	Mechanical endurance		op. c.	10,000,000		
	Weight		g/lbs	20/0.787	40/1.575	
AUXILIARY CIRCUIT	Contact reliability			≥17 V; ≥50 mA		
	Maximum back-up fuse for short-circuit protection gL and gG: coordination type 2		A	20		
	Rated insulation voltage	<i>U_i</i>	V	690		
	Rated impulse withstand voltage	<i>U_{imp}</i>	kV	6		
	Rated operational voltage	<i>U_e</i>	V	690		
	Rated frequency	<i>f</i>	Hz	50 /60		
	Thermal current	<i>I_{th}</i>	A	20		
	Rated operational current for AC-15: single-phase 230 V single-phase 400 V single-phase 500 V single-phase 690 V			A	6	
					4	
					2	
					1	
	Maximum operating frequency for AC-15		op. c./h	1,200		
	Electrical endurance for AC-15		op. c.	500,000		
	Switching of auxiliary loads acc. to standard UL and CSA			A600, R300		
	Rated operational current for DC-13: 1 pole ... 24 V DC / 110 V DC		A	3 / 0.15		
	Maximum operating frequency for DC-13		op. c./h	1,200		
	Electrical endurance for DC-13		op. c.	500,000		
	Terminal capacity: rigid (solid and stranded) flexible	S	mm ² / AWG	0.75 ... 2.5		
				0.5 ... 2.5		
	Length of removed wire insulation		mm/in	10/0.394		
Screw			M3.5			
Screw head			PZ2			
Tightening torque		Nm/lb-in	1.2/10.62			

Thermal overload relay BR7
TECHNICAL DATA

Type		Symbol	Unit	BR7	
GENERAL	Standards			IEC 60947-4-1, IEC 60947-5-1, UL508	
	Approvals			CE, UL	
	For use with			K07	
	Degree of protection			IP20	
	Ambient temperature operating		°C/°F	-25 ... +55/13 ... 131	
	Dimensions (WxHxD)		mm/in	44.8 x 70.6 x 50.6/1.76 x 2.78 x 1.99	
	Operating position			vertical	
	Reset type			auto, manual	
	Maximum altitude above sea level		m	2,000	
	Weight		g/lbs	100/0.220	
MAIN CIRCUIT	Rated insulation voltage	U_i	V	690 (IEC 60947), 600 (UL508)	
	Rated impulse withstand voltage	U_{imp}	kV	6	
	Rated operational voltage	U_e	V	690 (IEC 60947), 600 (UL508)	
	Adjustable current	I_r	A	0.1 ... 12.5	
	Rated frequency	f	Hz	50/60	
	Overvoltage category / pollution degree acc. to IEC/EN 60947-1			III / 3	
	Trip class acc. to IEC/EN 60947-4-1			10A	
	Temperature compensation range		°C/°F	-5 ... +40/23 ... 104	
	Sensitivity to phase failure			yes	
	Power loss at I_n	P	W	/	
	Terminal capacity		mm ² /AWG	0.75 ... 2.5/18 ... 10	
	Conductor insulation stripping length		mm/in	9/0.354	
	Screw			M4	
	Screw head			PZ2	
Tightening torque		Nm/lb-in	1.5 ... 2.2/13 ... 20		
AUXILIARY CIRCUITS	Rated insulation voltage	U_i	V	690	
	Rated impulse withstand voltage	U_{imp}	kV	6	
	Rated operational voltage	U_e	V	AC: 500 ; DC: 230	
	Overvoltage category / pollution degree acc. to IEC/EN 60947-1			III / 3	
	Thermal current (both contacts)	I_{th}	A	6	
	Contact electrical rating			A600 (NO), B600/Q300 (NC)	
	Rated operational current AC-15				
	120 V	both contacts	I_e	A	6
	240 V				3
	380 V				1.9
	480 V				1.5
	600 V				1.2
	Rated operational current DC-13				
	60 V	both contacts	I_e	A	0.45
	110 V				0.25
110 V	0.1				
230 V	0.5				
Terminal capacity		mm ² /AWG		0.5 ... 2.5/22 ... 12	
Conductor insulation stripping length		mm/in		9/0.354	
Screw				M4	
Screw head				PZ2	
Tightening torque		Nm/lb-in		1.2/10.6	

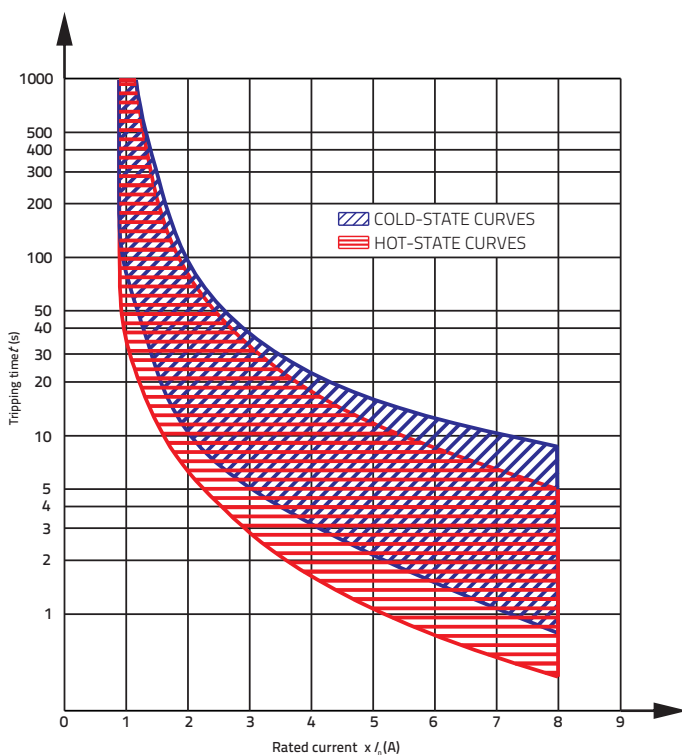
Miniature contactors - Accessories

Setting ranges and maximum permitted back-up fuses

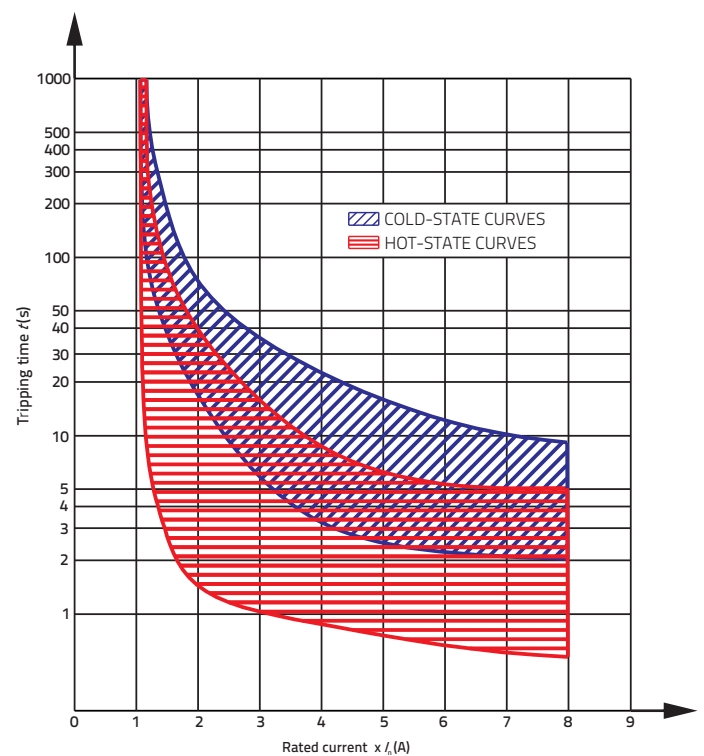
Setting range (A)	Max. back-up fuse gL/gG – for coordination 1 (A)
0.1 - 0.16	
0.16 - 0.25	
0.25 - 0.4	
0.35 ... 0.5	2
0.45 ... 0.63	2
0.55 ... 0.8	
0.75 ... 1	
0.9 ... 1.3	
1.1 ... 1.6	
1.4 ... 2	6
1.6 ... 2.5	10
2.3 ... 3.2	
2.9 ... 4	
3.5 ... 4.8	
4.5 ... 6.3	20
5.5 ... 7.5	
7.2 ... 10	
9 ... 12.5	

Tripping curve BR7

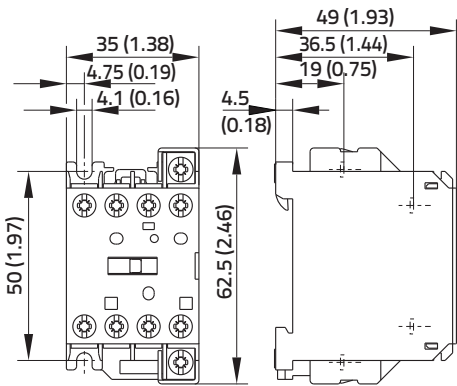
Two-phase characteristic



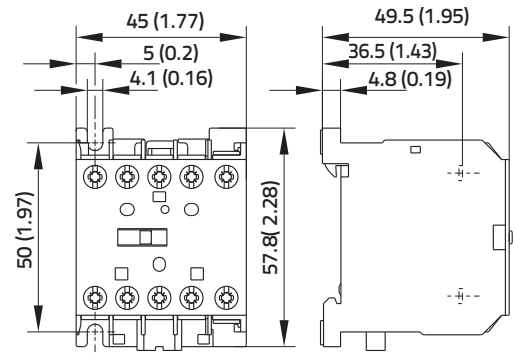
Three-phase characteristic



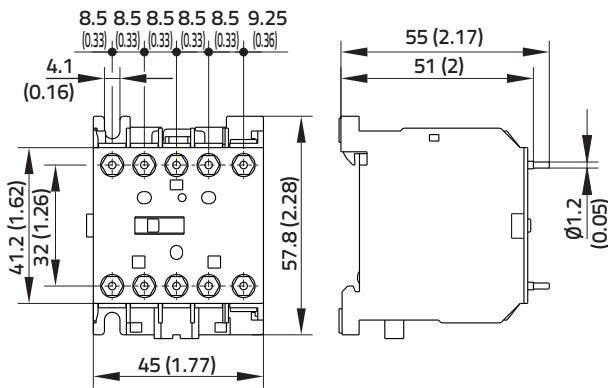
mm/(in)
K03C



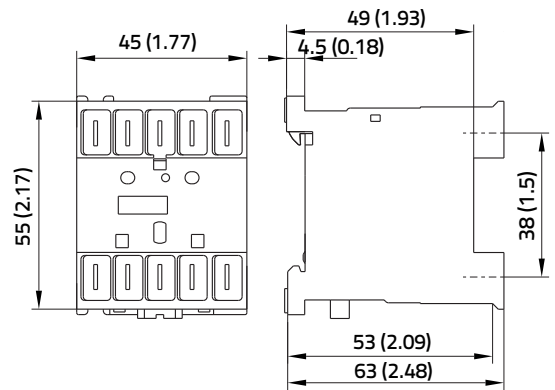
K07M, K07MG



K07MX, K07MGX

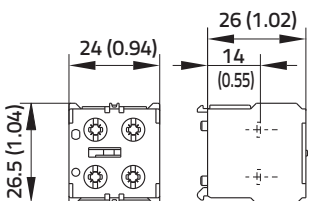


K07MF, K07MGF



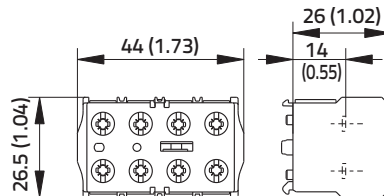
ND2

Two pole snap-on auxiliary switch blocks

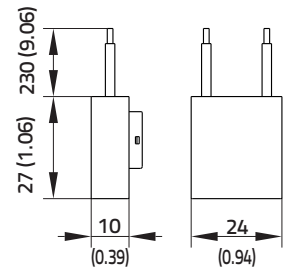


ND4

Four pole snap-on auxiliary switch blocks

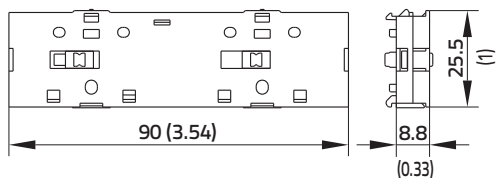


RC, DI suppressor



MB7

Mechanical interlock

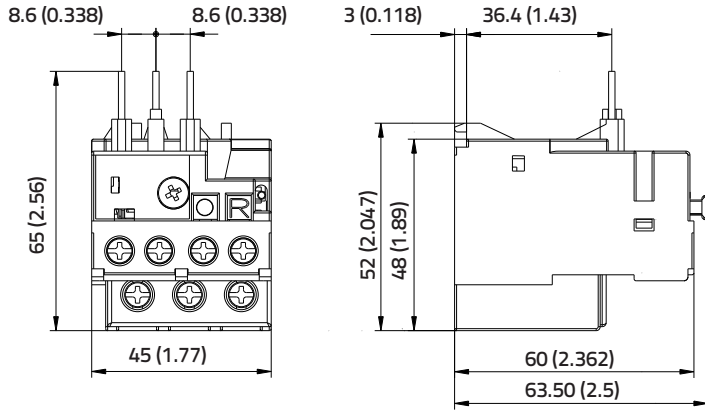


Miniature contactors - Dimensions

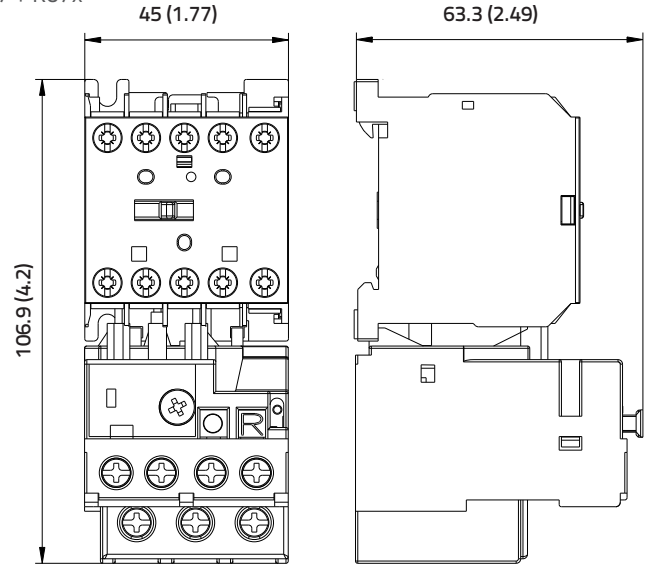
mm/(in)

BR7

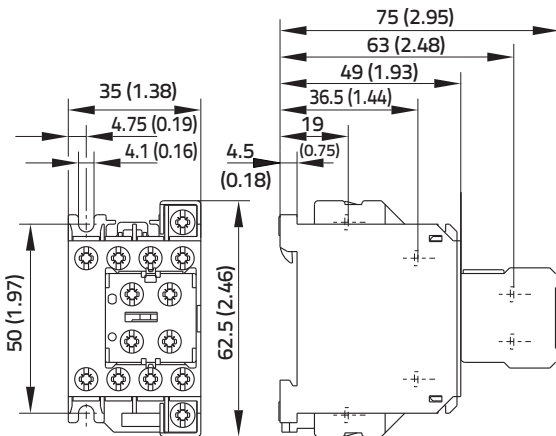
Thermal overload relay



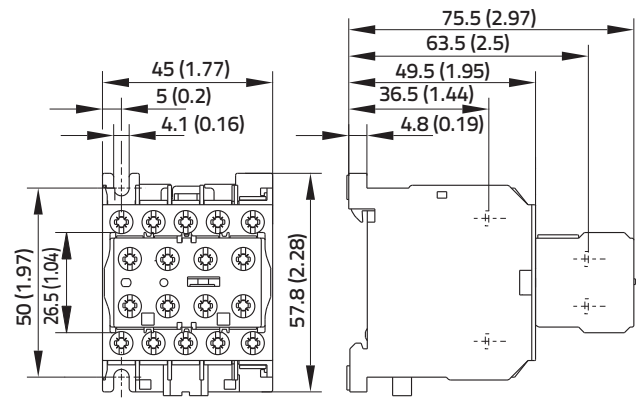
BR7 + K07x



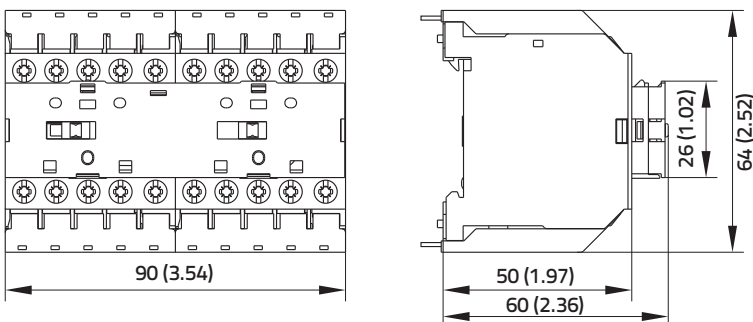
K03x + ND2



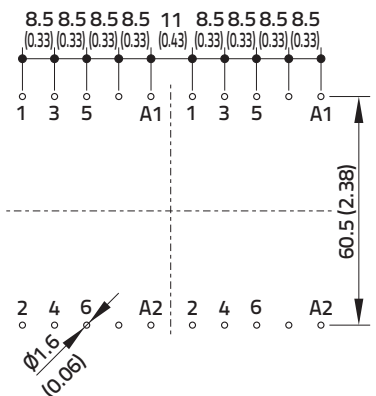
K07x + ND4
K08x + ND4



K07x + MB7 + LB7
K08x + MB7 + LB7



LB7 - raster





Contactors are magnetically operated devices used for controlling electric motors.

Class 10 thermal overload relays are available for direct connection to provide overload and phase failure protection. A full compliment of accessories are offered.

For universal switching:

- AC induction motors
- Electric heating
- Lights and lightning
- Capacitor
- Other electrical loads

Advanced operation:

- non-combination and combination starter assemblies

Other benefits:

- High contact reliability at low voltages
- High electrical and mechanical endurance and high switching capacity
- Wide range of coil voltages are available



Contactors KNL9 - KNL30	page 20
Accessories for contactors KNL9 - KNL30	page 22
Contactors KNL43 - KNL75	page 38
Accessories for contactors KNL43 - KNL75	page 39

Ordering data	page 24, 38
Technical characteristics	page 26, 41
Dimensions	page 36, 48

Motor contactors

General Use acc. to UL 60947-4-1 (4-pole, 1.77 in widths)

AC

Type	Rated current I _e	Control voltage 60 Hz	Wiring diagram	Ordering No.	Weight (g/lbs)	Packaging (pcs)
KNL9-01	9 A	240 V		30.050.475	300/0.661	10
KNL9-01	9 A	120 V		30.050.637	300/0.661	10
KNL9-01	9 A	24 V		30.050.615	300/0.661	10
KNL9-10	9 A	240 V		30.050.474	300/0.661	10
KNL9-10	9 A	120 V		30.050.638	300/0.661	10
KNL9-10	9 A	24 V		30.050.616	300/0.661	10
KNL9-10/Sp4	9 A	240 V		30.050.736	300/0.661	10
KNL9-10/Sp4	9 A	120 V		30.051.042	300/0.661	10
KNL9-10/Sp4	9 A	24 V		30.051.049	300/0.661	10
KNL9-01/Sp4	9 A	240 V		30.051.051	300/0.661	10
KNL9-01/Sp4	9 A	120 V		30.051.186	300/0.661	10
KNL9-01/Sp4	9 A	24 V		30.051.052	300/0.661	10
KNL9-22/Sp4	10 A	240 V		30.050.864	300/0.661	10
KNL9-22/Sp4	10 A	120 V		30.051.187	300/0.661	10
KNL9-22/Sp4	10 A	24 V		30.051.054	300/0.661	10
KNL9-13/Sp4	9 A	240 V		30.051.056	300/0.661	10
KNL9-13/Sp4	9 A	120 V		30.051.188	300/0.661	10
KNL9-13/Sp4	9 A	24 V		30.051.057	300/0.661	10
KNL9-04/Sp4	9 A	240 V		30.051.041	300/0.661	10
KNL9-04/Sp4	9 A	120 V		30.051.189	300/0.661	10
KNL9-04/Sp4	9 A	24 V		30.051.059	300/0.661	10



General Use acc. to UL 60947-4-1 (4-pole, 1.77 in widths)

AC

Type	Rated current I _e	Control voltage 60 Hz	Wiring diagram	Ordering No.	Weight (g/lbs)	Packaging (pcs)
KNL12-01	12 A	240 V		30.050.656	300/0.661	10
KNL12-01	12 A	120 V		30.050.654	300/0.661	10
KNL12-01	12 A	24 V		30.050.648	300/0.661	10
KNL12-10	12 A	240 V		30.050.488	300/0.661	10
KNL12-10	12 A	120 V		30.050.655	300/0.661	10
KNL12-10	12 A	24 V		30.050.649	300/0.661	10
KNL12-10/Sp4	12 A	240 V		30.050.735	300/0.661	10
KNL12-10/Sp4	12 A	120 V		30.051.043	300/0.661	10
KNL12-10/Sp4	12 A	24 V		30.051.061	300/0.661	10
KNL12-01/Sp4	12 A	240 V		30.051.063	300/0.661	10
KNL12-01/Sp4	12 A	120 V		30.051.190	300/0.661	10
KNL12-01/Sp4	12 A	24 V		30.051.064	300/0.661	10
KNL12-22/Sp4	12 A	240 V		30.050.039	300/0.661	10
KNL12-22/Sp4	12 A	120 V		30.051.191	300/0.661	10
KNL12-22/Sp4	12 A	24 V		30.051.066	300/0.661	10
KNL12-13/Sp4	12 A	240 V		30.051.068	300/0.661	10
KNL12-13/Sp4	12 A	120 V		30.051.192	300/0.661	10
KNL12-13/Sp4	12 A	24 V		30.051.069	300/0.661	10
KNL12-04/Sp4	12 A	240 V		30.051.071	300/0.661	10
KNL12-04/Sp4	12 A	120 V		30.051.193	300/0.661	10
KNL12-04/Sp4	12 A	24 V		30.051.072	300/0.661	10



Tags in title:

ü – version with early and late contacts
Sp4 – version with all four main contacts

Motor contactors

General Use acc. to UL 60947-4-1 (4-pole, 1.77 in widths)

AC

Type	Rated current I_e	Control voltage 60 Hz	Wiring diagram	Ordering No.	Weight (g/lbs)	Packaging (pcs)
KNL16-01	16 A	240 V		30.050.673	300/0.661	10
KNL16-01	16 A	120 V		30.050.671	300/0.661	10
KNL16-01	16 A	24 V		30.050.665	300/0.661	10
KNL16-10	16 A	240 V		30.050.489	300/0.661	10
KNL16-10	16 A	120 V		30.050.672	300/0.661	10
KNL16-10	16 A	24 V		30.050.666	300/0.661	10
KNL16-10/Sp4	16 A	240 V		30.050.807	300/0.661	10
KNL16-10/Sp4	16 A	120 V		30.051.044	300/0.661	10
KNL16-10/Sp4	16 A	24 V		30.051.073	300/0.661	10
KNL16-01/Sp4	16 A	240 V		30.050.930	300/0.661	10
KNL16-01/Sp4	16 A	120 V		30.051.194	300/0.661	10
KNL16-01/Sp4	16 A	24 V		30.051.075	300/0.661	10
KNL16-22/Sp4	17 A	240 V		30.050.860	300/0.661	10
KNL16-22/Sp4	17 A	120 V		30.051.195	300/0.661	10
KNL16-22/Sp4	17 A	24 V		30.051.077	300/0.661	10
KNL16-13/Sp4	16 A	240 V		30.050.975	300/0.661	10
KNL16-13/Sp4	16 A	120 V		30.051.196	300/0.661	10
KNL16-13/Sp4	16 A	24 V		30.051.079	300/0.661	10
KNL16-04/Sp4	16 A	240 V		30.050.834	300/0.661	10
KNL16-04/Sp4	16 A	120 V		30.051.197	300/0.661	10
KNL16-04/Sp4	16 A	24 V		30.051.081	300/0.661	10
KNL16-10/St4	16 A	240 V		30.050.984	300/0.661	10
KNL16-10/St4	16 A	120 V		30.051.198	300/0.661	10
KNL16-10/St4	16 A	24 V		30.051.083	300/0.661	10
KNL16-01/St4	16 A	240 V		30.050.985	300/0.661	10
KNL16-01/St4	16 A	120 V		30.051.199	300/0.661	10
KNL16-01/St4	16 A	24 V		30.051.085	300/0.661	10

Tags in title:

- Sp4 - version with all four main contacts
- St4 - contactor for switching of capacitor banks



General Use acc. to UL 60947-4-1 (3-pole, 1.77 in widths)

AC

Type	Rated current I_e	Control voltage 60 Hz	Wiring diagram	Ordering No.	Weight (g/lbs)	Packaging (pcs)
KNL22-00	22 A	240 V		30.050.470	320/0.705	10
KNL22-00	22 A	120 V		30.050.685	320/0.705	10
KNL22-00	22 A	24 V		30.050.609	320/0.705	10



General Use acc. to UL 60947-4-1 (3-pole, 1.77 in widths)

AC

Type	Rated current I_e	Control voltage 60 Hz	Wiring diagram	Ordering No.	Weight (g/lbs)	Packaging (pcs)
KNL30-00	30 A	240 V		30.050.471	320/0.705	10
KNL30-00	30 A	120 V		30.050.693	320/0.705	10
KNL30-00	30 A	24 V		30.050.690	320/0.705	10



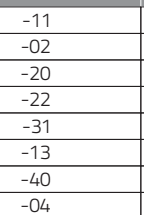
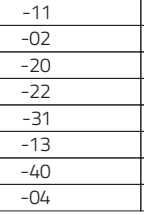
Note: All versions KNL9-KNL30 can be cabled with one (F1) or two (F2) pol faston interface. The limit when we use faston connection to the main circuit $I_{thmax} = 25$ A and $I_{emax} = 25$ A.

Contactors KNL9-KNL30

Accessories

Snap-on auxiliary switch blocks

General Use acc. to UL 60947-5-1 (4-pole)

Type	Rated current I _e	Wiring diagram	Ordering No.	Weight (g/lbs)	Packaging (pcs)	
NDL2 (for KNL9, KNL12, KNL16)	6 A		-11	38.423.834	66/0.145	10
			-02	38.422.835		
			-20	38.423.457		
			-22	38.422.779		
			-31	38.422.754		
			-13	38.422.941		
			-40	38.422.780		
NDL3 (for KNL22, KNL30)	6 A		-11	38.422.836	66/0.145	10
			-02	38.423.014		
			-20	38.423.470		
			-22	38.422.943		
			-31	38.422.851		
			-13	38.422.942		
			-40	38.423.390		
		-04	38.423.374			



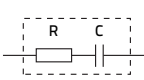
Auxiliary switch blocks

General Use acc. to UL 60947-5-1 (single pole)

Type	Rated current I _e	Version	Ordering No.	Weight (g/lbs)	Packaging (pcs)
NPL1 (for KNL9-KNL16)	6 A	-10	38.422.751	18/0.039	1
NPL1 (for KNL9-KNL16)		-01	38.422.752		
NPL2 (for KNL22-KNL30)		-10	38.422.852		
NPL2 (for KNL22-KNL30)		-01	38.422.945		



RC suppressor (for KNL9 - KNL30)

Type	Control voltage U _c	Wiring diagram	Ordering No.	Weight (g)	Packaging (pcs)
RC1-KNL	12 - 48 V		30.017.074	16/0.035	10
RC2-KNL	48 - 250 V		30.017.075	16/0.035	10
RC3-KNL	250 - 380 V		30.017.076	16/0.035	10
RC4-KNL	380 - 600 V		30.017.077	16/0.035	10



Mechanical interlock

for KNL9 - KNL30

Type	Ordering No.	Weight (g/lbs)	Packaging (pcs)
MBL	38.422.853	14/0.031	10



Distance spacer

Type	Ordering No.	Weight (g/lbs)	Packaging (pcs)
DZ	37.421.996	2/0.004	10



Identification plate

Type	Ordering No.	Weight (g/lbs)	Packaging (pcs)
NT	37.425.330	1/0.002	10



Spare parts: AC coils (50/60 Hz) for KNL9 - KNL30

Type	Ordering No.	Weight (g/lbs)	Packaging (pcs)
24	38.502.343	60/0.132	1
42	38.502.346	60/0.132	1
48	38.502.347	60/0.132	1
110/125	38.502.348	60/0.132	1
220/240	38.502.272	60/0.132	1
380/415	38.502.349	60/0.132	1
440/460	38.502.585	60/0.132	1
480/520	38.502.470	60/0.132	1

Rigid connecting kits

Type	Description	Ordering No.	Weight (g/lbs)	Packaging (pcs)
WK 2.1	For reversing switch, suitable for contactors: 4-9 kW (for contactors KNL9-KNL16) (max. current 32 A), 4 terminals in line (3 main terminals, 1 auxiliary terminal)	655200014000	40/0.088	1
WK 2.2	For star-delta starters, suitable for contactors: 4-9 kW (for contactors KNL9-KNL16) (max. current 32 A), 4 terminals in line (3 main terminals, 1 auxiliary terminal)	655200018000	50/0.110	
WK 4.1	For reversing switch, suitable for contactors: 11 and 18.5 kW (for contactors KNL22-KNL30) (max. current 40 A), 3 terminals in line (3 main terminals)	655200015000	50/0.110	
WK 4.2	For star-delta starters, suitable for contactors: 11 and 18.5 kW (for contactors KNL22, KNL30) (max. current 40 A), 3 terminals in line (3 main terminals)	655200019000	60/0.132	
WK 5.1	For reversing switch with mechanical interlock, suitable for contactors: 4-9 kW (for contactors KNL9-KNL16) (max. current 32 A), 4 terminals in line (3 main terminals, 1 auxiliary terminal)	655200016000	30/0.066	



WK 2.1

BR16 thermal overload relay

up to 20 A for KNL9-KNL16 contactors

Type	Setting range (A)	Max. backup fuse for Coordination 1 (A)	Ordering No.	Weight (g/lbs)	Packaging (pcs)
BR16-0.16	0.1 ... 0.16	1	786.050.481	115/0.253	1
BR16-0.25	0.16 ... 0.25	1	786.050.482		
BR16-0.4	0.25 ... 0.4	1	786.050.483		
BR16-0.5	0.35 ... 0.5	1	786.050.484		
BR16-0.63	0.45 ... 0.63	1	786.050.485		
BR16-0.8	0.55 ... 0.8	3	786.050.486		
BR16-1	0.75 ... 1	3	786.050.487		
BR16-1.3	0.9 ... 1.3	3	786.050.488		
BR16-1.6	1.1 ... 1.6	3	786.050.489		
BR16-2	1.4 ... 2	6	786.050.490		
BR16-2.5	1.8 ... 2.5	6	786.050.491		
BR16-3.2	2.3 ... 3.2	6	786.050.492		
BR16-4	2.9 ... 4	10	786.050.493		
BR16-4.8	3.5 ... 4.8	10	786.050.494		
BR16-6.3	4.5 ... 6.3	15	786.050.495		
BR16-7.5	5.5 ... 7.5	15	786.050.496		
BR16-10	7.2 ... 10	25	786.050.497		
BR16-12.5	9 ... 12.5	30	786.050.498		
BR16-16	11.3 ... 16	40	786.050.499		
BR16-20	15 ... 20	50	786.050.500		



BR30 thermal overload relay

up to 38 A for KNL22-KNL30 contactors

Type	Setting range (A)	Max. backup fuse for Coordination 1 (A)	Ordering No.	Weight (g/lbs)	Packaging (pcs)
BR30-21.5	17.5 ... 21.5	50	786.050.501	115/0.253	1
BR30-25	21 ... 25	60	786.050.502		
BR30-30	24.5 ... 30	70	786.050.503		
BR30-36	29 ... 36	60	786.050.532		
BR30-38	33 ... 38	70	786.050.533		



Connection module

for BR16 and BR30 thermal overload relays

Type	Thermal current (A)	Ordering No.	Weight (g/lbs)	Packaging (pcs)
RP16	40	38.422.749	50/0.110	1



Ordering data

For contactors KNL9 - KNL30

Standard control voltages and designations (AC)

V	24	42	48	120	240	380/415	440	480/520
60 Hz	B7	D7	E7	F7	M7	Q7	R7	S7

KNL16 - 10 - M7



Note:

The type designation and control voltage are stated when ordering the contactors.



Technical characteristics

Dimensions



Contactors KNL9-KNL16

Motor contactors



TECHNICAL DATA

Type	Symbol	Unit	KNL9	KNL12	KNL16
Standards			IEC/EN 60947-5-1, IEC 60947-4-1, UL 508		
Approvals			CE, UL, CSA, EAC		
Module width		mm/in	45/1.77		
Number of poles			4		
Degree of protection			IP20		
Pollution degree			3		
Climatic conditions			95 % relative humidity		
Ambient temperature:					
open		°C/°F	-20 ... +55/-4 ... 131		
closed			-20 ... +45/-4 ... 113		
Storage temperature		°C/°F	-30 ... +80/-22 ... 176		
Maximum altitude		m	2,000		
U _i and U _e is reduced for 1.2 % and I _e for 0.4 % for every additional 100 m					
Number of contactors or switches side-by-side:					
<40 °C			no limitation		
(40 ... 55) °C					
Noise level (operation)		dB	30		
Maximum operating frequency with no load		op. c./h	3,000		
Mechanical endurance		op. c.	10,000,000		
Weight		g/lbs	300		
Contact reliability			≥17 V; ≥50 mA		
Power dissipation per pole		W	1.3		
Overload current withstand capability					
10 s			72	96	128
5 s		A	90	120	150
1 s			110	140	180
0.001 s			220	330	450
Maximum back-up fuse for short-circuit protection gL and gG: coordination type 2		A	25		35
Rated insulation voltage	U _i	V	690		
Rated impulse withstand voltage	U _{imp}	kV	6		
Rated operational voltage	U _e	V	690		
Rated frequency	f	Hz	60		
Thermal current	I _{th}	A	25		
Rated operational current for AC-1, AC-7a and AC-21	I _e	A	25		
Operational power for AC-1, AC-7a and AC-21:					
single-phase 230 V			5.5		
three-phase 230 V			9		
three-phase 400 V			16		
three-phase 500 V			20		
three-phase 690 V			28		
Maximum operating frequency for AC-1, AC-7a and AC-21		op. c./h	600		
Electrical endurance for AC-1, AC-7a and AC-21		op. c.	200,000		
Rated operational current for AC-3, AC-3e, AC-7b and AC-23 (at 400 V)	I _e	A	9	12	16
Operational power for AC-3, AC-3e, AC-7b and AC-23:					
single-phase 230 V			1.1	1.5	2.2
three-phase 230 V			2.2	3	4
three-phase 400 V			4	4	5.5
three-phase 500 V			5.5	5.5	7.5
three-phase 690 V			5.5	7.5	7.5
Maximum operating frequency for AC-3, AC-3e, AC-7b and AC-23		op. c./h	600		
Electrical endurance for AC-3, AC-3e, AC-7b and AC-23		op. c.	1,000,000		900,000
Rated operational current for AC-4 (at 400 V)	I _e	A	3.6	4.9	6.5
Operational power for AC-4:					
three-phase 230 V			0.75	1.1	1.5
three-phase 400 V			1.5	2.2	3
three-phase 500 V			1.5	2.2	3
three-phase 690 V			1.5	2.2	3
Maximum operating frequency for AC-4		op. c./h	300		
Electrical endurance for AC-4		op. c.	300,000		
Rated motor power according to standards UL and CSA:					
single-phase 115 V			3/4	1	1.5
single-phase 230 V			1.5	2	3
three-phase 230 V			3	3	5
three-phase 460 V			5	5	7.5
three-phase 575 V			7.5	7.5	10
Electrical endurance for motors acc. to UL and CSA		op. c.	1,000,000		

TECHNICAL DATA

Type	Symbol	Unit	KNL9	KNL12	KNL16
Switching of capacitors AC-6b and AC-7c (at 230 V)	C	μF	50	66	88 (300 for KNL 16St4)
Maximum operating frequency for AC-6b and AC-7c		op. c./h		600	
Switching of capacitors AC-6b and AC-7c (at 230 V)		op. c.		100,000	
Rated operational current for DC-1 (L/R ≤ 1 ms):	I _e	A		1 pole ... 24 V DC/ 110 V DC/ 220 V DC	15 / 6 / 4
2 poles in series ... 24 V DC/ 110 V DC/ 220 V DC				18 / 12 / 8	
3 poles in series ... 24 V DC/ 110 V DC/ 220 V DC				20 / 15 / 10	
Maximum operating frequency for DC-1		op. c./h		300	
Rated operational current for DC-3 (L/R ≤ 2 ms):	I _e	A		1 pole ... 24 V DC/ 110 V DC/ 220 V DC	12 / 2 / 0.75
2 poles in series ... 24 V DC/ 110 V DC/ 220 V DC				15 / 8 / 1.5	
3 poles in series ... 24 V DC/ 110 V DC/ 220 V DC				18 / 12 / 6	
Maximum operating frequency for DC-3		op. c./h		300	
Rated operational current for DC-5 (L/R ≤ 7.5 ms):	I _e	A		1 pole ... 24 V DC/ 110 V DC/ 220 V DC	12 / 2 / 0.75
2 poles in series ... 24 V DC/ 110 V DC/ 220 V DC				15 / 8 / 1.5	
3 poles in series ... 24 V DC/ 110 V DC/ 220 V DC				18 / 12 / 6	
Maximum operating frequency for DC-5		op. c./h		300	
Terminal capacity:	S	mm ² / AWG		rigid (solid and stranded)	0.75 ... 6/18 ... 10
flexible				0.5 ... 6/20 ... 10	
Length of removed wire insulation		mm/in		10/0.394	
Screw				M3.5	
Screw head				PZ2	
Tightening torque		Nm/lb-in		1.4/12.4	
Maximum back-up fuse for short-circuit protection gL and gG: coordination type 2		A		20	
Rated insulation voltage	U _i	V		690	
Rated operational current for AC-15:	I _e	A		single-phase 230 V	6
single-phase 400 V				4	
single-phase 500 V				2	
single-phase 690 V				1	
Maximum operating frequency for AC-15		op. c./h		1,200	
Electrical endurance for AC-15		op. c.		1,000,000	
Rated operational current for DC-13:	I _e	A		1 pole ... 24 V DC/48 V DC/60 V DC/ 110 V DC/ 220 V DC	10 / 6 / 4 / 0.9 / 0.4
Maximum operating frequency for DC-13					op. c./h
Terminal capacity:	S	mm ² / AWG		rigid (solid and stranded)	0.75 ... 6/18 ... 10
flexible				0.5 ... 6/20 ... 10	
Length of removed wire insulation		mm/in		10/0.394	
Screw				M3.5	
Screw head				PZ2	
Tightening torque		Nm/lb-in		1.4/12.4	
Range of control voltage for switch-on	U _c	%		85 ... 110	
Range of control voltage for drop out	U _c	%		20 ... 75	
Kind of voltage				AC	
Standard control voltages	U _c	V		12,24,48,110/125,220/240,380/415,440/460,480/520,550/600	
Frequency of AC control voltage	f	Hz		50/60	
Control mode				remote control with U _c	
Coil consumption:		VA/W		switch-on	66/48
operation				8/2.5	
Delays:		ms		make	10 ... 25
brake				10 ... 15	
Terminal capacity:		mm ² / AWG		rigid (solid and stranded)	0.75 ... 4/18 ... 10
flexible				0.5 ... 2.5/20 ... 14	
Length of removed wire insulation		mm/in		10/0.394	
Screw				M3.5	
Screw head				PZ2	
Tightening torque		Nm/lb-in		1.4/12.4	

Contactors KNL9-KNL16

Motor contactors



TECHNICAL DATA

		Symbol	Unit	KNL9	KNL12	KNL16
SAFETY	Type					
	MTTF - Mean time to failure $MTTF = 1/\lambda = B10/(0.1 n_{op})$	AC-1 AC-3	h	5,000		
	MTTF _d - Mean time to failure dangerous $MTTF_d = 1/\lambda_d = B10_d/(0.1 n_{op})$	AC-1 AC-3	h	25,000		
				6,666		
				33,333		30,000
	B10 - Number of operating cycles until 10 % of devices fail	AC-1 AC-3	op. c.	150,000		
				750,000		675,000
	B10 _d - Number of operating cycles until 10 % of device dangerous $B10_d = B10/\text{ratio of dangerous failures}$	AC-1 AC-3	op. c.	200,000		
				1,000,000		900,000
	λ - Failure rate $\lambda = (0.1 n_{op})/B10$	AC-1 AC-3	1/h	0.0002		
				0.00004		0.000044
	λ_d - Failure rate dangerous $\lambda_d = (0.1 n_{op})/B10_d$	AC-1 AC-3	1/h	0.00015		
				0.00003		
Ratio of dangerous failures		%	75			
n_{op} - Operating cycles (operating cycles/h)		op. c./h	300			

TECHNICAL DATA

Type	Symbol	Unit	KNL22	KNL30
Standards			IEC/EN 60947-5-1, IEC 60947-4-1, UL 508	
Approvals			CE, UL, CSA, EAC	
Module width		mm/in	45/1.77	
Number of poles			3	
Degree of protection			IP20	
Pollution degree			3	
Climatic conditions			95 % relative humidity	
Ambient temperature:				
open		°C/°F	-20 ... +55/-4 ... 131	
closed			-20 ... +45/-4 ... 113	
Storage temperature		°C/°F	-30 ... +80/-22 ... 176	
Maximum altitude		m	2000	
U _i and U _e is reduced for 1.2 % and I _e for 0.4 % for every additional 100 m				
Number of contactors or switches side-by-side: ≤40 °C (40 ... 55) °C			no limitation	
Noise level (operation)		dB	30	
Maximum operating frequency with no load		op. c./h	3,000	
Mechanical endurance		op. c.	10,000,000	
Weight		g/lbs	320/0.704	
Contact reliability			≥17 V; ≥50 mA	
Power dissipation per pole		W	2.3	
Overload current withstand capability				
10 s		A	176	240
5 s			220	280
1 s			250	330
0.001 s			600	900
Maximum back-up fuse for short-circuit protection gL and gG: coordination type 2		A	50	
Rated insulation voltage	U _i	V	1,000	
Rated impulse withstand voltage	U _{imp}	kV	6	
Rated operational voltage	U _e	V	1,000	
Rated frequency	f	Hz	60	
Thermal current	I _{th}	A	35	35
Rated operational current for AC-1, AC-7a and AC-21	I _e	A	35	35
Operational power for AC-1, AC-7a and AC-21:				
single-phase 230 V		P _e	8	
three-phase 230 V			13	
three-phase 400 V			23	
three-phase 500 V			28	
three-phase 690 V			40	
Maximum operating frequency for AC-1, AC-7a and AC-21		op. c./h	600	
Electrical endurance for AC-1, AC-7a and AC-21		op. c.	200,000	
Rated operational current for AC-3, AC-3e, AC-7b and AC-23 (at 400 V)	I _e	A	22	30
Operational power for AC-3, AC-3e, AC-7b and AC-23:				
single-phase 230 V		P _e	2.2	3.7
three-phase 230 V			5.5	7.5
three-phase 400 V			11	15
three-phase 500 V			11	15
three-phase 690 V			11	15
three-phase 1000 V			11	15
Maximum operating frequency for AC-3, AC-3e, AC-7b and AC-23		op. c./h	600	
Electrical endurance for AC-3, AC-3e, AC-7b and AC-23		op. c.	800,000	400,000
Rated operational current for AC-4 (at 400 V)	I _e	A	7.7	12.5
Operational power for AC-4:				
three-phase 230 V		P _e	2.2	4
three-phase 400 V			4	6.5
three-phase 500 V			4	6.5
three-phase 690 V			4	6.5
Maximum operating frequency for AC-4		op. c./h	300	
Electrical endurance for AC-4		op. c.	300,000	250,000
Rated motor power according to standards UL and CSA:				
single-phase 115 V		P _e	2	2
single-phase 230 V			3	5
three-phase 230 V			7.5	10
three-phase 460 V			15	20
three-phase 575 V			15	20
Electrical endurance for motors acc. to UL and CSA		op. c.	800,000	400,000

Contactors KNL22, KNL30

Motor contactors



TECHNICAL DATA

	Type	Symbol	Unit	KNL22		KNL30	
MAIN CIRCUIT	Switching of capacitors AC-6b and AC-7c (at 230 V)	C	μF	220	330	350	
	Maximum operating frequency for AC-6b and AC-7c		op. c./h	600			
	Switching of capacitors AC-6b and AC-7c (at 230 V)		op. c.	100,000			
	Rated operational current for DC-1 (L/R ≤ 1 ms):	I _e	A				
	1 pole ... 24 V DC/ 110 V DC/ 220 V DC			28 / 7 / 4			
	2 poles in series ... 24 V DC/ 110 V DC/ 220 V DC			30 / 23 / 13			
	3 poles in series ... 24 V DC/ 110 V DC/ 220 V DC	32 / 25 / 20					
	Maximum operating frequency for DC-1		op. c./h	300			
	Rated operational current for DC-3 (L/R ≤ 2 ms):	I _e	A				
	1 pole ... 24 V DC/ 110 V DC/ 220 V DC			18 / 2 / 1			
	2 poles in series ... 24 V DC/ 110 V DC/ 220 V DC			23 / 13 / 2			
	3 poles in series ... 24 V DC/ 110 V DC/ 220 V DC	28 / 18 / 9					
	Maximum operating frequency for DC-3		op. c./h	300			
	Rated operational current for DC-5 (L/R ≤ 7.5 ms):	I _e	A				
1 pole ... 24 V DC/ 110 V DC/ 220 V DC	18 / 2 / 1						
2 poles in series ... 24 V DC/ 110 V DC/ 220 V DC	23 / 13 / 2						
3 poles in series ... 24 V DC/ 110 V DC/ 220 V DC	28 / 18 / 9						
Maximum operating frequency for DC-5		op. c./h	300				
Terminal capacity:	S	mm ² / AWG					
rigid (solid and stranded)			2.5 ... 10/13 ... 8				
flexible	1.5 ... 10/16 ... 8						
Length of removed wire insulation		mm/in	10/0.394				
Screw			M4				
Screw head			PZ2				
Tightening torque		Nm/lb-in	1.8/15.93				
COIL	Range of control voltage for switch-on	U _c	%	85 ... 110			
	Range of control voltage for drop out	U _c	%	20 ... 75			
	Kind of voltage			AC			
	Standard control voltages	U _c	V	12,24,48,110/125,220/240,380/415,440/460,480/520,550/600			
	Frequency of AC control voltage	f	Hz	50/60			
	Control mode			remote control with U _c			
	Coil consumption:		VA/W				
	switch-on			66/48			
	operation	8/2.5					
	Delays:		ms				
	make			10 ... 20			
	brake	5 ... 15					
	Terminal capacity:		mm ² / AWG				
	rigid (solid and stranded)			0.75 ... 4/18 ... 10			
flexible	0.5 ... 2.5/20 ... 14						
Length of removed wire insulation		mm/in	10/0.394				
Screw			M3.5				
Screw head			PZ2				
Tightening torque		Nm/lb-in	1.4/12.4				
SAFETY	MTTF - Mean time to failure	AC-1	h				
	MTTF = 1/λ = B10/(0.1 n _{op})	AC-3		20,000		10,000	
	MTTF _d - Mean time to failure dangerous	AC-1	h				
	MTTF _d = 1/λ _d = B10 _d /(0.1 n _{op})	AC-3		26,666		13,333	
	B10 - Number of operating cycles until 10 % of devices fail	AC-1	op. c.				
		AC-3		600,000	150,000	300,000	
	B10 _d - Number of operating cycles until 10 % of device dangerous	AC-1	op. c.				
	B10 _d = B10/ratio of dangerous failures	AC-3		800,000	200,000	400,000	
	λ - Failure rate	AC-1	1/h				
	λ = (0.1 n _{op})/B10	AC-3		0.00005		0.0001	
	λ _d - Failure rate dangerous	AC-1	1/h				
λ _d = (0.1 n _{op})/B10 _d	AC-3	0.00004		0.00015	0.000075		
Ratio of dangerous failures		%	75				
n _{op} - Operating cycles (operating cycles/h)		op. c./h	300				

Electrical endurance

Diagram 2

Electrical endurance of motor contactors KNL9 - KNL30 – AC-3, AC-3e

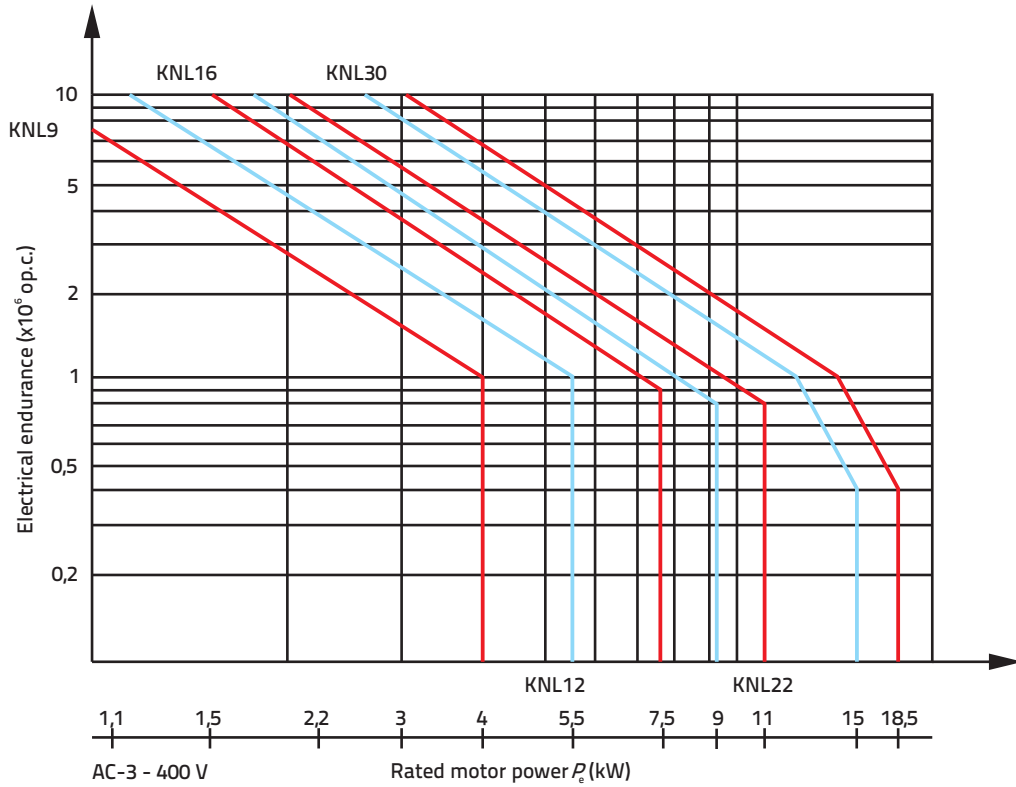
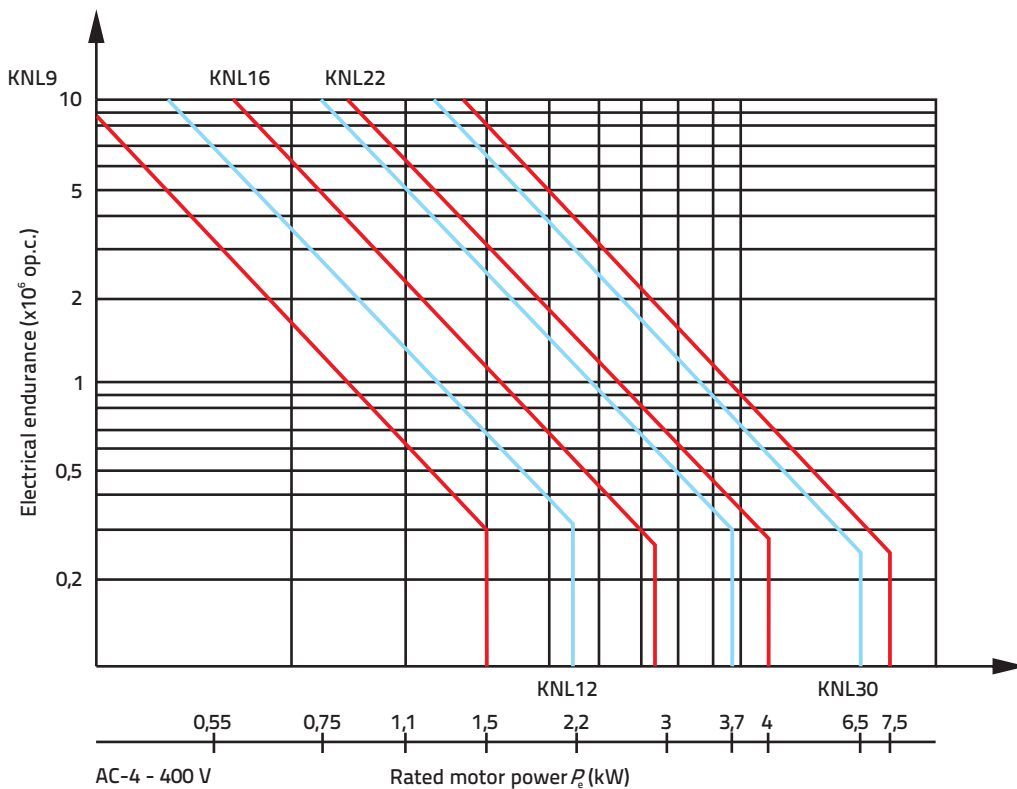


Diagram 3

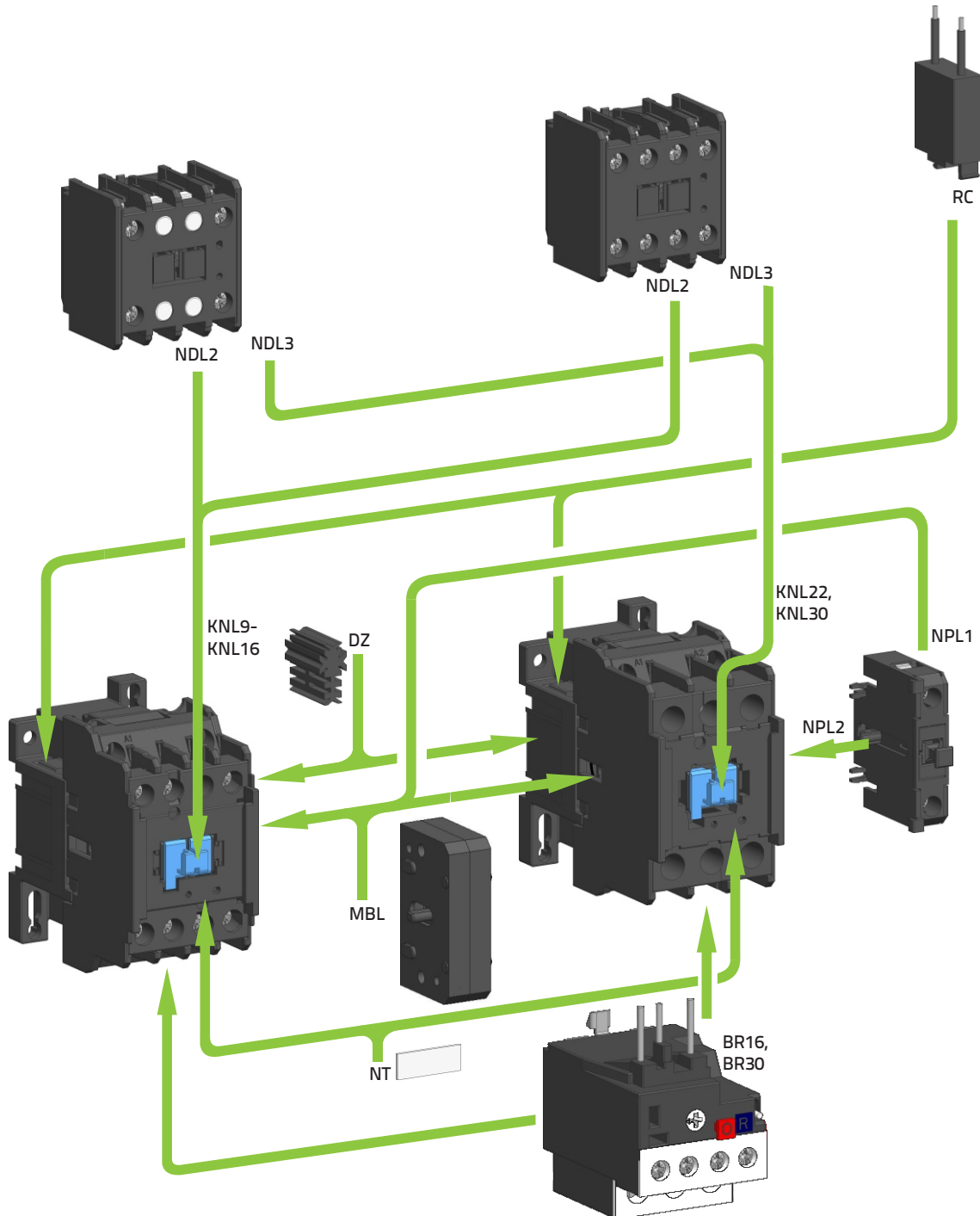
Electrical endurance of motor contactors KNL9 - KNL30 – AC-4



Contactors KNL9-KNL30

Accessories

Mounting positions of accessories



Snap-on auxiliary switch blocks

TECHNICAL DATA

Type	Symbol	Unit	NDL2, NDL3	NPL1, NPL2
Standards			IEC/EN 60947-5-1, VDE 0660, UL 508	
Approvals			CE, UL, CSA	
For use with			NDL2 (KNL9-KNL16), NDL3 (KNL22-KNL30)	NPL1 (KNL9 - KNL16), NPL2 (KNL22-KNL30)
Module width			2	0.5
Number of poles			2 or 4	1
Degree of protection			IP20	
Pollution degree			3	
Ambient temperature				
open		°C/°F	-20 ... +55/-4 ... 131	
closed			-20 ... +45/-4 ... 113	
Storage temperature		°C/°F	-30 ... +80/-22 ... 176	
Maximum altitude		m	2,000	
U _i and U _e is reduced for 1.2 % and I _e for 0.4 % for every additional 100 m				
Maximum operating frequency with no load		op. c./h	3,000	
Mechanical endurance		op. c.	10,000,000	
Weight		g/lbs	70/0.154	20/0.044
Contact reliability			≥ 17 V; ≥ 50 mA	
Maximum back-up fuse for short-circuit protection gL and gG: coordination type 2		A	16	10
Rated insulation voltage	U _i	V	690	
Rated impulse withstand voltage	U _{imp}	kV	6	
Rated operational voltage	U _e	V	690	
Rated frequency	f	Hz	60	
Thermal current	I _{th}	A	16	10
Rated operational current for AC-15:				
single-phase 230 V			6	
single-phase 400 V			4	
single-phase 500 V			2	
single-phase 690 V			1	
Maximum operating frequency for AC-15		op. c./h	1,200	
Electrical endurance for AC-15		op. c.	500,000	
Switching of auxiliary loads acc. to standard UL and CSA			A600, N600	
Rated operational current for DC-13:				
1 pole ... 24 V DC/ 60 V DC/ 110 V DC/ 220 V DC		A	10 / 4 / 0.9 / 0.4	6 / 2.5 / 0.5 / 0.2
Maximum operating frequency for DC-13		op. c./h	1,200	
Electrical endurance for DC-13		op. c.	500,000	
Terminal capacity:				
rigid (solid and stranded)			0.75 ... 4/18 ... 10	
flexible			0.5 ... 2.5/20 ... 14	
Length of removed wire insulation		mm/in	10/0.394	
Screw			M3.5	
Screw head			PZ2	
Tightening torque		Nm/lb-in	1.4/12.4	1/8.85

Contactors KNL9-KNL30

Accessories

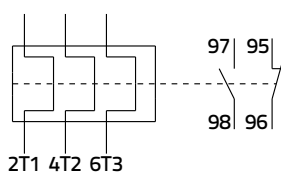


Thermal overload relay BR16 and BR30

TECHNICAL DATA

		Symbol	Unit	BR16	BR30
GENERAL	Type				
	Standards			IEC 60947-4-1, IEC 60947-5-1, UL508	
	Approvals			CE, UL	
	For use with			KNL9 ... KNL16	KNL22, KNL30
	Degree of protection			IP20	
	Ambient temperature operating		°C/°F	-5 ... +55/23 ... 131	
	storage			-25 ... +70/-13 ... 158	
	Dimensions (WxHxD)		mm/in	45 x 70.5 x 60/1.77 x 2.77 x 2.36	45 x 69 x 60/1.77 x 2.71 x 2.36
	Operating position			vertical	
	Reset type			auto, manual	
MAIN CIRCUIT	Maximum altitude above sea level		m	2,000	
	Weight		g/lbs	115/0.253	
	Rated insulation voltage	U_i	V	690	
	Rated impulse withstand voltage	U_{imp}	kV	6	
	Rated operational voltage	U_e	V	690	
	Adjustable current	I_r	A	0.1 ... 20	17.5 ... 30
	Rated frequency	f	Hz	50/60	
	Overvoltage category / pollution degree acc. to IEC/EN 60947-1			III / 3	
	Trip class acc. to IEC/EN 60947-4-1			10	
	Temperature compensation range		°C	-5 ... +40	
AUXILIARY CIRCUITS	Sensitivity to phase failure			yes	
	Power loss at I_n	P	W	5 ... 6.5	
	Terminal capacity		mm ² /AWG	1 ... 10/18 ... 8	
	Conductor insulation stripping length		mm/in	10/0.394	
	Screw			M4	
	Screw head			PZ2	
	Tightening torque		Nm/lb-in	1.2/10.62	
	Rated insulation voltage	U_i	V	690	
	Rated impulse withstand voltage	U_{imp}	kV	6	
	Rated operational voltage	U_e	V	AC: 500 ; DC: 230	
AUXILIARY CIRCUITS	Overvoltage category / pollution degree acc. to IEC/EN 60947-1			III / 3	
	Thermal current (both contacts)	I_{th}	A	6	
	Contact electrical rating			A600 / Q300	
	Rated operational current AC-15				
	230 V	NO	I_e	A	3
	400 V				2
	500 V				1
	230 V	NC	I_e	A	3
	400 V				2
	500 V				1
Rated operational current DC-13					
60 V	both contacts	I_e	A	0.45	
110 V				0.25	
230 V				0.1	
Terminal capacity		mm ² /AWG	0.75 ... 2.5/18 ... 14		
Conductor insulation stripping length		mm/in	9/0.354		
Screw			M3.5		
Screw head			PZ2		
Tightening torque		Nm/lb-in	0.8/7.08		

Connection diagram BR16 and BR30



Thermal overload relay BR16

Setting ranges and maximum permitted back-up fuses

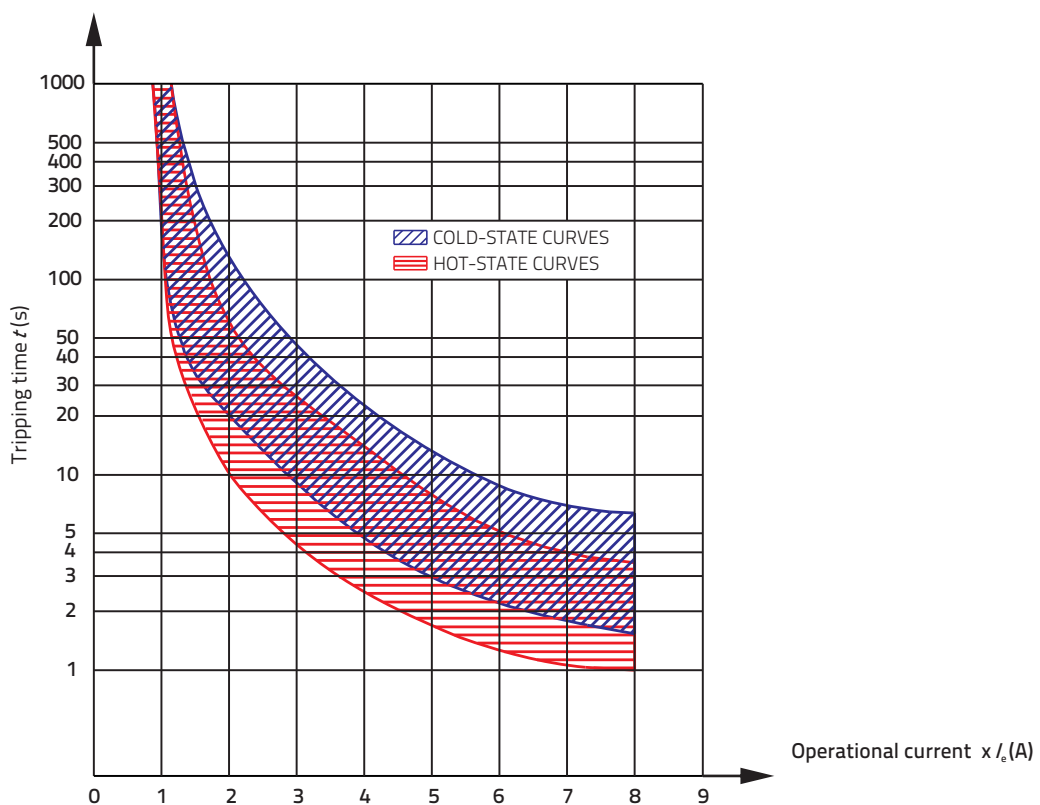
Setting range (A)	Max. back-up fuse gL/gG – UL 508 (A)	Max. back-up fuse gL/gG (A)
0.1 - 0.16	1	1
0.16 - 0.25	1	1
0.25 - 0.4	1	1
0.35 - 0.5	1	1
0.45 - 0.63	1	1
0.55 - 0.8	3	2
0.75 - 1	3	2
0.9 - 1.3	3	2
1.1 - 1.6	3	2
1.4 - 2	6	4
1.8 - 2.5	6	4
2.3 - 3.2	6	4
2.9 - 4	10	8
3.5 - 4.8	10	8
4.5 - 6.3	15	10
5.5 - 7.5	15	10
7.2 - 10	25	16
9 - 12.5	30	20
11.3 - 16	40	25
15 - 20	50	35

Thermal overload relay BR30

Setting ranges and maximum permitted back-up fuses

Setting range (A)	Max. back-up fuse gL/gG – UL 508 (A)	Max. back-up fuse gL/gG (A)
17.5 - 21.5	50	35
21 - 25	60	40
24.5 - 30	70	50
29 - 36	70	50
33 - 38	70	50

Tripping curve BR16 and BR30



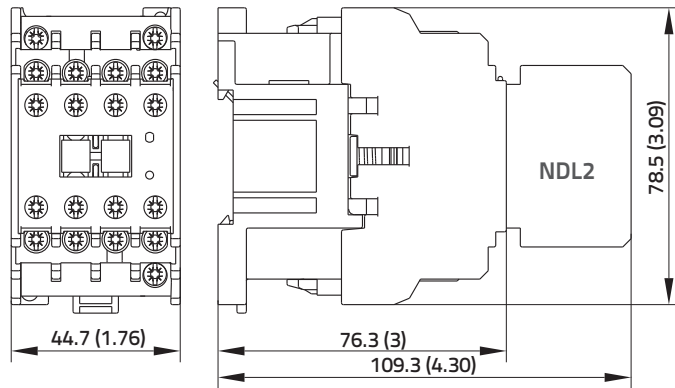
Contactors KNL9-KNL30

Dimensions

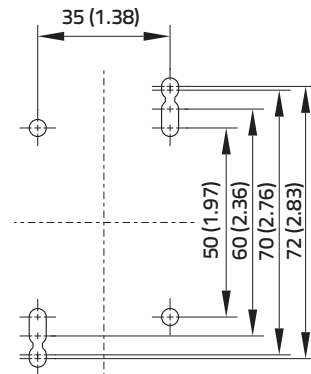


mm/(in)

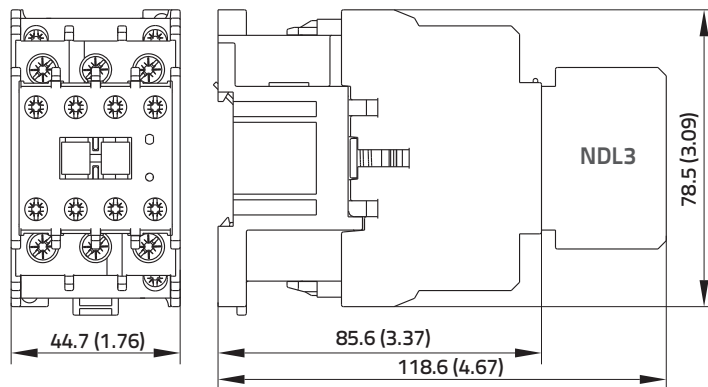
KNL9 ... KNL16



KNL9 ... KNL30 - drilling plan



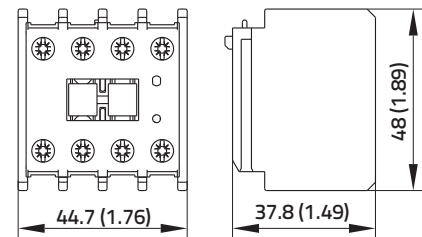
KNL22, KNL30



NDL2, NDL3

Two and four-pole snap-on auxiliary switch blocks (mounting on a basic contactor)

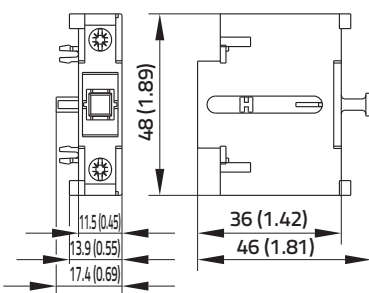
NDL2 - for KNL9 - KNL16
NDL3 - for KNL22, KNL30



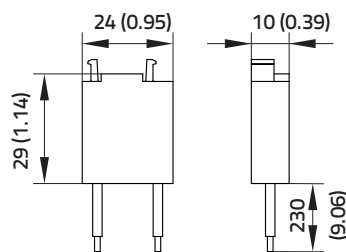
NPL1, NPL2

Single pole snap-on auxiliary switch block (for side mounting + push button)

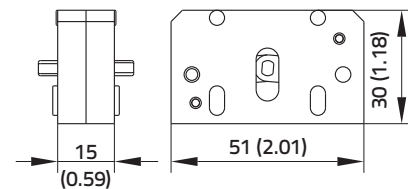
NPL1 - for KNL9 - KNL16
NPL2 - for KNL22, KNL30



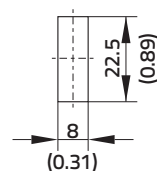
RC suppressor



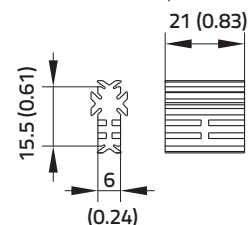
MBL mechanical interlock



NT identification plate



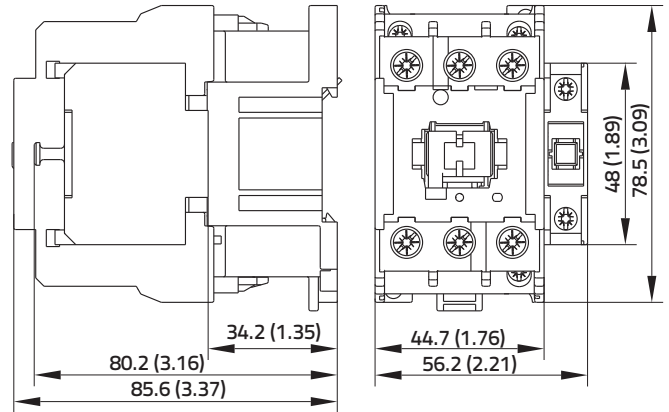
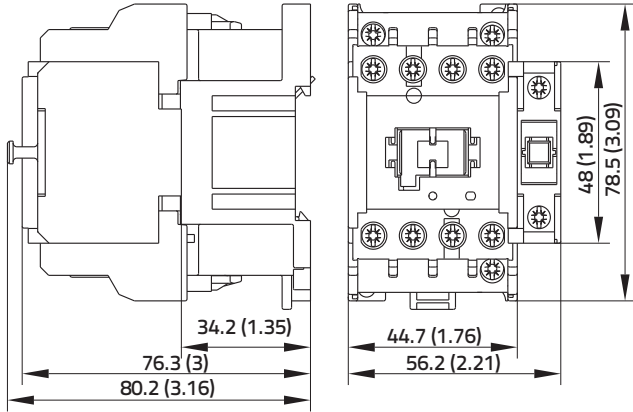
DZ distance spacer



mm/(in)

KNL9-KNL16 + NPL1

KNL22-KNL30 + NPL2

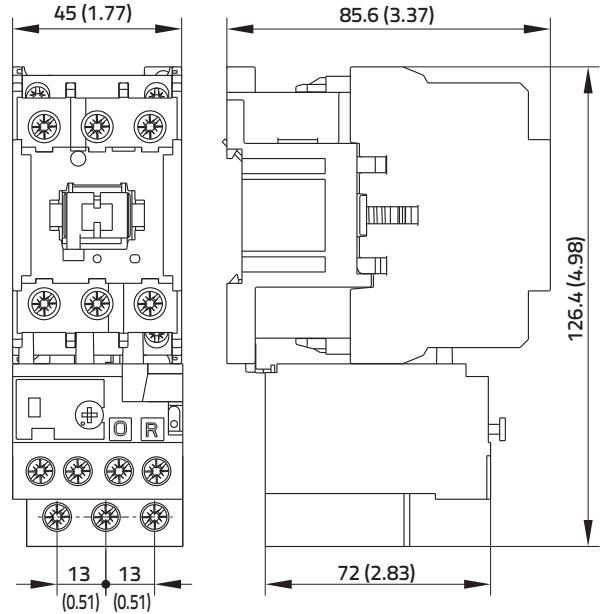
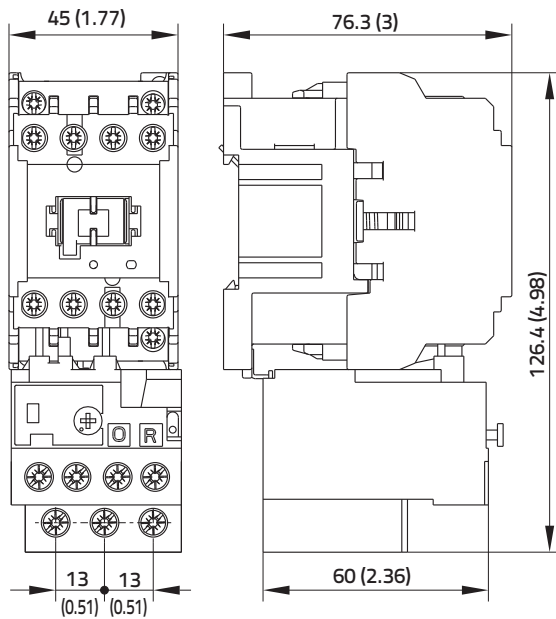


KNL9 ... KNL16 + BR16

Contactor + thermal overload relay

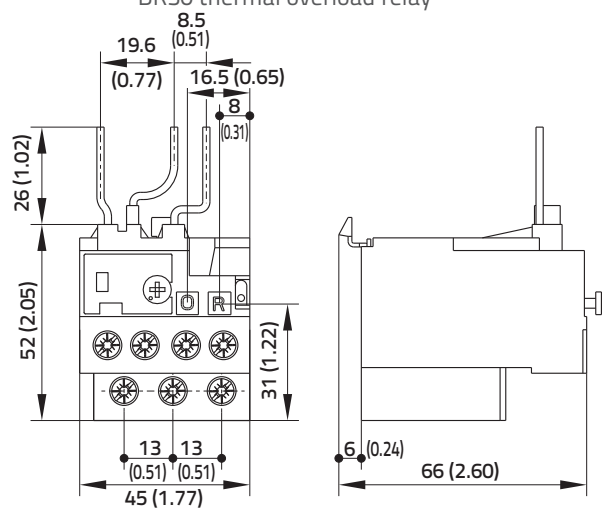
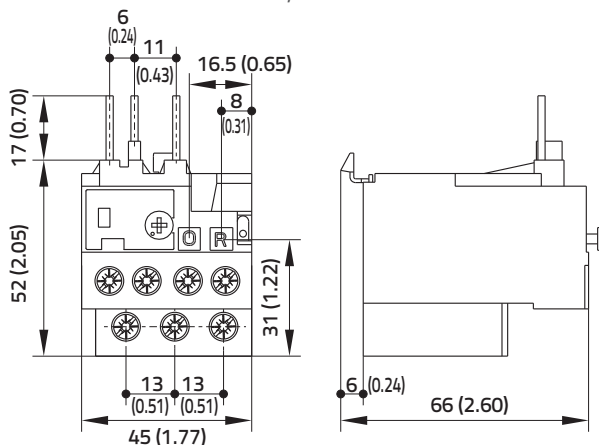
KNL22 ... KNL38 + BR30

Contactor + thermal overload relay



BR16 thermal overload relay

BR30 thermal overload relay



Contactors KNL43UL-KNL75

Motor contactors



Motor contactors

General Use acc. to UL 60947-4-1 (3-pole, 2.56 in widths)

AC

Type	Rated current I _e	Control voltage 60 Hz	Wiring diagram	Ordering No.	Weight (g/lbs)	Packaging (pcs)
KNL43-11UL	43 A	240 V		30.051.012	930/2.050	1
KNL43-11-UL	43 A	120 V		30.050.855	930/2.050	1
KNL43-11-UL	43 A	24 V		30.051.004	930/2.050	1



General Use acc. to UL 60947-4-1 (3-pole, 2.56 in widths)

AC

Type	Rated current I _e	Control voltage 60 Hz	Wiring diagram	Ordering No.	Weight (g/lbs)	Packaging (pcs)
KNL63-11-UL	63 A	240 V		30.051.028	930/2.050	1
KNL63-11-UL	63 A	120 V		30.050.856	930/2.050	1
KNL63-11-UL	63 A	24 V		30.051.020	930/2.050	1



General Use acc. to UL 60947-4-1 (3-pole, 2.56 in widths)

AC

Type	Rated current I _e	Control voltage 60 Hz	Wiring diagram	Ordering No.	Weight (g/lbs)	Packaging (pcs)
KNL75-11 ¹⁾	70 A	240 V		30.051.103	930/2.050	1
KNL75-11 ¹⁾	70 A	120 V		30.051.200	930/2.050	1
KNL75-11 ¹⁾	70 A	24 V		30.051.104	930/2.050	1



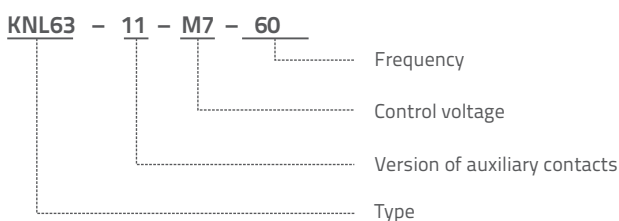
Note:
UL listing is pending

Ordering data

For contactors **KNL43UL, KNL63UL, KNL75**

Standard control voltages and designations (AC)

V	24	42	48	120	240	380/415
50/60 Hz	B7	D7	E7	F7	M7	Q7



Note:
The type designation and control voltage are stated when ordering the contactors.

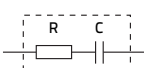
Snap-on auxiliary switch blocks

General Use acc. to UL 60947-5-1 (2- and 4-pole)

Type	Rated current I _e	Rated voltage U _e	Version	Ordering No.	Weight (g/lbs)	Packaging (pcs)
NDL4 (for KNL43, KNL43UL, KNL63, KNL63UL, KNL75)	6 A	230 V	-11	38.423.011	66/0.145	10
			-02	38.423.012		
			-20	38.423.473		
			-22	38.422.910		
			-31	38.422.911		
			-13	38.423.013		
			-40	38.423.474		
			-04	38.423.475		



RC suppressor (for KNL43-KNL75, KNL43UL, KNL63UL)

Type	Control voltage U _c	Wiring diagram	Ordering No.	Weight (g/lbs)	Packaging (pcs)
RC1-KNL	12 - 48 V		30.017.074	16/0.035	10
RC2-KNL	48 - 250 V		30.017.075	16/0.035	10
RC3-KNL	250 - 380 V		30.017.076	16/0.035	10
RC4-KNL	380 - 600 V		30.017.077	16/0.035	10



Mechanical interlock

for KNL43 - KNL75, KNL43UL, KNL63UL)

Type	Ordering No.	Weight (g/lbs)	Packaging (pcs)
MBL43	38.422.197	16/0.035	10



Identification plate

Type	Ordering No.	Weight (g/lbs)	Packaging (pcs)
NT	37.425.330	1/0.002	10



Spare parts: AC coils (60 Hz) for KNL43(UL) - KNL75(UL)

Type	Ordering No. (KNL43 - KNL75)	Ordering No. (KNL43UL - KNL75UL)	Weight (g/lbs)	Packaging (pcs)
24	38.501.841	38.502.846	140/0.308	1
42	38.502.602	38.502.850	140/0.308	1
48	38.501.987	38.502.851	140/0.308	1
240	38.502.286	38.502.847	140/0.308	1
380/415	38.502.610	38.502.848	140/0.308	1

BR63 thermal overload relay

up to 97 A for KNL43UL, KNL63UL, KNL75 contactors

Type	Setting range (A)	Max. backup fuse gL/gG Coordination 1 (A)	Ordering No.	Weight (g/lbs)	Packaging (pcs)
BR63-25	17 ... 25	100	786.050.504	350/0.771	1
BR63-36	24,5 ... 36	100	786.050.505		
BR63-47	35 ... 47	125	786.050.506		
BR63-60	45 ... 60	150	786.050.507		
BR63-75	58 ... 75	200	786.050.508		
BR63-90	72 ... 90	250	786.050.509		
BR63-97	77 ... 97	250	786.050.510		





Technical characteristics

Dimensions



Contactors KNL43UL - KNL75

Motor contactors



TECHNICAL DATA

Type	Symbol	Unit	KNL43UL	KNL63UL	KNL75 ¹⁾
Standards			IEC/EN 60947-5-1, IEC 60947-4-1, IEC/EN 60947-1, UL 508		
Approvals			UL, CSA, CE, EAC		CE, EAC
Module width		mm/in	65/2.559		
Number of poles			3		
Degree of protection			IP20		
Pollution degree			3		
Climatic conditions			95 % relative humidity		
Ambient temperature:					
open		°C/°F	-20 ... +60/-4 ... 140		
closed			-20 ... +45/-4 ... 113		
Storage temperature		°C/°F	-30 ... +80/-22 ... 176		
Maximum altitude		m	2,000		
U _i and U _e is reduced for 1.2 % and I _e for 0.4 % for every additional 100 m					
Number of contactors or switches side-by-side:					
<40 °C			no limitation		
(40 ... 55) °C					
Noise level (operation)		dB	30		
Maximum operating frequency with no load		op. c./h	3,000		
Mechanical endurance		op. c.	3,000,000		
Weight		g/lbs	930		
Contact reliability			≥17 V; ≥50 mA		
Power dissipation per pole		W	5	6	6
Overload current withstand capability					
10 s		A	344	504	528
Maximum back-up fuse for short-circuit protection gL and gG: coordination type 2		A	125	125	125
Rated insulation voltage	U _i	V	1,000		
Rated impulse withstand voltage	U _{imp}	kV	6		
Rated operational voltage	U _e	V	1,000		
Rated frequency	f	Hz	60		
Thermal current	I _{th}	A	85	100	100
Rated operational current for AC-1, AC-7a and AC-21	I _e	A	85	100	100
Operational power for AC-1, AC-7a and AC-21:					
single-phase 230 V	P _e	kW	19	22	22
three-phase 230 V			32	38	38
three-phase 400 V			56	66	66
Maximum operating frequency for AC-1, AC-7a and AC-21		op. c./h	600		
Electrical endurance for AC-1, AC-7a and AC-21		op. c.	200,000		
Rated operational current for AC-3, AC-3e, AC-7b and AC-23 (at 400 V)	I _e	A	43	63	70
Operational power for AC-3, AC-3e, AC-7b and AC-23:					
single-phase 230 V	P _e	kW	5.5	7.5	9
three-phase 230 V			12.5	15	18.5
three-phase 400 V			22	30	37
three-phase 500 V			30	40	45
three-phase 690 V			30	40	45
three-phase 1000 V			22	30	30
Maximum operating frequency for AC-3, AC-3e, AC-7b and AC-23		op. c./h	600		
Electrical endurance for AC-3, AC-3e, AC-7b and AC-23		op. c.	800,000	400,000	400,000
Rated operational current for AC-4 (at 400 V)	I _e	A	29	41	41
Operational power for AC-4:					
three-phase 400 V	P _e	kW	15	22	22
three-phase 500 V			18.5	25	25
Maximum operating frequency for AC-4		op. c./h	300		
Electrical endurance for AC-4		op. c.	40,000	20,000	20,000
Rated motor power according to standards UL and CSA:					
single-phase 120 V	P _e	HP	3	5	5
single-phase 240 V			7.5	10	10
three-phase 240 V			15	20	25
three-phase 480 V			25	30	40
three-phase 600 V			30	40	50
three-phase 600 V					
Maximum operating frequency for motors acc. to UL and CSA		op. c./h	600		
Electrical endurance for motors acc. to UL and CSA		op. c.	800,000	400,000	400,000

1) UL listing is pending

TECHNICAL DATA

Type	Symbol	Unit	KNL43UL	KNL63UL	KNL75 ¹⁾
Switching of capacitors AC-6b and AC-7c (at 230 V)	C	μF	440	660	770
Maximum operating frequency for AC-6b and AC-7c		op. c./h		600	
Electrical endurance for AC-6b and AC-7c		op. c.		100,000	
Rated operational current for DC-1 (L/R ≤ 1 ms): 1 pole ... 24 V DC/ 48 V DC/ 60 V DC/ 110 V DC/ 220 V DC 2 poles in series ... 24 V DC/ 48 V DC/ 60 V DC/ 110 V DC/ 220 V DC 3 poles in series ... 24 V DC/ 48 V DC/ 60 V DC/ 110 V DC/ 220 V DC	I _e	A		50 / 50 / 50 / 8 / 6 70 / 70 / 70 / 60 / 36 70 / 70 / 70 / 60 / 50	
Maximum operating frequency for DC-1		op. c./h		300	
Terminal capacity: rigid (solid and stranded) flexible	S	mm ² / AWG		35/3 25/4	
Length of removed wire insulation		mm/in		16/0.630	
Screw				M6	
Screw head				PZ2	
Tightening torque		Nm/lb-in		4/35.4	
Maximum back-up fuse for short-circuit protection gL and gG: coordination type 2	I _v	A		10	
Rated operational current for AC-15: single-phase 230 V single-phase 400 V single-phase 500 V single-phase 690 V	I _e	A		6 4 2 1	
Maximum operating frequency for AC-15		op. c./h		1,200	
Electrical endurance for AC-15		op. c.		1,000,000	
Terminal capacity: rigid (solid and stranded) flexible		mm ² / AWG		1 ... 2.5/18 ... 14 1 ... 2.5/18 ... 14	
Length of removed wire insulation		mm/in		10/0.394	
Screw				M3.5	
Screw head				PZ2	
Tightening torque		Nm/lb-in		0.8/7.08	
Range of control voltage for switch-on	U _c	%		85 ... 110	
Range of control voltage for drop out	U _c	%		20 ... 75	
Kind of voltage				AC	
Standard control voltages	U _c	V		12,24,48,120,240,380/415,440/460,480/520,550/600	
Frequency of AC control voltage	f	Hz		60	
Control mode				remote control with U _c	
Coil consumption: switch-on operation		VA/W		130/80 10/3	
Delays: make brake		ms		10 ... 20 8 ... 15	
Terminal capacity: rigid (solid and stranded) flexible		mm ² / AWG		1 ... 2.5/18 ... 14 1 ... 2.5/18 ... 14	
Length of removed wire insulation		mm/in		11/0.433	
Screw				M3.5	
Screw head				PZ2	
Tightening torque		Nm/lb-in		0.8/7.08	
MTTF - Mean time to failure MTTF = 1/λ = B10/(0.1 n _{op})	AC-1 AC-3	h	20,000	5,000	10,000
MTTF _d - Mean time to failure dangerous MTTF _d = 1/λ _d = B10 _d /(0.1 n _{op})	AC-1 AC-3	h	26,666	6,666	13,333
B10 - Number of operating cycles until 10 % of devices fail	AC-1 AC-3	op. c.	600,000	150,000	300,000
B10 _d - Number of operating cycles until 10 % of device dangerous B10 _d = B10/ratio of dangerous failures	AC-1 AC-3	op. c.	800,000	200,000	400,000
λ - Failure rate λ = (0.1 n _{op})/B10	AC-1 AC-3	1/h	0.00005	0.0002	0.0001
λ _d - Failure rate dangerous λ _d = (0.1 n _{op})/B10 _d	AC-1 AC-3	1/h	0.00004	0.00015	0.000075
Ratio of dangerous failures		%		75	
n _{op} - Operating cycles (operating cycles/h)		op. c./h		300	

1) UL listing is pending

Contactors KNL43UL - KNL75

Motor contactors

Electrical endurance

Diagram 1

Electrical endurance of motor contactors KNL43 - KNL75 – AC-3, AC-3e

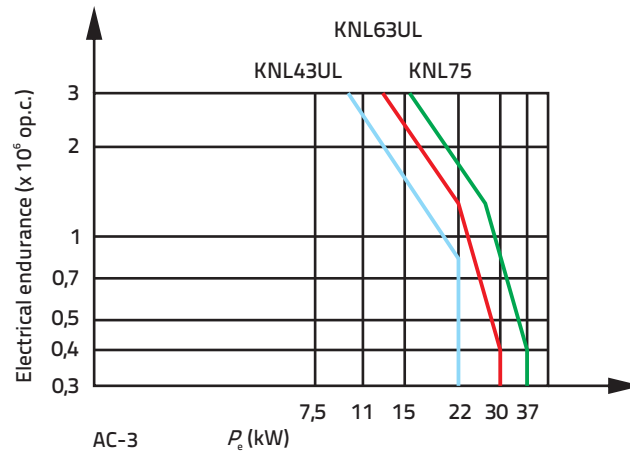
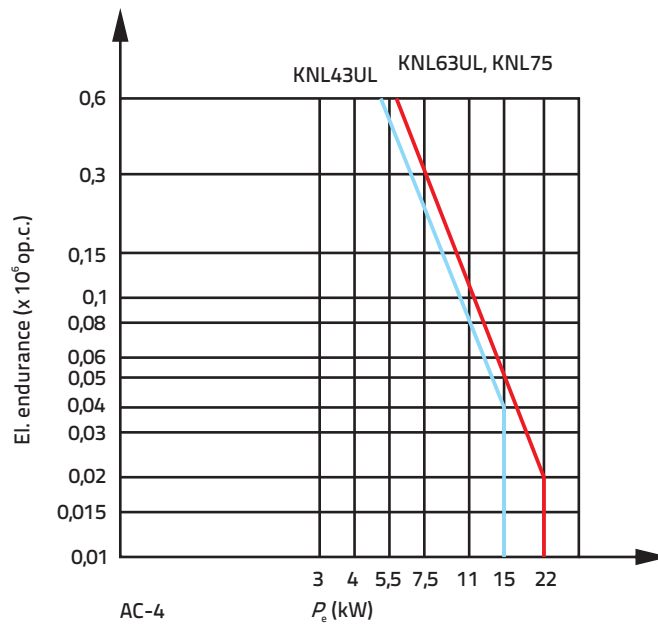
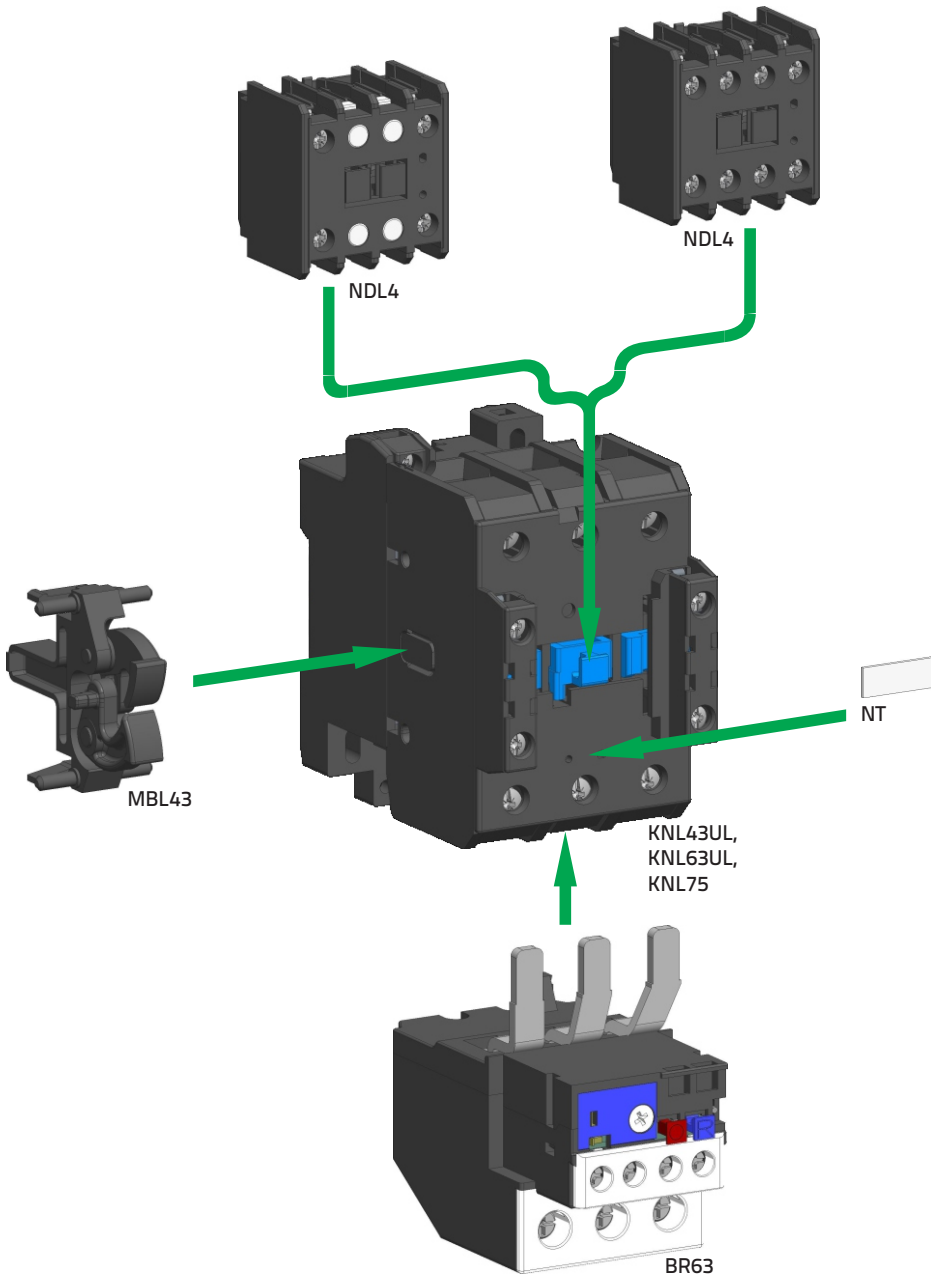


Diagram 2

Electrical endurance of motor contactors KNL43 - KNL75 – AC-4



Mounting positions of accessories



Contactors KNL43UL-KNL75

Accessories



Snap-on auxiliary switch blocks

TECHNICAL DATA

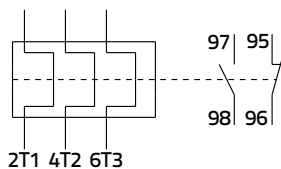
		Symbol	Unit	NDL4
GENERAL	Type			
	Standards			IEC/EN 60947-5-1, VDE 0660, UL 508
	Approvals			CE, UL, CSA
	For use with			KNL43UL, KNL63UL, KNL75
	Module width			2
	Number of poles			2 or 4
	Degree of protection			IP20
	Pollution degree			3
	Ambient temperature open		°C/°F	-25 ... +55/-13 ... 131
	closed			-25 ... +45/-13 ... 113
	Storage temperature		°C/°F	-30 ... +80/-22 ... 176
	Maximum altitude <i>U_i</i> and <i>U_e</i> is reduced for 1.2 % and <i>I_e</i> for 0.4 % for every additional 100 m		m	2,000
	Maximum operating frequency with no load		op. c./h	3,000
	Mechanical endurance		op. c.	10,000,000
	Weight		g/lbs	70/0.154
	AUXILIARY CIRCUIT	Contact reliability		
Maximum back-up fuse for short-circuit protection gL and gG: coordination type 2				16
Rated insulation voltage		<i>U_i</i>	V	690
Rated impulse withstand voltage		<i>U_{imp}</i>	kV	6
Rated operational voltage		<i>U_e</i>	V	690
Rated frequency		<i>f</i>	Hz	60
Thermal current		<i>I_{th}</i>	A	16
Rated operational current for AC-15: single-phase 230 V		<i>I_e</i>	A	6
single-phase 400 V				4
single-phase 500 V				2
single-phase 690 V				1
Maximum operating frequency for AC-15			op. c./h	1.200
Electrical endurance for AC-15			op. c.	500.000
Switching of auxiliary loads acc. to standard UL and CSA				A600, N600
Rated operational current for DC-13: 1 pole ... 24 V DC/ 60 V DC/ 110 V DC/ 220 V DC			A	10 / 4 / 0.9 / 0.4
Maximum operating frequency for DC-13			op. c./h	1.200
Electrical endurance for DC-13			op. c.	500.000
Terminal capacity: rigid (solid and stranded)		S	mm ² / AWG	0.75 ... 4/18 ... 10
flexible				0.5 ... 2.5/20 ... 14
Length of removed wire insulation			mm/in	10/0.394
Screw			M3.5	
Screw head			PZ2	
Tightening torque		Nm/lb-in	1.4/12.4	

Thermal overload relay BR63

TECHNICAL DATA

		Symbol	Unit	BR63	
GENERAL	Type			BR63	
	Standards			IEC 60947-4-1, IEC 60947-5-1, UL508	
	Approvals			CE, UL	
	For use with			KNL43UL, KNL63UL, KNL75	
	Degree of protection			IP20	
	Ambient temperature operating		°C/°F	-5 ... +55/23 ... 131	
	storage			-25 ... +70/-13 ... 158	
	Dimensions (WxHxD)		mm/in	65 x 85.5 x 97.5/2.559 x 3.378 x 3.839	
	Operating position			vertical	
	Reset type			auto, manual	
MAIN CIRCUIT	Weight		g/lbs	350/0.77	
	Rated insulation voltage	U_i	V	690	
	Rated impulse withstand voltage	U_{imp}	kV	6	
	Rated operational voltage	U_e	V	690	
	Adjustable current	I_r	A	17 ... 97	
	Rated frequency	f	Hz	50/60	
	Overvoltage category / pollution degree acc. to IEC/EN 60947-1			III / 3	
	Trip class acc. to IEC/EN 60947-4-1			10	
	Sensitivity to phase failure			yes	
	Power loss at I_n	P	W	11 ... 15.5	
	Terminal capacity		mm ² /AWG	6 ... 35/10 ... 3	
	Conductor insulation stripping length		mm/in	12/0.472	
	Screw			M5	
	Screw head			PZ2	
	Tightening torque		Nm/lb-in	2.5/22.13	
	AUXILIARY CIRCUITS	Rated insulation voltage	U_i	V	690
		Rated impulse withstand voltage	U_{imp}	kV	6
		Rated operational voltage	U_e	V	AC: 600 ; DC: 250
		Overvoltage category / pollution degree acc. to IEC/EN 60947-1			III / 3
Thermal current (both contacts)		I_{th}	A	10	
Contact electrical rating				A600 / Q300	
Rated operational current AC-15					
120 V		both contacts	I_e	A	6
240 V					3
380 V					1.9
480 V					1.5
500 V					1.4
600 V					1.2
Rated operational current DC-13					
125 V		both contacts	I_e	A	0.55
250 V					0.27
Terminal capacity			mm ² /AWG		0.75 ... 2.5/18 ... 14
Conductor insulation stripping length			mm/in		8/0.315
Screw					M3.5
Screw head				PZ2	
Tightening torque		Nm/lb-in		0.8/7.08	

Connection diagram BR63



Contactors KNL43UL-KNL75

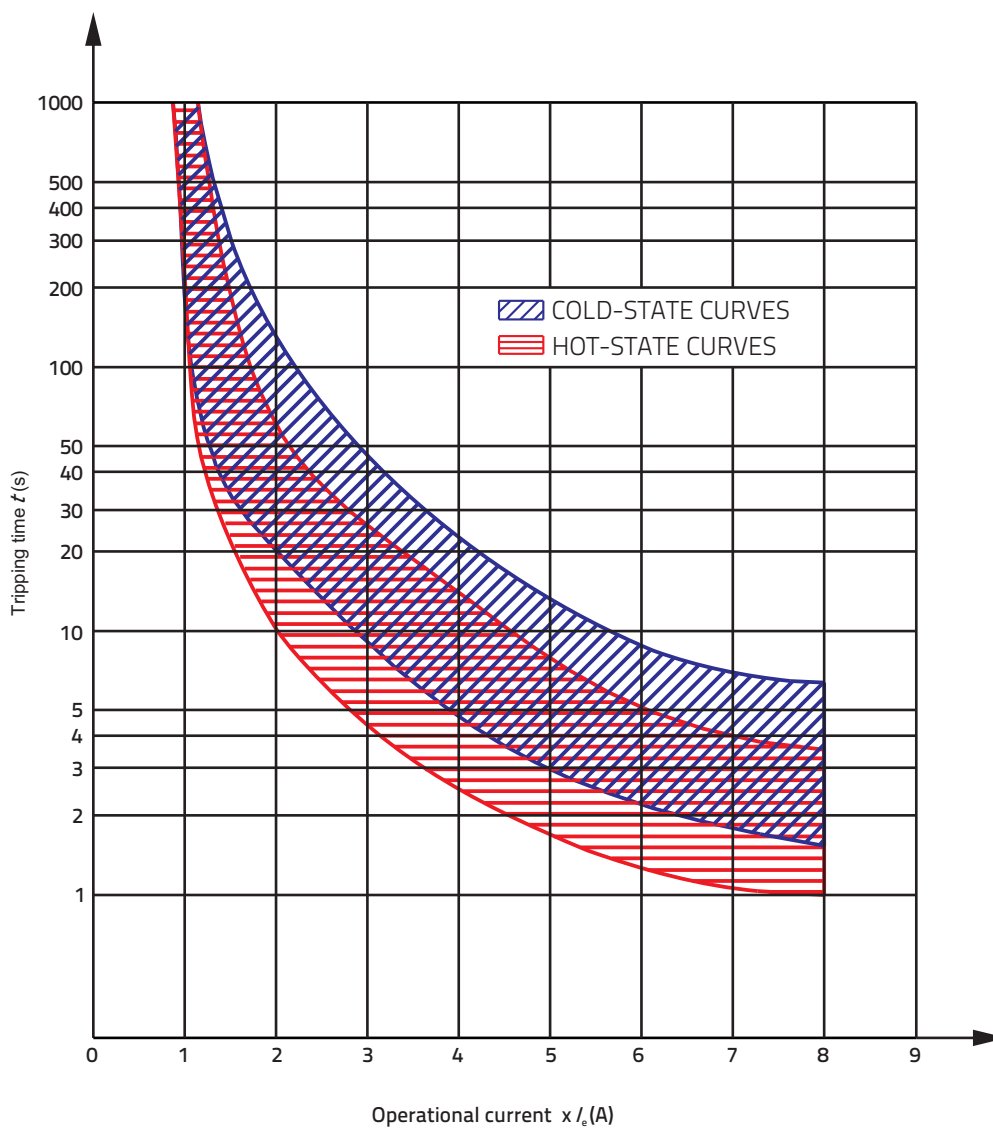
Accessories

Thermal overload relay BR63

Setting ranges and maximum permitted back-up fuses

Setting range (A)	Max. back-up fuse gL/gG (A)
17 - 25	100
24.5 - 36	100
35 - 47	125
45 - 60	150
58 - 75	200
72 - 90	250
77 - 97	250

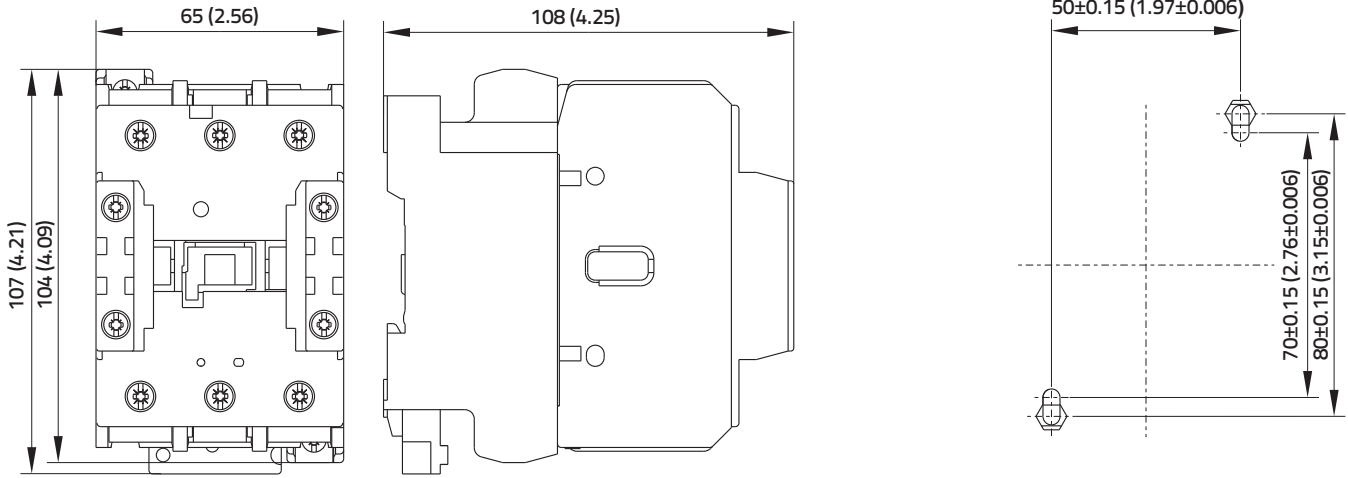
Tripping curve BR63



mm/(in)

KNL43UL ... KNL75

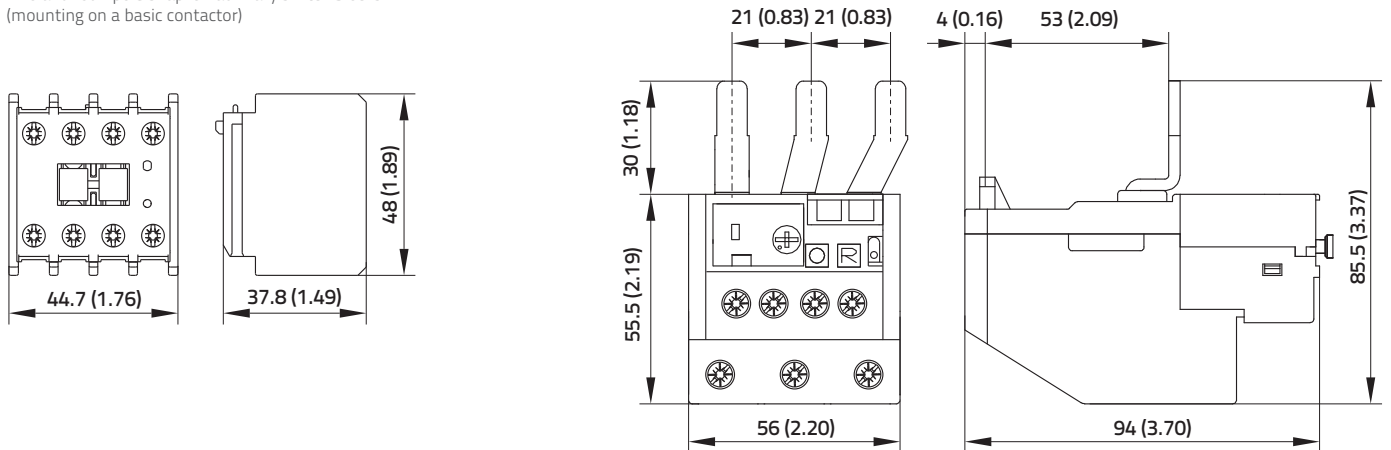
KNL43UL ... KNL75 - drilling plan



NDL4

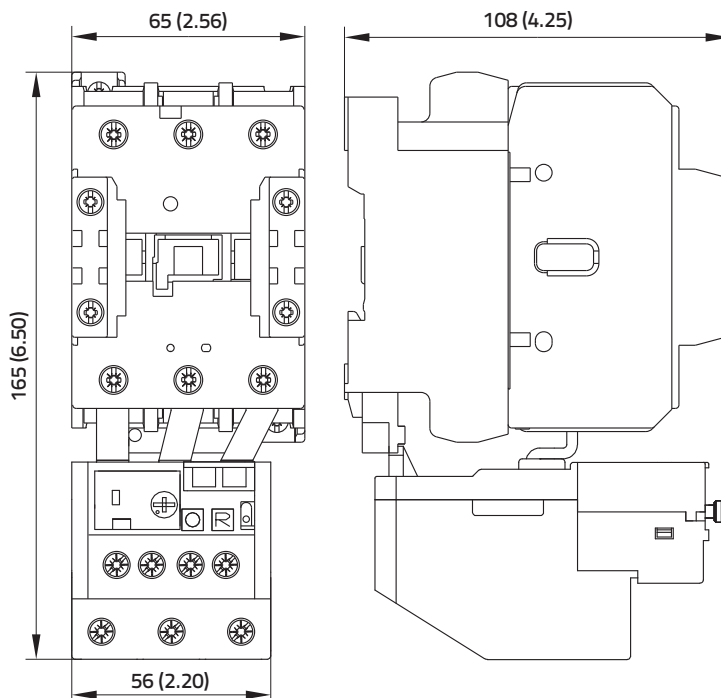
Two and four-pole snap-on auxiliary switch blocks
(mounting on a basic contactor)

BR63 thermal overload relay



KNL43UL ... KNL75 + BR63

Contactor + thermal overload relay





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