

Low Voltage Switchgear



Index

Contents:

Page

Contactors

K03, K07 Mini Contactors	2
BR6 Thermal overload relay	8
KNL6 - KNL30 Contactors	10
BR16, BR30 Thermal overload relay	17
KNL6G - KNL30G Contactors	19
KNL43, KNL 63 Contactors	23
BR63 Thermal overload relay	26
KNL80 - KNL110 Contactors	28
KNL95 - KNL630/1000 Contactors	31
KC12 - KC60 Capacitor Duty Contactor	37
IKA20 - IK63 Installation Contactors	39
IKA20-R, IKA-25R Installation Contactors	48
IKN Auxiliary Switch	52
IKA20 - IK63 Installation Contactors with UL certificates	53
IKN Auxiliary Switch with UL certificates	58
BI Bistable Switch	59

Motor Protection Switches

MS20, MS25	63
MS18, MS32	69

Miniature Circuit Breakers

RI 20	76
RI 50	77
RI 60	79
RI 120	83
RV 60, RV 120 RS	85
Surface Mounted (INO) and Flush Munted (IPO) Compact Distribution Boards	86

Residual Current Circuit Breakers

FI, NFI	87
RFI2	89

Contactor Combinations

KMPL, KPL Direct on-line Starters	91
ZK Star-Delta Motor Starters	92
KO-LD, KNL-LD Combinations for Reversing	93
KMSPL Combination Starters	93
Direct on-line Starters up to 30 A	94
Reversing Starters up to 30 A	97
Star-Delta Starters up to 25 kW	100

Switch Disconnectors

DS	103
DSPV	110

Time Relays

TRE 701	112
TRE 702	113
TRE 703	114
TRE 704	115
TRE 705	116
TRE 706	117

Accessories

Conection cabinets	118
Multi-functional adapters	119

NOTE: Data about OVERVOLTAGE PROTECTION and MOULDED CASE CIRCUIT BREAKERS can be found in separated brochures.
General sales conditions can be found on our website (www.iskra-mis.si)

Contactors

MINI CONTACTORS

K03C, K07C, K07CG (DC), K07CF, K03M, K07M, K07MG (DC), K07MF, K07CX, K0CGX (DC), K07MX, K07MGX (DC)



- Contactors are used for switching electric motors and other resistive, inductive and capacitive loads
- A wide variety of snap-on auxiliary switch blocks and accessories
- Uniform marking of terminals in accordance with the EN 50005 and EN 50011 European standards
- Quick assembly to a 35 mm wide mounting rail in accordance with EN 60715 or fixing with two screws
- Open and funnel-shaped connection terminals - fast and simple connection
- High contact reliability at low voltages
- Possibility of individual marking on a special plate - easy identification of a contactor in the circuit
- Two contactor widths: 35 and 45 mm
- Optional operating position
- AC or real DC drive with low consumption
- Possibility of direct connection of the BR6 bimetal relay for protection against overload and in case of phase failure
- Version with all four main contacts (Sp4)
- Degree of protection IP20
- High electrical and mechanical endurance, and high switching capacity
- K07CF and K07MF are contactors for fast-on connection
- K07CX, K07CGX, K07MX and K07MGX are contactors with soldering pins
- Technical data for K07MF and K07MX are identical to K07M
- Technical data for K07MGX are identical to K07MG
- Technical data for K07CX are identical to K07C
- Technical data for K07CGX are identical to K07CG

TECHNICAL DATA				MOTOR CONTACTORS		
GENERAL	Type			K03M	K07M	K07MG
	Standards			IEC/EN 60947-5-1, IEC/EN 60947-4-1, UL 508		
	Approvals (K07CX, K07CGX, K07MX, K07MGX are without approvals)			UL, CSA, EAC		
	Climatic class			constant damp heat (IEC 60068-2-78) cyclic damp heat (IEC 60068-2-30)		
	Ambient temperature	open closed	°C	-20 ... +60 -20 ... +45		
	Storage temperature		°C	-30 ... +80		
	Contact reliability			17 V; ≥ 50 mA		
	Mechanical endurance		op. c.	10 ⁷		
	Power dissipation per pole		W	1.2		
	Max. mechanical operating frequency with no load		op. c./h	3000		
	Max. electrical operating frequency AC-1/AC-3/AC-15/DC-13		op. c./h	600/600/1200/1200		
	Weight		kg	0.16	0.18	0.22
MAIN CIRCUIT	Rated insulation voltage		U_i V	690		
	Thermal current		I_{th} A	20		
	Rated frequency		f Hz	50/60		
	Rated power	230 V 400 V 500 V 690 V	P_e kW	7.5 13 17.5 22		
	Rated operational current	up to 50°C open up to 60°C open		20 16		
	Rated motor power	single-phase		0.75 1.5 2.2 3 4		
		230 V		1.1 3 5.5 5.5 5.5		
		400 V				
		500 V				
		690 V				
		three-phase				

Contactors

MINI CONTACTORS

K03C, K07C, K07CG (DC), K07CF, K03M, K07M, K07MG (DC), K07MF, K07CX, K0CGX (DC), K07MX, K07MGX (DC)

TECHNICAL DATA						MOTOR CONTACTORS		
MAIN CIRCUIT	Type					K03M	K07M	K07MG
	Rated operational motor current	single-phase	230 V	I_e	A	8	10	10
			230 V			6.3	11.5	11.5
		three-phase	400 V			5	11.3	11.3
			500 V			5.3	9	9
			690 V			4.9	6.5	6.5
	Rated motor power acc. to UL	single-phase	115 V	P_e	HP	1/3	1/2	1/2
			230 V			3/4	1 1/2	1 1/2
		three-phase	230 V			2	3	3
			460 V			3	5	5
			575 V			5	7 1/2	7 1/2
	Electrical endurance of contacts AC-1 / AC-3				op. c.	0.2 x 10 ⁶ / diagram 2		
	Max. back-up fuse for short-circuit protection gL Coordination type 2			I_v	A	25		
Terminal capacity		rigid	S	mm ²	0.75 ... 2.5			
		flexible			0.5 ... 2.5			
Screw					M3.5			
Screw head					PZ2			
Tightening torque				Nm	1.2			
AUXILIARY CIRCUIT	Rated insulation voltage			U_i	V	690		
	Thermal current			I_{th}	A	20		
	Rated operational current	230 V		I_e	A	6		
		400 V				4		
		500 V				2		
		690 V				1		
	Rated operational current		24 V		I_e	A	4	
	DC-13		110 V				0.25	
	Max. back-up fuse for short-circuit protection gL Coordination type 2			I_v	A	20		
	Terminal capacity		rigid	S	mm ²	0.75 ... 2.5		
			flexible			0.5 ... 2.5		
	Screw					M3,5		
	Screw head					PZ2		
Tightening torque				Nm	1.2			
MAGNETIC SYSTEM	Coil consumption	switch-on	P_c	VA	39		–	
				W	34		3	
		operation		VA	8.1		–	
				W	4		3	
	Make / Break delay	make	ms	NO	10 - 15	10 - 10	25 - 30	
				NC	10 - 15	10 - 15	8 - 10	
		break		NO	6 - 15	5 - 10	7 - 10	
				NC	6 - 15	6 - 15	10 - 25	
	Range of control voltage			U_c	%	85 ... 110		
	Control voltages			U_c	V	6 - 415	6 - 690	6 - 250
	Terminal capacity		rigid	S	mm ²	0.75 ... 2.5		
			flexible			0.5 ... 2.5		
	Screw					M3.5		
	Screw head					PZ2		
	Tightening toraue				Nm	1.2		

Contactors

MINI CONTACTORS

K03C, K07C, K07CG (DC), K07CF, K03M, K07M, K07MG (DC), K07MF, K07CX, K0CGX (DC), K07MX, K07MGX (DC)

TECHNICAL DATA				CONTACTOR RELAYS		
GENERAL	Type			K03C	K07C	K07CG
	Standards			IEC/EN 60947-5-1, UL 508		
	Approvals			UL, CSA, EAC		
	Climatic class			constant damp heat acc. to IEC 60068-2-78 cyclic damp heat acc. to IEC 60068-2-30		
	Ambient temperature	open	°C	-20 ... +60		
		closed		-20 ... +45		
	Storage temperature		°C	-30 ... +80		
	Mechanical endurance		op. c.	10 ⁷		
	Max. mechanical operating frequency with no load		op. c./h	3000		
	Max. electrical operating frequency AC-15/DC-13		op. c./h	1200/1200		
	Weight		kg	0.16	0.18	0.22
MAIN CIRCUIT	Rated insulation voltage	U_i	V	690		
	Thermal current	I_{th}	A	20		
	Rated operational current	I_e	A	6		
	400 V			4		
	500 V			2		
	690 V			1		
	Rated operational current	I_e	A	4		
	24 V			0.25		
	DC-13					
MAIN CIRCUIT	Electrical endurance AC-15		op. c.	diagram 1		
	Max. back-up fuse for short-circuit protection gL Coordination type 2	I_v	A	20		
	Coil consumption	P_c	VA	39		–
			W	34		3
			VA	8.1		–
			W	4		3
	Range of control voltage	U_c	%	85 ... 110		
	Control voltages	U_c	V	6 - 415	6 - 690	6 - 250
	Terminal capacity	S	mm ²	0.75 ... 2.5		
				0.5 ... 2.5		
MAIN CIRCUIT	Screw			M3.5		
	Screw head			PZ2		
	Tightening torque		Nm	1.2		

Standard control voltages and designations (AC)

V	24	42	48	110/125	220/240	380/415	440	500
50/60 Hz	B7	D7	E7	F7	M7	Q7	R7	S7

Standard control voltages and designations (DC)

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

Contactors

MINI CONTACTORS

K03C, K07C, K07CG (DC), K07CF, K03M, K07M, K07MG (DC), K07MF, K07CX, K0CGX (DC), K07MX, K07MGX (DC)

ELECTRICAL ENDURANCE

Diagram 1

Electrical endurance of contactor relays and auxiliary contacts of motor contactors

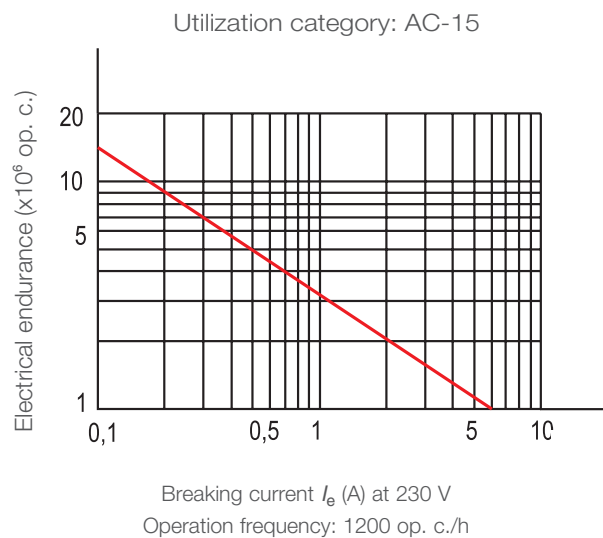
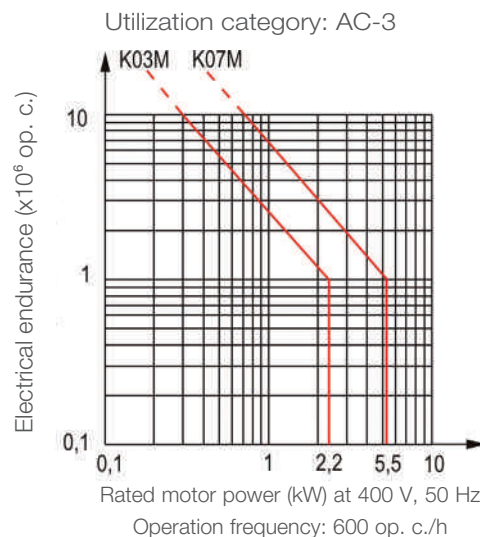


Diagram 2

Electrical endurance of main contacts of motor contactors



CONTACT ARRANGEMENTS

CONTACTOR RELAYS

Type	Arrangement of contacts and terminal designation
K03C -22 K07C -22 K07CG -22 K07CF -22 K07CX -22 K07CGX -22	
K03C -31 K07C -31 K07CG -31 K07CF -31 K07CX -31 K07CGX -31	
K03C -40 K07C -40 K07CG -40 K07CF -40 K07CX -40 K07CGX -40	

MOTOR CONTACTORS

Type	Arrangement of contacts and terminal designation
K03M -01 K07M -01 K07MG -01 K07MF -01 K07MX -01 K07MGX -01	
K03M -10 K07M -10 K07MG -10 K07MF -10 K07MX -10 K07MGX -10	
K03M -10 Sp4 K07M -10 Sp4 K07MG -10 Sp4	
K07M -22 Sp4 K07MG -22 Sp4	
K07M -04 Sp4 K07MG -04 Sp4	
K07M -01 Sp4 K07MG -01 Sp4	

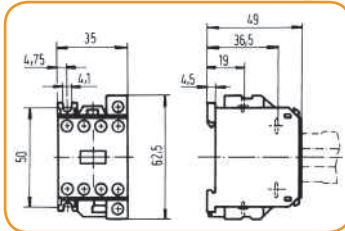
Contactors

MINI CONTACTORS

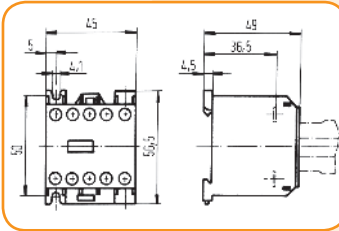
K03C, K07C, K07CG (DC), K07CF, K03M, K07M, K07MG (DC), K07MF, K07CX, K0CGX(DC), K07MX, K07MGX(DC)

DIMENSIONS

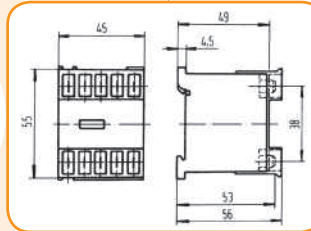
K03C, K03M



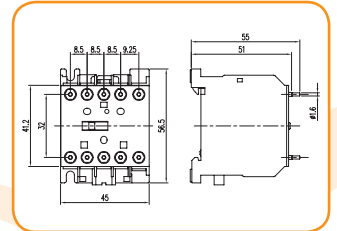
K07C, K07M, K07CG, K07MG



K07CF, K07MF



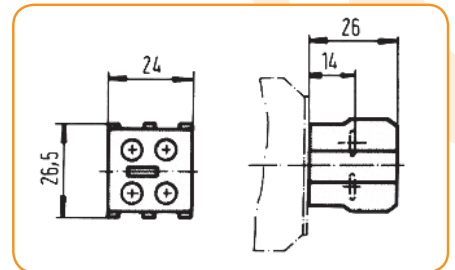
K07CX, K07CGX, K07MX, K07MGX



ACCESSORIES



ND2 - Two-pole snap-on auxiliary switch blocks



ND2C-02



ND2C-11



ND2C-20



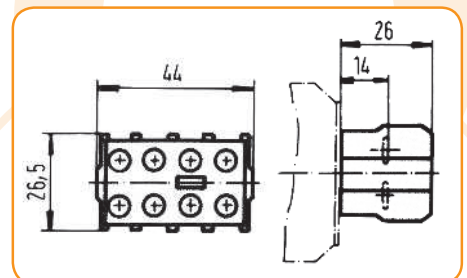
ND2M-02



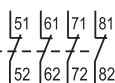
ND2M-11



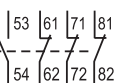
ND4 - Four-pole snap-on auxiliary switch blocks



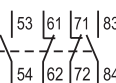
ND4C-04



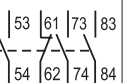
ND4C-13



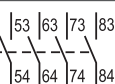
ND4C-22



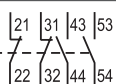
ND4C-31



ND4C-40



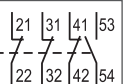
ND4M-22



ND4M-31



ND4M-13



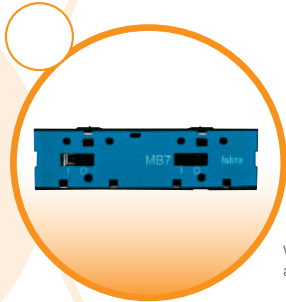
Contactors

MINI CONTACTORS

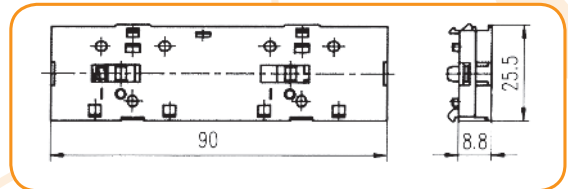
K03C, K07C, K07CG (DC), K07CF, K03M, K07M, K07MG (DC), K07MF, K07CX, K0CGX (DC), K07MX, K07MGX (DC)

ACCESSORIES

Type	Version	Rated operational current I_e (A) at AC-15			
		230 V	400 V	500 V	690 V
ND2	-20, -02, -11	6	4	2	1
ND4	-40, -04, -13, -31, -22	6	4	2	1

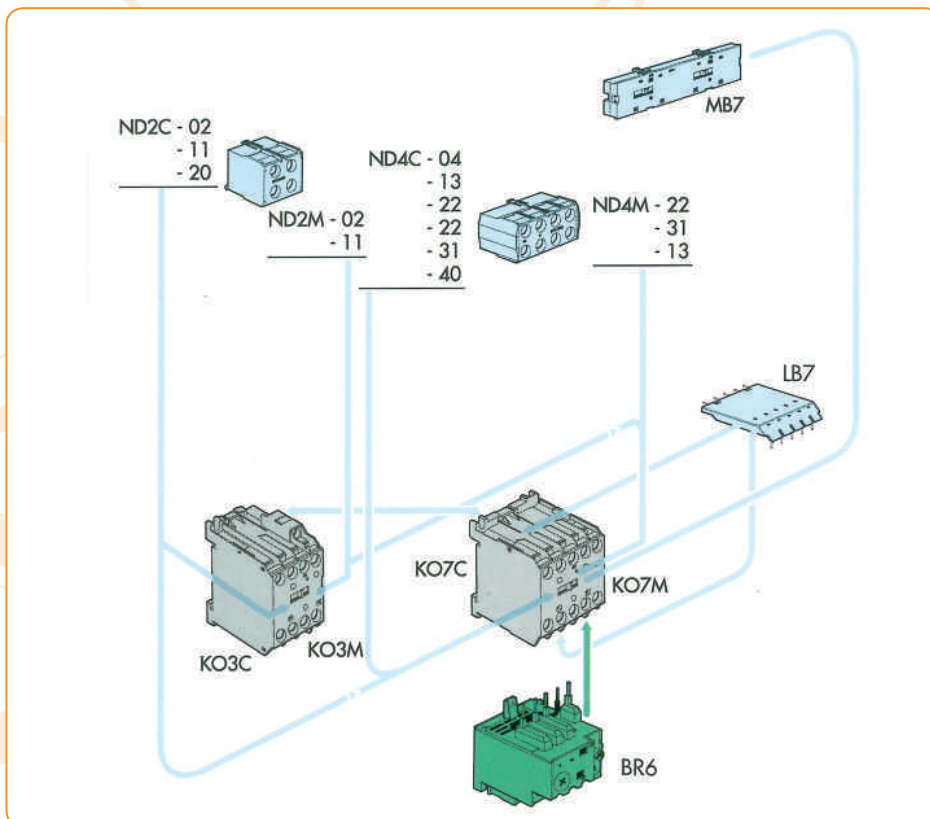


MB7 - Mechanical interlock



When a mechanical interlock is used, the minimum time of 50 ms is required from switching off the first contactor to switching on the second contactor and vice versa.

MOUNTING POSITIONS OF ACCESSORIES

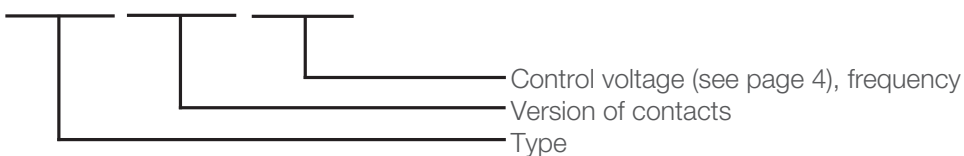


ORDERING DATA

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: ND2M-22

K07M - 01 - M7



Contactors

THERMAL OVERLOAD RELAY

BR6



- A three-pole relay for use with K07C, K07CG, K07M, K07MG mini contactors
- Used for overload protection of motors with operational currents up to 14 A and operational voltages up to 690 V AC
- Electrically isolated auxiliary contacts
- A RESET button provided with elements enabling selection between a manual and automatic mechanism and contacts reset to initial position
- A double trip lever enables sensitivity to phase failure in accordance with IEC/EN 60947-4-1
- Degree of protection IP20
- A scale for setting the motor operational current

Setting ranges and maximum permitted back-up fuses

Setting range (A)	Max. back-up fuse gL/gG For coordination "1": (A)	Max. back-up fuse gL/gG For coordination "2": (A)
0.11 - 0.16	20	0.5
0.16 - 0.25	20	1
0.25 - 0.4	20	2
0.4 - 0.6	20	2
0.6 - 0.9	20	4
0.9 - 1.3	20	4
1.3 - 1.9	20	6
1.9 - 2.8	20	6
2.8 - 4	20	10
4 - 6	20	10
6 - 9	20	16
8 - 11	25	20
11 - 14	35	25

Contactors

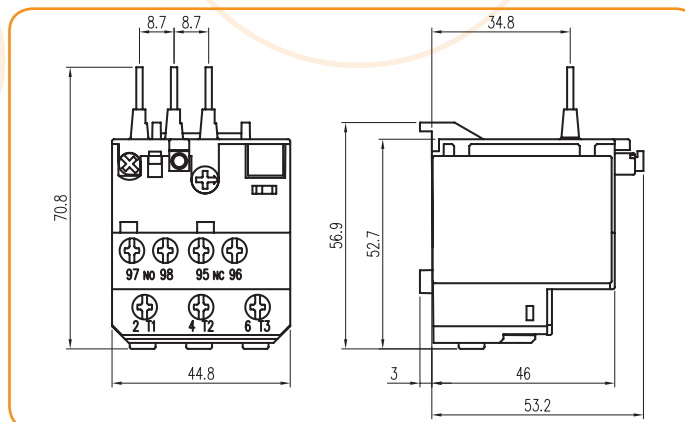
BR6 THERMAL OVERLOAD RELAY

BR6

TECHNICAL DATA

GENERAL	Type			BR6
	Standards			IEC/EN 60947-4-1, IEC/EN 60947-5-1, UL 508
	Ambient temperature	open	°C	-25 ... +50
		closed	°C	-25 ... +40
	Storage temperature		°C	-25 ... +70
	Terminal capacity	solid or stranded	mm ²	1 x 0.75 ... 2 x 2.5
		flexible		1 x 0.75 ... 2 x 2.5
		flexible with end sleeve		1 x 0.5 ... 2 x 1.5
	Screw			M 3.5
	Screw head			PZ 2
MAIN CIRCUIT	Tightening torque		Nm	1.0
	Weight		kg	0.08
	Rated insulation voltage	U_i	V	690
	Rated impulse withstand voltage	U_{imp}	kV	6
	Rated operational voltage	U_e	V	690
	Rated frequency		Hz	0 ... 400
	Adjustable current		A	0.11 - 14 (13 ranges)
	Overvoltage category / pollution category			III / 3
AUXILIARY CIRCUIT	Trip class acc. to IEC/EN 60947-4-1			10
	Power loss			approx. 2W / pole
	Rated insulation voltage	U_i	V	690
	Rated impulse withstand voltage	U_{imp}	kV	6
	Rated operational voltage	U_e	V	500 V AC, 220 V DC
	Overvoltage category / pollution degree			III / 3
	Thermal current	I_{th}	A	6
	Rated operational currents	220/240 V	I_e	0.5
	make contact	380/415 V		0.5
		500 V		0.3
	AC-15	220/240 V	I_e	1.5
	break contact	380/415 V		0.7
		500 V		0.5
	Rated operation currents	24 V	I_e	0.9
	both contacts	60 V		0.75
		110 V		0.4
	DC-13	220 V		0.2

DIMENSIONS



Contactors

KNL CONTACTORS

KNL6, KNL9, KNL12, KNL16, KNL18, KNL22, KNL30



- Contactors are used for switching electric motors and other resistive inductive and capacitive loads
- A wide variety of snap-on auxiliary switch blocks and accessories
- Uniform marking of connection terminals in accordance with EN 50005 and EN 50011
- Quick assembly to a 35 mm wide mounting rail in accordance with EN 60715 or fixing with screws
- KNL6 - KNL18 are 4-pole and KNL22 - KNL30 are 3-pole contactors
- Open and funnel-shaped connection terminals - fast and simple connection
- Plus/minus screws, protected against falling out - standard or posidrive screwdrivers can be used
- High contact reliability at low voltages
- Possibility of individual marking on a special plate - easy identification of a contactor in the circuit
- Auxiliary contact with a pushbutton function
- Uniform contactor width - 45 mm
- Assembly to vertical or horizontal surface with $\pm 20^\circ$ deviation
- Third coil terminal
- Possibility of direct connection of a bimetal relay for protection against overload and in case of phase failure
- Version with all four main contacts (Sp4) (KNL9 - KNL18)
- Degree of protection IP20
- High electrical and mechanical endurance, and high switching capacity
- Existing version KNL18 St4 for utilization category AC-6b (300 uF)

TECHNICAL DATA				MOTOR CONTACTORS							
GENERAL	Type				KNL9	KNL12	KNL16	KNL18	KNL22	KNL30	
	Standards				IEC/EN 60947-4-1, IEC/EN 60947-5-1, UL 508						
	Approvals				UL, CSA (except for KNL18), EAC						
	Climatic category				constant damp heat acc. to IEC 60068-2-78 cyclic damp heat acc. to IEC 60068-2-30						
	Ambient temperature	open	°C	-25 ... +55							
		closed		-25 ... +45							
	Storage temperature			°C	-30 ... +80						
	Contact reliability				17 V ; ≥ 50 mA						
	Mechanical endurance			op. c.	10 ⁷						
	Max. mechanical operating frequency with no load			c/h	3000						
	Max. electrical operating frequency AC-3/AC-4/AC-15/DC-13/DC-1 to DC5/AC-6B			op. c/h	600/300/1200/1200/300/600						
	Weight			kg	0.3				0.32		
MAIN CIRCUIT	Rated insulation voltage		U_i	V	690						
	Thermal current at ≤ 40°C		I_{th}	A	25	25	25	32	35	35	
	Rated frequency		f	Hz	50/60						
	Rated motor power	single-phase	230 V	P_e	kW	1.5	1.5	2.2	2.2	2.2	3.7
			230 V			2.2	3	4	4	5.5	7.5
		three-phase	400 V			4	5.5	7.5	9	11	15
			500 V			5.5	5.5	7.5	9	11	15
			690 V			5.5	7.5	7.5	9	11	15
	Rated operational current	single-phase	230 V	I_e	A	12	12	17	17	17	28
			230 V			8.7	11.5	14.8	14.8	19.6	26.4
		three-phase	400 V			9	12	16	18	22	30
			500 V			9	9	12.1	14	17.4	23.4
			690 V			6.5	8.8	8.8	10	12.6	17
	Rated motor power		230 V	P_e	kW	0.75	1.1	1.5	1.5	2.2	4
		three-phase	400 V			1.5	2.2	3	3	4	6.5
			500 V			1.5	2.2	3	3	4	6.5
			690 V			1.5	2.2	3	3	4	6.5

Contactor versions: KNL6 (-40, -22, -31) KNL9-KNL18 (-10, -01, Sp4 -01, Sp4 -10) KNL9-KNL16 (Sp4 -22, Sp4 -04) KNL22- KNL30 (-00)

Contactors

KNL CONTACTORS

KNL6, KNL9, KNL12, KNL16, KNL18, KNL22, KNL30

TECHNICAL DATA					MOTOR CONTACTORS						
MAIN CIRCUIT	Type				KNL9	KNL12	KNL16	KNL18	KNL22	KNL30	
	Rated motor power according to UL	single-phase	115 V	P_e	HP	1	1	1½	1½	2	2
			230 V			2	2	3	3	3	5
	three-phase		230 V			3	3	5	5	7½	10
			460 V			5	5	7½	7½	15	20
			575 V			7½	7½	10	10	15	20
	Electrical endurance of contacts AC-3 / AC-4					op.c.	diagram 2 / diagram 3				
	Rated operational current at 24/110/220 V	DC-1	1 1) 2 1) 3 1)	I_e	A	15 / 6 / 4 18 / 12 / 8 20 / 15 / 10			28 / 7 / 4 30 / 23 / 13 32 / 25 / 20		
			1 1)			12 / 2 / 0.75			18 / 2 / 1		
	1) Number of poles in series	DC-3 – DC-5	2 1) 3 1)			15 / 8 / 1.5 18 / 12 / 6			23 / 13 / 2 28 / 18 / 9		
	Max. back-up fuse for short-circuit protection gL Coordination type 2			I_v	A	25	25	35	35	50	50
	Terminal capacity		rigid flexible	S	mm²	0.75 ... 6 0.5 ... 6			2.5 ... 10 1.5 ... 10		
Screw					M3.5			M4			
Screw head					PZ2			PZ2			
Tightening torque				Nm	1.4			1.8			
AUXILIARY CIRCUIT	Rated insulation voltage		U_i	V	690			–			
	Thermal current		I_{th}	A	20			–			
	Rated operational current	230 V	I_e	A	6			–			
		400 V			4			–			
		500 V			2			–			
		690 V			1			–			
	Rated operational current	24 V	I_e	A	10			–			
		60 V			4			–			
	DC-13	110 V			0.9			–			
		220 V			0.4			–			
	Max. back-up fuse for short-circuit protection gL Coordination type 2			I_v	A	20			–		
	Terminal capacity		rigid flexible	S	mm²	0.75 ... 6 0.5 ... 6			– –		
	Screw					M3.5			–		
Screw head					PZ2			–			
Tightening torque				Nm	1.4			–			
MAGNETIC SYSTEM	Coil consumption	switch-on	P_c	VA W	66 48						
		operation		VA W	8 2.5						
	Make / Break delay	make	NO NC	ms	10 - 20 15 - 25			10 - 20 –			
		break	NO NC		10 - 15 8 - 15			5 - 15 –			
			Range of control voltage		U_c	%	85 ... 110				
	Control voltages		U_c	V	12 ... 600						
	Terminal capacity		rigid flexible	S	mm²	0.75 ... 4 0.5 ... 2.5					
	Screw					M3.5					
	Screw head					PZ2					
	Tightening torque				Nm	1.4					

Contactors

KNL CONTACTORS

KNL6, KNL9, KNL12, KNL16, KNL18, KNL22, KNL30

TECHNICAL DATA				CONTACTOR RELAYS
GENERAL	Type			KNL6
	Standards			IEC / EN 60947-5-1, UL 508
	Approvals			UL, CSA, EAC
	Climatic class			constant damp heat (IEC 60068-2-78) cyclic damp heat (IEC 60068-2-30)
	Ambient temperature	open closed	°C	-25 ... +55 -25 ... +40
	Storage temperature		°C	-30 ... +80
	Mechanical endurance		op. c.	10 ⁷
	Max. mechanical operating frequency with no load		op. c./h	3000
	Max. electrical operating frequency AC-15/DC-13		op. c./h	1200/1200
	Weight		kg	0.3
MAIN CIRCUIT	Rated insulation voltage	U_i	V	690
	Thermal current	I_{th}	A	20
	Rated operational current	230 V	I_e	6
		400 V		4
	AC-15	500 V		2
		690 V		1
	Rated operational current	24 V	I_e	10
		60 V		4
	DC-13	110 V		0.9
		220 V		0.4
	Electrical endurance of contacts AC-15		op. c.	diagram 1
	Max. back-up fuse for short-circuit protection gL Coordination type 2	I_v	A	20
MAGNETIC SYSTEM	Coil consumption	switch-on operation	P_c VA W VA W	66 48 8 2.5
	Make / Break delay	make break	NO NC NO NC	10 - 15 15 - 20 10 - 15 8 - 15
	Rated control voltage limits for closing	U_c	%	85 ... 110
	Control voltages	U_c	V	12 ... 600
	Terminal capacity	rigid flexible	S mm ²	0.75 ... 4 0.5 ... 2.5
	Screw			M3.5
	Screw head			PZ2
	Tightening torque		Nm	1.4

Standard control voltages and designations (AC)

V	24	42	48	110/125	220/240	380/415	440	480/520
50/60 Hz	B7	D7	E7	F7	M7	Q7	R7	S7

Contactors

KNL CONTACTORS

KNL6, KNL9, KNL12, KNL16, KNL18, KNL22, KNL30

ELECTRICAL ENDURANCE

DIAGRAM 1

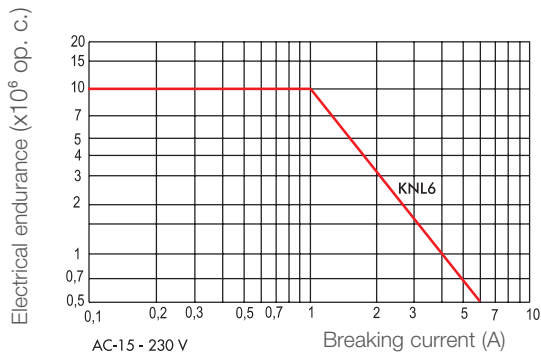


DIAGRAM 2

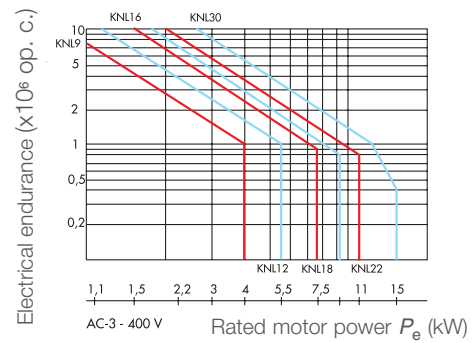
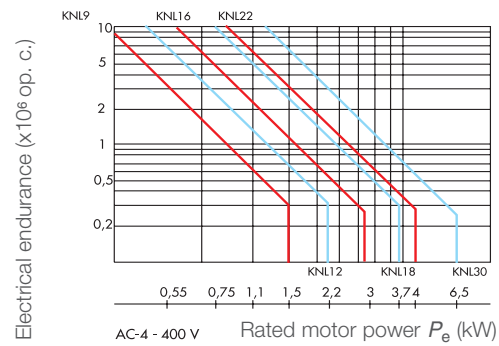
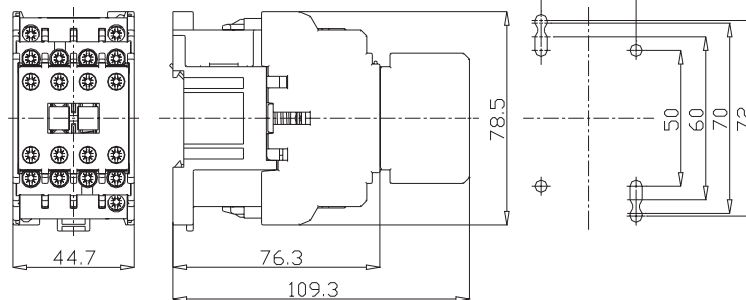


DIAGRAM 3

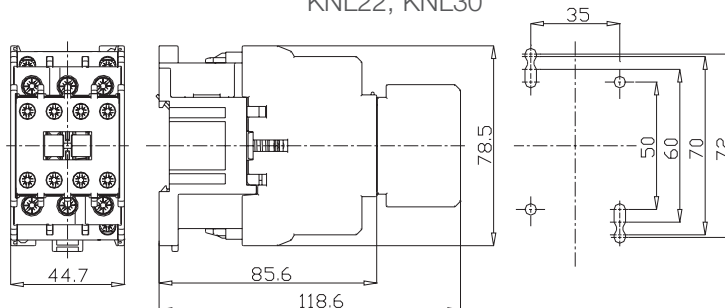


DIMENSIONS

KNL6, KNL9, KNL12, KNL16, KNL18



KNL22, KNL30



Contactors

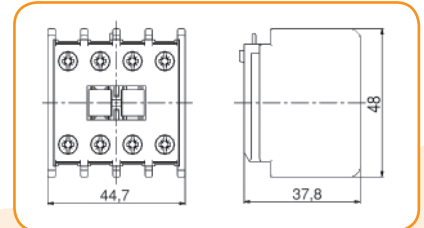
KNL CONTACTORS

KNL6, KNL9, KNL12, KNL16, KNL18, KNL22, KNL30

ACCESSORIES



NDL1, NDL1, NDL3 - Two- and four-pole snap-on auxiliary switch blocks (mounting on a basic contactor)

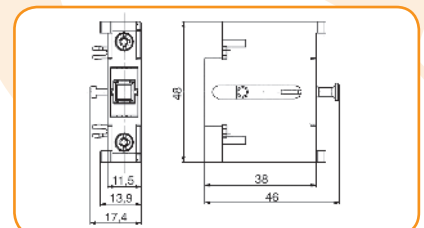


Type	Version	Rated operational current I_e (A) at AC-15			
		230 V	400 V	500 V	690 V
NDL1 (for KNL6)	-11, -02, -20, -22, -31, -13, -40, -04	6	4	2	1
NDL2 (for KNL9, KNL12, KNL16, KNL18)	-11, -02, -20, -22, -31, -13, -40, -04				
NDL3 (for KNL22, KNL30)	-11, -02, -20, -22, -31, -13, -40, -04				

NDL1-20		NDL1-11		NDL1-02		NDL1-40		NDL1-31	
NDL1-22		NDL1-13		NDL1-04		NDL2-11		NDL2-02	
NDL2-22		NDL2-31		NDL2-13		NDL2-40		NDL2-04	
NDL3-11		NDL3-02		NDL3-22		NDL3-31		NDL3-13	
NDL2-20		NDL3-20		NDL3-40		NDL3-04			



NPL1, NPL2 - Single-pole snap-on auxiliary switch for side mounting + push-button



Type	Version	Rated operational current I_e (A) at AC-15			
		230 V	400 V	500 V	690 V
NPL1 (only for KNL9, KNL12, KNL16, KNL18)	-10, -01	6	4	2	1
NPL2 (only for KNL22, KNL30)	-10, -01				

CONTACT ARRANGEMENTS

NPL1-10		NPL1-01		NPL2-10		NPL2-01	
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Contactors

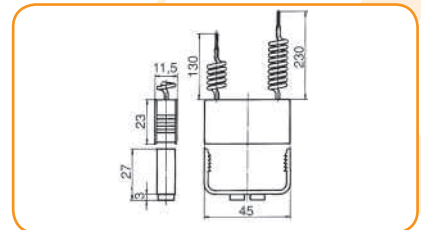
KNL CONTACTORS

KNL6, KNL9, KNL12, KNL16, KNL18, KNL22, KNL30

ACCESSORIES



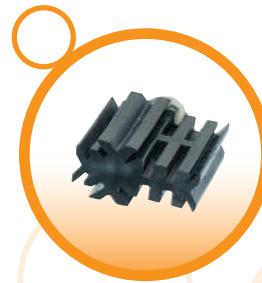
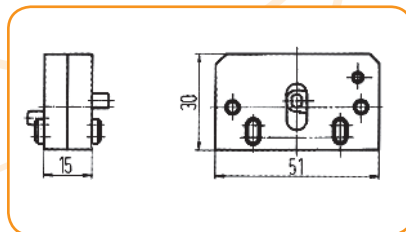
RC suppressor



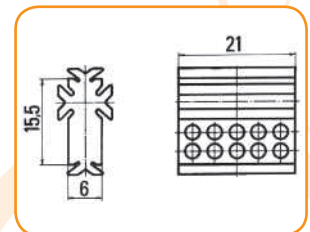
Type	RC1	RC2	RC3	RC4
Control voltage range U_c (V)	24 ... 48	48 ... 250	250 ... 380	380 ... 500



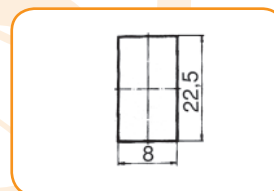
MBL mechanical interlock



DZ distance spacer



NT identification plate

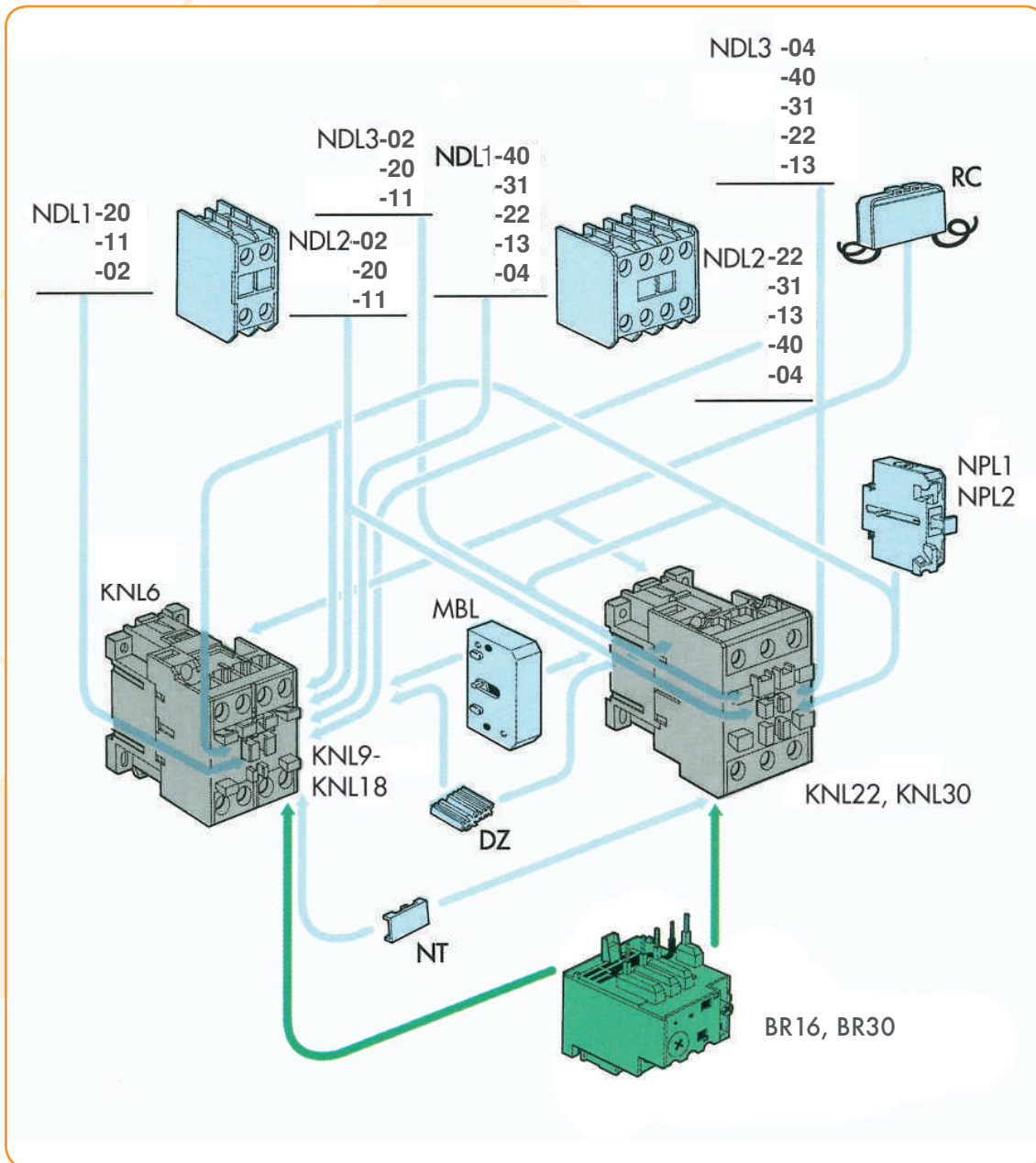


Contactors

KNL CONTACTORS

KNL6, KNL9, KNL12, KNL16, KNL18, KNL22, KNL30

MOUNTING POSITIONS OF ACCESSORIES



ORDERING DATA

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

KNL16-10 - M7

Control voltage
(see page 12), frequency
Type

Contactors

Thermal overload relays

BR16, BR30



- A three-pole overload relays for use with KNL6 to KNL30 and KNL6G to KNL30G contactors
- Used for overload protection of motors with operational currents up to 16 A (BR16) or 30 A (BR30) and operational voltages up to 690 V AC.
- Adjustable current setting
- Ambient temperature compensated
- Electrically isolated auxiliary contacts (1×NO and 1×NC)
- A RESET button provides both manual and automatic reset options
- A double trip lever provides sensitivity to phase loss in accordance with IEC/EN 60947-4-1.
- Degree of protection IP20

Setting ranges and maximum permitted back-up fuses

Type	Setting range (A)	Max. back-up fuse gL/gG (A)
BR16	0.1 - 0.16	1
	0.16 - 0.25	1
	0.25 - 0.4	1
	0.35 - 0.5	1
	0.45 - 0.63	1
	0.55 - 0.8	3
	0.75 - 1	3
	0.9 - 1.3	3
	1.1 - 1.6	3
	1.4 - 2	6
	1.8 - 2.5	6
	2.3 - 3.2	6
	2.9 - 4	10
	3.5 - 4.8	10
	4.5 - 6.3	15
	5.5 - 7.5	15
	7.2 - 10	25
	9 - 12.5	30
BR30	11.3 - 16	40
	15 - 20	50
	17.5 - 21.5	50
	21 - 25	60
	24.5 - 30	70

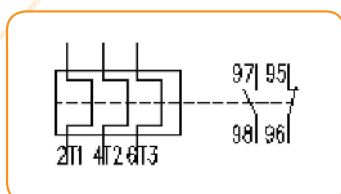
Contactors

Thermal overload relays

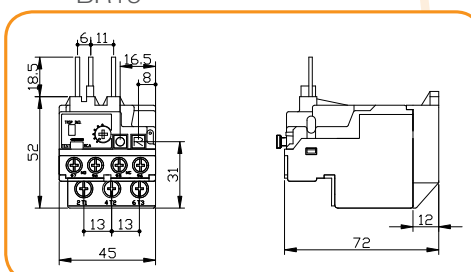
BR16, BR30

TECHNICAL DATA				THERMAL OVERLOAD RELAYS	
GENERAL	Type			BR16	BR30
	Standards			IEC / EN 60947-4-1, IEC / EN 60947-5-1, UL 508	
	Approvals			UL	
	For use with			KNL6-18, KNL6G-18G	KNL22, KNL30
	Ambient temperature	open	°C	-5 ... +55	
		closed		-5 ... +55	
	Terminal capacity		mm ²	1 ... 10 (main) 0.75 ... 2.5 (auxiliary)	
	Screw	main terminals auxiliary terminals		M 4 M3.5	
	Screw head			PZ2	
	Tightening torque	main terminals auxiliary terminals	Nm	1.2 0.8	
	Dimensions (W×H×D)		mm	45×70.5×60	45×69×60
	Weight		kg	0.115	
MAIN CIRCUIT	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 and pollution degree acc. to IEC/EN 60947-1			III / 3	
	Trip class acc. to IEC/EN 60947-4-1			10	
	Power loss	P	W	5...6.5 (depending on setting range)	
AUXILIARY CIRCUITS	Rated insulation voltage	U_i	V	690	
	Rated impulse withstand voltage	U_{imp}	kV	6	
	Rated operational voltage	U_e	V	up to 500 (AC) up to 230 (DC)	
	Overvoltage category and pollution degree acc. to IEC/EN 60947-1			III / 3	
	Thermal current (both contacts)	I_{th}	A	6	
	Rated operational currents (both contacts)				
	AC-15	230 V 400 V 500 V	I_e	A	3 2 1
	Rated operational currents (both contacts)	60 V 110 V 230 V	I_e	A	0.45 0.25 0.10

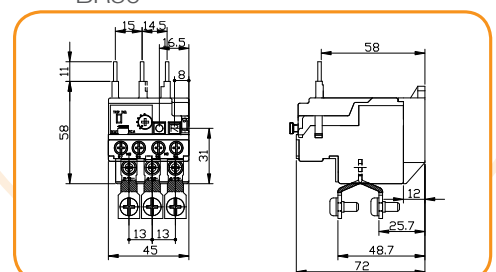
CONNECTION DIAGRAM



BR16



BR30



DIMENSIONS

Contactors

KNL CONTACTORS

KNL6G, KNL9G, KNL12G, KNL16G, KNL18G, KNL22G, KNL30G



- KNLG contactors are used for DC control voltages
- KNL6G contactor relays are mainly used for switching control and signal circuits, and KNL9G-KNL30G motor contactors are used for switching motors and other resistive, inductive and capacitive consumers
- Assembly to a 35 mm wide mounting rail in accordance with EN 60715 or fixing with screws
- Assembly to vertical or horizontal surface with $\pm 20^\circ$ deviation
- Degree of protection IP20

TECHNICAL DATA

GENERAL	Type					KNL6G	KNL9G	KNL12G	KNL16G	KNL18G	KNL22G	KNL30G
	Standards					IEC/EN 60947-4-1, IEC/EN 60947-5-1, UL 508						
	Approvals					EAC						
	Climatic category					constant damp heat acc. to IEC 60068-2-78 cyclic damp heat acc. to IEC 60068-2-30						
	Ambient temperature		open closed		°C	-25 ... +60 -25 ... +40						
	Storage temperature				°C	-30 ... +80						
	Contact reliability					17 V; ≥ 50 mA						
	Mechanical endurance				op. c.	5 x 10 ⁶						
	Max. mechanical operating frequency with no load				op. c/h	3000						
	Max. electrical operating frequency AC-3/AC-4/AC-15/DC-13/DC-1 to DC-5				op. c/h	600/300/1200/1200/300						
	Weight			NPLG/ NDLG	kg	0.335 / 0.385				0.36 / 0.41		
MAIN CIRCUIT	Rated insulation voltage			U_i	V	690						
	Thermal current			I_{th}	A	20	25	25	25	32	35	35
	Rated frequency			f	Hz	50/60						
	Rated motor power		single-phase 230 V	P_e	kW	—	1.5	1.5	2.2	2.2	2.2	3.7
	AC-3	three-phase	230 V			—	2.2	3	4	4	5.5	7.5
			400 V			—	4	5.5	7.5	9	11	15
			500 V			—	5.5	5.5	7.5	9	11	15
			690 V			—	5.5	7.5	7.5	9	11	15
	Rated operational current		single-phase 230 V	I_e	A	—	12	12	17	17	17	28
	AC-3	three-phase	230 V			—	8.7	11.5	14.8	14.8	19.6	26.4
			400 V			—	9	12	16	18	22	30
			500 V			—	9	9	12.1	14	17.4	23.4
			690 V			—	6.5	8.8	8.8	10	12.6	17
	Rated motor power		230 V	P_e	kW	—	0.75	1.1	1.5	1.5	2.2	4
	AC-4	three-phase	400 V			—	1.5	2.2	3	3	4	6.5
			500 V			—	1.5	2.2	3	3	4	6.5
			690 V			—	1.5	2.2	3	3	4	6.5
	Rated motor power acc. to UL		single-phase 115 V	P_e	HP	—	1	1	1½	1½	2	2
	three-phase	230 V	—			2	2	3	3	3	5	
230 V		—	3			3	5	5	7½	10		
460 V		—	5			5	7½	7½	15	20		
575 V		—	7½			7½	10	10	15	20		

Contactors

KNLG CONTACTORS

KNL6G, KNL9G, KNL12G, KNL16G, KNLG18G, KNL22G, KNL30G

TECHNICAL DATA					MOTOR CONTACTORS								
MAIN CIRCUIT	Type				KNL6G	KNL9G	KNL12G	KNL16G	KNL18G	KNL22G	KNL30G		
	Electrical endurance of contacts AC-3 / AC-4			op. c.	diagram1 (AC-15)	diagram 2 / diagram 3							
	Rated operational current at: 24/110/220 V	DC-1	1 ¹⁾	<i>I_e</i>	A	–	15 / 6 / 4				28 / 7 / 4		
			2 ¹⁾			–	18 / 12 / 8				30 / 23 / 13		
			3 ¹⁾			–	20 / 15 / 10				32 / 25 / 20		
		1 ¹⁾	–			12 / 2 / 0.75				18 / 2 / 1			
		1 ¹⁾ Number of poles in series	DC-3 – DC-5			2 ¹⁾	–	15 / 8 / 1.5				23 / 13 / 2	
						3 ¹⁾	–	18 / 12 / 6				28 / 18 / 9	
	Max. back-up fuse for short-circuit protection gL Coordination type 2			<i>I_v</i>	A	20	25	25	25	35	50	50	
	Terminal capacity		rigid flexible	S	mm ²	0.75 ... 6					2.5 ... 10		
						0.5 ... 6					1.5 ... 10		
	Screw					M3.5					M4		
Screw head					PZ 2					PZ 2			
Tightening torque				Nm	1.4					1.8			
AUXILIARY CIRCUIT	Rated insulation voltage			<i>U_i</i>	V	690					–		
	Thermal current			<i>I_{th}</i>	A	20					–		
	Rated operational current	230 V	<i>I_e</i>	A	6					–			
		400 V			4					–			
		500 V			2					–			
		690 V			1					–			
	Rated operational current	24 V	<i>I_e</i>	A	10					–			
		60 V			4					–			
		110 V			0.9					–			
		220 V			0.4					–			
	Max. back-up fuse for short-circuit protection gL Coordination type 2			<i>I_v</i>	A	20					–		
	Terminal capacity		rigid flexible	S	mm ²	0.75 ... 6					–		
						0.5 ... 6					–		
	Screw					M3.5					–		
Screw head					PZ 2					–			
Tightening torque				Nm	1.4					–			
MAGNETIC SYSTEM	Coil consumption		switch-on operation	<i>P_C</i>	W	110						3	
	Make / Break delay	make	NO	ms	15 - 20					15 - 20			
			NC		10 - 20					–			
		break	NO		5 - 10					5 - 10			
			NC		10 - 15					–			
	Range of control voltage			<i>U_C</i>	%	85 ... 110							
	Control voltage			<i>U_C</i>	V	12 ... 240							
	Terminal capacity		rigid flexible	S	mm ²	0.75 ... 4							
						0.5 ... 2.5							
	Screw					M3.5							
	Screw head					PZ 2							
Tightening torque				Nm	1.4								

Standard control voltages and designations (DC)

Volts	12	24	48	60	72	110	125	220	240
	JD	BD	ED	ND	SD	FD	GD	MD	MUD

Contactors

KNLG CONTACTORS

KNL6G, KNL9G, KNL12G, KNL16G, KNL18G, KNL22G, KNL30G

ELECTRICAL ENDURANCE

DIAGRAM 1

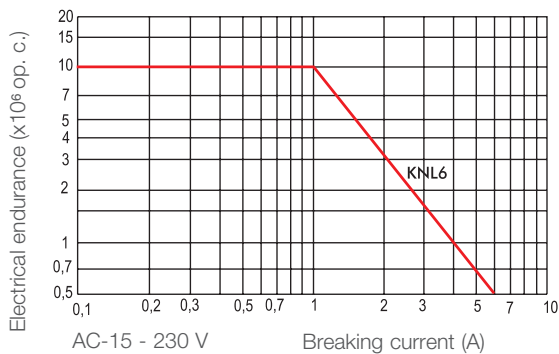


DIAGRAM 2

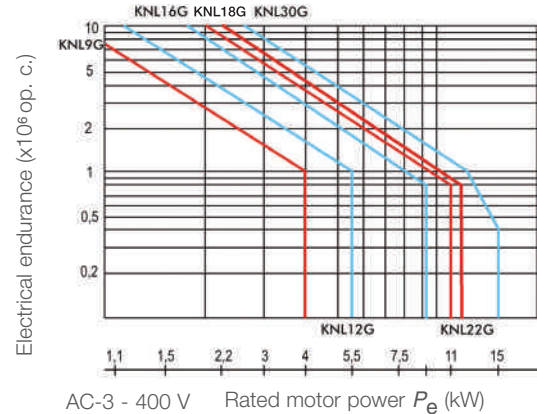
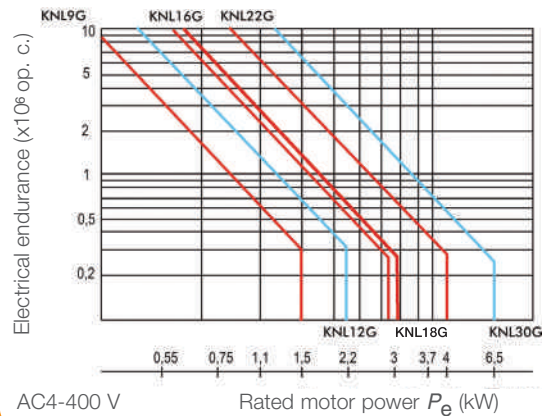
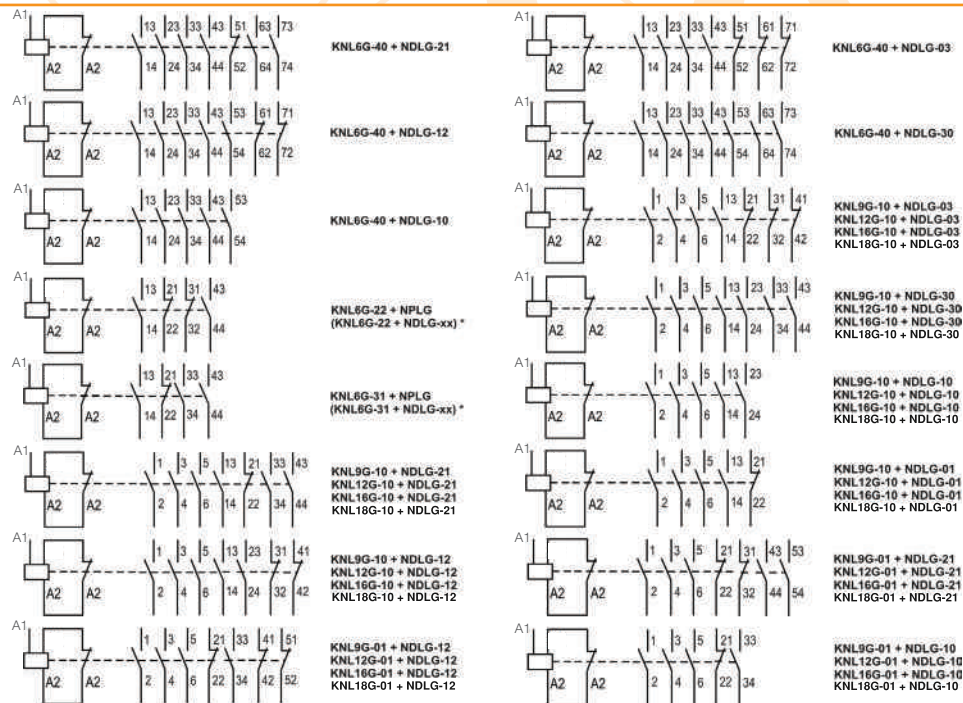


DIAGRAM 3



CONTACT ARRANGEMENTS

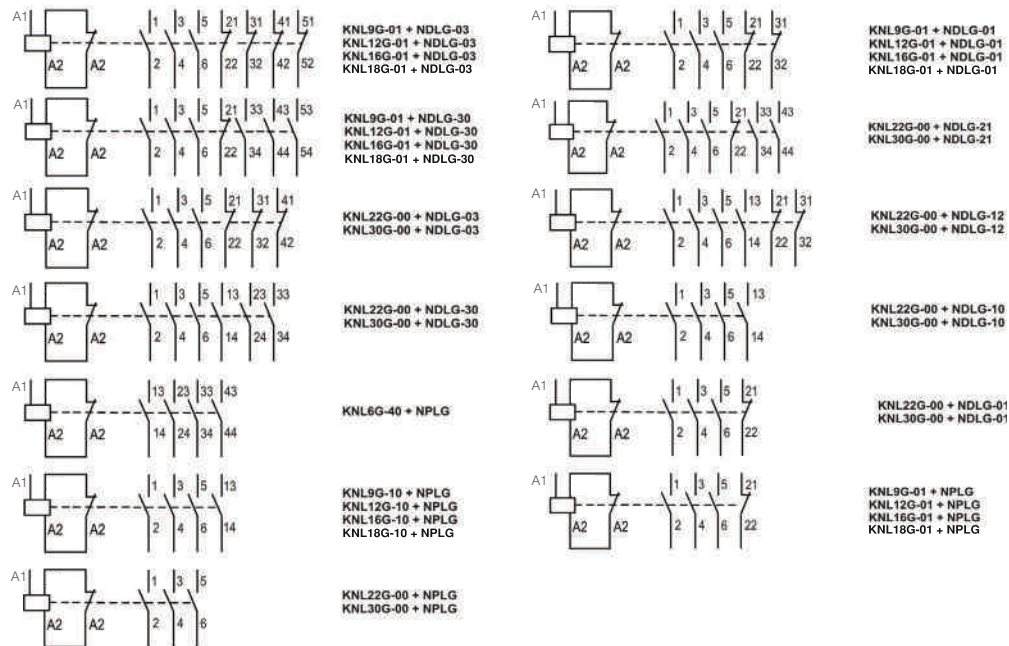


Contactors

KNLG CONTACTORS

KNL6G, KNL9G, KNL12G, KNL16G, KNL18G, KNL22G, KNL30G

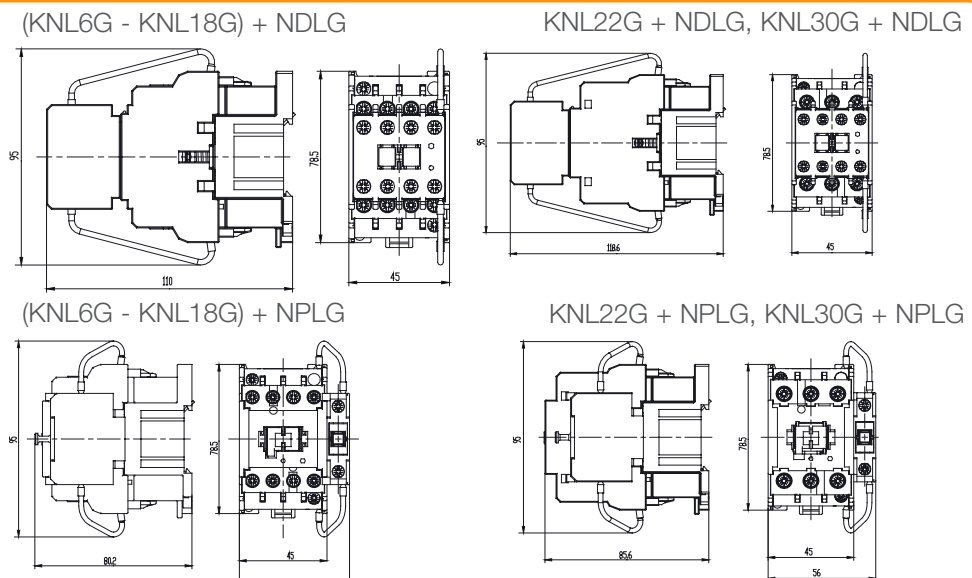
CONTACT ARRANGEMENTS



*Contactors in combination with NDLG can have the following versions of auxiliary contacts: 21, -12, -03, -30, -10, -01 -21, -12, -03, -30, -10, -01

Simultaneous application of NDLG+NPL and NDL+NPLG snap-on auxiliary switch blocks is available.

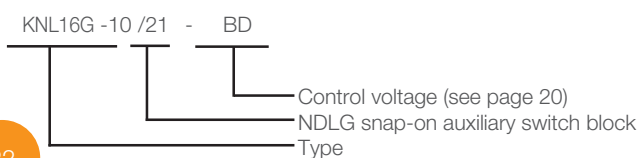
DIMENSIONS



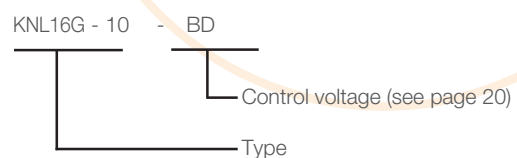
ORDERING DATA

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

KNLG + NDLG



KNLG + NPLG



Contactors

KNL CONTACTORS

KNL43, KNL63



- KNL43/63 contactors are mainly used for switching electric motors
- Possibility of direct connection of the BR63 bimetal relay for protection against overload and in case of phase failure
- Quick assembly to a 35 mm wide mounting rail in accordance with EN 60715
- Possibility of mounting the NDL4 snap-on auxiliary switch block with four auxiliary contacts
- Uniform marking of connection terminals in accordance with EN 50005 and EN 50011
- Use of the MBL43 mechanical interlock
- Degree of protection IP20

TECHNICAL DATA				MOTOR CONTACTORS	
GENERAL	Type			KNL43	KNL63
	Standards			IEC/EN 60947-4-1, IEC/EN 60947-5-1, IEC/EN 60947-1, UL 508	
	Approvals			UL, CSA, EAC	
	Ambient temperature	open	°C	-20 ... +60	
		closed	°C	-20 ... +45	
	Storage temperature		°C	-30 ... +80	
	Power dissipation per pole		W	5	6
	Mechanical endurance		op. c.	3 x 10 ⁶	
	Max. mechanical operating frequency with no load		c./h	3000	
	Max. electrical operating frequency AC-3/AC-4/AC-15/DC-13		c./h	600/300/1200/1200	
MAIN CIRCUIT	Weight		kg	0,93	
	Rated insulation voltage	U_i	V	690	
	Thermal current	I_{th}	A	75	85
	Rated frequency	f	Hz	50/60	
	Rated motor power	three-phase	230 V	12,5	15
			400 V	22	30
	AC-3		690 V	30	40
	Rated operational current	three-phase	230 V	45	63
			400 V	45	63
	AC-3		690 V	33	45
	Rated operational current	three-phase	400 V	15	22
	AC-4		690 V	18,5	25
	Electrical endurance AC-3 / AC-4		op. c.	diagram 1 / diagram 2	
	Max. back-up fuse for short-circuit protection gL Coordination type 2	I_v	A	80	125
	Terminal capacity	rigid	S	35	
		flexible		25	
	Screw			M6	
AUXILIARY CIRCUIT	Screw head			PZ2	
	Tightening torque		Nm	4	
	Rated insulation voltage	U_i	V	690	
	Thermal current	I_{th}	A	16	
	Rated operational current	230 V		6	
		400 V		4	
	AC-15	500 V		2	
		690 V		1	

Contactors

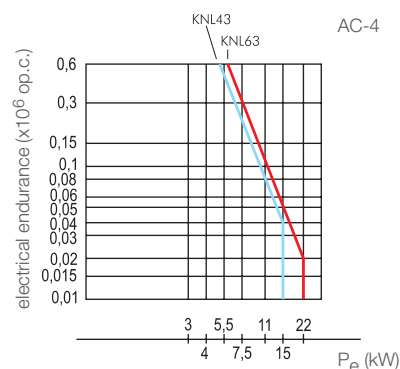
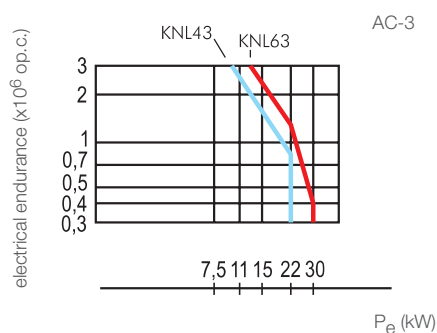
KNL CONTACTORS

KNL43, KNL63

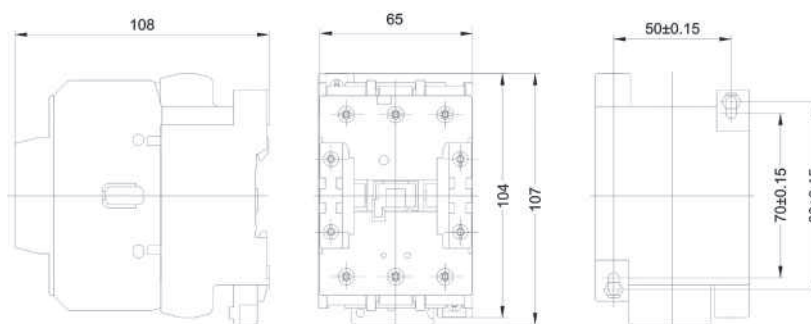
TECHNICAL DATA				MOTOR CONTACTORS	
AUXILIARY CIRCUIT	Type			KNL43	KNL63
	Rated operational current	24 V		4	
	DC-13	110 V	I_e	A	0.25
		220 V			0.1
	Max. back-up fuse for short-circuit protection gL Coordination type 2		I_v	A	10
	Terminal capacity	rigid flexible	S	mm ²	1 ... 2.5 1 ... 2.5
	Screw				M3.5
	Screw head				PZ 2
MAGNETIC SYSTEM	Tightening torque			Nm	0.8
	Coil consumption	switch-on	P_c	VA	130
				W	80
				VA	10
				W	3
	Make / brake delays	make		ms	10 - 20
		brake			8 - 15
	Range of control voltage		U_c	%	85 ... 110
	Control voltage		U_c	V	12 ... 500
	Terminal capacity	rigid	S	mm ²	1 ... 2.5
		flexible			1 ... 2.5
	Screw				M3.5
	Screw head				PZ 2
	Tightening torque			Nm	0.8

STANDARD CONTROL VOLTAGES AND DESIGNATIONS (AC)

V	24	42	48	220/240	380/415
50/60 Hz	B7	D7	E7	M7	Q7



DIMENSIONS



Contactors

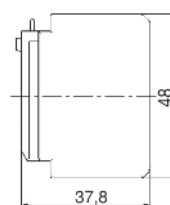
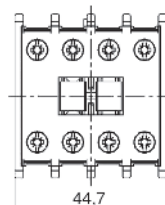
KNL CONTACTORS

KNL43, KNL63

ACCESSORIES

NDL4

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



Type	Version	Rated operational current I _e (A) at AC-15			
		230 V	400 V	500 V	690 V
NDL4	-11, -02, -20, -22, -31, -13, -40, -04	6	4	2	1

NDL4-11		NDL4-02		NDL4-22		NDL4-31		NDL4-13	
NDL4-40		NDL4-04		NDL4-20					



MBL43 Mechanical interlock

ORDERING DATA

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

KNL43/63 - 11 - M7 - 50/60

Frequency
Control voltage (see page 24)
Version of contacts
Type

Contactors

BR63 thermal overload relay



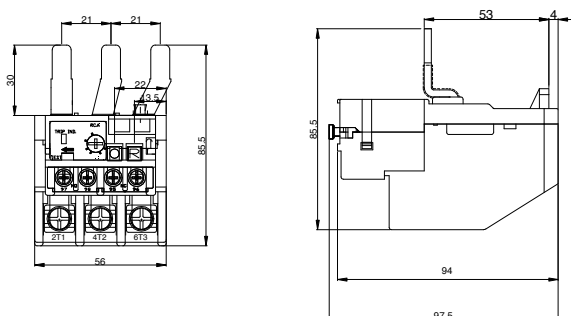
- A three-pole thermal overload relay for use with KNL43/63 contactors
- Used for overload protection of motors with operational currents up to 97 A and operational voltages up to 690 V AC
- Adjustable current setting
- Ambient temperature compensated
- Electrically isolated auxiliary contacts (1×NO, 1×NC)
- A RESET button provides both manual and automatic reset options
- A double trip lever provides sensitivity to phase loss in accordance with IEC/EN 60947-4-1.
- Degree of protection IP20

Setting ranges and maximum permitted back-up fuses

Type	Setting range (A)	Max. back-up fuse gL/gG (A)
BR63	17 - 25	100
	24.5 - 36	100
	35 - 47	125
	45 - 60	150
	58 - 75	200
	72 - 90	250
	77 - 97	250

DIMENSIONS

BR63

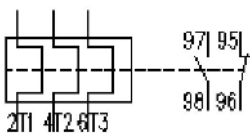


Contactors

BR63 thermal overload relay

TECHNICAL DATA				THERMAL OVERLOAD RELAYS
GENERAL	Type			BR63
	Standards			IEC / EN 60947-4-1, IEC / EN 60947-5-1, UL 508
	Approvals			UL
	For use with			KNL43/63
	Ambient temperature	open closed	°C	-5 ... +55 -5 ... +55
	Terminal capacity		mm ²	6...35 (main), 0.75...2.5 (auxiliary)
	Screw	main terminals auxiliary terminals		M 5 M 3.5
	Screw head	main terminals auxiliary terminals		PZ2
	Tightening torque	main terminals auxiliary terminals	Nm	2.5 0.8
	Dimensions (W×H×D)		mm	56x85.5x97.5
	Weight		kg	0.350
MAIN CIRCUIT	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 and pollution degree acc. to IEC/EN 60947-1			III / 3
	Trip class acc. to IEC/EN 60947-4-1			10
	Power loss at I_n	P	W	11...15.5 (depending on setting range)
AUXILIARY CIRCUITS	Rated insulation voltage	U_i	V	690
	Rated impulse withstand voltage	U_{imp}	kV	6
	Rated operational voltage	U_e	V	up to 600 (AC) up to 250 (DC)
	Overvoltage category and pollution degree acc. to IEC/EN 60947-1			III / 3
	Thermal current (both contacts)	I_{th}	A	10
	Rated operational currents (both contacts)			
	AC-15	120 V 240 V 380 V 480 V 500 V 600 V	I_e A	6 3 1.9 1.5 1.4 1.2
	Rated operational currents (both contacts)			
	DC-13	125 V 250 V	I_e A	0.55 0.27

CONNECTION DIAGRAM



Contactors

KNL CONTACTORS

KNL80, KNL90, KNL110



- Contactors are used for switching electric motors and other resistive, inductive and capacitive loads
- Possibility of fixing the snap-on auxiliary switch block with auxiliary contacts
- Possibility of connecting the BR90 thermal overload relay for protection against overload and in case of phase failure
- Assembly to a 35 mm or 75 mm wide mounting rail (EN 60715) or fixing with screws
- Degree of protection IP20, at extra installation of the G265 protection unit
- Fixing to the vertical or horizontal surface by $\pm 30^\circ$ deviation

TECHNICAL DATA					MOTOR CONTACTORS		
GENERAL	Type				KNL80	KNL90	KNL110
	Standards				IEC/EN 60947-1, IEC/EN 60947-4-1, UL 508		
	Approvals				UL, EAC		
	Ambient temperature		°C		-50 ... +70		
	Storage temperature		°C		-60 ... +80		
	Mechanical endurance		op. c.		15 x 10 ⁶		
	Max. mechanical operating frequency with no load		c./h		3600		
	Weight		kg		1.28		
MAIN CIRCUIT	Rated insulation voltage		U_i	V	690		
	Thermal current at $\leq 40^\circ\text{C}$		I_{th}	A	125	125	125
	Rated power at $\leq 40^\circ\text{C}$	230 V	P_e	kW	47	47	47
		400 V			82	82	82
	AC-1	500 V			108	108	108
		690 V			128	128	128
	Rated motor power at $\leq 55^\circ\text{C}$	3-fazno 230 V	P_e	kW	23	27.6	33
		400 V			41	50	61
	AC-3	500 V			56	56	59
		690 V			74	74	80
	Rate motor power acc. to UL	3-fazno 240 V	P_e	HP	30	30	40
		480 V			60	60	75
		600 V			75	75	100
	Rated motor power AC-4	≤ 400 V	P_e	kW	20	23	23

Contactors

KNL CONTACTORS

KNL80, KNL90, KNL110

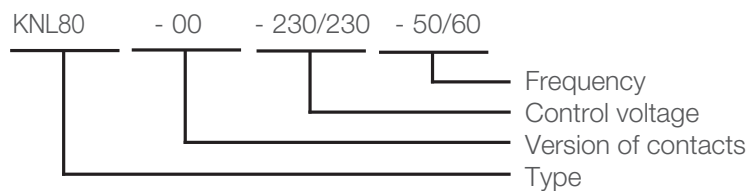
TECHNICAL DATA					MOTOR CONTACTORS			
MAIN CIRCUIT	Type					KNL80	KNL90	KNL110
	Electrical endurance AC-3 / AC-4			x 10 ⁶	op. c.	1.3/0.2	1.2/0.2	0.8/0.2
	Rated operational current at: 24/110/220 V	DC-1	1 ¹⁾	I _e	A	70/8/6	70/8/6	70/8/6
			2 ¹⁾			100/80/40	100/80/40	100/80/40
			3 ¹⁾			100/85/55	100/85/55	100/85/55
	1 ¹⁾ Number of poles in series	DC-3 – DC-5	1 ¹⁾			40/3/1	40/3/1	40/3/1
			2 ¹⁾			60/40/7	60/40/7	60/40/7
			3 ¹⁾			80/60/35	80/60/35	80/60/35
	Max. back-up fuse for short-circuit protection Coordination type 2		gG	I _v	A	160	160	160
			aM			80	100	125
	Terminal capacity		rigid	S	mm ²	6 ... 50		
flexible			6 ... 50					
Screw					M6			
Screw head				imbus	hexagon socket oval head			
Tightening torque				Nm	4.5			
MAGNETIC SYSTEM	Coil consumption		switch-on	AC	VA	210		
				DC	W	15		
			operation	AC	VA	18		
				DC	W	15		
	Make / Break delay		make break	AC	ms	13 - 25		
						8 - 12		
			make break	DC		60 - 90		
						7 - 12		
	Range of control voltage			U _c	%	85 ... 110		
	Control voltages			U _c	V	12 ... 600		
	Terminal capacity		rigid	S	mm ²	2.5		
flexible			2.5					
Screw					M3.5			
Screw head					Phillips 1			
Tightening torque				Nm	0.8 - 1			

STANDARD CONTROL VOLTAGES (AC)

V	24	48	110	220/230	240	380/400
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ORDERING DATA

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



Contactors

KNL CONTACTORS

KNL80, KNL90, KNL110

ACCESSORIES



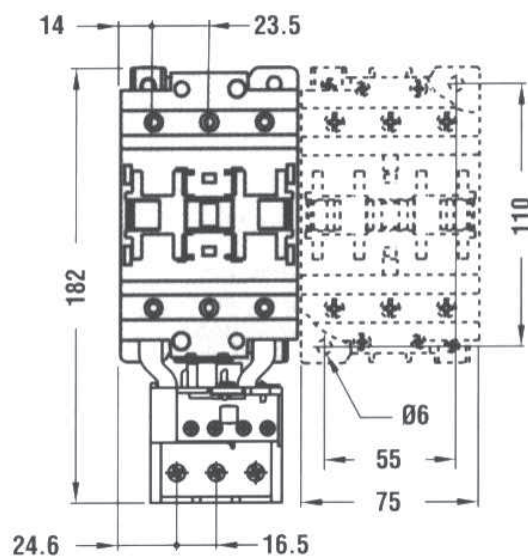
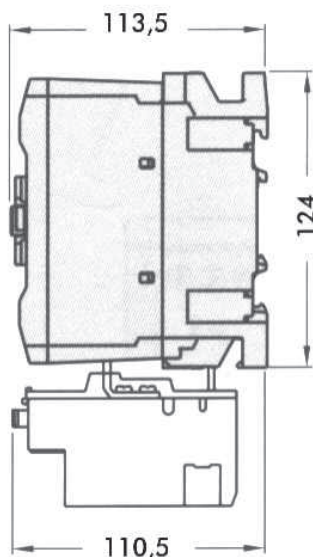
G484

G484
Snap-on auxiliary switch
blocks
(Type -12, -21)

BR90 OVERLOAD RELAY

Type	Rated operational current at 230 V and AC-15	Setting ranges (A)
BR90	2.5 A	60 - 82; 70 - 95; 90 - 110

DIMENSIONS



Contactors

MOTOR CONTACTORS

KNL95, KNL115, KNL145, KNL180, KNL250, KNL400, KNL500, KNL630/1000



- Contactors are used for switching electric motors and other resistive inductive and capacitive loads
- Three and four-pole versions up to 1000 A for AC-1 utilization category
- Three and four-pole versions up to 630 A for AC-3 utilization category
- AC/DC control voltages
- A wide variety of snap-on auxiliary switch blocks and accessories
- Fixing to the vertical and horizontal surface by $\pm 30^\circ$ deviation

TECHNICAL DATA

MOTOR CONTACTORS

GENERAL	Type			KNL95	KNL115	KNL145	KNL180	KNL250		
	Standards			IEC/EN 60947-4-1, UL 508						
	Approvals			UL, EAC						
	Ambient temperature		°C	-50 ... +70						
	Storage temperature		°C	-60 ... +80						
	Mechanical endurance		op. c.	10 x 10 ⁶						
	Max. mechanical operating frequency with no load		op. c./h	2400						
	Weight		kg	5.96	5.96	6.10	10.60	10.80		
MAIN CIRCUIT	Rated insulation voltage		<i>U_i</i>	V	1000					
	Thermal current at ≤ 40°C		<i>I_{th}</i>	A	125	160	250	275	350	
	Rated frequency		<i>f</i>	Hz	50/60					
	Rated power at ≤ 40°C	230 V	<i>P_e</i>	kW	47	57	91	95	124	
		400 V			82	98	150	160	214	
		500 V			103	129	196	213	282	
		690 V			142	173	270	298	380	
	Rated motor power at ≤ 55°C	230 V	<i>P_m</i>	kW	27.6	33	46	57	83	
		400 V			50	61	80	100	140	
		500 V			56	80	100	123	176	
		690 V			74	100	120	144	212	
		1000 V			46	63	75	103	156	
	Rated motor power acc. to UL	240 V	<i>P_m</i>	HP	30	40	50	75	100	
		480 V			50	75	100	150	200	
		600 V			75	100	125	150	250	
	Rated motor power AC-4	≤ 400 V	<i>P_m</i>	kW	23	25	31	36	52	
	Electrical endurance AC-3 / AC-4		x 10 ⁶	op. c.	1.1/0.2	1.1/0.2	1.1/0.2	1/0.2	1/0.2	
	Rated operational current at: 24/110/220 V	DC-1 L/R ≤ 1 ms	1 ¹⁾ 2 ¹⁾ 3 ¹⁾	<i>I_e</i>	A	70/8/6	160/100/-	220/110/-	260/120/-	350/160/-
						100/80/40	160/130/130	220/150/150	260/170/150	350/300/250
						100/85/55	160/130/130	220/150/150	260/170/170	350/300/300
1) Number of poles in series		DC-3 – DC-5 L/R ≤ 15 ms	1 ¹⁾ 2 ¹⁾ 3 ¹⁾	<i>I_e</i>	A	40/3/1	140/70/-	160/80/-	180/90/-	280/150/-
						60/40/7	140/100/80	160/120/90	180/140/100	280/250/200
Max. back-up fuse for short-circuit protection Coordination type 2	gG aM	<i>I_v</i>	A	160	200	250	315	400		
				100	125	160	200	250		
Terminal capacity	rigid	S	mm ²	70	70	120	150	240		
	busbar		mm	20 x 3 (1 x or 2 x)	20 x 3 (1 x or 2 x)	25 x 3 (1 x or 2 x)	25 x 3 (1 x or 2 x)	30 x 4 (1 x or 2 x)		
Screw				M6	M6	M8	M8	M10		
Wrench jaw opening			mm	10	10	13	13	17		
Tightening torque			Nm	3	3	6	6	10		

Contactors

MOTOR CONTACTORS

KNL95, KNL115, KNL145, KNL180, KNL250, KNL400, KNL500, KNL630/1000

MAGNETIC SYSTEM	Type			KNL95	KNL115	KNL145	KNL180	KNL250
	Coil consumption	switch-on	P_c	VA	300			
				W	300			
		operation		VA	10			
				W	10			
	Make / Break delay	make	AC/DC	ms	13-25/60-90	60 - 100		80 - 120
		break			8 - 12	25 - 60		30 - 75
	Range of control voltage		U_c	%	85 ... 110			
	Control voltages		U_c	V	24 to 480			
Connection			fast-on	2/ 2.8 x 0.8 or 6.3 x 0.8				

TECHNICAL DATA					MOTOR CONTACTORS				
GENERAL	Type			KNL400	KNL500	KNL630	KNL630/1000		
	Standards			IEC/EN 60947-4-1, UL 508					
	Ambient temperature		°C	-50 ... +70					
	Storage temperature		°C	-60 ... +80					
	Mechanical endurance		op. c.	10 x 10 ⁶	5 x 10 ⁶				
	Max. mechanical operating frequency with no load		op. c/h	2400	1200				
	Weight		kg	10.80	20.80	21.50	25.62		
MAIN CIRCUIT	Rated insulation voltage	U_i	V	1000					
	Thermal current at ≤ 40°C	I_{th}	A	550	700	800	1000		
	Rated frequency	f	Hz	50/60					
	Rated power at ≤ 40°C	230 V	P_e	kW	200	252	288	350	
		400 V			345	438	500	600	
		500 V			452	575	655	750	
		690 V			598	755	860	1000	
	Rated motor power	three-phase	230 V	P_m	kW	130	156	198	-
		400 V	225			290	335	-	
		500 V	271			367	368	-	
		690 V	352			416	440	-	
		1000 V	208			312	368	-	
	Rated motor power	≤ 400 V	P_m	kW	76	99	119	-	
	Electrical endurance AC-3 / AC-4		x 10 ⁶	op. c.	0.7/0.2	0.7/0.2	0.7/0.2	-	
	Rated operational current at: 75/110/220 V	1 1) DC-1 L/R ≤ 1ms	I_e	A	400/250/-	650/320/-	800/460/-	-	
		2 1) L/R ≤ 1ms			400/400/350	650/550/450	800/800/700	-	
		3 1)			400/400/400	650/600/600	800/800/800	-	
	1) Number of poles in series	1 1) DC-3 – DC-5 L/R ≤ 1ms	I_e	A	350/200/-	550/320/-	800/460/-	-	
		2 1) L/R ≤ 1ms			350/350/280	650/550/450	800/800/700	-	
		3 1)			350/350/350	650/550/550	800/800/800	-	
	Max. back-up fuse for short-circuit protection Coordination type 2	gG aM	I_v	A	630 400	800 500	1000 630	-	
	Terminal capacity	rigid busbar	S	mm ² mm	2 x 150 30 x 5 (1 x or 2 x)	 50 x 5 (1 x or 2 x)	2 x 240 60 x 5 (1x or 2x)		
	Screw				M10	M10	M12	2-M12	
	Wrench jaw opening			mm	17	17	19	19	
	Tightening torque			Nm	10	10	14	14	

Contractors

MOTOR CONTACTORS

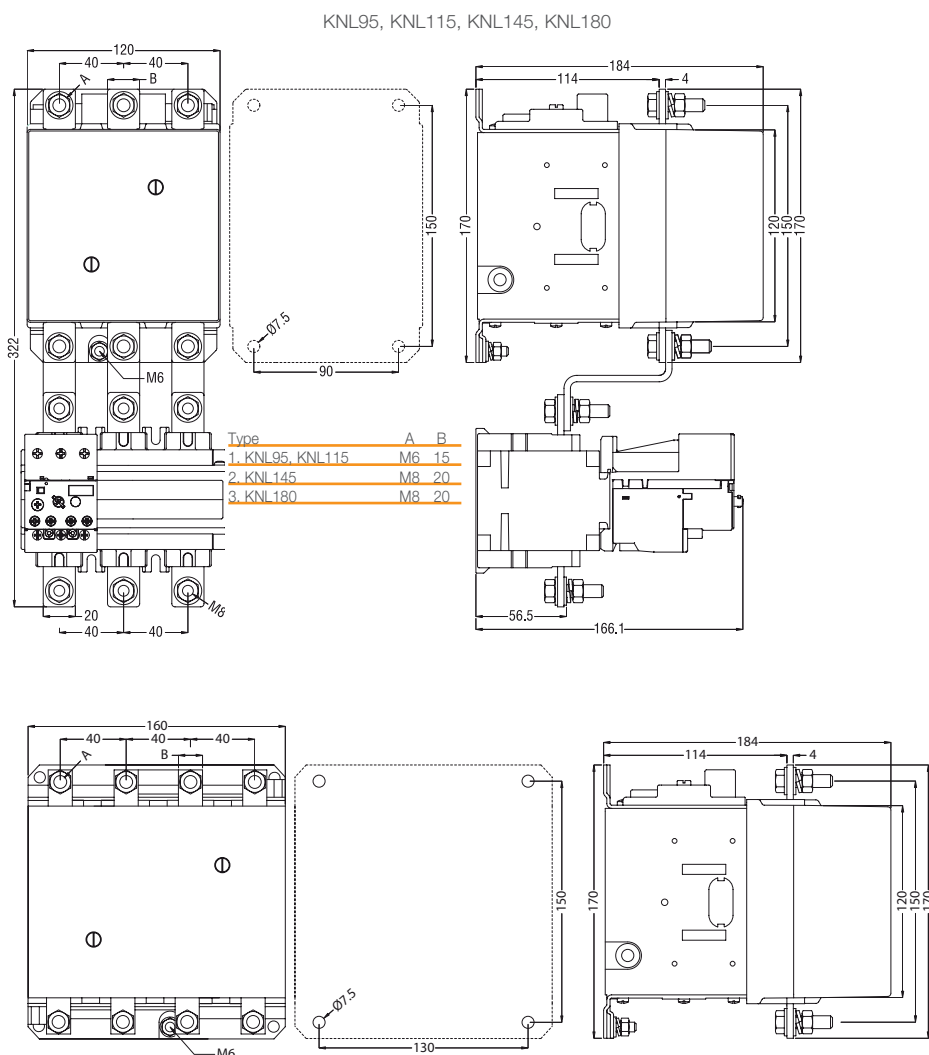
KNL95, KNL115, KNL145, KNL180, KNL250, KNL400, KNL500, KNL630/10000

MAGNETIC SYSTEM							
Type				KNL400	KNL500	KNL630	KNL1000
Coil consumption	switch-on	P_c	VA	300	400		
			W	300	400		
	operation		VA	10	18		
			W	10	18		
Make / Break delay	make		ms	80 - 120	110 - 180		
	break			30 - 75	60 - 100		
Range of control voltage		U_c	%	85 ... 110			
Control voltages		U_c	V	24 to 480		48 to 480	
Connection			fast-on	2/ 2.8 x 0.8 or 6.3 x 0.8			

STANDARD CONTROL VOLTAGES (AC)

V	24	48	60	110/125	220/240	380/415	440/480
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DIMENSIONS

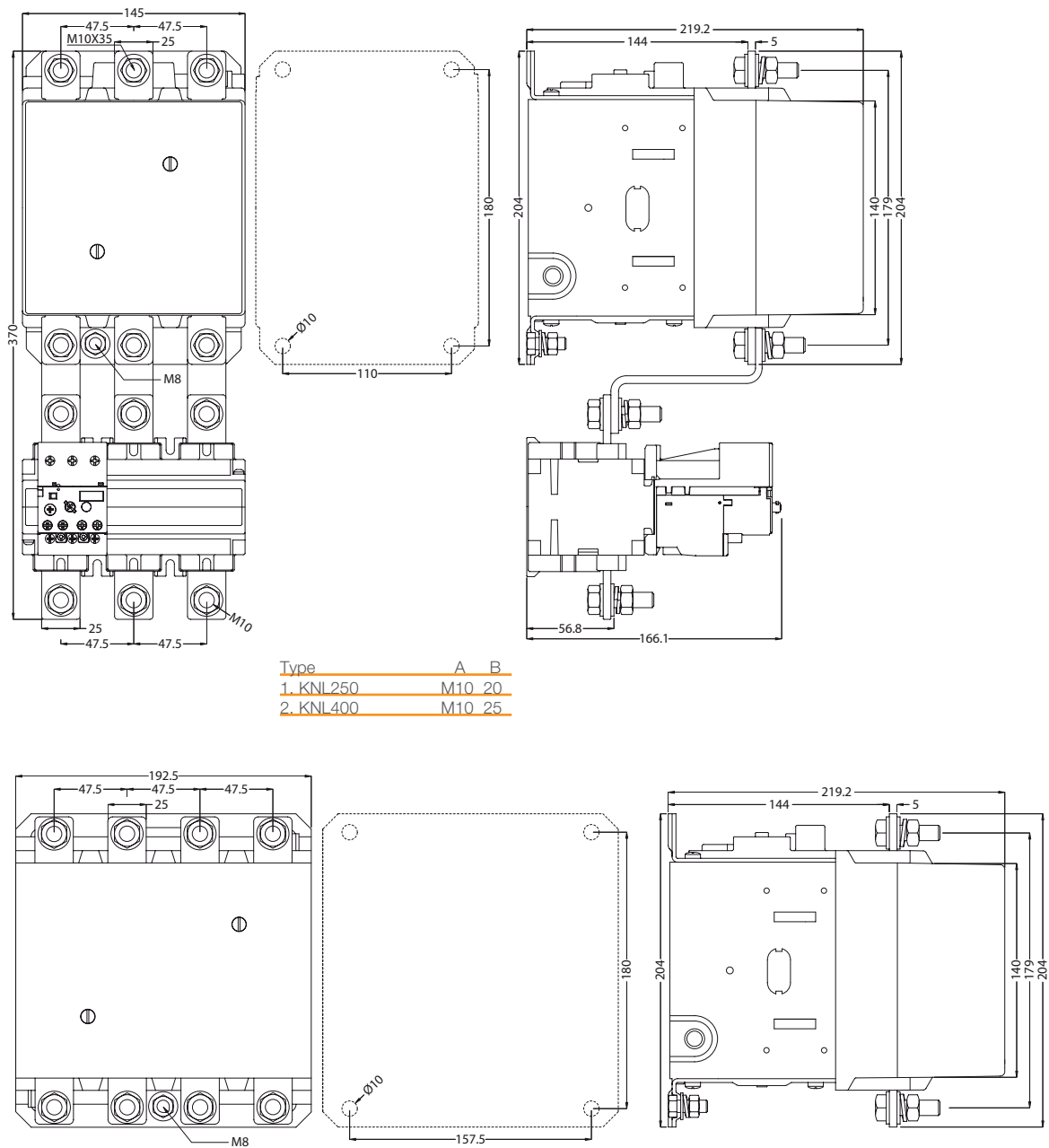


Contactors

MOTOR CONTACTORS

KNL95, KNL115, KNL145, KNL180, KNL250, KNL400, KNL500, KNL630/10000

KNL250, KNL400

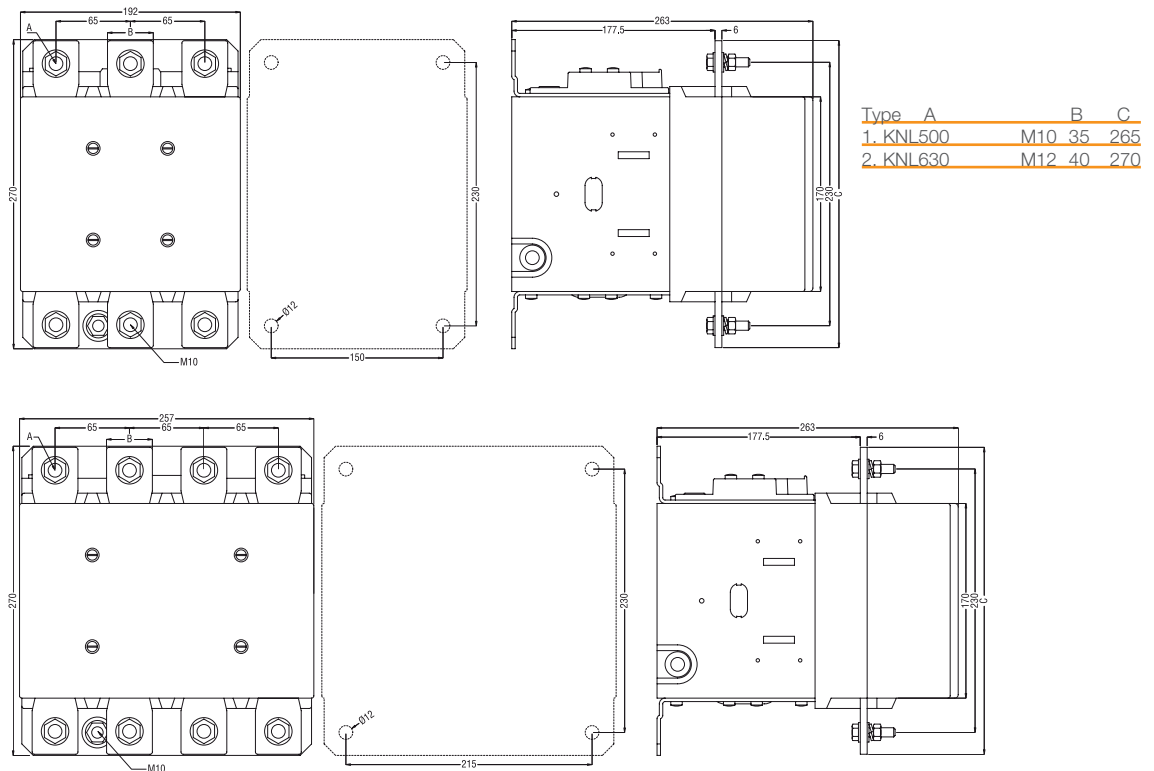


Contactors

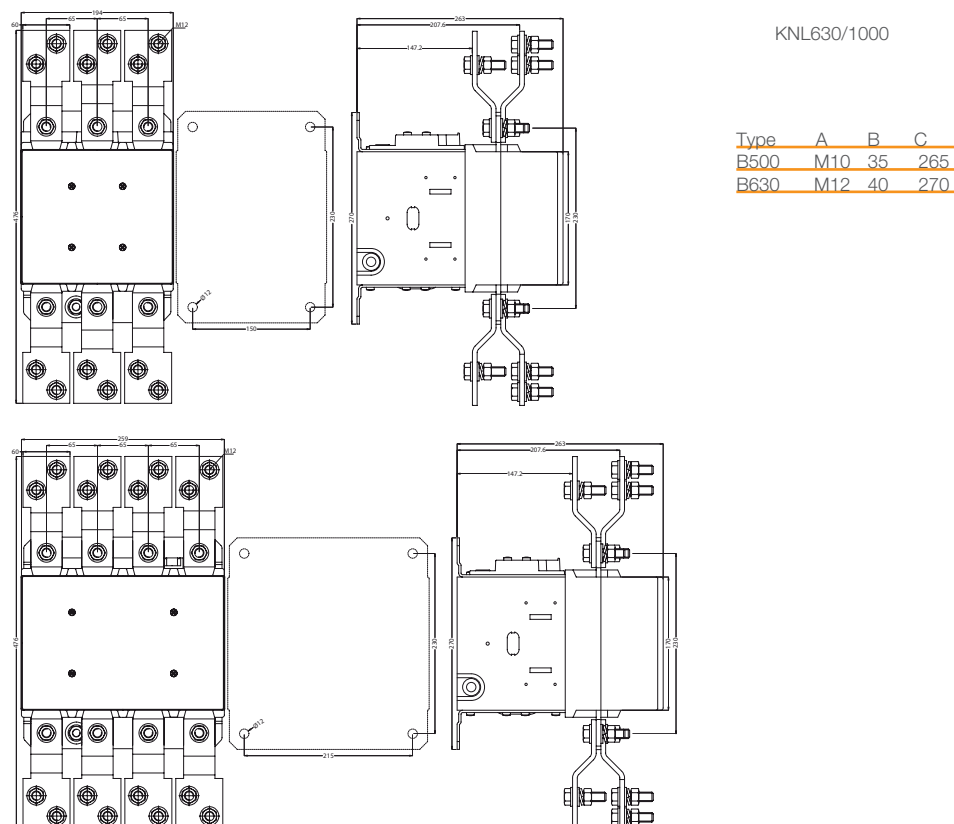
MOTOR CONTACTORS

KNL95, KNL115, KNL145, KNL180, KNL250, KNL400, KNL500, KNL630/10000

KNL500, KNL630



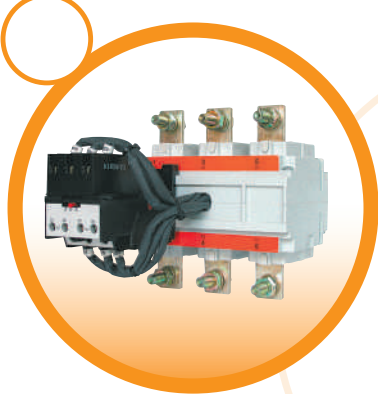
KNL630/1000



Contactors

KNL CONTACTORS

KNL95, KNL115, KNL145, KNL180, KNL250, KNL400, KNL500, KNL630/1000

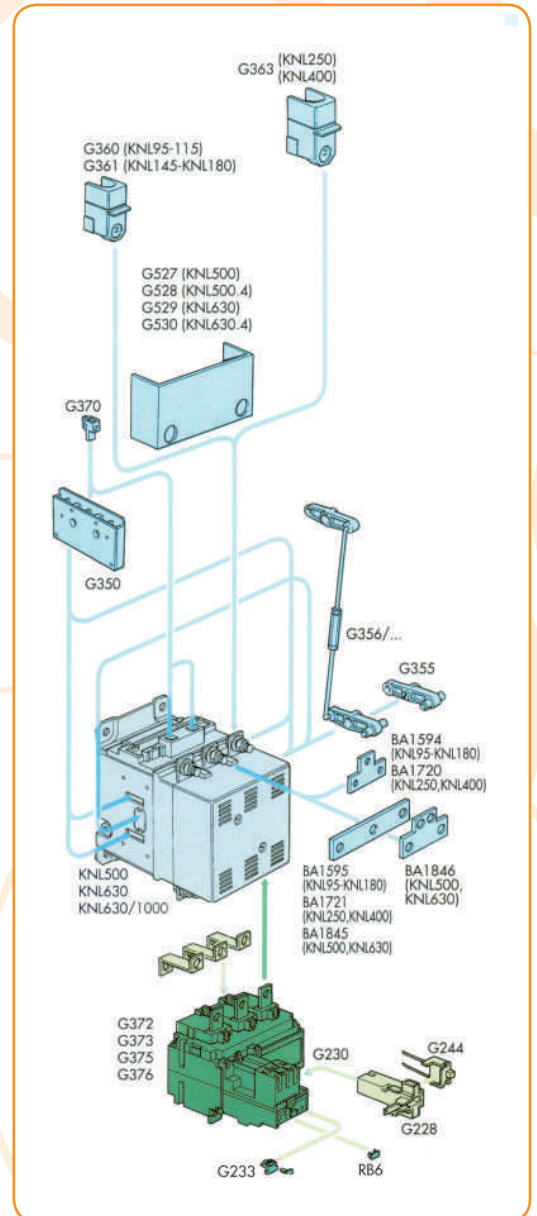


ACCESSORIES

BRA180, BRA400 Thermal overload relay

Type	Setting ranges (A)
BRA180	60 - 100; 75 - 125; 90 - 150; 120 - 200
BRA400	150 - 250; 180 - 300; 250 - 420
BRA25.5+G230+C.T.	300 - 500; 480 - 800

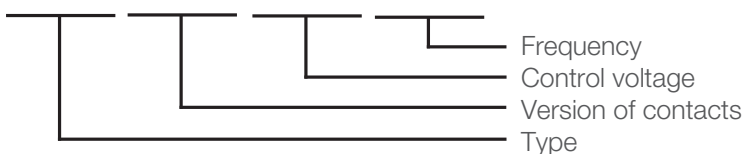
Description	Characteristic	Reference code
SNAP-ON AUXILIARY SWITCH BLOCKS		
Auxiliary contacts	2NO + 1NC or 1NO + 2NC	G350
Mechanical interlock	Side-by-side contactors One on top of other contactors	G355
	L(mm)	
	225 - 365	G356/1
	265 - 305	G356/2
	305 - 345	G356/3
	345 - 385	G356/4
	390 - 425	G356/5
	470 - 500	G356/6
Main terminal covers	for KNL 95, KNL 115 for KNL 145, KNL 180 for KNL 250, KNL 400 for KNL 500 for KNL 500.4 for KNL 630 for KNL 630.4	G360 G361 G363 G527 G528 G529 G530
Bars for 3 poles star connection	for KNL 95 - KNL 180 for KNL 250 - KNL 400 for KNL 500 - KNL 630	BA1595 BA1721 BA1846
Bars for 2 poles parallel connection	for KNL 95 - KNL 180 for KNL 250 - KNL 400 for KNL 500 - KNL 630	BA1594 BA1720 BA1845
Adapter	for screw terminal	G370
Identification plate		BA126/2
THERMAL OVERLOAD RELAY	BRA 180, BRA 400	
Adapter for mounting on contactor	BRA 180 KNL 95 - KNL 180 KNL 250 - KNL 400	G372 G373
	BRA 400 KNL 145 - KNL 180 KNL 250 - KNL 400	G375 G376
Electric reset	all types	G228
Sealing kit	all types	G233
Start button	all types	G244
Identification plate	all types	RB6



ORDERING DATA

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

KNL95 - 00 - 220/240 - 50/60



Contactors

CAPACITOR DUTY CONTACTORS

KC12, KC16, KC20, KC25, KC 33, KC 40, KC 60



When switched on, a capacitor can function as a short-circuit element. The capacitor inrush or charging current magnitude depends on AC voltage at turn-on and on the impedance of connection cables and a power supply transformer.

In case of individual capacitor load, charging current peaks that are 30-time greater than rated capacitor current can occur. In case of a multi-stage capacitor the inrush current can exceed 180-time rated capacitor current.

Such a strong current can flow through a contactor from the beginning when inrush current occurs from power supply network and the capacitor is already connected. Such inrush current is undesirable since main contacts of standard duty contactors are likely to weld.

A new capacitor duty contactor is designed to meet the requirements of capacitor duty applications. Contactors are fitted with a block of three auxiliary contacts connected in series with six quick discharge damping resistors, two per each phase. Peak current is limited to the value within the contactor making capacity.

Three-pole contactors from 12,5 kVar to 60 kVar are available in seven ratings complying with the IEC 60947-4-1 for AC-6b utilization category. They have the UL certificate.

Advantages

- Conforms to utilization category AC-6b
- Saves costs of expensive replacement
- Long electrical life
- Reduces watt losses during "ON" condition, saves energy
- High safety
- No risk of dangerous voltage
- Switching of capacitor bank in parallel without de-rating
- Less maintenance and downtime
- Standard control voltages: 24 V 50/60 Hz, 220 V 50/60 Hz, 230 V 50/60 Hz, 415 V 50/60 Hz

TECHNICAL DATA

Product Code	Rating at 50 / 60 Hz kVAr	Current carrying capacity							Power dissipation per pole	Mechanical Life (million)		Electrical Life
	≤ 55°C	220 - 240 V		400 - 440 V		kVAr/Current rating as per UL				50 or 60 Hz	50 / 60 Hz	(Operations)
		kVAr	Current at 230V (A)	kVAr	Current at 400V (A)	240 V	480 V	600 V	W			
KC12	12.5	6.7	17.58	12.5	18.04	6 kVAr/15 A	12.5 kVAr/15 A	15 kVAr/15 A	0.36	17	15	200.000
KC16	16.7	8.5	22.3	16.7	24.1	8 kVAr/20 A	16.7 kVAr/20 A	20 kVAr/20 A	0.8	20	15	200.000
KC20	20	10	26.24	20	28.86	10 kVAr/24 A	20 kVAr/24 A	25 kVAr/24 A	1.25	16	12	100.000
KC25	25	15	39.36	25	36.08	12.5 kVAr/30 A	25 kVAr/30 A	33.3 kVAr/30 A	2	16	12	100.000
KC33	33.3	20	52.48	33.3	48.06	16.5 kVAr/40 A	33.3 kVAr/40 A	40 kVAr/40 A	4.2	16	6	100.000
KC40	40	25	65.6	40	57.73	20 kVAr/48 A	40 kVAr/48 A	50 kVAr/48 A	4.2	16	6	100.000
KC60	50	40	104.9	60	86.6	30 kVAr/72 A	60 kVAr/72 A	80 kVAr/77 A	5.1	10	4	100.000

¹ For KC12 to KC25: clip-on mounting on 35 mm wide rail
For KC33 - KC60: clip-on mounting on 75 mm wide rail

² Average ambient temperature should not exceed 45 °C within the 24-hour period in accordance with IEC 60871 and IEC 60831

Contactors

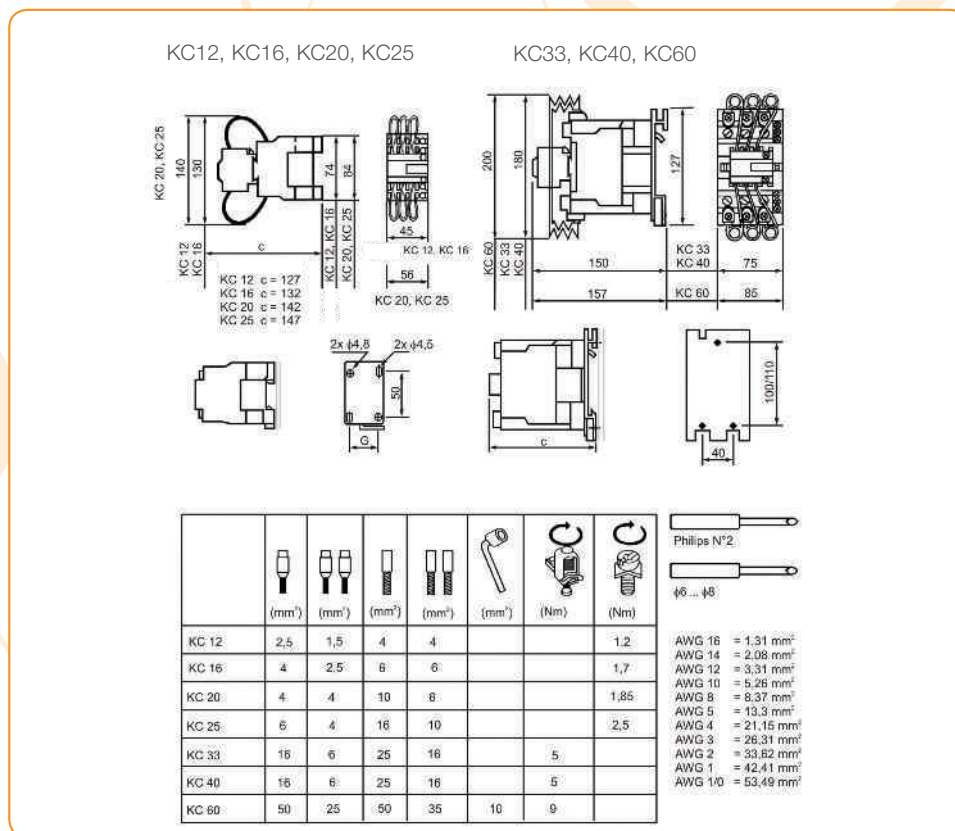
CAPACITOR DUTY CONTACTORS

KC12, KC16, KC20, KC25, KC33, KC40, KC60

TECHNICAL DATA

Product Code	Rating at 50 / 60 Hz kVAr	Upper Block		Wire Details						Coil Consumption		
		Time lag between make contacts of Aux block & contactor	Holding time of main contacts of Aux block	Cross - sectional Area	Length	Material	Lugs - at Contactor end	Lugs at Aux Block end	Tightening Torque	VA	VA	VA
	≤ 55°C	ms	ms	mm ²	mm				Nmm ²	50 Hz	60 Hz	50/60 Hz
KC12	12.5	2 - 10	5 - 12	0.292	174.0	PTFE coated Resistance wire	Ring type lug	Pin type lug	1.2	7	7.5	8
KC16	16.7	2 - 10	5 - 12	0.292	174.0	PTFE coated Resistance wire	Ring type lug	Pin type lug	1.7	7	7.5	8
KC20	20	2 - 10	5 - 12	0.292	174.0	PTFE coated Resistance wire	Ring type lug	Pin type lug	1.85	7.5	7.5	8.5
KC25	25	2 - 10	5 - 12	0.292	174.0	PTFE coated Resistance wire	Ring type lug	Pin type lug	2.5	7.5	7.5	8.5
KC33	33.3	2 - 10	5 - 12	0.196	245.0	PTFE coated Resistance wire	Pin type lug with Connector	Pin type lug	5.0	20	22	26
KC40	40	2 - 10	5 - 12	0.196	245.0	PTFE coated Resistance wire	Pin type lug with Connector	Pin type lug	5.0	20	22	26
KC60	50	2 - 10	5 - 12	0.196	245.0	PTFE coated Resistance wire	Pin type lug with Connector	Pin type lug	9.0	20	22	26

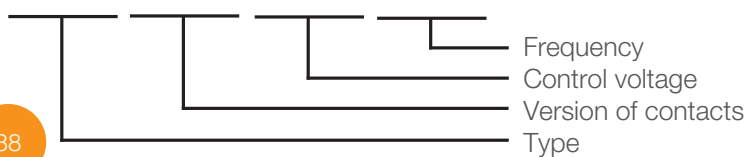
MOUNTING AND CONNECTION



ORDERING DATA

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

KC12 - 11 - 230 - 50/60



Contactors

IK INSTALLATION CONTACTORS

IKA20, IKD20, IK21, IKA25, IKD25, IK40, IKA40, IK63, IKA63



- Installation contactors are built in consumer units in dwellings, business premises, hotels, hospitals, shopping centres, sport centres, production halls, warehouses and public places
- They are used for remote switching and automatic control of electric devices and equipment, such as:
 - single-phase and three-phase motors
 - different pumps
 - air-conditioning
 - electric heating
 - lighting
- Basic contactor types are: IKA20-xx, IKD20-xx, IK21-xx, IKA25-xx, IKD25-xx, IK40-xx, IKA40-xx, IK63-xx, IKA63-xx
- IKD20, IKD25, IK40 and IK63 with a varistor for overvoltage protection and a rectifier enable dc and ac voltage control
- They excel in silent operation
- IKA20, IK21, IKA25, IKA40 and IKA63 are ac driven contactors only
- Contacts can be used as main or auxiliary
- Contactors are designed for assembling to 35 mm mounting rail in accordance with the EN 60715 standard
- Sealing terminal covers enable direct protection against contact with live parts
- IKV ventilation module is available for preventing exceeded heating when contactors are used side-by-side
- All contactors have degree of protection IP20

TECHNICAL DATA FOR IKA20, IKD20, IKA25 and IKD25

GENERAL	Type					IKA20	IKD20	IKA25	IKD25
	Standards					IEC/EN 61095 , IEC/EN 60947-4-1, IEC/EN 60947-5-1			
	Approvals					CB, NF, EAC			
	Module width					1		2	
	Mechanical endurance				op. c.	3 x 10 ⁶			
	Ambient temperature				°C	-5 ... +55			
	Storage temperature				°C	-30 ... +80			
	No. of contactors (side-by-side)		≤ 40° C			max. 3	max. 3	no limitation	max. 3
			40 - 55° C			max. 2	max. 2		max. 2
	Contact reliability					17 V; ≥ 50 mA			
	Min. distance of open contacts				mm	3.6			
	Power dissipation per pole				W	1.7	1.7	2.2	2.2
	Overload current withstand capability				A	72	72	68	68
	Max. back-up fuse for short-circuit protection gL Coordination type 2			<i>I_V</i>	A	20	20	25	25
	DC-1 Max. operating frequency AC-1/AC-3/AC-5b/AC-6b/ AC-15 no load				op. c./h	300			
				600					
				3000					
Weight				kg	0.13	0.13	0.24	0.24	
MAIN CIRCUIT	Rated insulation voltage			<i>U_i</i>	V	230	230	440	440
	Rated impulse withstand voltage			<i>U_{imp}</i>	kV	4			
	Thermal current			<i>I_{th}</i>	A	20	20	25	25
	Rated operational voltage			<i>U_e</i>	V	230	230	400	400
	Rated frequency			<i>f</i>	Hz	50/60			
	Rated operational current AC-1/AC-7a			<i>I_e</i>	A	20	20	25	25
	Operational power AC-1/AC-7a	single-phase	230 V	<i>P_e</i>	kW	4	4	5.4	5.4
		three-phase	230 V			-	-	9	9
three-phase		400 V	-			-	16	16	
Electrical endurance AC-1/AC-7a				op. c.	200.000				

Contactors

IK INSTALLATION CONTACTORS

IKA20, IKD20, IK21, IKA25, IKD25, IK40, IKA40, IK63, IKA63

TECHNICAL DATA FOR IKA20, IKD20, IKA25 and IKD25

MAIN CIRCUIT	Type				IKA20	IKD20	IKA25	IKD25	
	Rated operational current AC-3/AC-7b		I_e	A	NO: 9 NC: 6	NO: 9 NC: 6	8.5	8.5	
	Operational power	single-phase motor	230 V	P_e	kW	NO: 1.3 NC: 0.75	NO: 1.3 NC: 0.75	1.3 ¹⁾	1.3 ¹⁾
		three-phase motor	230 V			-	-	2.2	2.2
		three-phase motor	400 V			-	-	4	4
	Electrical endurance AC-3/AC-7b			op. c.	300.000	300.000	500.000	500.000	
	Switching of capacitors AC-6b 230 V		C	μF	30	30	36	36	
	Electrical endurance AC-6b			op. c.	100.000				
	DC-1 (L/R ≤ 1 ms) Electrical endurance: 1 pole $U_e = 24 \text{ V DC}$ $U_e = 48 \text{ V DC}$ $U_e = 60 \text{ V DC}$ $U_e = 110 \text{ V DC}$ $U_e = 220 \text{ V DC}$			A	20	20	25	25	
					15	15	20	20	
					10	10	15	15	
					6	6	6	6	
					0.6	0.6	0.6	0.6	
					2 poles connected in series $U_e = 24 \text{ V DC}$ $U_e = 48 \text{ V DC}$ $U_e = 60 \text{ V DC}$ $U_e = 110 \text{ V DC}$ $U_e = 220 \text{ V DC}$		20	20	25
	18	18	25	25					
	15	15	20	20					
	10	10	10	10					
	6	6	6	6					
	3 poles connected in series $U_e = 24 \text{ V DC}$ $U_e = 48 \text{ V DC}$ $U_e = 60 \text{ V DC}$ $U_e = 110 \text{ V DC}$ $U_e = 220 \text{ V DC}$		-	-			25	25	
			-	-	25	25			
			-	-	25	25			
-			-	20	20				
-			-	15	15				
4 poles connected in series $U_e = 24 \text{ V DC}$ $U_e = 48 \text{ V DC}$ $U_e = 60 \text{ V DC}$ $U_e = 110 \text{ V DC}$ $U_e = 220 \text{ V DC}$			-	-	25	25			
		-	-	25	25				
		-	-	25	25				
		-	-	20	20				
		-	-	15	15				
		Electrical endurance DC-1			op.c.	100.000	100.000	100.000	100.000
DC-3 (L/R ≤ 2 ms) Electrical endurance: 1 pole $U_e = 24 \text{ V DC}$ $U_e = 48 \text{ V DC}$ $U_e = 60 \text{ V DC}$ $U_e = 110 \text{ V DC}$ $U_e = 220 \text{ V DC}$			A	10	10	15	15		
				5	5	8	8		
				2	2	4	4		
				1	1	1.3	1.3		
				0.1	0.1	0.2	0.2		
				2 poles connected in series $U_e = 24 \text{ V DC}$ $U_e = 48 \text{ V DC}$ $U_e = 60 \text{ V DC}$ $U_e = 110 \text{ V DC}$ $U_e = 220 \text{ V DC}$		20	20	25	25
10	10	16	16						
8	8	12	12						
4	4	5.5	5.5						
0.4	0.4	0.6	0.6						

¹⁾ Data for single-phase power are valid for versions -22, -20 and -02

Contactors

IK INSTALLATION CONTACTORS

IKA20, IKD20, IK21, IKA25, IKD25, IK40, IKA40, IK63, IKA63

TECHNICAL DATA FOR IKA20, IKD20, IKA25 and IKD25

MAIN CIRCUIT	Type			IKA20	IKD20	IKA25	IKD25	
	DC-3 (L/R ≤ 2 ms) Rated operational current:							
	3 poles connected in series	$U_e = 24$ V DC $U_e = 48$ V DC $U_e = 60$ V DC $U_e = 110$ V DC $U_e = 220$ V DC	I_e	A	-	-	25	25
		-			-	25	25	
		-			-	25	25	
		-			-	15	15	
		-			-	3	3	
	4 poles connected in series	$U_e = 24$ V DC $U_e = 48$ V DC $U_e = 60$ V DC $U_e = 110$ V DC $U_e = 220$ V DC			-	-	25	25
		-			-	25	25	
		-			-	25	25	
		-			-	20	20	
		-			-	8	8	
	Electrical endurance DC-3		op. c.	100.000	100.000	100.000	100.000	
	DC-5 (L/R ≤ 7,5 ms) Rated operational current:							
	1 pole	$U_e = 24$ V DC $U_e = 48$ V DC $U_e = 60$ V DC $U_e = 110$ V DC $U_e = 220$ V DC	I_e	A	10	10	15	15
		4			4	5	5	
		1			1	3	3	
		0.3			0.3	0.5	0.5	
		0.06			0.06	0.1	0.1	
	2 poles connected in series	$U_e = 24$ V DC $U_e = 48$ V DC $U_e = 60$ V DC $U_e = 110$ V DC $U_e = 220$ V DC			20	20	25	25
	8	8			15	15		
	6	6			10	10		
	2	2			4	4		
	0.2	0.2			0.4	0.4		
3 poles connected in series	$U_e = 24$ V DC $U_e = 48$ V DC $U_e = 60$ V DC $U_e = 110$ V DC $U_e = 220$ V DC	-			-	25	25	
	-	-			25	25		
	-	-			20	20		
	-	-			12	12		
	-	-			2	2		
4 poles connected in series	$U_e = 24$ V DC $U_e = 48$ V DC $U_e = 60$ V DC $U_e = 110$ V DC $U_e = 220$ V DC	-			-	25	25	
	-	-			25	25		
	-	-			25	25		
	-	-			15	15		
	-	-			5	5		
Electrical endurance DC-5		op. c.	100.000	100.000	100.000	100.000		
Terminal capacity	rigid flexible	S	mm²	1 ... 10 1 ... 6				
Screw				M3.5				
Screw head				PZ1				
Tightening torque			Nm	1.2				

Contactors

IK INSTALLATION CONTACTORS

IKA20, IKD20, IK21, IKA25, IKD25, IK40, IKA40, IK63, IKA63

TECHNICAL DATA FOR IKA20, IKD20, IKA25 and IKD25

AUXILIARY CIRCUIT	Type					IKA20	IKD20	IKA25	IKD25
	Rated operational voltage			U_e	V	230	230	400	400
	Rated insulation voltage			U_i	V	230	230	440	440
	Rated impulse withstand voltage			U_{imp}	kV	4			
	Thermal current			I_{th}	A	20	20	25	25
	AC-15								
	Rated operational current	single-phase	230 V	I_e	A	6	6	6	6
		single-phase	400 V			-	-	4	4
Electrical endurance AC-15				op. c.	300.000	300.000	500.000	500.000	
CONTROL CIRCUIT	Range of control voltage			U_c	%	85 ... 110			
	Kind of voltages					AC	AC, DC	AC	AC, DC
	Control voltage			U_c	V	12 ... 230			
	Frequency (AC)			f	Hz	50/60 2)			
	Surge immunity test (1.2/50 μs), acc. to IEC/EN 61000-4-5				kV	2			
	Coil consumption	switch-on		VA/W	12/10	2.1/2.1	33/25	2.6/2.6 3)	
		operation			2.8/1.2	2.1/2.1	5.5/1.6	2.6/2.6 3)	
	Make/break delays	make		ms	15 – 25	15 – 45	10 – 30	15 – 45	
		break			10 – 30	20 – 50	10 – 30	20 – 70	
	Terminal capacity	rigid		S	mm²	1 ... 2.5			
		flexible				1 ... 2.5			
	Screw					M 3.5			
Screw head					PZ1				
Tightening torque				Nm	0.6				

²⁾ IKD20 and IKD25 can be controlled by ac voltage with frequency from 40 Hz to 400 Hz

³⁾ Coil consumption for version -04 is 3.8 VA/3.8 W

Contactors

IK INSTALLATION CONTACTORS

IK A20, IK D20, IK 21, IK A25, IK D25, IK 40, IK A40, IK 63, IK A63

TECHNICAL DATA FOR IK21, IK40, IK63, IKA40 and IKA63

GENERAL	Type			IK21	IKA40	IK40	IKA63	IK63	
	Standards			IEC/EN 61095, IEC/EN 60947-4-1, IEC 60947-5-1					
	Approvals			EAC	CB, NF, EAC				
	Module width			2	3				
	Mechanical endurance		op. c.	3 x 10 ⁶					
	Ambient temperature		°C	-5 ... +55					
	Storage temperature		°C	-30 ... +80					
	No. of contactors (side-by-side)	≤ 40 °C		no limitation	no limitation	max. 3 max. 2	no limitation	max. 3 max. 2	
		40 - 55 °C							
	Contact reliability			17 V; ≥50 mA					
	Min. distance of open contacts		mm	3.6					
	Power dissipation per pole		W	2	4		8		
	Overload current withstand capability		A	40	176		240		
	Max. back-up fuse for short-circuit protection gL Coordination type 2		I _v	A	20	63		80	
	Max. operating frequency	DC-1 AC-1/AC-3/AC-5b/AC-6b AC-15 no load		c./h	300 600 1200 3000				
Weight		kg	0.17	0.35	0.42	0.35	0.42		
MAIN CIRCUIT	Rated insulation voltage		U _i	V	415	440		440	
	Rated impulse withstand voltage		U _{imp}	kV	4				
	Thermal current		I _{th}	A	20	40		63	
	Rated operational voltage		U _e	V	400				
	Rated frequency		f	Hz	50/60				
	Rated operational current	AC-1/AC-7a	I _e	A	20	40		63	
	Operational power	single-phase 230 V	P _e	kW	4	8.7		13.3	
	AC-1/AC-7a	three-phase 230 V			7.5	16		24	
	three-phase 400 V	13			26		40		
	Electrical endurance	AC-1/AC-7a		op. c.	200.000	100.000		100.000	
	Rated operational current	AC-3/AC-7b	I _e	A	5	22		30	
	Operational power	single-phase 230 V	P _e	kW	0.37 ¹⁾	3.7 ¹⁾		5 ¹⁾	
	AC-3/AC-7b	three-phase 230 V			1.1	5.5		8.5	
	three-phase 400 V	2.2			11		15		
	Electrical endurance	AC-3/AC-7b		op. c.	300.000	150.000		150.000	
	Switching of capacitors	AC-6b	C	μF	36	220		330	
	Electrical endurance	AC-6b		op. c.	100.000				
DC-1 (L/R ≤ 1 ms) Rated operational current: 1 pole	U _e = 24 V DC U _e = 48 V DC U _e = 60 V DC U _e = 110 V DC U _e = 220 V DC	A		20	40		63		
	12			24		26			
	6			18		20			
	2			4		4			
	0.5			1.2		1.2			
2 poles connected in series	U _e = 24 V DC U _e = 48 V DC U _e = 60 V DC U _e = 110 V DC U _e = 220 V DC			20	40		63		
	15			38		42			
	10			32		34			
	4			10		10			
	1.5			8		8			

1) Data for single-phase power are valid for versions -22, -20 and -02

Contactors

IK INSTALLATION CONTACTORS

IKA20, IKD20, IK21, IKA25, IKD25, IK40, IKA40, IK63, IKA63

TECHNICAL DATA FOR IK21, IK40, IK63, IKA40 and IKA63							
MAIN CIRCUIT	Type		IK21	IKA40	IK40	IKA63	IK63
	DC-1 ($L/R \leq 1 \text{ ms}$) Electrical endurance:						
	3 poles connected in series	$U_e = 24 \text{ V DC}$ $U_e = 48 \text{ V DC}$ $U_e = 60 \text{ V DC}$ $U_e = 110 \text{ V DC}$ $U_e = 220 \text{ V DC}$	A	20 20 20 6 2.5	40 40 40 30 20	63 63 60 35 30	
	4 poles connected in series	$U_e = 24 \text{ V DC}$ $U_e = 48 \text{ V DC}$ $U_e = 60 \text{ V DC}$ $U_e = 110 \text{ V DC}$ $U_e = 220 \text{ V DC}$		20 20 20 6 3.5	40 40 40 40 40	63 63 63 63 63	
	Electrical endurance	DC-1	op. c.	100.000			
	DC-3 ($L/R \leq 2 \text{ ms}$) Electrical endurance:		A				
	1 pole	$U_e = 24 \text{ V DC}$ $U_e = 48 \text{ V DC}$ $U_e = 60 \text{ V DC}$ $U_e = 110 \text{ V DC}$ $U_e = 220 \text{ V DC}$		10 5 2 1 0.1	22 10 5 1.5 0.3	25 11 5 1.5 0.3	
	2 poles connected in series	$U_e = 24 \text{ V DC}$ $U_e = 48 \text{ V DC}$ $U_e = 60 \text{ V DC}$ $U_e = 110 \text{ V DC}$ $U_e = 220 \text{ V DC}$		20 10 8 4 0.4	40 20 16 5 1	45 22 18 5 1	
	3 poles connected in series	$U_e = 24 \text{ V DC}$ $U_e = 48 \text{ V DC}$ $U_e = 60 \text{ V DC}$ $U_e = 110 \text{ V DC}$ $U_e = 220 \text{ V DC}$		20 20 15 6 2.5	40 40 32 15 4	63 45 35 18 5	
	4 poles connected in series	$U_e = 24 \text{ V DC}$ $U_e = 48 \text{ V DC}$ $U_e = 60 \text{ V DC}$ $U_e = 110 \text{ V DC}$ $U_e = 220 \text{ V DC}$		20 20 15 6 3.5	40 40 40 40 10	63 63 63 63 10	
	Electrical endurance	DC-3	op. c.	100.000			
	DC-5 ($L/R \leq 7,5 \text{ ms}$) Electrical endurance:						
	1 pole	$U_e = 24 \text{ V DC}$ $U_e = 48 \text{ V DC}$ $U_e = 60 \text{ V DC}$ $U_e = 110 \text{ V DC}$ $U_e = 220 \text{ V DC}$	A	10 4 1 0.3 0.06	20 8 4 1 0.2	25 10 5 1 0.2	
	2 poles connected in series	$U_e = 24 \text{ V DC}$ $U_e = 48 \text{ V DC}$ $U_e = 60 \text{ V DC}$ $U_e = 110 \text{ V DC}$ $U_e = 220 \text{ V DC}$		20 8 6 2 0.2	40 18 14 5 0.8	45 20 15 5 0.8	

Contactors

IK INSTALLATION CONTACTORS

IK A20, IK D20, IK 21, IK A25, IK D25, IK 40, IK A40, IK 63, IK A63

TECHNICAL DATA FOR IK21, IK40, IK63, IKA40 and IKA63

MAIN CIRCUIT	Tip				IK21	IK40	IK40	IK63	IK63	
	DC-5 (L/R ≤ 7,5 ms) Electrical endurance: 3 poles connected in series			$U_e = 24$ V DC $U_e = 48$ V DC $U_e = 60$ V DC $U_e = 110$ V DC $U_e = 220$ V DC		20 20 15 5 1.5	40 40 28 12 3	63 44 30 15 4		
	4 poles connected in series			$U_e = 24$ V DC $U_e = 48$ V DC $U_e = 60$ V DC $U_e = 110$ V DC $U_e = 220$ V DC		20 20 15 5 3	40 40 40 35 8	63 63 60 45 10		
	Electrical endurance DC-5			op. c.	100.000					
	Terminal capacity		rigid flexible	S	mm ²	1 ... 2.5 1 ... 2.5	1.5 ... 25 1.5 ... 16			
	Screw					M3.5	M5			
	Head screw					PZ2				
	Tightening torque				Nm	1.2	3.5			
	AUXILIARY CIRCUIT	Rated operational voltage			U_e	V	400			
		Rated insulation voltage			U_i	V	415	440		
Rated impulse withstand voltage			U_{imp}	kV	4					
Thermal current			I_{th}	A	20	40	63			
AC-15										
Rated operational current		single-phase 230 V single-phase 400 V	I_e	A	6 4					
Electrical endurance AC-15				op. c.	300.000	150.000	150.000			
CONTROL CIRCUIT	Range at control voltage			U_c	%	85 ... 110				
	Kind of voltages					AC	AC	AC. DC	AC	AC. DC
	Control voltage			U_c	V	12 ... 230				
	Frequency (AC)			f	Hz	50/60 ²⁾				
	Surge immunity test (1.2/50 μs), acc. to IEC/EN 61000-4-5				kV	2				
	Coil consumption		switch-on operation		VA/W	30/25 5/1.5	15.4/6 7.7/3	5/5 5/5	15.4/6 7.7/3	5/5 5/5
	Make/break delays		make break			ms	7 – 20 10 – 20	10 – 20 10 – 15	15 – 20 35 – 45	10 – 20 10 – 15
	Terminal capacity		rigid flexible	S	mm ²	1 ... 2.5 1 ... 2.5				
	Screw					M3.5	M3			
	Screw head					PZ2	PZ1			
	Tightening torque				Nm	0.6				

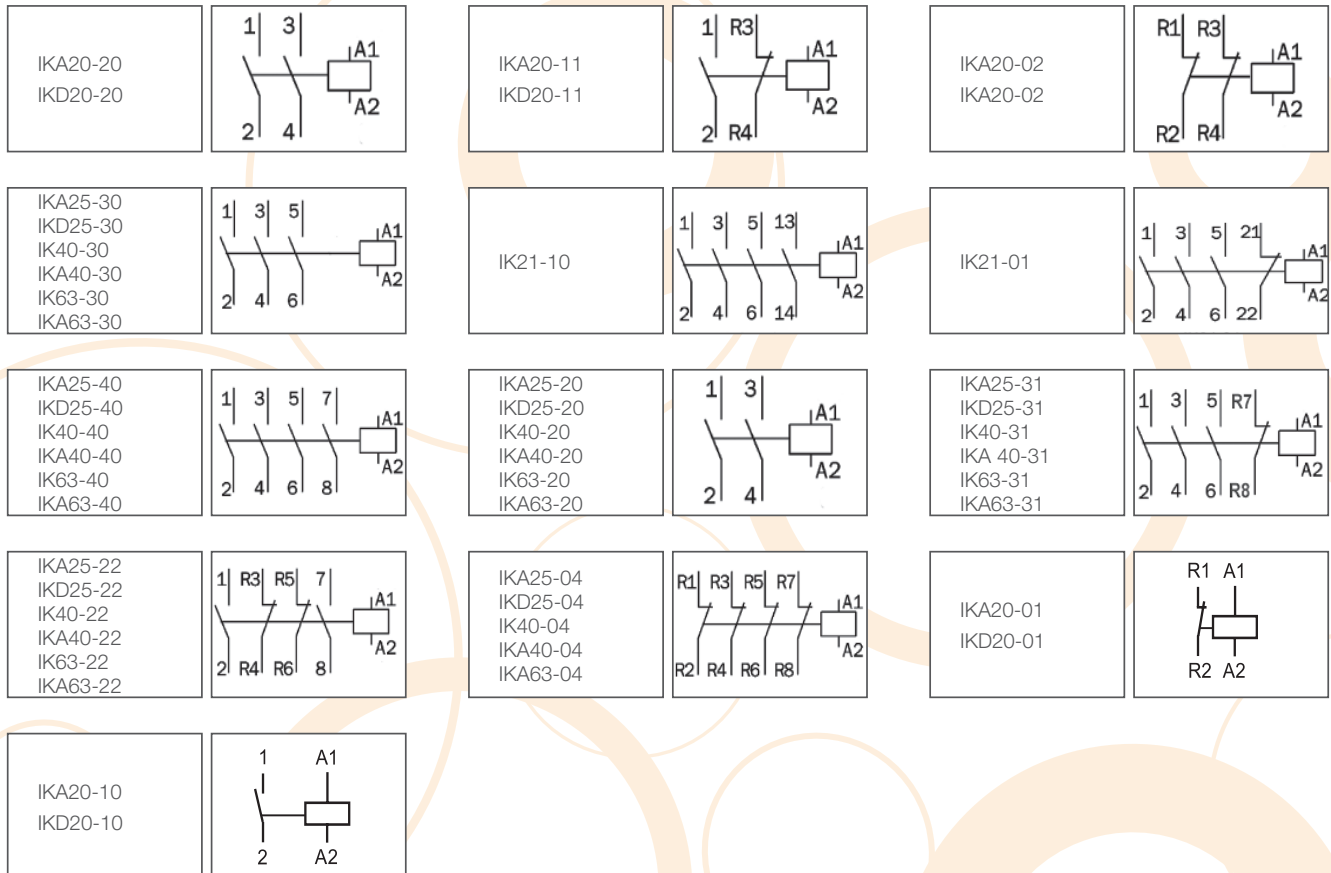
²⁾ IK40 and IK63 can be controlled by ac voltage with frequency from 40 Hz to 400 Hz

Contactors

IK INSTALLATION CONTACTORS

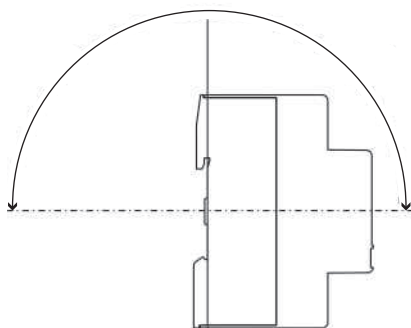
IKA20, IKD20, IK21, IKA25, IKD25, IK40, IKA40, IK63, IKA63

CONTACT ARRANGEMENTS

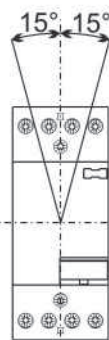


IKA40/63
IKA20/25

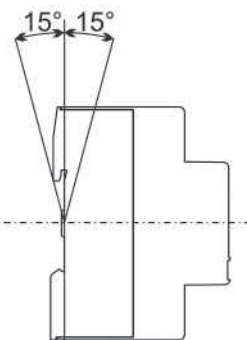
180°



IKA40/63
IK40/63
IKA20/25
IKD20/25



IK40, IK63
IKD20/25

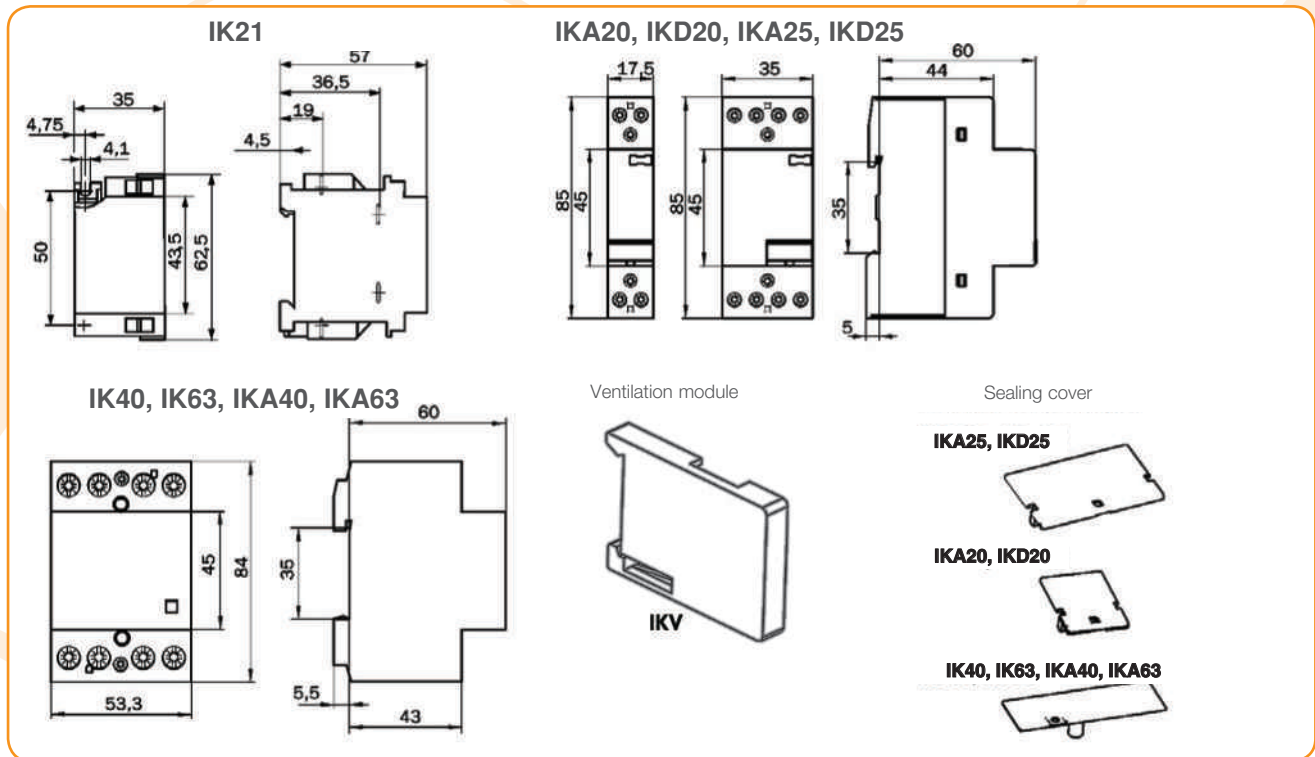


Contactors

IK INSTALLATION CONTACTORS

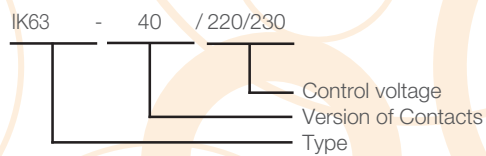
IKA20, IKD20, IK21, IKA25, IKD25, IK40, IKA40, IK63, IKA63

DIMENSIONS



ORDERING DATA

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



Contactors

IK-R INSTALLATION CONTACTORS

IKA20-R, IKA25-R, IKD20-R, IKD25-R



- IKA20-R, IKD20-R, IKA25-R and IKD25-R are upgraded versions of basic types of installation contactors
- Besides basic functions they enable manual control with a handle
- Description of the handle positions:
 - A: the contactor functions as an installation contactor without manual control
 - O: permanently switched off control voltage
 - I: at manual shifting the handle from position A to I, make contacts are closed and break contacts are open. When control voltage is applied, the handle is automatically set to position A.
- IKD20-R and IKD25-R are provided with a varistor for overvoltage protection and a rectifier, which enables control with AC and DC voltage
- Contactors with manual control enable
 - switching depending on tariff (selection of the most convenient tariff)
 - switching when control voltage is not applied
- Degree of protection IP20
- Technical data for lamps are identical to installation contactors without manual operation IKA20, IKD20, IKA25 and IKD25

TECHNICAL DATA

GENERAL	Type			IKA20-R	IKD20-R	IKA25-R	IKD25-R	
	Standards			IEC/EN 61095 , IEC/EN 60947-4-1, IEC 60947-5-1				
	Approvals			CB, NF, EAC				
	Module width			1		2		
	Mechanical endurance		op. c.	3 x 10 ⁶				
	Ambient temperature		°C	-5 ... +55				
	Storage temperature		°C	-30 ... +80				
	No. of contactors (side-by-side)	≤40 °C		max. 3	max. 3	no limit	max. 3	
		40 - 55 °C		max. 2	max. 2		max. 2	
	Contact reliability			17 V; ≥ 50 mA				
	Min. distance of open contacts		mm	3.6				
	Power dissipation per pole		W	1.7	1.7	2.2	2.2	
	Overload current withstand capability		A	72	72	68	68	
	Max. back-up fuse for short-circuit protection gL Coordination type 2		I _v	20	20	25	25	
	MAIN CIRCUIT	Max. operating frequency	DC-1 AC-1/AC-3/AC-5b/AC-6b/ AC-15 no load		op. c./h	300 600 3000		
Weight			kg	0.13	0.13	0.24	0.24	
Rated insulation voltage			U _i	V	230	230	440	440
Rated impulse withstand voltage			U _{imp}	kV	4			
Thermal current			I _{th}	A	20	20	25	25
Rated operational voltage			U _e	V	230	230	400	400
Rated frequency			f	Hz	50/60			
Rated operational current		AC-1/AC-7a	I _e	A	20	20	25	25
Operational power		single-phase 230 V			4	4	5.4	5.4
AC-1/AC-7a		three-phase 230 V	P _e	kW	-	-	9	9
		three-phase 400 V			-	-	16	16
Electrical endurance		AC-1/AC-7a	op. c.	200.000				

Contactors

IK-R INSTALLATION CONTACTORS

IKA20-R, IKA25-R, IKD20-R, IKD25-R

TEHNIICAL DATA

MAIN CIRCUIT	Type				IKA20-R	IKD20-R	IKA25-R	IKD25-R		
	Rated operational current	AC-3/AC-7b	I_e	A	NO: 9 NC: 6	NO: 9 NC: 6	8,5	8,5		
	Operational power	single-phase 230 V	P_e	kW	NO: 1,3 NC: 0,75	NO: 1,3 NC: 0,75	1,3 ¹⁾	1,3 ¹⁾		
	AC-3/AC-7b	three-phase 230 V			–	–	2,2	2,2		
		three-phase 400 V			–	–	4	4		
	Electrical endurance	AC-3/AC-7b		op. c.	300.000	300.000	500.000	500.000		
	Switching of capacitors	AC-6b	C	μF	30	30	36	36		
	Electrical endurance	AC-6b 230 V		op. c.	100.000					
	DC-1 (L/R ≤ 1 ms) Rated operational current: 1 pole	$U_e = 24 \text{ V DC}$ $U_e = 48 \text{ V DC}$ $U_e = 60 \text{ V DC}$ $U_e = 110 \text{ V DC}$ $U_e = 220 \text{ V DC}$	A		20 15 10 6 0.6	20 15 10 6 0.6	25 20 15 6 0.6	25 20 15 6 0.6		
	2 poles connected in series	$U_e = 24 \text{ V DC}$ $U_e = 48 \text{ V DC}$ $U_e = 60 \text{ V DC}$ $U_e = 110 \text{ V DC}$ $U_e = 220 \text{ V DC}$		20 18 15 10 6	20 18 15 10 6	25 25 20 10 6	25 25 20 10 6			
	3 poles connected in series	$U_e = 24 \text{ V DC}$ $U_e = 48 \text{ V DC}$ $U_e = 60 \text{ V DC}$ $U_e = 110 \text{ V DC}$ $U_e = 220 \text{ V DC}$		– – – – –	– – – – –	25 25 25 20 15	25 25 25 20 15			
	4 poles connected in series	$U_e = 24 \text{ V DC}$ $U_e = 48 \text{ V DC}$ $U_e = 60 \text{ V DC}$ $U_e = 110 \text{ V DC}$ $U_e = 220 \text{ V DC}$		– – – – –	– – – – –	25 25 25 20 15	25 25 25 20 15			
	Electrical endurance	DC-1			op. c.	100.000				
	DC-3 (L/R ≤ 2 ms) Rated operational current: 1 pole	$U_e = 24 \text{ V DC}$ $U_e = 48 \text{ V DC}$ $U_e = 60 \text{ V DC}$ $U_e = 110 \text{ V DC}$ $U_e = 220 \text{ V DC}$		A		10 5 2 1 0.1	10 5 2 1 0.1	15 8 4 1.3 0.2	15 8 4 1.3 0.2	
	2 poles connected in series	$U_e = 24 \text{ V DC}$ $U_e = 48 \text{ V DC}$ $U_e = 60 \text{ V DC}$ $U_e = 110 \text{ V DC}$ $U_e = 220 \text{ V DC}$			20 10 8 4 0.4	20 10 8 4 0.4	25 16 12 5.5 0.6	25 16 12 5.5 0.6		
	3 poles connected in series	$U_e = 24 \text{ V DC}$ $U_e = 48 \text{ V DC}$ $U_e = 60 \text{ V DC}$ $U_e = 110 \text{ V DC}$ $U_e = 220 \text{ V DC}$			– – – – –	– – – – –	25 25 25 15 3	25 25 25 15 3		
	4 poles connected in series	$U_e = 24 \text{ V DC}$ $U_e = 48 \text{ V DC}$ $U_e = 60 \text{ V DC}$ $U_e = 110 \text{ V DC}$ $U_e = 220 \text{ V DC}$			– – – – –	– – – – –	25 25 25 20 8	25 25 25 20 8		
	Electrical endurance	DC-3				op. c.	100.000			

1) Data for single-phase power are valid for versions -22, -20 and -02

Contactors

IK-R INSTALLATION CONTACTORS

IKA20-R, IKA25-R, IKD20-R, IKD25-R

TECHNICAL DATA

MAIN CIRCUIT	Type			A	IKA20-R	IKD20-R	IKA25-R	IKD25-R
	DC-5 (L/R ≤ 7,5 ms) Rated operational current:							
	1 pole	$U_e = 24\text{ V DC}$			10	10	15	15
		$U_e = 48\text{ V DC}$			4	4	5	5
		$U_e = 60\text{ V DC}$			1	1	3	3
		$U_e = 110\text{ V DC}$			0.3	0.3	0.5	0.5
		$U_e = 220\text{ V DC}$			0.06	0.06	0.1	0.1
	2 poles connected in series	$U_e = 24\text{ V DC}$			20	20	25	25
		$U_e = 48\text{ V DC}$			8	8	15	15
		$U_e = 60\text{ V DC}$			6	6	10	10
		$U_e = 110\text{ V DC}$			2	2	4	4
		$U_e = 220\text{ V DC}$			0.2	0.2	0.4	0.4
3 poles connected in series	$U_e = 24\text{ V DC}$		–	–	25	25		
	$U_e = 48\text{ V DC}$		–	–	25	25		
	$U_e = 60\text{ V DC}$		–	–	20	20		
	$U_e = 110\text{ V DC}$		–	–	12	12		
	$U_e = 220\text{ V DC}$		–	–	2	2		
4 poles connected in series	$U_e = 24\text{ V DC}$		–	–	25	25		
	$U_e = 48\text{ V DC}$		–	–	25	25		
	$U_e = 60\text{ V DC}$		–	–	25	25		
	$U_e = 110\text{ V DC}$		–	–	15	15		
	$U_e = 220\text{ V DC}$		–	–	5	5		
Electrical endurance DC-5			op. c.	100.000				
Terminal capacity	rigid	S	mm²	1 ... 10				
	flexible			1 ... 6				
Screw				M3.5				
Head screw				PZ1				
Tightening torque			Nm	1.2				
AUXILIARY CIRCUIT	Rated operational voltage		U_e	V	230	230	400	400
	Rated insulation voltage		U_i	V	230	230	440	440
	Rated impulse withstand voltage		U_{imp}	kV	4			
	Thermal current		I_{th}	A	20	20	25	25
	AC-15 Rated operational current	single-phase 230 V	I_e	A	6	6	6	6
		single-phase 400 V			–	–	4	4
Electrical endurance AC-15			op. c.	300.000	300.000	500.000	500.000	
CONTROL CIRCUIT	Range of control voltage		U_c	%	85 ... 110			
	Kind of voltages				AC	AC, DC	AC	AC, DC
	Control voltages		U_c	V	12 ... 230			
	Frequency (AC)		f	Hz	50/60 2)			
	Surge immunity test (1.2/50 µs), acc. to IEC/EN 61000-4-5			kV	2			
	Coil consumption	switch-on (handle in A)		VA/W	12/10	2.1/2.1	33/25	2.6/2.6 3)
		switch-on (handle in I)			6/3.8	2.1/2.1	10/5	2.6/2.6 3)
		operation			2.8/1.2	2.1/2.1	5.5/1.6	2.6/2.6 3)
	Make/break delays		make break	ms	15 – 25 10 – 30	15 – 45 20 – 50	10 – 30 10 – 30	15 – 45 20 – 70
	Terminal capacity	rigid	S	mm²	1 ... 2.5			
		flexible			1 ... 2.5			
	Screw				M3			
Screw head				PZ1				
Tightening torque			Nm	0.6				

²⁾ IKD20-R and IKD25-R can be controlled by ac voltage with frequency from 40 Hz to 400 Hz

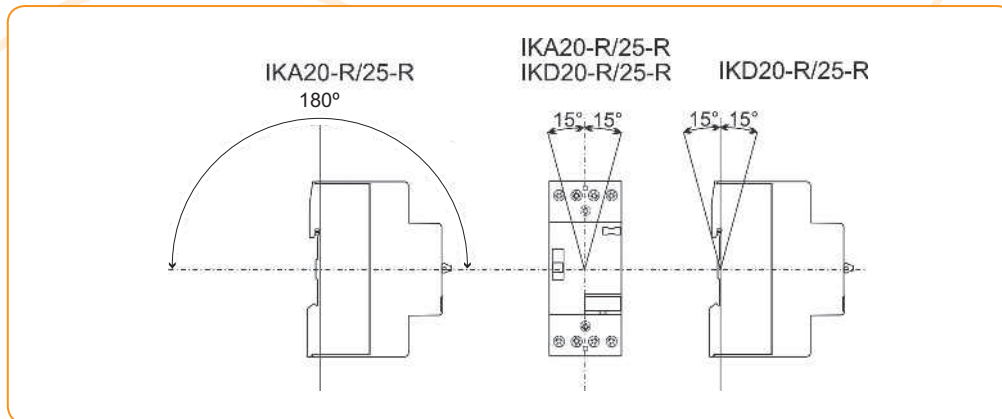
³⁾ Coil consumption for version -04 is 3.8 VA / 3.8 W

Contactors

IK-R INSTALLATION CONTACTORS

IKA20-R, IKA25-R, IKD20-R, IKD25-R

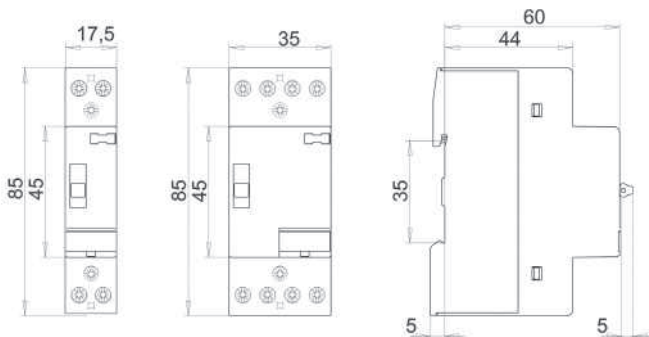
OPERATION POSITION FOR CONTACTORS IKA20-R, IKD20-R, IKA25-R, IKD25-R



DIMENSIONS

CONTACT ARRANGEMENTS

IKA20-R, IKD20-R, IKA25-R, IKD25-R



SEALING COVER



Ventilation module

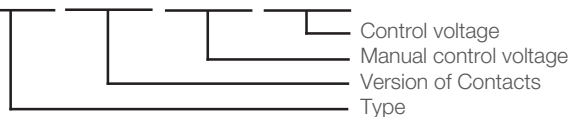


IKA20-20-R IKD20-20-R		IKA20-11-R IKD20-11-R	
IKA25-40-R IKD25-40-R		IKA25-31-R IKD25-31-R	
IKA25-30-R IKD25-30-R		IKA25-20-R IKD25-20-R	
IKA20-02-R IKD20-02-R		IKA25-04-R IKD25-04-R	
IKA25-22-R IKD25-22-R		IKA20-10-R IKD20-10-R	
IKA-20-01-R IKD-20-01-R			

ORDERING DATA

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

IKA20 - 20 - R / 230



Contactors

IKN AUXILIARY SWITCH



The IKN auxiliary switch is mainly used for indicating the contactor switching condition and also for control of heavier electromagnetic loads (above 72 VA).

The IKN auxiliary switch is provided with two contacts in the following versions:

- version-11 with one break and one make contact
- version-20 with two make contacts
- version-02 with two break contacts

Degree of protection IP20.

This auxiliary switch can be used at contactors IKA20-R, IKA25-R, IKD25-R, IKA20, IKA25, IKD25, IK40, IK63

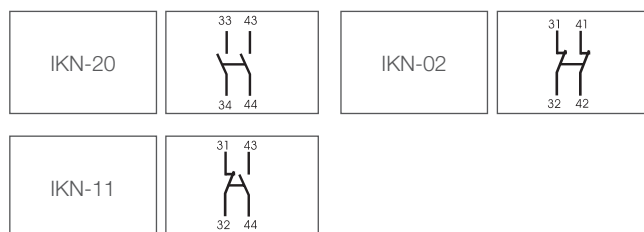
Available also special versions of auxiliary switch with UL certificate (contact us for details)

The auxiliary switch should not be applied in combination with IKD20 and IKD20-R.

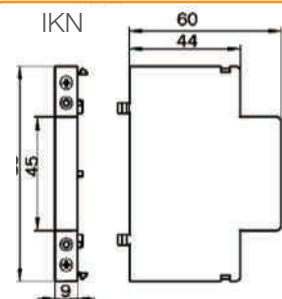
TEHKNICAL DATA

GENERAL	Type			IKN
	Standards			IEC/EN 60947-5-1
	Approvals			CB, NF, EAC
	Module width			1/2
MAIN CIRCUIT	Rated insulation voltage	U_i	V	500
	Rated impulse withstand voltage	U_{imp}	kV	4
	Thermal current	I_{th}	A	6
	Rated operational voltage	U_e	V	230
				400
	Rated operational current AC-15	I_e	A	6
				4
	$U_e = 230\text{ V}$			
	$U_e = 400\text{ V}$			
	Electrical endurance		op. c.	50,000
	Mechanical endurance		op. c.	3×10^6
	Min. distance of open contacts		mm	4
	Contact reliability			12 V; $\geq 5\text{ mA}$
	Power loss per pole		W	0.3
	Weight		kg	0.035
	Max. back-up fuse for short-circuit protection gL Coordination type 2.	I_v	A	6
	Terminal capacity	S	mm ²	1 ... 2.5
				1 ... 2.5
	Screw			M3
	Screw head			PZ1
	Tightening torque		Nm	0.6

CONTACT ARRANGEMENTS



DIMENSIONS



Contactors

IK INSTALLATION CONTACTORS

IKA220, IKD220, IKA425, IKD425, IKA440, IKD440, IKA463, IKD463



INTENDED USE:

- Customer units in dwellings
- Business premises
- Hotels
- Hospitals
- Shopping centres
- Sport centres
- Production halls
- Warehouses
- Public places

REMOTE SWITCHING AND AUTOMATIC CONTROL:

- Single-phase motors
- Three-phase motors
- Different pumps
- Air-conditioning
- Electric heating
- Lightning

SILENT OPERATION:

- Rectifier enable AC or DC voltage control
- Overvoltage protection with varistor
- IKD220, IKD425, IKD440 and IKD463

AC CONTROL:

- Fast switching
- IKA220, IKA425, IKA440 and IKA463

OTHER BENEFITS:

- Used as main or auxiliary
- Mounting on DIN rail
- Sealing terminal covers for direct protection against contact with live parts
- IKV ventilation module for preventing exceeded heating when contactors are used side-by-side

TECHNICAL DATA

Type				IKA220	IKD220	IKA425	IKD425
GENERAL	Standards			UL 60947-4-1, IEC 60947-4-1, EN 60947-4-1, IEC 61095, EN 61095, IEC 60947-5-1, EN 60947-5-1			
	Approvals			UL, CSA			
	Protection degree			IP20			
	Mechanical endurance		op. c.	3.000.000			
	Ambient temperature			23 °F...104 °F/-5 °C...+40 °C			
	Storage temperature			-22 °F...176 °F/-30 °C...+80 °C			
	No. of contactors side-by-side without ventilation module			max. 3		no limitation	max. 3
	Contact reliability			17 V/≥50 mA			
	Min. distance of open contacts		in/mm	0.1417/3.6			
	Power dissipation per pole		W	1.7	1.7	2.2	2.2
	Overload current withstand capability (10 s)		A	72	72	68	68
	Max. back-up fuse for short-circuit protection			20 A (gL) 20 A (K5)	20 A (gL) 20 A (K5)	25 A (gL) 25 A (K5)	25 A (gL) 25 A (K5)
	Max. operating frequency	No load	op. c./h	3000			
		AC-1/AC-3/AC-6b		600			
		AC-15		1200			
		El. switching acc. UL 60947-4-1		360			
	Weight		lb/kg	0.29/0.13	0.29/0.13	0.53/0.24	0.53/0.24

Contactors

IK INSTALLATION CONTACTORS

IK A220, IK D220, IK A425, IK D425, IK A440, IK D440, IK A463, IK D463

TECHNICAL DATA									
MAIN CIRCUIT - UL/CSA	Type					IK A220	IK D220	IK A425	IK D425
	Motor power	1-phase	120 V	HP		1/3	1/3	1/3	1/3
		1-phase	208 V			3/4	3/4	3/4	3/4
		1-phase	240 V			1	1	1	1
		3-phase	120 V					1	1
		3-phase	208 V					2	2
		3-phase	240 V					3	3
		3-phase	480 V					5	5
	General use	1-phase	240 V	A		20	20		
		3-phase	480 V					25	25
	Discharge lamps (standard ballast)	1-phase	240 V	A		20	20		
		3-phase	480 V					25	25
MAIN CIRCUIT - IEC/EN	Auxiliary circuit					B300, P300	B300, P300	B300, P300	B300, P300
	Rated insulation voltage			U_i	V	300	300	500	500
	Rated impulse withstand voltage			U_{imp}	kV	4	4	4	4
	Thermal current			I_{th}	A	20	20	25	25
	Rated operational voltage			U_e	V	230	230	400	400
	Rated frequency			f	Hz	50/60	50/60	50/60	50/60
	Rated operational current AC-1/AC-7a			I_e	A	20	20	25	25
	Operational power	1-phase	230 V	P_e	W	4	4	5.4	5.4
		3-phase	230 V					9	9
	AC-1/AC-7a	3-phase	400 V					16	16
	Electrical endurance AC-1/AC-7a				op. c.	200000			
	Rated operational current AC-3/AC-7b			I_e	A	9 NO/6 NC	9 NO/6 NC	8.5	8.5
	Operational power	1-phase	230 V	P_e	A	1.3 NO/0.75 NC	1.3 NO/0.75 NC	1.3	1.3
		3-phase	230 V					2.2	2.2
	AC-3/AC-7b	3-phase	400 V					4	4
	Electrical endurance AC-3/AC-7b				op. c.	300000		500000	
	Switching of capacitor AC-6b		230 V	C	μF	30	30	36	36
	Electrical endurance AC-6b				op. c.	100000			
	Auxiliary circuit	1-phase	230 V	I_e	A	6	6	6	6
		1-phase	400 V			4	4	4	4
	Rated operational current AC-15				op. c.	300000		500000	
	Terminal capacity	Rigid		S	AWG/ mm ²	16...10/1...10	16...10/1...10	16...10/1...10	16...10/1...10
		Flexible				16...8/1...6	16...8/1...6	16...8/1...6	16...8/1...6
	Screw					M3.5	M3.5	M3.5	M3.5
	Screw head					PZ1	PZ1	PZ1	PZ1
	Tightening torque				lb-in/Nm	10.62/1.2	10.62/1.2	10.62/1.2	10.62/1.2
CONTROL CIRCUIT	Range of control voltage			U_c	%	85...110			
	Control voltages			U_c	V	12...240			
	Kind of voltage			U_c		AC	AC, DC	AC	AC, DC
	Surge immunity test (1.2/50 μs), acc. to IEC/EN 61000-4-5				kV	2			
	Coil consumption	Switch-on			VA/W	12/10	2.1/2.1	33/25	2.6/2.6 ¹⁾
		Operation				2.8/1.2	2.1/2.1	5.5/1.6	2.6/2.6 ¹⁾
	Make/break delays	Make			ms	15...25	15...45	10...30	15...45
		Break				10...30	20...50	10...30	20...70
	Terminal capacity	Rigid		S	AWG/ mm ²	16...14/1...2.5	16...14/1...2.5	16...14/1...2.5	16...14/1...2.5
		Flexible				16...14/1...2.5	16...14/1...2.5	16...14/1...2.5	16...14/1...2.5
	Screw					M3	M3	M3	M3
	Screw head					PZ1	PZ1	PZ1	PZ1
	Tightening torque				lb-in/Nm	5.31/0.6	5.31/0.6	5.31/0.6	5.31/0.6

1) Coil consumption for version -04 is 3.8 VA/W

2) Coil consumption for versions -22 and -04 is 6.1 VA/W

Contactors

IK INSTALLATION CONTACTORS

IKA220, IKD220, IKA425, IKD425, IKA440, IKD440, IKA463, IKD463

TECHNICAL DATA									
	Type					IKA440	IKD440	IKA463	IKD463
GENERAL	Standards					UL 60947-4-1, IEC 60947-4-1, EN 60947-4-1, IEC 61095, EN 61095, IEC 60947-5-1, EN 60947-5-1			
	Approvals					UL, CSA			
	Protection degree					IP20			
	Mechanical endurance				op. c.	3.000.000			
	Surrounding air temperature					23 °F...104 °F/-5 °C...+40 °C, (IKA)...+35 °C (IKD)			
	Storage temperature					-22 °F...176 °F/-30 °C...+80 °C			
	No. of contactors side-by-side without ventilation module					no limitation	max. 3	no limitation	max. 3
	Contact reliability					17 V/≥50 mA			
	Min. distance of open contacts				in/mm	0.1417/3.6			
	Power dissipation per pole				W	4	4	8	8
	Overload current withstand capability (10 s)				A	176	176	240	240
	Max. back-up fuse for short-circuit protection					63 A (gL) 60 A (K5)	63 A (gL) 60 A (K5)	80 A (gL) 70 A (K5)	80 A (gL) 70 A (K5)
	Max. operating frequency		No load		op. c./h	3000			
AC-1/AC-3/AC-6b				600					
AC-15				1200					
El. switching acc. UL 60947-4-1				360					
Weight				lb/kg	0.77/0.35	0.93/0.42	0.77/0.35	0.93/0.42	
MAIN CIRCUIT - UL/CSA	Motor power	1-phase	120 V		HP	1	1	2	2
		1-phase	208 V			2	2	3	3
		1-phase	240 V			3	3	5	5
		3-phase	120 V			3	3	5	5
		3-phase	208 V			7-1/2	7-1/2	10	10
		3-phase	240 V			7-1/2	7-1/2	10	10
		3-phase	480 V			15	15	20	20
		General use	1-phase			240 V	A		
	3-phase		480 V	40	40	63		63	
	Discharge lamps (standard ballast)	1-phase	240 V	A					
3-phase		480 V	30		30	40	40		
Auxiliary circuit					B300, P300	B300, P300	B300, P300	B300, P300	
MAIN CIRCUIT - IEC/EN	Rated insulation voltage			U_i	V	600	600	600	600
	Rated impulse withstand voltage			U_{imp}	kV	4	4	4	4
	Thermal current			I_{th}	A	40	40	63	63
	Rated operational voltage			U_e	V	400	400	400	400
	Rated frequency			f	Hz	50/60	50/60	50/60	50/60
	Rated operational current AC-1/AC-7a			I_e	A	40	40	63	63
	Operational power AC-1/AC-7a	1-phase	230 V	P_e	W	8.7	8.7	13.3	13.3
		3-phase	230 V			16	16	25	25
		3-phase	400 V			26	26	40	40
	Electrical endurance AC-1/AC-7a				op. c.	100000			
	Rated operational current AC-3/AC-7b			I_e	A	22	22	30	30
	Operational power AC-3/AC-7b	1-phase	230 V	P_e	A	3.7	3.7	5	5
		3-phase	230 V			5.5	5.5	8.5	8.5
		3-phase	400 V			11	11	15	15
	Electrical endurance AC-3/AC-7b				op. c.	150000			
	Switching of capacitor AC-6b			230 V	C	μF	220	330	330
	Electrical endurance AC-6b				op. c.	100000			
	Auxiliary circuit	1-phase	230 V	I_e	A	6	6	6	6
		1-phase	400 V			4	4	4	4
	Rated operational current AC-15								
	Electrical endurance AC-15				op. c.	150000			
	Terminal capacity	Rigid		S	AWG/ mm²	14...10/1.5...25	14...10/1.5...25	14...10/1.5...25	14...10/1.5...25
		Flexible				14...4/1.5...16	14...4/1.5...16	14...4/1.5...16	14...4/1.5...16
	Screw					M5	M5	M5	M5
	Screw head					PZ2	PZ2	PZ2	PZ2
Tightening torque				lb-in/Nm	30.98/3.5	30.98/3.5	30.98/3.5	30.98/3.5	

Contactors

IK INSTALLATION CONTACTORS

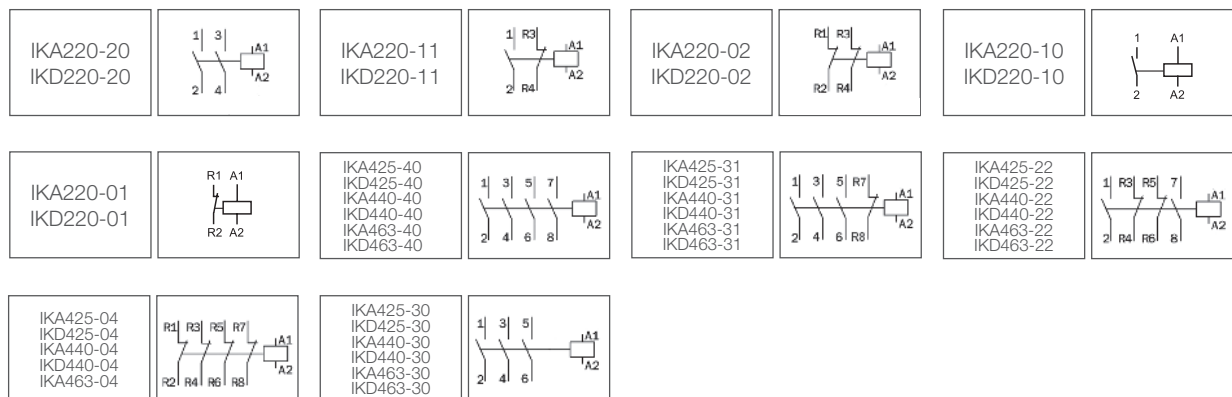
IK A220, IKD220, IK A425, IKD425, IK A440, IKD440, IK A463, IKD463

TECHNICAL DATA

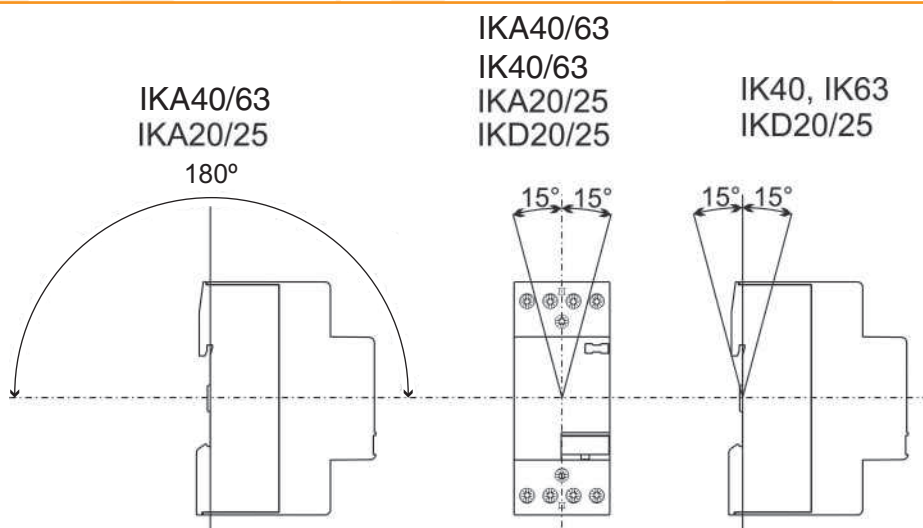
CONTROL CIRCUIT	Type			IK A440	IKD440	IK A463	IKD463
	Range of control voltage	U_c	%	85...110			
	Control voltages	U_c	V	12...240			
	Kind of voltage	U_c		AC	AC, DC	AC	AC, DC
	Surge immunity test (1.2/50 μ s), acc. to IEC/EN 61000-4-5		kV	2			
	Coil consumption	Switch-on	VA/W	15.4/6	5/5 2)	15.4/6	5/5 2)
		Operation		7.7/3	5/5 2)	7.7/3	5/5 2)
	Make/break delays	Make	ms	10...20	15...20	10...20	15...20
		Break		10...15	35...45	10...15	10...15
	Terminal capacity	Rigid	S	AWG/ mm ²	16...14/1...2.5	16...14/1...2.5	16...14/1...2.5
		Flexible			16...14/1...2.5	16...14/1...2.5	16...14/1...2.5
	Screw			M3	M3	M3	M3
	Screw head			PZ1	PZ1	PZ1	PZ1
	Tightening torque		lb-in/Nm	5.31/0.6	5.31/0.6	5.31/0.6	5.31/0.6

2) Coil consumption for versions -22 and -04 is 6.1 VA/W

CONTACT ARRANGEMENTS



CAUTIONS AND WARNINGS



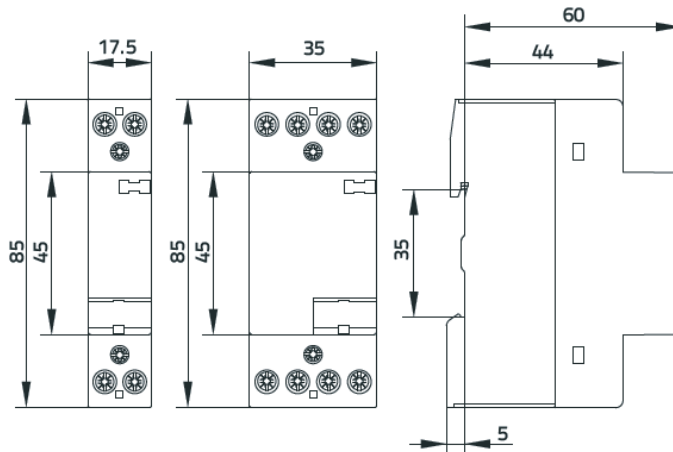
Contactors

IK INSTALLATION CONTACTORS

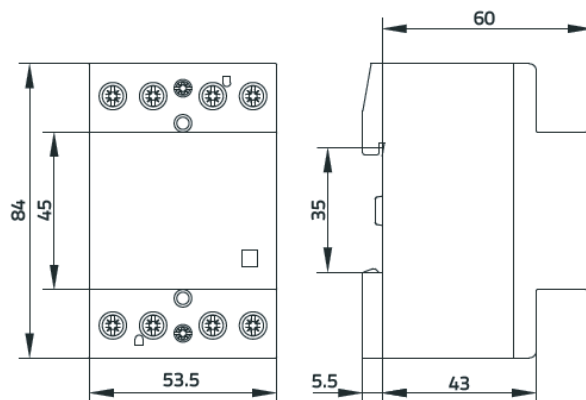
IKA220, IKD220, IKA425, IKD425, IKA440, IKD440, IKA463, IKD463

DIMENSIONS

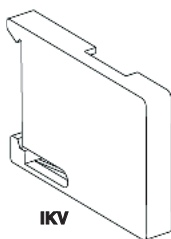
IKA220, IKD220 / IKA425,
IKD425



IKA440, IKD440, IKA463, IKD463



VENTILATION MODUL

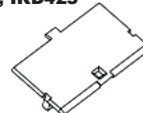


SEALING COVER

IKA440, IKD440,
IKA463, IKD463



IKA425, IKD425



IKA220, IKD220



ORDERING DATA:

IKA463 - 40 230 V

 _____ Control voltage
 _____ Version of contacts
 _____ Type

Contactors

Auxiliary Switch IKN



INTENDED USE:

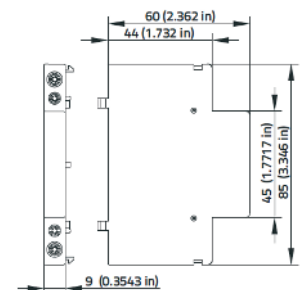
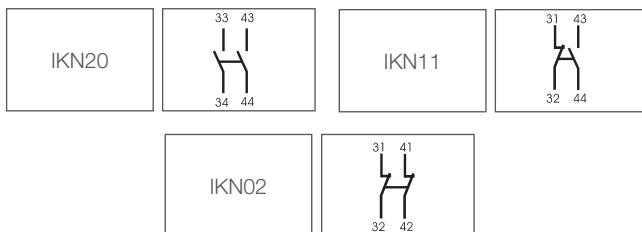
- The IKN auxiliary switch is mainly used for indicating the contactor switching condition and also for control of heavier electromagnetic loads
- The IKN auxiliary switch is provided with two contacts in the versions:
 - 11 with one break and one make contact
 - 20 with two make contacts
 - 02 with two break contacts
- This auxiliary switch can not be used only at contactor IKD220.

TECHNICAL DATA

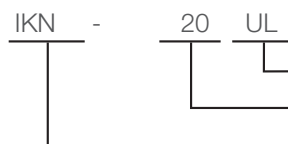
GENERAL	Type			IKN
	Standards			UL 508, CSA C22.2 No. 14 IEC 60947-5-1, EN 60947-5-1
	Approvals			UL, CSA
	Protection degree			IP20
	Mechanical endurance		op. c.	3.000.000
	Contact reliability			12 V; ≥ 5 mA
	Power dissipation per pole at $I_{th} = 6$ A		W	0,3
	Min. distance of open contacts		in/mm	0.1575/4
	Max. back-up fuse for short-circuit protection			6 A (gL) 6 A (K5)
	Weight		lb/kg	0.08/0.035
UL CSA	Auxiliary circuit			C300 (120 VAC, 240 VAC) Q300 (125 VDC, 250 VDC)
	Continuous thermal current	I_{th}	A	2.5
IEC/EN	Rated insulation voltage	U_i	V	500
	Rated impulse withstand voltage	U_{imp}	kV	4
	Thermal current	I_{th}	A	6
	Rated operational voltage	U_e	V	230 and 400
	Rated operational current AC-15	$I_e = 230$ V	A	6
		$U_e = 400$ V		4
	Electrical endurance AC-15		op. c.	50000
	Terminal capacity	Rigid	S	-/1...2.5
		Flexible		16/1...2.5
	Screw			M3
	Screw head			PZ1
	Tightening torque		lb-in/Nm	7.08/0.8

CONTACT ARRANGEMENTS

DIMENSIONS



ORDERING DATA:



UL/CSA approved
Version of contacts
Type

Bistable Switch



INTENDED USE:

- Residential buildings
- Buisness premises
- Hotels
- Hospitals
- Shoping centres
- Production halls
- Warehouses
- Public places

ADVANCED OPERATION:

- Impulse control
- Manual control

OTHER BENEFITS:

- Small switch on coil consumption
- No hold coil consumption
- Wide application
- Mounting on 35 mm rail
- Sealing terminal covers

REMOTE SWITCHING AND AUTOMATIC CONTROL:

- Lightning
- Electric heating
- Electric motors
- Electric equipment

TECHNICAL DATA

				BI220	BI225	BI232
GENERAL	Type					
	Standards			IEC/EN 60669-2-2		
	Manual control			Yes		
	Control with impulse voltage			Yes		
	Indication			With actuator		
	Protection degree accordance to IEC/EN 60529			IP 20		
	Module width			1		
	Ambient temperature		°C	-25...+55		
	Storage temperature		°C	-30...+80		
	Max. resistance to humidity			95 % RH at +55 °C		
	Min. contact reliability			10 V / 100 mA		
	Max. shock resistance accordance to IEC/EN 60068-2-27		g	15		
	Max. vibration resistance accordance to IEC/EN 60068-2-6		g	3		
	Min. distance of open contacts		mm	>3		
	Distance between contacts and coil		mm	>6		
	Mechanical endurance		op. c.	10 ⁶		
	Max. back-up fuse for short-circuit protection (gL)		A	20	25	32
	Power dissipation per pole		W	1.5	2	3
MAIN CIRCUIT	Rated impulse voltage	U_{imp}	kV	4		
	Thermal current	I_{th}	A	20	25	32
	Rated insulation voltage	U_i	V	440		
	Rated operational voltage	U_e	V	440		
	Rated frequency	f_e	Hz	50 / 60		
	Rated operational current for $\cos\phi = 0,6$ acc. to IEC/EN 60669-2-2	I_e	A	20 / 440 V	25 / 440 V	32 / 440 V
	Rated operational current for AC-1 acc. to IEC/EN 60947-4-1	I_e	A	20 / 440 V	25 / 440 V	32 / 440 V
	Rated operational current for AC-7a acc. to IEC/EN 61095 – Slightly inductive loads in household appliances and similar applications	I_e	A	20 / 440 V	25 / 440 V	32 / 440 V
	Rated operational current for AC-21 acc. to IEC/EN 60947-3 – Switching of resistive loads including modetare overloads	I_e	A	20 / 440 V	25 / 440 V	32 / 440 V
	Rated operational current for AC-22 acc. to IEC/EN 60947-3 Switching of mixed resistive and inductive loads, including moderate overloads	I_e	A	20 / 230 V 16 / 440 V	25 / 230 V 20 / 440 V	32 / 230 V 25 / 440 V

Bistable Switch

BI

TECHNICAL DATA

	Type			BI220	BI225	BI232
MAIN CIRCUIT	Rated operational current for AC-23 acc. to IEC/EN 60947-3 Switching of motor loads or other highly inductive loads	I_e	A	16 / 230 V / 1-phase	20 / 230 V / 1-phase	25 / 230 V / 1-phase
	Rated operational current for AC-3 acc. to IEC/EN 60947-4-1 Squirrel-cage motors: starting, switching off motors during running	I_e	A	7 / 230 V / 1-phase	8 / 230 V / 1-phase	10 / 230 V / 1-phase
	Rated operational current for AC-7b acc. to IEC/EN 61095 Motor-loads for household applications	I_e	A	7 / 230 V / 1-phase	8 / 230 V / 1-phase	10 / 230 V / 1-phase
	Rated operational current for AC-6a acc. to IEC/EN 60947-4-1 Switching of transformers having inrush current peaks of not more than 30 times peak of rated current	I_e	A	3 / 230 V 1.5 / 400 V	3.6 / 230 V 1.8 / 400 V	4.5 / 230 V 2.2 / 400 V
	Rated operational current for AC-6b acc. to IEC/EN 60947-4-1 – Switching of capacitor banks	C	μF	100 μF / 230 V		
	Rated operational current for DC-1 acc. to IEC/EN 60947-4-1 – Non- inductive or slightly inductive loads, resistance furnances	I_e	A	20 / 24 V / 1 pole	25 / 24 V / 1 pole	32 / 24 V / 1 pole
	Rated operational current for DC-3 acc. to IEC/EN 60947-4-1 – Shunt- motors: starting, plugging, inching	I_e	A	10 / 24 V / 1 pole	15 / 24 V / 1 pole	25 / 24 V / 1 pole
	Rated operational current for DC-5 acc. to IEC/EN 60947-4-1 – Series- motors: starting, plugging, inching	I_e	A	10 / 24 V / 1 pole	16 / 24 V / 1 pole	20 / 24 V / 1 pole
	Rated operational current for DC-21 acc. to IEC/EN 60947-3 – Switching of resistive loads including moderate overloads	I_e	A	20 / 24 V / 1 pole	25 / 24 V / 1 pole	32 / 24 V / 1 pole
	Rated operational current for DC-22 acc. to IEC/EN 60947-3 – Switching of mixed resistive and inductive loads, including moderate overloads	I_e	A	16 / 24 V / 1 pole	20 / 24 V / 1 pole	25 / 24 V / 1 pole
	Rated operational current for DC-23 acc. to IEC/EN 60947-3 – Switching of highly inductive loads (e.g. series motors)	I_e	A	10 / 24 V / 1 pole	16 / 24 V / 1 pole	20 / 24 V / 1 pole
	Rated operational current for AC-5a acc. to IEC/EN 60947-4-1 – Switching of electric discharge lamp controls	I_e	A	16 / 230 V		
	Rated operational current for AC-5b acc. to IEC/EN 60947-4-1 – Switching of incandescent lamps	I_e	A	10 / 230 V		
	Rated operational current for fluorescent lamps acc. to IEC/EN 60669-2-2	I_e	A	16 / 230 V		
	Fluorescent / energy saving / compact lamps with electronic control gear	I_e	A	2 / 230 V		
	Electrical endurance for all utilization categories		op. c.	10 ⁵		
	Terminal capacity for main circuit	S	mm ²	1...10 rigid / flexible		
	Screw for main circuit			M4		
	Screw-head for main circuit			(±) PZ2		
	Tightening torque for main circuit		Nm	1.2		
CONTROL CIRCUIT	Rated control voltages	U_c	V	AC: 12, 24, 48, 120, 230, 240		
	Rated frequency of control voltage	f_c	Hz	50 / 60		
	Range of control voltage	U_c	%	90...110		
	Coil consumption – inrush		VA/W	18 / 13		
	Coil consumption – hold		VA/W	9 / 4		
	Min. impulse duration at U_c		ms	50		
	Min. impulse duration at 0,85 U_c		ms	100		
	Min. duration between two impulses		ms	150		
	Max. number of impulses per minute			15	7.5	
	Max. impulse duration at U_c			1 hour		
	Terminal capacity for control circuit	S	mm ²	1...4 rigid / flexible		
	Screw for control circuit			M3		
	Screw-head for control circuit			(±) PZ1		
	Tightening torque for control circuit		Nm	0.6		

Bistable Switch

BI

TECHNICAL DATA

GENERAL	Type		BI420	BI425	BI432
	Standards		IEC/EN 60669-2-2		
	Manual control		Yes		
	Control with impulse voltage		Yes		
	Indication		With actuator		
	Protection degree accordance to IEC/EN 60529		IP 20		
	Module width		2		
	Ambient temperature	°C	-25...+55		
	Storage temperature	°C	-30...+80		
	Max. resistance to humidity		95 % RH at +55 °C		
	Min. contact reliability		10 V / 100 mA		
	Max. shock resistance accordance to IEC/EN 60068-2-27	g	15		
	Max. vibration resistance accordance to IEC/EN 60068-2-6	g	3		
	Min. distance of open contacts	mm	>3		
	Distance between contacts and coil	mm	>6		
	Mechanical endurance	op. c.	10 ⁶		
	Max. back-up fuse for short-circuit protection (gL)	A	20	25	32
	Power dissipation per pole	W	1,5	2	3
MAIN CIRCUIT	Rated impulse voltage	U_{imp} kV	4		
	Thermal current	I_{th} A	20	25	32
	Rated insulation voltage	U_i V	440		
	Rated operational voltage	U_e V	440		
	Rated frequency	f_e Hz	50 / 60		
	Rated operational current for $\cos\phi = 0,6$ acc. to IEC/EN 60669-2-2	I_e A	20 / 440 V	25 / 440 V	32 / 440 V
	Rated operational current for AC-1 acc. to IEC/EN 60947-4-1	I_e A	20 / 440 V	25 / 440 V	32 / 440 V
	Rated operational current for AC-7a acc. to IEC/EN 61095 – Slightly inductive loads in household appliances and similar applications	I_e A	20 / 440 V	25 / 440 V	32 / 440 V
	Rated operational current for AC-21 acc. to IEC/EN 60947-3 – Switching of resistive loads including moderate overloads	I_e A	20 / 440 V	25 / 440 V	32 / 440 V
	Rated operational current for AC-22 acc. to IEC/EN 60947-3 Switching of mixed resistive and inductive loads, including moderate overloads	I_e A	20 / 230 V 16 / 440 V	25 / 230 V 20 / 440 V	32 / 230 V 25 / 440 V
	Rated operational current for AC-23 acc. to IEC/EN 60947-3 Switching of motor loads or other highly inductive loads	I_e A	16 / 230 V / 1-phase 16 / 230 V / 3-phase 16 / 400 V / 3-phase	20 / 230 V / 1-phase 20 / 230 V / 3-phase 20 / 400 V / 3-phase	25 / 230 V / 1-phase 25 / 230 V / 3-phase 25 / 400 V / 3-phase
	Rated operational current for AC-3 acc. to IEC/EN 60947-4-1 Squirrel-cage motors: starting, switching off motors during running	I_e A	7 / 230 V / 1-phase 6.3 / 230 V / 3-phase 6.6 / 400 V / 3-phase	8 / 230 V / 1-phase 8.7 / 230 V / 3-phase 8.5 / 400 V / 3-phase	10 / 230 V / 1-phase 11.5 / 230 V / 3-phase 11.3 / 400 V / 3-phase
	Rated operational current for AC-7b acc. to IEC/EN 61095 Motor-loads for household applications	I_e A	7 / 230 V / 1-phase 6.3 / 230 V / 3-phase 6.6 / 400 V / 3-phase	8 / 230 V / 1-phase 8.7 / 230 V / 3-phase 8.5 / 400 V / 3-phase	10 / 230 V / 1-phase 11.5 / 230 V / 3-phase 11.3 / 400 V / 3-phase
	Rated operational current for AC-6a acc. to IEC/EN 60947-4-1 Switching of transformers having inrush current peaks of not more than 30 times peak of rated current	I_e A	3 / 230 V 1.5 / 400 V	3.6 / 230 V 1.8 / 400 V	4.5 / 230 V 2.2 / 400 V
	Rated operational current for AC-6b acc. to IEC/EN 60947-4-1 – Switching of capacitor banks	C	μ F	100 μ F / 230 V	
	Rated operational current for DC-1 acc. to IEC/EN 60947-4-1 – Non-inductive or slightly inductive loads, resistance furnaces	I_e A	20 / 24 V / 1 pole	25 / 24 V / 1 pole	32 / 24 V / 1 pole
	Rated operational current for DC-3 acc. to IEC/EN 60947-4-1 – Shunt-motors: starting, plugging, inching	I_e A	10 / 24 V / 1 pole	15 / 24 V / 1 pole	25 / 24 V / 1 pole
	Rated operational current for DC-5 acc. to IEC/EN 60947-4-1 – Series-motors: starting, plugging, inching	I_e A	10 / 24 V / 1 pole	16 / 24 V / 1 pole	20 / 24 V / 1 pole
	Rated operational current for DC-21 acc. to IEC/EN 60947-3 – Switching of resistive loads including moderate overloads	I_e A	20 / 24 V / 1 pole	25 / 24 V / 1 pole	32 / 24 V / 1 pole
	Rated operational current for DC-22 acc. to IEC/EN 60947-3 – Switching of mixed resistive and inductive loads, including moderate overloads	I_e A	16 / 24 V / 1 pole	20 / 24 V / 1 pole	25 / 24 V / 1 pole
	Rated operational current for DC-23 acc. to IEC/EN 60947-3 – Switching of highly inductive loads (e.g. series motors)	I_e A	10 / 24 V / 1 pole	16 / 24 V / 1 pole	20 / 24 V / 1 pole
	Rated operational current for AC-5a acc. to IEC/EN 60947-4-1 – Switching of electric discharge lamp controls	I_e A	16 / 230 V		
	Rated operational current for AC-5b acc. to IEC/EN 60947-4-1 – Switching of incandescent lamps	I_e A	10 / 230 V		
	Rated operational current for fluorescent lamps acc. to IEC/EN 60669-2-2	I_e A	16 / 230 V		
	Fluorescent / energy saving / compact lamps with electronic control gear	I_e A	2 / 230 V		

BI

MAIN CIRCUIT	Type			BI420	BI425	BI432
	Electrical endurance for all utilization categories		op. c.	10 ⁵		
	Terminal capacity for main circuit	S	mm ²	1...10 rigid / flexible		
	Screw for main circuit			M4		
	Screw-head for main circuit			(±) PZ2		
	Tightening torque for main circuit		Nm	1.2		
CONTROL CIRCUIT	Rated control voltages	U_c	V	AC: 12, 24, 48, 120, 230, 240		
	Rated frequency of control voltage	f_c	Hz	50 or 60		
	Range of control voltage	U_c	%	90...110		
	Coil consumption – inrush		VA/W	18 / 13		
	Coil consumption – hold		VA/W	9 / 4		
	Min. impulse duration at U_c		ms	50		
	Min. impulse duration at 0,85 U_c		ms	100		
	Min. duration between two impulses		ms	150		
	Max. number of impulses per minute			15		7.5
	Max. impulse duration at U_c			1 hour		
	Terminal capacity for control circuit	S	mm ²	1...4 rigid / flexible		
	Screw for control circuit			M3		
	Screw-head for control circuit			(±) PZ1		
Tightening torque for control circuit		Nm	0.6			

BI220-10 BI225-10 BI232-10		BI220-20 BI225-20 BI232-20		BI420-30 BI425-30 BI432-30		BI420-40 BI425-40 BI432-40	
BI220-11 BI225-11 BI232-11		BI420-21 BI425-21 BI432-21		BI420-31 BI425-31 BI432-31		BI220-22 BI225-22 BI232-22	
BI220-1C BI225-1C BI232-1C		BI220-2C BI225-2C BI232-2C		BI420-31 BI425-31 BI432-31		BI420-40 BI425-40 BI432-40	

Technical drawing of the SEALING COVER (Fig. 1) showing front and side views with dimensions.

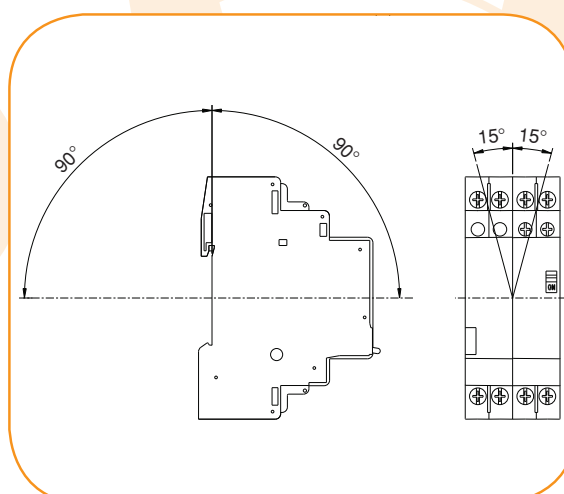
Front View Dimensions:

- Overall width: 17.6
- Overall height: 90
- Top section height: 45
- Bottom section height: 45

Side View Dimensions:

- Overall width: 44
- Overall height: 90
- Top section height: 45
- Bottom section height: 45

SEALING COVER



BI220 - 20 230 V

62

Motor protection switches

MS25, MST25, MS20, MST20



- Versions:
 - MS25 - with thermal and magnetic releases
 - MST25 - with a thermal release only
 - MS20 - with thermal and magnetic releases for single-phase loads
 - MST20 - with a thermal overload release for single phase loads
- Manual control:
 - START, STOP, push-buttons
 - Test of release function (TEST)
- Automatic switch-off with thermal or magnetic release
- Control with under-voltage release or shunt release
- An auxiliary switch for side mounting or flush mounting used for indication of the switching state
- ON/OFF, push-buttons position unequivocally indicates the switching position of main circuit contacts
- Contact material:
 - Resistant to contact welding
 - Enables low contact heating

- Isolating distance between contacts: 4.5 mm per contact place
- Connection of a rigid or flexible conductor
- Assembly to 35 mm wide mounting rail in accordance with EN 60715 or fixing with two screws
- Vertical or horizontal operational position

TECHNICAL DATA

GENERAL	Standards			IEC/EN 60947-2, IEC/EN 60947-4-1, IEC/EN 60947-5-1, IEC/EN 60204, UL 508, CSA 22.2 No. 14
	Approvals			UL
	Climatic class			constant damp heat acc. to IEC 60068-2-78 cyclic damp heat acc. to IEC 60068-2-30
	Degree of protection			IP20, after terminals covering IP40
	Ambient temperature		°C	-25 ... +60
	Storage temperature		°C	-25 ... +70
	Temperature range of thermal compensation for overload release		°C	-5 ... +40
	Mechanical and electrical endurance		op. c.	100.000
	Max. operating cycles		op. / h	25
	Shock resistance acc. to IEC 68-2-27		g	20
	Vibration resistance acc. to IEC 68-2-6			5 g at f = 5 ... 150 Hz
	Overvoltage category / pollution degree			III / 3
	Rated insulation voltage	U_i	V	690
	Rated impulse withstand voltage	U_{imp}	kV	6
	Weight		kg	0.252

Motor protection switches

MS25, MST25, MS20, MST20

TECHNICAL DATA					
MAIN CIRCUIT	Designation of connection terminals				1 – L1 ; 3 – L2 ; 5 – L3 ; 2 – T1 ; 4 – T2 ; 6 – T3
	Terminal capacity	rigid	S	mm ²	0.75 ... 6
		flexible			0.75 ... 4
	Screw				with self-lifting clamp, protected against falling out
	Screw head				PZ2
	Tightening torque			Nm	1.8
	Max. operational voltage		U_e	V	690
	Setting range			A	0.1 – 0.16 (only MS25); 0.16 – 0.25 (only MS25); 0.25 – 0.4; 0.4 – 0.63; 0.63 – 1; 1 – 1.6; 1.6 – 2.5; 2.5 – 4; 4 – 6.3; 6.3 – 10; 10 – 16; 16 – 20; 20 – 25
	No. of poles				3
	Operating current of thermal overload release		I		$1.05 I_r < I \leq 1.20 I_r$ I_r ...set value
	Sensitivity to phase failure				yes
	Power dissipation on pole at load with I_n		P	W	2 – 2.5
	Utilization category	acc. to IEC/EN 60947-4-1			AC-3
		acc. to IEC/EN 60947-2			A
	Trip class acc. to IEC/EN 60947-4-1				10A

SWITCH SELECTION FOR MOTOR PROTECTION						
Standard motor power						Setting range
Single-phase	Three-phase					
220 V 230 V 240 V	220 V 230 V 240 V	380 V 400 V 415 V	440 V	500 V	660 V 690 V	
kW						A
		0.02			0.06	0.1 ... 0.16
		0.06	0.06	0.06	0.09	0.16 ... 0.25
	0.06	0.09	0.12	0.12	0.18	0.25 ... 0.4
	0.09	0.12	0.18	0.25	0.25	0.4 ... 0.63
0.06 ... 0.09	0.09 ... 0.12	0.18 ... 0.25	0.25	0.37	0.37 ... 0.55	0.63 ... 1
0.12	0.18 ... 0.25	0.37 ... 0.55	0.37 ... 0.55	0.55 ... 0.8	0.75 ... 1.1	1 ... 1.6
0.18 ... 0.25	0.37	0.75 ... 1.1	0.75 ... 1.1	1.1	1.5	1.6 ... 2.5
0.37	0.55 ... 0.8	1.1 ... 1.5	1.5	1.5 ... 2.2	2.2 ... 3	2.5 ... 4
0.55 ... 0.75	1.1 ... 1.5	2.2 ... 2.5	2.2 ... 3	3	4	4 ... 6.3
1.1 ... 1.5	1.5 ... 2.5	3 ... 4	4 ... 5	4 ... 5.5	5.5 ... 7.5	6.3 ... 10
2.2	3 ... 4	5 ... 7.5	5.5 ... 9	7.5 ... 9	11	10 ... 16
3	5.5	9	11	11 ... 12.5	15	16 ... 20
	5.5 ... 7.5	11 ... 12.5	12.5	15	18.5	20 ... 25

Motor protection switches

MS25, MST25, MS20, MST20

MS25 motor protection switches, rated ultimate short-circuit breaking capacity I_{cu} and max. back-up fuses if prospective short-circuit current I_{cp} exceeds I_{cu} :

TECHNICAL DATA

Type	Operating current of short-circuit release (A)	Rated ultimate short-circuit breaking capacity I_{cu} (kA)				Max. back-up fuse, if $I_{cp} > I_{cu}$ (gL) (A)			
		230 V	400 V	500 V	690 V	230 V	400 V	500 V	690 V
		I_{cu}	I_{cu}	I_{cu}	I_{cu}				
MS25 – 0.16	2	50	50	50	50	No back-up fuse required			
MS25 – 0.25	3	50	50	50	50				
MS25 – 0.4	6	50	50	50	50				
MS25 – 0.63	8	50	50	50	50				
MS25 – 1	12	50	50	50	50				
MS25 – 1.6	18	50	50	50	50				
MS25 – 2.5	33	50	50	3	2.5			25	20
MS25 – 4	48	50	50	3	2.5			35	25
MS25 – 6.3	75	50	50	3	2.5			50	35
MS25 – 10	110	50	6	3	2.5		80	50	35
MS25 – 16	160	6	4	2.5	2	80	80	63	35
MS25 – 20	220	6	4	2.5	2	80	80	63	50
MS25 – 25	270	6	4	2.5	2	80	80	63	50

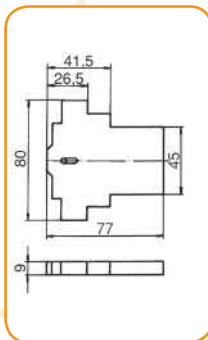
MST25 motor protection switches and max. back-up fuses for short-circuit protection:

Type	Max. back-up fuse $U_g < 400$ V gL (A)
MST25 – 0.4	1
MST25 – 0.63	2
MST25 – 1	2
MST25 – 1.6	4
MST25 – 2.5	6
MST25 – 4	16
MST25 – 6.3	20
MST25 – 10	25
MST25 – 16	35
MST25 – 20	50
MST25 – 25	50

Motor protection switches

MS25, MST25, MS20, MST20

ACCESSORIES



PS

Auxiliary switch for lateral mounting

PS 11 - with one make and one break contact
PS 10 - with one make contact
PS 01 - with one break contact
PS 20 - with two make contacts

Rated insulation voltage	U_i	V	500
Thermal current	I_{th}	A	6
Rated operational current at AC-15	230 V	I_e	3.5
	400 V		2
	500 V		1.5
Terminal capacity	S	mm ²	0.75 ... 2.5
Tightening torque		Nm	1



U - Under-voltage release
A - Shunt release

Control voltages		U_c	V	24 ... 600
Rated frequency		f	Hz	50 or 60
Coil consumption	switch on:	w	VA	4,3 / 7,5
	operation:	w	VA	1,3 / 3,8



RS - Trip-indicating auxiliary switch

Rated insulation voltage	U_i	V	500
Thermal current	I_{th}	A	6
 Rated operational current at AC-15	230 V	I_e	3.5
	400 V		2
	500 V		1.5
Terminal capacity	S	mm ²	0.75 ... 2.5
Tightening torque		Nm	1

Motor protection switches

MS25, MST25, MS20, MST20

ENCLOSURES

O-41/55

CP-41/55



O-41/55

Enclosure IP41/55

CP-41/55

Front plate IP41/55

MS25 or MST25 with all accessories can be built into an enclosure or a front plate.



NAT - Emergency stop push-button. It is also available with a key-lock.



Z - Padlocking feature



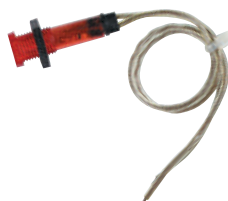
M - Push-button diaphragm

The manufacturer also supplies an enclosure and a front plate with degree of protection IP55 (O-55, CP-55); in this case the diaphragm is already mounted. However, it should be removed if a padlocking feature or an emergency stop push-button is built-in.



NL - Neutral link

One N/PE neutral link is usually built in the enclosure O-41/55 or CP-41/55. A place for an additional neutral link is also available.



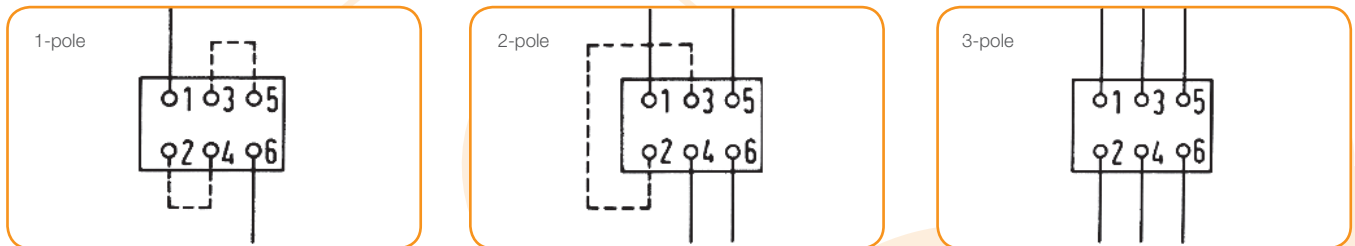
SS - Signal lamp

230, 240, 400 V
B-white, R-red, Z-green

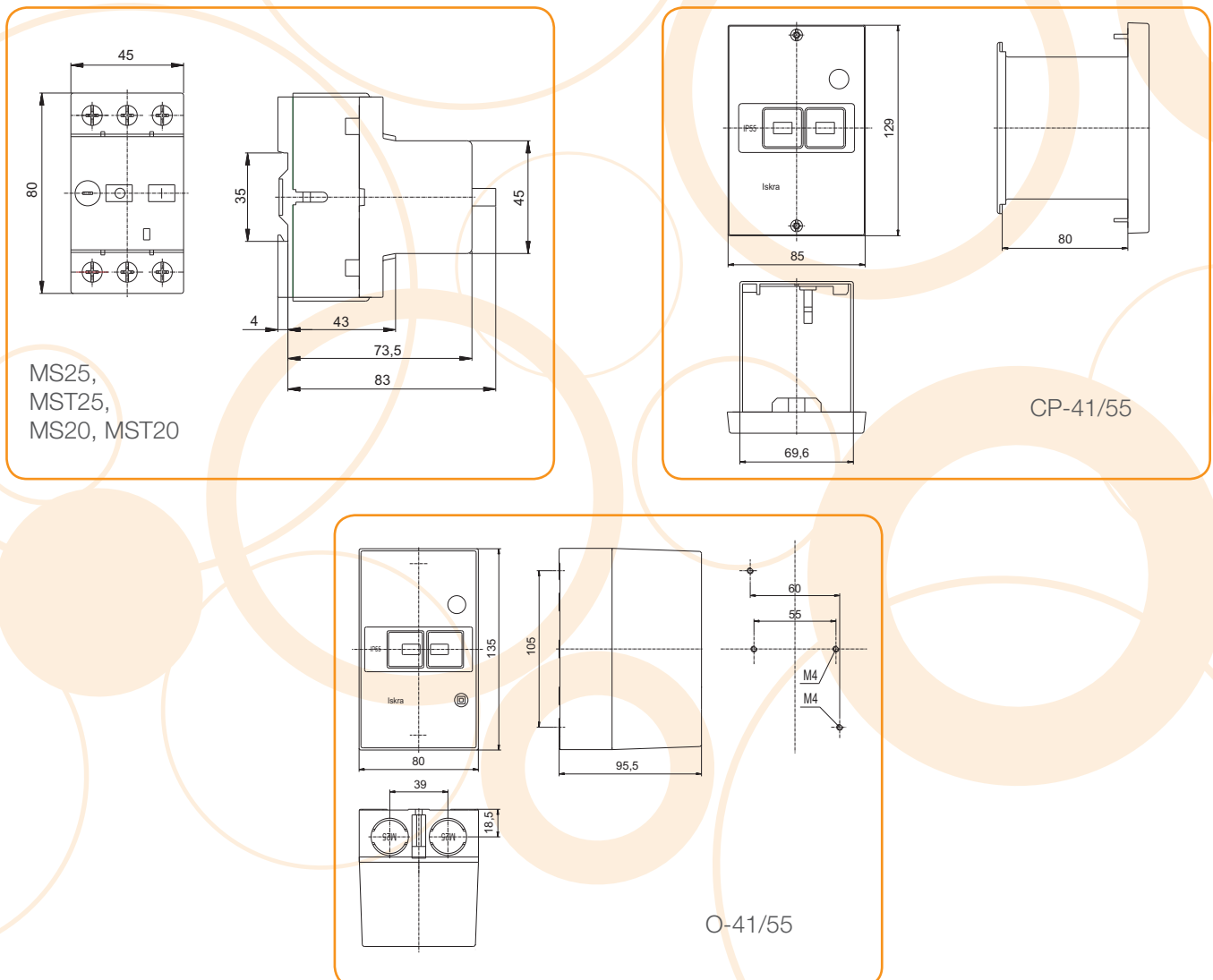
Motor protection switches

MS25, MST25, MS20, MST20

CONNECTION DIAGRAM



DIMENSIONS



ORDERING DATA

MS25 with the setting range 2.5 - 4.0 A:

MS25 - 4

The same switch with under-voltage release for control voltage 380 V with an auxiliary switch with two NO contacts, built in the enclosure, with an emergency stop push-button and a green signal lamp for 230 V:

MS 25 - 4 / U 380 / PS 20 / O-41 / NAT / SSz 230

Motor protection switches

MS32, MSB32, MS18, MSB18



- Versions:
 - MS32 / MS18 - with thermal and magnetic releases
 - MSB32 / MSB18 - with a thermal release only
- Manual control:
 - START, STOP, push-buttons - with a trip indication (i.e. push-buttons stay in the middle position)
- Automatic switch-off at over-current with thermal or magnetic release
- Control with under-voltage release or shunt release
- An auxiliary switch for side mounting or flush mounting used for indication of the switching state
- Indication of release with trip indicating auxiliary switch
- ON/OFF buttons position unequivocally indicates switching position of main circuit contacts
- Contact material
 - Resistant to contact welding
 - Enables low contact heating
- Isolating distance between contacts: 4.5 mm per contact place
- Connection of a rigid or flexible conductor
- Assembly to 35 mm wide mounting rail in compliance with EN 60715
- Vertical or horizontal operational position

TECHNICAL DATA

GENERAL	Standards				IEC/EN 60947-2, IEC/EN 60947-4-1, IEC/EN 60947-5-1, IEC/EN 60204, UL 508, CSA 22.2 No.14
	Approvals				UL
	Climatic class				constant damp heat acc. to IEC 60068-2-78 cyclic damp heat acc. to IEC 60068-2-30
	Degree of protection				IP20, after terminals covering IP40
	Ambient temperature			°C	-25 ... +60
	Storage temperature			°C	-25 ... +70
	Temperature range of thermal compensation for overload release			°C	-5 ... +40
	Mechanical and electrical endurance			op. c.	100,000
	Max. operating cycles			op. / h	25
	Shock resistance acc. to IEC 68-2-27			g	20
	Vibration resistance acc. to IEC 68-2-6				5 g at f = 5 ... 150 Hz
	Overvoltage category / pollution degree				III / 3
	Rated insulation voltage		U_i	V	690
	Rated impulse withstand voltage		U_{imp}	kV	6
	Weight			kg	0.279
MAIN CIRCUIT	Designation of connection terminals				1 - L1 ; 3 - L2 ; 5 - L3 ; 2 - T1 ; 4 - T2 ; 6 - T3
	Terminal capacity				
		rigid			
		flexible	S	mm ²	0.75 ... 10 0.75 ... 6
	Screw				with self-lifting clamp, protected against drop out
	Screw head				PZ2
	Tightening torque			Nm	2.0

Motor protection switches

MS32, MSB32, MS18, MSB18

TECHNICAL DATA

MAIN CIRCUIT				MS32 / MS18	MSB32 / MSB18
	Max. operational voltage	U _e	V	690	400
	Setting range		A	0.1 - 0.16; 0.16 - 0.25; 0.25 - 0.4; 0.4 - 0.63; 0.63 - 1; 1 - 1.6; 1.6 - 2.5; 2.5 - 4; 4 - 6.3; 6.3 - 10; 9 - 14; 13 - 18; 17 - 23 (only MS32); 20 - 27 (only MS32); 25 - 32 (only MS32)	0.25 - 0.4; 0.4 - 0.63; 0.63 - 1; 1 - 1.6; 1.6 - 2.5; 2.5 - 4; 4 - 6.3; 6.3 - 10; 9 - 14; 13 - 18; 17 - 23 (only MSB32); 20 - 27 (only MSB32); 25 - 32 (only MSB32)
	No. of poles			3	
	Operating current of thermal overload release	I		1,05 I _r < I ≤ 1,20 I _r I _r ...current setting value	
	Sensitivity to phase failure			yes	
	Power dissipation per pole at the upper setting limit	P	W	2 - 2,5	
	Utilization category acc. to IEC/EN 60947-4-1			AC-3	
	acc. to IEC/EN 60947-2			A	
	Trip class acc. To IEC/EN 60947-4-1			10	

SWITCH SELECTION FOR MOTOR PROTECTION

Standard motor powers						Setting range
Single-phase	Three-phase					
220 V 230 V 240 V	220 V 230 V 240 V	380 V 400 V 415 V	440 V	500 V	660 V 690 V	
kW						A
					0.06	0.1 ... 0.16
		0.06	0.06	0.06 ... 0.9	0.06 ... 0.12	0.16 ... 0.25
	0.06	0.09	0.12	0.09 ... 0.12	0.18	0.25 ... 0.4
	0.09	0.12 ... 0.18	0.18	0.18	0.25	0.4 ... 0.63
0.06 ... 0.09	0.09 ... 0.12	0.18 ... 0.25	0.25 ... 0.37	0.25 ... 0.37	0.37 ... 0.55	0.63 ... 1
0.12	0.18 ... 0.25	0.37 ... 0.55	0.37 ... 0.55	0.55 ... 0.75	0.75 ... 1.1	1 ... 1.6
0.18 ... 0.25	0.37	0.75	0.75 ... 1.1	1.1	1.5	1.6 ... 2.5
0.37	0.55 ... 0.75	1.1 ... 1.5	1.5	1.5 ... 2.2	2.2 ... 3	2.5 ... 4
0.55 ... 0.75	1.1 ... 1.5	2.2	2.2 ... 3	2.2 ... 3	4	4 ... 6.3
1.1 ... 1.5	1.5 ... 2.2	3 ... 4	4	4 ... 5.5	5.5 ... 7.5	6.3 ... 10
2.2	2.2 ... 3	5.5	5.5 ... 7.5	5.5 ... 7.5	9 ... 11	9 ... 14
3	4	7.5	7.5 ... 9	9 ... 11	15	13 ... 18
	5.5	9 ... 11	11	11	15 ... 18.5	17 ... 23
	5.5 ... 7.5	11	11	15	18.5 ... 22	20 ... 27
	7.5	15	15	18.5	22	25 ... 32

Motor protection switches

MS32, MSB32, MS18, MSB18

MS32 motor protection switches, rated ultimate and service short-circuit breaking capacity I_{cu} and I_{cs} , and max. back-up fuses if short circuit current I_{cp} exceeds I_{cu} :

Type		Operating current of short-circuit release (A)	Rated ultimate short-circuit breaking capacity I_{cu} · I_{cs} (kA)								Max. back-up fuse, if $I_{cp} > I_{cu}$ (gL) (A)			
			230 V		400 V		500 V		690 V		230 V	400 V	500 V	690 V
			I_{cu}	I_{cs}	I_{cu}	I_{cs}	I_{cu}	I_{cs}	I_{cu}	I_{cs}				
MS32 – 0.16	MS18 - 0.16	2	100	100	100	100	100	100	100	100	No back-up fuse required			
MS32 – 0.25	MS18 - 0.25	3	100	100	100	100	100	100	100	100				
MS32 – 0.4	MS18 - 0.4	5	100	100	100	100	100	100	100	100				
MS32 – 0.63	MS18 - 0.63	8	100	100	100	100	100	100	100	100				
MS32 – 1	MS18 - 1	13	100	100	100	100	100	100	100	100				
MS32 – 1.6	MS18 - 1.6	22	100	100	100	100	100	100	100	100				
MS32 – 2.5	MS18 - 2.5	33	100	100	100	100	100	100	100	5	5			16
MS32 – 4	MS18 - 4	55	100	100	100	100	100	100	100	3	3			25
MS32 – 6.3	MS18 - 6.3	84	100	100	100	100	6	4.5	3	2			35	35
MS32 – 10	MS18 - 10	126	100	100	100	100	6	4.5	3	2			50	35
MS32 – 14	MS18 - 14	170	25	12.5	25	12.5	6	4.5	3	2	80	63	50	50
MS32 – 18	MS18 - 18	230	25	12.5	25	12.5	6	4.5	3	2	80	63	50	50
MS32 – 23		270	25	12.5	25	12.5	4	3	3	2	80	80	50	50
MS32 – 27		360	25	12.5	25	12.5	4	3	3	2	80	80	50	50
MS32 – 32		400	25	12.5	25	12.5	4	3	3	2	80	80	50	50

MSB32 / MSB18 motor protection switches and max. back-up fuses for short-circuit protection:

Type		Max. back-up fuse $U_e < 400$ V gL (A)
MSB32 – 0.4	MSB18 – 0.4	2
MSB32 – 0.63	MSB18 – 0.63	2
MSB32 – 1	MSB18 – 1	4
MSB32 – 1.6	MSB18 – 1.6	6
MSB32 – 2.5	MSB18 – 2.5	6
MSB32 – 4	MSB18 – 4	10
MSB32 – 6.3	MSB18 – 6.3	16
MSB32 – 10	MSB18 – 10	25
MSB32 – 14	MSB18 – 14	25
MSB32 – 18	MSB18 – 18	35
MSB32 – 23		35
MSB32 – 27		50
MSB32 – 32		50

Motor protection switches

MS32, MSB32, MS18, MSB18

ACCESSORIES

The MS32 or MSB32 motor protective circuit breaker with all accessories can be built in an enclosure or under a frame and a front plate



HO-41/55 - Enclosure IP41/55



FP-41/55 - Frame IP41/55



P-41/55 - Front plate IP41/55

ACCESSORIES USED FOR ALL ENCLOSURES



E - Emergency stop push-button also available with a key-lock.



HZ - Padlocking feature



M - Push-button diaphragm

The manufacturer also supplies an enclosure, a frame and a front plate with degree of protection IP55 (HO-55, FP-55, P-55) where the diaphragm is already inserted. However, it should be removed if a padlocking feature or an emergency stop bush-button is built-in.



NL - Neutral link

One N/PE neutral link is already mounted in the enclosures HO-41/55 or frames FP-41/55. A place for an additional neutral link is also provided.



SS - Signal lamp (B-white, R-red, Z-green)

Motor protection switches

MS32, MSB32, MS18, MSB18

AUXILIARY SWITCH FOR SIDE MOUNTING HS, AUXILIARY CONTACT BLOCK HSV, TRIP INDICATING CONTACT BLOCK HRS



HS - Auxiliary switch

HS 11 - with 1 make and 1 break contact
HS 10 - with 1 make contact
HS 20 - with 2 make contacts

Rated insulation voltage	U_i	V	500
Thermal current	I_{th}	A	5
Electrical rating acc. to IEC/EN 60947-5-1			
B300	AC-15	U_e	V 240
		I_e	A 1,5
R300	DC-13	U_e	V 250
		I_e	A 0,1
Terminal capacity	S	mm ²	0,75 ... 2,5
Tightening torque		Nm	1



HSV - Auxiliary contact block* HRS - Trip indicating contact block**

HSV 10 - with 1 make contact
HSV 01 - with 1 break contact
HRS 10 - with 1 make contact
HRS 01 - with 1 break contact

Rated insulation voltage	U_i	V	300
Thermal current	I_{th}	A	1
Electrical rating acc. to IEC/EN 60947-5-1			
B300	AC-15	U_e	V 240
		I_e	A 1,5
R300	DC-13	U_e	V 125
		I_e	A 0,22
Terminal capacity	S	mm ²	0,75 ... 2,5
Tightening torque		Nm	1

* HSV contact remains in its normal position when MS32 / MS18 is in OFF or trip position

** HRS contact changes state from its normal position when MS32 / MS18 trip due to overload, short-circuit or manual depression of the TEST lever



PP - Sealing plate

UNDER-VOLTAGE RELEASE UR AND SHUNT RELEASE AR



UR - Under-voltage release AR - Shunt release

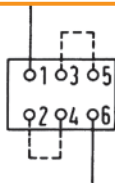
Control voltages	U_c	V	24 ... 600
Rated frequency	f	Hz	50 or 60
Terminal capacity	S	mm ²	0.75 ... 2.5
Tightening torque		Nm	1

Motor protection switches

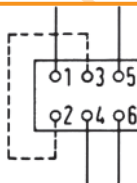
MS32, MSB32, MS18, MSB18

CONNECTION DIAGRAM

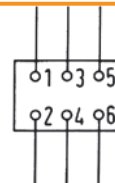
1-pole



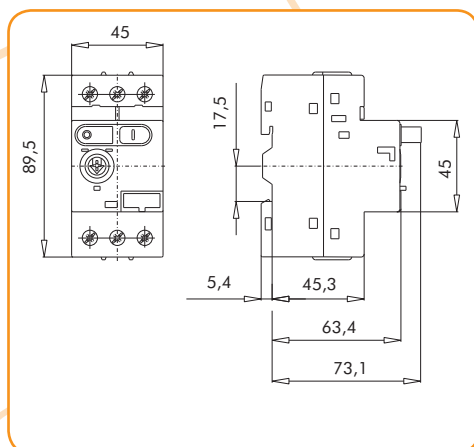
2-pole



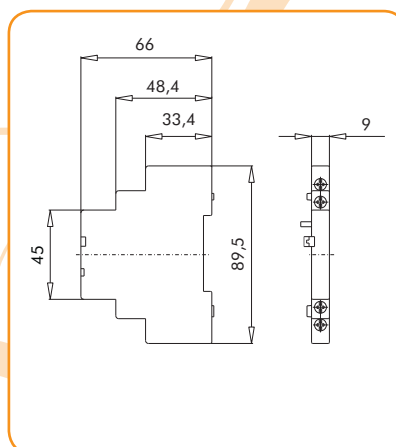
3-pole



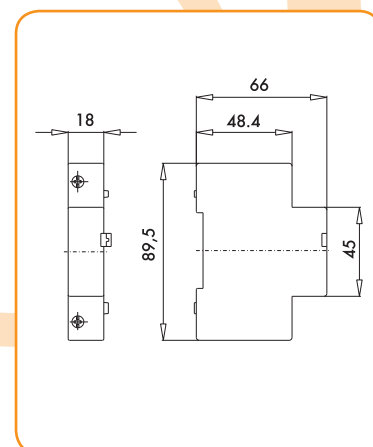
DIMENSIONS



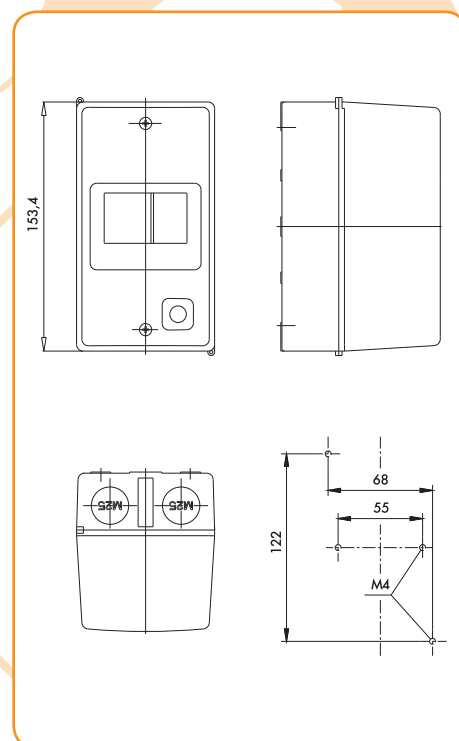
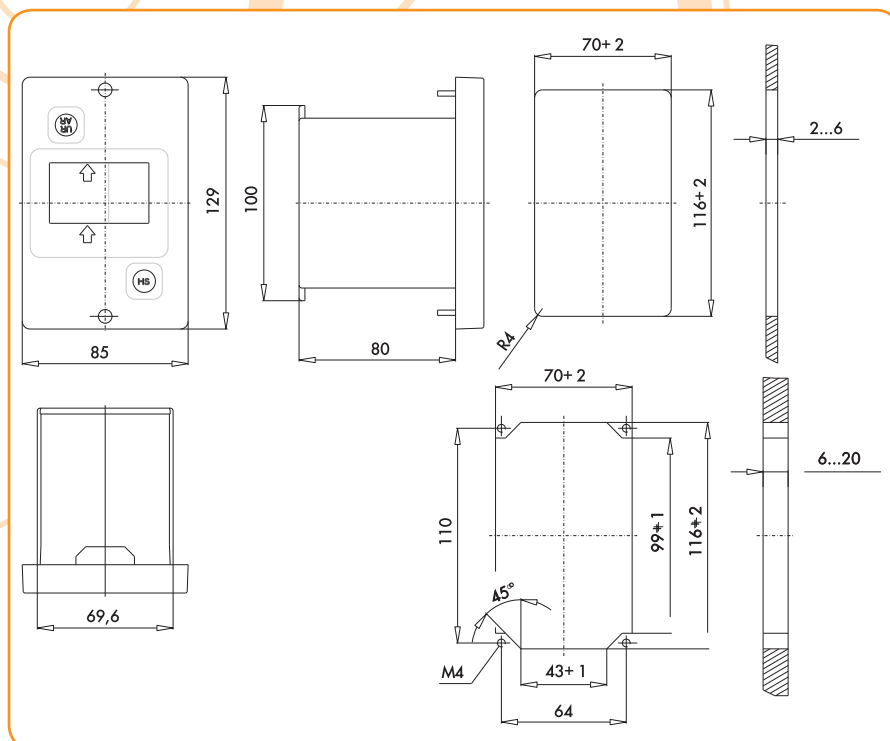
MS32 / MS18, MSB31 / MSB18
Motor protection switch



Auxiliary switch HS



Under-voltage release UR
Shunt release AR

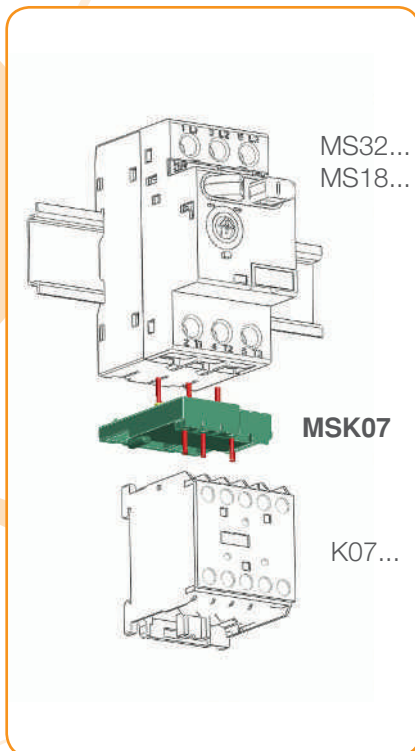


Motor protection switches

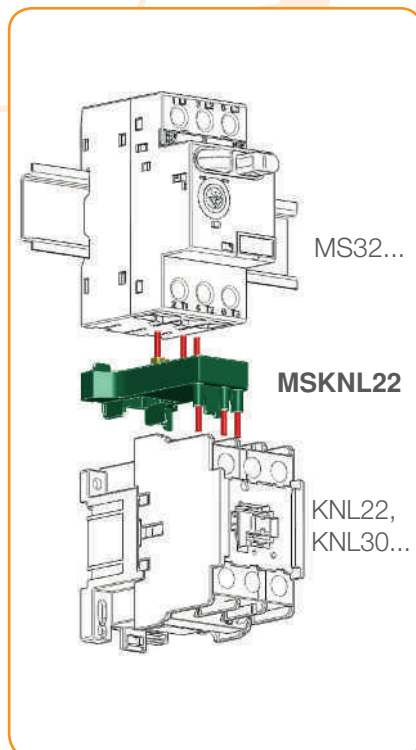
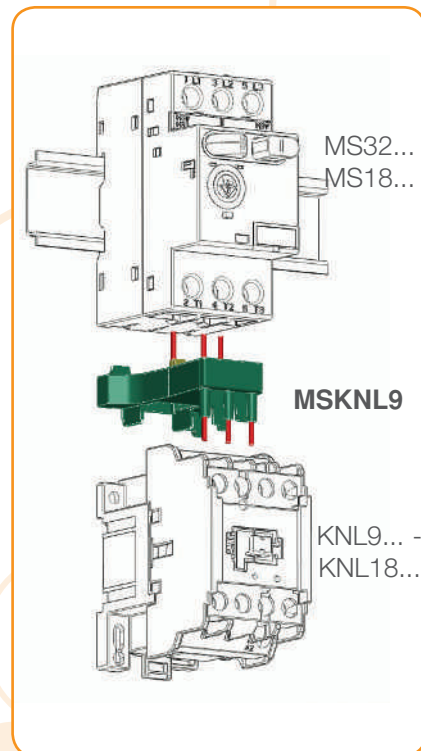
CONNECTION BLOCKS

MSK07, MSKNL9 and MSKNL22 adapters are used for connecting a motor protection switch with a contactor forming a single-unit starter for quick assembly to a 35 mm wide mounting rail (EN 60715).

Adapter for connecting MS32 / MS18 motor protection switch with K07 mini contactor



Adapter for connecting MS32 / MS18 motor protection switch with KNL9-KNL18 contactor



Adapter for connecting MS32 motor protection switch with KNL22, KNL30 contactor

Miniature Circuit Breakers

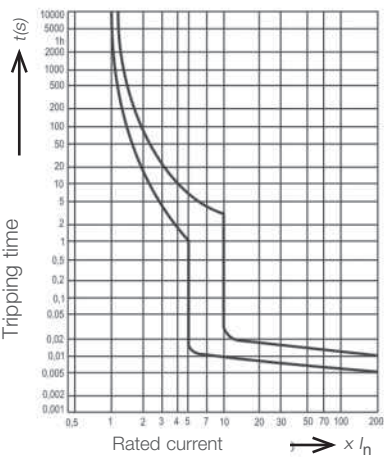
RI20



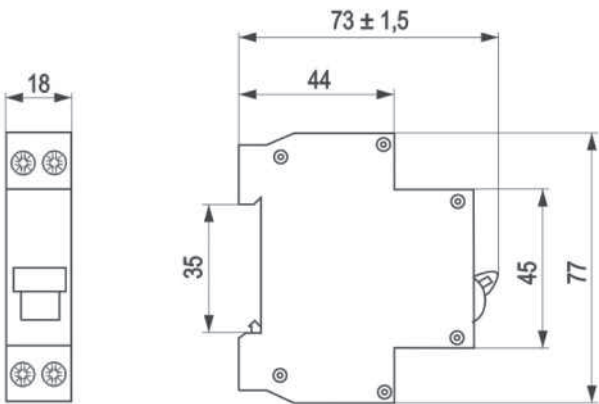
Number of poles	1 + N
Tripping characteristic	B, C, D
Rated current	A 2, 6, 10, 16, 20, 25, 32
Rated voltage	V 230
Rated frequency	Hz 50
Rated short-circuit capacity	kA 4.5
Terminal capacity	mm ² 1 - 10
Mounting	to 35 mm wide mounting rail accordance with EN 60715
Ambient temperature	°C -5 ...+40

TECHNICAL DATA								
Nominal current derating factors at different ambient temperatures								
Rated current		Ambient temperature						
(A)	-10 °C	0 °C	10 °C	20 °C	30 °C	40 °C	50 °C	60 °C
2	1.18	1.14	1.09	1.05	1	0.96	0.90	0.86
6	1.17	1.13	1.09	1.04	1	0.96	0.91	0.84
10	1.21	1.16	1.10	1.06	1	0.94	0.88	0.82
16	1.18	1.13	1.09	1.04	1	0.94	0.91	0.84
20	1.17	1.13	1.09	1.04	1	0.96	0.91	0.84
25	1.18	1.13	1.09	1.04	1	0.96	0.91	0.84
32	1.17	1.13	1.09	1.04	1	0.96	0.91	0.84

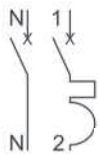
TRIPPING CHARACTERISTIC



DIMENSIONS



CONNECTION DIAGRAM



Miniature Circuit Breakers

RI 50



- RI 50 is used for the protection of installations and devices (overload and short circuit), and as a disconnector in case of electric shock
- Simple and quick fixing to a 35 mm mounting rail in accordance with EN 60715
- Low let-through energy under short-circuit conditions ensures longer contact life and reduces thermal stress in the distribution circuit
- RI 50 reduces the energy loss due to a unique contact configuration and reduction of hot spots. Watt loss per pole for RI 50 is far lower than those specified in IEC/EN 60898
- An optional operating position
- IP20 degree of protection; IP40 degree of protection after installation in a distribution box
- An additional colour indication of the position of main contacts (red: contacts closed; green: contacts open)

Types

RI 51	single-pole
RI 51N	single-pole + neutral pole
RI 52	two-pole
RI 53	three-pole
RI 53N	three-pole + neutral pole
RI 54	four-pole

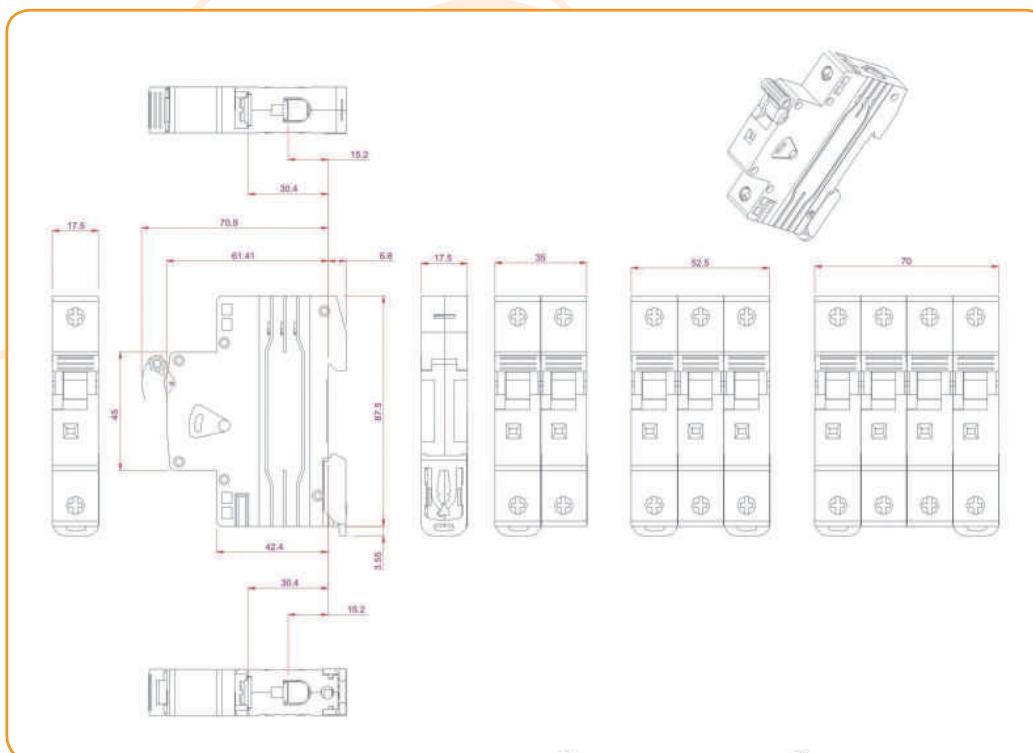
TECHNICAL DATA

Standards				IEC/EN 60898
Approvals				KEMA, GOST-R
No. of poles				1, 2, 3, 4, 1 + N, 3 + N
Tripping characteristic (IEC/EN 60898)				B, C
Rated voltage	single pole	U_n	V	230/400 AC
	multi-pole			400 AC
Insulation voltage		U_i	V	500
Impulse withstand voltage (1,2/50 μ s)		U_{imp}	kV	4
Rated frequency		f	Hz	50/60
Rated current		I_n	A	6 – 63 (characteristic B, C)
Rated short-circuit capacity		I_{cn}	kA	6
Selectivity class				3
Terminal capacity		S	mm ²	up to 25
Ambient temperature			°C	–5 ... +40

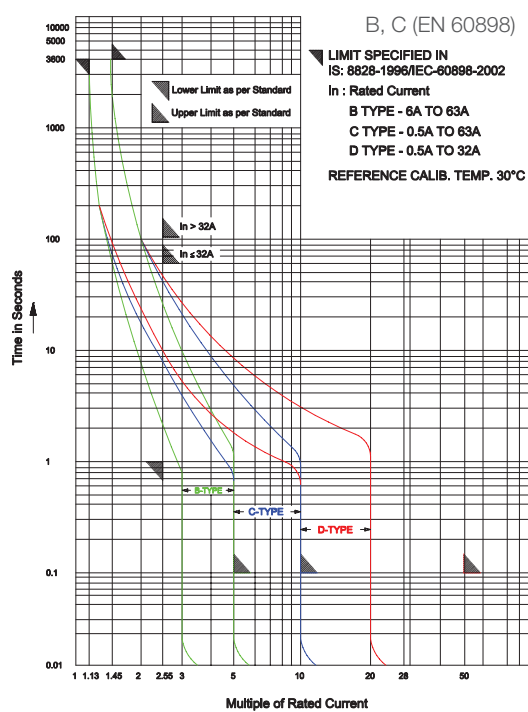
Miniature Circuit Breakers

RI 50

DIMENSIONS - Nova slika

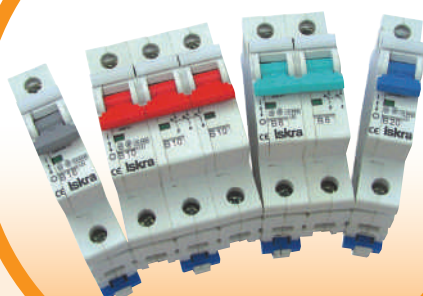


TRIPPING CHARACTERISTIC



Miniature Circuit Breakers

RI 60



- RI 60 is used for over-current (overload and short-circuit) protection of installations and devices, and as a disconnecter in case of electric shock
- RI 60 miniature circuit breakers are provided with two springs for assembly to a 35 mm wide mounting rail (EN 60715). The springs enable simple taking off irrespective of whether a busbar is positioned below or above
- Special springs are available for fixing miniature circuit breakers with two M5 screws
- A handle can be sealed in ON or OFF position
- Optional operation position
- Degree of protection IP20; degree of protection IP40 after installation in a distribution box
- Additional colour indication of the position of main contacts (red - contacts closed; green - contacts open)

Types

RI 61	single-pole
RI 61N	single-pole + neutral pole
RI 61J	single-pole (for DC circuits)
RI 62	two-pole
RI 62J	two-pole (for DC circuits)
RI 63	three-pole
RI 63N	three-pole + neutral pole
RI 64	four-pole

TECHNICAL DATA

			AC	DC
Standards			IEC/EN 60898, IEC/EN 60947-2	
Approvals			VDE, GOST-R	
No. of poles			1, 2, 3, 4, 1 + N, 3 + N	1, 2
Tripping characteristic (IEC/EN 60898)			B, C, D, M	C, M
Rated voltage	U_n	V	230/400	-
Rated DC voltage	U_n	V	max. 40 - 1 pole for $t=15$ ms	440 - 2-pole 220 - 1-pole
Rated insulation voltage	U_i	V	500	
Rated frequency	f	Hz	50/60	-
Rated current	I_n	A	0.2 to 63	
Short-circuit capacity	I_{cn}	kA	10	4.5
Selectivity class			3	
Terminal capacity	Cu Al	S mm ²	1.5 ... 25 2.5 ... 25	
Ambient temperature		°C	-25 ... +55	
Vibration resistance			3 g (8 - 50 Hz)	

ORDERING DATA

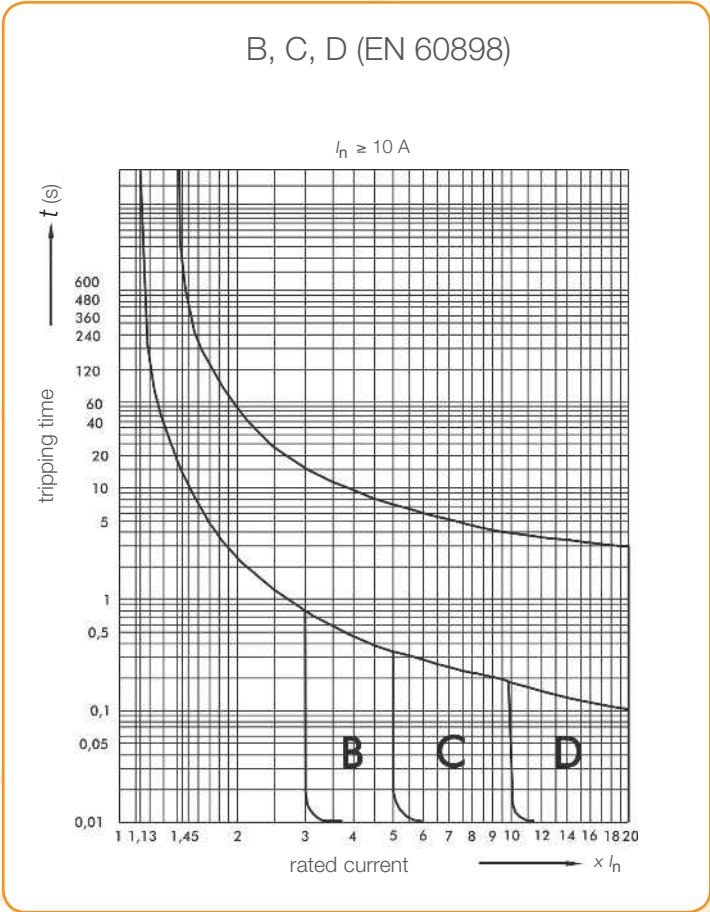
RI 61 - B - 16

Rated current I_n (A)
Tripping characteristic
Type

Miniature Circuit Breakers

RI 60

TRIPPING CHARACTERISTIC



ACCESSORIES

AUXILIARY AND SIGNAL CONTACTS

- They are used with RI 60 miniature circuit breakers and RV 60 disconnection switches (0.5 module width).
- Delivered as a single unit or with RI 60 or RV 60, respectively; mounted on the left side by means of pins and screw.
- Used for indication of contact position of the breaker
- Degree of protection IP20
- Types:
 - PKJ, 2PKJ – one or two auxiliary changeover contacts; position of contacts corresponds to the position of the main contacts of the breaker
 - PKJ + SKJ – one auxiliary changeover contact and one signal change over contact (fault indicating contact)
 - PKJ + SKJ + TEST – test button with two functions is added: signalling the position of signal contacts and testing of control circuit (non-stable change of position of the contacts) by slight movement of push-button upwards and downwards without change of contact position of the breaker

TECHNICAL DATA

Standards			IEC/EN 60947-5-1
Rated insulation voltage	U_i	V	400
Rated operational voltage	U_e	V	230
Rated thermal current	I_{th}	A	16
Rated operational current	I_e	A	4 ($U_e = 230 \text{ V}$)
AC-15			0.5 ($U_e = 110 \text{ V}$)*
DC-13			
Terminal capacity	S	mm ²	0.5 ... 2.5

*Connection of two auxiliary contacts in series at 220 V

Miniature Circuit Breakers

RI 60

SHUNT TRIP RELEASE VC

- Used with RI 60 miniature circuit breakers and RV 60 disconnection switches.
- Enables remote switch-off.
- Available as a single unit or together with RI 60 or RV 60; mounted on the the right side by means of pins and screw.

TECHNICAL DATA

Standards				IEC/EN 60947-1	
Control voltages	AC	U_c	V	12, 24, 48, 60, 110, 230, 400	
	DC			24, 48, 110	
Range of control voltage		U_c	%	70 ... 110	
Max. tripping current (at coil voltage)	AC		A (V)	6 (12); 2.8 (24); 0.8 (48); 0.9 (60); 0.5 (110); 0.6 (230); 0.5 (400)	
	DC			3 (24); 2 (48); 0.6 (110)	
Rated frequency		f	Hz	50	
Tripping time			ms	≤ 50	
Terminal capacity		S	mm ²	1.5 ... 6	

UNDERVOLTAGE RELEASE PC 60

- Used with RI 60, RI 120 miniature circuit breakers and RV 60, RV 120 disconnection switches;
- Protection of the load in the event of voltage drop (between 85% and 35% of its control voltage); uncontrolled restarting is prevented;
- Indication of release position green/red;
- Mounted on the right side of the breaker;
- Test button for the control of proper operation;
- Degree of protection IP 20

TECHNICAL DATA

Standards				IEC/EN 60947-1	
Control voltage		U_c	V	24, 48, 120, 230, 400	
Rated frequency		f	Hz	50	
Coil power consumption			W	3	
Mechanical endurance			op. c.	10,000	
Terminal capacity		S	mm ²	0.75 ... 2,5	

OTHER ACCESSORIES

Busbar - universal

(for single-pole circuit breakers and single-pole circuit breakers with an auxiliary switch)



Designation	Length (m)	Cross-section (mm ²)
G-1L-210 / 12 iso	0.21	12
G-1L-1000 / 12 iso	1	12
G-2L-1000 / 10	1	12

Busbar - fork-type, 3-phase

(for three-pole circuit breakers and single-pole circuit breakers in three-phase circuits)



Designation	Length (m)	Cross-section (mm ²)
G-3L-1000 / 10 C	1	10
G-3L-1000 / 16 C	1	16
G-4L-1000 / 16	1	16

Miniature Circuit Breakers

RI 60

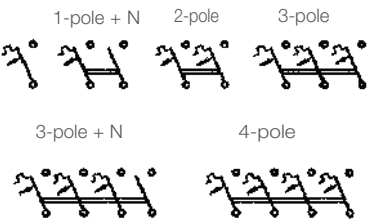
End caps (for three-phase busbars)



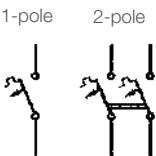
Designation	Cross-section (mm ²)
EK-C-3/10	10
EK-C-2+3/16	16

CONNECTION DIAGRAM

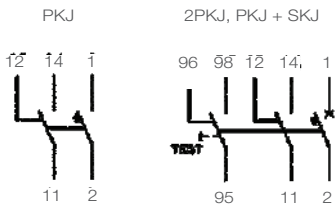
AC



DC

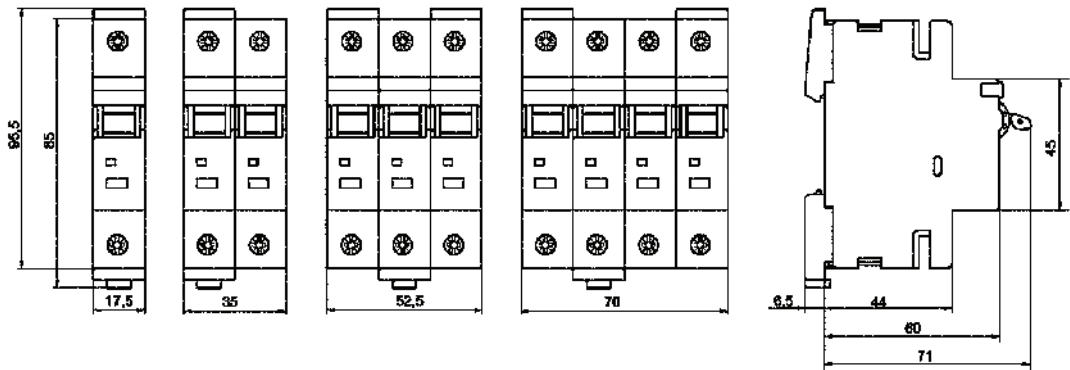


AUXILIARY CONTACTS

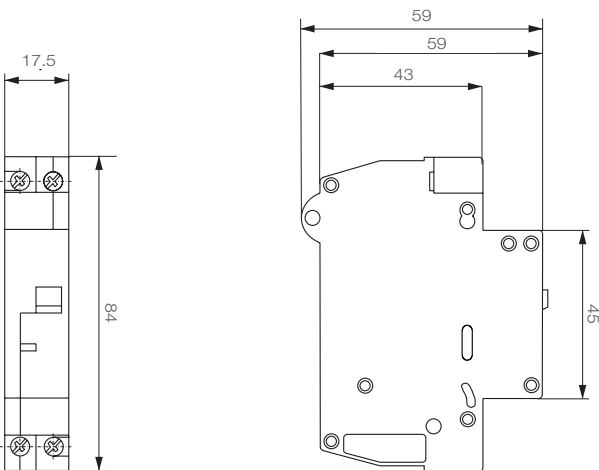


DIMENSIONS

RI 60, RV 60

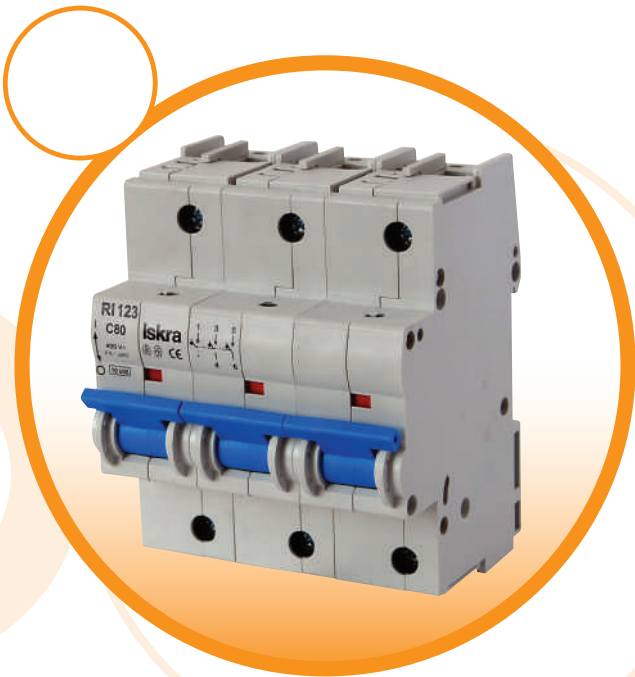


PC 60



Miniature Circuit Breakers

RI 120



- They are used for protecting house and industrial installations.
- RI 120 miniature circuit breakers are provided with two springs for assembly to a 35 mm wide mounting rail in accordance with EN 60715. The springs enable simple taking off irrespective of whether a busbar is positioned below or above.
- A handle can be sealed in ON or OFF position.
- Optional operation position.
- Degree of protection IP20; degree of protection IP40 after installation in a distribution box.

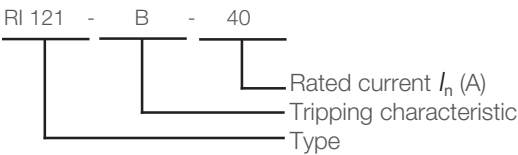
Types

RI 121	single-pole
RI 121N	single-pole + neutral pole
RI 122	two-pole
RI 123	three-pole
RI 123N	three-pole + neutral pole
RI 124	four-pole

TECHNICAL DATA			
Standards			IEC/EN 60898-1
No. of poles			1, 2, 3, 4, 1 + N; 3 + N
Tripping characteristic			B, C, D
Rated voltage	U_n	V	230, 230/400, 400
Rated DC voltage	U_n	V	max. 110 – 1 pole for $T_1 = 4$ ms
Rated insulation voltage	U_i	V	690 V
Rated frequency	f	Hz	50/60
Rated current	I_n	A	40, 50, 63, 80, 100, 125
Short-circuit breaking capacity		kA	10 (15)*
Selectivity class			3
Ambient temperature		°C	-5 ... +40
Terminal capacity	S	mm ²	2.5 ... 50
Accessories			Shunt trip release VC

* optional

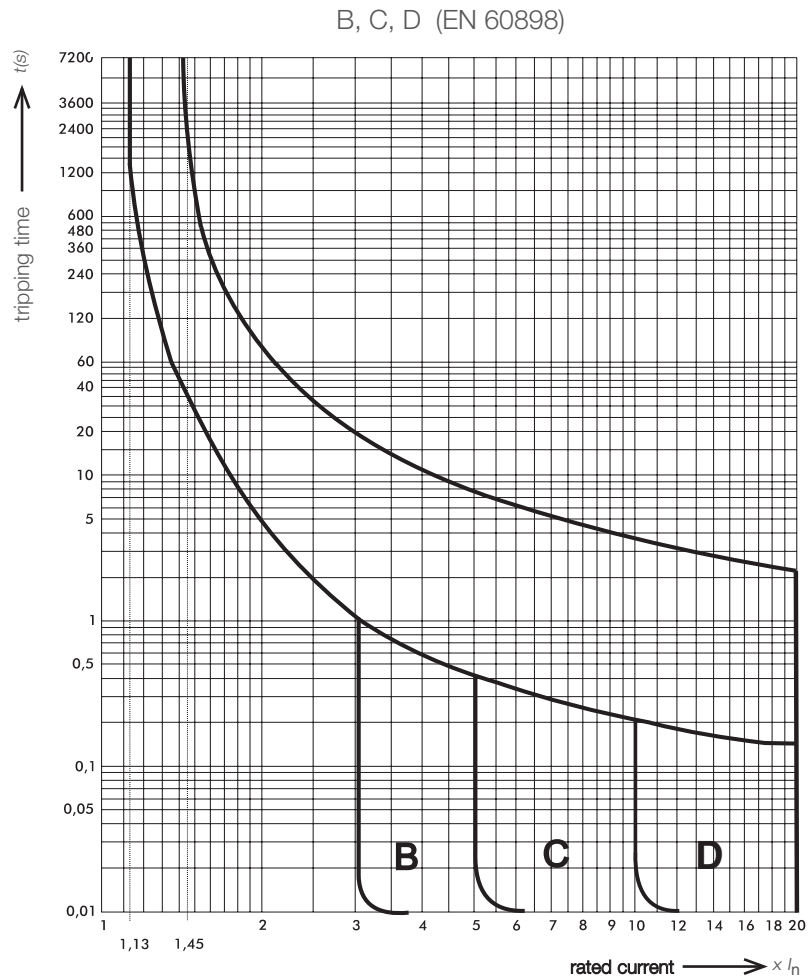
ORDERING DATA



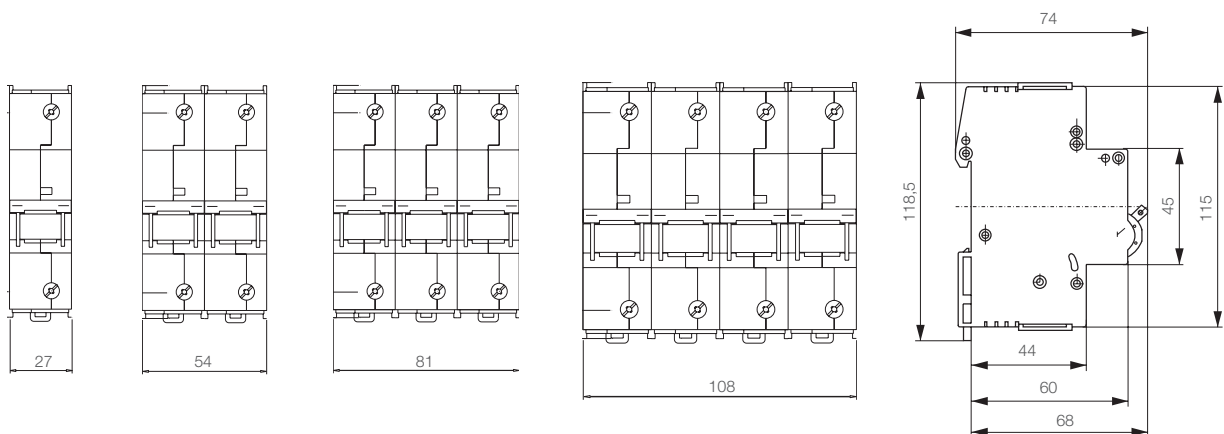
Miniature Circuit Breakers

RI 120

TRIPPING CHARACTERISTIC



DIMENSIONS



Miniature Circuit Breakers

RV 60, RV 120, RS



- They are used as main switches in house distribution boxes or as switches for individual electric circuits.
- A handle can be sealed in ON or OFF position.
- Assembly to 35 mm wide mounting rail in accordance with EN 60715.
- Optional operation position.
- Degree of protection IP20; degree of protection IP40 after installation in a distribution box.
- Additional colour indications of the position of main contacts (red – contacts closed, green – contacts open).
- External dimensions of RV 60 and RV 120 disconnection switches match with dimensions of RI 60 or RI 120 miniature circuit breakers.

DISCONNECTION SWITCH RV 60 - TECHNICAL DATA

Standards			IEC/EN 60947-3
No. of poles			1, 2, 3, 1 + N, 3 + N
Rated voltage	U_n	V	230/400
Rated frequency	f	Hz	50/60
Rated current	I_n	A	25, 63
Utilization category			AC-22A
Rated conditional short-circuit current		kA	3 (RV 60 63 A with 63 A gG back-up fuse) 6 (RV 60 63 A with 35 A gG back-up fuse) 10 (RV 60 25 A with 25 A gG back-up fuse)
Terminal capacity	S	mm ²	see page 70
Ambient temperature		°C	-25...+55
Vibration resistance			3 g (8 – 50 Hz)
Accessories			See accessories for RI 60 miniature circuit breaker

DISCONNECTION SWITCH RV 120 - TECHNICAL DATA

Standards			IEC/EN 60947-3
No. of poles			1, 2, 3, 1 + N, 3 + N
Rated voltage	U_n	V	230/400
Rated insulation voltage	U_i	V	690
Rated impulse voltage	U_{imp}	V	6000
Rated frequency	f	Hz	50
Rated thermal current	I_{th}	A	125
Rated current	I_n	A	100 (for utilization category AC-22A), 40 (for utilization category AC-23A)
Rated conditional short-circuit current	I_q	kA	3 (with 100 A gG back-up fuse), 6 (with 63 A gG back-up fuse)
Electrical endurance		op. c.	1500
Mechanical endurance		op. c.	10 000
Terminal capacity	S	mm ²	2,5...50
Ambient temperature		°C	-25...+55
Vibration resistance			3 g (8 – 50 Hz)

SIGNAL LAMP RS, RSB



- Assembly to a 35 mm wide mounting rail in accordance with EN 60715
- Optional operation position
- Degree of protection IP20, degree of protection IP40 after installation in a distribution box

TECHNICAL DATA

Standards			IEC/EN 60947-5-1
No. of poles			1
Rated voltage	AC DC	U_n	V 24, 48, 110, 230 24, 48, 110, 220
Light source			high capacity LED diode
Light source capacity		W	0,8
Colours			green - G, red - R, blue - B, transparent - T, yellow - Y
Illumination			constant - RS, blinking - RSB
Terminal capacity	S	mm ²	0,75...6
Ambient temperature		°C	-25...+55

Accessories

SURFACE MOUNTED (INO) and FLUSH MOUNTED (IPO) COMPACT DISTRIBUTION BOARDS

- Transparent or white door
- Additional terminals for PE- and N-conductors
- No. of modules from 4 to 36
- Protection class II
- Degree of protection IP40



TECHNICAL DATA

Type				INO-4 IPO-4	INO-12 IPO-12	INO-18	INO-24 IPO-24	INO-36 IPO-36
Standards				IEC 60670-24				
Rated voltage	U_n	V		400				
Max. power dissipation	INO		W	12	22	22	24	26
	IPO			14	22		24	26
No. of modules				4 (+4)	12	18	24	36
PE- and N-conductor terminals				2 x 8	2 x 10	2 x 13	2 x 13	2 x 15
Ambient temperature			°C	-20 ... +70				
Dimensions	INO		mm	215 x 263 x 112	287 x 236 x 112	396 x 236 x 112	287 x 361 x 112	287 x 482 x 112
	IPO			211 x 232 x 70	283 x 232 x 70		283 x 357 x 70	283 x 482 x 70

Residual Current Circuit Breakers

FI, NFI



- Residual current circuit breakers (RCCB) are used for protection against indirect contact, fire protection and additional protection against direct contact.
- They are suitable for isolation.
- No overload protection or short-circuit protection is built in RCCB.
- Two versions according to behaviour in presence of d.c. components:
 - Type A (marked NFI) - sensitive to alternating and pulsating d.c. residual currents.
 - Type AC (marked FI) - sensitive to alternating residual currents of sine form.
- Assembly to a 35 mm wide mounting rail in accordance with EN 60715.
- Optional operation position.
- Degree of protection IP20, degree of protection IP40 after installation in a distribution box.
- Additional colour display of the position of main contacts (red - contacts closed, green - contacts open).
- A terminal shape prevents connection of a conductor outside the connection area.
- Special versions:

- Type S: a switch with delayed break enabling selectivity regarding a general type and a short-time delayed type (type G) connected on the load side. Break time is longer than 40 ms. The switches excel in high resistance to surge currents (up to 3 kA), which prevents unwanted trippings. Their rated currents are from 25 to 100 A, and rated residual operating currents are 100, 300 and 500 mA. This is type A, and a customer can choose between NFI2S two-pole and NFI4S four-pole switches.

- Type G: a short-time delayed breaking characteristic (min. non-actuating period is 10 ms). The switches are resistant to unwanted trippings at current impulses or when built-in in special critical conditions. They excel in high resistance to surge currents (up to 3 kA) and a reliable operation in case of high making currents. Rated currents are from 25 to 100 A, and rated residual operating currents are 30, 100, 300 and 500 mA. This is type A, and a customer can choose between NFI2K two-pole and NFI4K four-pole switches. Versions S and G comply with the EN 61008 standard. Regarding tripping times, type G also complies with ÖVE/ ÖNORM E 8601 (supplement to ÖVE EN 61008). Both types are VDE approved.

- FIR – FIT combination: It is used for the protection in circuits where operational currents are higher than rated currents of residual current circuit breakers. An actuating relay FIR is separated from a FI transformer (FIT). The function of load switching is performed by the contactor or a circuit-breaker with an undervoltage release. A combination rated current therefore depends on selected switching devices. It is limited with cable cross-sections which can be inserted through the hole of the FI transformer. Rated differential currents are 0.3 A, 0.5 A, 1 A and 2 A.

FI, NFI

Type	AC A A-G A-S		FI2 NFI2 NFI2K NFI2S		FI4 NFI4 NFI4K NFI4S
Standards	IEC/EN 61008, type A-G acc. to ÖVE E 8601				
Approvals	VDE, EAC				
No. of poles			2	4	
Rated voltage	U_n	V	230	230/400	
Rated impulse voltage	U_{imp}	kV	4		
Rated frequency	f	Hz	50		
Rated current	I_n	A	16, 25, 40, 63, 80, 100		25, 40, 63, 80, 100
Rated residual operating current	$I_{\Delta n}$	mA	10 ($I_n = 16, 25$ A), 30, 100, 300, 500		30, 100, 300, 500
Rated making and breaking capacity = Rated residual making and breaking capacity	$I_m = I_{\Delta m}$	A	800 ($I_n = 16 - 80$ A) 1000 ($I_n = 100$ A)		
Max. back-up fuse for short-circuit current	I_v	A	63 ($I_n = 16 - 40$ A) 80 ($I_n = 63, 80$ A) 100 ($I_n = 100$ A)		
Rated conditional short-circuit current	I_{nc}	kA	10		
Terminal capacity	S	mm ²	1 ... 35		
Max. tripping times, types AC, A		ms	$1 \times I_{\Delta n} : \leq 300$ ms; $5 \times I_{\Delta n} : \leq 40$ ms		
Response time delay, types A-G, A-S		ms	type A-G - $1 \times I_{\Delta n} : 10$ ms < T ≤ 300 ms; $5 \times I_{\Delta n} : 10$ ms < T ≤ 40 ms type A-S - $1 \times I_{\Delta n} : 130$ ms < T ≤ 500 ms; $5 \times I_{\Delta n} : 50$ ms < T ≤ 150 ms		
Ambient temperature		°C	-25 ... +40		
Storage temperature		°C	-35 ... +60		
Weight		kg	0.23		0.39
Tightening torque		Nm	2.0		

A sealing cover for two-pole (SCNFI2) and four-pole (SCNFI4) switches

[illegible]

FI2	-	25	/0,03
NFI4	-	40	/0,3
Rated residual operating current $I_{\Delta n}$ (A)			
Rated current I_n (A)			
Type			

Residual Current Circuit Breakers with overcurrent protection

RFI2



- RFI2 is a combination of a residual current circuit breaker and a miniature circuit breaker (RCBO)
- A built-in protection against overload and short-circuit
- RFI2 may be used to provide:
 - fault protection (protection against indirect contact)
 - protection against fire
 - additional protection against direct contact
- The switch is type A which means that it is sensitive to alternating and pulsating d.c. residual currents
- Sealing in ON or OFF position
- Assembly to a 35 mm wide mounting rail in accordance with EN 60715
- Optional operation position
- Degree of protection IP20, degree of protection IP40 after installation in a distribution box
- Additional colour indication of the position of main contacts (red - contacts closed, green - contacts open)

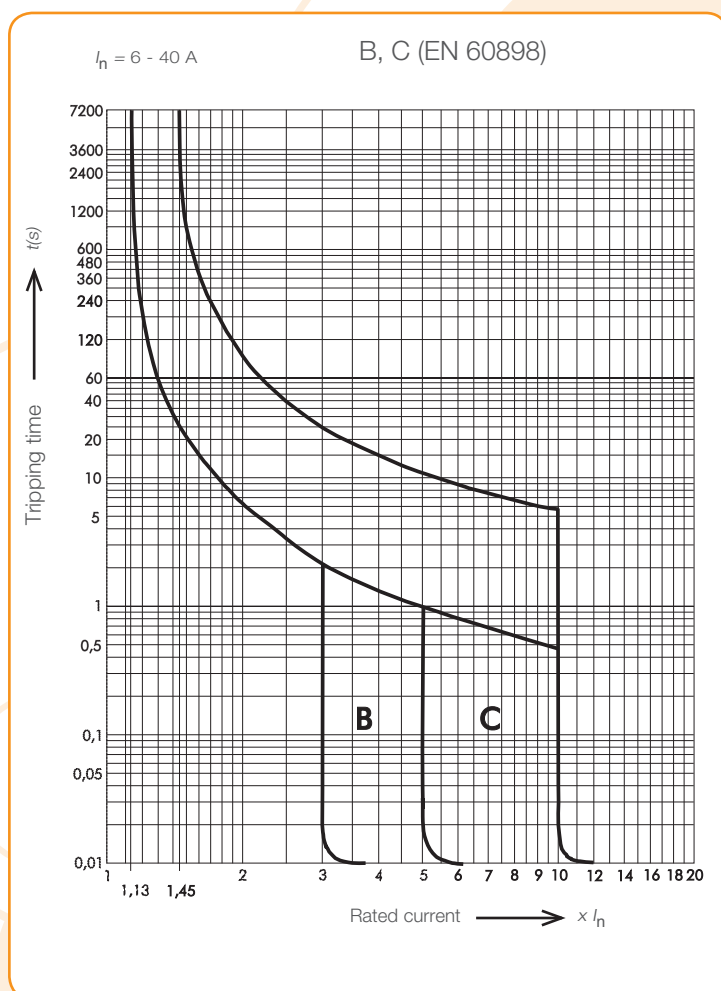
TECHNICAL DATA

Type			A	RFI2
Standards				IEC/EN 61009
Approvals				VDE, GOST-R
No. of poles				2
Tripping characteristic				B, C
Rated voltage	U_n	V		230
Rated impulse voltage	U_{imp}	kV		4
Rated frequency	f	Hz		50
Rated current	I_n	A		6, 10, 16, 20, 25, 32, 40
Rated residual operating current	$I_{\Delta n}$	mA		10 ($I_n = 6 - 25 A$), 30, 100, 300, 500
Rated short-circuit capacity		kA		10
Selectivity class				3
Terminal capacity	S	mm ²		1.5 ... 25
Ambient temperature		°C		-25 ... +40
Storage temperature		°C		-35 ... +60
Tightening torque		Nm		2.0
Accessories				Auxiliary and signal changeover contacts

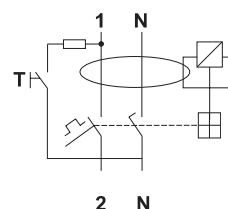
Residual Current Circuit Breakers

RFI2

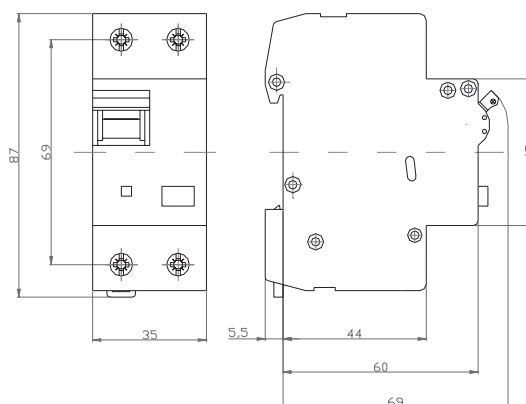
TRIPPING CHARACTERISTIC



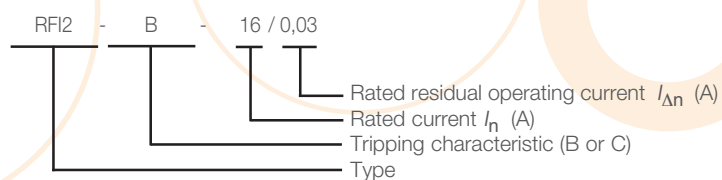
CONNECTION DIAGRAM



DIMENSIONS



ORDERING DATA



Contactors combinations

KMPL AND KPL DIRECT ON-LINE STARTERS

KMPL9, KMPL12, KMPL16, KMPL18, KMPL22, KPL9, KPL12, KPL16, KPL18, KPL22



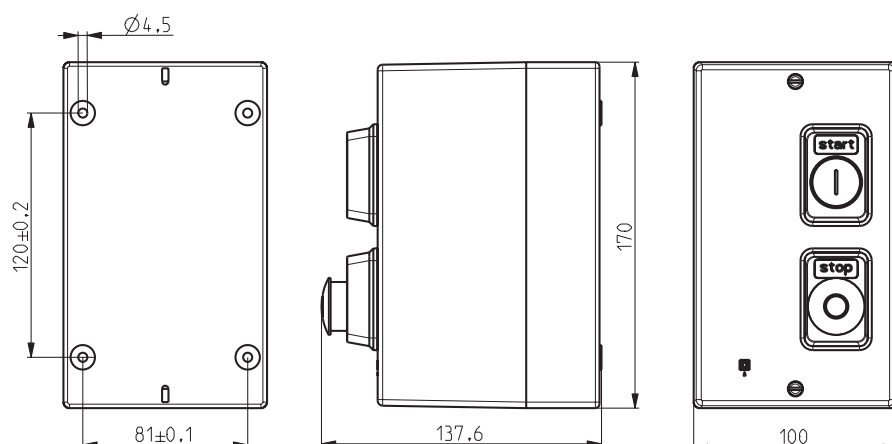
They are mainly used for start-up, overload protection and switch-off of electric motors and also for other loads. A contactor and a corresponding bimetal relay are built in the enclosure of degree of protection IP55. They are switched on with the ON pushbutton and switched off with the OFF pushbutton. The mushroom pushbutton functions as an emergency stop pushbutton.

Corresponding back-up fuses should be built in a circuit in front of an automatic contactor for the protection against short-circuit. The KPL starters are not provided with overload protection, while KMPL starters are.

TECHNICAL DATA

Type of direct starter without overload protection				KPL9	KPL12	KPL16	KPL18	KPL22
Type of direct starter with overload protection				KMPL9	KMPL12	KMPL16	KMPL18	KMPL22
Corresponding thermal overload relay				BR16, BR30				
Standards				IEC/EN 60947-4-1				
Rated insulation voltage	U_i	V		690				
Max. permitted powers of three-phase motors at AC-3	230 V	P_m	kW/ HP	2.2 / 3	3 / 4	4 / 5.5	4 / 5.5	5.5 / 7.5
	400 V			4 / 5.5	5.5 / 7.5	7.5 / 10	9 / 10	11 / 15
	500 V			5.5 / 7.5	5.5 / 7.5	7.5 / 10	9 / 10	11 / 15
	690 V			5.5 / 7.5	7.5 / 10	7.5 / 10	9 / 10	11 / 15
Max. back-up fuse for short-circuit protection gL Coordination type 2			A	25	25	35	35	50
Range at control voltage	U_c	%		85 ... 110				
Max. operating frequency			op. c./h	15				
Degree of protection				IP55				
Ambient temperature			°C	-20 ... +40				
Terminal capacity	rigid	S	mm ²	0.75 ... 6			2.5 ... 10	
	flexible			0.5 ... 6			1.5 ... 10	

DIMENSIONS



Contactors combinations

ZK STAR-DELTA MOTOR STARTER



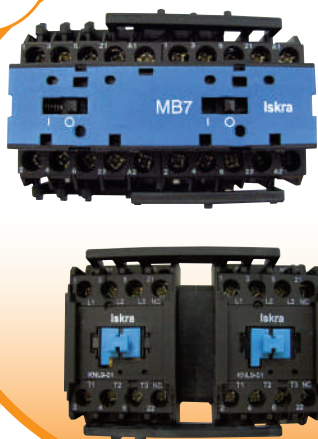
All required elements for start-up, overload protection and switch-off of asynchronous electric motors are built in the enclosure of degree of protection IP55.

TECHNICAL DATA

Starter type	Relay type	Permitted motor power					
		230 V		400 V		500 V	
		kW	HP	kW	HP	kW	HP
ZK 12	BR16 / 8,5 - 12,5	4	5.5	7.5	10	7.5	10
ZK 16	BR16 / 12,5 - 18	5.5	7.5	11	15	11	15
ZK 18	BR16 / 15 - 20	5.5	7.5	15	20	15	20
ZK 22	BR30 / 17 - 24	8	11	18.5	25	18.5	25
ZK 30	BR30 / 22 - 30	12.5	17	25	34	25	34
ZK 43	BR43 / 30 - 43	20	27	37	50	45	60
ZK 63	BR43 / 40 - 63	25	34	55	75	65	88
ZK 95	BRA180 / 75 - 125	40	54	75	100	100	136
ZK 115	BRA180 / 90 - 150	63	86	110	150	147	200
ZK 145	BRA180 / 120 - 200	80	108	132	180	185	252
ZK 180	BRA180 / 120 - 200	92	125	160	220	210	272

Contactors combinations

KO-LD, KNL-LD COMBINATIONS FOR REVERSING



TECHNICAL DATA

Type	AC-3 Rated operational power (kW)			
	230V	400V	500V	690V
KO-LD 7	3	5.5	5.5	5.5
KNL-LD 9	2.2	4	5.5	5.5
KNL-LD 12	3	5.5	5.5	7.5
KNL-LD 16	4	7.5	7.5	7.5
KNL-LD 18	4	9	9	9
KNL-LD 22	5.5	11	11	11
KNL-LD 30	7.5	15	15	15

KMSPL COMBINATION STARTERS



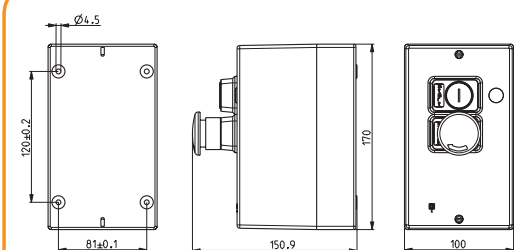
They are mainly used for start-up and switch-off of electric motors up to 11 kW power. MS25 motor protection switch with undervoltage release and a corresponding contactor are built in the enclosure of degree of protection IP55.

The advantages of combination starters over direct starters are:

- it is not necessary to build in back-up fuses for protection against short-circuit up to rated motor power 1.5 kW at 400 V
- after each overload and power line failure the automatic switch-on is not possible

TECHNICAL DATA

Type of combination starter				KMSPL3	KMSPL9	KMSPL12	KMSPL16	KMSPL18	KMSPL22
Type of motor protection switch				MS25-6,3	MS25-10	MS25-16	MS25-16	MS25-20	MS25-25
Setting range of bimetal release				4 ... 6,3	6,3 ... 10	10 ... 16	10 ... 16	10 ... 16	20 ... 25
AC-3, max. permitted powers of three-phase motors	230 V	P_m	kW	1.5	2.2	3	4	4	5.5
	400 V			2.2	4	5.5	7.5	9	11
	500 V			3	5.5	5.5	7.5	9	11
	690 V			4	5.5	7.5	7.5	9	11



Contactors combinations

DIRECT ON-LINE STARTERS UP TO 30 A



To define the starter, the following data have to be known:

- motor power, operational current
- coil control voltage
- required pushbuttons (none, start, stop, reset)
- main switch (yes or no)

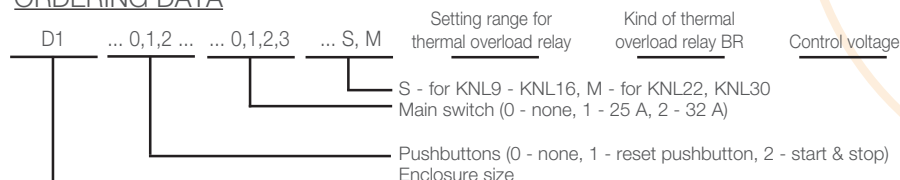
Based on these data, a convenient contactor and an overload relay as well as correspondingly equipped enclosure are selected.

You can choose between overload relay BR16/30.

COMPONENT SELECTION

	Permitted motor power 400/415 V, three-phase		Thermal overload relay BR16/30 Operational current (A) min.-max	Direct-on contactor*	Enclosure		
	kW	HP			Push-button arrangement	Main switch	Ordering code
BR16/KNL18	0.06	0.08	0.16 - 0.25	KNL9	start & stop reset none	—	D120S** D110 D100
	0.12	0.16	0.25 - 0.4				
	0.18	0.25	0.45 - 0.63				
	0.25	0.33	0.75 - 1				
	0.55	0.75	1.1 - 1.6				
	1.1	1.5	2.3 - 3.2				
	1.5	2	2.9 - 4				
	2.2	3	4.5 - 6.3				
	4	5.5	7.2 - 10	KNL12 KNL16 KNL18	start & stop reset none	with main switch	D121** D111 D101
	5.5	7.5	9 - 12.5				
	7.5	10	11.3 - 16				
	9	10	15 - 20				
BR30/KNL30	11	15	17.5 - 21.5	KNL22	start & stop reset none	—	D120M** D110 D120M
	15	20	24.5 - 30	KNL30	start & stop reset none	with main switch	D122** D112 D102

ORDERING DATA



* Standard control voltages (50/60 Hz)
 B7 24 V
 F7 110/125 V
 M7 220/240 V
 Q7 380/415 V
 Other control voltages on request.

** NDLE-11 snap-on auxiliary switch block included.

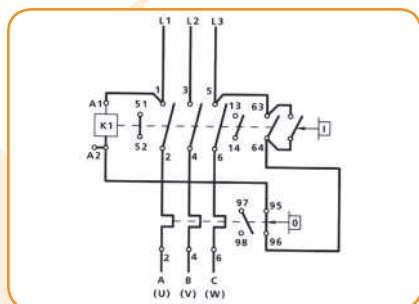
Enclosures: IP66, a metal base with a polycarbonate cover

Contactors combinations

KNL9-KNL30 direct-on-line starters

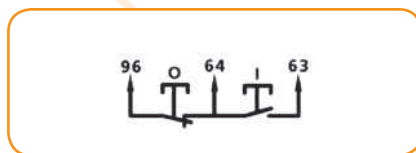
WIRING DIAGRAMS

KNL9-KNL30 direct-on-line starters

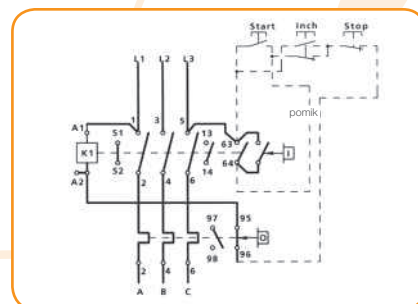


Connection for three-phase three-wire system-as shown above

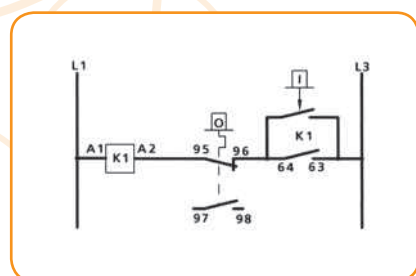
Connection for four-wire system:
1. Remove connection 1 (L1) - A1
2. Connect a neutral conductor to A1 terminal



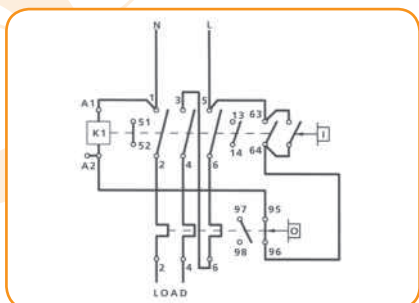
Connection for remote push-button control:
1. Remove connection 96 - 64
2. Connect as illustrated



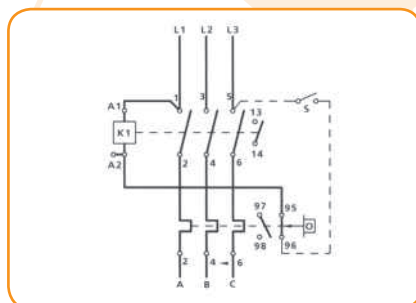
Connection for remote start-inch-stop control



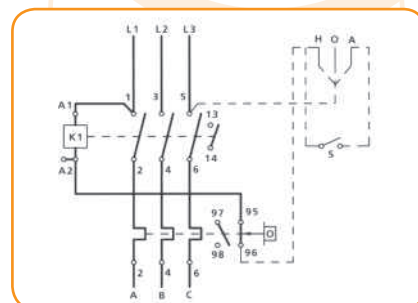
Connection diagram



Connection for single-phase motors



Connection for remote pilot switch control



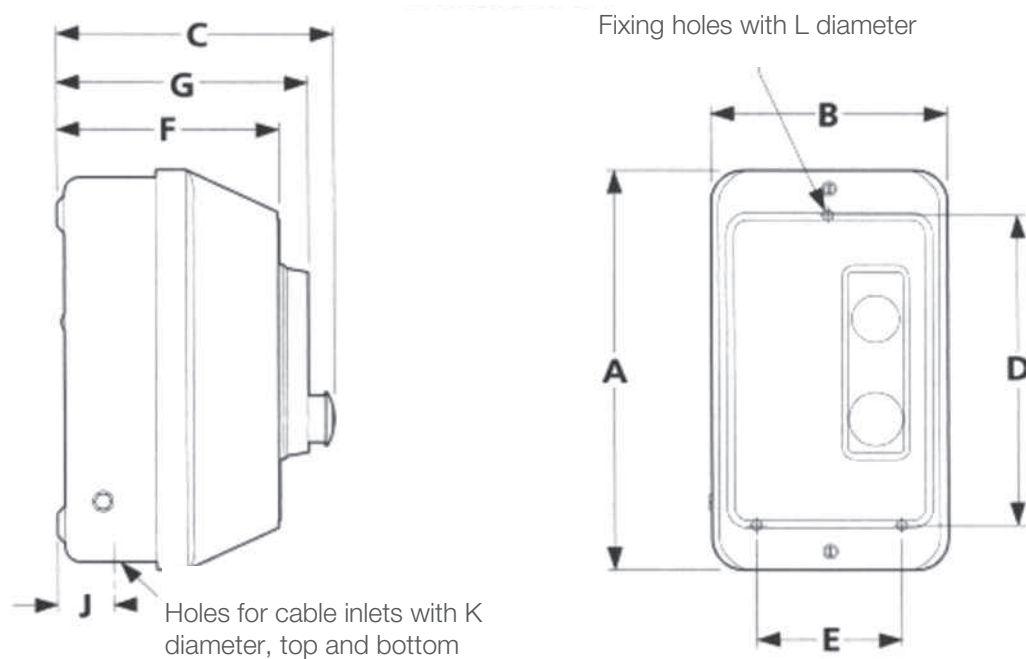
Connection for remote control with selection switch, manual - 0 - automatic

Contactors combinations

DIRECT ON-LINE STARTERS UP TO 30 A

DIMENSIONS

An enclosure for contactors and direct-on-line starters (size D1)



IP66	A	B	C	D	E	F	G	H	J	K	L
KNL9 - KNL30 (enclosure D1)	212	124	146	164	76	117	132.5	-	29.5	3 x 20	5.5
KNL9 - KNL30 + main switch (enclosure D1)	212	124	156	164	76	117	132	146	29.5	3 x 20	3 x 5.5

Contactors combinations

REVERSING STARTERS UP TO 30 A



To define the starter, the following data have to be known:

- motor power, operational current
- coil control voltage
- required pushbuttons (none, I, II, 0, reset)
- main switch (yes or no)

Based on these data, a convenient contactor and an overload relay as well as correspondingly equipped enclosure are selected.

COMPONENT SELECTION

	Motor power at 400/415 V, three-phase		Thermal overload relay BR16/30	Reversing starter*	Enclosure		
	kW	HP	Operational current (A) min.-max		Push-button arrangement	Main switch	Ordering code
BR16/KNL18	0.06	0.08	0.16 - 0.25	RS9	I, II and 0 reset none	—	R420S
	0.12	0.16	0.25 - 0.4				R410
	0.18	0.25	0.45 - 0.63				R400
	0.25	0.33	0.75 - 1		I, II and 0 reset none	with main switch	R221
	0.55	0.75	1.1 - 1.6				R211
	1.1	1.5	2.3 - 3.2				R201
	1.5	2	2.9 - 4				
	2.2	3	4.5 - 6.3				
	4	5.5	7.2 - 10	RS12			
	5.5	7.5	9 - 12.5	RS16			
	7.5	10	11.3 - 16	RS18			
BR30/KNL30	11	15	17.5 - 21.5	RS22	I, II and 0 reset none	—	R420M R410 R400
					I, II and 0 reset none	with main switch	R221 R211 R201
	15	20	24.5 - 30	RS30	I, II and 0 reset none	—	R420M R410 R400
					I, II and 0 reset none	with main switch	R222 R212 R202

ORDERING DATA

R2, R4	... 0,1,2 ...	... 0,1,2	... S, M -	...	Kind of thermal overload relay BR	Control voltage
					Setting range for thermal overload relay. S - for KNL9 - KNL16, M - for KNL22, KNL30	
					Main switch (0 - none, 1 - 25 A, 2 - 32 A)	
					Pushbuttons (0 - none, 1 - reset pushbutton, 2 - I, II and 0)	
					Enclosure size	

* Standard control voltages (50/60 Hz)

B7	24 V
F7	110/125 V
M7	220/240 V
Q7	380/415 V

Other control voltages also available

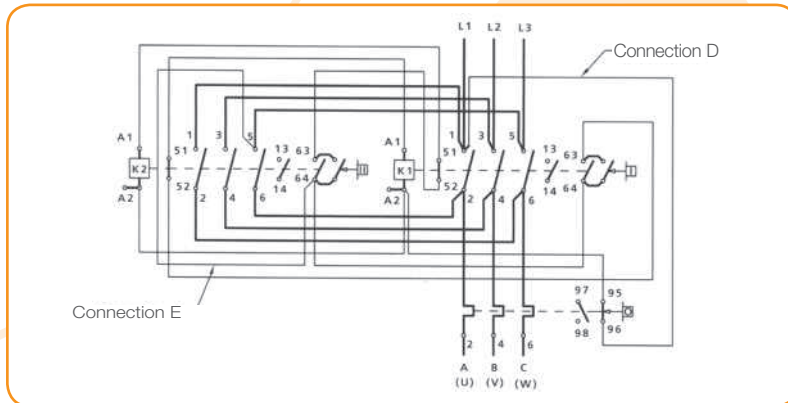
Enclosure: I, II and 0 pushbuttons can be marked: FOR/REV, UP/DOWN, OPEN/CLOSED, LEFT/ RIGHT
Degree of protection IP66, a metal base and a polycarbonate cover

Contactors combinations

REVERSING STARTERS UP TO 30 A

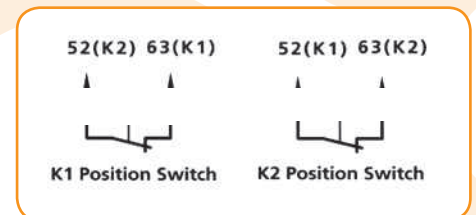
CONNECTION DIAGRAM

KNL9-KNL30 reversing starters



Wiring if a position switch is required:

1. Remove connections 52 - 63
2. Connect as illustrated



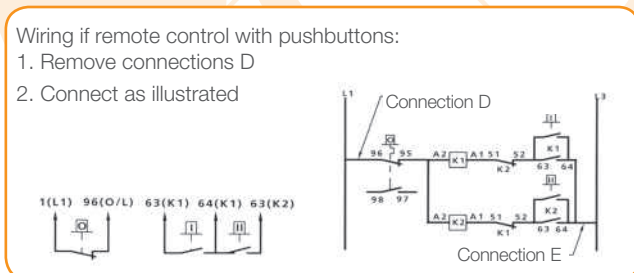
NOTE: Auxiliary contact 13-14 belongs to a KNL9-KNL16 contactor standard equipment

CONTROL CIRCUIT SUPPLY ARRANGEMENTS

SUPPLY	WIRING
Phase to phase	See a figure
Phase to neutral	Remove connection D connect neutral to terminal 96
Separate supply	Remove connections D and E. Connect separate coil supply to terminal 96 on overload relay and terminal 64 on K2 contactor

Wiring if remote control with pushbuttons:

1. Remove connections D
2. Connect as illustrated



Push to run

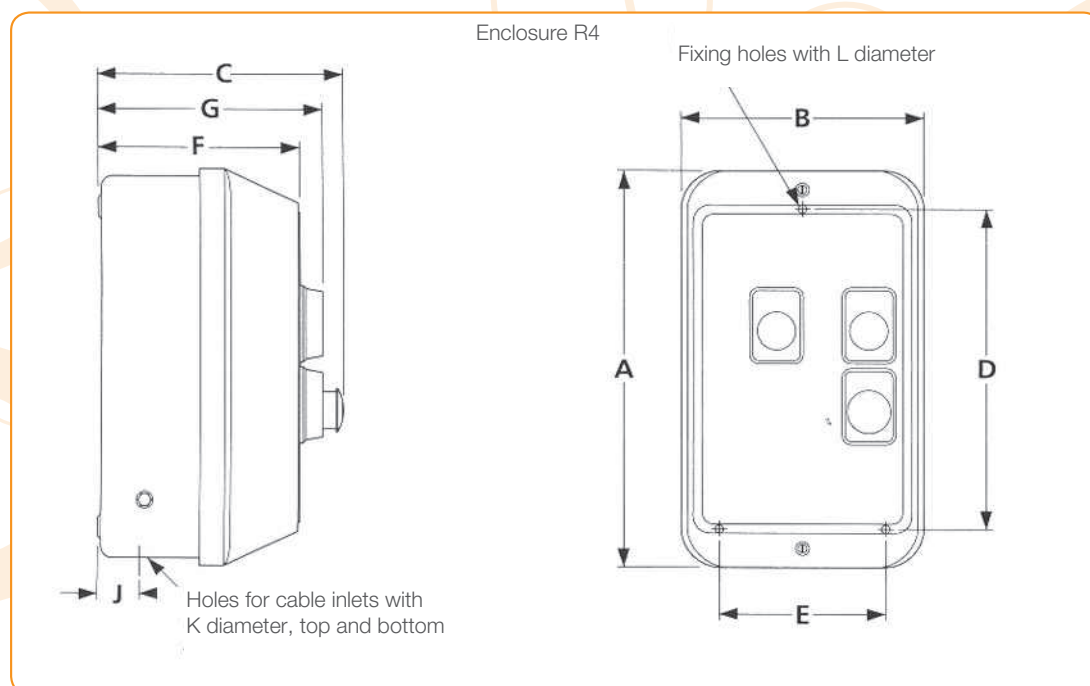
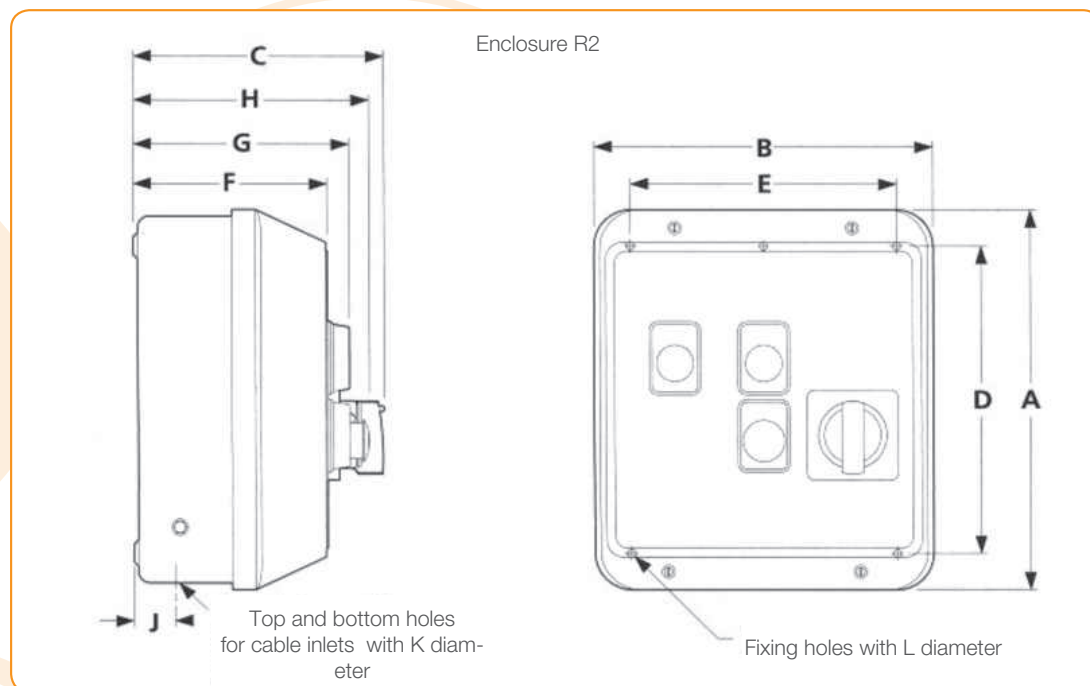
A simple push-to-run arrangement can be achieved in one or both directions by changing the top start switches.

Contactors combinations

REVERSING STARTERS UP TO 30 A

DIMENSIONS

Enclosures for reversing starters (enclosure sizes R2 and R4)



IP66	A	B	C	D	E	F	G	H	J	K	L
KNL9 - KNL30 (enclosure R4)	260	158	160	210	108	132	147	-	27.5	2 x 20 1 x 25	3 x 5.5
KNL9 - KNL30 + main switch (enclosure R2)	260	230	171	210	180	133	148	161	28.5	2 x 20 1 x 25	4 x 5.5

Contactors combinations

STAR-DELTA STARTERS UP TO 25 kW



To define the starter, the following data have to be known:

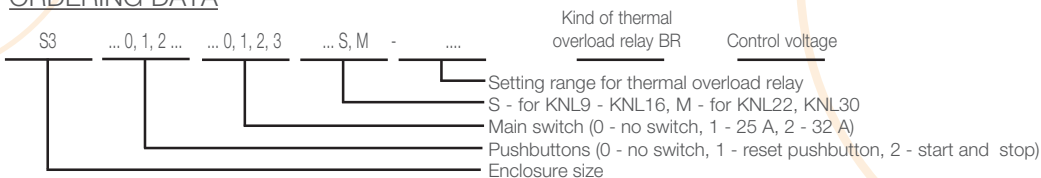
- motor power, operational current
- coil control voltage
- required pushbuttons (none, start, stop, reset)
- main switch (yes or no)

Based on these data, a convenient contactor and an overload relay as well as correspondingly equipped enclosure are selected.

COMPONENT SELECTION

	Motor power at 400/415 V, three-phase		Thermal overload relay BR16/30 Operational current (A) min.-max	Star-delta starter*	Enclosure		
	kW	HP			Push-button arrangement	Main switch	Ordering code
BR16/KNL18	2.2	3	2.3 - 3.2	SD16	start & stop reset none	—	S320S S310 S300
	4	5.5	4.5 - 6.3		start & stop reset none	with main switch	S321 S311 S301
	7.5	10	07.2 - 10		start & stop reset none	—	S320 S310 S300
	11	15	11.3 - 16		start & stop reset none	with main switch	S321 S311 S301
	15	20	15 - 20		start & stop reset none	—	S320 S310 S300
BR30/KNL30	18.5	25	21 - 25	SD22	start & stop reset none	—	S320 S310 S300
	22	30	21 - 25		start & stop reset none	with main switch	S321 S311 S301
	25	34	24.5 - 30		start & stop reset none	—	S320 S310 S300
	22	30	21 - 25		start & stop reset none	with main switch	S322 S312 S302
	25	34	24.5 - 30		start & stop reset none	—	S320 S310 S300

ORDERING DATA



* Standard control voltages (50/60 Hz)
B7 24 V
F7 110/125 V
M7 220/240 V
Q7 380/415 V

Other control voltages also available

STAR-DELTA STARTERS APPLICATION

For a star-delta unit, the overload relay is connected to a delta loop and therefore protects the motor only at this connection. For easier selection of the relay, motor currents are stated in a table.

A star-delta starter is equipped with an electronic time relay with a minimum range from 3 to 45 seconds.

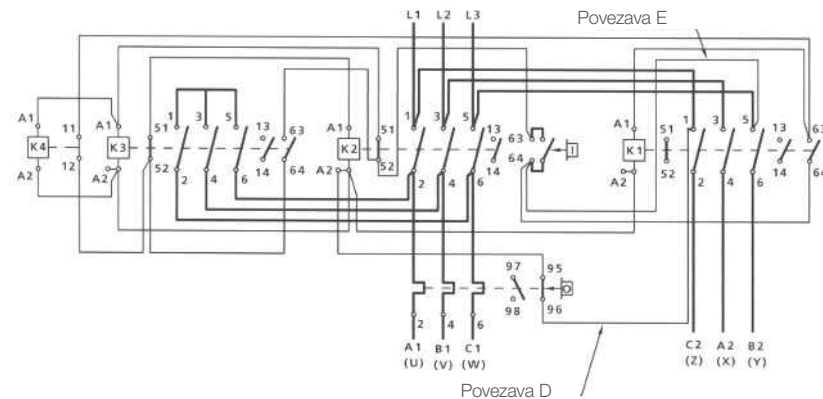
The time relay assures required delay between a "star" contactor opening and a "delta" contactor closing.

Contactors combinations

STAR-DELTA STARTERS UP TO 25 kW

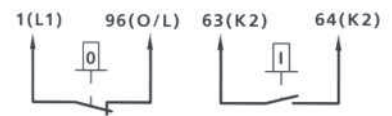
CONNECTION DIAGRAM

KNL9-KNL30 star delta starter contactors

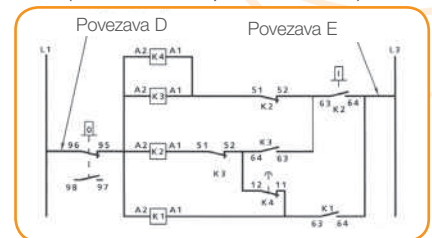


Wiring for remote control with pushbuttons

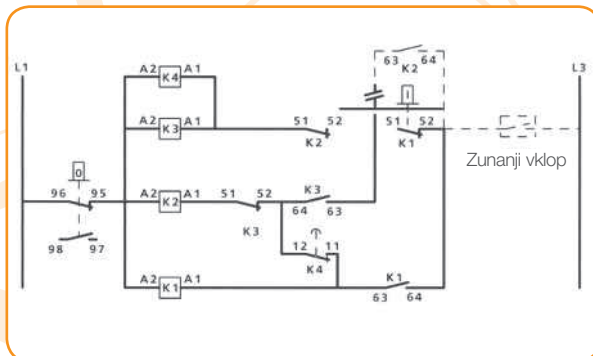
1. Remove connection D
2. Connect as illustrated



Connection diagram (control with pushbuttons)



NOTE: AUXILIARY CONTACT 13-14 BELONGS TO A KNL9-KNL16 CONTACTOR STANDARD EQUIPMENT



Connection diagram (Remote Pilot Switch Control)

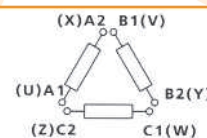
1. Remove connection 63 to 52 on the K2 contactor
2. Connect between 52 and 64 on the K1 contactor to terminal 52 on the K2 contactor
3. Connect the pilot switch in place of connection E
4. Set overload relay to manual reset position.

CONTROL CIRCUIT SUPPLY ARRANGEMENTS

SUPPLY	WIRING
Phase to phase	See a figure
Phase to neutral	Remove connection D Connect terminal 96 to a neutral conductor
Separate supply	Remove connections D and E Connect separate coil supply to terminal 96 on overload relay and terminal 64 on K2 contactor

Motor windings

Connect to appropriate terminals on the starter

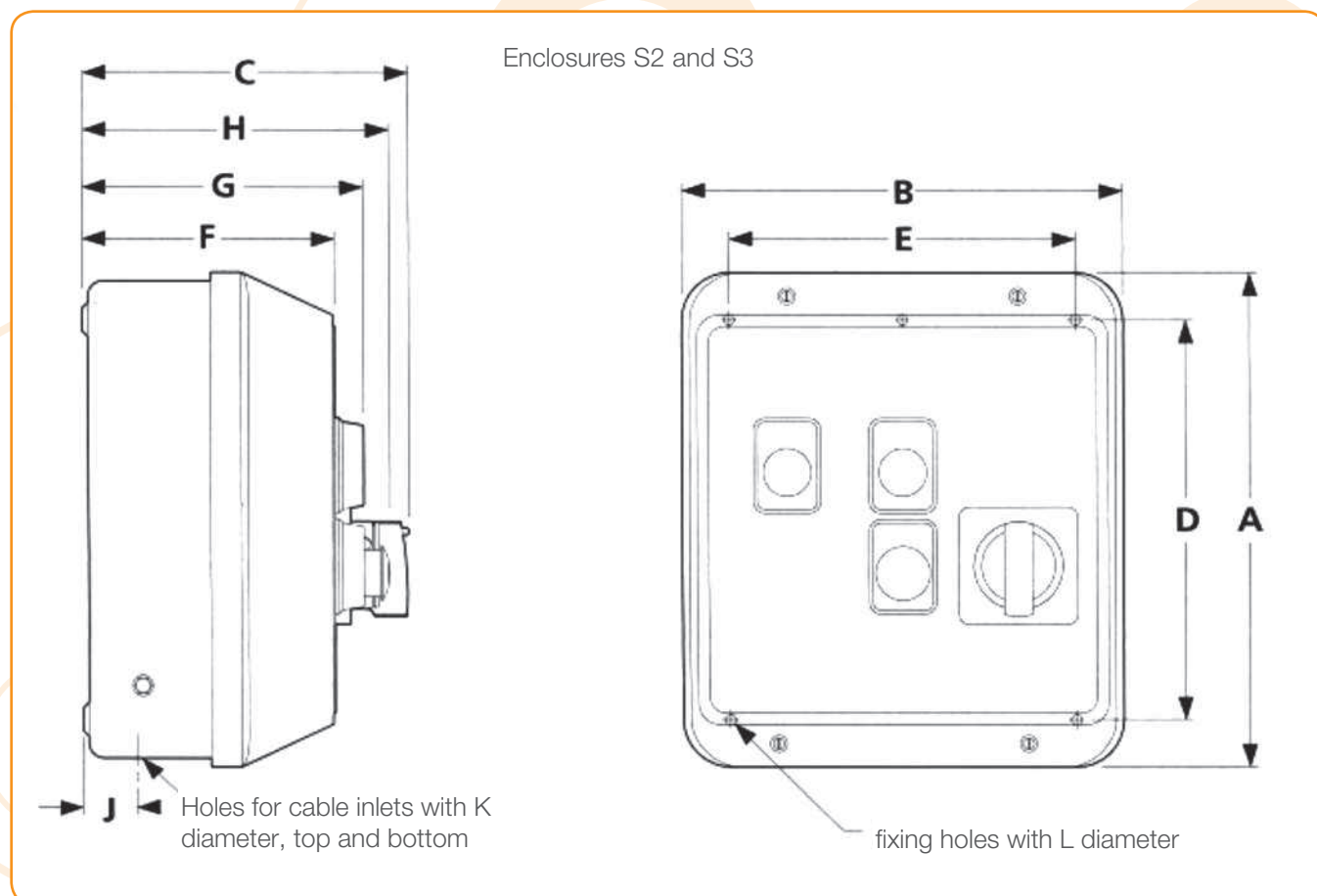


Contactors combinations

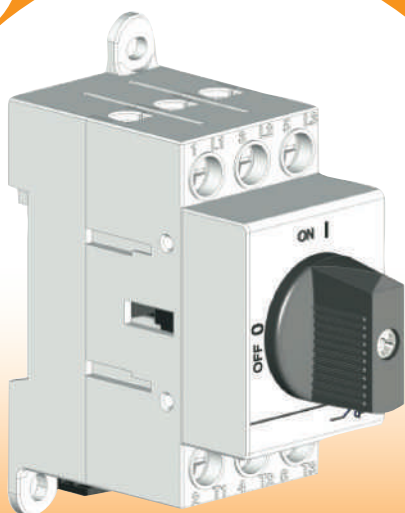
STAR-DELTA STARTERS UP TO 25 kW

DIMENSIONS

Enclosures for star-delta starters (sizes S2 and S3)



IP66	A	B	C	D	E	F	G	H	J	K	L
KNL16 - KNL30 (enclosure S2)	260	230	161	210	180	133	148	-	28.5	2 x 20 1 x 25	3 x 5.5
KNL16 - KNL30 + main switch (enclosureS3)	260	332	171	210	282	133	148	161	28.5	3 x 20 1 x 25	4 x 5.5



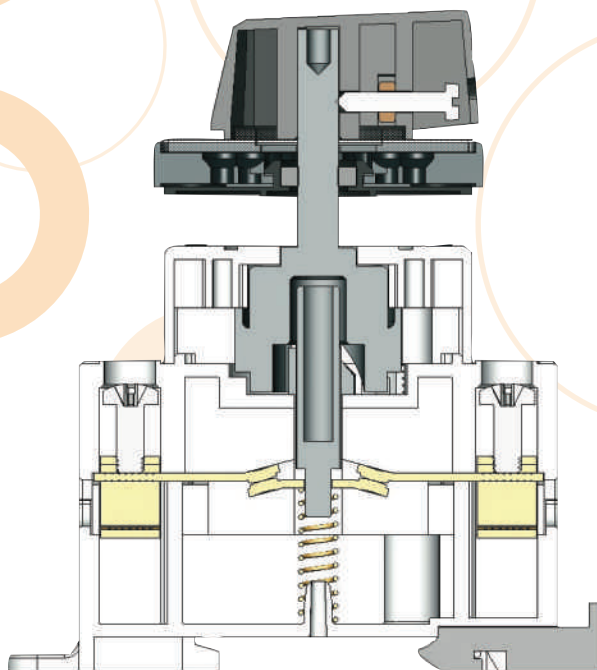
DS series of switches has been developed to the latest achievements in the field of switching devices through the application of quality insulation materials and contacts made with silver alloys. Modular construction allows subsequent changes, so stocking costs can be lowered. Elements that can be fixed to the left and/or right side of the switch:

- fourth pole (N-pole)
- auxiliary contacts 1n/o+1n/c
- auxiliary contacts 2 n/o
- PE terminal
- N terminal

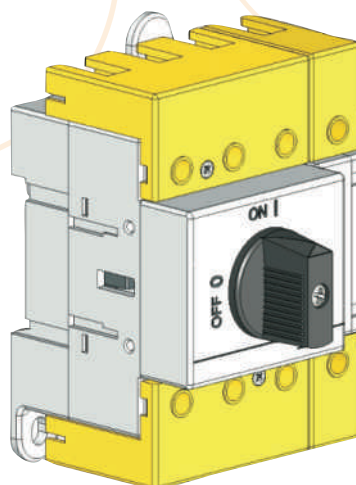
Because of the larger opening clearances the DS series of switches is particularly suitable for main switches (switch disconnectors) and safety switches (emergency-off switches). Switches are built in accordance with the following standards: IEC 60947-1, -3, IEC 60204, DIN EN 61058, UL 508, C22.2 No.14 etc.

General:

- Two modular frame sizes:
A0 size (16-25-32-40 A)
A1 size (40-63-80 A)
- Mechanical protection degree - front part IP65, connection terminals IP20 (for switches CS40,63,80 - option with protection cover is required)
- Positive contacts opening (IEC 60947-5-1 Annex K)
- Loosely screwed "self-lifting" clamps offer easier connection
- DIN-rail or screw mounting



Type	Type	I / U _{thi}
DS16	A0 (48)	16 A / 600 V
DS25	A0 (48)	25 A / 600 V
DS32	A0 (48)	32 A / 600 V
DS40R	A0 (48)	40 A / 600 V
DS40	A1 (65)	40 A / 600 V
DS63	A1 (65)	63 A / 600 V
DS80	A1 (65)	80 A / 600 V



Switch disconnectors

DS

TECHNICAL DATA

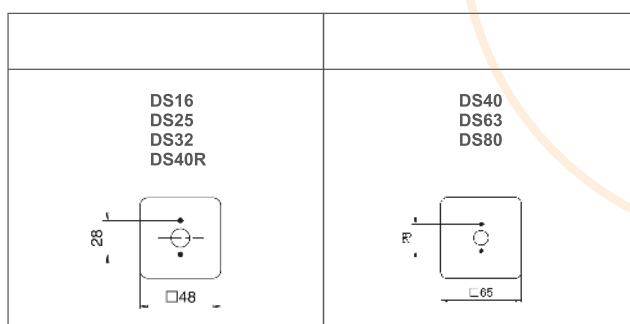
Switch type			DS16	DS25	DS32	DS40R	DS40	DS63	DS80
Rated insulation voltage	U_i	V	690						
Rated impulse withstand voltage (III/3) ¹⁾	U_{imp}	kV	6						
Rated thermal current	I_{th}	A	16	25	32	40	40	63	80
Rated short-time withstand current (1 s)	I_{cw}	A	400	500	600	600	1100	1300	1400
Max. fuse size for short circuit protection	10 kA		35	35	35	40	80	80	80
gG characteristic	25 kA		32	32	32	32	63	63	63
Rated operational current AC1/AC21A	50 kA		32	32	32	32	63	63	63
Rated operational current	I_e	A	16	25	32	40	40	63	80
Motor switch in utilization category	3 phase AC3	220/240 V	3.7	5.5	7.5	7.5	11	11	15
		380/440 V	3.5	7.5	11	11	15	22	25
		500 V	7.5	11	15	15	22	25	30
		690 V	7.5	11	15	15	22	25	25
	3 phase AC23	220/240 V	4	7.5	9	9	11	15	18.5
		380/440 V	7.5	11	15	15	18.5	25	30
		500 V	9	15	15	15	22	30	37
		690 V	9	15	15	15	22	30	30
Conductor size	rigid	S	mm ²	10	10	10	10	25	25
			AWG	8	8	8	8	4	4
	flexible	S	mm ²	6	6	6	6	16	16
			AWG	10	10	10	10	6	6

¹⁾ valid for neutral earthed systems, overvoltage category III, pollution degree 3

AUXILIARY CONTACTS

Type			DSX
Rated insulation voltage	U_i	V	690
Rated thermal current	I_{th}	A	10
Rated operational current	110 V	I_e A	8
	220-240 V		8
	380-400 V		3
	660-690 V		1
Conductor size	rigid	S	mm ² 1.5
			AWG 14
	flexible	S	mm ² 1.5
			AWG 14

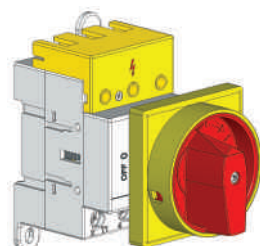
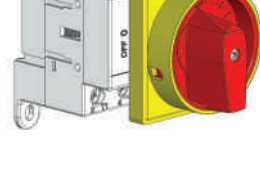
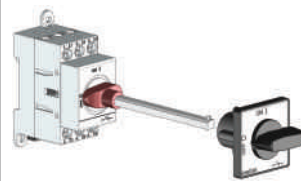
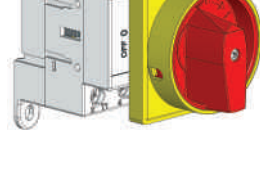
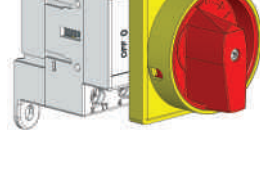
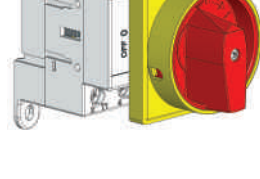
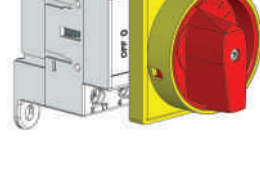
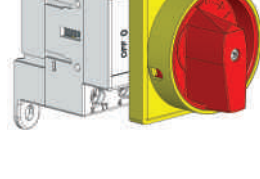
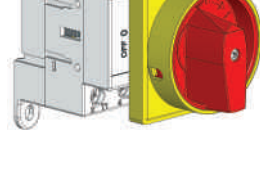
MOUNTING SIZES



Switch disconnectors

DS

STANDARD DESIGNS AND OPTIONAL EXTRAS

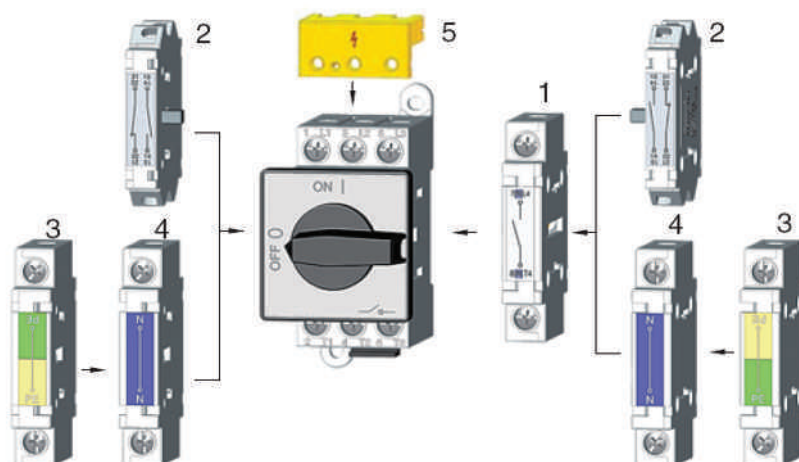
	Name	Form	Code				Description	
			1	2	3	4		
STANDARD SWITCHES	N		DS16	—	—	—	D	Standard front mounting - front assembly □48
	DS25		—	—	—	D		
	DS32		—	—	—	D		
	DS40R		—	—	—	D		
	Front mounting		DS40	—	—	—	D	Standard front mounting - front assembly □65
	DS63		—	—	—	D		
	DS80		—	—	—	D		
	N		DS16	—	—	—	C	Standard rear mounting - front assembly □48
	DS25		—	—	—	C		
	DS32		—	—	—	C		
	DS40R		—	—	—	C		
	Rear mounting		DS40	—	—	—	C	Standard rear mounting - front assembly □65
	DS63		—	—	—	C		
	DS80		—	—	—	C		
	Service cover		DS16	—	—	—	C	Snap on base mounting for the rail 35 EN 50022 for 45 mm standard knock-out
	DS25		—	—	—	C		
	DS32		—	—	—	C		
	DS40R		—	—	—	C		
			DS40	—	—	—	C	48D
	DS63		—	—	—	C	48D	
	DS80		—	—	—	C	48D	
	Switch with padlock		DS16	—	—	—	D/C	Main switch - black handle and front plate ¹⁾
	DS25		—	—	—	D/C	23	
	DS32		—	—	—	D/C	23	
	DS40R		—	—	—	D/C	23	
			DS40	—	—	—	D/C	Main switch with emergency - red handle, yellow front plate ¹⁾
	DS63		—	—	—	D/C	23	
	DS80		—	—	—	D/C	23	
	Switch with padlock		DS16	—	—	—	D/C	Main switch with emergency - red handle, yellow front plate ¹⁾
	DS25		—	—	—	D/C	25	
	DS32		—	—	—	D/C	25	
	DS40R		—	—	—	D/C	25	
			DS40	—	—	—	D/C	Main switch with emergency - red handle, yellow front plate ¹⁾
	DS63		—	—	—	D/C	25	
	DS80		—	—	—	D/C	25	
	Door coupling and shaft extension		DS16	—	—	—	D	Door opening in position "0" Standard version with 100 mm shaft
	DS25		—	—	—	D		
	DS32		—	—	—	D		
	DS40R		—	—	—	D		
DOOR COUPLING	N		DS40	—	—	—	D	
	DS63		—	—	—	D		
	DS80		—	—	—	D		

“N” - possibility of front plate title

Switch disconnectors

DS

ACCESSORIES



- 1 - Fourth pole (switched neutral cond
- 2 - Auxiliary contacts (1n/o+1n/c or 2
- 3 - PE terminal
- 4 - N terminal
- 5 - Protection cover

Accessories must be mounted in positi

ORDERING CODES FOR ACCESSORIES

4 pole

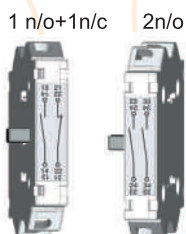
early make - late break



Mounting size A0	"C"	"D"
DSF16	786 120 118 000	786 120 112 000
DSF25	786 120 119 000	786 120 113 000
DSF32	786 120 120 000	786 120 114 000
DSF40R	786 120 122 000	786 120 123 000
Mounting size A1	"C"	"D"
DSF40	786 120 121 000	786 120 115 000
DSF63	786 120 124 000	786 120 116 000
DSF80	786 120 125 000	786 120 117 000

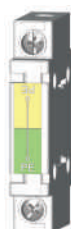
Auxiliary contacts

n/o contact: late make - early break



Type of auxiliary contacts	"C"	"D"
DSX11	786 125 061 000	786 125 043 000
DSX20	786 125 044 000	786 125 062 000

PE terminal



Type of switch	"C"	"D"
DSPE (DS16 - DS40R)	786 125 055 000	786 125 057 000
DSPE M (DS40 - DS80)	786 125 056 000	786 125 058 000

"C" - Rear mounting
"D" - Front mounting mounting

Switch disconnectors

DS

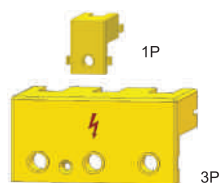
ORDERING CODES FOR ACCESSORIES

N terminal



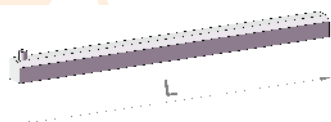
Type of switch	"C"	"D"
DSN (DS16 - DS40R)	786 125 049 000	786 125 051 000
DSN M (DS40 - DS80)	786 125 050 000	786 125 052 000

Protection cover



Number of poles	"C" or "D"
DSP1	786 125 053 000
DSP3	786 125 054 000

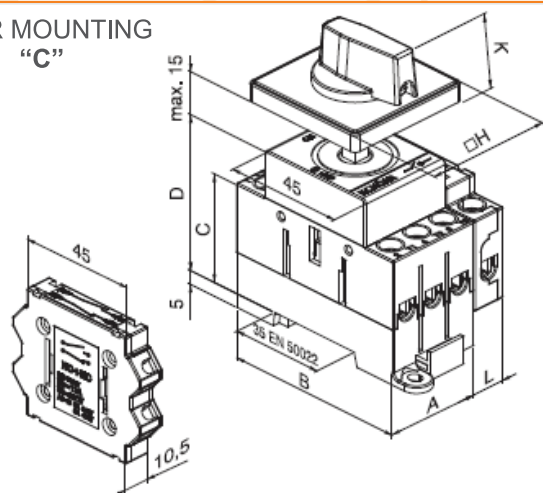
Shaft



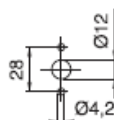
X (mm)	
DSS70	786 125 045 000
DSS90	786 125 046 000
DSS100	786 125 059 000
DSS150	786 125 047 000
DSS200	786 125 060 000
DSS300	786 125 048 000

DIMENSIONS

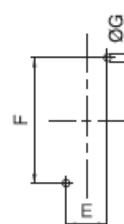
REAR MOUNTING "C"



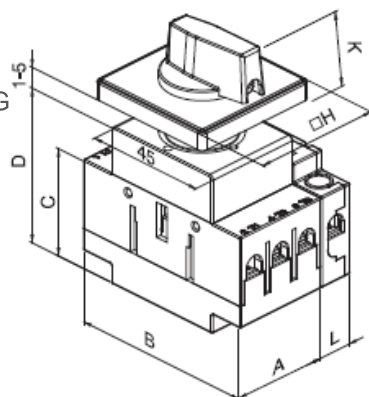
Front



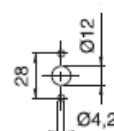
Rear



FRONT MOUNTING "D"



Front

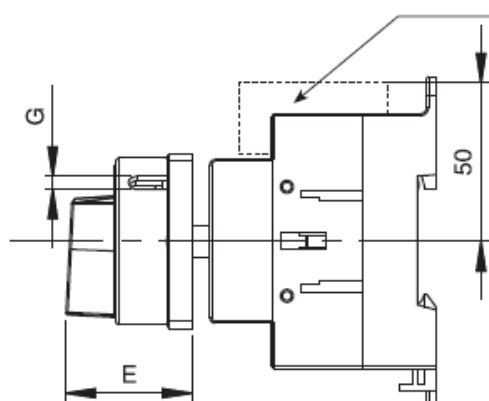


Type	A	B	C	D	E	F	ØG	ØH	K	L	M
DS16 DS25 DS32 DS40R	36	70	40	57	25	78	4.5	48	26.5	13.5	10.5
DS40 DS63 DS80	54	76	40	57	40	88	5.5	65	34.5	18	10.5

Switch disconnectors

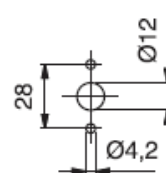
DS

DIMENSIONS



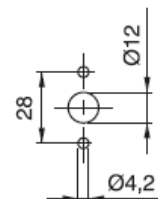
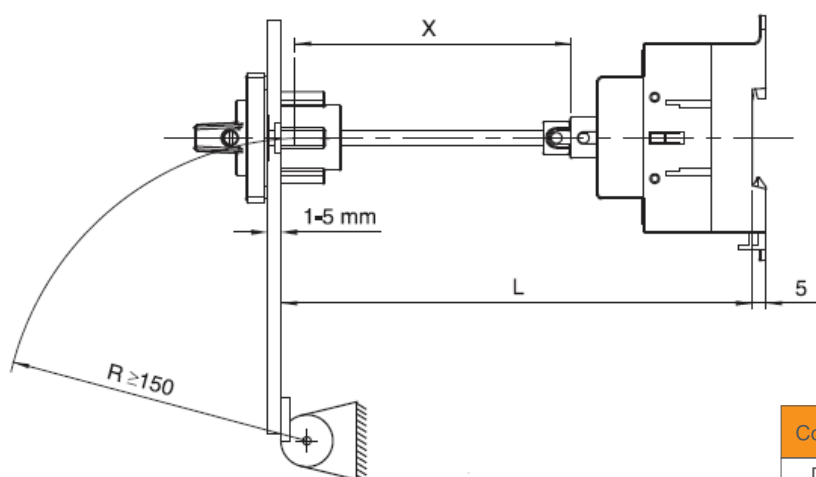
Protection cover for
main switch
DS40/63/80

Front



Optional extra **06/23/25**

Type	E	G
DS16 DS25 DS32 DS40R	34,2	5
DS40 DS63 DS80	38	6



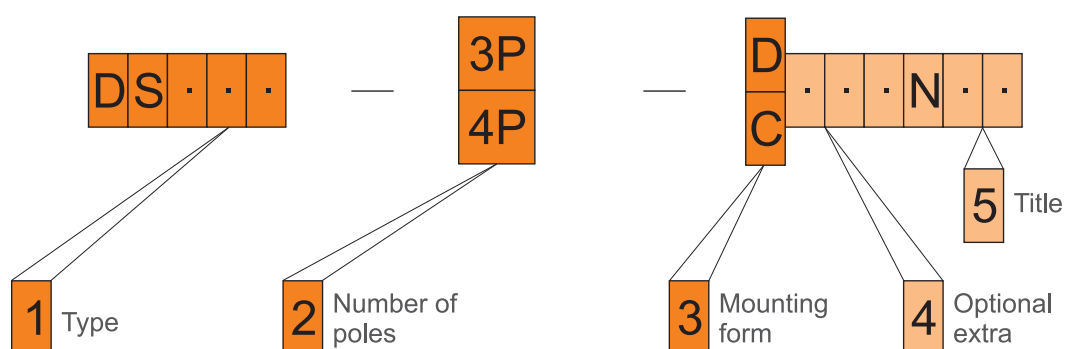
Optional extra **DSS100/200**

Code	X	Lmax
DSS100	100	175
DSS200	200	275

ORDERING CODE

When ordering please define:

- for **standard** switch 3 data types **123**
- for switch with an **optional extra** or with a **special request** max. 5 data types **123 45**

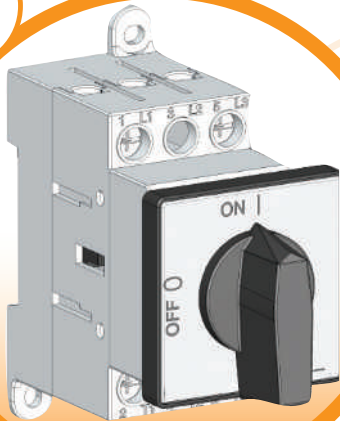


DESCRIPTION

- 1 Switch type.** To be chosen in accordance with the technical requests (see page 2)
- 2 Number of poles**
- 3 Standard mounting forms** (see page 3)
 - D** — Front mounting
 - C** — Rear mounting
- 4** To be marked when an optional extra is required (see page 3)
- 5** "N" is to be written when the front plate with a title is required. Possibility for N front plate (see pages 3)

Switch disconnectors

DSPV



The development of renewable energy sources on the basis of photovoltaic panels has resulted with the development of switch-disconnectors which are used for switching off DC circuit.

DSPV series of switch-disconnectors with double breaking system completely fulfils requirements for isolation according to IEC 60364-7-712 for photovoltaic installations.

DSPV type of switch-disconnectors can meet all requirements of installation with rated operational voltage up to 1000V and operational currents up to 80A in utilization category DC21B.

Switch-disconnectors are designed to be placed between photovoltaic cells and DC/AC inverter. SWITCH-DISCONNECTOR DSPV

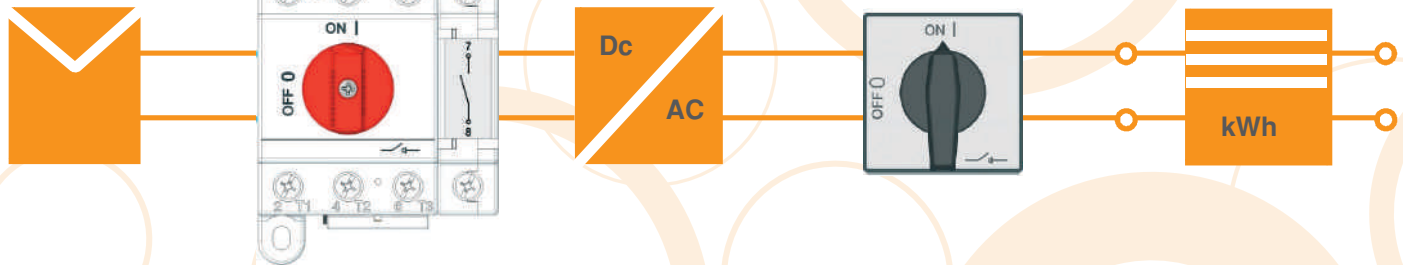


Compact design
Protection degree IP65
According to IEC 60947
DIN rail or screw mountings

PHOTOVOLTAIC
MODULE

DC / AC
INVERTER

AC
SWITCH-DISCONNECTOR



Rated operational current for specified voltage is achieved by serial wiring of the poles as shown in the table below.

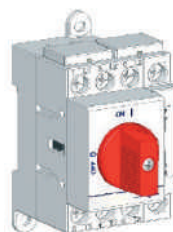
11	21	201 (DSPV40 - 750 V)	22	202 (DSPV40 - 750 V)	31
301 (CSP40 - 750V)	33	44	53		
			DSPV40		
			DSPV80		

Switch disconnectors

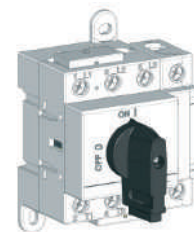
DSPV

TECHNICAL DATA

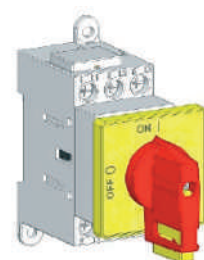
Type	Rated operational voltage U_e	Rated operational current I_e (DC21B)	Number of poles in series
DSPV40-21	220	40	3
DSPV80-21		50	3
DSPV80-31		80	4
DSPV40-11	450	7	2
DSPV40-21		16	3
DSPV40-31		30	4
DSPV40-33		40	6
DSPV80-31		63	4
DSPV80-33		80	6
DSPV40-21	500	10	3
DSPV40-31		30	4
DSPV40-33		35	6
DSPV40-44		40	8
DSPV80-31		35	4
DSPV80-33		50	6
DSPV80-44		80	8
DSPV40-21	750	8	3
DSPV40-31		12	4
DSPV40-33		35	6
DSPV40-44		40	8
DSPV80-33		45	6
DSPV80-44		50	8
DSPV40-33	1000	16	6
DSPV40-44		20	8
DSPV80-33		20	6
DSPV80-44		30	8



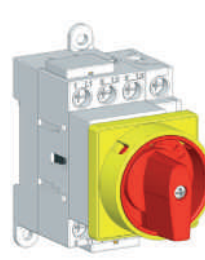
DSPV40-22-O48D
Service cover (48D)



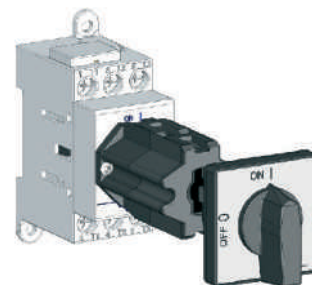
DSPV80-31-O48,56
Service cover (48, 56)



DSPV40-21-O75

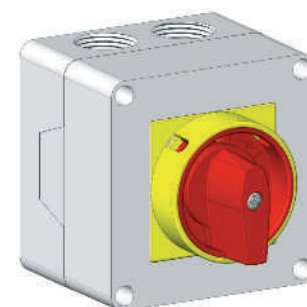


DSPV40-31-O25
Switches with locking (75/25)

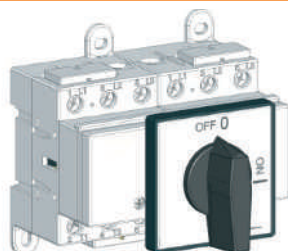


DSPV40-21-O108D

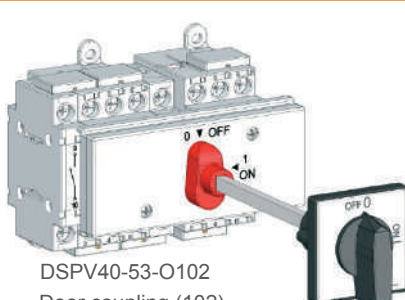
Door coupling (108D)



DSPV40-31-P
Plastic enclosure



DSPV80-33-O
Rear mounting



DSPV40-53-O102
Door coupling (102)



Time relays

TRE 701

TRE 701 is a multifunction multitime time relay with build-in microprocessor technology. It covers most of the user needs. It comprehends simple and more sophisticated time functions with very wide time ranges. It can be delivered in many varieties according to operating voltages and the number of output contacts.



Function description:

- A:** A pulse after power-on or after the rising edge of trigger pulse S.
- B:** Delay after power-on or after the rising edge of trigger pulse S.
- C:** A pulse after power-on or after the rising edge of trigger pulse S. Retriggerable.
- D:** Delay after power-on or after the rising edge of trigger pulse S. Retriggerable.
- E:** The first edge of trigger pulse S turns relay on while the second edge starts counting down till relay off. Additional trigger S before the process is finished prolongs the on-state.
- F:** Each rising edge of trigger S appends additional period T to the time of on-state.
- G:** Pulsating operating with a starting pulse or pause which depends on the state of trigger S at power-on.
- H:** Bistable operating. Each rising edge of trigger S swaps the relay into the opposite state.
- I:** Prolonged pulse after power-on. The presence of trigger S temporarily stops counting.
- J:** Prolonged pause after power-on. The presence of trigger S temporarily stops counting.

Notes

Functions A - D: If triggering at power-on is required, then the control signal S must be active.

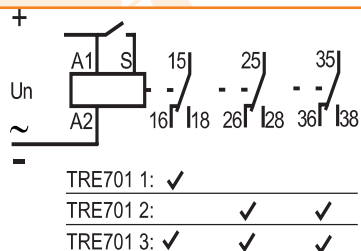
When changing function, the relay must be powered OFF and ON again.

It is possible to upgrade the relay with some user-defined functions with one or two independent output relays (for larger quantities).

Basic technical data

Time ranges	
(time ranges selected with a microswitch)	seconds: 1, 10
	minutes: 1, 10
	hours: 1, 10, 100, 500
	ON, OFF
Operating voltage ranges	
(select one range)	24 - 240 V AC/DC
	12 V AC/DC
	230 V AC
Output contacts	1 - 3 x 8 A/250 V

Connection diagram:



Orderind data:

TRE 701 2 24 - 240 V
 TRE 701 - relay type
 2 - number of contacts (1,2,3)
 24 - 240 V - operating voltage
 (12 V AC/DC, 230 V AC, 24-240 V AC/DC)

NOTE: Combination with 3 output contacts and 230 VAC operating voltage cannot be delivered.
 For technical data see page 117.



Time relays

TRE 702

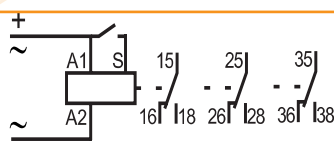
TRE 702 is a multifunction T1-T2 time relay with built-in microprocessor technology. It covers most of the user needs. The time relay comprehends simple and more sophisticated time functions with very wide time ranges. It can be delivered in many varieties according to operating voltages and the number of output contacts. It excels in the possibility of setting extremely asymmetrical T1-T2 time functions.



Basic technical data

Time ranges	
(time ranges selected with a microswitch)	seconds: 1, 10
	minutes: 1, 10
	hours: 1, 10, 100,
	T1,T2: 1h - 1 min;
	10 h - 10 min; 100 h - 1 h
Operating voltage ranges	
(select one range)	24 - 240 V AC/DC
	2 V AC/DC
	230 V AC
Output contacts	1 - 3 x 8 A/250 V

Connection diagram:



TRE702 1:	✓		
TRE702 2:		✓	✓
TRE702 3:	✓	✓	✓

Ordering data:

TRE 702 2 24 - 240 V
 TRE 702 – relay type
 2 - a number of contacts (1, 2, 3)
 24 - 240 V - operating voltage
 (12 V AC/DC, 230 V AC, 24-240 V AC/DC)

NOTE: A combination with three contacts and 230 V AC operating voltage cannot be delivered.
 For technical data see page 117.

Function description:

- A:** A pulse after power-on or after the rising edge of trigger pulse S. Eventual signals S occurring before time T expiry have no influence.
- B:** Delay after power-on or after the rising edge of trigger pulse S. Eventual signals S occurring before time T expiry have no influence.
- C:** A pulse after power-on or after the rising edge of trigger pulse S. Retriggerable.
- D:** Delay after power-on or after rising edge of trigger pulse S. Retriggerable.
- E:** The first edge of trigger pulse S turns relay on while the second edge starts counting down till relay off. Additional trigger S prolongs the on-state before the process is finished.
- F:** Prolonged pulse after power-on. The presence of trigger S temporarily stops counting.
- G:** Pulsating operating with a non-equal pulse-pause rate. A starting pulse or a pause which depends on the state of trigger S at power-on.
- H:** After the rising edge of trigger S, the device waits for period T1 and the relay is activated (if trigger S is still present). After period T2, it is deactivated. If the trigger signal is shorter than period T1, the relay does not activate at all. If trigger S reappears during period T2, it has no influence.
- I:** After the rising edge of trigger S, the device waits for period T1 and the relay is activated (if the trigger S is still present). At the falling edge of trigger S the second counting starts and when it reaches T2, the relay is deactivated. If the trigger signal is shorter than period T1, the relay does not activate at all. If trigger S reappears during period T2, it has no influence.
- J:** The rising edge of trigger S activates the relay for period T1. The falling edge of trigger S activates the relay for period T2. If trigger S falls down during period T1, period will be cancelled. If trigger S reappears during period T2, it has no influence.

Note:

Functions A - D: triggering power-on, is required the control signal S must be active.

When changing function, the relay must be powered OFF and ON again.

For larger quantities, it is possible to upgrade the relay with some user-defined functions by means of one or two independent output relays.



Time relays

TRE 703

TRE 703 is a one-function one-time time relay used for more sensitive applications. It can be delivered in many varieties according to function, time range, operating voltage and the number of output contacts.



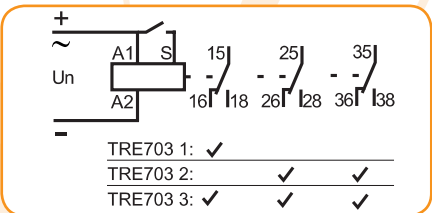
Function description

- A: Pulse at power-on or at falling edge of control signal S
- B: Pause at power-on or at falling edge of control signal S
- C: Pulsating with starting pulse
- D: Pulsating with starting pause

Basic technical data

Time ranges (select one range)	seconds: 3,15
	minutes: 1, 3, 15
	hours: 1, 3
Operating voltage ranges (select one range)	24-240 V AC/DC
	12 V AC/DC
	230 V AC
Output contacts	1 - 3 x 8 A/250 V

Connection diagram

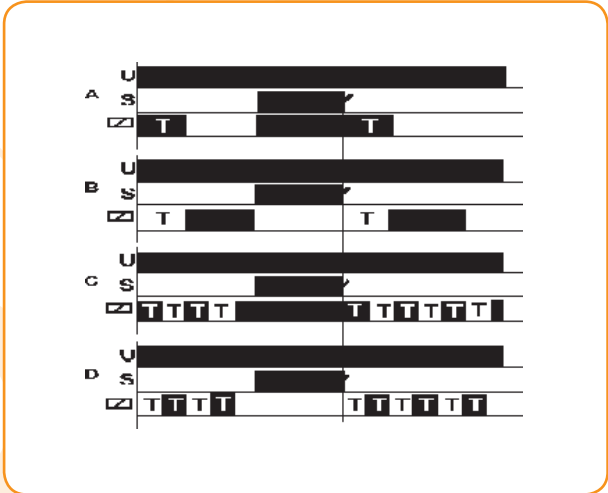


Ordering data

TRE 703 2 24-240 V A 1 h
TRE 703 - relay type
2 - number of contacts (1, 2, 3)
24-240 V - operating voltage (12 V AC/DC, 230 V AC, 24-240 V AC/DC)
A - time function (A, B, C, D)
1 h - time range (3 s, 15 s, 1 min, 3 min, 15 min, 1 h, 3 h)

NOTE: A combination with three contacts and 230 V AC operating voltage can not be delivered.

For technical data see page 117.



TRE 704 is a star-delta switch. Time T1 can be adjusted within the selected time range. It can be delivered in many varieties according to time range and operating voltage.



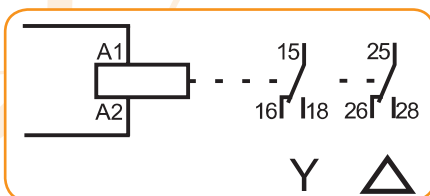
Function description

After power-on, the relay Y is activated for time T.
After the pause. T2 = 100 ms, the relay Δ is activated.

Basic technical data

Time ranges	
(select one range)	seconds: 10, 30, 60, 100, 600
Operating voltage ranges	
(select one range)	24-240 V AC/DC
	12 V AC/DC
	230 V AC
Output contacts	2 x 8 A/250 V

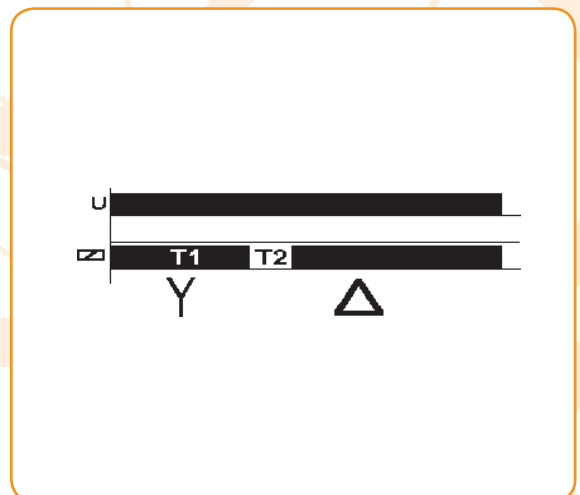
Connection diagram



Ordering data

TRE 704 24-240 V 100 s
TRE 704 - relay type
24-240 V - operating voltage (12 V AC/DC, 230 V AC, 24-240 V AC/DC)
100 s - time range (10, 30, 60, 100, 600)

For technical data see page 117.



Time relays

TRE 705

TRE 705 is a bistable time relay with hold-on after power off. Time T1 can be adjusted within the selected time range. It can be delivered in many varieties according to time range and operating voltage.



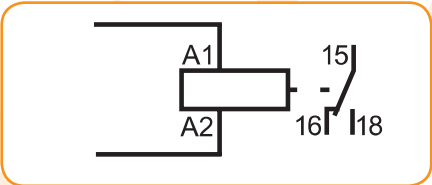
Function description

A: The relay is activated after power-on. After power-off, it remains activated for the period T.
B: The relay is activated at power-off and remains activated for the period T.

Basic technical data

Time ranges	
(select one range)	seconds: 3, 10, 30, 60, 100, 300
Operating voltage ranges	
(select one range)	24-240 V AC/DC
	12 V AC/DC
Output contacts	
	6 A/250 V

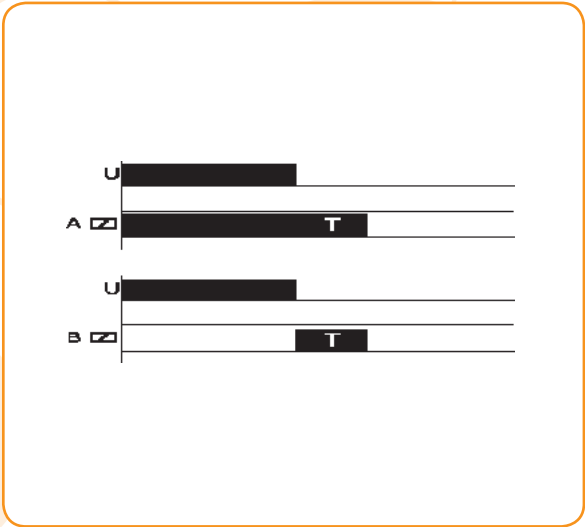
Connection diagram



Ordering data

TRE 705 - 24-240 V A 100 s
TRE 705 - relay type
24-240 V - operating voltage (12 V AC/DC, 24-240 V AC/DC)
A - time function
100 s - time range (3, 10, 30, 60, 100, 300 seconds)

For technical data see page 117.



Time relays

TRE 706

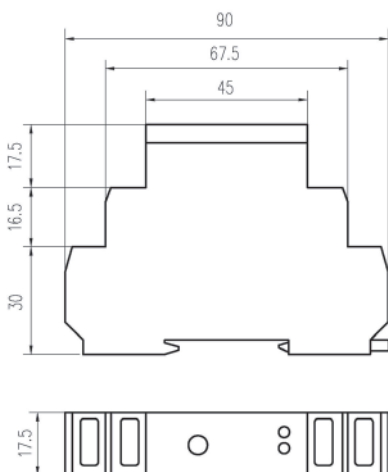
TRE 706 is a staircase switch. Time can be adjusted in the range from 0.5 to 10 minutes. It is edge triggered, which means that it is broken-switch proof. Enhanced version B has the possibility of multiplying ON time by factor 8. This fast-on function is activated by holding the switch for prolonged time (6- to 8 - second). This is very useful at cleaning, repairs etc.



Basic technical data

Time ranges	0.5 - 10 minutes
	ON, OFF
	Option B: extra
	4-80 minutes
	ON, OFF
Operating voltage	230 V AC
Output contact	16 A/250 V
Number of bulb lamps (<1mA)	10

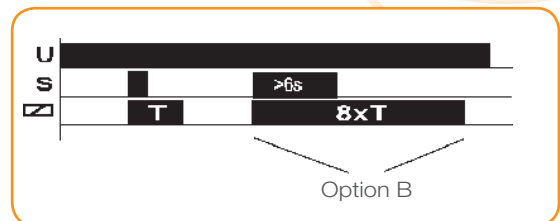
DIMENSIONS



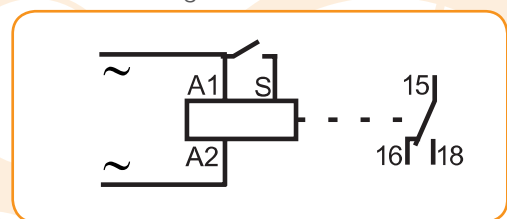
Function description

The signal S activates the relay for period T. If the duration of the signal S is longer than 6 seconds, the period T is prolonged by factor 8 (version B). This is indicated by changing the brightness of the control red LED.

If the signal S reappears before the period T expires, the counting time starts again from the beginning.



Connection diagram



Ordering data

TRE 706 A

TRE 706 - relay type

A - option (A, B): A is a basic version, B has the possibility of time prolonged operation

Technical data for time relays TRE 701 to TRE 706

Operating voltage range: -15%, +10%

Input resistance of control input S:

(TRE 701, 702, 703, 706): 100 kOhm

Min. duration of trigger pulse S: 50 ms

Time setting repeatability:

TRE 703/704/705/706/CRT < 2%

TRE 701/702 < 1%

Nominal time range tolerance

TRE 703, 704, 705, 706: 5%

TRE 701/702: 1%

Operating temperature: 0°C to 55°C

(-20°C to +65°C available on order)

Storage temperature: -25°C to +70°C

Degree of protection: IP20

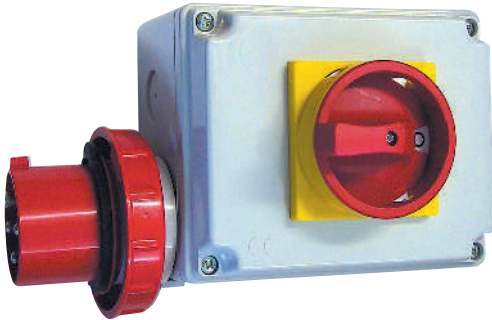
Diameter of connection cable: 2.2 mm max.

Mechanical endurance: >10⁷ cycles

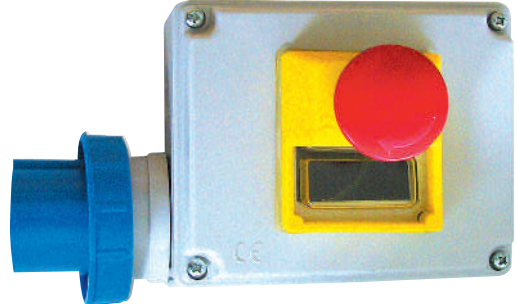
Standards: EN 60669, EN 60256; EN 61000, EN 61010, EN 61812

CONNECTION CABINETS

OS1, OS2, OS3, OS4, OS5, OS6 (WITH EXTENSION FOR MECHANICAL INTERLOCK)



Type
OS1/ 2P+Pe / IP55
OS1/ 3P+Pe / IP55



Type
OS2/ 2P+Pe / IP55
OS2/ 3P+Pe / IP55
OS2/ 4P+Pe / IP55



Type
OS3/ 2P+Pe / IP55
OS3/ 3P+Pe / IP55



Type
OS4/ 2P+Pe / IP55
OS4/ 3P+Pe / IP55



Type
OS5/ 2P+Pe / IP55
OS5/ 3P+Pe / IP55



Type
OS6/ 2P+Pe / IP55
OS6/ 3P+Pe / IP55

Accessories

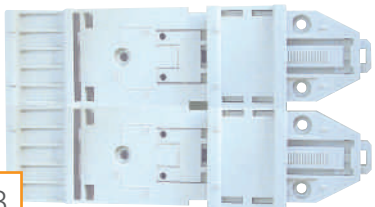
MULTI - FUNCTIONAL ADAPTERS

UMP 45



1

UMP 90 E



3

Type	Width
UMP 45	45 mm
UMP 90	90 mm
UMP 90 E	90 mm

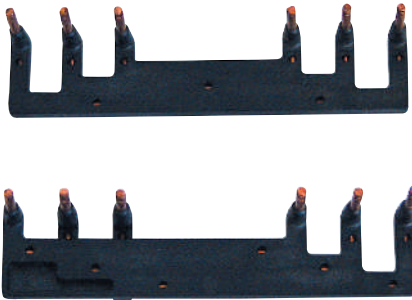
UMP 90



2

- 1 For direct-starter up to 30 A
- 2 For reversing starter up to 30 A
- 3 For star-delta starter up to 30 A

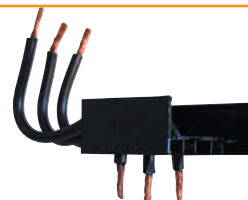
WK WIRING SYSTEM



Type	Description
WK 1.1	For reversing switch, suitable for contactors: 2.2-5.5 kW (for mini contactors K03, K07) (max. current 16 A)
WK 2.1	5 terminal in line, (3 main terminals, 1 auxiliary terminal, 1 coil terminal) For reversing switch, suitable for contactors: 4: 5.5; 7.5 or 9 kW (for KNL9-KNL18) (max. current 25 A), 4 terminals in line (3 main terminals, 1 auxiliary terminal)
WK 4.1	For reversing switch, suitable for contactors: 11 and 15 kW (for KNL22-KNL30) (max. current 40 A), 3 terminals in line (3 main terminals)
WK 5.1	For reversing switch with mechanical interlock (suitable for contactors: 4: 5.5; 7.5 or 9 kW (for KNL9-KNL18) (max. current 25 A), 4 terminals in line (3 main terminals, 1 auxiliary terminal)
WK 1.2	For star-delta starters, suitable for contactors: 2.2-5.5 kW (for mini contactors K03, K07) (max. current 16 A), 5 terminals in line (3 main terminals, 1 auxiliary terminal, 1 coil terminal)
WK 2.2	For star-delta starters, suitable for contactors: 4: 5.5; 7.5 or 9 kW (for KNL18) (max. current 25 A), 4 terminals in line (3 main terminals, 1 auxiliary terminal)
WK 4.2	For star-delta starters, suitable for contactors: 11 and 15 kW (for KNL22- KNL30) (max. current 40 A), 3 terminals in line (3 main terminals)

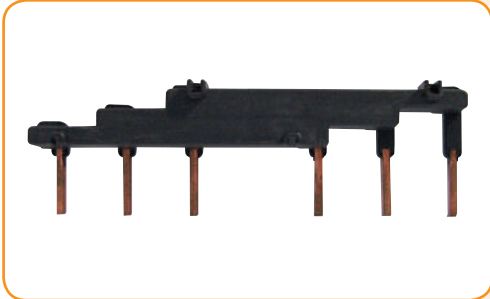
DST-U CONNECTION BLOCK BETWEEN MOTOR-PROTECTION SWITCH AND CONTACTOR

Type	Cable length	Cross-section	Width
DST-U-2,5 (20 A)	40 mm	2.5 mm ²	45 mm
DST-U-4 (35 A)	40 mm	4 mm ²	45 mm
DST-U-2,5 L (20 A)	70 mm	2.5 mm ²	45 mm



Accessories

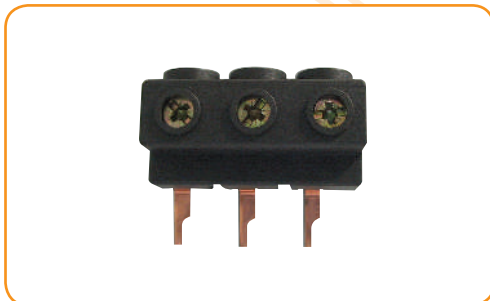
MSS-3L CONNECTION BLOCK FOR MOTOR PROTECTION SWITCH



Type
MSS-3L-M2-45
MSS-3L-M3-45
MSS-3L-M4-45
MSS-3L-M5-45
MSS-3L-M2 + Hi-45 + 9
MSS-3L-M3 + Hi-45 + 9
MSS-3L-M4 + Hi-45 + 9
MSS-3L-M5 + Hi-45 + 9

Module / length
2x3 / 80
3x3 / 125
4x3 / 170
5x3 / 215
2x3 / 90
3x3 / 145
4x3 / 200
5x3 / 250

ESB-S/V-MS SUPPLY BLOCK (25 MM²) FOR MOTOR PROTECTION SWITCH



BS-MS 0 PROTECTION FOR CONNECTION CABLE



M 25 X 1.5 CABLE INLET





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