

General Catalogue



Quality made in Austria



D946E152

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General

Test Authorities, Registration Mark, Approvals

Low voltage switchgear from Benedict GmbH is built and tested to national and international specifications. All devices suit all important specifications without any test obligation, like VDE, BS and also relative to IEC Recommendations and to European Standards like IEC 947 and EN 60947.

It is for this reason of our Low voltage switchgear is used all over the world. In order to provide special versions, limitations to the max. voltages, currents and power ratings or special markings are sometimes necessary.

Quality Control System

Since November 1991 Benedict GmbH has been certified according to the quality control system **ÖNORM EN ISO 29001**. The target of the ISO-certification is, to grant the customer the quality of the performance of his supplier, who is audited in accordance with this standard.

CE-Marking



The manufacturer has to sign his products with the CE-Marking. With the CE-Marking the manufacturer confirms the accordance with the different EEC Directives. The CE-Marking is absolutely necessary to sell the products in the EEC.

Below you find the EEC Directives concerning our products.

Low Voltage Directive 2006/95/EC

EMC Directive 2004/108/EC

RoHS + WEEE 2002/95/EC + "002/96/EC

Country	North America	Russia	China
State deputy or private examination (state admitted)	UL Canada, USA	EAC	CCC
Label marking of examination boards	Listed Component		
Duty of approvals	all switchgear	all switchgear	all switchgear

Explanations for choice and supply of low voltage switchgear in Canada and USA

Marking of auxiliary contacts

At several devices in UL-data are two voltages for auxiliary contacts mentioned (e. g.: 600 volts at same potential, 150 volts at different potentials). That means, if the voltage is higher than 150 volts, the control voltage applied to input terminals must be at the same potential.

Low voltage switchgear for auxiliary circuits (e. g. contactor relays, control units, auxiliary contacts in general) usually approved for "Heavy Duty" or "Standard Duty" UL and besides these marked with the admissible max. voltage or with short codes (see table).

Marking of auxiliary contacts according to CSA and UL	Max. rated values per pole			Cont. Current A	Contact Rating Code Designation
V	Voltage	Current Make A	Break A		
Heavy Duty (HD or HVY DTY)	AC 120	60	6	10	A150
	AC 240	30	3	10	A300
	AC 480	15	1,5	10	A600
	AC 600	12	1,2	10	A600
	DC 125	2,2	2,2	10	N150
	DC 250	1,1	1,1	10	N300
	DC 600	0,4	0,4	10	N600
Standard Duty (SD or STD DTY)	AC 120	30	3	5	B150
	AC 240	15	1,5	5	B300
	AC 480	7,5	0,75	5	B600
	AC 600	6	0,6	5	B600
	DC 125	1,1	1,1	5	P150
	DC 250	0,55	0,55	5	P300
	DC 600	0,2	0,2	5	P600
-	AC 120	15	1,5	2,5	C150
	AC 240	7,5	0,75	2,5	C300
	AC 480	3,75	0,375	2,5	C600
	AC 600	3	0,3	2,5	C600
	DC 125	0,55	0,55	2,5	Q150
	DC 250	0,27	0,27	2,5	Q300
	DC 600	0,1	0,1	2,5	Q600
-	AC 120	3,6	0,6	1	D150
	AC 240	1,8	0,3	1	D300
	DC 125	0,22	0,22	1	R150
	DC 250	0,11	0,11	1	R300
-	AC 120	1,8	0,3	0,5	E150

Discernment at UL-Standards

Recognized Component Industrial Control Equipment	Listed Industrial Control Equipment
UL issues yellow "Guide cards" with Guide- and File-No.	UL issues white "Guide cards" with Guide- and File-No.
Devices have permission to be marked with on the label	Devices have to be marked with the "UL-Listing Mark"
Devices as components approved for "factory wiring": devices for employment in control panels, when they are selected, mounted and wired according to the charging conditions by skilled worker.	Devices approved for "field wiring", a) devices for employment in control panels, when they are mounted and wired by skilled worker. b) devices for retail in USA
Valid UL-Standards: UL 508 "Standard for Industrial Control Equipment" (partly limited)	Valid UL-Standards: UL 508 "Standard for Industrial Control Equipment" (unlimited)

Are devices approved as "Listed Equipment" the approval is also valid for using as "Recognized Component"

Approvals

Country	North America		Switzerland	Europe	Russia EAC	China	CENELEC CB-Certificates
Type	UL		SEV				
							
Micro Contactor Relays, Micro Contactors, Micro Reversing Contactors and Accessories							
K0-04D..	-	-	-	0	-	-	-
K0-05D..	0	-	-	0	-	-	-
K0W05D..	0	-	-	0	-	-	-
Mini Contactor Relays, Mini Contactors, Mini Reversing Contactors K1 and Accessories							
K1-07D..(=)	0	-	-	0	0	-	0
K1-07L..(=)	-	0	-	0	0	-	0
K1-07F..(=)	-	0	-	0	-	-	-
K1-09D..(=)	0	-	-	0	0	0	0
K1-09L..(=)	-	0	-	0	0	0	0
K1-09F..(=)	-	0	-	0	-	0	-
K1-12D..(=)	0	-	-	0	-	0	-
K1W09D01(=)	0	-	-	0	-	0	-
K1W12D01(=)	0	-	-	0	-	0	-
K1W09L01(=)	-	0	-	0	-	0	-
HK..., HKM..	0	-	-	0	-	-	0
RC-K1	0	-	-	0	-	-	-
Contactor Relays, Contactors Series K3							
K3-07ND..(=)	0	-	-	0	-	-	-
K3-10N..(=)	0	-	0	0	0	0	0
K3-14N..(=)	0	-	0	0	0	0	0
K3-18N..(=)	0	-	0	0	0	0	0
K3-22N..(=)	0	-	0	0	0	0	0
K3-24A..(=)	0	-	0	0	0	0	0
K3-32A..(=)	0	-	0	0	0	0	0
K3-40A..(=)	0	-	0	0	0	0	0
K3-50A..(=)	0	-	0	0	0	0	0
K3-62A..(=)	0	-	0	0	0	0	0
K3-74A..(=)	0	-	0	0	0	0	0
K3-90A..(=)	0	-	-	0	-	0	-
K3-115A..(=)	0	-	-	0	-	0	-
K3-151A..(=)	0	-	-	0	-	-	-
K3-176A..(=)	0	-	-	0	-	-	-
K3-210A..(=)	x	-	-	0	-	-	-
K3-260A..(=)	x	-	-	0	-	-	-
K3-316A..(=)	x	-	-	0	-	-	-
K3-450A..(=)	0	-	-	0	-	-	-
K3-550A..(=)	0	-	-	0	-	-	-
K3-700A..(=)	0	-	-	0	-	-	-
K3-860A..(=)	0	-	-	0	-	-	-
K3-1000A..(=)	-	-	-	0	-	-	-
K3-1200A..(=)	0	-	-	0	-	-	-
Contactor Relays, Contactors DC-operated Series KG3							
KG3-07..	0	-	-	0	-	-	0
KG3-10..., -14..	0	-	-	0	-	-	0
KG3-18..., -22..	0	-	-	0	-	-	0
KG3-24..., -32..	0	-	-	0	-	-	0
KG3-40..	0	-	-	0	-	-	0
Capacitor Contactors Series K3							
K3-18K..	0	-	-	0	0	0	0
K3-24K..	0	-	-	0	0	0	0
K3-32K..	0	-	-	0	0	0	0
K3-50K..	0	-	-	0	0	0	0
K3-62K..	0	-	-	0	0	0	0
K3-74K..	0	-	-	0	0	0	0
K3-90K..	0	-	-	0	-	0	-
K3-115K..	0	-	-	0	-	0	-
Aux. contacts							
HN..., HTN..	0	-	-	0	0	0	0
HA..	0	-	-	0	0	-	0
HB..	0	-	-	0	0	0	0
K2-DK, K2-SK	0	-	-	0	-	-	-
HKA..., HKT..	0	-	-	0	-	-	-
HKF22	-	-	-	0	-	-	-
0 In standard version approved x In test - Not provided for test till now							

Approvals

Country	North America		Switzerland	Europe	Russia EAC	China	CENELEC CB-Certificates
Type	UL	UL	SEV	CE	EAC	CCC	
Accessories							
K2-T..E, -A	-	-	-	o	-	-	-
K2-TP	o	-	-	o	-	-	-
K2-L	o	-	-	o	-	-	-
K2-IN.	o	-	-	o	-	-	-
K2-UN.	o	-	-	o	-	-	-
K2-IM	-	-	-	o	-	-	-
K2-E	o	-	-	o	-	-	-
VG-K2	-	-	-	o	-	-	-
RC-K3	o	-	-	o	-	-	-
Reversing Contactors , Serie KW3							
KW3-10	o	-	-	o	-	-	-
KW3-14	o	-	-	o	-	-	-
KW3-18	o	-	-	o	-	-	-
KW3-22	o	-	-	o	-	-	-
KW3-24	o	-	-	o	-	-	-
KW3-32	o	-	-	o	-	-	-
KW3-40	o	-	-	o	-	-	-
D.O.L. Starters							
P1..	o	-	-	o	-	-	-
Thermal Overload Relays							
U3/32	o	-	-	o	o	-	o
U3/42	o	-	-	o	o	-	o
U3/74	o	-	-	o	o	-	o
U12/16E	o	-	-	o	o	-	o
U12/16A	-	-	-	o	o	-	o
U12/16EM	-	-	-	o	o	-	o
U12/16EQ	-	-	-	o	o	-	o
U32	o	-	-	o	o	-	o
U60	o	-	-	o	o	-	o
U85	o	-	-	o	o	-	o
U180	x	-	-	o	-	-	-
U320	x	-	-	o	-	-	-
U800	-	-	-	o	-	-	-
Modular Contactors							
R20	o	-	o	o	o	-	o
R25	o	-	o	o	o	-	o
R40	o	-	o	o	o	-	o
R63	o	-	o	o	o	-	o
R40, R63 2-pole	-	-	-	o	o	-	o
RH11	o	-	-	o	o	-	o

o In standard version approved

x In test

- Not provided for test till now

cULus - and cRUus - Guide- and File-No.

These data are important for UL-inspecting engineers.
Devices

	Guide-No.				File-No.
	Canada	USA	Canada	USA	
Contactors	NLDX7	NLDX	NLDX8	NLDX2	E41502
Reversing Contactors	NLDX7	NLDX	-	-	E41502
Control Relays, Accessories	NKCR7	NKCR	NKCR8	NKCR2	E66273
Thermal Overload Relays	NKCR7	NKCR	-	-	E66273
Cam Switches	NLRV7	NLRV	-	-	
Circuit Breakers as Manual Motor Controller	NLRV7	NLRV	-	-	E129916
Circuit Breakers as Combination Motor Controller	NKJH7	NKJH	-	-	E197641
Bus Bar Assemblies	NLRV7	NLRV	-	-	E129916
Accessories	NKCR7	NKCR	-	-	E66273

Technical Information

Degree of protection acc. to IEC 60947-1

Protection ratings are prefixed by the internationally agreed letters IP followed by two digits.

1st digit: Pertains to solid objects
2nd digit: Pertains to water.

1 st digit	Short description	Definition
1	Protected against solid objects greater than 50 mm	Excludes solid objects exceeding 50 mm in diameter and protects against contact with live and moving parts by a large body surface such as a hand (but not against deliberate access).
2L	Protected against solid objects greater than 12,5 mm and against contact by standard test finger	Excludes solid objects exceeding 12,5 mm in diameter and protects against contact with live and moving parts by a standard test finger or similar objects not exceeding 80 mm in length.
3	Protected against solid objects greater than 2,5 mm	Excludes solid objects exceeding 2,5 mm in diameter or thickness.
4	Protected against solid objects greater than 1 mm	Excludes solid objects exceeding 1 mm in diameter or thickness.
5	Dust protected	Prevents ingress of dust in quantities and locations that would interfere with the intended operation of the equipment.
6	Dust tight	Prevents ingress of dust.

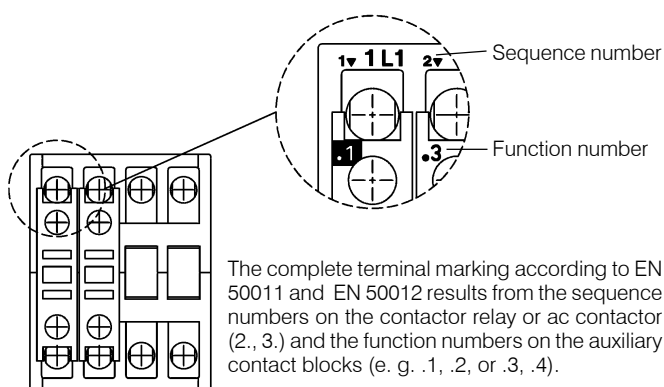
2 nd digit	Short description	Definition
1	Protected against dripping water	Dripping water (vertically falling drops) shall have no harmful effect.
2	Protected against dripping water when tilted up to 15°	Vertically dripping water shall have no harmful effect when the enclosure is tilted at any angle up to 15° from its normal position.
3	Protected against spraying water	Water falling as a spray at an angle up to 60° from the vertical shall have no harmful effect.
4	Protected against splashing water	Water splashed against the enclosure from any direction shall have no harmful effect.
5	Protected against water jets	Water protected by a nozzle against the enclosure from any direction shall have no harmful effect.
6	Protected against heavy seas	Water from heavy seas or water projected in powerful jets shall not enter the enclosure in harmful quantities.
7	Protected against the effects of immersion	Ingress of water in a harmful quantity shall not be possible when the enclosure is immersed in water under standard conditions of pressure and time.
8	Protected against submersion	No ingress of water.

Terminal markings acc. to EN50011

Auxiliary contacts of AC contactors and contacts of contactor relays and thermal overload relays are particularly marked. The terminal markings of normally-open contacts are printed as positive figures, they of normally-closed contacts as negative figures.

This gives a clear indication of the function of the contacts.

The figure below illustrates the determination of terminal markings for contactors with auxiliary contact blocks.



Resistance to climatic conditions acc. to IEC60068

Open-type devices are climate-resistant in the constant climate according to IEC60068-2-3 (this is a climate with an ambient temperature of 40°C and an atmospheric humidity of 90 to 95%).

Enclosed devices are climate-resistant in an alternating climate according to IEC 68-2-30 (this is a moist alternating climate with a 24-hour cycle between climates with an ambient temperature of 25°C, and an atmospheric humidity of 95 to 100% and an ambient temperature of 40°C, and an atmospheric humidity of 90 to 96% in the presence of condensation during rises in temperature).

Data are valid up to an altitude of 2000m above sea level.

Short circuit protection

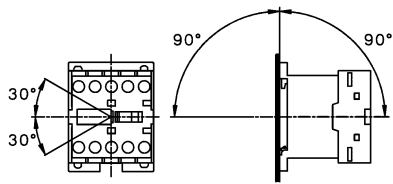
Back up fuses should be used to protect contactors and starters against short circuits. For starters the device with the smaller admissible fuse at the main and at the control circuit (contactor or thermal overload) determines the fuse size.

After a short circuit devices have to be checked for correct operation. Disconnect power before proceeding with any work on the equipment!

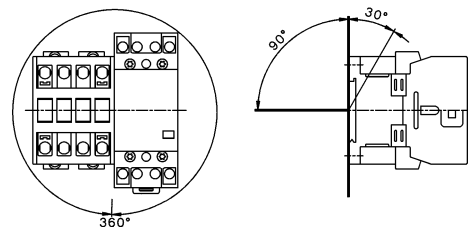
Technical Information

Mounting positions of contactors

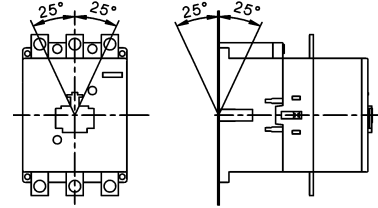
K0-.. / K1-..



K2-..A00-40, K(G)3-07 bis K3-115, R..



K3-151.. bis K3-1200..



Terminal screws

Devices	Kind of connection				Screw driver	Tightening torque	
Type	Screw with washer	Screw with clamp box	Screw w. nut			Nm	lb. inch
Micro Contactors , all conductors K0-..	M2,5	-	-	-	Pz1	0,6 - 0,8	5 - 7
Mini Contactors , all conductors K1-..	M3,5						
Contactors Relays , all conductors K(G)3-07..	M3,5	-	-	-	Pz2	0,8 - 1,4	7 - 12
Contactors							
Main conductor							
K(G)3-10.. bis K3-22..	M3,5	-	-	-	Pz2	0,8 - 1,4	7 - 12
K(G)3-24.. bis K3-40..	-	M5	-	-	Pz2	2,5 - 3	22 - 26
K3-50.. bis K3-74..	-	M6	-	-	Pz3	3,5 - 4,5	31 - 40
K2-23, -30, -37A00-40	M4	-	-	-	Pz2	1,2 - 1,8	11 - 16
K2-45, -60A00-40	-	M6	-	-	Pz3	3,5 - 4,5	31 - 40
K3-90, K3-115	-	-	M8	-	4mm hex socket	4 - 6,5	35 - 57
K3-116.. bis K3-176..	-	-	-	M8		17	150
K3-210.. bis K3-316..	-	-	-	M10		35	315
K3-450.. bis K3-700..	-	-	-	M12		60	540
K3-860..	-	-	-	M14		75	675
K3-1000.., K3-1200..	-	-	-	M12		60	540
Auxiliary conductor K(G)3-10 bis K3-22	M3,5	-	-	-	Pz2	0,8 - 1,4	7 - 12
Coil conductor K(G)3-10 bis K3-1200	M3,5	-	-	-	Pz2	0,8 - 1,4	7 - 12
Accessories							
HK, HKM	M3,5	-	-	-	Pz2	0,8 - 1,4	7 - 12
HA, HN, K2-.., HB..	M3,5	-	-	-	Pz2	0,8 - 1,4	7 - 12
Thermal Overload Relays							
Main conductor U12/16	M4	-	-	-	Pz2	1,2 - 1,8	11 - 16
U3/32	M3,5	-	-	-	Pz2	0,8 - 1,4	7 - 12
U3/42	M5	-	-	-	Pz2	2,5 - 3	22 - 26
U3/74	-	M6	-	-	Pz3	3,5 - 4,5	31 - 40
UAT21	-	M4	-	-	Size 3, 4	1,2 - 1,8	11 - 16
UAT22	-	M4	-	-		1,2 - 1,8	11 - 16
UAT23	-	M5	-	-		2,5 - 3	22 - 26
Auxiliary conductor All devices	M3,5	-	-	-	Pz2	0,8 - 1,4	7 - 12
Contactors for Distribution Boards							
Conductors							
R20, R25	-	M3,5	-	-	Pz1	0,8 - 1,4	7 - 12
R40, R63	-	M5	-	-		2,5 - 3	22 - 26
K1R	M3,5	-	-	-		0,8 - 1,4	7 - 12
Coil conductor							
R20, R25	-	M3	-	-	Pz1	0,6 - 1,2	5 - 11
R40, R63	-	M3	-	-	Pz2	0,6 - 1,2	5 - 11
K1R	M3,5	-	-	-	Pz2	0,8 - 1,4	7 - 12

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Micro Contactor Relays 4-pole

AC Operated

Ratings	Therm.	Contacts ²⁾	Distinct. Number	Type Additional Contact	Coil voltage ¹⁾	
					24 230	24V 50/60Hz 220-240V 50Hz/60Hz

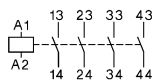
AC15		Rated- Current I_{th} A	NO		acc. to EN50011	Blocks Type	↓	Pack pcs.	Weight kg/pc.
230V	400V								
A	A	A							

4-pole, With Screw Terminals

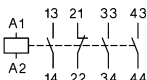


3	1,5	5	4	-	40E	-	K0-04D40 ...	10	0,07
3	1,5	5	3	1	31E	-	K0-04D31 ...	10	0,07
3	1,5	5	2	2	22E	-	K0-04D22 ...	10	0,07

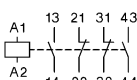
K0-04D40



K0-04D31



K0-04D22



1) Other coil voltages on request.
2) Contacts suitable for electronic circuits, according to EN947-5-4 for rated voltage 24V DC (test ratings 17V DC, 5mA). Positively guided contacts.

Micro Contactors

AC Operated

Power Ratings	Rated Current		Aux. Contacts ²⁾		Type	Coil voltage ¹⁾	Pack pcs.	Weight kg/pc.
	Built-in	Additional	Built-in	Additional				
AC2, AC3 AC1								
380V						24V 50/60Hz		
400V	660V					220-240V 50Hz/60Hz		
415V	690V	440V						
kW	kW	A	NO	NC	Type			



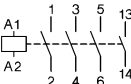
3-pole, With Screw Terminals

2,2	-	12	1	-	-	K0-05D10 ...	10	0,07
2,2	-	12	-	1	-	K0-05D01 ...	10	0,07

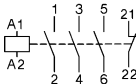
4-pole, With Screw Terminals

2,2	-	12	-	-	-	K0-05D00-40 ...	10	0,07
-----	---	----	---	---	---	-----------------	----	------

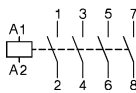
K0-05D10



K0-05D01



K0-05D00-40



Snap-On Adapter



For Type	Specification	Type	Pack pcs..	Weight kg/pc.
K0	for snap-on mounting of accessories on 35mm DIN-rail acc. DIN EN 50022	Snap on Adapter for K0	10	0,0061

1) Other coil voltages see page 12.
 2) Contacts suitable for electronic circuits, according to EN947-5-4 for rated voltage 24V DC (test ratings 17V DC, 5mA). Positively guided contacts.

Power Ratings	Rated Current	Aux. Contacts ²⁾ Built in	Type	Coil voltage ¹⁾
			24 230	24V 50/60Hz 220-240V 50Hz/60Hz

AC2, AC3 AC1

380V**400V****415V****kW**

660V

690V

690V

A

I

L

NO

NC

Type

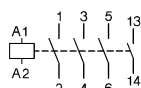
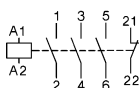
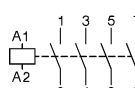
Pack
pcs. Weight
kg/pc.**3-pole, with Solder Pins Ø1,15 for Printed Circuit Applications**

2,2	-	xxx ³⁾	1	-	-	K0-05L10 ...	10	0,07
------------	---	-------------------	---	---	---	---------------------	----	------

2,2	-	xxx ³⁾	-	1	-	K0-05L01 ...	10	0,07
------------	---	-------------------	---	---	---	---------------------	----	------

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

2,2	-	xxx ³⁾	-	-	-	K0-05L00-40 ...	10	0,07
------------	---	-------------------	---	---	---	------------------------	----	------

K0-05L10**K0-05L01****K0-05L00-40****Coil voltages** for AC operated contactors

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

Suffix to contactor type e.g. K1-09D10 230	Voltage Marking		Rated Control Voltage U _s			
	at the coil for 50Hz V	for 60Hz V	range for 50Hz min. max. V V	for 60Hz min. max. V V		
200	200	200-220	195	205	200	220
210	205-215	220-230	205	215	220	230
220	210-220	220-240	210	220	220	240
230	220-230	230-250	220	230	230	250
240	230-240		230	240	250	260

Standard voltages in bold type letters

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

Coil not exchangeable

1) Other coil voltages see page 12.

2) Contacts suitable for electronic circuits, according to EN947-5-4 for rated voltage 24V DC (test ratings 17V DC, 5mA). Positively guided contacts.

3) Data on request.

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

3-pole, with Screw Terminals

2,2	-	12	-	1	-	-	K0W05D01MC ...	1	0,14
2,2	-	12	1	-	-	-	K0W05D10MC ...	1	0,14

4-pole, with Screw Terminals

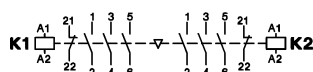
2,2	-	12	-	-	-	-	K0W05D00-40MC ...	1	0,14
-----	---	----	---	---	---	---	-------------------	---	------

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

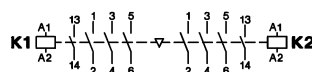
2,2	-	xxx ³⁾	-	1	-	-	K0W05L01MC ...	1	0,14
2,2	-	xxx ³⁾	1	-	-	-	K0W05L10MC ...	1	0,14



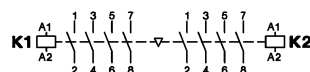
K0W05D01MC



K0W05D10MC



K0W05D00-40MC



1) Other coil voltages see page 12.

2) Contacts suitable for electronic circuits, according to EN947-5-4 for rated voltage 24V DC (test ratings 17V DC, 5mA). Positively guided contacts.

3) Data on request.

Micro Contactors

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

Main Contacts	Type	K0-05D..
Rated insulation voltage U_i	V AC	480 ¹⁾
Making capacity I_{eff} at $U_e = 440V$ AC	A	65
Breaking capacity I_{eff} $\cos\phi = 0,65$ 400V AC	A	50
Utilization category AC1 Switching of resistive load		
Rated operational current $I_e (=I_{th})$ at 40°C, open	A	12
Rated operational power of three-phase resistive loads 50-60Hz, $\cos\phi = 1$	230V kW	4,7
	240V kW	4,8
	400V kW	8,3
	415V kW	8,6
	480V kW	9,5
Rated operational current $I_e (=I_{th})$ at 60°C, enclosed	A	8
Rated operational power of three-phase resistive loads 50-60Hz, $\cos\phi = 1$	230V kW	3,1
	240V kW	3,3
	400V kW	5,5
	415V kW	5,7
	480V kW	6,5
Minimum cross-section of conductor at load with $I_e (=I_{th})$	mm ²	1,5
Utilization category AC2 and AC3 Switching of three-phase motors		
Rated operational current I_e open and enclosed	220V A	6,2
	230V A	6,2
	240V A	5,6
	380-400V A	5
	415-440V A	5
	480V A	5
Rated operational power of three-phase motors 50-60Hz	220-240V kW	1,5
	380-440V kW	2,2
	480V kW	2,2
Utilization category AC4 Switching of squirrel cage motors, inching		
Rated operational current I_e open and enclosed	220V A	4,9
	230V A	4,9
	240V A	4,1
	380-400V A	5
	415-440V A	5
	480V A	5
Rated operational power of three-phase motors 50-60Hz	220-240V kW	1,1
	380-440V kW	2,2
	480V kW	2,2

1) Suitable at 690V for: earthed-neutral systems, overvoltage category I to III, pollution degree 3 (standard-industry): $U_{imp} = 4kV$.
Data for other conditions on request.

Micro Contactors

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

Main Contacts				Type	K0-05D..
Utilization category DC1					
Switching of resistive load		1 pole	24V	A	12
Time constant L/R ≤1ms			60V	A	12
Rated operational current I _e			110V	A	-
			220V	A	-
		3 poles in series	24V	A	12
			60V	A	12
			110V	A	12
			220V	A	-
Utilization category DC3 and DC5					
Switching of shunt motors and series motors		1 pole	24V	A	12
Time constant L/R ≤15ms			60V	A	-
Rated operational current I _e			110V	A	-
			220V	A	-
		3 Pole in Serie	24V	A	12
			60V	A	12
			110V	A	12
			220V	A	-
Maximum ambient temperature					
Operation		open	°C	-40 to +60 (+90) ¹⁾	
		enclosed	°C	-40 to +40	
with therminal overload relay		open	°C	-25 to +60	
		enclosed	°C	-25 to +40	
Storage			°C	-50 to +90	
Short circuit protection					
for contactors without thermal overload relay					
Coordination-type "1" according to IEC 947-4-1					
Contact welding without hazard of persons					
max. fuse size		gL (gG)	A	20	
Coordination-type "2" according to IEC 947-4-1					
Light contact welding accepted					
max. fuse size		gL (gG)	A	-	
Contact welding not accepted					
max. fuse size		gL (gG)	A	-	
For contactors with thermal overload relay the device with the smaller admissible backup fuse (contactor or thermal overload relay) determines the fuse size.					
Cable cross-sections					
for contactors					
main connector		solid or stranded	mm ²	0,5 - 1,5	
		flexible	mm ²	0,5 - 1,5	
		flexible with multicore cable end	mm ²	0,5 - 1,5	
Cables per clamp				2	
		solid or stranded	AWG	20 - 14	
Frequency of operation z					
contactors without therminal oberload relay		without load	1/h	10000	
		AC3, I _e	1/h	600	
		AC4, I _e	1/h	120	
		DC3, I _e	1/h	600	
Mechanical life					
AC operated		S x	10 ⁶	3	
DC operated		S x	10 ⁶	xxx ²⁾	
Short time current		10s-current	A	50	
Power loss per pole		at I _e /AC3 400V	W	0,2	
Resistance to shock according to IEC 68-2-27					
Shock time 20ms sine-wave					
AC operated		NO	g	2,5	
		NC	g	2,5	

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

2) Data on request.

Micro Contactors

Data according to IEC 60947-5-1, VDE 0660, EN 60947-5-1

Auxiliary Contacts		Type	K0-04D.. K0-05D..
Rated insulation voltage	U_i	VAC	440 ¹⁾
Thermal rated current I_{th} bis 440V			
Ambient temperature	40°C	A	5
	60°C	A	3
Verlustleistung pro Pol	bei I_{th}	W	0,25
Utilization category AC15			
Rated operational current I_e	220-240V	A	3
	380-415V	A	1,5
	440V	A	1
Utilization category DC13			
Rated operational current I_e	60V	A	0,5
			-
			-
Maximum ambient temperature			
Operation	open	°C	-40 bis +60 (+90) ²⁾
	enclosed	°C	-40 bis +40
Storage		°C	-40 bis +90
Short circuit protection short-circuit current 1kA, contact welding not accepted max. fuse size	gL (gG)	A	10
For contactors with thermal overload relay the device with the smaller admissible control fuse (contactor or thermal overload relay) determines the fuse size.			
Power consumption of coils			
AC operated	inrush	VA	9
	sealed	VA	4
		W	1,8
Operation range of coils in multiples of control voltage U_s			0,85 - 1,1
Switching time at control voltage $U_s \pm 10\%$ ^{3) 4)}			
AC operated	make time	ms	13 - 18
	release time	ms	5 - 10
	arc duration	ms	10 - 15
DC operated	make time	ms	-
	release time	ms	-
	arc duration	ms	-
Cablecross-section			
all connectors	solid	mm ²	0,5 - 1,5
	flexible	mm ²	0,5 - 1,5
	flexible with multicore cable end	mm ²	0,5 - 1,5
Clamps per pole			2
	solid or stranded	AWG	20 - 14

1) Suitable at 690V for: earthed-neutral systems, overvoltage category I to III, pollution degree 3 (standard-industry): $U_{imp} = 4kV$.

Data for other conditions on request.

2) With reduced control voltage range 0,9 up to 1,0 x U_s and with reduced thermal rated current I_{th} to $I_e/AC15$.

3) Summary switching time = release time + arc duration.

4) Release time of NC make time of NO increase when suppressor units for voltage peak protection are used (Varistor, RC-units, Diode units).

5) Data on request.

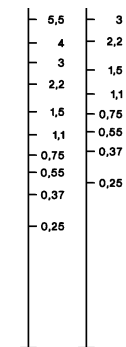
Micro Contactors for North America

Data according to UL508

Main Contacts (cULus)		Type	K0-05D.. K0W05D01..	K0-04D..
Rated operational current "General Use"		A	12	5
Rated operational power of three motors at 60Hz (3ph)	110-120V	hp	1/2	-
	200-208V	hp	1	-
	220-240V	hp	1	-
	277V	hp	1 1/2	-
	440-480V	hp	-	-
	550-600V	hp	-	-
Rated operational power of AC motors at 60Hz (1ph)	110-120V	hp	1/6	-
	200-208V	hp	1/2	-
	220-240V	hp	3/4	-
Fuse / Short-circuit current		A/kA	30/5	-
Rated voltage		VAC	300	300
Auxiliary Contacts (cULus)	heavy pilot duty	AC	B300	B300
	standard pilot duty	DC	R300	R300

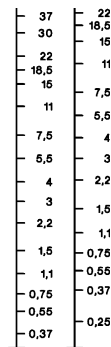
Motor Rating P_n = AC4

380/ 220/
400V 230V
kW kW

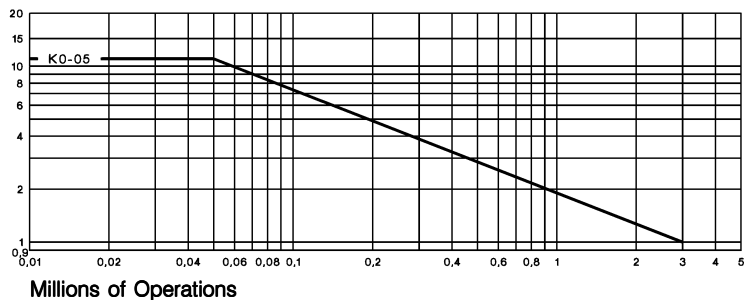


Motor Rating P_n = AC3

380/ 220/
400V 230V
kW kW



Breaking Current I_a (= I_e = AC1) A

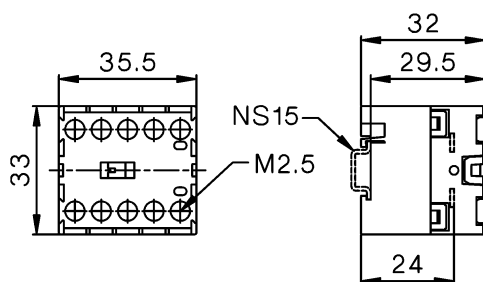


Micro Contactors

Dimensions

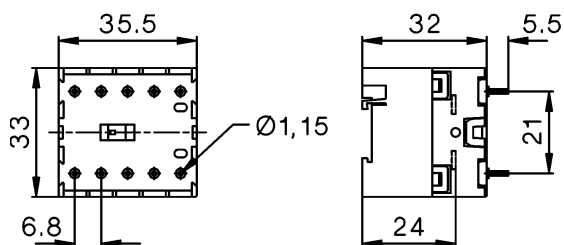
AC operated
with screw terminals

K0-04D..
K0-05D..



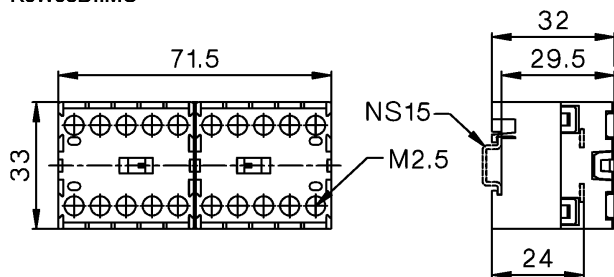
AC operated
with solder connections

K0-04L..
K0-05L..



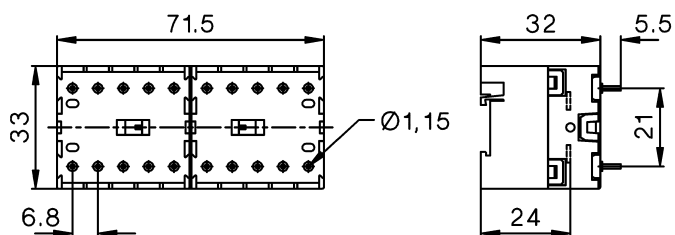
Reversing Contactors
with screw terminals

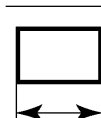
K0W05D..MC



Reversing Contactors
with solder connections

K0W05L..MC



	Mini Contactor Relays 4-pole Auxiliary Contact Blocks Interface Contactor Relays	20
	Mini Contactors Auxiliary Contact Blocks	22
	Mini Contactors With Fast On Tab Connectors	24
	Mini Contactors With Solder Pins Coil voltages	24 24
	Mini Reversing Contactors Auxiliary Contact Blocks	26
	Technical Data	28
	Dimensions	32

Mini Contactor Relays 4-pole

AC Operated

Ratings		Therm.		Contacts ²⁾		Distinc.	Additional	Type	Coil voltage ¹⁾	
						Number	Contact		24	24V 50/60Hz
									230	220-230V 50Hz
									24VS	24V 50/60Hz w. protection ³⁾
									230VS	220-230V 50Hz w. protection ³⁾
									24VM	24V 50/60Hz 24V= DC
									230VM	220-240V 50/60Hz 220V= DC
AC15		Rated								
		Current								
		I_{th}								
		A								

4-pole, With Screw Terminals



3	2	10	4	-	40E	1 HK..	K1-07D40	...	10	0,16
3	2	10	3	1	31E	1 HK..	K1-07D31	...	10	0,16
3	2	10	2	2	22E	1 HK..	K1-07D22	...	10	0,16

Auxiliary Contact Blocks For Contactor Relays



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

Aux. Contact Blocks

HK11

HK02

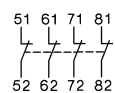
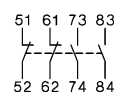
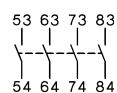
HK20

HK40

HK22

HK04

Wiring Diagrams



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

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

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

¹⁾ Other coil voltages see page 24

²⁾ Contacts suitable for electronic circuits, according to EN947-5-4 for rated voltage 24V DC
(test ratings 17V DC, 5mA) Positively guided contacts

³⁾ with built-in coil suppressor (varistor)

DC Solenoid Operated



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

1) Other coil voltages on request

2) Contacts suitable for electronic circuits, according to EN947-5-4 for rated voltage 24V DC (test ratings 17V DC, 5mA) Positively guided contacts

3) with integrated coil suppressor (Transient Voltage Suppressor Diode)

Mini Contactors

AC Operated

Power Ratings		Rated Current	Aux. Contacts ²⁾		Type	Coil voltage ¹⁾			
			Built-in	Additional				Pack	Weight
								pcs.	kg/pc.
AC2, AC3		AC1							
380V						24	24V 50/60Hz		
400V	660V					230	220-230V 50Hz		
415V	690V	690V				24VS	24V 50/60Hz w. protection ³⁾		
kW	kW	A				230VS	220-230V 50Hz w. protection ³⁾		
						24VM	24V 50/60Hz 24V= DC		
						230VM	220-240V 50/60Hz 220V= DC		

3-pole, With Screw Terminals

4	4	20	1	-	1 HKM..	K1-09D10 ...	10	0,16
5,5	5,5	20	1	-	1 HKM..	K1-12D10 ...	10	0,16
4	4	20	-	1	1HK..	K1-09D01 ...	10	0,16
5,5	5,5	20	-	1	1HK..	K1-12D01 ...	10	0,16

4-pole, With Screw Terminals

4	4	20	-	-	1HK..	K1-09D00-40 ...	10	0,16
5,5	5,5	20	-	-	1HK..	K1-12D00-40 ...	10	0,16

Auxiliary Contact Blocks for Contactors K1-..

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

Aux. Contact Blocks

HKM11

HKM02

HKM22

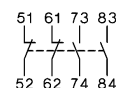
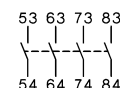
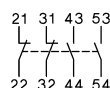
HK11

HK02

HK40

HK22

Wiring Diagrams



Contactors with Auxiliary Contact Block

Contacts according to EN50012

K1-..D10	21	12	32	-	-	-	-
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Contacts according to DIN EN50005

K1-..D01	-	-	-	12	03	41	23
K1-..D00-40	-	-	-	11	02	40	22

Prefer combinations according to EN50012

Suppressor Units for Contactors K1-..



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

1) Other coil voltages see page 24

2) Contacts suitable for electronic circuits, according to EN947-5-4 for rated voltage 24V DC (test ratings 17V DC, 5mA) Positively guided contacts

3) with built-in coil suppressor (varistor)

DC Solenoid Operated

Type

Coil voltage ¹⁾
24 24V= DC
24VS 24V= DC with
 protection ³⁾



Aux. Contacts ²⁾
 Built in Additional
 NO NC

Additional
 Overload
 Relay
 see
 page114
 Type

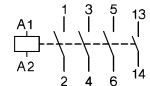
Pack
 pcs. Weight
 kg/pc.

Wiring Diagrams

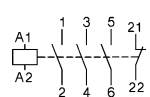


3-pole, With Screw Terminals, Coil 2,5W

K1-09D10= . . .	1	-	1 HKM..	U12/16..K1	10	0,19
K1-12D10= . . .	1	-	1 HKM..	U12/16..K1	10	0,19

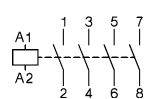


K1-09D01= . . .	-	1	1 HK..	U12/16..K1	10	0,19
K1-12D01= . . .	-	1	1 HK..	U12/16..K1	10	0,19



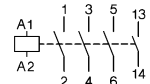
4-pole, With Screw Terminals, Coil 2,5W

K1-09D00-40= . . .	-	-	-	U12/16..K1	10	0,19
K1-12D00-40= . . .	-	-	-	U12/16..K1	10	0,19

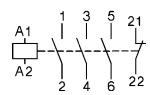


3-pole, With Screw Terminals, Coil 1,5W, 19 to 30V DC with suppressor ³⁾

K1-09D10=24VR	1	-	-	U12/16..K1	10	0,20
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K1-09D01= 24VR	-	1	-	U12/16..K1	10	0,20
----------------	---	---	---	------------	----	------



1) Other coil voltages on request

2) Contacts suitable for electronic circuits, according to EN947-5-4 for rated voltage 24V DC (test ratings 17V DC, 5mA) Positively guided contacts

3) with integrated coil suppressor (Transient Voltage Suppressor Diode)

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

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

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

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

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

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

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

Coil voltages for AC operated contactors

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

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

Standard voltages in bold type letters

Operating range of magnet-coils: $0,85 \times U_s$ (min. value of rated control voltage) up to $1,1 \times U_s$ (max. value of rated control voltage)

Coil not exchangeable

1) Other coil voltages see page 24

2) Contacts suitable for electronic circuits, according to EN947-5-4 for rated voltage 24V DC (test ratings 17V DC, 5mA) Positively guided contacts

3) with built-in coil suppressor (varistor)

DC Solenoid Operated

Type

Coil voltage ¹⁾
24 24V= DC
24VS 24V= DC with
 protection ³⁾



Aux. Contacts ²⁾
 Built in Additional
 NO NC

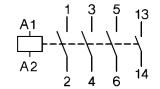
Additional
 Overload
 Relay see
 pages
 115, 117
 Type

Pack
 pcs. Weight
 kg/pc.

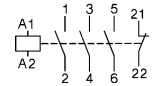
Wiring Diagrams

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

K1-09F10= . . . 1 - 1 HKM.. ⁴⁾ 10 0,19

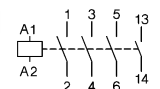


K1-09F01= . . . - 1 1 HK.. ⁴⁾ 10 0,19

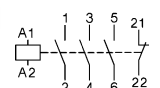


3-pole, with Solder Pins Ø1,15 for Printed Circuit Applications

K1-09L10= . . . 1 - - - 10 0,19

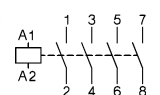


K1-09L01= . . . - 1 - - 10 0,19



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

K1-09L00-40= . . . - - - - 10 0,19



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

Mini Reversing Contactors, Mechanical Interlocked

AC Operated

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

3-pole, with Screw Terminals



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

4-pole, with Screw Terminals

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

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



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

Auxiliary Contact Blocks for Mini Reversing Contactors K1-..

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



Aux. Contact BlocksAux. Contact Blocks

HKM11V

HKM11X

Wiring Diagrams



Reversing Starter Connector



For Reversing Starter Types, incl. Coil Connector

Type

Pack Weight
pcs. kg/pc.

K1W09D..MC, K1W12D..MC

K1W-VB

1 0,01

1) Other coil voltages see page 24

2) Contacts suitable for electronic circuits, according to EN947-5-4 for rated voltage 24V DC (test ratings 17V DC, 5mA) Positively guided contacts

3) with built-in coil suppressor (varistor)

DC Solenoid Operated

Type

Coil voltage ¹⁾
24
24VS
 24V= DC
 24V= DC with
 protection ²⁾



Additional
 Overload
 Relay
 see
 page114
 Type

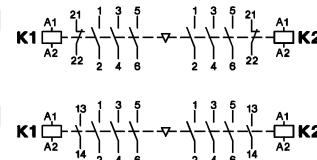
Pack
 pcs. Weight
 kg/pc.

Wiring Diagrams

3-pole, with Screw Terminals

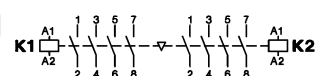


K1W09D01MC= . . .	U12/16..K1	1	0,32
K1W12D01MC= . . .	U12/16..K1	1	0,32
K1W09D10MC= . . .	U12/16..K1	1	0,32
K1W12D10MC= . . .	U12/16..K1	1	0,32



4-pole, with Screw Terminals

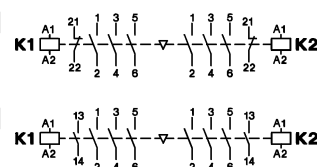
K1W09D00-40MC= . .	U12/16..K1	1	0,32
K1W12D00-40MC= . .	U12/16..K1	1	0,32



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



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



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

Mini Contactors

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

Main Contacts	Type	K1-09D..	K1-09F..	K1-09L..	K1-12D..
Rated insulation voltage U_i	V AC	690 ¹⁾	690 ¹⁾	690 ²⁾	690 ¹⁾
Making capacity I_{eff} at $U_e = 690V$ AC	A	165	165	165	165
Breaking capacity I_{eff} $\cos\phi = 0,65$	400V AC A 500V AC A 690V AC A	100 90 80	100 90 80	100 90 80	100 90 80
Utilization category AC1 Switching of resistive load					
Rated operational current $I_e (=I_{th})$ at 40°C, open	A	20	16	16	20
Rated operational power of three-phase resistive loads 50-60Hz, $\cos\phi = 1$	230V kW	7,9	6	6	7,9
	240V kW	8,3	6,5	6,5	8,3
	400V kW	13,8	11	11	13,8
	415V kW	14,3	11,5	11,5	14,3
Rated operational current $I_e (=I_{the})$ at 60°C, enclosed	A	16	12	12	16
Rated operational power of three-phase resistive loads 50-60Hz, $\cos\phi = 1$	230V kW	6,3	4,5	4,5	6,3
	240V kW	6,7	5	5	6,7
	400V kW	11	8	8	11
	415V kW	11,5	8,5	8,5	11,5
Minimum cross-section of conductor at load with $I_e (=I_{th})$	mm ²	2,5	2,5	-	2,5
Utilization category AC2 and AC3 Switching of three-phase motors					
Rated operational current I_e open and enclosed	220V A	12	12	12	15
	230V A	11,5	11,5	11,5	14,5
	240V A	11	11	11	14
380-400V A	A	9	9	9	12
415-440V A	A	8	8	8	11
500V A	A	7	7	7	9
660-690V A	A	5	5	5	6,5
Rated operational power of three-phase motors 50-60Hz	220-240V kW	3	3	3	4
	380-440V kW	4	4	4	5,5
	500-690V kW	4	4	4	5,5
Utilization category AC4 Switching of squirrel cage motors, inching					
Rated operational current I_e open and enclosed	220V A	12	12	12	15
	230V A	11,5	11,5	11,5	14,5
	240V A	11	11	11	14
380-400V A	A	9	9	9	12
415-440V A	A	8	8	8	11
500V A	A	7	7	7	9
660-690V A	A	5	5	5	6,5
Rated operational power of three-phase motors 50-60Hz	220-240V kW	3	3	3	4
	380-440V kW	4	4	4	5,5
	500-690V kW	4	4	4	5,5

1) Suitable at 690V for: earthed-neutral systems, overvoltage category I to IV, pollution degree 3 (standard-industry): $U_{imp} = 8kV$.
Data for other conditions on request.

2) Suitable at 690V for pollution degree 2, $U_{imp} = 6kV$.
Pollution degree 3 $U_i = 690V$ non-tracking of the printed circuit CTI ≥ 600
Pollution degree 3 $U_i = 500V$ non-tracking of the printed circuit CTI ≥ 400
Pollution degree 3 $U_i = 400V$ non-tracking of the printed circuit CTI ≥ 100

Mini Contactors

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

Main Contacts				Type	K1-09D..	K1-09F..	K1-09L..	K1-12D..	
Utilization category DC1									
Switching of resistive load				1 pole	24V	A			
Time constant L/R ≤1ms					60V	A			
Rated operational current I _e					110V	A			
					220V	A			
				3 poles in series	24V	A			
					60V	A			
					110V	A			
					220V	A			
Utilization category DC3 and DC5									
Switching of shunt motors and series motors				1 pole	24V	A			
Time constant L/R ≤15ms					60V	A			
Rated operational current I _e					110V	A			
					220V	A			
				3 poles in series	24V	A			
					60V	A			
					110V	A			
					220V	A			
Maximum ambient temperature									
Operation				open	°C	-40 to +60 (+90) ¹⁾			
				enclosed	°C	-40 to +40			
with thermal overload relay				open	°C	-25 to +60			
				enclosed	°C	-25 to +40			
Storage					°C	-50 to +90			
Short circuit protection									
for contactors without thermal overload relay									
Coordination-type "1" according to IEC 947-4-1									
Contact welding without hazard of persons									
max. fuse size				gL (gG)	A	40	40	40	40
Coordination-type "2" according to IEC 947-4-1									
Light contact welding accepted									
max. fuse size				gL (gG)	A	25	25	25	25
Contact welding not accepted									
max. fuse size				gL (gG)	A	10	10	10	10
For contactors with thermal overload relay the device with the smaller admissible backup fuse (contactor or thermal overload relay) determines the fuse size.									
Cable cross-sections									
for contactors without thermal overload relay									
main connector				solid or stranded	mm ²	0,5 - 2,5	Fast on	Solder connector	0,5 - 2,5
				flexible	mm ²	0,5 - 2,5	1x 6,3 x 0,8	Ø 1,15	0,5 - 2,5
				flexible with multicore cable end	mm ²	0,5 - 1,5	or		0,5 - 1,5
Cables per clamp						2	2x 2,8 x 0,8	-	2
				solid or stranded	AWG	18 - 14			18 - 14
Frequency of operations z									
without load				1/h	10000	10000	10000	10000	
Contactors without thermal overload relay				AC3, I _e	1/h	600	600	600	700
				AC4, I _e	1/h	120	120	120	150
				DC3, I _e	1/h	600	600	600	700
Mechanical life									
AC operated				S x	10 ⁶	5	5	5	5
DC operated				S x	10 ⁶	15	15	15	15
Short time current									
10s-current				A	96	96	96	120	
Power loss per pole									
at I _e /AC3 400V				W	0,15	0,15	0,15	0,25	
Resistance to shock according to IEC 68-2-27									
Shock time 20ms sine-wave									
AC operated				NO	g	5	5	5	5
				NC	g	5	5	5	5
DC operated				NO	g	8	8	8	8
				NC	g	6	6	6	6

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

Mini Contactors

Data according to IEC 947-5-1, VDE 0660, EN 60947-5-1

Auxiliary Contacts			Type	K1-07D.. K1-09D.. K1-12D..	K1-07D.. K1-09D.. K1-12D.. K1-07D..= 24VR K1-09D..= 24VR	K1-09F..(=)	K1-07L..(=) K1-09L..(=)	HK..
Rated insulation voltage U_i			V AC	690 ¹⁾	690 ¹⁾	690 ¹⁾	690 ²⁾	690 ¹⁾
Thermal rated current I_{th} to 690V								
Ambient temperature								
40°C			A	10	10	10	10	10
60°C			A	6	6	6	6	6
Power loss per pole			at I_{th} W	0,5	0,5	0,5	0,5	0,5
Utilization category AC15								
Rated operational current I_e								
220-240V			A	3	3	3	3	3
380-415V			A	2	2	2	2	2
440V			A	1,6	1,6	1,6	1,6	1,6
500V			A	1,2	1,2	1,2	1,2	1,2
660-690V			A	0,6	0,6	0,6	0,6	0,6
Utilization category DC13								
Rated operational current I_e								
60V			A	2	2	2	2	2
110V			A	0,4	0,4	0,4	0,4	0,4
220V			A	0,1	0,1	0,1	0,1	0,1
Maximum ambient temperature								
Operation			open °C	-40 to +60 (+90) ³⁾				
			enclosed °C					
Storage			°C					
Short circuit protection								
short-circuit current 1kA, contact welding not accepted max. fuse size			gL (gG) A	20	20	20	20	20
For contactors with thermal overload relay the device with the smaller admissible control fuse (contactor or thermal overload relay) determines the fuse size.								
Power consumption of coils								
AC operated								
inrush			VA	25	-	-	25	-
sealed			VA	4 - 5	-	-	4 - 5	-
			W	1,2	-	-	1,2	-
DC operated								
inrush			W	-	2,5	1,5	2,5	-
sealed			W	-	2,5	1,5	2,5	-
Operation range of coils								
in multiples of control voltage U_s				0,85 - 1,1	0,8 - 1,1	19 - 30V DC	0,85 - 1,1	0,85 - 1,1
Switching time at control voltage $U_s \pm 10\%$ ^{4) 5)}								
AC operated								
make time			ms	15 - 19	-	-	15 - 19	15 - 19
release time			ms	8 - 25	-	-	8 - 25	8 - 25
arc duration			ms	10 - 15	-	-	10 - 15	10 - 15
DC operated								
make time			ms	-	15 - 25	15 - 25	15 - 25	15 - 25
release time			ms	-	8 - 25	8 - 25	8 - 25	8 - 25
arc duration			ms	-	10 - 15	10 - 15	10 - 15	10 - 15
Cable cross-section								
all connectors								
solid			mm ²	0,5 - 2,5	0,5 - 2,5	0,5 - 2,5	Fast on	0,5 - 2,5
flexible			mm ²	0,5 - 2,5	0,5 - 2,5	0,5 - 2,5	1x 6,3 x 0,8	0,5 - 2,5
flexible with multicore cable end			mm ²	0,5 - 1,5	0,5 - 1,5	0,5 - 1,5	or	0,5 - 1,5
Clamps per pole								
				2	2	2	2x 2,8 x 0,8	2
solid or stranded			AWG	18 - 14	18 - 14	18 - 14	-	18 - 14

1) Suitable at 690V for: earthed-neutral systems, overvoltage category I to IV, pollution degree 3 (standard-industry): $U_{imp} = 8kV$.
Data for other conditions on request.

2) Suitable at 690V for pollution degree 2, $U_{imp} = 6kV$.
Pollution degree 3 $U_i = 690V$ non-tracking of the printed circuit CTI ≥ 600
Pollution degree 3 $U_i = 500V$ non-tracking of the printed circuit CTI ≥ 400
Pollution degree 3 $U_i = 400V$ non-tracking of the printed circuit CTI ≥ 100

3) With reduced control voltage range 0,9 up to 1,0 x U_s and with reduced thermal rated current I_{th} to $I_e/AC15$

4) Summary switching time = release time + arc duration

5) Release time of NC make time of NO increase when suppressor units for voltage peak protection are used (Varistor, RC-units, Diode units).

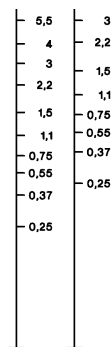
Mini Contactors for North America

Data according to UL508

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

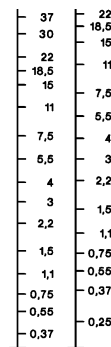
Motor Rating P_n = AC4

380/ 220/
400V 230V
kW kW



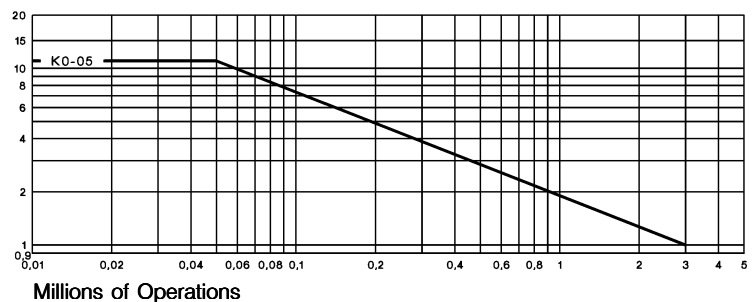
Motor Rating P_n = AC3

380/ 220/
400V 230V
kW kW



Breaking Current I_a (= I_g = AC1)

A



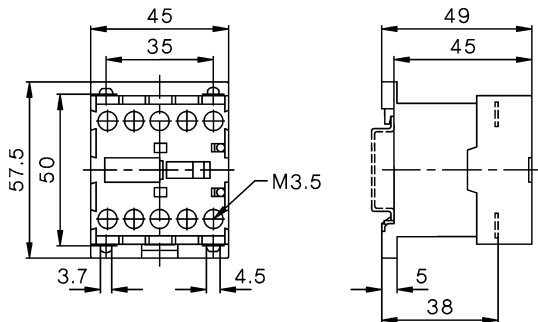
1) Pollution degree	CTI - PWB	U _i
2	≥ 100	600V
3	≥ 400	480V
3	100 - 400	240V

Mini Contactors

Dimensions

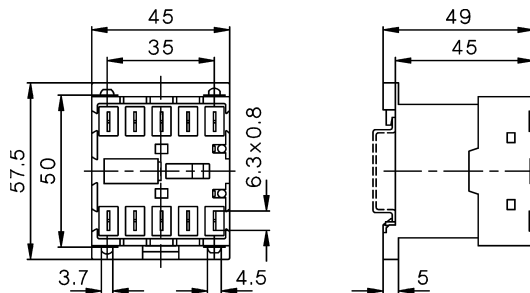
AC and DC operated
with screw terminals

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



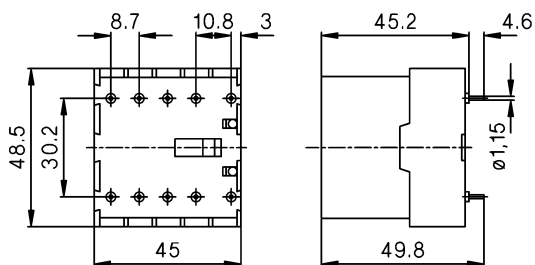
with fast on terminals

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



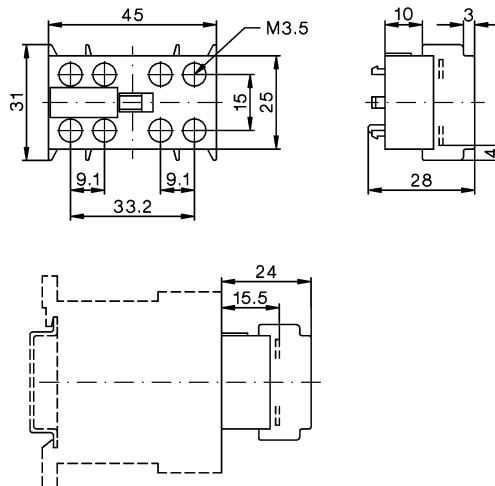
AC and DC operated
with solder connections

K1-07L..
K1-09L..



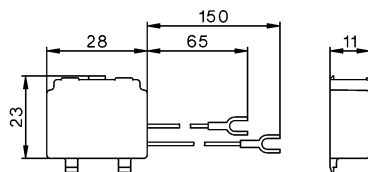
Auxiliary Contact Blocks

HK..



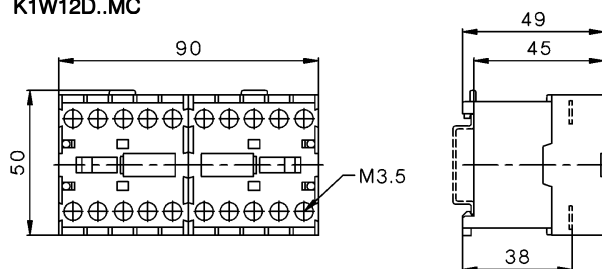
Suppressor Units

RC-K1



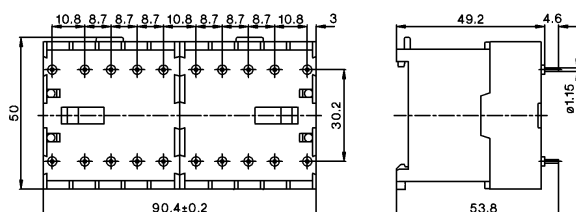
Reversing Contactors

K1W09D..MC
K1W12D..MC

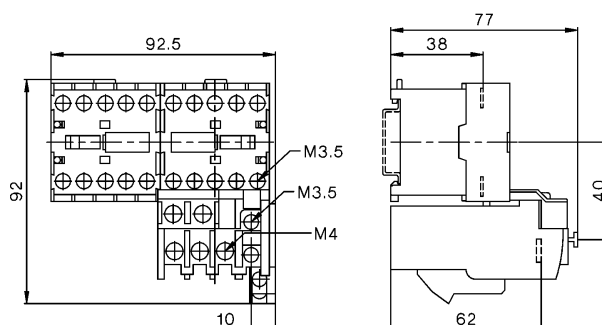


Reversing Contactors

K1W09L..MC



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





Contactor Relays 4-pole, AC Operated	34
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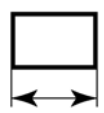
Auxiliary Contact Blocks 1-pole	34
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Contactor Relays 4-pole, DC Operated	35
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Technical Data	36
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Dimensions	38
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Contactor Relays

AC Operated

Ratings		Therm. Rated Current I_{th} A	Contacts		Distinc. Number acc. to	Additional Contact Blocks	Type	Coil voltage ¹⁾	
AC15	400V		Built-in						
230V	A		NO	NC	EN50011	Type		24	24V 50/60Hz
								110	110V 50Hz 110-120V 60Hz
								230	220-240V 50Hz 230-264V 60Hz
								400	380-415V 50Hz 400-440V 60Hz
									Pack Weight pcs. kg/pc.

4-pole, contacts suitable for electronic circuits according to EN947-5-4²⁾

4	2	10	4	-	40E	max. 4	K3-07ND40	...	1	0,22
4	2	10	3	1	31E	HN..	K3-07ND31	...	1	0,22
4	2	10	2	2	22E		K3-07ND22	...	1	0,22
4	2	10	-	4	04E		K3-07ND04	...	1	0,22



Auxiliary Contact Blocks ³⁾

Ratings		Thermal Rated Current A	Contacts ²⁾		Type	Pack pcs.	Weight kg/pc.
AC15	400V		NO	NC			
230V	A						

1-pole, contacts suitable for electronic circuits according to EN947-5-4²⁾

3	2	10	1	-	-	-	HN10	10	0,02
3	2	10	-	1	-	-	HN01	10	0,02
3	2	10	-	-	1	-	HN10U	10	0,02
3	2	10	-	-	-	1	HN01U	10	0,02



1-pole, for high switching capacity

6	3	25	1	-	-	-	HA10	10	0,03
6	3	25	-	1	-	-	HA01	10	0,03

Accessories see page 34 - 38

1) Other coil voltages see page 51

2) Contacts suitable for electronic circuits, according to EN947-5-4 for rated voltage 24V DC (test ratings 17V DC, 5mA) Positively guided contacts

3) Technical Data see page 64

DC Operated

Type	Coil voltage ¹⁾	Contacts Built-in	Distinc. Number acc. to	Additional Contact Blocks	Pack pcs.	Weight kg/pc.	Wiring Diagrams
	24 24V DC						
	60 60V DC						
	110 110V DC						
	220 220V DC						
	↓	NO NC	EN50011	Type			

3W Coil power, for high switching capacity ³⁾

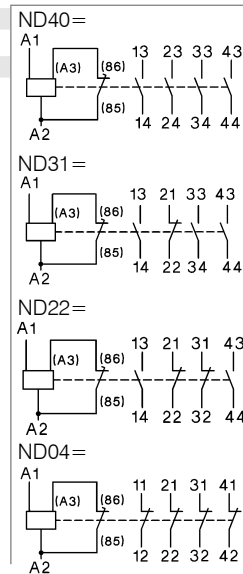
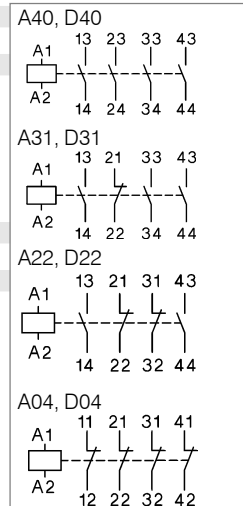
KG3-07A40 ...	4	-	40E	max. 4	1	0,53
KG3-07A31 ...	3	1	31E	HN..	1	0,53
KG3-07A22 ...	2	2	22E	oder	1	0,53
KG3-07A04 ...	-	4	04E	HA..	1	0,53

3W Coil power, for electronic circuits ²⁾³⁾

KG3-07D40 ...	4	-	40E	max. 4	1	0,53
KG3-07D31 ...	3	1	31E	HN..	1	0,53
KG3-07D22 ...	2	2	22E		1	0,53
KG3-07D04 ...	-	4	04E		1	0,53

with double winding coil, for electronic circuits ²⁾

K3-07ND40= ...	4	-	40E	max. 3	1	0,25
K3-07ND31= ...	3	1	31E	HN..	1	0,25
K3-07ND22= ...	2	2	22E		1	0,25
K3-07ND04= ...	-	4	04E		1	0,25



1) Other coil voltages on request

2) Contacts suitable for electronic circuits, according to EN947-5-4 for rated voltage 24V DC (test ratings 17V DC, 5mA) Positively guided contacts

3) with integrated coil suppressor (Transient Voltage Suppressor Diode)

Contactor Relays

Data according to IEC 947-5-1, VDE 0660, EN 60947-5-1

Type			K3-07ND	K3-07ND=	KG3-07A	KG3-07D
Rated insulation voltage $U_i^{1)}$			690	690	690	690
Thermal rated current I_{th} to 690V						
Ambient temperature	40°C	A	10	10	20	10
	60°C	A	6	6	16	6
Frequency of operations z			10000	10000	10000	10000
Mechanical life			10	10	10	50
Utilization category AC15						
Rated operational current I_e	220-240V	A	4	4	12	4
	380-415V	A	2	2	4	2
	440V	A	1,6	1,6	4	1,6
	500V	A	1,2	1,2	3	1,2
	660-690V	A	0,6	0,6	1	0,6
Utilization category DC13						
Rated operational current I_e per pole	24-60V	A	3,5	3,5	8	3,5
	110V	A	0,5	0,5	1	0,5
	220V	A	0,1	0,1	0,1	0,1
Power consumption of coils						
AC operated	inrush	VA	30 - 45	-	-	-
	sealed	VA	7 - 10	-	-	-
		W	2,6 - 3	-	-	-
DC operated	inrush	W	-	75	3	3
	sealed	W	-	2	3	3
Operation range of coils in multiples of control voltage U_s			0,85 - 1,1	0,8 - 1,1	0,8 - 1,1	0,8 - 1,1
Switching time at control voltage $U_s \pm 10\%$						
	make time	ms	8 - 16	8 - 16	65 - 85	65 - 85
	release time	ms	5 - 13	5 - 13	20 - 30 ³⁾	20 - 30 ³⁾
Maximum ambient temperature						
Operation	open	°C	-40 to +60 (+90) ²⁾			
	enclosed	°C				
Storage		°C	-40 to +90			
Short circuit protection short-circuit current 1kA, contact welding not accepted max. fuse size						
	gL (gG)	A	20	20	25	20
Cable cross-section						
Connector	solid	mm²	0,75 - 6 1 - 4 0,75 - 4			
	flexible	mm²				
	flexible with multicore cable end	mm²				
Magnet coil	solid	mm²	0,75 - 2,5 0,75 - 2,5 0,5 - 1,5			
	flexible	mm²				
	flexible with multicore cable end	mm²				
Clamps per pole			2			
Connector	solid	AWG	18 - 10 18 - 10 2			
	flexible	AWG				
Clamps per pole			2			
Magnet coil	solid	AWG	14 - 12 18 - 12 2			
	flexible	AWG				
Clamps per pole			2			

Data according to UL508

Rated operational current	A		10	10	20	10
"General Use"						
Rated operational voltage	max.	V AC	600	600	600	600
Auxiliary Contacts heavy pilot duty			A600	A600	A600	A600

1) Suitable at 690V for: earthed-neutral systems, overvoltage category I to IV, pollution degree 3 (standard-industry): Uimp = 8kV.

Data for other conditions on request.

2) With reduced control voltage range 0,9 up to 1,0 x U_s and with reduced thermal rated current I_{th} according to I_e /AC15

3) with built-in coil suppressor

Contactor Relays

Position of Terminals

AC operated

DC operated with double wound coil

K3-07ND22

K3-07ND31

K3-07ND40

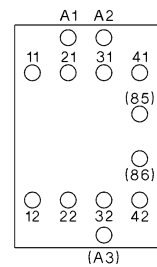
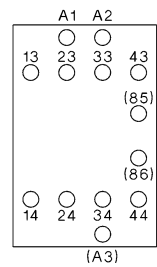
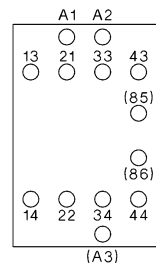
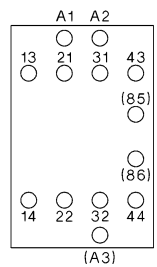
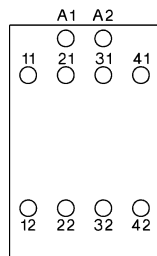
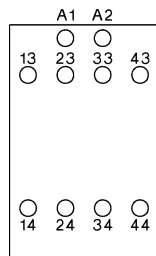
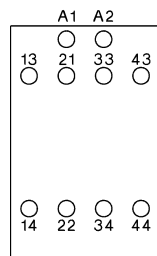
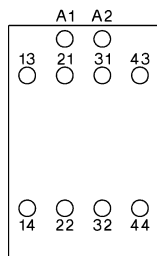
K3-07ND04

K3-07ND22=

K3-07ND31=

K3-07ND40=

K3-07ND04=



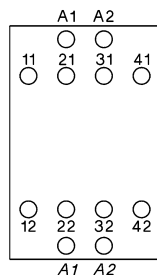
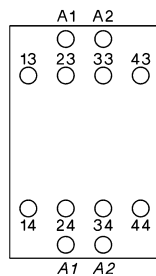
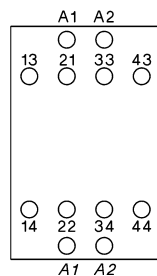
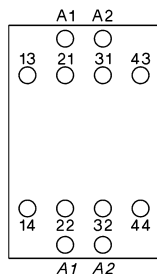
DC solenoid operated

KG3-07A22
KG3-07D22

KG3-07A31
KG3-07D31

KG3-07A40
KG3-07D40

KG3-07A04
KG3-07D04

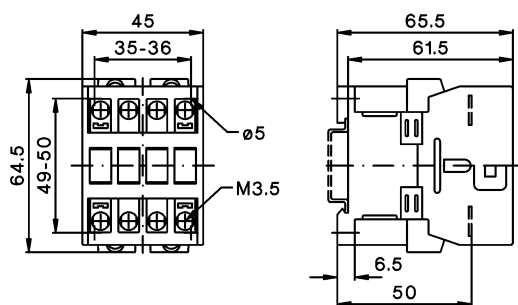


Contactor Relays

Dimensions

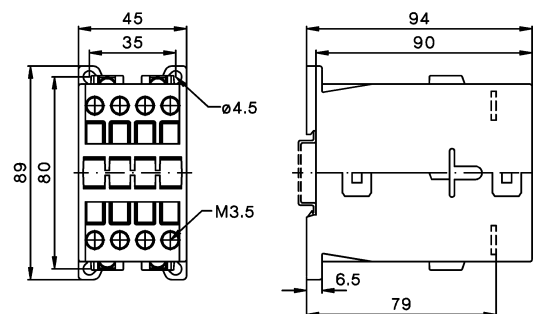
AC operated

K3-07ND..



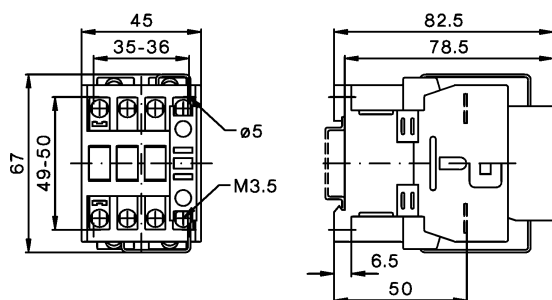
DC solenoid operated

KG3-07..



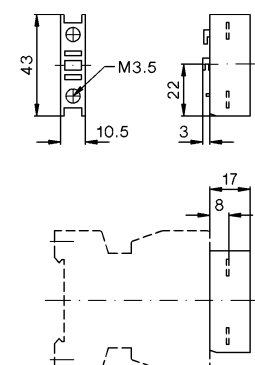
DC operated with double winding coil

K3-07ND.. =

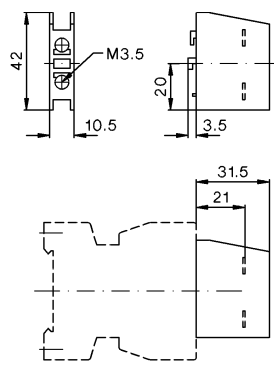


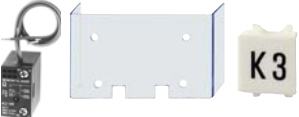
Auxiliary contact blocks

HN10, HN01



HA10, HA01



	Contactor overview	40
	Contactors 3-pole, AC Operated	42
	Contactors 3-pole, DC Operated	43
	Contactors 4-pole	44
	Capacitor Switching Contactors	45
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	Pneumatic Timers Electronic Timers On-delay Electronic Timers Off-delay	47
	Mechanical Interlocks Latches Additional Terminals, Parallel Connectors	48
	Indicator Units Fuse Holders Suppressor Units	49
	Interface Terminal Covers Mounting Parts, Marking System	50
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	Spare Coils AC-operated Feeder Groups	52
	Spare Coils DC-operated Spare Contacts	53
	Technical Data	56
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Contactors 3-pole

- Up to 1200A AC3
- Up to 1350A AC1
- DIN-rail mounting up to AC3 115A
- International Approvals
- Data according to IEC 947 / EN 60947



Ratings		10A14A18A22A				24A32A40A			50A62A74A			90A115A			
AC3	400V	Motor	4kW 5,5kW	5,5kW 7,5kW	7,5kW 10kW	11kW 10kW	11kW 15kW	15kW 18,5kW	18,5kW	22kW 30kW	30kW 37kW	37kW 45kW	45kW 55kW	55kW	
AC1	690V at 40°C		25A	25A	32A	32A	50A	65A	80A	110A	120A	130A	160A	200A	
Type	K3-		10ND10	14ND10	18ND10	22ND10	24A00	32A00	40A00	50A00	62A00	74A00	90A00	115A00	
Auxiliary contacts			1NO	1NO	1NO	1NO	-	-	-	-	-	-			
Type	K3-		10ND01	14ND01	18ND01	22ND01									
Auxiliary contacts			1NC	1NC	1NC	1NC									
Cable cross-section			0,75 - 6 1 - 4				1,5 - 25 2,5 - 16			4 - 50 10 - 35			10 - 120 10 - 95		
Solid	mm²														
Flexible	mm²														
Auxiliary contact															
I _{th} 40°C	A		10				-			-			-		
AC15 230V	A		3				-			-			-		
400V	A		2				-			-			-		
Power consumption	Inrush VA		33 - 45				90 - 115			140 - 165			280		
of coils	hold VA		7 - 10				9 - 13			13 - 18			5		
Operation range of coils			0,85 - 1,1				0,85 - 1,1			0,85 - 1,1			0,85 - 1,1		
Mounting			35mm DIN-rail or base											2x DIN-rail or base	
Additional aux. contact blocks	Front mounting	Type	 HN10 1NO f. low level switching	 HN01 1NC f. low level switching	 HA10 1NO 25A I _{th}	 HA01 1NC 25A I _{th}	max. 4 HN.. or 4 HA..						max. 7 HN.. or 7 HA..		
Additional aux. contact blocks	Side mounting	Type	-	-	-	-	 HB11 1NO+1NC f. low level switching	 HB02 2NC f. low level switching				max. 2 HB..			
Overload Relay (thermal)	Single phase protection Temperature compensation Trip and alarm contacts														
Type			U3/32						U3/74			U85			
			U12/16..K3			U3/42									
Number of Setting Ranges from			16 0,12 - 30A		16 0,12 - 32A		4 10 - 42A		5 20 - 74A			2 60 - 120A			
Busbar sets			-		-		-		-			-			



150A	175A	210A	260A	315A	450A	550A	700A	860A	1000A	1200A
75kW 90kW	90kW 110kW	110kW 160kW	132kW 210kW	160kW 250kW	250kW 375kW	300kW 475kW	400kW 630kW	500kW 700kW	580kW 850kW	680kW 1000kW
230A	250A	350A	450A	500A	600A	760A	1000A	1100A	1200A	1350A
151A00	176A00	210A00	260A00	316A00	450A22	550A22	700A22	860A22	1000A12	1200A12
-	-	-	-	-	2NO+2NC	2NO+2NC	2NO+2NC	2NO+2NC	1NO+2NC	1NO+2NC
2 x 16-120 2 x 16-120		busbar 30x6	busbar 30x6	busbar 30x6	busbar 30x5	busbar 40x6	busbar 50x8	busbar 50x8	busbar 50x10	busbar 50x10
- - -			- - -				10 3 2		10 3 2	
350 5 0,85 - 1,1	350 5	360 5	360 5 0,85 - 1,1	360 5	800-950 9-11	800-950 9-11	1350-1600 21-25 0,85 - 1,1	1350-1600 21-25	2400 70 0,85-1,1	2400 70
base										
 HKT11 HKT22 1NO+1NC 2NO+2NC max. 1 pc.					 HKF22 2NO+2NC max. 1 pc.				 HKB11 1NO+1NC max. 2 pcs.	
 HKA11 1NO+1NC max. 2 pcs.					- - - -				- -	
 U180 1 120 - 180A integrated		 U320 2 144 - 320A integrated			 U800 3 240 - 800A SU840/550 SU840/860					

Contactors 3-pole

AC Operated



Ratings AC2, AC3 380V 400V 415V kW		Rated Current	Aux. Contacts Built-in		Additional see page 46	Type	Coil voltage ¹⁾		Pack pcs.	Weight kg/pc.
							24 110 230 400 ▼	24V 50/60Hz 110V 50/60Hz 220-240V 50Hz 380-415V 50Hz		
4	5,5	25	1	-	max. 4	K3-10ND10 ...			1	0,23
4	5,5	25	-	1	HN.. or HA..	K3-10ND01 ...			1	0,23
5,5	7,5	25	1	-		K3-14ND10 ...			1	0,23
5,5	7,5	25	-	1		K3-14ND01 ...			1	0,23
7,5	10	32	1	-		K3-18ND10 ...			1	0,23
7,5	10	32	-	1		K3-18ND01 ...			1	0,23
11	10	32	1	-		K3-22ND10 ...			1	0,23
11	10	32	-	1		K3-22ND01 ...			1	0,23
11	15	50	-	-	max. 4	K3-24A00 ...			1	0,48
15	18,5	65	-	-	HN.. or	K3-32A00 ...			1	0,48
18,5	18,5	80	-	-	HA.. and 2HB..	K3-40A00 ...			1	0,48
22	30	110	-	-	max. 4 (3) ⁴⁾	K3-50A00 ...			1	0,85
30	37	120	-	-	HN.. or	K3-62A00 ...			1	0,85
37	45	130	-	-	HA.. and 2HB..	K3-74A00 ...			1	0,85
45	55	160	-	-	max. 7	K3-90A00 ... ^{2) / VS ³⁾}			1	2,2
55	55	200	-	-	HN.. or HA.. and 2HB..	K3-115A00 ... ^{2) / VS ³⁾}			1	2,2
75	110	230	-	-	1 HKT..	K3-151A00 ... ²⁾			1	4
90	132	250	-	-	and 2 HKA11	K3-176A00 ... ²⁾			1	4
110	160	350	-	-		K3-210A00 ... ²⁾			1	7,2
132	210	450	-	-		K3-260A00 ... ²⁾			1	7,2
160	250	500	-	-		K3-316A00 ... ²⁾			1	7,2
250	375	600	2	2	1 HKF22	K3-450A22 ... ²⁾			1	13
300	475	760	2	2		K3-550A22 ... ²⁾			1	13,5
400	630	1000	2	2		K3-700A22 ... ²⁾			1	26,5
500	700	1100	2	2		K3-860A22 ... ²⁾			1	27,6
580	850	1200	1	2	2 HKB11	K3-1000A12 ...			1	49
680	1000	1350	1	2		K3-1200A12 ...			1	53

1) Coil voltage range and other coil voltages see page 51

2) Type for AC- and DC-operating; e.g.: 230: 220-240V 50/60Hz and 220V DC (with integrated coil suppressor)

3) Type 230VS for AC-operating 220-240V 50Hz (with integrated coil suppressor)

4) max. 3 HN.. or HA.. for DC-operated Contactors

DC Operated

Type	Coil voltage ¹⁾	Coil power	Additional Overload Relay see page 114 Type	Pack pcs.	Weight kg/pc.	Wiring Diagram
						Coil Circuits see page 53
	24 24V DC					
	48 48V DC					
	110 110V DC					
	▼					
	KG3-10A10 ... ⁵⁾	3/3	U3/32	1	0,53	D10
	KG3-10A01 ... ⁵⁾	3/3	U12/16E U12/16EQ	1	0,53	A1 1 3 5 13 A2 2 4 6 14
	KG3-14A10 ... ⁵⁾	3/3	UAT21	1	0,53	
	KG3-14A01 ... ⁵⁾	3/3		1	0,53	
	KG3-18A10 ... ⁵⁾	3/3		1	0,53	D01
	KG3-18A01 ... ⁵⁾	3/3		1	0,53	A1 1 3 5 21 A2 2 4 6 22
	KG3-22A10 ... ⁵⁾	3/3		1	0,53	
	KG3-22A01 ... ⁵⁾	3/3		1	0,53	
	KG3-24A00 ... ⁵⁾	4/4	U3/32	1	0,57	A00
	KG3-32A00 ... ⁵⁾	4/4	U3/42	1	0,57	A1 1 3 5 A2 2 4 6
	KG3-40A00 ... ⁵⁾	4/4	UAT..	1	0,57	
	K3-50A00= ...	200/6	U3/74	1	0,9	A00=
	K3-62A00= ...	200/6		1	0,9	A1 (A3) (46) 1 3 5 (45) 2 4 6
	K3-74A00= ...	200/6		1	0,9	
	K3-90A00 ... ²⁾	280/5	U85	1	2,2	A00
	K3-115A00 ... ²⁾	280/5		1	2,3	A1 1 3 5 A2 2 4 6
	K3-151A00 ... ²⁾	350/5	U180	1	4	
	K3-176A00 ... ²⁾	350/5		1	4	
	K3-210A00 ... ²⁾	360/5	U320	1	7,2	
	K3-260A00 ... ²⁾	360/5		1	7,2	
	K3-316A00 ... ²⁾	360/5		1	7,2	
	K3-450A22 ... ²⁾	800/10	U800	1	13	A22
	K3-550A22 ... ²⁾	800/10	+SU840/550	1	13,5	A1 1 3 5 13 21 31 43 A2 2 4 6 14 22 32 44
	K3-700A22 ... ²⁾	1500/20	U800	1	26,5	
	K3-860A22 ... ²⁾	1500/20	+SU840/860	1	27,6	
	K3-1000A12= ...	2100/60		1	49	A12
	K3-1200A12= ...	2100/60		1	53	A1 1 3 5 13 21 31 A2 2 4 6 14 22 32

1) Other coil voltages on request

2) Type for AC- and DC-operating: e.g.: 24V 50/60Hz and 24V DC (with integrated coil suppressor)

5) with integrated coil suppressor

Contactors 3-pole

DC Operated



Ratings		Rated Current	Aux. Contacts		Type	Coil voltage ¹⁾		Pack pcs.	Weight kg/pc.	Wiring Diagram
AC2	AC3		Built-in	Additional see page 46		24	60			
380V		AC1				24V= DC	60V= DC			
400V	660V					110V= DC	220V= DC			
415V	690V	690V								
kW	kW	A	NO	NC	Type					
4	5,5	25	1	-	max. 3			1	0,25	D10=
4	5,5	25	-	1	HN.. or HA..			1	0,25	
5,5	7,5	25	1	-	HA..			1	0,25	D01=
5,5	7,5	25	-	1				1	0,25	
7,5	10	32	1	-				1	0,25	... A00=
7,5	10	32	-	1				1	0,25	
11	10	32	1	-				1	0,25	
11	10	32	-	1				1	0,25	
11	15	50	-	-	max. 4			1	0,55	
15	18,5	65	-	-	HN.. or HA..			1	0,55	
18,5	18,5	80	-	-	+ 2HB..			1	0,55	

Contactors 4-pole

AC Operated



Ratings		Rated Current	Aux. Contacts		Type	Coil voltage ²⁾		Pack pcs.	Weight kg/pc.	Wiring Diagram
AC2	AC3		Built-in	Additional see page 46		24	110			
380V		AC1				24V 50/60Hz	110V 50/60Hz			
400V						230	220-240V 50Hz			
415V	400V	690V				400	380-415V 50Hz			
kW	kW	A	NO	NC	Type					
4	17,5	25	-	-	max. 4			1	0,22	A00-40
4	17,5	25	-	-	HN.. or HA..			1	0,22	
4	17,5	25	-	-	HA..			1	0,22	A00-22
5,5	17,5	25	-	-				1	0,22	
5,5	17,5	25	-	-				1	0,22	A00-04
5,5	17,5	25	-	-				1	0,22	
7,5	22	32	-	-				1	0,22	
7,5	22	32	-	-				1	0,22	
7,5	22	32	-	-				1	0,22	
11	22	32	-	-				1	0,22	
11	31	45	-	-	max. 4			1	0,65	
15	34,5	50	-	-	HN..			1	0,65	
18,5	34,5	50	-	-	or HA..			1	0,65	
22	55	80	-	-	max. 6			1	1,1	
30	69	100	-	-	HN.. or HA..			1	1,1	
15	43	63	-	-	1HKT..			1	1,4	
15	43	63	-	-	+			1	1,4	
					2xHKA11			1	2,42	
30	85	125	-	-				1	2,42	
30	85	125	-	-				1	2,42	
55	139	200	-	-				1	4,7	
75	159	230	-	-				1	4,7	
90	173	250	-	-				1	4,7	
110	242	350	-	-				1	8	
132	310	450	-	-				1	8	
160	346	500	-	-				1	8	

Latch for Contactors 4-pole see page 48

1) Other coil voltages on request

2) Coil voltage range and non-standard coil voltages see page 51

3) with integrated coil suppressor

4) other technical data on request

Capacitor Switching Contactors

for use with reactive or non-reactive capacitor banks



Rated Operational Power at 50/60Hz

Ambient Temperature

50°C 60°C

380V	415V	660V	380V	415V	660V
400V	440V	690V	400V	440V	690V
kVAr	kVAr	kVAr	kVAr	kVAr	kVAr

Aux.
Contacts
Built-in Add.

Type

230

Coil voltage ¹⁾

220-240V 50Hz

Pack Weight
pcs. kg/pc.

0-12,5	0-13	0-20	0-12,5	0-13	0-20	1	-	1 ²⁾	K3-18NK10 ...	1	0,34
0-12,5	0-13	0-20	0-12,5	0-13	0-20	-	1	1 ²⁾	K3-18NK01 ...	1	0,34
10-20	10,5-22	17-33	10-20	10,5-22	17-33	-	-	3 ³⁾	K3-24K00 ...	1	0,62
10-25	10,5-27	17-41	10-25	10,5-27	17-41	-	-	3 ³⁾	K3-32K00 ...	1	0,62
20-33,3	23-36	36-55	20-33,3	23-36	36-55	-	-	3 ³⁾	K3-50K00 ...	1	1,0
20-50	23-53	36-82	20-50	23-53	36-82	-	-	3 ³⁾	K3-62K00 ...	1	1,0
20-75 ⁴⁾	23-75 ⁴⁾	36-120 ⁴⁾	20-60	23-64	36-100	-	-	3 ³⁾	K3-74K00 ...	1	1,0
33-80	36-82	57-120	33-75	36-77	57-120	-	-	6 ⁵⁾	K3-90K00 ... / VS ⁷⁾	1	2,3
33-100 ⁶⁾	36-103 ⁶⁾	57-148 ⁶⁾	33-90 ⁶⁾	36-93 ⁶⁾	57-148 ⁶⁾	-	-	6 ⁵⁾	K3-115K00 ... / VS ⁷⁾	1	2,3

Specification: Contactors K3-..K are suitable for switching low-inductive and low loss capacitors in capacitor banks (IEC70 and 831, VDE 0560) without and with reactors.

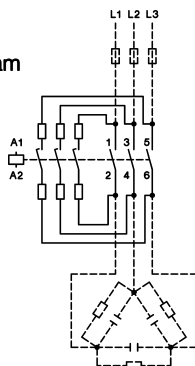
Capacitor switching contactors are fitted with early make contacts and damping resistors, to reduce the value of make current < 70 x I_e.

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

Technical Data acc. to IEC 947-4-1, IEC 947-5-1, EN 60947-4-1, EN 60947-5-1, VDE 0660

Type		K3-18K	K3-24K	K3-32K	K3-50K	K3-62K	K3-74K	K3-90K	K3-115K
Max. frequency of operations z	1/h	120	120	120	120	120	80	80	80
Contact life	non reactive capacitor banks reactive capacitor banks	S x 10 ³ S x 10 ³	250 400	150 300	150 300	150 300	120 200	120 200	120 200
Rated operational current I _e	at 50°C A at 60°C A	0-18 0-18	14-28 14-28	14-36 14-36	30-48 30-48	30-72 30-72	30-108 30-87	50-115 50-108	50-144 50-130
Rated operational current I _{th}	at 50°C A at 60°C A	32 32	45 40	60 55	100 90	110 100	120 110	155 145	190 170
Overload factor	at 50°C % at 60°C %	78 78	60 43	67 53	108 88	53 39	11 26	35 34	32 31
Fuses gL (gG)	from / to A	35 / 63	50 / 80	63 / 100	80 / 160	125 / 160	160/200	160/200	160/250

Typical Circuit Diagram

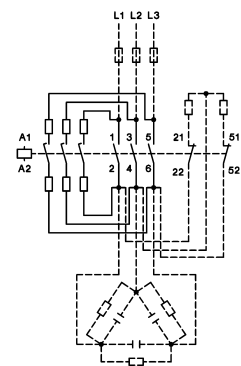


Wiring Diagram for Quick Discharge Resistors

Make sure that the current of the discharge resistors is not higher than the rated current (AC1) of the auxiliary contacts

Mounting instructions:

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



1) Coil voltage range and non-standard coil voltages see page 51

2) 1 HN.. or HA.. snap-on

3) 2HB.. for side mounting and 1 HN.. or HA.. snap-on

4) Consider the max. thermal current of the contactor K3-74A: I_{th} 130A

5) 2 HB.. on the left or right side and 4 HN.. or HA.. snap-on

6) Consider the min. cross-section of conductor at max. load

7) Type 230 for AC- and DC-operating 220-240V 50/60Hz and 220V DC (with integrated coil suppressor)

Type 230VS for AC-operating 220-240V 50Hz (with integrated coil suppressor)

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



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

Auxiliary Contact Block for contactors K3-24.. to K3-115.., for low level switching ¹⁾



Rated Operational Current			mounting: 1 HB.. on left side and 1 HB.. on right side	Contacts		Type	Pack	Weight
AC15 230V A	AC15 400V A	AC1 690V A		NO	NC		pcs.	kg/pc.
3	2	10		1	1	HB11	10	0,02
3	2	10		-	2	HB02	10	0,02

Auxiliary Contact Blocks for contactors K3-116.. to K3-1200



Rated Operational Current			For contactors	Contacts		Type	Pack	Weight
AC15 230V A	AC15 400V A	AC1 690V A		NO	NC		pcs.	kg/pc.
3	2	10	K3-116 to K3-316 top	1	1	HKT11	1	0,04
3	2	10	K3-116 to K3-316 top	2	2	HKT22	1	0,05
3	2	10	K3-116 to K3-316 outside	1	1	HKA11	1	0,05
6	3	16	K3-200 to K3-860 ²⁾	2 ²⁾	2	HKF22	1	0,12
6	3	16	K3-1000, K3-1200 inside	1	1	HKB11	1	0,17

Snap-on Momentary Contacts for K(G)3-07.. to K3-115.. for low level switching ¹⁾



Rated Operational Current			Specification	Contacts		Type	Pack	Weight
AC15 230V A	AC15 400V A	AC1 690V A		NO	NC		pcs.	kg/pc.
3	2	10	manual operated	1	-	HTN10	10	0,02
3	2	10	manual operated	-	1	HTN01	10	0,02

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



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

¹⁾Contacts suitable for electronic circuits, according to IEC60947-5-4 for rated voltage 24V DC
(test ratings 17V DC, 5mA) Positively guided contacts
Technical data see page 74

²⁾ Contact travel of make contacts adjustable, see page 73

Elektronic Timer

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



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

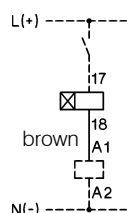
Electronic Timer On-delay for contactors K(G)3-07.. to K3-115.. and K2-..

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

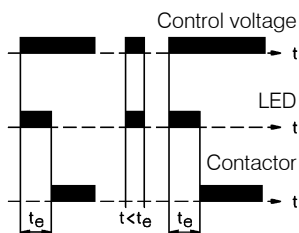


Operational Voltage V	Time Range s	Rated Current AC15 A	Type	Pack pcs.	Weight kg/pc.
24 - 60V AC/DC	1 - 30	0,75	K2-TE30 60	1	0,08
100 - 250V AC/DC	1 - 30	0,75	K2-TE30 250	1	0,08
24 - 60V AC/DC	10 - 180	0,75	K2-TE180 60	1	0,08
100 - 250V AC/DC	10 - 180	0,75	K2-TE180 250	1	0,08
24 - 60V AC/DC	30 - 600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

Wiring Diagram



Timing Chart



Operation Range

Time repeat accuracy
Recovery time (typical)

0,8 - 1,1 x U_s
≤1%
50ms

Voltage Drop

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

<3V
25A <10ms

Duty Cycle

Ambient temperature
Short circuit protection

100%
-40° - +60°C
2A

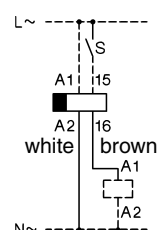
Electronic Timer Off-delay for contactors K(G)3-07.. to K3-74.. and K2-..

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

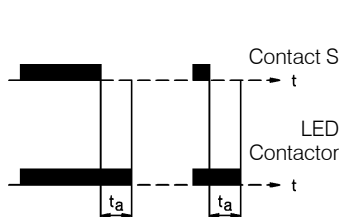


Operational Voltage V	Time Range s	Rated Current AC15 A	Type	Pack pcs.	Weight kg/pc.
24 - 60V AC	1 - 30	0,75	K2-TA30 60	1	0,08
100 - 120V AC	1 - 30	0,3	K2-TA30 120	1	0,08
200 - 250V AC	1 - 30	0,15	K2-TA30 250	1	0,08
24 - 60V AC	10 - 180	0,75	K2-TA180 60	1	0,08
100 - 120V AC	10 - 180	0,3	K2-TA180 120	1	0,08
200 - 250V AC	10 - 180	0,15	K2-TA180 250	1	0,08
24 - 60V AC	30 - 600	0,75	K2-TA600 60	1	0,08
100 - 120V AC	30 - 600	0,3	K2-TA600 120	1	0,08
200 - 250V AC	30 - 600	0,15	K2-TA600 250	1	0,08

Wiring Diagram



Timing Chart



Operation Range

Time repeat accuracy
Min. start time
Recovery time (typical)

0,8 - 1,1 x U_s
≤1%
15ms
15ms

Voltage Drop

Max. inrush current (peak value)

<0,7V
25A <10ms

Duty Cycle

Ambient temperature
Short circuit protection

100%
-40° - +40°C
2A

Utilization Category AC15

24 - 60V 100 - 120V 200 - 250V
0,75A 0,3A 0,15A

Interface for contactors K3-07.. to K3-74.. and K2-07.. to K2-60..



Input Voltage U _e	Power Consumption	Rated Current I _e	AC15 250V AC 400V AC	Type	Pack pcs.	Weight kg/pc.
24V DC	0,35W	0,75A	0,5A	K2-IM	1	0,03
Amplifier element for contactor control by programmable controller						

Fuse Holders for contactors K(G)3-07.. to K3-115.. and K2-..



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

Rectifier with Fuse Holder for contactors K(G)3-07.. to K3-115.. and K2-..

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

Latch for contactors K(G)3-07.. to K3-74.. and K2-..

with NC aux. contact
power consumption max. 30VA

Type	Coil voltage	Pack pcs.	Weight kg/pc.
24	22-26V 50/60Hz		
110	100-120V 50/60Hz		
230	210 -250V 50/60Hz		
400	360-440V 50/60Hz		
↓			

For Contactors

K3-07 to K3-22, K2-07 to K2-16	K2-L22 . . .	1	0,08
K3-24 to K3-40, K2-23 to K2-37, KG3-10 to KG3-40	K2-L40 . . .	1	0,08
K3-50 to K3-74, K2-45 to K2-60	K2-L74 . . .	1	0,08

Technical data see page 74
Latch for Contactors K3-200 to K3-860 on request

Indicator Units for contactors K(G)3-07.. to K3-115.. and K2-..



Specifications	Voltage Range	Type	Pack pcs.	Weight kg/pc.
Coil Current Indicator , green (LED)	24 - 660V AC/DC	K2-ING	10	0,02
Coil Current Indicator , red (LED)	24 - 660V AC/DC	K2-INR	10	0,02
To connect in series with the contactor coil. In case of coil interruption the indication goes out. Voltage drop appr. 2 volts				
Voltage Indicator , clear (glow-disc. I.)	220 - 415V AC/DC	K2-UN	10	0,02
Voltage Indicator , red (LED)	24 - 120V AC/DC	K2-UNR	10	0,02
To connect parallel to the contactor coil. In case of applied voltage the indication also lights at coil interruption.				

Snap-On Adapter



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

Additional 4th Poles for contactors K3-315.. to K3-1200



For Contactors	Thermal Current I _{th} A	Type	Pack pcs.	Weight kg/pc.
K3-315, K3-450, K3-550	325	NP325	1	0,7
K3-315, K3-450, K3-550	500	NP500	1	1,3
K3-450, K3-550	760	NP760	1	1,4
K3-700, K3-860	500	NP501	1	1,3
K3-700, K3-860	1000	NP1000	1	1,6
K3-1000, K3-1200	1000	NP1001	1	1,6

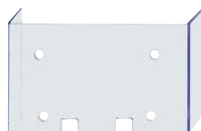
Mechanical Interlocks



Interlocks contactor with contactor Type	Type	Mounting	Type	Pack pcs.	Weight kg/pc.
K3-07 to K3-40 KG3-07 to KG3-22 KG3-24 to KG3-40 K2-07 to K2-37	K3-07 to K3-40 KG3-07 to KG3-22 KG3-24 to KG3-40 K2-07 to K2-37	horizontal	LG10889 ¹⁾	10	0,006
K3-24 to K3-74 K2-23 to K2-60	K3-50 to K3-74 K2-45 to K2-60	horizontal	LG10890 ¹⁾	1	0,010
K3-90, K3-115	K3-90, K3-115	horizontal	LG11478 ¹⁾	1	0,010
K65 to K110	K65 to K110	horizontal	LG8511	1	0,076
K3-116 to K3-316	K3-116 to K3-316	horizontal	LG11223H	1	0,06
K3-315 to K3-550	K3-315 to K3-550	horizontal	LG10400H	1	0,8
K3-315 to K3-550	K3-315 to K3-550	vertical	LG10400V	1	0,8
K3-450, K3-550	K3-700, K3-860	horizontal	LG10399H	1	1,6
K3-450, K3-550	K3-700, K3-860	vertical	LG10399V	1	0,9
K3-700, K3-860	K3-700, K3-860	horizontal	LG10402H	1	1,5
K3-700, K3-860	K3-700, K3-860	vertical	LG10402V	1	0,9
K3-700, K3-860	K3-1000, K3-1200	horizontal	LG10401H	1	1,9
K3-700, K3-860	K3-1000, K3-1200	vertical	LG10401V	1	1,6
K3-1000, K3-1200	K3-1000, K3-1200	horizontal	LG10403H	1	1,8
K3-1000, K3-1200	K3-1000, K3-1200	vertical	LG10403V	1	1,5

1) clamps for mounting incl.

Terminal Covers for terminal protection according to DIN 57106, VBG 4



For Contactors	Specification	Type	Pack pcs.	Weight kg/pc.
K65 to K110 (spare part)	for 6 terminals	LG9333	1	0,045
K3-151, K3-176 3-pole	for 3 terminals	LG10404	1	0,12
K3-116 to K3-176 4-pole	for 4 terminals	LG104044	1	0,14
K3-210, K3-260, K3-316	for 3 terminals	LG11457	1	0,14
K3-200	for 3 terminals	LG10405	1	0,18
K3-315, K3-450	for 3 terminals	LG10406	1	0,28
K3-550	for 3 terminals	LG10407	1	0,34
K3-700	for 3 terminals	LG10408	1	0,39
K3-860	for 3 terminals	LG10409	1	0,49

Additional Terminals



For Contactors	Cable Cross-sections to clamp mm²			Type	Pack	Weight
	solid or stranded	flexible	flex. with multi- core cable end		pcs.	kg/pc.
Additional Terminal Single Pole , with fingertouch protection						
K(G)3-10 to K(G)3-22	0,75 - 10	0,75 - 6	0,75 - 6	LG9339N	6	0,009
K2-09 to K2-16						
K3-151 to K3-176		16 - 120 + 16 - 95		LG11224	1	0,10
Additional Terminal Single Pole , set with 3 pieces						
K3-50 to K3-74, K2-45, K2-60	4 - 35	6 - 25	4 - 25	LG9030	1	0,052
K3-50 to K3-74 K2-45, K2-60	10 - 70	16 - 50	10 - 35	LG9031	1	0,170

Parallel Connectors



For Contactors	Cable Cross-sections to clamp mm² solid or flex. with multi- stranded flexible core cable end			Type	Pack pcs.	Weight kg/pc.
Parallel Connectors, 3 Poles Parallel						
Current-carrying capacity: 2,5 x AC1-value of the contactor						
K(G)3-10 to K(G)3-22	terminal hole for screw M5			LG9241	50	0,004
K2-09 to K2-16						
K2-23 to K2-37	4 - 35	6 - 25	4 - 25	LG5587	10	0,022
Parallel Connectors, 4 Poles Parallel						
Current-carrying capacity: 3,2 x AC1-value of the contactor						
K(G)3-10 to K(G)3-22	terminal hole for screw M5			LG7360	10	0,006
K2-09 to K2-16						

Suppressor Units



Voltage Range V	Mounting		Type	Pack pcs.	Weight kg/pc.
RC-units for contactors K3-07 - K3-74					
12 - 48V AC/DC	to snap	1600nF / 22 Ohm	RC-K3N 24	10	0,01
48 - 127V AC/DC	on the	680nF / 270 Ohm	RC-K3N 110	10	0,01
110 - 230V AC/DC	contactor	220nF / 2200 Ohm	RC-K3N 230	10	0,01
230 - 415V AC/DC		120nF / 620 Ohm	RC-K3N 400	10	0,01
RC-units for contactors K3-07 - K3-74 and reversing contactors K3NWU10 - K3WU74					
12 - 48V AC/DC	to snap	1600nF / 22 Ohm	RC-K3NW 24	10	0,01
48 - 127V AC/DC	on the	680nF / 270 Ohm	RC-K3NW 110	10	0,01
110 - 230V AC/DC	contactor	220nF / 2200 Ohm	RC-K3NW 230	10	0,01
230 - 415V AC/DC		120nF / 620 Ohm	RC-K3NW 400	10	0,01

Mounting Parts



Description	For Type	Specification	Type	Pack pcs.	Weight kg/pc.
Clamp, no distance	K3-07 to K3-115 K2-07 to K2-37	To join contactors without distance, 2 pieces required	P426-1	50	0,001
Clamp, 7mm distance	K3-07 to K3-115 K2-07 to K2-37	To join contactors with 7mm distance, 2 pieces required	P418-1	10	0,002
Clamp, 12mm distance	K3-07 to K3-115 K2-07 to K2-37	To join contactors with 12mm distance, 2 pieces required	P807-1	10	0,002
Clamp asymmetric	K3-07 to K3-40 with K3-50 - K3-74	To join contactors with 12mm distance, 2 pieces required	P785-1	10	0,002

Marking System for contactors K3-07.. to K3-115.., K2-.. and aux. contact blocks HN and HA



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

Coil voltages for AC operated contactors

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

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

Standard voltages in bold type letters

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

Type-suffix for coil-types K85/... and K110/...
for contactor-types K85 to K110

Suffix to contactor type	to coil type	Voltage Marking		Rated Control Voltage U _s			
		at the coil for 50Hz V	for 60Hz V	range for 50Hz min. V	max. V	for 60Hz min. V	max. V
20	4.20	20	24	20	22	24	26
24	4.24	24		24	27	29	32
42	4.42	42		42	47	50	56
110	4.110	110-120		110	122	132	146
230	4.230	220-240	277	220	240	264	288
400	4.400	380-415	460-480	380	415	455	498

Type-suffix for coil-types K3-1200/..
for contactor-types K3-1000.. to K3-1200..

110	4.110	110-115	-	110	115	110	115
230	4.230	220-230	-	220	230	220	230
400	4.400	380-400	-	380	400	380	400
440	4.440	440	-	440	440	440	440

Coil voltages for AC and DC operated contactors

Type-suffix for coil-types K3-115/.. to K3-860/..
for contactor-types K3-90.. to K3-860..

Suffix to contactor type	to coil type	Voltage Marking		Rated Control Voltage U _s			
		at the coil for 50/60Hz V	for DC V	range for 50Hz min. V	max. V	for 60Hz min. V	max. V
24	4.24	24	24	22	24	22	24
48	4.48	48	48	44	48	44	48
110	4.110	110-120	110	110	120	110	120
230	4.230	220-240	220	220	240	220	240
400	4.400	380-415	-	380	415	380	415

Coil voltages for AC operated contactors

Type-suffix for coil-types K3-115/..AC
for contactor-types K3-90..AC to K3-115..AC

Suffix to contactor type	to coil type	Voltage Marking		Rated Control Voltage U _s			
		at the coil for 50Hz V	for 60Hz V	range for 50Hz min. V	max. V	for 60Hz min. V	max. V
110AC	4.110AC	110-122	132-146	110	122	132	146
230AC	4.230AC	220-240	277	220	240	264	288

Other coil voltages on request

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

With reduced control voltage range 0,9 up to 1,0 x U_s at ambient temperature 60 - 90°C

Spare Coils for AC operated contactors



For Contactors

Type	Coil voltage ¹⁾	Pack pcs.	Weight kg/pc.
4.24	24V 50Hz		
4.42	42V 50Hz		
4.110	110V 50Hz		
41.180	180V 50Hz, 220V 60Hz		
4.230	220-240V 50Hz		
4.400	380-415V 50Hz		
↓			
K3-07N.. up to K3-22N..	K10N/ ...EUR	1	0,053
K3-07.. up to K3-22..	K3-6/ ...	10	0,040
K2-07.. up to K2-16..	K6/ ...	10	0,040
K3-24.. up to K3-40..	K24/ ...	1	0,085
K2-23.. up to K2-37..	K23/ ...	1	0,085
K3-50.. up to K3-74.., K2-45.., K2-60..	K45/ ...	1	0,110
K65.., K85..	K85/ ...	1	0,215
K110..	K110/ ...	1	0,220

For Contactors

Type	Coil voltage ¹⁾	Pack pcs.	Weight kg/pc.
4.110	110V 50Hz, 110-115V 60Hz		
4.230	220-230V 50Hz		
4.400	380-400V 50Hz		
▼			
K3-150.., K3-175..	K3-175/ ...	1	0,38
K3-1000.., K3-1200.. without feeder group ²⁾	K3-1200/ ...	1	3,12

Spare Coils for AC and DC operated contactors



For Contactors

Type	Coil voltage ¹⁾	Pack pcs.	Weight kg/pc.
4.24	24V 50/60Hz / 24V DC		
4.110	110-120V 50/60Hz / 110V DC		
4.230	220-240V 50/60Hz / 220V DC		
4.400	380-415V 50/60Hz		
▼			
K3-90.., K3-115.. with feeder group	K3-115/ ...	1	0,30
K3-151.., K3-176.. with feeder group	K3-176/ ...	1	0,68
K3-210.., K3-316.. with feeder group	K3-316/ ...	1	0,68
K3-450.., K3-550.. without feeder group ²⁾	K3-550/ ...	1	1,63
K3-700.., K3-860.. without feeder group ²⁾	K3-860/ ...	1	2,44

Spare Feeder Groups for contactors K3-450.. to K3-860..

In case of changing control voltage,
change coil and feeder group too



For Contactors

Type	Coil voltage ¹⁾	Pack pcs.	Weight kg/pc.
110	110-120V 50/60Hz / 110V DC		
230	220-240V 50/60Hz / 220V DC		
400	380-415V 50/60Hz		
↓			
K3-450.., K3-550.. for coils	K3-550/FG ...	1	0,33
K3-700.., K3-860..	K3-860/FG ...	1	0,54

1) Coil voltage range and non-standard coil voltages see page 51

2) In case of changing control voltage, change coil and feeder group too

Spare Coils for DC operated contactors



Aux. Contact Block for double winding coil		Type	Coil voltage ¹⁾	Pack pcs.	Weight kg/pc.
		47.24	24V DC		
		47.110	110V DC		
		47.220	220V DC		
		↓			
For Contactors					
K3-07N..= up to K3-22N..=	HN01U	K10N/ ...		1	0,052
K3-07..= up to K3-22..=	HN01U	K3-6/ ...		1	0,042
K2-07..= up to K2-16..=	HN01U	K6/ ...		1	0,042
K3-24..= up to K3-40..=	HN01X	K24/ ...		1	0,090
K2-23..= up to K2-37..=	HN01X	K23/ ...		1	0,090
K3-50..= up to K3-74..=, K2-45..=, K2-60..=	HN01Z	K45/ ...		1	0,115
K65..=, K85..=	-	K85/ ...		1	0,220
K110..=	-	K110/ ...		1	0,225
		Type	Coil voltage ¹⁾		
		43.110	110V DC		
		43.220	220V DC		
		▼			
For Contactors					
K3-1000..=, K3-1200..=	without feeder group ²⁾	K3-1200/ ...		1	3,12

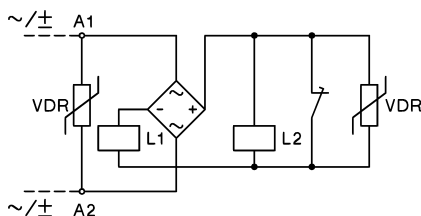
Wiring Diagrams for Coil Circuit

AC operated,

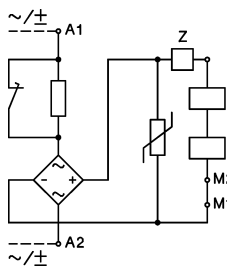
K3-07..
up to K110..



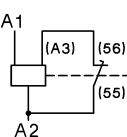
AC and DC operated
with double winding coil
K3-90A00, K3-115A00
K3-151A00, K3-176A00
K3-210A00 to K3-316A00



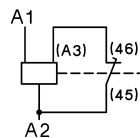
AC and DC operated
with series resistor
K3-450.. up to K3-860..



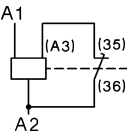
DC operated
with double winding coil
K3-07..
up to K3-22..=



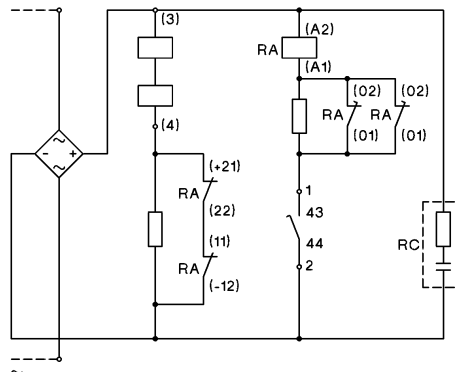
K3-24..
to
K3-74..=



K85..
K110..=

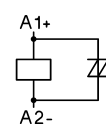


DC operated
with DC coil
K3-1000.., K3-1200..

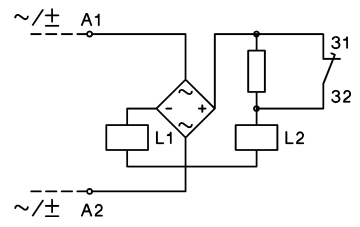


DC operated

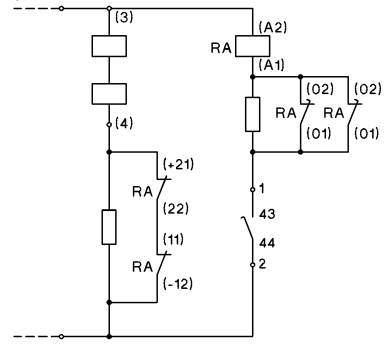
KG3..



AC and DC operated
with series resistor
K3-200A21
K3-315A21



AC operated
with DC coil
K3-1000.., K3-1200..



Adjustable dropout operating time for K3-450.. to K3-860..
150-200ms: Wiring see above (delivery standard)
500-1000ms: Jumper device "Z"
approx. 20ms: Special wiring see package folder

Contactor K3-1000.., K3-1200..
For control voltages up to 125V
NC contacts 21-22 and 11-12 are connected parallel,
for higher voltages contacts are connected in series (delivery standard).

1) Other coil voltages on request

2) In case of changing control voltage, change coil and feeder group too

Spare Contacts



Main Contacts for Contactors

	Type	Pack pcs.	Weight kg/pc.
K85..	EK85/1	3	0,235
K110..	EK110/1	3	0,275
K3-150..	EK3-150/10	1	0,32
K3-151..	EK3-151/10	1	0,16
K3-175..	EK3-175/10	1	0,32
K3-176..	EK3-176/10	1	0,16
K3-200..	EK3-200/10	1	0,18
K3-210..	EK3-210/10	1	
K3-260..	EK3-260/10	1	
K3-315..	EK3-315/10	1	0,34
K3-316..	EK3-316/10	1	
K3-450..	EK3-450/10	1	0,35
K3-550..	EK3-550/10	1	0,35
K3-700..	EK3-700/10	1	0,85
K3-860..	EK3-860/10	1	1,0
K3-1000..	EK3-1000/10	1	1,4
K3-1200..	EK3-1200/10	1	1,4

Contactors, Motor-Starter

Circuit Breakers

Manual Motor-Starters

Switches

motors with higher F.L.C., higher starting current and / or longer starting time, larger short-circuit fuses are required.
The maximum admissible value is dependent on the switchgear respectively thermal overload relay.

AC-Main Switches

DC-Switch Disconnect

Push Buttons

Representatives, Suppliers

Contactors

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

Main Contacts	Type	K(G)3-10	K(G)3-14	K(G)3-18	K(G)3-22	K(G)3-24	K(G)3-32	K(G)3-40	K3-50	K3-62	K3-74
Rated insulation voltage $U_i^{1)}$	V AC	690	690	690	690	690	690	690	690	690	690
Making capacity I_{eff} at $U_e = 690V$ AC	A	200	200	200	200	400	500	500	700	900	900
Breaking capacity I_{eff} 400V AC	A	180	180	200	200	380	400	400	600	800	800
K3-10 to K3-22 $\cos\phi = 0,65$ 500V AC	A	150	150	180	180	300	370	370	500	700	700
K3-24 to K3-1200 $\cos\phi = 0,35$ 690V AC	A	100	100	150	150	260	340	340	400	500	500
1000V AC	A	-	-	-	-	-	-	-	-	-	-
Utilization category AC1											
Switching of resistive load											
Rated operational current $I_e (=I_{th})$ at 40°C, open	690V A	25	25	32	32	50	65	80	110	120	130
Rated operational power of three-phase resistive loads 50-60Hz, $\cos\phi = 1$	220V kW	9,5	9,5	12,2	12,2	19,0	24,7	30,4	41,9	45,7	49,5
	230V kW	9,9	9,9	12,7	12,7	19,9	25,9	31,8	43,8	47,7	51,7
	240V kW	10,4	10,4	13,3	13,3	20,8	27,0	33,2	45,7	49,8	54,0
	380V kW	16,4	16,4	21,0	21,0	32,9	42,7	52,6	72,3	78,9	85,5
	400V kW	17,3	17,3	22,1	22,1	34,6	45,0	55,4	76,1	83,0	90,0
	415V kW	17,9	17,9	23,0	23,0	35,9	46,7	57,4	79,0	86,2	93,3
	440V kW	19,0	19,0	24,4	24,4	38,1	49,5	60,9	83,7	91,3	99,0
	500V kW	21,6	21,6	27,7	27,7	43,3	56,2	69,2	95,2	103,8	112,5
	660V kW	28,5	28,5	36,5	36,5	57,1	74,2	91,3	125,6	137,0	148,4
	690V kW	29,8	29,8	38,2	38,2	59,7	77,6	95,5	131,3	143,2	155,2
	1000V kW	-	-	-	-	-	-	-	-	-	-
Rated operational current $I_e (=I_{the})$ at 60°C, enclosed	690V A	25	25	32	32	40	55	65	90	100	110
Rated operational power of three-phase resistive loads 50-60Hz, $\cos\phi = 1$	220V kW	9,5	9,5	12,2	12,2	15,2	20,9	24,7	34,3	38,1	41,9
	230V kW	9,9	9,9	12,7	12,7	15,9	21,9	25,9	35,8	39,8	43,8
	240V kW	10,4	10,4	13,3	13,3	16,6	22,8	27,0	37,4	41,5	45,7
	380V kW	16,4	16,4	21,0	21,0	26,3	36,2	42,7	59,2	65,7	72,3
	400V kW	17,3	17,3	22,1	22,1	27,7	38,1	45,0	62,3	69,2	76,1
	415V kW	17,9	17,9	23,0	23,0	28,7	39,5	46,7	64,6	71,8	79,0
	440V kW	19,0	19,0	24,4	24,4	30,4	41,9	49,5	68,5	76,1	83,7
	500V kW	21,6	21,6	27,7	27,7	34,6	47,6	56,2	77,9	86,5	95,2
	660V kW	28,5	28,5	36,5	36,5	45,7	62,8	74,2	102,8	114,2	125,6
	690V kW	29,8	29,8	38,2	38,2	47,7	65,7	77,6	107,4	119,4	131,3
	1000V kW	-	-	-	-	-	-	-	-	-	-
Minimum cross-section of conductor at load with $I_e (=I_{th})$	mm ²	4	4	6	6	10	16	25	35	50	50
Utilization category AC2 and AC3											
Switching of three-phase motors											
Rated operational current I_e open and enclosed	220V A	12	15	18	22	24	30	40	50	63	74
	230V A	11,5	14,5	18	22	24	30	40	50	62	74
	240V A	11	14	18	22	24	32	40	50	62	74
	380-400V A	10	14	18	22	24	32	40	50	62	74
	415V A	9	14	18	22	23	30	40	50	62	74
	440V A	9	14	18	22	23	30	40	50	62	74
	500V A	7	9	9	9	17,5	21	21	33	42	42
	660-690V A	6,5	8,5	8,5	8,5	17	20	20	31	40	40
	1000V A	-	-	-	-	-	-	-	-	-	-
Rated operational power of three-phase motors 50-60Hz	220-230V kW	3	4	5	6	6	8,5	11	12,5	18,5	22
	240V kW	3	4	5	7	7	9	11,5	13,5	19	23
	380-400V kW	4	5,5	7,5	11	11	15	18,5	22	30	37
	415V kW	4,5	6	8,5	12	12	16	20	24	33	40
	440V kW	4,5	6	8,5	12	12	16	20	24	33	40
	500V kW	5,5	7,5	10	10	15	18,5	18,5	30	37	45
	660-690V kW	5,5	7,5	10	10	15	18,5	18,5	30	37	45
	1000V kW	-	-	-	-	-	-	-	-	-	-

1) Suitable at 690V for: earthed-neutral systems, overvoltage category I to IV, pollution degree 3 (standard-industry): $U_{imp} = 8kV$.
Data for other conditions on request.

Contactors

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

Type	K3-90	K3-115	K3-116	K3-151	K3-176	K3-210	K3-260	K3-316	K3-450	K3-550	K3-700	K3-860	K3-1000	K3-1200
V~	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	690	690	690	690
A	1100	1200	1200	1500	2000	2100	2600	3200	4500	5500	7000	8600	10000	12000
A	950	1100	1000	1200	1500	1600	2100	2600	4500	5500	7000	8000	8000	10000
A	850	1000	1000	1200	1500	1600	2100	2600	4500	5500	7000	8000	8000	10000
A	600	600	800	1000	800	1200	1900	2300	3200	4400	5600	6900	7000	8000
A	-	-	400	500	600	700	850	1000	-	-	-	-	-	-
A	160	200	200	230	250	350	450	500	700	760	1000	1100	1200	1350
kW	60	76	76	87	95	133	171	190	266	289	381	419	457	514
kW	63	79	79	91	99	139	179	199	279	302	398	438	478	537
kW	66	83	83	95	103	145	187	207	291	315	415	457	498	561
kW	105	131	131	151	164	230	296	329	460	500	658	724	789	888
kW	110	138	138	159	173	242	311	346	485	526	692	762	831	935
kW	115	143	143	165	179	251	323	359	503	546	718	790	862	970
kW	121	152	152	175	190	266	342	381	533	579	762	838	914	1028
kW	138	173	173	199	216	303	389	453	606	658	866	952	1039	1169
kW	182	228	228	262	285	400	514	571	800	868	1143	1257	1371	1543
kW	191	239	239	274	298	418	537	597	836	908	1195	1314	1434	1613
kW	221	277	216	318	346	433	546	606	692	866	-	-	-	-
A	145	170	170	180	200	280	360	400	550	600	800	875	960	1080
kW	55	64	64	68	76	106	137	152	209	228	304	333	365	411
kW	57	67	67	71	79	111	143	159	219	239	318	348	382	430
kW	59	70	70	74	83	116	150	166	228	249	332	363	399	448
kW	95	111	111	118	131	184	237	263	362	395	526	575	631	710
kW	100	117	117	124	138	193	249	277	381	415	554	606	665	748
kW	104	122	122	129	143	201	259	287	395	431	575	628	690	776
kW	110	129	129	137	152	213	274	304	419	457	609	666	731	823
kW	125	147	147	155	173	242	312	346	476	519	692	757	831	935
kW	165	194	194	205	228	320	412	457	628	685	914	1000	1097	1234
kW	173	202	202	215	239	334	430	478	657	717	956	1045	1147	1290
kW	166	187	216	277	346	388	499	554	692	866	-	-	-	-
mm ²	95	120	95	95	120	240	2x150	2x(30x6)	2x(40x5)	2x(50x5)	2x(60x5)	2x(60x6)	2x(60x6)	2x(60x8)
A	90	115	115	150	175	210	260	315	450	550	700	860	1000	1200
A	90	115	115	150	175	210	260	315	450	550	700	860	1000	1200
A	90	115	115	150	175	210	260	315	450	550	700	860	1000	1200
A	90	115	115	150	175	210	260	315	450	550	700	860	1000	1200
A	90	115	115	150	175	210	260	315	450	550	700	860	1000	1200
A	90	115	115	150	175	210	260	315	450	550	700	860	1000	1200
A	60	60	115	150	175	210	260	315	450	550	700	860	1000	1200
A	58	58	100	120	140	150	180	240	400	500	630	700	860	1000
A	58	58	45	60	70	85	100	125	200	250	-	-	-	-
kW	25	33	30	40	50	60	75	90	132	175	225	280	325	390
kW	27	35	35	45	55	65	80	100	140	185	235	290	335	400
kW	45	55	55	75	90	110	132	160	250	300	400	500	580	680
kW	49	63	59	80	95	115	140	180	257	315	415	515	600	710
kW	49	63	63	85	100	125	150	190	270	335	450	530	630	750
kW	55	55	75	90	100	132	160	210	300	375	500	600	720	850
kW	55	55	90	110	132	132	160	210	375	500	630	700	850	1000
kW	55	55	55	75	90	110	132	160	280	355	-	-	-	-

Contactors

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

Main Contacts	Type	K(G)3-10	K(G)3-14	K(G)3-18	K(G)3-22	K(G)3-24	K(G)3-32	K(G)3-40	K3-50	K3-62	K3-74
Utilization category AC4											
Switching of squirrel cage motors, inching											
Rated operational current I_e											
open and enclosed	220V A	12	15	18	18	24	30	40	50	63	63
	230V A	11,5	14,5	18	18	24	30	40	50	62	62
	240V A	11	14	18	18	24	32	40	50	62	62
	380-400V A	10	14	18	18	24	32	40	50	62	62
	415V A	9	14	18	18	23	30	37	45	60	60
	440V A	9	14	18	18	23	30	37	45	55	55
	500V A	9	12	16	16	17,5	21	21	33	42	42
	660V A	7	9	9	9	17	20	20	31	40	40
	690V A	6,5	8,5	8,5	8,5	17	20	20	31	40	40
	1000V A	-	-	-	-	-	-	-	-	-	-
Rated operational power of three-phase motors 50-60Hz	220-230V kW	3	4	5	5	6	8,5	11	12,5	18,5	18,5
	240V kW	3	4	5	5	7	9	11,5	13,5	19	19
	380-400V kW	4	5,5	7,5	7,5	11	15	18,5	22	30	30
	415V kW	4,5	6	8,5	8,5	12	16	20	24	33	33
	440V kW	4,5	6	8,5	8,5	12	16	20	24	33	33
	500V kW	5,5	7,5	10	10	15	18,5	18,5	30	37	37
	660-690V kW	5,5	7,5	10	10	15	18,5	18,5	30	37	37
	1000V kW	-	-	-	-	-	-	-	-	-	-
Utilization category AC5a											
Switching of gas discharge lamps											
Rated operational current I_e per pole at 220/230V											
Fluorescent lamps, uncompensated and serial compensated											
parallel compensated	A	20	20	25	25	40	52	64	88	96	104
dual-connection	A	7	9	9	9	18	22	22	30	40	45
	A	22,5	22,5	28	28	45	58	72	98	108	117
Metal halide lamps ¹⁾ , uncompensated											
parallel compensated	A	12	15	19	19	30	39	48	66	72	78
	A	7	9	9	9	18	22	22	30	40	45
Mercury-vapour lamps ²⁾ , uncompensated											
parallel compensated	A	22,5	25	28	28	45	58	72	99	108	117
	A	7	9	9	9	18	22	22	30	40	45
Mixed light lamps ³⁾											
	A	20	20	25	25	40	52	64	88	96	104
LED-Lamps											
consider the inrush current of the lamp ballast and $\cos\phi$ of the lamp											
max. lamps per pole ($I_{nLED} \leq I_{th}$)						= $\frac{\text{inrush current of contactor}}{\text{inrush current of lamp/EVG}}$					
max inrush current of contactor	A	282	282	282	282	564	705	705	987	1269	1268
Utilization category AC5b											
Switching of incandescent lamps⁴⁾											
Rated operational current I_e per pole at 220/230V	A	12,5	12,5	12,5	12,5	25	31	31	43	56	56

1) Metal halide lamps and sodium-vapour lamps (high- and low-pressure lamps)

2) High-pressure lamps

3) Blended lamps, containing a mercury high-pressure unit and a tungsten helix in a fluorescent glass bulb (daylight lamps)

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

Contactors

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

Type	K3-90	K3-115	K3-151	K3-176	K3-210	K3-260	K3-316	K3-450	K3-550	K3-700	K3-860	K3-1000	K3-1200
A	85	98	55	63	85	100	120	150	180	230	280	340	400
A	85	98	55	63	85	100	120	150	180	230	280	340	400
A	85	98	55	63	85	100	120	150	180	230	280	340	400
A	85	85	55	63	85	100	120	150	180	230	280	340	400
A	85	85	55	63	85	100	120	150	180	230	280	340	400
A	85	85	55	63	85	100	120	150	180	230	280	340	400
A	85	85	-	-	-	-	-	-	-	-	-	-	-
A	60	60	-	-	-	-	-	-	-	-	-	-	-
A	57,5	57,5	-	-	-	-	-	-	-	-	-	-	-
A	-	-	-	-	-	-	-	-	-	-	-	-	-
kW	25	30	15	18,5	25	30	37	45	51	68	80	110	132
kW	27	32	15,5	19	26	31	38	47	53	71	83	115	137
kW	45	45	25	30	45	55	63	75	90	120	150	185	220
kW	49	49	25	33	45	55	65	80	100	132	160	200	230
kW	49	49	30	34	48	55	67	85	100	132	160	200	230
kW	55	55	25	30	55	65	75	100	110	150	185	220	257
kW	55	55	25	30	55	65	75	100	110	150	185	220	257
kW	-	-	-	-	-	-	-	-	-	-	-	-	-
A	100	120	120	140	180	220	280	360	450	570	700	850	1000
A	55	70	85	100	130	160	200	300	360	460	550	660	800
A	112	144	120	140	180	220	280	360	450	570	700	850	1000
A	85	90	95	110	140	180	230	300	380	490	610	750	890
A	55	70	75	85	110	140	170	260	300	400	480	580	700
A	112	144	120	140	180	220	280	360	450	570	700	850	1000
A	55	70	75	85	110	140	170	260	300	400	480	580	700
A	100	120	100	120	160	200	250	320	400	500	600	700	800
	max. lamps per pole ($I_{nLED} \leq I_{th}$) = inrush current of contactor inrush current of lamp/EVG												
A	1551	1692	2115	2820	2961	3666	4512	6345	7755	9870	12126	14100	16920
A	69	75	100	120	160	190	220	260	315	440	500	560	630

Contactors

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

Main Contacts			Type	K(G)3-10	K(G)3-14	K(G)3-18	K(G)3-22	K(G)3-24	K(G)3-32	K(G)3-40	K3-50	K3-62	K3-74
Utilization category AC6a													
Transformer primary switching													
at inrush	n			30	30	30	30	30	30	30	30	30	30
Rated operational current I _e	400V	A		4,5	5,5	7,5	7,5	10,5	13,5	13,5	20	27	33
Rated operational power dependent on inrush n	220-230V	kVA		1,8	2,2	3	3	4,2	5,4	5,4	8	10,7	13
	240V	kVA		1,9	2,3	3,1	3,1	4,3	5,6	5,6	8,3	11,2	13,5
	380-400V	kVA		3,1	3,8	5,2	5,2	7,3	9,3	9,3	13,5	18,5	22,5
For different inrush-factors x use the following formula: Px=Pn*(n/x)	415-440V	kVA		3,4	4,2	5,7	5,7	8	10,2	10,2	15	20,5	25
	500V	kVA		3,9	4,8	6,5	6,5	9	11,5	11,5	17	23	28
	660-690V	kVA		5,4	6,5	9	9	12,5	16	16	24	32	39
Utilization category AC6b													
Switching of three-phase capacitors													
Maximum inrush current (peak value) as multiple k of the capacitor rated current				k									
Rated operational current I _e	500V	A		35	25	20	20	25	25	25	25	25	20
Rated operational power (sinφ→1)	220-230V	kVAr		8	12	15,5	15,5	23	32	32	45	60	70
	240V	kVAr											
	380-400V	kVAr											
For different multiples x use the following formula: Px=Pk*(k/x)	415-440V	kVAr		3	4,5	6	6	8,5	12	12	17	24	28
	500V	kVAr		3,5	5	6,5	6,5	9,5	13	13	18,5	25	29
	660-690V	kVAr		5	7,5	10	10	15	20	20	29	39	46
For different multiples x use the following formula: Px=Pk*(k/x)	415-440V	kVAr		5,5	8	11	11	16	22	22	32	43	50
	500V	kVAr		7	10	13	13	20	26	26	39	50	58
	660-690V	kVAr		7	10	13	13	20	26	26	40	50	58
Switching of reactive capacitor banks													
Rated operational current I _e	690V	A		8	13	18	20	28	36	42	48	72	108 ¹⁾
Rated operational power	220-230V	kVAr		2,9	5	7	7,5	11	14	16	20	28	33
	240V	kVAr		3,1	5,4	7	8	11	14	17	20	28	36
	380-400V	kVAr		5	9	12,5	13	20	25	27,5	33,3	50	75 ¹⁾
	415-440V	kVAr		5,5	9,5	13	14	22	27	30	36	53	75 ¹⁾
	500V	kVAr		6	11	15	17	25	30	36	40	60	75
	660-690V	kVAr		8	15	20	22	33	41	48	55	82	100
	1000V	kVAr		-	-	-	-	-	-	-	-	-	-
Utilization category DC1													
Switching of resistive load													
Time constant L/R ≤1ms													
Rated operational current I _e	1 pole	24V	A	20	25	32	32	50	65	80	110	120	130
		60V	A	20	25	32	32	50	65	80	110	120	130
		110V	A	6	6	6	6	10	10	10	12	12	12
		220V	A	0,8	0,8	0,8	0,8	1,4	1,4	1,4	1,4	1,4	1,4
3 poles in series	24V	A	20	25	32	32	50	65	80	110	120	130	
		A	20	25	32	32	50	65	80	110	120	130	
		A	20	25	32	32	50	65	80	110	120	130	
		A	16	20	20	20	30	35	35	63	80	80	
Utilization category DC3 and DC5													
Switching of shunt motors and series motors													
Time constant L/R ≤15ms													
Rated operational current I _e	1 pole	24V	A	20	25	32	32	50	65	80	110	120	130
		60V	A	6	6	6	6	30	30	30	60	60	60
		110V	A	1,2	1,2	1,2	1,2	1,8	1,8	1,8	1,8	1,8	1,8
		220V	A	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,25	0,25	0,25
3 poles in series	24V	A	20	25	32	32	50	65	80	110	120	130	
		A	20	25	32	32	40	40	40	80	80	80	
		A	20	20	20	20	40	40	40	80	80	80	
		A	2,5	2,5	2,5	2,5	4	4	4	5	5	5	

1) Consider resistive load (I_{th}). see page 56

Contactors

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

Type	K3-90	K3-115	K3-151	K3-176	K3-210	K3-260	K3-316	K3-450	K3-550	K3-700	K3-860	K3-1000	K3-1200
n	30	30	30	30	30	30	30	30	30	30	30	30	30
A	38	50	65	80	90	120	142	203	248	315	390	450	540
kVA	15	20	25	30	34	45	54	77	95	120	148	170	200
kVA	15,5	20,5	27	33	37	50	59	80	100	130	160	185	220
kVA	26	34	45	55	60	80	95	140	170	210	270	310	370
kVA	29	38	46	57	63	85	100	145	175	220	280	320	380
kVA	33	43	55	69	75	100	120	170	210	270	330	380	460
kVA	45	60	56	69	100	135	160	200	250	320	350	500	600
k	20	20	20	20	25	20	20	20	20	20	20	20	20
A	87	100	120	155	195	225	255	300	370	440	520	680	760
kVAr	33	38	45	60	75	90	100	115	145	170	200	260	290
kVAr	36	42	52	62	78	94	104	120	150	175	205	270	300
kVAr	57	65	80	100	130	155	170	200	250	300	350	450	500
kVAr	60	70	95	110	135	165	175	210	260	310	360	465	520
kVAr	70	80	100	130	170	194	220	260	320	380	450	590	660
kVAr	70	80	100	130	170	194	220	260	320	380	450	590	660
A	115	144	115	140	200	225	250	330	420	550	600	680	760
kVAr	45	55	43	53	76	85	95	125	160	209	228	260	290
kVAr	45	55	45	55	80	90	100	130	170	220	240	280	310
kVAr	80	100	75	90	130	145	160	210	270	350	390	440	480
kVAr	100	120	80	100	140	160	170	230	290	380	420	470	530
kVAr	105	125	95	120	170	190	210	280	350	450	500	570	640
kVAr	120	148	125	150	200	230	260	350	450	600	650	700	800
kVAr	160	200	155	200	300	340	400	500	650	-	-	-	-
A	160	200	-	-	-	-	-	-	-	-	-	-	-
A	160	200	-	-	-	-	-	-	-	-	-	-	-
A	20	25	-	-	-	-	-	-	-	-	-	-	-
A	2	2,5	-	-	-	-	-	-	-	-	-	-	-
A	160	200	200	250	350	400	450	600	760	1000	1100	1200	1350
A	160	200	200	250	350	400	450	600	760	1000	1100	1200	1350
A	160	200	150	170	250	280	315	400	480	560	630	800	900
A	100	160	80	100	150	180	200	250	315	400	450	500	600
A	160	200	-	-	-	-	-	-	-	-	-	-	-
A	85	110	-	-	-	-	-	-	-	-	-	-	-
A	2	2,5	-	-	-	-	-	-	-	-	-	-	-
A	0,5	0,5	-	-	-	-	-	-	-	-	-	-	-
A	160	200	-	-	-	-	-	-	-	-	-	-	-
A	100	110	-	-	-	-	-	-	-	-	-	-	-
A	100	110	-	-	-	-	-	-	-	-	-	-	-
A	7	8	-	-	-	-	-	-	-	-	-	-	-

Contactors

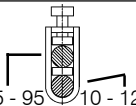
Data according to IEC 947-4-1, EN 60947-4-1, VDE 0660

Main Contacts			Type	K(G)3-10	K(G)3-14	K(G)3-18	K(G)3-22	K(G)3-24	K(G)3-32	K(G)3-40	K3-50	K3-62	K3-74
Maximum ambient temperature													
Operation	open	°C						-40 to +60 (+90) ¹⁾					
	enclosed	°C						-40 to +40					
with thermal overload relay	open	°C						-25 to +60					
	enclosed	°C						-25 to +40					
Storage			°C					-50 to +90					
Short circuit protection													
for contactors without thermal overload relay													
Coordination-type "1" according to IEC 947-4-1													
Contact welding without hazard of persons													
max. fuse size	gL (gG)	A		63	63	63	63	80	80	80	160	160	160
Coordination-type "2" according to IEC 947-4-1													
Light contact welding accepted													
max. fuse size	gL (gG)	A		25	35	35	35	50	50	50	100	125	125
Contact welding not accepted													
max. fuse size	gL (gG)	A		16	16	16	16	25	35	35	50	63	63
For contactors with thermal overload relay the device with the smaller admissible backup fuse (contactor or thermal overload relay) determines the fuse size.													
Cable cross-sections													
for contactors without thermal overload relay													
1 cable per clamp													
main connector	solid or stranded	mm ²											
	flexible	mm ²		0,75 - 6 1 - 4				1,5 - 25 2,5 - 16			4 - 50 10 - 35		
flexible with multicore cable end			mm ²	0,75 - 4				1,5 - 16			6 - 35		
2 cables per clamp													
	solid or stranded	mm ²		6+(1-6) / 4+(0,75-4) 2,5+(0,75-2,5) / 1,5+(0,75-1,5)				16+(2,5-16) / 10+(4-16) 6+(4-16) / 4+(2,5-16)			50+4 / 35+6 / 25+(6-16) 16+(6-16) / 10+(6-16)		
	flexible	mm ²		6+(1,5-4) / 4+(1-4) 2,5+(0,75-2,5) / 1,5+(0,75-1,5)				16+(2,5-6) / 10+(4-10) 6+(4-16) / 4+(2,5-16)			50+(4-10) / 35+(4-16) 25+(4-25) / 16+(4-16)		
1 cable per clamp													
main connector	solid	AWG		18 - 10				16 - 10			12 - 10		
	flexible	AWG		18 - 10				14 - 4			10 - 0		
2 cables per clamp													
	solid	AWG		10+(16-10) / 12+(18-12) 14+(18-14) / 16+(18-16)				10+(16-10) / 12+(18-12) 14+(18-14) / 16+(18-16)			10+(12-10) / 12+12		
	flexible	AWG		10+(14-10) / 12+(18-12) 14+(18-14) / 16+(18-16)				4+(18-12) / 6+(18-8) 8+(18-8) / 10+(18-12)			1+(12-10) / 2+(8-12) 3+(12-8) / 4+(10-6)		
Frequency of operations z													
Contactors without thermal overload relay													
	without load	1/h		10000				7000			7000		
	AC3, I _e	1/h		600				600			400		
	AC4, I _e	1/h		120				120			120		
	DC3, I _e	1/h		600				600			400		
Mechanical life													
AC operated	S x 10 ⁶			10				10			10		
DC operated	S x 10 ⁶			10				10			10		
DC-solenoid operated (KG3)	S x 10 ⁶			50				50			-		
Short time current													
	10s-current	A		96	120	144	176	184	240	296	450	504	592
	120s-current	A		42	52	58	66	80	97	110	195	203	222
Power loss per pole													
contact resistance	at I _e /AC3 400V	W		0,21	0,35	0,5	0,75	0,7	1,3	2	2,2	3,9	5,5
		mOhm		2,1	1,8	1,5	1,5	1,2	1,2	1,2	1	1	1
Resistance to shock acc. to IEC 68-2-27													
Shock time 20ms sine-wave	NO	g		10	10	10	10	8	8	8	8	8	8
	NC	g		6	6	6	6	-	-	-	-	-	-

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

Contactors

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

Type	K3-90	K3-115	K3-116	K3-151	K3-176	K3-210	K3-260	K3-316	K3-450	K3-550	K3-700	K3-860	K3-1000	K3-1200
°C	-40 to +60 (+90) ¹⁾ -40 to +40 -25 to +60 -25 to +40 -50 to +90		-25 to +55 (+70) ²⁾ -25 to +40 -25 to +55 -25 to +40 -55 to +80											
°C														
°C														
°C														
°C														
A	250	250	200	250	315	400	450	500	630	630	800	1000	1000	1250
A	160	200	160	200	250	315	400	400	500	560	-	-	-	-
A	100	125	125	160	200	250	315	-	-	-	-	-	-	-
mm ² mm ² mm ²	 0,5 - 95 10 - 120 0,5 - 70 25 - 95 0,5 - 70 10 - 95		 busbar 18 x 4 screw M8		 busbar 25 x 6 screw M10		 busbar 30 x 5 screw M12	 busbar 40 x 6 screw M12	 busbar 50 x 8 screw M12	 busbar 50 x 8 screw M14	 busbar 50 x 10 screw 2 x M12			
mm ² mm ² mm ²	0,5 - 95 + 10 - 120 0,5 - 70 + 25 - 95													
AWG AWG	18 - 10 18 - 3/0	- 8 - 4/0												
AWG	-													
AWG	18 - 3/0 + 8 - 4/0													
1/h 1/h 1/h 1/h	3000 300 120 300		1200 - - -			1200 - - -			1200 - - -			300 - - -		
S x 10 ⁶ S x 10 ⁶ S x 10 ⁶	5 5 -		10 10 -			5 5 -			5 5 -			5 ³⁾ 5 ³⁾ -		
A A	680 275	880 330	920 410	1200 500	1400 575	1800 800	2200 900	2600 1000	3600 1400	4400 1750	5600 2200	6900 2600	8000 3000	9600 3600
W mOhm	4,8 0,6	7,9 0,5	7,9 0,5	9 0,4	11 0,35	8 0,18	11 0,16	14,9 0,15	26,3	33,3	49	59,2	60	72
g g	7 5	7 5	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

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

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

3) After each 1x10⁶ operations magnetic core and built-in auxiliary contact block must be changed

Contactors

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

Auxiliary Contacts			Type	K(G)3-10	K(G)3-14	K(G)3-18	K(G)3-22	K(G)3-24	K(G)3-32	K(G)3-40	K3-50	K3-62	K3-74
Rated insulation voltage U_i ¹⁾			V~	690				-			-		
Thermal rated current I_{th} to 690V													
Ambient temperature	40°C	A		10				(16) ⁵⁾			-		
	60°C	A		6				(12) ⁵⁾			-		
Utilization category AC15													
Rated operational current I_e	220-240V	A		3				(12) ⁵⁾			-		
	380-415V	A		2				(4) ⁵⁾			-		
	440V	A		1,6				(4) ⁵⁾			-		
	500V	A		1,2				(3) ⁵⁾			-		
	660-690V	A		0,6				(1) ⁵⁾			-		
Utilization category DC13													
Rated operational current I_e	60V	A		3,5				(8) ⁵⁾			-		
	110V	A		0,5				(1) ⁵⁾			-		
	220V	A		0,1							-		
Short circuit protection short-circuit current 1kA, contact welding not accepted max. fuse size			gL (gG) A	20 (25) ⁵⁾				-			-		
Control Circuit Power consumption of coils													
AC operated	inrush	VA		33-45				90-115			140-165		
	sealed	VA		7-10				9-13			13-18		
		W		2,6-3				2,7-4			5,4-7		
DC operated	inrush	W		75				140			200		
	double winding coil	sealed W		2				2			6		
DC solenoid operated (KG3)	inrush	W		3				4			-		
	sealed	W		3				4			-		
Operation range of coils in multiples of control voltage U_s													
	AC operated			0,85-1,1				0,85-1,1			0,85-1,1		
	DC operated			0,8-1,1				0,8-1,1			0,8-1,1		
Switching time at control voltage $U_s \pm 10\%$ ^{2) 3)}													
AC operated	make time	ms		8-16				10-25			12-28		
	release time	ms		5-13				8-15			8-15		
	arc duration	ms		10-15				10-15			10-15		
DC operated	make time	ms		8-12				10-20			12-23		
	release time	ms		8-13				10-15			10-18		
	arc duration	ms		10-15				10-15			10-15		
DC solenoid operated (KG3)	make time	ms		65 - 85				65 - 85			-		
	release time	ms		20 - 30 ⁴⁾				20 - 30 ⁴⁾			-		
	arc duration	ms		10-15				10-15			-		
Cable cross-section													
Auxiliary connector	solid	mm ²		0,75-6				-			-		
	flexible	mm ²		1-4				-			-		
	flexible with multicore cable end	mm ²		0,75-4				-			-		
Magnet coil	solid	mm ²		0,75-2,5				0,75-2,5			0,75-2,5		
	flexible	mm ²		0,5-2,5				0,5-2,5			0,5-2,5		
	flexible with multicore cable end	mm ²		0,5-1,5				0,5-1,5			0,5-1,5		
Clamps per pole				2				2			2		
Auxiliary connector	solid	AWG		18 - 10				-			-		
	flexible	AWG		18 - 10				-			-		
Magnet coil	solid	AWG		14 - 12				14 - 12			14 - 12		
	flexible	AWG		18 - 12				18 - 12			18 - 12		
Clamps per pole				2				2			2		

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

2) Total breaking time = release time + arc duration

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

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

Contactors

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

Type	K3-90	K3-115	K3-116	K3-151	K3-176	K3-210	K3-260	K3-316	K3-450	K3-550	K3-700	K3-860	K3-1000	K3-1200
V~	-			-		-			690		690		690	
A	-			-		-			10		10		10	
A	-			-		-			-		-		-	-
-	-			-		-			-		-		-	-
A	-			-		-			3		3		3	
A	-			-		-			2		2		2	
A	-			-		-			1,5		1,5		1,5	
A	-			-		-			1,5		1,5		1,5	
A	-			-		-			1		1		1	
A	-			-		-			-		-		-	
A	-			-		-			1		1		1	
A	-			-		-			0,5		0,5		0,5	
A	-			-		-			10		10		10	
VA	165-220			350		360			800-950		1350-1600		2400	
VA	2,5-5			5		5			9-11		21-25		70	
W	2,5-5			5		5			9-11		21-25		70	
W	250			350		360			700-850		1300-1550		2100	
W	5			5		5			8-10		18-22		60	
W	-			-		-			-		-		-	
W	-			-		-			-		-		-	
ms	0,85-1,1 0,8-1,1			0,85-1,1 0,85-1,1		0,85-1,1 0,85-1,1			0,85-1,1 0,85-1,1				0,85-1,1 0,85-1,1	
ms	20-35			30-60		40-60			50-100				50-100	
ms	35-50			30-80		15-45			150-200 / 500-1000 ¹⁾				25-50	
ms	10-15			-		-			-				-	
ms	20-35			30-60		40-60			-				-	
ms	35-50			30-80		15-45			-				-	
ms	10-15			-		-			-				-	
ms	-			-		-			-				-	
ms	-			-		-			-				-	
ms	-			-		-			-				-	
mm ²	-			-		-			0,75-2,5				0,75-2,5	
mm ²	-			-		-			0,75-2,5				0,75-2,5	
mm ²	-			-		-			-				-	
mm ²	0,75-2,5			1-2,5		1-2,5			1-2,5				1-2,5	
mm ²	0,5-2,5			1-2,5		1-2,5			1-2,5				1-2,5	
mm ²	0,5-1,5			-		-			-				-	
	2			2		2			2				2	
AWG	-			-		-			16 - 12				16 - 12	
AWG	-			-		-			16 - 12				16 - 12	
AWG	14 - 12			16 - 12		16 - 12			16 - 12				16 - 12	
AWG	18 - 12			16 - 12		16 - 12			16 - 12				16 - 12	
	2			2		2			2				2	

1) Normal or delayed drop is adjustable

Contactors

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

Main Contacts	Type	K2-09	K2-12	K2-16	K2-23	K2-30	K2-37	K2-45	K2-60	K85	K110
Rated insulation voltage $U_i^{(1)}$	V~	690	690	690	690	690	690	690	690	750	750
Making capacity I_{eff} at $U_e = 690V$ AC	A	200	200	200	400	500	500	700	900	1100	1200
Breaking capacity I_{eff} 400V~	A	180	180	200	380	400	400	600	800	950	1100
K2-09 to K2-16 $\cos\phi = 0,65$ 500V AC	A	150	150	180	300	370	370	500	700	850	1100
K2-23 to K3-1200 $\cos\phi = 0,35$ 690V AC	A	100	100	150	260	340	340	400	500	600	600
1000V~	A	-	-	-	-	-	-	-	-	-	-
Utilization category AC1											
Switching of resistive load											
Rated operational current $I_e (=I_{th})$ at 40°C, open	A	25	25	25	45	50	50	80	100	150	170
Rated operational power of three-phase resistive loads 50-60Hz, $\cos\phi = 1$	220V kW	9,5	9,5	9,5	17	19	19	30	38	57	64
	230V kW	10	10	10	18	20	20	31,5	40	59	67
	240V kW	10,5	10,5	10,5	18,5	20,5	20,5	33	41	62	70
	380V kW	16,5	16,5	16,5	29,5	33	33	52	65	98	111
	400V kW	17,5	17,5	17,5	31	34,5	34,5	55	69	103	117
	415V kW	18	18	18	32	36	36	57	71	107	122
	440V kW	19	19	19	34	38	38	61	76	114	129
	500V kW	21,5	21,5	21,5	39	43	43	69	86	130	147
	660V kW	28,5	28,5	28,5	51	57	57	91	114	171	194
	690V kW	29,5	29,5	29,5	53,5	60	60	95	119	179	203
Rated operational current $I_e (=I_{the})$ at 60°C, enclosed	A	20	25	25	35	40	40	63	80	100	125
Rated operational power of three-phase resistive loads 50-60Hz, $\cos\phi = 1$	220V kW	7,5	9,5	9,5	13	15	15	24	30	38	47
	230V kW	8	10	10	13,5	16	16	25	31,5	40	49
	240V kW	8	10,5	10,5	14,5	16,5	16,5	26	33	41	52
	380V kW	13	16,5	16,5	23	26	26	41	52	65	82
	400V kW	13,5	17,5	17,5	24	27,5	27,5	43	55	69	86
	415V kW	14	18	18	25	28,5	28,5	45	57	71	89
	440V kW	15	19	19	26,5	30	30	48	61	71	95
	500V kW	17	21,5	21,5	30	34	34	54	69	86	116
	660V kW	22,5	28,5	28,5	40	45	45	72	91	114	142
	690V kW	23,5	29,5	29,5	42	48	48	75	95	119	149
Minimum cross-section of conductor at load with $I_e (=I_{th})$	mm²	4	4	4	10	10	10	25	35	50	70
Utilization category AC2 and AC3											
Switching of three-phase motors											
Rated operational current I_e open and enclosed	220V A	12	15	18	23	30	37	45	63	85	110
	230V A	11,5	14,5	17,5	23	30	37	45	61	85	110
	240V A	11	14	17	23	30	37	45	60	85	110
	380-400V A	10	12	16	23	30	37	45	60	85	110
	415-440V A	9	12	16	23	30	37	45	60	85	110
	500V A	9	12	16	23	30	30	45	55	85	110
	660V A	7	9	9	17,5	21	21	33	42	60	60
	690V A	6,5	8,5	8,5	17	20	20	31	40	58	58
Rated operational power of three-phase motors 50-60Hz	220-230V kW	3	4	5	6	8,5	11	12,5	18,5	25	33
	240V kW	3	4	5	7	9	11,5	13,5	19	27	35
	380-400V kW	4	5,5	7,5	11	15	18,5	22	30	45	55
	415V kW	4,5	6	8,5	12	16	20	24	33	49	63
	440V kW	4,5	6	8,5	12	16	20	24	33	49	63
	500V kW	5,5	7,5	10	15	18,5	18,5	30	37	55	55
	660-690V kW	5,5	7,5	7,5	15	18,5	18,5	30	37	55	55

1) Suitable at 690V for: earthed-neutral systems, overvoltage category I to IV, pollution degree 3 (standard-industry): $U_{imp} = 8kV$.
Data for other conditions on request.

Contactors

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

Main Contacts	Type	K2-09	K2-12	K2-16	K2-23	K2-30	K2-37	K2-45	K2-60	K85	K110
Utilization category AC4											
Switching of squirrel cage motors, inching											
Rated operational current I_e	220V A	12	15	16	23	30	37	45	63	85	98
open and enclosed	230V A	11,5	14,5	16	23	30	37	45	61	85	98
	240V A	11	14	16	23	30	37	45	60	85	98
	380-400V A	10	12	16	23	30	37	45	60	85	85
	415V A	9	12	16	21	28	37	45	60	85	85
	440V A	9	12	16	21	28	37	45	60	85	85
	500V A	9	12	16	17	23	23	45	55	85	85
	660V A	7	9	9	13	17	17	33	42	60	60
	690V A	6,5	8,5	8,5	12,5	16,5	16,5	31	40	57,5	57,5
Rated operational power of three-phase motors 50-60Hz	220-230V kW	3	4	5	6	8,5	11	12,5	18,5	25	30
	240V kW	3	4	5	7	9	11,5	13,5	19	27	32
	380-400V kW	4	5,5	7,5	11	15	18,5	22	30	45	45
	415-440V kW	4,5	6	8,5	11	15	20	24	33	49	49
	500V kW	5,5	7,5	10	11	15	15	30	37	55	55
	660-690V kW	5,5	7,5	7,5	11	15	15	30	37	55	55
Utilization category AC5a											
Switching of gas discharge lamps											
Rated operational current I_e per pole at 220/230V											
Fluorescent lamps, uncompensated	A	20	20	20	35	40	40	65	85	100	120
Fluorescent lamps, compensated	A	7	9	9	18	22	22	30	40	55	70
Fluorescent lamps, dual-connection	A	22,5	22,5	22,5	41	45	45	72	90	112	144
Metal-halide lamps ¹⁾ , uncompensated	A	12	15	15	28	30	30	50	62	85	90
Metal-halide lamps ¹⁾ , compensated	A	7	9	9	18	22	22	30	40	55	70
Mercury-vapour lamps ²⁾ , uncompensated	A	22,5	25	25	41	45	45	72	90	112	144
Mercury-vapour lamps ²⁾ , compensated	A	7	9	9	18	22	22	30	40	55	70
Mixed light lamps ³⁾	A	20	20	20	35	40	40	65	85	100	120
Utilization category AC5b											
Switching of incandescent lamps⁴⁾											
Rated operational current I_e per pole at 220/230V											
	A	12,5	12,5	12,5	25	31	31	43	56	69	75
Utilization category AC6a											
Transformer primary switching											
at inrush											
Rated operational current I_e	400V n A	30	30	30	30	30	30	30	30	30	30
		4,5	5,5	7,5	10,5	13,5	13,5	20	27	38	50
Rated operational power dependent on inrush n	220-230V kVA	1,8	2,2	3	4,2	5,4	5,4	8	10,7	15	20
	240V kVA	1,9	2,3	3,1	4,3	5,6	5,6	8,3	11,2	15,5	20,5
	380-400V kVA	3,1	3,8	5,2	7,3	9,3	9,3	13,5	18,5	26	34
For different inrush-factors x use the following formula: $P_x = P_n \cdot (n/x)$	415-440V kVA	3,4	4,2	5,7	8	10,2	10,2	15	20,5	29	38
	500V kVA	3,9	4,8	6,5	9	11,5	11,5	17	23	33	43
	660-690V kVA	5,4	6,5	9	12,5	16	16	24	32	45	60
Utilization category DC1											
Switching of resistive load											
Time constant $L/R \leq 1\text{ms}$											
Rated operational current I_e	1 pole 24V A	20	25	25	45	50	50	80	100	150	170
	60V A	20	25	25	45	50	50	80	100	150	170
	110V A	6	6	6	10	10	10	12	12	20	25
	220V A	0,8	0,8	0,8	1,4	1,4	1,4	1,4	1,4	2	2,5
	3 poles in series 24V A	20	25	25	45	50	50	80	100	150	170
	60V A	20	25	25	45	50	50	80	100	150	170
	110V A	20	25	25	45	50	50	80	100	150	170
	220V A	16	20	20	30	35	35	63	80	100	160

1) Metal halide lamps and sodium-vapour lamps (high- and low-pressure lamps)

2) High-pressure lamps

3) Blended lamps, containing a mercury high-pressure unit and a tungsten helix in a fluorescent glass bulb (daylight lamps)

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

5) With central compensation pay attention to the current inrush (capacitor switching contactors)

Contactors

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

Main Contacts			Type	K2-09	K2-12	K2-16	K2-23	K2-30	K2-37	K2-45	K2-60	K85	K110			
Utilization category DC3 and DC5 Switching of shunt motors and series motors Time constant L/R ≤15ms Rated operational current I _e				1 pole	24V	A	20	25	25	45	50	50	80	100	150	170
					60V	A	6	6	6	30	30	30	60	60	85	110
					110V	A	1,2	1,2	1,2	1,8	1,8	1,8	1,8	1,8	2	2,5
					220V	A	0,2	0,2	0,2	0,2	0,2	0,2	0,25	0,25	0,5	0,5
				3 poles in series	24V	A	20	25	25	45	50	50	80	100	150	170
					60V	A	20	25	25	40	40	40	80	80	100	110
	110V	A	20	20	20	40	40	40	80	80	100	110				
	220V	A	2,5	2,5	2,5	4	4	4	5	5	7	8				
Maximum ambient temperature																
Operation				open	°C	-40 to +60 (+90) ¹⁾										
				enclosed	°C											
with thermal overload relay				open	°C	-40 to +40 -25 to +60 -25 to +40										
enclosed					°C											
Storage					°C	-50 to +90										
Short circuit protection for contactors without thermal overload relay																
Coordination-type "1" according to IEC 947-4-1																
Contact welding without hazard of persons																
max. fuse size				gL (gG)	A	63	63	63	80	80	80	160	160	250	250	
Coordination-type "2" according to IEC 947-4-1																
Light contact welding accepted																
max. fuse size				gL (gG)	A	25	35	35	50	50	50	100	125	160	200	
Contact welding not accepted																
max. fuse size				gL (gG)	A	16	16	16	25	35	35	50	63	100	125	
For contactors with thermal overload relay the device with the smaller admissible backup fuse (contactor or thermal overload relay) determines the fuse size.																
Cable cross-sections for contactors without thermal overload relay																
main connector				solid or stranded	mm ²	0,75 - 4 0,75 - 2,5		1,5-10 + 1,5-6 1,5-6 + 1,5-4		4 - 35 ²⁾ 6 - 25 ²⁾		10 - 70 ²⁾ 10 - 70 ²⁾				
				flexible	mm ²											
				flexible with multicore cable end	mm ²	0,5 - 2,5		1,5-6 + 1,5-4		4 - 25		10 - 35				
Cables per clamp						2		1+1		1		1				
main connector				solid	AWG	14 - 10		14 - 10 + 14 - 10		10		10				
				flexible	AWG	18 - 10		14 - 8 + 14 - 10		10 - 2		6 - 0				
Cables per clamp						2		1+1		1		1				
Frequency of operations z Contactors without thermal overload relay																
				without load	1/h	10000		7000		7000		3000				
				AC3, I _e	1/h	600		600		400		300				
				AC4, I _e	1/h	120		120		120		120				
				DC3, I _e	1/h	600		600		400		300				
Mechanical life																
AC operated				S x 10 ⁶	10		10		10		5					
DC operated with economy resistor				S x 10 ⁶	10		10		10		5					
Short time current				10s-current	A	96	120	144	184	240	296	360	504	680	880	
Power loss per pole				at I _e /AC3 400V	W	0,21	0,26	0,4	0,63	1,1	1,7	1,8	3,6	4,3	6,0	
Resistance to shock acc. to IEC 68-2-27																
Shock time 20ms sine-wave				NO	g	10	10	10	8	8	8	8	8	7	7	
				NC	g	6	6	6	5	5	5	-	-	5	5	

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

2) Maximum cable cross-section with prepared conductor

Contactors

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

Auxiliary Contacts			Type	K2-09	K2-12	K2-16	K2-23	K2-30	K2-37	K2-45	K2-60	K85	K110
Rated insulation voltage U_i ¹⁾			V AC		690			690		-		690	
Thermal rated current I_{th} to 690V													
Ambient temperature			40°C A		16			16		-		16	
			60°C A		12			12		-		12	
Utilization category AC15													
Rated operational current I_e			220-240V A		12			12		-		12	
			380-415V A		4			4		-		6	
			440V A		4			4		-		6	
			500V A		3			3		-		4	
			660-690V A		1			1		-		2	
Utilization category DC13													
Rated operational current I_e			60V A		8			8		-		8	
			110V A		1			1		-		1	
			220V A		0,1			0,1		-		0,1	
Short circuit protection													
short-circuit current 1kA, contact welding not accepted max. fuse size gL (gG) A					25			-		-		25	
For contactors with thermal overload relay the device with the smaller admissible control fuse (contactor or thermal overload relay) determines the fuse.													
Control Circuit													
Power consumption of coils													
AC operated			inrush VA		33-45			90-115		140-165		280-350	350-420
			sealed VA		7-10			9-13		13-18		16-23	23-29
			W		2,6-3			2,7-4		5,4-7		4-6	6-7,3
DC operated			inrush W		75			140		200		170	320
with economic circuit			sealed W		2			2		6		2	4
Operation range of coils													
in multiples of control voltage U_s													
AC operated					0,85-1,1			0,85-1,1		0,85-1,1		0,85-1,1	
DC operated					0,8-1,1			0,8-1,1		0,8-1,1		0,8-1,1	
Switching time at control voltage $U_s \pm 10\%$ ^{2) 3)}													
AC operated			make time ms		8-16			10-25		12-28		13-30	
			release time ms		5-13			8-15		8-15		8-15	
			arc duration ms		10-15			10-15		10-15		10-15	
DC operated			make time ms		8-12			10-20		12-23		20-30	
with AC magnet system			release time ms		8-13			10-15		10-18		10-18	
			arc duration ms		10-15			10-15		10-15		10-15	
Cable cross-section													
Auxiliary connector			solid mm²		0,75-4			-		-		0,75-2,5	
			flexible mm²		0,75-2,5			-		-		0,75-2,5	
			flexible with multicore cable end mm²		0,5-2,5			-		-		0,5-1,5	
Magnet coil			solid mm²		0,75-2,5			0,75-2,5		0,75-2,5		0,75-2,5	
			flexible mm²		0,5-2,5			0,5-2,5		0,5-2,5		0,5-2,5	
			flexible with multicore cable end mm²		0,5-1,5			0,5-1,5		0,5-1,5		0,5-1,5	
Clamps per pole					2			2		2		2	

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

2) Total breaking time = release time + arc duration

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

Contactors for North America

Data according to UL508

Main Contacts (cULus)		Type	K(G)3-10	K(G)3-14	K(G)3-18	K(G)3-22	K(G)3-24	K(G)3-32	K(G)3-40	K3-50	K3-62	K3-74
Rated operational current "General Use"		A	25	25	30	30	50	65	80	110	120	130
Motor DOL 3-phase at 60Hz												
Rated operational current	600V	A	10	14	18	22	22	27	34	44	52	66
Rated operational power	110-120V	hp	1½	2	2	3	5	5	7½	10	10	10
	200V	hp	3	3	5	5	7½	10	10	15	20	25
	220-240V	hp	3	3	7½	7½	10	10	15	20	25	30
	277V	hp	3	5	7½	7½	7½	10	15	20	25	30
	380-415V	hp	5	5	10	10	10	15	20	25	30	40
	440-480V	hp	5	7½	10	15	15	20	25	30	40	50
	550-600V	hp	7½	10	15	20	20	25	30	40	50	50
Motor DOL 1-phase at 60Hz												
Rated operational current	600V	A	10	14	18	22	22	27	34	44	52	66
Rated operational power of AC motors at 60Hz (1ph)	110-120V	hp	½	¾	1	1½	1½	2	3	3	5	7½
	200V	hp	1	1,5	2	3	3	5	7½	7½	10	15
	220-240V	hp	1½	2	3	3	5	5	7½	10	15	15
	277V	hp	2	3	3	5	5	7½	10	10	15	15
	380-415V	hp	3	3	5	5	5	7½	10	15	20	20
	440-480V	hp	3	5	5	7½	7½	10	15	20	25	25
	550-600V	hp	3	5	7½	10	10	15	20	25	30	30
Motor DOL 3-phase according to ANSI A17.5												
Rated operational current	600V	A	-	-	-	-	15	22	-	27	37	-
Rated operational power of 3-phase motors for elevators (500.000 operations)	110-120V	hp	-	-	-	-	2	3	-	3	5	-
	200V	hp	-	-	-	-	3	5	-	7½	10	-
	220-240V	hp	-	-	-	-	5	7½	-	7½	10	-
	440-480V	hp	-	-	-	-	10	15	-	20	25	-
	550-600V	hp	-	-	-	-	10	20	-	25	30	-
Rated current 2 series contacts	600V	A	-	-	-	-	22	27	-	44	52	66
Fuse Class RK5 / Short-circuit current		A/kA	50/5	50/5	70/5	90/5	90/5	125/5	175/5	200/5	250/5	300/5
Fuse Class T / Short-circuit current		A/kA	45/100	50/100	70/100	90/100	110/100	150/100	150/100	175/100	175/100	175/100
Rated voltage		V	600	600	600	600	600	600	600	600	600	600
Auxiliary Contacts (cULus)			A600	A600	A600	A600	-	-	-	-	-	-

Main Contacts (cULus)		Type	K2-09	K2-12	K2-16	K2-23	K2-30	K2-45	K2-60	K85	K110
Rated operational current "General Use"		A	25	25	25	40	40	72	90	125	150
Motor DOL 3-phase at 60Hz											
Rated operational power	110-120V	hp	1½	2	2	3	5	-	-	15	-
	200V	hp	2	3	3	5	7½	10	15	-	30
	220-240V	hp	3	3	5	7½	10	15	20	35	40
	440-480V	hp	5	7½	10	15	20	30	40	65	75
	550-600V	hp	7½	10	15	20	25	40	50	85	100
Motor DOL 1-phase at 60Hz											
Rated operational power	110-120V	hp	½	¾	1	1½	2	3	5	8	10
	200V	hp	1	2	2	3	3	5	7½	-	20
	220-240V	hp	1½	2	3	3	5	7½	10	20	20
Fuse / Short-circuit current		A/kA	30/5	40/5	50/5	60/5	110/5	175/5	175/5	-	300/5
Rated voltage		V	600	600	600	600	600	600	600	600	600
Auxiliary Contacts (cULus)			A600	A600	A600	A600	A600	-	-	A600	A600

Contactors for North America

Data according to UL508

Type	K3-90	K3-115	K3-116	K3-151	K3-176	K3-210	K3-260	K3-316	K3-450	K3-550	K3-700	K3-860	K3-1000	K3-1200
A	160	200	150	180	220	250	300	350	420	520	700	810	-	1215
A	85	99		125	150	190	240	300	300	400	550	700	-	1000
hp	15	20	-	-	-	-	-	-	-	-	-	-	-	-
hp	25	35	30	40	50	60	75	100	125	150	200	250	-	450
hp	35	40	40	50	60	75	100	125	125	150	250	300	-	450
hp	-	-	-	-	-	-	-	-	-	-	-	-	-	-
hp	50	60	-	-	-	-	-	-	-	-	-	-	-	-
hp	65	75	75	100	125	150	200	250	250	350	500	600	-	900
hp	85	100	100	125	150	200	250	300	250	350	500	600	-	900
A	86	103		125	150	-	-	-	-	-	-	-	-	-
hp	8	10	10	15	25	-	-	-	-	-	-	-	-	-
hp	15	20	20	-	-	-	-	-	-	-	-	-	-	-
hp	20	25	-	25	30	40	50	50	-	-	-	-	-	-
hp	20	25	-	-	-	-	-	-	-	-	-	-	-	-
hp	30	40	-	-	-	-	-	-	-	-	-	-	-	-
hp	40	50	-	-	-	-	-	-	-	-	-	-	-	-
hp	50	60	-	-	-	-	-	-	-	-	-	-	-	-
A	-	-	-	-	-	-	-	-	-	-	-	-	-	-
hp	-	-	-	-	-	-	-	-	-	-	-	-	-	-
hp	-	-	-	-	-	-	-	-	-	-	-	-	-	-
hp	-	-	-	-	-	-	-	-	-	-	-	-	-	-
hp	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A/kA	300/10	300/10	225/10	300/10	350/10	400/18	500/18	500/18	1200/18	1200/18	2000/30	2000/30	-	2000/42
A/kA	300/100 ³⁾	300/100 ³⁾	-	-	-	-	-	-	-	-	-	-	-	-
V	600	600	600	600	600	600	600	600	600	600	600	600	-	600
	-	-	-	-	-	-	-	-	A600	A600	A600	A600	-	A600

Main Contacts (cULus)	Type	K3-18NK	K3-24K	K3-32K	K3-50K	K3-62K	K3-74K	K3-90K	K3-115K
Rated operational power of 3-phase capacitor banks at 60Hz (3ph)	110-120V kVAr	0-3,5	3-5,5	3-7	6,5-10	6,5-15	6,5-18 ¹⁾	10-24	10-28 ²⁾
	200V kVAr	0-6	4,5-10	4,5-12,5	10-16,7	10-25	10-32 ¹⁾	17-40	17-46 ²⁾
	220-240V kVAr	0-7	5,5-11	5,5-15	12,5-20	12,5-30	12,5-36 ¹⁾	20-47	20-56 ²⁾
	440-480V kVAr	0-15	11,5-25	11,5-30	25-40	25-60	25-72 ¹⁾	40-95	40-114 ²⁾
	550-600V kVAr	0-18	14,5-30	14,5-35	31-50	31-75	31-90 ¹⁾	50-120	50-143 ²⁾
Fuse Class RK5 / Short-circuit current	A/kA	70/5	90/5	125/5	200/5	250/5	300/5	300/10	300/10
Fuse Class T / Short-circuit current	A/kA	80/100	110/100	150/100	175/100	175/100	175/100	300/100 ³⁾	300/100 ³⁾
Rated voltage	V	600	600	600	600	600	600	600	600
Auxiliary Contacts (cULus)		A600	-	-	-	-	-	-	-

1) Consider the max. thermal current of the contactor K3-74A: I_{th} 130A

2) Consider the min. cross-section of conductor at max. load

3) Class T and Class RK1

Contactors

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

Contact Life

For selection of the suitable contactor-type according to supply voltage, power rating and application (utilization category AC1, AC3 or AC4) use contact life characteristic diagram.

For the most common supply voltages four scales of power ratings P_n are provided for each utilization category.

Select contactor-type according to utilization category **AC3** (breaking current $I_a = I_e$) using the **motor rating** scales to the right, according to utilization category **AC4** (breaking current $I_a = 6 \times I_e$) using the **motor rating** scales to the left. ¹⁾

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

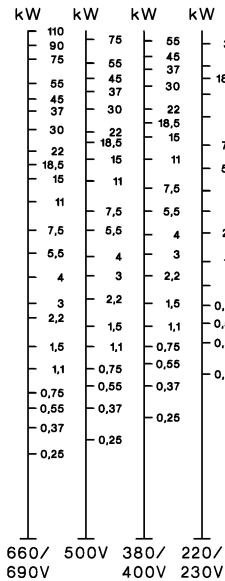
For contactors frequently used under AC3/AC4-mixed service conditions calculate contact life with the formula:

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

M = Contact life (switching cycles) for AC3/AC4-mixed operations
AC3 = Contact life (switching cycles) for AC3 operations (normal switching conditions).
Breaking current I_a = rated motor current I_e .
AC4 = Contact life (switching cycles) for AC4 operations (inching).
Breaking current I_a = multiples of rated motor current I_e .
%AC4 = Percents of AC4-operations related to the total cycles.

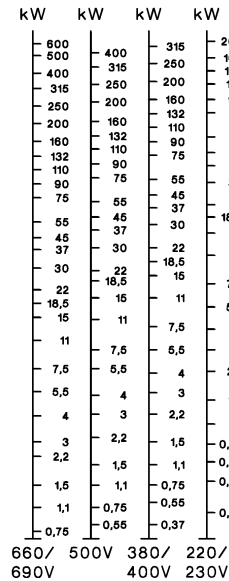
Motor Rating $P_n = AC4$

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



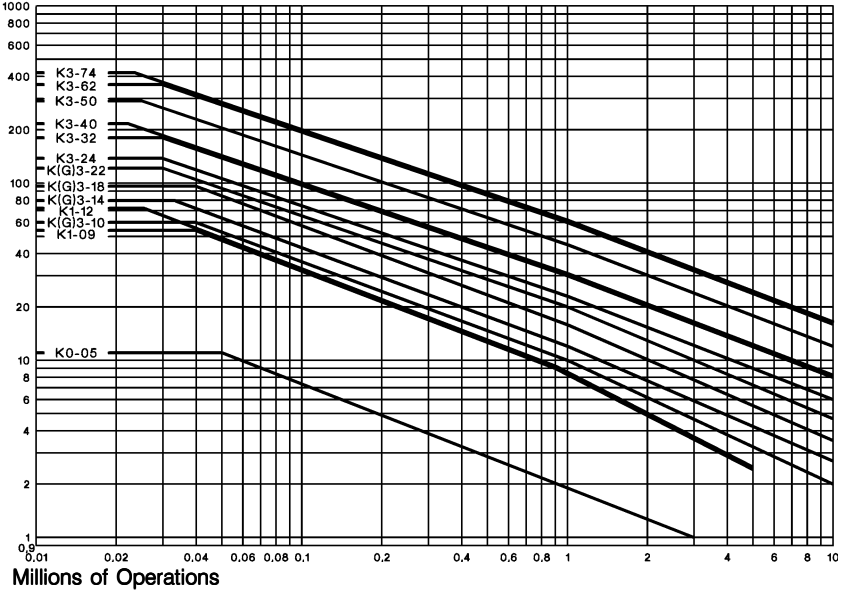
Motor Rating $P_n = AC3$

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



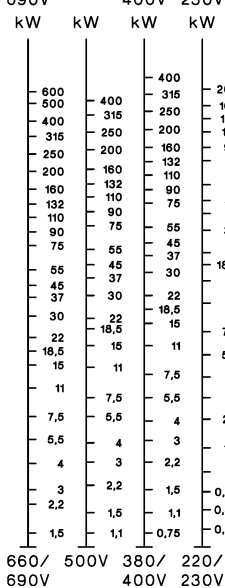
Breaking Current $I_a (= I_e = AC1)$

A



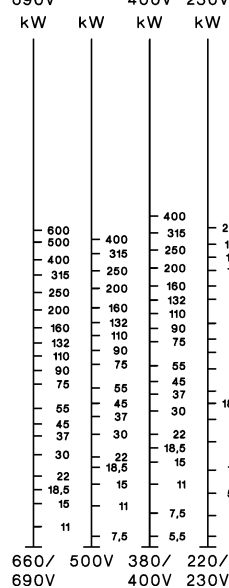
Motor Rating $P_n = AC4$

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



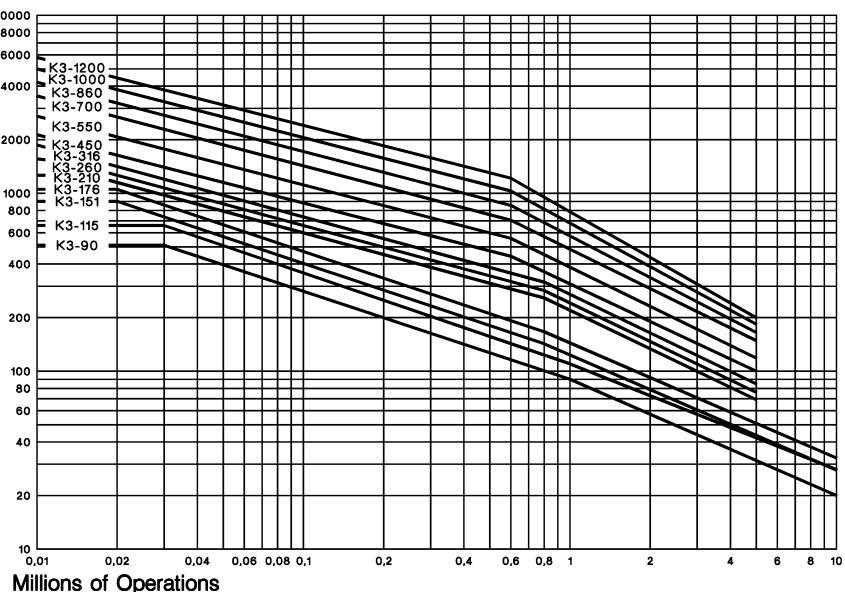
Motor Rating $P_n = AC3$

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



Breaking Current $I_a (= I_e = AC1)$

A



1) Pay attention to the approved rated values of the selected contactor according to the national approvals

Contactors

Utilization Categories

For easier choice of devices and in order to make the comparison of different products simpler are utilization categories for contactors and motor-starters according to IEC 947-4-1 and VDE 0660 Part 102, for

control circuit devices and switching elements according to IEC 947-5-1 and VDE 0660 Part 200 determind. The table offers different utilization categories, typical applications and assorted test conditions.

Type of current	Category	Typical applications	Rated operational current	Test conditions for the number of on-load operating cycles						Test conditions for making and breaking capacities					
				Make I_e/I_e	U/U_e	$\cos\phi$	Break I_c/I_e	U_r/U_e	$\cos\phi$	Make I_e/I_e	U/U_e	$\cos\phi$	Break I_c/I_e	U_r/U_e	$\cos\phi$
Alternating Current	AC1	Non-inductive or slightly inductive loads resistance furnaces	all values	1	1	0,95	1	1	0,95	1,5	1,05	0,8	1,5	1,05	0,8
	AC2	Slip-ring motors: starting, switching off	all values	2,5	1	0,65	2,5	1	0,65	4	1,05	0,65	4	1,05	0,65
	AC3	Squirrel-cage motors: starting, switching off motors during running	$I_e \leq 17A$ $I_e > 100A$	6	1	0,65	1	0,17	0,65	10	1,05	0,45	8	1,05	0,45
				6	1	0,35	1	0,17	0,35	10	1,05	0,45	8	1,05	0,45
				6	1	0,35	1	0,17	0,35	10	1,05	0,35	8	1,05	0,35
	AC4	Squirrel-cage motors: starting, plugging, inching	$I_e \leq 17A$ $I_e > 100A$	6	1	0,65	6	1	0,65	12	1,05	0,45	10	1,05	0,45
				6	1	0,35	6	1	0,35	12	1,05	0,45	10	1,05	0,45
				6	1	0,35	6	1	0,35	12	1,05	0,35	10	1,05	0,35
	AC5a	Switching of electric discharge lamp controls	all values	-	-	-	-	-	-	3	1,05	0,45	3	1,05	0,45
	AC5b	Switching of incandescent lamps	all values	-	-	-	-	-	-	1,5	1,05	1)	4	1,05	1)
	AC6a	Switching of transformers	$I_e \leq 100A$ $I_e > 100A$	-	-	-	-	-	-	4,5	1,05	0,45	3,6	1,05	0,45
				-	-	-	-	-	-	4,5	1,05	0,35	3,6	1,05	0,35
	AC6b	Switching of capacitors	-	-	-	-	-	-	-	2)			2)		
	AC7a	Slightly inductive loads in household appliances and similar applications	all values	-	-	-	-	-	-	1,5	1,05	0,8	1,5	1,05	0,8
	AC7b	Motor loads for household applications	$I_e \leq 100A$ $I_e > 100A$	-	-	-	-	-	-	8	1,05	0,45	6	1,05	0,45
				-	-	-	-	-	-	8	1,05	0,35	6	1,05	0,35
	AC8a	Hermetic refrigerant compressor motor control with manual resetting of overload releases	$I_e \leq 100A$ $I_e > 100A$	-	-	-	-	-	-	6	1,05	0,45	6	1,05	0,45
				-	-	-	-	-	-	6	1,05	0,35	6	1,05	0,35
	AC8b	Hermetic refrigerant compressor motor control with automatic resetting of overload releases	$I_e \leq 100A$ $I_e > 100A$	-	-	-	-	-	-	6	1,05	0,45	6	1,05	0,45
				-	-	-	-	-	-	6	1,05	0,35	6	1,05	0,35
	AC12	Control of resistive loads and solid state loads with isolation by opto couplers	all values	-	-	-	-	-	-	1	1	0,9	1	1	0,9
	AC13	Control of solid state loads with transformer isolation	all values	-	-	-	-	-	-	10	1,1	0,65	1,1	1,1	0,65
	AC14	Control of small electromagnetic loads ($\leq 72VA$)	-	-	-	-	-	-	-	6	1,1	0,7	6	1,1	0,7
	AC15	Control of electromagnetic load ($> 72VA$)	-	10	1	0,7	1	1	0,4	10	1,1	0,3	10	1,1	0,3
Direct Current				Make I_e/I_e	U/U_e	L/R [ms]	Break I_c/I_e	U_r/U_e	L/R [ms]	Make I_e/I_e	U/U_e	L/R [ms]	Break I_c/I_e	U_r/U_e	L/R [ms]
	DC1	Non-inductive or slightly inductive loads resistance furnaces	all values	1	1	1	1	1	1	1,5	1,05	1	1,5	1,05	1
	DC3	Shunt-motors: starting, plugging, inching dynamic braking of d.c. motors	all values	2,5	1	2	2,5	1	2	4	1,05	2,5	4	1,05	2,5
	DC5	Series-motors: starting, plugging, inching dynamic braking of d.c. motors	all values	2,5	1	7,5	2,5	1	7,5	4	1,05	15	4	1,05	15
	DC6	Switching of incandescent lamps	all values	-	-	-	-	-	-	1,5	1,05	1)	4	1,05	1)
	DC12	Control of resistive loads and solid state loads with isolation by opto couplers	all values	-	-	-	-	-	-	1	1	1	1	1	1
	DC13	Control of electromagnets	all values	1	1	≤ 300	1	1	≤ 300	1,1	1,1	≤ 300	1,1	1,1	≤ 300
	DC14	Control of electromagnetic loads having economy resistors in circuit	all values	-	-	-	-	-	-	10	1,1	15	10	1,1	15

U_e Rated operational voltage, U Voltage before make, U_r Recovery voltage, I_e Rated operational current, I Current make, I_c Current broken

1) Test with incandescent lamps

2) Test conditions according to standard

Accessories

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

Type		HN	HTN	HA	HB	HKT HKA	HKF HKB	K2-DK K2-SK	K2-TP	K2-L ²⁾
Rated insulation voltage U_i ¹⁾	V AC	690	690	690	690	690	690	690	690	690
Thermal rated current I_n to 690V										
Ambient temperature max. 40°C	A	10	10	25	10	10	16	26	10	10
max. 60°C	A	6	6	20	6	-	-	-	-	6
Frequency of operations z	1/h	3000	-	3000	3000	-	-	-	1200	3000
Mechanical life	S x 10 ⁶	10	10	10	10	-	-	-	1	10
Power loss per pole at I_e /AC1	W	0,5	0,5	1,5	0,5	-	-	-		
Utilization category AC15										
Rated operational current I_e 220-240V	A	3	3	6	3	3	3	-	4	3
380-400V	A	2	2	3	2	2	2	-	3	2
440V	A	1,6	1,6	2	1,6	1,5	1,5	-	2	1,6
500V	A	1,2	1,2	2	1,2	1,5	1,5	-	2	1
660-690V	A	0,6	0,6	1	0,6	1	1	-	2	0,5
Utilization category DC13										
Rated operational current I_e 60V	A	2	2	8	2	-	-	-	2,5	2
110V	A	0,4	0,4	1	0,4	0,5	0,5	-	1,5	0,4
220V	A	0,1	0,1	0,1	0,1	0,2	0,2	-	0,2	0,1
Short circuit protection short-circuit current 1kA, contact welding not accepted max. fuse size gL (gG)	A	20	20	25	20	10	10	-	10	10
For contactors with thermal overload relay or auxiliary contacts the device with the smaller admissible control fuse (contactor or thermal overload relay) determines the fuse size.										
Cable cross-sections										
solid or stranded	mm ²	0,75-2,5	0,75-2,5	0,75-2,5	0,75-2,5	0,75-2,5	0,75-2,5	1-2,5	0,75-2,5	0,75-2,5
flexible	mm ²	0,75-2,5	0,75-2,5	0,75-2,5	0,75-2,5	0,75-2,5	0,75-2,5	0,75-2,5	0,75-2,5	0,75-2,5
flexible with multicore cable end	mm ²	0,5-1,5	0,5-1,5	0,5-1,5	0,5-1,5	0,5-1,5	0,5-1,5	0,75-2,5	0,75-2,5	0,5-1,5
solid	AWG	14 - 12	14 - 12	14 - 12	14 - 12	14 - 12	14 - 12	14 - 12	14 - 12	14 - 12
flexible	AWG	18 - 12	18 - 12	18 - 12	18 - 12	18 - 12	18 - 12	18 - 12	18 - 12	18 - 12
Cables per clamp		2	2	2	2	2	2	2	2	2

Data according to CSA, UL and CUL

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

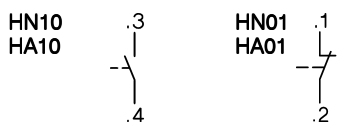
1) Suitable for: earthed-neutral systems, overvoltage category I to IV, pollution degree 3 (standard-industry): Uimp = 8kV. Data for other conditions on request.

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

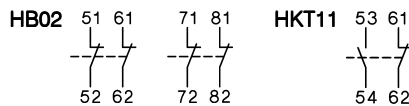
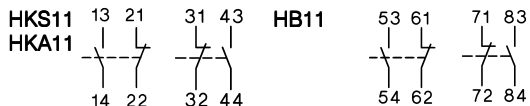
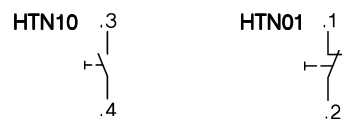
Contactor and Accessories

Wiring diagrams

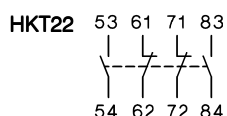
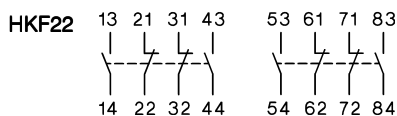
Auxiliary contact blocks



Snap-on momentary contact blocks



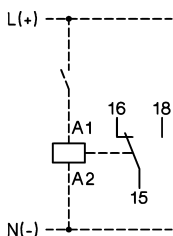
HB11, HB02:
Correct terminal marking
is given by mounting.



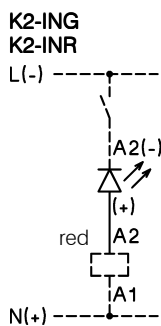
Indicator units

Electronic timer

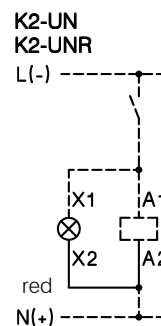
K3-T180 240



Coil current indicator

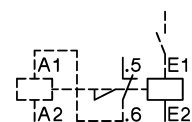


Voltage indicator



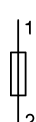
Latch

K2-L..



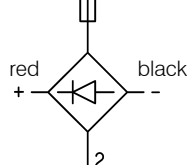
Fuse holder

K2-F



with rectifier

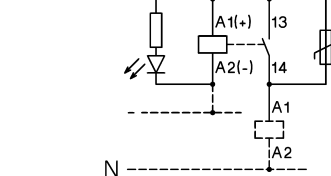
K2-RF1 K2-RF3



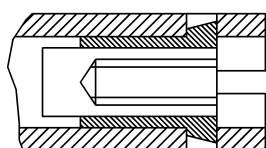
Colours mentioned in
wiring diagram refer to
the outgoing
connection wires
of the device.

Interface

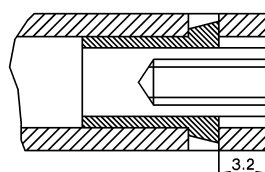
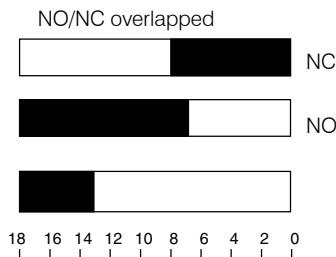
K2-IM



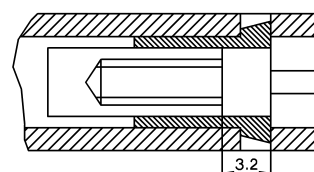
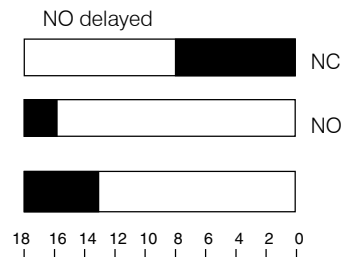
Regulation of switch position of aux. contact block HKF22 for contactors K3-450 to K3-860



Standard position of regulation screw



Regulation screw position (unscrew by 4 turns)



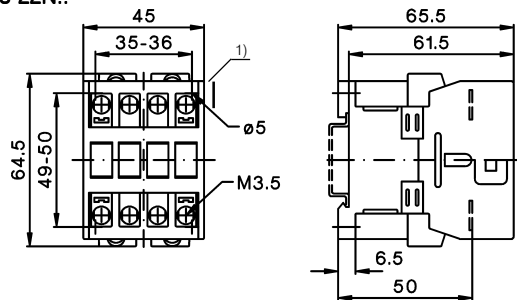
Regulation screw position (screw by 4 turns)

Contactors

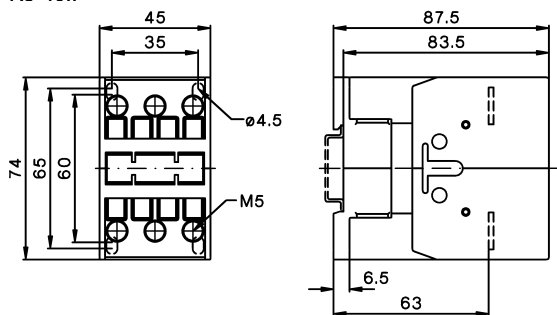
Dimensions

AC operated

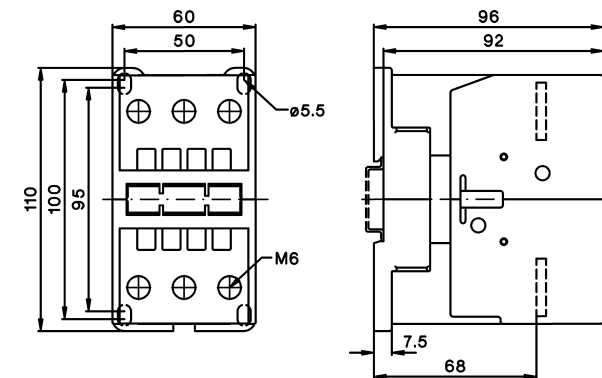
K3-10N..
K3-14N..
K3-18N..
K3-22N..



K3-24..
K3-32..
K3-40..

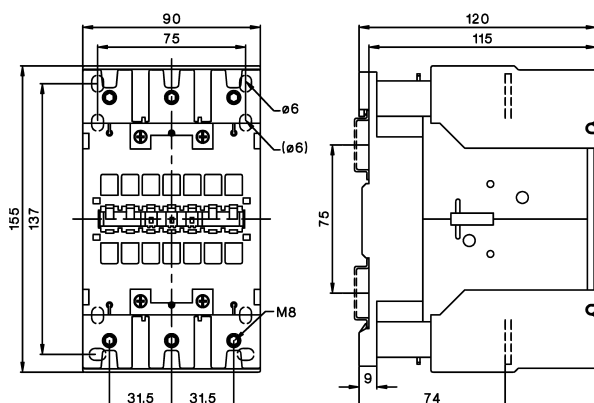


K3-50..
K3-62..
K3-74..



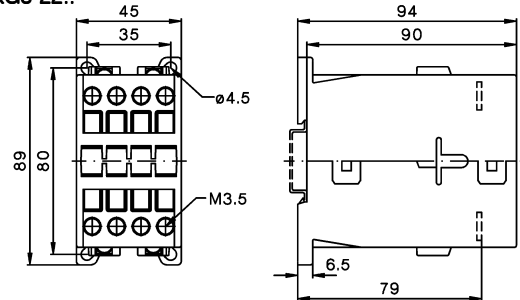
AC and DC operated

K3-90..
K3-115..

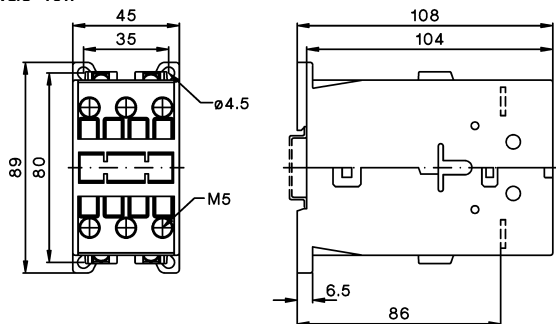


DC operated

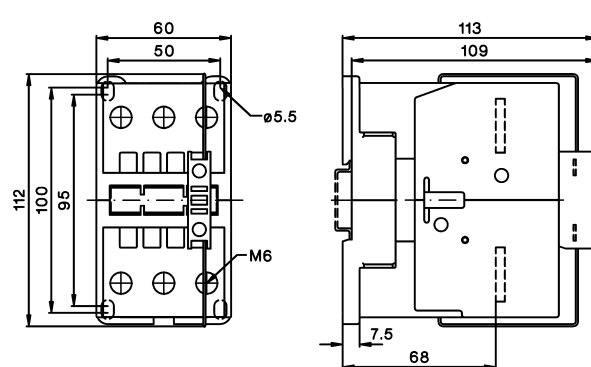
KG3-10..
KG3-14..
KG3-18..
KG3-22..



KG3-24..
KG3-32..
KG3-40..



K3-50..=
K3-62..=
K3-74..=



1) Minimum side distance to
conductive parts for coil voltage:
500V $U_{imp}=6kV$ 2mm
660-690V $U_{imp}=8kV$ 4,5mm

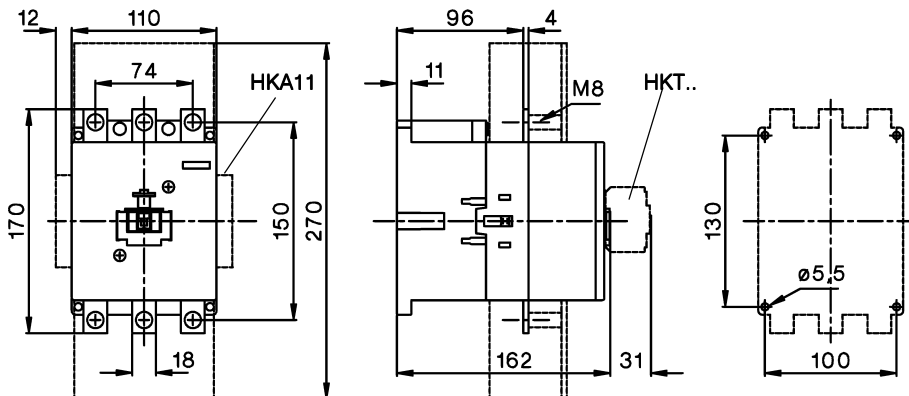
Contactor

Dimensions

AC operated, DC operated

K3-151..

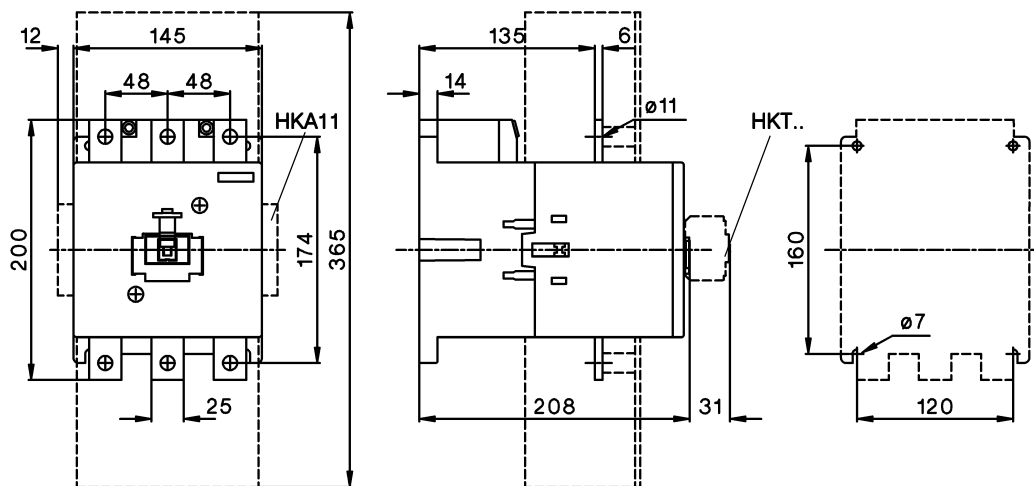
K3-176..



K3-210..

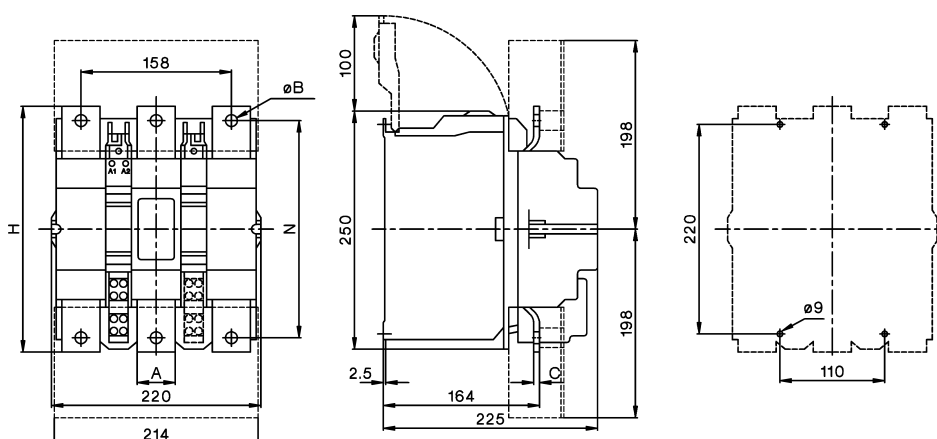
K3-260..

K3-316..



K3-450..

K3-550..



Typ	A	B	C	H	N
K3-450	40	10,5	4	233	206
K3-550	40	12,5	6	258	228

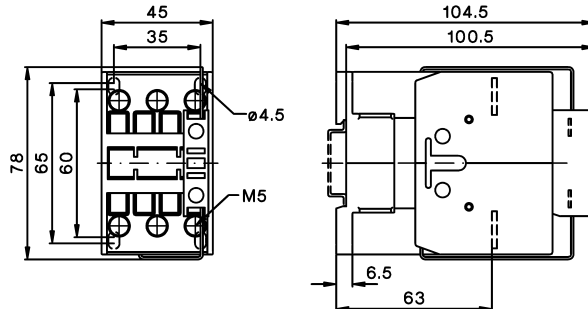
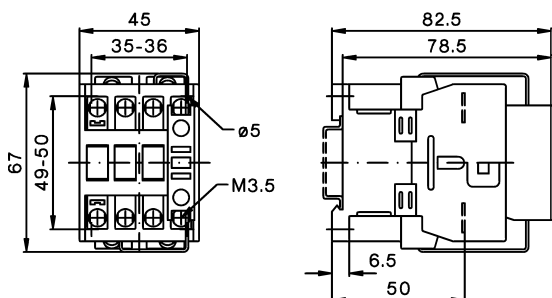
Contactor

Dimensions

Contactor DC operated

K3-10N..=
K3-14N..=
K3-18N..=
K3-22N..=

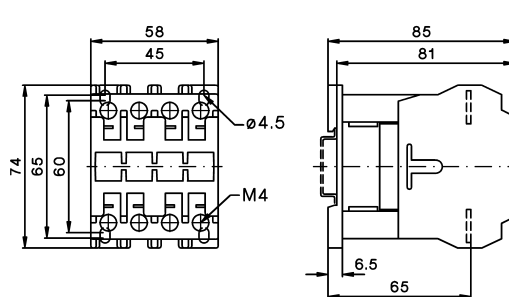
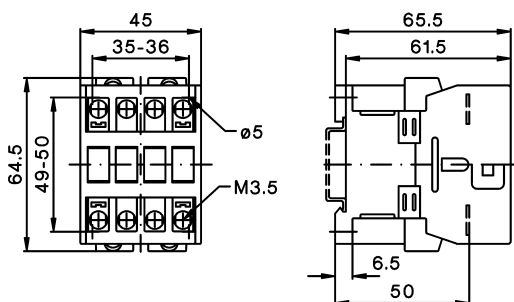
K3-24..=
K3-32..=
K3-40..=



Contactor 4-pole, AC operated

K3-10NA00-40
K3-14NA00-40
K3-18NA00-40
K3-22NA00-40

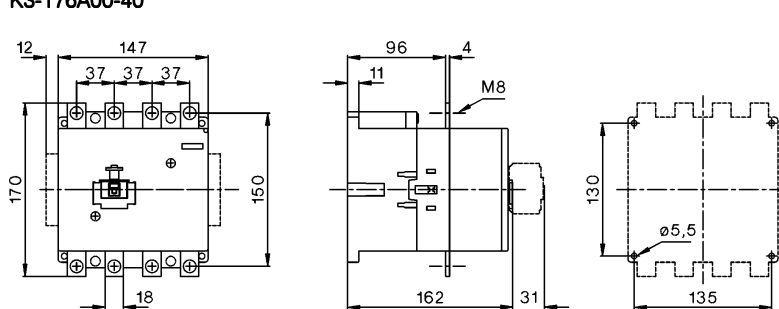
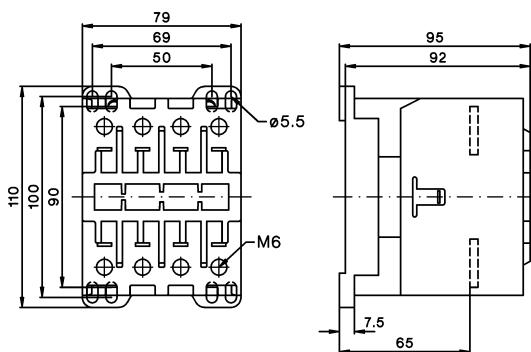
K2-23A00-40
K2-30A00-40
K2-37A00-40



Contactor 4-pole, AC operated

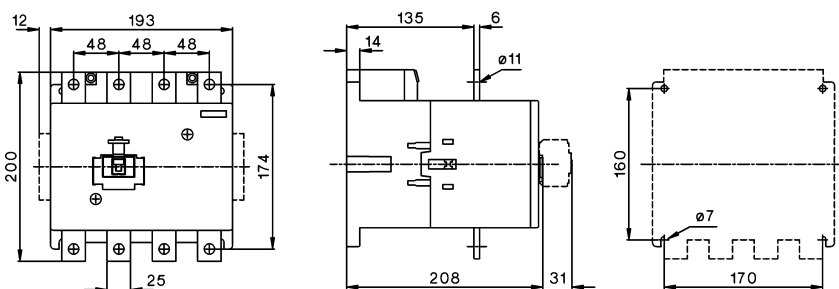
K2-45A00-40
K2-60A00-40

K3-116A00-40
K3-151A00-40
K3-176A00-40



Contactor 4-pole, AC and DC operated

K3-210A00-40
K3-260A00-40
K3-316A00-40



Contactors

Dimensions Accessories

Aux. cont. blocks, terminal blocks

Snap-on momentary cont. blocks

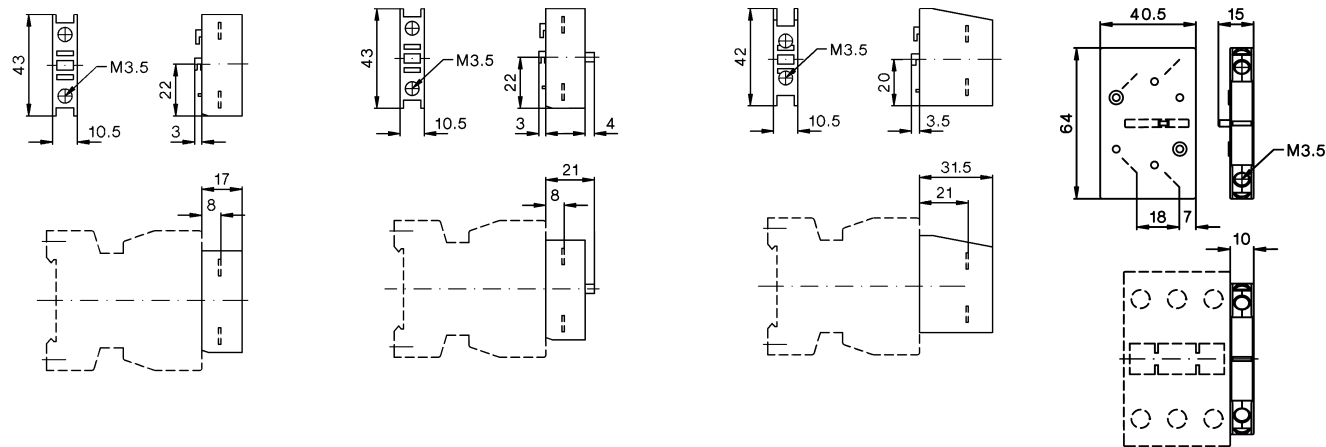
Auxiliary contact blocks

HN10, HN01 K2-SK, K2-DK

HTN10, HTN01

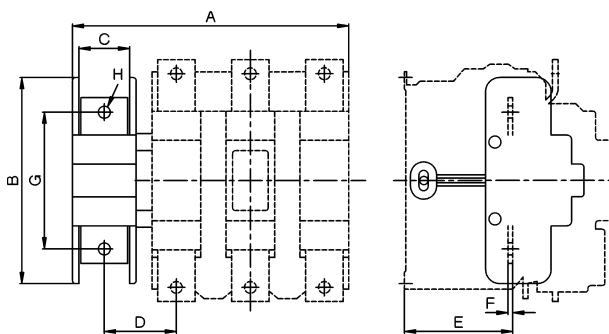
HA10, HA01

HB11, HB02



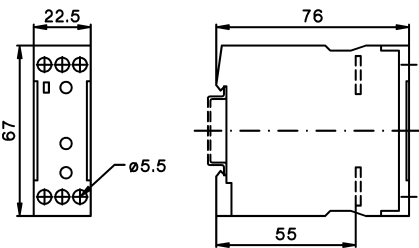
4. pole for contactors K3-200 to K3-1200

Type	A	B	C	D	E	F	G	H
NP175	223	148	26	52	98	5	122	M8
NP350	223	148	26	52	98	5	122	M8
NP325	262	148	26	55	116	5	122	M10
NP500	294	220	53	72	138	5	152	M12
NP760	294	220	53	72	138	5	152	M12
NP501	348	220	53	73	145	5	152	M12
NP1000	348	220	53	73	145	8	152	M12
NP1001	410	220	53	110	157	8	152	M12



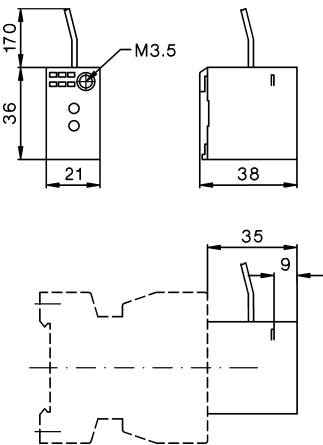
Electronic timer

K3-T180 240



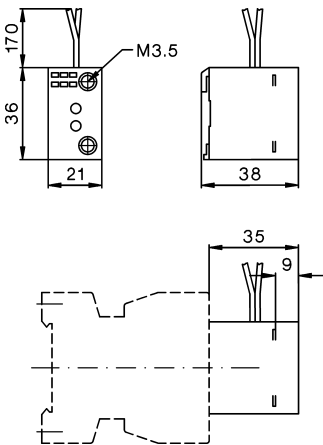
Electronic timer on-delay

K2-TE..



Electronic timer off-delay

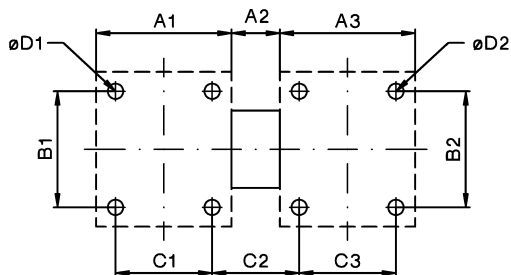
K2-TA..



Contactors

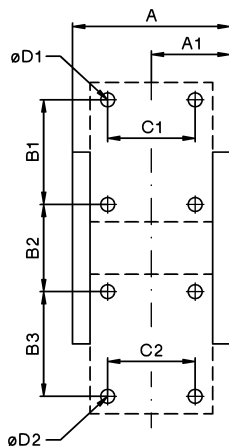
Dimensions Accessories

Mechanical interlocks

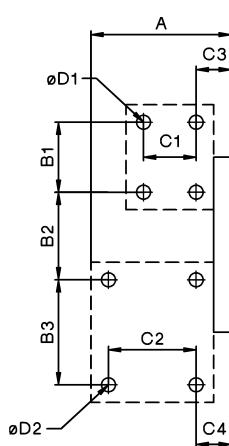


Type	Contactor 1	Contactor 2	A1	A2	A3	B1	B2	C1	C2	C3	D1	D2	
LG10889	K3-07 to K3-40	K3-07 to K3-40	45	7	45	50	50	35	17	35	4,5	4,5	
LG10889	KG3-07 to KG3-22	KG3-07 to KG3-22	45	7	45	80	50	35	17	35	4,5	4,5	
LG10889	KG3-24 to KG3-40	KG3-22 to KG3-40	45	7	45	80	50	35	17	35	4,5	4,5	
LG10890	K3-50 to K3-74	K3-24 to K3-40	60	12	55	100	65	50	22	45	5,5	4,5	
LG10890	K3-50 to K3-74	K3-50 to K3-74	60	12	60	100	100	50	22	50	5,5	5,5	
LG11478	K3-90 bis K3-115	K3-90 bis K3-115	90	12	90	100	100	75	27	75	5,5	5,5	
LG8511	K65 - K110	K65 - K110	90	12	90	100	100	75	27	75	6	6	
LG11223H	K3-151, -176	K3-151, -176	110	30	110	130	130	100	40	100	6	6	3-pole contactor
LG11223H	K3-116,-151, -176	K3-116,-151, -176	147	30	147	130	130	135	42	135	6	6	4-pole contactor
LG11223H	K3-210, -260, -316	K3-210, -260, -316	145	30	145	160	160	120	55	120	6	6	3-pole contactor
LG11223H	K3-210, -260, -316	K3-210, -260, -316	193	30	193	160	160	170	55	170	6	6	4-pole contactor
LG10400H	K3-450, K3-550	K3-450, K3-550	220	42	220	220	220	110	152	110	9	9	
LG10402H	K3-700, -860	K3-700, -860	280	32	280	280	280	175	137	175	11	11	
LG10403H	K3-1000, -1200	K3-1000, -1200	334	46	334	380	380	120	260	120	13,5	13,5	
LG10399H	K3-450, -550	K3-700, -860	220	37	280	220	280	110	144,5	175	9	11	
LG10401H	K3-700, -860	K3-1000, -1200	280	73	334	280	380	175	232,5	120	11	13,5	

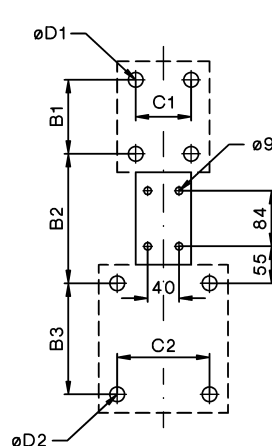
LG10400V, LG10402V



LG10399V



LG10403V, LG10401V



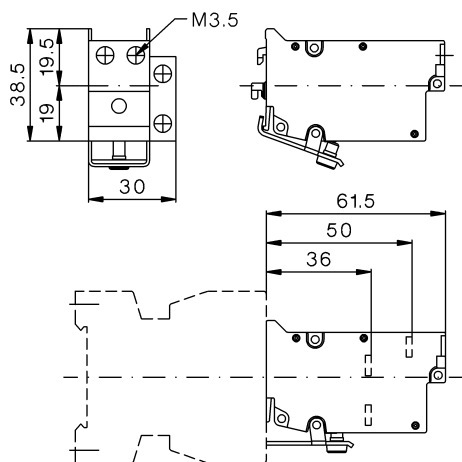
Type	Contactor 1	Contactor 2	A	A1	B1	B2	B3	C1	C2	C3	C4	D1	D2
LG10400V	K3-315 - K3-550	K3-315 - K3-550	250	134	220	94	220	110	110	-	-	9	9
LG10402V	K3-700, -860	K3-700, -860	302	162	280	200	280	175	175	-	-	11	11
LG10403V	K3-1000, -1200	K3-1000, -1200	-	-	380	280	380	120	120	-	-	13,5	13,5
LG10399V	K3-450, -550	K3-700, -860	302	-	220	150	280	110	175	51	74,5	9	11
LG10401V	K3-700, -860	K3-1000, -1200	-	-	280	240	380	175	120	-	-	11	13,5

Contactors

Dimensions Accessories

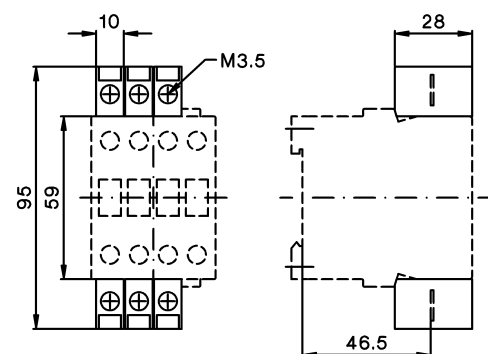
Latch

K2-L..



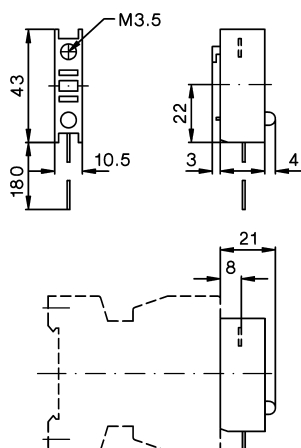
Contactors with additional terminals

LG9339N (2 x 3 pieces)
for K3-10N. to K3-22N.



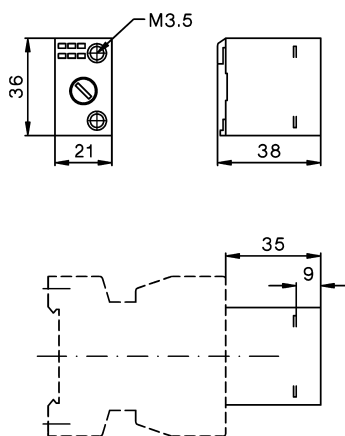
Indicator units

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



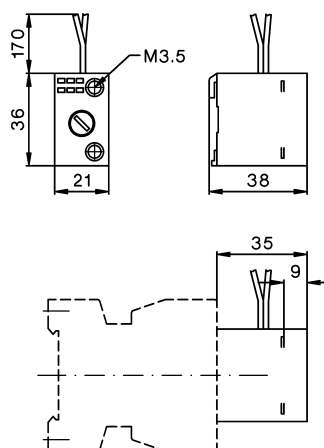
Fuse holder

K2-RF



Fuse holder with rectifier

K2-RF1
K2-RF3

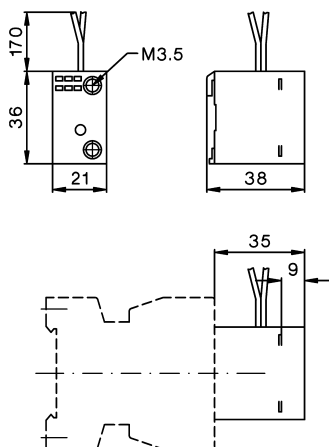


Contactors

Dimensions Accessories

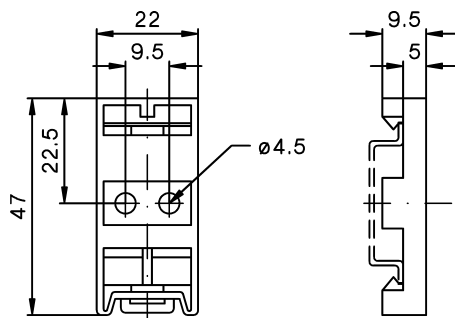
Interface

K2-IM



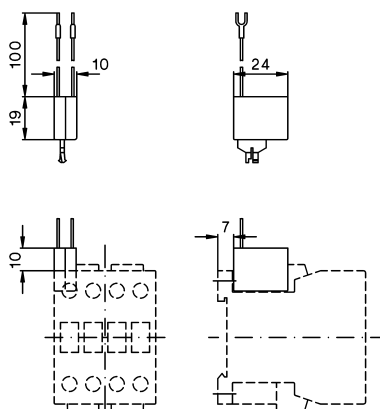
Snap-on adapter

K2-SM

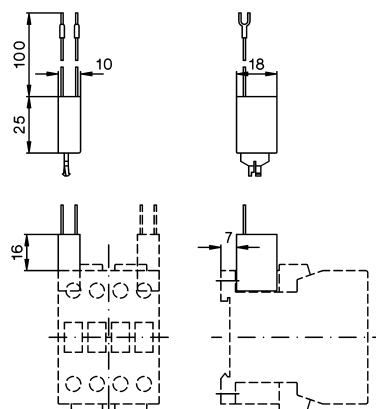


Suppressor units

RC-K3N ..

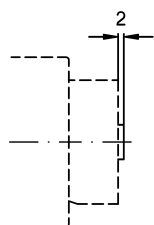


RC-K3NW ..



Marking systems

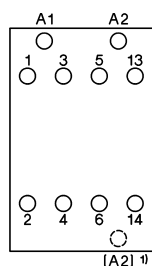
marking label
P487-1 or P245-.



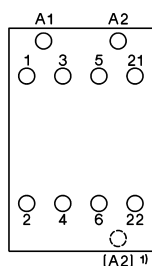
Contactors

Position of terminals

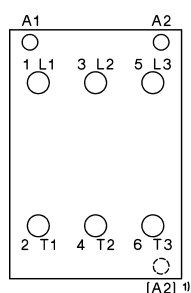
K3-10ND10
K3-14ND10
K3-18ND10
K3-22ND10
K3-18NK10



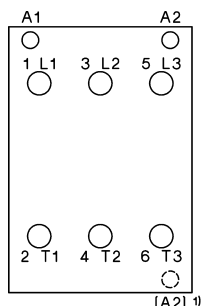
K3-10ND01
K3-14ND01
K3-18ND01
K3-22ND01
K3-18NK01



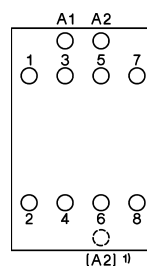
K3-24A00, K3-24K00
K3-32A00, K3-32K00
K3-40A00



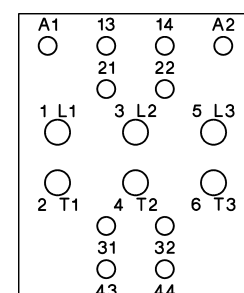
K3-50A00, K3-50K00
K3-62A00, K3-62K00
K3-74A00, K3-74K00



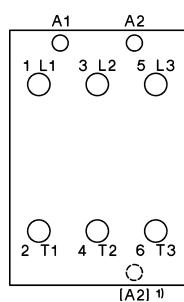
K3-10NA00-40
K3-14NA00-40
K3-18NA00-40
K3-22NA00-40
K2-23A00-40 bis
K2-60A00-40



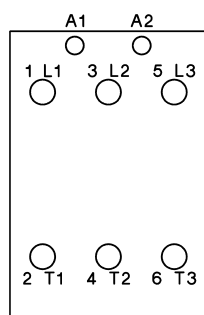
K85A22
K110A22



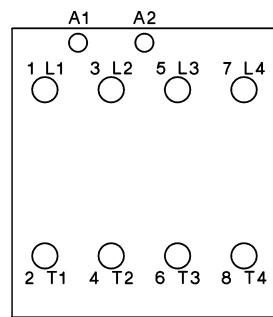
K3-90A00
K3-115A00



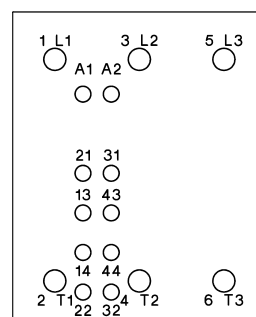
K3-151A00
K3-176A00
K3-210A00
K3-260A00
K3-316A00



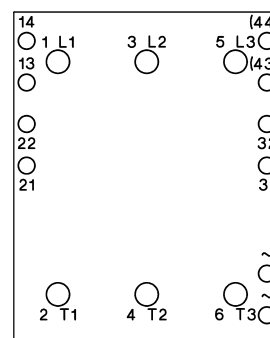
K3-116A00-40
K3-151A00-40
K3-176A00-40
K3-210A00-40
K3-260A00-40
K3-316A00-40



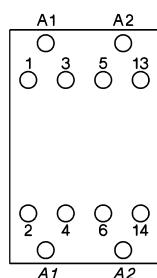
K3-450A22
K3-550A22
K3-700A22
K3-860A22



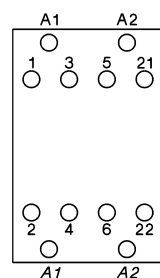
K3-1000A12
K3-1200A12



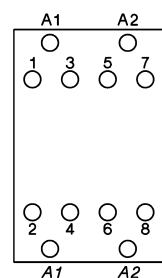
KG3-10A10
KG3-14A10
KG3-18A10
KG3-22A10



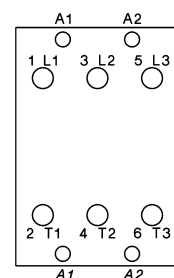
KG3-10A01
KG3-14A01
KG3-18A01
KG3-22A01



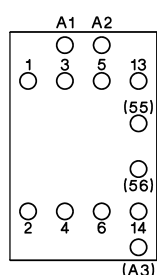
KG3-10A00-40
KG3-14A00-40
KG3-18A00-40
KG3-22A00-40



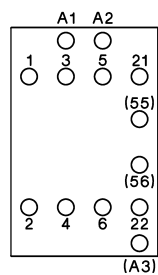
KG3-24A00
KG3-32A00
KG3-40A00



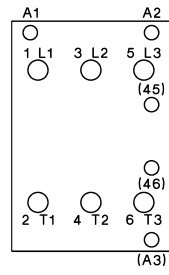
K3-10ND10=
K3-14ND10=
K3-18ND10=
K3-22ND10=



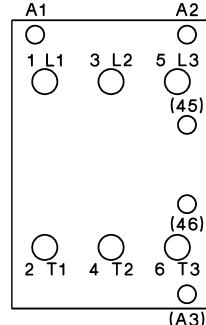
K3-10ND01=
K3-14ND01=
K3-18ND01=
K3-22ND01=



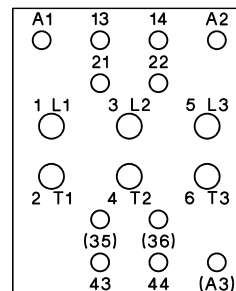
K3-24A00=
K3-32A00=
K3-40A00=



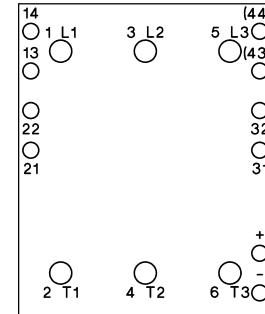
K3-50A00=
K3-62A00=
K3-74A00=



K85A21=
K110A21=



K3-1000A12=
K3-1200A12=



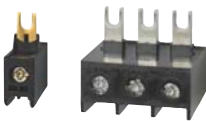
1) Type-suffix "EUR" with additional coil terminal
Ordering example: K3-10A10 **EUR** 230



Star-Delta Starters Open Type 86



Star-Delta Starters Enclosed Enclosure for Star-Delta Starters 88



Accessories 89



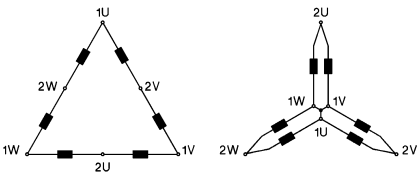
Reversing Contactors 90



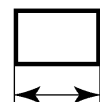
Pole Changing Starters 92



Technical Data 94



Wiring Diagrams 97



Dimensions 101

Star-Delta Starters Open Type

AC Operated



Ratings				Rated Current	order separately	Type	Coil voltage ¹⁾ 220-240V 50Hz 380-415V 50Hz	Pack pcs.	Weight kg/pc.
AC3 380V 400V 415V kW	500V kW	660V 690V kW	AC3 400V A	Overload Relay Type	230 400 ↓				
7,5	7,5	11	16	U3/32 U12/16E K3	K3NY15 ...		1	0,9	
15	18,5	15	30		K3NY26 ...		1	0,9	
22	30	22	45	U3/42	K3Y40 ...		1	1,4	
30	37	30	60		K3Y52 ...		1	1,8	
45	55	45	85	U3/74	K3Y80 ...		1	3,5	
55	75	55	109		K3Y100 ...		1	3,7	
75	90	90	150	U85	K3Y140 ...		1	6,6	
110	132	110	205		K3Y200 ...		1	7	
132	160	160	240	U180	K3Y240 ...		1	15	
160	180	180	300		K3Y300 ...		1	15	

Star-delta starters are wired to accept thermal overload relay. The thermal overload relay has to be ordered separately. For full load current setting use the YD-dial of thermal overload relay.

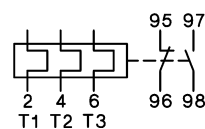
Ordering Example: Star-Delta Starter, open type, rated AC3 at 400V 205A
rated control voltage 230V 50Hz - **Order Type: K3Y200 230 + U85 120**

Thermal Overload Relays

Rated Motor Current A	Type	Pack pcs.	Weight kg/pc.	Wiring Diagram
--------------------------	------	--------------	------------------	----------------

For Star-Delta Starters K3NY15.. to K3Y40..

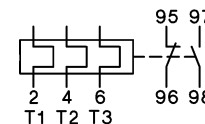
7 - 10,5	U12/16E 6 K3	1	0,10
10,5 - 15,5	U12/16E 9 K3	1	0,10
14 - 19	U12/16E 11 K3	1	0,10
18 - 24	U12/16E 14 K3	1	0,10
23 - 31	U12/16E 18 K3	1	0,10



manual reset

For Star-Delta Starters K3NY15.. to K3Y52..

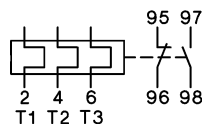
7 - 10,5	U3/32 6	1	0,14
10,5 - 15,5	U3/32 9	1	0,14
14 - 19	U3/32 11	1	0,14
18 - 24	U3/32 14	1	0,14
23 - 31	U3/32 18	1	0,14
30 - 41	U3/32 24	1	0,14
40 - 55	U3/32 32	1	0,14



manual and auto reset

For Star-Delta Starters K3Y40.., K3Y52..

24 - 35	U3/42 20	1	0,30
35 - 48	U3/42 28	1	0,30
48 - 73	U3/42 42	1	0,30



manual and auto reset

1) Coil voltage range and other coil voltages see page 94

Components for Combinations			Electronic Timer	Mechanical Interlock between K2 and K3 Type	Star-Delta Starter Connector Type	Auxiliary Contacts Built-in for use on Contactor			Free Space for Aux. Contact Blocks on Contactor		
Line Contactor	Delta Contactor	Star Contactor				Line K1	Delta K2	Star K3	Line K1	Delta K2	Star K3
K1 Type	K2 Type	K3 Type	K4 Type	Type	Type	NO/NC	NO/NC	NO/NC	HN..	HA..	
K3-10ND01 + HN10	K3-10ND01	K3-10ND10 + HN10 + HN01	Y9A	LG10889	K3NY-VB10	-	-	-	3	4	2
K3-18ND01 + HN10	K3-18ND01	K3-14ND10 + HN10 + HN01	Y9A	LG10889	K3NY-VB10	-	-	-	3	4	2
K3-24A00 + HN10 + HN01	K3-24A00 + HN01	K3-24A00 + 2HN10 + HN01	Y9A	LG10889	K3Y-VB24	-	-	-	2	3	1
K3-32A00 + HN10 + HN01	K3-32A00 + HN01	K3-24A00 + 2HN10 + HN01	Y9A	LG10889	K3Y-VB24	-	-	-	2	3	1
K3-50A00 + HN01 + HN10	K3-50A00 + HN01	K3-32A00 + 2HN10 + HN01	Y9A	LG10890	-	-	-	-	2	3	1
K3-62A00 + HN01 + HN10	K3-62A00 + HN01	K3-50A00 + 2HN10 + HN01	Y9A	LG10890	-	-	-	-	2	3	1
K3-90A00 + HN01 + HN10	K3-90A00 + HN01	K3-90A00 + 2HN10 + HN01	Y9AL	LG11478	-	-	-	-	5	6	4
K3-115A00 + HN01 + HN10	K3-115A00 + HN01	K3-90A00 + 2HN10 + HN01	Y9AL	LG11478	-	-	-	-	5	6	4
K3-151A00 + HKT11	K3-151A00 + HKT11	K3-151A00 + HKT22	Y9AL	LG11223H	-	-	1/-	-/1	2	1	1
K3-176A00 + HKT11	K3-176A00 + HKT11	K3-151A00 + HKT22	Y9AL	LG11223H	-	-	1/-	-/1	2	1	1

Applications

The star-delta starting method is only practicable in such cases where the motor windings are connected in delta configuration for normal operation and the torque which is needed during the starting period is not higher than approx. 30% of the rated torque. The starting current drawn from the line will be approx. 2 to 2,7 times the rated motor current.

Time setting

The transition from start (star configuration) to normal operation (delta configuration) should be after the motor achieves practically full rotational speed. The use of star-delta timer Y9A with a dwell period of approx. 25ms provides a careful operation of motor and drive equipment.

Thermal Overload Relays

	Rated Motor Current A	Type	Pack pcs.	Weight kg/pc.	Wiring Diagram	
	For Star-Delta Starters K3Y80.., K3Y100..					
	35 - 48	U3/74 28	1	0,40	 manual and auto reset	
	48 - 73	U3/74 42	1	0,40		
	70 - 90	U3/74 52	1	0,40		
	90 - 112	U3/74 65	1	0,40		
	For Star-Delta Starters K3Y140.., K3Y200..					
	104 - 156	U85 90	1	0,90	 manual reset	
	140 - 207	U85 120	1	0,90		
	For Star-Delta Starters K3Y240.., K3Y300..					
	208 - 312	U180 180	1	1,5	 manual and auto reset	

Star-Delta Starters Enclosed Type

AC Operated

Ratings			Rated	Optional	Wired	Type	Coil voltage ¹⁾		
AC3			Current	Extras	to accept		220-240V 50Hz		
380V					Overload		380-415V 50Hz		
400V		660V	AC3		Relay				
415V	500V	690V	400V						
kW	kW	kW	A		Type			Pack	Weight
								pcs.	kg/pc.

230
400
↓

Plastic Enclosed, protected to IP65

15	18,5	15	30	ST	U3/32	K3NY26P ...	1	1,8
22	30	22	45	ST, H	U3/42	K3Y40P ...	1	3,8
30	37	30	60	ST, H		K3Y52P ...	1	4,2
45	55	45	85	ST, H	U3/74	K3Y80P ...	1	5,9
55	75	55	109	ST, H		K3Y100P ...	1	8,7

Sheet Steel Enclosed, protected to IP54

15	18,5	15	30	ST, H	U3/32	K3NY26B ...	1	4,8
22	30	22	45	ST, H	U3/42	K3Y40B ...	1	4,8
30	37	30	60	ST, H		K3Y52B ...	1	5,2
45	55	45	85	ST, H	U3/74	K3Y80B ...	1	15
55	75	55	109	ST, H		K3Y100B ...	1	15
75	90	90	150	ST, H	U85	K3Y140B ...	1	22
110	132	110	205	ST, H		K3Y200B ...	1	22

1) Coil voltage range and other coil voltages see page 94

Type-suffix for optional extras

Start-Stop Push ButtonsT ...

Selector Switch

Typical wiring diagrams see page 98

Control Circuit Fuse <250V (1 piece)

>250V (2 pieces)

Run Hour Meter

.....W ...

.....ST ...

.....ST ...

.....H ...

Ordering Example: Star-Delta Starter, steel sheet enclosed, with selector switch and run hour meter rated AC3 at 400V 82A, rated control voltage 230V 50Hz - **Order Type: K3Y80BWH 230 + U3/74 52**

Enclosures for Star Delta Starter

for Starter	accept Overload Relay	Type	Pack pcs.	Weight kg/pc.
Plastic IP65				
K3NY15, K3NY26	U3/32	K3Y26P-G3	1	1,0
K3Y40, K3Y52	U3/42, U3/32	K3Y40/52P-G3	1	2,4
Sheet Steel IP54				
K3NY15, K3NY26	U3/32	K3Y26B-G3	1	3,4
K3Y40, K3Y52	U3/42, U3/32	K3Y40/52B-G3	1	3,4

Star-Delta Starter Connector



For Star-Delta Starter Types

K3NY15, K3NY26
K3Y40, K3Y52

Type

K3NY-VB10
K3Y-VB24

Pack pcs. Weight kg/pc.

1 0,02
1 0,03

Additional Terminals



For Star-Delta Starter Types
Line Conn. Motor Conn.
Line Contactor Overload Relay

Cable cross-section mm²

Type

Pack pcs. Weight kg/pc.

Single pole with Fingertouch Protection

K3NY15, K3NY26	U12/16	0,75 - 10 solid 0,75 - 6 flex.	LG9339	6	0,009
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Three-pole with Fingertouch Protection

	U3/42	4 - 35 strand. 4 - 25 flex.	LG7559	1	0,052
--	-------	--------------------------------	--------	---	-------

Electronic Timers for Star-Delta Starters¹⁾



Rated Control Voltage V	Time Range s	Delay Time ms	Rated Current 230V A	Rated Current 400V A	Type	Pack pcs.	Weight kg/pc.
24 - 60V AC	1 - 20	20 - 25	6	4	Y9A 60	1	0,075
110 - 415V AC	1 - 20	20 - 25	6	4	Y9A 415	1	0,075
24 - 60V~	1 - 20	40 - 80	6	4	Y9AL 60	1	0,075
110 - 415V~	1 - 20	40 - 80	6	4	Y9AL 415	1	0,075

Time repeat accuracy	± 1%
Minimum interval between operations	2s
Short circuit protection	4A gl (gG)

Power consumption at	24V 60V	0,2VA 5VA
	220-240V 380-415V	2VA 7VA

¹⁾ not suitable for contactors K3-450 - K3-1200

Mounting Bar



Specification	Type	Pack pcs.	Weight kg/pc.
For screw mounting of electronic timer Y9..	LG7735	10	0,09

Star-Delta Starters in Special Versions

Starters for Longer Starting Time

For longer starting times the thermal overload relay is mounted on delta-contactor. The motor is not protected in Y-connection. The timer used for this starter-type is the type Y91A, time range is 10 to 60s. Principal wiring diagram see page 98.

Ordering Example: K3YL52 230

Starters with two Thermal Overload Relays on request

Basic circuit diagram see page 98

Reversing Contactors with Mechanical Interlock

AC Operated

Ratings			Rated Current	Wired to accept Overload Relay page 114 Type	Type	Coil voltage ¹⁾ 110V 50Hz 220-240V 50Hz 380-415 50Hz	Pack pcs.	Weight > kg/pc.
AC3 380V 400V 415V kW	500V kW	660V 690V kW						
			AC3 400V A			110 230 400 ↓		

Open Type

4	5,5	5,5	10	U3/32 U12/16E K3	K3NWU10 ...		1	0,6
7,5	10	7,5	18		K3NWU18 ...		1	0,6
11	15	15	24	U3/42	K3WU24 ...		1	1,2
15	18,5	18,5	32		K3WU32 ...		1	1,4
22	30	30	50	U3/74	K3WU50 ...		1	2,5
30	37	37	62		K3WU62 ...		1	2,5
37	45	45	74		K3WU74 ...		1	2,5

Sheet Steel Enclosed, protected to IP54

4	5,5	5,5	10	U3/32	K3NWU10B ...		1	3,9
7,5	10	7,5	18		K3NWU18B ...		1	4,1
11	15	15	24	U3/42	K3WU24B ...		1	4,5
15	18,5	18,5	32		K3WU32B ...		1	4,7
22	30	30	50	U3/74	K3WU50B ...		1	7,1
30	37	37	62		K3WU62B ...		1	7,1

Reversing Starter Connector



For Reversing Starter Types

	Type	Pack pcs.	Weight kg/pc.
K3NWU10, K3NWU18	K3NW-VB10	1	0,02
K3WU24, K3WU32	K3W-VB24	1	0,025

1) Other coil voltages see page 51

Components for Combinations		Mechanical Interlock	Reversing Starter Connector	Auxiliary Contacts Built-in for use on Contactor		Free Space for Aux. Contact Blocks on Contactor	
Left Hand Side Contactor	Right Hand Side Contactor			K1 NO/NC	K2 NO/NC	K1 HN.. or HA..	K2
K1 Type	K2 Type	Type	Type				
K3-10ND10 + HN01	K3-10ND10 + HN01	LG10889	K3NW-VB10	-	-	3	3
K3-18ND10 + HN01	K3-18ND10 + HN01	LG10889	K3NW-VB10	-	-	3	3
K3-24A00 + HN10 + HN01	K3-24A00 + HN10 + HN01	LG10889	K3W-VB24	-	-	2	2
K3-32A00 + HN10 + HN01	K3-32A00 + HN10 + HN01	LG10889	K3W-VB24	-	-	2	2
K3-50A00 + HN10 + HN01	K3-50A00 + HN10 + HN01	LG10890	-	-	-	2	2
K3-62A00 + HN10 + HN01	K3-62A00 + HN10 + HN01	LG10890	-	-	-	2	2
K3-74A00 + HN10 + HN01	K3-74A00 + HN10 + HN01	LG10890	-	-	-	2	2
K3-10ND10 + HN01	K3-10ND10 + HN01	LG10889	K3NW-VB10	-	-	3	3
K3-18ND10 + HN01	K3-18ND10 + HN01	LG10889	K3NW-VB10	-	-	3	3
K3-24A00 + HN10 + HN01	K3-24A00 + HN10 + HN01	LG10889	K3W-VB24	-	-	2	2
K3-32A00 + HN10 + HN01	K3-32A00 + HN10 + HN01	LG10889	K3W-VB24	-	-	2	2
K3-50A00 + HN10 + HN01	K3-50A00 + HN10 + HN01	LG10890	-	-	-	2	2
K3-62A00 + HN10 + HN01	K3-62A00 + HN10 + HN01	LG10890	-	-	-	2	2

Contactors, Motor-Starter

Circuit Breakers

Manual Motor-Starters

Switches

AC-Main Switches

DC-Switch Disconnect

Push Buttons

Representatives, Suppliers

Reversing Contactors for North America

AC Operated

Ratings			Rated Current	Wired to accept Overload Relay page 114 Type	Type	Coil voltage ¹⁾ 220-240V 50Hz 380-415V 50Hz	Pack pcs.	Weight> kg/pc.
AC3	500V kW	660V 690V kW						
380V			AC3					
400V			400V					
415V			A					
kW								

230
400
↓

Open Type

4	5,5	5,5	10	U3/32 U12/16E K3	KNW3-10 . . .	1	0,6
7,5	10	10	18		KNW3-18 . . .	1	0,6
11	15	15	24	U3/42	KW3-24 . . .	1	1,2
15	18,5	18,5	32		KW3-32 . . .	1	1,4
18,5	18,5	18,5	40		KW3-40 . . .	1	1,4



Pole Changing Starters

AC Operated

Ratings			Rated Current	Wired to accept Overload Relay page 114 Type	Type	Coil voltage ¹⁾ 220-240V 50Hz 380-415V 50Hz	Pack pcs.	Weight> kg/pc.
AC3 at	500V kW	660V 690V kW						
380V			AC3					
400V			400V					
415V			A					
kW								

230
400
↓

Open Type

7,5	10	10	18	2 x U3/32 2 x U12/16E K3	K3NPU18 . . .	1	1,0
11	15	15	24		K3NPU24 . . .	1	1,5
15	18,5	18,5	32	2 x U3/32	K3PU32 . . .	1	1,9
22	30	30	50	2 x U3/74	K3PU50 . . .	1	3,9
30	37	37	62		K3PU62 . . .	1	3,9



Sheet Steel Enclosed, protected to IP54

7,5	10	7,5	18	2x U3/32	K3NPU18B . . .	1	1,0
11	15	15	24		K3NPU24B . . .	1	1,5
15	18,5	18,5	32		K3PU32B . . .	1	1,9



1) Other coil voltages see page 50

Ordering Example: Pole Changing Starter, open version, rated AC3 at 400V 28A and 15A, control voltage 230V 50Hz
Order Type: K3PU32 230 + U3/32 32 + U3/32 18

Pole Changing Starters for Star-Delta Operation on request

1) Other coil voltages see page 51

Components for Combinations		Mechanical Interlock	Auxiliary Contacts Built-in for use on Contactor		Free Space for Aux. Contact Blocks on Contactor	
Left Hand Side Contactor	Right Hand Side Contactor		K1 NO/NC	K2 NO/NC	K1 HN.. or HA..	K2
K1 Type	K2 Type	Type				

K3-10ND01	K3-10ND01	LG10889	-	-	4	4
K3-18ND01	K3-18ND01	LG10889	-	-	4	4
K3-24A00 + HN01	K3-24A00 + HN01	LG10889	-	-	3	3
K3-32A00 + HN01	K3-32A00 + HN01	LG10889	-	-	3	3
K3-40A00 + HN01	K3-40A00 + HN01	LG10890	-	-	3	3

Components for Combinations		Star Contactor	Free Space for Aux. Contact Blocks on Contactor		
High Speed	Low Speed		High Speed K1 HN.. or HA..	Low Speed K2	Star K3
K1 Type	K2 Type	K3 Type			

K3-18ND01 + 2 x HN10	K3-18ND01 + HN10	K3-14ND10	2	3	4
K3-24A00 + HN01 + 2 x HN10	K3-24A00 + HN01 + HN10	K3-18ND10	1	2	4
K3-32A00 + HN01 + 2 x HN10	K3-32A00 + HN01 + HN10	K3-24A00 + HN10	1	2	3
K3-50A00 + HN01 + 2 x HN10	K3-50A00 + HN01 + HN10	K3-32A00 + HN10	1	2	3
K3-62A00 + HN01 + 2 x HN10	K3-62A00 + HN01 + HN10	K3-50A00 + HN10	1	2	3
K3-18ND01 + 2 x HN10	K3-18ND01 + HN10	K3-14ND10	2	3	4
K3-24A00 + HN01 + 2 x HN10	K3-24A00 + HN01 + HN10	K3-18ND10	1	2	4
K3-32A00 + HN01 + 2 x HN10	K3-32A00 + HN01 + HN10	K3-24A00 + HN10	1	2	3

Star-Delta Starters

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

Type		K3NY15	K3NY26	K3Y40	K3Y52	K3Y80	K3Y100	K3Y140	K3Y200	K3Y240	K3Y300
Main Contacts											
Rated insulation voltage $U_i^{1)}$	V AC	690	690	690	690	690	690	690	690	690	690
Frequency of operations z	AC3, I_e										
Change-over time max. (Y-step)	1/h s					15 20 (Type K3YL ... 60)					
Utilization category AC3											
Switching of three-phase motors											
Rated operational current I_e	220-230V A	16	30	45	60	85	109	150	205	240	300
	240V A	16	30	45	60	85	109	150	205	240	300
	380-400V A	16	30	45	60	85	109	150	205	240	300
	415-440V A	15	30	45	60	85	109	150	205	240	300
	500V A	15	30	45	60	85	95	150	205	190	240
	660-690V A	13	17	30	36	57	72	103	118	147	180
Rated operational power of three-phase motors 50-60Hz	220-230V kW	4	7,5	11	15	22	30	45	55	75	90
	240V kW	5,5	11	15	18,5	22	30	45	55	75	90
	380-400V kW	7,5	15	22	30	45	55	75	110	132	160
	415-440V kW	7,5	15	22	30	45	55	75	110	140	170
	500V kW	7,5	18,5	30	37	55	75	90	132	132	180
	660-690V kW	11	15	22	30	45	55	90	110	132	180
Cable cross-sections											
Line	solid or stranded mm ²	1,5 - 6 ²⁾		1,5 - 16		10 - 70 ³⁾		10 - 120		busbar	
	flexible mm ²	1,5 - 4 ²⁾		1,5 - 16		16 - 50 ³⁾		10 - 95		18x5	
	flexible with multicore cable end mm ²	1,5 - 4 ²⁾		1,5 - 16		10 - 35		10 - 95		M8	
Motor	solid or stranded mm ²	1,5 - 6		1,5 - 16		4 - 35 ³⁾		10 - 120		busbar	
	flexible mm ²	1,5 - 4		1,5 - 16		6 - 25 ³⁾		10 - 95		18x5	
	flexible with multicore cable end mm ²	1,5 - 4		1,5 - 16		4 - 25		10 - 95		M8	
Power consumption of the combination											
inrush and change-over	VA	55		130		183		560		700	
sealed	VA	20		26		36		10		10	
	W	6		8		14		10		10	

Coil Voltage Ranges and Non Standard Voltages for Star-Delta Starters

K3NY15.. to K3Y100..

Suffix to Star-Delta Starter type e.g. K3Y80 400	Rated Control Voltage U_s range for 50Hz		range for 60Hz	
	min. V	max. V	min. V	max. V
24	24	24	24	27
42	42	47	47	52
110	100	110	110	122
180	180	210	200	240
230	220	240	230	264
400	380	415	400	415

K3Y140, to K3Y300..

Suffix to Star-Delta Starter type e.g. K3Y300 230	Rated Control Voltage U_s range for 50Hz		range for 60Hz		for DC V
	min. V	max. V	min. V	max. V	
24	24	24	24	24	24
48	48	48	48	48	48
110	110	120	110	120	110
230	220	240	220	240	220
400	380	415	380	415	-

Standard voltages in bold type letters

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

2) Additional terminals see page 89

3) Maximum cable cross-section with prepared conductor

Reversing Starters

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

Type		K3NWU10	K3NWU18	K3WU24	K3WU32	K3WU50	K3WU62	K3WU74
Main Contacts								
Rated insulation voltage $U_i^{1)}$	V AC	690	690	690	690	690	690	690
Utilization category AC3								
Switching of three-phase motors								
Rated operational current I_e								
220V	A	12	18	23	30	45	63	
230V	A	11,5	18	24	32	50	62	74
240V	A	11	18	24	32	50	62	74
380-400V	A	10	18	24	32	50	62	74
415-440V	A	9	18	23	30	50	62	74
500V	A	9	16	23	30	45	60	74
660-690V	A	6,5	8,5	17	20	31	40	40
Rated operational power of three-phase motors								
220-230V	kW	3	5	6	8,5	12,5	18,5	
240V	kW	3	5	7	9	13,5	19	23
50-60Hz	380-400V	kW	4	7,5	11	15	22	30
								37
415-440V	kW	4,5	8,5	12	16	24	33	40
500V	kW	5,5	10	15	18,5	30	37	45
660-690V	kW	5,5	10	15	18,5	30	37	45
Cable cross-sections								
Line								
solid or stranded	mm ²	0,75 - 6		1,5 - 25		4 - 50		
flexible	mm ²	1 - 4		2,5 - 16		6 - 35		
flexible with multicore cable end	mm ²	0,75 - 4		1,5 - 16		6 - 35		
Cables per clamp		1		1		1		
Power consumption of the combination								
inrush and change-over	VA	33 - 45		90 - 115		140 - 185		
sealed	VA	7 - 10		9 - 13		13 - 18		
	W	2,6 - 3		2,7 - 4		5,4 - 7		

Technical Data according to UL508

Main Contacts (cULus)	Type	KNW3-10	KNW3-18	KW3-24	KW3-32	KW3-40
Rated operational power of three-phase motors at 60Hz (3ph)						
110-120V	hp	1½	2	5	5	7½
200V	hp	3	5	7½	10	10
220-240V	hp	3	7½	10	10	15
277V	hp	3	7½	7½	10	15
380-415V	hp	5	10	10	15	20
440-480V	hp	5	10	15	20	25
550-600V	hp	7½	15	20	25	30
Fuse / Short-circuit current	A/kA	30/5	50/5	90/5	125/5	175/5
Rated voltage	V	600	600	600	600	600
Auxiliary Contacts (cULus)		A600	A600	A600	A600	A600
Cable cross-sections						
for main connectors						
solid	AWG	18 - 10		16 - 10		
flexible	AWG	18 - 10		14 - 4		
Cables per clamp		1		1		

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

Pole Changing Starters

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

Type		K3NPU18	K3NPU24	K3PU32	K3PU50	K3PU62
Main Contacts						
Rated insulation voltage $U_i^{1)}$	V AC	690	690	690	690	690
Utilization category AC3						
Switching of three-phase motors						
Rated operational current I_e						
220V A		18	23	30	45	63
230V A		17,5	23	30	45	60
240V A		17	23	30	45	60
380-400V A		16	23	30	45	60
415V A		16	23	30	45	60
440V A		16	23	30	45	60
500V A		16	23	30	45	55
660V A		9	17,5	21	33	42
690V A		8,5	17	20	31	40
Rated operational power of three-phase motors 50-60Hz						
220-230V kW		5	6	8,5	12,5	18,5
240V kW		5	7	9	13,5	19
380-400V kW		7,5	11	15	22	30
415-440V kW		8,5	12	16	24	33
500V kW		10	15	18,5	30	37
660-690V kW		7,5	15	18,5	30	37
Cable cross-sections						
Line						
solid or stranded mm ²		0,75 - 6	1,5 - 25	4 - 50		
flexible mm ²		1 - 4	2,5 - 16	6 - 35		
flexible with multicore cable end mm ²		0,75 - 4	1,5 - 16	6 - 35		
cables per clamp		1	1	1		
Power consumption of the combination						
inrush and change-over VA		55	128	178		
sealed VA		20	26	31		
W		6	8	11		

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

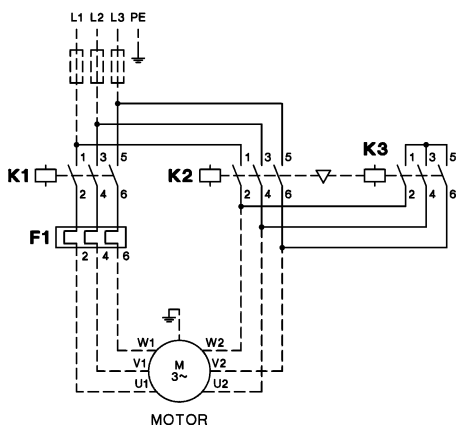
Star-Delta Starters

Wiring Diagrams Main Circuit

Terminal markings of contactors and relays according to DIN EN 50012
Connections shown in main and circuits as broken lines are not included.

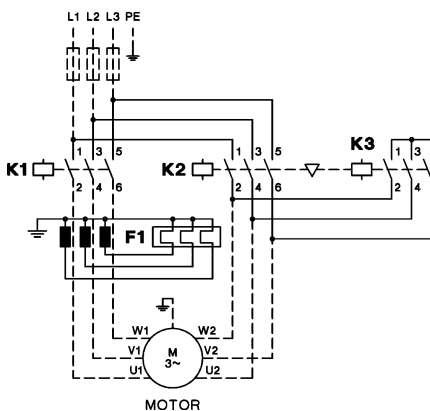
K3NY15 to K3Y100

with thermal overload relay U3/.. or U12/16



K3Y140 to K3Y300

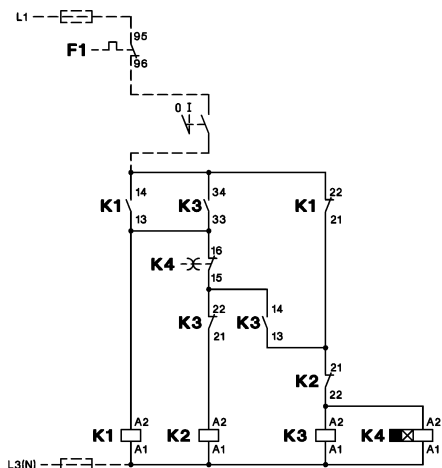
with thermal overload relay U85 or U180



Wiring Diagrams Control Circuit

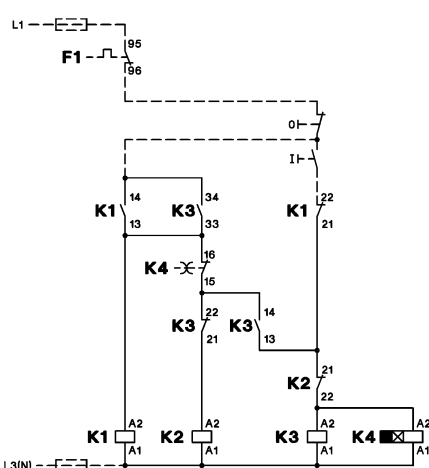
K3NY15 to K3Y52

operating with control switch



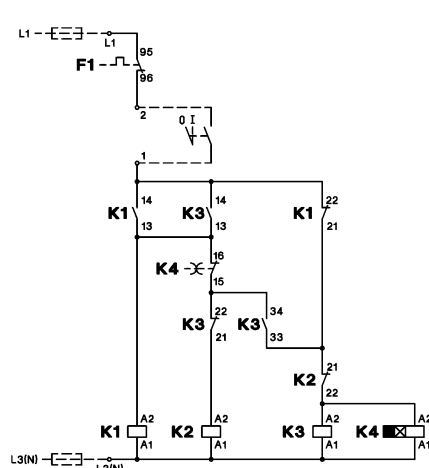
K3NY15 to K3Y52

operating with push buttons



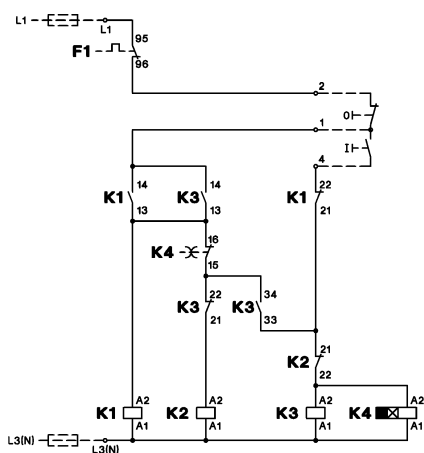
K3Y80 to K3Y200

operating with control switch



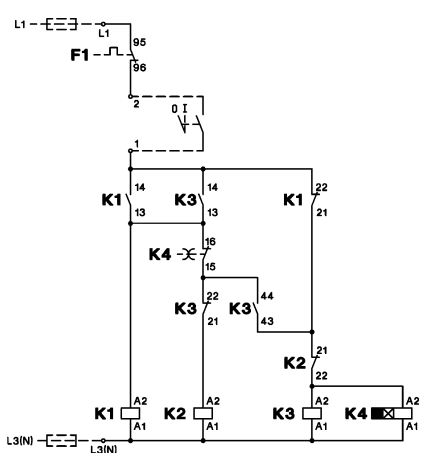
K3Y80 to K3Y200

operating with push buttons



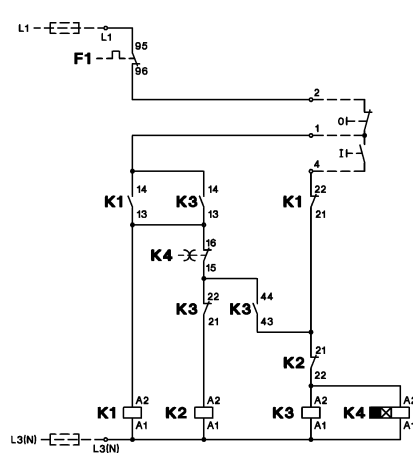
K3Y240 to K3Y300

operating with control switch



K3Y240 to K3Y300

operating with push buttons



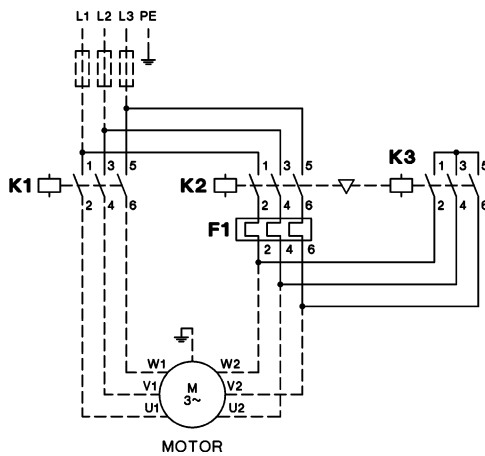
Star-Delta Starters

Wiring Diagrams Main Circuit

Terminal markings of contactors and relays according to DIN EN 50012
Connections shown in main and control circuits as broken lines are not included.

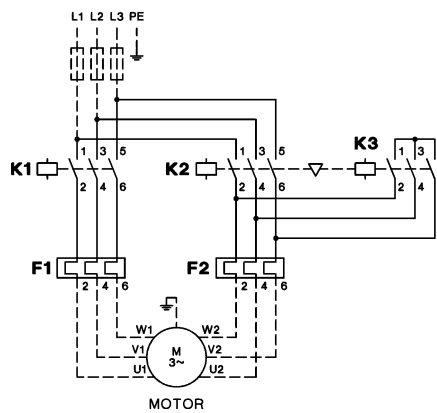
K3YL..

Typical circuit diagram



K3Y.. with 2 Thermal Overload Relays

Typical circuit diagram

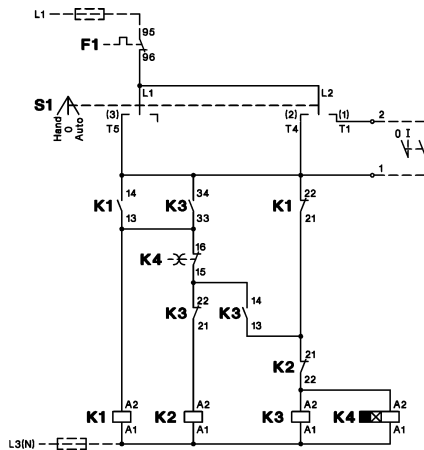


Wiring Diagrams Control Circuit

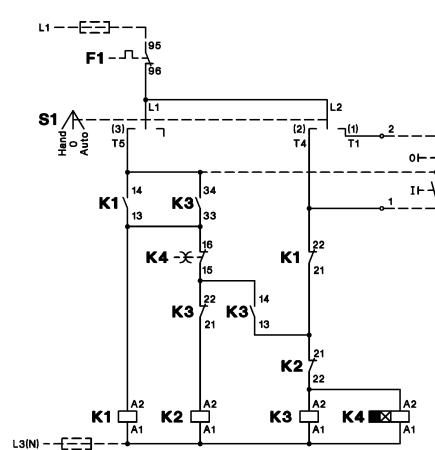
with selector switch

K3Y..W

Typical circuit diagram
operating with control switch



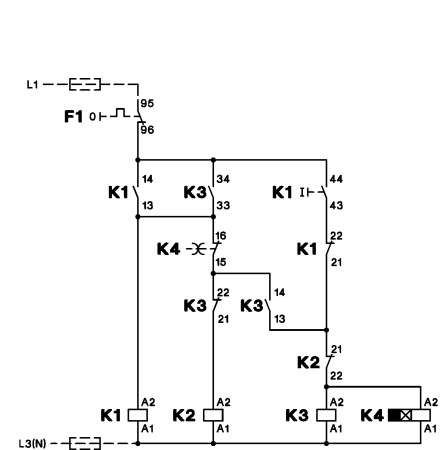
Typical circuit diagram
operating with push buttons



with push buttons

K3Y..T

Typical circuit diagram



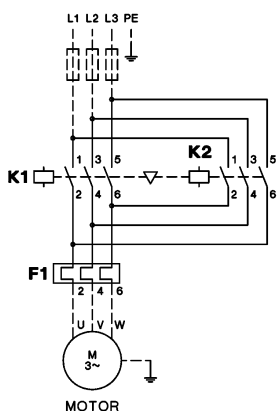
Reversing Contactors

Wiring Diagrams Main Circuit

Terminal markings of contactors and relays according to DIN EN 50012
Connections shown in main and control circuits as broken lines are not included.

K3NWU10 to K3WU74

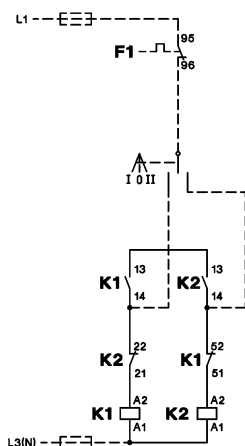
with thermal overload relay U3/32, U3/42 or U3/74



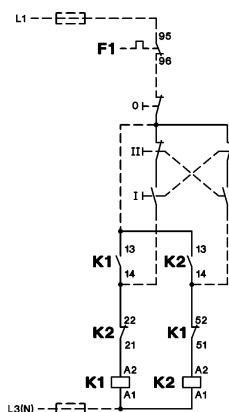
Wiring Diagrams Control Circuit

K3NWU10 to K3WU32

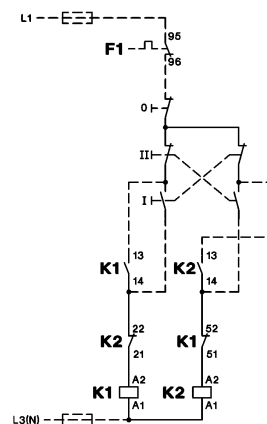
operating with control switch



operating with push buttons
Reversing over off-position

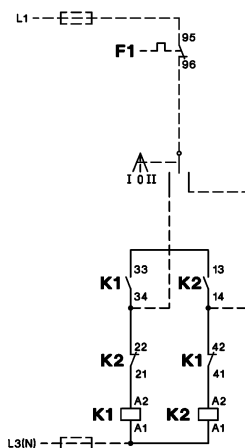


Reversing direct

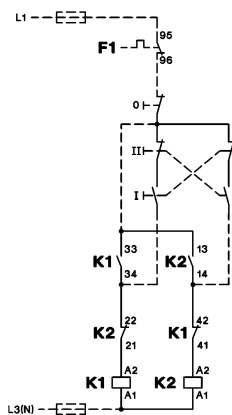


K3WU50, K3WU62, K3WU74

operating with control switch



operating with push buttons

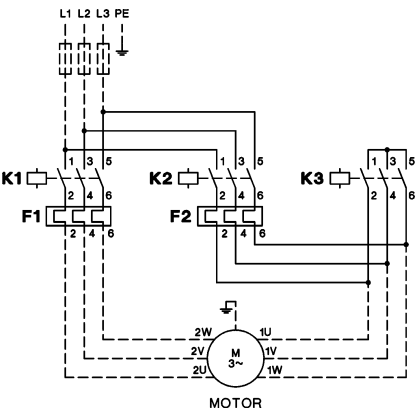


Pole Changing Starters

Wiring Diagrams

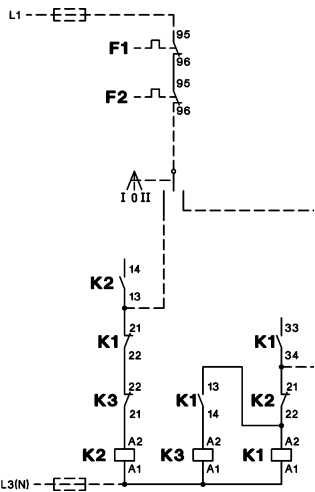
Terminal markings of contactors and relays according to DIN EN 50012
Connections shown in main and control circuits as broken lines are not included.

Main Circuit

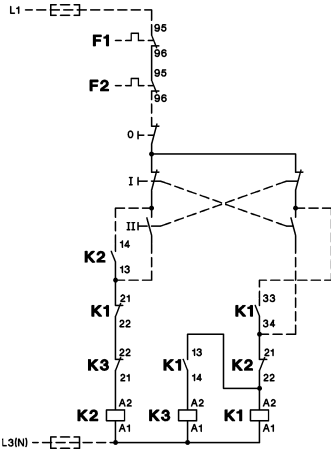


Principal Control Circuit Wiring Diagram

operating with control switch

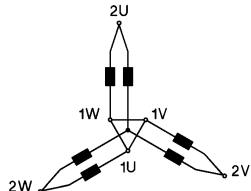
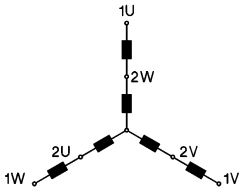
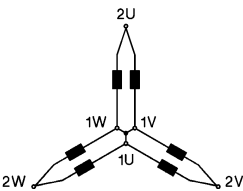
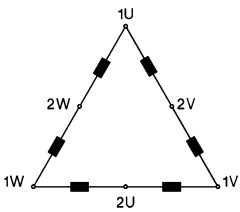


operating with push buttons



	Low speed	High speed
Operation	Delta	Double-Star
Speed relation	1	2
Power relation	1	1,5 - 1,8

	Low speed	High speed
Operation	Star	Double-Star
Speed relation	1	2
Power relation	0,3	1

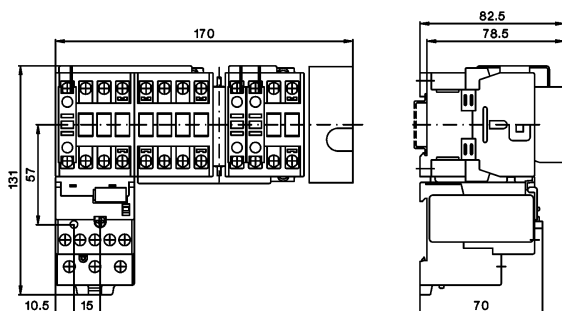


Star-Delta Starters

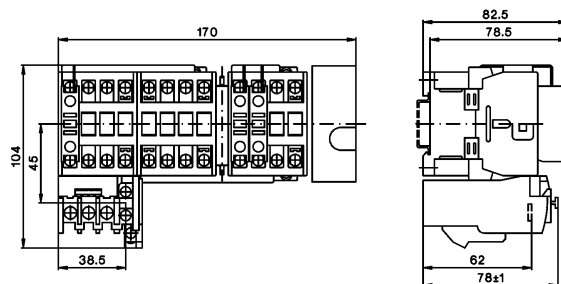
Dimensions

Star-Delta Starters, AC operated, open type

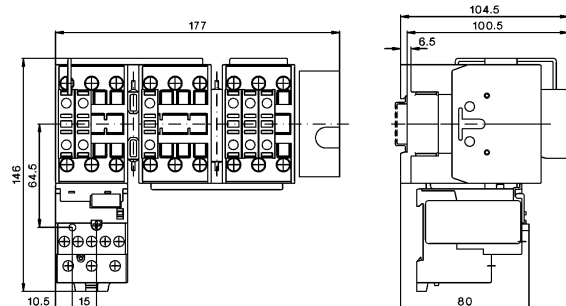
K3NY15 + U3/32
K3NY26



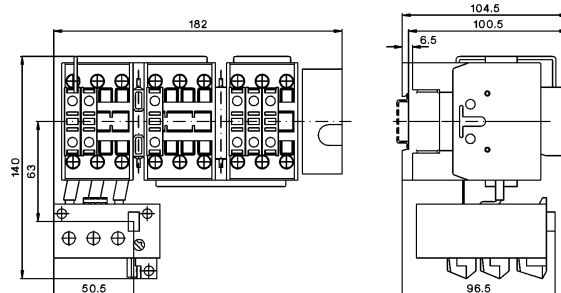
K3NY15 + U12/16E G3
K3NY26



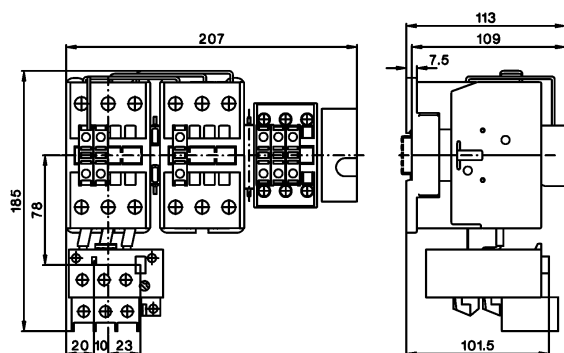
K3Y40 + U3/32
K3Y52 + U3/32



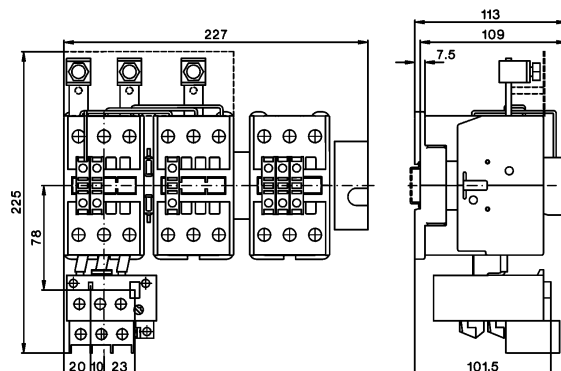
K3Y40 + U3/42
K3Y52 + U3/42



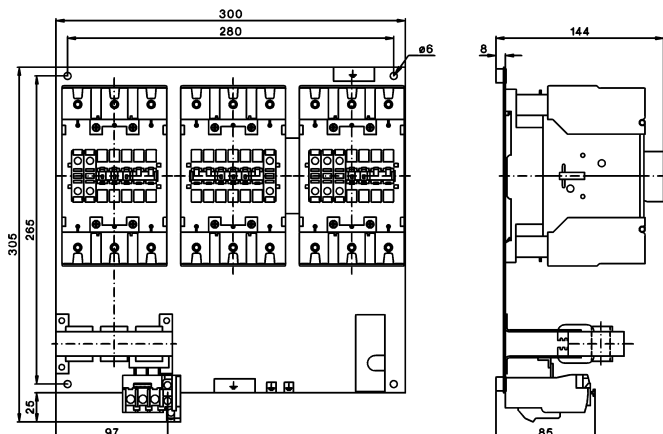
K3Y80 + U3/74



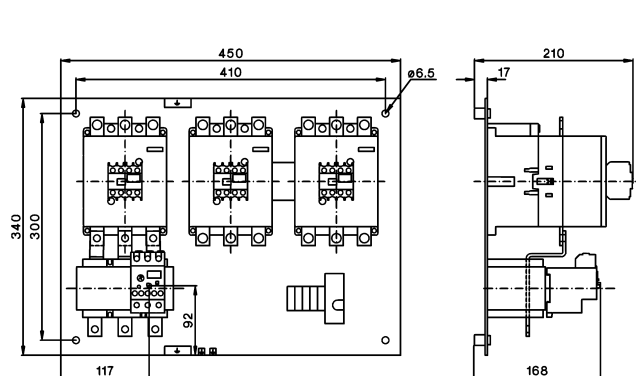
K3Y100 + U3/74



K3Y140 + U85
K3Y200



K3Y240 + U180 + SU180/176
K3Y300

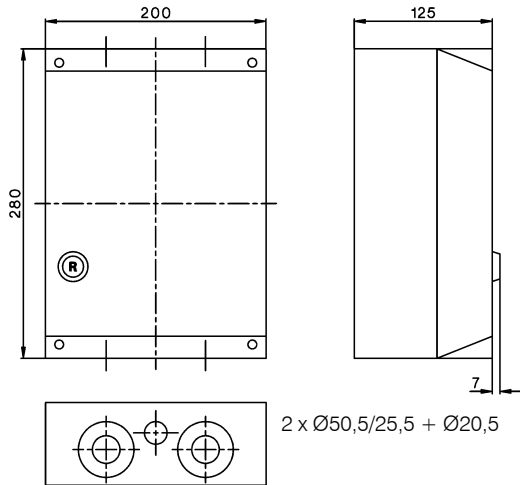


Star-Delta Starters

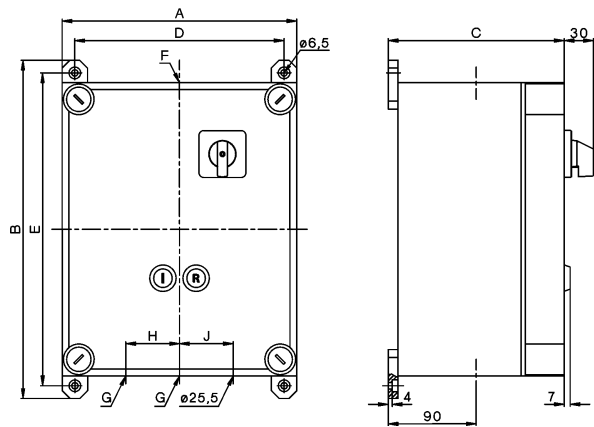
Dimensions

Star-Delta Starters, plastic enclosed, protected to IP65

K3NY26P



K3Y40P to K2Y100P



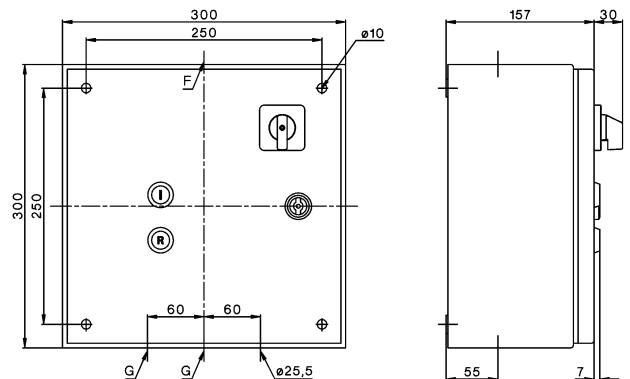
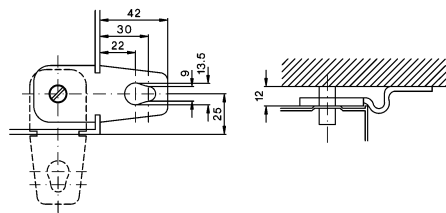
Type	A	B	C	D	E	Ø F	Ø G	H	J	
K3Y40P	300	346	180	272	320	6,5	32,5	32,5	60	60
K3Y52P	300	346	180	272	320	6,5	32,5	32,5	60	60
K3Y80P	300	446	180	272	420	6,5	40,5	40,5	70	70
K3Y100P	300	446	180	272	420	6,5	50,5	40,5	70	70

Star-Delta Starters, sheet steel enclosed, protected to IP54

K3Y26B to K3Y52B

Type	Ø F	Ø G
K3Y26B	25,5	25,5
K3Y40B	32,5	32,5
K3Y52B	32,5	32,5

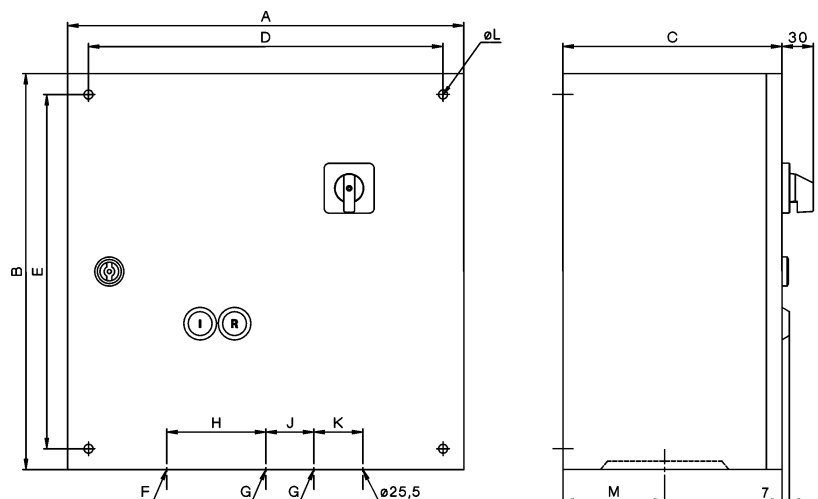
Mounting by included fixing link



K3Y80B to K2Y200B

Type	A	B	C	D	E	L	M
K3Y80B	380	380	210	340	340	8,7	65
K3Y100B	380	380	210	340	340	8,7	65
K3Y140B	380	600	210	560	340	8,7	65
K3Y200B	380	600	210	560	340	8,7	65

Type	Ø F	Ø G	H	J	K
K3Y80B	40,5	40,5	70	70	60
K3Y100B	50,5	40,5	80	70	60
K3Y140B	50,5	50,5	80	80	70
K3Y200B	50,5	50,5	80	80	70

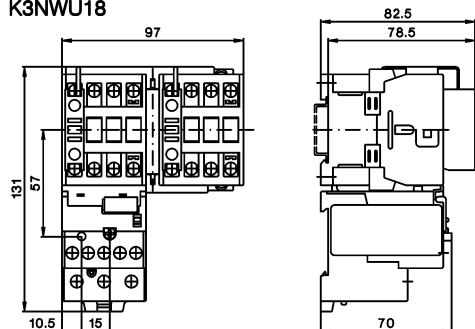


Reversing Contactors

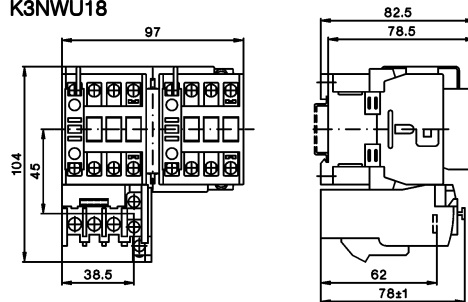
Dimensions

Reversing Starters, AC operated, open type

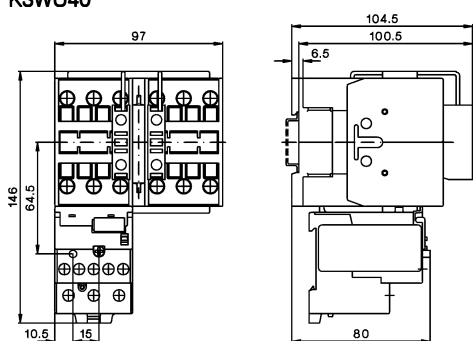
K3NWU10 + U3/32
K3NWU18



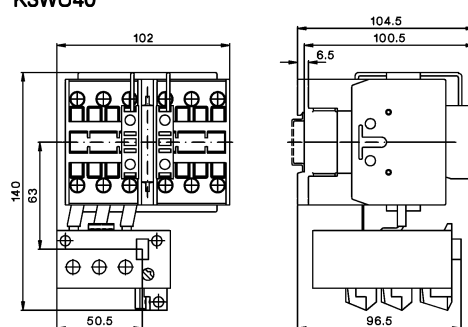
K3NWU10 + U12/16E G3
K3NWU18



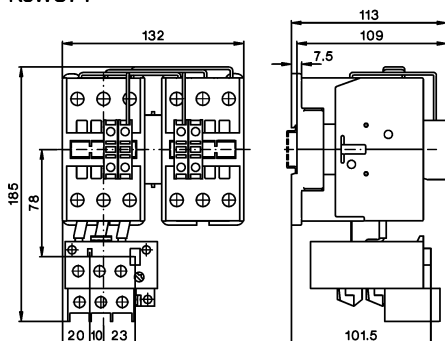
K3WU24 + U3/32
K3WU32
K3WU40



K3WU24 + U3/42
K3WU32
K3WU40



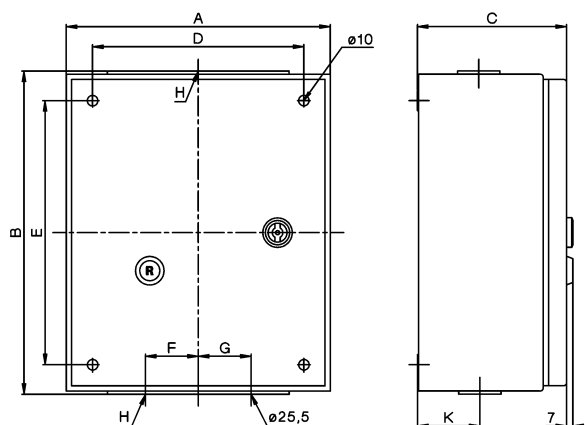
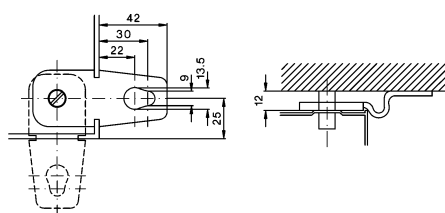
K3WU50 + U3/74
K3WU62
K3WU74



Reversing Contactors, sheet steel enclosed, protected to IP54

Type	A	B	C	D	E	F	G	H	K
K3NWU18B	300	300	150	250	250	30	30	Ø25,5	41
K3WU24B	300	300	150	250	250	30	30	Ø32,5	41
K3WU32B	300	300	150	250	250	30	30	Ø32,5	41
K3WU50B	300	300	150	250	250	40	40	Ø32,5	59
K3WU62B	300	300	150	250	250	40	40	Ø32,5	59

Mounting by included fixing link

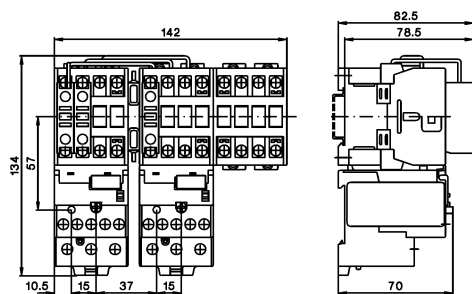


Pole Changing Starters

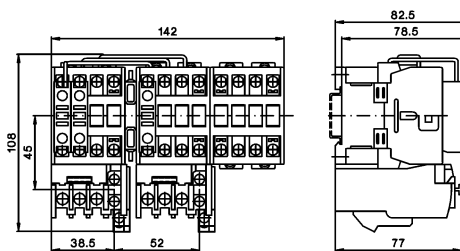
Dimensions

Pole Changing Starters, AC operated, open type

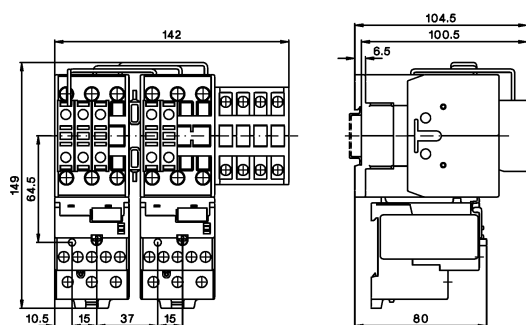
K3NPU18 + 2x U3/32



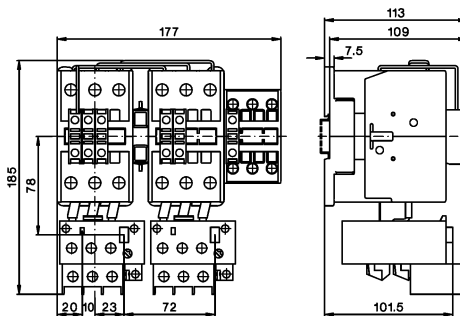
K3NPU18 + 2x U12/16



K3PU24 + 2x U3/32
K3PU32



K3PU50 + 2x U3/74
K3PU62

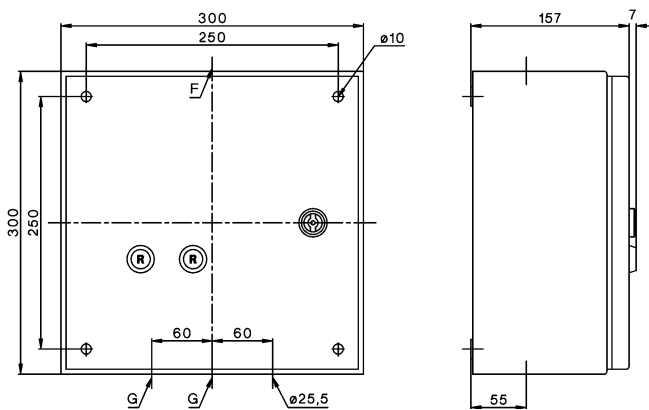
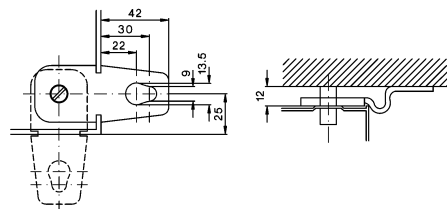


Pole Changing Starters, sheet steel enclosed, protected to IP54

K3NPU18B to K3PU32B

Type	Ø F	Ø G
K3NPU18B	25,5	25,5
K3PU24B	32,3	32,5
K3PU32B	32,3	32,5

Mounting by included fixing link





D.O.L. Starters With Start-Stop Buttons

106



D.O.L. Starters With Selector Switch

106



D.O.L. Starters With Selector Switch And
Pneumatic Switch For Use In Moist Rooms

106



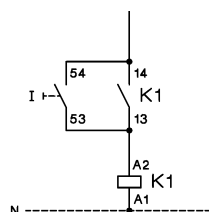
Enclosures

107



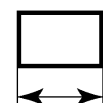
Accessories

107



Wiring Diagrams

108



Dimensions

110

D.O.L. Starters In Plastic Enclosure

Ratings AC3 at 380V 400V 415V kW	Included Contactor Type	Free Space f. Aux. Cont. HN.. pcs.	order extra Overload Relay Type	Protec- tion Degree	Conduit Entries	Type	Coil voltage ¹⁾ 230 220-240V 50Hz 400 230-264V 60Hz 380-415V 50Hz 400-440V 60Hz	Pack pcs.	Weight kg/pc.

D.O.L. Starters with Start-Stop/Reset Push Buttons



4	K3-10ND10	2	U12/16 K3	IP65	Ø 20,5mm	P1T10 ...		1	0,6
7,5	K3-18ND10	2	U12/16 K3	IP65	Ø 20,5mm	P1T18 ...		1	0,6
11	K3-22ND10	2	U12/16 K3	IP65	Ø 20,5mm	P1T22 ...		1	0,6

D.O.L. Starters with Selector Switch



4	K3-10ND10	2	U12/16 K3	IP65	Ø 20,5mm	P1W10 ...		1	0,6
7,5	K3-18ND10	2	U12/16 K3	IP65	Ø 20,5mm	P1W18 ...		1	0,6
11	K3-22ND10	2	U12/16 K3	IP65	Ø 20,5mm	P1W22 ...		1	0,6

D.O.L. Starters with Selector Switch and Pneumatic Switch for moist rooms



7,5	K3-18ND10	2	U12/16 K3	IP65	Ø 20,5mm	P1W18P ...		1	0,6
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Push button and tube on request

Ordering Example: D.O.L. Starter with selector switch, plastic enclosed, rated AC3 at 400V 15,5A, rated control voltage 230V 50Hz - **Order Type:** **P1W18 230 + U12/16E 18 K3**

Pneumatic Button



						P1LT		1	
--	--	--	--	--	--	-------------	--	---	--

Air Pressure Hose



Length 5m						P1LS-5		1	
-----------	--	--	--	--	--	---------------	--	---	--

Pneumatic Switch

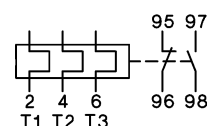


for refill of D.O.L. Starter P1W.. to P1W..P						P1-LDR		1	0,02
--	--	--	--	--	--	---------------	--	---	------

Thermal Overload Relays



Setting range A	Type	Pack pcs.	Weight kg/pc.
0,12 - 0,18	U12/16E 0,18 K3	1	0,10
0,18 - 0,27	U12/16E 0,27 K3	1	0,10
0,27 - 0,4	U12/16E 0,4 K3	1	0,10
0,4 - 0,6	U12/16E 0,6 K3	1	0,10
0,6 - 0,9	U12/16E 0,9 K3	1	0,10
0,8 - 1,2	U12/16E 1,2 K3	1	0,10
1,2 - 1,8	U12/16E 1,8 K3	1	0,10
1,8 - 2,7	U12/16E 2,7 K3	1	0,10
2,7 - 4	U12/16E 4 K3	1	0,10
4 - 6	U12/16E 6 K3	1	0,10
6 - 9	U12/16E 9 K3	1	0,10
8 - 11	U12/16E 11 K3	1	0,10
10 - 14	U12/16E 14 K3	1	0,10
13 - 18	U12/16E 18 K3	1	0,10
17 - 23	U12/16E 23 K3	1	0,10
22 - 30	U12/16E 30 K3	1	0,13



manual reset

Overload Relays with Quick Tripping Characteristic see page 115

Technical data see contactors page 56 and thermal overload relays page 119

1) Non-standard coil voltages see page 51

Enclosures for Contactors



Suitable for contactor	Protection Degree	Conduit Entries		Type	Pack pcs.	Weight kg/pc.
		Top	Bottom			
K3-07.. to K3-22.. K3-24.. ¹⁾ to K3-40.. ¹⁾	IP65	2 x Ø 20,5mm	2 x Ø 20,5mm	P1	1	0,35

Enclosures for D.O.L. Starters with reset button



Suitable for contactor	Protection Degree	Conduit Entries		Type	Pack pcs.	Weight kg/pc.
		Top	Bottom			
K3-10.. to K3-22.. +U12/16.. K3	IP65	2 x Ø 20,5mm	2 x Ø 20,5mm	P1R	1	0,35

Indicator Units



Specifications	Voltage Range	Type	Pack pcs.	Weight kg/pc.
Coil Current Indicator , green (LED)	24 - 660V AC/DC	K2-ING	10	0,02
Coil Current Indicator , red (LED)	24 - 660V AC/DC	K2-INR	10	0,02
To be connected in series with the contactor coil. In case of coil interruption the indicator goes out. Voltage drop approx. 2 volts				
Voltage Indicator , clear (glow-disc. I.)	220 - 415V AC/DC	K2-UN	10	0,02
Voltage Indicator , red (LED)	24 - 120V AC/DC	K2-UNR	10	0,02
To be connected parallel to the contactor coil. In case of applied voltage the indicator also lights at coil interruption.				
Lens Caps For Indicator Units				
Lens cap transparent		LG9743T	10	0,005
Lens cap red		LG9743R	10	0,005
Lens cap green		LG9743GR	10	0,005
Mounting instructions see page 112				

Heating Element



Specifications	Voltage Range Power Consumption	Type	Pack pcs.	Weight kg/pc.
To avoid condensed water on places where high humidity is given together with alterations of ambient temperature	380 - 415V, 1,5W	K2-HR	10	0,02
	220 - 240V, 1,5W	K2-HR 230	10	0,02

Additional Terminals, Start Contact



Specification	Cable Cross-sections to clamp mm ²			Type	Pack pcs.	Weight kg/pc.
	solid or stranded	flexible	flexib. w. multi- core cable end			
Neutral Terminal	2 x 0,75-4	2 x 0,75-2,5	2 x 0,5-2,5	LG9744	10	0,009
Earth Terminal	2,5-16	1,5-10	1,5-10	LG9750	10	0,052
Mounting instructions see page 112						
Start Contact	for contactor K3-10 to K3-22	to be snapped on top of the auxiliary contact		LG9319-K3	10	0,03

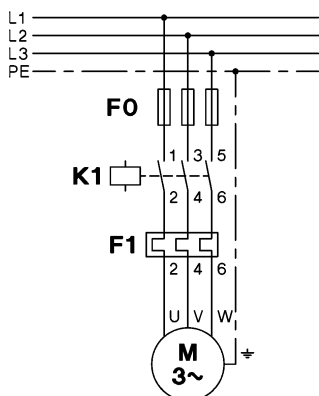
¹⁾ without auxiliary contact blocks

D.O.L. Starters

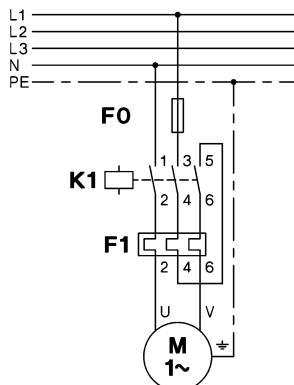
Wiring Diagrams Main Circuit

All fuses F0 shown in the main circuits are not included.
Terminal markings according to EN 50012

P1...
with overload relay U12/16.. K3



Wiring for single phase motors



Wiring Diagrams Control Circuit

D.O.L. Starters P1 with standard coil voltages (see page 94) are supplied with connectors between main circuit and control circuit.

Coil connectors

Coils for **380-415V 50Hz** and **400-440V 60Hz**: The starter is supplied with control circuit connectors between terminals 1 (L1) and 5 (L3).

Coils for **220-240V 50Hz** and **230-264V 60Hz**: The starter is supplied with control circuit connectors between terminals 95 and 5 (L3). Connect neutral wire to terminal A1.

Coils for **other voltages**: Without connectors between supply and control circuit. Connect supply to terminals A1 and 95.

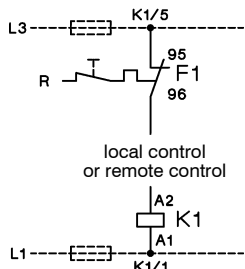
Separate coil supply

Coils for **380-415V 50Hz** and **400-440V 60Hz**: Remove connectors A1-1 and 95-5, connect supply to terminals A1 and 95.

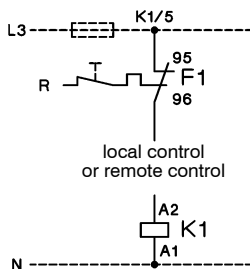
Coils for **220-240V 50Hz** and **230-264V 60Hz**: Remove connectors 95-5 connect supply to terminals A1 and 95.

Coils for **other voltages**: Connect supply to terminals A1 and 95.

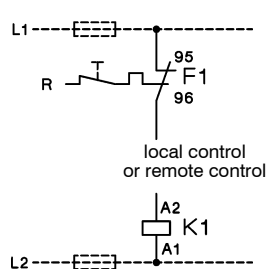
Coil phase to phase (380-415V 50Hz)



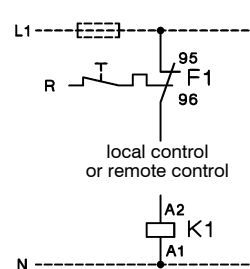
Coil phase to neutral (220-240V 50Hz)



Coil phase to phase

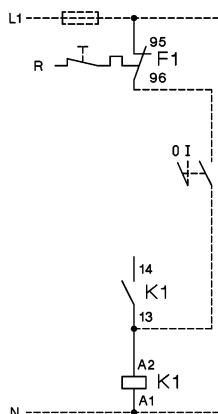


Coil phase to neutral

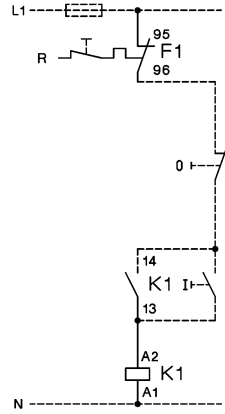


D.O.L. Starters with remote control

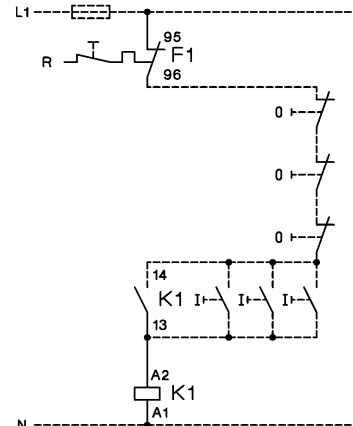
P1..
Remote 2-wire (switch) control



Remote 3-wire (push button) control



Remote start-stop control
(3 control stations)



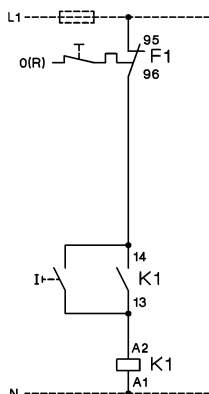
D.O.L. Starters

Wiring Diagrams Control Circuits

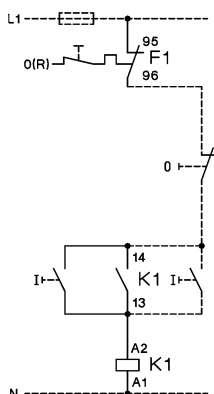
Typical circuit diagram (for separate coil supply, control circuit connected between L1 and N)
Terminal markings according to EN 50012

D.O.L. Starters with Start-Stop/Reset Push Buttons

P1T10, P1T18, P1T22
with overload relay U12/16.. K3

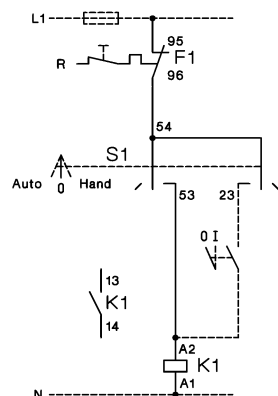


P1T10, P1T18, P1T22
with external push buttons

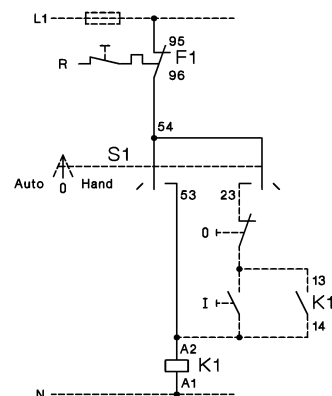


D.O.L. Starters with Selector Switch

P1W10, P1W18, P1W22
with external control switch

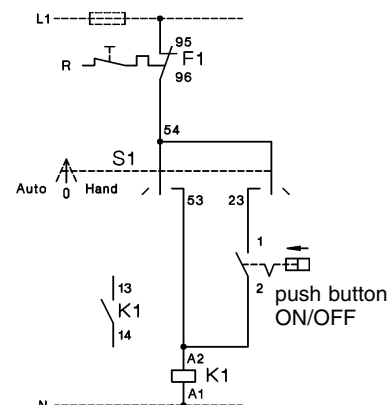


P1W10, P1W18, P1W22
with external push buttons



D.O.L. Starters with Selector Switch and Pneumatic Switch for Swimmingpool Control Gear and for use in Moist Rooms

P1W18P
with overload relay U12/16.. K3

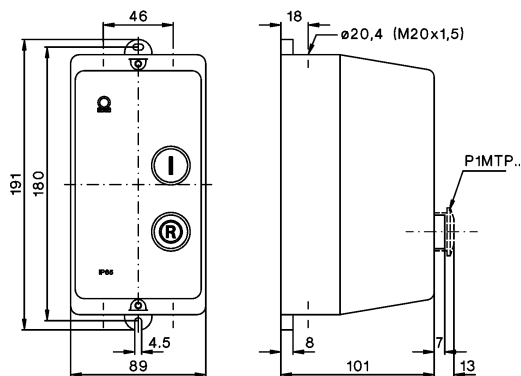


D.O.L. Starters

Dimensions

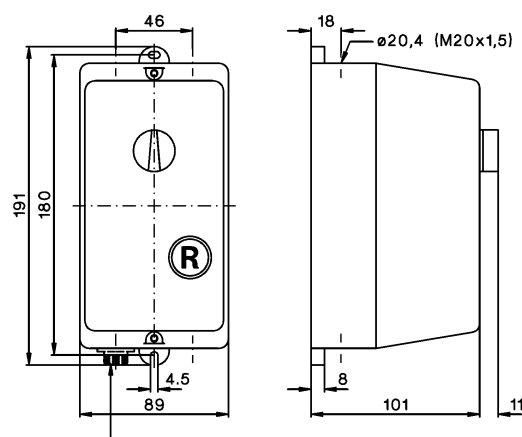
D.O.L. Starters with Start-Stop/Reset Push Buttons, Plastic Enclosed

P1T..., P1TP..



D.O.L. Starters with Selector Switch, Plastic Enclosed

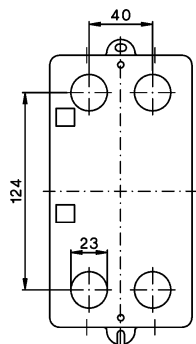
P1W..., P1W18P



P1W18P: plug-in for air tube inside diameter 3mm

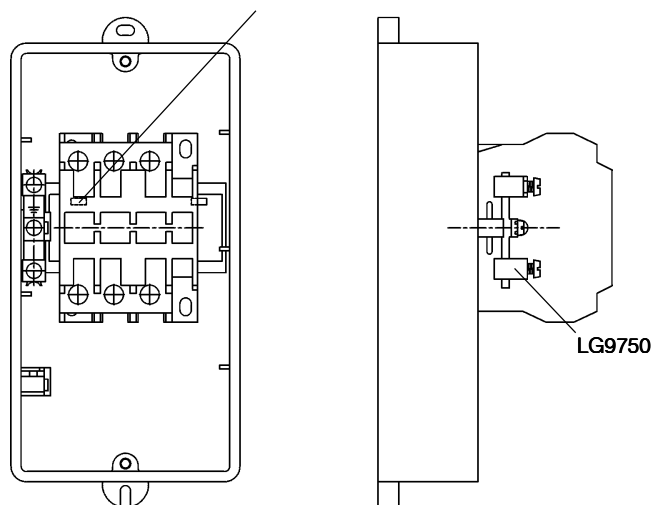
Rear Conduit Entries

knockouts
4 x $\varnothing 23$

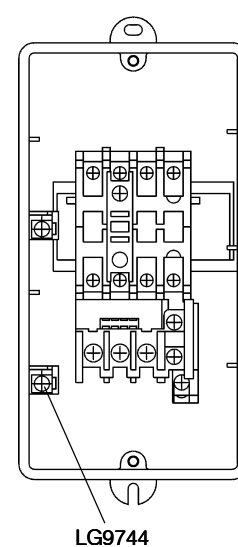


Earth Terminal LG9750 for K2-23 and K2-30 in Enclosure P1

for K2-23 and K2-30 remove spacing piece



Neutral Terminal LG9744

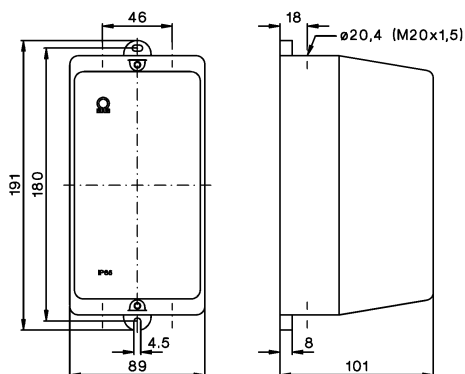


Enclosures

Dimensions

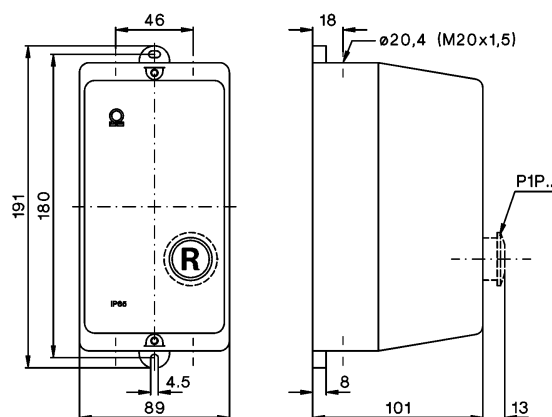
Enclosures for Contactors

P1



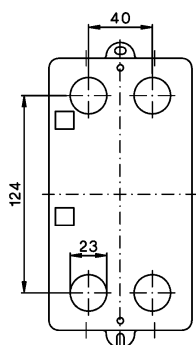
Enclosures for D.O.L. Starters

P1R, P1P



Rear Conduit Entries

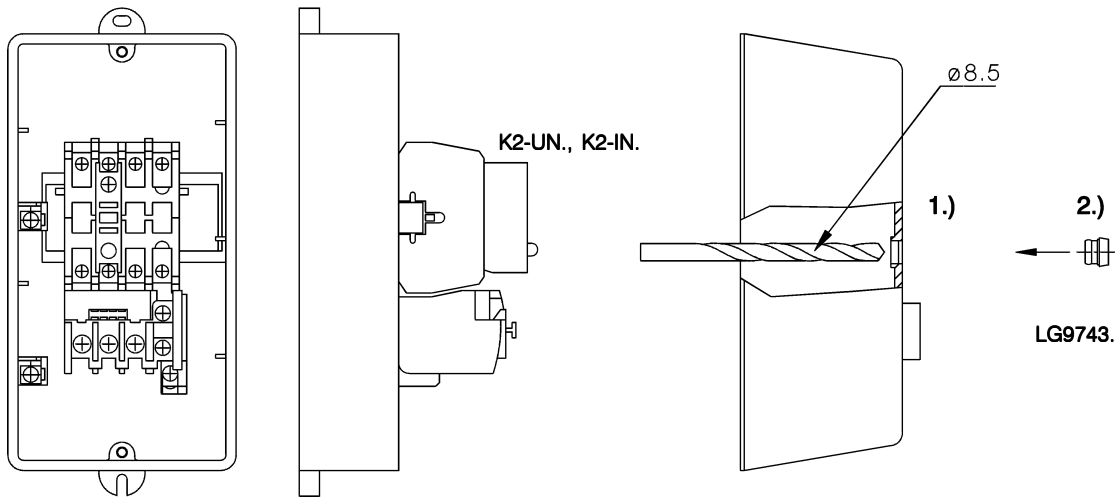
knockouts
4 x $\varnothing 23$



D.O.L. Starters

Mounting and Wiring Instructions

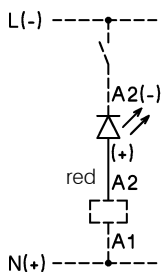
Indicators and Lens Caps for D.O.L. Starters P1



Wiring Examples

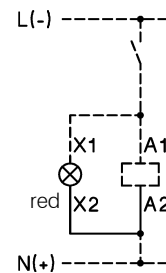
Coil Current Indicator

K2-ING
K2-INR



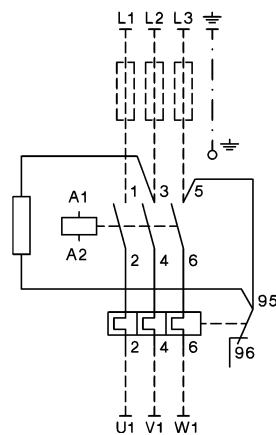
Voltage Indicator

K2-UN
K2-UNR

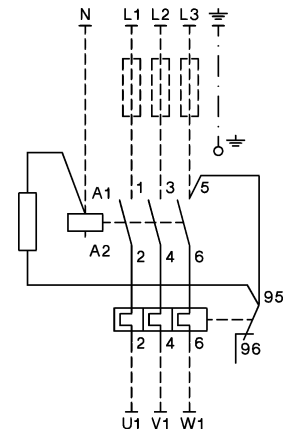


Heating Element

K2-HR

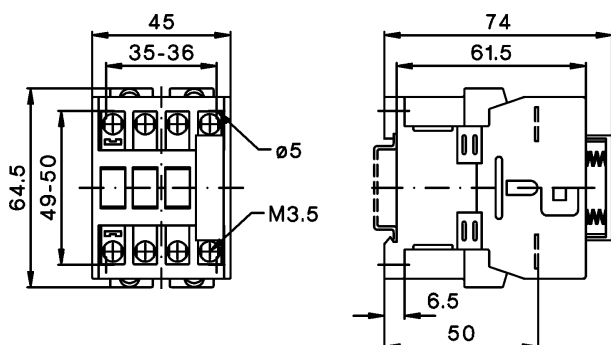


K2-HR 230



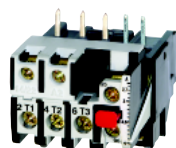
Colour mentioned in wiring diagrams refer to the outgoing connection wire of the device.

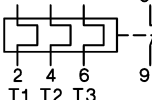
Start Contact LG9319-K3 for K3-10ND10 up to K3-22ND10

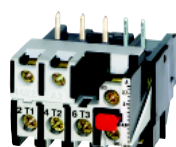


	Thermal Overload Relays for Direct Mounting	114
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	Accessories	117
	Technical Data	118
	Dimensions	123

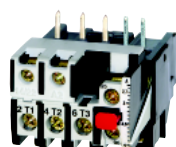
Thermal Overload Relays for plug-in mounting



Setting Range			Type	Pack pcs.	Weight kg/pc.	Wiring Diagram
D.O.L. (A)	Δ (A)					
With Manual Reset, for contactors K1-..						
0,12 - 0,18	-		U12/16E 0,18 K1	1	0,10	 manual reset
0,18 - 0,27	-		U12/16E 0,27 K1	1	0,10	
0,27 - 0,4	-		U12/16E 0,4 K1	1	0,10	
0,4 - 0,6	-		U12/16E 0,6 K1	1	0,10	
0,6 - 0,9	-		U12/16E 0,9 K1	1	0,10	
0,8 - 1,2	-		U12/16E 1,2 K1	1	0,10	
1,2 - 1,8	-		U12/16E 1,8 K1	1	0,10	
1,8 - 2,7	-		U12/16E 2,7 K1	1	0,10	
2,7 - 4	-		U12/16E 4 K1	1	0,10	
4 - 6	7 - 10,5		U12/16E 6 K1	1	0,10	
6 - 9	10,5 - 15,5		U12/16E 9 K1	1	0,10	
8 - 11	14 - 19		U12/16E 11 K1	1	0,10	
10 - 14	18 - 24		U12/16E 14 K1	1	0,10	

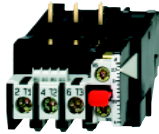


With Auto Reset, for contactors K1-..						
0,12 - 0,18	-		U12/16A 0,18 K1	1	0,10	auto reset or manual reset
0,18 - 0,27	-		U12/16A 0,27 K1	1	0,10	
0,27 - 0,4	-		U12/16A 0,4 K1	1	0,10	
0,4 - 0,6	-		U12/16A 0,6 K1	1	0,10	
0,6 - 0,9	-		U12/16A 0,9 K1	1	0,10	
0,8 - 1,2	-		U12/16A 1,2 K1	1	0,10	
1,2 - 1,8	-		U12/16A 1,8 K1	1	0,10	
1,8 - 2,7	-		U12/16A 2,7 K1	1	0,10	
2,7 - 4	-		U12/16A 4 K1	1	0,10	
4 - 6	7 - 10,5		U12/16A 6 K1	1	0,10	
6 - 9	10,5 - 15,5		U12/16A 9 K1	1	0,10	
8 - 11	14 - 19		U12/16A 11 K1	1	0,10	
10 - 14	18 - 24		U12/16A 14 K1	1	0,10	



With Quick Tripping Characteristic for EEx e motors and submersible pumps, f. contactors K1-..						
0,4 - 0,6	-		U12/16EQ 0,6 K1	1	0,10	manual reset
0,6 - 0,9	-		U12/16EQ 0,9 K1	1	0,10	
0,8 - 1,2	-		U12/16EQ 1,2 K1	1	0,10	
1,2 - 1,8	-		U12/16EQ 1,8 K1	1	0,10	
1,8 - 2,7	-		U12/16EQ 2,7 K1	1	0,10	
2,7 - 4	-		U12/16EQ 4 K1	1	0,10	
4 - 6	7 - 10,5		U12/16EQ 6 K1	1	0,10	
6 - 9	10,5 - 15,5		U12/16EQ 9 K1	1	0,10	
8 - 11	14 - 19		U12/16EQ 11 K1	1	0,10	
10 - 14	18 - 24		U12/16EQ 14 K1	1	0,10	

Thermal Overload Relays for plug-in mounting



Setting Range
D.O.L. (A) Δ (A)

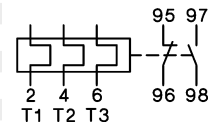
Type

Pack Weight
pcs. kg/pc.

Wiring Diagram

With Manual Reset, for contactors K(G)3-10.. to K(G)3-22.. ..

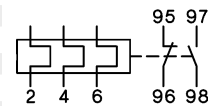
0,12 - 0,18	-	U12/16E 0,18 K3	1	0,10
0,18 - 0,27	-	U12/16E 0,27 K3	1	0,10
0,27 - 0,4	-	U12/16E 0,4 K3	1	0,10
0,4 - 0,6	-	U12/16E 0,6 K3	1	0,10
0,6 - 0,9	-	U12/16E 0,9 K3	1	0,10
0,8 - 1,2	-	U12/16E 1,2 K3	1	0,10
1,2 - 1,8	-	U12/16E 1,8 K3	1	0,10
1,8 - 2,7	-	U12/16E 2,7 K3	1	0,10
2,7 - 4	-	U12/16E 4 K3	1	0,10
4 - 6	7 - 10,5	U12/16E 6 K3	1	0,10
6 - 9	10,5 - 15,5	U12/16E 9 K3	1	0,10
8 - 11	14 - 19	U12/16E 11 K3	1	0,10
10 - 14	18 - 24	U12/16E 14 K3	1	0,10
13 - 18	23 - 31	U12/16E 18 K3	1	0,10
17 - 23	30 - 40	U12/16E 23 K3	1	0,10
22 - 30	38 - 52	U12/16E 30 K3	1	0,13



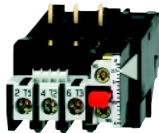
manual reset

With quick Tripping Characteristic for EEx e motors and under water pumps

0,4 - 0,6	-	U12/16EQ 0,6 K3	1	0,10
0,6 - 0,9	-	U12/16EQ 0,9 K3	1	0,10
0,8 - 1,2	-	U12/16EQ 1,2 K3	1	0,10
1,2 - 1,8	-	U12/16EQ 1,8 K3	1	0,10
1,8 - 2,7	-	U12/16EQ 2,7 K3	1	0,10
2,7 - 4	-	U12/16EQ 4 K3	1	0,10
4 - 6	7 - 10,5	U12/16EQ 6 K3	1	0,10
6 - 9	10,5 - 15,5	U12/16EQ 9 K3	1	0,10
8 - 11	14 - 19	U12/16EQ 11 K3	1	0,10
10 - 14	18 - 24	U12/16EQ 14 K3	1	0,10

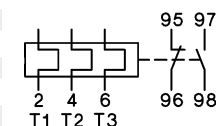


manual reset



For contactors K(G)3-10.. to K(G)3-40A..

0,12 - 0,18	-	U3/32 0,18	1	0,14
0,18 - 0,27	-	U3/32 0,27	1	0,14
0,27 - 0,4	-	U3/32 0,4	1	0,14
0,4 - 0,6	-	U3/32 0,6	1	0,14
0,6 - 0,9	-	U3/32 0,9	1	0,14
0,8 - 1,2	-	U3/32 1,2	1	0,14
1,2 - 1,8	-	U3/32 1,8	1	0,14
1,8 - 2,7	-	U3/32 2,7	1	0,14
2,7 - 4	-	U3/32 4	1	0,14
4 - 6	7 - 10,5	U3/32 6	1	0,14
6 - 9	10,5 - 15,5	U3/32 9	1	0,14
8 - 11	14 - 19	U3/32 11	1	0,14
10 - 14	18 - 24	U3/32 14	1	0,14
13 - 18	23 - 31	U3/32 18	1	0,14
17 - 24	30 - 41	U3/32 24	1	0,14
23 - 32	40 - 55	U3/32 32	1	0,14

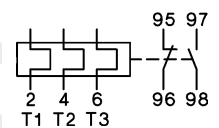


manual and auto reset



For contactors K(G)3-24A.. to K(G)3-40A ..

10 - 14	18 - 24	U3/42 14	1	0,30
14 - 20	24 - 35	U3/42 20	1	0,30
20 - 28	35 - 48	U3/42 28	1	0,30
28 - 42	48 - 73	U3/42 42	1	0,30

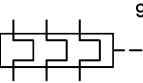


manual and auto reset



Thermal Overload Relays for plug-in mounting



Setting Range				Type	Pack	Weight	Wiring Diagram
D.O.L. (A)	Δ (A)				pcs.	kg/pc.	
For contactors K3-50A.. to K3-74A..							
20 - 28	35 - 48	U3/74 28		1	0,40		
28 - 42	48 - 73	U3/74 42		1	0,40		
40 - 52	70 - 90	U3/74 52		1	0,40		
52 - 65	90 - 112	U3/74 65		1	0,40		
60 - 74	104 - 128	U3/74 74		1	0,40		
							manual and auto reset

Thermal Overload Relays for separate mounting



Setting Range		Type	Pack pcs.	Weight kg/pc.	Wiring Diagram
D.O.L. (A)	Δ (A)				
For contactors K3-90, K3-115, K85, K110					
60 - 90	104 - 156	U85 90	1	0,90	
80 - 120	140 - 207	U85 120			

manual reset



For contactors K3-151.. and K3-176.., busbars included

120 - 180	208 - 312	U180 180	1	1,5	

manual and auto reset



For contactors K3-210.. up to K3-316.., busbars included

144 - 216	250 - 374	U320 216	1	1,8	
216 - 320	374 - 554	U320 320			

manual and auto reset



For contactors K3-315.. , K3-450.. , K3-550.. , K3-700.. , K3-860..

240 - 360	416 - 623	U800 360	1	4,1	
360 - 540	623 - 935	U800 540	1	4,1	
540 - 800	935 - 1385	U800 800	1	4,1	

With Slow Tripping Characteristic for heavy duty starting with long run up times

For separate mounting, suitable for all contactors



0,8 - 1,2	1,2 - 2,1	UAT21 1,2	1	1,0	
1,2 - 1,8	2,1 - 3,1	UAT21 1,8	1	1,0	
1,6 - 2,4	2,8 - 4,2	UAT21 2,4	1	1,0	
2,4 - 3,7	4,2 - 6,4	UAT21 3,7	1	1,0	manual reset
3,7 - 5,7	6,4 - 9,9	UAT21 5,7	1	1,0	
5,3 - 8,2	9,2 - 14,2	UAT21 8,2	1	1,0	
8 - 12	13,9 - 20,1	UAT21 12	1	1,0	
12 - 18	20,1 - 31,2	UAT21 18	1	1,0	
16 - 24	27,7 - 41,6	UAT22 24	1	1,1	
24 - 37	41,6 - 64	UAT23 37	1	1,3	
32 - 49	55,4 - 85	UAT23 49	1	1,3	
48 - 72	83 - 125	UAT23 72	1	1,3	

manual reset

Accessories



for overload relays	for contactors	Type	Pack set	Weight kg/set
Busbar Sets				
U800	K3-450.., K3-550..	SU840/550	1	1,7
U800	K3-700.., K3-860..	SU840/860		2,1



for overload relay	Cable Cross-section (mm²) solid or stranded	flexible	Type	Pack pcs.	Weight kg/pc.
Set for Single Mounting on DIN-rail with terminals					
U12/16..K3	0,75 - 6	0,75 - 4	U12SM K3	1	0,035



Additional Terminals with fingertouch protection					
U3/32	0,75 - 6	0,75 - 4	U3/32SM	1	0,035



Set for Single Mounting on DIN-rail					
U3/42, U3/74	-	-	U3/42G	1	0,030



Connecting Wire Set for U3/42, U3/74 with Single Mounting					
U3/42, U3/74	150mm lang	10mm²	LG5830-4	1	0,060
U3/42, U3/74	250mm lang	10mm²	LG5830-2	1	0,100



Additional Terminals with fingertouch protection					
1-pole f. U12/16, U3/32	0,75 - 10	0,75 - 6	LG9339	1	0,009
3-pole for U3/42	4 - 35	6 - 25	LG7559	1	0,052

Thermal Overload Relays, tripping times for selection to motors of protection degree EEx e

Relays With Standard Tripping Characteristic

Setting Range		Tripping time depending on the multiple of the current setting from cold condition (tolerance $\pm 20\%$ of the tripping time)					
A	A	I_A/I_N 3	I_A/I_N 4	I_A/I_N 5	I_A/I_N 6	I_A/I_N 7,2	I_A/I_N 8
U3/32 ..		s	s	s	s	s	s
0,12 -	0,18	16,1	9,6	6,8	5,3	4,2	3,7
0,18 -	0,27	16,6	9,7	6,7	5,2	4,1	3,6
0,27 -	0,4	19,4	11,4	7,9	6,1	4,7	4,2
0,4 -	0,6	18,7	10,9	7,6	5,9	4,6	4,0
0,6 -	0,9	19,2	11,2	7,7	5,9	4,6	4,1
0,8 -	1,2	20,8	12,3	8,5	6,6	5,2	4,6
1,2 -	1,8	25,5	14,1	9,8	7,6	5,9	5,2
1,8 -	2,7	26,6	15,6	10,9	8,3	6,5	5,7
2,7 -	4	22,7	13,6	9,5	7,4	5,8	5,1
4 -	6	22,2	13,3	9,3	7,1	5,6	4,9
6 -	9	20,4	11,9	8,2	6,1	4,7	4,0
8 -	11	20,9	11,8	7,9	5,7	4,3	3,5
10 -	14	21,3	11,7	7,4	5,1	3,7	3,0
13 -	18	21,2	12,1	8,0	6,2	4,6	4,1
17 -	24	20,4	12,0	8,6	6,3	4,5	3,7
23 -	32	20,2	10,2	6,7	4,7	3,4	2,8
U3/42		s	s	s	s	s	s
10 -	14	21,8	11,4	7,0	5,0	3,7	2,8
14 -	20	22,4	11,2	6,7	4,5	3,2	2,4
20 -	28	21,8	10,8	6,5	4,5	3,3	2,5
28 -	42	25,2	13,3	8,0	5,5	4,0	3,1
U3/74		s	s	s	s	s	s
20 -	28	21,8	10,8	6,5	4,5	3,3	2,5
28 -	42	25,2	13,3	8,0	5,5	4,0	3,1
40 -	52	18,3	9,2	5,6	3,9	2,8	2,2
52 -	65	17,8	8,7	5,2	3,4	2,5	1,9
U85 ..		s	s	s	s	s	s
60 -	90	19,5	13,5	11,0	10,0	9,5	8,5
80 -	120	18,0	11,0	10,0	9,0	8,5	8,0
U840 ..		s	s	s	s	s	s
260 -	360	23,3	14,1	10,0	7,6	6,1	5,4
340 -	480	23,0	13,8	9,6	7,6	6,1	5,4
440 -	620	20,5	12,4	9,0	7,0	5,5	5,0
560 -	800	21,0	12,5	9,0	7,0	5,6	5,2
U12/16E(A) ..		s	s	s	s	s	s
0,12 -	0,18	18,5	10,4	7,2	5,5	4,3	3,6
0,18 -	0,27	16,7	9,8	6,5	5,0	4,1	3,5
0,27 -	0,4	19,4	12,1	8,2	5,9	4,9	4,2
0,4 -	0,6	18,7	11,2	8,0	6,0	4,9	4,1
0,6 -	0,9	19,7	11,6	8,1	6,1	4,9	4,2
0,8 -	1,2	22,9	13,6	10,0	7,3	6,0	5,2
1,2 -	1,8	22,2	13,2	9,2	7,6	5,8	5,3
1,8 -	2,7	23,0	13,7	9,3	7,6	5,7	5,1
2,7 -	4	24,0	14,4	9,9	7,8	5,9	5,1
4 -	6	24,7	13,8	9,9	7,3	5,6	4,8
6 -	9	22,0	13,4	8	5,7	4,1	3,5
8 -	11	17,4	9,2	5,9	4,1	2,9	2,3
10 -	14	26,4	12,9	7,6	5,2	3,5	2,8
13 -	18	14,7	7,7	4,8	3,2	2,3	1,7
17 -	23	16,2	8,4	5,0	3,6	2,4	1,8
22 -	30	16,8	8,5	5,0	3,6	2,3	1,9

Relays With Quick Tripping Characteristic

preferably for motors with short t_E time and for submersible pumps

Setting Range		Tripping time depending on the multiple of the current setting from cold condition (tolerance $\pm 20\%$ of the tripping time)					
A	A	I_A/I_N 3	I_A/I_N 4	I_A/I_N 5	I_A/I_N 6	I_A/I_N 7,2	I_A/I_N 8
U12/16EQ ..		s	s	s	s	s	s
0,4 -	0,6	13,6	8,4	5,9	4,2	3,3	3,0
0,6 -	0,9	13,8	7,8	5,2	4,1	3,2	2,7
0,8 -	1,2	13,1	7,5	5,2	3,9	3,1	2,7
1,2 -	1,8	14,6	8,7	6,0	4,6	3,6	3,2
1,8 -	2,7	13,5	7,6	5,3	3,9	3,1	2,7
2,7 -	4	11,0	6,0	4,1	2,6	1,7	1,4
4 -	6	9,6	5,3	3,3	2,3	1,6	1,3
6 -	9	10,2	5,4	3,4	2,3	1,6	1,3
8 -	11	12,0	6,2	3,9	2,5	1,8	1,3
10 -	14	12,8	6,6	4,0	2,6	1,8	1,4

All tripping times of overload relays U12/16EQ are shorter than the minimum values of the t_E time for motors of protection degree EEx e acc. to EN 50019 and therefore are suitable for all motors of protection degree EEx e. For these overload relays the selection on basis of tripping curves is thereby not necessary.

When selecting a standard overload, refer to the tripping curve. Determine the values of the starting current ratio I_A/I_N and the time t_E which is marked on the label of the motor. The overload must trip within the t_E time, which means that the tripping curve from cold condition must be (20% due to tolerance) below the co-ordination point I_A/I_N and the time t_E .

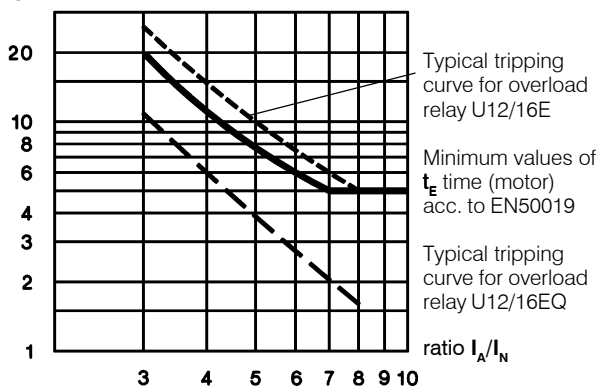
I_A = Starting current of motor

I_N = Rated current of motor

t_E = t_E -time of motor

Time t_E /Tripping time

s



Labels of tripping curves for each setting range, sized 148x105mm (self-adhesive) are available on request.

Order No. D588, specify type and setting range.

Example of selection for thermal overload relay:

Technical data of a motor protection EEx e

$P_N = 1,5\text{kW}$ $I_N = 3,6\text{A}$ $I_A/I_N = 5$ $t_E \text{ time} = 8\text{s}$

1) U12/16E 4 (2,7 - 4A)

Tripping time at $5 \times I_N = 9,9\text{s}$

$9,9\text{s} + 20\% \text{ tolerance} = 11,9\text{s} > t_{E \text{ Motor}} = 8\text{s}$

The device U12/16E 4 is **not suitable**.

2) U12/16EQ 4 (2,7 - 4A)

Tripping time at $5 \times I_N = 4,1\text{s}$

$4,1\text{s} + 20\% \text{ tolerance} = 4,9\text{s} < t_{E \text{ Motor}} = 8\text{s}$

The device U12/16EQ 4 is **therefore suitable** for motor protection

Thermal Overload Relays

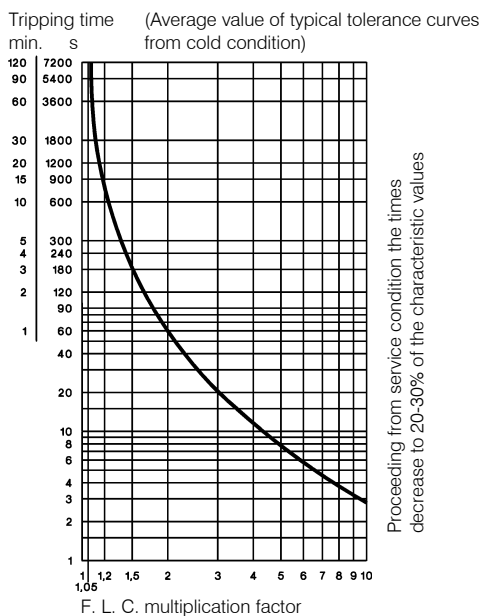
Fuses for U3/32, U3/42, U3/74, U12/16E, U85, U180, U320 and U800

Type	Setting Range				Max. Fuse Size According to Coordination-type				Fuse UL	SCCR
	DOL	A	Δ	A	"2" 1)		"1" 1)			
					quick	slow, gL(gG)	slow, gL(gG)	aM		
					A	A	A	A	A	kA
U3/32 (U12/16E)	0,12 -	0,18	-		0,5 ²⁾	0,5 ²⁾	25	-	15	5
	0,18 -	0,27	-		1,0 ²⁾	1,0 ²⁾	25	-	15	5
	0,27 -	0,4	-		2	2	25	-	15	5
	0,4 -	0,6	-		2	2	25	-	15	5
	0,6 -	0,9	-		4	4	25	-	15	5
	0,8 -	1,2	-		4	4	25	2	15	5
	1,2 -	1,8	-		6	6	25	2	15	5
	1,8 -	2,7	-		10	10	25	4	15	5
	2,7 -	4	-		16	10	25	4	15	5
	4 -	6	7 -	10,5	20	16	25	6	15	5
	6 -	9	10,5 -	15,5	35	25	35	10	25	5
	8 -	11	14 -	19	35	25	35	16	30	5
	10 -	14	18 -	24	50	35	63	16	40	5
	13 -	18	23 -	31	50	35	63	20	50	5
	17 -	(23)24	30 -	(40)41	63	50	63	25	60	5
	(22)23 -	(30)32	(38)40 -	(52)55	80	63	80	35	70	5
U3/42	10 -	14	18 -	24	50	35	80	16	40	5
	14 -	20	24 -	35	63	50	80	25	60	5
	20 -	28	35 -	48	80	63	80	35	80	5
	28 -	42	48 -	73	100	80	150	50	110	5
U3/74	20 -	28	35 -	48	100	80	150	35	80	5
	28 -	42	48 -	73	125	100	150	50	110	5
	40 -	52	70 -	90	160	100	150	63	200	5
	52 -	65	90 -	112	160	125	150	80	250	10
	60 -	74	104 -	128	160	125	150	80	250	10
U85	60 -	90	104 -	156					300	10
	80 -	120	140 -	207					-	10
U180, U320 U800	all ranges all ranges				For short circuit protecting overload relays with current transformer use fuse according to the contactor of the combination.				-	- -

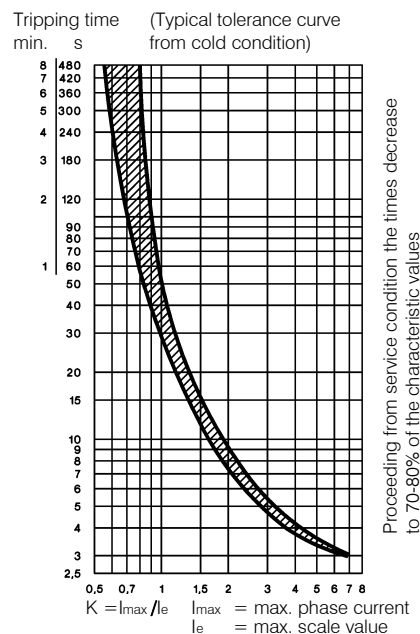
Tripping Characteristics for U3/32, U3/42, U3/74 and U12/16E

Detailed tripping times for each range see table page 118

with three-phase load



with two-pole load



- 1) Coordination-type according to IEC 947-4-1:
 "2": Light contact welding accepted. Thermal overload relay must not be damaged.
 "1": Welding of contactor and damage of the thermal overload relay allowed.
- 2) Miniature fuse

- 3) Suitable for use on a capability of delivering not more than

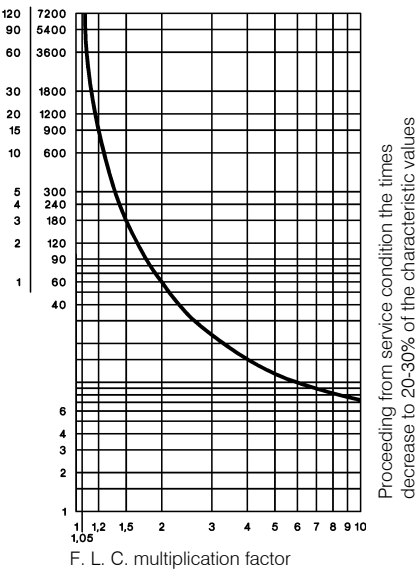
Thermal Overload Relays

Tripping Characteristics for U85, U180, U320, and U800

Detailed tripping times for each range of U85 see table page 118

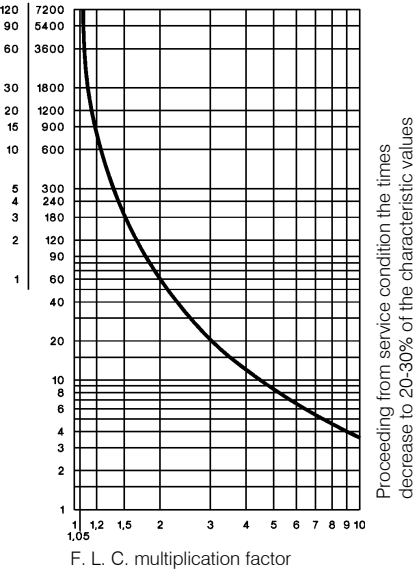
U85 with three-phase load

Tripping time (Average value of typical tolerance curves from cold condition)



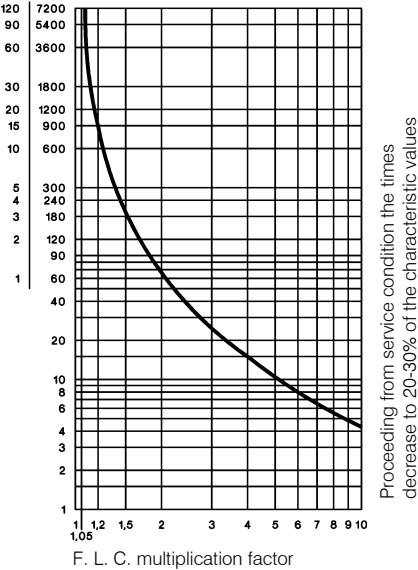
U180, U320 with three-phase load

Tripping time (Average value of typical tolerance curves from cold condition)



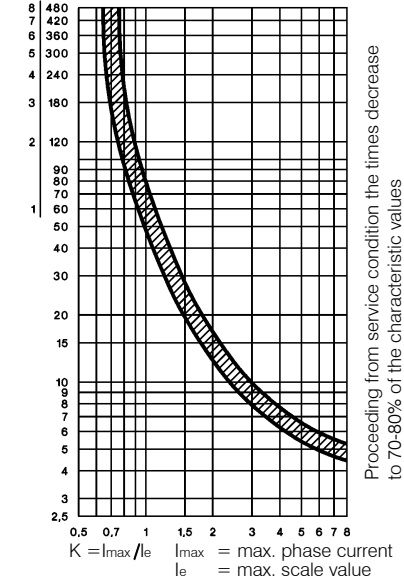
U800 with three-phase load

Tripping time (Average value of typical tolerance curves from cold condition)



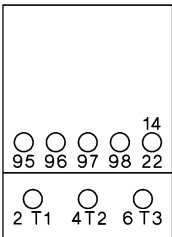
U85 with two-pole load

Tripping time (Typical tolerance curve from cold condition)

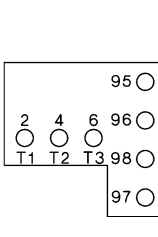


Position of Terminals

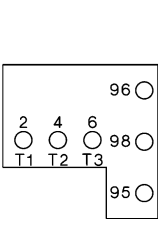
U3/32



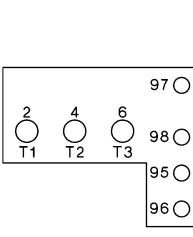
U12/16E, U12/16EM, U12/16EQ



U12/16A



U3/42, U3/74



Thermal Overload Relays in Special Version

Fuse for U12/16EQ

Setting Range	Maximum Fuse Acc. to Coordination-type		
	"2" ¹⁾ quick A	slow, gL(gG) A	"1" ¹⁾ slow, gL(gG) A
0,4 - 0,6	2	2	25
0,6 - 0,9	4	4	25
0,8 - 1,2	4	4	25
1,2 - 1,8	6	6	25
1,8 - 2,7	10	10	25
2,7 - 4	16	10	25
4 - 6	20	16	25
6 - 9	35	25	35
8 - 11	35	25	35
10 - 14	50	35	63

Fuse for U12/16EM

Setting Range	Maximum Fuse Acc. to Coordination-type "2" ¹⁾		
	380-400V slow, gL(gG) A	500V slow, gL(gG) A	660-690V slow, gL(gG) A
0,12 - 0,18	none	none	on request
0,18 - 0,27	none	none	on request
0,27 - 0,4	none	none	on request
0,4 - 0,6	none	none	on request
0,6 - 0,9	none	none	on request
0,8 - 1,2	none	10	on request
1,2 - 1,8	none	16	on request
1,8 - 2,7	20	20	on request
2,7 - 4	35	35	on request

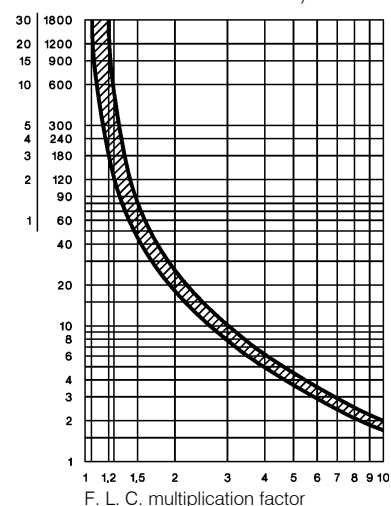
Tripping Characteristic for U12/16EQ

Detailed tripping times for each range see table page 118

with three-phase load

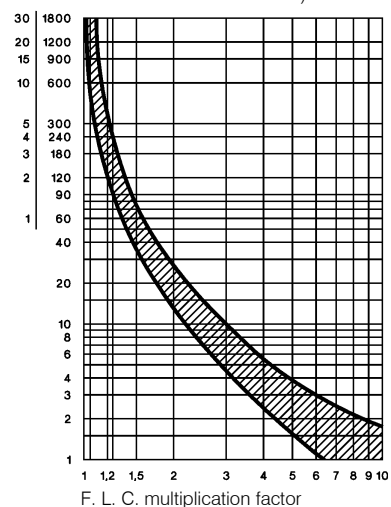
range 0,4-0,6 to 1,8-2,7A

Tripping time (Typical tolerance curve from cold condition)



range 2,7-4 to 10-14A

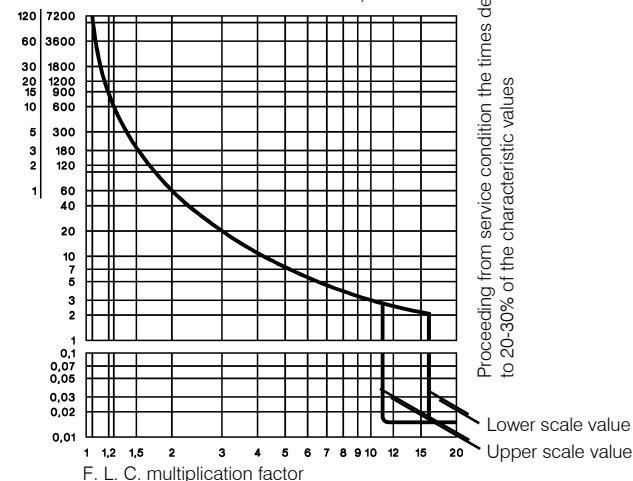
Tripping time (Typical tolerance curve from cold condition)



Tripping Characteristic for U12/16EM

with three-phase load

Tripping time (Average value of typical tolerance curves from cold condition)



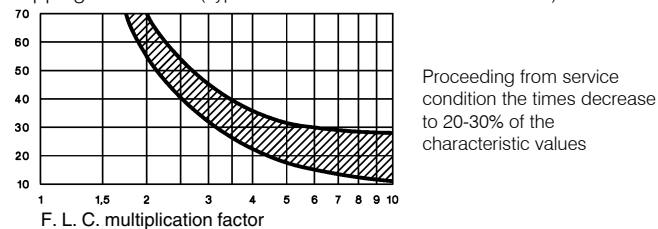
Fuse for UAT21, UAT22, UAT23

For short circuit protecting thermal overload relays with current transformer use fuse according to the contactor of the combination.

Tripping characteristic for UAT21, UAT22, UAT23

with three-phase load

Tripping time in s (Typical tolerance curve from cold condition)



1) Coordination-type according to IEC 947-4-1:
 "2": Light contact welding accepted. Thermal overload relay must not be damaged.
 "1": Welding of contactor and damage of the thermal overload relay allowed.

Thermal Overload Relays

Data according to IEC 947-4-1, IEC 947-5-1, VDE 0660, EN 60947-4-1, EN 60947-5-1

Type		U3/32	U12/16 ⁶⁾	U3/42	U3/74	U85	U180	U320	U800	UAT21	UAT22	UAT23
Rated insulation voltage $U_i^{1)}$	V~	690	690	690	690	750	1000	1000	1000	690	690	690
Permissible ambient temperature												
operation	open °C			-25 to +60					-25 to +55	-25 to +60		
storage	°C			-50 to +70					-40 to +70	-50 to +70		
Trip class according to IEC 947-4-1	10A	10A	10A	10A	20	10A	10A	10	10	30	30	30
Cable cross-section												
main connector	solid or stranded mm ²	0,75-6	0,75-6+0,75-2,5 ²⁾	0,75-10	4-35 ²⁾	3)	7)	-	7)	0,5-10	0,5-16	0,5-25
	flexible mm ²	1-4	0,75-4+0,5-2,5 ²⁾	0,75-6	6-25 ²⁾					0,5-6	0,5-10	0,5-16
	flexible with multicore cable end mm ²	0,75-4	0,5-2,5+0,5-1,5	0,75-6	4-25					0,5-6	0,5-10	0,5-16
Cables per clamp	number	2	1+1	2	1					1	1	1
auxiliary connector	solid mm ²			0,75-2,5 ²⁾					1-2,5 ²⁾	0,75-2,5 ²⁾		
	flexible mm ²			0,5-2,5 ²⁾					1-2,5 ²⁾	0,5-2,5 ²⁾		
	flexible with multicore cable end mm ²			0,5-1,5					1-2,5 ²⁾	0,5-1,5		
Cables per clamp	number			2					2	2		
Type		U3/32	U12/16A	U12/16E	U12/16EQ	U3/42	U85	U180	U800	UAT21	UAT22	UAT23
Auxiliary contacts												
Rated insulation voltage $U_i^{1)}$												
same potential	V~	690	690	690	690	690	690	690	500	690		
different potential	V~	440	-	440	440	250	440	440	500	440		
Utilization category AC15												
Rated operational current I_e	24V A	3	4	5	5	4	5	3	4 ⁵⁾	5		
	230V A	2	2,5	3	3	2,5	3	2	2,5	3		
	400V A	1	1,5	2	2	1,5	2	1	1,5	2		
	690V A	0,5	0,6	0,6	0,6	0,6	0,6	0,5	0,6	0,6		
Utilization category DC13												
Rated operational current I_e	24V A	1	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2		
	110V A	0,15	0,15	0,15	0,15	0,15	0,15	0,15	0,15	0,15		
	220V A	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1		
Short circuit prot. (without welding 1kA)												
highest fuse rating	gL (gG) A	4	4	6	6	6	6	4	6	6		
Type		U3/32	U12/16	U12/16E	U3/42	U3/42	U3/74	U3/74	U85			
Setting range		all	to 23A	22 - 30A	to 28A	28 - 42A	to 52A	52 - 65A				
Power loss per current path (max.)												
minimum setting value	W	1,1	1,1	1,7	1,3	1,3	2,0	2,9	1,1			
maximum setting value	W	2,3	2,3	3,7	2,6	3,3	3,7	4,5	2,5			

Data according to cULus

Type		U3/32	U12/16A	U12/16E	U12/16EQ	U3/42	U3/74	U85
Rated insulation voltage	V~	600	600	600	600	600	600	600
Rated current	A	32	23	23	23	42	74	85
Auxiliary contacts								
Rated voltage								
same potential	V AC	600	600	600	600	600	600	600
different potential	V~	150	-	150	150	150	150	150
Switching capacity AC	VA	500	500	500	500	600	600	600
of aux. contacts	A	2	3	4	4	4	4	4

Temperature Compensation

In case of higher ambient temperature use the following formula:
 (Ambient temperature - 20) x 0,125 = correction factor in % of the
 full load motor current

Example: Ambient temperature 70°C, full load motor current 7A
 (70 - 20) x 0,125 = 6,25%
 Setting value: 7A + 6,25% = 7,44A

1) Suitable for: earthed-neutral systems, overvoltage category I to III, pollution degree 3 (standard-industry): $U_{imp} = 4kV$ (at 440V), 6kV (at 690V).
 Data for other conditions on request.

2) Maximum cable cross-section with prepared conductor

3) Without terminals, suitable for bushing one connector 70mm² (stranded) per phase

4) Switching capacity of the start contact: AC15 300VA, max. 1,5A, DC13 (max. 220V) 30W, max. 1,5A

5) Switching capacity of the make contact: AC15 400VA, max. 1,7A, DC13 (max. 220V) 10W, max. 1A

6) U12/16E 30: Cable cross-section for main connector like type U3/42, one connector only

7) Busbar sets see accessories page 117

Thermal Overload Relays

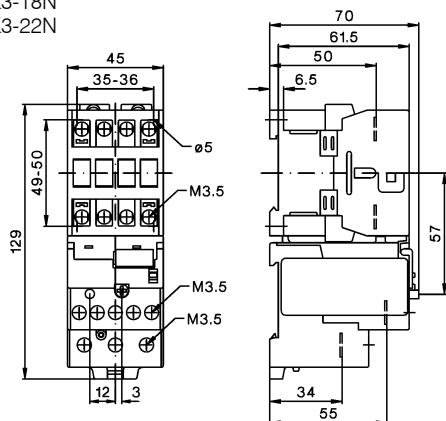
Dimensions

K3-10N + U3/32

K3-14N

K3-18N

K3-22N

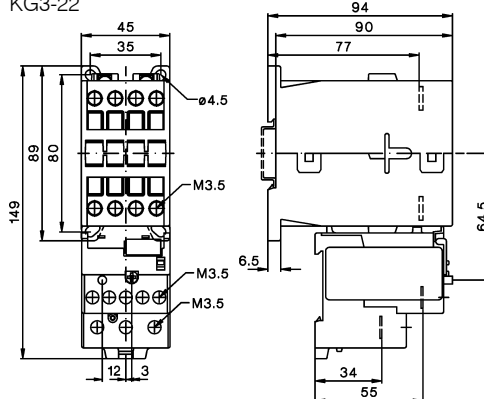


KG3-10 + U3/32

KG3-14

KG3-18

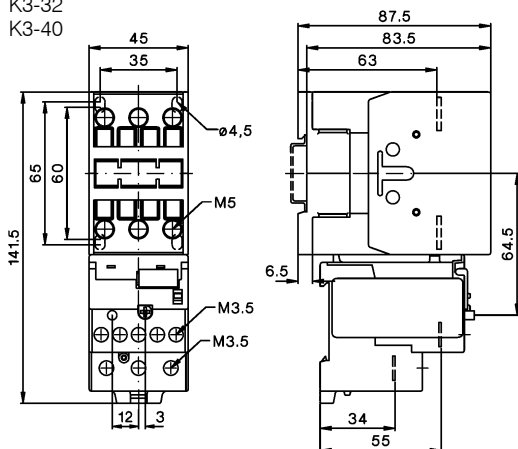
KG3-22



K3-24 + U3/32

K3-32

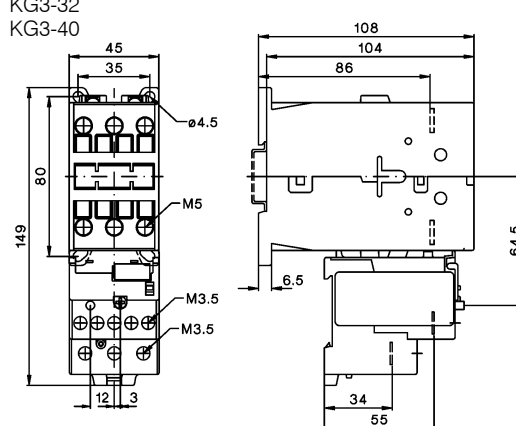
K3-40



KG3-24 + U3/32

KG3-32

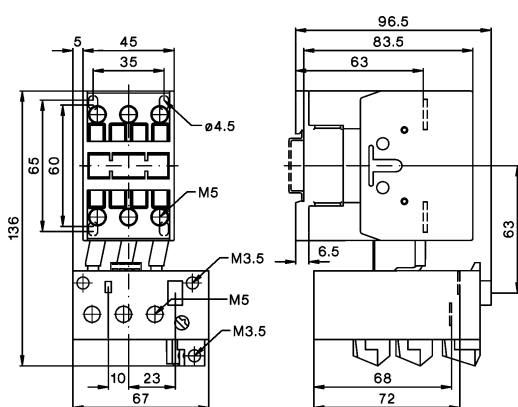
KG3-40



K3-24 + U3/42

K3-32

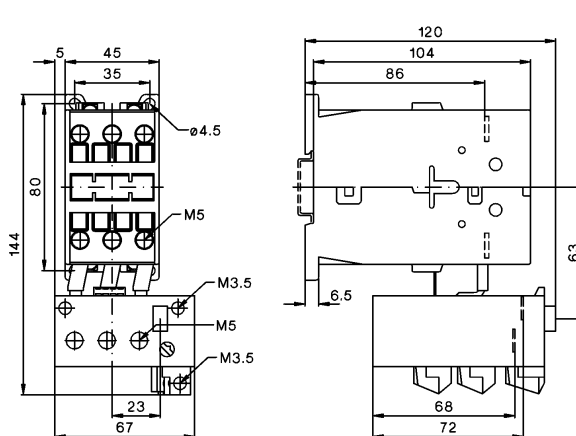
K3-40



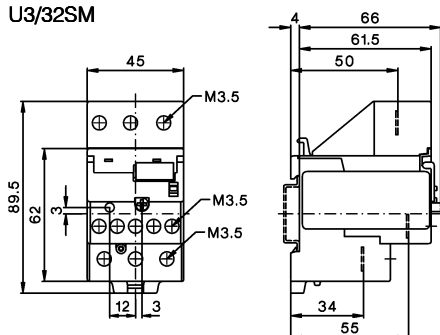
KG3-24 + U3/42

KG3-32

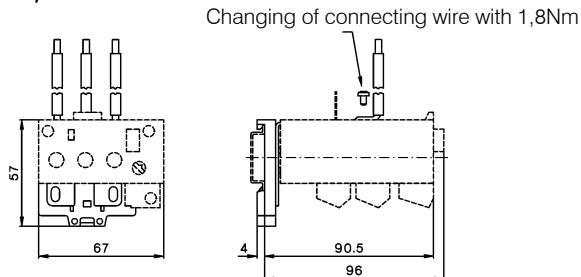
KG3-40



U3/32SM



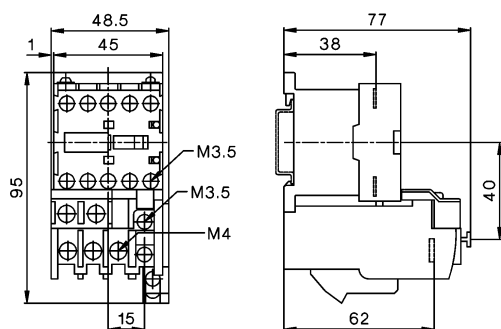
U3/42G + LG5830-



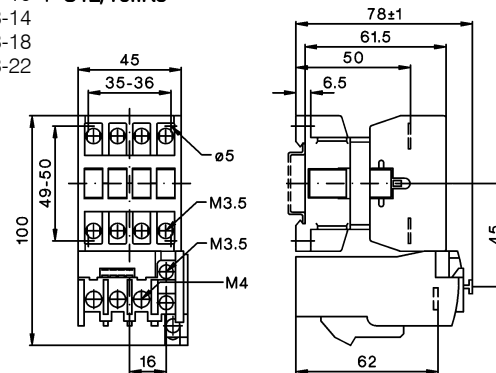
Thermal Overload Relays

Dimensions

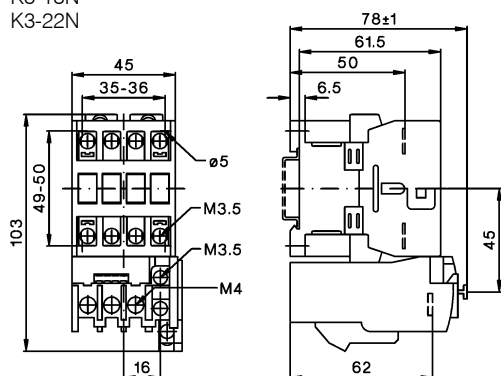
K1-09 + U12/16.. K1
K1-12



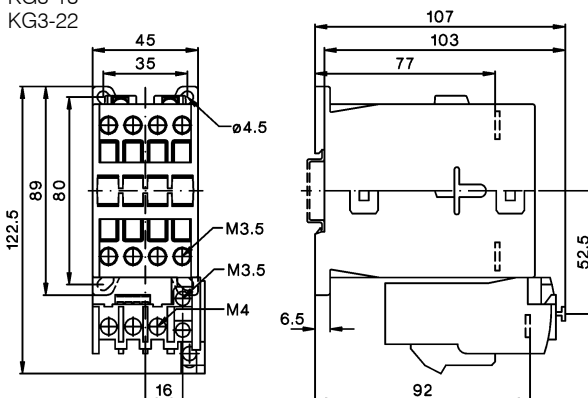
K3-10 + U12/16..K3
K3-14
K3-18
K3-22



K3-10N + U12/16..K3
K3-14N
K3-18N
K3-22N

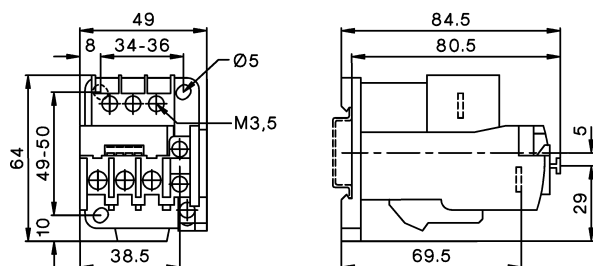


KG3-10 + U12/16..K3
KG3-14
KG3-18
KG3-22

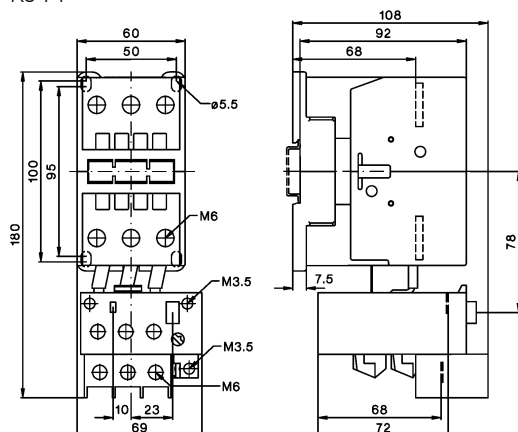


U12SM K3

U12/16..K3 + U12SM K3 for snap-on 35mm DIN-rail according to DIN EN50022 and screw mounting (single mounting)



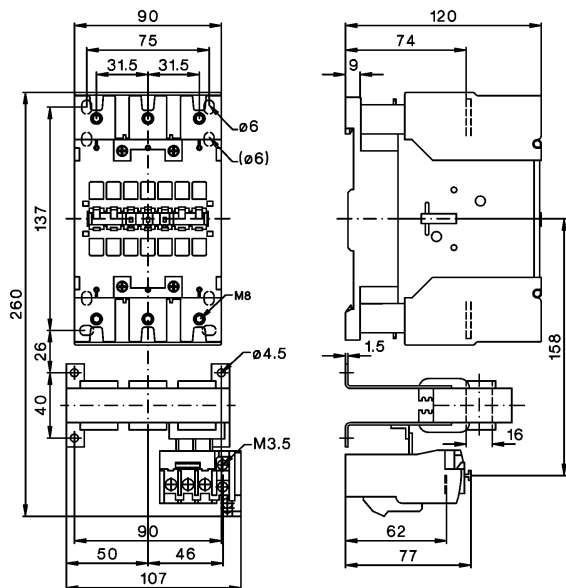
K3-50 + U3/74
K3-62
K3-74



Thermal Overload Relays

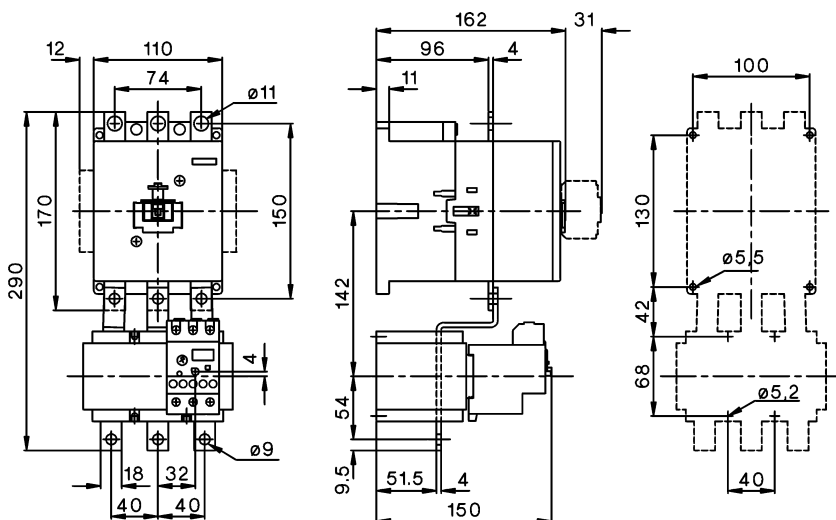
Dimensions

K3-90A + U85
K3-115A



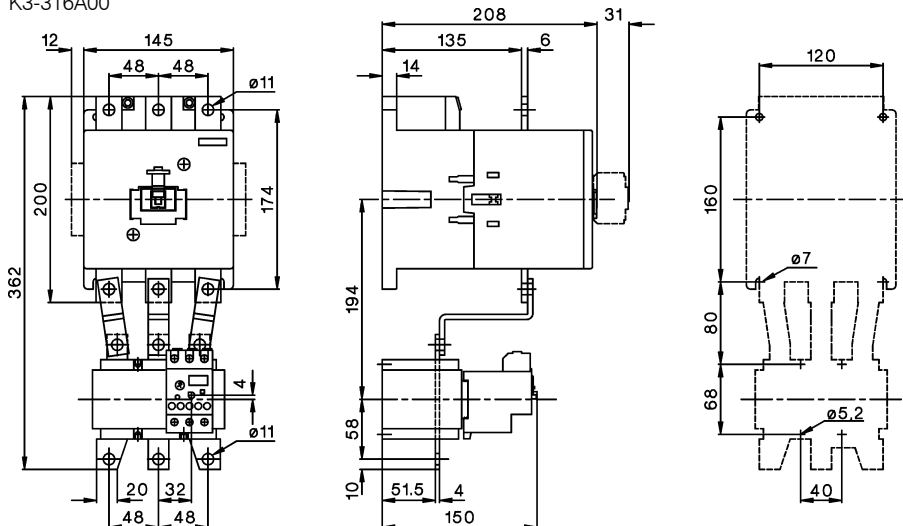
K3-151A00 + U180
K3-176A00

Bohrplan



K3-210A00 + U320
K3-260A00
K3-316A00

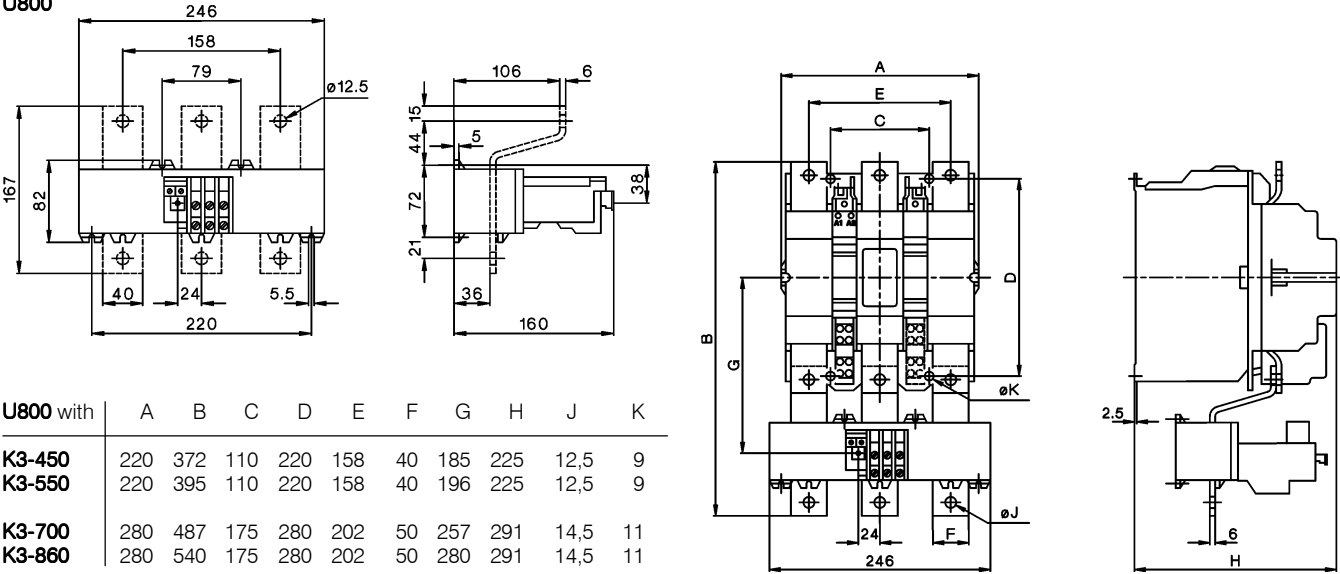
Bohrplan



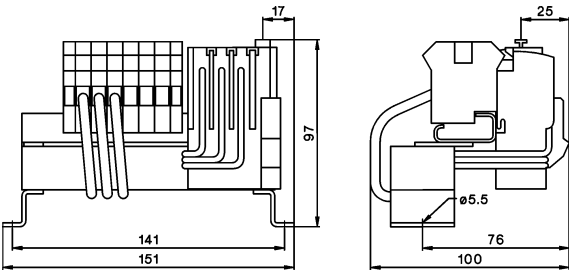
Thermal Overload Relays

Dimensions

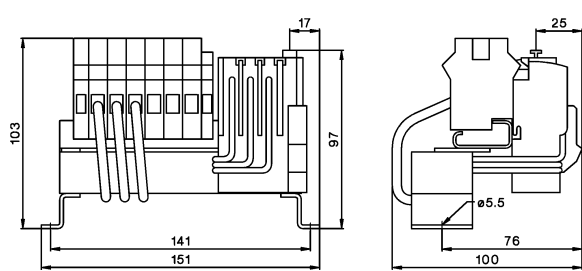
U800



UAT21

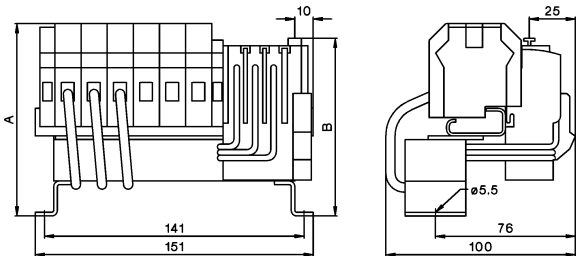


UAT22



UAT23

Type	Setting Range	A	B
UAT23 37	23-37A	105,5	97,5
UAT23 49	32-49A	94	86
UAT23 72	48-72A	94	86



	Modular Contactors	128
	Auxiliary Contact Block	129
	Accessories	129
	Day-Night Reloading Contactors	130
	Switching Of Lamps	130
	Technical Data	132
	Dimensions	134

Modular Contactors

Rated Heating Power
Current AC1 at

AC1 1-phase 3-phase
400V 230V 400V
A kW kW

Type

24
230
24VM
230VM
↓

coil voltage
24V 50/60Hz
220-240V 50Hz, 230-264V 60Hz
24V 50/60Hz, 24V DC
220-240V 50/60Hz, 220V DC
Pack Weight
pcs. kg/pc. Wiring Diagram

One-pole 1 module (17,5mm)



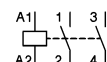
20	4,6	-	R20-10 24	12	0,12
20	4,6	-	R20-10 230	12	0,12



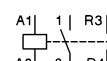
Two-pole 1 module (17,5mm)



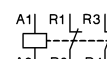
20	4,6	-	R20-20 24	12	0,12
20	4,6	-	R20-20 230	12	0,12



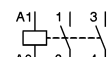
20	4,6	-	R20-11 24	12	0,12
20	4,6	-	R20-11 230	12	0,12



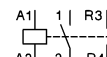
20	4,6	-	R20-02 24	12	0,12
20	4,6	-	R20-02 230	12	0,12



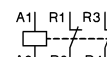
25	5,5	-	R25-20 24	12	0,14
25	5,5	-	R25-20 230	12	0,14



25	5,5	-	R25-11 24	12	0,14
25	5,5	-	R25-11 230	12	0,14



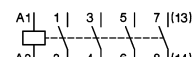
25	5,5	-	R25-02 24	12	0,14
25	5,5	-	R25-02 230	12	0,14



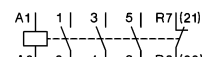
Four-pole 2 modules (35mm) ¹⁾



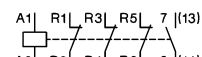
25	5,7	17	R25-40 24	6	0,21
25	5,7	17	R25-40 230	6	0,21



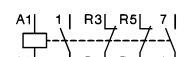
25	5,7	17	R25-31 24	6	0,21
25	5,7	17	R25-31 230	6	0,21



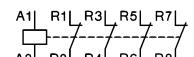
25	5,7	17	R25-13 24	6	0,21
25	5,7	17	R25-13 230	6	0,21



25	5,7	-	R25-22 24	6	0,21
25	5,7	-	R25-22 230	6	0,21



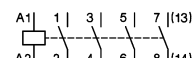
25	5,7	17	R25-04 24	6	0,21
25	5,7	17	R25-04 230	6	0,21



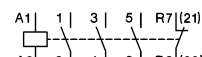
Four-pole 2 modules(35mm), AC/DC-operated ¹⁾



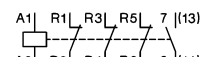
25	5,7	17	R25-40 24VM	6	0,22
25	5,7	17	R25-40 230VM	6	0,22



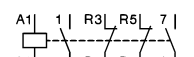
25	5,7	17	R25-31 24VM	6	0,22
25	5,7	17	R25-31 230VM	6	0,22



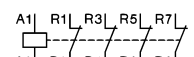
25	5,7	17	R25-13 24VM	6	0,22
25	5,7	17	R25-13 230VM	6	0,22



25	5,7	-	R25-22 24VM	6	0,22
25	5,7	-	R25-22 230VM	6	0,22



25	5,7	17	R25-04 24VM	6	0,22
25	5,7	17	R25-04 230VM	6	0,22



1) Sealable with Sealing Cover P721, available aux. contact block RH11(see page 129)
2) Sealable with Sealing Cover P721, available aux. contact block RH11-1(see page 129)

Modular Contactors



Rated Current	Heating Power AC1 at	
AC1	1-phase	3-phase
400V	230V	400V
A	kW	kW

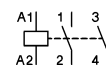
Type
24
230
↓

coil voltage
24V 50/60Hz
220-240V 50Hz, 230-264V 60Hz
Pack pcs.
Weight kg/pc.

Wiring Diagram

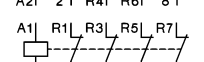
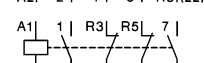
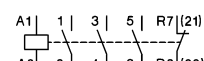
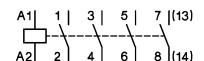
Two-pole 2 modules (35mm)

40	9	-	R40-20 24	6	0,23
40	9	-	R40-20 230	6	0,23
63	14,3	-	R63-20 24	6	0,23
63	14,3	-	R63-20 230	6	0,23

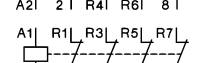
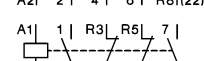
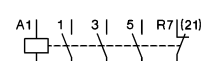
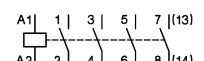


Four-pole 3 modules (52,5mm) ¹⁾

40	9	27,5	R40-40 24	4	0,35
40	9	27,5	R40-40 230	4	0,35
40	9	27,5	R40-31 24	4	0,35
40	9	27,5	R40-31 230	4	0,35
40	9	-	R40-22 24	4	0,35
40	9	-	R40-22 230	4	0,35
40	9	27,5	R40-04 24	4	0,35
40	9	27,5	R40-04 230	4	0,35



63	14,3	43	R63-40 24	4	0,36
63	14,3	43	R63-40 230	4	0,36
63	14,3	43	R63-31 24	4	0,36
63	14,3	43	R63-31 230	4	0,36
63	14,3	-	R63-22 24	4	0,36
63	14,3	-	R63-22 230	4	0,36
63	14,3	43	R63-04 24	4	0,36
63	14,3	43	R63-04 230	4	0,36



Auxiliary Contact Block $\frac{1}{2}$ module (8,8mm) for contactor R25 (4p.), R40, R63 (max. 1pc.)



Rated current	AC1		Type	Pack pcs.	Weight kg/pc.
AC15	AC15	AC1			
230V	400V	690V			
A	A	A	for contactor		
3	2	10	R25 ²⁾ , R40, R63	RH11	3 0,026
3	2	10	R25-..VM	RH11-1	3 0,026

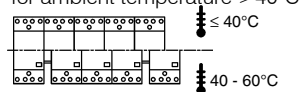
Wiring Diagram



Accessories



RC-unit	Type	Pack pcs.	Weight kg/pc.
2x for R20.. to R63.. for 12V to 250V AC 220nF / 100 Ohm not for R25-..VM	RC-R 230	2	0,05
Spacing piece $\frac{1}{2}$ module (8,8mm) for R20.. to R63.. for ambient temperature $>40^{\circ}\text{C}$	P730	10	0,012
Sealing cover for R25.. (4p.)	P721	10	0,002
Sealing cover for R40-.., R63-..	P690	10	0,003



1) Sealable with Sealing Cover P690, available aux. contact block RH11
2) AC-operated R25-..., 4-pole

Day-Night Reloading Contactors

	Type	Pack pcs.	Weight kg/pc.	Wiring Diagram
Compact Module, for separate tariff counters 2 modules (35mm)				

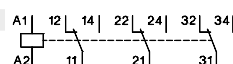


3-pole 400V 25A

R25-TN 230

1

0,22



2 Switch positions:

Day (Reloading, contact 11-14 ... closed, remains in position Night, until the next occurs)

Night (Basis operation) contact 11-12 ... closed

Contactor Module, for double tariff counters 1 module (17,5mm)



2-pole 400V 25A

R25-TN20 230

1

0,13



4 Switch position:

Day (Reloading, contact 1-2 ... closed, remains in position Night, until the next occurs)

Night (automatic operation, contact 1-2 ... only at night closed)

On (Permanently On)

Off (permanently Off)

Switch Module 1 module (17,5mm)



2-pole 400V 25A

RH25-20

1

0,13



Modular Contactors

Switching of lamps

Lamp Type	Power W	Current A	Capacitors μ F	Max. lamps per pole at 230V 50Hz and max. 60°C			
				R20..	R25..	R40..	R63..
Incandescent lamps	60	0,27	-	22	50	92	129
	100	0,45	-	13	30	55	77
	200	0,91	-	10	15	27	38
	300	1,36	-	4	10	19	26
	500	2,27	-	3	6	11	16
	1000	4,5	-	1	3	6	8
Fluorescent lamps uncompensated or serial compensated	11	0,16	1,3	60	75	210	310
	18	0,37	2,7	25	30	90	140
	24	0,35	2,5	25	30	90	140
	36	0,43	3,4	20	25	70	140
	58	0,67	5,3	14	17	45	70
	65	0,67	5,3	13	16	40	65
	85	0,8	5,3	11	14	35	60
Fluorescent lamps dual-connection	11	0,07	-	2 x 100	2 x 110	2 x 220	2 x 250
	18	0,11	-	2 x 50	2 x 55	2 x 130	2 x 200
	24	0,14	-	2 x 40	2 x 44	2 x 110	2 x 160
	36	0,22	-	2 x 30	2 x 33	2 x 70	2 x 100
	58	0,35	-	2 x 20	2 x 22	2 x 45	2 x 70
	65	0,35	-	2 x 15	2 x 16	2 x 40	2 x 60
	85	0,47	-	2 x 10	2 x 11	2 x 30	2 x 40
Fluorescent lamps parallel compensated	11	0,09	2,0	30	43	67	107
	18	0,13	2	20	32	50	80
	24	0,16	3	15	32	50	80
	36	0,27	4	10	32	50	80
	58	0,45	7	6	18	36	46
	65	0,5	7	5	18	36	46
	85	0,6	8	4	16	33	44

Modular Contactors

Switching of lamps

Lamp Type	Power W	Current A	Capacitors µF	Max. lamps per pole at 230V 50Hz and max. 60°C			
				R20..	R25..	R40..	R63..
Fluorescent lamps with electronic fluorescent lamp ballast	18	0,09	-	40	40	100	150
	36	0,16	-	20	20	52	75
	58	0,25	-	15	15	30	55
	80	0,4	-	7	10	20	30
	2 x 18	0,17	-	20	20	50	60
	2 x 28	0,25	-	15	15	37	45
	2 x 36	0,32	-	10	10	25	30
	2 x 58	0,49	-	7	7	15	20
	2 x 80	0,7	-	4	4	8	10
Transformers for metal halid low voltage lamps	20	0,09	-	40	52	110	174
	50	0,22	-	20	24	50	80
	75	0,33	-	13	16	35	54
	100	0,43	-	10	12	27	43
	150	0,65	-	7	9	19	29
	200	0,87	-	5	5	14	23
	300	1,30	-	3	4	9	14
Mercury-vapour lamps (high-pressure lamps), uncompensated e. g. HQL, HPL	50	0,61	-	16	21	38	55
	80	0,8	-	12	16	29	40
	125	1,15	-	8	11	20	28
	250	2,15	-	4	6	11	15
	400	3,25	-	3	4	7	10
	700	5,4	-	1	2	4	6
	1000	7,5	-	1	1	3	4
Mercury-vapour lamps (high-pressure lamps), compensated e. g. HQL, HPL	50	0,28	7	7	18	36	50
	80	0,41	8	5	16	31	44
	125	0,65	10	3	13	25	35
	250	1,22	18	2	7	14	19
	400	1,95	25	1	5	10	14
	700	3,45	45	1	3	6	8
	1000	4,8	60	-	2	4	6
Metal halide lamps uncompensated e. g. HQI, HPI, CDM	35	0,53	-	22	24	57	65
	70	1	-	12	14	30	35
	150	1,8	-	6	8	17	18
	250	3	-	4	5	10	12
	400	3,5	-	3	4	8	10
	1000	9,5	-	1	1	3	4
	2000	16,5	-	-	-	2	2
	400V per pole						
	2000	10,5	-	-	-	2	2
	3500	18	-	-	-	1	1
Metal halide lamps compensated e. g. HQI, HPI, CDM	35	0,25	6	8	21	42	58
	70	0,45	12	4	11	21	29
	150	0,75	20	2	7	13	18
	250	1,5	33	1	4	9	11
	400	2,1	35	1	4	9	10
	1000	5,8	95	-	1	3	4
	2000	11,5	148	-	-	2	2
	400V per pole						
	2000	6,6	58	-	-	3	4
	3500	11,6	100	-	-	2	3
Metal halide lamps with electronic fluorescent with electronic fluorescent lamp ballast (e. g.: PCI) 50-125 x I _n lamp for 0,6ms	20	0,1	integrated	9	9	18	20
	28	0,15	integrated	-	-	-	18
	35	0,2	integrated	6	6	11	13
	70	0,36	integrated	5	5	10	12
	150	0,7	integrated	4	4	8	10
Sodium-vapour lamps (low pressure lamps), uncompensated	35	1,5	-	7	9	22	30
	55	1,5	-	7	9	22	30
	90	2,4	-	4	6	13	19
	135	3,3	-	3	4	10	14
	150	3,3	-	3	4	10	14
	180	3,3	-	3	4	10	14
	200	3,3	-	3	4	10	14

Modular Contactors

Switching of lamps

Lamp Type	Power W	Current A	Capacitors μF	Max. lamps per pole at 230V 50Hz and max. 60°C			
				R20..	R25..	R40..	R63..
Sodium-vapour lamps (low pressure lamps), compensated	35	0,31	20	3	6	15	18
	55	0,42	20	2	6	15	18
	90	0,63	30	1	4	10	12
	135	0,94	45	1	3	7	8
	150	1	40	1	3	8	9
	180	1,16	40	1	3	8	9
	200	1,32	25	-	-	10	12
Sodium-vapour lamps (high pressure lamps), uncompensated	150	1,8	-	5	8	17	22
	250	3	-	4	5	10	13
	330	3,7	-	3	4	8	10
	400	4,7	-	2	3	6	8
	1000	10,3	-	1	1	3	4
Sodium-vapour lamps (high pressure lamps), compensated	150	0,83	20	2	7	20	25
	250	1,5	33	1	4	12	15
	330	2	40	1	3	10	13
	400	2,4	48	1	2	8	12
	1000	6,3	106	-	1	4	6
Sodium-vapour lamps (high pressure lamps) with serial electronic (e. g.: PCI) 50-125 x I _{nlamp} for 0,6ms	20	0,1	integrated	9	9	18	20
	35	0,2	integrated	6	6	11	13
	70	0,36	integrated	5	5	10	12
	150	0,7	integrated	4	4	8	10
LED-Lamps consider the inrush current of the lamp ballast and the cosφ of the lamp	max. inrush current of contactor [A] $\frac{\text{inrush current of contactor}}{\text{inrush current of lamp/EVG}} =$			195	233	424	565
				max. lamps per pole at 230V 50Hz and max. 60°C			

Data according to IEC60 947-4-1, IEC 60947-5-1, VDE 0660-5-1

Type		2-pole R20	R25	R40	R63	4-pole R25	R40	R63	RH11
Main Contacts 5 6 7									
Rated insulation voltage U _i	V~	440²⁾	440²⁾	440²⁾	440²⁾	440²⁾	440²⁾	440²⁾	440²⁾
Rated operation voltage U _e	V~	440	440	440	440	440	440	440	440
Frequency of operations z	AC1, AC3	300	300	600	600	300	600	600	600
Mechanical life	1/h S x 10 ⁶	1	1	1	1	1	1	1	1
Utilization category AC1									
Rated operational current I _e (=I _{ln}) open	A	20	25	40	63	25	40	63	-
Contact life	S x 10 ⁶	0,1	0,1	0,1	0,1	0,1	0,1	0,1	-
Minimum Switch Voltage	V/mA	24/100	24/100	24/100	24/100	24/100	24/100	24/100	17/5
Short time current	10s-current A	72	72	216	240	72	216	240	-
Power loss per pole at I _e /AC1	W	3	3	7	2	3	7	0,5	-
Utilization category AC3 / AC7b									
Switching of three-phase motors									
Rated operational current I _e	A	-	-	-	-	9	27	30	-
Rated operational power of three-phase motors									
50-60Hz	220V kW	-	-	-	-	2,2	7,5	8	-
	230-240V kW	-	-	-	-	2,5	8	8,5	-
	380-415V kW	-	-	-	-	4	12,5	15	-
2-pole motors	230V kW	1,1	1,3	2,6	5	-	-	-	-
Contact life	S x 10 ⁶	0,15	0,15	0,15	0,15	0,15	0,15	0,15	-
Power consumption of coils									
AC operated									
inrush	VA	7 - 9	7 - 9			20 - 25	33 - 45	33 - 45	-
sealed	VA	2,2 - 4,2	2,2 - 4,2	5 - 7	5 - 7	4 - 6	6 - 8	6 - 8	-
	W	0,8 - 1,6	0,8 - 1,6			1,5 - 2,5	2,6	2,6	-
AC and DC-operated	W	-	-			3 - 4	-	-	-
Operation range of coils									
in multiples of control voltage U _s (-40° - +40°C)		0,85 - 1,1	0,85 - 1,1	0,85 - 1,1	0,85 - 1,1	0,85 - 1,1	0,85 - 1,1	0,85 - 1,1	-

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

2) Suitable for: earthed-neutral systems, overvoltage category I to III, pollution degree 3 (standard-industry): U_{imp} = 4kV.

3) Maximum cable cross-section with prepared conductor

5) Rated frequency 50/60Hz

6) Max. occ. switching overvoltage < 4kV

7) Duty cycle: 100%

Modular Contactors

Data according to IEC60 947-4-1, IEC 60947-5-1, VDE 0660-5-1

Type		R20	R25 (2p.)	R25 (4p.)	R25-..VM	R40	R63	RH11
Short circuit protection								
max. fuse Coordination-type "1"gL (gG)	A	35	35	35	35	63	80	-
Rated short circuit current	"I _{sc} " kA	3	3	3	3	3	3	-
	"I _q " kA	3	3	10	10	10	10	-
Switching time at control voltage U _s ± 10%								
make time	ms	7 - 16	7 - 16	9 - 15	17 - 24	11 - 15	11 - 15	-
release time	ms	6 - 12	6 - 12	4 - 8	17 - 23	6 - 13	6 - 13	-
arc duration	ms	10 - 15	10 - 15	10 - 15	10 - 15	10 - 15	10 - 15	-
Cable cross-sections								
Main connector solid or stranded	mm ²	1,5 - 10	1,5 - 10	1,5 - 10	1,5 - 10	2,5 - 25	2,5 - 25	0,5 - 2,5 ³⁾
flexible	mm ²	1,5 - 6	1,5 - 6	1,5 - 6	1,5 - 6	2,5 - 16	2,5 - 16	0,5 - 2,5 ³⁾
flexible with multicore cable end	mm ²	1,5 - 6	1,5 - 6	1,5 - 6	1,5 - 6	2,5 - 16	2,5 - 16	0,5 - 1,5
Clamps per pole		1	1	1	1	1	1	2
Magnetic coil solid or stranded	mm ²	0,75 - 2,5	0,75 - 2,5	0,75 - 2,5	0,75 - 2,5	0,75 - 2,5	0,75 - 2,5	-
flexible	mm ²	0,5 - 2,5	0,5 - 2,5	0,5 - 2,5	0,5 - 2,5	0,5 - 2,5	0,5 - 2,5	-
flexible with multicore cable end	mm ²	0,5 - 1,5	0,5 - 2,5	0,5 - 1,5	0,5 - 1,5	0,5 - 1,5	0,5 - 1,5	-
Clamps per pole		1	1	1	1	1	1	-
Auxiliary Contacts ^{5) 6) 7)}								
Rated insulation voltage U _i ¹⁾	V AC	-	-	440 ²⁾	440 ²⁾	440 ²⁾	440 ²⁾	440 ²⁾
Thermal rated current I _{th}	40°C A	-	-	25	25	40	40	10
Ambient temperature	60°C A	-	-	25	25	40	40	6
Utilization category AC15								
Rated operational current I _e	220-240V A	-	-	3	3	3	3	3
	380-415V A	-	-	2	2	2	2	2
	440V A	-	-	1,6	1,6	1,6	1,6	1,6
Utilization category DC13								
Rated operational current I _e	24-60V A	-	-	2	2	2	2	2
	110V A	-	-	0,4	0,4	0,4	0,4	0,4
per pole	220V A	-	-	0,1	0,1	0,1	0,1	0,1
Short circuit protection								
short-circuit current 1kA, contact welding not accepted								
max. fuse size	gL (gG) A	-	-	10	10	10	10	10

Data according to UL508

Main Contacts (cULus)	Type	R20	R25 (2p.)	R25 (4p.)	R40	R63	RH11
Rated operational current "General Use"	A	20	25	25	40	63	10
Rated operational power of three-phase motors at 60Hz (3ph)	110-120V hp	-	-	1	2	3	-
	200-208V hp	-	-	2	5	7½	-
	220-240V hp	-	-	3	7½	10	-
	265-277V hp	-	-	3	7½	10	-
Rated operational power of AC motors at 60Hz (1ph)	110-120V hp	½	½	½	1	1½	-
	200-208V hp	1	1	1	2	3	-
	220-240V hp	1½	1 ½	1½	3	5	-
	265-277V hp	1½	2	2	3	5	-
Fuses	A	40	40	40	80	80	-
Suitable for use on a capability of delivering not more than	rms A	5000	5000	5000	5000	5000	-
	V	300	300	300	300	300	300
Rated operation voltage	V~	300	300	300	300	300	300
Auxiliary Contacts (cULus)	heavy pilot duty AC	-	-	-	-	-	C300

2) Suitable for: earthed-neutral systems, overvoltage category I to III, pollution degree 3 (standard-industry): U_{imp} = 4kV.

3) Maximum cable cross-section with prepared conductor 4) AC7b motor 2-pole 230V 1,1kW

5) Rated frequency 50/60Hz

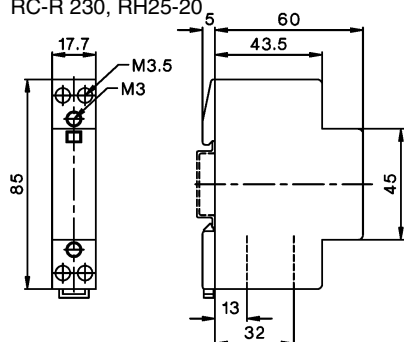
6) Max. occ. switching overvoltage <4kV

7) Duty cycle: 100%

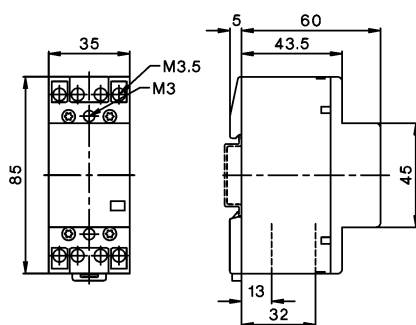
Modular Contactors

Dimensions

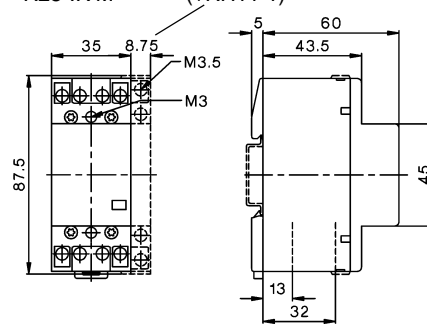
R20-..., R25-... (2-pole)
RC-R 230, RH25-20



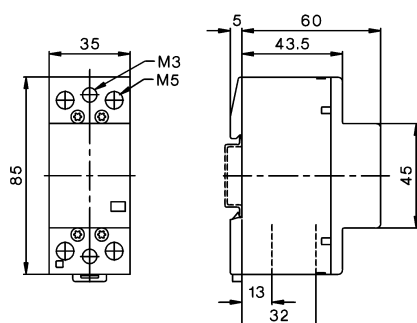
R25-TN



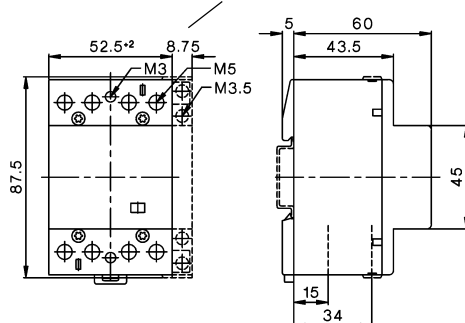
R25-... (4-pole) (+RH11)
R25-...VM (+RH11-1)



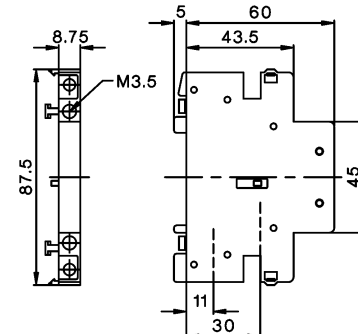
R40-... (2-pole)
R63-... (2-pole)



R40-... (4-pole) (+RH11)
R63-... (4-pole) (+RH11)



Aux. contact block
RH11, RH11-1



Contactors for DC-Switching

AC-operated



Rated Operational Current DC1

600V 1000V 1200V

Additional
Aux.
Contacts

Type

230
↓

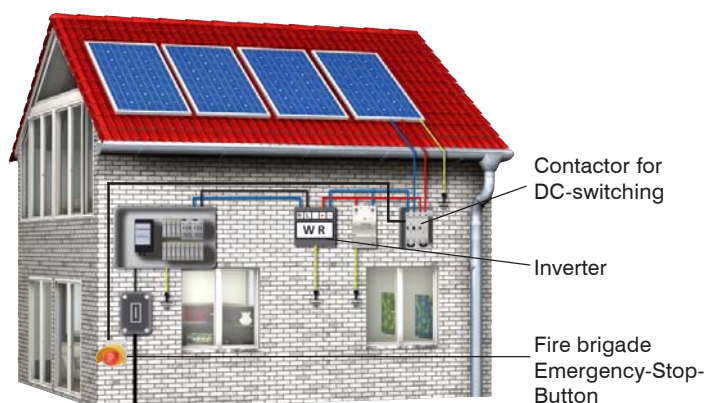
Coil voltage ¹⁾
220-230V 50Hz, 240V 60Hz

Pack pcs. Weight kg/pc.

Wiring diagram

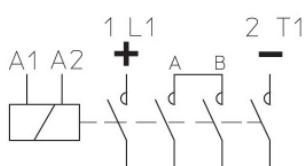
20A	-	-	2 HKA11	K3DC-20A00 ...	1	0,45	
48A	-	-	+1 HKT.	K3DC-48A00 ...	1	0,45	
80A	60A	-	2 HKA11	K3DC-80A00 ...	1	1,17	
100A	-	-	+1 HKT.	K3DC-100A00 ...	1	1,8	
12A	12A	6A	2 HKA11 +2 HKT.	K3PV-12A00 ...	1	0,8	
30A	30A	-	2 HKA11	K3PV-30A00 ...	1	0,9	
60A	60A	-	+2 HKT.	K3PV-60A00 ...	1	0,9	
80A	80A	-	2 HKA11	K3PV-80A00 ...	1	1,35	
100A	100A	-	+1 HKT.	K3PV-100A00 ...	1	2,3	
150A	150A	-	2 HKA11	K3PV-150A00 ...²⁾	1	5	
200A	200A	-	+1 HKT.	K3PV-200A00 ...²⁾	1	5	
240A	240A	-	-	K3PV-240A00 ...²⁾	1	5	
300A	300A	-	2 HKA11	K3PV-300A00 ...²⁾	1	7,5	
400A	400A	-	+1 HKT.	K3PV-400A00 ...²⁾	1	7,5	
450A	450A	-	-	K3PV-450A00 ...²⁾	1	7,5	

Contactors for DC-Switching for PV-installations, as remote controlled fire protection defeat device

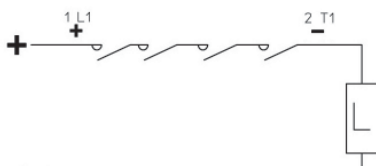


In most Photovoltaic-installations, the switch disconnectors according to IEC 60364-7-712 are integrated in the DC/AC-inverter. So the wires between solar-panels and inverter are continuously under voltage. According to ÖVE-R11-1: 2013, Photovoltaic-installations must have a fire protection defeat device. For this purpose, BENEDICT contactors for DC-switching, used as a fire protection defeat device, can switch off the Photovoltaic-installation with a remote controlled fire brigade Emergency-Stop-button.

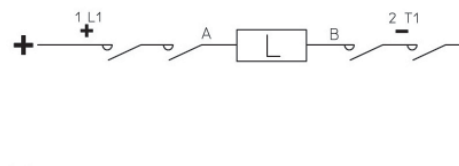
Switch diagram (4 contacts)



Connection diagram 1-pole



For using as two-poles contactor remove connection A-B



1) Other coil voltages from 24 to 600V AC, on request
2) Type for AC- and DC-operating: e.g.: 230: 220-240V 50/60Hz and 220V=

Contactors for DC-Switching

DC-operated



Type	Coil voltage ¹⁾ 24 24V DC ↓	Aux. Contacts		Pack pcs.	Weight kg/pc.	Wiring diagram
		build in	additional			
		NO NC	Type			
K3DC-20A10= ...		1 -	1 HKA11	1	0,5	
K3DC-48A10= ...		1 -	+1 HKT.	1	0,5	
K3DC-80A00= ...		- -	1 HKA11	1	1,17	
K3DC-100A00= ...		- -	+1 HKT.	1	1,8	
K3PV-12A10=		1 -	1 HKA11 +2 HKT.	1	0,85	
K3PV-30A10= ...		1 -	1 HKA11	1	0,95	
K3PV-60A10= ...		1 -	+2 HKT.	1	0,95	
K3PV-80A00= ...		- -	2 HKA11	1	1,35	
K3PV-100A00= ...		- -	+1 HKT.	1	2,3	
K3PV-150A00 ... ²⁾		- -	2 HKA11	1	5	
K3PV-200A00... ²⁾		- -	+1 HKT.	1	5	
K3PV-240A00 ... ²⁾		- -		1	5	
K3PV-300A00 ... ²⁾		- -	2 HKA11	1	7,5	
K3PV-400A00 ... ²⁾		- -	+1 HKT.	1	7,5	
K3PV-450A00 ... ²⁾		- -		1	7,5	

Auxiliary Contact Blocks for contactors K3DC-.. and K3PV-..

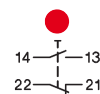


Rated Operational Current				Type	Pack pcs.	Weight kg/pc.	Wiring diagram
AC15 230V A	AC15 400V A	AC1 690V A	For contactors				
3	2	10	K3-DC, K3PC-... top	HKT11	1	0,04	
3	2	10	K3-DC, K3PC-... top	HKT22	1	0,05	
3	2	10	K3-DC, K3PC-... outside	HKA11	1	0,05	

Accessories



Fire Brigade-EMERGENCY STOP key operated button Ø40mm, according to EN418, unlock by key	BG10P44S3-11 +SK1	0,22
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1) Other coil voltages from 24 to 250V DC, on request

2) Type for AC- and DC-operating: e.g.: 24: 24V 50/60Hz and 24V=

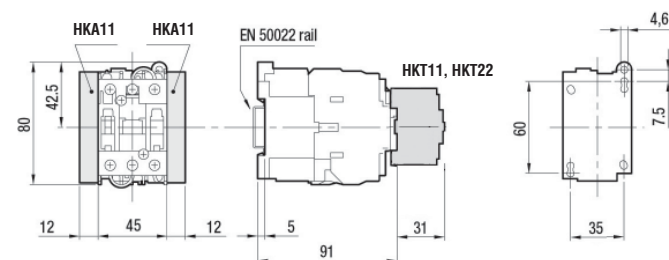
Technical Data

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

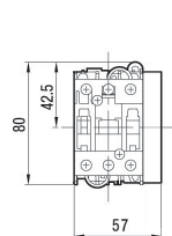
Type		K3DC- 20..	K3DC- 48..	K3DC- 80..	K3DC- 100..	K3PV- 12..	K3PV- 30..	K3PV- 60..	K3PV- 80..	K3PV- 100..	K3PV- 150..	K3PV- 200..	K3PV- 240..	K3PV- 300..	K3PV- 400..	K3PV- 450..
Rated insulation voltage. $V = U_{imp}$	kV	600 8	600 8	1000 8	600 8	1200 8	1000 8	1000 8	1000 8	1000 8	1000 8	1000 8	1000 8	1000 8	1000 8	1000 8
poles in series		3	3	3	3	8	6	6	4	4	3	3	3	3	3	3
DC1 600V dc I_e	A	20	48	80	100	12	30	60	80	100	150	200	240	300	400	450
DC1 1000V dc I_e	A	-	-	35	100	12	30	60	80	100	150	200	240	300	400	450
DC1 1200V dc I_e	A	-	-	-	-	6	-	-	-	-	-	-	-	-	-	-
Main pole resistance	mΩ	2,5	2,3		3	13	8,5	8,5		4	1,5	1,5	1,5	0,85	0,85	0,85
Mechanical life	10^6	10		10		10			10		10			8		
Protection degree		IP20		IP20		IP20			IP20		IP00			IP20 w. terminal lug.		
Weight	kg	0,45		1,17	1,8		0,9		1,35	2,3		5			7,5	
Main poles																
Cable cross-sections	mm ²	2 x 1,5 - 10		2,5-35	4 - 35 +4-50	2x 1,5-2,5	2 x 1,5 - 10		2,5-35	4 - 35 +4-50		busbar 18 x 4 screw M8		busbar 25 x 6 screw M10		
Tightening torque	Nm	2,3		5	8	1,4	2,3		5	8		17		35		
Montage		DIN-rail or screw		screw		DIN-rail or screws				Screws						
Operating range of coils	U_C	0,85 - 1,1														
Power consumption of coils																
AC inrush	VA	90		250		200			250		350			360		
AC sealed	VA/W	9 / 4		18 / 6,3		18 / 8			18 / 6,3		5 / 5			5 / 5		
DC inrush	W	120		230		230			230		350			360		
DC sealed	W	2		4		4			4		5			5		
Switching time at ac voltage																
make time	ms	10 - 25		15 - 50		10 - 25			15 - 50		30 - 60			40 - 60		
release time	ms	6 - 18		30 - 80		6 - 18			30 - 80		30 - 80			40 - 60		
Maximum ambient temperature		-25 to +40 (+70) ¹⁾ -25 to +70														
Operation	°C															
Storage	°C															

Dimensions (mm)

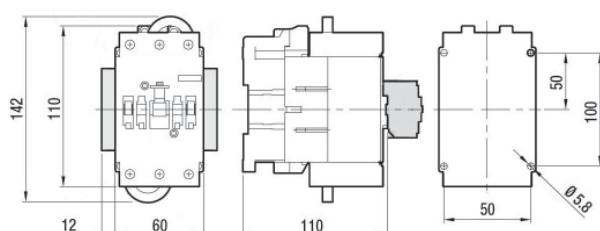
K3DC-20A00, K3DC-48A00



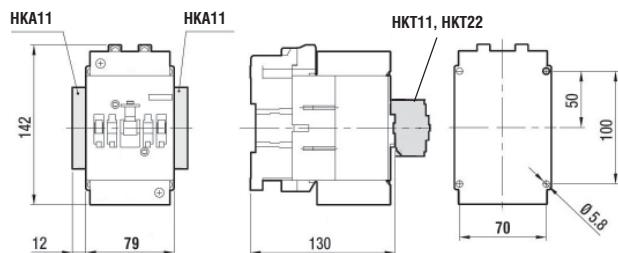
K3DC-20A10=, K3DC-48A10=



K3DC-80A00(=)



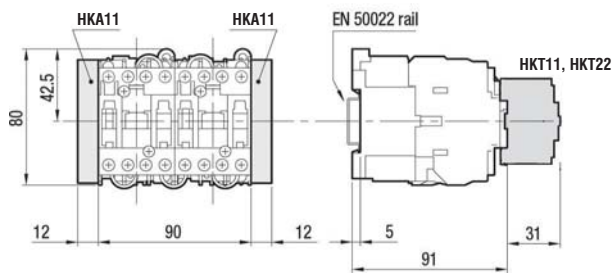
K3DC-100A00(=)



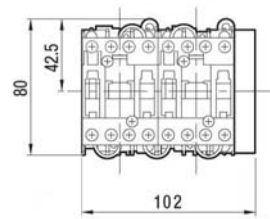
1) > 40° ... 1% / °C de-rating (eg. at 60°C 20% de-rating)

Dimensions (mm)

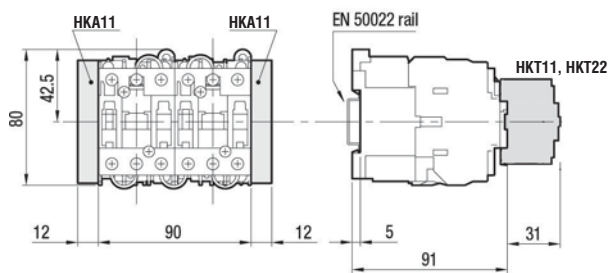
K3PV-12A00



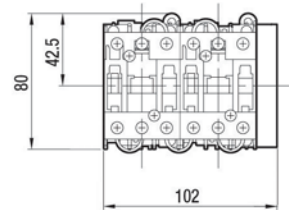
K3PV-12A10=



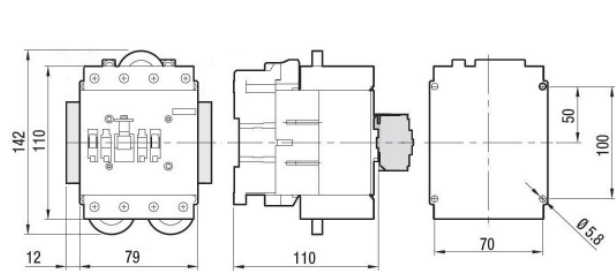
K3PV-30A00, K3PV-60A00



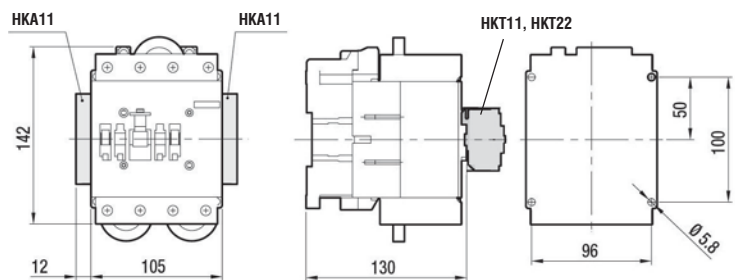
K3PV-30A10=, K3PV-60A10=



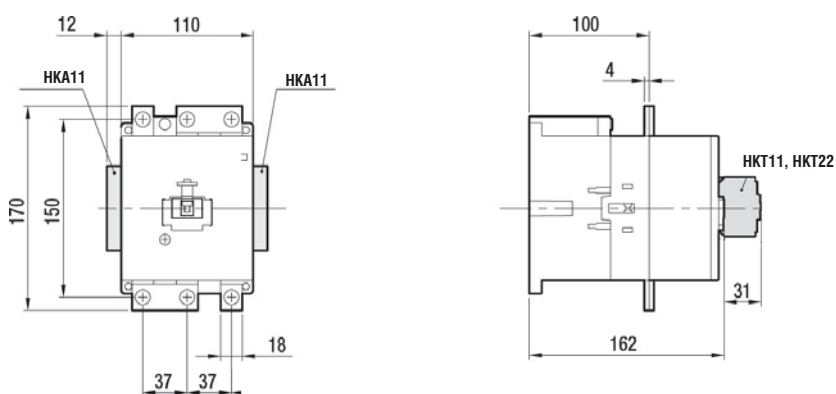
K3PV-80A00(=)



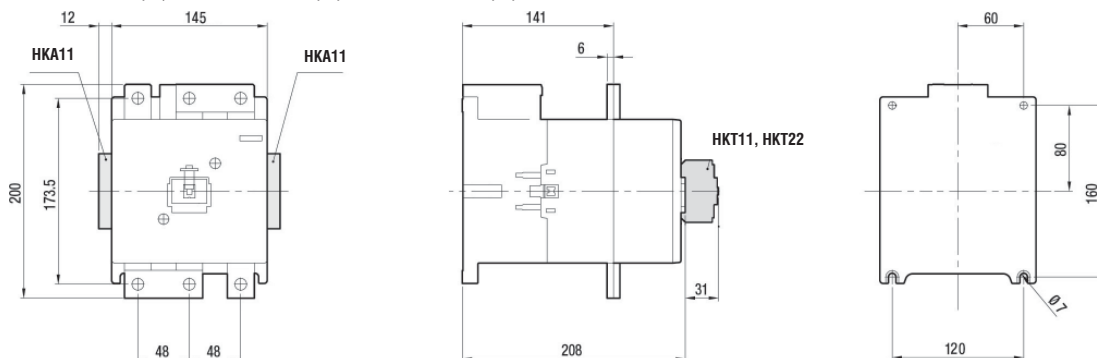
K3PV-100A00(=)



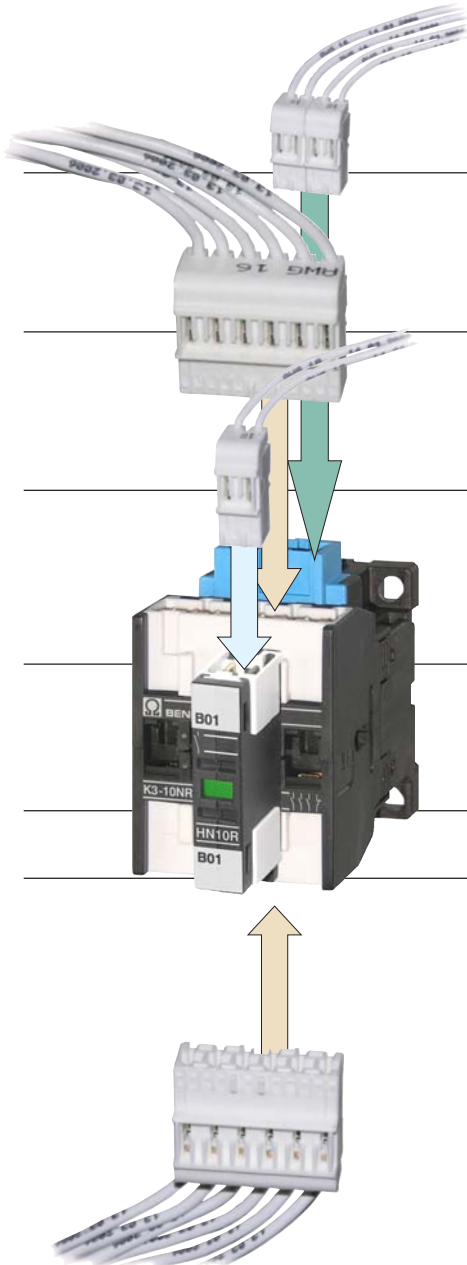
K3PV-150A00(=), K3PV-200A00(=), K3PV-240A00(=)



K3PV-300A00(=), K3PV-400A00(=), K3PV-450A00(=)



Contactors	RAST 5	141
	Contactors Relays	141
	Contactors	141
Accessories		141
	Auxilliary Contact Blocks	141
Combinations		142
	Contactors for Fuseless Load Feeder	142
	Contactors for Overload Relays	142
Industry Standard RAST 5		
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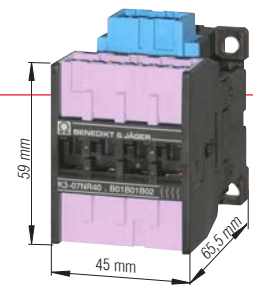


RAST 5 - exklusiv for OEM-Partner

5 mm pitch connector system

Advantages RAST 5 - Technology

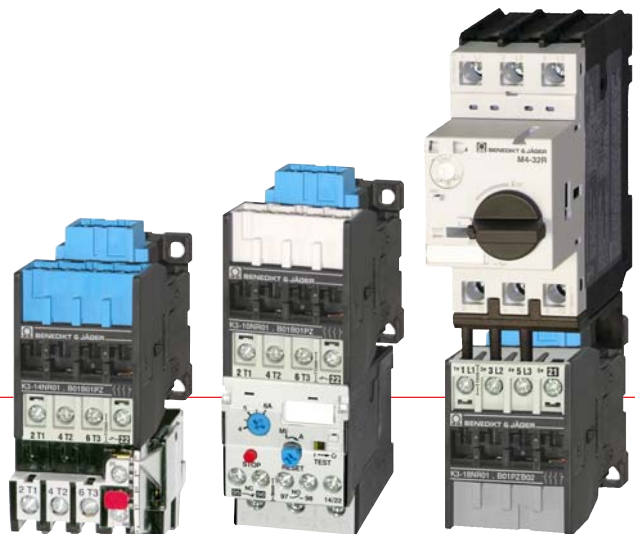
- Time saving installation
- Easy assembly without tools
- Tailor-made sockets, custom - designed codes
- Ambient temperatures up to +90°C/194°F
- Smallest sizes
- Plug technology up to 32 A / 415 V
- color coding for power ratings
- color coding for coil voltages



RAST 5 - Accessories



Combining switchgears with plug-in connections and screw connections



Contactors are available for plugs of many different producers



Contactors, RAST 5

AC operated

Ratings AC2, AC3 380V 400V 220V 415V 230V kW kW kW			Rated- Current AC1 415V A	Auxiliary Contacts built in NO NC		Auxiliary Contacts snap on HN10R..	Type	Coil Voltage	Code Housing Coil	Code Housing IN (L)	Code Housing OUT (T)	Pack pcs.	Weight kg/pc.
---	--	--	---	--	--	---	------	--------------	-------------------	---------------------	----------------------	--------------	------------------

● Contactor Relays



-	-	-	10	4	-	2	K3-07NR40					1	0,23
-	-	-	10	2	2	2	K3-07NR22					1	0,23

● Contactors



4	3	3	25	1	-	2	K3-10NR10					1	0,23
4	3	3	25	-	1	2	K3-10NR01					1	0,23



5,5	4	4	25	1	-	2	K3-14NR10					1	0,23
5,5	4	4	25	-	1	2	K3-14NR01					1	0,23



7,5	5	5	32	1	-	2	K3-18NR10					1	0,23
7,5	5	5	32	-	1	2	K3-18NR01					1	0,23



11	6	7	32	1	-	2	K3-22NR10					1	0,23
11	6	7	32	-	1	2	K3-22NR01					1	0,23

Standard Coils Voltage Color of housing

24V 50Hz	white
110V 50Hz	bright grey
180V 50Hz	yellow
230V 50Hz	blue
special voltages	pink

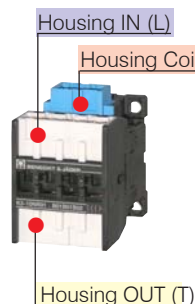
Auxiliary

● Auxiliary Contact Blocks

for Contactors	AC15 230V A	I _{th} A	Contacts NO NC		Type	Pack pcs.	Weight kg/pc.
K3-..R..	3	10	1	-	HN10R	10	0,02
K3-..R..	3	10	-	1	HN01R	10	0,02

Order Example for Contactors:

Coil Voltage	Code Housing Coil ... see page 144, 146, 148, 150	Code Housing IN (L) ... see page 143, 145, 147, 149	Code Housing OUT (T) ... see page 143, 145, 147, 149
Contactor			
K3-14NR10	230	B01B02B01	



Technical data are subject to change without notice

Contactors, RAST 5 Combinations

AC operated

AC operated

Motor				Type	Coil Voltage	Code Housing Coil	Screw Connection IN (L)	Code Housing OUT (T)	Pack pcs.	Weight kg/pc.
AC2, AC3	380V	AC3	for							
	400V	400V	Circuit							
	415V	415V	Breakers							
kW		A	M4...							

● Contactors for Fuseless Load Feeders

	4	10	M4-32T(R)-0,16....	M4-32T(R)-10	K3-10NR10	PZ	.VK3	1	0,23
	4	10	M4-32T(R)-0,16....	M4-32T(R)-10	K3-10NR01	PZ	.VK3	1	0,23
	5,5	14	M4-32T(R)-13		K3-14NR10	PZ	.VK3	1	0,23
	5,5	14	M4-32T(R)-13		K3-14NR01	PZ	.VK3	1	0,23
	7,5	18	M4-32T(R)-17		K3-18NR10	PZ	.VK3	1	0,23
	7,5	18	M4-32T(R)-17		K3-18NR01	PZ	.VK3	1	0,23
	11	22	M4-32T(R)-22....	M4-32T(R)-32	K3-22NR10	PZ	.VK3	1	0,23
	11	22	M4-32T(R)-22....	M4-32T(R)-32	K3-22NR01	PZ	.VK3	1	0,23

Pozidriv . . . PZ
Torx TX

Motor				Type	Coil Voltage	Code Housing Coil	Code Housing IN (L)	Screw Connection OUT (T)	Pack pcs.	Weight kg/pc.
AC2, AC3	380V	AC3	400V							
	400V	400V	for							
	415V	415V	Overload Relays							
kW	A		U12/16E.. and U3/32...							
● Contactors for Overload Relays										
	4	10	U12/16E 0,18-..23 K3 and U3/32 0,18-..32	K3-10NR10	.	.	.	.PZ	1	0,23
	4	10	U12/16E 0,18-..23 K3 and U3/32 0,18-..32	K3-10NR01	.	.	.	.PZ	1	0,23
	5,5	14	U12/16E 0,18-..23 K3 and U3/32 0,18-..32	K3-14NR10	.	.	.	.PZ	1	0,23
	5,5	14	U12/16E 0,18-..23 K3 and U3/32 0,18-..32	K3-14NR01	.	.	.	.PZ	1	0,23
	7,5	18	U12/16E 0,18-..23 K3 and U3/32 0,18-..32	K3-18NR10	.	.	.	.PZ	1	0,23
	7,5	18	U12/16E 0,18-..23 K3 and U3/32 0,18-..32	K3-18NR01	.	.	.	.PZ	1	0,23
	11	22	U12/16E 0,18-..23 K3 and U3/32 0,18-..32	K3-22NR10	.	.	.	.PZ	1	0,23
	11	22	U12/16E 0,18-..23 K3 and U3/32 0,18-..32	K3-22NR01	.	.	.	.PZ	1	0,23
								Pozidriv . . .PZ		
								TorxTX		

Selection of Contactor-Housings for Standard plugs acc. Industry Standard RAST 5



IN (L)

OUT (T)

13 4. 3. 2. 1.

13 4. 3. 2. 1.

T1 1. T2 2. T3 3. T4 4.

T1 1. T2 2. T3 3. T4 4.

Code Contactor-Housings

B01 B02 B03 B04 further housings on request

Standard plugs acc. Industry Standard RAST 5



Order Example for Contactors:

Contactor K3-14NR10...230

Coil Voltage B01

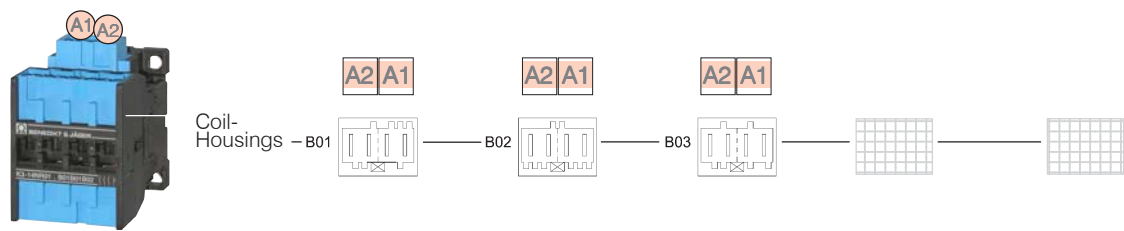
Code Housing Coil ...see page 144, 146, 148, 150 B02

Code Housing IN (L) ... see page 143, 145, 147, 149 B01

Code Housing OUT (T) ...see page 143, 145, 147, 149

8-pole				
6-pole left				
6-pole right				
4-pole left		-0A-		
4-pole right		-0B-		-0B-
2-pole left				-0A-
				-0C-
		-0I-		
		-0L-		
				-0O-
				-0Q-
2-pole center left		-0A-		
		-0C-		
				-0K-
		-0O-		
		-0Q-		
2-pole center right				-0B-
				-0F-
		-0K-		
				-0L-
2-pole right				-0B-
				-0F-
		-0I-		
		-0L-		

Selection of Coil-Housings for Standard plugs acc. **Industry Standard RAST 5**



Code	Coil-Housings	B01	B02	B03	B04	B05	further housings on request
Standard plugs acc. Industry Standard RAST 5	4-pole						
	3-pole left	 -0B-	 -0K-				
	3-pole right	 -0C-	 -0A-				
				 -0H-			
			 -0I-				
			 -0A-				
				 -0B-			
			 -0C-				
				 -0E-			
		 -0I-		 -0L-			
	2-pole center	 -0L-		 -0M-			
			 -0O-				
				 -0P-			
			 -0Q-				

Contactors, Motor-Starter

Switches

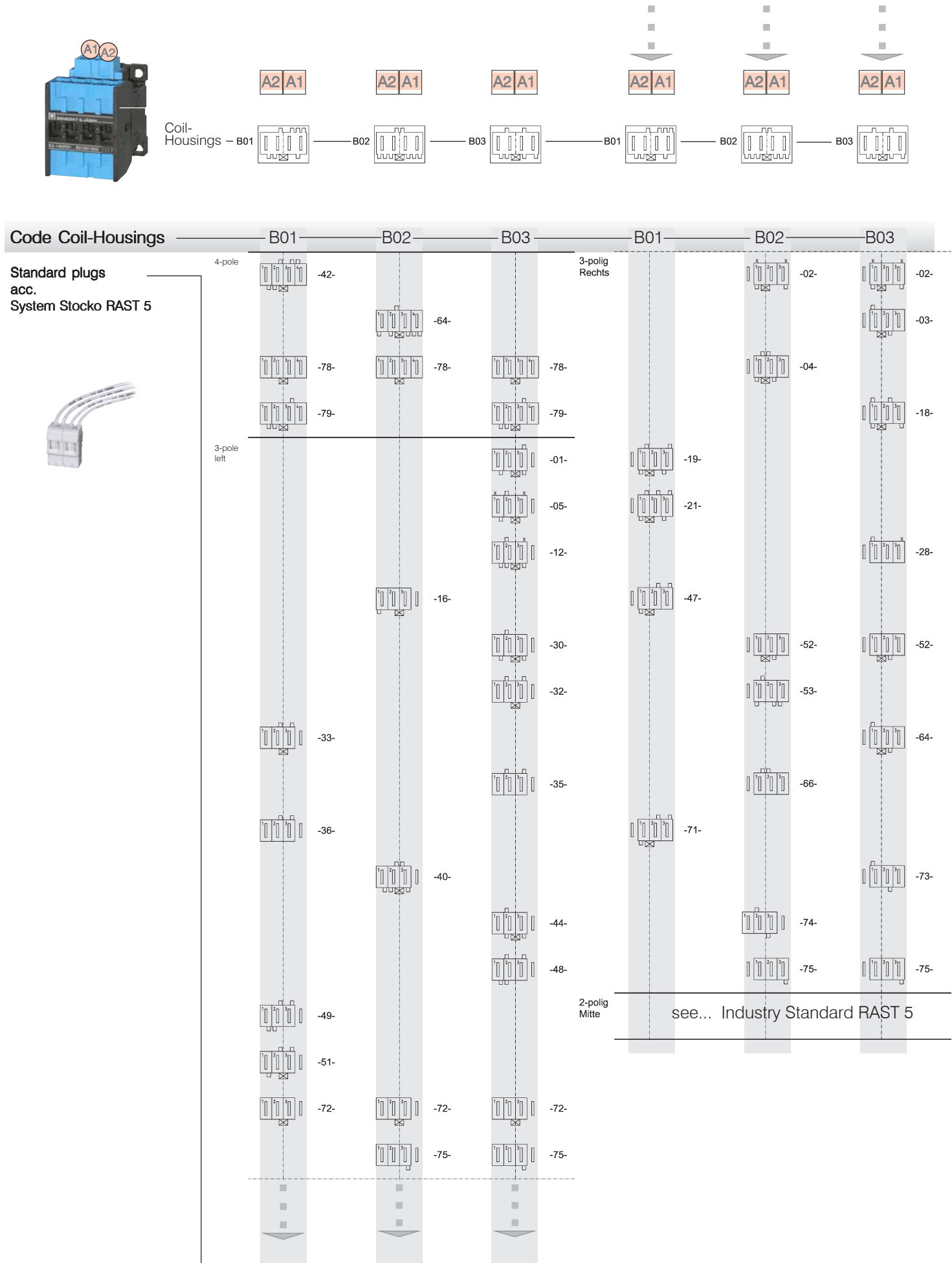
AC-Main Switches

DC-Switch Disconnect

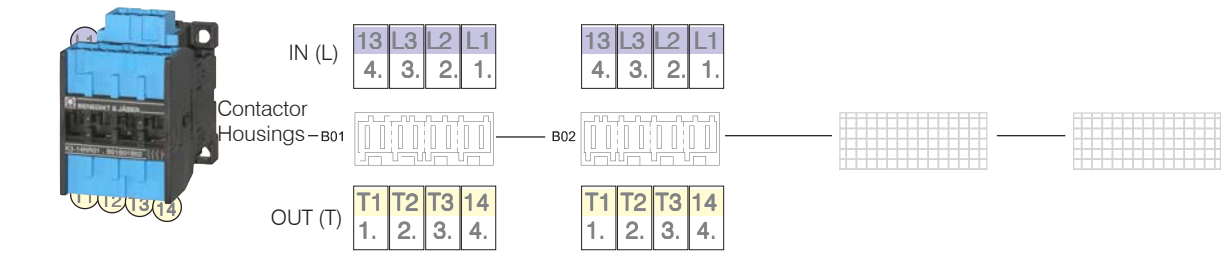
Push Buttons

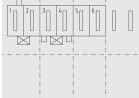
Representatives, Suppliers

Selection of Coil-Housings for Standard plugs acc. **System Stocko RAST 5**



Selection of Contactor-Housings for Standard plugs acc. **System Tyco RAST 5**

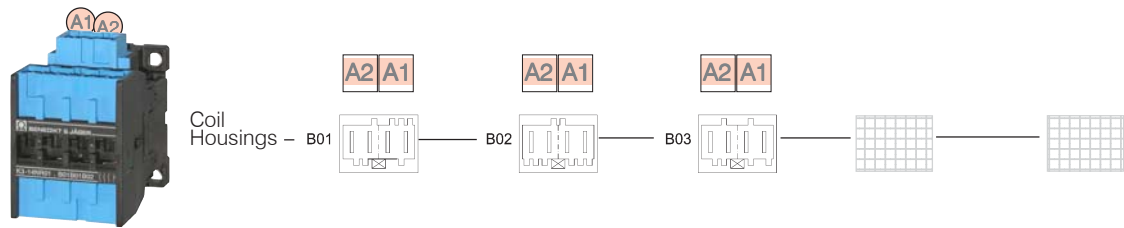


Code Contactor-Housings		B01		B02		B03		B04		further housings on request
Standard plugs acc. System Tyco RAST 5 		4-pole								
		6-pole left		928151-6						
				2-928344-6						
		6-pole right								
		4-pole left		928344-4				4-928344-4		
			4-pole right							
		2-pole left					928344-2			
							3-964951-2			
				2-964951-2						
				928343-2				964951-2		
					4-928344-2					
2-pole center left		928344-2								
		3-964951-2								
		4-928344-2								
2-pole center right					2-928344-2					
					928343-2					
2-pole right		2-928344-2				2-964951-2				
		928343-2				928343-2				

Order Example for Contactors:

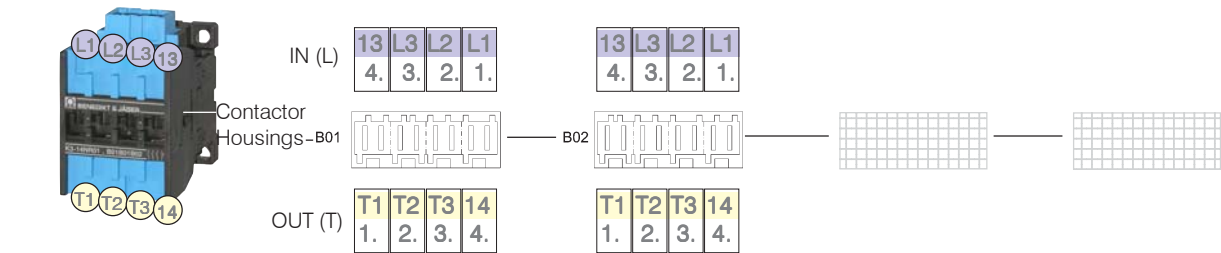
Contactor	K3-14NR10...
Coil Voltage	230
Code Housing Coil ...see page 144, 146, 148, 150	B01
Code Housing IN (L)... see page 143, 145, 147, 149	B02
Code Housing OUT (T)...see page 143, 145, 147, 149	B01

Selection of Coil-Housings for Standard plugs acc. **System Tyco RAST 5**



Code Coil-Housings	B01	B02	B03	B04	B05	further housings on request
4-pole						
3-pole left						
3-pole right			928344-3			
2-pole center			928344-2		2-928344-2	
			3-964951-2		6-928344-2	
		2-964951-2				
		928343-2		928343-2		
			964951-2			
			4-928344-2			

Selection of Contactor-Housings for Standard plugs acc. **System Lumberg RAST 5**



Code	Contactor-Housings	B01	B02	B03	B04	further housings on request
Standard plugs acc. System Lumberg RAST 5						
8-pole						
6-pole left						
6-pole right						
4-pole left						
4-pole right						
2-pole left						
2-pole center left						
2-pole center right						
2-pole right						

Order Example for Contactors:

Contactor K3-14NR10...230..B01 B02 B01

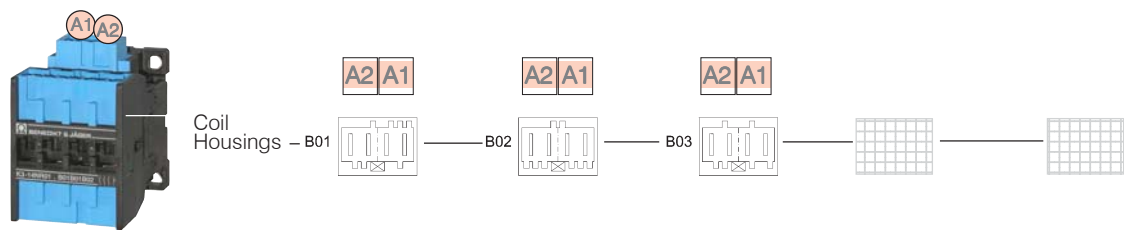
Coil Voltage

Code Housing Coil ...see page 144, 146, 148, 150

Code Housing IN (L) ... see page 143, 145, 147, 149

Code Housing OUT (T) ...see page 143, 145, 147, 149

Selection of Coil-Housings for Standard plugs acc. **System Lumberg RAST 5**



Code Coil-Housings	B01	B02	B03	B04	B05	further housings on request
4-pole						
3-pole left						
3-pole right		 -01-				
2-pole center		 -01-	 -02-			
		 -03-	 -05-			
	 -09-					

Selection of Auxiliary Contact Block-Housings for Standard plugs acc. **Industry Standard RAST 5**



Auxiliary Contact Block-Housings

IN

OUT

803

0I3

further housings on request

Code Auxilliary-Contact Block-Housings

Standard plugs acc. Industry Standard RAST 5



2-polig

-0A-

-0B-

-0C-

-0D-

-0E-

-0F-

-0G-

-0H-

-0I-

-0K-

-0L-

-0M-

-0N-

-0O-

-0P-

-0Q-

-80-

-0I-

-0L-

Order Example for Aux. Contact Blocks:

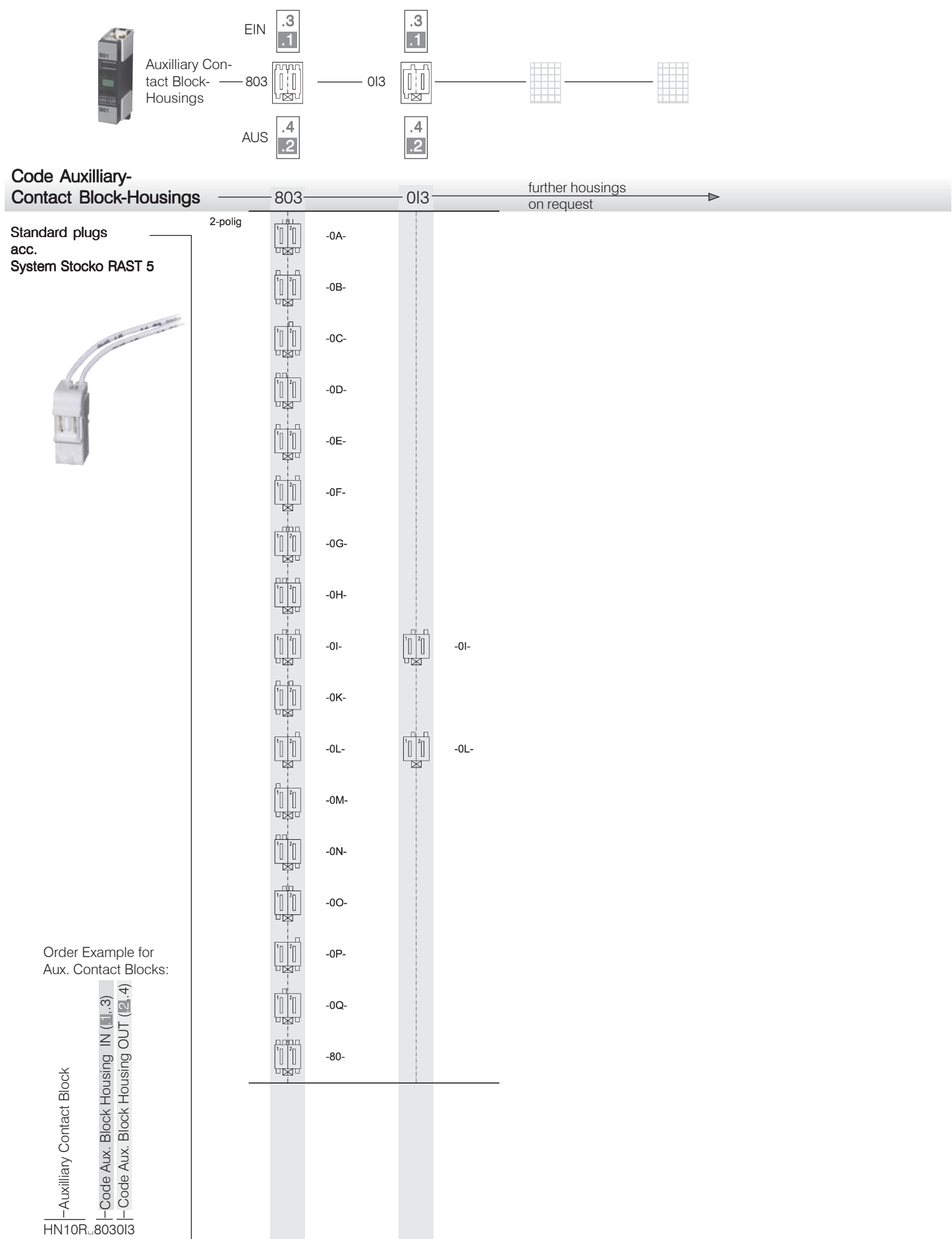
-Auxiliary Contact Block

-Code Aux. Block Housing IN (1.3)

-Code Aux. Block Housing OUT (2.4)

HN10R.8030I3

Selection of Auxiliary Contact Block-Housings for Standard plugs acc. **System Stocko RAST 5**



Selection of Auxiliary Contact Block-Housings for Standard plugs acc. **System Tyco RAST 5**



Auxiliary Contact Block-Housings

EIN

AUS

803

013

further housings on request

Code Auxilliary-Contact Block-Housings

Standard plugs acc. System Tyco RAST 5



2-polig	928344-2	
	2-928344-2	
	3-964951-2	
	6-928344-2	
	5-928344-2	
	3-928344-2	
	2-964951-2	2-964951-2
	928343-2	928343-2
	964951-2	
	4-928344-2	

Order Example for Aux. Contact Blocks:

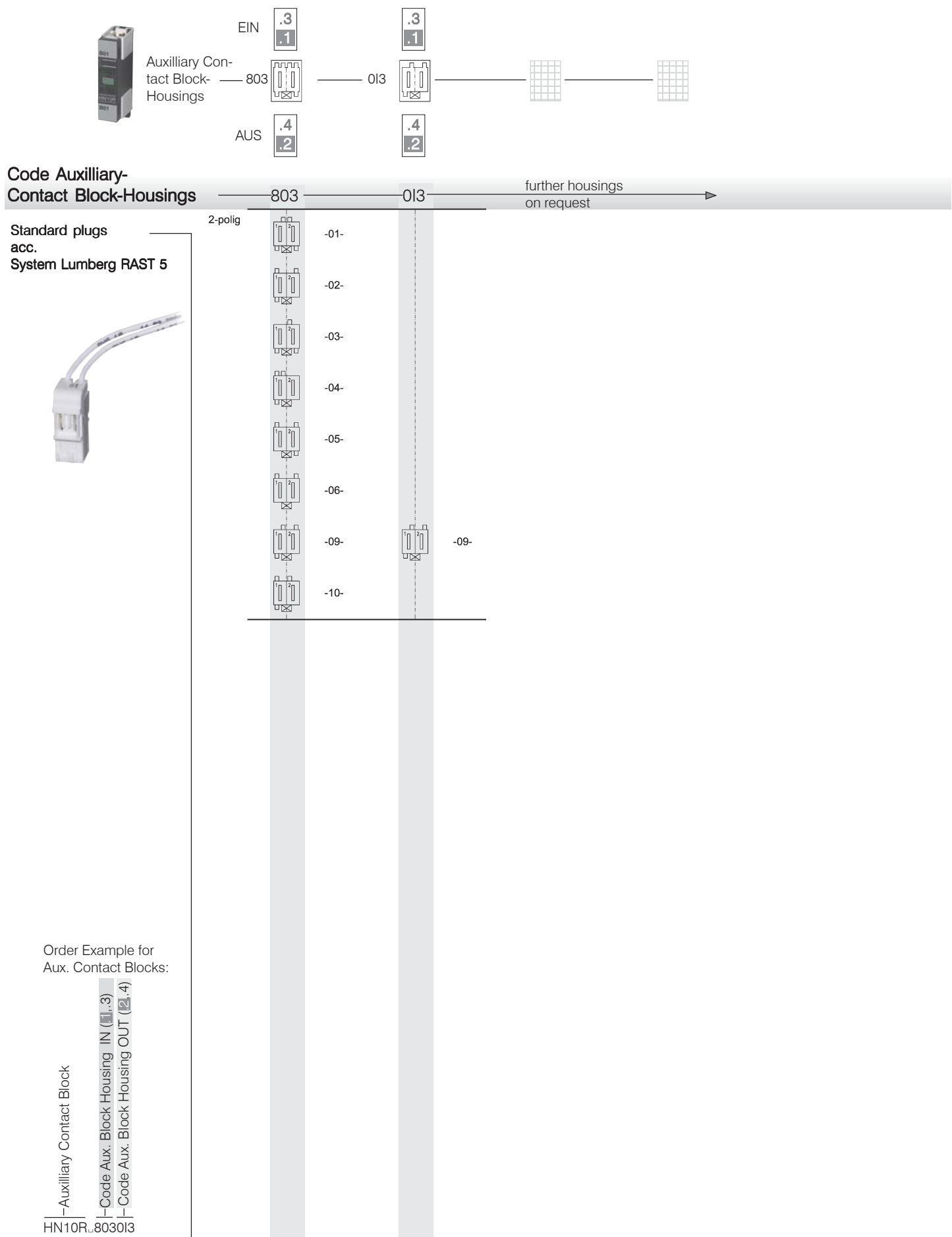
-Auxiliary Contact Block

-Code Aux. Block Housing IN (1,3)

-Code Aux. Block Housing OUT (2,4)

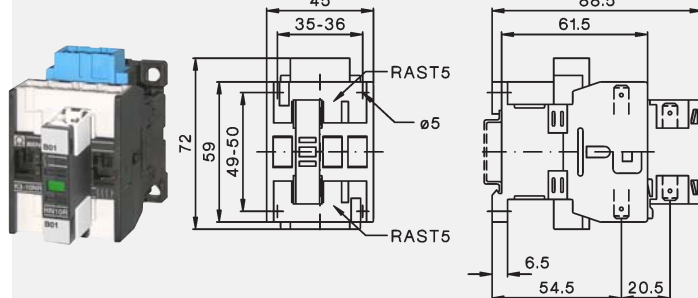
HN10R.803013

Selection of Auxiliary Contact Block-Housings for Standard plugs acc. **System Lumberg RAST 5**

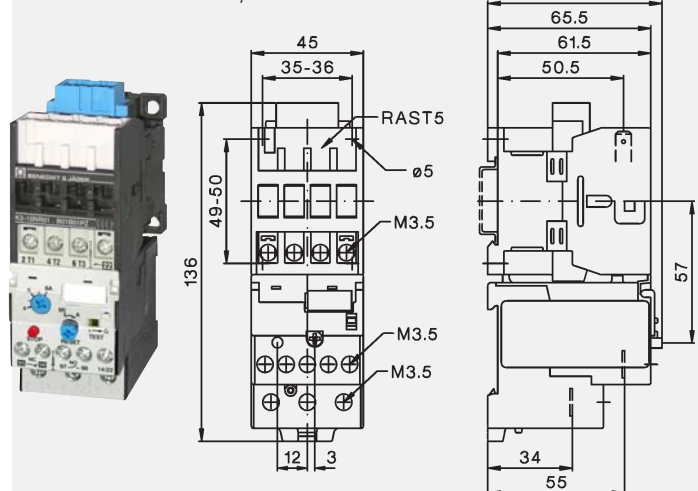


Dimensions

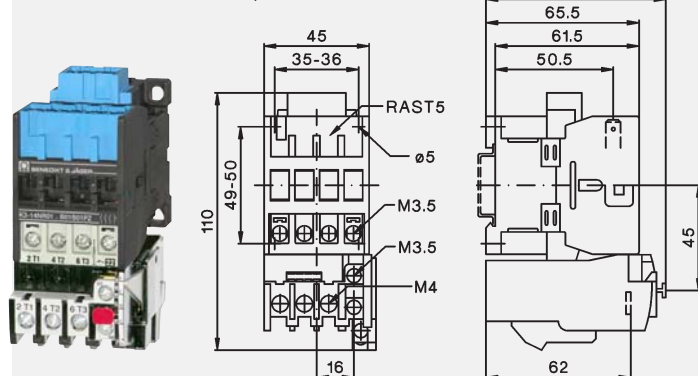
K3-..NR.. +HN..R



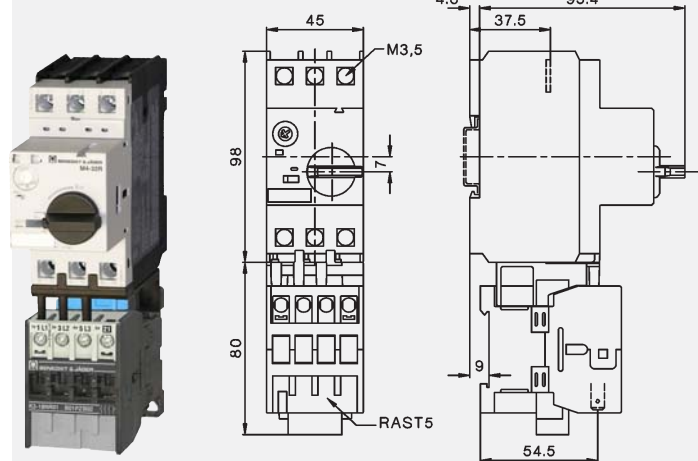
K3-..NR.....PZ + U3/32..



K3-..NR.....PZ + U12/16.. K3



K3-..NR....PZ...VK3 + M4..



Color-Coding acc. to Ratings

Contactor	Type	Ratings	Color
		AC3/415V	Contactor Housing

Contactor Relay	K3-07NR...	-	pink
-----------------	------------	---	------

Contactor	K3-10NR...	4 kW	bright grey
	K3-14NR...	5.5 kW	blue
	K3-18NR...	7.5 kW	dark grey
	K3-22NR...	11 kW	yellow

Color-Coding acc. to Coil Voltage

Voltage	Color
	Coil Housing

24V	white
110V	bright grey
180V	yellow
230V	blue
Special Voltage	pink

Technical data are subject to change without notice

Data acc. to IEC 60947-4-1, VDE 0660

Main Contacts		Type	K3-07NR	K3-10NR	K3-14NR	K3-18NR	K3-22NR
Rated insulation voltage U_i ¹⁾		V~	415	415	415	415	415
Making capacity I_{eff} at $U_e = 415V\sim$		A	-	200	200	200	200
Breaking capacity I_{eff} at $U_e = 415V\sim$ $\cos\varphi = 0,65$		A	-	180	180	200	200
Utilization category AC1							
Switching of resistive load							
Rated operational current $I_e (=I_{th})$ at 40°C, open	415V	A	10	25	25	32	32
Rated operation power of three-phase resistive loads 50-60Hz, $\cos\varphi = 1$	220V	kW	-	9,5	9,5	12,2	12,2
	230V	kW	-	9,9	9,9	12,7	12,7
	240V	kW	-	10,4	10,4	13,3	13,3
	380V	kW	-	16,4	16,4	21,0	21,0
	400V	kW	-	17,3	17,3	22,1	22,1
	415V	kW	-	17,9	17,9	23,0	23,0
Utilization category AC2 and AC3							
Switching of three-phase motors							
Rated operational current I_e open and enclosed	220V	A	-	12	15	18	22
	230V	A	-	11,5	14,5	18	22
	240V	A	-	11	14	18	22
380-400V		A	-	10	14	18	22
	415V	A	-	9	14	18	22
Rated operational power of three-phase motors 50-60Hz	220-230V	kW	-	3	4	5	6
	240V	kW	-	3	4	5	7
	380-400V	kW	-	4	5,5	7,5	11
	415V	kW	-	4,5	6	8,5	12
Auxiliary Contacts							
Rated insulation voltage U_i		V~	415	415	415	415	415
Thermal rated current I_{th} up to 415V							
Ambient temperature	40°C	A	10	10	10	10	10
	60°C	A	6	6	6	6	6
Utilization category AC15							
Rated operational current I_e	220-240V	A	3	3	3	3	3
	380-415V	A	2	2	2	2	2
Utilization category DC13							
Rated operational current I_e	60V	A	3,5	3,5	3,5	3,5	3,5
	110V	A	0,5	0,5	0,5	0,5	0,5
	220V	A	0,1	0,1	0,1	0,1	0,1
Short circuit protection							
gL (gG)		A	20	20	20	20	20

¹⁾ Suitable for: earthed -neutral systems, overvoltage category I to III, pollution degree 3 (Industry-Standard): $U_{imp} = 4kV$. Data for other conditions on request.

Data acc. to IEC 60947-4-1, VDE 0660

Main Contacts		Type	K3-07NR	K3-10NR	K3-14NR	K3-18NR	K3-22NR	
Maximum ambient temperature								
Operation	open	°C	-40 up to +60 (+90) ¹⁾					
	enclosed	°C	-40 up to +40					
	with thermal overload relay	open	°C	-25 up to +60				
	enclosed	°C	-25 up to +40					
Storage		°C	-50 up to +90					
Short circuit protection								
for contactors without thermal overload relay								
Coordination-Type "1" acc. to IEC 947-4-1, Contact welding without hazard of persons								
max. fuse size	gL (gG)	A	20	63	63	63	63	
Coordination-Type "2" acc. to IEC 947-4-1, light Contact welding accepted								
max. fuse size	gL (gG)	A		25	35	35	35	
Contact welding not accepted								
max. fuse size	gL (gG)	A		16	16	16	16	
for Contactors with thermal overload relay the device with the smaller admissible backup fuse (contactor or thermal overload relay) determines the fuse size.								
Frequency of operations z								
Contactors without thermal overload relay								
	without load	1/h	10000	10000	10000	10000	10000	
	AC3, I _e	1/h		600	600	600	600	
	AC4, I _e	1/h		120	120	120	120	
	DC3, I _e	1/h		600	600	600	600	
Mechanical life								
AC-operated		S x 10 ⁶	10	10	10	10	10	
DC-operated		S x 10 ⁶	10	10	10	10	10	
Short time current	10sec.-current	A		96	120	144	176	
Power loss per pole	at I _e /AC3 400V	W		0,21	0,35	0,5	0,75	
Resistance to shock acc. to IEC 68-2-27								
Shock time 20ms sine-wave	NO	g			10			
	NC	g			6			
Control Circuit								
Power consumption of coils								
AC operated	inrush	VA			33-45			
	sealed	VA			7-10			
		W			2,6-3			
DC operated	inrush	W			75			
	sealed	W			2			
Operating range of coils								
in multiples of control voltage U _s								
	AC operated				0,85-1,1			
	DC operated				0,8-1,1			
Switching time at control voltage U _s ±10% ^{2) 3)}								
AC operated	make time	ms			8-16			
	release time	ms			5-13			
	arc duration	ms			10-15			
DC operated	make time	ms			8-12			
	release time	ms			8-13			
	arc duration	ms			10-15			

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

2) Total breaking time = release time + arc duration

3) Values for delay of the release time of the make contact and the make time of the break contact will be increased, if magnet coils are protected with coil suppressor (Varistor, RC-Unit, Diode-Unit).

Data acc. to UL508

Main Contacts (cULus)		Type	K3-10NR	K3-14NR	K3-18NR	K3-22NR
Rated operational current "General Use"		A	25	25	30	30
Motor DOL 3-phase at 60Hz						
Rated operational current	415V	A	10	14	18	22
Rated operational power	110-120V	hp	1½	2	2	3
	200-208V	hp	3	3	5	5
	220-240V	hp	3	3	5	5
	265-277V	hp	3	5	7½	7½
	380-415V	hp	5	5	10	10
Motor DOL 1-phase at 60Hz						
Rated operational current	415V	A	10	14	18	22
Rated operational power of AC motor at 60Hz (1ph)	110-120V	hp	½	¾	1	1½
	200-208V	hp	1	1½	2	3
	220-240V	hp	1½	2	3	3
	265-277V	hp	2	3	3	3
	380-415V	hp	3	3	5	5
Fuses		A	30	40	50	50
Suitable for use on a capability of delivering not more than (SCCR)	rms	A	5000	5000	5000	5000
		V	415	415	415	415
Auxilliary Contacts (cULus)			A300	A300	A300	A300

Accessories

Data acc. to IEC 60947-5-1, VDE 0660

Auxilliary Contacts		Type	HN10R	HN01R
Rated insulation voltage U_i		V~	415	415
Thermal rated current I_m up to 415V				
Ambient temperature	max. 40°C	A	10	10
	max. 60°C	A	6	6
Frequency of operations z		1/h	3000	3000
Mechanical life		$S \times 10^6$	10	10
Power loss per pole at $I_e/AC1$		W	0,5	0,5
Utilization category AC15				
Rated operational current I_e	220-240V	A	3	3
	380-415V	A	2	2
Utilization category DC13				
Rated operational current I_e	60V	A	2	2
	110V	A	0,4	0,4
	220V	A	0,1	0,1
Short circuit protection				
short circuit current 1kA, contact welding not accepted				
max. fuse size	gL (gG)	A	20	20

Data acc. to UL508

Rated operational current "General Use"		A	10	10
Rated operational voltage	max.	V~	300	300
Auxiliary Contacts			A300	A300

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Circuit Breakers M4 for Motor Control

Rated Current I_n	Suitable for motors ¹⁾ 3~400V kW	Setting range Thermal Overload Release	Instantaneous Short Circuit Release	Short Circuit Breaking Capacity at 3~400V kA (I_{cu})	Type	Pack	Weight approx.
A		A	A			pcs.	kg/pc.

Circuit Breaker M4-32T-..



switch type

0,16	-	0,10 – 0,16	2,1	100	M4-32T-0,16	1	0,32
0,25	0,06	0,16 – 0,25	3,3	100	M4-32T-0,25	1	0,32
0,4	0,09	0,25 – 0,4	5,2	100	M4-32T-0,4	1	0,32
0,63	0,18	0,4 – 0,63	8,2	100	M4-32T-0,63	1	0,32
1	0,25	0,63 – 1	13	100	M4-32T-1	1	0,32
1,6	0,55	1 – 1,6	20,8	100	M4-32T-1,6	1	0,32
2,5	0,75	1,6 – 2,5	32,5	100	M4-32T-2,5	1	0,32
4	1,5	2,5 – 4	52	100	M4-32T-4	1	0,32
6	2,2	4 – 6	78	100	M4-32T-6	1	0,32
8	3	5 – 8	104	100	M4-32T-8	1	0,32
10	4	6 – 10	130	50	M4-32T-10	1	0,32
13	5,5	9 – 13	169	50	M4-32T-13	1	0,32
17	7,5	11 – 17	221	20	M4-32T-17	1	0,32
22	7,5	14 – 22	286	15	M4-32T-22	1	0,32
26	11	18 – 26	338	15	M4-32T-26	1	0,32
32	15	22 – 32	416	15	M4-32T-32	1	0,32

Circuit Breaker M4-32R-..



rotary type

0,16	-	0,10 – 0,16	2,1	100	M4-32R-0,16	1	0,36
0,25	0,06	0,16 – 0,25	3,3	100	M4-32R-0,25	1	0,36
0,4	0,09	0,25 – 0,4	5,2	100	M4-32R-0,4	1	0,36
0,63	0,18	0,4 – 0,63	8,2	100	M4-32R-0,63	1	0,36
1	0,25	0,63 – 1	13	100	M4-32R-1	1	0,36
1,6	0,55	1 – 1,6	20,8	100	M4-32R-1,6	1	0,36
2,5	0,75	1,6 – 2,5	32,5	100	M4-32R-2,5	1	0,36
4	1,5	2,5 – 4	52	100	M4-32R-4	1	0,36
6	2,2	4 – 6	78	100	M4-32R-6	1	0,36
8	3	5 – 8	104	100	M4-32R-8	1	0,36
10	4	6 – 10	130	100	M4-32R-10	1	0,36
13	5,5	9 – 13	169	100	M4-32R-13	1	0,36
17	7,5	11 – 17	221	50	M4-32R-17	1	0,36
22	7,5	14 – 22	286	50	M4-32R-22	1	0,36
26	11	18 – 26	338	50	M4-32R-26	1	0,36
32	15	22 – 32	416	50	M4-32R-32	1	0,36

Circuit Breaker M4-63R-..



rotary type

26	12,5	18 – 26	338	50	M4-63R-26	1	1,0
32	15	22 – 32	416	50	M4-63R-32	1	1,0
40	18,5	28 – 40	520	50	M4-63R-40	1	1,0
50	22	34 – 50	650	50	M4-63R-50	1	1,0
63	30	45 – 63	819	50	M4-63R-63	1	1,0

Circuit Breaker M4-100R-..



rotary type

63	30	45 – 63	819	50	M4-100R-63	1	2,2
75	37	55 – 75	975	50	M4-100R-75	1	2,2
90	45	70 – 90	1170	50	M4-100R-90	1	2,2
100	-	80 – 100	1300	50	M4-100R-100	1	2,2

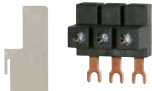
1) Approximate values of standard motors

Accessories

Contacts		Rated Operational Current			Type	Pack	Weight approx.	
NO	NC	AC15 24V A	240V A	AC1 240V A		pcs.	kg/pc.	
Transverse Auxiliary Contact Block, max. 1 pc. per circuit-breaker ¹⁾								
	1	1	3	2	5	M4 HQ11	1 0,02	
	2	-	3	2	5	M4 HQ20	1 0,02	
	-	2	3	2	5	M4 HQ02	1 0,02	
Auxiliary Contact Block for left hand side mounting, 1 or 2 pcs. per circuit-breaker ¹⁾								
	1	1	6	4	10	M4 HS11	1 0,03	
	2	-	6	4	10	M4 HS20	1 0,03	
	-	2	6	4	10	M4 HS02	1 0,03	
Alarm Switch (any tripping) for left hand side mounting, max. 1 pc. per circuit-breaker ¹⁾								
	1	1	for M4-32T, -32R	6	4	10	M4 MA11	1 0,04
	1	1	for M4-63R, -100R	6	4	10	M4 MA11 63	1 0,04
Alarm Switch (short circuit) for left hand side mounting, max. 1 pc. per circuit-breaker ¹⁾								
	1	1		6	4	10	M4 M11	1 0,04
Operates in case of short circuit accidents that is over 20 times of the rated current of the circuit breaker.								
Undervoltage Releases for right hand side mounting, max. 1 pc. per circuit-breaker ¹⁾								
	Trips the circuit-breaker when the voltage is interrupted. Prevents the motor from being restarted accidentally when the voltage is restored, suitable for EMERGENCY STOP acc. to IEC 60204							
	24V 50Hz, 28V 60Hz				M4 U24	1	0,11	
	110-127V 50Hz, 120V 60Hz				M4 U110	1	0,11	
	220-230V 50Hz, 240-260V 60Hz				M4 U230	1	0,11	
	240V 50Hz, 277V 60Hz				M4 U240	1	0,11	
	380-400V 50Hz, 440-460V 60Hz				M4 U400	1	0,11	
	415-440V 50Hz, 460-480V 60Hz				M4 U415	1	0,11	
Shunt Releases for right hand side mounting, max. 1 pc. per circuit-breaker ¹⁾								
	Trips the circuit-breaker when the release coil energized.							
	100% ON		max. 5sec. ON					
	20-24V 50Hz, 28V 60Hz			20-70V 50/60Hz DC	M4 A24	1	0,12	
	75-127V 50Hz, 120V 60Hz			75-190V 50/60Hz DC	M4 A110	1	0,12	
	190-230V 50Hz, 240-260V 60Hz			190-330V 50/60Hz DC	M4 A230	1	0,12	
	200-240V 50Hz, 277V 60Hz			200-330V 50/60Hz DC	M4 A240	1	0,12	
	300-400V 50Hz, 440-460V 60Hz			300-500V 50/60Hz DC	M4 A400	1	0,12	
	330-440V 50Hz, 460-480V 60Hz			330-500V 50/60Hz DC	M4 A415	1	0,12	
Enclosure for circuit breaker M4 32R protection degree IP65								
	Plastic enclose with rotary operating mechanism black-grey lockable, with N- and PE-terminal space for 1 transverse and side aux. contact + release				M4 32R PFH4	1	0,53	
	Enclose with rotary operating mechanism yellow - red, lockable with N- and PE-terminal space for 1 transverse and side aux. contact + release				M4 32R PFHN4	1	0,53	

1) Number and position see page 172

Accessories and Busbars

			for circuit- breaker	Type	Pack pcs.	Weight approx. kg/pc.
Accessories						
	Scale cover sealable	for covering the current setting scale	M4-32...100	M4 K	10	0,003
	Push-in lugs	for screwing the circuit-breaker onto mounting plates. 2 units required (1 bag with 10 units)	M4-32	M4 32 L	10	0,01
 	Spade terminal block	up to 600V acc.UL 489	M4-32R	M4 32R E	on request	
	Pin terminal block	up to 600V acc.UL 489	M4-32R	M4 32R EV	on request	
	Insulation barriers	up to 600V acc.UL 489 for increased distances and clearances acc. to UL Type "E", 2 pcs per device (on input side)	M4-100	M4 100 E	2	0,01

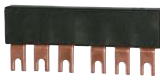
Door-coupling rotary mechanisms IP65

The door locking device prevents accidental opening of the cubicle door in the ON position of the circuit-breaker. The OFF position can be locked with up to 3 padlocks.

	Door-coupling rotary mechanism black	extension shaft 115mm	M4-32R	M4 32R EH1 115	1	0,1
		extension shaft 315mm	M4-32R	M4 32R EH1 315	1	0,2
		extension shaft 115mm	M4-63R	M4 63R EH1 115	1	0,1
		extension shaft 315mm	M4-63R	M4 63R EH1 315	1	0,2
		extension shaft 115mm	M4-100R	M4 100R EH1 115	1	0,1
		extension shaft 315mm	M4-100R	M4 100R EH1 315	1	0,2
	Emergency-Stop	extension shaft 115mm	M4-32R	M4 32R EHN1 115	1	0,1
	Door-coupling rotary mechanism; red/yellow	extension shaft 315mm	M4-32R	M4 32R EHN1 315	1	0,2
		extension shaft 115mm	M4-63R	M4 63R EHN1 115	1	0,1
		extension shaft 315mm	M4-63R	M4 63R EHN1 315	1	0,2
		extension shaft 115mm	M4-100R	M4 100R EHN1 115	1	0,1
		extension shaft 315mm	M4-100R	M4 100R EHN1 315	1	0,2

		Protection degree	Type	Pack pcs.	Weight kg/pc.
Insulated 3-phase busbar system					

For feeding several modular circuit-breakers M4-32. on standard mounting rails, insulated
Rated operational voltage max. 690 V, 63 A, with **spade connection**, modular spacing 45mm (54mm on request)

	3-phase busbars	for 2 circuit-breakers	IP20	M4 32 S2	1	0,03
		for 3 circuit-breakers	IP10	M4 32 S3	1	0,05
		for 4 circuit-breakers	IP10	M4 32 S4	1	0,07
		for 5 circuit-breakers	IP10	M4 32 S5	1	0,10
	Line side terminal 3-pole, connection from above	Conductor cross-section solid or stranded 6-25mm ² with end sleeve 4-16mm ²	IP10	M4 32 SE	1	0,04
	Cover for tags	Touch guard for empty spaces		M4 32 SF	1	0,003

For feeding several modular circuit-breakers M4-32. on standard mounting rails, insulated
Rated operational voltage max. 690 V, 63 A, with **pin connection**, modular spacing 45mm (54mm on request)

	3-phase busbars	for 2 circuit-breakers	IP20	M4 32 S2V	1	0,03
		for 3 circuit-breakers	IP20	M4 32 S3V	1	0,05
		for 4 circuit-breakers	IP20	M4 32 S4V	1	0,07
		for 5 circuit-breakers	IP20	M4 32 S5V	1	0,10
	Line side terminal 3-pole, connection from above	Conductor cross-section solid or stranded 6-25mm ² with end sleeve 4-16mm ²	IP20	M4 32 SEV	1	0,04
	Cover for tags	Touch guard for empty spaces		M4 32 SFV	1	0,003

For feeding several modular circuit-breakers M4-63. on standard mounting rails, insulated
Rated operational voltage max. 690 V, with **pin connection**, modular spacing 55mm

	3-phase busbars	for 2 circuit-breakers	IP20	M4 63 S2	1	0,15
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Mounting Parts for Fuseless Load Feeders

	Type	Pack pcs.	Weight approx. kg/pc.
DIN-rail adapters with DIN-rail for contactor			
	for M4-32.. DIN-rails moveable for easy mounting and replacing can be connected on one 35 mm DIN-rail (high 15mm) or two 35 mm-DIN-rails (125mm distance) suitable for contactors K1-..., K(G)3-10 to K(G)3-40	M4 32 HU1	1 0,1
	Adapter, for M4-63.. can be connected on two 35 mm DIN-rails (125mm distance) or one 75 mm DIN-rail, or screw mounting suitable for contactors K(G)3-24 to K(G)3-40, K3-50 to K3-74	M4 63 HU1	1 0,2
	Adapter, for M4-100.. can be connected on two 35 mm DIN-rails (125mm distance) or one 75 mm DIN-rail, or screw mounting suitable for contactors K3-50 to K3-74	M4 100 HU1	1 0,2

Busbar adapters for 60-mm-system, 3 copper busbars acc. to DIN 46433

	for M4-32 up to 32A, 690V 45mm width, 182mm long bar width: 12 und 15mm bar thickness: 5 and 10mm	M4 32 SA60	1 0,18
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Link modules, for mechanical and electrical connection between circuit-breaker and contactor

	for M4-32.. with contactors K1-..	max. 32A	M4 32 VK1	1 0,015
	for M4-32.. with contactors K3-10 to K3-22	max. 32A	M4 32 VK3	1 0,02
	for M4-32.. with contactors KG3-10 to KG3-22	max. 32A	M4 32 VKG3	1 0,02

Link modules, for electrical connection between circuit-breaker and contactor

for M4-32.. with contactors K(G)3-24to K(G)3-40	max. 32A	M4 32 VD	1 0,01
for M4-63R. with contactors K3-24 to K3-74	max. 63A	M4 63 VD	1 0,02
for M4-63R. with contactors KG3-24 to KG3-40	max. 63A	M4 63 VDG	1 0,02
for M4-100R. with contactors K3-50 to K3-74	max. 100A	M4 100 VD	1 0,02

Components for Fuseless Load Feeders, DIN-Rail Mounting

Type of coordination "1" 3x415V 10kA ¹⁾



Motor 3~400V kW	Setting range A	Circuit-breaker page 160 Type	Link module Type	Contactor ²⁾ 220-230V 50Hz Type	DIN-rail adapter Type
-	0,10 – 0,16	M4-32T-0,16	M4 32 VK1	K1-09D10 230	-
0,06	0,16 – 0,25	M4-32T-0,25	M4 32 VK1	K1-09D10 230	-
0,09	0,25 – 0,4	M4-32T-0,4	M4 32 VK1	K1-09D10 230	-
0,18	0,40 – 0,63	M4-32T-0,63	M4 32 VK1	K1-09D10 230	-
0,25	0,63 – 1	M4-32T-1	M4 32 VK1	K1-09D10 230	-
0,55	1,0 – 1,6	M4-32T-1,6	M4 32 VK1	K1-09D10 230	-
0,75	1,6 – 2,5	M4-32T-2,5	M4 32 VK1	K1-09D10 230	-
1,5	2,5 – 4	M4-32T-4	M4 32 VK1	K1-09D10 230	-
2,2	4 – 6	M4-32T-6	M4 32 VK1	K1-09D10 230	-
3	5 – 8	M4-32T-8	M4 32 VK1	K1-09D10 230	-
4	6 – 10	M4-32T-10	M4 32 VK1	K1-09D10 230	-
5,5	9 – 13	M4-32T-13	M4 32 VK1	K1-12D10 230	-
7,5	11 – 17	M4-32T-17	M4 32 VK3	K3-18ND10 230EUR	-
7,5	14 – 22	M4-32T-22	M4 32 VK3	K3-22ND10 230EUR	-
11	18 – 26	M4-32T-26	M4 32 VK3	K3-22ND10 230EUR	-
15	22 – 32	M4-32T-32	M4 32 VD	K3-32A00 230	M4 32 HU1
-	0,10 – 0,16	M4-32R-0,16	M4 32 VK3	K3-10ND10 230EUR	-
0,06	0,16 – 0,25	M4-32R-0,25	M4 32 VK3	K3-10ND10 230EUR	-
0,09	0,25 – 0,4	M4-32R-0,4	M4 32 VK3	K3-10ND10 230EUR	-
0,18	0,40 – 0,63	M4-32R-0,63	M4 32 VK3	K3-10ND10 230EUR	-
0,25	0,63 – 1	M4-32R-1	M4 32 VK3	K3-10ND10 230EUR	-
0,55	1,0 – 1,6	M4-32R-1,6	M4 32 VK3	K3-10ND10 230EUR	-
0,75	1,6 – 2,5	M4-32R-2,5	M4 32 VK3	K3-10ND10 230EUR	-
1,5	2,5 – 4	M4-32R-4	M4 32 VK3	K3-10ND10 230EUR	-
2,2	4 – 6	M4-32R-6	M4 32 VK3	K3-10ND10 230EUR	-
3	5 – 8	M4-32R-8	M4 32 VK3	K3-10ND10 230EUR	-
4	6 – 10	M4-32R-10	M4 32 VK3	K3-10ND10 230EUR	-
5,5	9 – 13	M4-32R-13	M4 32 VK3	K3-14ND10 230EUR	-
7,5	11 – 17	M4-32R-17	M4 32 VK3	K3-18ND10 230EUR	-
7,5	14 – 22	M4-32R-22	M4 32 VK3	K3-22ND10 230EUR	-
11	18 – 26	M4-32R-26	M4 32 VK3	K3-22ND10 230EUR	-
15	22 – 32	M4-32R-32	M4 32 VD	K3-32A00 230	M4 32 HU1
12,5	18 – 26	M4-63R-26	M4 63 VD	K3-32A00 230	M4 63 HU1
15	22 – 32	M4-63R-32	M4 63 VD	K3-32A00 230	M4 63 HU1
18,5	28 – 40	M4-63R-40	M4 63 VD	K3-40A00 230	M4 63 HU1
22	34 – 50	M4-63R-50	M4 63 VD	K3-50A00 230	M4 63 HU1
30	45 – 63	M4-63R-63	M4 63 VD	K3-62A00 230	M4 63 HU1
30	45 – 63	M4-100R-63	M4 100 VD	K3-62A00 230	M4 100 HU1
37	55 – 75	M4-100R-75	M4 100 VD	K3-74A00 230	M4 100 HU1
45	70 – 90	M4-100R-90	-	K3-90A00 230	-
-	80 – 100	M4-100R-100	-	K3-115A00 230	-

1) Other conditions on request

2) Contactors K1.. 220-230V 50Hz, Contactors K3.. 220-240V 50Hz, further technical data see Catalog D677..

Technical Data according to IEC/EN 60947-1, 60947-2, 60947-4-1 and VDE 0660

This table shows the rated ultimate short-circuit breaking capacity I_{cu} and the rated service short-circuit breaking capacity I_{cs} of the M4 circuit-breakers with different operational voltages as a function of the rated current I_n of the circuit-breakers.
The circuit-breakers can be fed at the top or bottom supply terminals without any reduction of the rated data.

If the short-circuit current exceeds the rated short-circuit breaking capacity of the circuit-breaker specified in the tables at the installation point, a back-up fuse is to be used.
The maximum rated current for the back-up fuse is specified in the tables. These fuses are only suitable for the short-circuit-currents as indicated on the fuses.

Circuit-breaker	Rated current I_n	up to AC 240V ²⁾			up to AC 400V ²⁾ up to AC 415V ³⁾			up to AC 440V ²⁾ up to AC 460V ³⁾			up to AC 500V ²⁾ up to AC 525V ³⁾			up to AC 690V ²⁾		
		I_{cu}	I_{cs}	max. fuse ¹⁾ (gL/gG)	I_{cu}	I_{cs}	max. fuse ¹⁾ (gL/gG)	I_{cu}	I_{cs}	max. fuse ¹⁾ (gL/gG)	I_{cu}	I_{cs}	max. fuse ¹⁾ (gL/gG)	I_{cu}	I_{cs}	max. fuse ¹⁾ (gL/gG)
Type	A	kA	kA	A	kA	kA	A	kA	kA	A	kA	kA	A	kA	kA	A
M4-32T	0,16 ... 0,63	100	100	--	100	100	--	100	100	--	100	100	--	100	100	--
	1	100	100	--	100	100	--	100	100	--	100	100	--	100	100	--
	1,6	100	100	--	100	100	--	100	100	--	100	100	--	3	3	20
	2,5	100	100	--	100	100	--	100	100	--	50	38	50	3	3	35
	4	100	100	--	100	100	--	50	38	50	15	11	40	3	3	40
	6	100	100	--	100	100	--	15	11	50	10	8	40	3	3	50
	8	100	100	--	100	100	--	15	11	63	10	8	63	3	3	63
	10	100	100	--	50	38	80	15	11	63	6	5	63	3	3	63
	13	100	100	--	50	38	80	10	8	80	6	5	80	3	3	63
	17	50	38	--	20	15	100	10	8	80	6	5	80	3	3	63
	22	40	30	125	15	11	100	8	6	100	6	5	80	3	3	63
	26	40	30	125	15	11	100	8	6	100	6	5	80	3	3	63
	32	30	22	125	15	11	100	6	4	100	5	4	80	3	3	63
M4-32R	0,16 ... 1,0	100	100	--	100	100	--	100	100	--	100	100	--	100	100	--
	1,6	100	100	--	100	100	--	100	100	--	100	100	--	100	100	--
	2,5	100	100	--	100	100	--	100	100	--	100	100	--	8	8	35
	4	100	100	--	100	100	--	100	100	--	100	100	--	8	8	40
	6	100	100	--	100	100	--	100	100	--	100	100	--	6	6	50
	8	100	100	--	100	100	--	50	38	80	50	38	63	6	6	63
	10	100	100	--	100	100	--	50	38	80	50	38	80	6	6	63
	13	100	100	--	100	100	--	50	38	80	42	32	80	6	6	63
	17	100	100	--	50	38	100	20	15	80	10	8	80	4	4	63
	22	100	100	--	50	38	125	20	15	100	10	8	80	4	4	63
	26	100	100	--	50	38	125	20	15	100	10	8	80	4	4	63
	32	100	100	--	50	38	125	20	15	100	10	8	80	4	4	63
M4-63R	26	100	100	--	50	50	125	35	27	125	12	9	100	5	5	80
	32	100	100	--	50	50	125	35	27	125	10	8	100	5	5	80
	40	100	100	--	50	50	160	35	27	125	10	8	100	5	5	80
	50	100	100	--	50	50	160	35	27	125	10	8	100	5	5	80
	63	100	100	--	50	50	160	35	27	160	10	8	100	5	5	80
M4-100R	63	100	100	--	50	38	160	40	30	160	12	9	100	6	5	80
	75	100	100	--	50	38	160	40	30	160	8	6	125	5	4	100
	90	100	100	--	50	38	160	40	30	160	8	6	125	5	4	125
	100	100	100	--	50	38	160	40	30	160	8	6	125	5	4	125

-- No back-up fuse required

1) Back up fuse required if short-circuit current at installation point > I_{cu}

2) 10 % overvoltage

3) 5 % overvoltage

Main Circuit

Type	Number of poles	Max. rated current I _{max} (= max rated operational current I _e)	Storage / Transport Permissible ambient temperature	Operation Permissible ambient temperature	Rated insulation voltage U _i	Rated impulse withstand voltage U _{imp}	Rated operational Voltage U _e	Rated frequency	Utilisation category IEC 60947-2 (circuit-breaker)	Utilisation category IEC 60947-4-1 (motor starter)	Class acc. to IEC 60947-4-1
	A	°C	°C	°C	V	kV	V	Hz			
M4-32T	3	32	-50°C to +80°C -58°F to +176°F	-20°C to +60°C -4°F to +140°F	690 ¹⁾	6	690	50/60	A	AC3	10
M4-32R	3	32	-50°C to +80°C -58°F to +176°F	-50°C to +80°C -4°F to +140°F	690 ¹⁾	6	690	50/60	A	AC3	10
M4-63R	3	63	-50°C to +80°C -58°F to +176°F	-50°C to +80°C -4°F to +140°F	1000 ²⁾	8	690	50/60	A	AC3	10
M4-100R	3	100	-50°C to +80°C -58°F to +176°F	-50°C to +80°C -4°F to +140°F	1000 ²⁾	8	690	50/60	A	AC3	10

Type	Power loss P _v per circuit-breaker dependent on rated current I _n (upper setting range)			R per conducting path = P _{1P} × 3			Shock resistance	Degree of protection	Shock hazard protection	Temperature compensation	Mechanical endurance	Electrical endurance	Max. operation frequency per hour (motor starts)
	In -> to 4 A	In -> 6 to 26 A	In -> 32A	In -> 26 to 63 A	In -> to 63 A	In -> 75 to 100 A	acc. to IEC 60068 Part 2-27	acc. to IEC 60529	acc. to DIN VDE 0106 Part 100	acc. to IEC 60947-4-1	operating cycles		1/h
	W	W	W	W	W	W	g			°C			
M4-32T	9,8	8	3,9	-	-	-	25	IP 20	safe against finger touch	-20 bis +60	100 000	100 000	25
M4-32R	9,8	8	3,9	-	-	-	25	IP 20	safe against finger touch	-20 bis +60	100 000	100 000	25
M4-63R	-	-	-	12,6	-	-	25	IP 20	safe against finger touch	-20 bis +60	50 000	25 000	25
M4-100R	-	-	-	-	11,9	15	25	IP 20	safe against finger touch	-20 bis +60	50 000	25 000	25

Approvals

Type	 USA, Canada UL	 Switzerland SEV	 Europe CCC	CB/CCA- Certificates
M4-32T	o	o	/	o
M4-32R	o	o	/	o
M4-63R	o	o	/	o
M4-100R	o	o	/	o
M4 H..	o	-	/	-
M4 M..	o	-	/	-
M4 U..	o	-	/	-
M4 A..	o	-	/	-

o In standard version approved
- Not provided for test till now

/ No testing required CE

x In test

1) Suitable at 690V for: earthed-neutral systems, overvoltage category I to IV, pollution degree 3 (standard-industry): U_{imp} = 6kV.

2) Suitable at 1000V for: earthed-neutral systems, overvoltage category I to IV, pollution degree 3 (standard-industry): U_{imp} = 8kV.
Data for other conditions on request.

Conductor cross-sections for main circuit

Type	Terminal Type, Screw Type	Tightening torque		Conductor cross-sections solid		Conductor cross-sections stranded		Conductor cross-sections flexible	
		Nm	lb - in	mm²	AWG	mm²	AWG	mm²	AWG
M4-32T 	Pz2	0,8 - 2,5	7 - 22	1 x (1 - 10) 2 x (1 - 6)	1 x (18 - 8) 2 x (18 - 10)	1 x (1 - 6) 2 x (1 - 6)	1 x (18 - 10) 2 x (18 - 10)	1 x (1 - 6) 2 x (0,75 - 4)	1 x (18 - 10) 2 x (18 - 10)
M4-32R 	Pz2	0,8 - 2,5	7 - 22	1 x (1 - 10) 2 x (1 - 6)	1 x (18 - 8) 2 x (18 - 10)	1 x (1 - 6) 2 x (1 - 6)	1 x (18 - 10) 2 x (18 - 10)	1 x (1 - 6) 2 x (0,75 - 4)	1 x (18 - 10) 2 x (18 - 10)
M4-63R 	Pz2	3 - 4,5	26 - 39	1 x (0,75 - 35) 2 x (0,75 - 25)	1 x (18 - 2) 2 x (18 - 4)	1 x (0,75 - 35) 2 x (0,75 - 25)	1 x (18 - 2) 2 x (18 - 4)	1 x (0,75 - 25) 2 x (0,75 - 16)	1 x (18 - 4) 2 x (18 - 6)
M4-100R 	4mm hexagon socket screw	4-6	35 - 53	1 x (2,5 - 70) 2 x (2,5 - 50)	1 x (12 - 2/0) 2 x (12 - 1/0)	1 x (2,5 - 70) 2 x (2,5 - 50)	1 x (12 - 2/0) 2 x (12 - 1/0)	1 x (2,5 - 50) 2 x (2,5 - 35)	1 x (12 - 1/0) 2 x (10 - 2)

Auxiliary switches

	Type	Rated operational voltage		Rated operational current		Rated operational current		Rated operational voltage		Rated operational current	
		U _e		I _e /AC-15		I _e /AC-12 Ith		U _e		I _e /DC-13	
		AC						DC L/R 200 ms			
		V		A		A		V		A	
Front transverse auxiliary switch	M4 HQ..	24	240	3	3	5	5	24	220	1	0,1
Lateral auxiliary switch and signalling switch	M4 HS..										
	M4 M..	24	240	6	4	10	10	24	220	2	0,25

	Type	Power consumption		Response voltage		Response voltage acc. to	
		during pick-up	uninterrupted duty	trip	pick-up	IEC 60947-1	
		VA/W		V		V	
Undervoltage release	M4 U..	8,5/6	3/1,2	0,7 - 0,35xUs	0,85 - 1,1xUs		
Shunt release	M4 A..	8,5/6	3/1,2			0,7 - 1,1xUs	

		Fuse	Miniature circuit breaker	solid	flexible	AWG-wires, solid	flexible
		gL/gG	C-characteristic				
		A	A	mm²	mm²	AWG	AWG
		16	6				
Short-circuit protection for auxiliary and control circuits							
Conductor cross-section for auxiliary and control circuits				1 x (0,5 - 2,5) 2 x (0,5 - 2,5) ¹⁾	1 x (0,5 - 4) 2 x (0,75 - 2,5)	1 x (20 - 14) 2 x (20 - 14) ¹⁾	1 x (20 - 10) 2 x (18 - 14)

1) M4 HQ.. 1 solid conductor only

Permissible ratings of devices approved for North America

Circuit breakers M4 as „Manual Motor Starter“

If used as „Manual Motor Starter“ the circuit breaker is always operated in combination with a short circuit device. For use with approbated fuses or circuit breakers according to UL489 or CSA22.2 No. 5 only. The sizes are selected according to National Electrical Code (UL), or Canadian Electrical Code (CSA).

Type	Rated operational current I _e A	Max. short-circuit current			Motor load 1-phase		Motor load 3-phase				Max. rated fuse A	Max. breaker size A
		240V kA	480V kA	600V kA	115V HP	230V HP	200V HP	230V HP	460V HP	600V HP		
M4-32T	0,16 ... 0,63	100	50	10	-	-	-	-	-	-	1	15
	1	100	50	10	-	-	-	-	-	1/2	3	15
	1,6	100	50	10	-	1/10	-	-	3/4	3/4	6	15
	2,5	100	50	10	-	1/6	1/2	1/2	1	1 1/2	10	15
	4	100	50	5	1/8	1/3	3/4	3/4	2	3	15	15
	6	100	25	5	1/4	1/2	1	1 1/2	3	5	20	20
	8	100	25	5	1/3	1	2	2	5	5	30	30
	10	50	10	5	1/2	1 1/2	2	3	5	7 1/2	40	40
	13	50	10	5	1/2	2	3	3	7 1/2	10	50	50
	17	40	10	5	1	3	3	5	10	15	60	60
	22	30	10	5	1 1/2	3	5	7 1/2	15	20	80	80
	26	30	7,5	5	2	3	7 1/2	7 1/2	15	20	100	100
	32	20	7,5	5	2	5	7 1/2	10	20	30	125	125
M4-32R	0,16 ... 0,63	100	50	10	-	-	-	-	-	-	1	15
	4	100	50	10	1/8	1/3	3/4	3/4	2	3	15	15
	6	100	50	10	1/4	1/2	1	1 1/2	3	5	20	20
	8	100	50	10	1/3	1	2	2	5	5	30	30
	10	100	50	10	1/2	1 1/2	2	3	5	7 1/2	40	40
	13	100	50	10	1/2	2	3	3	7 1/2	10	50	50
	17	100	30	10	1	3	3	5	10	15	60	60
	22	100	30	10	1 1/2	3	5	7 1/2	15	20	80	80
	26	100	30	10	2	3	7 1/2	7 1/2	15	20	100	100
	32	100	30	10	2	5	7 1/2	10	20	30	125	125
M4-63R	26	100	50	10	2	3	7 1/2	7 1/2	15	20	100	100
	32	100	50	10	2	5	7 1/2	10	20	30	125	125
	40	100	50	10	3	7 1/2	10	10	30	30	150	150
	50	100	50	10	5	10	15	15	30	40	200	200
	63	100	50	10	5	10	20	20	40	60	250	250
M4-100R	63	100	25	10	5	10	20	20	40	60	250	250
	75	100	25	10	5	15	20	25	50	60	300	300
	90	100	25	10	7 1/2	20	25	30	60	75	350	350
	100	100	25	10	10	20	30	30	75	100	400	400

Permissible ratings of devices approved for North America

Circuit breakers M4 as „Combination Motor Controller Type E“ and "Suitable for Group Installation"

Acc to UL508 demands a line-side 1 inch air and 2 inch creepage distance for „Combination Motor Controller Type E“ is necessary. Therefor circuit-breaker M4-32R is approved to UL 508 in combination with the Terminal block M4 32R E. Circuit-breakers M4-100 are approved to UL 508 in combination with the insulation barriers M4 100 E. According to CSA these terminal blocks can be omitted when the device is used as „Combination Motor Controller Type E“.

Typ	Rated operational current I _e A	Max. short-circuit current			Motor load 1-phase		Motor load 3-phase				Max. rated fuse A	Max. breaker A
		240V kA	480V kA	600V kA	115V HP	230V HP	200V HP	230V HP	460V HP	600V HP		
M4-32R	0,16 ... 0,63	100	65	25	-	-	-	-	-	-	500	500
(+ M4 32R E)	1	100	65	25	-	-	-	-	-	1/2	500	500
	1,6	100	65	25	-	1/10	-	-	3/4	3/4	500	500
	2,5	100	65	25	-	1/6	1/2	1/2	1	1 1/2	500	500
	4	100	65	25	1/8	1/3	3/4	3/4	2	3	500	500
	6	100	65	25	1/4	1/2	1	1 1/2	3	5	500	500
	8	100	65	25	1/3	1	2	2	5	5	500	500
	10	100	65	25	1/2	1 1/2	2	3	5	7 1/2	500	500
	13	100	65	25	1/2	2	3	3	7 1/2	10	500	500
	17	100	30	10	1	3	3	5	10	15	500	500
	22	100	30	10	1 1/2	3	5	7 1/2	15	20	500	500
	26	100	30	10	2	5	7 1/2	7 1/2	15	20	500	500
	32	100	30	10	2	5	7 1/2	10	20	30	500	500
M4-63R	26	100	50	10	2	3	7 1/2	7 1/2	15	20	600	600
	32	100	50	10	2	5	7 1/2	10	20	30	600	600
	40	100	50	10	3	7 1/2	10	10	30	30	600	600
	50	100	50	10	5	10	15	15	30	40	600	600
	63	100	50	10	5	10	20	20	40	60	600	600
M4-100R	63	100	40	10	5	10	20	20	40	60	1000	1000
(+ M4 100 E)	75	100	40	10	5	15	20	25	50	60	1000	1000
	90	100	40	10	7 1/2	20	25	30	60	75	1000	1000
	100	100	40	10	10	20	30	30	75	100	1000	1000

Ratings of auxiliary switches and alarm switches

	Breaking capacity		Rated operational voltage max. V AC	Rated operational current A
	AC	DC		
Lateral auxiliary switch M4 HS.. and signalling switch M4 M..	A600	Q300	600	10
Transversal auxiliary switch M4 HQ..	A300	R300	240	5

Description

Releases

Circuit-breakers M4 are equipped with bimetallic-based, inverse-time delayed overload releases and with instantaneous overcurrent releases (electromagnetic short-circuit releases). The overload releases can be set in accordance with the load current. The overcurrent releases are permanently set to a value 13 times the rated current and thus enable trouble-free start-up of motors. The scale cover can be sealed to prevent unauthorized adjustments to the set current.

Operating mechanisms

Circuit-breakers M4-32T are actuated via a rocker operating mechanism and circuit-breakers M4-32R, M4-63R and M4-100R via a rotary operating mechanism. An electrical signal can be output, at all Circuit-breakers, via a signalling switch to indicate that the Circuit-breaker has tripped. All operating mechanisms can be locked in the 0 position with a padlock (shackle diameter 3.5 to 4.5 mm). The M4 Circuit-breakers fulfil the isolation characteristics specified in IEC 60947-2.

Operating conditions

Circuit-breakers M4 are suitable for use in any climate. To avoid error tripping we recommend to protect the Circuit Breakers M4 against fresh and cold air (caused by air condition etc.) They are designed for operation in enclosed rooms under normal conditions (e. g. no dust, corrosive vapours or harmful gases). Suitable enclosures must be provided for installation in dusty or damp rooms. Circuit-breakers M4 can also be fed from below. In order to prevent premature tripping due to phase failure sensitivity, the three conducting paths must always be uniformly loaded. The conducting paths must be connected in series in the case of single-phase loads.

Short-circuit protection

The short-circuit releases of M4 circuit-breakers disconnect the faulty load feeder from the system in the event of a short circuit and thus prevent any further damage from being caused. Circuit-breakers with a short-circuit breaking capacity of 50 kA or 100 kA at a voltage of 400 V AC are practically short-circuit-proof at this voltage, as higher short-circuit currents are not usually encountered at the installation point. Back-up fuses are only necessary if the short-circuit current at the installation point exceeds the rated ultimate short-circuit breaking capacity of the circuit-breakers.

Motor protection

The tripping characteristics of M4 circuit-breakers are designed mainly to protect three-phase induction motors. The circuit-breakers are therefore also referred to as Manual Motor Starters. The current of the motor to be protected is set with the aid of the scale.

Line protection

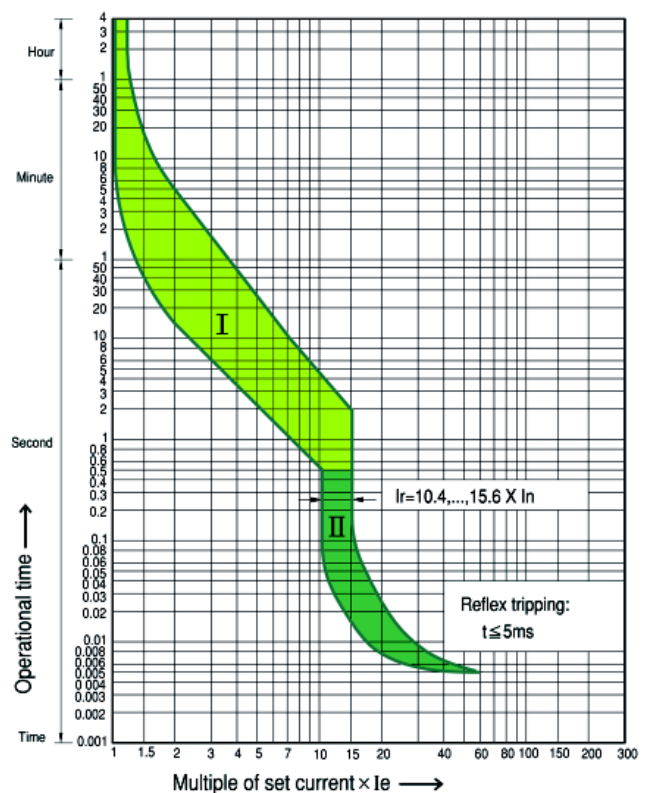
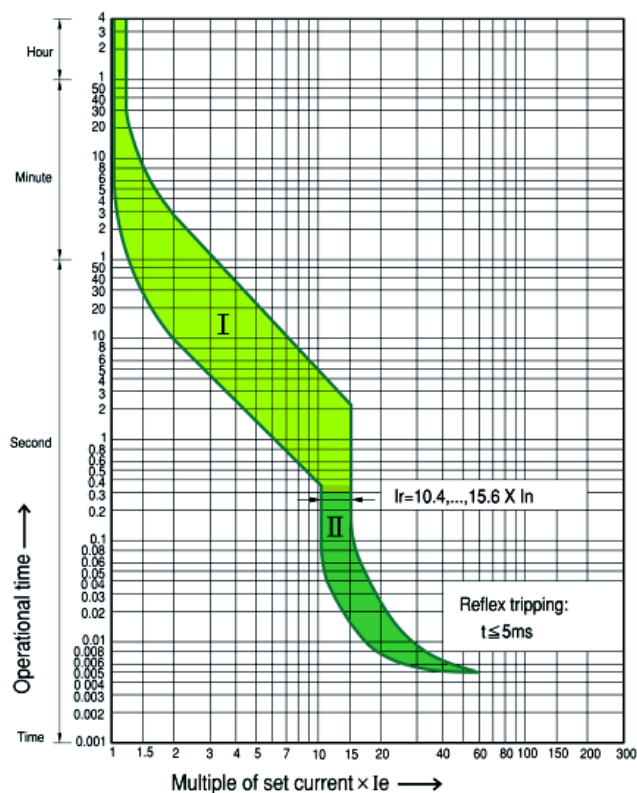
M4 Circuit-breakers for motor protection are also suitable for line protection. The M4 Circuit-breakers fulfil the isolation conditions of IEC 60 947-3 as well as the additional test conditions for circuit-breakers with isolation characteristics specified in IEC 60947-2.

Taking IEC 60 204-1 into consideration, they can thus be implemented as main and EMERGENCY STOP switches. Door-coupling rotary operating mechanism do not fulfil the isolation characteristics.

Tripping-Characteristics

M4-32

M4-63R, M4-100R



I The curve shows the mean operating current at an ambient temperature of 20°C starting from cold.

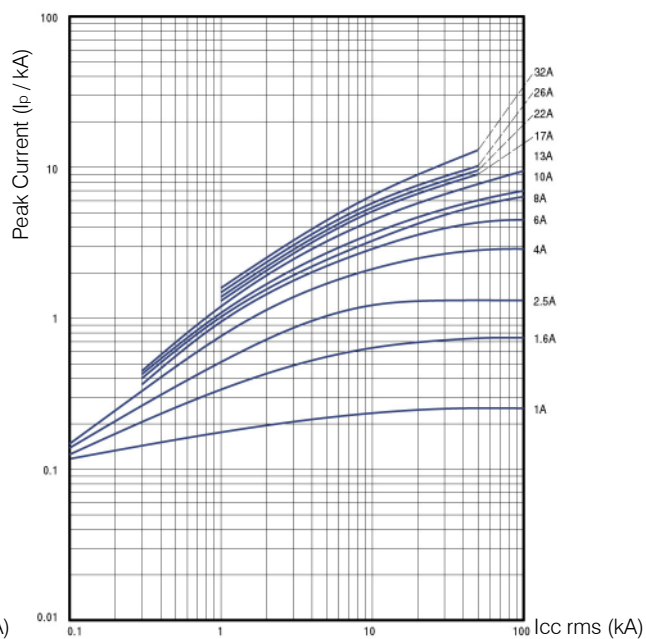
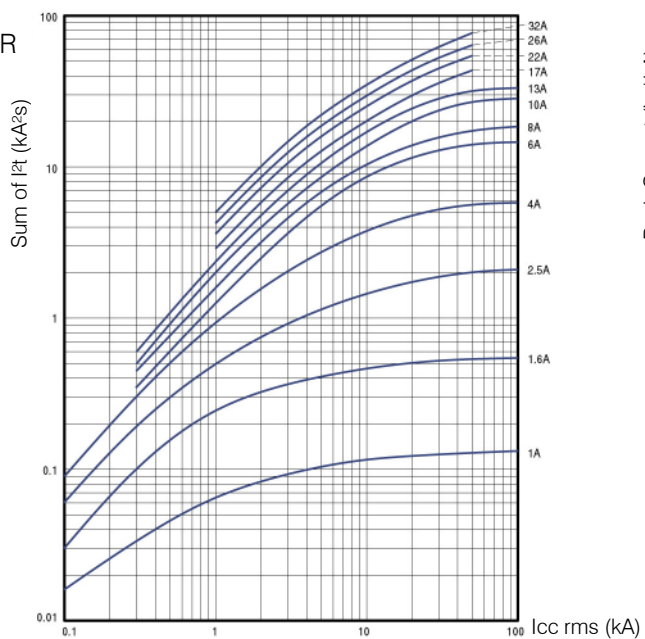
II The tripping characteristic of electromagnetic overcurrent releases (short-circuit releases)

The tripping characteristic of the inverse-time delayed overload releases apply for DC and AC with a frequency of 0 to 400 Hz. At operating temperature, the tripping times of the thermal releases are reduced to approximately 25 %.

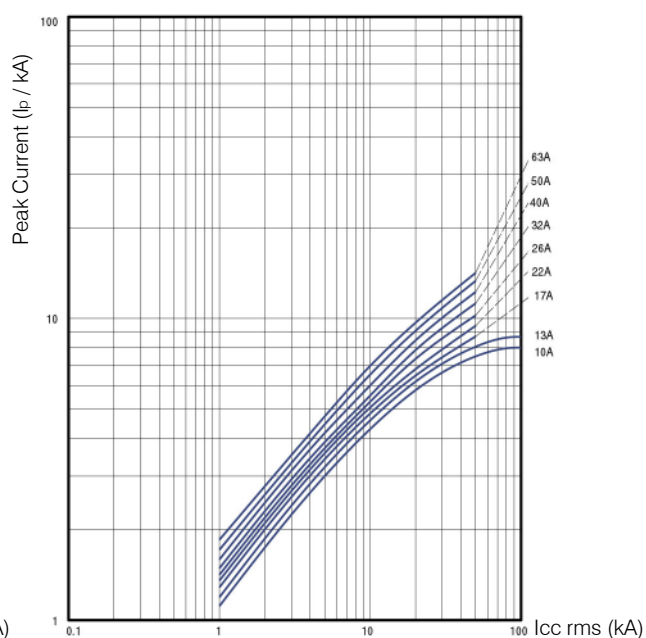
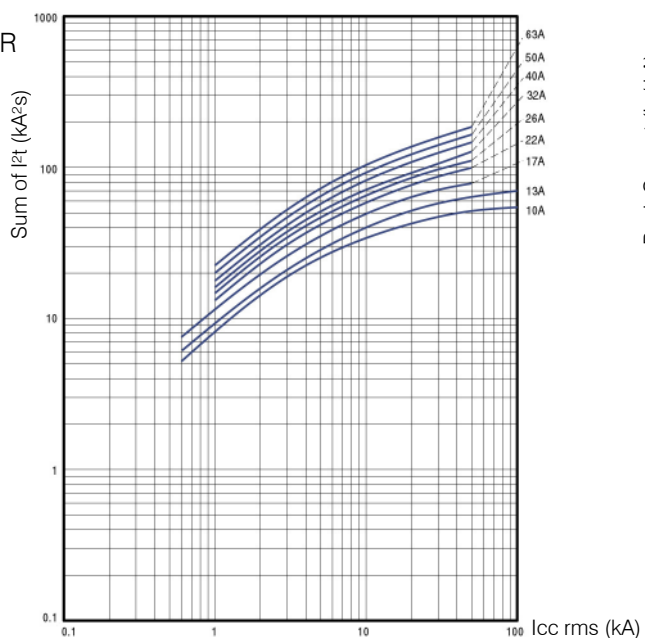
The characteristic shown here is a schematic representation of circuit-breakers for all ranges. Current limiting characteristics and I^2t characteristics are available on request.

Let-through Energy (I^2t / kA^2s) and Peak Current (I_p / kA) at $U_e=415\text{V}$

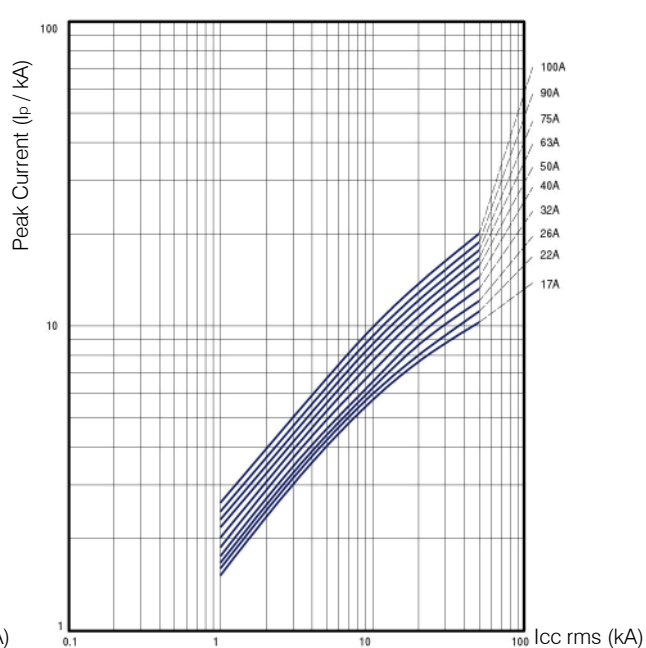
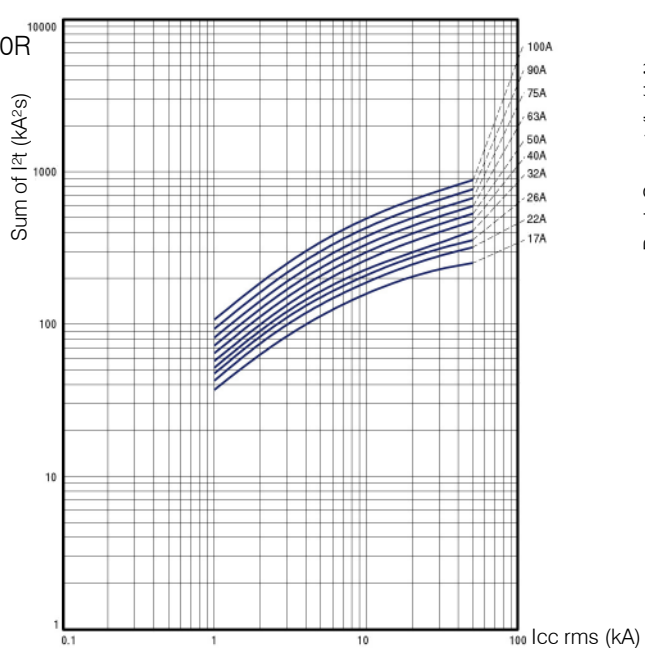
M4-32R



M4-63R

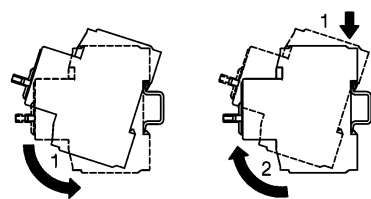


M4-100R

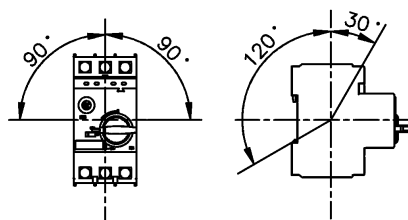


Mounting

DIN-rail mounting

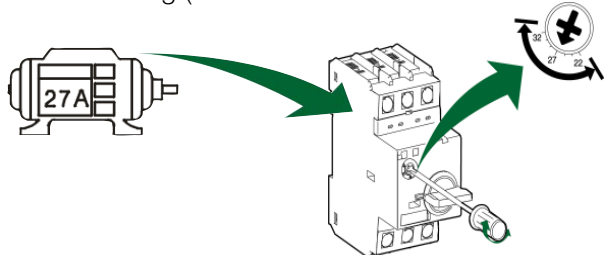


Operating positions



Current setting (dont rotate the dial out of the shown range)

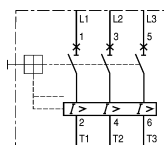
Connection of 1-phase motor



Wiring diagrams

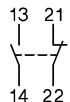
Circuit breaker

M4...



Traverse Aux. Contact Block

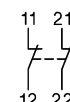
M4 HQ11



M4 HQ20

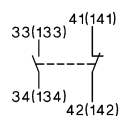


M4HQ02

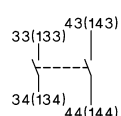


Aux. Contact Block (side mounted)

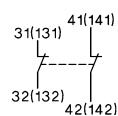
M4 HS11



M4 HS20



M4 HS02



Alarm Switch

M4 M11

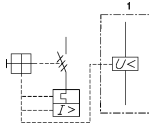


M4 MA11



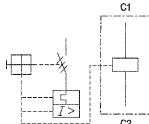
Undervoltage Release

M4 U...



Shunt Release

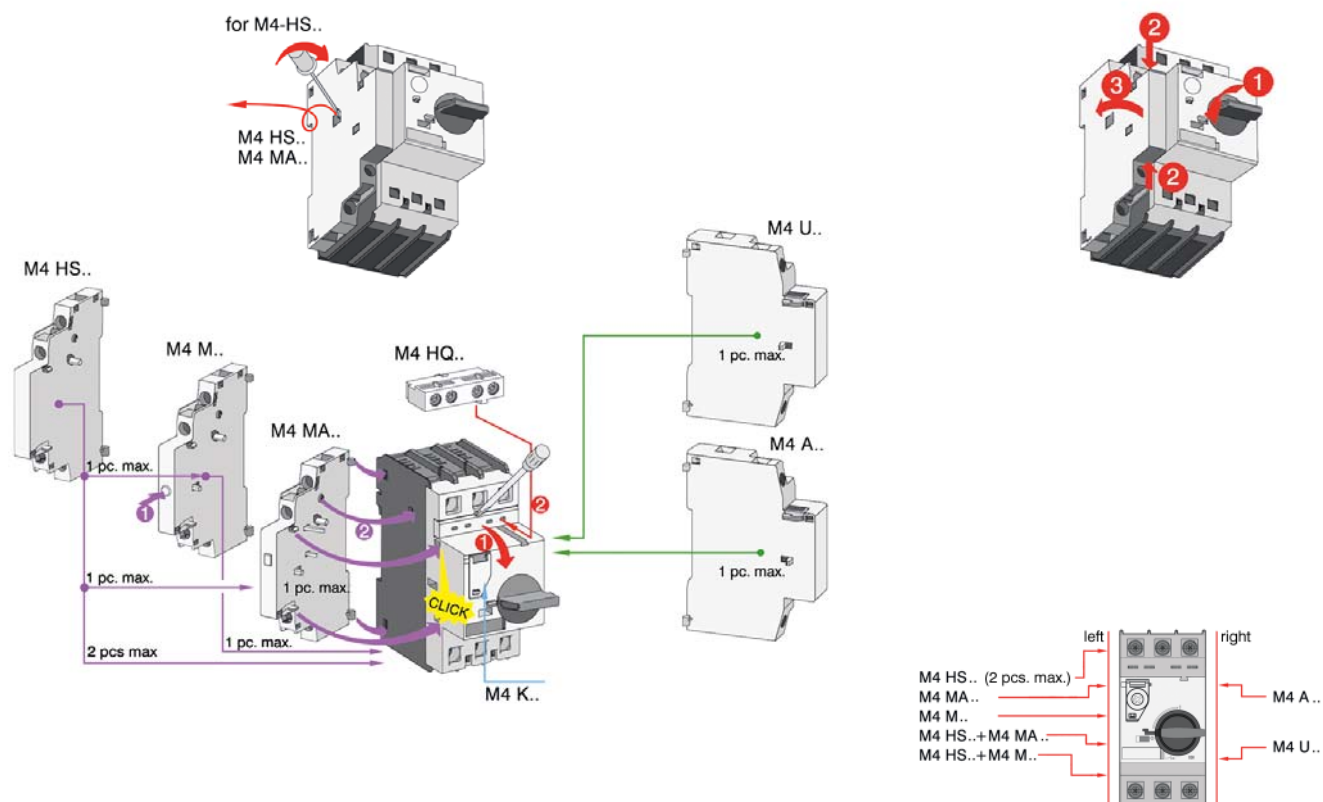
M4 A...



Installation of Accessories

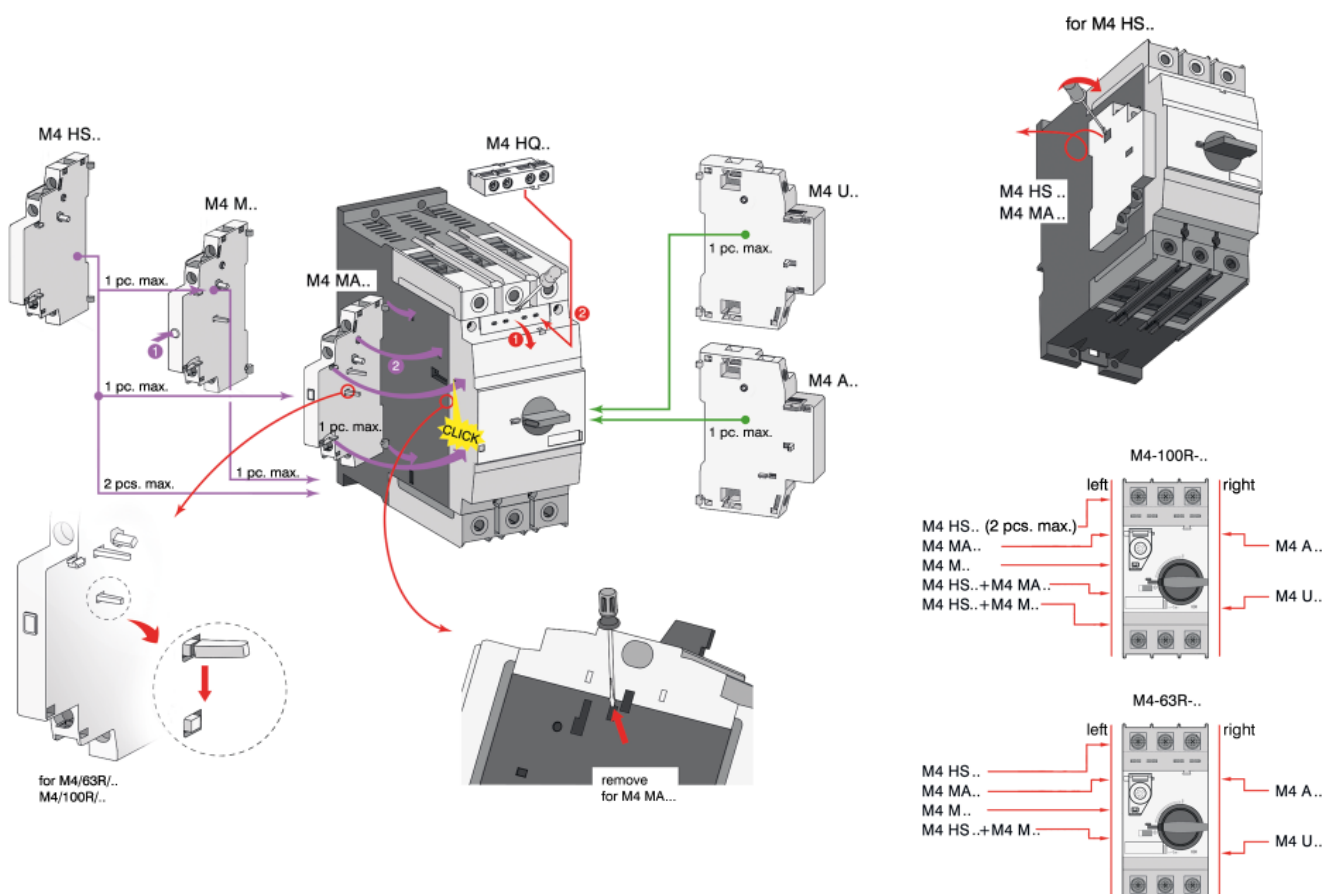
M4-32T

M4-32R



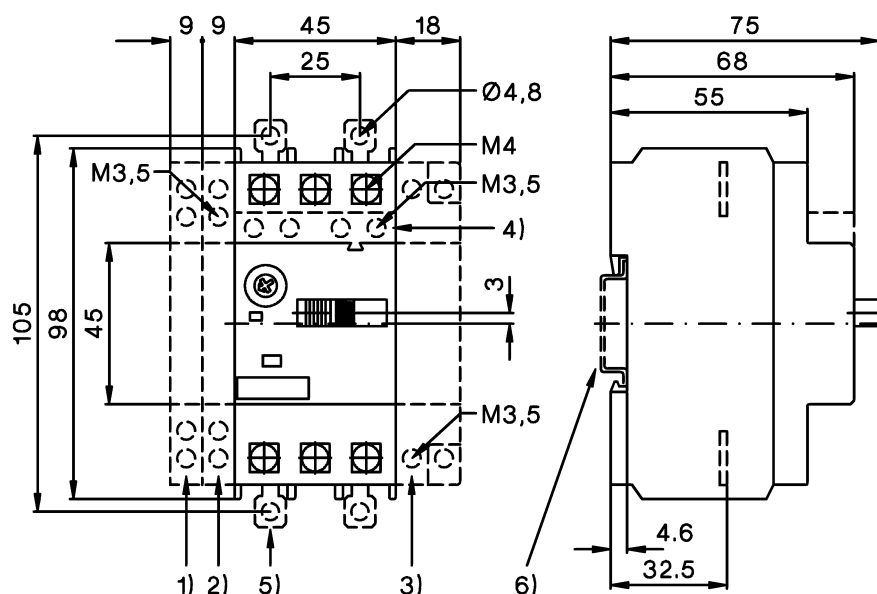
M4-63R

M4-100R



Dimensions

Circuit-breaker M4-32T

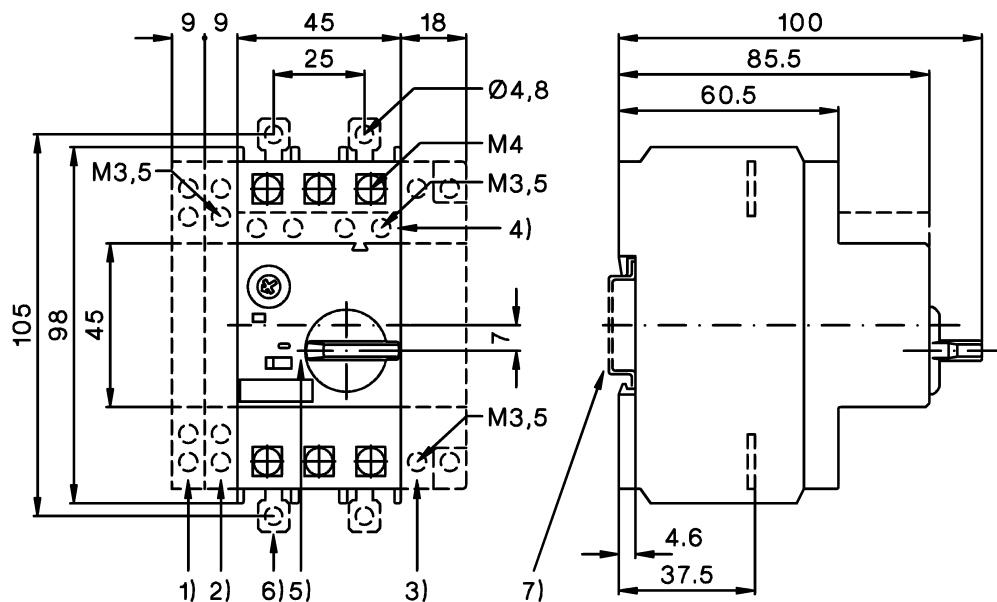


- 1) Side aux. contact
- 2) Magnetic trip alarm
- 3) Shunt or undervoltage release of arcing
- 4) Transverse aux. contact
- 5) Push-in Lugs for screw mounting
- 6) 35mm DIN-rail acc. to EN 50022

Height of arcing spaces (clearance from earthed parts)

at Ue (V)	240	415	460	525	690
mm	20	20	20	20	20
inch	0,8	0,8	0,8	0,8	0,8

Circuit-breaker M4-32R



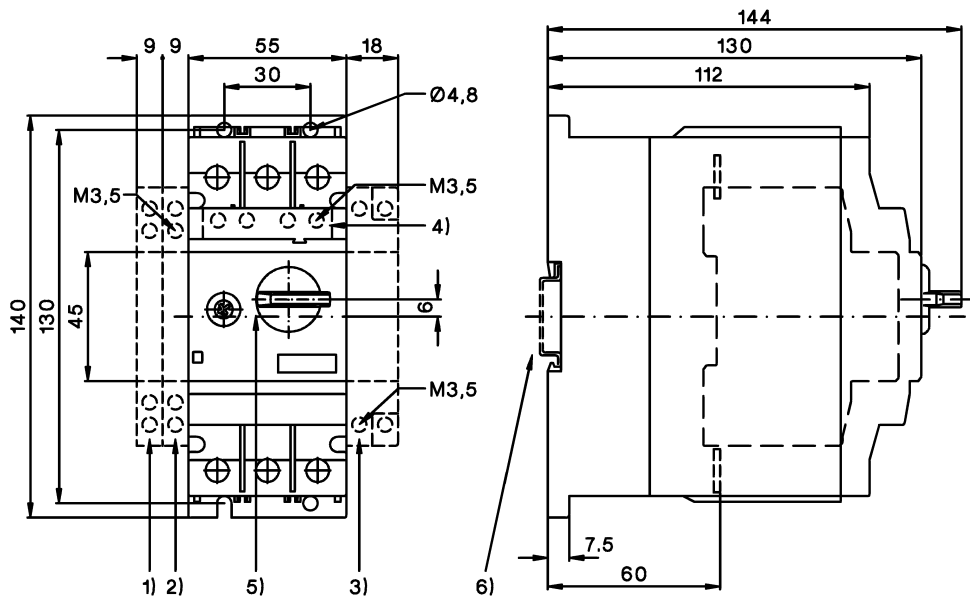
- 1) Side aux. contact
- 2) Magnetic trip alarm
- 3) Shunt or undervoltage release of arcing
- 4) Transverse aux. contact
- 5) Handle lock in OFF-position (Ø 5mm)
- 6) Push-in Lugs for screw mounting
- 7) 35mm DIN-rail acc. to EN 50022

Height of arcing spaces (clearance from earthed parts)

at Ue (V)	240	415	460	525	690
mm	30	30	30	30	50
inch	1,18	1,18	1,18	1,18	2

Dimensions

Circuit-breaker M4-63R

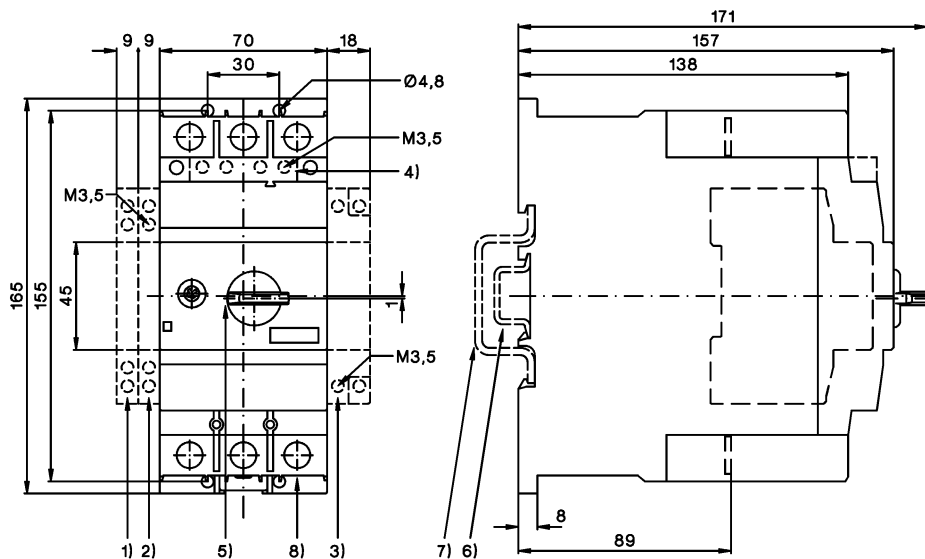


Height of arcing spaces (clearance from earthed parts)

at Ue (V)	240	415	460	525	690
mm	50	50	50	50	50
inch	2	2	2	2	2

- 1) Side aux. contact
- 2) Magnetic trip alarm
- 3) Shunt or undervoltage release
- 4) Transverse aux. contact
- 5) Handle lock in OFF-position (Ø 5mm)
- 6) 35mm DIN-rail acc. to EN 50022

Circuit-breaker M4-100R



Height of arcing spaces (clearance from earthed parts)

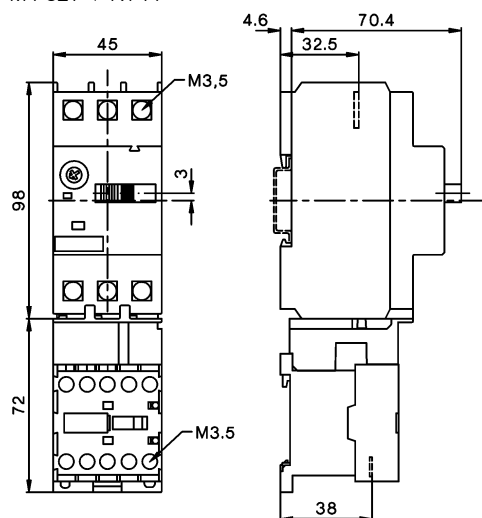
at Ue (V)	240	415	460	525	690
mm	50	70	70	110	150
inch	2	2¾	2¾	4,33	6

- 1) Side aux. contact
- 2) Magnetic trip alarm
- 3) Shunt or undervoltage release
- 4) Transverse aux. contact
- 5) Handle lock in OFF-position (Ø 5mm)
- 6) 35mm DIN-rail acc. to EN 50022
- 7) 70mm DIN-rail acc. to EN 50023
- 8) 4mm hexagon socket screw

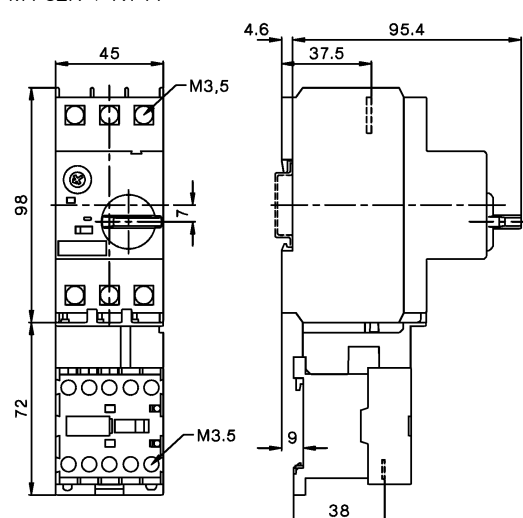
Dimensions

Link Module M4 32 VK1

M4-32T + K1-..



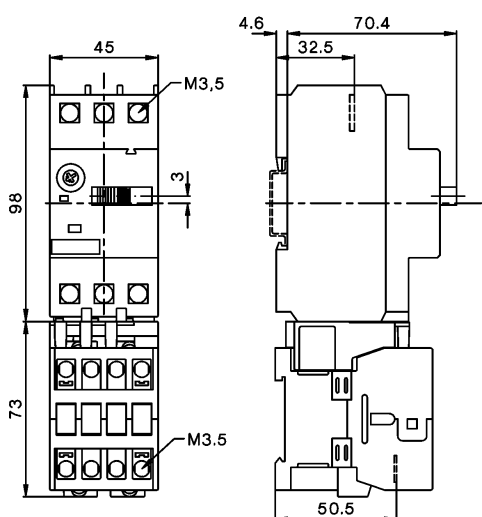
M4-32R + K1-..



Link Module M4 32 VK3

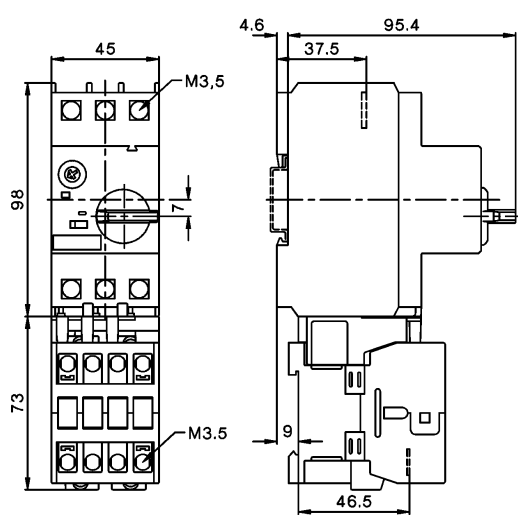
M4-32T + K3-10ND..
M4-32T + K3-18ND..

M4-32T + K3-14ND..
M4-32T + K3-22ND..



M4-32R + K3-10ND..
M4-32R + K3-18ND..

M4-32R + K3-14ND..
M4-32R + K3-22ND..



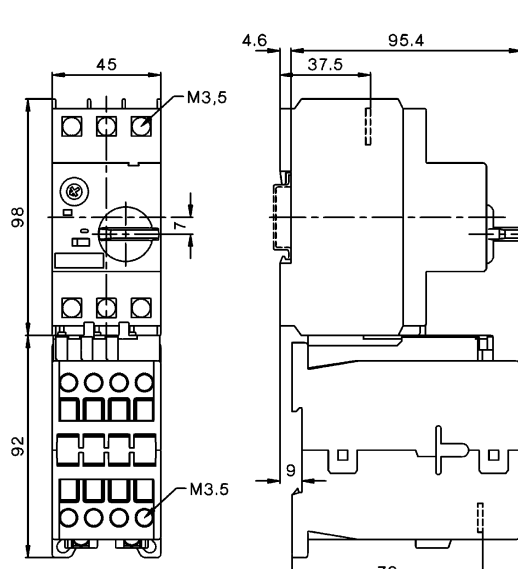
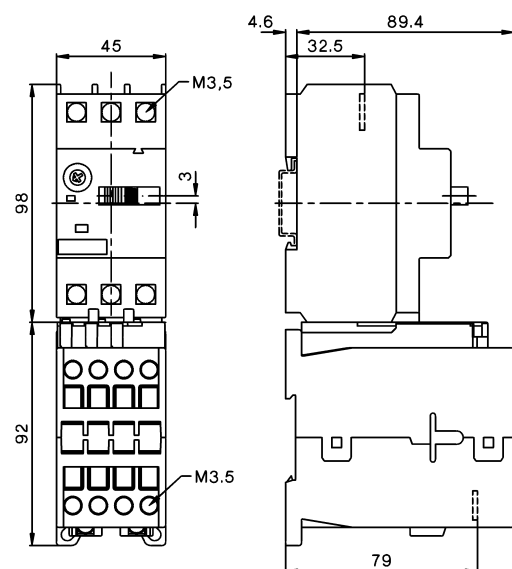
Link Module M4 32 VKG3

M4-32T + KG3-10..
M4-32T + KG3-18..

M4-32T + KG3-14..
M4-32T + KG3-22..

M4-32R + KG3-10..
M4-32R + KG3-18..

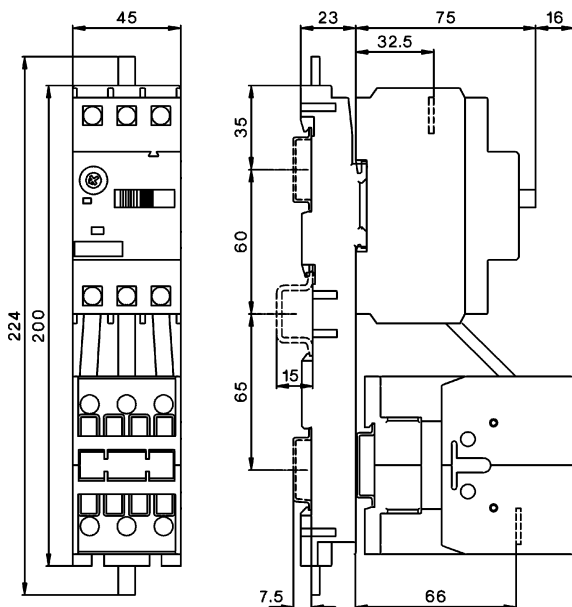
M4-32R + KG3-14..
M4-32R + KG3-22..



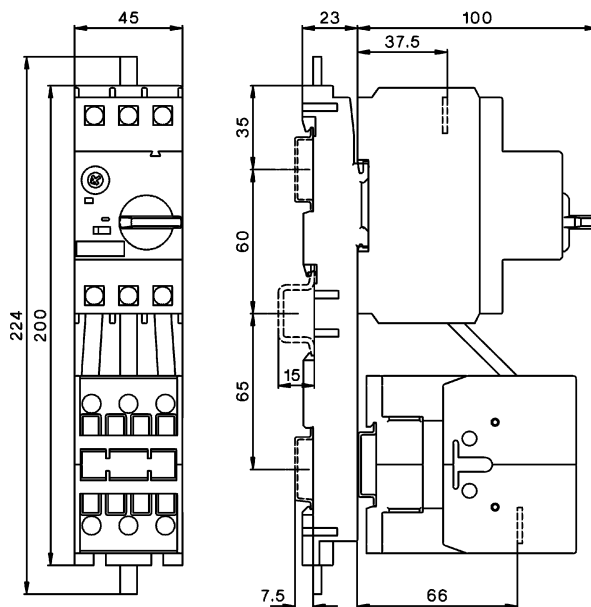
Dimensions

DIN-rail adapter M4 32 HU1

M4-32T + K3-24 + M4 32VD
M4-32T + K3-32 + M4 32VD

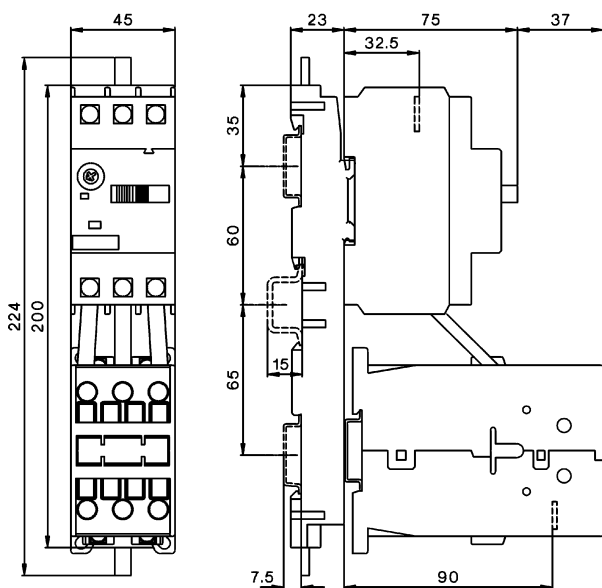


M4-32R + K3-24 + M4 32VD
M4-32R + K3-32 + M4 32VD

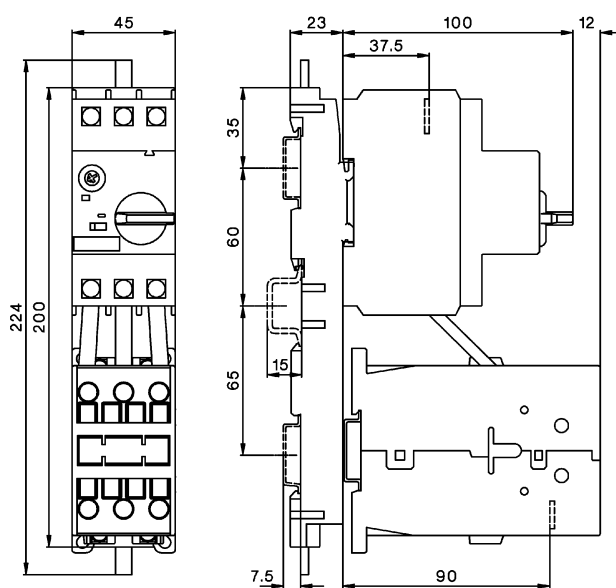


DIN-rail adapter M4 32 HU1

M4-32T + KG3-24 + M4 32 VD
M4-32T + KG3-32 + M4 32 VD



M4-32R + KG3-24 + M4 32 VD
M4-32R + KG3-32 + M4 32 VD

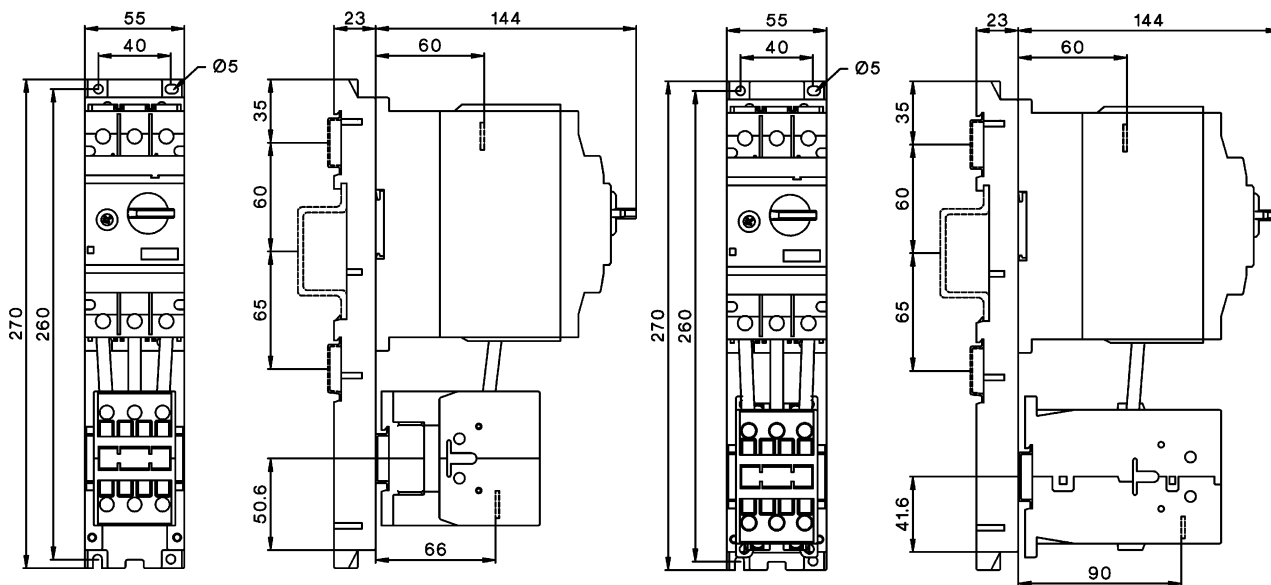


Dimensions

DIN-rail adapter M4 63 HU1

M4-63T + K3-32 + M4 63 VD
M4-63T + K3-40 + M4 63 VD

M4-63T + KG3-32 + M4 63 VDG
M4-63T + KG3-40 + M4 63 VDG

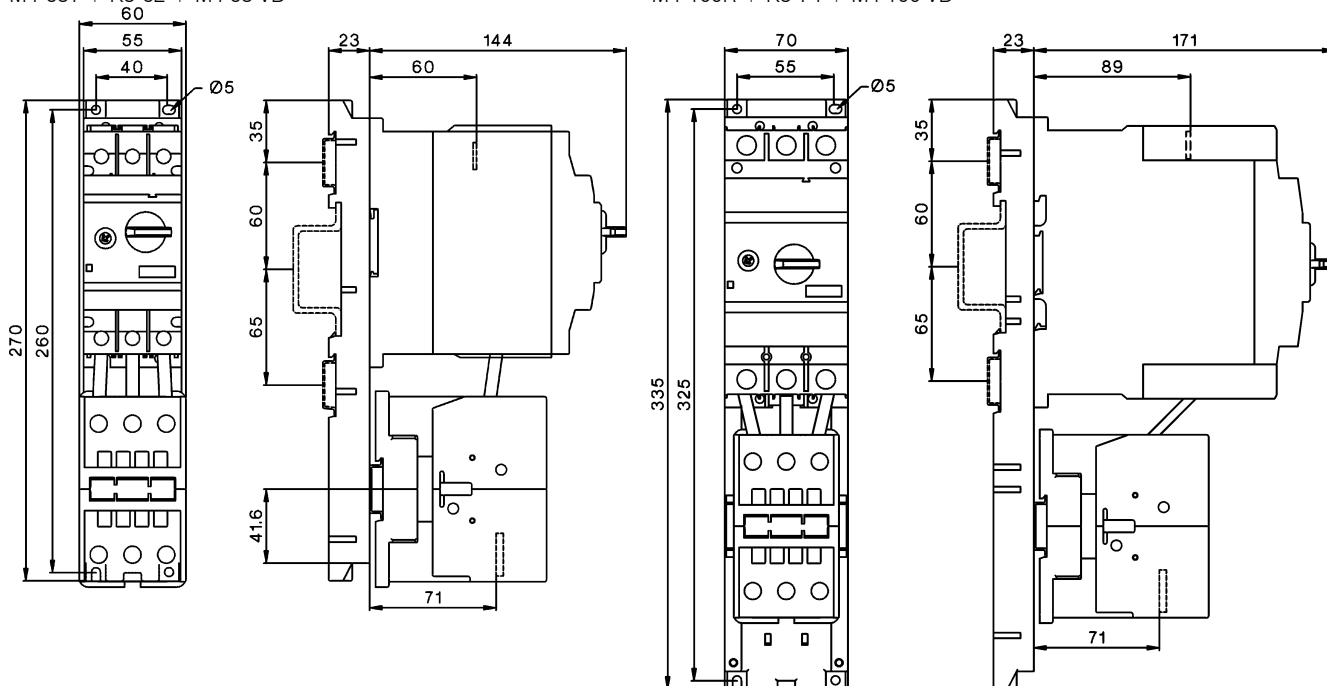


DIN-rail adapter M4 63 HU1

M4-63T + K3-50 + M4 63 VD
M4-63T + K3-62 + M4 63 VD

DIN-rail adapter M4 100 HU1

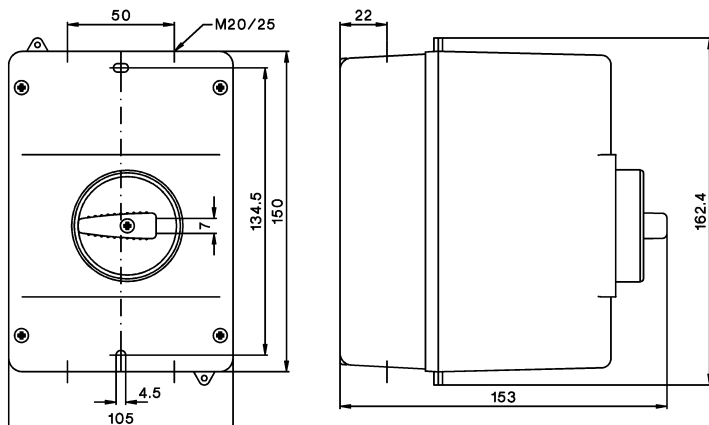
M4-100R + K3-62 + M4 100 VD
M4-100R + K3-74 + M4 100 VD



Dimensions

Enclosures

M4 32R PFH4
M4 32R PFHN4



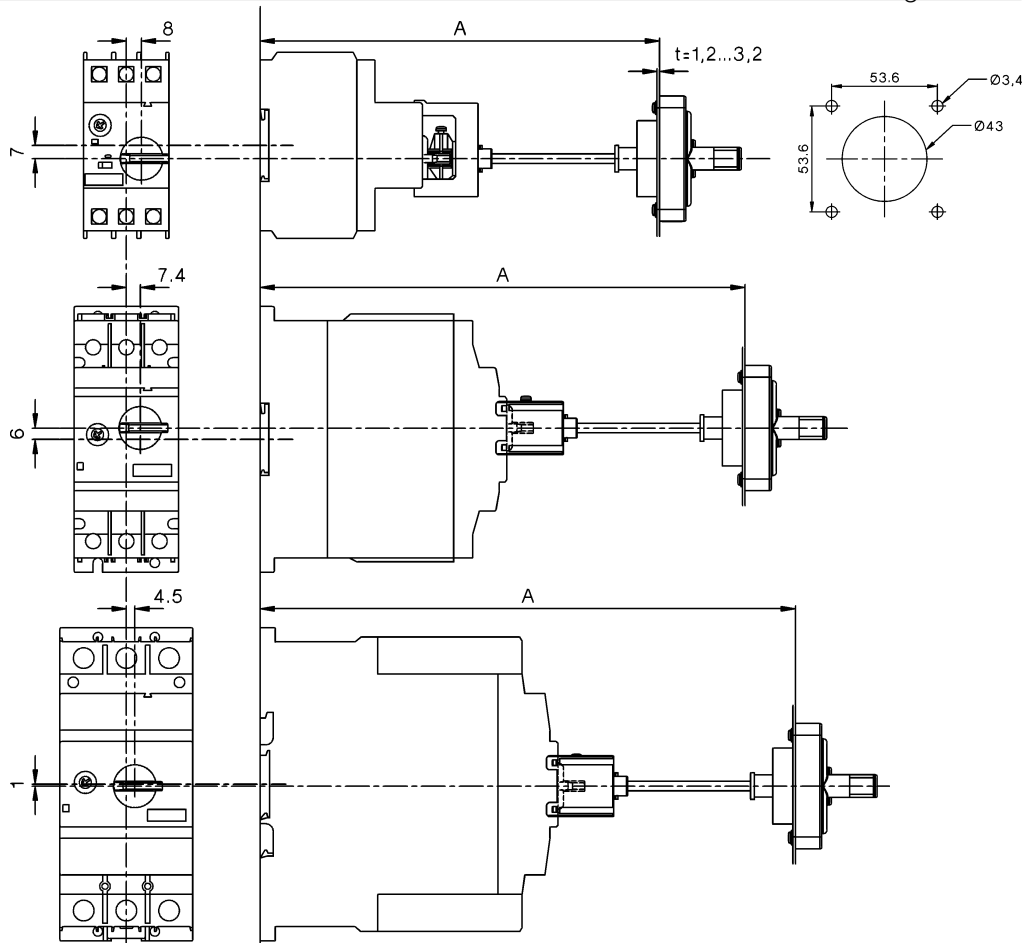
Door-coupling rotary mechanisms

Mounting holes

Type	A
M4 32R EH1 115	149 - 210
M4 32R EHN1 115	149 - 210
M4 32R EH1 315	149 - 410
M4 32R EHN1 315	149 - 410

Type	A
M4 63R EH1 115	194 - 255
M4 63R EHN1 115	194 - 255
M4 63R EH1 315	194 - 455
M4 63R EHN1 315	194 - 455

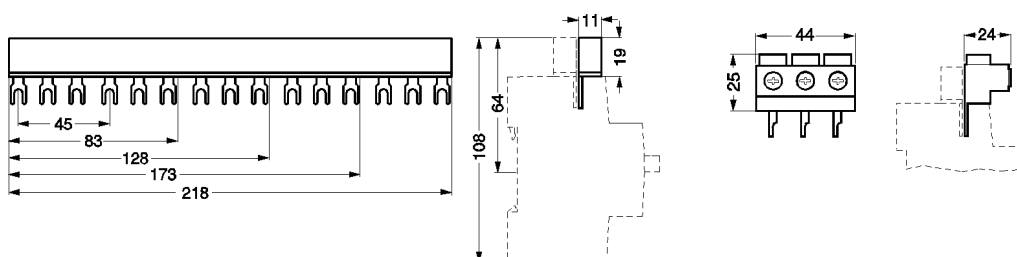
Type	A
M4 100R EH1 115	220 - 282
M4 100R EHN1 115	220 - 282
M4 100R EH1 315	220 - 482
M4 100R EHN1 315	220 - 482

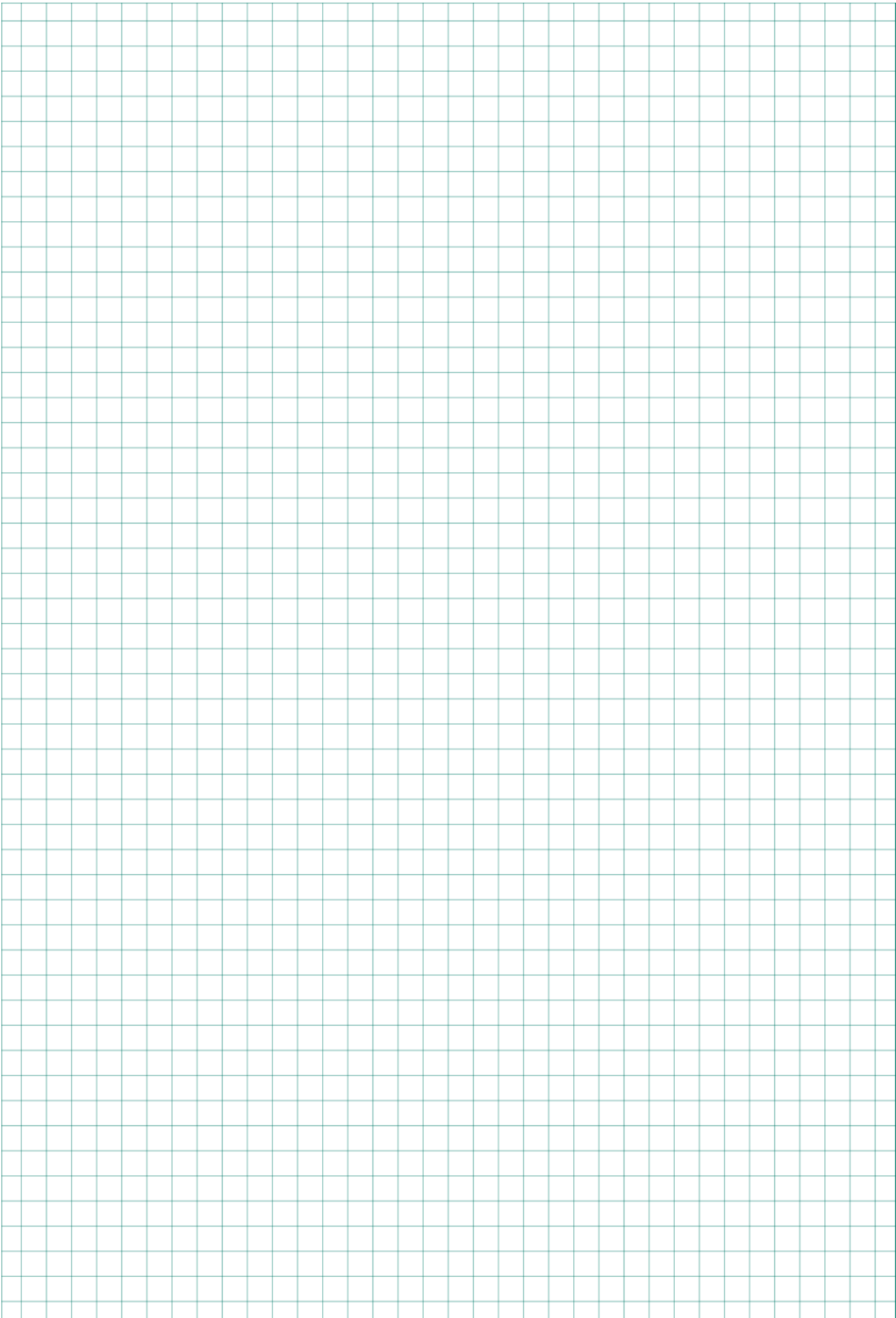


Insulated 3-phase busbar system

M4 32 S..

M4 32 SE







Manual Motors Starters

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Auxiliary Contact Blocks

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Trip Alarm Aux. Switch

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Shunt Release

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Under-voltage Release

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Accessories

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Busbar Connectors

183



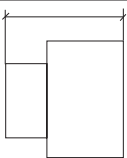
Enclosures

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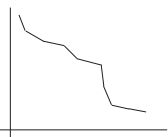
Technical Data

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Dimensions

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Tripping Characteristic

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Manual Motor Starters



Thermal Overload Release Setting Range A	Ratings AC3 at 400V kW	690V kW	Magnetic short circuit trip A	Type	Pack	Weight
					pcs.	kg/pc.
0,1 - 0,16	0,02	0,06	1,92	MU25A-0,16	1	0,25
0,16 - 0,25	0,06	0,12	3,0	MU25A-0,25	1	0,25
0,25 - 0,4	0,09	0,18	4,8	MU25A-0,4	1	0,25
0,4 - 0,63	0,12	0,25	7,6	MU25A-0,63	1	0,25
0,63 - 1	0,25	0,55	12,0	MU25A-1	1	0,25
1 - 1,6	0,55	1,1	19,2	MU25A-1,6	1	0,25
1,6 - 2,5	0,75	1,5	30	MU25A-2,5	1	0,25
2,5 - 4	1,5	3	48	MU25A-4	1	0,25
4 - 6,3	2,5	4	75,6	MU25A-6,3	1	0,25
6,3 - 10	4	7,5	120	MU25A-10	1	0,25
10 - 16	7,5	11	192	MU25A-16	1	0,25
16 - 20	9	12	240	MU25A-20	1	0,25
20 - 25	12,5	22	300	MU25A-25	1	0,25
25 - 32	15		384	MU25A-32	1	0,25

Auxiliary Contact Blocks, for side mounting, max. 2 pieces



Contacts			Rated Operational Current			Type	Pack	Weight
NO	NC	EM ¹⁾	AC15 230V A	400V A	AC1 500V A		pcs.	kg/pc.
1	-	-	3,5	2	6	MU25A-PS10	10	0,03
-	1	-	3,5	2	6	MU25A-PS01	10	0,03
2	-	-	3,5	2	6	MU25A-PS20	10	0,03
1	1	-	3,5	2	6	MU25A-PS11	10	0,03
-	2	-	3,5	2	6	MU25A-PS02	10	0,03
-	1	1	3,5	2	6	MU25A-PV11	10	0,03
-	-	2	3,5	2	6	MU25A-PV20	10	0,03

Transverse Auxiliary Contact Block, max. 1 piece



Contacts			Rated Operational Current			Type	Pack	Weight
NO	NC	EM ¹⁾	AC15 230V A	400V A	AC1 230V A		pcs.	kg/pc.
1	1	-	1		5	MU25A-PA11	10	0,02

Auxiliary Contact Blocks for mounting under the cover, max. 1 piece



Contacts			Rated Operational Current			Type	Pack	Weight
NO	NC	EM ¹⁾	AC15 230V A	400V A	AC1 500V A		pcs.	kg/pc.
1	1	-	3,5	2	6	MU25A-PE11	10	0,02

Trip Alarm Auxiliary Switch for mounting under the cover, max. 1 piece



Contacts			Rated Operational Current			Type	Pack	Weight
NO	NC	EM ¹⁾	AC15 230V A	400V A	AC1 500V A		pcs.	kg/pc.
1	-	-	3,5	2	6	MU25A-PM10	10	0,02
-	1	-	3,5	2	6	MU25A-PM01	10	0,02

1) early make

Shunt Release for mounting under the cover



Rated Control Voltage and Frequency V	Power Consumption		Type	Pack pcs.	Weight kg/pc.
	VA	W			
24V 50/60Hz	2,7	1,8	MU25A-A24	10	0,06
110V 50Hz, 110-120V 60Hz	2,7	1,8	MU25A-A110	10	0,06
220-230V 50Hz, 240V 60Hz	2,7	1,8	MU25A-A230	10	0,06
380-415V 50Hz, 440V 60Hz	2,7	1,8	MU25A-A400	10	0,06

Under-voltage Release for mounting under the cover



Rated Control Voltage and Frequency V	Power Consumption		Type	Pack pcs.	Weight kg/pc.
	VA	W			
24V 50/60Hz	2,7	1,8	MU25A-U24	10	0,06
110V 50Hz, 110-120V 60Hz	2,7	1,8	MU25A-U110	10	0,06
220-230V 50Hz, 240V 60Hz	2,7	1,8	MU25A-U230	10	0,06
380-415V 50Hz, 440V 60Hz	2,7	1,8	MU25A-U400	10	0,06

Accessories



Description	Specification	Type	Pack pcs.	Weight kg/pc.
Busbar Connector Fully Isolated, U_i 690V, I_u 63A				
Busbar	For 2 units 3-pole, 99mm long	MU25A-D99	10	0,036
Busbar	For 3 units 3-pole, 154mm long	MU25A-D154	10	0,060
Busbar	For 4 units 3-pole, 208mm long	MU25A-D208	10	0,084
Busbar	For 5 units 3-pole, 262mm long	MU25A-D262	10	0,107
Supply Block	3-pole for use with busbar connector	MU25A-DB	10	0,034
Spacing piece 1/2TE	for ambient temperature $>40^{\circ}\text{C}$	P730	10	0,013
Current Limiter	For increasing the fault breaking capacity of single unit or group back-up to 50kA at 3~415V, above setting range 6,3-10A $U_i = 690\text{V}$, $I_u = 32\text{A}$	MU25A-ID50	1	0,172



Enclosures				
Moulded Enclosure	Protection to IP55	MU25A-O55	1	0,24
Moulded Front Plate	Protection to IP55	MU25A-C55	1	0,16
Locking Bracket	Suitable for 3 padlocks in "OFF"-position, stirrup diameter of the padlock max. 8 mm	MU25A-Z	1	0,10
Stop Button	Mushroom head	MU25A-NAT	1	0,04
Emergency Stop Button	latch, release by turning	MU25A-NAV	1	0,04
Emergency Stop Button	latch, release by key	MU25A-NAS	1	0,04
Neutral Conductor Block	for mounting in enclosure and front plate Wiring cross section 0,75 - 2,5mm ²	MU25A-NL	10	0,01
Moulded Enclosure for 5-pole CEE-plug	Protection to IP54 with phase changing	MU25A-GC1	1	0,40

Manual Motor Starters

Data according to IEC 947, IEC 204, EN 60947, EN 60204, VDE 0660, VDE 0113

Type				MU25A			
Main Contacts							
Rated insulation voltage U_i		$V \sim ^{1)}$		690			
Rated operational current I_e ($=I_{th}$) open, at 50°C		A		25			
Mechanical life		$S \times 10^6$		0,1			
Contact life at I_e /AC3		$S \times 10^6$		0,1			
Tripping class according to IEC 60947-4-1				10A			
Rated ultimate short-circuit breaking capacity I_{cu}				220-240V AC	380-415V AC	500V AC	660-690V AC
Values for open unit, when incoming supply on upper terminals							
Setting range		to 1A	kA	100	100	100	100
		1 - 1,6A	kA	100	100	100	100
		1,6 - 2,5A	kA	100	100	3	2,5
		2,5 - 4A	kA	100	100	3	2,5
		4 - 6,3A	kA	100	100	3	2,5
		6,3 - 10A	kA	100	6/50 ²⁾	3	2,5
		10 - 16A	kA	10/100 ²⁾	6/50 ²⁾	2,5	2
		16 - 20A	kA	10/100 ²⁾	6/50 ²⁾	2,5	2
		20 - 25A	kA	10/100 ²⁾	6/50 ²⁾	2,5	2
		25 - 32A	kA	10/100 ²⁾	6/50 ²⁾	2,5	2
Short circuit protection				220-240V AC	380-415V AC	500V AC	660-690V AC
Setting range		to 1A	A	-	-	-	-
		1 - 1,6A	A	-	-	-	-
Fuse gL(gG) only necessary if the short circuit current could be greater than the rated ultimate short-circuit breaking capacity		1,6 - 2,5A	A	-	-	25	20
		2,5 - 4A	A	-	-	35	25
		4 - 6,3A	A	-	-	50	35
		6,3 - 10A	A	-	80	50	35
		10 - 16A	A	80	80	63	35
		16 - 20A	A	80	80	63	50
		20 - 25A	A	80	80	63	50
		25 - 32A	A	80	80	63	50
Maximum ambient temperature							
Operation		open	°C	-25 to +55			
		enclosed	°C	-25 to +40			
Temperature compensation			°C	-20 to +55			
Power loss							
at rated current, warm condition			W	6 - 8			
Auxiliary Contacts							
Rated insulation voltage U_i		$V \sim$		500			
Thermal rated current I_{th}		Ambient temperature max. 50°C	A	6			
Utilization category AC15							
Rated operational current I_e		220-240V	A	3,5			
		380-415V	A	2			
		500V	A	1			
Short circuit protection							
max. fuse size		gL (gG)	A	6			
Cable cross-section							
Main connector		solid or stranded	mm ²	0,75 - 4			
		flexible	mm ²	0,75 - 2,5			
Cables per clamp		flexible with multicore cable end	mm ²	0,75 - 2,5			
				2			
Auxiliary connector		solid or stranded	mm ²	0,75 - 2,5			
		flexible	mm ²	0,75 - 1,5			
Cables per clamp		flexible with multicore cable end	mm ²	0,75 - 1,5			
				2			
Resistance to shock according to IEC 68-2-27							
Operation		g / ms		4 / 11			
Solidity		g / ms		30 / 18			

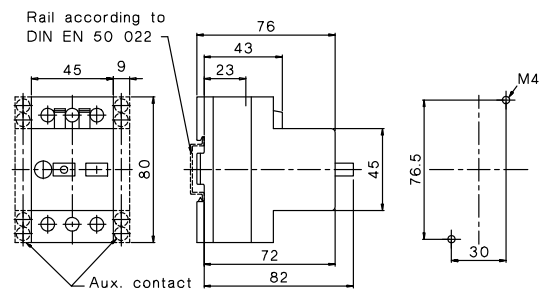
1) Suitable for: earthed-neutral systems, overvoltage category I to III, pollution degree 3 (standard-industry): $U_{imp} = 6kV$.

2) with current limiter MBS25-ID50 up to 415V AC

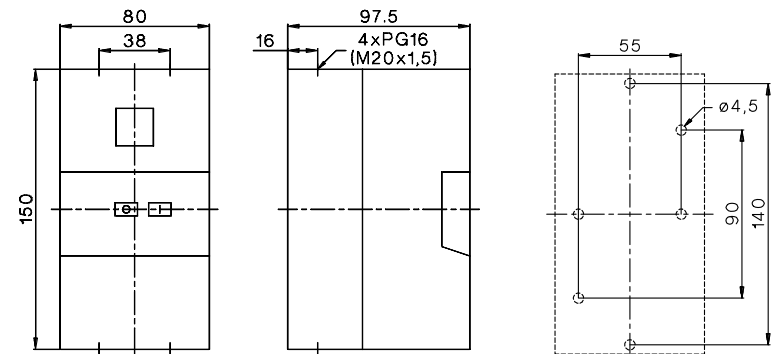
Manual Motor Starters

Dimensions

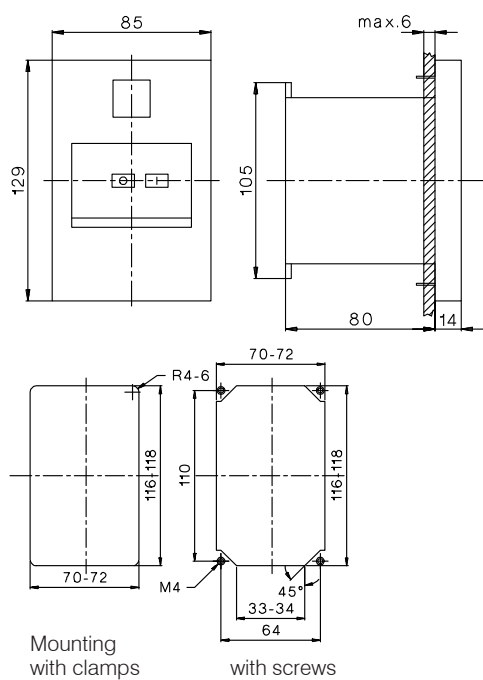
Manual Motor Starter MU25A



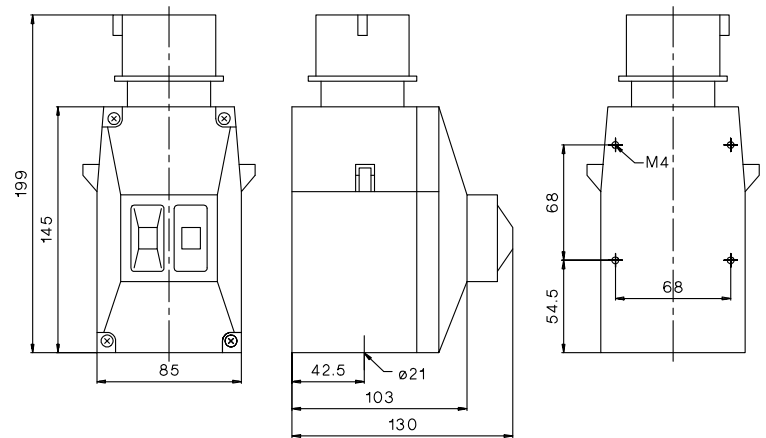
Moulded Enclosure MU25A-O55



Moulded Front Plate MU25A-C55



Moulded Enclosure for 5-pole CEE-plug MU25A-GC1



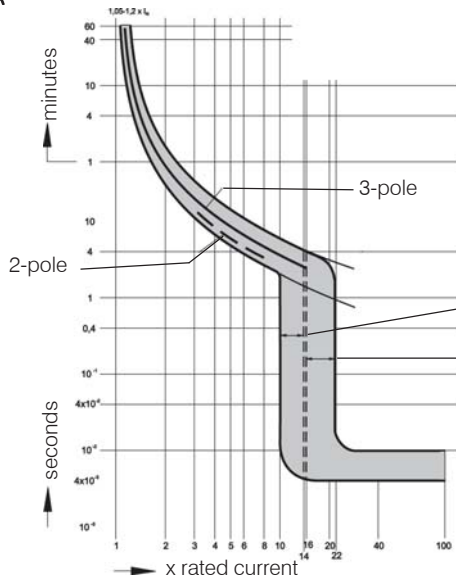
Temperature Compensation

In case of higher ambient temperature use the following formula:
(Ambient temperature - 20) x 0,3 = correction factor in % of the full load motor current

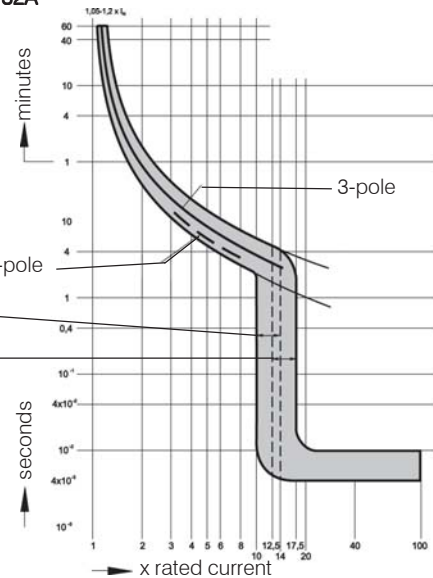
Example: Ambient temperature 60°C, full load motor current 5A
(60 - 20) x 0,3 = 12%
Setting value: 5A + 12% = 5,6A

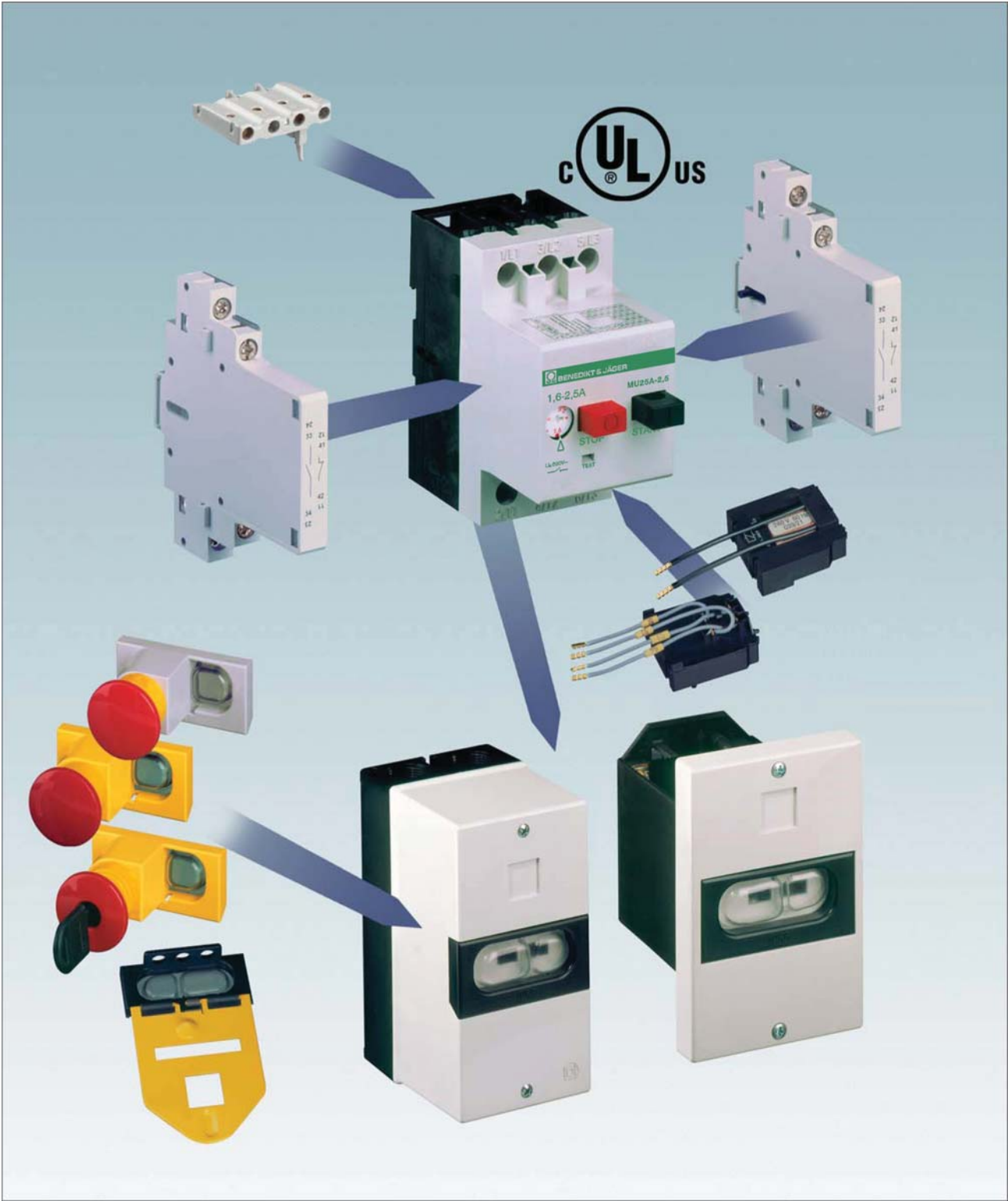
Tripping Characteristic

0,16 - 16A



16 - 32A





Approvals

Country	USA, Canada UL	Switzerland SEV	Europe	CB/CCA- Certificates
Type	cUL US LISTED	Ⓢ	CE	
MU25A	o	o	/	-
o In standard version approved / No testing required CE x In test - Not provided for test till now				

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General

Test Authorities, Registration Mark, Approvals

Low voltage switchgear from Benedict GmbH is built and tested to national and international specifications. All devices suit all important specifications without any test obligation, like VDE, BS and also relative to IEC Recommendations and to European Standards like IEC 947 and EN 60947.

It is for this reason of our Low voltage switchgear is used all over the world. In order to provide special versions, limitations to the max. voltages, currents and power ratings or special markings are sometimes necessary.

Quality Control System

Since November 1991 Benedict GmbH has been certified according to the quality control system **ÖNORM EN ISO 29001**. The target of the ISO-certification is, to grant the customer the quality of the performance of his supplier, who is audited in accordance with this standard.

CE-Marking



The manufacturer has to sign his products with the CE-Marking. With the CE-Marking the manufacturer confirms the accordance with the different EEC Directives. The CE-Marking is absolutely necessary to sell the products in the EEC.

Below you find the EEC Directives concerning our products.

Low Voltage Directive 2006/95/EC

EMC Directive 2004/108/EC

RoHS + WEEE 2002/95/EC + "002/96/EC

Country	North America	Russia
State deputy or private examination (state admitted)	UL Canada, USA	EAC
Label marking of examination boards	Listed Component	
Duty of approvals	all switchgear	all switchgear

Explanations for choice and supply of low voltage switchgear in Canada and USA

Marking of auxiliary contacts

At several devices in UL-data are two voltages for auxiliary contacts mentioned (e. g.: 600 volts at same potential, 150 volts at different potentials). That means, if the voltage is higher than 150 volts, the control voltage applied to input terminals must be at the same potential.

Low voltage switchgear for auxiliary circuits (e. g. contactor relays, control units, auxiliary contacts in general) usually approved for "Heavy Duty" or "Standard Duty" UL and besides these marked with the admissible max. voltage or with short codes (see table).

Marking of auxiliary contacts according to CSA and UL	Max. rated values per pole				Contact Rating Code Designation
V	Voltage	Current Make A	Break A	Cont. Current A	
Heavy Duty (HD or HVY DTY)	AC 120	60	6	10	A150
	AC 240	30	3	10	A300
	AC 480	15	1,5	10	A600
	AC 600	12	1,2	10	A600
	DC 125	2,2	2,2	10	N150
	DC 250	1,1	1,1	10	N300
	DC 600	0,4	0,4	10	N600
Standard Duty (SD or STD DTY)	AC 120	30	3	5	B150
	AC 240	15	1,5	5	B300
	AC 480	7,5	0,75	5	B600
	AC 600	6	0,6	5	B600
	DC 125	1,1	1,1	5	P150
	DC 250	0,55	0,55	5	P300
	DC 600	0,2	0,2	5	P600
-	AC 120	15	1,5	2,5	C150
	AC 240	7,5	0,75	2,5	C300
	AC 480	3,75	0,375	2,5	C600
	AC 600	3	0,3	2,5	C600
	DC 125	0,55	0,55	2,5	Q150
	DC 250	0,27	0,27	2,5	Q300
	DC 600	0,1	0,1	2,5	Q600
-	AC 120	3,6	0,6	1	D150
	AC 240	1,8	0,3	1	D300
	DC 125	0,22	0,22	1	R150
	DC 250	0,11	0,11	1	R300
-	AC 120	1,8	0,3	0,5	E150

Discernment at UL-Standards

Recognized Component Industrial Control Equipment	Listed Industrial Control Equipment
UL issues yellow "Guide cards" with Guide- and File-No.	UL issues white "Guide cards" with Guide- and File-No.
Devices have permission to be marked with on the label	Devices have to be marked with the "UL-Listing Mark"
Devices as components approved for "factory wiring": devices for employment in control panels, when they are selected, mounted and wired according to the charging conditions by skilled worker.	Devices approved for "field wiring", a) devices for employment in control panels, when they are mounted and wired by skilled worker. b) devices for retail in USA
Valid UL-Standards: UL 508 "Standard for Industrial Control Equipment" (partly limited)	Valid UL-Standards: UL 508 "Standard for Industrial Control Equipment" (unlimited)

Are devices approved as "Listed Equipment" the approval is also valid for using as "Recognized Component"

Approvals

Country	USA, Canada UL	Europe	Russia EAC	CB/CCA- Certificates
Type				

Cam Switches (UL-Listed as MANUAL MOTOR CONTROLLER and suitable as MOTOR DISCONNECT)

M10	o	o	o	o
M10H	o	o	o	o
M20	o	o	o	o
N20	o	o	o	o
N33F	o	o	o	o
N40	-	o	o	o
N60	-	o	o	o
N80	o	o	o	o
N100	o	o	o	o
N200	o	o	o	o
L400	o	o	-	-

o In standard version approved
- Not provided for test till now

/ No testing required CE

x In test

Technical Information

Degree of protection acc. to IEC 60947-1

Protection ratings are prefixed by the internationally agreed letters IP followed by two digits.

1st digit: Pertains to solid objects
2nd digit: Pertains to water.

1 st digit	Short description	Definition
1	Protected against solid objects greater than 50 mm	Excludes solid objects exceeding 50 mm in diameter and protects against contact with live and moving parts by a large body surface such as a hand (but not against deliberate access).
2L	Protected against solid objects greater than 12,5 mm and against contact by standard test finger	Excludes solid objects exceeding 12,5 mm in diameter and protects against contact with live and moving parts by a standard test finger or similar objects not exceeding 80 mm in length.
3	Protected against solid objects greater than 2,5mm	Excludes solid objects exceeding 2,5 mm in diameter or thickness.
4	Protected against solid objects greater than 1 mm	Excludes solid objects exceeding 1 mm in diameter or thickness.
5	Dust protected	Prevents ingress of dust in quantities and locations that would interfere with the intended operation of the equipment.
6	Dust tight	Prevents ingress of dust.

2 nd digit	Short description	Definition
1	Protected against dripping water	Dripping water (vertically falling drops) shall have no harmful effect.
2	Protected against dripping water when tilted up to 15°	Vertically dripping water shall have no harmful effect when the enclosure is tilted at any angle up to 15° from its normal position.
3	Protected against spraying water	Water falling as a spray at an angle up to 60° from the vertical shall have no harmful effect.
4	Protected against splashing water	Water splashed against the enclosure from any direction shall have no harmful effect.
5	Protected against water jets	Water protected by a nozzle against the enclosure from any direction shall have no harmful effect.
6	Protected against heavy seas	Water from heavy seas or water projected in powerful jets shall not enter the enclosure in harmful quantities.
7	Protected against the effects of immersion	Ingress of water in a harmful quantity shall not be possible when the enclosure is immersed in water under standard conditions of pressure and time.
8	Protected against submersion	No ingress of water.

Resistance to climatic conditions acc. to IEC60068

Open-type devices are climate-resistant in the constant climate according to IEC60068-2-3 (this is a climate with an ambient temperature of 40°C and an atmospheric humidity of 90 to 95%).

Enclosed devices are climate-resistant in an alternating climate according to IEC 68-2-30 (this is a moist alternating climate with a 24-hour cycle between climates with an ambient temperature of 25°C, and an atmospheric humidity of 95 to 100% and an ambient temperature of 40°C, and an atmospheric humidity of 90 to 96% in the presence of condensation during rises in temperature).

Data are valid up to an altitude of 2000m above sea level.

Short circuit protection

Back up fuses should be used to protect contactors and starters against short circuits. For starters the device with the smaller admissible fuse at the main and at the control circuit (contactor or thermal overload) determines the fuse size.

After a short circuit devices have to be checked for correct operation. Disconnect power before proceeding with any work on the equipment!

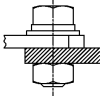
Mounting positions

Zulässige Umgebungstemperatur

Operation	open °C	-40 up to +60
	enclosed °C	-40 up to +40
Storage	°C	-50 up to +90

Technical Information

Terminal screws

Devices Type	Kind of connection				Screw driver	Tightening torque	
	Screw with washer	Screw with clamp box	2 Screw s	Screw with w. nut		Nm	lb. inch
							
Cam Switches							
M4H..	M2,5	-	-	-	 Pz1	0,6	5
M10	M3	-	-	-	 Pz2	0,6 - 1,2	5 - 11
M10H	M3,5	-	-	-	 Pz2	0,8 - 1,4	7 - 12
M20, N20, N33F	M4	-	-	-	 Pz2	1,2 - 1,8	11 - 16
N40	M5	-	-	-	 Pz2	2,5 - 3	22 - 26
N60, N80	-	-	2 x M5	-	 Pz2	2,5 - 3	22 - 26
N100	-	-	2 x M6	-	 Pz3	3,5 - 4,5	31 - 40
N200	-	-	-	M10		10	88
L100	-	-	2 x M5	-	 Pz2	2,5 - 3	22 - 26
L160	-	-	-	M8		4 - 6,5	35 - 57
L400	-	-	-	M12		16	140
L600	-	-	-	M16		24	210
L800	-	-	-	M16		24	210
L1200	-	-	-	M16		24	210

Telux - - Cam Switches

Ratings								Designs			
Typ	Rated current Therm. $I_{th\ open}$ A			Protection degree from front in mounted position			Plate mm	Panel moun. M10H, M20 IP65 IP40	Single hole mount. Ø22,5mm with Plate IP65	without Plate IP65	Flush mount. IP40
	AC21 A	atU _e V	Motor AC3 3~400V kW	AC23 3~400V A	kW						
M4H	10	10	440	2,2	6	3	30□	M4H E ●◆	M4H Z ●◆	M4H ZO ●◆	-
M10H	20	20	690	5,5	16	7,5	48□	M10H E ●◆	M10H Z ●◆	M10H ZO ●◆	-
M10	20	20	440	5,5	16	7,5	48□	-	-	-	M10 UP ●◆
M20	32	32	690	11	30	15	48□	M20 E ●◆	M20 Z ●◆	M20 ZO ●◆	-
N20	32	32	690	11	30	15	64□	N20 E ●◆	-	-	-
N33F	50	50	690	15	45	22	64□	N33F E ●◆	N33F Z ●◆	-	-
N32	40	40	690	11	30	15	64□	-	-	-	-
N40	63	63	690	15	45	22	88□	N40 E ●◆	-	-	-
N60	85	85	690	25	60	30	88□	N60 E ●◆	-	-	-
N80	115	115	690	30	85	45	88□	N80 E ●◆	-	-	-
L100	125	125	690	15	45	22	88□	L100 E ●◆	-	-	-
L160	180	180	690	25	60	30	88□	L160 E ●◆	-	-	-
N100	150	150	690	40	110	55	132□	N100 E ●◆	-	-	-
N200	250	250	690	70	140	70	132□	N200 E ●◆	-	-	-
L400	400	400	690	70	140	70	132□	L400 E ●◆	-	-	-
L600	600	400	690	70	140	70	132□	L600 E ●◆	-	-	-
L800	800	400	690	70	140	70	132□	L800 E ●◆	-	-	-
L1200	1200	400	690	70	140	70	132□	L1200 E ●◆	-	-	-

Cam Switches 10 - 250A

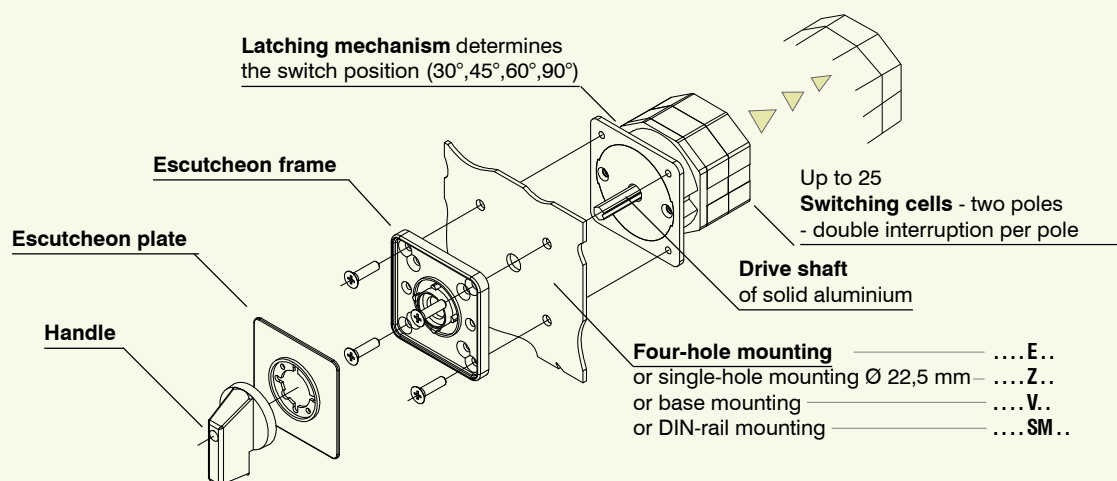
Cam switches can be used for virtually all purposes, e.g. as motor, main, control or instrument switches. Over and above the switching programs mentioned in the list, an effectively limitless number of special programs can be implemented.

Load switch L.. 125 - 1200A

Load switches are primarily employed where resistive or slightly inductive current loads are to be switched on and off, or switching takes place without loading.

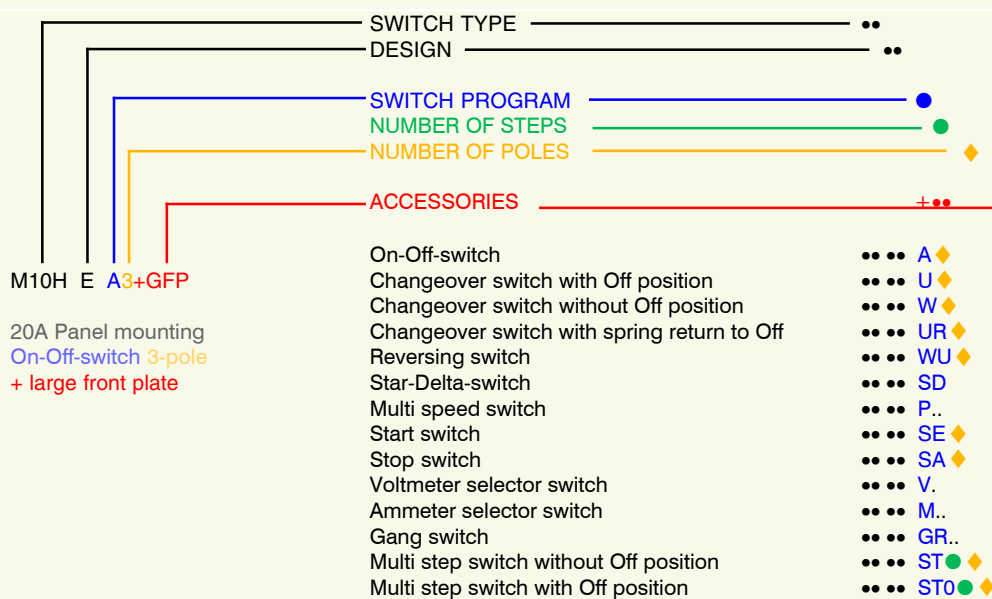
Load switches are assembled by parallel switching of two or more of cam switch contacts.

With customer built main terminal protection, load switch L.. can also be used as main switch.



Designs Base mounting IP40	DIN-rail mounting IP40	Modular IP40	Plastic enclosed ..P.. IP40 ..PF.. IP65	horizontal, IP65	Motor switch enclosed IP65	Terminal box mounting IP65	Cast enclosed ..G.. IP40 ..GF.. IP65
							
-	-	-	-	-	-	-	-
M10H V ♦	M10H SM ♦	M10H SMA ♦	-	-	M10H PM ♦	-	-
-	-	-	M10 P(F) ♦	-	-	M10 KE ♦	-
M20 V ♦	M20 SM ♦	M20 SMA ♦	-	-	-	-	-
N20 V ♦	N20 SM ♦	-	N20 P(F) ♦	-	N20 PM ♦	N20 KE ♦	N20 G(F) ♦
N33F V ♦	N33F SM ♦	-	N33F P(F) ♦	-	N33F PM ♦	N33F KE ♦	-
-	-	-	-	-	-	-	-
N40 V ♦	-	-	N40 P(F) ♦	N40 PLF ♦	-	-	-
N60 V ♦	-	-	N60 P(F) ♦	N60 PLF ♦	-	-	-
N80 V ♦	-	-	N80 P(F) ♦	N80 PLF ♦	-	-	-
L100 V ♦	-	-	-	-	-	-	-
L160 V ♦	-	-	-	-	-	-	-
N100 V ♦	-	-	N100 PF ♦	-	-	-	-
N200 V ♦	-	-	N200 PF ♦	-	-	-	-
L400 V ♦	-	-	-	-	-	-	-
L600 V ♦	-	-	-	-	-	-	-
L800 V ♦	-	-	-	-	-	-	-
L1200 V ♦	-	-	-	-	-	-	-

Ordering



Panel mounting designs

Switches of the panel mounting designs listed below have protection from front IP40. Where a shaft seal (appendix +WD) is used, the protection is increased to IP54. Use of a moisture proofing cap (appendix +FR) results in an increase in rear protection to IP54. In the standard version, the switches are delivered with a square escutcheon plate and black twist knob. Forward mounting is possible for some of the

design E switches. The position of the terminals of the standard switches is left and right, at switch M10H the terminals are above and below. Where a knob insert is turned by 90° (can easily be performed after delivery), the position of the terminals can be changed.

Dimensions see page 256.



Design

Design		Possible switch sizes					
Description	Type appendix	M10H	M20	N20 N33F	N40 N60 N80	N100 N200	L...
Panel mounting For installation in control panels, machines and equipment. For panel thickness of over 5mm, an extended switch shaft is required (appendix +VW). Protection from front: M10H, M20 IP65 all others IP40	E	X	X	X	X	X	X
Central fixing 22,5mm Switch for mounting with standard 22,5mm mounting holes and 1-4mm panel thickness. Protection from front: IP65 Wrench J7049 necessary	Z	X	X	X ²⁾	-	-	-
Central fixing 22,5mm Switch without escutcheon plate , for installation with standard 22,5mm mounting holes and 1-4mm panel thickness. Protection from front: IP65 Wrench J7049 necessary	ZO	X	X	-	-	-	-
Flush mounting version Switch with white instrument knob, cream escutcheon plate with black markings, for installation in 65mm flush mounting boxes and use of Unitas plate. Supplied with flush mounting box: appendix +UP. Maximum number of cells with: M10 FM box 45mm deep 2 FM box 65mm deep 4	UP	X ¹⁾	-	-	-	-	-

1) Switches are delivered with switch type M10

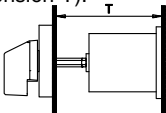
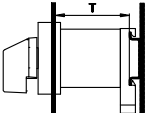
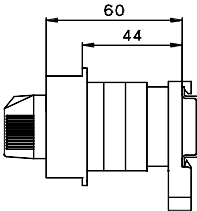
2) For switch types N33F only, max. 3 poles and 3 cells

Base mounting designs

Switches of the designs listed below have protection from front IP40. When a shaft seal (appendix +WD) is used, the front protection type is increased to IP54. In the standard version, the switches are delivered with a square escutcheon plate and black twist knob (design SMA with grey cover and grey toggle knob). Door couplings are advisable for switchgear cabinets with hinged doors.

The position of the terminals of the standard switches is left and right, at switch M10H the terminals are above and below. Where a knob insert is turned by 90° (can easily be performed after delivery), the position of the terminals can be changed.

Dimensions see page 257.

Design	Type appendix	Possible switch sizes					
		M10H	M20	N20 N33F	N40 N60 N80	N100 N200	L...
 Base mounting For screw mounting to the back wall or floor of distributor boxes, or of appliances with removable lids. Additional it is necessary to state the installation depth - that is the distance between mounting level of the switch and the inside edge of the door (dimension T).  Door couplings see page 244	V ... +T/...	X	X	X	X	X	X
 Snap-on mounting on DIN-rail Switch with square escutcheon plate, for snap-on mounting on standard DIN EN 50022 rail. Additional it is necessary to state the installation depth - that is the distance between mounting level of the switch and the inside edge of the door (dimension T).  Door couplings see page 244	SM ... +T/...	X	X	X	-	-	-
 Snap-on mounting on DIN-rail with installation cover for standard opening and toggle knob. The lay-out of the terminals of the standard switches is above and below. Dimensions for Switch types M10H SMA .. with 1-3 cells M20 SMA .. with 1 or 2 cells  further dimensions see page 257	SMA	X	X	-	-	-	-

Plastic enclosed switches

The switches, which have durable plastic enclosures, are intended for wall mounting or attachment to machines. In the standard version, they are supplied with a light-grey enclosure, square escutcheon plate, black markings on a silver background, and a black twist knob. Other colours and colour combinations are available for most enclosure types. It is not possible to mount an additional rectangular plate. The enclosure base is equipped with 4 entry glands with heavy-gauge conduit threads (see drawings). In all types of plastic enclosures, two terminals that are connected and insulated from switch column can be provided for a PE conductor (appendix +PE). In addition, 1 or 2 pilot lamps (appendix +SL..) with neon lights can be installed.

Dimensions see page 258.

Cast aluminium enclosed switches

The switches with cast aluminium enclosures are intended for wall mounting or attachment to machines, under heavy-duty operating conditions. The switches are delivered with a square escutcheon plate, black markings on a silver background, and a black instrument knob. It is not possible to mount an additional rectangular plate. The enclosure base makes provision for 2 (4) entry glands with heavy-gauge conduit threads. If a switch with an aluminium enclosure is to be mounted directly on the terminal box of a motor, a 35mm or 50mm hole can be made in the floor of the switch enclosure. Design PLF is the replacement for designs G and GF at types N40 to N80.

Dimensions see page 259.



Design

Description	Type appendix	Possible switch sizes							
		M10H	N20	N33F	N40	N60	N80	N100	N200
Plastic enclosure light grey Protection class IP40 Maximum number of cells	P	X 6	X 6	X 6	X 6	X 2	-	-	-
Plastic enclosure light grey Moisture protection Protection class IP65 Maximum number of cells	PF	X 6	X 6	X 6	X 6	X 5	X 5	X 4	X 3
Plastic enclosure horizontal light grey Moisture protection Protection class IP65 Maximum number of cells	PLF	- -	- -	- -	X 10	X 6	X 6	-	-
Cast enclosure Protection class IP40 Maximum number of cells	G	- -	X 6	-	-	-	-	-	-
Cast enclosure Moisture protection Protection class IP65 Maximum number of cells	GF	- -	X 6	-	-	-	-	-	-
Terminal box mounting Protection class IP65 These switches are front mounted on a terminal box. The switch cells protrude through a hole into the terminal compartment. Maximum number of cells	KE	X 12	X 12	X 12	-	-	-	-	-
Plastic motor switch enclosure Moisture protection Protection class IP65 Maximum number of cells	PM	-	X 6	-	-	-	-	-	-

Switching programs

Description	Wiring diagram	Switching angle	Number of cells ↓ Size ↓ AC21	Type	Design see page 6-8 E. Z. V. SMA. P. G.	Switch pro- gram	Escutcheon plate
On-Off-switches A							
1-pole		60°	1	48 □ 20A 32A	M10H . x x x x x ¹⁾ - . A1 M20 . x x x x - - . A1		
				64 □ 32A 50A	N20 . x - x - x x . A1 N33F . x x x - x - . A1		
				88 □ 63A 80A 115A	N40 . x - x - x - . A1 N60 . x - x - x - . A1 N80 . x - x - - - . A1	+003	
				132 □ 150A 250A	N100 . x - x - - - . A1 N200 . x - x - - - . A1		
2-pole		60°	1	48 □ 20A 32A	M10H . x x x x x ¹⁾ - . A2 M20 . x x x x - - . A2		
				64 □ 32A 50A	N20 . x - x - x x . A2 N33F . x x x - x - . A2		
				88 □ 63A 80A 115A	N40 . x - x - x - . A2 N60 . x - x - x - . A2 N80 . x - x - - - . A2	+003	
				132 □ 150A 250A	N100 . x - x - - - . A2 N200 . x - x - - - . A2		
3-pole		60°	2	48 □ 20A 32A	M10H . x x x x x ¹⁾ - . A3 M20 . x x x x - - . A3		
				64 □ 32A 50A	N20 . x - x - x x . A3 N33F . x x x - x - . A3		
				88 □ 63A 80A 115A	N40 . x - x - x - . A3 N60 . x - x - x - . A3 N80 . x - x - - - . A3	+003	
				132 □ 150A 250A	N100 . x - x - - - . A3 N200 . x - x - - - . A3		
4-pole 4. pole early make		60°	2	48 □ 20A 32A	M10H . x x x x x ¹⁾ - . A4 M20 . x x x x - - . A4		
				64 □ 32A 50A	N20 . x - x - x x . A4 N33F . x - x - x - . A4		
				88 □ 63A 80A 115A	N40 . x - x - x - . A4 N60 . x - x - x - . A4 N80 . x - x - - - . A4	+003	
				132 □ 150A 250A	N100 . x - x - - - . A4 N200 . x - x - - - . A4		
6-pole		60°	3	48 □ 20A 32A	M10H . x x x x x ¹⁾ - . A6 M20 . x x x x - - . A6		
				64 □ 32A 50A	N20 . x - x - x x . A6 N33F . x - x - x - . A6		
				88 □ 63A 80A 115A	N40 . x - x - x - . A6 N60 . x - x - x - . A6 N80 . x - x - - - . A6	+003	
				132 □ 150A 250A	N100 . x - x - - - . A6 N200 . x - x - - - . A6		

Ordering example: AC21 250A panel mounting, On-Off-switch 6-pole, Escutcheon plate OFF - ON

N200 E A6+003

1) Plastic enclosed switches are delivered with switch type M10.

Switching programs

Description	Wiring diagram	Switching angle	Number of cells ↓ Size ↓ AC21	Type	Design see page 6-8 E. Z. V. SMA. P. G.	Switch pro- gram	Escutcheon plate
Changeover switches U							
1-pole		60°	1	48 □ 20A 32A	M10H . M20 .	x x x x x ¹⁾ . U1 x x x x - - . U1	
				64 □ 32A 50A	N20 . N33F .	x - x - x x . U1 x x x - x - . U1	
				88 □ 63A 80A 115A	N40 . N60 . N80 .	x - x - x - . U1 x - x - x - . U1 x - x - - - . U1	+007
				132 □ 150A 250A	N100 . N200 .	x - x - - - . U1 x - x - - - . U1	
2-pole		60°	2	48 □ 20A 32A	M10H . M20 .	x x x x x ¹⁾ - . U2 x x x x - - . U2	
				64 □ 32A 50A	N20 . N33F .	x - x - x x . U2 x x x - x - . U2	
				88 □ 63A 80A 115A	N40 . N60 . N80 .	x - x - x - . U2 x - x - x - . U2 x - x - - - . U2	+007
				132 □ 150A 250A	N100 . N200 .	x - x - - - . U2 x - x - - - . U2	
3-pole		60°	3	48 □ 20A 32A	M10H . M20 .	x x x x x ¹⁾ - . U3 x x x x - - . U3	
				64 □ 32A 50A	N20 . N33F .	x - x - x x . U3 x x x - x - . U3	
				88 □ 63A 80A 115A	N40 . N60 . N80 .	x - x - x - . U3 x - x - x - . U3 x - x - - - . U3	+007
				132 □ 150A 250A	N100 . N200 .	x - x - - - . U3 x - x - - - . U3	
4-pole 4. pole early make		60°	4	48 □ 20A 32A	M10H . M20 .	x x x x x ¹⁾ - . U4 x x x x - - . U4	
				64 □ 32A 50A	N20 . N33F .	x - x - x x . U4 x - x - x - . U4	
				88 □ 63A 80A 115A	N40 . N60 . N80 .	x - x - x - . U4 x - x - x - . U4 x - x - - - . U4	+007
				132 □ 150A 250A	N100 . N200 .	x - x - - - . U4 x - x - - - . U4	
6-pole		60°	6	48 □ 20A 32A	M10H . M20 .	x x x - x ¹⁾ - . U6 x x x - - - . U6	
				64 □ 32A 50A	N20 . N33F .	x - x - x x . U6 x - x - x - . U6	
				88 □ 63A 80A 115A	N40 . N60 . N80 .	x - x - x - . U6 x - x - x - . U6 x - x - - - . U6	+007
				132 □ 150A 250A	N100 . N200 .	x - x - - - . U6 x - x - - - . U6	

Ordering example: AC21 250A panel mounting, changeover switch 6-pole, Escutcheon plate 1 - OFF - 2 **N200 E U6+007**

1) Plastic enclosed switches are delivered with switch type M10.

Switching programs

Description	Wiring diagram	Switching angle	Number of cells ↓ Size ↓ AC21	Type	Design see page 6-8 E. Z. V. SMA. P. G.	Switch pro- gram	Escutcheon plate
Changeover switches without off W							
1-pole		60°	1	48 □ 20A 32A	M10H . x x x x x ¹⁾ - M20 . x x x x - -	. W1 . W1	
				64 □ 32A 50A	N20 . x - x - x x N33F . x x x - x -	. W1 . W1	
				88 □ 63A 80A 115A	N40 . x - x - x - N60 . x - x - x - N80 . x - x - - -	. W1 . W1 . W1	
				132 □ 150A 250A	N100 . x - x - - - N200 . x - x - - -	. W1 . W1	
2-pole		60°	2	48 □ 20A 32A	M10H . x x x x x ¹⁾ - M20 . x x x x - -	. W2 . W2	
				64 □ 32A 50A	N20 . x - x - x x N33F . x x x - x -	. W2 . W2	
				88 □ 63A 80A 115A	N40 . x - x - x - N60 . x - x - x - N80 . x - x - - -	. W2 . W2 . W2	
				132 □ 150A 250A	N100 . x - x - - - N200 . x - x - - -	. W2 . W2	
3-pole		60°	3	48 □ 20A 32A	M10H . x x x x x ¹⁾ - M20 . x x x x - -	. W3 . W3	
				64 □ 32A 50A	N20 . x - x - x x N33F . x x x - x -	. W3 . W3	
				88 □ 63A 80A 115A	N40 . x - x - x - N60 . x - x - x - N80 . x - x - - -	. W3 . W3 . W3	
				132 □ 150A 250A	N100 . x - x - - - N200 . x - x - - -	. W3 . W3	
4-pole 4. pole early make		60°	4	48 □ 20A 32A	M10H . x x x x x ¹⁾ - M20 . x x x x - -	. W4 . W4	
				64 □ 32A 50A	N20 . x - x - x x N33F . x - x - x -	. W4 . W4	
				88 □ 63A 80A 115A	N40 . x - x - x - N60 . x - x - x - N80 . x - x - - -	. W4 . W4 . W4	
				132 □ 150A 250A	N100 . x - x - - - N200 . x - x - - -	. W4 . W4	
6-pole		60°	6	48 □ 20A 32A	M10H . x x x - x ¹⁾ - M20 . x x x - - -	. W6 . W6	
				64 □ 32A 50A	N20 . x - x - x x N33F . x - x - x -	. W6 . W6	
				88 □ 63A 80A 115A	N40 . x - x - x - N60 . x - x - x - N80 . x - x - - -	. W6 . W6 . W6	
				132 □ 150A 250A	N100 . x - x - - - N200 . x - x - - -	. W6 . W6	

Ordering example: AC21 250A panel mounting, changeover switch without off 6-pole, **N200 E W6**

1) Plastic enclosed switches are delivered with switch type M10.

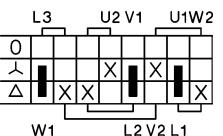
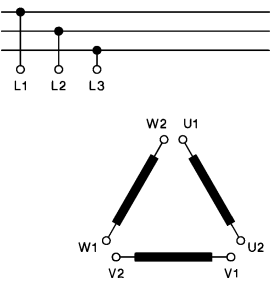
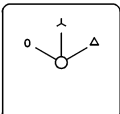
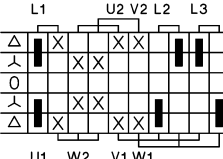
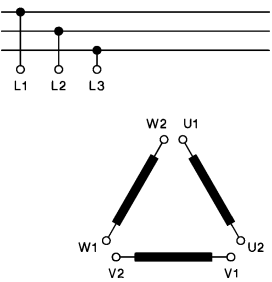
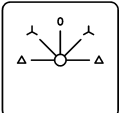
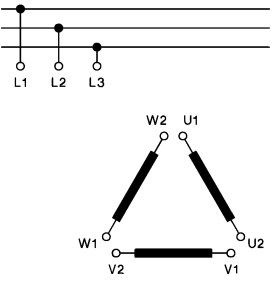
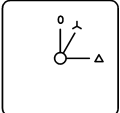
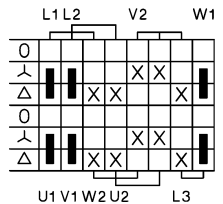
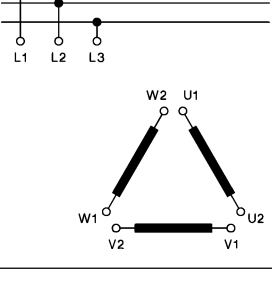
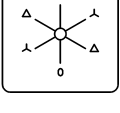
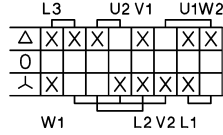
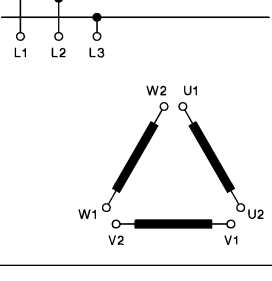
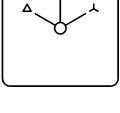
Switching programs

Description	Wiring diagram	Switching angle	Number of cells ↓ Size ↓ AC21	Type	Design see page 6-8 E. Z. V. SMA. P. G.	Switch pro- gram	Escutcheon plate
Reversing switches WU							
2-pole		60°	2	48 □ 20A 32A	M10H . x x x x x ¹⁾ - M20 . x x x x - -	. WU2 . WU2	
				64 □ 32A 50A	N20 . x - x - x x N33F . x x x - x -	. WU2 . WU2	
				88 □ 63A 80A 115A	N40 . x - x - x - N60 . x - x - x - N80 . x - x - - -	. WU2 . WU2 . WU2	+007
				132 □ 150A 250A	N100 . x - x - - - N200 . x - x - - -	. WU2 . WU2	
2-pole without off cross switch		60°	2	48 □ 20A 32A	M10H . x x x x x ¹⁾ - M20 . x x x x - -	. WK2 . WK2	
				64 □ 32A 50A	N20 . x - x - x x N33F . x x x - x -	. WK2 . WK2	
				88 □ 63A 80A 115A	N40 . x x - x - N60 . x - x - x - N80 . x - x - - -	. WK2 . WK2 . WK2	
				132 □ 150A 250A	N100 . x - x - - - N200 . x - x - - -	. WK2 . WK2	
2-pole with spring return from both sides to off		30°	2	48 □ 20A 32A	M10H . x x x x x ¹⁾ - M20 . x x x x - -	. WU2R2 . WU2R2	
				64 □ 32A 50A	N20 . x - x - x x N33F . x x x - x -	. WU2R2 . WU2R2	
				88 □ 63A	N40 . x - x - x -	. WU2R2	
2-pole position 1 latched position 2 with spring return to off		60°+30°	2	48 □ 20A 32A	M10H . x x x x x ¹⁾ - M20 . x x x x - -	. WU2R1 . WU2R1	
				64 □ 32A 50A	N20 . x - x - x x N33F . x x x - x -	. WU2R1 . WU2R1	
				88 □ 63A	N40 . x - x - x -	. WU2R1	
3-pole		60°	3	48 □ 20A 32A	M10H . x x x x x ¹⁾ - M20 . x x x x - -	. WU3 . WU3	
				64 □ 32A 50A	N20 . x - x - x x N33F . x x x - x -	. WU3 . WU3	
				88 □ 63A 80A 115A	N40 . x - x - x - N60 . x - x - x - N80 . x - x - - -	. WU3 . WU3 . WU3	+007
				132 □ 150A 250A	N100 . x - x - - - N200 . x - x - - -	. WU3 . WU3	
3-pole with spring return from both sides to off		30°	3	48 □ 20A 32A	M10H . x x x x x ¹⁾ - M20 . x x x x - -	. WU3R2 . WU3R2	
				64 □ 32A 50A	N20 . x - x - x x N33F . x x x - x -	. WU3R2 . WU3R2	
				88 □ 63A	N40 . x - x - x -	. WU3R2	
3-pole position 1 latched position 2 with spring return to off		60°+30°	3	48 □ 20A 32A	M10H . x x x x x ¹⁾ - M20 . x x x x - -	. WU3R1 . WU3R1	
				64 □ 32A 50A	N20 . x - x - x x N33F . x - x - x -	. WU3R1 . WU3R1	
				88 □ 63A	N40 . x - x - x -	. WU3R1	

Ordering example: AC21 63A base mounting, reversing switch 3-pole, position 2 with spring to off **N40 V WU3R1**

1) Plastic enclosed switches are delivered with switch type M10.

Switching programs

Description	Wiring diagram	Switching angle	Number of cells ↓ Size ↓ AC21	Type	Design see page 6-8 E. Z. V. SMA. P. G.	Switch pro- gram	Escutcheon plate
Star-Delta switches SD							
1 rotary direction 		60°	4	48 □ 20A 32A	M10H . x x x x x ¹⁾ - M20 . x x x x - -	. SD . SD	
				64 □ 32A 50A	N20 . x - x - x x N33F . x - x - x -	. SD . SD	
				88 □ 63A 80A 115A	N40 . x - x - x - N60 . x - x - x - N80 . x - x - - -	. SD . SD . SD	
				132 □ 150A 250A	N100 . x - x - - - N200 . x - x - - -	. SD . SD	
both rotary directions 		45°	5	48 □ 20A 32A	M10H . x x x x x ¹⁾ - M20 . x x x x - -	. SDR . SDR	
				64 □ 32A 50A	N20 . x - x - x x N33F . x - x - x -	. SDR . SDR	
				88 □ 63A 80A 115A	N40 . x - x - x - N60 . x - x - x - N80 . x - x - - -	. SDR . SDR . SDR	
				132 □ 150A 250A	N100 . x - x - - - N200 . x - x - - -	. SDR . SDR	
1 rotary direction spring return from  to off		°	4	48 □ 20A 32A	M10H . x x x x x ¹⁾ - M20 . x x x x - -	. SRD . SRD	
				64 □ 32A 50A	N20 . x - x - x x N33F . x - x - x -	. SRD . SRD	
				88 □ 63A 80A 115A	N40 . x - x - x - N60 . x - x - x - N80 . x - x - - -	. SRD . SRD . SRD	
				132 □ 150A 250A	N100 . x - x - - - N200 . x - x - - -	. SRD . SRD	
1 rotary direction with clockwise operation and backswitch interlock 		60°	5	48 □ 20A 32A	M10H . x x x x x ¹⁾ - M20 . x x x x - -	. SDRU . SDRU	
				64 □ 32A 50A	N20 . x - x - x x N33F . x - x - x -	. SDRU . SDRU	
				88 □ 63A 80A 115A	N40 . x - x - x - N60 . x - x - x - N80 . x - x - - -	. SDRU . SDRU . SDRU	
				132 □ 150A 250A	N100 . x - x - - - N200 . x - x - - -	. SDRU . SDRU	
Star-Delta selector switch 		60°	4	48 □ 20A 32A	M10H . x x x x x ¹⁾ - M20 . x x x x - -	. SDU . SDU	
				64 □ 32A 50A	N20 . x - x - x x N33F . x - x - x -	. SDU . SDU	
				88 □ 63A 80A 115A	N40 . x - x - x - N60 . x - x - x - N80 . x - x - - -	. SDU . SDU . SDU	
				132 □ 150A 250A	N100 . x - x - - - N200 . x - x - - -	. SDU . SDU	

Ordering example: AC21 32A cast enclosed, star-delta selector switch

N20 G SDU

1) Plastic enclosed switches are delivered with switch type M10.

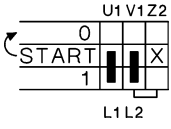
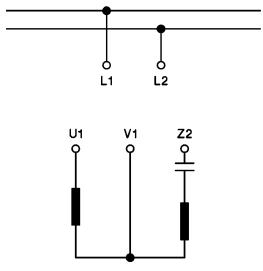
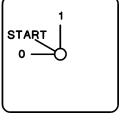
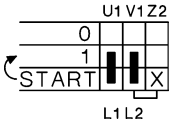
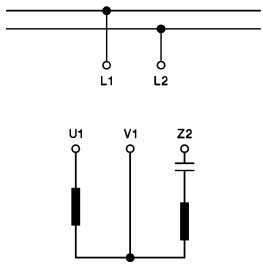
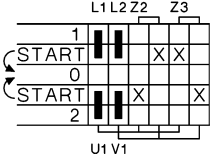
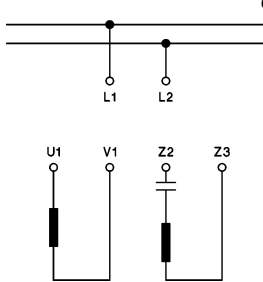
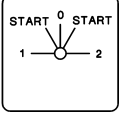
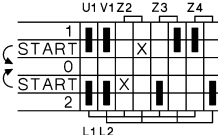
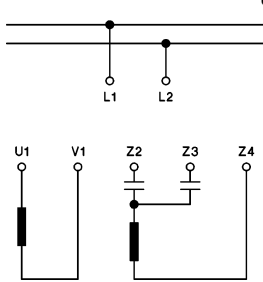
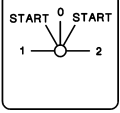
Switching programs

Description	Wiring diagram	Switching angle	Number of cells ↓ Size ↓ AC21	Type	Design see page 6-8 E. Z. V. SMA. P. G.	Switch pro- gram	Escutcheon plate
Star-Delta switches SD							
with double outfeed phases for use with manual motor starter		60°	4	48 □ 20A 32A	M10H . x x x x x ¹⁾ - M20 . x x x x - -	.SDMO .SDMO	
				64 □ 32A 50A	N20 . x - x - x x N33F . x - x - x -	.SDMO .SDMO	
				88 □ 63A 80A 115A	N40 . x - x - x - N60 . x - x - x - N80 . x - x - - -	.SDMO .SDMO .SDMO	
				132 □ 150A 250A	N100 . x - x - - - N200 . x - x - - -	.SDMO .SDMO	
with auxiliary contacts for contactor control, without main contacts, automatic zero setting in event of mains break- down		90°	4	48 □ 20A 32A	M10H . x x x x x ¹⁾ - M20 . x x x x - -	.SDJ1 .SDJ1	
				64 □ 32A 50A	N20 . x - x - x x N33F . x - x - x -	.SDJ1 .SDJ1	
				88 □ 63A 80A 115A	N40 . x - x - x - N60 . x - x - x - N80 . x - x - - -	.SDJ1 .SDJ1 .SDJ1	
				132 □ 150A 250A	N100 . x - x - - - N200 . x - x - - -	.SDJ1 .SDJ1	
with auxiliary contacts for contactor control, without main contacts, automatic zero setting in event of mains break- down, spring return to		90°+30°	4	48 □ 20A 32A	M10H . x x x x x ¹⁾ - M20 . x x x x - -	.SDJ2 .SDJ2	
				64 □ 32A 50A	N20 . x - x - x x N33F . x - x - x -	.SDJ2 .SDJ2	
				88 □ 63A 80A 115A	N40 . x - x - x - N60 . x - x - x - N80 . x - x - - -	.SDJ2 .SDJ2 .SDJ2	
				132 □ 150A 250A	N100 . x - x - - - N200 . x - x - - -	.SDJ2 .SDJ2	
as type SDJ1 but for both rotary directions		60°	7	48 □ 20A 32A	M10H . x x x - - - M20 . x x x - - -	.SDRJ1 .SDRJ1	
				64 □ 32A 50A	N20 . x - x - x x N33F . x - x - - -	.SDRJ1 .SDRJ1	
				88 □ 63A 80A 115A	N40 . x - x - x - N60 . x - x - - - N80 . x - x - - -	.SDRJ1 .SDRJ1 .SDRJ1	
				132 □ 150A 250A	N100 . x - x - - - N200 . x - x - - -	.SDRJ1 .SDRJ1	
with brake position (counter current braking) brake position is a momentary operation		45°+30°	5	48 □ 20A 32A	M10H . x x x x x ¹⁾ - M20 . x x x x - -	.SDB .SDB	
				64 □ 32A 50A	N20 . x - x - x x N33F . x - x - x -	.SDB .SDB	
				88 □ 63A 80A 115A	N40 . x - x - x - N60 . x - x - x - N80 . x - x - - -	.SDB .SDB .SDB	
				132 □ 150A 250A	N100 . x - x - - - N200 . x - x - - -	.SDB .SDB	

Ordering example: AC21 250A panel mounting star-delta switch with brake position **N200 E SDB**

1) Plastic enclosed switches are delivered with switch type M10.

Switching programs

Description	Wiring diagram	Switching angle	Number of cells ↓ Size ↓ AC21	Type	Design see page 6-8 E. Z. V. SMA. P. G.	Switch pro- gram	Escutcheon plate
Split phase switches HP							
for starting up single-phase motors with split-phase, spring return from START to Off 		30°+60°	2	48 □ 20A 32A	M10H . x x x x x ¹⁾ - M20 . x x x x - -	. HP1 . HP1	
				64 □ 32A 50A	N20 . x - x - x x N33F . x - x - x -	. HP1 . HP1	
				88 □ 63A	N40 . x - x - x -	. HP1	
for starting up single-phase motors with split-phase, spring return from START to 1 		90°+30°	2	48 □ 20A 32A	M10H . x x x x x ¹⁾ - M20 . x x x x - -	. HP2 . HP2	
				64 □ 32A 50A	N20 . x - x - x x N33F . x - x - x -	. HP2 . HP2	
				88 □ 63A	N40 . x - x - x -	. HP2	
for starting up single-phase motors with split-phase, both rotary directions 		60°+30°	3	48 □ 20A 32A	M10H . x x x x x ¹⁾ - M20 . x x x x - -	. HPR1 . HPR1	
				64 □ 32A 50A	N20 . x - x - x x N33F . x - x - x -	. HPR1 . HPR1	
				88 □ 63A	N40 . x - x - x -	. HPR1	
as type HPR1 with starting and phase-shifting capacitor 		60°+30°	4	48 □ 20A 32A	M10H . x x x x x ¹⁾ - M20 . x x x x - -	. HPR2 . HPR2	
				64 □ 32A 50A	N20 . x - x - x x N33F . x - x - x -	. HPR2 . HPR2	
				88 □ 63A	N40 . x - x - x -	. HPR2	

Ordering example: AC21 63A panel mounting, split phase switch, both rotary directions

N40 E HPR1

1) Plastic enclosed switches are delivered with switch type M10.

Switching programs

Description	Wiring diagram	Switching angle	Number of cells ↓ Size ↓ AC21	Type	Design see page 6-8 E. Z. V. SMA. P. G.	Switch pro- gram	Escutcheon plate
Multi speed switches P							
1 Dahlander winding 1 rotary direction		60°	4	48 □ 20A 32A	M10H . x x x x x ¹⁾ - M20 . x x x x x - -	. P61 . P61	
				64 □ 32A 50A	N20 . x - x - x x N33F . x - x - x -	. P61 . P61	
				88 □ 63A 80A 115A	N40 . x - x - x - N60 . x - x - x - N80 . x - x - - -	. P61 . P61 . P61	
				132 □ 150A 250A	N100 . x - x - - - N200 . x - x - - -	. P61 . P61	
1 Dahlander winding 1 rotary direction		60°	4	48 □ 20A 32A	M10H . x x x x x ¹⁾ - M20 . x x x x x - -	. P62 . P62	
				64 □ 32A 50A	N20 . x - x - x x N33F . x - x - x -	. P62 . P62	
				88 □ 63A 80A 115A	N40 . x - x - x - N60 . x - x - x - N80 . x - x - - -	. P62 . P62 . P62	
				132 □ 150A 250A	N100 . x - x - - - N200 . x - x - - -	. P62 . P62	+007
1 Dahlander winding both rotary directions		60°	7	48 □ 20A 32A	M10H . x x x - - - M20 . x x x - - -	. P61R . P61R	
				64 □ 32A 50A	N20 . x - x - x - N33F . x - x - - -	. P61R . P61R	
				88 □ 63A 80A 115A	N40 . x - x - x - N60 . x - x - - - N80 . x - x - - -	. P61R . P61R . P61R	
				132 □ 150A 250A	N100 . x - x - - - N200 . x - x - - -	. P61R . P61R	
1 Dahlander winding 1 rotary direction, clockwise operation		60°	5	48 □ 20A 32A	M10H . x x x x x ¹⁾ - M20 . x x x x x - -	. P61RU . P61RU	
				64 □ 32A 50A	N20 . x - x - x x N33F . x - x - x -	. P61RU . P61RU	
				88 □ 63A 80A 115A	N40 . x - x - x - N60 . x - x - x - N80 . x - x - - -	. P61RU . P61RU . P61RU	
				132 □ 150A 250A	N100 . x - x - - - N200 . x - x - - -	. P61RU . P61RU	
1 Dahlander winding 1 rotary direction, with auxiliary contacts for contactor control		60°	5	48 □ 20A 32A	M10H . x x x x x ¹⁾ - M20 . x x x x x - -	. P61J . P61J	
				64 □ 32A 50A	N20 . x - x - x x N33F . x - x - x -	. P61J . P61J	
				88 □ 63A 80A 115A	N40 . x - x - x - N60 . x - x - x - N80 . x - x - - -	. P61J . P61J . P61J	
				132 □ 150A 250A	N100 . x - x - - - N200 . x - x - - -	. P61J . P61J	

Ordering example: AC21 32A cast enclosed, multi speed switch, 1 Dahlander winding, 1 rotary direction

N20 G P61

1) Plastic enclosed switches are delivered with switch type M10.

Switching programs

Description	Wiring diagram	Switching angle	Number of cells ↓ Size ↓ AC21	Type	Design see page 6-8 E. Z. V. SMA. P. G.	Switch pro- gram	Escutcheon plate
Multi speed switches P							
open Dahlander winding 1 rotary direction low speed with star-delta-start		45°	6	48 □ 20A 32A	M10H . x x x - x ¹⁾ - M20 . x x x - - -	. P91 . P91	
			64 □ 32A 50A	N20 . x - x - x x N33F . x - x - x -	. P91 . P91		
			88 □ 63A 80A 115A	N40 . x - x - x - N60 . x - x - x - N80 . x - x - - -	. P91 . P91 . P91		
			132 □ 150A 250A	N100 . x - x - - - N200 . x - x - - -	. P91 . P91		
open Dahlander winding both rotary directions low speed with star-delta-start		30°	8	48 □ 20A 32A	M10H . x x x - - - M20 . x x x - - -	. P91R . P91R	
			64 □ 32A 50A	N20 . x - x - x - N33F . x - x - - -	. P91R . P91R		
			88 □ 63A 80A 115A	N40 . x - x - x - N60 . x - x - - - N80 . x - x - - -	. P91R . P91R . P91R		
			132 □ 150A 250A	N100 . x - x - - - N200 . x - x - - -	. P91R . P91R		
same as type P91 no load return from 2 to Off		45°	10	48 □ 20A 32A	M10H . - - - - - M20 . - - - - -	. P91S . P91S	
			64 □ 32A 50A	N20 . x - x - - - N33F . x - x - - -	. P91S . P91S		
			88 □ 63A 80A 115A	N40 . x - x - - - N60 . x - x - - - N80 . x - x - - -	. P91S . P91S . P91S		
			132 □ 150A 250A	N100 . - - - - - N200 . - - - - -	. P91S . P91S		
open Dahlander winding 1 rotary direction, low speed with star-delta-start, with additional start position (starting resistor)		30°	7	48 □ 20A 32A	M10H . x x x - - - M20 . x x x - - -	. P91W . P91W	
			64 □ 32A 50A	N20 . x - x - x - N33F . x - x - - -	. P91W . P91W		
			88 □ 63A 80A 115A	N40 . x - x - x - N60 . x - x - - - N80 . x - x - - -	. P91W . P91W . P91W		
			132 □ 150A 250A	N100 . x - x - - - N200 . x - x - - -	. P91W . P91W		

Ordering example: AC21 250A panel mounting, multi speed switch, 1 rotary direction, low speed with star-delta-start

N200 E P91

1) Plastic enclosed switches are delivered with switch type M10.

Switching programs

Description	Wiring diagram	Switching angle	Number of cells ↓ Size ↓ AC21	Type	Design see page 6-8 E. Z. V. SMA. P. G.	Switch pro- gram	Escutcheon plate
Multi speed switches P							
2 separate windings 1 rotary direction		60°	3	48 □ 20A 32A	M10H . x x x x x ¹⁾ - M20 . x x x x x - -	. P63 . P63	
				64 □ 32A 50A	N20 . x - x - x x N33F . x - x - x -	. P63 . P63	
				88 □ 63A 80A 115A	N40 . x - x - x - N60 . x - x - x - N80 . x - x - - -	. P63 . P63 . P63	
				132 □ 150A 250A	N100 . x - x - - - N200 . x - x - - -	. P63 . P63	
2 separate windings 1 rotary direction		60°	3	48 □ 20A 32A	M10H . x x x x x ¹⁾ - M20 . x x x x x - -	. P64 . P64	
				64 □ 32A 50A	N20 . x - x - x x N33F . x - x - x -	. P64 . P64	
				88 □ 63A 80A 115A	N40 . x - x - x - N60 . x - x - x - N80 . x - x - - -	. P64 . P64 . P64	+007
				132 □ 150A 250A	N100 . x - x - - - N200 . x - x - - -	. P64 . P64	
2 separate windings both rotary directions		60°	5	48 □ 20A 32A	M10H . x x x x x ¹⁾ - M20 . x x x x x - -	. P66 . P66	
				64 □ 32A 50A	N20 . x - x - x x N33F . x - x - x -	. P66 . P66	
				88 □ 63A 80A 115A	N40 . x - x - x - N60 . x - x - x - N80 . x - x - - -	. P66 . P66 . P66	
				132 □ 150A 250A	N100 . x - x - - - N200 . x - x - - -	. P66 . P66	
2 separate windings 1 opened 1 rotary direction		60°	4	48 □ 20A 32A	M10H . x x x x x ¹⁾ - M20 . x x x x x - -	. P71 . P71	
				64 □ 32A 50A	N20 . x - x - x x N33F . x - x - x -	. P71 . P71	
				88 □ 63A 80A 115A	N40 . x - x - x - N60 . x - x - x - N80 . x - x - - -	. P71 . P71 . P71	
				132 □ 150A 250A	N100 . x - x - - - N200 . x - x - - -	. P71 . P71	
2 separate windings 1 rotary direction low speed with star-delta-start		45°	6	48 □ 20A 32A	M10H . x x x - x ¹⁾ - M20 . x x x - - -	. P96 . P96	
				64 □ 32A 50A	N20 . x - x - x x N33F . x - x - x -	. P96 . P96	
				88 □ 63A 80A 115A	N40 . x - x - x - N60 . x - x - x - N80 . x - x - - -	. P96 . P96 . P96	
				132 □ 150A 250A	N100 . x - x - - - N200 . x - x - - -	. P96 . P96	

Ordering example: AC21 250A panel mounting, multi speed switch, 2 separate windings, low speed with star-delta-start

N200 E P96

1) Plastic enclosed switches are delivered with switch type M10.

Switching programs

Description	Wiring diagram	Switching angle	Number of cells ↓ Size ↓ AC21	Type	Design see page 6-8 E. Z. V. SMA. P. G.	Switch pro- gram	Escutcheon plate
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Multi speed switches P

2 separate windings 1 rotary direction both speeds with star-delta-start 	45°	8	48 □ 20A 32A	M10H . x x x - - - . P122 M20 . x - x - - - . P122	
			64 □ 32A 50A	N20 . x - x - x - . P122 N33F . x - x - - - . P122	
			88 □ 63A 80A 115A	N40 . x - x - x - . P122 N60 . x - x - - - . P122 N80 . x - x - - - . P122	
			132 □ 150A 250A	N100 . x - x - - - . P122 N200 . x - x - - - . P122	
1 Dahlander winding A 1 normal winding B 3 speeds 1 rotary direction 0-A Δ-B Δ or Δ-A Δ	45°	6	48 □ 20A 32A	M10H . x x x - x ¹⁾ - . P93 M20 . x x x - - - . P93	
			64 □ 32A 50A	N20 . x - x - x x . P93 N33F . x - x - x - . P93	
			88 □ 63A 80A 115A	N40 . x - x - x - . P93 N60 . x - x - x - . P93 N80 . x - x - - - . P93	
			132 □ 150A 250A	N100 . x - x - - - . P93 N200 . x - x - - - . P93	
1 Dahlander winding A 1 normal winding B 3 speeds 1 rotary direction 0-B Δ or Δ-A Δ	45°	6	48 □ 20A 32A	M10H . x x x - x ¹⁾ - . P94 M20 . x x x - - - . P94	
			64 □ 32A 50A	N20 . x - x - x - . P94 N33F . x - x - x - . P94	
			88 □ 63A 80A 115A	N40 . x - x - x - . P94 N60 . x - x - x - . P94 N80 . x - x - - - . P94	
			132 □ 150A 250A	N100 . x - x - - - . P94 N200 . x - x - - - . P94	
1 Dahlander winding A 1 normal winding B 3 speeds 1 rotary direction 0-A Δ-A Δ-B Δ or Δ	45°	6	48 □ 20A 32A	M10H . x x x - x ¹⁾ - . P95 M20 . x x x - - - . P95	
			64 □ 32A 50A	N20 . x - x - x x . P95 N33F . x - x - x - . P95	
			88 □ 63A 80A 115A	N40 . x - x - x - . P95 N60 . x - x - x - . P95 N80 . x - x - - - . P95	
			132 □ 150A 250A	N100 . x - x - - - . P95 N200 . x - x - - - . P95	
1 Dahlander winding A 1 normal winding B 3 speeds both rotary directions	45°	9	48 □ 20A 32A	M10H . x x x - - - . P93R M20 . x x x - - - . P93R	
			64 □ 32A 50A	N20 . x - x - - - . P93R N33F . x - x - - - . P93R	
			88 □ 63A 80A 115A	N40 . x - x - - - . P93R N60 . x - x - - - . P93R N80 . x - x - - - . P93R	
			132 □ 150A 250A	N100 . x - x - - - . P93R N200 . x - x - - - . P93R	

Ordering example: AC21 250A panel mounting, multi speed switch, 1 Dahlander winding A,
 1 normal winding B, 3 speeds, both rotary directions **N200 E P93R**

1) Plastic enclosed switches are delivered with switch type M10.

Switching programs

Description	Wiring diagram	Switching angle	Number of cells ↓ Size ↓ AC21	Type	Design see page 6-8 E. Z. V. SMA. P. G.	Switch pro- gram	Escutcheon plate
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Multi speed switches P

1 Dahlander winding A 1 normal winding B 3 speeds both rotary directions		45°	9 48 □ 20A 32A	M10H . x x x - - - . P94R M20 . x x x - - - . P94R	
			64 □ 32A 50A	N20 . x - x - - - . P94R N33F . x - x - - - . P94R	
			88 □ 63A 80A 115A	N40 . x - x - - - . P94R N60 . x - x - - - . P94R N80 . x - x - - - . P94R	
			132 □ 150A 250A	N100 . x - x - - - . P94R N200 . x - x - - - . P94R	
1 Dahlander winding A 1 normal winding B 3 speeds both rotary directions		45°	8 48 □ 20A 32A	M10H . x x x - - - . P95R M20 . x x x - - - . P95R	
			64 □ 32A 50A	N20 . x - x - x - . P95R N33F . x - x - - - . P95R	
			88 □ 63A 80A 115A	N40 . x - x - x - . P95R N60 . x - x - - - . P95R N80 . x - x - - - . P95R	
			132 □ 150A 250A	N100 . x - x - - - . P95R N200 . x - x - - - . P95R	
2 Dahlander windings 4 speeds 1 rotary direction 0 - A Δ - B Δ - A Δ - B Δ		30°	8 48 □ 20A 32A	M10H . x x x - - - . P124 M20 . x x x - - - . P124	
			64 □ 32A 50A	N20 . x - x - x - . P124 N33F . x - x - - - . P124	
			88 □ 63A 80A 115A	N40 . x - x - x - . P124 N60 . x - x - - - . P124 N80 . x - x - - - . P124	
			132 □ 150A 250A	N100 . x - x - - - . P124 N200 . x - x - - - . P124	
2 Dahlander windings 4 speeds both rotary directions		30°	12 48 □ 20A 32A	M10H . x x x - - - . P124R M20 . x x x - - - . P124R	
			64 □ 32A 50A	N20 . x - x - - - . P124R N33F . x - x - - - . P124R	
			88 □ 63A 80A 115A	N40 . x - x - - - . P124R N60 . x - x - - - . P124R N80 . x - x - - - . P124R	
			132 □ 150A 250A	N100 . x - x - - - . P124R N200 . x - x - - - . P124R	

Ordering example: AC21 250A Base mounting, multi speed switch, 2 Dahlander windings, 4 speeds, 1 rotary direction

N200 V P124

Switching programs

Description	Wiring diagram	Switching angle	Number of cells ↓ Size ↓ AC21	Type	Design see page 6-8 E. Z. V. SMA. P. G.	Switch pro- gram	Escutcheon plate
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Changeover switches with spring return to off UR

1-pole		30°	1	48 □ 20A 32A	M10H . x x x x x ¹⁾ - . UR1 M20 . x x x x - - . UR1	+264
				64 □ 32A 50A	N20 . x - x - x x . UR1 N33F . x - x - x - . UR1	
				88 □ 63A	N40 . x - x - x - . UR1	
2-pole		30°	2	48 □ 20A 32A	M10H . x x x x x ¹⁾ - . UR2 M20 . x x x x - - . UR2	+264
				64 □ 32A 50A	N20 . x - x - x x . UR2 N33F . x - x - x - . UR2	
				88 □ 63A	N40 . x - x - x - . UR2	
3-pole		30°	3	48 □ 20A 32A	M10H . x x x x x ¹⁾ - . UR3 M20 . x x x x - - . UR3	+264
				64 □ 32A 50A	N20 . x - x - x x . UR3 N33F . x - x - x - . UR3	
				88 □ 63A	N40 . x - x - x - . UR3	

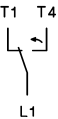
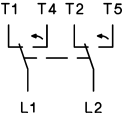
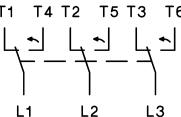
Changeover switches with 1 latched and 1 momentary position UK

1-pole position 1 latched position 2 with spring return		60°+30°	1	48 □ 20A 32A	M10H . x x x x x ¹⁾ - . UK1 M20 . x x x x - - . UK1	
				64 □ 32A 50A	N20 . x - x - x x . UK1 N33F . x - x - x - . UK1	
				88 □ 63A	N40 . x - x - x - . UK1	
2-pole position 1 latched position 2 with spring return		60°+30°	2	48 □ 20A 32A	M10H . x x x x x ¹⁾ - . UK2 M20 . x x x x - - . UK2	
				64 □ 32A 50A	N20 . x - x - x x . UK2 N33F . x - x - x - . UK2	
				88 □ 63A	N40 . x - x - x - . UK2	
3-pole position 1 latched position 2 with spring return		60°+30°	3	48 □ 20A 32A	M10H . x x x x x ¹⁾ - . UK3 M20 . x x x x - - . UK3	
				64 □ 32A 50A	N20 . x - x - x x . UK3 N33F . x - x - x - . UK3	
				88 □ 63A	N40 . x - x - x - . UK3	

Ordering example: AC21 63A panel mounting, changeover switch, position 1 latched, position 2 with spring return, 3-pole: **N40 E UK3**

1) Plastic enclosed switches are delivered with switch type M10.

Switching programs

Description	Wiring diagram	Switching angle	Number of cells ↓ Size ↓ AC21	Type	Design see page 6-8 E. Z. V. SMA. P. G.	Switch pro- gram	Escutcheon plate
Double throw switches with spring return to off WR							
1-pole		30°	1 48 □ 20A 32A	M10H . x x x x x ¹⁾ - . W1R M20 . x x x x - - . W1R			
			64 □ 32A 50A	N20 . x - x - x x . W1R N33F . x - x - x - . W1R			
			88 □ 63A	N40 . x - x - x - . W1R			
2-pole		30°	2 48 □ 20A 32A	M10H . x x x x x ¹⁾ - . W2R M20 . x x x x - - . W2R			
			64 □ 32A 50A	N20 . x - x - x x . W2R N33F . x - x - x - . W2R			
			88 □ 63A	N40 . x - x - x - . W2R			
3-pole		30°	3 48 □ 20A 32A	M10H . x x x x x ¹⁾ - . W3R M20 . x x x x - - . W3R			
			64 □ 32A 50A	N20 . x - x - x x . W3R N33F . x - x - x - . W3R			
			88 □ 63A	N40 . x - x - x - . W3R			

Start-Stop switches S

Start-switch, 1-pole		30°	1 48 □ 20A 32A	M10H . x x x x x ¹⁾ - . SE M20 . x x x x - - . SE	
			64 □ 32A 50A	N20 . x - x - x x . SE N33F . x - x - x - . SE	
Start-switch, 2-pole		30°	1 48 □ 20A 32A	M10H . x x x x x ¹⁾ - . S2E M20 . x x x x - - . S2E	
			64 □ 32A 50A	N20 . x - x - x x . S2E N33F . x - x - x - . S2E	
Start-switch, 3-pole		30°	2 48 □ 20A 32A	M10H . x x x x x ¹⁾ - . S3E M20 . x x x x - - . S3E	
			64 □ 32A 50A	N20 . x - x - x x . S3E N33F . x - x - x - . S3E	

Bestellbeispiel: AC21 50A base mounting, Start-switch, 3-pole

1) Plastic enclosed switches are delivered with switch type M10.

N33F V S3E

Switching programs

Description	Wiring diagram	Switching angle	Number of cells ↓ Size ↓ AC21	Type	Design see page 6-8 E. Z. V. SMA. P. G.	Switch pro- gram	Escutcheon plate
Start-Stop switches S							
Stop-switch, 1-pole		30°	1	48 □ 20A 32A	M10H . x x x x x ¹⁾ - M20 . x x x x - -	. SA . SA	
				64 □ 32A 50A	N20 . x - x - x x N33F . x - x - x -	. SA . SA	
				88 □ 63A	N40 . x - x - x -	. SA	
Stop-switch, 2-pole		30°	1	48 □ 20A 32A	M10H . x x x x x ¹⁾ - M20 . x x x x - -	. S2A . S2A	
				64 □ 32A 50A	N20 . x - x - x x N33F . x - x - x -	. S2A . S2A	
				88 □ 63A	N40 . x - x - x -	. S2A	
Stop-switch, 3-pole		30°	2	48 □ 20A 32A	M10H . x x x x x ¹⁾ - M20 . x x x x - -	. S3A . S3A	
				64 □ 32A 50A	N20 . x - x - x x N33F . x - x - x -	. S3A . S3A	
				88 □ 63A	N40 . x - x - x -	. S3A	
Start-Stop-switch, 1-pole		30°	1	48 □ 20A 32A	M10H . x x x x x ¹⁾ - M20 . x x x x - -	. SEA . SEA	
				64 □ 32A 50A	N20 . x - x - x x N33F . x - x - x -	. SEA . SEA	
Start-Stop-switch, 1-pole position START with spring return to 1		90°+30°	1	48 □ 20A 32A	M10H . x x x x x ¹⁾ - M20 . x x x x - -	. S392 . S392	
				64 □ 32A 50A	N20 . x - x - x x N33F . x - x - x -	. S392 . S392	
Start-Stop-switch, 1-pole for reversing contactors		60°+30°	2	48 □ 20A 32A	M10H . x x x x x ¹⁾ - M20 . x x x x - -	. S2EA . S2EA	
				64 □ 32A 50A	N20 . x - x - x x N33F . x - x - x -	. S2EA . S2EA	
Start-Stop-switch, 1-pole for reversing contactors with limit switches		30°	2	48 □ 20A 32A	M10H . x x x x x ¹⁾ - M20 . x x x x - -	. S22 . S22	
				64 □ 32A 50A	N20 . x - x - x x N33F . x - x - x -	. S22 . S22	

Ordering example: AC21 50A panel mounting, Start-Stop-switch, 1-pole for reversing contactors

N33F E S2EA

1) Plastic enclosed switches are delivered with switch type M10.

Switching programs

Description	Wiring diagram	Switching angle	Number of cells ↓ Size ↓ AC21	Type	Design see page 6-8 E. Z. V. SMA. P. G.	Switch pro- gram	Escutcheon plate																											
Voltmeter selector switches V																																		
3 line voltages	L2 L1 L3 0 L1-L2 L2-L3 L3-L1 J2 J1 L1 L2 L3 J1 J2 V	45°	2 48 □ 20A 32A 64 □ 32A 50A	M10H . M20 . N20 . N33F .	<table><tr><td>x</td><td>x</td><td>x</td><td>x</td><td>x¹⁾</td><td>-</td><td>. V3</td></tr><tr><td>x</td><td>x</td><td>x</td><td>x</td><td>-</td><td>-</td><td>. V3</td></tr><tr><td>x</td><td>-</td><td>x</td><td>-</td><td>x</td><td>x</td><td>. V3</td></tr><tr><td>x</td><td>x</td><td>x</td><td>-</td><td>x</td><td>-</td><td>. V3</td></tr></table>	x	x	x	x	x ¹⁾	-	. V3	x	x	x	x	-	-	. V3	x	-	x	-	x	x	. V3	x	x	x	-	x	-	. V3	L1-L2 L2-L3 L3-L1 0
x	x	x	x	x ¹⁾	-	. V3																												
x	x	x	x	-	-	. V3																												
x	-	x	-	x	x	. V3																												
x	x	x	-	x	-	. V3																												
3 phase voltages	L1 L2 L3 0 L1-N L2-N L3-N J2 J1 L1 L2 L3 N J1 J2 V	45°	2 48 □ 20A 32A 64 □ 32A 50A	M10H . M20 . N20 . N33F .	<table><tr><td>x</td><td>x</td><td>x</td><td>x</td><td>x¹⁾</td><td>-</td><td>. V0</td></tr><tr><td>x</td><td>x</td><td>x</td><td>x</td><td>-</td><td>-</td><td>. V0</td></tr><tr><td>x</td><td>-</td><td>x</td><td>-</td><td>x</td><td>x</td><td>. V0</td></tr><tr><td>x</td><td>x</td><td>x</td><td>-</td><td>x</td><td>-</td><td>. V0</td></tr></table>	x	x	x	x	x ¹⁾	-	. V0	x	x	x	x	-	-	. V0	x	-	x	-	x	x	. V0	x	x	x	-	x	-	. V0	L1-N L2-N L3-N 0
x	x	x	x	x ¹⁾	-	. V0																												
x	x	x	x	-	-	. V0																												
x	-	x	-	x	x	. V0																												
x	x	x	-	x	-	. V0																												
3 line voltages and 3 phase voltages	N L3 L2 L1 L3-L1 L2-L3 L1-L2 0 L1-N L2-N L3-N J2 J1 L1 L2 L3 N J1 J2 V	30°	3 48 □ 20A 32A 64 □ 32A 50A	M10H . M20 . N20 . N33F .	<table><tr><td>x</td><td>x</td><td>x</td><td>x</td><td>x¹⁾</td><td>-</td><td>. V1</td></tr><tr><td>x</td><td>x</td><td>x</td><td>x</td><td>-</td><td>-</td><td>. V1</td></tr><tr><td>x</td><td>-</td><td>x</td><td>-</td><td>x</td><td>x</td><td>. V1</td></tr><tr><td>x</td><td>x</td><td>x</td><td>-</td><td>x</td><td>-</td><td>. V1</td></tr></table>	x	x	x	x	x ¹⁾	-	. V1	x	x	x	x	-	-	. V1	x	-	x	-	x	x	. V1	x	x	x	-	x	-	. V1	L1-L2 L2-L3 L3-L1 0 L1-N L2-N L3-N
x	x	x	x	x ¹⁾	-	. V1																												
x	x	x	x	-	-	. V1																												
x	-	x	-	x	x	. V1																												
x	x	x	-	x	-	. V1																												
2 3-phase systems 2 x 3 line voltages	L32 L21 L11 L22 L31 L31-L11 L21-L31 L11-L21 0 L12-L22 L22-L32 L32-L12 J2 J1 L11 L21 L31 L12 L22 L32 J1 J2 V	45°	4 48 □ 20A 32A 64 □ 32A 50A	M10H . M20 . N20 . N33F .	<table><tr><td>x</td><td>x</td><td>x</td><td>x</td><td>x¹⁾</td><td>-</td><td>. V32</td></tr><tr><td>x</td><td>x</td><td>x</td><td>x</td><td>-</td><td>-</td><td>. V32</td></tr><tr><td>x</td><td>-</td><td>x</td><td>-</td><td>x</td><td>x</td><td>. V32</td></tr><tr><td>x</td><td>x</td><td>x</td><td>-</td><td>x</td><td>-</td><td>. V32</td></tr></table>	x	x	x	x	x ¹⁾	-	. V32	x	x	x	x	-	-	. V32	x	-	x	-	x	x	. V32	x	x	x	-	x	-	. V32	L11 L21 L21 L31 L31 L11 0 L12 L22 L22 L32 L32 L12
x	x	x	x	x ¹⁾	-	. V32																												
x	x	x	x	-	-	. V32																												
x	-	x	-	x	x	. V32																												
x	x	x	-	x	-	. V32																												
3 line voltages and 1 phase voltage	N L3 L1 L2 L1-N 0 L1-L2 L2-L3 L3-L1 J2 J1 L1 L2 L3 N J1 J2 V	45°	3 48 □ 20A 32A 64 □ 32A 50A	M10H . M20 . N20 . N33F .	<table><tr><td>x</td><td>x</td><td>x</td><td>x</td><td>x¹⁾</td><td>-</td><td>. V13</td></tr><tr><td>x</td><td>x</td><td>x</td><td>x</td><td>-</td><td>-</td><td>. V13</td></tr><tr><td>x</td><td>-</td><td>x</td><td>-</td><td>x</td><td>x</td><td>. V13</td></tr><tr><td>x</td><td>x</td><td>x</td><td>-</td><td>x</td><td>-</td><td>. V13</td></tr></table>	x	x	x	x	x ¹⁾	-	. V13	x	x	x	x	-	-	. V13	x	-	x	-	x	x	. V13	x	x	x	-	x	-	. V13	L1-N L1-L2 L2-L3 L3-L1 0
x	x	x	x	x ¹⁾	-	. V13																												
x	x	x	x	-	-	. V13																												
x	-	x	-	x	x	. V13																												
x	x	x	-	x	-	. V13																												

Ordering example: AC21 50A panel mounting, Voltmeter selector switch, 3 line voltages and 1 phase voltage
 1) Plastic enclosed switches are delivered with switch type M10.

N33F E V13

Switching programs

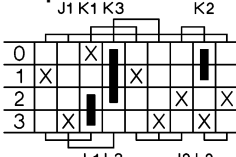
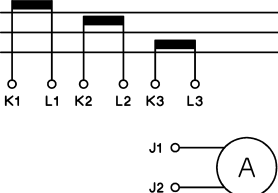
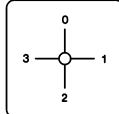
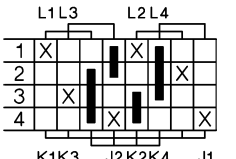
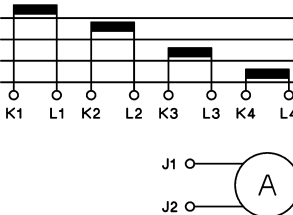
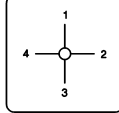
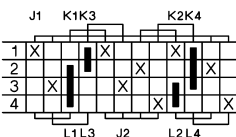
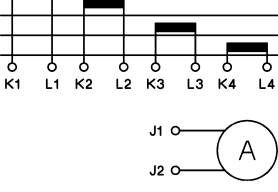
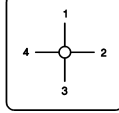
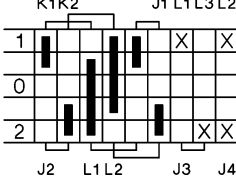
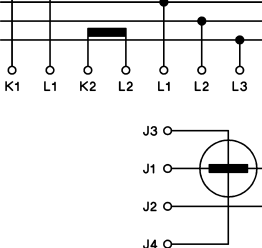
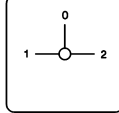
Description	Wiring diagram	Switching angle	Number of cells ↓ Size ↓ AC21	Type	Design see page 6-8 E. Z. V. SMA. P. G.	Switch pro- gram	Escutcheon plate
Ammeter selector switches M							
1-pole, for current transformer		90°	1	48 □ 20A 32A	M10H . x x x x x ¹⁾ - . M11 M20 . x x x x - - . M11		
				64 □ 32A 50A	N20 . x - x - x x . M11 N33F . x x x - x - . M11		
				88 □ 63A	N40 . x - x - x - . M11		
2-pole, for 1 current transformer or direct current measurement		90°	2	48 □ 20A 32A	M10H . x x x x x ¹⁾ - . M12 M20 . x x x x - - . M12		
				64 □ 32A 50A	N20 . x - x - x x . M12 N33F . x x x - x - . M12		
				88 □ 63A 80A 115A	N40 . x - x - x - . M12 N60 . x - x - x - . M12 N80 . x - x - - - . M12		
				132 □ 150A 250A	N100 . x - x - - - . M12 N200 . x - x - - - . M12		
1-pole, for 2 current transformers		90°	2	48 □ 20A 32A	M10H . x x x x x ¹⁾ - . M21 M20 . x x x x - - . M21		
				64 □ 32A 50A	N20 . x - x - x x . M21 N33F . x x x - x - . M21		
				88 □ 63A	N40 . x - x - x - . M21		
2-pole, for 2 current transformers or direct current measurement in 2 phases		90°	3	48 □ 20A 32A	M10H . x x x x x ¹⁾ - . M22 M20 . x x x x - - . M22		
				64 □ 32A 50A	N20 . x - x - x x . M22 N33F . x x x - x - . M22		
				88 □ 63A 80A 115A	N40 . x - x - x - . M22 N60 . x - x - x - . M22 N80 . x - x - - - . M22		
				132 □ 150A 250A	N100 . x - x - - - . M22 N200 . x - x - - - . M22		
1-pole, for 3 current transformers		90°	3	48 □ 20A 32A	M10H . x x x x x ¹⁾ - . M31 M20 . x x x x - - . M31		
			4	64 □ 32A 50A	N20 . x - x - x x . M31 N33F . x - x - x - . M31		
				88 □ 63A	N40 . x - x - x - . M31		

Ordering example: AC21 63A panel mounting, ammeter selector switch, for 3 current transformers 1-pole

N40 V M31

1) Plastic enclosed switches are delivered with switch type M10.

Switching programs

Description	Wiring diagram	Switching angle	Number of cells ↓ Size ↓ AC21	Type	Design see page 6-8 E. Z. V. SMA. P. G.	Switch pro- gram	Escutcheon plate
Ammeter selector switches M							
2-pole, for 3 current transformers or direct current measurement in 3 phases 		90°	6 48 □ 20A 32A 64 □ 32A 50A 88 □ 63A 80A 115A 132 □ 150A 250A	M10H . x x x x x ¹⁾ - . M32 M20 . x x x - - - . M32 N20 . x - x - x x . M32 N33F . x - x - x - . M32 N40 . x - x - x - . M32 N60 . x - x - x - . M32 N80 . x - x - - - . M32 N100 . x - x - - - . M32 N200 . x - x - - - . M32			
1-pole, for 4 current transformers 		90°	4 48 □ 20A 32A 64 □ 32A 50A 88 □ 63A	M10H . x x x x x ¹⁾ - . M41 M20 . x x x x - - . M41 N20 . x - x - x x . M41 N33F . x - x - x - . M41 N40 . x - x - x - . M41			
2-pole, for 4 current transformers or direct current measurement in 4 phases 		90°	6 48 □ 20A 32A 64 □ 32A 50A 88 □ 63A 80A 115A 132 □ 150A 250A	M10H . x x x x x ¹⁾ - . M42 M20 . x x x - - - . M42 N20 . x - x - x x . M42 N33F . x - x - x - . M42 N40 . x - x - x - . M42 N60 . x - x - x - . M42 N80 . x - x - - - . M42 N100 . x - x - - - . M42 N200 . x - x - - - . M42			
f. output measurement in 3-phase systems by 2-wattmeter method 		90°	5 48 □ 20A 32A 64 □ 32A 50A 88 □ 63A 80A 115A 132 □ 150A 250A	M10H . x x x x x ¹⁾ - . M2W M20 . x x x x - - . M2W N20 . x - x - x x . M2W N33F . x - x - x - . M2W N40 . x - x - x - . M2W N60 . x - x - x - . M2W N80 . x - x - - - . M2W N100 . x - x - - - . M2W N200 . x - x - - - . M2W			

Ordering example: AC21 63A panel mounting, ammeter selector switch, for 4 current transformers 1-pole

N40 V M41

1) Plastic enclosed switches are delivered with switch type M10.

Switching programs

Description	Wiring diagram	Switching angle	Number of cells ↓ Size ↓ AC21	Type	Design see page 6-8 E. Z. V. SMA. P. G.	Switch pro- gram	Escutcheon plate
Gang switches GR							
2 circuits A and B 1-pole 0 - A - A+B		45°	1	48 □ 20A 32A 64 □ 32A 50A 88 □ 63A 80A 115A 132 □ 150A 250A	M10H . x x x x x ¹⁾ - M20 . x x x x - - N20 . x - x - x x N33F . x x x - x - N40 . x - x - x - N60 . x - x - x - N80 . x - x - - - N100 . x - x - - - N200 . x - x - - -	. GR11 . GR11 . GR11 . GR11 . GR11 . GR11 . GR11 . GR11 . GR11	
							+126
2 circuits A and B 1-pole 0 - A - B - A+B		45°	1	48 □ 20A 32A 64 □ 32A 50A 88 □ 63A 80A 115A 132 □ 150A 250A	M10H . x x x x x ¹⁾ - M20 . x x x x - - N20 . x - x - x x N33F . x x x - x - N40 . x - x - x - N60 . x - x - x - N80 . x - x - - - N100 . x - x - - - N200 . x - x - - -	. GR12 . GR12 . GR12 . GR12 . GR12 . GR12 . GR12 . GR12 . GR12	
							+127
2 circuits A and B 2-pole 0 - A - A+B		45°	2	48 □ 20A 32A 64 □ 32A 50A 88 □ 63A 80A 115A 132 □ 150A 250A	M10H . x x x x x ¹⁾ - M20 . x x x x - - N20 . x - x - x x N33F . x x x - x - N40 . x - x - x - N60 . x - x - x - N80 . x - x - - - N100 . x - x - - - N200 . x - x - - -	. GR21 . GR21 . GR21 . GR21 . GR21 . GR21 . GR21 . GR21 . GR21	
							+126
2 circuits A and B 2-pole 0 - A - B - A+B		45°	2	48 □ 20A 32A 64 □ 32A 50A 88 □ 63A 80A 115A 132 □ 150A 250A	M10H . x x x x x ¹⁾ - M20 . x x x x - - N20 . x - x - x x N33F . x x x - x - N40 . x - x - x - N60 . x - x - x - N80 . x - x - - - N100 . x - x - - - N200 . x - x - - -	. GR22 . GR22 . GR22 . GR22 . GR22 . GR22 . GR22 . GR22 . GR22	
							+127
2 circuits A and B 3-pole 0 - A - A+B		45°	3	48 □ 20A 32A 64 □ 32A 50A 88 □ 63A 80A 115A 132 □ 150A 250A	M10H . x x x x x ¹⁾ - M20 . x x x x - - N20 . x - x - x x N33F . x - x - x - N40 . x - x - x x N60 . x - x - x - N80 . x - x - - - N100 . x - x - - - N200 . x - x - - -	. GR31 . GR31 . GR31 . GR31 . GR31 . GR31 . GR31 . GR31 . GR31	
							+126

Ordering example: AC21 250A panel mounting, gang switch, 2 circuits A and B, 3-pole

N200 E GR31

1) Plastic enclosed switches are delivered with switch type M10.

Switching programs

Description	Wiring diagram	Switching angle	Number of cells ↓ Size ↓ AC21	Type	Design see page 6-8 E. Z. V. SMA. P. G.	Switch pro- gram	Escutcheon plate																																									
Gang switches GR																																																
2 circuits A and B 3-pole 0 - A - B - A+B <table><tr><td></td><td>A1</td><td>A2</td><td>A3</td><td>B1</td><td>B2</td><td>B3</td></tr><tr><td>0</td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>1</td><td>X</td><td></td><td>X</td><td></td><td></td><td>X</td></tr><tr><td>2</td><td></td><td>X</td><td></td><td>X</td><td></td><td></td></tr><tr><td>3</td><td>X</td><td></td><td>X</td><td></td><td>X</td><td></td></tr><tr><td></td><td>L1</td><td>L2</td><td>L3</td><td></td><td></td><td></td></tr></table>		A1	A2	A3	B1	B2	B3	0							1	X		X			X	2		X		X			3	X		X		X			L1	L2	L3				 45°	3	48 □ 20A 32A 64 □ 32A 50A 88 □ 63A 80A 115A 132 □ 150A 250A	M10H . x x x x x ¹⁾ - M20 . x x x x - - N20 . x - x - x x N33F . x - x - x - N40 . x - x - x - N60 . x - x - x - N80 . x - x - - - N100 . x - x - - - N200 . x - x - - -	. GR32 . GR32 . GR32 . GR32 . GR32 . GR32 . GR32 . GR32	 +127
	A1	A2	A3	B1	B2	B3																																										
0																																																
1	X		X			X																																										
2		X		X																																												
3	X		X		X																																											
	L1	L2	L3																																													
3 circuits A, B and C 1-pole 0 - A - A+B - A+B+C <table><tr><td></td><td>A</td><td>B</td><td>C</td></tr><tr><td>0</td><td></td><td></td><td></td></tr><tr><td>1</td><td>X</td><td></td><td></td></tr><tr><td>2</td><td></td><td>X</td><td></td></tr><tr><td>3</td><td>X</td><td></td><td>X</td></tr><tr><td></td><td>L1</td><td></td><td></td></tr></table>		A	B	C	0				1	X			2		X		3	X		X		L1			 45°	2	48 □ 20A 32A 64 □ 32A 50A 88 □ 63A 80A 115A 132 □ 150A 250A	M10H . x x x x x ¹⁾ - M20 . x x x x - - N20 . x - x - x x N33F . x - x - x - N40 . x - x - x - N60 . x - x - x - N80 . x - x - - - N100 . x - x - - - N200 . x - x - - -	. GR14 . GR14 . GR14 . GR14 . GR14 . GR14 . GR14 . GR14	 +127 																		
	A	B	C																																													
0																																																
1	X																																															
2		X																																														
3	X		X																																													
	L1																																															
3 circuits A, B and C 2-pole 0 - A - A+B - A+B+C <table><tr><td></td><td>L1</td><td>L2</td><td></td><td></td><td></td><td></td></tr><tr><td>0</td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>1</td><td>X</td><td></td><td>X</td><td></td><td></td><td></td></tr><tr><td>2</td><td></td><td>X</td><td></td><td>X</td><td></td><td></td></tr><tr><td>3</td><td>X</td><td></td><td>X</td><td></td><td>X</td><td>X</td></tr><tr><td></td><td>A1</td><td>B1</td><td>C1</td><td>A2</td><td>B2</td><td>C2</td></tr></table>		L1	L2					0							1	X		X				2		X		X			3	X		X		X	X		A1	B1	C1	A2	B2	C2	 45°	3	48 □ 20A 32A 64 □ 32A 50A 88 □ 63A 80A 115A 132 □ 150A 250A	M10H . x x x x x ¹⁾ - M20 . x x x x - - N20 . x - x - x x N33F . x - x - x - N40 . x - x - x - N60 . x - x - x - N80 . x - x - - - N100 . x - x - - - N200 . x - x - - -	. GR23 . GR23 . GR23 . GR23 . GR23 . GR23 . GR23 . GR23	 +127
	L1	L2																																														
0																																																
1	X		X																																													
2		X		X																																												
3	X		X		X	X																																										
	A1	B1	C1	A2	B2	C2																																										
3 circuits A, B and C 3-pole 0 - A - A+B - A+B+C <table><tr><td></td><td>A1</td><td>C1</td><td>A3</td><td>B3</td><td>C3</td></tr><tr><td></td><td>B1</td><td>A2</td><td>B2</td><td>C2</td><td></td></tr><tr><td>0</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>1</td><td>X</td><td></td><td>X</td><td>X</td><td></td></tr><tr><td>2</td><td></td><td>X</td><td></td><td>X</td><td></td></tr><tr><td>3</td><td>X</td><td></td><td>X</td><td></td><td>X</td></tr><tr><td></td><td>L1</td><td>L2</td><td>L3</td><td></td><td></td></tr></table>		A1	C1	A3	B3	C3		B1	A2	B2	C2		0						1	X		X	X		2		X		X		3	X		X		X		L1	L2	L3			 45°	5	48 □ 20A 32A 64 □ 32A 50A 88 □ 63A 80A 115A 132 □ 150A 250A	M10H . x x x x x ¹⁾ - M20 . x x x x - - N20 . x - x - x x N33F . x - x - x - N40 . x - x - x - N60 . x - x - x - N80 . x - x - - - N100 . x - x - - - N200 . x - x - - -	. GR33 . GR33 . GR33 . GR33 . GR33 . GR33 . GR33 . GR33	 +127
	A1	C1	A3	B3	C3																																											
	B1	A2	B2	C2																																												
0																																																
1	X		X	X																																												
2		X		X																																												
3	X		X		X																																											
	L1	L2	L3																																													

Ordering example: AC21 250A panel mounting, gang switch, 3 circuits A, B and C, 3-pole **N200 E GR33**

1) Plastic enclosed switches are delivered with switch type M10.

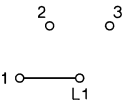
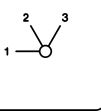
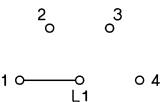
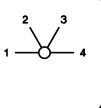
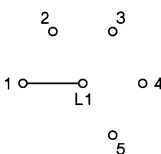
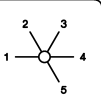
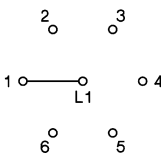
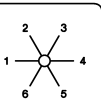
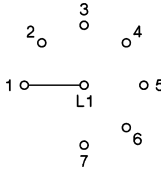
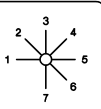
Switching programs

Description	Wiring diagram	Switching angle	Number of cells ↓ Size ↓ AC21	Type	Design see page 6-8 E. Z. V. SMA. P. G.	Switch pro- gram	Escutcheon plate
Series-Parallel switches SP							
2 circuits A and B 2-pole 0 - A + B - A,B (parallel)		45°	2	48 □ 20A 32A 64 □ 32A 50A 88 □ 63A 80A 115A 132 □ 150A 250A	M10H . x x x x x ¹⁾ - M20 . x x x x - - N20 . x - x - x x N33F . x x x - x - N40 . x - x - x - N60 . x - x - x - N80 . x - x - - - N100 . x - x - - - N200 . x - x - - -	. SP1 . SP1 . SP1 . SP1 . SP1 . SP1 . SP1 . SP1	 +126
2 circuits A and B 2-pole 0 - A,B (parall.) - A - A+B		90°	3	48 □ 20A 32A 64 □ 32A 50A 88 □ 63A 80A 115A 132 □ 150A 250A	M10H . x x x x x ¹⁾ - M20 . x x x x - - N20 . x - x - x x N33F . x x x - x - N40 . x - x - x - N60 . x - x - x - N80 . x - x - - - N100 . x - x - - - N200 . x - x - - -	. SP4 . SP4 . SP4 . SP4 . SP4 . SP4 . SP4 . SP4	 +270
2 circuits A and B for 3-phase systems 0 - A+B - A - B - A,B		30°	2	48 □ 20A 32A 64 □ 32A 50A 88 □ 63A 80A 115A 132 □ 150A 250A	M10H . x x x x x ¹⁾ - M20 . x x x x - - N20 . x - x - x x N33F . x x x - x - N40 . x - x - x - N60 . x - x - x - N80 . x - x - - - N100 . x - x - - - N200 . x - x - - -	. SP3 . SP3 . SP3 . SP3 . SP3 . SP3 . SP3 . SP3	 +112

Ordering example: AC21 250A panel mounting, series-parallel switch, 2 circuits for 3-phase systems **N200 E SP3**

1) Plastic enclosed switches are delivered with switch type M10.

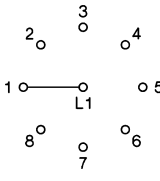
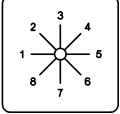
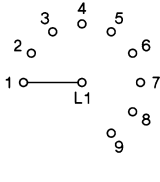
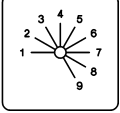
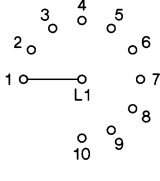
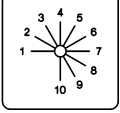
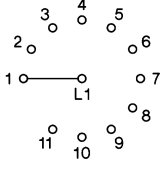
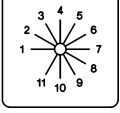
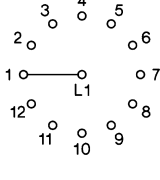
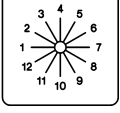
Switching programs

Description	Wiring diagram	Switching angle	Number of cells ↓ Size ↓ AC21	Type	Design see page 6-8 E. Z. V. SMA. P. G.	Switch pro- gram	Escutcheon plate
Multi step switches 1-pole without Off ST.1							
3 steps		60°	2	48 □ 20A 32A	M10H . x x x x x ¹⁾ - . ST31 M20 . x x x x - - . ST31		
			64 □ 32A 50A	N20 . x - x - x x . ST31 N33F . x x x - x - . ST31			
			88 □ 63A 80A 115A	N40 . x - x - x - . ST31 N60 . x - x - x - . ST31 N80 . x - x - - - . ST31			
			132 □ 150A 250A	N100 . x - x - - - . ST31 N200 . x - x - - - . ST31			
4 steps		60°	2	48 □ 20A 32A	M10H . x x x x x ¹⁾ - . ST41 M20 . x x x x - - . ST41		
			64 □ 32A 50A	N20 . x - x - x x . ST41 N33F . x x x - x - . ST41			
			88 □ 63A 80A 115A	N40 . x - x - x - . ST41 N60 . x - x - x - . ST41 N80 . x - x - - - . ST41			
			132 □ 150A 250A	N100 . x - x - - - . ST41 N200 . x - x - - - . ST41			
5 steps		60°	3	48 □ 20A 32A	M10H . x x x x x ¹⁾ - . ST51 M20 . x x x x - - . ST51		
			64 □ 32A 50A	N20 . x - x - x x . ST51 N33F . x x x - x - . ST51			
			88 □ 63A 80A 115A	N40 . x - x - x - . ST51 N60 . x - x - x - . ST51 N80 . x - x - - - . ST51			
			132 □ 150A 250A	N100 . x - x - - - . ST51 N200 . x - x - - - . ST51			
6 steps		60°	3	48 □ 20A 32A	M10H . x x x x x ¹⁾ - . ST61 M20 . x x x x - - . ST61		
			64 □ 32A 50A	N20 . x - x - x x . ST61 N33F . x x x - x - . ST61			
			88 □ 63A 80A 115A	N40 . x - x - x - . ST61 N60 . x - x - x - . ST61 N80 . x - x - - - . ST61			
			132 □ 150A 250A	N100 . x - x - - - . ST61 N200 . x - x - - - . ST61			
7 steps		45°	4	48 □ 20A 32A	M10H . x x x x x ¹⁾ - . ST71 M20 . x x x x - - . ST71		
			64 □ 32A 50A	N20 . x - x - x x . ST71 N33F . x - x - x - . ST71			
			88 □ 63A 80A 115A	N40 . x - x - x - . ST71 N60 . x - x - x - . ST71 N80 . x - x - - - . ST71			
			132 □ 150A 250A	N100 . x - x - - - . ST71 N200 . x - x - - - . ST71			

Ordering example: AC21 250A panel mounting, multi step switch 1-pole without off, 7 steps **N200 E ST71**

1) Plastic enclosed switches are delivered with switch type M10.

Switching programs

Description	Wiring diagram	Switching angle	Number of cells ↓ Size ↓ AC21	Type	Design see page 6-8 E. Z. V. SMA. P. G.	Switch pro- gram	Escutcheon plate
Multi step switches 1-pole without Off ST.1							
8 steps		45°	4	48 □ 20A 32A	M10H . x x x x x ¹⁾ - M20 . x x x x - -	. ST81 . ST81	
				64 □ 32A 50A	N20 . x - x - x x N33F . x - x - x -	. ST81 . ST81	
				88 □ 63A 80A 115A	N40 . x - x - x - N60 . x - x - x - N80 . x - x - - -	. ST81 . ST81 . ST81	
				132 □ 150A 250A	N100 . x - x - - - N200 . x - x - - -	. ST81 . ST81	
9 steps		30°	5	48 □ 20A 32A	M10H . x x x x x ¹⁾ - M20 . x x x x - -	. ST91 . ST91	
				64 □ 32A 50A	N20 . x - x - x x N33F . x - x - x -	. ST91 . ST91	
				88 □ 63A 80A 115A	N40 . x - x - x - N60 . x - x - x - N80 . x - x - - -	. ST91 . ST91 . ST91	
				132 □ 150A 250A	N100 . x - x - - - N200 . x - x - - -	. ST91 . ST91	
10 steps		30°	5	48 □ 20A 32A	M10H . x x x x x ¹⁾ - M20 . x x x x - -	. ST101 . ST101	
				64 □ 32A 50A	N20 . x - x - x x N33F . x - x - x -	. ST101 . ST101	
				88 □ 63A 80A 115A	N40 . x - x - x - N60 . x - x - x - N80 . x - x - - -	. ST101 . ST101 . ST101	
				132 □ 150A 250A	N100 . x - x - - - N200 . x - x - - -	. ST101 . ST101	
11 steps		30°	6	48 □ 20A 32A	M10H . x x x - x ¹⁾ - M20 . x x x - - -	. ST111 . ST111	
				64 □ 32A 50A	N20 . x - x - x x N33F . x - x - x -	. ST111 . ST111	
				88 □ 63A 80A 115A	N40 . x - x - x - N60 . x - x - x - N80 . x - x - - -	. ST111 . ST111 . ST111	
				132 □ 150A 250A	N100 . x - x - - - N200 . x - x - - -	. ST111 . ST111	
12 steps		30°	6	48 □ 20A 32A	M10H . x x x - x ¹⁾ - M20 . x x x - - -	. ST121 . ST121	
				64 □ 32A 50A	N20 . x - x - x x N33F . x - x - x -	. ST121 . ST121	
				88 □ 63A 80A 115A	N40 . x - x - x - N60 . x - x - x - N80 . x - x - - -	. ST121 . ST121 . ST121	
				132 □ 150A 250A	N100 . x - x - - - N200 . x - x - - -	. ST121 . ST121	

Ordering example: AC21 250A panel mounting, multi step switch 1-pole without off, 12 steps **N200 E ST121**

1) Plastic enclosed switches are delivered with switch type M10.

Switching programs

Description	Wiring diagram	Switching angle	Number of cells ↓ Size ↓ AC21	Type	Design see page 6-8 E. Z. V. SMA. P. G.	Switch pro- gram	Escutcheon plate
Multi step switches 1-pole with Off ST0.1							
2 steps		60°	1	48 □ 20A 32A	M10H . x x x x x ¹⁾ - . ST021 M20 . x x x x - - . ST021		
				64 □ 32A 50A	N20 . x - x - x x . ST021 N33F . x x x - x - . ST021		
				88 □ 63A 80A 115A	N40 . x - x - x - . ST021 N60 . x - x - x - . ST021 N80 . x - x - - - . ST021	+422	
				132 □ 150A 250A	N100 . x - x - - - . ST021 N200 . x - x - - - . ST021		
3 steps		45°	2	48 □ 20A 32A	M10H . x x x x x ¹⁾ - . ST031 M20 . x x x x - - . ST031		
				64 □ 32A 50A	N20 . x - x - x x . ST031 N33F . x x x - x - . ST031		
				88 □ 63A 80A 115A	N40 . x - x - x - . ST031 N60 . x - x - x - . ST031 N80 . x - x - - - . ST031	+127	
				132 □ 150A 250A	N100 . x - x - - - . ST031 N200 . x - x - - - . ST031		
4 steps		30°	2	48 □ 20A 32A	M10H . x x x x x ¹⁾ - . ST041 M20 . x x x x - - . ST041		
				64 □ 32A 50A	N20 . x - x - x x . ST041 N33F . x x x - x - . ST041		
				88 □ 63A 80A 115A	N40 . x - x - x - . ST041 N60 . x - x - x - . ST041 N80 . x - x - - - . ST041	+112	
				132 □ 150A 250A	N100 . x - x - - - . ST041 N200 . x - x - - - . ST041		
5 steps		45°	3	48 □ 20A 32A	M10H . x x x x x ¹⁾ - . ST051 M20 . x x x x - - . ST051		
				64 □ 32A 50A	N20 . x - x - x x . ST051 N33F . x x x - x - . ST051		
				88 □ 63A 80A 115A	N40 . x - x - x - . ST051 N60 . x - x - x - . ST051 N80 . x - x - - - . ST051	+423	
				132 □ 150A 250A	N100 . x - x - - - . ST051 N200 . x - x - - - . ST051		
6 steps		45°	4	48 □ 20A 32A	M10H . x x x x x ¹⁾ - . ST061 M20 . x x x x - - . ST061		
				64 □ 32A 50A	N20 . x - x - x x . ST061 N33F . x - x - x - . ST061		
				88 □ 63A 80A 115A	N40 . x - x - x - . ST061 N60 . x - x - x - . ST061 N80 . x - x - - - . ST061	+128	
				132 □ 150A 250A	N100 . x - x - - - . ST061 N200 . x - x - - - . ST061		

Ordering example: AC21 250A panel mounting, multi step switch 1-pole with off, 6 steps

N200 E ST061

1) Plastic enclosed switches are delivered with switch type M10.

Switching programs

Description	Wiring diagram	Switching angle	Number of cells ↓ Size ↓ AC21	Type	Design see page 6-8 E. Z. V. SMA. P. G.	Switch pro- gram	Escutcheon plate
Multi step switches 1-pole with Off ST0.1							
7 steps		45°	4	48 □ 20A 32A	M10H . x x x x x ¹⁾ - . ST071 M20 . x x x x - - . ST071		
				64 □ 32A 50A	N20 . x - x - x x . ST071 N33F . x - x - x - . ST071		
				88 □ 63A 80A 115A	N40 . x - x - x - . ST071 N60 . x - x - x - . ST071 N80 . x - x - - - . ST071		
				132 □ 150A 250A	N100 . x - x - - - . ST071 N200 . x - x - - - . ST071		
							+129
8 steps		30°	5	48 □ 20A 32A	M10H . x x x x x ¹⁾ - . ST081 M20 . x x x x - - . ST081		
				64 □ 32A 50A	N20 . x - x - x x . ST081 N33F . x - x - x - . ST081		
				88 □ 63A 80A 115A	N40 . x - x - x - . ST081 N60 . x - x - x - . ST081 N80 . x - x - - - . ST081		
				132 □ 150A 250A	N100 . x - x - - - . ST081 N200 . x - x - - - . ST081		
							+114
9 steps		30°	5	48 □ 20A 32A	M10H . x x x x x ¹⁾ - . ST091 M20 . x x x x - - . ST091		
				64 □ 32A 50A	N20 . x - x - x x . ST091 N33F . x - x - x - . ST091		
				88 □ 63A 80A 115A	N40 . x - x - x - . ST091 N60 . x - x - x - . ST091 N80 . x - x - - - . ST091		
				132 □ 150A 250A	N100 . x - x - - - . ST091 N200 . x - x - - - . ST091		
							+115
10 steps		30°	6	48 □ 20A 32A	M10H . x x x - x ¹⁾ - . ST0101 M20 . x x x - - - . ST0101		
				64 □ 32A 50A	N20 . x - x - x x . ST0101 N33F . x - x - x - . ST0101		
				88 □ 63A 80A 115A	N40 . x - x - x - . ST0101 N60 . x - x - x - . ST0101 N80 . x - x - - - . ST0101		
				132 □ 150A 250A	N100 . x - x - - - . ST0101 N200 . x - x - - - . ST0101		
							+116
11 steps		30°	6	48 □ 20A 32A	M10H . x x x - x ¹⁾ - . ST0111 M20 . x x x - - - . ST0111		
				64 □ 32A 50A	N20 . x - x - x x . ST0111 N33F . x - x - x - . ST0111		
				88 □ 63A 80A 115A	N40 . x - x - x - . ST0111 N60 . x - x - x - . ST0111 N80 . x - x - - - . ST0111		
				132 □ 150A 250A	N100 . x - x - - - . ST0111 N200 . x - x - - - . ST0111		
							+117

Ordering example: AC21 250A panel mounting, multi step switch 1-pole with off, 11 steps **N200 E ST0111**

1) Plastic enclosed switches are delivered with switch type M10.

Switching programs

Description	Wiring diagram	Switching angle	Number of cells ↓ Size ↓ AC21	Type	Design see page 6-8 E. Z. V. SMA. P. G.	Switch pro- gram	Escutcheon plate
Multi step switches 2-pole without Off ST.2							
3 steps		60°	3	48 □ 20A 32A	M10H . x x x x x ¹⁾ - M20 . x x x x - -	. ST32 . ST32	
				64 □ 32A 50A	N20 . x - x - x x N33F . x x x - x -	. ST32 . ST32	
				88 □ 63A 80A 115A	N40 . x - x - x - N60 . x - x - x - N80 . x - x - - -	. ST32 . ST32 . ST32	
				132 □ 150A 250A	N100 . x - x - - - N200 . x - x - - -	. ST32 . ST32	
4 steps		60°	4	48 □ 20A 32A	M10H . x x x x x ¹⁾ - M20 . x x x x - -	. ST42 . ST42	
				64 □ 32A 50A	N20 . x - x - x x N33F . x - x - x -	. ST42 . ST42	
				88 □ 63A 80A 115A	N40 . x - x - x - N60 . x - x - x - N80 . x - x - - -	. ST42 . ST42 . ST42	
				132 □ 150A 250A	N100 . x - x - - - N200 . x - x - - -	. ST42 . ST42	
5 steps		60°	5	48 □ 20A 32A	M10H . x x x x x ¹⁾ - M20 . x x x x - -	. ST52 . ST52	
				64 □ 32A 50A	N20 . x - x - x x N33F . x - x - x -	. ST52 . ST52	
				88 □ 63A 80A 115A	N40 . x - x - x - N60 . x - x - x - N80 . x - x - - -	. ST52 . ST52 . ST52	
				132 □ 150A 250A	N100 . x - x - - - N200 . x - x - - -	. ST52 . ST52	
6 steps		60°	6	48 □ 20A 32A	M10H . x x x - x ¹⁾ - M20 . x x x - - -	. ST62 . ST62	
				64 □ 32A 50A	N20 . x - x - x x N33F . x - x - x -	. ST62 . ST62	
				88 □ 63A 80A 115A	N40 . x - x - x - N60 . x - x - x - N80 . x - x - - -	. ST62 . ST62 . ST62	
				132 □ 150A 250A	N100 . x - x - - - N200 . x - x - - -	. ST62 . ST62	
7 steps		45°	7	48 □ 20A 32A	M10H . x x x - - - M20 . x x x - - -	. ST72 . ST72	
				64 □ 32A 50A	N20 . x - x - x - N33F . x - x - - -	. ST72 . ST72	
				88 □ 63A 80A 115A	N40 . x - x - x - N60 . x - x - - - N80 . x - x - - -	. ST72 . ST72 . ST72	
				132 □ 150A 250A	N100 . x - x - - - N200 . x - x - - -	. ST72 . ST72	

Ordering example: AC21 250A panel mounting, multi step switch 2-pole without off, 7 steps **N200 E ST72**

1) Plastic enclosed switches are delivered with switch type M10.

Switching programs

Description	Wiring diagram	Switching angle	Number of cells ↓ Size ↓ AC21	Type	Design see page 6-8 E. Z. V. SMA. P. G.	Switch pro- gram	Escutcheon plate
Multi step switches 2-pole without Off ST.2							
8 steps		45°	8	48 □ 20A 32A	M10H . x x x - - - . ST82 M20 . x x x - - - . ST82		
				64 □ 32A 50A	N20 . x - x - x - . ST82 N33F . x - x - - - . ST82		
				88 □ 63A 80A 115A	N40 . x - x - x - . ST82 N60 . x - x - - - . ST82 N80 . x - x - - - . ST82		
				132 □ 150A 250A	N100 . x - x - - - . ST82 N200 . x - x - - - . ST82		
9 steps		30°	9	48 □ 20A 32A	M10H . x x x - - - . ST92 M20 . x x x - - - . ST92		
				64 □ 32A 50A	N20 . x - x - - - . ST92 N33F . x - x - - - . ST92		
				88 □ 63A 80A 115A	N40 . x - x - - - . ST92 N60 . x - x - - - . ST92 N80 . x - x - - - . ST92		
				132 □ 150A 250A	N100 . x - x - - - . ST92 N200 . x - x - - - . ST92		
10 steps		30°	10	48 □ 20A 32A	M10H . x x x - - - . ST102 M20 . x x x - - - . ST102		
				64 □ 32A 50A	N20 . x - x - - - . ST102 N33F . x - x - - - . ST102		
				88 □ 63A 80A 115A	N40 . x - x - - - . ST102 N60 . x - x - - - . ST102 N80 . x - x - - - . ST102		
				132 □ 150A 250A	N100 . x - x - - - . ST102 N200 . x - x - - - . ST102		
11 steps		30°	11	48 □ 20A 32A	M10H . x x x - - - . ST112 M20 . x x x - - - . ST112		
				64 □ 32A 50A	N20 . x - x - - - . ST112 N33F . x - x - - - . ST112		
				88 □ 63A 80A 115A	N40 . x - x - - - . ST112 N60 . x - x - - - . ST112 N80 . x - x - - - . ST112		
				132 □ 150A 250A	N100 . x - x - - - . ST112 N200 . x - x - - - . ST112		
12 steps		30°	12	48 □ 20A 32A	M10H . x x x - - - . ST122 M20 . x x x - - - . ST122		
				64 □ 32A 50A	N20 . x - x - - - . ST122 N33F . x - x - - - . ST122		
				88 □ 63A 80A 115A	N40 . x - x - - - . ST122 N60 . x - x - - - . ST122 N80 . x - x - - - . ST122		
				132 □ 150A 250A	N100 . x - x - - - . ST122 N200 . x - x - - - . ST122		

Ordering example: AC21 250A panel mounting, multi step switch 2-pole without off, 12 steps **N200 E ST122**

Switching programs

Description	Wiring diagram	Switching angle	Number of cells ↓ Size ↓ AC21	Type	Design see page 6-8 E. Z. V. SMA. P. G.	Switch pro- gram	Escutcheon plate
Multi step switches 2-pole with Off ST0.2							
2 steps		60°	2	48 □ 20A 32A	M10H . x x x x x ¹⁾ - . ST022 M20 . x x x x - - . ST022		
				64 □ 32A 50A	N20 . x - x - x x . ST022 N33F . x x x - x - . ST022		
				88 □ 63A 80A 115A	N40 . x - x - x - . ST022 N60 . x - x - x - . ST022 N80 . x - x - - - . ST022	+422	
				132 □ 150A 250A	N100 . x - x - - - . ST022 N200 . x - x - - - . ST022		
3 steps		45°	3	48 □ 20A 32A	M10H . x x x x x ¹⁾ - . ST032 M20 . x x x x - - . ST032		
				64 □ 32A 50A	N20 . x - x - x x . ST032 N33F . x x x - x - . ST032		
				88 □ 63A 80A 115A	N40 . x - x - x - . ST032 N60 . x - x - x - . ST032 N80 . x - x - - - . ST032	+127	
				132 □ 150A 250A	N100 . x - x - - - . ST032 N200 . x - x - - - . ST032		
4 steps		30°	4	48 □ 20A 32A	M10H . x x x x x ¹⁾ - . ST042 M20 . x x x x - - . ST042		
				64 □ 32A 50A	N20 . x - x - x x . ST042 N33F . x - x - x - . ST042		
				88 □ 63A 80A 115A	N40 . x - x - x - . ST042 N60 . x - x - x - . ST042 N80 . x - x - - - . ST042	+112	
				132 □ 150A 250A	N100 . x - x - - - . ST042 N200 . x - x - - - . ST042		
5 steps		45°	6	48 □ 20A 32A	M10H . x x x - x ¹⁾ - . ST052 M20 . x x x - - - . ST052		
				64 □ 32A 50A	N20 . x - x - x x . ST052 N33F . x - x - x - . ST052		
				88 □ 63A 80A 115A	N40 . x - x - x - . ST052 N60 . x - x - x - . ST052 N80 . x - x - - - . ST052	+423	
				132 □ 150A 250A	N100 . x - x - - - . ST052 N200 . x - x - - - . ST052		
6 steps		45°	7	48 □ 20A 32A	M10H . x x x - x ¹⁾ - . ST062 M20 . x x x - - - . ST062		
				64 □ 32A 50A	N20 . x - x - x - . ST062 N33F . x - x - - - . ST062		
				88 □ 63A 80A 115A	N40 . x - x - x - . ST062 N60 . x - x - - - . ST062 N80 . x - x - - - . ST062	+128	
				132 □ 150A 250A	N100 . x - x - - - . ST062 N200 . x - x - - - . ST062		

Ordering example: AC21 250A panel mounting, multi step switch 2-pole with off, 6 steps

N200 E ST062

1) Plastic enclosed switches are delivered with switch type M10.

Switching programs

Description	Wiring diagram	Switching angle	Number of cells ↓ Size ↓ AC21	Type	Design see page 6-8 E. Z. V. SMA. P. G.	Switch pro- gram	Escutcheon plate
Multi step switches 2-pole with Off ST0.2							
7 steps		45°	8	48 □ 20A 32A	M10H . x x x - - - . ST072 M20 . x x x - - - . ST072		
				64 □ 32A 50A	N20 . x - x - x - . ST072 N33F . x - x - - - . ST072		
				88 □ 63A 80A 115A	N40 . x - x - x - . ST072 N60 . x - x - - - . ST072 N80 . x - x - - - . ST072		
				132 □ 150A 250A	N100 . x - x - - - . ST072 N200 . x - x - - - . ST072		
8 steps		30°	9	48 □ 20A 32A	M10H . x x x - - - . ST082 M20 . x x x - - - . ST082		
				64 □ 32A 50A	N20 . x - x - - - . ST082 N33F . x - x - - - . ST082		
				88 □ 63A 80A 115A	N40 . x - x - - - . ST082 N60 . x - x - - - . ST082 N80 . x - x - - - . ST082		
				132 □ 150A 250A	N100 . x - x - - - . ST082 N200 . x - x - - - . ST082		
9 steps		30°	10	48 □ 20A 32A	M10H . x x x - - - . ST092 M20 . x x x - - - . ST092		
				64 □ 32A 50A	N20 . x - x - - - . ST092 N33F . x - x - - - . ST092		
				88 □ 63A 80A 115A	N40 . x - x - - - . ST092 N60 . x - x - - - . ST092 N80 . x - x - - - . ST092		
				132 □ 150A 250A	N100 . x - x - - - . ST092 N200 . x - x - - - . ST092		
10 steps		30°	11	48 □ 20A 32A	M10H . x x x - - - . ST0102 M20 . x x x - - - . ST0102		
				64 □ 32A 50A	N20 . x - x - - - . ST0102 N33F . x - x - - - . ST0102		
				88 □ 63A 80A 115A	N40 . x - x - - - . ST0102 N60 . x - x - - - . ST0102 N80 . x - x - - - . ST0102		
				132 □ 150A 250A	N100 . x - x - - - . ST0102 N200 . x - x - - - . ST0102		
11 steps		30°	12	48 □ 20A 32A	M10H . x x x - - - . ST0112 M20 . x x x - - - . ST0112		
				64 □ 32A 50A	N20 . x - x - - - . ST0112 N33F . x - x - - - . ST0112		
				88 □ 63A 80A 115A	N40 . x - x - - - . ST0112 N60 . x - x - - - . ST0112 N80 . x - x - - - . ST0112		
				132 □ 150A 250A	N100 . x - x - - - . ST0112 N200 . x - x - - - . ST0112		

Ordering example: AC21 250A panel mounting, multi step switch 2-pole with off, 11 steps **N200 E ST0112**

Switching programs

Description	Wiring diagram	Switching angle	Number of cells ↓ Size ↓ AC21	Type	Design see page 6-8 E. Z. V. SMA. P. G.	Switch pro- gram	Escutcheon plate
Multi step switches 3-pole without Off ST.3							
3 steps		60°	5	48 □ 20A 32A	M10H . x x x x x ¹⁾ - M20 . x x x x - -	. ST33 . ST33	
				64 □ 32A 50A	N20 . x - x - x x N33F . x - x - x -	. ST33 . ST33	
				88 □ 63A 80A 115A	N40 . x - x - x - N60 . x - x - x - N80 . x - x - - -	. ST33 . ST33 . ST33	
				132 □ 150A 250A	N100 . x - x - - - N200 . x - x - - -	. ST33 . ST33	
4 steps		60°	6	48 □ 20A 32A	M10H . x x x - x ¹⁾ - M20 . x x x - - -	. ST43 . ST43	
				64 □ 32A 50A	N20 . x - x - x x N33F . x - x - x -	. ST43 . ST43	
				88 □ 63A 80A 115A	N40 . x - x - x - N60 . x - x - x - N80 . x - x - - -	. ST43 . ST43 . ST43	
				132 □ 150A 250A	N100 . x - x - - - N200 . x - x - - -	. ST43 . ST43	
5 steps		60°	8	48 □ 20A 32A	M10H . x x x - - - M20 . x x x - - -	. ST53 . ST53	
				64 □ 32A 50A	N20 . x - x - x - N33F . x - x - - -	. ST53 . ST53	
				88 □ 63A 80A 115A	N40 . x - x - x - N60 . x - x - - - N80 . x - x - - -	. ST53 . ST53 . ST53	
				132 □ 150A 250A	N100 . x - x - - - N200 . x - x - - -	. ST53 . ST53	
6 steps		60°	9	48 □ 20A 32A	M10H . x x x - - - M20 . x x x - - -	. ST63 . ST63	
				64 □ 32A 50A	N20 . x - x - - - N33F . x - x - - -	. ST63 . ST63	
				88 □ 63A 80A 115A	N40 . x - x - - - N60 . x - x - - - N80 . x - x - - -	. ST63 . ST63 . ST63	
				132 □ 150A 250A	N100 . x - x - - - N200 . x - x - - -	. ST63 . ST63	
7 steps		45°	11	48 □ 20A 32A	M10H . x x x - - - M20 . x x x - - -	. ST73 . ST73	
				64 □ 32A 50A	N20 . x - x - - - N33F . x - x - - -	. ST73 . ST73	
				88 □ 63A 80A 115A	N40 . x - x - - - N60 . x - x - - - N80 . x - x - - -	. ST73 . ST73 . ST73	
				132 □ 150A 250A	N100 . x - x - - - N200 . x - x - - -	. ST73 . ST73	

Ordering example: AC21 250A panel mounting, multi step switch 3-pole without off, 7 steps **N200 E ST73**

1) Plastic enclosed switches are delivered with switch type M10.

Switching programs

Description	Wiring diagram	Switching angle	Number of cells ↓ Size ↓ AC21	Type	Design see page 6-8 E. Z. V. SMA. P. G.	Switch pro- gram	Escutcheon plate
Multi step switches 3-pole without Off ST.3							
8 steps		45°	12 48 □ 20A 32A	M10H . M20 .	x x x - - - . x x x - - - .	ST83 ST83	
			64 □ 32A 50A	N20 . N33F .	x - x - - - . x - x - - - .	ST83 ST83	
			88 □ 63A 80A 115A	N40 . N60 . N80 .	x - x - - - . x - x - - - . x - x - - - .	ST83 ST83 ST83	
			132 □ 150A 250A	N100 . N200 .	x - x - - - . x - x - - - .	ST83 ST83	
9 steps		30°	14 48 □ 20A 32A	M10H . M20 .	x - x - - - . x - x - - - .	ST93 ST93	
			64 □ 32A 50A	N20 . N33F .	x - x - - - . x - x - - - .	ST93 ST93	
			88 □ 63A 80A 115A	N40 . N60 . N80 .	x - x - - - . x - x - - - . x - x - - - .	ST93 ST93 ST93	
			132 □ 150A 250A	N100 . N200 .	x - x - - - . x - x - - - .	ST93 ST93	
10 steps		30°	15 48 □ 20A 32A	M10H . M20 .	x - x - - - . x - x - - - .	ST103 ST103	
			64 □ 32A 50A	N20 . N33F .	x - x - - - . x - x - - - .	ST103 ST103	
			88 □ 63A 80A 115A	N40 . N60 . N80 .	x - x - - - . x - x - - - . x - x - - - .	ST103 ST103 ST103	
			132 □ 150A 250A	N100 . N200 .	x - x - - - . x - x - - - .	ST103 ST103	
11 steps		30°	17 48 □ 20A 32A	M10H . M20 .	x - x - - - . x - x - - - .	ST113 ST113	
			64 □ 32A 50A	N20 . N33F .	x - x - - - . x - x - - - .	ST113 ST113	
			88 □ 63A 80A 115A	N40 . N60 . N80 .	x - x - - - . x - x - - - . x - x - - - .	ST113 ST113 ST113	
			132 □ 150A 250A	N100 . N200 .	x - x - - - . x - x - - - .	ST113 ST113	
12 steps		30°	18 48 □ 20A 32A	M10H . M20 .	x - x - - - . x - x - - - .	ST123 ST123	
			64 □ 32A 50A	N20 . N33F .	x - x - - - . x - x - - - .	ST123 ST123	
			88 □ 63A 80A 115A	N40 . N60 . N80 .	x - x - - - . x - x - - - . x - x - - - .	ST123 ST123 ST123	
			132 □ 150A 250A	N100 . N200 .	x - x - - - . x - x - - - .	ST123 ST123	

Ordering example: AC21 250A panel mounting, multi step switch 3-pole without off, 12 steps **N200 E ST123**

Switching programs

Description	Wiring diagram	Switching angle	Number of cells ↓ Size ↓ AC21	Type	Design see page 6-8 E. Z. V. SMA. P. G.	Switch pro- gram	Escutcheon plate
Multi step switches 3-pole with Off ST0.3							
2 steps		60°	3	48 □ 20A 32A	M10H . x x x x x ¹⁾ - M20 . x x x x - -	. ST023 . ST023	
				64 □ 32A 50A	N20 . x - x - x x N33F . x x x - x -	. ST023 . ST023	
				88 □ 63A 80A 115A	N40 . x - x - x - N60 . x - x - x - N80 . x - x - - -	. ST023 . ST023 . ST023	
				132 □ 150A 250A	N100 . x - x - - - N200 . x - x - - -	. ST023 . ST023	
3 steps		45°	5	48 □ 20A 32A	M10H . x x x x x ¹⁾ - M20 . x x x x - -	. ST033 . ST033	
				64 □ 32A 50A	N20 . x - x - x x N33F . x - x - x -	. ST033 . ST033	
				88 □ 63A 80A 115A	N40 . x - x - x - N60 . x - x - x - N80 . x - x - - -	. ST033 . ST033 . ST033	
				132 □ 150A 250A	N100 . x - x - - - N200 . x - x - - -	. ST033 . ST033	
4 steps		30°	6	48 □ 20A 32A	M10H . x x x x - x ¹⁾ - M20 . x x x x - -	. ST043 . ST043	
				64 □ 32A 50A	N20 . x - x - x x N33F . x - x - x -	. ST043 . ST043	
				88 □ 63A 80A 115A	N40 . x - x - x - N60 . x - x - x - N80 . x - x - - -	. ST043 . ST043 . ST043	
				132 □ 150A 250A	N100 . x - x - - - N200 . x - x - - -	. ST043 . ST043	
5 steps		45°	9	48 □ 20A 32A	M10H . x x x x - - - M20 . x x x x - - -	. ST053 . ST053	
				64 □ 32A 50A	N20 . x - x - - - N33F . x - x - - -	. ST053 . ST053	
				88 □ 63A 80A 115A	N40 . x - x - - - N60 . x - x - - - N80 . x - x - - -	. ST053 . ST053 . ST053	
				132 □ 150A 250A	N100 . x - x - - - N200 . x - x - - -	. ST053 . ST053	
6 steps		45°	11	48 □ 20A 32A	M10H . x x x x - - - M20 . x x x x - - -	. ST063 . ST063	
				64 □ 32A 50A	N20 . x - x - - - N33F . x - x - - -	. ST063 . ST063	
				88 □ 63A 80A 115A	N40 . x - x - - - N60 . x - x - - - N80 . x - x - - -	. ST063 . ST063 . ST063	
				132 □ 150A 250A	N100 . x - x - - - N200 . x - x - - -	. ST063 . ST063	

Ordering example: AC21 250A panel mounting, multi step switch 3-pole with off, 6 steps

N200 E ST063

1) Plastic enclosed switches are delivered with switch type M10.

Switching programs

Description	Wiring diagram	Switching angle	Number of cells ↓ Size ↓ AC21	Type	Design see page 6-8 E. Z. V. SMA. P. G.	Switch pro- gram	Escutcheon plate
Multi step switches 3-pole with Off ST0.3							
7 steps		45°	12 48 □ 20A 32A	M10H . M20 .	x x x - - - . x x x - - - .	ST073 ST073	
			64 □ 32A 50A	N20 . N33F .	x - x - - - . x - x - - - .	ST073 ST073	
			88 □ 63A 80A 115A	N40 . N60 . N80 .	x - x - - - . x - x - - - . x - x - - - .	ST073 ST073 ST073	
			132 □ 150A 250A	N100 . N200 .	x - x - - - . x - x - - - .	ST073 ST073	
8 steps		30°	14 48 □ 20A 32A	M10H . M20 .	x - x - - - . x - x - - - .	ST083 ST083	
			64 □ 32A 50A	N20 . N33F .	x - x - - - . x - x - - - .	ST083 ST083	
			88 □ 63A 80A 115A	N40 . N60 . N80 .	x - x - - - . x - x - - - . x - x - - - .	ST083 ST083 ST083	
			132 □ 150A 250A	N100 . N200 .	x - x - - - . x - x - - - .	ST083 ST083	
9 steps		30°	15 48 □ 20A 32A	M10H . M20 .	x - x - - - . x - x - - - .	ST093 ST093	
			64 □ 32A 50A	N20 . N33F .	x - x - - - . x - x - - - .	ST093 ST093	
			88 □ 63A 80A 115A	N40 . N60 . N80 .	x - x - - - . x - x - - - . x - x - - - .	ST093 ST093 ST093	
			132 □ 150A 250A	N100 . N200 .	x - x - - - . x - x - - - .	ST093 ST093	
10 steps		30°	17 48 □ 20A 32A	M10H . M20 .	x - x - - - . x - x - - - .	ST0103 ST0103	
			64 □ 32A 50A	N20 . N33F .	x - x - - - . x - x - - - .	ST0103 ST0103	
			88 □ 63A 80A 115A	N40 . N60 . N80 .	x - x - - - . x - x - - - . x - x - - - .	ST0103 ST0103 ST0103	
			132 □ 150A 250A	N100 . N200 .	x - x - - - . x - x - - - .	ST0103 ST0103	
11 steps		30°	18 48 □ 20A 32A	M10H . M20 .	x - x - - - . x - x - - - .	ST0113 ST0113	
			64 □ 32A 50A	N20 . N33F .	x - x - - - . x - x - - - .	ST0113 ST0113	
			88 □ 63A 80A 115A	N40 . N60 . N80 .	x - x - - - . x - x - - - . x - x - - - .	ST0113 ST0113 ST0113	
			132 □ 150A 250A	N100 . N200 .	x - x - - - . x - x - - - .	ST0113 ST0113	

Ordering example: AC21 250A panel mounting, multi step switch 3-pole with off, 11 steps **N200 E ST0113**

Mini-Cam Switches M4H

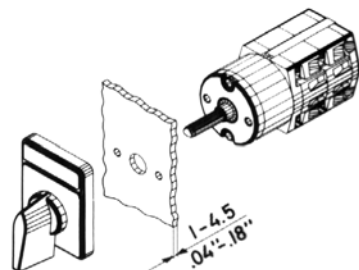
Panel mounting E, IP40



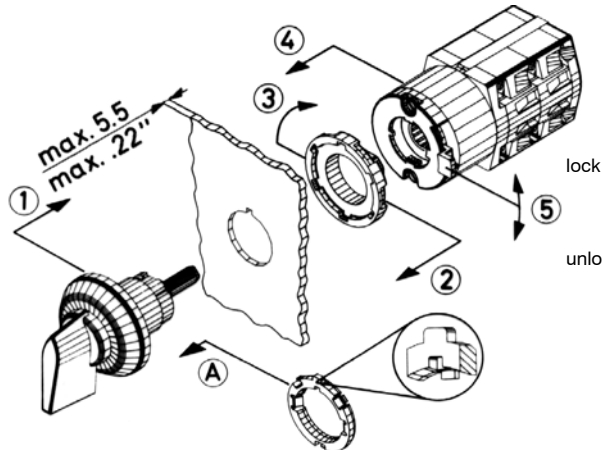
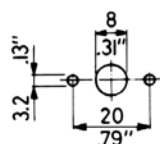
Central fixing Z



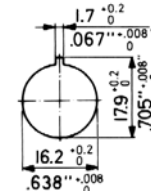
Central fixing without escutcheon plate ZO



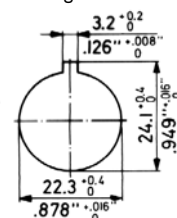
Mounting holes



Central fixing 16mm



unlock Central fixing 22mm



Single hole mountings are generally delivered for a 16mm (.64") mounting. Using the forwarded adapter ring, it is possible to alter the single hole mountings from 22mm (.88"). For that purpose the adapter ring has to be attached onto the threaded part of the body in such a manner, that

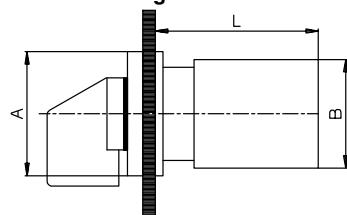
1. the flat side of the adapter ring shows towards the front seal and
2. the inner nose fits into the notch of the body.

The adapter ring has to be pushed towards the front seal.

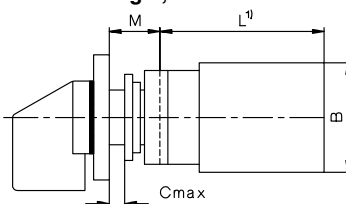
Optional extras	ordering code	for design	M4H Z ... +SRE	M4H Z ... +SA.	M4H ZO ... +SA.	M4H Z ... +SRE+SA.
Additional escutcheon plate	+SRE	E, Z, ZO				
Additional escutcheon plate	+SRE2	E, Z, ZO				
Key operated switch with lock KABA	+SA1	Z, ZO				
with lock Ronis	+SA2	Z, ZO				

Wrench J7400
for switches M4H with central fixing is necessary

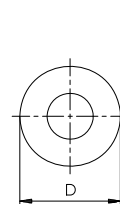
Panel mounting E



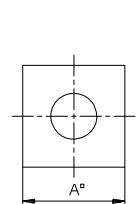
Central fixing Z, ZO



ZO



Z



Type		A	B	D	M	Dimension L for ... cells							
						1	2	3	4	5	6	7	8
M4H	mm	30	28	29.5	12.5	38.5	50.5	62.5	74.5	86.5	98.5	110.5	122.5

Technical data

Type	according to specifications	AC21A	AC15	Motor rating AC3									
		General use	110V 380V 240V 440V Pilot Duty	Volt	3 phase 3-pole	3 phase 3-pole	1 phase 2-pole	1 phase 2-pole	1 phase 2-pole	1 phase 2-pole	1 phase 2-pole	1 phase 2-pole	1 phase 2-pole
M4H	IEC, VDE, BS, SEV UL, CSA	10A/500V 10A/300V	2,5A 1,5A A300	kW HP	0,65 0,75	1,5 1	2,2 -	0,3 0,33	0,55 0,75	- 0,75	0,75 -	- -	- -

Type	according to specifications	Volt	Motor rating AC23					
			3-pole	3-pole	3-pole	2-pole	2-pole	2-pole
M4H	IEC, VDE, BS, SEV UL, CSA	kW HP	0,75 -	1,8 -	3 -	110 120	220 240	380 440

additional data for wiring according to UL and CSA

Type	type of wire	temp. rating of wire	torque value for field wiring terminals
M4H	copper wire only	60/75°C	0,6Nm / 5lb - inch

Mini-Cam Switches M4H

Switch programs

Description	Wiring diagram	AC21 500V 10A AC15 230V 2,5A AC3 4x400V 2,2kW	escutch. 30 x 30	numb. of cells	Type	Design .E. ↓ .Z. ↓ .ZO. ↓	Switch pro- gram
On-Off-switch A 1-pole 2-pole 3-pole 4-pole 6-pole				1 1 2 2 3	M4H . M4H . M4H . M4H . M4H .	x x x x x x x x x x x x x x x	. A1 . A2 . A3 . A4 . A6
Changeover switch U 1-pole 2-pole 3-pole 4-pole				1 2 3 4	M4H . M4H . M4H . M4H .	x x x x x x x x x x x x	. U1 . U2 . U3 . U4
Changeover switch without off W 1-pole 2-pole 3-pole 4-pole 6-pole				1 2 3 4 6	M4H . M4H . M4H . M4H . M4H .	x x x x x x x x x x x x x x x	. W1 . W2 . W3 . W4 . W6
Reversing switch WU 2-pole 3-pole 3-pole with spring return to 0				2 3 3	M4H . M4H . M4H .	x x x x x x x x x	. WU2 . WU3 . WU3R2
Star-delta switch SD 1 rotary direction both rotary directions				4 5	M4H . M4H .	x x x x x x	. SD . SDR
Changeover with spring return UR 1-pole 2-pole 3-pole				1 2 3	M4H . M4H . M4H .	x x x x x x x x x	. UR1 . UR2 . UR3
Start switch 1-pole				1	M4H .	x x x	. SE
Stop switch 1-pole				1	M4H .	x x x	. SA

Ordering example: Stop switch, 1-pole, Central fixing: **M4H Z SA**

Mini-Cam Switches M4H

Switch programs

Description	Wiring diagram	AC21 500V 10A AC15 230V 2,5A AC3 4x400V 2,2kW	escutch. 30 x 30	numb. of cells	Type	Design			Switch pro- gram
						.E. ↓	.Z. ↓	.ZO. ↓	
Start-Stop switch				1	M4H .	x	x	x	. SEA
Start-Stop switch position START with spring return to 1				1	M4H .	x	x	x	. S392
Start-Stop switch for reversing contactors				2	M4H .	x	x	x	. S2EA
Voltmeter selector switch V 3 line voltages			2	M4H .	x	x	x	x	. V3
3 phase voltages			2	M4H .	x	x	x	x	. V0
3 line voltages 3 phase voltages			3	M4H .	x	x	x	x	. V1
Ammeter selector switch A 1-pole, 3 current transformer			4	M4H .	x	x	x	x	. M31
Gang switch GR 2 circuits A and B 1-pole 0 - A - A+B			1	M4H .	x	x	x	x	. GR11
2 circuits A and B 1-pole 0 - A - B - A+B			1	M4H .	x	x	x	x	. GR12
3 circuits A, B and C 1-pole			2	M4H .	x	x	x	x	. GR14
Multi step switch without 0 ST 3 steps, 1-pole			2	M4H .	x	x	x	x	. ST31
3 steps, 2-pole			3	M4H .	x	x	x	x	. ST32
3 steps, 3-pole			5	M4H .	x	x	x	x	. ST33

Ordering example: Multi step switch without 0, 3 steps, 3-pole, panel mounting: **M4H E ST33**

Mini-Cam Switches M4H

Switch programs

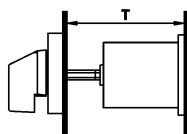
Description	Wiring diagram	AC21 500V 10A AC15 230V 2,5A AC3 4x400V 2,2kW	escutch. 30 x 30	numb. of cells	Type	Design .E. ↓ .Z. ↓ .ZO. ↓	Switch pro- gram
Multi step switch without 0 ST							
4 steps, 1-pole				2	M4H .	x x x	. ST41
4 steps, 2-pole				4	M4H .	x x x	. ST42
4 steps, 3-pole				6	M4H .	x x x	. ST43
5 steps, 1-pole				3	M4H .	x x x	. ST51
5 steps, 2-pole				5	M4H .	x x x	. ST52
6 steps, 1-pole				3	M4H .	x x x	. ST61
6 steps, 2-pole				6	M4H .	x x x	. ST62
Multi step switch with 0 ST0.							
2 steps, 1-pole				1	M4H .	x x x	. ST021
2 steps, 2-pole				2	M4H .	x x x	. ST022
2 steps, 3-pole				3	M4H .	x x x	. ST023
3 steps, 1-pole				2	M4H .	x x x	. ST031
3 steps, 2-pole				3	M4H .	x x x	. ST032
3 steps, 3-pole				5	M4H .	x x x	. ST033
4 steps, 1-pole				2	M4H .	x x x	. ST041
4 steps, 2-pole				4	M4H .	x x x	. ST042
4 steps, 3-pole				6	M4H .	x x x	. ST043
5 steps, 1-pole				3	M4H .	x x x	. ST051
5 steps, 2-pole				5	M4H .	x x x	. ST052
6 steps, 1-pole				4	M4H .	x x x	. ST061
7 steps, 1-pole				4	M4H .	x x x	. ST071
8 steps, 1-pole				5	M4H .	x x x	. ST081
9 steps, 1-pole				5	M4H .	x x x	. ST091
10 steps, 1-pole				6	M4H .	x x x	. ST0101

Ordering example: Multi step switch with 0, 10 steps, 1-pole, Central fixing without escutcheon plate: **M4H ZO ST0101**

Load Switches for resistive or slightly inductive loads or switching without load

Description	Wiring diagram	Switching angle	Number of cells ↓ Size ↓ AC21	Type	Design .E. .V. ↓ ↓	Switch pro- gram	Escutcheon plate
On-Off-switches A							
1-pole		60°	2 88 □ 125A 1 180A 1 132 □ 400A 3 600A 2 800A 3 1200A	L100 . L160 . L400 . L600 . L800 . L1200 .	x x x x x x x x x x x x	. A1 . A1 . A1 . A1 . A1 . A1	
2-pole		60°	2 88 □ 125A 2 180A 2 132 □ 400A 3 600A 4 800A 6 1200A	L100 . L160 . L400 . L600 . L800 . L1200 .	x x x x x x x x x x x x	. A2 . A2 . A2 . A2 . A2 . A2	
3-pole		60°	4 88 □ 125A 3 180A 3 132 □ 400A 6 600A 6 800A 9 1200A	L100 . L160 . L400 . L600 . L800 . L1200 .	x x x x x x x x x x x x	. A3 . A3 . A3 . A3 . A3 . A3	
4-pole 4. pole early make		60°	4 88 □ 125A 4 180A 4 132 □ 400A 6 600A 8 800A 12 1200A	L100 . L160 . L400 . L600 . L800 . L1200 .	x x x x x x x x x x x x	. A4 . A4 . A4 . A4 . A4 . A4	
6-pole		60°	6 88 □ 125A 6 180A 6 132 □ 400A 9 600A 12 800A 18 1200A	L100 . L160 . L400 . L600 . L800 . L1200 .	x x x x x x x x x x x x	. A6 . A6 . A6 . A6 . A6 . A6	

For switches with the design **V..** it is necessary to state the installation depth - that is, the distance between mounting level of the switch and the inside edge of the door (dimension T).



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Load Switches for resistive or slightly inductive loads or switching without load

Description	Wiring diagram	Switching angle	Number of cells ↓ Size ↓ AC21	Type	Design .E. .V. ↓ ↓	Switch pro- gram	Escutcheon plate
Changeover switches U							
1-pole		60°	2 88 □ 125A	L100 .	x x	. U1	
			2 180A	L160 .	x x	. U1	
			2 132□ 400A	L400 .	x x	. U1	
			3 600A	L600 .	x x	. U1	
			4 800A	L800 .	x x	. U1	
6 1200A	L1200 .	x x	. U1				
2-pole		60°	4 88 □ 125A	L100 .	x x	. U2	
			4 180A	L160 .	x x	. U2	
			4 132□ 400A	L400 .	x x	. U2	
			6 600A	L600 .	x x	. U2	
			8 800A	L800 .	x x	. U2	
12 1200A	L1200 .	x x	. U2				
3-pole		60°	6 88 □ 125A	L100 .	x x	. U3	
			6 180A	L160 .	x x	. U3	
			6 132□ 400A	L400 .	x x	. U3	
			9 600A	L600 .	x x	. U3	
			12 800A	L800 .	x x	. U3	
18 1200A	L1200 .	x x	. U3				
4-pole 4. pole early make		60°	8 88 □ 125A	L100 .	x x	. U4	
			8 180A	L160 .	x x	. U4	
			8 132□ 400A	L400 .	x x	. U4	
			12 600A	L600 .	x x	. U4	
			16 800A	L800 .	x x	. U4	
24 1200A	L1200 .	x x	. U4				
Changeover switches without off W							
1-pole		60°	2 88 □ 125A	L100 .	x x	. W1	
			2 180A	L160 .	x x	. W1	
			2 132□ 400A	L400 .	x x	. W1	
			3 600A	L600 .	x x	. W1	
			4 800A	L800 .	x x	. W1	
6 1200A	L1200 .	x x	. W1				
2-pole		60°	4 88 □ 125A	L100 .	x x	. W2	
			4 180A	L160 .	x x	. W2	
			4 132□ 400A	L400 .	x x	. W2	
			6 600A	L600 .	x x	. W2	
			8 800A	L800 .	x x	. W2	
12 1200A	L1200 .	x x	. W2				
3-pole		60°	6 88 □ 125A	L100 .	x x	. W3	
			6 180A	L160 .	x x	. W3	
			6 132□ 400A	L400 .	x x	. W3	
			9 600A	L600 .	x x	. W3	
			12 800A	L800 .	x x	. W3	
18 1200A	L1200 .	x x	. W3				
4-pole 4. pole early make		60°	8 88 □ 125A	L100 .	x x	. W4	
			8 180A	L160 .	x x	. W4	
			8 132□ 400A	L400 .	x x	. W4	
			12 600A	L600 .	x x	. W4	
			16 800A	L800 .	x x	. W4	
24 1200A	L1200 .	x x	. W4				

Ordering example: AC1 1200A panel mounting, changeover switch without off 4-pole **L1200 E W4**

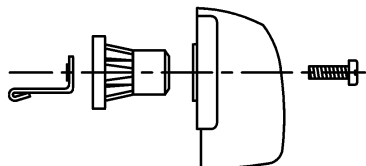
Operating Knobs and Handles

Types of handles

In the standard version, the switches are supplied with a black twist knob or instrument knob (M10H - N33F), except for design SMA, which has a grey toggle knob. Switches of size L, which consist of 2 or 3 switch columns, come with a black hand wheel. If required, the switch can be supplied with other knobs, which can later easily be exchanged.

All operating knobs have an insert, which sets the position of the knob in relation to the switch shaft. This insert can be mounted in 8 different positions (at intervals of 45°), causing the angle of each individual switch setting to be rotated by 45°.

In the standard version, the switch terminals are positioned left and right (except M10H). When the knob insert is turned by 90°, the lay-out of the terminals changes to top and bottom.



All operating knobs can be moved on the hexagonal shaft, to permit adaptation to different sheet thicknesses, etc.

Type	M10 M10H M20	N20 N33F	N40 N60 N80 L100 L160	N100 N200 L400 L600 L800 L1200
Knob movement mm	5	5	7	9
Hexagonal shaft dimension mm	5	7	9	12

Ordering example: Cam switch N60 V U3 with ball type handle red

Order type: **N60 V U3 +B3**

Dimensions see page 261



Knobs and handles Description	Colour	Ordering Code	M10 M10H M20	N20 N33F	N40 N60 N80 L100 L160	N100 N200 L400 L600 L800 L1200
Instrument knob Standard for M10 to N80	grey black red white	+G1 +G2 +G3 +G5	X X X X	X X X X	X	
Twist knob Standard for N100 and N200	grey black red white yellow	+R1 +R2 +R3 +R5 +R7	X X X X X	X X X X X	X X X X X	X X X
Toggle knob	grey black red white blue	+K1 +K2 +K3 +K5 +K6	X X X X X	X X X X		
Ball type handle	grey black red	+B1 +B2 +B3		X X X	X X X	X X X
Hand wheel	black	+HR				X

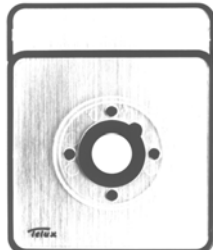
Escutcheon Plates

TELUX-Cam Switches in designs E, V, P, PF, SM, UP, Z and KE are supplied with a square escutcheon plate consisting of a black frame and plexi insert plate. The markings are printed in black are on the back of the insert plate. To protect the markings so that they remain easy to read, the back of the insert plate is lined with silver foil. In addition, rectangular plates can be provided for all switch sizes, which can fitted on all switches after mounting.

Square plate



Rectangular plate
(with square plate)



TELUX-Cam Switches in design SMA, for distribution boards with 45mm inside edge of installation cover, is supplied with a grey cover and black markings.



Special engraved markings on escutcheon plates are limited by the available space. In the case of relatively large production runs or frequent use of the text, we recommend ordering of a printing block. This will be invoiced at cost price, and the engraving will not be charged for. This investment generally pays with batches from 50 pieces upwards.

The "escutcheon plate" column of the selection and ordering tables for switch programs indicates the standard plate and, in some cases, an additional plate that is often used for the programs in question. If such a plate, listed in the selection table, is desired, the appropriate code number should be stated when ordering a switch and switch program.

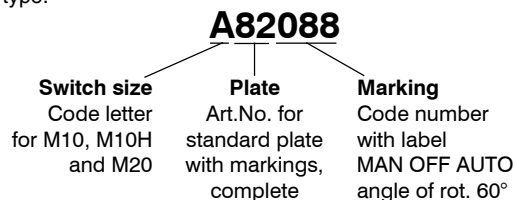
Should only **plates** or **parts** of the latter be ordered, the order type is assembled as shown by the following example.

Code letter of switch sizes

M10, M10H, M20	A
N20, N33F	E
N40, N60, N80, L100, L160	H
N100, N200, L400, L600, L800, L1200	L

Ordering example: Escutcheon plate silver, complete, for cam switch M10, marked with MAN OFF AUTO, angle of rotation 60°

Order type:



However, if a **switch** with non-standard lettering is required, only three-digit code number for the marking need be added to the order type (see next page).

Dimensions see page 261

Description	Order type Switch size Code letter	Plate Art.No.	Marking Code number
Escutcheon plate for designs E, V, P., Z, SM, KE and UP Escutcheon frame black, plexi insert plate silver, markings black			
Escutcheon plate complete silver	A E H L	.82...	... (see pp. 238-240)
Escutcheon plate complete yellow	A E H L	.90...	... (see pp. 238-240)
Plexi insert plate silver	A E H L	.85...	... (see pp. 238-240)
Plexi insert plate yellow	A E H L	.80...	... (see pp. 238-240)
Escutcheon frame black	A E H L	.8203	-
Rectangular escutcheon plate for designs E, V, Z and SM Escutcheon frame black, plexi insert plate silver, markings black			
Rectangular additional escutcheon plate complete silver	A E H L	.865..	... (see pp. 238-240)
Rectangular additional escutcheon plate complete yellow	A E H L	.915..	... (see pp. 238-240)
Plexi insert plate silver	A E H L	.885..	... (see pp. 238-240)
Plexi insert plate yellow	A E H L	.895..	... (see pp. 238-240)
Escutcheon frame black	A E H L	.8503	-
Installation cover for design SMA grey cover , markings black	A - - -	.68...	... (see page 240)

Escutcheon Plates

Selected standard markings

The markings that are most commonly required are shown below, together with code letters for the switch size and the code number.

Ordering example: Switch type M10H E A3 with escutcheon plate "OFF ON" and additional rectangular escutcheon plate "PUMP"

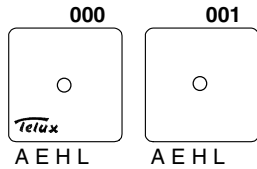
Order type: **M10H E A3 +003 +516**

Code letter of switch sizes

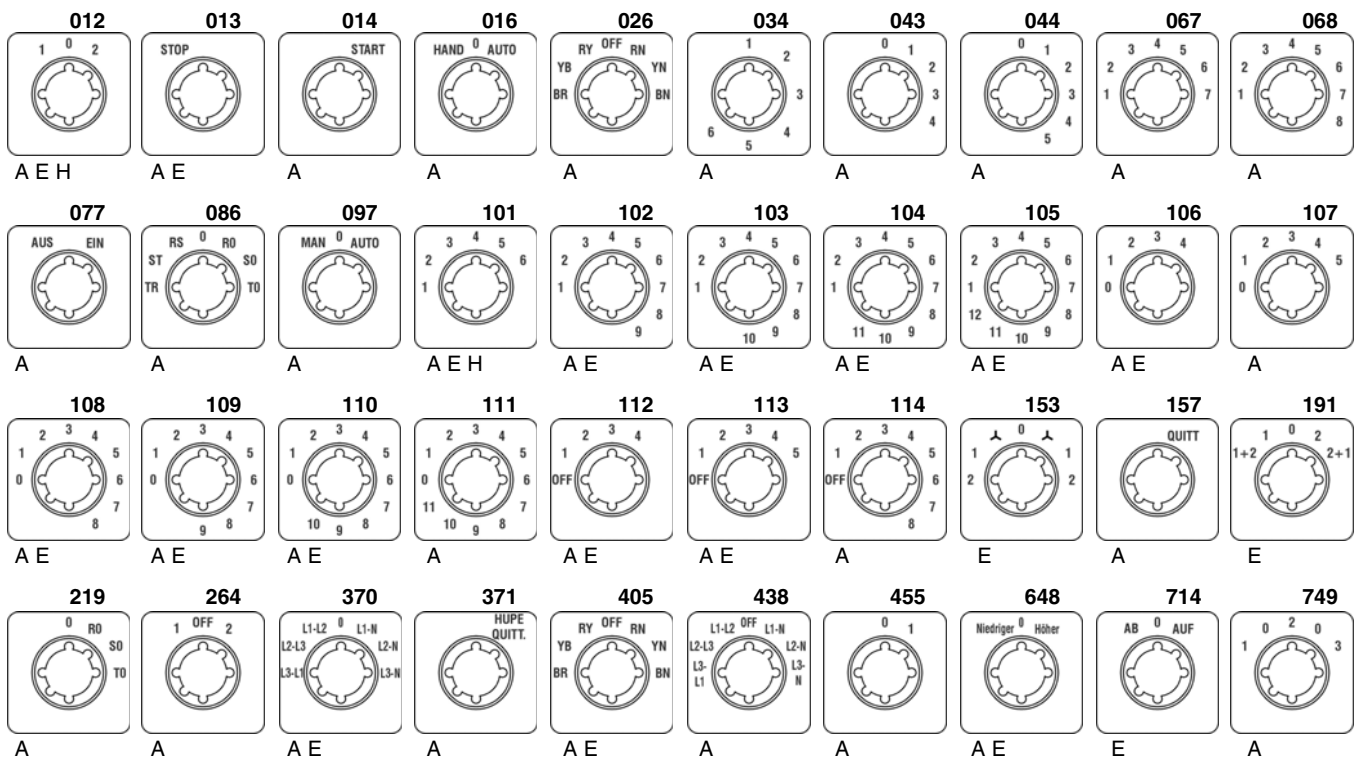
M10, M10H, M20
N20, N33F
N40, N60, N80, L100, L160
N100, N200, L400, L600, L800, L1200

A
E
H
L

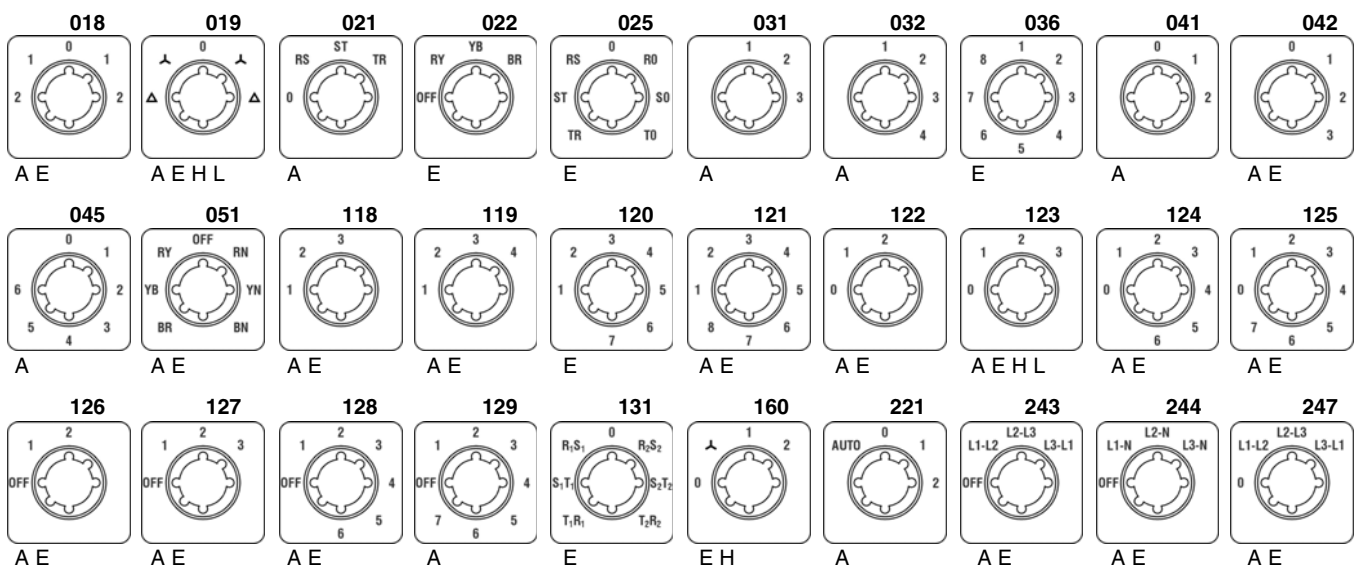
Blank escutcheon plates



Switching angle 30°

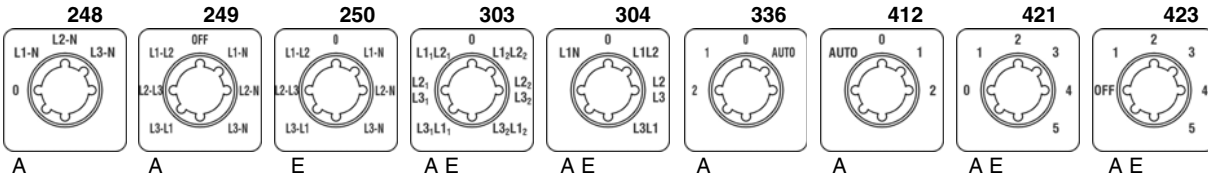


Switching angle 45°

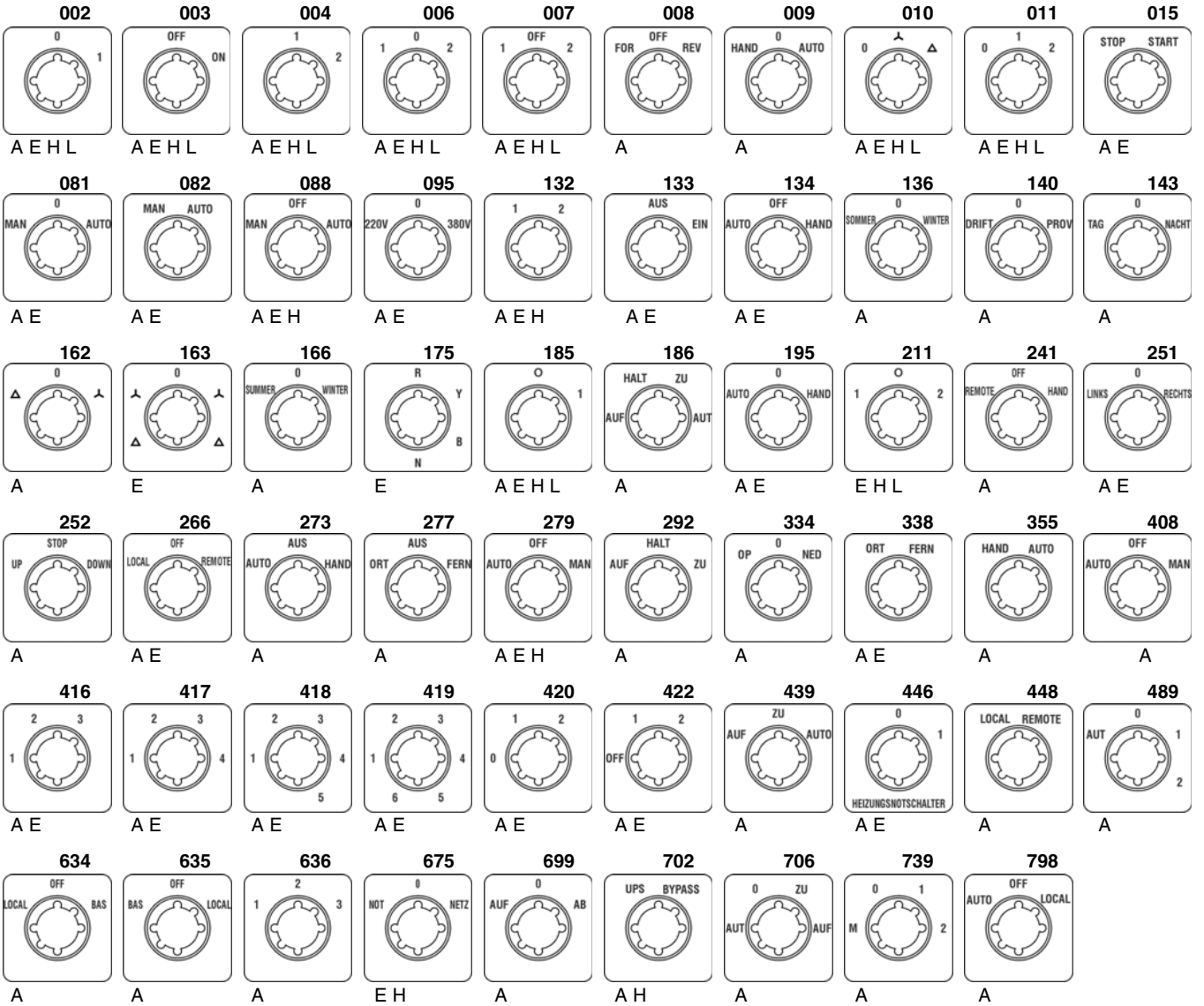


Escutcheon Plates

Switching angle 45°

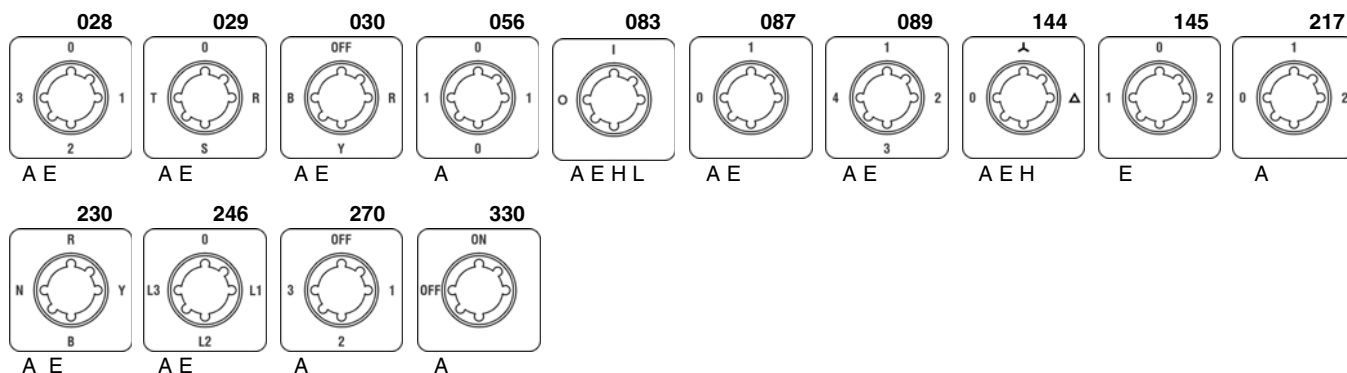


Switching angle 60°

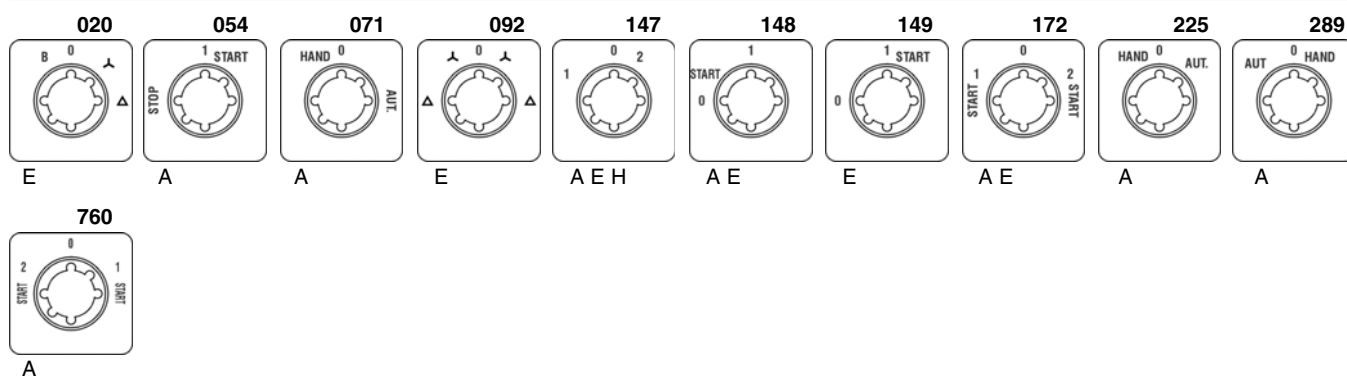


Escutcheon Plates

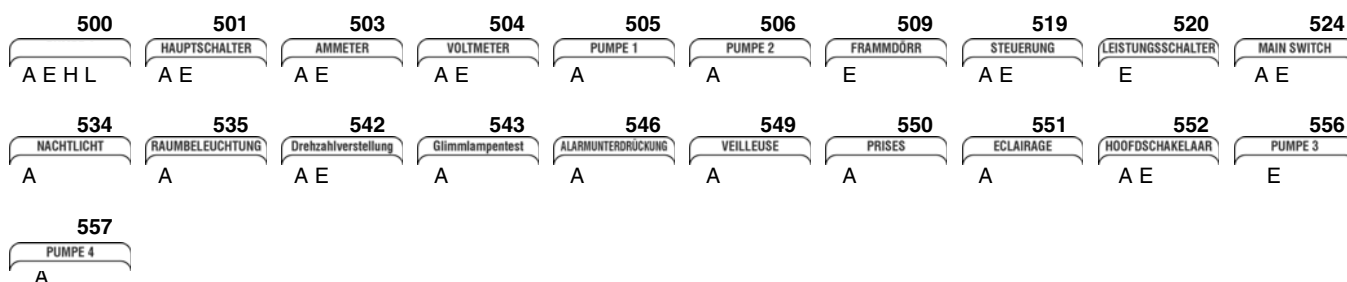
Switching angle 90°



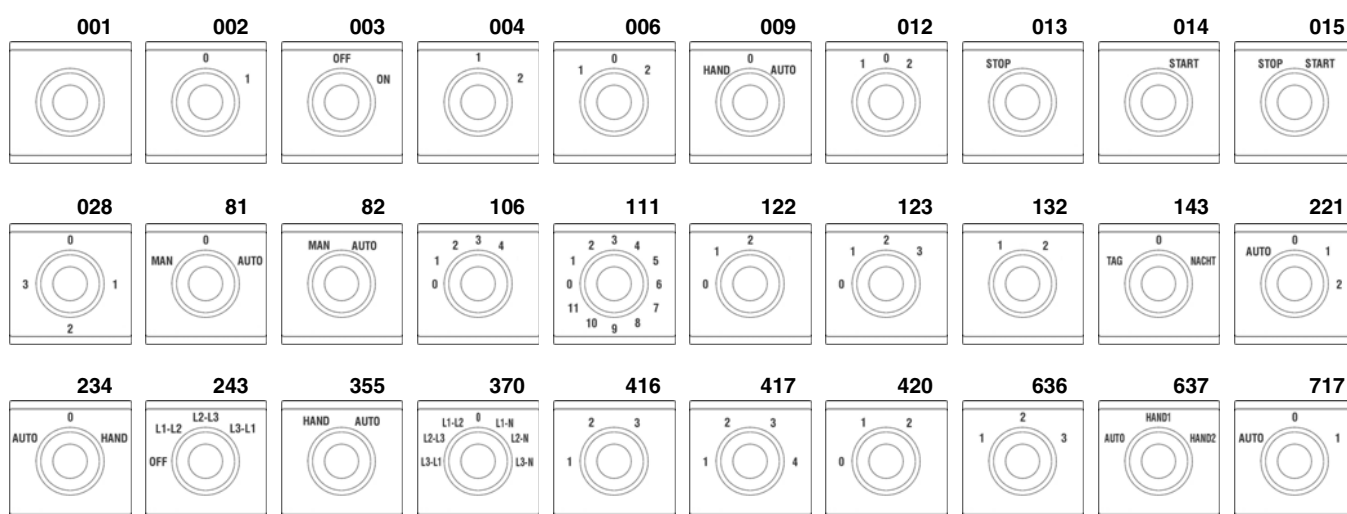
Miscellaneous



Rectangular additional escutcheon plates



Covers for design SMA



Switching angles

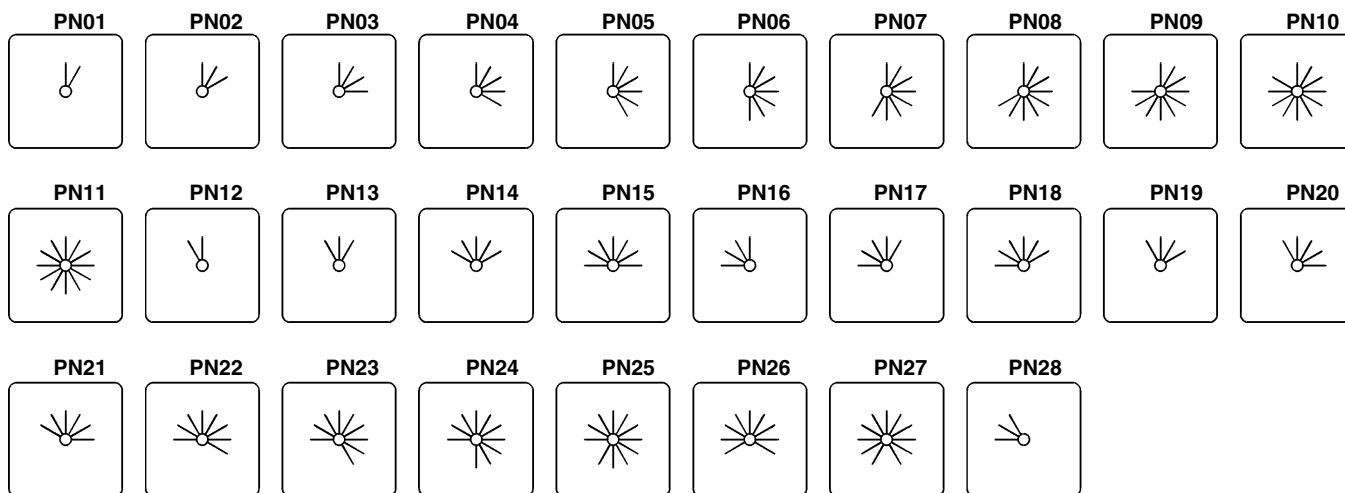
Arrangement of switch settings

All feasible arrangements of switch settings are shown, and defined by position numbers, in the following tables. Not only the switching angles, but also switches with latched or momentary settings, or combinations of the two, are distinguished from one another.

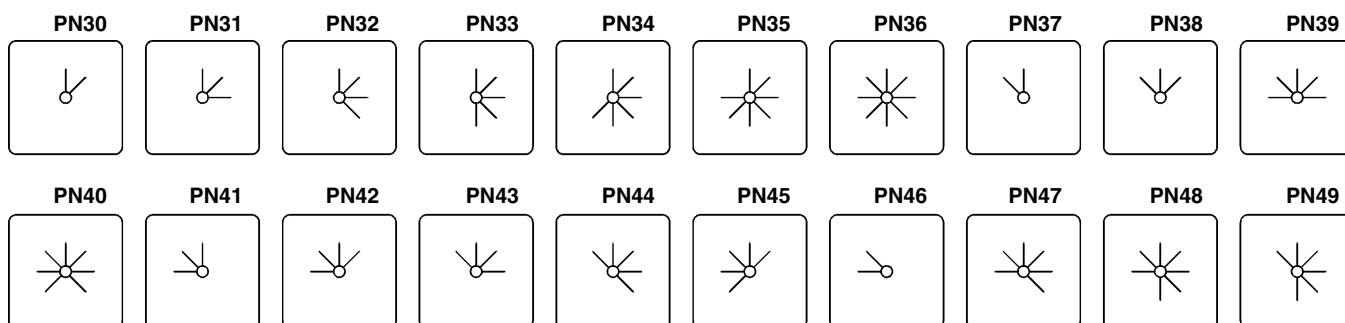
Knowledge of the following variations is particularly important when planning special switches. It is necessary to state the position number when ordering special switches, as the cheapest version will otherwise be selected.

All the switches types listed can be supplied with switching angles other than those indicated, provided that they are permitted by the switch program (additional charge).

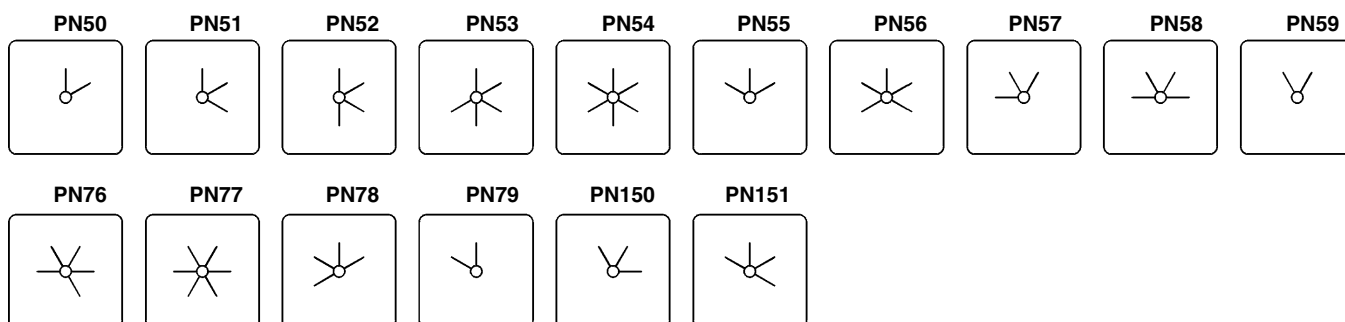
Switching angle 30°



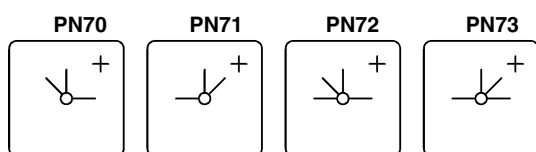
Switching angle 45°



Switching angle 60°



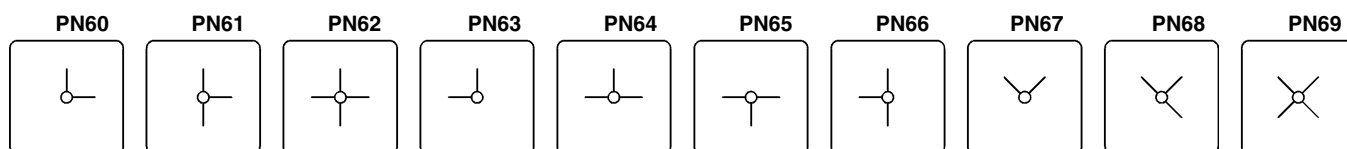
Switching angle 45/90°



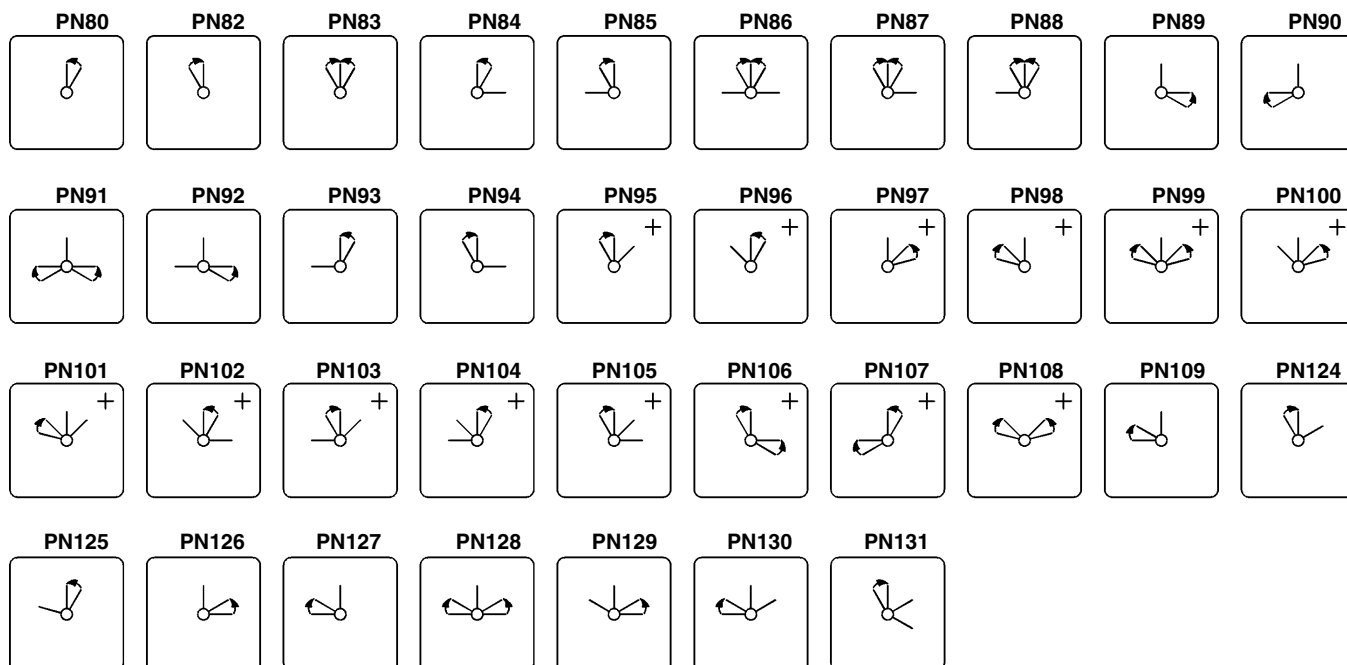
+) Not available for switch types M10, M10H and M20

Switching angles

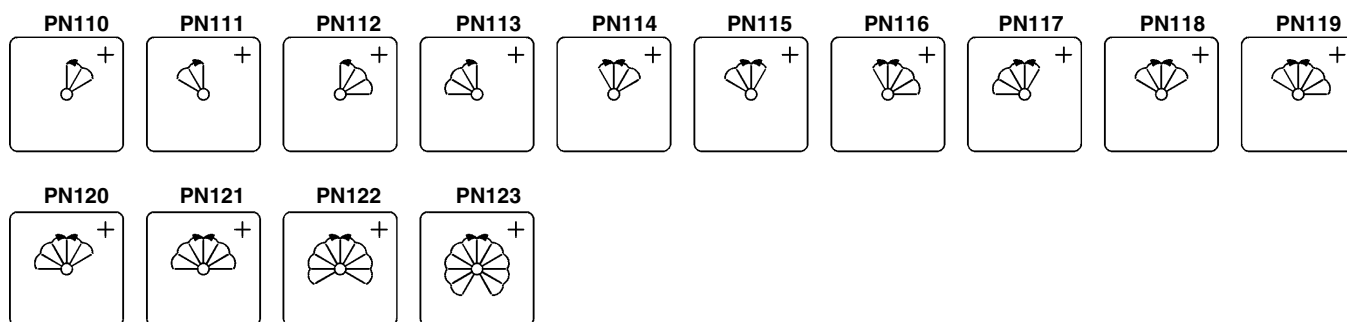
Switching angle 90°



Momentary settings and special combinations



Spring return over several settings



+) Not available for switch types M10, M10H and M20

Handles and drive units

Special actuating mechanisms and ancillary attachments can be provided for many switch sizes and designs. Here, the switch type is followed by order code for the ancillary attachment.

Ordering example: Cam switch N20 GF W3R with removable knob
Order type: **N20 E W3R +STGR**

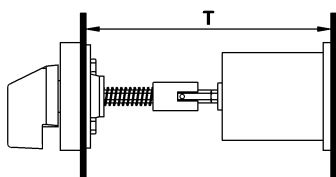
Dimensions see page 262



	Ordering Code	Suitable for designs	Suitable for switch type
Removable knob drive The operating knob is designed to be removable, and can be withdrawn in any setting. The switch shaft is covered when the knob is withdrawn.	+STGR	E P	M10H, M20, N20, N33F M10, N20, N33F
Removable knob drive 2 The operating knob is designed to be removable. It can be withdrawn in one setting, to be stated when ordering.	+STGR2	E P	M10H, M20, N20, N33F M10, N20, N33F

Door couplings

For switches with door couplings it is necessary to state the installation depth - that is, the distance between mounting level of the switch and the inside edge of the door (dimension T).



Door couplings are available for switches to be installed in switchgear cabinets or distribution boards with hinged doors. These permit the doors to be opened without removal of the operating knobs.

Ordering example: Cam switch N100 V A3 with lockable door coupling, moisture protected IP65, dimension T=580mm
Order type: **N100 V A3 +TK2FR/580**

Dimensions see page 263



	Ordering Code	Suitable for designs	Suitable for switch type
Door coupling Protection class from front: IP65 5-hole mounting	+TKE/...	V, SM	M10H, M20, N20, N33F
Door coupling locked Protection class from front: IP65 5-hole mounting Doors only open at a given switch setting: unless otherwise stated, the "OFF" setting.	+TK2E/...	V, SM	M10H, M20, N20, N33F
Door coupling locked Protection class from front: IP65 Central fixing Ø22mm Doors only open at a given switch setting: unless otherwise stated, the "OFF" setting.	+TK2Z/...	V, SM	M10H, M20, N20, N33F
Door coupling Protection class from front: IP40 5-hole mounting	+TK/...	V	N40, N60, N80, N100, N200 L100, L160, L400, L600 L800
Door coupling Protection class from front: IP54 5-hole mounting	+TKFR/...	V	N40, N60, N80, N100, N200 L100, L160, L400, L600 L800
Door coupling locked Protection class from front: IP40 5-hole mounting Doors only open at a given switch setting: unless otherwise stated, the "OFF" setting.	+TK2/...	V	N40, N60, N80, N100, N200 L100, L160, L400, L600 L800
Door coupling locked Protection class from front: IP54 5-hole mounting Doors only open at a given switch setting: unless otherwise stated, the "OFF" setting.	+TK2FR/...	V	N40, N60, N80, N100, N200 L100, L160, L400, L600 L800

Lockable switches

Key-operated and lockable switches are supplied with two keys. Additional keys or other types of lock on request.

Ordering example: Cam switch N20 E A3 key operated
Order type: **N20 E A3 +SA**

Dimensions see page 264 and 265



	Ordering Code	Suitable for designs	Suitable for switch type
Key operated switch Lock Willenhal FT101, key removable in all lockable settings. Other types of lock on request. Maximum number of cells M10 - N33F: 6 N40, N60: 2 Key operated switch, key removable only in some settings. Add letter of setting where key is removable to ordering code according to the scetch below.	+SA +SA/.	E, V, SM E, V P SMA UP	M10H, M20, N20, N33F N40, N60 M10, N20, N33F, N40, N60 M10H, M20 M10
Key operated switch IP65 Lock Ronis R455, key removable in all lockable settings. Key operated switch, key removable only in some settings. Add letter of setting where key is removable to ordering code according to the scetch above.	+SA +SA/.	Z, ZO	M10H, M20
Key operated switch Lock KABA8, key removable in all lockable settings. Key operated switch, key removable only in some settings. Add letter of setting where key is removable to ordering code according the scetch below.	+SAK +SAK/.	E	M10H, M20
Key operated switch with barrel for special security functions Lock EVVA EHZ50/5 Nickel matt Special version which prevents not only switching but also access to the cable ends and removal of the switch when locked. Maximum number of cells Design E, P: 4 Design UP : 3	+SASI	E P UP	M10H, M20 M10, M20 M10, M20
Key operated switch for special security functions without lock for use of lock EVVA EHZ50/5 or with same dimensions Maximum number of cells Design E, P: 4 Design UP : 3	+SASO	E P UP	M10H, M20 M10, M20 M10, M20

Padlock devices

A range of padlock devices designed to prevent from being turned on by unauthorized personnel, or during maintenance and repair work, can be supplied.

Dimensions see page 266

Ordering example: Cam switch N33F E A3 with interlocking device SV3 suitable for 3 padlocks

Order type: **N33F E A3 +SV3**

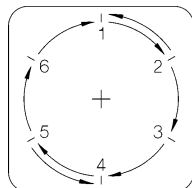
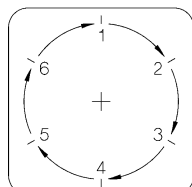
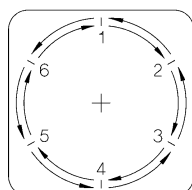
	Padlock device Description	Ordering Code	Suitable for designs	Suitable for switch type
	Padlock device Standard version black , otherwise red , for 1 or 2 padlocks. Shackles up to Ø6mm	+SV1 +SV1R	E, V, SM P, PF	M10H, M20 M10
	Standard version black 64 x 64mm, otherwise red 64 x 64mm	+SV164 +SV164R	E, V P, PF	M10H, N20, N33F N20, N33F
	Padlock device Standard version black , otherwise yellow insert plate and red twist knob for 1-3 padlocks. Shackles up to Ø8,5mm Prior to insertion of the first padlock, a red locking ledge must be depressed. This indicates that the switch is locked.	+SV3 +SV3R	E, V E, V E, V PF	N40, N60, N80, L100, L160 N100, N200, L400, L600, L800, L1200 N40, N60, N80, N100, N200
	Padlock device Standard base grey , locking ring black , or with yellow base and red locking ring. Locking ring for 1-3 padlocks. Shackles up to Ø6mm	+SV4 +SV4R	E, V SM P, PF	M10H, N20, N33F M10H, N20, N33F N20, N33F
	Standard base grey , locking ring black 88 x 88mm, or with yellow base and red locking ring 88 x 88mm	+SV488 +SV488R	E, V E, V P, PF	N20, N33F N40, N60, N80 N40, N60, N80
	Key lock device With a cylinder lock in the lock attach- ment, one or more switch settings are lockable (state when ordering). The operating knob can only be turned when unlocked. The key can be withdrawn wheter locked or unlocked. Special versions, in which the key can- not be withdrawn when in some (unlok- kable) settings can be supplied.	+SZ	E, V SM	alle M10H, M20, N20, N33F
	Key lock device Special version for on-off switches, in which it is possible to switch off without a key.	+SZ2	E, V SM	alle M10H, M20, N20, N33F

Switch interlocks

A wide range of locks and interlocking devices, designed to prevent accidental or hazardous switching, can be supplied.

Ordering example: Cam switch N20 E A3 with push button switch lock
Order type: **N20 E A3 +DV**

Dimensions see page 267



Description	Ordering Code	Suitable for designs	Suitable for switch type
Push button interlock The switch can only be actuated when the pushbutton is simultaneously depressed (two-handed operation).	+DV	E, V	all
Interlock with electrical contact The switch can only be actuated when the pushbutton, which also operates a make and break contact, is actuated (for external interlocking devices or safety measures).	+ET	E, V	all
Magnetic interlock The switch can only be actuated when an electromagnet is simultaneously excited. When ordering, voltage and percentage duty cycle of the magnet coil should be stated.	+MV	E	N20, N33F, N40, N60, N80 N100, N200
Circular switch Switches that have the maximum number of settings for a given switching angle can be made without a stop position, permitting direct switching from the last to the first setting.	+RU	all	all
Backswitch 1 Special version of the circular switch, in which the switch can only be turned in one direction.	+RS1	all	all
Backswitch 2 Special version of the circular switch, in which, in given positions, the switch can only be operated in one direction.	+RS2	all	all

Couplings and stop mechanism

A range of couplings and stop mechanisms for trouble-free operation of switches with a very large number of contacts can be supplied.

Dimension see page 268

Ordering example: Cam switch N200 V ST0113 spread over three columns interconnected by gears

Order type: **N200 V ST0113 +ZK3**

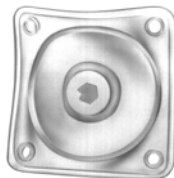


Description	Ordering Code	Suitable for designs	Suitable for switch type
Coupling of two columns For simultaneous drive of two switch columns (with very large number of switch cells or limited installation depth).	+ZK2	E, V	all
Coupling of three columns For simultaneous drive of three switch columns.	+ZK3	E, V	all
Coupling of different switch sizes For attachment of control switches (auxiliary contacts) to larger switches. M10H, M20 in sizes E and H. N20 to N80 in size L.	+ZWK	E	N40, N60, N80, L100, L160 N100, N200, L400, L600, L800, L1200
Delayed action switch Using a delayed action coupling, two switch shafts - a main shaft and delayed shaft - can be coupled, such that the delayed shaft is rotated together with the main shaft once a given angle of rotation is reached (e.g. for off-load return of switches used with pole-changing motors).	+SK	E, V G, GF	N20, N33F, N40, N60, N80 N20
Second stop mechanism With switches in which a large number of contacts is simultaneously operated, use of a second stop mechanism is sometimes necessary, in order to ensure precise switching to the next setting.	+RW2	all	all
Metal stop mechanism for extreme mechanical stress on the stop mechanism, e.g. where many contacts are switched at the same time. Not for PN110 to PN123	+MRW	E, V E, V E, V G, GF	N40, N60, N80, L100, L160 N100, N200, L400, L600, L800, L1200 N20

Special versions

A number of special versions can be supplied for adaptation of switches to various conditions of use.

Ordering example: Cam switch M10H E U3 with large front plate
Order type: **M10H E U3 +GFP**



Description	Ordering Code	Suitable for designs	Suitable for switch type
Switch shaft sealing For increased front protection class on IP54.	+WD	E, V SM	N20 to L1200 N20, N33F
Front plate/switch shaft sealing For increased front protection class on IP65. In this version, a wider hole is required for the shaft. Dimensions see page 268	+FPWD	E, V, SM	N20, N33F
Extended switch shaft For adaptation of switch designs V and SM to the enclosure depth. State additional shaft length when ordering.	+VW/...	E, V SM	all M10H, M20, N20, N33F
Large front plate Switch with front plate and operating knob of the next size (for replacement of older, larger switches or aesthetic reasons).	+GFP	E, V, SM	M10H, N20, N33F
Switch with pilot lamp lamp red, 230V lamp red, 400V lamp green, 230V lamp green, 400V	+SLR/230 +SLR/400 +SLG/230 +SLG/400	E P UP	all M10, N20, N33F, N40, N60 M10, N20
Gold plated contacts For electronic circuits with low voltages and currents.	+GK	all	M10H, M20, N20, N33F
Tropical proof type	+TR	all	all
Neon safety switch For all-pole switching off of neon advertisement circuits by the Fire Brigade. Dimensions see page 268	+FEU	E	N20, N33F



Accessories

A number of special versions can be supplied for adaptation of switches to various conditions of use.

Dimensions see page 267

Ordering example: Cam switch N20 E A3 with terminal cover plate
Order type: **N20 E A3 +KLAD**

Description	Ordering Code	Suitable for designs	Suitable for switch type
Terminal cover plate Prevents accidental touching of live terminals (requirement for main switches according to VDE 0113) only for 2 cells for all cells	+KLAD +KLAD	E, V E, V	N20, N40, N60, N80 N100, N200 N33F
Moisture proofing caps Protection class from rear: IP54. For protection of the switch from dust and moisture (e.g. when installed in machine pedestals). For switch mounting from the front and rear. Conical cable entry glands. Maximum number of cells: M10H 7 N20 5 N40 4 N60 2	+FR	E	M10H, N20, N40, N60
Angled terminals For easy connection of inaccessible switches. Unless otherwise stated, all terminals specified with markings are equipped in this manner. A distinction is drawn between left and right angled terminals. Seen from the switch end, the left terminals are located above left and below right; conversely, right terminals are above right and below left.	+WK	E, V	M20, N20, N40, N60, N80, N100
Fast-on connectors For 6,3 x 0,8mm plugs.	+AMPZ	E, V	M20, N20
Earth terminals 2 terminals, connected with one another, insulated from switch column: for earth conductors.	+PE	E, V, P, PF PF G, GF	all M10, N20, N33F, N40, N60 N80, N100, N200 N20
Additional rectangular escutcheon plate 1 line Dimensions see page 261	SRE	E, Z, V, SM	all
Big additional rectangular escutcheon plate for 2 lines Dimensions see page 261	SRE2	E, V	M10H, M20, N20, N33F
Spare key for key operated switches with Lock Willenhal FT101	J7101	E, V, P SMA	M10H, M20, N20, N33F, N40 M10H, M20
Spare key for key operated switches with Lock Ronis R455	B4-R455	Z, ZO	M10H, M20
Wrench for switches with central fixing	J7049	Z, ZO	M10H, M20



Contactors, Motor-Starter

Circuit Breakers

Manual Motor-Starters

Switches

AC-Main Switches

DC-Switch Disconnect

Push Buttons

Representatives, Suppliers

Order sheet A4 see page 269

Utilization Categories

For easier choice of devices and in order to make the comparison of different products simpler are utilization categories for cam switches according to IEC 947-3, VDE 0660 Part 107 and auxiliary contacts

according to IEC 947-5-1 and VDE 0660 Part 200 determined. The Table below offers diverse utilization categories and assorted test conditions.

Kind of current	Category		Typical applications	Rated operational current	Test conditions for the number of on-load operating cycles (normal service)						Test conditions for making and breaking capacities (operation in fault case)					
	fre-quent operation	infre-quent operation			Make I/I _e	U/U _e	cosφ	Break I _c /I _e	U _r /U _e	cosφ	Make I/I _e	U/U _e	cosφ	Break I _c /I _e	U _r /U _e	cosφ
Alternating Current	AC20A	AC20B	No-load conditions	all values	-	-	-	-	-	-	-	-	-	-	-	-
	AC21A	AC21B	Switching of resistive loads including moderate overloads	all values	1	1	0,95	1	1	0,95	1,5	1,05	0,95	1,5	1,05	0,95
	AC22A	AC22B	Switching of mixed resistive and inductive loads including moderate overloads	all values	1	1	0,8	1	1	0,8	3	1,05	0,65	3	1,05	0,65
	AC23A	AC23B	Switching of motor loads or other highly inductive loads	0<I _e ≤100A all values 100A<I _e	1	1	0,65	1	1	0,65	10 10	1,05 1,05	0,45 0,35	8 8	1,05 1,05	0,45 0,35
	AC2		Slip-ring motors: Starting, plugging	all values	2,5	1	0,65	2,5	1	0,65	4	1,05	0,65	4	1,05	0,65
	AC3		Squirrel-cage motors: Starting, switching off motors during running	0<I _e ≤100A all values 100A<I _e	I _e ≤17A 6 1 I _e >17A	0,65 0,35	I _e ≤17A 1 0,17 I _e >17A	0,65 0,35	10	1,05	0,45 0,35	8	1,05	0,45 0,35		
	AC4		Squirrel-cage motors: Starting, plugging, inching	0<I _e ≤100A all values 100A<I _e	I _e ≤17A 6 1 I _e >17A	0,65 0,35	I _e ≤17A 6 1 I _e >17A	0,65 0,35	12	1,05	0,45 0,35	10	1,05	0,45 0,35		
	AC15		Control of electromagnetic loads (> 72VA)	-	10	1	0,7	1	1	0,4	10	1,1	0,3	10	1,1	0,3
					I/I _e	U/U _e	L/R ¹⁾	I _c /I _e	U _r /U _e	L/R ¹⁾	I/I _e	U/U _e	L/R ¹⁾	I _c /I _e	U _r /U _e	L/R ¹⁾
Direct current	DC20A	DC20B	No-load conditions	all values	-	-	-	-	-	-	-	-	-	-	-	-
	DC21A	DC21B	Switching of resistive loads including moderate overloads	all values	1	1	1	1	1	1	1,5	1,05	1	1,5	1,05	1
	DC22A	DC22B	Switching of mixed resistive a. induct. loads incl. moderate overloads (shunt motors)	all values	1	1	2	1	1	2	4	1,05	2,5	4	1,05	2,5
	DC23A	DC23B	Switching of highly inductive loads (e.g. series motors)	all values	1	1	7,5	1	1	7,5	4	1,05	15	4	1,05	15
	DC3		Shunt-motors: Starting, plugging, inching	all values	2,5	1	2	2,5	1	2	4	1,05	2,5	4	1,05	2,5
	DC5		Series-motors: Starting, plugging, inching	all values	2,5	1	7,5	2,5	1	7,5	4	1,05	15	4	1,05	15

U_e Rated operational voltage, U Voltage before make, U_r Recovery voltage, I_e Rated operational current, I Current made, I_c Current broken
1) Time in milliseconds (ms)

Note:
By plugging, is understood stopping or reversing the motor rapidly by reversing motor primary connections while the motor is running.
By inching (jogging), is understood energizing a motor once or repeatedly for short periods to obtain small movements of the driven mechanism.

Technical Data

Data according to IEC 947-3, IEC 947-5-1, VDE 0660, EN 60947-3, EN 60947-5-1

Type	M10 P	M10H	M20	N20	N33F	N40	N60	N80	N100	N200
Rated therm. current I_{th} open A	20	20	32	32	50	63	85	115	150	250
Rated therm. current I_{the} encl. A	20	20	32	32	50	63	85	115	150	250
Rated operational voltage U_e V	440	690 ¹⁾	690 ¹⁾	690 ¹⁾	690 ¹⁾	690 ¹⁾	690 ¹⁾	690 ¹⁾	690 ¹⁾	690 ¹⁾
Disconnection property ²⁾ acc. to VDE, IEC up to V	440	440	440	440	440	690	440	440	690	690
Breaking capacity I_{eff}										
3 x 220-440V A	160	160	220	220	260	380	520	740	900	1100
3 x 500V A	-	100	160	160	200	290	380	560	680	850
3 x 660-690V A	80	120	120	150	150	200	290	520	450	-
Utilization categ. AC21A, AC21B Switching of resistive loads including moderate overloads Rated operational current I_e A	20	20	32	32	50	63	85	115	150	250
Utilization categ. AC23A, AC23B Switching of motor loads or other highly inductive loads Rated current I_e 400V A	16	16	30	30	45	45	60	85	105	135
Power rating 220-240V kW	4	4	7,5	7,5	11	15	22	30	40	40
3-phase 3-pole 380-440V kW	7,5	7,5	15	15	22	22	30	45	55	70
500V kW	-	7,5	15	15	22	22	30	45	55	70
660-690V kW	-	7,5	15	15	22	18,5	30	45	45	-
Star-Delta-Switches for squirrel cage motors Power rating 3-phase 3-pole 220-240V kW	3,7	3,7	7,5	7,5	8	11	15	18,5	37	40
380-415V kW	7,5	7,5	15	15	18,5	18,5	25	30	40	70
Utilization category AC3 Switching of three-phase motors Rated current I_e 400V A	12	12	22	22	30	30	50	60	80	135
Power rating 220-240V kW	3	3	5,5	5,5	7,5	7,5	15	18,5	37	40
3-phase 3-pole 380-440V kW	5,5	5,5	11	11	15	15	25	30	40	70
500V kW	-	5,5	11	11	15	15	25	30	40	70
660-690V kW	-	5,5	11	11	15	15	25	30	40	-
Utilization category AC4 squirrel cage motors, inching Power rating 220-240V kW	0,55	0,55	2,2	2,2	3,7	4	5,5	6	11	18,5
3-phase 3-pole 380-440V kW	1,5	1,5	4	4	5,5	7,5	11	15	18,5	35
500V kW	-	1,5	4	4	5,5	7,5	11	15	22	35
660-690V kW	-	1,5	4	4	5,5	7,5	11	15	22	-
Utilization category AC15 Control of electromagnetic loads, contactors, Rated current I_e up to 240V A	6	6	12	12	16	-	-	-	-	-
380-440V A	4	4	6	6	7	-	-	-	-	-
2-pole in series 500V A	-	5	8	8	10	-	-	-	-	-
Utilization categ. DC21A, DC21B Switching of resistive loads Time constant $L/R \leq 1ms$ Rated current I_e 1-pole 30V A	20	20	32	32	40	63	80	100	150	250
60V A	4	4	6	6	20	30	30	30	-	-
110V A	0,6	0,6	3	3	4	6	6	6	-	-
220V A	0,3	0,3	0,8	0,8	0,8	1,3	1,3	1,3	2,5	2,5
440V A	-	-	0,4	0,4	0,4	0,6	0,6	0,6	0,7	0,7
Utilization category DC3 - DC5 Switching of shunt motors and series motors Time constant $L/R \leq 15ms$ Rated current I_e 1-pole 30V A	8	8	13	13	16	25	32	40	60	100
60V A	1	1	2,4	2,4	4	12	12	12	-	-
110V A	0,3	0,3	0,5	0,5	1,6	2,4	2,4	2,4	-	-
Protection class of terminals	IP00	IP20	IP00	IP00	IP20	IP00	IP00	IP00	IP00	IP00

1) suitable for: earthed-neutral systems, overvoltage category I to III, pollution degree 3 (standard-industry): $U_{imp} = 6kV$. Data for other conditions on request

2) valid for lines with grounded common neutral termination, overvoltage category III, pollution degree 3.

Technical Data

Data according to IEC 947-3, IEC 947-5-1, VDE 0660, EN 60947-3, EN 60947-5-1

Type		M10 P	M10H	M20	N20	N33F	N40	N60	N80	N100	N200
Cable cross-sections											
solid	mm ²	1-2,5	1-2,5 ¹⁾	1,5-6	1,5-6	2,5-10	2,5-16 ¹⁾	6-25 ¹⁾	6-35	10-50 ¹⁾	50-150
flexible	mm ²	0,75-2,5	0,75-2,5 ¹⁾	1-4	1-4	1,5- 6	2,5-10 ¹⁾	6-25 ¹⁾	6-35	10-35 ¹⁾	35-120
flexible w. multicore cable end	mm ²	0,75-2,5	0,75-1,5	1-4	1-4	1,5- 6	2,5-6	6-16	6-35	10-25	-
Conductors to clamp per pole		2	2	2	2	2	2	1	1	1	1
Size of terminal screw		M3	M3,5	M4	M4	M4	M5	2xM5	2xM5	2xM6	M10
Tightening torque	Nm lb.inch	0,6-1,2 5-11	0,8-1,4 7-12	1,2-1,8 11-16	1,2-1,8 11-16	1,2-1,8 11-16	2,5-3 22-26	2,5-3 22-26	2,5-3 22-26	3,5-4,5 31-40	10 88
Short circuit protection											
Max. fuse size	gL (gG) A	20	20	35	35	50	63	100	125	160	250
Rated short-time withstand current (1sec. current)	A	250	250	400	400	500	800	1000	1400	1800	3000
Rated conditional short-circuit current	kA _{eff}	10	10	10	10	10	10	10	10	10	10
Short-time capacity											
Load duration	3s A	100	100	200	200	350	400	600	720	1000	2000
	10s A	60	60	130	130	230	250	400	480	600	1200
Note: Ratings applies to contacts already closed	30s A	35	35	85	85	110	160	250	300	500	600
	60s A	25	25	65	65	80	110	200	250	370	480
Power loss at AC21A											
per pole	A W	20 0,6	20 0,5	32 0,9	32 1,1	50 1,9	63 2	85 2,8	115 4,4	150 5,7	250 21
Switching of capacitive loads											
maximum making capacity up to 500V	A	140	140	300	300	350	400	600	700	900	1800

Data according to UL and cUL

Type			M10 P	M10H	M20	N20	N33F	N80	N100	N200	L400
Rated voltage		V~	300	600	600	600	600	600	600	600	600
Rated operational current	"General Use" with jumper	A	20	20	35	35	60	115	130	250	350
		A	15	-	25	25	40	80	-	-	-
DOL-Rating 3-phase	110-120V	hp	1½	1½	5	5	7½	10	15	15	15
	200-208V	hp	2	2	5	5	10	15	25	25	25
	220-240V	hp	3	3	5	5	15	20	30	30	30
	440-480V	hp	-	5	10	10	25	40	40	60	60
	550-600V	hp	-	7½	15	15	30	50	50	75	75
DOL-Rating 1-phase	110-120V	hp	½	½	1½	1½	3	5	7½	7½	7½
	200-208V	hp	1	1	3	3	5	7½	15	15	15
	220-240V	hp	1½	1½	5	5	7½	10	15	20	20
Fuse size (RK5) 5kA / 600V	Manual Motor Controller and Motor Disconnect	A	40 ²⁾	40	80	80	150	200	300	350	350
Heavy pilot duty		AC	A300	A600	A600	A600	A600	-	-	-	-
Cable cross sections											
solid		AWG	12 - 20	12 - 20	10 - 18	10 - 18	10 - 12	10 - 12	10 - 14	-	-
flexible		AWG	14 - 20	14 - 20	8 - 18	8 - 18	6 - 12	2 - 12	1 - 14	250kcmil	500kcmil
Tightening torque		Nm	1.7	1-1.7	1.7-2.8	1.7-2.8	2.3-2.8	2.8	4.5	-	-
		lb.inch	15	9-15	15-25	15-25	20-25	25	40	-	-

1) Maximum cable cross-section with prepared conductor

2) 5kA / 300V

Technical Data

Data according to IEC 947-3, IEC 947-5-1, VDE 0660, EN 60947-3, EN 60947-5-1

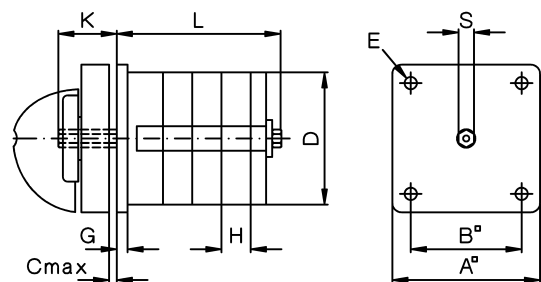
Type		L100	L160	L400	L600	L800	L1200
Rated insulation voltage U_i	V	690 ²⁾	690 ²⁾	690 ²⁾	690 ²⁾	690 ²⁾	690 ²⁾
Rated thermal current I_{th} open	A	125	180	400	600	800	1200
Rated thermal current I_{the} encl.A	125	180	400	600	800	1200	
with conductor	mm ²	50	70	40x5	40x10	busbar 2x40x10	busbar 2x50x10
Utilization category AC21A, AC21B							
Switching of resistive loads, including moderate overloads							
Rated operational current I_e	A	125	180	400	400	400	400
Shot-time current-carrying capacity							
Load duration	1s	-	-	4800	6500	8500	10000
	3s	800	1200	3600	5000	6500	8000
	10s	500	800	2000	3200	4000	5800
Note: Ratings applies to contacts already closed	30s	320	480	1200	1700	2200	3200
	60s	180	380	960	1300	1700	2300
Cable cross-sections							
solid or stranded	mm ²	25-50 ¹⁾	cable lug	busbar	busbar	busbar	busbar
flexible	mm ²	25-50 ¹⁾	70	40x5	40x10	2x40x10	2x50x10
flexible with multicore cable end	mm ²	25-35	-	-	-	-	-
Size of terminal screw		2xM5	M8	M12	M16	M16	M16
Number of conductors to clamp per pole		1	1	1	2	1	1
Short circuit protection							
Max. fuse size	slow, gL (gG) A	125	200	400	630	800	1250

1) Maximum cable cross-section with prepared conductor

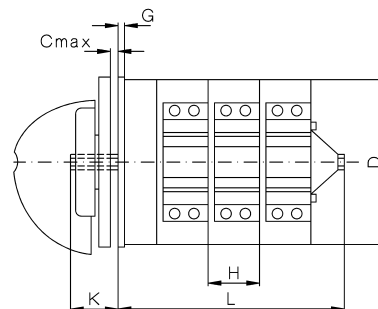
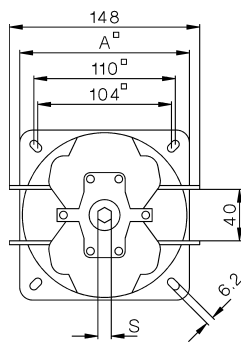
2) suitable for: earthed-neutral systems, overvoltage category I to III, pollution degree 3 (standard-industry): $U_{imp} = 6kV$. Data for other conditions on request

Dimensions (mm)

Panel mounting E M10 - N100



N200

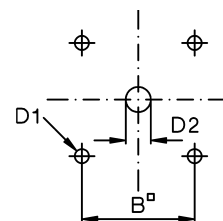


Type	A	B	C	D	D1	D2	D3	E	G	H	K	S
M10H	48	36	5	44 ¹⁾	5	8	-	4	3,5	9,5	19	SW5
M20	48	36	5	56	5	8	57	4	3,5	12,5	19	SW5
N20	64	48	5	56	5	12	57	4,2	3	12,5	20	SW7
N33F	64	48	5	58 ²⁾	5	12	-	4,2	3	15,5	20	SW7
N40	86	68	7	80	6	12	82	5,2	3,5	18	24,5	SW9
N60	86	68	7	80	6	12	82	5,2	3,5	29,5	24,5	SW9
N80	86	68	7	80	6	12	82	5,2	3,5	29,5	24,5	SW9
N100	132	110	9	128	7	16	129	6,2	5	30	37	SW12
N200	132	110	9	128	7	16	-	6,2	5	40	37	SW12

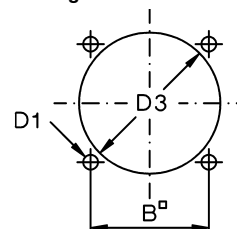
1) 44,5 x 42

2) 58 x 58

Mounting holes: built in from ear

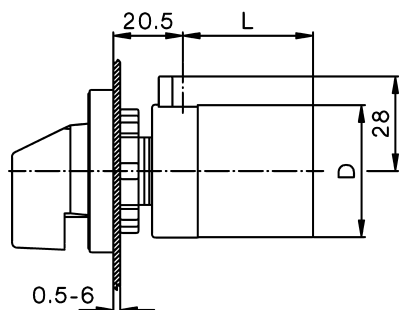


Mounting holes: built in from front

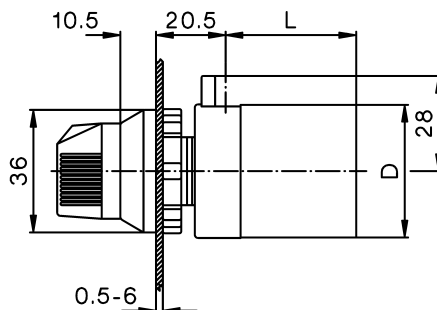


Type	Dimension 1	Dimension 2	L with 3 cells	L with 4 cells	5	6	7	8	9	10	11	12	13	14	15
M10H	36,5	46	55,5	65	74,5	84	93,5	103	112,5	122	131,5	141	-	-	-
M20	38,5	51	63,5	76	88,5	101	113,5	126	138,5	151	163,5	176	-	-	-
N20	40,5	53	65,5	78	90,5	103	115,5	128	140,5	153	165,5	178	190,5	203	215,5
N33F	44	59,5	75	90,5	106	121,5	137	152,5	168	183,5	199	214,5	230	245,5	261
N40	52,5	70,5	88,5	106,5	124,5	142,5	160,5	178,5	196,5	214,5	232,5	250,5	268,5	286,5	304,5
N60	64	93,5	123	152,5	182	211,5	241	270,5	300	329,5	359	388,5	-	-	-
N80	64	93,5	123	152,5	182	211,5	241	270,5	300	329,5	359	388,5	-	-	-
N100	88	118	148	178	208	238	268	298	328	358	388	418	-	-	-
N200	96	136	176	216	256	296	336	376	416	456	496	536	-	-	-

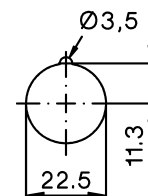
Central fixing Z M10H, M20, N33F



Central fixing without escutcheon plate ZO M10H, M20



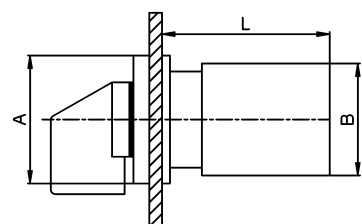
Mounting hole:



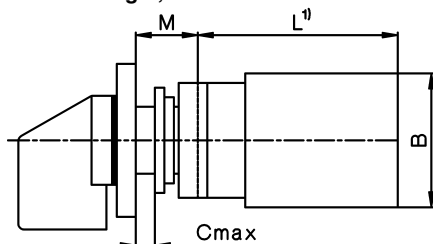
Further dimensions see tables above

Mini-Cam Switches M4H

Panel mounting E

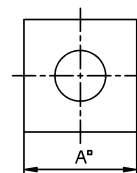
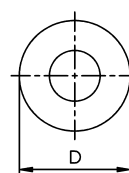


Central fixing Z, ZO



ZO

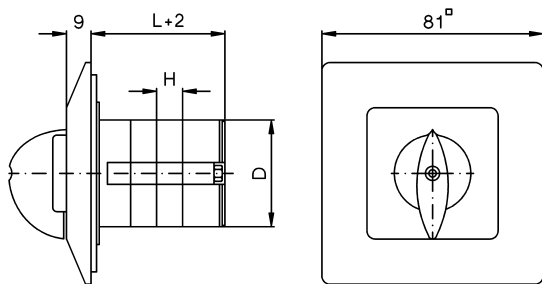
Z



					Dimension L with .. cells								
Type		A	B	D	M	1	2	3	4	5	6	7	8
M4H	mm	30	28	29,5	12,5	38,5	50,5	62,5	74,5	86,5	98,5	110,5	122,5

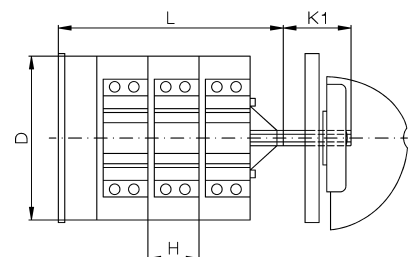
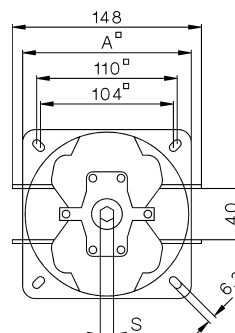
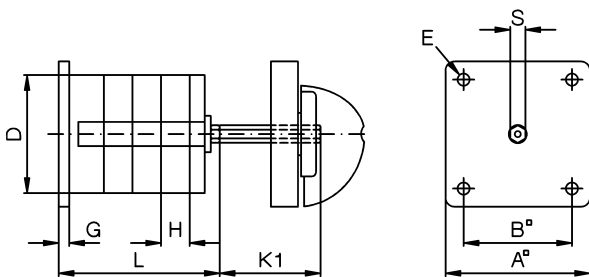
Mounting holes see page 230

Flush mounting UP M10



Base mounting V M10H - N100

N200

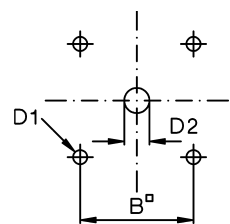


Type	A	B	D	D1	D2	E	G	H	I	K	K1	S
M10	48	36	39	5	8	4	3,5	9,5	6	19	41	SW5
M10H	48	36	44 ¹⁾	5	8	4,2	3	9,5	6	19	41	SW5
M20	48	36	56	5	8	4,2	3	12,5	6	19	47	SW5
N20	64	48	56	5	12	4,2	3	12,5	0	20	29	SW7
N33F	64	48	58 ²⁾	5	12	4,2	3	15,5	0	20	31,5	SW7
N40	86	68	80	6	12	5,2	3,5	18	-	-	38,5	SW9
N60	86	68	80	6	12	5,2	3,5	29,5	-	-	49,5	SW9
N80	86	68	80	6	12	5,2	3,5	29,5	-	-	49,5	SW9
N100	132	110	128	7	16	6,2	5	30	-	-	79,5	SW12
N200	132	110	128	7	16	6,2	5	40	-	-	104	SW12

1) 42 x 44,5

2) 58 x 58

Mounting holes: for escutcheon plate

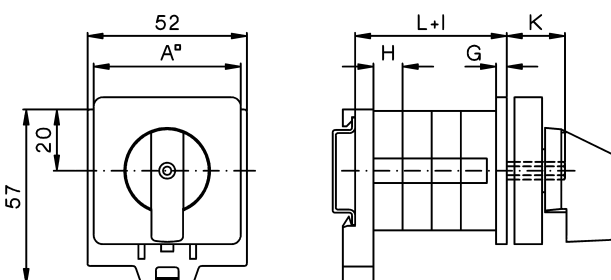


Type	Dimensions L with .. cells														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
M10	34,5	44	53,5	63	72,5	82	91,5	101	110,5	120	129,5	139	-	-	-
M10H	36,5	46	55,5	65	74,5	84	93,5	103	112,5	122	131,5	141	-	-	-
M20	38,5	51	63,5	76	88,5	101	113,5	126	138,5	151	163,5	176	-	-	-
N20	40,5	53	65,5	78	90,5	103	115,5	128	140,5	153	165,5	178	190,5	203	215,5
N33F	44	59,5	75	90,5	106	121,5	137	152,5	168	183,5	199	214,5	230	245,5	261
N40	52,5	70,5	88,5	106,5	124,5	142,5	160,5	178,5	196,5	214,5	232,5	250,5	268,5	286,5	304,5
N60	64	93,5	123	152,5	182	211,5	241	270,5	300	329,5	359	388,5	-	-	-
N80	64	93,5	123	152,5	182	211,5	241	270,5	300	329,5	359	388,5	-	-	-
N100	88	118	148	178	208	238	268	298	328	358	388	418	-	-	-
N200	96	136	176	216	256	296	336	376	416	456	496	536	-	-	-

Snap-on mounting SM

M10H - N33F for 35mm DIN-rail mounting according to DIN EN 50022

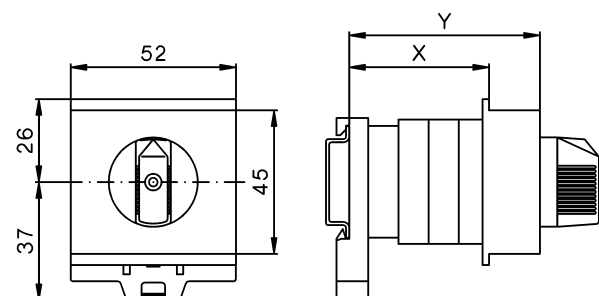
Dimensions see tables above



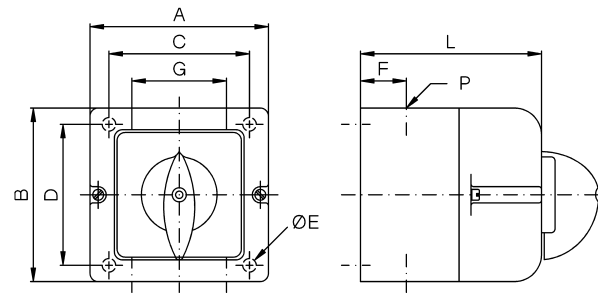
Switch with installation cover SMA

M10H, M20 for 35mm DIN-rail mounting according to DIN EN 50022

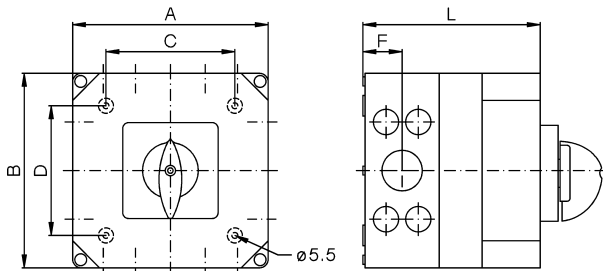
Type	Dimension X with .. cells					Dimension Y with .. cells				
	1, 2	3	4	5		1, 2	3	4	5	
M10H	44	44	61	76		60	60	75	90	
M20	44	61	76	76		60	75	90	90	



Plastic enclosed switches P, PF M10 - N60

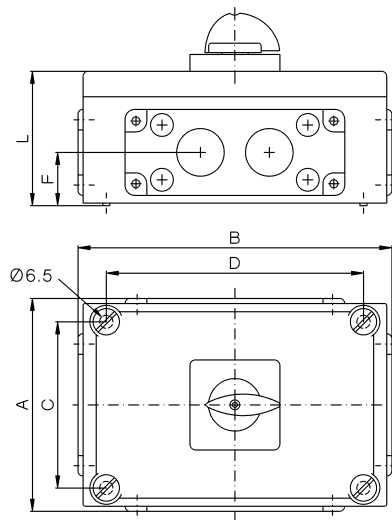


N60, N80



Type	A	B	C	D	E	F	G	P	Dimension L with .. cells					
									1	2	3	4	5	6
M10	66	64	50	36	5	15,5	26	M20	43	52	62	71	81	90
N20	82	78	57	53	4,5	17	35	M20	66	66	80	94	108	122
N33F	112	108	85	50	5	20	50	M25	92	92	92	110	128	146
N40	112	108	85	50	5	20	50	M25	92	92	110	128	146	164
N60	112	108	85	50	5	20	50	M25	92	110	-	-	-	-
N60	182	180	120	120	5,5	36,5	-	1)	-	-	165	215	215	-
N80	182	180	120	120	5,5	36,5	-	1)	110	110	165	215	215	-
N100	210	310	165	255	6,5	52,5	-	2)	130	130	180	-	-	-
N200	310	310	255	255	6,5	52,5	-	3)	130	180	230	-	-	-

N100, N200

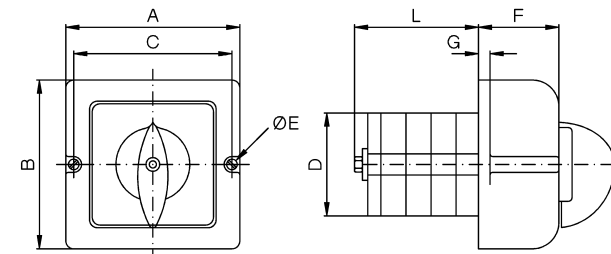


1) knock outs for M40/M32 + 4x M20 at top and bottom
M32/M25 + 4x M20 at the right and left hand side,

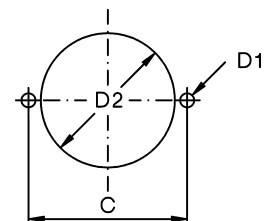
2) 2 flange plates with hole 50,5 at top and bottom

3) 2 flange plates with hole 50,5 at top and bottom, can also be mounted at the right and left hand side

Motor terminal box mounting KE M10 - N33F



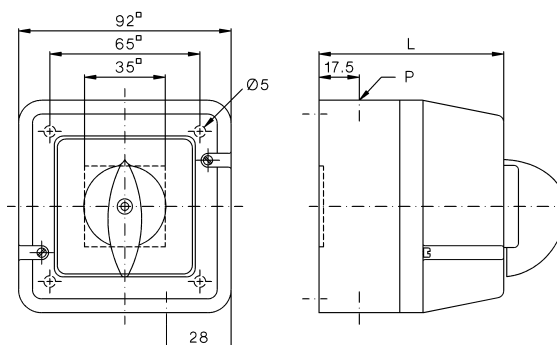
Mounting holes



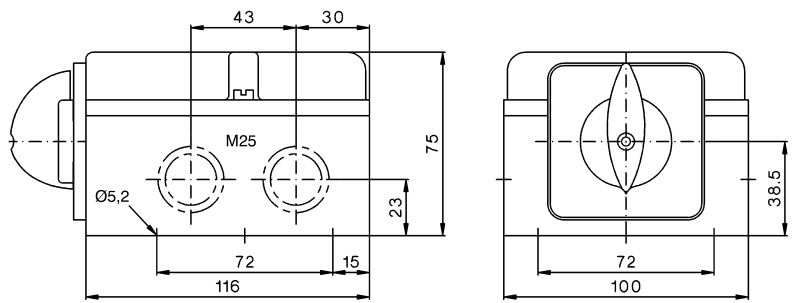
Type										Dimension L with .. cells				
	A	B	C	D	D1	D2	E	F	G	2	3	4	5	6
M10	66	64	58	39	4	48	3,2	24	6	22	31,5	41	50,5	60
N20	82	78	71	48	5	57	4,2	34	5	24,5	37	49,5	62	74,5
N33F	112	108	100	56	5	70	4,2	49	11	32,5	48	63,5	79	94,5

Plastic enclosed motor starter PM N20

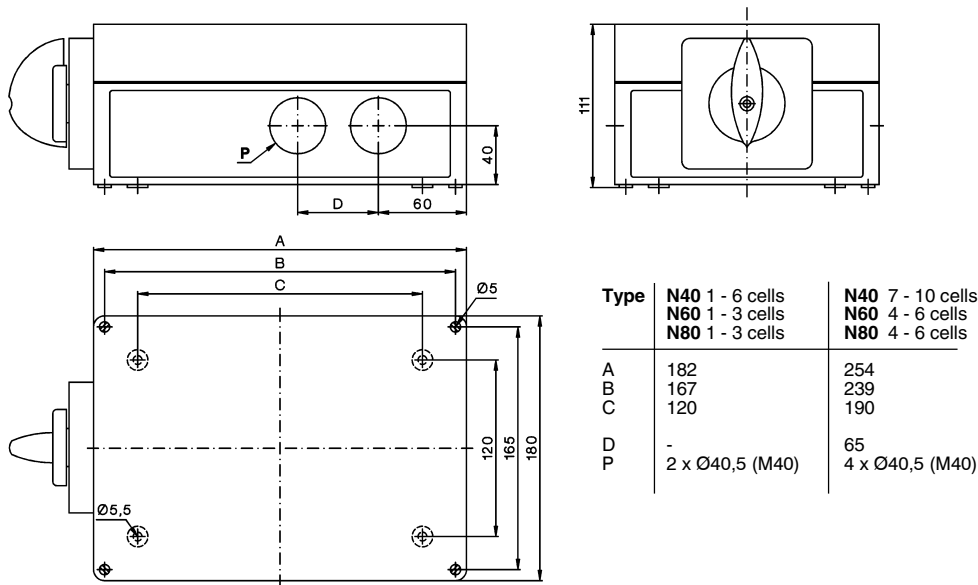
Typ	P	Dimension L with .. cells					
		1	2	3	4	5	6
N20	M25	80	80	80	92,5	105	117,5



**Cast aluminium enclosed switches G, GF
N20**



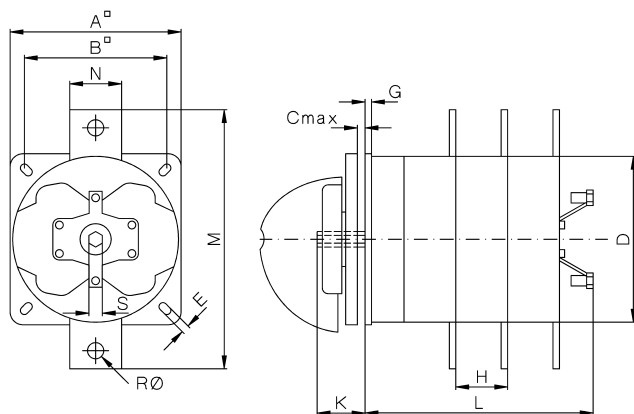
**Plastic enclosure horizontal PLF (Replacement for cast aluminium enclosure G, GF)
N40, N60, N80**



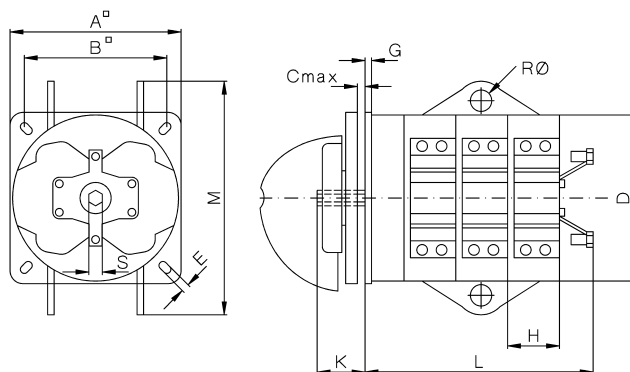
Load Switches

Panel mounting E

L100 - 400, L800, L1200

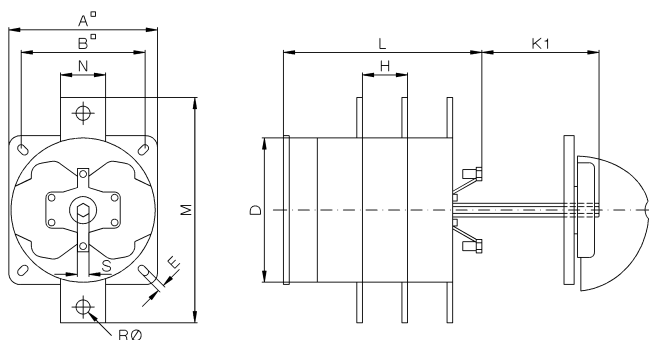


L600

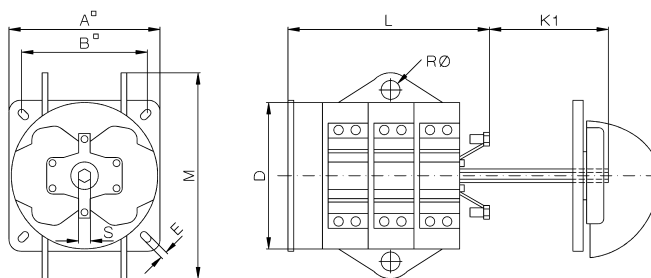


Base mounting V

L100 - 400, L800, L1200



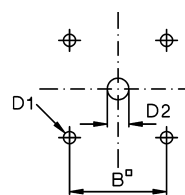
L600



Type	A	B	C	D	D1	D2	E	G	H	K	K1	M	N	R	S
L100	86	68	7	80	6	12	5,2	3,5	18	24,5	38,5	103	27	-	SW9
L160	86	68	7	80	6	12	5,2	3,5	29,5	24,5	38,5	115	-	8,5	SW9
L400	132	110	9	128	7	16	6,2	5	40	37	104	200	40	12,5	SW12
L600	132	110	9	128	7	16	6,2	5	40	37	104	180	-	16,5	SW12
L800	132	110	9	128	7	16	6,2	5	40	37	104	240	40	16,5	SW12
L1200	132	110	9	128	7	16	6,2	5	40	37	104	240	40	16,5	SW12

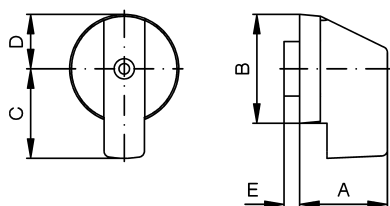
Type	Dimension L with .. cells											
	1	2	3	4	5	6	7	8	9	10	11	12
L100	52,5	70,5	88,5	106,5	124,5	142,5	160,5	178,5	196,5	214,5	232,5	250,5
L160	64	93,5	123	152,5	182	211,5	241	270,5	300	329,5	359	388,5
L400	96	136	176	216	256	296	336	376	416	456	496	536
L600	96	136	176	216	256	296	336	376	416	456	496	536
L800	96	136	176	216	256	296	336	376	416	456	496	536
L1200	96	136	176	216	256	296	336	376	416	456	496	536

Mounting holes :



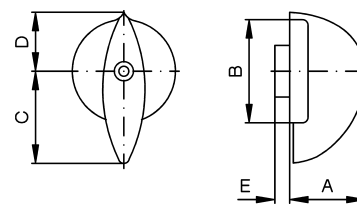
Operating Knobs and Handles

Instrument knob G.



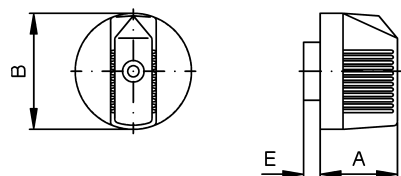
Type	A	B	C	D	E
M10, M10H, M20	23	28	24	14	4
M10, M10H, M20	27	36	32	18	3
N40, N60, N80, L100, L160	36	47	42	24	3,5

Twist knob R.



Type	A	B	C	D	E
M10, M10H, M20	20,5	28	25	15	4
N20, N33F	24	36	29,5	19	3
N40, N60, N80, L100, L160	31	49	41	28	3,5
N100, N200, L400, L600, L800, L1200	50	75	62	41	2,5

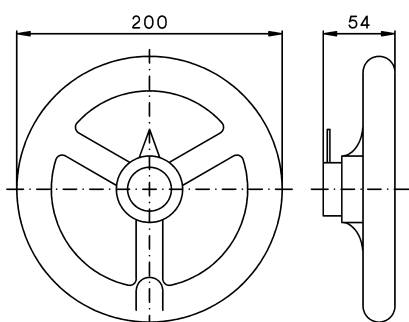
Toggle knob K.



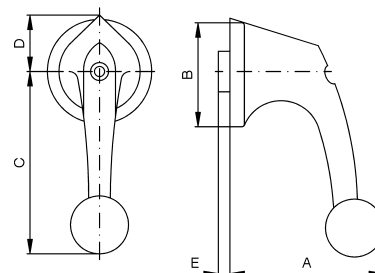
Type	A	B	E
M10, M10H, M20	18,5	28	4
N20, N33F	24	36	3

Hand wheel HR

N100, N200,
L400, L600, L800, L1200



Ball type handle B.



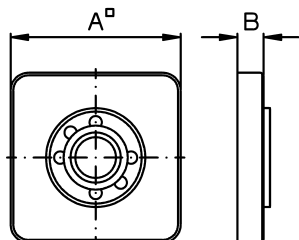
Type	A	B	C	D	E
N20, N33F	53	36,5	64	21	3
N40, N60, N80, L100, L160	62	49	82	31	3,5
N100, N200, L400, L600, L800, L1200	63	75	110	45	2,5

Code number for colour

grey	.1	white	.5
black	.2	blue	.6
red	.3	yellow	.7
cream-coloured	.4	euro-white	.8

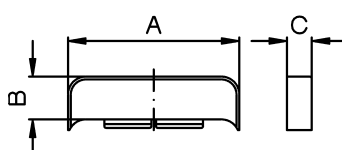
Escutcheon plates

Escutcheon plate



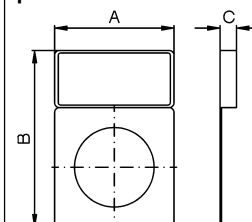
Type	A	B
M10, M10H, M20	48	7,5
N20, N33F	64	7,5
N40, N60, N80, L100, L160	88	8
N100, N200, L400, L600, L800, L1200	132	9

Rectangular additional plate SRE



Type	A	B	C
M10, M10H, M20	48	12	7,5
N20, N33F	64	14	7,5
N40, N60, N80, L100, L160	88	22	8
N100, N200, L400, L600, L800, L1200	132	31	9

Big rectangular additional plate SRE2



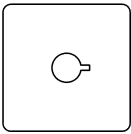
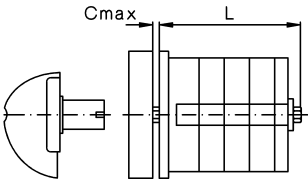
Type	A	B	C
M10, M10H, M20	48	69	6
N20, N33F	64	91	6

Special drives

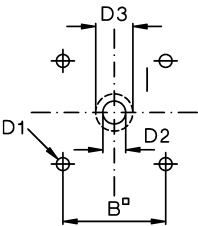
**Removable knob drive STGR, STGR2
M10H - N33F**

Type	B	C	D1	D2	D3
M10H, M20	36	5	5	12	18
N20, N33F	48	5	5	12	18

Replace dimension D2 with dimension D3 for STGR2
Dimension L see page 256



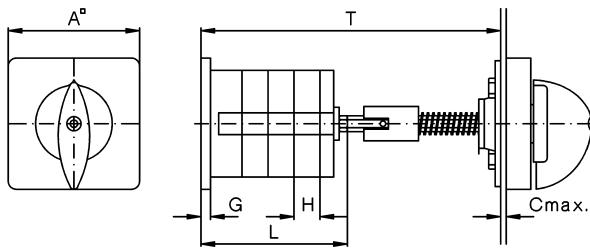
Mounting holes



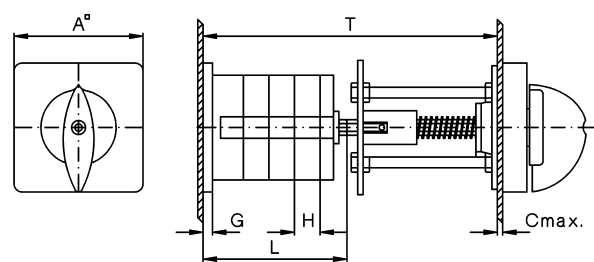
Door couplings

Dimension T is a minimum value. In case of order the dimension T is necessary.

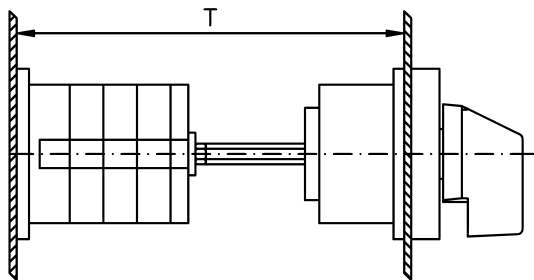
Door coupling TK, TKFR N40 - L1200



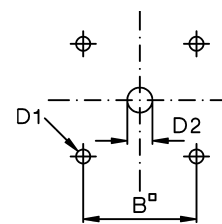
Door coupling, lockable TK2, TK2FR N40 - L1200



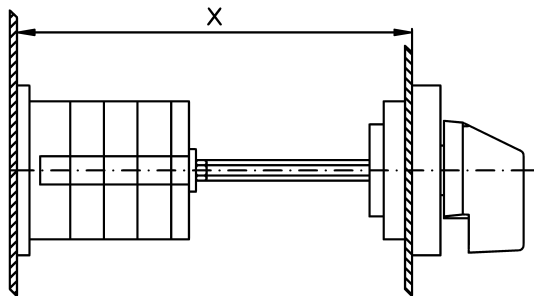
Door coupling TKE, TK2E M10H, M20, N20, N33F



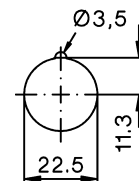
Mounting holes: TK, TKFR, TK2, TK2FR TKE, TK2E



Door coupling, lockable TK2Z M10H, M20, N20, N33F



Mounting holes: TKZ



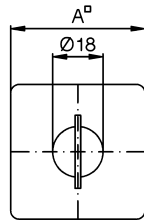
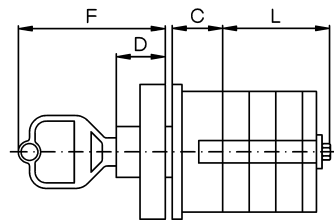
Further dimensions see pages 256 and 257.

Dimension T is a minimum value dependent on switch Type and number of cells. For ordering dimension T is necessary

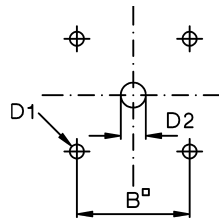
Type	A	B	C	D1	D2	Minimum dimension T with .. cells							
						1	2	3	4	5	6	7	8
M10H	48	36	5	5	8	108	117,5	127	136,5	146	155,5	165	174,5
M20	48	36	5	5	8	100	112,5	125	137,5	150	162,5	175	187,5
N20	64	48	5	5	10	100	112,5	125	137,5	150	162,5	175	187,5
N33F	64	48	5	5	10	103	118,5	134	149,5	165	180,5	196	211,5
N40	88	48	7	6	12	134	152	170	188	206	224	242	260
N60	88	48	7	6	12	145,5	175	245,5	234	263,5	293	322,5	352
N80	88	48	7	6	12	145,5	175	245,5	234	263,5	293	322,5	352
N100	132	110	9	7	15	202	232	262	292	322	352	382	412
N200	132	110	9	7	15	212	252	292	332	372	412	452	492
L100	88	48	7	6	12	-	152	-	188	-	224	-	260
L160	88	48	7	6	12	145,5	175	245,5	234	263,5	293	322,5	352
L400	132	110	9	7	15	212	252	292	332	372	412	452	492
L600	132	110	9	7	15	-	-	292	-	-	412	-	-
L800	132	110	9	7	15	-	252	-	332	-	412	452	492
L1200	132	110	9	7	15	-	-	292	-	-	412	-	-

Key operated switches SA

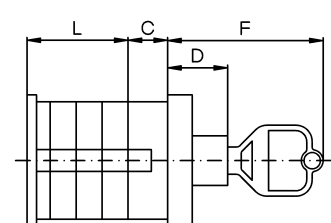
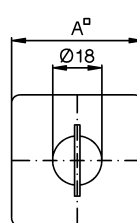
Panel mounting E M10 - N60



Mounting holes



Base mounting V M10 - N60



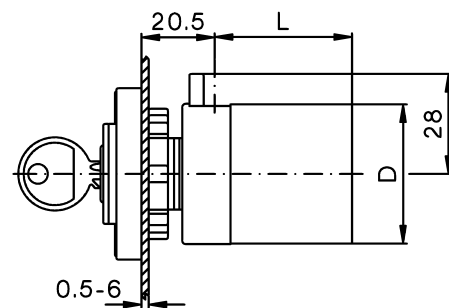
Type	A	B	C	D	D1	D2	F
M10H, M20	48	36	18	17,5	5	18,5	52,5
N20, N33F	64	48	10	17,5	5	18,5	52,5
N40, N60	88	68	23,5	15	6	18,5	50

Dimension L see page 256

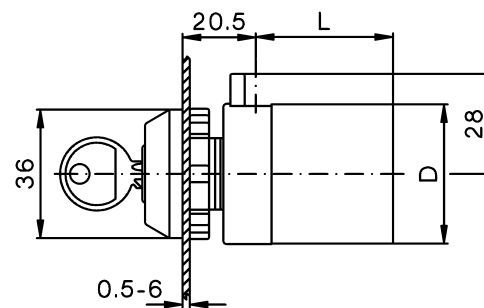
Type	A	C	D	F
M10H, M20	48	18	22	57
N20, N33F	64	8	22	57
N40, N60	88	15	15	50

Dimension L see page 257

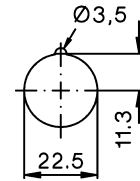
Central fixing Z M10H Z ... + SA M20 Z ... + SA



Central fixing without escutcheon plate ZO M10H ZO ... + SA M20 ZO ... + SA

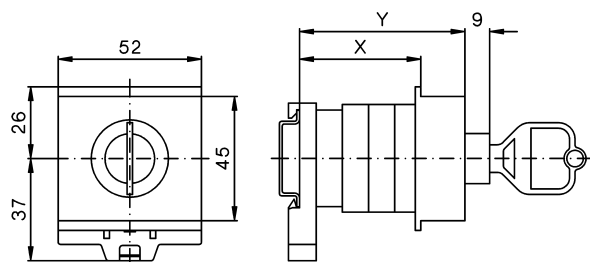


Mounting holes:



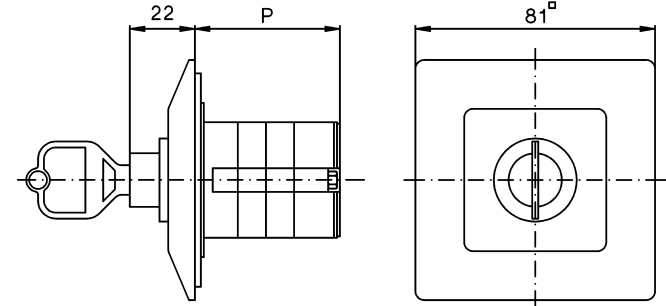
Further dimensions see page 256

DIN rail mounting SMA M10H, M20



Type	Dimension X with .. cells				Dimension Y with .. cells			
	1	2	3	4	1	2	3	4
M10H	44	75	75	91	60	90	90	107
M20	59	75	75	91	75	90	90	107

Flush mounting UP M10

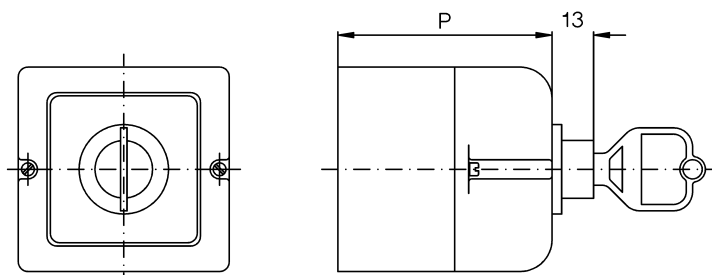


Type	Dimension P with .. cells
M10	47,5 57

Plastic enclosed switches P, PF M10, N20, N33F, N40, N60

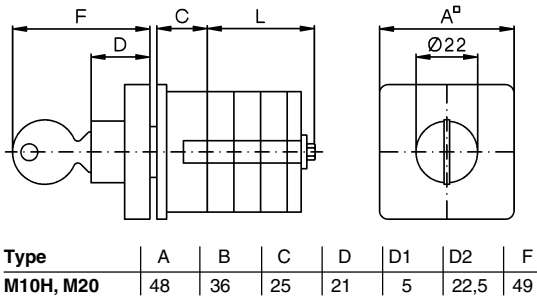
Type	Dimension P with .. cells			
	1	2	3	4
M10	62	71	81	90
N20	66	80	94	108
N33F	92	110	110	128
N40	92	110	-	-
N60	110	-	-	-

Further dimensions see page 258

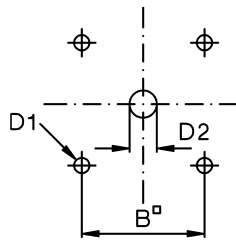


Key operated switches

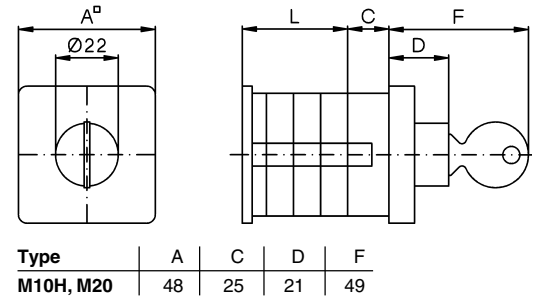
Key operated switch SAK Panel mounting E M10H, M20



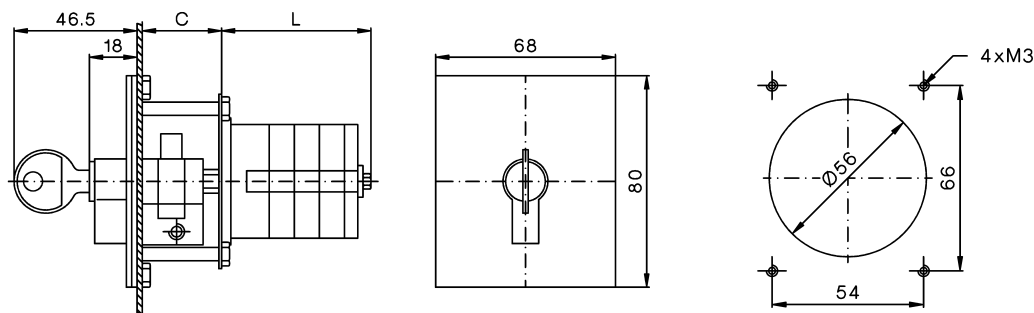
Mounting holes



Key operated switch SAK Base mounting V M10H, M20



Key operated switch SASI Panel mounting E M10, M20

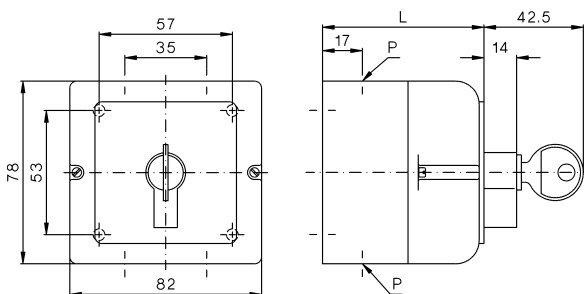


Mounting holes M10, M20

Type	M10	M20
C	20	20

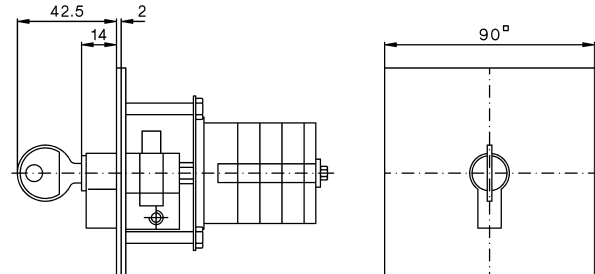
Dimension L see page 256

Key operated switch SASI Plastic enclosed P M10, M20



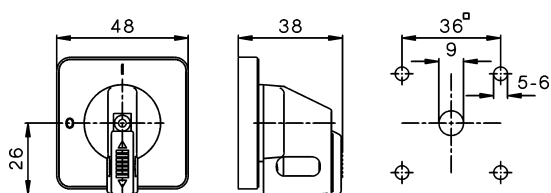
Typ	Dimension P with .. cells				P
	1	2	3	4	
M10	67	79,5	92	104,5	2xM20
M20	79,5	92	104,5	117	2xM20

Key operated switch SASI Flush mounting UP M10, M20

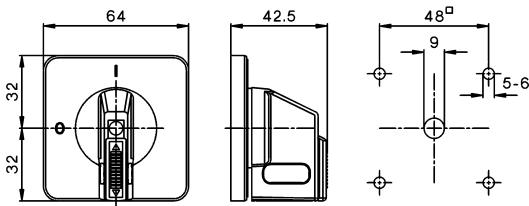


Padlock devices

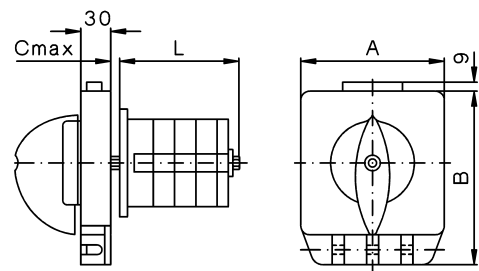
Padlock device SV1 (max. 2 padlocks with stirrup Ø6mm)
M10H, M20
Mounting holes design E, V



Padlock device SV164
M10H - N33F
Mounting holes design E, V



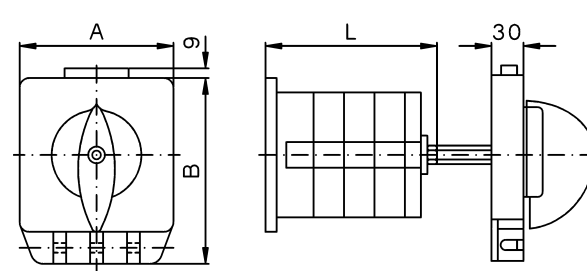
Padlock device SV3 (max. 3 padlocks with stirrup Ø8,5mm)
Panel mounting E
N20 - N200, L100 - L1200



Further dimensions see page 77

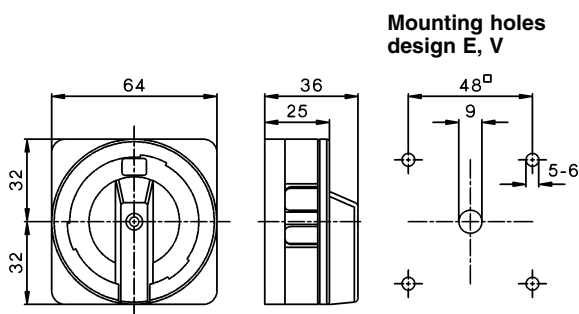
Type	A	B	C
N20, N33F	102	128	5
N40, N60, N80, L100, L160	102	128	7
N100, N200, L400, L600, L800, L1200	132	159	9

Base mounting V
N20 - N200, L100 - L1200

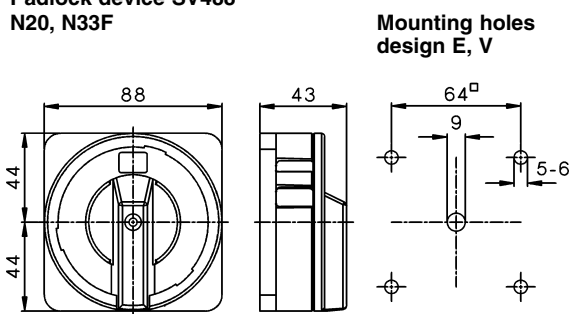


Further dimensions see page 257

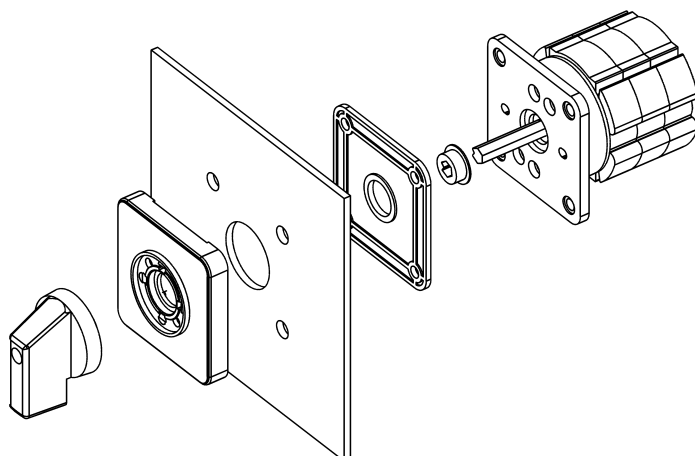
Padlock device SV4 (max. 3 padlocks with stirrup Ø6mm)
M10H - N33F
Mounting holes design E, V



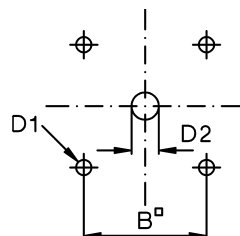
Padlock device SV4 (max. 3 padlocks with stirrup Ø6mm)
N40 - N80, L100 - L160
Padlock device SV488
N20, N33F
Mounting holes design E, V



Front plate/switch shaft sealing FPWD
N20, N33F



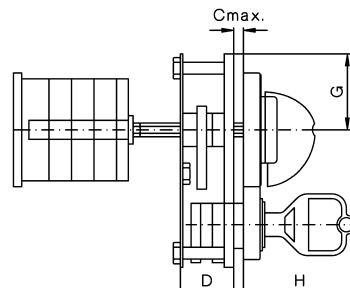
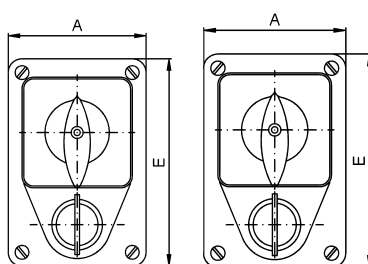
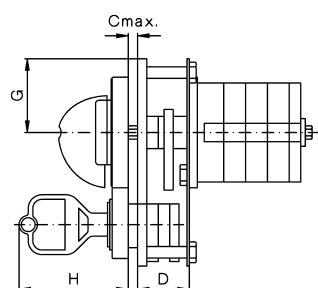
Mounting holes



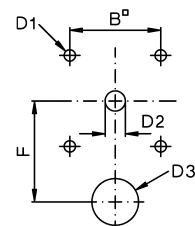
Typ	B	D1	D2
N20, N33F	48	5	17

Interlocks

Lock switch SZ, SZ2 Panel mounting E



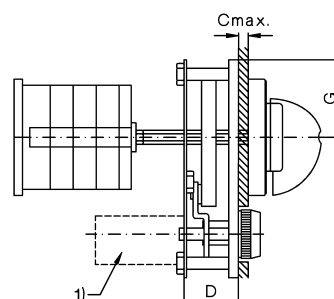
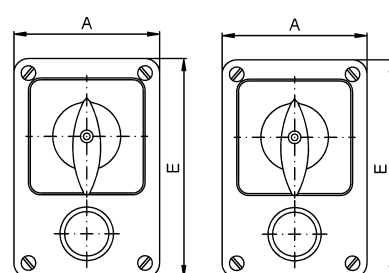
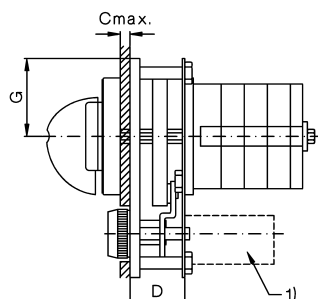
Mounting holes



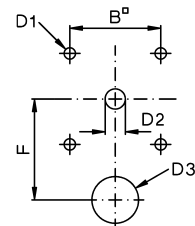
Type	A	B	C	D	D1	D2	D3	E	F	G	H
M10H, M20	60	36	3	22,5	5	8	18,5	90	40	32	47,5
N20, N33F	60	36	3	22,5	5	12	18,5	90	45	32	47,5
N40, N60, N80, L100, L160	90	68	4	24	6	12	18,5	142	61	61,5	48
N100, N200, L400, L600, L800, L1200	140	110	4	27	7	15	18,5	180	83	90,5	49

Push-button switch lock DV

Switch interlock with electrical contact ET Panel mounting E



Mounting holes

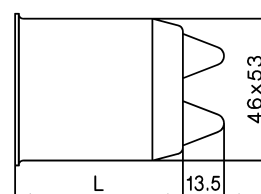
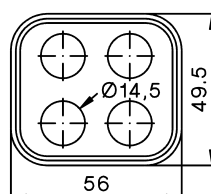


Type	A	B	C	D	D1	D2	D3	E	F	G
M10H, M20	60	36	3	22,5	5	8	26	90	40	32
N20, N33F	60	36	3	22,5	5	12	26	90	45	32
N40, N60, N80, L100, L160	90	68	4	25	6	12	29	142	61	61,5
N100, N200, L400, L600, L800, L1200	140	110	4	41	7	15	29	180	83	90,5

1) only at +ET

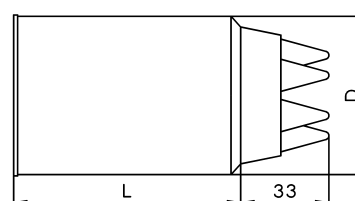
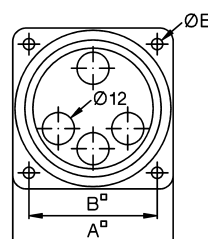
Moisture proofing caps for panel switches FR M10H

Type	Dimension L with .. cells						
	1	2	3	4	5	6	7
M10H	55	55	75	75	88	106	106



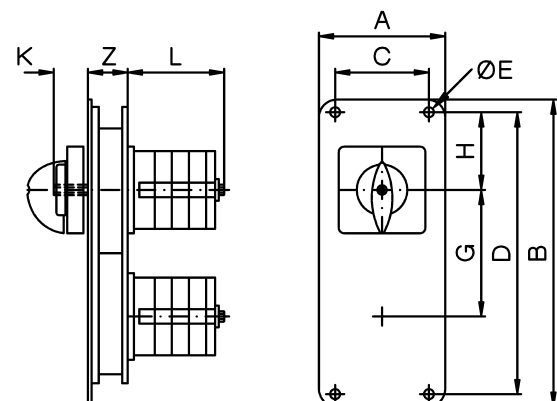
Moisture proofing caps for panel switches FR N20, N40, N60

Type	A	B	D	E	Dimension L with .. cells				
					1	2	3	4	5
N20	60	48	59	5,5	68	68	68	91	91
N40	87	68	83	5,5	82	82	117	117	-

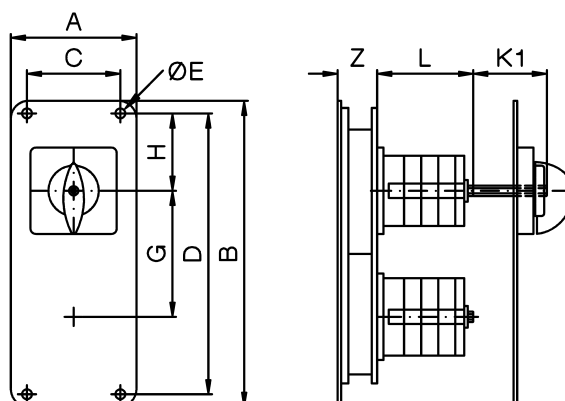


Interlocks

Geared switch with two columns ZK2 Panel mounting E



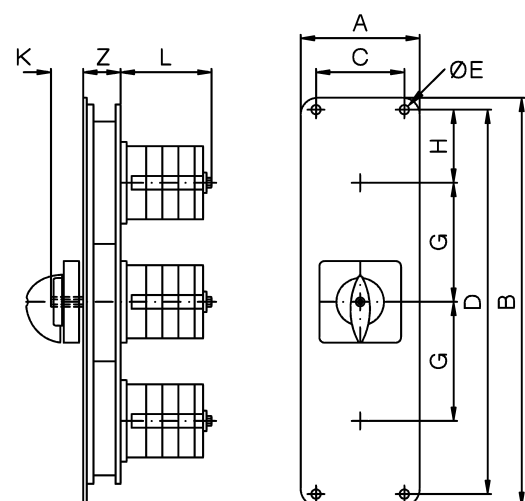
Base mounting V



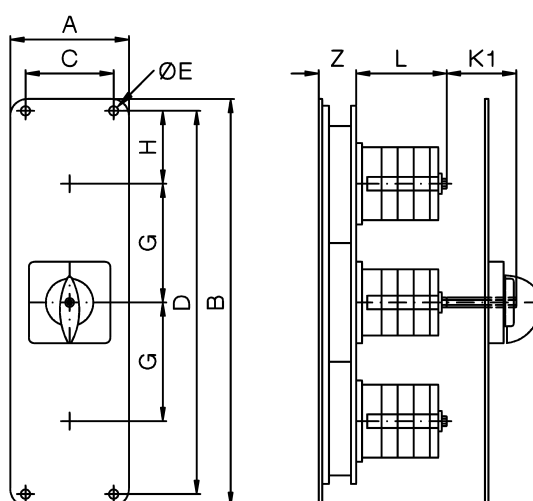
Type	A	B	C	D	E	G	H	Z
M10H, M20	70	170	52	156	5,5	70	43	22
N20, N33F	70	170	52	156	5,5	70	43	22
N40, N60, N80, L100, L160	170	190	150	168	6,5	100	43	23
N100, N200, L400, L600, L800, L1200	180	340	150	310	6,5	140	80	25

Further dimensions see pages 256 and 257

Geared switch with tree columns ZK3 Panel mounting E



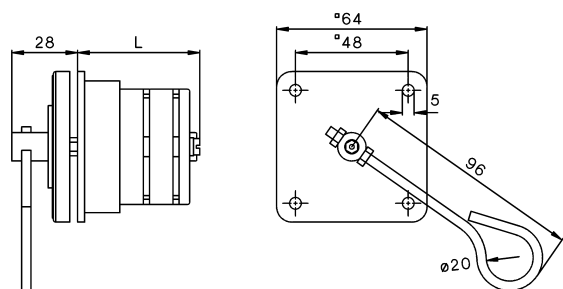
Base mounting V



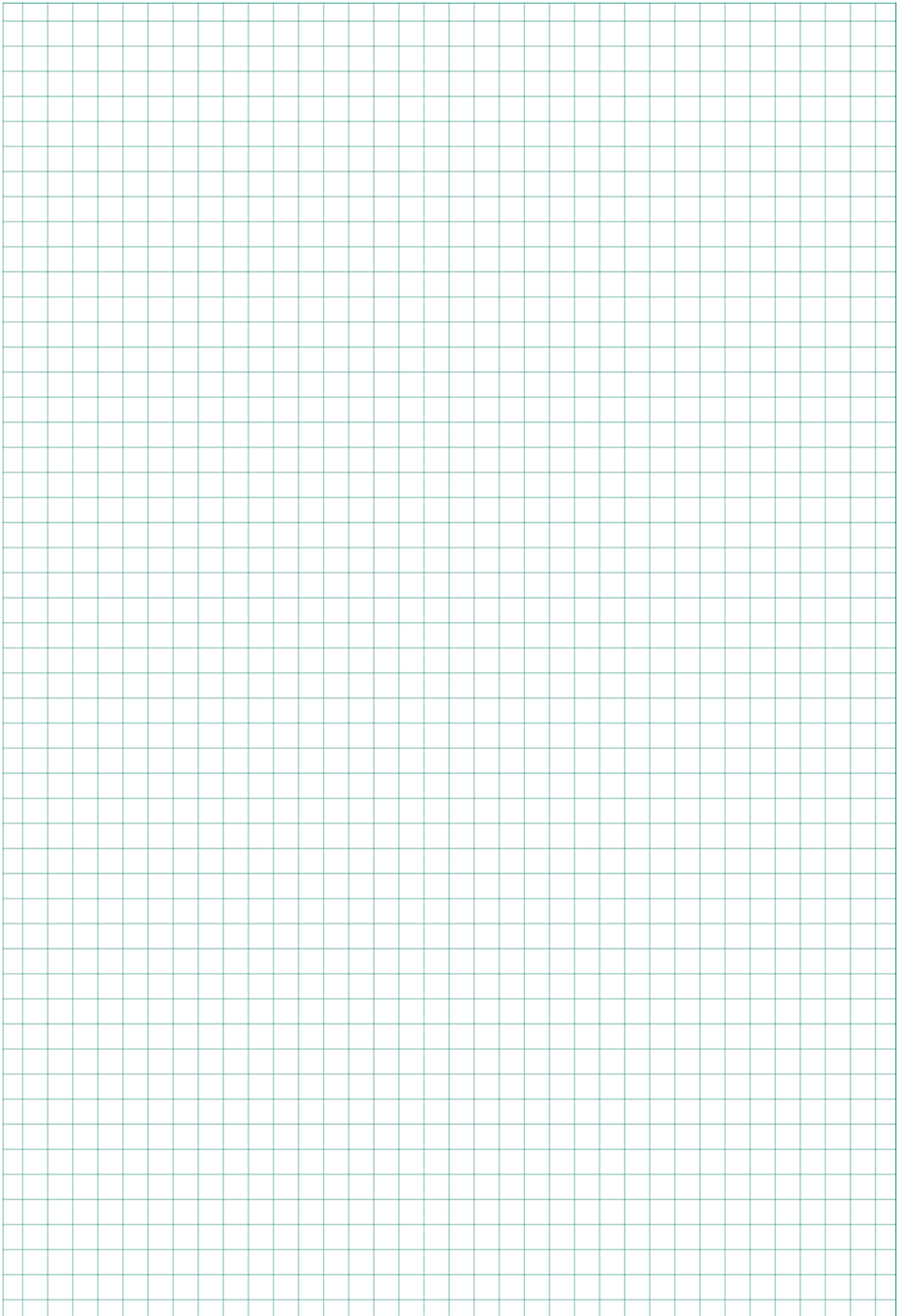
Type	A	B	C	D	E	G	H	Z
M10H, M20	70	240	52	226	5,5	70	43	22
N20, N33F	70	240	52	226	5,5	70	43	22
N40, N60, N80, L100, L160	170	290	150	269	6,5	100	43	23
N100, N200, L400, L600, L800, L1200	180	490	150	460	6,5	140	80	25

Further dimensions see pages 256 and 257

Neon safety switch N20 E .. +FEU, N33F E .. +FEU



Further dimensions see pages 256





Main Switches-Emergency-Stop for Panel Mounting
Main Switches-Emergency-Stop for Single Hole Mounting

274
275



Add-on modules

276



Main Switches-Emergency-Stop for Base Mounting
with Door Clutch

278



Main Switches-Emergency-Stop for Distribution Boards

280



Maintenance and Safety Switches, in Plastic Enclosure

281



Main Switches for Panel Mounting

282



Main Switches for Base Mounting with Door Clutch

283



Switch Disconnectors for Panel Mounting

285



Switch Disconnectors in Plastic Enclosure

286



Switch Disconnectors for Distribution Boards

286



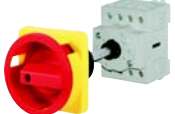
Technical Data

287



Dimensions

288

Ratings								Main Switch Emergency Stop		
Type	Rated current		at U _e V	Motor			Plate Switch disconnect or mm	Panel mounting	Single hole mount.	Base mounting
	Therm. I _{th} open A	AC21 A		AC3 3~400V kW	AC23 3~400V A	kW		IP66	Ø22,5mm IP66	with door coupling adjust. installation depth IP66
										
LTS20	20	20	690	5,5	16	7,5	48□	LTS20 EHN1 .. LTS20 EHN4 ..	LTS20 ZHN1 ..	LTS20 VZVHN4 .. LTS20 VHN4 ..
LTS25	25	25	690	7,5	20	10	48□	LTS25 EHN1 .. LTS25 EHN4 ..	LTS25 ZHN1 ..	LTS25 VZVHN4 .. LTS25 VHN4 ..
LTS32	32	32	690	11	25	12,5	48□	LTS32 EHN1 .. LTS32 EHN4 ..	LTS32 ZHN1 ..	LTS32 VZVHN4 .. LTS32 VHN4 ..
LTS40	40	40	690	15	32	16	48□	LTS40 EHN1 .. LTS40 EHN4 ..	LTS40 ZHN1 ..	LTS40 VZVHN4 .. LTS40 VHN4 ..
LTS63	63	63	690	18,5	45	22	48□	LTS63 EHN1 .. LTS63 EHN4 ..	-	LTS63 VZVHN4 .. LTS63 VHN4 ..
LTS80	80	80	690	18,5	45	22	48□	LTS80 EHN1 .. LTS80 EHN4 ..	-	LTS80 VZVHN4 .. LTS80 VHN4 ..
LTS85	85	85	690	22	60	30	64□	LTS85 EHN4 ..	-	LTS85 VZVHN4 .. LTS85 VHN4 ..
LTS100	100	100	690	30	72	37	64□	LTS100 EHN4 ..	-	LTS100 VZVHN4 .. LTS100 VHN4 ..
LTS125	125	125	690	37	85	45	64□	LTS125 EHN4 ..	-	LTS125 VZVHN4 .. LTS125 VHN4 ..
LT160	160	160	690	45	110	55	88□	LT160 EHN34 ..	-	LT160 VHN34 ..

Switch disconnector LT.. 20 - 160A

Switch disconnectors are to be used as an ON-OFF-switch where a high breaking capacity with high contact pressure and in fact better short circuit behavior is necessary. These applications are:

Main switches according to IEC/EN 60204 respectively VDE0113 with interlocking device, terminal protection and restrictive contacts.

Switch disconnectors according to IEC/EN 60947-3 and VDE 0660 part 107 with break distance for 690V.

Motor switches 3-pole or 4-pole; according to IEC/EN 60947-3 respectively VDE 0660 part 107, motor switches series LT are dimensioned for switching high rated current AC3 and AC23A.

Switch program

On-Off Switch 3-pole	●● ●●●	A3
On-Off Switch 4-pole	●● ●●●	A4
On-Off Switch 6-pole	●● ●●●	A6
On-Off Switch 8-pole	●● ●●●	A8
Changeover Switches 3-pole	●● ●●●	U3
Changeover Switches 4-pole	●● ●●●	U4

On-Off Switch 3-pole	●● ●●●	T300	(for LT160)
On-Off Switch 4-pole	●● ●●●	T400	(for LT160)

Main switches and Main switches with Emergency-Stop function

According to standards IEC/EN60204 or VDE0113, all electrical equipment of industrial machines must be equipped with a main switch. This must permit disconnection of all the electrical equipment during cleaning, maintenance and repair work, and other extended periods when it is stationary.

In case of two or more main switches, an interlock system must be used. It is recommended to use a multiple-pole main switch (cam switch).

Main switches have to correspond to:

- Switch disconnecter according to IEC/EN 60947-3 and VDE 0660 part 107 for utilization category AC23-B or DC-23B.
- Disconnectors are selected according to thermal rated current. They must possess a contact that ensures load switching via the contactors (see switching program A3-10). This contact must have a sufficient AC15 switching capacity.
- The interruption capacity of the switch must equal or exceed the locked rotor current of the largest motor plus the total current of all other electrical equipment in the circuit.

Requirements:

Interruption of the electrical equipment, with only on and off positions clearly marked with O and I.

It must be lockable in the off setting.

The line terminals of the main switch must be protected according to utilization category IP2X.

Colour of handle black or grey.

Main switches with Emergency-Off function are additional supplied with red handles and contrasting yellow escutcheon plates.

Main Switch Emergency Stop			Main Switch		Switch Disconnectors	
Base mounting w. door coupling depth not adjustable IP66	Modular switch IP40	Plastic enclosed IP66	Panel mounting IP66	Base mounting with door coupling IP66	Panel mounting IP66	Modular switch IP40
						
LTS20 VZHN1 .. LTS20 VZHN4 ..	LTS20 SMAHN1 ..	LTS20 PFHN4 ..	LTS20 EH1 .. LTS20 EH4 ..	LTS20 VZVH4 .. LTS20 VH4 ..	LTS20 E ..	LTS20 SMA ..
LTS25 VZHN1 .. LTS25 VZHN4 ..	LTS25 SMAHN1 ..	LTS25 PFHN4 ..	LTS25 EH1 .. LTS25 EH4 ..	LTS25 VZVH4 .. LTS25 VH4 ..	LTS25 E ..	LTS25 SMA ..
LTS32 VZHN1 .. LTS32 VZHN4 ..	LTS32 SMAHN1 ..	LTS32 PFHN4 ..	LTS32 EH1 .. LTS32 EH4 ..	LTS32 VZVH4 .. LTS32 VH4 ..	LTS32 E ..	LTS32 SMA ..
LTS40 VZHN1 .. LTS40 VZHN4 ..	LTS40 SMAHN1 ..	LTS40 PFHN4 ..	LTS40 EH1 .. LTS40 EH4 ..	LTS40 VZVH4 .. LTS40 VH4 ..	LTS40 E ..	LTS40 SMA ..
LTS63 VZHN1 .. LTS63 VZHN4 ..	LTS63 SMAHN1 ..	LTS63 PFHN4 ..	LTS63 EH1 .. LTS63 EH4 ..	LTS63 VZVH4 .. LTS63 VH4 ..	LTS63 E ..	LTS63 SMA ..
LTS80 VZHN1 .. LTS80 VZHN4 ..	LTS80 SMAHN1 ..	LTS80 PFHN4 ..	LTS80 EH1 .. LTS80 EH4 ..	LTS80 VZVH4 .. LTS80 VH4 ..	LTS80 E ..	LTS80 SMA ..
LTS85 VZHN4 ..	LTS85 SMAHN1 ..	LTS85 PFHN4 ..	LTS85 EH4 ..	LTS85 VZVH4 .. LTS85 VH4 ..	LTS85 E ..	LTS85 SMA ..
LTS100 VZHN4 ..	LTS100 SMAHN1 ..	LTS100 PFHN4 ..	LTS100 EH4 ..	LTS100 VZVH4 .. LTS100 VH4 ..	LTS100 E ..	LTS100 SMA ..
LTS125 VZHN4 ..	LTS125 SMAHN1 ..	LTS125 PFHN4 ..	LTS125 EH4 ..	LTS125 VZVH4 .. LTS125 VH4 ..	LTS125 E ..	LTS125 SMA ..
-	-	LT160 PFHN34 ..	LT160 EH34 ..	LT160 VH34 ..	LT160 E ..	-

Approvals

Area	USA, Canada / UL	Europe	Russia / EAC	CB/CCA-Certificates
Typ				

Switch disconnectos (UL-Listed as MANUAL MOTOR CONTROLLER and suitable as MOTOR DISCONNECT)

LTS20	o	o	o	o
LTS25	o	o	o	o
LTS32	o	o	o	o
LTS40	o	o	o	o
LTS63	o	o	o	o
LTS80	o	o	o	o
LTS85	o	o	-	-
LTS100	o	o	-	-
LTS125	o	o	-	-
LT160	o	o	-	o

o in standard version approved
/ No testing required CE
x in test
- Not provided for test til now

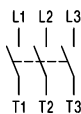
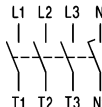
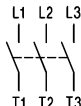
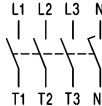
Terminal screws

Devices	Kind of connection				Screwdriver	Tightening torque	
Typ	Screw with washer	Screw with clamp box	2 Screws	Screw with w. nut		Nm	lb. inch
							

Switch Disconnectors

LTS20, LTS25	-	M3,5	-	-		Pz2	0,8 - 1,4	7 - 12
LTS32, LTS40	-	M5	-	-		Pz2	2,5 - 3	22 - 26
LTS63, LTS80	-	M6	-	-		Pz3	3,5 - 4,5	31 - 40
LTS85, LTS100, LTS125	-		-	-				
LT160	-	M10					14	124

Emergency-Stop-Main Switches for Panel Mounting, lockable IP66

		max. padlocks	AC21 690V	AC23 3x400V	Plate	Type	Pack pcs.	Weight kg/pcs
3-pole, padlock device SV1 								
			20A	7,5kW	48 □ ¹⁾	LTS20 EHN1 A3	1	0,15
			25A	10kW	48 □ ¹⁾	LTS25 EHN1 A3	1	0,15
			32A	12,5kW	48 □ ¹⁾	LTS32 EHN1 A3	1	0,15
			40A	16kW	48 □ ¹⁾	LTS40 EHN1 A3	1	0,15
			63A	22kW	48 □ ¹⁾	LTS63 EHN1 A3	1	0,17
			80A	22kW	48 □ ¹⁾	LTS80 EHN1 A3	1	0,17
4-pole, padlock device SV1 								
			20A	7,5kW	48 □ ¹⁾	LTS20 EHN1 A4	1	0,19
			25A	10kW	48 □ ¹⁾	LTS25 EHN1 A4	1	0,19
			32A	12,5kW	48 □ ¹⁾	LTS32 EHN1 A4	1	0,19
			40A	16kW	48 □ ¹⁾	LTS40 EHN1 A4	1	0,19
			63A	22kW	48 □ ¹⁾	LTS63 EHN1 A4	1	0,21
			80A	22kW	48 □ ¹⁾	LTS80 EHN1 A4	1	0,21
6-pole, 8-pole						on request		
3-pole, padlock device SV4(34) 								
			20A	7,5kW	64 □ ²⁾	LTS20 EHN4 A3	1	0,17
			25A	10kW	64 □ ²⁾	LTS25 EHN4 A3	1	0,17
			32A	12,5kW	64 □ ²⁾	LTS32 EHN4 A3	1	0,17
			40A	16kW	64 □ ²⁾	LTS40 EHN4 A3	1	0,17
			63A	22kW	64 □ ²⁾	LTS63 EHN4 A3	1	0,19
			80A	22kW	64 □ ²⁾	LTS80 EHN4 A3	1	0,19
			85A	30kW	64 □ ²⁾	LTS85 EHN4 A3	1	0,39
			100A	37kW	64 □ ²⁾	LTS100 EHN4 A3	1	0,39
			125A	45kW	64 □ ²⁾	LTS125 EHN4 A3	1	0,39
			160A	55kW	88 □	LT160 EHN34 T300	1	1,16
4-pole, padlock device SV4(34) 								
			20A	7,5kW	64 □ ²⁾	LTS20 EHN4 A4	1	0,20
			25A	10kW	64 □ ²⁾	LTS25 EHN4 A4	1	0,20
			32A	12,5kW	64 □ ²⁾	LTS32 EHN4 A4	1	0,20
			40A	16kW	64 □ ²⁾	LTS40 EHN4 A4	1	0,20
			63A	22kW	64 □ ²⁾	LTS63 EHN4 A4	1	0,23
			80A	22kW	64 □ ²⁾	LTS80 EHN4 A4	1	0,23
			85A	30kW	64 □ ²⁾	LTS85 EHN4 A4	1	0,44
			100A	37kW	64 □ ²⁾	LTS100 EHN4 A4	1	0,44
			125A	45kW	64 □ ²⁾	LTS125 EHN4 A4	1	0,44
			160A	55kW	88 □	LT160 EHN34 T400	1	1,55

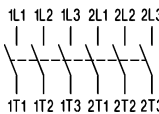
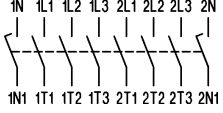
Add-on modules see page 276

Extended Switch Shaft for switches for panel mounting type suffix **+VW"x"** x = panel thickness

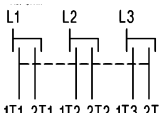
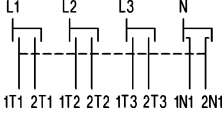
1) Types with padlock device 64 □ type suffix **64**, ordering example: LTS32 EHN**164** A3, on request

2) Types with padlock device 88 □ type suffix **88**, ordering example: LTS32 EHN**488** A3, on request

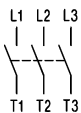
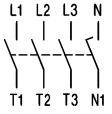
Emergency-Stop-Main Switches for Panel Mounting, lockable IP66

	max. padlocks	AC21 690V	AC23 3x400V	Plate	Type	Pack pcs.	Weight kg/pcs
6-pole, padlock device SV4 							
		20A	7,5kW	64 □	LTS20 EHN4 A6	1	0,30
		25A	10kW	64 □	LTS25 EHN4 A6	1	0,30
		32A	12,5kW	64 □	LTS32 EHN4 A6	1	0,30
		40A	16kW	64 □	LTS40 EHN4 A6	1	0,30
		63A	22kW	64 □	LTS63 EHN4 A6	1	0,34
		80A	22kW	64 □	LTS80 EHN4 A6	1	0,34
8-pole, padlock device SV4 							
		20A	7,5kW	64 □	LTS20 EHN4 A8	1	0,38
		25A	10kW	64 □	LTS25 EHN4 A8	1	0,38
		32A	12,5kW	64 □	LTS32 EHN4 A8	1	0,38
		40A	16kW	64 □	LTS40 EHN4 A8	1	0,38
		63A	22kW	64 □	LTS63 EHN4 A8	1	0,42
		80A	22kW	64 □	LTS80 EHN4 A8	1	0,42

Changeover Switch with Padlock Device for Panel Mounting, lockable IP66

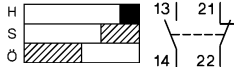
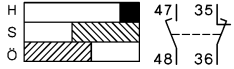
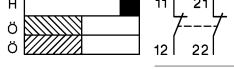
3-pole, padlock device SV4 							
		20A	7,5kW	64 □	LTS20 EHN4 U3	1	0,30
		25A	10kW	64 □	LTS25 EHN4 U3	1	0,30
		32A	12,5kW	64 □	LTS32 EHN4 U3	1	0,30
		40A	16kW	64 □	LTS40 EHN4 U3	1	0,30
		63A	22kW	64 □	LTS63 EHN4 U3	1	0,34
4-pole, padlock device SV4 							
		20A	7,5kW	64 □	LTS20 EHN4 U4	1	0,38
		25A	10kW	64 □	LTS25 EHN4 U4	1	0,38
		32A	12,5kW	64 □	LTS32 EHN4 U4	1	0,38
		40A	16kW	64 □	LTS40 EHN4 U4	1	0,38
		63A	22kW	64 □	LTS63 EHN4 U4	1	0,42

Main Switches Emergency-Stop for Single Hole Mounting, lockable IP66

	max. padlocks	AC21 690V	AC23 3x400V	Plate	Type	Pack pcs.	Weight kg/pcs
3-pole, padlock device SV1 							
		20A	7,5kW	48 □	LTS20 ZHN1 A3	1	0,16
		25A	10kW	48 □	LTS25 ZHN1 A3	1	0,16
		32A	12,5kW	48 □	LTS32 ZHN1 A3	1	0,16
		40A	16kW	48 □	LTS40 ZHN1 A3	1	0,16
4-pole, padlock device SV1 							
		20A	7,5kW	48 □	LTS20 ZHN1 A4	1	0,20
		25A	10kW	48 □	LTS25 ZHN1 A4	1	0,20
		32A	12,5kW	48 □	LTS32 ZHN1 A4	1	0,20
		40A	16kW	48 □	LTS40 ZHN1 A4	1	0,20

Add-on modules see page 276

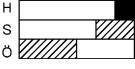
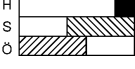
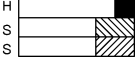
Add-on Modules for Main Switches, Panel Mounting and Single Hole Mounting

	for switch	Type	Pack pcs.	Weight kg/pcs
	4th Add-on Neutral Switching Pole			
	 LTS20 ... to LTS40 ... LTS63 ... , LTS80 ...	N40E N80E	1 1	0,035 0,042
	Aux. Contact Block 1NO + 1NC			
	 LTS20 ... to LTS125 ...	LH11	1	0,02
	Aux. Contact Block 1NO + 1NC Overlapping			
	 LTS20 ... to LTS125 ...	LH11X	1	0,02
	Aux. Contact Block 2NC			
	 LTS20 ... to LTS125 ...	LH20V/02E	1	0,02
	PE-Terminal			
	 LTS20 ... to LTS80 ... LT125 E.. to LT160 E..	PE80E LTXX-E/E	1 1	0,04 0,2
	N-Terminal			
	 LTS20 ... to LTS80 ... LT125 E.. to LT160 E..	PEN80E LTXX-N/E	1 1	0,04 0,2
	Terminal Cover 3-pole			
	LTS20 ... to LTS80 ...	KLAD70	1	0,005
	LTS85.. to LTS125. LT125.. to LT160..	KLAD125 XX-KLAD3	1 1	0,01 0,02
	Terminal Cover for 4th pole			
	Mains LTS20 ... to LTS80.. Load circuit LTS20 ... to LTS80..	KLAD70N KLAD70NI	1 1	0,002 0,002
	Terminal Cover 4-pole			
	LTS85.. to LTS125. LT125.. to LT160..	KLAD125 XX-KLAD4	1 1	0,01 0,02

Accessories for Main Switches, Panel Mounting, Single Hole and Base Mounting

	for switch	Type	Pack pcs.	Weight kg/pcs
	Additional Escutcheon Plate Yellow, Marked with: HAUPTSCHALTER			
	for plate 48□ LTS.. .HN1.. for plate 64□ LTS.. .HN4..	A91501 E91501	1 1	0,003 0,005
	Additional Escutcheon Plate Yellow, Marked with: MAIN SWITCH			
	for plate 48□ LTS.. .HN1.. for plate 64□ LTS.. .HN4..	A91524 E91524	1 1	0,003 0,005

Add-on Modules for Main Switches, Base and Rail Mounting

	for switch	Type	Pack pcs.	Weight kg/pcs
	4th Add-on Neutral Switching Pole			
	 LTS20 ... , LTS40 ... N40V LTS63 ... , LTS80 ... N80V		1 1	0,035 0,042
	Aux. Contact Block 1NO + 1NC			
	 LTS20 ... to LTS125 ... LH11		1	0,02
	Aux. Contact Block 1NO + 1NC Overlapping			
	 LTS20 ... to LTS125 ... LH11X		1	0,02
	Aux. Contact Block 2NO			
	 LTS20 ... to LTS125 ... LH20V/02E		1	0,02
	PE-Terminal			
	 LTS20 ... to LTS80 ... PE80V LT125 .. to LT160 .. LTXX-E/V		1 1	0,04 0,2
	N-Terminal			
	 LTS20 ... to LTS80 ... PEN80V LT125 .. to LT160 .. LTXX-N/V		1 1	0,04 0,2
	Terminal Cover 3-pole			
	LTS20 ... to LTS40 ...	KLAD40	1	0,005
	LTS63 ... to LTS80 ...	KLAD70	1	0,005
	LTS85.. to LTS125.	KLAD125	1	0,01
	Terminal Cover for 4th pole			
	Mains	KLAD70N	1	0,002
	Load circuit	KLAD70NI	1	0,002
	Terminal Cover 4-pole			
	LTS20 ... to LTS40 ...	KLAD40	1	0,005
	LTS85.. to LTS125.	KLAD125	1	0,01
	LT125.. to LT160..	XX-KLAD4	1	0,02
	Tab Terminal 6,3 x 0,8mm			
	LTS20 ... to LTS40 ...	LG11073	10	0,001

Contactor, Motor-Starters

Circuit Breakers

Manual Motor-Starters

Switches

AC-Main Switches

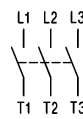
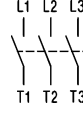
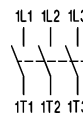
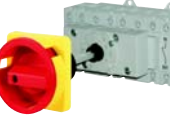
DC-Switch Disconnectors

Push Buttons

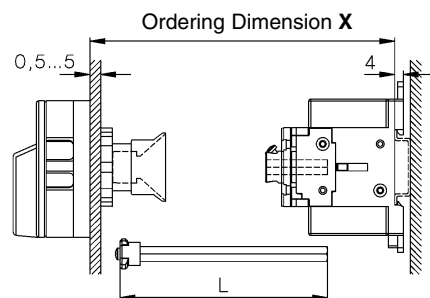
Representatives, Suppliers

Emergency-Stop-Main Switches, Base Mounting with Door Clutch for Single-Hole Mounting

Depth X is adjustable (delivered with X_{max} see below), IP66

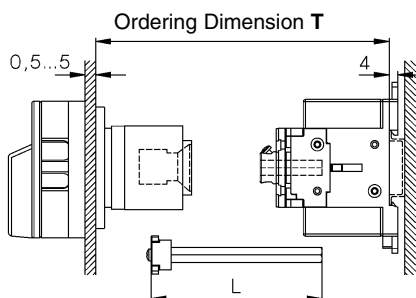
	max. padlocks	AC21 690V	AC23 3x400V	Plate	Type	Pack pcs.	Weight kg/pcs
3-pole, padlock device SV4							
 		20A	7,5kW	64 □	LTS20 VZVHN4 A3	1	0,19
		25A	10kW	64 □	LTS25 VZVHN4 A3	1	0,19
		32A	12,5kW	64 □	LTS32 VZVHN4 A3	1	0,19
		40A	16kW	64 □	LTS40 VZVHN4 A3	1	0,19
		63A	22kW	64 □	LTS63 VZVHN4 A3	1	0,22
		80A	22kW	64 □	LTS80 VZVHN4 A3	1	0,22
		85A	30kW	64 □	LTS85 VZVHN4 A3	1	0,40
		100A	37kW	64 □	LTS100 VZVHN4 A3	1	0,40
		125A	45kW	64 □	LTS125 VZVHN4 A3	1	0,40
	4-pole, padlock device SV4						
 		20A	7,5kW	64 □	LTS20 VZVHN4 A4	1	0,20
		25A	10kW	64 □	LTS25 VZVHN4 A4	1	0,20
		32A	12,5kW	64 □	LTS32 VZVHN4 A4	1	0,20
		40A	16kW	64 □	LTS40 VZVHN4 A4	1	0,20
		63A	22kW	64 □	LTS63 VZVHN4 A4	1	0,26
		80A	22kW	64 □	LTS80 VZVHN4 A4	1	0,26
		85A	30kW	64 □	LTS85 VZVHN4 A4	1	0,45
		100A	37kW	64 □	LTS100 VZVHN4 A4	1	0,45
		125A	45kW	64 □	LTS125 VZVHN4 A4	1	0,45
	6-pole, padlock device SV4						
 		20A	7,5kW	64 □	LTS20 VZVHN4 A6	1	0,32
		25A	10kW	64 □	LTS25 VZVHN4 A6	1	0,32
		32A	12,5kW	64 □	LTS32 VZVHN4 A6	1	0,32
		40A	16kW	64 □	LTS40 VZVHN4 A6	1	0,32
		63A	22kW	64 □	LTS63 VZVHN4 A6	1	0,37
		80A	22kW	64 □	LTS80 VZVHN4 A6	1	0,37
	8-pole, padlock device SV4						
 		20A	7,5kW	64 □	LTS20 VZVHN4 A8	1	0,34
		25A	10kW	64 □	LTS25 VZVHN4 A8	1	0,34
		32A	12,5kW	64 □	LTS32 VZVHN4 A8	1	0,34
		40A	16kW	64 □	LTS40 VZVHN4 A8	1	0,34
		63A	22kW	64 □	LTS63 VZVHN4 A8	1	0,45
		80A	22kW	64 □	LTS80 VZVHN4 A8	1	0,45

Depth Single Hole Mounting Ø22mm LTS.. VZV..



Type	X min	X max	L
LTS20-80 VZV.. 3, 4-pole	91 -	190	X - 40±3
LTS20-80 VZV.. 6, 8-pole	111 -	190	X - 60±3
LTS85-125 VZV.. 3, 4-pole	95 -	190	X - 44±3

4-Hole Mounting LTS.. V(HN).. (3, 4-pole)



Type	T min	T max	L	Type	T min	T max
LTS20-80 VH..	111 -	190	T - 60±3	LTS20-80 VZV.. 3, 4-pole	91 -	190
LTS85-125 VH..	115 -	190	T - 64±3	LTS20-80 VZV.. 6, 8-pole	111 -	190
				LTS85-125 VZV.. 3, 4-pole	95 -	190

greater X- and T-Dimensions (max. 380mm for LTS..) on request

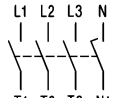
Emergency-Stop-Main Switches, Base Mounting with Door Clutch, Padlock Device for Four-Hole Mounting

Depth T is adjustable (delivered with T_{max} see page 278), IP66

	max. padlocks	AC21 690V	AC23 3x400V	Plate	Type	Pack pcs.	Weight kg/pcs
3-pole, padlock device SV4(34) 							
		20A	7,5kW	64 □ 1)	LTS20 VHN4 A3	1	0,20
		25A	10kW	64 □ 1)	LTS25 VHN4 A3	1	0,20
		32A	12,5kW	64 □ 1)	LTS32 VHN4 A3	1	0,20
		40A	16kW	64 □ 1)	LTS40 VHN4 A3	1	0,20
		63A	22kW	64 □ 1)	LTS63 VHN4 A3	1	0,24
		80A	22kW	64 □ 1)	LTS80 VHN4 A3	1	0,24
		85A	30kW	64 □ 1)	LTS85 VHN4 A3	1	0,40
		100A	37kW	64 □ 1)	LTS100 VHN4 A3	1	0,40
		125A	45kW	64 □ 1)	LTS125 VHN4 A3	1	0,40
		160A	55kW	88 □	LT160 VHN34 T300	1	1,38
4-pole, padlock device SV4(34) 							
		20A	7,5kW	64 □ 1)	LTS20 VHN4 A4	1	0,21
		25A	10kW	64 □ 1)	LTS25 VHN4 A4	1	0,21
		32A	12,5kW	64 □ 1)	LTS32 VHN4 A4	1	0,21
		40A	16kW	64 □ 1)	LTS40 VHN4 A4	1	0,21
		63A	22kW	64 □ 1)	LTS63 VHN4 A4	1	0,28
		80A	22kW	64 □ 1)	LTS80 VHN4 A4	1	0,28
		85A	30kW	64 □ 1)	LTS85 VHN4 A4	1	0,45
		100A	37kW	64 □ 1)	LTS100 VHN4 A4	1	0,45
		125A	45kW	64 □ 1)	LTS125 VHN4 A4	1	0,45
		160A	55kW	88 □	LT160 VHN34 T400	1	1,77
6-pole, 8-pole Changeover Switch with Padlock Device for Base Mounting					on request on request		

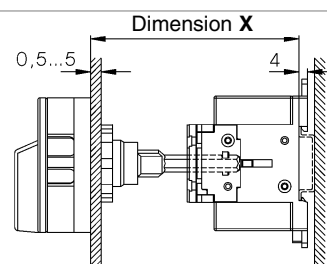
Emergency-Stop-Main Switches, Base Mounting with Door Clutch for Single-Hole Mounting

Depth X is not adjustable, declare depth X when ordering, IP66

4-pole, padlock device SV4							
		20A	7,5kW	64 □	LTS20 VZHN4 A4 X..	1	0,18
		25A	10kW	64 □	LTS25 VZHN4 A4 X..	1	0,18
		32A	12,5kW	64 □	LTS32 VZHN4 A4 X..	1	0,18
		40A	16kW	64 □	LTS40 VZHN4 A4 X..	1	0,18
		63A	22kW	64 □	LTS63 VZHN4 A4 X..	1	0,25
		80A	22kW	64 □	LTS80 VZHN4 A4 X..	1	0,25
		3-pole, 6-pole, 8-pole					on request

Declare depth X when ordering

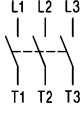
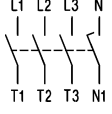
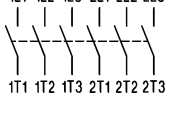
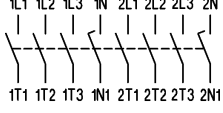
Type	Preference values for X
LTS.. VZH..	80, 85, 104, 129 (tolerance -3, +1,5)



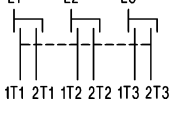
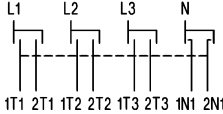
Add-on modules see page 277

1) Types with padlock device 88 □ type suffix **88**, ordering example: LTS32 VHN4**88** A3, on request

Emergency-Stop-Main Switches for Distribution Boards, lockable IP40

		max. padlocks	AC21 690V	AC23 3x400V	Plate	Type	Pack pcs.	Weight kg/pcs
3-pole, padlock device SV1 								
								
			20A	7,5kW	52x45	LTS20 SMAHN1 A3 ²⁾	1	0,15
			25A	10kW	52x45	LTS25 SMAHN1 A3 ²⁾	1	0,15
			32A	12,5kW	52x45	LTS32 SMAHN1 A3 ²⁾	1	0,15
			40A	16kW	52x45	LTS40 SMAHN1 A3 ²⁾	1	0,15
			63A	22kW	52x45	LTS63 SMAHN1 A3 ²⁾	1	0,18
			80A	22kW	52x45	LTS80 SMAHN1 A3 ²⁾	1	0,18
			85A	30kW	78x45	LTS85 SMAHN1 A3	1	0,37
			100A	37kW	78x45	LTS100 SMAHN1 A3	1	0,37
			125A	45kW	78x45	LTS125 SMAHN1 A3	1	0,37
4-pole, padlock device SV1 								
			20A	7,5kW	52x45	LTS20 SMAHN1 A4 ²⁾	1	0,16
			25A	10kW	52x45	LTS25 SMAHN1 A4 ²⁾	1	0,16
			32A	12,5kW	52x45	LTS32 SMAHN1 A4 ²⁾	1	0,16
			40A	16kW	52x45	LTS40 SMAHN1 A4 ²⁾	1	0,16
			63A	22kW	52x45	LTS63 SMAHN1 A4 ²⁾	1	0,21
			80A	22kW	52x45	LTS80 SMAHN1 A4 ²⁾	1	0,21
			85A	30kW	78x45	LTS85 SMAHN1 A4	1	0,42
			100A	37kW	78x45	LTS100 SMAHN1 A4	1	0,42
			125A	45kW	78x45	LTS125 SMAHN1 A4	1	0,42
6-pole, padlock device SV1(64) 								
			20A	7,5kW	52x45	LTS20 SMAHN1 A6	1	0,29
			25A	10kW	52x45	LTS25 SMAHN1 A6	1	0,29
			32A	12,5kW	52x45	LTS32 SMAHN1 A6	1	0,29
			40A	16kW	52x45	LTS40 SMAHN1 A6	1	0,29
			63A	22kW	97x45	LTS63 SMAHN1 A6 ¹⁾	1	0,34
			80A	22kW	97x45	LTS80 SMAHN1 A6 ¹⁾	1	0,34
8-pole, padlock device SV164 								
			20A	7,5kW	97x45	LTS20 SMAHN1 A8	1	0,31
			25A	10kW	97x45	LTS25 SMAHN1 A8	1	0,31
			32A	12,5kW	97x45	LTS32 SMAHN1 A8	1	0,31
			40A	16kW	97x45	LTS40 SMAHN1 A8	1	0,31
			63A	22kW	126x45	LTS63 SMAHN1 A8	1	0,42
			80A	22kW	126x45	LTS80 SMAHN1 A8	1	0,42

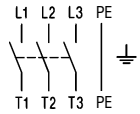
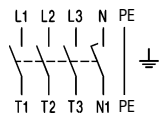
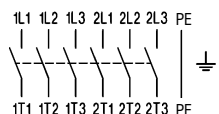
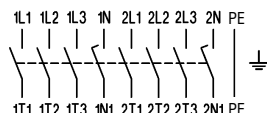
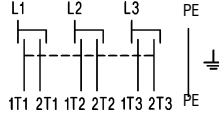
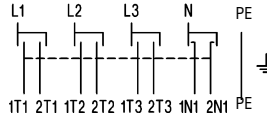
Changeover Switch with Padlock Device for Distribution Boards, lockable

3-pole, padlock device SV164 								
			20A	7,5kW	97x45	LTS20 SMAHN1 U3	1	0,29
			25A	10kW	97x45	LTS25 SMAHN1 U3	1	0,29
			32A	12,5kW	97x45	LTS32 SMAHN1 U3	1	0,29
			40A	16kW	97x45	LTS40 SMAHN1 U3	1	0,29
			63A	22kW	97x45	LTS63 SMAHN1 U3	1	0,34
4-pole, padlock device SV164 								
			20A	7,5kW	97x45	LTS20 SMAHN1 U4	1	0,31
			25A	10kW	97x45	LTS25 SMAHN1 U4	1	0,31
			32A	12,5kW	97x45	LTS32 SMAHN1 U4	1	0,31
			40A	16kW	97x45	LTS40 SMAHN1 U4	1	0,31
			63A	22kW	126x45	LTS63 SMAHN1 U4	1	0,42

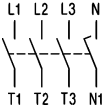
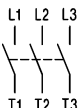
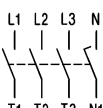
¹⁾ With padlock device SV164

²⁾ Emergency-Stop-Main Switches for Distribution Boards, lockable with low height handle, IP40
Type with Type-suffix „+SV1N“ e.g.: **LTS40 SMAHN1 A3 +SV1N**

Maintenance and Safety Switches, in Plastic Enclosure, lockable IP66

	max. padlocks	AC21 690V	AC23 3x400V	Plate	Type	Pack pcs.	Weight kg/pcs
3-pole, padlock device SV4(34) 							
		20A	7,5kW	64 □	LTS20 PFHN4 A3	1	0,32
		25A	10kW	64 □	LTS25 PFHN4 A3	1	0,32
		32A	12,5kW	64 □	LTS32 PFHN4 A3	1	0,32
		40A	16kW	64 □	LTS40 PFHN4 A3	1	0,32
		63A	22kW	64 □	LTS63 PFHN4 A3	1	0,60
		80A	22kW	64 □	LTS80 PFHN4 A3	1	0,60
		85A	30kW	64 □	LTS85 PFHN4 A3	1	0,78
		100A	37kW	64 □	LTS100 PFHN4 A3	1	0,78
		125A	45kW	64 □	LTS125 PFHN4 A3	1	0,78
		160A	55kW	88 □	LT160 PFHN34 T300	1	2,09
Larger enclosure Type: ..PFL... on request							
4-pole, padlock device SV4(34) 							
		20A	7,5kW	64 □	LTS20 PFHN4 A4	1	0,33
		25A	10kW	64 □	LTS25 PFHN4 A4	1	0,33
		32A	12,5kW	64 □	LTS32 PFHN4 A4	1	0,33
		40A	16kW	64 □	LTS40 PFHN4 A4	1	0,33
		63A	22kW	64 □	LTS63 PFHN4 A4	1	0,64
		80A	22kW	64 □	LTS80 PFHN4 A4	1	0,64
		85A	30kW	64 □	LTS85 PFHN4 A4	1	0,83
		100A	37kW	64 □	LTS100 PFHN4 A4	1	0,83
		125A	45kW	64 □	LTS125 PFHN4 A4	1	0,83
		160A	55kW	88 □	LT160 PFHN34 T400	1	2,47
Larger enclosure Type appendix +PF3 on request +PF3/M50 on request							
6-pole, padlock device SV4 							
		20A	7,5kW	64 □	LTS20 PFHN4 A6	1	1,39
		25A	10kW	64 □	LTS25 PFHN4 A6	1	1,39
		32A	12,5kW	64 □	LTS32 PFHN4 A6	1	1,39
		40A	16kW	64 □	LTS40 PFHN4 A6	1	1,39
		63A	22kW	64 □	LTS63 PFHN4 A6	1	1,42
		80A	22kW	64 □	LTS80 PFHN4 A6	1	1,42
knockoutlets M50/40 Type appendix +PF3/M50 on request							
8-pole, padlock device SV4 							
		20A	7,5kW	64 □	LTS20 PFHN4 A8	1	1,44
		25A	10kW	64 □	LTS25 PFHN4 A8	1	1,44
		32A	12,5kW	64 □	LTS32 PFHN4 A8	1	1,44
		40A	16kW	64 □	LTS40 PFHN4 A8	1	1,44
		63A	22kW	64 □	LTS63 PFHN4 A8	1	1,50
		80A	22kW	64 □	LTS80 PFHN4 A8	1	1,50
knockoutlets M50/40 Type appendix +PF3/M50 on request							
Changeover Switch with Padlock Device, lockable							
3-pole, padlock device SV4 							
		20A	7,5kW	64 □	LTS20 PFHN4 U3	1	1,39
		25A	10kW	64 □	LTS25 PFHN4 U3	1	1,39
		32A	12,5kW	64 □	LTS32 PFHN4 U3	1	1,39
		40A	16kW	64 □	LTS40 PFHN4 U3	1	1,39
		63A	22kW	64 □	LTS63 PFHN4 U3	1	1,42
		80A	22kW	64 □	LTS80 PFHN4 U3	1	1,42
4-pole, padlock device SV4 							
		20A	7,5kW	64 □	LTS20 PFHN4 U4	1	1,44
		25A	10kW	64 □	LTS25 PFHN4 U4	1	1,44
		32A	12,5kW	64 □	LTS32 PFHN4 U4	1	1,44
		40A	16kW	64 □	LTS40 PFHN4 U4	1	1,44
		63A	22kW	64 □	LTS63 PFHN4 U4	1	1,50
		80A	22kW	64 □	LTS80 PFHN4 U4	1	1,50

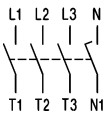
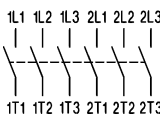
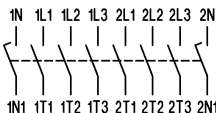
Main Switches for Panel Mounting, lockable IP66

		max. padlocks	AC21 690V	AC23 3x400V	Plate	Type		Pack pcs.	Weight kg/pcs
3-pole, padlock device SV1 									
			20A	7,5kW	48 □ ¹⁾	LTS20 EH1 A3		1	0,15
			25A	10kW	48 □ ¹⁾	LTS25 EH1 A3		1	0,15
			32A	12,5kW	48 □ ¹⁾	LTS32 EH1 A3		1	0,15
			40A	16kW	48 □ ¹⁾	LTS40 EH1 A3		1	0,15
			63A	22kW	48 □ ¹⁾	LTS63 EH1 A3		1	0,17
			80A	22kW	48 □ ¹⁾	LTS80 EH1 A3		1	0,17
		4-pole, padlock device SV1 							
			20A	7,5kW	48 □ ¹⁾	LTS20 EH1 A4		1	0,19
			25A	10kW	48 □ ¹⁾	LTS25 EH1 A4		1	0,19
			32A	12,5kW	48 □ ¹⁾	LTS32 EH1 A4		1	0,19
			40A	16kW	48 □ ¹⁾	LTS40 EH1 A4		1	0,19
			63A	22kW	48 □ ¹⁾	LTS63 EH1 A4		1	0,21
			80A	22kW	48 □ ¹⁾	LTS80 EH1 A4		1	0,21
6-pole, 8-pole						on request			
3-pole, padlock device SV4(34) 									
			20A	7,5kW	64 □ ²⁾	LTS20 EH4 A3		1	0,17
			25A	10kW	64 □ ²⁾	LTS25 EH4 A3		1	0,17
			32A	12,5kW	64 □ ²⁾	LTS32 EH4 A3		1	0,17
			40A	16kW	64 □ ²⁾	LTS40 EH4 A3		1	0,17
			63A	22kW	64 □ ²⁾	LTS63 EH4 A3		1	0,19
			80A	22kW	64 □ ²⁾	LTS80 EH4 A3		1	0,19
			80A	30kW	64 □ ²⁾	LTS85 EH4 A3		1	0,39
			100A	37kW	64 □ ²⁾	LTS100 EH4 A3		1	0,39
			125A	45kW	64 □ ²⁾	LTS125 EH4 A3		1	0,39
	160A	55kW	88 □	LT160 EH34 T300		1	1,16		
4-pole, padlock device SV4(34) 									
			20A	7,5kW	64 □ ²⁾	LTS20 EH4 A4		1	0,20
			25A	10kW	64 □ ²⁾	LTS25 EH4 A4		1	0,20
			32A	12,5kW	64 □ ²⁾	LTS32 EH4 A4		1	0,20
			40A	16kW	64 □ ²⁾	LTS40 EH4 A4		1	0,20
			63A	22kW	64 □ ²⁾	LTS63 EH4 A4		1	0,23
			80A	22kW	64 □ ²⁾	LTS80 EH4 A4		1	0,23
			80A	30kW	64 □ ²⁾	LTS85 EH4 A4		1	0,44
			100A	37kW	64 □ ²⁾	LTS100 EH4 A4		1	0,44
			125A	45kW	64 □ ²⁾	LTS125 EH4 A4		1	0,44
	160A	55kW	88 □	LT160 EH34 T400		1	1,55		
6-pole, 8-pole						on request			

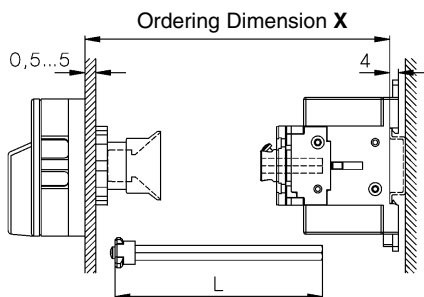
Add-on modules see page 276

- 1) Types with padlock device 64 □ type suffix **64**, ordering example: LTS32 EH1**64** A3, on request
- 2) Types with padlock device 88 □ type suffix **88**, ordering example: LTS32 EH4**88** A3, on request

Main Switches, Base Mounting with Door Clutch, Padlock Device for Single-Hole Mounting Depth X is adjustable (delivered with X_{max} see below), IP66

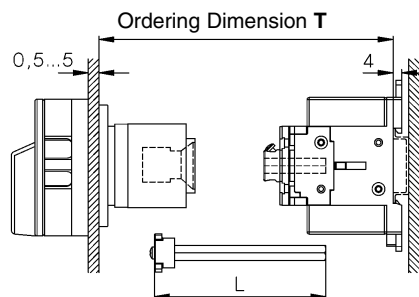
	max. padlocks	AC21 690V	AC23 3x400V	Plate	Type	Pack pcs.	Weight kg/pcs
3-pole, padlock device SV4  		20A	7,5kW	64 □	LTS20 VZVH4 A3	1	0,19
		25A	10kW	64 □	LTS25 VZVH4 A3	1	0,19
		32A	12,5kW	64 □	LTS32 VZVH4 A3	1	0,19
		40A	16kW	64 □	LTS40 VZVH4 A3	1	0,19
		63A	22kW	64 □	LTS63 VZVH4 A3	1	0,22
		80A	22kW	64 □	LTS80 VZVH4 A3	1	0,22
		85A	30kW	64 □	LTS85 VZVH4 A3	1	0,40
		100A	37kW	64 □	LTS100 VZVH4 A3	1	0,40
		125A	45kW	64 □	LTS125 VZVH4 A3	1	0,40
4-pole, padlock device SV4  		20A	7,5kW	64 □	LTS20 VZVH4 A4	1	0,20
		25A	10kW	64 □	LTS25 VZVH4 A4	1	0,20
		32A	12,5kW	64 □	LTS32 VZVH4 A4	1	0,20
		40A	16kW	64 □	LTS40 VZVH4 A4	1	0,20
		63A	22kW	64 □	LTS63 VZVH4 A4	1	0,26
		80A	22kW	64 □	LTS80 VZVH4 A4	1	0,26
		85A	30kW	64 □	LTS85 VZVH4 A4	1	0,45
		100A	37kW	64 □	LTS100 VZVH4 A4	1	0,45
		125A	45kW	64 □	LTS125 VZVH4 A4	1	0,45
6-pole, padlock device SV4  		20A	7,5kW	64 □	LTS20 VZVH4 A6	1	0,32
		25A	10kW	64 □	LTS25 VZVH4 A6	1	0,32
		32A	12,5kW	64 □	LTS32 VZVH4 A6	1	0,32
		40A	16kW	64 □	LTS40 VZVH4 A6	1	0,32
		63A	22kW	64 □	LTS63 VZVH4 A6	1	0,37
		80A	22kW	64 □	LTS80 VZVH4 A6	1	0,37
8-pole, padlock device SV4  		20A	7,5kW	64 □	LTS20 VZVH4 A8	1	0,34
		25A	10kW	64 □	LTS25 VZVH4 A8	1	0,34
		32A	12,5kW	64 □	LTS32 VZVH4 A8	1	0,34
		40A	16kW	64 □	LTS40 VZVH4 A8	1	0,34
		63A	22kW	64 □	LTS63 VZVH4 A8	1	0,45
		80A	22kW	64 □	LTS80 VZVH4 A8	1	0,45

Depth
Single Hole Mounting Ø22mm
LTS.. VZV..



Type	X min	X max	L
LTS20-80 VZV.. 3, 4-pole	91 -	190	X - 40±3
LTS20-80 VZV.. 6, 8-pole	111 -	190	X - 60±3
LTS85-125 VZV.. 3, 4-pole	95-	190	X - 44±3

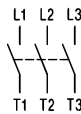
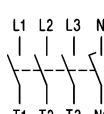
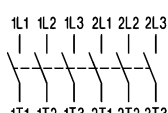
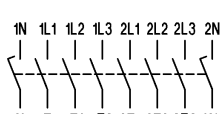
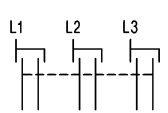
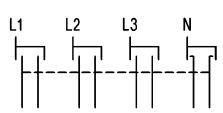
4-Hole Mounting
LTS.. V(H).. (3, 4-pole)



Type	T min	T max	L	Type	T min	T max
LTS20-80 VH..	111 -	190	T - 60±3	LTS20-80 VZV..	91 -	190
LTS85-125 VH..	115 -	190	T - 64±3	LTS85-125 VZV..	95 -	190
				LT160 VH..	120 -	450

greater X- and T-Dimensions (max. 380mm for LTS..) on request

Switch Disconnectors for Panel Mounting, IP66

	AC21 690V	AC23 3x400V	Plate	Type	Pack pcs.	Weight kg/pcs
On-Off Switches 3-pole						
 	20A	7,5kW	48 □	LTS20 E A3	1	0,15
	25A	10kW	48 □	LTS25 E A3	1	0,15
	32A	12,5kW	48 □	LTS32 E A3	1	0,15
	40A	16kW	48 □	LTS40 E A3	1	0,15
	63A	22kW	48 □	LTS63 E A3	1	0,17
	80A	22kW	48 □	LTS80 E A3	1	0,17
	85A	30kW	64 □	LTS85 E A3	1	0,39
	100A	37kW	64 □	LTS100 E A3	1	0,39
	125A	45kW	64 □	LTS125 E A3	1	0,39
	160A	55kW	88 □	LT160 E T300	1	1,10
On-Off Switches 4-pole						
 	20A	7,5kW	48 □	LTS20 E A4	1	0,18
	25A	10kW	48 □	LTS25 E A4	1	0,18
	32A	12,5kW	48 □	LTS32 E A4	1	0,18
	40A	16kW	48 □	LTS40 E A4	1	0,18
	63A	22kW	48 □	LTS63 E A4	1	0,21
	80A	22kW	48 □	LTS80 E A4	1	0,21
	85A	30kW	64 □	LTS85 E A4	1	0,44
	100A	37kW	64 □	LTS100 E A4	1	0,44
	125A	45kW	64 □	LTS125 E A4	1	0,44
	160A	55kW	88 □	LT160 E T400	1	1,50
On-Off Switches 6-pole						
 	20A	7,5kW	64 □	LTS20 E A6	1	0,30
	25A	10kW	64 □	LTS25 E A6	1	0,30
	32A	12,5kW	64 □	LTS32 E A6	1	0,30
	40A	16kW	64 □	LTS40 E A6	1	0,30
	63A	22kW	64 □	LTS63 E A6	1	0,36
	80A	22kW	64 □	LTS80 E A6	1	0,36
On-Off Switches 8-pole						
 	20A	7,5kW	64 □	LTS20 E A8	1	0,32
	25A	10kW	64 □	LTS25 E A8	1	0,32
	32A	12,5kW	64 □	LTS32 E A8	1	0,32
	40A	16kW	64 □	LTS40 E A8	1	0,32
	63A	22kW	64 □	LTS63 E A8	1	0,43
	80A	22kW	64 □	LTS80 E A8	1	0,43
Changeover Switches 3-pole						
 	20A	7,5kW	64 □	LTS20 E U3	1	0,31
	25A	10kW	64 □	LTS25 E U3	1	0,31
	32A	12,5kW	64 □	LTS32 E U3	1	0,31
	40A	16kW	64 □	LTS40 E U3	1	0,31
	63A	22kW	64 □	LTS63 E U3	1	0,37
Changeover Switches 4-pole						
 	20A	7,5kW	64 □	LTS20 E U4	1	0,33
	25A	10kW	64 □	LTS25 E U4	1	0,33
	32A	12,5kW	64 □	LTS32 E U4	1	0,33
	40A	16kW	64 □	LTS40 E U4	1	0,33
	63A	22kW	64 □	LTS63 E U4	1	0,44

Switch Disconnectors for Base Mounting on request

Switch Disconnectors in Plastic Enclosure, IP66

	AC21 690V	AC23 3x400V	Plate	Type	Pack pcs.	Weight kg/pcs
On-Off Switches 3-pole 	20A	7,5kW	64 □	LTS20 PF A3	1	0,30
	25A	10kW	64 □	LTS25 PF A3	1	0,30
	32A	12,5kW	64 □	LTS32 PF A3	1	0,30
	40A	16kW	64 □	LTS40 PF A3	1	0,30
	63A	22kW	64 □	LTS63 PF A3	1	0,58
	80A	22kW	64 □	LTS80 PF A3	1	0,58
On-Off Switches 4-pole 	20A	7,5kW	64 □	LTS20 PF A4	1	0,31
	25A	10kW	64 □	LTS25 PF A4	1	0,31
	32A	12,5kW	64 □	LTS32 PF A4	1	0,31
	40A	16kW	64 □	LTS40 PF A4	1	0,31
	63A	22kW	64 □	LTS63 PF A4	1	0,62
	80A	22kW	64 □	LTS80 PF A4	1	0,62

Switch Disconnectors for Distribution Boards, IP40

On-Off Switches 3-pole 	20A	7,5kW	52x45	LTS20 SMA A3	1	0,15
	25A	10kW	52x45	LTS25 SMA A3	1	0,15
	32A	12,5kW	52x45	LTS32 SMA A3	1	0,15
	40A	16kW	52x45	LTS40 SMA A3	1	0,15
	63A	22kW	52x45	LTS63 SMA A3	1	0,17
	80A	22kW	52x45	LTS80 SMA A3	1	0,17
	85A	30kW	78x45	LTS85 SMA A3	1	0,37
On-Off Switches 4-pole 	100A	37kW	78x45	LTS100 SMA A3	1	0,37
	125A	45kW	78x45	LTS125 SMA A3	1	0,37
	20A	7,5kW	52x45	LTS20 SMA A4	1	0,16
	25A	10kW	52x45	LTS25 SMA A4	1	0,16
	32A	12,5kW	52x45	LTS32 SMA A4	1	0,16
	40A	16kW	52x45	LTS40 SMA A4	1	0,16
	63A	22kW	52x45	LTS63 SMA A4	1	0,21
On-Off Switches 6-pole 	80A	22kW	52x45	LTS80 SMA A4	1	0,21
	85A	30kW	78x45	LTS85 SMA A4	1	0,42
	100A	37kW	78x45	LTS100 SMA A4	1	0,42
	125A	45kW	78x45	LTS125 SMA A4	1	0,42
	20A	7,5kW	52x45	LTS20 SMA A6	1	0,29
	25A	10kW	52x45	LTS25 SMA A6	1	0,29
	32A	12,5kW	52x45	LTS32 SMA A6	1	0,29
On-Off Switches 8-pole 	40A	16kW	52x45	LTS40 SMA A6	1	0,29
	63A	22kW	97x45	LTS63 SMA A6	1	0,34
	80A	22kW	97x45	LTS80 SMA A6	1	0,34
	20A	7,5kW	97x45	LTS20 SMA A8	1	0,31
	25A	10kW	97x45	LTS25 SMA A8	1	0,31
	32A	12,5kW	97x45	LTS32 SMA A8	1	0,31
	40A	16kW	97x45	LTS40 SMA A8	1	0,31
Changeover Switches 3-pole 	63A	22kW	126x45	LTS63 SMA A8	1	0,42
	80A	22kW	126x45	LTS80 SMA A8	1	0,42
	20A	7,5kW	97x45	LTS20 SMA U3	1	0,30
	25A	10kW	97x45	LTS25 SMA U3	1	0,30
	32A	12,5kW	97x45	LTS32 SMA U3	1	0,30
Changeover Switches 4-pole 	40A	16kW	97x45	LTS40 SMA U3	1	0,30
	63A	22kW	97x45	LTS63 SMA U3	1	0,35
	20A	7,5kW	97x45	LTS20 SMA U4	1	0,32
	25A	10kW	97x45	LTS25 SMA U4	1	0,32
	32A	12,5kW	97x45	LTS32 SMA U4	1	0,32
	40A	16kW	97x45	LTS40 SMA U4	1	0,32
	63A	22kW	126x45	LTS63 SMA U4	1	0,43

Technical Data

Data according to IEC 947-3, IEC 947-5-1, VDE 0660, EN 60947-3, EN 60947-5-1

Type			LTS20	LTS25	LTS32	LTS40	LTS63	LTS80	LTS85	LTS100	LTS125	LT160
Main contacts												
Rated thermal current I _{th} open	A		20	25	32	40	63	80	85	100	125	160
Rated thermal current I _{the} enclosed	A		20	25	32	40	63	80	85	100	110	160
Rated insulation voltage U _i ¹⁾	V		690	690	690	690	690	690	1000 ⁵⁾	1000 ⁵⁾	1000 ⁵⁾	1000 ³⁾
Rated operational current I _e AC21A	A		20	25	32	40	63	80	85	100	125	160
Making capacity I _{eff} 3x380-440V	A		160	190	220	300	370	440	600	725	850	1050
Breaking capacity 3x220-240V	A		160	180	200	250	330	380	480	580	680	900
3x380-440V	A		160	180	200	250	330	380	480	580	680	850
3x660-690V	A		80	110	140	170	190	220	250	330	420	340
Disconnection property performed up to	V		690	690	690	690	690	690	1000	1000	1000	1000 ³⁾
Motor Switch AC3 3x400V	A		12	16	23	30	37	37	45	60	72	85
Motor Switch AC3 3x220-240V	kW		3	4	5,5	7,5	11	11	15	18,5	22	30
Direct switching of single motors 3x380-440V	kW		5,5	7,5	11	15	18,5	18,5	22	30	37	45
3x660-690V	kW		5,5	7,5	11	15	18,5	18,5	18,5	22	30	37
Main Switch AC23 3x400V	A		16	20	25	32	45	45	60	72	85	110
Motor Switch, AC23A, 3x220-240V	kW		4	5,5	7,5	9	15	15	18,5	22	30	30
Main Switch, AC23B 3x380-440V	kW		7,5	10	12,5	16	22	22	30	37	45	55
Safety Switch 3x660-690V	kW		5,5	7,5	11	15	18,5	18,5	22	30	37	37
Rated conditional short-circuit current kA _{eff}			10	10	10	10	10	10	10	10	5	30
Max. fuse size gL (gG)	A		25	35	40	40	63	80	100	100	125	160
Mechanical life x10 ³			200	200	200	200	100	100	100	100	100	100
Rated short-time withstand current (1sec. current)	A		250	300	400	500	600	850	1000	1200	1500	3000
Power loss per pole AC21 = I _{th}												
P/pole [W]	E, Z		0,322	0,503	0,824	1,288	2,739	4,416	3,851	5,330	8,328	
	V, SMA, PF		0,364	0,569	0,933	1,458	2,739	4,416	3,851	5,330	8,328	
R/pole [mOhm]	E, Z		0,805	0,805	0,805	0,805	0,690	0,690	0,533	0,533	0,533	
	V, SMA, PF		0,911	0,911	0,911	0,911	0,690	0,690	0,533	0,533	0,533	
Cable cross sections												
solid or stranded	mm ²		0,5 - 10				1-25 ⁶		4-50		max.95	
	AWG		20 - 8 (10)				16 - 4 (10)		10 - 0 (10)		max.3/0	
flexible	mm ²		0,5 - 6				4 - 16 ⁶		10 - 35		max.70	
	AWG		20 - 10				16 - 6		8 - 2		max.2/0	
flexible (+ multicore cable end)	mm ²		0,5 - 6				0,75 - 16 ⁶		6 - 35		max.50	
	AWG		20 - 10				16 - 6		8 - 2		max.1/0	
Size of terminal screw			M3,5				M5		M6		M10	
Tightening torque	Nm		0,8-1,7				2-4		3,5-4,5		14	
Auxiliary contacts												
Rated insulation voltage U _i ¹⁾	V		690				690		690		690	
Rated thermal current I _{th} , I _{the}	A		10				10		10		16	
Switching capacity AC15 220-240V	A		2,5				2,5		2,5		6	
AC15 380-440V	A		1,5				1,5		1,5		4	
Rated conditional short-circuit current kA _{eff}			3				3		3		3	
Max. short circuit protection gL (gG)	A		10				10		10		16	
Cable cross sections												
solid or stranded	mm ²		0,75 - 2,5				0,75 - 2,5		0,75 - 2,5		max.4	
	AWG		14 - 12				14 - 12		14 - 12		max.12	
flexible (+ multicore cable end)	mm ²		0,75 - 2,5 (1,5)				0,75 - 2,5 (1,5)		0,75 - 2,5 (1,5)		max.2,5	
	AWG		18 - 14				18 - 14		18 - 14		max.14	

Data according to UL und cUL

Type		LTS20	LTS25	LTS32	LTS40	LTS63	LTS80	LTS85	LTS100	LTS125	LT160
Rated voltage	V	600	600	600	600	600	600	600	600	600	600
Ampere-Rating "General use"	A	20	25	32	40	63	80	85	100	125	200
DOL-Rating 3-phase 110-120V	HP	1	1,5	2	2	3	5	7,5	10	15	20
220-240V	HP	3	5	5	5	10	10	20	25	30	40
440-480V	HP	7,5	10	10	10	20	20	40	50	60	60
550-600V	HP	10	10	15	15	25	25	50	60	60	60
DOL-Rating 1-phase 110-120V	HP	1	1	1	1	2	2	3	5	7,5	-
200-208V	HP	1	2	2	2	3	3	7,5	10	10	-
220-240V	HP	2	2	3	3	5	5	10	15	15	-
Fuse size (RK5) Manual Motor Controller	A	40	50	50	70	90	110	125	125	125	400 ⁴⁾
5kA / 600V Motor Disconnect	A	40	50	50	50	70	70	125	125	125	400 ⁴⁾
Tightening torque	Nm	1,2-2,3	1,2-2,3	1,2-2,3	1,2-2,3	2,8-4	2,8-4	1,7-4,5	1,7-4,5	1,7-4,5	14
	lb.inch	11-20	11-20	11-20	11-20	24-35	24-35	15-40	15-40	15-40	124

1) suitable for: earthed-neutral systems, overvoltage category I to III, pollution degree 3 (standard-industry): $U_{imp} = 6kV$. Data for other conditions on request

2) the values after the slash are valid for switches 6-pole or more

3) Suitable for no load applications (AC20A) above 690V

4) Fuse RK1 / 10kA / 600V

5) $U_{imp} = 8kV$

6) LTS63..U. stranded 16mm², flexible 10mm²

Dimensions (mm)

Main Switches, Switch Disconnectors LT(S)..

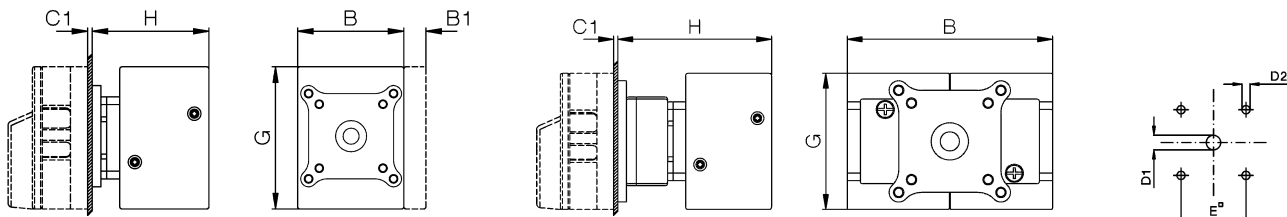
Panel mounting LT(S).. E(HN)..

ON-OFF Switches 3-pole, 4-pole

ON-OFF Switches 6-pole, 8-pole

Changeover Switches 3-pole, 4-pole

Mounting holes



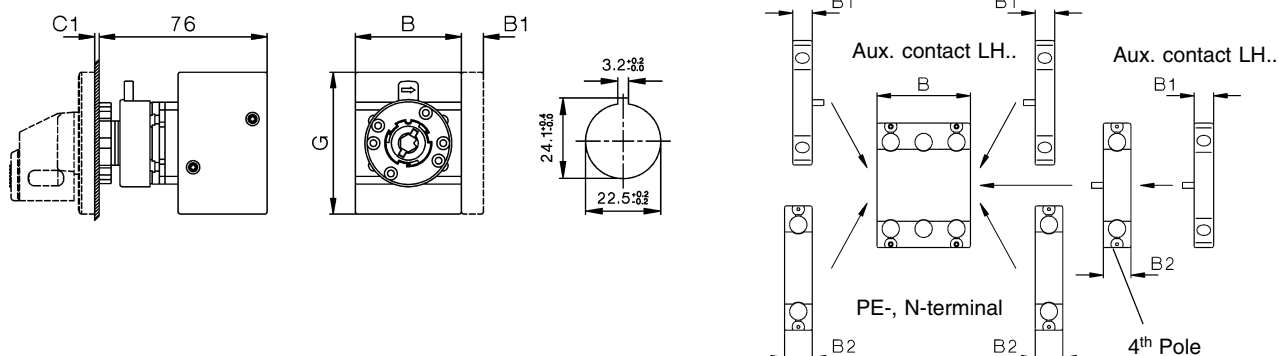
Single hole mounting LTS.. Z(HN)..

ON-OFF Switches 3-pole, 4-pole

Mounting holes

Mounting of add-on modules LTS20 - LTS80

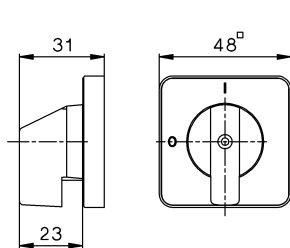
Panel mounting, Single hole mounting



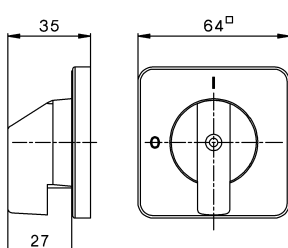
Type	Changeover ON-OFF Escutch. plate or padlock device	3-pole		4-pole	3-pole	4-pole	aux. contact B1	4 Pole						3,4-pole		
		A	B	B	6-pole	8-pole		PE	B2	C1	D1	D2	E		F	G
LTS..	48 □, SV1	48	48	62,5	-	-	10	14,5	1-5	9	5	36	-	64	54	-
LTS..	64 □, SV4, SV164	64	48	62,5	97	126	10	14,5	1-5	9	5	48	-	64	54	74
LTS85-125..	64 □, SV4	64	78	78	-	-	10	-	1-5	9	5	48	-	85	60	-
LTS85-125..	88 □, SV488	88	78	78	-	-	10	-	1-5	9	6	68	-	85	60	-
LT125/160	88 □, SV34	88	112	150	224	-	-	-	1-4	13-17	6	68	49,3	108	96	98

Escutcheon plate

48 □

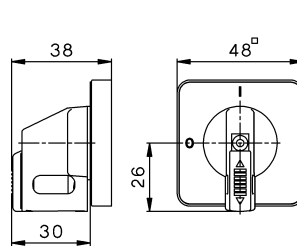


64 □

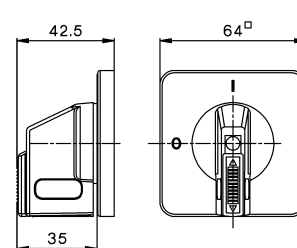


Padlock devices

SV1

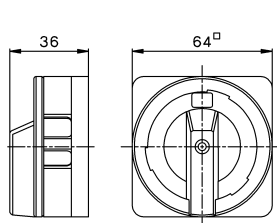


SV164

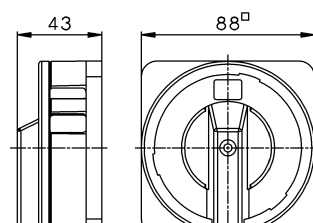


Padlock devices

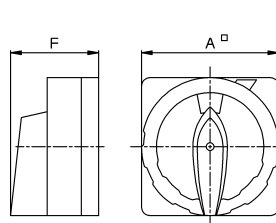
SV4



SV488

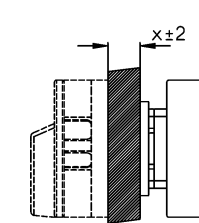


SV34



Extended Switch Shaft

+VW"x"



Dimensions (mm)

Main Switches, Switch Disconnectors LT(S)..

Base mounting LTS.. VZV(HN)..

ON-OFF Switches 3-pole, 4-pole

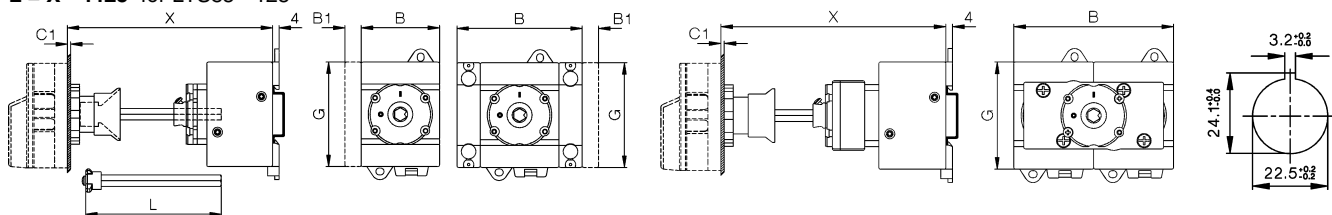
$L = X - 40 \pm 3$ for LTS20 - 80

$L = X - 44 \pm 3$ for LTS85 - 125

6-pole
for LTS20 - 40 only
 $L = X - 40 \pm 3$

ON-OFF Switches 6-pole, 8-pole
Changeover Switches 3-pole, 4-pole
 $L = X - 60 \pm 3$

Mounting
holes



Base mounting LT(S).. V(HN)..

ON-OFF Switches 3-pole, 4-pole

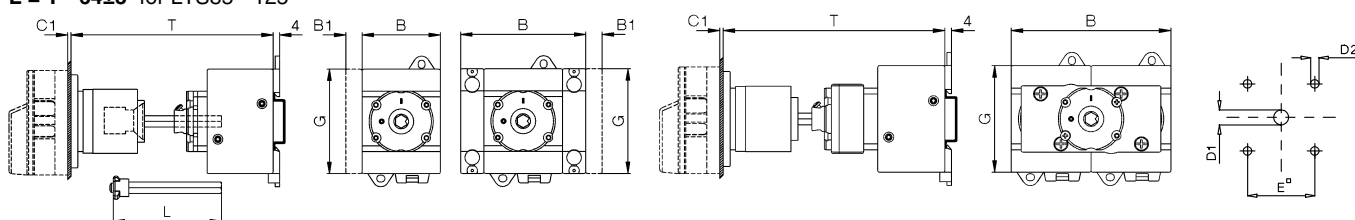
$L = T - 60 \pm 3$ for LTS20 - 80

$L = T - 64 \pm 3$ for LTS85 - 125

6-pole
for LTS20 - 40 only
 $L = T - 60 \pm 3$

ON-OFF Switches 6-pole, 8-pole
Changeover Switches 3-pole, 4-pole
 $L = T - 80 \pm 3$ for LTS20 - 80 only

Mounting
holes



Base mounting LTS.. VZ(HN)..

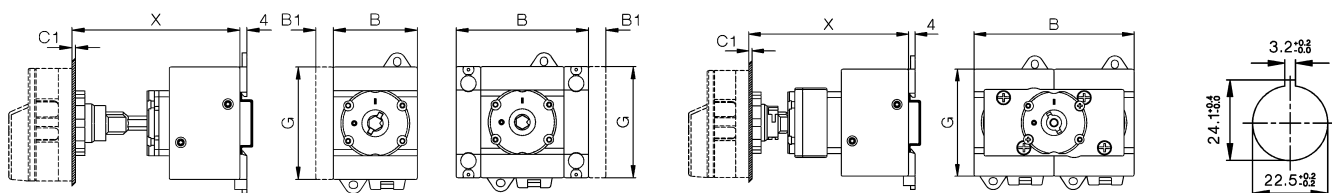
ON-OFF Switches 3-pole, 4-pole

Preference values for X: 80, 85, 104, 129

6-pole
for LTS20 - 40 only

ON-OFF Switches 6-pole, 8-pole
Changeover Switches 3-pole, 4-pole

Mounting
holes



Type	Changeover ON-OFF Escutch. plate or padlock device							4.Pole PE B2									
		3-pole	4-pole	6-pole	3,4-pole	8-pole	aux. contact B1		C1	D1	D2	D3	E	G	K	K1	J
LTS20 -40	64 □, SV4, SV164	64	48	48	77	97	10	14,5	1-5	9	5	M4	48	64	25	48	70
LTS63, 80	64 □, SV4, SV164	64	48	62,5	97	126	10	14,5	1-5	9	5	M4	48	64	25	48	70
LTS85-125..	64 □, SV4	64	78	78	-	-	10	-	1-5	9	5	M4	48	85	38	-	90
LT125/160	88 □, SV34	88	112	150	224	-	-	-	1-4	13/27 ²⁾	6	M6	68	108	36	-	120

Base mounting

ON-OFF Switches LTS20 - LTS80

3-pole, 4-pole

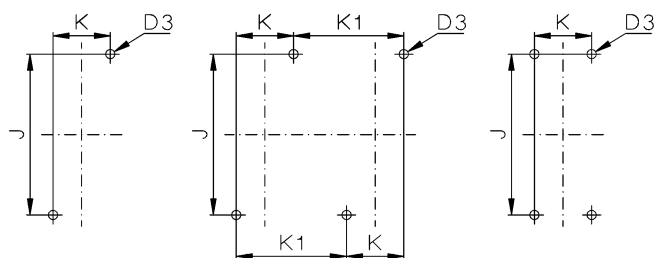
6-pole LTS20 -40

6-pole, 8-pole

Changeover Switches

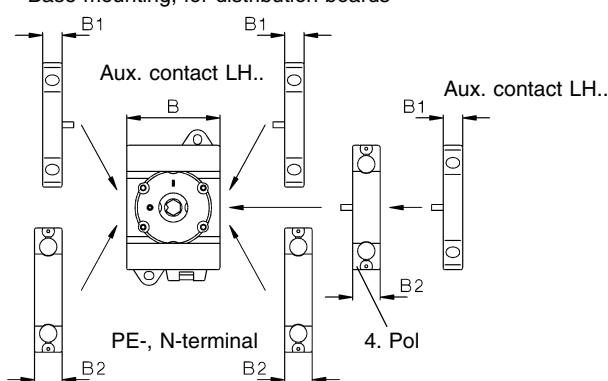
LTS85-125, LT160

3-pole, 4-pole



Mounting of Accessories LTS20 - LTS80

Base mounting, for distribution boards



- 1) Ø 22-25 for LT80(100) VH(N)34 .. only
2) Ø 26-30 for LT125(160) VH(N)34 .. only

Dimensions (mm)

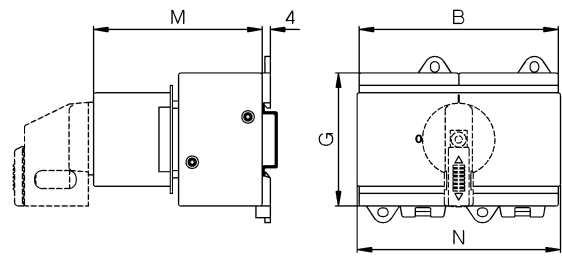
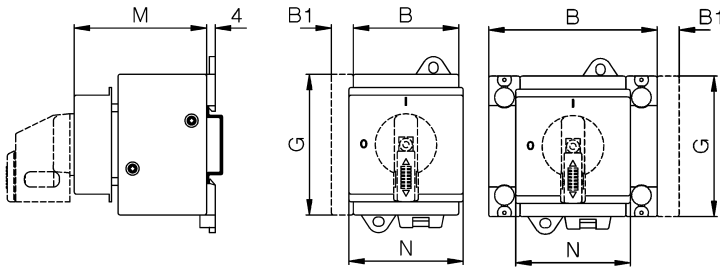
Main Switches, Switch Disconnectors LT(S)..

Installation cover LT(S).. SMA(HN)..

ON-OFF Switches 3-pole, 4-pole

ON-OFF Switches 6-pole
for LTS20 - 40 only

ON-OFF Switches 6-pole, 8-pole
Changeover Switches 3-pole, 4-pole



Type	padlock device	Changeover ON-OFF						G	ON-OFF Switches 6-pole, 8-pole					
		3-pole	4-pole	6-pole	8-pole	aux. contact	4-pole PE		3-pole 4-pole	6-pole	8-pole	3-pole 4-pole	6-pole	8-pole
		B	B	B	B	B1	B2		M	M	M	N	N	N
LTS20 - 40	SV1, SV164	48	48	77	96	10	14,5	64	60	60	74	52	52	97 ⁴⁾
LTS63, 80	SV1, SV164	48	62,5	96	125	10	14,5	64	60	74	74	52	97 ⁴⁾	126
LTS85-125..	SV164	78	78	-	-	10	-	85	60	-	-	78	-	-

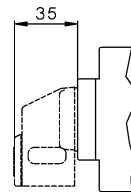
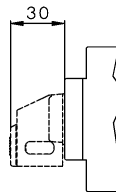
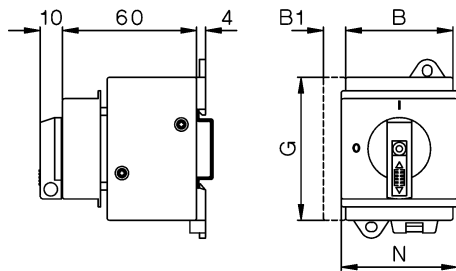
Installation cover with low height handle LTS SMAHN1.. +SV1N

Main switch 3-pole, 4-pole

LTS20 - LTS80

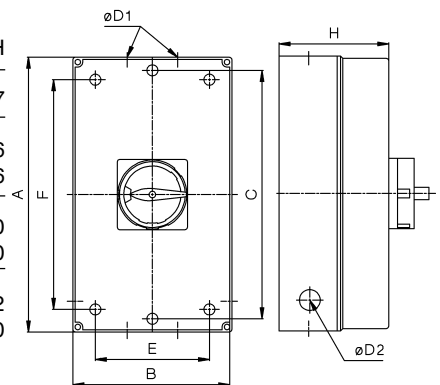
Padlock device SV1

Padlock device SV164



Maintenance and Safety Switches LT(S)..PF..

Type	pole	A	B	C	D1	D2	E	F	H
LTS20 PFH.. A. - LTS40 PFH.. A. ¹⁾	3, 4	130	98	121	2x25,5/20,5	-	75	100	77
LTS63 PFH.. - LTS125 PFH.. A. ²⁾	3, 4	200	120	-	40,5/32,5 +16,5	-	95	165	86
LTS20 PFH.. A. - LTS40 PFH.. A. ²⁾	6	200	120	-	40,5/32,5 +16,5	-	95	165	86
LTS20 PFH.. A. - LTS40 PFH.. A. ³⁾	8	240	160	-	40,5/32,5	-	130	228	120
LTS63 PFH.. A., LTS80 PFH.. A. ³⁾	6, 8	240	160	-	40,5/32,5	-	130	228	120
LT160 PF..	3	300	200	-	2x50,5	25,5	172	272	172
LT160 PF..	4	300	280	-	2x50,5	-	254	254	180



Switch Disconnectors in Plastic Enclosure LTS..PF..

Type	pole	A	B	C	D1	E	F	H
LTS20 PF A., LTS40 PF A. ¹⁾	3, 4	130	98	121	2x25,5/20,5 / 16,5/12,5	75	100	77
LTS20 PFL A., LTS40 PFL A.	3, 4	180	98	170	2x25,5/20,5 / 16,5/12,5	75	150	77
LTS63 PF A., LTS80 PF A. ²⁾	3, 4	200	120	-	40,5/32,5 + 16,5	95	165	86
+ PF3	3, 4	240	160	-	2 x 40,5/32,5	130	228	120
+ PF3/M50	3, 4	240	160	-	1 x 50,5/40,5	130	228	120

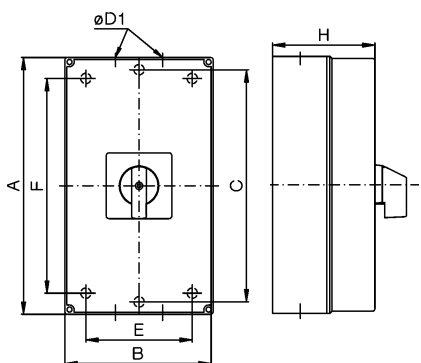
Maximum switch in this enclosure

1) LTS40 PF.. A5 + LH11

2) LTS40 PF.. A6, LTS80 PF.. A5 + LH11, LTS125 PF.. A4

3) LTS40 PF.. A10, LTS40 PF.. U4 + LH11,
LTS80 PF.. A8, LTS80 PF.. A6 + LH11, LTS80 PF.. U4, LTS40 PF.. U3 + LH11

4) inclusiv removable cover parts 126mm



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ON-OFF Switches for Single Hole Mounting

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ON-OFF Switches for Base Mounting with Door Clutch

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ON-OFF Switches for Distribution Boards

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Main Switches for Panel Mounting

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Main Switches for Single Hole Mounting

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Main Switches for Base Mounting with Door Clutch

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Main Switches for Distribution Boards

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Main Switches in Plastic Enclosure

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Technical Datas
Approvals
Dimensions

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Contactors, Motor-Starter

Circuit Breakers

Manual Motor-Starters

Switches

AC-Main Switches

DC-Switch Disconnecter

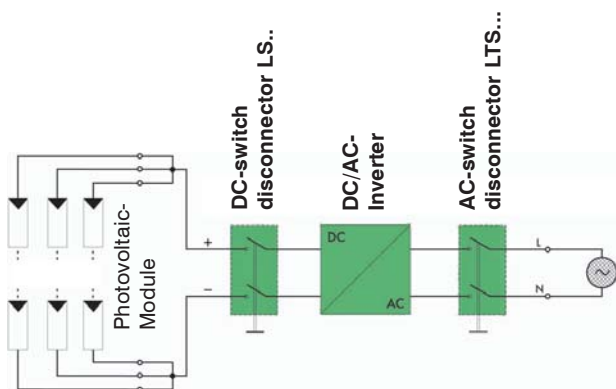
Push Buttons

Representatives, Suppliers

Ratings				DC-Switch Disconnectors				
Type	Rated current			Design	Panel mounting IP66 ¹⁾	Single hole mounting Ø22,5mm IP66 ¹⁾	Base mounting w. door coupling IP66 ¹⁾	Modular switch IP40 ¹⁾
	I _{th} open A	DC21B A	at U _e V					
		4 poles in series						
LS16	16	16	1000	.. E ..	.. Z(O) ..	.. VZV ..	.. SMA ..	
LS25	25	25	1000	.. E ..	.. Z(O) ..	.. VZV ..	.. SMA ..	
LS32	32	32	1000	.. E ..	.. Z(O) ..	.. VZV ..	.. SMA ..	
LS40	40	25	1000	.. E ..	-	.. VZV ..	.. SMA ..	
LS55	55	32	1000	.. E ..	-	.. VZV ..	.. SMA ..	

Switch Disconnectors for Photovoltaic

Switch disconnectors „LS..“ are switch gears for interrupting the DC/AC-Inverter from the solar-panels. Photovoltaic-installations have to be equipped with DC-isolators according to IEC 60364-7-712.



Switch disconnectors „LS..“ ensures a reliable switching up to 58A with 1000V in the category DC21B.

The construction of the contacts and the material selection guarantee that no oxidation (small switching frequency) develops, and is thus prevented inadmissible heating-up.

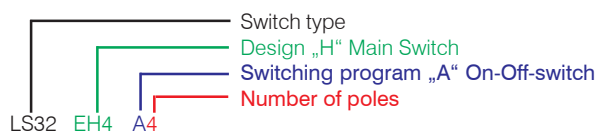
The switch disconnecter has 2, 4, 6 or 8 contacts, by serial or parallel wiring of the contacts the contact rating will be increased.

The switching speed at the manually operated handle does not have an effect on the switching attitude of the contacts.

Switching programs

Type	2-pole	2+2-pole 2 poles in series +2 poles parallel	4-pole	4-pole with jumpers Input on top Output bottom	4-pole with jumpers Input and Output bottom	4-pole with jumpers Input and Output on top
LS16	.. A2	.. A2+2	.. A4	.. A4B	.. A4O	.. A4U
LS25	.. A2	.. A2+2	.. A4	.. A4B	.. A4O	.. A4U
LS32	.. A2	.. A2+2	.. A4	.. A4B	.. A4O	.. A4U
LS40	.. A2	.. A2+2	.. A4	.. A4B	.. A4O	.. A4U
LS55	.. A2	.. A2+2	.. A4	.. A4B	.. A4O	.. A4U
Contacts Wiring diagram						
Switching example						

Ordering



1) Protection in front and built in

DC-Main Switch

Panel mounting IP66¹⁾



Single hole mounting Ø22,5mm IP66¹⁾



Base mounting with door coupling IP66¹⁾



Modular switch IP40¹⁾

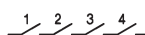
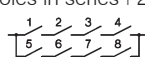


Plastic enclosed IP66¹⁾



.. EH4. ..	.. Z(O)H1 ..	.. VZVH4 ..	.. SMAH1 ..	.. PFLH4 ..
.. EH4. ..	.. Z(O)H1 ..	.. VZVH4 ..	.. SMAH1 ..	.. PFLH4 ..
.. EH4. ..	.. Z(O)H1 ..	.. VZVH4 ..	.. SMAH1 ..	.. PFLH4 ..
.. EH4. ..	-	.. VZVH4 ..	.. SMAH1 ..	.. PFH4 ..
.. EH4. ..	-	.. VZVH4 ..	.. SMAH1 ..	.. PFH4 ..

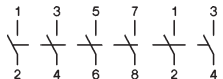
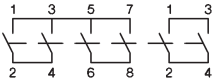
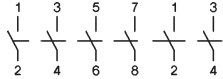
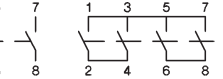
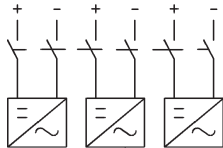
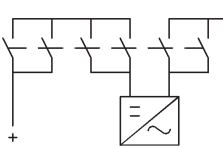
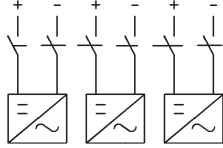
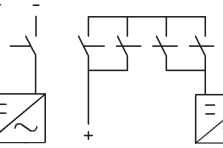
Technical data for DC, according to IEC 60947-3, VDE0660, more data see page 301

Type		DC21A/B								DC22B			
		500V	600V	700V	800V	900V	1000V	1200V	1500V	500V	600V	800V	1000V
2 poles in series 	LS16 ..	16A	16A	16A	16A	13A	9A	6A	3A	7A	5,5A	2A	1A
	LS25..	25A	25A	23A	20A	16A	11A	8A	4A	8A	6A	2,5A	1,5A
	LS32 ..	32A	32A	27A	23A	20A	13A	10A	5A	9A	6,5A	3A	2A
	LS40 ..	40A	40A	35A	30A	25A	20A	15A	10A	-	-	-	-
	LS55..	55A	55A	55A	45A	35A	25A	20A	15A	-	-	-	-
2 poles in series + 2 parallel 	LS16 ..	29A	29A	16A	16A	13A	9A	6A	3A	-	-	-	-
	LS25..	45A	45A	23A	20A	16A	11A	8A	4A	-	-	-	-
	LS32 ..	58A	50A	27A	23A	20A	13A	10A	5A	-	-	-	-
	LS40 ..	72A	64A	35A	30A	25A	20A	15A	10A	-	-	-	-
	LS55..	85A	80A	55A	45A	35A	25A	20A	15A	-	-	-	-
4 poles in series 	LS16 ..	16A	16A	16A	16A	16A	16A	16A	16A	16A	16A	11,5A	8A
	LS25..	25A	25A	25A	25A	25A	25A	25A	20A	25A	25A	12A	9A
	LS32 ..	32A	32A	32A	32A	32A	32A	32A	23A	32A	27,5A	12,5A	10A
	LS40 ..	40A	40A	40A	40A	40A	40A	40A	30A	-	-	-	-
	LS55..	55A	55A	55A	55A	55A	55A	55A	40A	-	-	-	-
4 poles in series + 2 parallel 	LS16 ..	29A	29A	29A	29A	29A	29A	29A	16A	-	-	-	-
	LS25..	45A	45A	45A	45A	45A	45A	45A	20A	-	-	-	-
	LS32 ..	58A	58A	58A	58A	58A	58A	50A	23A	-	-	-	-

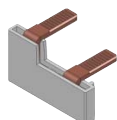
DC21 Switching of DC-resistive loads including moderate overloads, Time constant L/R≤1ms

DC22 Switching of DC-resistive and inductive loads including moderate overloads, Time constant L/R≤2,5ms (e. g: shunt-motors)

Switching programs

Type	6-pole	3+2-pole 3 poles in series + 2 poles parallel	8-pole	4+2-pole 4 poles in series + 2 poles parallel
LS16	...A6	.. A3+2	...A8	.. A4+2
LS25	...A6	.. A3+2	...A8	.. A4+2
LS32	...A6	.. A3+2	...A8	.. A4+2
LS40	-	-	-	-
LS55	-	-	-	-
Contacts Wiring diagram				
Switching example				

Insulated Jumper LSV-B1 for series and parallel switching of contacts

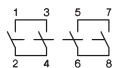


Type	Pack	Weight
LS16, LS25, LS32	100	6,6 g/pc.
LS40, LS55	100	9,64 g/pc.

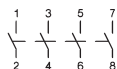
ON-OFF Switches for Panel Mounting, Escutcheon plate 64□, IP66, c Typ 3R



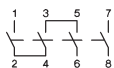
DC21B 600V DC	1000V DC	Poles in series	Number of Strings	Type	Pack pcs	Weight kg/pcs.
16A	9A	2	1	LS16 E A2	1	0,20
25A	11A	2	1	LS25 E A2	1	0,20
32A	13A	2	1	LS32 E A2	1	0,20
40A	20A	2	1	LS40 E A2	1	0,41
55A	25A	2	1	LS55 E A2	1	0,41



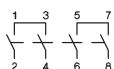
29A	9A	2	1	LS16 E A2+2	1	0,25
45A	11A	2	1	LS25 E A2+2	1	0,25
50A	13A	2	1	LS32 E A2+2	1	0,25
64A	20A	2	1	LS40 E A2+2	1	0,54
80A	25A	2	1	LS55 E A2+2	1	0,54



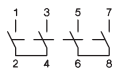
16A	9A	2	2	LS16 E A4	1	0,23
25A	11A	2	2	LS25 E A4	1	0,23
32A	13A	2	2	LS32 E A4	1	0,23
40A	20A	2	2	LS40 E A4	1	0,49
55A	25A	2	2	LS55 E A4	1	0,49



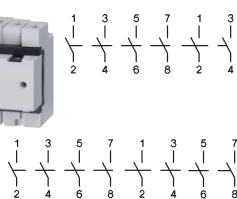
16A	16A	4	1	LS16 E A4B	1	0,24
25A	25A	4	1	LS25 E A4B	1	0,24
32A	32A	4	1	LS32 E A4B	1	0,24
40A	40A	4	1	LS40 E A4B	1	0,52
55A	55A	4	1	LS55 E A4B	1	0,52



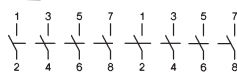
16A	16A	4	1	LS16 E A4O	1	0,24
25A	25A	4	1	LS25 E A4O	1	0,24
32A	32A	4	1	LS32 E A4O	1	0,24
40A	40A	4	1	LS40 E A4O	1	0,52
55A	55A	4	1	LS55 E A4O	1	0,52



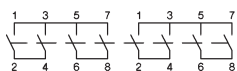
16A	16A	4	1	LS16 E A4U	1	0,24
25A	25A	4	1	LS25 E A4U	1	0,24
32A	32A	4	1	LS32 E A4U	1	0,24
40A	40A	4	1	LS40 E A4U	1	0,52
55A	55A	4	1	LS55 E A4U	1	0,52



16A	9A	2	3	LS16 E A6	1	0,36
25A	11A	2	3	LS25 E A6	1	0,36
32A	13A	2	3	LS32 E A6	1	0,36



16A	9A	2	4	LS16 E A8	1	0,41
25A	11A	2	4	LS25 E A8	1	0,41
32A	13A	2	4	LS32 E A8	1	0,41



29A	29A	4	1	LS16 E A4+2	1	0,46
45A	45A	4	1	LS25 E A4+2	1	0,46
58A	58A	4	1	LS32 E A4+2	1	0,46

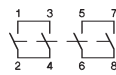
Extended Switch Shaft for all switches for panel mounting

type suffix +VW"x" x = panel thickness

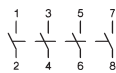
ON-OFF Switches for Single Hole Mounting Ø22mm, Escutcheon plate 48□, IP66, c Typ 3R



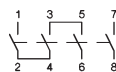
DC21B 600V DC	1000V DC	Poles in series	Number of Strings	Type	Pack pcs	Weight kg/pcs.
16A	9A	2	1	LS16 Z A2	1	0,21
25A	11A	2	1	LS25 Z A2	1	0,21
32A	13A	2	1	LS32 Z A2	1	0,21



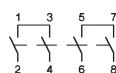
29A	9A	2	1	LS16 Z A2+2	1	0,26
45A	11A	2	1	LS25 Z A2+2	1	0,26
50A	13A	2	1	LS32 Z A2+2	1	0,26



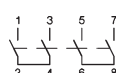
16A	9A	2	2	LS16 Z A4	1	0,23
25A	11A	2	2	LS25 Z A4	1	0,23
32A	13A	2	2	LS32 Z A4	1	0,23



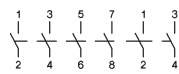
16A	16A	4	1	LS16 Z A4B	1	0,25
25A	25A	4	1	LS25 Z A4B	1	0,25
32A	32A	4	1	LS32 Z A4B	1	0,25



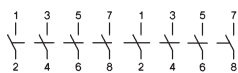
16A	16A	4	1	LS16 Z A4O	1	0,25
25A	25A	4	1	LS25 Z A4O	1	0,25
32A	32A	4	1	LS32 Z A4O	1	0,25



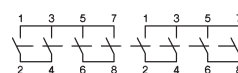
16A	16A	4	1	LS16 Z A4U	1	0,25
25A	25A	4	1	LS25 Z A4U	1	0,25
32A	32A	4	1	LS32 Z A4U	1	0,25



16A	9A	2	3	LS16 Z A6	1	0,38
25A	11A	2	3	LS25 Z A6	1	0,38
32A	13A	2	3	LS32 Z A6	1	0,38



16A	9A	2	4	LS16 Z A8	1	0,43
25A	11A	2	4	LS25 Z A8	1	0,43
32A	13A	2	4	LS32 Z A8	1	0,43



29A	29A	4	1	LS16 Z A4+2	1	0,48
45A	45A	4	1	LS25 Z A4+2	1	0,48
58A	58A	4	1	LS32 Z A4+2	1	0,48

ON-OFF Switches for Single Hole Mounting Ø22mm, without Escutcheon plate, IP66, c Typ 3R

Replace at the Type „Z“ with „ZO“ **LS.. ZO A.**

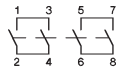
ON-OFF Switches f. Base Mounting w. Door Clutch f. Single Hole, Plate 64□, IP66, c Typ 3R



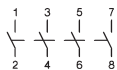
Depth is adjustable
see page 25



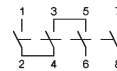
DC21B 600V DC	1000V DC	Poles in series	Number of Strings	Type	Pack pcs	Weight kg/pcs.
16A	9A	2	1	LS16 VZV A2	1	0,22
25A	11A	2	1	LS25 VZV A2	1	0,22
32A	13A	2	1	LS32 VZV A2	1	0,22
40A	20A	2	1	LS40 VZV A2	1	0,51
55A	25A	2	1	LS55 VZV A2	1	0,51



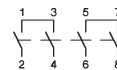
29A	9A	2	1	LS16 VZV A2+2	1	0,27
45A	11A	2	1	LS25 VZV A2+2	1	0,27
50A	13A	2	1	LS32 VZV A2+2	1	0,27
64A	20A	2	1	LS40 VZV A2+2	1	0,55
80A	25A	2	1	LS55 VZV A2+2	1	0,55



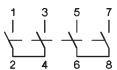
16A	9A	2	2	LS16 VZV A4	1	0,25
25A	11A	2	2	LS25 VZV A4	1	0,25
32A	13A	2	2	LS32 VZV A4	1	0,25
40A	20A	2	2	LS40 VZV A4	1	0,56
55A	25A	2	2	LS55 VZV A4	1	0,56



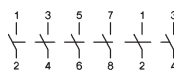
16A	16A	4	1	LS16 VZV A4B	1	0,26
25A	25A	4	1	LS25 VZV A4B	1	0,26
32A	32A	4	1	LS32 VZV A4B	1	0,26
40A	40A	4	1	LS40 VZV A4B	1	0,58
55A	55A	4	1	LS55 VZV A4B	1	0,58



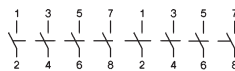
16A	16A	4	1	LS16 VZV A4O	1	0,26
25A	25A	4	1	LS25 VZV A4O	1	0,26
32A	32A	4	1	LS32 VZV A4O	1	0,26
40A	40A	4	1	LS40 VZV A4O	1	0,58
55A	55A	4	1	LS55 VZV A4O	1	0,58



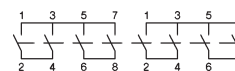
16A	16A	4	1	LS16 VZV A4U	1	0,26
25A	25A	4	1	LS25 VZV A4U	1	0,26
32A	32A	4	1	LS32 VZV A4U	1	0,26
40A	40A	4	1	LS40 VZV A4U	1	0,58
55A	55A	4	1	LS55 VZV A4U	1	0,58



16A	9A	2	3	LS16 VZV A6	1	0,38
25A	11A	2	3	LS25 VZV A6	1	0,38
32A	13A	2	3	LS32 VZV A6	1	0,38



16A	9A	2	4	LS16 VZV A8	1	0,43
25A	11A	2	4	LS25 VZV A8	1	0,43
32A	13A	2	4	LS32 VZV A8	1	0,43

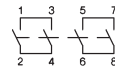


29A	29A	4	1	LS16 VZV A4+2	1	0,48
45A	45A	4	1	LS25 VZV A4+2	1	0,48
58A	58A	4	1	LS32 VZV A4+2	1	0,48

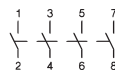
ON-OFF Switches for Distribution Boards, IP40, c Typ 1



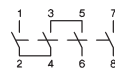
DC21B 600V DC	1000V DC	Poles in series	Number of Strings	Type	Pack pcs	Weight kg/pcs.
16A	9A	2	1	LS16 SMA A2	1	0,19
25A	11A	2	1	LS25 SMA A2	1	0,19
32A	13A	2	1	LS32 SMA A2	1	0,19
40A	20A	2	1	LS40 SMA A2	1	0,41
55A	25A	2	1	LS55 SMA A2	1	0,41



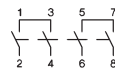
29A	9A	2	1	LS16 SMA A2+2	1	0,24
45A	11A	2	1	LS25 SMA A2+2	1	0,24
50A	13A	2	1	LS32 SMA A2+2	1	0,24
64A	20A	2	1	LS40 SMA A2+2	1	0,52
80A	25A	2	1	LS55 SMA A2+2	1	0,52



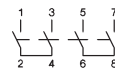
16A	9A	2	2	LS16 SMA A4	1	0,22
25A	11A	2	2	LS25 SMA A4	1	0,22
32A	13A	2	2	LS32 SMA A4	1	0,22
40A	20A	2	2	LS40 SMA A4	1	0,45
55A	25A	2	2	LS55 SMA A4	1	0,45



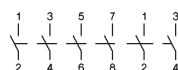
16A	16A	4	1	LS16 SMA A4B	1	0,23
25A	25A	4	1	LS25 SMA A4B	1	0,23
32A	32A	4	1	LS32 SMA A4B	1	0,23
40A	40A	4	1	LS40 SMA A4B	1	0,49
55A	55A	4	1	LS55 SMA A4B	1	0,49



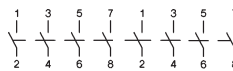
16A	16A	4	1	LS16 SMA A4O	1	0,23
25A	25A	4	1	LS25 SMA A4O	1	0,23
32A	32A	4	1	LS32 SMA A4O	1	0,23
40A	40A	4	1	LS40 SMA A4B	1	0,49
55A	55A	4	1	LS55 SMA A4B	1	0,49



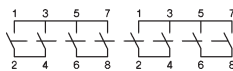
16A	16A	4	1	LS16 SMA A4U	1	0,23
25A	25A	4	1	LS25 SMA A4U	1	0,23
32A	32A	4	1	LS32 SMA A4U	1	0,23
40A	40A	4	1	LS40 SMA A4B	1	0,49
55A	55A	4	1	LS55 SMA A4B	1	0,49



16A	9A	2	3	LS16 SMA A6	1	0,35
25A	11A	2	3	LS25 SMA A6	1	0,35
32A	13A	2	3	LS32 SMA A6	1	0,35



16A	9A	2	4	LS16 SMA A8	1	0,40
25A	11A	2	4	LS25 SMA A8	1	0,40
32A	13A	2	4	LS32 SMA A8	1	0,40



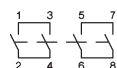
29A	29A	4	1	LS16 SMA A4+2	1	0,43
45A	45A	4	1	LS25 SMA A4+2	1	0,43
58A	58A	4	1	LS32 SMA A4+2	1	0,43

Main Switches for Panel Mounting, Escutcheon plate 64□, IP66, Typ 3R

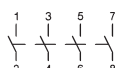


DC21B 600V DC	1000V DC	Poles in series	Number of Strings	Type	Pack pcs	Weight kg/pcs.
16A	9A	2	1	LS16 EH4 A2	1	0,21
25A	11A	2	1	LS25 EH4 A2	1	0,21
32A	13A	2	1	LS32 EH4 A2	1	0,21
40A	20A	2	1	LS40 EH4 A2	1	0,43
55A	25A	2	1	LS55 EH4 A2	1	0,43

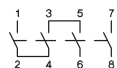
padlock device SV4



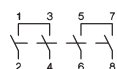
29A	9A	2	1	LS16 EH4 A2+2	1	0,26
45A	11A	2	1	LS25 EH4 A2+2	1	0,26
50A	13A	2	1	LS32 EH4 A2+2	1	0,26
64A	20A	2	1	LS40 EH4 A2+2	1	0,57
80A	25A	2	1	LS55 EH4 A2+2	1	0,57



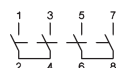
16A	9A	2	2	LS16 EH4 A4	1	0,24
25A	11A	2	2	LS25 EH4 A4	1	0,24
32A	13A	2	2	LS32 EH4 A4	1	0,24
40A	20A	2	2	LS40 EH4 A4	1	0,50
55A	25A	2	2	LS55 EH4 A4	1	0,50



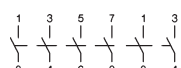
16A	16A	4	1	LS16 EH4 A4B	1	0,25
25A	25A	4	1	LS25 EH4 A4B	1	0,25
32A	32A	4	1	LS32 EH4 A4B	1	0,25
40A	40A	4	1	LS40 EH4 A4B	1	0,53
55A	55A	4	1	LS55 EH4 A4B	1	0,53



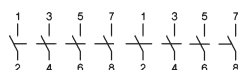
16A	16A	4	1	LS16 EH4 A4O	1	0,25
25A	25A	4	1	LS25 EH4 A4O	1	0,25
32A	32A	4	1	LS32 EH4 A4O	1	0,25
40A	40A	4	1	LS40 EH4 A4O	1	0,53
55A	55A	4	1	LS55 EH4 A4O	1	0,53



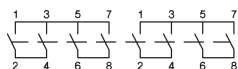
16A	16A	4	1	LS16 EH4 A4U	1	0,25
25A	25A	4	1	LS25 EH4 A4U	1	0,25
32A	32A	4	1	LS32 EH4 A4U	1	0,25
40A	40A	4	1	LS40 EH4 A4U	1	0,53
55A	55A	4	1	LS55 EH4 A4U	1	0,53



16A	9A	2	3	LS16 EH4 A6	1	0,37
25A	11A	2	3	LS25 EH4 A6	1	0,37
32A	13A	2	3	LS32 EH4 A6	1	0,37



16A	9A	2	4	LS16 EH4 A8	1	0,42
25A	11A	2	4	LS25 EH4 A8	1	0,42
32A	13A	2	4	LS32 EH4 A8	1	0,42

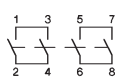
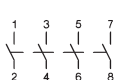
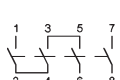
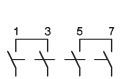
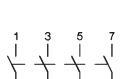
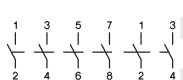
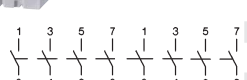
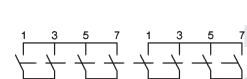


29A	29A	4	1	LS16 EH4 A4+2	1	0,47
45A	45A	4	1	LS25 EH4 A4+2	1	0,47
58A	58A	4	1	LS32 EH4 A4+2	1	0,47

Extended Switch Shaft for all switches for panel mounting

type suffix +VW"x" x = panel thickness

Main Switches for Single Hole Mounting Ø22mm, Escutcheon plate 48□, IP66, Typ 3R

		DC21B 600V DC	1000V DC	Poles in series	Number of Strings	Type	Pack pcs	Weight kg/pcs.
		16A	9A	2	1	LS16 ZH1 A2	1	0,21
		25A	11A	2	1	LS25 ZH1 A2	1	0,21
		32A	13A	2	1	LS32 ZH1 A2	1	0,21
padlock device SV1		29A	9A	2	1	LS16 ZH1 A2+2	1	0,27
		45A	11A	2	1	LS25 ZH1 A2+2	1	0,27
		50A	13A	2	1	LS32 ZH1 A2+2	1	0,27
		16A	9A	2	2	LS16 ZH1 A4	1	0,24
		25A	11A	2	2	LS25 ZH1 A4	1	0,24
		32A	13A	2	2	LS32 ZH1 A4	1	0,24
		16A	16A	4	1	LS16 ZH1 A4B	1	0,25
		25A	25A	4	1	LS25 ZH1 A4B	1	0,25
		32A	32A	4	1	LS32 ZH1 A4B	1	0,25
		16A	16A	4	1	LS16 ZH1 A4O	1	0,25
		25A	25A	4	1	LS25 ZH1 A4O	1	0,25
		32A	32A	4	1	LS32 ZH1 A4O	1	0,25
		16A	16A	4	1	LS16 ZH1 A4U	1	0,25
		25A	25A	4	1	LS25 ZH1 A4U	1	0,25
		32A	32A	4	1	LS32 ZH1 A4U	1	0,25
		16A	9A	2	3	LS16 ZH1 A6	1	0,39
		25A	11A	2	3	LS25 ZH1 A6	1	0,39
		32A	13A	2	3	LS32 ZH1 A6	1	0,39
		16A	9A	2	4	LS16 ZH1 A8	1	0,44
		25A	11A	2	4	LS25 ZH1 A8	1	0,44
		32A	13A	2	4	LS32 ZH1 A8	1	0,44
		29A	29A	4	1	LS16 ZH1 A4+2	1	0,49
		45A	45A	4	1	LS25 ZH1 A4+2	1	0,49
		58A	58A	4	1	LS32 ZH1 A4+2	1	0,49

Main Switches for Single Hole Mounting Ø22mm, without Escutcheon plate, IP66, Typ 3R ¹⁾

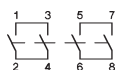
Replace at the Type „ZH1“ with „ZOH1“ **LS.. ZOH1 A.**

Main Switches f. Base Mounting, Door Clutch f. Single Hole, Escutcheon plate 64□, IP66, Typ 3R

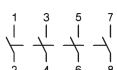


DC21B
600V DC 1000V DC Poles in series Number of Strings Type Pack pcs Weigth kg/pcs.

16A	9A	2	1	LS16 VZVH4 A2	1	0,23
25A	11A	2	1	LS25 VZVH4 A2	1	0,23
32A	13A	2	1	LS32 VZVH4 A2	1	0,23
40A	20A	2	1	LS40 VZVH4 A2	1	0,51
55A	25A	2	1	LS55 VZVH4 A2	1	0,51

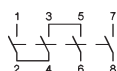


29A	9A	2	1	LS16 VZVH4 A2+2	1	0,28
45A	11A	2	1	LS25 VZVH4 A2+2	1	0,28
50A	13A	2	1	LS32 VZVH4 A2+2	1	0,28
64A	20A	2	1	LS40 VZVH4 A2+2	1	0,65
80A	25A	2	1	LS55 VZVH4 A2+2	1	0,65

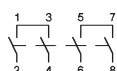


16A	9A	2	2	LS16 VZVH4 A4	1	0,26
25A	11A	2	2	LS25 VZVH4 A4	1	0,26
32A	13A	2	2	LS32 VZVH4 A4	1	0,26
40A	20A	2	2	LS40 VZVH4 A4	1	0,58
55A	25A	2	2	LS55 VZVH4 A4	1	0,58

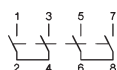
Depth is adjustable
see page 25
padlock device SV4



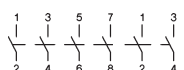
16A	16A	4	1	LS16 VZVH4 A4B	1	0,27
25A	25A	4	1	LS25 VZVH4 A4B	1	0,27
32A	32A	4	1	LS32 VZVH4 A4B	1	0,27
40A	40A	4	1	LS40 VZVH4 A4B	1	0,62
55A	55A	4	1	LS55 VZVH4 A4B	1	0,62



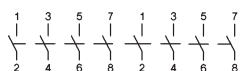
16A	16A	4	1	LS16 VZVH4 A4O	1	0,27
25A	25A	4	1	LS25 VZVH4 A4O	1	0,27
32A	32A	4	1	LS32 VZVH4 A4O	1	0,27
40A	40A	4	1	LS40 VZVH4 A4O	1	0,62
55A	55A	4	1	LS55 VZVH4 A4O	1	0,62



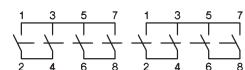
16A	16A	4	1	LS16 VZVH4 A4U	1	0,27
25A	25A	4	1	LS25 VZVH4 A4U	1	0,27
32A	32A	4	1	LS32 VZVH4 A4U	1	0,27
40A	40A	4	1	LS40 VZVH4 A4U	1	0,62
55A	55A	4	1	LS55 VZVH4 A4U	1	0,62



16A	9A	2	3	LS16 VZVH4 A6	1	0,39
25A	11A	2	3	LS25 VZVH4 A6	1	0,39
32A	13A	2	3	LS32 VZVH4 A6	1	0,39

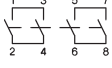
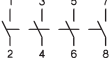
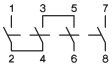
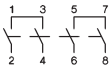
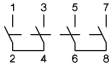
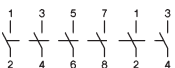
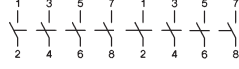
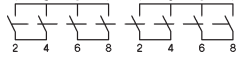


16A	9A	2	4	LS16 VZVH4 A8	1	0,44
25A	11A	2	4	LS25 VZVH4 A8	1	0,44
32A	13A	2	4	LS32 VZVH4 A8	1	0,44



29A	29A	4	1	LS16 VZVH4 A4+2	1	0,49
45A	45A	4	1	LS25 VZVH4 A4+2	1	0,49
58A	58A	4	1	LS32 VZVH4 A4+2	1	0,49

Main Switches for Distribution Boards, IP40, Typ 1

		DC21B 600V DC	1000V DC	Poles in series	Number of Strings	Type	Pack pcs	Weight kg/pcs.
		16A	9A	2	1	LS16 SMAH1 A2	1	0,19
		25A	11A	2	1	LS25 SMAH1 A2	1	0,19
		32A	13A	2	1	LS32 SMAH1 A2	1	0,19
		40A	20A	2	1	LS40 SMAH1 A2	1	0,40
		55A	25A	2	1	LS55 SMAH1 A2	1	0,40
padlock device SV1 		29A	9A	2	1	LS16 SMAH1 A2+2 ¹⁾	1	0,25
		45A	11A	2	1	LS25 SMAH1 A2+2 ¹⁾	1	0,25
		50A	13A	2	1	LS32 SMAH1 A2+2 ¹⁾	1	0,25
		64A	20A	2	1	LS40 SMAH1 A2+2	1	0,54
		80A	25A	2	1	LS55 SMAH1 A2+2	1	0,54
		16A	9A	2	2	LS16 SMAH1 A4 ¹⁾	1	0,22
		25A	11A	2	2	LS25 SMAH1 A4 ¹⁾	1	0,22
		32A	13A	2	2	LS32 SMAH1 A4 ¹⁾	1	0,22
		40A	20A	2	2	LS40 SMAH1 A4	1	0,47
		55A	25A	2	2	LS55 SMAH1 A4	1	0,47
		16A	16A	4	1	LS16 SMAH1 A4B ¹⁾	1	0,23
		25A	25A	4	1	LS25 SMAH1 A4B ¹⁾	1	0,23
		32A	32A	4	1	LS32 SMAH1 A4B ¹⁾	1	0,23
		40A	40A	4	1	LS40 SMAH1 A4B	1	0,50
		55A	55A	4	1	LS55 SMAH1 A4B	1	0,50
		16A	16A	4	1	LS16 SMAH1 A4O ¹⁾	1	0,23
		25A	25A	4	1	LS25 SMAH1 A4O ¹⁾	1	0,23
		32A	32A	4	1	LS32 SMAH1 A4O ¹⁾	1	0,23
		40A	40A	4	1	LS40 SMAH1 A4B	1	0,50
		55A	55A	4	1	LS55 SMAH1 A4B	1	0,50
		16A	16A	4	1	LS16 SMAH1 A4U ¹⁾	1	0,23
		25A	25A	4	1	LS25 SMAH1 A4U ¹⁾	1	0,23
		32A	32A	4	1	LS32 SMAH1 A4U ¹⁾	1	0,23
		40A	40A	4	1	LS40 SMAH1 A4B	1	0,50
		55A	55A	4	1	LS55 SMAH1 A4B	1	0,50
		16A	9A	2	3	LS16 SMAH1 A6	1	0,36
		25A	11A	2	3	LS25 SMAH1 A6	1	0,36
		32A	13A	2	3	LS32 SMAH1 A6	1	0,36
		16A	9A	2	4	LS16 SMAH1 A8	1	0,41
		25A	11A	2	4	LS25 SMAH1 A8	1	0,41
		32A	13A	2	4	LS32 SMAH1 A8	1	0,41
		29A	29A	4	1	LS16 SMAH1 A4+2	1	0,46
		45A	45A	4	1	LS25 SMAH1 A4+2	1	0,46
		58A	58A	4	1	LS32 SMAH1 A4+2	1	0,46

¹⁾ Main Switches for Distribution Boards with low height handle, IP40,   Typ 1

Type with Type-suffix „+SV1N“ e.g. LS.. SMAH1 A2+2 +SV1N

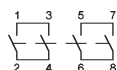
Main Switches in Plastic Enclosure Escutcheon plate 64□, IP66, c Typ 1



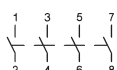
padlock device SV4



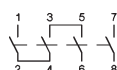
DC21B 600V DC	1000V DC	Poles in series	Number of Strings	Type	Pack pcs	Weight kg/pcs.
16A	9A	2	1	LS16 PFLH4 A2	1	0,43
25A	11A	2	1	LS25 PFLH4 A2	1	0,43
32A	13A	2	1	LS32 PFLH4 A2	1	0,43
40A	20A	2	1	LS40 PFH4 A2	1	1,59
55A	25A	2	1	LS55 PFH4 A2	1	1,59



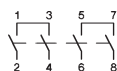
29A	9A	2	1	LS16 PFLH4 A2+2	1	0,49
45A	11A	2	1	LS25 PFLH4 A2+2	1	0,49
50A	13A	2	1	LS32 PFLH4 A2+2	1	0,49
64A	20A	2	1	LS40 PFH4 A2+2	1	1,74
80A	25A	2	1	LS55 PFH4 A2+2	1	1,74



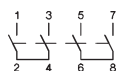
16A	9A	2	2	LS16 PFLH4 A4	1	0,46
25A	11A	2	2	LS25 PFLH4 A4	1	0,46
32A	13A	2	2	LS32 PFLH4 A4	1	0,46
40A	20A	2	2	LS40 PFH4 A4	1	1,67
55A	25A	2	2	LS55 PFH4 A4	1	1,67



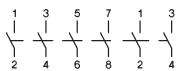
16A	16A	4	1	LS16 PFLH4 A4B	1	0,47
25A	25A	4	1	LS25 PFLH4 A4B	1	0,47
32A	32A	4	1	LS32 PFLH4 A4B	1	0,47
40A	40A	4	1	LS40 PFH4 A4B	1	1,70
55A	55A	4	1	LS55 PFH4 A4B	1	1,70



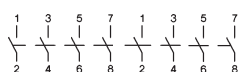
16A	16A	4	1	LS16 PFLH4 A4O	1	0,47
25A	25A	4	1	LS25 PFLH4 A4O	1	0,47
32A	32A	4	1	LS32 PFLH4 A4O	1	0,47
40A	40A	4	1	LS40 PFH4 A4O	1	1,70
55A	55A	4	1	LS55 PFH4 A4O	1	1,70



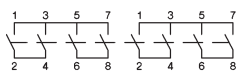
16A	16A	4	1	LS16 PFLH4 A4U	1	0,47
25A	25A	4	1	LS25 PFLH4 A4U	1	0,47
32A	32A	4	1	LS32 PFLH4 A4U	1	0,47
40A	40A	4	1	LS40 PFH4 A4U	1	1,70
55A	55A	4	1	LS55 PFH4 A4U	1	1,70



16A	9A	2	3	LS16 PFH4 A6	1	1,53
25A	11A	2	3	LS25 PFH4 A6	1	1,53
32A	13A	2	3	LS32 PFH4 A6	1	1,53



16A	9A	2	4	LS16 PFH4 A8	1	1,58
25A	11A	2	4	LS25 PFH4 A8	1	1,58
32A	13A	2	4	LS32 PFH4 A8	1	1,58



29A	29A	4	1	LS16 PFH4 A4+2	1	1,63
45A	45A	4	1	LS25 PFH4 A4+2	1	1,63
58A	58A	4	1	LS32 PFH4 A4+2	1	1,63

Technical Data

Data according to IEC 60947-3, VDE 0660, GB14048.3 (CCC China)

Main contacts		Type	LS16	LS25	LS32	LS40	LS55
Rated thermal current I_{the}		A	16	25	32	40	55
Rated insulation voltage U_i ¹⁾		V	1000	1000	1000	1500	1500
Rated insulation voltage U_i ²⁾		V	1500	1500	1500	-	-
Distance of contacts (per pole)		mm	8	8	8		
Rated operational current I_e							
DC21A and DC21B	1 pole	300V A	16	23	27	40	55
		400V A	12	14	16	30	40
	A1	500V A	9	11	13	19	25
		600V A	6	8	10	15	20
		700V A	4,5	6	7,5	10	15
L/R = 1ms		800V A	3	4	5	8	10
		900V A	2,5	3	4	6	8
		1000V A	1,5	2	2,5	4	6
	2 pole in series	500V A	16	25	32	40	55
	A2	600V A	16	25	32	40	55
		700V A	16	23	27	35	55
		800V A	16	20	23	30	45
		850V A	-	-	25	-	-
		900V A	13	16	20	25	35
		1000V A	9	11	13	20	25
		1200V A	6	8	10	10	15
		1500V A	3	4	5	6	8
	2 poles in series + 2 poles parallel	500V A	29	45	58	72	85
	A2+2	600V A	29	45	50	64	80
		700V A	16	23	27	35	55
		800V A	16	20	23	30	45
		900V A	13	16	20	25	35
		1000V A	9	11	13	20	25
		1200V A	6	8	10	10	15
		1500V A	3	4	5	6	8
	3 poles in series + 2 poles parallel	500V A	29	45	58	-	-
	A3+2	600V A	29	45	50	-	-
		700V A	29	38	45	-	-
		800V A	29	38	45	-	-
		900V A	29	38	45	-	-
		1000V A	29	38	45	-	-
		1200V A	12	14	16	-	-
		1500V A	9	11	13	-	-
	4 poles in series	500V A	16	25	32	40	55
	A4	600V A	16	25	32	40	55
		700V A	16	25	32	40	55
		800V A	16	25	32	40	55
		900V A	16	25	32	40	55
		1000V A	16	25	32	40	55
		1200V A	16	25	32	40	55
		1500V A	16	20	23	30	40
	4 poles in series + 2 poles parallel	500V A	29	45	58	-	-
	A4+2	600V A	29	45	58	-	-
		700V A	29	45	58	-	-
		800V A	29	45	58	-	-
		900V A	29	45	58	-	-
		1000V A	29	45	58	-	-
		1200V A	29	45	50	-	-
		1500V A	16	20	23	-	-
Rated operational current I_e							
AC21B	A2, A4	U_e max. 440V	16	25	32	40	55
	A2+2	U_e max. 440V	29	45	58	72	85

1) Suitable at overvoltage category I to III, pollution degree 3 (standard-industry): $U_{imp} = 8kV$.

2) Suitable at overvoltage category I to III, pollution degree 2 (min. IP55): $U_{imp} = 8kV$.

Technical Data

Data according to IEC 60947-3, VDE 0660, GB14048.3 (CCC China)

Main contacts				Type	LS16	LS25	LS32	LS40	LS55	
Rated operational current I_e		500V	A		1	1,25	1,5	x	2,5	
DC22B	1 pole	600V	A		0,5	0,75	1	x	2,0	
L/R = 2,5ms		A1	800V	A	0,3	0,4	0,5	x	1,5	
			1000V	A	0,15	0,2	0,25	x	1,0	
			1200V	A	-	-	-	x	x	
			1500V	A	-	-	-	x	x	
	2 poles in series	500V	A		7	8	9	x	x	
		A2	600V	A		5,5	6	6,5	x	x
			800V	A		2	2,5	3	x	x
			1000V	A		1	1,5	2	x	x
			1200V	A		-	-	-	x	x
		1500V	A		-	-	-	x	x	
	4 poles in series	500V	A		16	25	32	x	x	
		A4	600V	A		16	25	27,5	x	x
			800V	A		11,5	12	12,5	x	x
			1000V	A		8	9	10	x	x
			1200V	A		-	-	-	x	x
		1500V	A		-	-	-	x	x	
	Rated conditional short-circuit current				kA _{eff}	5	5	5	10	10
Max. fuse size		gL (gG)	A		40	63	80	125	160	
Mechanical life				x10 ³	10	10	10	10	10	
Rated short-time withstand current (1s)	I _{cw}	A2, A4, A6, A8	A		800	900	1000	A2, A4: 1200	A2, A4: 1400	
		A2+2, A3+2, A4+2	A		1300	1500	1700	A2+2: 2000	A2+2: 2400	
Short circuit making capacity	I _{cm}	A2, A4, A6, A8	A		800	900	1000	A2, A4: 1200	A2, A4: 1400	
		A2+2, A3+2, A4+2	A		1300	1500	1700	A2+2: 2000	A2+2: 2400	
Maximum cable cross sections (incl. jumper LSV-B1)										
solid or stranded			mm ²		4 - 16	4 - 16	4 - 16	2,5 - 25	2,5 - 25	
flexible			mm ²		4 - 10	4 - 10	4 - 10	4 - 16	4 - 16	
flexible (+ multicore cable end)			mm ²		4 - 10	4 - 10	4 - 10	2,5 - 16	2,5 - 16	
Size of terminal screw					M4 Pz2	M4 Pz2	M4 Pz2	M5 Pz2	M5 Pz2	
Tightening torque			Nm		1,7 - 1,8	1,7 - 1,8	1,7 - 1,8	2,5 - 2,8	2,5 - 2,8	
2 cables per clamp without jumper LSV-B1 / LSV-B2										
solid or stranded			mm ²		16+(1,5-2,5) / 10+(1,5-6) / 6+(1,5-10) / 4+(1,5-10)			16+(1,5-2,5) / 10+(1,5-10) / 6+(1,5-10) / 4+(1,5-10)		
flexible			mm ²		16+(1,5-2,5) / 10+(1,5-4) / 6+(1,5-6)			16+(1,5-6) / 10+(1,5-10) / 6+(1,5-16) / 4+(1,5-16)		
& flexible + multicore cable end										
stranded			AWG		8+(16-12) / 10+(16-10) / 12+(16-8) 14+(16-8)			3+(18-10) / 4+(18-10) / 6+(18-8) 8+(18-8)		
solid			AWG		10+(16-12) / 12+(16-10) 14+(16-10)			10+(16-10) / 12+(16-10) / 14+(16-10) 12+(16-10) / 14+(16-10)		
Maximum ambient temperature										
Operation	open	enclosed	°C		-40 to +65					
			°C							
Storage			°C		-40 to +45					
Storage						-50 to +90				
Power loss per switch at I _e max. DC21B										
A2			W		0,8	2	3	4	6	
A4			W		1,6	4	6	8	12	
A6			W		2,4	6	9	12	18	
A8			W		3,2	8	12	16	24	
A2+2			W		0,4	1	1,5	2	3	
A3+2			W		0,6	1,5	2,25	3	4,5	
A4+2			W		0,8	2	3	4	6	

x in test

Technical Data

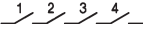
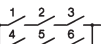
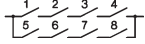
Data according to IUL508I



File E359344, and UL508



File E332938, Category no.: NRNT2, NRNT8

Type	LISTED			LS16	LS25	LS32	LS40	LS55	
Ampere-Rating "General use"  1 Pol	DC	350V	A	4	5	6	7,1	10,0	
		500V	A	4	5	6	5,7	7,0	
		600V	A	4	5	6	5,0	5,8	
		700V	A	-	-	-	3,9	5,0	
		800V	A	-	-	-	3,2	4,4	
		900V	A	-	-	-	2,5	3,5	
		1000V	A	-	-	-	1,5	2,0	
		 2 poles in series	350V	A	16	20	25	40	55
			500V	A	16	20	25	40	55
			600V	A	16	20	25	40	55
700V	A		-	-	-	32	46		
800V	A		-	-	-	26	37		
900V	A		-	-	-	20	28		
1000V	A		-	-	-	16	20		
 2 poles in series + 2 poles parallel	350V	A	29	45	58	72	85		
	400V	A				67	79		
	500V	A	29	38	40	53	66		
	600V	A	21	23	25	42	55		
	700V	A	-	-	-	35	47		
	800V	A	-	-	-	30	40		
	900V	A	-	-	-	26	32		
	1000V	A	-	-	-	22	25		
	 4 poles in series	350V	A	16	25	32	40	55	
500V		A	16	25	32	40	55		
600V		A	16	25	32	40	55		
700V		A	-	-	-	40	55		
800V		A	-	-	-	40	55		
900V		A	-	-	-	40	55		
1000V		A	-	-	-	40	55		
 3 poles in series + 2 poles parallel	350V	A	29	45	58	-	-		
	500V	A	29	38	50	-	-		
	600V	A	21	38	45	-	-		
 4 poles in series + 2 poles parallel	350V	A	29	45	58	-	-		
	500V	A	29	45	58	-	-		
	600V	A	29	45	50	-	-		
AC-Rating "General use"									
2 poles in series 	600V	A	16	25	32	x	x		
2 poles in series + 2 poles parallel 	277V	A	-	-	50	x	x		
3 poles parallel	3x480V	A	-	-	32	-	-		
Fuse size (RK5)Industrial Control Switch									
5kA / 600V		A	40	60	80	-	-		
5KA/1000V		A	-	-	-	90	125		
Maximum cable cross sections (incl. jumper LSV-B1)									
solid or stranded		AWG	12 - 10	12 - 10	12 - 10	16 - 10	16 - 10		
flexible		AWG	12 - 6	12 - 6	12 - 6	14 - 4	14 - 4		
flexible (+ multicore cable end)		AWG	12 - 6	12 - 6	12 - 6				
Size of terminal screw			M4 Pz2	M4 Pz2	M4 Pz2	M5 Pz2	M5 Pz2		
Tightening torque		lb.inch	9 - 16	9 - 16	9 - 16	22 - 25	22 - 25		

Approvals

Country	USA, UL508I	US, Canada UL508	Europe	TÜVRheinland	China CCC	CB- Zertifikate
Type						
LS16	o	o	/	o	o	o
LS25	o	o	/	o	o	o
LS32	o	o	/	o	o	o
LS40	o	o	/	x	x	o
LS55	o	o	/	x	x	o

o In standard version approved

- Not provided for test till now

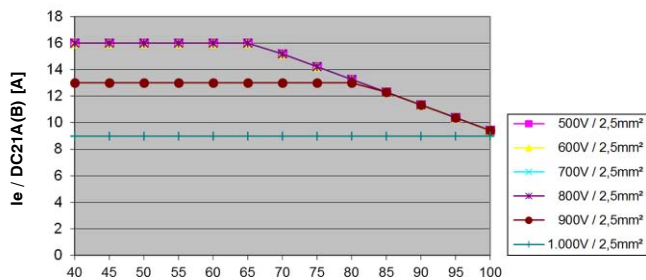
/ No testing required CE

x In test

Technical Datas

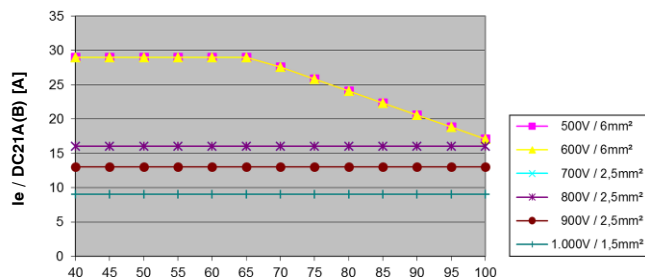
Maximum current according to ambient temperature and cable cross section

Switch LS16..., 2 contacts in series, open



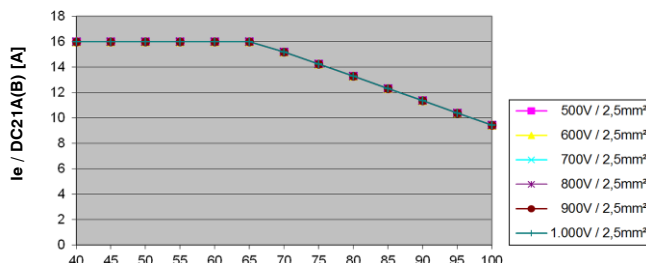
Ambient temperature around the switch (°C)

Switch LS16 ..., 2 contacts in series + 2 parallel, open



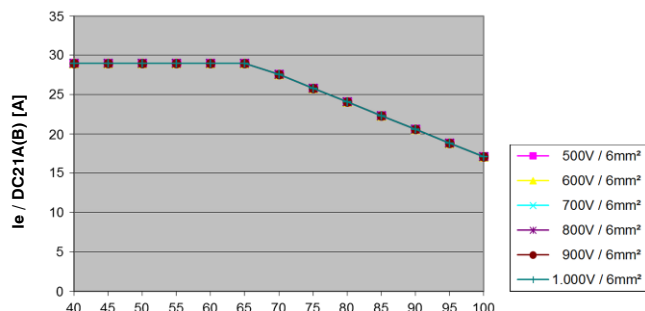
Ambient temperature around the switch (°C)

Switch LS16..., 4 contacts in series, open



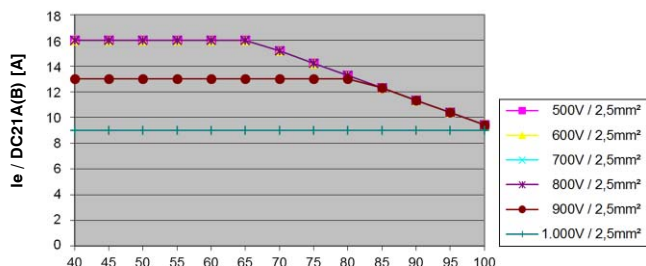
Ambient temperature around the switch (°C)

Switch LS16 ..., 4 contacts in series + 2 parallel, open



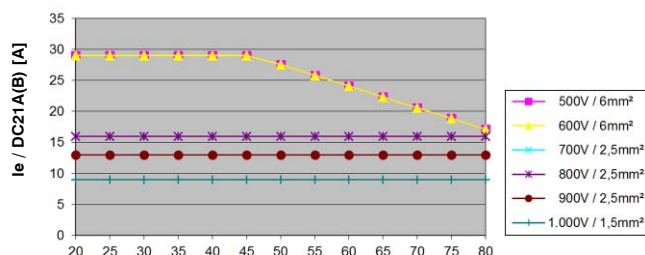
Ambient temperature around the switch (°C)

Enclosed switch LS16 PFL..., 2 contacts in series



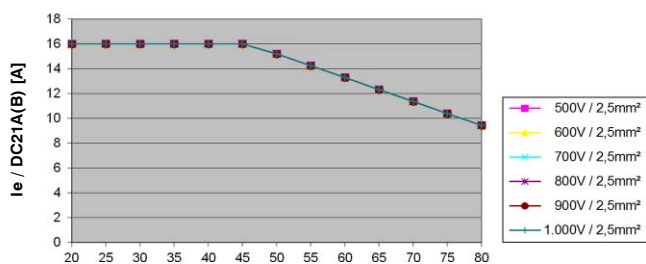
Ambient temperature around the switch (°C)

Enclosed switch LS16 PFL..., 2 contacts in series + 2 parallel



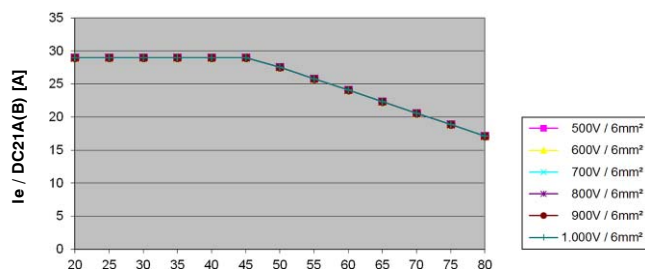
Ambient temperature around the switch (°C)

Enclosed switch LS16 PFL..., 4 contacts in series



Ambient temperature around the switch (°C)

Enclosed switch LS16 PFL..., 4 contacts in series + 2 parallel

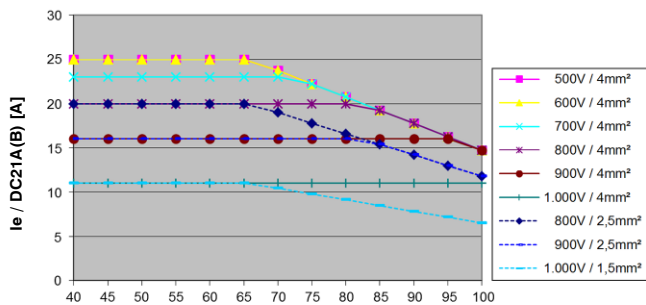


Ambient temperature around the switch (°C)

Technical Datas

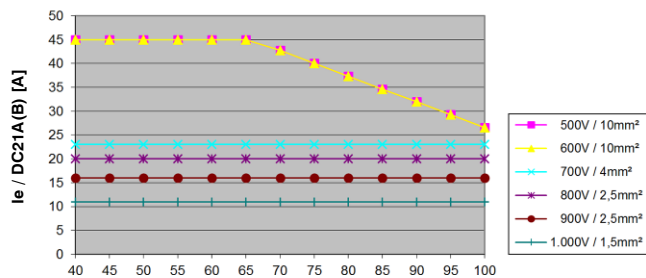
Maximum current according to ambient temperature and cable cross section

Switch LS25..., 2 contacts in series, open



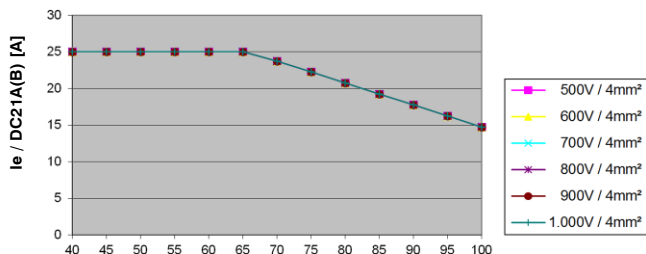
Ambient temperature around the switch (°C)

Switch LS25 ..., 2 contacts in series + 2 parallel, open



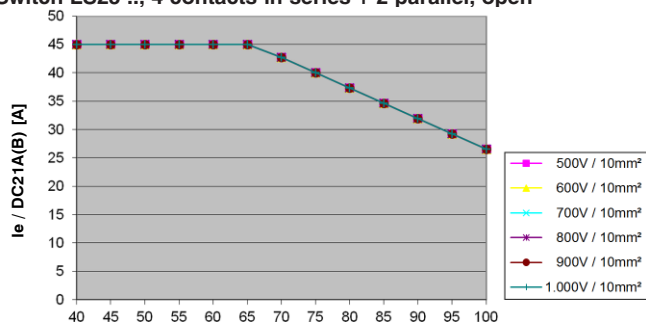
Ambient temperature around the switch (°C)

Switch LS25..., 4 contacts in series, open



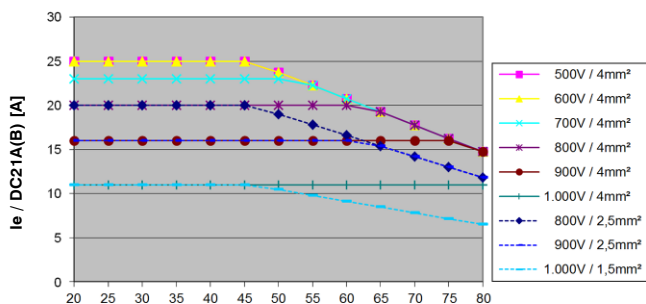
Ambient temperature around the switch (°C)

Switch LS25 ..., 4 contacts in series + 2 parallel, open



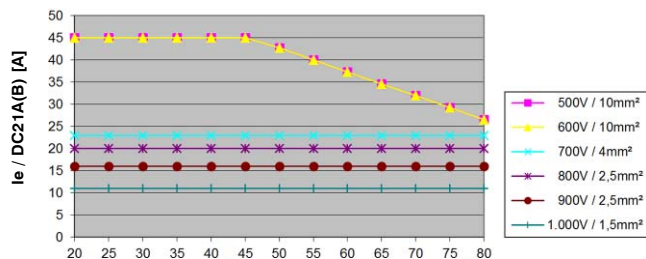
Ambient temperature around the switch (°C)

Enclosed switch LS25 PFL..., 2 contacts in series



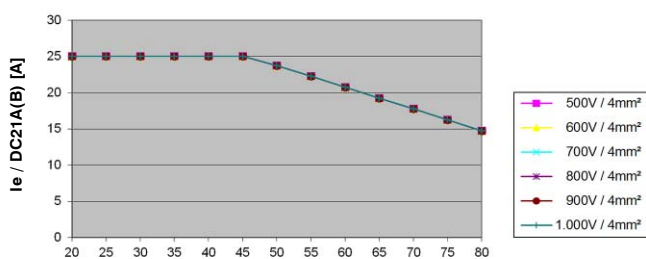
Ambient temperature around the switch (°C)

Enclosed switch LS25 PFL..., 2 contacts in series + 2 parallel



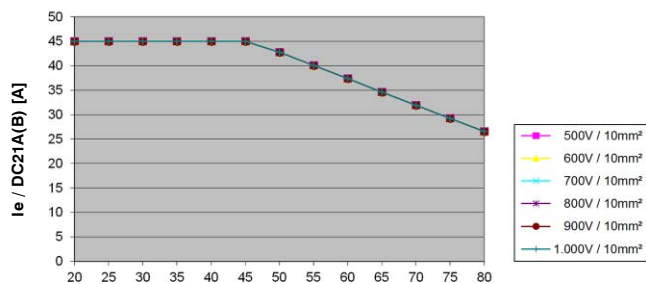
Ambient temperature around the switch (°C)

Enclosed switch LS25 PFL..., 4 contacts in series



Ambient temperature around the switch (°C)

Enclosed switch LS25 PFL..., 4 contacts in series + 2 parallel

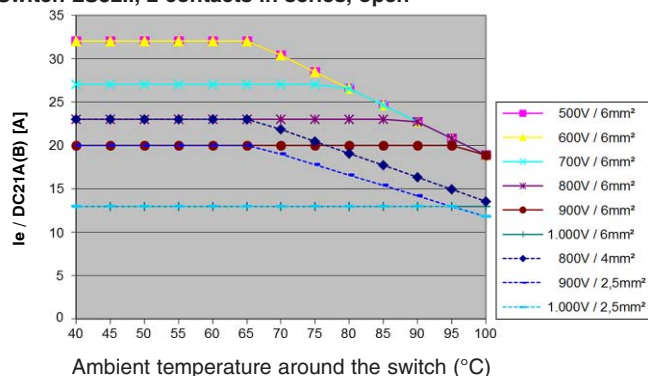


Ambient temperature around the switch (°C)

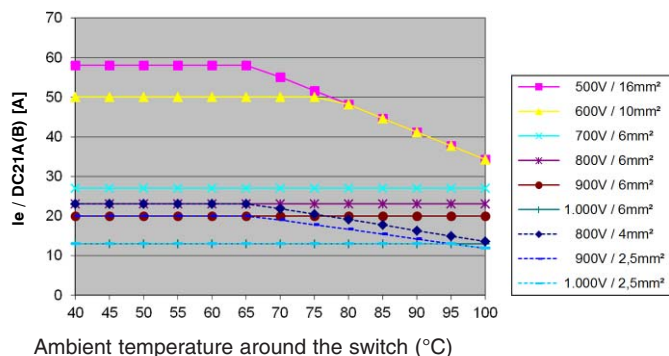
Technical Datas

Maximum current according to ambient temperature and cable cross section

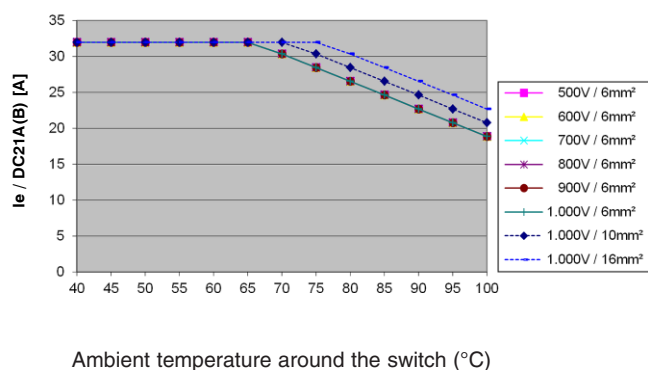
Switch LS32..., 2 contacts in series, open



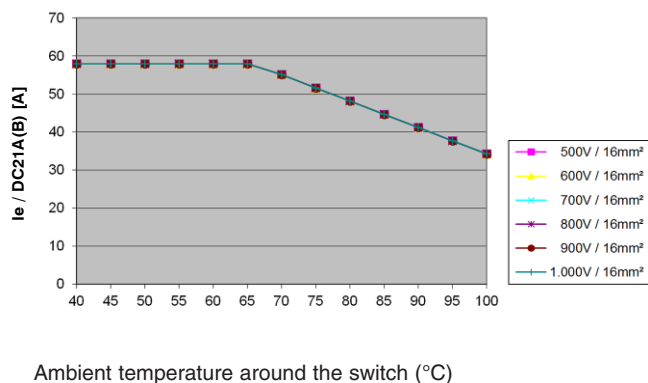
Switch LS32 ..., 2 contacts in series + 2 parallel, open



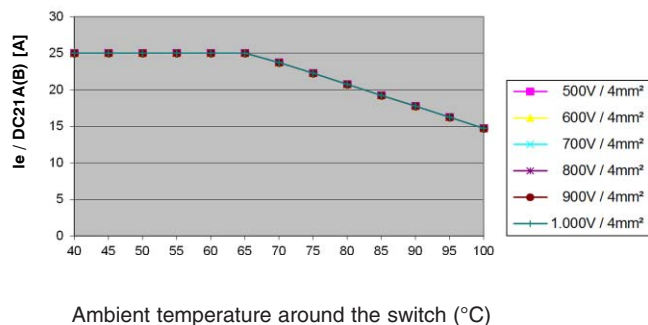
Switch LS32..., 4 contacts in series, open



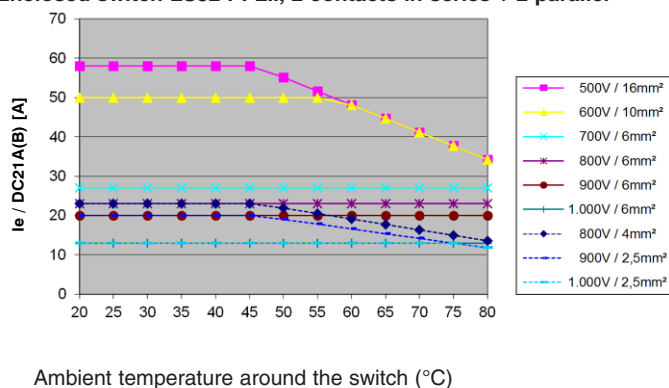
Switch LS32 ..., 4 contacts in series + 2 parallel, open



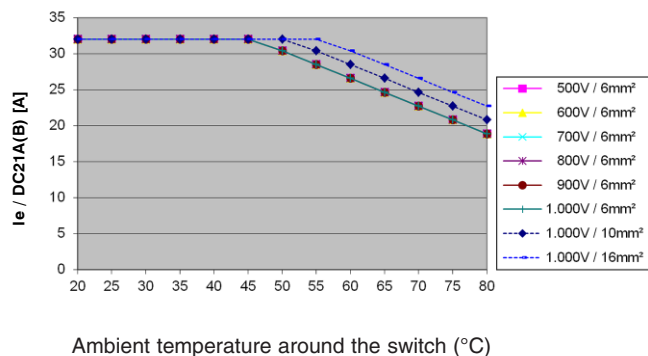
Enclosed switch LS32 PFL..., 2 contacts in series



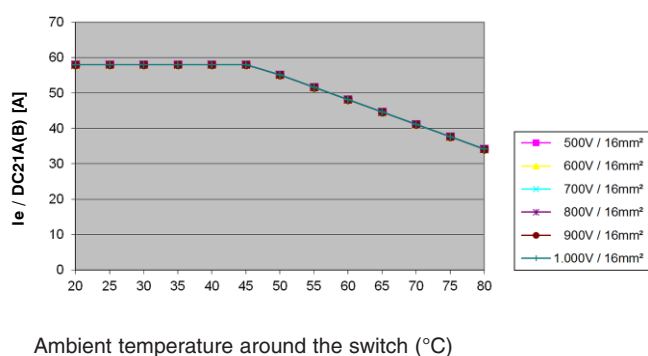
Enclosed switch LS32 PFL..., 2 contacts in series + 2 parallel



Enclosed switch LS32 PFL..., 4 contacts in series

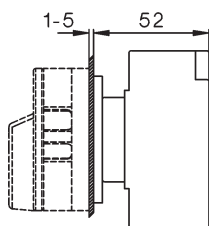


Enclosed switch LS32 PFL..., 4 contacts in series + 2 parallel

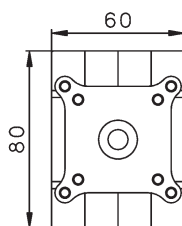
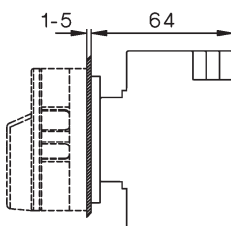


Dimensions

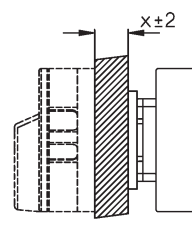
LS16 E..., LS25 E..., LS32 E...,
..A2



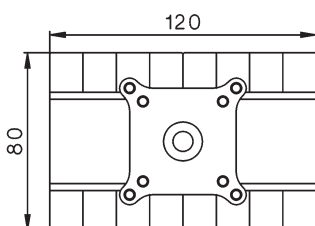
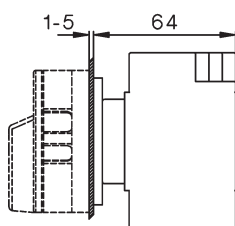
..A2+2, ..A4.



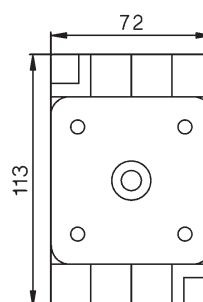
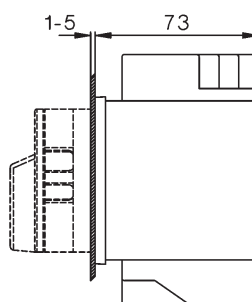
LS... + VW"x"
Extended Switch Shaft



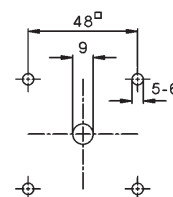
LS16 E..., LS25 E..., LS32 E...,
..A6, ..A8, ..A3+2, ..A4+2



LS40 E..., LS55 E..
..A2, ..A2+2, ..A4.

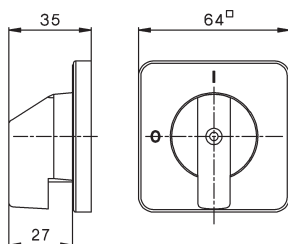


Mounting hole

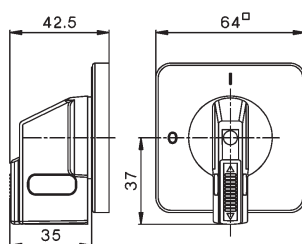


Escutcheon plate 64□

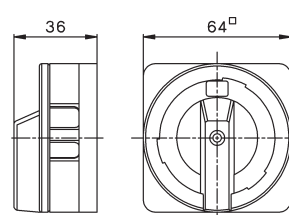
Handle



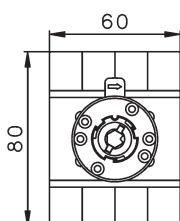
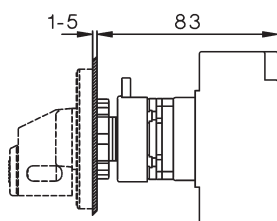
Padlock device SV1.



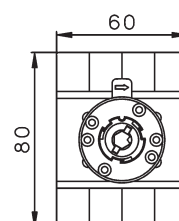
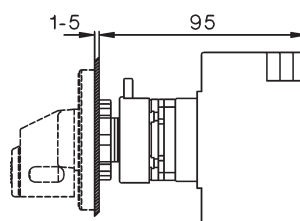
Padlock device SV4.



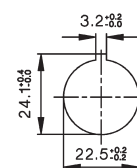
LS16 Z..., LS25 Z..., LS32 Z...,
..A2



..A2+2, ..A4.

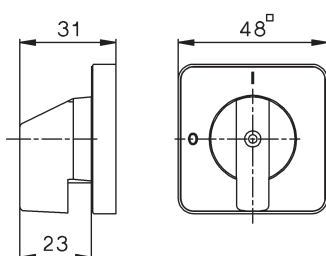


Mounting hole

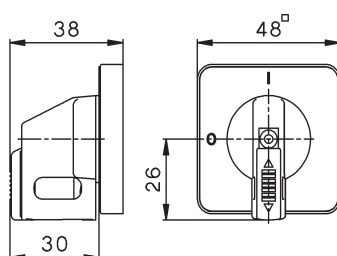


Escutcheon plate 48□

Handle



Padlock device SV1.

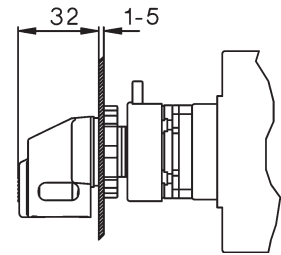
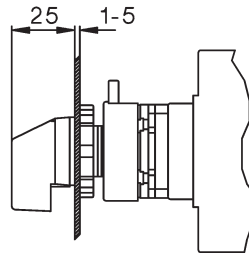
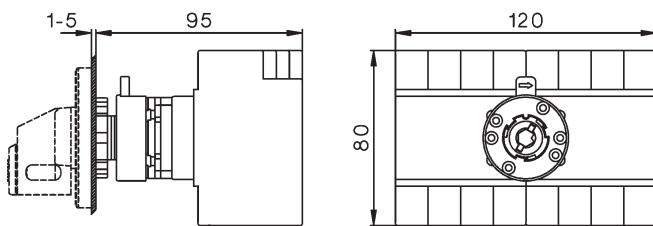


Dimensions

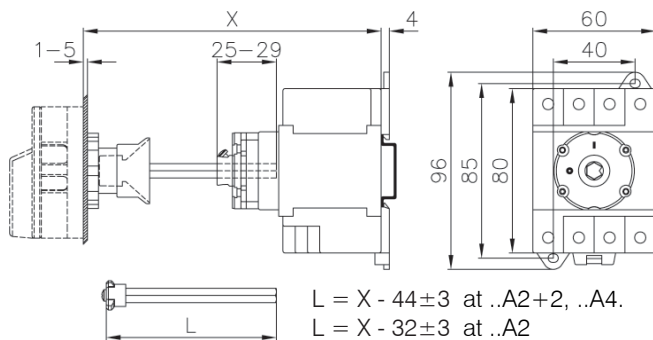
LS16 Z.., LS25 Z.., LS32 Z..
..A6, ..A8, ..A3+2, ..A4+2

LS.. ZO..

LS.. ZOH1..,



LS16 VZV.., LS25 VZV.., LS32 VZV..,



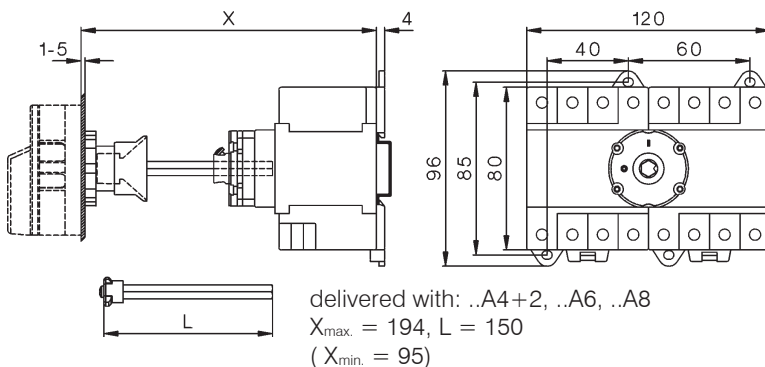
delivered with: ..A2+2, ..A4.
 $X_{\max.} = 194$, $L = 150$
($X_{\min.} = 89$)

delivered with: ..A2
 $X_{\max.} = 182$, $L = 150$
($X_{\min.} = 77$)

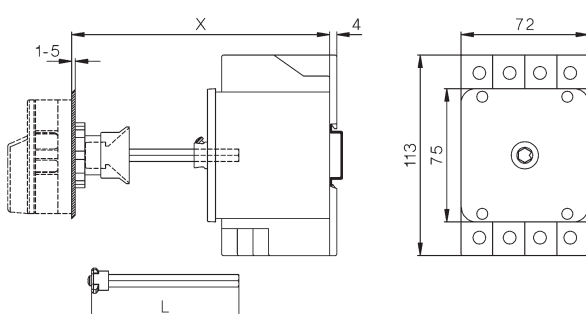
greater X-Dimensions on request

LS16 VZV.., LS25 VZV.., LS32 VZV..
..A6, ..A8, ..A3+2, ..A4+2

Mounting hole



LS40 VZV.., LS55 VZV..
..A2, ..A2+2, ..A4.



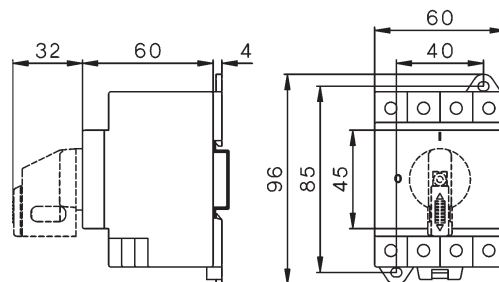
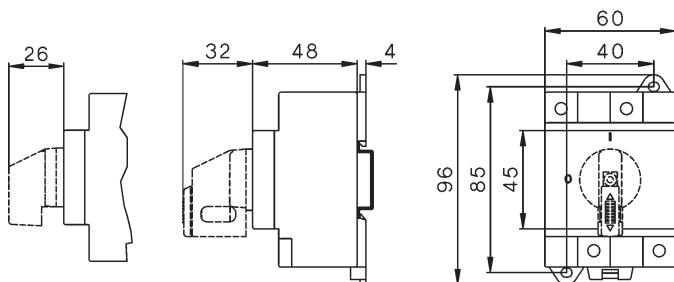
$X_{\max.} = 194$, $L = 133$
($X_{\min.} = 103$)

$L = X - 61 \pm 3$

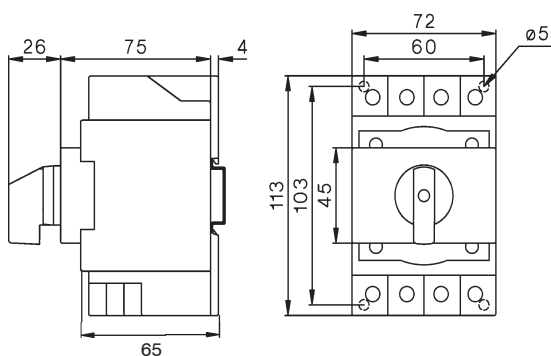
Dimensions

LS16 SMA..., LS25 SMA..., LS32 SMA...,
..A2 ..

A2+2, ..A4.

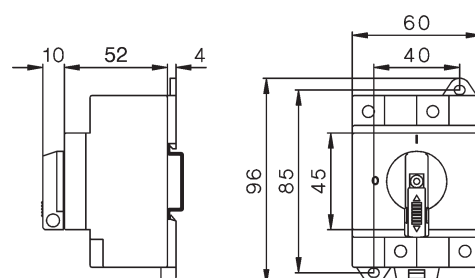
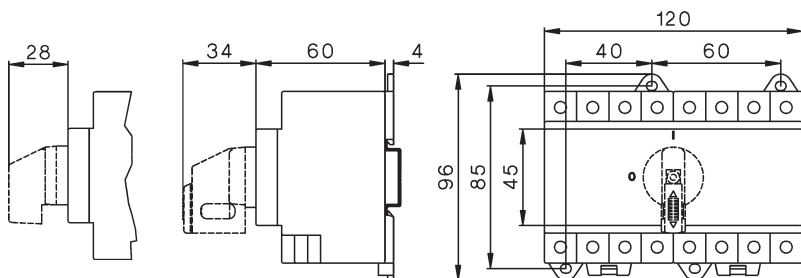


LS40 SMA..., LS55 SMA..
..A2, ..A2+2, ..A4.



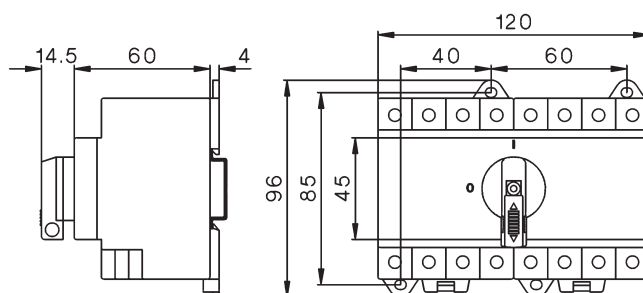
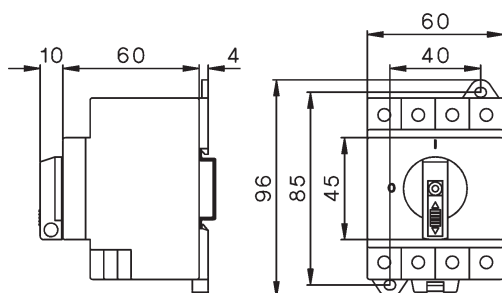
LLS16 SMA..., LS25 SMA..., LS32 SMA...,
..A6, ..A8, ..A3+2, ..A4+2

LS.. SMAH1.. with low height handle
A2+SV1N



LS16 SMAH1..., LS25 SMAH1, LS32 SMAH1 with low height handle
A2+2 +SV1N, A4.+SV1N

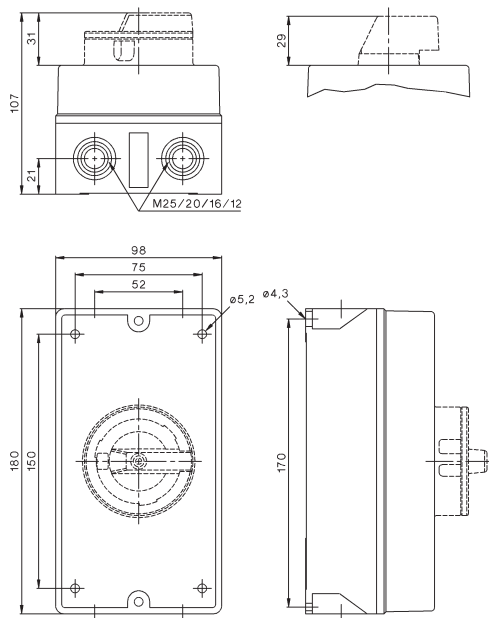
A4+2 +SV1N, A6+SV1N,A8+SV1N



Dimensions:

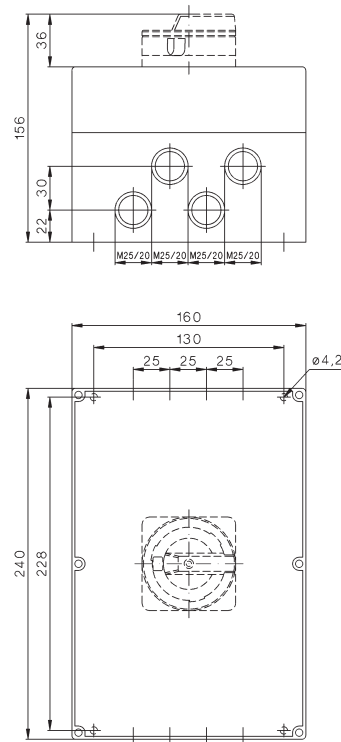
LS16 PFL..., LS25 PFL..., LS32 PFL..
..A2, ..A2+2, ..A4.

Main-Switch (lockable)
LS..PFLH4 A..

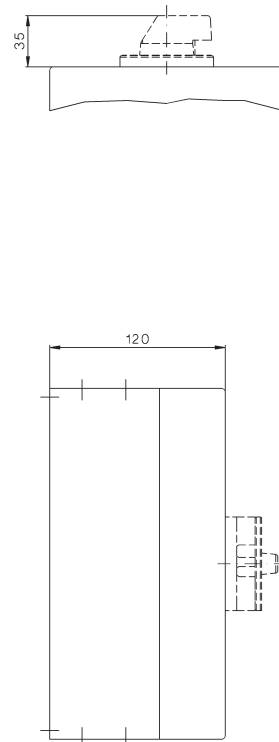


LS16 PF., LS25 PF., LS32 PF..
..A6, ..A8, ..A3+2, ..A4+2

Main-Switch (lockable)
LS..PFH4 A..



LS40 PF., LS55 PF..
A2, A2+2, A4



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Actuators and Lens Caps 22mm IP67 (IP65), Type12

Push Buttons



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IP65

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EMERGENCY STOP Buttons



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Illuminated Operators



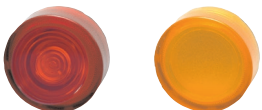
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Double Push Buttons with Indicator Lamp, IP65



→ page 318

Lens Caps



→ page 319

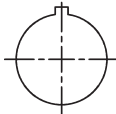
Mono Block Multi Chip LED IP65, IEC 60947, EN 60947



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Mounting hole
Ø 22,5mm

with key way



without key way



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Connectors



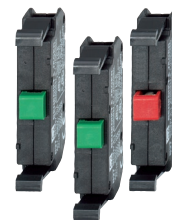
Thickness
0,5 - 4 mm
→ page 322

or

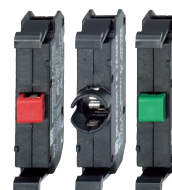


Thickness
1 - 6 mm
→ page 322

Contacts Lamp Holders



Actuator insert
→ page 322



→ page 322



LED
24-230V



Filament
6-130V



Glow-discharge
230V
→ page 323

Wrench for Actuators
Lens Caps and
Mono Block Multi Chip LED
J7049



Actuators 22mm IP67, Type12

Ring



Colour

Symbol

Alu

Black

Chrome

Pack
pcs.

Weight
kg/pc.

Push Buttons, Actuator Caps markable see page 323



red		B3D RT	BS3D RT	BC3D RT	10	0,014
red	0	B3D RT-0	BS3D RT-0	BC3D RT-0	10	0,014
green		B3D GN	BS3D GN	BC3D GN	10	0,014
grün	I	B3D GN-I	BS3D GN-I	BC3D GN-I	10	0,014
grün	II	B3D GN-II	BS3D GN-II	BC3D GN-II	10	0,014
grün	→	B3D GN-PF	BS3D GN-PF	BC3D GN-PF	10	0,014
yellow		B3D GE	BS3D GE	BC3D GE	10	0,014
blue		B3D BL	BS3D BL	BC3D BL	10	0,014
white		B3D WS	BS3D WS	BC3D WS	10	0,014
black		B3D SW	BS3D SW	BC3D SW	10	0,014
black	→	B3D SW-PF	BS3D SW-PF	BC3D SW-PF	10	0,014

Push Buttons, Maintained, Actuator Caps markable see page 323



red		B3DR RT	BS3DR RT	BC3DR RT	10	0,014
green		B3DR GN	BS3DR GN	BC3DR GN	10	0,014
yellow		B3DR GE	BS3DR GE	BC3DR GE	10	0,014
blue		B3DR BL	BS3DR BL	BC3DR BL	10	0,014
white		B3DR WS	BS3DR WS	BC3DR WS	10	0,014
black		B3DR SW	BS3DR SW	BC3DR SW	10	0,014

Mushroom Head Ø28mm



red		B3P1 RT	BS3P1 RT	BC3P1 RT	10	0,017
red	0	B3P1 RT-0	BS3P1 RT-0	BC3P1 RT-0	10	0,017
green		B3P1 GN	BS3P1 GN	BC3P1 GN	10	0,017
yellow		B3P1 GE	BS3P1 GE	BC3P1 GE	10	0,017
blue		B3P1 BL	BS3P1 BL	BC3P1 BL	10	0,017
black		B3P1 SW	BS3P1 SW	BC3P1 SW	10	0,017

Mushroom Head Ø40mm



red	0	B3P14 RT-0	BS3P14 RT-0	BC3P14 RT-0	10	0,020
-----	---	------------	-------------	-------------	----	-------

Mushroom Head Ø40mm



red		BS3P44T RT	BS3P44T RT	BS3P44T RT	10	0,028
-----	--	------------	------------	------------	----	-------

Foot and Palm switch Ø70mm



red		BS3P14P RT	BS3P14P RT	BS3P14P RT	1	0,062
grey		BS3P14P GR	BS3P14P GR	BS3P14P GR	1	0,062

Contactors, Motor-Starters

Circuit Breakers

Manual Motor-Starters

Switches

AC-Main Switches

DC-Switch Disconnectors

Push Buttons

Representatives, Suppliers

Actuators 22mm IP67, Type12

Ring	Colour	Symbol/ high				Pack pcs.	Weight kg/pc
			Alu	Black	Chrome		

EMERGENCY STOP Push Buttons, according to EN418, push to trip, pull to release Ø40mm



red	30mm	BS3P44 RT	BS3P44 RT	BS3P44 RT	10	0,028
red	38mm	BS3P45 RT	BS3P45 RT	BS3P45 RT	10	0,028

EMERGENCY STOP Push Buttons, according to EN418, release by key, Ø40mm



red	38mm	BS3P44S3	BS3P44S3	BS3P44S3	1	0,050
-----	------	----------	----------	----------	---	-------

Spare Key	lock Ronis R455		B4-R455	1	0,007
-----------	-----------------	--	---------	---	-------

EMERGENCY STOP Push Buttons, release by turning, Ø28mm



red		B3P3 RT	BS3P3 RT	BC3P3 RT	10	0,017
red	0	B3P3 RT-0	BS3P3 RT-0	BC3P3 RT-0	10	0,017

EMERGENCY STOP Push Buttons, release by turning, Ø40mm



red	0	B3P34 RT-0	BS3P34 RT-0	BC3P34 RT-0	10	0,020
-----	---	------------	-------------	-------------	----	-------



red	Pfeile	B3P34 RT-PF	BS3P34 RT-0	BC3P34 RT-0	10	0,020
-----	--------	-------------	-------------	-------------	----	-------

red illuminated		B3P34L RT	BS3P34L RT	BC3P34L RT	10	0,020
--------------------	--	-----------	------------	------------	----	-------

EMERGENCY STOP Push Buttons, release by turning, Ø70mm



red		BS3P34P RT	BS3P34P RT	BS3P34P RT	1	0,062
-----	--	------------	------------	------------	---	-------

Yellow Disk Ø70mm, Thickness 1mm ¹⁾



neutral		B3-7603	1	0,004
with marking NOT-AUS		B3-7603-1	1	0,004
with marking EMERGENCY STOP		B3-7603-2	1	0,004

2-side markings: NOT-AUS / EMERGENCY STOP		B3-7603-12	1	0,004
2-side markings: ARRET D'URGENCE / NØDSTOP		B3-7603-34	1	0,004
2-side markings: ARRET D'URGENCE / NOODSTOP		B3-7603-35	1	0,004

Protection cover against unintentional manipulation, Thickness 1mm



for Push Buttons Ø28mm and Ø40mm	yellow	B3-SK GE	1	0,04
----------------------------------	--------	----------	---	------

1) Not for enclosure BG..

Actuators 22mm Type12

Ring

Knob

Alu

Black

Chrome

Pack
pcs.

Weight
kg/pc.

Rotary Knobs and Swing Knobs, black IP65



Rotary



Swing

maintained 60°



Rotary
Swing

B3KN2
B3KRN2

BS3KN2
BS3KRN2

BC3KN2
BC3KRN2

10
10

0,020
0,020

spring return 60°



Rotary
Swing

B3KN8
B3KRN8

BS3KN8
BS3KRN8

BC3KN8
BC3KRN8

10
10

0,020
0,020

spring return 60°



Rotary
Swing

B3KN1
B3KRN1

BS3KN1
BS3KRN1

BC3KN1
BC3KRN1

10
10

0,020
0,020

maintained 60°



Rotary
Swing

B3KN3
B3KRN3

BS3KN3
BS3KRN3

BC3KN3
BC3KRN3

10
10

0,020
0,020

maintained/spring return 60°



Rotary

B3KN6

BS3KN6

BC3KN6

10

0,020

spring return/maintained 60°



Rotary

B3KN7

BS3KN7

BC3KN7

10

0,020

maintained 120°



Rotary

B3KN9

BS3KN9

BC3KN9

10

0,020

maintained 90°
according to EN81



Rotary

B3KN10

BS3KN10

BC3KN10

10

0,020

maintained 90°



Rotary

B3KN11

BS3KN11

BC3KN11

10

0,020

Illuminated Rotary Knobs and Swing Knobs, clear IP67, lamp max. 1,2W, lamps see page 323



Rotary



Swing

maintained 90°



Rotary

B3KL2

BS3KL2

BC3KL2

10

0,016

spring return 60°



Rotary
Swing

B3KL1
B3KRL1

BS3KL1
BS3KRL1

BC3KL1
BC3KRL1

10
10

0,016
0,016

maintained 60°



Rotary
Swing

B3KL3
B3KRL3

BS3KL3
BS3KRL3

BC3KL3
BC3KRL3

10
10

0,016
0,016

maintained/spring return 60°



Rotary

B3KL6

BS3KL6

BC3KL6

10

0,016

Toggle IP65



O - I

B3E

BS3E

BC3E

10

0,017

Actuators 22mm IP65, Type12

Ring				Pack pcs.	Weight kg/pc.
	Key removeable in	Alu	Black	Chrome	

Key Operated Rotary Switches with lock Ronis 455



B3SAR 0

maintained 60°



B3SAR 0

BS3SAR 0

BC3SAR 0

1

0,044

B3SAR 1

BS3SAR 1

BC3SAR 1

1

0,044

B3SAR 01

BS3SAR 01

BC3SAR 01

1

0,044



B3SARR 0

spring return 60°



B3SAT 0

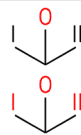
BS3SAT 0

BC3SAT 0

1

0,044

maintained 60°



B3SARR 0

BS3SARR 0

BC3SARR 0

1

0,044

B3SARR 102

BS3SARR 102

BC3SARR 102

1

0,044

spring return/maintained 60°



B3SATR 02

BS3SATR 02

BC3SATR 02

1

0,044

spring return 60°



B3SATT 0

BS3SATT 0

BC3SATT 0

1

0,044

Spare Key lock Ronis R455

B4-R455

1

0,007

Colour Symbol

pcs.

kg/pc.

Illuminated Push Buttons IP67, lamp max. 1,9W, lamps see page 323



red

B3DL RT

BS3DL RT

BC3DL RT

10

0,014

green

B3DL GN

BS3DL GN

BC3DL GN

10

0,014

yellow

B3DL GE

BS3DL GE

BC3DL GE

10

0,014

blue

B3DL BL

BS3DL BL

BC3DL BL

10

0,014

white

B3DL WS

BS3DL WS

BC3DL WS

10

0,014

Illuminated Push Buttons, Maintained IP67, lamp max. 1,9W, lamps see page 323



red

B3DLR RT

BS3DLR RT

BC3DLR RT

10

0,014

green

B3DLR GN

BS3DLR GN

BC3DLR GN

10

0,014

yellow

B3DLR GE

BS3DLR GE

BC3DLR GE

10

0,014

blue

B3DLR BL

BS3DLR BL

BC3DLR BL

10

0,014

white

B3DLR WS

BS3DLR WS

BC3DLR WS

10

0,014

Double Push Buttons, with indicator lamp white, lamp max. 1,9W, lamps see page 323



green

B3DT G/R ¹⁾

BS3DT G/R

BC3DT G/R

10

0,016

red

white

B3DT W/S ¹⁾

BS3DT W/S

BC3DT W/S

10

0,016

black

green

I

B3DT GI/RO ¹⁾

BS3DT GI/RO

BC3DT GI/RO

10

0,016

red

O

white

I

B3DT WI/SO ¹⁾

BS3DT WI/SO

BC3DT WI/SO

10

0,016

black

O

with non-standard marking on request

1) Plastic ring in alu design

suitable for Alu, Black and Chrome

Colour

Type

Pack
pcs.

Weight
kg/pc.

Lens Caps IP67 with fresnel lens, lamp max. 1,9W, lamps see page 323, laser marking on request



red	B3R RT	10	0,009
green	B3R GN	10	0,009
yellow	B3R GE	10	0,009
blue	B3R BL	10	0,009
clear	B3R KL	10	0,009
white	B3R WS	10	0,009

Lens Caps Low IP67 with fresnel lens, lamp max. 1,9W, lamps see page 323, laser marking on request



red	B3RN RT	10	0,008
green	B3RN GN	10	0,008
yellow	B3RN GE	10	0,008
blue	B3RN BL	10	0,008
clear	B3RN KL	10	0,008
white	B3RN WS	10	0,008

Lens Caps IP67, lamp max. 1,9W, lamps see page 323, laser marking on request



red	B3RF RT	10	0,009
green	B3RF GN	10	0,009
yellow	B3RF GE	10	0,009
blue	B3RF BL	10	0,009
white	B3RF WS	10	0,009

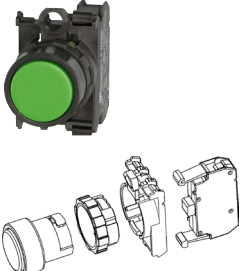
Colour Voltage Power VA W Type Pack pcs. Weight kg/pc

Monoblock LEDs IP65, IEC 60947, EN 60947



red	20-30V AC/DC	0,4	0,4	B3-MB24 RTB	10	0,022
green	20-30V AC/DC	0,4	0,4	B3-MB24 GNB	10	0,022
yellow	20-30V AC/DC	0,4	0,4	B3-MB24 GEB	10	0,022
blue	20-30V AC/DC	0,4	0,4	B3-MB24 BLB	10	0,022
white	20-30V AC/DC	0,4	0,4	B3-MB24 WSB	10	0,022
red	110-130V AC 110V DC	1,2	1,2	B3-MB110 RTB	10	0,022
green	110-130V AC 110V DC	1,2	1,2	B3-MB110 GNB	10	0,022
yellow	110-130V AC 110V DC	1,2	1,2	B3-MB110 GEB	10	0,022
blue	110-130V AC 110V DC	1,2	1,2	B3-MB110 BLB	10	0,022
white	110-130V AC 110V DC	1,2	1,2	B3-MB110 WSB	10	0,022
red	170-250V AC	4,0	1,0	B3-MB230 RTB	10	0,022
green	170-250V AC	4,0	1,0	B3-MB230 GNB	10	0,022
yellow	170-250V AC	4,0	1,0	B3-MB230 GEB	10	0,022
blue	170-250V AC	4,0	1,0	B3-MB230 BLB	10	0,022
white	170-250V AC	4,0	1,0	B3-MB230 WSB	10	0,022
red	400V AC		0,5	B3-MB400 RTB	10	0,022
green	400V AC		0,5	B3-MB400 GNB	10	0,022
yellow	400V AC		0,5	B3-MB400 GEB	10	0,022
blue	400V AC		0,5	B3-MB400 BLB	10	0,022
white	400V AC		0,5	B3-MB400 WSB	10	0,022

Push Button 22mm-Sets, with Contact Block and Connector

	Aktuator Farbe	Symbol	with	Type	Pack pcs.	Weight kg/pc.
	black		+connector +1NO	BS3D SW/10	1	0,037
	green		+connector +1NO	BS3D GN/10	1	
	yellow		+connector +1NO	BS3D GE/10	1	0,037
	blue		+connector +1NO	BS3D BL/10	1	0,037
	red		+connector +1NC	BS3D RT/01	1	
	green		+connector +1NO	BS3D GN-I/10	1	0,037
	red		+connector +1NC	BS3D RT-0/01	1	0,037

Double Push Buttons, IP65

	green/ red		+connector +1NO +1NC	BS3DT G/R/11	1	0,049
--	------------	--	----------------------	--------------	---	-------

EMERGENCY STOP Push Buttons, IP67 Ø40mm

	pull to release acc. EN418		+connector +1NO +1NC	BS3P44 RT/11	1	0,061
	key release acc. EN418		+connector +1NO +1NC	BS3P44S3 RT/11	1	0,083
	twist release		+connector +1NO +1NC	BS3P34 RT-0/11	1	0,053

Rotary Knobs, IP65

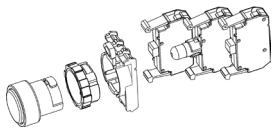
			+connector +1NO	BS3KN2/10	1	0,043
			+connector +1NO +1NC	BS3KN2/11	1	0,053
			+connector +2NO	BS3KN3/20	1	0,053
			+connector +2NO	BS3KN1/20	1	0,053

Key Operated Rotary Switch with lock Ronis 455, IP65

		key removeable in 0-position	+connector +1NO	BS3SAR 0/10	1	0,057
		key removeable in all positions	+connector +1NO	BS3SAR 01/10	1	0,057
		key removeable in 0-position	+connector +1NO	BS3SAT 0/10	1	0,057
		key removeable in all positions	+connector +2NO	BS3SARR 102/20	1	0,067
		key removeable in 0-position	+connector +2NO	BS3SARR 0/20	1	0,067

Illuminated Push Button 22mm-Sets, with Contact Block, Connector and LED

Illuminated Push Buttons, IP67



Aktuator colour	with	LED	Type	Pack pcs.	Weight kg/pc.
white	+connector +1NO +1NC +LED	20-30V AC/DC	BS3DL WS/11/L24	1	0,054
green	+connector +1NO +1NC +LED	20-30V AC/DC	BS3DL GN/11/L24	1	0,054
red	+connector +1NO +1NC +LED	20-30V AC/DC	BS3DL RT/11/L24	1	0,054
yellow	+connector +1NO +1NC +LED	20-30V AC/DC	BS3DL GE/11/L24	1	0,054
blue	+connector +1NO +1NC +LED	20-30V AC/DC	BS3DL BL/11/L24	1	0,054
white	+connector +1NO +1NC +LED	90-120V AC/DC	BS3DL WS/11/L110	1	0,054
green	+connector +1NO +1NC +LED	90-120V AC/DC	BS3DL GN/11/L110	1	0,054
red	+connector +1NO +1NC +LED	90-120V AC/DC	BS3DL RT/11/L110	1	0,054
yellow	+connector +1NO +1NC +LED	90-120V AC/DC	BS3DL GE/11/L110	1	0,054
blue	+connector +1NO +1NC +LED	90-120V AC/DC	BS3DL BL/11/L110	1	0,054
white	+connector +1NO +1NC +LED	200-250V AC/DC	BS3DL WS/11/L230	1	0,054
green	+connector +1NO +1NC +LED	200-250V AC/DC	BS3DL GN/11/L230	1	0,054
red	+connector +1NO +1NC +LED	200-250V AC/DC	BS3DL RT/11/L230	1	0,054
yellow	+connector +1NO +1NC +LED	200-250V AC/DC	BS3DL GE/11/L230	1	0,054
blue	+connector +1NO +1NC +LED	200-250V AC/DC	BS3DL BL/11/L230	1	0,054

Double Push Buttons with Pilot Light, IP65



green/ red	+connector +1NO +1NC +LED	20-30V AC/DC	BS3DT G/R/11/L24	1	0,066
green/ red	+connector +1NO +1NC +LED	90-120V AC/DC	BS3DT G/R/11/L110	1	0,066
green/ red	+connector +1NO +1NC +LED	200-250V AC/DC	BS3DT G/R/11/L230	1	0,066

Pilot Lights, IP67 with socket BA9S (without lamp)



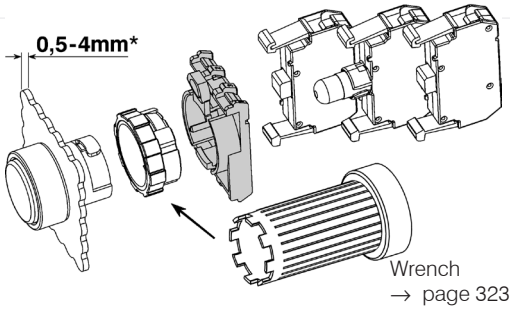
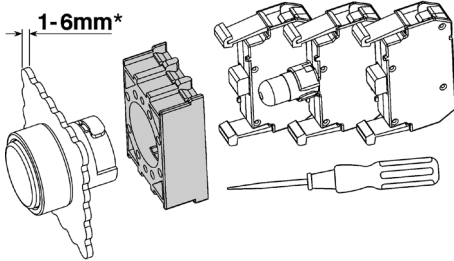
white	+connector +socket BA9S	-	B3R WS/0	1	0,037
green	+connector +socket BA9S	-	B3R GN/0	1	0,037
red	+connector +socket BA9S	-	B3R RT/0	1	0,037
yellow	+connector +socket BA9S	-	B3R GE/0	1	0,037

Pilot Lights with LEDs, IP67



white	+connector +socket BA9S	20-30V AC/DC	B3R WS/L24	1	0,042
green	+connector +socket BA9S	20-30V AC/DC	B3R GN/L24	1	0,042
red	+connector +socket BA9S	20-30V AC/DC	B3R RT/L24	1	0,042
yellow	+connector +socket BA9S	20-30V AC/DC	B3R GE/L24	1	0,042
white	+connector +socket BA9S	90-120V AC/DC	B3R WS/L110	1	0,042
green	+connector +socket BA9S	90-120V AC/DC	B3R GN/L110	1	0,042
red	+connector +socket BA9S	90-120V AC/DC	B3R RT/L110	1	0,042
yellow	+connector +socket BA9S	90-120V AC/DC	B3R GE/L110	1	0,042
white	+connector +socket BA9S	200-250V AC/DC	B3R WS/L230	1	0,042
green	+connector +socket BA9S	200-250V AC/DC	B3R GN/L230	1	0,042
red	+connector +socket BA9S	200-250V AC/DC	B3R RT/L230	1	0,042
yellow	+connector +socket BA9S	200-250V AC/DC	B3R GE/L230	1	0,042

Connectors

Specification	Description	Type	Pack pcs.	Weight kg/pc.
		B3S	10	0,013
		B3M	10	0,013

*) inclusive Thickness from Label Holder and Yellow Disk

Contact Blocks and Lamp Holders for Panel Mounting

for voltage	Description	Type	Pack pcs.	Weight kg/pc.
	max. 690V AC 1 NC ¹⁾ 	B3T01 ²⁾	10	0,010
	max. 690V AC 1 NO ¹⁾ 	B3T10 ²⁾	10	0,010
	to actuate the center contact block	P642	10	0,001

Lamp holders, socket BA9s

	max. 440V AC/DC    direct connection, for lamps max. 1,9W (active power consumption)	X1 X2 	B3F	10	0,012
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Lamp holders for lamp test circuits, socket BA9s

	max. 440V AC   direct connection, for filament and glow-discharge lamps max. 1,7W (active power consumption)	X5 X2 X1 	B3FT	10	0,020
	max. 250V  direct connection of LED	X5 X2 X1 	B3FTD	10	0,020

1)  NC contact has a positive opening according to IEC/EN 60947-5-1

2) Contact blocks with gold contacts (B3T..G) on request suitable for 17V= /1mA and for difficult ambient conditions.

Lamps

Socket BA9s	Power consumption	Type	Pack pcs.	Weight kg/pc.
Lamp voltage				

LED lamps²⁾ (6 years middle lifetime, for equivalent lens caps only)



20-30V AC/DC	17mA / 0,4W	for red lens caps	B3-L24 RTB	50	0,005
20-30V AC/DC	17mA / 0,4W	for green lens caps	B3-L24 GNB	50	0,005
20-30V AC/DC	17mA / 0,4W	for yellow lens caps	B3-L24 GEB	50	0,005
20-30V AC/DC	17mA / 0,4W	for blue lens caps	B3-L24 BLB	50	0,005
20-30V AC/DC	17mA / 0,4W	for white lens caps	B3-L24 WSB	50	0,005
90-120V AC/DC	7mA / 0,8W	for red lens caps	B3-L110 RTB	50	0,005
90-120V AC/DC	7mA / 0,8W	for green lens caps	B3-L110 GNB	50	0,005
90-120V AC/DC	7mA / 0,8W	for yellow lens caps	B3-L110 GEB	50	0,005
90-120V AC/DC	7mA / 0,8W	for blue lens caps	B3-L110 BLB	50	0,005
90-120V AC/DC	7mA / 0,8W	for white lens caps	B3-L110 WSB	50	0,005
200-250V AC/DC	4mA / 0,9W	for red lens caps	B3-L230 RTB	50	0,005
200-250V AC/DC	4mA / 0,9W	for green lens caps	B3-L230 GNB	50	0,005
200-250V AC/DC	4mA / 0,9W	for yellow lens caps	B3-L230 GEB	50	0,005
200-250V AC/DC	4mA / 0,9W	for blue lens caps	B3-L230 BLB	50	0,005
200-250V AC/DC	4mA / 0,9W	for white lens caps	B3-L230 WSB	50	0,005

Filament lamps



12V	1,2W	for all lens caps	B4-G12	100	0,005
24V	1,2W	for all lens caps	B4-G24	100	0,005
42V	1W	for all lens caps	B4-G42	100	0,005
48V	1,2W	for all lens caps	B4-G48	100	0,005
60V	1,2W	for all lens caps	B4-G60	100	0,005
110/120V 1)	1,5/1,8W	for all lens caps	B4-G130	100	0,005

Glow-discharge lamps



220-250V AC	0,3W	for clear, red, yellow lens caps	B4-GL230K	100	0,005
220-250V AC	0,3W	for green, blue lens caps	B4-GL230G	100	0,005

Accessories



		Type	Pack pcs.	Weight kg/pc.
Wrench	for mounting of actuators and lens caps B(S)3..	J7049	1	0,018
Marking plate	for marking of contact blocks B3T. and lamp holders B3F	P672-1	10	0,001
Lampengreifer	Zum Einsetzen oder Tauschen von	B4-7408	1	0,010
Spare Key	for B(S)3SA.. and BS3P44S3, Ronis R455 for B(S)3SB.., Ronis R786	B4-R455 B4-R786	1 1	0,007 0,007
Blindverschluß	schwarz, zum Verschließen von Bohrungen grau Ø22,5mm	B3-DU SW B3-DU GR	10 10	0,007 0,007
Sealing Cover protection against coarse contamination	ambient temp. 0° - +50 °C ³⁾	P279-1	1	0,003
	petrol-resistant ³⁾ ambient temp. -25° - +55 °C	P279-3	1	0,003
	silicone, petrol-resistant ⁴⁾ ambient temp. -25° - +70 °C	P279-4	1	0,003
	for double push buttons, petrol-resistant ambient temp. -25° - +55 °C	P279-DT	1	0,003
Protection cover	against unintentional manipulation			
	Thickness 1mm yellow	B3-SK GE	1	0,04
	Thickness 1mm grey	B3-SK GR	1	0,04
Protection ring with thread	against unintentional manipulation			
	has to be mounted instead of the existing ring black	P921-1	1	0,012
	chrome	P921-2	1	0,012
	alu	P921-3	1	0,012

1) Voltage marking 130V / 2W max. rated voltage 120V / 1,8W
3) not for B3D..R.. (maintained)

2) suitable for B3FT lamp test lamp holders
4) additional for B3D..R.. (maintained)

Label Holders and Legend Plates for Push Buttons B3, 22mm

Marking 1 or 2 lines



	Type	Pack pcs.	Weight kg/pc.
Label holder for legend plate BK4, black, Thickness 0,8mm	P751	100	0,001
Label holder for legend plate BK4, yellow, Thickness 0,8mm	P751-3	10	0,001

marking	Type	marking	Type	Pack pcs.	Weight kg/pc.
---------	------	---------	------	-----------	---------------

Legend plate alu, for label holder P751

blank	BK4-9736			100	0,0002
I	BK4-I	II	BK4-II	10	0,0002
III	BK4-III	IV	BK4-IV	10	0,0002
V	BK4-V			10	0,0002
→	BK4--->	←	BK4-<--	10	0,0002
0 I	BK4-0-I	H 0 A	BK4-H 0 A	10	0,0002
0 I	BK4-0__I	1 0 2	BK4-1 0 2	10	0,0002
START	BK4-START	STOP	BK4-STOP	10	0,0002
EIN	BK4-EIN	AUS	BK4-AUS	10	0,0002
BETRIEB	BK4-BETRIEB	STÖRUNG	BK4-STÖRUNG	10	0,0002
VOR	BK4-VOR	ZURÜCK	BK4-ZURÜCK	10	0,0002
HEBEN	BK4-HEBEN	SENKEN	BK4-SENKEN	10	0,0002
LINKS	BK4-LINKS	RECHTS	BK4-RECHTS	10	0,0002
MEHR	BK4-MEHR	WENIGER	BK4-WENIGER	10	0,0002
SCHNELL	BK4-SCHNELL	LANGSAM	BK4-LANGSAM	10	0,0002
HELLER	BK4-HELLER	DUNKLER	BK4-DUNKLER	10	0,0002
AUF	BK4-AUF	ZU	BK4-ZU	10	0,0002
AB	BK4-AB	HALT	BK4-HALT	10	0,0002
EILGANG	BK4-EILGANG	TIPPEN	BK4-TIPPEN	10	0,0002

Legend plate with non-standard marking (e. g.: BK4-MOTOR-START)

Text 1 line, max. 11 letters, letter height 3mm	BK4-...	1	0,0002
Text 2 lines, max. 2 x 11 letters, letter height 3mm	BK4-...-...	1	0,0002

Legend plate yellow, for label holder P751-3

Legend plate yellow without marking	BK4-10827	10	0,0002
Legend plate yellow with marking NOT-AUS	BK4-10827-1	10	0,0002
Legend plate yellow with marking EMERGENCY STOP	BK4-10827-2	10	0,0002
Legend plate yellow with marking ARRET D'URGENCE	BK4-10827-3	10	0,0002

NOT-AUS

Marking 3 or 4 lines



Label holder for legend plate BK8, black, Thickness 0,8mm	P761	10	0,0013
Label holder for legend plate BK8, yellow, Thickness 0,8mm	P761-3	10	0,0013
Label holder for BK8, for double push buttons only	P761-DT	10	0,0013

Legend plate BK8 for label holder P761 (with marking e. g.: BK8-WATER-PUMP-START)

Legend plate without marking	BK8-9736	10	0,0004
Text 3 lines, max. 3 x 11 letters, letter height 3mm	BK8-...-...-...	10	0,0004
Text 4 lines, max. 4 x 11 letters, letter height 3mm	BK8-...-...-...	10	0,0004

Actuator Caps with Laser Marking

Code for colours

Colour	for buttons		for illuminated buttons	
	B3D(R)	B5D(R)	B3DL(R)	B5DL(R)
	BS3D(R)	BS5D(R)	BS3DL(R)	BS5DL(R)
	BC3D(R)	BC5D(R)	BC3DL(R)	BC5DL(R)
rot	DK RT-..		DKL RT-..	
grün	DK GN-..		DKL GN-..	
gelb	DK GE-..		DKL GE-..	
blau	DK BL-..		DKL BL-..	
weiß	DK WS-..		DKL WS-..	
schwarz	DK SW-..		-	

marking	Type	-suffix for marking	marking	Type	-suffix for marking.	Pack pcs.	Weight kg/pc
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Actuator Caps with text, the Type must be completed with the code for colours



		NOT AUS	...-NOT-AUS	10	0,001
START	...-START	STOP	...-STOP	10	0,001
EIN	...-EIN	AUS	...-AUS	10	0,001
BETRIEB	...-BETRIEB	STÖRUNG	...-STÖRUNG	10	0,001
ANLAUF	...-ANLAUF	HALT	...-HALT	10	0,001
VOR	...-VOR	ZURÜCK	...-ZURÜCK	10	0,001
HEBEN	...-HEBEN	SENKEN	...-SENKEN	10	0,001
LINKS	...-LINKS	RECHTS	...-RECHTS	10	0,001
MEHR	...-MEHR	WENIGER	...-WENIGER	10	0,001
SCHNELL	...-SCHNELL	LANGSAM	...-LANGSAM	10	0,001
HELLER	...-HELLER	DUNKLER	...-DUNKLER	10	0,001
AUF	...-AUF	ZU	...-ZU	10	0,001
AB	...-AB	LAUF	...-LAUF	10	0,001
EILGANG	...-EILGANG	TIPPEN	...-TIPPEN	10	0,001

Actuator Caps with symbols according to DIN 30600, the Type must be completed with the code for colours

	...-100		...-101	10	0,001
	...-102		...-103	10	0,001
	...-200		...-201	10	0,001
	...-202		...-203	10	0,001
	...-204		...-205	10	0,001
	...-300		...-301	10	0,001
	...-302		...-303	10	0,001
	...-304		...-305	10	0,001
	...-306		...-307	10	0,001
	...-400		...-401	10	0,001
	...-402		...-403	10	0,001
	...-404		...-405	10	0,001
	...-406		...-407	10	0,001
	...-408		...-409	10	0,001
	...-410		...-411	10	0,001
	...-412		...-413	10	0,001

Actuators and Lens Caps 30mm IP67 (IP65)

Push Buttons



→ page 327



IP65

→ page 328
329

EMERGENCY STOP Buttons



→ page 327

Illuminated Operators



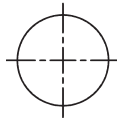
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Lens Caps



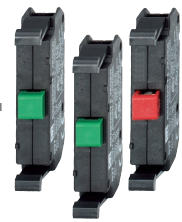
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Mounting hole
Ø 30,5mm



Connectors

Contacts Lamp Holder



Actuator insert
→ page 330



→ page 327



→ page 331



Thickness
0,5 - 3 mm
→ page 330



→ page 330



LED
24-230V



Filament
6-130V



Glow-discharge
230V

→ page 331

Wrench
J7049



Actuators 30mm IP67

Ring

Colour Symbol

Alu

Black

Chrome

Pack Weight
pcs. kg/pc.

Push Buttons, Actuator Caps markable



red		B5D RT	BS5D RT	BC5D RT	10	0,029
red	0	B5D RT-0	BS5D RT-0	BC5D RT-0	10	0,029
green		B5D GN	BS5D GN	BC5D GN	10	0,029



green	I	B5D GN-I	BS5D GN-I	BC5D GN-I	10	0,029
green	II	B5D GN-II	BS5D GN-II	BC 5D GN-II	10	0,029
green	→	B5D GN-PF	BS5D GN-PF	BC5D GN-PF	10	0,029

yellow		B5D GE	BS5D GE	BC5D GE	10	0,029
blue		B5D BL	BS5D BL	BC5D BL	10	0,029
white		B5D WS	BS5D WS	BC 5D WS	10	0,029

black		B5D SW	BS5D SW	BC5D SW	10	0,029
black	→	B5D SW-PF	BS5D SW-PF	BC5D SW-PF	10	0,029

Push Buttons, Maintained, Actuator Caps markable



red		B5DR RT	BS5DR RT	BC5DR RT	10	0,029
green		B5DR GN	BS5DR GN	BC5DR GN	10	0,029
yellow		B5DR GE	BS5DR GE	BC5DR GE	10	0,029

blue		B5DR BL	BS5DR BL	BC5DR BL	10	0,029
white		B5DR WS	BS5DR WS	BC5DR WS	10	0,029
black		B5DR SW	BS5DR SW	BC5DR SW	10	0,029

Mushroom Heads, Ø28mm



red		B5P1 RT	BS5P1 RT	BC5P1 RT	10	0,032
red	0	B5P1 RT-0	BS5P1 RT-0	BC5P1 RT-0	10	0,032
green		B5P1 GN	BS5P1 GN	BC5P1 GN	10	0,032

yellow		B5P1 GE	BS5P1 GE	BC5P1 GE	10	0,032
blue		B5P1 BL	BS5P1 BL	BC5P1 BL	10	0,032
black		B5P1 SW	BS5P1 SW	BC5P1 SW	10	0,032

Mushroom Heads, Ø40mm



red	0	B5P14 RT-0	BS5P14 RT-0	BC5P14 RT-0	10	0,035
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EMERGENCY STOP Push Buttons, Ø 28mm, release by turning, with yellow ring



red		B5P3 RT			10	0,032
red	0	B5P3 RT-0			10	0,032

EMERGENCY STOP Push Buttons, Ø 40mm, release by turning



red	0	B5P34 RT-0	BS5P34 RT-0	BC5P34 RT-0	10	0,035
-----	---	------------	-------------	-------------	----	-------

Yellow Disk for EMERGENCY-STOP Push Buttons, Ø70mm, Thickness 1mm



neutral		B5-7603			1	0,004
with marking NOT-AUS		B5-7603-1			1	0,004
with marking EMERGENCY STOP		B5-7603-2			1	0,004

Actuators 30mm

Ring

Knob

Alu

Black

Chrome

Pack
pcs.

Weight
kg/pc.

Rotary Knobs and Swing Knobs, black IP65



Rotary



Swing

maintained 60°



Rotary
Swing

B5KN2
B5KRN2

BS5KN2
BS5KRN2

BC5KN2
BC5KRN2

10
10

0,035
0,035

spring return 60°



Rotary
Swing

B5KN8
B5KRN8

BS5KN8
BS5KRN8

BC5KN8
BC5KRN8

10
10

0,035
0,035

spring return 60°



Rotary
Swing

B5KN1
B5KRN1

BS5KN1
BS5KRN1

BC5KN1
BC5KRN1

10
10

0,035
0,035

spring return 60°



Rotary
Swing

B5KN3
B5KRN3

BS5KN3
BS5KRN3

BC5KN3
BC5KRN3

10
10

0,035
0,035

maintained/spring return 60°



Rotary

B5KN6

BS5KN6

BC5KN6

10

0,035

spring return/maintained 60°



Rotary

B5KN7

BS5KN7

BC5KN7

10

0,035

maintained 120°



Rotary

B5KN9

BS5KN9

BC5KN9

10

0,035

maintained 90°
according to EN81



Rotary

B5KN10

BS5KN10

BC5KN10

10

0,035

Illuminated Rotary Knobs and Swing Knobs IP67, clear, lamp max. 1,2W, lamps see page 331



Knebel



Rüssel

maintained 90°



Rotary

B5KL2

BS5KL2

BC5KL2

10

0,031

spring return 60°



Rotary
Swing

B5KL1
B5KRL1

BS5KL1
BS5KRL1

BC5KL1
BC5KRL1

10
10

0,031
0,031

maintained 60°



Rotary
Swing

B5KL3
B5KRL3

BS5KL3
BS5KRL3

BC5KL3
BC5KRL3

10
10

0,031
0,031

maintained/spring return 60°



Rotary

B5KL6

BS5KL6

BC5KL6

10

0,031

Toggle IP65



O - I

B5E

BS5E

BC5E

10

0,032

Actuators and Lens Caps 30mm IP65

Ring

key
removeable in

Alu

Black

Chrome

Pack Weight
pcs. kg/pc.

Key Operated Rotary Switch with lock Ronis 455

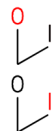


B3SAR 0



B3SARR 0

maintained 60°



B5SAR 0

BS5SAR 0

BC5SAR 0

1

0,059

B5SAR 1

BS5SAR 1

BC5SAR 1

1

0,059



B5SAR 01

BS5SAR 01

BC5SAR 01

1

0,059

spring return 60°



B5SAT 0

BS5SAT 0

BC5SAT 0

1

0,059

maintained 60°



B5SARR 0

BS5SARR 0

BC5SARR 0

1

0,059



B5SARR 102

BS5SARR 102

BC5SARR 102

1

0,059

spring return/maintained 60°



B5SATR 02

BS5SATR 02

BC5SATR 02

1

0,059

spring return 60°



B5SATT 0

BS5SATT 0

BC5SATT 0

1

0,059

Spare Keylock Ronis R455

B4-R455

1

0,007

Colour

pcs.

kg/pc.

Illuminated Push Buttons IP67, lamp max. 1,9W, lamps see page 331



red

B5DL RT

BS5DL RT

BC5DL RT

10

0,029

green

B5DL GN

BS5DL GN

BC5DL GN

10

0,029

yellow

B5DL GE

BS5DL GE

BC5DL GE

10

0,029

blue

B5DL BL

BS5DL BL

BC5DL BL

10

0,029

white

B5DL WS

BS5DL WS

BC5DL WS

10

0,029

Illuminated Push Buttons IP67, Maintained, lamp max. 1,9W, lamps see page 331



red

B5DLR RT

BS5DLR RT

BC5DLR RT

10

0,029

green

B5DLR GN

BS5DLR GN

BC5DLR GN

10

0,029

yellow

B5DLR GE

BS5DLR GE

BC5DLR GE

10

0,029

blue

B5DLR BL

BS5DLR BL

BC5DLR BL

10

0,029

white

B5DLR WS

BS5DLR WS

BC5DLR WS

10

0,029

Lens Caps with fresnel lens IP67, lamp max. 1,9W, lamps see page 331



red

B5R RT

BS5R RT

BC5R RT

10

0,029

green

B5R GN

BS5R GN

BC5R GN

10

0,029

yellow

B5R GE

BS5R GE

BC5R GE

10

0,029

blue

B5R BL

BS5R BL

BC5R BL

10

0,029

clear

B5R KL

BS5R KL

BC5R KL

10

0,029

white

B5R WS

BS5R WS

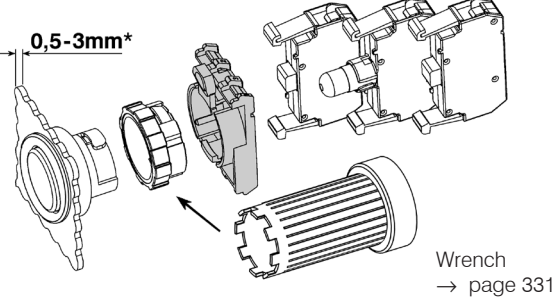
BC5R WS

10

0,029

Connectors

Specification	Description	Type	Pack pcs.	Weight kg/pc.
Connector B3S		B3S	10	0,013



Wrench
→ page 331

*) inclusive Thikness from Label Holder and Yellow Disk

Contact Blocks and Lamp Holders for Panel Mounting

for voltage	Description	Type	Pack pcs.	Weight kg/pc.
Contact blocks				
max. 690V AC	1 NC 	 B3T01 ²⁾	10	0,010
max. 690V AC	1 NO	 B3T10 ²⁾	10	0,010
	Actuator insert	to actuate the center contact block	P642	10 0,001



Lamp holders, socket BA9s

max. 440V AC/DC	direct connection, for lamps max. 1,9W (active power consumption)	 B3F	10	0,012
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Lamp holders for lamp test circuits, socket BA9s

max. 440V AC	direct connection, for filament and glow-discharge lamps max. 1,7W (active power consumption)	 B3FT	10	0,020
max. 250V	direct connection of LED	 B3FTD	10	0,020



1)  NC contact has a positive opening according to IEC/EN 60947-5-1

2) Contact blocks with gold contacts (B3T..G) on request suitable for 17V= /1mA and for difficult ambient conditions.

Lamps

LED lamps ²⁾ (6 years middle lifetime, for equivalent lens caps only)



Socket BA9s Lamp voltage	Power consumption		Type	Pack pcs.	Weight kg/pc.
20-30V AC/DC	17mA / 0,4W	for red lens caps	B3-L24 RTB	50	0,005
20-30V AC/DC	17mA / 0,4W	for green lens caps	B3-L24 GNB	50	0,005
20-30V AC/DC	17mA / 0,4W	for yellow lens caps	B3-L24 GEB	50	0,005
20-30V AC/DC	17mA / 0,4W	for blue lens caps	B3-L24 BLB	50	0,005
20-30V AC/DC	17mA / 0,4W	for white lens caps	B3-L24 WSB	50	0,005
90-120V AC/DC	7mA / 0,8W	for red lens caps	B3-L110 RTB	50	0,005
90-120V AC/DC	7mA / 0,8W	for green lens caps	B3-L110 GNB	50	0,005
90-120V AC/DC	7mA / 0,8W	for yellow lens caps	B3-L110 GEB	50	0,005
90-120V AC/DC	7mA / 0,8W	for blue lens caps	B3-L110 BLB	50	0,005
90-120V AC/DC	7mA / 0,8W	for white lens caps	B3-L110 WSB	50	0,005
200-250V AC/DC	4mA / 0,9W	for red lens caps	B3-L230 RTB	50	0,005
200-250V AC/DC	4mA / 0,9W	for green lens caps	B3-L230 GNB	50	0,005
200-250V AC/DC	4mA / 0,9W	for yellow lens caps	B3-L230 GEB	50	0,005
200-250V AC/DC	4mA / 0,9W	for blue lens caps	B3-L230 BLB	50	0,005
200-250V AC/DC	4mA / 0,9W	for white lens caps	B3-L230 WSB	50	0,005

Filament lamps



12V	1,2W	for all lens caps	B4-G12	100	0,005
24V	1,2W	for all lens caps	B4-G24	100	0,005
42V	1W	for all lens caps	B4-G42	100	0,005
48V	1,2W	for all lens caps	B4-G48	100	0,005
60V	1,2W	for all lens caps	B4-G60	100	0,005
110/120V ¹⁾	1,5/1,8W	for all lens caps	B4-G130	100	0,005

Glow-discharge lamps



220-250V AC	0,3W	for clear, red, yellow lens caps	B4-GL230K	100	0,005
220-250V AC	0,3W	for green, blue lens caps	B4-GL230G	100	0,005

1) Voltage marking 130V / 2W max. rated voltage 120V / 1,8W

2) suitable for B3FT lamp test lamp holders

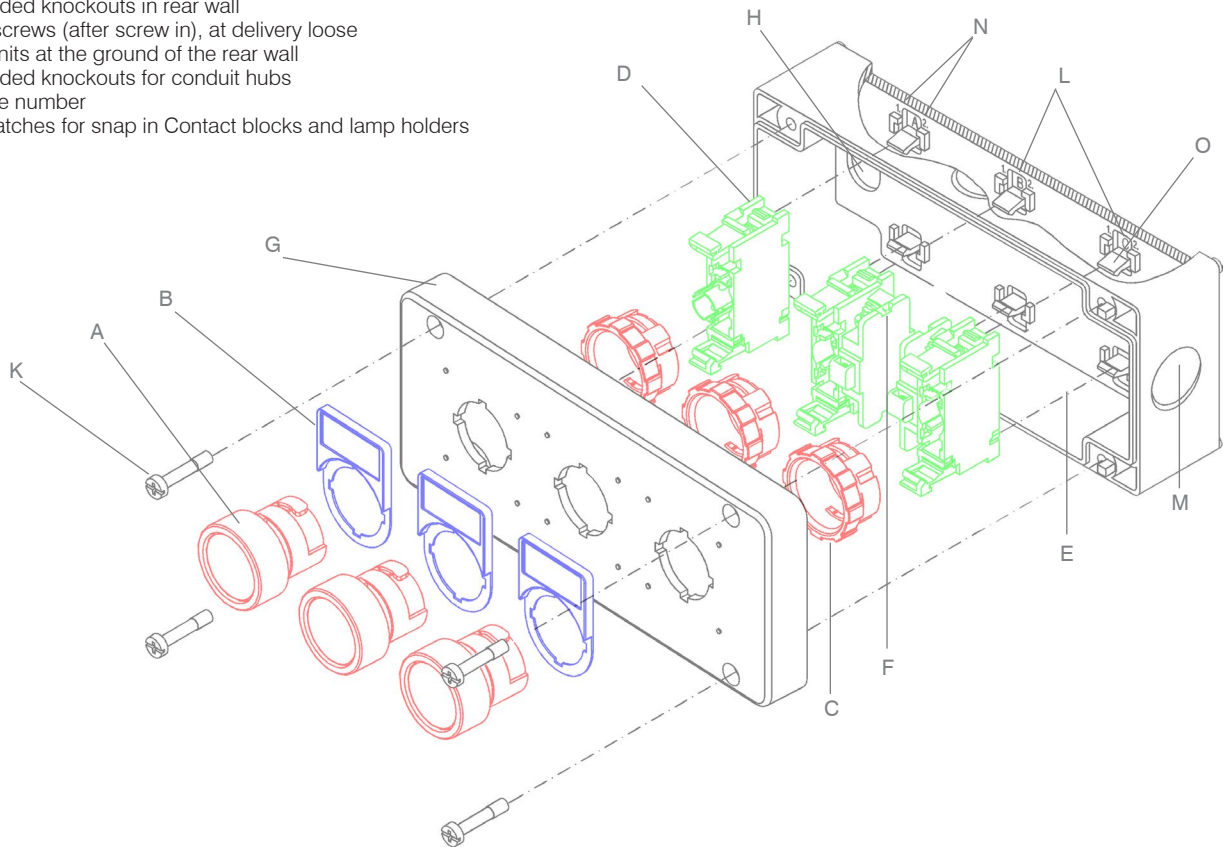
Accessories



		Type	Pack Stk.	Weight kg/Stk.
Wrench	for mounting of actuators and lens caps B(S)3..	J7049	1	0,018
Marking plate	for marking of contact blocks B3T. and lamp holders B3F	P672-1	10	0,001
Lamp Installer	used to install or replace lamps BA9s	B4-7408	1	0,010
Spare Key	for B(S)3SA.. and BS3P44S3, Ronis R455 for B(S)3SB.., Ronis R786	B4-R455 B4-R786	1 1	0,007 0,007
Protectiv cover sealable	against unintentional manipulation of buttons B5, (not for mushroom heads, rotary and swing knobs)	B5-SAP	1	0,008
Label holder for legend plate BK5, black, 1 or 2 lines		P942-1	10	0,0013
Legend plate BK5 with for label holder P942-1 (with marking e. g.: BK5-MOTOR-START)				
Legend plate alu without marking for label holder P42-1		BK5-11374	10	0,0003
	Text 1 or 2 lines, max. 2 x 13 letters, letter height 3mm			
Label holder for legend plate BK10, black, 3 or 4 lines		P1043	10	0,0015
Legend plate BK10 with for label holder P1043 (with marking e. g.: BK10-WATER-PUMP-START)				
Legend plate alu without marking for label holder P1043		BK10-11724	10	0,0005
	Text 3 or 4 lines, max. 4 x 13 letters, letter height 3mm			
Adapter to convert Actuators 22mm to 30mm				
alu		B5	10	0,017
black		BS5	10	0,017
chrome		BC5	10	0,017

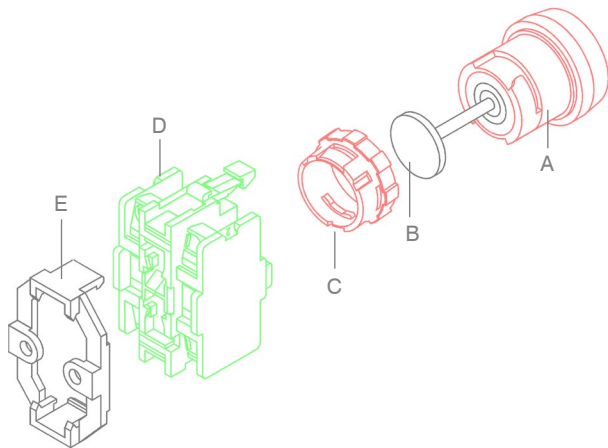
Assembled Stations BG.. IP67 Type12

- A Actuators or Lens caps, see page 315 - 318
- B Legend plates with label holder
- C Ring and nut (included with actuator or lens cap)
- D Contact blocks and lamp holders, see page 334
- E Rear shroud
- F Function number
- G Cover
- H Pre-moulded knockouts in rear wall
- K Captive screws (after screw in), at delivery loose
- L Sign of units at the ground of the rear wall
- M Pre-moulded knockouts for conduit hubs
- N Sequence number
- O Spring-catches for snap in Contact blocks and lamp holders



Buttons for base mounting

- A Actuator Ø 22mm see page 315 - 318, Ø 30mm see page 327 - 329
- B Extension B4V...
- C Ring and nut (included with actuator or lens cap)
- D Contact block B4.. see page 334
- E Base B4U for base and DIN-rail mounting of contact blocks



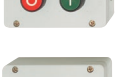
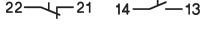
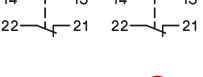
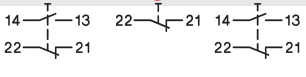
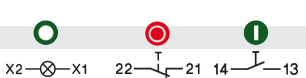
Mounting Plate for base and DIN-rail mounting of contact blocks



Type	Pack pcs.	Weight kg/pc.
Mounting Plate for base and DIN-rail mounting of contact blocks and lamp holders B4.U...	10	0,010
Ring and Nut for mounting former actuators and lens caps B4...	10	0,004

Assembled Stations IP67 (IP65) Typ12

For conduit entries are in top and both small sides only one knockouts for conduit hubs Ø20,5mm, for M20 or PG13,5 provided.

	Type	Diagram	Pack pcs.	Weight kg/pc.
Plastic enclosed buttons and Pilot Lights				
	ON push button green		BG10 GN	1 0,135
	OFF push button red		BG10 RT	1 0,135
	Pilot light green		BG01 GN	1 0,135
	Pilot light red		BG01 RT	1 0,135
	Key operated 0 - I ¹⁾ lock Ronis R455 60° maintained		BG10SAR 0	1 0,165
	Key operated I - 0 - II ¹⁾ lock Ronis R455 60° maintained		BG10SARR 0	1 0,172
	2 push buttons 0 - I		BG20	1 0,200
	2 push buttons ← →		BG20PF	1 0,200
	3 push buttons ← 0 →		BG30PF	1 0,283
	3 push buttons I - 0 - II		BG30	1 0,283
	2 push buttons 0 - I with pilot light green		BG21 GN	1 0,270
	Foot and palm button mushroom Ø70mm		BG10P14P GR	1 0,187
Plastic enclosed EMERGENCY STOP buttons				
	EMERGENCY STOP button head Ø40mm unlock by turning		BG10P34-11	1 0,145
	EMERGENCY STOP mushroom button Ø40mm according to EN418 unlock by pull		BG10P44-11	1 0,145
	EMERGENCY STOP key operated button Ø40mm according to EN418 unlock by key		BG10P44S3-11	1 0,178
	EMERGENCY STOP mushroom button Ø70mm unlock by turning		BG10P34P-11	1 0,187

1) IP65

Enclosures BG.. IP67, Type12

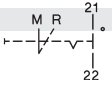
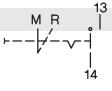
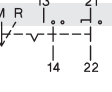
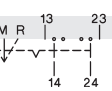


Number of units	Description	Type	Pack pcs.	Weight kg/pc.
1	3 knockouts Ø20,5mm (M20 or PG13,5)	BG1	1	0,108
2	3 knockouts Ø20,5mm (M20 or PG13,5)	BG2	1	0,145
3	3 knockouts Ø20,5mm (M20 or PG13,5)	BG3	1	0,188

Buttons and Lens Caps B3.. see page 315 -316

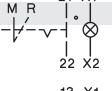
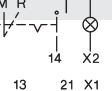
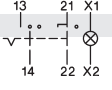
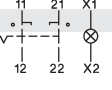
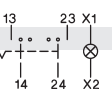
Contact blocks for enclosures BG..



Contacts	Lamp voltage	Wiring diagram	actuators with 2 or 3 switch positions	Type	Pack pcs.	Weight kg/pc.
1NC ¹⁾ 				B4TU01	10	0,015
1NO 				B4TU10	10	0,015
1NO+1NC ¹⁾ 				B4TU11	10	0,022
2NC ¹⁾ 				B4TU02	10	0,022
2NO 				B4TU20	10	0,022

Contact blocks with lamp holder, socket BA9s for LED or lamps, for enclosures BG.., lamps see page 331



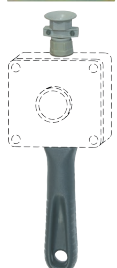
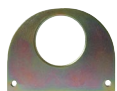
1NC ¹⁾ 	max. 440V AC/DC			B4TU01F	10	0,020
1NO 	max. 440V AC/DC			B4TU10F	10	0,020
1NO+1NC ¹⁾ 	max. 440V AC/DC			B4TU11F	10	0,027
2NC ¹⁾ 	max. 440V AC/DC			B4TU02F	10	0,027
2NO 	max. 440V AC/DC			B4TU20F	10	0,027

Lamp holder, socket BA9s for LED or lamps, lamps see page 331

max. 440V AC/DC	direct connection, for lamps max. 1,9W (take care for active power consumption)		B4FU	10	0,013
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1)  NC contact has a positive opening according to IEC/EN 60947-5-1

Accessories for Plastic enclosed buttons



		Type	Pack pcs.	Weight kg/pc.
	Wrench for mounting of actuators and lens caps B(S)3..	J7049	1	0,018
	Couple Part to couple enclosures BKL G or assembled stations BG..	B4-8852	1	0,018
	Suspension Eye for hanging stations	B4-9929	1	0,188
	Handle and Cable Inlet to change enclosures BG.. or assembled stations BG.. into a hanging station	B4-9149	1	0,064

Push Buttons for Enclosures 22mm IP65

Push buttons grey RAL7035



Specification	Colour	Symbol	Length mm	Type	Pack pcs.	Weight kg/pc.
Reset push button	blue	R	8-22	B2GRB-22	10	0,005
	blue	R	22-60	B2GRB-60	10	0,016
Reset push button with stop function	red	0/R	8-22	B2GR-22	10	0,005
	red	0/R	22-60	B2GR-60	10	0,016
Start push button	green	I	8-22	B2GI-22	10	0,005
	green	I	22-60	B2GI-60	10	0,016
Stop push button	red	0	8-22	B2G0-22	10	0,005
	red	0	22-60	B2G0-60	10	0,016
Mushroom head lockable Ø28mm	red	0	8-22	B2GP-22	10	0,005
	red	0	22-60	B2GP-60	10	0,016

Push buttons with metal ring and self adjusting extension pin



Reset push button	blue	R	19,5-38,5	B3GRB-31,5	10	0,023
	blue	R	38,5-60	B3GRB-60	10	0,026
Reset push button with stop function	red	0/R	19,5-38,5	B3GR-31,5	10	0,023
	red	0/R	38,5-60	B3GR-60	10	0,026
Start push button	green	I	19,5-38,5	B3GI-31,5	10	0,023
	green	I	38,5-60	B3GI-60	10	0,026
Stop push button	red	0	19,5-38,5	B3G0-31,5	10	0,023
	red	0	38,5-60	B3G0-60	10	0,026
Mushroom head lockable Ø28mm	red		19,5-38,5	B3GP-31,5	10	0,023
	red		38,5-60	B3GP-60	10	0,026

Extensions for push buttons



Specification	Diameter Ø mm	Length mm	Type	Pack pcs.	Weight kg/pc.
self adjusting pin, for B(S, C)3D.. and B(S, C)3P..	15	19,5 - 38,5	B4V31,5	10	0,001
	18,5	38,5 - 60	B4V60	10	0,004

Technical Data

Terminal markings for control units according to DIN EN 50013

Distinc. number	Contact elements	Distinc. number	Contact elements	Distinc. number	Contact elements	Distinc. number	Contact elements	Distinc. number	Contact elements	Colour code
10								01		 NO Green NC Red
20		11						02		
30		21		12				03		
40		31		22		13		04		

Data according to IEC 947-5-1, VDE 0660, EN 60947-5-1

Type		B3T	B4T
Rated insulation voltage U_i	V AC	690 ¹⁾	500
Utilization category AC12 Control of resistive loads and solid stateloads with isolation by opto couplers			
Rated current I_e	220-240V A 380-415V A 500V A 690V A	10 10 10 10	10 10 10 -
Utilization category AC15 Control of electromagnetic load (> 72VA)			
Rated current I_e	220-240V A 380-415V A 500V A 690V A	6 5 3 2	6 5 3 -
Utilization category DC12 L/R = 1ms Control of resistive loads and solid stateloads with isolation by opto couplers			
Rated current I_e	24V A 60V A 110V A 220V A	10 6 2,5 0,8	10 6 2,5 0,8
Utilization category DC14 L/R = 15ms Control of electromagnetic loads having economy resistors in circuit			
Rated current I_e	24V A 60V A 110V A 220V A	8 1 2 0,5	8 1 2 0,5
Utilization category DC13 L/R = 300ms Control of electromagnets			
Rated current I_e	24V A 60V A 110V A 220V A	2 5 0,5 0,2	2 5 0,5 0,2
Making capacity	A	60	60
Breaking capacity $\cos \phi = 0,7-1$	40-60Hz A	50	50
Mechanical life	millions of operations	10	10
Contact life (AC15)			
100VA	millions of operations	10	10
300VA	millions of operations	3	3
800VA	millions of operations	1	1
1200VA	millions of operations	0,5	0,5
Maximum frequency of operations	ops. per hour	600	600
Short circuit protection	slow, gL (gG) A	25	25

Type	B3F	B4F
Rated insulation voltage U_i	V AC	440 ²⁾
Lamp base	BA9s	

Type	B3., B4., B5.
Protection degree (according to IEC 947-1) in assembled state, from the front from rear	IP67/IP65 IP20/IP00
Ambient temperature	°C
Cable cross-section	
	solid, mm ² flexible, mm ² flexible with multicore cable end, mm ² number
Cables per clamp	0,5 - 2,5 0,5 - 2,5 0,5 - 1,5 2
Mounting hole (according to IEC 947-1)	Ø mm Ø mm
Mounting position	optional
Terminal screws	Pozidriv No. 2 screws M3,5

Data according to cULus

Type	B3.	B4.
Contact Block for NO and NC	600 V AC max.	600 V AC max.
General use	10A	10A
Heavy pilot duty	A600	A600
Lamp Holder with socket BA9s	240V 2,6W max.	240V 2,6W max.
Wire (Contact and lamp holder)	14 - 18AWG 9 lb/in.	14 - 18AWG 9 lb/in.
Torque		

Approvals

Country	USA, Canada UL	Europe CE	Register of Shipping Great Britain LRS	CENELEC CB- Certificates
Type				
B3T..	o	o	-	o
B3F..	o	o	-	o
B4TU..	o	o	o	o
B4T..UF	o	o	o	o
B4FU..	o	o	o	o
B3-MB..	-	o	-	-

o In standard version approved

- Not provided for test till now

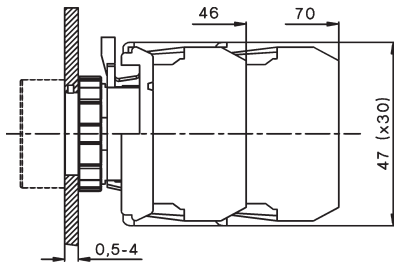
1) suitable for: earthed-neutral systems, overvoltage category I to IV, pollution degree 3 (standard-industry): $U_{imp} = 6kV$. Data for other conditions on request

2) suitable for: earthed-neutral systems, overvoltage category I to III, pollution degree 3 (standard-industry): $U_{imp} = 4kV$

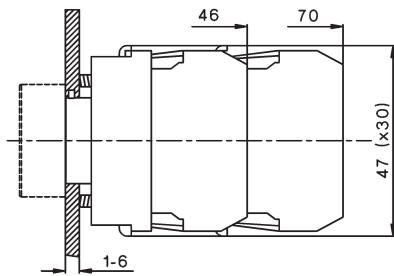
Dimensions

Actuators and Lens Caps 22mm

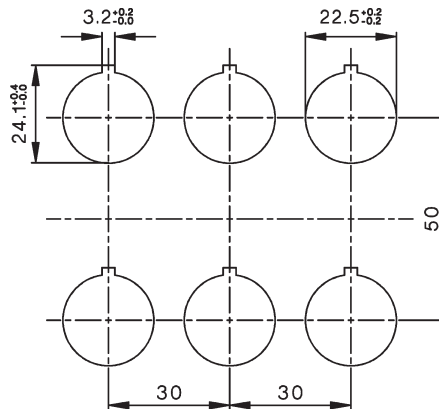
Panel mounting B3S



Panel mounting B3M

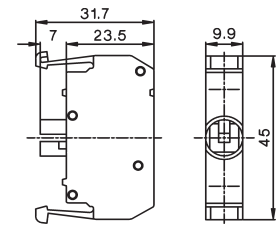


Mounting holes



Dimensions of minimum space requirements according to IEC. Take to consideration the field of traverse of swing knobs (27mm) and the diameter of mushroom heads.

Contact blocks and Lampenhalter B3...



Actuators and Lens caps

Flush Head Illuminated Flush Head	Mushroom Head Ø28mm Emergency Stop Ø28mm	Mushroom Head Ø40mm Emergency Stop Ø40mm	Mushroom Head Ø70mm Emergency Stop Ø70mm
B3D(R), B3DL(R) BS3D(R), BS3DL(R) BC3D(R), BC3DL(R)	B3P1 bis B3P3 BS3P1 bis BS3P3 BC3P1 bis BC3P3	B3P14, B3P34 BS3P14, BS3P34 BC3P14, BC3P34	BS3P14P BS3P34P
Push-and pull button Ø40mm	Push-and pull button Ø40mm	Push-and pull button Ø40mm with key	Lockable Push button
BS3P44	BS3P45	BS3P44S3	B3SAR., B3SAT. BS3SAR., BS3SAT. BC3SAR., BC3SAT.
Toggle	Rotary Knob	Swing Knob	Lens Cap
B3E BS3E BC3E	B3KN, B3KL BS3KN, BS3KL BC3KN, BC3KL	B3KRL, B3KRN BS3KRL, BS3KRN BC3KRL, BC3KRN	B3R(F) B3RN

Dimensions

Actuators and Lens Caps 22mm

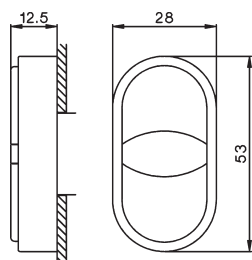
Double push button

Monoblock Multi-LED

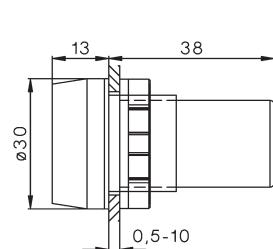
Protection cover

Protection ring w. thread

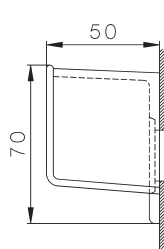
B3DT



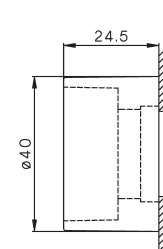
B3-MB...



B3-SK ..



P921-.



Label holder

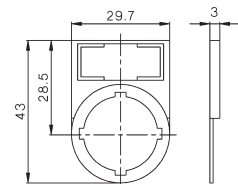
Legend plate

Label holder

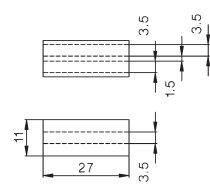
Label holder

Legend plate

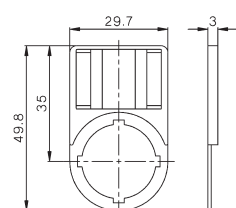
P751



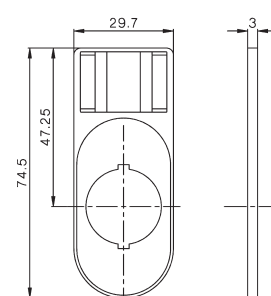
BK4-...



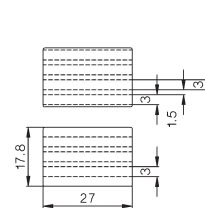
P761



P761-DT



BK8-...

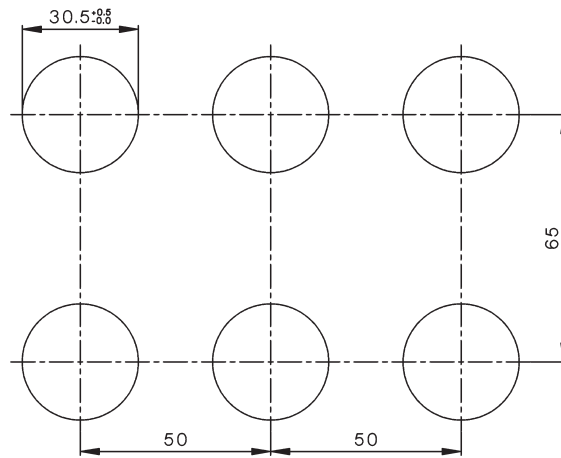
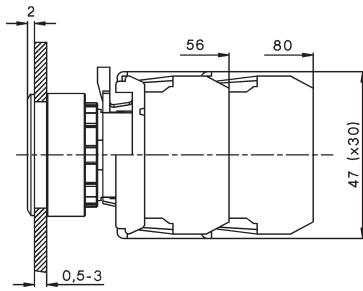


Dimensions

Actuators and Lens Caps 30mm

Panel mounting B3S

Mounting holes

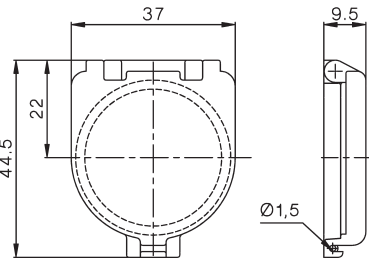


Actuators and Lens caps

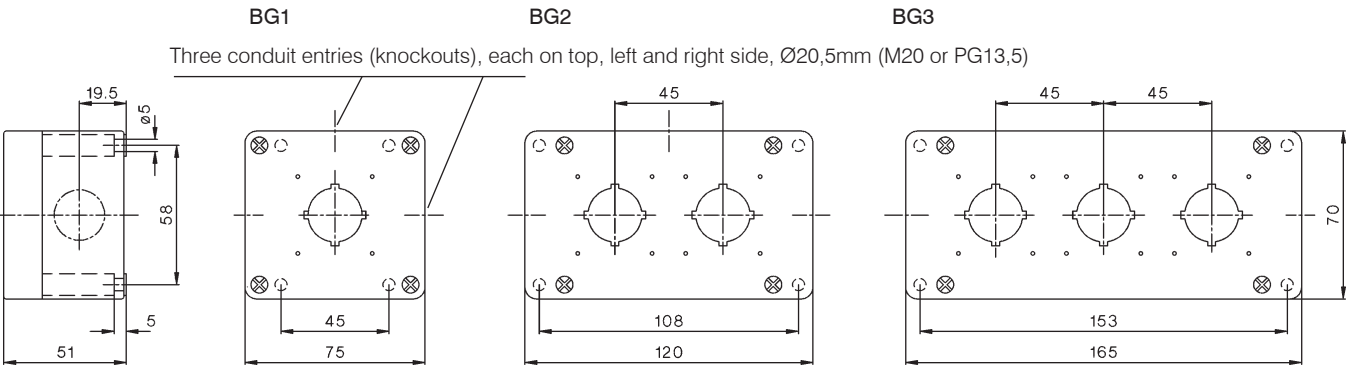
Flush Head Illuminated Flush Head	Mushroom Head Ø28mm Emergency Stop Ø28mm	Mushroom Head Ø40mm Emergency Stop Ø40mm	Lens Cap
B5D(R), B5DL(R) BS5D(R), BS5DL(R)	B5P1 to B5P3 BS5P1 to BS5P3	B5P14, B5P34 BS5P14, BS5P34	B5RF
Toggle	Rotary Knob	Swing Knob	Lockable Push button
B5E BS5E	B5KN, B5KL BS5KN, BS5KL	B5KRL, B5KRN BS5KRL, BS5KRN	B5SAR., B5SAT. BS5SAR., BS5SAT.
Label holder	Legend plate	Label holder	Legend plate
P942-1	BK5-...	P1043	BK10-..

Dimensions

Protective Cover
B5-SAP



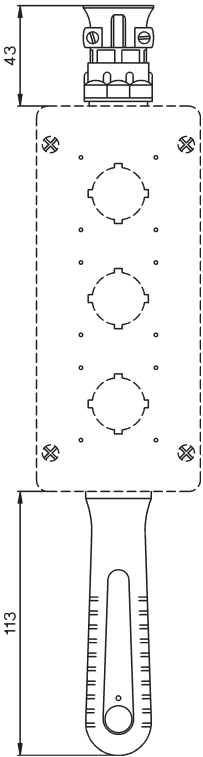
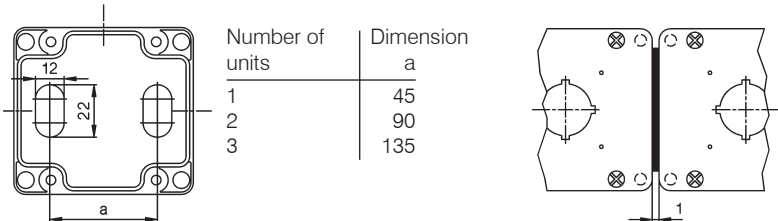
Enclosures for Custom Built Stations



Conduit entries in the bottom
(knockouts)

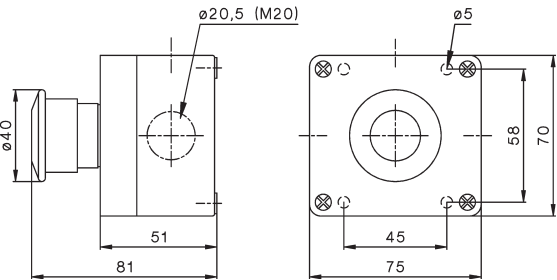
Coupled Enclosures
B4-8852

Hanging Station
B4-9149



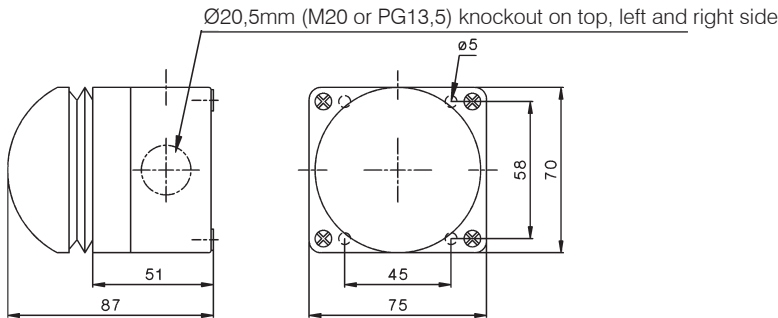
EMERGENCY STOP Push Button Ø40 mm

BG10P44



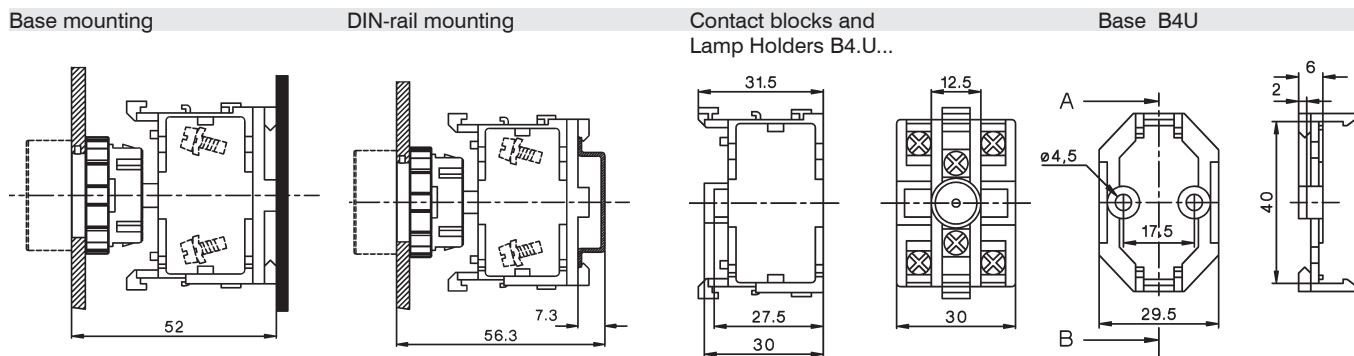
EMERGENCY STOP Push Button Ø70 mm, Foot switch

BG10P34P, BG10P14P



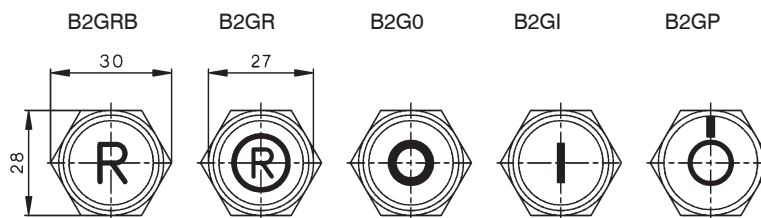
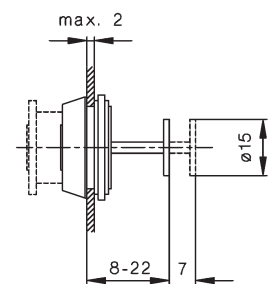
Dimensions

Actuators 22mm

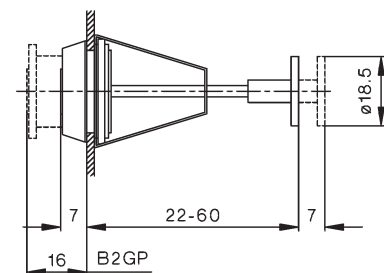


Push buttons for enclosures

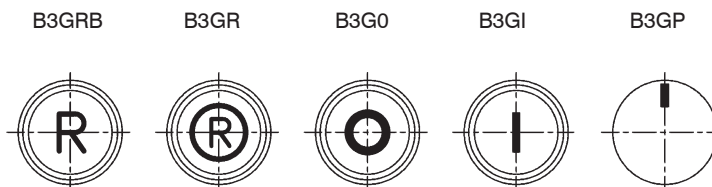
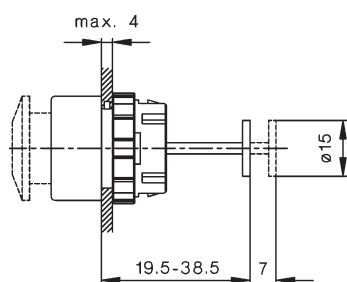
B2G...-22



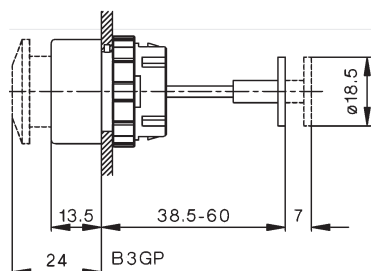
B2G...-60

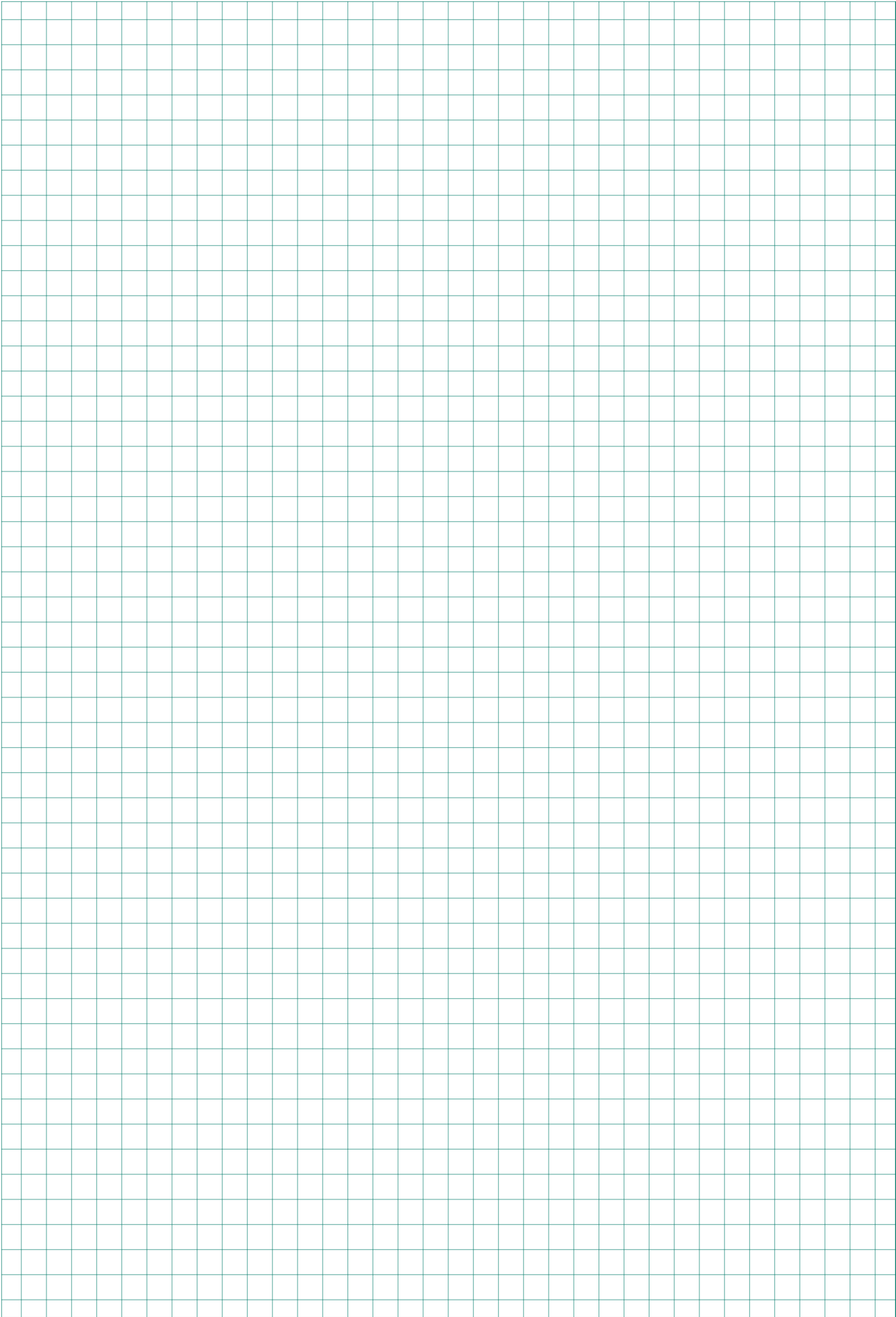


B3G...-31,5



B3G...-60





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