APATOR

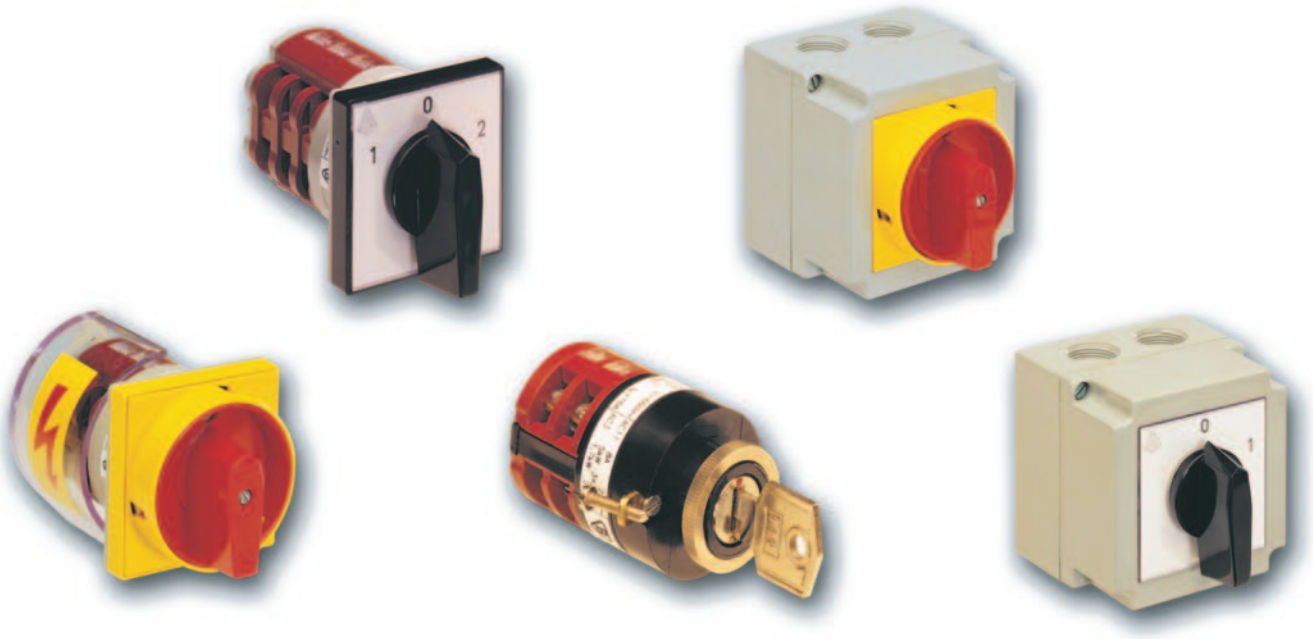
Najbardziej innowacyjna firma

EURO LEADER

RZETELNY PARTNER

Cam switches

4G



Apator Group Mission

A leading company in the Middle-East Europe in the field of measuring systems, measuring equipment and switchgear.

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CONTENTS

GENERAL INFORMATION

4G-series cam switches are low voltage switches, designed according to the latest knowledge about switchgear and using the achievements of modern engineering. Only high quality insulation and contact materials have been used in these products. Basic components and units are standardized and mass-produced, making it possible to make switches performing any switching programs, and short delivery terms.

Switches can be produced in many versions and have various applications. They conform all requirements for low voltage switches in industry, mining, shipbuilding, etc. They can be used as hand-operated switches in transformer stations, control switchboxes and boards, switchgears made of cast iron or other metals, welding machines and similar devices.

4G series switches are characterized by small external dimensions, powerful switching capabilities, long contact life and high mechanical stability, and resistance to short-lasting overloads. When additionally protected with fuses, they are also resistant to dynamic effects of short-circuit currents.

APPLICATION

Cam switches can be used in main and auxiliary circuits, especially:

– as switches for electric motors for switching and controlling the drives with single- and three-phase motors, as star-delta switches, reversing switches and switches for changing the rotational speed, etc.,
– in auxiliary, controlling, signalling and measuring circuits, manufactured according to the required switching program,
– as breaker switches, change-over switches and tap switches, for example for transformers and electric welding machines,
– as switchgroups, for example to connect resistors and heating elements,
– as change-over switches working as push-buttons with automatic returning to an off position,
– as switch disconnectors.

REGULATIONS AND STANDARDS

4G-series cam switches fully comply with the requirements of the following standards: PN-93/E-06150/10, PN-93/E-06150/30, IEC 947-1, IEC 947-3.

These switches have a BBJ certificate for “B” safety mark, Recognition Certificate of the Polish Register of Shipping, and “CE” Declaration of conformity of the European directive 73/23/EEC.

DIVISION

Basic division of switches and their marking is based on the rated current. Further division, based on external dimensions of the switches, enables to distinguish three groups characterized by overall dimensions. Each group has the same knobs, front plates and spacing for mounting holes.

Table 1

Group	A0	A1		A2			A3
Switch type	4G10	4G16	4G25	4G40	4G63	4G80	4G100
Rated current I_e	10	16	25	40	63	80	100

DESIGN

Depending on the switching program, every cam switch consists of a certain number of switching elements, which can be easily assembled together. Switching elements’ bodies are made of plastics based on melamine, especially resistant to the effects related to creep currents and electric arcs.

A switching element has one or two current circuits arranged at the angle of 180º and equipped with contact with a double contact gap. Each of them consists of two stationary contacts and one movable contact bridge. The contact bridge is switched on (pressed) by contact springs, and opened by a cam inside the switching element. The cams in individual switching elements are firmly coupled together, ensuring practically simultaneous switching (on and off) of all contacts. Thanks to the double gap contact assembly and contact tips made of special alloy containing silver and very resistant to effects of an electric arc, high switching capabilities and contact life have been obtained. Good clicking mechanism of a motion work ensures unfailing switching of moving contacts in respective fixed positions. The power springs of the clicking mechanism are different, depending on the number of the switching elements. According to individual requirements, cam switches can be made with the switching angles given in table 2.

Table 2

Group		A0	A1	A2	A3	maximum number of knob positions
Connection angle	30°	•	•	•	•	12
	45°	•	•	•		8
	60°	•	•	•	•	6
	90°	•	•	•	•	4

Special stops are used to fix proper positions. Switching elements, driving mechanism and a rear plate (mounting plate) are connected into one unit with insulating bolts.

Special versions of cam switches can have more than 12 switching elements.

SUB-ASSEMBLIES

Front plate

Complete front plate consists of:

– a front plate with a place with black frame for a text; - an indicating plate cover (transparent),
– indicating plate (under the cover, standard version is white with black signs). According to requirements, this plate can be black, yellow or silver.

KNOB

The knob is used to control the switch. Black is a standard colour. According specjal to requirements, the knobs can be supplied in red colour.

Table 3

Group	A0	A1	A2	A3
	R012 red R014 black (standard)	R112 red R114 black (standard)	R212 red R214 black (standard)	R312 red R314 black (standard)
		R122 red R124 black	R222 red R224 black	R322 red R324 black

TECHNICAL DATA

Table 4

Terms			switch type											
			4G10	4G16	4G25	4G40	4G63	4G80	4G100	4G200	4G400	4G630	4G800	4G1200
Rated insulation voltage U_i		V	690	690	690	690	690	690	690	690	690	690	690	690
Rated impulse withstand voltage U_{imp}		kV	4	4	4	6	6	6	6	8	8	8	8	8
Rated thermal current I_{th}		A	16	20	25	50	63	80	125	200	400	630	800	1200
Short-circuit protection maximum rated current of fuses characterized by high interrupting capacity	10 kA_{sk}	A	–	25	25	50	63	80	125	200	400	630	2x400	2x630
	25 kA_{sk}	A	–	25	25	50	63	80	125	160	315	500	2x400	2x630
	40 kA_{sk}	A	–	25	25	50	63	80	125	160	315	400	500	2x400
	63 kA_{sk}	A	–	25	25	36	50	63	100	160	250	355	400	630
	75 kA_{sk}	A	–	25	25	36	50	63	100					
Mechanical life (number of movements)			$3x10^6$	$3x10^6$	$3x10^6$	$3x10^6$	$3x10^6$	$3x10^6$	$3x10^6$	$2x10^5$	$2x10^5$	$2x10^5$	$2x10^5$	$2x10^5$
Terminal bolts Maximum cross-section of connecting conductors		mm^2	M3 2 x 2,5	M4 2 x 4	M4 2 x 6	M5 2 x 10	M5 2 x 10	M6 25	2 x M6 50	M6 –	M10 –	M12 –	M16 –	M16 –
Short duration load capacity	1 s	A	220	430	690	920	1600	1600	2600	3300	6500	9500	12000	18000
	10 s	A	70	145	240	290	600	650	850	1100	2000	3000	4000	6100
	30 s	A	40	90	160	200	375	400	500	640	1200	1800	2400	3500
	60 s	A	30	75	125	155	285	300	360	460	850	1250	1600	2450
Maximum interrupting capacity	660 V - cosφ = 0,65	A	–	190	–	–	–	–	–	640	–	–	–	–
	660 V - cosφ = 0,35	A	–	–	250	490	500	500	650	–	–	–	–	–
	600 V - cosφ = 0,35	A	–	200	260	500	610	610	–	–	–	–	–	–
	500 V - cosφ = 0,35	A	100[1)]	–	–	–	–	–	900	900	–	–	–	–
	500 V - cosφ = 0,75	A	–	–	–	–	–	–	–	–	1100	1100	1200	1800
Switch disconnectors, category of utility AC2. Rated power of three-phase receivers.	3 x 220 V~	kW	5,2	7	9	14	23	29	37	72	150	150	150	150
	3 x 380 V~	kW	9	12,5	15,5	24	39	50	63	125	260	260	260	260
	3 x 500 V~	kW	11,8	17	20	33	52	66	84	165	340	340	340	340
	3 x 660 V~	kW	15,5	22	27	43	69	86	110	210	400	400	400	400
Switch disconnector for motors, category of utility AC3, AC23 (30 connections/h). Rated power of three-phase motors.	3 x 220 V~	kW	3	4,5	7,5	12,5	18,5	21	–	27,5	27,5	27,5	27,5	27,5
	3 x 380 V~	kW	5	8	13	21	32	37	–	47	47	47	47	47
	3 x 500 V~	kW	6	11	17	27	42	48	–	62	62	62	62	62
	3 x 660 V~	kW	6	11	17	27	55	60	–	80	80	80	80	80
Switch disconnector for motors, category of utility AC23. Rated power of three-phase motors.	3 x 220 V~	kW	–	–	–	–	–	–	27,5	27,5	27,5	27,5	27,5	27,5
	3 x 380 V~	kW	–	–	–	–	–	–	47	47	47	47	47	47
	3 x 500 V~	kW	–	–	–	–	–	–	62	62	62	62	62	62
	3 x 660 V~	kW	–	–	–	–	–	–	80	80	80	80	80	80
Switch disconnector for motors, category of utility AC3, AC23 (30 connections/h). Rated power of one-phase (dipolar) motors.	110 V~	kW	0,8	1,3	2,1	3,6	5,3	6	–	–	–	–	–	–
	220 V~	kW	1,7	2,6	4,3	7,2	10,6	12,1	–	–	–	–	–	–
	380 V~	kW	2,8	4,6	7,5	12	18,5	21,1	–	–	–	–	–	–
Auxiliary switch disconnectors, category of utility AC14. Rated making current I_e (1 pole).	110 V~	A	11	20	25	50	63	72	–	–	–	–	–	–
	220 V~	A	8	20	25	40	50	50	–	–	–	–	–	–
	380 V~	A	3,5	16	20	40	45	45	–	–	–	–	–	–
	660 V~	A	2,5	8	8,5	10	10	10	–	–	–	–	–	–
Type of operation		–	Continuous duty											

[1)] - cosφ = 0,65

BREAKING CAPACITY FOR DIRECT CURRENT

ATTENTION! category of utility according to PN-90/E-06150/10, PN-93/E-06150/30, PN-92/E-06150/51 and IEC 947-1, IEC 947-3, IEC 947-5-1.

Breaking capacity for direct current operation depends on current intensity, voltage and inductance.

Time constant T = L/R represents inductance values in a current circuit.

T = 1 ms – active power or lightly inductive power predominates, for example resistance furnaces.

T = 15 ms – inductive power predominates, for example relay coils. For direct current and voltage above 60 V, switch contacts must be connected in parallel to obtain higher breaking capacity.

Table 5

Switch type	rated breaking capacity of one contact											
	24 V		60 V		110 V		220 V		440 V		600 V	
	T = 1 ms	T = 15 ms	T = 1 ms	T = 15 ms	T = 1 ms	T = 15 ms	T = 1 ms	T = 15 ms	T = 1 ms	T = 15 ms	T = 1 ms	T = 15 ms
4G10	40	40	40	20	17	3	1,1	0,5	0,5	0,2	0,5	0,1
4G16	100	100	38	18	5,5	3	0,95	0,4	0,5	0,25	0,3	0,2
4G25	100	100	38	18	5,5	3	0,95	0,4	0,5	0,25	0,3	0,2
4G40	252	252	95	40	15	3,5	1,2	0,4	0,6	0,25	0,45	0,2
4G63	252	252	95	40	15	3,5	1,2	0,4	0,6	0,25	0,45	0,2
4G100	800	800	400	400	35	7,5	2,5	0,75	0,9	0,3	0,5	0,25

Table 6 shows a number of contacts which can be connected in series for rated making currents at specific constant voltages for category of utility DC 1.

Table 6

switch type	number of contacts connected in series			
	110 V	220 V	440 V	600 V
4G10	1	3	6	8
4G16	2	4	6	9
4G25	2	4	6	9
4G40	2	3	6	9
4G63	2	4	6	9
4G100	2	3	6	–

DC1 – main noninductive or low voltage load
T = 1 ms breaking capacity I = 1,5 I_e

Note: Breaking capacity for a 4G25 switch with two contacts connected in series is 2A at 220V; T = 15 ms. In table 7 the rated making current values (Ie) for category of utility DC 11 (according to EC 337-1, 337-1A) have been shown.

Table 7

switch type	rated making current I_e [A]					
	24 V	60 V	110 V	220 V	440 V	600 V
4G10	10	2	1	0,27	0,16	0,14
4G16	20	2,2	1	0,3	0,22	0,16
4G25	25	2,2	1	0,3	0,22	0,16
4G40	50	5	2	0,4	0,23	0,2
4G63	63	5	2	0,4	0,23	0,2

SWITCHING PROGRAMS

Table 8

Switching program		diagram number	page
switch disconnectors with “0” (0-1) position			
1-phase		90	12
2-phase		91	
3-phase		10	
multi-pole		92	
		100	
		528	
		659	
switch disconnectors with quick-connecting contacts (0-1)			
with 30º contact lead	1-phase	270	12
	2-phase	271	
	3-phase	63	
with 30º contact lead on three contacts and 60º on one contact	4-phase	272	
with 30º contact lead on three contacts and 60º on two contacts	5-phase	273	
with 30º contact lead	6-phase	274	
switches with “0”(1-0-2) position			
1-phase		51	13
2-phase		52	
3-phase		53	
multi-pole		75	
		76	
		77	
		78	
		79	
		80	
		81	
switches for current transformers (1-2)			
		57	13
switches without “0” (1-2) position			
1-phase		54	14
2-phase		55	
3-phase		56	
multi-pole		69	
		70	
		71	
		72	
		73	
		74	
		62	

Switching program		diagram number	page
multiposition switches with “0” (0-1-2...) position			
1-phase	3-position	107	15
	4-position	108	
	5-position	109	
	6-position	110	
	7-position	111	
	8-position	112	
	9-position	113	
	10-position	114	
	11-position	115	
	12-position	116	
2-phase	3-position	123	16
	4-position	124	
	5-position	125	
	6-position	126	
	7-position	127	
	8-position	128	
	9-position	129	
	10-position	130	
	11-position	131	
	12-position	132	
3-phase	3-position	135	17
	4-position	136	
	5-position	137	
	6-position	138	
	7-position	139	
	8-position	140	
multi-pole	3-position	145	17
	4-position	146	
	5-position	147	
	6-position	148	
	3-position	151	
	4-position	152	
	5-position	153	
	3-position	156	
	4-position	157	
	5-position	158	
	3-position	160	
	4-position	161	
	3-position	163	
	4-position	164	

SWITCHING PROGRAMS

switching program		diagram number	page
multiposition switches without “0” position			
1-phase	3-position	82	19
	4-position	83	
	5-position	84	
	6-position	85	
	7-position	101	
	8-position	102	
	9-position	103	
	10-position	104	
	11-position	105	
	12-position	106	
2-phase	3-position	86	20
	4-position	87	
	5-position	88	
	6-position	89	
	7-position	117	
	8-position	118	
	9-position	119	
	10-position	120	
	11-position	121	
	12-position	122	21
3-phase	3-position	93	
	4-position	94	
	5-position	95	
	6-position	96	
	7-position	133	
	8-position	134	
multi-pole	3-position	141	
	4-position	142	22
	5-position	143	
	6-position	144	21
	3-position	149	22
	4-position	150	
	3-position	154	
	4-position	155	
	3-position	159	
	3-position	162	

switchgroups with “0” position			
1-phase	2-grup.	251	23
	3-grup.	254	
2-phase	2-grup.	252	
	3-grup.	255	
3-phase	2-grup.	253	
	3-grup.	256	

serial switches		
1-phase	257	23
2-phase	258	
3-phase	259	

serial-parallel switches		
2-phase	260	24

measurement switches for voltage and current ammeter switches			
phase measurement	L1-L2-L3	58	24
phase measurement	0-1-2-3	97	
phase measurement with grounding	0-1-2-3	98	

serial-parallel switches		
3 phase-to-phase voltages + phase voltage	60	24

switching program	diagram number	page
voltmeter switches without “0” position		
3 phase voltages	68	25
3 phase-to-phase voltages	67	
3 phase-to-phase voltages + 3 phase voltages	66	

switches with an automatic return to initial position		
switch with a function of left - right pushbuttons switch with “0” position (1-0-2) return to “0” from both sides	210	25
1-phase	201	
2-phase	202	
3-phase	203	

switches without “0” position		
1 normally closed contact + 1 normally open contact	204	26
2 normally closed contacts + 2 normally open contacts	205	
3 normally closed contacts + 3 normally open contacts	206	
to control a contactor – 1 normally open contact (turn right) and 1 normally closed contact (turn left)	207	
1 normally open contact and 1 normally closed contact, when turning left and right	208	
2 normally open contacts and 2 normally closed contacts, when turning left and right	209	

switch disconnectors for motor controlling, star-delta switch disconnectors		
basic version	12	26
Y/Δ back from Y to 0	28	
with counter-current braking back from Y to 0	29	27
as a voltage switch	30	
for operaction with contactor	31	
bidirectional (left-right)	21	

switch disconnectors in a Dahlander’s system		
dipolar Δ-0-YY	13	27
dipolar 0-Δ-YY	19	
dipolar bidirectional YY-Δ-0-Δ-YY	20	
dipolar and contactor controlling	32	

switch disconnectors for two-winding motors		
0-1-2	22	28
bidirectional	23	
to control the contactors	33	

switch disconnectors for three-speed motors		
2 windings 0-Δ-YY-Y (with 3 speeds in a Dahlander’s system)	34	28
2 windings 0-Δ-YY-Y (1 and 2 speeds in a Dahlander’s system)	35	29
2 windings 0-Δ-YY-Y (2 and 3 speeds in a Dahlander’s system)	36	

reversing switches		
2-phase	24	29
2-phase, return to “0” position	25	
3-phase	11	
3-phase, return to “0” position	26	
to control a contactor	27	
starting switches for 1-phase motors	15	

AN ORDER EXAMPLE

4G25 - 10 - U S5 R112

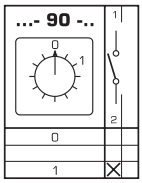
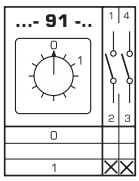
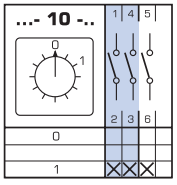
- **4G25** – switch type determined according to the rated current, selection in accordance with table 1 current rating – page 3
- **10** – diagram number specified in the switching program, circuit diagrams – pages 7-29
- **U** – version:
  U – switch to be built-in
  OU – switch to be mounted in a housing
  PK – switch in a plastic case, mechanical version – pages 31-32
- **S5** – special version, its symbol can be added to the description of type, special version – pages 33-37
- **R112** – knob and handle version and colour according to table 3 – page 3

NOTES:

1. Every order on devices for rated current 100A requires arrangements with the manufacturer related to the technical details and delivery date.
2. Devices in PK housings can be made only for those switching programs which require not more than four segments (protection class IP 55).

STANDARD CONNECTION DIAGRAMS

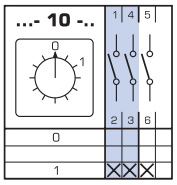
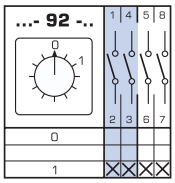
Switch disconnector with “0” (0-1) position

Diagram number	Number of poles	Making current	Voltage	Number of packs	Symbol Drawing number	Knob	Protection class from the front [IP]	Maximum conductor cross-section [mm²]	Installation
	1	10	690	1	4G10-90-U 63-840390-011	R014	IP40	2 x 2,5	to be mounted behind the panel
	1	16	690	1	4G16-90-U 63-840390-021	R014	IP40	2 x 4	to be mounted behind the panel
	1	25	690	1	4G25-90-U 63-840390-031	R014	IP40	2 x 6	to be mounted behind the panel
	1	10	690	1	4G10-90-PK 63-840392-011	R014	IP55	2 x 2,5	in a housing
	1	16	690	1	4G16-90-PK 63-840392-021	R014	IP55	2 x 4	in a housing
	1	25	690	1	4G25-90-PK 63-840392-031	R014	IP55	2 x 6	in a housing
	2	10	690	1	4G10-91-U 63-840393-011	R014	IP40	2 x 2,5	to be mounted behind the panel
	2	16	690	1	4G16-91-U 63-840393-021	R014	IP40	2 x 4	to be mounted behind the panel
	2	10	690	1	4G10-91-PK 63-840395-011	R014	IP55	2 x 2,5	in a housing
	2	16	690	1	4G16-91-PK 63-840395-021	R014	IP55	2 x 4	in a housing
	2	25	690	1	4G25-91-PK 63-840395-031	R014	IP55	2 x 6	in a housing
	3	10	690	2	4G10-10-U 63-840304-011	R014	IP40	2 x 2,5	to be mounted behind the panel
	3	16	690	2	4G16-10-U 63-840304-021	R014	IP40	2 x 4	to be mounted behind the panel
	3	25	690	2	4G25-10-U 63-840304-031	R014	IP40	2 x 6	to be mounted behind the panel

* See dimensions on pages 31-32

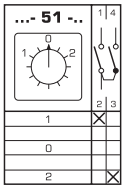
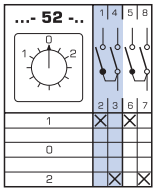
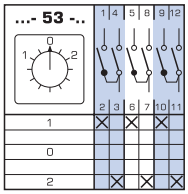
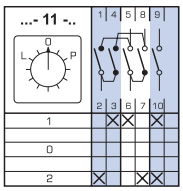
STANDARD CONNECTION DIAGRAMS

Switch disconnector with “0” (0-1) position

Diagram number	Number of poles	Making current	Voltage	Number of packs	Symbol Drawing number	Knob	Protection class from the front [IP]	Maximum conductor cross-section [mm²]	Installation
	3	40	690	2	4G40-10-U 63-840304-041	R014	IP40	2 x 10	to be mounted behind the panel
	3	63	690	2	4G63-10-U 63-840304-051	R014	IP40	2 x 10	to be mounted behind the panel
	3	80	690	2	4G80-10-U 63-840304-061	R014	IP40	25	to be mounted behind the panel
	3	10	690	2	4G10-10-PK 63-840306-011	R014	IP55	2 x 2,5	in a housing
	3	16	690	2	4G16-10-PK 63-840306-021	R014	IP55	2 x 4	in a housing
	3	25	690	2	4G25-10-PK 63-840306-031	R014	IP55	2 x 6	in a housing
	3	40	690	2	4G40-10-PK 63-840306-041	R014	IP55	2 x 10	in a housing
	3	63	690	2	4G63-10-PK 63-840306-051	R014	IP55	2 x 10	in a housing
	3	80	690	2	4G80-10-PK 63-840306-061	R014	IP55	25	in a housing
	4	10	690	2	4G10-92-U 63-840396-011	R014	IP40	2 x 2,5	to be mounted behind the panel
	4	16	690	2	4G16-92-U 63-840396-021	R014	IP40	2 x 4	to be mounted behind the panel
	4	25	690	2	4G25-92-U 63-840396-031	R014	IP40	2 x 6	to be mounted behind the panel
	4	40	690	2	4G40-92-U 63-840396-041	R014	IP40	2 x 10	in a housing
	4	63	690	2	4G63-92-U 63-840396-051	R014	IP40	2 x 10	in a housing
	4	80	690	2	4G80-92-U 63-840396-061	R014	IP40	25	in a housing
	4	10	690	2	4G10-92-PK 63-840398-011	R014	IP55	2 x 2,5	w obudowie
	4	16	690	2	4G16-92-PK 63-840398-021	R014	IP55	2 x 4	in a housing
	4	25	690	2	4G25-92-PK 63-840398-031	R014	IP55	2 x 6	in a housing
	4	40	690	2	4G40-92-PK 63-840398-041	R014	IP55	2 x 10	in a housing
	4	63	690	2	4G63-92-PK 63-840398-051	R014	IP55	2 x 10	in a housing
	4	80	690	2	4G80-92-PK 63-840398-061	R014	IP55	25	in a housing

* See dimensions on pages 31-32

STANDARD CONNECTION DIAGRAMS

Diagram number	Number of poles	Making current	Voltage	Number of packs	Symbol Drawing number	Knob	Protection class from the front [IP]	Maximum conductor cross-section [mm²]	Installation
“mains-unit” switch (1-0-2)									
	1	10	690	1	4G10-51-U 63-840338-011	R014	IP40	2 x 2,5	to be mounted behind the panel
	1	10	690	1	4G10-51-PK 63-840340-011	R014	IP55	2 x 2,5	in a housing
	2	10	690	2	4G10-52-U 63-840341-011	R014	IP40	2 x 2,5	to be mounted behind the panel
	3	10	690	3	4G10-53-U 63-840343-011	R014	IP40	2 x 2,5	to be mounted behind the panel
	3	16	690	3	4G16-53-U 63-840343-021	R014	IP40	2 x 4	to be mounted behind the panel
	3	25	690	3	4G25-53-U 63-840343-031	R014	IP40	2 x 6	to be mounted behind the panel
	3	40	690	3	4G40-53-U 63-840343-041	R014	IP40	2 x 10	to be mounted behind the panel
	3	63	690	3	4G63-53-U 63-840343-051	R014	IP40	2 x 10	to be mounted behind the panel
	3	80	690	3	4G80-53-U 63-840343-061	R014	IP40	25	to be mounted behind the panel
	3	10	690	3	4G10-53-PK 63-840345-011	R014	IP55	2 x 2,5	in a housing
	3	16	690	3	4G16-53-PK 63-840345-021	R014	IP55	2 x 4	in a housing
	3	25	690	3	4G25-53-PK 63-840345-031	R014	IP55	2 x 6	in a housing
	3	40	690	3	4G40-53-PK 63-840345-041	R014	IP55	2 x 10	in a housing
	3	63	690	3	4G63-53-PK 63-840345-051	R014	IP55	2 x 10	in a housing
	3	80	690	3	4G80-53-PK 63-840345-061	R014	IP55	25	in a housing
“rotation direction change” switch (L-0-P)									
	3	10	690	3	4G10-11-U 63-840307-011	R014	IP40	2 x 2,5	to be mounted behind the panel
	3	16	690	3	4G16-11-U 63-840307-021	R014	IP40	2 x 4	to be mounted behind the panel
	3	25	690	3	4G25-11-U 63-840307-031	R014	IP40	2 x 6	to be mounted behind the panel
	3	40	690	3	4G40-11-U 63-840307-041	R014	IP40	2 x 10	to be mounted behind the panel

* See dimensions on pages 31-32

STANDARD CONNECTION DIAGRAMS

“rotation direction change” switch (L-0-P)

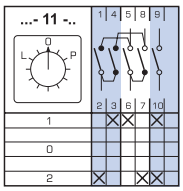


Diagram number	Number of poles	Making current	Voltage	Number of packs	Symbol Drawing number	Knob	Protection class from the front [IP]	Maximum conductor cross-section [mm²]	Installation
...- 11 -..	3	63	690	3	4G63-11-U 63-840308-051	R014	IP40	2 x 10	to be mounted behind the panel
	3	80	690	3	4G80-11-U 63-840308-061	R014	IP40	25	to be mounted behind the panel
	3	10	690	3	4G10-11-PK 63-840309-011	R014	IP55	2 x 2,5	in a housing
	3	16	690	3	4G16-11-PK 63-840309-021	R014	IP55	2 x 4	in a housing
	3	25	690	3	4G25-11-PK 63-840309-031	R014	IP55	2 x 6	in a housing
	3	40	690	3	4G40-11-PK 63-840309-041	R014	IP55	2 x 10	in a housing
	3	63	690	3	4G63-11-PK 63-840309-051	R014	IP55	2 x 10	in a housing
	3	80	690	3	4G80-11-PK 63-840309-06	R014	IP55	25	in a housing

“star-delta” (Y-0-Δ) motor control switch

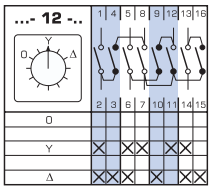


Diagram number	Number of poles	Making current	Voltage	Number of packs	Symbol Drawing number	Knob	Protection class from the front [IP]	Maximum conductor cross-section [mm²]	Installation
...- 12 -..	3	10	690	4	4G10-12-U 63-840310-011	R014	IP40	2 x 2,5	to be mounted behind the panel
	3	16	690	4	4G16-12-U 63-840310-021	R014	IP40	2 x 4	to be mounted behind the panel
	3	25	690	4	4G25-12-U 63-840310-031	R014	IP40	2 x 6	to be mounted behind the panel
	3	40	690	4	4G40-12-U 63-840310-041	R014	IP40	2 x 10	to be mounted behind the panel
	3	63	690	4	4G63-12-U 63-840310-051	R014	IP40	2 x 10	to be mounted behind the panel
	3	80	690	4	4G80-12-U 63-840310-061	R014	IP40	25	to be mounted behind the panel
	3	10	690	4	4G10-12-PK 63-840591-011	R014	IP55	2 x 2,5	in a housing
	3	16	690	4	4G16-12-PK 63-840591-021	R014	IP55	2 x 4	in a housing
	3	25	690	4	4G25-12-PK 63-840591-031	R014	IP55	2 x 6	in a housing
	3	40	690	4	4G40-12-PK 63-840591-041	R014	IP55	2 x 10	in a housing
	3	63	690	4	4G63-12-PK 63-840591-051	R014	IP55	2 x 10	in a housing
	3	80	690	4	4G80-12-PK 63-840591-061	R014	IP55	25	in a housing

voltmeter switch (L3L1, L2L3, L1L2 - 0 - L1N, L2N, L3N)

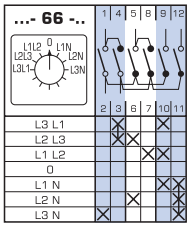
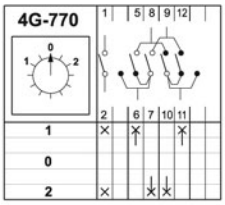
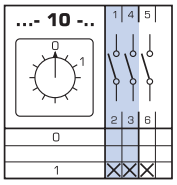
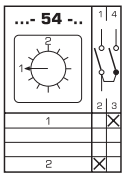
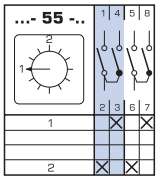
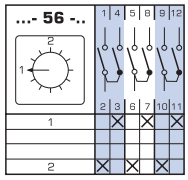
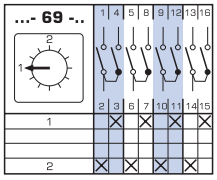


Diagram number	Number of poles	Making current	Voltage	Number of packs	Symbol Drawing number	Knob	Protection class from the front [IP]	Maximum conductor cross-section [mm²]	Installation
...- 66 -..	4	10	690	3	4G10-66-U 63-840360-011	R014	IP40	2 x 2,5	to be mounted behind the panel

* See dimensions on pages 31-32

STANDARD CONNECTION DIAGRAMS

Diagram number	Number of poles	Making current	Voltage	Number of packs	Symbol Drawing number	Knob	Protection class from the front [IP]	Maximum conductor cross-section [mm²]	Installation
switch for battery-electric trucks (1-0-2)									
	5	80	690	6	4G80-770-U 63-841838-061	R014	IP40	25	to be mounted behind the panel
main (emergency) switch connectors									
	3	16	690	2	4G16-10-PK S6 63-241669-021	R014	IP55	2 x 4	in a housing
	3	16	690	2	4G16-10-OU S8 S25 63-241670-021	R014	IP40	2 x 4	to be mounted behind the panel
	3	16	690	2	4G16-10-U S25 63-241671-021	R014	IP40	2 x 4	to be mounted behind the panel
	3	25	690	2	4G25-10-OU S8 S25 63-241672-031	R014	IP40	2 x 6	to be mounted behind the panel
	3	25	690	2	4G25-10-PK S6 63-241673-031	R014	IP55	2 x 6	in a housing
	3	25	690	2	4G25-10-U S25 63-241674-031	R014	IP40	2 x 6	to be mounted behind the panel
	3	40	690	2	4G40-10-OU S8 S25 63-241675-041	R014	IP40	2 x 10	to be mounted behind the panel
	3	40	690	2	4G40-10-PK S6 63-241676-041	R014	IP55	2 x 10	in a housing
	3	40	690	2	4G40-10-U S25 63-241677-041	R014	IP40	2 x 10	to be mounted behind the panel
	3	63	690	2	4G63-10-U S25 63-241678-051	R014	IP40	2 x 10	to be mounted behind the panel
	3	80	690	2	4G80-10-U S6 63-241858-061	R014	IP40	25	to be mounted behind the panel
switches (1-2)									
	1	10	690	1	4G10-54-U 63-840346-011	R014	IP40	2 x 2,5	to be mounted behind the panel
	1	10	690	1	4G10-54-PK 63-840347-011	R014	IP55	2 x 2,5	in a housing
	2	10	690	2	4G10-55-U 63-840348-011	R014	IP40	2 x 2,5	to be mounted behind the panel
	3	10	690	3	4G10-56-U konfigurator	R014	IP40	2 x 2,5	to be mounted behind the panel
	4	10	690	4	4G10-69-U 63-840367-011	R014	IP40	2 x 2,5	to be mounted behind the panel

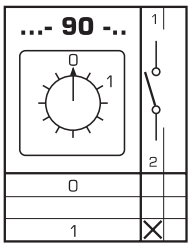
* special versions S6, S8, S25* see on pages 33-37

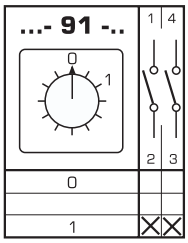
SWITCHING PROGRAMS

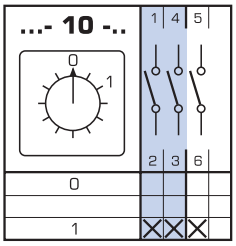
Switch disconnector with “0” (0-1) position

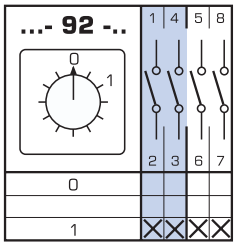
Table 9

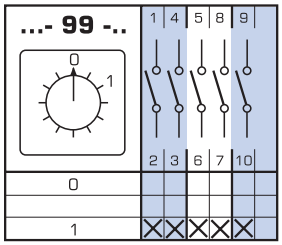
Switching program	Diagram number
1-phase	90
2-phase	91
3-phase	10
multi-pole	92
	99
	100
	528
	659

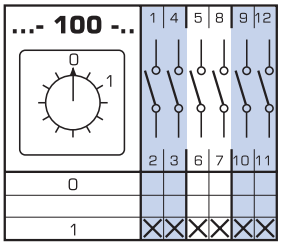


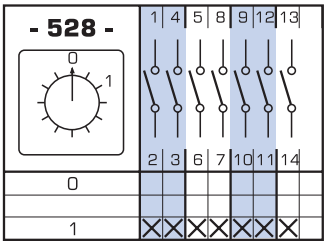


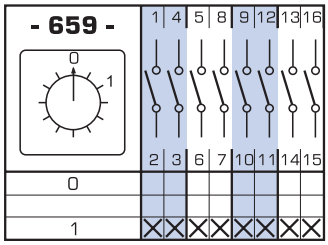








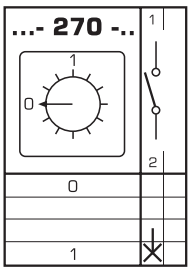


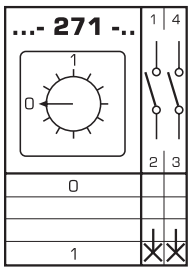


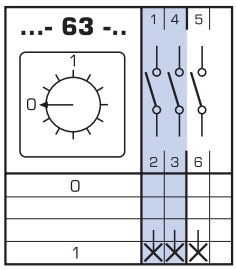
Switch disconnectors with quick-connecting contacts (0-1)

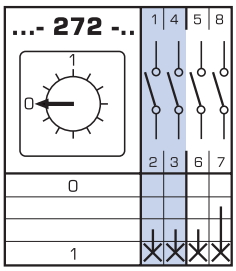
Table 10

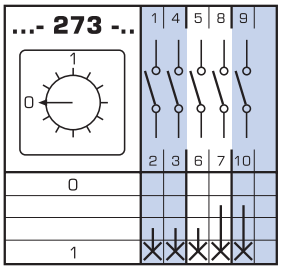
Switching program		Diagram number
with 30º contact lead 30°	1-pole.	270
with 30º contact lead 30°	2-pole.	271
with 30º contact lead 30°	3-pole.	63
with 30º contact lead on three contacts and 60º on one contact	4-pole.	272
with 30º contact lead on three contacts and 60º on two contacts	5-pole.	273
with 30º contact lead 30°	6-pole.	274

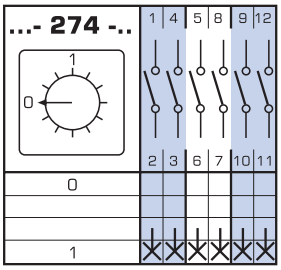












* See dimensions on pages 31-32

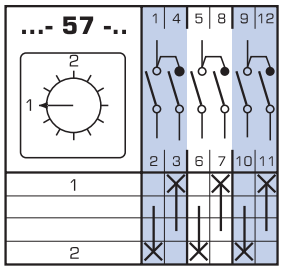
SWITCHING PROGRAMS

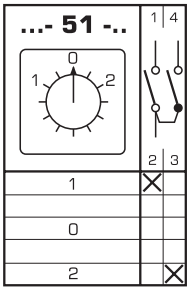
Switches with “0”(1-0-2) position

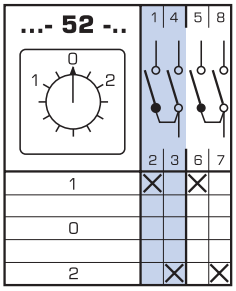
Tablica 11

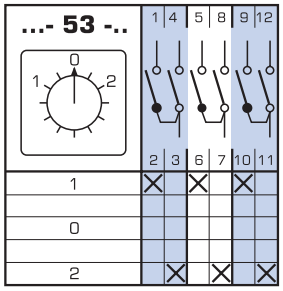
Switching program	Diagram number
1-phase	51
2-phase	52
3-phase	53
multi-pole	75
	76
	77
	78
	79
	80
	81

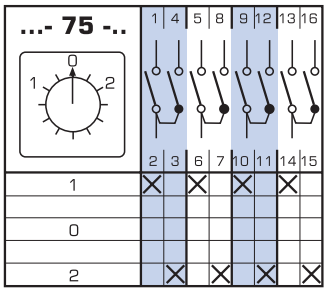
Switches for current transformers (1-2)

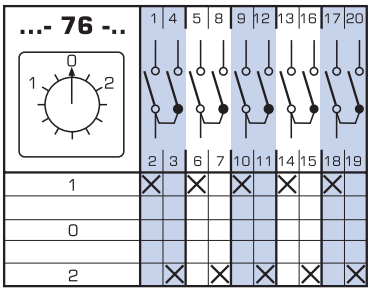


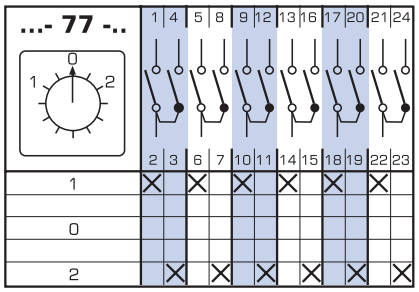


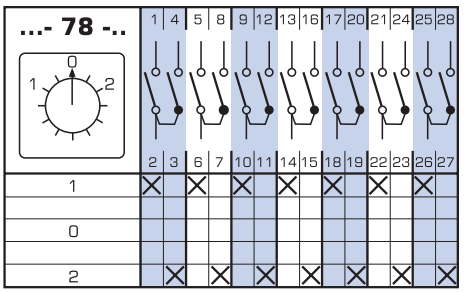


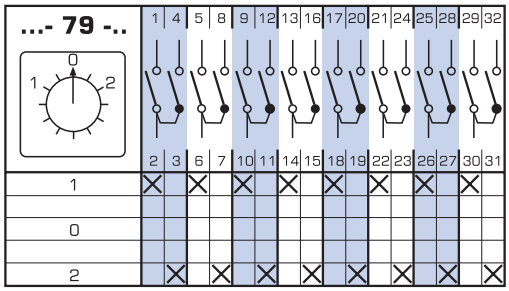


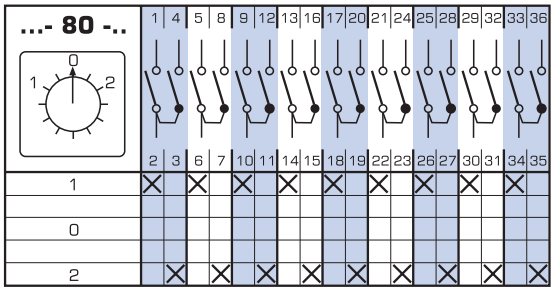


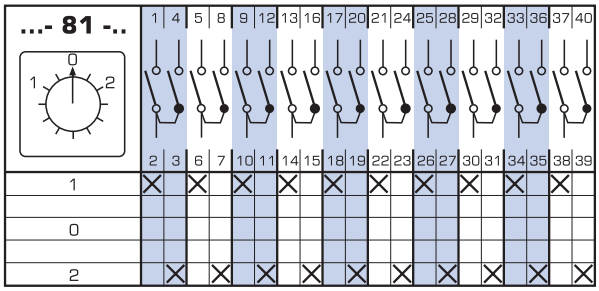












* Only in versions U, OU

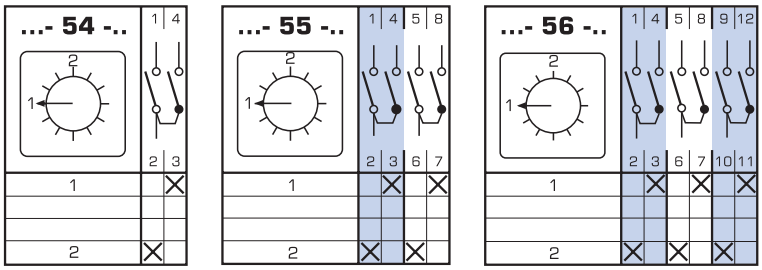
* See dimensions on pages 31-32

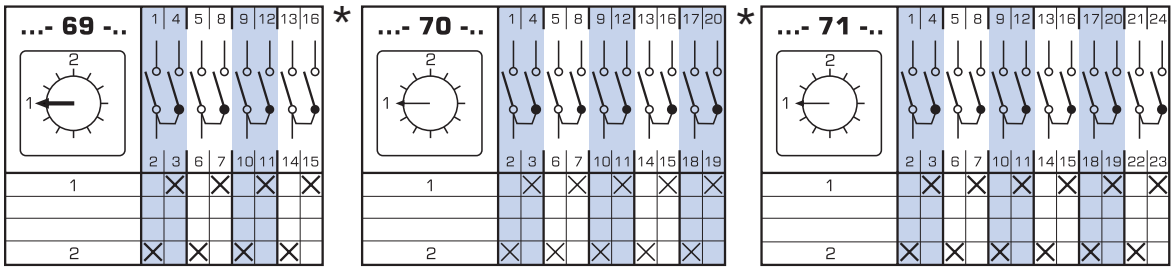
SWITCHING PROGRAMS

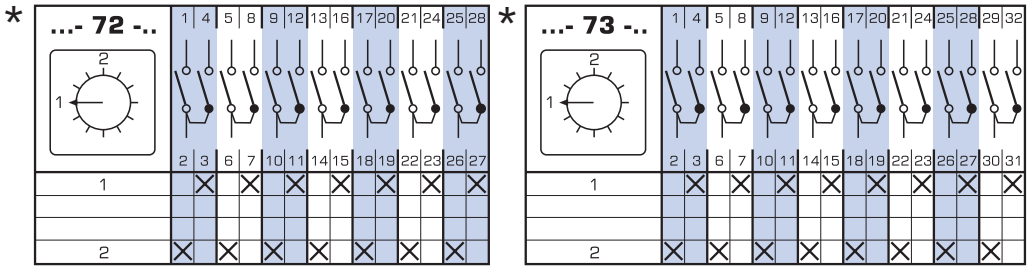
switches without “0”(1-2) position

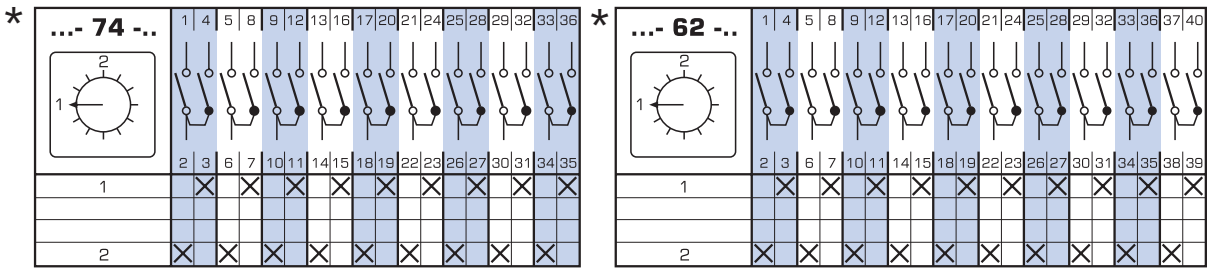
Table 12

Switching program	Diagram number
1-phase	54
2-phase	55
3-phase	56
multi-pole	69
	70
	71
	72
	73
	74
	62









* Only in versions U, OU

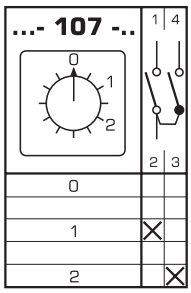
* See dimensions on pages 31-32

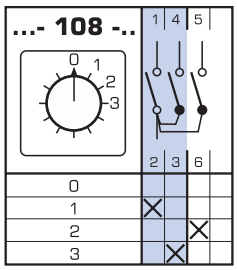
SWITCHING PROGRAMS

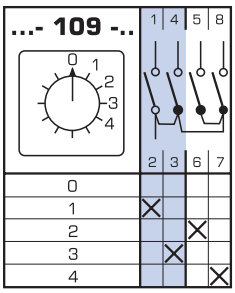
Multiposition switches with “0” (0-1-2...) position

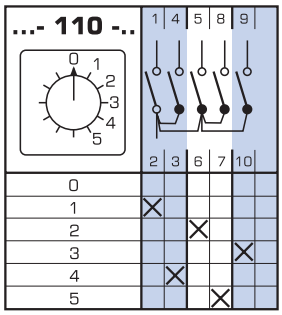
Table 13

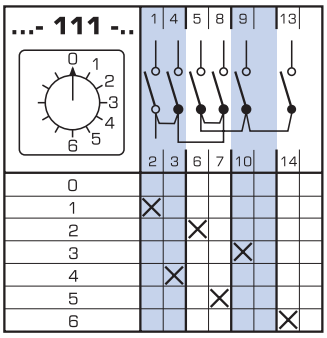
Switching program		Diagram number
1-phase	3-position	107
	4-position	108
	5-position	109
	6-position	110
	7-position	111
	8-position	112
	9-position	113
	10-position	114
	11-position	115
	12-position	116
2-phase	3-position	123
	4-position	124
	5-position	125
	6-position	126
	7-position	127
	8-position	128
	9-position	129
	10-position	130
	11-position	131
	12-position	132
3-phase	3-position	135
	4-position	136
	5-position	137
	6-position	138
	7-position	139
	8-position	140
multi-pole	3-position	145
	4-position	146
	5-position	147
	6-position	148
	3-position	151
	4-position	152
	5-position	153
	3-position	156
	4-position	157
	5-position	158
	3-position	160
	4-position	161
	3-position	163
	4-position	164

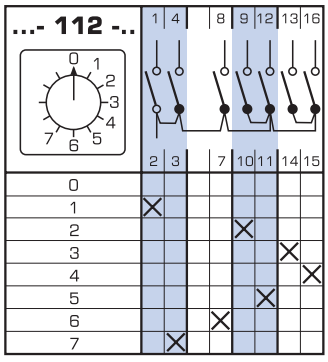


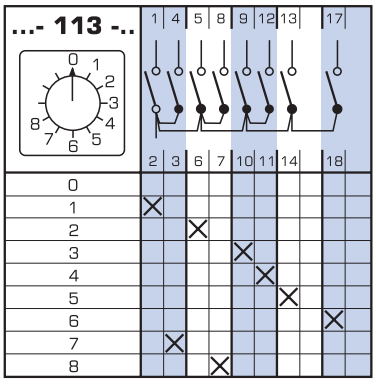


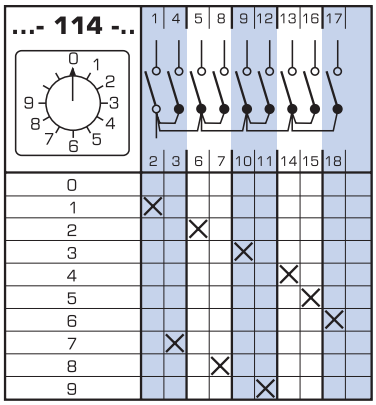


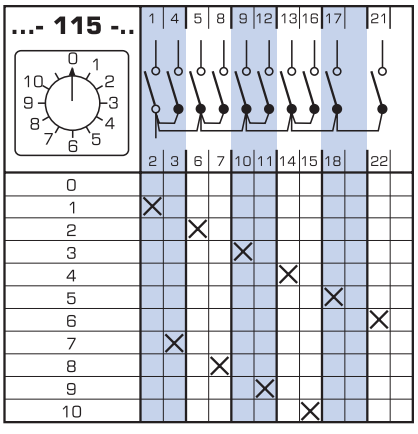


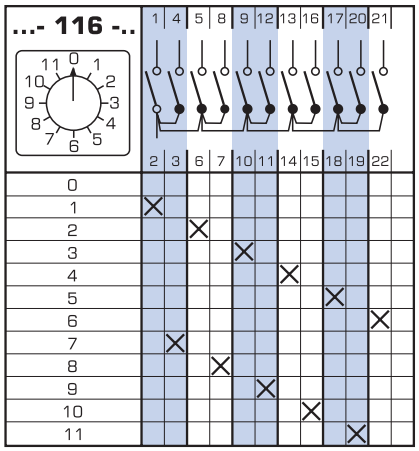




* 

* 

* 

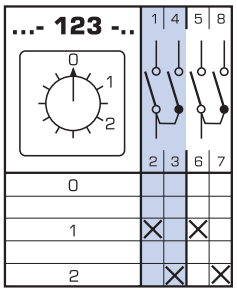
* 

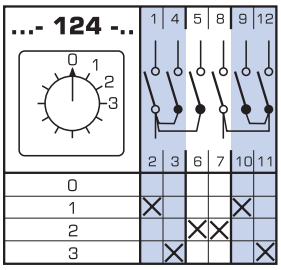
* Only in versions U, OU

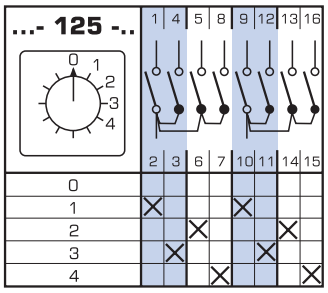
* See dimensions on pages 31-32

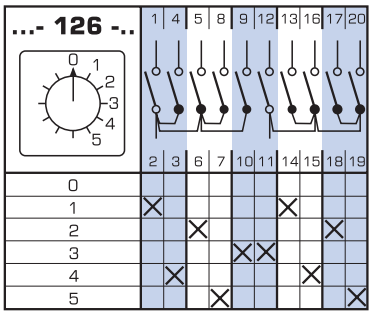
SWITCHING PROGRAMS

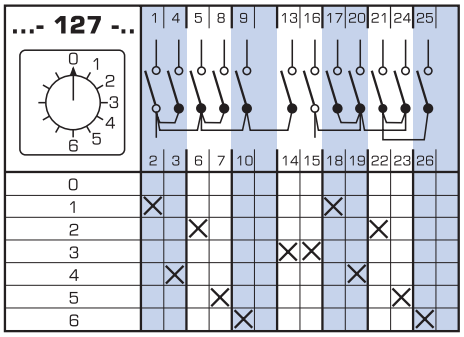
Multiposition switches with “0” (0-1-2...) position

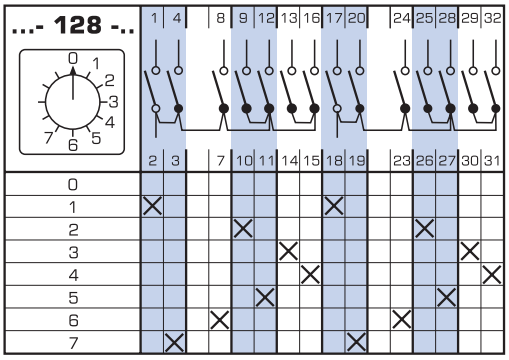


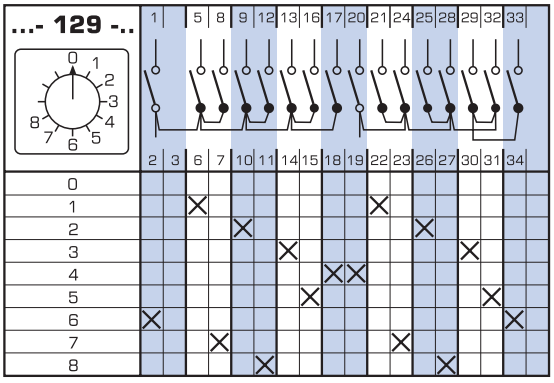


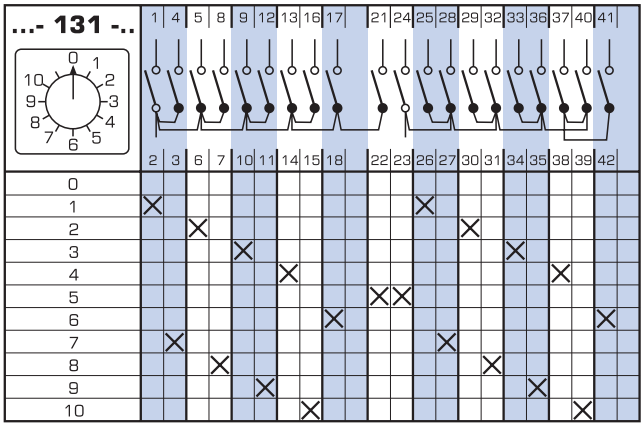


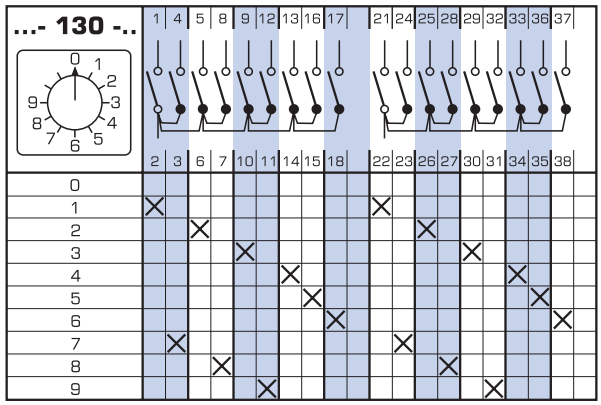
* 

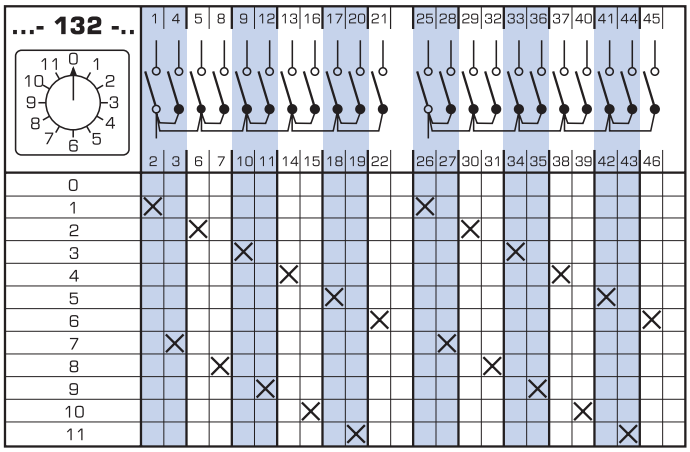
* 

* 

* 

* 

* 

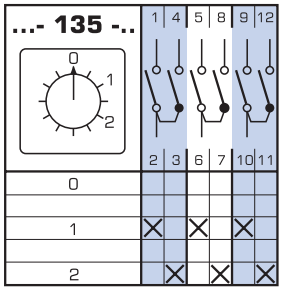
* 

* Only in versions U, OU

* See dimensions on pages 31-32

SWITCHING PROGRAMS

Multiposition switches with “0” (0-1-2...) position



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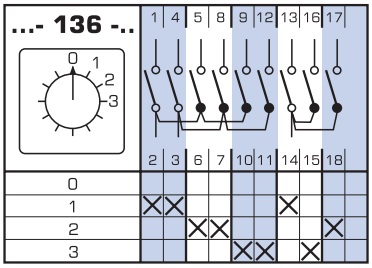

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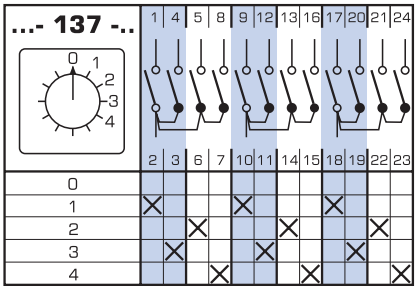

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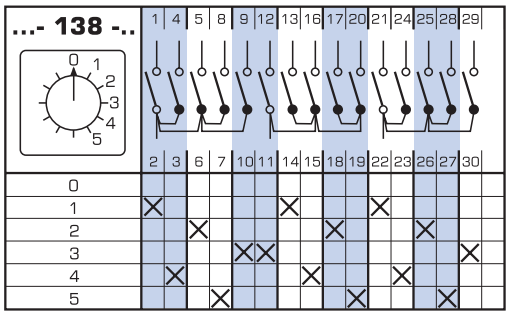
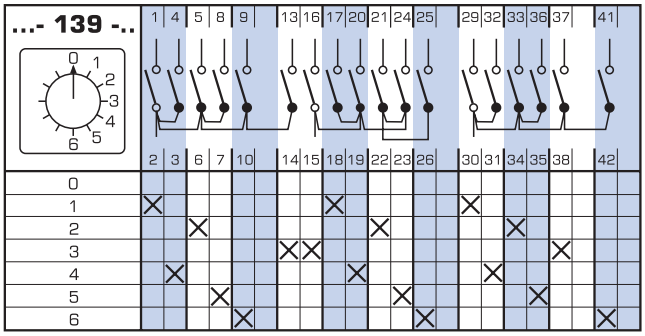


*



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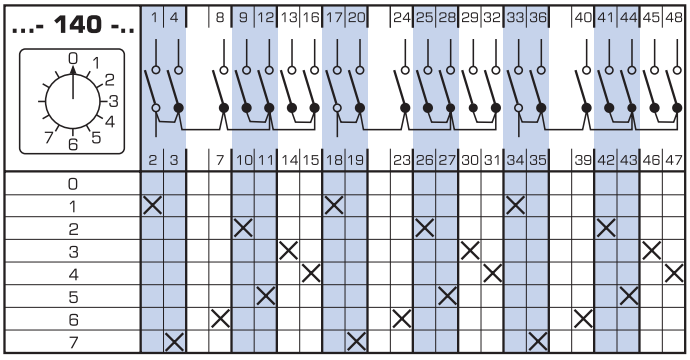
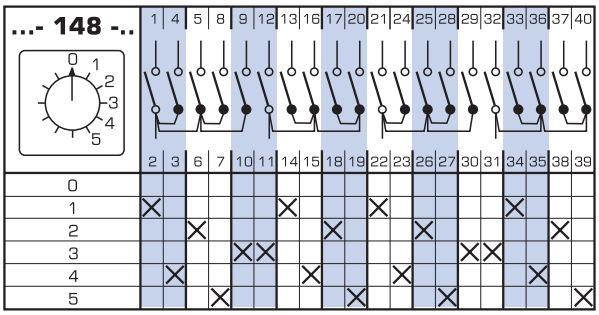
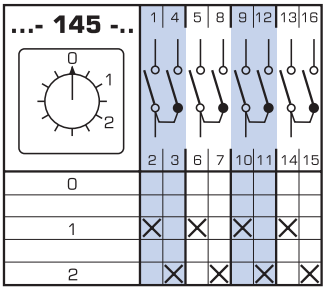


*





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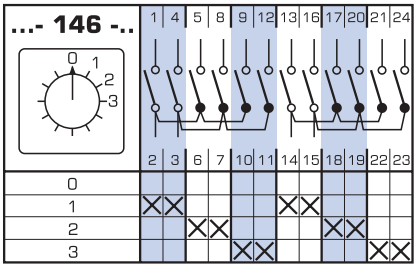

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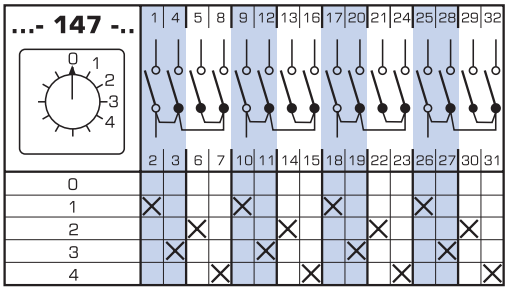

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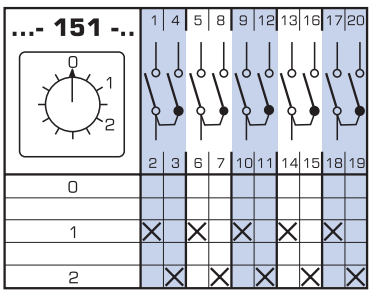

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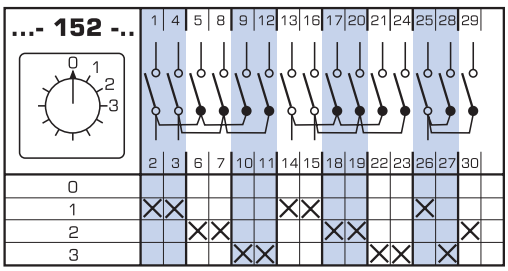


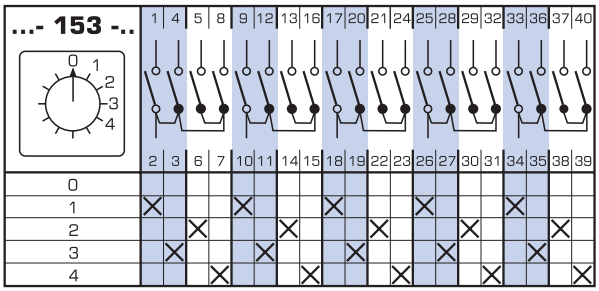
* Only in versions U, OU

* See dimensions on pages 31-32

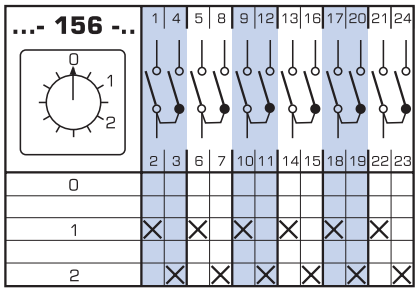
SWITCHING PROGRAMS

Multiposition switches with “0” (0-1-2...) position

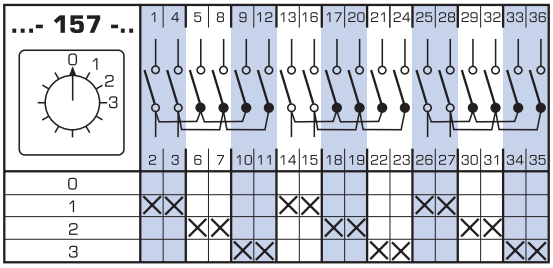
* ...- 153 -..



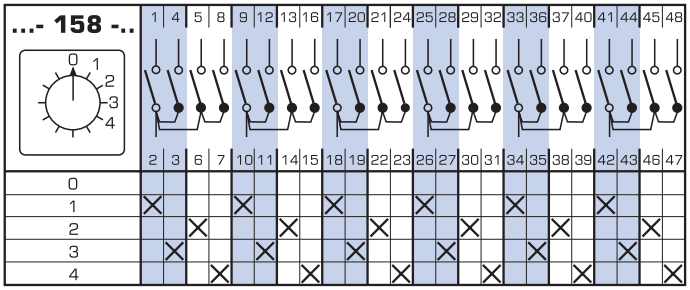
* ...- 156 -..



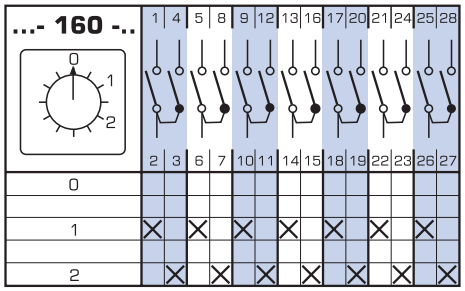
* ...- 157 -..



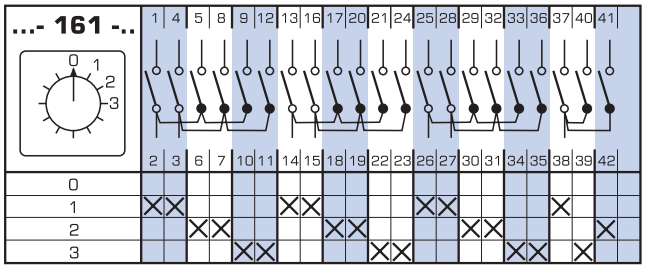
* ...- 158 -..



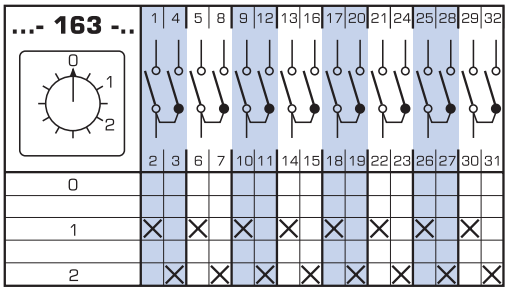
* ...- 160 -..



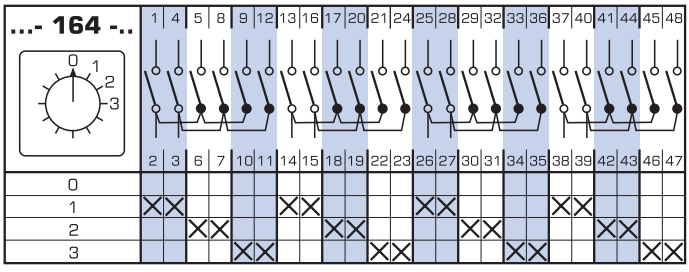
* ...- 161 -..



* ...- 163 -..



* ...- 164 -..



* Only in versions U, OU

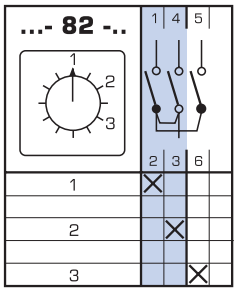
* See dimensions on pages 31-32

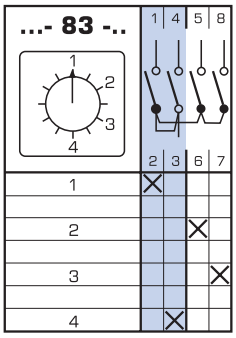
SWITCHING PROGRAMS

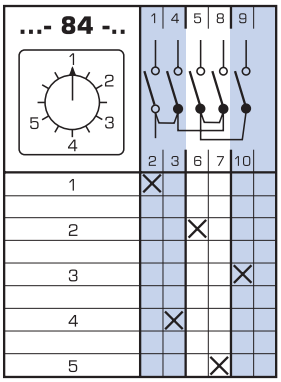
Multiposition switches without “0” position

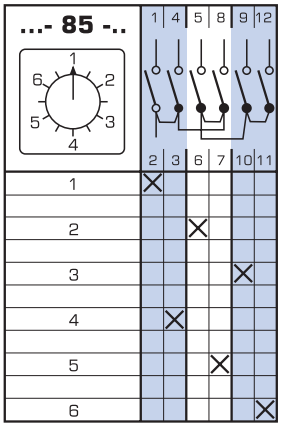
Table 14

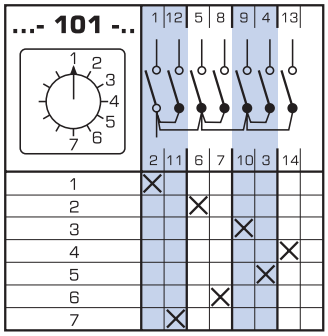
Switching program		Diagram number
1-phase	3-position	82
	4-position	83
	5-position	84
	6-position	85
	7-position	101
	8-position	102
	9-position	103
	10-position	104
	11-position	105
	12-position	106
2-phase	3-position	86
	4-position	87
	5-position	88
	6-position	89
	7-position	117
	8-position	118
	9-position	119
	10-position	120
	11-position	121
	12-position	122
3-phase	3-position	93
	4-position	94
	5-position	95
	6-position	96
	7-position	133
	8-position	134
multi-pole	3-position	141
	4-position	142
	5-position	143
	6-position	144
	3-position	149
	4-position	150
	3-position	154
	4-position	155
	3-position	159
	3-position	162

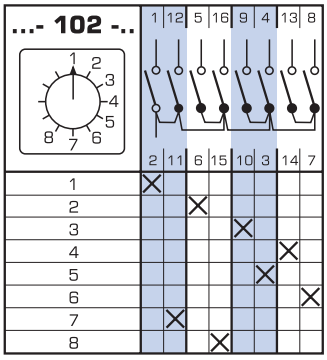


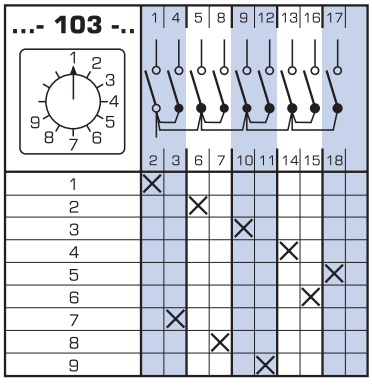


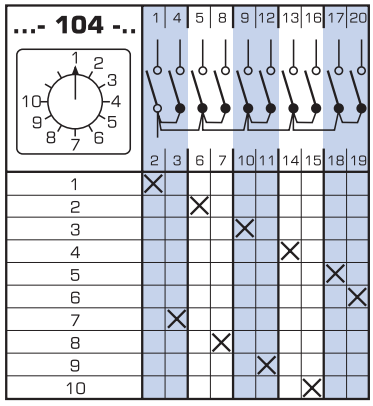


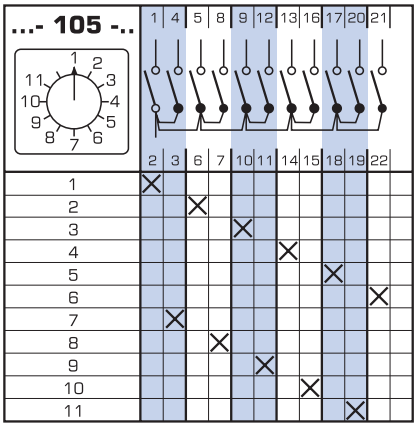


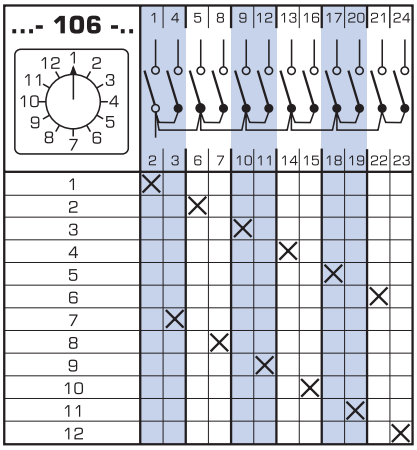




* 

* 

* 

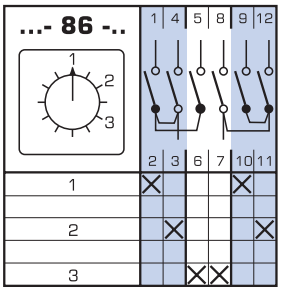
* 

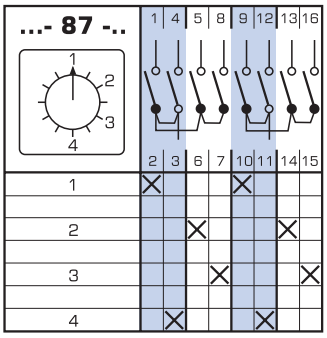
* Only in versions U, OU

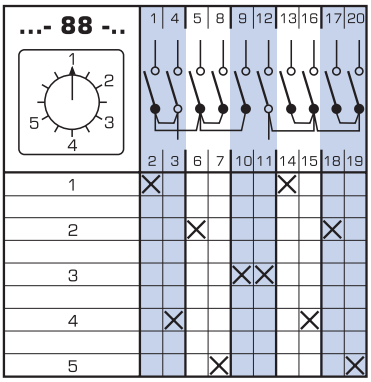
* See dimensions on pages 31-32

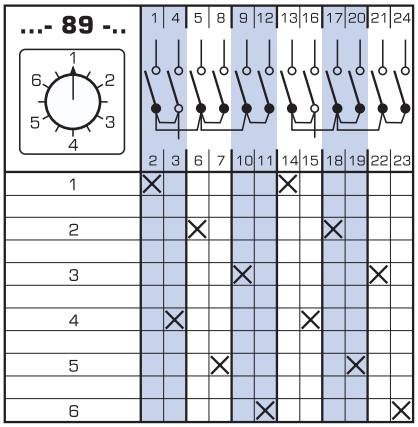
SWITCHING PROGRAMS

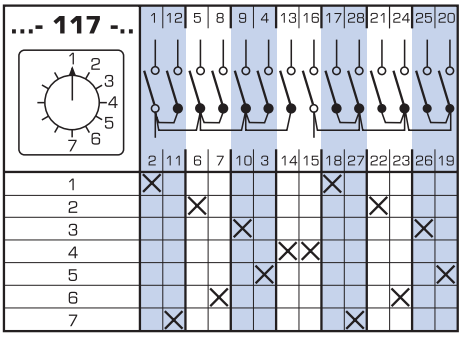
Multiposition switches without “0” position

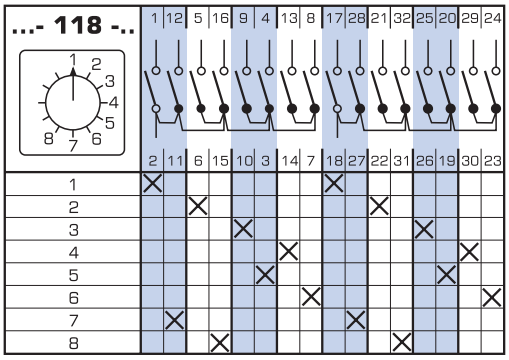


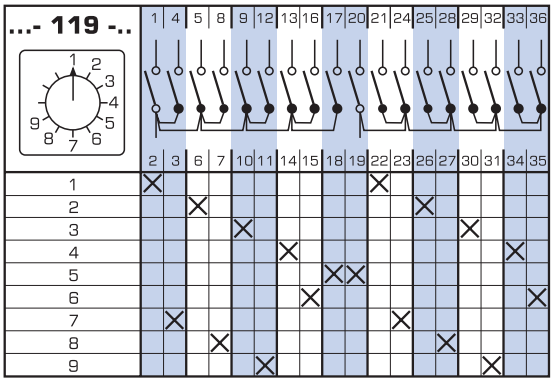


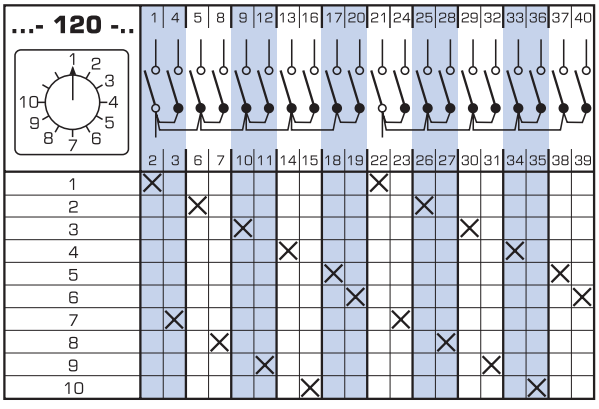
* 

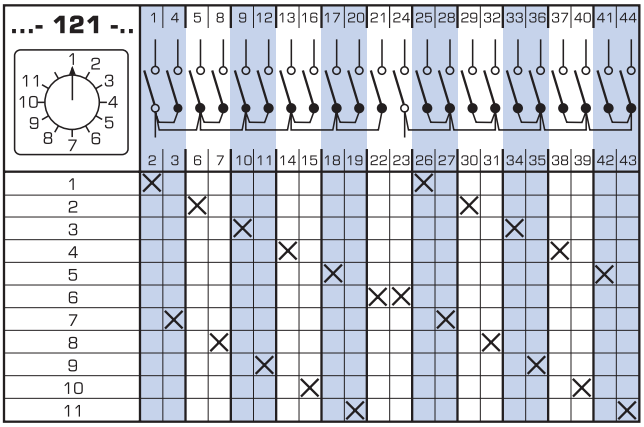
* 

* 

* 

* 

* 

* 

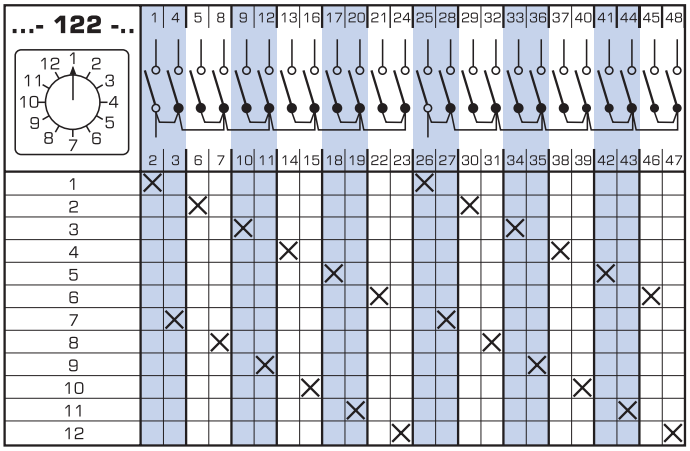
* Only in versions U, OU

* See dimensions on pages 31-32

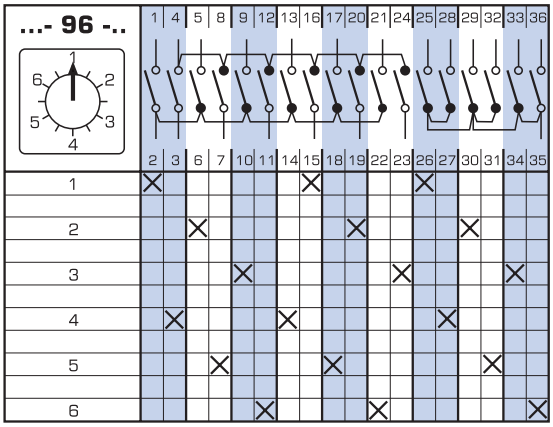
SWITCHING PROGRAMS

Multiposition switches without “0” position

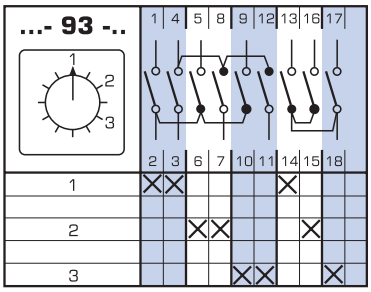
* ...- 122 -..



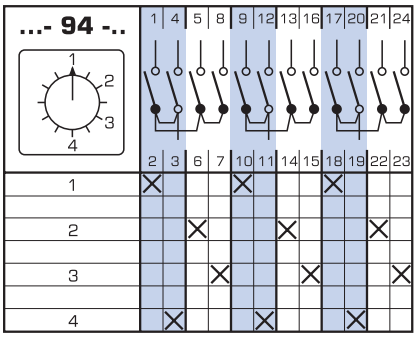
* ...- 96 -..



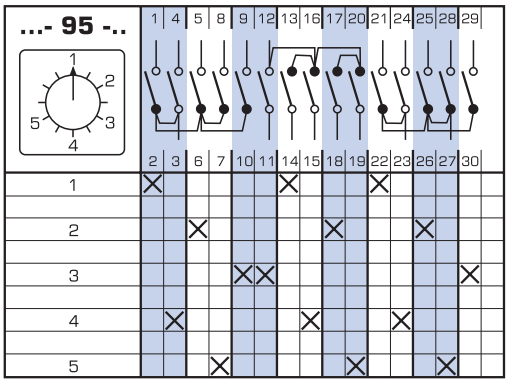
* ...- 93 -..



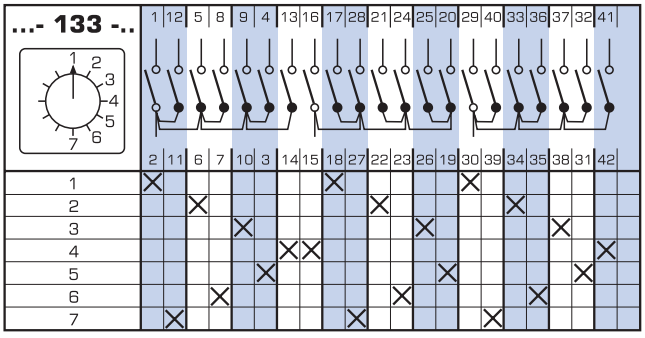
* ...- 94 -..



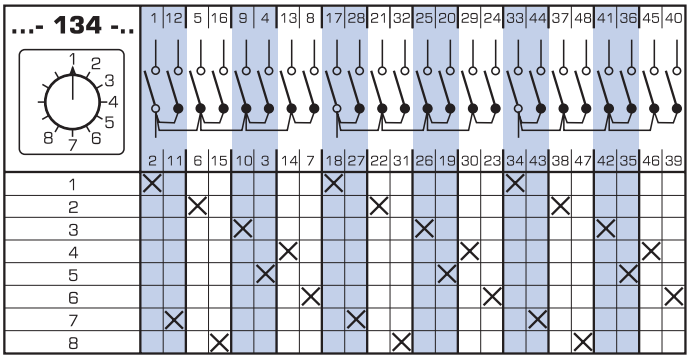
* ...- 95 -..



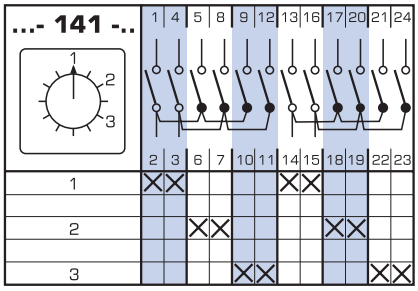
* ...- 133 -..



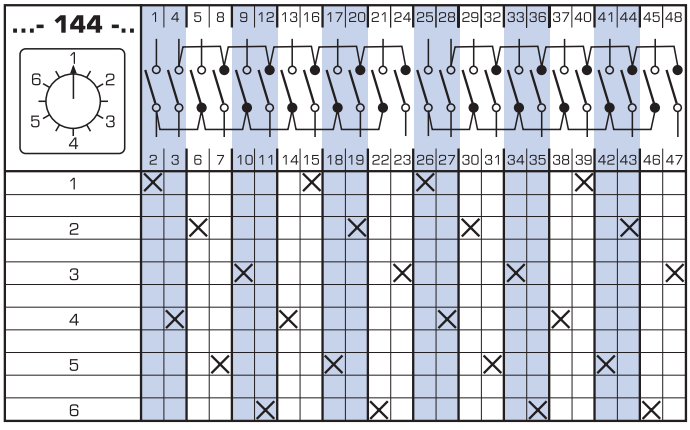
* ...- 134 -..



* ...- 141 -..



* ...- 144 -..



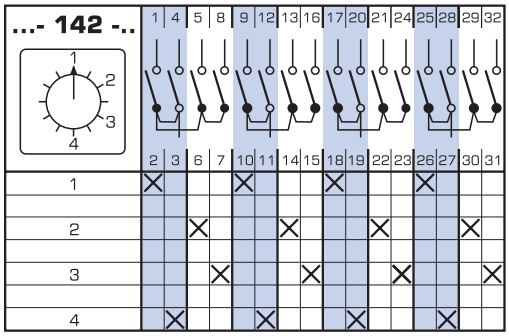
* Only in versions U, OU

* See dimensions on pages 31-32

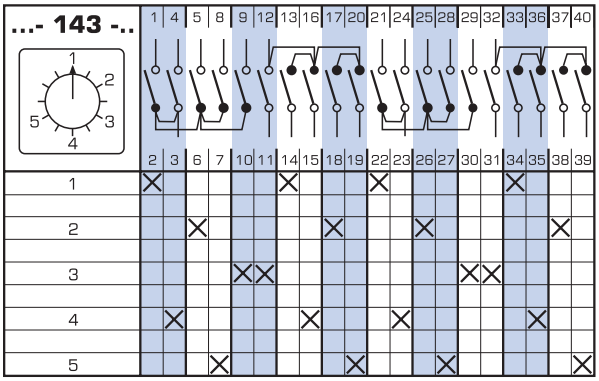
SWITCHING PROGRAMS

Multiposition switches without “0” position

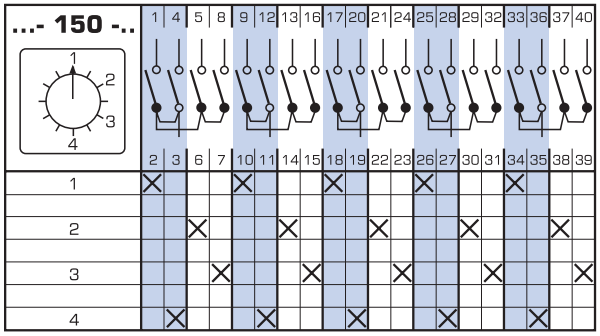
* ...- 142 -..



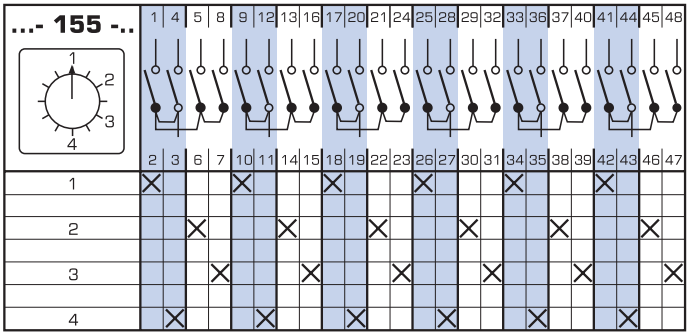
* ...- 143 -..



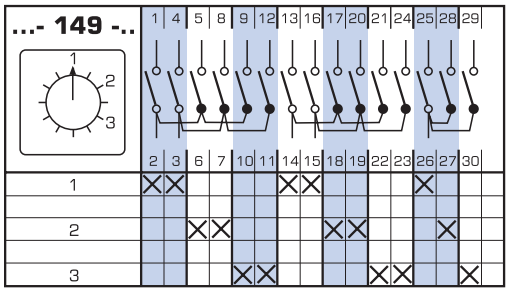
* ...- 150 -..



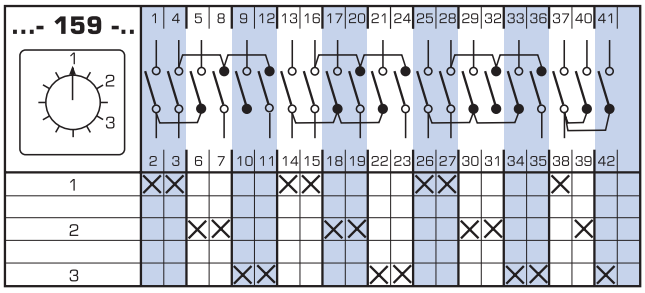
* ...- 155 -..



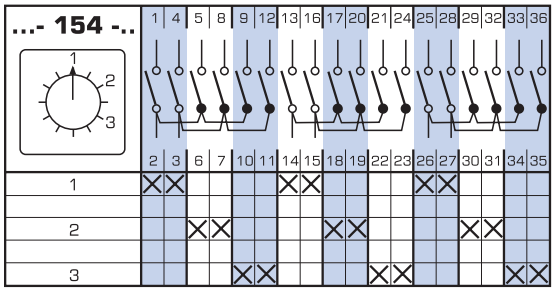
* ...- 149 -..



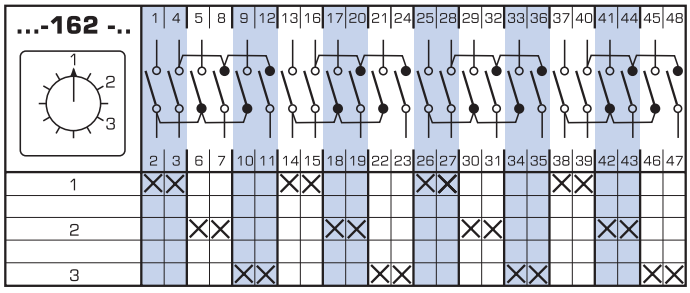
* ...- 159 -..



* ...- 154 -..



* ...-162 -..



* Only in versions U, OU

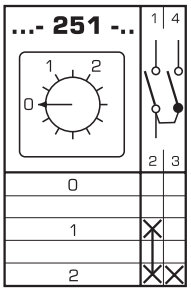
* See dimensions on pages 31-32

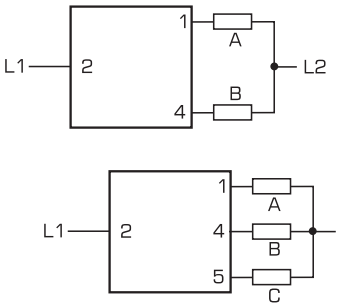
SWITCHING PROGRAMS

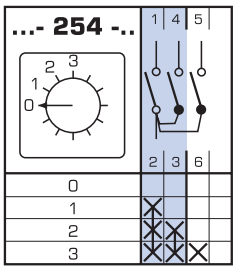
Switchgroups with “0” position

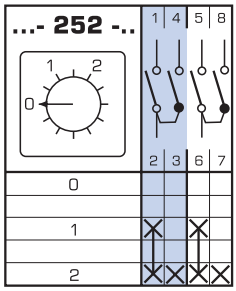
Table 15

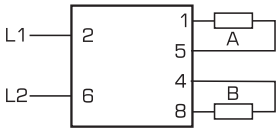
Switching program		Diagram number
1-phase	2-group	251
	3-group	254
2-phase	2-group	252
	3-group	255
3-phase	2-group	253
	3-group	256

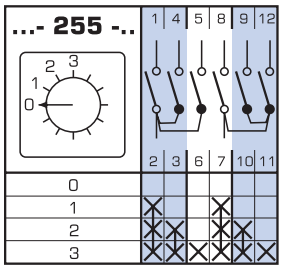


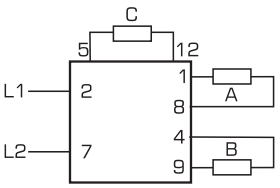


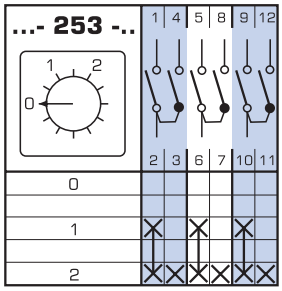


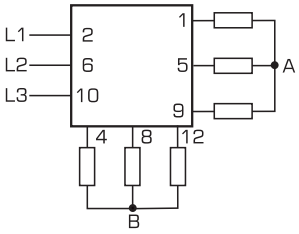


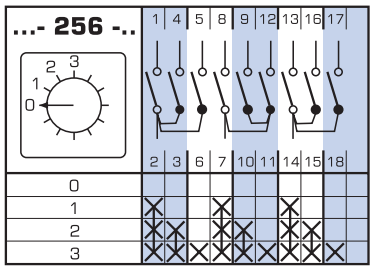


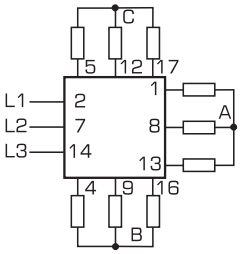








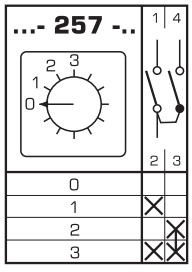
* 

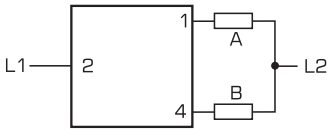


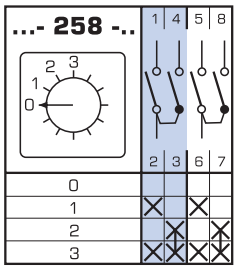
Serial switches

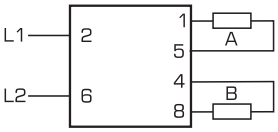
Table 16

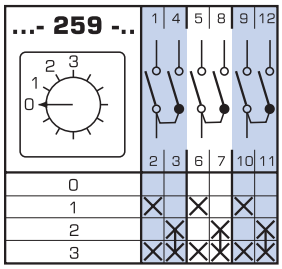
Switching program	Diagram number
1-phase	257
2-phase	258
3-phase	259

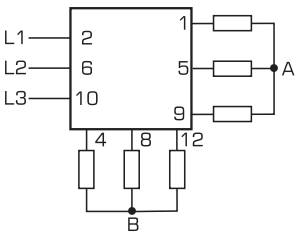












* Only in versions U, OU

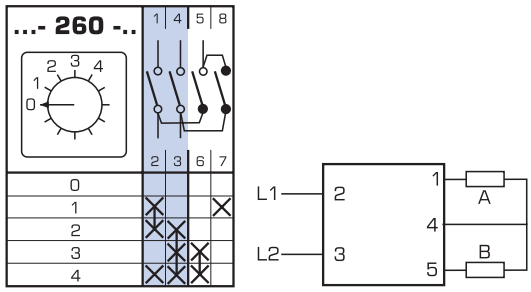
* See dimensions on pages 31-32

SWITCHING PROGRAMS

Serial-parallel switches

Table 17

Switching program	Diagram number
2-fazowy	260

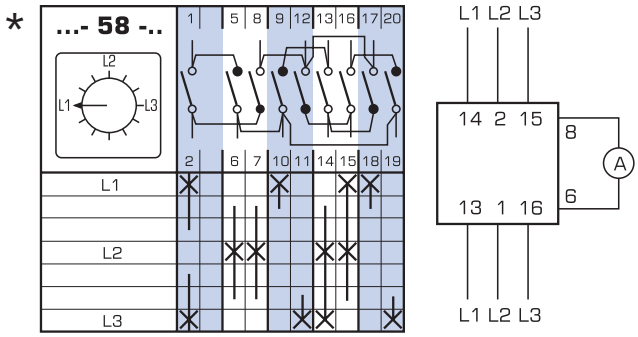


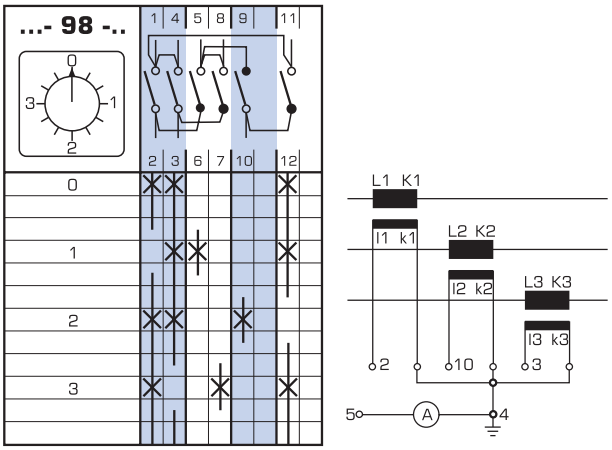
MEASUREMENT SWITCHES FOR VOLTAGE AND CURRENT

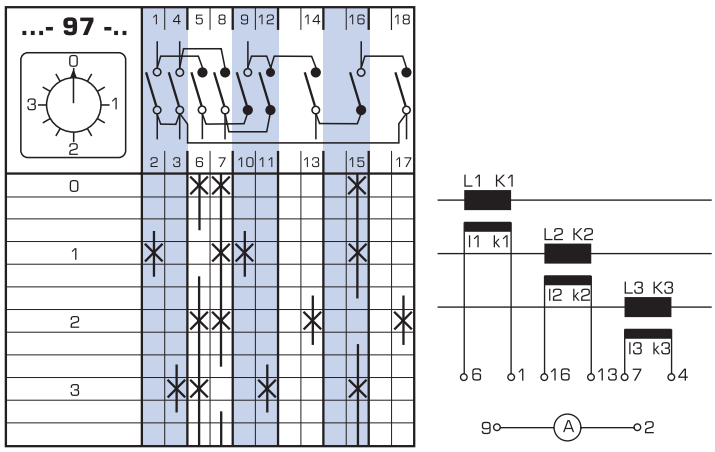
Ammeter switches

Table 18

Switching program		Diagram number
phase measurement	L1–L2–L3	58
phase measurement	0–1–2–3	97
phase measurement with grounding	0–1–2–3	98

* 

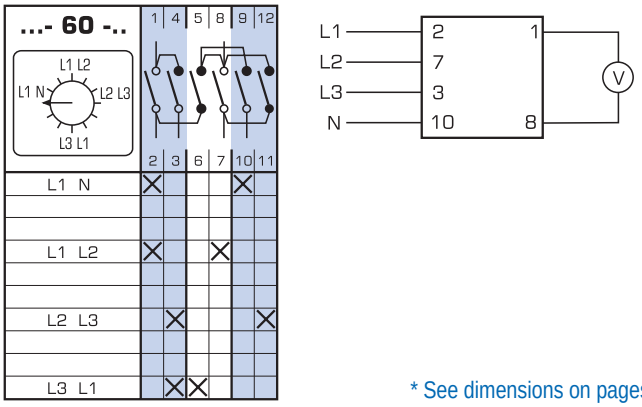


* 

Voltmeter switches without “0” position

Table 19

Switching program	Diagram number
phase-to-phase voltages + 3 phase voltages	60



* Only in versions U, OU

* See dimensions on pages 31-32

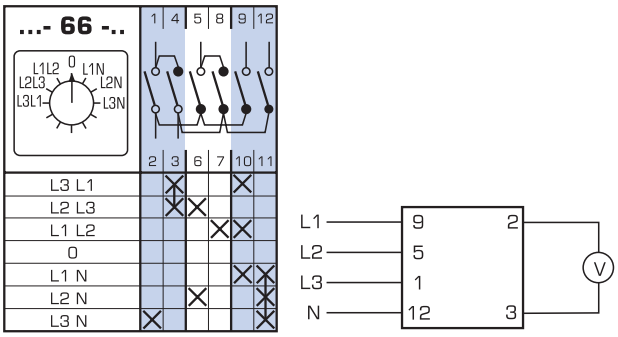
SWITCHING PROGRAMS

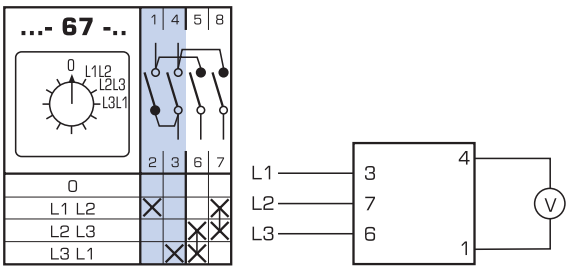
MEASUREMENT SWITCHES FOR VOLTAGE AND CURRENT

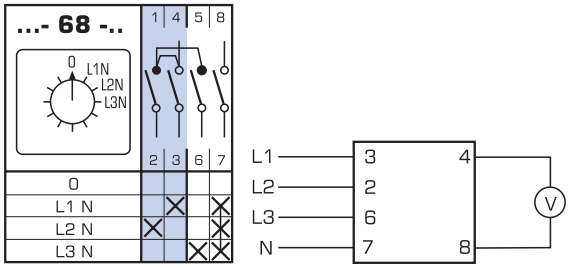
Measurement switches for voltage and current, voltmeter switches without “0” position

Table 20

Switching program	Diagram number
3 phase voltages	68
3 phase-to-phase voltages	67
3 phase-to-phase voltages + napięcie phase	66







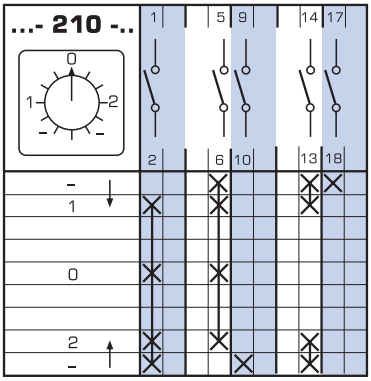
SWITCHES WITH AUTOMATIC RETURN TO INITIAL POSITION

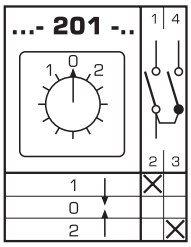
Switch with “0” position (1-0-2), return to “0” from both sides

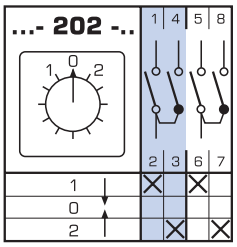
Table 21

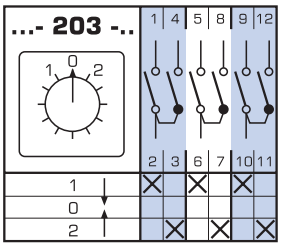
Switching program	Diagram number
switches with automatic return to initial position, switch with function of left - right pushbuttons	210
switch with “0” position (1-0-2) return to “0” from both sides 1-phase	201
2-phase	202
3-phase	203

*









* Only in versions U, OU

* See dimensions on pages 31-32

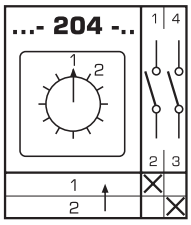
SWITCHING PROGRAMS

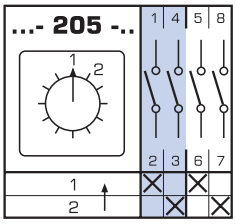
SWITCHES WITH AUTOMATIC RETURN TO INITIAL POSITION

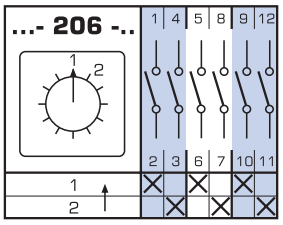
switches without “0” (0-2) position

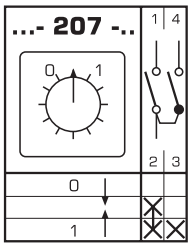
Table 22

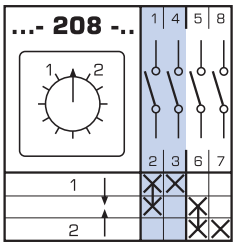
Switching program	Diagram number
1 normally closed contact + 1 normally open contact	204
2 normally closed contacts + 2 normally open contacts	205
3 normally closed contacts + 3 normally open contacts	206
to control a contactor – 1 normally open contact (turn right) and 1 normally closed contact (turn left)	207
1 normally open contact and 1 normally closed contact, when turning left and right	208
2 normally open contacts and 2 normally closed contacts, when turning left and right	209

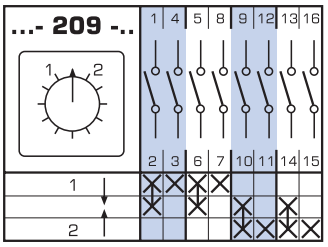










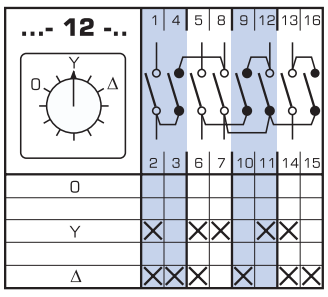


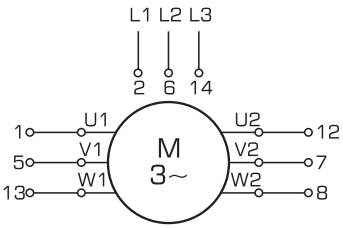
SWITCH DISCONNECTORS FOR MOTOR CONTROLLING

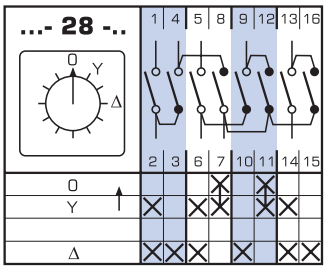
star-delta switch disconnectors

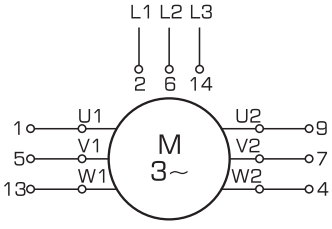
Table 23

Switching program	Diagram number
basic version	12
Y/Δ back from Y to 0	28
with counter-current braking back from Y to 0	29
as a voltage switch	30
for operaction with contactor	31
bidirectional (left-right)	21









* See dimensions on pages 31-32

SWITCHING PROGRAMS
SWITCH DISCONNECTORS FOR MOTOR CONTROLLING

Star-delta switch disconnectors

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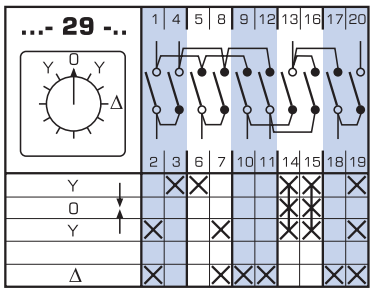
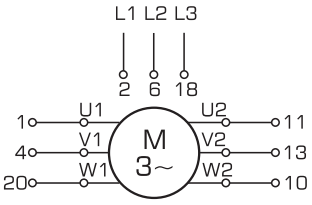
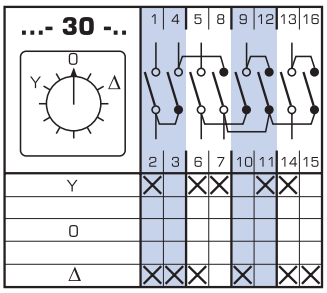
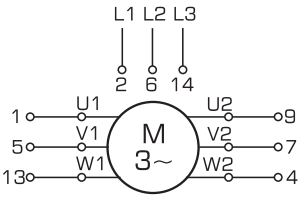
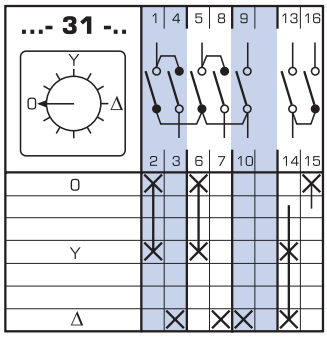
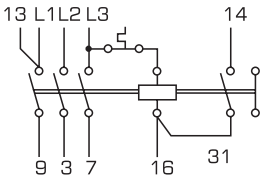


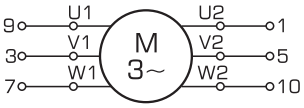


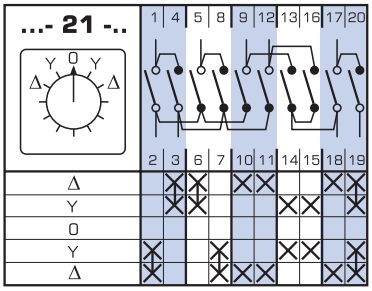


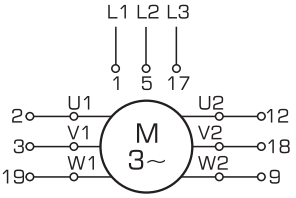










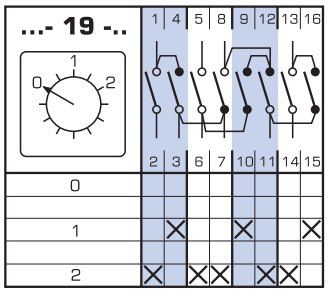


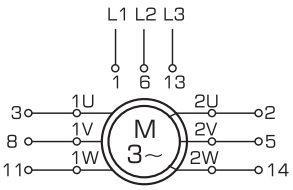
* Only in versions U, OU

Switch disconnectors in a Dahlander's system

Table 24

Switching program	Diagram number
Switch disconnectors for motor controlling, switch disconnectors in a dahlander's system dipolar δ-0-yy	13
Dipolar 0-δ-yy	19
Dipolar bidirectional yy-δ-0-δ-yy	20
Dipolar and contactor controlling	32





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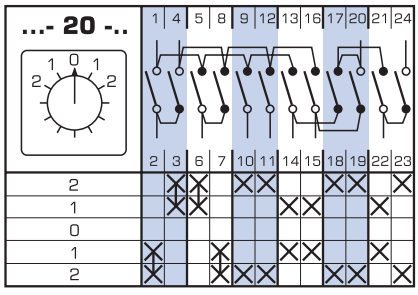

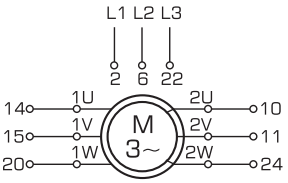

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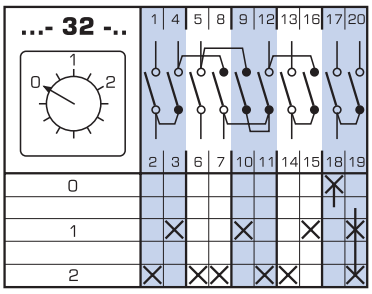
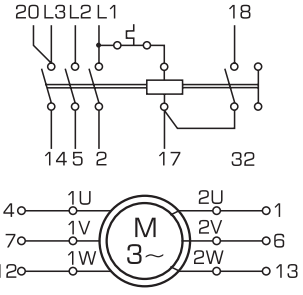
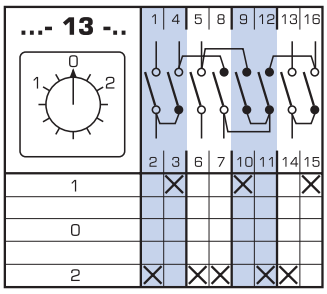
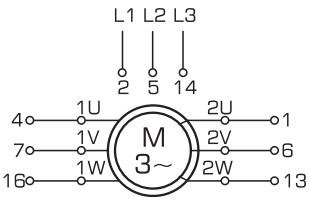








* Only in versions U, OU

* See dimensions on pages 31-32

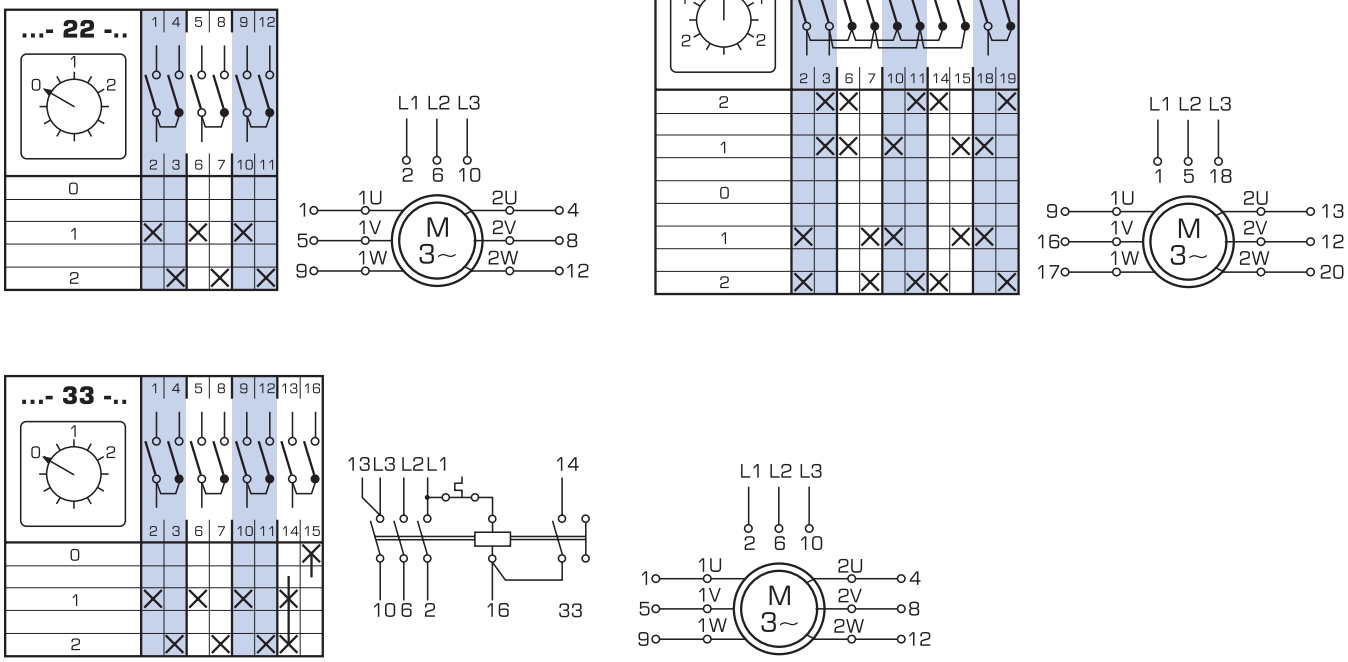
SWITCHING PROGRAMS

SWITCH DISCONNECTORS FOR MOTOR CONTROLLING

Switch disconnectors for two-winding motors

Table 25

Switching program	Diagram number
0-1-2	22
bidirectional	23
to control the contactors	33



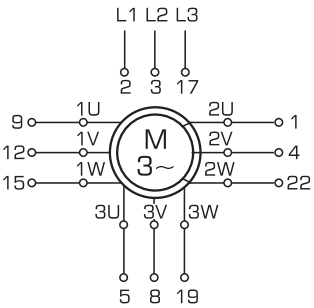
* Only in versions U, OU

Switch disconnectors for three-speed motors

Table 26

Switching program	Diagram number
2 windings 0-Δ-YY-Y (with 3 speeds in a Dahlander's system)	34
2 windings 0-Δ-YY-Y (1 and 2 speeds in a Dahlander's system)	35
2 windings 0-Δ-YY-Y (2 and 3 speeds in a Dahlander's system)	36

* ...- 34 -..



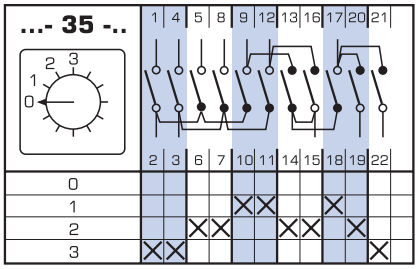
* Only in versions U, OU

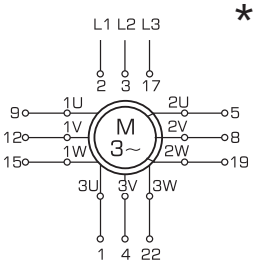
* See dimensions on pages 31-32

SWITCHING PROGRAMS

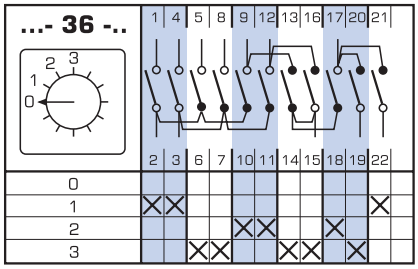
Switch disconnectors for three-speed motors

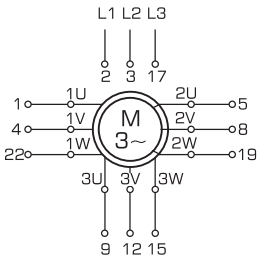
* ...- 35 -..





* ...- 36 -..





* Only in versions U, OU

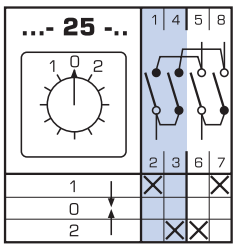
SWITCH DISCONNECTORS FOR MOTOR CONTROLLING

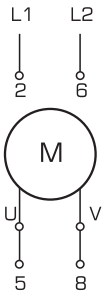
Reversing switches

Table 27

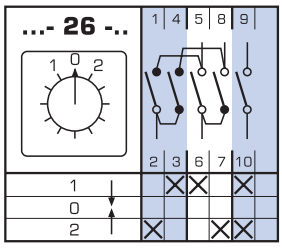
Switching program	Diagram number
2-phase	24
2-phase, return to “0” position	25
3-phase	11
3-phase, return to “0” position	26
to control a contactor	27
starting switches for 1-phase motors	15

...- 25 -..

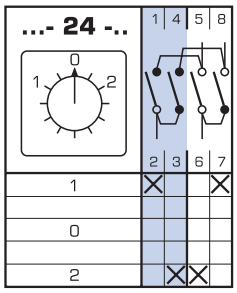


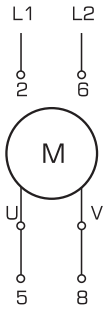


...- 26 -..

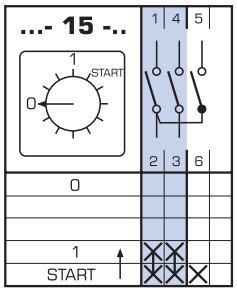


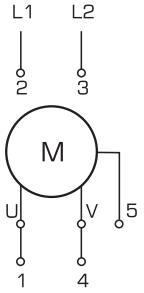
...- 24 -..



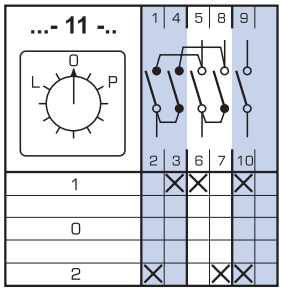


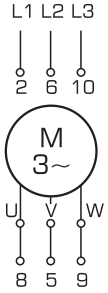
...- 15 -..



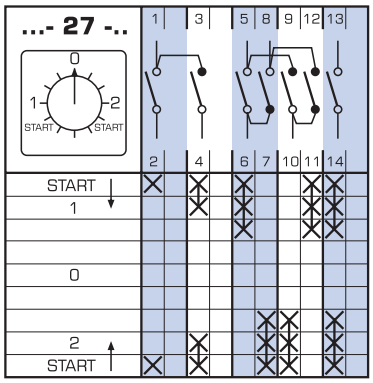


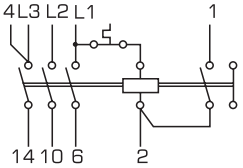
...- 11 -..

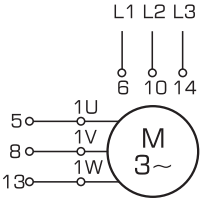




* ...- 27 -..







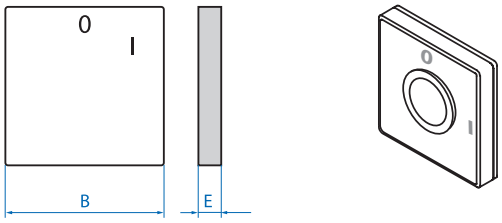
* Only in versions U, OU

* See dimensions on pages 31-32

MECHANICAL DIMENSIONS

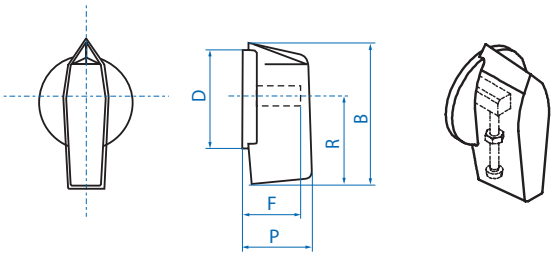
Standard version front plate

group	B	E
	ø	
A0	48	7,5
A1	65	9,5
A2	90	9,5
A3	132	10

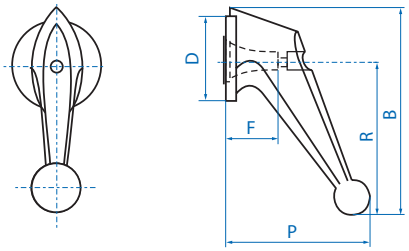


Knobs

group	D	P	R	B	F
	ø				
A0	27,5	19	23,5	39,5	16
A1	35	25	32	53	20
A2	48	32	43,5	70,5	26
A3	75	46,5	63,5	104	39

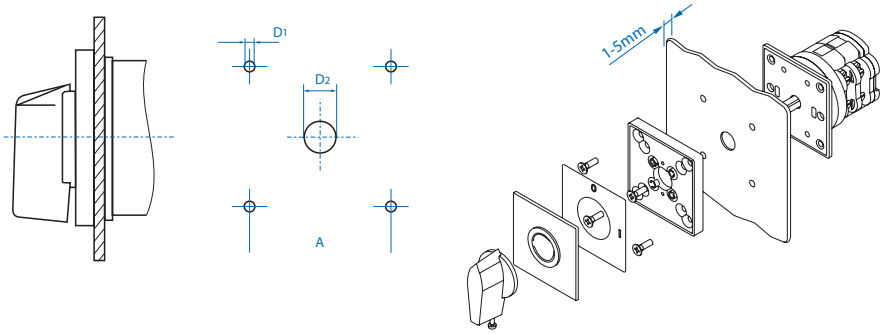


group	D	P	R	B	F
	ø				
A1	35	51	61,5	81,5	15
A2	48	64	79,5	105,5	19
A3	75	88	115	155,5	28



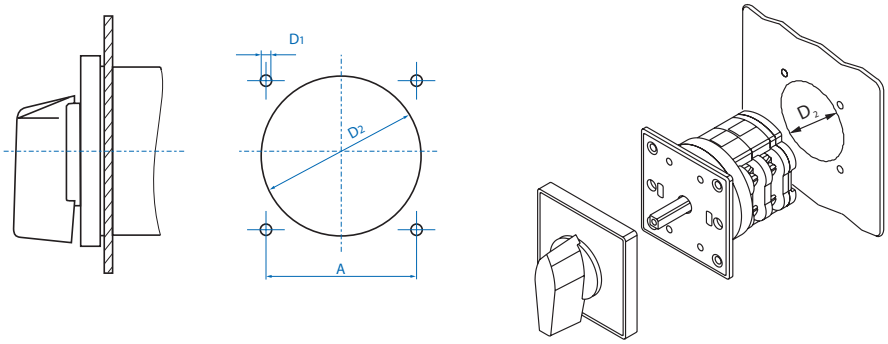
Switches installed under the panel

group	D1	D2	A
	ø	ø	⌑
A0	5	14	36
A1	5	14	48
A2	6	16	72
A3	6	18	104



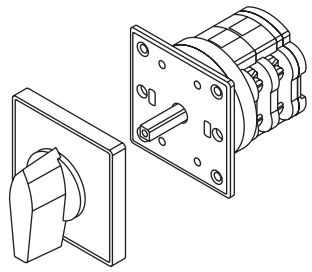
Switches installed on the panel

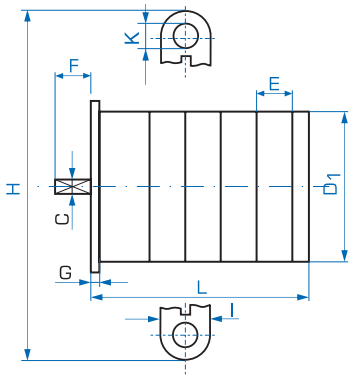
group	D1	D2	A
	ø	ø	⌑
A0	5	42,5	36
A1	5	59	48
A2	6	82	72

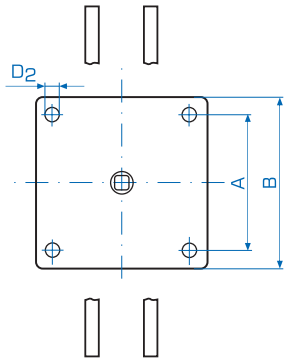


MECHANICAL DIMENSIONS

U switches to be built-in



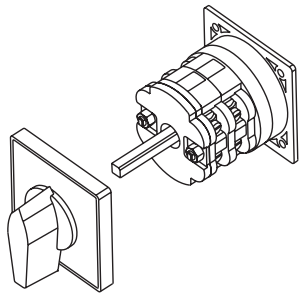


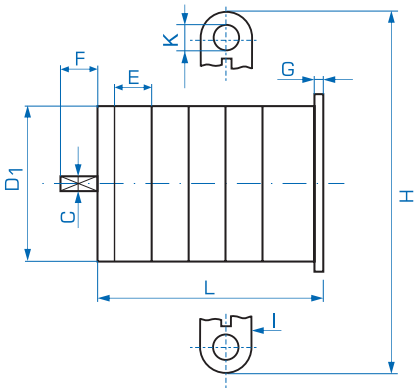


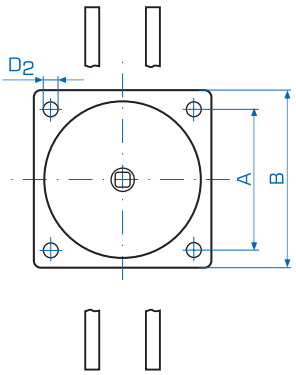
group	switch type	D_1	D_2	A	B	C	E	F	G	H	I	K	L (depending on the number of switching elements)											
		ø	ø	⫫	⫫	⫫							1	2	3	4	5	6	7	8	9	10	11	12
A0	4G 10	38	4,3	36	48	6	9,6	22	4	–	–	–	33	42,5	52	61,5	71	81	90,5	100	109,5	119	129	138,5
A1	4G 16	57	4,3	48	65	6	13,5	26	3	–	–	–	46,5	60	73,5	87,5	101	114,5	128,5	143	156	169,5	183	196,5
	4G 25	57	4,3	48	65	6	13,5	26	3	–	–	–	46,5	60	73,5	87,5	101	114,5	128,5	143	156	169,5	183	196,5
A2	4G 40	80	5,3	72	90	8	18	31	5	–	–	–	56,5	74,5	92,5	110,5	128,5	146,5	164,5	182,5	200,5	218,5	236,5	254,5
	4G 63, 80	80	5,3	72	90	8	18	31	5	–	–	–	56,5	74,5	92,5	110,5	128,5	146,5	164,5	182,5	200,5	218,5	236,5	254,5
A3	4G 100	120	5,3	104	132	10	29	37,5	6	–	–	–	77	107	136	166	196	226	284	314	343	373	402	432
	4G 200	120	5,3	104	132	10	29	37,5	6	145	20	10,5	77	107	136	166	196	226	284	314	343	373	402	432
	4G 400	120	5,3	104	132	10	29	37,5	6	170	45	13	–	107	–	166	–	226	–	314	–	373	–	432
	4G 630	120	5,3	104	132	10	29	37,5	6	190	74	17,5	–	–	136	–	–	226	–	–	343	–	–	432
	4G 800	120	5,3	104	132	10	29	37,5	6	260	50	17,5	–	107	–	166	–	226	–	314	–	373	–	432
	4G 1200	120	5,3	104	132	10	29	37,5	6	260	80	17,5	–	–	136	–	–	226	–	–	343	–	–	432

Protection class IP40 (from the front plate side), IP55 in a special version – S1

OU switches to be built in a housing





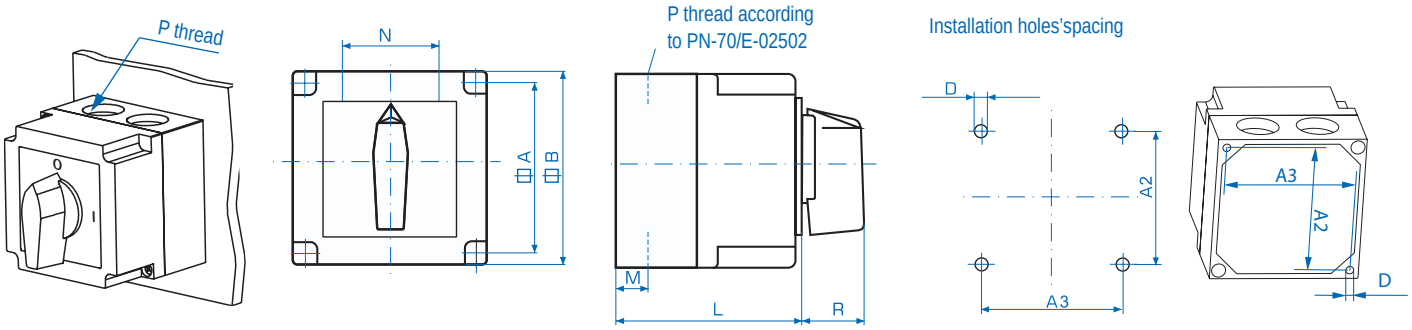


group	switch type	D_1	D_2	A	B	C	E	F	G	H	I	K	L (depending on the number of switching elements)											
		ø	ø	⫫	⫫	⫫							1	2	3	4	5	6	7	8	9	10	11	12
A0	4G 10	38	4,3	36	48	6	9,6	32	4	–	–	–	33	46,5	56	65,5	75	85	94,5	104	113,5	123	133	142,5
A1	4G 16	57	4,3	48	65	6	13,5	35	3	–	–	–	46,5	60	73,5	87,5	101	114,5	128,5	143	156	169,5	183	196,5
	4G 25	57	4,3	48	65	6	13,5	35	3	–	–	–	46,5	60	73,5	87,5	101	114,5	128,5	143	156	169,5	183	196,5
A2	4G 40	80	5,3	72	90	8	18	40	5	–	–	–	56,5	74,5	92,5	110,5	128,5	146,5	164,5	182,5	200,5	218,5	236,5	254,5
	4G 63, 80	80	5,3	72	90	8	18	40	5	–	–	–	56,5	74,5	92,5	110,5	128,5	146,5	164,5	182,5	200,5	218,5	236,5	254,5
A3	4G 100	120	5,3	104	132	10	29	50	6	–	–	–	77	107	136	166	196	226	284	314	343	373	402	432
	4G 200	120	5,3	104	132	10	29	50	6	145	20	10,5	77	107	136	166	196	226	284	314	343	373	402	432
	4G 400	120	5,3	104	132	10	29	50	6	170	45	13	–	107	–	166	–	226	–	314	–	373	–	432
	4G 630	120	5,3	104	132	10	29	50	6	190	74	17,5	–	–	136	–	–	226	–	–	343	–	–	432
	4G 800	120	5,3	104	132	10	29	50	6	260	50	17,5	–	107	–	166	–	226	–	314	–	373	–	432
	4G 1200	120	5,3	104	132	10	29	50	6	260	80	17,5	–	–	136	–	–	226	–	–	343	–	–	432

Protection class IP40 (from the front plate side), IP55 in a special version – S1

INSTALLATION DIMENSIONS

PK switches in a plastic housing



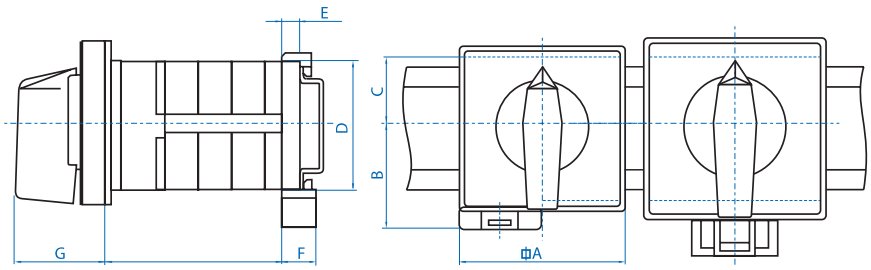
Group	Switch type	D	A1	A2	A3	B	M	N	R	Thread P	L (depending on the number of the switching elements)			
		ø	⊡			⊡					1	2	3	4
A0	4G 10	4,3	55	38	54	64	13	25	19	11	55,5	55,5	75	75
A1	4G 16	4,3	75	75	75	85	19	34	25	16	77	77	104	104
	4G 25	4,3	75	75	75	85	19	34	25	16	77	77	104	104
A2	4G 40	5,3	109	91	107	120	29	45	32	21	95	95	132	132
	4G 63, 4G 80	5,3	109	91	107	120	29	45	32	21	95	95	132	132

Protection class IP55 (standard)

S18 switch to be mounted on a rail according to 35 DIN EN 50022

Group A0, A1, A2 version U

A2 A1 A0



Group	A	B	C	D	E	F	G
	⊡						
A0	48	30	21	35	5	10,5	26,5
A1	65	48,5	21	35	9	15	34,5
A2	90	48,5	21	35	9	15	41,5

SPECIAL VERSIONS

S1 switch with a sealed shaft /protection class IP 55/

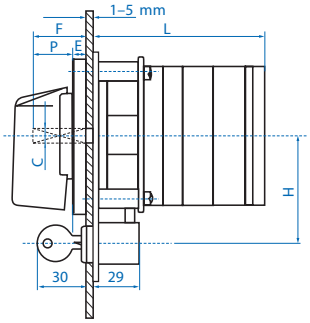
group A0, A1, A2 version U, OU

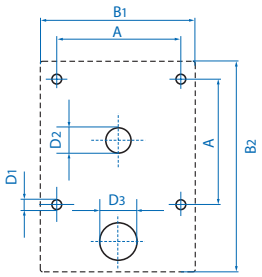
The difference between standard and special versions is the use of a sealing ring on the driving shaft, which guarantees achieving an IP 55 housing tightness.

S5 switch with a cylindrical lock

group A1, A2 version U

Blocking when ordered



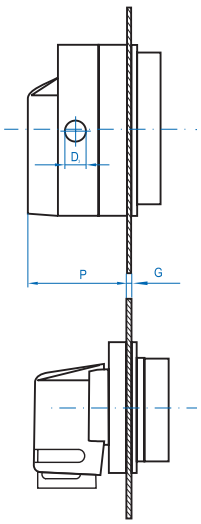


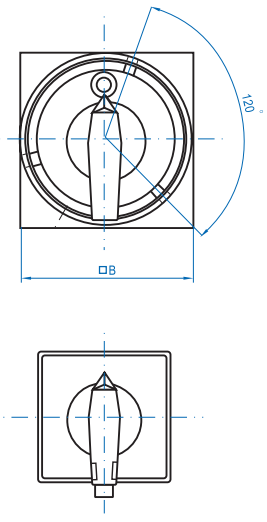
Group	D_1	D_2	D_3	A	B_1	B_2	C	E	F	H	P	L (depending on the number of the switching elements)											
							中					1	2	3	4	5	6	7	8	9	10	11	12
A0	5	14	21,5	48	65	98	6	9,5	26	48	25	72,5	86	99,5	113,5	127	140,5	154,5	169	182	195,5	209	222,5
A1	6	16	21,5	72	90	122	8	9,5	31	60	32	82,5	100,5	118,5	136,5	154,5	172,5	190,5	208,5	226,5	244,5	262,5	280,5

S6 switch with padlock blocking

group A0, A1, A2 version U

Blocking only in 0 position





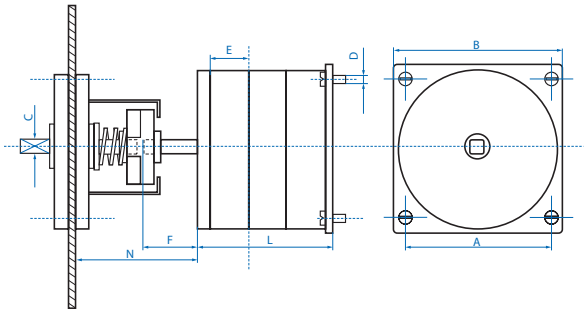
Group	P	D_3	G
A0	35	-	2÷5 mm
A1	35	Ø=7	1÷5 mm
A2	44	Ø=8	1÷5 mm

SPECIAL VERSIONS

S7 switch with a door coupling

group A1, A2 version OU

The switch is to be installed on the back wall of the housing /cubicle/. The knob with a front plate is placed on the cover or on the door. The shaft may be lengthened and sealed.



S8 switch with a door coupling and a door blocking

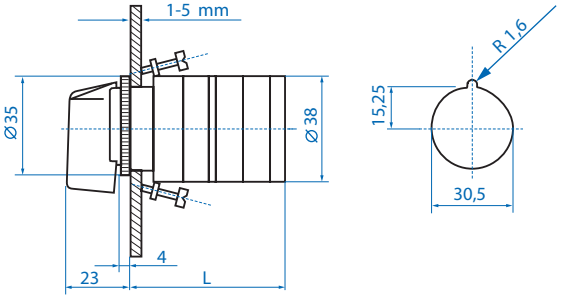
group A1, A2 version OU

The features are like for S7, but the door can be opened in a zero position, for example.

Group	D	A	B	C	E	F	N*	L (depending on the number of the switching elements)											
		⊡	⊡	⊡				1	2	3	4	5	6	7	8	9	10	11	12
A0	4	48	65	6	13,5	16,5	54	46,5	60	73,5	87,5	101	114,5	128,5	143	156	169,5	183	196,5
A1	5	72	90	8	18	17	60	56,5	74,5	95,5	110,5	128,5	146,5	164,5	182,5	200,5	218,5	236,5	254,5

S9 switch to be mounted in Ø30,5 (in control boards witch standard holes)

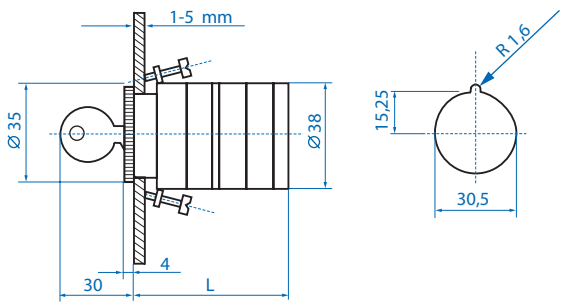
group A0 version U



S10 switch to be mounted in a Ø30,5 hole

group A0 version U

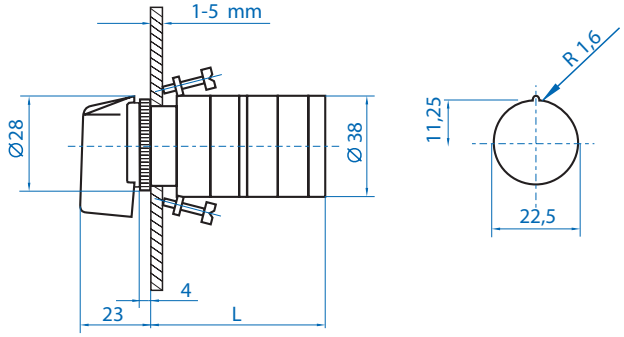
(Like for S9), the key operates as a knob. Closing in positions 3, 6, 9, 12 /like on a clock/. The key can be removed in the same positions.



SPECIAL VERSIONS

S11 switch to be mounted in a Ø22,5 hole (control boards)

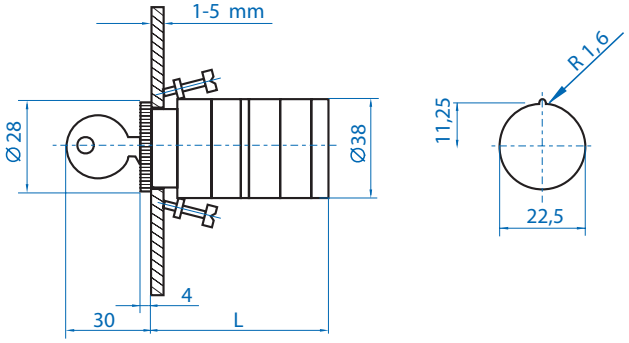
group A0 version U



S12 switch to be mounted in a Ø22,5 hole (like for S11)

group A0 version U

The key operates as a knob. Closing and removing the key in positions like for S10.



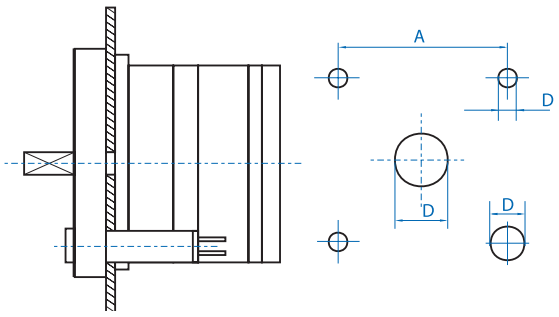
version S9, S10, S11, S12	L (dependent on the number of switching elements)											
	1	2	3	4	5	6	7	8	9	10	11	12
	47	56,5	66	75,5	85	95	104,5	114	123,5	133	143	152,5

S15 switch with a signal lamp

group A0, A1, A2 version U, OU, PK*)

*) protection class IP 52

(Standard colour – red; 220 V).

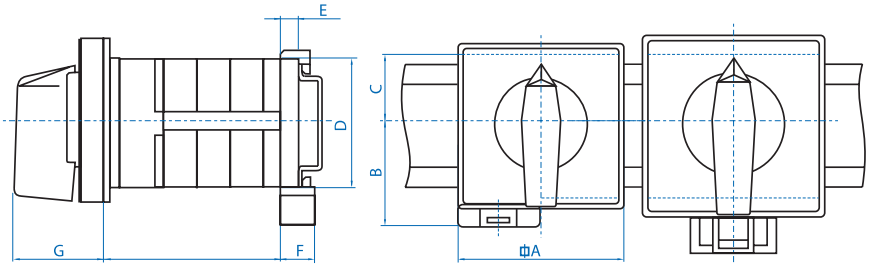


Group	A	D_1	D_2	D_3
	⊕	ø	ø	ø
A0	35	5	14	9
A1	48	5	14	9
A2	72	6	16	9

SPECIAL VERSIONS

S18 switch to be mounted on a rail according to 35 DIN EN 50022

group A0, A1, A2 version U

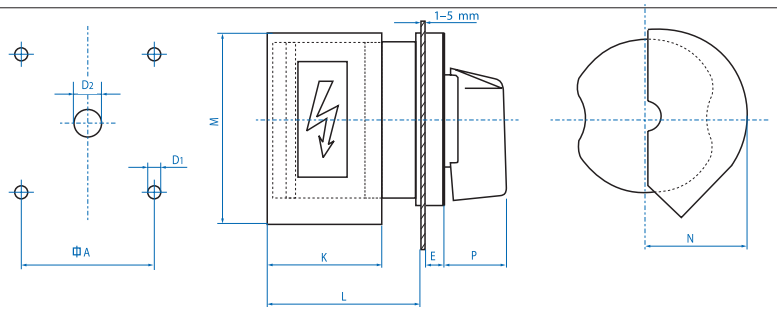


Group	A	B	C	D	E	F	G
	⌀						
A0	48	30	21	35	5	10,5	26,5
A1	65	48,5	21	35	9	15	34,5
A2	90	48,5	21	35	9	15	41,5

S19 switch with a protective housing (up to two packs)

group A1, A2 version U, OU

Protection to prevent from touching the terminals.



Group	D_1	D_2	A	E	P	K	M	N	L
	ø	ø	⌀						
A1	5	14	48	9,5	25	51	78	36	69
A2	6	16	72	9,5	32	58	99	53	78

S21 main switch disconnector according to IEC 204 and VDE 0113

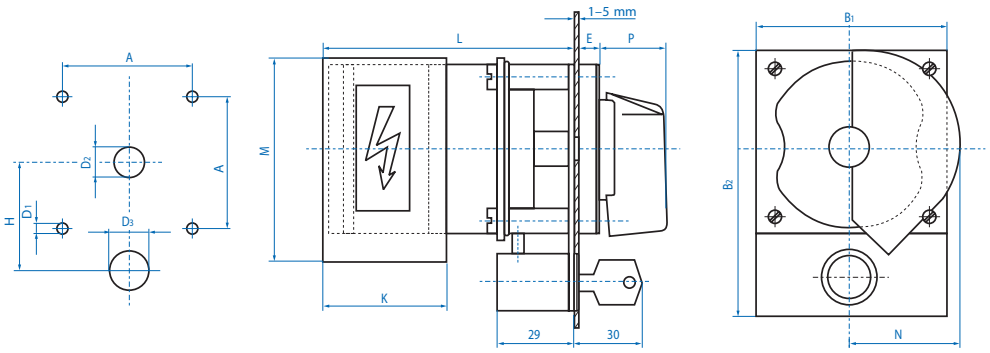
group A1, A2, A3 version U

Black knob, front plate and indicating plate, white markings. Protecting housing like in S19. Blocking lock. Blocking according to order.

S22 emergency and main switch disconnector (for two packs)

group A1, A2, A3 version U

Red knob, yellow background of an indicating plate, black markings. Protecting housing like in S19. Blocking lock. Blocking according to order.



Group	D_1	D_2	D_3	A	B_1	B_2	P	K	M	N	L	E	H
	ø	ø	ø										
A1	5	14	21,5	48	65	98	25	51	78	36	95	9,5	48
A2	6	16	21,5	72	90	122	32	58	99	53	104	9,5	60
A3	6	18	21,5	104	132	168	46,5	88	132	78	137	10	85

SPECIAL VERSIONS

S24 emergency switch disconnector according to IEC 204 and VDE 0113

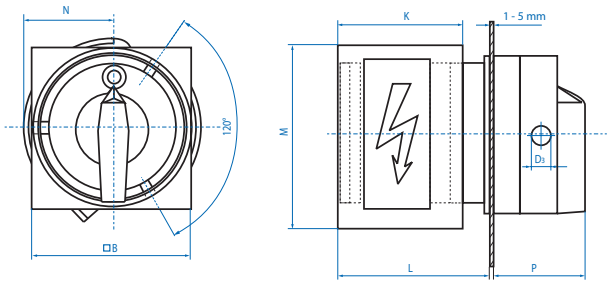
group A1, A2 version U, OU

Red knob, yellow background of an indicating plate, black markings.
The difference between standard and special versions is in different colours of a knob and a plate (red knob, yellow plate, black signs).

S25 main and emergency switch disconnector (for two packs)

group A1, A2 version U, OU

The blocking position should be specified (red knob, yellow front plate) in the order. Blocking only in 0 position.



Group	D_1	D_2	D_3	A	B	P	K	M	N	L
	ø	ø	ø	□	□					
A1	5	14	7	48	65	35	51	78	36	69
A2	6	16	8	72	90	44	58	99	53	78

S29 switch to be mounted in a Ø22,5 hole /in control boards/

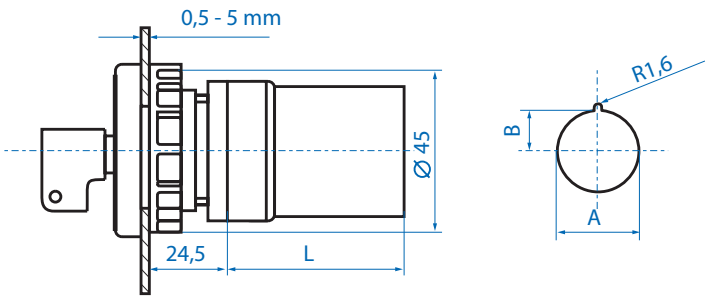
group A0 version U

The key operates as a knob. Closing in positions 3, 6, 9, 12 /like on a clock /. The key can be removed in the same positions. It is possible to remove the key in the same positions.

S22 switch to be mounted in a Ø30,5 hole with a front plate /in control boards/

group A0 version U

The key operates as a knob. Closing in positions 3, 6, 9, 12 /like on a clock/. The key can be removed in the same positions.
It is also possible to remove the key in any position.



Group	S29	S30
A	22,5	30,5
B	11,25	15,25

The number of the switching elements	1	2	3	4	5	6	7	8	8	10	11	12
L	29	38,5	48	57,5	67	77	86,5	96	105,5	115	125	134

THE CHOICE OF THE MOTOR SWITCHES

Contact life depends on loading conditions. In AC-1 usage class, where making currents and cut-off currents are the same and equal the rated current, the contact life of the switches up to 4G 63 size reaches one million of switching operations.

In more difficult operating conditions the contact life becomes lower. The diagram presented below can be used to make an approximate choice of motor switches, depending on voltage, motor power, number of switching operations per hour and usage class.

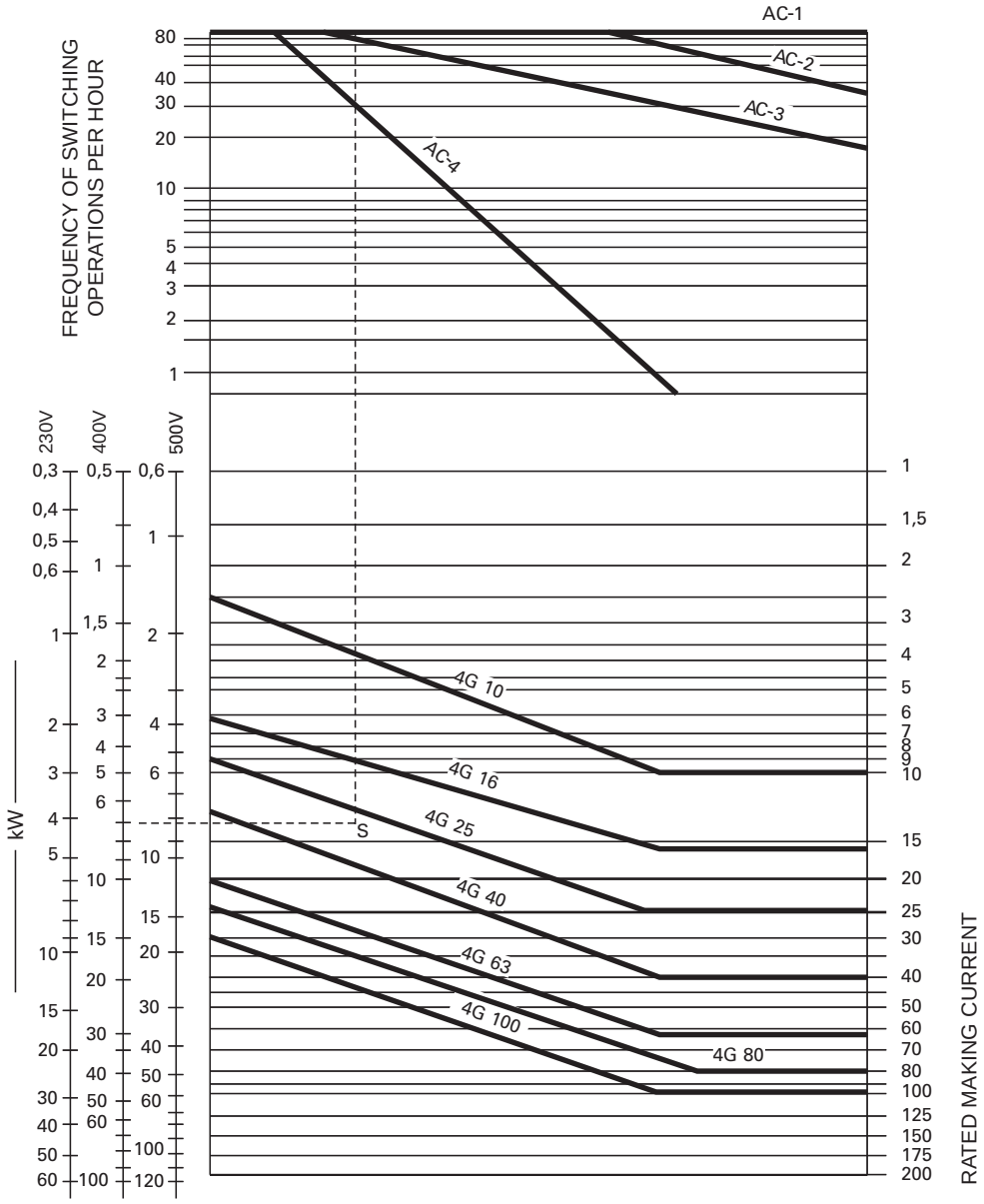


Diagram application example:

The task is to select a cam switch for direct switching and counter-current braking of a squirrel-cage motor characterized by the rated power 7 kW, 380 V and 30 switching operations per hour:

1. Category of utility: AC-4.
2. Find the number of switching operations in the diagram: 30 per hour /in the top part of the diagram/.
3. Draw a horizontal line from the point you have found from the point of intersection with relevant usage category (AC-4).
4. In the bottom part of the diagram, find the motor power (7 kW, 380 V) on the scale of proper voltage and draw a horizontal line to the right.
5. Draw a perpendicular line down from the point of intersection of the top horizontal line with the load category line (AC-4).
6. The point of intersection with the bottom horizontal line “S” lies in the area related to the switch type you are looking for (4G 40).

ORDER FORM

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Technical data

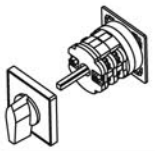
Ue.....V~

Ue.....V=

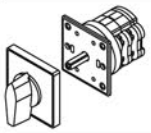
Ie.....A

Number of pices

Type of assembly



OU



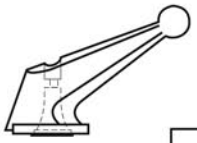
U

PK

Type and colour of a knob or a handle

Black

Red

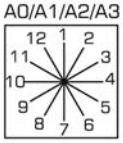


Black

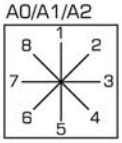
Red

Knob rotation angle

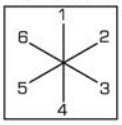
30° A0/A1/A2/A3



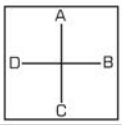
45° A0/A1/A2



60° A0/A1/A2/A3



60° A0/A1/A2/A3

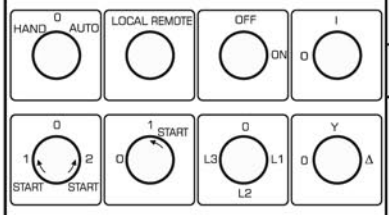


90° A0/A1/A2/A3

Special version

S1		S17	
S5		S18	
S6		S19	
S7		S21	
S8		S22	
S9		S24	
S10		S25	
S11		S29	
S12		S30	
S15			

Indicating plate description example



osition descriptions on the indicating plate, according to the angle of rotation.

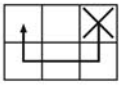
Notes:

Switching diagram:

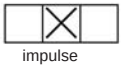
1	4	5	8	9	12	13	16	17	20	21	24	25	28	29	32	33	36	37	40	41	44	45	48
2	3	6	7	10	11	14	15	18	19	22	23	26	27	30	31	34	35	38	39	42	43	46	47

Description of the indicating plate according to customer's requirements. (to be entered in the adjacent fields)

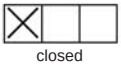
1	A	
2		
	B	
3		
4	C	
5		
	D	
6		
7		
8		
9		
10		
11		
12		



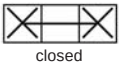
automatic return (only after turning by 30ş from the stable position)



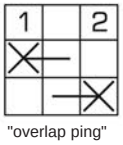
impulse instantaneous contact)



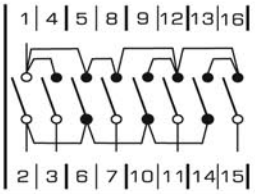
closed contact



closed contact without breaking



"overlap ping" contacts



Example of connecting the contacts with bridges

Order from (to be copied)

1/2009/3

NOTE: The manufacturer reserves the right to introduce changes without notification

The equipment is intended to be operated by the qualified staff

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ISO 9001
ISO 14001
ISO 18001