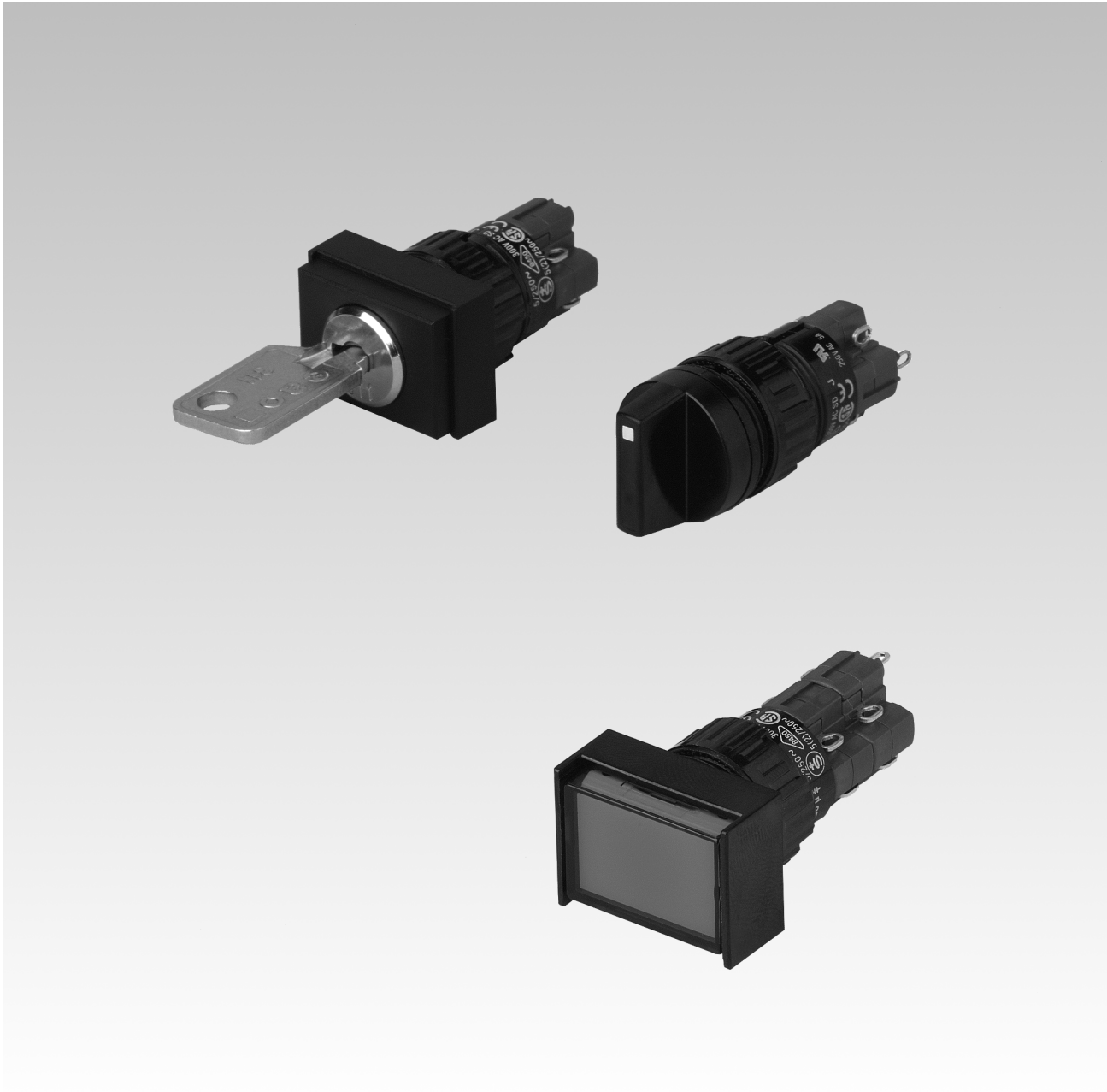




EAO Product Information

Series 51



Index

Series 51

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	Product Range	
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General Notes

The illuminated pushbuttons of series 51 with hoseproof front (IP 65) can be supplied with snap-action or low-level switching elements. They are protected against accidental operation by the extended sides of the bezel.

Besides of the standard contacts (gold-plated silver) silver contacts for switching elements 2.8 mm plug-in terminals can be supplied on request.

The front dimensions of these units are 18 x 24 mm, 18 x 18 mm or 18 mm dia.

To supplement the range of illuminated pushbuttons, we can offer a hoseproof safety keylock switch (Index K) or standard keylock switch (Index D) fitted as standard with anti-twist ring No. 51-910.

Mounting

All switch actuators are mounted from the front by pushing them through the mounting hole in the front panel. They are then fixed from the back with a fixing nut and the mounting tool typ no. 01-907. Max. tightening torque 50 Ncm. For mounting dimensions and grid size see as of page 382.

The preassembled switching element with the connecting wires in a single plane can be clipped on afterwards. For block or series mounting aids are available.

For switching elements with 2.8 mm plug-in terminals, we offer plug-in bases, which when soldered to a PCB enable a plug-in connection to the button. All actuators are provided with an anti-rotation device.

Lenses

The flat or concave lenses, made of polymethyl methacrylate, are available in various colours, as well as translucent or transparent.

Marking

For engraving, hot stamping and film inserts, see under "Marking" on page 397.

Illumination

Perfect illumination of the different coloured lenses is assured by midget-grooved lamps T 1 3/4 (6-60 V).

For below supply voltages above 60 V, it is necessary to use a voltage reduction element (external series resistor, capacitor, transformer). Do not solder the terminals directly because of the high surface temperature. Multi-LED midget-grooved lamps T 1 3/4 (6, 12, 24, 48 V) are available in the colours white, red, yellow and green.

Position Indication

When a switch with maintained action is actuated, the lens remains in the depressed position mechanically. The state of the switch is apparent at all times from the position of the lens.

Keylock switches

Standard lock

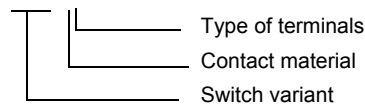
1 Standard number 311. If the lock number is not specified, we will supply No. 311. An additional 134 special locks (Index X) are available on request. Master keys for locks No. 311-445 may be ordered by quoting No. 31-989.300. Two keys are supplied with each keylock

switch.

Spare keys for DOM standard locks may be ordered by quoting No. 31-989 (please state the lock number).

Number structure

51-XXX.OXX



51-9XX.X

Lens

Example:

-Illuminated pushbutton, round,
with momentary action; silver contact;
1 switching element
51-131.025
-Lens, red
51-933.2

Specimen order

Indicator

- indicator, soldering terminal,
18 mm dia.

51-030.005

Recommended accessories:

- lens flat, blue, 18 mm dia.
- LED, 1 chip, white

51-933.6

10-2312.3139

All dimensions in mm.

We reserve the right to modify technical data.

illuminated-/pushbutton






- 1 lens
- 2 switch housing
- 3 fixing nut

indicator



- lens page 369
- filament lamp page 372
- LED page 372

	diode (1N 4007)	connection method	 18 x 24 mm Typ-Nr.	 18 x 18 mm Typ-Nr.	18 mm dia. Typ-Nr.	circuit drawing	technical drawing	mounting dimensions	component layout	
indicator	-	S	51-040.005	51-050.005	51-030.005	4	1	1		0,004
	-	-	51-040.002	51-050.002	51-030.002	1	1	1		0,004
		UT	51-041.006	51-051.006	51-031.006	1	3	1	1	0,005
	1	UT	51-701.006	51-703.006	51-741.006	2	2	1	1	0,006
	2	UT	51-702.006	51-704.006	51-742.006	3	2	1	1	0,006

connection method : soldering-/plug-in terminal = -, universal terminal = UT, soldering terminal = S

pushbuttons fitt also in mounting drawing no. 2

circuit drawings from page 382, technical drawings from page 378, mounting dimensions from page 381, component layouts from page 381




illuminated-/pushbutton



lens page 369

filament lamp page 372

LED page 372

	switching system	contacts	diode (1N 4007)	switching action	connection method	 18 x 24 mm Typ-Nr.	 18 x 18 mm Typ-Nr.	18 mm dia. Typ-Nr.	circuit drawing	technical drawing	mounting dimensions	component layout		
illuminated-/pushbutton	LL	1 NO	-	M	UT	51-425.036	51-455.036	51-435.036	15	3	1	1	0,007	
				MA	UT	51-465.036	51-485.036	51-475.036	20	3	1	1	0,007	
		1 NC	-	M	UT	51-426.036	51-456.036	51-436.036	17	3	1	1	0,007	
				MA	UT	51-466.036	51-486.036	51-476.036	22	3	1	1	0,007	
		1 NC + 1 NO	-	M	UT	51-423.036	51-453.036	51-433.036	19	3	1	1	0,007	
				MA	UT	51-463.036	51-483.036	51-473.036	24	3	1	1	0,007	
		2 NO	-	M	UT	51-421.036	51-451.036	51-431.036	16	3	1	1	0,007	
				MA	UT	51-461.036	51-481.036	51-471.036	21	3	1	1	0,007	
		2 NC	-	M	UT	51-422.036	51-452.036	51-432.036	18	3	1	1	0,007	
				MA	UT	51-462.036	51-482.036	51-472.036	23	3	1	1	0,007	
		SA	1 NC + 1 NO	-	M	S	51-121.0252	51-151.0252	51-131.0252	25	4	1		0,006
						-	51-121.022	51-151.022	51-131.022	5	4	1		0,006
					MA	S	51-261.0252	51-281.0252	51-271.0252	29	4	1		0,006
						-	51-261.022	51-281.022	51-271.022	6	4	1		0,006
	1			M	UT	51-705.0292	51-709.0292	51-743.0292	7	5	1	1	0,008	
					MA	UT	51-713.0292	51-717.0292	51-747.0292	11	5	1	1	0,008
				2	M	UT	51-706.0292	51-710.0292	51-744.0292	8	5	1	1	0,008
					MA	UT	51-714.0292	51-718.0292	51-748.0292	12	5	1	1	0,008
	2 NC + 2 NO		-	M	S	51-122.0252	51-152.0252	51-132.0252	26	4	1		0,008	
					MA	S	51-262.0252	51-282.0252	51-272.0252	30	4	1		0,008
			1	M	UT	51-707.0292	51-711.0292	51-745.0292	9	5	1		0,010	
					MA	UT	51-715.0292	51-719.0292	51-749.0292	13	5	1		0,010
			2	M	UT	51-708.0292	51-712.0292	51-746.0292	10	5	1		0,010	
					MA	UT	51-716.0292	51-720.0292	51-750.0292	14	5	1		0,010
	3 NC + 3 NO	-	M	S	51-123.0252	51-153.0252	51-133.0252	27	4	1		0,010		
				MA	S	51-263.0252	51-283.0252	51-273.0252	31	4	1		0,010	
	4 NC + 4 NO	-	M	S	51-124.0252	51-154.0252	51-134.0252	28	4	1		0,012		
				MA	S	51-264.0252	51-284.0252	51-274.0252	32	4	1		0,012	

switching system : snap-action switching element = SA, low level switching element = LL

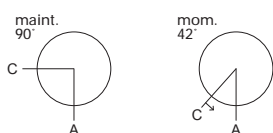
contacts : normally closed = NC, normally open = NO, 1 normally open = 1 NO, 1 normally closed = 1 NC

switching action : momentary action = M, maintained action = MA

connection method : soldering-/plug-in terminal = -, universal terminal = UT, soldering terminal = S

pushbuttons fitt also in mounting drawing no. 2

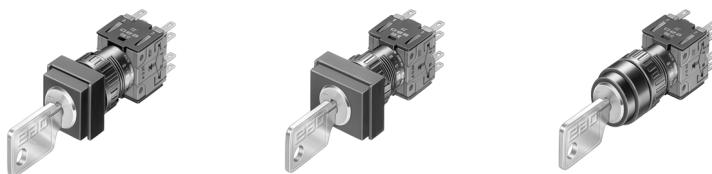
circuit drawings from page 382, technical drawings from page 378, mounting dimensions from page 381, component layouts from page 381



switching system : snap-action switching element = SA, low level switching element = LL
contacts : normally closed = NC, normally open = NO
switching action : maintained action = MA, momentary action = M
connection method : soldering-/plug-in terminal = -, universal terminal = UT, soldering terminal = S
power rating: Low Level switching element: 42 V/100 mA, snap-action switching element: 250 V/5 A
circuit drawings from page 382, technical drawings from page 378, mounting dimensions from page 381

keylock switch 3 positions

other lock numbers on request



	 maint. 90°	 mom. 42°	switching system	contacts	switching action	connection method	key removable in	 18 x 24 mm Typ-Nr.	 18 x 18 mm Typ-Nr.	18 mm dia. Typ-Nr.	circuit drawing	technical drawing	mounting dimensions	 0,025
keylock switch 3 positions position C: momentary action position A: basic position position B: momentary action standard lock 311 other lock numbers on request			snap-action switching element block	2 x 1 NC + 1 NO	M - 0 - M	-	A	51-364.022D	51-384.022D	51-374.022D	46	8	2	0,025
position C: momentary action position A: basic position position B: maintained action standard lock 311 other lock numbers on request			snap-action switching element block	2 x 1 NC + 1 NO	M - 0 - MA	-	A A+ B	51-367.022D 51-368.022D	51-387.022D 51-388.022D	51-377.022D 51-378.022D	48 48	8 8	2 2	0,025 0,025
position C: maintained action position A: basic position position B: momentary action standard lock 311, other lock numbers on request			snap-action switching element block	2 x 1 NC + 1 NO	MA - 0 - M	-	A C+ A	51-365.022D 51-366.022D	51-385.022D 51-386.022D	51-375.022D 51-376.022D	47 47	8 8	2 2	0,025 0,025
position C: maintained action position A: basic position position B: maintained action standard lock 311, other lock numbers on request			snap-action switching element block	2 x 1 NC + 1 NO	MA - 0 - MA	-	A C+ A+ B C+ B	51-361.022D 51-362.022D 51-363.022D	51-381.022D 51-382.022D 51-383.022D	51-371.022D 51-372.022D 51-373.022D	45 45 45	8 8 8	2 2 2	0,025 0,025 0,025

contacts : normally closed = NC, normally open = NO

switching action : maintained action = MA, momentary action = M






connection method : soldering-/plug-in terminal = -

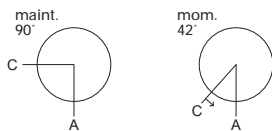
snap-action switching element block only available with plug-in terminals 2.8 x 0.5 mm and gold/silver contacts

circuit drawings from page 382, technical drawings from page 378, mounting dimensions from page 381

selector switch 2 positions



-  lever page 369
-  front bezel page 370
-  filament lamp page 372
-  LED page 372
-  anti-twisting ring page 373



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switching system : snap-action switching element = SA, low level switching element = LL

contacts : normally closed = NC, normally open = NO, 1 normally open = 1 NO, 1 normally closed = 1 NC






switching action : momentary action = M, maintained action = MA

connection method : soldering-/plug-in terminal = -, universal terminal = UT, soldering terminal = S

circuit drawings from page 382, technical drawings from page 378, mounting dimensions from page 381

selector switch 3 positions



-  lever page 369
-  front bezel page 370
-  filament lamp page 372
-  LED page 372
-  anti-twisting ring page 373

<div> <div> <div>maint. 90°</div> <div>C</div> <div>A</div> <div>B</div> </div> <div> <div>mom. 42°</div> <div>C</div> <div>A</div> <div>B</div> </div> </div>	switching system	contacts	switching action	connection method	18 mm dia. Typ-Nr.	circuit drawing	technical drawing	mounting dimensions	
selector switch 3 positions illuminable, position C: momentary action position A: basic position position B: momentary action	snap-action switching element block	2 x 1 NC + 1 NO	M - 0 - M	-	52-572.022A	78	12	2	0,015
illuminable, position C: momentary action position A: basic position position B: maintained action	snap-action switching element block	2 x 1 NC + 1 NO	M- 0 - MA	-	52-574.022A	80	12	2	0,015
illuminable, position C: maintained action position A: basic position position B: momentary action	snap-action switching element block	2 x 1 NC + 1 NO	MA - 0 - M	-	52-573.022A	79	12	2	0,015
illuminable, position C: maintained action position A: basic position position B: maintained action	snap-action switching element block	2 x 1 NC + 1 NO	MA - 0 - MA	-	52-571.022A	77	12	2	0,015

contacts : normally closed = NC, normally open = NO

switching action

connection method : soldering-/plug-in terminal = -

circuit drawings from page 382, technical drawings from page 378, mounting dimensions from page 381

at front

lens

	shape	lens/support	colour	18 x 24 mm Typ-Nr.	18 x 18 mm Typ-Nr.	18 mm dia. Typ-Nr.	kg
lens of plastic	flat	transparent/trans- lucent	blue	51-903.6	51-953.6	51-933.6	0,001
			colourless, clear	51-903.7	51-953.7	51-933.7	0,001
			yellow	51-903.4	51-953.4	51-933.4	0,001
			green	51-903.5	51-953.5	51-933.5	0,001
			orange	51-903.3	51-953.3	51-933.3	0,001
			smoked	51-903.1	51-953.1	51-933.1	0,001
	concave	transparent/trans- lucent	red	51-903.2	51-953.2	51-933.2	0,001
			blue	51-904.6	51-954.6		0,001
			colourless, clear	51-904.7	51-954.7		0,001
			yellow	51-904.4	51-954.4		0,001
			green	51-904.5	51-954.5		0,001
			orange	51-904.3	51-954.3		0,001
			red	51-904.2	51-954.2		0,001
of plastic (not recommen- ded for film insert)	flat	transparent/trans- parent	colourless, clear	51-905.7	51-955.7	51-935.7	0,001
			yellow	51-905.4	51-955.4	51-935.4	0,001
			green	51-905.5	51-955.5	51-935.5	0,001
			red	51-905.2	51-955.2	51-935.2	0,001
	concave	transparent/trans- parent	colourless, clear	51-906.7	51-956.7		0,001
			yellow	51-906.4	51-956.4		0,001
			green	51-906.5	51-956.5		0,001
			red	51-906.2	51-956.2		0,001
of plastic (not for film insert and illumination)	flat	opaque/translu- cent	grey	51-901.8	51-951.8	51-931.8	0,001
			black	51-901.0	51-951.0	51-931.0	0,001
	concave	opaque/translu- cent	grey	51-902.8	51-952.8		0,001
			black	51-902.0	51-952.0		0,001
of plastic (not for film insert and LED)	flat	translucent/trans- lucent	blue	51-901.6	51-951.6	51-931.6	0,001
			yellow	51-901.4	51-951.4	51-931.4	0,001
			green	51-901.5	51-951.5	51-931.5	0,001
			orange	51-901.3	51-951.3	51-931.3	0,001
			red	51-901.2	51-951.2	51-931.2	0,001
			white	51-901.9	51-951.9	51-931.9	0,001
	concave	translucent/trans- lucent	blue	51-902.6	51-952.6		0,001
			yellow	51-902.4	51-952.4		0,001
			green	51-902.5	51-952.5		0,001
			orange	51-902.3	51-952.3		0,001
			red	51-902.2	51-952.2		0,001
			white	51-902.9	51-952.9		0,001



lever

lever	colour	colour of bar	part no.	kg
	grey	blue	52-929.60	0,001
		yellow	52-929.40	0,001
		grey, opaque	52-929.8	0,001
		green	52-929.50	0,001
		orange	52-929.30	0,001
		red	52-929.20	0,003
		white, translucent	52-929.9	0,001
	black	blue	52-928.60	0,001
		yellow	52-928.40	0,001
		green	52-928.50	0,001
		orange	52-928.30	0,001
		red	52-928.20	0,001
		black, opaque	52-928.0	0,001



front bezel

for selector switch square front

	material	colour	24 x 24 mm Typ-Nr.	26 x 26 mm Typ-Nr.	
front bezel	plastic	black	52-950.0	52-952.0	0,001



legend plate

		24.9 x 23.8 mm Typ-Nr.	
legend plate aluminium adhesive		31-998	0,001



protective cover

	front dimension pushbutton	part no.	technical drawing	
protective cover hinged, transparent, with means for sealing	18 x 18 mm	51-920	13	0,002
	18 x 24 mm	51-925	14	0,002



technical drawings from page 378

blind plug

	colour	18 x 24 mm Typ-Nr.	18 x 18 mm Typ-Nr.	18 mm dia. Typ-Nr.	mounting dimensions	
blind plug	black	51-947.0	51-948.0	51-949.0	1	0,003



blind plugs fitt also in mounting drawing no. 2
mounting dimensions from page 381

plug socket


	colour	mounting dimensions	weight (kg)	photo	86 x 86 mm Typ-Nr.

master key

	part no.	
master key for lock numbers 311-445	31-989.300	0,006




spare key

	part no.	
spare key for standard lock 311, other lock numbers on request	31-989.311	0,006




EMC key protection cap

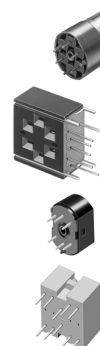
	part no.	
EMC key protection cap plastic black, for lock type DOM	31-985.0	0,005



at back


PCB plug-in base

	for	pin orientation	part no.	component layout	
PCB plug-in base 17.9 x 8.4 mm high	Low Level switching element With the extendable mounting the distance between PCB plug-in base and PCB can be varied up to 3 mm.	right-angled	31-941	3	0,004
18.0 x 11.2 mm high	snap-action switching element block	axial	51-942	5	0,005
16.4 mm dia. x 9.8 mm high	low level switching element	axial	31-940	2	0,002
17.8 mm dia. x 9.8 mm high	snap-action switching element 2.8 mm	axial	31-942	4	0,002




component layouts from page 381

multi-plug housing

	part no.	
multi-plug housing for switching block	51-943.0	0,005




cable shoe

	connection method	part no.	
cable shoe	plug-in terminal 2.8 x 0.5 mm	31-946	0,001
	plug-in terminal 2.8 x 0.5 mm for multi-plug housing	51-943.1	0,001
	universal terminal 2.0 x 0.5 mm	31-945	0,001



insulation socket

	part no.	
insulation socket for snap-action switching element, to cover the plug-in terminals 2.8 x 0.5 mm	01-928	0,001
for connector 31-945	31-928	0,001
for connector 31-946	31-929	0,001



terminal cover

for switching element

	part no.	kg
terminal cover	01-929	0,010



for illumination

Filament lamp

	voltage/current	part no.	kg
Filament lamp base MG T 1 3/4	6 VAC/VDC/125 mA	10-1306.1349	0,001
	6.3 VAC/VDC/200 mA	10-1307.1369	0,001
	12 VAC/VDC/75 mA	10-1309.1309	0,001
	14 VAC/VDC/80 mA	10-1310.1319	0,001
	18 VAC/VDC/40 mA	10-1311.1249	0,001
	24 VAC/VDC/35 mA	10-1312.1229	0,001
	28 VAC/VDC/30 mA	10-1313.1209	0,001
	28 VAC/VDC/40 mA	10-1313.1249	0,001
	36 VAC/VDC/20 mA	10-1316.1179	0,001
	36 VAC/VDC/30 mA	10-1316.1209	0,001
	48 VAC/VDC/20 mA	10-1319.1179	0,001
	48 VAC/VDC/25 mA	10-1319.1199	0,001



LED


	number of chips	voltage/current	colour	part no.	kg
LED base MG T 1 3/4	1 chip	24 VDC/14 mA	white	10-2312.3139	0,001
		28 VDC/14 mA	white	10-2313.3139	0,001
	6 chips	6 VDC/45 mA	yellow	10-5306.3254	0,001
			green	10-5306.3255	0,001
			red	10-5306.3252	0,001
		12 VDC/30 mA	yellow	10-5309.3204	0,001
			green	10-5309.3205	0,001
			red	10-5309.3202	0,001
		24 VAC/DC/12.5 mA	yellow	10-5312.1114	0,001
			green	10-5312.1115	0,001
			red	10-5312.1112	0,001
		24 VDC/14 mA	yellow	10-5312.3134	0,001
			green	10-5312.3135	0,001
			red	10-5312.3132	0,001
		28 VAC/DC/12.5 mA	yellow	10-5313.1114	0,001
			green	10-5313.1115	0,001
			red	10-5313.1112	0,001
		28 VDC/14 mA	yellow	10-5313.3134	0,001
			green	10-5313.3135	0,001
			red	10-5313.3132	0,001
		48 VDC/12 mA	yellow	10-5319.3104	0,001
			green	10-5319.3105	0,001
			red	10-5319.3102	0,001



Note:
For optimal illumination we strongly recommend using our new single-chip LEDs.


For new designs, only the new single-chip LEDs should be chosen. They can be found on page 669.

Continued on next page

	number of chips	voltage/current	colour	part no.	
LED base MG T 1 3/4 Note: For optimal illumination we strongly recommend using our new single-chip LEDs. For new designs, only the new single-chip LEDs should be chosen. They can be found on page 669.	8 chips	6 VDC/48 mA	yellow	10-6306.3264	0,001
			green	10-6306.3265	0,001
			red	10-6306.3262	0,001
		12 VDC/24 mA	yellow	10-6309.3184	0,001
			green	10-6309.3185	0,001
			red	10-6309.3182	0,001
		24 VDC/12 mA	yellow	10-6312.3104	0,001
			green	10-6312.3105	0,001
			red	10-6312.3102	0,001
		28 VDC/12 mA	yellow	10-6313.3104	0,001
			green	10-6313.3105	0,001
			red	10-6313.3102	0,001

capacitor

for lamp voltage reduction


	value	part no.	
capacitor use with 60 VAC/20 mA, 50 Hz lamp voltage	230 VAC/0.27 µF	02-917.0	0,004



Please keep to the country specific security rules.

series resistor

for lamp voltage reduction


	value	part no.	
series resistor use with 60 VAC/20 mA lamp rating	110 V/2.7 kΩ	02-904.0	0,003
	125 V/3.3 kΩ	02-904.1	0,003
	145 V/4.7 kΩ	02-904.3	0,003
	230-240 V/10 kΩ	02-904.7	0,003

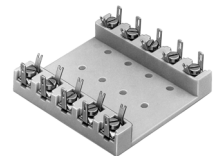


Please keep to the country specific security rules.

terminal plate empty

for fitting with series resistors and capacitors

	no. of spaces	part no.	
terminal plate empty	5 spaces	02-912.1	0,025
	10 spaces	02-912.2	0,045
	15 spaces	02-912.3	0,090
	20 spaces	02-912.4	0,095



Please keep to the country specific security rules.

assembling


fixing nut

specifically for keylock switches

	part no.	
fixing nut metallic	31-991	0,005




anti-twisting ring

	part no.	
anti-twisting ring for key- and selector switch	51-910	0,002




lens remover

	part no.	
lens remover	02-905	0,011



lamp/LED remover

	part no.	
lamp/LED remover	61-9740.0	0,002




CAUTION

A switching process might be released when replacing the lamp/LED!

for illumination

dismantling tool

	part no.	
dismantling tool for lens, lens holder and switching element block	51-938	0,027




assembling

mounting tool

	part no.	
mounting tool for tightening (or loosening) fixing nuts	01-907	0,020



cable shoe remover

	part no.	
cable shoe remover for removing the connector from the multi-plug housing	51-943.9	0,001



actuator with snap-action switching element

switching system

switching system

self-cleaning, double-break, snap action switching system. (with contact gap 2 x 0.5 mm).
1 normally closed or 1 normally open contact per element.
snap-action switching elements with soldering terminals at the sides: up to 4 switching element can be on a pushbutton (max. 4 normally closed and 4 normally open contacts).
snap-action switching element with axial plug-in terminals 2.8 mm stackable, only 1 switching element can be on a pushbutton.

material

material of contacts

gold-plated silver

switching element

axial plug-in-/soldering terminal 2.8 mm:
diallyl phthalate DAP, polyamide 66, polysulfone, heat-resistant and self-extinguishing

soldering terminal: PA 6.6 Ultramid

actuator case

polyetherimide, self-extinguishing

mechanical characteristics

connection method

snap-action switching element with tinned soldering terminals at the sides:
max. wire diameter: 2 wires à 1.2 mm
max. wire cross-section of stranded cable: 1 x 1 mm²

snap-action switching element with axial plug-in terminals, which can also be used as soldering terminals:
plug-in terminal: 2.8 x 0.5 mm

soldering terminal:

max. wire diameter: 2 wires of 1 mm;
max. wire cross-section of stranded cable: 2 of 0.75 mm² or 1 x 1.0 mm²

actuating torque

measured at the key or lever of the keylock- or selector switch: 2.5-5.5 Ncm

actuating force

4-6 N, depending on the number of switching elements

actuating travel

illuminated pushbutton: 3 mm

keylock-/selector switch actuators with 2 positions:

1x ca. 42° deflection momentary action

1x ca. 90° deflection maintained action

resistance to climate

standard condition as per IEC 68-2-3 and 2-30
changing condition as per IEC 68-2-14 and 2-33

storage temperature

-40°C to + 85°C
(as per DIN IEC 68-)

mechanical life

momentary action
maintained action
keylock switch

2 million cycles of operation
1 million cycles of operation
50.000 cycles of operation

rebound time

≤ 5ms

resistance to shock

(single impacts, semi-sinusoidal)
15 g for 11 ms as per IEC 512-4-3, IEC 68-2-27

degree of protection

front as per IEC 529: IP 65

resistance to vibration

(sinusoidal)
10 g at 10-2000 Hz, amplitude 1.5 mm as per IEC 512-4-4, IEC 68-2-6

ambient air temperature

-25°C to + 55°C
for indicators and illuminated pushbuttons mounted as a block , make sure the heat can escape freely
(as per DIN IEC 68-)

electrical characteristics

rated voltage

250 VAC/VDC

rated current

5 A

contact resistance

starting value (initial) ≤ 50 mΩ

electrostatic breakdown value

≤ 15 KV (keylock switch)

continuous thermal current I_{th2}

5 A

The maximum current in continuous operation and at ambient temperature not exceeding the quoted maximum values.

switch rating

250 VAC/5 A (cos φ 1)
250 VAC/3 A (cos φ 0.3)

switch rating AC, cos φ 0.7:

voltage	125 V	250 V
current	3 A	2 A

switch rating DC (inductive), L:R = 30 ms

voltage	24 V	60 V	110 V	220 V
current	2 A	0.7 A	0.2 A	0.1 A

protection class

II

electric strength

2500 VAC, 50 Hz, 1 min. between all terminals and earth, as per IEC 512-2-11.

rules

rules

IEC 1058 EN 61 058

approvals

approvals

- CSA 300 VAC
- UL
- CB
- ENEC
- German Lloyd
- CE (declaration of conformity)

actuator with snap-action switching element block (keylock-/selector switch 3 positions)

switching system

switching system

self-cleaning, double-break, snap action switching system
1 normally closed or 1 normally open contact per element.

material

material of contacts

gold-plated hardsilver

switching element

diallyl phthalate DAP, heat-resistant and self-extinguishing

actuator case

polyetherimide, self-extinguishing

mechanical characteristics

connection method

Plug-in terminals which can also be used as soldering terminals.
plug-in terminal: 2.8 x 0.5 mm

soldering terminal:

max. wire diameter: 2 wires of 1 mm
max. wire cross-section of stranded cable: 2 x 0.75 mm²

actuating torque

measured at the key or lever of the keylock- or selector switch: 2.5-5.5 Ncm

actuating travel

keylock-/selector switch actuators with 3 positions
2x ca. 42° deflection momentary action
2x ca. 90° deflection maintained action

storage temperature

-40°C to + 85°C
(as per DIN IEC 68-)

mechanical life

keylock switch	50.000 cycles of operation
selector switch	100.000 cycles of operation

rebound time

≤ 5ms

degree of protection

front as per IEC 529: IP 65 keylock switch
IP 40 selector switch

ambient air temperature

-25 °C to + 55 °C
for selector switches mounted as a block, make sure the heat can escape freely
(as per DIN IEC 68-)

electrical characteristics

electrostatic breakdown value

≤ 15 KV (keylock switch)

continuous thermal current I_{th2}

5 A

The maximum current in continuous operation and at ambient temperature not exceeding the quoted maximum values.

switch rating

250 VAC, 5 A (cos φ 0.75)

protection class

II

electric strength

2500 VAC, 50 Hz, 1 min. between all terminals and earth, as per IEC 512-2-11.

approvals

approvals

- CSA 250 VAC, 6 A
- UL
- CB
- ENEC
- German Lloyd
- CE (declaration of conformity)

actuator with Low Level switching element

switching system

switching system

This low level switching element was designed for switching low powers in electronic circuits. The mechanism assures reliable switching of loads ranging from a few μA/μV up to 100 mA/42 VAC/VDC.

Single-break momentary contact, as normally open or normally closed with 4 independent points of contact. 2 momentary contacts per switching element; combination of normally open and normally closed is possible.

Special features are the long life, extremely short rebound time and stable contact resistance.

material

material of contacts

gold-plated

switching element

polysulfone, heat-resistant and self-extinguishing

actuator case

polyetherimide, self-extinguishing

mechanical characteristics

connection method

The universal terminals permit these units to be mounted on printed circuit boards (PCB). These terminals can also be used as soldering or plug-in terminals.

For these terminals we can also supply a plug-in base which, when soldered on to the board, enables the switch to be plugged in.

soldering terminal:

max. wire diameter: 2 wires à 0.8 mm
max. wire cross-section of stranded cable: 1x 0.75 mm²

plug-in terminal:
2.0 x 0.5 mm

actuating torque

measured at the key or lever of the keylock- or selector switch: 2.5-5.5 Ncm

actuating force

3-3.5 N

actuating travel

illuminated pushbutton: 3 mm

keylock-/selector switch actuators with 2 positions:

1x ca. 42° deflection momentary action

1x ca. 90° deflection maintained action

storage temperature

-40°C to + 85°C

(as per DIN IEC 68-)

mechanical life

momentary action

5 million cycles of operation

maintained action

1 million cycles of operation

keylock switch

50.000 cycles of operation

rebound time

type. < 100 µs

resistance to shock

(single impacts, semi-sinusoidal)

15 g for 11 ms as per IEC 512-4-3, IEC 68-2-27

degree of protection

front as per IEC 529: IP 65

ambient air temperature

-25°C to + 55°C

for indicators and illuminated pushbuttons mounted as a block ,

make sure the heat can escape freely

(as per DIN IEC 68-)

electrical characteristics

contact resistance

starting value (initial) <= 50 mΩ

electrostatic breakdown value

<= 15 KV (keylock switch)

switch rating

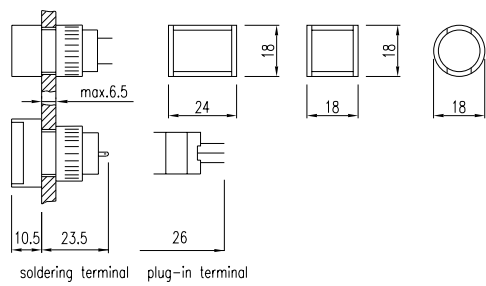
10 µA/100 µV to 100 mA at 42 VAC/VDC

electric strength

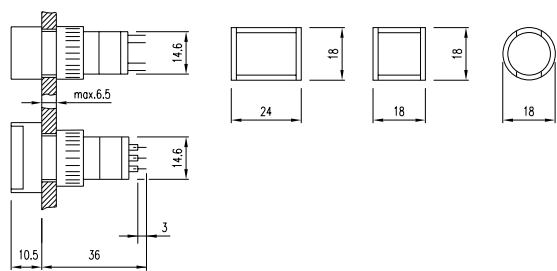
2500 VAC, 50 Hz, 1 min. between all terminals and earth, as per IEC 512-2-11.

technical drawings

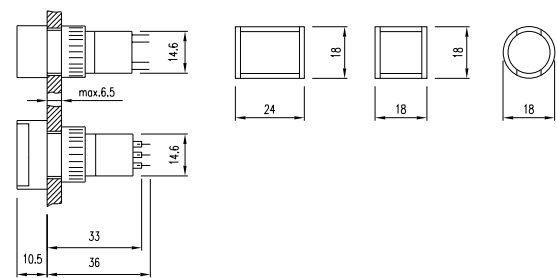
1 indicator
page 363



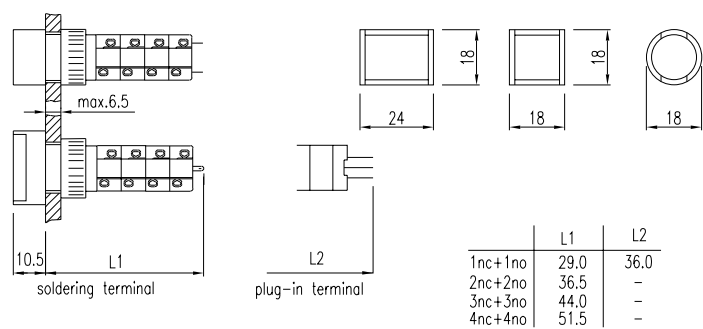
2 indicator
page 363



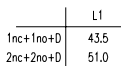
3 indicator, illuminated-/pushbutton
page 363, 364



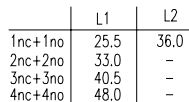
4 illuminated-/pushbutton
page 364



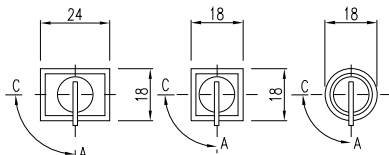
page 364



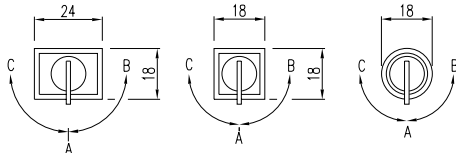
page 365



page 365

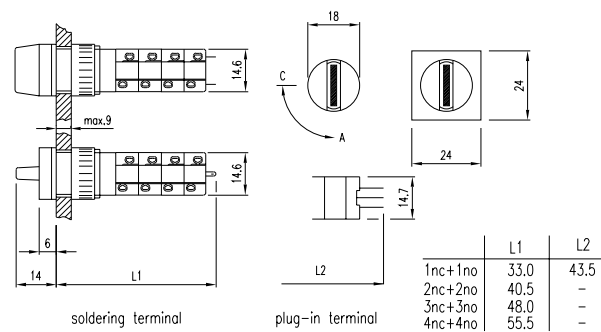


page 366



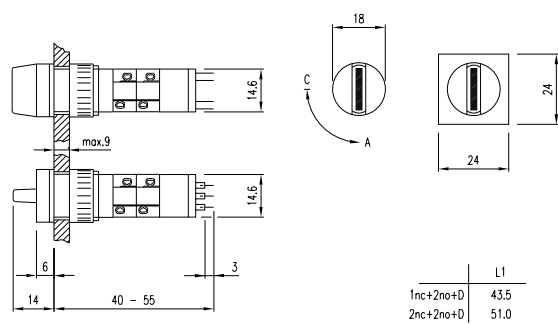
9 selector switch 2 positions

page 367



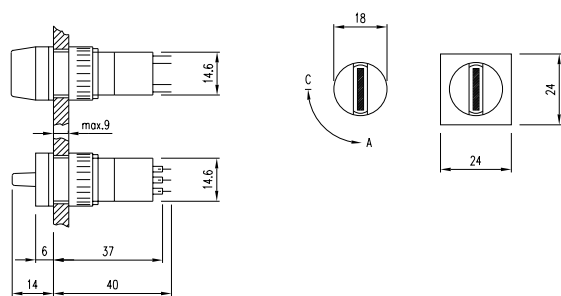
10 selector switch 2 positions

page 367



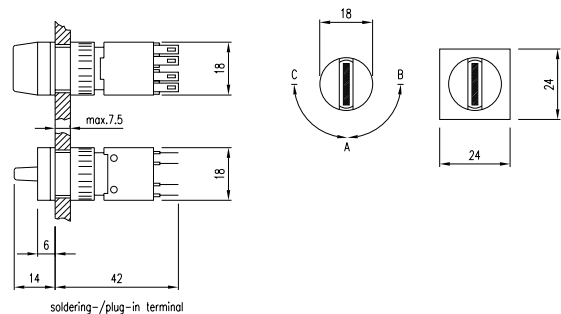
11 selector switch 2 positions

page 367

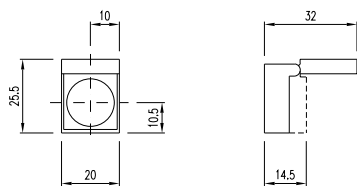


12 selector switch 3 positions

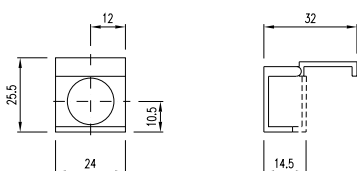
page 368



13 protective cover page 370

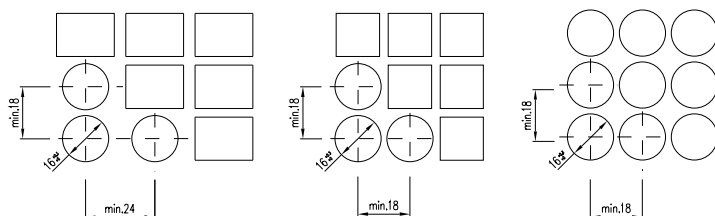


14 protective cover page 370

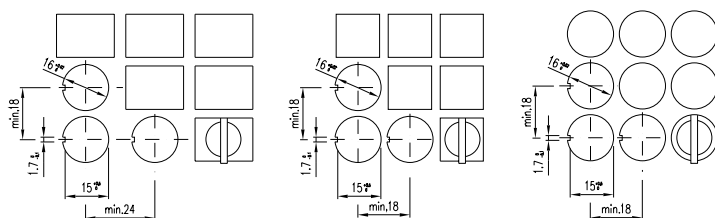


mounting dimensions

1 indicator, illuminated-/pushbutton, blind plug page 363, 364, 370

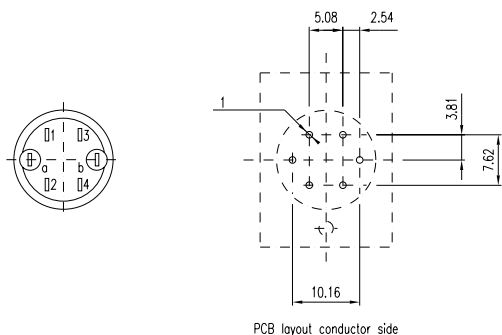


2 keylock switch 2 positions, keylock switch 3 positions, selector switch 2 positions, selector switch 3 positions page 365, 366, 367, 368



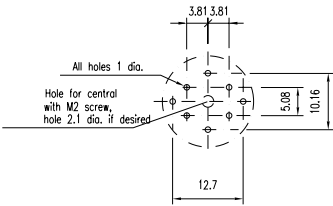
component layouts

1 indicator, illuminated-/pushbutton page 363, 364



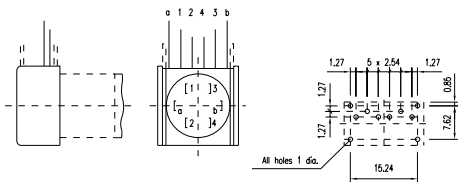
2 PCB plug-in base

page 371



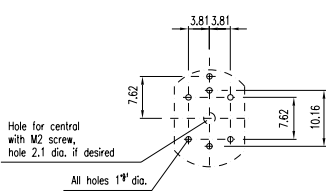
3 PCB plug-in base

page 371



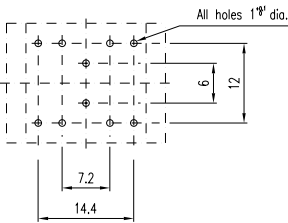
4 PCB plug-in base

page 371



5 PCB plug-in base

page 371



circuit drawings

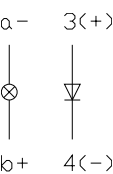
1 indicator

page 363



2 indicator

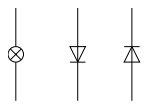
page 363



3 indicator

page 363

a- 3(+)1(-)



b+ 4(-)2(+)

4 indicator

page 363

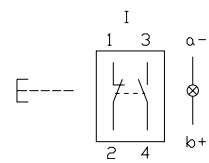
x1-



x2+

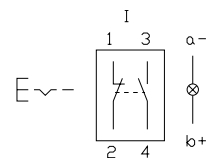
5 illuminated-/pushbutton

page 364



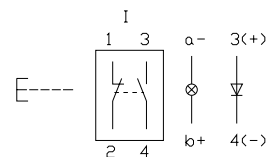
6 illuminated-/pushbutton

page 364



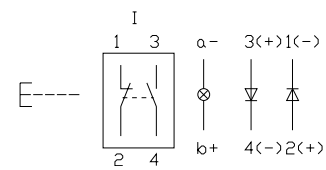
7 illuminated-/pushbutton

page 364



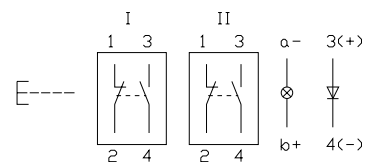
8 illuminated-/pushbutton

page 364



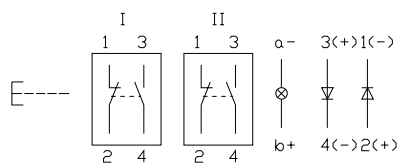
9 illuminated-/pushbutton

page 364



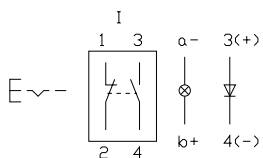
10 illuminated-/pushbutton

page 364



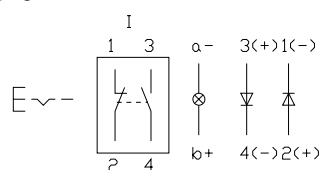
11 illuminated-/pushbutton

page 364



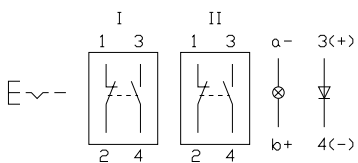
12 illuminated-/pushbutton

page 364



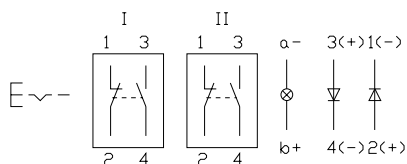
13 illuminated-/pushbutton

page 364



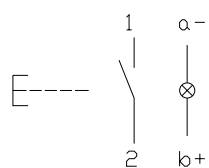
14 illuminated-/pushbutton

page 364



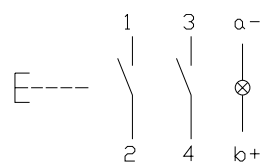
15 illuminated-/pushbutton

page 364



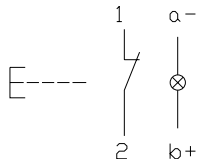
16 illuminated-/pushbutton

page 364



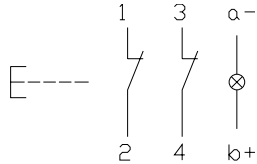
17 illuminated-/pushbutton

page 364



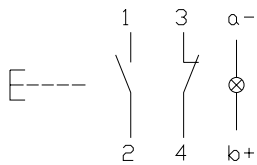
18 illuminated-/pushbutton

page 364



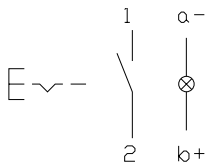
19 illuminated-/pushbutton

page 364



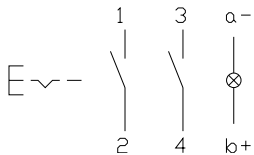
20 illuminated-/pushbutton

page 364



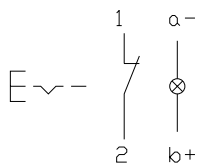
21 illuminated-/pushbutton

page 364



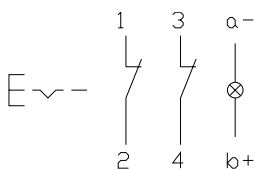
22 illuminated-/pushbutton

page 364



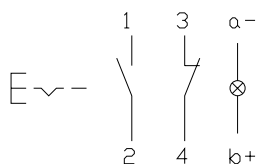
23 illuminated-/pushbutton

page 364



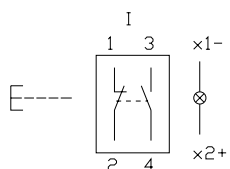
24 illuminated-/pushbutton

page 364



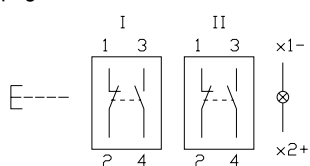
25 illuminated-/pushbutton

page 364



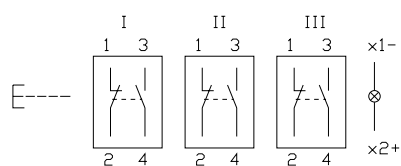
26 illuminated-/pushbutton

page 364



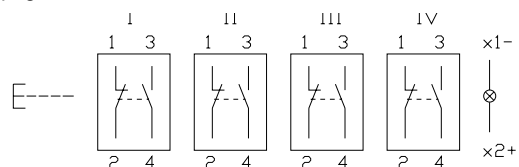
27 illuminated-/pushbutton

page 364



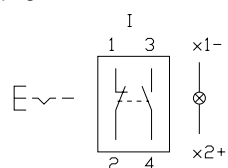
28 illuminated-/pushbutton

page 364



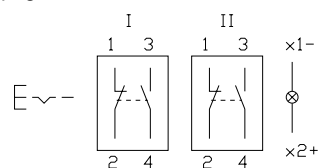
29 illuminated-/pushbutton

page 364



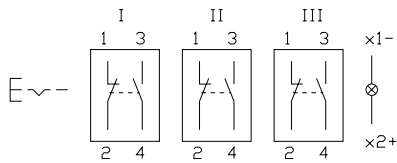
30 illuminated-/pushbutton

page 364



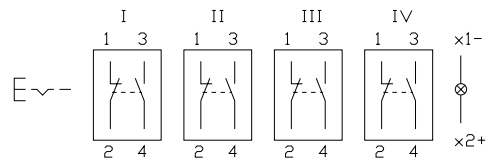
31 illuminated-/pushbutton

page 364



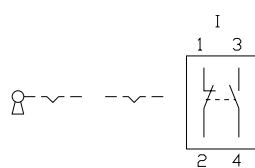
32 illuminated-/pushbutton

page 364



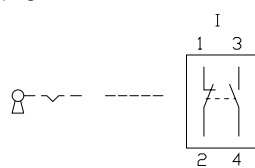
33 keylock switch 2 positions

page 365



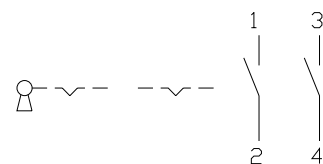
34 keylock switch 2 positions

page 365



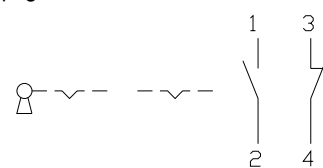
35 keylock switch 2 positions

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36 keylock switch 2 positions

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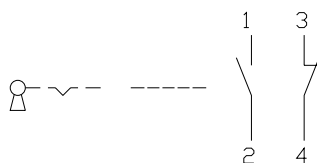
37 keylock switch 2 positions

page 365



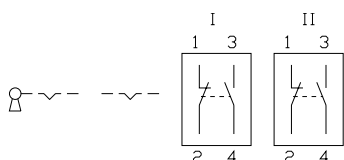
38 keylock switch 2 positions

page 365



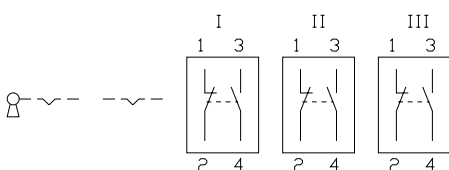
39 keylock switch 2 positions

page 365



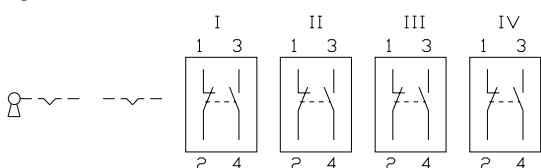
40 keylock switch 2 positions

page 365



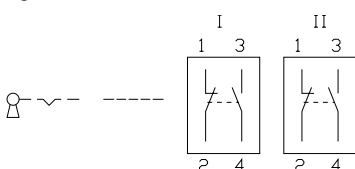
41 keylock switch 2 positions

page 365



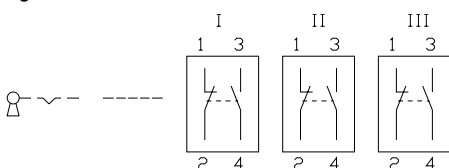
42 keylock switch 2 positions

page 365



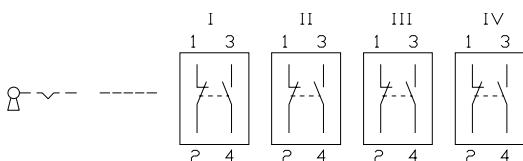
43 keylock switch 2 positions

page 365



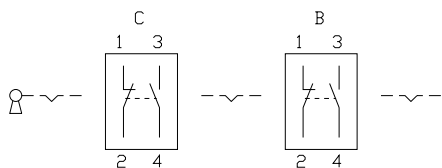
44 keylock switch 2 positions

page 365



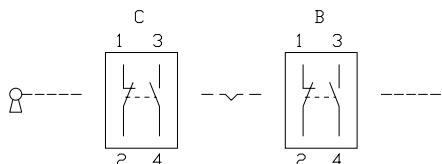
45 keylock switch 3 positions

page 366



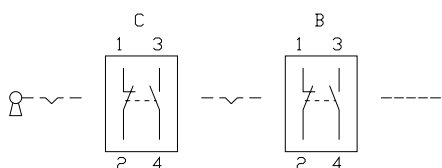
46 keylock switch 3 positions

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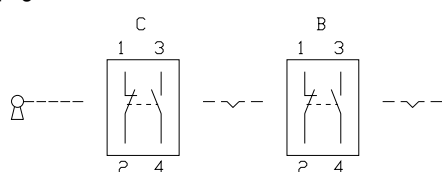
47 keylock switch 3 positions

page 366



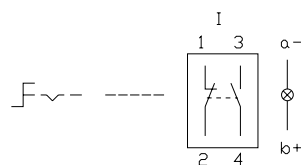
48 keylock switch 3 positions

page 366



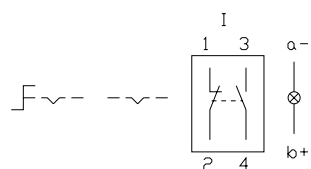
49 selector switch 2 positions

page 367



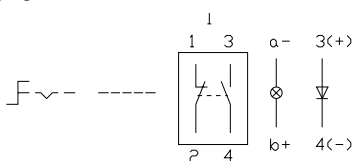
50 selector switch 2 positions

page 367



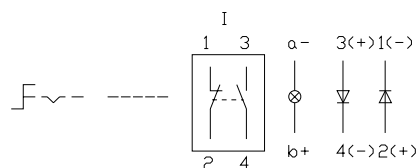
51 selector switch 2 positions

page 367



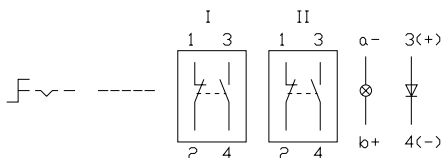
52 selector switch 2 positions

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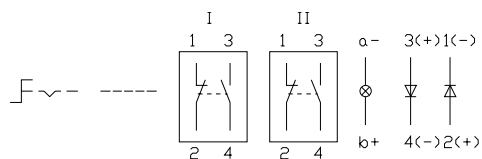
53 selector switch 2 positions

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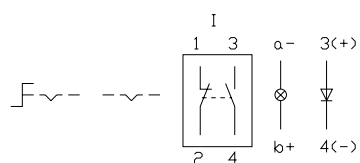
54 selector switch 2 positions

page 367



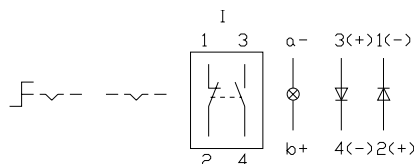
55 selector switch 2 positions

page 367



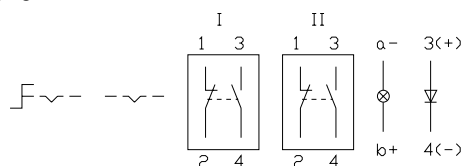
56 selector switch 2 positions

page 367



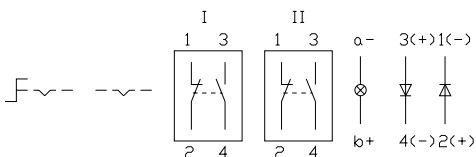
57 selector switch 2 positions

page 367



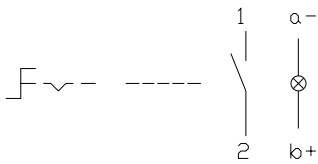
58 selector switch 2 positions

page 367



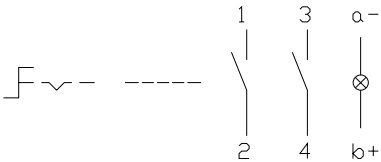
59 selector switch 2 positions

page 367



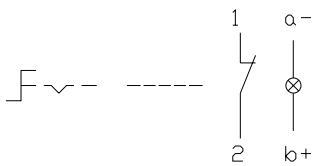
60 selector switch 2 positions

page 367



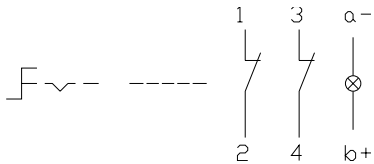
61 selector switch 2 positions

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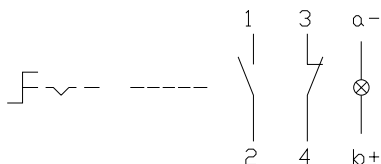
62 selector switch 2 positions

page 367



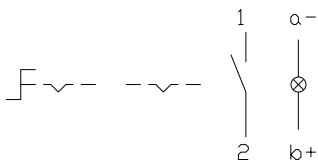
63 selector switch 2 positions

page 367



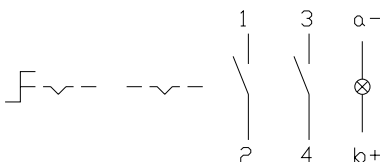
64 selector switch 2 positions

page 367



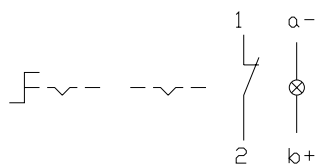
65 selector switch 2 positions

page 367



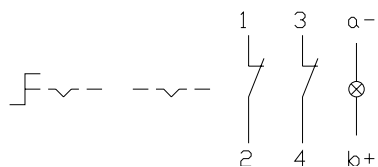
66 selector switch 2 positions

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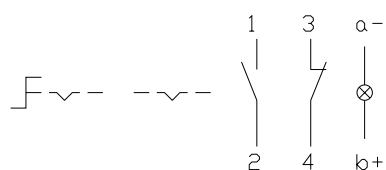
67 selector switch 2 positions

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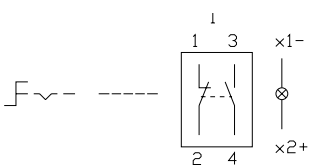
68 selector switch 2 positions

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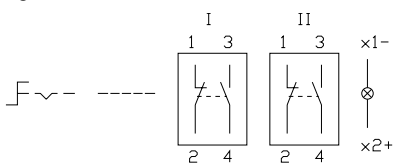
69 selector switch 2 positions

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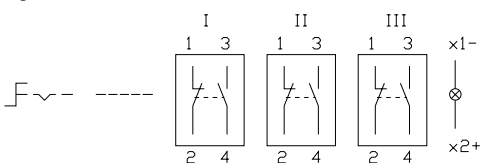
70 selector switch 2 positions

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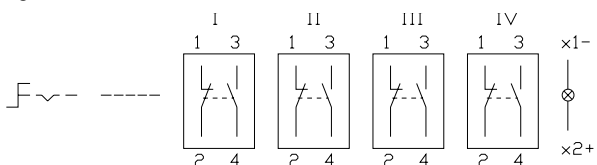
71 selector switch 2 positions

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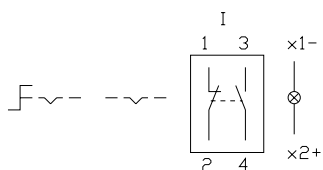
72 selector switch 2 positions

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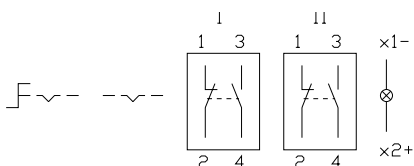
73 selector switch 2 positions

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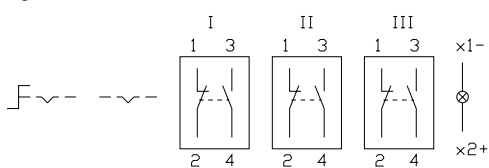
74 selector switch 2 positions

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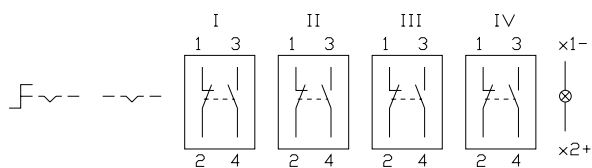
75 selector switch 2 positions

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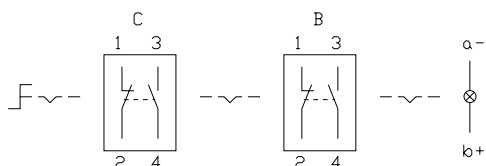
76 selector switch 2 positions

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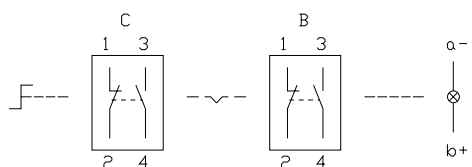
77 selector switch 3 positions

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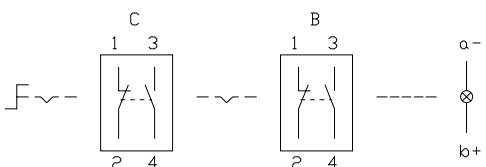
78 selector switch 3 positions

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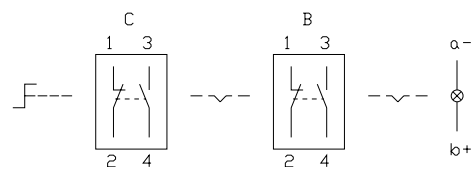


79 selector switch 3 positions

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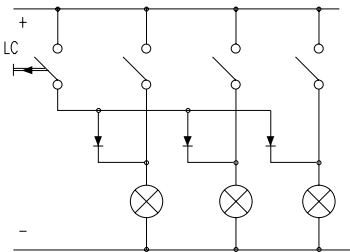
80 selector switch 3 positions
page 368



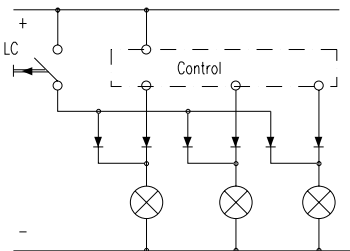
indicators and illuminated pushbuttons with built-in diodes

With indicators and illuminated pushbuttons equipped with diodes, the user is able to perform a lamp check or wire an alarm circuit simply with a considerable saving of space

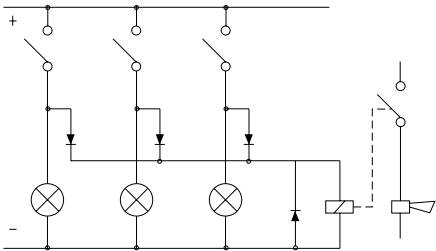
lamp check



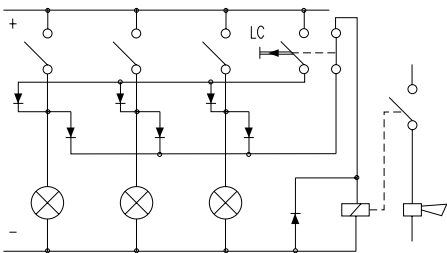
lamp check with blocking diodes



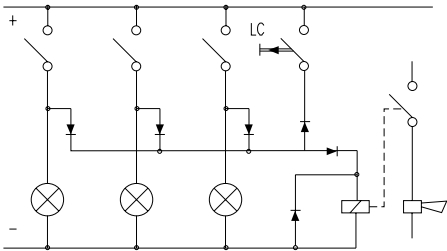
alarm circuit from fault
annunciating system



lamp check and alarm circuit



lamp check and alarm circuit with
only one diode and AC voltage



LC = lamp check

1. Engraving

Typefaces

In addition to the most commonly used world languages (see DIN 1451) with close spacing, the following typefaces are available: Scandinavian, Slavian, Greek, Russian.

Coloured filling of engraving

Specify whether engraving should be on the diffuser, or on the lens.
Specify the infill colour, character height and the text or symbol orientation.

Symbols

A list of the symbols available can be supplied on request.

2. Hot stamping

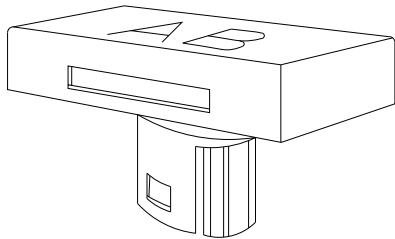
For large batches it is worth while to have the lettering produced by hot stamping.

Typefaces

For letters and figures, typefaces with 2,5 mm, 3 mm and 4 mm are available.

Symbols

A list of the symbols available can be supplied on request.



3. Film inserts

Instead of using engraving, the lenses can be fitted with transparent film inserts.
For this purpose, though, it is advisable to use transparent lenses. When a smoked lens is used, the lettering does not become visible until the lamp lights.

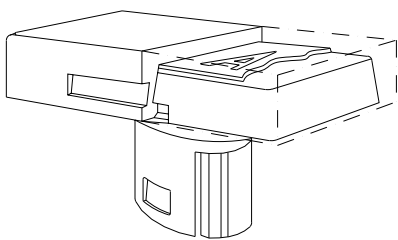
Film dimensions

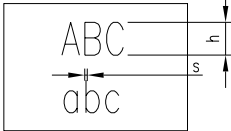
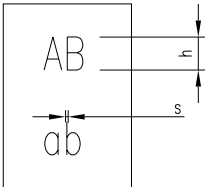
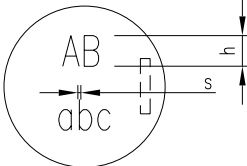
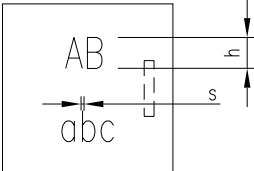


max. 12,7 x 18,7 mm
12,7 x 12,7 mm
12,8 mm

Film thickness 0,2 mm

Important!

Before engraving, check the position of the illuminated pushbuttons or indicator.



Height of letters mm	Thickness of letters mm												
		Horizontal mounting			Vertical mounting								
		Number of lines	Number of letters per line	Number of letters per line	Number of lines	Number of letters per line	Number of letters per line	Number of lines	Number of letters per line	Number of letters per line	Number of lines	Number of letters per line	Number of letters per line
h	s		(caps)	(small)		(caps)	(small)		(caps)	(small)		(caps)	(small)
2,5	0,4	4	11	12	5	7-8	8	3	6	6	4	7-8	8
3	0,4	3	9-10	10-11	4	6-7	7	2	5	6	3	6-7	7
4	0,5	2	7	7-8	3	4-5	5	2	3	4	2	4-5	5
5	0,5	2	5-6	6	2	3-4	4	1	2	3	2	3-4	4
6	0,6	1	4-5	5	2	3	3-4	1	2	2	1	3	3-4
8	0,6	1	3-4	3-4	1	2-3	2-3	1	2	2	1	2-3	2-3
film dimension		 max. 12,7 x 18,7 mm						Ø 12,8 mm			 12,7 x 12,7 mm		

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