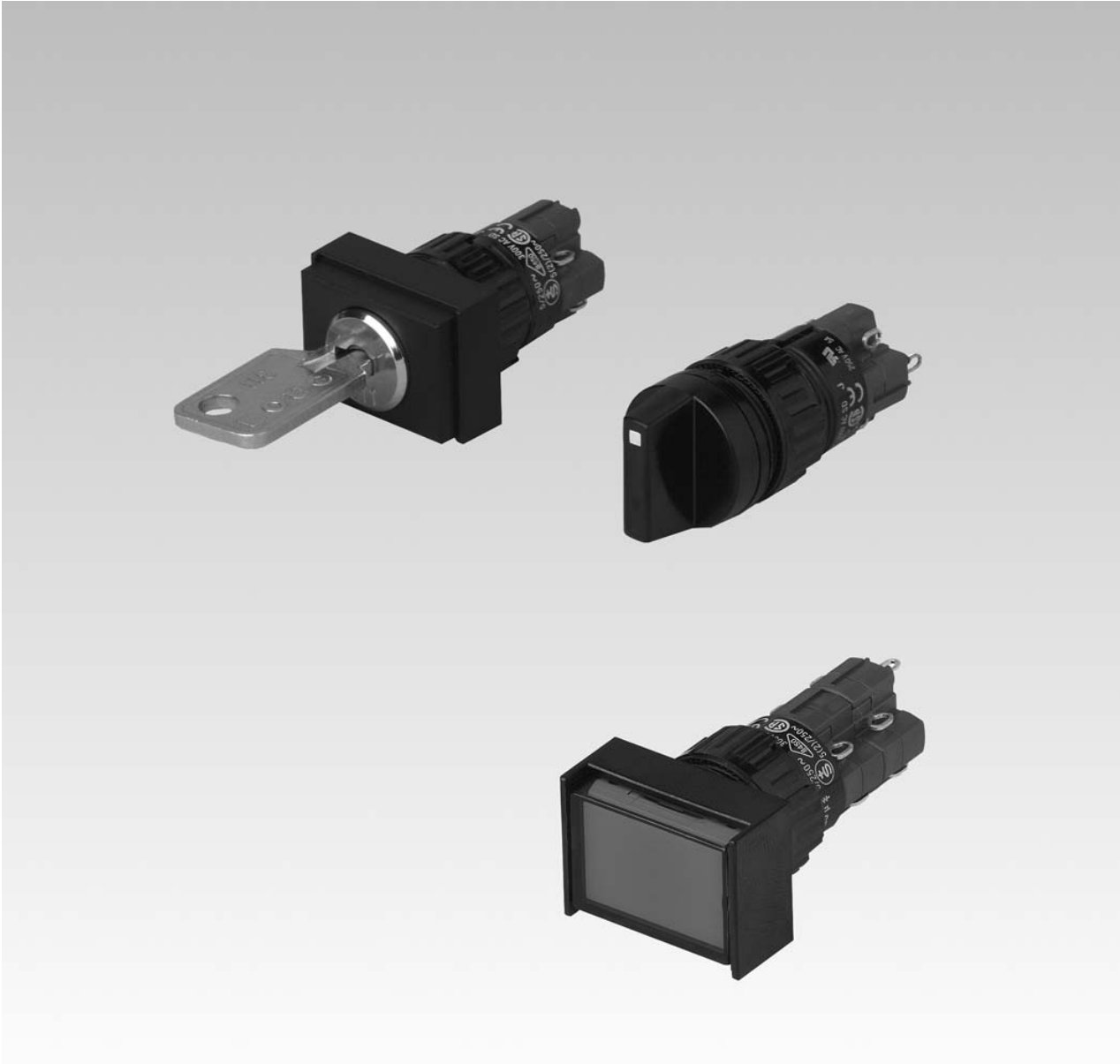




EAO Product Information

Series 51

eao ■



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Product Information

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.

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 with various lock numbers.

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-Nr. 01-907. Max. tightening torque 50 Ncm.

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. The rectangular actuators are provided with an anti-twisting device.

Lenses

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

Marking

For further information about engraving, hot stamping and film inserts see part Marking.

Illumination

The T1 ³/₄ Midget Groove incandescent (filament) lamp (6 ... 48 V) ensures perfect illumination of the lenses, which are supplied in various colours.

T1 ³/₄ Midget Groove Single-LED (6, 12, 24, 28, 48 V) are also available in blue, green, red, white or yellow.

Luminosity and wave length scattering caused by the technology used in the LED manufacturing processes may lead to visual differences in our products.

For supply voltages above 48 V, it is necessary to use a voltage reduction element (external series resistor or transformer).

Position indication

The status of a maintained action switch can be determined by the position of the lens.

Keylock switch

Standard lock (Index D). Standard lock number is 311. If the lock number is not specified, we will supply standard number 311.

An additional 134 special locks (Index X) are available on request.

Master keys for lock numbers 311 ... 445 may be ordered by quoting Typ-Nr. 31-989.300. Two keys are supplied with each keylock switch. Spare keys (Index D) for standard locks may be ordered by quoting Typ-Nr. 31-989.xxx (please state the lock number).

Specimen order

Indicator :

- | | |
|--|------------|
| - Indicator actuator, 18 x 24 mm, soldering terminal | 31-040.005 |
|--|------------|

Essential accessories :

- | | |
|--|--------------|
| - Lens plastic blue, transparent, flush, 18 x 24 mm | 31-903.6 |
| - Single-LED, T1 ³ / ₄ MG, 24 VAC/DC, blau | 10-2J12.1066 |

We reserve the right to modify technical data

All dimensions in mm

Pushbutton illuminative, raised mounting





- 1 Lens
- 2 Switch housing
- 3 Fixing nut

Indicator actuator



Essential Accessories:

-  Lens plastic page 12
-  Single-LED page 16

	Front protection	Diode (1N 4007)	Terminals				Component layout	Mounting dimensions			Circuit drawing
				∅ 18 x 18 mm Typ-Nr.	□ 18 x 24 mm Typ-Nr.	∅ 18 mm Typ-Nr.					
Indicator actuator	IP 65	1 D	UT	51-703.006	51-701.006	51-741.006	4	1	1	79	0.006
		2 D	UT	51-704.006	51-702.006	51-742.006	4	1	1	80	0.006
	-	S	51-050.005	51-040.005	51-030.005		1	8	2	0.004	
	S1	51-050.002	51-040.002	51-030.002		1	8	1	0.004		
	UT	51-051.006	51-041.006	51-031.006	4	1	2	1	0.005		

Indicators fit also in mounting hole no. 2

Diode (1N 4007): D = Diode, - = without



Terminals: UT = Universal terminal, S = Soldering terminal, S1 = Soldering terminal (also pluggable 2.8 x 0.5 mm)

Component layout from page 24, Mounting dimensions from page 25, Technical drawing from page 25, Circuit drawing from page 28

Illuminated pushbutton actuator



Essential Accessories:

-  Lens plastic page 12
-  Single-LED page 16

	Front protection	Switching system	Contacts	Diode (1N 4007)	Switching action	Terminals	Ø 18 x 18 Typ-Nr.	Ø 18 x 24 mm Typ-Nr.	Ø 18 mm Typ-Nr.	Component layout		Mounting dimensions		Technical drawing		Circuit drawing
										4	1	2	12	0.007		
Illuminated pushbutton actuator	IP 65	LL	1 NC	-	MA	UT	51-486.036	51-466.036	51-476.036	4	1	2	12	0.007		
					M	UT	51-456.036	51-426.036	51-436.036	4	1	2	58	0.007		
			1 NC + 1 NO	-	MA	UT	51-483.036	51-463.036	51-473.036	4	1	2	15	0.007		
					M	UT	51-453.036	51-423.036	51-433.036	4	1	2	61	0.007		
			1 NO	-	MA	UT	51-485.036	51-465.036	51-475.036	4	1	2	14	0.007		
					M	UT	51-455.036	51-425.036	51-435.036	4	1	2	60	0.007		
			2 NC	-	MA	UT	51-482.036	51-462.036	51-472.036	4	1	2	13	0.007		
					M	UT	51-452.036	51-422.036	51-432.036	4	1	2	59	0.007		
			2 NO	-	MA	UT	51-481.036	51-461.036	51-471.036	4	1	2	16	0.007		
					M	UT	51-451.036	51-421.036	51-431.036	4	1	2	62	0.007		
			SA	1 NC + 1 NO	1 D	MA	UT	51-717.0292	51-713.0292	51-747.0292	4	1	10	9	0.008	
						M	UT	51-709.0292	51-705.0292	51-743.0292	4	1	10	55	0.008	
		2 D			MA	UT	51-718.0292	51-714.0292	51-748.0292	4	1	10	10	0.008		
					M	UT	51-710.0292	51-706.0292	51-744.0292	4	1	10	56	0.008		
		-			MA	S	51-281.0252	51-261.0252	51-271.0252		1	9	11	0.006		
						S1	51-281.022	51-261.022	51-271.022		1	9	8	0.006		
					M	S	51-151.0252	51-121.0252	51-131.0252		1	9	57	0.006		
						S1	51-151.022	51-121.022	51-131.022		1	9	54	0.006		
		2 NC + 2 NO			1 D	MA	UT	51-719.0292	51-715.0292	51-749.0292	4	1	10	5	0.010	
						M	UT	51-711.0292	51-707.0292	51-745.0292	4	1	10	51	0.010	
					2 D	MA	UT	51-720.0292	51-716.0292	51-750.0292	4	1	10	6	0.010	
						M	UT	51-712.0292	51-708.0292	51-746.0292	4	1	10	52	0.010	
			-	MA	S	51-282.0252	51-262.0252	51-272.0252		1	9	7	0.008			
				M	S	51-152.0252	51-122.0252	51-132.0252		1	9	53	0.008			
3 NC + 3 NO	-	MA	S	51-283.0252	51-263.0252	51-273.0252		1	9	4	0.010					
		M	S	51-153.0252	51-123.0252	51-133.0252		1	9	50	0.010					
4 NC + 4 NO	-	MA	S	51-284.0252	51-264.0252	51-274.0252		1	9	3	0.012					
		M	S	51-154.0252	51-124.0252	51-134.0252		1	9	49	0.012					

Illuminated pushbuttons fit also in mounting hole no. 2

Switching system: LL = Low level switching element, SA = Snap-action switching element

Contacts: NC = Normally closed, NO = Normally open

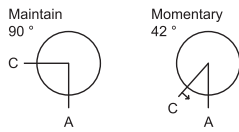
Diode (1N 4007): - = without, D = Diode

Switching action: MA = Maintained action, M = Momentary action

Terminals: UT = Universal terminal, S = Soldering terminal, S1 = Soldering terminal (also pluggable 2.8 x 0.5 mm)

Component layout from page 24, Mounting dimensions from page 25, Technical drawing from page 25, Circuit drawing from page 28

Keylock switch 2 positions



	Front protection	Switching system	Contacts	Switching action	Terminals	Key remove	Key remove	Key remove	Mounting dimensions	Technical drawing	Circuit drawing	kg		
													Typ-Nr.	Typ-Nr.
Keylock switch 2 positions Position A : Basic position Position C : Maintained action Standard lock 311 Front : Plastic black	IP 65	LL	1 NC + 1 NO	MA	UT	A	51-445.036D	51-405.036D	51-415.036D	2 3	77	0.017		
							C	51-448.036D	51-408.036D	51-418.036D	2 3	77	0.017	
							C + A	51-442.036D	51-402.036D	51-412.036D	2 3	77	0.017	
			2 NO	MA	UT	A	51-444.036D	51-404.036D	51-414.036D	2 3	78	0.017		
							C	51-447.036D	51-407.036D	51-417.036D	2 3	78	0.017	
							C + A	51-441.036D	51-401.036D	51-411.036D	2 3	78	0.017	
		SA	1 NC + 1 NO	MA	S	A	51-255.025D2	51-295.025D2	51-235.025D2	2 11	73	0.016		
							C	51-355.025D2	51-395.025D2	51-335.025D2	2 11	73	0.016	
							C + A	51-155.025D2	51-195.025D2	51-135.025D2	2 11	73	0.016	
						S1	A	51-255.022D	51-295.022D	51-235.022D	2 11	73	0.016	
								C	51-355.022D	51-395.022D	51-335.022D	2 11	73	0.016
								C + A	51-155.022D	51-195.022D	51-135.022D	2 11	73	0.016
			2 NC + 2 NO	MA	S	A	51-256.025D2	51-296.025D2	51-236.025D2	2 11	74	0.016		
							C	51-356.025D2	51-396.025D2	51-336.025D2	2 11	74	0.016	
							C + A	51-156.025D2	51-196.025D2	51-136.025D2	2 11	74	0.016	
			3 NC + 3 NO	MA	S	A	51-257.025D2	51-297.025D2	51-237.025D2	2 11	75	0.016		
							C	51-357.025D2	51-397.025D2	51-337.025D2	2 11	75	0.016	
							C + A	51-157.025D2	51-197.025D2	51-137.025D2	2 11	75	0.016	
4 NC + 4 NO	MA	S	A	51-258.025D2	51-298.025D2	51-238.025D2	2 11	76	0.016					
				C	51-358.025D2	51-398.025D2	51-338.025D2	2 11	76	0.016				
				C + A	51-158.025D2	51-198.025D2	51-138.025D2	2 11	76	0.016				
Position A : Basic position Position C : Momentary action Standard lock 311 Front : Plastic black	IP 65	LL	1 NC + 1 NO	M	UT	A	51-458.036D	51-428.036D	51-438.036D	2 3	71	0.017		
			2 NO	M	UT	A	51-457.036D	51-427.036D	51-437.036D	2 3	72	0.017		
		SA	1 NC + 1 NO	M	S	A	51-145.025D2	51-495.025D2	51-141.025D2	2 11	67	0.016		
						S1	A	51-145.022D	51-495.022D	51-141.022D	2 11	67	0.016	
		2 NC + 2 NO	M	S	A	51-146.025D2	51-496.025D2	51-142.025D2	2 11	68	0.016			
						3 NC + 3 NO	M	S	A	51-147.025D2	51-497.025D2	51-143.025D2	2 11	69
		4 NC + 4 NO	M	S	A	51-148.025D2				51-498.025D2	51-144.025D2	2 11	70	0.016

Power rating: Low level switching element 42 V, 100 mA; Snap action switching element 250 V, 5 A

Other lock numbers on request

Switching system: LL = Low level switching element, SA = Snap-action switching element

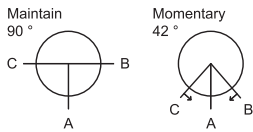
Contacts: NC = Normally closed, NO = Normally open

Switching action: MA = Maintained action, M = Momentary action

Terminals: UT = Universal terminal, S = Soldering terminal, S1 = Soldering terminal (also pluggable 2.8 x 0.5 mm)

Mounting dimensions from page 25, Technical drawing from page 25, Circuit drawing from page 28

Keylock switch 3 positions



	Front protection	Switching system	Contacts	Switching action	Terminals	Key remove	□ 18 x 18 mm Typ-Nr.	□ 18 x 24 mm Typ-Nr.	∅ 18 mm Typ-Nr.	Mounting dimensions	Technical drawing	Circuit drawing	EN
Keylock switch 3 positions Position C : Maintained action Position A : Basic position Position B : Maintained action Standard lock 311	IP 65	SA	2 NC + 2 NO	MA-0-MA	S1	A	51-381.022D	51-361.022D	51-371.022D	2	4	66	0.025
						C+A+B	51-382.022D	51-362.022D	51-372.022D	2	4	66	0.025
						C + B	51-383.022D	51-363.022D	51-373.022D	2	4	66	0.025
Position C : Maintained action Position A : Basic position Position B : Momentary action Standard lock 311	IP 65	SA	2 NC + 2 NO	MA-0-M	S1	A	51-385.022D	51-365.022D	51-375.022D	2	4	65	0.025
						C + A	51-386.022D	51-366.022D	51-376.022D	2	4	65	0.025
Position C : Momentary action Position A : Basic position Position B : Momentary action Standard lock 311	IP 65	SA	2 NC + 2 NO	M-0-M	S1	A	51-384.022D	51-364.022D	51-374.022D	2	4	64	0.025
Position C : Momentary action Position A : Basic position Position B : Maintained action standard lock 311	IP 65	SA	2 NC + 2 NO	M-0-MA	S1	A	51-387.022D	51-367.022D	51-377.022D	2	4	63	0.025
						A + B	51-388.022D	51-368.022D	51-378.022D	2	4	63	0.025

Snap-action element block only available with soldering terminal 2.8 x 0.5 mm (also pluggable) and Gold/Silver contact.

Other lock numbers on request

Switching system: SA = Snap-action switching element

Contacts: NC = Normally closed, NO = Normally open

Switching action: MA = Maintained action, M = Momentary action



Terminals: S1 = Soldering terminal (also pluggable 2.8 x 0.5 mm)

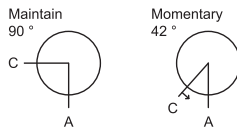
Mounting dimensions from page 25, Technical drawing from page 25, Circuit drawing from page 28

Selector switch 2 positions



Essential Accessories:

-  Lever page 12
-  Single-LED page 16



	Front protection	Switching system	Contacts	Diode (1N 4007)	Switching action	Terminals	Ø 18 mm Typ-Nr.	Mounting dimensions	Technical drawing	Circuit drawing	
Selector switch 2 positions illuminative Position A : Basic position Position C : Maintained action	IP 65	LL	1 NC	-	MA	UT	52-476.036	2 7	44	0.007	
			1 NC + 1 NO	-	MA	UT	52-473.036	2 7	47	0.007	
			1 NO	-	MA	UT	52-475.036	2 7	46	0.007	
			2 NC	-	MA	UT	52-472.036	2 7	45	0.007	
			2 NO	-	MA	UT	52-471.036	2 7	48	0.007	
		SA	1 NC + 1 NO	1 D	MA	UT	52-747.0292	2 13	41	0.008	
				2 D	MA	UT	52-748.0292	2 13	42	0.008	
				-	MA	S	52-271.0252	2 12	43	0.006	
			2 NC + 2 NO	-	MA	S1	52-271.022	2 12	40	0.006	
				1 D	MA	UT	52-749.0292	2 13	37	0.010	
				2 D	MA	UT	52-750.0292	2 13	38	0.010	
			3 NC + 3 NO	-	MA	S	52-272.0252	2 12	39	0.006	
				-	MA	S	52-273.0252	2 12	36	0.006	
				-	MA	S	52-274.0252	2 12	35	0.006	
illuminative Position A : Basic position Position C : Momentary action	IP 65	LL	1 NC	-	M	UT	52-436.036	2 7	30	0.007	
			1 NC + 1 NO	-	M	UT	52-433.036	2 7	33	0.007	
			1 NO	-	M	UT	52-435.036	2 7	32	0.007	
			2 NC	-	M	UT	52-432.036	2 7	31	0.007	
			2 NO	-	M	UT	52-431.036	2 7	34	0.007	
		SA	1 NC + 1 NO	1 D	M	UT	52-743.0292	2 13	27	0.008	
				2 D	M	UT	52-744.0292	2 13	28	0.008	
				-	M	S	52-131.0252	2 12	29	0.006	
			2 NC + 2 NO	-	M	S1	52-131.022	2 12	26	0.006	
				1 D	M	UT	52-745.0292	2 13	23	0.010	
				2 D	M	UT	52-746.0292	2 13	24	0.010	
			3 NC + 3 NO	-	M	S	52-132.0252	2 12	25	0.006	
				-	M	S	52-133.0252	2 12	22	0.006	
				-	M	S	52-134.0252	2 12	21	0.006	

Switching system: LL = Low level switching element, SA = Snap-action switching element

Contacts: NC = Normally closed, NO = Normally open

Diode (1N 4007): - = without, D = Diode

Switching action: MA = Maintained action, M = Momentary action

Terminals: UT = Universal terminal, S = Soldering terminal, S1 = Soldering terminal (also pluggable 2.8 x 0.5 mm)

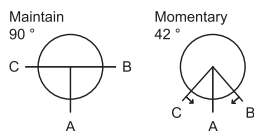
Mounting dimensions from page 25, Technical drawing from page 25, Circuit drawing from page 28

Selector switch 3 positions



Essential Accessories:

- Lever page 12
- Single-LED page 16



	Front protection	Switching system	Contacts	Switching action	Terminals	Ø 18 mm Typ-Nr.	Mounting dimensions	Technical drawing	Circuit drawing	
Selector switch 3 positions illuminative Position C : Maintained action Position A : Basic position Position B : Maintained action	IP 40	SA	2 NC + 2 NO	MA-0-MA	S1	52-571.022A	2	14	20	0.015
illuminative Position C : Maintained action Position A : Basic position Position B : Momentary action	IP 40	SA	2 NC + 2 NO	MA-0-M	S1	52-573.022A	2	14	19	0.015
illuminative Position C : Momentary action Position A : Basic position Position B : Momentary action	IP 40	SA	2 NC + 2 NO	M-0-M	S1	52-572.022A	2	14	17	0.015
illuminative Position C : Momentary action Position A : Basic position Position B : Maintained action	IP 40	SA	2 NC + 2 NO	M-0-MA	S1	52-574.022A	2	14	18	0.015

Switching system: SA = Snap-action switching element

Contacts: NC = Normally closed, NO = Normally open


Switching action: MA = Maintained action, M = Momentary action

Terminals: S1 = Soldering terminal (also pluggable 2.8 x 0.5 mm)

Mounting dimensions from page 25, Technical drawing from page 25, Circuit drawing from page 28

Front

Lens plastic

	Lens	∅ 18 x 18 mm Typ-Nr.	∅ 18 x 24 mm Typ-Nr.	∅ 18 mm Typ-Nr.		
Lens plastic concave, illuminative	blue transparent	51-954.6	51-904.6		0.001	
	colourless transparent	51-954.7	51-904.7		0.001	
	green transparent	51-954.5	51-904.5		0.001	
	orange transparent	51-954.3	51-904.3		0.001	
	red transparent	51-954.2	51-904.2		0.001	
	yellow transparent	51-954.4	51-904.4		0.001	
flush, illuminative	blue transparent	51-953.6	51-903.6	51-933.6	0.001	
	colourless transparent	51-953.7	51-903.7	51-933.7	0.001	
	green transparent	51-953.5	51-903.5	51-933.5	0.001	
	orange transparent	51-953.3	51-903.3	51-933.3	0.001	
	red transparent	51-953.2	51-903.2	51-933.2	0.001	
	smoked transparent	51-953.1	51-903.1	51-933.1	0.001	
	yellow transparent	51-953.4	51-903.4	51-933.4	0.001	
	flush, illuminative (not recommended for film insert)	blue translucent	51-951.6	51-901.6	51-931.6	0.001
colourless transparent		51-955.7	51-905.7	51-935.7	0.001	
green translucent		51-951.5	51-901.5	51-931.5	0.001	
green transparent		51-955.5	51-905.5	51-935.5	0.001	
orange translucent		51-951.3	51-901.3	51-931.3	0.001	
red translucent		51-951.2	51-901.2	51-931.2	0.001	
red transparent		51-955.2	51-905.2	51-935.2	0.001	
white translucent		51-951.9	51-901.9	51-931.9	0.001	
yellow translucent		51-951.4	51-901.4	51-931.4	0.001	
yellow transparent		51-955.4	51-905.4	51-935.4	0.001	
flush, non-illuminative		black opaque	51-951.0	51-901.0	51-931.0	0.001
		grey opaque	51-951.8	51-901.8	51-931.8	0.001
concave, illuminative (not recommended for film insert)		colourless transparent		51-906.7		0.001
	green transparent		51-906.5		0.001	
	red transparent		51-906.2		0.001	
	yellow transparent		51-906.4		0.001	




Lever

with bar and marking dot

	Lever	Bar colour	Typ-Nr.	
Lever illuminative	Plastic black	blue	52-928.60	0.001
		green	52-928.50	0.001
		orange	52-928.30	0.001
		red	52-928.20	0.001
		yellow	52-928.40	0.001
	Plastic grey	blue	52-929.60	0.001
		green	52-929.50	0.001
		orange	52-929.30	0.001
		red	52-929.20	0.001
		yellow	52-929.40	0.001
non-illuminative	Plastic black	black	52-928.0	0.001
	Plastic grey	grey	52-929.8	0.001
		white	52-929.9	0.001



Front bezel square, raised mounting

	Front bezel	Typ-Nr.	
Front bezel square, raised mounting 24 x 24 mm, for Selector switch	Plastic black	52-950.0	0.001
26 x 26 mm, for Selector switch	Plastic black	52-952.0	0.001




Protective cover

	\varnothing 18 x 18 mm Typ-Nr.	\varnothing 18 x 24 mm Typ-Nr.	Technical drawing	
Protective cover hinged, transparent, with means for sealing	51-920		5	0.002
		51-925	6	0.002



Technical drawing from page 25


Blind plug

	Blind plug	\varnothing 18 x 18 Typ-Nr.	\varnothing 18 x 24 mm Typ-Nr.	\varnothing 18 mm Typ-Nr.	Mounting dimensions	
Blind plug	Plastic black	51-948.0	51-947.0	51-949.0	1	0.003

Blind plugs fit also in mounting holes no. 2
Mounting dimensions from page 25



Master key

	Typ-Nr.	
Master key Lock numbers 311 ... 445 (DOM)	31-989.300	0.006




Spare key

	Typ-Nr.	
Spare key Key lock switch, standard lock 311 (DOM)	31-989.311	0.006



Other lock numbers on request


EMC Key protection cap

	Typ-Nr.	
EMC Key protection cap Plastic black, for lock type DOM	31-985.0	0.005



Backside

PCB plug-in base

	Terminals	Typ-Nr.	Component layout	
PCB plug-in base 16.4 mm dia. x 9.8 mm for Low level switching element, Pins axial	P	31-940	1	0.002
17.8 x 12.9 mm x 9.8 mm for Snap-action switching element 2.8 mm, Pins axial	P	31-942	3	0.002
17.9 x 17.9 x 8.4 mm for Low level switching element, Pins bent at right-angle	P	31-941	2	0.004




PCB plug-in base Pins right-angle : With the extendable mounting the distance between plug-in base and PCB can be varied up to 3 mm

Terminals: P = PCB terminal


Component layout from page 24

Multi-plug housing

	Typ-Nr.	
Multi-plug housing for Switching block	51-943.0	0.005




Flat receptacle

	Typ-Nr.	
Flat receptacle 2.0 x 0.5 mm for Universal terminal	31-945	0.001
2.8 x 0.5 mm for Multi-plug housing	51-943.1	0.001
2.8 x 0.5 mm for Plug-in terminal	31-946	0.001




Insulation sleeve

	Typ-Nr.	
Insulation sleeve Cover Plug-in terminals for snap-action switching element 2.8 mm	01-928	0.001
for Flat receptacle 31-945	31-928	0.001
for Flat receptacle 31-946	31-929	0.001




Terminal cover

	Typ-Nr.	
Terminal cover	01-929	0.010




Illumination

Filament lamp

	Socket	Operating voltage/-current	Typ-Nr.	
Filament lamp	T1 $\frac{3}{4}$ MG	12 VAC/DC, 75 mA	10-1309.1309	0.001
		14 VAC/DC, 80 mA	10-1310.1319	0.001
		18 VAC/DC, 40 mA	10-1311.1249	0.001
		24 VAC/DC, 35 mA	10-1312.1229	0.001
		28 VAC/DC, 30 mA	10-1313.1209	0.001
		28 VAC/DC, 40 mA	10-1313.1249	0.001
		36 VAC/DC, 20 mA	10-1316.1179	0.001
		36 VAC/DC, 30 mA	10-1316.1209	0.001
		48 VAC/DC, 20 mA	10-1319.1179	0.001
		48 VAC/DC, 25 mA	10-1319.1199	0.001
		6 VAC/DC, 120 mA	10-1306.1349	0.001
		6.3 VAC/DC, 200 mA	10-1307.1369	0.001



Single-LED

	Socket	Light colour	Operating voltage/-current	Typ-Nr.	
Single-LED	T1 3/4 MG	blue	12 VAC/DC, 7/14 mA	10-2J09.1066	0.002
			24 VAC/DC, 7/14 mA	10-2J12.1066	0.002
			28 VAC/DC, 7/14 mA	10-2J13.1066	0.002
			48 VAC/DC, 4/8 mA	10-2J19.1046	0.002
			6 VDC, 15 mA	10-2J06.3146	0.002
		green	12 VAC/DC, 4/7 mA	10-2J09.1065	0.002
			24 VAC/DC, 4/7 mA	10-2J12.1065	0.002
			28 VAC/DC, 4/7 mA	10-2J13.1065	0.002
			48 VAC/DC, 2/4 mA	10-2J19.1045	0.002
			6 VDC, 7 mA	10-2J06.3145	0.002
		red	12 VAC/DC, 7/14 mA	10-2J09.1062	0.002
			24 VAC/DC, 7/14 mA	10-2J12.1062	0.002
			28 VAC/DC, 7/14 mA	10-2J13.1062	0.002
			48 VAC/DC, 4/8 mA	10-2J19.1042	0.002
			6 VDC, 15 mA	10-2J06.3142	0.002
		white diffuse	12 VAC/DC, 7/14 mA	10-2J09.1069	0.002
			24 VAC/DC, 7/14 mA	10-2J12.1069	0.002
			28 VAC/DC, 7/14 mA	10-2J13.1069	0.002
			48 VAC/DC, 4/8 mA	10-2J19.1049	0.002
			6 VDC, 15 mA	10-2J06.3149	0.002
		yellow	12 VAC/DC, 7/14 mA	10-2J09.1064	0.002
			24 VAC/DC, 7/14 mA	10-2J12.1064	0.002
			28 VAC/DC, 7/14 mA	10-2J13.1064	0.002
			48 VAC/DC, 4/8 mA	10-2J19.1044	0.002
6 VDC, 15 mA	10-2J06.3144		0.002		




Note:

AC operation through half-wave rectifier possible, slight flickering can occur.

Series resistor

for lamp voltage reduction


	Operation voltage	Typ-Nr.	
Series resistor 10 kΩ, for filament lamp 48 VAC, 25 mA	230/240 V	02-904.7	0.003
2.7 kΩ, for filament lamp 48 VAC, 25 mA	110 V	02-904.0	0.003
3.3 kΩ, for filament lamp 48 VAC, 25 mA	125 V	02-904.1	0.003
4.7 kΩ, for filament lamp 48 VAC, 25 mA	145 V	02-904.3	0.003



Please keep to the country specific security rules.

Terminal plate empty


for fitting with series resistors

	Typ-Nr.	
Terminal plate empty 10 spaces 125 x 60 x 15 mm	02-912.2	0.045
15 spaces 187.5 x 60 x 15 mm	02-912.3	0.090
20 spaces 250 x 60 x 15 mm	02-912.4	0.095
5 spaces 62.5 x 60 x 15 mm	02-912.1	0.025



Assembling


Fixing nut

	Typ-Nr.	
Fixing nut Metal, specifically for keylock switches	31-991	0.005



Anti-twist ring

for Key lock- and Selector switch

	Typ-Nr.	
Anti-twist ring	51-910	0.001




Lens remover

	Typ-Nr.	
Lens remover	02-905	0.011



Lamp remover


	Typ-Nr.	
Lamp remover	61-9740.0	0.003



CAUTION


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

Mounting tool

	Typ-Nr.	
Mounting tool for Indicator 16 mm dia.	01-907	0.020




Dismantling tool

	Typ-Nr.	
Dismantling tool for dismantling of Lens, Lens holder and Switching element block	51-938	0.027



Flat receptacle remover

	Typ-Nr.	
Flat receptacle remover for removing the Flat receptacle of the Multi-plug in housing	51-943.9	0.001



Actuator with snap-action switching element

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 stachable, only 1 switching element can be on a pushbutton.

Material

Material of contact

Gold plated silver

Switch housing

Axial soldering-/plug-in terminal 2.8 mm:
 Diallylphthalate DAP, Polyamide 66, Polysulfone, heat-resistant and self-extinguishing.
 Soldering terminal: PA 6.6 Ultramid

Actuator housing

Polyetherimide, self-extinguishing

Mechanical characteristics

Terminals

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

2.5 Ncm ... 5.5 Ncm, depending on the number of switching elements. Measured at the key or lever of the keylock- or selector switch.

Actuating force

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

Actuating travel

Illuminated pushbutton 3 mm

Keylock-/selector switch actuator 2 positions:

1x ca. 42° deflection momentary action

1x ca. 90° deflection maintained action

Rebound time

≤5ms

Mechanical lifetime

Momentary action 2 million cycles of operation

Maintained action 1 million cycles of operation

Keylock switch 50 000 cycles of operation

Electrical characteristics

Standards

IEC 61058, EN 61058

Rated voltage

250 VAC/VDC

Rated current

5 A

Contact resistance

Starting value (initial) ≤50 mΩ

Electrostatic discharge

≤15 KV (Keylock switch)

Conventional free air thermal current

5 A

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

Switch rating

250 VAC, 5 A (cosφ 1)

250 VAC, 3 A (cosφ 0,3)

Switch rating AC (cosφ 0,7)

Voltage	125 VAC	250 VAC
---------	---------	---------

Current	3 A	2 A
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Switch rating DC (inductive) L:R = 30 ms

Voltage	24 VDC	60 VDC	110 VDC	220 VDC
---------	--------	--------	---------	---------

Current	2 A	0.7 A	0.2 A	0.1 A
---------	-----	-------	-------	-------

Electric strength

2500 VAC, 50 Hz, 1 min. between all terminals and earth, as per IEC 60512-2-11

Protection class

II

Environmental conditions

Storage temperature

-40 °C ... +85 °C

Service temperature

-25 °C ... +55 °C

For indicators and illuminated pushbuttons mounted as a block, make sure the heat can escape freely.

Protection degree

IP 65 front side, as per IEC 60529

Shock resistance

(Single impacts, semi-sinusoidal)

15 g for 11 ms, as per IEC 60512-4-3, IEC 60068-2-27

Vibration resistance

(Sinusoidal)

10 g at 10 Hz ... 1500 Hz, amplitude 1.5 mm, as per IEC 60512-4-4, IEC 60068-2-6

Climate resistance

Standard condition, as per IEC 60068-2-3 and 2-30

Changing condition, as per IEC 60068-2-14 and 2-33

Approvals

Approbations

CB (IEC 61058)

CSA

ENEC (EN 61058)

Germanischer Lloyd

UL

Declaration of conformity

CE
RoHS

Actuator with snap-action switching element block (Keylock-/selector switch 3 positions)

Switching system

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

Material

Material of contact

Gold plated hardsilver

Switch housing

Diallylphthalate (DAP), heat-resistant and self-extinguishing

Actuator housing

Polyetherimide, self-extinguishing

Mechanical characteristics

Terminals

Soldering terminal which can also be used as plug-in terminal 2.8 x 0.5 mm:

Max. wire diameter 2 wires of 1 mm

Max. wire cross-section of stranded cable 2 x 0.75 mm²

Actuating torque

2.5 Ncm ... 5.5 Ncm, depending on the number of switching elements. Measured at the key or lever of the keylock- or selector switch.

Actuating travel

Keylock-/selector switch actuator with 3 positions

2x ca. 42° deflection momentary action

2x ca. 90° deflection maintained action

Rebound time

≤5ms

Mechanical lifetime

Keylock switch 50 000 cycles of operation

Selector switch 100 000 cycles of operation

Electrical characteristics

Electrostatic discharge

≤15 KV (Keylock switch)

Conventional free air thermal current

5 A

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

Switch rating

250 VAC, 5 A (cosφ 0,75)

Electric strength

2500 VAC, 50 Hz, 1 min. between all terminals and earth, as per IEC 60512-2-11

Protection class

II

Environmental conditions

Storage temperature

-40 °C ... +85 °C

Service temperature

-25 °C ... +55 °C

for selector switches mounted as a block, make sure the heat can escape freely

Protection degree

Front side, as per IEC 60529

IP 65 keylock switch

IP 40 selector switch

Approvals

Approbations

CB (IEC 61058)

CSA

ENEC (EN 61058)

Germanischer Lloyd

UL

Declaration of conformity

CE

RoHS

Actuator with low level switching element

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/DC.

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 contact

Gold plated

Switch housing

Polysulfone, heat-resistant and self-extinguishing

Actuator housing

Polyetherimide, self-extinguishing

Mechanical characteristics

Terminals

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

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

Actuating force

3 N ... 3,5 N

Actuating travel

Illuminated pushbutton 3 mm

Keylock-/selector switch actuator 2 positions:

1x ca. 42° deflection momentary action

1x ca. 90° deflection maintained action

Rebound time

Typ. <100 µs

Mechanical lifetime

Momentary action 5 million cycles of operation

Maintained action 1 million cycles of operation

Keylock switch 50 000 cycles of operation

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 60512-2-11

Environmental conditions

Storage temperature

-40 °C ... +85 °C

Service temperature

-25 °C ... +55 °C

For indicators and illuminated pushbuttons mounted as a block, make sure the heat can escape freely.

Protection degree

IP 65 front side, as per IEC 60529

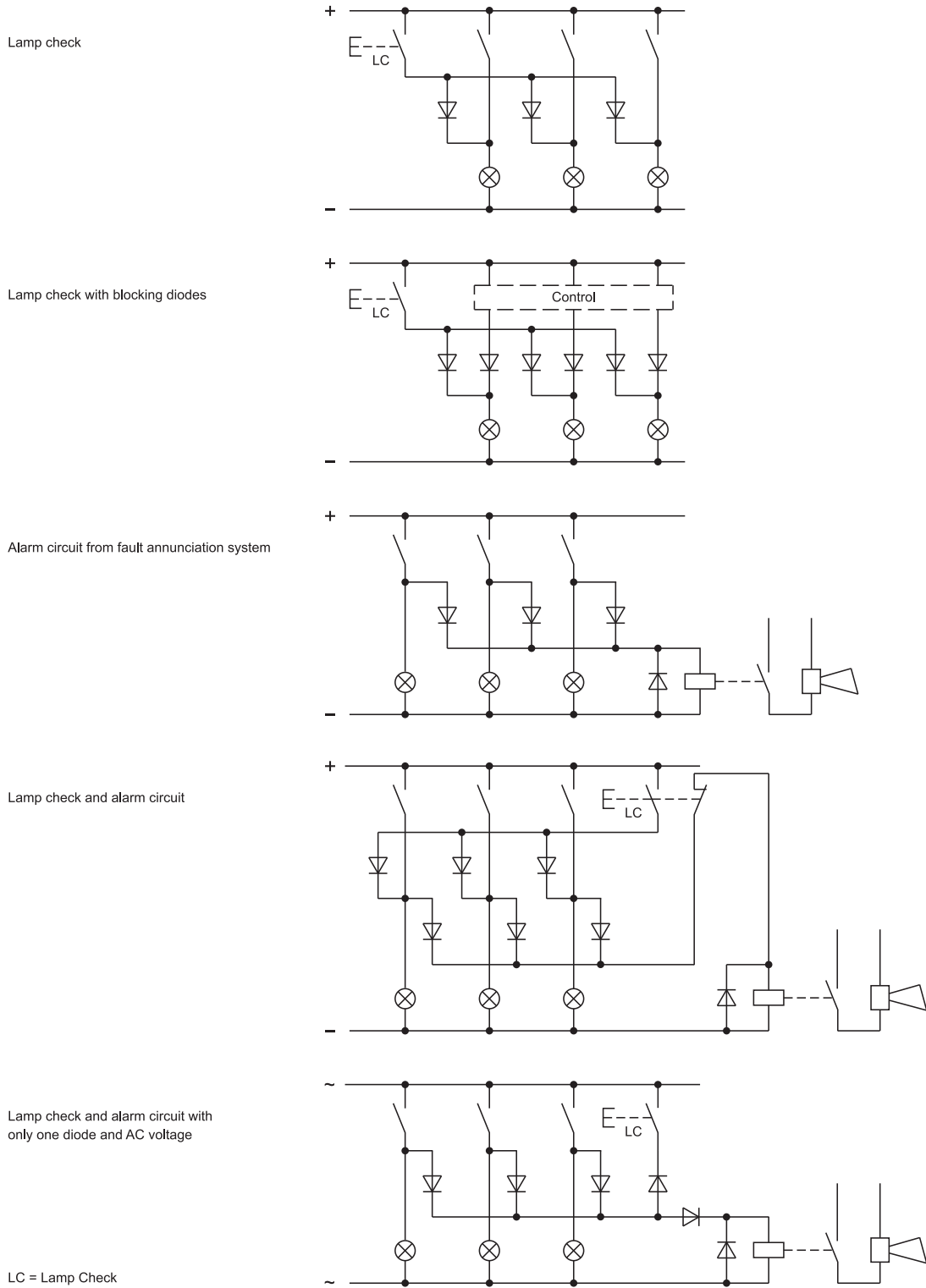
Shock resistance

(Single impacts, semi-sinusoidal)

15 g for 11 ms, as per IEC 60512-4-3, IEC 60068-2-27

Diode element

When 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.



General notes

1. Engraving

In addition to the most commonly used world languages, in DIN 1451-3 close spacing, other typefaces are available as Scandinavian, Slavic, Greek, Russian and Polish. Red, blue and black lenses are filled with white colour. Other colour lenses are filled in black.

2. Hot stamping

For larger series it is worth considering markings by means of hot stamping. We will be pleased to advise you. For letters and figures, typefaces with 2.5 mm, 3 mm and 4 mm are available.

3. Film inserts

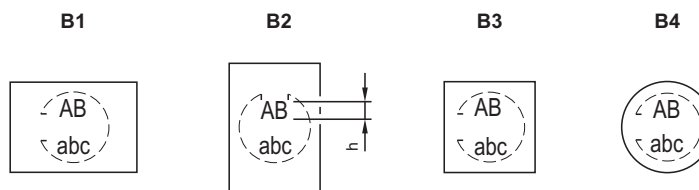
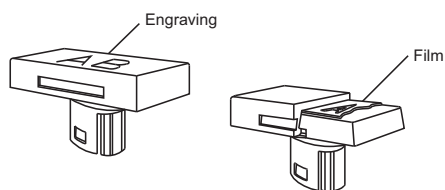
Instead of using engraving the lenses can be fitted with transparent film inserts, as an alternative. For this purpose, though, it is advisable to use transparent lenses. In the case of use of a smoke-black lens the fitted film becomes readable only if the lamp is on.

The film thickness is 0.2 mm.

Important : Consider pushbutton mounting orientation before specifying engraving characters !

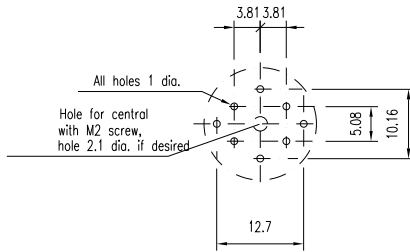
All dimensions in mm

Film insert max. size	Height of letters h	Number of lines	Number of (target value) capital letters per line	Number of (target value) small letters per line	Image
12.7 x 18.7	2.5	4	11	12	B1
		5	7 - 8	8	B2
12.7 x 12.7	2.5	4	7 - 8	8	B3
Ø 12.8	2.5	3	6	6	B4
12.7 x 18.7	3	3	9 - 10	10 - 11	B1
		4	6 - 7	7	B2
12.7 x 12.7	3	3	6 - 7	7	B3
Ø 12.8	3	2	5	6	B4
12.7 x 18.7	4	2	7	7 - 8	B1
		3	4 - 5	5	B2
12.7 x 12.7	4	2	4 - 5	5	B3
Ø 12.8	4	2	3	4	B4
12.7 x 18.7	5	2	5 - 6	6	B1
			3 - 4	4	B2
12.7 x 12.7	5	2	3 - 4	4	B3
Ø 12.8	5	1	2	3	B4
12.7 x 18.7	6	1	4 - 5	5	B1
		2	3	3 - 4	B2
12.7 x 12.7	6	1	3	3 - 4	B3
Ø 12.8	6	1	2	2	B4
12.7 x 18.7	8	1	3 - 4	3 - 4	B1
			2 - 3	2 - 3	B2
12.7 x 12.7	8	1	2 - 3	2 - 3	B3
Ø 12.8	8	1	2	2	B4

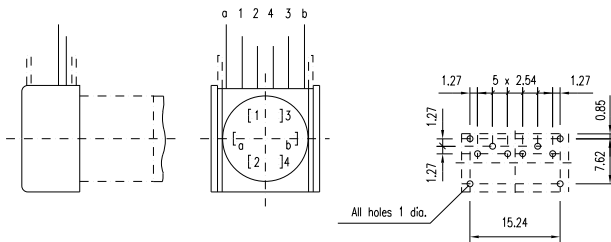


Component layout

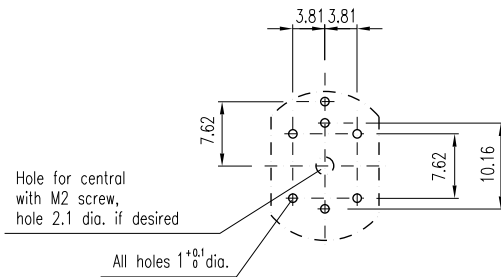
1 PCB plug-in base page 14



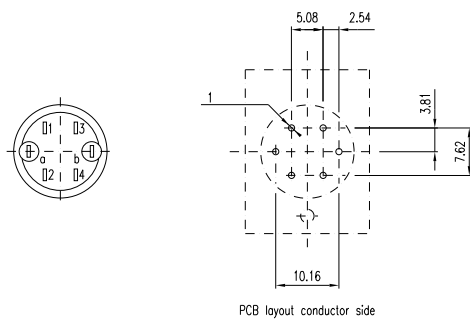
2 PCB plug-in base page 14



3 PCB plug-in base page 14

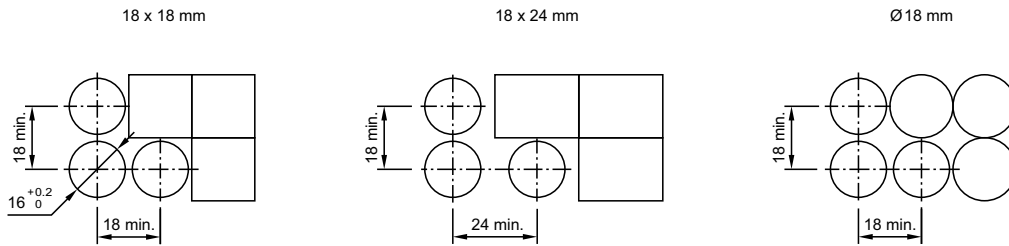


4 Indicator actuator page 6 | Illuminated pushbutton actuator page 7

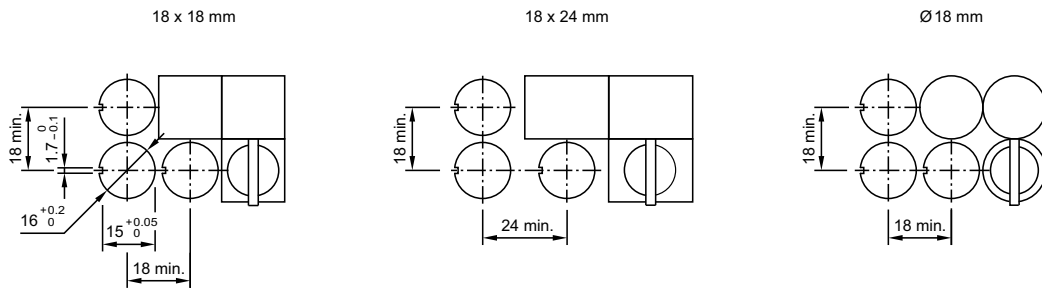


Mounting dimensions

1 Indicator actuator page 6 | Illuminated pushbutton actuator page 7 | Blind plug page 13

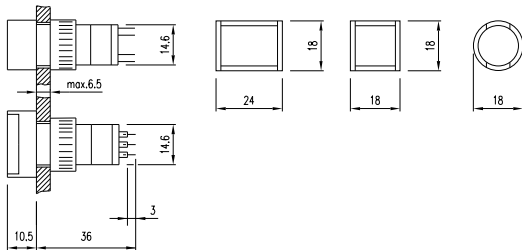


2 Keylock switch 2 positions page 8 | Keylock switch 3 positions page 9 | Selector switch 2 positions page 10 | Selector switch 3 positions page 11

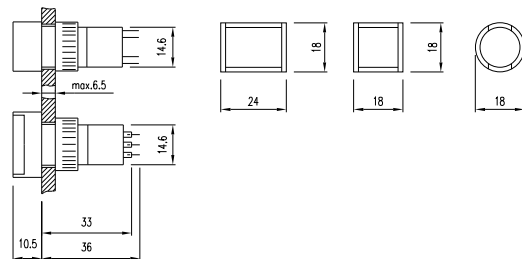


Technical drawing

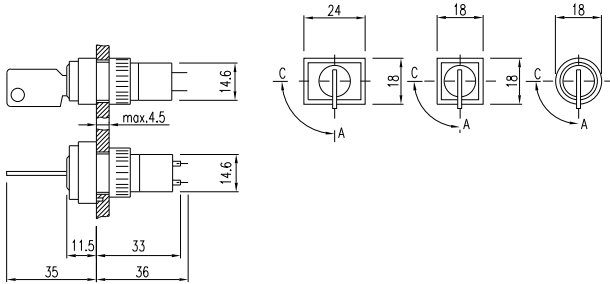
1 Indicator actuator page 6



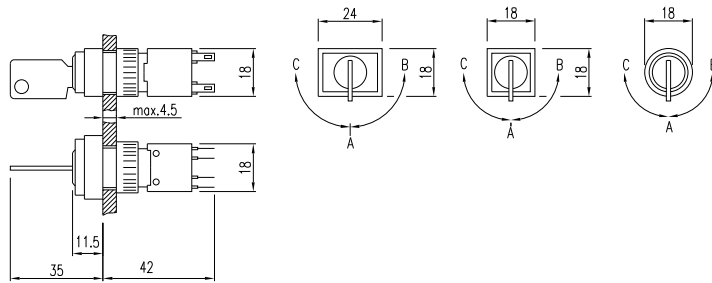
2 Indicator actuator page 6 | Illuminated pushbutton actuator page 7



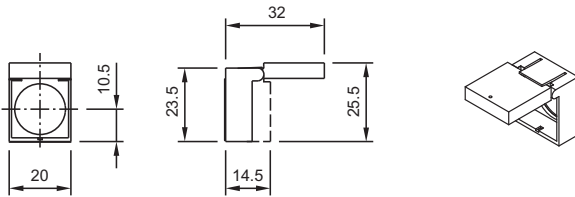
3 Keylock switch 2 positions page 8



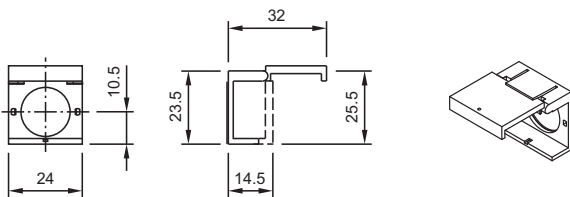
4 Keylock switch 3 positions page 9



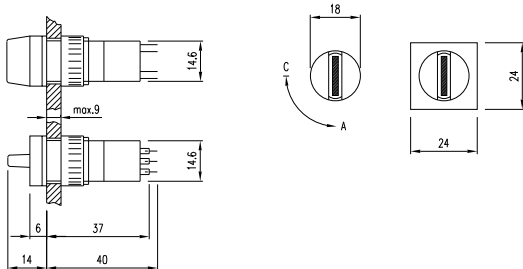
5 Protective cover page 13



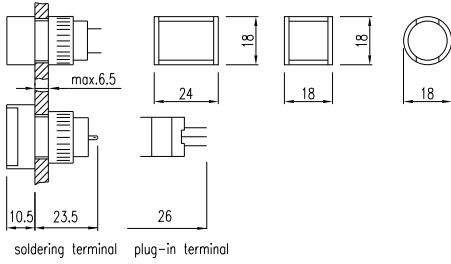
6 Protective cover page 13



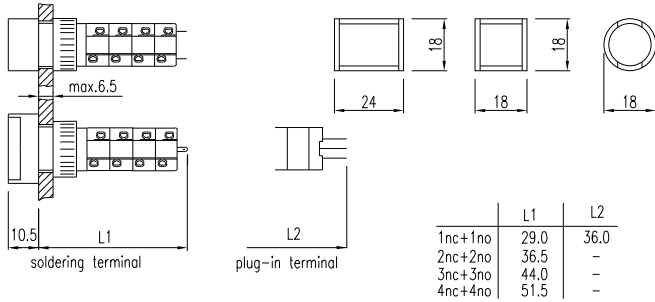
7 Selector switch 2 positions page 10



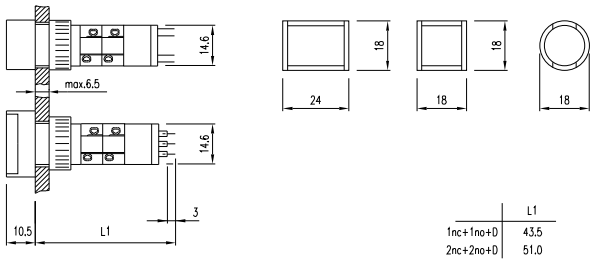
8 Indicator actuator page 6



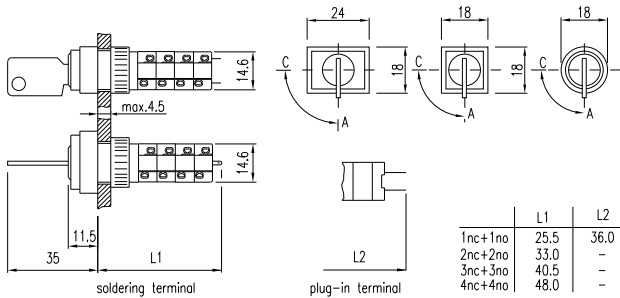
9 Illuminated pushbutton actuator page 7



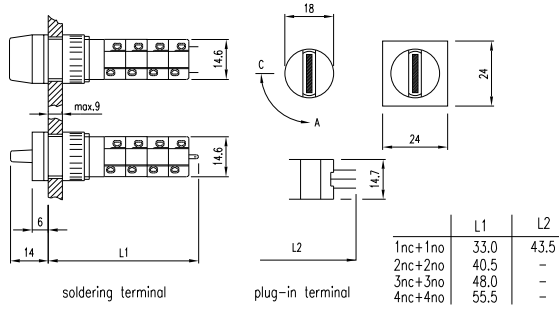
10 Illuminated pushbutton actuator page 7



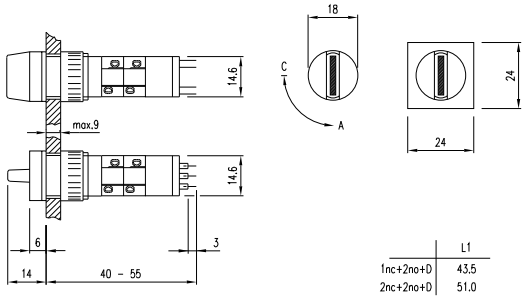
11 Keylock switch 2 positions page 8



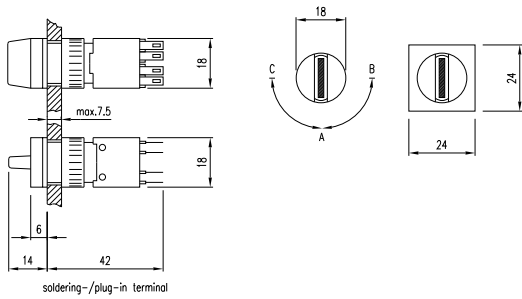
12 Selector switch 2 positions page 10



13 Selector switch 2 positions page 10



14 Selector switch 3 positions page 11



Circuit drawing

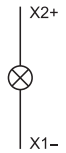
1 Indicator actuator page 6

a-(x1)

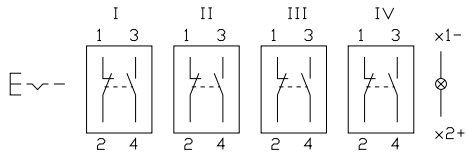


b+(x2)

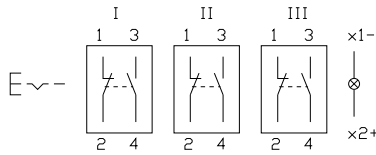
2 Indicator actuator page 6



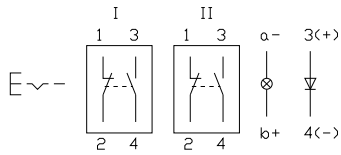
3 Illuminated pushbutton actuator page 7



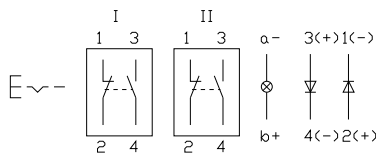
4 Illuminated pushbutton actuator page 7



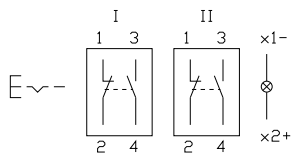
5 Illuminated pushbutton actuator page 7



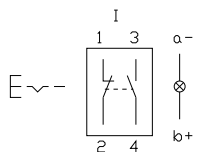
6 Illuminated pushbutton actuator page 7



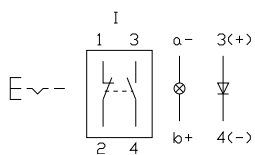
7 Illuminated pushbutton actuator page 7



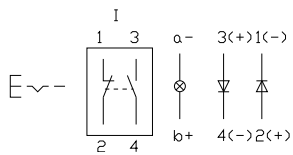
8 Illuminated pushbutton actuator page 7



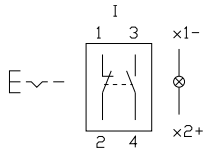
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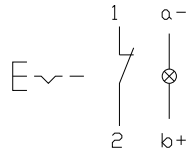
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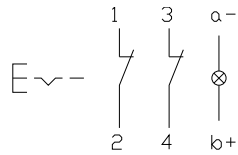
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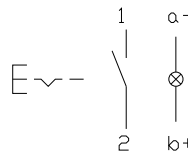
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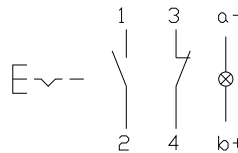
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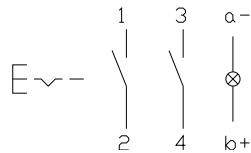
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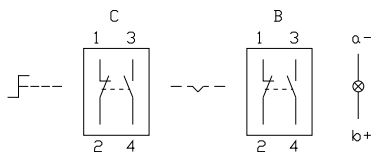
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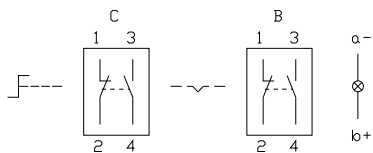
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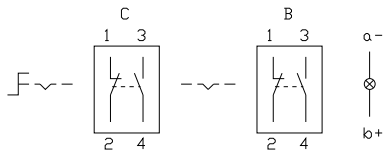
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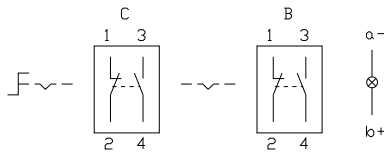
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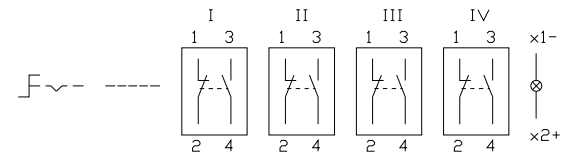
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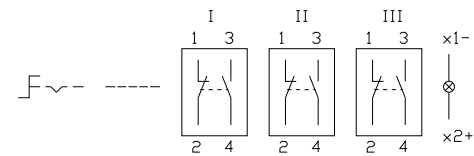
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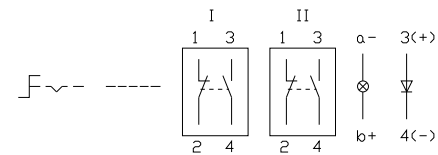
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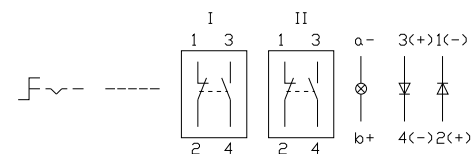
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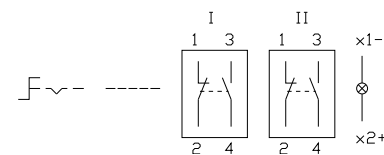
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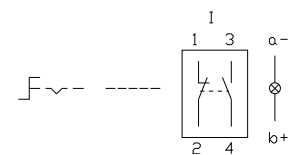
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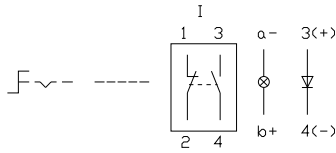
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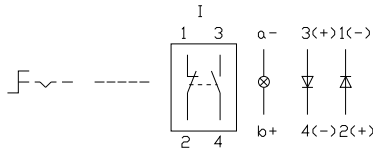
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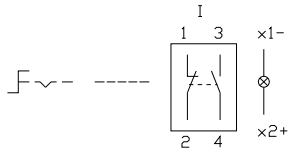
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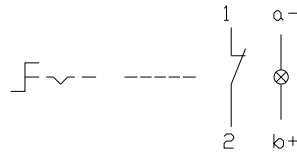
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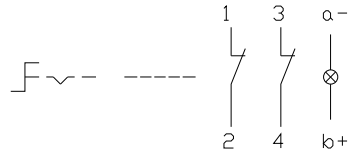
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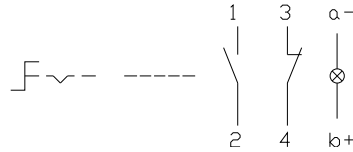
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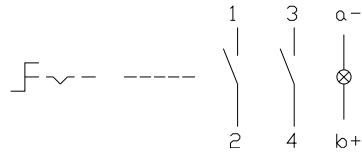
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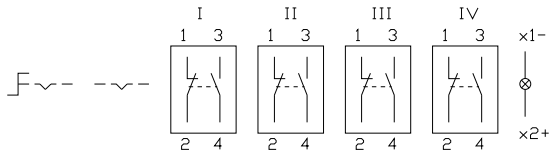
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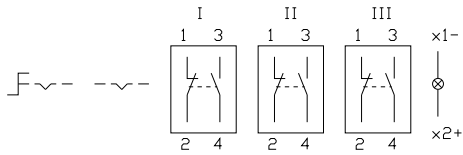
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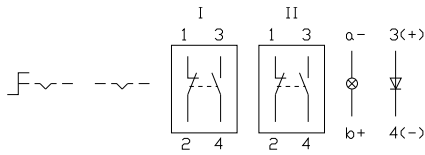
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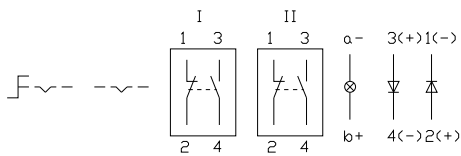
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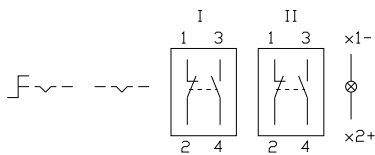
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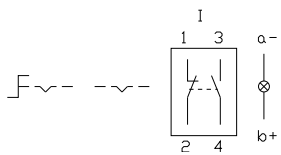
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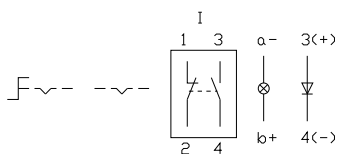
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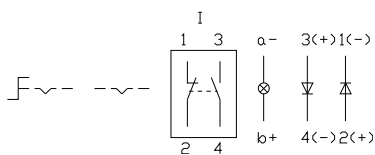
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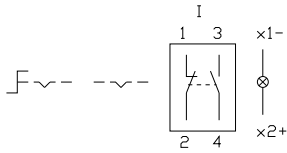
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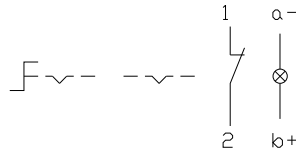
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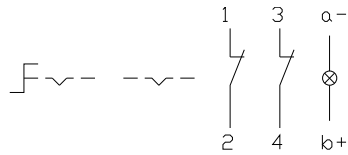
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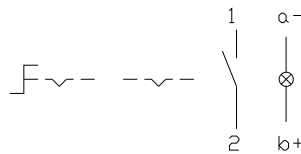
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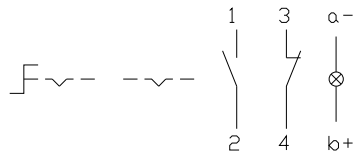
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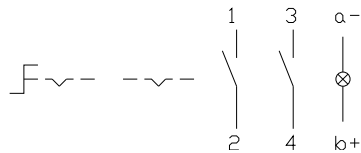
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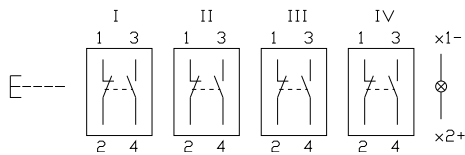
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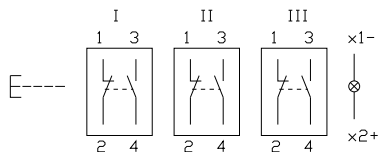
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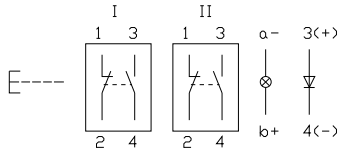
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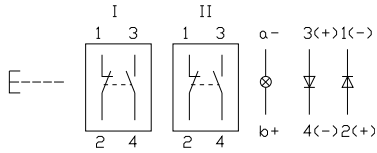
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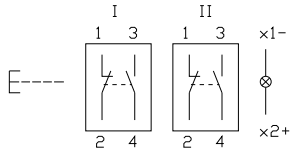
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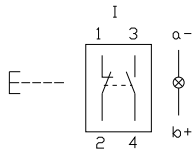
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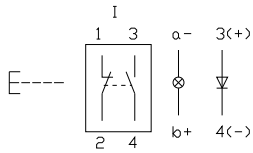
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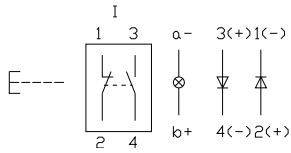
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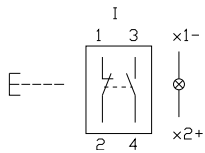
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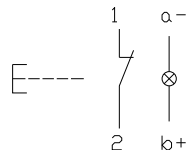
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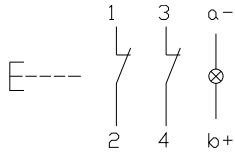
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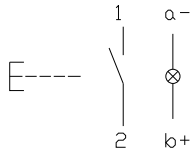
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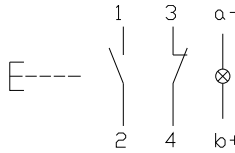
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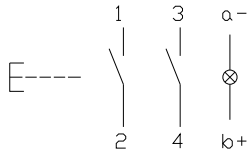
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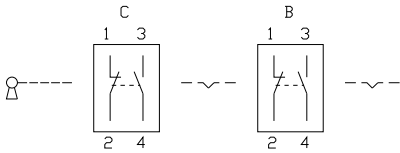
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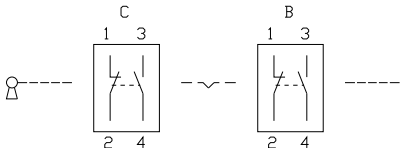
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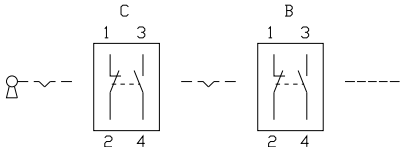
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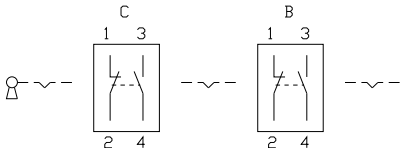
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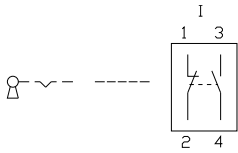
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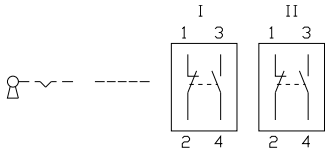
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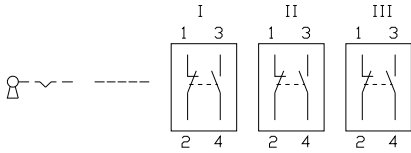
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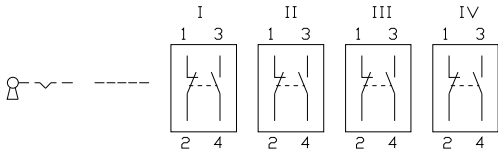
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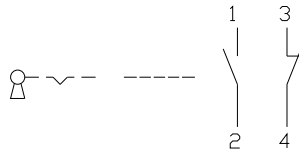
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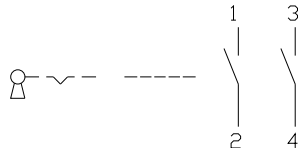
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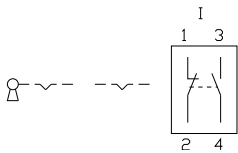
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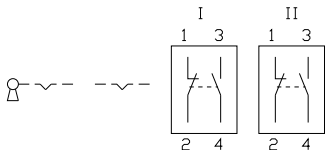
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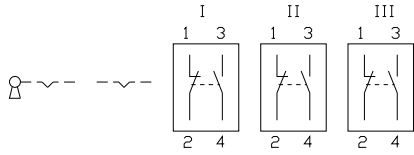
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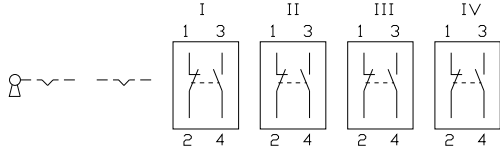
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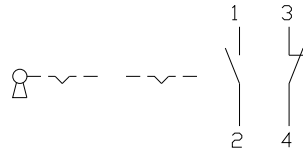
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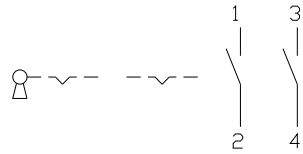
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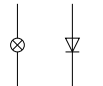


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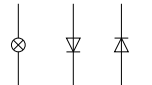
a-(x1) 3(+)



b+(x2) 4(-)

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a-(x1) 3(+) 1(-)



b+(x2) 4(-) 2(+)

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	EAO AG
	Tannwaldstrasse 88 4601 Olten, Switzerland
E-mail	info@eao.com
Website	www.eao.com
	Austria
Phone	+49 201 85 87 0
Fax	+49 201 85 87 210
E-mail	sales.ede@eao.com
	Belgium
Phone	+32 3 777 82 36
Fax	+32 3 777 84 19
E-mail	sales.ebl@eao.com
	China
Phone	+852 27 86 91 41
Fax	+852 27 86 95 61
E-mail	sales.ehk@eao.com
	France
Phone	+33 1 64 43 37 37
Fax	+33 1 64 43 37 49
E-mail	sales.esa@eao.com
	Germany
Phone	+49 201 85 87 0
Fax	+49 201 85 87 210
E-mail	sales.ede@eao.com
	Italy
Phone	+39 035 481 0189
Fax	+39 035 481 3786
E-mail	sales.eit@eao.com
	Japan
Phone	+81 3 5401 0953
Fax	+81 3 5444 0345
E-mail	sales.esj@eao.com
	Netherlands
Phone	+31 78 653 17 00
Fax	+31 78 653 17 99
E-mail	sales.enl@eao.com
	Sweden
Phone	+46 8 683 86 60
Fax	+46 8 724 29 12
E-mail	sales.esw@eao.com
	Switzerland
Phone	+41 62 388 95 00
Fax	+41 62 388 95 55
E-mail	sales.ech@eao.com
	United Kingdom
Phone	+44 1444 236 000
Fax	+44 1444 236 641
E-mail	sales.euk@eao.com
	USA
Phone	+1 203 877 4577
Fax	+1 203 877 3694
E-mail	sales.eus@eao.com
	Other Countries
Phone	+41 62 286 92 10
Fax	+41 62 296 21 62
E-mail	info@eao.com

