

EAO – Your Expert Partner for  
Human Machine Interfaces

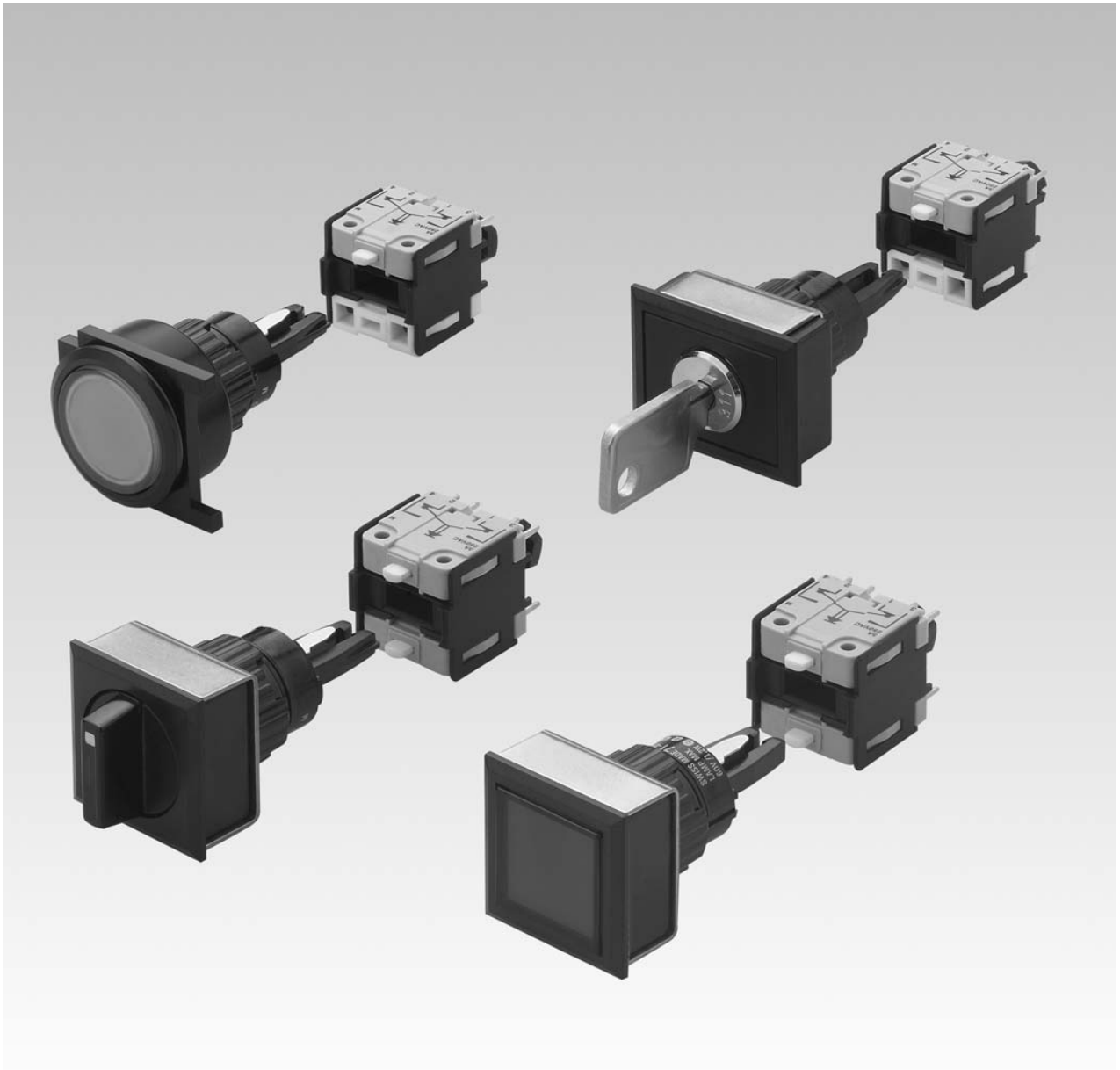


## EAO Product Information

Series 71

**e a o** ■





**Description ..... 3**

**Product Assembly ..... 4**

**Devices flush mounting ..... 8**

**Accessories..... 12**

**Technical Data..... 21**

**Application guidelines..... 22**

**Drawings..... 23**

**Index..... 29**

## Product Information

### General notes

The system switch 71 is a pushbutton system of modular design, which is especially suited for the assembly of input units. It consists of a lens, front module, actuator and switching element. It has five decisive advantages:

#### 1. Attractive front design

Various attractively designed low profile actuators guarantee ergonomic and user-friendly operation.

#### 2. A multitude of combinations

Due to a clever modular assembly system - based on PCB technology - with a standard print layout, this system component tops also anything in flexibility.

#### 3. Compact operation unit

The extremely small dimensions of the switching elements and the use of PCB's give a broad scope of benefits where space is a premium.

#### 4. Efficient manufacture

The print adaptable switching element can be directly soldered to the PCB without the aid of additional mechanical or electrical mounting components. This means reduced production costs, reduction of wiring errors and bad contacts.

#### 5. A clever way of mounting

Front module and PCB module can be simple assembled and disassembled without tools due to the patented interlocking pin mechanism.

### Mounting

All actuators are plugged into the mounting cut-out from the front via front module. It is then fixed into place from the back with the mounting clip and the locking nut. The max. torque on the locking nut is limited to 50 Ncm.

The switching element can be pre-mounted on the PCB and later connected to the actuator by insertion of the position legs and securing with the interlocking pin mechanism. Additional adjusting or spacers are not required.

It has to pay attention, that there will be no kind of mechanical stress on the PCB (eg. caused by tension on the wiring).

### Lenses

The flat, transparent lenses are available in various colours. The round version can also be supplied in aluminium. Anodized aluminium parts can have visible variations due production-technical reasons.

### Illumination

T1 <sup>3</sup>/<sub>4</sub> midget groove LED's in red, blue, green, yellow and white or filament lamps give superb illumination and can be supplied in 6, 12, 24, or 48 V.

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

### 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

#### Pushbutton :

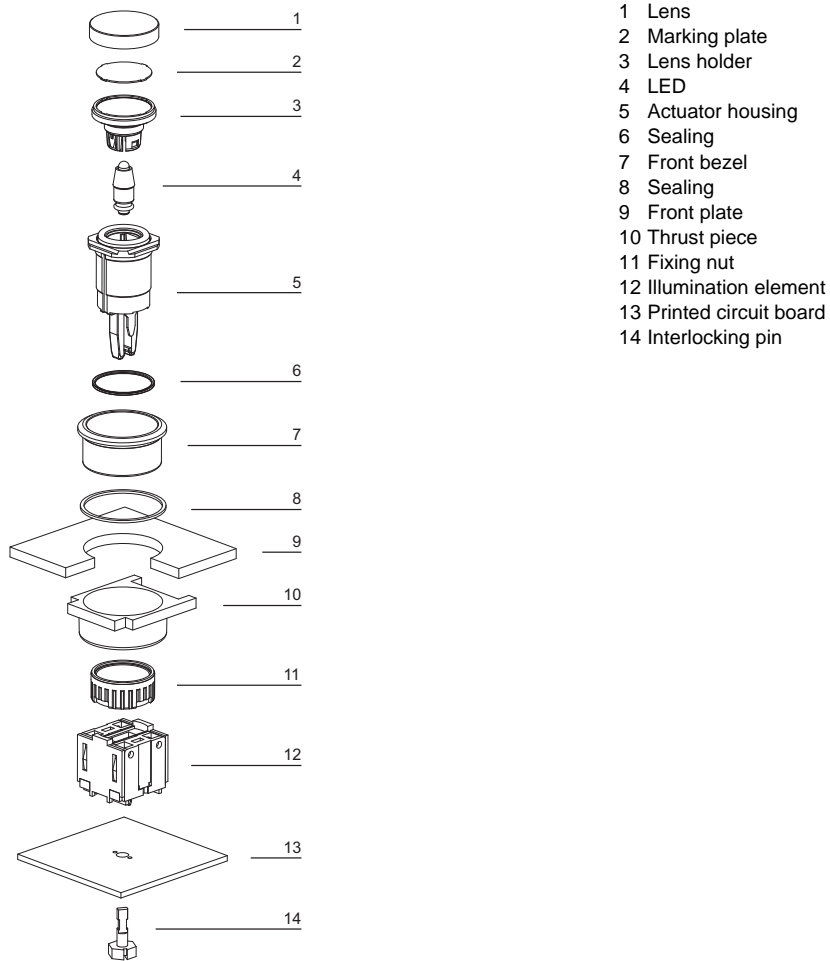
- Illuminated pushbutton actuator, momentary action, 25 mm dia. 71-611.0

#### Essential accessories :

- Lens plastic green transparent, 25 mm dia. 61-9642.7
- Single-LED T1 <sup>3</sup>/<sub>4</sub> MG, 24 VDC, green 10-2J12.1065
- Front bezel set for Illuminated Pushbutton, Aluminium natural, 25 mm dia. 61-9933.0
- Switching element 1 NC + 1 NO 71-671.026

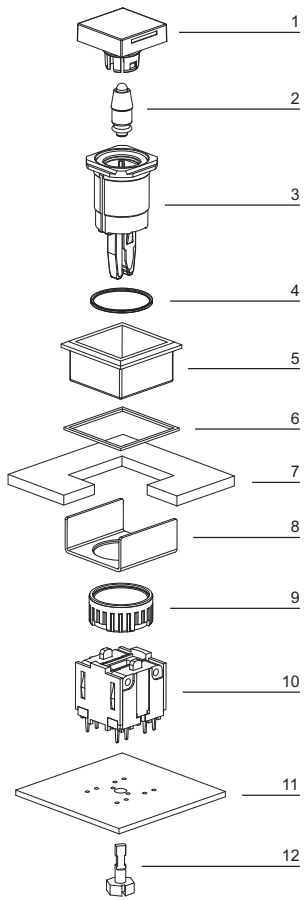
*We reserve the right to modify technical data  
All dimensions in mm*

## Indicator, flush mounting



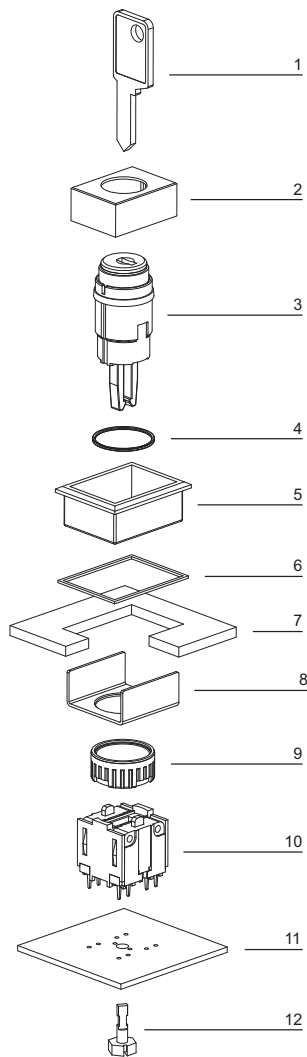
- 1 Lens
- 2 Marking plate
- 3 Lens holder
- 4 LED
- 5 Actuator housing
- 6 Sealing
- 7 Front bezel
- 8 Sealing
- 9 Front plate
- 10 Thrust piece
- 11 Fixing nut
- 12 Illumination element
- 13 Printed circuit board
- 14 Interlocking pin

## Pushbutton illuminative, flush mounting



- 1 Lens
- 2 LED
- 3 Actuator housing
- 4 Sealing
- 5 Front bezel
- 6 Sealing
- 7 Front plate
- 8 Fixing bracket
- 9 Fixing nut
- 10 Switching element
- 11 Printed circuit board
- 12 Interlocking pin

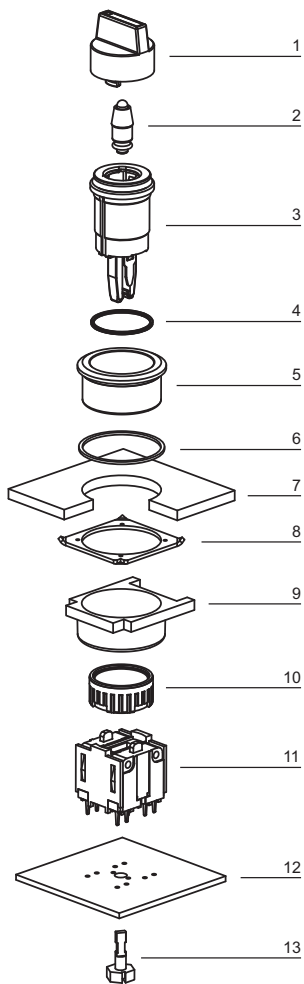
## Keylock switch, flush mounting



- 1 Key
- 2 Keylock front bezel
- 3 Keylock switch actuator
- 4 Sealing
- 5 Front bezel
- 6 Sealing
- 7 Front plate
- 8 Fixing bracket
- 9 Fixing nut
- 10 Switching element
- 11 Printed circuit board
- 12 Interlocking pin



## Selector switch illuminative, flush mounting







- 1 Lever
- 2 LED
- 3 Selector switch actuator
- 4 Sealing
- 5 Front bezel
- 6 Sealing
- 7 Front plate
- 8 Anti-twist ring
- 9 Thrust piece
- 10 Fixing nut
- 11 Switching element
- 12 Printed circuit board
- 13 Interlocking pin

## Indicator actuator, flush mounting

Actuators usable for front dimensions:  $\square$  24 x 24 mm |  $\square$  24 x 30 mm | 25 mm dia.



### Essential Accessories:

-  Front bezel set for Indicators and Illuminated pushbutton, flush mounting page 14
-  Illumination element page 17
-  Lens plastic, flush mounting page 12
-  Single-LED page 19

	Front protection	Typ-Nr.	Mounting dimensions	Technical drawing	Circuit drawing	
<b>Indicator actuator, flush mounting</b>	IP 65	<b>71-600.0</b>	1	6	3	0.005





Mounting dimensions from page 24, Technical drawing from page 24, Circuit drawing from page 26

## Illuminated pushbutton actuator, flush mounting

Actuators usable for front dimensions:  $\square$  24 x 24 mm |  $\square$  24 x 30 mm | 25 mm dia.



### Essential Accessories:

-  Front bezel set for Indicators and Illuminated pushbutton, flush mounting page 14
-  Lens plastic, flush mounting page 12
-  Single-LED page 19
-  Switching element for Illuminated pushbutton | Mushroom-head pushbutton page 18

	Front protection	Switching action	Typ-Nr.	Mounting dimensions	Technical drawing	Circuit drawing	
<b>Illuminated pushbutton actuator, flush mounting</b>	IP 65	MA	<b>71-612.0</b>	1	6	5	0.005
		M	<b>71-611.0</b>	1	6	4	0.005




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


Mounting dimensions from page 24, Technical drawing from page 24, Circuit drawing from page 26

## Mushroom-head pushbutton actuator, flush mounting



### Essential Accessories:

-  Front bezel set for Mushroom-head pushbutton, flush mounting page 15
-  Mushroom-head cap page 13
-  Switching element for Illuminated pushbutton | Mushroom-head pushbutton page 18

	Front protection	Switching action	Ø 32 mm Typ-Nr.	Mounting dimensions	Technical drawing	Circuit drawing	
<b>Mushroom-head pushbutton actuator, flush mounting</b>	IP 65	MA	<b>71-612.0</b>	2 5 1	0.005		
		M	<b>71-611.0</b>	2 5 2	0.005		

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




Mounting dimensions from page 24, Technical drawing from page 24, Circuit drawing from page 26

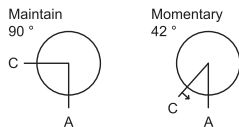
## Keylock switch actuator 2 positions, flush mounting


Actuators usable for front dimensions:  $\square$  24 x 24 mm |  $\square$  24 x 30 mm | 25 mm dia.



### Essential Accessories:

-  Front bezel set for Keylock switch, flush mounting page 15
-  Keylock front bezel for keylock switch, flush mounting page 13
-  Switching element for Keylock- and Selector switch 2 positions page 18



	Front protection	Switching action	Key remove	Typ-Nr.	Mounting dimensions	Technical drawing	Circuit drawing	
<b>Keylock switch actuator 2 positions, flush mounting</b> Position A : Basic position Standard lock 311	IP 65	MA	A	<b>71-622.0/D</b>	1 7 11	0.003		
			C	<b>71-623.0/D</b>	1 7 11	0.003		
			C + A	<b>71-624.0/D</b>	1 7 11	0.003		
		M	A	<b>71-621.0/D</b>	1 7 10	0.003		

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

Mounting dimensions from page 24, Technical drawing from page 24, Circuit drawing from page 26

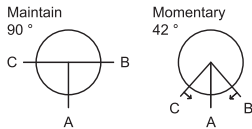
## Keylock switch actuator 3 positions, flush mounting

Actuators usable for front dimensions:  $\square$  24 x 24 mm |  $\square$  24 x 30 mm | 25 mm dia.



### Essential Accessories:

- Front bezel set for Keylock switch, flush mounting page 15
- Keylock front bezel for keylock switch, flush mounting page 13
- Switching element for Keylock- and Selector switch 3 positions page 18



	Front protection	Switching action	Key remove	Typ-Nr.	Mounting dimensions	Technical drawing	Circuit drawing	
<b>Keylock switch actuator 3 positions, flush mounting</b> Position A : Basic position Standard lock 311	IP 65	MA-0-MA	A	<b>71-632.0/D</b>	1	7	13	0.003
			C	<b>71-633.0/D</b>	1	7	13	0.003
			C + A + B	<b>71-635.0/D</b>	1	7	13	0.003
			C + B	<b>71-634.0/D</b>	1	7	13	0.003
	MA-0-M	A	<b>71-636.0/D</b>	1	7	12	0.003	
		C + A	<b>71-637.0/D</b>	1	7	12	0.003	
	M-0-MA	A	<b>71-638.0/D</b>	1	7	9	0.003	
		A + B	<b>71-639.0/D</b>	1	7	9	0.003	
	M-0-M	A	<b>71-631.0/D</b>	1	7	8	0.003	

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

Mounting dimensions from page 24, Technical drawing from page 24, Circuit drawing from page 26

## Selector switch actuator 2 positions, flush mounting

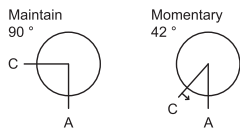
illuminative

Actuators usable for front dimensions:  $\square$  24 x 24 mm | 25 mm dia.



### Essential Accessories:

- Front bezel set for Selector switch, flush mounting page 16
- Lever, flush mounting page 14
- Single-LED page 19
- Switching element for Keylock- and Selector switch 2 positions page 18



	Front protection	Switching action	Typ-Nr.	Mounting dimensions	Technical drawing	Circuit drawing	
<b>Selector switch actuator 2 positions, flush mounting</b> Position A : Basic position	IP 65	MA	<b>71-642.0</b>	1	8	15	0.003
		M	<b>71-641.0</b>	1	8	14	0.003

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

Mounting dimensions from page 24, Technical drawing from page 24, Circuit drawing from page 26





## Selector switch actuator 3 positions, flush mounting

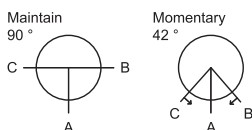
illuminative


Actuators usable for front dimensions:  $\square$  24 x 24 mm | 25 mm dia.



### Essential Accessories:

-  Front bezel set for Selector switch, flush mounting page 16
-  Lever, flush mounting page 14
-  Single-LED page 19
-  Switching element for Keylock- and Selector switch 3 positions page 18



	Front protection	Switching action	Typ-Nr.	Mounting dimensions	Technical drawing	Circuit drawing	
<b>Selector switch actuator 3 positions, flush mounting</b> Position A : Basic position	IP 65	MA-0-MA	<b>71-652.0</b>	1 8	19	0.003	
		MA-0-M	<b>71-656.0</b>	1 8	18	0.003	
		M-0-MA	<b>71-658.0</b>	1 8	17	0.003	
		M-0-M	<b>71-651.0</b>	1 8	16	0.003	


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

Mounting dimensions from page 24, Technical drawing from page 24, Circuit drawing from page 26

## Front


### Lens plastic, flush mounting

mat

	Lens	∅ 24 x 24 mm Typ-Nr.	∅ 24 x 30 mm Typ-Nr.	∅ 25 mm Typ-Nr.	
<b>Lens plastic, flush mounting</b> illuminative	blue transparent flush	<b>61-9671.6</b>	<b>61-9681.6</b>	<b>61-9642.6</b>	0.002
	colourless transparent flush	<b>61-9671.7</b>	<b>61-9681.7</b>	<b>61-9642.7</b>	0.002
	green transparent flush	<b>61-9671.5</b>	<b>61-9681.5</b>	<b>61-9642.5</b>	0.002
	orange transparent flush	<b>61-9671.3</b>	<b>61-9681.3</b>	<b>61-9642.3</b>	0.002
	red transparent flush	<b>61-9671.2</b>	<b>61-9681.2</b>	<b>61-9642.2</b>	0.002
	smoked transparent flush	<b>61-9671.1</b>	<b>61-9681.1</b>	<b>61-9642.1</b>	0.002
	yellow transparent flush	<b>61-9671.4</b>	<b>61-9681.4</b>	<b>61-9642.4</b>	0.002
non-illuminative	black opaque flush	<b>61-9771.0</b>	<b>61-9781.0</b>		0.002
	grey opaque flush	<b>61-9771.8</b>	<b>61-9781.8</b>		0.002
	white translucent flush	<b>61-9771.9</b>	<b>61-9781.9</b>		0.002



### Lens plastic with symbol


	Symbol	Lens	∅ 25 mm Typ-Nr.	
<b>Lens plastic with symbol</b> flush - level, illuminative	ON/OFF	blue transparent	<b>61-9643.602</b>	0.002
		colourless transparent	<b>61-9643.702</b>	0.002
		green transparent	<b>61-9643.502</b>	0.002
		red transparent	<b>61-9643.202</b>	0.002
	Ring	blue transparent	<b>61-9643.601</b>	0.002
		colourless transparent	<b>61-9643.701</b>	0.002
		green transparent	<b>61-9643.501</b>	0.002
		orange transparent	<b>61-9643.301</b>	0.002
		red transparent	<b>61-9643.201</b>	0.002
		yellow transparent	<b>61-9643.401</b>	0.002
	Stand by	blue transparent	<b>61-9643.603</b>	0.002
		colourless transparent	<b>61-9643.703</b>	0.002
		green transparent	<b>61-9643.503</b>	0.002
		red transparent	<b>61-9643.203</b>	0.002



The silvery coat is being applied on the lens (screen print) with an additional protective lacquer.

### Marking plate for lens plastic


can be hot stamped

	Marking plate	Typ-Nr.	
<b>Marking plate for lens plastic</b> only applicable with Lens round Typ-Nr. 61-9642.X	Plastic colourless transparent	<b>61-9707.7</b>	0.001



## Lens metal with spot

mat

	Lens	Ø 25 mm Typ-Nr.	
<b>Lens metal with spot</b>	Aluminium black flush	<b>61-9841.0A</b>	0.002
	Aluminium blue flush	<b>61-9841.6A</b>	0.002
	Aluminium gold flush	<b>61-9841.4A</b>	0.002
	Aluminium natural flush	<b>61-9841.8A</b>	0.002
	Aluminium olive-green flush	<b>61-9841.5A</b>	0.002
	Aluminium red flush	<b>61-9841.2A</b>	0.002




## Lens metal

mat

	Lens	Ø 25 mm Typ-Nr.	
<b>Lens metal convex</b>	Aluminium black	<b>61-9842.0</b>	0.003
	Aluminium blue	<b>61-9842.6</b>	0.003
	Aluminium gold	<b>61-9842.4</b>	0.003
	Aluminium natural	<b>61-9842.8</b>	0.003
	Aluminium olive-green	<b>61-9842.5</b>	0.003
	Aluminium red	<b>61-9842.2</b>	0.003
flush	Aluminium black	<b>61-9841.0</b>	0.002
	Aluminium blue	<b>61-9841.6</b>	0.002
	Aluminium gold	<b>61-9841.4</b>	0.002
	Aluminium natural	<b>61-9841.8</b>	0.002
	Aluminium olive-green	<b>61-9841.5</b>	0.002
	Aluminium red	<b>61-9841.2</b>	0.002




## Mushroom-head cap

	Mushroom had cap	Ø 32 mm Typ-Nr.	
<b>Mushroom-head cap</b>	Plastic black opaque	<b>61-9593.0</b>	0.004
	Plastic green opaque	<b>61-9593.5</b>	0.004
	Plastic red opaque	<b>61-9593.2</b>	0.004
	Plastic yellow opaque	<b>61-9593.4</b>	0.004



## Keylock front bezel for keylock switch, flush mounting

	Keylock front bezel	Ø 24 x 24 mm Typ-Nr.	Ø 24 x 30 mm Typ-Nr.	Ø 25 mm Typ-Nr.	
<b>Keylock front bezel for keylock switch, flush mounting</b>	Plastic black	<b>61-9220.0</b>	<b>61-9230.0</b>	<b>61-9210.0</b>	0.001



## Lever, flush mounting

	Lever	Bar colour	Typ-Nr.	QTY
<b>Lever, flush mounting</b> illuminative	Plastic black	blue	<b>61-9028.60</b>	0.001
		green	<b>61-9028.50</b>	0.001
		orange	<b>61-9028.30</b>	0.001
		red	<b>61-9028.20</b>	0.001
		yellow	<b>61-9028.40</b>	0.001
	Plastic grey	blue	<b>61-9029.60</b>	0.001
		green	<b>61-9029.50</b>	0.001
		orange	<b>61-9029.30</b>	0.001
		red	<b>61-9029.20</b>	0.001
		yellow	<b>61-9029.40</b>	0.001
non-illuminative	Plastic black	black	<b>61-9028.0</b>	0.001
		white	<b>61-9028.9</b>	0.001
	Plastic grey	grey	<b>61-9029.8</b>	0.001
		white	<b>61-9029.9</b>	0.001



## Front bezel set for Indicators and Illuminated pushbutton, flush mounting

	Front bezel	∅ 24 x 24 mm Typ-Nr.	□ 24 x 30 mm Typ-Nr.	∅ 25 mm Typ-Nr.	Mounting dimensions	QTY
<b>Front bezel set for Indicators</b> <b>and Illuminated pushbutton,</b> <b>flush mounting</b>	Plastic black	<b>61-9930.0</b>	<b>61-9931.0</b>	<b>61-9933.10</b>	1	0.008
	Plastic silver	<b>61-9930.4</b>	<b>61-9931.4</b>		1	0.008
	Aluminium black			<b>61-9933.1</b>	1	0.006
	Aluminium blue			<b>61-9933.6</b>	1	0.006
	Aluminium gold			<b>61-9933.4</b>	1	0.006
	Aluminium natural			<b>61-9933.0</b>	1	0.006
	Aluminium olive-green			<b>61-9933.5</b>	1	0.006
	Aluminium red			<b>61-9933.2</b>	1	0.006



Mounting dimensions from page 24



## Front bezel set for Mushroom-head pushbutton, flush mounting

	Front bezel	Ø 40 mm Typ-Nr.	Ø 25 mm Typ-Nr.	Mounting dimensions	
<b>Front bezel set for Mushroom-head pushbutton, flush mounting</b>	Aluminium natural	<b>61-9934.8</b>		2	0.013
	Aluminium black		<b>61-9933.1</b>	2	0.006
	Aluminium blue		<b>61-9933.6</b>	2	0.006
	Aluminium gold		<b>61-9933.4</b>	2	0.006
	Aluminium natural		<b>61-9933.0</b>	2	0.006
	Aluminium olive-green		<b>61-9933.5</b>	2	0.006
	Aluminium red		<b>61-9933.2</b>	2	0.006
	Plastic black		<b>61-9933.10</b>	2	0.008



Mounting dimensions from page 24

## Front bezel set for Keylock switch, flush mounting

	Front bezel	Ø 24 x 24 mm Typ-Nr.	Ø 24 x 30 mm Typ-Nr.	Ø 25 mm Typ-Nr.	Mounting dimensions	
<b>Front bezel set for Keylock switch, flush mounting</b>	Plastic black	<b>61-9930.0</b>	<b>61-9931.0</b>	<b>61-9932.10</b>	1	0.008
	Plastic silver	<b>61-9930.4</b>	<b>61-9931.4</b>		1	0.008
	Aluminium black			<b>61-9932.1</b>	1	0.006
	Aluminium blue			<b>61-9932.6</b>	1	0.006
	Aluminium gold			<b>61-9932.4</b>	1	0.006
	Aluminium natural			<b>61-9932.0</b>	1	0.006
	Aluminium olive-green			<b>61-9932.5</b>	1	0.006
	Aluminium red			<b>61-9932.2</b>	1	0.006



With the round front bezel sets Ø25 mm the anti-twist ring is part of the sales-package.  
Mounting dimensions from page 24

## Front bezel set for Selector switch, flush mounting

	Front bezel	⌀ 24 x 24 mm Typ-Nr.	Ø 25 mm Typ-Nr.	Mounting dimensions	
<b>Front bezel set for Selector switch, flush mounting</b>	Plastic black	<b>61-9936.0</b>		1	0.007
	Aluminium black		<b>61-9932.1</b>	1	0.006
	Aluminium blue		<b>61-9932.6</b>	1	0.006
	Aluminium gold		<b>61-9932.4</b>	1	0.006
	Aluminium natural		<b>61-9932.0</b>	1	0.006
	Aluminium olive-green		<b>61-9932.5</b>	1	0.006
	Aluminium red		<b>61-9932.2</b>	1	0.006
	Plastic black		<b>61-9932.10</b>	1	0.008



With the round front bezel sets Ø25 mm the anti-twist ring is part of the sales-package.  
Mounting dimensions from page 24

## Front protective cap

for flush - level lenses only for protection IP 68

	Front protective cap	Typ-Nr.	
<b>Front protective cap</b> for front bezel set 24 x 30 mm, flush mounting	Silicone natural transparent	<b>61-9927.2</b>	0.001
for front bezel set round, flush mounting	Silicone natural transparent	<b>84-9103.7</b>	0.001

### ATTENTION

when using the front protection cover for push buttons the external sealing in the front bezel set and the silicone bellows in the actuator are to be removed !



## Protective cover, flush mounting

	⌀ 24 x 24 mm Typ-Nr.	⌀ 24 x 30 mm Typ-Nr.	Ø 25 mm Typ-Nr.	Mounting dimensions	Technical drawing	
<b>Protective cover, flush mounting</b> hinged, transparent, with means for sealing	<b>61-9921.0</b>			1	1	0.006
		<b>61-9922.0</b>		1	2	0.006
			<b>61-9924.0</b>	1	3	0.006
slide by side, with means not for sealing						



Mounting dimensions from page 24, Technical drawing from page 24

## Blind plug, flush mounting

	Blind plug	□ 24 x 24 mm Typ-Nr.	□ 24 x 30 mm Typ-Nr.	∅ 25 mm Typ-Nr.	Mounting dimensions Technical drawing	
<b>Blind plug, flush mounting</b>	Plastic black	<b>61-9451.0</b>	<b>61-9452.0</b>		1	0.006
				<b>61-9453.0</b>	1 4	0.006



Mounting dimensions from page 24, Technical drawing from page 24

## Master key

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



## Spare key

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



Other lock numbers on request

## EMC Key protection cap

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



## Backside

### Illumination element

including Locking pin

	Terminals	Typ-Nr.	Component layout Circuit drawing	
<b>Illumination element</b>	P	<b>71-670.006</b>	1 3	0.005



Terminals: P = PCB terminal

Component layout from page 23, Circuit drawing from page 26

## Switching element for Illuminated pushbutton | Mushroom-head pushbutton

including Locking pin

	Terminals	Contacts	Typ-Nr.	Component layout		Ⓜ
				Circuit drawing		
<b>Switching element for Illuminated pushbutton   Mushroom-head pushbutton</b>	P	1 NC + 1 NO	<b>71-671.026</b>	1	7	0.005
		2 NC + 2 NO	<b>71-672.026</b>	1	6	0.005



Terminals: P = PCB terminal

Contacts: NC = Normally closed, NO = Normally open

Component layout from page 23, Circuit drawing from page 26

## Switching element for Keylock- and Selector switch 2 positions

including Locking pin

	Terminals	Contacts	Typ-Nr.	Component layout		Ⓜ
				Circuit drawing		
<b>Switching element for Keylock- and Selector switch 2 positions</b>	P	1 NC + 1 NO	<b>71-671.026</b>	1	7	0.005



Terminals: P = PCB terminal

Contacts: NC = Normally closed, NO = Normally open

Component layout from page 23, Circuit drawing from page 26

## Switching element for Keylock- and Selector switch 3 positions

including Locking pin

	Terminals	Contacts	Typ-Nr.	Component layout		Ⓜ
				Circuit drawing		
<b>Switching element for Keylock- and Selector switch 3 positions</b>		2 NC + 2 NO	<b>71-672.026</b>	1	6	0.005



Contacts: NC = Normally closed, NO = Normally open

Component layout from page 23, Circuit drawing from page 26


## Interlocking pin

	Typ-Nr.	Ⓜ
<b>Interlocking pin</b>	<b>71-679.0</b>	0.001




## Illumination

### Filament lamp

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



### Single-LED

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




Note:

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


## Assembling

### Anti-twist ring

	Typ-Nr.	
<b>Anti-twist ring</b> Mounting hole size 22.5 mm dia.	<b>61-9912.0</b>	0.002




### Lens remover

	Typ-Nr.	
<b>Lens remover</b>	<b>61-9730.0</b>	0.011



### Lamp remover


	Typ-Nr.	
<b>Lamp remover</b>	<b>61-9740.0</b>	0.003



#### CAUTION

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

### Mounting tool

	Typ-Nr.	
<b>Mounting tool</b> for Indicator 16 mm dia.	<b>01-907</b>	0.020



## System switch 71

### Switching system

Self-cleaning, double-break snap-action switching system with one NC- (Normally closed) and one NO-contact (Normally open).

### Material

#### Lens

Polycarbonat (PC), as per UL 94 V0, or Aluminium anodized

#### Front bezel

Polyetherimid (PEI), as per UL 94 V0, or Aluminium anodized

#### Material of contact

AgNi, 2 µm gold plated

#### Switching element

Polyethylene terephthalate (PETP), as per UL 94 V0

#### Actuator housing

Polyetherimide (PEI), as per UL 94 V0

### Mechanical characteristics

#### Terminals

PCB terminal, Brass gold plated

#### Actuating torque

Selector-/ Keylock switch 4 Ncm ... 8 Ncm

#### Actuating force

Pushbutton 2 N ... 3 N

#### Actuating travel

Pushbutton 3 mm

Selector-/ keylock switch	2 positions	3 positions
Momentary action	approx. 42 °	approx. 2 x 42 °
Maintained action	approx. 90 °	approx. 2 x 90 °

#### Rebound time

≤1 ms

#### Mechanical lifetime

Pushbutton maintained action	1 million	cycles of operation
Pushbutton momentary action	2 million	cycles of operation
Keylock switch	50 000	cycles of operation
Selector switch	100 000	cycles of operation

#### Resistance to heat of soldering

Manual soldering	350 °C, 3 sec.
Flow soldering	260 °C, 5 sec.

### Electrical characteristics

#### Contact resistance

Starting value (initial) ≤50 mΩ

#### Isolation resistance

≥10<sup>12</sup> Ω

#### Switch rating

Switch rating AC cosφ 0.7 ... 0.8

Voltage 250 VAC

Current 3 A

#### Switch rating DC

Voltage 24 VDC 250 VDC

Current 3 A 0.5

#### Recommended minimum operational data

Voltage 5 VAC

Current 10 mA

#### Electric strength

2000 VAC, 50 Hz, 1 min. between all terminals and earth

### Environmental conditions

#### Storage temperature

-40 °C ... +85 °C

#### Operating temperature

-25 °C ... +55 °C

#### Protection degree

Frontside IP 65

#### Shock resistance

(semi-sinusoidal)

max. 500 m/s<sup>2</sup>, pulse width 11 ms, 3-axis, as per EN IEC 60068-2-27

#### Vibration resistance

(sinusoidal)

max. 100 m/s<sup>2</sup> at 10 Hz ... 500 Hz, as per EN IEC 60068-2-6

#### Climate resistance

Damp heat, state

56 days, +40 °C / 93 % relative humidity, as per EN IEC 60068-2-78

### Approvals

#### Declaration of conformity

CE

## Suppressor circuits

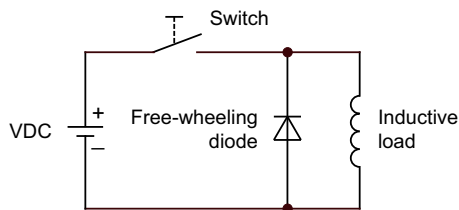
When switching inductive loads such as relays, DC motors, and DC solenoids, it is always important to absorb surges (e.g. with a diode) to protect the contacts. When these inductive loads are switched off, a counter emf can severely damage switch contacts and greatly shorten lifetime.

Fig. 1 shows an inductive load with a free-wheeling diode connected in parallel. This free-wheeling diode provides a path for the inductor current to flow when the current is interrupted by the switch. Without this free-wheeling diode, the voltage across the coil will be limited only by dielectric breakdown voltages of the circuit or parasitic elements of the coil. This voltage can be kilovolts in amplitude even when nominal circuit voltages are low (e.g. 12 VDC) see Fig. 2.

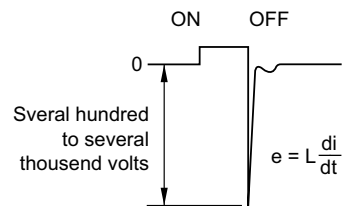
The free-wheeling diode should be chosen so that the reverse breakdown voltage is greater than the voltage driving the inductive load. The DC blocking voltage (VR) of the free-wheeling diode can be found in the datasheet of a diode. The forward current should be equal or greater than the maximum current flowing through the load.

**To get an efficient protection, the free-wheeling diode must be connected as close as possible to the inductive load!**

Switching with inductive load  
Fig. 1



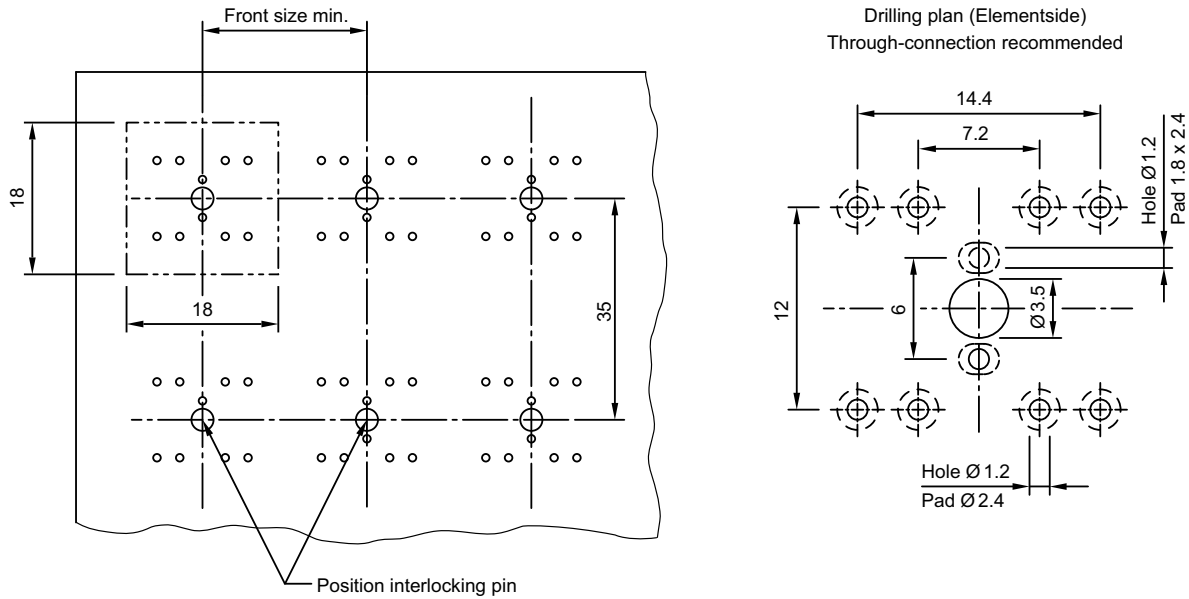
Counter emf  
over load without free-wheeling diode  
Fig. 2





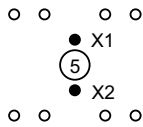
## Component layout

1 Illumination element page 17 | Switching element for Illuminated pushbutton | Mushroom-head pushbutton page 18 | Switching element for Keylock- and Selector switch 2 positions page 18 | Switching element for Keylock- and Selector switch 3 positions page 18

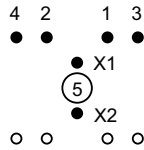


Note:  
Pitch of the print circuit board hole Ø3.5 must agree with the mounting holes on the front plate

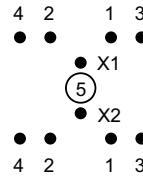
### Layout



Illumination element  
71-670.006



Switching element 1NC+1NO  
71-671.026

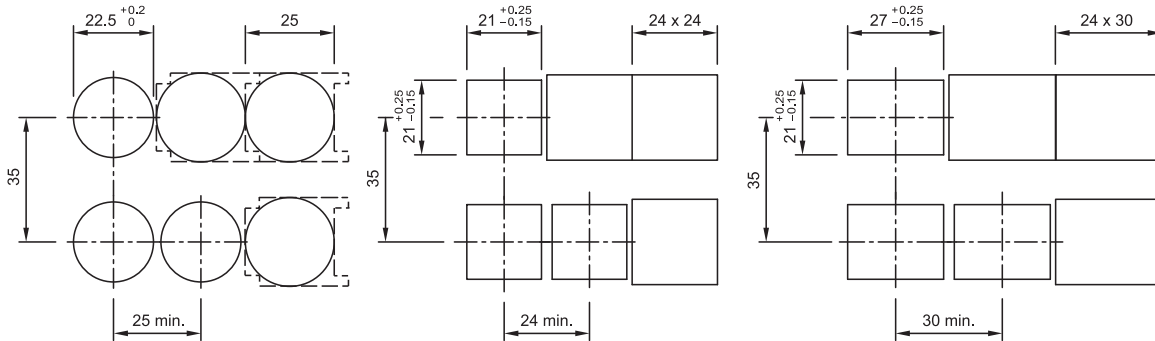


Switching element 2NC+2NO  
71-672.026

- X1 Lamp cathode (-)
- X2 Lamp anode (+)
- 1-2 Contact normally closed
- 3-4 Contact normally open
- 5 Hole for interlocking pin

## Mounting dimensions

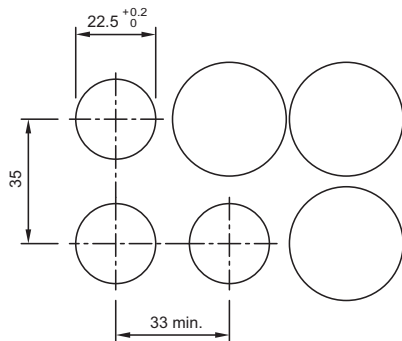
1 Indicator actuator, flush mounting page 8 | Illuminated pushbutton actuator, flush mounting page 8 | Keylock switch actuator 2 positions, flush mounting page 9 | Keylock switch actuator 3 positions, flush mounting page 10 | Selector switch actuator 2 positions, flush mounting page 10 | Selector switch actuator 3 positions, flush mounting page 11 | Front bezel set for Indicators and Illuminated pushbutton, flush mounting page 14 | Front bezel set for Keylock switch, flush mounting page 15 | Front bezel set for Selector switch, flush mounting page 16 | Protective cover, flush mounting page 16 | Blind plug, flush mounting page 17



### NOTE

Pitch of the front plate mounting holes must agree with the printed circuit board holes 3.5 dia.

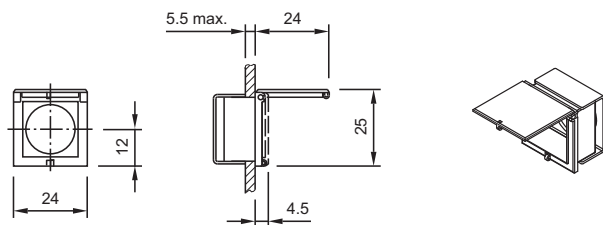
2 Mushroom-head pushbutton actuator, flush mounting page 9 | Front bezel set for Mushroom-head pushbutton, flush mounting page 15



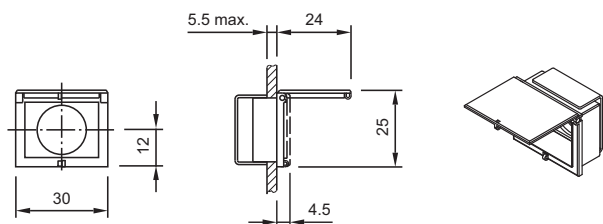
Hole spacing 41 mm min. by using front bezel set 61-9934.8

## Technical drawing

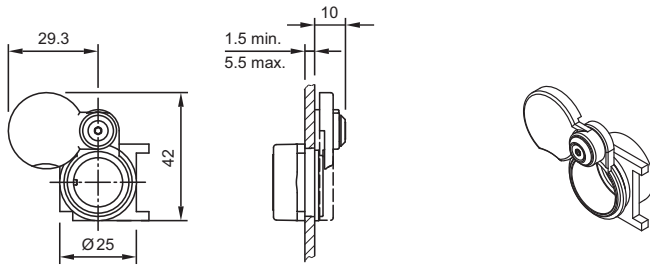
1 Protective cover, flush mounting page 16



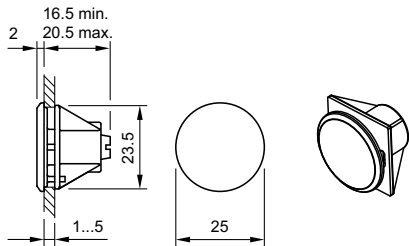
2 Protective cover, flush mounting page 16



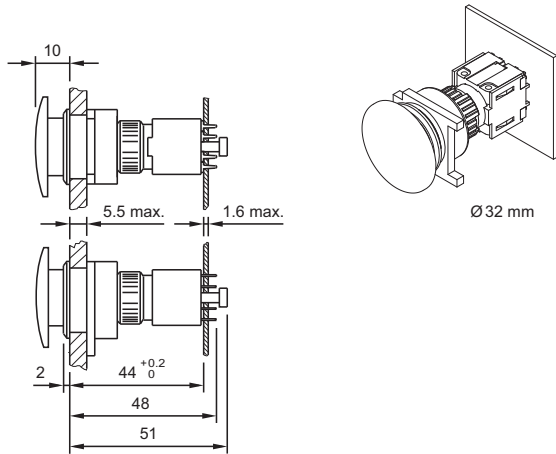
### 3 Protective cover, flush mounting page 16



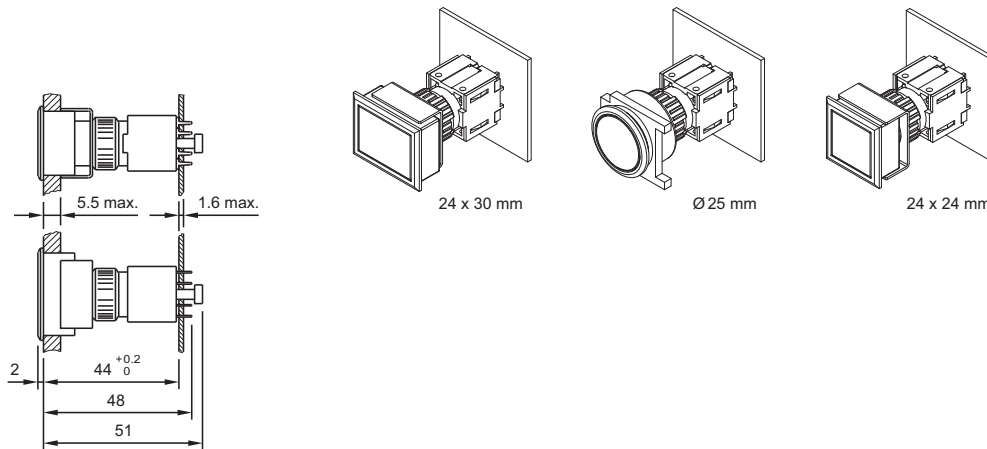
### 4 Blind plug, flush mounting page 17



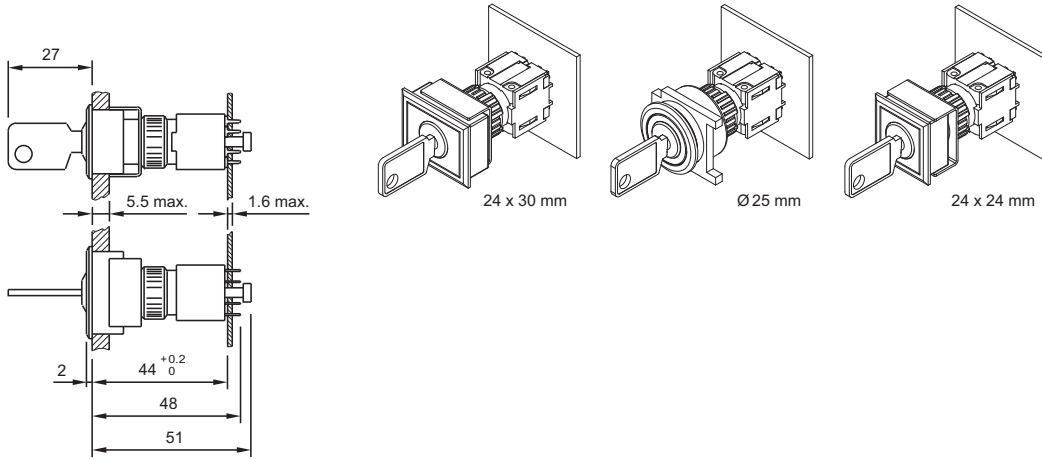
### 5 Mushroom-head pushbutton actuator, flush mounting page 9



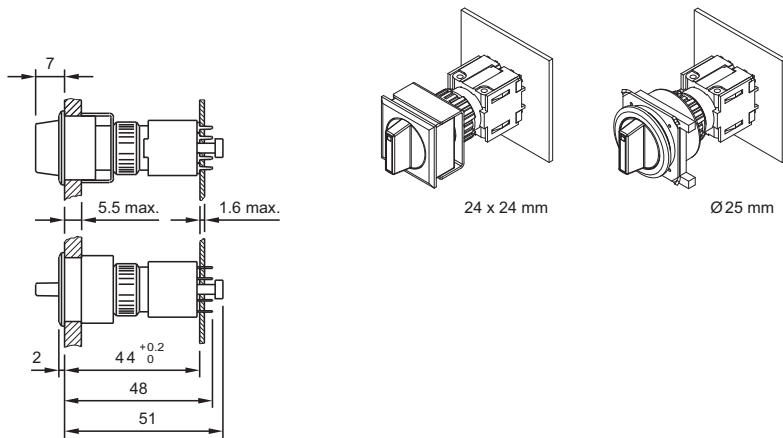
### 6 Indicator actuator, flush mounting page 8 | Illuminated pushbutton actuator, flush mounting page 8



7 Keylock switch actuator 2 positions, flush mounting page 9 | Keylock switch actuator 3 positions, flush mounting page 10



8 Selector switch actuator 2 positions, flush mounting page 10 | Selector switch actuator 3 positions, flush mounting page 11



## Circuit drawing

1 Mushroom-head pushbutton actuator, flush mounting page 9



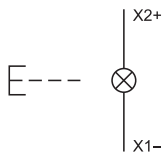
2 Mushroom-head pushbutton actuator, flush mounting page 9



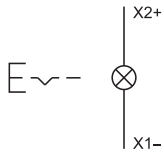
3 Indicator actuator, flush mounting page 8 | Illumination element page 17



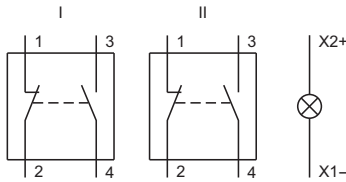
4 Illuminated pushbutton actuator, flush mounting page 8



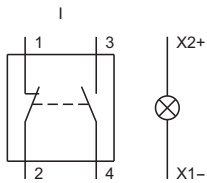
**5 Illuminated pushbutton actuator, flush mounting** page 8



**6 Switching element for Illuminated pushbutton | Mushroom-head pushbutton** page 18 | **Switching element for Keylock- and Selector switch 3 positions** page 18



**7 Switching element for Illuminated pushbutton | Mushroom-head pushbutton** page 18 | **Switching element for Keylock- and Selector switch 2 positions** page 18



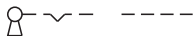
**8 Keylock switch actuator 3 positions, flush mounting** page 10



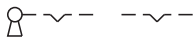
**9 Keylock switch actuator 3 positions, flush mounting** page 10



**10 Keylock switch actuator 2 positions, flush mounting** page 9



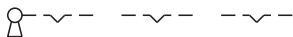
**11 Keylock switch actuator 2 positions, flush mounting** page 9



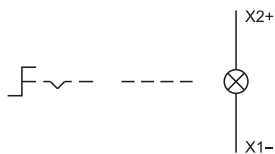
**12 Keylock switch actuator 3 positions, flush mounting** page 10



**13 Keylock switch actuator 3 positions, flush mounting** page 10



**14 Selector switch actuator 2 positions, flush mounting** page 10



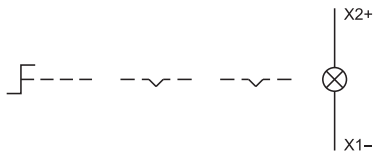
15 Selector switch actuator 2 positions, flush mounting page 10



16 Selector switch actuator 3 positions, flush mounting page 11



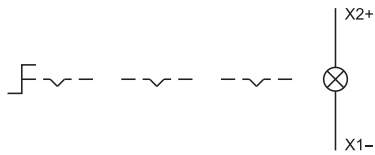
17 Selector switch actuator 3 positions, flush mounting page 11



18 Selector switch actuator 3 positions, flush mounting page 11



19 Selector switch actuator 3 positions, flush mounting page 11



# Index from Typ-Nr.

Typ-Nr.	Page	Typ-Nr.	Page	Typ-Nr.	Page
01-907	20	61-9593.4	13	61-9842.8	13
10-1306.1349	19	61-9593.5	13	61-9912.0	20
10-1307.1369	19	61-9642.1	12	61-9921.0	16
10-1309.1309	19	61-9642.2	12	61-9922.0	16
10-1310.1319	19	61-9642.3	12	61-9924.0	16
10-1311.1249	19	61-9642.4	12	61-9927.2	16
10-1312.1229	19	61-9642.5	12	61-9930.0	14
10-1313.1209	19	61-9642.6	12	61-9930.0	15
10-1313.1249	19	61-9642.7	12	61-9930.4	14
10-1316.1179	19	61-9643.201	12	61-9930.4	15
10-1316.1209	19	61-9643.202	12	61-9931.0	14
10-1319.1179	19	61-9643.203	12	61-9931.0	15
10-1319.1199	19	61-9643.301	12	61-9931.4	14
10-2J06.3142	19	61-9643.401	12	61-9931.4	15
10-2J06.3144	19	61-9643.501	12	61-9932.0	15
10-2J06.3145	19	61-9643.502	12	61-9932.0	16
10-2J06.3146	19	61-9643.503	12	61-9932.1	15
10-2J06.3149	19	61-9643.601	12	61-9932.1	16
10-2J09.1062	19	61-9643.602	12	61-9932.10	15
10-2J09.1064	19	61-9643.603	12	61-9932.10	16
10-2J09.1065	19	61-9643.701	12	61-9932.2	15
10-2J09.1066	19	61-9643.702	12	61-9932.2	16
10-2J09.1069	19	61-9643.703	12	61-9932.4	15
10-2J12.1062	19	61-9671.1	12	61-9932.4	16
10-2J12.1064	19	61-9671.2	12	61-9932.5	15
10-2J12.1065	19	61-9671.3	12	61-9932.5	16
10-2J12.1066	19	61-9671.4	12	61-9932.6	15
10-2J12.1069	19	61-9671.5	12	61-9932.6	16
10-2J13.1062	19	61-9671.6	12	61-9933.0	14
10-2J13.1064	19	61-9671.7	12	61-9933.0	15
10-2J13.1065	19	61-9681.1	12	61-9933.1	14
10-2J13.1066	19	61-9681.2	12	61-9933.1	15
10-2J13.1069	19	61-9681.3	12	61-9933.10	14
10-2J19.1042	19	61-9681.4	12	61-9933.10	15
10-2J19.1044	19	61-9681.5	12	61-9933.2	14
10-2J19.1045	19	61-9681.6	12	61-9933.2	15
10-2J19.1046	19	61-9681.7	12	61-9933.4	14
10-2J19.1049	19	61-9707.7	12	61-9933.4	15
31-985.0	17	61-9730.0	20	61-9933.5	14
31-989.300	17	61-9740.0	20	61-9933.5	15
31-989.311	17	61-9771.0	12	61-9933.6	14
61-9028.0	14	61-9771.8	12	61-9933.6	15
61-9028.20	14	61-9771.9	12	61-9934.8	15
61-9028.30	14	61-9781.0	12	61-9936.0	16
61-9028.40	14	61-9781.8	12	71-600.0	8
61-9028.50	14	61-9781.9	12	71-611.0	8
61-9028.60	14	61-9841.0	13	71-611.0	9
61-9028.9	14	61-9841.0A	13	71-612.0	8
61-9029.20	14	61-9841.2	13	71-612.0	9
61-9029.30	14	61-9841.2A	13	71-621.0/D	9
61-9029.40	14	61-9841.4	13	71-622.0/D	9
61-9029.50	14	61-9841.4A	13	71-623.0/D	9
61-9029.60	14	61-9841.5	13	71-624.0/D	9
61-9029.8	14	61-9841.5A	13	71-631.0/D	10
61-9029.9	14	61-9841.6	13	71-632.0/D	10
61-9210.0	13	61-9841.6A	13	71-633.0/D	10
61-9220.0	13	61-9841.8	13	71-634.0/D	10
61-9230.0	13	61-9841.8A	13	71-635.0/D	10
61-9451.0	17	61-9842.0	13	71-636.0/D	10
61-9452.0	17	61-9842.2	13	71-637.0/D	10
61-9453.0	17	61-9842.4	13	71-638.0/D	10
61-9593.0	13	61-9842.5	13	71-639.0/D	10
61-9593.2	13	61-9842.6	13	71-641.0	10

# Index from Typ-Nr.

<u>Typ-Nr.</u>	<u>Page</u>	<u>Typ-Nr.</u>	<u>Page</u>	<u>Typ-Nr.</u>	<u>Page</u>
71-642.0 .....	10				
71-651.0 .....	11				
71-652.0 .....	11				
71-656.0 .....	11				
71-658.0 .....	11				
71-670.006 .....	17				
71-671.026 .....	18				
71-671.026 .....	18				
71-672.026 .....	18				
71-672.026 .....	18				
71-679.0 .....	18				
84-9103.7 .....	16				





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