

EAO – Your Expert Partner for  
Human Machine Interfaces

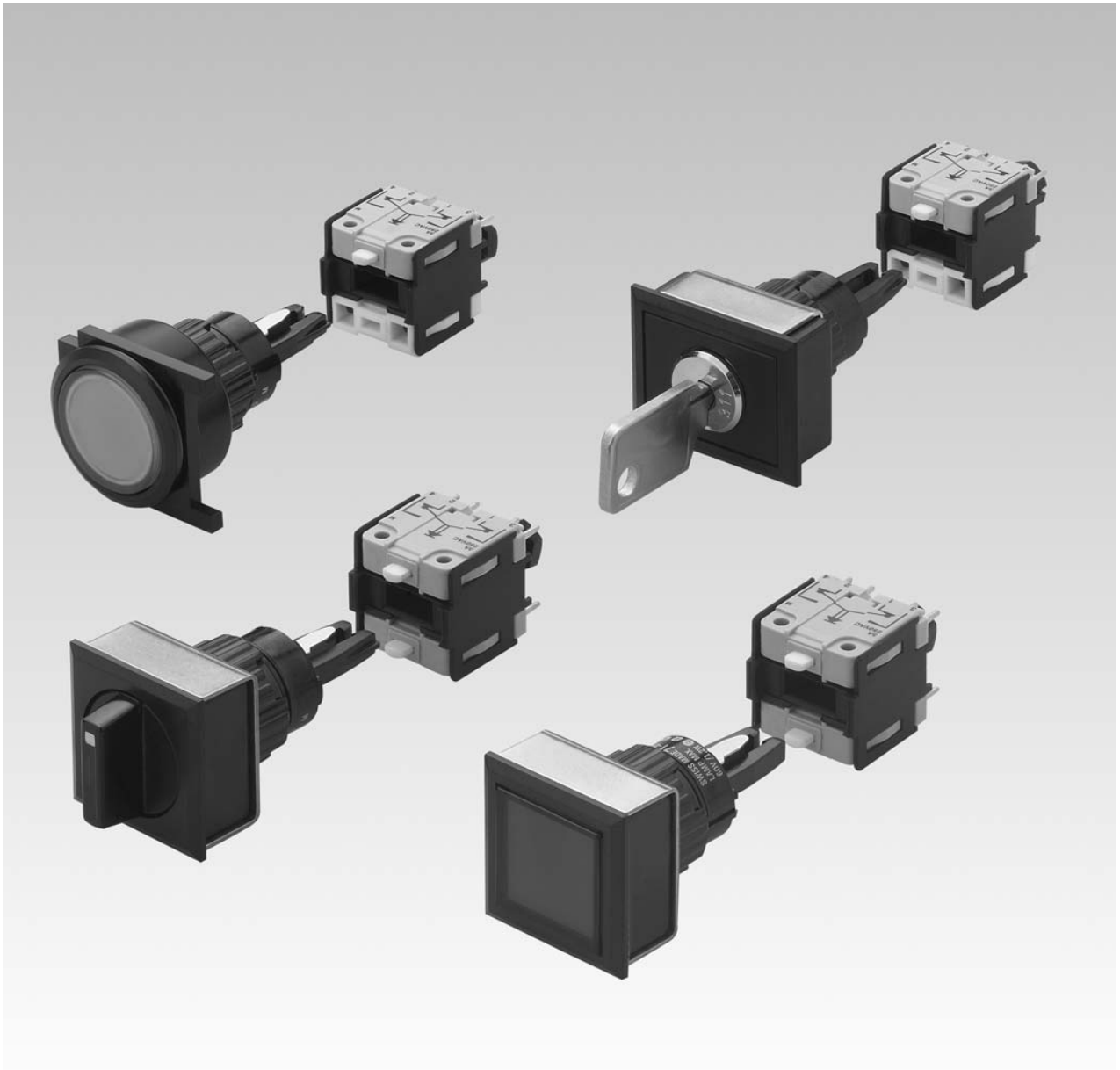


## EAO Product Information

Series 71

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|                                     |           |
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## 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 :

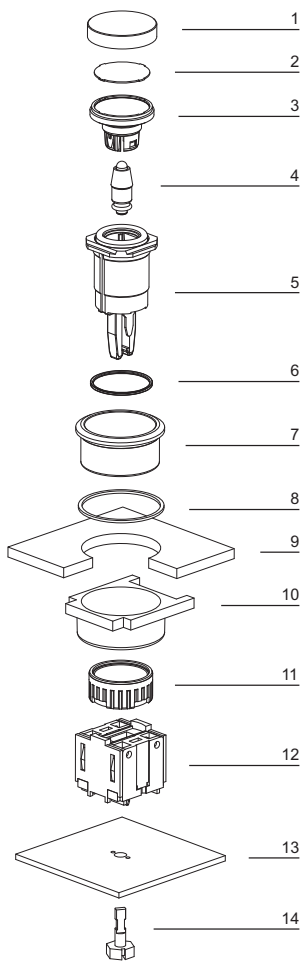
- Illuminated pushbutton actuator, momentary action, 25 mm dia. 71-611.0

#### 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

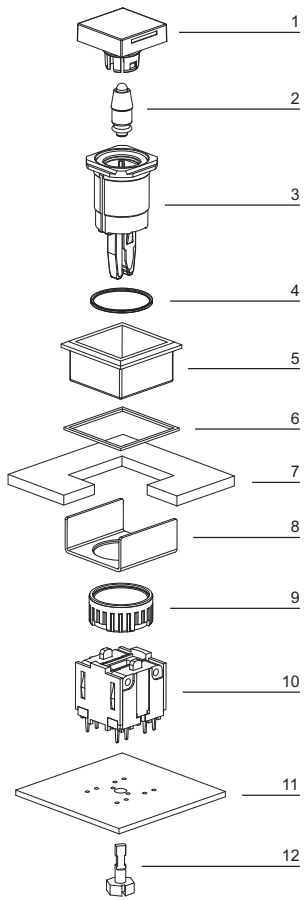
*We reserve the right to modify technical data  
All dimensions in mm*

## Indicator, flush mounting



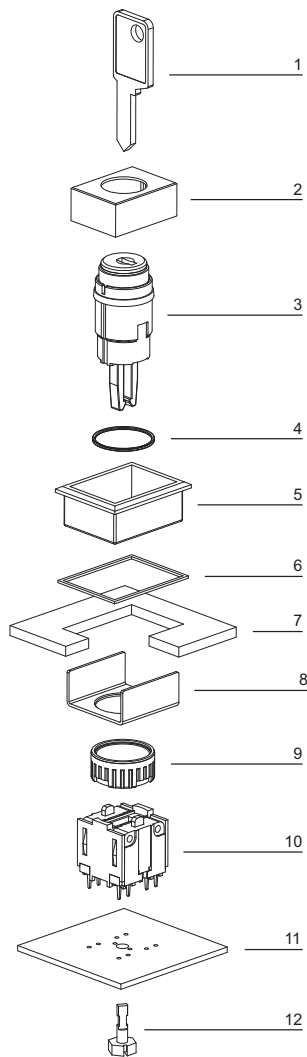
- 1 Lens
- 2 Marking plate
- 3 Lens holder
- 4 LED
- 5 Actuator housing
- 6 Sealing
- 7 Front bezel
- 8 Sealing
- 9 Front plate
- 10 Thrust piece
- 11 Fixing nut
- 12 Illumination element
- 13 Printed circuit board
- 14 Interlocking pin

## 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

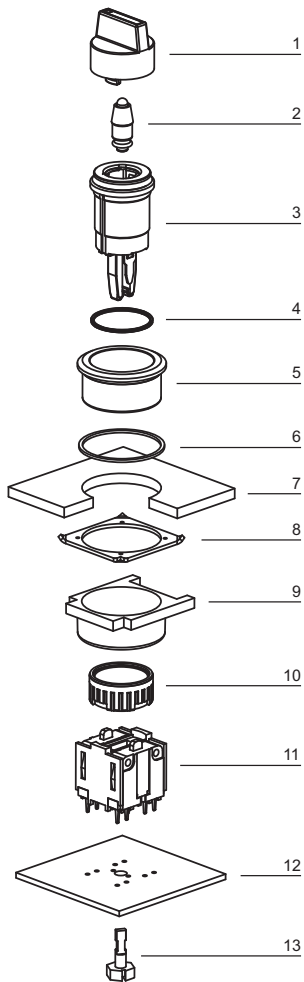
## Keylock switch, flush mounting



- 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 17

|  | 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 14
-  Mushroom-head cap page 13
-  Switching element for Illuminated pushbutton | Mushroom-head pushbutton page 17

|  | Front protection | Switching action | Ø 32 mm<br>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               | 1                 | 0.005           |   |
|  |                  | M                | <b>71-611.0</b>    | 2 5 2               | 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

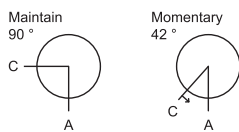
## Keylock switch actuator 2 positions, flush mounting


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



### Essential Accessories:

-  Anti-twist ring page 19
-  Front bezel set for Keylock switch, flush mounting page 15
-  Keylock front bezel, flush mounting page 13
-  Switching element for Keylock- and Selector switch 2 positions page 17



|  | Front protection | Switching action | Key remove | Typ-Nr.           | Mounting dimensions | Technical drawing | Circuit drawing |  |
|--|------------------|------------------|------------|-------------------|---------------------|-------------------|-----------------|---|
| <b>Keylock switch actuator 2 positions, flush mounting</b><br>Position A : Basic position<br>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             |                 |   |

Order anti-twist ring only for round devices 25 mm dia.

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





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

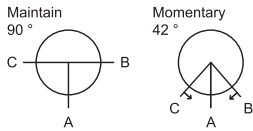
## Keylock switch actuator 3 positions, flush mounting


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



### Essential Accessories:

-  Anti-twist ring page 19
-  Front bezel set for Keylock switch, flush mounting page 15
-  Keylock front bezel, 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><br>Position A : Basic position<br>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   |

Order anti-twist ring only for round devices 25 mm dia.

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

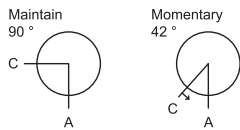
illuminative

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



### Essential Accessories:

- Anti-twist ring page 19
- Front bezel set for Selector switch, flush mounting page 15
- Single-LED page 19
- Switching element for Keylock- and Selector switch 2 positions page 17



|  | Front protection | Switching action | Typ-Nr.         | Mounting dimensions |   | Circuit drawing |       |
|--|------------------|------------------|-----------------|---------------------|---|-----------------|-------|
|  |                  |                  |                 | Technical drawing   |   |                 |       |
| <b>Selector switch actuator 2 positions, flush mounting</b><br>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 |

Order anti-twist ring only for round devices 25 mm dia.

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

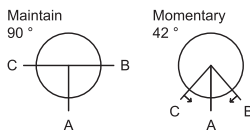
illuminative

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



### Essential Accessories:

- Anti-twist ring page 19
- Front bezel set for Selector switch, flush mounting page 15
- Single-LED page 19
- Switching element for Keylock- and Selector switch 3 positions page 18



|  | Front protection | Switching action | Typ-Nr.         | Mounting dimensions |   | Circuit drawing |       |
|--|------------------|------------------|-----------------|---------------------|---|-----------------|-------|
|  |                  |                  |                 | Technical drawing   |   |                 |       |
| <b>Selector switch actuator 3 positions, flush mounting</b><br>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 |

Order anti-twist ring only for round devices 25 mm dia.


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<br>Typ-Nr. | ∅ 24 x 30 mm<br>Typ-Nr. | ∅ 25 mm<br>Typ-Nr. |  |
|---|------------------------------|-------------------------|-------------------------|--------------------|---|
| <b>Lens plastic, flush mounting</b><br>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, flush mounting


|  | Symbol   | Lens                   | ∅ 25 mm<br>Typ-Nr. |  |
|--|----------|------------------------|--------------------|---|
| <b>Lens plastic with symbol, flush mounting</b><br>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><br>only applicable with Lens round Typ-Nr. 61-9642.X | Plastic colourless transparent | <b>61-9707.7</b> | 0.001   |



## Lens metal with window, flush mounting


mat

|   | Lens                    | Ø 25 mm<br>Typ-Nr. |  |
|---|-------------------------|--------------------|---|
| <b>Lens metal with window, flush mounting</b> | Aluminium black flush   | <b>61-9841.0A</b>  | 0.002   |
|   | Aluminium blue flush    | <b>61-9841.6A</b>  | 0.002   |
|   | Aluminium green flush   | <b>61-9841.5A</b>  | 0.002   |
|   | Aluminium natural flush | <b>61-9841.8A</b>  | 0.002   |
|   | Aluminium red flush     | <b>61-9841.2A</b>  | 0.002   |
|   | Aluminium yellow flush  | <b>61-9841.4A</b>  | 0.002   |




## Lens metal, flush mounting

mat

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




## Mushroom-head cap

|                          | Mushroom had cap      | Ø 32 mm<br>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, flush mounting

|  | Keylock front bezel | ∅ 24 x 24 mm<br>Typ-Nr. | ∅ 24 x 30 mm<br>Typ-Nr. | Ø 25 mm<br>Typ-Nr. |  |
|--|---------------------|-------------------------|-------------------------|--------------------|---|
| <b>Keylock front bezel, 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

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




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

|  | Front bezel       | ∅ 24 x 24 mm<br>Typ-Nr. | ∅ 24 x 30 mm<br>Typ-Nr. | ∅ 25 mm<br>Typ-Nr. | Mounting dimensions |  |
|--|-------------------|-------------------------|-------------------------|--------------------|---------------------|---|
| <b>Front bezel set for Indicators and Illuminated pushbutton, flush mounting</b> | Plastic black     | <b>61-9930.0</b>        | <b>61-9931.0</b>        | <b>61-9933.10</b>  | 1                   | 0.008   |
|  | Aluminium black   |                         |                         | <b>61-9933.1</b>   | 1                   | 0.006   |
|  | Aluminium natural |                         |                         | <b>61-9933.0</b>   | 1                   | 0.006   |



Mounting dimensions from page 24

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

|   | Front bezel       | ∅ 40 mm<br>Typ-Nr. | ∅ 32 mm<br>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 natural |                    | <b>61-9933.0</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       | ∅ 24 x 24 mm<br>Typ-Nr. | ∅ 24 x 30 mm<br>Typ-Nr. | ∅ 25 mm<br>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 |
|   | Aluminium black   |                         |                         | <b>61-9932.1</b>   | 1                   | 0.006 |
|   | Aluminium natural |                         |                         | <b>61-9932.0</b>   | 1                   | 0.006 |

Mounting dimensions from page 24



## Front bezel set for Selector switch, flush mounting

|  | Front bezel       | ∅ 24 x 24 mm<br>Typ-Nr. | ∅ 25 mm<br>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 natural |                         | <b>61-9932.0</b>   | 1                   | 0.006 |
|  | Plastic black     |                         | <b>61-9932.10</b>  | 1                   | 0.008 |

Mounting dimensions from page 24



## Front protective cap

|   | Front protective cap         | Typ-Nr.          | 0.001 |
|---|------------------------------|------------------|-------|
| <b>Front protective cap</b><br>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

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



Mounting dimensions from page 24, Technical drawing from page 24

## Blind plug, flush mounting

|                                   | Blind plug    | Ø 24 x 24 mm<br>Typ-Nr. | Ø 24 x 30 mm<br>Typ-Nr. | Ø 25 mm<br>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><br>Lock numbers 311 ... 445 (DOM) | <b>31-989.300</b> | 0.006 |



## Spare key

|  | Typ-Nr.           |       |
|--|-------------------|-------|
| <b>Spare key</b><br>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><br>Plastic black, for lock type DOM | <b>31-985.0</b> | 0.005 |



## Backside

### Illumination element

including Locking pin

|                             | Terminals | Typ-Nr.           | Component layout<br>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<br>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<br>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



|   | Contacts    | Typ-Nr.           | Component layout |                 |       |
|---|-------------|-------------------|------------------|-----------------|-------|
|   |             |                   | 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

|                      | Socket              | Operating voltage/-current | Typ-Nr.             |       |
|----------------------|---------------------|----------------------------|---------------------|-------|
| <b>Filament lamp</b> | T1 $\frac{3}{4}$ 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

|                   | Socket    | Light colour  | Operating voltage/-current | Typ-Nr.             |  |
|-------------------|-----------|---------------|----------------------------|---------------------|---|
| <b>Single-LED</b> | 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 halve-wave rectifier possible, slight flickering can occur.


## Assembling

### Anti-twist ring

|   | Typ-Nr.          |  |
|---|------------------|---|
| <b>Anti-twist ring</b><br>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.   |  |
|--------------|-----------|---|
| 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<br>for Indicator 16 mm dia. | 01-907  | 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  
RoHS

## Suppressor circuits

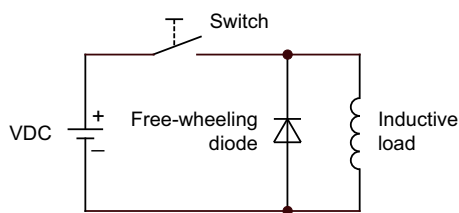
When switching inductive loads such as relays, DC motors, and DC solenoids, it is always important to absorb surges (e.g. with a diode) to protect the contacts. When these inductive loads are switched off, a counter emf can severely damage switch contacts and greatly shorten lifetime.

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.

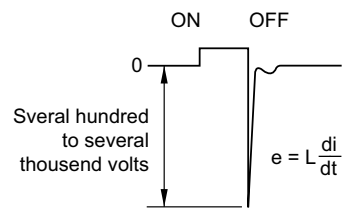
The free-wheeling diode should be chosen so that the reverse breakdown voltage is greater than the voltage driving the inductive load. The DC blocking voltage (VR) of the free-wheeling diode can be found in the datasheet of a diode. The forward current should be equal or greater than the maximum current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



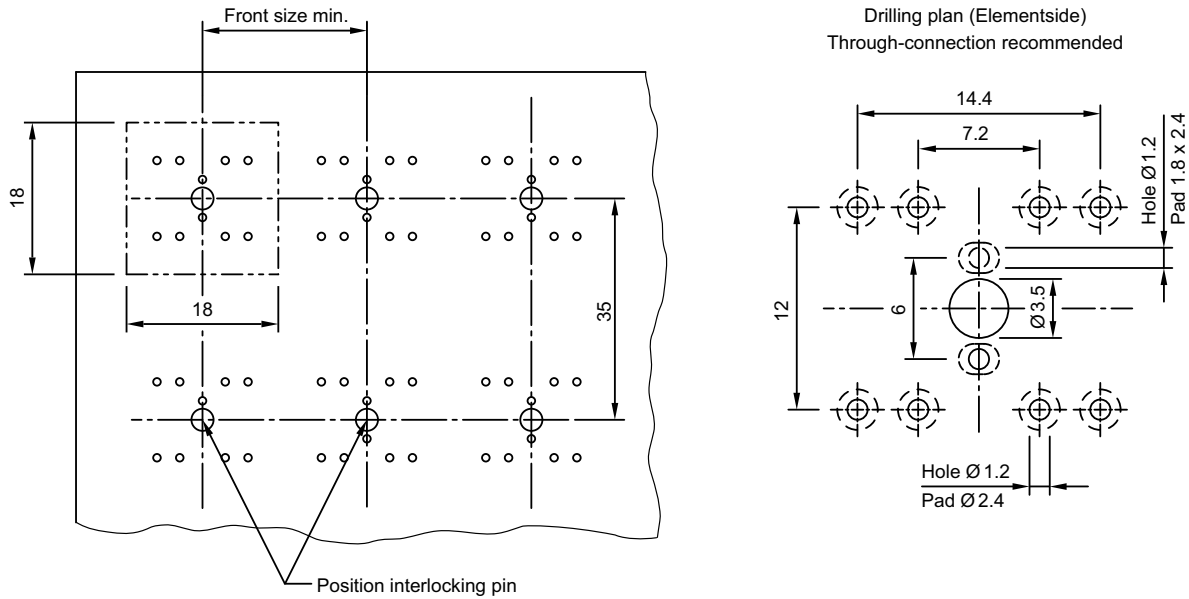
Counter emf  
over load without free-wheeling diode  
Fig. 2





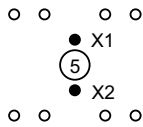
## Component layout

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

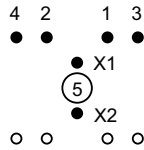


Note:  
Pitch of the print circuit board hole Ø3.5 must agree with the mounting holes on the front plate

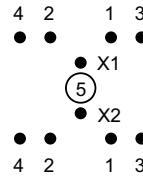
### Layout



Illumination element  
71-670.006



Switching element 1NC+1NO  
71-671.026

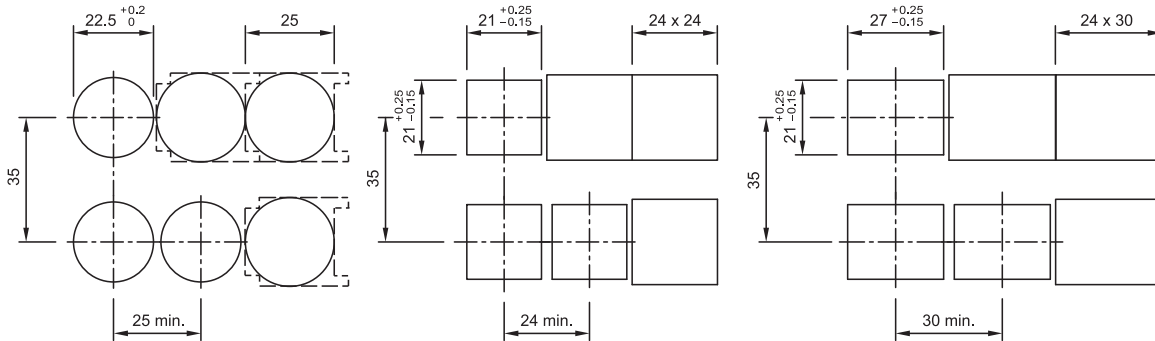


Switching element 2NC+2NO  
71-672.026

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

## Mounting dimensions

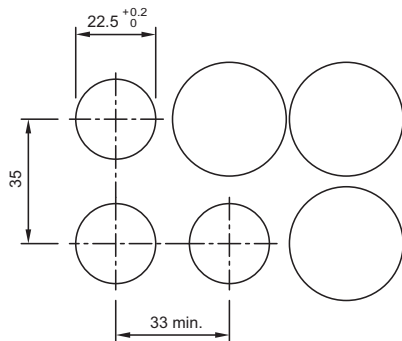
1 Indicator actuator, flush mounting page 8 | Illuminated pushbutton actuator, flush mounting page 8 | Keylock switch actuator 2 positions, flush mounting page 9 | Keylock switch actuator 3 positions, flush mounting page 10 | Selector switch actuator 2 positions, flush mounting page 11 | Selector switch 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 15 | Protective cover, flush mounting page 16 | Blind plug, flush mounting page 16



### NOTE

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

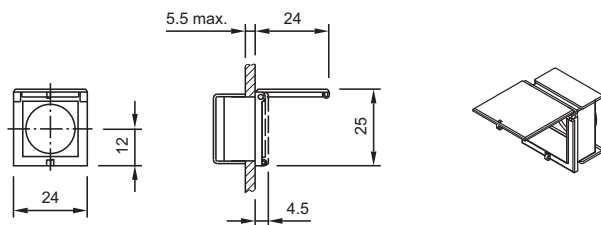
2 Mushroom-head pushbutton actuator, flush mounting page 9 | Front bezel set for Mushroom-head pushbutton, flush mounting page 14



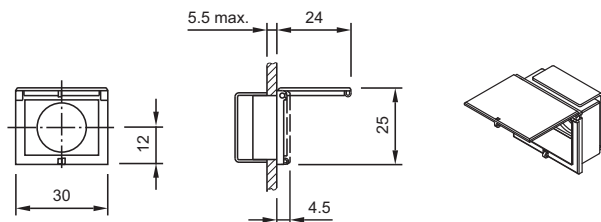
Hole spacing 41 mm min. by using front bezel set 61-9934.8

## Technical drawing

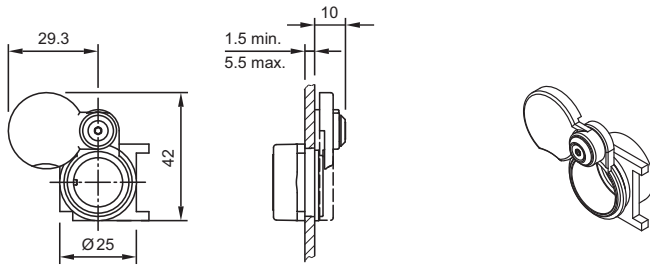
1 Protective cover, flush mounting page 16



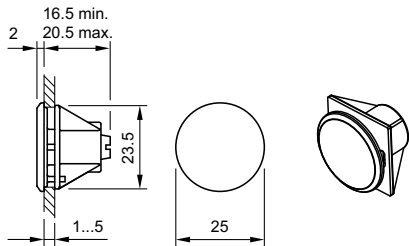
2 Protective cover, flush mounting page 16



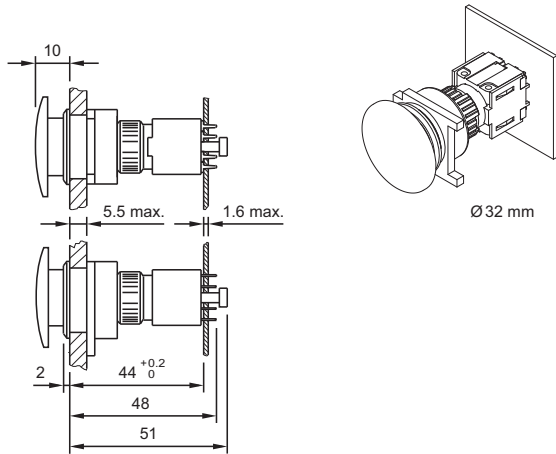
### 3 Protective cover, flush mounting page 16



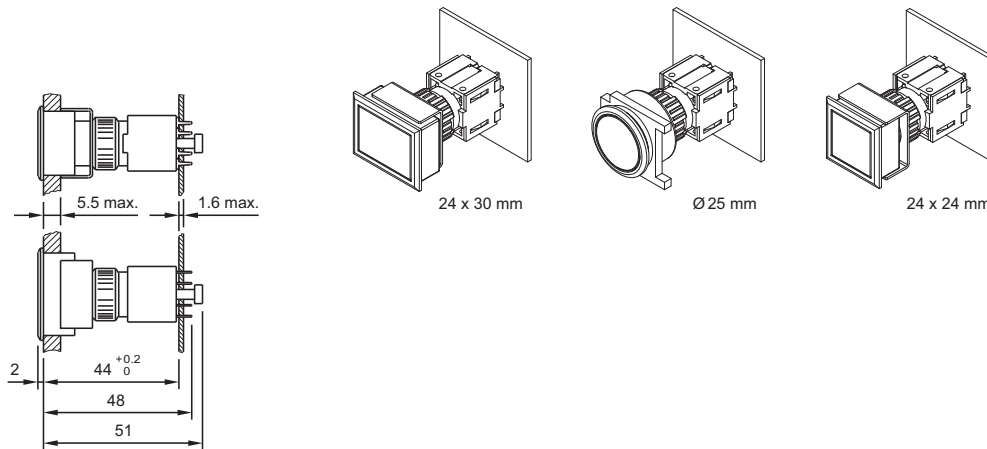
### 4 Blind plug, flush mounting page 16



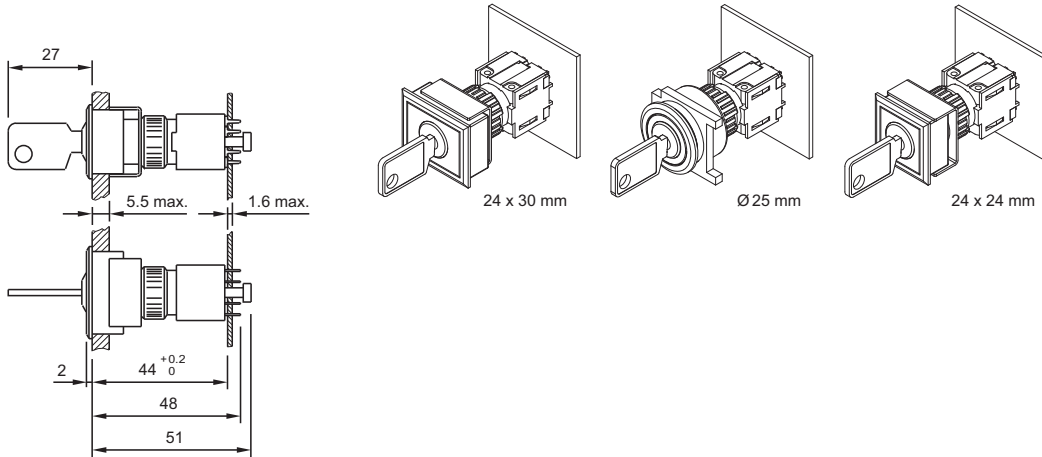
### 5 Mushroom-head pushbutton actuator, flush mounting page 9



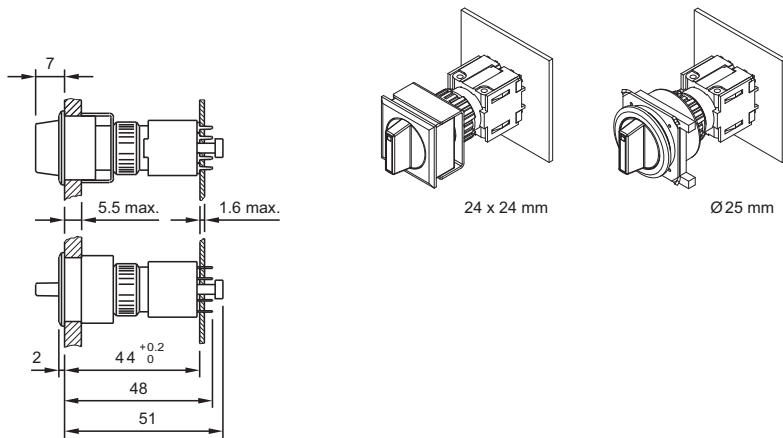
### 6 Indicator actuator, flush mounting page 8 | Illuminated pushbutton actuator, flush mounting page 8



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 11 | Selector switch actuator 3 positions, flush mounting page 11



## Circuit drawing

1 Mushroom-head pushbutton actuator, flush mounting page 9



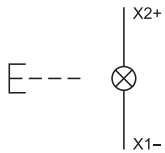
2 Mushroom-head pushbutton actuator, flush mounting page 9



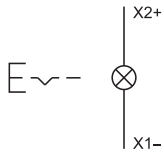
3 Indicator actuator, flush mounting page 8 | Illumination element page 17



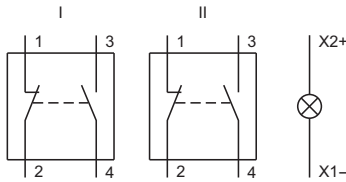
4 Illuminated pushbutton actuator, flush mounting page 8



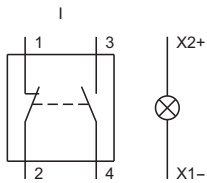
**5 Illuminated pushbutton actuator, flush mounting** page 8



**6 Switching element for Illuminated pushbutton | Mushroom-head pushbutton** page 17 | **Switching element for Keylock- and Selector switch 3 positions** page 18



**7 Switching element for Illuminated pushbutton | Mushroom-head pushbutton** page 17 | **Switching element for Keylock- and Selector switch 2 positions** page 17



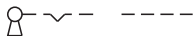
**8 Keylock switch actuator 3 positions, flush mounting** page 10



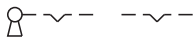
**9 Keylock switch actuator 3 positions, flush mounting** page 10



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



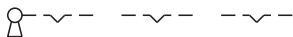
**11 Keylock switch actuator 2 positions, flush mounting** page 9



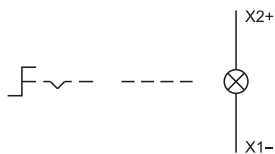
**12 Keylock switch actuator 3 positions, flush mounting** page 10



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



**14 Selector switch actuator 2 positions, flush mounting** page 11



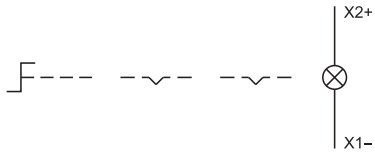
15 Selector switch actuator 2 positions, flush mounting page 11



16 Selector switch actuator 3 positions, flush mounting page 11



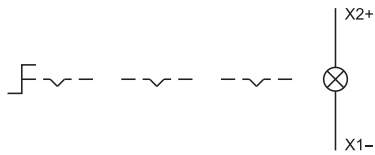
17 Selector switch actuator 3 positions, flush mounting page 11



18 Selector switch actuator 3 positions, flush mounting page 11



19 Selector switch actuator 3 positions, flush mounting page 11



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| Typ-Nr.      | Page | Typ-Nr.     | Page | Typ-Nr.    | Page |
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| 01-907       | 20   | 61-9593.4   | 13   | 61-9842.8  | 13   |
| 10-1306.1349 | 18   | 61-9593.5   | 13   | 61-9912.0  | 19   |
| 10-1307.1369 | 18   | 61-9642.1   | 12   | 61-9921.0  | 16   |
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| 10-1310.1319 | 18   | 61-9642.3   | 12   | 61-9924.0  | 16   |
| 10-1311.1249 | 18   | 61-9642.4   | 12   | 61-9927.2  | 15   |
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| 10-2J06.3145 | 19   | 61-9643.502 | 12   | 61-9932.10 | 15   |
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