

# Series 92

## Characteristics

The Series 92 with its short stroke pushbuttons, making it especially suited for:

- PCB mounting

This series can be used to replace a membrane keypad if only a few buttons are needed.

## Functions

The Series 92 incorporates the following functions:

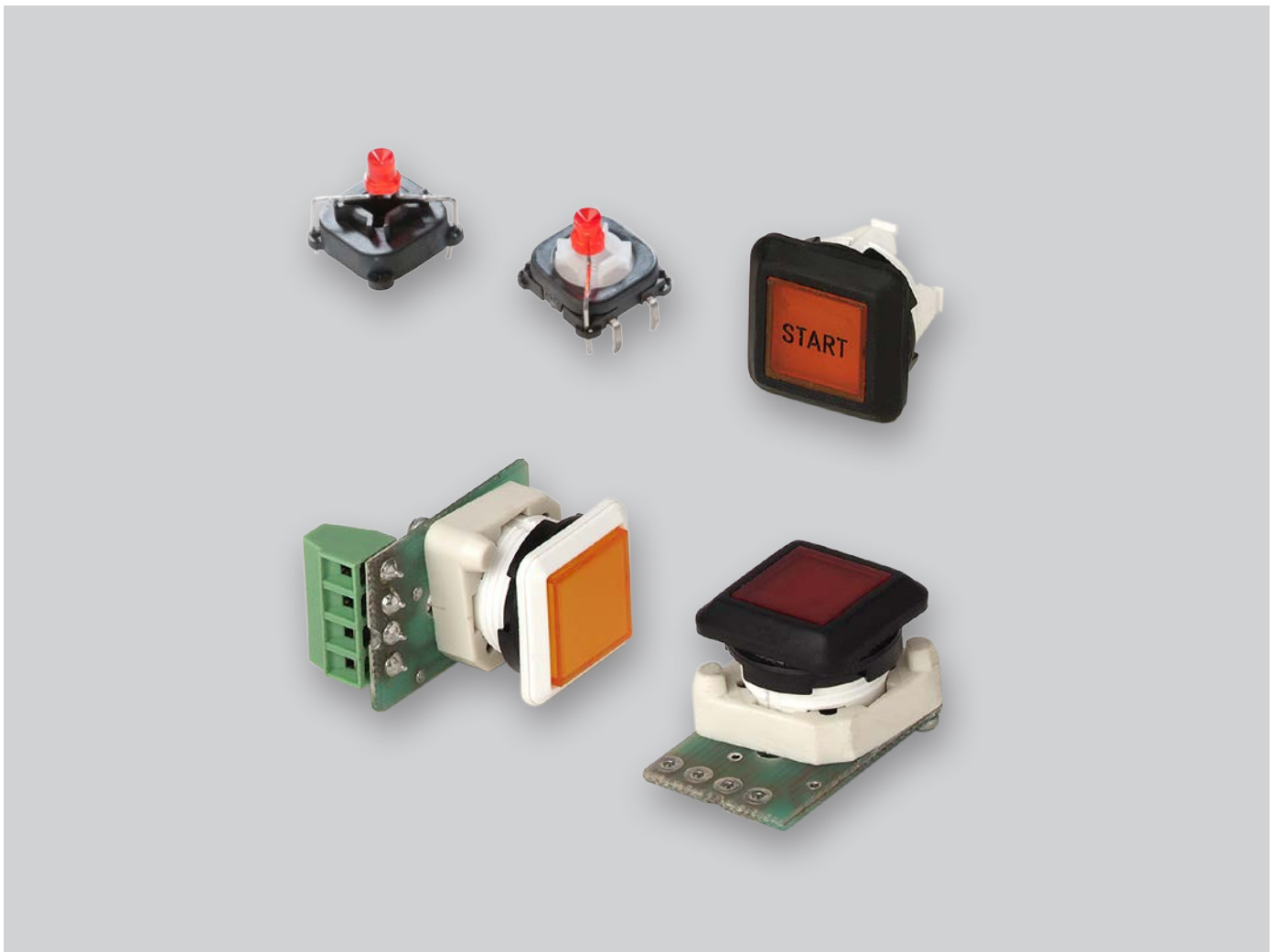
- Indicator
- Pushbutton
- Illuminated pushbutton

## Market segments

The EAO Series 92 is especially suited for applications in the segments:

- Machinery and Automation
- Medicinal technology
- Laboratory and measuring equipment

Please refer to the EAO website to obtain detailed information regarding this series [www.products.eao.com](http://www.products.eao.com)  
Configure a product to your exact needs and request a quotation.





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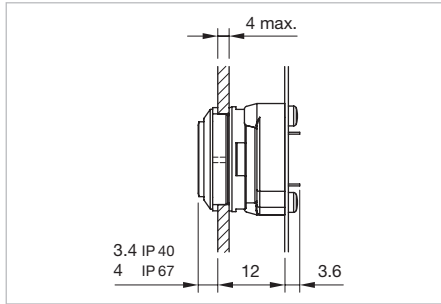
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## Indicator

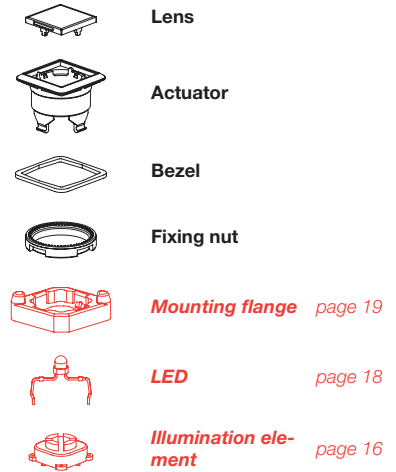


Product can differ from the current configuration.



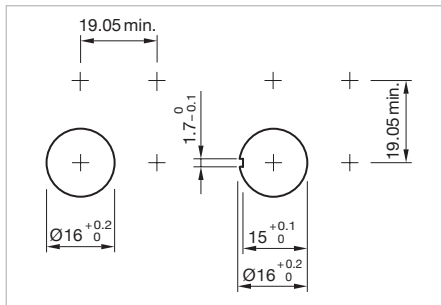
Dimensions

### Equipment consisting of (schematic overview)



### Additional Information



- Transparent lens and pressure plate
- IP 67 version without bezel



Mounting cut-outs

Each Part Number listed below includes all the black components shown in the 3D-drawing.

To obtain a complete unit, please select the red components from the pages shown.

| Front protection  | Front   | Pressure plate     | Lens               | Part No.          | Weight            |          |
|---|---|--------------------|--------------------|-------------------|-------------------|----------|
|  <p><b>Indicator actuator, Front dimension 18.8 x 18.8 mm</b></p> |   |                    |                    |                   |                   |          |
| IP 67   | Plastic white   | Plastic red        |                    | <b>92-043.200</b> | 0.003 kg          |          |
|   |   | Plastic orange     |                    | <b>92-043.300</b> | 0.003 kg          |          |
|   |   | Plastic yellow     |                    | <b>92-043.400</b> | 0.003 kg          |          |
|   |   | Plastic green      |                    | <b>92-043.500</b> | 0.003 kg          |          |
|   |   | Plastic blue       |                    | <b>92-043.600</b> | 0.003 kg          |          |
|   |   | Plastic colourless |                    | <b>92-043.700</b> | 0.003 kg          |          |
|   |   | Plastic black      | Plastic red        |                   | <b>92-143.200</b> | 0.003 kg |
|   | Plastic orange  |                    |                    | <b>92-143.300</b> | 0.003 kg          |          |
|   | Plastic yellow  |                    |                    | <b>92-143.400</b> | 0.003 kg          |          |
|   | Plastic green   |                    |                    | <b>92-143.500</b> | 0.003 kg          |          |
|   | Plastic blue  |                    |                    | <b>92-143.600</b> | 0.003 kg          |          |
|   | Plastic colourless  |                    |                    | <b>92-143.700</b> | 0.003 kg          |          |
|   |  <p><b>Indicator actuator, Front dimension 18.4 x 18.4 mm</b></p> |                    |                    |                   |                   |          |
|   | IP 40   | Plastic white      |                    | Plastic smoked    | <b>92-058.100</b> | 0.003 kg |
|   |   |                    | Plastic red        | <b>92-058.200</b> | 0.003 kg          |          |
|   |   |                    | Plastic orange     | <b>92-058.300</b> | 0.003 kg          |          |
|   |   |                    | Plastic yellow     | <b>92-058.400</b> | 0.003 kg          |          |
|   |   |                    | Plastic green      | <b>92-058.500</b> | 0.003 kg          |          |
|   |   |                    | Plastic blue       | <b>92-058.600</b> | 0.003 kg          |          |
|   |   |                    | Plastic colourless | <b>92-058.700</b> | 0.003 kg          |          |

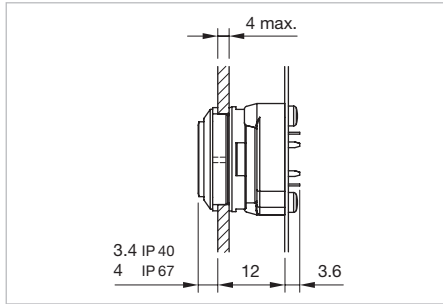
| Front protection | Front         | Pressure plate | Lens               | Part No.          | Weight   |
|------------------|---------------|----------------|--------------------|-------------------|----------|
| IP 40            | Plastic black |                | Plastic smoked     | <b>92-158.100</b> | 0.003 kg |
|                  |               |                | Plastic red        | <b>92-158.200</b> | 0.003 kg |
|                  |               |                | Plastic orange     | <b>92-158.300</b> | 0.003 kg |
|                  |               |                | Plastic yellow     | <b>92-158.400</b> | 0.003 kg |
|                  |               |                | Plastic green      | <b>92-158.500</b> | 0.003 kg |
|                  |               |                | Plastic blue       | <b>92-158.600</b> | 0.003 kg |
|                  |               |                | Plastic colourless | <b>92-158.700</b> | 0.003 kg |

# 92 PCB pushbuttons

## Pushbutton



Product can differ from the current configuration.



Dimensions

### Equipment consisting of (schematic overview)



Lens



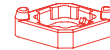
Actuator



Bezel



Fixing nut



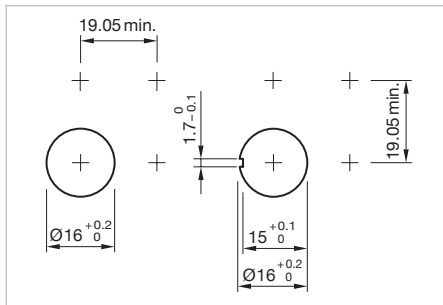
Mounting flange [page 19](#)



Switching element [page 16](#)

### Additional Information

- Lens opaque
- IP 67 version without bezel



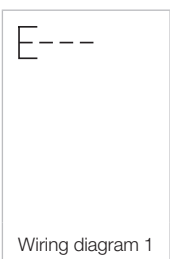
Mounting cut-outs

Each Part Number listed below includes all the black components shown in the 3D-drawing.

To obtain a complete unit, please select the red components from the pages shown.

| Front protection  | Front         | Pressure plate | Lens          | Switching action | Part No.          | Wiring diagram | Weight   |
|---|---------------|----------------|---------------|------------------|-------------------|----------------|----------|
| <p><b>Pushbutton actuator, Front dimension 18.8 x 18.8 mm</b></p> |               |                |               |                  |                   |                |          |
| IP 67   | Plastic white | Plastic black  |               | B                | <b>92-341.000</b> | 1              | 0.002 kg |
|   |               | Plastic grey   |               | B                | <b>92-341.800</b> | 1              | 0.002 kg |
|   | Plastic black | Plastic black  |               | B                | <b>92-441.000</b> | 1              | 0.002 kg |
|   |               | Plastic grey   |               | B                | <b>92-441.800</b> | 1              | 0.002 kg |
| <p><b>Pushbutton actuator, Front dimension 18.4 x 18.4 mm</b></p> |               |                |               |                  |                   |                |          |
| IP 40   | Plastic white |                | Plastic black | B                | <b>92-356.000</b> | 1              | 0.002 kg |
|   |               |                | Plastic grey  | B                | <b>92-356.800</b> | 1              | 0.002 kg |
|   |               |                | Plastic white | B                | <b>92-356.900</b> | 1              | 0.002 kg |
|   | Plastic black |                | Plastic black | B                | <b>92-456.000</b> | 1              | 0.002 kg |
|   |               |                | Plastic grey  | B                | <b>92-456.800</b> | 1              | 0.002 kg |
|   |               |                | Plastic white | B                | <b>92-456.900</b> | 1              | 0.002 kg |





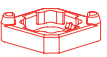


Switching action: B = Momentary



Wiring diagram 1

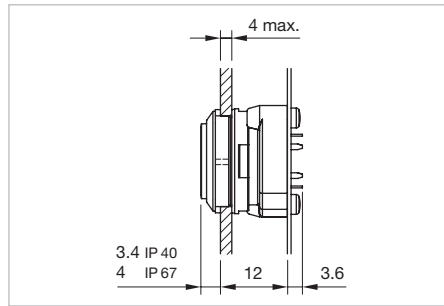
**Illuminated pushbutton**

**Equipment consisting of (schematic overview)**

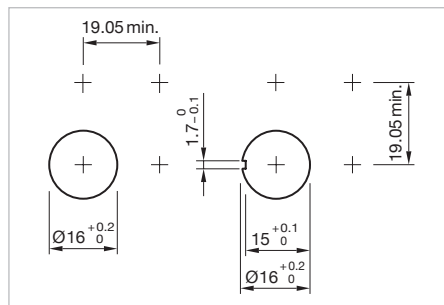
-  **Lens**
-  **Actuator**
-  **Bezel**
-  **Fixing nut**
-  **Mounting flange** *page 19*
-  **LED** *page 18*
-  **Switching element** *page 16*

Each Part Number listed below includes all the black components shown in the 3D-drawing.

*To obtain a complete unit, please select the red components from the pages shown.*



Dimensions





Mounting cut-outs



Product can differ from the current configuration.

**Additional Information**

- Transparent lens and pressure plate
- IP 67 version without bezel

| Front protection  | Front   | Pressure plate     | Lens               | Switching action | Part No.          | Wiring diagram | Weight   |
|---|---|--------------------|--------------------|------------------|-------------------|----------------|----------|
|  <p><b>Illuminated pushbutton actuator, Front dimension 18.8 x 18.8 mm</b></p> |   |                    |                    |                  |                   |                |          |
| IP 67   | Plastic white   | Plastic red        |                    | B                | <b>92-343.200</b> | 1              | 0.003 kg |
|   |   | Plastic orange     |                    | B                | <b>92-343.300</b> | 1              | 0.003 kg |
|   |   | Plastic yellow     |                    | B                | <b>92-343.400</b> | 1              | 0.003 kg |
|   |   | Plastic green      |                    | B                | <b>92-343.500</b> | 1              | 0.003 kg |
|   |   | Plastic blue       |                    | B                | <b>92-343.600</b> | 1              | 0.003 kg |
|   |   | Plastic colourless |                    | B                | <b>92-343.700</b> | 1              | 0.003 kg |
|   | Plastic black   | Plastic red        |                    | B                | <b>92-443.200</b> | 1              | 0.003 kg |
|   |   | Plastic orange     |                    | B                | <b>92-443.300</b> | 1              | 0.003 kg |
|   |   | Plastic yellow     |                    | B                | <b>92-443.400</b> | 1              | 0.003 kg |
|   |   | Plastic green      |                    | B                | <b>92-443.500</b> | 1              | 0.003 kg |
|   |   | Plastic blue       |                    | B                | <b>92-443.600</b> | 1              | 0.003 kg |
|   |   | Plastic colourless |                    | B                | <b>92-443.700</b> | 1              | 0.003 kg |
|   |  <p><b>Illuminated pushbutton actuator, Front dimension 18.4 x 18.4 mm</b></p> |                    |                    |                  |                   |                |          |
| IP 40   | Plastic white   |                    | Plastic smoked     | B                | <b>92-358.100</b> | 1              | 0.003 kg |
|   |   |                    | Plastic red        | B                | <b>92-358.200</b> | 1              | 0.003 kg |
|   |   |                    | Plastic orange     | B                | <b>92-358.300</b> | 1              | 0.003 kg |
|   |   |                    | Plastic yellow     | B                | <b>92-358.400</b> | 1              | 0.003 kg |
|   |   |                    | Plastic green      | B                | <b>92-358.500</b> | 1              | 0.003 kg |
|   |   |                    | Plastic blue       | B                | <b>92-358.600</b> | 1              | 0.003 kg |
|   |   |                    | Plastic colourless | B                | <b>92-358.700</b> | 1              | 0.003 kg |

# 92 PCB pushbuttons

| Front protection | Front         | Pressure plate | Lens               | Switching action | Part No.          | Wiring diagram | Weight   |
|------------------|---------------|----------------|--------------------|------------------|-------------------|----------------|----------|
| IP 40            | Plastic black |                | Plastic smoked     | B                | <b>92-458.100</b> | 1              | 0.003 kg |
|                  |               |                | Plastic red        | B                | <b>92-458.200</b> | 1              | 0.003 kg |
|                  |               |                | Plastic orange     | B                | <b>92-458.300</b> | 1              | 0.003 kg |
|                  |               |                | Plastic yellow     | B                | <b>92-458.400</b> | 1              | 0.003 kg |
|                  |               |                | Plastic green      | B                | <b>92-458.500</b> | 1              | 0.003 kg |
|                  |               |                | Plastic blue       | B                | <b>92-458.600</b> | 1              | 0.003 kg |
|                  |               |                | Plastic colourless | B                | <b>92-458.700</b> | 1              | 0.003 kg |








Switching action: B = Momentary





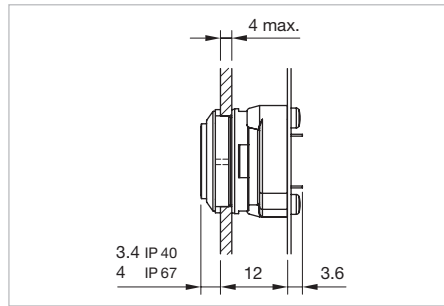
Indicator actuator IP 67

Equipment consisting of (schematic overview)

-  **Pressure plate** *page 14*
-  **Front bezel**
-  **Actuator**
-  **Fixing nut**
-  **Mounting flange** *page 19*
-  **LED** *page 18*
-  **Illumination element** *page 16*

Each Part Number listed below includes all the black components shown in the 3D-drawing.

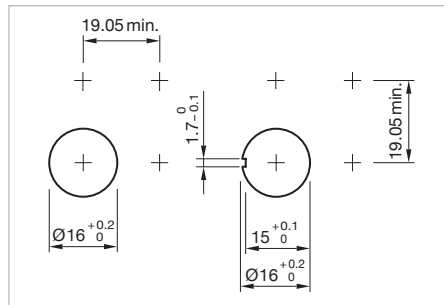
To obtain a complete unit, please select the red components from the pages shown.




Dimensions



Product can differ from the current configuration.



Mounting cut-outs

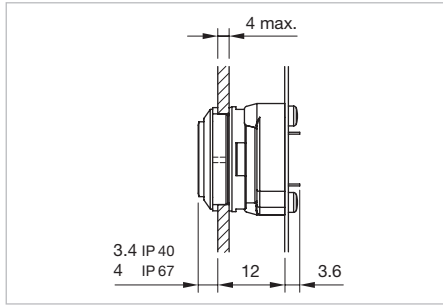
| Front  | Part No.          | Weight   |
|--|-------------------|----------|
|  <p><b>Indicator actuator IP 67, Front dimension 18.8 x 18.8 mm</b></p> |                   |          |
| Plastic black  | <b>92-140.000</b> | 0.003 kg |

# 92 PCB pushbuttons

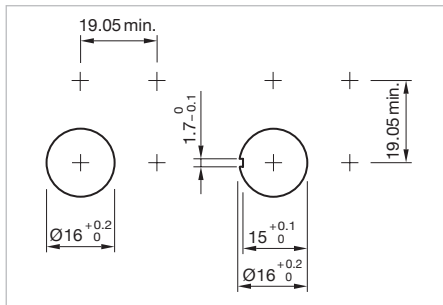
## Pushbutton actuator IP 40



Product can differ from the current configuration.









Dimensions




Mounting cut-outs

### Equipment consisting of (schematic overview)

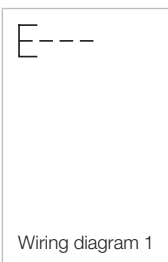
-  **Lens** page 14
-  **Actuator**
-  **Bezel** page 15
-  **Fixing nut**
-  **Mounting flange** page 19
-  **Switching element** page 16

Each Part Number listed below includes all the black components shown in the 3D-drawing.

*To obtain a complete unit, please select the red components from the pages shown.*







| Front  | Switching action | Part No.          | Wiring diagram | Weight   |
|--|------------------|-------------------|----------------|----------|
|  |                  |                   |                |          |
| <b>Pushbutton actuator IP 40, Front dimension 18.4 x 18.4 mm</b>                   |                  |                   |                |          |
| Plastic white  | B                | <b>92-350.000</b> | 1              | 0.003 kg |
| Plastic black  | B                | <b>92-450.000</b> | 1              | 0.003 kg |

Switching action: B = Momentary



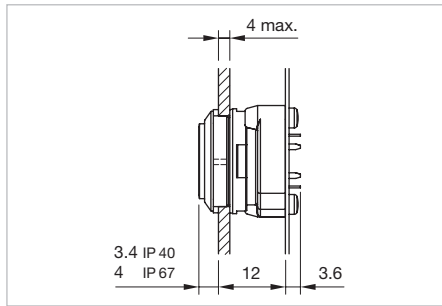
Pushbutton actuator IP 67

Equipment consisting of (schematic overview)

-  **Pressure plate** *page 14*
-  **Front bezel**
-  **Actuator**
-  **Fixing nut**
-  **Mounting flange** *page 19*
-  **Switching element** *page 16*

Each Part Number listed below includes all the black components shown in the 3D-drawing.

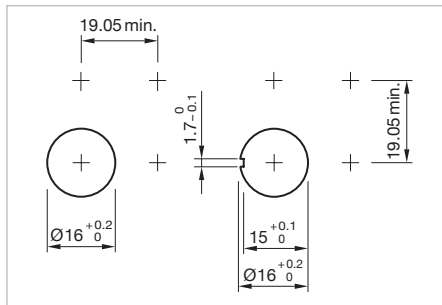
To obtain a complete unit, please select the red components from the pages shown.




Dimensions



Product can differ from the current configuration.



Mounting cut-outs

| Front   | Switching action | Part No.          | Wiring diagram | Weight   |
|---|------------------|-------------------|----------------|----------|
|  |                  |                   |                |          |
| <b>Pushbutton actuator IP 67, square 18.8 x 18.8 mm</b>                             |                  |                   |                |          |
| Plastic white   | B                | <b>92-340.000</b> | 1              | 0.003 kg |
| Plastic black   | B                | <b>92-440.000</b> | 1              | 0.003 kg |

Switching action: B = Momentary

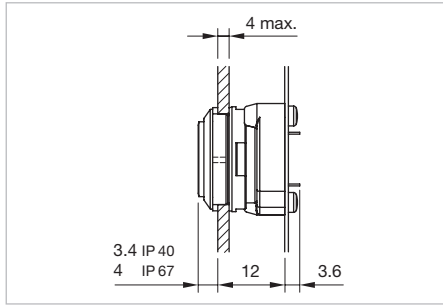


# 92 PCB pushbuttons

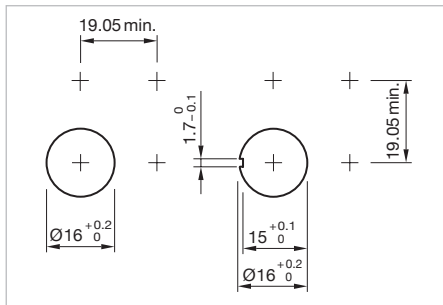
## Illuminated pushbutton actuator IP 40



Product can differ from the current configuration.










Dimensions




Mounting cut-outs

### Equipment consisting of (schematic overview)

-  **Lens** page 14
-  **Actuator**
-  **Bezel** page 15
-  **Fixing nut**
-  **Mounting flange** page 19
-  **LED** page 18
-  **Switching element** page 16

Each Part Number listed below includes all the black components shown in the 3D-drawing.

*To obtain a complete unit, please select the red components from the pages shown.*








| Front  | Switching action | Part No.          | Wiring diagram | Weight   |
|--|------------------|-------------------|----------------|----------|
|  <b>Illuminated pushbutton actuator IP 40, Front dimension 18.4 x 18.4 mm</b> |                  |                   |                |          |
| Plastic white  | B                | <b>92-350.000</b> | 1              | 0.003 kg |
| Plastic black  | B                | <b>92-450.000</b> | 1              | 0.003 kg |

Switching action: B = Momentary



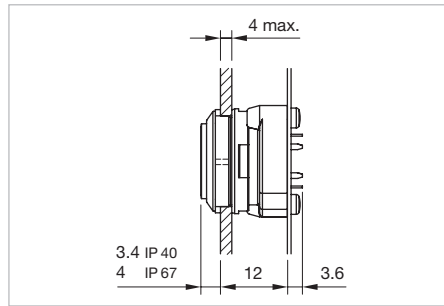
**Illuminated pushbutton actuator IP 67**

**Equipment consisting of (schematic overview)**

-  **Pressure plate** *page 14*
-  **Front bezel**
-  **Actuator**
-  **Fixing nut**
-  **Mounting flange** *page 19*
-  **LED** *page 18*
-  **Switching element** *page 16*

Each Part Number listed below includes all the black components shown in the 3D-drawing.

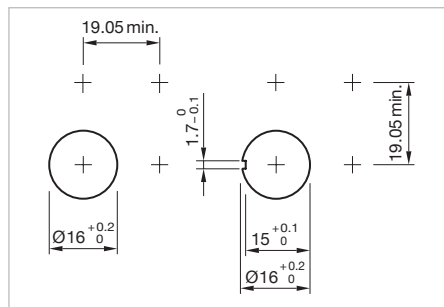
To obtain a complete unit, please select the red components from the pages shown.




Dimensions



Product can differ from the current configuration.



Mounting cut-outs

| Front   | Switching action | Part No.          | Wiring diagram | Weight   |
|---|------------------|-------------------|----------------|----------|
|  |                  |                   |                |          |
| <b>Illuminated pushbutton actuator IP 40, square 18.8 x 18.8 mm</b>                 |                  |                   |                |          |
| Plastic white   | B                | <b>92-340.000</b> | 1              | 0.003 kg |
| Plastic black   | B                | <b>92-440.000</b> | 1              | 0.003 kg |

Switching action: B = Momentary




## Front

### Lens plate IP 67

#### Additional Information


- Material plastic

| Product attribute   | Dimension  | Pressure plate         | Part No.          | Weight   |
|---|------------|------------------------|-------------------|----------|
|  <p><b>Lens plate for pushbutton and indicator IP 67</b></p> |            |                        |                   |          |
| non-illuminative  | 12 x 12 mm | black opaque           | <b>92-941.000</b> | 0.001 kg |
|   |            | grey opaque            | <b>92-941.800</b> | 0.001 kg |
| illuminative  | 12 x 12 mm | red transparent        | <b>92-941.200</b> | 0.001 kg |
|   |            | orange transparent     | <b>92-941.300</b> | 0.001 kg |
|   |            | yellow transparent     | <b>92-941.400</b> | 0.001 kg |
|   |            | green transparent      | <b>92-941.500</b> | 0.001 kg |
|   |            | blue transparent       | <b>92-941.600</b> | 0.001 kg |
|   |            | colourless transparent | <b>92-941.700</b> | 0.001 kg |


### Lens IP 40

#### Additional Information

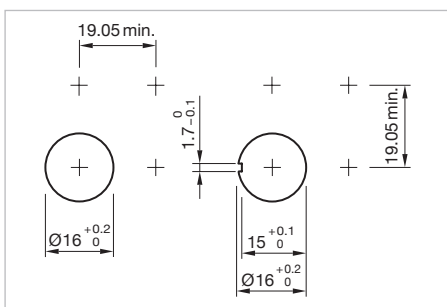
- Material plastic
- With white marking plate

| Product attribute   | Dimension      | Lens                   | Part No.          | Weight   |
|---|----------------|------------------------|-------------------|----------|
|  <p><b>Lens for pushbutton and indicator IP 40</b></p> |                |                        |                   |          |
| non-illuminative  | 13.2 x 13.2 mm | black opaque           | <b>92-956.000</b> | 0.001 kg |
|   |                | grey opaque            | <b>92-956.800</b> | 0.001 kg |
|   |                | white opaque           | <b>92-956.900</b> | 0.001 kg |
| illuminative  | 13.2 x 13.2 mm | red translucent        | <b>92-956.200</b> | 0.001 kg |
|   |                | orange translucent     | <b>92-956.300</b> | 0.001 kg |
|   |                | yellow translucent     | <b>92-956.400</b> | 0.001 kg |
|   |                | green translucent      | <b>92-956.500</b> | 0.001 kg |
|   |                | blue translucent       | <b>92-956.600</b> | 0.001 kg |
|   |                | smoked transparent     | <b>92-958.100</b> | 0.001 kg |
|   |                | red transparent        | <b>92-958.200</b> | 0.001 kg |
|   |                | orange transparent     | <b>92-958.300</b> | 0.001 kg |
|   |                | yellow transparent     | <b>92-958.400</b> | 0.001 kg |
|   |                | green transparent      | <b>92-958.500</b> | 0.001 kg |
|   |                | blue transparent       | <b>92-958.600</b> | 0.001 kg |
|   |                | colourless transparent | <b>92-958.700</b> | 0.001 kg |


**Bezel IP 40**

| Material   | Colour | Part No.        | Weight   |
|--|--------|-----------------|----------|
|  <p><b>Front bezel for pushbutton and indicator IP 40</b></p> | black  | <b>92-912.0</b> | 0.001 kg |
|  | white  | <b>92-912.9</b> | 0.001 kg |

**Blind plug**



Mounting cut-outs

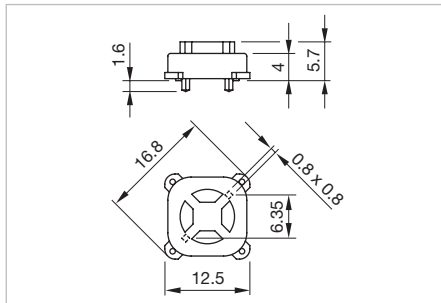
| Dimension  | Material | Colour | Part No.        | Weight   |
|--|----------|--------|-----------------|----------|
|  <p><b>Blind plug</b></p> | Plastic  | black  | <b>51-948.0</b> | 0.003 kg |

## Rear side


### Illumination element PCB

#### Additional Information

- The customer has to decide what series resistor shall be used to the LED



Dimensions

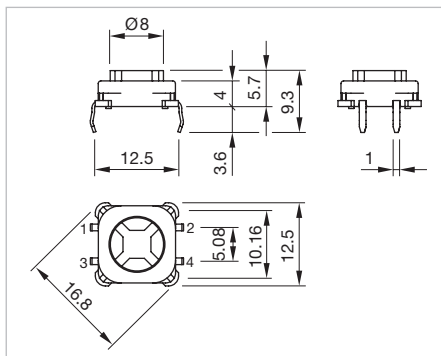
| Terminal   | Part No.          | Component layout | Weight   |
|--|-------------------|------------------|----------|
|  <p><b>Illumination element PCB mounting</b></p> |                   |                  |          |
| PCB  | <b>92-800.042</b> | 1                | 0.001 kg |

The component layouts you will find from page { $\$$ |-BR92\_KAZE\_Zeichnung}


### Switching element PCB illuminative

#### Additional Information

- The customer has to decide what series resistor shall be used to the LED

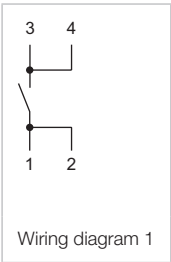


Dimensions

| Contacts   | Terminal | Part No.          | Component layout | Wiring diagram | Weight   |
|--|----------|-------------------|------------------|----------------|----------|
|  <p><b>Switching element PCB mounting illuminative</b></p> |          |                   |                  |                |          |
| 1 NO   | PCB      | <b>92-851.342</b> | 2                | 1              | 0.001 kg |


The component layouts you will find from page { $\$$ |-BR92\_KAZE\_Zeichnung}






**Spacer**

- Additional Information**
- Adjustable for front plate thickness of 2/2.5/3/3.5/4 mm
  - When fitting, ensure that back of panel is free of grease and dirt

| Part No.   | Weight   |
|--|----------|
|  <p><b>Spacer</b></p> |          |
| 92-965.0   | 0.003 kg |

**PCB assembled**

- Additional Information**
- For discrete switching applications including switching element and mounting flange, soldering terminal (assembled PCB incl. series resistor and LED on request)


| Part No.  | Weight   |
|---|----------|
|  <p><b>PCB assembled</b></p> |          |
| 92-981.0  | 0.003 kg |

## Illumination

### Single-LED, T1 Bi-Pin

#### Additional Information

- The customer has to decide what series resistor shall be used to the LED
- Luminosity and wave length scattering caused by LED manufacturing processes may cause slight variations in the illumination

| LED colour  | Forward voltage typ. | Lumi. intensity | Dom. wavelength | Part No.             | Weight   |
|---|----------------------|-----------------|-----------------|----------------------|----------|
|  <p><b>Single-LED</b></p> |                      |                 |                 |                      |          |
| Single-LED red  | 2.0 VDC @ 20 mA      | 160 mcd         | 625 nm          | <b>10-2601.3172S</b> | 0.001 kg |
| Single-LED orange   | 2.0 VDC @ 20 mA      | 165 mcd         | 605 nm          | <b>10-2601.3173S</b> | 0.001 kg |
| Single-LED yellow   | 2.9 VDC @ 20 mA      | 600 mcd         | 580 nm          | <b>10-2603.3174S</b> | 0.001 kg |
| Single-LED green  | 3.2 VDC @ 20 mA      | 650 mcd         | 525 nm          | <b>10-2603.3175S</b> | 0.001 kg |
| Single-LED blue   | 3.0 VDC @ 20 mA      | 250 mcd         | 467 nm          | <b>10-2603.3176S</b> | 0.001 kg |
| Single-LED white  | 3.2 VDC @ 20 mA      | 500 mcd         | x=0.3/y=0.3     | <b>10-2603.3178S</b> | 0.001 kg |

**Mounting**

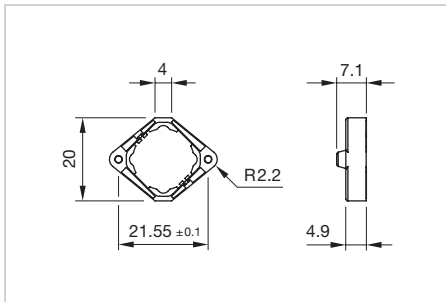
**Anti-twist ring**

**Additional Information**


- For front panel thickness max. 2 mm

| Mounting cut-out  | Part No.      | Weight   |
|---|---------------|----------|
|  <p><b>Anti-twist ring</b></p> |               |          |
| Ø 16 mm   | <b>51-910</b> | 0.001 kg |

**Mounting flange**




Dimensions

| Part No.  | Weight   |
|---|----------|
|  <p><b>Mounting flange</b></p> |          |
| <b>92-960.0</b>   | 0.001 kg |

**Lens remover**

**Additional Information**


- For lens IP 40 only

| Part No.   | Weight   |
|--|----------|
|  <p><b>Lens remover</b></p> |          |
| <b>18-910</b>  | 0.002 kg |

## Mounting tool

### Additional Information


- For tightening or loosening of the fixing nut

| Part No.  | Weight   |
|---|----------|
| <br><b>Mounting tool</b> |          |
| 01-907  | 0.020 kg |

## Dismantling tool

### Additional Information

- For actuator dismantling of switching element, illumination element and mounting flange

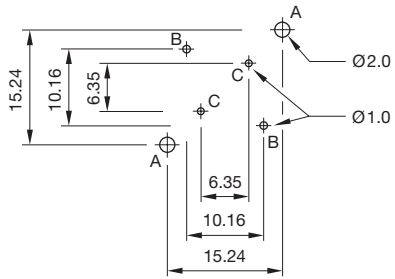
| Part No.   | Weight   |
|--|----------|
| <br><b>Dismantling tool</b> |          |
| 92-971.0   | 0.002 kg |

Drawings

Single-LED

Drilling plan (element side)

- A Fixing holes for mounting flange (92-960.0)
- B Holes for LED
- C Holes for centering pins

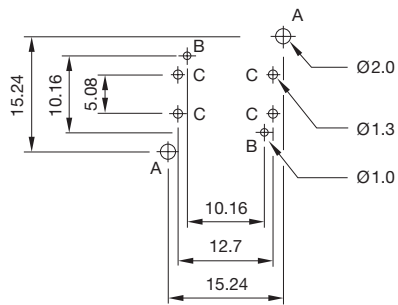


Bauteil layout 1

Single-LED

Drilling plan (element side)

- A Fixing holes for mounting flange (92-960.0)
- B Holes for LED
- C Holes for contact pins  
Pad max. Ø 2.5 mm  
Through-connection recommended



Bauteil layout 2

## Pushbutton and Illuminated pushbutton

### Switching system

Short-travel switching system with 2 independent contact points and tactile operation.

Guarantees reliable switching even of very light loads.  
Fitted with 1 normally open contact.

### Material

#### Lens

Polycarbonate (PC)

#### Front bezel

Thermoplastic Elastomer (TPE)

#### Frame

Thermoplastic Polyester (PBT)

#### Material of contact

Gold (Au)

#### Switching element

Thermoplastic Polyester (PET, PBT) and Polyacetale (POM)

#### Actuator housing

Thermoplastic Polyester (PBT)

### Mechanical characteristics

#### Tightening torque

Fixing screw 40Ncm recommended  
Fixing nut max. 50Ncm

#### Actuating force

2.7 N  $\pm$  1 N measured at the switching element  
5 N measured at the lens

#### Actuating travel

Switching element 0.4 mm

#### Rebound time

$\leq$  1 ms

#### Resistance to heat of soldering

250 °C, 3 s (PCB assembly)  
320 °C, 3 s (when using a soldering iron)

#### Mechanical lifetime

$\geq$  1 Million operations as per IEC 60512-5-9a

### Electrical characteristics

#### Contact resistance

Starting value (initial)  $\leq$  100 m $\Omega$  as per IEC 60512-2-2b

#### Isolation resistance

$\geq$  10<sup>9</sup>  $\Omega$  between all terminals at 100VDC, as per IEC 60512-2-3a

#### Electrical life

$\geq$  500 000 operations at 42VDC, 50 mA as per IEC 60512-5-9c.  
When attention is paid to the direction of current flow from terminal 3/4 to 1/2 the electrical life can be prolonged.

#### Electrostatic discharge (ESD)

15 kV

#### Switch rating

|                   |  |
|-------------------|--|
| Switching voltage | min. 50 mV AC/DC<br>max. 42 V AC/DC        |
| Switching current | min. 10 $\mu$ A AC/DC<br>max. 100 mA AC/DC |
| Power rating      | max. 2 W                                   |

#### Electric strength

500 VAC, 50 Hz, 1 min, as per IEC 60512-2-4a

### Environmental conditions

#### Storage temperature

-40 °C ... +80 °C

#### Operating temperature

-25 °C ... +70 °C

#### Front protection

Switching element IP 40 (fluxproof to DIN 41640 Part 84)  
front IP 67 or IP 40

#### 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, 10 cycles, 3-axis,  
as per EN IEC 60068-2-6

### Approvals

#### Declaration of conformity

CE

*EAO reserves the right to alter specifications without further notice.*

## General notes

If desired, the actuators of the series 92 can be supplied ready marked. With your order please enclose a list of the desired markings or a drawing, showing the type or size of script or the symbols desired.

### 1. Laser engraving (Fig. 1)

In addition to the most commonly used world languages, in DIN1451-3 close spacing, other typefaces are available as Scandinavian, Slavic, Greek, Russian and Polish. Red, blue and black lenses are filled with white colour. Other colour lenses are filled in black. Standard height of letters is 2 mm. If the height is not specified, we will supply 2 mm engraved letters.

### 2. Hot stamping (Fig. 1)

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

### 3. Film inserts (Fig. 2)

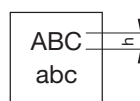
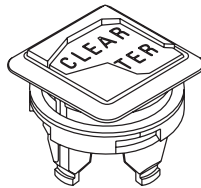
Instead of using engraving, the actuator can be fitted with transparent film inserts. However, for this purpose the use of transparent lens caps is recommended. If smoked lens caps are used the lettering does not become visible until the LED is alight. Max. size of film insert 11.4 x 11.4 mm for IP 40 10.4 x 10.4 mm for IP 67 Film thickness 0.2 mm.

All dimensions in mm

| Height of letters h | Number of lines | Number of capital letters per line (target value) | Number of small letters per line (target value) |
|---------------------|-----------------|---|---|
| 3                   | 2               | 5-6   | 6   |
| 4                   | 2               | 4   | 4   |
| 5                   | 1               | 3   | 3-4   |
| 6                   | 1               | 2-3   | 3   |
| 8                   | 1               | 2   | 2   |

Fig. 1

Fig. 2



# 92 Application guidelines

## Suppressor circuits

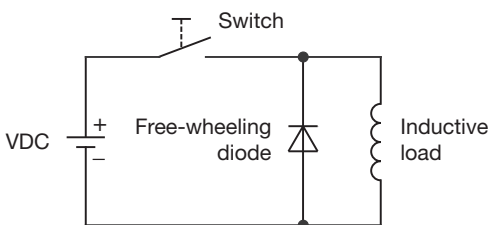
When switching inductive loads such as relays, DC motors, and DC solenoids, it is always important to absorb surges (e.g. with a diode) to protect the contacts. When these inductive loads are switched off, a counter emf can severely damage switch contacts and greatly shorten lifetime.

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. 12VDC) 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 ( $V_R$ ) 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



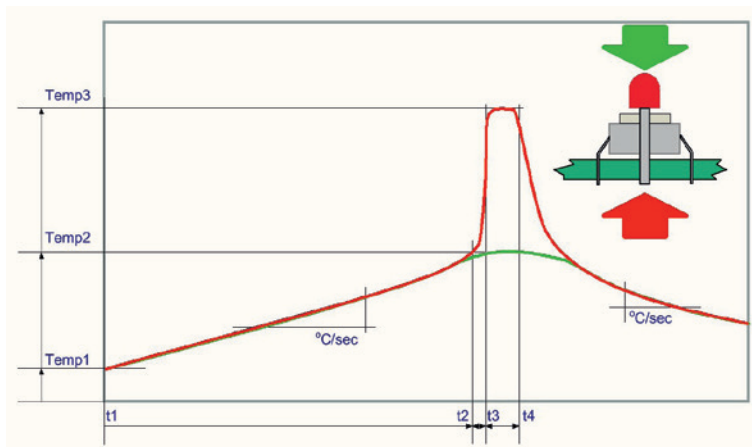
## Note for soldering

### Process parameter for wave soldering

Basic specification for wave soldering J-STD 75 W4C

|  |                                  |
|--|----------------------------------|
| Maximum temperature on the component side of the pcb<br>(Temperature must not exceed during the entire processing) | 120 °C                           |
| Preheating phase (t1 ... t2)<br>Ramp up  | 70 ... 120 sec<br>typ. + 1°C/sec |
| Ramp up to maximum temperature (t2 ... t3)   | not defined                      |
| Maximum temperature on the soldering side (Temp 3)<br>Maximum time of soldering process (t3 ... t4)                | 250 °C<br>3 sec                  |
| Ramp down at 170 °C:   | typ. -2 °C/sec                   |



**Temperature curve wave soldering**

Green curve: Temperature on the component side of the pcb  
 Red curve: Temperature on the soldering side of the pcb

Room temperature: Temp 1

Preheating: Temperature process = Temp 1 ... Temp 2  
 Process time = t1 ... t2

Ramp up to soldering temperature: Process time = t2 ... t3

Soldering phase: Temperature process = Temp 3  
 Process time = t3 ... t4

**Iron soldering**

Basic specification for iron soldering IEC 60068-2-20

Maximum temperature at tip of iron: 320 °C

Maximum soldering time: 3 sec

**Cleaning/Lacquering**

The switching elements are not sealed. Cleaning up the PCB may damage the contacts in the switching elements. For this reason, the following points should be noted:

- When soldering make sure that the flux does not pass on the upper side of the PCB.
- When cleaning the PCB with detergents ensure that no dust or other debris may get inside of the switching elements.
- Ensure that no lacquer penetrates into the interior of the switching element when lacquering the PCB.

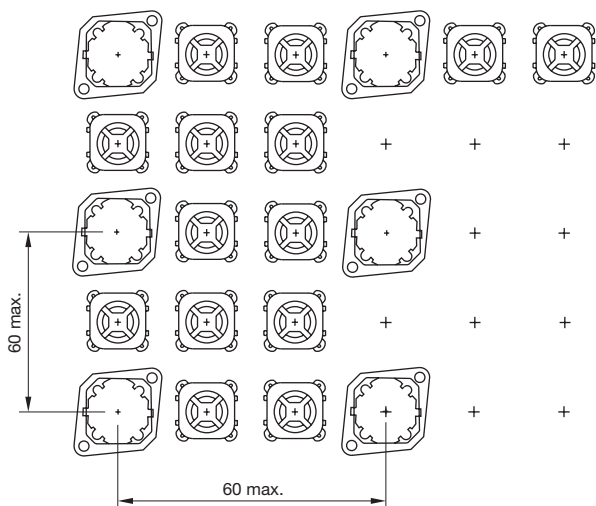
**Storage of components**

To obtain the optimum solderability of the components, the following points should be noted during storage:

- Do not store components in locations with high temperature or humidity.
- Do not expose components to corrosive gases.
- Avoid direct sunlight for a long period.

# 92 Application guidelines

## Arrangement mounting flange



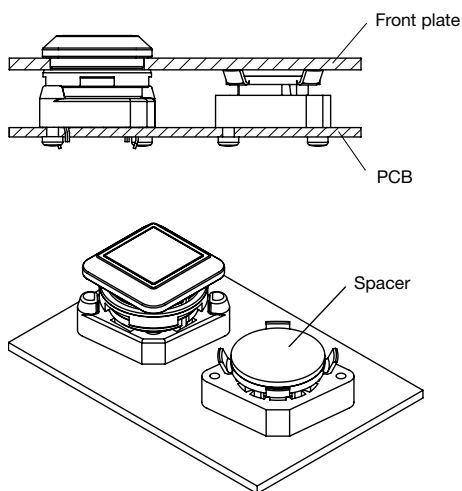
The arrangement of the mounting flanges and their number is determined by the size of the front panel or PCB. To ensure uniform, tactile switching, we recommend a layout of the flanges as per adjacent sketch.

For large PCBs with several switching elements we recommend the following procedure:

1. Fit the actuator to the front panel.
2. Clip the mounting flange to the rear of the intended actuator.
3. Screw the PCB with the components soldered to it to the assembled mounting flange.

This arrangement applies to PCBs 1.6 mm thick.

## Dismantling mounting flange



The tool Part No. 92-971.0 must be used for removing the mounting flange from the actuator. Before removing the flange, the PCB fixing screws must be loosened.

If the number of actuators is insufficient, use the spacer Part. No. 92-965.0 which can be attached to the front panel.

The spacer can be adjusted to the following front panel thicknesses: 1.5/2.2/3/3.5/4 mm and can be stuck to the back of the panel free of dirt and grease.

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| 92-143.500    | 4    | 92-958.400 | 14   |
| 92-143.600    | 4    | 92-958.500 | 14   |
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| 92-341.800    | 6    |            |      |
| 92-343.200    | 7    |            |      |
| 92-343.300    | 7    |            |      |
| 92-343.400    | 7    |            |      |
| 92-343.500    | 7    |            |      |
| 92-343.600    | 7    |            |      |
| 92-343.700    | 7    |            |      |
| 92-350.000    | 10   |            |      |
| 92-350.000    | 12   |            |      |
| 92-356.000    | 6    |            |      |
| 92-356.800    | 6    |            |      |
| 92-356.900    | 6    |            |      |
| 92-358.100    | 7    |            |      |
| 92-358.200    | 7    |            |      |
| 92-358.300    | 7    |            |      |
| 92-358.400    | 7    |            |      |
| 92-358.500    | 7    |            |      |
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| 92-358.700    | 7    |            |      |
| 92-440.000    | 11   |            |      |
| 92-440.000    | 13   |            |      |
| 92-441.000    | 6    |            |      |
| 92-441.800    | 6    |            |      |
| 92-443.200    | 7    |            |      |
| 92-443.300    | 7    |            |      |
| 92-443.400    | 7    |            |      |
| 92-443.500    | 7    |            |      |
| 92-443.600    | 7    |            |      |
| 92-443.700    | 7    |            |      |
| 92-450.000    | 10   |            |      |
| 92-450.000    | 12   |            |      |
| 92-456.000    | 6    |            |      |
| 92-456.800    | 6    |            |      |
| 92-456.900    | 6    |            |      |
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| 92-458.200    | 8    |            |      |
| 92-458.300    | 8    |            |      |

