

Description .....	3
Product Assembly .....	4
PCB Pushbuttons .....	5
Accessories.....	8
Technical Data.....	10
Marking .....	11
Drawings.....	12
Index.....	15

## Product Information

### General notes

The series 97 contains indicators and illuminated pushbuttons with maintained and momentary action with one or two contacts which may be either normally open or normally closed or a combination of the two. The illuminated pushbuttons are equipped with the low-level switching system.

The front dimensions are 9 x 9 mm or 9 mm dia.; or with overhanging lens 12.2 x 12.2 mm.

### Mounting

The illuminated pushbuttons of series 97 can be soldered to a printed circuit board. The contact layout conforms to the module of 2.54 mm (1/10 "). A centering pin ensures dimensionally exact mounting in rows or blocks and prevents the button from lifting when being soldered.

### Cleaning of soldered PCB

In many cases the boards are cleaned following mechanical soldering. In this case it is essential to prevent the cleaning fluid containing dirt, grease and flux from entering the switch.

### Lenses

The flat lenses, made of polycarbonate, are obtainable in various colours. The transparent lens is available with translucent or transparent support.

The overhanging lenses consist of a lens bezel, a text plate and a mat transparent lens plate, obtainable in flat form.

### Marking

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

### Illumination

Perfect illumination of the different coloured lenses is assured by LED Bi-Pin T 1 lamps. The LEDs are soldered through the pushbutton housing direct onto the PC boards.

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

### Position indication

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

## Specimen order

### Indicator :

- Indicator actuator, 9 mm dia. 97-061.007

### Essential accessories :

- Lens, plastic blue transparent flush, 9 mm dia. 97-932.6  
 - Single-LED T1 Bi-Pin, 2.2 VDC, 20 mA, yellow 10-2602.3174F

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

## Pushbutton illuminative





- 1 Lens plate
- 2 Marking plate
- 3 Lens bezel
- 4 Switching element

## Indicator actuator



### Essential Accessories:

-  Lens page 8
-  Single-LED page 9

	Front protection	Terminals	□ 9 x 9 mm Typ-Nr.	∅ 9 mm Typ-Nr.	Component layout	Mounting dimensions	Technical drawing	Circuit drawing	
<b>Indicator actuator</b>	IP 40	P	<b>97-081.007</b>	<b>97-061.007</b>	1	1	1	1	0.002



Terminals: P = PCB terminal

Component layout from page 12, Mounting dimensions from page 12, Technical drawing from page 13, Circuit drawing from page 13

## Indicator actuator overhanging



### Essential Accessories:

-  Lens overhanging complete page 8
-  Single-LED for overhanging version page 9

	Front protection	Terminals	□ 12.2 x 12.2 mm Typ-Nr.	Component layout	Mounting dimensions	Technical drawing	Circuit drawing	
<b>Indicator actuator overhanging</b>	IP 40	P	<b>97-041.007</b>	1	2	2	1	0.002

Terminals: P = PCB terminal

Component layout from page 12, Mounting dimensions from page 12, Technical drawing from page 13, Circuit drawing from page 13

## Illuminated pushbutton actuator



### Essential Accessories:

- Lens page 8
- Single-LED page 9

	Front protection	Contacts	Switching action		Terminals		9 x 9 mm Typ-Nr.		Ø 9 mm Typ-Nr.		Component layout		Mounting dimensions		Technical drawing		Circuit drawing		
			MA	M	P														
<b>Illuminated pushbutton actuator</b>	IP 40	1 NC	MA	P	<b>97-382.037</b>	<b>97-372.037</b>	2	1	1	2	0.002								
			M	P	<b>97-352.037</b>	<b>97-332.037</b>	2	1	1	6	0.002								
	1 NC + 1 NO	MA	P	<b>97-383.037</b>	<b>97-373.037</b>	2	1	1	3	0.002									
		M	P	<b>97-353.037</b>	<b>97-333.037</b>	2	1	1	7	0.002									
	1 NO	MA	P	<b>97-380.037</b>	<b>97-370.037</b>	2	1	1	5	0.002									
		M	P	<b>97-350.037</b>	<b>97-330.037</b>	2	1	1	9	0.002									
	2 NO	MA	P	<b>97-381.037</b>	<b>97-371.037</b>	2	1	1	4	0.002									
		M	P	<b>97-351.037</b>	<b>97-331.037</b>	2	1	1	8	0.002									

Contacts: NC = Normally closed, NO = Normally open

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



Terminals: P = PCB terminal

Component layout from page 12, Mounting dimensions from page 12, Technical drawing from page 13, Circuit drawing from page 13

## Illuminated pushbutton actuator overhanging



### Essential Accessories:

-  Lens overhanging complete page 8
-  Single-LED for overhanging version page 9

	Front protection	Contacts	Switching action	Terminals	12.2 x 12.2 mm Typ-Nr.	Component layout	Mounting dimensions	Technical drawing	Circuit drawing	
<b>Illuminated pushbutton actuator overhanging</b>	IP 40	1 NC	MA	P	<b>97-362.037</b>	2	2	2	2	0.002
			M	P	<b>97-322.037</b>	2	2	2	6	0.002
		1 NC + 1 NO	MA	P	<b>97-363.037</b>	2	2	2	3	0.002
			M	P	<b>97-323.037</b>	2	2	2	7	0.002
		1 NO	MA	P	<b>97-360.037</b>	2	2	2	5	0.002
			M	P	<b>97-320.037</b>	2	2	2	9	0.002
		2 NO	MA	P	<b>97-361.037</b>	2	2	2	4	0.002
			M	P	<b>97-321.037</b>	2	2	2	8	0.002

Contacts: NC = Normally closed, NO = Normally open


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

Terminals: P = PCB terminal

Component layout from page 12, Mounting dimensions from page 12, Technical drawing from page 13, Circuit drawing from page 13

## Front


### Lens

	Lens	Lens holder	∅ 9 x 9 mm Typ-Nr.	∅ 9 mm Typ-Nr.	 kg
<b>Lens</b> Plastic (not for film insert and LED)	black opaque flush	translucent	<b>97-951.0</b>	<b>97-931.0</b>	0.001
	blue translucent flush	translucent	<b>97-951.6</b>	<b>97-931.6</b>	0.001
	green translucent flush	translucent	<b>97-951.5</b>	<b>97-931.5</b>	0.001
	grey opaque flush	translucent	<b>97-951.8</b>	<b>97-931.8</b>	0.001
	red translucent flush	translucent	<b>97-951.2</b>	<b>97-931.2</b>	0.001
	white translucent flush	translucent	<b>97-951.9</b>	<b>97-931.9</b>	0.001
	yellow translucent flush	translucent	<b>97-951.4</b>	<b>97-931.4</b>	0.001
Plastic (not recommended for film insert)	blue transparent flush	transparent	<b>97-952.6</b>	<b>97-932.6</b>	0.001
	colourless transparent flush	transparent	<b>97-952.7</b>	<b>97-932.7</b>	0.001
	green transparent flush	transparent	<b>97-952.5</b>	<b>97-932.5</b>	0.001
	red transparent flush	transparent	<b>97-952.2</b>	<b>97-932.2</b>	0.001
	yellow transparent flush	transparent	<b>97-952.4</b>	<b>97-932.4</b>	0.001



### Lens overhanging complete


for indicator and illuminated pushbutton overhanging

	Lens plate	∅ 12.2 x 12.2 mm Typ-Nr.	 kg
<b>Lens overhanging complete</b> flush, mat	Plastic colourless transparent	<b>97-910.9</b>	0.001



### Lens plate

for lens overhanging


	Lens plate	∅ 12.2 x 12.2 mm Typ-Nr.	 kg
<b>Lens plate</b> convex for film insert or marking plate	Plastic colourless transparent	<b>97-929.7A</b>	0.001
	Plastic blue transparent	<b>97-927.6</b>	0.001
flush, mat	Plastic colourless transparent	<b>97-927.7</b>	0.001
	Plastic green transparent	<b>97-927.5</b>	0.001
	Plastic red transparent	<b>97-927.2</b>	0.001
	Plastic yellow transparent	<b>97-927.4</b>	0.001
	flush for film insert or marking plate	Plastic blue transparent	<b>97-921.6</b>
	Plastic colourless transparent	<b>97-921.7</b>	0.001
	Plastic green transparent	<b>97-921.5</b>	0.001
	Plastic red transparent	<b>97-921.2</b>	0.001
	Plastic yellow transparent	<b>97-921.4</b>	0.001





## Marking plate


for lens overhanging

	Marking plate	Ø 12.2 x 12.2 mm Typ-Nr.	
<b>Marking plate</b>	Plastic white translucent	<b>97-908.9</b>	0.001




## Marking foil

for lens overhanging

	Marking foil	Typ-Nr.	
<b>Marking foil</b>	colourless	<b>97-909.7</b>	0.001

## Lens bezel


for lens overhanging

	Lens bezel	Typ-Nr.	
<b>Lens bezel</b> rounded edges	Plastic grey	<b>97-920.83</b>	0.001
with edges	Plastic grey	<b>97-920.8</b>	0.001



## Illumination

### Single-LED

	Socket	Light colour	Operating voltage/-current	Typ-Nr.	
<b>Single-LED</b>	T1 Bi-Pin	green	2.2 VDC, 20 mA	<b>10-2602.3175F</b>	0.001
		rot	2.2 VDC, 20 mA	<b>10-2602.3172F</b>	0.001
		yellow	2.2 VDC, 20 mA	<b>10-2602.3174F</b>	0.001



### Single-LED for overhanging version

	Socket	Light colour	Operating voltage/-current	Typ-Nr.	
<b>Single-LED for overhanging version</b>	T1 Bi-Pin	green	2.2 VDC, 20 mA	<b>10-2602.3175G</b>	0.001
		red	2.2 VDC, 20 mA	<b>10-2602.3172G</b>	0.001
		yellow	2.2 VDC, 20 mA	<b>10-2602.3174G</b>	0.001



## Assembling

### Lens remover

for lens standard

	Typ-Nr.	
<b>Lens remover</b>	<b>19-910</b>	0.002



## Actuator with low level switching element

### Switching system

This low-level switching system was designed for switching low powers in electronic circuits. The switching system assures reliable switching of loads.

Single-break momentary contact, as normally open or normally closed with 4 independent points of contact.

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

Contact combinations: 1 normally open contact, 2 normally open contacts, 1 normally closed/1 normally open contact, 1 normally closed contact

### Material

#### Lens

Polycarbonate (PC)

#### Switch housing

Polyester, self-extinguishing

#### Material of contact

Gold plated

### Mechanical characteristics

#### Actuating force

3.4 N  $\pm$ 0.3 N (130 g)

#### Actuating travel

Lead distance NC contact: 0.6 mm  $\pm$ 0.2 mm

Lead distance NO contact: 1.6 mm  $\pm$ 0.2 mm

Total distance: 3 mm  $\pm$ 0.2 mm

#### Rebound time

typ.  $\leq$ 200  $\mu$ s

#### Mechanical lifetime

$\leq$ 5 million operations, as per IEC 60512-5-9a

### Electrical characteristics

#### Contact resistance

Starting value (initial)  $\leq$ 50 m $\Omega$ , as per IEC 60512-2-2b

#### Isolation resistance

$\geq$ 10<sup>12</sup>  $\Omega$  between contacts at 100 VDC, as per IEC 60512-2-3a

#### Electrical life

$\geq$ 2 million operations at 30 VDC/100 mA, as per IEC 60512-5-9c

#### Switch rating

min. 100  $\mu$ VDC/AC, 10  $\mu$ A

max. 42 VDC/AC, 100 mA

#### Electric strength

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

### Environmental conditions

#### Storage temperature

-40 °C ... +85 °C

#### Service temperature

-25 °C ... +65 °C

### Front protection

IP 40 front side, as per IEC 60529

### Shock resistance

(single impacts, semi-sinusoidal)

$\geq$ 50 g for 11 ms, as per IEC 60512-4-3

### Vibration resistance

(sinusoidal)

10 g at 10-2000 Hz, amplitude 0.75 mm, as per IEC 60512-4-4

### Approvals

#### Declaration of conformity

RoHS

## General notes

### 1. Engraving

In addition to the most commonly used world languages, in DIN 1451-3 close spacing, other typefaces are available as Scandinavian, Slavic, Greek, Russian and Polish.

Unless requested otherwise by customer, the lettering on white marking plates will be 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

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

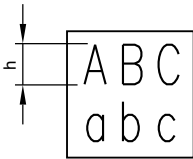
### 3. Film inserts for overhanging lens

Instead of using engraving the lenses can be fitted with transparent film inserts, placed between the lens plate and the marking plate. The film thickness is 0.2 mm. Maximum film size 10 x 10 mm.

## Lenses for Indicators | Illuminated pushbuttons

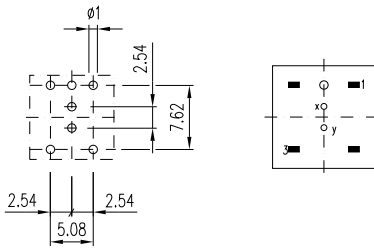
All dimensions in mm

Height of letters h	Number of lines	Number of (target value) capital letters per line	Number of (target value) small letters per line
2	3	6	7
3	2	5	6
4	2	4	4
5	1	3	3
6	1	2	3
8	1	1	1

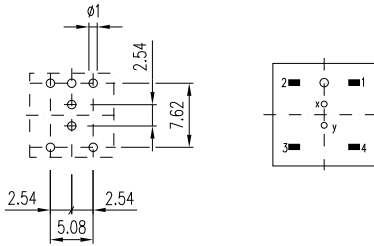


## Component layout

1 Indicator actuator page 5 | Indicator actuator overhanging page 5

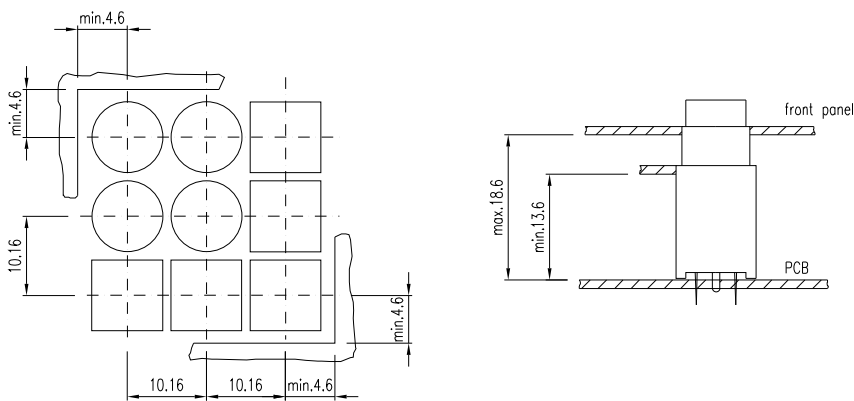


2 Illuminated pushbutton actuator page 6 | Illuminated pushbutton actuator overhanging page 7

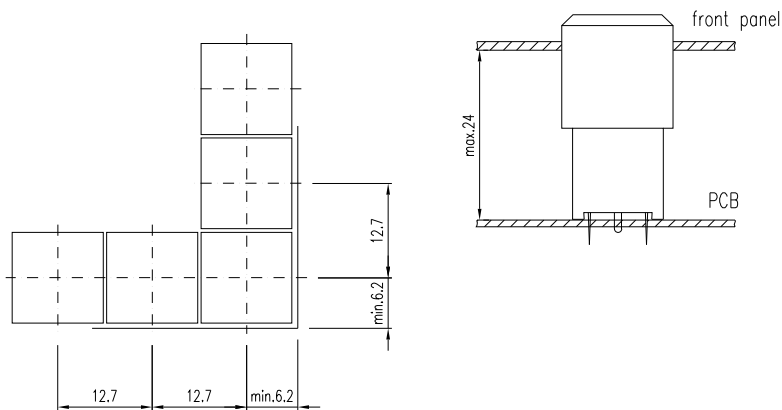


## Mounting dimensions

1 Indicator actuator page 5 | Illuminated pushbutton actuator page 6

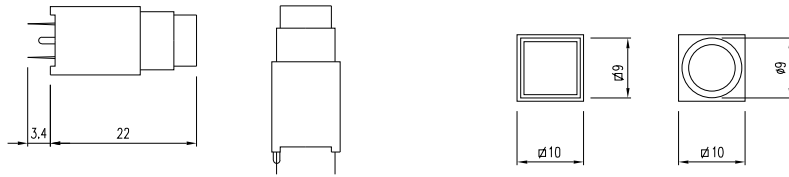


2 Indicator actuator overhanging page 5 | Illuminated pushbutton actuator overhanging page 7

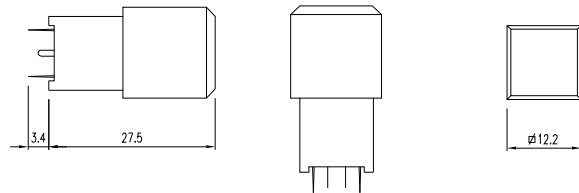


## Technical drawing

1 Indicator actuator page 5 | Illuminated pushbutton actuator page 6



2 Indicator actuator overhanging page 5 | Illuminated pushbutton actuator overhanging page 7

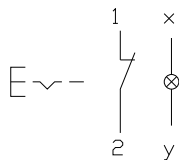


## Circuit drawing

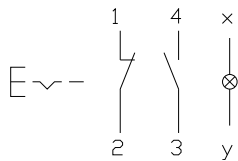
1 Indicator actuator page 5 | Indicator actuator overhanging page 5



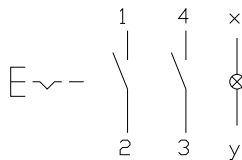
2 Illuminated pushbutton actuator page 6 | Illuminated pushbutton actuator overhanging page 7



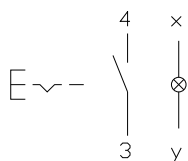
3 Illuminated pushbutton actuator page 6 | Illuminated pushbutton actuator overhanging page 7



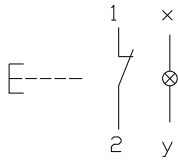
4 Illuminated pushbutton actuator page 6 | Illuminated pushbutton actuator overhanging page 7



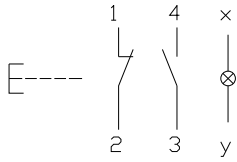
5 Illuminated pushbutton actuator page 6 | Illuminated pushbutton actuator overhanging page 7



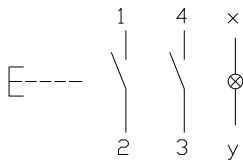
**6 Illuminated pushbutton actuator** page 6 | **Illuminated pushbutton actuator overhanging** page 7



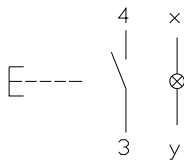
**7 Illuminated pushbutton actuator** page 6 | **Illuminated pushbutton actuator overhanging** page 7



**8 Illuminated pushbutton actuator** page 6 | **Illuminated pushbutton actuator overhanging** page 7



**9 Illuminated pushbutton actuator** page 6 | **Illuminated pushbutton actuator overhanging** page 7



# Index from Typ-Nr.

Typ-Nr.	Page	Typ-Nr.	Page	Typ-Nr.	Page
10-2602.3172F	9	97-951.2	8		
10-2602.3172G	9	97-951.4	8		
10-2602.3174F	9	97-951.5	8		
10-2602.3174G	9	97-951.6	8		
10-2602.3175F	9	97-951.8	8		
10-2602.3175G	9	97-951.9	8		
19-910	9	97-952.2	8		
97-041.007	5	97-952.4	8		
97-061.007	5	97-952.5	8		
97-081.007	5	97-952.6	8		
97-320.037	7	97-952.7	8		
97-321.037	7				
97-322.037	7				
97-323.037	7				
97-330.037	6				
97-331.037	6				
97-332.037	6				
97-333.037	6				
97-350.037	6				
97-351.037	6				
97-352.037	6				
97-353.037	6				
97-360.037	7				
97-361.037	7				
97-362.037	7				
97-363.037	7				
97-370.037	6				
97-371.037	6				
97-372.037	6				
97-373.037	6				
97-380.037	6				
97-381.037	6				
97-382.037	6				
97-383.037	6				
97-908.9	9				
97-909.7	9				
97-910.9	8				
97-920.8	9				
97-920.83	9				
97-921.2	8				
97-921.4	8				
97-921.5	8				
97-921.6	8				
97-921.7	8				
97-927.2	8				
97-927.4	8				
97-927.5	8				
97-927.6	8				
97-927.7	8				
97-929.7A	8				
97-931.0	8				
97-931.2	8				
97-931.4	8				
97-931.5	8				
97-931.6	8				
97-931.8	8				
97-931.9	8				
97-932.2	8				
97-932.4	8				
97-932.5	8				
97-932.6	8				
97-932.7	8				
97-951.0	8				