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### Series 70

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## General Notes

Series 70 offers users an all-bright momentary switch for use in membrane switching systems. Now for the first time the multi-6 LED permits exceedingly bright illumination of the complete touch surface in 4 colours in either a round or square configuration.

When employed together with the optionally available white caps the ON condition of these products is clearly visible even under conditions of high ambient lighting due to the change in colour from white to the corresponding LED colour.

Where more importance is attached to the brilliance than the wavelength (color) of the green light the yellow multi LED can be combined with the green cap to boost the light output of the naturally weaker green version. Switchless indicators, non-illuminated types as well as blank elements round of this assortment.

PCB layout and style are in keeping with the most popular switch elements employed in film-seal keypads. Merly the LED leads need to be supplemented in the existing layout. Due to the neat styling and sculptured surface of the caps all products can also be put to use as normal PCB switches having no film seal.

This permits huge savings in the cost of small quantities or pilot series and when keypad seal requirement are not critical. Customized and collated deliveries are possible on request for large-quantity orders.

## specimen order

### indicator

- indicator-element, LED, green 70-820.5

### Recommended accessories:

- lens, green, 15 mm dia.70-911.5

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

## illuminated pushbutton

- 1 lens
- 2 switching element



## indicator element



lens page 483

	illumination	colour	part no.	circuit drawing	technical drawing	component layout	
<b>indicator element</b>	without	without	<b>92-800.042</b>	.	2	2	0,001
LED bi-pin T1, 20 mA without built-in series resistor typ. forward voltage 2.2 VDC	LED	yellow	<b>70-820.4</b>	1	1	1	0,001
		green	<b>70-820.5</b>	1	1	1	0,001
		orange	<b>70-820.3</b>	1	1	1	0,001
		red	<b>70-820.2</b>	1	1	1	0,001
Multi-LED bi-pin T1, 20 mA without built-in series resistor typ. forward voltage 12 VDC	Multi-LED	yellow	<b>70-810.4</b>	1	1	1	0,001
		green	<b>70-810.5</b>	1	1	1	0,001
		orange	<b>70-810.3</b>	1	1	1	0,001
		red	<b>70-810.2</b>		1	1	0,001

circuit drawings from page 491, technical drawings from page 487, component layouts from page 490

## switching element non-illuminated



spacing cap page 483

	material of contacts	use	part no.	circuit drawing	technical drawing	component layout	
<b>switching element non-illuminated</b>	gold	with spacing cap	<b>70-201.0</b>	2	5	5	0,001
	silver	with spacing cap	<b>70-101.0</b>	2	4	4	0,001
		without spacing cap	<b>70-100.0</b>	2	3	3	0,001

circuit drawings from page 491, technical drawings from page 487, component layouts from page 490

## switching element illuminated



🛒 lens page 483

	illumination	colour	part no.	circuit drawing	technical drawing	component layout	
<b>switching element illuminated</b>	LED	yellow	<b>70-220.4</b>	3	6	6	0,001
		green	<b>70-220.5</b>	3	6	6	0,001
		orange	<b>70-220.3</b>	3	6	6	0,001
		red	<b>70-220.2</b>	3	6	6	0,001
	Multi-LED	yellow	<b>70-210.4</b>	3	6	6	0,001
		green	<b>70-210.5</b>	3	6	6	0,001
		orange	<b>70-210.3</b>	3	6	6	0,001
		red	<b>70-210.2</b>	3	6	6	0,001
	without	without	<b>92-851.342</b>	4	7	5	0,001

circuit drawings from page 491, technical drawings from page 487, component layouts from page 490

at front

lens

	colour	∅ 19.05 x 19.05 mm Typ-Nr.	15.4 mm dia. Typ-Nr.	∅ 15.4 x 15.4 mm Typ-Nr.	12.4 mm dia. Typ-Nr.	∅ 12.4 x 12.4 mm Typ-Nr.	technical drawing		
lens	blue			70-921.6			8	0,001	
						70-922.6	9	0,001	
	yellow		70-911.4	70-921.4				8	0,001
						70-912.4	70-922.4	9	0,001
	green		70-911.5	70-921.5				8	0,001
						70-912.5	70-922.5	9	0,001
	orange					70-912.3	70-922.3	9	0,001
			70-911.3	70-921.3				8	0,001
	red		70-911.2	70-921.2				8	0,001
						70-912.2	70-922.2	9	0,001
	white					70-912.9	70-922.9	9	0,001
			70-911.9	70-921.9				8	0,001
		70-920.9						0,001	



technical drawings from page 487

spacing cap

	height	part no.	technical drawing	
spacing cap 2 recesses for LED	22.5 mm	70-912.0	12	0,001
	9 mm	70-910.0	10	0,001
	13 mm	70-911.0	11	0,001
without recesses for LED	18.9 mm	70-901.0	13	0,001



technical drawings from page 487

for illumination

LED

base T 1 Bi-Pin

	voltage/current	colour	part no.	
LED 1 chip	2.2 VDC/20 mA	yellow	10-2602.3174D (92-948.4)	0,002
		green	10-2602.3175D (92-948.5)	0,002
		orange	10-2602.3173D (92-948.3)	0,002
		red	10-2602.3172D (92-948.2)	0,002
	3.6 VDC/20 mA	blue	10-2603.3176D	0,002
		white	10-2603.3179D	0,002



**Multi-LED**

base T 1 Bi-Pin

	voltage/current	colour	part no.	
<b>Multi-LED</b> 6 chips	12.0 VDC/20 mA	yellow	<b>10-5609.3174D (92-945.4)</b>	0,002
		green	<b>10-5609.3175D (92-945.5)</b>	0,002
		orange	<b>10-5609.3173D (92-945.3)</b>	0,002
		red	<b>10-5609.3172D (92-945.2)</b>	0,002
	6.0 VDC/40 mA	yellow	<b>10-5606.3244D (92-944.4)</b>	0,002
		orange	<b>10-5606.3243D (92-944.3)</b>	0,002
		red	<b>10-5606.3242D (92-944.2)</b>	0,002





## switching element illuminated

### switching system

#### switching system

Short-travel switching system with 2 independent contact points and tactile operation. Guarantees reliable switching even of very light loads.

1 normally open contact

### material

#### material of contacts

gold

#### switching element

thermoplastic polyester PET, PBT and polyacetale POM

### mechanical characteristics

#### actuating force

with overlay foil:  $4\text{ N} \pm 1.5\text{ N}$   
as per DIN 42115:  
max. actuating force > 50 N

#### actuating travel

0.5 mm

#### storage temperature

-40°C to + 85°C  
(as per DIN IEC 68-)

#### resistance to heat of soldering

260°C/5 s as per IEC 68-2-20

#### mechanical life

> 5 million operations

#### rebound time

<= 1 ms

#### degree of protection

front with overlay foil IP 65

#### ambient air temperature

-25°C to + 70°C  
(as per DIN IEC 68-)

### electrical characteristics

#### contact resistance

starting value (initial) <= 100 mΩ as per IEC 512-2, test 2b

#### electrical life

>=  $5 \times 10^5$  operations at 42 VDC/50 mA as per IEC 512-5, test 9c.  
When attention is paid to the direction of current flow from terminal  $\frac{3}{4}$  to  $\frac{1}{2}$  the electrical life can be prolonged.

#### insulation resistance

>= 1.000 mΩ

#### contact resistance

<= 100 mΩ  
as per 500'000 cycles of operation at 12 VDC, 5 mA resistive load:  
<= 200 mΩ

#### power rating

max. 2 VA (resistive load)

#### switch rating

switching voltage VDC/VAC: min. 50 mV, max. 42 V  
switching current VDC/VAC: min. 10 μA, max. 100 mA  
power rating: max. 2 W

#### electric strength

500 VAC, 50 Hz, 1 min, as per IEC 512-2, test 4a

### electrical characteristics LED

#### constant current

15-20 mA

#### pre-voltage

Multi-LED: typ. 12.5 V  
LED: typ. 2.2 V

## switching element non-illuminated type 770.000.0, part no. 770.101.0

### switching system

#### switching system

1 normally open contact

Short-travel switching system with 2 independent contact points and tactile operation. Guarantees reliable switching even of very light loads.

### material

#### material of contacts

silver

### mechanical characteristics

#### actuating force

with overlay foil:  $5\text{ N} \pm 2\text{ N}$   
as per DIN 42115:  
max. actuating force > 50 N

#### actuating travel

0.3 mm

#### storage temperature

-30°C to + 85°C  
(as per DIN IEC 68-)

#### mechanical life

> 1 million operations

#### rebound time

<= 5ms

#### degree of protection

front with overlay foil IP 65

#### ambient air temperature

-20°C to + 70°C  
(as per DIN IEC 68-)

### electrical characteristics

#### electrostatic breakdown value

250 VAC for 1 Min.

#### electrical life

at 5 VDC, 1 mA: > 1 million operations

at 24 VDC, 1 mA: > 100'000 operations

**insulation resistance**  
50 mΩ

**contact resistance**  
<= 100 mΩ  
as per 500'000 cycles of operation at 12 VDC, 5 mA resistive load:  
<= 200 mΩ

**power rating**  
<= 1 VA (resistive load)

**switch rating**  
<= 24 VDC/ <= 50 mA

**electric strength**  
250 VAC for 1min.

## electrical characteristics

**contact resistance**  
starting value (initial) <= 100 mΩ as per IEC 512-2, test 2b

**electrical life**  
>= 5 x 10<sup>5</sup> operations at 42 VDC/50 mA as per IEC 512-5, test 9c.  
When attention is paid to the direction of current flow from terminal <sup>3</sup>/<sub>4</sub> to <sup>1</sup>/<sub>2</sub> the electrical life can be prolonged.

**insulation resistance**  
>= 1.000 mΩ

**contact resistance**  
<= 100 mΩ  
as per 500'000 cycles of operation at 12 VDC, 5 mA resistive load:  
<= 200 mΩ

**power rating**  
max. 42 V/50 mA  
min. 50 mV/10 μ

**switch rating**

switching voltage VDC/VAC	min. 50 mV, max. 42 V
switching current VDC/VAC	min. 10 mA, max. 100 mA
power rating	max. 2 W

**electric strength**  
500 VAC, 50 Hz, 1 min, as per IEC 512-2, test 4a

**switching element non-illuminated part no.**  
**770.201.0**

## switching system

**switching system**  
Short-travel switching system with 2 independent contact points and tactile operation. Guarantees reliable switching even of very light loads.  
1 normally open contact

## material

**material of contacts**  
gold

**switching element**  
thermoplastic polyester PET, PBT and polyacetale POM

## mechanical characteristics

**actuating force**  
with overlay foil: 2,1 N ± 0.2 N  
as per DIN 42115:  
max. actuating force > 50 N

**actuating travel**  
max. 0,5 mm

**storage temperature**  
-40°C to + 85°C  
(as per DIN IEC 68-)

**resistance to heat of soldering**  
260°C/5 s as per IEC 68-2-20

**mechanical life**  
> 5 million operations

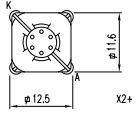
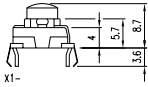
**rebound time**  
<=1 ms

**degree of protection**  
front with overlay foil IP 65

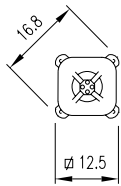
**ambient air temperature**  
-25°C to + 85°C  
(as per DIN IEC 68-)

## technical drawings

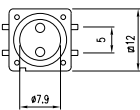
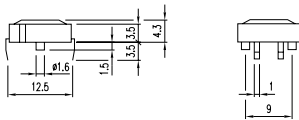
### 1 indicator element page 481



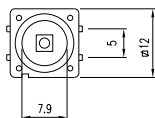
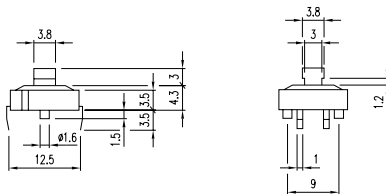
### 2 indicator element page 481



### 3 switching element non-illuminated page 481

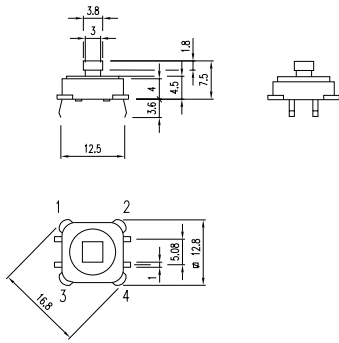


### 4 switching element non-illuminated page 481



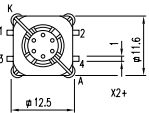
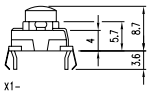
## 5 switching element non-illuminated

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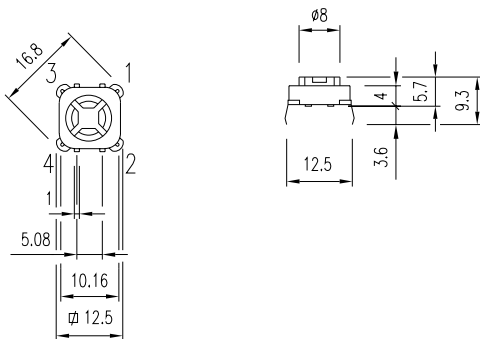
## 6 switching element illuminated

page 482



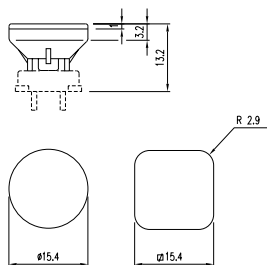
## 7 switching element illuminated

page 482

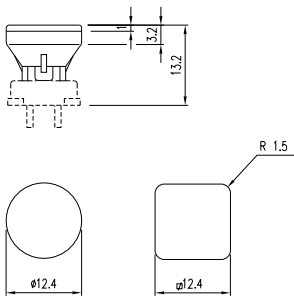


## 8 lens

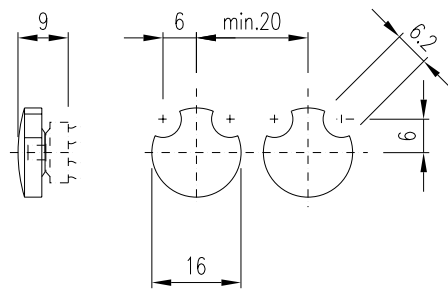
page 483



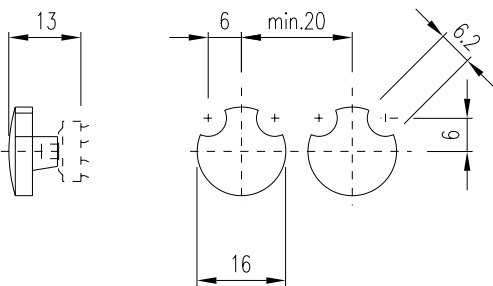
**9 lens**  
page 483



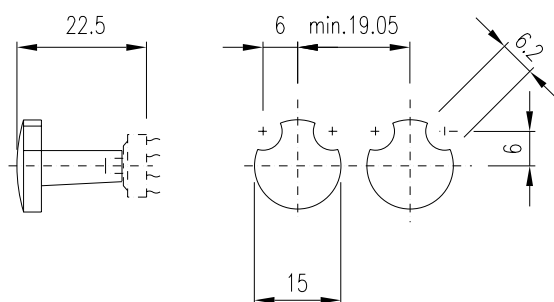
**10 spacing cap**  
page 483



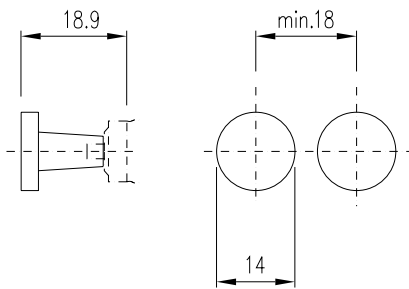
**11 spacing cap**  
page 483



**12 spacing cap**  
page 483

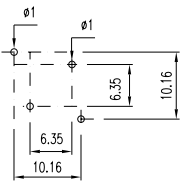


### 13 spacing cap page 483



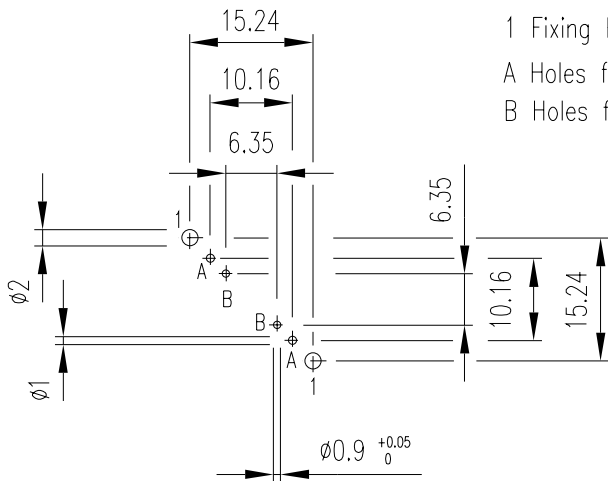
## component layouts

### 1 indicator element page 481



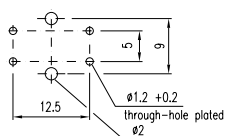
### 2 indicator element page 481

Drilling plan (conductor side of board)



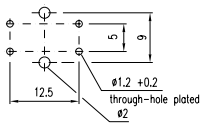
- 1 Fixing holes for mounting flange
- A Holes for LED
- B Holes for centering pin

### 3 switching element non-illuminated page 481



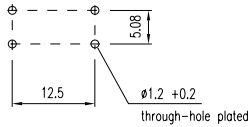
## 4 switching element non-illuminated

page 481



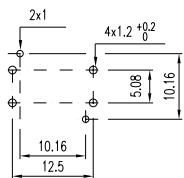
## 5 switching element non-illuminated, switching element illuminated

page 481, 482



## 6 switching element illuminated

page 482



### Note:

More information about the PCB-Software can be found at [www.pcad.com/en/library](http://www.pcad.com/en/library).

## circuit drawings

### 1 indicator element

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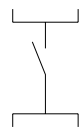
x1-



x2+

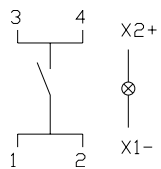
### 2 switching element non-illuminated

page 481



### 3 switching element illuminated

page 482



## 4 switching element illuminated

page 482

