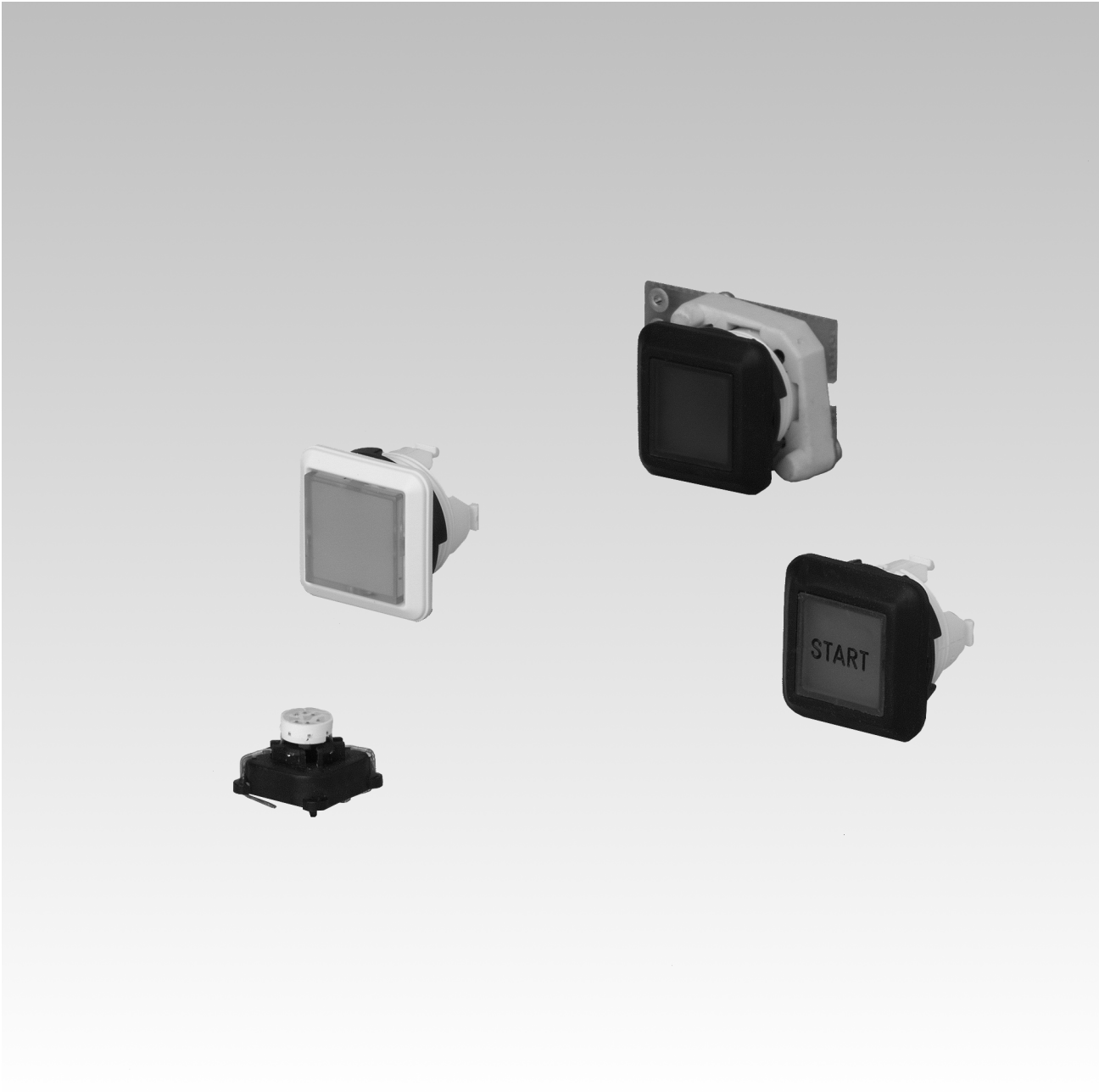




EAO Product Information

Series 92



Index

Series 92

	Description	Page 557
	Product Assembly	Page 558
	Mounting Instruction	Page 559
	Product Range	
	- pushbuttons for flush mounting	Page 560
	- accessories / spare parts	Page 563
	Technical Data	Page 567
	Technical Drawing / Dimension / Layout	Page 568
	Circuit Drawing	Page 571
	Marking	Page 572

Description

General Notes

With the series 92, users have a comprehensive range of applications at their disposal in the PCB key range. In particular, this series is an interesting alternative to the membrane switching system, because it offers convincing advantages, such as: saving on initial costs, short manufacturing times, all-over illumination and a reliable and nevertheless removable PCB fastening technology.

With the series 92, many different applications are possible even as a discrete switch.

Thanks to front sealing IP 67, and the use of chemical-resistant materials, the elements of this series are suited for industrial use.

The actuator, measuring 18.8 x 18.8 mm at the front (18.8 x 18.4 mm IP 40), is available as an indicator, pushbutton or illuminated pushbutton in marked or unmarked versions.

In order to have matching colours, the actuator element can be supplied with different colours. The switching element complies with international protection level IP 40 and is solder-proof on the connection side. The specially formed connection legs prevent it from falling out when using flow soldering.

Mounting

The actuators of the series 92 are made for the standard 16 mm dia. mounting hole and fastened tightly to the front panel by means of a fixing nut. Mounting torque max. 50 Ncm.

The switching element is mounted on the printed board independently of the actuator. The arrangement of contacts is based on the matrix dimension 2.54 mm (1/10"). By means of the mounting flange, the PCB can be snapped on the pre-assembled actuator. Later adjustment is no longer necessary. The mounting flange is fastened to the PCB with two 1.8 mm dia. screws, also independent of the actuator. The positioning and the number of flanges is determined by the size of the front panel or PCB.

The actuators are protected against distortion.

Instructions for cleaning soldered printed circuit boards

PCBs are often cleaned after machine soldering.

When doing this, care must be taken to prevent the „cleaning fluid“ polluted with dirt, grease and flux from penetrating the switch.

Touch surface

The flat front bezel with integrated pressure plate, made of UV resistant TPE has a black finish (standard). Colour variations enable the manufacture of transparent pressure plates of different colours.

Marking

For standard markings and customers' special characters, see under "Markings" on page 572.

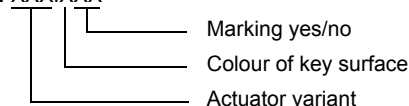
Illumination

Perfect illumination of the touch surfaces available in various colours is assured by the LEDs bipin T 1 or Multi-LED in the colours red, orange, yellow and green.

Number structure

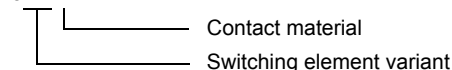
Actuator

92-XXX.XXX



Switching element/Base element

92-8XX.X42



Example:

-Illuminated pushbutton actuator IP 67,
key surface red, housing black unmarked
92-443.200

-Switching element, 1 NO contact (gold)
92-851.342

-Mounting flange
92-960.0

-LED
10-2602.3172D

Specimen order

Indicator

- indicator actuator, IP40 92-458.400

Recommended accessories:

- LED, 1 chip, yellow 10-2602.3174D

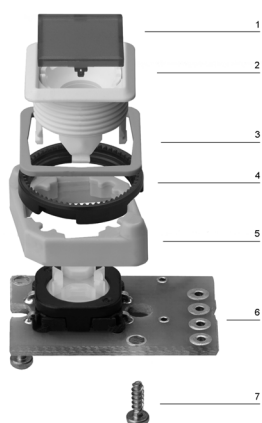
- indicator element 92-800.042

- mounting flange 92-960.0

All dimensions in mm.

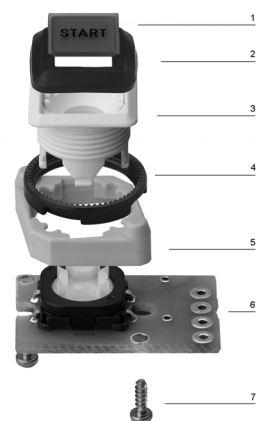
We reserve the right to modify technical data.

illuminated-/pushbutton IP 40



- 1 lens of one colour
- 2 actuator case
- 3 frame
- 4 fixing nut
- 5 mounting flange
- 6 switching element
- 7 fixing screw

illuminated-/pushbutton IP 67

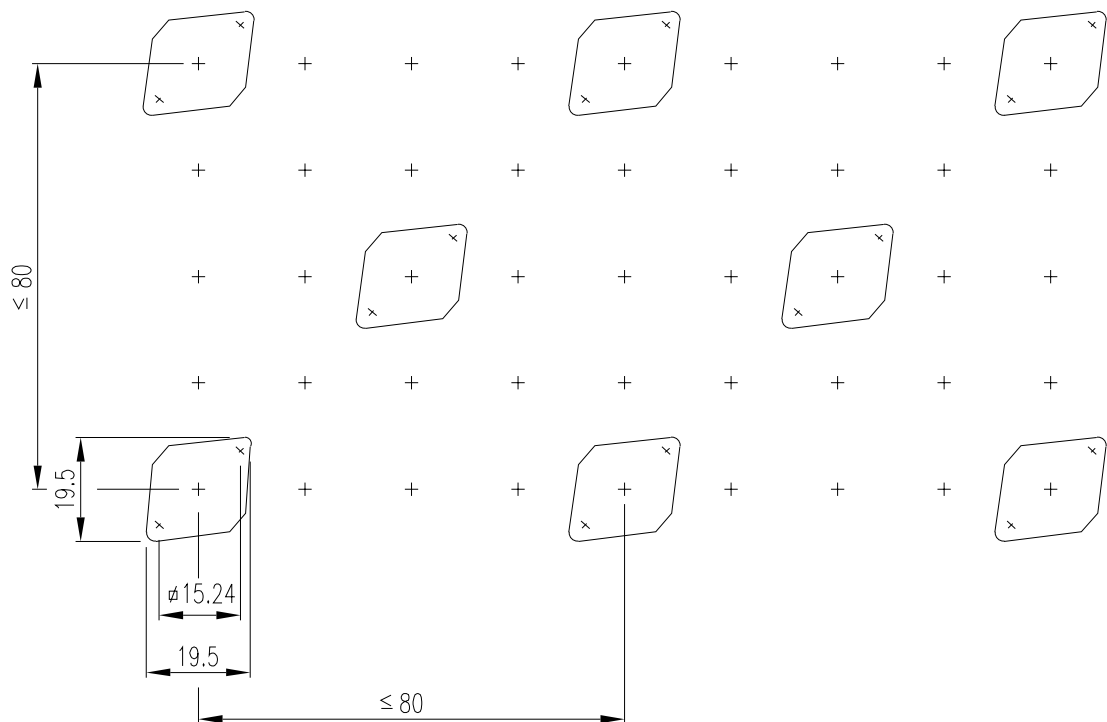


- 1 pressure plate
- 2 front cap
- 3 actuator case
- 4 fixing nut
- 5 mounting flange
- 6 switching unit
- 7 fixing screw

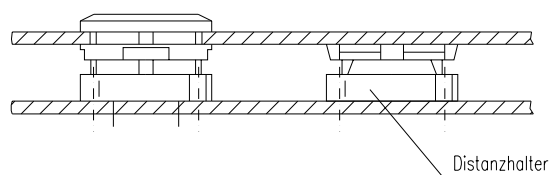
Mounting flange

The positioning of the mounting flanges and their number is determined by the size of the front and PCB.
To ensure a uniform tactile switching feeling, we recommend that mounting flanges be positioned as shown below.
This arrangement applies to PCBs 1.6 mm thick.
For large surface printed circuit boards with a large number of switching elements we recommend following mounting procedure:

1. mount the actuator element in the front panel
2. snap the mounting flange on the back of the above mentioned actuator elements
3. screw the printed circuit board containing the soldered components on to the mounting flanges.



The tool 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 92-965.0 which can be attached to the front panel.
The spacer can be adjusted to the following front panel thicknesses: 1.5/2/2.2/3/3.5/4 mm and can be stuck to the back of the panel free of dirt and grease.



indicator actuator



- LED page 564
- indicator element page 563
- mounting flange page 564

	degree of protection	colour of front bezel	lens	colour of lens	Ø 18.4 x 18.4 mm Typ-Nr.	Ø 18.8 x 18.8 mm Typ-Nr.	technical drawing mounting dimensions		
indicator actuator	IP 40	black	transparent	blue	92-158.600		1	1	0,003
				yellow	92-158.400		1	1	0,003
				green	92-158.500		1	1	0,003
				clear	92-158.700		1	1	0,003
				orange	92-158.300		1	1	0,003
				smoked	92-158.100		1	1	0,003
				red	92-158.200		1	1	0,003
		white	transparent	blue	92-058.600		1	1	0,003
				yellow	92-058.400		1	1	0,003
				green	92-058.500		1	1	0,003
				clear	92-058.700		1	1	0,003
				orange	92-058.300		1	1	0,003
				smoked	92-058.100		1	1	0,003
				red	92-058.200		1	1	0,003
	IP 67	black	transparent matt	blue		92-143.600	2	1	0,003
				yellow		92-143.400	2	1	0,003
				green		92-143.500	2	1	0,003
				clear		92-143.700	2	1	0,003
				orange		92-143.300	2	1	0,003
				red		92-143.200	2	1	0,003
		white	transparent matt	blue		92-043.600	2	1	0,003
				yellow		92-043.400	2	1	0,003
				green		92-043.500	2	1	0,003
				clear		92-043.700	2	1	0,003
				orange		92-043.300	2	1	0,003
				red		92-043.200	2	1	0,003

technical drawings from page 568, mounting dimensions from page 569

pushbutton actuator



switching element page 563

mounting flange page 564

	degree of protection	colour of front bezel	lens	colour of lens	Ø 18.8 x 18.8 mm Typ-Nr.	Ø 18.4 x 18.4 mm Typ-Nr.	circuit drawing	technical drawing	mounting dimensions	
pushbutton actuator	IP 40	black	opaque	grey		92-456.800	1	1	1	0,002
				black		92-456.000	1	1	1	0,002
				white		92-456.900	1	1	1	0,002
		white	opaque	grey		92-356.800	1	1	1	0,002
				black		92-356.000	1	1	1	0,002
				white		92-356.900	1	1	1	0,002
	IP 67	black	opaque	grey	92-441.800		1	2	1	0,002
				black	92-441.000		1	2	1	0,002
		white	opaque	grey	92-341.800		1	2	1	0,002
				black	92-341.000		1	2	1	0,002

circuit drawings from page 571, technical drawings from page 568, mounting dimensions from page 569

illuminated-/pushbutton actuator




- LED page 564
- switching element page 563
- mounting flange page 564

	degree of protection	colour of front bezel	lens	colour of lens	Ø 18.4 x 18.4 mm Typ-Nr.	Ø 18.8 x 18.8 mm Typ-Nr.	circuit drawing	technical drawing	mounting dimensions	
illuminated-/ pushbutton actuator	IP 40	black	transparent	blue	92-458.600		1	1	1	0,003
				yellow	92-458.400		1	1	1	0,003
				green	92-458.500		1	1	1	0,003
				clear	92-458.700		1	1	1	0,003
				orange	92-458.300		1	1	1	0,003
				smoked	92-458.100		1	1	1	0,003
				red	92-458.200		1	1	1	0,003
		white	transparent	blue	92-358.600		1	1	1	0,003
				yellow	92-358.400		1	1	1	0,003
				green	92-358.500		1	1	1	0,003
				clear	92-358.700		1	1	1	0,003
				orange	92-358.300		1	1	1	0,003
				smoked	92-358.100		1	1	1	0,003
				red	92-358.200		1	1	1	0,003
	IP 67	black	transparent matt	blue		92-443.600	1	2	1	0,003
				yellow		92-443.400	1	2	1	0,003
				green		92-443.500	1	2	1	0,003
				clear		92-443.700	1	2	1	0,003
				orange		92-443.300	1	2	1	0,003
				red		92-443.200	1	2	1	0,003
		white	transparent matt	blue		92-343.600	1	2	1	0,003
				yellow		92-343.400	1	2	1	0,003
				green		92-343.500	1	2	1	0,003
				clear		92-343.700	1	2	1	0,003
				orange		92-343.300	1	2	1	0,003
				red		92-343.200	1	2	1	0,003

circuit drawings from page 571, technical drawings from page 568, mounting dimensions from page 569

at front

blind plug

		Ø 18 x 18 mm Typ-Nr.	mounting dimensions	
blind plug	colour black	51-948.0	1	0,003 



mounting dimensions from page 569

at back

indicator element

	connection method	part no.	technical drawing	component layout	
indicator element	P	92-800.042	3	1	0,001 



technical drawings from page 568, component layouts from page 570

switching element


	contact	connection method	part no.	circuit drawing	technical drawing	component layout	
switching element	1NO	P	92-851.342	2	4	2	0,001 



contact: 1 NO = 1 normally open, connection method: P = PCB terminal


circuit drawings from page 571, technical drawings from page 568, component layouts from page 570

spacer

	part no.	
spacer When fitting, ensure that back of panel is free of grease and dirt.	92-965.0	0,003 




equipped PCB

	part no.	
equipped PCB for discrete switching applications including switching element and mounting flange, soldering terminal (equipped PCB incl. protective resistor and LED on request)	92-981.0	0,003 



for illumination

LED


	number of chips	voltage/current	colour	part no.	
LED base T 1 Bi-Pin	1 chip	2.2 VDC/20 mA	yellow	10-2602.3174D (92-948.4)	0,001
			green	10-2602.3175D (92-948.5)	0,001
			orange	10-2602.3173D (92-948.3)	0,001
			red	10-2602.3172D (92-948.2)	0,001
	6 chips	3.6 VDC/20 mA	white	10-2603.3179D	0,001
		12.0 VDC/20 mA	yellow	10-5609.3174D (92-945.4)	0,001
			orange	10-5609.3173D (92-945.3)	0,001
			red	10-5609.3172D (92-945.2)	0,001
		6.0 VDC/40 mA	yellow	10-5606.3244D (92-944.4)	0,001
			orange	10-5606.3243D (92-944.3)	0,001
			red	10-5606.3242D (92-944.2)	0,001



Note: protective series resistor must be taken into consideration.


assembling

anti-twisting ring

	part no.	
anti-twisting ring 18 x 18 mm, for front panel thickness up to 2 mm max.	51-910	0,001




mounting flange

	part no.	
mounting flange	92-960.0	0,001



lens remover


for lens IP 40 only

	part no.	
lens remover	18-910	0,002




dismantling tool

for dismantling mounting flange from actuator

	part no.	
dismantling tool	92-971.0	0,002




mounting tool

	part no.	
mounting tool for tightening (or loosening) fixing nuts starting torque fixing nut max. 50 Ncm	01-907	0,020




for illuminated-/pushbutton IP 67**illuminated-/pushbutton actuator IP 67**

pressure plate order separately

	colour of front bezel	⌀ 18.8 x 18.8 mm Typ-Nr.	
illuminated-/pushbutton actuator IP 67	black	92-440.000	0,003
	white	92-340.000	0,003


**indicator sleeve IP 67**

pressure plate order separately

	colour of front bezel	⌀ 18.8 x 18.8 mm Typ-Nr.	
indicator sleeve IP 67	black	92-140.000	0,003


**pressure plate**

for IP 67 version

	shape	pressure plate	colour	⌀ 18.8 x 18.8 mm Typ-Nr.	
pressure plate plastic 12 x 12 mm	flat	opaque	grey	92-941.800	0,001
			black	92-941.000	0,001
		transparent clear	blue	92-942.600	0,001
			yellow	92-942.400	0,001
			green	92-942.500	0,001
			clear	92-942.700	0,001
			orange	92-942.300	0,001
			red	92-942.200	0,001
		transparent matt	blue	92-941.600	0,001
			yellow	92-941.400	0,001
			green	92-941.500	0,001
			clear	92-941.700	0,001
			orange	92-941.300	0,001
			red	92-941.200	0,001

**for illuminated-/pushbutton IP 40****illuminated-/pushbutton actuator IP 40**


lens and bezel order separately

	colour of actuator case	⌀ 18.4 x 18.4 mm Typ-Nr.	
illuminated-/pushbutton actuator IP 40	black	92-450.000	0,003
	white	92-350.000	0,003



lens


for IP 40 version

	shape	lens	colour	Ø 18.4 x 18.4 mm Typ-Nr.	
lens plastic 13.2 x 13.2 mm with white marking plate	flat	opaque	grey	92-956.800	0,001
			black	92-956.000	0,001
			white	92-956.900	0,001
		translucent	blue	92-956.600	0,001
			yellow	92-956.400	0,001
			green	92-956.500	0,001
			orange	92-956.300	0,001
			red	92-956.200	0,001
		transparent	blue	92-958.600	0,001
			yellow	92-958.400	0,001
			green	92-958.500	0,001
			clear	92-958.700	0,001
			orange	92-958.300	0,001
			smoked	92-958.100	0,001
			red	92-958.200	0,001



front bezel

for IP 40 version

	material	colour	Ø 18.4 x 18.4 mm Typ-Nr.	
front bezel	plastic	black	92-912.0	0,001
		white	92-912.9	0,001



technical Data

switching system

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

pressure plate

polycarbonate PC

front membrane cap

thermoplastic elastomer TPE

material of contacts

gold

frame

thermoplastic polyester PBT

switching element

thermoplastic polyester PET, PBT and polyacetale POM

actuator case

thermoplastic polyester PBT

mechanical characteristics

actuating force

2N measured at the switching element
5N measured at the pressure plate

actuating travel

switching element 0.5 mm

fixing screws

40 Ncm recommended

resistance to heat of soldering

260°C/5 s as per IEC 68-2-20

mechanical life

>= 1 million operations as per IEC 512-5, test 9a

rebound time

<= 1 ms

resistance to shock

>= 50 g for 11 ms as per IEC 512-4, test 6c

degree of protection

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

resistance to vibration

(sinusoidal)
10 g at 10-2000 Hz, amplitude 0.75 mm as per IEC 512-4, test 6d

storage temperature

-40°C to + 80°C
(as per DIN IEC 68-)

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

electrostatic breakdown value

15 kV

electrical life

>= 500.000 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 3/4 to 1/2 the electrical life can be prolonged.

insulation resistance

>= 10⁹ Ω between all terminals at 100 VDC, as per IEC 512-2, test 3a

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.	2W

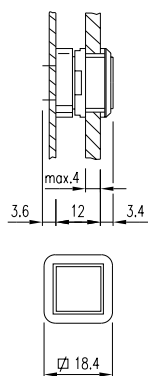
electric strength

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

technical drawings

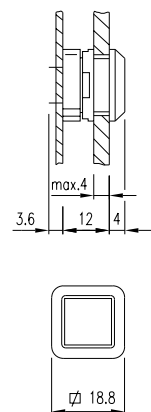
1 indicator actuator, pushbutton actuator, illuminated-/pushbutton actuator

page 560, 561, 562



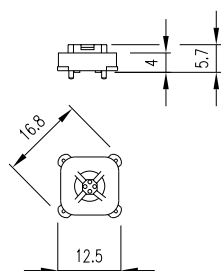
2 indicator actuator, pushbutton actuator, illuminated-/pushbutton actuator

page 560, 561, 562

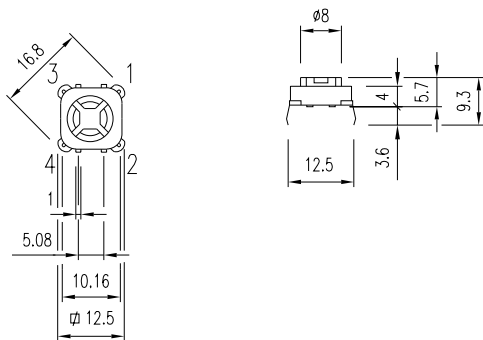


3 indicator element

page 563

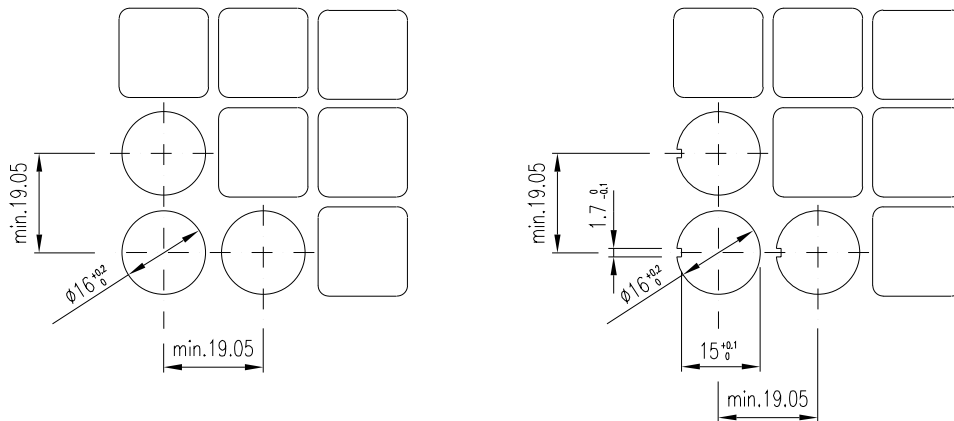


4 switching element page 563



mounting dimensions

1 indicator actuator, pushbutton actuator, illuminated-/pushbutton actuator, blind plug page 560, 561, 562, 563

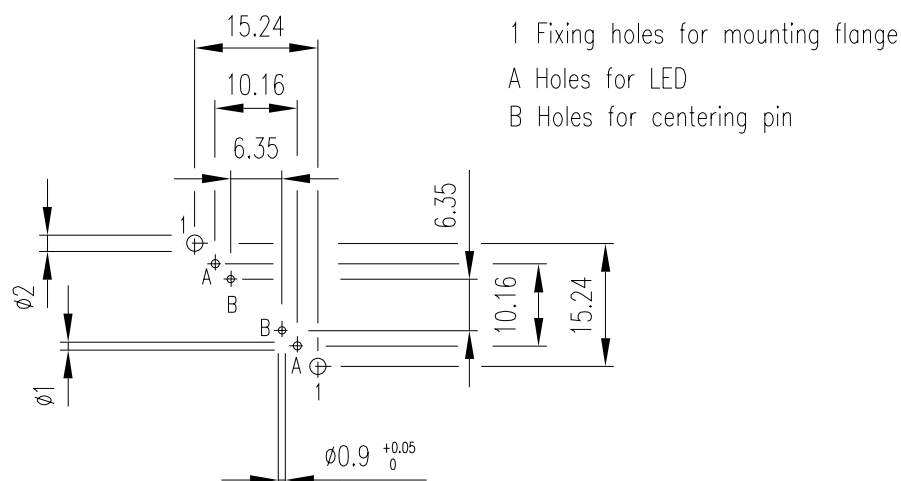


component layouts

1 indicator element

page 563

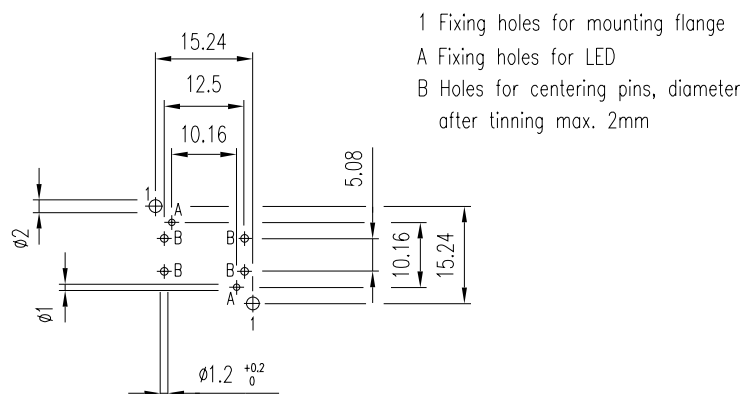
Drilling plan (conductor side of board)



2 switching element

page 563

Drilling plan(conductor side of board)



* Final diameter after tinning

Note:

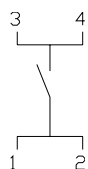
More information about the PCB-Software can be found at www.pcad.com/en/library.

circuit drawings

1 pushbutton actuator, illuminated-/pushbutton actuator
page 561, 562



2 switching element
page 563



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. Hot pressing (Fig.1)

For large numbers of identical engravings hot pressing is more economical.

Type sets

For letters and numerals type sets with characters 2.5, 3 or 4 mm high are available.

Symbols

A list of the symbols available can be forwarded on application

2. 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.

3. Laser markings (Fig.1)

Type sets

In addition to current world languages (see DIN 1451), the following type sets are available: Scandinavian, Slavic, Greek and Russian.

Colour

All markings and symbols are filled in black.

Symbols

A list of the symbols available can be forwarded on application.

Film dimensions

max. 11,4 x 11,4 mm, IP 40
max. 10,4 x 10,4 mm, IP 67

Film thickness 0,2 mm

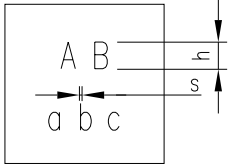
Height of letters mm	Thickness of letters mm			
		Number of lines	Letters per line	Letters per line
h	s		(caps)	(small)
3	0,4	2	5-6	6
4	0,5	2	4	4
5	0,5	1	3	3-4
6	0,6	1	2-3	3
8	0,6	1	2	2

Fig.1

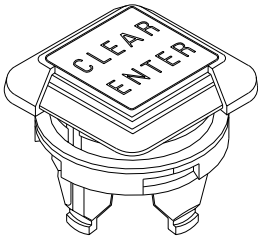
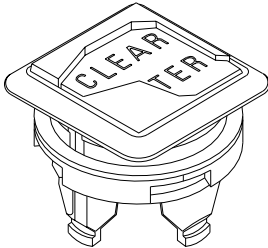


Fig. 2



	EAO AG Tannwaldstrasse 88 4601 Olten, Switzerland
E-mail	info@eao.com
Website	www.eao.com
	Belgium
Phone	+32/2 456 00 10
E-mail	sales.ebl@eao.com
	China
Phone	+852/27 86 91 41
E-mail	sales.ehk@eao.com.hk
	France
Phone	+33/1 64 43 37 37
E-mail	sales.esa@eao.com
	Germany
Phone	+49/201 85 87 0
E-mail	sales.ede@eao.com
	Japan
Phone	+81/3 5401 0953
E-mail	sales.esj@eao.com
	Netherlands
Phone	+31/78 653 17 00
E-mail	sales.enl@eao.com
	Sweden
Phone	+46/8 683 86 60
E-mail	sales.esw@eao.com
	Switzerland
Phone	+41/62 388 95 00
E-mail	sales.ech@eao.com
	United Kingdom
Phone	+44/1444 236000
E-mail	sales.euk@eao.com
	USA
Phone	+1/203 877 4577
E-mail	sales.eus@eao.com
	Other Countries
Fax	+41/62 296 21 62
E-mail	info@eao.com
Website	www.eao.com