

# Series 31

## Characteristics

The compact 16mm Series 31 is especially suited for:

- Raised design
- PCB (with adaptor)

This series is ideally suited for combined use with Series 51.

## Functions

The Series 31 incorporates the following functions:

- Indicator
- Pushbutton
- Illuminated pushbutton
- Buzzer

## Market segments

The EAO Series 31 is especially suited for applications in the segments:

- Machinery and Automation
- Panel building

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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# 31 Raised design

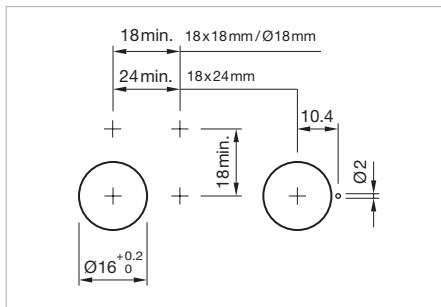
Indicator, IP 40



Product can differ from the current configuration.







Dimensions [mm]  
 H = Universal terminal 2.0 x 0.5 mm,  
 L = Solder terminal,  
 L1 = Solder terminal 2.8 x 0.5 mm





Mounting cut-outs [mm]

Equipment consisting of (schematic overview)

-  **Lens** page 11
-  **Single-LED** page 18
-  **Actuator**
-  **Fixing nut**

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.

Diode 1N4007	Terminal	Part No.	Component layout	Wiring diagram	Weight
	<b>Indicator actuator, Front dimension 18 x 18 mm</b>				
1	Universal 2.0 x 0.5 mm	<b>31-703.006</b>	4	1	0.006 kg
2	Universal 2.0 x 0.5 mm	<b>31-704.006</b>	4	2	0.006 kg
	Solder 2.8 x 0.5 mm	<b>31-050.002</b>		3	0.004 kg
	Solder	<b>31-050.005</b>		3	0.004 kg
	Universal 2.0 x 0.5 mm	<b>31-051.006</b>	4	3	0.005 kg
	<b>Indicator actuator, Front dimension 18 x 24 mm</b>				
1	Universal 2.0 x 0.5 mm	<b>31-701.006</b>	4	1	0.006 kg
2	Universal 2.0 x 0.5 mm	<b>31-702.006</b>	4	2	0.006 kg
	Solder 2.8 x 0.5 mm	<b>31-040.002</b>		3	0.004 kg
	Solder	<b>31-040.005</b>		3	0.004 kg
	Universal 2.0 x 0.5 mm	<b>31-041.006</b>	4	3	0.005 kg

Diode 1N4007	Terminal	Part No.	Component layout	Wiring diagram	Weight
 <p><b>Indicator actuator, Front dimension Ø 18 mm</b></p>					
	Solder 2.8 x 0.5 mm	<b>31-030.002</b>		3	0.004 kg
	Solder	<b>31-030.005</b>		3	0.004 kg
	Universal 2.0 x 0.5 mm	<b>31-031.006</b>	4	3	0.005 kg

The component layouts you will find from page 23



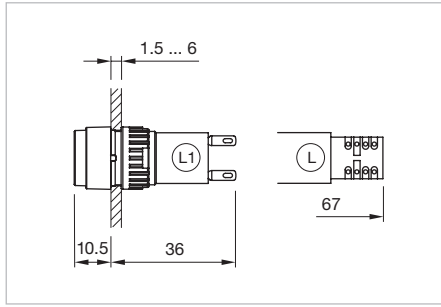
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# 31 Raised design

## Buzzer, IP 40



Product can differ from the current configuration.



Dimensions [mm]  
 L = Solder terminal,  
 L1 = Solder terminal 2.8 x 0.5 mm

### Equipment consisting of (schematic overview)

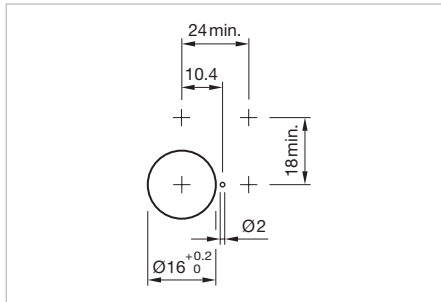


Each Part Number listed below includes all the black components shown in the 3D-drawing.

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

### Additional Information

- Further information see «Technical data»



Mounting cut-outs [mm]

Operating voltage	Front cap	Terminal	Part No.	Wiring diagram	Weight
 <p><b>Buzzer, Front dimension 18 x 24 mm</b></p>					
10 ... 26 VDC	Plastic black	Solder 2.8 x 0.5 mm	<b>31-801.002</b>	1	0.015 kg
 <p><b>Buzzer, Front dimension 18 x 24 mm</b></p>					
10 ... 55 VAC, 10 ... 75 VDC	Plastic black	Solder	<b>31-810.005</b>	2	0.015 kg



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**Illuminated pushbutton, IP 40**

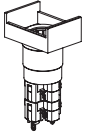
**Equipment consisting of (schematic overview)**



*Lens* [page 11](#)



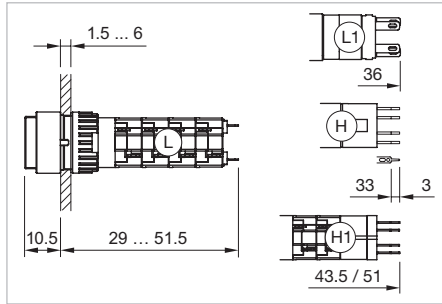
*Single-LED* [page 18](#)



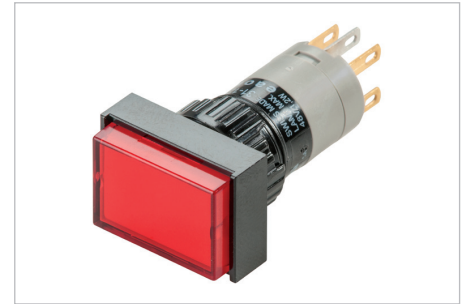
**Actuator**



**Fixing nut**



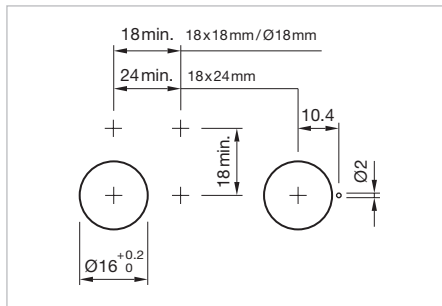
Dimensions [mm]  
 H = Universal terminal 2.0 x 0.5 mm,  
 H1 = Universal-Solder terminal,  
 L = Solder terminal,  
 L1 = Solder terminal 2.8 x 0.5 mm



Product can differ from the current configuration.

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.*



Mounting cut-outs [mm]

**Additional Information**

- Material of contact Gold

Switching system	Contacts	Diode 1N4007	Switching action	Terminal	Part No.	Component layout	Wiring diagram	Weight	
 <b>Illuminated pushbutton actuator, Front dimension 18 x 18 mm</b>	2 NO		B	Universal 2.0 x 0.5 mm	<b>31-451.036</b>	4	9	0.007 kg	
			C	Universal 2.0 x 0.5 mm	<b>31-481.036</b>	4	10	0.007 kg	
	2 NC		B	Universal 2.0 x 0.5 mm	<b>31-452.036</b>	4	7	0.007 kg	
			C	Universal 2.0 x 0.5 mm	<b>31-483.036</b>	4	4	0.007 kg	
	1 NO		B	Universal 2.0 x 0.5 mm	<b>31-455.036</b>	4	5	0.007 kg	
			C	Universal 2.0 x 0.5 mm	<b>31-485.036</b>	4	6	0.007 kg	
	1 NC		B	Universal 2.0 x 0.5 mm	<b>31-456.036</b>	4	1	0.007 kg	
	Snap-action switching element	1 NC + 1 NO	1	B	Universal-Solder	<b>31-709.0292</b>	4	11	0.008 kg
				C	Universal-Solder	<b>31-717.0292</b>	4	12	0.008 kg
				B	Universal-Solder	<b>31-710.0292</b>	4	13	0.008 kg
C				Universal-Solder	<b>31-718.0292</b>	4	14	0.008 kg	
			B	Solder 2.8 x 0.5 mm	<b>31-151.022</b>		16	0.006 kg	
			B	Solder	<b>31-151.0252</b>		15	0.006 kg	
			C	Solder 2.8 x 0.5 mm	<b>31-281.022</b>		18	0.006 kg	
			C	Solder	<b>31-281.0252</b>		17	0.006 kg	
2 NC + 2 NO		1	C	Universal-Solder	<b>31-719.0292</b>	4	20	0.010 kg	
			B	Solder	<b>31-152.0252</b>		23	0.008 kg	
			C	Solder	<b>31-282.0252</b>		24	0.008 kg	
			B	Solder	<b>31-153.0252</b>		25	0.010 kg	
3 NC + 3 NO		B	Solder	<b>31-153.0252</b>		25	0.010 kg		
		C	Solder	<b>31-283.0252</b>		26	0.010 kg		

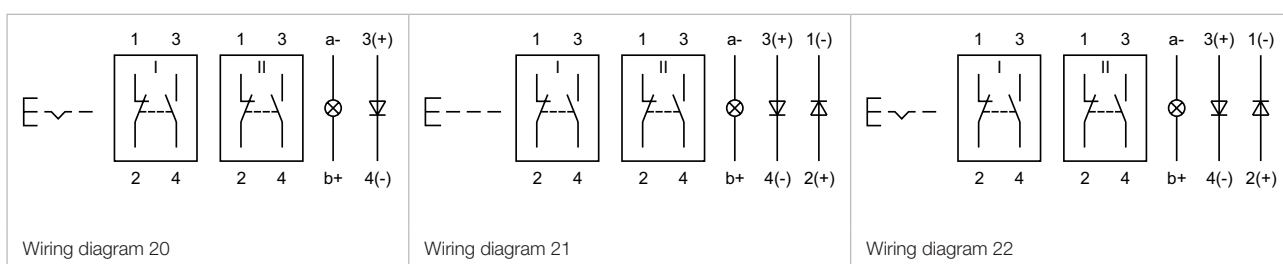
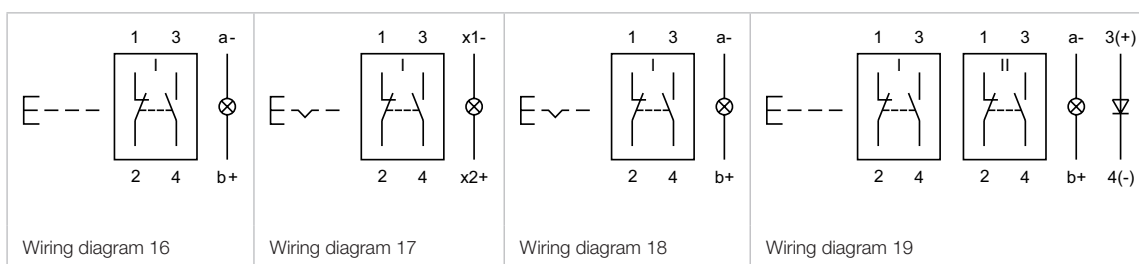
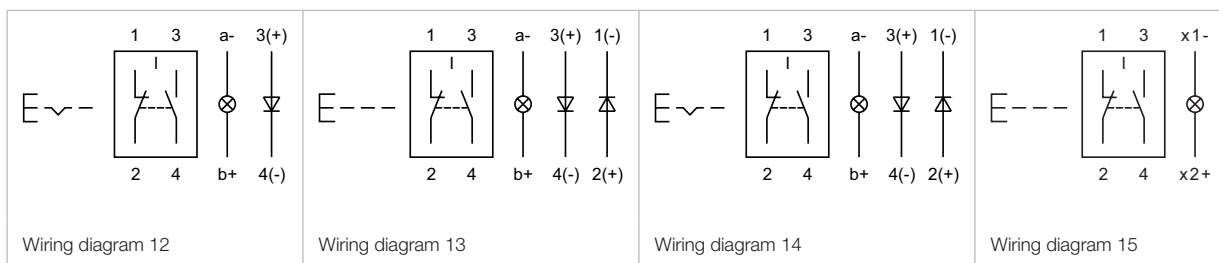
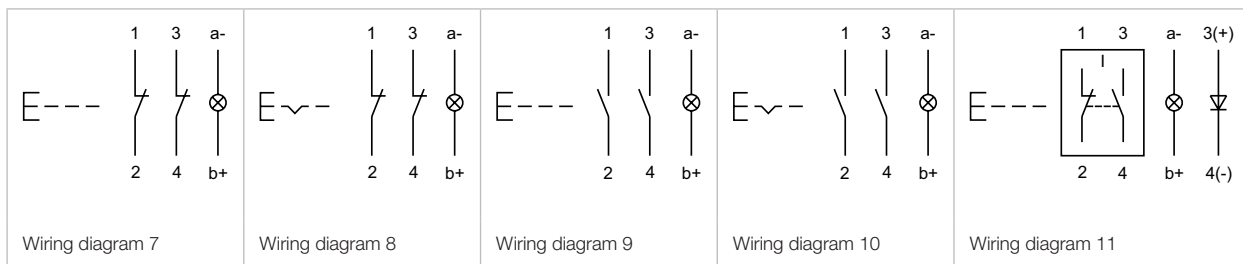
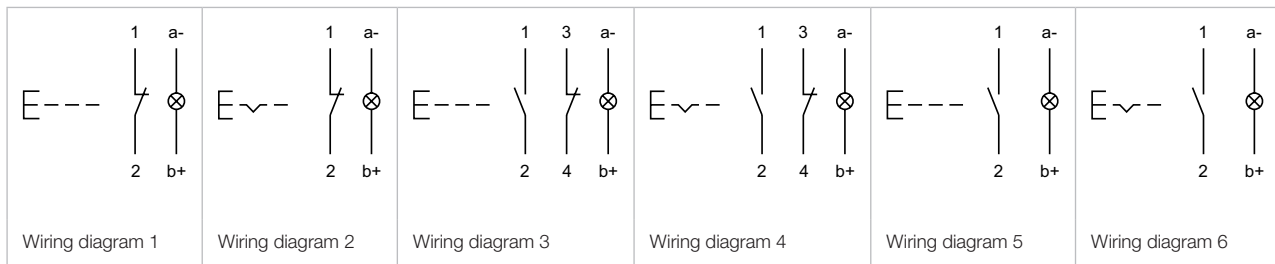
# 31 Raised design

Switching system	Contacts	Diode 1N4007	Switching action	Terminal	Part No.	Component layout	Wiring diagram	Weight	
Snap-action switching element	4 Ö + 4 S		B	Löt	<b>31-154.0252</b>		27	0.012 kg	
			C	Solder	<b>31-284.0252</b>		28	0.012 kg	
 <p><b>Illuminated pushbutton actuator, Front dimension 18 x 24 mm</b></p>									
Low-level element	2 NO		B	Universal 2.0 x 0.5 mm	<b>31-421.036</b>	4	9	0.007 kg	
			C	Universal 2.0 x 0.5 mm	<b>31-461.036</b>	4	10	0.007 kg	
	2 NC		B	Universal 2.0 x 0.5 mm	<b>31-422.036</b>	4	7	0.007 kg	
			C	Universal 2.0 x 0.5 mm	<b>31-423.036</b>	4	3	0.007 kg	
	1 NC + 1 NO		B	Universal 2.0 x 0.5 mm	<b>31-423.036</b>	4	3	0.007 kg	
			C	Universal 2.0 x 0.5 mm	<b>31-463.036</b>	4	4	0.007 kg	
	1 NO		B	Universal 2.0 x 0.5 mm	<b>31-425.036</b>	4	5	0.007 kg	
			C	Universal 2.0 x 0.5 mm	<b>31-465.036</b>	4	6	0.007 kg	
	1 NC		B	Universal 2.0 x 0.5 mm	<b>31-426.036</b>	4	1	0.007 kg	
			C	Universal 2.0 x 0.5 mm	<b>31-466.036</b>	4	2	0.007 kg	
	Snap-action switching element	1 NC + 1 NO	1	B	Universal-Solder	<b>31-705.0292</b>	4	11	0.008 kg
				C	Universal-Solder	<b>31-713.0292</b>	4	12	0.008 kg
B				Universal-Solder	<b>31-706.0292</b>	4	13	0.008 kg	
C				Universal-Solder	<b>31-714.0292</b>	4	14	0.008 kg	
B				Solder 2.8 x 0.5 mm	<b>31-121.022</b>		16	0.006 kg	
B				Solder	<b>31-121.0252</b>		15	0.006 kg	
2 NC + 2 NO		1	C	Solder 2.8 x 0.5 mm	<b>31-261.022</b>		18	0.006 kg	
			C	Solder	<b>31-261.0252</b>		17	0.006 kg	
			B	Universal-Solder	<b>31-707.0292</b>	4	19	0.010 kg	
			C	Universal-Solder	<b>31-715.0292</b>	4	20	0.010 kg	
			B	Universal-Solder	<b>31-708.0292</b>	4	21	0.010 kg	
			C	Universal-Solder	<b>31-716.0292</b>	4	22	0.010 kg	
3 NC + 3 NO			B	Solder	<b>31-122.0252</b>		23	0.008 kg	
			C	Solder	<b>31-262.0252</b>		24	0.008 kg	
			B	Solder	<b>31-123.0252</b>		25	0.010 kg	
			C	Solder	<b>31-263.0252</b>		26	0.010 kg	
4 NC + 4 NO			B	Solder	<b>31-124.0252</b>		27	0.012 kg	
			C	Solder	<b>31-264.0252</b>		28	0.012 kg	
 <p><b>Illuminated pushbutton actuator, Front dimension Ø 18 mm</b></p>									
Low-level element	2 NO		B	Universal 2.0 x 0.5 mm	<b>31-431.036</b>	4	9	0.007 kg	
			C	Universal 2.0 x 0.5 mm	<b>31-471.036</b>	4	10	0.007 kg	
	2 NC		B	Universal 2.0 x 0.5 mm	<b>31-432.036</b>	4	7	0.007 kg	
			C	Universal 2.0 x 0.5 mm	<b>31-472.036</b>	4	8	0.007 kg	
	1 NC + 1 NO		B	Universal 2.0 x 0.5 mm	<b>31-433.036</b>	4	3	0.007 kg	
			C	Universal 2.0 x 0.5 mm	<b>31-473.036</b>	4	4	0.007 kg	
	1 NO		B	Universal 2.0 x 0.5 mm	<b>31-435.036</b>	4	5	0.007 kg	
			C	Universal 2.0 x 0.5 mm	<b>31-475.036</b>	4	6	0.007 kg	
	1 NC		B	Universal 2.0 x 0.5 mm	<b>31-436.036</b>	4	1	0.007 kg	
	Snap-action switching element	1 NC + 1 NO	1	C	Universal-Solder	<b>31-747.0292</b>	4	12	0.008 kg
				B	Universal-Solder	<b>31-744.0292</b>	4	13	0.008 kg
				C	Universal-Solder	<b>31-748.0292</b>	4	14	0.008 kg
B				Solder 2.8 x 0.5 mm	<b>31-131.022</b>		16	0.006 kg	
B				Solder	<b>31-131.0252</b>		15	0.006 kg	
C				Solder 2.8 x 0.5 mm	<b>31-271.022</b>		18	0.006 kg	
		C	Solder	<b>31-271.0252</b>		17	0.006 kg		



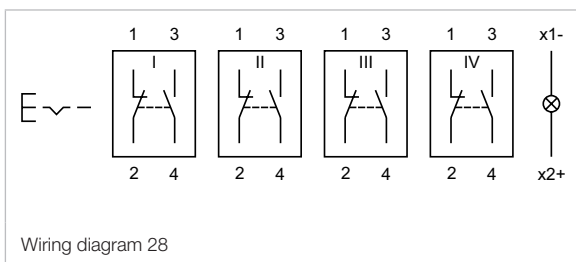
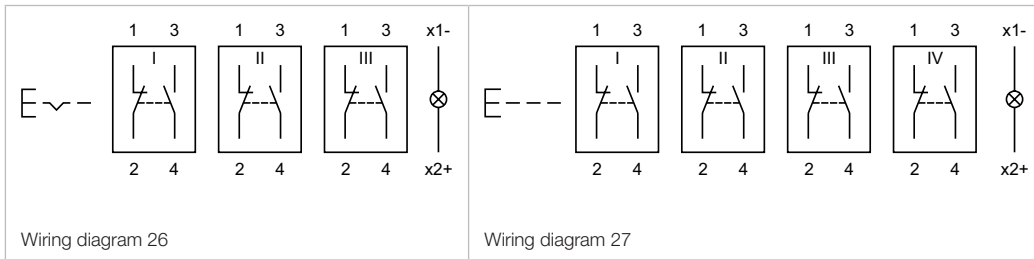
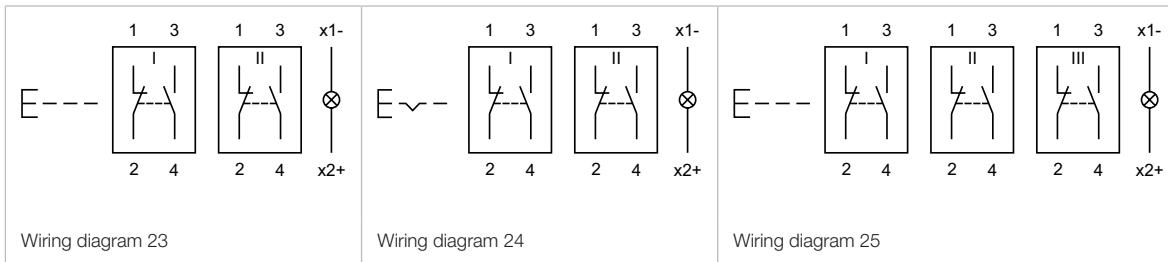
Switching system	Contacts	Diode 1N4007	Switching action	Terminal	Part No.	Component layout	Wiring diagram	Weight
Snap-action switching element	2 NC + 2 NO		B	Solder	<b>31-132.0252</b>		23	0.008 kg
			C	Solder	<b>31-272.0252</b>		24	0.008 kg
	3 NC + 3 NO		B	Solder	<b>31-133.0252</b>		25	0.010 kg
			C	Solder	<b>31-273.0252</b>		26	0.010 kg
	4 NC + 4 NO		B	Solder	<b>31-134.0252</b>		27	0.012 kg
			C	Solder	<b>31-274.0252</b>		28	0.012 kg

Contacts: NC = Normally closed, NO = Normally open  
 Switching action: B = Momentary, C = Maintain  
 The component layouts you will find from page 23



# 31 Raised design

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Front

Lens plastic

Product attribute	Dimension	Lens	Part No.	Weight
 <b>Lens plastic</b>				
flat, illuminative	15.3 x 15.3 mm	smoked transparent	<b>31-953.1</b>	0.001 kg
		red transparent	<b>31-953.2</b>	0.001 kg
		orange transparent	<b>31-953.3</b>	0.001 kg
		yellow transparent	<b>31-953.4</b>	0.001 kg
		green transparent	<b>31-953.5</b>	0.001 kg
		blue transparent	<b>31-953.6</b>	0.001 kg
		colourless transparent	<b>31-953.7</b>	0.001 kg
flat, illuminative, not suitable for film insert	15.3 x 15.3 mm	red translucent	<b>31-951.2</b>	0.001 kg
		orange translucent	<b>31-951.3</b>	0.001 kg
		yellow translucent	<b>31-951.4</b>	0.001 kg
		green translucent	<b>31-951.5</b>	0.001 kg
		blue translucent	<b>31-951.6</b>	0.001 kg
		white translucent	<b>31-951.9</b>	0.001 kg
flat, illuminative, less suitable for film insert	15.3 x 15.3 mm	red transparent	<b>31-955.2</b>	0.001 kg
		yellow transparent	<b>31-955.4</b>	0.001 kg
		green transparent	<b>31-955.5</b>	0.001 kg
		colourless transparent	<b>31-955.7</b>	0.001 kg
flat, non-illuminative	15.3 x 15.3 mm	black opaque	<b>31-951.0</b>	0.001 kg
		grey opaque	<b>31-951.8</b>	0.001 kg
 <b>Lens plastic</b>				
concave, illuminative	15.3 x 15.3 mm	red transparent	<b>31-954.2</b>	0.001 kg
		orange transparent	<b>31-954.3</b>	0.001 kg
		yellow transparent	<b>31-954.4</b>	0.001 kg
		green transparent	<b>31-954.5</b>	0.001 kg
		blue transparent	<b>31-954.6</b>	0.001 kg
		colourless transparent	<b>31-954.7</b>	0.001 kg
concave, non-illuminative	15.3 x 15.3 mm	black opaque	<b>31-952.0</b>	0.001 kg
 <b>Lens plastic</b>				
flat, illuminative	15.3 x 21.5 mm	smoked transparent	<b>31-903.1</b>	0.001 kg
		red transparent	<b>31-903.2</b>	0.001 kg
		orange transparent	<b>31-903.3</b>	0.001 kg
		yellow transparent	<b>31-903.4</b>	0.001 kg
		green transparent	<b>31-903.5</b>	0.001 kg
		blue transparent	<b>31-903.6</b>	0.001 kg
		colourless transparent	<b>31-903.7</b>	0.001 kg
flat, illuminative, not suitable for film insert	15.3 x 21.5 mm	red translucent	<b>31-901.2</b>	0.001 kg
		orange translucent	<b>31-901.3</b>	0.001 kg

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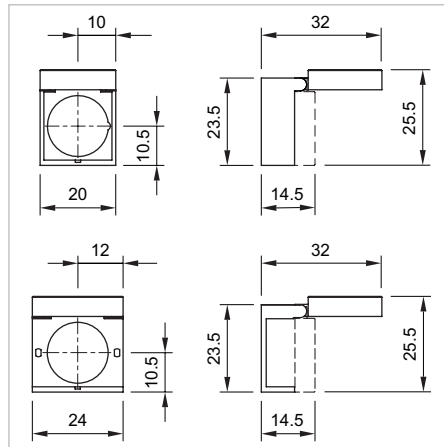
# 31 Accessories

Product attribute	Dimension	Lens	Part No.	Weight
flat, illuminative, not suitable for film insert	15.3 x 21.5 mm	yellow translucent	<b>31-901.4</b>	0.001 kg
		green translucent	<b>31-901.5</b>	0.001 kg
		blue translucent	<b>31-901.6</b>	0.001 kg
		white translucent	<b>31-901.9</b>	0.001 kg
flat, illuminative, less suitable for film insert	15.3 x 21.5 mm	red transparent	<b>31-905.2</b>	0.001 kg
		yellow transparent	<b>31-905.4</b>	0.001 kg
		green transparent	<b>31-905.5</b>	0.001 kg
		colourless transparent	<b>31-905.7</b>	0.001 kg
flat, non-illuminative	15.3 x 21.5 mm	black opaque	<b>31-901.0</b>	0.001 kg
		grey opaque	<b>31-901.8</b>	0.001 kg
 <b>Lens plastic</b>				
concave, illuminative	15.3 x 21.5 mm	red transparent	<b>31-904.2</b>	0.001 kg
		orange transparent	<b>31-904.3</b>	0.001 kg
		yellow transparent	<b>31-904.4</b>	0.001 kg
		green transparent	<b>31-904.5</b>	0.001 kg
		blue transparent	<b>31-904.6</b>	0.001 kg
		colourless transparent	<b>31-904.7</b>	0.001 kg
concave, illuminative, not suitable for film insert	15.3 x 21.5 mm	red translucent	<b>31-902.2</b>	0.001 kg
		orange translucent	<b>31-902.3</b>	0.001 kg
		yellow translucent	<b>31-902.4</b>	0.001 kg
		green translucent	<b>31-902.5</b>	0.001 kg
		blue translucent	<b>31-902.6</b>	0.001 kg
		white translucent	<b>31-902.9</b>	0.001 kg
concave, non-illuminative	15.3 x 21.5 mm	black opaque	<b>31-902.0</b>	0.001 kg
		grey opaque	<b>31-902.8</b>	0.001 kg
 <b>Lens plastic</b>				
flat, illuminative	Ø 15.8 mm	smoked transparent	<b>31-933.1</b>	0.001 kg
		red transparent	<b>31-933.2</b>	0.001 kg
		orange transparent	<b>31-933.3</b>	0.001 kg
		yellow transparent	<b>31-933.4</b>	0.001 kg
		green transparent	<b>31-933.5</b>	0.001 kg
		blue transparent	<b>31-933.6</b>	0.001 kg
		colourless transparent	<b>31-933.7</b>	0.001 kg
flat, illuminative, not suitable for film insert	Ø 15.8 mm	red translucent	<b>31-931.2</b>	0.001 kg
		orange translucent	<b>31-931.3</b>	0.001 kg
		yellow translucent	<b>31-931.4</b>	0.001 kg
		green translucent	<b>31-931.5</b>	0.001 kg
		blue translucent	<b>31-931.6</b>	0.001 kg
flat, illuminative, less suitable for film insert	Ø 15.8 mm	red transparent	<b>31-935.2</b>	0.001 kg
		green transparent	<b>31-935.5</b>	0.001 kg
		colourless transparent	<b>31-935.7</b>	0.001 kg
flat, non-illuminative	Ø 15.8 mm	black opaque	<b>31-931.0</b>	0.001 kg

**Protective cover, IP 40**

**Zusätzliche Informationen**

- Hinged, with means for sealing
- Front panel thickness reduces by 2 mm
- Please note that bigger minimum distances are necessary



Dimensions [mm]

Product attribute	Material	Optics	Dimension	Part No.	Weight
 <p><b>Protective cover</b></p>					
for button 18 x 18 mm with mounting cut-out Ø16 mm	Plastic	transparent		<b>31-920</b>	0.002 kg
 <p><b>Protective cover</b></p>					
for button 18 x 24 mm with mounting cut-out Ø16 mm	Plastic	transparent	18 x 24 mm	<b>01-925</b>	0.002 kg

**Front protective cap, IP 67**

**Additional Information**

- Two-part
- Please note that bigger minimum distances are necessary



Dimensions [mm]

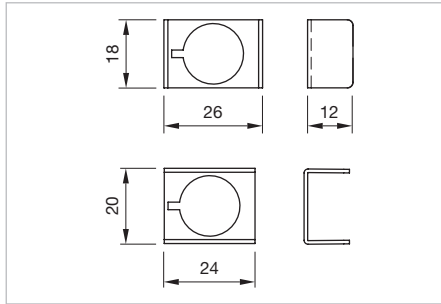
Product attribute	Dimension	Material	Colour	Optics	Part No.	Weight
 <p><b>Front protective cap</b></p>						
for button 18 x 18 mm with mounting cut-out Ø16 mm	24 x 24 mm	PVC/PE	colourless	transparent	<b>31-923</b>	0.003 kg
for button 18 x 24 mm with mounting cut-out Ø16 mm	24 x 30 mm	PE/Silicone	colourless	transparent	<b>31-924.2</b>	0.003 kg

# 31 Accessories



## Protective guard

### Additional Information

- Please note that bigger minimum distances are necessary



Dimensions [mm]

Product attribute	Dimension	Material	Colour	Part No.	Weight
 <p><b>Protective guard</b></p> <p>narrow ends bent upwards, for button 18 x 24 mm with mounting cut-out Ø16 mm</p>	18 x 26 mm	Brass	matt chrome	<b>01-926</b>	0.011 kg
 <p><b>Protective guard</b></p> <p>broad sides bent upwards, for button 18 x 24 mm with mounting cut-out Ø16 mm</p>	20 x 24 mm	Brass	matt chrome	<b>01-927</b>	0.011 kg

**Blind plug**



Mounting cut-outs [mm]

Dimension	Material	Colour	Part No.	Weight
 <p><b>Blind plug</b></p>				
18 x 18 mm	Plastic	black	<b>01-948.0</b>	0.001 kg
 <p><b>Blind plug</b></p>				
18 x 24 mm	Plastic	black	<b>01-947.0</b>	0.001 kg
 <p><b>Blind plug</b></p>				
Ø 18 mm	Plastic	black	<b>01-949.0</b>	0.001 kg

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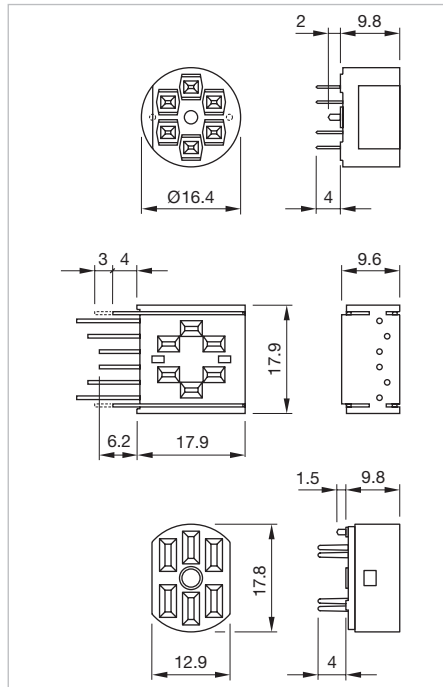
# 31 Accessories

## Rear side


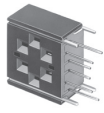

### PCB plug-in base

#### Additional Information

- PCB plug-in base pins right-angle: With the extendable mounting the distance between plug-in base and PCB can be varied up to 3 mm



Dimensions [mm]

Product attribute	Pins	Terminal	Part No.	Component layout	Weight
 <b>PCB plug-in base</b>					
for low level switching element	axial	PCB	<b>31-940</b>	3	0.002 kg
 <b>PCB plug-in base</b>					
for low level switching element	right-angled	PCB	<b>31-941</b>	1	0.004 kg
 <b>PCB plug-in base</b>					
for snap-action switching element 2.8 mm	axial	PCB	<b>31-942</b>	2	0.002 kg

The component layouts you will find from page 23



**Flat receptacle**

Product attribute	Part No.	Weight
 <p><b>Flat receptacle</b></p>		
2.0 x 0.5 mm plug-in terminal	<b>31-945</b>	0.001 kg
 <p><b>Flat receptacle</b></p>		
2.8 x 0.5 mm plug-in terminal	<b>31-946</b>	0.001 kg

**Insulation sleeve**

Product attribute	Part No.	Weight
 <p><b>Insulation sleeve</b></p>		
cover plug-in terminals for snap-action switching element 2.8 mm	<b>01-928</b>	0.001 kg
 <p><b>Insulation sleeve</b></p>		
for flat receptacle 2.0 mm	<b>31-928</b>	0.001 kg
 <p><b>Insulation sleeve</b></p>		
for flat receptacle 2.8 mm	<b>31-929</b>	0.001 kg

**Terminal cover**

Part No.	Weight
 <p><b>Terminal cover for snap-action switching element 16</b></p>	
<b>01-929_579</b>	0.010 kg

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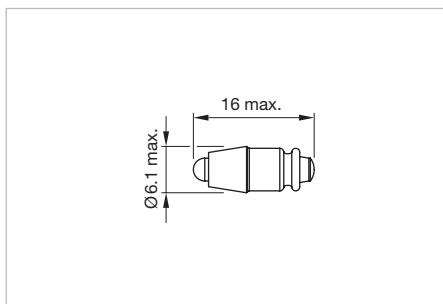
# 31 Accessories

## Illumination

### LED, T1 3/4 MG

#### Additional Information

- Due to high surface temperatures, the series resistor must not be soldered directly to the terminals of the equipment (use a terminal plate)
- When using AC/DC types with AC operation, slight flickering can occur
- Luminous intensity data of the LEDs on direct voltage
- Electrical and optical data are measured at 25 °C
- The specified versions are built with a protection diode (half wave rectifier) in series and the LED
- Luminosity and wave length variations caused by LED manufacturing processes may cause slight differences regarding the illumination




Dimensions [mm]

LED colour	Operating voltage	Operation current	Lumi. intensity	Dom. wavelength	Part No.	Weight
 <p><b>Single-LED</b></p>						
Single-LED red	6 VDC +10 %	15 mA ±15 %	350 mcd	630 nm	<b>10-2J06.3142</b>	0.002 kg
	12 VAC/DC +10 %	7/14 mA ±15 %	330 mcd	630 nm	<b>10-2J09.1062</b>	0.002 kg
	24 VAC/DC +10 %	7/14 mA ±15 %	330 mcd	630 nm	<b>10-2J12.1062</b>	0.002 kg
	28 VAC/DC +10 %	7/14 mA ±15 %	330 mcd	630 nm	<b>10-2J13.1062</b>	0.002 kg
	48 VAC/DC +10 %	4/8 mA ±15 %	200 mcd	630 nm	<b>10-2J19.1042</b>	0.002 kg
Single-LED yellow	6 VDC +10 %	15 mA ±15 %	300 mcd	587 nm	<b>10-2J06.3144</b>	0.002 kg
	12 VAC/DC +10 %	7/14 mA ±15 %	280 mcd	587 nm	<b>10-2J09.1064</b>	0.002 kg
	24 VAC/DC +10 %	7/14 mA ±15 %	280 mcd	587 nm	<b>10-2J12.1064</b>	0.002 kg
	28 VAC/DC +10 %	7/14 mA ±15 %	280 mcd	587 nm	<b>10-2J13.1064</b>	0.002 kg
	48 VAC/DC +10 %	4/8 mA ±15 %	180 mcd	587 nm	<b>10-2J19.1044</b>	0.002 kg
Single-LED green	6 VDC +10 %	7 mA ±15 %	1050 mcd	525 nm	<b>10-2J06.3145</b>	0.002 kg
	12 VAC/DC +10 %	4/7 mA ±15 %	1050 mcd	525 nm	<b>10-2J09.1065</b>	0.002 kg
	24 VAC/DC +10 %	4/7 mA ±15 %	1050 mcd	525 nm	<b>10-2J12.1065</b>	0.002 kg
	28 VAC/DC +10 %	4/7 mA ±15 %	1050 mcd	525 nm	<b>10-2J13.1065</b>	0.002 kg
	48 VAC/DC +10 %	2/4 mA ±15 %	600 mcd	525 nm	<b>10-2J19.1045</b>	0.002 kg
Single-LED blue	6 VDC +10 %	15 mA ±15 %	680 mcd	470 nm	<b>10-2J06.3146</b>	0.002 kg
	12 VAC/DC +10 %	7/14 mA ±15 %	650 mcd	470 nm	<b>10-2J09.1066</b>	0.002 kg
	24 VAC/DC +10 %	7/14 mA ±15 %	650 mcd	470 nm	<b>10-2J12.1066</b>	0.002 kg
	28 VAC/DC +10 %	7/14 mA ±15 %	650 mcd	470 nm	<b>10-2J13.1066</b>	0.002 kg
	48 VAC/DC +10 %	4/8 mA ±15 %	400 mcd	470 nm	<b>10-2J19.1046</b>	0.002 kg
Single-LED white	6 VDC +10 %	15 mA ±15 %	750 mcd	x0.31/y0.32 nm	<b>10-2J06.3149</b>	0.002 kg
	12 VAC/DC +10 %	7/14 mA ±15 %	700 mcd	x0.31/y0.32 nm	<b>10-2J09.1069</b>	0.002 kg
	24 VAC/DC +10 %	7/14 mA ±15 %	700 mcd	x0.31/y0.32 nm	<b>10-2J12.1069</b>	0.002 kg
	28 VAC/DC +10 %	7/14 mA ±15 %	700 mcd	x0.31/y0.32 nm	<b>10-2J13.1069</b>	0.002 kg
	48 VAC/DC +10 %	4/8 mA ±15 %	400 mcd	x0.31/y0.32 nm	<b>10-2J19.1049</b>	0.002 kg

LED colour	Operating voltage	Operation current	Lumi. intensity	Dom. wavelength	Part No.	Weight
 <p><b>Bi-colour LED</b></p>						
red/green	24 VDC +10 %	15/14 mA ±15 %	600/630 mcd	625/525 nm	<b>10-A312.314A</b>	0.002 kg


**Filament lamp, T1 3/4 MG**

Operating voltage	Operation current	Part No.	Weight
 <p><b>Filament lamp</b></p>			
6 VAC/DC	120 mA ±10 %	<b>10-1306.1349</b>	0.001 kg
6.3 VAC/DC	200 mA ±10 %	<b>10-1307.1369</b>	0.001 kg
12 VAC/DC	75 mA ±10 %	<b>10-1309.1309</b>	0.001 kg
14 VAC/DC	80 mA ±10 %	<b>10-1310.1319</b>	0.001 kg
18 VAC/DC	40 mA ±10 %	<b>10-1311.1249</b>	0.001 kg
24 VAC/DC	35 mA ±10 %	<b>10-1312.1229</b>	0.001 kg
28 VAC/DC	30 mA ±10 %	<b>10-1313.1209</b>	0.001 kg
28 VAC/DC	40 mA ±10 %	<b>10-1313.1249</b>	0.001 kg
36 VAC/DC	20 mA ±10 %	<b>10-1316.1179</b>	0.001 kg
36 VAC/DC	30 mA ±10 %	<b>10-1316.1209</b>	0.001 kg
48 VAC/DC	20 mA ±10 %	<b>10-1319.1179</b>	0.001 kg
48 VAC/DC	25 mA ±10 %	<b>10-1319.1199</b>	0.001 kg

**Series resistor**

**Additional Information**

- Only for filament lamp 48 VAC, 25 mA
- For lamp voltage reduction
- Keep to the country specific safety instructions
- Due to high surface temperatures, the series resistor must not be soldered directly to the terminals of the equipment (use a terminal plate)

Operating voltage	Resistance	Part No.	Weight
 <p><b>Series resistor</b></p>			
110 VAC	2.7 kOhm	<b>02-904.0</b>	0.003 kg
125 VAC	3.3 kOhm	<b>02-904.1</b>	0.003 kg
145 VAC	4.7 kOhm	<b>02-904.3</b>	0.003 kg
240 VAC	10 kOhm	<b>02-904.7</b>	0.003 kg

# 31 Accessories

## Terminal plate empty

### Additional Information

- For fitting with series resistors

Product attribute	Dimension	Part No.	Weight
	<b>Terminal plate empty</b>		
5 spaces	62.5 x 60 x 15 mm	<b>02-912.1</b>	0.025 kg
10 spaces	125 x 60 x 15 mm	<b>02-912.2</b>	0.045 kg
15 spaces	187.6 x 60 x 15 mm	<b>02-912.3</b>	0.090 kg
20 spaces	250 x 60 x 15 mm	<b>02-912.4</b>	0.095 kg

Mounting

Lens remover

Part No.	Weight
 <p><b>Lens remover</b></p>	
02-905	0.011 kg

Lamp remover

Additional Information


▲ **Caution:** A switching process might be released when replacing the lamp

Part No.	Weight
 <p><b>Lamp remover</b></p>	
61-9740.0	0.003 kg

Mounting tool

Additional Information

- for tightening or loosening of the fixing nut

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

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# 31 Accessories

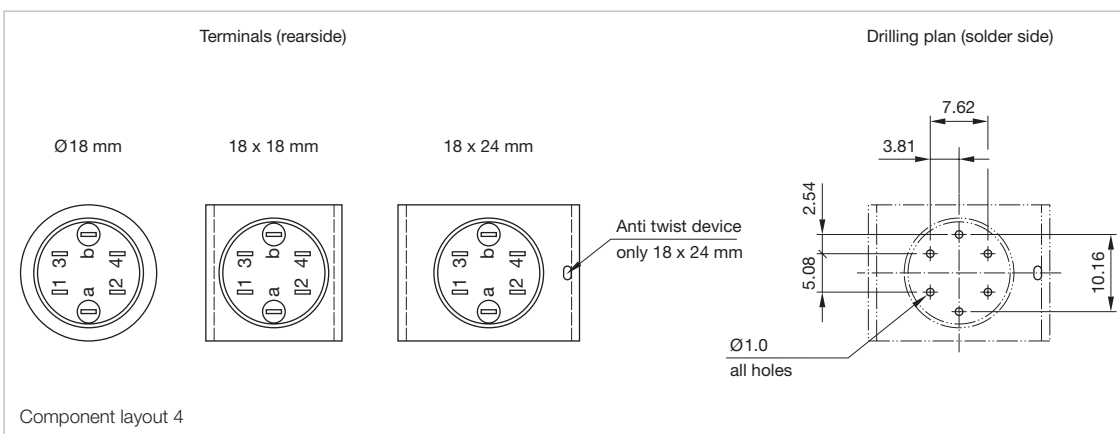
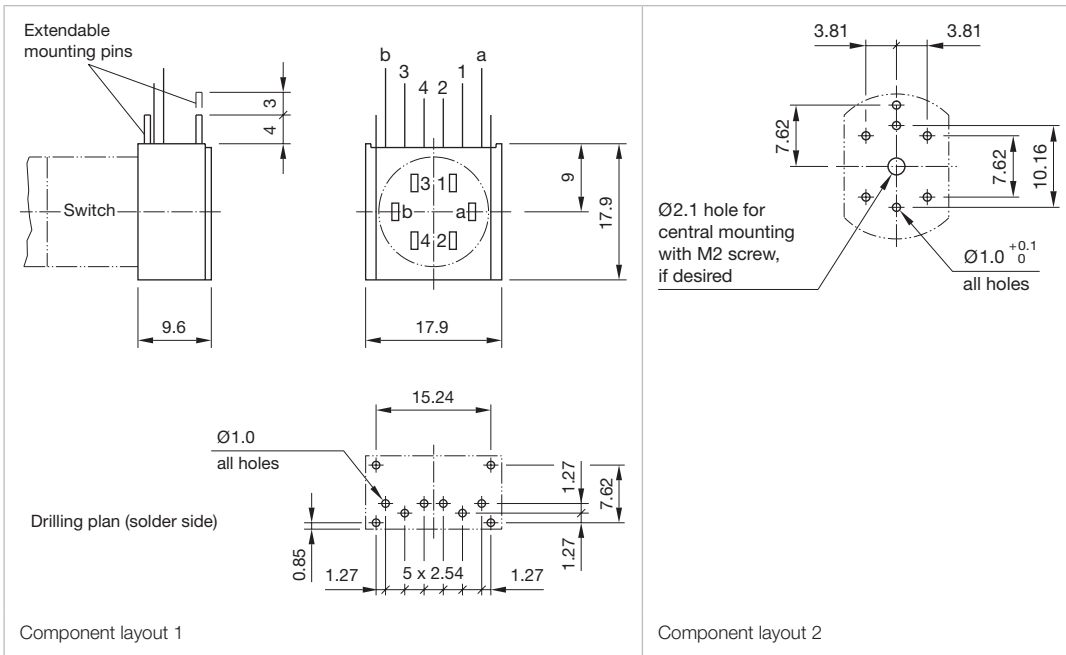
## Dressing tool

### Additional Information

- For aligning buttons

Part No.	Weight
 <b>Dressing tool</b>	
01-906	0.03 kg

Drawings



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- 99
- ST

# 31 Technical data

## Actuator with snap-action switching element

### Switching system

Self-cleaning, double-break, snap action switching system (with contact gap 2 x 0.5 mm).  
1 Normally closed or 1 Normally open contact per element.  
Snap-action switching elements with soldering terminals at the sides: Up to 4 switching element can be on a pushbutton (max. 4 Normally closed and 4 Normally open contacts).  
Snap-action switching element with axial plug-in terminals 2.8 mm stachable, only 1 switching element can be on a pushbutton.

### Material

#### Material of contact

Gold plated silver

#### Switch housing

Axial plug-in-/soldering terminal 2.8 mm:  
Diallyphthalate (DAP), Polyamide (PA66), Polysulfone, heatresistant and self-extinguishing  
Soldering terminal: PA 6.6 Ultramide

#### Actuator housing

Polyetherimide, self-extinguishing

### Mechanical characteristics

#### Terminals

Snap-action switching element with tinned soldering terminals at the sides:  
Max. wire diameter 2 wires à 1.2 mm  
Max. wire cross-section of stranded cable 1 x 1 mm<sup>2</sup>  
Snap-action switching element with axial plug-in terminals, which can also be used as soldering terminals: Plug-in terminal 2.8 x 0.5 mm

Soldering terminal:

Max. wire diameter 1 wire of 1.5 mm<sup>2</sup>  
Max. wire cross-section of stranded cable 2 x 0.75 mm<sup>2</sup> or 1 x 1.0 mm<sup>2</sup>

#### Tightening torque

for fixing nut max. 50 Ncm

#### Actuating force

2 N...5.5 N, depending on the number of switching elements

#### Actuating travel

3 mm

#### Rebound time

≤ 5 ms

#### Mechanical lifetime

Momentary action 2 million cycles of operation  
Maintained action 1 million cycles of operation

### Electrical characteristics

#### Standards

IEC 61058, EN 61058

#### Rated voltage

250 VAC/VDC

#### Rated current

5 A

#### Contact resistance

Starting value (initial) ≤ 50 mΩ

#### Conventional free air thermal current

5 A

The maximum current in continuous operation and at ambient temperature not exceeding the quoted maximum values.

#### Switch rating

250 VAC, 5 A (cosφ 1)  
250 VAC, 3 A (cosφ 0.3)

Switch rating AC (cosφ 0.7)

Voltage 125 VAC 250 VAC  
Current 3 A 2 A

Switch rating DC (inductive) L: R = 30 ms

Voltage 24 VDC 60 VDC 110 VDC 220 VDC  
Current 2 A 0.7 A 0.2 A 0.1 A

#### Electric strength

2500 VAC, 50 Hz, 1 min. between all terminals and earth, as per IEC 60512-2-11

#### Protection class

II

### Environmental conditions

#### Storage temperature

-40 °C ... +85 °C

#### Service temperature

-25 °C ... +55 °C

For indicators and illuminated pushbuttons mounted as a block, make sure the heat can escape freely.

#### Protection degree

Front as per:

IP 40

IP 67 with spray cover

#### Shock resistance

(Single impacts, semi-sinusoidal)

15 g for 11 ms, as per IEC 60512-4-3, IEC 60068-2-27

#### Vibration resistance

(sinusoidal)

10 g at 0–2000 Hz, amplitude 1.5 mm, as per IEC 60512-4-4, IEC 60068-2-6

#### Climate resistance

Standard condition, as per IEC 60068-2-3 and 2-30

Changing condition, as per IEC 60068-2-14 and 2-33



## Approvals

### Approbations

CB (IEC 61058)  
 CSA  
 ENEC (EN 61058)  
 Germanischer Lloyd  
 UL

## Declaration of conformity

CE

## Actuator with low level switching element

### Switching system

This low level switching element was designed for switching low powers in electronic circuits. The mechanism assures reliable switching of loads ranging from a few  $\mu\text{A}/\mu\text{V}$  up to 100 mA/42 VAC/DC.

Single-break momentary contact, as normally open or normally closed with 4 independent points of contact. 2 momentary contacts per switching element; combination of normally open and normally closed is possible.

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

### Material

#### Material of contact

Gold plated

#### Switch housing

Polysulfone, heat-resistant and self-extinguishing

#### Actuator housing

Polyetherimide, self-extinguishing

### Mechanical characteristics

#### Terminals

The universal terminals permit these units to be mounted on printed circuit boards (PCB). These terminals can also be used as soldering or plug-in terminals.

For these terminals we can also supply a plug-in base which, when soldered on to the board, enables the switch to be plugged in.

Soldering terminal:

Max. wire diameter 2 wires  $\leq 0.8\text{ mm}$

Max. wire cross-section of stranded cable  $1 \times 0.75\text{ mm}^2$

Plug-in terminal:  $2.0 \times 0.5\text{ mm}$

#### Tightening torque

for fixing nut max. 50 Ncm

#### Actuating force

3 N ... 3.5 N

#### Actuating travel

3 mm

#### Rebound time

Typ.  $< 100\ \mu\text{s}$

### Mechanical lifetime

Momentary action 5 million cycles of operation

Maintained action 1 million cycles of operation

### Electrical characteristics

#### Standards

EN 61058

#### Contact resistance

Starting value (initial)  $\leq 50\text{ m}\Omega$

#### Switch rating

$10\ \mu\text{A}$ ,  $100\ \mu\text{V}$  to 100 mA at 42 VAC/VDC

#### Electric strength

2500 VAC, 50 Hz, 1 min. between all terminals and earth, as per IEC 60512-2-11

#### Protection class

II

### Environmental conditions

#### Storage temperature

$-40\text{ }^\circ\text{C}$  ...  $+85\text{ }^\circ\text{C}$

#### Service temperature

$-25\text{ }^\circ\text{C}$  ...  $+55\text{ }^\circ\text{C}$

For indicators and illuminated pushbuttons mounted as a block, make sure the heat can escape freely.

#### Protection degree

Front as per:

IP 40

IP 67 with spray cover

#### Shock resistance

(Single impacts, semi-sinusoidal)

15 g for 11 ms, as per IEC 60512-4-3, IEC 60068-2-27

#### Vibration resistance

(sinusoidal)

10 g at 0–2000 Hz, amplitude 1.5 mm, as per IEC 60512-4-4, IEC 60068-2-6

#### Climate resistance

Standard condition, as per IEC 60068-2-3 and 2-30

Changing condition, as per IEC 60068-2-14 and 2-33

# 31 Technical data

## Buzzer 31-810.005

### Buzzer system

Electronic non-contacting buzzer with IC oscillator

88 dB (A)  $\pm 8$  dB at a distance of 0.1 m  
Volume variable with a 1 M $\Omega$  potentiometer or corresponding fixed resistor

### Material

**Alarm buzzer case**  
Polyetherimide

**Front bezel**  
Polyamide

### Mechanical characteristics

**Terminals**  
Soldering terminal

**Tightening torque**  
for fixing nut max. 50Ncm

### Electrical characteristics

**Frequency (tone)**  
Approx. 2.8kHz

**Interval frequency**  
approx. 3Hz

**Sound pressure**

### Operation Voltage/Current

Typ. 10VAC...55VAC, 25mA  
Typ. 10VDC...75VDC, 15mA

### Environmental conditions

**Storage temperature**  
-40°C...+85°C

**Service temperature**  
-25°C...+55°C

**Protection degree**  
IP 40

### Approvals

**Approbations**  
Germanischer Lloyd

**Declaration of conformity**  
CE

## Buzzer 31-801.002

### Buzzer system

Electronic non-contacting buzzer with IC oscillator

**Interval frequency**  
2 Hz

**Sound pressure**  
88 db (A)  $\pm 8$  dB at a distance of 0.1 m

### Material

**Alarm buzzer case**  
Polyetherimide

**Front bezel**  
Polyamide

### Mechanical characteristics

**Terminals**  
Plug-in terminal 2.8 x 0.5mm

**Tightening torque**  
for fixing nut max. 50Ncm

### Electrical characteristics

**Frequency (tone)**  
ca. 2.0kHz

**Operation Voltage/Current**  
10VDC...26VDC,  $\leq 20$ mA

### Environmental conditions

**Storage temperature**  
-40°C...+85°C

**Service temperature**  
-25°C...+55°C

**Protection degree**  
IP 40

### Approvals

**Approbations**  
Germanischer Lloyd

**Declaration of conformity**  
CE

## General notes

### 1. Engraving

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 refilled in black. Standard height of letters is 2 mm. If the height is not specified, we will supply 2mm engraved letters.

### 2. Hot stamping

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 2.5mm, 3mm and 4mm are available.

### 3. Film inserts

Instead of using engraving the lenses can be fitted with transparent film inserts, as an alternative. For this purpose, though, it is advisable to use transparent lenses. In the case of use of a smoke-black lens the fitted film becomes readable only if the lamp is on. To insert the film, the feet of the lens holder have to be pushed together far enough to enable the lens to be lifted off easily. The film thickness is 0.2mm. Important : Consider pushbutton mounting orientation before specifying engraving characters !

Alle Dimensionen in mm

Front size (Lens)	Film insert max. size	Height of letters h	Number of lines	Number of capital letters per line (target value)	Number of small letters per line (target value)	Image
18 x 18 (15.2 x 15.2)	12.7 x 12.7	2.5	4	7-8	8	B3
		3.0	3	6-7	7	B3
		4.0	2	4-5	5	B3
		5.0	2	3-4	4	B3
		6.0	1	3	3-4	B3
		8.0	1	2-3	2-3	B3
18 x 24 (15.2 x 21.2)	12.7 x 18.7	2.5	4	11	12	B1
			5	7-8	8	B2
		3.0	3	9-10	10-11	B1
			4	6-7	7	B2
		4.0	2	7	7-8	B1
			3	4-5	5	B2
		5.0	2	5-6	6	B1
				3-4	4	B2
		6.0	1	4-5	5	B1
				3	3-4	B2
		8.0	1	3-4	3-4	B1
				2-3	2-3	B2
Ø 18 (Ø 15.8)	Ø 12.8	2.5	3	6	6	B4
		3.0	2	5	6	B4
		4.0	2	3	4	B4
		5.0	1	2	3	B4
		6.0	1	2	2	B4
		8.0	1	2	2	B4



# 31 Application guidelines

## Suppressor circuits

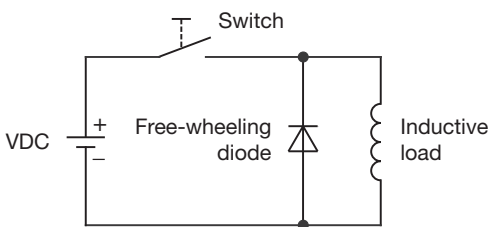
When switching inductive loads such as relays, DC motors, and DC solenoids, it is always important to absorb surges (e.g. with a diode) to protect the contacts. When these inductive loads are switched off, a counter emf can severely damage switch contacts and greatly shorten lifetime.

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.

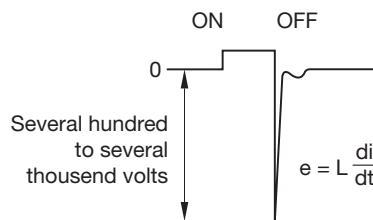
The free-wheeling diode should be chosen so that the reverse breakdown voltage is greater than the voltage driving the inductive load. The DC blocking voltage (VR) of the free-wheeling diode can be found in the datasheet of a diode. The forward current should be equal or greater than the maximum current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

**To get an efficient protection, the free-wheeling diode must be connected as close as possible to the inductive load!**

Switching with inductive load  
Fig. 1



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



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01-926	14	31-154.0252	8	31-902.6	12
01-927	14	31-261.022	8	31-902.8	12
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01-948.0	15	31-264.0252	8	31-903.3	11
01-949.0	15	31-271.022	8	31-903.4	11
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10-2J06.3146	18	31-461.036	8	31-931.9	12
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10-2J09.1062	18	31-465.036	8	31-933.2	12
10-2J09.1064	18	31-466.036	8	31-933.3	12
10-2J09.1065	18	31-471.036	8	31-933.4	12
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10-2J09.1069	18	31-473.036	8	31-933.6	12
10-2J12.1062	18	31-475.036	8	31-933.7	12
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