# Series 31

**Characteristics**
The compact 16 mm Series 31 is especially suited for:

- Raised design
- PCB (with adaptor)

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

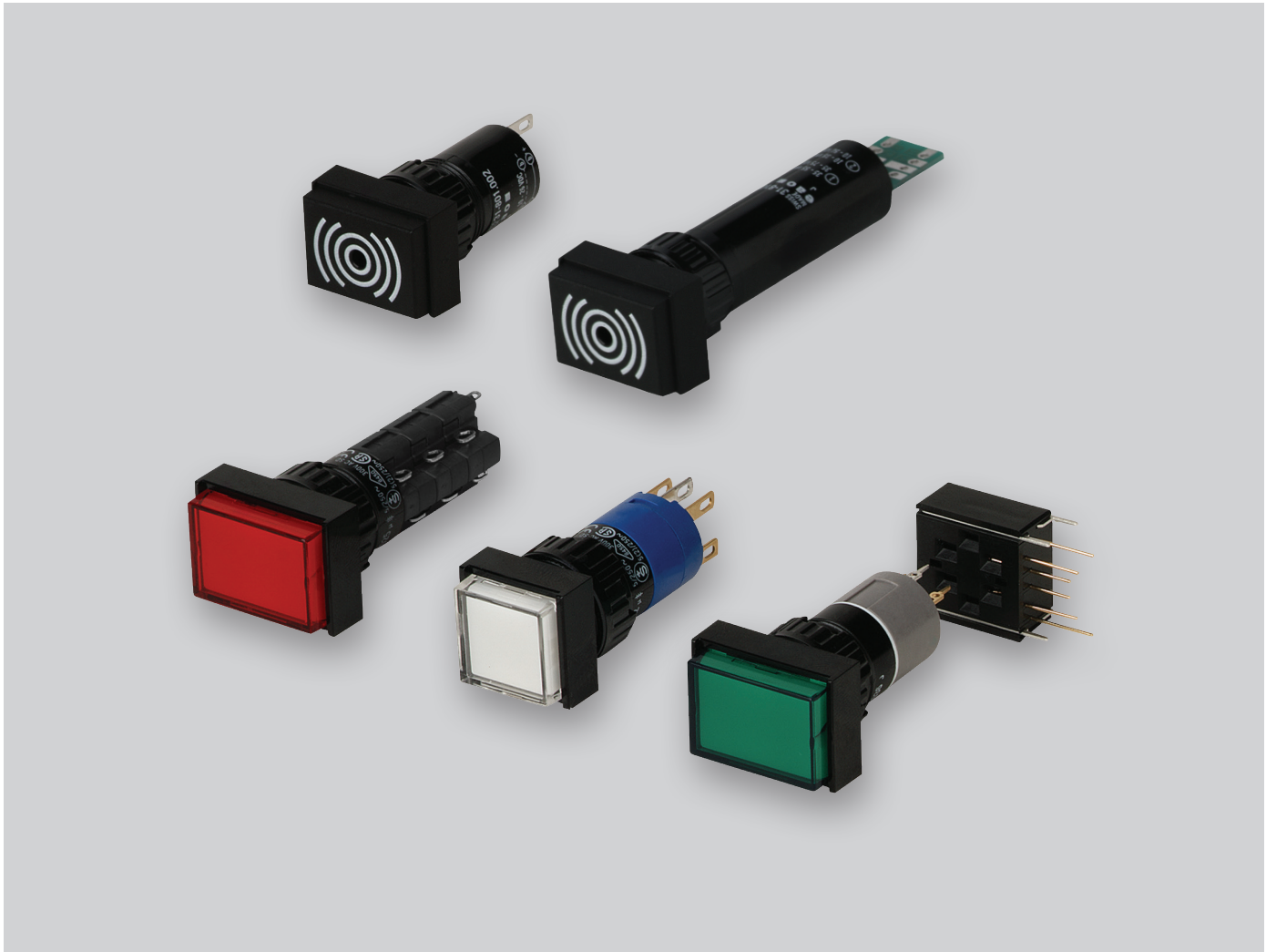
**Functions**
The Series 31 incorporates the following functions:

- 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**
Configure a product to your exact needs and request a quotation.



## Overview


| | |
|---|---|
| **Raised design** | |
| Indicator | 4 |
| Buzzer | 6 |
| Illuminated pushbutton | 7 |
| **Accessoires** | **11** |
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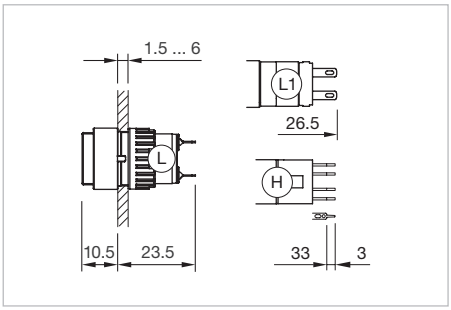
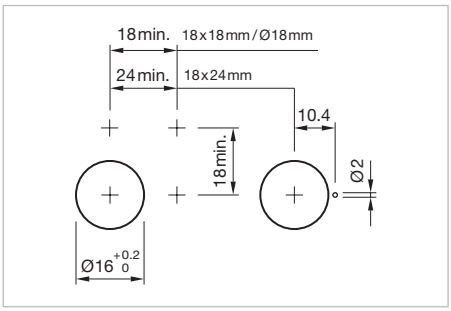
| **Technical data** | **24** |
| **Marking** | **27** |
| **Guidelines for use** | **28** |
| **Index** | **29** |

## 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** | |

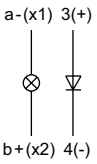
Each Part Number listed below includes all the black components shown in the 3D-drawing.

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

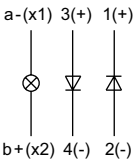
| Diode 1N4007 | Terminal | Part No. | Component layout | Wiring diagram | Weight |
|---|---|---|---|---|---|
| **Indicator actuator, Front dimension 18 x 18 mm** | | | | | |
| 1 | Universal 2.0 x 0.5 mm | **31-703.006** | 4 | 1 | 0.006 kg |
| 2 | Universal 2.0 x 0.5 mm | **31-704.006** | 4 | 2 | 0.006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

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

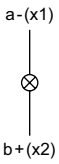
The component layouts you will find from page 23




Wiring diagram 1



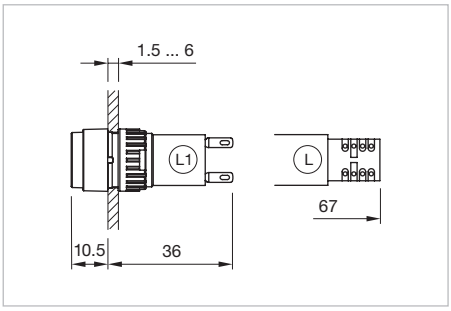

Wiring diagram 2




Wiring diagram 3

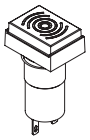
## Buzzer, IP 40

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)**



**Buzzer**

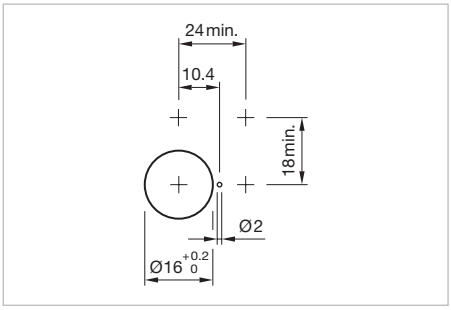
**Fixing nut**

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.*

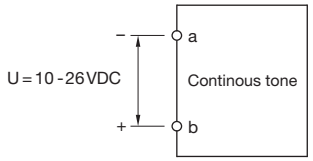
**Additional Information**

- Further information see «Technical data»

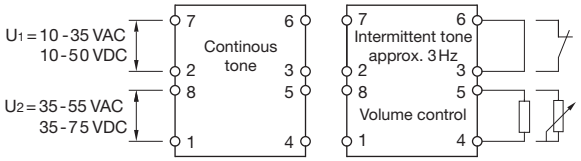



Mounting cut-outs [mm]

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




Wiring diagram 1



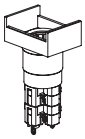

Wiring diagram 12

## Illuminated pushbutton, IP 40

**Equipment consisting of (schematic overview)**

*Lens* *page 11*

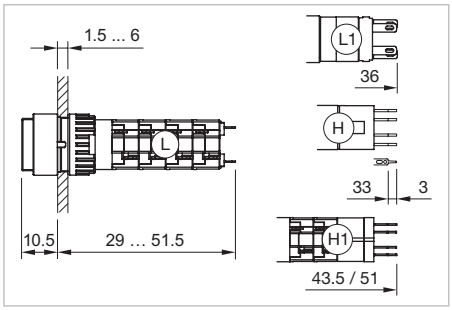
*Single-LED* *page 18*


**Actuator**

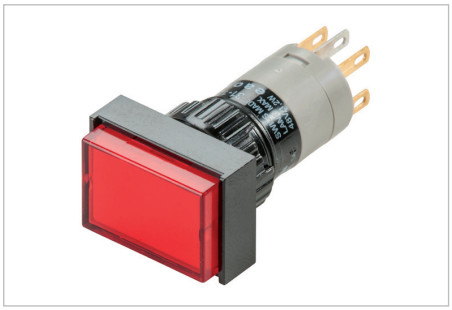
**Fixing nut**

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

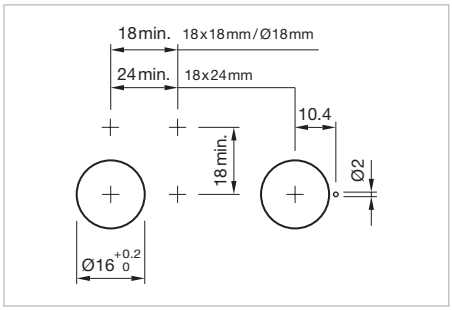
*To obtain a complete unit, please select the red components from the pages shown.*




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.




Mounting cut-outs [mm]

**Additional Information**

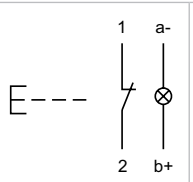
- Material of contact Gold

| Switching system | Contacts | Diode 1N4007 | Switching action | Terminal | Part No. | Component layout | Wiring diagram | Weight |
|---|---|---|---|---|---|---|---|---|
| **Illuminated pushbutton actuator, Front dimension 18 x 18 mm** | | | | | | | | |
| Low-level element | 2 NO | | B | Universal 2.0 x 0.5 mm | **31-451.036** | 4 | 9 | 0.007 kg |
| | | | C | Universal 2.0 x 0.5 mm | **31-481.036** | 4 | 10 | 0.007 kg |
| | 2 NC | | B | Universal 2.0 x 0.5 mm | **31-452.036** | 4 | 7 | 0.007 kg |
| | 1 NC + 1 NO | | B | Universal 2.0 x 0.5 mm | **31-453.036** | 4 | 3 | 0.007 kg |
| | | | C | Universal 2.0 x 0.5 mm | **31-483.036** | 4 | 4 | 0.007 kg |
| | 1 NO | | B | Universal 2.0 x 0.5 mm | **31-455.036** | 4 | 5 | 0.007 kg |
| | | | C | Universal 2.0 x 0.5 mm | **31-485.036** | 4 | 6 | 0.007 kg |
| | 1 NC | | B | Universal 2.0 x 0.5 mm | **31-456.036** | 4 | 1 | 0.007 kg |
| Snap-action switching element | 1 NC + 1 NO | 1 | B | Universal-Solder | **31-709.0292** | 4 | 11 | 0.008 kg |
| | | 1 | C | Universal-Solder | **31-717.0292** | 4 | 12 | 0.008 kg |
| | | 2 | B | Universal-Solder | **31-710.0292** | 4 | 13 | 0.008 kg |
| | | 2 | C | Universal-Solder | **31-718.0292** | 4 | 14 | 0.008 kg |
| | | | B | Solder 2.8 x 0.5 mm | **31-151.022** | | 16 | 0.006 kg |
| | | | B | Solder | **31-151.0252** | | 15 | 0.006 kg |
| | | | C | Solder 2.8 x 0.5 mm | **31-281.022** | | 18 | 0.006 kg |
| | | | C | Solder | **31-281.0252** | | 17 | 0.006 kg |
| | 2 NC + 2 NO | 1 | C | Universal-Solder | **31-719.0292** | 4 | 20 | 0.010 kg |
| | | | B | Solder | **31-152.0252** | | 23 | 0.008 kg |
| | | | C | Solder | **31-282.0252** | | 24 | 0.008 kg |
| | 3 NC + 3 NO | | B | Solder | **31-153.0252** | | 25 | 0.010 kg |
| | | | C | Solder | **31-283.0252** | | 26 | 0.010 kg |

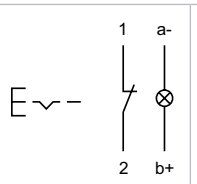
| Switching system | Contacts | Diode 1N4007 | Switching action | Terminal | Part No. | Compo-nent layout | Wiring diagram | Weight |
|---|---|---|---|---|---|---|---|---|
| Snap-action switching element | 4 Ö + 4 S | | B | Löt | **31-154.0252** | | 27 | 0.012 kg |
| | | | C | Solder | **31-284.0252**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

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

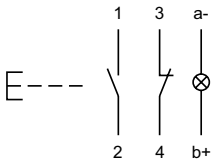
Contacts: NC = Normally closed, NO = Normally open
Switching action: B = Momentary, C = Maintain
The component layouts you will find from page 23



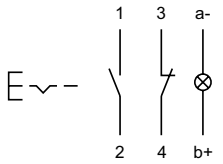
Wiring diagram 1



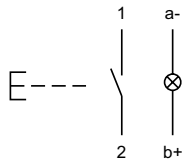
Wiring diagram 2



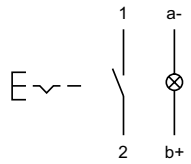
Wiring diagram 3



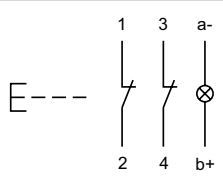
Wiring diagram 4



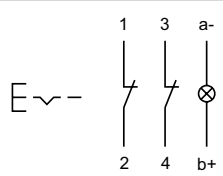
Wiring diagram 5



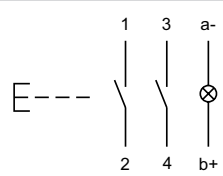
Wiring diagram 6



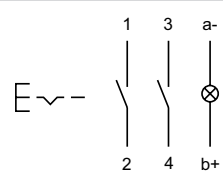
Wiring diagram 7



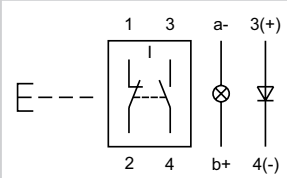
Wiring diagram 8



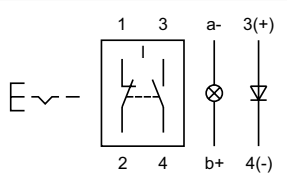
Wiring diagram 9



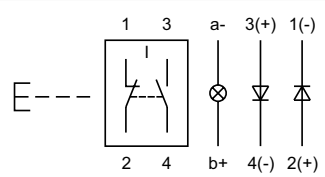
Wiring diagram 10



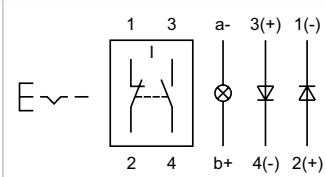
Wiring diagram 11



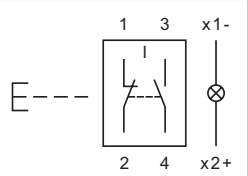
Wiring diagram 12



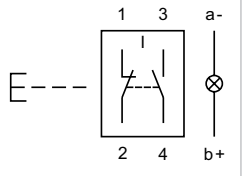
Wiring diagram 13



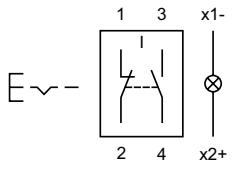
Wiring diagram 14



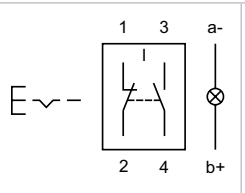
Wiring diagram 15



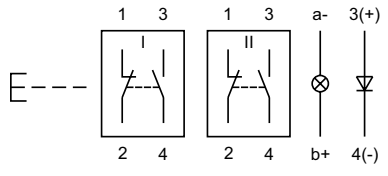
Wiring diagram 16



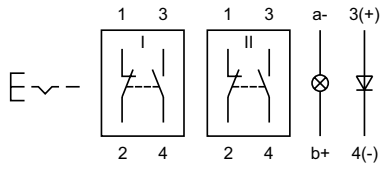
Wiring diagram 17



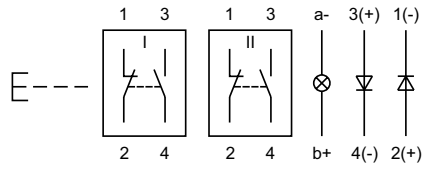
Wiring diagram 18



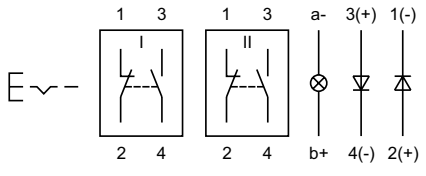
Wiring diagram 19



Wiring diagram 20



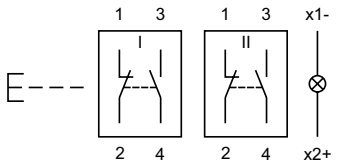
Wiring diagram 21



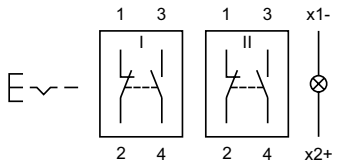
Wiring diagram 22

# 31 Raised design

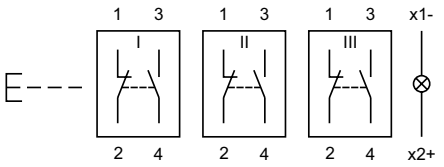




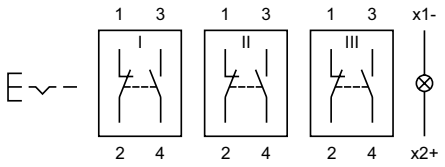

Wiring diagram 23



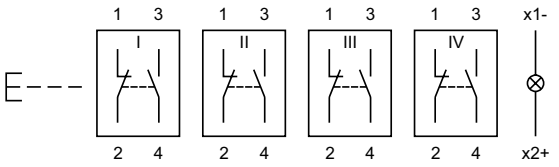

Wiring diagram 24



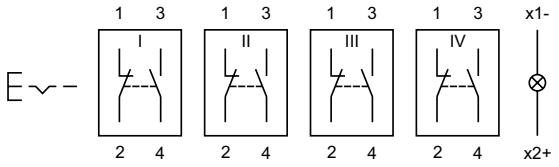

Wiring diagram 25




Wiring diagram 26




Wiring diagram 27




Wiring diagram 28

## Front

### Lens plastic

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

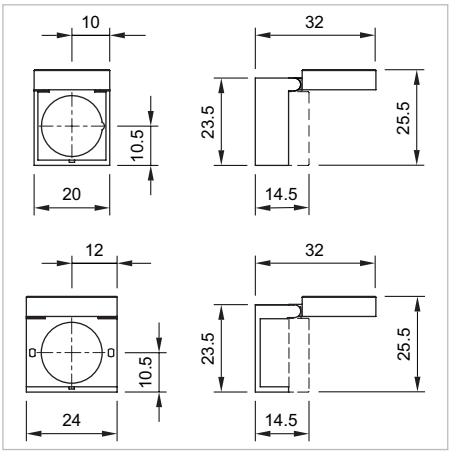
# 31 Accessories

| Product attribute | Dimension | Lens | Part No. | Weight |
|---|---|---|---|---|
| flat, illuminative, not suitable for film insert | 15.3 x 21.5 mm | yellow translucent | **31-901.4** | 0.001 kg |
| | | green translucent | **31-901.5** | 0.001 kg |
| | | blue translucent | **31-901.6** | 0.001 kg |
| | | white translucent | **31-901.9** | 0.001 kg |
| flat, illuminative, less suitable for film insert | 15.3 x 21.5 mm | red transparent | **31-905.2** | 0.001 kg |
| | | yellow transparent | **31-905.4** | 0.001 kg |
| | | green transparent | **31-905.5** | 0.001 kg |
| | | colourless transparent | **31-905.7** | 0.001 kg |
| flat, non-illuminative | 15.3 x 21.5 mm | black opaque | **31-901.0** | 0.001 kg |
| | | grey opaque | **31-901.8** | 0.001 kg |
| **Lens plastic** | | | | |
| concave, illuminative | 15.3 x 21.5 mm | red transparent | **31-904.2** | 0.001 kg |
| | | orange transparent | **31-904.3** | 0.001 kg |
| | | yellow transparent | **31-904.4** | 0.001 kg |
| | | green transparent | **31-904.5** | 0.001 kg |
| | | blue transparent | **31-904.6** | 0.001 kg |
| | | colourless transparent | **31-904.7** | 0.001 kg |
| concave, illuminative, not suitable for film insert | 15.3 x 21.5 mm | red translucent | **31-902.2** | 0.001 kg |
| | | orange translucent | **31-902.3** | 0.001 kg |
| | | yellow translucent | **31-902.4** | 0.001 kg |
| | | green translucent | **31-902.5** | 0.001 kg |
| | | blue translucent | **31-902.6** | 0.001 kg |
| | | white translucent | **31-902.9** | 0.001 kg |
| concave, non-illuminative | 15.3 x 21.5 mm | black opaque | **31-902.0** | 0.001 kg |
| | | grey opaque | **31-902.8** | 0.001 kg |
| **Lens plastic** | | | | |
| flat, illuminative | Ø 15.8 mm | smoked transparent | **31-933.1** | 0.001 kg |
| | | red transparent | **31-933.2** | 0.001 kg |
| | | orange transparent | **31-933.3** | 0.001 kg |
| | | yellow transparent | **31-933.4** | 0.001 kg |
| | | green transparent | **31-933.5** | 0.001 kg |
| | | blue transparent | **31-933.6** | 0.001 kg |
| | | colourless transparent | **31-933.7** | 0.001 kg |
| flat, illuminative, not suitable for film insert | Ø 15.8 mm | red translucent | **31-931.2** | 0.001 kg |
| | | orange translucent | **31-931.3** | 0.001 kg |
| | | yellow translucent | **31-931.4** | 0.001 kg |
| | | green translucent | **31-931.5** | 0.001 kg |
| | | blue translucent | **31-931.6** | 0.001 kg |
| | | white translucent | **31-931.9** | 0.001 kg |
| flat, illuminative, less suitable for film insert | Ø 15.8 mm | red transparent | **31-935.2** | 0.001 kg |
| | | green transparent | **31-935.5** | 0.001 kg |
| | | colourless transparent | **31-935.7** | 0.001 kg |
| flat, non-illuminative | Ø 15.8 mm | black opaque | **31-931.0** | 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



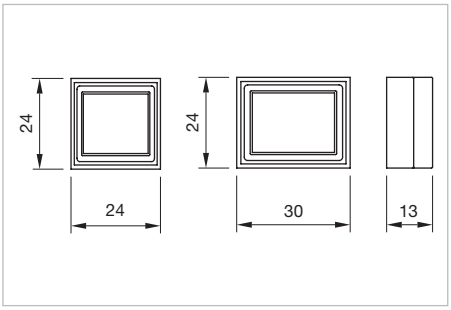

Dimensions [mm]

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

## Front protective cap, IP 67

**Additional Information**

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



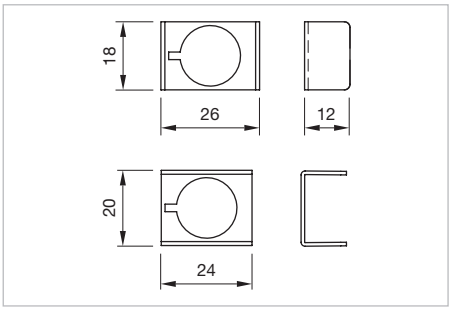

Dimensions [mm]

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

## Protective guard

**Additional Information**

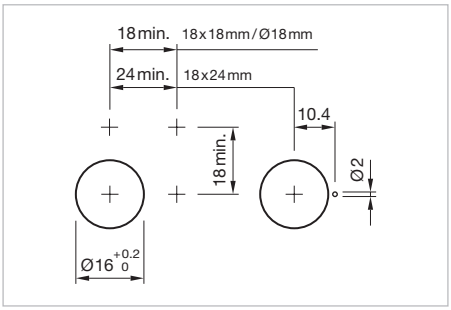
- Please note that bigger minimum distances are necessary




Dimensions [mm]

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

## Blind plug




Mounting cut-outs [mm]

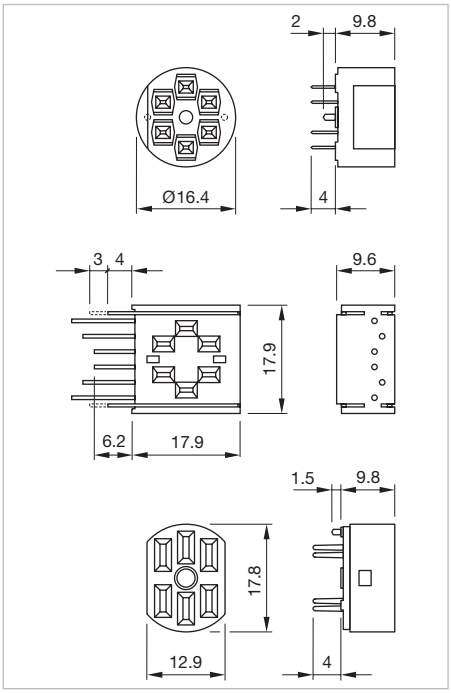
| Dimension | Material | Colour | Part No. | Weight |
|---|---|---|---|---|
| **Blind plug** | | | | |
| 18 x 18 mm | Plastic | black | **01-948.0** | 0.001 kg |
| **Blind plug** | | | | |
| 18 x 24 mm | Plastic | black | **01-947.0** | 0.001 kg |
| **Blind plug** | | | | |
| Ø 18 mm | Plastic | black | **01-949.0** | 0.001 kg |

## Rear side

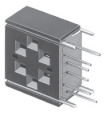
## PCB plug-in base

**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

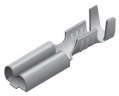



Dimensions [mm]

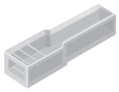
| Product attribute | Pins | Terminal | Part No. | Component layout | Weight |
|---|---|---|---|---|---|
| **PCB plug-in base** | | | | | |
| for low level switching element | axial | PCB | **31-940** | 3 | 0.002 kg |
|  **PCB plug-in base** | | | | | |
| for low level switching element | right-angled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

The component layouts you will find from page 23

## Flat receptacle

| Product attribute | Part No. | Weight |
|---|---|---|
| **Flat receptacle** | | |
| 2.0 x 0.5 mm plug-in terminal | **31-945** | 0.001 kg |
|  **Flat receptacle** | | |
| 2.8 x 0.5 mm plug-in terminal | **31-946** | 0.001 kg |

## Insulation sleeve

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

## Terminal cover

| Part No. | Weight |
|---|---|
| **Terminal cover for snap-action switching element 16** | |
| **01-929_579** | 0.010 kg |

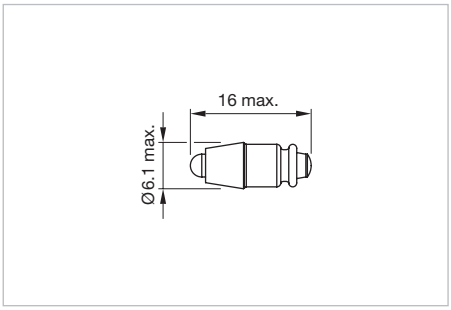
# 31 Accessories

## 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 occure
- 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 (halve 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 |
|---|---|---|---|---|---|---|
| **Single-LED** | | | | | | |
| Single-LED red | 6 VDC +10 % | 15 mA ±15 % | 350 mcd | 630 nm | **10-2J06.3142** | 0.002 kg |
| | 12 VAC/DC +10 % | 7/14 mA ±15 % | 330 mcd | 630 nm | **10-2J09.1062** | 0.002 kg |
| | 24 VAC/DC +10 % | 7/14 mA ±15 % | 330 mcd | 630 nm | **10-2J12.1062** | 0.002 kg |
| | 28 VAC/DC +10 % | 7/14 mA ±15 % | 330 mcd | 630 nm | **10-2J13.1062** | 0.002 kg |
| | 48 VAC/DC +10 % | 4/8 mA ±15 % | 200 mcd | 630 nm | **10-2J19.1042** | 0.002 kg |
| Single-LED yellow | 6 VDC +10 % | 15 mA ±15 % | 300 mcd | 587 nm | **10-2J06.3144** | 0.002 kg |
| | 12 VAC/DC +10 % | 7/14 mA ±15 % | 280 mcd | 587 nm | **10-2J09.1064** | 0.002 kg |
| | 24 VAC/DC +10 % | 7/14 mA ±15 % | 280 mcd | 587 nm | **10-2J12.1064** | 0.002 kg |
| | 28 VAC/DC +10 % | 7/14 mA ±15 % | 280 mcd | 587 nm | **10-2J13.1064** | 0.002 kg |
| | 48 VAC/DC +10 % | 4/8 mA ±15 % | 180 mcd | 587 nm | **10-2J19.1044** | 0.002 kg |
| Single-LED green | 6 VDC +10 % | 7 mA ±15 % | 1050 mcd | 525 nm | **10-2J06.3145** | 0.002 kg |
| | 12 VAC/DC +10 % | 4/7 mA ±15 % | 1050 mcd | 525 nm | **10-2J09.1065** | 0.002 kg |
| | 24 VAC/DC +10 % | 4/7 mA ±15 % | 1050 mcd | 525 nm | **10-2J12.1065** | 0.002 kg |
| | 28 VAC/DC +10 % | 4/7 mA ±15 % | 1050 mcd | 525 nm | **10-2J13.1065** | 0.002 kg |
| | 48 VAC/DC +10 % | 2/4 mA ±15 % | 600 mcd | 525 nm | **10-2J19.1045** | 0.002 kg |
| Single-LED blue | 6 VDC +10 % | 15 mA ±15 % | 680 mcd | 470 nm | **10-2J06.3146** | 0.002 kg |
| | 12 VAC/DC +10 % | 7/14 mA ±15 % | 650 mcd | 470 nm | **10-2J09.1066** | 0.002 kg |
| | 24 VAC/DC +10 % | 7/14 mA ±15 % | 650 mcd | 470 nm | **10-2J12.1066** | 0.002 kg |
| | 28 VAC/DC +10 % | 7/14 mA ±15 % | 650 mcd | 470 nm | **10-2J13.1066** | 0.002 kg |
| | 48 VAC/DC +10 % | 4/8 mA ±15 % | 400 mcd | 470 nm | **10-2J19.1046** | 0.002 kg |
| Single-LED white | 6 VDC +10 % | 15 mA ±15 % | 750 mcd | x0.31/y0.32 nm | **10-2J06.3149** | 0.002 kg |
| | 12 VAC/DC +10 % | 7/14 mA ±15 % | 700 mcd | x0.31/y0.32 nm | **10-2J09.1069** | 0.002 kg |
| | 24 VAC/DC +10 % | 7/14 mA ±15 % | 700 mcd | x0.31/y0.32 nm | **10-2J12.1069** | 0.002 kg |
| | 28 VAC/DC +10 % | 7/14 mA ±15 % | 700 mcd | x0.31/y0.32 nm | **10-2J13.1069** | 0.002 kg |
| | 48 VAC/DC +10 % | 4/8 mA ±15 % | 400 mcd | x0.31/y0.32 nm | **10-2J19.1049** | 0.002 kg |

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

## Filament lamp, T1 3/4 MG

| Operating voltage | Operation current | Part No. | Weight |
|---|---|---|---|
| **Filament lamp** | | | |
| 6 VAC/DC | 120 mA ±10 % | **10-1306.1349** | 0.001 kg |
| 6.3 VAC/DC | 200 mA ±10 % | **10-1307.1369** | 0.001 kg |
| 12 VAC/DC | 75 mA ±10 % | **10-1309.1309** | 0.001 kg |
| 14 VAC/DC | 80 mA ±10 % | **10-1310.1319** | 0.001 kg |
| 18 VAC/DC | 40 mA ±10 % | **10-1311.1249** | 0.001 kg |
| 24 VAC/DC | 35 mA ±10 % | **10-1312.1229** | 0.001 kg |
| 28 VAC/DC | 30 mA ±10 % | **10-1313.1209** | 0.001 kg |
| 28 VAC/DC | 40 mA ±10 % | **10-1313.1249** | 0.001 kg |
| 36 VAC/DC | 20 mA ±10 % | **10-1316.1179** | 0.001 kg |
| 36 VAC/DC | 30 mA ±10 % | **10-1316.1209** | 0.001 kg |
| 48 VAC/DC | 20 mA ±10 % | **10-1319.1179** | 0.001 kg |
| 48 VAC/DC | 25 mA ±10 % | **10-1319.1199** | 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 |
|---|---|---|---|
| **Series resistor** | | | |
| 110 VAC | 2.7 kOhm | **02-904.0** | 0.003 kg |
| 125 VAC | 3.3 kOhm | **02-904.1** | 0.003 kg |
| 145 VAC | 4.7 kOhm | **02-904.3** | 0.003 kg |
| 240 VAC | 10 kOhm | **02-904.7** | 0.003 kg |

## Terminal plate empty

**Additional Information**

- For fitting with series resistors

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

## Mounting

### Lens remover

| Part No. | Weight |
|---|---|
| **Lens remover** | |
| **02-905** | 0.011 kg |

### Lamp remover

**Additional Information**

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

| Part No. | Weight |
|---|---|
| **Lamp remover** | |
| **61-9740.0** | 0.003 kg |

### Mounting tool

**Additional Information**

- for tightening or loosening of the fixing nut

| Part No. | Weight |
|---|---|
| **Mounting tool** | |
| **01-907** | 0.020 kg |

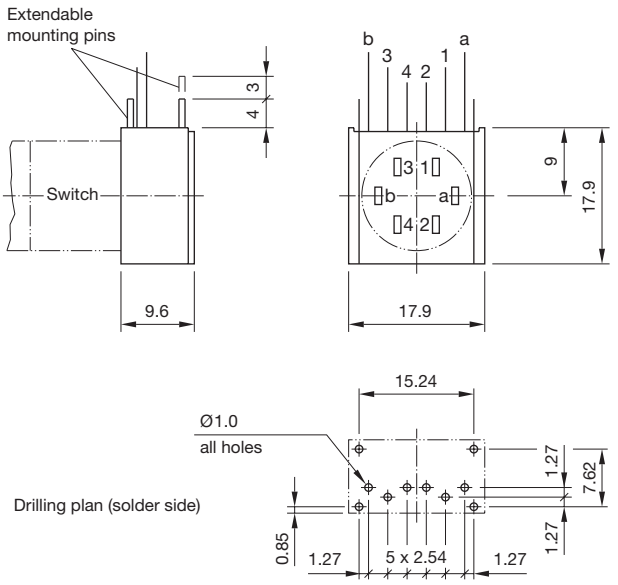
## Dressing tool

**Additional Information**

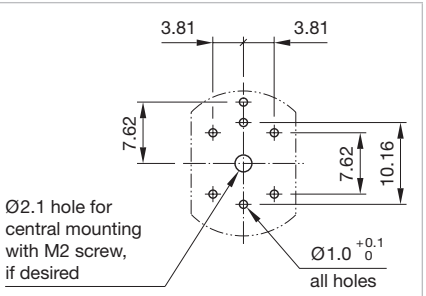
- For aligning buttons

| Part No. | Weight |
|---|---|
| **Dressing tool** | |
| **01-906** | 0.03 kg |

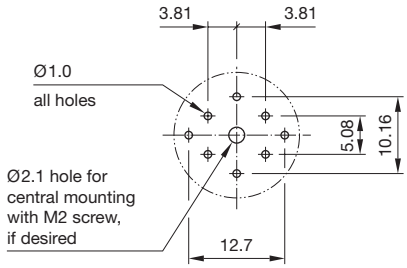
## Drawings



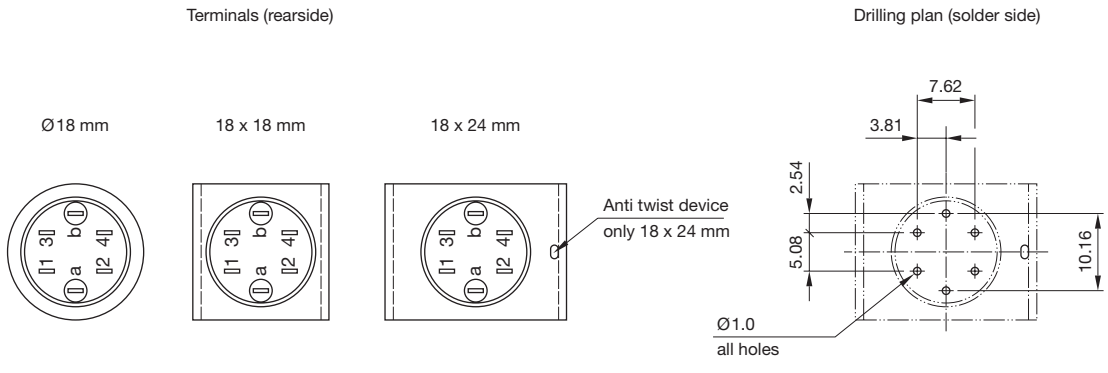

Component layout 1




Component layout 2




Component layout 3




Component layout 4

## 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:
Diallylphthalate (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 mm²
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 mm²
Max. wire cross-section of stranded cable 2 x 0.75 mm² or 1 x 1.0 mm²

**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 µA/µV 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 à 0.8 mm
Max. wire cross-section of stranded cable 1x 0.75 mm²

Plug-in terminal: 2.0 x 0.5 mm

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

**Actuating force**
3 N … 3.5 N

**Actuating travel**
3 mm

**Rebound time**
Typ. < 100 µs

**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) ≤ 50 mΩ

**Switch rating**
10 µA, 100 µV 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 °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

## Buzzer 31-810.005

### Buzzer system

Electronic non-contacting buzzer
with IC oscillator

### Material

**Alarm buzzer case**
Polyetherimide

**Front bezel**
Polyamide

### Mechanical characteristics

**Terminals**
Soldering terminal

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

### Electrical characteristics

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

**Interval frequency**
approx. 3 Hz

**Sound pressure**
88 dB (A) ±8 dB at a distance of 0.1 m
Volume variable with a 1 MΩ potentiometer or corresponding fixed resistor

**Operation Voltage/Current**
Typ. 10 VAC … 55 VAC, 25 mA
Typ. 10 VDC … 75 VDC, 15 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

## Buzzer 31-801.002

### Buzzer system

Electronic non-contacting buzzer
with IC oscillator

### Material

**Alarm buzzer case**
Polyetherimide

**Front bezel**
Polyamide

### Mechanical characteristics

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

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

### Electrical characteristics

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

**Interval frequency**
2 Hz

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

**Operation Voltage/Current**
10 VDC … 26 VDC, ≤ 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

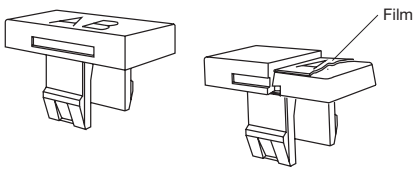
### 1. Engraving
In addition to the most commonly used world languages, in DIN1451-3 close spacing, other typefaces are available as Scandinavian, Slavic, Greek, Russian and Polish. Red, blue and black lenses are filled with white colour. Other colour lenses arefilled in black. Standard height of letters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

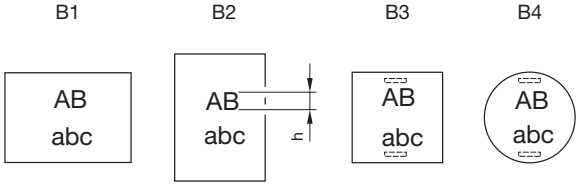
### 2. Hot stamping
For larger series it is worth considering markings by means of hot stamping  We will pleased to advise you. For letters and figures, typefaces with 2.5 mm, 3 mm and 4 mm are available.

### 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 advisible 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 lift off easily. The film thickness is 0.2 mm. Important : Consider pushbutton mounting orientation befor 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 |
| | | | 2 | 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 |



## Suppressor circuits

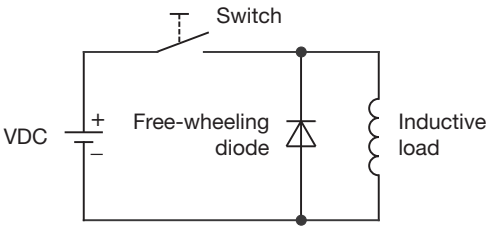
When switching inductive loads such as relays, DC motors, and DC solenoids, it is always important to absorb surges (e. g. with a diode) to protect the contacts. When these inductive loads are switched off, a counter emf can severely damage switch contacts and greatly shorten lifetime.

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. 12 VDC) see Fig. 2.

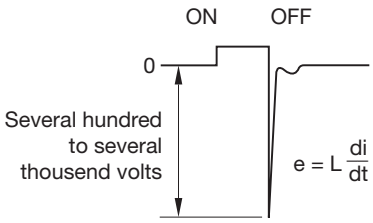
The free-wheeling diode should be chosen so that the reverse breakdown voltage is greater than the voltage driving the inductive load. The DC blocking voltage (VR) of the free-wheeling diode can be found in the datasheet of a diode. The forward current should be equal or greater than the maximum current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