

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:

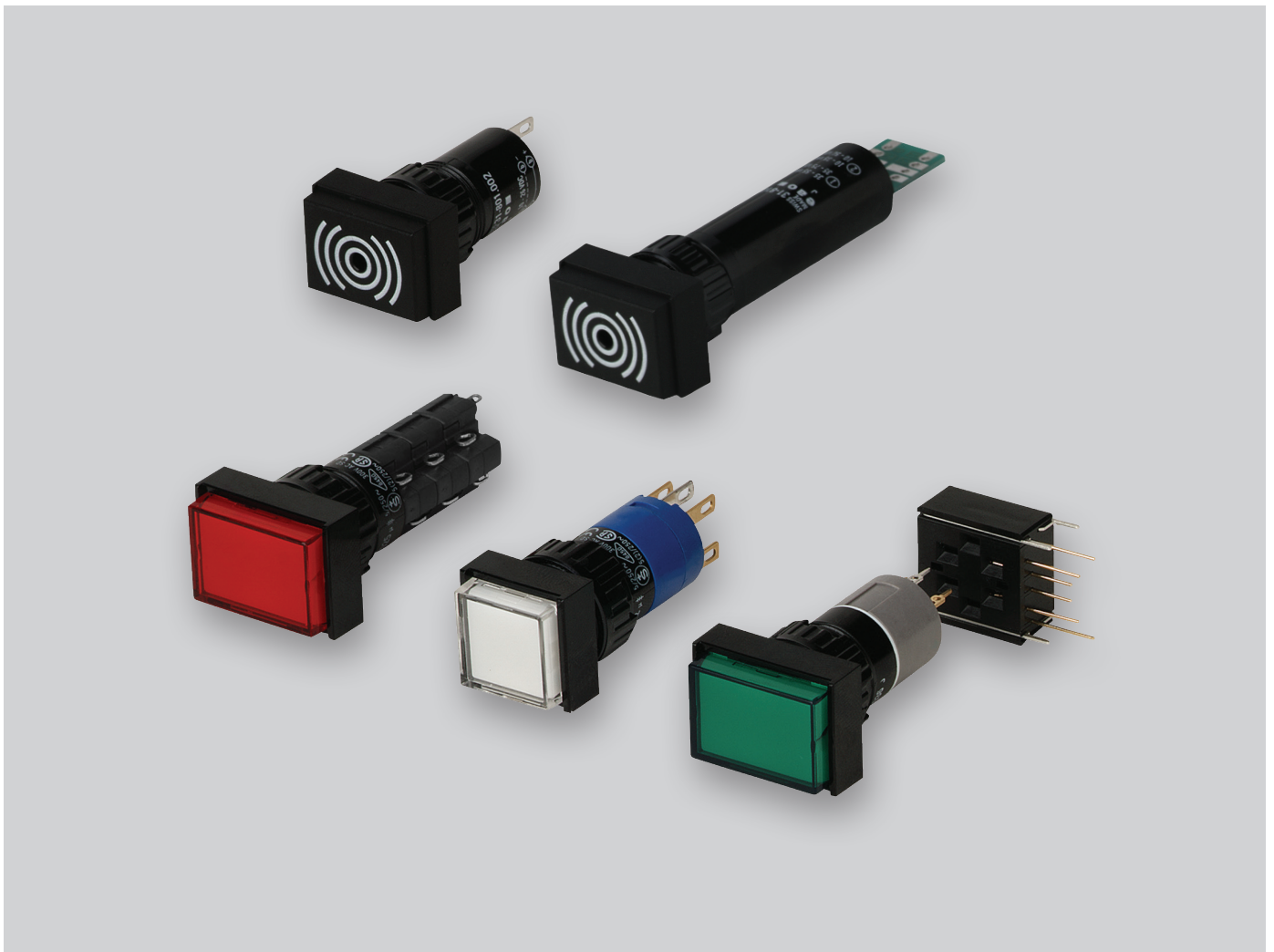
- Indicator
- Pushbutton
- Illuminated pushbutton
- Buzzer

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



Overview	
Raised design	
Indicator	4
Buzzer	6
Illuminated pushbutton	7
Accessoires	11
Drawings	23
Technical data	24
Marking	27
Guidelines for use	28
Index	29

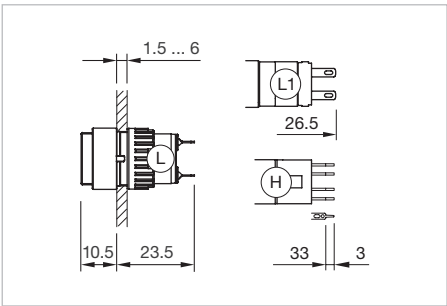
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31 Raised design

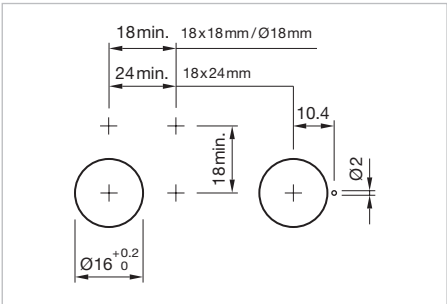
Indicator, IP 40



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

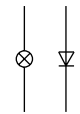
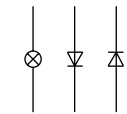
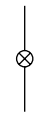
Each Part Number listed below includes all the black components shown in the 3D-drawing.

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

		Part No.	Component layout	Wiring diagram	Weight
Diode 1N4007		Terminal			
 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.	Compo- nent layout	Wiring dia- gram	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

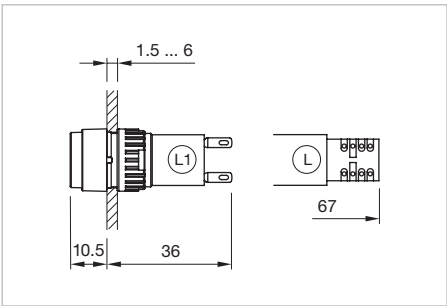
a-(x1) 3(+)  b+(x2) 4(-) Wiring diagram 1	a-(x1) 3(+) 1(+)  b+(x2) 4(-) 2(-) Wiring diagram 2	a-(x1)  b+(x2) Wiring diagram 3
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31 Raised design

Buzzer, IP 40

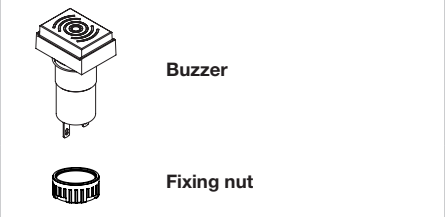


Product can differ from the current configuration.



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

Equipment consisting of (schematic overview)

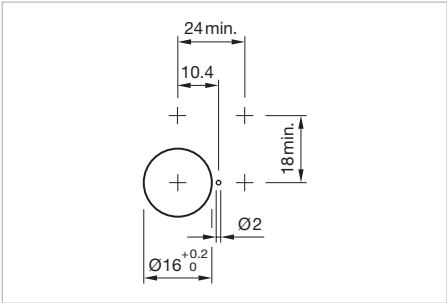


Each Part Number listed below includes all the black components shown in the 3D-drawing.

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

Additional Information

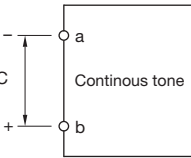
- Further information see «Technical data»



Mounting cut-outs [mm]

Operating voltage	Front cap	Terminal	Part No.	Wiring diagram	Weight
 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

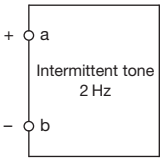
U = 10 - 26VDC



Continuous tone

Wiring diagram 1

Intermittent tone 2 Hz

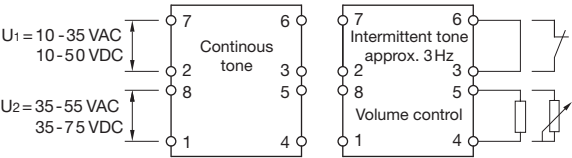


Intermittent tone 2 Hz

Wiring diagram 12

U₁ = 10 - 35 VAC
10 - 50 VDC

U₂ = 35 - 55 VAC
35 - 75 VDC



Continuous tone

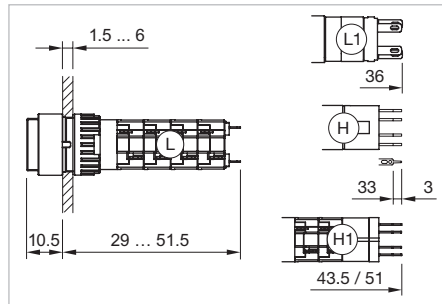
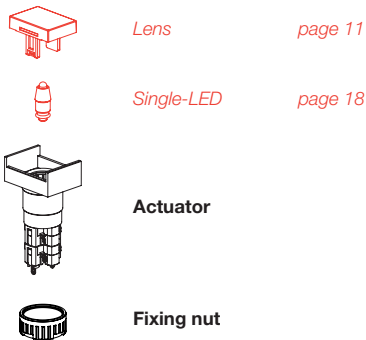
Intermittent tone approx. 3Hz

Volume control

Wiring diagram 12

Illuminated pushbutton, IP 40

Equipment consisting of (schematic overview)



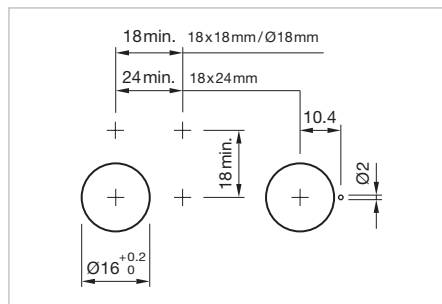
Dimensions [mm]
H = Universal terminal 2.0 x 0.5 mm,
H1 = Universal-Solder terminal,
L = Solder terminal,
L1 = Solder terminal 2.8 x 0.5 mm



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
 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
			C	Universal 2.0 x 0.5 mm	31-453.036	4	3	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
Snap-action switching element	1 NC		B	Universal 2.0 x 0.5 mm	31-456.036	4	1	0.007 kg
			B	Universal-Solder	31-709.0292	4	11	0.008 kg
			C	Universal-Solder	31-717.0292	4	12	0.008 kg
			B	Universal-Solder	31-710.0292	4	13	0.008 kg
			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
	2 NC + 2 NO	1	C	Solder	31-281.0252		17	0.006 kg
			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
			B	Solder	31-153.0252		25	0.010 kg
			C	Solder	31-283.0252		26	0.010 kg

31 Raised design

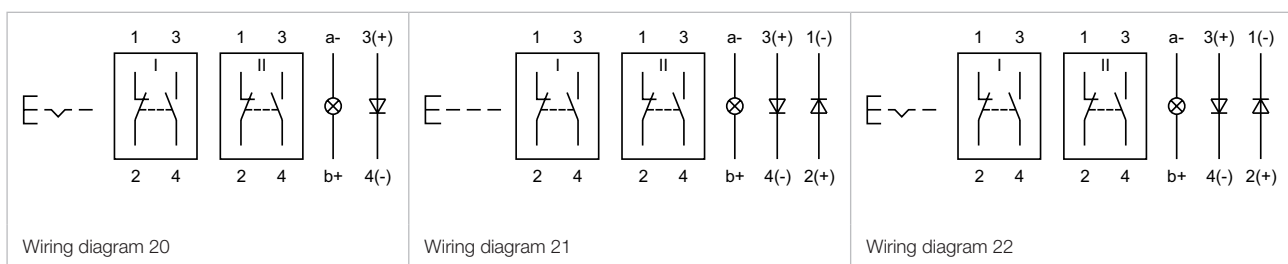
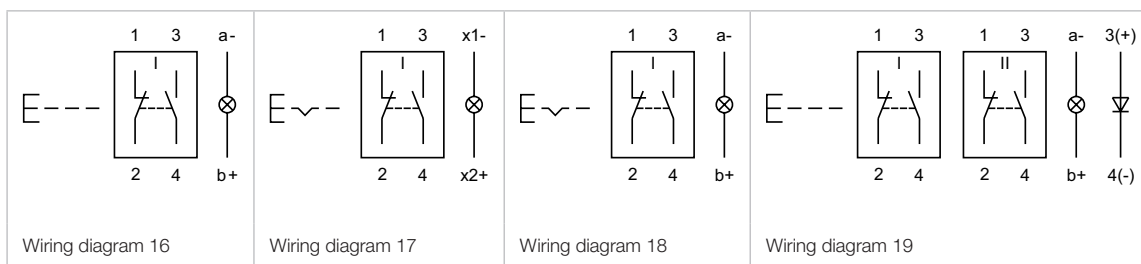
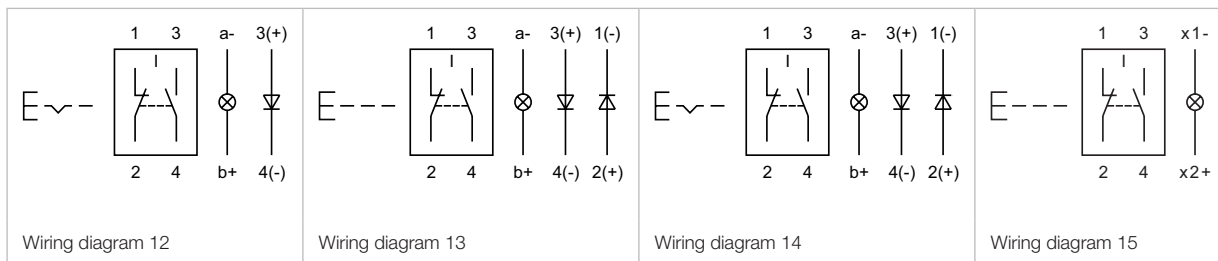
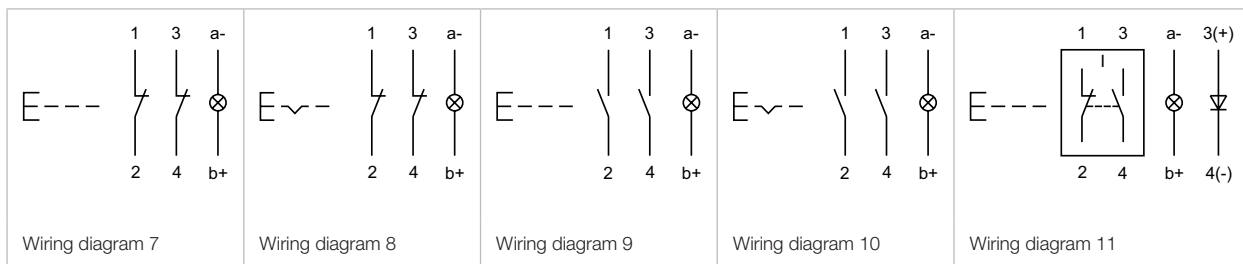
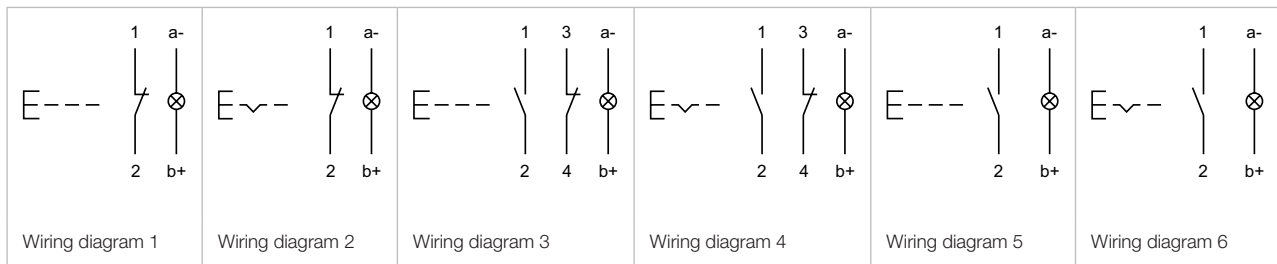
Switching system	Contacts	Diode 1N4007	Switching action	Terminal	Part No.	Compo- nent layout	Wiring diagram	Weight
Snap-action switching element	4 Ö + 4 S		B	Löt	31-154.0252		27	0.012 kg
			C	Solder	31-284.0252		28	0.012 kg
 Illuminated pushbutton actuator, Front dimension 18 x 24 mm								
Low-level 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
			C	Universal 2.0 x 0.5 mm	31-423.036	4	3	0.007 kg
	1 NC + 1 NO		B	Universal 2.0 x 0.5 mm	31-463.036	4	4	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.	Component 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

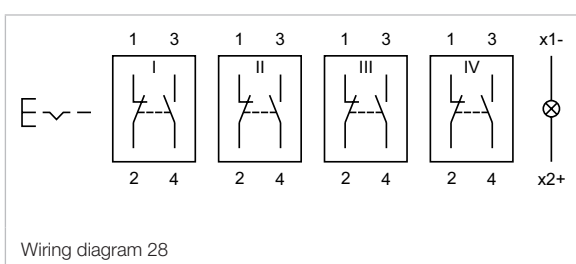
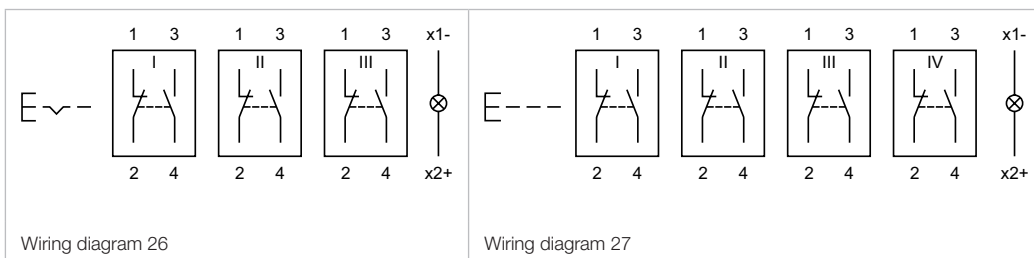
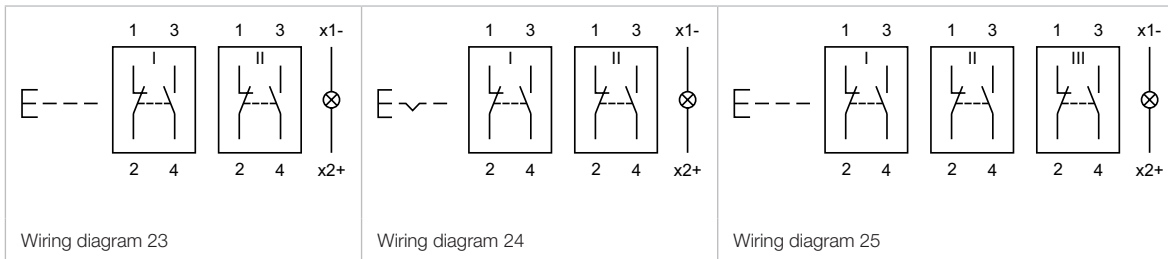
Contacts: NC = Normally closed, NO = Normally open

Switching action: B = Momentary, C = Maintain

The component layouts you will find from page 23



31 Raised design



Front

Lens plastic

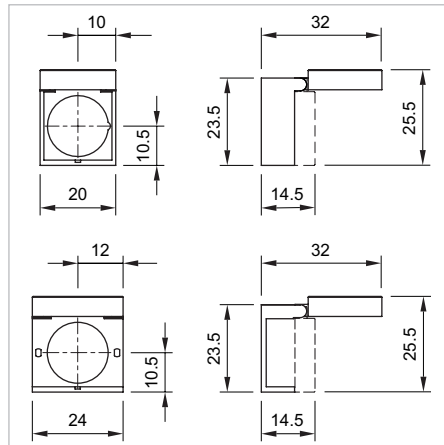
Product attribute	Dimension	Lens	Part No.	Weight
Lens plastic				
flat, illuminative	15.3 x 15.3 mm	smoked transparent	31-953.1	0.001 kg
		red transparent	31-953.2	0.001 kg
		orange transparent	31-953.3	0.001 kg
		yellow transparent	31-953.4	0.001 kg
		green transparent	31-953.5	0.001 kg
		blue transparent	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

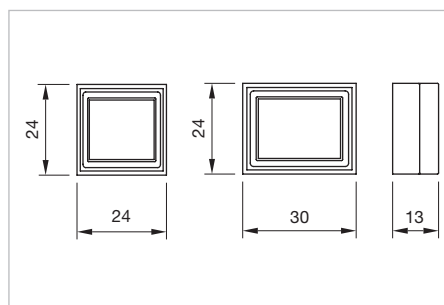


Dimensions [mm]

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



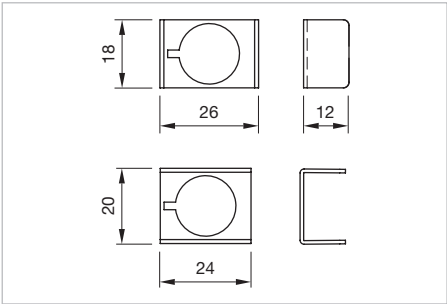
Dimensions [mm]

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

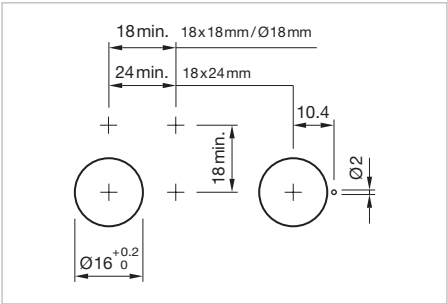
- Please note that bigger minimum distances are necessary



Dimensions [mm]

Product attribute	Dimension	Material	Colour	Part No.	Weight
 Protective guard narrow ends bent upwards, 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, 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]

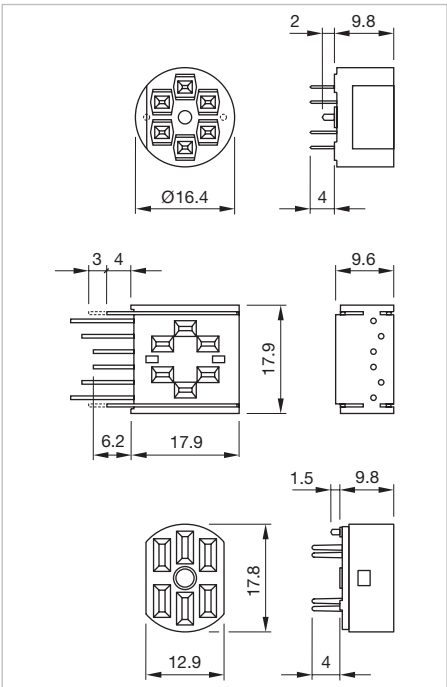
Dimension	Material	Colour	Part No.	Weight
 Blind plug				
18 x 18 mm	Plastic	black	01-948.0	0.001 kg
 Blind plug				
18 x 24 mm	Plastic	black	01-947.0	0.001 kg
 Blind plug				
Ø 18 mm	Plastic	black	01-949.0	0.001 kg

Rear side

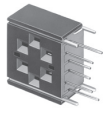
PCB plug-in base

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

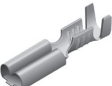


Dimensions [mm]

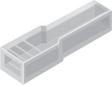
Product attribute	Pins	Terminal	Part No.	Component layout	Weight
 PCB plug-in base					
for low level switching element	axial	PCB	31-940	3	0.002 kg
 PCB plug-in base					
for low level switching element	right-angled	PCB	31-941	1	0.004 kg
 PCB plug-in base					
for snap-action switching element 2.8 mm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

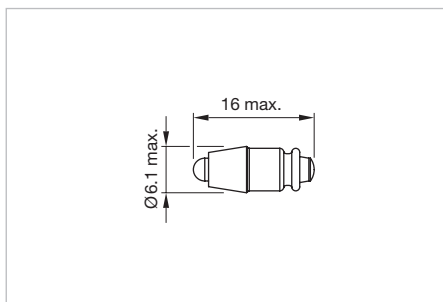
Part No.	Weight
 Terminal cover for snap-action switching element 16 01-929_579	0.010 kg

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
 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

31

Accessories

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

31

Accessories

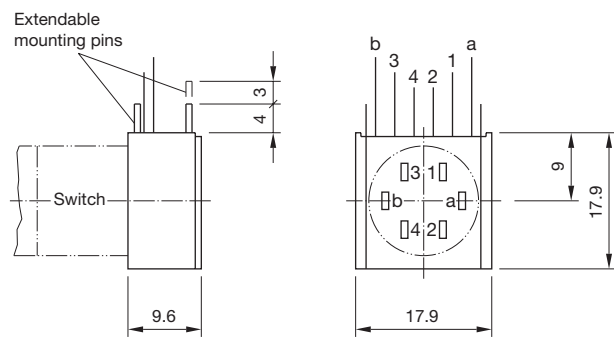
Dressing tool

Additional Information

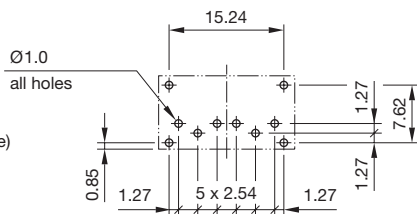
- For aligning buttons

Part No.	Weight
 Dressing tool	
01-906	0.03 kg

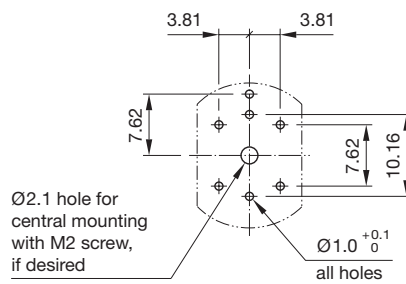
Drawings



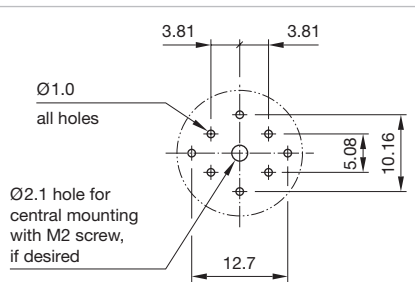
Drilling plan (solder side)



Component layout 1

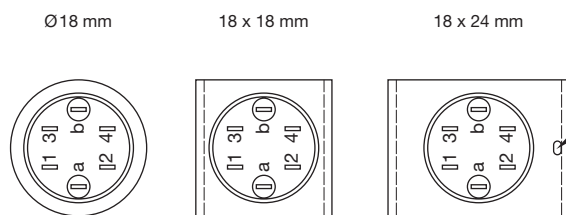


Component layout 2



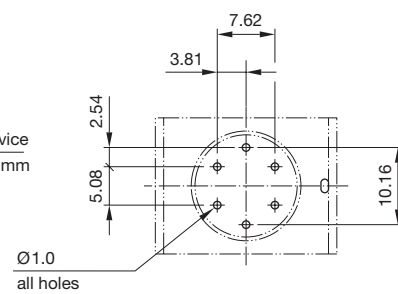
Component layout 3

Terminals (rearside)



Component layout 4

Drilling plan (solder side)



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:
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 $\mu\text{A}/\mu\text{V}$ 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. $< 100\text{ }\mu\text{s}$

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 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

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

Service temperature

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

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

01
02
03
04
10
14
17
18
19
22
31
41
44
51
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57
61
70
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84
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ST

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. 50Ncm

Electrical characteristics

Frequency (tone)
Approx. 2.8kHz

Interval frequency
approx. 3Hz

Sound pressure

88 dB (A) ± 8 dB at a distance of 0.1 m
Volume variable with a 1 M Ω 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. 50Ncm

Electrical characteristics

Frequency (tone)
ca. 2.0kHz

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 are filled 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

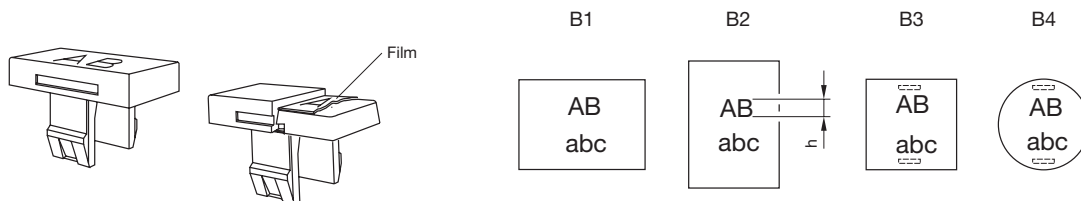
For larger series it is worth considering markings by means of hot stamping. We will be pleased to advise you. For letters and figures, typefaces with 2.5 mm, 3 mm and 4 mm are available.

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 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 0.2 mm. 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
			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



31 Application guidelines

Suppressor circuits

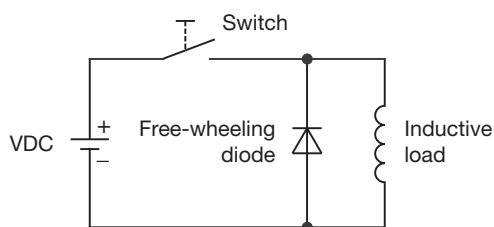
When switching inductive loads such as relays, DC motors, and DC solenoids, it is always important to absorb surges (e.g. with a diode) to protect the contacts. When these inductive loads are switched off, a counter emf can severely damage switch contacts and greatly shorten lifetime.

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.

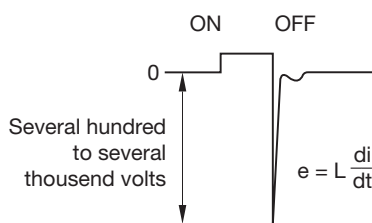
The free-wheeling diode should be chosen so that the reverse breakdown voltage is greater than the voltage driving the inductive load. The DC blocking voltage (V_R) of the free-wheeling diode can be found in the datasheet of a diode. The forward current should be equal or greater than the maximum current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



Index from Part No.

Part No.	Page	Part No.	Page	Part No.	Page
01-906	22	31-151.0252	7	31-902.3	12
01-907	21	31-152.0252	7	31-902.4	12
01-925	13	31-153.0252	7	31-902.5	12
01-926	14	31-154.0252	8	31-902.6	12
01-927	14	31-261.022	8	31-902.8	12
01-928	17	31-261.0252	8	31-902.9	12
01-929	17	31-262.0252	8	31-903.1	11
01-947.0	15	31-263.0252	8	31-903.2	11
01-948.0	15	31-264.0252	8	31-903.3	11
01-949.0	15	31-271.022	8	31-903.4	11
02-904.0	19	31-271.0252	8	31-903.5	11
02-904.1	19	31-272.0252	9	31-903.6	11
02-904.3	19	31-273.0252	9	31-903.7	11
02-904.7	19	31-274.0252	9	31-904.2	12
02-905	21	31-281.022	7	31-904.3	12
02-912.1	20	31-281.0252	7	31-904.4	12
02-912.2	20	31-282.0252	7	31-904.5	12
02-912.3	20	31-283.0252	7	31-904.6	12
02-912.4	20	31-284.0252	8	31-904.7	12
10-1306.1349	19	31-421.036	8	31-905.2	12
10-1307.1369	19	31-422.036	8	31-905.4	12
10-1309.1309	19	31-423.036	8	31-905.5	12
10-1310.1319	19	31-425.036	8	31-905.7	12
10-1311.1249	19	31-426.036	8	31-920	13
10-1312.1229	19	31-431.036	8	31-923	13
10-1313.1209	19	31-432.036	8	31-924.2	13
10-1313.1249	19	31-433.036	8	31-928	17
10-1316.1179	19	31-435.036	8	31-929	17
10-1316.1209	19	31-436.036	8	31-931.0	12
10-1319.1179	19	31-451.036	7	31-931.2	12
10-1319.1199	19	31-452.036	7	31-931.3	12
10-2J06.3142	18	31-453.036	7	31-931.4	12
10-2J06.3144	18	31-455.036	7	31-931.5	12
10-2J06.3145	18	31-456.036	7	31-931.6	12
10-2J06.3146	18	31-461.036	8	31-931.9	12
10-2J06.3149	18	31-463.036	8	31-933.1	12
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
10-2J09.1066	18	31-472.036	8	31-933.5	12
10-2J09.1069	18	31-473.036	8	31-933.6	12
10-2J12.1062	18	31-475.036	8	31-933.7	12
10-2J12.1064	18	31-481.036	7	31-935.2	12
10-2J12.1065	18	31-483.036	7	31-935.5	12
10-2J12.1066	18	31-485.036	7	31-935.7	12
10-2J12.1069	18	31-701.006	4	31-940	16
10-2J13.1062	18	31-702.006	4	31-941	16
10-2J13.1064	18	31-703.006	4	31-942	16
10-2J13.1065	18	31-704.006	4	31-945	17
10-2J13.1066	18	31-705.0292	8	31-946	17
10-2J13.1069	18	31-706.0292	8	31-951.0	11
10-2J19.1042	18	31-707.0292	8	31-951.2	11
10-2J19.1044	18	31-708.0292	8	31-951.3	11
10-2J19.1045	18	31-709.0292	7	31-951.4	11
10-2J19.1046	18	31-710.0292	7	31-951.5	11
10-2J19.1049	18	31-713.0292	8	31-951.6	11
10-A312.314A	19	31-714.0292	8	31-951.8	11
31-030.002	5	31-715.0292	8	31-951.9	11
31-030.005	5	31-716.0292	8	31-952.0	11
31-031.006	5	31-717.0292	7	31-953.1	11
31-040.002	4	31-718.0292	7	31-953.2	11
31-040.005	4	31-719.0292	7	31-953.3	11
31-041.006	4	31-744.0292	8	31-953.4	11
31-050.002	4	31-747.0292	8	31-953.5	11
31-050.005	4	31-748.0292	8	31-953.6	11
31-051.006	4	31-801.002	6	31-953.7	11
31-121.022	8	31-810.005	6	31-954.2	11
31-121.0252	8	31-901.0	12	31-954.3	11
31-122.0252	8	31-901.2	11	31-954.4	11
31-123.0252	8	31-901.3	11	31-954.5	11
31-124.0252	8	31-901.4	12	31-954.6	11
31-131.022	8	31-901.5	12	31-954.7	11
31-131.0252	8	31-901.6	12	31-955.2	11
31-132.0252	9	31-901.8	12	31-955.4	11
31-133.0252	9	31-901.9	12	31-955.5	11
31-134.0252	9	31-902.0	12	31-955.7	11
31-151.022	7	31-902.2	12	61-9740.0	21

