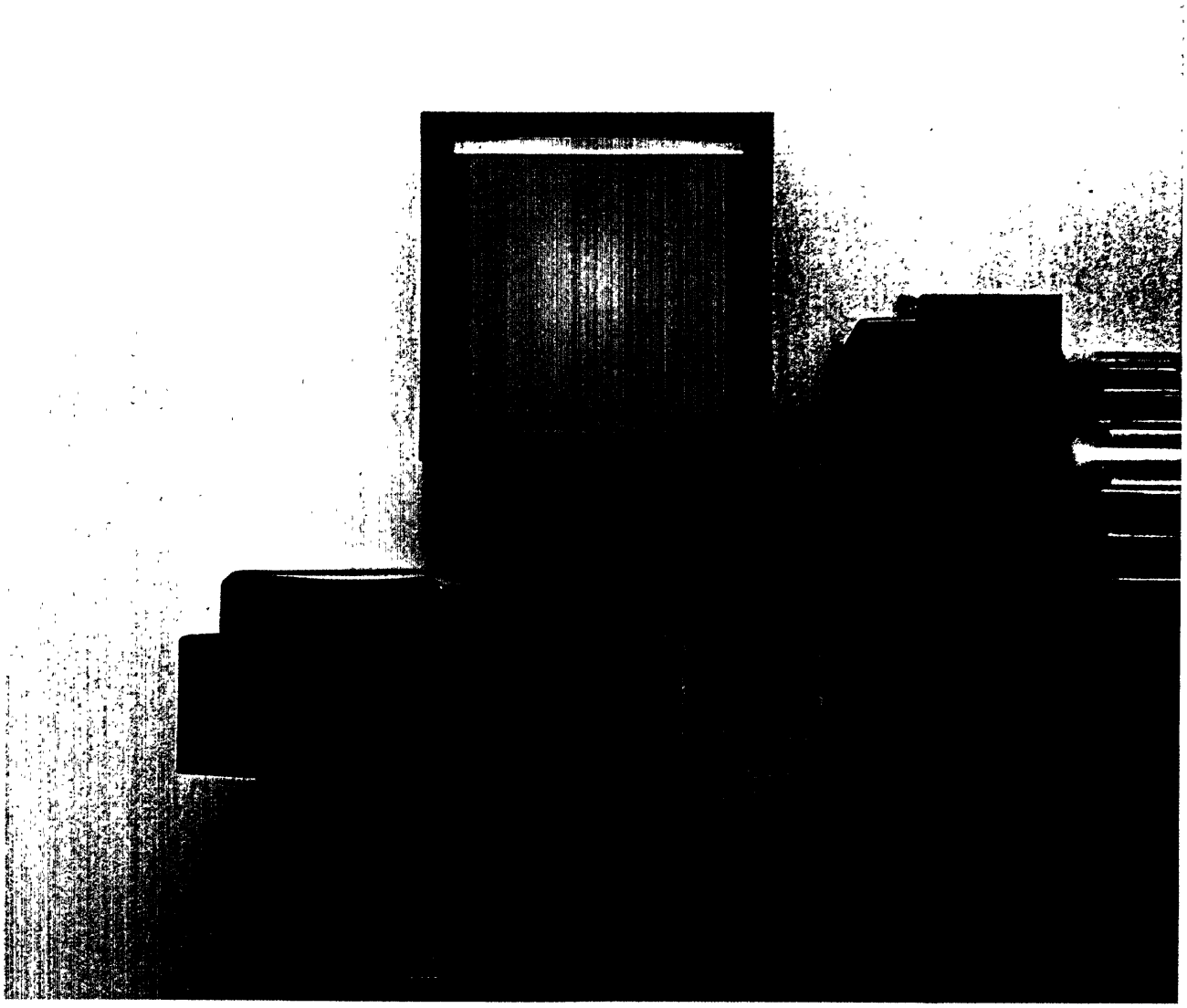
925-093 to 925-299

31/32



General Notes

The series 31 illuminated pushbuttons are equipped with snap-action or low-level switching elements.
For technical data see pages 2-4.
In addition to the standard contacts (gold-plated silver), silver contacts can also be ordered. The front dimensions of these units are 18 x 24 mm or 18 mm dia.
In addition to a number of illuminated pushbuttons, the customer can choose from a wide range of other units and accessories having the same front and mounting dimensions: indicators, keylock switches, flashers, segment displays, buzzers, illuminated pushbuttons with microfuse, etc.
(For keylock switches see series 51 or 61.)

Mounting

Mounting from the front through the mounting hole is assured even when the wiring has already been attached (mounting dimensions and spacing see pages 5-7).
The universal terminals of the low-level switching elements permit mounting on printed circuit boards (PCB).
These terminals are also suitable for dip soldering. 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.
All rectangular switches, as well as the square and round keylock switches are secured against rotation.

Lenses

The flat or concave lenses, made of polymethyl methacrylate, are obtainable in various colours, as well as translucent or transparent.

Marking

For engravings, hot stamping and film inserts, see under "Marking" on page 29.

Illumination

Perfect illumination of the different coloured lenses is assured by midget-grooved lamps T 1¾ (6-60 V).
If the supply voltage is above 60 V, an external dropping resistor or capacitor must be used. Multi-LED midget-grooved lamps T 1¾ (6, 12, 24, 48 V) are available in the colours red, yellow and green.
Due to the high surface temperature, resistors may not be soldered direct to the terminals of the pushbuttons.
See under "Lamp accessories" on page 22.

Position indication

When a switch with maintained action is actuated, the lens remains in the depressed position mechanically. The state of the switch is apparent at all times from the position of the lens.

How to order

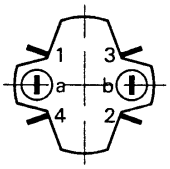
31-XXX.0XX
- XXX — Switch variant
- 0 — Contact material (1 = silver)
- XX — Type of terminals

31-9XX.X — Lens

Example:
- Illuminated pushbutton, round, with momentary action; gold-plated silver contact; 1 switching element
  31-131.025
- Lens, red
  31-933.2

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

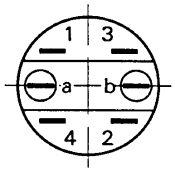
Snap-action switching element with soldering terminals at the sides



These elements can be stacked up to 4 elements per button.

Indicator	.005/.805
Illuminated pushbuttons and keylock switches with snap-action switching elements:	
– gold-plated silver contacts	.025/.825
– silver contacts, suitable for over 20 V	.015/.815

Snap-action switching element with axial plug-in/soldering terminals 2,8 mm



These elements cannot be stacked, hence only one element per button.

Indicator	.002/.802
Illuminated pushbuttons and keylock switches with snap-action switching elements:	
– gold-plated silver contacts	.022/.822
– silver contacts, suitable for over 20 V	.012/.812

Switching system

Self-cleaning, double-break, snap-action switching system. Can be used as double-throw switch with one normally closed or one normally open contact per element.

Contact material

– gold-plated silver
– silver, suitable for over 20 V

Travel

3 mm

Actuating force (measured at the lens)

2–5,5 N (200–550 g), depending on the number of switching elements

Switch rating

250 VAC, 5 A (p. f. = 1)
250 VAC, 3 A (p. f. = 0,3)

Switch rating AC, p. f. 0,7
as per AC 11 (IEC 337)

Voltage V	125	250
Current A	3	2

Switch rating DC (inductive), L : R = 30 ms
as per DC 11 (IEC 337)

Voltage V	24	60	110	220
Current A	2	0,7	0,2	0,1

Continuous current

I_{th_2} 5 A.
The maximum permissible current in continuous operation and at ambient temperature not exceeding the quoted maximum values.

Mechanical life

2 million operations

Rated insulation voltage

250 VAC/DC as per VDE 0110, Group B

Electric strength

2500 VAC, 50 Hz, 1 min between all terminals and earth, as per IEC 512-2-11.

Terminals

Snap-action element with soldering terminals at the sides:
Max. wire diameter: 2 wires of 0,8 mm each
Max. wire cross-section of stranded cable: 1 x 0,75 mm²
Snap-action element with axial plug-in terminals which can also be used as soldering terminals.
Plug-in terminals: 2,8 x 0,5 mm
Soldering terminal: max. wire diameter: 2 wires of 1 mm each
Max. wire cross-section of stranded cable: 2 x 0,75 mm²

Ambient temperature

–25 °C to +55 °C

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

Storage temperature

–40 °C to +85 °C

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/VDC. 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.

Contact material

gold-plated

Travel

3 mm

Actuating force (measured at the lens)

3–3,5 N (300–350 g)

Switch rating

10 µA/100 µV to 100 mA at 42 VAC/VDC

Contact resistance

Value as new ≤ 50 mΩ

Rebound time

typical < 100 µs

Mechanical life

5 million operations

Electric strength

2500 VAC, 50 Hz, 1 min between all terminals and earth, as per IEC 512-2-11.

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.
Max. wire diameter: 2 wires of 0,8 mm each
Max. wire cross-section of stranded cable: 1 × 0,75 mm²
Plug-in terminals: 2,0 × 0,5 mm

Ambient temperature

–25 °C to +55 °C

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

Storage temperature

–40 °C to +85 °C

Shockproof (single impact, semi-sinusoidal)

15 g for 11 ms as per IEC 68-2-27

Actuator case

Made of polytherimide, self-extinguishing

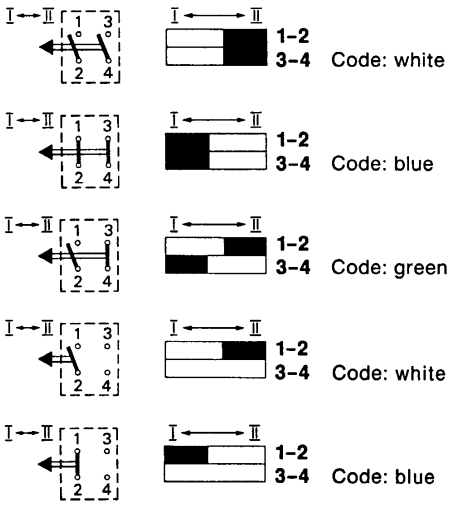
Switch case

Made of polysulfon, heat-resistant and self-extinguishing

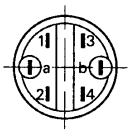
Degree of protection of front as per IEC 529

IP 40
IP 67 with sprayproof cover

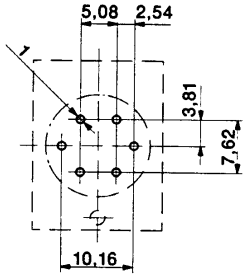
Switching function (colour code)



Terminals



PCB layout
conductor side



11.92

eao

Resistance to vibration (sinusoidal)

10 g at 10–2000 Hz, amplitude 1,5 mm as per IEC 68-2-6

Shockproof (single impacts, semi-sinusoidal)

15 g for 11 ms as per IEC 68-2-27

Actuator case

Made of polytherimide, self-extinguishing

Switch case

DAP (diallyl phthalate), heat-resistant and self-extinguishing

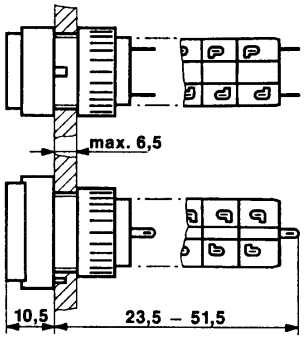
Degree of protection of front as per IEC 529

IP 40
IP 67 with sprayproof cover

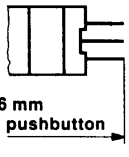
Approvals

- SEV 250 VAC/5 A
- CSA 300 VAC
- Lloyd's Marine Register
- UL
- Germanischer Lloyd
- NEMKO
- ÖVE
- Russian Marine Register
- VDE

Dimensions refer to page 9



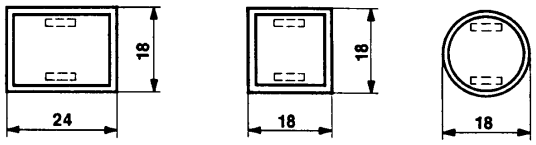
Snap-action switching element



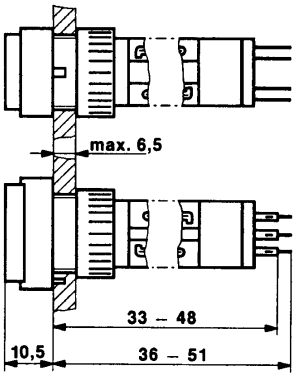
Plug-in terminals 2,8 mm

Indicator 26 mm
Illuminated pushbutton
36 mm

Indicator, illuminated pushbuttons

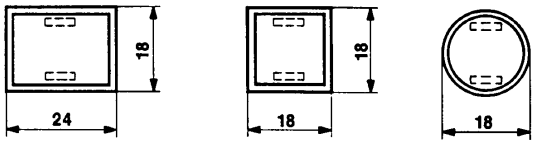


Dimensions refer to page 10

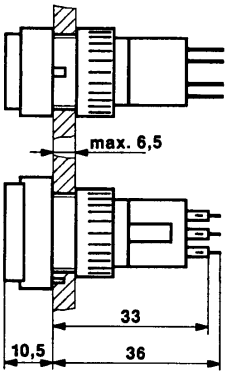


Diode matrix "M"

Indicator, illuminated pushbuttons

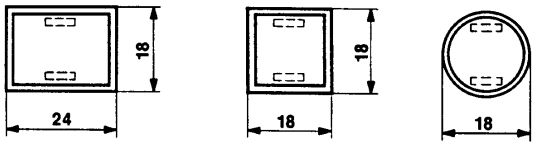


Dimensions refer to pages 12 + 13

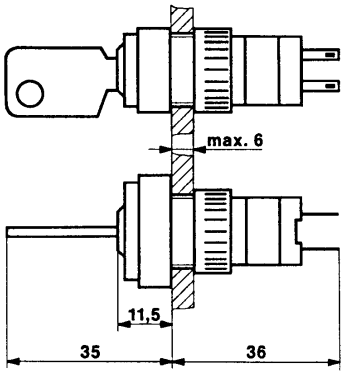


Low-level "LL"

Indicator, illuminated pushbuttons

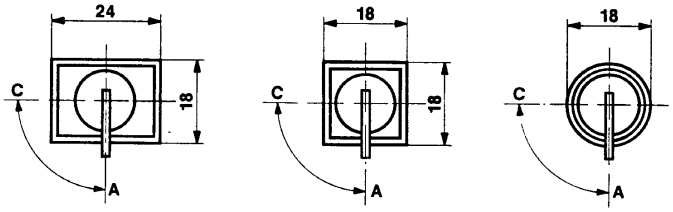


Dimensions refer to page 19

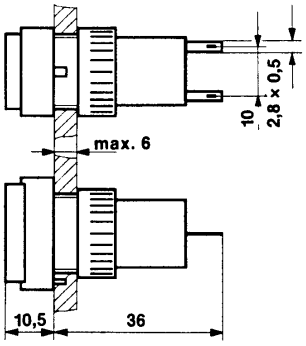


Snap-action switching element

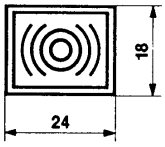
Keylock switches Series 32



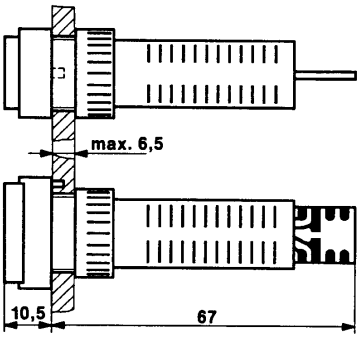
Dimensions refer to page 14



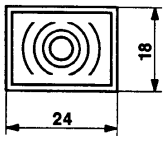
Buzzer



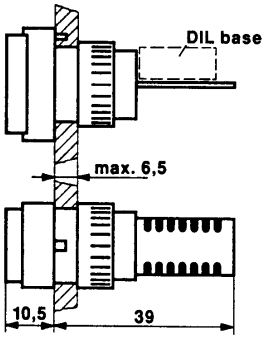
Dimensions refer to page 15



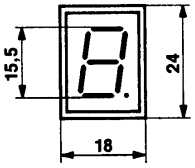
Buzzer



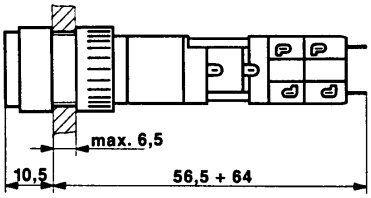
Dimensions refer to page 16



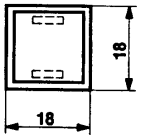
Segmental dispay



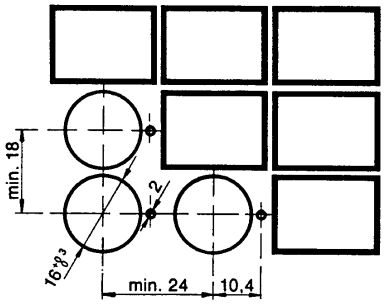
Dimensions refer to page 18

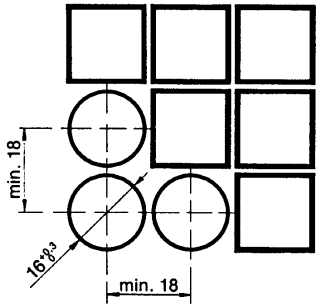


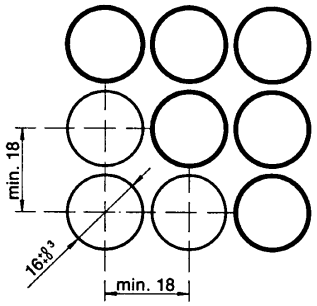
Illuminated pushbutton with microfuse



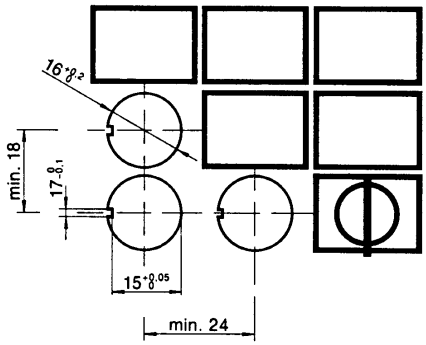
Indicators, illuminated pushbuttons

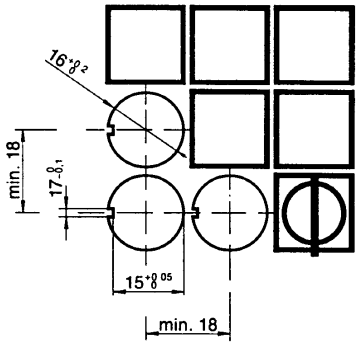


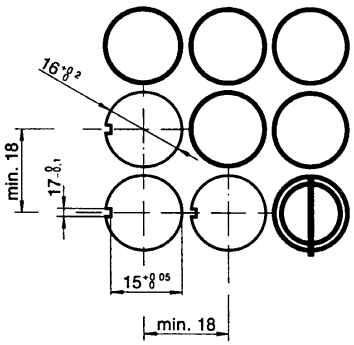


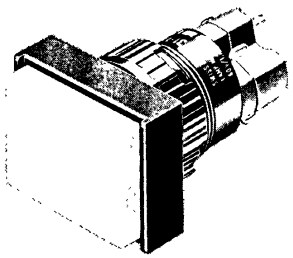


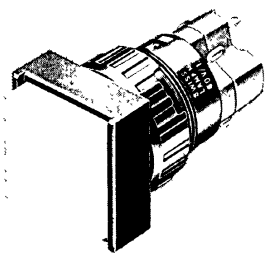
Keylock switches series 32

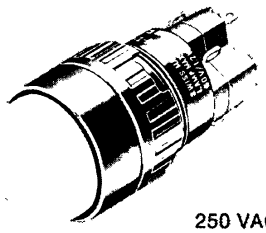








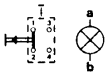
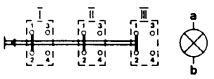
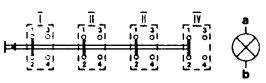
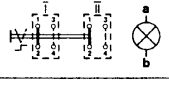
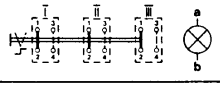
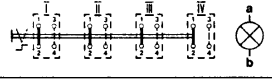




250 VAC, 5 A

Dimensions see page 5

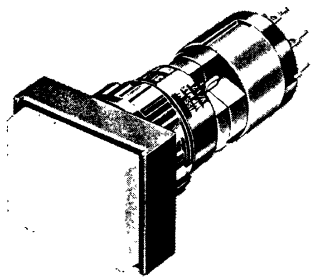
Order lenses separately see page 20

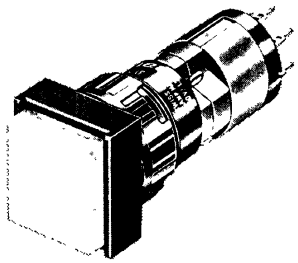
▱ 18 × 24 mm ▱ 18 × 18 mm ∅ 18 mm **Description**	Momentary action	Maintained action		Type No.	Case colour	Contact material	Terminals	Depth mm with soldering terminals	Depth mm with plug-in terminals
Indicator	–	–		▱ 31-040. ▱ 31-050. ∅ 31-030.	0 0 0	0 0 0		23,5	26,5
Illuminated pushbutton 1 switching element	×	–		▱ 31-121. ▱ 31-151. ∅ 31-131.	0 0 0			29	36
Illuminated pushbutton 2 switching elements	×	–		▱ 31-122. ▱ 31-152. ∅ 31-132.	0 0 0		5 5 5	36,5	
Illuminated pushbutton 3 switching elements	×	–		▱ 31-123. ▱ 31-153. ∅ 31-133.	0 0 0		5 5 5	44	
Illuminated pushbutton 4 switching elements	×	–		▱ 31-124. ▱ 31-154. ∅ 31-134.	0 0 0		5 5 5	51,5	
Illuminated pushbutton 1 switching element	–	×		▱ 31-261. ▱ 31-281. ∅ 31-271.	0 0 0			29	36
Illuminated pushbutton 2 switching elements	–	×		▱ 31-262. ▱ 31-282. ∅ 31-272.	0 0 0		5 5 5	36,5	
Illuminated pushbutton 3 switching elements	–	×		▱ 31-263. ▱ 31-283. ∅ 31-273.	0 0 0		5 5 5	44	
Illuminated pushbutton 4 switching elements	–	×		▱ 31-264. ▱ 31-284. ∅ 31-274.	0 0 0		5 5 5	51,5	

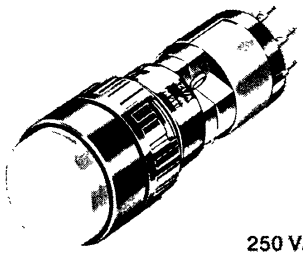
Silver = 1, gold-plated silver = 2

Plug-in terminals 2,8 × 0,5 mm = 2, soldering terminals = 5

For lamps see page 21





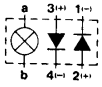
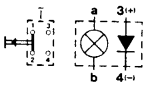
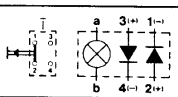
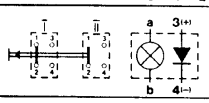
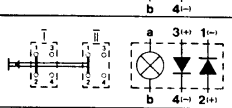
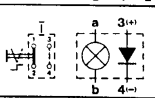
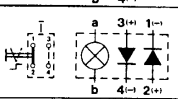
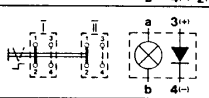
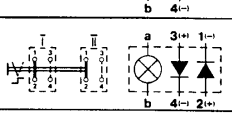


250 VAC, 5 A

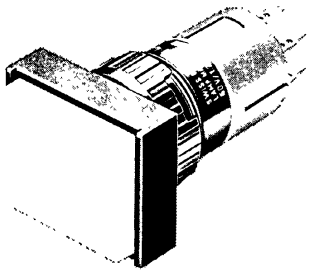
Dimensions see page 5

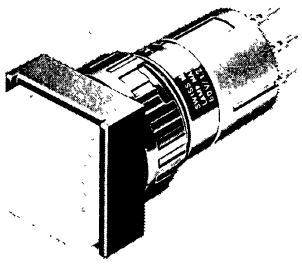
Order lenses separately see page 20

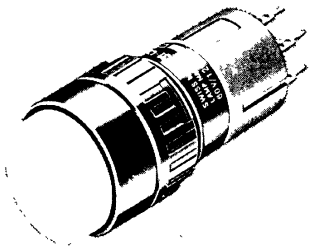
□ 18 × 24 mm
▱ 18 × 18 mm
⌀ 18 mm

Description	Number of diodes	Momentary action	Maintained action		Type No.	Case colour	Contact material	Terminals	Depth mm
Indicator with diodes	1	–	–		□ 31-701. ▱ 31-703. ⌀ 31-741.	0 0 0	0 0 0	6 6 6	36
	2	–	–		□ 31-702. ▱ 31-704. ⌀ 31-742.	0 0 0	0 0 0	6 6 6	36
Illuminated pushbutton 1 switching element and diodes	1	×	–		□ 31-705. ▱ 31-709. ⌀ 31-743.	0 0 0	2 2 2	9 9 9	43,5
	2	×	–		□ 31-706. ▱ 31-710. ⌀ 31-744.	0 0 0	2 2 2	9 9 9	43,5
Illuminated pushbutton 2 switching elements and diodes	1	×	–		□ 31-707. ▱ 31-711. ⌀ 31-745.	0 0 0	2 2 2	9 9 9	51
	2	×	–		□ 31-708. ▱ 31-712. ⌀ 31-746.	0 0 0	2 2 2	9 9 9	51
Illuminated pushbutton 1 switching element and diodes	1	–	×		□ 31-713. ▱ 31-717. ⌀ 31-747.	0 0 0	2 2 2	9 9 9	43,5
	2	–	×		□ 31-714. ▱ 31-718. ⌀ 31-748.	0 0 0	2 2 2	9 9 9	43,5
Illuminated pushbutton 2 switching elements and diodes	1	–	×		□ 31-715. ▱ 31-719. ⌀ 31-749.	0 0 0	2 2 2	9 9 9	51
	2	–	×		□ 31-716. ▱ 31-720. ⌀ 31-750.	0 0 0	2 2 2	9 9 9	51

For lamps see page 21



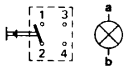
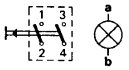
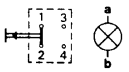
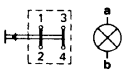
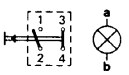




42 VAC/VDC, 100 mA

Dimensions see page 5

Order lenses separately see page 20

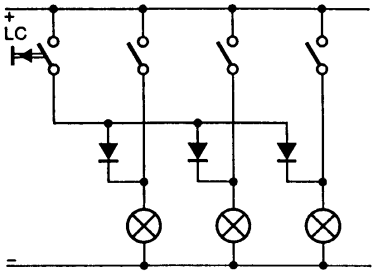
☐ 18 × 24 mm ☐ 18 × 18 mm ∅ 18 mm **Description**	Momentary action	Maintained action		Type No.	Case colour	Contact material	Terminals	Depth mm
Indicator (The total length is the same as that of the illuminated pushbutton)	–	–		☐ 31-041. ☐ 31-051. ∅ 31-031.	0 0 0	0 0 0	6 6 6	36
Illuminated pushbutton 1 normally open contact	×	–		☐ 31-425. ☐ 31-455. ∅ 31-435.	0 0 0	3 3 3	6 6 6	36
Illuminated pushbutton 2 normally open contacts	×	–		☐ 31-421. ☐ 31-451. ∅ 31-431.	0 0 0	3 3 3	6 6 6	36
Illuminated pushbutton 1 normally closed contact	×	–		☐ 31-426. ☐ 31-456. ∅ 31-436.	0 0 0	3 3 3	6 6 6	36
Illuminated pushbutton 2 normally closed contacts	×	–		☐ 31-422. ☐ 31-452. ∅ 31-432.	0 0 0	3 3 3	6 6 6	36
Illuminated pushbutton 1 normally closed contact 1 normally open contact	×	–		☐ 31-423. ☐ 31-453. ∅ 31-433.	0 0 0	3 3 3	6 6 6	36

For lamps see page 21

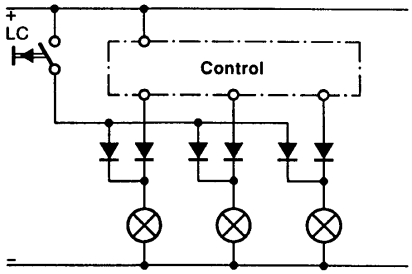
With indicators and illuminated pushbuttons equipped with diodes, the user is able to perform a lamp check or wire an alarm circuit simply with a considerable saving of space.

Applications:

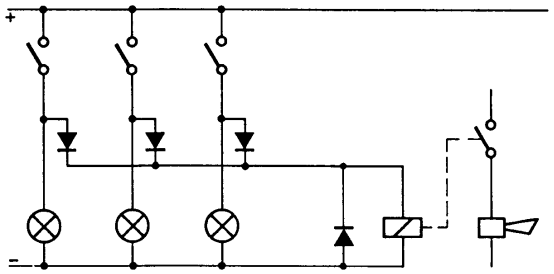
Lamp check



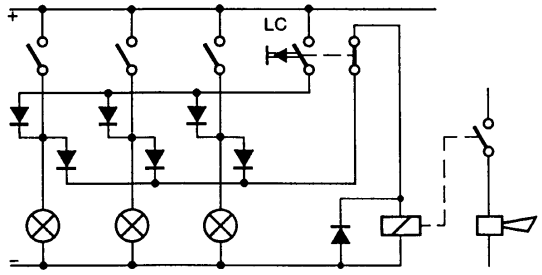
Lamp check with blocking diodes



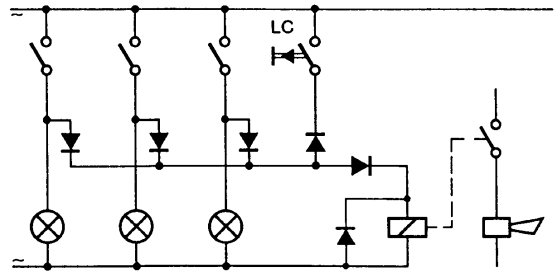
Alarm circuit from fault annunciating system



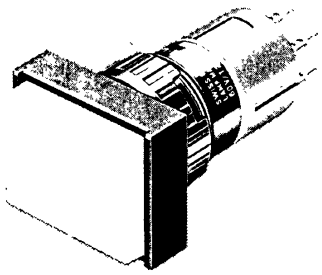
Lamp check and alarm circuit

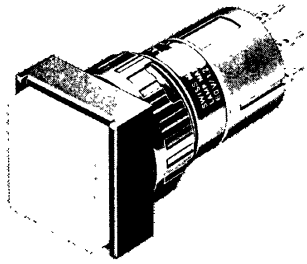


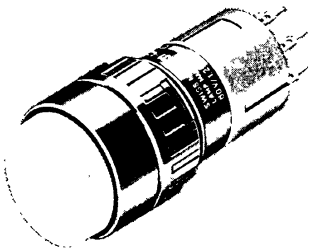
Lamp check and alarm circuit with only one diode and AC voltage



LC = Lamp check



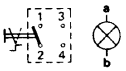
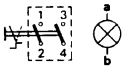
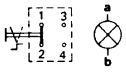
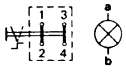
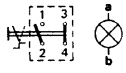




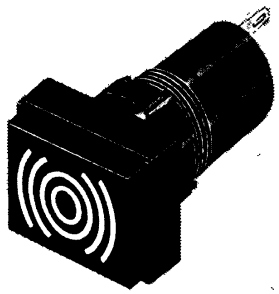
42 VAC/VDC, 100 mA

Order lenses separately
see page 20

Dimensions see page 5

☐ 18 × 24 mm ☐ 18 × 18 mm ∅ 18 mm **Description**	Momentary action	Maintained action		Type No.	Case colour	Contact material	Terminals	Depth mm
Illuminated pushbutton 1 normally open contact	–	×		☐ 31-465. ☐ 31-485. ∅ 31-475.	0 0 0	3 3 3	6 6 6	36
Illuminated pushbutton 2 normally open contacts	–	×		☐ 31-461. ☐ 31-481. ∅ 31-471.	0 0 0	3 3 3	6 6 6	36
Illuminated pushbutton 1 normally closed contact	–	×		☐ 31-466. ☐ 31-486. ∅ 31-476.	0 0 0	3 3 3	6 6 6	36
Illuminated pushbutton 2 normally closed contacts	–	×		☐ 31-462. ☐ 31-482. ∅ 31-472.	0 0 0	3 3 3	6 6 6	36
Illuminated pushbutton 1 normally closed contact 1 normally open contact	–	×		☐ 31-463. ☐ 31-483. ∅ 31-473.	0 0 0	3 3 3	6 6 6	36

For lamps see page 21



Dimensions see page 6

⍁ 18 x 24 mm

Description			Type No.	Depth mm
Buzzer, continuous and intermittent tone	10–26 VDC	(–) a——b (+) Continuous tone (+) a.....b (–) Intermittent tone 	31–801.002	36

Technical data

Acoustic data

Sound pressure 95 db ± 5 at a distance of 0,1 m
Sound frequency approx. 2,0 kHz
Interval frequency 4 Hz

Electrical data

Operating voltage: 10–26 VDC
Working current: ≤ 30 mA

Mechanical data

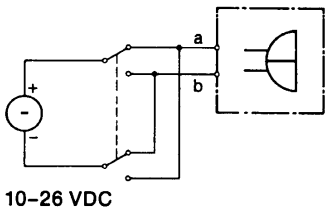
Dimensions of front: 18 x 24 mm
Mounting hole: 16 mm dia.
Back panel depth: 36 mm
Terminals: Plug-in terminals 2,8 x 0,5 mm
Degree of protection: IP 40 as per IEC 529

Materials

Case: polyetherimide, self-extinguishing

Storage and operating temperature: –25 °C to +55 °C

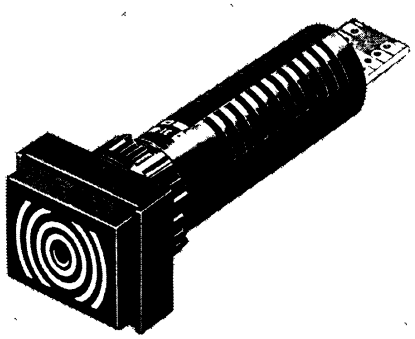
Application



10–26 VDC

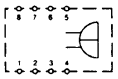
Depending on how the terminals are connected, the buzzer can operate with a continuous tone a(–) b(+) or with intermittent tone a(+) b(–).

Note: For mounting on PCB use plug-in base 31–942.



Dimensions see page 6

☐ 18 x 24 mm

Description			Type No.	Depth mm
Buzzer, continuous and intermittent tone	10–55 VAC 10–75 VDC		31–810.005	67

Technical data

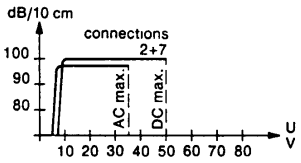
Sound pressure

90 db ± 5 at a distance of 0,1 m
Volume variable with a 1 MΩ/potentiometer or corresponding fixed resistor.

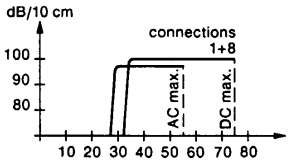
Frequency (tone)

appr. 2,8 kHz

Supply voltage I



Supply voltage II



Current consumption

typical 25 mA AC
typical 15 mA DC

Ambient temperature

–25 °C to +55 °C

Storage temperature

–40 °C to +85 °C

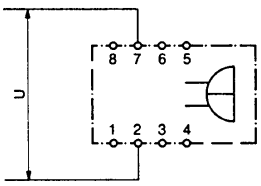
System

- Contactless electronic buzzer
- With IC oscillator

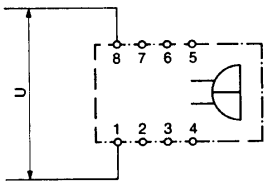
Features

- Low power consumption
- Wide voltage range
- No mechanical contacts
- Rugged construction

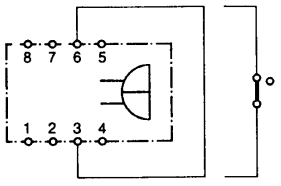
Typical applications



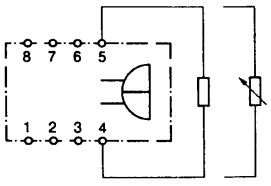
1. Supply voltage I
Continuous tone
U = 10–35 VAC
U = 10–50 VDC



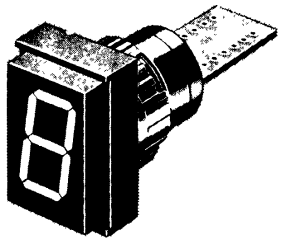
2. Supply voltage II
Continuous tone
U = 35–55 VAC
U = 35–75 VDC



3. Intermittent tone
Interval appr. 3 Hz

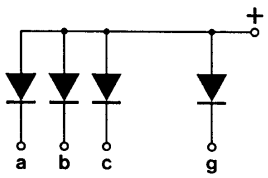
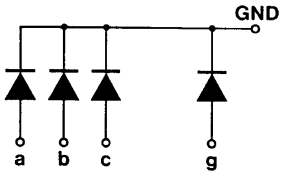


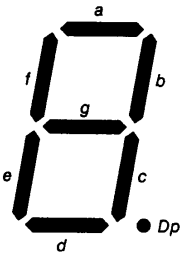
4. Volume control

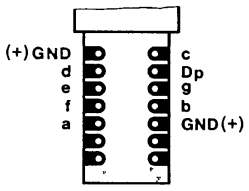


Dimensions see page 7

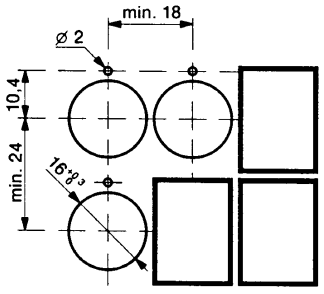
☐ 18 x 24 mm

Description	Connections	Type No.	Case colour	Contact material	Terminals	Depth mm
This segmental display contains a seven-segment GA-P element including decimal point with common anode. It should be energized with current limitation in 7-segment code (e.g. switch, semiconductor driver).		31-022.	0	0	5	39
This segmental display contains a seven-segment GA-P element including decimal point with common cathode. It should be energized with current limitation in 7-segment code (e.g. switch, semiconductor driver).		31-023.	0	0	5	39





Connections for DIL base

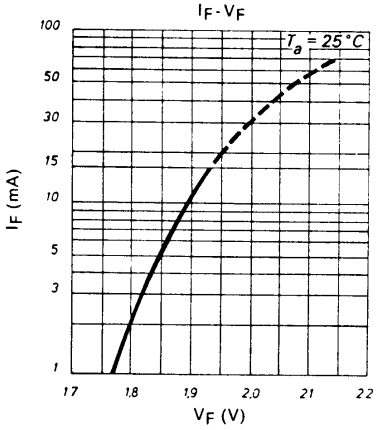


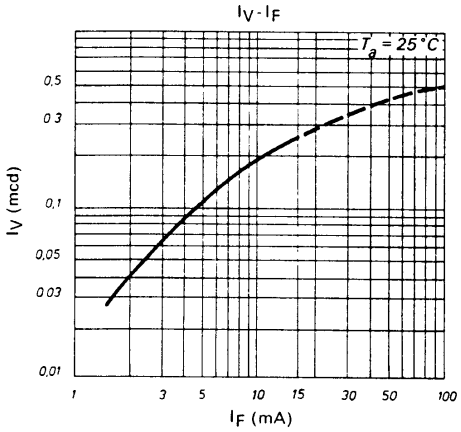
11.92

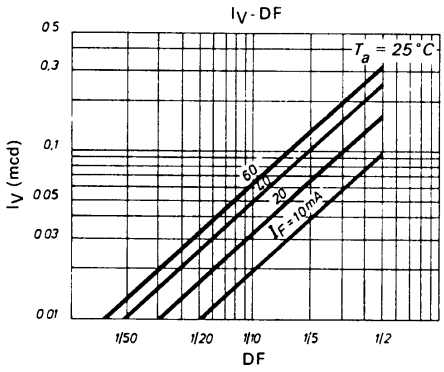
eao

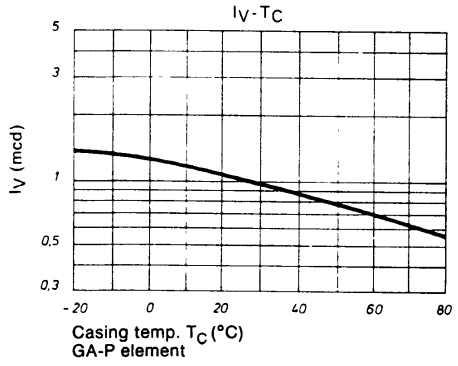
Technical data T_a = 25 °C

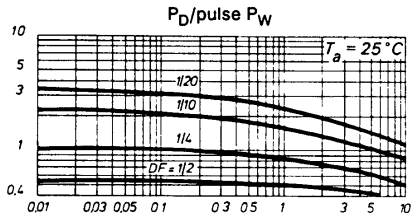
	symbol	min.	typ.	max.	unit	conditions
Continuous current	I_F			15	mA	per segment, Dp
Pulse current	I_{FP}			80	mA	P_W = 1 ms, DF = 1/10
Forward voltage	V_F	1.8	1.9	2.4	V	I_F = 15 mA
Blocking voltage	BV_R			3	V	I_R = 5.0 µA max.
Light intensity	I_V	0.04	0.11		mcd	I_F = 5 mA
Power loss	P_D			350	mW	7 Segm. + Dp
Temp. coeff. of V_F	TC_{VF}		-2		mV/°C	
Ambient temperature	T_a	-20		+75	°C	



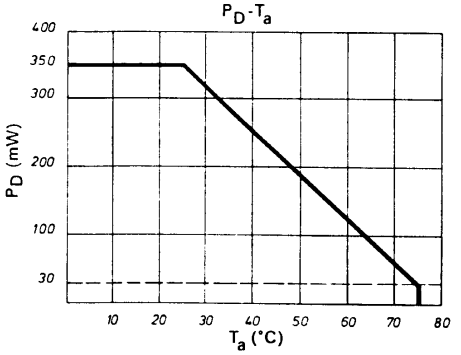


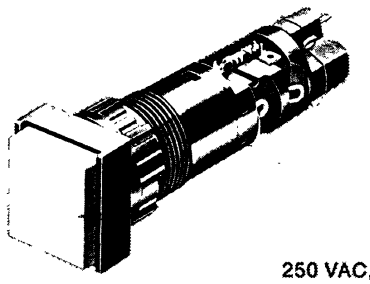






DF = duty cycle = $\frac{\text{pulse duration}}{\text{cycle duration}}$



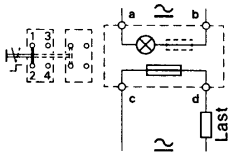
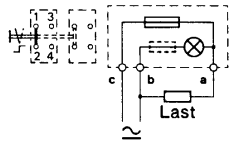
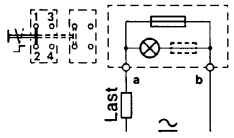


250 VAC, 5 A

Dimensions see page 7

Order lenses separately see page 20

⍁ 18 x 18 mm

Description	Lamp voltage	Maintained action		Type No.	Case colour	Contact material	Terminals	Depth mm
Separate circuits between microfuse and lamp Illuminated pushbutton 1 switching element	6– 60 V	x		31-201.	0	2	5	56,5
Illuminated pushbutton 2 switching elements	6– 60 V	x		31-202.	0	2	5	64
Operating indicator Lamp goes out when fuse blows Illuminated pushbutton 1 switching element	6– 60 V	x		31-207.	0	2	5	56,5
Illuminated pushbutton 2 switching elements	6– 60 V	x		31-208.	0	2	5	64
Interruption indicator Lamp lights when fuse blows Illuminated pushbutton 1 switching element	6– 60 V	x		31-213.	0	2	5	56,5
Illuminated pushbutton 2 switching elements	6– 60 V	x		31-214.	0	2	5	64

Technical data

- Microfuse: 5 dia. x 20 mm
- Rated voltage: max. 250 V
- Rated current: max. 6,3 A fast

For lamps see page 21

11.92

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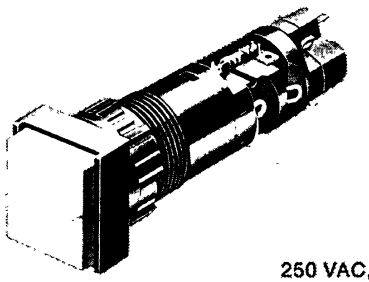
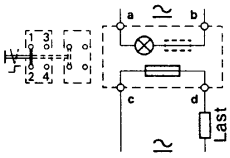
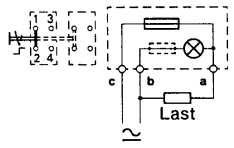
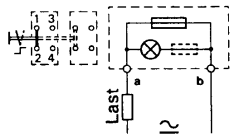


250 VAC, 5 A

Dimensions see page 7

Order lenses separately see page 20

☐ 18 x 18 mm

Description	Lamp voltage	Maintained action		Type No.	Case colour	Contact material	Terminals	Depth mm
Separate circuits between microfuse and lamp Illuminated pushbutton 1 switching element	6– 60 V	×		31-201.	0	2	5	56,5
Illuminated pushbutton 2 switching elements	6– 60 V	×		31-202.	0	2	5	64
Operating indicator Lamp goes out when fuse blows Illuminated pushbutton 1 switching element	6– 60 V	×		31-207.	0	2	5	56,5
Illuminated pushbutton 2 switching elements	6– 60 V	×		31-208.	0	2	5	64
Interruption indicator Lamp lights when fuse blows Illuminated pushbutton 1 switching element	6– 60 V	×		31-213.	0	2	5	56,5
Illuminated pushbutton 2 switching elements	6– 60 V	×		31-214.	0	2	5	64

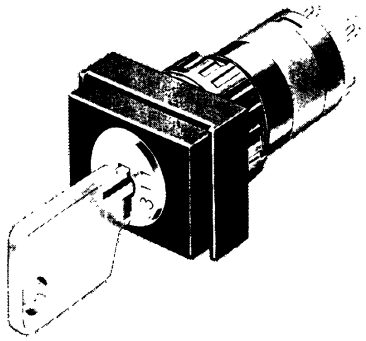
Technical data

- Microfuse: 5 dia. x 20 mm
- Rated voltage: max. 250 V
- Rated current: max. 6,3 A fast

For lamps see page 21

11.92

eao



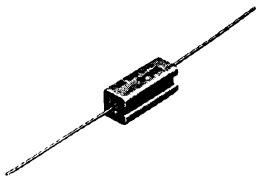
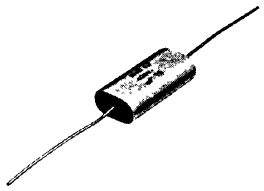
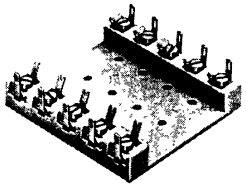
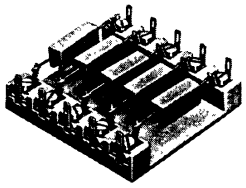
Dimensions see page 6

▱ 18 × 24 mm ▱ 18 × 18 mm ∅ 18 mm **Description**		Key removable in position			Type No.	Case colour	Contact material	Terminals	Depth mm
Keylock switch Position A basic position Position C maintained action 1 switching element		A	C		▱ 32-195. ▱ 32-155. ∅ 32-135.	0 0 0	1 1 1	2 2 2	36
Keylock switch Position A basic position Position C maintained action 1 switching element		A			▱ 32-295. ▱ 32-255. ∅ 32-235.	0 0 0	1 1 1	2 2 2	36
Keylock switch Position A basic position Position C maintained action 1 switching element			C		▱ 32-395. ▱ 32-355. ∅ 32-335.	0 0 0	1 1 1	2 2 2	36

Silver = 1
Plug-in terminals 2,8 × 0,5 mm = 2

Description	Colour ● opaque	□/ 15,2 x 21,2 mm Type No.	□/ 15,2 x 15,2 mm Type No.	Ø 15,8 mm Type No.	
Flat, **translucent lens** with translucent support	● black	31-901.0	31-951.0	31-931.0	
	red	31-901.2	31-951.2	31-931.2	
	orange	31-901.3	31-951.3	31-931.3	
	yellow	31-901.4	31-951.4	31-931.4	
	green	31-901.5	31-951.5	31-931.5	
	blue	31-901.6	31-951.6	31-931.6	
	● grey	31-901.8	31-951.8	31-931.8	
	white	31-901.9	31-951.9	31-931.9	
Concave, **translucent lens** with translucent support	● black	31-902.0	31-952.0		
	red	31-902.2	31-952.2		
	orange	31-902.3	31-952.3		
	yellow	31-902.4	31-952.4		
	green	31-902.5	31-952.5		
	blue	31-902.6	31-952.6		
	● grey	31-902.8	31-952.8		
	white	31-902.9	31-952.9		
Flat, **transparent lens** with translucent support (for film insert and LED)	smoked	31-903.1	31-953.1	31-933.1	
	red	31-903.2	31-953.2	31-933.2	
	orange	31-903.3	31-953.3	31-933.3	
	yellow	31-903.4	31-953.4	31-933.4	
	green	31-903.5	31-953.5	31-933.5	
	blue	31-903.6	31-953.6	31-933.6	
	clear	31-903.7	31-953.7	31-933.7	
Concave, **transparent lens** with translucent support (for film insert and LED)	red	31-904.2	31-954.2		
	orange	31-904.3	31-954.3		
	yellow	31-904.4	31-954.4		
	green	31-904.5	31-954.5		
	blue	31-904.6	31-954.6		
	clear	31-904.7	31-954.7		
Flat, **transparent lens** with transparent support	red	31-905.2	31-955.2	31-935.2	
	yellow	31-905.4	31-955.4	31-935.4	
	green	31-905.5	31-955.5	31-935.5	
	clear	31-905.7	31-955.7	31-935.7	
Concave, **transparent lens** with transparent support	red	31-906.2	31-956.2		
	yellow	31-906.4	31-956.4		
	green	31-906.5	31-956.5		
	clear	31-906.7	31-956.7		

Description	Lamp voltage	Power consumption		Type No.	
Filament lamp midget-grooved T1¾	6,3 V	200 mA		31-963.0	
	14 V	80 mA		31-963.1	
	28 V	40 mA		31-963.2	
	36 V	30 mA		31-963.5	
	48 V	25 mA		31-963.3	
	60 V	20 mA		31-963.4	
Multi-LED midget-grooved T1¾ (6 chips) with built-in blocking diode	6 V	45 mA	red	31-968.02	
			yellow	31-968.04	
Recommended: transparent lens with translucent support should be used			green	31-968.05	
	12 V	25 mA	red	31-968.12	
			yellow	31-968.14	
			green	31-968.15	
	24 V	12,5 mA	red	31-968.22	
			yellow	31-968.24	
			green	31-968.25	
	48 V	12,5 mA	red	31-968.42	
			yellow	31-968.44	
(Lamp connection a = cathode)			green	31-968.45	

Description		Type No.	
Series resistor to reduce the lamp voltage. Use with 60 V/20 mA lamp rating	110 V 2,7 kΩ 125 V 3,3 kΩ 145 V 4,7 kΩ 230–240 V 10 kΩ	02-904.0 02-904.1 02-904.3 02-904.7	
Capacitor to reduce the lamp voltage. Use with 60 V/20 mA lamp rating, 50 Hz	230 V 0,27 µF	02-917.0	
Empty **terminal plate** for wiring resistors or capacitors	5 spaces 10 spaces 15 spaces 20 spaces	02-912.1 02-912.2 02-912.3 02-912.4	
Terminal plate fitted with resistors or capacitors	2,7 kΩ 110/60 V 5 spaces 10 spaces 15 spaces 20 spaces 3,3 kΩ 125/60 V 5 spaces 10 spaces 15 spaces 20 spaces 10 kΩ 230–240/60 V 5 spaces 10 spaces 15 spaces 20 spaces 0,27 µF 230/60 V 5 spaces 10 spaces 15 spaces 20 spaces	 02-913.10 02-913.20 02-913.30 02-913.40 02-913.11 02-913.21 02-913.31 02-913.41 02-913.17 02-913.27 02-913.37 02-913.47 02-914.10 02-914.20 02-914.30 02-914.40	

05.95

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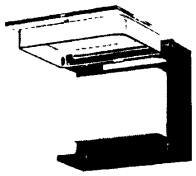
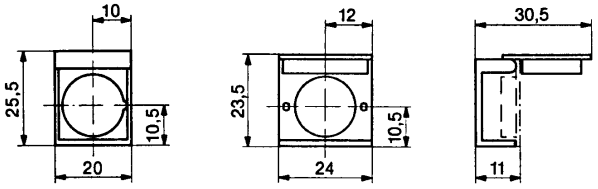
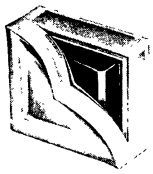
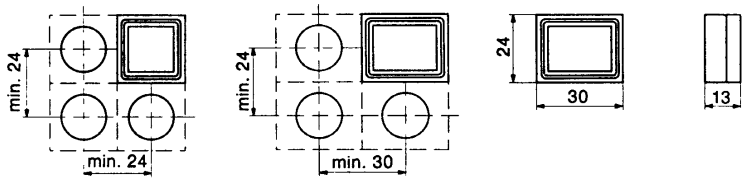
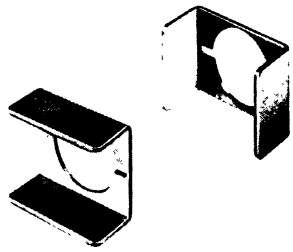
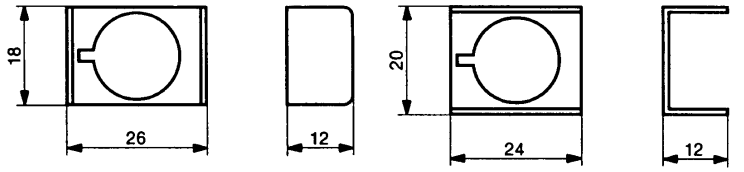
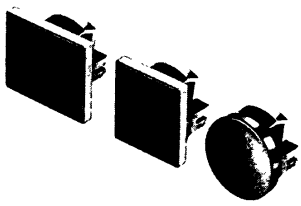
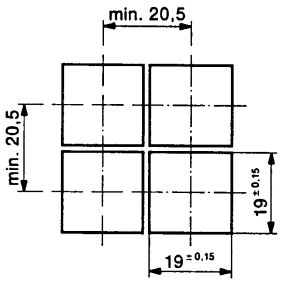
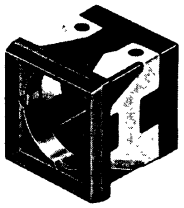
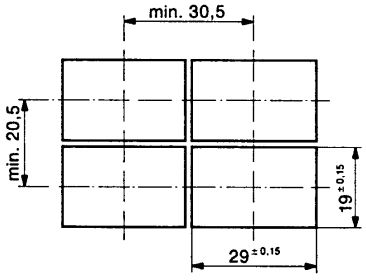
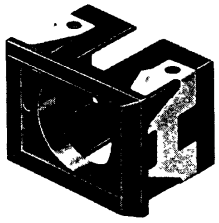
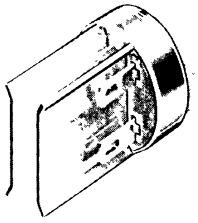
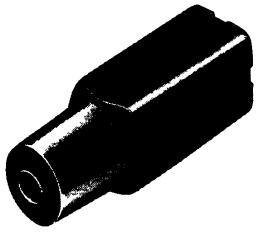
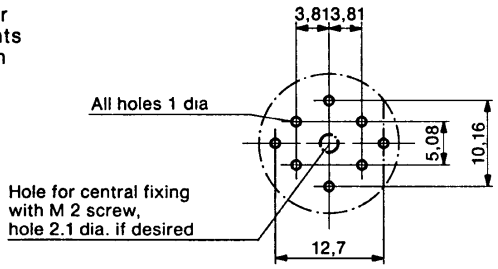
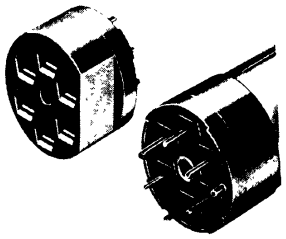
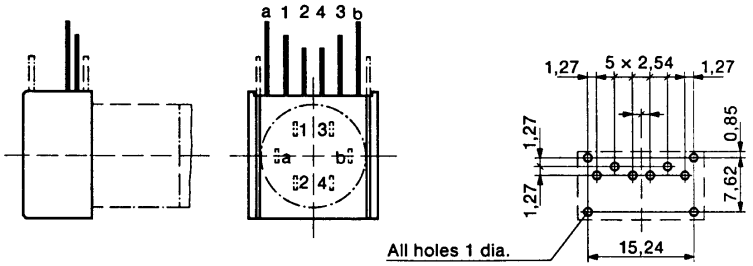
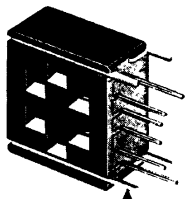
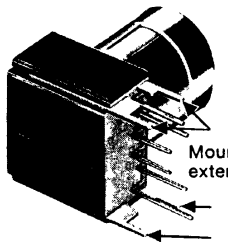
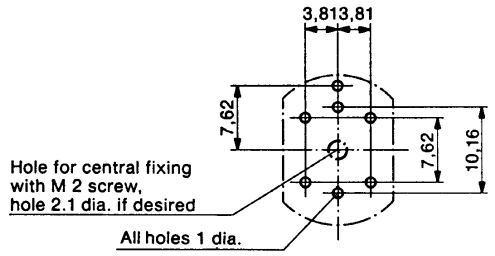
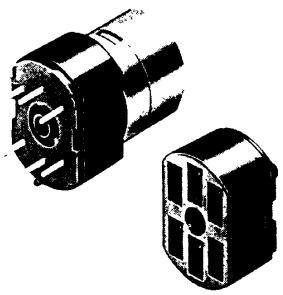
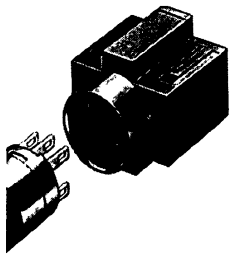
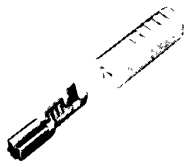
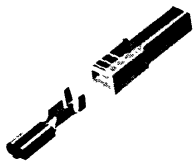
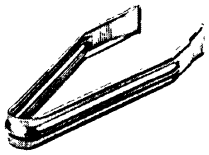
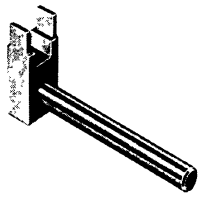
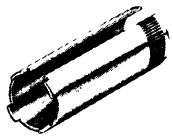
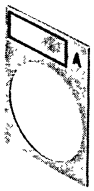
Description		Type No.	
Hinged, transparent **protective cover** with means of sealing (to prevent unauthorized operation of the lens)	square	31-920	
	rectangular	01-925	
			
Two-part **sprayproof cover** enabling the lamp to be replaced without problems (protection IP 67)	square membrane of PVC	31-923	
	rectangular membrane of silicone	31-924.2	
			
Protective guard, matt chromium-plated (with the narrow ends bent upwards) (with the broad sides bent upwards)		01-926 01-927	
			
Blind plugs	rectangular 18 x 24 mm — black	01-947.0	
	rectangular 18 x 24 mm — grey	01-947.8	
	square 18 x 18 mm — black	01-948.0	
	square 18 x 18 mm — grey	01-948.8	
	circular 18 mm dia. — black	01-949.0	
	circular 18 mm dia. — grey	01-949.8	

Description		Type No.	
AML adaptor for American panel cutout	 square	31-948	
	 rectangular	31-949	
Insulation socket for axial snap-action switching element 2,8 mm, to cover the plug-in terminals		01-928	
Terminal cover for snap-action switching element		01-929	

Description	Type No.	
Axial **PCB plug-in base** for low-level switching elements 16,4 mm dia. x 9,8 mm high 	31-940	
Right-angled **PCB plug-in base** for low-level switching elements 17,9 mm square x 8,4 mm high The withdrawable mounting pins allow the distance between the PCB plug-in base and the board to be varied by up to 3 mm 	31-941	 Mounting pins  Mounting pins extended
Axial **PCB plug-in base** for axial snap-action switching element 2,8 mm 17,8 mm dia. x 9,8 mm high 	31-942	
Plug-in adapter with screw connection for switches with plug-in terminal 2,8 x 0,5 mm The screw connections can be applied for 2 wires each 1 mm Ø or 2 standard wires each 0,75 mm². The use of the plug-in adapter increases the back panel depth by 14 mm compared to the standard switch requiring a new spacing dimension with the adapter of 24 x 24 mm.	31-943.0	

Description	Type No.	
Connector for low-level switching elements	31-945	
Insulation socket for connector 31-945	31-928	
Connector for axial snap-action switching element 2,8 mm	31-946	
Insulation socket for connector 31-946	31-929	

Description	Type No.	
Lens remover	02-905	
Lamp remover	02-906	
LED remover	51-996	
Dressing tool used as aid to aligning buttons	01-906	
Mounting tool for tightening (or loosening) fixing nuts	01-907	

Description	Type No.	
Metal **fixing ring** (especially for keylock switches)	**31-991**	
Adhesive **label** for illuminated pushbuttons with microfuse 18 mm dia. x 24 mm	**31-999**	

1. Engraving

Typefaces

In addition to the most commonly used world languages (see DIN 1451) with close spacing, the following typefaces are available: Scandinavian, Slavian, Greek, Russian.

Coloured filling of engraving

Red, blue and black lenses have the engraving filled with white.
Lenses of other colours have the engraving filled with black.

Symbols

A list of the symbols available can be supplied on request.

2. Hot stamping

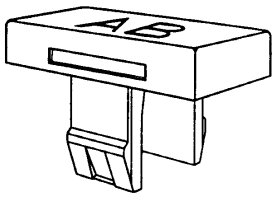
For large batches it is worth while to have the lettering produced by hot stamping.

Typefaces

For letters and figures, typefaces with 2,5 mm, 3 mm and 4 mm are available.

Symbols

A list of the symbols available can be supplied on request.



Important!

Before engraving, check the position of the illuminated pushbutton or indicator.

		Horizontal mounting			Vertical mounting								
Height of letters mm	Thickness of letters mm	Number of lines	Number of letters per line	Number of letters per line	Number of lines	Number of letters per line	Number of letters per line	Number of lines	Number of letters per line	Number of letters per line	Number of lines	Number of letters per line	Number of letters per line
h	s		(caps)	(small)		(caps)	(small)		(caps)	(small)		(caps)	(small)
2,5	0,4	4	11	12	5	7–8	8	3	6	6	4	7–8	8
3	0,4	3	9–10	10–11	4	6–7	7	2	5	6	3	6–7	7
4	0,5	2	7	7–8	3	4–5	5	2	3	4	2	4–5	5
5	0,5	2	5–6	6	2	3–4	4	1	2	3	2	3–4	4
6	0,6	1	4–5	5	2	3	3–4	1	2	3	1	3	3–4
8	0,6	1	3–4	3–4	1	2–3	2–3	1	2	2	1	2–3	2–3

3. Film inserts

Instead of using engraving, the lenses can be fitted with transparent film inserts.
For this purpose, though, it is advisable to use transparent lenses. When a smoked lens is used, the lettering does not become visible until the lamp lights.

To insert the film, the feet of the lens support have to be pushed together far enough to enable the lens to be lifted off easily.

Film dimensions

max. 12,7 × 18,7 mm

12,7 × 12,7 mm

12,8 mm

Film thickness 0,2 mm