



## Index

### Series 01

|  |                                                |                |
|--|------------------------------------------------|----------------|
|  | <b>Description</b>                             | <b>Page 15</b> |
|  | <b>Product Assembly</b>                        | <b>Page 16</b> |
|  | <b>Product Range</b>                           |                |
|  | - pushbutton for standard mounting             | <b>Page 17</b> |
|  | - accessories / spare parts                    | <b>Page 19</b> |
|  | <b>Technical Data</b>                          | <b>Page 25</b> |
|  | <b>Technical Drawing / Dimension / Layouts</b> | <b>Page 27</b> |
|  | <b>Circuit Drawing</b>                         | <b>Page 31</b> |
|  | <b>Typical Applications</b>                    | <b>Page 32</b> |
|  | <b>Marking</b>                                 | <b>Page 33</b> |

## General Notes

The Series 01 illuminated pushbuttons are equipped with snap-action, low level switching elements.  
In addition to the standard contacts (gold-plated silver), on request silver contacts for switching elements 2.8 mm plug-in terminals are available. The front dimensions of these units are 18 x 24 mm, 18 x 18 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.

## Mounting

Mount from the front through the mounting hole.  
The universal terminals of the low-level switching elements permit them to be mounted 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 are secured against rotation.

## Lenses

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

## Marking

For engraving, hot stamping and film inserts, see under "Marking" on page 33.

## Illumination

Perfect illumination of the different coloured lenses is assured by lamps T 5,5 (6-60 V).  
For supply voltages above 60 V, it is necessary to use a voltage reduction element (external series resistor, capacitor, or transformer). Do not solder the terminals directly, because of the high surface temperature. Multi-LED lamps T 5,5 (6, 12, 24, 48 V) are available in the colours white, red, yellow and green.

## 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.

## Number structure

|            |                                                                                                                          |
|------------|--------------------------------------------------------------------------------------------------------------------------|
| 01-XXX.0XX |                                                                                                                          |
| └──┬──┬──┘ | Kind of terminals                                                                                                        |
| └──┬──┘    | Contact material                                                                                                         |
| └──┘       | Switch variant                                                                                                           |
| 01-9XX.X   | Lens                                                                                                                     |
| Example:   | -Illuminated pushbutton, circular; momentary action, gold-plated silver contact; soldered terminals, 1 switching element |
|            | 01-131.025                                                                                                               |
|            | -Lens red                                                                                                                |
|            | 01-983.2                                                                                                                 |

## Specimen order

|                                              |              |
|----------------------------------------------|--------------|
| <u>Indicator:</u>                            |              |
| - indicator, soldering terminals, 18 x 24 mm | 01-040.005   |
| <u>Recommended accessories:</u>              |              |
| - lens, blue, 18 x 24 mm                     | 01-982.6     |
| - LED, 1 chip, 12 VDC, white                 | 10-2109.3139 |

All dimensions in mm.

We reserve the right to modify technical data.

## illuminated-/pushbutton



- 1 lens
- 2 switch housing
- 3 fixing nut

## indicator



### recommended accessories:

lens → 19

incandescent lamp → 21; LED → 22

|           | diode (1N 4007) | connection method | 18 x 24 mm part no. | 18 x 18 mm part no. | 18 mm dia. part no. | circuit drawing | technical drawing | mounting dimension | components layout | kg    |
|-----------|-----------------|-------------------|---------------------|---------------------|---------------------|-----------------|-------------------|--------------------|-------------------|-------|
| indicator | -               | PT                | <b>01-040.002</b>   | <b>01-050.002</b>   | <b>01-030.002</b>   | 1               | 1                 | 1                  | 1                 | 0,006 |
|           | -               | ST                | <b>01-040.005</b>   | <b>01-050.005</b>   | <b>01-030.005</b>   | 2               | 1                 | 1                  | 1                 | 0,006 |
|           | -               | UT                | <b>01-041.006</b>   | <b>01-051.006</b>   | <b>01-031.006</b>   | 1               | 3                 | 1                  | 1                 | 0,006 |
|           | 1               | UT                | <b>01-701.006</b>   | <b>01-703.006</b>   | <b>01-741.006</b>   | 3               | 2                 | 1                  | 1                 | 0,008 |
|           | 2               | UT                | <b>01-702.006</b>   | <b>01-704.006</b>   | <b>01-742.006</b>   | 4               | 2                 | 1                  | 1                 | 0,008 |

connection method: ST = soldering terminal; PT = plug-in terminal; UT = universal terminal; PCB plug-in base page 20

marking see page 33

technical drawing as of page 27, mounting dimensions, components layouts as of page 29, circuit drawing as of page 31

## illuminated-/pushbutton



### recommended accessories:

lens → 19

incandescent lamp → 21; LED → 22

|                         | switching system | contacts  | diode (1N 4007) | switching action | connection method | <br>18 x 24 mm<br>part no. | <br>18 x 18 mm<br>part no. | 18 mm dia.<br>part no. | circuit drawing | technical drawing | mounting dimension | components layout |  |       |
|-------------------------|------------------|-----------|-----------------|------------------|-------------------|-------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|------------------------|-----------------|-------------------|--------------------|-------------------|-------------------------------------------------------------------------------------|-------|
| illuminated-/pushbutton | LL               | 1NC       | -               | main             | UT                | 01-466.036                                                                                                  | 01-486.036                                                                                                  | 01-476.036             | 14              | 3                 | 1                  | 1                 | 0,009                                                                               |       |
|                         |                  |           | mom             | UT               | 01-426.036        | 01-456.036                                                                                                  | 01-436.036                                                                                                  | 28                     | 3               | 1                 | 1                  | 0,009             |                                                                                     |       |
|                         |                  | 1NC + 1NO | -               | main             | UT                | 01-463.036                                                                                                  | 01-483.036                                                                                                  | 01-473.036             | 17              | 3                 | 1                  | 1                 | 0,009                                                                               |       |
|                         |                  |           | mom             | UT               | 01-423.036        | 01-453.036                                                                                                  | 01-433.036                                                                                                  | 31                     | 3               | 1                 | 1                  | 0,009             |                                                                                     |       |
|                         |                  | 1NO       | -               | main             | UT                | 01-465.036                                                                                                  | 01-485.036                                                                                                  | 01-475.036             | 16              | 3                 | 1                  | 1                 | 0,009                                                                               |       |
|                         |                  |           | mom             | UT               | 01-425.036        | 01-455.036                                                                                                  | 01-435.036                                                                                                  | 30                     | 3               | 1                 | 1                  | 0,009             |                                                                                     |       |
|                         |                  | 2NC       | -               | main             | UT                | 01-462.036                                                                                                  | 01-482.036                                                                                                  | 01-472.036             | 15              | 3                 | 1                  | 1                 | 0,009                                                                               |       |
|                         |                  |           | mom             | UT               | 01-422.036        | 01-452.036                                                                                                  | 01-432.036                                                                                                  | 29                     | 3               | 1                 | 1                  | 0,009             |                                                                                     |       |
|                         |                  | 2NO       | -               | main             | UT                | 01-461.036                                                                                                  | 01-481.036                                                                                                  | 01-471.036             | 18              | 3                 | 1                  | 1                 | 0,009                                                                               |       |
|                         |                  |           | mom             | UT               | 01-421.036        | 01-451.036                                                                                                  | 01-431.036                                                                                                  | 32                     | 3               | 1                 | 1                  | 0,009             |                                                                                     |       |
|                         |                  | SA        | 1NC + 1NO       | -                | main              | ST/<br>PT                                                                                                   | 01-261.022                                                                                                  | 01-281.022             | 01-271.022      | 10                | 4                  | 1                 | -                                                                                   | 0,008 |
|                         |                  |           |                 |                  |                   | ST                                                                                                          | 01-261.025                                                                                                  | 01-281.025             | 01-271.025      | 13                | 4                  | 1                 | -                                                                                   | 0,008 |
|                         |                  |           |                 |                  | mom               | ST/<br>PT                                                                                                   | 01-121.022                                                                                                  | 01-151.022             | 01-131.022      | 24                | 4                  | 1                 | -                                                                                   | 0,008 |
|                         |                  |           |                 |                  |                   | ST                                                                                                          | 01-121.025                                                                                                  | 01-151.025             | 01-131.025      | 27                | 4                  | 1                 | -                                                                                   | 0,008 |
|                         | 1                |           |                 | main             | UT                | 01-713.029                                                                                                  | 01-717.029                                                                                                  | 01-747.029             | 11              | 5                 | 1                  | 1                 | 0,010                                                                               |       |
|                         |                  |           |                 |                  | UT                | 01-705.029                                                                                                  | 01-709.029                                                                                                  | 01-743.029             | 25              | 5                 | 1                  | 1                 | 0,010                                                                               |       |
|                         | 2                |           |                 | main             | UT                | 01-714.029                                                                                                  | 01-718.029                                                                                                  | 01-748.029             | 12              | 5                 | 1                  | 1                 | 0,010                                                                               |       |
|                         |                  |           |                 |                  | UT                | 01-706.029                                                                                                  | 01-710.029                                                                                                  | 01-744.029             | 26              | 5                 | 1                  | 1                 | 0,010                                                                               |       |
|                         | 2NC + 2NO        |           |                 | -                | main              | ST                                                                                                          | 01-262.025                                                                                                  | 01-282.025             | 01-272.025      | 9                 | 4                  | 1                 | -                                                                                   | 0,010 |
|                         |                  |           |                 |                  |                   | ST                                                                                                          | 01-122.025                                                                                                  | 01-152.025             | 01-132.025      | 23                | 4                  | 1                 | -                                                                                   | 0,010 |
|                         |                  |           | 1               | main             | UT                | 01-715.029                                                                                                  | 01-719.029                                                                                                  | 01-749.029             | 7               | 5                 | 1                  | 1                 | 0,012                                                                               |       |
|                         |                  |           |                 |                  | UT                | 01-707.029                                                                                                  | 01-711.029                                                                                                  | 01-745.029             | 21              | 5                 | 1                  | 1                 | 0,012                                                                               |       |
|                         |                  |           | 2               | main             | UT                | 01-716.029                                                                                                  | 01-720.029                                                                                                  | 01-750.029             | 8               | 5                 | 1                  | 1                 | 0,012                                                                               |       |
|                         |                  |           |                 |                  | UT                | 01-708.029                                                                                                  | 01-712.029                                                                                                  | 01-746.029             | 22              | 5                 | 1                  | 1                 | 0,012                                                                               |       |
|                         | 3NC + 3NO        | -         | main            | ST               | 01-263.025        | 01-283.025                                                                                                  | 01-273.025                                                                                                  | 6                      | 4               | 1                 | -                  | 0,012             |                                                                                     |       |
|                         |                  |           |                 | ST               | 01-123.025        | 01-153.025                                                                                                  | 01-133.025                                                                                                  | 20                     | 4               | 1                 | -                  | 0,012             |                                                                                     |       |
|                         | 4NC + 4NO        | -         | main            | ST               | 01-264.025        | 01-284.025                                                                                                  | 01-274.025                                                                                                  | 5                      | 4               | 1                 | -                  | 0,014             |                                                                                     |       |
|                         |                  |           |                 | ST               | 01-124.025        | 01-154.025                                                                                                  | 01-134.025                                                                                                  | 19                     | 4               | 1                 | -                  | 0,014             |                                                                                     |       |

switching system: LL = Low Level switching element, SA = snap-action switching element

switching action: main = maintained action, mom = momentary action

connection method: ST = soldering terminal; PT = plug-in terminal; UT = universal terminal; PCB plug-in base page 20

contacts: NC = normally closed, NO = normally open

power rating: Low Level switching element: 42 V/100 mA, snap-action switching element: 250 V/5 A

marking see page 33

technical drawing as of page 27, mounting dimensions, components layouts as of page 29, circuit drawing as of page 31

## at front

### lens

|                                                         | shape | lens/support                 | colour            | 18 x 24 mm<br>part no. | 18 x 18 mm<br>part no. | 18 mm dia.<br>part no. | kg    |                                                                                     |
|---------------------------------------------------------|-------|------------------------------|-------------------|------------------------|------------------------|------------------------|-------|-------------------------------------------------------------------------------------|
| <b>lens</b><br>12,8 x 18,8 mm, of<br>plastic            | flat  | transparent/trans-<br>lucent | blue              | <b>01-982.6</b>        | <b>01-985.6</b>        | <b>01-983.6</b>        | 0,001 |  |
|                                                         |       |                              | colourless, clear | <b>01-982.7</b>        | <b>01-985.7</b>        | <b>01-983.7</b>        | 0,001 |                                                                                     |
|                                                         |       |                              | green             | <b>01-982.5</b>        | <b>01-985.5</b>        | <b>01-983.5</b>        | 0,001 |                                                                                     |
|                                                         |       |                              | orange            | <b>01-982.3</b>        | <b>01-985.3</b>        | <b>01-983.3</b>        | 0,001 |                                                                                     |
|                                                         |       |                              | red               | <b>01-982.2</b>        | <b>01-985.2</b>        | <b>01-983.2</b>        | 0,001 |                                                                                     |
|                                                         |       |                              | yellow            | <b>01-982.4</b>        | <b>01-985.4</b>        | <b>01-983.4</b>        | 0,001 |                                                                                     |
| of plastic<br>(not for film insert<br>and LED)          | flat  | translucent/translu-<br>cent | blue              | <b>01-901.6</b>        | <b>01-951.6</b>        | <b>01-931.6</b>        | 0,001 |                                                                                     |
|                                                         |       |                              | green             | <b>01-901.5</b>        | <b>01-951.5</b>        | <b>01-931.5</b>        | 0,001 |                                                                                     |
|                                                         |       |                              | orange            | <b>01-901.3</b>        | <b>01-951.3</b>        | <b>01-931.3</b>        | 0,001 |                                                                                     |
|                                                         |       |                              | red               | <b>01-901.2</b>        | <b>01-951.2</b>        | <b>01-931.2</b>        | 0,001 |                                                                                     |
|                                                         |       |                              | white             | <b>01-901.9</b>        | <b>01-951.9</b>        | <b>01-931.9</b>        | 0,001 |                                                                                     |
| of plastic<br>(not for film insert<br>and illumination) | flat  | opaque/translucent           | yellow            | <b>01-901.4</b>        | <b>01-951.4</b>        | <b>01-931.4</b>        | 0,001 |                                                                                     |
|                                                         |       |                              | black             | <b>01-901.0</b>        | <b>01-951.0</b>        | <b>01-931.0</b>        | 0,001 |                                                                                     |
| of plastic<br>(not recommended<br>for film insert)      | flat  | transparent/trans-<br>parent | grey              | <b>01-901.8</b>        | <b>01-951.8</b>        | <b>01-931.8</b>        | 0,001 |                                                                                     |
|                                                         |       |                              | colourless, clear | <b>01-972.7</b>        | <b>01-975.7</b>        | <b>01-973.7</b>        | 0,001 |                                                                                     |
|                                                         |       |                              | green             | <b>01-972.5</b>        | <b>01-975.5</b>        | <b>01-973.5</b>        | 0,001 |                                                                                     |
|                                                         |       |                              | red               | <b>01-972.2</b>        | <b>01-975.2</b>        | <b>01-973.2</b>        | 0,001 |                                                                                     |
|                                                         |       |                              | yellow            | <b>01-972.4</b>        | <b>01-975.4</b>        | <b>01-973.4</b>        | 0,001 |                                                                                     |

### protective cover

|                                                                                       | 18 x 24 mm<br>part no. | 18 x 18 mm<br>part no. | technical drawing | kg    |                                                                                       |
|---------------------------------------------------------------------------------------|------------------------|------------------------|-------------------|-------|---------------------------------------------------------------------------------------|
| <b>protective cover</b><br>hinged, transparent, cover to prevent accidental operation | <b>01-925</b>          |                        | 6                 | 0,002 |  |
|                                                                                       |                        | <b>31-920</b>          | 7                 | 0,002 |                                                                                       |

[technical drawing as of page 27](#)

### sprayproof cover

front protection IP 67

|                                     | front shape | material         | part no.        | technical drawing | mounting dimension | kg    |                                                                                       |
|-------------------------------------|-------------|------------------|-----------------|-------------------|--------------------|-------|---------------------------------------------------------------------------------------|
| <b>sprayproof cover</b><br>two-part | rectangular | made of silicone | <b>31-924.2</b> | 8                 | 2                  | 0,003 |  |
|                                     | square      | made of PVC      | <b>31-923</b>   | 8                 | 2                  | 0,003 |                                                                                       |

[technical drawing as of page 27](#), [mounting dimensions as of page 29](#)

## protective guard

|                                                 | construction             | part no.      | technical drawing |       |                                                                                     |
|-------------------------------------------------|--------------------------|---------------|-------------------|-------|-------------------------------------------------------------------------------------|
| <b>protective guard</b><br>matt chromium-plated | broad sides bent upwards | <b>01-927</b> | 10                | 0,011 |  |
|                                                 | narrow ends bent upwards | <b>01-926</b> | 9                 | 0,011 |                                                                                     |

technical drawing as of page 27

## blind plug

|                   | colour | <br>18 x 24 mm<br>part no. | <br>18 x 18 mm<br>part no. | 18 mm dia.<br>part no. | mounting dimension |       |                                                                                       |
|-------------------|--------|-------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|------------------------|--------------------|-------|---------------------------------------------------------------------------------------|
| <b>blind plug</b> | black  | <b>01-947.0</b>                                                                                             | <b>01-948.0</b>                                                                                             | <b>01-949.0</b>        | 1                  | 0,001 |  |

mounting dimensions as of page 29

## at back

## PCB plug-in base

|                                                       | for                                                                                                                                | pin orientation | part no.      | components layout |       |                                                                                       |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------------|-------------------|-------|---------------------------------------------------------------------------------------|
| <b>PCB plug-in base</b><br>16.4 mm dia. x 9.8 mm high | Low Level switching element                                                                                                        | axial           | <b>31-940</b> | 2                 | 0,002 |  |
| 17.8 mm dia. x 9.8 mm high                            | snap-action switching element 2.8 mm                                                                                               | axial           | <b>31-942</b> | 4                 | 0,002 |                                                                                       |
| 17.9 x 8.4 mm high                                    | Low Level switching element<br>With the extendable mounting the distance between PCB plug-in base and PCB can be varied up to 3mm. | right-angled    | <b>31-941</b> | 3                 | 0,004 |                                                                                       |

components layouts as of page 29



## cable shoe

|            | connection method               | part no.      |  |                                                                                     |
|------------|---------------------------------|---------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| cable shoe | plug-in terminal 2.8 x 0.5 mm   | <b>31-946</b> | 0,001                                                                               |  |
|            | universal terminal 2.0 x 0.5 mm | <b>31-945</b> | 0,001                                                                               |                                                                                     |

connection method: PT = plug-in terminal, UT = universal terminal

## insulation socket

|                                                                            | part no.      |  |                                                                                     |
|----------------------------------------------------------------------------|---------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| insulation socket<br>for connector 31-945                                  | <b>31-928</b> | 0,001                                                                               |  |
| for connector 31-946                                                       | <b>31-929</b> | 0,001                                                                               |                                                                                     |
| for snap-action switching element 2.8 mm<br>to cover the plug-in terminals | <b>01-928</b> | 0,001                                                                               |                                                                                     |

## terminal cover

|                | part no.      |  |                                                                                      |
|----------------|---------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| terminal cover | <b>01-929</b> | 0,010                                                                               |  |

## for illumination

### incandescent lamp

|                                 | voltage/current | part no.                        |  |                                                                                       |
|---------------------------------|-----------------|---------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| incandescent lamp<br>base T 5.5 | 6 AC/DC/200 mA  | <b>10-1106.1369 (01-903.0)</b>  | 0,001                                                                                 |  |
|                                 | 12 AC/DC/100 mA | <b>10-1109.1329 (01-903.1)</b>  | 0,001                                                                                 |                                                                                       |
|                                 | 12 AC/DC/50 mA  | <b>10-1109.1279 (01-913.12)</b> | 0,001                                                                                 |                                                                                       |
|                                 | 24 AC/DC/25 mA  | <b>10-1112.1199 (01-913.24)</b> | 0,001                                                                                 |                                                                                       |
|                                 | 24 AC/DC/50 mA  | <b>10-1112.1279 (01-903.2)</b>  | 0,001                                                                                 |                                                                                       |
|                                 | 28 AC/DC/40 mA  | <b>10-1113.1249 (01-903.28)</b> | 0,001                                                                                 |                                                                                       |
|                                 | 30 AC/DC/40 mA  | <b>10-1114.1249 (01-903.3)</b>  | 0,001                                                                                 |                                                                                       |
|                                 | 36 AC/DC/35 mA  | <b>10-1116.1229 (01-903.4)</b>  | 0,001                                                                                 |                                                                                       |
|                                 | 48 AC/DC/25 mA  | <b>10-1119.1199 (01-903.5)</b>  | 0,001                                                                                 |                                                                                       |
|                                 | 60 AC/DC/20 mA  | <b>10-1120.1179 (01-903.6)</b>  | 0,001                                                                                 |                                                                                       |

## LED

|                          | number of chips | voltage/current | colour | part no.                        |  |                                                                                     |
|--------------------------|-----------------|-----------------|--------|---------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>LED</b><br>base T 5.5 | 1 chip          | 12 VDC/14 mA    | white  | <b>10-2109.3139</b>             | 0,001                                                                               |  |
|                          |                 | 24 VDC/14 mA    | white  | <b>10-2112.3139</b>             | 0,001                                                                               |                                                                                     |
|                          |                 | 28 VDC/14 mA    | white  | <b>10-2113.3139</b>             | 0,001                                                                               |                                                                                     |
|                          | 6 chips         | 6 VDC/45 mA     | green  | <b>10-5106.3255 (01-968.05)</b> | 0,001                                                                               |                                                                                     |
|                          |                 |                 | red    | <b>10-5106.3252 (01-968.02)</b> | 0,001                                                                               |                                                                                     |
|                          |                 |                 | yellow | <b>10-5106.3254 (01-968.04)</b> | 0,001                                                                               |                                                                                     |
|                          |                 | 12 VDC/30 mA    | green  | <b>10-5109.3205 (01-968.15)</b> | 0,001                                                                               |                                                                                     |
|                          |                 |                 | red    | <b>10-5109.3202 (01-968.12)</b> | 0,001                                                                               |                                                                                     |
|                          |                 |                 | yellow | <b>10-5109.3204 (01-968.14)</b> | 0,001                                                                               |                                                                                     |
|                          |                 | 24 VDC/15 mA    | green  | <b>10-5112.3145 (01-968.25)</b> | 0,001                                                                               |                                                                                     |
|                          |                 |                 | red    | <b>10-5112.3142 (01-968.22)</b> | 0,001                                                                               |                                                                                     |
|                          |                 |                 | yellow | <b>10-5112.3144 (01-968.24)</b> | 0,001                                                                               |                                                                                     |
|                          |                 | 28 VDC/15 mA    | green  | <b>10-5113.3145 (01-968.35)</b> | 0,001                                                                               |                                                                                     |
|                          |                 |                 | red    | <b>10-5113.3142 (01-968.32)</b> | 0,001                                                                               |                                                                                     |
|                          |                 |                 | yellow | <b>10-5113.3144 (01-968.34)</b> | 0,001                                                                               |                                                                                     |
|                          |                 | 48 VDC/14 mA    | green  | <b>10-5119.3135 (01-968.45)</b> | 0,001                                                                               |                                                                                     |
|                          |                 |                 | red    | <b>10-5119.3132 (01-968.42)</b> | 0,001                                                                               |                                                                                     |
|                          |                 |                 | yellow | <b>10-5119.3134 (01-968.44)</b> | 0,001                                                                               |                                                                                     |

## capacitor

for lamp voltage reduction

|                                                               | value           | part no.        |  |                                                                                      |
|---------------------------------------------------------------|-----------------|-----------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <b>capacitor</b><br>use with 60 VAC/20 mA, 50 Hz lamp voltage | 230 VAC/0.27 µF | <b>02-917.0</b> | 0,004                                                                               |  |

Wire in accordance with local electrical safety regulations.

## series resistor

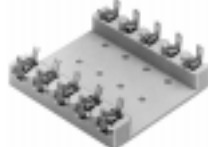
for lamp voltage reduction

|                                                             | value             | part no.        |  |                                                                                       |
|-------------------------------------------------------------|-------------------|-----------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <b>series resistor</b><br>use with 60 VAC/20 mA lamp rating | 110 V/2.7 kOhm    | <b>02-904.0</b> | 0,003                                                                                 |  |
|                                                             | 125 V/3.3 kOhm    | <b>02-904.1</b> | 0,003                                                                                 |                                                                                       |
|                                                             | 145 V/4.7 kOhm    | <b>02-904.3</b> | 0,003                                                                                 |                                                                                       |
|                                                             | 230-240 V/10 kOhm | <b>02-904.7</b> | 0,003                                                                                 |                                                                                       |

Wire in accordance with local electrical safety regulations.

## terminal plate empty

for fitting with series resistors and capacitors

|                             | no. of spaces | part no.        |  |                                                                                       |
|-----------------------------|---------------|-----------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <b>terminal plate empty</b> | 5 spaces      | <b>02-912.1</b> | 0,015                                                                                 |  |
|                             | 10 spaces     | <b>02-912.2</b> | 0,045                                                                                 |                                                                                       |
|                             | 15 spaces     | <b>02-912.3</b> | 0,040                                                                                 |                                                                                       |
|                             | 20 spaces     | <b>02-912.4</b> | 0,045                                                                                 |                                                                                       |

## terminal plate with capacitor

|                                                                           | value                  | no. of components | part no.         |  |                                                                                     |
|---------------------------------------------------------------------------|------------------------|-------------------|------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>terminal plate with capacitor</b><br>use with 60 VAC/20 mA lamp rating | 0,27 µF/230 VAC/60 VAC | 5 spaces          | <b>02-914.10</b> | 0,045                                                                               |  |
|                                                                           |                        | 10 spaces         | <b>02-914.20</b> | 0,090                                                                               |                                                                                     |
|                                                                           |                        | 15 spaces         | <b>02-914.30</b> | 0,135                                                                               |                                                                                     |
|                                                                           |                        | 20 spaces         | <b>02-914.40</b> | 0,180                                                                               |                                                                                     |

Wire in accordance with local electrical safety regulations.

## terminal plate with series resistor

|                                                                                 | value                | no. of components | part no.         |  |                                                                                     |
|---------------------------------------------------------------------------------|----------------------|-------------------|------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>terminal plate with series resistor</b><br>use with 60 VAC/20 mA lamp rating | 2.7 kOhm/110/60 V    | 5 spaces          | <b>02-913.10</b> | 0,040                                                                               |  |
|                                                                                 |                      | 10 spaces         | <b>02-913.20</b> | 0,075                                                                               |                                                                                     |
|                                                                                 |                      | 15 spaces         | <b>02-913.30</b> | 0,115                                                                               |                                                                                     |
|                                                                                 |                      | 20 spaces         | <b>02-913.40</b> | 0,155                                                                               |                                                                                     |
|                                                                                 | 3.3 kOhm/125/60 V    | 5 spaces          | <b>02-913.11</b> | 0,040                                                                               |                                                                                     |
|                                                                                 |                      | 10 spaces         | <b>02-913.21</b> | 0,075                                                                               |                                                                                     |
|                                                                                 |                      | 15 spaces         | <b>02-913.31</b> | 0,115                                                                               |                                                                                     |
|                                                                                 |                      | 20 spaces         | <b>02-913.41</b> | 0,155                                                                               |                                                                                     |
|                                                                                 | 10 kOhm/230-240/60 V | 5 spaces          | <b>02-913.17</b> | 0,040                                                                               |                                                                                     |
|                                                                                 |                      | 10 spaces         | <b>02-913.27</b> | 0,075                                                                               |                                                                                     |
|                                                                                 |                      | 15 spaces         | <b>02-913.37</b> | 0,115                                                                               |                                                                                     |
|                                                                                 |                      | 20 spaces         | <b>02-913.47</b> | 0,155                                                                               |                                                                                     |

Wire in accordance with local electrical safety regulations.

## assembling

### lens remover

|                     | part no.      |  |                                                                                       |
|---------------------|---------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <b>lens remover</b> | <b>02-905</b> | 0,011                                                                                 |  |

### lamp remover

|                     | part no.      |  |                                                                                       |
|---------------------|---------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <b>lamp remover</b> | <b>02-906</b> | 0,002                                                                                 |  |

### LED remover

|                    | part no.      |  |                                                                                       |
|--------------------|---------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <b>LED remover</b> | <b>51-996</b> | 0,024                                                                                 |  |

dressing tool

|                                       | part no. |  kg |                                                                                     |
|---------------------------------------|----------|----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| dressing tool<br>for aligning buttons | 01-906   | 0,030                                                                                  |  |

mounting tool

|                                                            | part no. |  kg |                                                                                     |
|------------------------------------------------------------|----------|----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| mounting tool<br>for tightening (or loosening) fixing nuts | 01-907   | 0,020                                                                                  |  |

## 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 not stachable, only 1 switching element can be on a pushbutton.

### material

#### actuator case

polyphenylene PPO, self-extinguishing

#### material of contacts

gold-plated silver

#### switching element

axial plug-in-/soldering terminal 2.8 mm:  
diallyl phthalate DAP, polyamide 66, polysulfone, heat-resistant and self-extinguishing  
soldering terminal: PA 6.6 Ultramid

### mechanical characteristics

#### actuating force

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

#### actuating travel

3 mm

#### ambient air temperature

-25°C to +55°C

for indicators and illuminated pushbuttons mounted as a block , make sure the heat can escape freely  
(as per DIN IEC 68-)

#### connection method

snap-action switching element with tinned soldering terminals at the sides:  
max. wire diameter: 2 wires of 1.2 mm  
max. wire cross-section of stranded cable: 1x 1 mm<sup>2</sup>.  
snap-action switching element with axial plug-in terminals, which can also be used as soldering terminals:  
plug-in terminal: 2.8 x 0.5 mm  
soldering terminal:  
max. wire diameter: 2 wires of 1 mm<sup>2</sup>  
max. wire cross-section of stranded cable: 2 x 0.75 mm<sup>2</sup> or 1 x 1.0 mm<sup>2</sup>

#### degree of protection

front as per IEC 529:

IP 40

IP 67 with spray cover

#### mechanical life

momentary action 2 million cycles of operation

maintained action 1 million cycles of operation

#### rebound time

<= 5ms

#### resistance to climate

standard condition as per IEC 68-2-3 and 2-30

changing condition as per IEC 68-2-14 and 2-33

#### resistance to shock

(single impacts, semi-sinusoidal)

15 g for 11 ms as per IEC 512-4-3, IEC 68-2-27

#### resistance to vibration

(sinusoidal)

10 g at 0-2000 Hz, amplitude 1.5 mm as per IEC 512-4-4, IEC 68-2-6

#### storage temperature

-40°C to + 85°C

(as per DIN IEC 68-)

### electrical characteristics

#### continuous thermal current Ith<sub>2</sub>

5 A

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

#### electric strength

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

#### protection class

II

#### rated current

5 A

#### rated voltage

250 VAC/VDC

#### switch rating

250 VAC/5 A (cos φ 1)

250 VAC/3 A (cos φ 0.3)

switch rating AC, cos φ 0,7:

voltage 125 V 250 V

current 3 A 2 A

switch rating DC (inductive), L:R = 30 ms:

voltage 24 V 60 V 110 V 220 V

current 2 A 0,7 A 0,2 A 0,1 A

#### volume resistance

starting value (initial) <= 50 mΩ

### rules

IEC 1058 EN 61 058

### approvals

- SEV 250 VAC/5A

- CSA 300 VAC

- UL

## actuator with Low Level switching element

### switching system

This low level switching element was designed for switching low powers in electronic circuits. The mechanism assures reliable switching of loads ranging from a few μA/μV up to 100 mA/42 VAC/ 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.

### material

#### actuator case

polyphenylene PPO, self-extinguishing

#### material of contacts

gold-plated

## switching element

polysulfone, heat-resistant and self-extinguishing

## mechanical characteristics

### actuating force

3-3.5 N

### actuating travel

3 mm

### ambient air temperature

-25°C to +55°C

for indicators and illuminated pushbuttons mounted as a block ,  
make sure the heat can escape freely  
(as per DIN IEC 68-)

### connection method

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

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

soldering terminal:

max. wire diameter: 2 wires à 0.8 mm

max. wire cross-section of stranded cable: 1x 0.75 mm<sup>2</sup>

plug-in terminal:

2.0 x 0.5 mm

### degree of protection

front as per IEC 529:

IP 40

IP 67 with spray cover

### mechanical life

momentary action 5 mio. cycles of operation

maintained action 1 mio. cycles of operation

### rebound time

Typ. < 100 µs

### resistance to climate

standard condition as per IEC 68-2-3 and 2-30

changing condition as per IEC 68-2-14 and 2-33

### resistance to shock

(single impacts, semi-sinusoidal)

15 g for 11 ms as per IEC 512-4-3, IEC 68-2-27

### storage temperature

-40°C to + 85°C

(as per DIN IEC 68-)

## electrical characteristics

### electric strength

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

### protection class

II

### switch rating

10 µA/100 µV to 100 mA at 42 VAC/VDC

### volume resistance

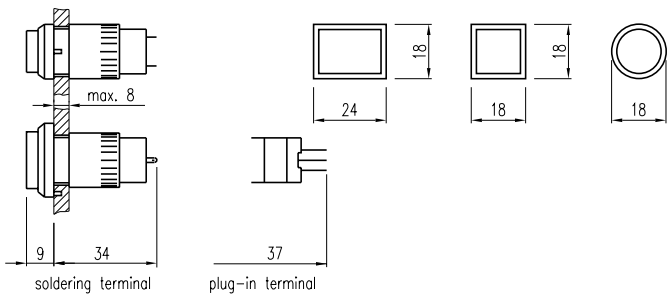
starting value (initial) ≤ 50 mΩ

## rules

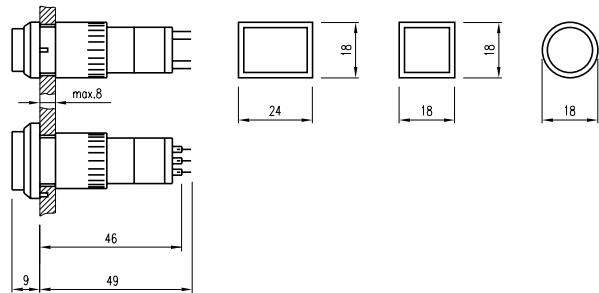
EN 61 058

technical drawing

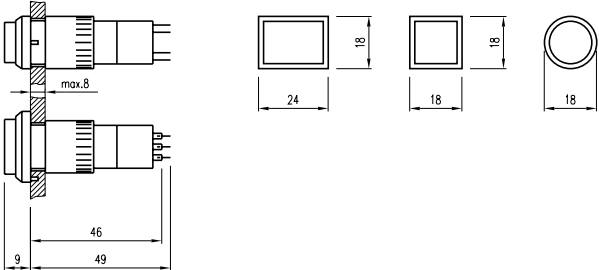
1 indicator  
page 17



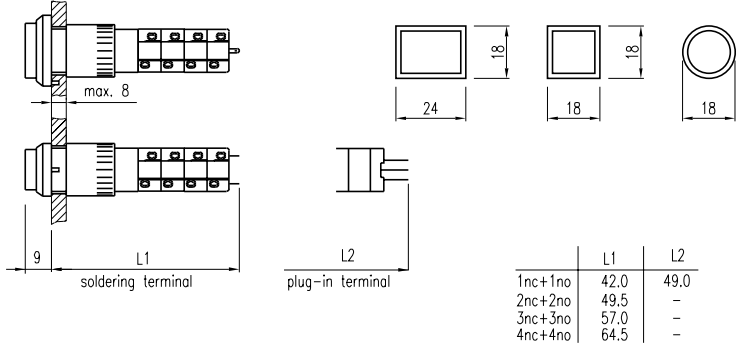
2 indicator  
page 17



3 indicator, illuminated-/pushbutton  
page 17, 18

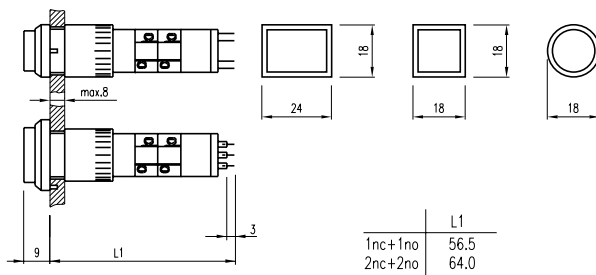


4 illuminated-/pushbutton  
page 18



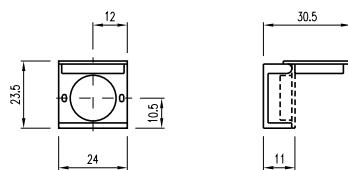
## 5 illuminated-/pushbutton

page 18



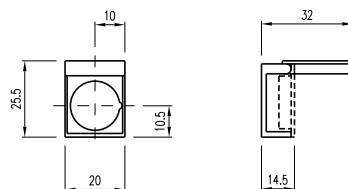
## 6 protective cover

page 19



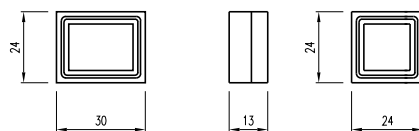
## 7 protective cover

page 19



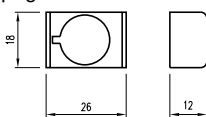
## 8 sprayproof cover

page 19



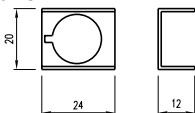
## 9 protective guard

page 20



## 10 protective guard

page 20





## 0:

page 17, 18, 20



page 19



## 0:

page 17, 18



## page 20

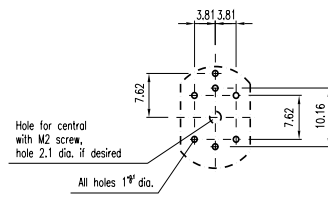


## page 20



## 4 PCB plug-in base

page 20

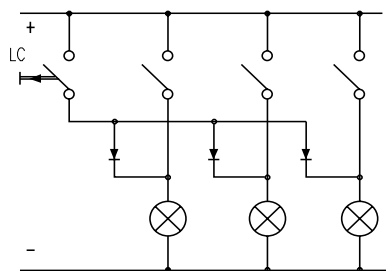


|    | circuit drawing |
|----|-----------------|
| 1  |                 |
| 2  |                 |
| 3  |                 |
| 4  |                 |
| 5  |                 |
| 6  |                 |
| 7  |                 |
| 8  |                 |
| 9  |                 |
| 10 |                 |
| 11 |                 |
| 12 |                 |
| 13 |                 |
| 14 |                 |
| 15 |                 |
| 16 |                 |
| 17 |                 |
| 18 |                 |
| 19 |                 |
| 20 |                 |

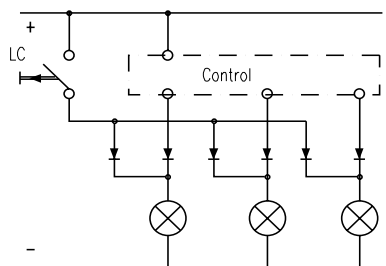
|    | circuit drawing |
|----|-----------------|
| 21 |                 |
| 22 |                 |
| 23 |                 |
| 24 |                 |
| 25 |                 |
| 26 |                 |
| 27 |                 |
| 28 |                 |
| 29 |                 |
| 30 |                 |
| 31 |                 |
| 32 |                 |

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.

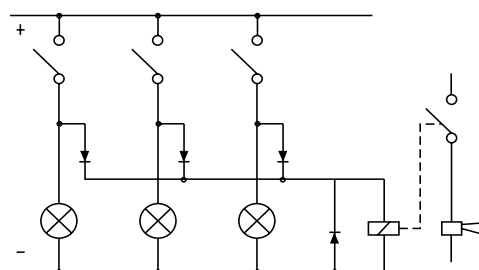
lamp check



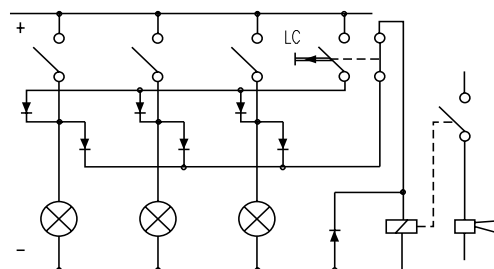
lamp check with blocking diodes



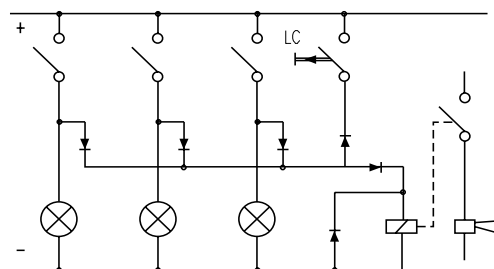
alarm circuit from fault  
annunciating system



lamp check and alarm circuit



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



LC = lamp check

## 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

Specify whether engraving should be on the diffuser, or on the lens.

Specify the infill colour, character height and the text or symbol orientation.

### Symbols

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

## 2. Hot stamping

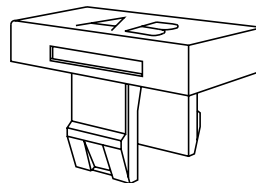
For large batches it is worth while to have the lettering produced by hot stamping.

### 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.



## 3. Film inserts

Instead of using engraving, the lenses can be fitted with transparent film inserts.

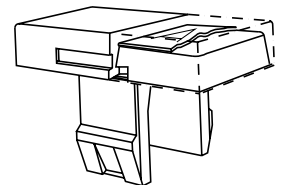
For this purpose, though, it is advisable to use transparent lenses. When a smoked lens is used, the lettering does not become visible until the lens lights.

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. 10,2 x 16,2 mm  
10,2 x 10,2 mm  
12,8 mm

### Film thickness 0,2 mm



### Important!

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

| Height of letters | Thickness of letters | Horizontal mounting |                            |                            | Vertical mounting |                            |                            | Circular mounting |                            |                            | Square mounting |                            |                            |
|-------------------|----------------------|---------------------|----------------------------|----------------------------|-------------------|----------------------------|----------------------------|-------------------|----------------------------|----------------------------|-----------------|----------------------------|----------------------------|
|                   |                      | 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                  | 3                   | 10                         | 10-11                      | 4                 | 6-7                        | 7                          | 3                 | 6                          | 6                          | 3               | 6-7                        | 7                          |
| 3                 | 0,4                  | 2                   | 8-9                        | 9                          | 4                 | 5-6                        | 6                          | 2                 | 5                          | 6                          | 2               | 5-6                        | 6                          |
| 4                 | 0,5                  | 2                   | 6                          | 6-7                        | 3                 | 4                          | 4                          | 2                 | 3                          | 4                          | 2               | 4                          | 4                          |
| 5                 | 0,5                  | 1                   | 5                          | 5-6                        | 2                 | 3                          | 3-4                        | 1                 | 2                          | 3                          | 1               | 3                          | 3-4                        |
| 6                 | 0,6                  | 1                   | 4                          | 4-5                        | 1                 | 2-3                        | 3                          | 1                 | 2                          | 2                          | 1               | 2-3                        | 3                          |
| 8                 | 0,6                  | 1                   | 3                          | 3-4                        | 1                 | 2                          | 2                          | 1                 | 2                          | 2                          | 1               | 2                          | 2                          |