

Product manual

# Vandal-proof MSM switch

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|  |           |
|--|-----------|
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## 1 PRODUCT DESCRIPTION

- housing and actuator are made of high-quality stainless steel
- switch is particularly suitable for the use in harsh environments
- available with mounting diameters of 16, 19, 22 and 30 mm
- permissible switching voltages from 30 VDC to 250 VAC, switching currents from 0.1 to 10 Ampere
- equipped with flat-pin plugs to permit fast connection
- point and ring-illuminated versions are available for applications at night or as an optical status display

## 2 TECHNICAL DATA AND DIMENSIONAL DRAWINGS

### 2.1 Technical Data

| <b>Micro Switch for Electrical Rating</b><br>(Protection Class IP 40) | 0.1 A<br>30 VDC | 5 A<br>125 VAC | 3 A<br>250 VAC | 10 A<br>250 VAC |
|---|-----------------|----------------|----------------|-----------------|
| <b>Electrical Data</b>  |                 |                |                |                 |
| Contact Material  | gold            | silver         |                | silver          |
| Switching Voltage max. (VAC)<br>(VDC)                                 | 30              | 125 / 250      |                | 250             |
| Switching Current max. (A)  | 0.1             | 5 / 3          |                | 10              |
| Rated Braking Capacity (W)  | 3               | 1250           |                | 2500            |
| Lifetime <sup>1)</sup> (at Rated Braking Capacity)                    | 200,000         | 200,000        |                | 50,000          |
| Lifetime (160mA at 48VDC)   |                 | 1,500,000      |                |                 |
| Initial Contact Resistance, new (mΩ)                                  | < 50            | < 30           |                | < 30            |
| Insulation Resistance (IEC 512-2) (MΩ)                                | > 100           | > 100          |                | > 100           |
| Contact Bounce Time (ms)  | < 5             | < 5            |                | < 5             |

1) The electrical lifetime according to ENEC or UL approbation can vary, depending on the corresponding micro switch, under the lifetime indicated above. The type and license numbers for the individual micro switches can be found in "point 6 approvals".

| <b>Micro Switch for Electrical Rating</b><br>(Protection Class IP 67) | <i>0.1 A</i><br><i>250 VAC</i> | <i>5 A</i><br><i>250 VAC</i> | <i>10 A</i><br><i>250 VAC</i> |
|---|--------------------------------|------------------------------|-------------------------------|
| <b>Electrical Data</b>  |                                |                              |                               |
| Switching Voltage max. (VAC)  | 250                            | 250                          | 250                           |
| Switching Current max. (A)  | 0.1                            | 5                            | 10                            |
| Rated Braking Capacity (W)  | 25                             | 1500                         | 2500                          |
| Lifetime <sup>1)</sup> (at Rated Braking Capacity)                    | 50,000                         | 50,000                       | 10,000                        |

➤ *Itally written types on request*

1) *The electrical lifetime according to ENEC or UL approbation can vary, depending on the corresponding micro switch, under the lifetime indicated above. The type and license numbers for the individual micro switches can be found in "point 6 approvals".*

| <b>Mechanical Data</b>  |  |              |
|---|--|--------------|
| Actuating Force (single-pole) (N)                                     |  | 4.5          |
| Actuating Travel<br>Mounting Diameter 16, 19, 22 mm (mm)              |  | 1.0          |
| Actuating Travel<br>Mounting Diameter 30 mm (mm)                      |  | 1.2          |
| Lifetime (Actuations)   |  | 1,500,000    |
| Shock Resistance DIN EN 50102<br>Mounting Diameter 16 mm (IK)         |  | 06           |
| Shock Resistance DIN EN 50102<br>Mounting Diameter 19, 22, 30 mm (IK) |  | 07           |
| <b>Climatical Data</b>  |  |              |
| Operating/Storage Temperature (°C)                                    |  | - 25 to + 85 |
| Degree of Protection Front Side<br>mechanical* (IP)                   |  | 40           |
| Degree of Protection Front Side<br>Contact Area (IP)                  |  | 67           |
| Degree of Protection Rear Side<br>Contact Area (IP)                   |  | 40 / 67      |

| <b>Ring Illumination</b>                  |  |           |
|---|--|-----------|
| Supply Voltage<br>Ring Illumination (VDC) |  | 5/ 12/ 24 |

➤ *Other supply voltages on request*

*\*The degree of protection refers to the area of the movable actuator.*

| Changes that contribute to technical improvement are subject to alternations |               |            |                 |               |               |                |       |
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| <b>Point Illumination</b>                               | <b>Attention: Parts are delivered without series resistor.</b>                                     |
|---|--|
| Characteristics <b>red LED</b><br>Point Illumination    | Forward Current max. 30 mA<br>Forward Voltage at 10 mA = 1.9 VDC<br>Forward Voltage max. = 3.0 VDC |
| Characteristics <b>green LED</b><br>Point Illumination  | Forward Current max. 30 mA<br>Forward Voltage at 10 mA = 2.1 VDC<br>Forward Voltage max. = 3.0 VDC |
| Characteristics <b>yellow LED</b><br>Point Illumination | Forward Current max. 30 mA<br>Forward Voltage at 10 mA = 2.1 VDC<br>Forward Voltage max. = 3.0 VDC |
| Characteristics <b>blue LED</b><br>Point Illumination   | Forward Current max. 20 mA<br>Forward Voltage at 8 mA = 3.7 VDC<br>Forward Voltage max. = 4.5 VDC  |
| Characteristics <b>white LED</b><br>Point Illumination  | Forward Current max. 30 mA<br>Forward Voltage at 20 mA = 3.6 VDC<br>Forward Voltage max. = 4.0 VDC |

**Recommendation of series resistors for Point Illumination:**

| LED-Color | I <sub>D</sub><br>[mA] | I <sub>DMax</sub><br>[mA] | U <sub>V</sub> = 5    |                                      |                         |      | U <sub>V</sub> = 12   |                                      |                         |      | U <sub>V</sub> = 24   |                                      |                       |  |
|-----------|------------------------|---------------------------|-----------------------|--------------------------------------|-------------------------|------|-----------------------|--------------------------------------|-------------------------|------|-----------------------|--------------------------------------|-----------------------|--|
|           |                        |                           | R <sub>V</sub><br>[Ω] | R <sub>V</sub> <sup>E24</sup><br>[Ω] | P <sub>V</sub><br>[W]** |      | R <sub>V</sub><br>[Ω] | R <sub>V</sub> <sup>E24</sup><br>[Ω] | P <sub>V</sub><br>[W]** |      | R <sub>V</sub><br>[Ω] | R <sub>V</sub> <sup>E24</sup><br>[Ω] | P <sub>V</sub><br>[W] |  |
| red       | 10                     | ---                       | 310                   | 330                                  | 0,03                    | 1010 | 1000                  | 0,10                                 |                         | 2210 | 2200                  | 0,22                                 |                       |  |
|           | ---                    | 30                        | 67                    | 68                                   | 0,06                    | 300  | 300                   | 0,27                                 |                         | 700  | 750                   | 0,63                                 |                       |  |
| green     | 10                     | ---                       | 290                   | 300                                  | 0,03                    | 990  | 1000                  | 0,10                                 |                         | 2190 | 2200                  | 0,22                                 |                       |  |
|           | ---                    | 30                        | 67                    | 68                                   | 0,06                    | 300  | 300                   | 0,27                                 |                         | 700  | 750                   | 0,63                                 |                       |  |
| Yellow    | 10                     | ---                       | 290                   | 300                                  | 0,03                    | 990  | 1000                  | 0,10                                 |                         | 2190 | 2200                  | 0,22                                 |                       |  |
|           | ---                    | 30                        | 67                    | 68                                   | 0,06                    | 300  | 300                   | 0,27                                 |                         | 700  | 750                   | 0,63                                 |                       |  |
| blue      | 8                      | ---                       | 163                   | 160                                  | 0,01                    | 1038 | 1100                  | 0,07                                 |                         | 2538 | 2700                  | 0,16                                 |                       |  |
|           | ---                    | 20                        | 25                    | 27                                   | 0,01                    | 375  | 390                   | 0,15                                 |                         | 975  | 1000                  | 0,39                                 |                       |  |
| white     | 10                     | ---                       | 140                   | 150                                  | 0,01                    | 840  | 820                   | 0,08                                 |                         | 2040 | 2200                  | 0,20                                 |                       |  |
|           | ---                    | 30                        | 33                    | 33                                   | 0,03                    | 267  | 270                   | 0,24                                 |                         | 667  | 680                   | 0,60                                 |                       |  |

I<sub>D</sub> LED-Forward Current [8mA/10mA]  
I<sub>DMax</sub> LED-Forward Current max. [20mA/30mA]  
R<sub>V</sub> Series Resistor (calculated)  
R<sub>V</sub><sup>E24</sup> Series Resistor (regarding E24-Resistor series)  
P<sub>V</sub> Power dissipation concerning R<sub>V</sub> (calculated)

Changes that contribute to technical improvement are subject to alternations

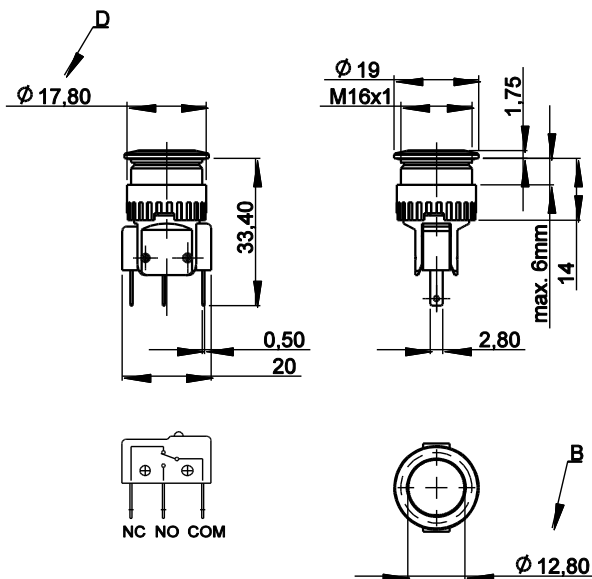
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| <u>Material</u>                      |                 |
|--------------------------------------|-----------------|
| Component                            | Material        |
| Housing                              | Stainless Steel |
| Actuator                             | Stainless Steel |
| Light Conductor (Point Illumination) | PC              |
| Illuminated Ring (Ring Illumination) | PA              |
| Gasket                               | NBR70           |
| Micro switch holder                  | PA              |

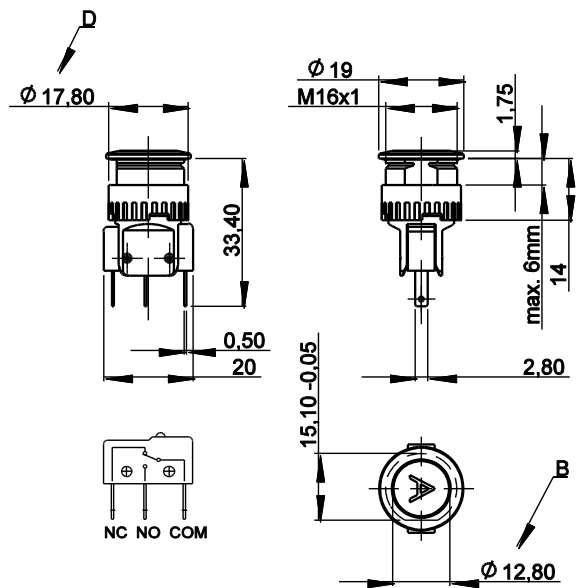
## 2.2 Component dimensions

### 2.2.1 Component dimensions MSM 16

#### MSM 16 ST



#### MSM 16 LE



### Legend

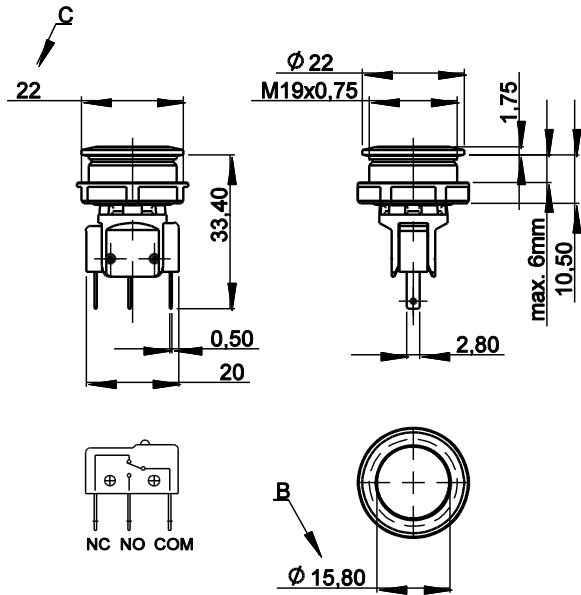
- A = Illumination Area
- B = Actuating Area
- C = Width Across Flats
- D = Knurled Nut

Changes that contribute to technical improvement are subject to alternations

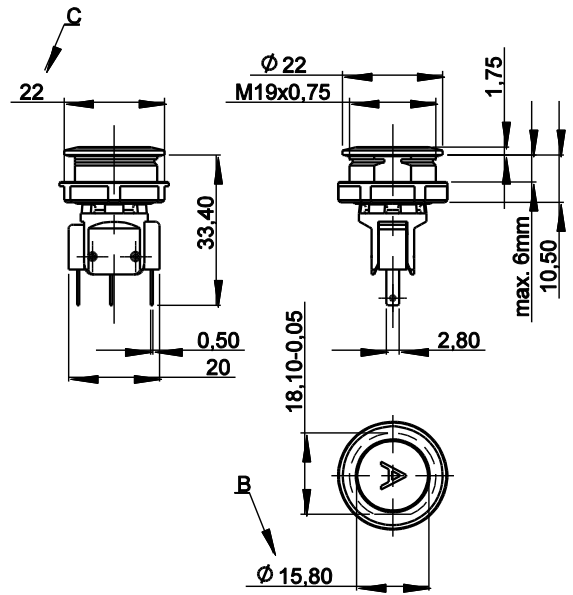
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2.2.2 Component dimensions MSM 19

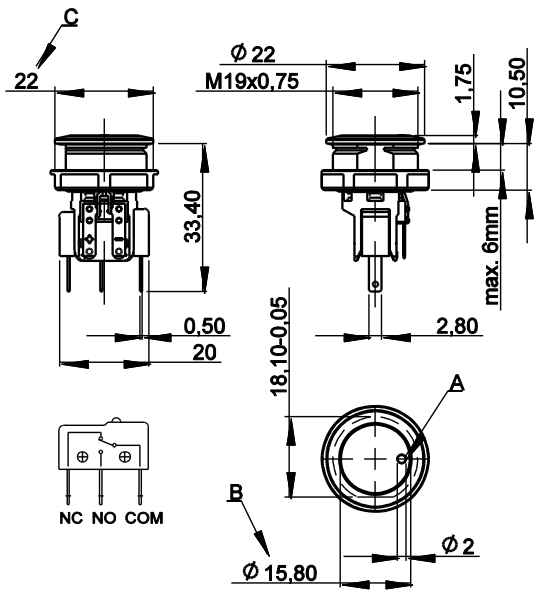
**MSM 19 ST**



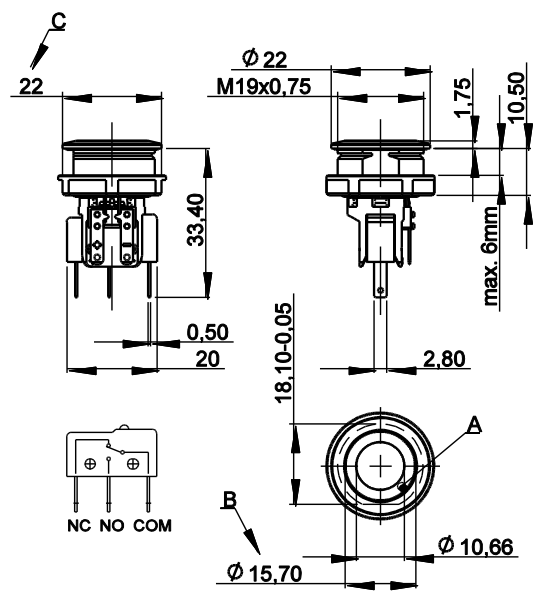
**MSM 19 LE**



**MSM 19 PI**



**MSM 19 RI**



**Legend**

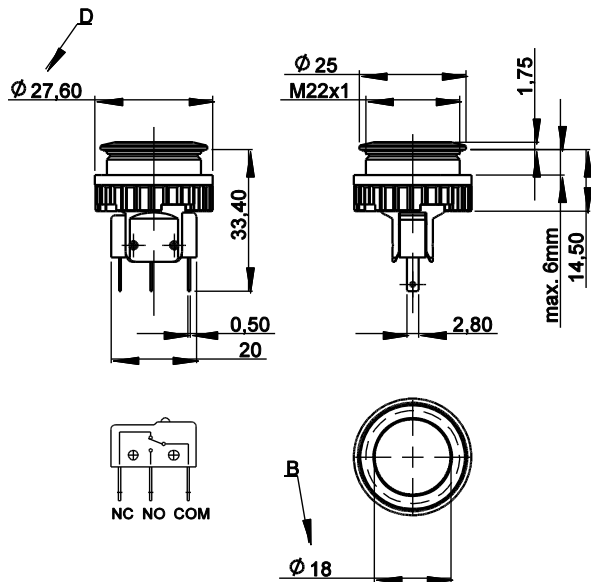
- A = Illumination Area
- B = Actuating Area
- C = Width Across Flats
- D = Knurled Nut

Changes that contribute to technical improvement are subject to alternations

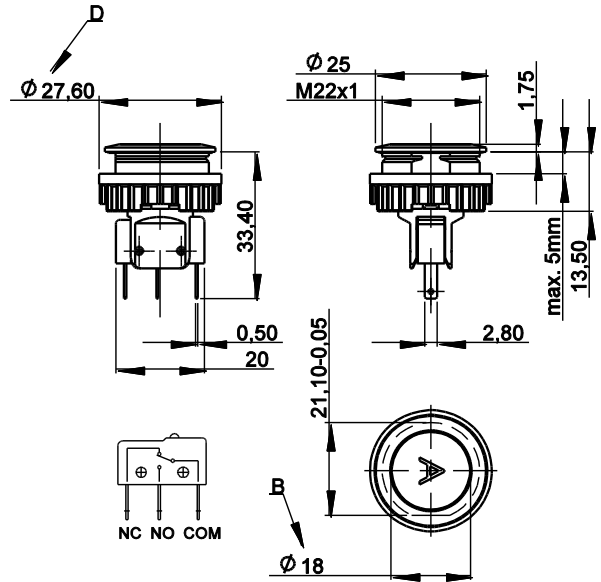
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### 2.2.3 Component dimensions MSM 22

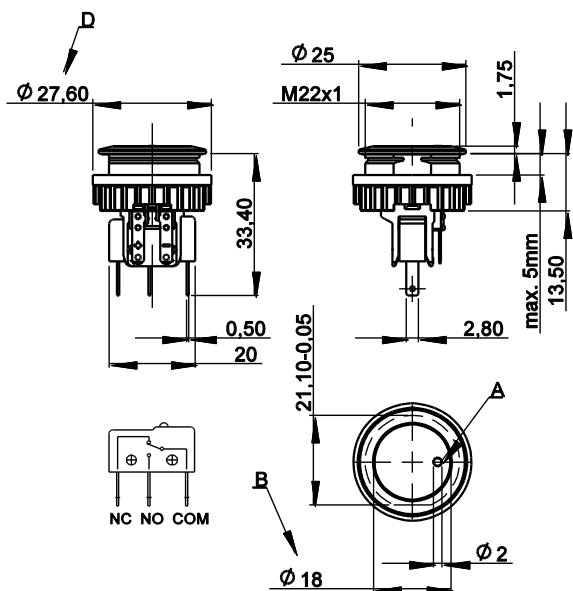
#### MSM 22 ST



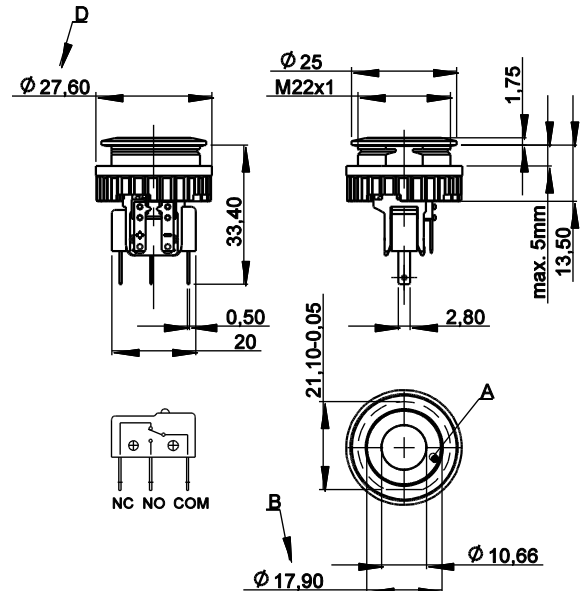
#### MSM 22 LE



#### MSM 22 PI



#### MSM 22 RI



#### Legend

- *A* = Illumination Area
- *B* = Actuating Area
- *C* = Width Across Flats
- *D* = Knurled Nut

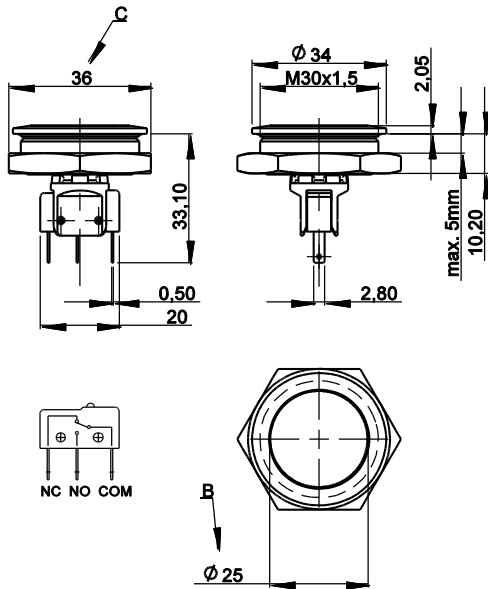
Changes that contribute to technical improvement are subject to alternations

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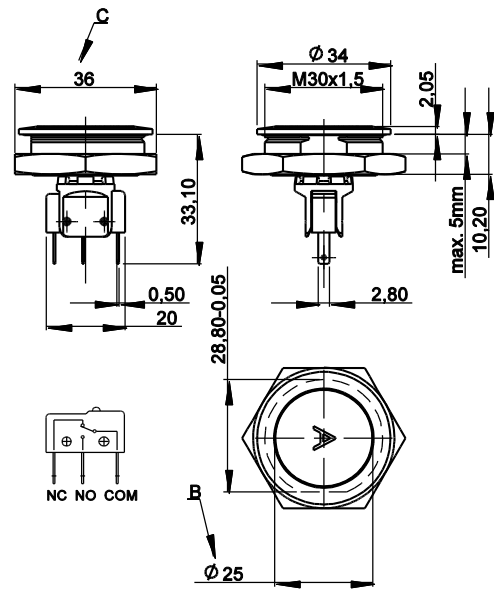


2.2.4 Component dimensions MSM 30

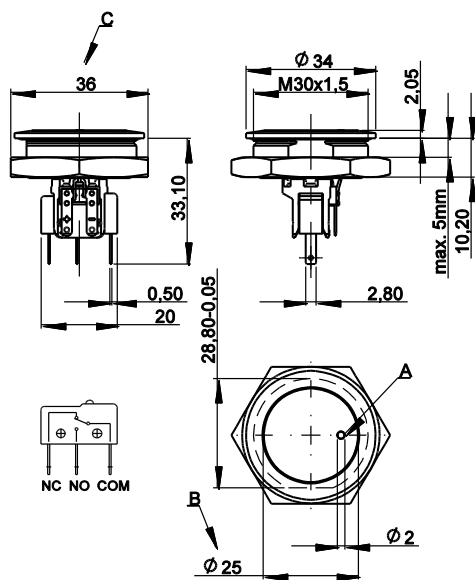
MSM 30 ST



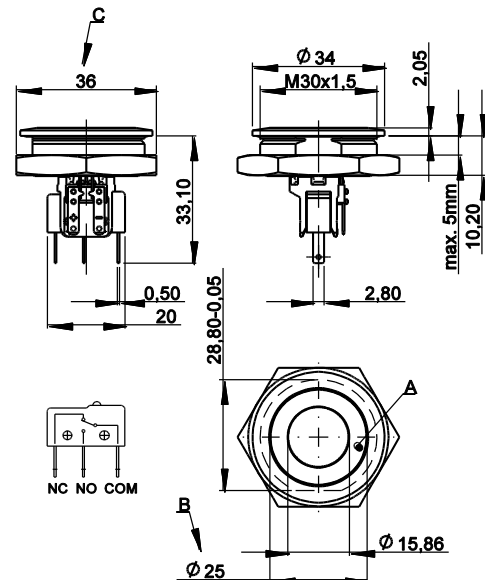
MSM 30 LE



MSM 30 PI



MSM 30 RI



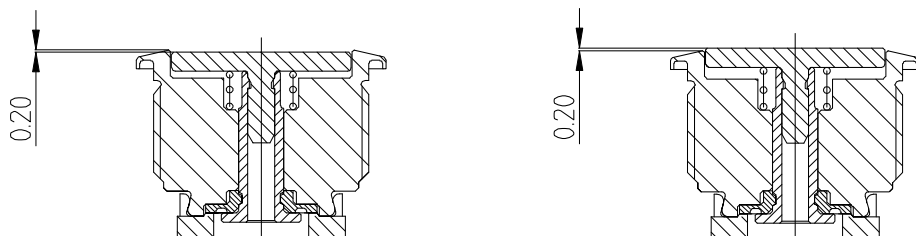
**Legend**

- A = Illumination Area
- B = Actuating Area
- C = Width Across Flats
- D = Knurled Nut

Changes that contribute to technical improvement are subject to alternations

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### 2.3 Actuator Tolerance Range



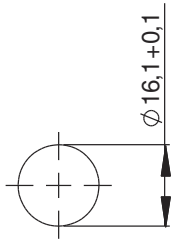
The mounting tolerance range of the actuator varies from 0.2 mm projection length and 0.2 mm short length to the housing edge. The slanting position of the actuator can range within this tolerance.

Changes that contribute to technical improvement are subject to alternations

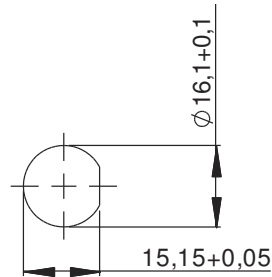
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**2.4 Hole dimensions**

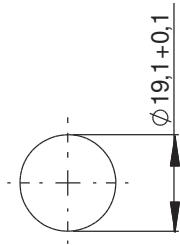
**MSM 16 ST**



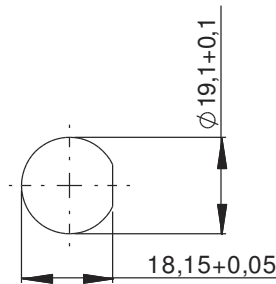
**MSM 16 LE**



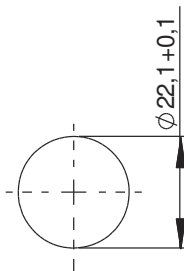
**MSM 19 ST / MSM 19 RI**



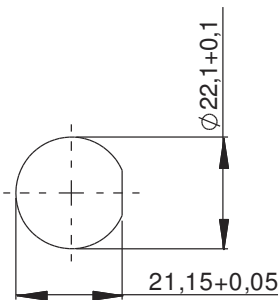
**MSM 19 LE / MSM 19 PI / MSM 19 RI optional**



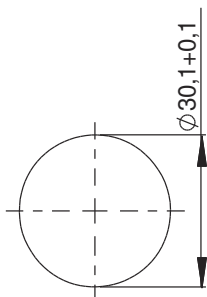
**MSM 22 ST / MSM 22 RI**



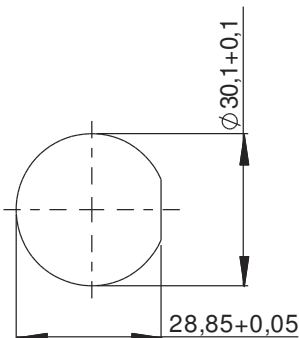
**MSM 22 LE / MSM 22 PI / MSM 22 RI optional**



**MSM 30 ST / MSM 30 RI**



**MSM 30 LE / MSM 30 PI / MSM 30 RI optional**



Changes that contribute to technical improvement are subject to alternations

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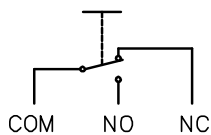
## 2.5 Starting Torque

|        | Plastic Nut max. (Nm) | Stainless Steel Nut * max. (Nm) |
|--------|-----------------------|---------------------------------|
| MSM 16 | 2                     | 10                              |
| MSM 19 | 4.5                   | 12                              |
| MSM 22 | 3.5                   | 16                              |
| MSM 30 | 8                     | 50                              |

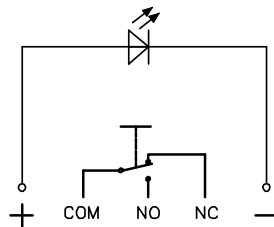
➤ \* on request

## 2.6 Switching Symbols

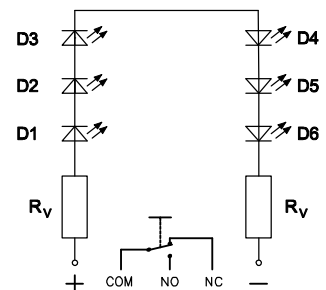
**MSM ST / MSM LE**



**MSM PI**



**MSM RI**



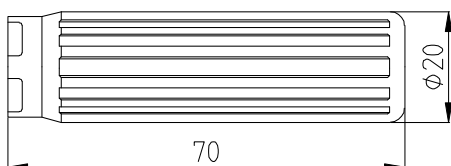
Changes that contribute to technical improvement are subject to alternations

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## 2.7 Accessories

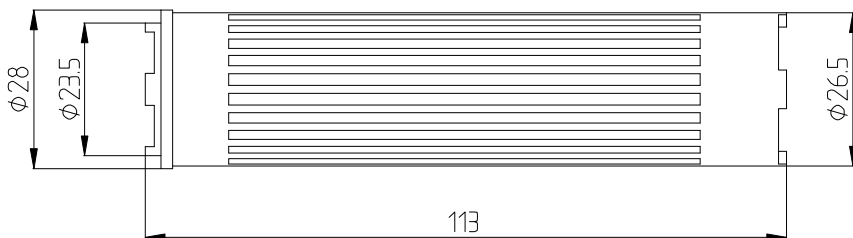
### MSM 16 Installation wrench

Order number: 0853.0622



### MSM 22 Installation wrench

Order number: 1141.1337



| Changes that contribute to technical improvement are subject to alternations |               |            |                 |               |               |                |       |
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### 3 ORDER NUMBERS

#### 3.1 Order numbers MSM with stainless steel housing and micro switches of protection class IP40

| Mounting Diameter (mm)                       | Ø 16              | Ø 19                     | Ø 22                     |
|--|-------------------|--------------------------|--------------------------|
| <b>Electrical Rating max. 0.1 A / 30 VDC</b> |                   |                          |                          |
| Standard                                     | 1241.6611.1110000 | 1241.6621.1110000        | 1241.6631.1110000        |
| With Lettering                               | 1241.6612.1110XXX | 1241.6622.1110XXX        | 1241.6632.1110XXX        |
| Point Illumination red                       |                   | 1241.6623.1111000        | 1241.6633.1111000        |
| Point Illumination green                     |                   | 1241.6623.1112000        | 1241.6633.1112000        |
| <i>Point Illumination blue</i>               |                   | <i>1241.6623.1114000</i> | <i>1241.6633.1114000</i> |
| Ring Illumination red                        |                   | 1241.6624.1111000        | 1241.6634.1111000        |
| Ring Illumination green                      |                   | 1241.6624.1112000        | 1241.6634.1112000        |
| <i>Ring Illumination blue</i>                |                   | <i>1241.6624.1114000</i> | <i>1241.6634.1114000</i> |
| Installation Wrench                          | 0853.0622         |                          | 1141.1337                |

| <b>Electrical Rating max. 5 A / 125 VAC or 3 A / 250 VAC</b> |                   |                   |                   |
|--|-------------------|-------------------|-------------------|
| Standard   | 1241.6611.1120000 | 1241.6621.1120000 | 1241.6631.1120000 |
| With Lettering   | 1241.6612.1120XXX | 1241.6622.1120XXX | 1241.6632.1120XXX |
| Point Illumination red                                       |                   | 1241.6623.1121000 | 1241.6633.1121000 |
| Point Illumination green                                     |                   | 1241.6623.1122000 | 1241.6633.1122000 |
| Point Illumination blue                                      |                   | 1241.6623.1124000 | 1241.6633.1124000 |
| Ring Illumination red  |                   | 1241.6624.1121000 | 1241.6634.1121000 |
| Ring Illumination green                                      |                   | 1241.6624.1122000 | 1241.6634.1122000 |
| Ring Illumination blue                                       |                   | 1241.6624.1124000 | 1241.6634.1124000 |
| Installation Wrench  | 0853.0622         |                   | 1141.1337         |

| <b>Electrical Rating max. 10 A / 250 VAC</b> |                   |                          |                          |
|--|-------------------|--------------------------|--------------------------|
| Standard                                     | 1241.6611.1130000 | 1241.6621.1130000        | 1241.6631.1130000        |
| With Lettering                               | 1241.6612.1130XXX | 1241.6622.1130XXX        | 1241.6632.1130XXX        |
| Point Illumination red                       |                   | 1241.6623.1131000        | 1241.6633.1131000        |
| Point Illumination green                     |                   | 1241.6623.1132000        | 1241.6633.1132000        |
| <i>Point Illumination blue</i>               |                   | <i>1241.6623.1134000</i> | <i>1241.6633.1134000</i> |
| Ring Illumination red                        |                   | 1241.6624.1131000        | 1241.6634.1131000        |
| Ring Illumination green                      |                   | 1241.6624.1132000        | 1241.6634.1132000        |
| <i>Ring Illumination blue</i>                |                   | <i>1241.6624.1134000</i> | <i>1241.6634.1134000</i> |
| Installation Wrench                          | 0853.0622         |                          | 1141.1337                |

- *Italic written types on request*
- *XXX for standard lettering see chapter [3.6 Lettering](#)*
- *At a minimum order quantity of 100 pieces the ring illuminated Version with Lettering is available on request*

|  |                          |
|--|--------------------------|
| Mounting Diameter (mm)                                       | Ø 30                     |
| <b>Electrical Rating max. 0.1 A / 30 VDC</b>                 |                          |
| Standard   | 1241.6661.1110000        |
| With Lettering   | 1241.6662.1110XXX        |
| Point Illumination red                                       | 1241.6663.1111000        |
| Point Illumination green                                     | 1241.6663.1112000        |
| <i>Point Illumination blue</i>                               | <i>1241.6663.1114000</i> |
| Ring Illumination red  | 1241.6664.1111000        |
| Ring Illumination green                                      | 1241.6664.1112000        |
| <i>Ring Illumination blue</i>                                | <i>1241.6664.1114000</i> |
| <b>Electrical Rating max. 5 A / 125 VAC or 3 A / 250 VAC</b> |                          |
| Standard   | 1241.6661.1120000        |
| With Lettering   | 1241.6662.1120XXX        |
| Point Illumination red                                       | 1241.6663.1121000        |
| Point Illumination green                                     | 1241.6663.1122000        |
| <i>Point Illumination blue</i>                               | <i>1241.6663.1124000</i> |
| Ring Illumination red  | 1241.6664.1121000        |
| Ring Illumination green                                      | 1241.6664.1122000        |
| <i>Ring Illumination blue</i>                                | <i>1241.6664.1124000</i> |
| <b>Electrical Rating max. 10 A / 250 VAC</b>                 |                          |
| Standard   | 1241.6661.1130000        |
| With Lettering   | 1241.6662.1130XXX        |
| Point Illumination red                                       | 1241.6663.1131000        |
| Point Illumination green                                     | 1241.6663.1132000        |
| <i>Point Illumination blue</i>                               | <i>1241.6663.1134000</i> |
| Ring Illumination red  | 1241.6664.1131000        |
| Ring Illumination green                                      | 1241.6664.1132000        |
| <i>Ring Illumination blue</i>                                | <i>1241.6664.1134000</i> |

- *Italic written types on request*
- *XXX for standard lettering see chapter [3.6 Lettering](#)*
- *At a minimum order quantity of 100 pieces the ring illuminated Version with Lettering is available on request*

### 3.2 Order numbers MSM with stainless steel housing and micro switches of protection class IP 67

| Mounting Diameter (mm)             | Ø 19              | Ø 22              |
|------------------------------------|-------------------|-------------------|
| Electrical Rating max. 5A / 250VAC |                   |                   |
| Standard                           | 1241.6621.1180000 | 1241.6631.1180000 |
| Ring Illumination red              | 1241.6624.1181000 | 1241.6634.1181000 |

Combinations with micro switches of the protection class IP 67 are available for following types on request:

- Standard
- With Lettering
- Point Illumination red / green / yellow / blue / white
- Ring Illumination red / green / yellow / blue / white

For other types of the MSM product family, please visit:

[http://www.schurter.de/wwwsc/con\\_pg70.asp?language\\_id=10](http://www.schurter.de/wwwsc/con_pg70.asp?language_id=10)

### 3.3 Order numbers MSM with aluminium housing anodised and micro switches of protection class IP 40

| Mounting Diameter (mm)              | Ø 19              | Ø 22              |
|-------------------------------------|-------------------|-------------------|
| Electrical Rating max. 5A / 250VAC  |                   |                   |
| Standard, housing red               | 1241.6622.3120000 | 1241.6632.3120000 |
| Standard, housing green             | 1241.6622.5120000 | 1241.6632.5120000 |
| With Lettering „AUS“, housing red   | 1241.6622.3120062 | 1241.6632.3120062 |
| With Lettering „EIN“, housing green | 1241.6622.5120061 | 1241.6632.5120061 |
| With Lettering “OFF“, housing red   | 1241.6622.3120066 | 1241.6632.3120066 |
| With Lettering ”ON“, housing green  | 1241.6622.5120065 | 1241.6632.5120065 |

For other types of the MSM product family, please visit:

[http://www.schurter.de/wwwsc/con\\_pg70.asp?language\\_id=10](http://www.schurter.de/wwwsc/con_pg70.asp?language_id=10)



### 3.4 Order numbers MSM module actuator element with stainless steel housing

The ring illuminated version is available for supply voltages 5, 12 and 24 VDC, a resistor is integrated. This part has to be ordered together with the accessory module switch contact (see 3.5).

| Mounting Diameter (mm)          | Ø 16      | Ø 19        | Ø 22        | Ø 30        |
|---------------------------------|-----------|-------------|-------------|-------------|
| Standard                        | 0865.9841 | 0865.9842   | 0865.9843   | 0865.9873   |
| With Lettering                  | 0865.9844 | 0865.9845   | 0865.9846   | 0865.9877   |
| Point Illumination red          |           | 0865.9847.1 | 0865.9848.1 | 0865.9881.1 |
| Point Illumination green        |           | 0865.9847.2 | 0865.9848.2 | 0865.9881.2 |
| Point Illumination yellow       |           | 0865.9847.3 | 0865.9848.3 | 0865.9881.3 |
| Point Illumination blue         |           | 0865.9847.4 | 0865.9848.4 | 0865.9881.4 |
| Point Illumination white        |           | 0865.9847.5 | 0865.9848.5 | 0865.9881.5 |
| Ring Illumination red 24 VDC    |           | 0865.9849.1 | 0865.9850.1 | 0865.9885.1 |
| Ring Illumination green 24 VDC  |           | 0865.9849.2 | 0865.9850.2 | 0865.9885.2 |
| Ring Illumination yellow 24 VDC |           | 0865.9849.3 | 0865.9850.3 | 0865.9885.3 |
| Ring Illumination blue 24 VDC   |           | 0865.9849.4 | 0865.9850.4 | 0865.9885.4 |
| Ring Illumination white 24 VDC  |           | 0865.9849.5 | 0865.9850.5 | 0865.9885.5 |
| Ring Illumination red 12 VDC    |           | 0865.9894.1 | 0865.9895.1 | 0865.9898.1 |
| Ring Illumination green 12 VDC  |           | 0865.9894.2 | 0865.9895.2 | 0865.9898.2 |
| Ring Illumination yellow 12 VDC |           | 0865.9894.3 | 0865.9895.3 | 0865.9898.3 |
| Ring Illumination blue 12 VDC   |           | 0865.9894.4 | 0865.9895.4 | 0865.9898.4 |
| Ring Illumination white 12 VDC  |           | 0865.9894.5 | 0865.9895.5 | 0865.9898.5 |
| Ring Illumination red 5 VDC     |           | 0865.7106.1 | 0865.7107.1 |             |
| Ring Illumination green 5 VDC   |           | 0865.7106.2 | 0865.7107.2 |             |
| Ring Illumination yellow 5 VDC  |           | 0865.7106.3 | 0865.7107.3 |             |
| Ring Illumination blue 5 VDC    |           | 0865.7106.4 | 0865.7107.4 |             |
| Ring Illumination white 5 VDC   |           | 0865.7106.5 | 0865.7107.5 |             |

### 3.5 Order numbers MSM module micro switch

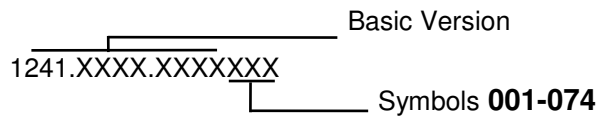
| Micro switches | 0,1 A @ 30 VDC<br>IP40 | 5 A @ 125 VAC<br>3 A @ 250 VAC<br>IP40 | 10 A @ 250 VAC<br>IP40 | 5 A @ 250 VAC<br>IP67 |
|----------------|------------------------|--|------------------------|-----------------------|
|                | 0865.9851              | 0865.9852                              | 0865.9853              | 0865.9891             |

### 3.6 Lettering

The last three digits in the order number define the lettering.

|         |                      |
|---------|----------------------|
| 000     | No Lettering         |
| 001-074 | Standard Lettering   |
| 101-    | Customized Lettering |

#### Example for ordering with lettering



#### Ordering Indices for Lettering

|               |               |               |                    |                    |
|---------------|---------------|---------------|--------------------|--------------------|
| 001= <b>A</b> | 016= <b>P</b> | 031= <b>4</b> | 046= ↕             | 061= <b>EIN</b>    |
| 002= <b>B</b> | 017= <b>Q</b> | 032= <b>5</b> | 047= →             | 062= <b>AUS</b>    |
| 003= <b>C</b> | 018= <b>R</b> | 033= <b>6</b> | 048= ←             | 063= <b>AUF</b>    |
| 004= <b>D</b> | 019= <b>S</b> | 034= <b>7</b> | 049= ↓             | 064= <b>AB</b>     |
| 005= <b>E</b> | 020= <b>T</b> | 035= <b>8</b> | 050= ↑             | 065= <b>ON</b>     |
| 006= <b>F</b> | 021= <b>U</b> | 036= <b>9</b> | 051= %             | 066= <b>OFF</b>    |
| 007= <b>G</b> | 022= <b>V</b> | 037= +        | 052= √             | 067= <b>UP</b>     |
| 008= <b>H</b> | 023= <b>W</b> | 038= –        | 053= <b>CTRL</b>   | 068= <b>DOWN</b>   |
| 009= <b>I</b> | 024= <b>X</b> | 039= .        | 054= <b>RETURN</b> | 069= <b>HIGH</b>   |
| 010= <b>J</b> | 025= <b>Y</b> | 040= ×        | 055= <b>SHIFT</b>  | 070= <b>LOW</b>    |
| 011= <b>K</b> | 026= <b>Z</b> | 041= ÷        | 056= <b>LOCK</b>   | 071= <b>ON/OFF</b> |
| 012= <b>L</b> | 027= <b>0</b> | 042= *        | 057= <b>STOP</b>   | 072= <b>START</b>  |
| 013= <b>M</b> | 028= <b>1</b> | 043= =        | 058= <b>ENTER</b>  | 073= <b>RESET</b>  |
| 014= <b>N</b> | 029= <b>2</b> | 044= #        | 059= <b>BACK</b>   | 074=               |
| 015= <b>O</b> | 030= <b>3</b> | 045= ↔        | 060= <b>LINE</b>   |                    |

#### Lettering Colour of Laser Lettering

| <u>Material</u> | <u>Lettering Colour</u> |
|-----------------|-------------------------|
| Stainless Steel | black Filled letters    |

| Changes that contribute to technical improvement are subject to alternations |               |            |                 |               |               |                |       |
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## Lettering Size

### **MSM 16 LE:**

**Single characters:** height 5 mm, font: Helvetica normal DIN1451-1E  
**Text, max. 3 characters** height 3 mm, font: Helvetica normal DIN1451-1E  
**Text, max. 6 characters:** height 2.5 mm, font: Helvetica condensed DIN1451-3E  
**Symbols (indices 037-052):** capitals height 5 mm, font: True Type, Symbol

### **MSM 19 LE / MSM 19 PI :**

**Single characters:** height 8 mm, font: Helvetica normal DIN1451-1E  
**Text, max. 3 characters** height 3 mm, font: Helvetica normal DIN1451-1E  
**Text, max. 6 characters:** height 2.5 mm, font: Helvetica condensed DIN1451-3E  
**Symbols (indices 037-052):** capitals height 8 mm, font: True Type, Symbol

### **MSM 22 LE / MSM 22 PI :**

**Single characters:** height 8 mm, font: Helvetica normal DIN1451-1E  
**Text, max. 3 characters** height 5 mm, font: Helvetica normal DIN1451-1E  
**Text, max. 6 characters:** height 2.5 mm, font: Helvetica condensed DIN1451-3E  
**Symbols (indices 037-052):** capitals height 8 mm, font: True Type, Symbol

### **MSM 30 LE / MSM 30 PI :**

**Single characters:** height 12 mm, font: Helvetica normal DIN1451-1E  
**Text, max. 3 characters:** height 7 mm, font: Helvetica normal DIN1451-1E  
**Text, max. 6 characters:** height 3.5 mm, font: Helvetica condensed DIN1451-3E  
**Symbols (indices 037-052):** capitals height 12 mm, font: True Type, Symbol

### **MSM 19 RI \* / MSM 22 RI \*:**

**Single characters:** height 5 mm, font: Helvetica normal DIN1451-1E  
**Text, max. 3 characters** height 3 mm, font: Helvetica normal DIN1451-1E  
**Symbols (indices 037-052):** capitals height 5 mm, font: True Type, Symbol

### **MSM 30 RI \*:**

**Single characters:** height 8 mm, font: Helvetica normal DIN1451-1E  
**Text, max. 3 characters** height 3 mm, font: Helvetica normal DIN1451-1E  
**Text, max. 6 characters:** height 2.5 mm, font: Helvetica condensed DIN1451-3E  
**Symbols (indices 037-052):** capitals height 8 mm, font: True Type, Symbol

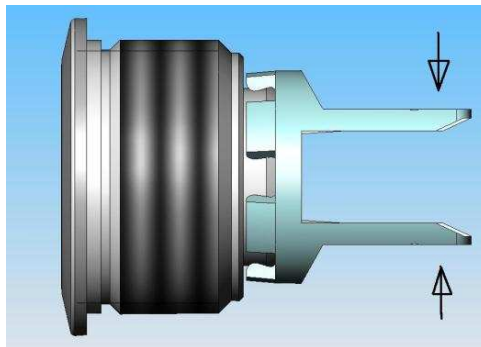
- *\* At a minimum order quantity of 100 pieces the ring illuminated Version with Lettering is available on request*

| Changes that contribute to technical improvement are subject to alternations |               |            |                 |               |               |                |       |
|--|---------------|------------|-----------------|---------------|---------------|----------------|-------|
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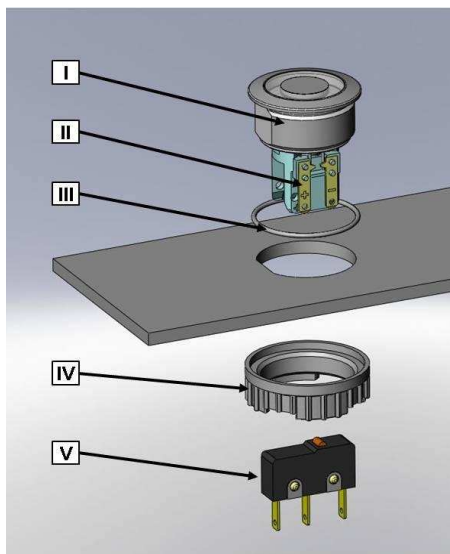
## 4 ASSEMBLY

### 4.1 General Instruction

- During assembly, the protruding bars of the holder should not be pressed together.



### 4.2 Installation



#### Installation instruction

1. Place the gasket accurately on the actuator housing. Then mount the actuator housing assembly into the panel.
2. Tighten the screw nut with the torque instructions according to [Chapter 2.5](#)
3. Clasp the module switching contact into the micro switch holder of the actuator housing.

#### Installation information:

1. The power supply and the configuration of the flat pin terminals have to be installed correctly for the illumination and micro switch function.
2. Insulate the terminals as required. Fully insulated plug-in sleeves are recommended.
3. Installation instructions according to VDE-standard DIN VDE 0100-100 or alternatively IEC 60354 standard. During assembly please mind that there is no tensile or pressure load on the connection of the MSM through the cable connection. A corresponding wire lead, running of cables and strain relief has to be arranged.

#### Legend

- I = Housing
- II = Flat Pin Terminals(Illumination)
- III = Gasket
- IV = Module Switching Contact
- V = Module Switching Contact

Changes that contribute to technical improvement are subject to alternations

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## 5 PACKAGING

### MSM Switch

|        |                            |                              |
|--------|----------------------------|------------------------------|
| MSM 16 |                            | 10 pieces per box with inlay |
| MSM 19 |                            | 10 pieces per box with inlay |
| MSM 22 |                            | 10 pieces per box with inlay |
| MSM 30 | 1 piece in air cushion bag | 10 pieces per box            |

The nuts with gaskets and corresponding micro switches are packed separately and enclosed in the box.



| Changes that contribute to technical improvement are subject to alternations |               |            |                 |               |               |                |       |
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**MSM module actuator element**

|        |                            |                              |
|--------|----------------------------|------------------------------|
| MSM 16 |                            | 10 pieces per box with inlay |
| MSM 19 |                            | 10 pieces per box with inlay |
| MSM 22 |                            | 10 pieces per box with inlay |
| MSM 30 | 1 piece in air cushion bag | 10 pieces per box            |

The nuts with gaskets are packed separately and enclosed in the box.



**MSM module micro switch**

The microswitch is packed in bags with 10 pieces.



|  |               |            |                 |               |               |                |       |
|--|---------------|------------|-----------------|---------------|---------------|----------------|-------|
| Changes that contribute to technical improvement are subject to alternations |               |            |                 |               |               |                |       |
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## 6 QUALIFICATION TEST

### 6.1 IP Protection Class

|                                       |       |
|---------------------------------------|-------|
| IP Protection Class IEC/DIN/EN/ 60529 | IP 67 |
|---------------------------------------|-------|

### 6.2 IK Protection Class

Tested Centrally

|   |       |
|---|-------|
| IK Protection Class DIN EN 50102<br>Mounting Diameter 16 mm         | IK 06 |
| IK Protection Class DIN EN 50102<br>Mounting Diameter 19, 22, 30 mm | IK 07 |

### 6.3 ESD Protection

ESD-Test according to DIN 61000-4-2:

|                       |        |                     |
|-----------------------|--------|---------------------|
| 4kV Contact Discharge | MSM ST | Ø 16; 19; 22; 30 mm |
| 4kV Contact Discharge | MSM LE | Ø 16; 19; 22; 30 mm |

### 6.4 Salt Spray Test

Salt spray test according to DIN 50021- SS  
24h, 48h and 96h residence time

The surface of the stainless steel material is covered with a molecular-passive layer. Only under very unfavourable conditions it is possible, that iron and rust molecules as well as base metals penetrate the passive layer as foreign substances (pollutions) and initiate the rust process.

The smoothness of the actuator was not affected. After the residence time the tested samples were cleaned under running water and all rust spots could be removed.

|  |               |            |                 |               |               |                |       |
|--|---------------|------------|-----------------|---------------|---------------|----------------|-------|
| Changes that contribute to technical improvement are subject to alternations |               |            |                 |               |               |                |       |
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## 7 APPROVALS

The listed approvals only refer to the micro switch and not to the complete switch.

### Micro switch:

| Electrical Rating of Switch    | Micro Switch IP Protection Class | Micro Switch Type | Manufacturer                                     | Testing Laboratory | Licence Number |
|--------------------------------|----------------------------------|-------------------|--|--------------------|----------------|
| 0,1 A, 30 VDC                  | IP 40                            | SS-01 T           | Omron Corporation                                | VDE, ENEC          | 40008425       |
|                                |                                  |                   |  | UL / CSA           | E41515         |
|                                |                                  |                   |  | TÜV Rheinland      |                |
| 5 A, 125 VAC /<br>3 A, 250 VAC | IP 40                            | SS-5 T            | Omron Corporation                                | VDE, ENEC          | 129246         |
|                                |                                  |                   |  | UL / CSA           | E41515         |
|                                |                                  |                   |  | TÜV Rheinland      |                |
| 10 A, 250 VAC                  | IP 40                            | SS-10 T           | Omron Corporation                                | VDE, ENEC          | 125256         |
|                                |                                  |                   |  | UL / CSA           | E41515         |
|                                |                                  |                   |  | TÜV Rheinland      |                |
| 0,1 A, 30 VDC                  | IP 40                            | 1050.1151         | Marquardt GmbH                                   | VDE, ENEC          | 097550         |
|                                |                                  |                   |  | UL / CSA           | E41791         |
| 5 A, 125 VAC /<br>3 A, 250 VAC | IP 40                            | 1050.1102         | Marquardt GmbH                                   | VDE, ENEC          | 097550         |
|                                |                                  |                   |  | UL / CSA           | E41791         |
| 10 A, 250 VAC                  | IP 40                            | 1050.1103         | Marquardt GmbH                                   | VDE, ENEC          | 097550         |
|                                |                                  |                   |  | UL / CSA           | E41791         |
| 0,1 A, 30 VDC                  | IP 67                            | DC3GL1AA          | Cherry GmbH /<br>ZF Friedrichshafen<br>(pending) | KEMA, ENEC         | 2089323.01     |
|                                |                                  |                   |  | UL / CSA           | E23301         |
| 5 A, 125 VAC /<br>3 A, 250 VAC | IP 67                            | DC1GL1AA          | Cherry GmbH /<br>ZF Friedrichshafen<br>(pending) | KEMA, ENEC         | 2089323.01     |
|                                |                                  |                   |  | UL / CSA           | E23301         |
| 10 A, 250 VAC                  | IP 67                            | DC2GL1AA          | Cherry GmbH /<br>ZF Friedrichshafen<br>(pending) | KEMA, ENEC         | 2089323.01     |
|                                |                                  |                   |  | UL / CSA           | E23301         |
|                                |                                  | for all types     |  | DIN EN             | 61058-1        |
|                                |                                  |                   |  | UL                 | 1054           |

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## 8 COMPLIANTS

All articles are ROHS-compliant and in compliance to the Low Voltage Directive (2006/95/EC).



| Changes that contribute to technical improvement are subject to alternations |               |            |                 |               |               |                |       |
|--|---------------|------------|-----------------|---------------|---------------|----------------|-------|
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