

Product manual

# Vandal-proof MSM switch

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## 1 PRODUCT DESCRIPTION

Both, the housing and the actuator of the vandal-proof MSM switch are made of high-quality stainless steel. By applying this robust and weather-resistant material, the switch is particularly suitable for the use in harsh environments. The MSM is available with mounting diameters of 16, 19, 22 and 30 mm. Different types of contact cover a range of permissible switching voltages from 30 VDC to 250 VAC, switching currents are permissible from 0.1 to 10 Ampere. The MSM is equipped with flat-pin plugs to permit fast connection. The cables are plugged onto the micro switch which is subsequently plugged onto the previously screwed-in switch. 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> (Protection Class IP 40)	0.1 A 30 VDC	5 A 125 VAC	3 A 250 VAC	10 A 250 VAC
<b>Electrical Data</b>				
Contact Material	gold	silver		silver
Switching Voltage max. (VAC) (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".

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<b>Micro Switch for Electrical Rating</b> (Protection Class IP 67)	0.1 A 250 VAC	5 A 250 VAC	10 A 250 VAC
<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

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

<b>Ring Illumination</b>		
Supply Voltage Ring Illumination (VDC)		24

➤ *Supply Voltage 5 V and 12 V are available. Other supply voltages on request*

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

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<b>Point Illumination</b>	<b>Attention: Parts are delivered without series resistor.</b>
Characteristics <b>red LED</b> Point Illumination	Forward Current max. 40 mA Forward Voltage at 10 mA = 2.0 VDC Forward Voltage max. = 2.5 VDC
Characteristics <b>green LED</b> Point Illumination	Forward Current max. 40 mA Forward Voltage at 10 mA = 2.0 VDC Forward Voltage max. = 2.5 VDC
Characteristics <b>blue LED</b> Point Illumination	Forward Current max. 20 mA Forward Voltage at 10 mA = 3.2 VDC Forward Voltage max. = 3.7 VDC

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

LED-Color	I <sub>D</sub> [mA]	I <sub>DMax</sub> [mA]	U <sub>V</sub> 5				U <sub>V</sub> 12				U <sub>V</sub> 24			
			R <sub>V</sub> [Ω]	R <sub>V</sub> <sup>E24</sup> [Ω]	P <sub>V</sub> [W]**		R <sub>V</sub> [Ω]	R <sub>V</sub> <sup>E24</sup> [Ω]	P <sub>V</sub> [W]**		R <sub>V</sub> [Ω]	R <sub>V</sub> <sup>E24</sup> [Ω]	P <sub>V</sub> [W]	
red	10	---	300	300	0,03		1000	1000	0,10		2200	2200	0,22	
	---	40	63	62	0,10		238	240	0,38		538	240	0,86	
green	10	---	300	300	0,03		1000	1000	0,10		2200	2200	0,22	
	---	40	63	62	0,10		238	240	0,38		538	560	0,86	
blue	10	---	180	180	0,02		880	910	0,09		2080	2000	0,21	
	---	20	65	68	0,03		415	430	0,17		1015	1000	0,41	

I<sub>D</sub> LED-Forward Current [10mA]  
I<sub>DMax</sub> LED-Forward Current max. [40mA/20mA]  
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)

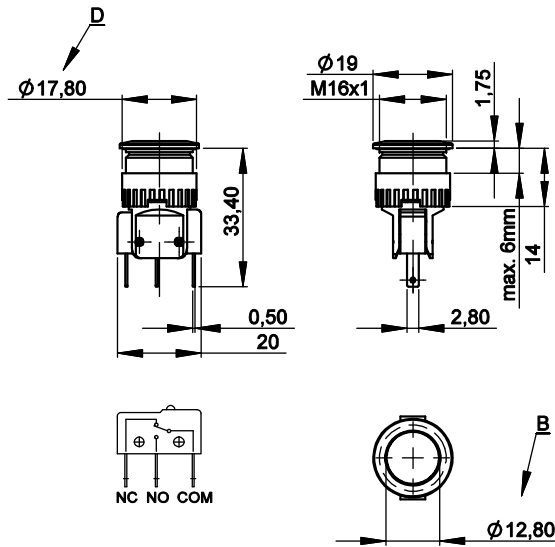
<b>Material</b>	
<b>Component</b>	<b>Material</b>
Housing	Stainless Steel
Actuator	Stainless Steel
Light Conductor (Point Illumination)	PC
Illuminated Ring (Ring Illumination)	PA
Gasket	NBR70
Micro switch holder	PA

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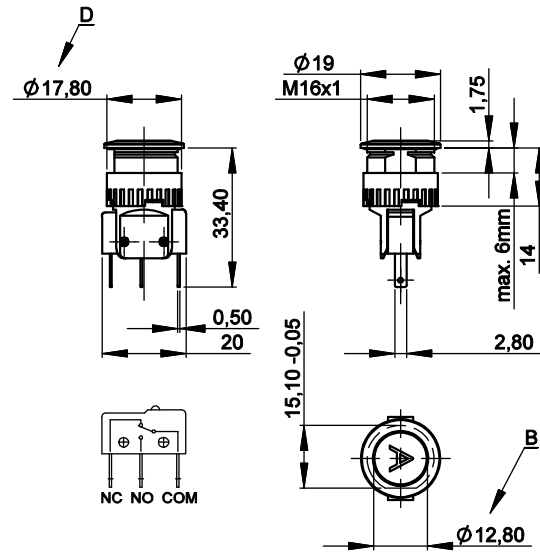
## 2.2 Component dimensions

### 2.2.1 Component dimensions MSM 16

#### MSM 16 ST



#### MSM 16 LE



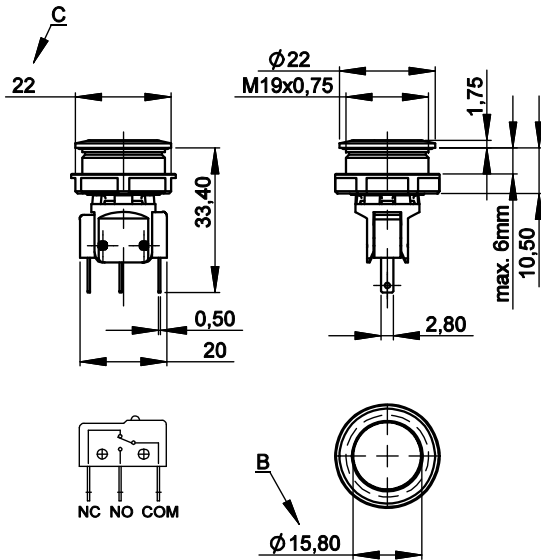
### Legend

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

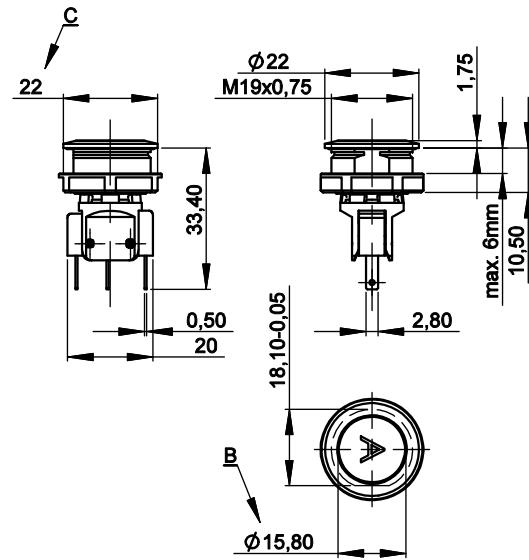
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2.2.2 Component dimensions MSM 19

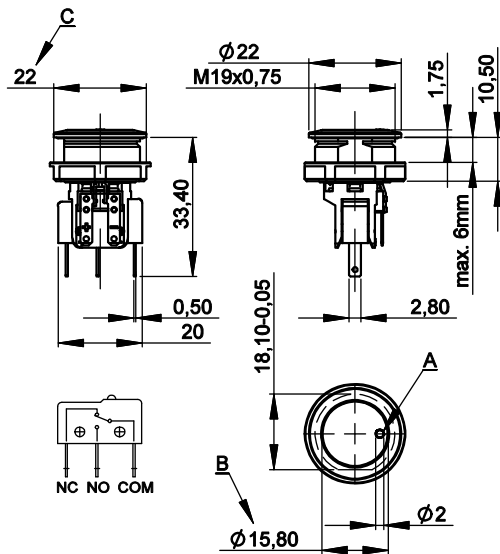
MSM 19 ST



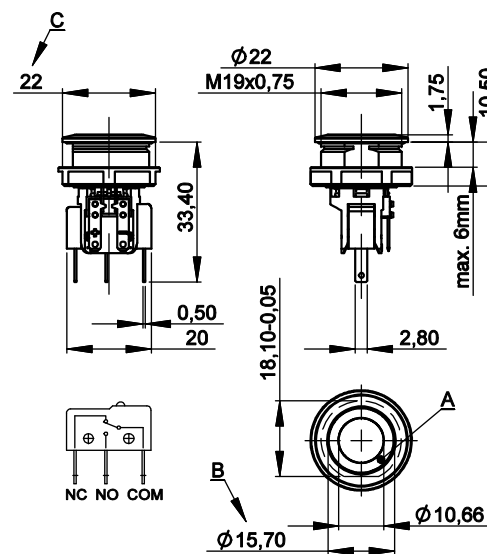
MSM 19 LE



MSM 19 PI



MSM 19 RI



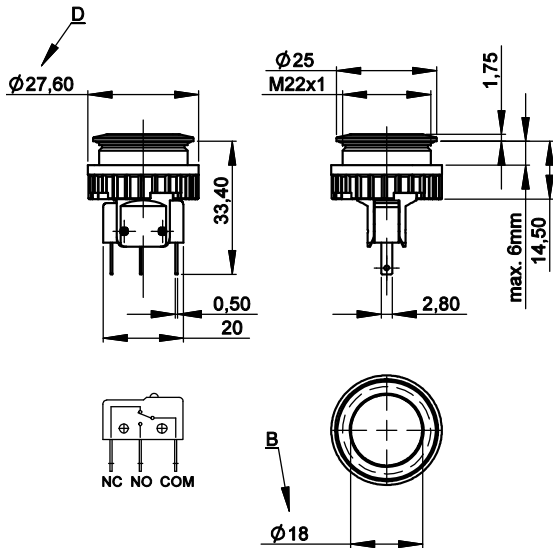
Legend

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

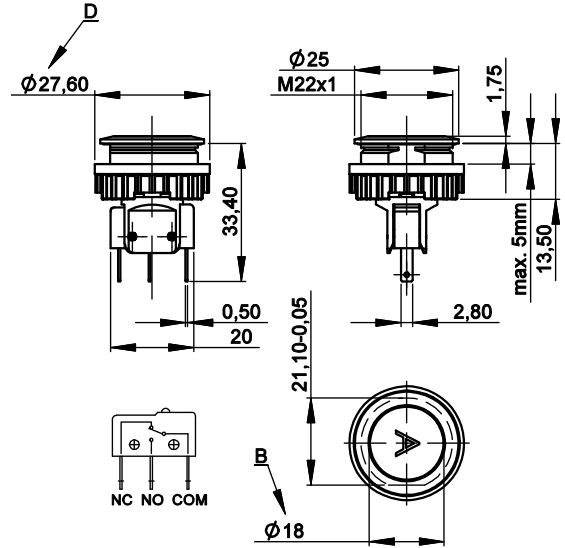
Changes that contribute to technical improvement are subject to alternations						
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### 2.2.3 Component dimensions MSM 22

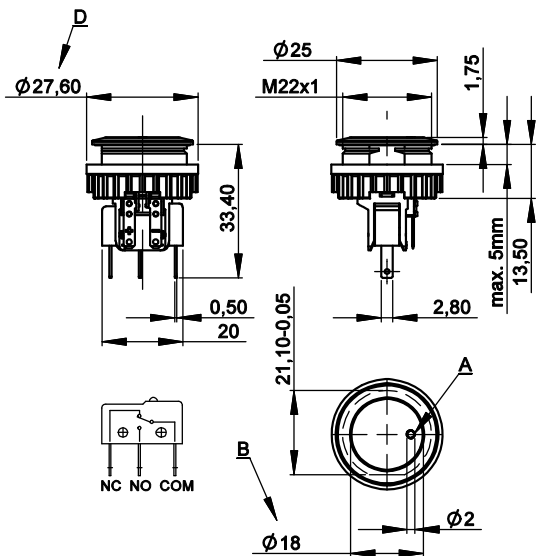
#### MSM 22 ST



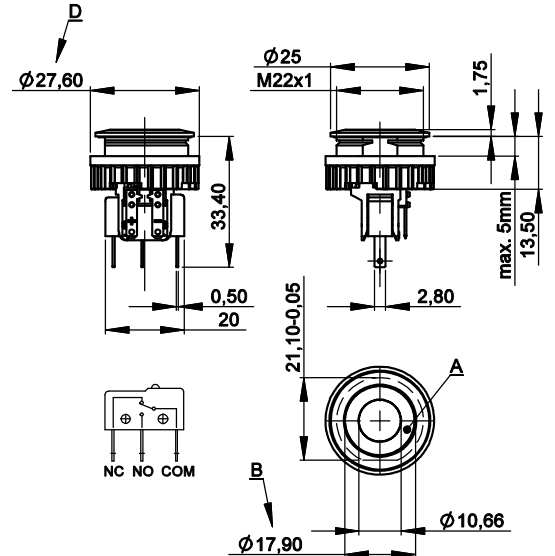
#### MSM 22 LE



#### MSM 22 PI



#### MSM 22 RI



#### Legend

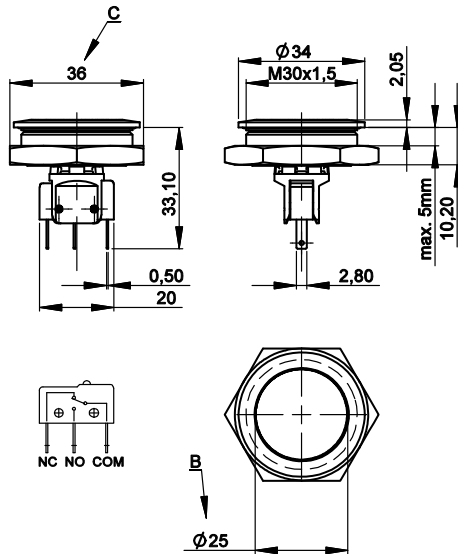
- A = Illumination Area
- B = Actuating Area
- C = Width Across Flats
- D = Knurled Nut

Changes that contribute to technical improvement are subject to alternations							
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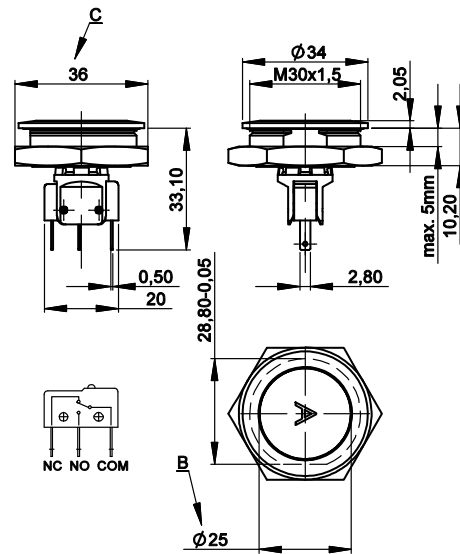


## 2.2.4 Component dimensions MSM 30

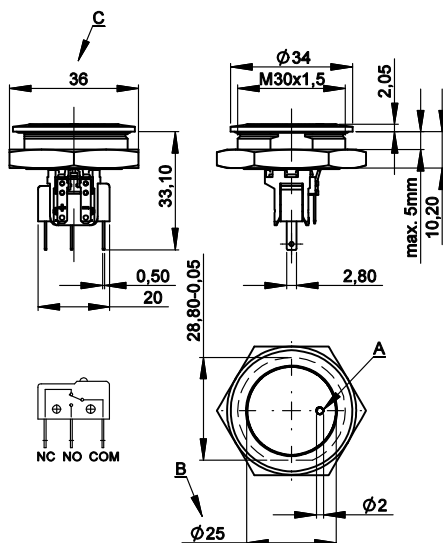
### MSM 30 ST



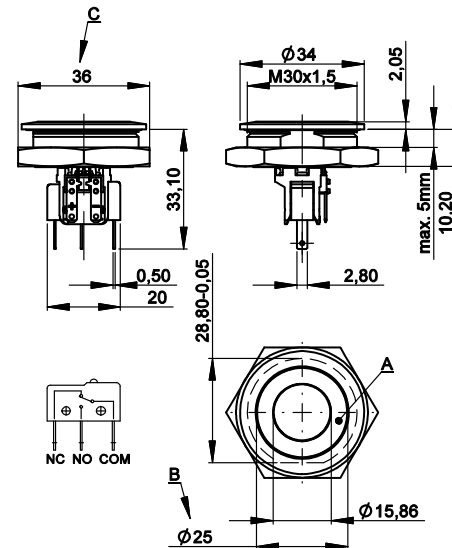
### MSM 30 LE



### MSM 30 PI



### MSM 30 RI

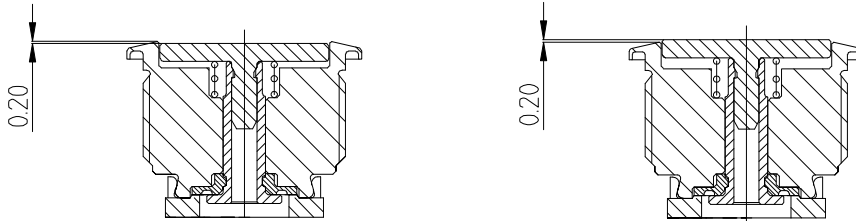


### Legend

- 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

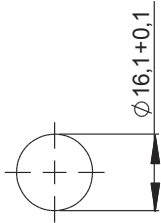


The mounting tolerance range of the actuator varies from 0.2 mm projection length and 0.2 mm short length to the housing edge. The slanting position of the actuator can range within this tolerance.

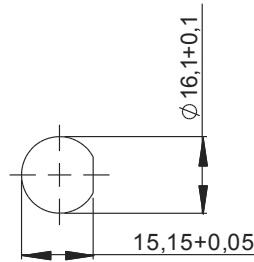
Changes that contribute to technical improvement are subject to alternations							
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**2.4 Hole dimensions**

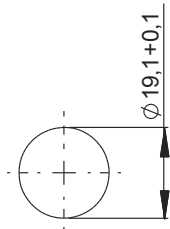
**MSM 16 ST**



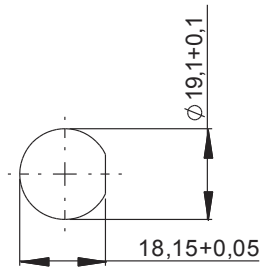
**MSM 16 LE**



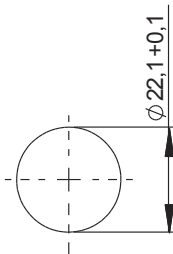
**MSM 19 ST / MSM 19 RI**



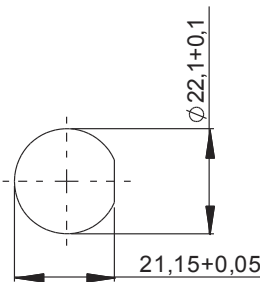
**MSM 19 LE / MSM 19 PI / MSM 19 RI optional**



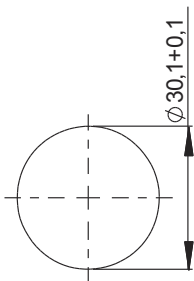
**MSM 22 ST / MSM 22 RI**



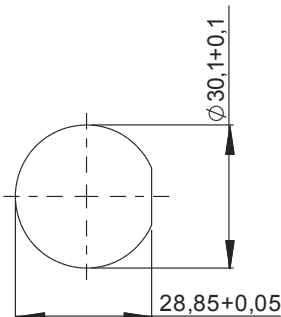
**MSM 22 LE / MSM 22 PI / MSM 22 RI optional**



**MSM 30 ST / MSM 30 RI**



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



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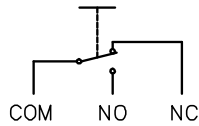
## 2.5 Starting Torque

	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

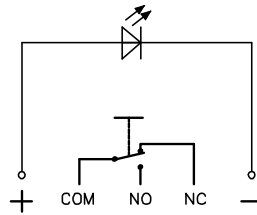
➤ \* on request

## 2.6 Switching Symbols

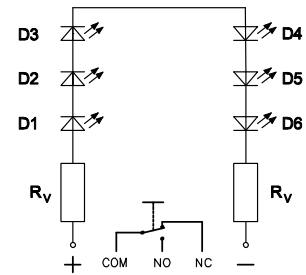
### MSM ST / MSM LE



### MSM PI



### MSM RI



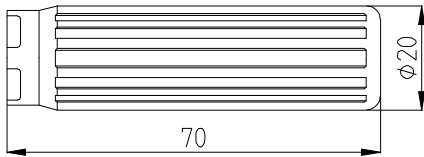
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Print date: 25/03/2010 09:46:00

## 2.7 Accessories

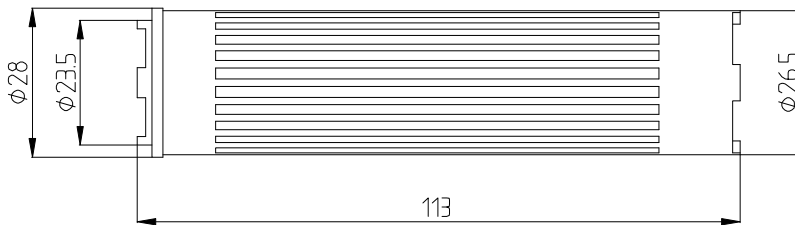
### MSM 16 Installation wrench

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

- *Italicly written types on request*
- *XXX for standard lettering see chapter [3.4 Lettering](#)*
- *At a minimum order quantity of 100 pieces the ring illuminated Version with Lettering is available on request*

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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>

- *Itally written types on request*
- *XXX for standard lettering see chapter [3.4 Lettering](#)*
- *At a minimum order quantity of 100 pieces the ring illuminated Version with Lettering is available on request*

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### 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 / blue
- Ring Illumination red / green / blue

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	1241.6632.5121000
With Lettering „AUS“, housing red	1241.6622.3120062	1241.6632.3120062
With Lettering „EIN“, housing green	1241.6622.5121061	1241.6632.5121061
With Lettering “OFF“, housing red	1241.6622.3120066	1241.6632.3120066
With Lettering ”ON“, housing green	1241.6622.5121065	1241.6632.5121065

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)

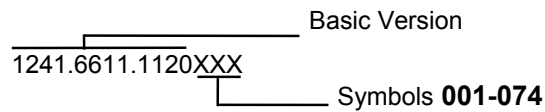


### 3.4 Lettering

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

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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 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 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

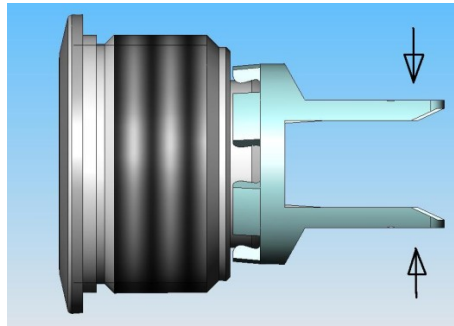
- *\* At a minimum order quantity of 100 pieces the ring illuminated Version with Lettering is available on request*

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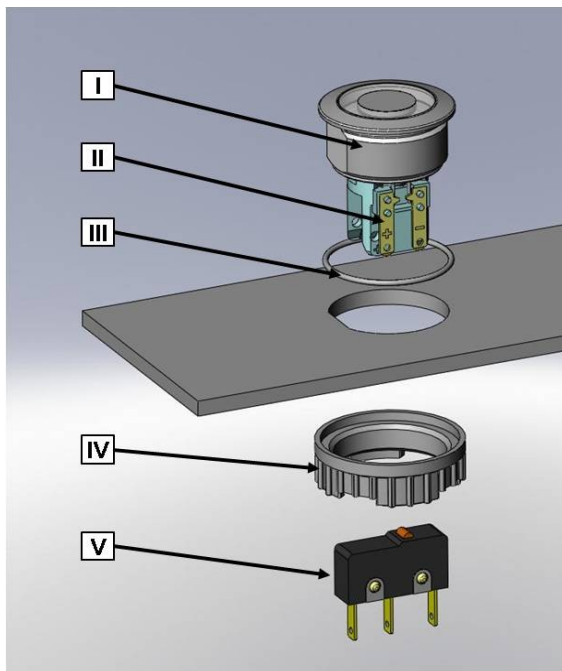
## 4 ASSEMBLY

### 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 micro switch into the micro switch holder of the actuator housing.

#### Installation information:

1. The power supply and the configuration of the flat pin terminals has to be installed correctly for the illumination and micro switch function.
2. Insulate the terminals as required
3. Installation instructions according to VDE-standard DIN VDE 0100-100 or alternatively IEC 60354 standard

#### Legend

- I = Housing
- II = Flat pin terminals (illumination)
- III = Gasket
- IV = Screw Nut
- V = Micro Switch element

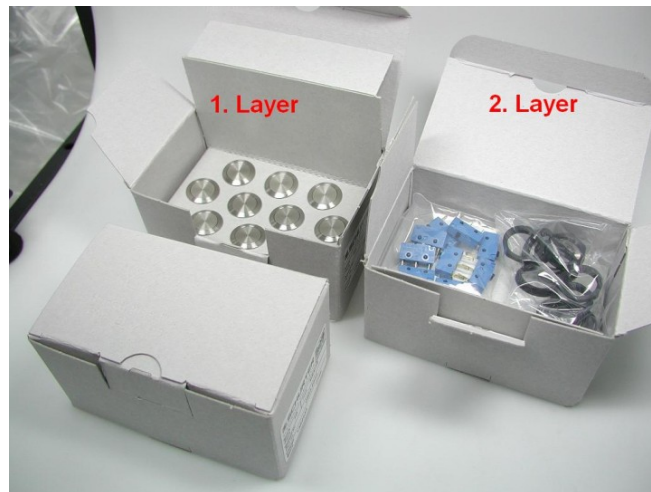
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## 5 PACKAGING

### 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.



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## 6 QUALIFICATION TEST

### 6.1 IP Protection Class

IP Protection Class IEC/DIN/EN/ 60529	IP 67
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### 6.2 IK Protection Class

Tested Centrally

IK Protection Class DIN EN 50102 Mounting Diameter 16 mm	IK 06
IK Protection Class DIN EN 50102 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.

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## 7 APPROVALS

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

### Micro switch:

Type	Licence number	ENEC VDE / KEMA	UL 1054 CSA C22.2 NO55
1050.1151	097550	DIN EN 61058	E41791
1050.1102	097550	DIN EN 61058	E41791
1050.1103	097550	DIN EN 61058	E41791
SS-01 T	40008425	DIN EN 61058	E41515
SS-5 T	129246	DIN EN 61058	E41515
SS-10 T	125256	DIN EN 61058	E41515
DC3GL1AA	2089323.01	DIN EN 61058	E23301
DC1GL1AA	2089323.01	DIN EN 61058	E23301
DC2GL1AA	2089323.01	DIN EN 61058	E23301

## 8 COMPLIANTS

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



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