

Product Manual

# Vandal-proof latching action switch MSM LA

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## 1 PRODUCT DESCRIPTION

Both, the housing and the actuator of the vandal-proof latching action switch MSM LA are made of high-quality stainless steel. By using this robust and weather-resistant material and due to the high impact resistance, the switch is particularly suited for use in equipment in harsh environments or for vandal-protected applications.



The MSM LA is available in 19 and 22 mm mounting diameters and suitable for use in temperatures ranging from -40 °C to +85 °C. With an actuating travel greater than 5 mm, the MSM LA is ideal for use in applications where increased feedback of the switching status is required. Different types of contact offer a range of permissible switching voltages up to 125 VDC / 250 VAC. The switching status (ON/OFF) is easy to discern by looking at, or feeling, the resting position of the actuator. In the off state, the actuator position protrudes from the housing; in the ON state, it is depressed into the housing.

The MSM LA is equipped with quick connect terminals to allow for fast connections. The cables are plugged onto the switching element which is subsequently plugged onto the previously screwed-in actuating element. Point and ring illuminated versions in red, green and blue are available for indicating the switching status or for providing visibility during night-time use. All versions can be lettered. All options for the MSM LA are available in single-pole and double-pole versions.

## 2 TECHNICAL DATA AND DIMENSIONAL DRAWINGS

### 2.1 Technical Data

<b>Electrical Data</b>		
Switching Voltage min.	[V <sub>DC</sub> ]	30 (125VDC/0,5A) <sup>1)</sup>
Switching Voltage max.	[V <sub>AC</sub> ]	250
Switching Current max.	[A <sub>AC</sub> ]	12
Rated Braking Capacity	[W <sub>AC</sub> ]	3000
Lifetime (at 8A / 250 VAC)	[Actuations]	50.000
Lifetime <sup>1)</sup> (at 0,5A / 125 VDC)	[Actuations]	100.000
Initial Contact Resistance (at 12V / 1 ADC)	[mΩ]	< 100
Insulation Resistance (500 VDC)	[MΩ]	> 100

1) Direct current Lifetime testing accomplished for switch element 1682.1101 with an actuation frequency of 1 Hz and an actuation velocity of 100 mm/s.

<b>Ring Illumination (RI)</b>	MSM 19 LA RI and MSM 22 LA RI
Supply Voltage $U_{LED}$ [V <sub>DC</sub> ]	24

<b>Point Illumination (PI)</b>	<b>Attention: Parts are delivered without series resistor.</b>
Characteristics <b>LED red</b> Point Illumination	Forward Current max. 40 mA Forward Voltage at 10 mA = 2.0 VDC Forward Voltage max. = 2.5 VDC
Characteristics <b>LED green</b> Point Illumination	Forward Current max. 40 mA Forward Voltage at 10 mA = 2.0 VDC Forward Voltage max. = 2.5 VDC
Characteristics <b>LED blue</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	$I_D$ [mA]	$I_{DMax}$ [mA]	$U_V = 5$				$U_V = 12$				$U_V = 24$			
			$R_V$ [Ω]	$R_V^{E24}$ [Ω]	$P_V$ [W]**		$R_V$ [Ω]	$R_V^{E24}$ [Ω]	$P_V$ [W]**		$R_V$ [Ω]	$R_V^{E24}$ [Ω]	$P_V$ [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		

- $I_D$  LED-Forward Current [10mA]
- $I_{DMax}$  LED-Forward Current max. [40mA/20mA]
- $R_V$  Series Resistor (calculated)
- $R_V^{E24}$  Series Resistor (regarding E24-Resistor series)
- $P_V$  Power dissipation concerning  $R_V$  (calculated)

<b>Mechanical Data</b>		
Actuating Force typ.	[N]	10
Actuating Travel typ.	[mm]	5.2
Lifetime mechanical	[Actuations]	150.000
Contact Gap	[mm]	3
Shock Resistance (DIN EN 50102)	[IK]	07

<b>Starting Torque</b>		MSM 19 LA	MSM 22 LA
Plastic Nut max.	[Nm]	4.5	3.5
Stainless Steel Nut* max.	[Nm]	12	16

\* on request

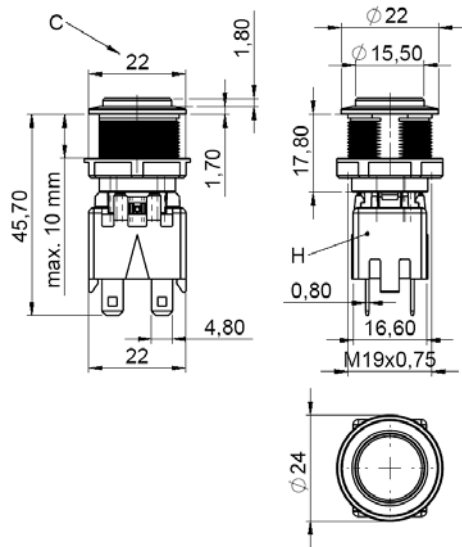
<b>Climatic Data</b>		
Operating Temperature	[°C]	-40 to +85
Storage Temperature	[°C]	-40 to +85
Degree of Protection (DIN EN 60529)	[IP]	IP 67 Front Side IP 00 Rear Side

<b>Material</b>	
<b>Component</b>	<b>Material with flammability rating</b>
Switcher Collet	PA66 (UL94-V0 related to d ≥ 1.6 mm)
Intermediate Connector	PA66 (UL94-V0 related to d ≥ 1.6 mm)
Contact Pin Adapter	PA66 (UL94-V0 related to d ≥ 1.6 mm)
<b>Component</b>	<b>Material without flammability rating</b>
Housing	Stainless Steel 1.4305
Actuator (disc, outside housing)	Stainless Steel 1.4305
Illuminated Ring (die-casting, inside housing)	PC
Sealing Ring	NBR70

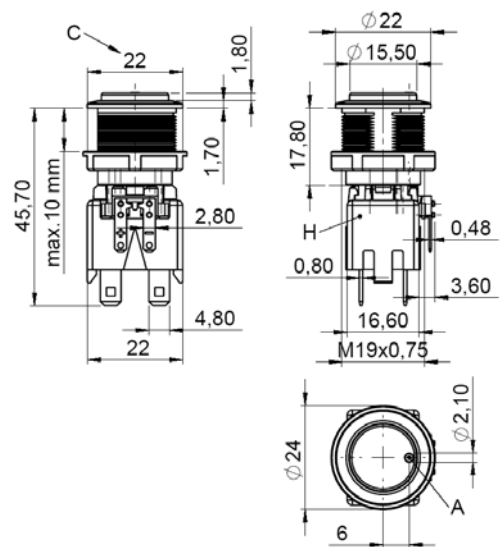
## 2.2 Dimensional Drawings

### 2.2.1 Component Dimensions M19

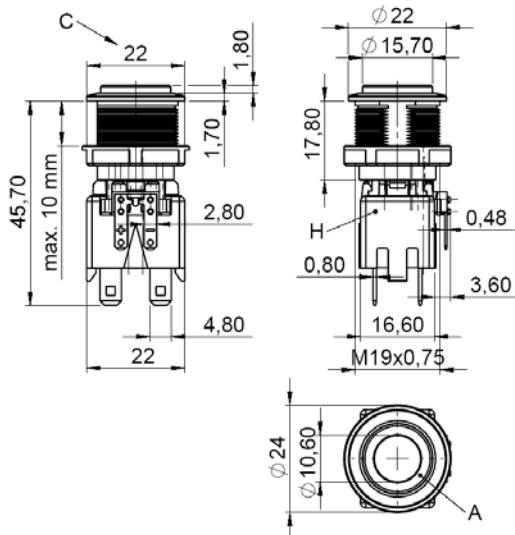
MSM 19 LA ST double-pole /  
MSM 19 LA LE double-pole



MSM 19 LA PI double-pole

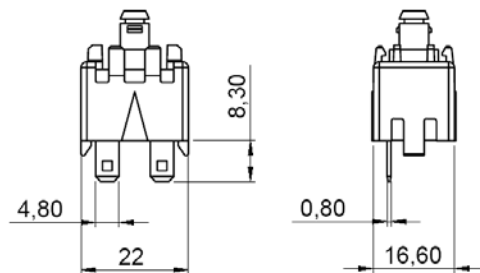


MSM 19 LA RI double-pole



Switching Element single-pole

consists of: switch single-pole + switcher collet



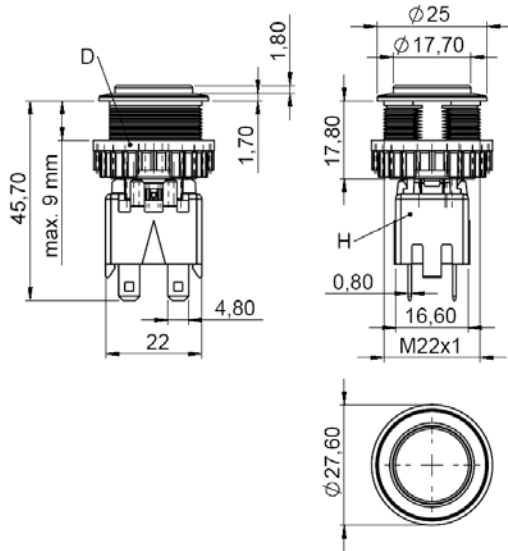
### Legend

- A = Illumination Area
- C = Width Across Flats
- H = Switching Element

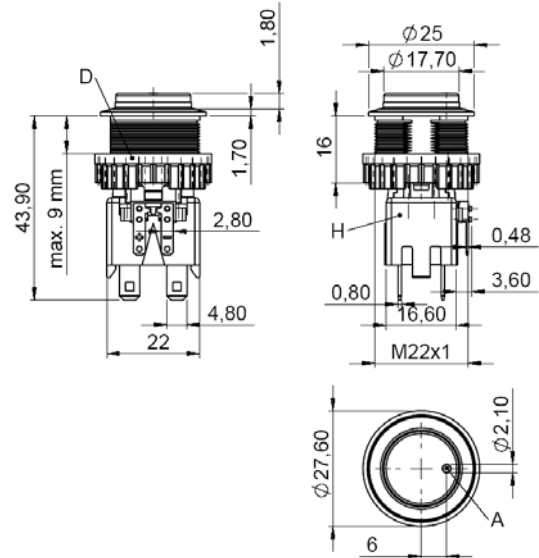
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### 2.2.2 Component Dimensions M22

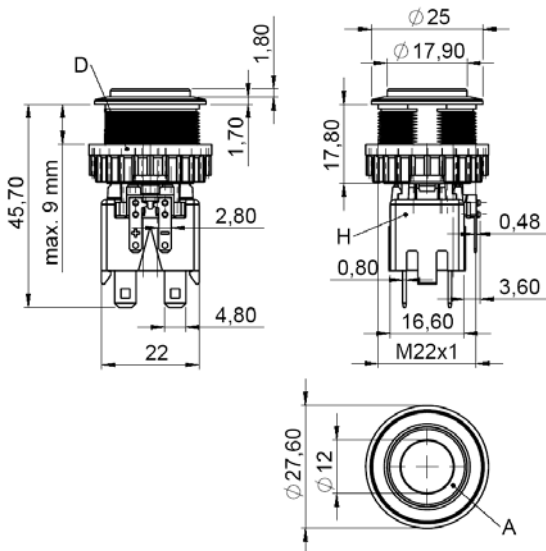
MSM 22 LA ST double-pole /  
MSM 22 LA LE double-pole



MSM 22 LA PI double-pole

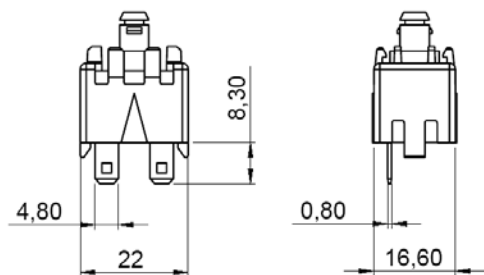


MSM 22 LA RI double-pole



Switching Element single-pole

consists of: switch single-pole + switcher collet



#### Legend

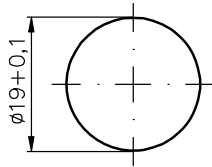
- A = Illumination Area
- D = Knurled Nut
- H = Switching Element

Changes that contribute to technical improvement are subject to alternations

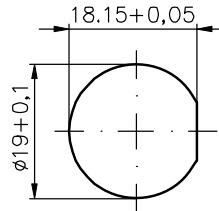
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### 2.3 Hole Dimensions

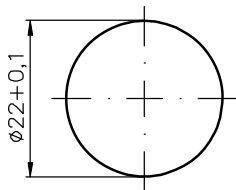
MSM 19 LA (without torsion protection)



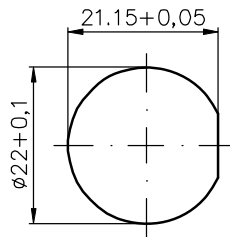
MSM 19 LA (with torsion protection) \*



MSM 22 LA (without torsion protection)



MSM 22 LA (with torsion protection) \*

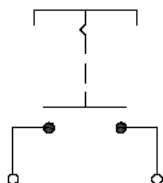


\* Hole Dimensions with torsion protection:

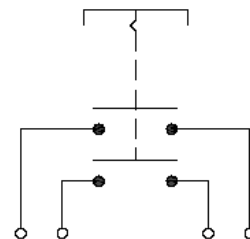
- recommended for version „Ring Illumination“
- required for version „Point Illumination“ and „Lettered“

### 2.4 Switching Symbols

MSM LA ST single-pole /  
MSM LA LE single-pole

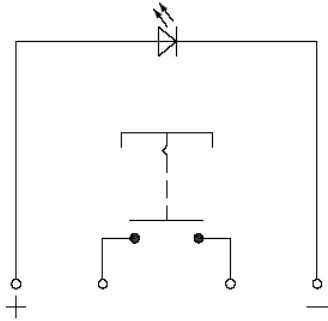


MSM LA ST double-pole /  
MSM LA LE double-pole

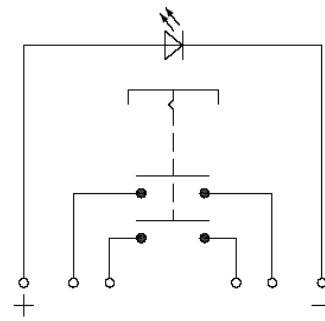


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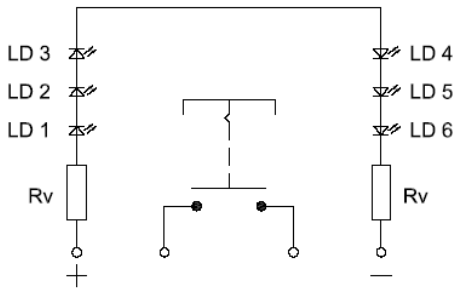
MSM LA PI single-pole



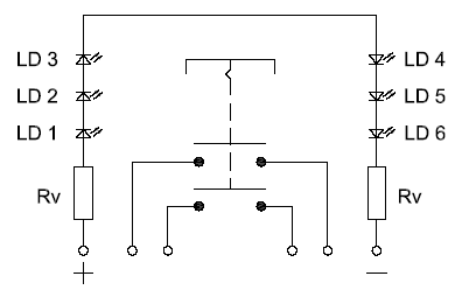
MSM LA PI double-pole



MSM LA RI single-pole

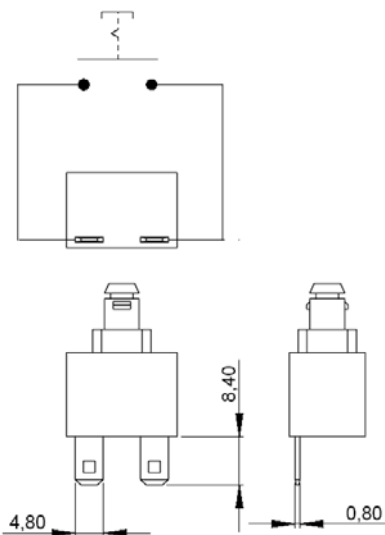


MSM LA RI double-pole

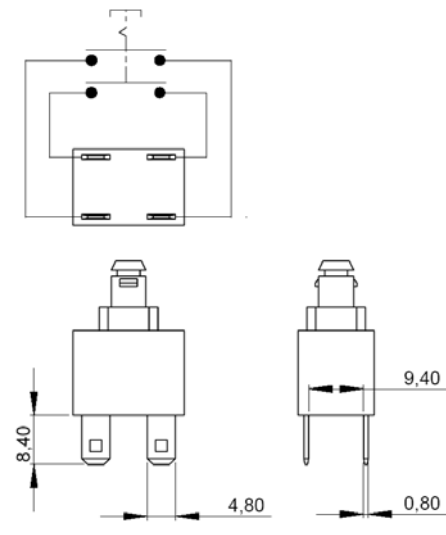


## 2.5 Contact Layout

Contact Layout single-pole



Contact Layout double-pole



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### 3 ORDER NUMBERS

#### 3.1 Order Numbers MSM LA

Mounting Diameter (mm)		Ø 19	Ø 22
<b>Latching Action Switch, single-pole</b>			
<b>ST</b> (Standard)		1241.6821.1110000	1241.6831.1110000
<b>LE</b> (Lettering) *		1241.6822.1110XXX	1241.6832.1110XXX
<b>PI</b> (Point Illumination) <b>red</b>		1241.6823.1111000	1241.6833.1111000
<b>PI</b> (Point Illumination) <b>green</b>		1241.6823.1112000	1241.6833.1112000
<b>PI</b> (Point Illumination) <b>blue</b>		1241.6823.1114000	1241.6833.1114000
<b>RI</b> (Ring Illumination) <b>red</b>		1241.6824.1111000	1241.6834.1111000
<b>RI</b> (Ring Illumination) <b>green</b>		1241.6824.1112000	1241.6834.1112000
<b>RI</b> (Ring Illumination) <b>blue</b>		1241.6824.1114000	1241.6834.1114000
<b>Latching Action Switch, double-pole</b>			
<b>ST</b> (Standard)		1241.6821.1120000	1241.6831.1120000
<b>LE</b> (Lettering) *		1241.6822.1120XXX	1241.6832.1120XXX
<b>PI</b> (Point Illumination) <b>red</b>		1241.6823.1121000	1241.6833.1121000
<b>PI</b> (Point Illumination) <b>green</b>		1241.6823.1122000	1241.6833.1122000
<b>PI</b> (Point Illumination) <b>blue</b>		1241.6823.1124000	1241.6833.1124000
<b>RI</b> (Ring Illumination) <b>red</b>		1241.6824.1121000	1241.6834.1121000
<b>RI</b> (Ring Illumination) <b>green</b>		1241.6824.1122000	1241.6834.1122000
<b>RI</b> (Ring Illumination) <b>blue</b>		1241.6824.1124000	1241.6834.1124000

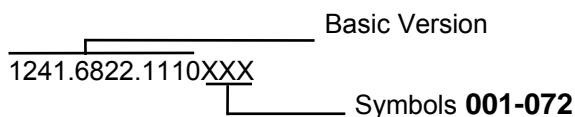
\* Lettering Index see under point 3.2

### 3.2 Lettering

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

000	No Lettering
001-072	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= EIN
002= <b>B</b>	017= <b>Q</b>	032= <b>5</b>	047= →	062= AUS
003= <b>C</b>	018= <b>R</b>	033= <b>6</b>	048= ←	063= AUF
004= <b>D</b>	019= <b>S</b>	034= <b>7</b>	049= ↓	064= AB
005= <b>E</b>	020= <b>T</b>	035= <b>8</b>	050= ↑	065= ON
006= <b>F</b>	021= <b>U</b>	036= <b>9</b>	051= %	066= OFF
007= <b>G</b>	022= <b>V</b>	037= +	052= √	067= UP
008= <b>H</b>	023= <b>W</b>	038= –	053= CTRL	068= DOWN
009= <b>I</b>	024= <b>X</b>	039= .	054= RETURN	069= HIGH
010= <b>J</b>	025= <b>Y</b>	040= ×	055= SHIFT	070= LOW
011= <b>K</b>	026= <b>Z</b>	041= ÷	056= LOCK	071= ON/OFF
012= <b>L</b>	027= <b>0</b>	042= *	057= STOP	072= START
013= <b>M</b>	028= <b>1</b>	043= =	058= ENTER	
014= <b>N</b>	029= <b>2</b>	044= #	059= BACK	
015= <b>O</b>	030= <b>3</b>	045= ↔	060= LINE	

## Font Size

### **MSM 19 LA LE, MSM 19 LA PI :**

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

### **MSM 22 LA LE, MSM 22 LA PI :**

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

### **MSM 19 LA RI, MSM 22 LA RI :**

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

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

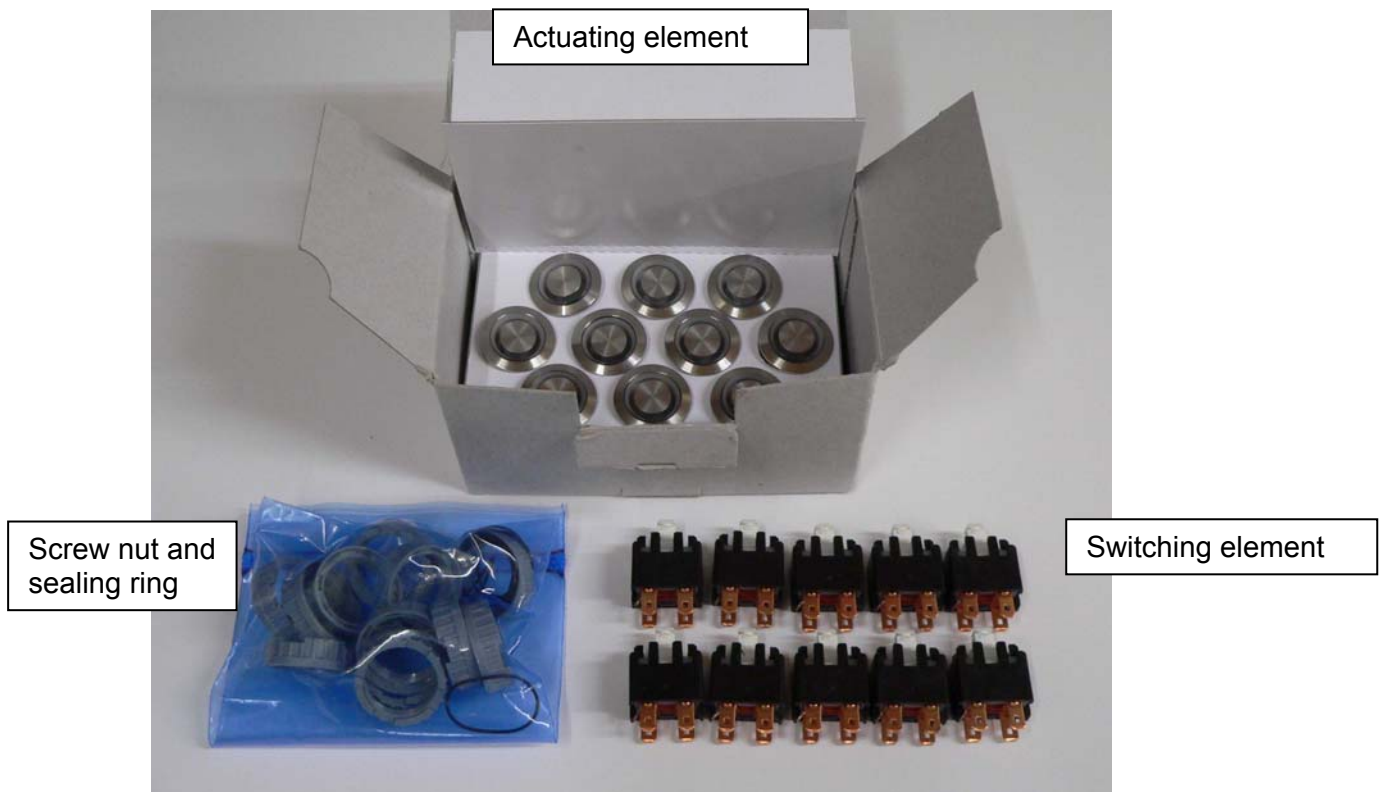
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## 4 PACKAGING

### MSM LA

MSM 19 LA	10 pieces per box with inlay
MSM 22 LA	10 pieces per box with inlay

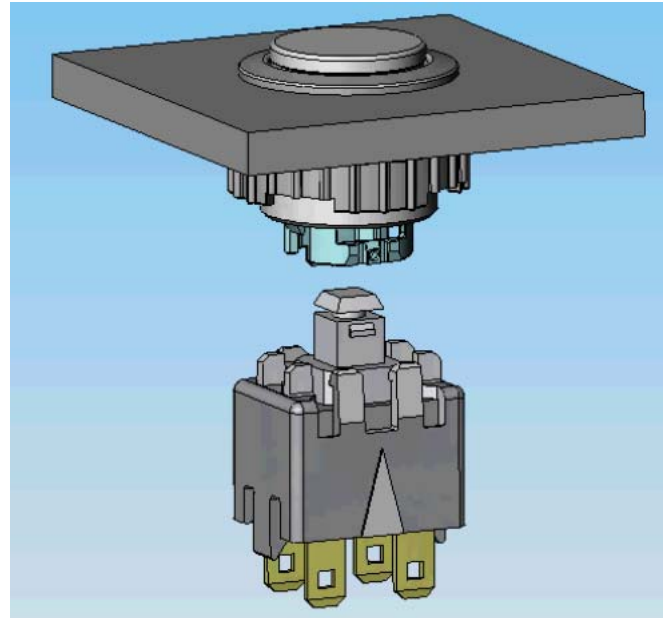
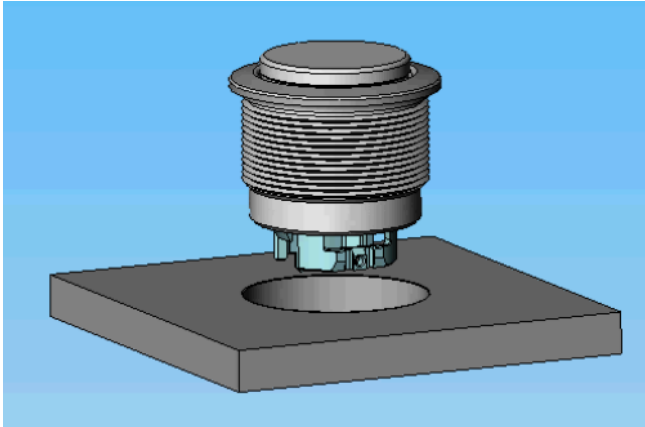
The screw nuts with sealing rings and corresponding switching elements are packed separately and enclosed in the box.



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## 5 ASSEMBLY

The actuating element with the sealing ring has to be mounted to the frontpanel and fastened with the nut. Afterwards the switching element has to be clipped on the actuating element.



## 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	IK 07
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### 6.3 ESD Protection

ESD test according to DIN 61000-4-2:

4kV Contact Discharge	MSM LA ST MSM LA LE	Ø 19; 22 mm
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#### 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.

## 7 APPROVALS

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

#### Push button switch:

Type	Identification Number	ENEC VDE / KEMA	UL 1054 CSA C22.2 NO55
1681.1101	KEMA 2106068.01	DIN EN 61058	E41791
1682.1101	KEMA 2106068.01	DIN EN 61058	E41791

## 8 ROHS COMPLIANT



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