

Product manual

Vandal-proof MSM switches

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Changes that contribute to technical improvement are subject to alternations

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1 Description

Both the housing and the actuator of the vandal-proof MSM switch are made of high-quality stainless steel. Use of this stable and weather-resistant material means that the switch is particularly suitable for use in harsh environments. The MSM is available with mounting diameters of 16, 19, 22 and 30mm. Different types of contact cover a permissible switching voltage range from 5 to 250 V AC, and 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, and this 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 Data and dimensional drawings

Technical data

| Micro switch for electrical rating | 0.1 A 30 V DC | 5 A 125 VAC | 3 A 250 VAC | 10 A 250 V AC |
|---|------------------|----------------|----------------|------------------|
| Electrical data | | | | |
| Contact material | Gold | Silver | | Silver |
| Switching voltage max. (V) | 30 | 125 / 250 | | 250 |
| Switching voltage min. (V) | 3 | 5 | | 5 |
| Switching current max. (A) | 0.1 | 5 / 3 | | 10 |
| Rated braking capacity (W) | 3 | 1250 | | 2500 |
| Lifetime (rated braking capacity) | 200,000 | 200,000 | | 50,000 |
| Lifetime (160 mA at 48 V DC) | | 1,500,000 | | |
| Initial contact resistance, new | < 50 mOhm | < 30 mOhm | | < 30 mOhm |
| Initial contact resistance after 1 million cycles | < 150 mOhm | < 90 mOhm | | < 90 mOhm |
| Insulation resistance (IEC 512-2) | > 100,000 kOhm | > 100,000 kOhm | | > 100,000 kOhm |
| Contact bounce time | < 5 ms | < 5 ms | | < 5 ms |

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| Micro switch for electrical rating | 0.1 A 30 V DC | 5 A 125 VAC | 3 A 250 VAC | 10 A 250 V AC |
|--|------------------|----------------|----------------|------------------|
| Mechanical data | | | | |
| Actuating force (N) | 3.7 | 3.7 | 3.7 | 3.7 |
| Actuating travel (mm) | 0.8 | 0.8 | 0.8 | 0.8 |
| Degree of protection (IP) | 67 | 67 | 67 | 67 |
| Shock resistance DIN EN 50102 (IK), mounting diameter 16 | 06 | 06 | 06 | 06 |
| Shock resistance DIN EN 50102 (IK), mounting diameter 19; 22; 30 | 07 | 07 | 07 | 07 |
| Climatic data | | | | |
| Operating/storage temp. (°C) | - 25 to + 85 | - 25 to + 85 | - 25 to + 85 | - 25 to + 85 |

| Ring illumination | | | |
|--|----|----|----|
| Supply voltage Ring illumination (V DC) | 24 | 24 | 24 |

| Point illumination | | | |
|--|---|---|---|
| Characteristics red LED Point illumination | Forward current max. 40 mA Forward voltage at 10 mA = 1.6 V DC Forward voltage max. = 2.0 V DC | Forward current max. 40 mA Forward voltage at 10 mA = 1.6 V DC Forward voltage max. = 2.0 V DC | Forward current max. 40 mA Forward voltage at 10 mA = 1.6 V DC Forward voltage max. = 2.0 V DC |
| Characteristics green LED Point illumination | Forward current max. 40 mA Forward voltage at 10 mA = 2.0 V DC Forward voltage max. = 2.6 V DC | Forward current max. 40 mA Forward voltage at 10 mA = 2.0 V DC Forward voltage max. = 2.6 V DC | Forward current max. 40 mA Forward voltage at 10 mA = 2.0 V DC Forward voltage max. = 2.6 V DC |
| Characteristics blue LED Point illumination | Forward current max. 20 mA Forward voltage at 10 mA = 3.2 V DC Forward voltage max. = 3.7 V DC | Forward current max. 20 mA Forward voltage at 10 mA = 3.2 V DC Forward voltage max. = 3.7 V DC | Forward current max. 20 mA Forward voltage at 10 mA = 3.2 V DC Forward voltage max. = 3.7 V DC |

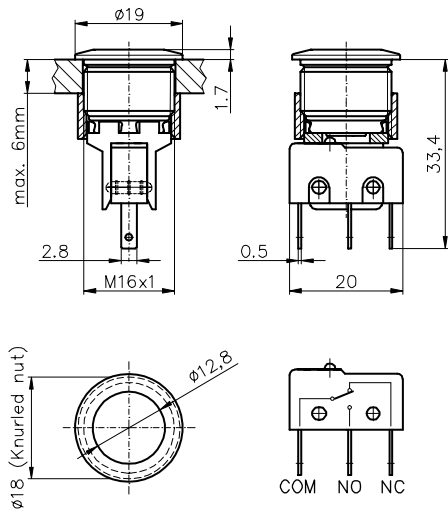
| Material | |
|---|------------------------|
| Individual component | material |
| Housing | Stainless steel 1.4305 |
| Actuator | Stainless steel 1.4305 |
| Light conductor (point illumination) | PC |
| Illuminated ring (ring illumination) | PC |
| gasket | NBR70 |

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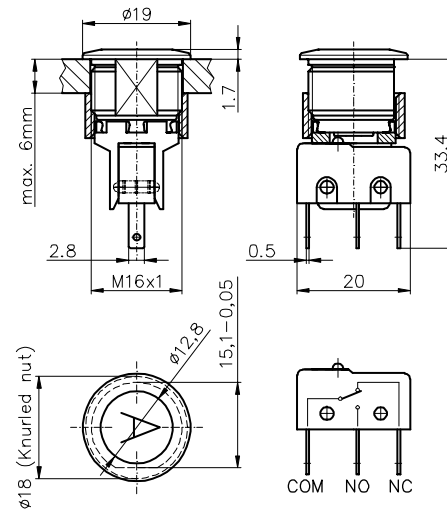
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Component dimensions

MSM16 ST

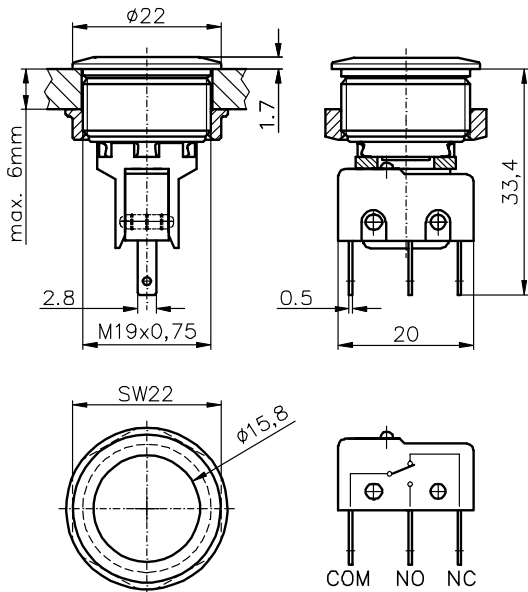


MSM16 LE

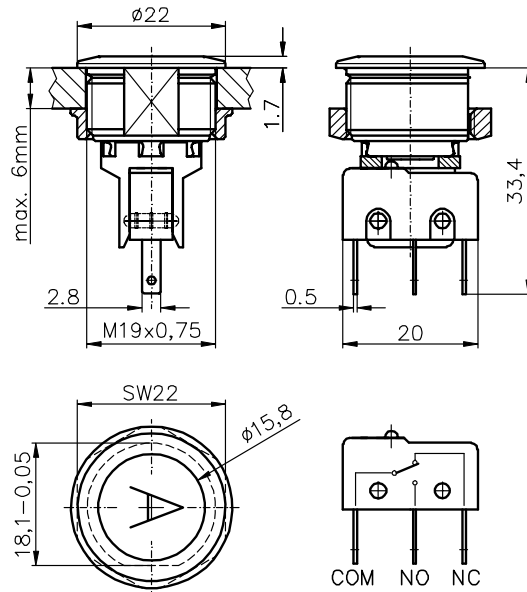


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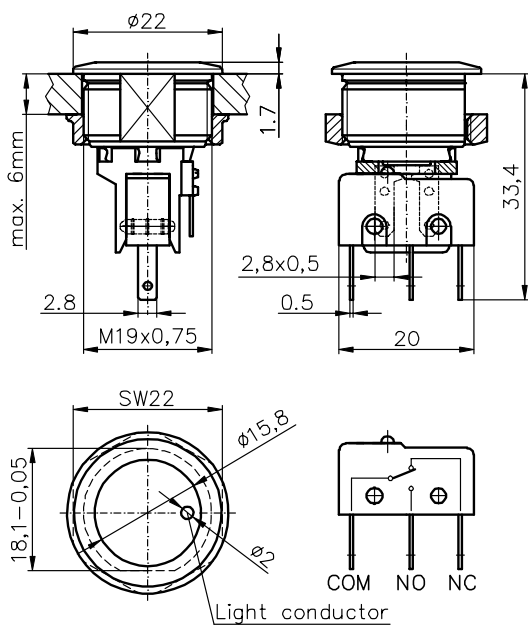
MSM19 ST



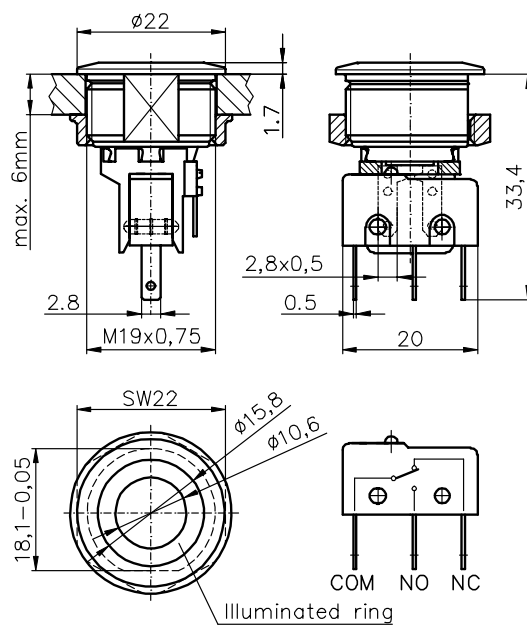
MSM19 LE



MSM19 PI



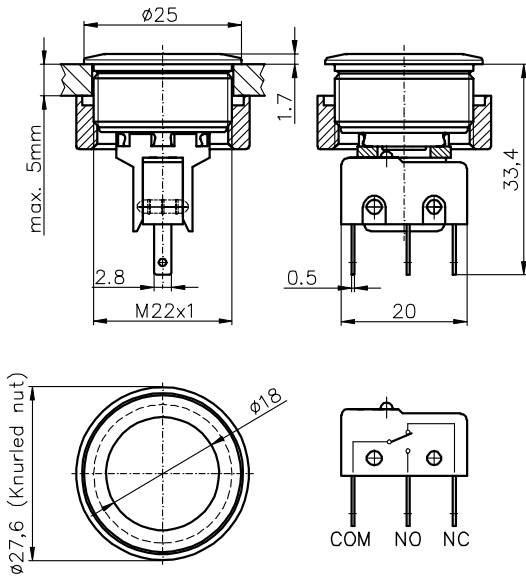
MSM19 RI



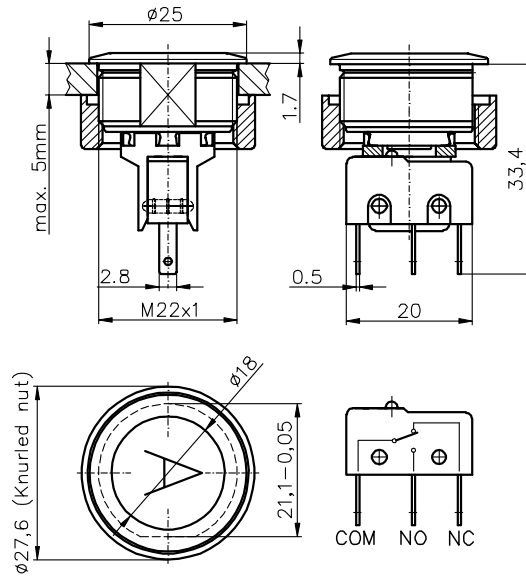
Changes that contribute to technical improvement are subject to alternations

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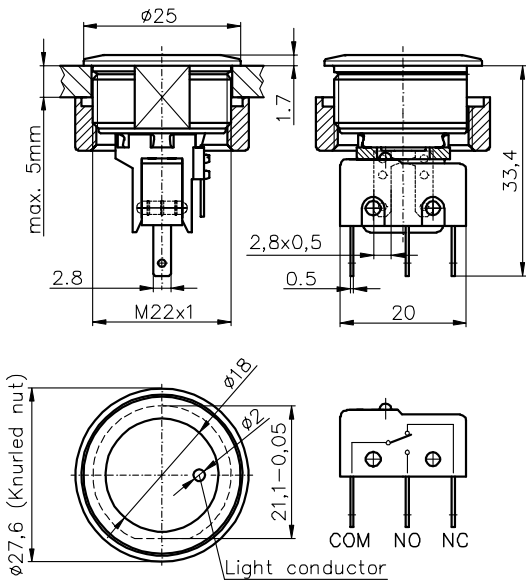
MSM22 ST



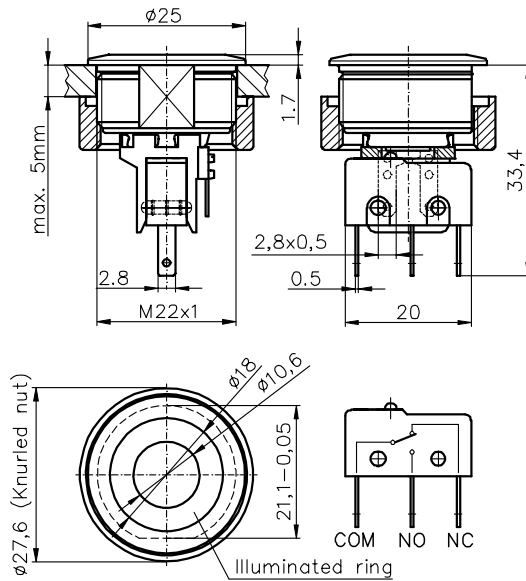
MSM22 LE



MSM22 PI



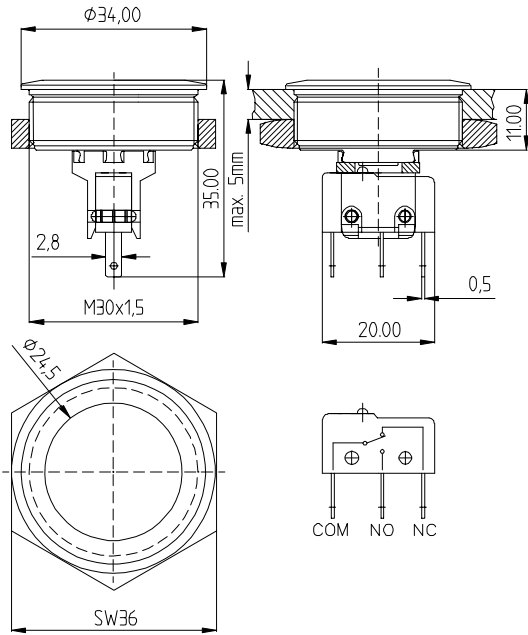
MSM22 RI



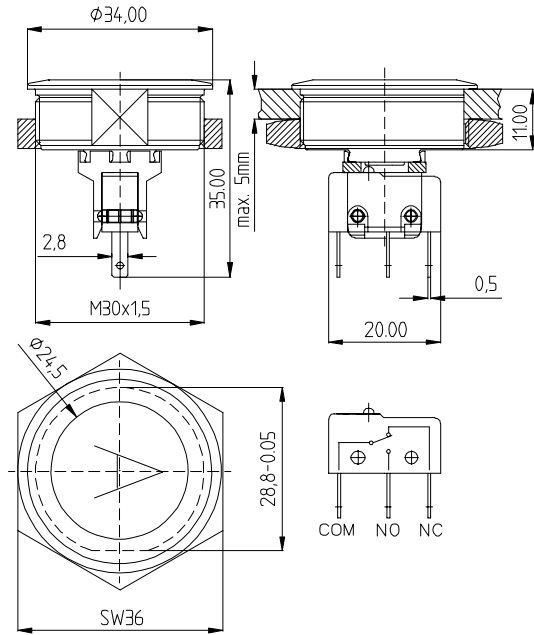
Changes that contribute to technical improvement are subject to alternations

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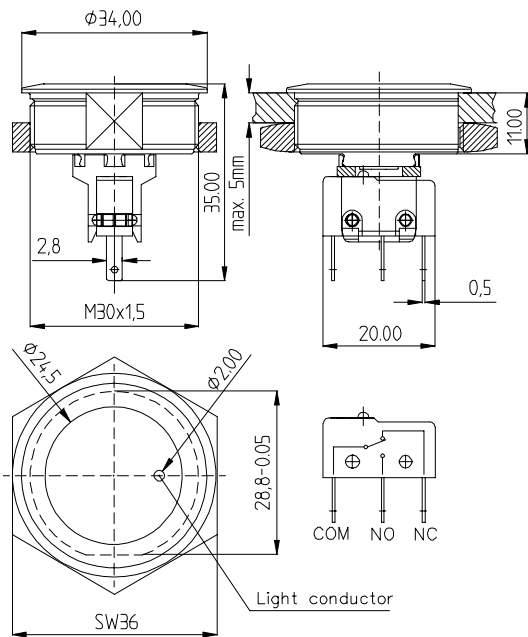
MSM30 ST



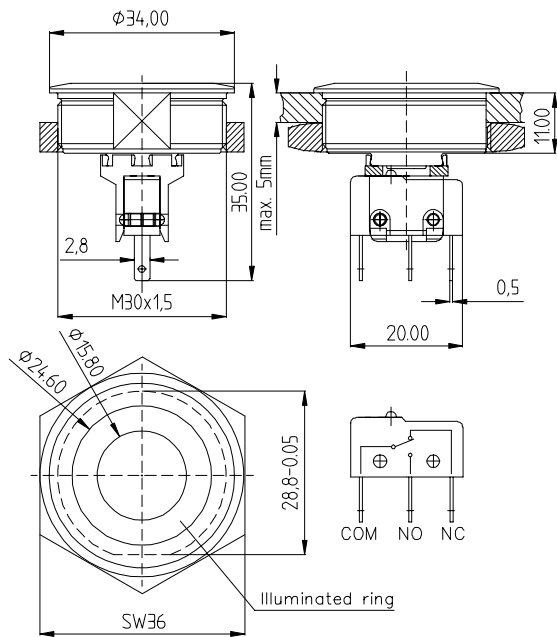
MSM30 LE



MSM30 PI



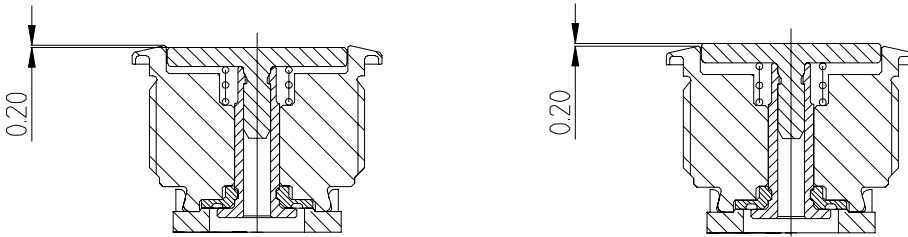
MSM30 RI



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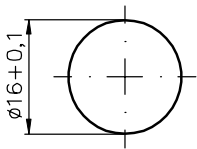
Actuator tolerance range



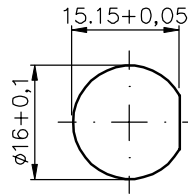
The mounting range tolerance of the actuator varies from 0.2mm projection length and 0.2mm short length to the housing edge. The slanting position of the actuator can range within this tolerance.

Hole dimensions

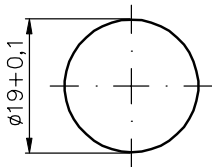
MSM16 ST



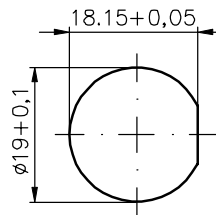
MSM16 LE



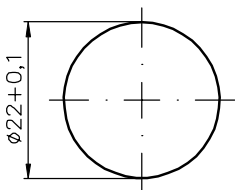
MSM19 ST / MSM19 RI



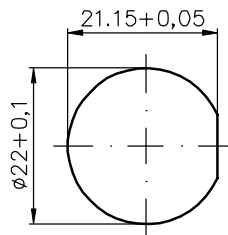
MSM19 LE/ MSM19 PI



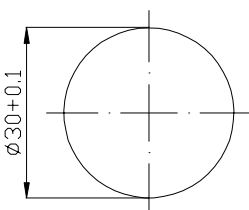
MSM22 ST / MSM22 RI



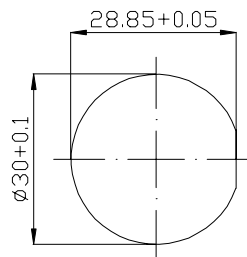
MSM22 LE/ MSM22 PI



MSM30 ST / MSM30 RI



MSM30 LE / MSM 30 PI



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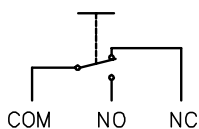
Tightening torque

| | 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 |

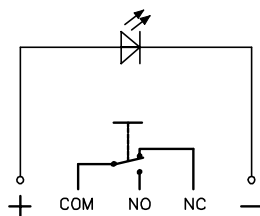
* on request

Switching symbols

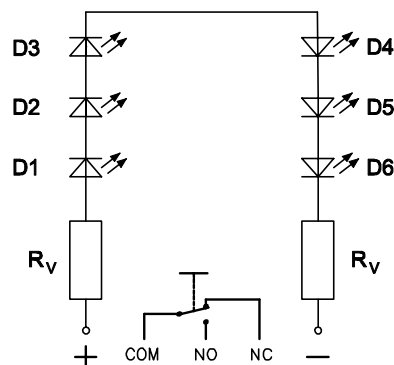
MSM ST / MSM LE



MSM PI



MSM RI



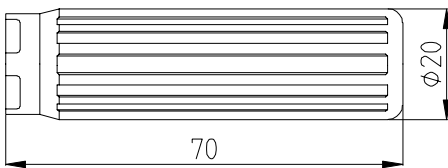
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2.1 Accessories

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 Number

| | | | |
|------------------------|----|----|----|
| Mounting diameter (mm) | 16 | 19 | 22 |
|------------------------|----|----|----|

| Electrical rating max. 0.1 A / 30 V DC | | | |
|--|-------------------|--------------------------|--------------------------|
| Standard | 1241.6611.1110000 | 1241.6621.1110000 | 1241.6631.1110000 |
| With lettering | 1241.6612.1110000 | 1241.6622.1110000 | 1241.6632.1110000 |
| Red point illumination | | 1241.6623.1111000 | 1241.6633.1111000 |
| Green point illumination | | 1241.6623.1112000 | 1241.6633.1112000 |
| <i>Blue point illumination</i> | | <i>1241.6623.1114000</i> | <i>1241.6633.1114000</i> |
| Red ring illumination | | 1241.6624.1111000 | 1241.6634.1111000 |
| Green ring illumination | | 1241.6624.1112000 | 1241.6634.1112000 |
| <i>Blue ring illumination</i> | | <i>1241.6624.1114000</i> | <i>1241.6634.1114000</i> |
| Installation wrench | 0853.0622 | | 1141.1337 |

| Electrical rating max. 5 A / 125 V AC or 3 A / 250V AC | | | |
|--|-------------------|-------------------|-------------------|
| Standard | 1241.6611.1120000 | 1241.6621.1120000 | 1241.6631.1120000 |
| With lettering | 1241.6612.1120000 | 1241.6622.1120000 | 1241.6632.1120000 |
| Red point illumination | | 1241.6623.1121000 | 1241.6633.1121000 |
| Green point illumination | | 1241.6623.1122000 | 1241.6633.1122000 |
| Blue point illumination | | 1241.6623.1124000 | 1241.6633.1124000 |
| Red ring illumination | | 1241.6624.1121000 | 1241.6634.1121000 |
| Green ring illumination | | 1241.6624.1122000 | 1241.6634.1122000 |
| Blue ring illumination | | 1241.6624.1124000 | 1241.6634.1124000 |
| Installation wrench | 0853.0622 | | 1141.1337 |

| Electrical rating max. 10 A / 250 V AC | | | |
|--|-------------------|--------------------------|---------------------------|
| Standard | 1241.6611.1130000 | 1241.6621.1130000 | 1241.6631.1130000 |
| With lettering | 1241.6612.1130000 | 1241.6622.1130000 | 1241.6632.1130000 |
| Red point illumination | | 1241.6623.1131000 | 1241.6633.1131000 |
| Green point illumination | | 1241.6623.1132000 | 1241.6633.1132000 |
| <i>Blue point illumination</i> | | <i>1241.6623.1134000</i> | <i>1241.6633.11342000</i> |
| Red ring illumination | | 1241.6624.1131000 | 1241.6634.1131000 |
| Green ring illumination | | 1241.6624.1132000 | 1241.6634.1132000 |
| <i>Blue ring illumination</i> | | <i>1241.6624.1134000</i> | <i>1241.6634.1134000</i> |
| Installation wrench | 0853.0622 | | 1141.1337 |

Part numbers with italic type on request

| | |
|------------------------|------|
| Mounting diameter (mm) | Ø 30 |
|------------------------|------|

| Electrical rating max. 0.1 A / 30 V DC | |
|--|--------------------------|
| Standard | 1241.6661.1110000 |
| With lettering | 1241.6662.1110000 |
| Red point illumination | 1241.6663.1111000 |
| Green point illumination | 1241.6663.1112000 |
| <i>Blue point illumination</i> | <i>1241.6663.1114000</i> |
| Red ring illumination | 1241.6664.1111000 |
| Green ring illumination | 1241.6664.1112000 |
| <i>Blue ring illumination</i> | <i>1241.6664.1114000</i> |

| Electrical rating max. 5 A / 125 V AC or 3 A / 250V AC | |
|--|--------------------------|
| Standard | 1241.6661.1120000 |
| With lettering | 1241.6662.1120000 |
| Red point illumination | 1241.6663.1121000 |
| Green point illumination | 1241.6663.1122000 |
| <i>Blue point illumination</i> | <i>1241.6663.1124000</i> |
| Red ring illumination | 1241.6664.1121000 |
| Green ring illumination | 1241.6664.1122000 |
| <i>Blue ring illumination</i> | <i>1241.6664.1124000</i> |

| Electrical rating max. 10 A / 250 V AC | |
|--|--------------------------|
| Standard | 1241.6661.1130000 |
| With lettering | 1241.6662.1130000 |
| Red point illumination | 1241.6663.1131000 |
| Green point illumination | 1241.6663.1132000 |
| <i>Blue point illumination</i> | <i>1241.6663.1134000</i> |
| Red ring illumination | 1241.6664.1131000 |
| Green ring illumination | 1241.6664.1132000 |
| <i>Blue ring illumination</i> | <i>1241.6664.1134000</i> |

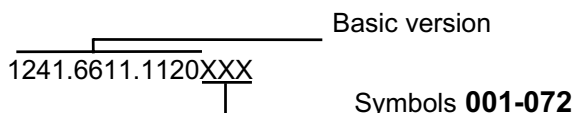
Part numbers with italic type on request

3.1 Lettering

The last three digits in the Order No. define the lettering.

| | |
|---------|----------------------|
| 000 | No lettering |
| 001-072 | Standard lettering |
| 101- | Customized lettering |

Example for ordering an lettering



Ordering indices for lettering

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

Lettering size

MSM16 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

MSM19 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

MSM22 LE / MSM22 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

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MSM30 LE / MSM30 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

4 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 | Air cushion bag 1 pieces | 10 pieces per box |

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



5 QUALIFICATION TESTS

IP degree of protection

IP degree of protection IEC/DIN/EN/ 60529

IP 67

IK protection class

IK protection class DIN EN 50102

16 mm diam.: IK 06
19; 22; 30 mm diam.: IK 07

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-passiv layer. Only under very unfavourable conditions is it possible, that iron and rust molecules as well as base medals as foreign substances(pollutions) the passiv layer penetrate, hence 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 removed.

6 Approvals


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

Micro switch:

| Type | Licence number | ENEC VDE | UL 1054 CSA C22.2 NO55 |
|---------------|----------------|--------------|---------------------------|
| 1050.1151 2A | 97550 | DIN EN 61058 | E41791 |
| 1050.1102 5A | 97550 | DIN EN 61058 | E41791 |
| 1050.1103 10A | 97550 | 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 |
| DB 3GB1BA0,1A | | DIN EN 61058 | E23301 |
| DB 2GB1BA 6A | | DIN EN 61058 | E23301 |
| DB 1GB1BA 10A | | DIN EN 61058 | E23301 |


| Changes that contribute to technical improvement are subject to alternations | | | | | | | |
|--|------------------|--------------|--------------------|--------------|------------------|----------------|-------|
| Page | Production date: | Produced by: | Modification date: | Modified by: | Modification No. | Data sheet No. | Index |
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7 ROHS COMPLIANT

| | |  | | |
|-----------------------------|-----------|---|-------------------|-------------------|
| | | Mounting diameter (mm) | | |
| Rating max. 0.1 A / 30 V DC | | Ø 16 | Ø 19 | Ø 22 |
| Standard | compliant | 1241.6611.1110000 | 1241.6621.1110000 | 1241.6631.1110000 |
| With lettering | compliant | 1241.6612.1110000 | 1241.6622.1110000 | 1241.6632.1110000 |
| Red point illumination | compliant | | 1241.6623.1111000 | 1241.6633.1111000 |
| Green point illumination | compliant | | 1241.6623.1112000 | 1241.6633.1112000 |
| Blue point illumination | compliant | | 1241.6623.1114000 | 1241.6633.1114000 |
| Red ring illumination | compliant | | 1241.6624.1111000 | 1241.6634.1111000 |
| Green ring illumination | compliant | | 1241.6624.1112000 | 1241.6634.1112000 |
| Blue ring illumination | compliant | | 1241.6624.1114000 | 1241.6634.1114000 |
| Rating max. 5 A / 125 V AC | | Ø 16 | Ø 19 | Ø 22 |
| Standard | compliant | 1241.6611.1120000 | 1241.6621.1120000 | 1241.6631.1120000 |
| With lettering | compliant | 1241.6612.1120000 | 1241.6622.1120000 | 1241.6632.1120000 |
| Red point illumination | compliant | | 1241.6623.1121000 | 1241.6633.1121000 |
| Green point illumination | compliant | | 1241.6623.1122000 | 1241.6633.1122000 |
| Blue point illumination | compliant | | 1241.6623.1124000 | 1241.6633.1124000 |
| Red ring illumination | compliant | | 1241.6624.1121000 | 1241.6634.1121000 |
| Green ring illumination | compliant | | 1241.6624.1122000 | 1241.6634.1122000 |
| Blue ring illumination | compliant | | 1241.6624.1124000 | 1241.6634.1124000 |
| Rating max. 10A / 250 V AC | | Ø 16 | Ø 19 | Ø 22 |
| Standard | compliant | 1241.6611.1130000 | 1241.6621.1130000 | 1241.6631.1130000 |
| With lettering | compliant | 1241.6612.1130000 | 1241.6622.1130000 | 1241.6632.1130000 |
| Red point illumination | compliant | | 1241.6623.1131000 | 1241.6633.1131000 |
| Green point illumination | compliant | | 1241.6623.1132000 | 1241.6633.1132000 |
| Blue point illumination | compliant | | 1241.6623.1134000 | 1241.6633.1134000 |
| Red ring illumination | compliant | | 1241.6624.1131000 | 1241.6634.1131000 |
| Green ring illumination | compliant | | 1241.6624.1132000 | 1241.6634.1132000 |
| Blue ring illumination | compliant | | 1241.6624.1134000 | 1241.6634.1134000 |

Changes that contribute to technical improvement are subject to alternations

| | | | | | | | |
|----------|------------------|--------------|--------------------|--------------|------------------|----------------|-------|
| Page | Production date: | Produced by: | Modification date: | Modified by: | Modification No. | Data sheet No. | Index |
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|  | | Mounting diameter (mm) |
|---|-----------|------------------------|
| Rating max. 0.1 A / 30 V DC | | Ø 30 |
| Standard | compliant | 1241.6661.1110000 |
| With lettering | compliant | 1241.6662.1110000 |
| Red point illumination | compliant | 1241.6663.1111000 |
| Green point illumination | compliant | 1241.6663.1112000 |
| Blue point illumination | compliant | 1241.6663.1114000 |
| Red ring illumination | compliant | 1241.6664.1111000 |
| Green ring illumination | compliant | 1241.6664.1112000 |
| Blue ring illumination | compliant | 1241.6664.1114000 |
| Rating max. 5 A / 125 V AC | | Ø 30 |
| Standard | compliant | 1241.6661.1120000 |
| With lettering | compliant | 1241.6662.1120000 |
| Red point illumination | compliant | 1241.6663.1121000 |
| Green point illumination | compliant | 1241.6663.1122000 |
| Blue point illumination | compliant | 1241.6663.1124000 |
| Red ring illumination | compliant | 1241.6664.1121000 |
| Green ring illumination | compliant | 1241.6664.1122000 |
| Blue ring illumination | compliant | 1241.6664.1124000 |
| Rating max. 10A / 250 V AC | | Ø 30 |
| Standard | compliant | 1241.6661.1130000 |
| With lettering | compliant | 1241.6662.1130000 |
| Red point illumination | compliant | 1241.6663.1131000 |
| Green point illumination | compliant | 1241.6663.1132000 |
| Blue point illumination | compliant | 1241.6663.1134000 |
| Red ring illumination | compliant | 1241.6664.1131000 |
| Green ring illumination | compliant | 1241.6664.1132000 |
| Blue ring illumination | compliant | 1241.6664.1134000 |