

Product Manual

Vandal-proof latching action switch MSM LA

CONTENTS

1 PRODUCT DESCRIPTION 2

2 TECHNICAL DATA AND DIMENSIONAL DRAWINGS 2

 2.1 Technical Data2

 2.2 Dimensional Drawings5

 2.3 Hole Dimensions7

 2.4 Starting Torque.....7

 2.5 Switching Symbols.....8

 2.6 Contact Layout9

3 ORDER NUMBERS 10

 3.1 Order Numbers MSM LA10

 3.2 Lettering.....11

4 ASSEMBLY 13

 4.1 Installation13

5 PACKAGING 14

6 QUALIFICATION TEST 15

 6.1 IP Protection Class15

 6.2 IK Protection Class15

 6.3 ESD Protection.....15

 6.4 Salt Spray Test.....15

7 APPROVALS 16

8 COMPLIANTS..... 16

| Changes that contribute to technical improvement are subject to alternations | | | | | | | |
|--|-------------|-------------|-----------------|--------------|----------------|----------------|-------|
| page | issue date: | created by: | amendment date: | released by: | amendment no.: | datasheet no.: | index |
| 1 of 16 | 04.08.2007 | Mangold | 07.12.2010 | Schillak | 10321 | 105.9526.200 | h |

1 PRODUCT DESCRIPTION

- housing and actuator are made of high-quality stainless steel
- switch is particularly suitable for use in equipment in harsh environments or for vandal-protected applications
- available with mounting diameters of 19 and 22 mm
- suitable for use in temperatures ranging from -20 °C to +85 °C
- permissible switching voltages up to 125 VDC / 250 VAC
- 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
- with quick connect terminals to allow for fast connections
- 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
- available in single-pole and double-pole versions

2 TECHNICAL DATA AND DIMENSIONAL DRAWINGS

2.1 Technical Data

| Electrical Data | | |
|--|--------------------|--------------------------------|
| Switching Voltage max. | [V _{DC}] | 30 (125VDC/0,5A) ¹⁾ |
| Switching Voltage max. | [V _{AC}] | 250 |
| Switching Current max. | [A _{AC}] | 12 |
| Rated Braking Capacity | [W _{AC}] | 3000 |
| Lifetime (at 8A / 250 VAC) | [Actuations] | 50.000 |
| Lifetime ¹⁾ (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.

| | |
|---|-------------------------------|
| Ring Illumination (RI) | MSM 19 LA RI and MSM 22 LA RI |
| Supply Voltage U_{LED} [V _{DC}] | 24 |

| | |
|--|--|
| Point Illumination (PI) | Attention: Parts are delivered without series resistor. |
| Characteristics LED red Point Illumination | Forward Current max. 40 mA Forward Voltage at 10 mA = 2.0 VDC Forward Voltage max. = 2.5 VDC |
| Characteristics LED green Point Illumination | Forward Current max. 40 mA Forward Voltage at 10 mA = 2.0 VDC Forward Voltage max. = 2.5 VDC |
| Characteristics LED blue 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 [V] | | | | U_V [V] | | | | U_V [V] | | | |
|-----------|---------------|--------------------|-----------|-----------|-----------------|-------------|-----------|-----------|-----------------|-------------|-----------|-----------|-----------------|-----------|
| | | | 5 | R_V [Ω] | R_V^{E24} [Ω] | P_V [W]** | 12 | R_V [Ω] | R_V^{E24} [Ω] | P_V [W]** | 24 | R_V [Ω] | R_V^{E24} [Ω] | P_V [W] |
| red | 10 | --- | 300 | 300 | 300 | 0,03 | 1000 | 1000 | 1000 | 0,10 | 2200 | 2200 | 2200 | 0,22 |
| | --- | 40 | | 63 | 62 | 0,10 | | 238 | 240 | 0,38 | | 538 | 240 | 0,86 |
| green | 10 | --- | 300 | 300 | 300 | 0,03 | 1000 | 1000 | 1000 | 0,10 | 2200 | 2200 | 2200 | 0,22 |
| | --- | 40 | | 63 | 62 | 0,10 | | 238 | 240 | 0,38 | | 538 | 560 | 0,86 |
| blue | 10 | --- | 180 | 180 | 180 | 0,02 | 880 | 910 | 910 | 0,09 | 2080 | 2000 | 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)

| | | | | | | | |
|--|-------------|-------------|-----------------|--------------|----------------|----------------|-------|
| Changes that contribute to technical improvement are subject to alternations | | | | | | | |
| page | issue date: | created by: | amendment date: | released by: | amendment no.: | datasheet no.: | index |
| 3 of 16 | 04.08.2007 | Mangold | 07.12.2010 | Schillak | 10321 | 105.9526.200 | h |

| Mechanical Data | | |
|------------------------------------|--------------|---------|
| Actuating Force typ. | [N] | 10 |
| Actuating Travel typ. | [mm] | 5.2 |
| Lifetime mechanical | [Actuations] | 100.000 |
| Contact Gap | [mm] | 3 |
| Shock Resistance (DIN EN 50102) | [IK] | 07 |

| Starting Torque | | MSM 19 LA | MSM 22 LA |
|---------------------------|------|-----------|-----------|
| Plastic Nut max. | [Nm] | 4.5 | 3.5 |
| Stainless Steel Nut* max. | [Nm] | 12 | 16 |

* on request

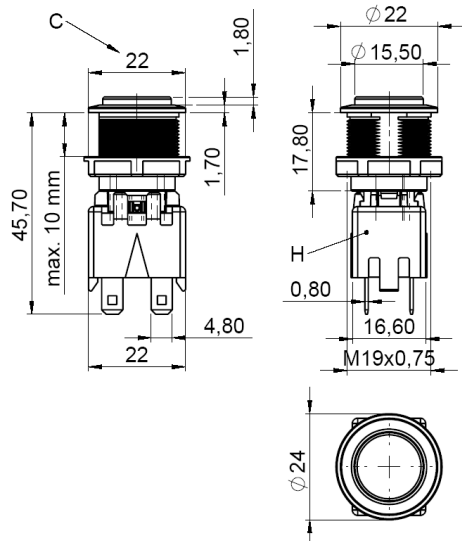
| Climatic Data | | |
|--|------|-------------------------------------|
| Operating Temperature | [°C] | -20 to +85 |
| Storage Temperature | [°C] | -20 to +85 |
| Degree of Protection (DIN EN 60529) | [IP] | IP 64 Front Side IP 00 Rear Side |

| Material | |
|--|---|
| Component | Material with flammability rating |
| Push button holder | 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) |
| Component | Material without flammability rating |
| Housing | Stainless Steel 1.4305 |
| Actuator (disc, outside housing) | Stainless Steel 1.4305 |
| Illuminated Ring (die-casting, inside housing) | PC |
| Sealing Ring | NBR70 |

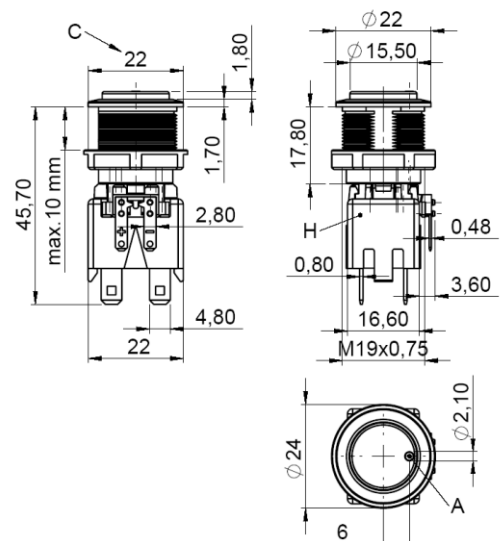
2.2 Dimensional Drawings

2.2.1 Component Dimensions M19

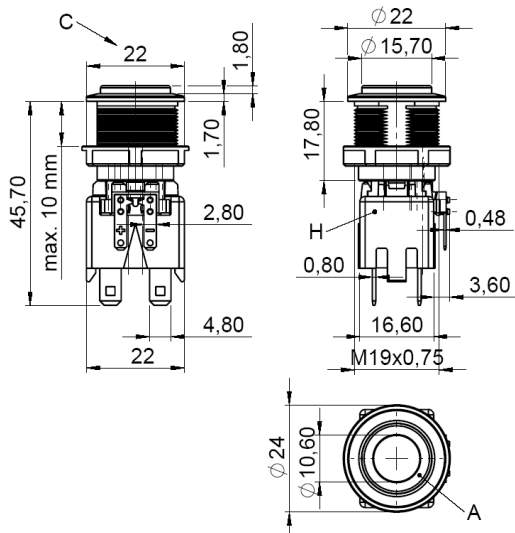
**MSM 19 LA ST double-pole /
MSM 19 LA LE double-pole**



MSM 19 LA PI double-pole

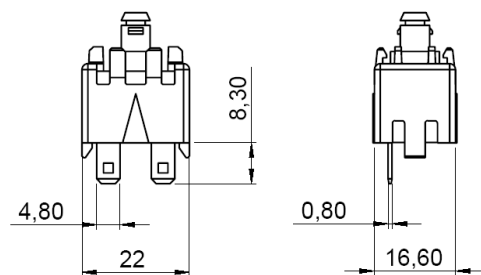


MSM 19 LA RI double-pole



Switching Element single-pole

consists of: switch single-pole + push button holder



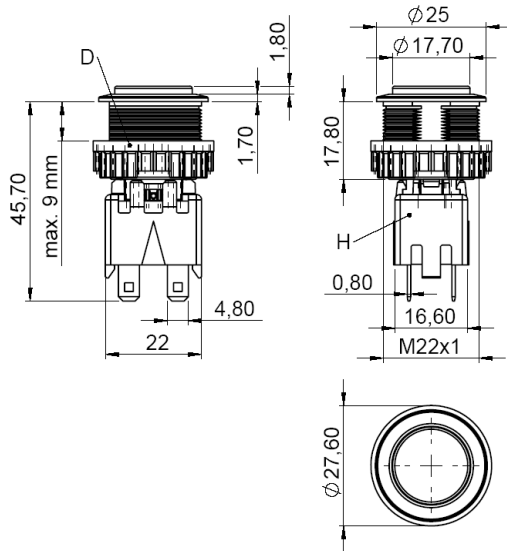
Legend

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

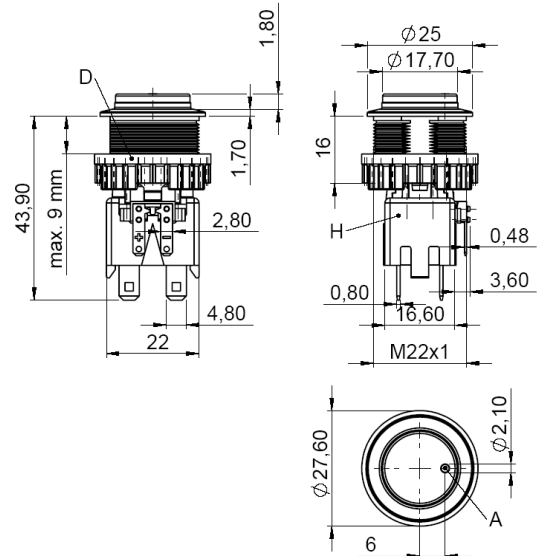
| Changes that contribute to technical improvement are subject to alternations | | | | | | | |
|--|-------------|-------------|-----------------|--------------|----------------|----------------|-------|
| page | issue date: | created by: | amendment date: | released by: | amendment no.: | datasheet no.: | index |
| 5 of 16 | 04.08.2007 | Mangold | 07.12.2010 | Schillak | 10321 | 105.9526.200 | h |

2.2.2 Component Dimensions M22

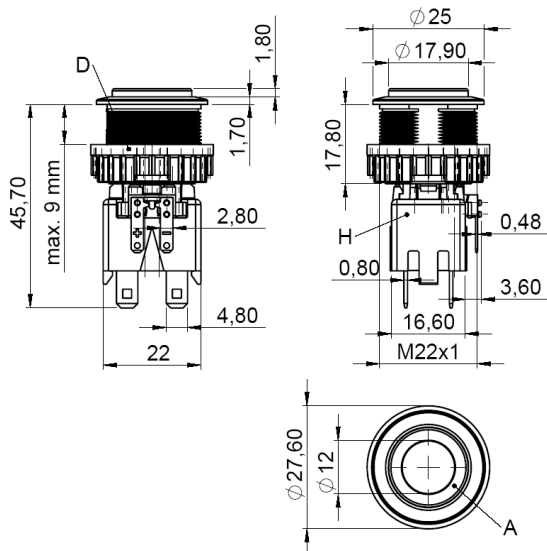
**MSM 22 LA ST double-pole /
MSM 22 LA LE double-pole**



MSM 22 LA PI double-pole

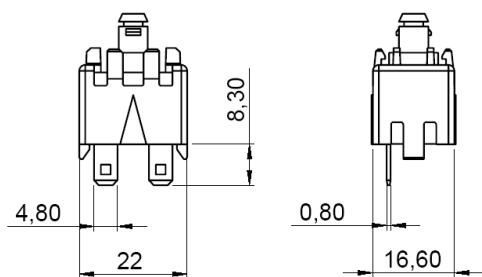


MSM 22 LA RI double-pole



Switching Element single-pole

consists of: switch single-pole + push button holder



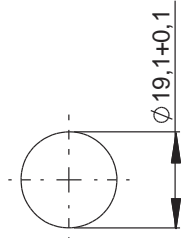
Legend

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

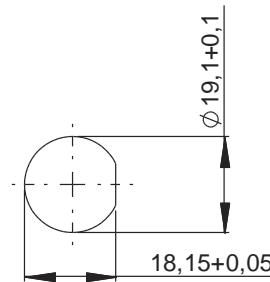
| Changes that contribute to technical improvement are subject to alternations | | | | | | | |
|--|-------------|-------------|-----------------|--------------|----------------|----------------|-------|
| page | issue date: | created by: | amendment date: | released by: | amendment no.: | datasheet no.: | index |
| 6 of 16 | 04.08.2007 | Mangold | 07.12.2010 | Schillak | 10321 | 105.9526.200 | h |

2.3 Hole Dimensions

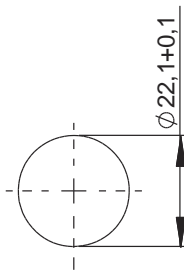
MSM 19 LA (without torsion protection)



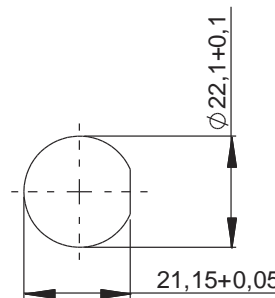
MSM 19 LA (with torsion protection)



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“

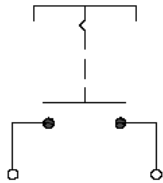
2.4 Starting Torque

| | Plastic Nut max. (Nm) | Stainless Steel Nut * max. (Nm) |
|--------|-----------------------|---------------------------------|
| MSM 19 | 4.5 | 12 |
| MSM 22 | 3.5 | 16 |

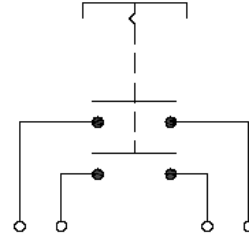
➤ * on request

2.5 Switching Symbols

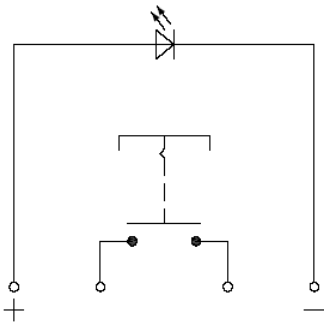
**MSM LA ST single-pole /
MSM LA LE single-pole**



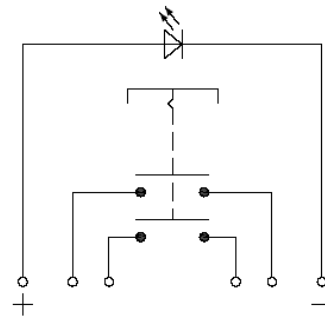
**MSM LA ST double-pole /
MSM LA LE double-pole**



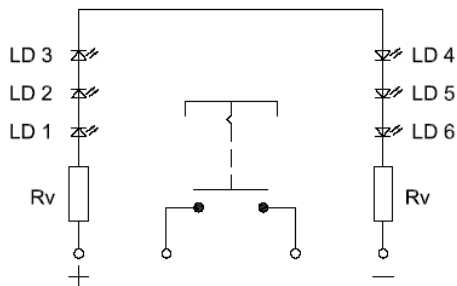
MSM LA PI single-pole



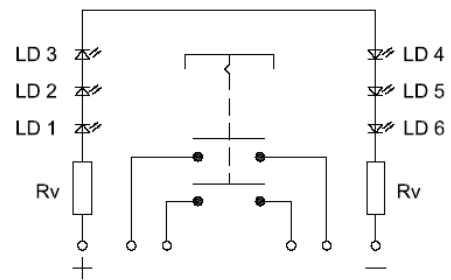
MSM LA PI double-pole



MSM LA RI single-pole



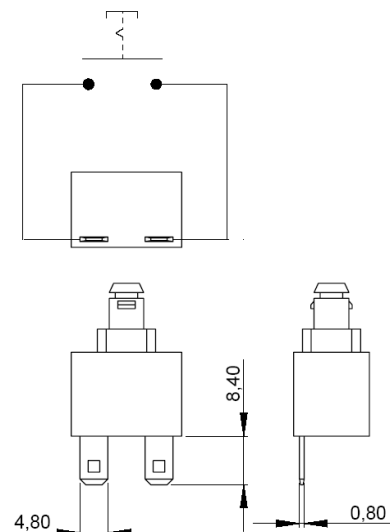
MSM LA RI double-pole



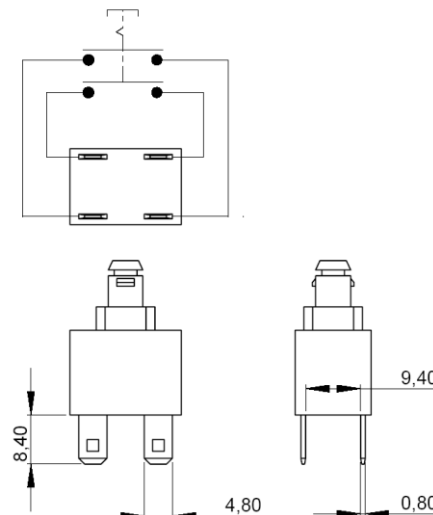
| Changes that contribute to technical improvement are subject to alternations | | | | | | | |
|--|-------------|-------------|-----------------|--------------|----------------|----------------|-------|
| page | issue date: | created by: | amendment date: | released by: | amendment no.: | datasheet no.: | index |
| 8 of 16 | 04.08.2007 | Mangold | 07.12.2010 | Schillak | 10321 | 105.9526.200 | h |

2.6 Contact Layout

Contact Layout single-pole



Contact Layout double-pole



| Changes that contribute to technical improvement are subject to alternations | | | | | | | |
|--|-------------|-------------|-----------------|--------------|----------------|----------------|-------|
| page | issue date: | created by: | amendment date: | released by: | amendment no.: | datasheet no.: | index |
| 9 of 16 | 04.08.2007 | Mangold | 07.12.2010 | Schillak | 10321 | 105.9526.200 | h |

3 ORDER NUMBERS

3.1 Order Numbers MSM LA

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

* Lettering Index see under [chapter 3.2](#)

3.2 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 Basic Version

1241.6822.1110XXX

 Symbols **001-074**

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= x | 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 | 073= RESET |
| 014= N | 029= 2 | 044= # | 059= BACK | 074=  |
| 015= O | 030= 3 | 045= ↔ | 060= LINE | |

| Changes that contribute to technical improvement are subject to alternations | | | | | | | |
|--|-------------|-------------|-----------------|--------------|----------------|----------------|-------|
| page | issue date: | created by: | amendment date: | released by: | amendment no.: | datasheet no.: | index |
| 11 of 16 | 04.08.2007 | Mangold | 07.12.2010 | Schillak | 10321 | 105.9526.200 | h |

Font Size

MSM 19 LA LE / MSM 19 LA 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 LA LE / MSM 22 LA 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 19 LA RI * / MSM 22 LA RI

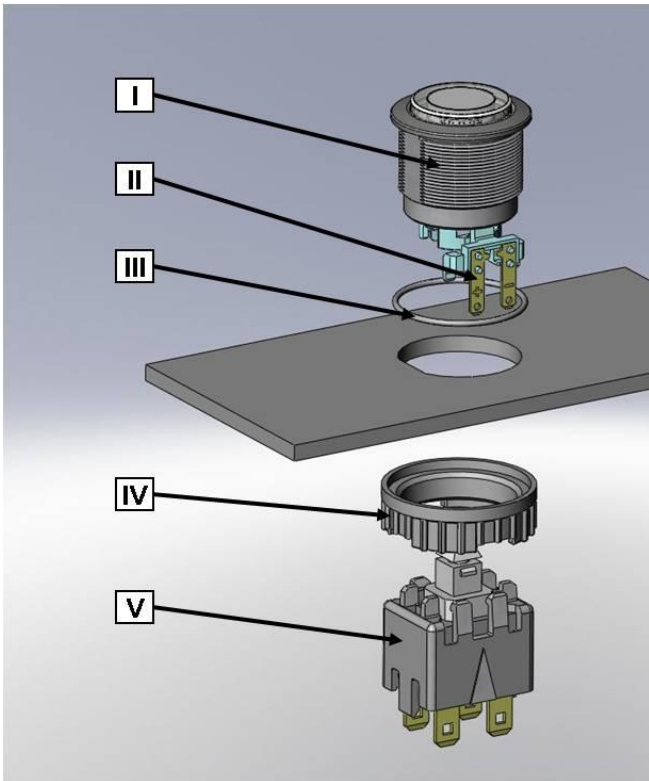
| | |
|-----------------------------------|--|
| Single characters: | height 5 mm, font: Helvetica normal DIN1451-1E |
| Text, max. 3 characters | height 3 mm, font: Helvetica normal DIN1451-1E |
| Symbols (indices 037-052): | capitals height 5 mm, font: True Type, Symbol |

- ** 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 | | | | | | | |
|--|-------------|-------------|-----------------|--------------|----------------|----------------|-------|
| page | issue date: | created by: | amendment date: | released by: | amendment no.: | datasheet no.: | index |
| 12 of 16 | 04.08.2007 | Mangold | 07.12.2010 | Schillak | 10321 | 105.9526.200 | h |

4 ASSEMBLY

4.1 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 2.4](#)
3. Clasp the push button switch assembly into 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 push button 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 Assembly
- II = Flat Pin Terminals (illumination)
- III = Gasket
- IV = Screw Nut
- V = Push Button Switch Assembly

Changes that contribute to technical improvement are subject to alternations

| page | issue date: | created by: | amendment date: | released by: | amendment no.: | datasheet no.: | index |
|----------|-------------|-------------|-----------------|--------------|----------------|----------------|-------|
| 13 of 16 | 04.08.2007 | Mangold | 07.12.2010 | Schillak | 10321 | 105.9526.200 | h |

Print date: 10/12/2010 14:40:00

5 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.



| Changes that contribute to technical improvement are subject to alternations | | | | | | | |
|--|-------------|-------------|-----------------|--------------|----------------|----------------|-------|
| page | issue date: | created by: | amendment date: | released by: | amendment no.: | datasheet no.: | index |
| 14 of 16 | 04.08.2007 | Mangold | 07.12.2010 | Schillak | 10321 | 105.9526.200 | h |

6 QUALIFICATION TEST

6.1 IP Protection Class

| | |
|--------------------------------------|-------------------------------------|
| IP Protection Class IEC/DIN/EN/60529 | IP 64 Front Side IP 00 Rear Side |
|--------------------------------------|-------------------------------------|

6.2 IK Protection Class

Tested centrally

| | |
|----------------------------------|-------|
| IK Protection Class DIN EN 50102 | IK 07 |
|----------------------------------|-------|

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 |
|-----------------------|------------------------|-------------|

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 | | | | | | | |
|--|-------------|-------------|-----------------|--------------|----------------|----------------|-------|
| page | issue date: | created by: | amendment date: | released by: | amendment no.: | datasheet no.: | index |
| 15 of 16 | 04.08.2007 | Mangold | 07.12.2010 | Schillak | 10321 | 105.9526.200 | h |

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 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 | | | | | | | |
|--|-------------|-------------|-----------------|--------------|----------------|----------------|-------|
| page | issue date: | created by: | amendment date: | released by: | amendment no.: | datasheet no.: | index |
| 16 of 16 | 04.08.2007 | Mangold | 07.12.2010 | Schillak | 10321 | 105.9526.200 | h |