SCHURTER GmbH
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SCHURTER ELECTRONIC COMPONENTS

Product manual

Vandal-proof MSM switches

CONTENTS

1. DESCRIPTION
2. DATA AND DIMENSIONAL DRAWINGS
   - 2.1. Data
   - 2.2. Dimensions Mounting Diameter 16mm
     Dimensions Mounting Diameter 19mm
     Dimensions Mounting Diameter 22mm
     Dimensions Mounting Diameter 30mm
   - 2.3. Actuator tolerance range
   - 2.4. Cut out
   - 2.5. Tightening torque
   - 2.6. Switching symbols
   - 2.7. Accessories
3. ORDER NUMBER
   - 3.1. Lettering
4. PACKAGING
5. QUALIFICATION TESTS
   - 5.1. IP degree of protection
   - 5.2. IK protection class
   - 5.3. Salt spray test
6. Approvals
7. ROHS COMPLIANT

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

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
Actuating travel (mm)	0.8	0.8		0.8
Degree of protection (IP)	67	67		67
Shock resistance DIN EN 50102 (IK), mounting diameter 16	06	06		06
Shock resistance DIN EN 50102 (IK), mounting diameter 19; 22; 30	07	07		07
Climatic data				
Operating/storage temp. (°C)	- 25 to + 85	- 25 to + 85		- 25 to + 85

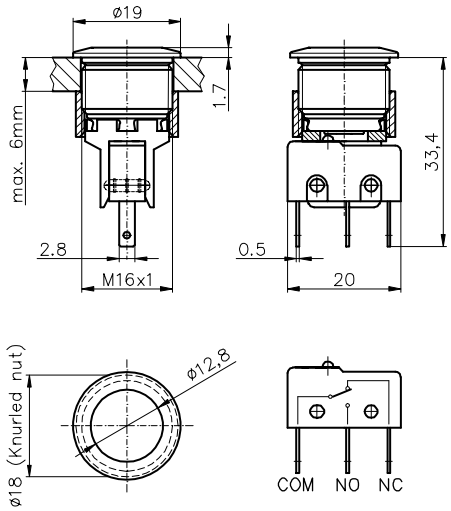
Ring illumination				
Supply voltage Ring illumination (V DC)	24	24		24

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

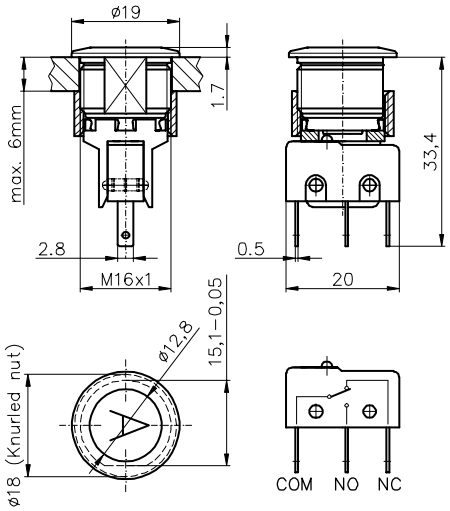
Material	
Individual component	**material**
Housing	Stainless steel 1.4305
Actuator	Stainless steel 1.4305
Light conductor (point illumination)	PC
Illuminated ring (ring illumination)	PC
gasket	NBR70

Component dimensions

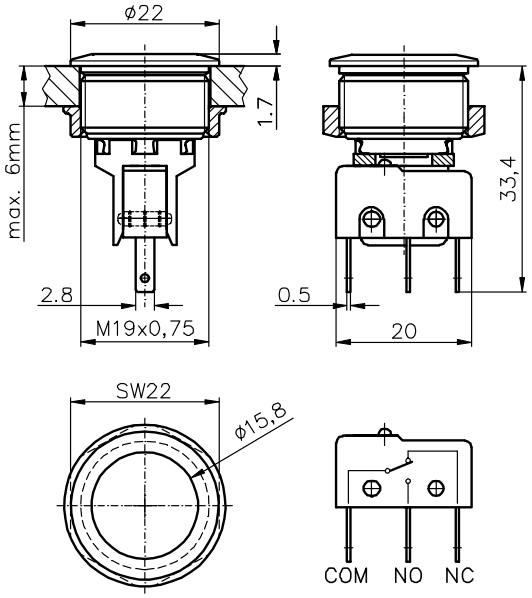
MSM16 ST



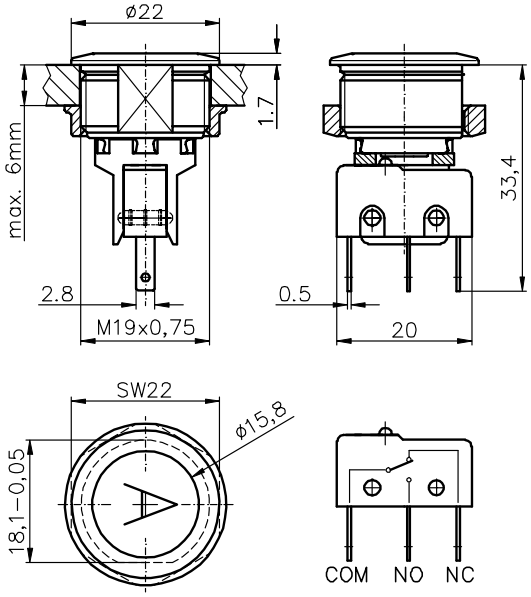
MSM16 LE



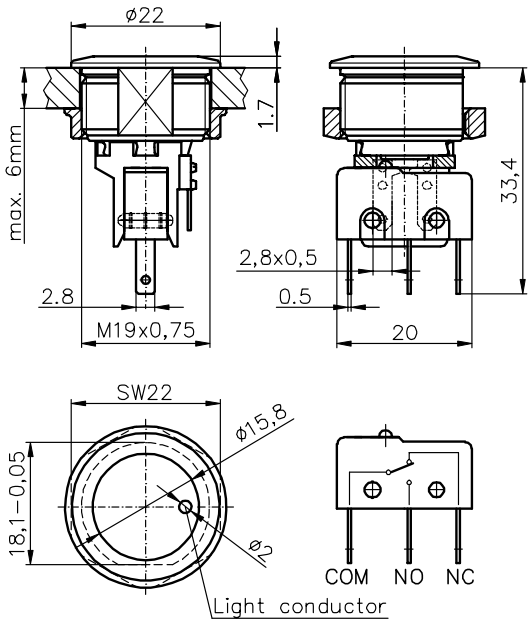
MSM19 ST



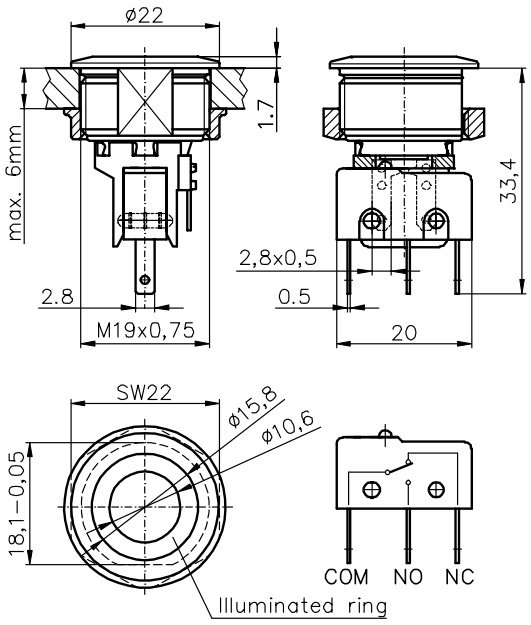
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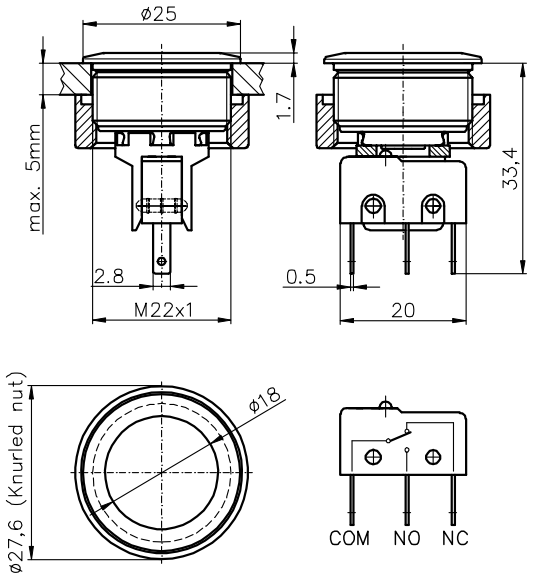
MSM19 PI



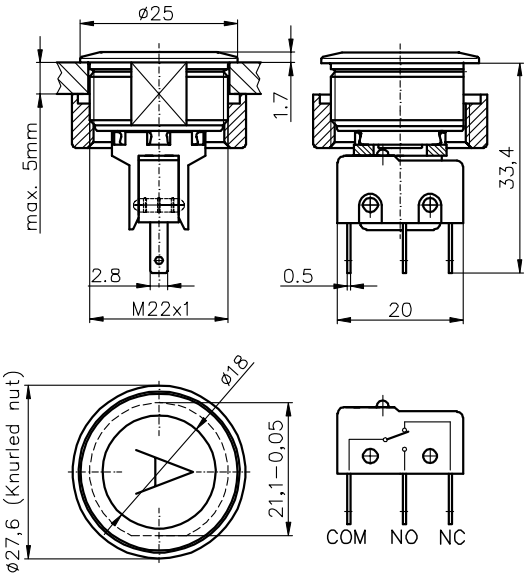
MSM19 RI



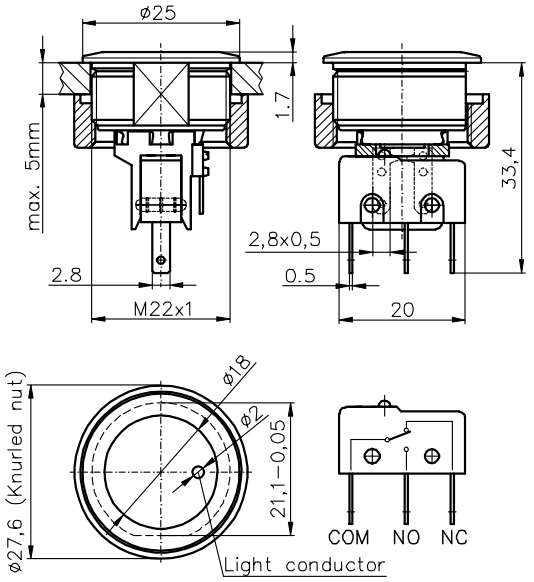
MSM22 ST



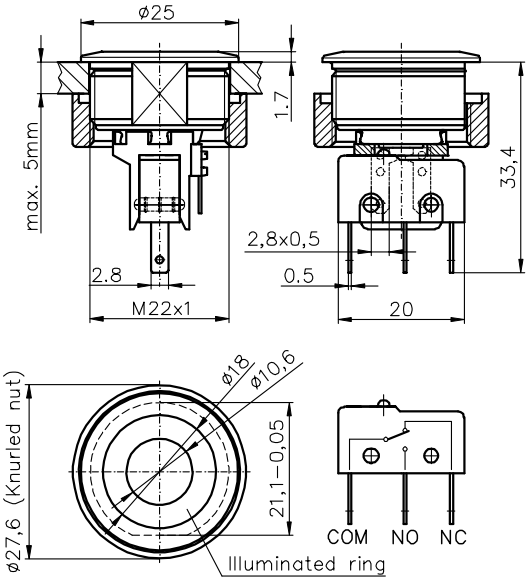
MSM22 LE



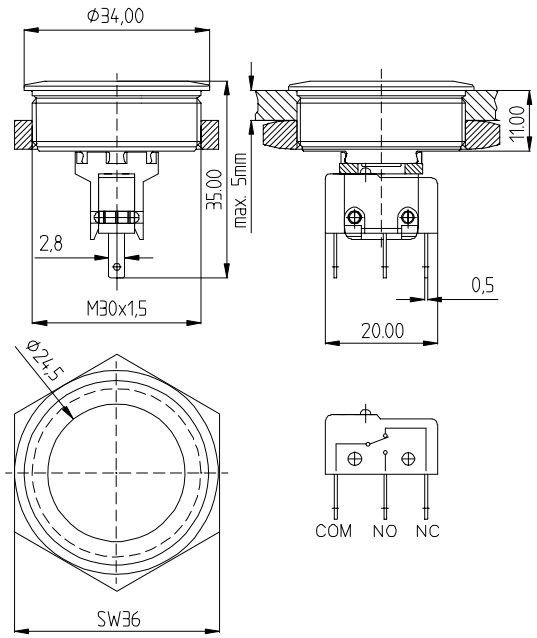
MSM22 PI



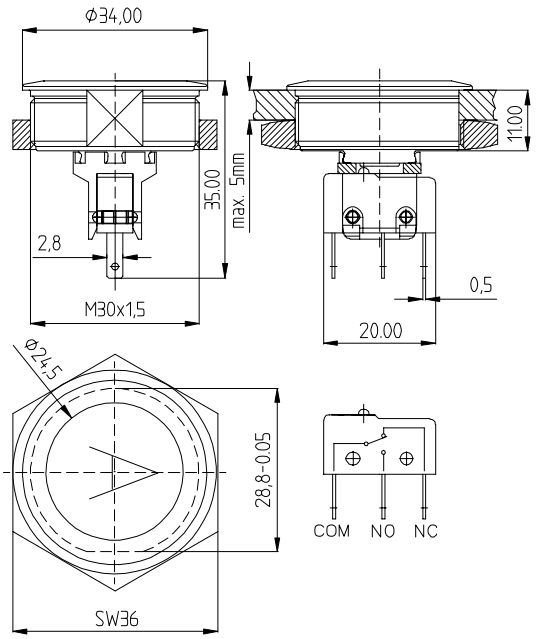
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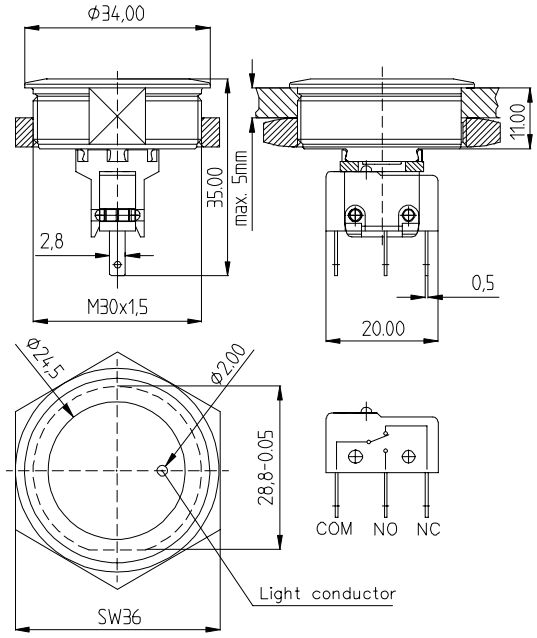
MSM30 ST



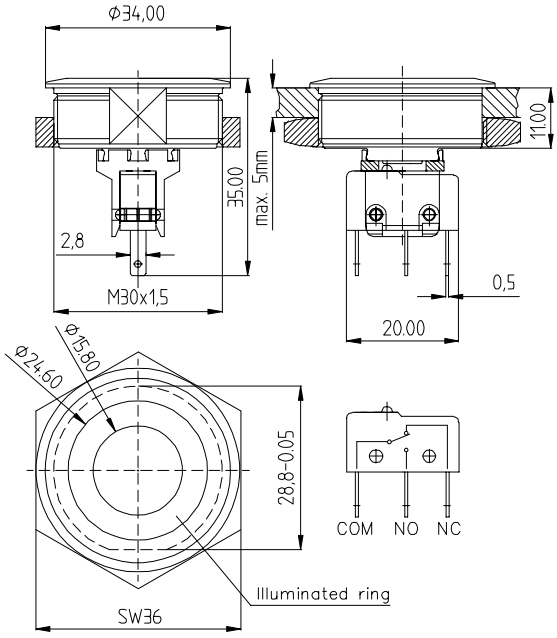
MSM30 LE



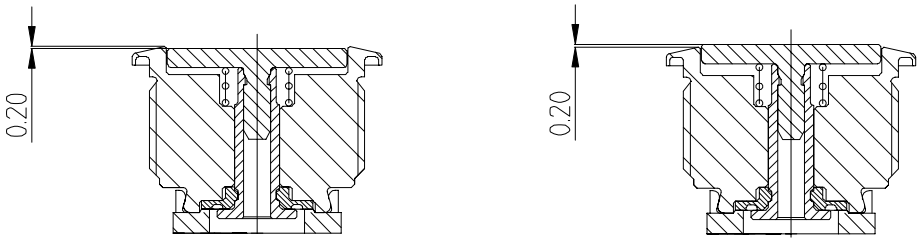
MSM30 PI



MSM30 RI



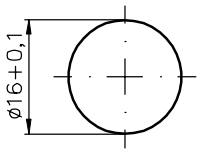
Actuator tolerance range



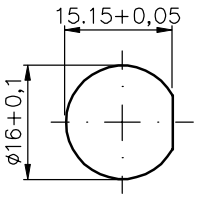
The mounting range tolerance of the actuator varies from 0.2mm projection length and 0.2mm short length to the housing edge. The slanting position of the actuator can range within this tolerance.

Hole dimensions

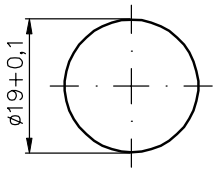
MSM16 ST



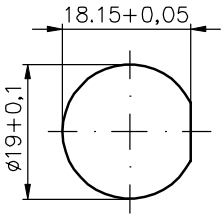
MSM16 LE



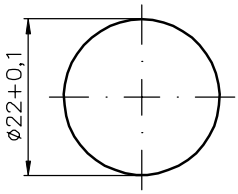
MSM19 ST / MSM19 RI



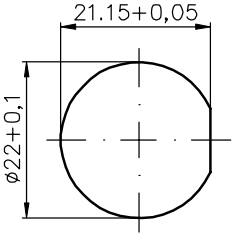
MSM19 LE/ MSM19 PI



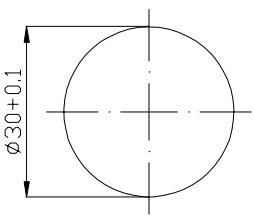
MSM22 ST / MSM22 RI



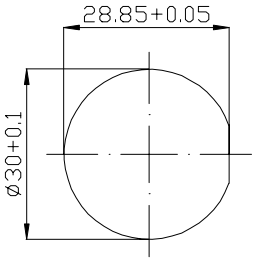
MSM22 LE/ MSM22 PI



MSM30 ST / MSM30 RI



MSM30 LE / MSM 30 PI



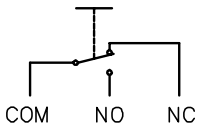
Tightening torque

	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

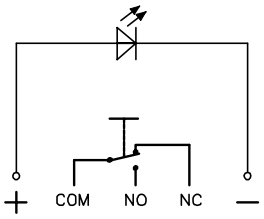
* on request

Switching symbols

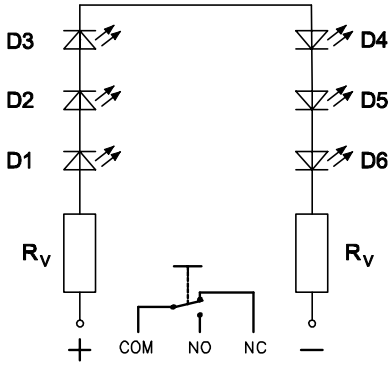
MSM ST / MSM LE



MSM PI



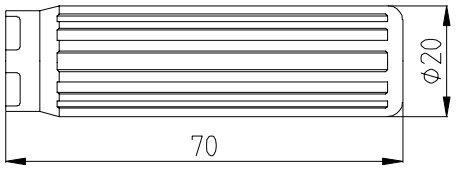
MSM RI



2.1 Accessories

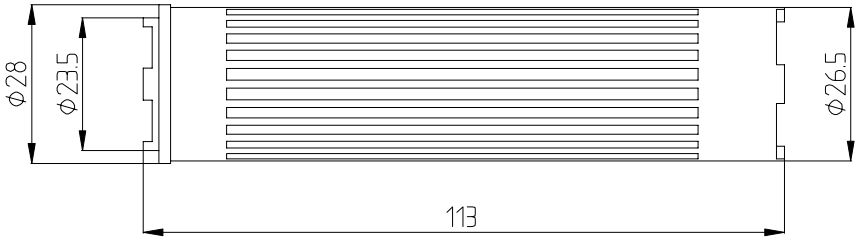
MSM 16 Installation wrench

Order Number: 0853.0622



MSM 22 Installation wrench

Order Number: 1141.1337



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
Blue point illumination		*1241.6623.1114000*	*1241.6633.1114000*
Red ring illumination		1241.6624.1111000	1241.6634.1111000
Green ring illumination		1241.6624.1112000	1241.6634.1112000
Blue ring illumination		*1241.6624.1114000*	*1241.6634.1114000*
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
Blue point illumination		*1241.6623.1134000*	*1241.6633.11342000*
Red ring illumination		1241.6624.1131000	1241.6634.1131000
Green ring illumination		1241.6624.1132000	1241.6634.1132000
Blue ring illumination		*1241.6624.1134000*	*1241.6634.1134000*
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
Blue point illumination	*1241.6663.1114000*
Red ring illumination	1241.6664.1111000
Green ring illumination	1241.6664.1112000
Blue ring illumination	*1241.6664.1114000*

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
Blue point illumination	*1241.6663.1124000*
Red ring illumination	1241.6664.1121000
Green ring illumination	1241.6664.1122000
Blue ring illumination	*1241.6664.1124000*

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
Blue point illumination	*1241.6663.1134000*
Red ring illumination	1241.6664.1131000
Green ring illumination	1241.6664.1132000
Blue ring illumination	*1241.6664.1134000*

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

1241.6611.1120XXX
- Basic version
- Symbols **001-072**

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

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

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

	RoHS COMPLIANT 2002/95/EC	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