

MSM – CLASSY DESIGN – HIGH RESISTANCE



The robust vandal-proof MSM switch has a high shock resistance and an extremely flat front construction of only 1.7 mm. Housing and actuator are made of top-quality stainless steel. The MSM is designed for quick mounting: the wires are simply plugged into the quick connect terminals of the detachable contact module. Then the module is snapped into the

switch, which is simply screwed in beforehand. There are variants with point or ring illumination for night applications or for optical status indications. The MSM switch is available with mounting diameters of Ø 16, 19 or 22 mm, with a switching voltage range of 5 V DC to 250 V AC, and a current range of 0.1 – 10 A.

METAL LINE

INPUT SYSTEMS

MSM – CLASSY DESIGN – HIGH RESISTANCE



BENEFITS

- high shock resistance
- pleasant tactile feeling
- flat front design
- made of top-quality stainless steel
- available with point or ring illumination
- easy mounting
- laser lettering is possible

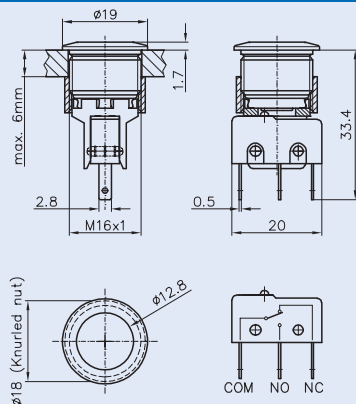
	MSM16	MSM19	MSM22
TECHNICAL DATA			
Contact material	silver	silver	silver
Switching voltage max. (VAC)	250	250	250
Switching voltage min.* (VDC)	5	5	5
Switching current max.* (A)	3	3	3
Lifetime (Rated breaking capacity 3A at 250 VAC/160 mA at 48 VDC)	200.000/1,5 mill.	200.000/1,5 mill.	200.000/1,5 mill.
Contact bounce (ms)	< 5	< 5	< 5
Actuating force (N)	4,5	4,5	4,5
Contact travel (mm)	1	1	1
Degree of protection (IP)	67	67	67
Protection (DIN EN 50102) (IK)	06	07	07
Operating/storage temperature (°C)	-25 to +85	-25 to +85	-25 to +85

* Switches with different electrical ratings available on request

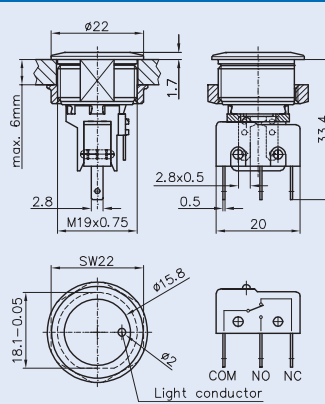
PART NUMBER

	MSM16	MSM19	MSM22
Mounting diameter (mm)	Ø 16	Ø 19	Ø 22
Standard	1241.6611.1120000	1241.6621.1120000	1241.6631.1120000
Lettered	on request	on request	on request
Point Illumination red		1241.6623.1121000	1241.6633.1121000
Point Illumination green		1241.6623.1122000	1241.6633.1122000
Ring Illumination red		1241.6624.1121000	1241.6634.1121000
Ring Illumination green		1241.6624.1122000	1241.6634.1122000

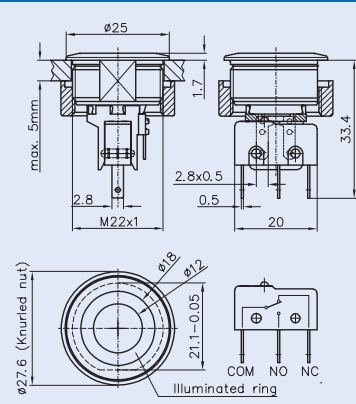
MSM 16 ST



MSM 19 PI



MSM 22 RI



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. [Switching symbols](#)
 - 2.6. [Accessories](#)
3. [ORDER NUMBER](#)
 - 3.1. [Lettering](#)
4. [PACKAGING](#)
5. [QUALIFICATION TESTS](#)
6. [ROHS COMPLIANT](#)

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
1 of 14	05.11.2004	Ullmer	28.07.05	Birmelin	9078	105.9502	a

Print date: 28.07.2005 18:04

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

2.1 Technical data

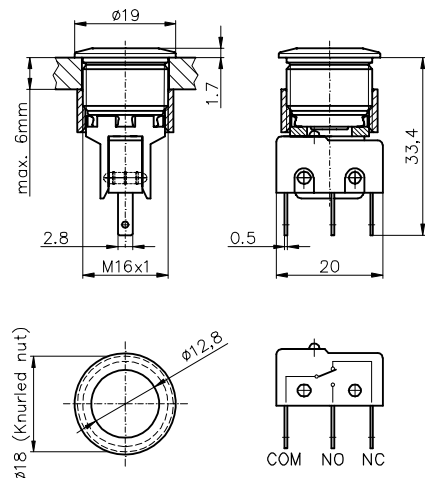
Micro switch for electrical rating	0.1 A 30 V DC	5 A 125 VAC	3 A 250 VAC	10 A 250 V AC
Electrical data				
Contact material	Gold	Silver	Silver	Silver
Switching voltage max. (V)	30	250	250	250
Switching voltage min. (V)	3	5	5	5
Switching current max. (A)	0.1	3	3	10
Rated braking capacity (W)	3	1250	1250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

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
2 of 14	05.11.2004	Ullmer	28.07.05	Birmelin	9078	105.9502	a

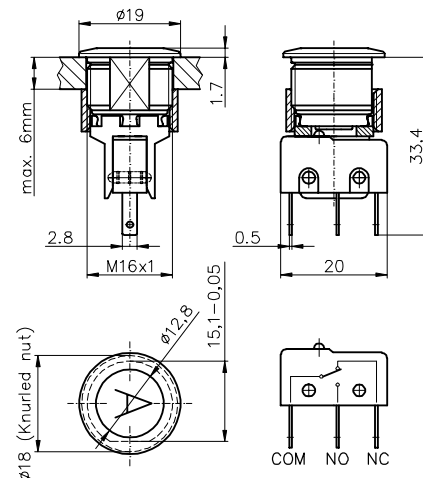
Micro switch for electrical rating	0.1 A 30 V DC	5 A 125 VAC	3 A 250 VAC	10 A 250 V AC
Mechanical data				
Actuating force (N)	3.7	3.7	3.7	3.7
Actuating travel (mm)	0.8	0.8	0.8	0.8
Degree of protection (IP)	67	67	67	67
Shock resistance DIN EN 50102 (IK), mounting diameter 16	06	06	06	06
Shock resistance DIN EN 50102 (IK), mounting diameter 19; 22	07	07	07	07
Climatic data				
Operating/storage temp. (°C)	- 25 to + 85	- 25 to + 85	- 25 to + 85	- 25 to + 85
Illumination				
Supply voltage Ring illumination (V DC)	24	24	24	24
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	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	Forward current max. 40 mA Forward voltage at 10 mA = 2.0 V DC Forward voltage max. = 2.6 V DC

2.2 Component dimensions

MSM16 ST



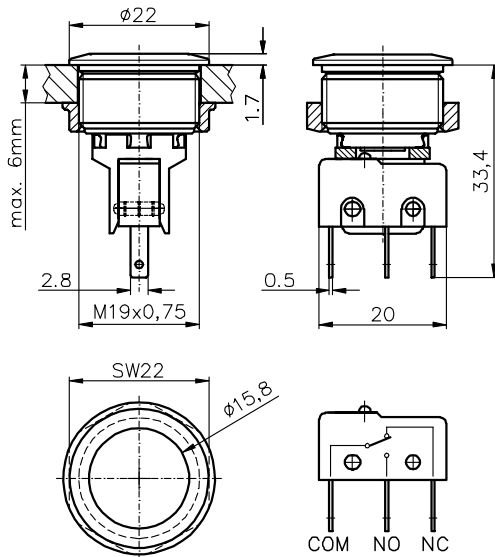
MSM16 LE



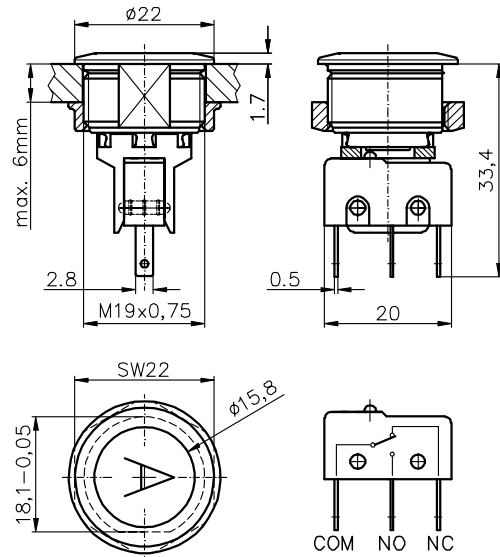
Changes that contribute to technical improvement are subject to alternations							
Page	Production date:	Produced by:	Modification date:	Modified by:	Modification No.	Data sheet No.	Index
3 of 14	05.11.2004	Ullmer	28.07.05	Birmelin	9078	105.9502	a

Print date: 28.07.2005 18:04

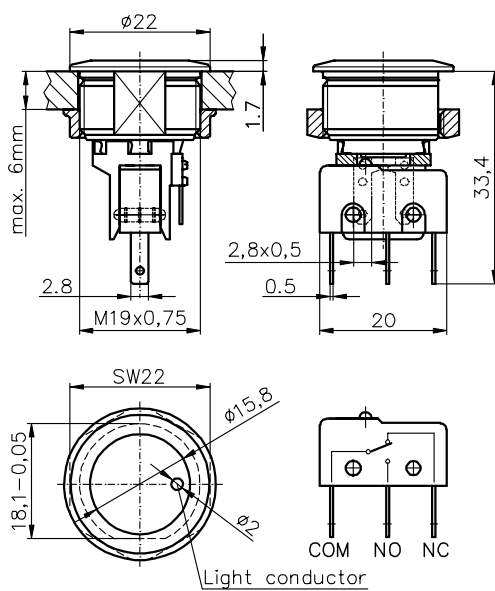
MSM19 ST



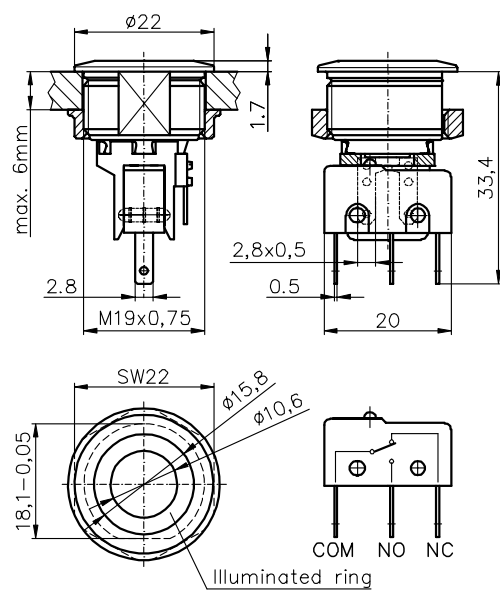
MSM19 LE



MSM19 PI

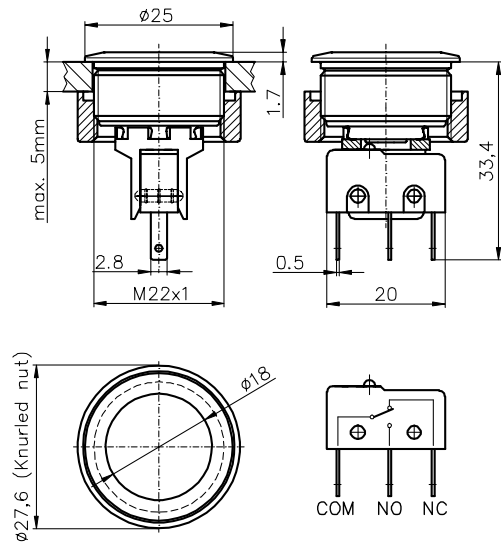


MSM19 RI

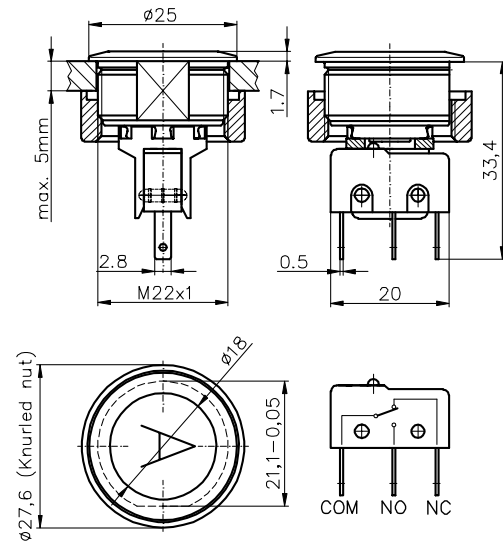


Changes that contribute to technical improvement are subject to alternations							
Page	Production date:	Produced by:	Modification date:	Modified by:	Modification No.	Data sheet No.	Index
4 of 14	05.11.2004	Ullmer	28.07.05	Birmelin	9078	105.9502	a

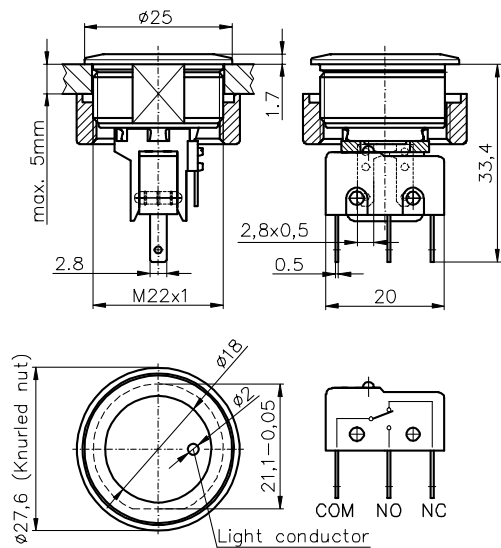
MSM22 ST



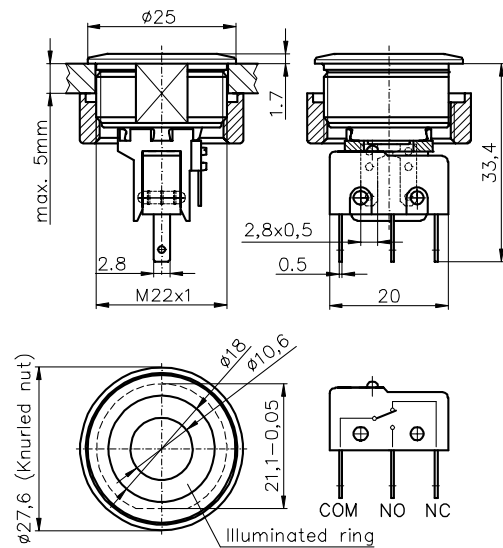
MSM22 LE



MSM22 PI

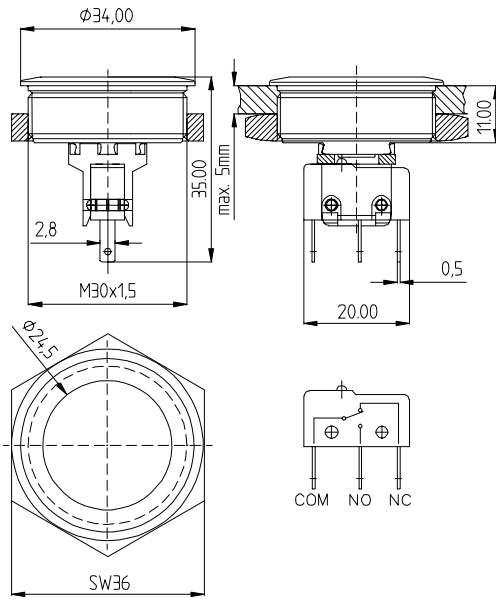


MSM22 RI

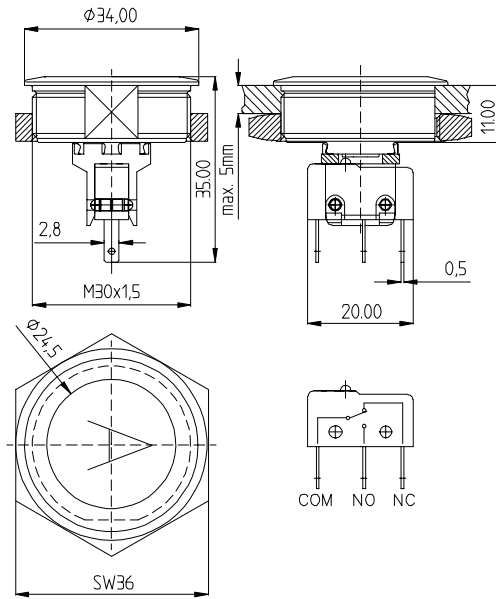


Changes that contribute to technical improvement are subject to alternations						
Page	Production date:	Produced by:	Modification date:	Modified by:	Modification No.	Data sheet No.
5 of 14	05.11.2004	Ullmer	28.07.05	Birmelin	9078	105.9502
						Index
						a

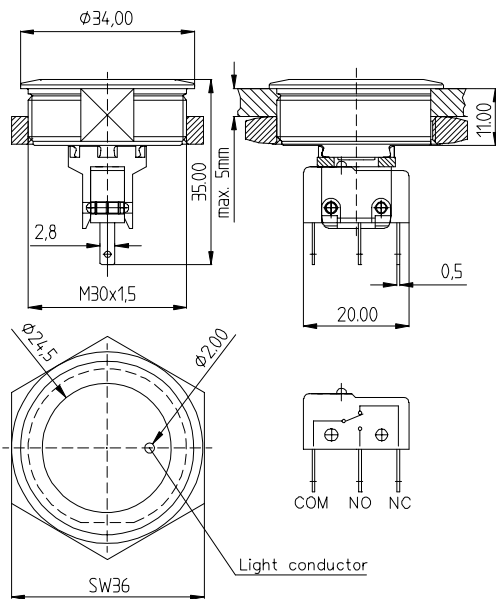
MSM30 ST



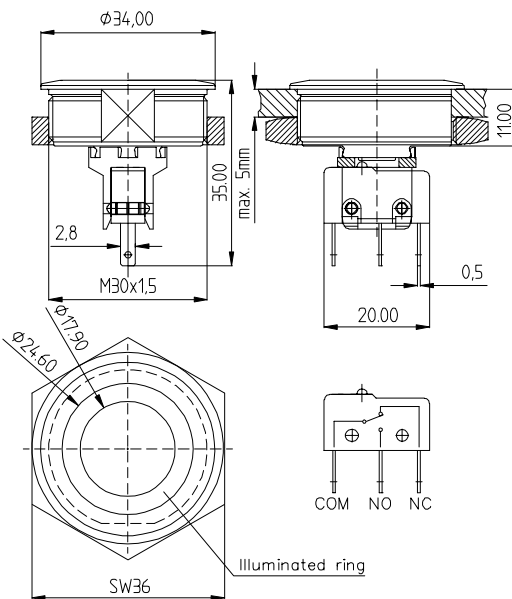
MSM30 LE



MSM30 PI

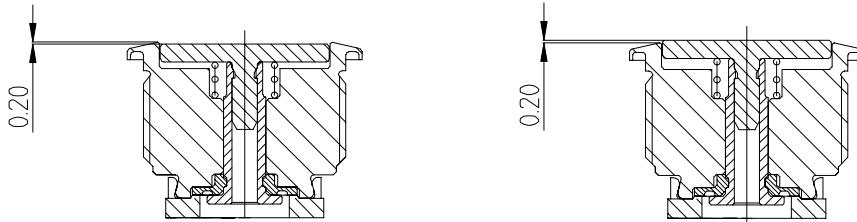


MSM30 RI



Changes that contribute to technical improvement are subject to alternations						
Page	Production date:	Produced by:	Modification date:	Modified by:	Modification No.	Data sheet No.
6 of 14	05.11.2004	Ullmer	28.07.05	Birmelin	9078	105.9502
						Index
						a

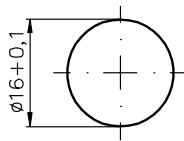
2.3 Actuator tolerance range



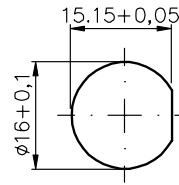
The mounting range tolerance of the actuator varies from 0.2mm projection length and 0.2mm short length to the housing edge. The slanting position of the actuator can range within this tolerance.

2.4 Hole dimensions

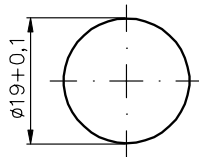
MSM16 ST



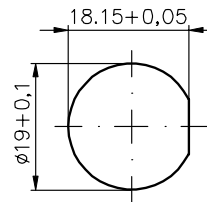
MSM16 LE



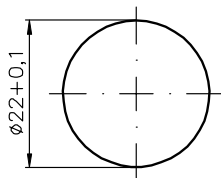
MSM19 ST / MSM19 RI



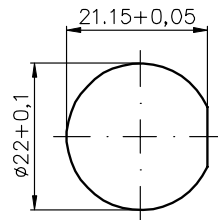
MSM19 LE/ MSM19 PI



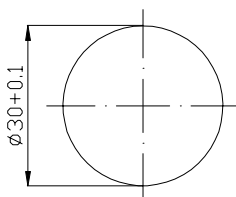
MSM22 ST / MSM22 RI



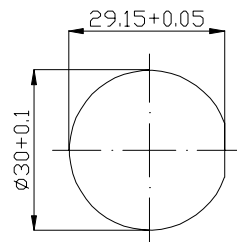
MSM22 LE/ MSM22 PI



MSM30 ST / MSM30 RI



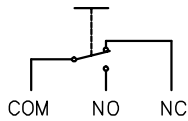
MSM30 LE / MSM 30 PI



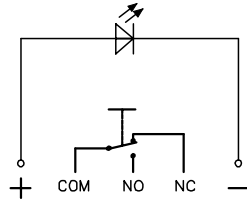
Changes that contribute to technical improvement are subject to alternations							
Page	Production date:	Produced by:	Modification date:	Modified by:	Modification No.	Data sheet No.	Index
7 of 14	05.11.2004	Ullmer	28.07.05	Birmelin	9078	105.9502	a

2.5 Switching symbols

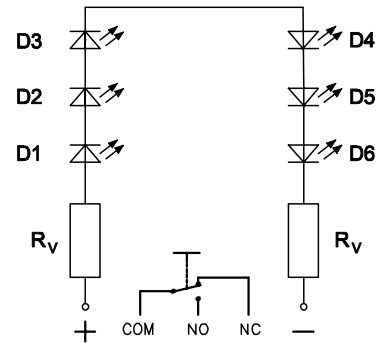
MSM ST / MSM LE



MSM PI



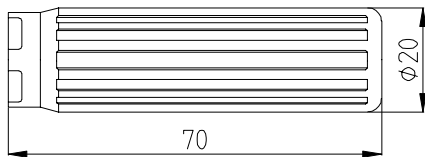
MSM RI



2.6 Accessories

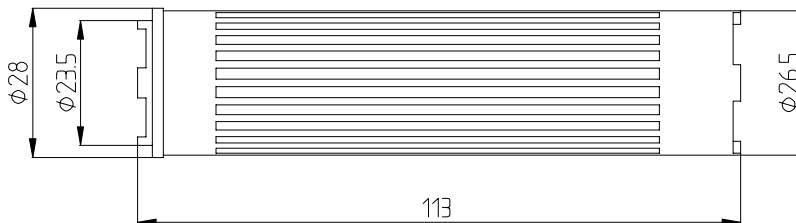
MSM 16 Installation wrench

Order Number: 0853.0622



MSM 22 Installation wrench

Order Number: 1141.1337



Changes that contribute to technical improvement are subject to alternations							
Page	Production date:	Produced by:	Modification date:	Modified by:	Modification No.	Data sheet No.	Index
8 of 14	05.11.2004	Ullmer	28.07.05	Birmelin	9078	105.9502	a

Print date: 28.07.2005 18:04

3 Order Number

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

Electrical rating max. 0.1 A / 30 V DC (SS-01)			
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
Red ring illumination		1241.6624.1111000	1241.6634.1111000
Green ring illumination		1241.6624.1112000	1241.6634.1112000
Installation wrench	0853.0622		1141.1337

Electrical rating max. 5 A / 125 V AC or 3 A / 250V AC(SS-5)			
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
Red ring illumination		1241.6624.1121000	1241.6634.1121000
Green ring illumination		1241.6624.1122000	1241.6634.1122000
Installation wrench	0853.0622		1141.1337

Electrical rating max. 5 A / 125 V AC (SS-5)			
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
Red ring illumination		1241.6624.1131000	1241.6634.1131000
Green ring illumination		1241.6624.1132000	1241.6634.1132000
Installation wrench	0853.0622		1141.1337

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

Electrical rating max. 0.1 A / 30 V DC (SS-01)	
Standard	1241.6661.1110000
With lettering	1241.6662.1110000
Red point illumination	1241.6663.1111000
Green point illumination	1241.6663.1112000
Red ring illumination	1241.6664.1111000
Green ring illumination	1241.6664.1112000

Electrical rating max. 5 A / 125 V AC or 3 A / 250V AC(SS-5)	
Standard	1241.6661.1120000
With lettering	1241.6662.1120000
Red point illumination	1241.6663.1121000
Green point illumination	1241.6663.1122000
Red ring illumination	1241.6664.1121000
Green ring illumination	1241.6664.1122000

Electrical rating max. 5 A / 125 V AC (SS-5)	
Standard	1241.6661.1130000
With lettering	1241.6662.1130000
Red point illumination	1241.6663.1131000
Green point illumination	1241.6663.1132000
Red ring illumination	1241.6664.1131000
Green ring illumination	1241.6664.1132000

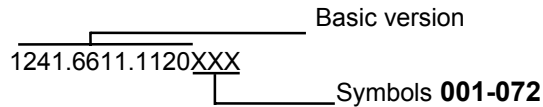
Changes that contribute to technical improvement are subject to alternations							
Page	Production date:	Produced by:	Modification date:	Modified by:	Modification No.	Data sheet No.	Index
10 of 14	05.11.2004	Ullmer	28.07.05	Birmelin	9078	105.9502	a

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

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
11 of 14	05.11.2004	Ullmer	28.07.05	Birmelin	9078	105.9502	a

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

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



The switch MSM30 with a mounting diameter of 30mm will be individually packed in bags with 10 pieces in a box as seen above.

5 QUALIFICATION TESTS

IP degree of protection IEC/DIN/EN/ 60529

IP 67


IK protection class DIN EN 50102

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

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
12 of 14	05.11.2004	Ullmer	28.07.05	Birmelin	9078	105.9502	a


Print date: 28.07.2005 18:04

5 ROHS COMPLIANT

		 Mounting diameter (mm)		
		Ø 16	Ø 19	Ø 22 *
Rating max. 0.1 A / 30 V DC (SS-01)				
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	by 07/05		1241.6623.1111000	1241.6633.1111000
Green point illumination	by 07/05		1241.6623.1112000	1241.6633.1112000
Red ring illumination	pending		1241.6624.1111000	1241.6634.1111000
Green ring illumination	pending		1241.6624.1112000	1241.6634.1112000
Rating max. 5 A / 125 V AC (SS-5)				
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	by 07/05		1241.6623.1121000	1241.6633.1121000
Green point illumination	by 07/05		1241.6623.1122000	1241.6633.1122000
Red ring illumination	pending		1241.6624.1121000	1241.6634.1121000
Green ring illumination	pending		1241.6624.1122000	1241.6634.1122000
Rating max. 10A / 250 V AC (SS-10)				
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	by 07/05		1241.6623.1131000	1241.6633.1131000
Green point illumination	by 07/05		1241.6623.1132000	1241.6633.1132000
Red ring illumination	pending		1241.6624.1131000	1241.6634.1131000
Green ring illumination	pending		1241.6624.1132000	1241.6634.1132000

* RoHS Compliant for the nuts available by 2006

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
13 of 14	05.11.2004	Ullmer	28.07.05	Birmelin	9078	105.9502	a

		Mounting diameter (mm)
Rating max. 0.1 A / 30 V DC (SS-01)		Ø 30
Standard	compliant	1241.6661.1110000
With lettering	compliant	1241.6662.1110000
Red point illumination	pending	1241.6663.1111000
Green point illumination	pending	1241.6663.1112000
Red ring illumination	pending	1241.6664.1111000
Green ring illumination	pending	1241.6664.1112000
Rating max. 5 A / 125 V AC (SS-5)		Ø 30
Standard	compliant	1241.6661.1120000
With lettering	compliant	1241.6662.1120000
Red point illumination	pending	1241.6663.1121000
Green point illumination	pending	1241.6663.1122000
Red ring illumination	pending	1241.6664.1121000
Green ring illumination	pending	1241.6664.1122000
Rating max. 10A / 250 V AC (SS-10)		Ø 30
Standard	compliant	1241.6661.1130000
With lettering	compliant	1241.6662.1130000
Red point illumination	pending	1241.6663.1131000
Green point illumination	pending	1241.6663.1132000
Red ring illumination	pending	1241.6664.1131000
Green ring illumination	pending	1241.6664.1132000

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
14 of 14	05.11.2004	Ullmer	28.07.05	Birmelin	9078	105.9502	a