

# RUAG Space MSwitch SG

## Space Grade Micro Switch

January 2019



## GENERAL DESCRIPTION

The RUAG Space MSwitch SG is a space grade miniature switch (normally closed) that can detect presence and absence by physical contact (activating force 0.75 N (0.17 lbf)) while combining high accuracy and high repeatability (< 0.001 mm resp. < 0.00004 in).

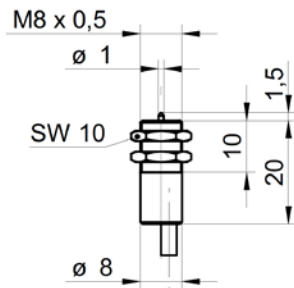


Figure 1: RUAG Space MSwitch dimension

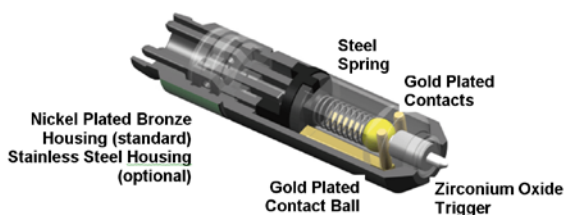


Figure 2: RUAG Space MSwitch cutaway view

## APPLICATIONS

Based on an industrial design (from Baumer Electric AG) the RUAG Space MSwitch SG has been especially modified to meet the quality and material requirements needed for space applications while retaining the high reliability known to high cost-of-failure applications.

## BENEFITS

Due to its high repeat accuracy (< 0.001 mm resp. 0.00004 in) the light weight RUAG Space MSwitch SG (5 g resp. 0.18 oz) can be an alternative to heavy position transducers when precise end-position sensing is sufficient.

The compact size of the RUAG Space MSwitch SG allows easy accommodation of two sensors where redundancy is required.

## SPACE HERITAGE

The Baumer switch has space flight heritage on following ESA projects:

- Herschel PACS
- Seviri
- Swarm

Furthermore the MSwitch is implemented in the EnMAP FAD and SCM mechanism which has successfully passed the Qualification test campaign. The use of this component has been authorized by the customers who signed the corresponding PAD sheet.

## General data

Mass (w/o cable)	5 g (0.18 oz)
Repeat accuracy	< 0.001 mm (< 0.00004 in)
Activating force	0.75 N (0.17 lbf)
Mech. pre-run	No mechanical pre-run
Mech. overrun	1.5 mm (0.06 in) approx.

## Electrical data

Max Supply Voltage	15 VDC / 24 VAC
Max. Switch Current	2 mA DC / 50 mA AC
Switching Function	Normally Closed (NC)
Standard Cable (Length)	AWG26 (l = 1.35 m (53.1 in))

## Mechanical data

Activating Pin	Zirconium oxide ZrO <sub>2</sub>
Potting Resin	Stycast-2651MM
Housing Material	Brass nickel plated
Diameter	8 mm
Type	Cylindrical threaded (M8x0.5)
Housing length	20 mm
Thread length	10 mm
Life Cycle (Trigger Events)	10'000'000 (industrial environment)

## Environmental condition

Operating Temperature	-50°C to +75°C (-58°F to 167°F)
Non-operating Temperature	-60°C to +80°C (-76°F to 176°F)
Thermal Vacuum	< 10 <sup>-3</sup> Pa (<7.5·10 <sup>-6</sup> Torr)
Protection Class	IP 50
Cleanliness	Standard, ISO8 (100'000)

## PACKAGING

The MSwitch is delivered with flying leads and two interface nuts. It is packed in a sealed inner bag, an outer air bubble bag and finally delivered in a cardboard box. The RUAG Space MSwitch is not sensitive to ESD.

## DELIVERABLES

- Packed RUAG Space MSwitch
- Technical documentation
- Data sheet (This document)
- KIP report with test data of all ordered switches
- CoC for all ordered switches (1 document)

## COMPONENT TESTS AT RUAG Space

RUAG Space performs the tests listed below with each switch:

- Visual inspection
- Functional test and switch signal characterization