Magnetic switch
Model MSA

Applications

- Pulse generator for revolution, piston stroke and meter counting
- Running and standstill monitoring for machinery
- Amplitude of vibration monitoring for centrifuges
- Control of machine tools and also textile and printing machinery
- Filling scales, resonance conveyors and screens

Special features

- Magnetic switches work properly under extreme environmental influences, e.g. dirt, humidity, gases, dust, chips etc.
- Stable switch point, reproducible switch point accuracy 0.01 mm
- Reed contact can be actuated from several directions
- Can be mounted in any orientation
- Can be actuated in a voltage-free condition, bistable variants can save signals and are particularly suitable for extremely long stroke lengths

Fig. left: Model MSA-MRU 20 Ex,
Fig. center: MSA-GMSM 16,
Fig. right: MSA-KRS 9

Description

The magnetic switch is made up of flat contact studs, which are hermetically sealed in a glass tube filled with inert gas (reed contact). By bringing a permanent magnet close, the overlapping contact stud ends attract each other and spring together into contact. Upon removal of the permanent magnet, the contact studs demagnetise immediately and return to their rest position.

The air gap between the contact stud ends is only 0.2 ... 0.3 mm and, for the contact studs, the mass to be moved and their spring force are very small. Thus the magnetic switch switches with almost no inertia and one can consider it as a “quasi-electronic component”.

These cost-effective magnetic switches, which are particularly easy to install, are excellently suited for the automation of processes and as position indicators for sliders, flaps and valves.

The reliability of these compact switches is ensured through their long electrical service life. Since the magnetic switches mostly consist of just one component, they are particularly safe in operation. In addition, special versions for extreme temperatures of -200 … +200 °C are possible.

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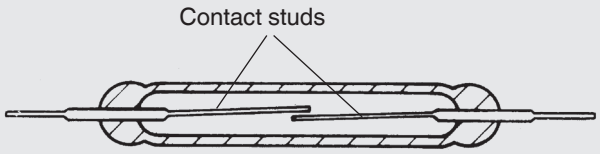
Design, mode of operation and contact functions

Normally open
When a permanent magnet (blue north pole or red south pole) approaches the actuation zone of the magnetic switch, the contact studs of the integral inert gas contact (reed contact) are magnetised and pull on each other. Since the magnetic field between the contact studs increases quadratically with decreasing air gap, the magnetic switch contact closes with a snap action.

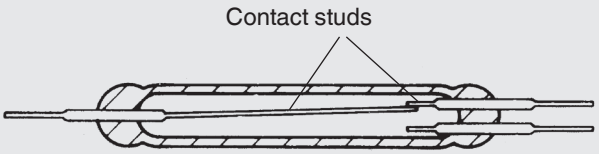
Reed contact for normally open contact or normally closed contact



Normally closed
The contact stud of a normally open contact has been magnetised using a polarising magnet with a south pole field such that the contact closes. When a blue south pole actuating magnet is brought close to the magnetic switch, both contact studs are magnetised with the same polarity. Like poles repel each other and the magnetic switch contact opens.

Change-over
The change-over contact has one movable and two fixed contact studs. When there is no magnetic field present, the moving contact stud is held against the fixed break (normally closed) contact by spring force. By bringing an actuating magnet close (red north pole or blue south pole) the moving contact stud is attracted by the working contact (normally open). The break contact opens and the working contact snaps closed.

Reed contact for change-over



Bistable normally open contact and change-over
Using a polarising magnet, one contact stud is magnetised with a south pole field so that when a red north pole permanent magnet approaches, the magnetic switch contact closes and when a blue south pole permanent magnet approaches it then opens again.

Mechanical lifetime
The actuation of the magnetic switch with permanent magnets (or electromagnets) is completely wear-free, since the magnetic field produces no wear. Since the contact studs are very pliant, even after 3×10^9 switching cycles (bends), no fatigue fractures occur. If a magnetic switch is actuated once every second, then one would need 100 years before 3×10^9 (3 billion) switching cycles were reached. The mechanical lifetime is therefore practically unlimited.

Electrical lifetime
Magnetic switches are susceptible to excessive current loads. Since the spring forces of the pliant contact studs are only small, if there is a welding effect between only a few molecules of the contact material, it is sufficient to cause a sticking of the contact studs. Since magnetic switches open their contacts extremely quickly, with the switching off of inductive devices such as relays, solenoid valves and solenoids particularly high self-induction voltages exist. If contact protection measures are taken, then a high electrical lifetime can be achieved.

Actuating distances
The largest actuation distance between magnetic switch and permanent magnet is achieved when one fixes the permanent magnet directly to iron with non-metallic screws. As a result of an iron baseplate, the magnetic field is concentrated and thus has a greater range. If one attaches the permanent magnet with iron screws, then a part of the magnetic field in the holes is short-circuited and the range is thus smaller. When permanent magnets are arranged next to each other with smaller distances than 50 to 60 mm, the polarity must alternate (north-south-north-south and so on), so that the magnetic field between the permanent magnets is interrupted. Only then will the magnetic switches be actuated by each permanent magnet.

For permanent magnets with order code and also a table of actuating distances, see Accessories at the end of this data sheet.

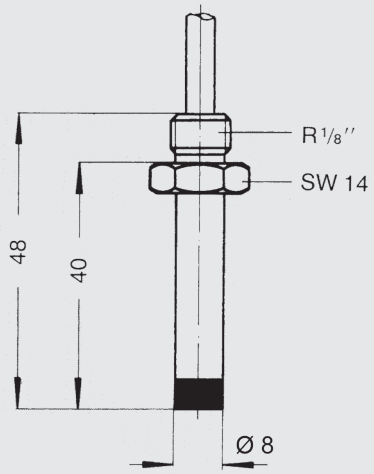
Model overview

Magnetic switches, case forms and materials	Dimensions	Switch behaviour	Max. switching power	Max. switching voltage	Max. switching current
Mini magnetic switch in round stainless steel case					
Model MSA-VS-Lx	L = 40 or 55	Monostable	10 VA	250 V	0.5 A
Magnetic switch in round polyamide case, glass-fibre reinforced					
Model MSA-MRS 9	L = 50	Monostable	10 VA	250 V	0.5 A
Model MSA-KRx 9	L = 60	Monostable	40 VA / 60 VA	250 V	1 A / 2 A
Model MSA-KWU 9	L = 60	Monostable	60 VA	250 V	1 A
Model MSA-GMx 9	L = 80	Monostable	40 VA / 100 VA	250 V	1 A / 2 A
Model MSA-GMSM 16	L = 75	Bistable	100 VA	250 V	2 A
Model MSA-GMOM 16	L = 75	Bistable	100 VA	250 V	2 A
Model MSA-GMUM 16	L = 75	Bistable	40 VA	250 V	1 A
Magnetic switch in round brass case					
Model MSA-MRS 10	Thread M10 x 1	Monostable	10 VA	250 V	0.5 A
Model MSA-MRS 12	M12 x 1 thread	Monostable	60 VA	250 V	2 A
Model MSA-MRU 12	M12 x 1 thread	Monostable	40 VA	250 V	1 A
Model MSA-MRS 20	M20 x 1 thread	Monostable	60 VA	250 V	2 A
Model MSA-MRU 20	M20 x 1 thread	Monostable	40 VA	250 V	1 A
Magnetic switch in round polyamide case					
Model MSA-MRU 20 Ex	M20 x 1.5 thread	Monostable	40 VA	250 V	1 A
Model MSA-GMS 18	M18 x 1.5 thread	Monostable	60 VA	250 V	2 A
Model MSA-GMU 18	M18 x 1.5 thread	Monostable	40 VA	250 V	1 A
Model MSA-GMUM 18	M18 x 1.5 thread	Bistable	40 VA	250 V	1 A
Magnetic switch in flat polyamide case, glass-fibre reinforced					
Model MSA-DRS	L = 80	Monostable	60 VA	250 V	2 A
Model MSA-DRU	L = 80	Monostable	40 VA	250 V	1 A
Model MSA-DRSM	L = 80	Bistable	100 VA	250 V	2 A
Model MSA-DRUM	L = 80	Bistable	40 VA	250 V	1 A
Model MSA-DWU	L = 80	Monostable	60 VA	250 V	1 A
Model MSA-DGS	L = 80	Monostable	100 VA	250 V	2 A
Magnetic switch in aluminium case					
Model MSA-FKS-AL	L = 50	Monostable	10 VA	250 V	0.5 A
Model MSA-FKOM-AL	L = 50	Bistable	10 VA	250 V	0.5 A
Model MSA-FKSM-AL	L = 50	Bistable	10 VA	250 V	0.5 A
Model MSA-FLS-AL	L = 80	Monostable	60 VA	250 V	2 A
Model MSA-FLU-AL	L = 80	Monostable	40 VA	250 V	1 A
Model MSA-FLSM-AL	L = 80	Bistable	100 VA	250 V	2 A
Model MSA-FLUM-AL	L = 80	Bistable	40 VA	250 V	1 A
Model MSA-FWU-AL	L = 80	Monostable	60 VA	250 V	1 A
Model MSA-FGMS-AL	L = 80	Monostable	100 VA	250 V	2 A
Magnetic switch in round stainless steel case					
Model MSA-EVS-L70 (KRS)	L = 70	Monostable	40 VA / 60 VA	250 V	1 A / 2 A
Model MSA-EVU-L70 (KRU)	L = 70	Monostable	100 VA	250 V	2 A
Model MSA-EVS-L100 (GMS)	L = 100	Monostable	100 VA	250 V	2 A
Model MSA-EVSM-L100 (GMSM)	L = 100	Bistable	40 VA / 100 VA	250 V	1 A / 2 A
Model Model MSA-EVOM-L100 (GMOM)	L = 100	Bistable	40 VA / 100 VA	250 V	1 A / 2 A
Model MSA-EVUM-L100 (GMUM)	L = 100	Bistable	40 VA / 100 VA	250 V	1 A / 2 A
Slot magnetic switch in polyamide case, glass-fibre reinforced					
Model MSA-KSWO	-	Monostable	60 VA	250 V	1 A
Model MSA-KSWU	-	Monostable	60 VA	250 V	1 A
Slot magnetic switch for non-contact actuation using a sheet iron flag in polyamide case, glass-fibre reinforced					
Model MSA-SRO	-	Monostable	100 VA	250 V	2 A
Model MSA-SRU	-	Monostable	40 VA	250 V	1 A
Model MSA-SWO	-	Monostable	60 VA	250 V	1 A
Model MSA-SWO	-	Monostable	60 VA	250 V	1 A

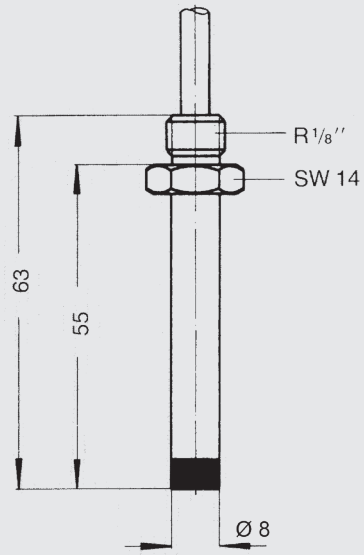
Mini magnetic switch in 316 Ti (1.4571) stainless steel version, model MSA-VS-Lx

Dimensions in mm

Model MSA-VS-L40



Model MSA-VS-L55



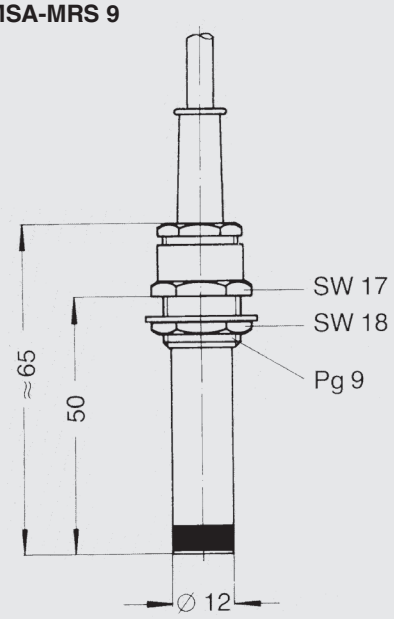
Specifications	
Switching function	Normally open
Switch behaviour	Monostable
Contact material	Rhodium
Switching power	AC 10 VA, DC 5 W
Switching voltage	AC/DC 250 V
Switching current	AC 0.5 A, DC 0.25 A
Switching frequency	1,000 1/sec
Switch hysteresis	approx. 5 mm
Permissible temperature	-10 ... +80 °C
Ingress protection	IP 54
Connection cable	NYLHY 2 x 0.25 mm² (specify length when ordering)
Case	Stainless steel 316 Ti (1.4571)

Specifications	
Switching function	Normally open
Switch behaviour	Monostable
Contact material	Rhodium
Switching power	AC 10 VA, DC 5 W
Switching voltage	AC/DC 250 V
Switching current	AC 0.5 A, DC 0.25 A
Switching frequency	1,000 1/sec
Switch hysteresis	approx. 5 mm
Permissible temperature	-10 ... +80 °C
Ingress protection	IP 54
Connection cable	NYLHY 2 x 0.25 mm² (specify length when ordering)
Case	Stainless steel 316 Ti (1.4571)

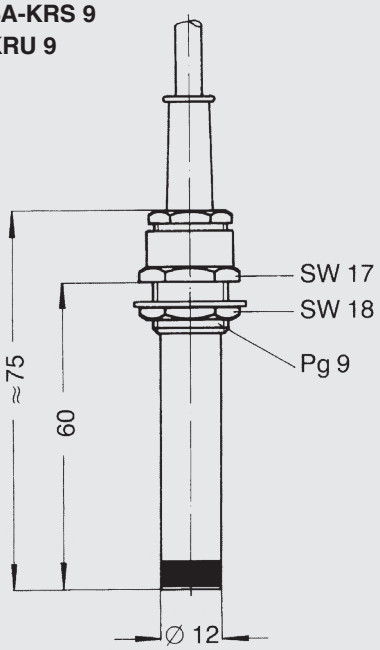
Magnetic switch in round polyamide case, glass-fibre reinforced
Models MSA-MRS 9, MSA-KRx 9

Dimensions in mm

Model MSA-MRS 9



Models MSA-KRS 9 and MSA-KRU 9



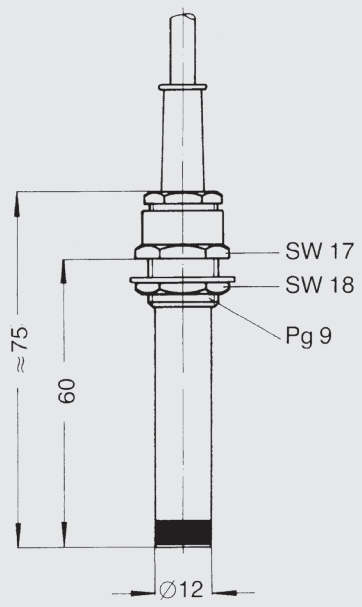
Specifications	
Switching function	Normally open
Switch behaviour	Monostable
Contact material	Rhodium
Switching power	AC 10 VA, DC 5 W
Switching voltage	AC/DC 250 V
Switching current	AC 0.5 A, DC 0.25 A
Switching frequency	1,000 1/sec
Switch hysteresis	approx. 5 mm
Permissible temperature	-10 ... +80 °C
Ingress protection	IP 65
Connection cable	NYLHY 2 x 0.75 mm² (specify length when ordering)
Case	Polyamide, glass-fibre reinforced

Specifications	
Switching function	Model MSA-KRS 9: normally open Model MSA-KRU 9: change-over
Switch behaviour	Monostable
Contact material	Rhodium
Switching power	Model MSA-KRS 9: AC 60 VA, DC 30 W Model MSA-KRU 9: AC 40 VA, DC 20 W
Switching voltage	AC/DC 250 V
Switching current	Model MSA-KRS 9: AC 2 A, DC 1 A Model MSA-KRU 9: AC 1 A, DC 0.5 A
Switching frequency	300 1/sec
Switch hysteresis	approx. 5 mm
Permissible temperature	-10 ... +80 °C
Ingress protection	IP 65
Connection cable	Model MSA-KRS 9: NYLHY 2 x 0.75 mm² Model MSA-KRU 9: NYLHY 3 x 0.75 mm² (specify length when ordering)
Case	Polyamide, glass-fibre reinforced

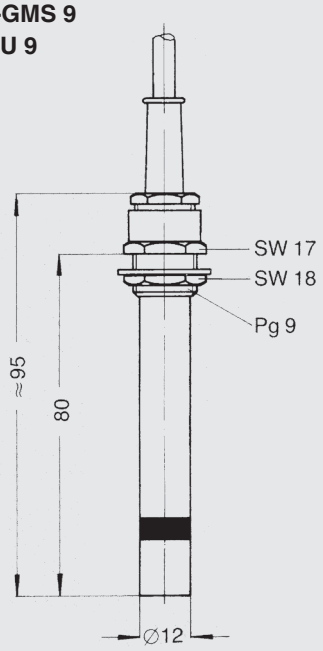
Magnetic switch in round polyamide case, glass-fibre reinforced
Models MSA-KWU 9, MSA-GMx 9

Dimensions in mm

Model MSA-KWU 9



Models MSA-GMS 9 and MSA-GMU 9

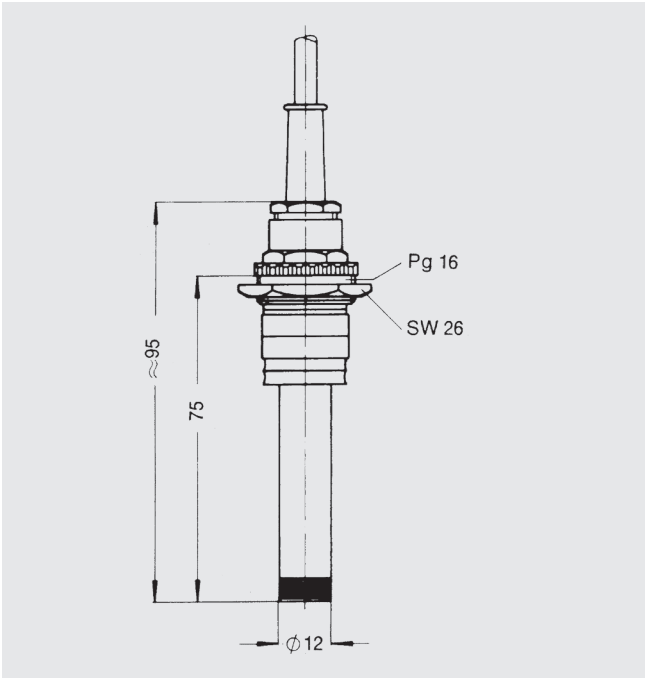


Specifications	
Switching function	Change-over
Switch behaviour	Monostable
Contact material	Rhodium
Switching power	AC 60 VA, DC 30 W
Switching voltage	AC/DC 250 V
Switching current	AC 1 A, DC 0.5 A
Switching frequency	100 1/sec
Switch hysteresis	approx. 2 ... 3 mm
Permissible temperature	-10 ... +80 °C
Ingress protection	IP 65
Connection cable	NYLHY 3 x 0.75 mm² (specify length when ordering)
Case	Polyamide, glass-fibre reinforced

Specifications	
Switching function	Model MSA-GMS 9: normally open Model MSA-GMU 9: change-over
Switch behaviour	Monostable
Contact material	Rhodium
Switching power	Model MSA-GMS 9: AC 100 VA, DC 50 W Model MSA-GMU 9: AC 40 VA, DC 20 W
Switching voltage	AC/DC 250 V
Switching current	Model MSA-GMS 9: AC 2 A, DC 1 A Model MSA-GMU 9: AC 1 A, DC 0.5 A
Switching frequency	300 1/sec
Switch hysteresis	Model MSA-GMS 9: approx. 3 ... 4 mm Model MSA-GMU 9: approx. 5 mm
Permissible temperature	-10 ... +80 °C
Ingress protection	IP 65
Connection cable	Model MSA-GMS 9: NYLHY 2 x 0.75 mm² Model MSA-GMU 9: NYLHY 3 x 0.75 mm² (specify length when ordering)
Case	Polyamide, glass-fibre reinforced

Magnetic switch in round polyamide case, glass-fibre reinforced
Models MSA-GMSM 16, MSA-GMOM 16 and MSA-GMUM 16

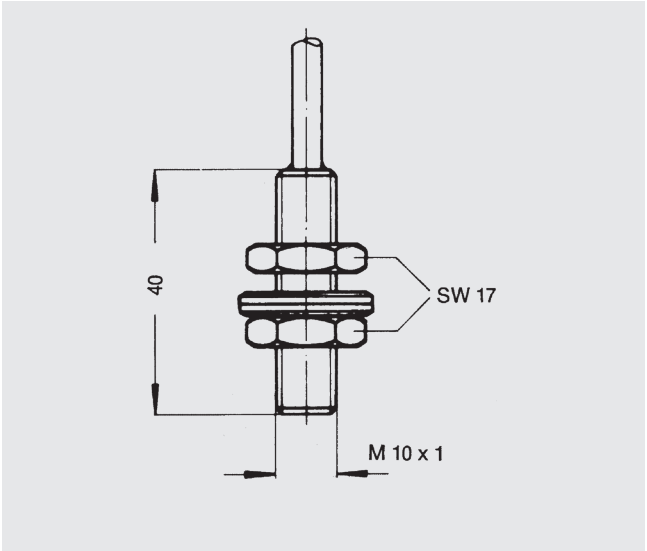
Dimensions in mm



Specifications	
Switching function	Model MSA-GMSM 16: normally open Model MSA-GMOM 16: normally closed Model MSA-GMUM 16: change-over
Switch behaviour	Bistable
Contact material	Rhodium
Switching power	Model MSA-GMSM 16: AC 100 VA, DC 50 W Model MSA-GMOM 16: AC 100 VA, DC 50 W Model MSA-GMUM 16: AC 40 VA, DC 20 W
Switching voltage	AC/DC 250 V
Switching current	Model MSA-GMSM 16: AC 2 A, DC 1 A Model MSA-GMOM 16: AC 2 A, DC 1 A Model MSA-GMUM 16: AC 1 A, DC 0.5 A
Switching frequency	300 1/sec
Permissible temperature	-10 ... +80 °C
Ingress protection	IP 65
Connection cable	Model MSA-GMSM 16: NYLHY 2 x 0.75 mm² Model MSA-GMOM 16: NYLHY 2 x 0.75 mm² Model MSA-GMUM 16: NYLHY 3 x 0.75 mm² (specify length when ordering)
Case	Polyamide, glass-fibre reinforced

Magnetic switch in round brass case, M10 x 1 male thread
Model MSA-MRS 10

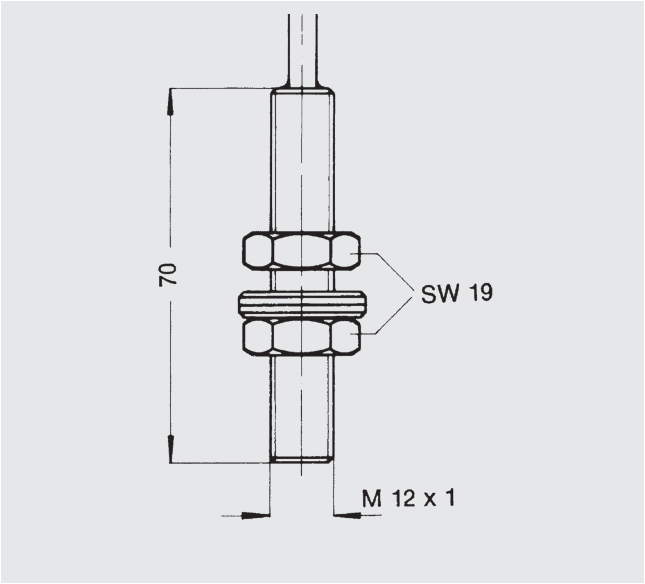
Dimensions in mm



Specifications	
Switching function	Normally open
Switch behaviour	Monostable
Contact material	Rhodium
Switching power	AC 10 VA, DC 5 W
Switching voltage	AC/DC 250 V
Switching current	AC 0.5 A, DC 0.25 A
Switching frequency	1,000 1/sec
Switch hysteresis	approx. 5 mm
Permissible temperature	-10 ... +80 °C
Ingress protection	IP 54
Connection cable	NYLHY 2 x 0.75 mm² (specify length when ordering)
Case	Brass

Magnetic switch in round brass case, M12 x 1 male thread
Model MSA-MRx 12

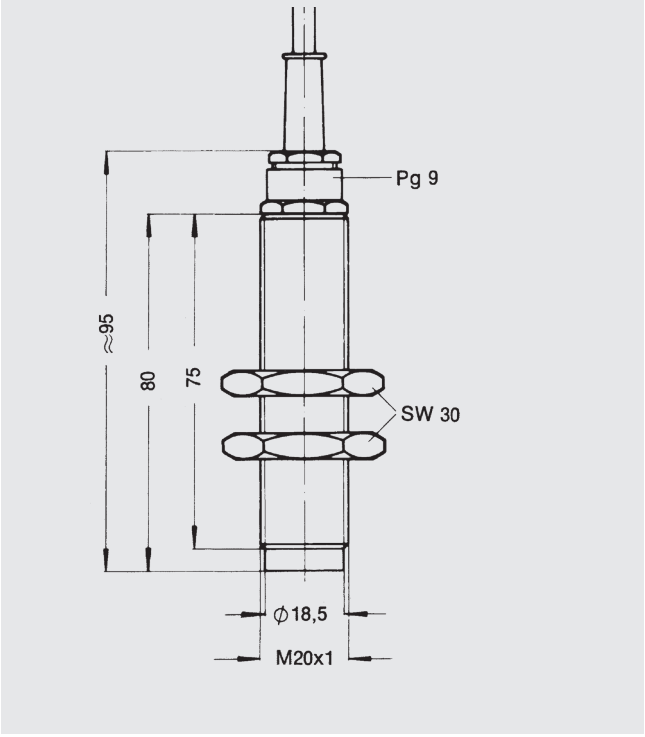
Dimensions in mm



Specifications	
Switching function	Model MSA-MRS 12: normally open Model MSA-MRU 12: change-over
Switch behaviour	Monostable
Contact material	Rhodium
Switching power	Model MSA-MRS 12: AC 60 VA, DC 30 W Model MSA-MRU 12: AC 40 VA, DC 20 W
Switching voltage	AC/DC 250 V
Switching current	Model MSA-MRS 12: AC 2 A, DC 1 A Model MSA-MRU 12: AC 1 A, DC 0.5 A
Switching frequency	300 1/sec
Switch hysteresis	approx. 5 mm
Permissible temperature	-10 ... +80 °C
Ingress protection	IP 54
Connection cable	Model MSA-MRS 12: NYLHY 2 x 0.75 mm² Model MSA-MRU 12: NYLHY 3 x 0.75 mm² (specify length when ordering)
Case	Brass

Magnetic switch in round brass case, M20 x 1 male thread
Model MSA-MRx 20

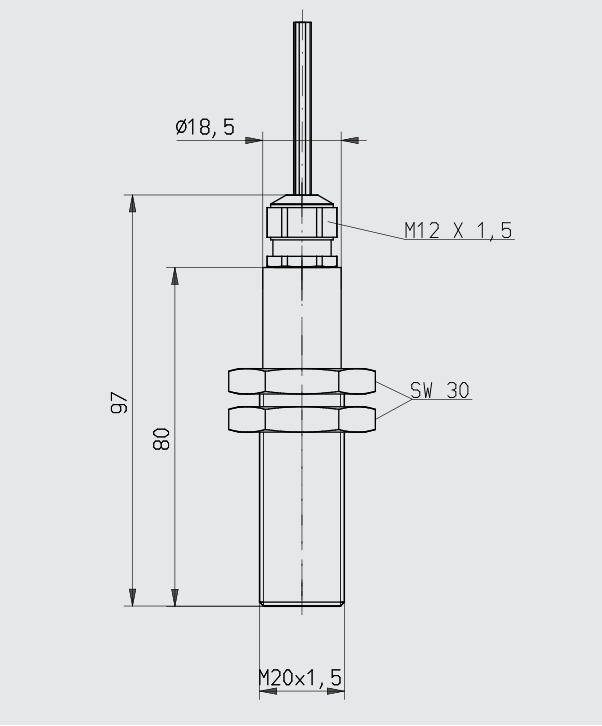
Dimensions in mm



Specifications	
Switching function	Model MSA-MRS 20: normally open Model MSA-MRU 20: change-over
Switch behaviour	Monostable
Contact material	Rhodium
Switching power	Model MSA-MRS 20: AC 60 VA, DC 30 W Model MSA-MRU 20: AC 40 VA, DC 20 W
Switching voltage	AC/DC 250 V
Switching current	Model MSA-MRS 20: AC 2 A, DC 1 A Model MSA-MRU 20: AC 1 A, DC 0.5 A
Switching frequency	300 1/sec
Switch hysteresis	Model MSA-MRS 20: approx. 3 ... 4 mm Model MSA-MRU 20: approx. 5 mm
Permissible temperature	-10 ... +80 °C
Ingress protection	IP 65
Connection cable	Model MSA-MRS 20: NYLHY 3 x 0.75 mm² Model MSA-MRU 20: NYLHY 4 x 0.75 mm² (specify length when ordering)
Case	Brass

Magnetic switch in round polyamide case, M20 x 1.5 male thread
Model MSA-MRU 20 Ex

Dimensions in mm

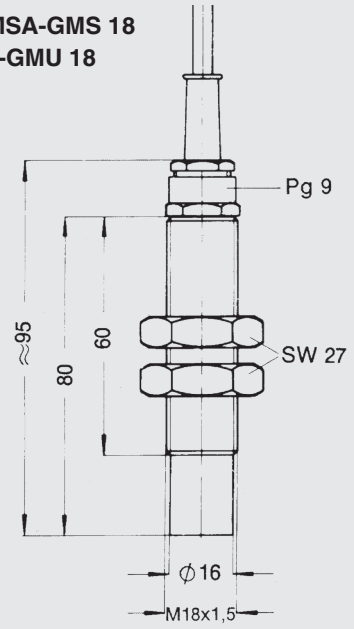


Specifications	
Switching function	Change-over
Switch behaviour	Monostable
Contact material	Rhodium
Switching power	AC 40 VA, DC 20 W
Switching voltage	AC/DC 250 V
Switching current	AC 1 A, DC 0.5 A
Switching frequency	300 1/sec
Switch hysteresis	approx. 5 mm
Permissible temperature	-20 ... +40 °C
Ingress protection	IP 65
Connection cable	PVC, oil-resistant or Ölflex 3 x 0.75 mm² (specify length when ordering)
Case	Polyamide
Explosion protection	IBExU00ATEX1063 X Encapsulated EEx m 2G IIB, Zone 1 and 2, T6

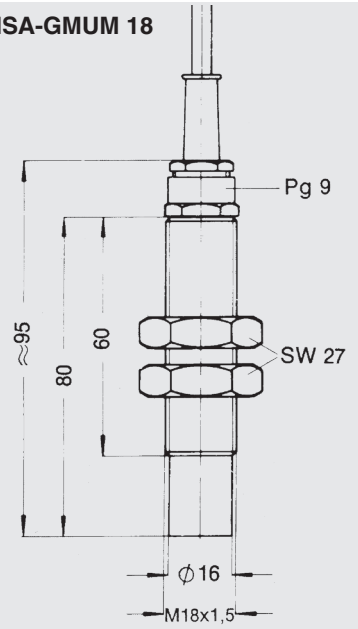
Magnetic switch in round polyamide case
Models MSA-GMx 18, MSA-GMUM 18

Dimensions in mm

Models MSA-GMS 18 and MSA-GMU 18



Model MSA-GMUM 18



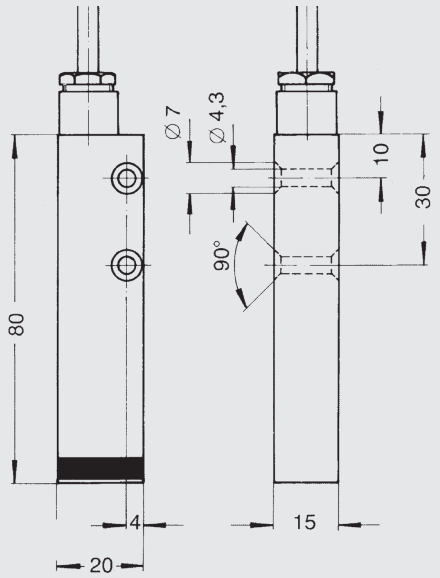
Specifications	
Switching function	Model MSA-GMS 18: normally open Model MSA-GMU 18: change-over
Switch behaviour	Monostable
Contact material	Rhodium
Switching power	Model MSA-GMS 18: AC 60 VA, DC 30 W Model MSA-GMU 18: AC 40 VA, DC 20 W
Switching voltage	AC/DC 250 V
Switching current	Model MSA-GMS 18: AC 2 A, DC 1 A Model MSA-GMU 18: AC 1 A, DC 0.5 A
Switching frequency	300 1/sec
Switch hysteresis	approx. 5 mm
Permissible temperature	-10 ... +80 °C
Ingress protection	IP 65
Connection cable	Model MSA-GMS 18: NYLHY 2 x 0.75 mm² Model MSA-GMU 18: NYLHY 3 x 0.75 mm² (specify length when ordering)
Case	Polyamide

Specifications	
Switching function	Change-over
Switch behaviour	Bistable
Contact material	Rhodium
Switching power	AC 40 VA, DC 20 W
Switching voltage	AC/DC 250 V
Switching current	AC 1 A, DC 0.5 A
Switching frequency	300 1/sec
Permissible temperature	-10 ... +80 °C
Ingress protection	IP 65
Connection cable	NYLHY 3 x 0.75 mm² (specify length when ordering)
Case	Polyamide

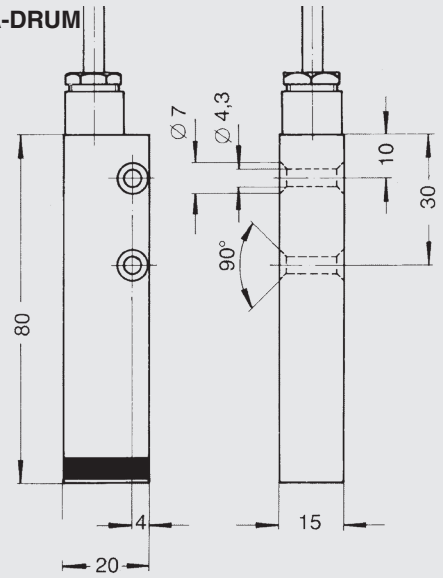
Magnetic switch in flat polyamide case, glass-fibre reinforced
Models MSA-DRx, MSA-DRSM and MSA-DRUM

Dimensions in mm

Models MSA-DRS and MSA-DRU



Models MSA-DRSM and MSA-DRUM



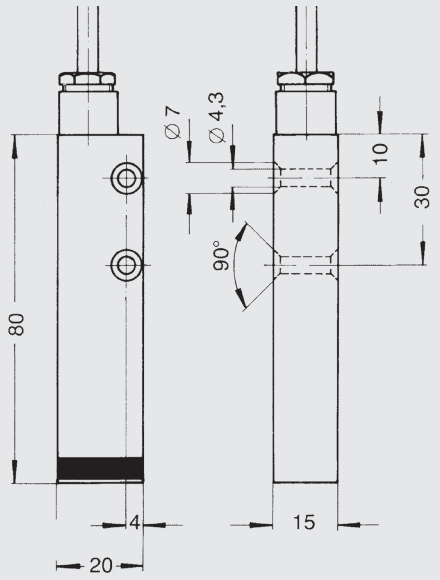
Specifications	
Switching function	Model MSA-DRS: normally open Model MSA-DRU: change-over
Switch behaviour	Monostable
Contact material	Rhodium
Switching power	Model MSA-DRS: AC 60 VA, DC 30 W Model MSA-DRU: AC 40 VA, DC 20 W
Switching voltage	AC/DC 250 V
Switching current	Model MSA-DRS: AC 2 A, DC 1 A Model MSA-DRU: AC 1 A, DC 0.5 A
Switching frequency	300 1/sec
Switch hysteresis	approx. 5 mm
Permissible temperature	-10 ... +80 °C
Ingress protection	IP 65
Connection cable	Model MSA-DRS: NYLHY 2 x 0.75 mm² Model MSA-DRU: NYLHY 3 x 0.75 mm² (specify length when ordering)
Case	Polyamide, glass-fibre reinforced

Specifications	
Switching function	Model MSA-DRSM: normally open Model MSA-DRUM: change-over
Switch behaviour	Bistable
Contact material	Rhodium
Switching power	Model MSA-DRSM: AC 100 VA, DC 50 W Model MSA-DRUM: AC 40 VA, DC 20 W
Switching voltage	AC/DC 250 V
Switching current	Model MSA-DRSM: AC 2 A, DC 1 A Model MSA-DRUM: AC 1 A, DC 0.5 A
Switching frequency	300 1/sec
Permissible temperature	-10 ... +80 °C
Ingress protection	IP 65
Connection cable	Model MSA-DRSM: NYLHY 2 x 0.75 mm² Model MSA-DRUM: NYLHY 3 x 0.75 mm² (specify length when ordering)
Case	Polyamide, glass-fibre reinforced

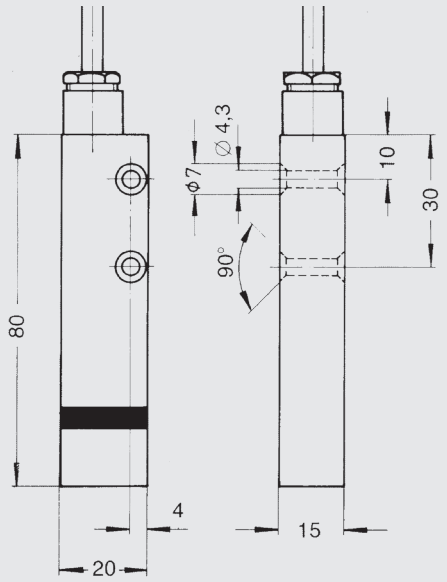
Magnetic switch in flat polyamide case, glass-fibre reinforced
Models MSA-DWU and MSA-DGS

Dimensions in mm

Model MSA-DWU



Model MSA-DGS



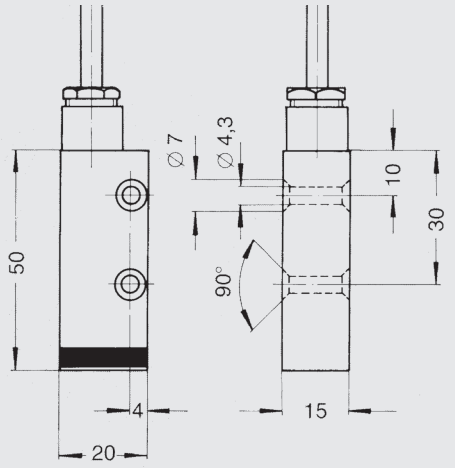
Specifications	
Switching function	Change-over
Switch behaviour	Monostable
Contact material	Tungsten
Switching power	AC 60 VA, DC 30 W
Switching voltage	AC/DC 250 V
Switching current	AC 1 A, DC 0.5 A
Switching frequency	100 1/sec
Switch hysteresis	approx. 2 ... 3 mm
Permissible temperature	-10 ... +80 °C
Ingress protection	IP 65
Connection cable	NYLHY 3 x 0.75 mm² (specify length when ordering)
Case	Polyamide, glass-fibre reinforced

Specifications	
Switching function	Normally open
Switch behaviour	Monostable
Contact material	Rhodium
Switching power	AC 100 VA, DC 50 W
Switching voltage	AC/DC 250 V
Switching current	AC 2 A, DC 1 A
Switching frequency	300 1/sec
Switch hysteresis	approx. 3 ... 4 mm
Permissible temperature	-10 ... +80 °C
Ingress protection	IP 65
Connection cable	NYLHY 2 x 0.75 mm² (specify length when ordering)
Case	Polyamide, glass-fibre reinforced

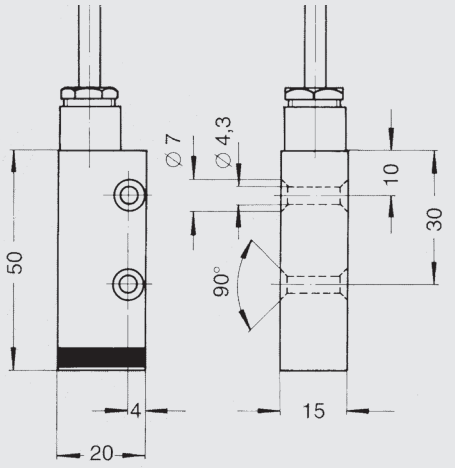
Magnetic switch in aluminium case
Models MSA-FKS-AL, MSA-FKOM-AL and MSA-FKSM-AL

Dimensions in mm

Model MSA-FKS-AL



Models MSA-FKSM-AL and MSA-FKOM-AL



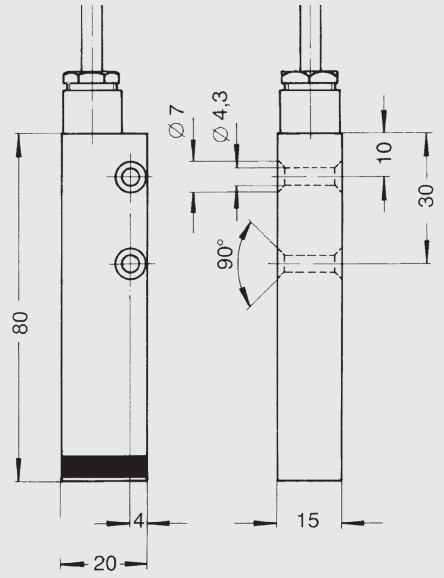
Specifications	
Switching function	Normally open
Switch behaviour	Monostable
Contact material	Rhodium
Switching power	AC 10 VA, DC 5 W
Switching voltage	AC/DC 250 V
Switching current	AC 0.5 A, DC 0.25 A
Switching frequency	1,000 1/sec
Switch hysteresis	approx. 5 mm
Permissible temperature	-10 ... +80 °C
Ingress protection	IP 65
Connection cable	NYLHY-J 2 x 0.75 mm² (specify length when ordering)
Case	Aluminium

Specifications	
Switching function	Model MSA-FKSM-AL: normally open Model MSA-FKOM-AL: normally closed
Switch behaviour	Bistable
Contact material	Rhodium
Switching power	AC 10 VA, DC 5 W
Switching voltage	AC/DC 250 V
Switching current	AC 0.5 A, DC 0.25 A
Switching frequency	1,000 1/sec
Permissible temperature	-10 ... +80 °C
Ingress protection	IP 65
Connection cable	Model MSA-FKSM-AL: NYLHY-J 2 x 0.75 mm² Model MSA-FKOM-AL: NYLHY-J 2 x 0.75 mm² (specify length when ordering)
Case	Aluminium

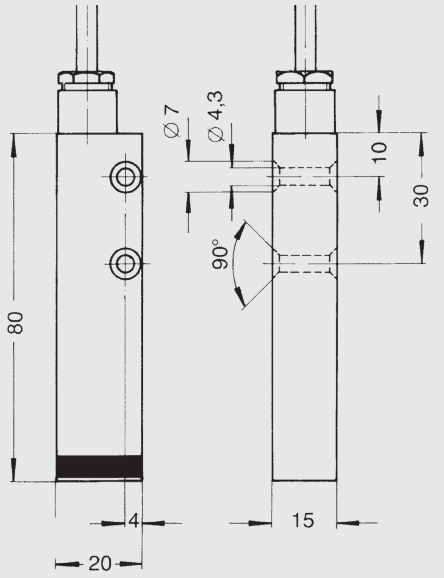
Magnetic switch in aluminium case
Models MSA-FLS-AL, MSA-FLU-AL, MSA-FLSM-AL and MSA-FLUM-AL

Dimensions in mm

Models MSA-FLS-AL and MSA-FLU-AL



Model MSA-FLSM-AL and MSA-FLUM-AL



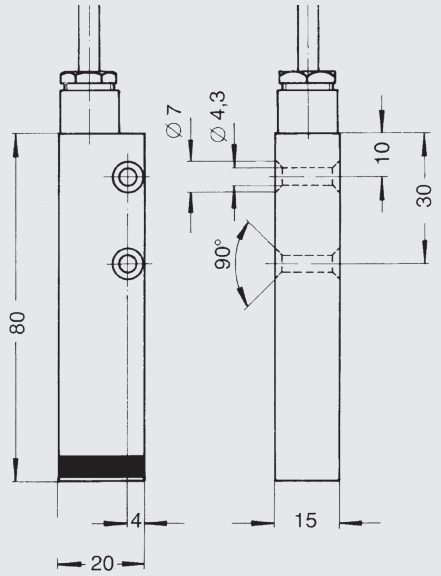
Specifications	
Switching function	Model MSA-FLS-AL: normally open Model MSA-FLU-AL: change-over
Switch behaviour	Monostable
Contact material	Rhodium
Switching power	Model MSA-FLS-AL: AC 60 VA, DC 30 W Model MSA-FLU-AL: AC 40 VA, DC 20 W
Switching voltage	AC/DC 250 V
Switching current	Model MSA-FLS-AL: AC 2 A, DC 1 A Model MSA-FLU-AL: AC 1 A, DC 0.5 A
Switching frequency	300 1/sec
Switch hysteresis	approx. 5 mm
Permissible temperature	-10 ... +80 °C
Ingress protection	IP 65
Connection cable	Model MSA-FLS-AL: NYLHY-J 3 x 0.75 mm² Model MSA-FLU-AL: NYLHY-J 4 x 0.75 mm² (specify length when ordering)
Case	Aluminium

Specifications	
Switching function	Model MSA-FLSM-AL: normally open Model MSA-FLUM-AL: change-over
Switch behaviour	Bistable
Contact material	Rhodium
Switching power	Model MSA-FLSM-AL: AC 100 VA, DC 50 W Model MSA-FLUM-AL: AC 40 VA, DC 20 W
Switching voltage	AC/DC 250 V
Switching current	Model MSA-FLSM-AL: AC 2 A, DC 1 A Model MSA-FLUM-AL: AC 1 A, DC 0.5 A
Switching frequency	300 1/sec
Permissible temperature	-10 ... +80 °C
Ingress protection	IP 65
Connection cable	Model MSA-FLSM-AL: NYLHY-J 3 x 0.75 mm² Model MSA-FLUM-AL: NYLHY-J 4 x 0.75 mm² (specify length when ordering)
Case	Aluminium

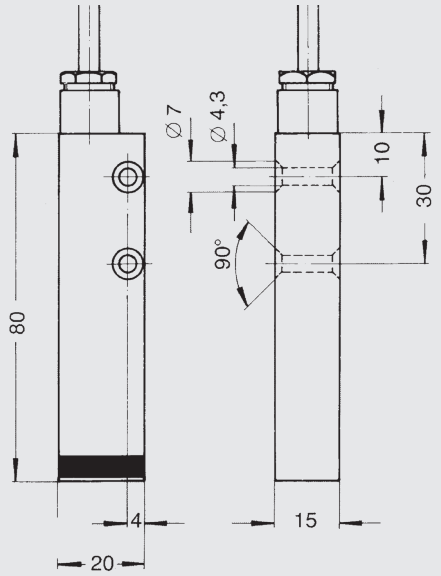
Magnetic switch in aluminium case
Models MSA-FWU-AL and MSA-FGMS-AL

Dimensions in mm

Model MSA-FWU-AL



Model MSA-FGMS-AL



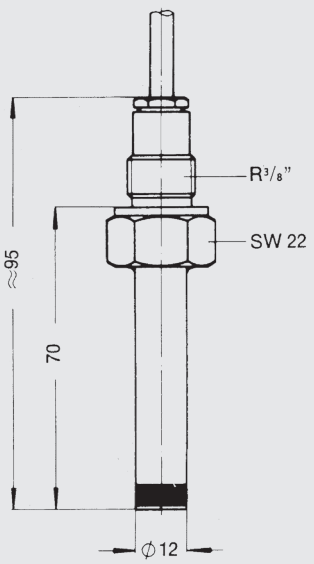
Specifications	
Switching function	Change-over
Switch behaviour	Monostable
Contact material	Tungsten
Switching power	AC 60 VA, DC 30 W
Switching voltage	AC/DC 250 V
Switching current	AC 1 A, DC 0.5 A
Switching frequency	100 1/sec
Switch hysteresis	approx. 2 ... 3 mm
Permissible temperature	-10 ... +80 °C
Ingress protection	IP 65
Connection cable	NYLHY-J 4 x 0.75 mm² (specify length when ordering)
Case	Aluminium

Specifications	
Switching function	Normally open
Switch behaviour	Monostable
Contact material	Rhodium
Switching power	AC 100 VA, DC 50 W
Switching voltage	AC/DC 250 V
Switching current	AC 2 A, DC 1 A
Switching frequency	300 1/sec
Switch hysteresis	approx. 3 ... 4 mm
Permissible temperature	-10 ... +80 °C
Ingress protection	IP 65
Connection cable	NYLHY-J 3 x 0.75 mm² (specify length when ordering)
Case	Aluminium

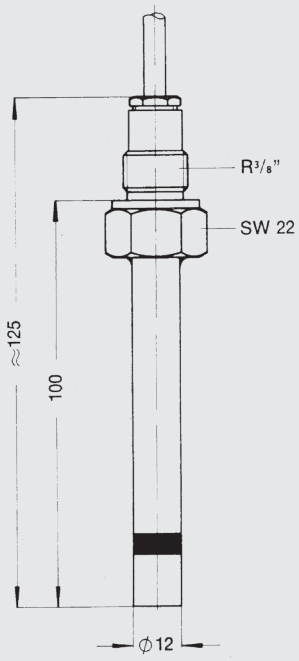
Magnetic switch in round stainless steel case
Models MSA-EVS-L70 (KRS), MSA-EVU-L70 (KRU) and MSA-EVS-L100 (GMS)

Dimensions in mm

Models MSA-EVS-L70 (KRS) and MSA-FLU-AL



Model MSA-EVS-L100 (GMS)

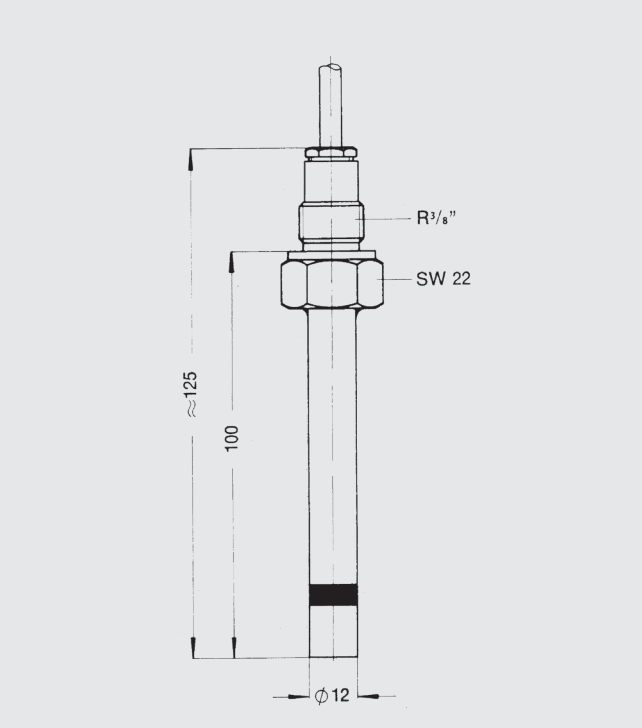


Specifications	
Switching function	Model MSA-EVS-L70 (KRS): normally open Model MSA--EVU-L70 (KRU): change-over
Switch behaviour	Monostable
Contact material	Rhodium
Switching power	Model MSA-EVS-L70 (KRS): AC 60 VA, DC 30 W Model MSA-EVU-L70 (KRU): AC 40 VA, DC 20 W
Switching voltage	AC/DC 250 V
Switching current	Model MSA-EVS-L70 (KRS): AC 2 A, DC 1 A Model MSA-EVU-L70 (KRU): AC 1 A, DC 0.5 A
Switching frequency	300 1/sec
Switch hysteresis	approx. 5 mm
Permissible temperature	-10 ... +80 °C
Ingress protection	IP 65
Connection cable	Model MSA-EVS-L70 (KRS): NYLHY 2 x 0.75 mm² Model MSA-EVU-L70 (KRU): NYLHY 3 x 0.75 mm² (specify length when ordering)
Case	Stainless steel 316 Ti (1.4571)

Specifications	
Switching function	Normally open
Switch behaviour	Monostable
Contact material	Rhodium
Switching power	AC 100 VA, DC 50 W
Switching voltage	AC/DC 250 V
Switching current	AC 2 A, DC 1 A
Switching frequency	300 1/sec
Switch hysteresis	approx. 3 ... 4 mm
Permissible temperature	-10 ... +80 °C
Ingress protection	IP 65
Connection cable	NYLHY 2 x 0.75 mm² (specify length when ordering)
Case	Stainless steel 316 Ti (1.4571)

Magnetic switch in round stainless steel case
Models MSA-EVSM-L100 (GMSM), MSA-EVOM-L100 (GMOM) and MSA-EVUM-L100 (GMUM)

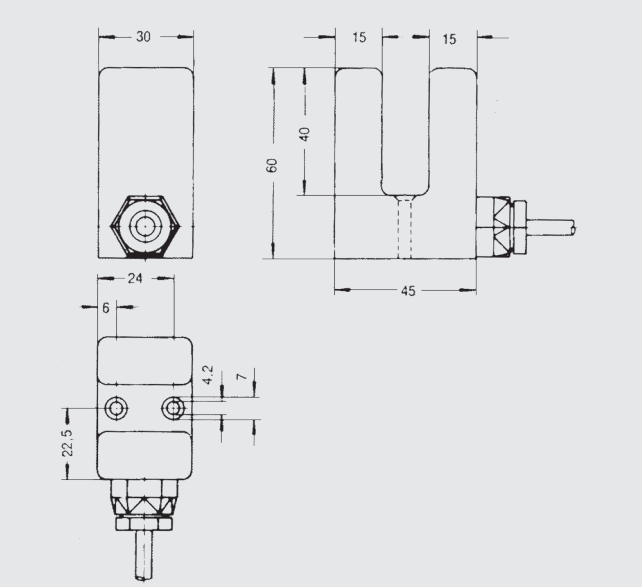
Dimensions in mm



Specifications	
Switching function	Model MSA-EVSM-L100 (GMSM): normally open Model MSA-EVOM-L100 (GMOM): normally closed Model MSA-EVUM-L100 (GMUM): change-over
Switch behaviour	Bistable
Contact material	Rhodium
Switching power	Model MSA-EVSM-L100 (GMSM): AC 100 VA, DC 50 W Model MSA-EVOM-L100 (GMOM): AC 100 VA, DC 50 W Model MSA-EVUM-L100 (GMUM): AC 40 VA, DC 20 W
Switching voltage	AC/DC 250 V
Switching current	Model MSA-EVS-L70 (KRS): AC 2 A, DC 1 A Model MSA-EVU-L70 (KRU): AC 1 A, DC 0.5 A
Switching frequency	300 1/sec
Permissible temperature	-10 ... +80 °C
Ingress protection	IP 65
Connection cable	Model MSA-EVSM-L100 (GMSM): : NYLHY 2 x 0.75 mm² Model MSA-EVOM-L100 (GMOM): NYLHY 2 x 0.75 mm² Model MSA-EVUM-L100 (GMUM): NYLHY 3 x 0.75 mm² (specify length when ordering)
Case	Stainless steel 316 Ti (1.4571)

Slot magnetic switch in polyamide case, glass-fibre reinforced
Models MSA-KSWO and MSA-KSWU

Dimensions in mm

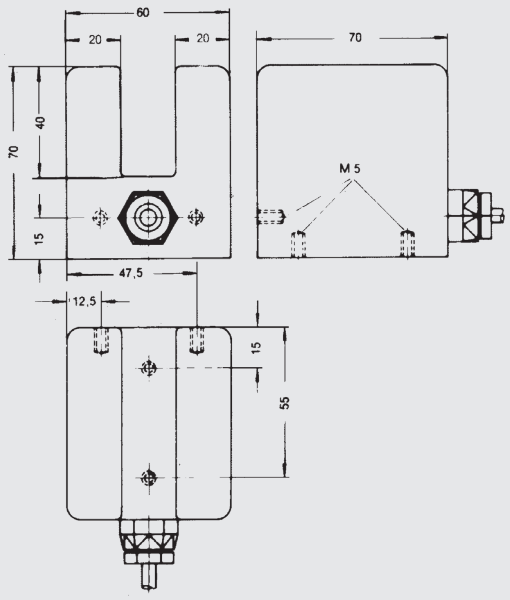


Specifications	
Switching function	Model MSA-KSWO: normally closed Model MSA-KSWU: change-over
Switch behaviour	Monostable
Contact material	Tungsten
Switching power	AC 60 VA, DC 30 W
Switching voltage	AC/DC 250 V
Switching current	AC 1 A, DC 0.5 A
Switching frequency	100 1/sec
Switch hysteresis	approx. 3 ... 5 mm
Permissible temperature	-10 ... +80 °C
Ingress protection	IP 54
Connection cable	Model MSA-KSWO: NYLHY 2 x 0.75 mm² Model MSA-KSWU: NYLHY 3 x 0.75 mm² (specify length when ordering)
Case	Polyamide, glass-fibre reinforced

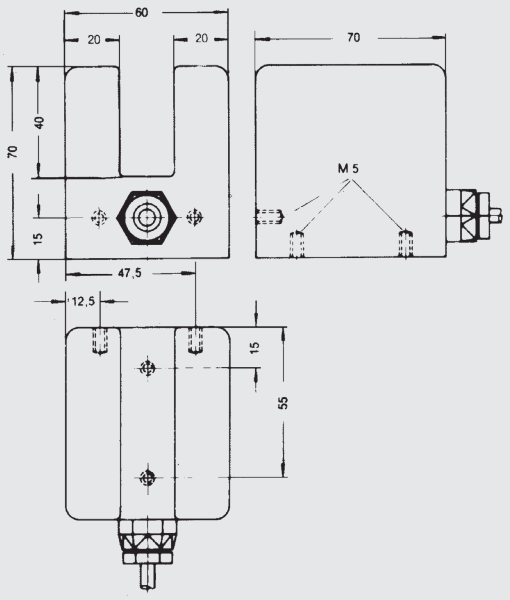
Slot magnetic switch for non-contact actuation using a sheet iron flag in polyamide case, glass-fibre reinforced
Models MSA-SRO, MSA-SRU, MSA-SWO and MSA-SWU

Dimensions in mm

Models MSA-SRO and MSA-SRU



Models MSA-SWO and MSA-SWU



Specifications	
Switching function	Model MSA-SRO: normally closed Model MSA-SRU: change-over
Switch behaviour	Monostable
Contact material	Rhodium
Switching power	Model MSA-SRO: AC 100 VA, DC 50 W Model MSA-SRU: AC 40 VA, DC 20 W
Switching voltage	AC/DC 250 V
Switching current	Model MSA-SRO: AC 2 A, DC 1 A Model MSA-SRU: AC 1 A, DC 0.5 A
Switching frequency	100 1/sec
Switch hysteresis	Model MSA-SRO: approx. 10 ... 12 mm Model MSA-SRU: approx. 10 ... 15 mm
Permissible temperature	-10 ... +80 °C
Ingress protection	IP 65
Connection cable	Model MSA-SRO: NYLHY 2 x 0.75 mm² Model MSA-SRU: NYLHY 3 x 0.75 mm² (specify length when ordering)
Case	Polyamide, glass-fibre reinforced

Specifications	
Switching function	Model MSA-SWO: normally closed Model MSA-SWU: change-over
Switch behaviour	Monostable
Contact material	Tungsten
Switching power	AC 60 VA, DC 30 W
Switching voltage	AC/DC 250 V
Switching current	AC 1 A, DC 0.5 A
Switching frequency	100 1/sec
Switch hysteresis	approx. 3 ... 5 mm
Permissible temperature	-10 ... +80 °C
Ingress protection	IP 65
Connection cable	Model MSA-SWO: NYLHY 2 x 0.75 mm² Model MSA-SWU: NYLHY 3 x 0.75 mm² (specify length when ordering)
Case	Polyamide, glass-fibre reinforced

Contact protection measures

The reed contacts should be protected against any voltage or current spikes that might occur.

Depending on the different load types different protective circuits are used.

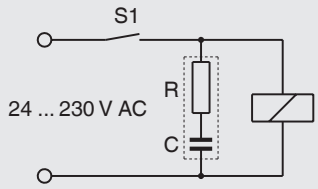
Model KR 24

RC module

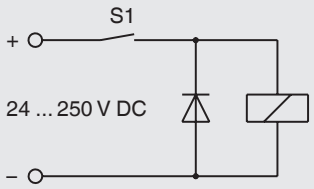
Contact protection relays	Contacts	Input	Power supply	Approval marking	Order number
KR 24	1 x change-over AC 250 V, 2 A	2 x contacts	DC 20 ... 30 V		112941
KR 24-EX	2 x change-over AC 253 V, 2 A	2 x contacts	DC 20 ... 30 V	PTB 02 ATEX 2072 / II(1) GD [EEx ia] IIC	112944
KR 230	1 x change-over AC 250 V, 2 A	2 x contacts	230 V AC		112942
KR 230-EX	2 x change-over AC 253 V, 2 A	2 x contacts	230 V AC	II 1 GD EEx ia IIC, PTB 02 ATEX 2073 / II(1) GD [EEx ia] IIC	112943

RC module	Capacitance	Resistance	Voltage	Order number
B3/115	0.33 µF	470 Ω	115 V AC	110446
B3/230	0.33 µF	1,000 Ω	230 V AC	110460

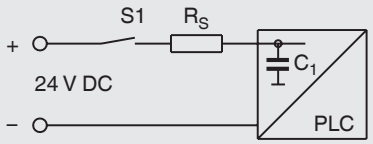
Inductive load
AC voltage



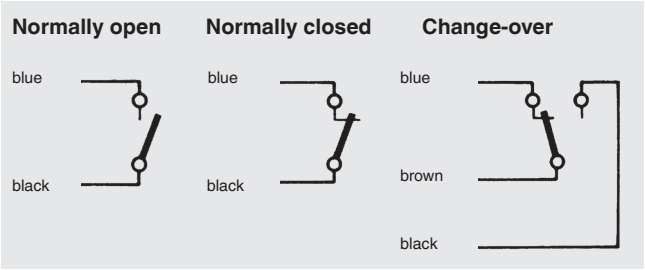
Inductive load
DC voltage



Capacitive load

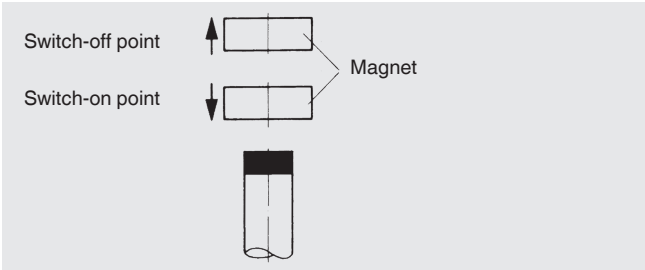


Connection diagrams



Switch hysteresis

The size of the switch hysteresis (stroke of the actuating magnet) is dependent on the size of the actuating magnet and the magnetic shunt caused by the ferrous environment. For most magnetic switches the stroke of actuating magnets is around 5 ... 10 mm.



Switch point accuracy

The reproducible switch point accuracy of magnetic switches is, with steady conditions, very high and is around 0.01 mm. When using barium ferrite magnets as actuating magnets, the switching point will shift with a change in the ambient temperature, since the magnetic field gets stronger with dropping temperature and with increasing temperature, it gets weaker.

The temperature behaviour with this is not linear; under 0 °C the magnetic field hardly increases and over 100 °C it is barely any weaker. With a temperature change of ±20 °C the switching point shifts by around ±0.05 mm. One can therefore describe the switching point of a magnetic switch as practically stable.

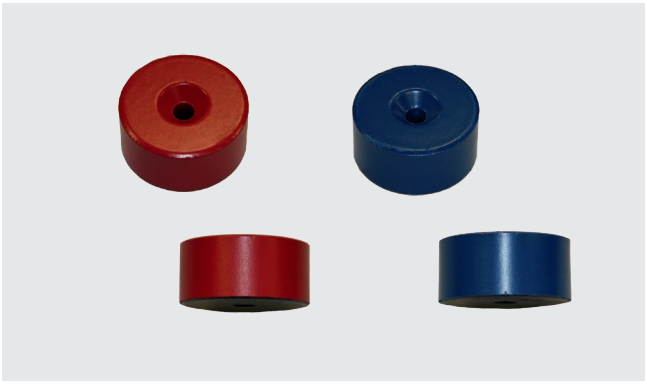
Vibration resistance

If strong vibrations can occur, it is recommended to secure the magnetic switch with elastic rubber. In the axial direction, the sensitivity to shock and vibration is the lowest. Magnetic switches in monostable designs, such as the models MSA-MRS 10, MSA-GMS 9, MSA-KRU 9, MSA-GMU 9 and the like, can be exposed to vibrations of up to 100 g with elastic mountings. Magnetic switches in bistable designs, such as the models MSA-GMSM 16, MSA-GMUM 16 and the like, are suitable for vibrations of 10 ... 20 g with elastic mountings (g = acceleration due to gravity).

Accessories

Permanent magnets

Permanent magnet	Size	Dimensions in mm	Order number
Magnet M0 north, red	M 0	15 x 4 x 6	005141
Magnet M0 south, blue	M 0	15 x 4 x 6	005140
Magnet M1 north, red	M 1	20 x 4 x 6	015529
Magnet M1 south, blue	M 1	20 x 4 x 6	015530
Magnet M2 north, red	M 2	20 x 5 x 10	015531
Magnet M2 south, blue	M 2	20 x 5 x 10	005144
Magnet M3 north, red	M 3	30 x 6 x 15	015532
Magnet M3 south, blue	M 3	30 x 6 x 15	015533



Actuating distances

Magnetic switch model	Actuating distances in mm			
	M 0	M 1	M 2	M 3
MSA-MS-Lxx	~ 8	~ 12	~ 19	~ 40
MSA-VS-Lx	~ 8	~ 12	~ 19	~ 40
MSA-MRS 9	~ 3	~ 6	~ 10	~ 27
MSA-KRS 9	~ 3	~ 6	~ 10	~ 27
MSA-KRU 9	~ 5	~ 9	~ 14	~ 30
MSA-KWU 9	~ 4	~ 7	~ 11	~ 26
MSA-GMS 9	~ 3	~ 6	~ 10	~ 22
MSA-GMU 9	~ 3	~ 5	~ 8	~ 19
MSA-GMSM 16	~ 17	~ 25	~ 32	~ 60
MSA-GMOM 16	~ 7	~ 12	~ 17	~ 40
MSA-GMUM 16	~ 10	~ 16	~ 23	~ 50
MSA-MRS 10	~ 4	~ 7	~ 11	~ 28
MSA-MRS 12	~ 4	~ 7	~ 11	~ 27
MSA-MRU 12	~ 3	~ 6	~ 10	~ 28
MSA-MRS 20	~ 2	~ 4	~ 7	~ 24
MSA-MRU 20	~ 3	~ 6	~ 10	~ 26
MSA-MRU 20 Ex	~ 3	~ 8	~ 13	~ 31
MSA-GMS 18	~ 6	~ 10	~ 15	~ 35
MSA-GMU 18	~ 5	~ 8	~ 12	~ 26
MSA-GMUM 18	~ 13	~ 19	~ 27	~ 55

Magnetic switch model	Actuating distances in mm			
	M 0	M 1	M 2	M 3
MSA-DRS	~ 5	~ 7	~ 11	~ 27
MSA-DRU	~ 3	~ 5	~ 9	~ 17
MSA-DRSM	~ 14	~ 20	~ 28	~ 58
MSA-DRUM	~ 8	~ 15	~ 20	~ 45
MSA-DWU	~ 5	~ 8	~ 13	~ 30
MSA-DGS	~ 3	~ 5	~ 9	~ 21
MSA-FKS-AL	~ 4	~ 7	~ 11	~ 27
MSA-FKOM-AL	~ 11	~ 15	~ 21	~ 40
MSA-FKSM-AL	~ 17	~ 24	~ 30	~ 55
MSA-FLS-AL	~ 5	~ 7	~ 11	~ 27
MSA-FLU-AL	~ 3	~ 5	~ 9	~ 17
MSA-FLSM-AL	~ 14	~ 20	~ 28	~ 55
MSA-FLUM-AL	~ 8	~ 15	~ 20	~ 45
MSA-FWU-AL	~ 5	~ 8	~ 13	~ 30
MSA-FGMS-AL	~ 3	~ 5	~ 9	~ 21
MSA-EVS-L70 (KRS)	~ 3	~ 6	~ 10	~ 27
MSA-EVU-L70 (KRU)	~ 5	~ 9	~ 14	~ 30
MSA-EVS-L100 (GMS)	~ 3	~ 6	~ 10	~ 22
MSA-EVSM-L100 (GMSM)	~ 17	~ 25	~ 32	~ 60
MSA-EVOM-L100 (GMOM)	~ 7	~ 12	~ 17	~ 40
MSA-EVUM-L100 (GMUM)	~ 10	~ 16	~ 23	~ 50

Ordering information
To order the described product the order number is sufficient.

Alternatively:
Model / Switching function / Cable length

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We reserve the right to make modifications to the specifications and materials.

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