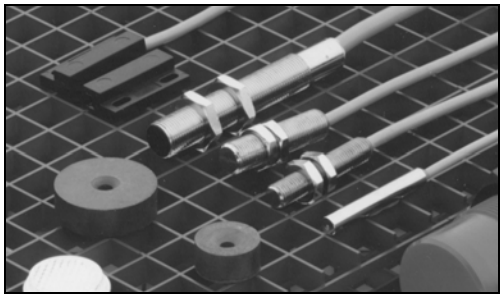
OPERATING PRINCIPLES FOR MAGNETIC SENSORS



Magnetic sensors are actuated by the presence of a permanent magnet. Their operating principle is based on the use of reed contacts, whose thin plates are hermetically sealed in a glass bulb with inert gas. The presences of a magnetic field makes the thin plates flex and touch each other causing an electrical contact. The plate's surface has been treated with a special material particularly suitable for low current or high inductive circuits. Magnetic sensors compared to traditional mechanical switches have the following advantage:

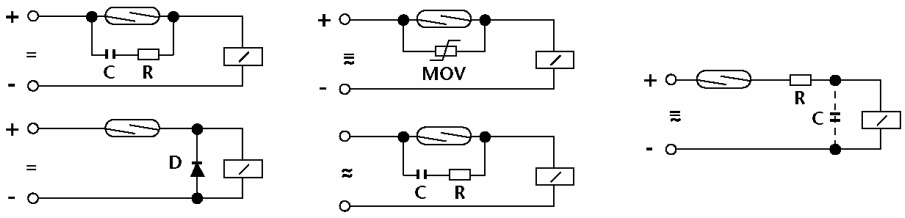
- Contacts are well protected against dust, oxidization and corrosion due to the hermetic glass bulb and inert gas; contacts are activated by means of a magnetic field rather than mechanical parts
- Special surface treatment of contacts assures long contact life
- Maintenance free
- Easy operation
- Reduced size

When using the NO (normally open) type the open reed contact closes as the magnet approaches. NO Magnetic sensors are two wires. When using the NO+NC type both NO (normally open) and NC (normally closed) functions are made available by means of a single glass bulb. NO+NC Magnetic sensors are supplied with three wires, one is in common, one is NO and one is NC

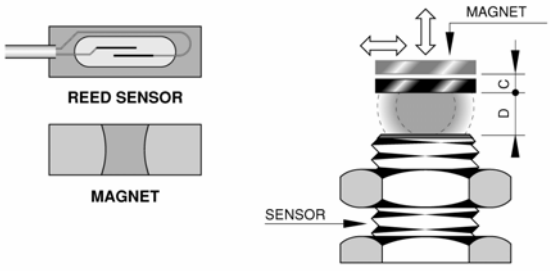
In the BISTABLE versions, contact closes only when external activation magnet is in NORTH polarity position. This state is maintained even when Magnet goes out of sensing area. Contact opens back only when SOUTH polarity of magnet is present, maintaining this condition even when magnet goes out of sensing zone, and can close again only when a NORTH polarity magnet is present.

TYPICAL REED CONTACT PROTECTIONS
The lifespan of a magnetic sensor at low values of voltage and current depends on the mechanical characteristics of the contact while for higher values the operating life depends on the characteristics of the load. In these cases, it is suggested to apply some form of external protection at the sensor output.

TYPICAL REED CONTACT PROTECTIONS



EXAMPLE OF FUNCTIONING



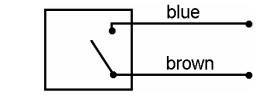
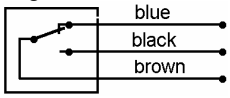
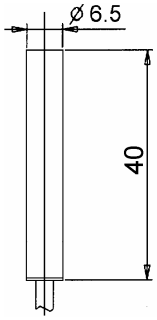
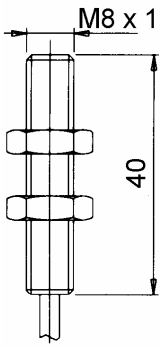
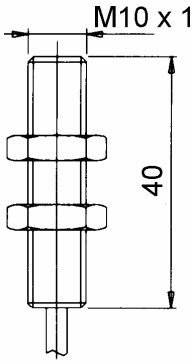
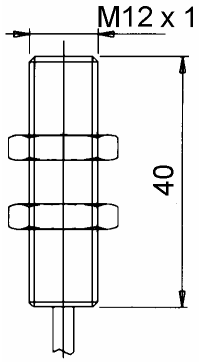
D: Max switching distance in relation to the magnet used.
C: Differential stroke.
D + C: Distance of contact re-opening during the removal magnet.

Magnetic Proximity Sensors

Extremely small dimensions and high operating distances characterize these magnetic sensors in metallic case. To actuate sensor **a magnetic is required**.

Features:

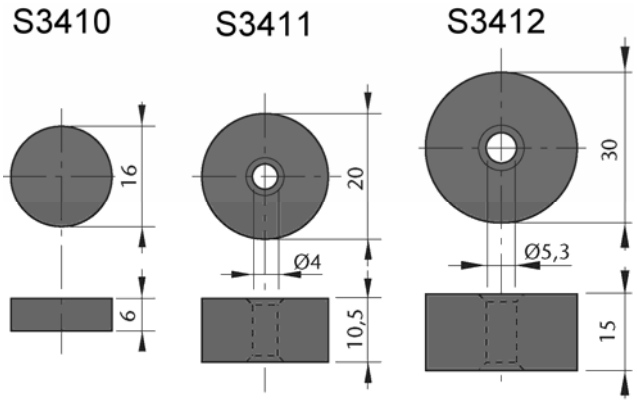
- High operating distance
- Threaded metallic case
- Protection degree of IP 67
- Hermetically sealed
- RoHS & CE Compliant to the EMC directive

Output	VA	V	A	MODEL			
NO	50	230	0.5	S3390	S3391	S3392	S3393
NO+NC	20	150	1	S3398	S3399	S3400	S3401
Dimensions: mm 1" = 25.4 mm 1 mm = .03937" Wiring NO  Changeover, NO+NC  				 	 	 	
External Dimensions				∅ 6 mm	M8 x1	M10 x 1	M12 x 1
Operating Distance				See Table 1			
Switching Frequency				NO output = 230 Hz max/ NO+NC output = 250 Hz max			
Case				Nickel-Plated Brass			
Protection Degree				IP 67			
Operating Temperature				-25 to +100°C (-13 to +212°F)			
Output Connection				Cable: 2 x 0.14 mm², L=2m			

Output	NO	NO/NC
Magnet		
S3410	8	6
S3411	20	17
S3412	40	33

Table 1. Operating distances as a function of the magnetic unit (mm)

Dimensions: mm, 1" = 25.4 mm, 1 mm = .03937"



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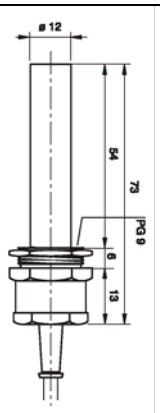
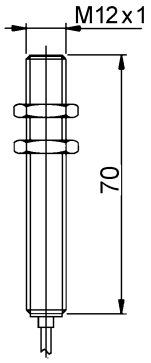
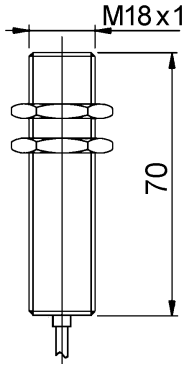
Magnetic Proximity Sensors

Increase current ratings and high operating distances make these sensors suitable for many applications.
To actuate sensor **a magnetic is required**.

Features:

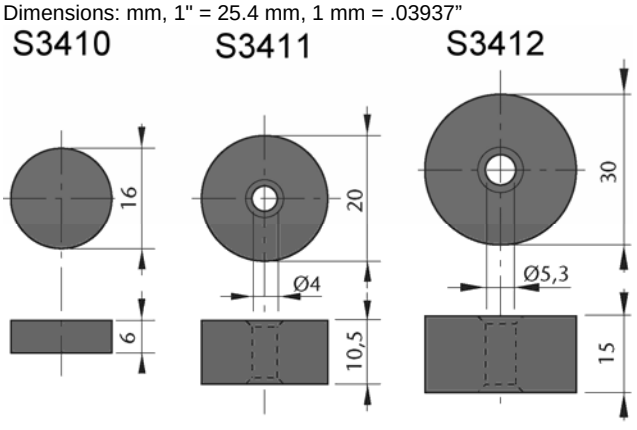
-
- High operating distance
- Threaded metallic case
- Protection degree of IP 67
- Hermetically sealed
- RoHS & CE Compliant to the EMC directive

Output	VA	V	A	MODEL		
NO	10	220	0.5	S3396		
NO	120	250	3	S3396L	S3393L	S3406
NO+NC	30	500	0.5	S3404	S3401L	S3407
BISTABLE	60	230	3		S3393LB	
Dimensions: mm 1" = 25.4 mm 1 mm = .03937” Wiring NO blue brown Changeover, NO+NC blue black brown						
External Dimensions				∅ 12 mm, PG 9	M12 x1	M18 x 1
Operating Distance				See Table 1		
Switching Frequency				NO(10VA) 230Hz, NO (120VA) 100Hz, NO/NC 150Hz, BISTABLE 230Hz		
Case				Nickel-Plated Brass		
Protection Degree				IP 67		
Operating Temperature				-25 to +100°C (-13 to +212°F)		
Output Connection				Cable: 2 x 0.14 mm², L=2m		

Output	NO (10VA)	NO (120VA)	NO/NC	BISTABLE
Magnet				
S3410	8	-	-	6
S3411	20	10	10	20
S3412	40	33	33	40

Table 1. Operating distances as a function of the magnetic unit (mm)

Dimensions: mm, 1" = 25.4 mm, 1 mm = .03937”



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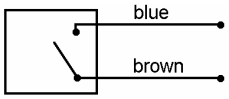
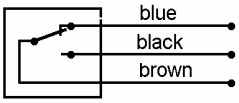
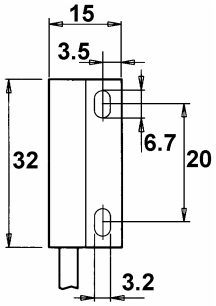
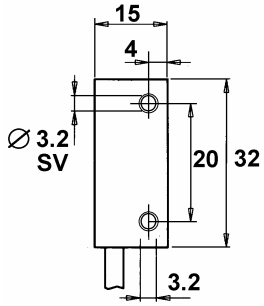
Rectangular Magnetic Proximity Sensors

To actuate sensor **a magnetic is required**.

Features:

- High operating distance
- Rectangular case
- Protection degree of IP 67
- Hermetically sealed
- RoHS & CE Compliant to the EMC directive

Output	VA	V	A	MODEL	
NO	10	220	0.5	S3394	S3395
NO+NC	20	150	1	S3402	S3403
Dimensions mm, 1mm = .03937” Wiring NO  NO+NC 				 Height = 8 mm	 Height = 8 mm
Operating Distance				10 mm	
Switching Frequency				NO output = 230 Hz max/ NO+NC output = 250 Hz max	
Case				Plastic	Anodized Aluminum
Protection Degree				IP 67	
Operating Temperature				-25 to +100°C (-13 to +212°F)	
Output Connection				Cable: 2 x 0.14 mm², L=2m	
Required Magnet				**S3414** M302, Ferrite in Plastic Housing (dimensions same as sensor)	**S3415** M304, Ferrite in Aluminum Housing (dimensions same as sensor)