



# MAGNETIC SENSORS

The magnetic sensors range is basically made by two categories

## DETECTION OF EXTERNAL MAGNETS

Very long sensing distance even with small sensors are possible. In order to choose properly the magnet see page C-12. In many cases the sensor is used to detect a magnet embedded inside other devices such as pneumatic cylinders, specifically made for this purpose.

There are two basic technologies : Reed contact or solid state.

### Reed contact

They are the cheapest solution. Being made with the same production process as for the inductive sensors, they join the advantages of a robust and sealed construction to the electromechanical devices performances:

- no need of power supply
- no voltage drop
- no minimum load required
- no limitations in series and parallel connection

It must be observed that eventhough the number of cycles of a Reed contact is very high, that's not infinite. They are hence not suited for applications with high working frequency or requiring fast response time. It is also highly recommended to avoid to apply excessive mechanical strenght on the body of the sensors.

### Working principle:

A Reed contact embedded inside the sensor detects the magnetic field and closes a contact able to drive directly the load. Versions with three wires or without LED don't have voltage drop on contacts. On the two wires with LED version you must consider a little voltage drop, to be considered for the series connection of more sensors.

### Amplified in d.c. or static output

They are much more sensitive than the Reed contacts, as showed on page C-12 table.

They have all the advantages of the solid state sensors :

- Illimited number of cycles
- Very fast switching time
- High working frequencies
- High resistance against vibrations and mechanical strenght on the housing

### Working principle:

An electronic, solid state component detects the magnetic field and drives amplifier stage, LED and short circuit protection.

## DETECTION OF A FERROMAGNETIC TARGET

These sensors are able to detect only ferromagnetic objects. They are mainly used as selective sensors on working plants for aluminium, brass, copper, where bits of metal would create unavoided signals using standard inductive sensors.

### Working principle:

An electronic, solid state component, internally polarized by an embedded magnet, detects the magnetic field variation due to the influence of an external ferromagnetic object, driving the amplifier, LED and short circuit protection.



# MAGNETIC SENSORS

**BMS** = activated by external magnet  
**DCH** = activated by ferromagnetic target

Diameter of cylindrical sensors.  
 For other types, change the number with the following:

**Z** = rectangular plastic 16 x 28 x 10  
**W** = rectangular plastic 19 x 28,5 x 10,5

**BMS Z / 4 6 0 9 KS -5 PUR**

**3** = with connector M12 x 1  
**6** = standard type cable output  
**9** = with connector M8 x 1  
**\*** = male connector cabled on sensor (see pag. H-1)

**0** = NO (normally open output)  
**1** = NC (normally closed output)  
**2** = NO + NC (complementary outputs)

**0** = REED contact  
**2** = 2 wires with LED  
**8** = NPN static output  
**9** = PNP static output

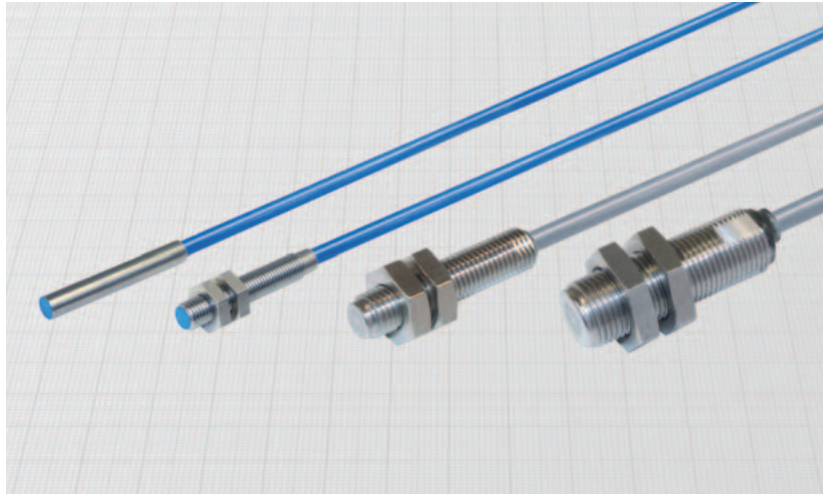
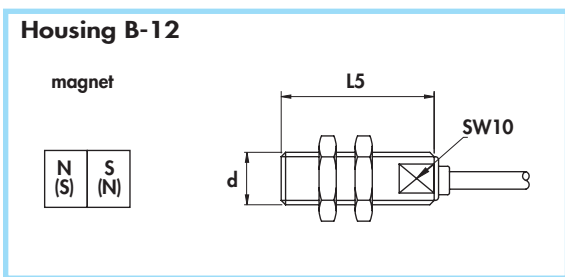
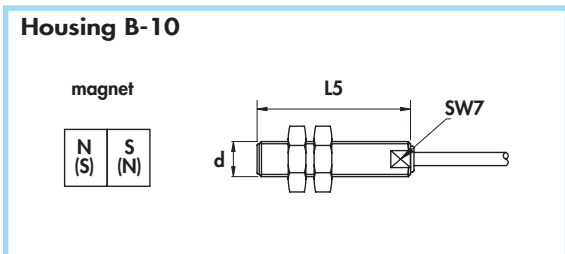
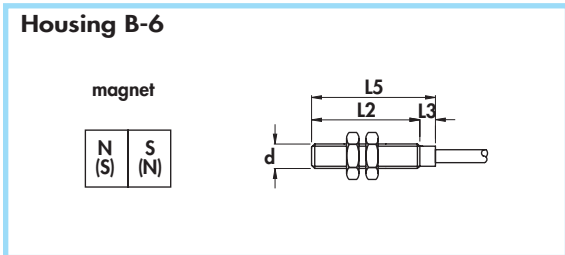
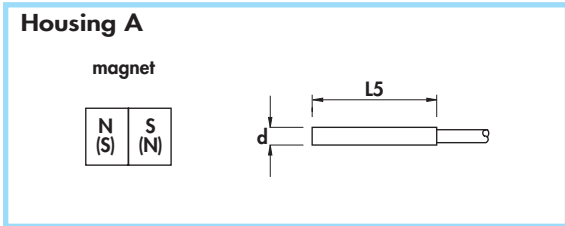
**L** = smooth body  
**J** = degree of protection IP68  
**K** = protection against short circuit and overload  
**S** = LED output status  
**T** = high temperatures version

Cable length (if required different than standard 2m)

For Polyurethane cable add PUR



**REED CONTACT 2 wires •**  
**Detection of magnets •**  
**Cable output •**



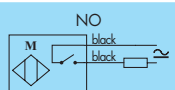
Diameter	M5 x 0,5	M8 x 1	M12 x 1
Nut	Size	SW7	SW13
	Thickness mm	2,5	4
Max tightening torque Nm	2	10	20

- Materials:**
- Cable: 2m PVC CEI 20 - 22 II; 90°C; 300 V; O.R.
  - Housing: stainless steel

**General Features:**  
 These sensors give on the output a contact activated by an external magnetic field, not depending by the polarity of the field. The activation distance depends by the power of the magnet (see on page C-12), which must be ordered separately. Reed contacts allows to drive directly dc loads (PNP/NPN) or ac loads. Diameters 8 and 12 mm are completely in stainless steel and are able to withstand high pressures on the housing.

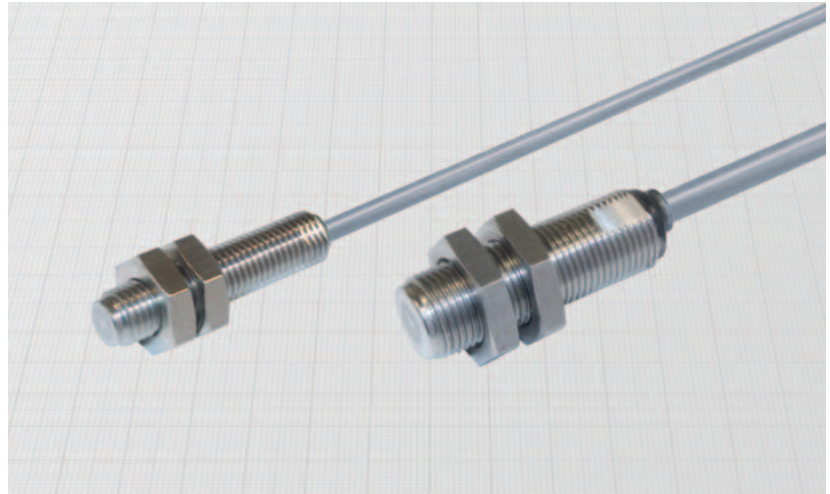
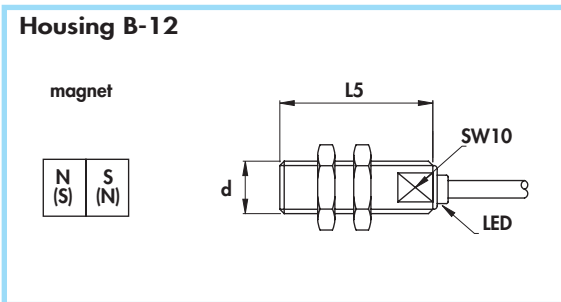
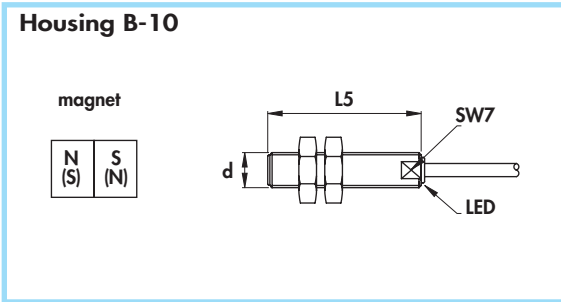
- Technical data:**
- Max working voltage: 50 Vac/75 Vdc normally open
  - Output logic: 0,1 Ω
  - Contact resistance max: 1 ms
  - Operate time max: 0,4 ms
  - Release time max: -25 ÷ +85°C
  - Temperature range: front side (diameters 8 and 12 mm): IP68
  - Degree of protection: back side: IP67
  - Pressure on the front side max (diameters 8 and 12 mm): 150 bar
  - Cable conductor cross section: 0,15 mm<sup>2</sup> on 4 and 5 mm
  - 0,35 mm<sup>2</sup> on 6,5 ÷ 12 mm

Housing	L1	L2	L3	L4	L5	Cable diameter	Body diameter (d)	Max switching frequency (f)	Rated operational current (I <sub>e</sub> )	ORDERING REFERENCES
	mm	mm	mm	mm	mm					
A	-	-	-	-	25	3	4	0,5	500	<b>BMS4/4600L</b>
B-6	-	20	5	-	25	3	M5 x 0,5	0,5	500	<b>BMS5/4600</b>
A	-	-	-	-	30	4	6,5	0,5	500	<b>BMS6,5/4600L</b>
B-10	-	-	-	-	35	4	M8 x 1	0,5	500	<b>BMS8/4600</b>
B-12	-	-	-	-	35	4	M12 x 1	0,5	500	<b>BMS12/4600</b>



# CYLINDRICAL MAGNETIC SENSORS IN METAL HOUSING

- REED CONTACT 2 and 3 wires with LED
- Detection of magnets
- Cable output



Diameter	M8 x 1	M12 x 1
Nut	Size	SW13
	Thickness mm	4
Max tightening torque Nm	10	20

**Materials:**

- Cable: 2m PVC CEI 20 - 22 II; 90°C; 300 V; O.R.
- Housing: stainless steel

**General Features:**

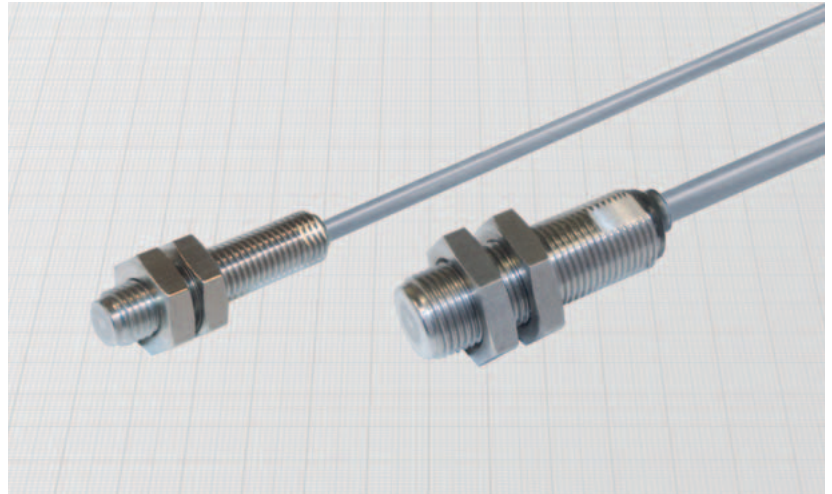
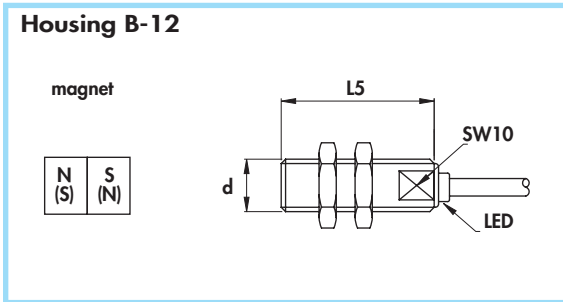
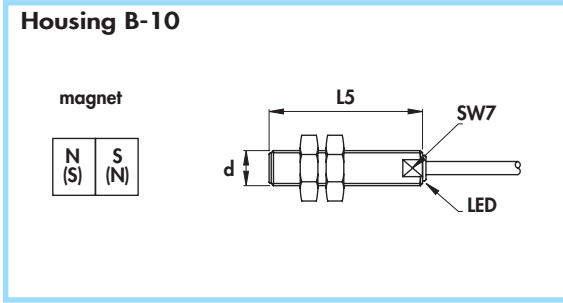
These sensors give on the output a contact activated by an external magnetic field, not depending by the polarity of the field. The activation distance depends by the power of the magnet (see on page C-12), which must be ordered separately. Reed contacts allows to drive directly dc loads (PNP/NPN) or ac loads. The output status is indicated by LED. The extremely strong construction allows the use in the most difficult conditions even with high pressures on the housing.

**Technical data:**

- Working voltage: 10 ÷ 30 Vac/Vdc
- Voltage drop (U<sub>d</sub>) (2 wires versions) with I<sub>e</sub> = 10 mA: ≤ 2,2 V  
with I<sub>e</sub> = 100 mA: ≤ 3 V
- Output logic: normally open
- Contact resistance max (3 wires versions): 0,1 Ω
- Operate time max: 1 ms
- Release time max: 0,4 ms
- Temperature range: - 25 ÷ + 85°C
- Degree of protection: front side: IP68  
cable output side: IP67
- Max pressure on the front side: 150 bar
- Output status indication: yellow LED
- Cable conductor cross section: 0,22 mm<sup>2</sup> on 8 mm  
0,34 mm<sup>2</sup> on 12 mm

Housing	L1	L2	L3	L4	L5	Cable diameter	Body diameter (d)	Max switching frequency (f)	Rated operational current (I <sub>e</sub> )	ORDERING REFERENCES		
										PNP	NPN	2 wires
										NO brown black blue	NO blue black brown	NO black black
B-10	-	-	-	-	35	3,5	M8 x 1	0,5	500	<b>BMS8/4600S</b> <b>BMS12/4600S</b>	-	
B-12	-	-	-	-	35	4	M12 x 1	0,5	500		-	
B-10	-	-	-	-	35	4	M8 x 1	0,5	100	-	<b>BMS8/4602S</b> <b>BMS12/4602S</b>	
B-12	-	-	-	-	35	4	M12 x 1	0,5	100	-		

- Amplified in d.c. 3 wires with LED •
- Detection of magnets •
- Cable output •



Diameter	M8 x 1	M12 x 1
Nut	Size	SW13
	Thickness mm	4
Max tightening torque Nm	10	20

**Materials:**

- Cable: 2m PVC CEI 20 - 22 II; 90°C; 300 V; O.R.
- Housing: stainless steel

**General Features:**

These sensors are completely electronic and are activated by an external magnetic field, not depending by the polarity of the field. The activation distance depends by the power of the magnet (see on page C-12), which must be ordered separately. Main advantages of static output sensors are unlimited electric life, protection against short circuit and lines transients, high switching frequency and no bounces on switching edges. The output status is indicated by LED. The extremely strong construction allows the use in the most difficult conditions even with high pressures on the housing.

**Technical data:**

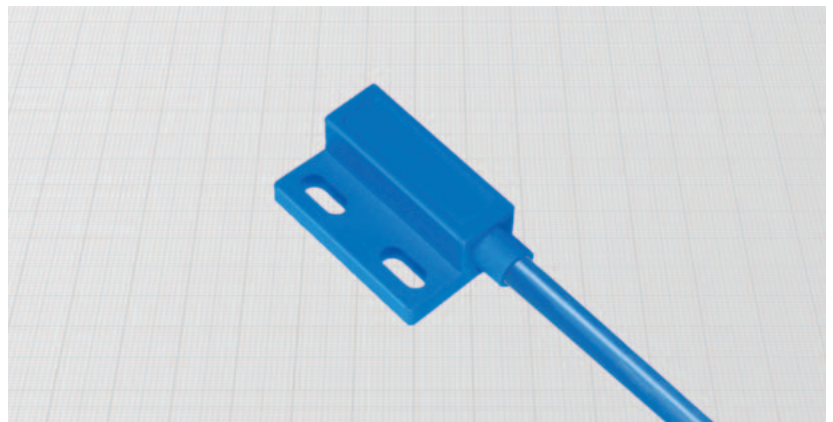
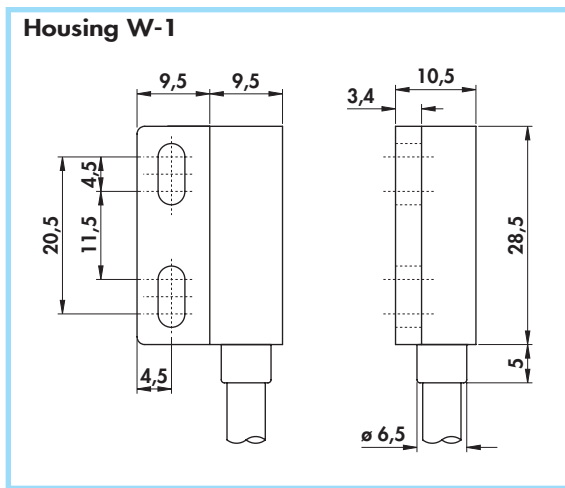
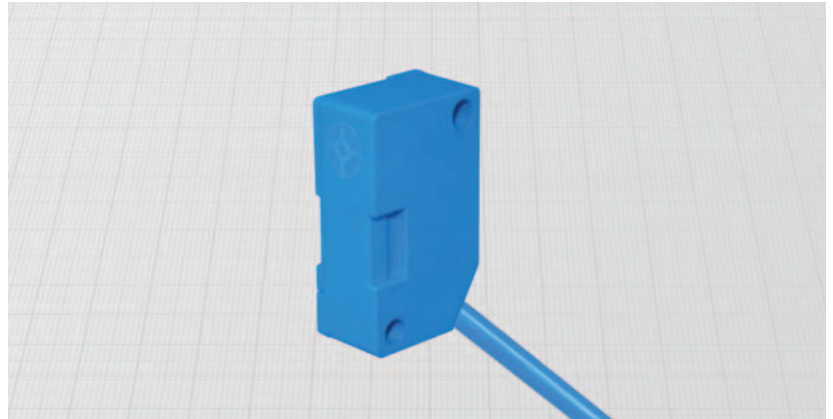
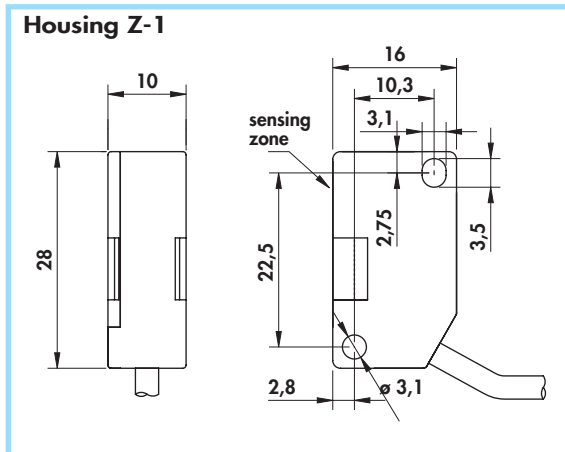
- Supply voltage ( $U_B$ ): 10 ÷ 30 Vdc
  - Max ripple: 10%
  - No-load supply current ( $I_0$ ): < 20 mA
  - Voltage drop ( $U_d$ ): ≤ 1.5 V
  - Repeat accuracy (R): < 2%
  - Temperature range: -25 ÷ + 85°C
  - Degree of protection: IP67
  - Max pressure on front side: 150 bar
  - Output status indicator: yellow LED
  - Cable conductor cross section: 0,22 mm<sup>2</sup> on 8 mm  
0,34 mm<sup>2</sup> on 12 mm
- Protected against short-circuit and overload
  - Protected against any wrong connection
  - Suppression of initial false impulse
  - Electromagnetic compatibility (EMC) according to EN60947-5-2
  - Shock and vibration resistance according to EN60068-2-27 EN60068-2-6

Housing	L1	L2	L3	L4	L5	Cable diameter	Body diameter (d)	Max switching frequency (f)	Rated operational current (I <sub>e</sub> )	ORDERING REFERENCES	
										PNP (positive switching)	
										NO	NC
B-10	-	-	-	-	35	3,5	M8 x 1	10	200		
B-12	-	-	-	-	35	4	M12 x 1	10	200	<b>BMS8/4609KS</b>	<b>BMS8/4619KS</b>
										<b>BMS12/4609KS</b>	<b>BMS12/4619KS</b>
<b>NPN (negative switching)</b>											
Use the above mentioned part number changing the last number 9 with 8 (ie. BMS8/4608KS)											



## RECTANGULAR MAGNETIC SENSORS

- REED CONTACT 2 wires
- Type Z and W
- Cable output



### Materials:

- Cable: 2m PVC CEI 20 - 22 II; 90°C; 300 V; O.R.
- Housing: plastic

### General Features:

These sensors give on the output a contact activated by an external magnetic field, not depending by the polarity of the field. The activation distance depends by the power of the magnet (see on page C-12), which must be ordered separately. Reed contacts allows to drive directly dc loads (PNP/NPN) or ac loads.

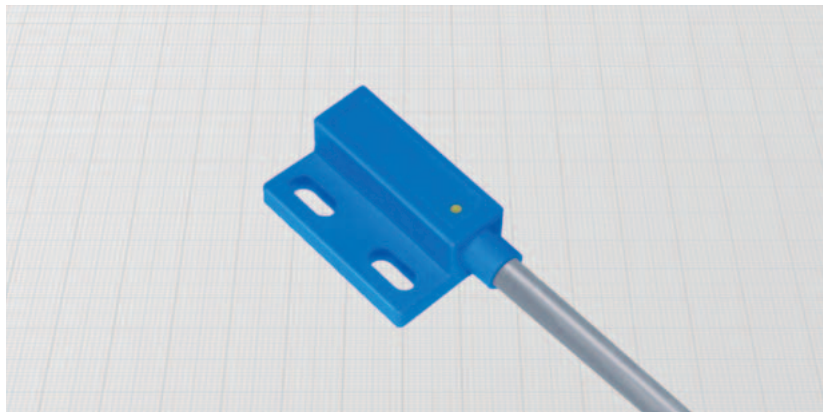
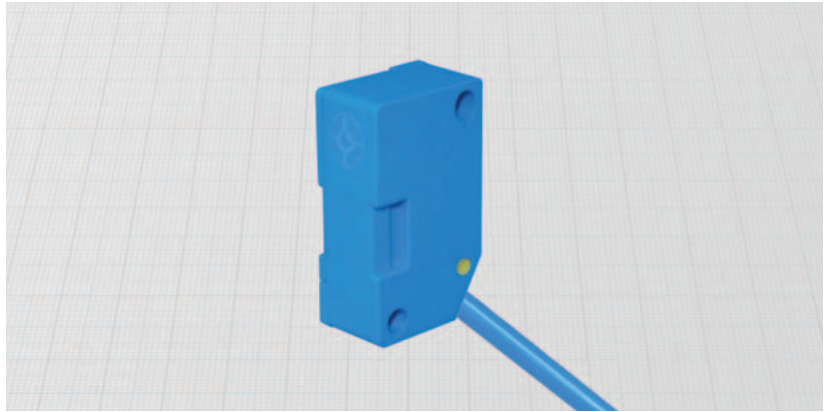
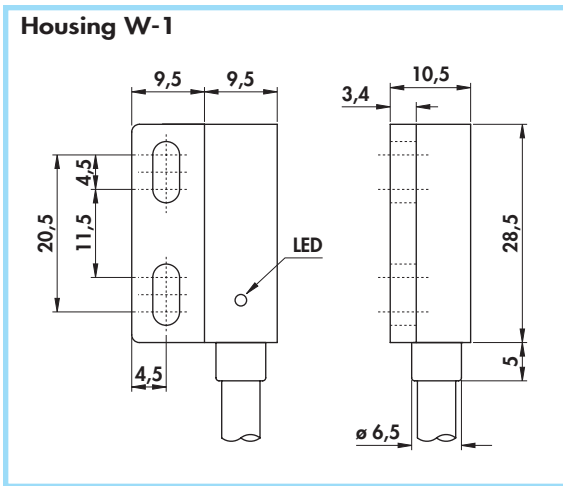
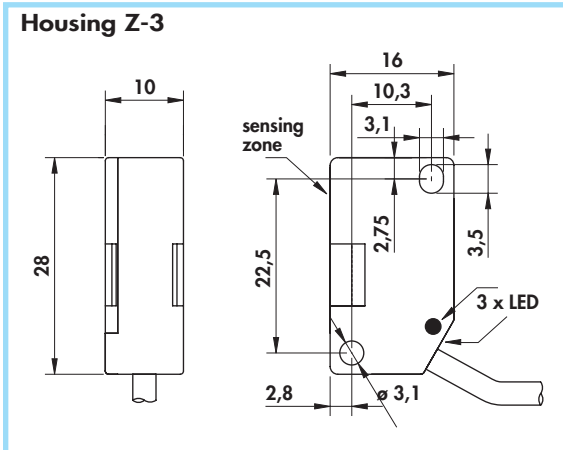
### Technical data:

- Working voltage: max 50 Vac/75 Vdc
- Output function: normally open
- Contact resistance max: 0,1 Ω
- Operate time max: 1 ms
- Release time max: 0,4 ms
- Temperature range: -25 ÷ + 85°C
- Degree of protection: IP67
- Cable conductor cross section: 0,15 mm<sup>2</sup> Type Z  
0,50 mm<sup>2</sup> Type W

Housing	Cable diameter	Max switching frequency (f <sub>1</sub> )	Rated operational current (I <sub>0</sub> )	ORDERING REFERENCES
	mm	KHz	mA	
Z - 1	3	0,5	500	<b>BMSZ/4600</b>
W - 1	5	0,5	500	<b>BMSW/4600</b>



Type Z and W - Amplified in d.c. 3 wires with LED •  
 Detection of magnets •  
 Cable output •



**Materials:**

- Cable: 2m PVC CEI 20 - 22 II; 90°C; 300 V; O.R.
- Housing: plastic

**General Features:**

These sensors are completely electronic and are activated by an external magnetic field, not depending by the polarity of the field. The activation distance depends by the power of the magnet (see on page C-12), which must be ordered separately. Main advantages of static output sensors are unlimited electric life, protection against short circuit and lines transient, high switching frequency and no bounces on switching edges. The output status is indicated by LED.

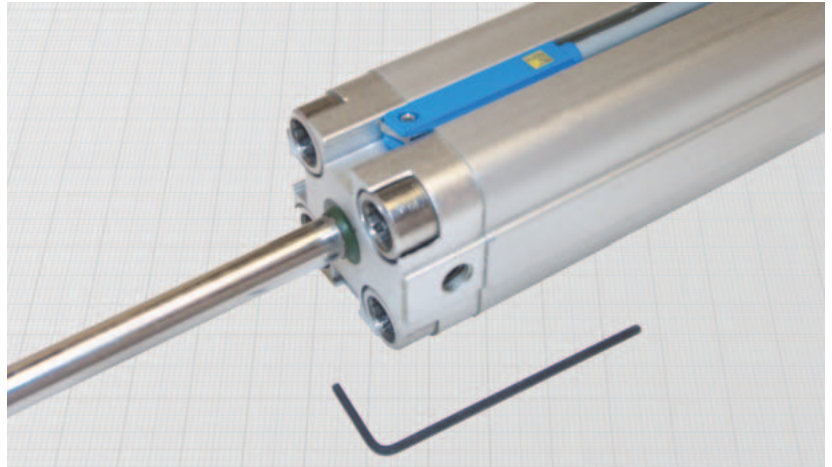
**Technical data:**

- Supply voltage ( $U_B$ ): 10 ÷ 30 Vdc
- No-load supply current ( $I_0$ ): < 20 mA
- Voltage drop ( $U_d$ ): ≤ 1,5 V
- Repeat accuracy (R): < 2%
- Temperature range: - 25 ÷ + 85°C
- Degree of protection: IP67
- Switch status indicator: yellow LED
- Cable conductor cross section: 0,15 mm<sup>2</sup> Type Z  
0,50 mm<sup>2</sup> Type W
- Protected against short-circuit, overload and any wrong connection
- Electromagnetic compatibility (EMC) according to EN60947-5-2
- Shock and vibration resistance according to EN60068-2-27 EN60068-2-6

Housing	Max ripple	Cable diameter	Max switching frequency (f)	Rated operational current (I <sub>e</sub> )	ORDERING REFERENCES	
					PNP (positive switching)	
	%	mm	KHz	mA		
Z - 3	10	3	10	200	<b>BMSZ/4609KS</b>	<b>BMSZ/4619KS</b>
W - 1	10	5	10	200	<b>BMSW/4609KS</b>	<b>BMSW/4619KS</b>
					NPN (negative switching)	
Use the above mentioned part number changing the last number 9 with 8 (ie. BMSZ/4608KS)						

## RECTANGULAR MAGNETIC SENSORS

- REED CONTACT 2 and 3 wires with LED
- For pneumatic cylinders
- Cable and connector output M8 x 1



### General Features:

This sensor detects the position of the magnetic ring inside a standard pneumatic cylinder with a T slot. The sensor remains completely recessed and thus mechanically protected. Reed contact provides for a direct driving of DC (PNP/NPN) and AC loads. A yellow LED gives indication of the output status. Available with cable exit or connector M8x1.

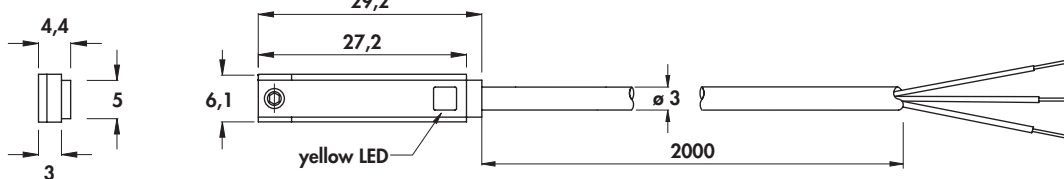
### Technical data:

- Working voltage: 10 ÷ 30 Vac/Vdc
- Output function: normally open
- Voltage drop ( $U_d$ ) 2 wires versions:
  - with  $I_e = 10 \text{ mA}$   $\leq 2,2 \text{ V}$
  - with  $I_e = 160 \text{ mA}$   $\leq 3 \text{ V}$
- Contact resistance max (3 wires versions): 0,1  $\Omega$
- Operate time max: 1 ms
- Release time max: 0,4 ms
- Temperature range: -25 ÷ +85°C
- Degree of protection: IP67
- Output status indication: yellow LED
- Cable conductor cross section: 0,15 mm<sup>2</sup>

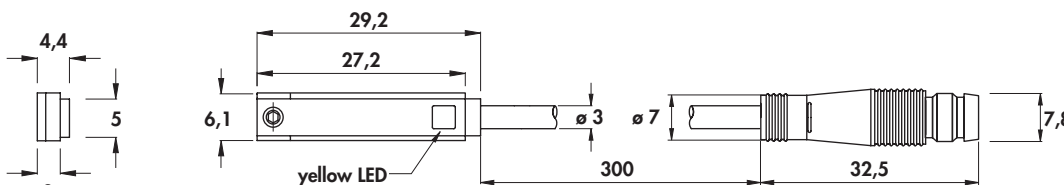
### Materials:

- Cable: PVC CEI 20-22 II; 90°C; 300V
- Connector: PUR
- Sensor: plastic
- Connector ferrule and fixing nut: nickel plated brass

### Housing S-1



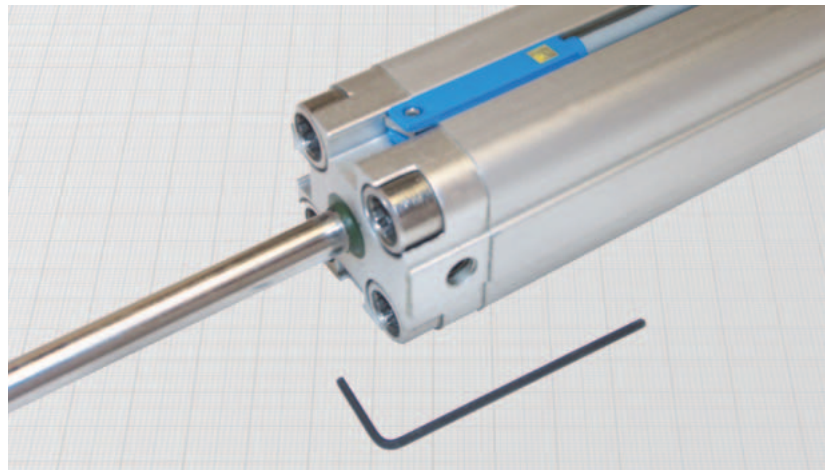
### Housing S-2



Housing	Female connector	Cable diameter	Rated operational current ( $I_e$ )	Max switching frequency (f)	ORDERING REFERENCES		
					PNP (positive switching)	NPN (negative switching)	2 wires
S-1	-	3	500	30,5			
S-2	11-12	-	500	0,5			
S-1	-	3	100	0,5	<b>BMS/4600S</b> <b>BMS/4FO0S</b> - -	- - <b>BMS/4602S</b> <b>BMS/4FO2S</b>	
S-2	11-12	-	100	0,5			

Note: different cable lengths must be specified at the end of the code. Ex: BMS/4FO0S-1 for 1m of cable with connector

- Amplified in d.c. 3 wires with LED •
- For pneumatic cylinders •
- Cable and connector output M8 x 1 •



**General Features:**

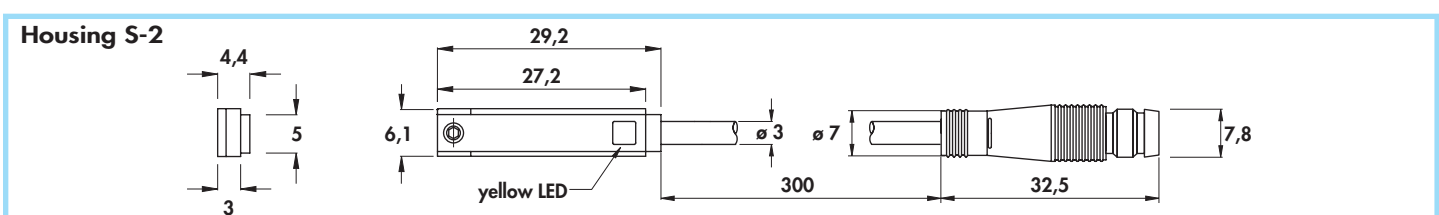
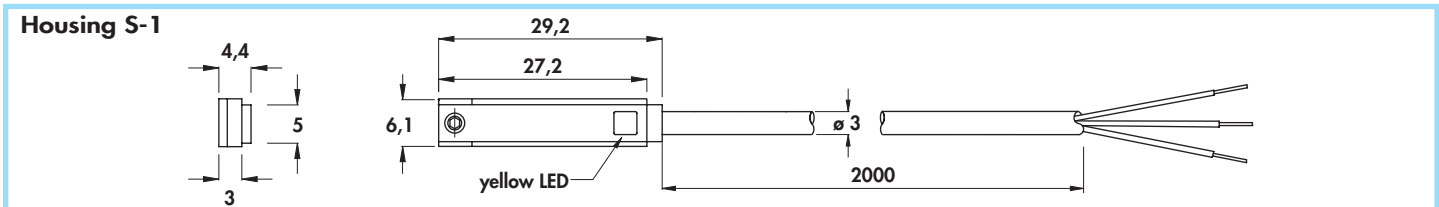
These sensors are completely electronic and detects the position of the magnetic ring inside a standard pneumatic cylinder with a T slot. The sensor remains completely recessed and thus mechanically protected. Main advantages of static output sensors are unlimited electric life, protection against short circuit and lines transient, high switching frequency and no bounces on switching edges. A yellow LED gives indication of the output status. Available with cable exit or connector M8x1.

**Technical data:**

- Supply voltage ( $U_B$ ): 10 ÷ 30 Vdc
- No-load supply current ( $I_0$ ): < 10 mA
- Temperature range: - 25 ÷ + 85° C
- Degree of protection: IP67
- Switch status indicator: yellow LED
- Cable conductor cross section: 0,15 mm<sup>2</sup>
- Electromagnetic compatibility (EMC) according to EN60947-5-2
- Protected against short circuit, overload and connection mistakes
- Shock and vibration resistance according to EN60068-2-27 EN60068-2-6

**Materials:**

- Cable: PVC CEI 20-22 II; 90°C; 300V
- Connector body: PUR
- Sensor body: plastic
- Connector ferrule and fixing nut: nickel plated brass



Housing	Female connector n°	Cable diameter mm	Max ripple %	Max switching frequency (f) KHz	Rated operational current ( $I_0$ ) mA	ORDERING REFERENCES	
						PNP (positive switching)	
						NO 	NC 
S-1	-	3	10	10	200	<b>BMS/4609KS</b>	<b>BMS/4619KS</b>
S-2	11-12	-	10	10	200	<b>BMS/4F09KS</b>	<b>BMS/4F19KS</b>

Note: different cable lengths must be specified at the end of the code.  
Ex: BMS/4FOOS-1 for 1m of cable with connector.

**NPN (negative switching)**  
Use the above mentioned part number changing the last number 9 with 8 (ie. BMS/4608KS)

NO 	NC 
--------	--------

## • MAGNETS FOR SENSORS

Fig. A

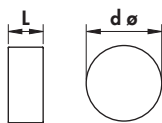


Fig. B

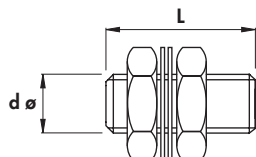


Fig. C

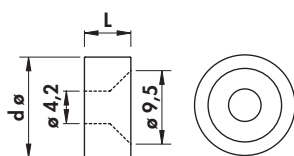
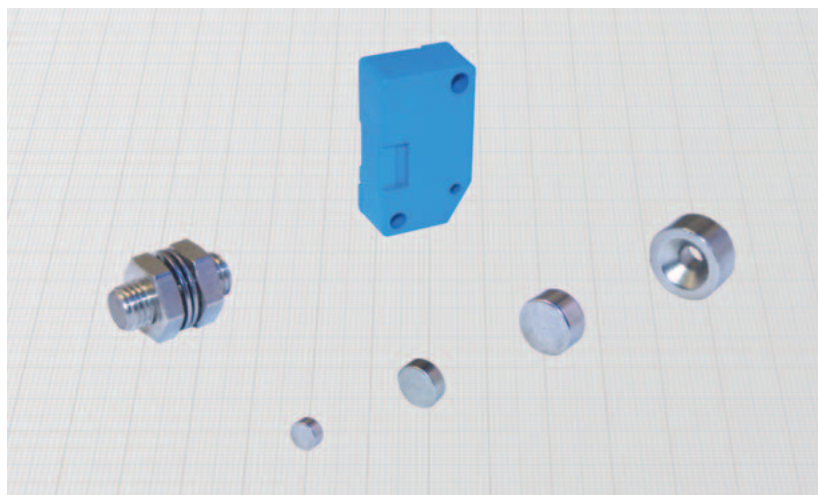
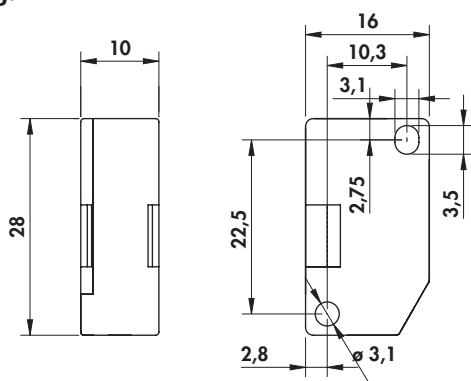


Fig. D



### General Features:

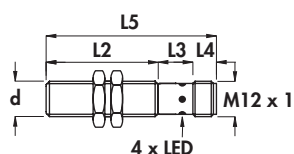
These magnets can be used as actuator for all the magnetic sensors which need an external activation magnet. They're suitable for applications up to 70° C. For particular applications contact our technical office.

In the ordering reference table there are approximate detection distances obtained with different types of BDC sensors.

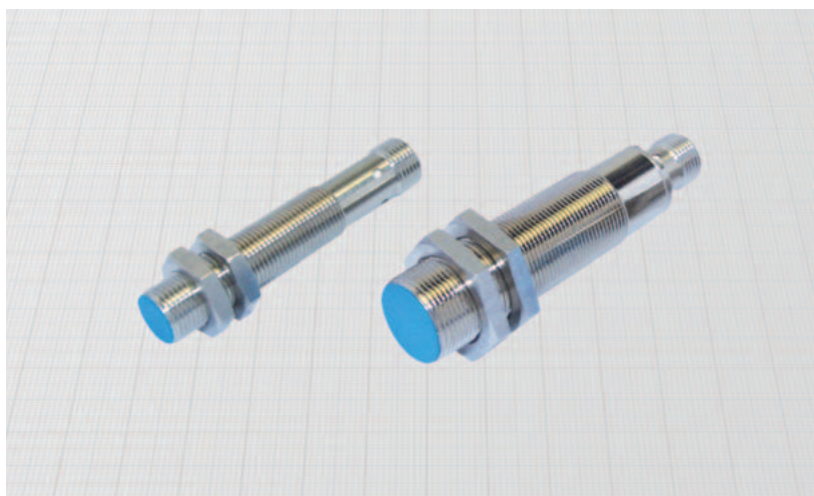
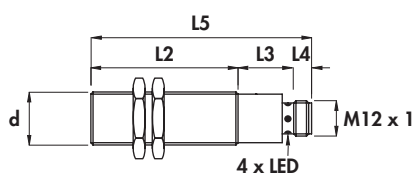
Fig.	Diameter	L	DETECTION DISTANCE		ORDERING REFERENCES
			With Reed sensors	With static sensors	
	mm	mm			
A	5	3	6	15	MAG-T53 MAG-T83 MAG-T105
A	8	3,6	13	22	
A	10	5	20	30	
B	M8x1	20	10	17	MAG-M820
C	13	6	25	45	MAG-TF136
D	-	-	13	22	MAG-Z

- Amplified in d.c. 3 and 4 wires
- Detection of ferromagnetic targets
- Connector output M12 x 1

## Housing I-14



## Housing I-13



Diameter		M12 x 1	M18 x 1
Nut	Size	SW17	SW24
	Thickness mm	4	4
Max tightening torque Nm		15	35

### Materials:

- Housing: nickel plated brass
- Sensing face: plastic

### General Features:

These sensors are able to detect only ferromagnetic objects. They are mainly used as selective sensors on working plants for aluminium, brass, copper, where bits of metal would create unavoids signals using standard inductive sensors.

### Technical data:

- Supply voltage ( $U_B$ ): 10 ÷ 30 Vdc
- Max ripple: 10%
- No-load supply current ( $I_0$ ): ≤ 20 mA
- Voltage drop ( $U_d$ ): ≤ 1,5 V
- Temperature range: -20° ÷ +70°C
- Max thermal drift of sensing distance  $S_r$ : ± 10%
- Repeat accuracy (R): 2%
- Switching hysteresis max (H): 10%
- Degree of protection: IP67
- Switch status indicator: yellow LED
- Protected against short-circuit and overload
- Protected against any wrong connection
- Suppression of initial false impulse
- Electromagnetic compatibility (EMC) according to EN60947-5-2
- Shock and vibration resistance according to EN60068-2-27 EN60068-2-6

Housing	Flush mounting Non flush mounting	L1	L2	L3	L4	L5	Female connector	Body diameter (d)	Max switching frequency (f)	Rated operational current ( $I_e$ )	Nominal sensing distance ( $S_n$ ) ± 10% with Fe37	ORDERING REFERENCES		
												PNP (positive switching)		
		mm	mm	mm	mm	mm	n°	mm	KHz	mA	mm			
I-14	•	-	43	15	8	66	6-8B-10	M12 x 1	1	200	3	<b>DCH12/4309KS</b>	<b>DCH12/43C9KS</b>	<b>DCH12/4329KS</b>
I-13	•	-	50	19	8	77	6-8B-10	M18 x 1	1	200	3	<b>DCH18/4309KS</b>	<b>DCH18/43C9KS</b>	<b>DCH18/4329KS</b>
												NPN (negative switching)		
												Use the above mentioned part number changing the last number 9 with 8 (ie. DCH12/4308KS)		