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Designation code

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DESIGNATION CODE

Example:

K	J	10	-	M	30	M	B	45	-	D	P	S	-	V1	-	X0000
	1	2		3	4	5	6	7		8	9	10		11		12

1 = Working principle

A	Acoustic		
B	Acceleration sensor		
C	Capacitive		
D	Strain gauge sensor		
H	Hall-effect		
J	Inductive	**JR**	Inductive ring
		JF	Inductive surface
		JG	Inductive slot
		JD	Metalface
M	Magnetoresistive		
N	Inclination sensor		
R	Reed-contact		
W	Angle sensor		

2 = Switching distance / range

3 = Design

D	Ring housing
G	Cylindrical housing without thread
M	Cylindrical housing with metrical thread
Q	Square housing

4 = Housing diameter / edge length

5 = Housing material

A	Aluminium
E	Stainless steel
K	Plastic
M	Brass, nickel plated
T	PTFE

6 = Installation

B	Shielded
N	Non shielded

7 = Tube length

8 = Operating voltage

AZ	AC alternating current voltage
D	DC direct current voltage
VZ	AC/DC all voltages

9 = Type of output signal

AN	Analog	**ANI**	Current output
		ANU	Voltage output
N	NPN	**CAN**	CAN-bus interface
NA	Namur		
P	PNP		
Z	Two wire		

10 = Function

A	Changeover
I	Impulse output
Ö	N.C.
S	N.O.
U	Switchable

11 = Connection

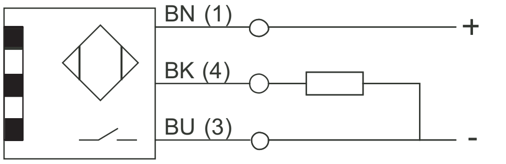
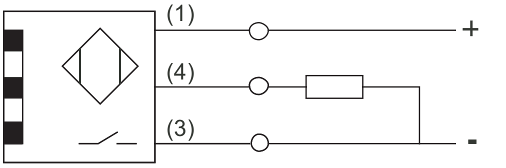
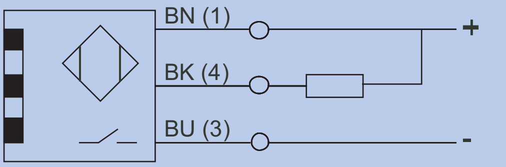
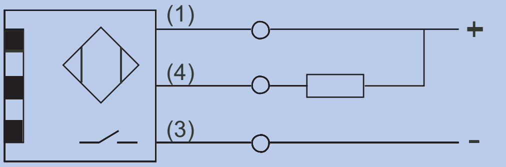
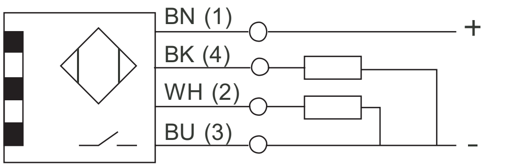
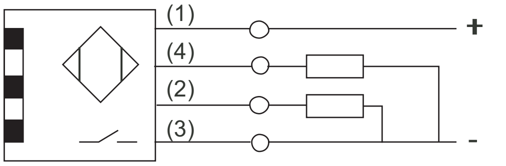
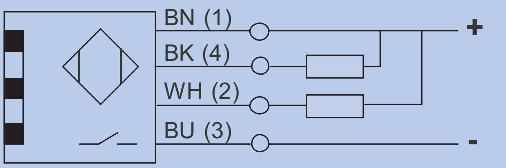
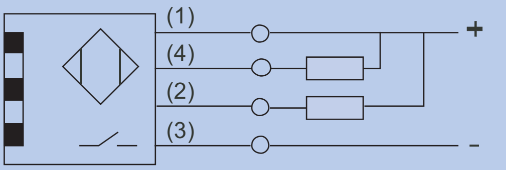
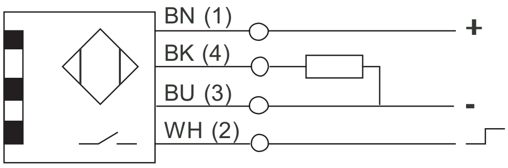
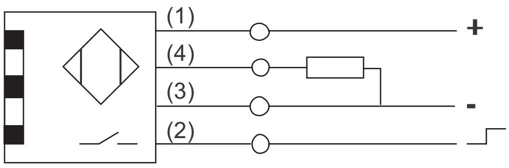
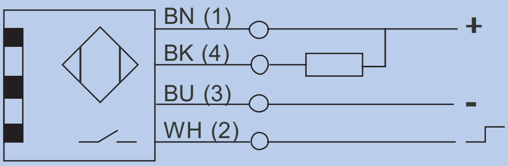
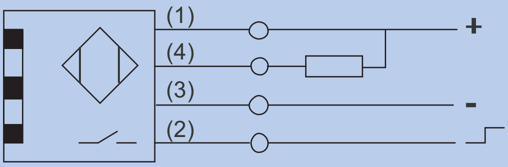
V1	M8 screw-/snap-in
V2	M12 metal
V2/1	M12 plastic
V3	M5 metal
V4	Amphenol Tuchel
V6	Brad Harrison
V7	Valve connector type A
V8	M8 snap-in only
V9	Torson
V10	Valve connector type C
V11	AC connector 1/2" UNF
V12	M18 plastic
VE	Euchner connector
RS232	Data interface
PG	Thread joint PG
Mxx	Thread joint metrical

others as requested

12 = Additional marks

AM	Sensing face in centre
FE	Reduction 1 to steel / iron
HT	High temperature
NF	Reduction 1 to nonferrous metal
SF	Weld field immune
T	Enlarged temperature range
W	Angled sensing face / angled cable exit
X	Customized design with detailled description

CIRCUIT DIAGRAMS

Circuit diagram for	Cable / clamp connection	Connector V1 ... V9
DPI Pulse generator PNP		
DNI Pulse generator NPN		
DPI-D9 Pulse generator PNP 90°		
DNI-D9 Pulse generator NPN 90°		
DPI-D Pulse generator PNP L / H		
DNI-D Pulse generator PNP L / H		

AUTOMATICA

FUNCTIONAL DESCRIPTION

Magnetoresistive sensors are used for measuring rotational speed, directions, distances and angles as well as for controlling mechanical processes. They are of special importance for applications in which inductive sensors are not appropriate due to high switching frequencies or enlarged operating temperatures. Magnetoresistive sensors measure speed etc. on moving gear wheels made of ferromagnetic material (passive targets) and on rotating wheels with alternating magnetic poles (active targets). The operating mode of these sensors is based on a voltage fluctuation in the inside of the sensor caused by an alternating magnetic field.

Passive targets: For the detection of passive targets an internal permanent magnet generates a constant magnetic field in and around the sensor. On the sensor a voltage is impressed on. If a ferromagnetic object (toothed wheel) is moved in the magnetic field, it deflects the magnetic field lines (see illstr. 1). This causes a voltage fluctuation in the sensor. This analog fluctuation passes trigger and amplifier, the sensor provides a digital output signal.

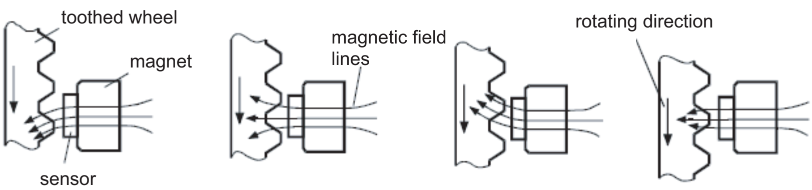


Illustration 1: Deflection of magnetic field lines on the passive target

Active targets:
Here the target itself generates the magnetic field. There is no need of a permanent magnet (see illstr. 2). On the sensor a voltage is impressed on. Due to the rotation of the target the poles and the magnetic field lines on front of the sensor are changing. This leads to a voltage fluctuation in the sensor. The deviation of the signal excites an output pulse.

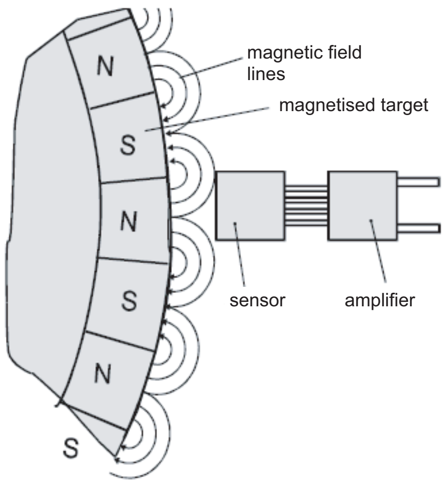


Illustration 2: Changing of the magnetic field lines on the active target

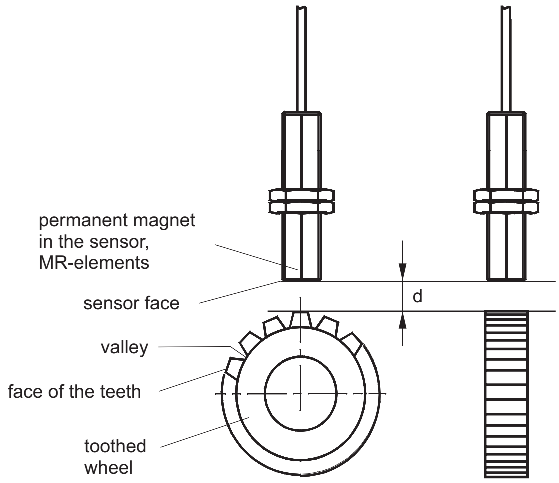
Specific characteristics

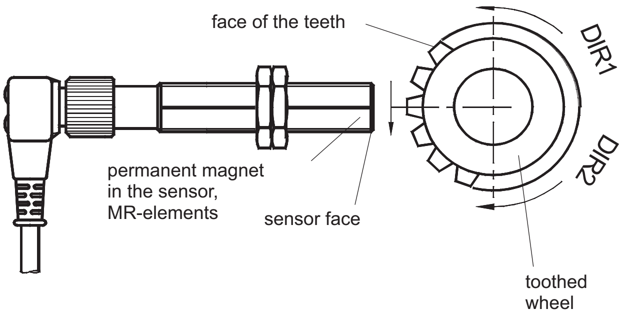
Minimum changes of the magnetic field, for example caused by a gear wheel, can be detected by our version DPI up to a frequency of 20kHz and a switching distance of 2,5mm. The output signal of a magnetoresistive sensor does not depend on the speed. The PNP-output allows a maximum ampacity of 200mA respectively 2 x 100mA. Magnetoresistive sensors work independently of vibrations and provide a high electromagnetic compatibility. They are compatible to inductive proximity switches and optionally available with enlarged temperature range of maximum 120°C.

APPLICATIONS

Speed measuring

A permanent magnet in the sensor generates a constant magnetic field. The MR-element, which is situated in front of the magnet in the sensing head, collects the magnetic field and is biased by it. A ferromagnetic gear wheel rotating in front of the sensing head causes a deflection of the magnetic field lines due to the alternation of tooth and valley. The MR-elements registrate these changes and increase or decrease their resistor depending on the alignment of the field lines. The result is a voltage fluctuation in the sensor. The switching distance d is the space between the sensor face and the face of the teeth. Measurement is realised centrally to the axis of the permanent magnet.



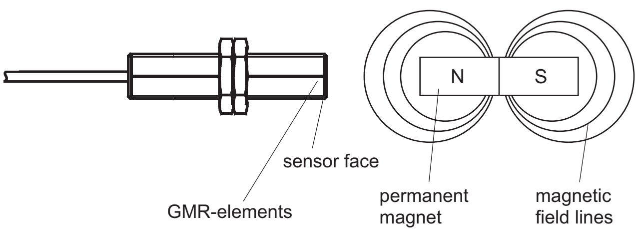


Detection of rotating direction

Pulsotronic magnetoresistive sensors in design DPI-D9 and DPI-D are able to detect the rotating direction. Due to two elements in the threaded tube the sensors DPI-D9 provide two phase shifted rectangular signals. At left handed rotation signal 1 is leading ahead of signal two. At right handed rotation signal 1 is lagging behind signal 2. Thus this version can for instance replace an incremental encoder. The version DPI-D evaluates these signals directly in the sensor: Depending on the rotating direction the sensor exites a permanent HIGH- or LOW pulse. The frequency output is realised by a separate connection. One possible application is for example a speed measurement with detection of the rotating direction: signal 1 indicates the speed, signal 2 the direction by HIGH or LOW.

End-of-travel detection

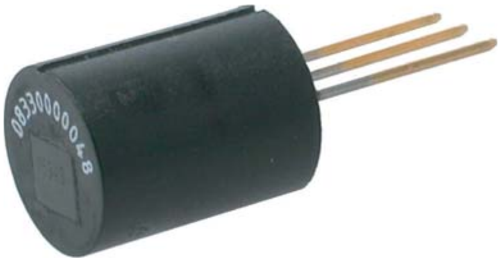
For this kind of applications the permanent magnet is situated outside of the sensor. Measurement is realised by the changings of the magnetic field in front of the sensing head. Similar to speed measuring and the detection of the rotating direction the working principle is based on a voltage fluctuation in the sensor due to an external magnetic field. Hereby GMR-elements are used that are able to detect even smallest magnetic fields. Depending on the distance between permanent magnet and sensor the flux density in the MR-element changes. This leads to a voltage fluctuation in the sensor because of the variation of the resisitors.



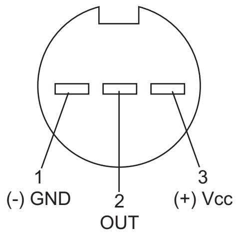
CYLINDER G10

Technical data

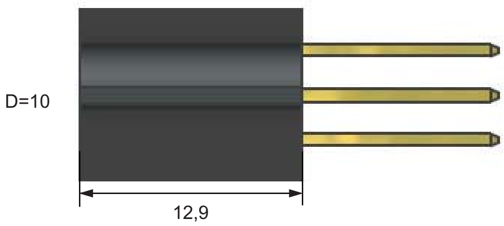
Article number	Designation
08330000048	**KM0,5-G10KB13-ANU-X0101** (compatible to FP 210 from Infineon)
Mounting	shielded
Switching distance	0,5mm (+/- 0,2mm)
Reference target	transmitter wheel module 1
Output signal	analog, sinusoidal
Operating voltage U_b	4,1 ... 6,2V DC
Max. output current	+ / - 4mA
Usable switching frequency	50.000Hz
Operating temperature T_a	-40°C ... +85°C
DC-Offset	$U_{o\text{-}dyn}$ = 2,50V +/- 10% (U_B 0 5,00V)
Protection class	IP67
Housing material	Terez 7500 GF35 H
Connection	3 x PIN (L = 13,5mm)

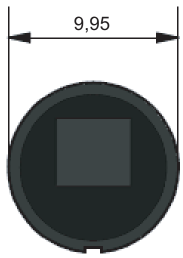


Connector pin assignment



Dimensions





all data in mm

AUTOMATICA

CYLINDER M12

General data

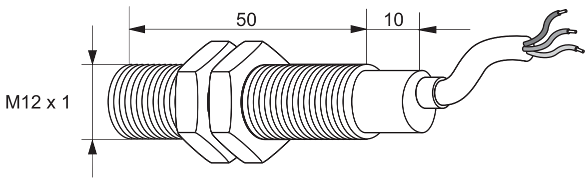
Mounting	shielded
Switching distance	1,5mm
Output signal	rectangular pulse
Operating voltage U_b	10 ... 30V DC
Voltage drop U_d	≤ 1,5V
Module	0,8
Off-state current I_0	≤ 10mA
Operating temperature T_a	-25°C ... +70°C
Temperature drift	≤ 10% (Sr)
Protection class	IP67
EMV-standard	according to IEC 60947-5-2
Switching state	LED
Housing material	brass, nickel-plated *
Front cap	PA 6.6

* On request also with stainless steel housing and enlarged temperature range up to 120 °C.

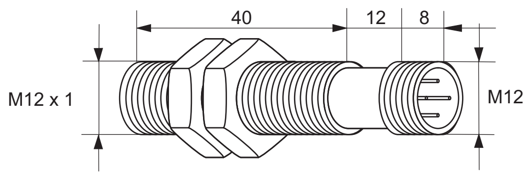
The selection chart for these sensors is shown on the following page.

Dimensions

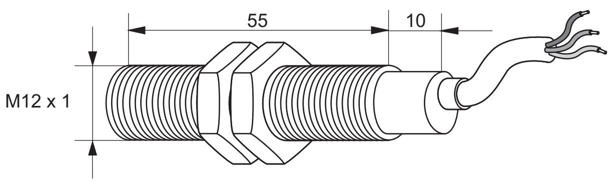
A)



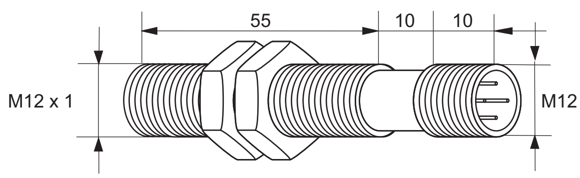
A1)



B)



B1)



all data in mm

AUTOMATICA

CYLINDER M12

Selection chart

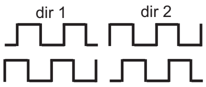
Article number	Designation standard Output signal (1)	Output signal pulse	Usable Switching frequency	Max. load current * = per output	Connection	Drawing (previous page)
08330000017	**KM1,5-M12MB-DPI**	**PNP**	0 - 20.000Hz	≤ 200mA	cable	A
08330000117	**KM1,5-M12MB-DNI**	**NPN**	0 - 20.000Hz	≤ 200mA	cable	A
08330000045	**KM1,5-M12MB-DPI-V2**	**PNP**	0 - 20.000Hz	≤ 200mA	connector	A1
08330000145	**KM1,5-M12MB-DNI-V2**	**NPN**	0 - 20.000Hz	≤ 200mA	connector	A1

Cable: 2m cable PVC 3 x 0,34mm²
Connector: connector M12 4-pole

(1) f out 

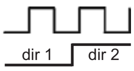
	Designation Phase quadrature Output signal (2)					
08330000011	**KM1,5-M12MB-DPI-D9**	**PNP**	2 - 20.000Hz	≤ 100mA*	cable	B
08330000033	**KM1,5-M12MB-DNI-D9**	**NPN**	2 - 20.000Hz	≤ 100mA*	cable	B
08330000039	**KM1,5-M12MB-DPI-D9-V2**	**PNP**	2 - 20.000Hz	≤ 100mA*	connector	B1
08330000139	**KM1,5-M12MB-DNI-D9-V2**	**NPN**	2 - 20.000Hz	≤ 100mA*	connector	B1

Cable: 2m cable PVC 4 x 0,25mm²
Connector: connector M12 4-pole

(2) f out 1
f out 2


	Designation Low/High flank Output signal (3)					
08330000016	**KM1,5-M12MB-DPI-D**	**PNP**	2 - 20.000Hz	≤ 100mA*	cable	B
08330000116	**KM1,5-M12MB-DNI-D**	**NPN**	2 - 20.000Hz	≤ 100mA*	cable	B
08330000015	**KM1,5-M12MB-DPI-D-V2**	**PNP**	2 - 20.000Hz	≤ 100mA*	connector	B1
08330000115	**KM1,5-M12MB-DNI-D-V2**	**NPN**	2 - 20.000Hz	≤ 100mA*	connector	B1

Cable: 2m cable PVC 4 x 0,25mm²
Connector: connector M12 4-pole

(3) f out 1
f out 2


Other cable lengths as requested.

CYLINDER M18

General data

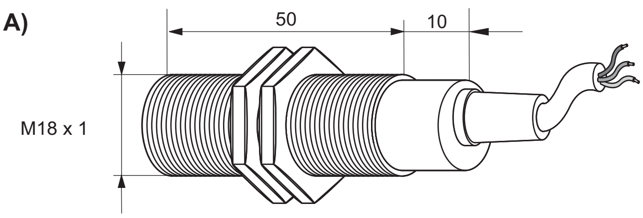
Mounting	shielded
Switching distance	2,5mm
Output signal	rectangular pulse
Operating voltage U_b	10 ... 30V DC
Voltage drop U_d	≤ 1,5V
Module	1,5
Off-state current I_0	≤ 10mA
Operating temperature T_a	-25°C ... +70°C
Temperature drift	≤ 10%
Protection class	IP67
EMV-standard	according to IEC 60947-5-2
Switching state	LED
Housing material	brass, nickel-plated*
Front cap	PA 6.6

* On request also with stainless steel housing and enlarged temperature range up to 120 °C.

The selection chart for these sensors is shown on the following page.

Dimensions

A)



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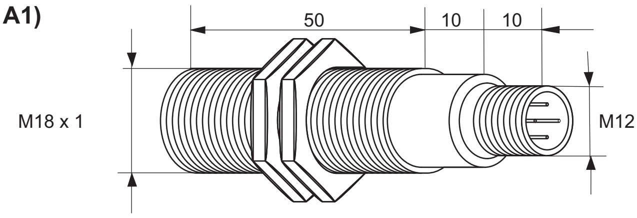

all data in mm

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CYLINDER M18

Selection chart

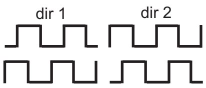
Article number	Designation standard Output signal (1)	Output signal pulse	Usable Switching frequency	Max. load current * = per output	Connection	Drawing (previous page)
08330000044	**KM2,5-M18MB-DPI**	**PNP**	0 - 20.000Hz	≤ 200mA	cable	A
08330000144	**KM2,5-M18MB-DNI**	**NPN**	0 - 20.000Hz	≤ 200mA	cable	A
08330000008	**KM2,5-M18MB-DPI-V2**	**PNP**	0 - 20.000Hz	≤ 200mA	connector	A1
08330000108	**KM2,5-M18MB-DNI-V2**	**NPN**	0 - 20.000Hz	≤ 200mA	connector	A1

Cable: 2m cable PVC 3 x 0,34mm²
Connector: connector M12 4-pole

(1) f out 

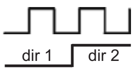
	Designation Phase quadrature Output signal (2)					
08330000012	**KM2,5-M18MB-DPI-D9**	**PNP**	2 - 20.000Hz	≤ 100mA*	cable	A
08330000112	**KM2,5-M18MB-DNI-D9**	**NPN**	2 - 20.000Hz	≤ 100mA*	cable	A
08330000031	**KM2,5-M18MB-DPI-D9-V2**	**PNP**	2 - 20.000Hz	≤ 100mA*	connector	A1
08330000131	**KM2,5-M18MB-DNI-D9-V2**	**NPN**	2 - 20.000Hz	≤ 100mA*	connector	A1

Cable: 2m cable PVC 4 x 0,25mm²
Connector: connector M12 4-pole

(2) f out 1
f out 2


	Designation Low/High flank Output signal (3)					
08330000025	**KM2,5-M18MB-DPI-D**	**PNP**	2 - 20.000Hz	≤ 100mA*	cable	A
08330000125	**KM2,5-M18MB-DNI-D**	**NPN**	2 - 20.000Hz	≤ 100mA*	cable	A
08330000026	**KM2,5-M18MB-DPI-D-V2**	**PNP**	2 - 20.000Hz	≤ 100mA*	connector	A1
08330000126	**KM2,5-M18MB-DNI-D-V2**	**NPN**	2 - 20.000Hz	≤ 100mA*	connector	A1

Cable: 2m cable PVC 4 x 0,25mm²
Connector: connector M12 4-pole

(3) f out 1
f out 2


Other cable lengths as requested.