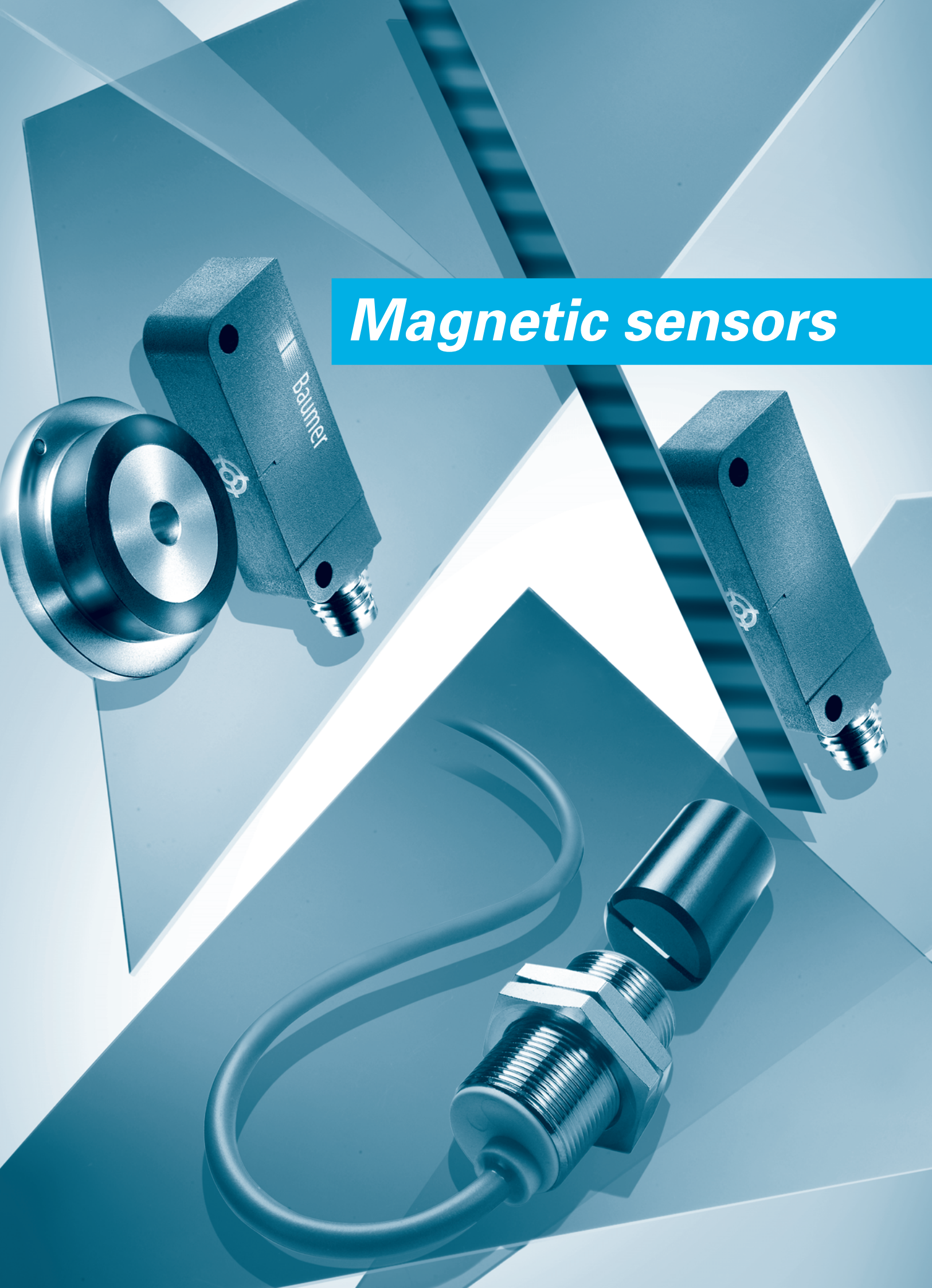


Magnetic sensors

Hall sensors
Magnetic sensors

				
type		**IHRM/MHRM**	**MDFM**	**MDRM**
typical use		hall sensor to sense moving ferromagnetic objects such as toothed wheels, gears or toothed racks	as non-contact electronic potentiometer magnetic scanning principle	as non-contact electronic potentiometer magnetic scanning principle
features		protection class IP 68 temperature range -40...+85 °C -40...+120 °C	rectangular construction with plug	cylindrical construction with cable I and U output
voltage supply		8 - 28 VDC	5 VDC ±5%	5 / 24 VDC ±5%
output signals		A & B	2 Vpp (sin, cos)	2 Vpp (sin, cos) / lin 120°, 160°
max. resolution / min. gear size		module 1	10 bit	10 bit
max. switching frequency		1 - 20'000 Hz	20 kHz	20 kHz
dimensions	housing (mm)	M12 x 1	20 x 32	M18 x 1
	depth (mm)	50/60	10	30
page		**176 / 177**	**178**	**178 / 180**

				
type		**MDFK 08 / MLFK 08**	**MDFK 10 / MLFK 10**	
typical use		**MDFK 08** to capture rotational speed as well as direction of rotation **MLFK 08** to capture linear movement as well as direction of movement	**MDFK 10** to capture rotational speed as well as direction of rotation **MLFK 10** to capture linear movement as well as direction of movement	
features		2 and 3 channel versions	max. resolution 5µm	
voltage supply		5 VDC / 8 - 30 VDC	5 VDC / 8 - 28 VDC	
output signals		square pulses	square pulses	
max. resolution / min. gear size		512 Imp. / 25 Imp.	2'048 Imp. / 100 Imp.	
max. switching frequency		3,2 MHz	1 MHz / 400 kHz	
dimensions	housing (mm)	45 x 8	40 x 10	
	depth (mm)	15	15	
page		**182 / 184 / 186**	**188 / 190**	

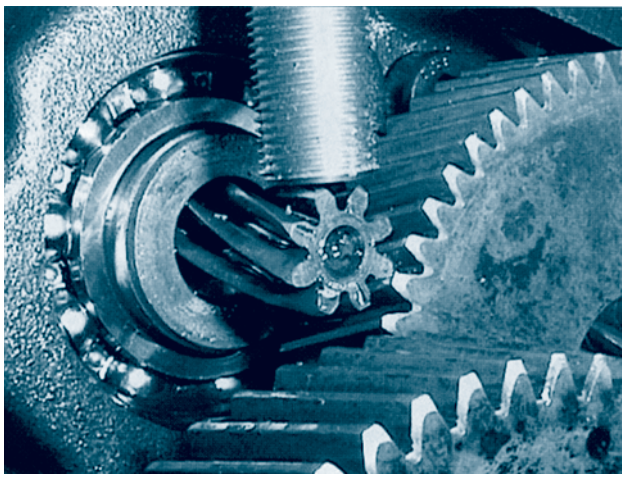
features

- for sensing moving ferromagnetic objects
- detects toothed wheels, gears and toothed racks

description

IHRM sensors employ a magnetically biased semiconductor Hall element to sense moving ferromagnetic objects. They are preferably used to scan toothed racks as well as gear wheels in gear boxes. The housing made of stainless steel 1.4305 protects the electronics against external influences such as oil and general aggressive environments.

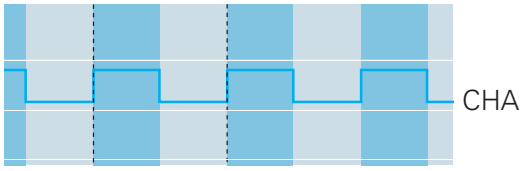
application



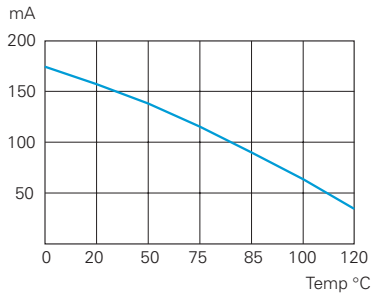
Hall sensors are used, for instance, as tachometer generators in the following situations:

- in dusty and damp environments, e.g. outdoor use, in agriculture, building machinery, etc.
- in textile, tobacco and cement processing (dust, vibration, smoke)
- integrated in portable devices, because of low power consumption, compact construction and shock resistance

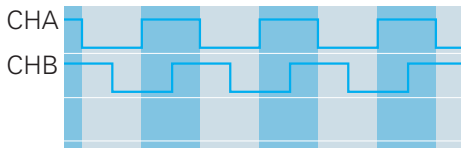
output signal IHRM (One channel)



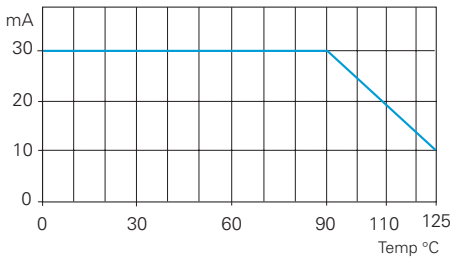
load current reduction (IHRM 12P1501)



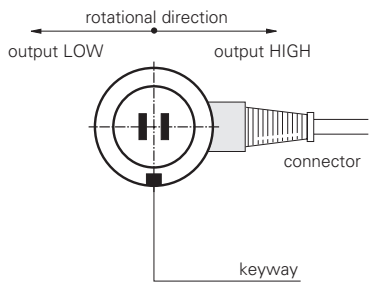
output signal MHRM (Two channel)



load current reduction (MHRM 12G2501)



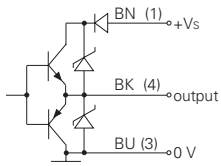
rotational direction



The Hall sensors with keyway must be mounted in the specified orientation.

Hall sensors
MHRM

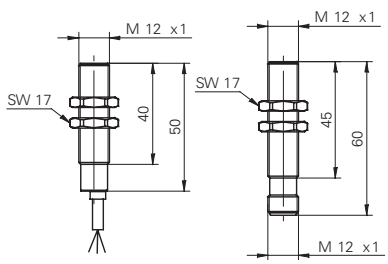
dimensions	12 mm	
air gap for module 2	1,8 mm	

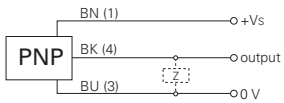
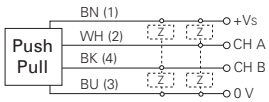
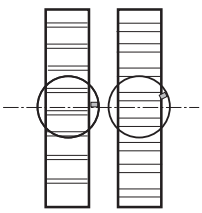
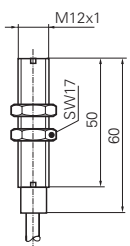
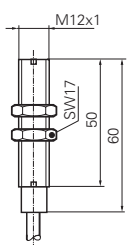


Push-Pull

push-pull	MHRM 12G5501	MHRM 12G5501/S14
output	1 channel	

technical data		
voltage supply	8 - 28 VDC	
supply current	20 mA	
max. switching current	30 mA	
max. switching frequency	0 - 15'000 Hz	
voltage drop	< 5 VDC (IOUT=20mA)	
short-circuit protection	yes	
reverse polarity protection	yes, against GND	
min. gear size	module 1	
air gap for module 1	0,7 mm	
air gap for module 2	1,8 mm	
gear material	ferrous metal	
alignment aid	non defined mounting	
temperature range	-40...+85 °C	
housing material	brass nickel plated	
connection cable	PUR	
protection class	IP 67	
connector options	ES 14, ES 18, ESW 33, ESG 34	

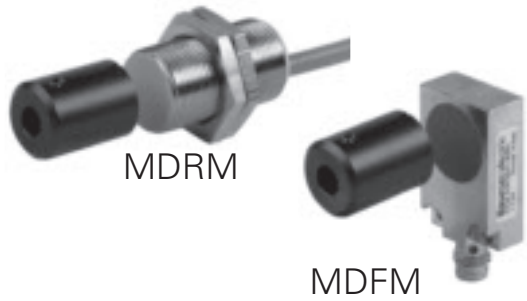


dimensions	12 mm	12 mm
Air gap for module 3	2,5 mm	1,0 mm
IHRM 12P1501  **output NPN (IOUT = 20 mA) possible** **MHRM 12G2501** 		
PNP	**IHRM 12P1501**	**MHRM 12G2501**
output	**1 channel**	**2 channel**
technical data		
voltage supply	8 - 28 VDC	8 - 28 VDC
supply current	20 mA	20 mA
max. switching current	see load current reduction diagram	see load current reduction diagram
max. switching frequency	1 - 20'000 Hz	0 - 15'000 Hz
voltage drop	< 3 VDC	< 5 VDC
output A (CH A)	PNP	push-pull
output B (CH B)	-	push-pull
short-circuit protection	yes	yes
reverse polarity protection	yes	yes, against GND
min. gear size	module 1	module 1
air gap for module 1	1 mm	0,5 mm
air gap for module 3	2,5 mm	1,0 mm
gear material	ferrous metal	ferrous metal
installation aid	keyway	keyway
temperature range	-40...+120 °C	-40...+120 °C
housing material	stainless steel (1.4305)	stainless steel (1.4305)
connection cable	teflon	teflon
protection class sensing face	IP 68 / 20 bar	IP 68 / 20 bar
protection class sensor	IP 67	IP 67
mounting MHRM 12G2501 **Mod 1 Mod 2** 		

Magnetic sensors
MDRM/MDFM

features

- can replace mechanical potentiometers
- sine/cosine output signals
- high protection class
- cylindrical and rectangular design



description

The MDRM/MDFM miniature encoders have been designed to replace mechanical potentiometers in certain motion control applications. They are magnetically controlled by a small rotor closely positioned in front of the active sensing face. The encoders provide 2 sinusoidal signals. Further processing of the signals, having a maximum resolution of 10 bits, is easily accomplished using a standard PLC. The non-contact potentiometers offer IP 67 protection which makes them ideal components for an array of applications in harsh industrial environments involving wide working temperature ranges. The products can be provided either in threaded barrel type housings or in rectangular enclosures.

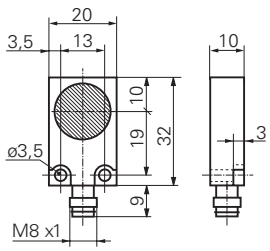
part numbers

output signals sine/cos cylindrical design M18 x 1	**MDRM 18U4501** **MDFM 20U4501/S35A**
magnetic rotor	**123344**

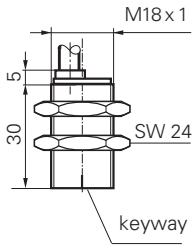
technical data	sine/cos			
voltage supply	5 VDC ±5%			
supply range	typ. 10 mA			
output signals	2 Vpp (sine, 2 periods per rev.)			
load	≥ 400 Ω			
offset voltage	2,5 VDC ±5%			
linearity error	typ. 2,5%			
temperature range	-20...+85 °C			
temperature coefficient	-0,3%/K			
max. switching frequency	20 kHz			
housing size	M18 x 1 x 30 32 x 20 x 10			
mounting rotor	hollow shaft ø 6 x 15 mm			
installation tolerance	longitudinal ±0,5 mm horizontal ±0,5 mm			
zero point adjustment	coarse: by keyway fine: electronically			
protection class	IP 67			
material sensor material rotor	brass nickel plated aluminium anodized			

dimensions

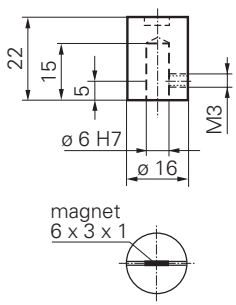
MDFM
sine/cos



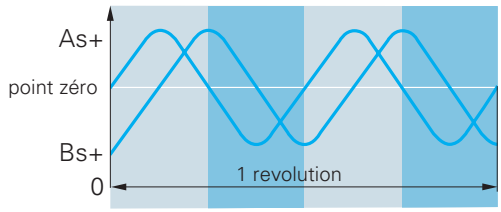
MDRM
sine/cos



rotor



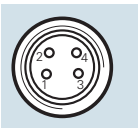
output signals sine/cos



cable assignment		sine/cos
color	abbreviation	signals
brown	BN	+Vs
black	BK	As+
blue	BU	0 V
white	WH	Bs+

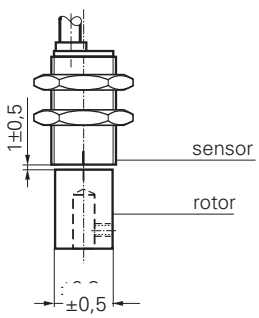
assignment connector

for connector version **/S35A** (MDFM only)

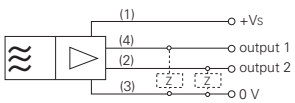


pin nr.	signals
1	+Vs
2	output Bs+
3	0 V
4	output As+

mounting



connection diagram



accessories

connector 2 m PUR, halogen-free	
right angle	part nr. ESW 31AH0200
straight	part nr. ESG 32AH0200
rotor	part nr. 123344
	see end of chapter

Magnetic sensors
MDRM

features

- can replace mechanical potentiometers
- linear output signals
- high protection class
- cylindrical design

description

The MDRM miniature encoders have been designed to replace mechanical potentiometers in certain motion control applications. They are magnetically controlled by a small rotor closely positioned in front of the active sensing face. The encoders provide a DC voltage signal which is linear over +/- 80° (+/- 60° for current output). Further processing of the signals, having a maximum resolution of 10 bits, is easily accomplished using a standard PLC. The non-contact potentiometers offer IP 67 protection which makes them ideal components for an array of applications in harsh industrial environments involving wide working temperature ranges.

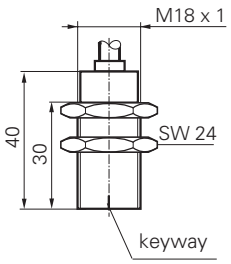
part numbers

output signals linear cylindrical design M18 x 1	
+Vs 5 VDC / Vout 0,5 - 4,5 VDC	**MDRM 18U9501**
+Vs 24 VDC / Vout 1 - 9 VDC	**MDRM 18U9524**
+Vs 24 VDC / Iout 4 - 20 mA	**MDRM 18I9524**
magnetic rotor	**123344**

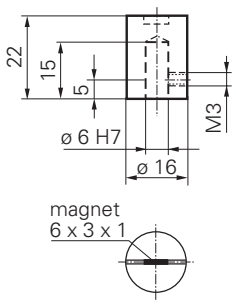
technical data	MDRM 18U9501	MDRM 18U9524	MDRM 18I9524
voltage supply	5 VDC ±5%	12 - 30 VDC	10 - 30 VDC
supply current	< 20 mA	< 30 mA	< 50 mA
output signals	0,3 - 4,7 VDC	1 - 9 VDC	4 - 20 mA
load	≥ 400 Ω	> 3,3 k Ω	0,5 k Ω @ 15 VDC 1 k Ω @ 25 VDC
linearity	±80° linear	±80° linear	±60° linear
linearity error	2,5%	±2,5%	±2,5%
temperature range	-20...+85 °C	-25...+85 °C	-25...+85 °C
temperature drift full scale (FS)	±2%	±2%	±2%
max. switching frequency	20 kHz	20 kHz	20 kHz
housing size	M18 x 1 x 40	M18 x 1 x 40	M18 x 1 x 40
mounting rotor	hollow shaft ø 6 x 15 mm	hollow shaft ø 6 x 15 mm	hollow shaft ø 6 x 15 mm
installation	longitudinal ±0,3 mm horizontal ±0,3 mm	longitudinal ±0,5 mm horizontal ±0,5 mm	longitudinal ±0,5 mm horizontal ±0,5 mm
zero point adjustment	coarse: by keyway fine: electronically	coarse: by keyway fine: electronically	coarse: by keyway fine: electronically
protection class	IP 67	IP 67	IP 67
material sensor material rotor	brass nickel plated alu anodized	brass nickel plated alu anodized	brass nickel plated alu anodized

dimensions

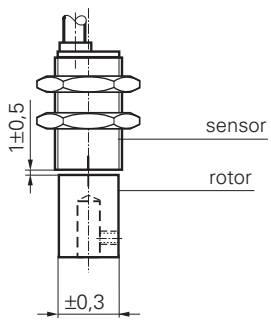
sensor



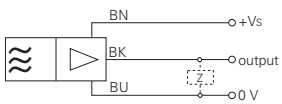
rotor



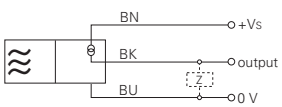
mounting



connection diagrams

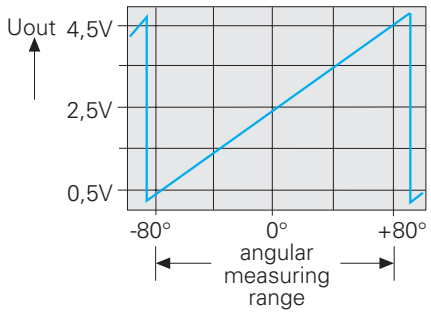


voltage output

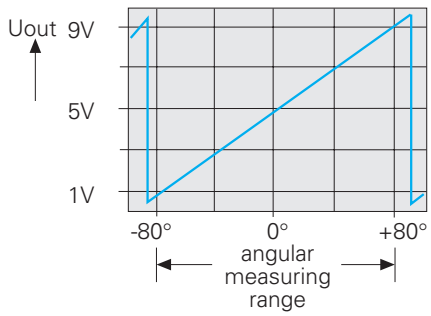


current output

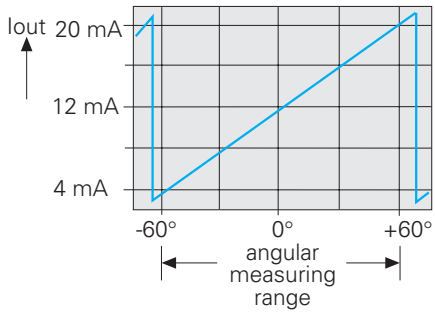
linear output signal 0,5 - 4,5 VDC



linear output signal 1 - 9 VDC



linear output signal 4 - 20 mA



cable assignment		linear
color	abbreviation	signals
brown	BN	+Vs
black	BK	Out
blue	BU	0 V
white	WH	-

accessory	
magnetic rotor	part nr. 123344 see end of chapter

Magnetic sensors for rotary applications
MDFK 08, 2 channel

features

- competitively priced angular measurement solution using ring magnet or magnetic rotor
- 2 channel version
- channel A/B 90° shifted
- 8-/16-fold interpolation

description

Magnet encoders provide angular information by non-contact tracking of a multi-pole ring magnet based on a magneto resistive sensor. Depending on the angle between the sensor and the magnetic field, the device generates analog signals containing the angular information. These signals are further fed into an electronics circuit for additional conditioning and processing. The rugged and easy to mount sensor generates 4'096 steps when used in conjunction with a ring magnet of 64 poles. Angular resolution of the device can be partly determined by selecting appropriate ring magnets. The IP 67 protected sensor contains absolutely no moving parts and is not subject to any wear when in operation. Air gap between magnet and sensor can be up to 0,8 mm without sacrificing system accuracy.

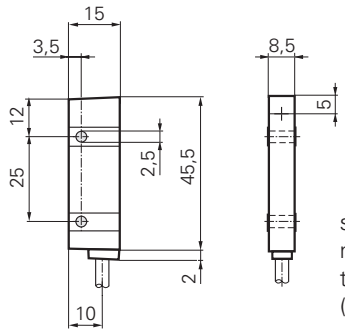
part numbers

8-fold interpolation	
2 channel push-pull	**MDFK 08G2101**
2 channel complementary RS 422	**MDFK 08T7101**
16-fold interpolation	
2 channel push-pull	**MDFK 08G2124/N16**
2 channel complementary RS 422	**MDFK 08T7105/N16**

technical data	MDFK 08G2101	MDFK 08T7101	MDFK 08G2124/N16	MDFK 08T7105/N16
	push-pull	**RS 422**	**push-pull**	**RS 422**
voltage supply	8 - 30 VDC	5 VDC ±5%	8 - 28 VDC	5 VDC ±5%
supply current	35 mA	55 mA	30 mA	20 mA
switching current	30 mA	RS 422	50 mA	RS 422
max. switching frequency	160 kHz	160 kHz	3,2 MHz	3,2 MHz
voltage drop	< 4 VDC (I_{OUT} = 20 mA)	RS 422	< 2 VDC (I_{OUT} = 20 mA)	RS 422
output circuit A/B	push-pull	TTL (RS 422)	push-pull	TTL (RS 422)
output signal	CH A/B	CH A/$\overline{A}$/B/$\overline{B}$	CH A/B	CH A/$\overline{A}$/B/$\overline{B}$
air gap	max. 0,8 mm	max. 0,8 mm	max. 0,6 mm	max. 0,6 mm
resolution	256 ppr ring magnet 32 poles	256 ppr ring magnet 32 poles	512 ppr ring magnet 32 poles	512 ppr ring magnet 32 poles
interpolation	8-fold*	8-fold*	16-fold*	16-fold*
max. measuring steps	1'024 steps	1'024 steps	2'048 steps	2'048 steps
short-circuit protection	yes	yes	yes	yes
reverse polarity protection	yes	no	yes	no
temperature range	-25...+85 °C	-25...+85 °C	-25...+85 °C	-25...+85 °C
housing material	PC	PC	PC	PC
max. protection class	IP 67	IP 67	IP 67	IP 67
connection cable PUR	4 x 0,25 mm²	6 x 0,14 mm²	4 x 0,25 mm²	6 x 0,14 mm²

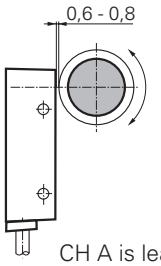
*lower interpolation rates on request

dimensions



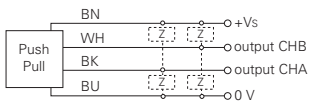
sensor can also be mounted with self-tapping special screws (M3)

mounting and sense of rotation

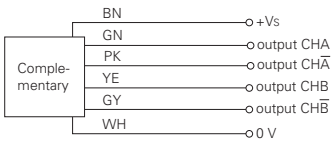


CH A is leading CH B by 90° when rotating CW.

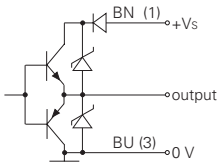
2 channel push-pull



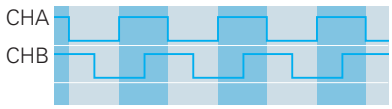
2 channel complementary RS 422



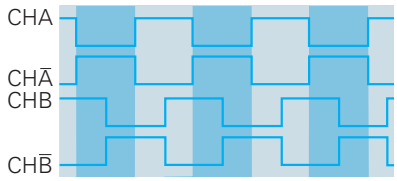
connection diagram push-pull



pin assignment 2 channel push-pull



pin assignment 2 channel RS 422



pin assignment 2 channel push-pull

color	abbreviation	signals
brown	BN	+Vs
blue	BU	GND
black	BK	CH A
white	WH	CH B

pin assignment 2 channel complementary RS 422

color	abbreviation	signals
brown	BN	+Vs
green	GN	CH A
pink	PK	CH Ā
yellow	YE	CH B
grey	GY	CH B̄
white	WH	GND

accessories

see end of chapter

Magnetic sensors for rotary applications
MDFK 08, 3 channel

features

- competitively priced angular measurement solution using ring magnet or magnetic rotor
- 3 channel version
- channel A/B 90° shifted and zero pulse
- 10-/16-fold interpolation

description

Magnet encoders provide angular information by non-contact tracking of a multi-pole ring magnet based on a magneto resistive sensor. Depending on the angle between the sensor and the magnetic field, the device generates analog signals containing the angular information. These signals are further fed into an electronics circuit for additional conditioning and processing. The rugged and easy to mount sensor generates 2'048 steps when used in conjunction with a ring magnet of 32 poles. Angular resolution of the device can be partly determined by selecting appropriate ring magnets. The IP 67 protected sensor contains absolutely no moving parts and is not subject to any wear when in operation. Air gap between magnet and sensor can be up to 0,5 mm without sacrificing system accuracy.

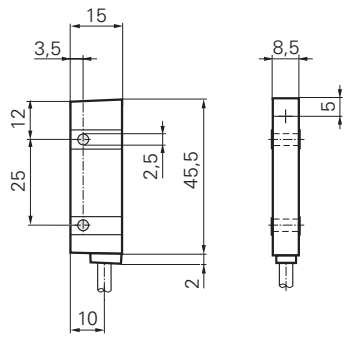
part numbers

3 channel push-pull	**MDFK 08G8124**
3 channel complementary RS 422	**MDFK 08T8101**

technical data	MDFK 08G8124	MDFK 08T8101		
	push-pull	**RS 422**		
voltage supply	8 - 28 VDC	5 VDC ±5%		
supply current	30 mA	30 mA		
switching current	50 mA	RS 422		
max. switching frequency	3,2 MHz	160 kHz		
voltage drop	< 2 VDC (I_{OUT} = 50 mA)	RS 422		
output circuit A/B	push-pull	TTL (RS 422)		
output signal	CH A/B/N	CH A/$\overline{A}$/B/$\overline{B}$/N/$\overline{N}$		
air gap	max. 0,5 mm	max. 0,5 mm		
resolution	512 ppr ring magnet 32 poles	320 ppr ring magnet 32 poles		
interpolation	16-fold*	10-fold*		
max. measuring steps	2'048 steps	1'280 steps		
short-circuit protection	yes	yes		
reverse polarity protection	yes	no		
temperature range	-25...+85 °C	-25...+85 °C		
housing material	PC	PC		
max. protection class	IP 67	IP 67		
connection cable PUR	5 x 0,14 mm²	8 x 0,14 mm²		

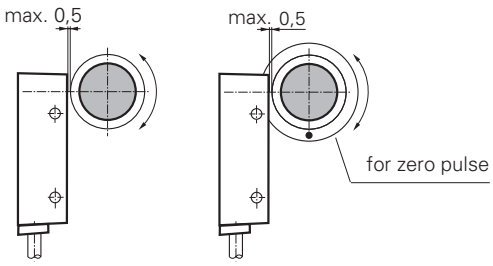
*lower interpolation rates on request

dimensions



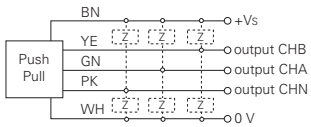
sensor can also be mounted with self-tapping special screws (M3)

montage and sense of rotation

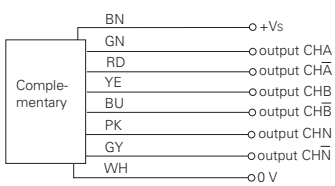


CH A is leading CH B by 90° when rotating CW.

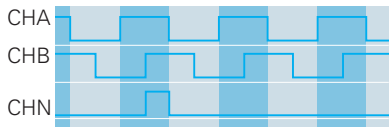
3 channel push-pull (with zero pulse)



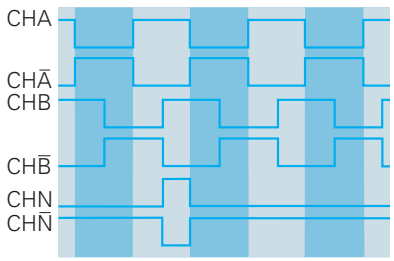
3 channel complementary RS 422 (with zero pulse)



output signals 3 channel push-pull



output signals 3 channel RS 422



3 channel version with zero-pulse (CHN/CHN̄)

pin assignment 3 channel push-pull

color	abbreviation	signals
brown	BN	+Vs
green	GN	CH A
yellow	YE	CH B
pink	PK	CH N
white	WH	GND

pin assignment 3 channel complementary RS 422

color	abbreviation	signals
brown	BN	+Vs
green	GN	CH A
red	RD	CH Ā
yellow	YE	CH B
blue	BU	CH B̄
pink	PK	CH N
grey	GY	CH N̄
white	WH	GND

accessories

magnet rotor 32 poles (zero pulse)	part nr. 132124 see end of chapter
magnet rotor 64 poles (zero pulse)	part nr. 150984 see end of chapter
mounting bracket	part nr. 134683 see end of chapter

Magnetic sensors for linear applications
MLFK 08, 2 channel

features

- non-contact, magnetic linear measuring sensor
- low cost alternative to linear encoders
- max. resolution 10 µm with external quadrature electronics
- 2 channel version
- max. displacement speed 40 m/s

description

MLFK magnet encoders provide linear position information by non- contact tracking of a magnetic strip based on a magneto resistive sensor. Depending on the angle between the sensor and the magnetic field, the device generates analog signals containing the angular information. These signals are further fed into an electronics circuit for additional conditioning and processing. The rugged and easy to mount linear encoder generates 25 pulses per pole (1 mm width) when used in conjunction with a magnetic strip. The IP 67 protected sensor contains absolutely no moving parts and is not subject to wear when in operation.

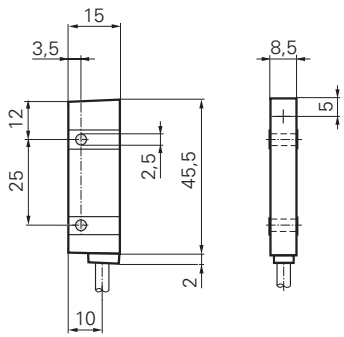
part numbers

2 channel push-pull	**MLFK 08G2101**
2 channel complementary (RS 422)	**MLFK 08T7101**
2 channel complementary (RS 422) high resolution	**MLFK 08T7105/N16X**
2 channel complementary (RS 422) very high resolution	**MLFK 08T7105/N25X**

technical data	MLFK 08G2101	MLFK 08T7101	MLFK 08T7105/N16X	MLFK 08T7105/N25X
	push-pull	**RS 422**	**RS 422**	**RS 422**
voltage supply	8 - 30 VDC	5 VDC ±5%	5 VDC ±5%**	5 VDC ±5%**
supply current	35 mA	55 mA	20 mA	20 mA
switching current	30 mA	RS 422	RS 422	RS 422
max. switching frequency	160 kHz	160 kHz	3,2 MHz	3,2 MHz
voltage drop	< 4 VDC (I_{OUT} = 20 mA)	RS 422	RS 422	RS 422
output circuit A/B	push-pull	TTL (RS 422)	TTL (RS 422)	TTL (RS 422)
output signal	CH A/B	CH A/$\overline{A}$/B/$\overline{B}$	CH A/$\overline{A}$/B/$\overline{B}$	CH A/$\overline{A}$/B/$\overline{B}$
air gap	max. 1,0 mm	max. 1,0 mm	max. 0,3 mm	max. 0,3 mm
resolution	8 ppr	8 ppr	16 ppr	25 ppr
interpolation	8-fold*	8-fold*	16-fold*	25-fold*
max. measuring steps	32 steps	32 steps	64 steps	100 steps
short-circuit protection	yes	yes	yes	yes
reverse polarity protection	yes Vs to GND	no	no	no
temperature range	-25...+85 °C	-25...+85 °C	-25...+85 °C	-10...+65 °C
housing material	PC	PC	PC	PC
max. protection class	IP 67	IP 67	IP 67	IP 67
connection cable PUR	4 x 0,25 mm²	6 x 0,14 mm²	6 x 0,14 mm²	6 x 0,14 mm²
matching magnetic strip	128606	128606	147044	147044

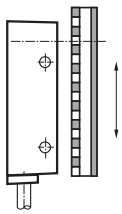
*lower interpolation rates on request **24 VDC version on request

dimensions

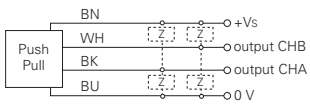


sensor can also be mounted with special self-tapping screws (M3)

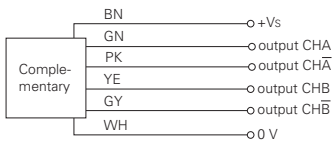
mounting and direction of travel



2 channel push-pull

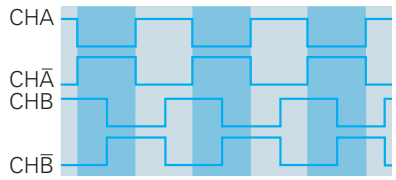


2 channel complementary RS 422



output signals 2 channel push-pull

output signals 2 channel RS 422



pin assignment 2 channel push-pull

color	abbreviation	signals
brown	BN	+Vs
blue	BU	GND
black	BK	CH A
white	WH	CH B

pin assignment 2 channel complementary RS 422

color	abbreviation	signals
brown	BN	+Vs
green	GN	CH A
pink	PK	CH Ā
yellow	YE	CH B
grey	GY	CH B̄
white	WH	GND

accessories

magnetic strip

pole width 2 mm, strip width 10 mm, height max. 1,4 mm

length	
50 mm	part nr. 128662
150 mm	part nr. 128663
300 mm	part nr. 128664
cut to length	part nr. 128606

pole width 1 mm, strip width 10 mm, height max. 1,4 mm

length	
cut to length	part nr. 147044

for more information see end of chapter

Magnetic sensors for rotary applications
MDFK 10, 3 channel

features

- competitively priced angular measurement solution using ring magnet or magnetic rotor
- 3 channel version
- channel A/B 90° shifted
- 64-fold interpolation

description

Magnet encoders provide angular information by non-contact tracking of a multi-pole ring magnet based on a magneto resistive sensor. Depending on the angle between the sensor and the magnetic field, the device generates analog signals containing the angular information. These signals are further fed into an electronics circuit for additional conditioning and processing. The rugged and easy to mount sensor generates 8'196 steps when used in conjunction with a ring magnet of 32 poles. The MDFK 10 range of sensors provides a high degree of installation flexibility due to the position of the magneto-resistive pick-up being at the center of the device's face. An important fact when space is at a premium. All 10-series sensors feature a screened PUR cable.

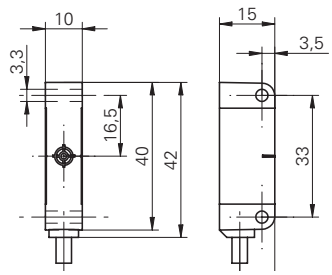
part numbers

64-fold interpolation	
3 channel push-pull	**MDFK 10G8124/N64**
3 channel complementary RS 422	**MDFK 10T8105/N64**

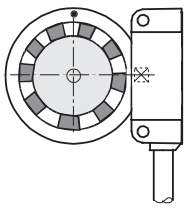
technical data	MDFK 10G8124/N64	MDFK 10T8105/N64		
	push-pull	**RS 422**		
voltage supply	8 - 28 VDC	5 VDC ±5%		
supply current	40 mA	40 mA		
switching current	50 mA	50 mA		
max. switching frequency	1 MHz	1 MHz		
voltage drop	< 4 VDC (I_{OUT} = 20 mA)	–		
output circuit A/B	3 channel, push-pull	RS 422		
output signal	A/B/N	CH A/$\overline{A}$/B/$\overline{B}$/N/$\overline{N}$		
air gap	max. 0,6 mm	max. 0,6 mm		
resolution	2048 ppr ring magnet 32 poles	2048 ppr ring magnet 32 poles		
interpolation	64-fold*	64-fold*		
max. measuring steps	8192 steps	8192 steps		
short-circuit protection	yes	yes		
reverse polarity protection	yes Vs to GND	no		
temperature range	-25...+85 °C	-25...+85 °C		
housing material	PA6	PA6		
max. protection class	IP 67	IP 67		
connection cable PUR	5 x 0,14 mm^2	6 x 0,14 mm^2		

*lower interpolation rates on request

dimensions

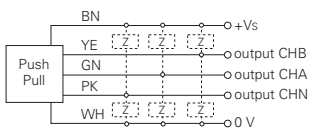


mounting and sense of rotation

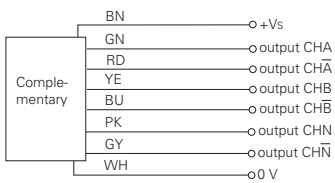


CH A is leading CH B by 90°
when rotating CW.

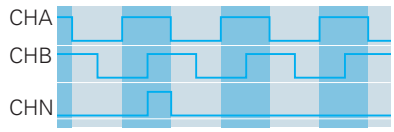
3 channel push-pull (with zero pulse)



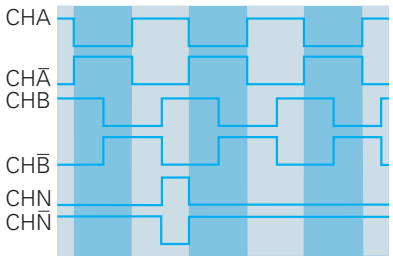
3 channel complementary RS 422 (with zero pulse)



pin assignment 3 channel push-pull



pin assignment 3 channel RS 422



pin assignment 3 channel push-pull

color	abbreviation	signals
brown	BN	+Vs
green	GN	CHA
yellow	YE	CHB
pink	PK	CHN
white	WH	GND

pin assignment 3 channel complementary RS 422

color	abbreviation	signals
brown	BN	+Vs
green	GN	CH A
red	RD	CHĀ
yellow	YE	CHB
blue	BU	CHB̄
pink	PK	CHN
grey	GY	CHN̄
white	WH	GND

accessories

magnet rotor 32 poles (zero pulse)	part nr. 132124 see end of chapter
magnet rotor 64 poles (zero pulse)	part nr. 150984 see end of chapter

Magnetic sensors for linear applications
MLFK 10, 2 channel

features

- non-contact, magnetic linear measuring sensor
- low cost alternative to linear encoders
- max. resolution 10 µm with external quadrature electronics
- 2 channel version
- max. displacement speed 40 m/s

description

Magnet encoders provide angular information by non-contact tracking of a multi-pole ring magnet based on a magneto resistive sensor. Depending on the angle between the sensor and the magnetic field, the device generates analog signals containing the angular information. A resolution of 5µ can be achieved when using a magnetic strip of 2 mm pole width and external signal quadrature. The MDFK 10 range of sensors provides a high degree of installation flexibility due to the position of the magneto-resistive pick-up being at the center of the device's face. An important fact when space is at a premium. All 10-series sensors feature a screened PUR cable.

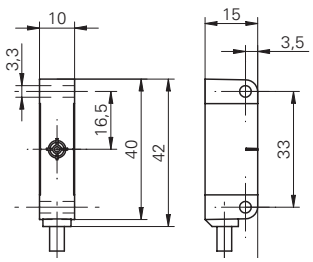
part numbers

2 channel push-pull	**MLFK 10G2124/N100**
2 channel (RS 422)	**MLFK 10T7105/N100**

technical data	MLFK 10G2124/N100	MLFK 10T7105/N100		
	push-pull	**RS 422**		
voltage supply	8 - 28 VDC	5 VDC ±5%		
supply current	30 mA	20 mA		
switching current	50 mA	50 mA		
max. switching frequency	400 kHz	400 kHz		
voltage drop	2 VDC (I_{OUT} = 20 mA)	RS 422		
output circuit A/B	2 channel, push-pull	RS 422		
output signal	CH A/B	CH A/$\overline{A}$/B/$\overline{B}$		
air gap	0,8 mm	0,8 mm		
resolution	100 ppr	100 ppr		
interpolation	100-fold*	100-fold*		
max. measuring steps	400 steps	400 steps		
short-circuit protection	yes	yes		
reverse polarity protection	yes Vs to GND	no		
temperature range	-25...+85 °C	-25...+85 °C		
housing material	PA6	PA6		
max. protection class	IP 67	IP 67		
connection cable PUR	4 x 0,25 mm²	6 x 0,14 mm²		
matching magnetic strip	128606	128606		

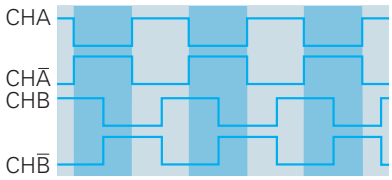
*lower interpolation rates on request

dimensions

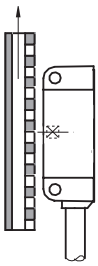


output signals 2 channel push-pull

output signals 2 channel RS 422



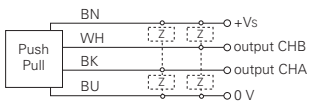
mounting and direction of travel



pin assignment 2 channel push-pull

color	abbreviation	signals
brown	BN	+Vs
blue	BU	GND
black	BK	CH A
white	WH	CH B

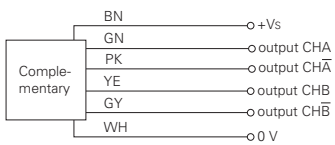
2 channel push-pull



pin assignment 2 channel complementary RS 422

color	abbreviation	signals
brown	BN	+Vs
green	GN	CH A
pink	PK	CH Ā
yellow	YE	CH B
grey	GY	CH B̄
white	WH	GND

2 channel complementary RS 422



accessories

magnetic strip
pole width 2 mm, strip width 10 mm, height max. 1,4 mm

length	
50 mm	part nr. 128662
150 mm	part nr. 128663
300 mm	part nr. 128664
cut to length	part nr. 128606

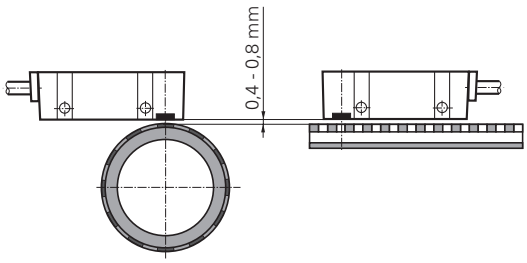
Mounting instructions
Linear and rotary magnetic sensors
MDFK / MLFK

instructions

Magnetic sensors must be mounted in a defined position in relation to ring magnets or magnetic strips. Always maintain air gap, angular and axial misalignment within specifications in order to prevent negative effects on the measuring accuracy.

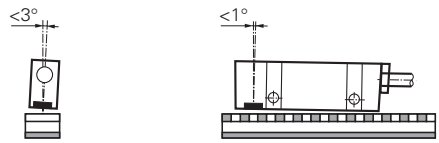
Small misalignments within specifications result in minor system related measuring inaccuracies caused by ring magnets or magnetic strips (inaccuracy of magnetization, glued magnetic strip, true running of ring magnets). Ring magnets or magnetic strips should not be exposed to strong external magnetic fields, excessive ambient temperatures or heavy mechanical abuse like direct hits with hard objects. Also, be certain that ring magnets or magnetic strips are never placed near ferromagnetic parts, as this could cause magnetization resulting in signal distortion.

air gap

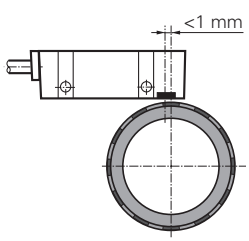


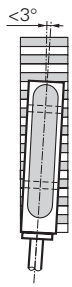
angular misalignment

(applies to applications with both ring magnets and magnetized strips)



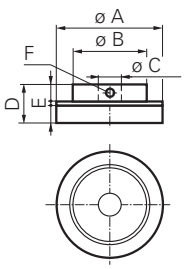
axial misalignment





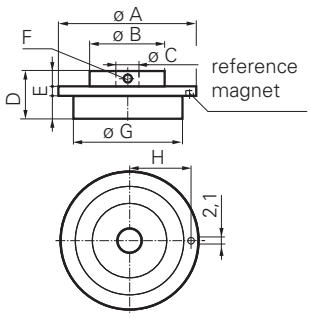
magnet rotor

part nr. see chart



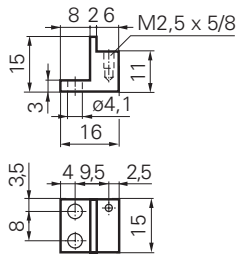
magnet rotor (zero pulse)

part nr. see chart



mounting bracket MDFK 08

part number 134683



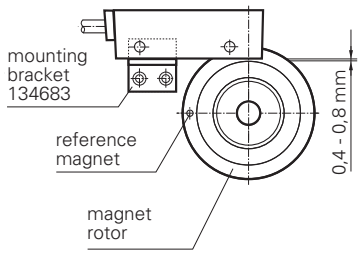
dimension without zero pulse

	32 poles	36 poles	64 poles
A	30,5	30,5	56
B	20	20	35
C	6H7	6H7	25E7
D	14	14	15
E	7 / 5	7 / 5	8 / 6
F	M3	M3	M4
G	–	–	–
H	–	–	–
material	alu	alu	alu
part number	134061	157948	143924

dimension with zero pulse

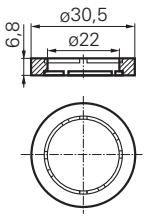
	32 poles	36 poles	64 poles
A	40	40	66
B	20	20	66
C	6H7	6H7	25E7
D	17	17	18
E	8 / 5	8 / 5	9 / 9
F	M3	M3	M4
G	30,5	30,5	56
H	18	18	31,3
material	alu	alu	alu
part number	132124	147433	150984

mounting MDFK 08 (0-pulse)



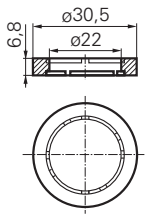
ring magnet 32 poles

part number 156640



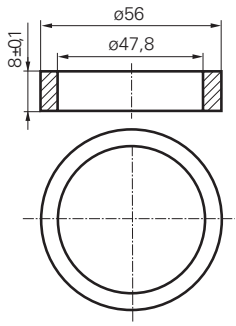
ring magnet 36 poles

part number 147431



ring magnet 64 poles

part number 143920

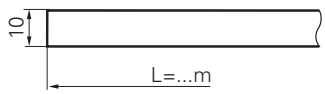


Ring magnet can be designed to meet application specific requirements.

Accessories
Magnetic sensors

magnetic strip for MLFK

length	part number
50 mm	128662
150 mm	128663
300 mm	128664
L= (cut to length)	128606

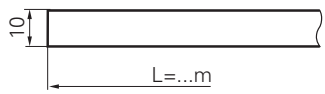


pole width 2 mm
strip thickness 1,4 mm

magnetic strip for MLFK

length	part number
L= (cut to length)	147044

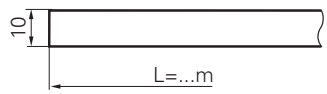
for MLFK with suffix X only



pole width 1 mm
strip thickness 1,4 mm

self-adhesive protective tape

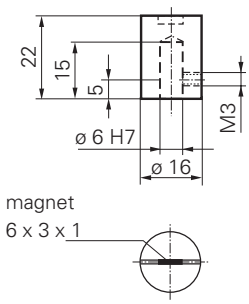
part number 157164



strip thickness 0,25 mm

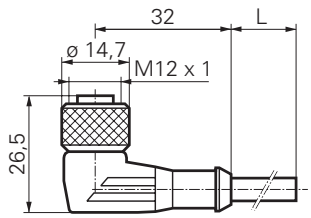
rotor

part number 123344



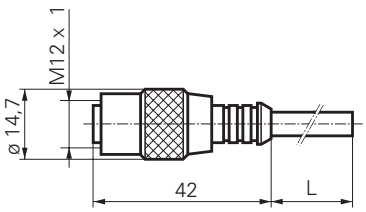
connector ESW 33A

part number		cable length
ESW 33AH0200	4-pin	2 m PUR
ESW 33AH0500	4-pin	5 m PUR
ESW 33AH1000	4-pin	10 m PUR
halogen-free		



connector ESG 34A

part number		cable length
ESG 34AH0200	4-pin	2 m PUR
ESG 34AH0500	4-pin	5 m PUR
ESG 34AH1000	4-pin	10 m PUR
halogen-free		

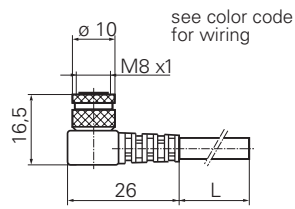


pin-assignment con. 4-pin (M12)

pin nr.	color
1	BN (brown)
2	WH (white)
3	BU (blue)
4	BK (black)

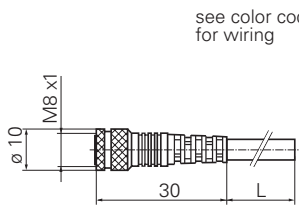
connector ESW 31A

part number		cable length
ESW 31AH0200	4-pin	2 m PUR
ESW 31AH0500	4-pin	5 m PUR
ESW 31AH1000	4-pin	10 m PUR
halogen-free		

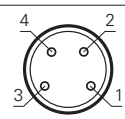


connector ESG 32A

part number		cable length
ESG 32AH0200	4-pin	2 m PUR
ESG 32AH0500	4-pin	5 m PUR
ESG 32AH1000	4-pin	10 m PUR
halogen-free		



pin-assignment con. 4-pin (M8)



pin nr.	color
1	BN (brown)
2	WH (white)
3	BU (blue)
4	BK (black)