Encoders without bearings - incremental
Sensor head with magnetic wheel
Max. 4096 pulses per revolution

MIR10

MIR10

Features

– **Sensor head with magnetic wheel**
– **Robust magnetic sensing method**
– **Max. 4096 pulses per revolution**
– **Output signals A 90° B with zero pulse**
– **Output circuits: HTL/push-pull and TTL/RS422**
– **Non-contact, wear-free sensing system**
– **High resistance to dirt and vibrations**

Technical data - electrical ratings

Short-circuit proof	Yes
Pulses per revolution	320...4096
Initializing time	≤50 ms after power on (see general informations)
Interpolation	10-fold, 20-fold, 32-fold, 64-fold
Output signals	A+, B+, R+, A-, B-, R-
Reference signal	Zero pulse, width 90° (zero pulse only with magnet rotor incl. reference magnet)
Output frequency	≤350 kHz
System accuracy	Typ. ±0.7° (+20 °C)
Sensing method	Magnetic
Output stages	HTL/push-pull TTL/RS422
Interference immunity	DIN EN 61000-6-2
Emitted interference	DIN EN 61000-6-4
Approvals	CE, UL

Technical data - electrical ratings (HTL)

Voltage supply	10...30 VDC
Reverse polarity protection	Yes
Consumption typ.	20 mA (w/o load)

Technical data - electrical ratings (TTL)

Voltage supply	5 VDC ±5 %
Consumption typ.	30 mA (w/o load)
Recommended cable termination	On control side each channel pair 120 Ohm

Technical data - mechanical design

Shaft type	ø6...43.5 mm (through hollow shaft)
Dimensions (sensor head)	10 x 15 x 45.5 mm
Protection DIN EN 60529	IP 66, IP 67
Operating speed	≤10000 rpm (50 and 64 poles) ≤20000 rpm (up to 36 poles)
Working distance	0.1...0.6 mm (axial/radial)
Material	Housing: zinc diecast, plated
Operating temperature	-40...+85 °C
Relative humidity	EN 60068-2-78:2010 EN 60068-2-30:2005 93 % condensation permitted
Resistance	DIN EN 60068-2-6 Vibration 30 g, 10-2000 Hz DIN EN 60068-2-27 Shock 500 g, 6 ms
Weight approx.	130 g
Connection	Cable 2 m Cable 0.3 m with connector M12

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Part number

Sensor head

MIR10-S0.☐☐.☐A.A

Interpolation
010 10 pulses per pole
020 20 pulses per pole
032 32 pulses per pole
064 64 pulses per pole

Voltage supply / output stages
N 10...30 VDC / HTL/push-pull, 6 channel (with an adequate magnetic rotor with reference magnet)
R 10...30 VDC / HTL/push-pull, 4 channel
K 10...30 VDC / HTL/push-pull, 3 channel (with an adequate magnetic rotor with reference magnet)
S 10...30 VDC / HTL/push-pull, 2 channel
E 5 VDC ±5 % / TTL/RS422, 6 channel (with an adequate magnetic rotor with reference magnet)
C 5 VDC ±5 % / TTL/RS422, 4 channel

Connection
L Cable 2 m
C Cable 0.3 m with connector M12, 8-pin, pin terminals, CCW

Magnetic wheel

MIR10-P.☐☐.☐☐S

Bore diameter*
006 ø6 mm
5Z8 ø5/8" (15.875 mm)
025 ø25 mm
1Z0 ø1" (25.4 mm)

Reference
N Without reference magnet
A With reference magnet

Number of poles
032.0.031 32 poles (Bore diameter max. 17.5 mm)
036.0.031 36 poles (Bore diameter max. 17.5 mm)
050.0.056 50 poles (Bore diameter max. 43.5 mm)
064.0.056 64 poles (Bore diameter max. 43.5 mm)

* Other bore diameter on request.

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Selection of sensor head / magnetic wheel

The pulses are a result of the interpolation factor of the sensor head and the number of poles on the magnetic wheel. The table below shows as an example which sensor head and which magnetic wheel have to be combined in order to achieve a certain number of pulses. Other pulses are available on request.

Sensor head MIR10-S	Magnetic wheel MIR10-P				
Interpolation factor	32 poles	36 poles	50 poles	64 poles	
10	320	**360**	**500**	640	
20	640	**720**	**1000**	1280	
32	**1024**	1152	1600	**2048**	
64	**2048**	2304	3200	**4096**	

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Accessories

Connectors and cables

10146775	Female connector M12, 8-pin, straight, without cable
11170528	Female connector M12, 8-pin, straight, shielded, 5 m cable (ESG 34FH0500GVS)
11177375	Female connector M12, 8-pin, straight, shielded, 10 m cable (ESG 34FH1000GVS)
11091511	Female connector M12, 8-pin, straight, shielded, 20 m cable

Output signals

With clockwise rotation shown below.
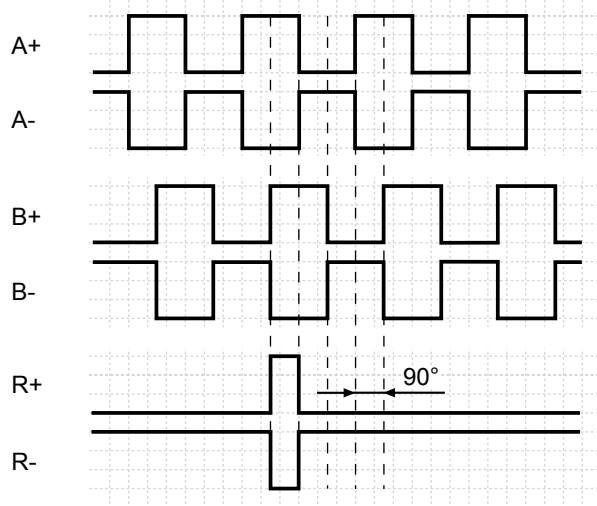
Trigger level

Outputs	HTL/push-pull
Output level High	>+Vs -2.2 V
Output level Low	<0.7 V
Load	≤20 mA

| Outputs	TTL/RS422
Output level High	>2.4 V
Output level Low	<0.7 V
Load	≤20 mA

General information

The initializing time of the sensor is 50 ms. Output signals may not be processed during this time.

Terminal assignment

### Cable or cable 0.3 m with connector M12

| Connector	Core colour	Signals
Pin 1	white	0 V
Pin 2	brown	+Vs
Pin 3	green	A+
Pin 4	yellow	A-
Pin 5	grey	B+
Pin 6	pink	B-
Pin 7	blue	R+ (zero pulse)
Pin 8	red	R- (zero pulse inv.)
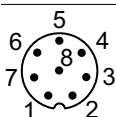
Cable screen: connected to sensor housing or connector M12 and sensor housing.

Cable data: PUR 4 x 2 x 0.14 mm², shielded
Bending radius: >50 mm (fix) / >100 mm (cable chain)
Outer diameter: 6.3 mm

Recommended grounding concept
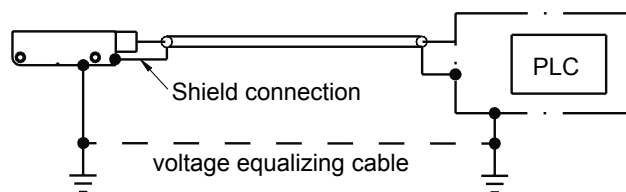
Rotational or linear direction
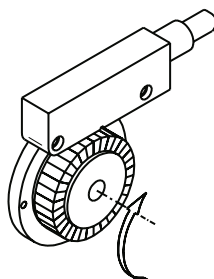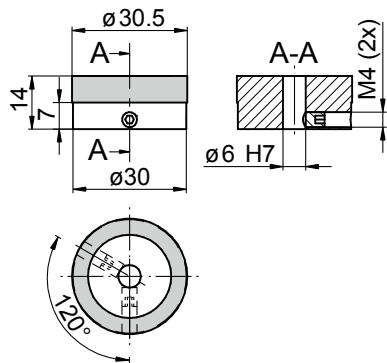
Encoders without bearings - incremental
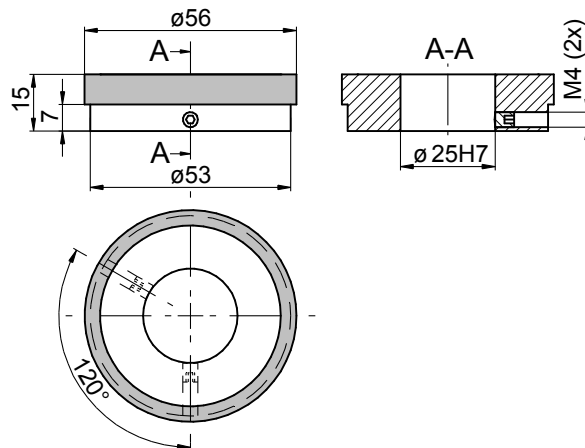## Sensor head with magnetic wheel
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Axial misalignment

< 1 mm

Angular misalignment

<3°

<1°

90° ±3

Working distance

MIR10 with reference magnet

<0.5

D

D = 0.1...0.6 mm

MIR10 without reference magnet

≤ 1

D

D = 0.1...0.6 mm

Dimensions

54.8

45.5±0.2

10±0.1

A

ø6±0.3

ø8.8

15±0.2

10.3±0.2

3.5

16.5

3.5

33±0.2

Detail A

ø4.2 (4 x)

1.7(4x)

ø3.2 (2x)

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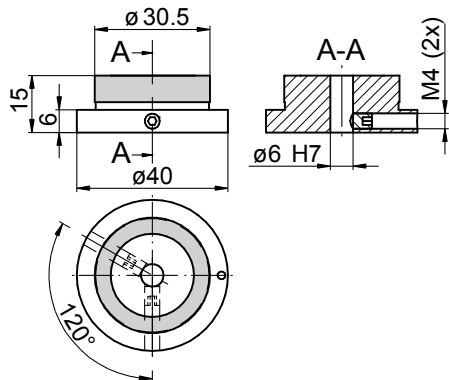## Magnetic wheel without reference magnet

MIR10-P with 32, 36 poles

ø 30.5
A
14
7
A
ø30
A-A
M4 (2x)
ø6 H7
120°

MIR10-P with 50, 64 poles

ø56
A
15
7
A
ø53
A-A
M4 (2x)
ø 25H7
120°

Magnetic wheel with reference magnet

MIR10-P with 32, 36 poles

ø 30.5
A
15
6
A
ø40
A-A
M4 (2x)
ø6 H7
120°

MIR10-P with 50, 64 poles

ø56
A
15
6
A
ø66
A-A
M4 (2x)
ø25H7
120°