

Encoders without bearing

Absolute encoder, sensor head with integrated FPGA signal processing

Magnetic sensing, hollow shaft max. $\varnothing 180$ mm,

Singleturn 8...17 Bit, additional incremental resolution 1...262144

MHAP 200 - HDmag



MHAP 200 - Version for axial screw mounting

Features

- Absolute encoder with magnetic sensing and without bearings
- Sensor head with integrated FPGA signal processing
- Absolute resolution max. 17 bit singleturn
- Additional incremental output
- Robust and free from wear
- Electronics is fully encapsulated
- High protection standard
- Large tolerances: axial ± 1 mm, radial max. 0.5 mm
- Very compact dimensions
- Simple mounting, easy adaptation
- Several mounting possibilities

Technical data - electrical ratings (SSI)

Voltage supply	4.5...30 VDC
Interface	SSI
Function	Singleturn
Steps per turn	≤ 131072 / 17 bit
Sensing method	Magnetic
Code	Gray or binary
Code sequence	CW default
Additional output signals	Square-wave TTL (RS422) Square-wave universal HTL/ TTL Sine 1 Vpp
Interference immunity	DIN EN 61000-6-2
Emitted interference	DIN EN 61000-6-4

Technical data - electrical ratings (square-wave)

Voltage supply	4.5...30 VDC
Consumption w/o load	≤ 300 mA
Resolution (steps/turn)	1...262144
Phase shift	$90^\circ \pm 10^\circ$
Scan ratio	40...60 %
Sensing method	Magnetic
Output frequency	≤ 2 MHz
Output signals	A+, A-, B+, B-
Output circuit	HTL (power linedriver) TTL (RS422)
Interference immunity	DIN EN 61000-6-2
Emitted interference	DIN EN 61000-6-4

Technical data - electrical ratings (sinewave)

Voltage supply	4.5...30 VDC
Consumption w/o load	≤ 300 mA
Resolution (steps/turn)	1...16384
Phase shift	$90^\circ \pm 5^\circ$
Sensing method	Magnetic
Output signals	A+, A-, B+, B-
Output circuit	Sine/cosine 1 Vpp
Harmonics share approx.	-40 dB
Offset sine/cosine amplitude	≤ 20 mV
Spectrum	400 kHz (-3 dB)
Overlying constant share	≤ 20 mV
Interference immunity	DIN EN 61000-6-2
Emitted interference	DIN EN 61000-6-4

Technical data - mechanical design

Sensor head	FPGA signal processing
Dimensions (flange)	$\varnothing 203.1$ mm
Shaft	$\varnothing 50...180$ mm hollow shaft
Protection DIN EN 60529	IP 67 (sensor head), IP 68 (encoder wheel)
Operating speed	≤ 4000 rpm
Operating temperature	-20...+85 °C
Resistance	DIN EN 60068-2-6 Vibration 30 g, 55-2000 Hz DIN EN 60068-2-27 Shock 300 g, 2 ms
Axial tolerance	± 1 mm (wheel/head)
Radial tolerance	0.1...0.5 mm (wheel/head)
Accuracy of magnetic scale	± 200 "
Connection	Connector M23, 17-pin

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Part number

MHAP 200 B5

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See part number (pulses)

Voltage supply / signals

P 4,5...30 VDC / sine

R 4,5...30 VDC / square-wave (TTL)

U 5...30 VDC / square-wave (5 VDC = TTL / 10...30 VDC = HTL universal)

Z Without additional output signals

Parity

O Odd

E Even

N None

Resolution Singleturn (bit)

8, 9 ... 17

Code

B Binary code

G Gray code

Mounting type / hollow shaft (\varnothing mm)

Screw mounting

G50, G75, G80, G85, G90, G95, G100, G110, G115, G120, G130, G150, G160, G170, G180

Clamping set mounting

Z70, Z75, Z80, Z85, Z90, Z95, Z100, Z110, Z120, Z130, Z140, Z150

Shrink fit mounting

H50, H75, H80, H85, H90, H95, H100, H110, H115, H120, H130, H150, H160, H170, H180

Clamping ring mounting

K70, K75, K80, K85, K90, K95, K100, K105, K110, K115, K120, K140, K150

Part number (pulses)

1	16	256	4096	65536
2	32	512	8192	131072
4	64	1024	16384	262144
8	128	2048	32768	

Maximum pulses at sinewave signals 16384

Encoders without bearing

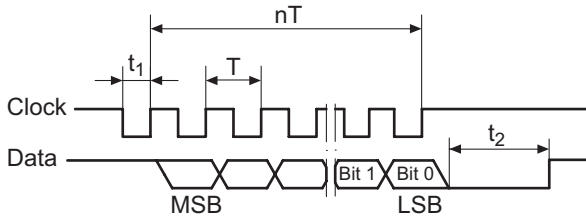
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Data transfer



$$T = 0.5 \dots 10 \mu\text{s}$$

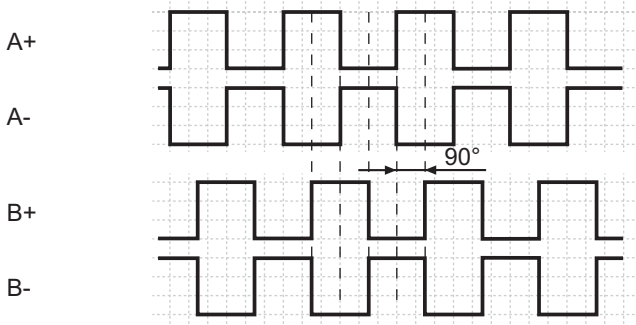
$$t_1 = 0.25 \dots 5 \mu\text{s}$$

$$t_2 = 5 \dots 30 \mu\text{s} \text{ (depending on clock frequency)}$$

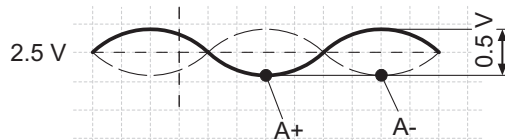
$$\text{Clock frequency } f \leq 2 \text{ MHz}$$

Output signals

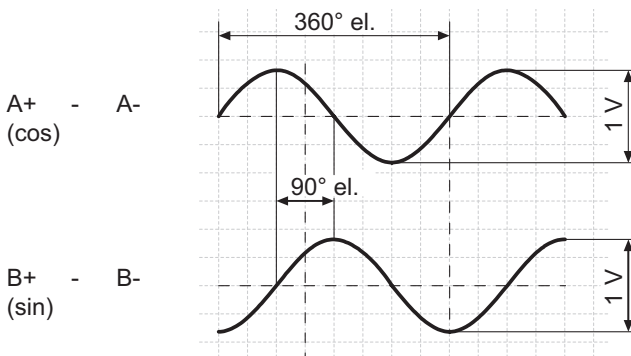
Version with additional square-wave signals
HTL oder TTL at positive rotating direction



Version with additional sinewave signals



at positive rotating direction

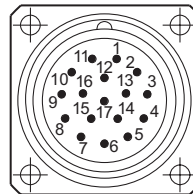


Terminal assignment

View A - Connector M23, male contacts, clockwise

Male	Assignment
Pin 1	do not use
Pin 2	do not use
Pin 3	do not use
Pin 4	do not use
Pin 5	do not use
Pin 6	do not use
Pin 7	UB
Pin 8	SSI CLK+
Pin 9	SSI CLK-
Pin 10	0 V
Pin 11	internal shield
Pin 12	B+ *
Pin 13	B- *
Pin 14	SSI DATA+
Pin 15	A+ *
Pin 16	A- *
Pin 17	SSI DATA-

* do not use
(at version without additional incremental signals)



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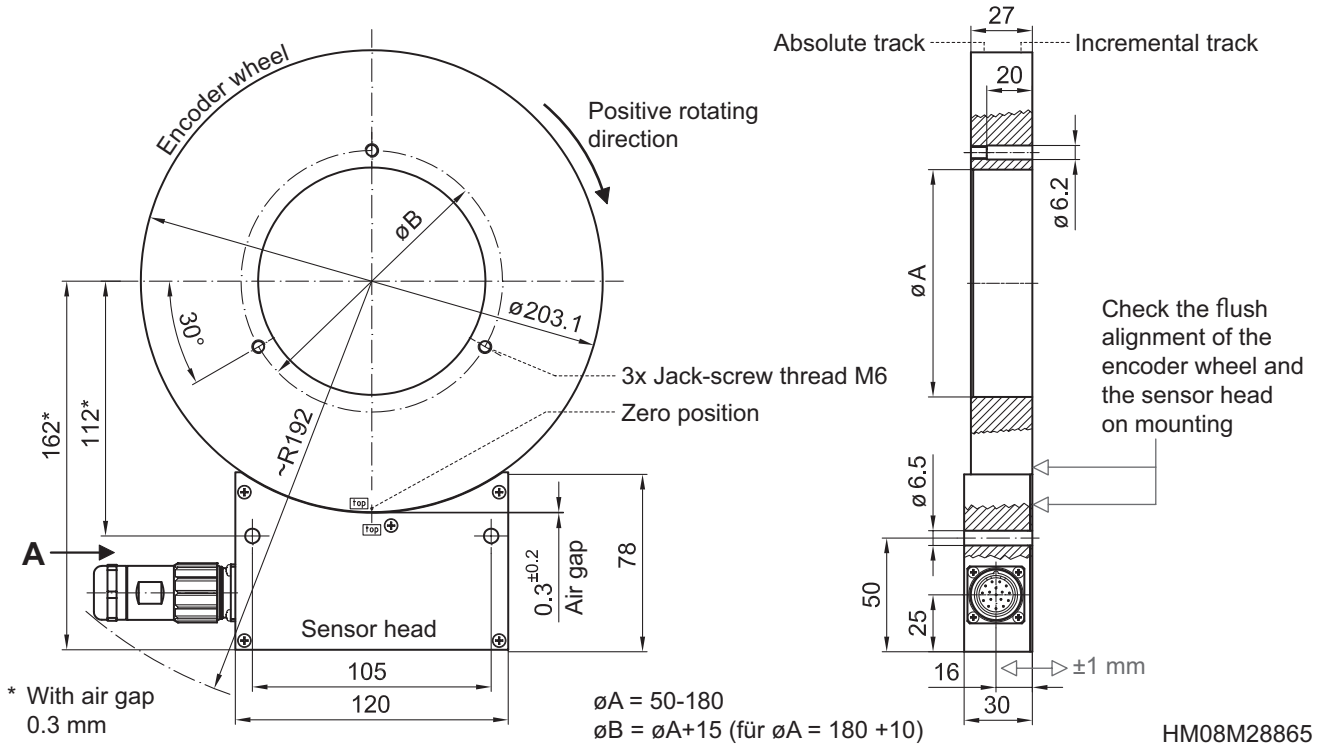
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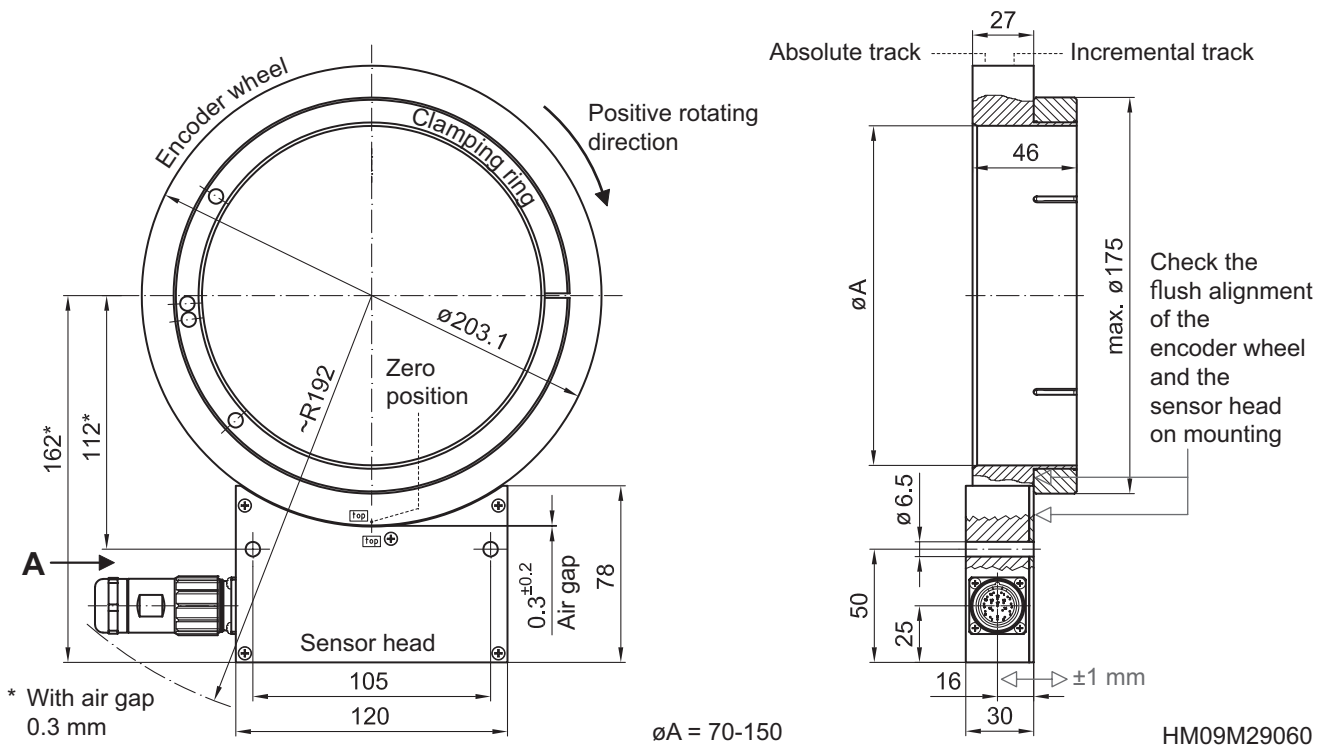
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Version for shrink fit mounting



Version for clamping ring mounting



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