

MHAP 400

Absolute encoder / Singleturn 8...17 Bit / Magnetic sensing / Through hollow shaft max. \varnothing 340 mm
 Additional 1...524288 pulses or 1...32768 sinewave cycles per turn

Overview

- 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 wearless
- Electronics is fully encapsulated
- High protection
- Large tolerances: axial 0.3 ± 0.2 mm, radial max. 0.5 mm
- Simple mounting, easy adaptation
- Several mounting possibilities
- Magnetic rotor included in delivery



Technical data

Technical data - electrical ratings

Voltage supply	4.5...30 VDC
Consumption w/o load	≤ 300 mA
Function	Singleturn
Sensing method	Magnetic
Interference immunity	EN 61000-6-2
Emitted interference	EN 61000-6-3
Approval	CE UL approval / E217823

Technical data - electrical ratings (square-wave)

Pulses per revolution	1 ... 524288
Phase shift	$90^\circ \pm 10^\circ$
Duty cycle	40...60 %
Output frequency	≤ 2 MHz
Output signals	A+, A-, B+, B-
Output stages	HTL TTL/RS422

Technical data - electrical ratings (SinCos)

Sinewave cycles per revolution	1 ... 32768
Phase shift	$90^\circ \pm 5^\circ$
Output signals	A+, A-, B+, B-
Output stages	SinCos 1 Vpp
Difference of SinCos amplitude	≤ 20 mV
Harmonics typ.	-40 dB
DC offset	≤ 20 mV

Technical data - electrical ratings (SinCos)

Bandwidth	400 kHz (-3 dB)
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Technical data - electrical ratings (SSI)

Interface	SSI
Steps per revolution	$\leq 131072 / 17$ bit
Code	Gray or binary
Code sequence	CW default
Additional outputs	Square-wave TTL (RS422) Square-wave universal HTL/TTL SinCos

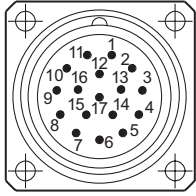
Technical data - mechanical design

Sensor head	FPGA signal processing
Size (flange)	$\varnothing 406.8$ mm
Shaft type	$\varnothing 70...340$ mm (through hollow shaft)
Axial tolerance	0.3 ± 0.2 mm (wheel/head)
Radial tolerance	$0.1...0.5$ mm (wheel/head)
Protection EN 60529	IP 67
Operating speed	≤ 2000 rpm
Material	Housing sensing head: aluminium alloy Wheel: stainless steel (1.4104)
Operating temperature	$-20...+85^\circ\text{C}$
Resistance	IEC 60068-2-6 Vibration 30 g, 55-2000 Hz IEC 60068-2-27 Shock 300 g, 2 ms
Accuracy of magnetic measure	$\pm 150''$
Connection	Flange connector M23, 17-pin

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Terminal assignment



Flange connector M23, male, 17-pin, clockwise (CW)

Pin	Assignment
1	dnu
2	dnu
3	dnu
4	dnu
5	dnu
6	dnu
7	+UB
8	SSI Clk+
9	SSI Clk-
10	0V (\perp)
11	Internal shield
12	dnu (B+ *)
13	dnu (B- *)
14	SSI Data+
15	dnu (A+ *)
16	dnu (A- *)
17	SSI Data-

* With additional output incremental

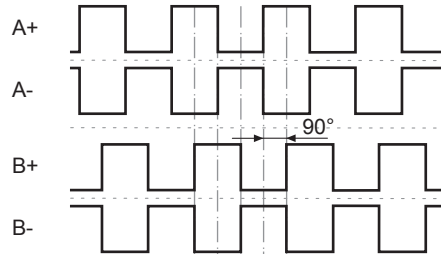
Terminal significance

+UB	Voltage supply
0V (\perp)	Ground
SSI Data+	SSI data+
SSI Data-	SSI data-
SSI Clk+	SSI clock+
SSI Clk-	SSI clock-
A+	Additional output output signal channel 1
A-	Additional output output signal channel 1 inverted
B+	Additional output output signal channel 2 (offset by 90° to channel 1)
B-	Additional output output signal channel 2 inverted
dnu	Do not use

Output signals

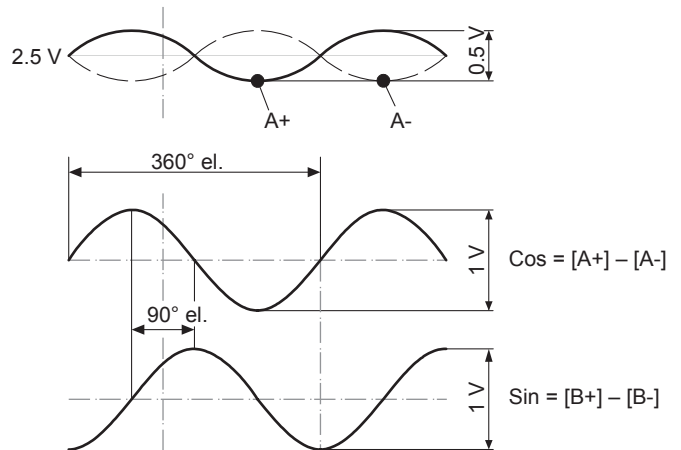
Additional output HTL/TTL

At positive rotating direction (see dimension)



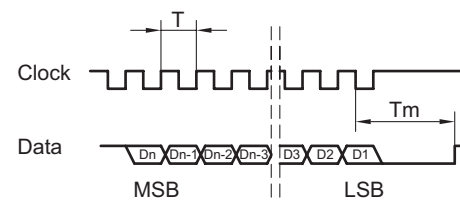
Additional output SinCos

At positive rotating direction (see dimension)

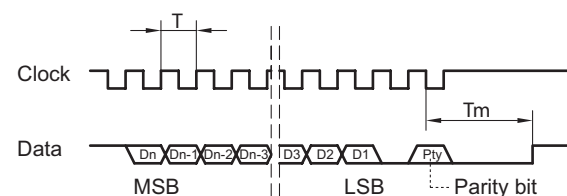


Data transfer

Without parity bit



With parity bit



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

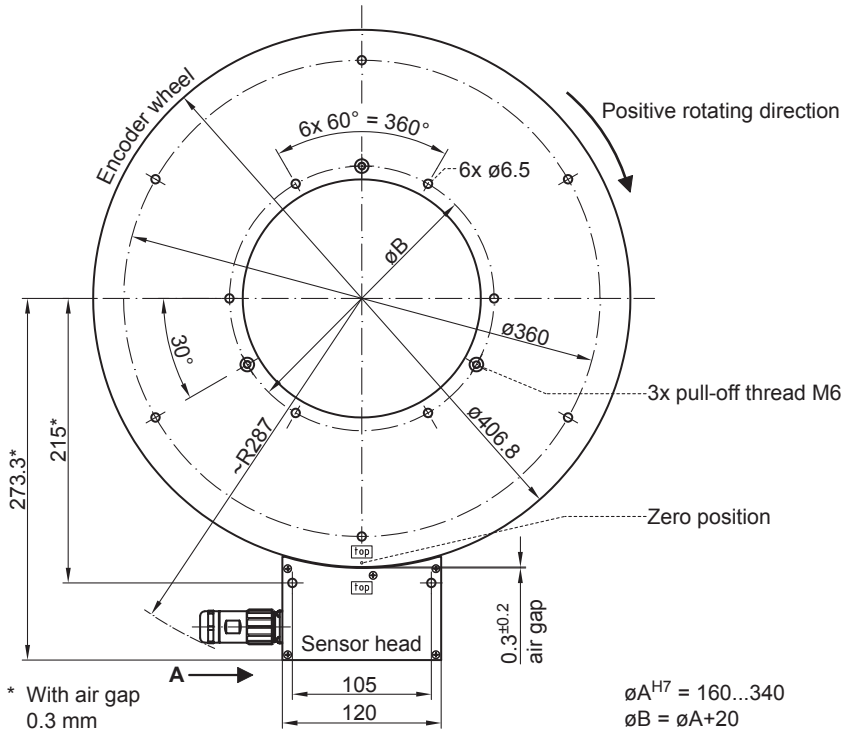
$T_m = 15 \mu\text{s}$

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

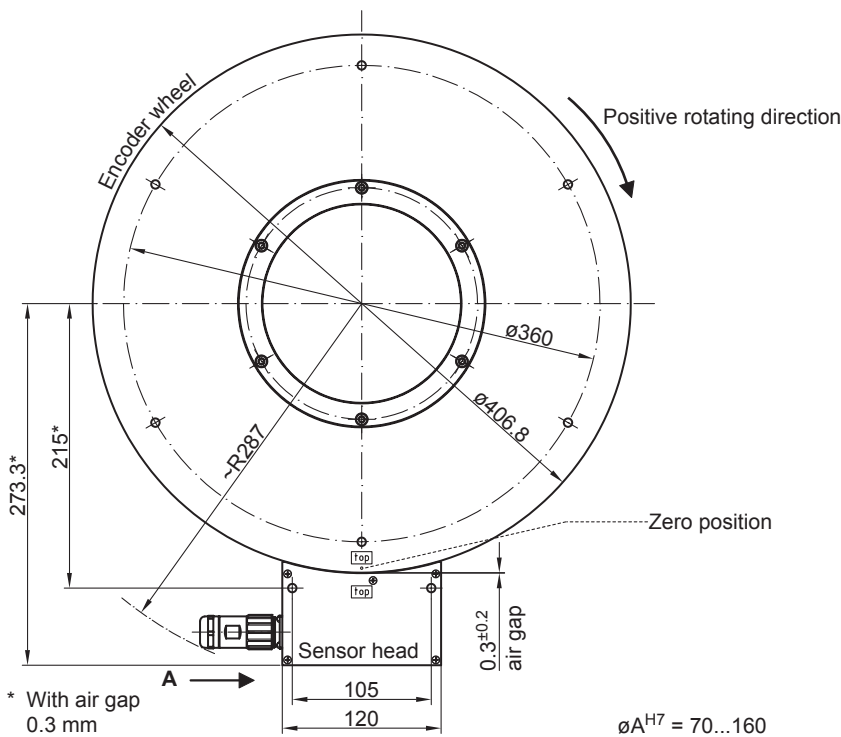
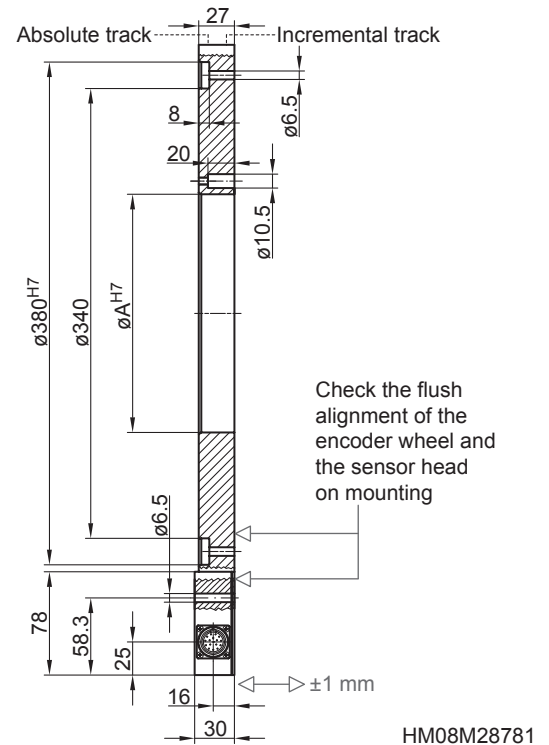
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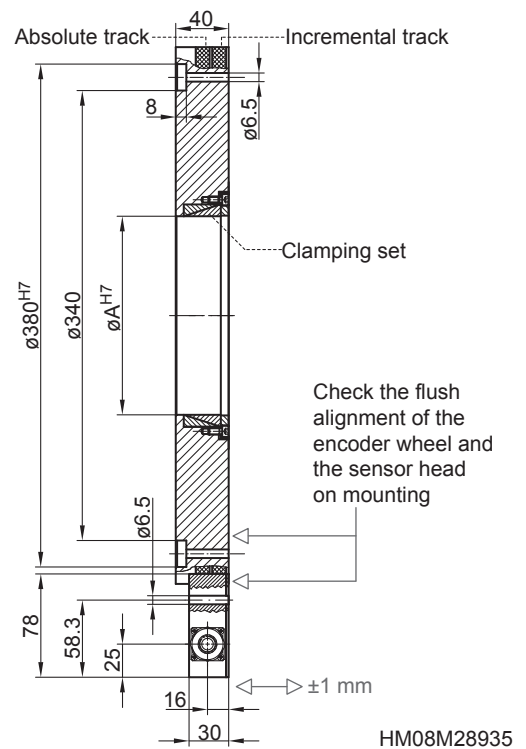
Dimensions



Version for axial screw mounting or shrink fit mounting



Version for clamping set mounting



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Ordering reference

	MHAP400	B	5	####	S	#	##	#	#	#####	D
Product	MHAP400										
Encoder without bearings - absolute	MHAP400										
Bandaging											
Encoder wheel standard bandage		B									
Pole width											
1 pole = 5 mm			5								
Mounting type / hollow shaft (ø mm)⁽²⁾											
Screw or shrink fit mounting / ø160 mm										G160	
Screw or shrink fit mounting / ø180 mm										G180	
Screw or shrink fit mounting / ø230 mm										G230	
Screw or shrink fit mounting / ø300 mm										G300	
Screw or shrink fit mounting / ø360 mm										G360	
Clamping set mounting / ø130 mm										Z130	
Clamping set mounting / ø160 mm										Z160	
Absolute share											
SSI					S						
Code											
Binary code										B	
Gray code										G	
Resolution Singleturn (bit)⁽²⁾											
13										13	
17										17	
Parity bit											
Odd											O
Even											E
None											N
Voltage supply / output stage (incremental output)											
4.5...30 VDC / SinCos											P
4.5...30 VDC / TTL											R
5...30 VDC / 5 VDC = TTL, 10...30 VDC = HTL universal											U
Without additional output signals											Z
Pulse number/sinewave cycles (incremental output)⁽²⁾											
Without additional output signals											0
256											256
512											512
1024											1024
2048											2048
4096											4096
8192											8192
32768											32768
65536 ⁽¹⁾											65536
524288 ⁽¹⁾											524288
Connection											
1x flange connector M23, tangential 17-pin, male, CW											D

(1) No SinCos output possible

(2) Other versions on request