

Encoders without bearings - absolute

Sensor head with split wheel and magnetic tape for shaft $\varnothing 90...300$ mm

Singleturn resolution up to 20 bit

MQR 350A - HDmag flex



MQR 350A

Technical data - electrical ratings

Voltage supply	4.75...30 VDC
Consumption w/o load	≤ 300 mA (24 VDC)
Output signals	SSI data (Linedriver RS485)
Position resolution	0...20 bit singleturn
Speed resolution	≤ 18 bit ($\pm 20... \pm 2000$ rpm)
Code	Gray or binary
Code sequence	Positiv at CW
Input signals	SSI clock, set zero, counting direction
Additional output signals	Square-wave HTL, TTL/RS422 or SinCos
Status indicator	Color-LED, system OK output
Interference immunity	EN 61000-6-2
Emitted interference	EN 61000-6-3
Approval	CE

Technical data - electrical ratings (square-wave)

Pulses per revolution	1024...4096
Phase shift	$90^\circ \pm 2^\circ$
Scan ratio	45...55 %
Output frequency	≤ 500 kHz (HTL), ≤ 2 MHz (TTL)
Output signals	A+, A-, B+, B-
Output stages	HTL, TTL/RS422

Technical data - electrical ratings (SinCos)

Sinewave cycles per turn	1024...4096
Phase shift	$90^\circ \pm 2^\circ$
Output frequency	≤ 500 kHz
Output signals	A+, A-, B+, B-
Output stages	SinCos 1 Vpp

Features

- "Quasi-absolute" (see page 5) encoder SSI without bearings
- Split wheel design for easiest mounting on installed shafts
- Very large axial tolerances ± 8 mm
- Resolution: Singleturn ≤ 20 Bit, speed ≤ 18 Bit
- Zero position and counting direction inputs
- Status indication via system OK output and LED

Optional

- Corrosion protection for offshore applications
- Additional incremental output
- Parity bit

Technical data - mechanical design

Dimensions (sensor head)	165 x 25 x 93 mm
Outer diameter adapter wheel	350 mm
Over all depth adapter wheel	40 mm
Shaft type	$\varnothing 90...300$ mm (through hollow shaft)
Axial tolerance	± 8 mm (belt to head)
Radial tolerance	1...3 mm (belt to head)
Shaft diameter tolerance	-0.4...0 mm
Protection DIN EN 60529	IP 67
Operating temperature	-40...+85 °C
Operating speed	2000 rpm
Resistance	IEC 60068-2-6 Vibration 30 g, 10-2000 Hz IEC 60068-2-27 Shock 300 g, 6 ms
Materials	Housing: aluminium alloy Adapter wheel: stainless steel
Connection	Flange connector M23, 17-pin
Weight approx.	880 g (head), 13 kg (wheel with belt, bore size $\varnothing 90$ mm), 12.5 kg (wheel with belt, bore size $\varnothing 150$ mm), 7 kg (wheel with belt, bore size $\varnothing 299$ mm)

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Part number

MQR350A- [....] [.] [N] [] [.] [] [] [] [.] [A] []

Parity bit

- None
- /4802 Even
- /4803 Odd

Operating temperature

A -40...+85 °C

Additional output

- 0 No additional output
- G 4096 pulses TTL, HTL (Vin=Vout), 4 channel
- H 4096 pulses TTL/RS422, 4 channel
- J 4096 sinewave cycles SinCos (1 Vpp), 4 channel
- 7 2048 pulses TTL, HTL (Vin=Vout), 4 channel
- 8 2048 pulses TTL/RS422, 4 channel
- 9 2048 sinewave cycles SinCos (1 Vpp), 4 channel
- 4 1024 pulses TTL, HTL (Vin=Vout), 4 channel
- 5 1024 pulses TTL/RS422, 4 channel
- 6 1024 sinewave cycles SinCos (1 Vpp), 4 channel

Resolution speed

- 00 No speed signal
- SE 12 bit, ± 20 rpm
- SF 12 bit, ± 40 rpm
- SG 12 bit, ± 500 rpm
- SH 12 bit, ± 2000 rpm
- SI 14 bit, ± 20 rpm
- SK 14 bit, ± 40 rpm
- SL 14 bit, ± 500 rpm
- SM 14 bit, ± 2000 rpm
- S2 16 bit, ± 40 rpm
- S3 16 bit, ± 500 rpm
- S4 16 bit, ± 2000 rpm
- S7 18 bit, ± 500 rpm
- S8 18 bit, ± 2000 rpm

Resolution position singleturn

- 00 No position signal
- 13 13 bit
- 16 16 bit
- 20 20 bit

Voltage supply / interface

- UG 4,75...30 VDC, SSI Gray
- UB 4,75...30 VDC, SSI binary

Connection

N Flange connector M23, tangential, 17-pin, male contacts, cw

Shaft diameter (mm)

.... 0090...0300

Other versions on request.

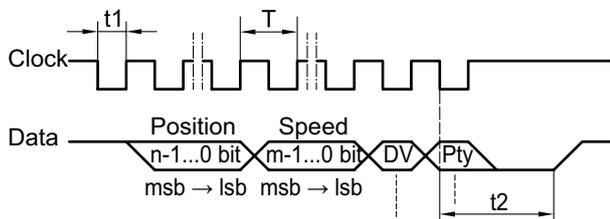
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Data transfer



Data valid bit

With position output:

1 = Position output is valid and no error,
0 = Position output is not valid

Without position output:

1 = no error, 0 = error

Parity bit

Only for version with parity

Clock frequency	100 kHz...2 MHz
Period (T)	0,5...10 μ s
Time lag (t1)	0,25...5 μ s
Monoflop time (t2)	13 μ s (internal)
Master wait time (t2)	15 μ s (master)
n, m	Number of bits
Data valid bit and the optional parity bit are excepted from Gray code.	

For continuous clocking, the SSI word is transmitted only once followed by zero values (no ring register operation).

The filter cut-off frequency f_{filter} for the speed word is fixed depending on speed range and shaft diameter.

It is calculated by:

$$f_{\text{filter}} = \left\{ 20 \text{ Hz} \leq \frac{n_{\text{max}} [\text{rpm}]}{60} \cdot \frac{\pi \cdot d [\text{mm}]}{20} \leq 500 \text{ Hz} \right\}$$

Further frequency settings on request.

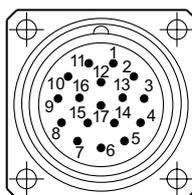
Terminal assignment

View A

Flange connector M23, 17-pin, male, CW

Pin	Assignment
1	System OK-
2	DIR direction of rotation (Adoption with HIGH)
3	Do not use
4	System OK+
5	Zero (Adoption at rising edge)
6	Do not use
7	+UB
8	SSI Clock+
9	SSI Clock-
10	0 V
11	Internal shield
12	B+ / Sin+ *
13	B- / Sin- *
14	SSI Data+
15	A+ / Cos+ *
16	A- / Cos- *
17	SSI Data-

* Do not use in version without incremental output



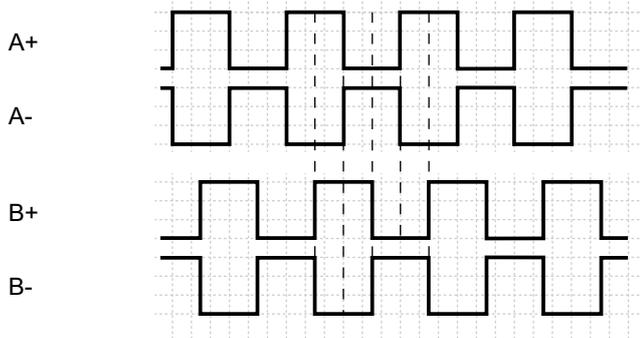
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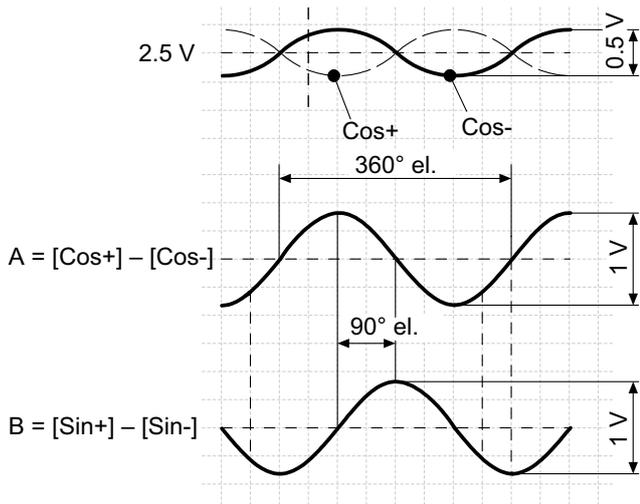
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Output signals

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



Version with additional SinCos signals at positive rotating direction



Accessories

Connectors and cables

11068551 Mating connector M23, solder version, 17-pin, CCW

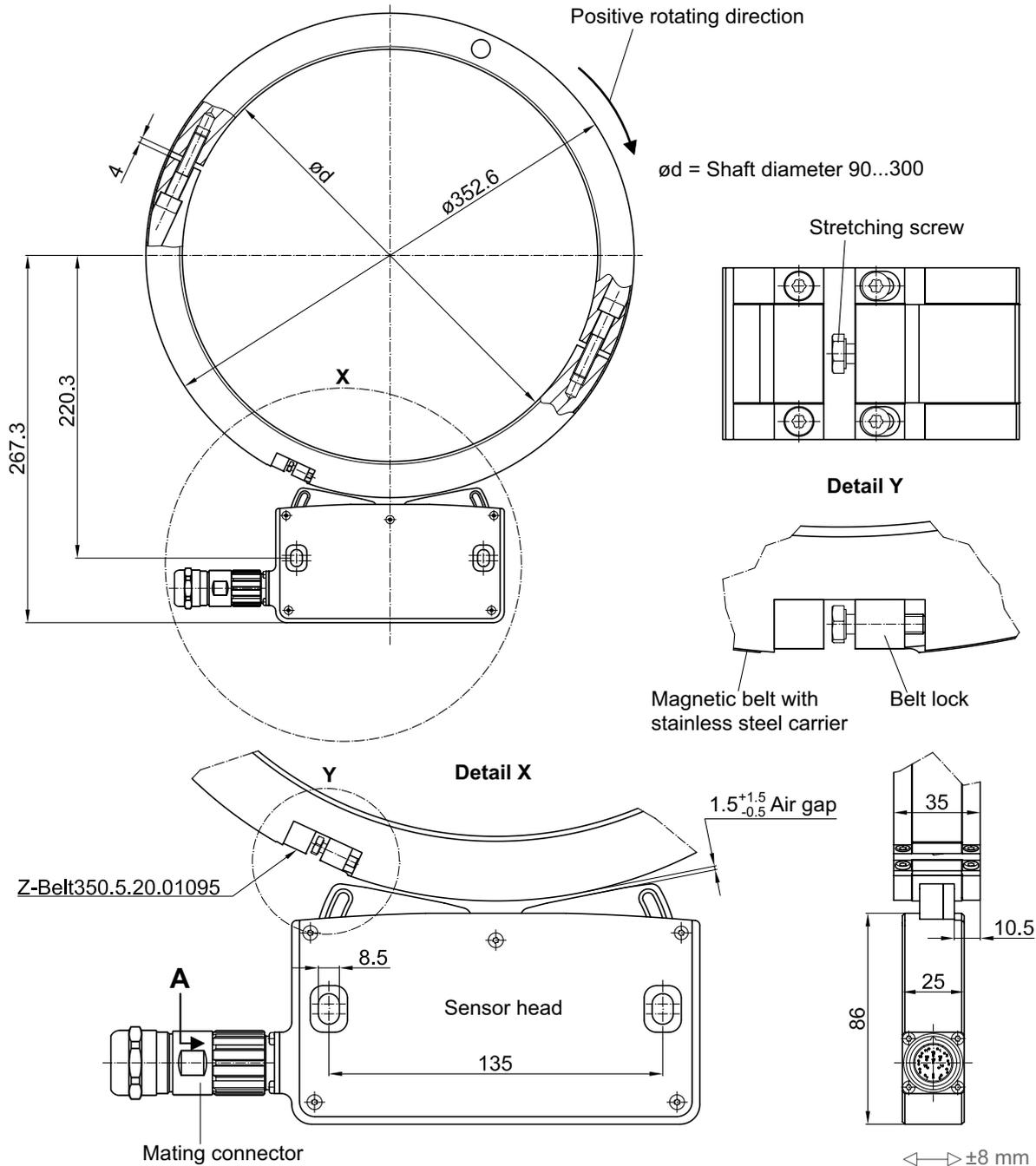
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Dimensions



Initialization of a validate absolute position

The MQR350A is a "quasi-absolute" encoder.

"Quasi-absolute" means that it is an incremental encoder that provides a valid absolute position only after initialization.

Therefore the belt lock must pass the sensor head twice in the same direction. The zero position will then be set to the middle of the belt lock and the encoder delivers valid absolute position data.