

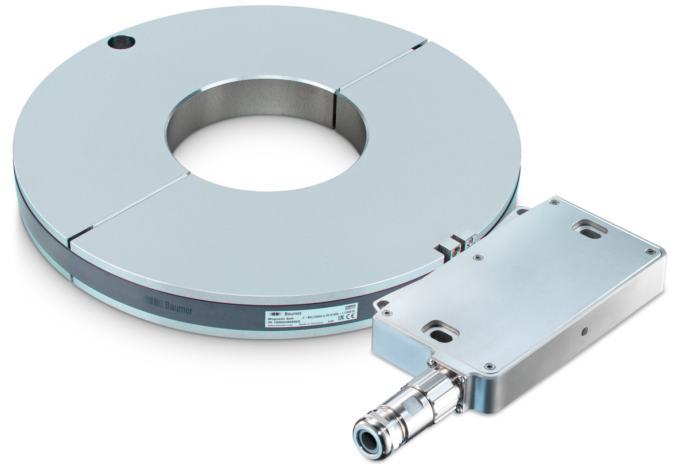
MQR 350A

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

Singleturn resolution up to 20 bit

Overview

- "Quasi-absolute" (see below) 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
- Magnetic rotor included in delivery



Technical data

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 ($\pm 20 \dots \pm 2000$ rpm)
Code	Gray or binary
Code sequence	Positiv at CW
Input signals	SSI clock Zero position Rotating direction
Additional outputs	Square-wave HTL Square-wave TTL (RS422) SinCos
Status indicator	Color-LED, system OK output
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	1024 ... 4096
Phase shift	$90^\circ \pm 2^\circ$
Duty cycle	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 revolution	1024 ... 4096
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Optional

- Additional incremental output
- Parity bit

Technical data - electrical ratings (SinCos)

Phase shift	$90^\circ \pm 2^\circ$
Output frequency	≤ 500 kHz
Output signals	A+, A-, B+, B-
Output stages	SinCos 1 Vpp

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	$\varnothing 90 \dots 300$ 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 EN 60529	IP 67
Operating speed	≤ 2000 rpm
Material	Housing sensing head: aluminium alloy Adapter wheel: stainless steel (1.4104) Magnetic belt: stainless steel (1.4104)
Operating temperature	-40...+85 °C
Resistance	IEC 60068-2-6 Vibration 30 g, 10-2000 Hz IEC 60068-2-27 Shock 300 g, 6 ms
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)
Connection	Flange connector M23, 17-pin

MQR 350A

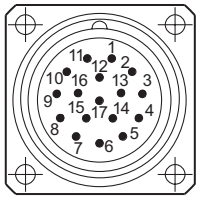
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Initialization of a validate absolute position

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.

Terminal assignment

View A (see dimension)
Assignment flange connector



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

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

* With additional output incremental

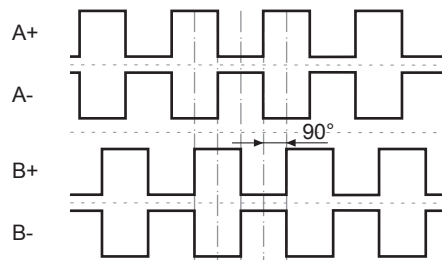
Terminal significance

+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
DIR	Direction of rotation (adoption with HIGH)
ZERO	Zero setting (adoption at rising edge)
System OK+	Error output
System OK-	Error output inverted
dnv	Do not use

Output signals

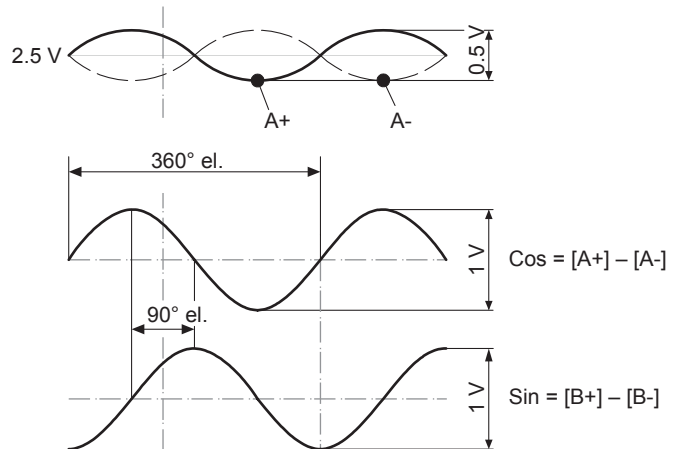
Additional output HTL/TTL

At positive rotating direction (see dimension)



Additional output SinCos

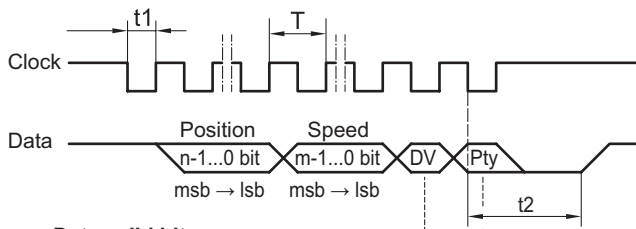
At positive rotating direction (see dimension)



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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:

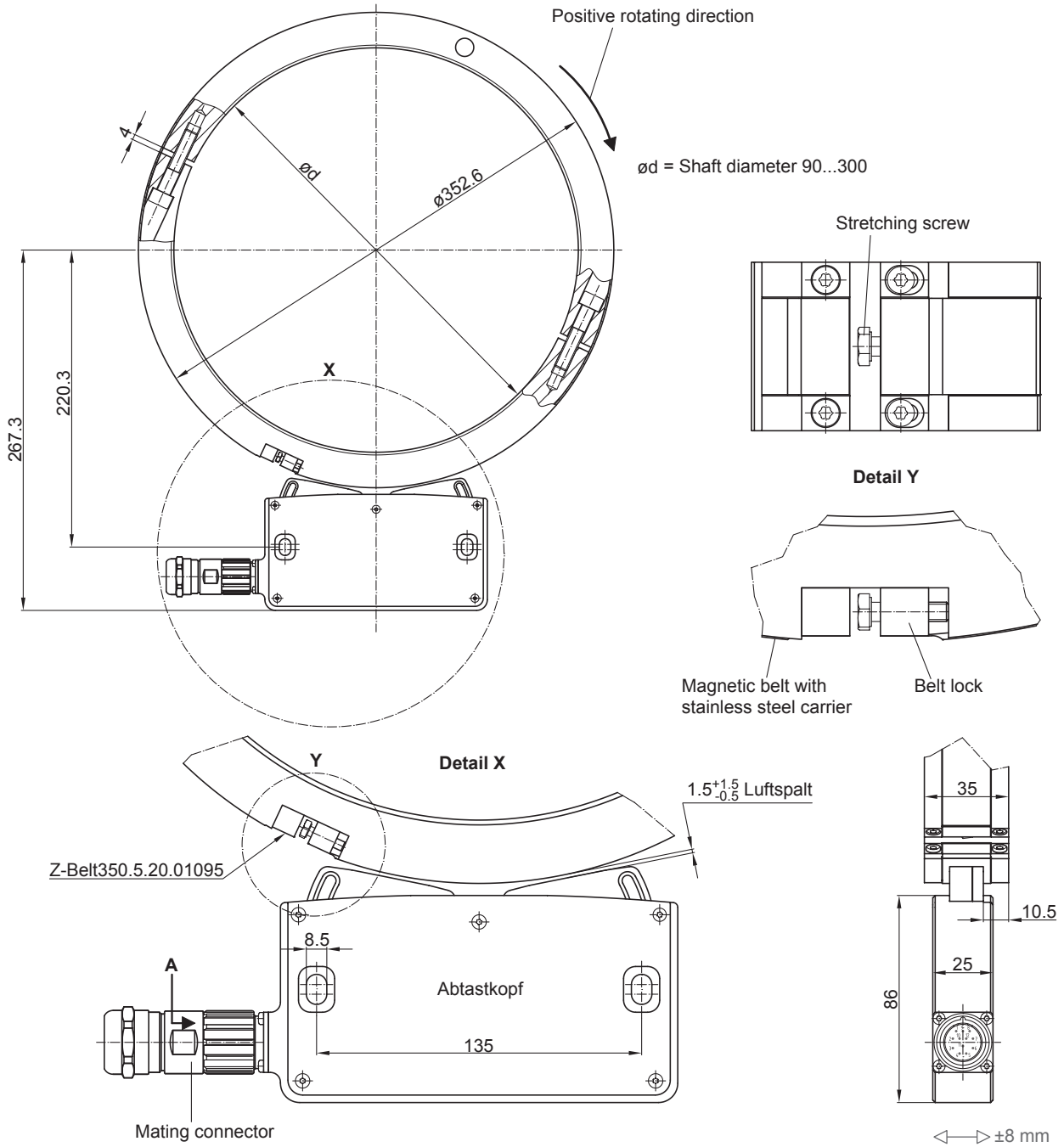
$$f_{\text{filter}} = \left\{ 20 \text{ Hz} \leq \frac{n_{\text{max}} [\text{rpm}]}{60} \cdot \frac{\pi \cdot d [\text{mm}]}{20} \leq 500 \text{ Hz} \right\}$$

Further frequency settings on request.

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Dimensions



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Ordering reference

	MQR350A	-	N	##	.	##	##	#	.	A	/	####
Product	Encoder without bearings - absolute													
Shaft diameter (mm)	0090...0300													
Connection	Flange connector M23, tangential, 17-pin, male, CW				N									
Voltage supply / interface	4,75...30 VDC, SSI Gray													UG
	4,75...30 VDC, SSI binary													UB
Resolution singleturn	No position signal													00
	13 bit													13
	16 bit													16
	20 bit													20
Resolution speed	No speed signal													00
	12 bit, ±20 rpm													SE
	12 bit, ±40 rpm													SF
	12 bit, ±500 rpm													SG
	12 bit, ±2000 rpm													SH
	14 bit, ±20 rpm													SI
	14 bit, ±40 rpm													SK
	14 bit, ±500 rpm													SL
	14 bit, ±2000 rpm													SM
	16 bit, ±40 rpm													S2
	16 bit, ±500 rpm													S3
	16 bit, ±2000 rpm													S4
	18 bit, ±500 rpm													S7
	18 bit, ±2000 rpm													S8
Additional output	No additional output													0
	4096 pulses TTL, HTL (Vin=Vout), 4 channel													G
	4096 pulses TTL/RS422, 4 channel													H
	4096 sinewave cycles SinCos (1 Vpp), 4 channel													J
	2048 pulses TTL, HTL (Vin=Vout), 4 channel													7
	2048 pulses TTL/RS422, 4 channel													8
	2048 sinewave cycles SinCos (1 Vpp), 4 channel													9
	1024 pulses TTL, HTL (Vin=Vout), 4 channel													4
	1024 pulses TTL/RS422, 4 channel													5
	1024 sinewave cycles SinCos (1 Vpp), 4 channel													6
Operating temperature	-40...+85 °C													A
Parity bit	None													
	Even													4802
	Odd													4803

Other versions on request.