

G0M2H

Through hollow shaft up to $\varnothing 14$ mm

Optical multiturn encoders 14 bit ST / 12 bit MT

Overview

- Encoder multiturn / SSI
- Optical sensing method
- Resolution: singleturn 14 bit, multiturn 12 bit
- Through hollow shaft up to $\varnothing 14$ mm
- Compact design
- Cost-efficient mounting
- High reliability by self-diagnostics
- Counting direction input
- Available with additional incremental output
- Maximum resistant against magnetic fields



Technical data

Technical data - electrical ratings

Voltage supply	10...30 VDC
Reverse polarity protection	Yes
Consumption w/o load	≤ 50 mA (24 VDC)
Initializing time typ.	20 ms after power on
Interface	SSI Incremental A 90° B (optional)
Function	Multiturn
Steps per revolution	≤ 16384 / 14 bit
Number of revolutions	4096 / 12 bit
Absolute accuracy	$\pm 0.025^\circ$
Sensing method	Optical
Code	Gray or binary
Code sequence	CW/CCW coded by connection
Inputs	SSI clock Control signals UP/DOWN inv. and zero
Output stages	SSI data: Linedriver RS422 Diagnostic outputs push-pull
Incremental output	2048 pulses A90°B + inverted
Interference immunity	EN 61000-6-2
Emitted interference	EN 61000-6-4
Diagnostic function	Self-diagnosis Multiturn sensing
Approval	UL approval / E63076

Technical data - mechanical design

Size (flange)	$\varnothing 58$ mm
Shaft type	$\varnothing 10...14$ mm (through hollow shaft)
Protection EN 60529	IP 54 IP 65 (optional)
Operating speed	≤ 6000 rpm (mechanical) ≤ 6000 rpm (electric)
Angular acceleration	≤ 2500 rad/s ² (UB = 0 VDC) ≤ 500000 rad/s ² (UB = 10...30 VDC)
Starting torque	≤ 0.04 Nm (+25 °C, IP 54)
Rotor moment of inertia	20 gcm ²
Material	Housing: aluminium Flange: aluminium
Operating temperature	-25...+85 °C -40...+85 °C (optional)
Relative humidity	95 % non-condensing
Resistance	EN 60068-2-6 Vibration ± 0.75 mm - 10-58 Hz, 10 g - 58-2000 Hz EN 60068-2-27 Shock 200 g, 6 ms
Weight approx.	400 g
Connection	Connector M23, 12-pin Cable 1 m

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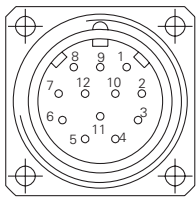
Terminal assignment

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Connector	Core colour	Assignment
Pin 1	brown	UB
Pin 2	black	GND
Pin 3	blue	Clock+
Pin 4	beige	Data+
Pin 5	green	Zero setting
Pin 6	yellow	Data-
Pin 7	violet	Clock-
Pin 8	brown/yellow	DATAVALID inv.
Pin 9	pink	UP/DOWN inv.
Pin 10	black/yellow	DATAVALID MT inv.
Pin 11-12	–	–

G0M2H with incremental tracks | SinCos

Connector	Core colour	Assignment Incremental	SinCos
Pin 1	brown	UB	UB
Pin 2	white	GND	GND
Pin 3	blue	Clock+	Clock+
Pin 4	green	Data+	Data+
Pin 5	grey	Zero setting	Zero setting
Pin 6	yellow	Data-	Data-
Pin 7	red	Clock-	Clock-
Pin 8	red/blue	Track B inv.	Cosine inv.
Pin 9	pink	UP/DOWN inv.	UP/DOWN inv.
Pin 10	violet	Track A inv.	Sine inv.
Pin 11	black	Track A	Sine
Pin 12	grey/pink	Track B	Cosine



Please use cores twisted in pairs (for example clock+ / clock-) for extension cables of more than 10 m length.

Terminal significance

UB	Encoder voltage supply.
GND	Encoder ground connection relating to UB.
Data+/Data-	Differential SSI data output.
Clock+/Clock-	Differential SSI clock input. Optocoupler or RS422 input.
Zero setting	Input for setting a zero point anywhere within the encoder resolution. The zero setting operation is triggered by a High impulse and has to be in line with the selected direction of rotation (UP/DOWN inv.). Connect to GND after setting operation for maximum interference immunity. Impulse duration ≥100 ms.
DATAVALID inv.	Diagnostic output. An error warning is given at level Low.
DATAVALID MT inv.	Diagnostic output for monitoring the multiturn sensor voltage supply. Upon dropping below a defined voltage level the DV MT inv. output is switched to Low.
UP/DOWN inv.	UP/DOWN inv. counting direction input. This input is standard on High. UP/DOWN inv. means ascending output data with clockwise shaft rotation when looking at flange. UP/DOWN inv.-Low means ascending values with counterclockwise shaft rotation when looking at flange.
Incremental	Incremental tracks A 90° B and inverted. Outputs

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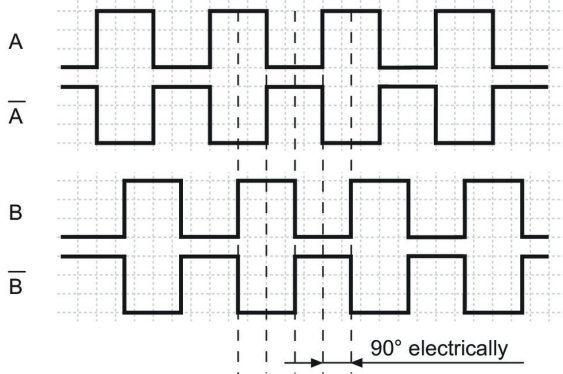
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Output signals

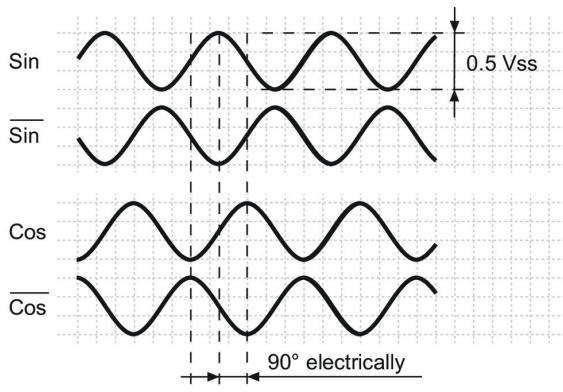
Push-pull and RS422

A leading B when rotating the shaft clockwise and looking at flange.



SinCos

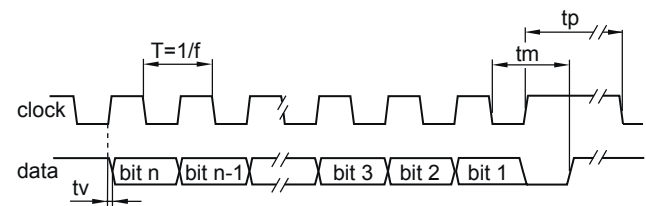
Sin leading Cos when rotating the shaft clockwise and looking at flange.



Trigger level

SSI	Circuit
SSI-Clock	Optocoupler with switching current approx. 7 mA or RS422 with terminating resistor
SSI-Data	Linedriver RS422 or RS485
Control inputs	Input circuit
Input level High	$>0.7 U_B$
Input level Low	$<0.3 U_B$
Input resistance	10 k Ω
Diagnostic outputs or Incremental outputs	Output circuit Push-pull circuit-proof
Output level High	$>U_B - 3.5 V$ ($I = -20$ mA)
Output level Low	$<0.5 V$ ($I = 20$ mA)
Load High / Low	<20 mA
Incremental outputs	Linedriver RS422
Output level High	$>2.5 V$ ($I = -20$ mA)
Output level Low	$<0.5 V$ ($I = 20$ mA)
Load High / Low	<20 mA
Outputs	SinCos
Output level	$0.5 V_{pp} \pm 10 \%$ (Output signals before difference formation)
Load	<10 mA

Data transfer



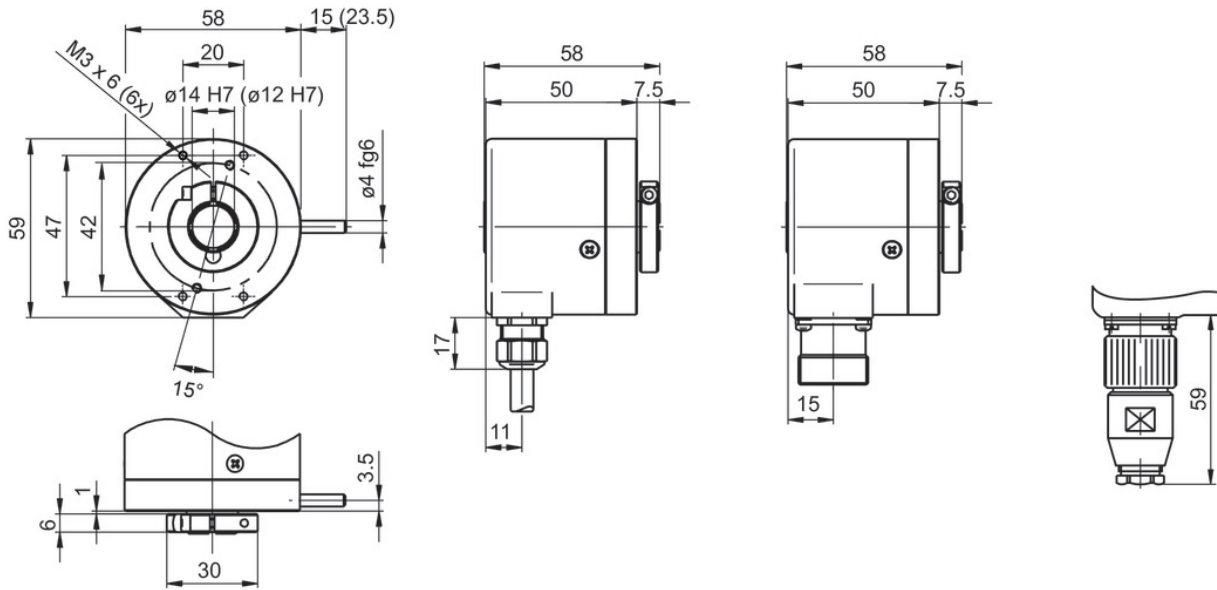
Clock frequency f	62.5...1500 kHz
Duty cycle of T	40...60 %
Delay time t_v	150 ns
Monoflop time t_m	$26 \mu s + T/2$
Clock interval t_p	30 μs

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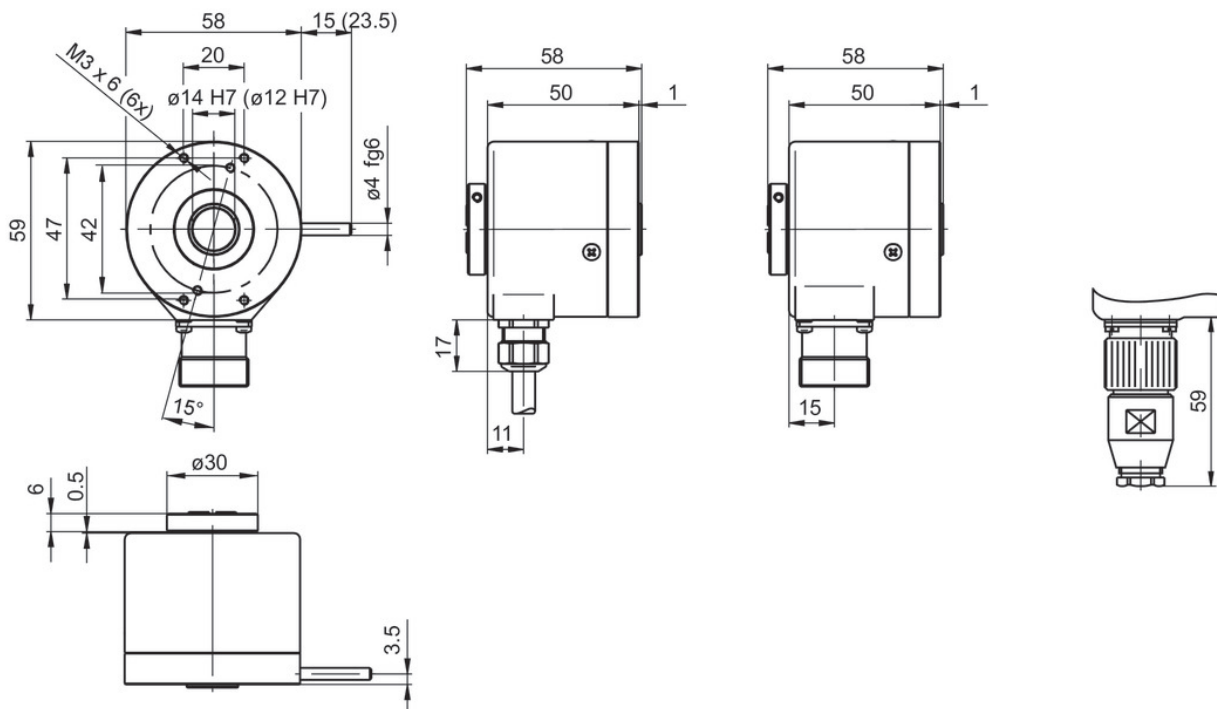
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Dimensions



G0M2H - clamping ring on flange



G0M2H - clamping ring on housing

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Ordering reference

	G0M2H.	#	###	##	##
Product	G0M2H.				
Through hollow shaft					
ø10 mm, without pin, on flange		8			
ø10 mm, pin 15 mm, on flange		9			
ø12 mm, pin 23.5 mm, on housing		A			
ø12 mm, without pin, on flange		0			
ø12 mm, pin 15 mm, on flange		1			
ø12 mm, without pin, on housing		L			
ø14 mm, without pin, on flange		4			
ø14 mm, pin 15 mm, on flange		5			
ø14 mm, without pin, on housing		M			
ø14 mm, pin 23.5 mm, on housing		E			
Voltage supply / Signals					
10...30 VDC, Gray code 25 bit (ST 13 + MT 12)			10		
10...30 VDC, binary code 25 bit (ST 13 + MT 12)			12		
10...30 VDC, Gray code 24 bit (ST 12 + MT 12)			20		
10...30 VDC, Gray code 26 bit (ST 14 + MT 12)			90		
10...30 VDC, binary code 26 bit (ST 14 + MT 12)			92		
Connection					
Cable radial, 1 m				21	
Cable 1 m, radial, for incremental output				41	
Flange socket M23, radial, 12-pin, male contacts, CW				A1	
Flange socket M23, radial, 12-pin, male contacts, CW, for incremental output				A3	
Pulses / Incremental output					
No incremental output					02
2048 pulses, push-pull					04
2048 pulses, RS422					06
2048 periods, SinCos 1 Vpp					07

Accessories

Mounting accessories

10140347	Torque support and spring washer for encoders with 9.5 mm pin (Z 119.024)
10139345	Torque support by rubber buffer for encoders with 15 mm pin (Z 119.041)
11066120	Torque arm, 1-arm (mounting kit 056)
11034106	Spring coupling for motor's fan guard (Z 119.053)
10165157	Spring coupling for encoders with ø58 mm housing, hole distance 73 mm (Z 119.072)
11034121	Spring coupling for encoders with ø58 mm housing, hole distance 68 mm (Z 119.073)
11034123	Spring coupling for one-side attachment, length 115 mm (Z 119.076)
11003562	Spring coupling for encoders with ø58 mm housing, hole distance 63 mm (Z 119.082)
11201396	Spring coupling, hole distance 32.5 mm (Z 119.101)
11098229	Clamping ring set 16/30x6 - stainless steel (Z 119.092)