

Absolute encoders - SSI

Hollow shaft max. \varnothing 14 mm

Optical multiturn encoders 14 bit ST / 12 bit MT

G0M2H - SSI



G0M2H hollow shaft

Features

- Encoder multiturn / SSI
- Optical sensing
- Resolution: singleturn 14 bit, multiturn 12 bit
- Hollow shaft max. \varnothing 14 mm
- Compact design
- Cost-efficient mounting
- High reliability by self-diagnostics
- Counting direction input
- Available with additional incremental output

Technical data - electrical ratings

Voltage supply	10...30 VDC
Reverse polarity protection	Yes
Consumption w/o load	\leq 50 mA (24 VDC)
Initializing time (typ.)	20 ms after power on
Interfaces	SSI, Incremental A 90° B (optional)
Function	Multiturn
Steps per turn	16384 / 14 bit
Number of turns	4096 / 12 bit
Incremental output	2048 pulses A90°B + inverted
Absolute accuracy	\pm 0.025 °
Sensing method	Optical
Code	Gray or binary
Code sequence	CW/CCW coded by connection
Inputs	SSI clock Control signals UP/DOWN and zero
Output circuit	SSI data: linedriver RS485 Diagnostic outputs push-pull
Interference immunity	DIN EN 61000-6-2
Emitted interference	DIN EN 61000-6-4
Diagnostic functions	Self-diagnosis Code continuity check Multiturn sensing
Approval	UL approval / E63076

Technical data - mechanical design

Housing	\varnothing 58 mm
Shaft	\varnothing 12 mm hollow shaft \varnothing 14 mm hollow shaft
Protection DIN EN 60529	IP 54
Operating speed	\leq 6000 rpm (mechanical) \leq 6000 rpm (electric)
Starting torque	\leq 0.04 Nm IP 54
Rotor moment of inertia	20 gcm ²
Materials	Housing: aluminium Flange: aluminium
Operating temperature	-25...+85 °C -40...+85 °C (optional)
Relative humidity	95 % non-condensing
Resistance	DIN EN 60068-2-6 Vibration 10 g, 16-2000 Hz DIN 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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Part number

GOM2H.

Pulses / Incremental output

- 02 No incremental output
- 04 2048 pulses / push-pull
- 06 2048 pulses / RS422
- 07 2048 periods, Sin/Cos 1 Vpp

Connection

- A1 Connector M23, 12-pin, radial
- A3 Connector M23, 12-pin, radial, for incremental output 04/06
- 21 Cable 1 m, radial

Voltage supply / signals

- 10 10...30 VDC / gray code 25 bit
- 12 10...30 VDC / binary code 25 bit
- 20 10...30 VDC / gray code 24 bit
- 90 10...30 VDC / gray code 26 bit
- 92 10...30 VDC / binary code 26 bit

Hollow shaft / clamping ring

- 0 Hollow shaft $\varnothing 12$ mm without pin / on flange
- 1 Hollow shaft $\varnothing 12$ mm with pin 15 mm / on flange
- 4 Hollow shaft $\varnothing 14$ mm without pin / on flange
- 5 Hollow shaft $\varnothing 14$ mm with pin 15 mm / on flange
- L Hollow shaft $\varnothing 12$ mm without pin / on housing
- A Hollow shaft $\varnothing 12$ mm with pin 23.5 mm / on housing
- M Hollow shaft $\varnothing 14$ mm without pin / on housing
- E Hollow shaft $\varnothing 14$ mm with pin 23.5 mm / on housing

Accessories

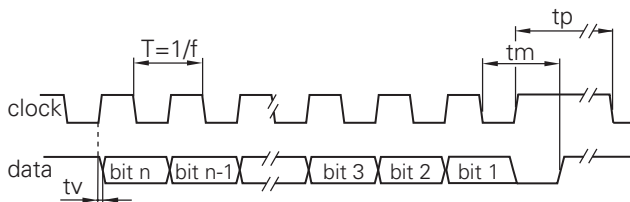
Connectors and cables

Z 130.001	Female connector M23, 12-pin, less cable
Z 130.003	Female connector M23, 12-pin, 2 m cable
Z 130.005	Female connector M23, 12-pin, 5 m cable
Z 130.007	Female connector M23, 12-pin, 10 m cable
Z 182.001	Female connector M23, 12-pin, less cable (incr.)
Z 182.003	Female connector M23, 12-pin, 2 m (incr.)

Mounting accessories

Z 119.023	Spring coupling for encoders with $\varnothing 58$ mm housing
Z 119.024	Torque support and spring washer for encoders with 9.5 mm pin
Z 119.041	Torque support by rubber buffer element for encoders with 15 mm pin
Z 119.050	Spring coupling
Z 119.053	Spring coupling height 19.1 mm
Z 119.070	Spring coupling height 29.1 mm
Z 119.072	Spring coupling for encoders with $\varnothing 58$ mm housing, hole distance 73 mm
Z 119.073	Spring coupling for encoders with $\varnothing 58$ mm housing, hole distance 68 mm
Z 119.076	Spring coupling for encoders with $\varnothing 58$ mm housing
Z 119.082	Spring coupling for encoders with $\varnothing 58$ mm housing, hole distance 63 mm

Data transfer



Clock frequency f	62.5...1500 kHz
Scan ratio of T	40...60 %
Time lag tv	150 ns
Monoflop time tm	25 μ s + T/2
Clock interval tp	30 μ s

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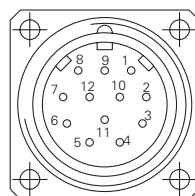
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Terminal significance	
UB	Encoder voltage supply.
GND	Encoder ground connection relating to UB.
Data+	Positive, serial data output of differential linedriver.
Data-	Negative, serial data output of differential linedriver.
Clock+	Positive SSI clock input. Clock+ together with clock- forms a current loop. A current of approx. 7 mA towards clock+ input means logic 1 in positive logic.
Clock-	Negative SSI clock input. Clock- together with clock+ forms a current loop. A current of approx. 7 mA towards clock- input means logic 0 in positive logic.
Zero setting	Input for setting a zero point anywhere within the programmed 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). Connect to GND after setting operation for maximum interference immunity. Impulse duration >100 ms.
$\overline{\text{DATAVALID}}$	Diagnostic output. An error warning is given at level Low. Important: Interferences must be filtered by the downstream electronics.
$\overline{\text{DATAVALID MT}}$	Diagnostic output for monitoring the multiturn sensor voltage supply. Upon dropping below a defined voltage level the $\overline{\text{DV MT}}$ output is switched to Low.
$\overline{\text{UP/DOWN}}$	$\overline{\text{UP/DOWN}}$ counting direction input. This input is standard on High. $\overline{\text{UP/DOWN}}$ means ascending output data with clockwise shaft rotation when looking at flange. $\overline{\text{UP/DOWN-Low}}$ means ascending values with counterclockwise shaft rotation when looking at flange.
Incremental Outputs	Incremental tracks A 90° B and inverted.

Terminal assignment		
GOM2H		
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	$\overline{\text{DATAVALID}}$
Pin 9	pink	$\overline{\text{UP/DOWN}}$
Pin 10	black/yellow	$\overline{\text{DATAVALID MT}}$
Pin 11	–	–
Pin 12	–	–

GOM2H with incremental tracks		
Connector	Core colour	Assignment
Pin 1	brown	UB
Pin 2	white	GND
Pin 3	blue	Clock+
Pin 4	green	Data+
Pin 5	grey	Zero setting
Pin 6	yellow	Data-
Pin 7	red	Clock-
Pin 8	red/blue	Track B inv.
Pin 9	pink	$\overline{\text{UP/DOWN}}$
Pin 10	violet	Track A inv.
Pin 11	black	Track A
Pin 12	grey/pink	Track B



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

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Trigger level			
SSI	Circuit	Incremental outputs	Linedriver RS422
SSI-Clock	Optocoupler	Output level High	>2.5 V (I = -20 mA)
SSI-Data	Linedriver RS485	Output level Low	<0.5 V (I = 20 mA)
		Load High	<20 mA
		Load Low	<20 mA
Control inputs	Input circuit	Outputs	Sine / Cosine
Input level High	>0.7 UB	Output level	1 V _{pp} ±10 %
Input level Low	<0.3 UB	Load	<10 mA
Input resistance	10 k Ω		
Diagnostic outputs or Incremental outputs	Output circuit Push-pull circuit-proof		
Output level High	>UB -3.5 V (I = -20 mA)		
Output level Low	<0.5 V (I = 20 mA)		
Load High	<20 mA		
Load Low	<20 mA		

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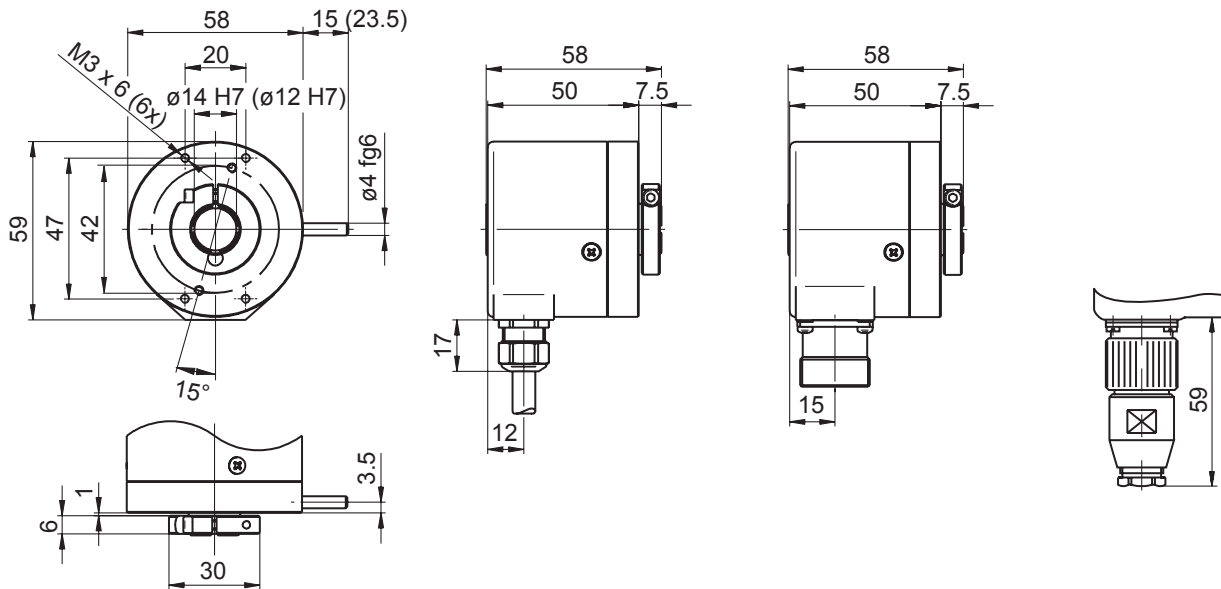
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Dimensions

G0M2H - clamping ring on flange



G0M2H - clamping ring on housing

