

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 | ≤ 50 mA (24 VDC) |
| Initializing time (typ.) | 20 ms after power on |
| Interfaces | SSI, Incremental A 90° B (optional) |
| Steps per turn | 16384 / 14 bit |
| Number of turns | 4096 / 12 bit |
| Incremental output | 2048 pulses A90°B + inverted |
| 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 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 | ≤ 6000 rpm (mechanical) ≤ 6000 rpm (electric) |
| 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 |
| E-connection | Connector, 12-pin |

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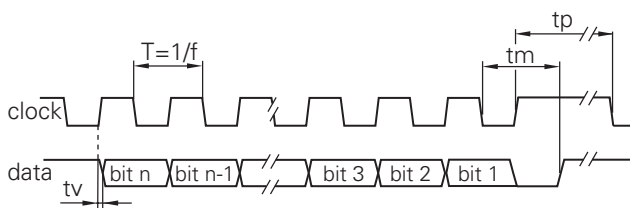
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Part number

G0M2H.

| | | | | |
|--|--|--|----|---|
| | | | | |
| | | | | <u>Pulses / Incremental output</u> |
| | | | 02 | No incremental output |
| | | | 04 | 2048 pulses / push-pull |
| | | | 06 | 2048 pulses / RS422 |
| | | | | <u>E-connection</u> |
| | | | A1 | Connector M23, 12-pin, radial |
| | | | A3 | Connector M23, 12-pin, radial, for incremental output 04/06 |
| | | | 21 | Cable 1 m, radial |
| | | | | <u>Voltage supply / signals</u> |
| | | | 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 |
| | | | | <u>Hollow shaft</u> |
| | | | 0 | Hollow shaft $\varnothing 12$ mm without pin |
| | | | 1 | Hollow shaft $\varnothing 12$ mm with pin 15 mm |
| | | | B | Hollow shaft $\varnothing 12$ mm with pin 9.5 mm |
| | | | 4 | Hollow shaft $\varnothing 14$ mm without pin |
| | | | 5 | Hollow shaft $\varnothing 14$ mm with pin 15 mm |
| | | | F | Hollow shaft $\varnothing 14$ mm with pin 9.5 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 |

Accessories

Connectors and cables (page %S)

| | |
|-----------|--|
| 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 (page %S)

| | |
|-----------|--|
| 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 |

Trigger level

| SSI | Circuit |
|-----------|------------------|
| SSI-Clock | Optocoupler |
| SSI-Data | Linedriver RS485 |

| Control input | Input circuit |
|------------------|---------------|
| Input level High | >0.7 UB |
| Input level Low | <0.3 UB |
| Input resistance | 10 k Ω |

| Incremental outputs | Output circuit |
|---------------------|-------------------------|
| | Linedriver RS422 |
| Output level High | >2.5 V (I = -20 mA) |
| Output level Low | <0.5 V (I = 20 mA) |
| | 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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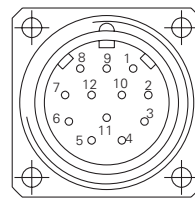
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| Terminal significance | |
|----------------------------------|--|
| UB | Encoder voltage supply. |
| GND | Encoder ground connection relating to UB. |
| Data+ | Positive, serial data output of differential linedriver. |
| Data- | Negative, serial 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 | | |
|---------------------|--------------|----------------------------------|
| G0M2H | | |
| 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 | – | – |

| G0M2H 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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Dimensions

