

Absolute encoders - SSI

End shaft max. $\varnothing 14$ mm

Optical multiturn encoders 14 bit ST / 12 bit MT

GXM2S - SSI



GXM2S with end shaft

Features

- Encoder multiturn / SSI
- Optical sensing
- Resolution: singleturn 14 bit, multiturn 12 bit
- End shaft $\varnothing 12$ mm / $\varnothing 14$ mm
- Electronic setting of zero point
- Permanent check of code continuity
- Counting direction input
- Suitable for high positive and negative accelerations
- 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 and incremental outputs |
| 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 end shaft $\varnothing 14$ mm end shaft |
| Protection DIN EN 60529 | IP 54 |
| Operating speed | ≤ 6000 rpm (mechanical) ≤ 6000 rpm (electric) |
| Starting torque | ≤ 0.015 Nm IP 54 |
| Rotor moment of inertia | 20 gcm ² |
| Materials | Housing: steel Flange: steel |
| 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 100 g, 6 ms |
| Weight approx. | 600 g |
| E-connection | Connector, 12-pin |

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Part number

Multiturn

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Pulses / Incremental output

- 02 No incremental output
- 04 2048 pulses / push-pull
- 06 2048 pulses / RS422
- 07 2048 pulses / sine 1 Vpp

E-connection

- A1 Connector M23, 12-pin, radial
- A3 Connector M23, 12-pin, radial, for incremental output 04/06/07

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

End shaft

- 0 End shaft ø12 mm without pin
- 1 End shaft ø12 mm with pin 15 mm
- B End shaft ø12 mm with pin 9.5 mm
- 4 End shaft ø14 mm without pin
- 5 End shaft ø14 mm with pin 15 mm
- F End shaft ø14 mm with pin 9.5 mm

Accessories

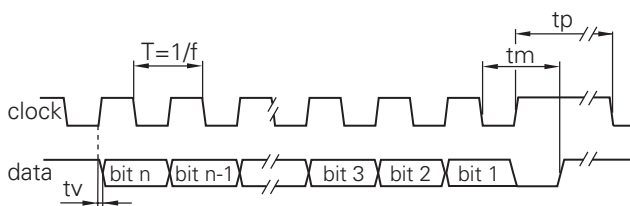
Connectors and cables (page %S)

| | |
|-----------|--|
| 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.) |
| Z 182.005 | Female connector M23, 12-pin, 5 m (incr.) |

Mounting accessories (page %S)

| | |
|-----------|---|
| Z 119.023 | Spring coupling for encoders with ø58 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 ø58 mm housing, hole distance 73 mm |
| Z 119.073 | Spring coupling for encoders with ø58 mm housing, hole distance 68 mm |
| Z 119.076 | Spring coupling for encoders with ø58 mm housing |
| Z 119.082 | Spring coupling for encoders with ø58 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 µs + T/2 |
| Clock interval tp | 30 µs |

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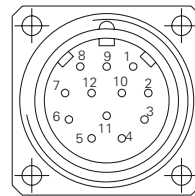
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| Terminal significance | |
|----------------------------------|--|
| UB | Encoder voltage supply. |
| GND | Encoder ground connection relating to UB. |
| Data+ | Positive, serial data output of differential linedriver. |
| Data- | Negative, serial data output of differential linedriver. |
| Clock+ | Positive SS 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 drained 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 | | |
|---------------------|--------------|----------------------------------|
| GXM2S | | |
| 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 | – | – |

| GXM2S 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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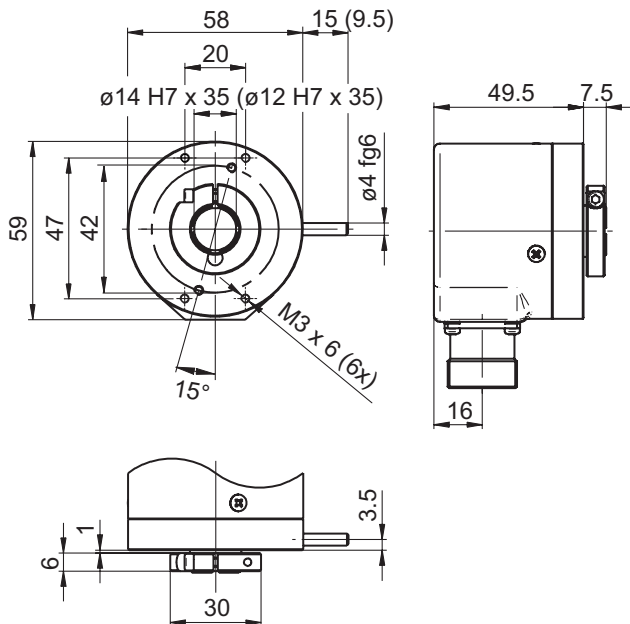
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Trigger level

| 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 | Input 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 | | |

Dimensions

GXM2S



Connector dimensions

