

Absolute encoders - SSI

Solid shaft with clamping or synchro flange

Optical multiturn encoders 18 bit ST / 12 bit MT

GBM2W



GBM2W with clamping flange

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) |
| Function | Multiturn |
| Steps per revolution | 262144 / 18 bit |
| Number of revolutions | 4096 / 12 bit |
| Absolute accuracy | ±0.01 ° |
| Sensing method | Optical |
| Code | Gray or binary |
| Code sequence | CW/CCW coded by connection |
| Inputs | SSI clock: RS422 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 | DIN EN 61000-6-2 |
| Emitted interference | DIN EN 61000-6-4 |
| Diagnostic functions | Self-diagnosis Multiturn sensing |
| Approval | UL approval / E63076 |

Features

- High resolution encoder multiturn / SSI
- Optical sensing method
- Resolution: singleturn 18 bit, multiturn 12 bit
- Electronic setting of zero point
- Counting direction input
- Available with additional incremental output
- Maximum resistant against magnetic fields

Optional

- Stainless steel design
- Corrosion protection for offshore applications
- Extended operating temperature range up to -40 °C

Technical data - mechanical design

| | |
|-------------------------|--|
| Size (flange) | ø58 mm |
| Shaft type | ø10 mm solid shaft (clamping flange) ø6 mm solid shaft (synchro flange) |
| Flange | Clamping or synchro flange |
| Protection DIN EN 60529 | IP 54 (without shaft seal), IP 65 (with shaft seal) |
| Operating speed | ≤10000 rpm (mechanical) ≤6000 rpm (electric) |
| Starting acceleration | ≤1000 U/s ² |
| Starting torque | ≤0.015 Nm (+25 °C, IP 54) ≤0.03 Nm (+25 °C, IP 65) |
| Rotor moment of inertia | 20 gcm ² |
| Admitted shaft load | ≤20 N axial ≤40 N radial |
| Materials | Housing: steel Flange: aluminium |
| Operating temperature | -25...+85 °C -40...+85 °C (optional) |
| Relative humidity | 95 % non-condensing |
| Resistance | DIN EN 60068-2-6 Vibration ±0.75 mm - 10-58 Hz 10 g - 58-2000 Hz DIN EN 60068-2-27 Shock 200 g, 6 ms |
| Weight approx. | 400 g |
| Connection | Connector M23, 12-pin Cable 1 m |

Subject to modification in technic and design. Errors and omissions excepted.

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Part number

GBM2W.

Pulses / Incremental output

- 02 No incremental output
- 04 2048 pulses / push-pull
- 06 2048 pulses / RS422
- 07 2048 periods / SinCos

Connection

- A0 Connector M23, 12-pin, axial
- A1 Connector M23, 12-pin, radial
- A2 Connector M23, 12-pin, axial, for incremental output 04/06/07
- A3 Connector M23, 12-pin, radial, for incremental output 04/06/07
- 11 Cable 1 m, axial
- 21 Cable 1 m, radial
- 31 Cable 1 m, axial, for incremental output 04/06/07
- 41 Cable 1 m, radial, for incremental output 04/06/07

Voltage supply / signals

- 10 10...30 VDC / gray code 30 bit (ST 18 + MT 12)
- 12 10...30 VDC / binary code 30 bit (ST 18 + MT 12)

Flange / Solid shaft

- 0 Clamping flange / \varnothing 10 mm, IP 54
- A Clamping flange / \varnothing 10 mm, IP 65
- 1 Synchro flange / \varnothing 6 mm, IP 54
- B Synchro flange / \varnothing 6 mm, IP 65

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Accessories

Connectors and cables

| | |
|----------|---|
| 11034154 | Female connector M23, 12-pin, without cable (Z 130.001) |
| 10138559 | Female connector M23, 12-pin, 2 m cable (Z 130.003) |
| 11034156 | Female connector M23, 12-pin, 3 m cable (Z 130.004) |
| 10126594 | Female connector M23, 12-pin, 5 m cable (Z 130.005) |
| 10129757 | Female connector M23, 12-pin, 10 m cable (Z 130.007) |
| 11042991 | Female connector M23, 12-pin, 15 m cable (Z 130.M15) |
| 11034344 | Female connector M23, 12-pin, without cable (incr.) (Z 182.001) |
| 11034345 | Female connector M23, 12-pin, 2 m (incr.) (Z 182.003) |
| 11034346 | Female connector M23, 12-pin, 5 m (incr.) (Z 182.005) |
| 11076757 | Female connector M23, 12-pin, 8 m (incr.) (Z 182.M08) |
| 11034347 | Female connector M23, 12-pin, 10 m (incr.) (Z 182.007) |
| 11051323 | Female connector M23, 12-pin, 15 m (incr.) (Z 182.M15) |

Mounting accessories

| | |
|----------|--|
| 10117669 | Eccentric fixing, single (Z 119.006) |
| 10141255 | Adaptor plate for clamping flange for modification into synchro flange (Z 119.013) |
| 10117667 | Mounting adaptor for encoders with synchro flange (Z 119.015) |
| 10125051 | Mounting adaptor for encoders with clamping flange (M3) (Z 119.017) |
| 10141132 | Spring washer coupling D1=6 / D2=10 (Z 121.C01) |

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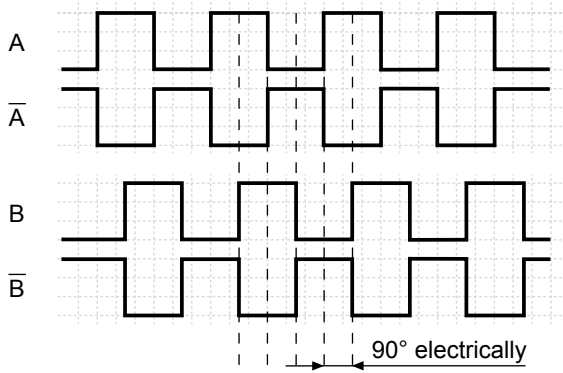
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Output signals

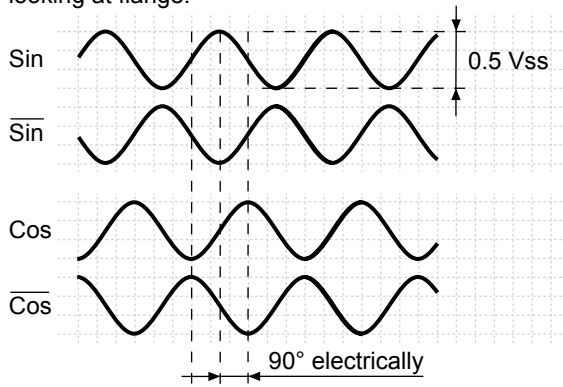
Push-pull and RS422

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

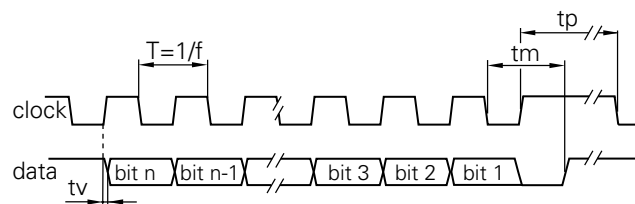


SinCos

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



Data transfer



| | |
|-------------------|-----------------|
| Clock frequency f | 62.5...1500 kHz |
| Duty cycle of T | 40...60 % |
| Delay time tv | 150 ns |
| Monoflop time tm | 26 μs + T/2 |
| Clock interval tp | 30 μs |

Trigger level

| SSI | Circuit |
|-----------|--|
| SSI-Clock | Optocoupler, RS422 with terminating resistor |
| SSI-Data | Linedriver RS422 or RS485 |

Control inputs

| Control inputs | Input circuit |
|------------------|---------------|
| Input level High | >0.7 UB |
| Input level Low | <0.3 UB |
| Input resistance | 10 kΩ |

Diagnostic outputs or Incremental outputs

| 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 / Low | <20 mA |

Incremental outputs

| 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

| Outputs | SinCos |
|--------------|--|
| Output level | 0.5 Vpp ±10 % (Output signals before difference formation) |
| Load | <10 mA |

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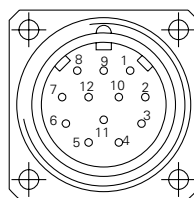
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| Terminal significance | |
|-----------------------|--|
| UB | Encoder voltage supply. |
| GND | Encoder ground connection relating to UB. |
| Data+ | Positive, serial data output of differential linedriver. |
| Data- | Negative, serial data output of differential linedriver. |
| Clock+ | Positive, serial clock input of differential RS422 receiver. |
| Clock- | Negative, serial clock input of differential RS422 receiver. |
| 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. |
| <u>DATAVALID</u> | Diagnostic output. An error warning is given at level Low. Important: Interferences must be drained by the downstream electronics. |
| <u>DATAVALID MT</u> | Diagnostic output for monitoring the multiturn sensor voltage supply. Upon dropping below a defined voltage level the DV MT output is switched to Low. |
| <u>UP/DOWN</u> | UP/DOWN counting direction input. This input is standard on High. UP/DOWN means ascending output data with clockwise shaft rotation when looking at flange. 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 | | |
|---------------------|--------------|---------------------|
| GBM2W | | |
| 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 | <u>DATAVALID</u> |
| Pin 9 | pink | <u>UP/DOWN</u> |
| Pin 10 | black/yellow | <u>DATAVALID MT</u> |
| Pin 11-12 | - | - |

GBM2W with incremental tracks | SinCos

| Connector | Core colour | Assignment | 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. | <u>Cosine</u> |
| Pin 9 | pink | <u>UP/DOWN</u> | <u>UP/DOWN</u> |
| Pin 10 | violet | Track A inv. | <u>Sine</u> |
| 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.

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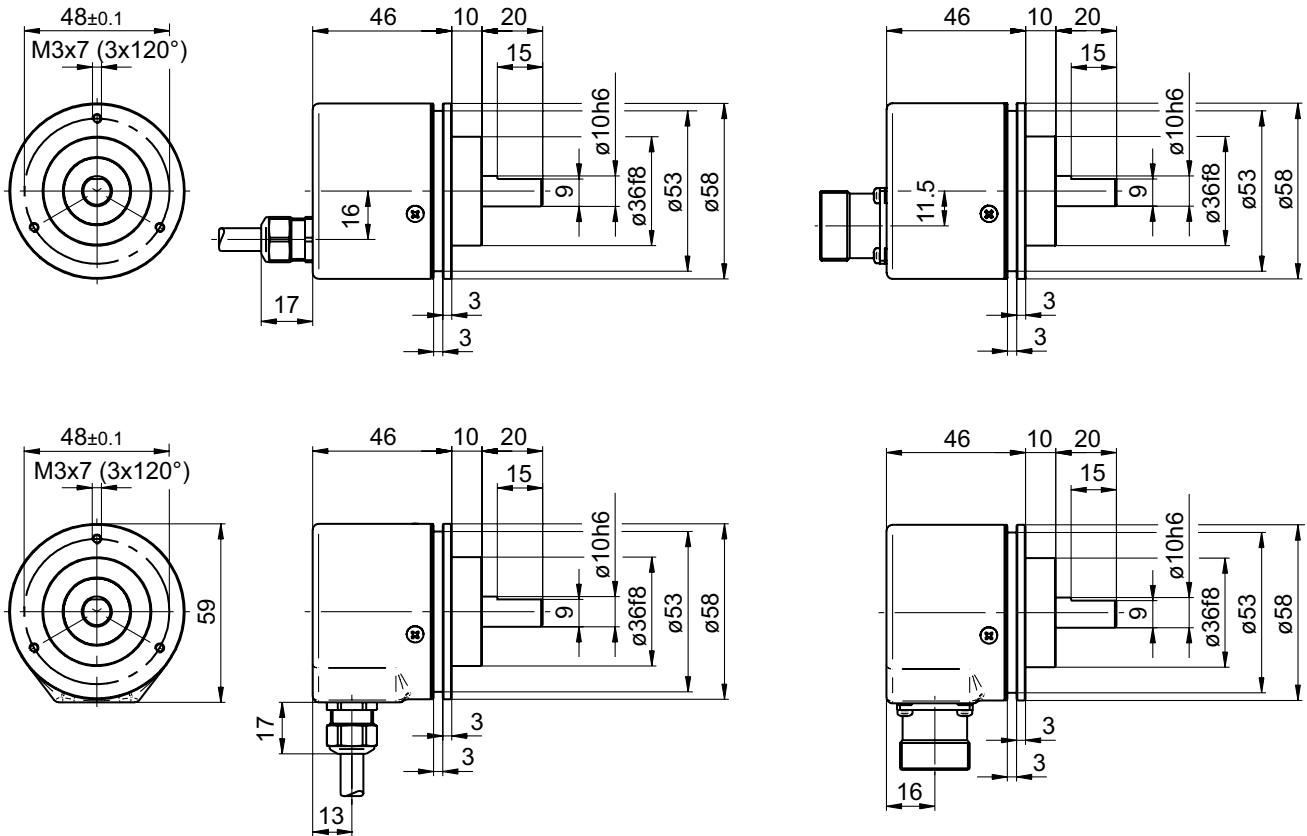
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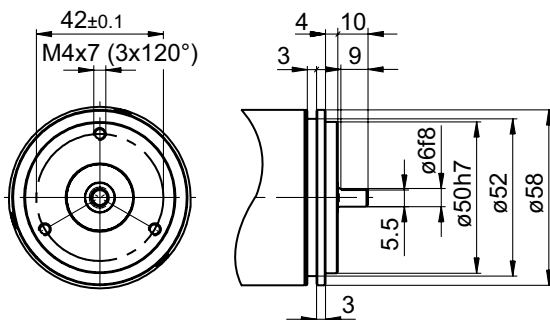
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Dimensions

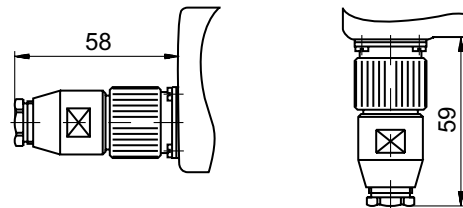
GBM2W - clamping flange



GBM2W - synchro flange



GBM2W - connector dimensions



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