

Absolute encoders - SSI

Solid shaft with clamping or synchro flange

Optical singleturn encoders up to 18 bit

GBA2W



GBA2W with clamping flange

Features

- High resolution encoder singleturn / SSI
- Optical sensing method
- Resolution: max. 18 bit
- Clamping or synchro flange
- Electronic setting of zero point
- Counting direction input
- Suitable for high positive, 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) |
| Function | Singleturn |
| Steps per turn | ≤262144 / 18 bit |
| Incremental output | 2048 pulses A90°B + inverted |
| Absolute accuracy | ±0.01 ° |
| Sensing method | Optical |
| Code | Gray or binary |
| Code sequence | CW/CCW coded by connection |
| Inputs | SSI clock Control signals UP/DOWN and zero |
| Output stages | SSI data: linedriver RS485 Diagnostic outputs push-pull |
| Interference immunity | DIN EN 61000-6-2 |
| Emitted interference | DIN EN 61000-6-4 |
| Diagnostic function | Self-diagnosis |
| Approval | UL approval / E63076 |

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 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 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 |

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

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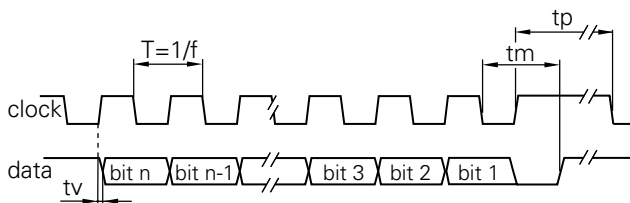
Part number

GBA2W.

| | |
|----|---|
| | <u>Pulses / Incremental output</u> |
| 05 | No incremental output |
| 14 | 2048 pulses / push-pull |
| 16 | 2048 pulses / RS422 |
| 17 | 2048 periods / SinCos* |
| | <u>Connection</u> |
| A0 | Connector M23, 12-pin, axial |
| A1 | Connector M23, 12-pin, radial |
| A4 | Connector M23, 12-pin, axial, for incremental output 14/16 |
| A5 | Connector M23, 12-pin, radial, for incremental output 14/16 |
| 11 | Cable 1 m, axial |
| 21 | Cable 1 m, radial |
| 71 | Cable 1 m, axial, for incremental output 14/16/17 |
| 81 | Cable 1 m, radial, for incremental output 14/16/17 |
| | <u>Voltage supply / signals</u> |
| 10 | 10...30 VDC / gray code 18 bit |
| 12 | 10...30 VDC / binary code 18 bit |
| 20 | 10...30 VDC / gray code 17 bit |
| | <u>Flange / Solid shaft</u> |
| 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 |

* On request

Data transfer



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

Accessories

Connectors and cables

| | |
|-----------|---|
| Z 130.001 | Female connector M23, 12-pin, without cable |
| Z 130.003 | Female connector M23, 12-pin, 2 m cable |
| Z 182.001 | Female connector M23, 12-pin, without cable (incr.) |
| Z 182.003 | Female connector M23, 12-pin, 2 m (incr.) |

Mounting accessories

| | |
|-----------|--|
| Z 119.006 | Eccentric fixing, single |
| Z 119.013 | Adaptor plate for clamping flange for modification into synchro flange |
| Z 119.017 | Mounting adaptor for clamping flange (M3) |

Trigger level

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

Control inputs

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

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 | 1 Vpp \pm 10 % |
| Load | <10 mA |

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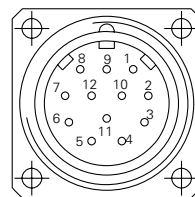
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| Terminal significance | |
|-----------------------------|--|
| UB | Encoder voltage supply. |
| GND | Encoder ground connection relating to UB. |
| Data+ | Positive, serial data output of differential linedriver. |
| Data- | Negative, serial data output of differential linedriver. |
| Clock+ | Positive 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. |
| $\overline{\text{UBminOK}}$ | Diagnostic output. Level low indicates the operating voltage has dropped below the minimum limit. |
| $\overline{\text{UP/DOWN}}$ | $\overline{\text{UP/DOWN}}$ 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 | | |
|---------------------|--------------|-----------------------------|
| GBA2W | | |
| 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 | $\overline{\text{UBminOK}}$ |
| Pin 9 | pink | $\overline{\text{UP/DOWN}}$ |
| Pin 10-12 | – | – |

| GBA2W 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. | $\overline{\text{Cosine}}$ |
| Pin 9 | pink | $\overline{\text{UP/DOWN}}$ | $\overline{\text{UP/DOWN}}$ |
| Pin 10 | violet | Track A inv. | $\overline{\text{Sine}}$ |
| 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.

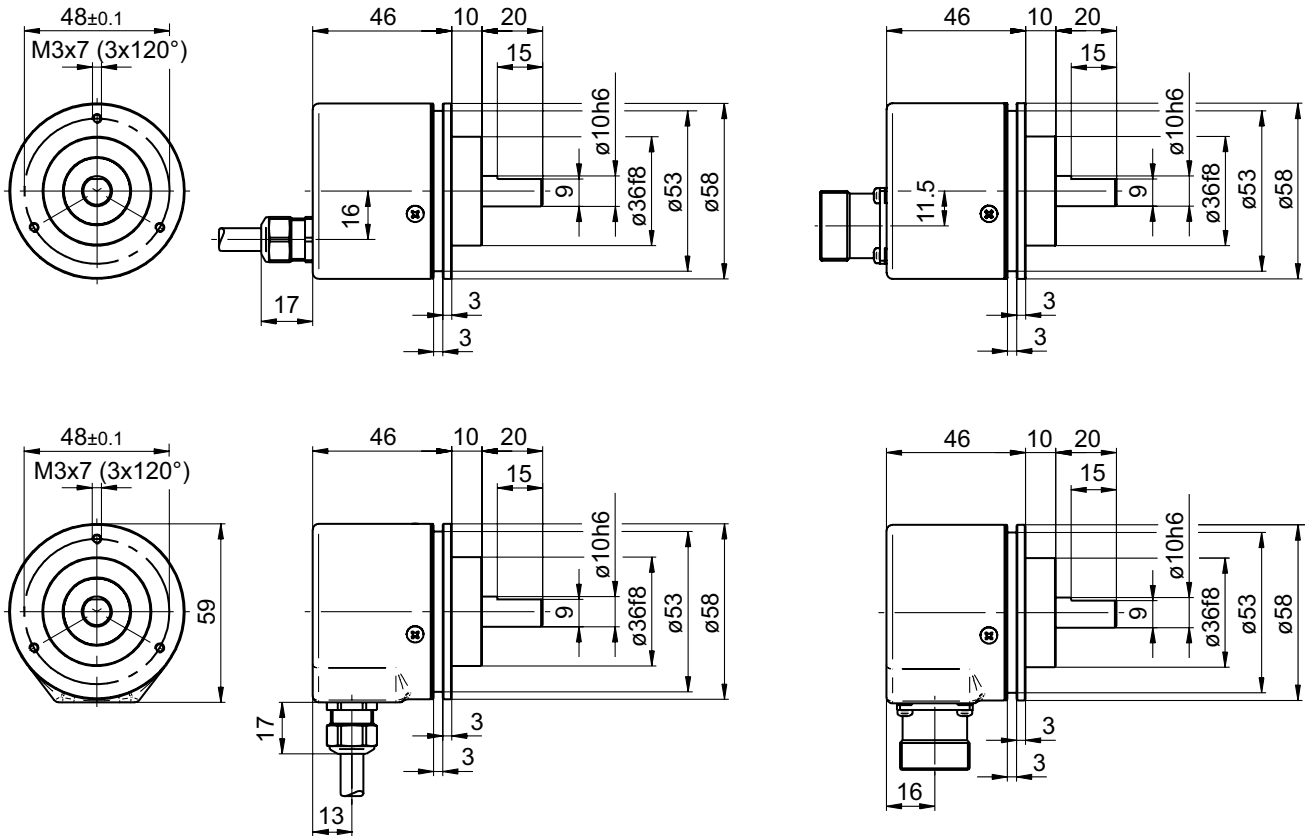
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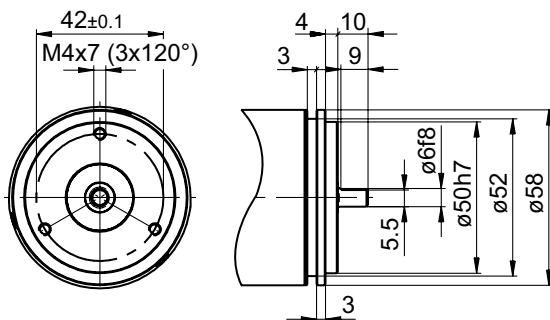
GBA2W

Dimensions

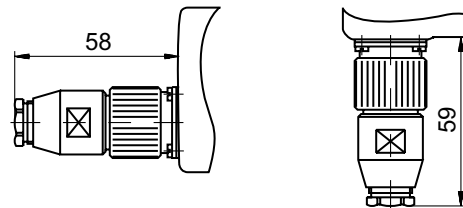
GBA2W - clamping flange



GBA2W - synchro flange



GBA2W - connector dimensions



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