

Absolute encoders - SSI

Shaft with clamping or synchro flange

Optical singleturn encoders 14 bit

GA240, GA241 - SSI



GA240 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 | Singleturn |
| Steps per turn | 16384 / 14 bit |
| Incremental output | 2048 pulses A90°B + inverted |
| Absolute accuracy | ±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 Incremental: push-pull or linedriver RS422 |
| Interference immunity | DIN EN 61000-6-2 |
| Emitted interference | DIN EN 61000-6-4 |
| Diagnostic functions | Self-diagnosis Code continuity check |
| Approval | UL approval / E63076 |

Features

- Encoder singleturn / SSI
- Optical sensing
- Resolution: 14 bit
- Clamping or synchro flange
- Permanent check of code continuity
- Extreme resistance to shock and vibration
- Electronic setting of zero point
- Available with additional incremental output

Technical data - mechanical design

| | |
|-------------------------|--|
| Housing | ø58 mm |
| Protection DIN EN 60529 | IP 54 without shaft seal IP 65 with shaft seal |
| Operating speed | ≤10000 rpm (mechanical) ≤6000 rpm (electric) |
| Rotor moment of inertia | 14.5 gcm ² |
| Admitted shaft load | ≤20 N axial ≤40 N radial |
| 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. | 250 g |
| Connection | Connector M23, 12-pin Cable 1 m |
| GA240 | |
| Shaft | ø10 mm |
| Flange | Clamping flange |
| Starting torque | ≤0.015 Nm IP 54 ≤0.03 Nm IP 65 |
| GA241 | |
| Shaft | ø6 mm |
| Flange | Synchro flange |
| Starting torque | ≤0.01 Nm IP 54 ≤0.015 Nm IP 65 |

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Part number

Clamping flange

GA240.

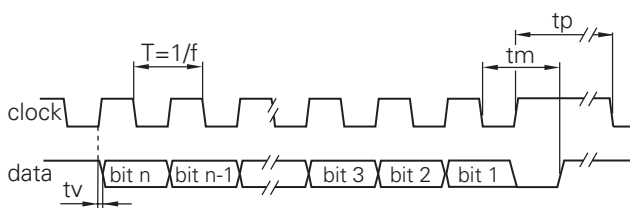
| | |
|----|--|
| | <u>Pulses / Incremental output</u> |
| 05 | No incremental output |
| 14 | 2048 pulses / push-pull |
| 16 | 2048 pulses / RS422 |
| 17 | 2048 periods, Sin/Cos 1 Vpp |
| | <u>Connection</u> |
| A0 | Connector M23, 12-pin, axial |
| A1 | Connector M23, 12-pin, radial |
| A5 | Connector M23, 12-pin, radial, for incremental output 14/16/17 |
| 11 | Cable 1 m, axial |
| 21 | Cable 1 m, radial |
| | <u>Voltage supply / signals</u> |
| 30 | 10...30 VDC / gray code 13 bit |
| 32 | 10...30 VDC / binary code 13 bit |
| 90 | 10...30 VDC / gray code 14 bit |
| 92 | 10...30 VDC / binary code 14 bit |
| | <u>Flange / Shaft</u> |
| 0 | Clamping flange / ø10 mm IP 54 |
| A | Clamping flange / ø10 mm IP 65 |

Synchro flange

GA241.

| | |
|----|--|
| | <u>Pulses / Incremental output</u> |
| 05 | No incremental output |
| 14 | 2048 pulses / push-pull |
| 16 | 2048 pulses / RS422 |
| 17 | 2048 periods, Sin/Cos 1 Vpp |
| | <u>Connection</u> |
| A0 | Connector M23, 12-pin, axial |
| A1 | Connector M23, 12-pin, radial |
| A5 | Connector M23, 12-pin, radial, for incremental output 14/16/17 |
| 11 | Cable 1 m, axial |
| 21 | Cable 1 m, radial |
| | <u>Voltage supply / signals</u> |
| 30 | 10...30 VDC / gray code 13 bit |
| 32 | 10...30 VDC / binary code 13 bit |
| 90 | 10...30 VDC / gray code 14 bit |
| 92 | 10...30 VDC / binary code 14 bit |
| | <u>Flange / Shaft</u> |
| 1 | Synchro flange / ø6 mm IP 54 |
| B | Synchro flange / ø6 mm IP 65 |

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 |

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 for GA240

| | |
|-----------|---|
| Z 119.006 | Eccentric fixing, single |
| Z 119.013 | Adaptor plate for clamping flange for modification into synchro flange |
| Z 119.017 | Mounting angle for clamping flange |
| Z 119.025 | Adaptor plate for clamping flange, mounting by eccentric fixings (order separately) |

Mounting accessories for GA241

| | |
|-----------|---|
| Z 119.006 | Eccentric fixing, single |
| Z 119.015 | Mounting adaptor for synchro flange |
| Z 119.035 | Bearing flange for encoders with synchro flange |

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

Absolute encoders - SSI

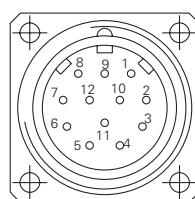
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| Terminal significance | |
|-------------------------------|--|
| UB | Encoder voltage supply. |
| GND | Encoder ground connection relating to UB. |
| Data+ | Positive, serial data output of differential linedriver. |
| Data- | Negative, serial data 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 drained by the downstream electronics. |
| $\overline{\text{UP/DOWN}}$ | 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 | | |
|---|--------------|-------------------------------|
| GA240, GA241 | | |
| 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 | UP/DOWN |
| Pin 10 | black/yellow | – |
| Pin 11 - 12 | – | – |
| GA240, GA241 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 | 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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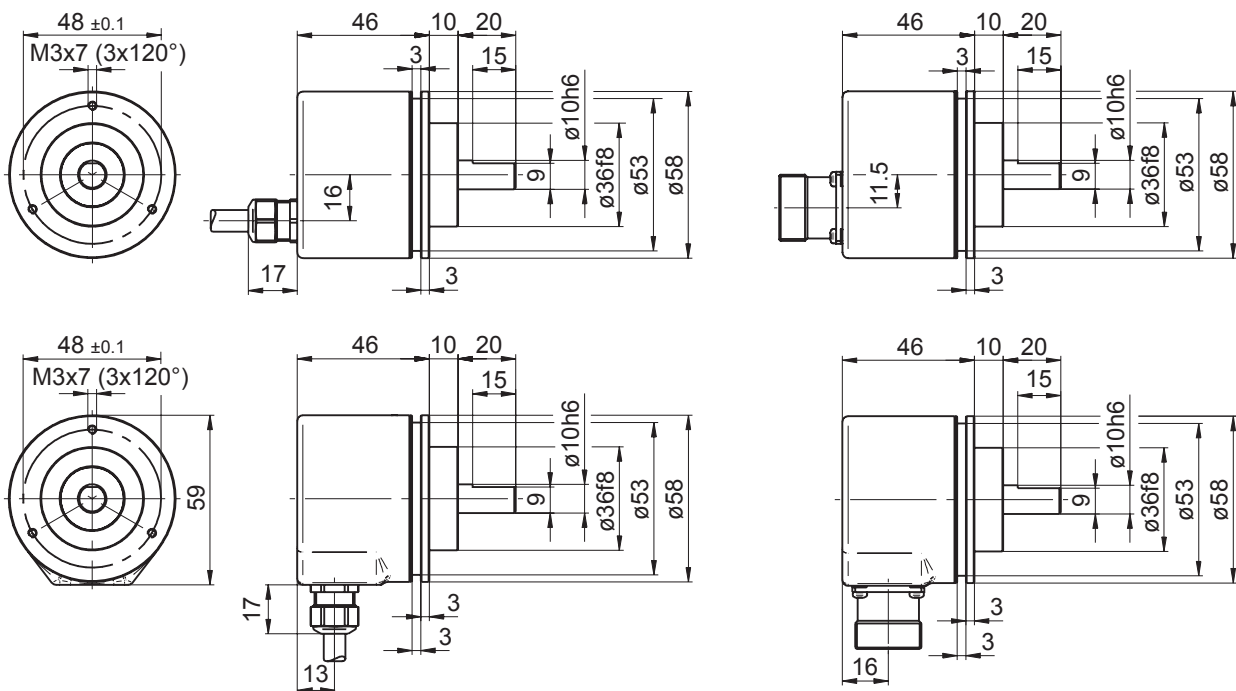
GA240, GA241 - SSI

Trigger level

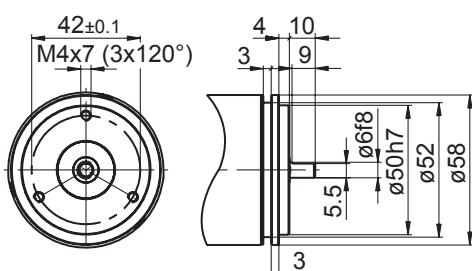
| SSI | Circuit | Incremental outputs | Linedriver RS422 |
|---------------------|--------------------------------|---|-------------------------|
| SSI-Clock | Optocoupler | Output level High | >2.5 V (I = -20 mA) |
| SSI-Data | Linedriver RS485 | Output level Low | <0.5 V (I = 20 mA) |
| | | Load High / 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 kΩ | | |
| Incremental outputs | Output circuit | Diagnostic output | |
| | Push-pull circuit-proof | NPN-Open Collector – 10 kΩ to UB internally connected | |
| Output level High | >UB -3.5 V (I = -20 mA) | Output level Low | ≤0.5 V (I = 20 mA) |
| Output level Low | <0.5 V (I = 20 mA) | Load Low | ≤40 mA |
| Load High / Low | <20 mA | | |

Dimensions

GA240 SSI clamping flange



GA241 SSI synchro flange



GA240, GA241 SSI connector dimensions

