

# Absolute encoders - SSI

Solid shaft with clamping flange

Optical singleturn encoders 14 bit

## GA240 - SSI



GA240 with clamping flange

### Features

- Encoder singleturn / SSI
- Optical sensing method
- Resolution: 14 bit
- Clamping flange
- Electronic setting of zero point
- Available with additional incremental output

### Optional

- Corrosion protection for offshore applications

### Technical data - electrical ratings

Voltage supply	10...30 VDC 5 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 revolution	≤16384 / 14 bit
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 inv. and zero
Output stages	SSI data: linedriver RS485 Diagnostic outputs push-pull Incremental: push-pull or linedriver RS422
Incremental output	2048 pulses A90°B + inverted
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
Flange	Clamping 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	14.5 gcm <sup>2</sup>
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 ±0.75 mm - 10-58 Hz 10 g - 58-2000 Hz DIN EN 60068-2-27 Shock 200 g, 6 ms
Weight approx.	250 g
Connection	Connector M23, 12-pin Cable 1 m

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## Part number

GA240.

### Pulses / Incremental output

- 05 No incremental output
- 14 2048 pulses / push-pull
- 16 2048 pulses / RS422
- 17 2048 periods / SinCos\*

### Connection

- 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
- 71 Cable 1 m, axial, for incremental output 14/16/17
- 81 Cable 1 m, radial, for incremental output 14/16/17

### Voltage supply / signals

- 33 5 VDC / binary code 13 bit
- 40 10...30 VDC / gray code 12 bit
- 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

### Flange / Solid shaft

- 0 Clamping flange /  $\varnothing$ 10 mm, IP 54
- A Clamping flange /  $\varnothing$ 10 mm, IP 65

\* On request

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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)
10125051	Mounting adaptor for encoders with clamping flange (M3) (Z 119.017)
11034088	Adaptor plate for clamping flange, mounting by eccentric fixings (order separately) (Z 119.025)
10141132	Spring washer coupling D1=6 / D2=10 (Z 121.C01)

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## Solid shaft with clamping flange

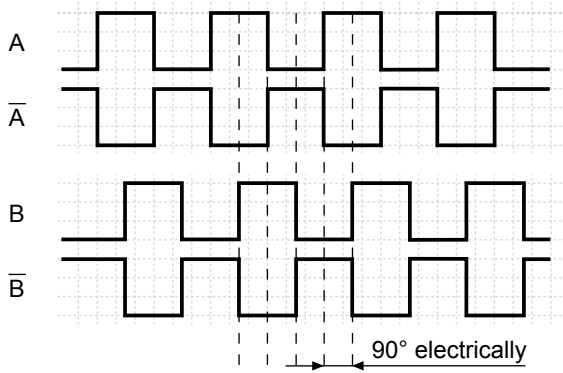
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#### Output signals

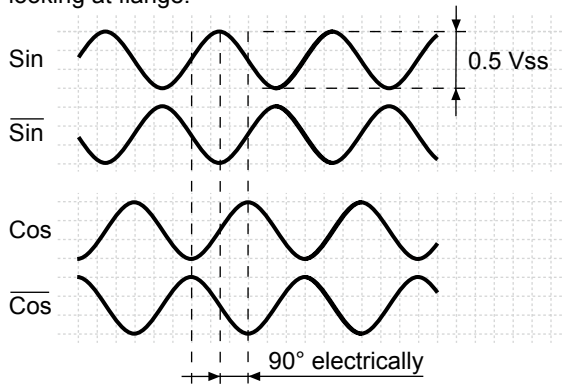
##### Push-pull and RS422

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

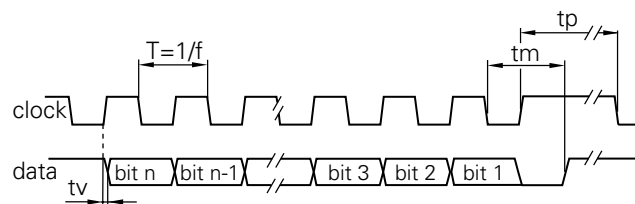


##### SinCos

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
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 kΩ

#### Incremental outputs

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

#### Diagnostic output

NPN-Open Collector	– 10 kΩ to UB internally connected
Output level Low	≤0.5 V (I = 20 mA)
Load Low	≤40 mA

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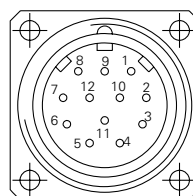
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Terminal significance	
UB	Encoder voltage supply.
GND	Encoder ground connection relating to UB.
Data+	Positive, serial data output of differential linedriver.
Data-	Negative, serial data output of differential linedriver.
Clock+	Positive SSI clock 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 inv.). Connect to GND after setting operation for maximum interference immunity. Impulse duration >100 ms.
UBminOK inv.	Diagnostic output. Level low indicates the operating voltage has dropped below the minimum limit.
UP/DOWN inv.	UP/DOWN inv. counting direction input. This input is standard on High. UP/DOWN inv. means ascending output data with clockwise shaft rotation when looking at flange. UP/DOWN inv.-Low means ascending values with counterclockwise shaft rotation when looking at flange.
Incremental outputs	Incremental tracks A 90° B and inverted.

Terminal assignment		
<b>GA240</b>		
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	UBminOK inv.
Pin 9	pink	UP/DOWN inv.
Pin 10-12	–	–

#### GA240 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.	Cosine inv.
Pin 9	pink	UP/DOWN inv.	UP/DOWN inv.
Pin 10	violet	Track A inv.	Sine inv.
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.

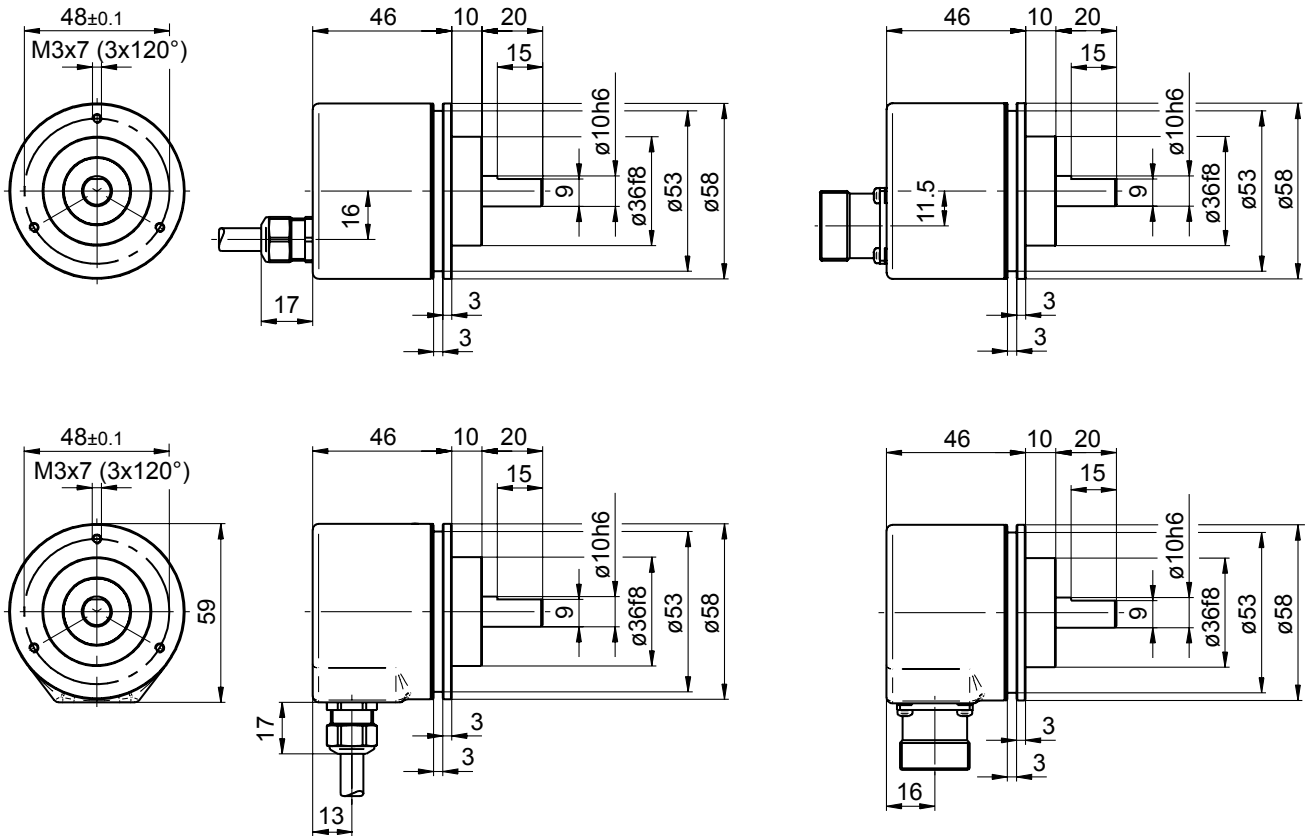
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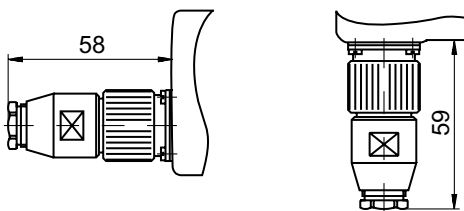
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## Dimensions

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### GA240 - SSI, connector dimensions



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