

Absolute encoders - SSI

Solid 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 stages	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 function	Self-diagnosis
Approval	UL approval / E63076

Features

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

Optional

- Corrosion protection for offshore applications

Technical data - mechanical design

Size (flange)	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 type	ø10 mm solid shaft
Flange	Clamping flange
Starting torque	≤0.015 Nm (+25 °C, IP 54) ≤0.03 Nm (+25 °C, IP 65)
GA241	
Shaft type	ø6 mm solid shaft
Flange	Synchro flange
Starting torque	≤0.01 Nm (+25 °C, IP 54) ≤0.015 Nm (+25 °C, IP 65)

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Part number

Clamping flange

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

- 30 10...30 VDC / gray code 13 bit
- 32 10...30 VDC / binary code 13 bit
- 40 10...30 VDC / gray code 12 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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Part number

Synchro flange

GA241.

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

- 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

- 1 Synchro flange / \varnothing 6 mm, IP 54
- B Synchro flange / \varnothing 6 mm, IP 65

* On request

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

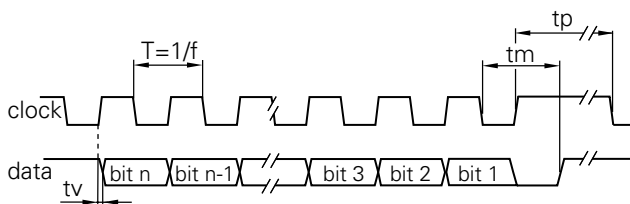
Mounting accessories for GA240

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

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	1 Vpp ±10 %
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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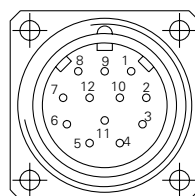
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Terminal significance	
UB	Encoder voltage supply.
GND	Encoder ground connection relating to UB.
Data+	Positive, serial data output of differential linedriver.
Data-	Negative, serial data output of differential linedriver.
Clock+	Positive SSI clock 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). 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		
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	$\overline{\text{UBminOK}}$
Pin 9	pink	$\overline{\text{UP/DOWN}}$
Pin 10-12	–	–

GA240, GA241 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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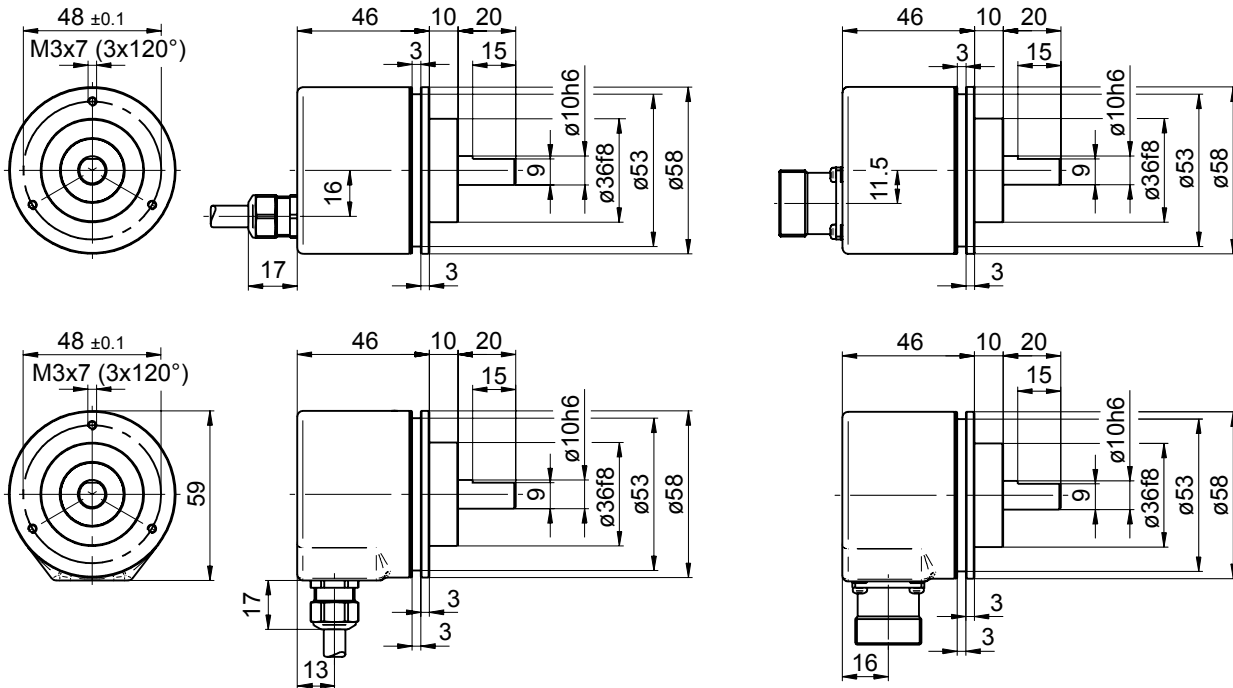
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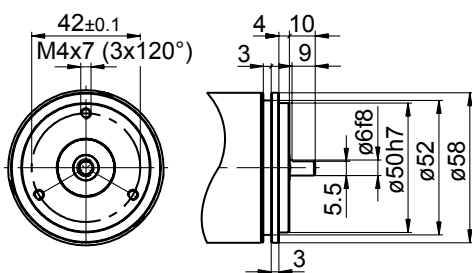
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Dimensions

GA240 - SSI, clamping flange



GA241 - SSI, synchro flange



GA240, GA241 - SSI, connector dimensions

