

GA241 - SSI

Solid shaft with synchro flange

Optical singleturn encoders 14 bit

Overview

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



Technical data

Technical data - electrical ratings

Voltage supply	10...30 VDC 5 VDC $\pm 10\%$ (on request)
Reverse polarity protection	Yes (10...30 VDC) / No (5 VDC)
Consumption w/o load	≤ 50 mA (24 VDC)
Initializing time typ.	20 ms after power on
Interface	SSI Incremental A 90° B (optional)
Function	Singleturn
Steps per revolution	≤ 16384 / 14 bit
Absolute accuracy	$\pm 0.025^\circ$
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 RS422 Diagnostic outputs push-pull Incremental: push-pull or linedriver RS422
Incremental output	2048 pulses A90°B + inverted
Interference immunity	EN 61000-6-2
Emitted interference	EN 61000-6-4
Diagnostic function	Self-diagnosis
Approval	UL approval / E63076

Technical data - mechanical design

Size (flange)	$\varnothing 58$ mm
Shaft type	$\varnothing 6$ mm solid shaft
Flange	Synchro flange
Protection EN 60529	IP 54 (without shaft seal) IP 65 (with shaft seal)
Operating speed	≤ 10000 rpm (mechanical) ≤ 6000 rpm (electric)
Starting torque	≤ 0.01 Nm (+25 °C, IP 54) ≤ 0.015 Nm (+25 °C, IP 65)
Rotor moment of inertia	14.5 gcm ²
Admitted shaft load	≤ 20 N axial ≤ 40 N radial
Material	Housing: aluminium Flange: aluminium
Operating temperature	-25...+85 °C -40...+85 °C (optional)
Relative humidity	95 % non-condensing
Resistance	EN 60068-2-6 Vibration ± 0.75 mm - 10-58 Hz 10 g - 58-2000 Hz EN 60068-2-27 Shock 200 g, 6 ms
Weight approx.	250 g
Connection	Connector M23, 12-pin Connector M12, 8-pin Cable 1 m

Optional

- Corrosion protection for offshore applications

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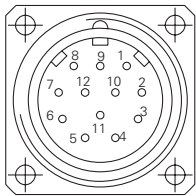
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Terminal assignment

Cable or connector M23

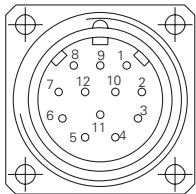
Pin	Core colour	Assignment
1	brown	UB
2	black	GND
3	blue	Clock+
4	beige	Data+
5	green	Zero setting
6	yellow	Data-
7	violet	Clock-
8	brown/yellow	UBminOK inv.
9	pink	UP/DOWN inv.
10-12	–	–



Please use cores twisted in pairs (for example clock+ / clock-) for extension cables of more than 10 m length.

Cable or connector M23 with incremental tracks

Pin	Core colour	Assignment
1	brown	UB
2	white	GND
3	blue	Clock+
4	green	Data+
5	grey	Zero setting
6	yellow	Data-
7	red	Clock-
8	red/blue	Track B inv.
9	pink	UP/DOWN inv.
10	violet	Track A inv.
11	black	Track A
12	grey/pink	Track B

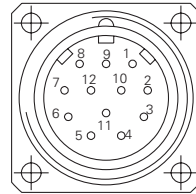


Please use cores twisted in pairs (for example clock+ / clock-) for extension cables of more than 10 m length.

Terminal assignment

Cable or connector M23 with SinCos

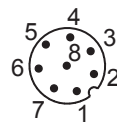
Pin	Core colour	Assignment
1	brown	UB
2	white	GND
3	blue	Clock+
4	green	Data+
5	grey	Zero setting
6	yellow	Data-
7	red	Clock-
8	red/blue	Cosine inv.
9	pink	UP/DOWN inv.
10	violet	Sine inv.
11	black	Sine
12	grey/pink	Cosine



Please use cores twisted in pairs (for example clock+ / clock-) for extension cables of more than 10 m length.

Connector M12

Pin	Assignment
1	GND
2	UB
3	Clock+
4	Clock-
5	Data+
6	Data-
7	Zero setting
8	UP/DOWN inv.



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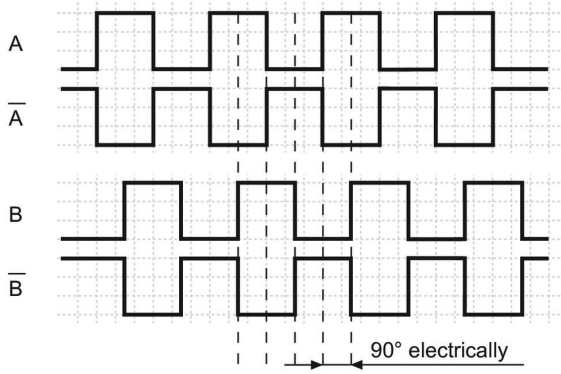
Terminal significance

UB	Encoder voltage supply.
GND	Encoder ground connection relating to UB.
Data+/Data-	Differential SSI data output.
Clock+/Clock-	Differential SSI clock input. Optocoupler or RS422 input.
Zero setting	Input for setting a zero point anywhere within the 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. <9 V 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.

Output signals

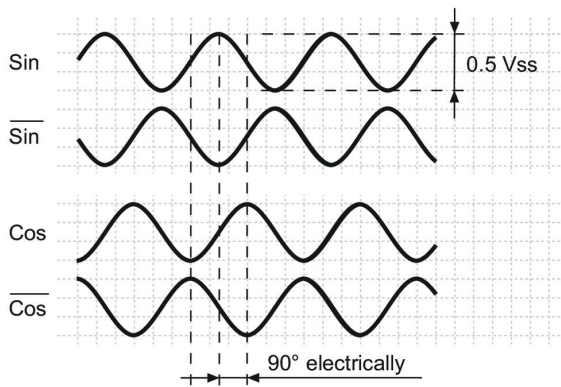
Push-pull and RS422

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.



Trigger level

SSI	Circuit
SSI-Clock	Optocoupler with switching current approx. 7 mA or RS422 with terminating resistor
SSI-Data	Linedriver RS422 or RS485

Control inputs

Input level High	>0.7 UB
Input level Low	<0.3 UB
Input resistance	10 kΩ

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

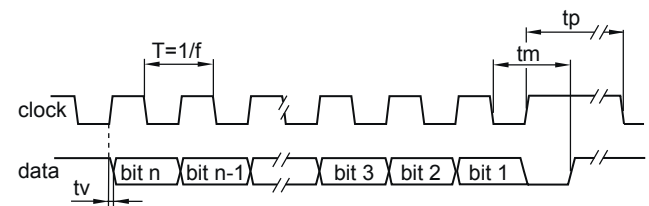
Incremental outputs

Output level High	>2.5 V (I = -20 mA)
Output level Low	<0.5 V (I = 20 mA)
Load High / Low	<20 mA

Outputs

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

Data transfer



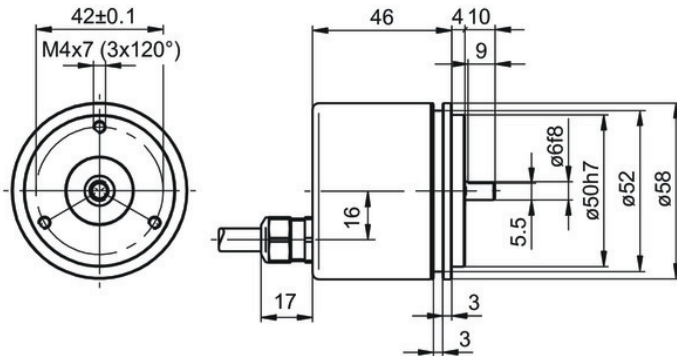
Clock frequency f	62.5...1500 kHz
Duty cycle of T	40...60 %
Delay time tv	150 ns
Monoflop time tm	26 μ s + T/2
Clock interval tp	30 μ s

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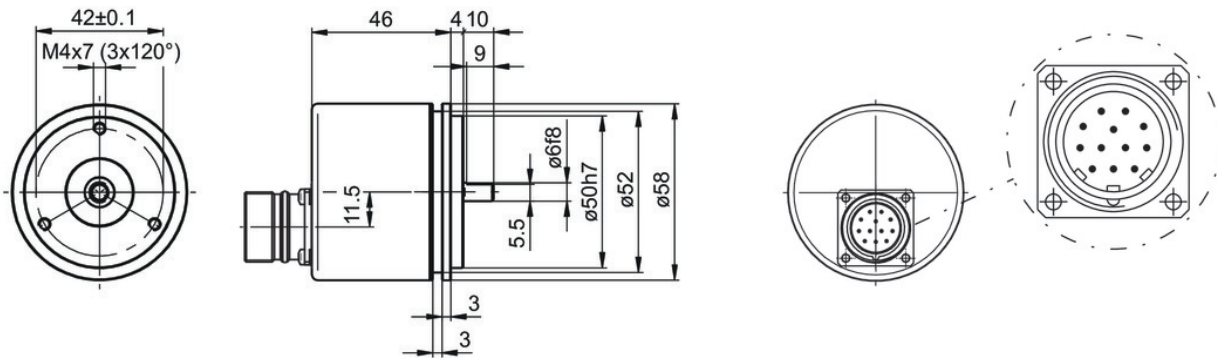
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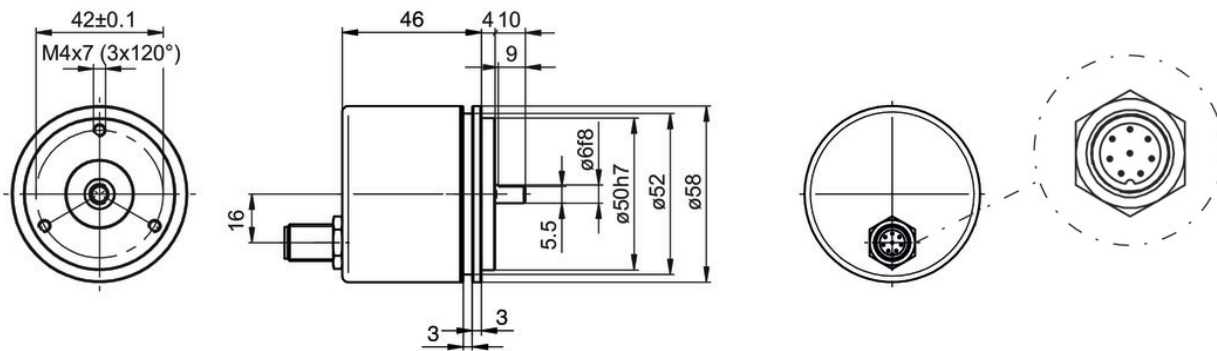
Dimensions



Cable, axial

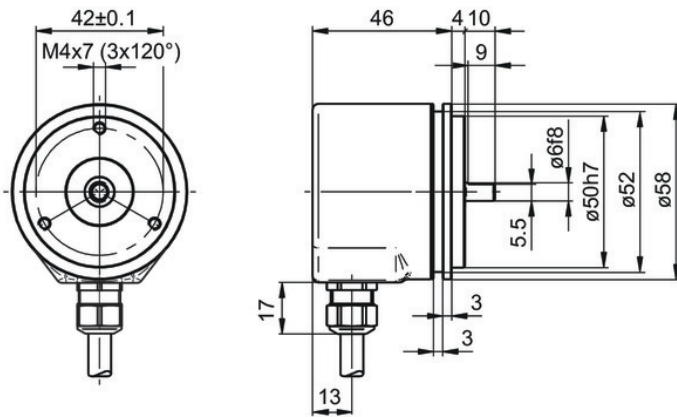


Connector M23, axial

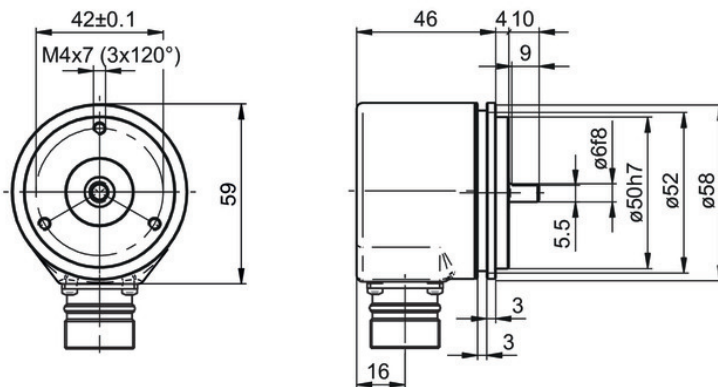
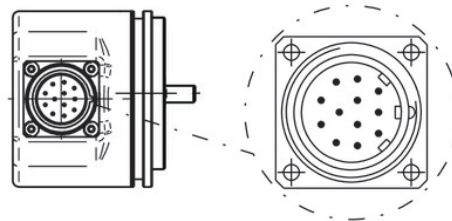


Connector M12, axial

Dimensions



Cable, radial



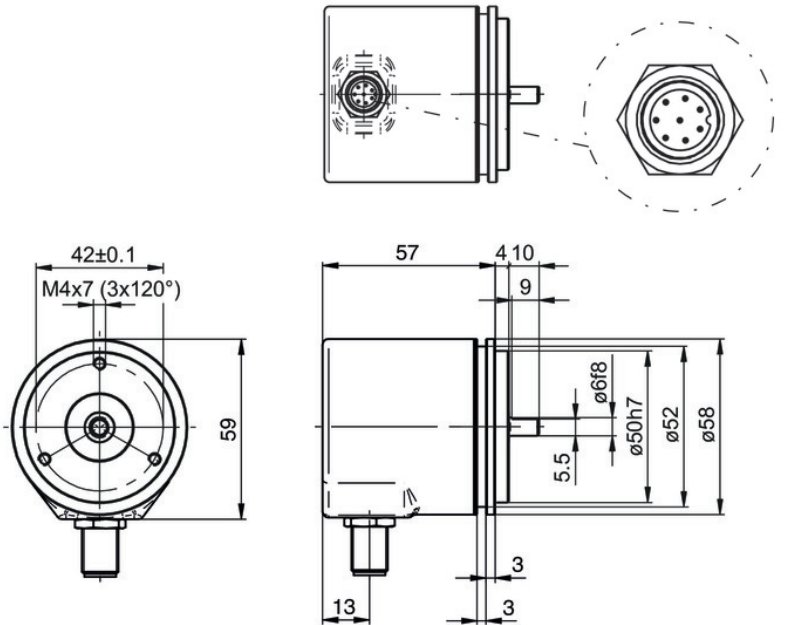
Connector M23, radial

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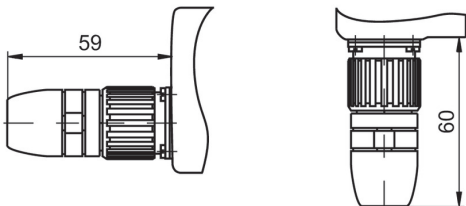
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Dimensions



Connector M12, radial



Connector dimensions M23

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Ordering reference

	GA241.	#	##	##	##
Product	GA241.				
Flange / Solid shaft					
Synchro flange, ø6 mm, IP 54		1			
Synchro flange, ø6 mm, IP 65		B			
Voltage supply / signals					
10...30 VDC, Gray code, 13 bit			30		
10...30 VDC, binary code, 13 bit			32		
5 VDC, binary code, 13 bit			33		
10...30 VDC, Gray code, 12 bit			40		
10...30 VDC, Gray code, 14 bit			90		
5 VDC, Gray code, 14 bit			91		
10...30 VDC, binary code, 14 bit			92		
Connection					
Cable axial, 1 m				11	
Cable radial, 1 m				21	
Cable axial, 1 m, for incremental output				71	
Cable radial, 1 m, for incremental output				81	
Flange socket M23, axial, 12-pin, male contacts, CW				A0	
Flange socket M23, radial, 12-pin, male contacts, CW				A1	
Flange socket M23, radial, 12-pin, male contacts, CW for incremental output				A5	
Flange socket M12, axial, 8-pin, male contacts, A-coded				M4	
Flange socket M12, radial, 8-pin, male contacts, A-coded				M5	
Pulses / Incremental output					
Without incremental output					05
2048 pulses, push-pull					14
2048 pulses, RS422					16

Accessories

Mounting accessories

10117669	Eccentric fixing, single (Z 119.006)
10117667	Mounting adaptor for encoders with synchro flange (Z 119.015)
10158124	Bearing flange for encoders with synchro flange (Z 119.035)
10141132	Spring washer coupling D1=6 / D2=10 (Z 121.C01)