

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.

Pulses / Incremental output
 05 No incremental output
 14 2048 pulses / push-pull
 16 2048 pulses / RS422
 17 2048 periods, Sin/Cos 1 Vpp

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

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 / Shaft
 0 Clamping flange / ø10 mm IP 54
 A Clamping flange / ø10 mm IP 65

Synchro flange

GA241.

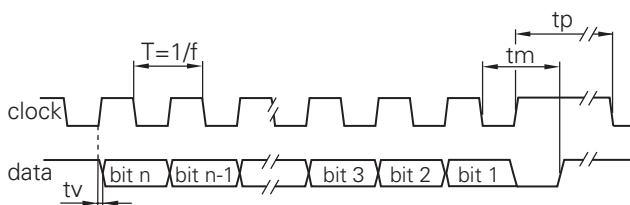
Pulses / Incremental output
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 14 2048 pulses / push-pull
 16 2048 pulses / RS422
 17 2048 periods, Sin/Cos 1 Vpp

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
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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 / Shaft
 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

Absolute encoders - SSI

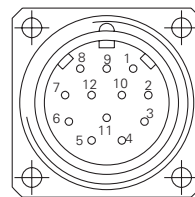
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Terminal significance	
UB	Encoder voltage supply.
GND	Encoder ground connection relating to UB.
Data+	Positive, serial data output of differential linedriver.
Data-	Negative, serial data output of differential linedriver.
Clock+	Positive SSI clock 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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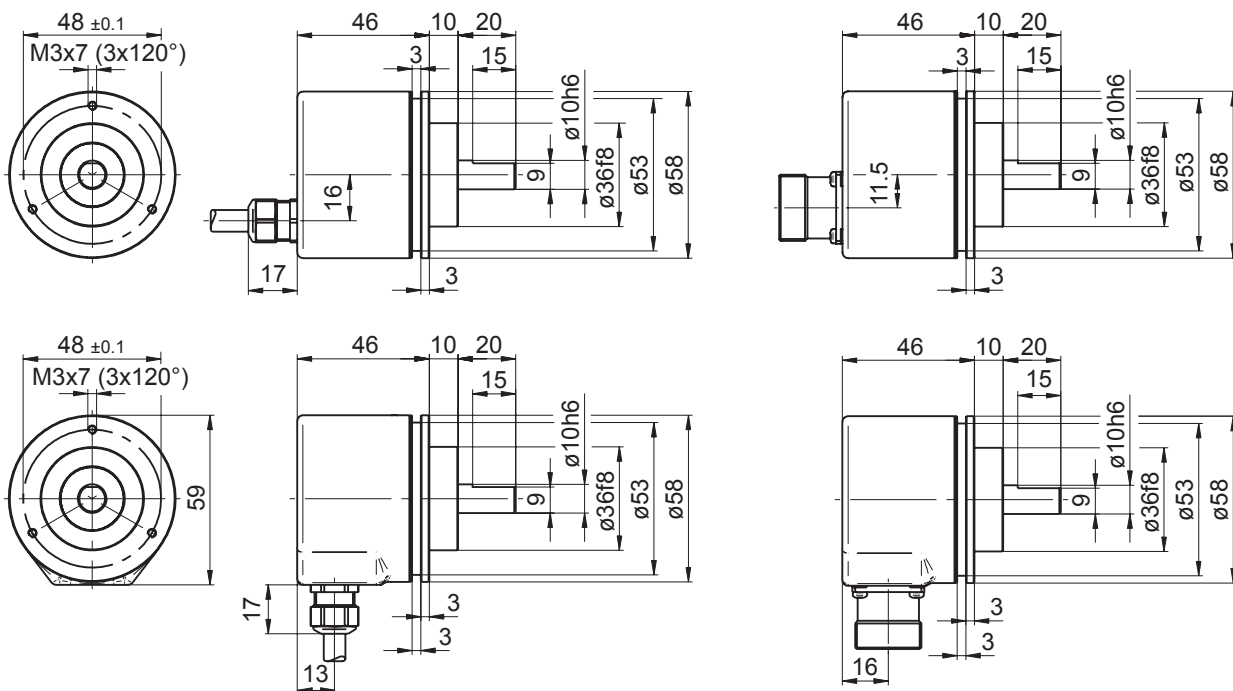
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Trigger level

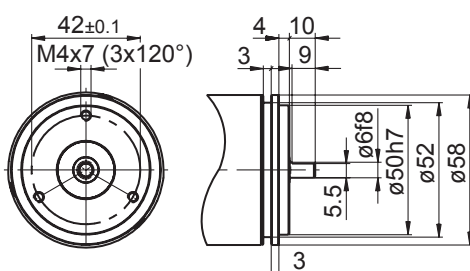
SSI	Circuit	Incremental outputs	Linedriver RS422
SSI-Clock	Optocoupler	Output level High	>2.5 V (I = -20 mA)
SSI-Data	Linedriver RS485	Output level Low	<0.5 V (I = 20 mA)
		Load High / Low	<20 mA
Control inputs	Input circuit	Outputs	Sine / Cosine
Input level High	>0.7 UB	Output level	1 V _{pp} ±10 %
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

