

# Absolute encoders - SSI

## Shaft with clamping or synchro flange

### Optical singleturn encoders 18 bit

#### GBA2W - SSI



GBA2W with clamping flange

#### Features

- Encoder singleturn / SSI
- Optical sensing
- Resolution: 18 bit
- Clamping or synchro flange
- Electronic setting of zero point
- Counting direction input
- High resistance to shock and vibrations
- Suitable for high positive, negative accelerations
- Available with additional incremental output

#### 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	262144 / 18 bit
Incremental output	2048 pulses A90°B + inverted
Absolute accuracy	±0.01 °
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
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

#### Technical data - mechanical design

Dimensions (flange)	ø58 mm
Shaft	ø10 mm (clamping flange) ø6 mm (synchro flange)
Flange	Clamping or synchro 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 (IP 54) ≤0.03 Nm (IP 65)
Rotor moment of inertia	20 gcm <sup>2</sup>
Shaft loading	≤20 N axial ≤40 N radial
Materials	Housing: steel 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.	400 g
Connection	Connector M23, 12-pin Cable 1 m

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#### Part number

GBA2W.

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#### Pulses / Incremental output

- 05 No incremental output
- 14 2048 pulses / push-pull
- 16 2048 pulses / RS422

#### Connection

- A0 Connector M23, 12-pin, axial
- A1 Connector M23, 12-pin, radial
- A2 Connector M23, 12-pin, axial, for incremental output 14/16
- A3 Connector M23, 12-pin, radial, for incremental output 14/16
- 11 Cable 1 m, axial
- 21 Cable 1 m, radial

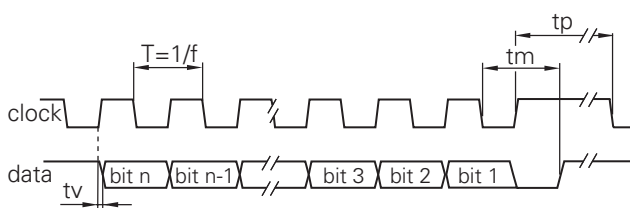
#### Voltage supply / signals

- 10 10...30 VDC / gray code 18 bit
- 12 10...30 VDC / binary code 18 bit

#### Flange / Shaft

- 0 Clamping flange /  $\varnothing$ 10 mm IP 54
- A Clamping flange /  $\varnothing$ 10 mm IP 65
- 1 Synchro flange /  $\varnothing$ 6 mm IP 54
- B Synchro flange /  $\varnothing$ 6 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 $\mu$ s + T/2
Clock interval tp	30 $\mu$ s

#### 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 182.001	Female connector M23, 12-pin, less cable (incr.)
Z 182.003	Female connector M23, 12-pin, 2 m (incr.)

##### Mounting accessories

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 (M3)

#### Trigger level

SSI	Circuit
SSI-Clock	Optocoupler
SSI-Data	Linedriver RS485

Control inputs	Input circuit
Input level High	>0.7 UB
Input level Low	<0.3 UB
Input resistance	10 k $\Omega$

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	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

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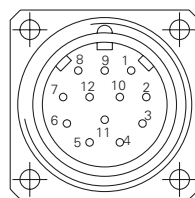
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Terminal significance	
UB	Encoder voltage supply.
GND	Encoder ground connection relating to UB.
Data+	Positive, serial data output of differential linedriver.
Data-	Negative, serial data output of differential linedriver.
Clock+	Positive SSI clock 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 $\geq 100$ 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		
<b>GBA2W</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	$\overline{\text{DATAVALID}}$
Pin 9	pink	UP/DOWN
Pin 10	–	–
Pin 11	–	–
Pin 12	–	–

GBA2W 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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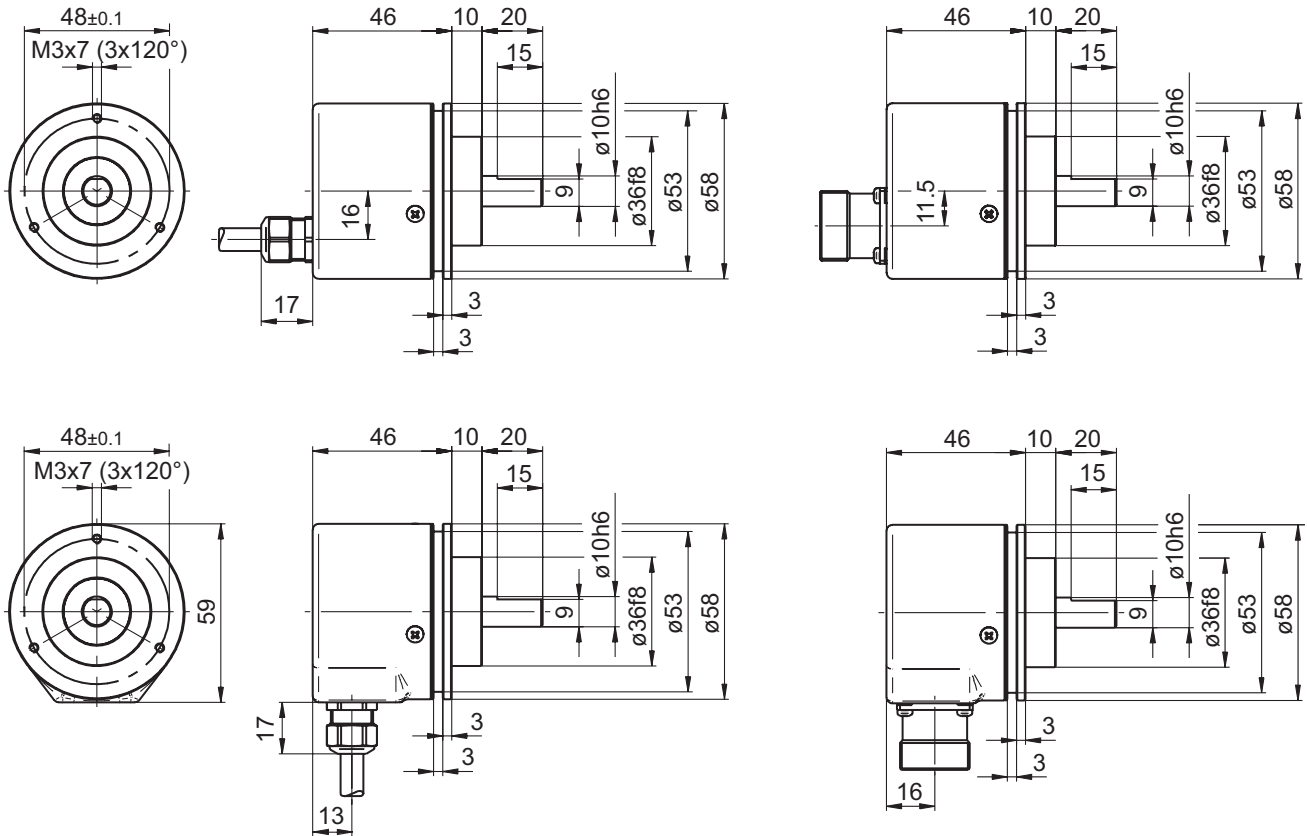
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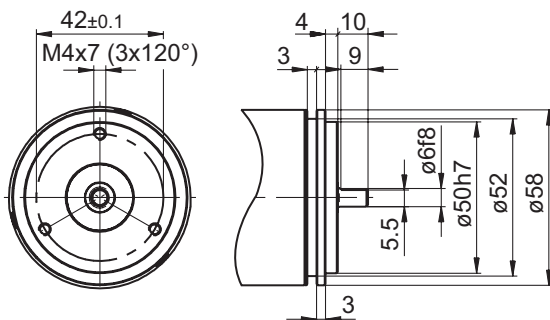
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#### Dimensions

##### GBA2W - clamping flange



##### GBA2W - synchro flange



##### GBA2W - connector dimensions

