

Absolute encoders - SSI

Through hollow shaft up to $\varnothing 14$ mm

Optical singleturn encoders up to 18 bit

GBA2H



GBA2H with through hollow shaft

Features

- High resolution encoder singleturn / SSI
- Optical sensing method
- Resolution: max. 18 bit
- Through hollow shaft up to $\varnothing 14$ mm
- High reliability by self-diagnostics
- Counting direction input
- Electronic setting of zero point
- 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
Absolute accuracy	$\pm 0.01^\circ$
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 RS485 Diagnostic and incremental outputs
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)	$\varnothing 58$ mm
Shaft type	$\varnothing 10...14$ mm (through hollow shaft)
Protection DIN EN 60529	IP 54, IP 65 (optional)
Operating speed	≤ 6000 rpm (mechanical) ≤ 6000 rpm (electric)
Starting torque	≤ 0.04 Nm (+25 °C, IP 54)
Rotor moment of inertia	20 gcm ²
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.	400 g
Connection	Connector M23, 12-pin Cable 1 m

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Part number

GBA2H.				
				Pulses / Incremental output
			05	No incremental output
			14	2048 pulses / push-pull
			16	2048 pulses / RS422
			17	2048 periods / SinCos*
				Connection
		A1		Connector M23, 12-pin, radial
		A5		Connector M23, 12-pin, radial, for incremental output 14/16/17
		21		Cable 1 m, radial
		81		Cable 1 m, radial, for incremental output 14/16/17
				Voltage supply / signals
		10		10...30 VDC / gray code 18 bit
		12		10...30 VDC / binary code 18 bit
		20		10...30 VDC / gray code 17 bit
				Through hollow shaft
	8			$\varnothing 10$ mm, without pin
	9			$\varnothing 10$ mm, pin 15 mm
	0			$\varnothing 12$ mm, without pin
	1			$\varnothing 12$ mm, pin 15 mm
	B			$\varnothing 12$ mm, pin 9.5 mm
	4			$\varnothing 14$ mm, without pin
	5			$\varnothing 14$ mm, pin 15 mm
	F			$\varnothing 14$ mm, pin 9.5 mm

* On request

Accessories

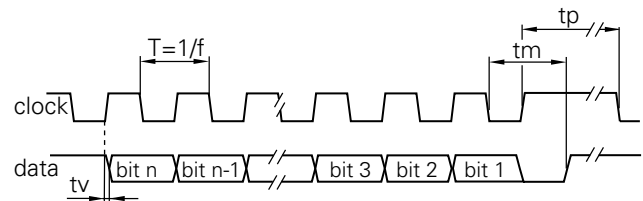
Connectors and cables

11034154	Female connector M23, 12-pin, without cable (Z 130.001)
10138559	Female connector M23, 12-pin, 2 m cable (Z 130.003)
10126594	Female connector M23, 12-pin, 5 m cable (Z 130.005)
10129757	Female connector M23, 12-pin, 10 m cable (Z 130.007)
11034344	Female connector M23, 12-pin, without cable (incr.) (Z 182.001)
11034345	Female connector M23, 12-pin, 2 m (incr.) (Z 182.003)

Mounting accessories

11003562	Spring coupling for encoders with $\varnothing 58$ mm housing, hole distance 63 mm (Z 119.082)
11034121	Spring coupling for encoders with $\varnothing 58$ mm housing, hole distance 68 mm (Z 119.073)
10165157	Spring coupling for encoders with $\varnothing 58$ mm housing, hole distance 73 mm (Z 119.072)
10147837	Spring coupling for one-side attachment, length 35 mm (Z 119.050)
11034106	Spring coupling for motor's fan guard (Z 119.053)
11034123	Spring coupling for one-side attachment, length 115 mm (Z 119.076)

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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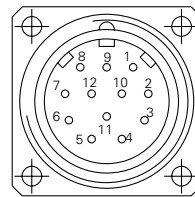
GBA2H

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.
UBminOK	Diagnostic output. Level low indicates the operating voltage has dropped below the minimum limit.
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		
GBA2H		
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
Pin 9	pink	UP/DOWN
Pin 10-12	–	–

GBA2H 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
Pin 9	pink	UP/DOWN	UP/DOWN
Pin 10	violet	Track A inv.	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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Trigger level

SSI	Circuit	Incremental outputs	Linedriver RS422
SSI-Clock	Optocoupler	Output level High	$>2.5\text{ V}$ ($I = -20\text{ mA}$)
SSI-Data	Linedriver RS485	Output level Low	$<0.5\text{ V}$ ($I = 20\text{ mA}$)
		Load High / Low	$<20\text{ mA}$
Control inputs	Input circuit	Outputs	SinCos
Input level High	$>0.7\text{ UB}$	Output level	$1\text{ Vpp} \pm 10\%$
Input level Low	$<0.3\text{ UB}$	Load	$<10\text{ mA}$
Input resistance	$10\text{ k}\Omega$		
Incremental outputs	Output circuit Push-pull circuit-proof	Diagnostic output	
Output level High	$>\text{UB} - 3.5\text{ V}$ ($I = -20\text{ mA}$)	NPN-Open Collector – $10\text{ k}\Omega$ to UB internally connected	
Output level Low	$<0.5\text{ V}$ ($I = 20\text{ mA}$)	Output level Low	$\leq 0.5\text{ V}$ ($I = 20\text{ mA}$)
Load High / Low	$<20\text{ mA}$	Load Low	$\leq 40\text{ mA}$

Dimensions

