

Absolute encoders - SSI

Solid shaft with clamping flange, stainless steel housing

Optical multiturn encoders 14 bit ST / 12 bit MT

GE404



GE404 with clamping flange

Features

- Encoder multiturn / SSI
- Stainless steel design V4A
- Optical sensing method
- Resolution: singleturn 14 bit, multiturn 12 bit
- 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
- Viton sealing resistant against chemical agents
- Maximum resistant against magnetic fields

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
Interface	SSI
Function	Multiturn
Steps per turn	≤16384 / 14 bit
Number of turns	4096 / 12 bit
Incremental output	2048 pulses A90°B (optional)
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
Interference immunity	DIN EN 61000-6-2
Emitted interference	DIN EN 61000-6-4
Diagnostic functions	Self-diagnosis Multiturn sensing
Approval	UL approval / E63076

Technical data - mechanical design

Size (flange)	ø58 mm
Shaft type	ø10 mm solid shaft
Flange	Clamping flange
Protection DIN EN 60529	IP 67
Operating speed	≤10000 rpm (mechanical) ≤6000 rpm (electric)
Starting acceleration	≤1000 U/s ²
Starting torque	≤0.03 Nm (+25 °C)
Rotor moment of inertia	20 gcm ²
Admitted shaft load	≤20 N axial ≤40 N radial
Materials	Housing: stainless steel 1.4305 or 1.4404 Flange: stainless steel 1.4305 or 1.4404
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.	600 g
Connection	Connector M23, 12-pin

· Subject to modification in technic and design. Errors and omissions excepted.

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Part number

Clamping flange

GE404. **A**

	<u>Pulses / Incremental output</u>
02	No incremental output
04	2048 pulses / push-pull
06	2048 pulses / RS422
07	2048 periods / SinCos
	<u>Connection</u>
A1	Connector M23, 12-pin, radial
A3	Connector M23, 12-pin, radial, for incremental output 04/06/07
	<u>Voltage supply / signals</u>
10	10...30 VDC / gray code 25 bit (ST 13 + MT 12)
12	10...30 VDC / binary code 25 bit (ST 13 + MT 12)
20	10...30 VDC / gray code 24 bit (ST 12 + MT 12)
90	10...30 VDC / gray code 26 bit (ST 14 + MT 12)
	<u>Flange / Solid shaft</u>
A	Clamping flange / ø10 mm, IP 67

Accessories

Connectors and cables

Z 189.001	Female connector M23, 12-pin, stainless steel, without cable
Z 189.007	Female connector M23, 12-pin, stainless steel, 10 m cable

Mounting accessories

Z 119.017	Mounting adaptor for clamping flange (M3)
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Trigger level

SSI	Circuit
SSI-Clock	Optocoupler
SSI-Data	Linedriver RS485

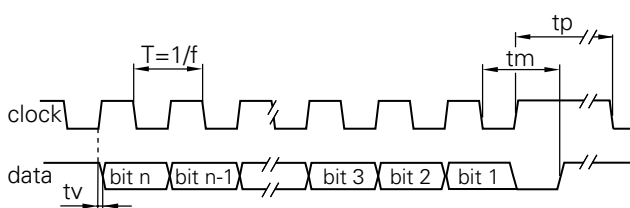
Control inputs	Input circuit
Input level High	>0.7 UB
Input level Low	<0.3 UB
Input resistance	10 kΩ

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	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	SinCos
Output level	1 V _{pp} ±10 %
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 μs + T/2
Clock interval tp	30 μs

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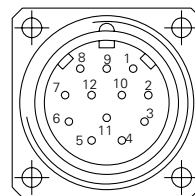
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Terminal significance	
UB	Encoder voltage supply.
GND	Encoder ground connection relating to UB.
Data+	Positive, serial data output of differential linedriver.
Data-	Negative, serial data output of differential linedriver.
Clock+	Positive SS clock input. 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.
$\overline{\text{DATAVALID MT}}$	Diagnostic output for monitoring the multiturn sensor voltage supply. Upon dropping below a defined voltage level the $\overline{\text{DV MT}}$ output is switched to Low.
$\overline{\text{UP/DOWN}}$	$\overline{\text{UP/DOWN}}$ 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		
GE404		
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	$\overline{\text{DATAVALID}}$
Pin 9	pink	$\overline{\text{UP/DOWN}}$
Pin 10	violet	$\overline{\text{DATAVALID MT}}$
Pin 11-12	–	–

GE404 with incremental tracks SinCos			
Connector	Core colour	Assignment	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	$\overline{\text{UP/DOWN}}$	$\overline{\text{UP/DOWN}}$
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.

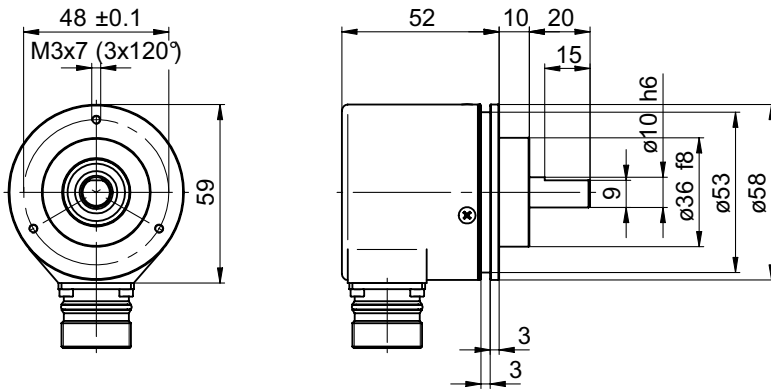
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Dimensions

GE404 - clamping flange



GE404 - connector dimensions

