

# Absolute encoders - SSI

Through hollow shaft up to  $\varnothing 50.8$  mm

Optical multiturn encoders 13 bit ST / 12 bit MT

## G1M2H, G2M2H



G1M2H with through hollow shaft

### Features

- Encoder multiturn / SSI
- Optical sensing method
- Resolution: singleturn 13 bit, multiturn 12 bit
- Through hollow shaft of 1" and 2" diameter
- Electronic setting of zero point
- Counting direction input
- High resistance to shock and vibrations
- Suitable for high positive, negative accelerations

### Technical data - electrical ratings

Voltage supply	10...30 VDC
Reverse polarity protection	Yes
Consumption w/o load	$\leq 50$ mA (24 VDC)
Initializing time typ.	20 ms after power on
Interface	SSI
Function	Multiturn
Steps per turn	8192 / 13 bit
Number of turns	4096 / 12 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 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

Protection DIN EN 60529	IP 54, IP 65 (optional)
Materials	Housing: aluminium Flange: aluminium
Operating temperature	-25...+85 °C
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
Connection	Connector M23, 12-pin

### G1M2H

Size (flange)	$\varnothing 90$ mm
Shaft type	$\varnothing 25.4$ mm (through hollow shaft)
Operating speed	$\leq 3800$ rpm (mechanical) $\leq 6000$ rpm (electric)
Starting torque	$\leq 0.35$ Nm (+25 °C)
Rotor moment of inertia	2000 gcm <sup>2</sup>
Weight approx.	890 g

### G2M2H

Size (flange)	$\varnothing 116$ mm
Shaft type	$\varnothing 50.8$ mm (through hollow shaft)
Operating speed	$\leq 2000$ rpm (mechanical) $\leq 6000$ rpm (electric)
Starting torque	$\leq 0.5$ Nm (+25 °C)
Rotor moment of inertia	11000 gcm <sup>2</sup>
Weight approx.	1200 g

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## Through hollow shaft up to ø50.8 mm

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#### G1M2H, G2M2H

##### Part number

G1M2H.     **A1** **02**

Connection  
A1 Connector M23, 12-pin, radial

Voltage supply / signals  
10 10...30 VDC / gray code 25 bit  
(ST 13 + MT 12)  
12 10...30 VDC / binary code 25 bit  
(ST 13 + MT 12)

Through hollow shaft  
0 ø25.4 mm, pin 15 mm  
1 ø20 mm, pin 15 mm

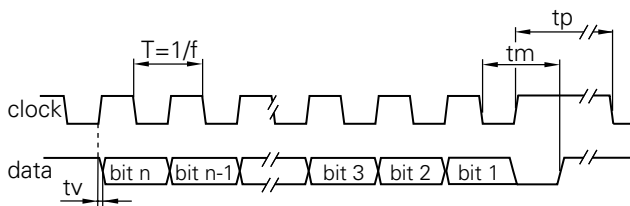
G2M2H.     **A1** **02**

Connection  
A1 Connector M23, 12-pin, radial

Voltage supply / signals  
10 10...30 VDC / gray code 25 bit  
(ST 13 + MT 12)  
12 10...30 VDC / binary code 25 bit  
(ST 13 + MT 12)

Through hollow shaft  
0 ø50.8 mm, clamping ring  
1 ø50 mm, clamping ring

##### Data transfer



Clock frequency f	62.5...1500 kHz
Duty cycle of T	40...60 %
Delay time tv	150 ns
Monoflop time tm	20 µs
Clock interval tp	25 µs

##### Accessories

###### Connectors and cables

Z 130.001	Female connector M23, 12-pin, without 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

###### Mounting accessories for G1M2H

Z 119.037	Rubber buffer element 18.5 mm long, as torque support
Z 119.039	Set of adjusting angles as torque support
Z 119.040	Shoulder screw M5 as torque support
Z 119.041	Torque support by rubber buffer for encoders with 15 mm pin
Z 119.043	Spring coupling for GX and G1
Z 119.050	Spring coupling for one-side attachment, length 35 mm

###### Mounting accessories for G2M2H

Z 119.037	Rubber buffer element 18.5 mm long, as torque support
Z 119.039	Set of adjusting angles as torque support
Z 119.040	Shoulder screw M5 as torque support
Z 119.041	Torque support by rubber buffer for encoders with 15 mm pin
Z 119.050	Spring coupling for one-side attachment, length 35 mm

# Absolute encoders - SSI

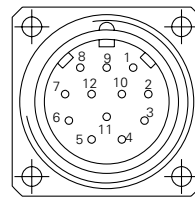
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## G1M2H, G2M2H

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 filtered 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.
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.

Terminal assignment		
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	$\overline{\text{DATAVALID MT}}$
Pin 11-12	–	–



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

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 $\Omega$

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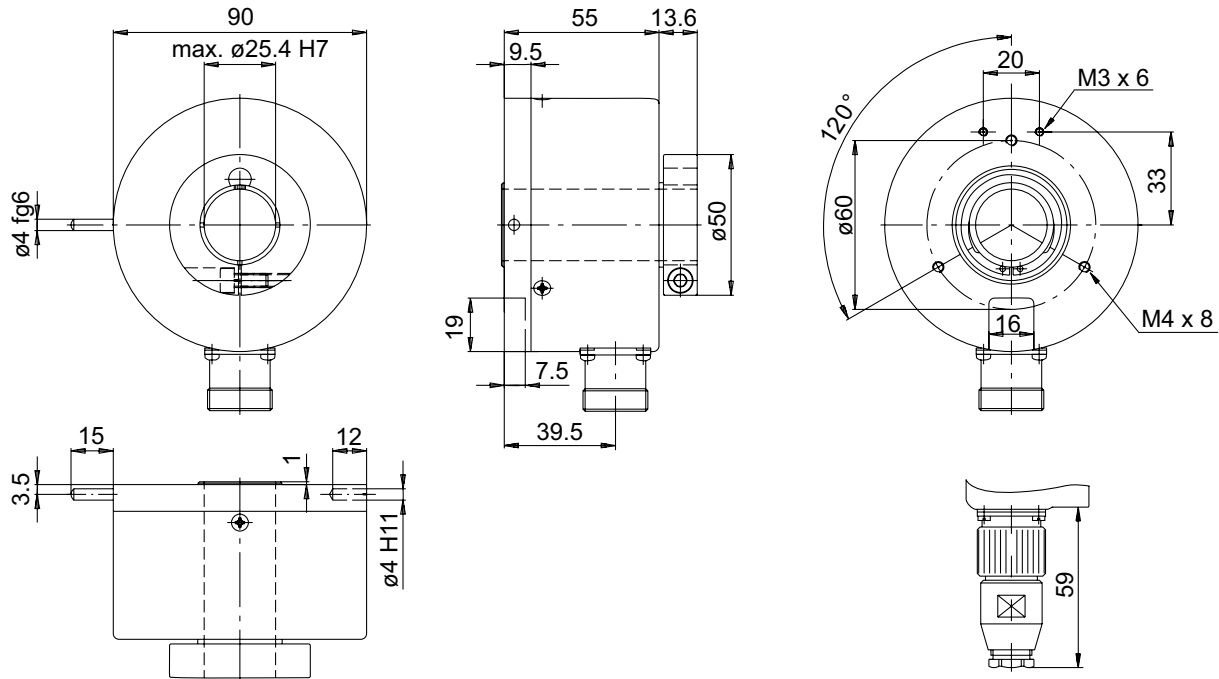
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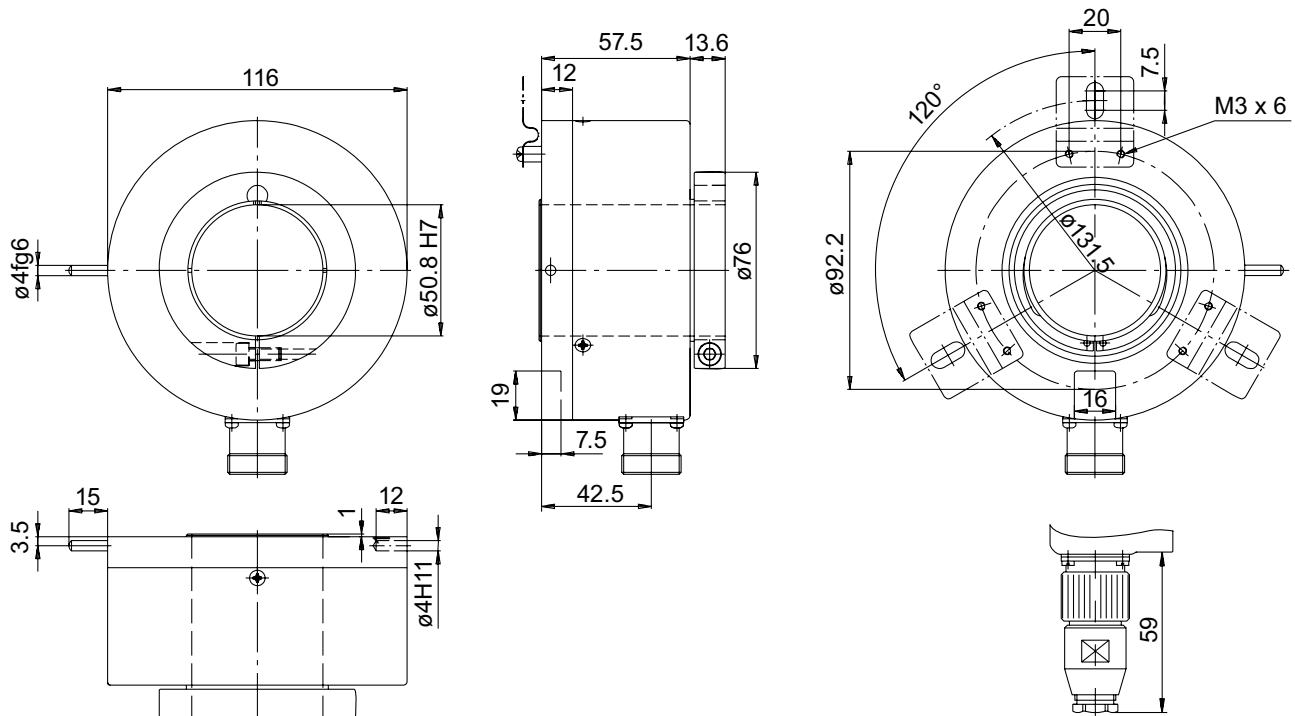
G1M2H, G2M2H

## Dimensions

### G1M2H



### G2M2H



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