Absolute encoders - SSI

Ex approval Ex II 2D/2G (ATEX)

Optical multiturn encoders

Multiturn 13 bit ST / 12 bit MT

X 700 - SSI - Multiturn

X 700 with clamping flange

Features

- **Encoder multiturn / SSI / ATEX**
- **Optical sensing method**
- **Resolution: multiturn 13 + 12 bit**
- **Clamping flange with solid shaft ø10 mm**
- **Explosion protection per Ex II 2D/2G (ATEX)**
- **Device class 2 / zone 1 (gas), zone 21 (dust)**
- **Electronic setting of zero point**
- **Counting direction input**
- **Maximum resistant against magnetic fields**

Technical data - electrical ratings

Voltage supply	10...30 VDC 5 VDC ±10 %
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 revolution	16384 / 14 bit
Number of revolutions	4096 / 12 bit
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 inv. and zero
Output stages	SSI data: Linedriver RS422 Diagnostic outputs push-pull
Interference immunity	DIN EN 61000-6-2
Emitted interference	DIN EN 61000-6-4
Diagnostic functions	Self-diagnosis Multiturn sensing

Technical data - mechanical design

Size (flange)	ø70 mm
Shaft type	ø10 mm solid shaft (clamping flange)
Flange	Clamping flange
Protection DIN EN 60529	IP 67
Operating speed	≤6000 rpm (mechanical) ≤6000 rpm (electric)
Starting acceleration	≤1000 U/s²
Starting torque	≤0.4 Nm (+25 °C)
Admitted shaft load	≤60 N axial ≤50 N radial
Materials	Housing: stainless steel Flange: stainless steel
Operating temperature	-20...+70 °C
Relative humidity	95 % non-condensing
Resistance	DIN EN 60068-2-6 Vibration ±0.75 mm - 10-58 Hz 10 g - 58-2000 Hz DIN EN 60068-2-27 Shock 200 g, 6 ms
Explosion protection	Ex II 2G Ex d IIC T6 Ex II 2D
Weight approx.	1300 g
Connection	Cable

Part number

X 700. | **M** | **1** | | | **02** |

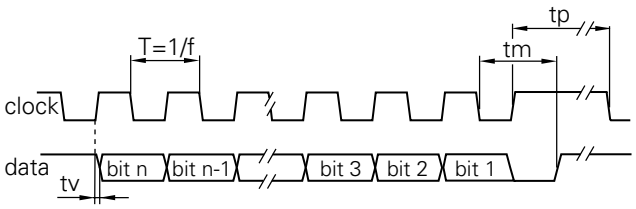
Connection
- 12 Cable 2 m, axial
- 14 Cable 5 m, axial
- 16 Cable 10 m, axial
- 19 Cable 20 m, axial
- 21 Cable 70 m, axial
- 22 Cable 6 m, axial
- 23 Cable 40 m, axial

Voltage supply / signals
- 1 10...30 VDC / gray code 13 + 12 bit
- 2 10...30 VDC / binary code 13 + 12 bit
- 4 10...30 VDC / gray code 12 + 12 bit
- 5 5 VDC / binary code 12 + 12 bit

Flange / Solid shaft
- 1 Clamping flange / ø10 mm, IP 67

Design
- M Multiturn

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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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/$\overline{\text{DOWN}}$). 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 downstram 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/$\overline{\text{DOWN}}$	UP/$\overline{\text{DOWN}}$ counting direction input. This input is standard on High. UP/$\overline{\text{DOWN}}$ means ascending output data with clockwise shaft rotation when looking at flange. UP/$\overline{\text{DOWN}}$-Low means ascending values with counterclockwise shaft rotation when looking at flange.

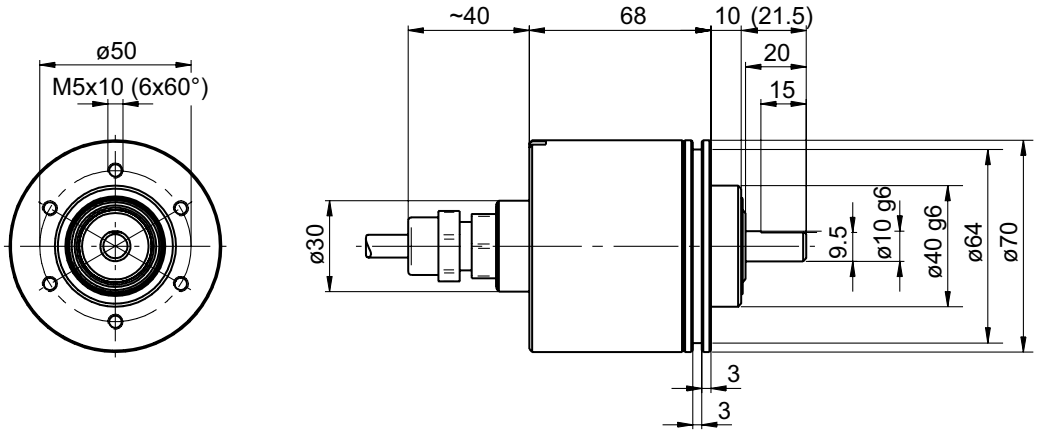
Terminal assignment	
Core colour	Assignment
brown	UB
white	GND
green	Clock+
grey	Data+
blue	Zero setting
pink	Data-
yellow	Clock-
black	$\overline{\text{DATAVALID}}$
red	UP/$\overline{\text{DOWN}}$
violet	$\overline{\text{DATAVALID MT}}$

Trigger level	
SSI	**Circuit**
SSI-Clock	Optocoupler, RS422 with terminating resistor
SSI-Data	Linedriver RS422 or RS485

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

Diagnostic 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

Dimensions



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Checklist for EX protection data collection

For the design of explosion-proof encoders of the X 700 series according to EU Directive 2014/34/EU, it is absolutely necessary to complete this checklist in order to be able to resolve all open questions regarding explosion protection and application conscientiously.

Company: _____

Address: _____

Department: _____ Phone-No.: _____

Clerk/Technician: _____

Email: _____ Fax: _____

Responsibility:
The operator is responsible for maintaining the performance limit of the devices (see datasheet)

Equipment group:			**Please select**
Equipment group I,	**M2**	Mining (underground /above-ground mining)	
Equipment group II,	**2G/2D**	all other areas	

Equipment Use / Field Application: (i.e.: paint line, process engineering, gas storage etc.)

_____

_____

Information on operating temperature and ambient temperature		**Enter values**
Expected operating temperature:		
Operating temperature:	Standard: -20...+70 °C, optional 100 °C	datasheet
Ambient temperature in the field:		

Mechanical load			**Enter values**
Numbers of Revolutions:	RMP	max. 3000 RMP	
Axial shaft load:	(N)		
Radial shaft load:	(N)		
Environmental influences (Salt, alkalis, etc.):			

Date:	**Stamp:**
Signature:	