

# Absolute encoders - SSI

EX approval ATEX EEx d IIC T6

Single- and multiturn encoder 14 bit ST / 12 bit MT

## X 700 - SSI



X 700 with clamping flange

### Features

- Encoder single- or multiturn / SSI / ATEX
- Optical sensing
- Resolution: singleturn 14 bit, multiturn 12 bit
- Clamping flange / shaft  $\varnothing$ 10 mm
- Explosion protection per EEx d IIC T6
- Area of application: EX I/II 2 GD / ATEX 133213X
- Device class 2 / zone 1 (gas), zone 21 (dust)
- Electronic setting of zero point
- Counting direction input

### 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
Steps per turn	16384 / 14 bit
Number of turns	4096 / 12 bit
Absolute accuracy	$\pm$ 0.025°
Sensing method	Optical
Code	Gray or binary
Code sequence	CW/CCW coded by connection
Inputs	SSI clock Control signals UP/ $\overline{\text{DOWN}}$ 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 Multiturn sensing
Approval	UL approval / E301461

### Technical data - mechanical design

Housing	$\varnothing$ 70 mm
Shaft	$\varnothing$ 10 mm (clamping flange)
Flange	Clamping flange
Protection DIN EN 60529	IP 67
Operating speed	$\leq$ 6000 rpm (mechanical) $\leq$ 6000 rpm (electric)
Starting torque	$\leq$ 0.4 Nm
Admitted shaft load	$\leq$ 60 N axial $\leq$ 50 N radial
Materials	Housing: stainless steel Flange: stainless steel
Operating temperature	-25...+60 °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
Weight approx.	1300 g
E-connection	Cable 2 m (other length upon request)

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## Part number

### Singleturn

X 700. **A** **1** **12** **02**

E-connection  
12 Cable 2 m, axial

Voltage supply / signals  
0 10...30 VDC / gray code 13 bit  
2 10...30 VDC / binary code 13 bit

Flange / Shaft  
1 Clamping flange / ø10 mm IP 67

Design  
A Singleturn

### Multiturn

X 700. **M** **1** **12** **02**

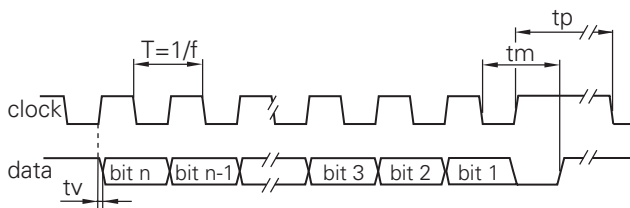
E-connection  
12 Cable 2 m, axial

Voltage supply / signals  
1 10...30 VDC / gray code 25 bit  
2 10...30 VDC / binary code 25 bit  
4 10...30 VDC / gray code 24 bit

Flange / Shaft  
1 Clamping flange / ø10 mm IP 67

Design  
M Multiturn

## Data transfer



Clock frequency f	62.5...1500 kHz
Scan ratio of T	40...60 %
Time lag tv	150 ns
Monoflop time tm	25 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 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.

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	$\overline{\text{UP/DOWN}}$
violet	$\overline{\text{DATAVALID MT}}$

Trigger level	
<b>SSI</b>	<b>Circuit</b>
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 $\Omega$

Output	Linedriver RS422
Output level High	>2.5 V (I = -20 mA)
Output level Low	<0.5 V (I = 20 mA)
Load High	<20 mA
Load Low	<20 mA

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## Dimensions

