Absolute encoders - SSI

EX approval ATEX EEx d IIC T6

Optical single and multiturn encoders 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 with shaft ø10 mm**
- **Explosion protection per EEx d IIC T6**
- **Area of application: EX I/II 2 GD**
- **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	≤50 mA (24 VDC)
Initializing time (typ.)	20 ms after power on
Interface	SSI
Steps per turn	16384 / 14 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/$\overline{\text{DOWN}}$ 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
X 700 - Singleturn	
Function	Singleturn
X 700 - Multiturn	
Function	Multiturn
Number of turns	4096 / 12 bit

Technical data - mechanical design

Dimensions (flange)	ø70 mm
Shaft	ø10 mm (clamping flange)
Flange	Clamping flange
Protection DIN EN 60529	IP 67
Operating speed	≤6000 rpm (mechanical) ≤6000 rpm (electric)
Starting torque	≤0.4 Nm
Shaft loading	≤60 N axial ≤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
Connection	Cable

X 700 - SSI

Part number

Singleturn

X 700.	A	1		12	02

Design
A Singleturn

Flange / Shaft
1 Clamping flange / ø10 mm IP 67

Voltage supply / signals
0 10...30 VDC / gray code 14 bit
2 10...30 VDC / binary code 14 bit

Connection
12 Cable 2 m, axial

Multiturn

X 700.	M	1			02

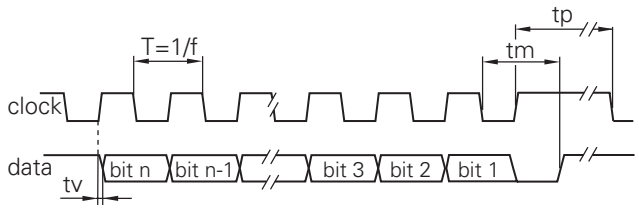
Design
M Multiturn

Flange / Shaft
1 Clamping flange / ø10 mm IP 67

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

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

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 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	$\overline{\text{DATAVALID MT}}$

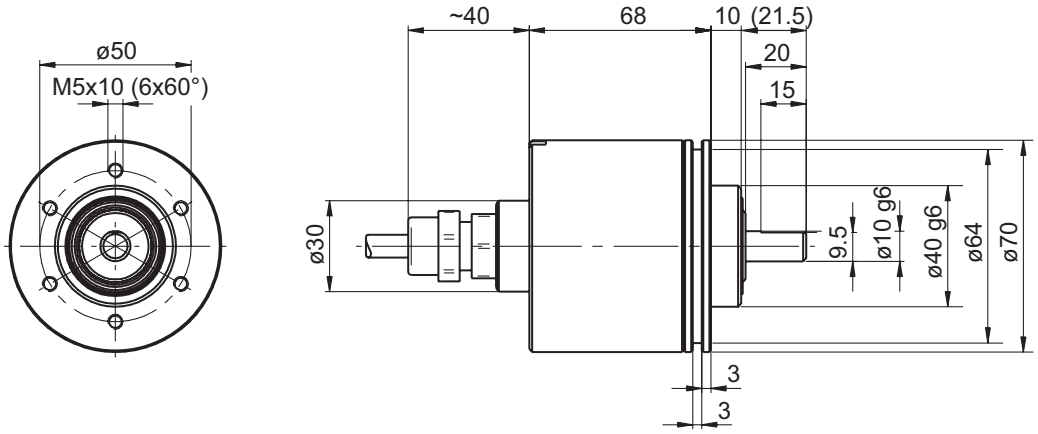
Trigger level	
SSI	**Circuit**
SSI-Clock	Optocoupler
SSI-Data	Linedriver RS485

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

Diagnostic outputs	**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	<20 mA
Load Low	<20 mA

X 700 - SSI

Dimensions



Check list for EX-approval

In compliance with EU standards 94/9/EG for potentially explosive areas it is imperative that the present checklist is duly completed and that all pending questions relating to explosion protection and application are clarified.

Company: _____

Address: _____

Division: _____

In charge: _____

Phone: _____ Fax: _____

e-mail: _____

Product name:	Version:	Resolution (ppr / code):	Supply voltage:

Kind of e-connection:	Length of cable (m):	Output circuit:	Special options:

Responsibility
- Our customer will receive all relevant information to verify a correct application.
- Our customer has to clarify all relevant criterions and characteristics.
- The operator shall be responsible for not exceeding the maximum performance limits of our devices (see data sheet).

Device utilization/application (E.g.: Lacquering line, manufacturing tech., gas storing vessel etc.)

_____

_____

_____

Device group, device category and zone classification

Device group		please tick
Device group I		☐
Device group II		☐

Category / Zone	**Ex-atmosphere prevailing**	
Category 1 (= Zone 0/20)	... permanently, long-term or frequently	☐
Category 2 (= Zone 1/21)	... only now and then	☐
Category 3 (= Zone 2/22)	... rarely or seldom	☐

Zone classification		
G (gases)	Zone 0, zone 1, zone 2	☐
D (dusts)	Zone 20, zone 21, zone 22	☐

Check list for EX-approval

Ignition protection		please tick
Ex d	Flameproof (pressure-proof capsule)	☐
Ex ia	Intrinsic safety	☐
Ex ib	Intrinsic safety	☐

Gas explosion group

Gases are classified into explosion groups. Danger increases from group II A to II C.

		please tick
II A	Propane	☐
II B	Ethylene	☐
II C	Hydrogen, Acetylene	☐

Temperature classes and groups of explosion

Temperature class	Max. surface temperature of operating equipment (°C)	Max. ignition temperature of combustible substances (°C)	please tick
T1	450	> 450	void
T2	300	>300...< 450	void
T3	200	>200...< 300	void
T4	135	>135...< 200	☐
T5	100	>100...< 135	void
T6	85	> 85...< 100	☐

Information on ambient and operating temperature

Expected operating temperature:	to be clarified
Field ambient temperature:	to be clarified

Mechanical strain

Rotation speed (rpm)
Axial shaft load (N)
Radial shaft load (N)
Ambient impacts (salt, lye, etc.)

Date _____ Signature _____

Stamp:

Date _____ Release EExB / trained sales _____