

Absolute encoders - bus interfaces

EX approval ATEX EEx d IIC T6

Optical multiturn encoders 13 bit ST / 12 bit MT

X 700 - RS485



X 700 with RS485

Features

- Encoder multiturn / RS485 / ATEX
- Optical sensing
- Resolution: singleturn 13 bit, multiturn 12 bit
- Clamping flange with 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)
- Galvanic isolation

Technical data - electrical ratings

Voltage supply	10...30 VDC
Reverse polarity protection	Yes
Consumption w/o load	≤ 50 mA (24 VDC)
Initializing time (typ.)	50 ms after power on
Interface	RS485
Function	Multiturn
Transmission rate	38.4 kBaud
User address	02
Steps per turn	≤ 8192 / 13 bit
Number of turns	≤ 4096 / 12 bit
Absolute accuracy	$\pm 0.025^\circ$
Sensing method	Optical
Code	Binary
Code sequence	CW/CCW programmable
Output circuit	RS485
Interference immunity	DIN EN 61000-6-2
Emitted interference	DIN EN 61000-6-4
Programmable parameters	Total resolution Scaling Preset
Diagnostic functions	Position or parameter error Multiturn sensing
Approval	UL approval / E301461

Technical data - mechanical design

Dimensions (flange)	$\varnothing 70$ mm
Shaft	$\varnothing 10$ mm
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	$-25 \dots +60$ °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 2 m (other length upon request)

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Part number

X 700.P 1 2 07

				Interface
				07 RS485 / 5 cores cable
				Connection
				12 Cable 2 m, axial
				16 Cable 10 m, axial
				Voltage supply / signals
				2 10...30 VDC / 13 + 12 bit
				Flange / Shaft
				1 Clamping flange / ø10 mm IP 67

Data transmission format

Aufbau der Datenfelder (25 Bit programmierbar)

Datenaustausch (Daten ohne Preset)

Anforderung/Master:	10h			
Antwort/Drehgeber:	Daten 1	Daten 2	Daten 3	Daten 4

Daten 1: LSB Daten 3: MSB
Daten 2: NSB Daten 4: Diagnose

Daten 4:	2 ⁷	2 ⁶	2 ⁵	2 ⁴ - 2 ¹	2 ⁰
	D1	D2	D3	0	Positionsdaten

D1: Diagnosebit: Synchronisation elektrisches Getriebe
D2: Diagnosebit: Betriebsspannung elektrisches Getriebe
D3: Diagnosebit: ungültiger Presetwert
D1 + D2 + D3 = 0, dann Drehgeber OK

Preset + Drehrichtung steigend (CW Blick auf Welle):

Anforderung/Master:	20h	LSB	NSB	MSB
Antwort/Drehgeber:	Daten 1	Daten 2	Daten 3	Daten 4

Preset + Drehrichtung fallend (CCW Blick auf Welle):

Anforderung/Master:	60h	LSB	NSB	MSB
Antwort/Drehgeber:	Daten 1	Daten 2	Daten 3	Daten 4

Programmieren der Auflösung:

Anforderung/Master:	30h	LSB	MSB	00
Antwort/Drehgeber:	Daten 1	Daten 2	Daten 3	Daten 4

LSB, MSB max. 0x2000; 13 Bit

Auslesen der Störungsmeldungen:

Anforderung/Master:	50h	00	00	00
Antwort/Drehgeber:	ST1	ST2	ST3	ST4

ST1: LSB: Anzahl Störungen
ST2: NSB
ST3: NSB
ST4: MSB: Anzahl Störungen

Ausstattungsmerkmale

RS485, Baudrate 38,4 kBaud

9 Datenbits: 9. Bit Master - Slave Kennung
1 = Master, 0 = Slave

1 Stopbit

1 Drehgeber mit fest-codierter Adresse = 02 anschliessbar
Voreinstellung Preset: 196920

Aufbau der Datenfelder (22 Bit)

Datenaustausch (Daten ohne Preset)

Anforderung/Master:	02h		
Antwort/Drehgeber:	Daten 1	Daten 2	Daten 3

Daten 1: LSB Daten 2: NSB

Daten 3: MSB + Diagnosebits

Daten 3:	2 ⁷	2 ⁶	2 ⁵ - 2 ⁰
	D1	D2	Positionsdaten

D1: Diagnosebit: Synchronisation elektrisches Getriebe
D2: Diagnosebit: Betriebsspannung elektrisches Getriebe
D1 + D2 = 0, dann Geber OK

Default: Binär Code 10 + 12 Bit

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Terminal significance	
UB	Encoder voltage supply
GND B	Encoder ground connection relating to UB
T,R+	Serial data line
T,R-	Serial data line
Sig. GND	GND relating to RS485 interface.

Terminal assignment	
Core colour	Assignment
brown	UB
white	GNDB
green	T,R+
yellow	T,R-
black	-
red	-
blue	-
grey	Sig. GND
pink	-
violet	-

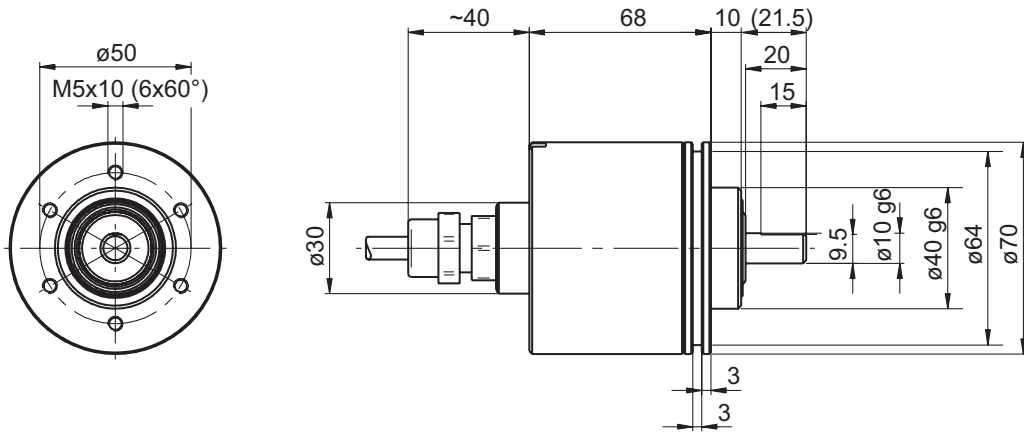
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Dimensions



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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		<input type="checkbox"/>
Device group II		<input type="checkbox"/>
Category / Zone	Ex-atmosphere prevailing	
Category 1 (= Zone 0/20)	... permanently, long-term or frequently	<input type="checkbox"/>
Category 2 (= Zone 1/21)	... only now and then	<input type="checkbox"/>
Category 3 (= Zone 2/22)	... rarely or seldom	<input type="checkbox"/>
Zone classification		
G (gases)	Zone 0, zone 1, zone 2	<input type="checkbox"/>
D (dusts)	Zone 20, zone 21, zone 22	<input type="checkbox"/>

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Check list for EX-approval

Ignition protection

please tick

Ex d	Flameproof (pressure-proof capsule)	<input type="checkbox"/>
Ex ia	Intrinsic safety	<input type="checkbox"/>
Ex ib	Intrinsic safety	<input type="checkbox"/>

Gas explosion group

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

please tick

II A	Propane	<input type="checkbox"/>
II B	Ethylene	<input type="checkbox"/>
II C	Hydrogen, Acetylene	<input type="checkbox"/>

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	<input type="checkbox"/>
T5	100	>100...< 135	void
T6	85	> 85...< 100	<input type="checkbox"/>

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