



## 2CEX-A SSI

- Shaft Encoder - Ø 68 mm
- Shaft: Ø 10 mm
- SSI Interface
- Singleturn or Multiturn
- Non-removable end cap - delivered with 10-pin MIL Connector
- ATEX, EAC Ex certified

### Electrical Specifications

<b>Encoder Type:</b>	Absolute Multiturn
<b>Singleturn Resolution:</b>	13 bits (8192) steps per revolution
<b>Number of Revolutions:</b>	12 bits (4096) revolutions 16 bits (65536) revolutions 20 bits (1048576) revolutions 24 bits (16777216) revolutions
<b>Supply Voltage:</b>	5 VDC $\pm 5\%$ or 9-30 VDC
<b>Typical Current Consumption:</b>	30 mA @ $V_{sup} = 5V$ 25 mA @ $V_{sup} = 10V$ 15 mA @ $V_{sup} = 24V$
<b>Accuracy:</b>	$\pm 0,35^\circ$
<b>Interface:</b>	SSI (Synchronous Serial Interface)
<b>Output Code:</b>	Binary or Gray
<b>Electrical Interface:</b>	Differential (RS422)
<b>Clock Frequency:</b>	100 kHz to 2 MHz
<b>Counting Direction:</b>	Increasing clockwise or increasing counter clockwise seen from shaft end of encoder
<b>Electrical Protection:</b>	Reverse polarity and output short circuit protected
<b>Noise Immunity:</b>	EN61000-6-2: 2005 (industrial environments) Electromagnetic compatibility (EMC) EN 61000-6-3: 2007 (residential, commercial, and light-industrial environments) for Electromagnetic compatibility (EMC)

### Mechanical Specifications

<b>Material:</b>	Housing: Aluminum Cap: Aluminum Shaft: Stainless Steel (AISI 303)
<b>Weight:</b>	Encoder: Approx. 540 gr (19 oz) Cable: 50 gr / meter (1.76 oz / meter)
<b>Bearing Life:</b>	$> 1.9 \times 10^{10}$ revolutions at rated load
<b>Shaft Speed:</b>	3,000 rpm continuous (max.) IP 67
<b>Starting Torque:</b>	$< 0.1$ Nm (14.16 oz-in) at 25° C IP 67
<b>Mass Moment of Inertia:</b>	50 gcm <sup>2</sup> ( $7.08 \times 10^{-4}$ oz-in-sec <sup>2</sup> )
<b>Shaft Loads:</b>	Axial: 50 N (11.25 lbs) max. Radial: 100 N (22.50 lbs) max.

### Environmental Specifications

<b>Operating Temp.:</b>	-40° to +70° C
<b>Storage Temp.:</b>	-40° to +85° C
<b>Shock:</b>	100 G / 11 ms
<b>Vibration:</b>	10-2000 Hz / 10 G
<b>Bump:</b>	10 G / 16 ms (1000 x 3 axis)
<b>Humidity:</b>	98 % RH without condensation
<b>Enclosure Rating:</b>	IP 64 / Nema 4 (approx.) IP 65 / Nema 4 (approx.) IP 66 / Nema 6 (approx.) IP 67 / Nema 6 (approx.) option

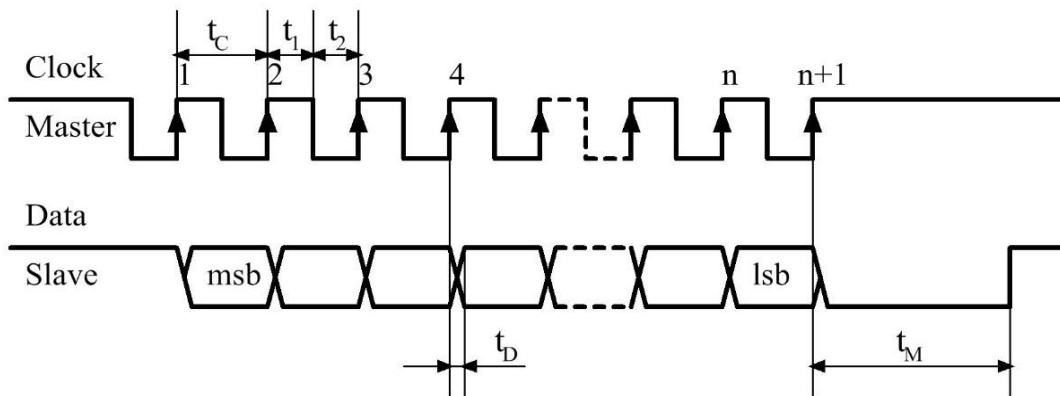
### Connection Options

<b>Connectors:</b>	10-pin Mil radial See Table 1
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## Certifications

<b>ATEX:</b>	Certificate No.: ITS 09 ATEX 46134X II 3G Ex nA IIC T4 Gc, II 3D Ex tc IIIC T100°C Dc, -40°C<T.amb<+70°C
<b>EAC Ex:</b>	НАННО «ЦСВЭ» No. EAЭС RU C-DK.AA87.B.00266/19 2Ex nA IIC T4 Gc X, Ex tc IIIC T100°C Dc X -40°C<T.amb<+70°C

## SSI Interface Timing



msb = Most Significant Bit

lsb = Least Significant Bit

n = Total Number of Bits

$t_c$  = Clock Period = 0.5 to 10  $\mu$ Sec (100kHz to 2 MHz)

$t_1$  = Clock High = 50%  $\pm$ 15% of Clock Period

$t_2$  = Clock Low = 50%  $\pm$ 15% of Clock Period

$t_D$  = Clock to Data Valid = Max. 100 nSec

$t_M$  = Monoflop Time = 20  $\pm$ 3  $\mu$ Sec

### Implementation

During the initial set-up and installation of the encoder, it is possible to set the direction of rotation and preset the encoder to zero.

#### Setting of Direction.

The connection designated “Direction” is used to set the direction of rotation. Notice, that the encoder must not be powered when the direction of rotation is set/changed. Notice also, that the encoder will change its position value when the direction of rotation is changed. Direction of rotation is viewed on the shaft end of the encoder.

Voltage Level on Input	Function
High: $V_{sup}$ or $V_{sup}/2 \leq V_{in} \leq V_{sup}$	Encoder Increasing on Counter Clockwise Rotation
Low: Input not connected or $0V \leq V_{in} \leq V_{sup}/2$	Encoder Increasing on Clockwise Rotation

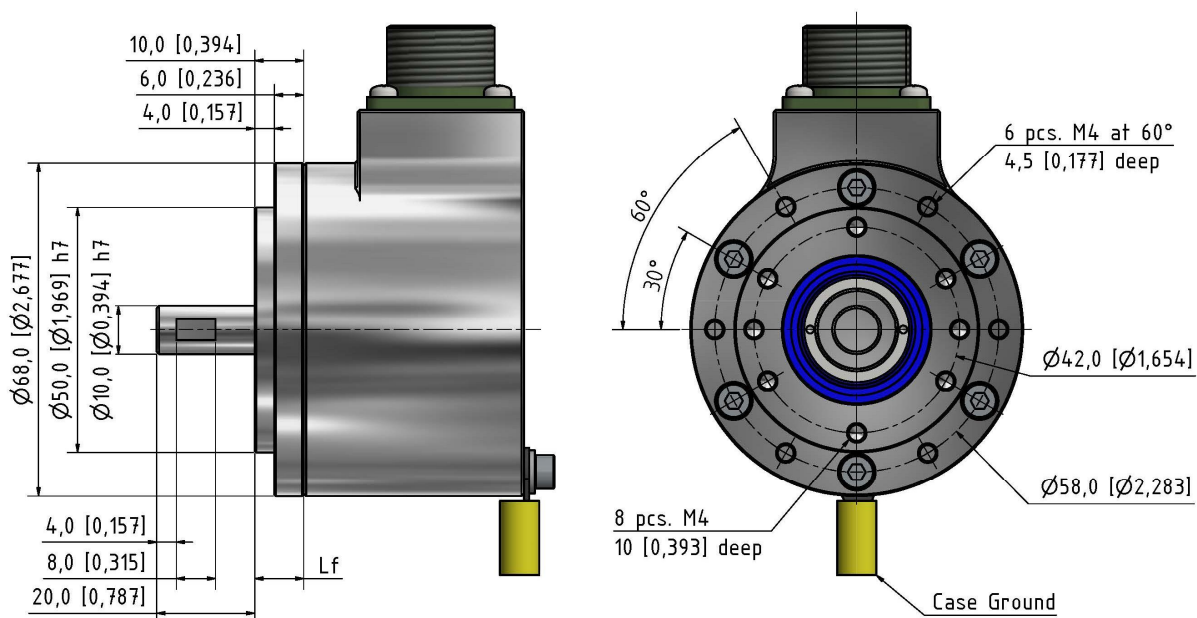
#### Preset to Zero

The connection designated “Preset” is used to preset the encoder to zero. Notice, that the encoder must be powered when it is preset to zero.

Voltage Level on Input	Function
High: $V_{sup}$ or $V_{sup}/2 \leq V_{in} \leq V_{sup}$	Encoder Value is set to Zero
Low: Input not connected or $0V \leq V_{in} \leq V_{sup}/2$	Inactive

The encoder will be held at zero as long as the line is high, even though the shaft is turned. The line must be high for at least 100 mSec. for the preset to take effect. The new zero point will be stored permanently in the encoder.

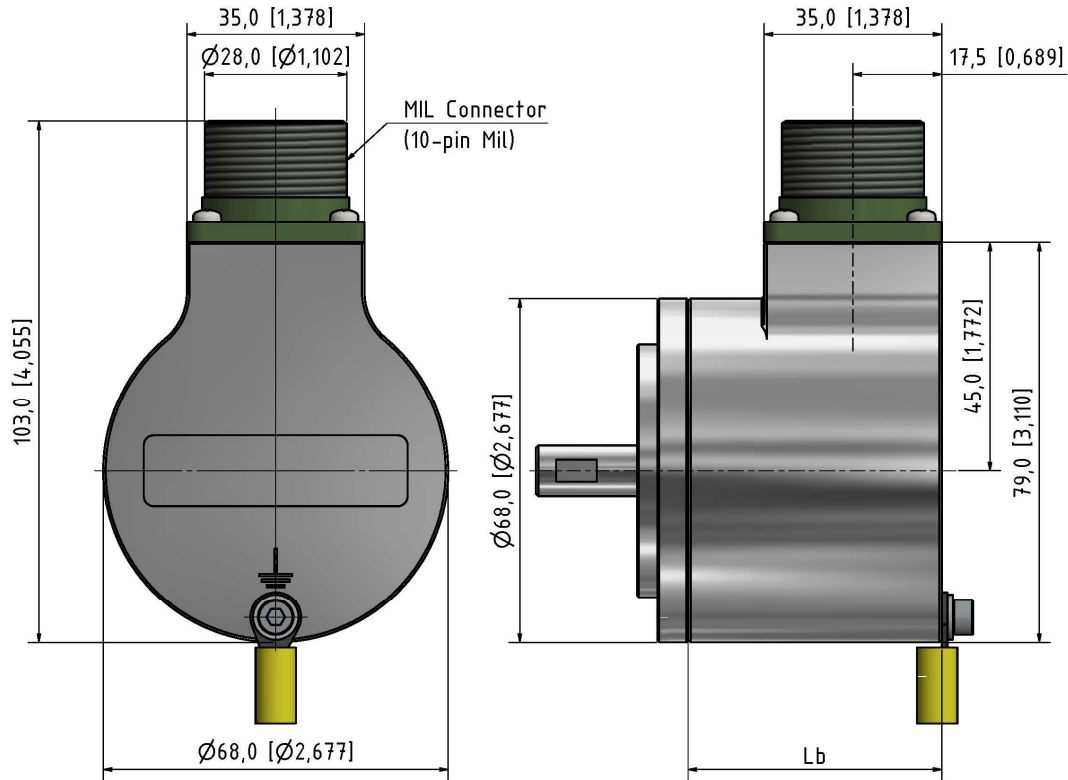
### Face Mount



Face Mount A

mm (inches)

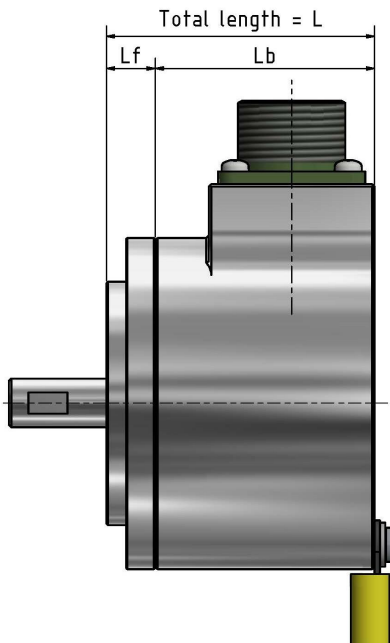
## Caps with MIL Connector



**MIL Connector Cap (C10)**  
10-pin Mil

mm (inches)

## Encoder Length



**Total Encoder Length  $L = L_b + L_f$**

Cap	Face mount A
<b>C10</b>	60,0 mm (2,36 in)

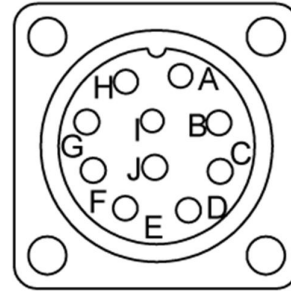
Cap + Face Mount = Total Encoder Length

**Table 1 Output Terminations – MIL Connector**

Table 1	
10-pin MIL Connector	
Differential Input/Output	
Pin	Signal
A	CLK +
B	CLK –
C	D0 +
D	D0 –
E	Direction
F	Preset
G	Vsup
H	GND (0 Volt)
I	NC
J	NC

*GND = Circuit Ground*

*Shield Connected to Case Ground*



## Ordering Code

**Example: 2CEX-A-01S – 1613 – AL – 9 – B – D – 10 – 20 – 67 – 00 – C10 – A – 00**

2CEX-A	-	01S	-		-	AL	-		-		-	D	-		-		-		-	00	-		-	A	-	00
		1		2		3		4		5		6		7		8		9		10		11		12		13

### 1. Interface

SSI ..... 01S

### 2. Resolution

**Singleturn**  
 Resolution 13 bits ..... 0013  
**Multiturn**  
 Revolutions 12 bits ..... 1213  
 Revolutions 16 bits ..... 1613  
 Revolutions 20 bits ..... 2013  
 Revolutions 24 bits ..... 2413

### 3. Material

Aluminium..... AL

### 4. Supply Voltage

5 VDC..... 5  
 9-30 VDC..... 9

### 5. Code

Binary ..... B  
 Gray ..... G

### 6. Electrical Interface

Differential (RS422)..... D

### 7 & 8. Shaft diameter

10 mm x 20 mm

### 7.      8.

10      x      20

### 9. IP Rating

IP 64 ..... 64  
 IP 65 ..... 65  
 IP 66 ..... 66  
 IP 67 ..... 67

### 10. Cable Length

No cable..... 00

### 11. Connector

MIL - 10 pins..... C10

### 12. Flange

Flange A ..... A

### 13. Accessory

No accessory..... 00