

## EXAG - Dual Output Profibus / Incremental Removable End Cap



- Shaft Encoder - Ø 78 mm
- Shaft: Ø 10 mm and ø 12mm
- Provides simultaneous Profibus and Incremental outputs
- Absolute Resolution up to 30 bits
- Incremental Resolution up to 8192 ppr
- ATEX, IECEx, and Profibus Trade Org. certified
- North America Class I Div. 2, Ex db IIC.

### Encoder Description

The EXAG encoder is intended for use in Oil & Gas industry. It is suitable for use in Class I Division 2 Groups ABCD or Class II Division 2 Groups FG, Class I Zone 1 or non-hazardous locations. EXAG encoder can be provided with interfaces as for example: Profibus, CanOpen DeviceNet, Ethernet, SSI, etc.

### Electrical Specifications - General

<b>Code:</b>	Absolute (Binary) & Incremental
<b>Supply Voltage:</b>	10 to 30 Vdc
<b>Current Consumption:</b>	Max. 230 mA with 10 Vdc Max. 100 mA with 24 Vdc
<b>Power Consumption:</b>	Max. 2.5 watts
<b>Electrical Lifetime:</b>	> 10 <sup>5</sup> hours
<b>Electrical Protection:</b>	Reverse polarity and over-voltage-peak protection
<b>Noise Immunity:</b>	EN61000-6-2
<b>Emitted Interference:</b>	EN 61000-6-4

### Environmental Specifications

<b>Operating Temp.:</b>	-40° C to + 70° C
<b>Storage Temp.:</b>	-40° C to + 70° C
<b>Humidity:</b>	98% RH without condensation
<b>Enclosure Rating:</b>	IP 64 / Nema 4 (approx.) IP 65 / Nema 5 (approx.) IP 66 / Nema 6 (approx.) IP 67 / Nema 6 (approx.) IP 68 (1hour/1 meter) / Nema 6P (approx.)

### Mechanical Specifications

<b>Material:</b>	Housing: Aluminum or Stainless Steel Cap: Aluminum or Stainless Steel Shaft: Stainless Steel
<b>Weight:</b>	Aluminum: ~ 1600 gr (56,44 oz) Stainless Steel: ~ 3100 gr (109,35 oz)
<b>Bearing Life:</b>	> 1,9 x 10 <sup>10</sup> revolutions at rated load
<b>Shaft Speed:</b>	6.000 rpm (max.) IP 64 3.000 rpm (max.) IP 65/66/67/68
<b>Starting Torque:</b>	≤ 0,01 Nm at 25° C (no seal) ≤ 0,03 Nm at 25° C (with seal)
<b>Rotor Mass Moment of Inertia:</b>	42 gcm <sup>2</sup> (5,95 x 10 <sup>-4</sup> oz-in-sec <sup>2</sup> )
<b>Shaft Loads:</b>	Axial: 60 N (13,50 lbs) max. Radial: 80 N (17,98 lbs) max.
<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)

### Connection Options

<b>Cable Outlets:</b>	M20 threaded M25 threaded
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## Electrical Specifications - Absolute

<b>Interface:</b>	Profibus - DP DPV2 – Functionality Line Driver according to RS 485; galvanically isolated by opto-couplers
<b>Resolution:</b>	Max. 14 bit (16384) revolutions Max. 16 bit (65536) steps per rev.
<b>Device Addressing:</b>	Adjustable by rotary switches in the connection cap
<b>Transmission Rate:</b>	Max. 12 MBaud
<b>Step Frequency LSB:</b>	800 kHz
<b>Accuracy of Division:</b>	+/- ½ LSB (12 bit) +/- 2 LSB (16 bit)

## Electrical Specifications - Incremental

<b>Output:</b>	RS422 Line Driver (TTL compatible) 10 to 30V input – 5V output HTL Driver 10 to 30 V input – 10 to 30 V output
<b>Output Current:</b>	40 mA load per output channel
<b>Output Format:</b>	Two channel (A, B) quadrature with Index (Z) and complementary (A-, B-, Z-) outputs
<b>Phase Sense:</b>	A leads B clockwise from the mounting end of the encoder
<b>Index:</b>	½ period gating with Ch. B low
<b>Maximum Frequency:</b>	1 Mhz
<b>Resolution:</b>	1024, 2048, 4096, 8192 ppr

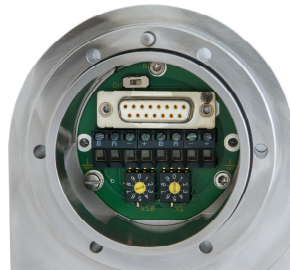
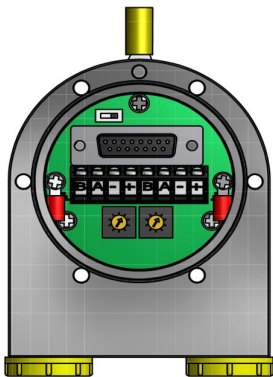
## Certifications

<b>ATEX:</b>	Certificate No.: ITS09ATEX16867X II 2 G Ex db IIC T5 Gb II 2 D Ex tb IIIC T100°C Db -40°C ≤ Ta ≤ +70°C
<b>IECEX:</b>	Certificate No.: IECEX ITS 10.0016X Ex db IIC T5 Gb, Ex tb IIIC T100°C Db -40°C ≤ Ta ≤ +70°C
<b>North America:</b>	Certificate No: LR1192-5 Class I Division 2 Groups ABCD T5, Class II Division 2 Groups FG, Class I Zone 1 AEx db IIC T5 Gb, Ex db IIC T5 Gb, Zone 21 AEx tb IIIC T100°C Db, Ex tb IIIC T100°C Db, Tamb= -40 °C to +70 °C
<b>EAC Ex:</b>	НАННО «ЦСВЭ» No. EAЭC RU C-DK.AA87.B.00266/19 1Ex db IIC T5 Gb X, Ex tb IIIC T100°C Db X -40°C < T.amb < +70°C

## Interface

### Installation

This rotary encoder provides simultaneous Profibus and Incremental outputs. It is connected by two cables, a Profibus cable and an Incremental cable. The power supply must be integrated into the bus cable. Any unused cable outlets must be closed using a suitably certified - proof blind plug. The threaded entries are M20x1,5 and M25x1,5.



### Profibus Output

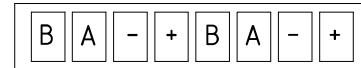
The Profibus-DP device address is set by user-friendly rotary switches in the connection cap. Allowed addresses are between 1 and 99. Each can only be used once.

The connection cap can easily be opened by removing the six screws in the cap.

The Termination Resistor is integrated into the connection cap. It must be switched on if the encoder is connected at the end or the beginning of the bus.



Connections for the data lines and power supply:



Terminal	Description
B (left)	Bus line B (Bus in)
A (left)	Bus line A (Bus in)
-	0V
+	10-30V
B (right)	Bus line B (Bus out)
A (right)	Bus line A (Bus out)
-	0V
+	10-30V

The power supply has to be connected once (no matter which clamps). If the Termination Resistor is switched on, the outgoing lines are disconnected.

The GSD file is necessary for installing the encoder. The GSD file and the detailed user manual can be downloaded from our homepage: [www.scancon.dk](http://www.scancon.dk)

## Interface

The Profibus-DP interface supports CLASS 1 and CLASS 2 functionality according to the encoder profile\*. In addition to these functions, the GSD file supports further features, for example software limit switches. Furthermore, the following encoder parameters can be programmed directly via the Profibus-DP network without any extra device:

Parameter	Comment
Counting Direction	The counting direction parameter defines whether the output code increases when the shaft rotates clockwise.
Resolution per Revolution	The parameter "resolution per revolution" is used to program the desired number of steps per revolution. Each value between 1 and the physical resolution per revolution can be programmed
Total Resolution	This parameter is used to program the desired number of measuring units over the total measuring range. This value may not exceed the total physical resolution of the absolute rotary encoder.
Preset Value	The preset value is the desired position value, which should be reached at a certain physical position of the axis. The position value is set to the desired process value by the parameter preset.
Velocity	The implemented software can additionally deliver the current velocity. This value is transmitted in binary code, 16 Bit, in addition to the process value.  It is possible to choose between four different units; steps per 10 ms, per 100 ms, per 1000 ms, and revolutions per minute.
Software Limit Switches Function	Two software limit switches can be set. If the position value falls below the lower or exceeds the higher limit switch, a status bit in the process value is set.
Teach-in (On-line Parameterization)	A special mode is available for the commissioning phase of the device. This makes it possible to change parameters while the encoder is in data exchange mode.  For continuous operation, another mode is available in which the parameters are protected against unintentional changes.

\* The Profibus-DP profile for the encoder can be ordered using Order No. 3.062 from:

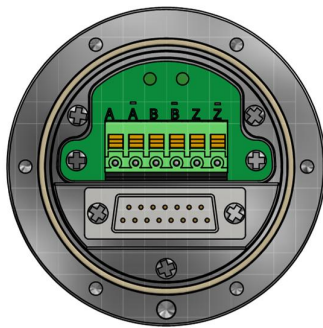
Profibus Nutzerorganisation e.V.  
 Haid und Neu-Str. 7  
 D-76131 Karlsruhe  
 Germany

## Incremental Output

The Incremental output consists of two channel (A, B) quadrature with an index channel (Z) as well as complementary (A-, B-, and Z-) outputs.

The Incremental output terminal block is found on the encoder body cover. This can be accessed once the connection cap has been removed.

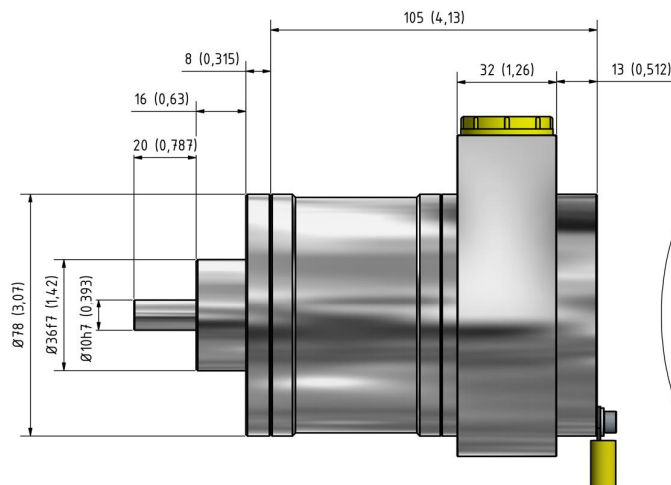
Connections for the incremental wires.



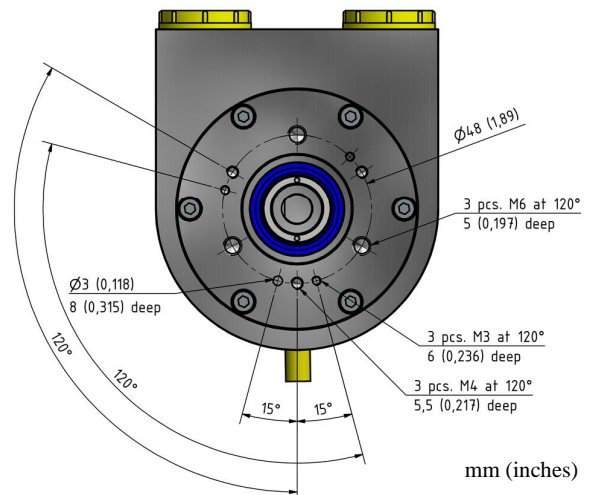
A	$\bar{A}$	B	$\bar{B}$	Z	$\bar{Z}$
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Terminal	Description
A	Channel A
A not	Channel A not
B	Channel B
B not	Channel B not
Z	Channel Z
Z not	Channel Z not

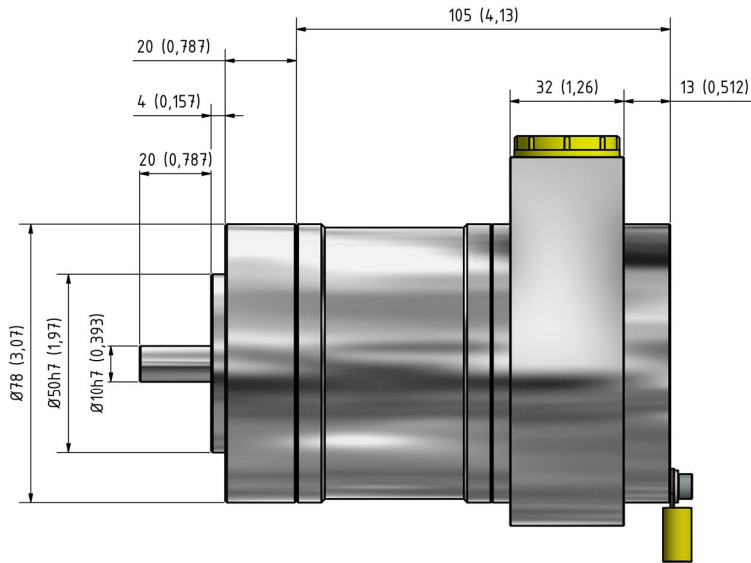
## Face Mounts



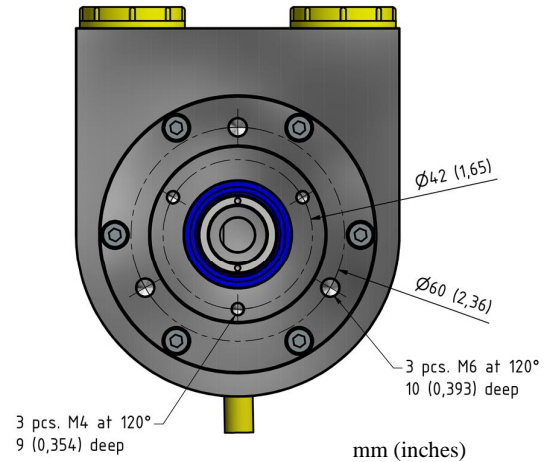
**Face Mount C**  
 Clamping Flange



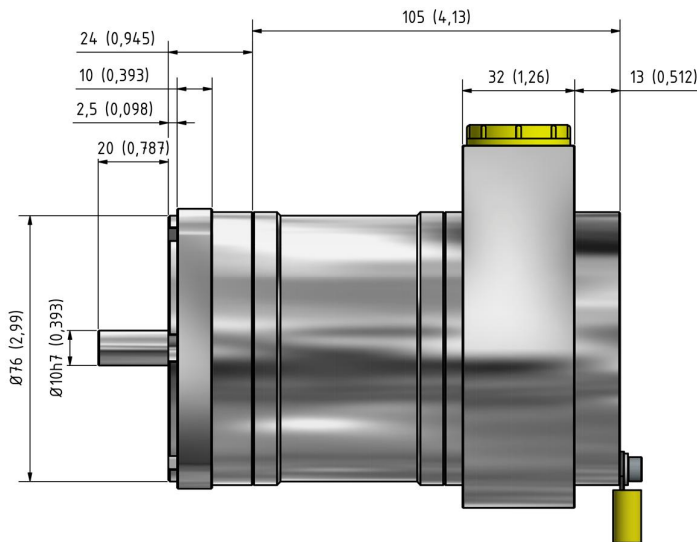
mm (inches)



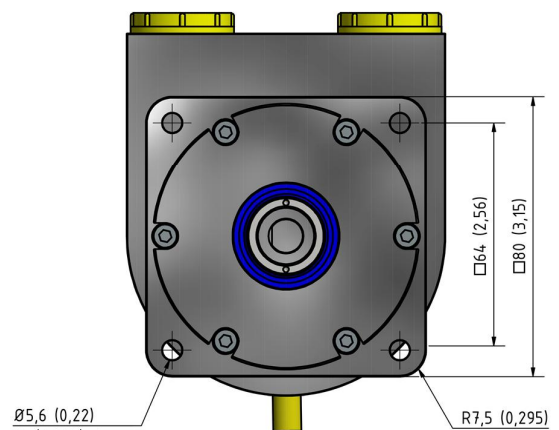
**Face Mount S**  
*Servo Flange*



mm (inches)



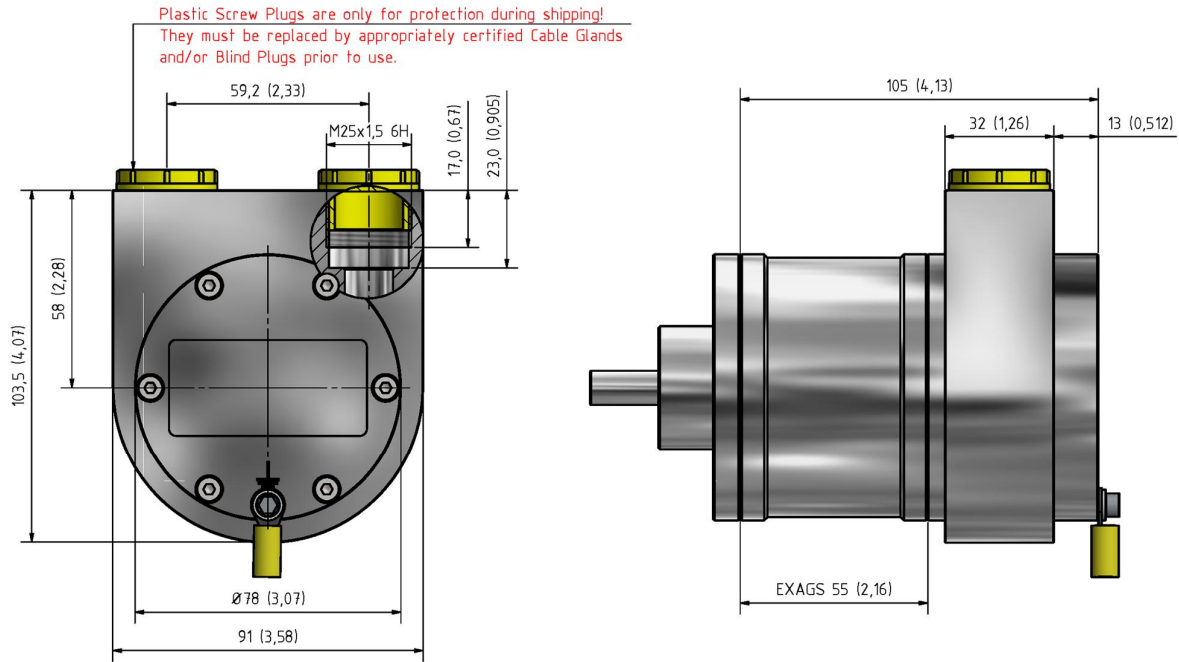
**Face Mount Q**  
*Square Flange*



mm (inches)

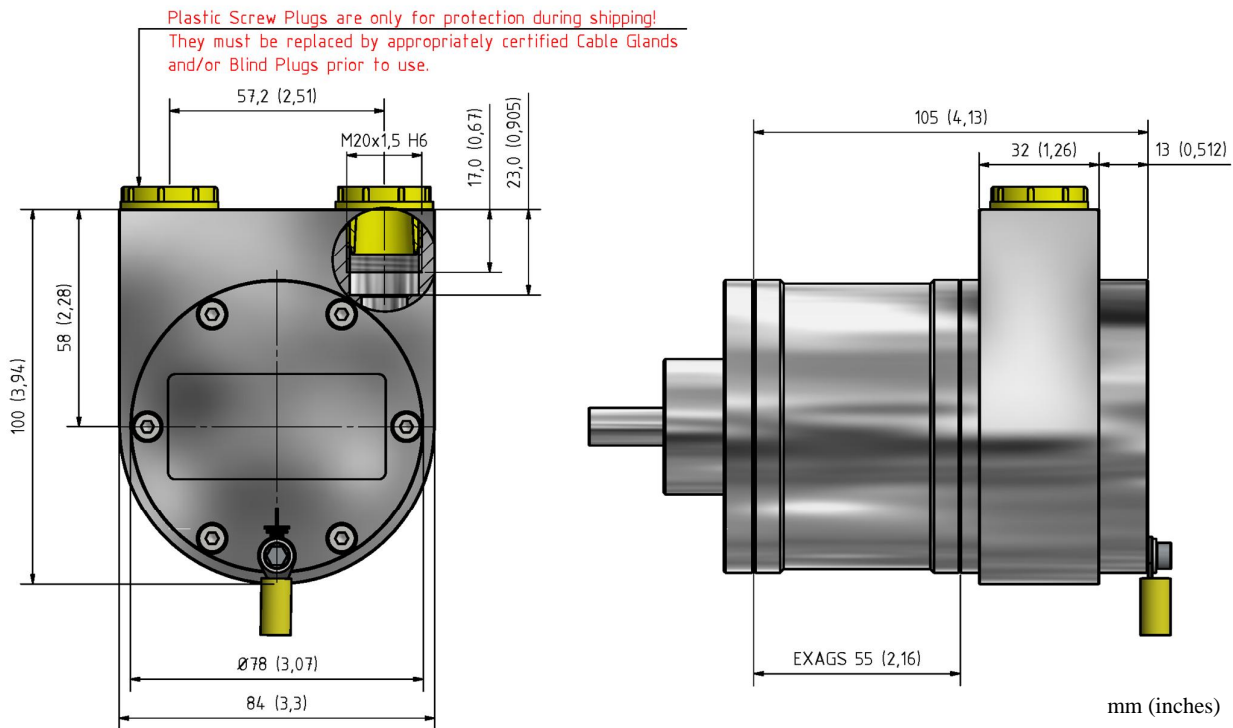


## End Caps with Cable Outlets



**Side Standard End Cap (FI)**

mm (inches)

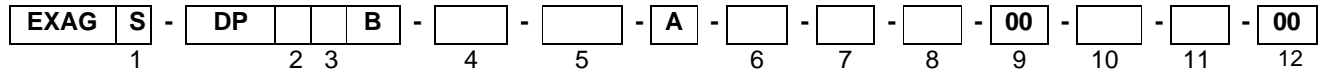


**Side Standard End Cap (FN)**

mm (inches)

## Ordering Code

**Example: EXAGS - DP6AB - 14 - 16 - A - SA - 02 - 67 - 00 - FI - C - 00**



### 1. Housing

Delivered *ONLY*  
 As a short "S" version

### 4. Absolute revolution

Single Turn.....**00**  
 Multiturn 12 bits (4096) .....**12**  
 Multiturn 14 bits (16384).....**14**

### 7. Shaft (diameter x length)

10 mm x 20 mm 2 flats, 8mm Length .....**01**  
 12 mm x 25 mm 2 flats, 8 mm length ..... **02**  
 10 mm x 20 mm 1 flat, 15 mm length ..... **03**

### 10. Cable Outlets

Side Standard 2 outlets - M20 ..... **FN**  
 Side Standard 2 outlets - M25 ..... **FI**

### 2. Incremental Output

RS422 Driver (TTL compatible) ....**5**  
*10 to 30V input - 5V output*  
 HTL Driver ..... **6**  
*10 to 30V input - 10 to 30V output*

### 5. Absolute Steps per Resolution

12 bits (4096) (0.09°).....**12**  
 13 bits (8192) (0.04°).....**13**  
 16 bits (65536) (0.005°).....**16**

### 8. IP Rating

IP 64 ..... **64**  
 IP 65 ..... **65**  
 IP 66 ..... **66**  
 IP 67 ..... **67**  
 IP 68\* ..... **68**  
 \*1 meter/1 hour

### 11. Flange

Clamping flange .....**C**  
 Synchro flange .....**S**  
 Square VA/SA option only.....**Q**

### 3. Incremental Revolution

1024 ppr ..... **A**  
 2048 ppr ..... **B**  
 4096 ppr ..... **C**  
 8192 ppr ..... **D**

### 6. Composition

Aluminum ..... **AL**  
 Stainless Steel\* ..... **SA**  
 \*AISI316

### 9. Cable

No cable..... **00**

### 12. Accessory

No accessory..... **00**