

# EX11 Series— Miniature Incremental Rotary Optical Encoder

BEI Sensors



The EX11 Series was developed to provide a high precision, low cost enclosed shaft encoder for light duty applications. The EX11 offers benefits of the Opto-ASIC design with 1024 line counts in a 1.1 inch diameter size.

Packaged in a glass filled polycarbonate housing with 1/8" stainless steel shaft and precision bearings, the EX11 provides superior performance at a lower cost.

The EX11 Series is capable of operating over a temperature range of 0°C to +70°C without degradation of signals.

Proven design and Duncan Electronics' experience makes the EX11 perfectly suited for high volume OEM applications, including: robotics, process control and instrumentation.

## Mechanical Specifications

**Dimensions:** See Figure 1  
**Weight:** 2.0 oz. (Approx.)  
**Shaft Diameter:** 0.1247 +0.0000/-0.0003  
**Shaft Load:** axial 2 lbs., Radial 1 lb.  
**Torque, starting:** less than 0.4 oz. in.  
**running:** less than 0.2 oz. in.  
**Inertia:** 3.0 x 10<sup>-5</sup> oz. in./sec  
**Motor Interface**  
**Servo Mounting Holes:** 4 places #2-56 @ 90° on 0.75"B.C.  
**Servo Mount:** designed to accommodate motor mount cleat "PIC type" L2-2  
**Flange Mounting Holes:** 4 places .100 dia. through holes  
**Shaft Coupling:** must be flexible (do not hard mount)

## Electrical Specifications

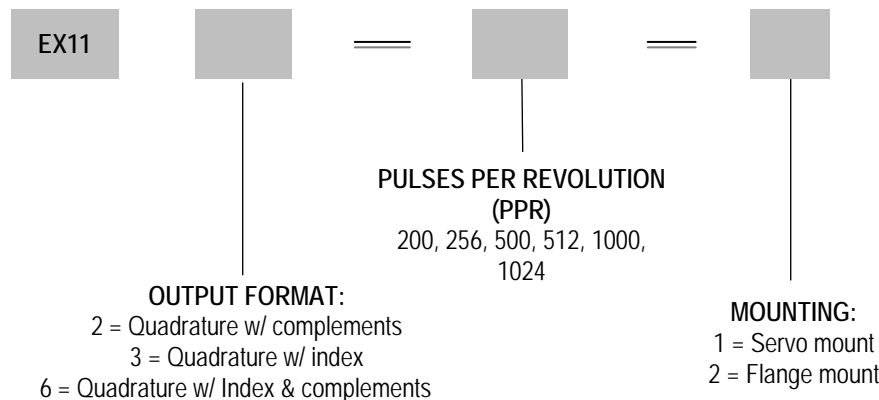
**Code:** incremental  
**Pulses per Revolution:** see "Ordering Options"  
**Supply Voltage:** +5 volts ± 5% @ 80mA max.  
**Output Format:** dual channel Quadrature and index with complements (no index on EX112)  
**Output Type:**  
 -EX116- Line driver 26LS31 or equivalent should be terminated into a line receiver  
 -EX112/EX113- Buffer driver 74F365 and 74F368 or equivalent. (not open collector)  
**Rise Time:** 1.0µsec. max.  
**Frequency Response:** see graph: Fig 3

## Environmental Specifications

**Temperature:**  
 Operating: 0°C to +70°C  
 Storage: -25°C to +90°C  
**Termination Type:** 28 AWG flat ribbon cable with 10 position connector FXI-Berg P/N 6690-310 or equivalent  
 Mates with FCI-Berg P/N 65863-165 or equivalent (mating connector not provided)

## EX11 Incremental Ordering Options for assistance, call 800.350.2727

Use this diagram, working from left to right to construct your model number (example: EX113-500-2)

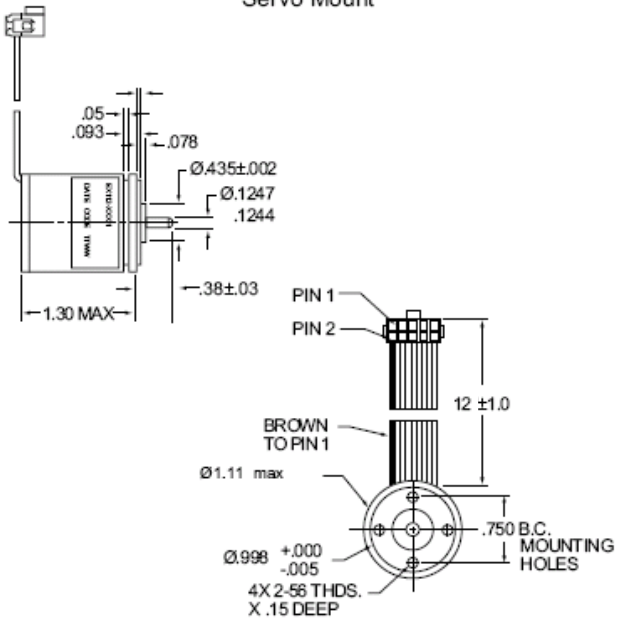


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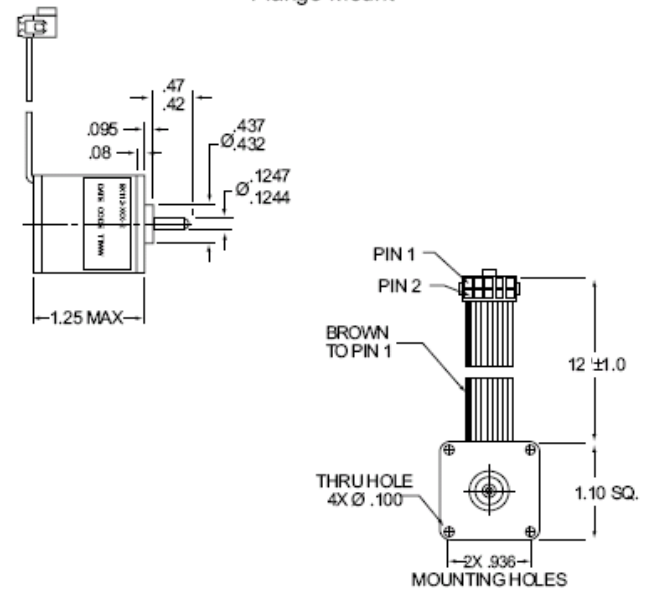
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## Dimensions

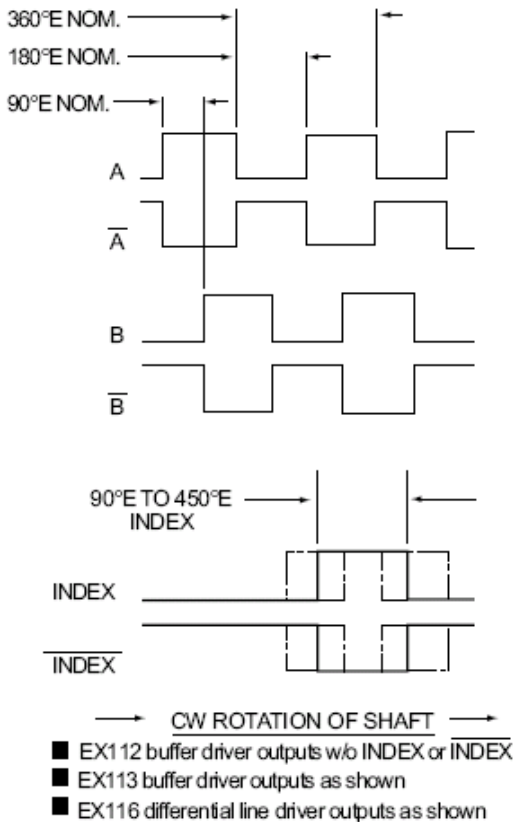
**Figure 1**  
Servo Mount



**Figure 2**  
Flange Mount

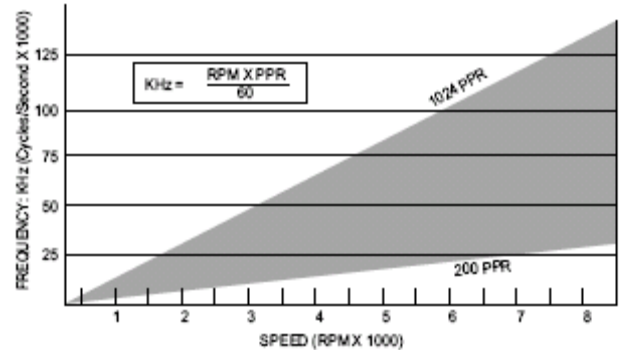


## Output Wave Form



## Frequency Response

**Figure 3**



## Pin Out

| Pin No. | Color  | Signal    |
|---------|--------|-----------|
| 1       | Brown  | N/C       |
| 2       | Red    | +5V       |
| 3       | Orange | $\bar{B}$ |
| 4       | Yellow | B         |
| 5       | Green  | index     |
| 6       | Blue   | index     |
| 7       | Violet | $\bar{A}$ |
| 8       | Gray   | A         |
| 9       | White  | N/C       |
| 10      | Black  | Ground    |



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