

# Model 121

Incremental Thru-Bore  
& Motor Mount Encoders



Patent #6,608,300B2

## Features

- Simple, Hassle Free Mounting
- Accepts Larger Shafts up to 5/8" (or 15 mm)
- Up to 12 Pole Commutation Available
- 0° to 100° C Operating Temperature Available
- Patented Design
- Includes New IP50 Dust Seal Kit

AT LAST! A reliable modular encoder that requires no calibration, gapping, or special tools to install! EPC has taken the performance of modular encoders to a new level with the Model 121 Auto-Aligning Modular Encoder. This new and innovative design provides simple, reliable, hassle free installation. Simply tighten the shaft clamp, install the mounting screws, and you're done!

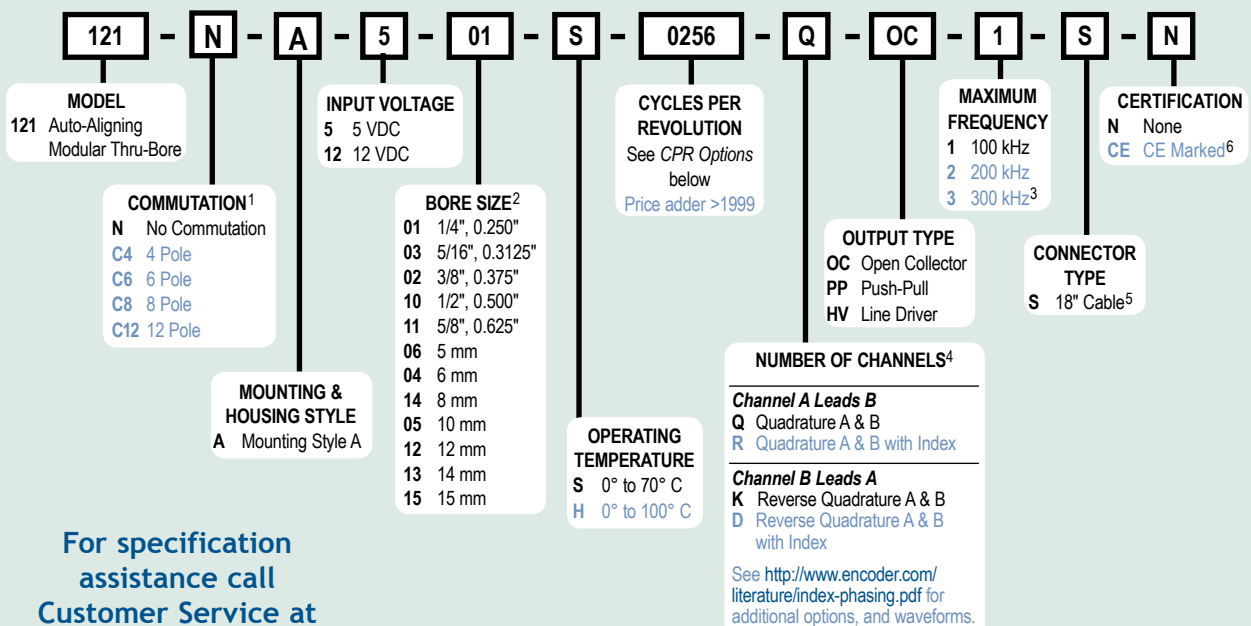
The Model 121 incorporates the latest Optical ASIC technology for greatly enhanced performance. Common problems with other modular encoder designs are warping and deflection, caused by their extensive use of plastic, both of which are virtually eliminated by the Model 121's all metal construction. For brushless servo motor applications, the Model 121 can be specified with three commutation tracks to provide motor feedback. The optional 100° C temperature capability allows servo motors to operate at higher power outputs and duty cycles.

## Common Applications

Servo Motor Control, Robotics, Specialty Assembly Machines, Digital Plotters, High Power Motors

## Model 121 Ordering Guide

Blue type indicates price adder options. Not all configuration combinations may be available. Contact Customer Service for details.



For specification assistance call  
Customer Service at  
1-800-366-5412

### Model 121 CPR Options

0200	0250	0254	0256	0300	0360	0500
0512	0600	0720	0800	0840	1000	1024
1200	1250	1800*	2000*	2048*	2500*	2540*

\*Contact Customer service for application analysis

New CPR values are periodically added to those listed. Contact Customer Service to determine all currently available values. Special disk resolutions are available upon request and may be subject to a one-time NRE fee.

### NOTES:

- 1 Not available in all configurations. Contact Customer Service for availability.
- 2 Contact Customer Service for additional options not shown.
- 3 Standard 0° to 70° C operating temperature only.
- 4 Contact Customer Service for non-standard index gating options.
- 5 For Non-Standard Cable Lengths add a forward slash (/) plus cable length expressed in feet. Example: S/6 = 6 feet of cable.
- 6 Please refer to **Technical Bulletin TB100: When to Choose the CE Option** at [www.encoder.com](http://www.encoder.com).

# Model 121

## Model 121 Specifications

### Electrical

- Input Voltage.....5 VDC  $\pm 10\%$  Fixed Voltage  
12 VDC  $\pm 10\%$  Fixed Voltage
- Input Current.....100 mA maximum with no output load
- Output Format.....Incremental- Two square waves in quadrature with channel A leading B for clockwise shaft rotation, as viewed from the mounting face. Index optional
- Output Types.....Open Collector- 20 mA per channel max  
Push-Pull- 20 mA per channel max  
Line Driver- 20 mA max per channel (Meets RS 422 at 5 VDC supply)
- Index.....Once per revolution gated to channel A. Contact Customer Service for additional gating options.
- Max Frequency.....100 kHz standard, 200 kHz, and 300 kHz optional
- Symmetry.....180° ( $\pm 18^\circ$ ) electrical at 100 kHz
- Quad. Phasing.....90° ( $\pm 22.5^\circ$ ) electrical at 100 kHz
- Min. Edge Sep.....67.5° electrical at 100 kHz
- Accuracy.....Within 0.1° mechanical from one cycle to any other cycle, or 6 arc minutes
- Commutation.....Optional- three 120° electrical phase tracks for commutation feedback. (4, 6, 8, or 12 poles. Others available upon request)
- Comm. Accuracy.....1° mechanical

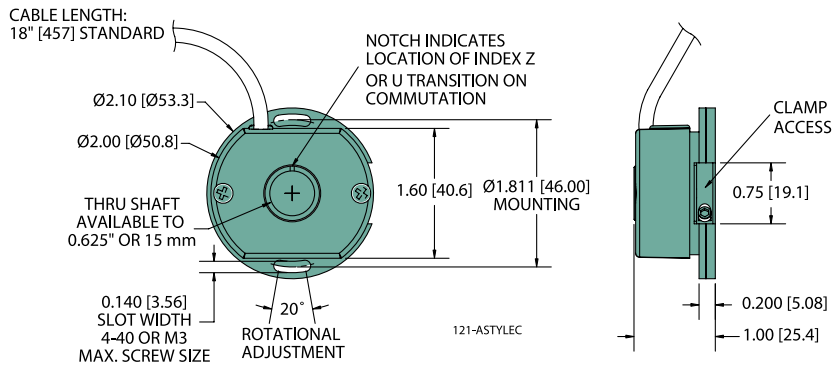
### Mechanical

- Max. Shaft Speed.....Determined by maximum frequency response
- Bore Size.....0.250" through 0.625"  
5 mm through 15 mm
- Bore Tolerance.....+0.0007" (max) -0.0000" (Based on H7 bore fit for g6 shaft Class LC5 per ANSI B-4.1 standard)
- User Shaft Tolerance  
Radial Runout.....0.002" max  
Axial End Play..... $\pm 0.015"$  for CPR  $\leq 512$   
 $\pm 0.010"$  for CPR 513 to 1250  
 $\pm 0.005"$  for CPR  $> 1250$
- Moment of Inertia..... $2.5 \times 10^{-4}$  oz-in-sec<sup>2</sup>
- Max. Acceleration..... $5 \times 10^5$  rad/sec<sup>2</sup>
- Electrical Conn.....18" cable (foil and braid shield, 24 AWG conductors non-commutated, 28 AWG commutated)
- Housing.....All Metal Aluminum and Zinc Alloy
- Mounting.....Two screws on a 1.812" Dia. B.C. (4-40 or M3 maximum screw size)
- Weight.....4 oz typical

### Environmental

- Operating Temp.....0° to 70° C for standard models  
0° to 100° C for high temperature option
- Storage Temp.....-25° to +100° C
- Humidity.....98% RH non-condensing
- Vibration.....10 g @ 58 to 500 Hz
- Shock.....50 g @ 11 ms duration

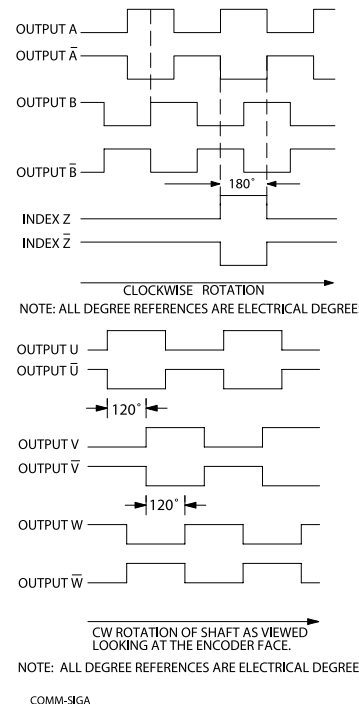
## Model 121 Auto-Aligning Modular (A)



All dimensions are in inches with a tolerance of  $\pm 0.005"$  or  $\pm 0.01"$  unless otherwise specified  
Metric dimensions are given in brackets [mm]



### Waveform Diagrams



### Wiring Table

Function	Cable Wire Color
Com	Black
+VDC	White
A	Brown
A'	Yellow
B	Red
B'	Green
Z	Orange
Z'	Blue
U	Violet
U'	Gray
V	Pink
V'	Tan
W	Red/Green
W'	Red/Yellow
Shield	Bare *

\*CE Option: Cable shield (bare wire) is connected to internal case

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