MODEL 121 - THRU-BORE MODULAR ENCODER

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 IP50 dust seal kit

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 requires no calibration, gapping or special tools for hassle-free installation. The Model 121 incorporates the latest Opto-ASIC technology for 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.

<table>
<thead>
<tr>
<th>MODEL 121</th>
<th>N</th>
<th>A</th>
<th>S</th>
<th>01</th>
<th>S</th>
<th>0256</th>
<th>Q</th>
<th>OC</th>
<th>1</th>
<th>S</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autonomous modular thru-bore</td>
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</tr>
<tr>
<td><strong>INPUT VOLTAGE</strong></td>
<td>5 V DC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>OPERATING TEMPERATURE</strong></td>
<td>S 0° to 70° C</td>
<td>H 0° to 100° C</td>
<td></td>
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</tbody>
</table>
| **BORE SIZE** | Ø2.1"
Patent #6,608,300B2 |

**COMMUTATION**
N No commutation
C4 4-pole
C6 6-pole
C8 8-pole
C12 12-pole

**Cycles per Revolution**
See CPR Options below
Price adder for >1999

**NUMBER OF CHANNELS**
Channel A Leads B
Q Quadrature A & B
R Quadrature A & B with Index
Channel B Leads A
K Reverse Quadrature A & B
D Reverse Quadrature A & B with Index
See Quadrature Phasing and Index Gating Options for additional options and waveforms at encoder.com

**NOTES:**
1 Not available in all configurations. Contact Customer Service for availability.
2 Contact Customer Service for additional options not shown.
3 Contact Customer Service for non-standard index gating options.
4 Standard 0° to 70° C operating temperature only.
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 TB-100: When to Choose the CE Mark at encoder.com.

Model 121 CPR Options
0200 0360 0500 0512 0720 1000 1024 1200
1250 1800* 2000* 2048* 2500*

*Contact customer service for availability
New CPR values are periodically added to those listed. Contact Customer Service to determine all currently available values. Special disc resolutions are available upon request and may be subject to a one-time NRE fee.
MODEL 121 SPECIFICATIONS

Electrical
- Input Voltage: 5 VDC ±10% Fixed Voltage
- Input Current: 130 mA max (< 100 mA typical) 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
  Line Driver – 20 mA max per channel (Meets RS 422 at 5 VDC supply)
- Index: Once per revolution gated to channel A.
- Max Frequency: 100 kHz standard, 200 kHz, and 300 kHz optional
- Electrical Protection: Reverse voltage and output short circuit protected. NOTE: Sustained reverse voltage may result in permanent damage.
- Quadrature Edge Separation: 67.5° electrical or better is typical, 54° electrical minimum at temperatures > 99° C
- 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.)

Mechanical
- Max. Shaft Speed: Determined by maximum frequency response
- 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: ±0.015” for CPR <= 512
  - ±0.010” for CPR 513 to 1250
  - ±0.005” for CPR > 1250
- Moment of Inertia: 2.5 x 10⁻⁴ oz-in-sec²
- Max. Acceleration: 5 x 10⁵ rad/sec²
- Housing: All Metal Aluminum and Zinc Alloy
- Weight: ±0.01” or ±0.005” unless otherwise specified. Metric dimensions are given in brackets [mm].

Environmental
- Storage Temp: -25° to 100° C
- Humidity: 98% RH non-condensing
- Vibration: 10 g @ 58 to 500 Hz
- Shock: 50 g for 11 ms duration

MODEL 121 AUTO-ALIGNING MODULAR (A)

CLOCKWISE ROTATION AS VIEWED FROM THE MOUNTING FACE

NOTE: ALL DEGREE REFERENCES ARE ELECTRICAL DEGREES. Waveform shown with optional complementary signals A, B, Z for HV output only.

WAVEFORM DIAGRAM

Incremental signals

WIRING TABLE

For EPC-supplied mating cables, refer to wiring table provided with cable. Trim back all unused wires.

<table>
<thead>
<tr>
<th>Function</th>
<th>Flying Leads Cable† Wire Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>Com</td>
<td>Black</td>
</tr>
<tr>
<td>+VDC</td>
<td>White</td>
</tr>
<tr>
<td>A</td>
<td>Brown</td>
</tr>
<tr>
<td>A’</td>
<td>Yellow</td>
</tr>
<tr>
<td>B</td>
<td>Red</td>
</tr>
<tr>
<td>B’</td>
<td>Green</td>
</tr>
<tr>
<td>Z</td>
<td>Orange</td>
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<tr>
<td>Z’</td>
<td>Blue</td>
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<td>U</td>
<td>Violet</td>
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<td>U’</td>
<td>Gray</td>
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<tr>
<td>V</td>
<td>Pink</td>
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<tr>
<td>V’</td>
<td>Tan</td>
</tr>
<tr>
<td>W</td>
<td>Red/Green</td>
</tr>
<tr>
<td>W’</td>
<td>Red/Yellow</td>
</tr>
<tr>
<td>Shield</td>
<td>Bare*</td>
</tr>
</tbody>
</table>

*CE Option: Cable shield (bare wire) is connected to internal case
†Standard cable is 24 AWG conductors with foil and braid shield. For commutated units, conductors are 28 AWG.