Encoder Specification & Selection Criteria for Inkjet Systems

To select the optimal encoder solution for each unique application, four primary encoder specification categories must be defined: Mechanical, CPR, Environmental and Interconnect. (Some of those variables are predetermined by encoder interface requirements. See chart, bottom of page):

**Mechanical:** Thru-bore encoders mount directly to the shaft via a collar, and are anchored by a flexible anti-rotation mount. Their bearings are designed to carry the encoder only. Shaft encoders can carry heavier loads and can be used with a measuring wheel. To define your mechanical requirements, determine the following:

- Space constraints
- Appropriate housing size
- The mounting method: to a motor, a driven shaft, a conveyor belt, etc.
- Whether or not loads will be applied to the bearings
- Whether or not a measuring wheel will be used

**Cycles Per Revolution (CPR):** CPR specification is commonly provided by the End Customer, Integrator or someone familiar with the system design and sensing/control requirements. See chart below for minimum CPR requirements.

**Environmental:** IP50 provides dust protection; IP64 or higher prevents ingress of extremely fine dust or moisture. Specify stainless steel and/or nylon for corrosion resistance (when possible).

**Interconnect:** For distances over 10 feet, select body-mounted connectors for ease of installation and after-market service. Integrated M12 cordsets are available on some models; Flying Leads are offered on all models. For cable lengths exceeding 30 feet, consult EPC Technical Sales Engineers.

**Encoder Interface Requirements:**

1. Supply Voltage to Encoder + 24vdc
2. Encoder Output Type Open Collector (OC), NPN, or Push Pull (PP) PNP
3. Number of Channels / Encoder Waveform A & B in Quadrature
4. Max Encoder Frequency Response Output 200kHz
5. Min Encoder CPR ~ 20 pulse/mm linear travel

**Useful Definitions and Formulas**

<table>
<thead>
<tr>
<th>Frequency Response of Encoder Output</th>
<th>CPR x RPM</th>
<th>Hz</th>
<th>Hz</th>
<th>kHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 x 1000</td>
<td>60</td>
<td>1000</td>
<td>1000</td>
<td></td>
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</tbody>
</table>

**Encoder Pulses with Measuring Wheel**

<table>
<thead>
<tr>
<th>Encoder CPR</th>
<th>Encoder Pulses/mm</th>
</tr>
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<tbody>
<tr>
<td>Pulley Diameter (mm) x π</td>
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</table>

**Open Collector**

Designated OC in EPC part numbers, this is an NPN type output. It is a current-sinking output that requires pull-up resistors external to the encoder. Typical values are 1.5K to 2.2K. EPC’s OC output allows for level shifting, where the encoder signal is pulled up externally to a different voltage.

**Push Pull**

Designated PP in EPC part numbers, this is compatible with PNP circuits. Sometimes referred to as a “totem-pole” type of output circuit. When the output is in the logic high state, current is sourced to the load. When the output is in the logic low state, current is sinking from the load.

**NOTE:** All degree references are electrical degrees.

**NOTE:** If system is bi-directional, then both A and B outputs are required.

1-800-366-5412 | www.encoder.com | sales@encoder.com
Model 802S Accu-Coder™
- Programmable
- Size 58 mm thru-bore programmable encoder
- Programmable:
  - Resolution to 65,536 CPR
  - Output Type – six different options
  - Wave Form – choose from 32 options
  - Standard and metric thru-bore sizes up to 5/8” and 16 mm
  - Several flexible mounting options

Model 25SP Accu-CoderPro™
- Programmable
- Standard Size 25 shaft encoder
- Programmable:
  - Resolution to 65,536 CPR
  - Output Type – six different options
  - Wave Form – choose from 32 options
  - Shaft sizes up to 5/16” or 10 mm
  - Flange and servo mounts
  - Up to IP67 sealing available
  - Operating temperature options

Model TR1 Tru-Trac™
- Programmable
- Integrated Encoder and Measuring Wheel
- Resolutions to 30,000 CPR
- Overall Size Less Than 4 Inches
- Easy Installation in Many Orientations

Model TR3 Tru-Trac™
- Programmable
- Integrated Heavy Duty Encoder and Measuring Wheel
- Resolutions to 2540 CPR
- Operates Over a Variety of Surfaces
- Easy Installation in Many Orientations

With a PROGRAMMABLE Accu-CoderPro™ encoder, you can use a Windows tablet or laptop to adjust the application’s resolution on site by programming the encoder’s CPR to different values, allowing you to test/tune the application.

Solutions for Packaging, Printing, Labeling, Vision
Typical Examples of Select Encoder Applications for Inkjet Systems

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