

# Model 725



## Features

- Standard Size 25 Package (2.5" x 2.5")
- Up to 30,000 CPR
- Standard and Industrial Housings
- Servo and Flange Mounting
- IP67 Sealing Available

Model 725 Size 25 Accu-Coder™ optical shaft encoder is specifically designed for the challenges of an industrial environment. But don't let its tough, industrial package fool you; it still has the performance to reach resolutions up to 30,000 cycles per revolution. The Model 725 offers both flange and servo mounting options, and is available in two distinctive housing styles. The rugged Standard Housing (N) isolates the internal electronics from the shock and stress of the outer environment. The extra heavy-duty Industrial Housing (I) features a fully isolated internal encoder unit that prolongs bearing life by using an internal flexible mount to protect the encoder from severe axial and radial shaft loading. The Industrial Housing option is the recommended solution for applications subject to continuous side loads, such as applications that drive the encoder with a measuring wheel, pulley or chain & sprocket.

## Common Applications

Motion Control Feedback, Conveyors, Elevator Controls, Machine Control, Food Processing, Process Control, Robotics, Material Handling, Textile Machines

## Model 725 Ordering Guide

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

**725** - **N** - **4** - **S** - **1000** - **R** - **HV** - **1** - **F** - **1** - **E** - **X** - **N** - **CE**

**MODEL**  
725 Size 25 (2.5")

**HOUSING STYLE**  
N Standard Housing  
I Heavy Duty Industrial with Internal Flex Mount

**OPERATING TEMPERATURE**  
S 0° to 70° C  
L -40° to 70° C  
H 0° to 100° C<sup>2</sup>

**CYCLES PER REVOLUTION**  
1-30,000  
See CPR Options for available resolutions.  
Price adder for CPR >1270

**OUTPUT TYPE**  
5 - 28V In/Out<sup>4</sup>  
OC Open Collector  
PU Pull-Up Resistor  
PP Push-Pull  
HV Line Driver<sup>9</sup>  
8 - 28V In/5V Out<sup>5,11</sup>  
H5 Line Driver<sup>9</sup>  
P5 Push-Pull

**MOUNTING**  
F Flange  
S 2.50" Servo  
R 2.50" Servo  
Q 2.50" Servo  
L 2.62" Servo  
P 5PY

**CONNECTOR LOCATION**  
S Side  
E End

**MATING CONNECTOR**  
N No  
Y Yes

**SHAFT SIZE**  
S 3/8", 0.375" (standard)  
4 1/4", 0.250"  
19 5/16", 0.3125"  
25 3/8", 0.375" - No flat<sup>1</sup>  
06 6 mm  
18 8 mm  
21 10 mm

**NUMBER OF CHANNELS<sup>3</sup>**  
A Channel A  
**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

**MAXIMUM FREQUENCY**  
1 Standard 100 kHz  
2 200 kHz  
5 250 kHz, >3000 CPR  
3 500 kHz, >6000 CPR<sup>6</sup>  
4 1 MHz, >10,000 CPR<sup>6</sup>

**CONNECTOR TYPE<sup>10</sup>**  
W 6-pin MS Style  
Y 7-pin MS Style  
X 10-pin MS Style  
9D 9-pin D-subminiature  
K 5-pin M12 (12 mm)  
L 8-pin M12 (12 mm)  
G Gland, 24" Cable<sup>7</sup>

**SEAL**  
N No Seal  
1 IP66  
2 IP64<sup>12</sup>  
5 IP67

**CERTIFICATION**  
N None  
CE CE Marked<sup>8</sup>

**Accessory Mounting Bracket can be ordered separately as part # 140122. For more details [www.encoder.com](http://www.encoder.com)**

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

## Model 725 CPR Options

|                     |                     |                     |                     |                     |                     |                     |                     |                     |
|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| 0001*               | 0002*               | 0004*               | 0005*               | 0006*               | 0007*               | 0008*               | 0010*               | 0011*               |
| 0012*               | 0014*               | 0020                | 0021*               | 0024*               | 0025*               | 0028*               | 0030*               | 0032*               |
| 0033*               | 0034*               | 0035*               | 0038*               | 0040*               | 0042*               | 0045*               | 0050*               | 0060                |
| 0064*               | 0100                | 0120                | 0125                | 0128*               | 0144*               | 0150*               | 0160*               | 0192*               |
| 0200                | 0240*               | 0250                | 0254*               | 0256*               | 0300                | 0333*               | 0360                | 0400                |
| 0500                | 0512                | 0600                | 0625*               | 0635                | 0665*               | 0720                | 0768*               | 0800                |
| 0889                | 0900*               | 1000                | 1024                | 1200                | 1201* <sup>a</sup>  | 1203* <sup>a</sup>  | 1204* <sup>a</sup>  | 1250 <sup>a</sup>   |
| 1270 <sup>a</sup>   | 1440                | 1500                | 1800                | 2000                | 2048                | 2400 <sup>a</sup>   | 2500                | 2540 <sup>a</sup>   |
| 2880 <sup>a</sup>   | 3000 <sup>a</sup>   | 3600 <sup>a</sup>   | 4000 <sup>a</sup>   | 4096 <sup>a</sup>   | 5000 <sup>a</sup>   | 6000 <sup>a</sup>   | 7200 <sup>a</sup>   | 7500 <sup>a</sup>   |
| 9000 <sup>a</sup>   | 10,000 <sup>a</sup> | 10,240 <sup>a</sup> | 12,000 <sup>a</sup> | 12,500 <sup>a</sup> | 14,400 <sup>a</sup> | 15,000 <sup>a</sup> | 18,000 <sup>a</sup> | 20,000 <sup>a</sup> |
| 20,480 <sup>a</sup> | 25,000 <sup>a</sup> | 30,000 <sup>a</sup> |                     |                     |                     |                     |                     |                     |

\* Contact Customer Service for High Temperature Option.

<sup>a</sup> High Temperature Option (H) limited to 85° C maximum for these CPR options.

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

## NOTES:

- 1 Available with I housing style only.
- 2 0° to 85° C for certain resolutions, see CPR Options.
- 3 Contact Customer Service for index gating options.
- 4 24 VDC max for high temperature option.
- 5 Standard temperature, 60 to 3000 CPR only.
- 6 Standard cable lengths only. For details, please refer to **Technical Bulletin TB116: Noise and Signal Distortion Considerations** at [www.encoder.com](http://www.encoder.com).
- 7 For Non-Standard Cable Lengths add a forward slash (/) plus cable length expressed in feet. Example: SG/6 = 6 feet of cable.
- 8 Please refer to **Technical Bulletin TB100: When to Choose the CE Option**.
- 9 Not available with 5-pin M12 or 6-pin MS connector. Available with 7-pin MS connector only without Index Z.
- 10 For Mating Connectors, Cables, and Cordsets see [www.encoder.com](http://www.encoder.com).
- 11 H5 and P5 outputs not available with CE option, or any End Mount MS Connector.
- 12 IP64 not available in low temp option.

# Model 725

## Model 725 Specifications

### Electrical

|                     |  |
|---------------------|--|
| Input Voltage.....  | 4.75 to 28 VDC max for temperatures up to 70° C<br>4.75 to 24 VDC for temperatures between 70° C to 100° C   |
| Input Current.....  | 100 mA max with no output load   |
| Input Ripple.....   | 100 mV peak-to-peak at 0 to 100 kHz  |
| Output Format.....  | Incremental- Two square waves in quadrature with channel A leading B for clockwise shaft rotation, as viewed from the encoder mounting face. See <i>Waveform Diagrams</i> below.   |
| Output Types.....   | Open Collector- 100 mA max per channel<br>Pull-Up- 100 mA max per channel<br>Push-Pull- 20 mA max per channel<br>Line Driver- 20 mA max per channel (Meets RS 422 at 5 VDC supply)   |
| Index.....          | Occurs once per revolution. The index for units >3000 CPR is 90° gated to Outputs A and B. See <i>Waveform Diagrams</i> below.   |
| Max Frequency.....  | Up to 1 MHz  |
| Noise Immunity..... | Tested to BS EN61000-4-2; IEC801-3; BS EN61000-4-4; DDEVN 50141; DDEVN 50204; BS EN55022 (with European compliance option); BS EN61000-6-2; BS EN50081-2   |
| Symmetry.....       | 1 to 6000 CPR: 180° (±18°) electrical at 100 kHz output<br>6001 to 20,480 CPR: 180° (±36°) electrical at 100 kHz output  |
| Quad Phasing.....   | 1 to 6000 CPR: 90° (±22.5°) electrical at 100 kHz output<br>6001 to 20,480 CPR: 90° (±36°) electrical at 100 kHz output  |
| Min Edge Sep.....   | 1 to 6000 CPR: 67.5° electrical at 100 kHz output<br>6001 to 20,480 CPR: 54° electrical<br>>20,480 CPR: 50° electrical   |
| Rise Time.....      | Less than 1 microsecond  |
| Accuracy.....       | Instrument and Quadrature Error: For 200 to 1999 CPR, 0.017° mechanical (1.0 arc minutes) from one cycle to any other cycle.<br>For 2000 to 3000 CPR, 0.01° mechanical (0.6 arc minutes) from one cycle to any other cycle.<br>Interpolation error (units > 3000 CPR only) within 0.005° mechanical. (Total Optical Encoder Error = Instrument + Quadrature + Interpolation) |

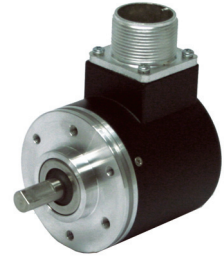
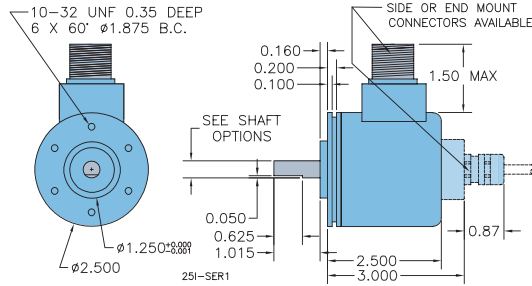
### Mechanical

|                        |  |
|------------------------|--|
| Max Shaft Speed.....   | 8000 RPM. Higher shaft speeds may be achievable, contact Customer Service.   |
| Shaft Size.....        | 0.375" (standard), 0.250", 0.3125", 6 mm, 8 mm, 10 mm  |
| Shaft Material.....    | 303 stainless steel  |
| Shaft Rotation.....    | Bi-directional   |
| Radial Shaft Load..... | 80 lb max (standard housing)<br>80 lb max (industrial housing)   |
| Axial Shaft Load.....  | 80 lb max (standard housing)<br>80 lb max (industrial housing)   |
| Starting Torque.....   | 1.0 oz-in typical with IP64 seal or no seal<br>3.0 oz-in typical with IP66 shaft seal<br>7.0 oz-in typical with IP67 shaft seal                        |
| Moment of Inertia..... | $5.2 \times 10^{-4}$ oz-in-sec <sup>2</sup>  |
| Max Acceleration.....  | $1 \times 10^5$ rad/sec <sup>2</sup>   |
| Electrical Conn.....   | 6-, 7-, or 10-pin MS Style, 5- or 8-pin M12 (12 mm), 9-pin D-subminiature, or gland with 24 inches of cable (foil and braid shield, 24 AWG conductors) |
| Housing.....           | Black non-corrosive finish   |
| Bearings.....          | Precision ABEC ball bearings   |
| Mounting.....          | Flange, servo, or 5PY  |
| Weight.....            | 20 oz typical  |

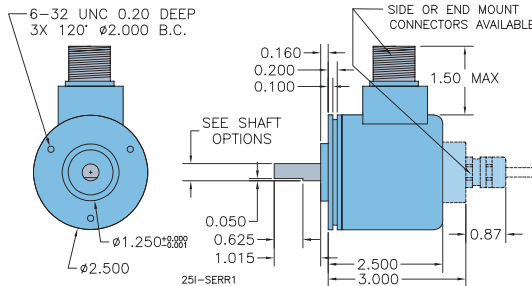
### Environmental

|                     |  |
|---------------------|--|
| Operating Temp..... | 0° to 70° C for standard models<br>0° to 100° C for high temperature option (0° to 85° C for certain resolutions, see CPR Options.)<br>-40° to 70° C |
| Storage Temp.....   | -25° to +85° C   |
| Humidity.....       | 95% RH non-condensing  |
| Vibration.....      | 725N: 10 g @ 58 to 500 Hz<br>725I: 20 g @ 58 to 500 Hz   |
| Shock.....          | 725N: 50 g @ 11 ms duration<br>725I: 75 g @ 11 ms duration   |
| Sealing.....        | IP50 standard; IP64, IP66 or IP67 optional   |

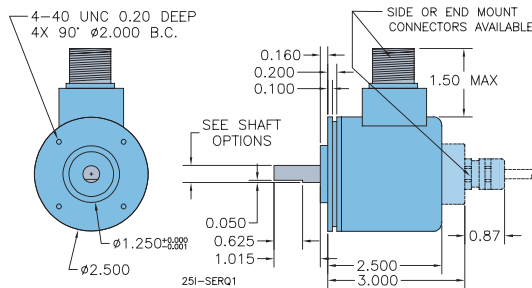
## Model 725 2.5" Servo Mount (S)



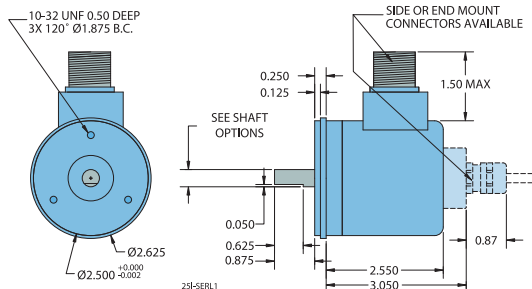
## Model 725 2.5" Servo Mount (R)



## Model 725 2.5" Servo Mount (Q)



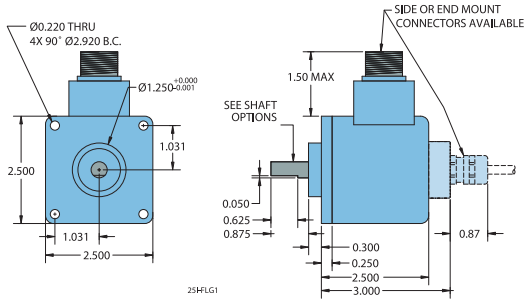
## Model 725 2.62" Servo Mount (L)



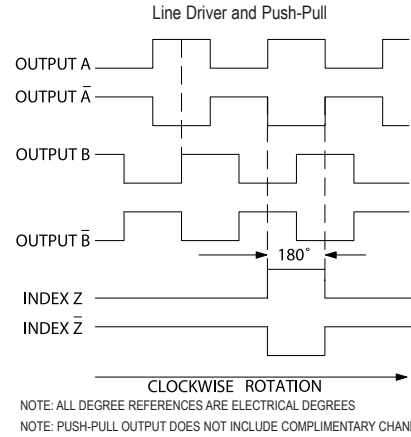
All dimensions are in inches with a tolerance of ±0.005" or ±0.01" unless otherwise specified

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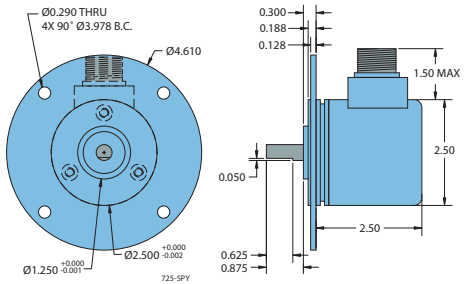
## Model 725 Flange Mount (F)



## Waveform Diagrams



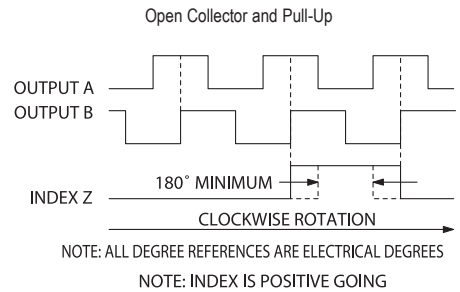
## Model 725 Optional 5PY Mounting (P)



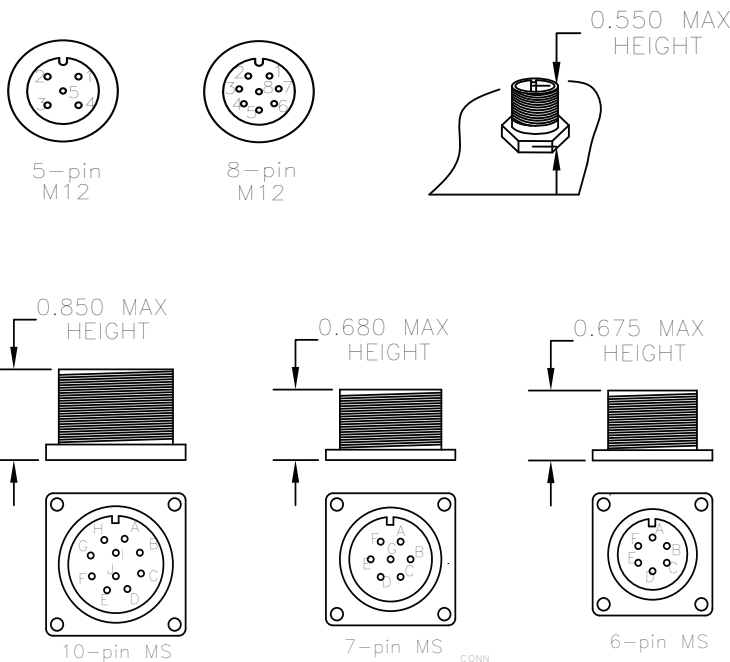
The optional 5PY adapter is made of all aluminum construction and allows Model 725 encoder to replace DC tachometer technology. The 5PY adapter is mechanically interchangeable with any 5PY tach generator.



All dimensions are in inches with a tolerance of  $\pm 0.005"$  or  $\pm 0.01"$  unless otherwise specified



## Connector Pin-Outs



## Wiring Table

| Function | Gland Cable Wire Color | 5-pin M12 <sup>2</sup> | 8-pin M12 <sup>2</sup> | 10-pin MS | 7-pin MS HV,H5 | 7-pin MS PU, PP, OC, P5 | 6-pin MS PU, PP, OC, P5 | 9-pin D-sub |
|----------|------------------------|------------------------|------------------------|-----------|----------------|-------------------------|-------------------------|-------------|
| Com      | Black                  | 3                      | 7                      | F         | F              | F                       | A, F                    | 9           |
| +VDC     | Red                    | 1                      | 2                      | D         | D              | D                       | B                       | 1           |
| A        | White                  | 4                      | 1                      | A         | A              | A                       | D                       | 2           |
| A'       | Brown                  | ---                    | 3                      | H         | C              | ---                     | ---                     | 3           |
| B        | Blue                   | 2                      | 4                      | B         | B              | B                       | E                       | 4           |
| B'       | Violet                 | ---                    | 5                      | I         | E              | ---                     | ---                     | 5           |
| Z        | Orange                 | 5                      | 6                      | C         | ---            | C                       | C                       | 6           |
| Z'       | Yellow                 | ---                    | 8                      | J         | ---            | ---                     | ---                     | 7           |
| Case     | Green                  | ---                    | ---                    | G         | G              | G                       | ---                     | 8           |
| Shield   | Bare <sup>1</sup>      | ---                    | ---                    | ---       | ---            | ---                     | ---                     | ---         |

<sup>1</sup>CE Option: Cable shield (bare wire) is connected to internal case  
<sup>2</sup>CE Option: Read Technical Bulletin TB111