

# Model 702 Ultra Rugged 50.80mm Diameter



**BRITISH  
ENCODER**  
PRODUCTS COMPANY



## Features

- Standard Size 20 Package (50mm x 50mm)
- Flange, and Servo Mounting
- Up to 30,000 PPR
- 35 kg Max. Axial and Radial Shaft Loading
- IP65 Sealing Available

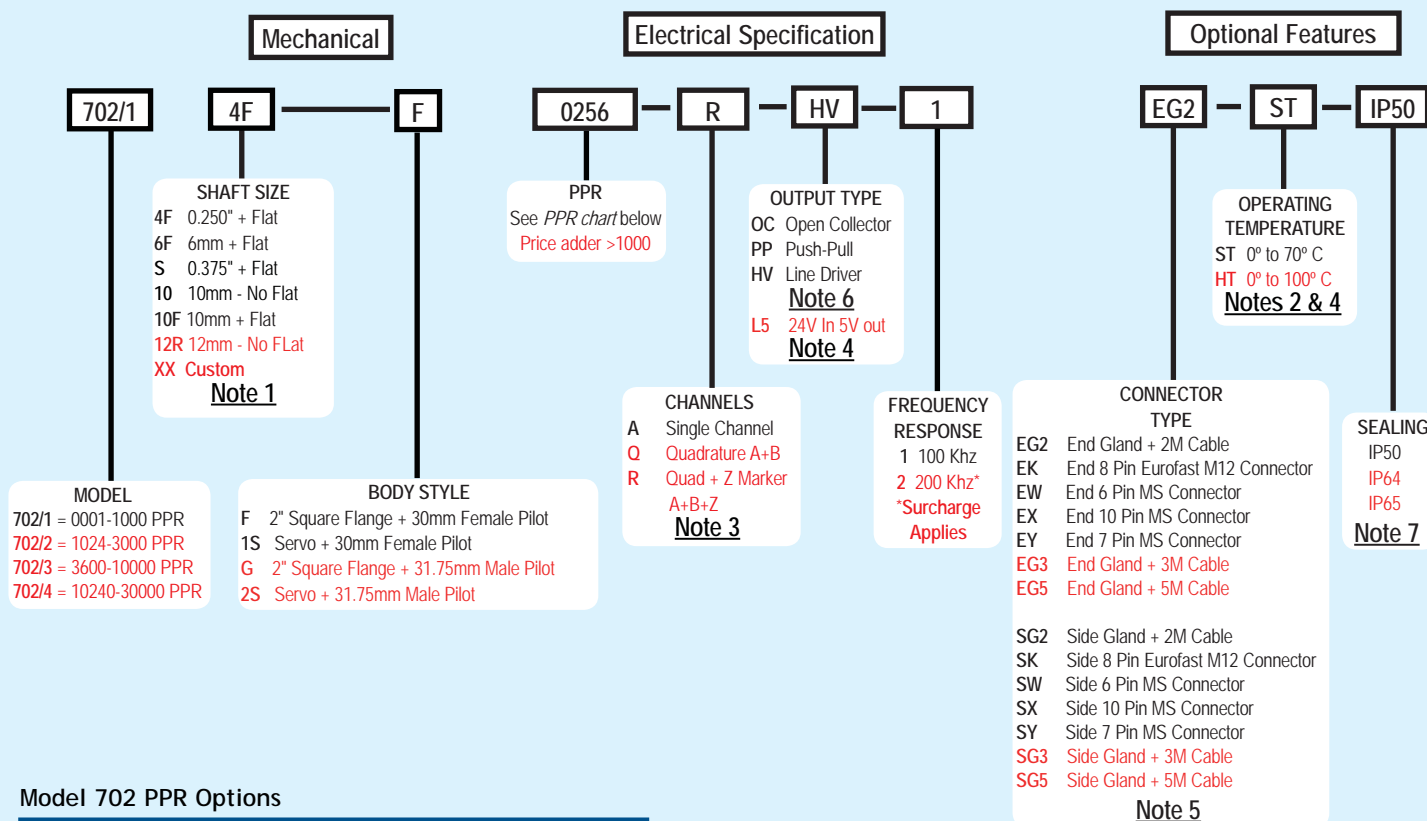
The Model 702 is a heavy duty, extremely rugged, reliable, yet compact industry standard 50.8mm diameter encoder, designed for harsh factory and plant floor environments. The double shielded ball bearings are rated at 35 kg maximum axial and radial shaft loading to ensure a long operating life. Made to withstand the harsh effects of the real world, both the flange and servo models are rated IP65 with the option of an extra heavy duty shaft seal. With a variety of mounting options in both the flange and servo models, the Model 702 is ideal for both new application and replacements. If you need an encoder that won't let you down, the Model 702 is it.

## Common Applications

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

## Model 702 Ordering Guide

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



## Model 702 PPR Options

0010*	0020	0025*	0030*	0040*	0060	0100	0120	0125
0128*	0144*	0150*	0160*	0200	0240*	0250	0254*	0256*
0300	0333*	0360	0400	0500	0512	0600	0625*	0635
0720	0800	0900*	1000	1024	1200 <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>	12,500 <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 PPR options.

New PPR values are periodically added to those listed. Contact Customer Service to determine all currently available PPR values. Special disk resolutions are available upon request.

A one-time NRE (Non Recurring Engineering) fee may apply.

**For specification  
assistance call  
Customer Service at  
+44 (0)1978 262100**

### NOTES:

- 1 Contact Customer Service for additional options.
- 2 0° to 85° C for certain resolutions, see PPR Options.
- 3 Contact Customer Service for non-standard index gating options.
- 4 24 VCC max for high temperature option.
- 5 For non-standard cable lengths, call sales office for availability and cost.
- 6 Not available with 6-pin MS Type connector. Available with 7-pin MS Type connector only without Index Z.
- 7 Increased starting torque with IP64 & IP65 options.

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## Model 702 Specifications

### Electrical

Input Voltage.....4.75 to 24 VCC max for temperatures up 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 *Waveform Diagrams* below.  
 Output Types ..... Open Collector- 50 mA max per channel  
 Push-Pull- 20 mA max per channel  
 Line Driver- 20 mA max per channel (Meets RS 422 at 5 VDC supply)  
 Index ..... Occurs once per revolution. The index for units >3000 PPR is 90° gated to Output A. See *Waveform Diagrams* below.  
 Freq Response..... Up to 500 KHz.  
 Noise Immunity..... Tested to BS EN61000-4-2; IEC801-3; BS EN61000-4-4; DENV 50141; DENV 50204; BS EN55022 (with European compliance option); BS EN61000-6-2; BS EN50081-2  
 Symmetry ..... 1 to 6000 PPR: 180° (±18°) electrical at 100 kHz output  
 6001 to 20,480 PPR: 180° (±36°) electrical  
 Quad Phasing..... 1 to 6000 PPR: 90° (±22.5°) electrical at 100 kHz output  
 6001 to 20,480 PPR: 90° (±36°) electrical  
 Min Edge Sep..... 1 to 6000 PPR: 67.5° electrical at 100 kHz  
 6001 to 20,480 PPR: 54° electrical  
 >20,480 PPR: 50° electrical  
 Rise Time..... Less than 1 microsecond  
 Accuracy..... Instrument and Quadrature Error: For 200 to 1999 PPR, 0.017° mechanical (1.0 arc minutes) from one cycle to any other cycle. For 2000 to 3000 PPR, 0.01° mechanical (0.6 arc minutes) from one cycle to any other cycle. Interpolation error (units > 3000 PPR only) within 0.005° mechanical. (Total Optical Encoder Error = Instrument + Quadrature + Interpolation)

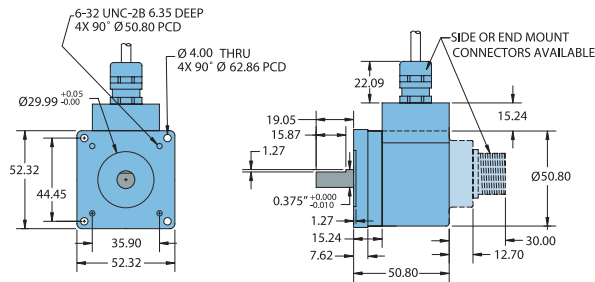
### Mechanical

Max Shaft Speed.....8000 RPM. Higher shaft speeds may be achievable, contact Customer Service.  
 Shaft Size ..... 0.250", 0.375", 10mm or 12mm  
 Shaft Rotation..... Bi-directional  
 Radial Shaft Load..... 35kg max. Rated load of 10kg to 20kg for bearing life of  $1.5 \times 10^9$  revolutions  
 Axial Shaft Load ..... 35kg max. Rated load of 10kg to 20kg for bearing life of  $1.5 \times 10^9$  revolutions  
 Starting Torque .....  $7.0615 \times 10^{-3}$  Nm typical with IP64 seal or no seal  
 $2.0118 \times 10^{-2}$  Nm typical with IP65 shaft seal  
 Max Acceleration .....  $1 \times 10^5$  rad/sec<sup>2</sup>  
 Connector Type ..... 6-, 7-, and 10-pin MS Style, 8-pin M12 (12 mm), or gland with 2 Metres of cable (foil and braid shield, 24 AWG conductors)  
 Housing..... Black non-corrosive finish  
 Bearings..... Precision ABEC ball bearings  
 Mounting..... Various flange or servo mounts  
 Weight..... 320g typical

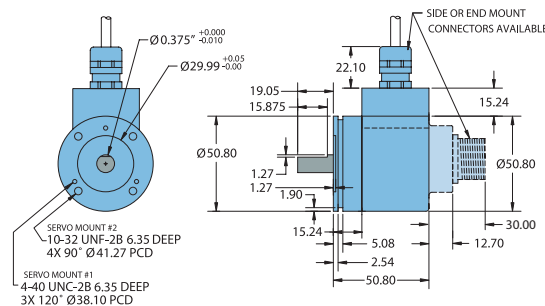
### Environmental

Operating Temp..... 0° to 70° C for standard models  
 0° to 100° C for high temperature option  
 Storage Temp ..... -25° to +85° C  
 Humidity..... 98% RH non-condensing  
 Vibration..... 20 g @ 58 to 500 Hz  
 Shock..... 75 g @ 11 ms duration  
 Sealing..... IP64/IP65 with shaft seal and cable gland.

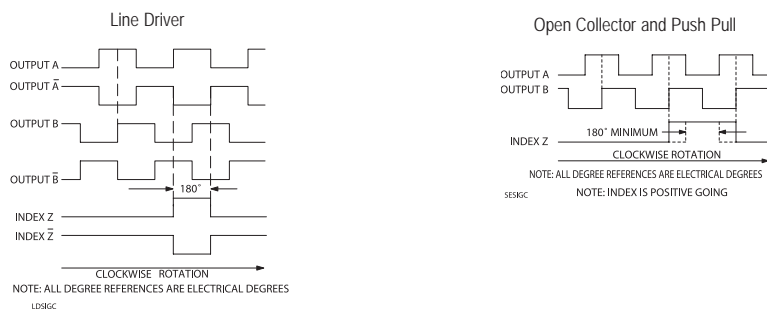
## Model 702 Flange Mount (F)



## Model 702 Servo Mount



## Waveform Diagrams



## Wiring Tables

Function	Gland Cable Wire Color	8-pin M12	10-pin MS	7-pin MS HV L5	7-pin MS PP OC	6-pin MS PP OC
Com	Black	7	F	F	F	F
+VDC	White	2	D	D	D	D
A	Brown	1	A	A	A	A
A'	Yellow	3	H	C	---	---
B	Red	4	B	B	B	B
B'	Green	5	I	E	---	---
Z	Orange	6	C	---	C	C
Z'	Blue	8	J	---	---	---
Case	---	---	G	G	G	---
Shield	Screen	---	---	---	---	---

CAUTION - Always check wiring colour code against Encoder Label due to changes in specification since September 2006