

# Model 702 Ultra Rugged 50.80mm Diameter Encoder



Ø50.8 mm

## Features

- Standard Size 20 Package (50mm x 50mm)
- Flange, and Servo Mounting
- Up to 30,000 PPR
- 35Kg Max. Axial and Radial Shaft Loading
- IP67 Sealing Available

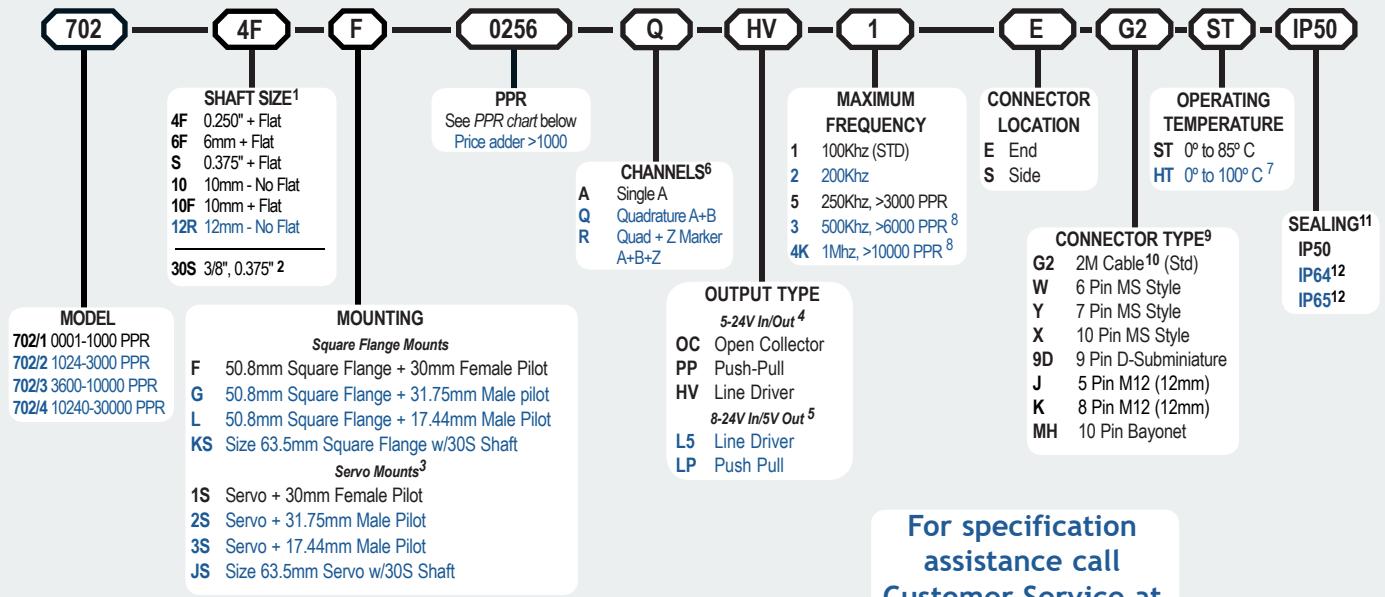
The Model 702 Size 20 is a heavy duty, extremely rugged, reliable, yet compact industry standard 50.80mm diameter encoder, designed for harsh factory and plant floor environments. The double shielded ball bearings are rated at 35Kg maximum axial and radial shaft loading to ensure a long operating life. Made to withstand the harsh effects of the real world, both the flange and servo models are rated IP67 with the optional 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 applications 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

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  
 +44 (0)1978 262100

## Model 702 PPR 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	0889	1000
1024	1200	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 PPR options.

Contact Customer Service to determine all currently available PPR values. Special disk resolutions are available upon request. A one-time NRE fee may apply.

## NOTES:

- 1 Contact Customer Service for additional options not shown.
- 2 Shaft Size 30S ONLY available with KS and JS Mountings.
- 3 Please make sure you state the type of Servo option for 1S, 2S and 3S - See opposite page for mounting hole arrangements for the 2 Versions (Servo #1 and Servo #2)
- 4 Not available with 5-Pin & HV option / Marker not available with 6-Pin (HV-Q) or 7-Pin MS Connector & HV option.
- 5 24Vcc Max for High Temperature Option / Standard Temperature 60 to 3000 PPR only.
- 6 Contact Customer Service for non-standard marker gating or phase relationship options.
- 7 0° to 85°C for certain PPR resolutions - See PPR options.
- 8 Standard Cable Length Only.
- 9 For Mating Connectors & Cables please refer to Accessories pages.
- 10 For non-standard cable lengths contact sales for availability and cost.
- 11 Increased starting torque with IP64, IP65 sealing.
- 12 IP66 & IP67 available in certain configurations - Please contact sales office for information and availability.

# Model 702 Ultra Rugged 50.80mm Diameter Encoder

## Model 702 Specifications

### Electrical

Input Voltage.....	4.75 to 24 Vcc max for temperatures up to 70° C 4.75 to 24 Vcc 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> .
Output Types .....	Open Collector- 100 mA max per channel Pull-Up- 100 mA max per channel Push-Pull- 20 mA max per channel Line Driver- 20 mA max per channel (Meets RS 422 at 5 Vcc supply)
Index .....	Occurs once per revolution. The index for units >3000 PPR is 90° gated to Outputs A and B. See <i>Waveform Diagrams</i> .
Max Frequency.....	Up to 1 MHz.
Noise Immunity.....	Tested to BS EN61000-4-2; IEC801-3; BS EN61000-4-4; DDENV 50141; DDENV 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 output 6001 to 20,480 PPR: 54° electrical >20,480 CPR: 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

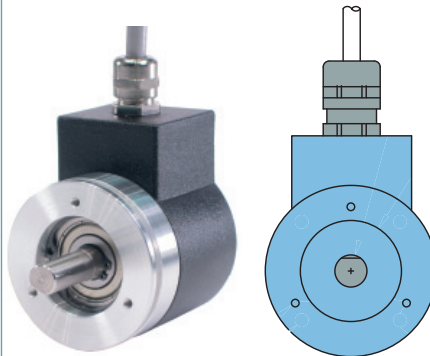
Max Shaft Speed.....	8000 RPM. Higher shaft speeds may be achievable, contact Customer Service.
Shaft Size .....	0.250", 0.375", 10 mm or 12 mm
Shaft Rotation.....	Bi-directional
Radial Shaft Load.....	35 Kg max. Rated load of 10 to 20 Kg for bearing life of $1.5 \times 10^9$ revolutions
Axial Shaft Load .....	35 Kg max. Rated load of 10 to 20 Kg for bearing life of $1.5 \times 10^9$ revolutions
Starting Torque .....	$7.0615 \times 10^{-3}$ Nm Typical with IP64 or no seal $2.0118 \times 10^{-2}$ Nm Typical with IP65 Seal $4.0943 \times 10^{-2}$ Nm Typical with IP67 Seal
Connector Type .....	6-, 7-, and 10-pin MS Style, 5- or 8-pin M12 (12 mm), 9-pin D-subminiature, or gland with 2 Metres of cable (foil and braid shield, 24 AWG conductors), 10-pin Bayonet
Housing.....	Black non-corrosive finish
Bearings.....	Precision ABEC ball bearings
Mounting.....	Various flange or servo mounts
Weight.....	320 grams typical

### Environmental

Operating Temp.....	0° to 70° C for standard models 0° to 100° C for high temperature option (0° to 85° C for certain resolutions, see PPR Options.)
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.....	IP50 standard; IP64, IP66 or IP67 optional

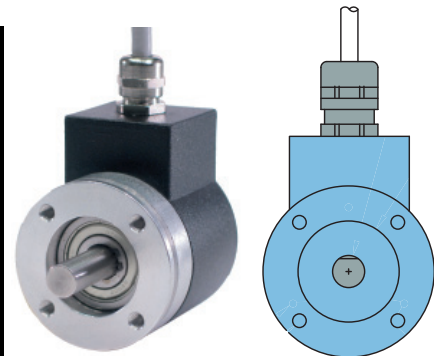
## Model 702 Servo Mounts

### Servo #1 (S)



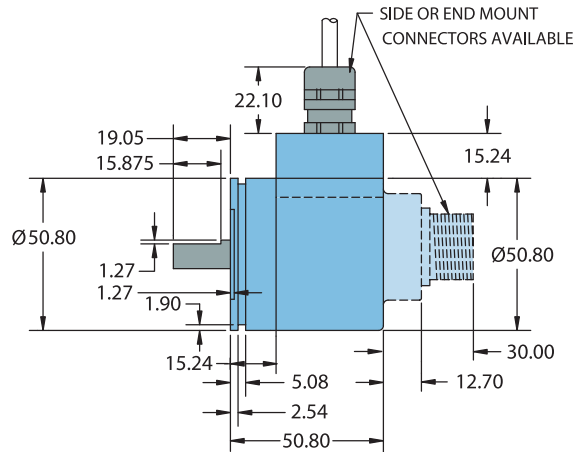
**SERVO MOUNT #1**  
4-40 UNC-2B 6.35mm DEEP  
3 x 120° on a 38.20mm PCD

### Servo #2 (C)

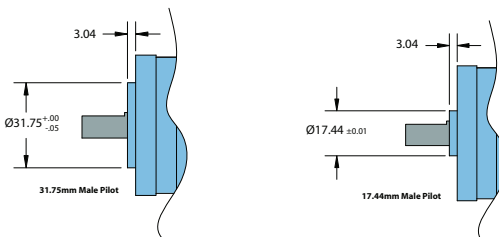


**SERVO MOUNT #2**  
10-32 UNF-2B 6.35mm DEEP  
4 x 90° on a 41.27mm PCD

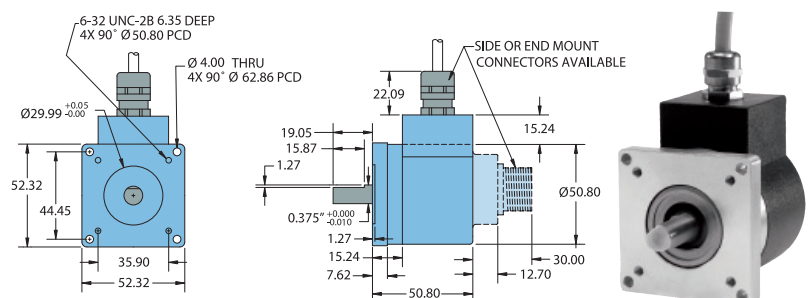
## Body Dimensions for Servo Mounts #1 and #2



## Optional Male Pilots for Flange and Servo Mounts



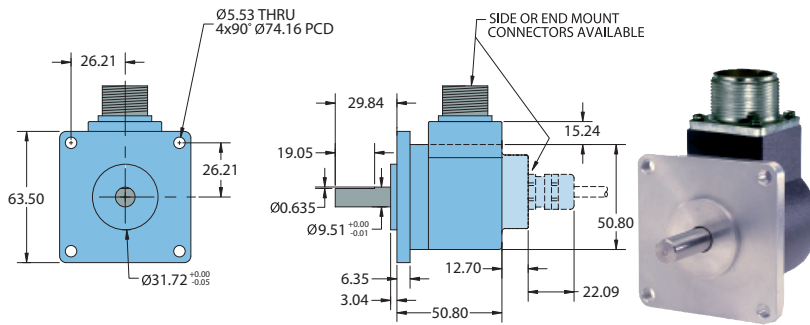
## Model 702 Square Flange Mount (F)



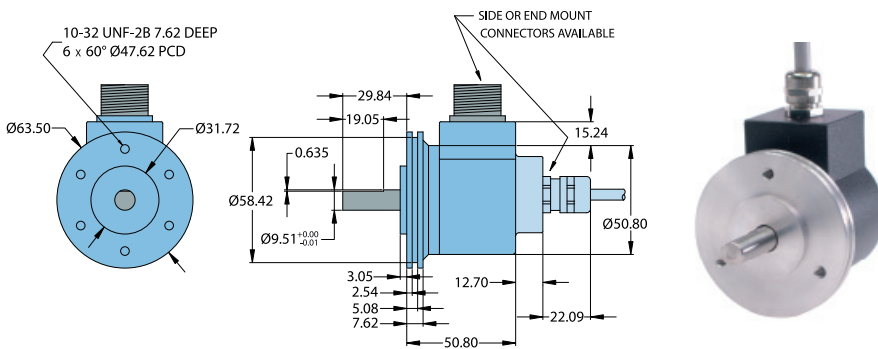
All dimensions are in mm with a tolerance of ±0.127mm or ±0.254 unless otherwise specified

# Model 702 Ultra Rugged 50.80mm Diameter Encoder

## Model 702 63.5mm Square Flange (KS)

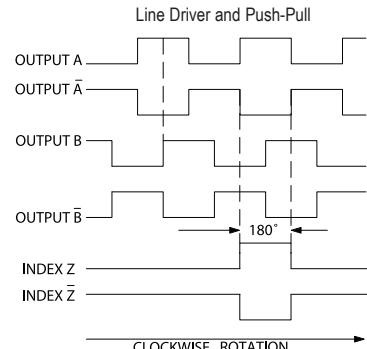


## Model 702 63.5mm Servo Mount (JS)



All dimensions are in mm with a tolerance of  $\pm 0.127$ mm or  $\pm 0.254$  unless otherwise specified

## Waveform Diagrams

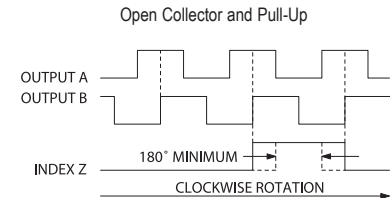


CLOCKWISE ROTATION

NOTE: ALL DEGREE REFERENCES ARE ELECTRICAL DEGREES

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NOTE: PUSH-PULL OUTPUT DOES NOT INCLUDE COMPLEMENTARY CHANNELS



CLOCKWISE ROTATION

NOTE: ALL DEGREE REFERENCES ARE ELECTRICAL DEGREES

NOTE: INDEX IS POSITIVE GOING

## Wiring Table

Function	Gland Cable† Wire Color	5-pin M12** PP,OC,PU	8-pin M12** HV	8-pin M12** OC,PP,PU	6 Pin MS** PU,OC,PP	6 Pin MS** HV	7 Pin MS** HV	7 Pin MS** PU,OC,PP	10 Pin MS** HVL5	9 Pin D-SUB HVL5	10 Pin Bayonet HV
0 Volts	Black	3	7	7	F	F	F	F	F	9	F
+VCC	White	1	2	2	D	D	D	D	D	1	D
A	Brown	4	1	1	A	A	A	A	A	2	A
A'	Yellow	--	3	--	--	C	C	--	H	3	H
B	Red	2	4	4	B	B	B	B	B	4	B
B'	Green	--	5	--	--	E	E	--	I	5	J
Z	Orange	5	6	6	C	--	--	C	C	6	C
Z'	Blue	--	8	--	--	--	--	--	J	7	K
Shield	Bare*	Case	Case	8	Case	Case	G	G	G	8	G

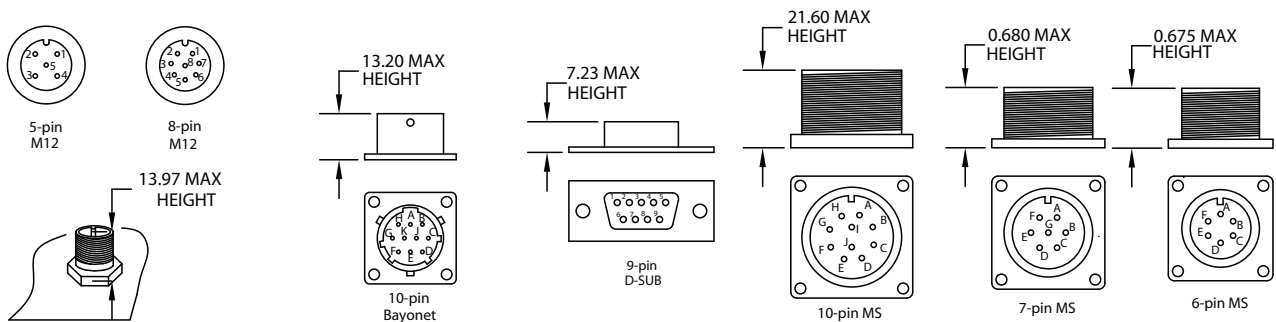
\*CE: Cable shield (bare wire) is connected to internal case.

†Standard cable is 24 AWG conductors with foil and braid shield.

\*\*CE: Shield is connected to connector case unless otherwise specified.

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

## Connector Pin-Outs



# Ultra Rugged 50.80mm Encoder & Related Products

## Quick Specs

- Rugged Industrial Encoder
- 50.80mm x 50.80mm Housing
- PPR to 30,000
- Many Output Types
- RPM to 8000
- Sealing to IP66
- High Temperature Option

## Mounting Options

The 702 Motor Mount comes with coupling and available with a Bossed Hub to attach directly to fast revving motors.

The 702 Shaft has many different servo mounts and mounting flanges available and able to handle heavy loads.

## Other Related Products :-



*The Model 802S is an industry standard Size 20 (50.80mm diameter) encoder housed in a heavy duty 316 stainless steel package. It's specifically designed for harsh factory and plant floor environments. A variety of flange and servo mounting styles, make it easy to use in a broad range of applications.*



*Model 725 Size 25 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 pulses per revolution.*



*The Model 858S European Size 58 is a heavy duty, extremely rugged, reliable encoder, in a 316 stainless steel package. Its compact design is well suited for harsh factory and plant floor environments, calling for a metric solution.*



## **The Best Choice**

- A 3-Year Satisfaction Guaranteed Warranty
- Encoder Products Company has Specialised in Building Only Durable, Dependable Encoders for More Than 40 Years
- Superior Customer Service
- More Configurations Than Any Other Encoder Manufacturer
- Expert Cross Reference Service
- Next Day Expedite Delivery Available

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