

# Model 702 Hollow Bore



## Features

- Standard Size 20 Package (2" x 2")
- Up to 30,000 CPR
- Easy Installation
- IP64 Sealing Optional

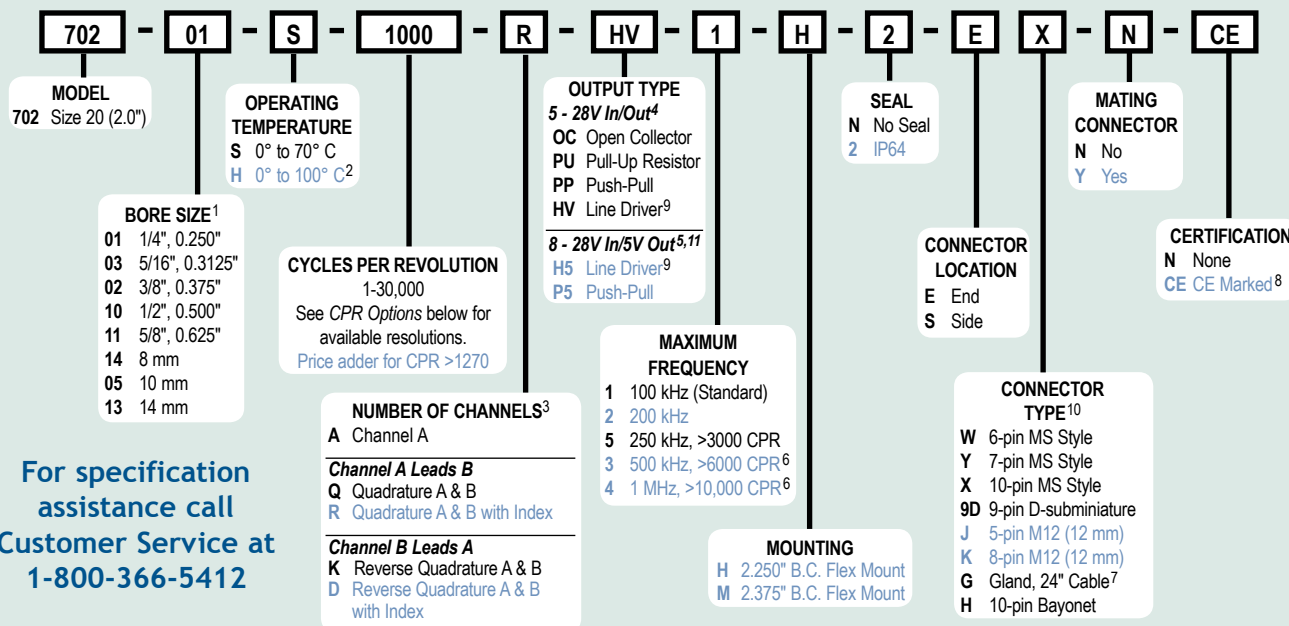
The Model 702 Size 20 Accu-Coder™ is an ultra-rugged, reliable, yet compact industry standard 2-inch diameter encoder designed for harsh factory and plant floor environments. Installation is quick and simple, with a wide range of bore sizes, and a flex mount design that easily slips over motor or machine shafts. Installation takes up less space, since no shaft couplings or mounting brackets are required. Electrical protection from reverse voltage and output short circuits, allows for worry free wiring. A variety of connector options are available for easy integration into your system. With its ultra-rugged construction, and numerous configuration options, the Model 702 is the ideal choice for a wide variety of industrial applications.

## 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 1-800-366-5412

## Model 702 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 Contact Customer Service for additional options.
- 2 0° to 85° C for certain resolutions, see CPR Options.
- 3 Contact Customer Service for non-standard index gating options.
- 4 24 VDC max for high temp option.
- 5 Standard temperature, 60 to 3000 CPR only.
- 6 Standard cable lengths only. For details, please refer to **Technical Bulletin TB 116: Noise and Signal Considerations** on the web 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: G/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 Style connector. 7-pin MS Style connector only available without Index Z.
- 10 For Mating Connectors, Cables, and Cordsets see Electrical Accessories on the web at [www.encoder.com](http://www.encoder.com).
- 11 H5 and P5 outputs are not available with CE option, or any End Mount MS Connector.

# Model 702 Hollow Bore

## Model 702 Specifications

### Electrical

Input Voltage.....4.75 to 28 VDC max for temperatures up to 70° C  
 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 *Waveform Diagrams* below.

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 VDC supply)

Index .....Occurs once per revolution. The index for units >3000 CPR is 90° gated to Outputs A and B. See *Waveform Diagrams* below.

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 CPR: 180° (±18°) electrical at 100 kHz output  
 6001 to 20,480 CPR: 180° (±36°) electrical

Quad Phasing.....1 to 6000 CPR: 90° (±22.5°) electrical at 100 kHz output  
 6001 to 20,480 CPR: 90° (±36°) electrical

Min Edge Sep.....1 to 6000 CPR: 67.5° electrical at 100 kHz output  
 6001 to 20,480 CPR: 54° electrical  
 >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. For 2000 to 3000 CPR, 0.01° mechanical (0.6 arc minutes) from one cycle to any other cycle. 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.

Bore Size .....0.250", 0.3125, 0.375", 0.500", 0.625", 8 mm, 10 mm or 14 mm  
 Note: Bore sizes 1/2", 5/8", and 14 mm are clamp style. All others are set screw style.

Bore Tolerance .....+0.0006" / -0.0000"

User Shaft Tolerances  
 Radial Runout .....0.007" max  
 Axial Endplay .....±0.030" max

Starting Torque .....1.0 oz-in typical with IP64 seal or no seal

Moment of Inertia .....5.2 x 10<sup>-4</sup> oz-in-sec<sup>2</sup>

Max Acceleration .....1 x 10<sup>5</sup> rad/sec<sup>2</sup>

Electrical Conn .....6-, 7-, and 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), 10-pin Bayonet

Housing.....Black non-corrosive finish

Bearings.....Precision ABEC ball bearings

Mounting.....Flex mount

Weight.....11 oz typical

### Environmental

Operating Temp.....0° to 70° C standard models  
 0° to 100° C for high temperature option (0° to 85° C for certain resolutions, see CPR Options.)

Storage Temp .....-25° to +85° C

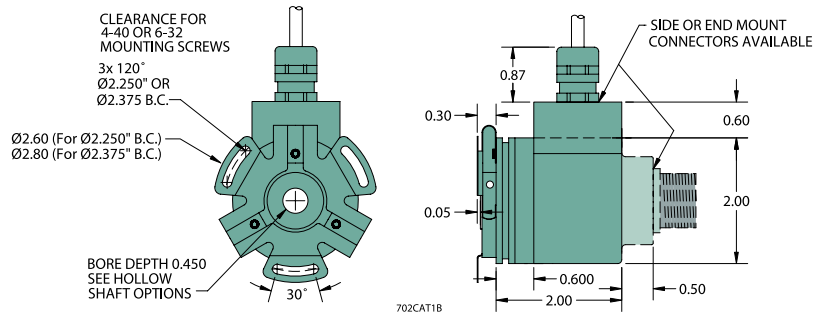
Humidity.....98% RH non-condensing

Vibration.....20 g @ 58 to 500 Hz

Shock.....75 g @ 11 ms duration

Sealing.....IP64

## Model 702 Flex Mount (H, M)

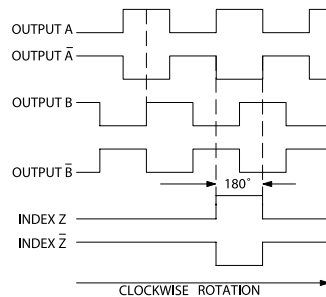


Note: Bore sizes 1/2", 5/8", and 14 mm are clamp style. All others are set screw style.  
 All dimensions are in inches with a tolerance of ±0.005" or ±0.01" unless otherwise specified



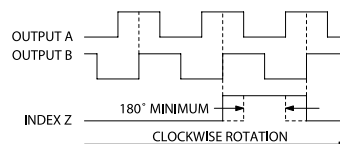
### Waveform Diagrams

#### Line Driver and Push-Pull



NOTE: ALL DEGREE REFERENCES ARE ELECTRICAL DEGREES  
 LDSIGC

#### Open Collector and Pull-Up



NOTE: ALL DEGREE REFERENCES ARE ELECTRICAL DEGREES  
 SESIGC NOTE: INDEX IS POSITIVE GOING

### 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	10-pin Bayonet
Com	Black	3	7	F	F	F	A, F	9	F
+VDC	Red	1	2	D	D	D	B	1	D
A	White	4	1	A	A	A	D	2	A
A'	Brown	---	3	H	C	---	---	3	H
B	Blue	2	4	B	B	B	E	4	B
B'	Violet	---	5	I	E	---	---	5	J
Z	Orange	5	6	C	---	C	C	6	C
Z'	Yellow	---	8	J	---	---	---	7	K
Case	Green	---	---	G	G	G	---	8	G
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