

Shaft Encoders

Spring 2007

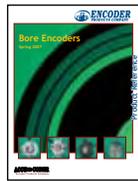
Product Reference



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Encoder Solutions For Every Application



Don't forget to check out the rest of our product families. Encoder Products Company manufactures a complete line of encoder solutions.

Bore Encoders - From small to large, a complete line of thru and hollow bore encoders with the most comprehensive selection of mounting options available in the industry.



Specialty Encoders - From stainless steel encoders for extreme environments, absolute positioning encoders, to unique linear measurement solutions, we have the specialty solution you need.

About Encoder Products

Company History

Encoder Products Company Inc. (EPC) is a leading designer and world-wide manufacturer of motion sensing devices. Founded in 1969 by William Watt, EPC began operations with a small line of custom encoders. Today, more than 35 years later, EPC's popular Accu-Coder™ brand is the most complete line of incremental and absolute shaft encoders in the industry. Our core philosophy is that each and every customer deserves quality products, superior customer service, and expert support.

Business Partnerships

Fostering long term business partnerships with satisfied customers is what we do best, and the heart of our mission. We take pride in providing superior customer service and supplying you an encoder that functions precisely, dependably, and flawlessly. Listening to our customers needs, and designing products that provide solutions for them, is a key to our success. It isn't every company that can say they have satisfied their customers for over 35 years!

Innovative Design Team

At EPC, we concentrate on encoders, making us famous for paving the path of the encoder industry and providing encoder standards for our industry since 1969. First to design the cube style encoder, now an industry standard. First to resolve mounting installation problems by providing an industry first flexible-mounting system. First to include Opto-ASIC technology, which virtually eliminates miscounts by eliminating electrical noise, and enhancing signal quality. First to provide an encoder that operates at 120° C. First to provide 6000 CPR in a 1.5" diameter encoder. First to provide a 3 year standard warranty, demonstrating that we stand proudly behind the reliability of each of our products.

Solving Problems

For over 35 years, we have been solving encoder problems. Custom designs, faster delivery, and reliable products are all areas in which we excel. We believe that an encoder supplier should solve problems, not cause them.

Custom Encoders Our Specialty

Through years of experience, we understand each industrial environment is different; you need an encoder that fits your specific situation. This ultimately means not having to make due with someone else's specifications or configurations, but having your own custom designed unit. Many of our customers have come to depend on us for this special area of customization. Using state of the art technology, we can design and deliver custom encoders faster than most suppliers standard products - often shipping your unique encoder in 2 to 6 days or sooner.

ISO 9001 Quality Systems

At EPC, quality is designed into every product. Before it's offered for sale, each Accu-Coder™ model is developed using state-of-the-art design tools and fully tested against EPC's exacting quality standards. But quality does not stop at design. During the manufacturing process, each Accu-Coder™ is subjected to a series of stringent quality control tests to ensure you are receiving the best encoder available. Our quality system has successfully been audited to the requirements of ISO 9001:2000, an internationally recognized standard for comprehensive Quality Systems. By paying close attention to detail, our Accu-Coder™ brand has become known throughout the industry for quality and reliability.

ACCU-CODER
 by Encoder Products Company

Model 15S



Features

- Very High Performance Economical Encoder
- Low Profile- Less Than 1.0" (25.4 mm) Height and 1.5" (38 mm) Diameter
- Extended Temperature Operating Ranges Available
- Up To 12 Pole Commutation Optional (for brushless motor control)

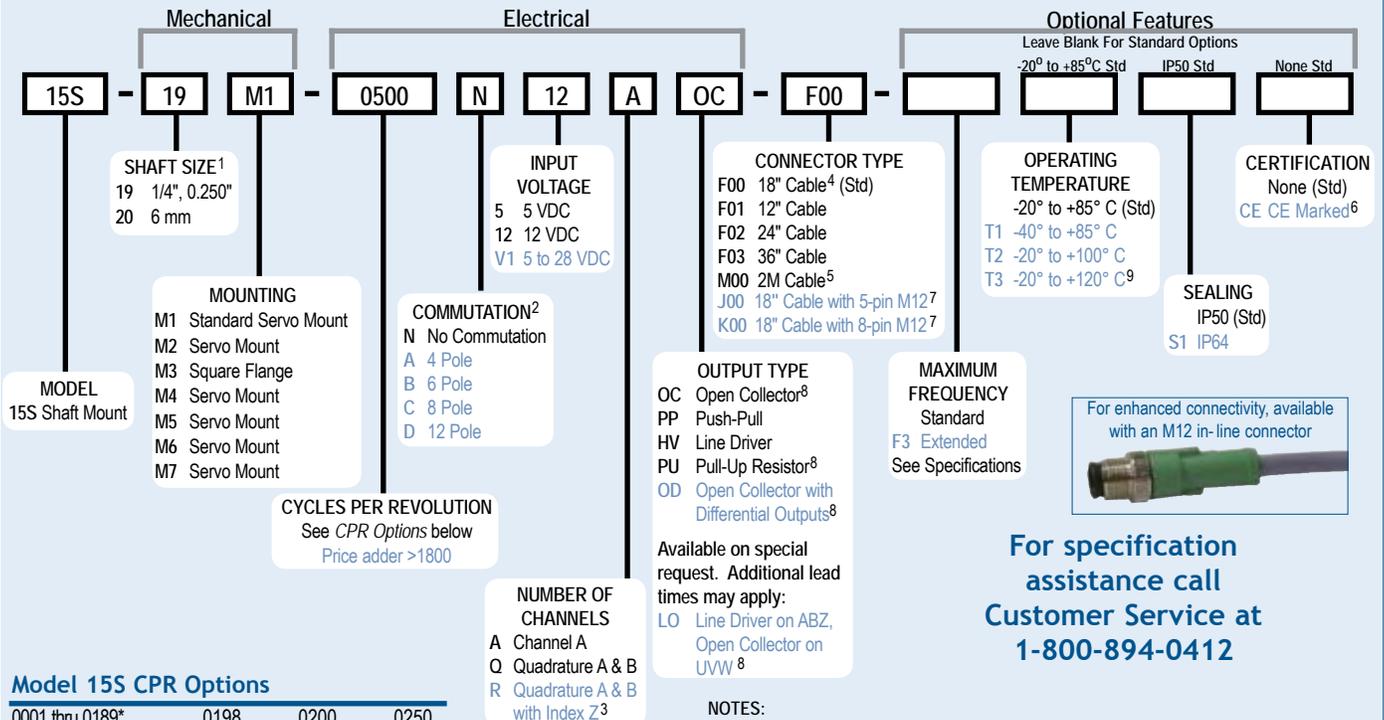
The Model 15S Accu-Coder™ offers a high performance feedback solution in a low profile package, making the Model 15S ideal for commercial and light-duty industrial applications. This industry standard Size 15 (1.5" diameter) encoder features a precision bearing set, sealing available to IP64, a durable 1/4" or 6 mm stainless steel shaft, and a selection of servo, flange, and face mount options. The Model 15S may also be specified with features such as extended operating temperatures from -20° C to +120° C, or up to 12 pole commutation for brushless motor control. The Model 15S features EPC's Opto-ASIC circuitry for a clean, reliable signal. Its durable, yet economical design makes it an ideal encoder for high precision OEM applications.

Common Applications

Servo Motor Control, Robotics, Medical Diagnostic Equipment, Specialty Assembly Machines, Digital Plotters, Printers, Typesetting Equipment

Model 15S Ordering Guide

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



Model 15S CPR Options

0001 thru 0189*	0198	0200	0250
0256	0300	0315	0360
0500	0512	0580	0600
1000	1024	1200	1250
1800	2000	2048	2500
3000+	4096+	5000+	6000+
10,000+			8192+

*Contact Customer Service For Availability

*Not available in 12V option

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

NOTES:

- 1 Contact Customer Service for additional options not shown.
- 2 Not available in all configurations, and not available with V1 Input Voltage. Contact Customer Service for availability.
- 3 Contact Customer Service for non-standard index gating or phase relationship options.
- 4 For non-standard English cable lengths enter 'F' plus cable length expressed in feet. Example: F06 = 6 feet of cable. Frequency above 300 kHz standard cable lengths only.
- 5 For non-standard metric cable lengths enter 'M' plus cable length expressed in meters. Example: M06 = 6 meters of cable.
- 6 Please refer to Technical Bulletin TB100: *When to Choose the CE Option* at Encoder site.
- 7 Not available with commutation. 5-pin not available with Line Driver (HV, OD, LO) outputs. Additional cable lengths available. Please contact Customer Service.
- 8 With Input Voltage above 16 VDC, operating temperature is limited to 85° C.
- 9 Only available with 5 VDC Input Voltage

For specification assistance call Customer Service at 1-800-894-0412

Model 15S

Model 15S Specifications

Electrical

Input Voltage	5 VDC $\pm 10\%$ Fixed Voltage 12 VDC $\pm 10\%$ Fixed Voltage 4.75 to 28 VDC max for temperatures up to 85° C 4.75 to 24 VDC for temperatures between 85° to 100° C
Input Current	100 mA max (65 mA typical) with no output load
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- 20 mA max per channel Push-Pull- 20 mA max per channel Pull-Up- Open collector with 2.2K ohm Pull-Up 20mA max per channel Line Driver- 20 mA max per channel (Meets RS 422 at 5 VDC supply)
Index	Once per revolution. 190 to 10,000 CPR: Gated to output A 1 to 189 CPR: Ungated See <i>Waveform Diagrams</i> below.
Max. Frequency	Standard Frequency Response is 200 kHz for CPR 1 to 2540 500 kHz for CPR 2541 to 5000 1 MHz for CPR 5001 to 10,000 Extended Frequency Response (optional) is 300 kHz for CPR 2000, 2048, 2500, and 2540
Noise Immunity	Tested to BS EN61000-6-2; BS EN50081-2; BS EN61000-4-2; BS EN61000-4-3; BS EN61000-4-6, BS EN500811
Symmetry	180° ($\pm 18^\circ$) electrical
Quad. Phasing	90° ($\pm 22.5^\circ$) electrical
Min. Edge Sep	67.5° electrical
Accuracy	Within 0.017° mechanical or 1 arc-minute from true position. (for CPR>189)
Commutation	Up to 12 pole. Contact Customer Service for availability.
Comm. Accuracy	1° mechanical

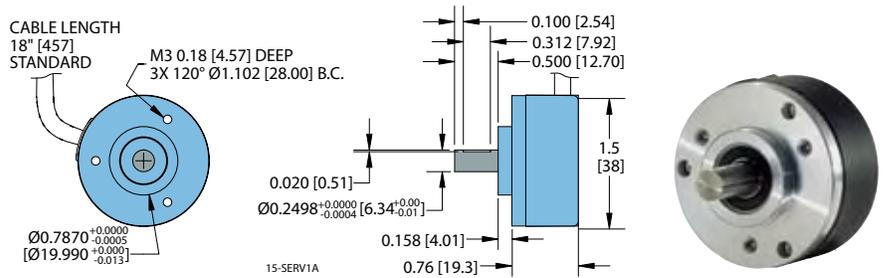
Mechanical

Max Shaft Speed	8000 RPM. Higher speeds may be achievable, contact Customer Service.
Shaft Material	Stainless Steel
Radial Shaft Load	5 lb max. Rated load of 2 to 3 lb for bearing life of 1.2×10^{10} revolutions
Axial Shaft Load	5 lb max. Rated load of 2 to 3 lb for bearing life of 1.2×10^{10} revolutions
Starting Torque	IP50 0.05 oz-in IP64 0.4 oz-in
Moment of Inertia	6.7×10^{-5} oz-in-sec ² (4.8 gm-cm ²)
Max Acceleration	1×10^5 rad/sec ²
Electrical Conn	18" cable (foil and braid shield, 24 AWG conductors non-commutated, 28 AWG commutated), 5- or 8-pin M12 (12 mm) in-line connector with 18" cable (braid shield)
Weight	3 oz typical

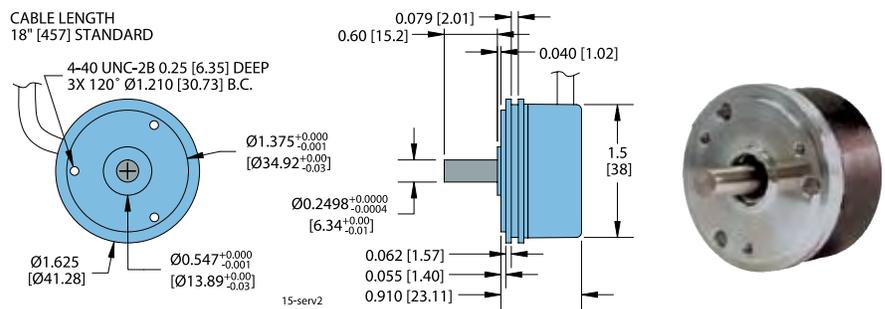
Environmental

Operating Temp	-20° to +85° C for standard models -40° to +85° C for low temperature option -20° to +100° C for high temperature option -20° to +120° C for extreme temperature option
Storage Temp	-25° to +85° C
Humidity	98% RH non-condensing
Vibration	10 g @ 58 to 500 Hz
Shock	80 g @ 11 ms duration
Sealing	IP50 standard; IP64 available

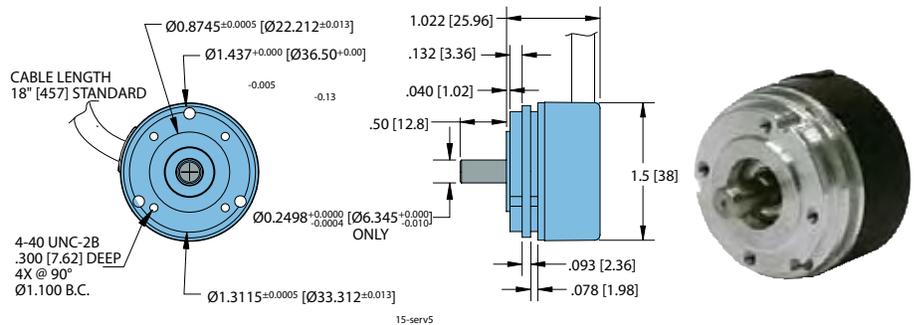
Model 15S Standard Servo Mount M1



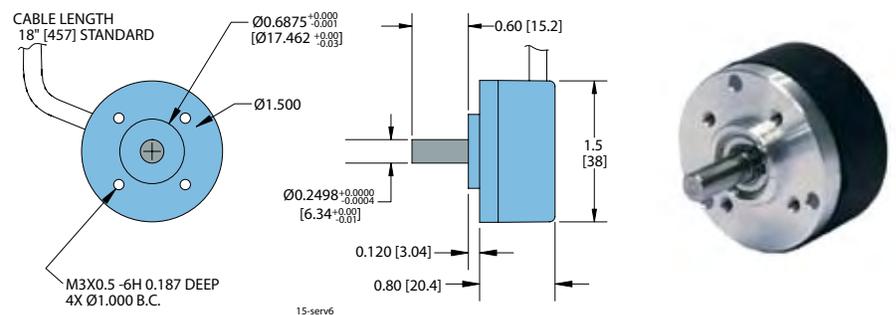
Model 15S Servo Mount M2



Model 15S Servo Mount M5



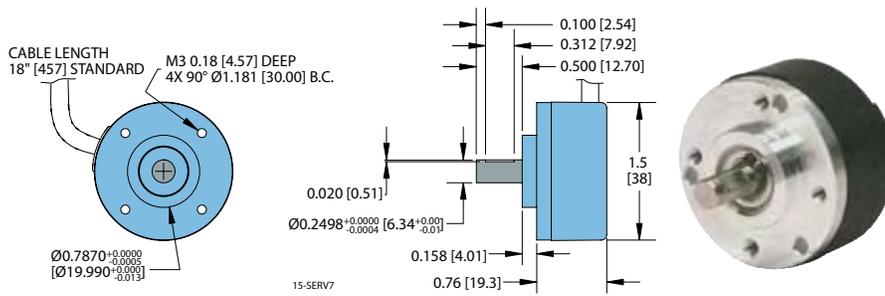
Model 15S Servo Mount M6



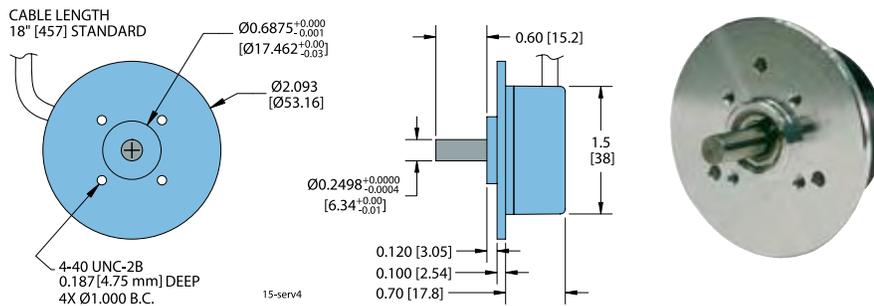
All dimensions are in inches with a tolerance of $\pm 0.005"$ or $\pm 0.01"$ unless otherwise specified
Metric dimensions are given in brackets [mm]

Model 15S

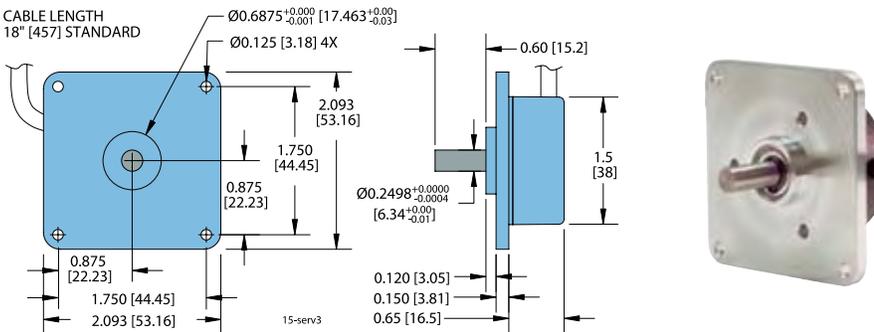
Model 15S Standard Servo Mount M7



Model 15S Servo Mount M4

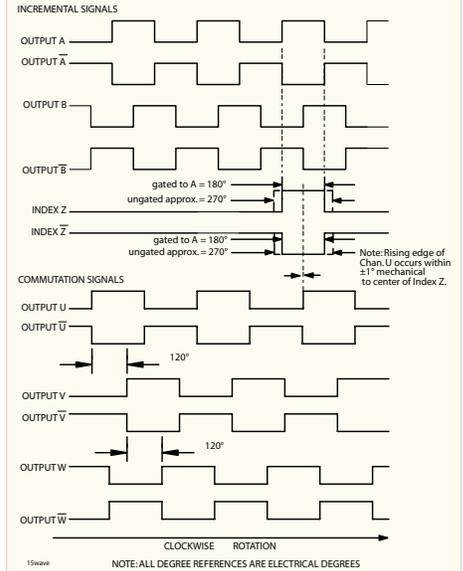


Model 15S Square Flange M3



All dimensions are in inches with a tolerance of ±0.005" or ±0.01" unless otherwise specified
 Metric dimensions are given in brackets [mm]

Waveform Diagrams

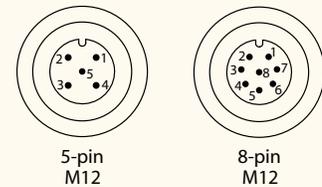


Wiring Table

Function	Cable Wire Color	5-pin M12**	8-pin M12**
Com	Black	3	7
+VDC	White	1	2
A	Brown	4	1
A'	Yellow	--	3
B	Red	2	4
B'	Green	--	5
Z	Orange	5	6
Z'	Blue	--	8
U	Violet	--	--
U'	Gray	--	--
V	Pink	--	--
V'	Tan	--	--
W	Red/Green	--	--
W'	Red/Yellow	--	--
Shield	Bare *	--	--

* CE Option: Cable shield (bare wire) is connected to internal case
 **Non-CE Option: Cable shield is connected to M12 connector body.
 CE Option: Cable shield and M12 connector body is connected to internal case.

Connector Pin-Outs



Model 755A



Features

- Miniature Size (1.5" Diameter)
- Up to 30,000 Cycles Per Revolution
- Servo or Flange Mounting
- 1 MHz Frequency Response Available
- Extended Temperature Operating Range Available

The Model 755A Size 15 Accu-Coder™ is ideal for applications requiring a small, high precision, high performance encoder. Approximately 1.5" in diameter and 1.5" long, it will fit where many encoders cannot. Designed with all metal construction and shielded ball bearings, it will provide years of trouble-free use.

The standard servo mount (S) version is available with a variety of shaft sizes and lengths. Three additional servo style mounts (S1, S2, S3) are also available. The optional flange mounting (MF) is ideal for applications requiring a bolt-on, high precision encoder. With its high reliability and quick delivery, the Model 755A encoder is the perfect replacement encoder for less reliable encoders of this size.

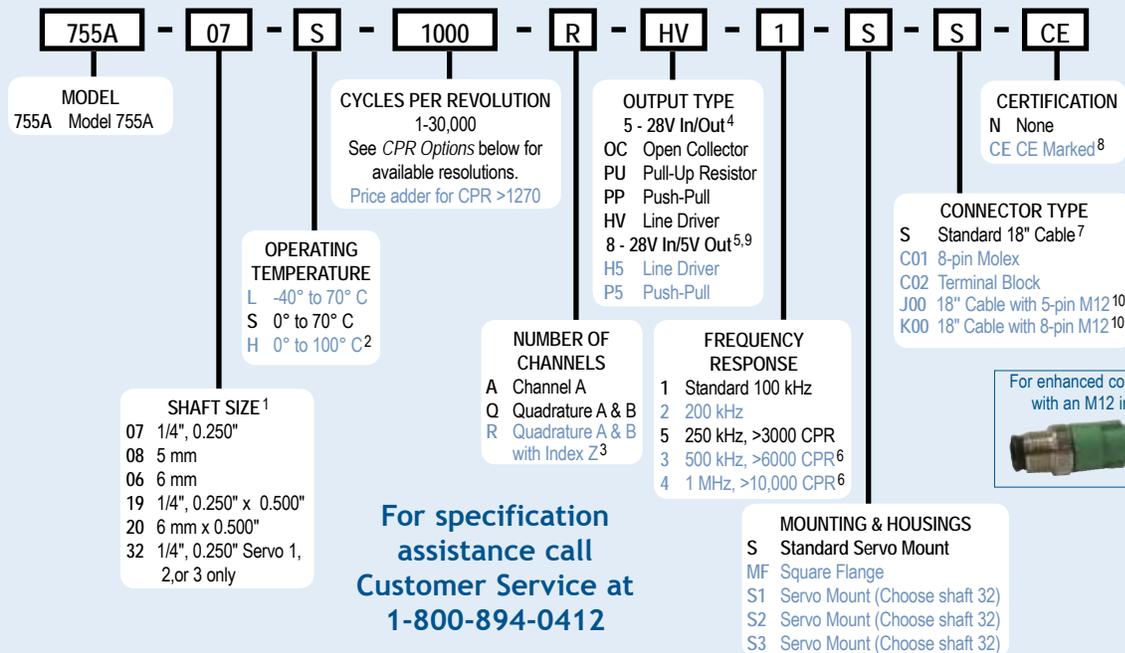
Common Applications

Robotics, Assembly Machines, Motor-Mounted Feedback, Phototypesetters, Printers & Digital Plotters, Elevator Controls, Medical Diagnostic Equipment

Ø1.5"

Model 755A Ordering Guide

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



Model 755A 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*	0200
0240*	0250	0254*	0256*	0300	0333*	0360	0400	0500
0512	0600	0625*	0635	0665*	0720	0768*	0800	0889
0900*	1000	1024	1200	1201* ^a	1203* ^a	1204* ^a	1250 ^a	1270 ^a
1440	1500	1800	2000	2048	2400 ^a	2500	2540 ^a	2880 ^a
3000 ^a	3600 ^a	4000 ^a	4096 ^a	5000 ^a	6000 ^a	7200 ^a	7500 ^a	9000 ^a
10,000 ^a	10,240 ^a	12,000 ^a	12,500 ^a	14,400 ^a	15,000 ^a	18,000 ^a	20,000 ^a	20,480 ^a
25,000 ^a	30,000 ^a							

* Contact Customer Service for High Temperature Option.

^a 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 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 Considerations* at Encoder site.
- 7 For non-standard cable lengths, add a forward slash (/) plus cable length expressed in feet. Example: S/6 = 6 feet of cable.
- 8 Please refer to Technical Bulletin TB100: *When to Choose the CE Option*.
- 9 H5 and P5 outputs are not available with CE option.
- 10 5-pin not available with Line Driver (HV, H5) outputs. Additional cable lengths available. Please consult Customer Service.

Model 755A

Model 755A Specifications

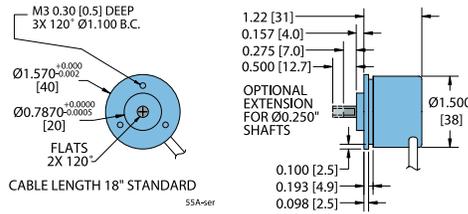
Electrical

- 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 Ripple100 mV peak-to-peak at 0 to 100 kHz
- Output FormatIncremental- 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 TypesOpen Collector- 100 mA max per channel
Push-Pull- 100 mA max per channel
Line Driver- 20 mA max per channel (Meets RS 422 at 5 VDC supply)
- IndexOccurs once per revolution. The index for units >3000 CPR is 90° gated to Outputs A and B. See *Waveform Diagrams* below.
- Freq Response.....100 kHz std; Up to 1 MHz optional. (See Ordering Guide for availability)
- 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
- Symmetry1 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°)
- 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)

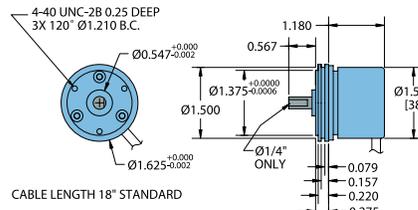
Mechanical

- Max Speed7500 RPM. Higher shaft speeds may be achievable, contact Customer Service.
 - Shaft Size0.250", 5 mm, 6 mm
 - Shaft Rotation.....Bi-directional
 - Radial Shaft Load....5 lb
 - Axial Shaft Load.....3 lb
 - Starting Torque0.14 oz-in typical
4.0 oz-in typical for -40° C operation
 - Moment of Inertia2.8 x 10⁻⁴ oz-in-sec²
 - Max Acceleration.....1 x 10⁵ rad/sec²
 - Electrical Conn18" cable (foil and braid shield, 24 AWG conductors), 5- or 8-pin M12 (12 mm) in-line connector with 18" cable (braid shield), 8-pin Molex, Terminal Block
 - Housing.....Black non-corrosive finish
 - Bearings.....Precision ABEC ball bearings
 - Mounting.....Servo or OPTIONAL Flange
 - Weight.....3.10 oz servo mount, typical
- ### Environmental
- Operating Temp.....0° to 70° C for standard models
-40° to 70° C for low temperature option
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.....10 g @ 58 to 500 Hz
 - Shock.....50 g @ 11 ms duration

Model 755A Standard Servo Mount S



Model 755A Servo Mounts S1 and S2



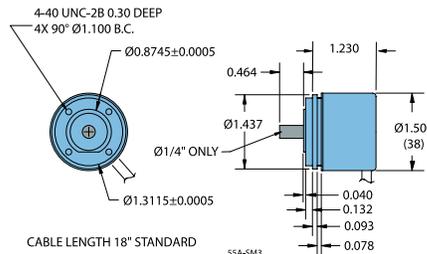
S1

S2 Pictured below has a 0.750" Boss. S1 has a 0.547" Boss. See Encoder site to download drawings

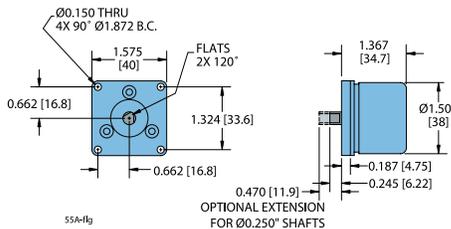


S2

Model 755A Servo Mount S3



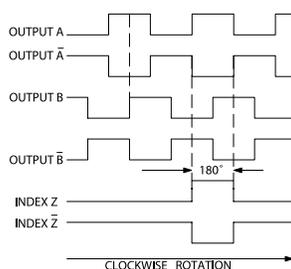
Model 755A Square Flange MF



All dimensions are in inches with a tolerance of ±0.005" or ±0.01" unless otherwise specified
Metric dimensions are given in brackets [mm]

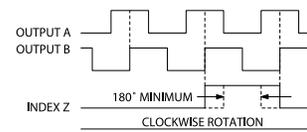
Waveform Diagrams

Line Driver and Push-Pull



NOTE: ALL DEGREE REFERENCES ARE ELECTRICAL DEGREES

Open Collector and Pull-Up



NOTE: ALL DEGREE REFERENCES ARE ELECTRICAL DEGREES

NOTE: INDEX IS POSITIVE GOING

Wiring Table

Function	Cable Wire Color	Terminal Block	8-pin Molex	5-pin M12 ²	8-pin M12 ²
Com	Black	7	2	3	7
+ VDC	White	8	1	1	2
A	Brown	1	8	4	1
A'	Yellow	2	7	-----	3
B	Red	3	4	2	4
B'	Green	4	3	-----	5
Z	Orange	6	6	5	6
Z'	Blue	5	5	-----	8
Shield	Bare ¹	-----	-----	-----	-----

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

Model 711 Single Channel Cube

ACCUCODER
Encoder Products Company



Features

- The Original Industry-Standard Cube
- Five Versatile Housing Styles
- Thousands of Configurations
- Many New Resolutions Available!

The Model 711 Accu-Coder™ is the original, industry standard Cube encoder. Designed for compatibility with most programmable controllers, electronic counters, motion controllers, and motor drives, it is ideally suited for applications that require a simple, symmetrical, unidirectional square wave output in a single channel format.

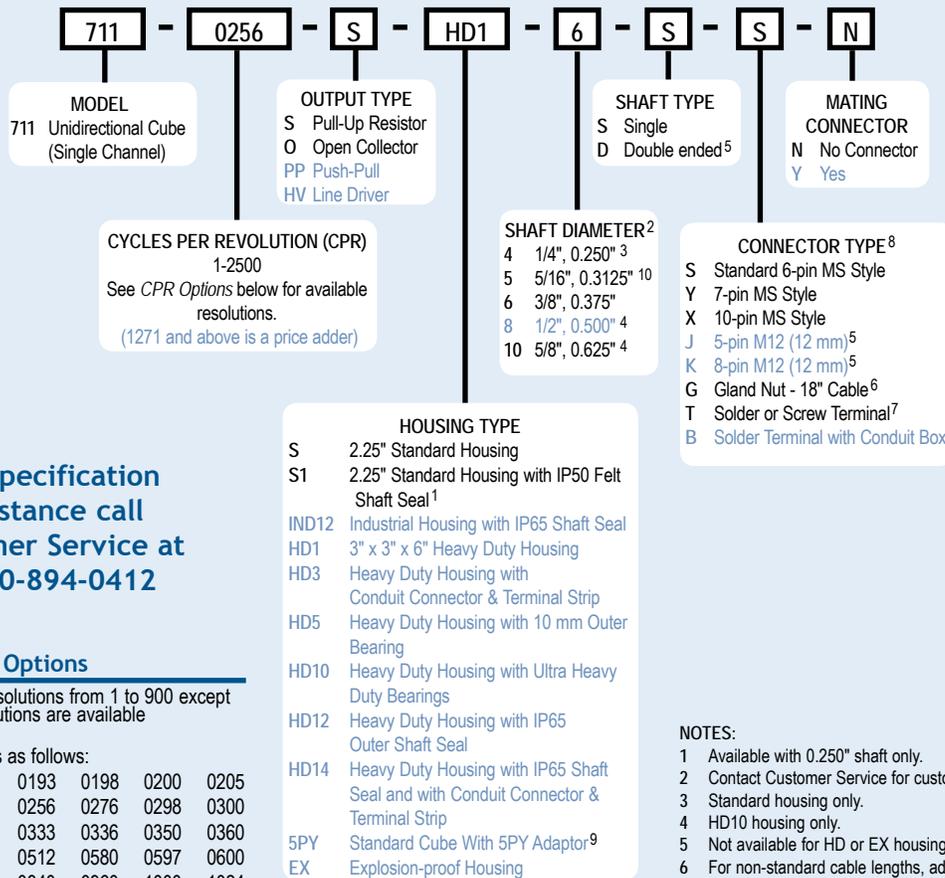
The new E-Cube™ version increases critical performance specifications for the most popular resolutions. The E-Cube™ features advanced Opto-ASIC circuitry, a single chip design that eliminates many board level components. This increases the reliability of an already dependable and durable encoder. With new options continually being added, the E-Cube™ just keeps getting better, and better!

Common Applications

Feedback For Counters, PLC's & Motors, Measuring For Packaging, Filling & Materials Handling Machines, Wire Winding, Film Extrusion

Model 711 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
1-800-894-0412

Model 711 CPR Options

Standard Cube; All resolutions from 1 to 900 except where E-Cube™ resolutions are available

E-Cube™ resolutions as follows:

0001 thru 0189*	0193	0198	0200	0205
0210	0240	0250	0256	0276
0298	0300	0305	0308	0315
0333	0336	0350	0360	0400
0480	0500	0512	0580	0597
0600	0700	0720	0800	0840
0960	1000	1024	1200	1250
1270	1800	2000	2048	2500

*Contact Customer Service For Availability

Contact Customer Service for other disk resolutions;
not all disk resolutions available with all output types

NOTES:

- 1 Available with 0.250" shaft only.
- 2 Contact Customer Service for custom shaft lengths and diameters.
- 3 Standard housing only.
- 4 HD10 housing only.
- 5 Not available for HD or EX housings.
- 6 For non-standard cable lengths, add a forward slash (/) plus cable length expressed in feet. Example: G/6 = 6 feet of cable.
- 7 Screw terminals available for HD and EX housings. Solder terminals available for S and S1 housings.
- 8 For Mating Connectors, Cables, and Cordsets see Encoder site.
- 9 Only available with 5/16" (0.3125") shaft.
- 10 Standard or 5PY housing only.

Model 711 Single Channel Cube

Model 711 Specifications Common to All Cube Housing Styles

Electrical

Input Voltage.....E-Cube™- 4.75 to 28 VDC max for temperatures up to 85° C 4.75 to 24 VDC for temperatures between 85° C and 100° C. Standard Cube- 4.75 to 28 VDC for temperatures up to 70° C

Input Current.....80 mA maximum with no output load

Input Ripple.....100 mV peak-to-peak at 0 to 100 kHz

Output Format.....Incremental- Square wave with single channel

Output Types.....Open Collector- 250 mA max per channel
Pull-Up- 250 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)

Freq Response.....E-Cube™- 0 to 125 kHz
Standard Cube- 0 to 20 kHz

Symmetry.....180° (±18°) electrical

Rise Time.....Less than 1 microsecond

Accuracy.....E-Cube™- Within 0.05° mechanical from one cycle to any other cycle, or 3 arc minutes
Standard Cube- Within 0.1° mechanical from one cycle to any other cycle, or 6 arc minutes

Electrical Conn.....6-, 7-, or 10-pin MS Style, 5-, or 8-pin M12 (12 mm), Gland with 18" cable (foil and braid shield, 24 AWG conductors), Solder Terminal, or Solder Terminal with conduit box

Mechanical

Max Speed.....6000 RPM. Higher shaft speeds achievable, contact Customer Service.

Shaft Material.....303 stainless steel

Housing.....Black non-corrosive finished 6063-T6 aluminum

Bearings.....Precision ABEC Ball Bearings

Environmental

Operating Temp.....E-Cube™- 0° to 85° C or 0° to 100° C at 5 to 24 VDC
Standard Cube- 0° to 70° C

Storage Temp.....-25° to +85° C

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

Vibration.....10 g @ 58 to 500 Hz

Shock.....50 g @ 11 ms duration

Standard Cube Housing (S, S1)

Standard Cube Housing (S, S1) Specifications

Mechanical

Shaft Size.....0.250" or 0.375"

Shaft Type.....Single or double-ended (specify choice)

Radial Loading.....15 lb maximum (0.250" diameter shaft)
40 lb maximum (0.375" diameter shaft)

Axial Loading.....10 lb maximum (0.250" diameter shaft)
30 lb maximum (0.375" diameter shaft)

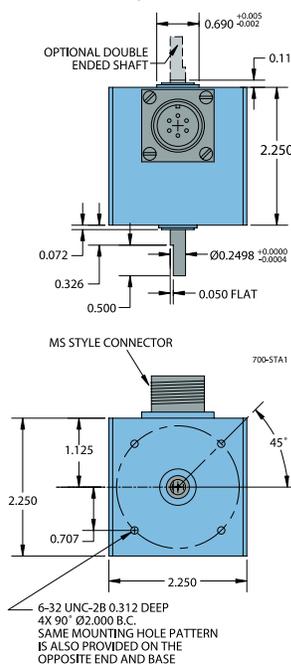
Starting Torque.....0.13 oz-in typical for 0.250" shaft
0.38 oz-in typical for 0.375" shaft

Moment of Inertia..... 6.5×10^{-6} oz-in-sec²

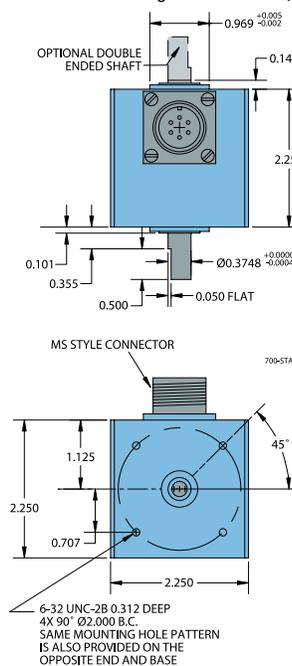
Mounting.....Tapped mounting holes on three sides for base or face mounting

Weight.....10 oz for standard housing

Cube Housing With 1/4" Shaft (4)



Cube Housing With 3/8" Shaft (6)



Industrial Cube Housing (IND12)

Industrial Housing Features

This more robust unit meets requirements between Standard and Heavy Duty housings while retaining the Cube design. The Industrial 12 (IND12) model features an IP65 shaft seal. The tough, sealed aluminum housing has a wall thickness of 0.187" and offers greater protection from wash down, sprays, dust, moisture, shock, vibration, and other hazards found in industrial environments.

Industrial Cube Housing (IND12) Specifications

Refer to all Standard Cube Housing specifications except as follows:

Mechanical

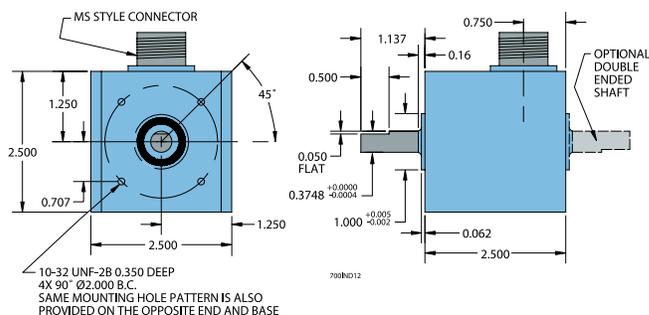
Shaft Size.....0.375" diameter

Shaft Type.....Single- or Double-Ended Shaft Available

Radial Loading.....40 lb Maximum

Axial Loading.....30 lb Maximum

Starting Torque.....3 oz-in Starting Torque w/IP65 Shaft Seal



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



Model 715 Timed Pulse Cube



Features

- The Original Industry-Standard Cube
- Five Versatile Housing Styles
- Thousands of Configurations
- Many New Resolutions Available!

The Model 715 Accu-Coder™ is ideally suited for applications requiring bi-directional feedback with a constant pulse width. The Model 715 is available in two versions. The Model 715-1 provides output pulses for clockwise shaft rotation on one channel and pulses for counterclockwise rotation on another. The Model 715-2 provides output pulses for counting on one channel while the other channel indicates direction of rotation.

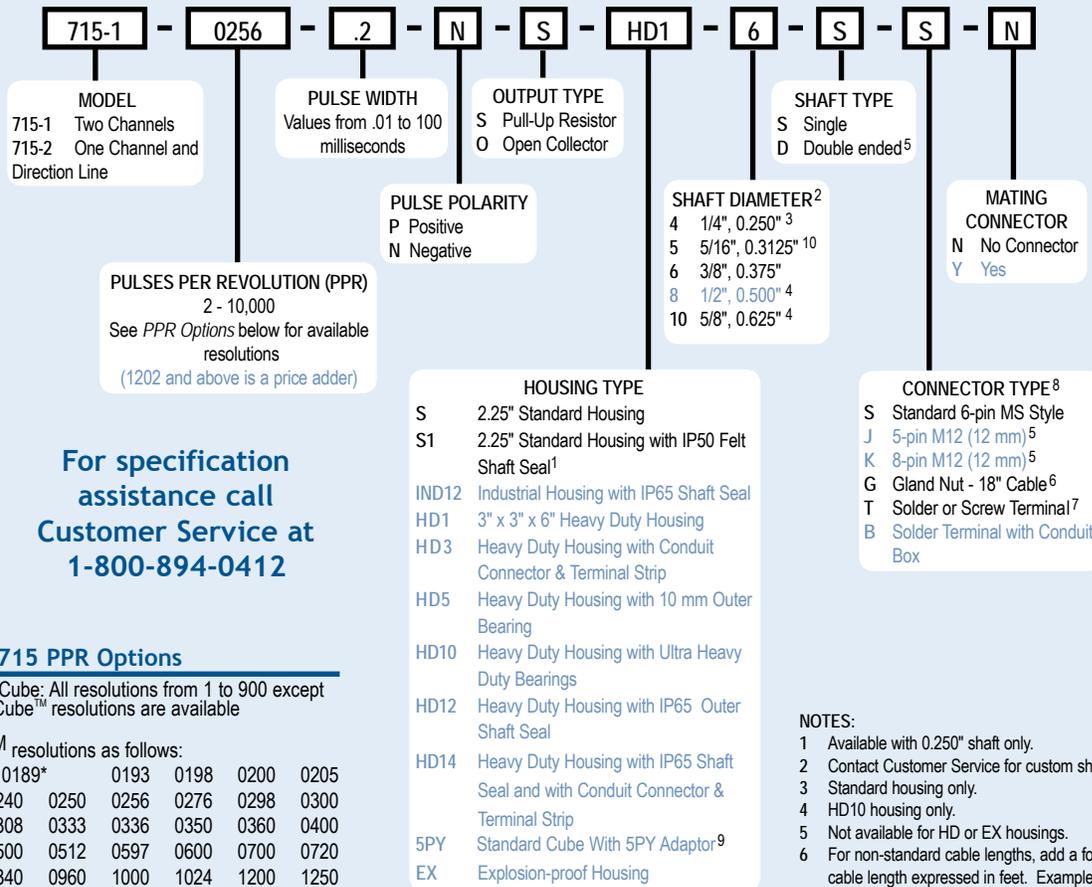
The new E-Cube™ version increases critical performance specifications for the most popular resolutions. The E-Cube™ features advanced Opto-ASIC circuitry, a single chip design that eliminates many board level components. This increases the reliability of an already dependable and durable encoder. With new options continually being added, the E-Cube™ just keeps getting better, and better!

Common Applications

Measuring for Cut-To-Length, Labeling & Filling, Position Control, Motion Following, or Slaving Applications

Model 715 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 1-800-894-0412

Model 715 PPR Options

Standard Cube: All resolutions from 1 to 900 except where E-Cube™ resolutions are available

E-Cube™ resolutions as follows:

0001 thru 0189*	0193	0198	0200	0205
0210	0240	0250	0256	0276
0298	0300	0305	0308	0333
0336	0350	0360	0400	
0480	0500	0512	0597	0600
0700	0720	0800	0840	0960
1000	1024	1200	1250	
1270	1800	2000	2048	2500

1x, 2x, and 4x, of all of the above resolutions are available

*Contact Customer Service For Availability

Contact Customer Service for other disk resolutions; not all disk resolutions available with all output types

NOTES:

- 1 Available with 0.250" shaft only.
- 2 Contact Customer Service for custom shaft lengths and diameters.
- 3 Standard housing only.
- 4 HD10 housing only.
- 5 Not available for HD or EX housings.
- 6 For non-standard cable lengths, add a forward slash (/) plus cable length expressed in feet. Example: G/6 = 6 feet of cable.
- 7 Screw terminals available for HD and EX housings. Solder terminals available for S and S1 housings.
- 8 For Mating Connectors, Cables, and Cordsets see Electrical Accessories at Encoder site.
- 9 Only available with 5/16" (0.3125") shaft.
- 10 Standard or 5PY housing only.

Model 715 Timed Pulse Cube

Model 715 Specifications Common to All Cube Housing Styles

Electrical

Input Voltage.....E-Cube™- 4.75 to 28 VDC max for temperatures up to 85° C 4.75 to 24 VDC for temperatures between 85° to 100°C
Standard Cube- 4.75 to 28 VDC max for temperatures up to 70° C

Input Current.....80 mA maximum with no output load

Input Ripple100 mV peak-to-peak at 0 to 100 kHz

Output FormatIncremental- Square wave with timed output

Output TypesOpen Collector- 250 mA max per channel
Pull-Up- 250 mA max per channel

Freq Response.....E-Cube™- 0 to 125 kHz
Standard Cube- 0 to 20 kHz

Rise Time.....Less than 1 microsecond

AccuracyE-Cube™- Within 0.05° mechanical from one cycle to any other cycle, or 3 arc minutes
Standard Cube- Within 0.1° mechanical from one cycle to any other cycle, or 6 arc minutes

Electrical Conn.....5- or 8-pin M12 (12 mm), gland nut with 18" cable (foil and braid shield, 24 AWG conductors), Solder or Screw Terminal, with or without Conduit Box.

Mechanical

Max Speed.....6000 RPM. Higher shaft speeds achievable, contact Customer Service.

Shaft Material.....303 stainless steel

Housing.....Black non-corrosive finished 6063-T6 aluminum

BearingsPrecision ABEC Ball Bearings

Environmental

Operating Temp.....E-Cube™- 0° to 85° C or 0° to 100° C at 5 to 24 VDC
Standard Cube- 0° to 70° C

Storage Temp.....-25° to +85° C

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

Vibration.....10 g @ 58 to 500 Hz

Shock.....50 g @ 11 ms duration

Standard Cube Housing (S, S1)

Standard Cube Housing (S, S1) Specifications

Mechanical

Shaft Size.....0.250" or 0.375"

Shaft TypeSingle or double-ended (specify choice)

Radial Loading15 lb maximum (0.250" diameter shaft)
40 lb maximum (0.375" diameter shaft)

Axial Loading.....10 lb maximum (0.250" diameter shaft)
30 lb maximum (0.375" diameter shaft)

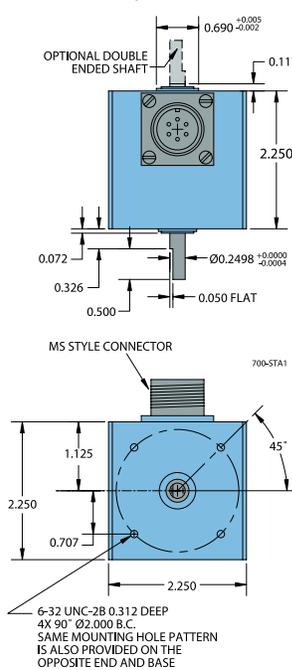
Starting Torque0.13 oz-in typical for 0.250" shaft
0.38 oz-in typical for 0.375" shaft

Moment of Inertia6.5 x 10⁻⁶ oz-in-sec²

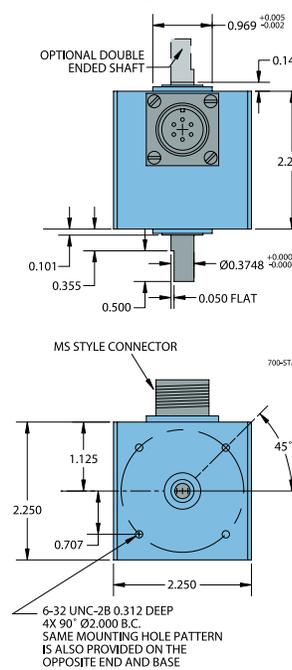
Mounting.....Tapped mounting holes on three sides for base or face mounting

Weight.....10 oz for standard housing

Cube Housing With 1/4" Shaft (4)



Cube Housing With 3/8" Shaft (6)



Industrial Cube Housing (IND12)

Industrial Housing Features

This more robust unit meets requirements between Standard and Heavy Duty housings while retaining the Cube design. The Industrial 12 (IND12) model features an IP65 shaft seal. The tough, sealed aluminum housing has a wall thickness of 0.187" and offers greater protection from wash down, sprays, dust, moisture, shock, vibration, and other hazards found in industrial environments.

Industrial Cube Housing (IND12) Specifications

Refer to all specifications in the standard or E-Cube, unless otherwise stated:

Mechanical

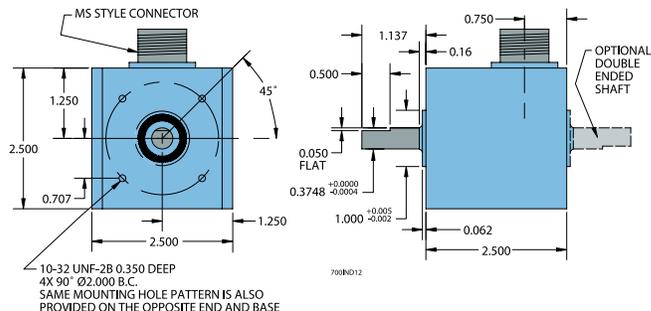
Shaft Size0.375" diameter

Shaft Type.....Single- or Double-Ended Shaft Available

Radial Loading.....40 lb Maximum

Axial Loading30 lb Maximum

Starting Torque.....3 oz-in Starting Torque w/IP65 Shaft Seal



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



Model 716 Quadrature Cube



Features

- The Original Industry-Standard Cube
- Five Versatile Housing Styles
- Thousands of Configurations
- Many New Resolutions Available!

The Model 716 Accu-Coder™ is ideally suited for applications requiring a quadrature output. Designed for compatibility with most programmable controllers, electronic counters, motion controllers, and motor drives, it is ideally suited for industrial applications where it is important that the direction of rotation be known.

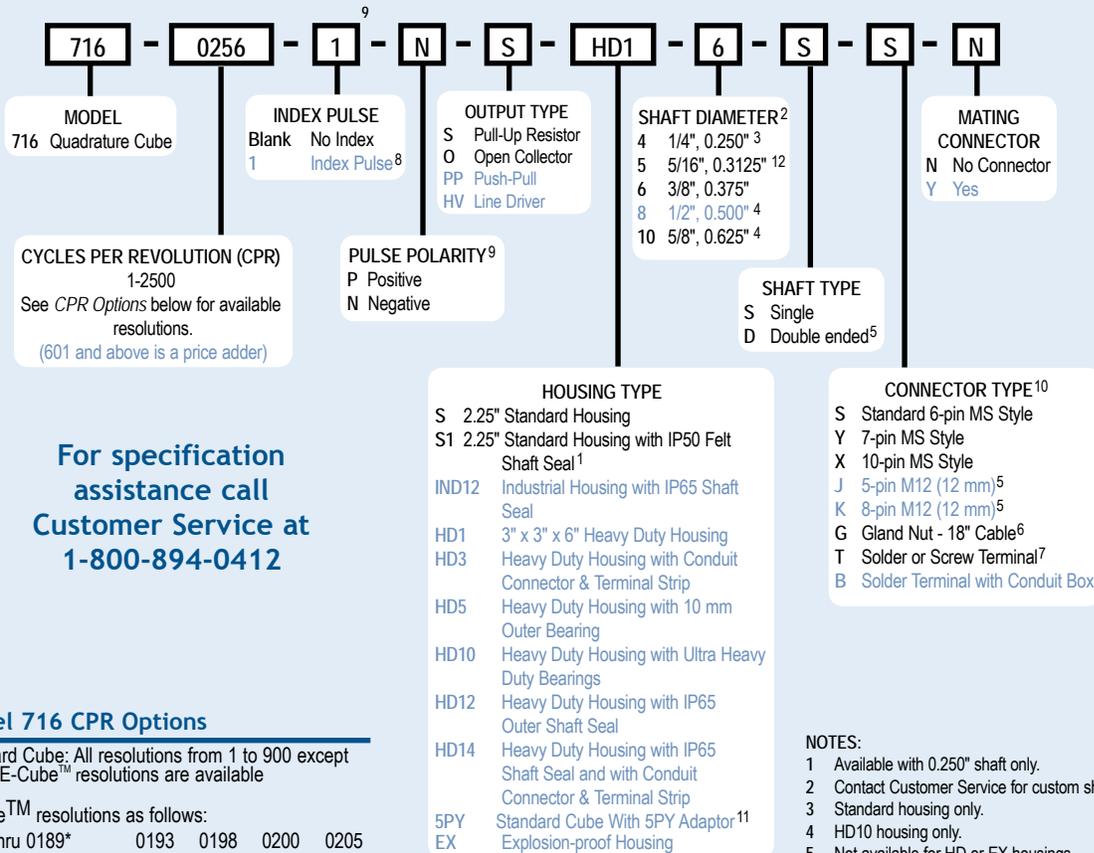
The new E-Cube™ version increases critical performance specifications for the most popular resolutions. The E-Cube™ features advanced Opto-ASIC circuitry, a single chip design that eliminates many board level components. This increases the reliability of an already dependable and durable encoder. With new options continually being added, the E-Cube™ just keeps getting better, and better!

Common Applications

Feedback for counters, PLC's & Motors, Cut To Length, Labeling, Measuring For Packaging, Filling & Materials Handling Machines, Wire Winding, Film Extrusion

Model 716 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
1-800-894-0412

Model 716 CPR Options

Standard Cube: All resolutions from 1 to 900 except where E-Cube™ resolutions are available

E-Cube™ resolutions as follows:

0001 thru 0189*	0193	0198	0200	0205
0210	0240	0250	0256	0276
0298	0300	0305	0308	0315
0333	0336	0350	0360	0400
0480	0500	0512	0580	0597
0600	0700	0720	0800	0840
0960	1000	1024	1200	1250
1270	1800	2000	2048	2500

*Contact Customer Service For Availability

Contact Customer Service for other disk resolutions;
not all disk resolutions available with all output types

NOTES:

- 1 Available with 0.250" shaft only.
- 2 Contact Customer Service for custom shaft lengths and diameters.
- 3 Standard housing only.
- 4 HD10 housing only.
- 5 Not available for HD or EX housings.
- 6 For non-standard cable lengths, add a forward slash (/) plus cable length expressed in feet. Example: G/6 = 6 feet of cable.
- 7 Screw terminals available for HD and EX housings. Solder terminals available for S and S1 housings.
- 8 For HV and PP Output Types, Index Pulse only available on E-Cube™.
- 9 Complete only if Index Pulse option is selected.
- 10 For Mating Connectors, Cables, and Cordsets see Encoder site.
- 11 Only available with 5/16" (0.3125") shaft.
- 12 Standard or 5PY housing only.

Model 716 Quadrature Cube

Model 716 Specifications Common to All Cube Housing Styles

Electrical

Input Voltage.....	E-Cube™- 4.75 to 28 VDC max for temperatures up to 85° C 4.75 to 24 VDC for temperatures between 85° and 100° C Standard Cube- 4.75 to 28 VDC max for temperatures up to 70° C
Input Current.....	80 mA maximum with no output load
Input Ripple.....	100 mV peak-to-peak at 0 to 100 kHz
Output Format.....	Incremental- Quadrature square wave with channel A leading B for clockwise shaft rotation
Output Types.....	Open Collector- 250 mA max per channel Pull-Up- 250 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.....	E-Cube™- gated to channel A, 180° electrical wide (1 to 189 CPR ungated typical 270° electrical)

Index.....	Standard Cube- Once per revolution, 180° electrical minimum non-gated
Freq Response.....	E-Cube™- 0 to 125 kHz Standard Cube- 0 to 20 kHz
Symmetry.....	180° (±18°) electrical
Quad Phasing.....	E-Cube™- 90° (±22.5°) electrical Standard Cube- 90° (±36°) electrical
Rise Time.....	Less than 1 microsecond
Accuracy.....	E-Cube™- Within 0.05° mechanical from one cycle to any other cycle, or 3 arc minutes Standard Cube- Within 0.1° mechanical from one cycle to any other cycle, or 6 arc minutes

Housing.....	Black non-corrosive finished 6063-T6 aluminum
Bearings.....	Precision ABEC Ball Bearings
Electrical Conn.....	Refer to ordering guide notes

Environmental

Operating Temp.....	E-Cube™- 0° to 85° C or 0° to 100° C at 5 to 24 VDC Standard Cube- 0° to 70° C
Storage Temp.....	-25° to +85° C
Humidity.....	98% RH non-condensing
Vibration.....	10 g @ 58 to 500 Hz
Shock.....	50 g @ 11 ms duration

Mechanical

Max Speed.....	6000 RPM. Higher shaft speeds achievable, contact Customer Service.
Shaft Material.....	303 stainless steel

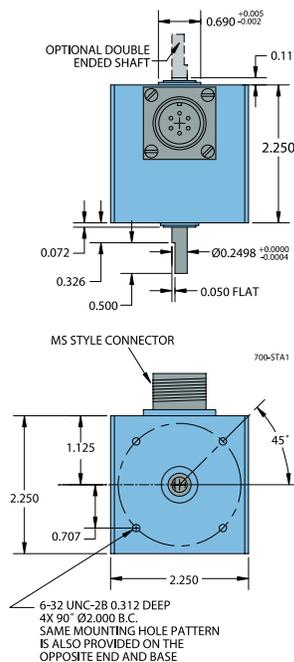
Standard Cube Housing (S, S1)

Standard Cube Housing (S, S1) Specifications

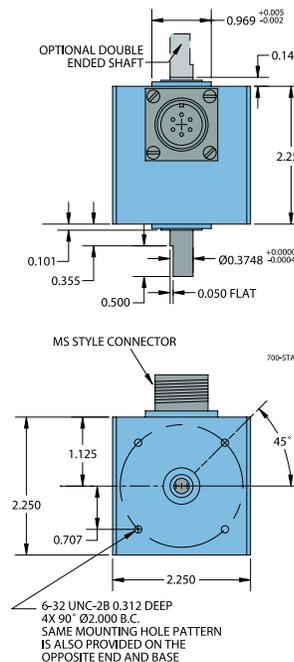
Mechanical

Shaft Size.....	0.250" or 0.375"
Shaft Type.....	Single or double-ended (specify choice)
Radial Loading.....	15 lb maximum (0.250" diameter shaft) 40 lb maximum (0.375" diameter shaft)
Axial Loading.....	10 lb maximum (0.250" diameter shaft) 30 lb maximum (0.375" diameter shaft)
Starting Torque.....	0.13 oz-in typical for 0.250" shaft 0.38 oz-in typical for 0.375" shaft
Moment of Inertia.....	6.5 x 10 ⁻⁶ oz-in-sec ²
Mounting.....	Tapped mounting holes on three sides for base or face mounting
Weight.....	10 oz for standard housing

Cube Housing With 1/4" Shaft (4)



Cube Housing With 3/8" Shaft (6)



Industrial Cube Housing (IND12)

Industrial Housing Features

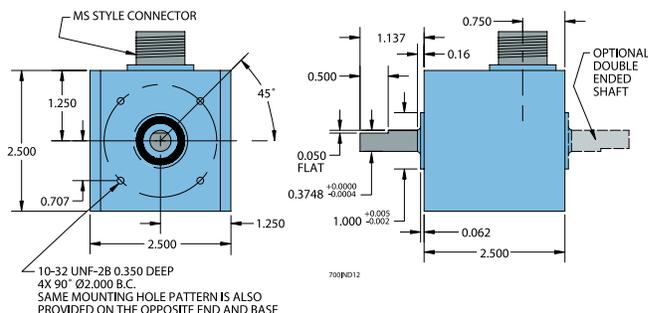
This more robust unit meets requirements between Standard and Heavy Duty housings while retaining the Cube design. The Industrial 12 (IND12) model features an IP65 shaft seal. The tough, sealed aluminum housing has a wall thickness of 0.187" and offers greater protection from wash down, sprays, dust, moisture, shock, vibration, and other hazards found in industrial environments.

Industrial Cube Housing (IND12) Specifications

Refer to all specifications in the standard or E-Cube, unless otherwise stated:

Mechanical

Shaft Size.....	0.375" diameter
Shaft Type.....	Single- or Double-Ended Shaft Available
Radial Loading.....	40 lb Maximum
Axial Loading.....	30 lb Maximum
Starting Torque.....	3 oz-in Starting Torque w/IP65 Shaft Seal



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



Cube Series Housing Options

Heavy Duty Cube Housing (HD12)

The Heavy Duty housing uses a separate 0.375" diameter external shaft and bearing assembly to rotate the shaft of an internally mounted Cube Housing. This provides mechanical isolation from external loads and stress. A flexible coupling between the external shaft and the encoder protects the internal unit from axial and radial loading. The 0.250" aluminum walls protect the encoder from external shock, vibration, and the outside environment.

Heavy Duty Housing Options

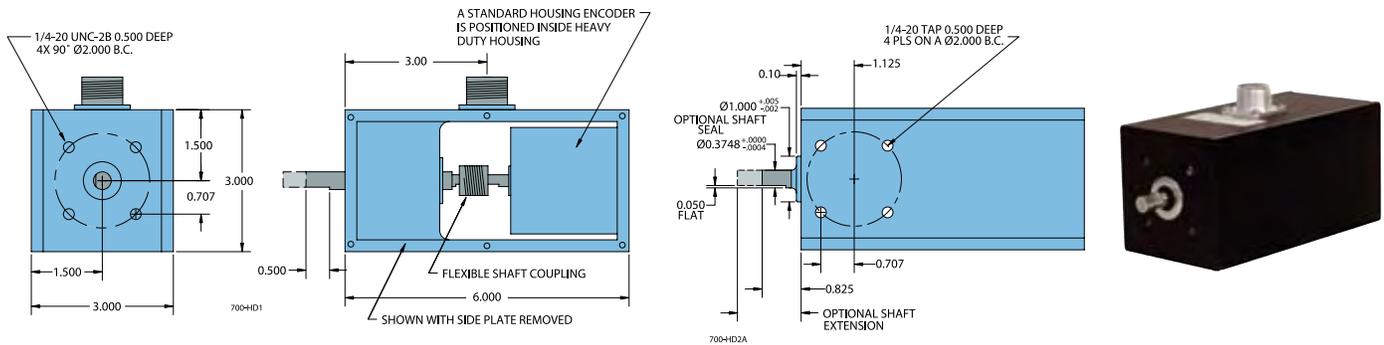
- HD 1 Heavy Duty 3" X 6" housing
- HD 3 Heavy Duty w/conduit connector (threaded for 0.500" NPT Conduit) and terminal strip
- HD 5 Heavy Duty w/10 mm outer bearing
- HD 12* Heavy Duty w/IP65 rated outer shaft seal
- HD 14* Heavy Duty w/IP65 rated outer shaft seal, conduit connector (threaded for 0.500" NPT Conduit), and terminal strip

* These units have an outer boss diameter of 1.000"

Heavy Duty Cube Housing (HD12) Specifications

Refer to all cube specifications except as follows:

Mechanical	
Max Speed	6000 RPM
Shaft Size	0.375"
Rotation	Either direction
Radial Loading	40 lb maximum (50 lb for HD 5)
Axial Loading	30 lb maximum (35 lb for HD 5)
Bearings	Precision ABEC ball bearings
Starting Torque	1 oz-in; 3 oz-in w/IP65 seal
Mounting	Tapped holes face and base
Weight	3.25 lb



Ultra Heavy Duty Cube Housing (HD10)

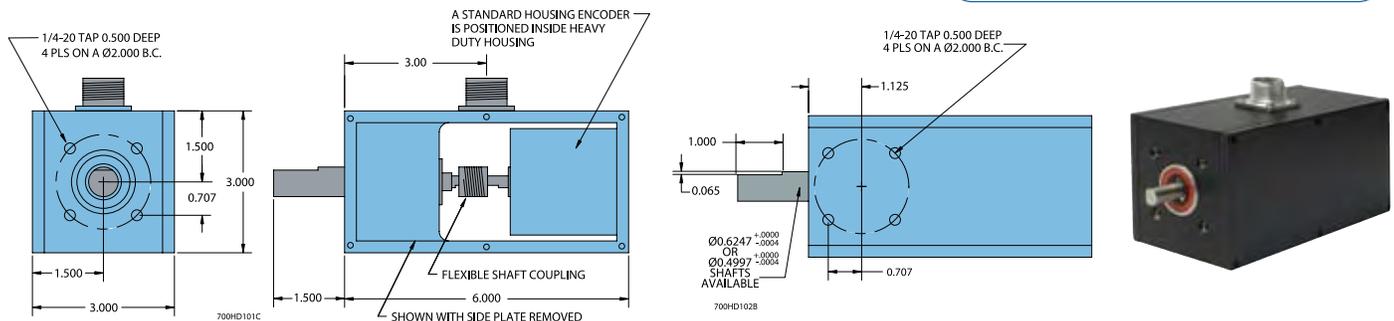
The HD 10 Ultra Heavy Duty encoder is designed for use in applications with severe shaft loading conditions. The HD 10 offers two shaft sizes: 0.500" and 0.625". Shaft material is 303 stainless steel. Bearings are conservatively rated at 95 lb radial and 60 lb axial shaft loading. IP65 shaft seal is standard on all units.

The HD 10 Ultra Heavy Duty housing uses a larger external shaft and R10 bearing assembly to rotate the shaft of an internally mounted Cube Housing. This provides mechanical isolation from external loads and stress. A flexible coupling between the external shaft and the encoder protects the internal unit from axial and radial loading. The 0.250" aluminum walls protect the encoder from external shock, vibration, and the outside environment.

Ultra Heavy Duty Cube Housing (HD 10) Specifications

Refer to all cube specifications except as follows:

Mechanical	
Max Speed	6000 RPM
Shaft Size	0.500" or 0.625"
Rotation	Either direction
Radial Loading	95 lb operating
Axial Loading	60 lb operating
Bearings	ABEC precision ball bearings
Bearing Life	15,000 hours at rated load
Starting Torque	3 oz-in IP65 rated
Mounting	Tapped holes face and base
Weight	3.85 lb

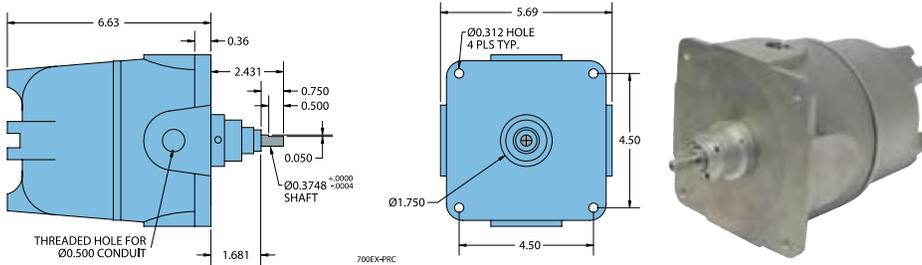


All dimensions are in inches with a tolerance of ±0.005" or ±0.01" unless otherwise specified

Cube Series Housing Options

Explosion-Proof Housing (EX)

An explosion-proof housing is available for installing the Cube Series Accu-Coder™ in hazardous locations. The Cube Series encoder is mounted within the explosion-proof housing and is coupled to the 0.375" shaft assembly by a flexible shaft coupling. This decreases radial and axial loading on the internal encoder shaft and bearings to ensure long life. Electrical connection to the Accu-Coder™ is by an internal barrier terminal strip. A threaded hole for 0.500" NPT conduit is provided.



Explosion-Proof Housing (EX) Specifications

The explosion-proof housing is designed to meet the following:

- NEC Class 1, Groups C and D
- NEC Class 2, Groups E, F, and G
- UL Standard 1203
- Class 1, Division 1, Groups C and D
- Class 2, Division 1, Groups E, F, and G
- CSA Standard C 22.2 No. 30-M 1986
- NEMA 7 and NEMA 9

Refer to all cube specifications except as follows:

Mechanical

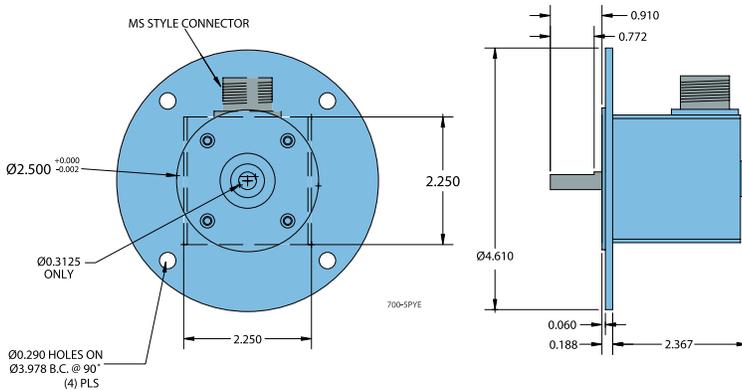
- Max Speed 4000 RPM
- Radial Loading 30 lb operating
- Axial Loading 10 lb operating
- Weight 6 lb
- Finish Unpainted Aluminum

Cube Series Optional 5PY Adapter (175443)

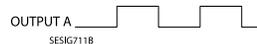
The all aluminum optional 5PY adapter allows any standard housing Cube Series encoder to replace DC tachometer technology. The 5PY adapter is interchangeable with any 5PY tach generator.

Ordering Information

Order standard housing Cube Series Accu-Coder™ with 5/16" shaft and specify Accessory Part #175443. 5PY adapter kit includes all necessary hardware to attach the adapter to the encoder.



Waveform Diagram



Wiring Table

Function	Gland Cable Wire Color	5-pin M12	8-pin M12	10-pin MS	7-pin MS HV	7-pin MS O.S PP	6-pin MS HV No Index	6-pin MS O.S PP	Term. Block HV No Index	Term. Block O.S, HV, PP
Com	Black	3	7	F	F	F	A	A, F	1	1, 6
+VDC	Red	1	2	D	D	D	B	B	2	2
A	White	4	1	A	A	A	C	D	3	4
A'	Brown	----	3	H	C	----	D	----	4	----
Case	----	----	----	G	G	G	----	----	----	----
Shield	Bare	----	----	----	----	----	----	----	----	----

Model 702 Shaft

ACCUCODER
 in Encoder Products Company



Ø2.0"

Features

- Standard Size 20 Package (2" x 2")
- Flange, and Servo Mounting
- Up to 30,000 CPR
- 80 lb Max. Axial and Radial Shaft Loading
- IP66 Sealing Available

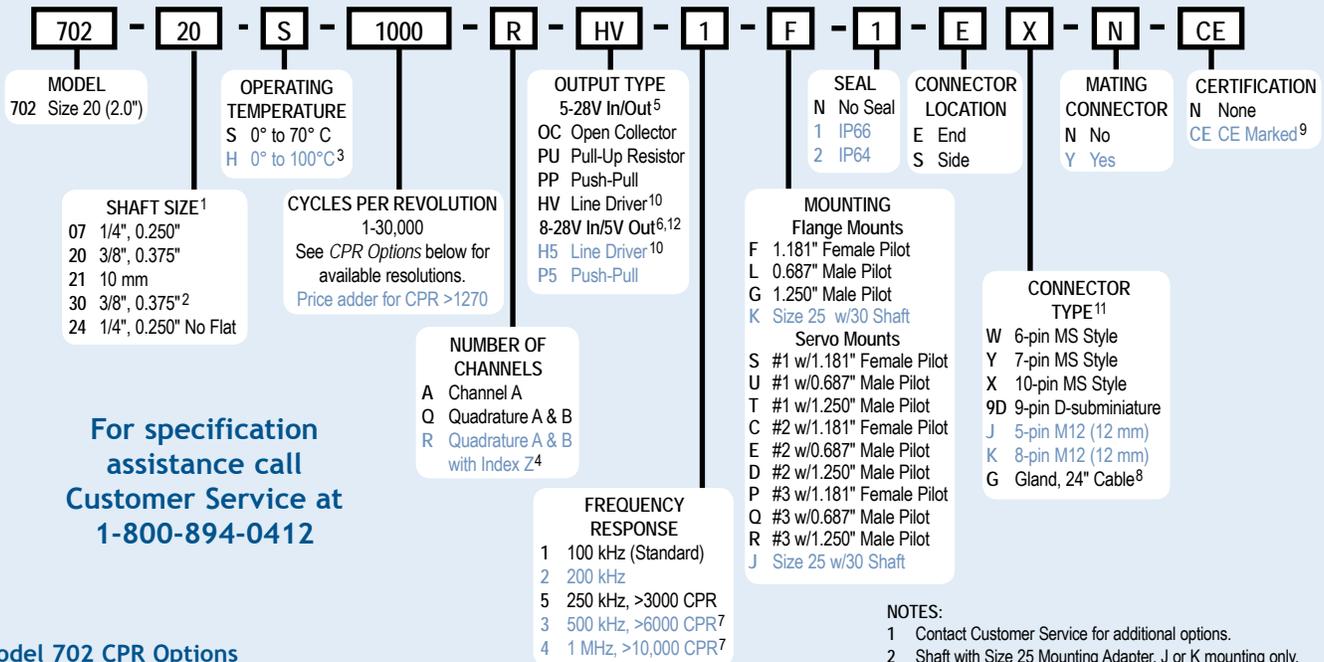
The Model 702 Size 20 Accu-Coder™ is a heavy duty, extremely rugged, reliable, yet compact industry standard 2" diameter encoder, designed for harsh factory and plant floor environments. The double shielded ball bearings are rated at 80 lb maximum axial and radial shaft loading to ensure a long operating life. Made to withstand the harsh effects of the real world, both the flange and servo models are rated IP66 (NEMA 4 & 13) 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
 1-800-894-0412

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*	0200
0240*	0250	0254*	0256*	0300	0333*	0360	0400	0500
0512	0600	0625*	0635	0665*	0720	0768*	0800	0889
0900*	1000	1024	1200	1201 ^a	1203 ^a	1204 ^a	1250 ^a	1270 ^a
1440	1500	1800	2000	2048	2400 ^a	2500	2540 ^a	2880 ^a
3000 ^a	3600 ^a	4000 ^a	4096 ^a	5000 ^a	6000 ^a	7200 ^a	7500 ^a	9000 ^a
10,000 ^a	10,240 ^a	12,000 ^a	12,500 ^a	14,400 ^a	15,000 ^a	18,000 ^a	20,000 ^a	20,480 ^a
25,000 ^a	30,000 ^a							

* Contact Customer Service for High Temperature Option.

^a 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 Shaft with Size 25 Mounting Adapter, J or K mounting only.
- 3 0° to 85° C for certain resolutions, see CPR Options.
- 4 Contact Customer Service for non-standard index gating options.
- 5 24 VDC max for high temperature option.
- 6 Standard temperature, 60 to 3000 CPR only.
- 7 Standard cable lengths only. For details, please refer to Technical Bulletin TB116: *Noise & Signal Considerations*.
- 8 For non-standard cable lengths, add a forward slash (/) plus cable length expressed in feet. Example: G/6 = 6 feet of cable.
- 9 Please refer to Technical Bulletin TB 100: *When to Choose the CE Option* found on the web at Encoder site.
- 10 Not available with 5-pin M12 or 6-pin MS Type connector. Available with 7-pin MS Type connector only without Index Z.
- 11 For Mating Connectors, Cables, and Cordsets see Electrical Accessories on the web at Encoder site.
- 12 H5 and P5 outputs are not available with CE option, or any End Mount MS Connector

Model 702 Shaft

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 <i>Waveform Diagrams</i> 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 <i>Waveform Diagrams</i> below.
Freq Response.....	Up to 1 MHz.
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 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)

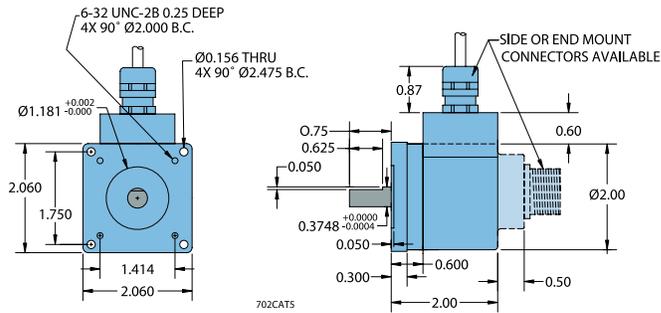
Mechanical

Max Shaft Speed.....	8000 RPM. Higher shaft speeds may be achievable, contact Customer Service.
Shaft Size.....	0.250", 0.375", or 10 mm
Shaft Rotation.....	Bi-directional
Radial Shaft Load.....	80 lb max. Rated load of 20 to 40 lb for bearing life of 1.5×10^9 revolutions
Axial Shaft Load.....	80 lb max. Rated load of 20 to 40 lb for bearing life of 1.5×10^9 revolutions
Starting Torque.....	1.0 oz-in typical with IP64 seal or no seal 3.0 oz-in typical with IP66 shaft seal
Moment of Inertia.....	5.2×10^{-4} oz-in-sec ²
Max Acceleration.....	1×10^5 rad/sec ²
Connector Type.....	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)
Housing.....	Black non-corrosive finish
Bearings.....	Precision ABEC ball bearings
Mounting.....	Various flange or servo mounts
Weight.....	11 oz typical

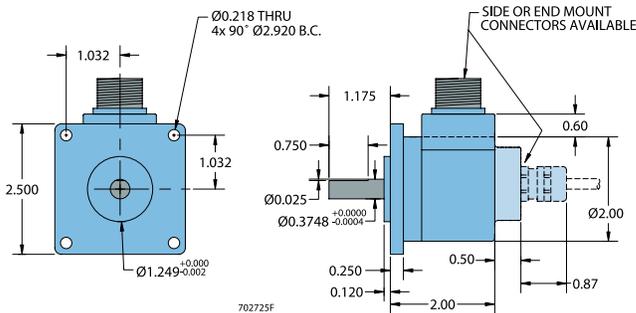
Environmental

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 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.....	IP66 (NEMA 13 and 4/4X) with shaft seal on flange and servo mounts; or IP64 available.

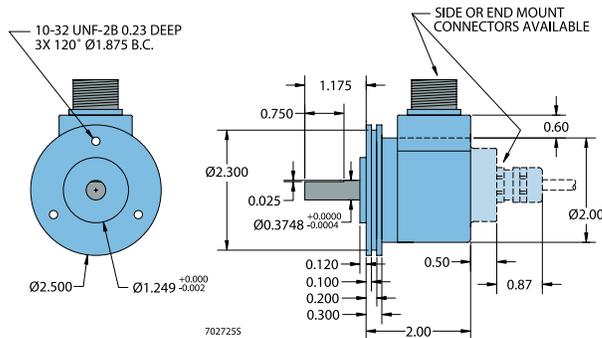
Model 702 Flange Mount (F)



Model 702 With 2.5" Flange Mount (K)



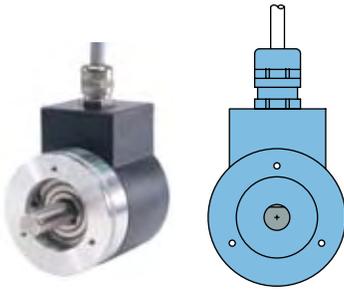
Model 702 With 2.5" Servo Mount (J)



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

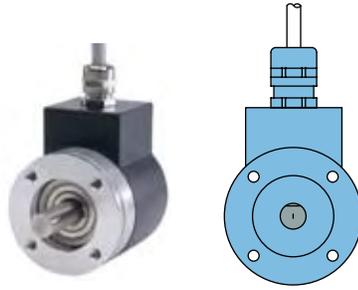
Model 702 Shaft

Model 702 Servo Mounts Servo #1 (S)



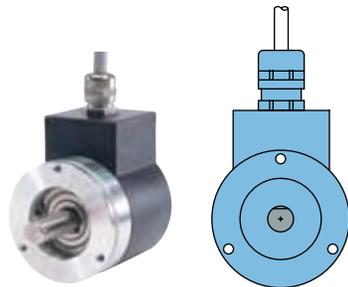
SERVO MOUNT #1
4-40 UNC-2B 0.25 DEEP
3X 120° Ø1.500 B.C.

Servo #2 (C)



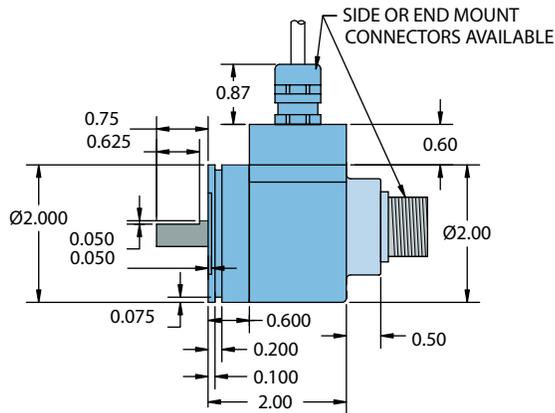
SERVO MOUNT #2
10-32 UNF-2B 0.25 DEEP
4X 90° Ø1.625 B.C.

Servo #3 (P)



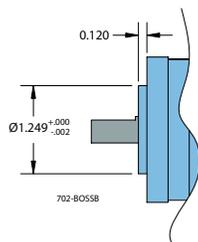
SERVO MOUNT #3
6-32 UNC-2B 0.25 DEEP
3X 120° Ø1.750 B.C.

Body For Servo Mounts #1, #2, #3

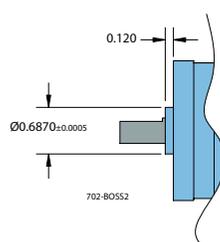


Optional Pilots For Flange And Servo Mounts

(G, T, D)



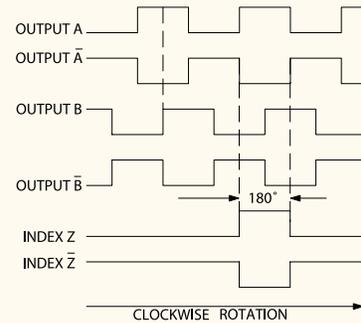
(L, U, E)



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

Waveform Diagrams

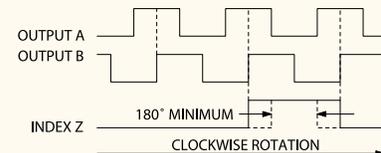
Line Driver and Push-Pull



NOTE: ALL DEGREE REFERENCES ARE ELECTRICAL DEGREES

LDSIGC

Open Collector and Pull-Up



NOTE: ALL DEGREE REFERENCES ARE ELECTRICAL DEGREES

SESIGC

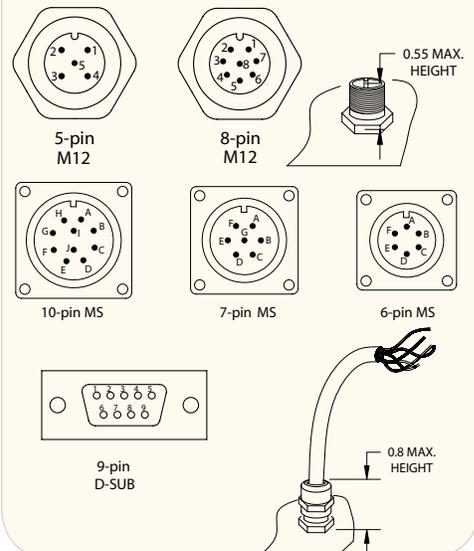
NOTE: INDEX IS POSITIVE GOING

Wiring Table

Function	Gland Cable Wire Color	5-pin M12 ²	8-pin M12 ²	10-pin MS	7-pin MS HV, HS	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 ¹	---	---	---	---	---	---	---

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

Connector Pin-Outs



Mounting/Mechanical Installation and Applications

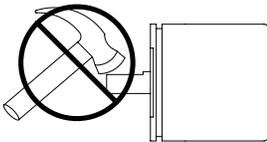
For over 35 years, our engineers have been designing encoders that are quick and easy to install. With a variety of mounting options available, your encoder should be a perfect match for your existing equipment. Accessories such as pivoting mounting brackets, measuring wheels, flexible couplings, etc., are available from EPC to ease installation. The first principle for every encoder installation is "Don't force it!". Striking or using excessive force can either damage your new encoder, or introduce excessive shaft loading, shaft misalignment, or other conditions shortening its expected life. Tighten all couplings and bolts to their recommended torque. Remember, tighter isn't always better!

Shaft Style Encoders

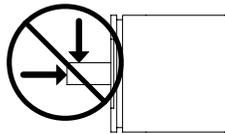


- Gently couple the shaft of the Accu-Coder™ to the driving shaft, using a correctly sized flexible shaft coupling. **Never use a rigid coupling.**
- Verify proper alignment between the Accu-Coder™ shaft and the driving shaft.
- If using pulleys or gears, mount them on the shaft as close as possible to the Accu-Coder™ to reduce bearing load.
- Axial and radial shaft loading should be low as possible. Never exceed printed specifications.
- Use recommended torques to tighten all clamping bolts and couplings.

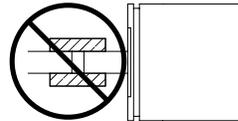
Caution: Avoid damage to your Accu-Coder™. The following actions may cause damage, and void product warranty.



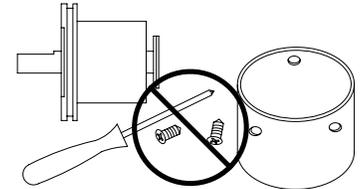
Do not shock or strike.



Do not subject shaft to excessive axial or radial shaft stresses.



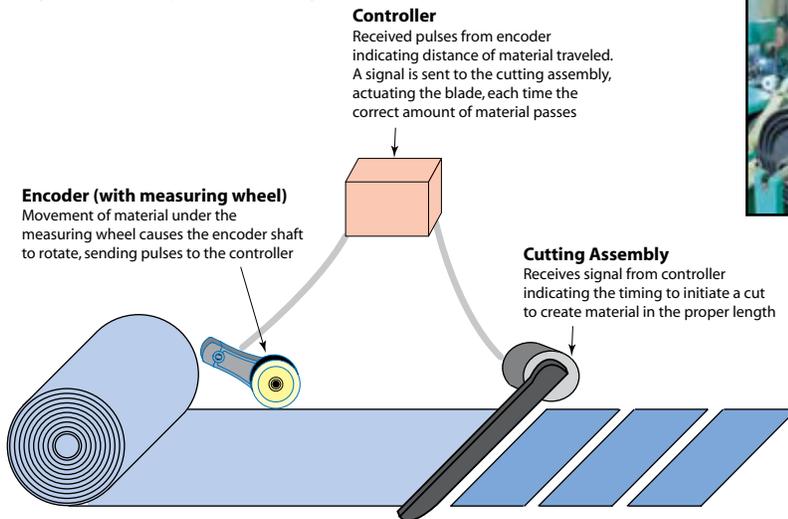
Do not use a rigid coupling.



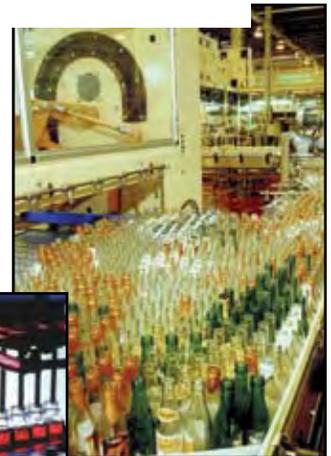
Do not disassemble.

Accu-Coder™ Applications Include:

Any application that measures speed, distance, or position can use an encoder. An example of how an encoder works in a motion control system is diagrammed in this typical cut-to-length example below.



Textiles



Packaging



Automotive



Flood Gate Control



Printing and Binding

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
- IP66 Sealing Available

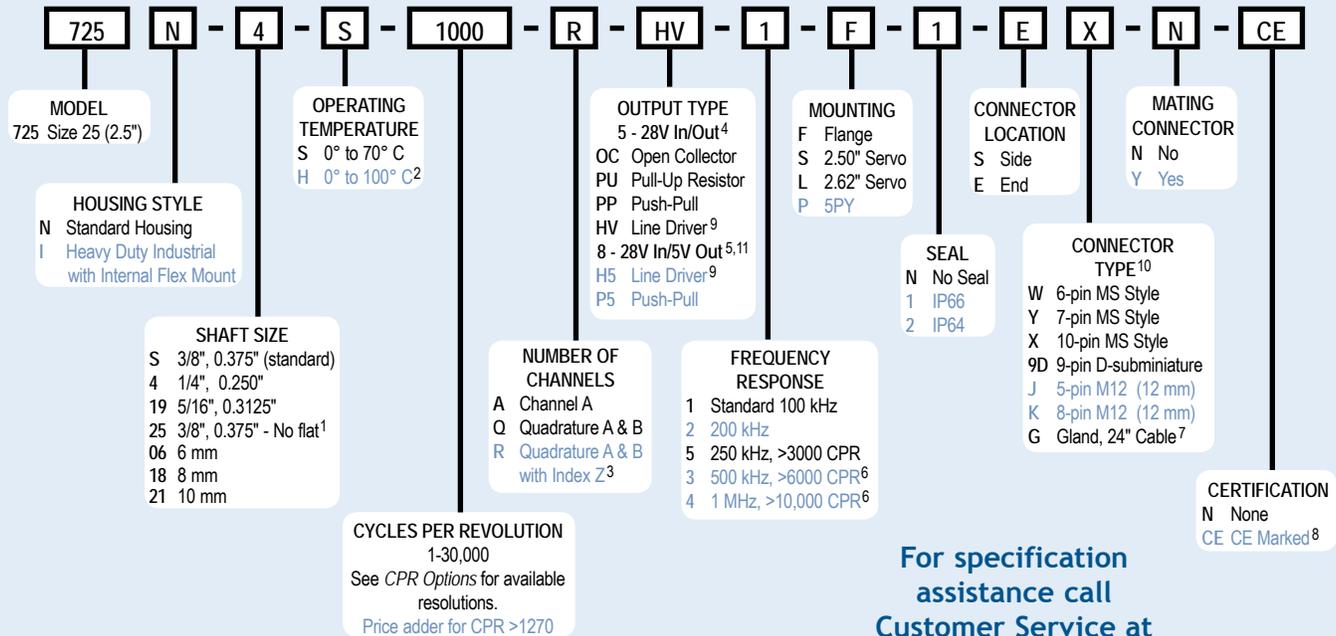
Model 725 Size 25 Accu-Coder™ optical shaft encoder is specifically designed for the challenges of an industrial environment. But don't let its tough, industrial package fool you; it still has the performance to reach resolutions up to 30,000 cycles per revolution. The Model 725 is available with both flange and servo mounting options, along with two distinctive 2.5" diameter 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.

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.



For specification assistance call
 Customer Service at
 1-800-894-0412

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*	0200
0240*	0250	0254*	0256*	0300	0333*	0360	0400	0500
0512	0600	0625*	0635	0665*	0720	0768*	0800	0889
0900*	1000	1024	1200	1201* ^a	1203* ^a	1204* ^a	1250 ^a	1270 ^a
1440	1500	1800	2000	2048	2400 ^a	2500	2540 ^a	2880 ^a
3000 ^a	3600 ^a	4000 ^a	4096 ^a	5000 ^a	6000 ^a	7200 ^a	7500 ^a	9000 ^a
10,000 ^a	10,240 ^a	12,000 ^a	12,500 ^a	14,400 ^a	15,000 ^a	18,000 ^a	20,000 ^a	20,480 ^a
25,000 ^a	30,000 ^a							

* Contact Customer Service for High Temperature Option.

^a 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 Encoder site.
- 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 Encoder site.
- 11 H5 and P5 outputs not available with CE option, or any End Mount MS Connector.

Model 758



Features

- Standard Size 58 Mounting (58 mm Diameter)
- Up to 30,000 CPR
- 80 lb Max. Axial and Radial Shaft Loading
- High Temperature Option (100° C)
- IP66 Sealing Available

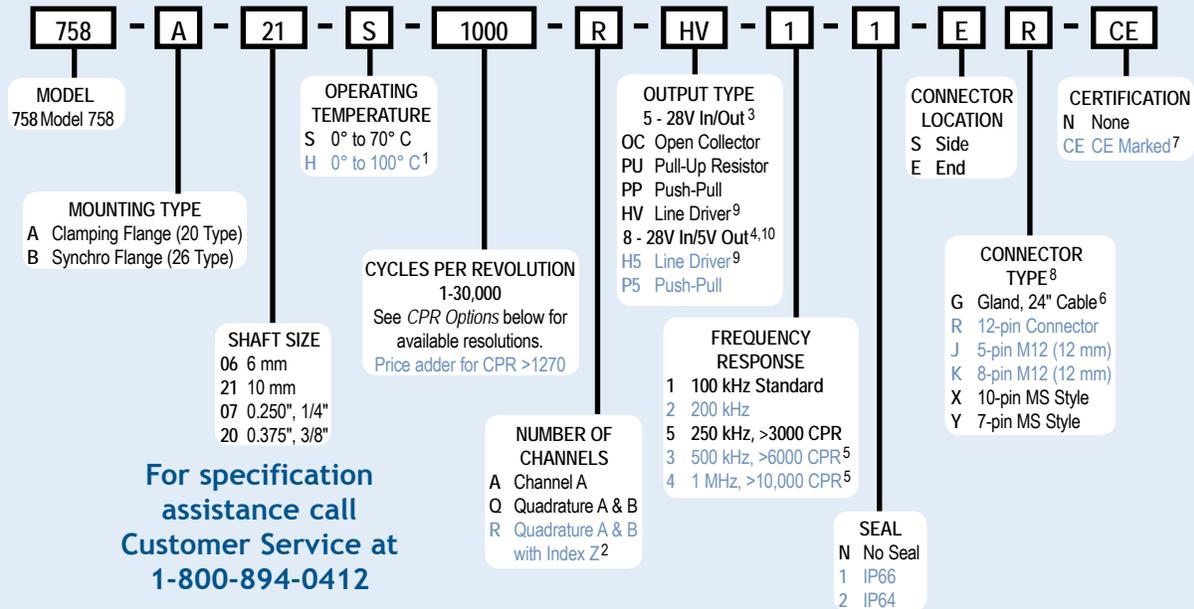
The Model 758 Size 58 Accu-Coder™ is a heavy duty, extremely rugged, reliable, yet compact European standard 58 millimeter diameter encoder, designed for harsh factory and plant floor environments. Shaft loading is no problem for the double-shielded ball bearings; their 80 lb load rating ensures a long operating life. With the optional heavy-duty shaft seal, the Model 758 is rated IP66 (NEMA 4 & 13). Two European standard mounting options are available: Clamping Flange (20 type) or Synchro Flange (26 type). The Model 758 is the perfect replacement encoder for units requiring the European mount.

Common Applications

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

Model 758 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 1-800-894-0412

Model 758 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*	0200
0240*	0250	0254*	0256*	0300	0333*	0360	0400	0500
0512	0600	0625*	0635	0665*	0720	0768*	0800	0889
0900*	1000	1024	1200	1201* ^a	1203* ^a	1204* ^a	1250 ^a	1270 ^a
1440	1500	1800	2000	2048	2400 ^a	2500	2540 ^a	2880 ^a
3000 ^a	3600 ^a	4000 ^a	4096 ^a	5000 ^a	6000 ^a	7200 ^a	7500 ^a	9000 ^a
10,000 ^a	10,240 ^a	12,000 ^a	12,500 ^a	14,400 ^a	15,000 ^a	18,000 ^a	20,000 ^a	20,480 ^a
25,000 ^a	30,000 ^a							

* Contact Customer Service for High Temperature Option.

^a 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 0° to 85° C for certain resolutions, see CPR Options.
- 2 Contact Customer Service for index gating options.
- 3 24 VDC max for high temperature option.
- 4 Standard temperature, 60 to 3000 CPR only.
- 5 Standard cable lengths only. For details, please refer to Technical Bulletin TB116: *Noise and Signal Considerations* at Encoder site.
- 6 For Non-Standard Cable Lengths add a forward slash (/) plus cable length expressed in feet. Example: SG/6 = 6 feet of cable.
- 7 Please refer to Technical Bulletin TB100: *When to Choose the CE Option*.
- 8 For mating connectors, cables, and cordsets, see Electrical Accessories on the web at Encoder site.
- 9 Not available with 5-pin M12 connector. Available with 7-pin MS Type Connector only without Index Z.
- 10 H5 and P5 outputs are not available with CE option, or any End Mount MS Connector

Model 758

Model 758 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 Ripple100 mV peak-to-peak at 0 to 100 kHz
- Output FormatIncremental- 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)
- IndexOccurs once per revolution. The index for units >3000 CPR is 90° gated to Outputs A and B. See *Waveform Diagrams* below.
- Freq Response.....Up to 1 MHz
- 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
- Symmetry1 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°)
- 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)

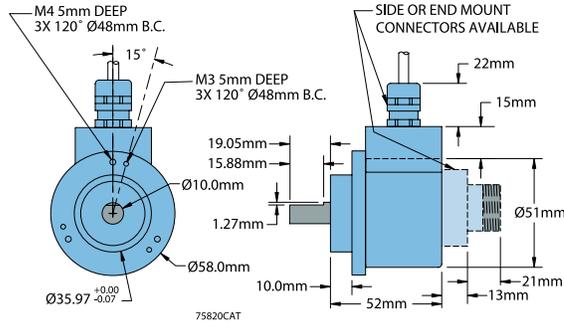
Mechanical

- Max Shaft Speed.....8000 RPM. Higher shaft speeds may be achievable, contact Customer Service.
- Shaft Size0.250", or 0.375", 6 mm, 10 mm
- Shaft Rotation.....Bi-directional
- Radial Shaft Load.....80 lb max. Rated load of 20 to 40 lb for bearing life of 1.5×10^9 revolutions
- Axial Shaft Load.....80 lb max. Rated load of 20 to 40 lb for bearing life of 1.5×10^9 revolutions
- Starting Torque1.0 oz-in typical with IP64 seal or no seal
3.0 oz-in typical with IP66 shaft seal
- Moment of Inertia..... 5.2×10^{-4} oz-in-sec²
- Max. Acceleration..... 1×10^5 rad/sec²
- Electrical ConnGland with 24" cable (foil and braid shield, 24 AWG conductors) 7- or 10-pin MS Style, 12-pin connector, 5- or 8-pin M12 (12 mm)
- Housing.....Black non-corrosive finish
- Bearings.....Precision ABEC ball bearings
- Mounting.....European Standard Clamping Flange (20 Type) and Synchro Flange (26 Type)
- Weight.....11 oz typical

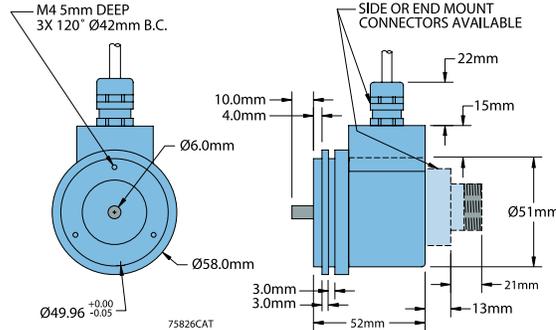
Environmental

- 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 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.....IP66 (NEMA 13 and 4/4X) shaft seal or IP64 shaft seal

Model 758 Clamping Flange 20 Type (A)

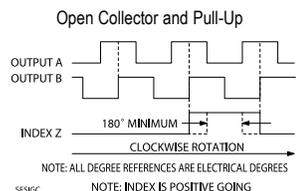
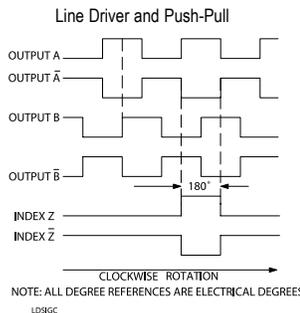


Model 758 Synchro Flange 26 Type (B)



All dimensions are in millimeters with a tolerance of ±0.17 mm unless otherwise specified

Waveform Diagrams



Wiring Table

Function	Gland Cable Wire Color	5-pin M12 ²	8-pin M12 ²	10-pin MS	7-pin MS HV, H5	7-pin MS PU, PP, PS, OC	12-pin
Com	Black	3	7	F	F	F	10
+VDC	Red	1	2	D	D	D	12
A	White	4	1	A	A	A	5
A'	Brown	---	3	H	C	---	6
B	Blue	2	4	B	B	B	8
B'	Violet	---	5	I	E	---	1
Z	Orange	5	6	C	---	C	3
Z'	Yellow	---	8	J	---	---	4
Shield	Bare ¹	---	---	---	---	---	---
+VDC Sense	---	---	---	---	---	---	2
Com Sense	---	---	---	---	---	---	11
Case	Green	---	---	G	G	G	9

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

Ordering/Delivery/ Technical Support

Ordering Through a Distributor

Encoder Products Company has distributors across the United States and Canada. Call 800-894-0412 and ask a Customer Service Representative for a distributor in your area.

Part Numbers

Accu-Coder™ part numbers are found on the model Datasheet located at Encoder website. Use the appropriate *Ordering Guide* for your particular model. It is important to specify the complete part number. If you are reordering, the serial number of the unit being replaced will help speed the ordering process. Ordering with incomplete information may delay product delivery. In addition, Encoder Products Company cannot assume responsibility for errors when a part number is incomplete. If you need help creating a part number, contact Customer Service.

Product Lead Time

Standard lead time is 4 to 6 business days. Expedite Service is available upon request. Accessories are generally in stock and available for quick delivery. Contact Customer Service to confirm lead times.

Next Day Express

Single-piece orders for many of our products can ship the next business day without an expedite charge. Contact Customer Service for details.

Expedite Service

One, two, and three working day expedited service is available upon request. Contact Customer Service for applicable expedite charges. Expedited service is done on a "best efforts" basis. In some cases a part shortage or other unforeseen factor may cause an expedited order to ship late. In such a case, the expedite charge is prorated.

Confirming an Order

Confirmation by mail or fax is required for all telephone orders. Please be sure the order is clearly marked "confirmation". Please check your purchase order against the acknowledgment that Encoder Products Company faxes to you. To ensure accuracy, a Customer Service Representative will check your confirmation against your order.

Change Orders

To change an order, ask for a Customer Service Representative. For faster service, either have your purchase order number or Encoder Products Company's sales order number available. Service charges are assessed for some changes, including order cancellations. Contact Customer Service to determine applicable charges.

Shipping Methods

Orders will be shipped out by UPS or Federal Express. All shipments are F.O.B. factory.

Consignment & Evaluation Units

If you are a new OEM account or have a new OEM application, consignment or evaluation units may be available for up to 60 days. Contact Customer Service for complete details.

Technical Application Support

Our Technical Support professionals are available to assist you in your application needs - whether its selecting the right encoder for your application, troubleshooting a new installation, or connecting your new encoder to your motion control system.

Custom Design Service

If your application calls for a solution that cannot be solved using off-the-shelf-products, EPC's Custom Design Service may be just what you need. A simple phone call to Customer Service will put our expertise to work for you.

Expert Cross Reference & Retrofit Service

Encoder Products Company understands the importance of time when you have a machine down. Through its free Cross Reference and Retrofit Service, and thanks to a thorough library of specifications and dimensional information for a wide range of competitive encoders, EPC offers expert assistance for the cross-referencing and/or retrofit replacement of most domestic and foreign optical rotary encoders. In addition, serviceable replacements can often be found for encoders that use other technologies. As a final service, for those hard to find units, EPC can often suggest an alternative approach that will get you back up and running. We have provided an Expert Cross-Reference Service page on our website. It provides you with part numbers of competitor encoders, and compares them with Accu-Coder™ encoders, so that you can begin the cross-referencing process.

Direct Replacements

Encoder Products has identified some of the encoders on the market that are currently hard to find or replace. We have labeled these "Direct Replacement Encoders"

Encoder Accessories

Mating Connectors and Pre-Wired Cable/Mating Connector Assemblies



EPC stocks an extensive selection of high quality connectors, cables, cable assemblies, and cordsets to optimize encoder performance; most can be ordered with MS style or M12 connectors.

M12 (12 mm) Cordsets



M12 (12 mm) cordsets are available for use with 5- or 8-pin M12 connectors. Cable lengths may vary.

Shaft Couplings



EPC's precision shaft couplings are carefully manufactured to optimize performance, reduce the chance of premature failure, and provide easy installation. We stock a wide range of choices to match your exact shaft size requirements.

Hubs/Flanges



Hubs and Flanges allow Accu-Coder™ encoders to be easily mounted to industry standard housing styles; NEMA, servo, 5PY, and other styles available.

Protective Covers



The protective *Uni-Cover* helps to keep encoders from damage, and allow a wide variety of encoders to be used in harsh environments. The *Uni-Cover Kit* is equipped with washers and bolts and is compatible with the Models 121, 225, 260, 755A, 702, 775, 776, and 960. It can be mounted on NEMA 4.5" AK motors with a 5.875" bolt hole pattern.

The Linear Cable Adapter (LCA)



The *Linear Cable Adapter (LCA)* is used to transform a Cube Series Encoder into a Linear Encoder. It can be mounted to a Standard or Industrial housed Cube, and provides a low cost alternative for obtaining accurate linear measurement.

Mounting Brackets



The *Uni-Bracket* adapts the Model 260 or the Model 702 Flex-Mount to fit a standard motor mount with a mounting bolt circle up to 5.875", such as NEMA 4.5" AK mount or IEC equivalent.

Cube Series Mounting Bracket are used to mount measuring wheels to Cube and 702 Series Accu-Coders™. Available in two types: *single pivot* which pivots vertically, and *dual pivot* which pivots vertically and longitudinally.

The *Tru-Trac™ Mounting Bracket* secures the TR1 to your assembly for perfect linear measurement.

Measuring Wheels



Often used to obtain linear motion feedback from a rotating shaft, EPC carries measuring wheels in a large range of surface finishes (urethane, rubber, knurled, grooved). See chart in Encoders Measuring Wheel section on the internet, detailing applications and temperatures for proper mating to nearly any surface. Available in a variety of both English and metric circumferences, to provide linear measurement in a host of different manufacturing applications.

Power Supplies, Anti-Rotational Mounts, RX/TX Converter/Splitter/Repeater

Power Supplies, Mounting Brackets and RXTX information can be found in detail at Encoder website.

