MODEL 715 – INCREMENTAL SHAFT ENCODER

FEATURES

The Original Industry-Standard Cube
Versatile Housing Styles
Bi-Directional, Constant Pulse Width
Resolutions Available up to 10,000 CPR

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. Critical performance specifications for the most popular resolutions and advanced Opto-ASIC circuitry – a single chip design that eliminates many board level components – increases the reliability of an already dependable and durable encoder. With new options continually being added, the Model 715 excels in a wide variety of industrial applications.

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.

715-1 – 0256 – .2 – N – S – HD1 – 6 – S – S – N

MODEL
- **715-1** Two Channels
- **715-2** One Channel and Direction Line

PULSES PER REVOLUTION (PPR) 2 - 10,000
See CPR Options below for available resolutions
(1202 and above is a price adder)

PULSE WIDTH
Values from .01 to 100 milliseconds

PULSE POLARITY
- **P** Positive
- **N** Negative

OUTPUT TYPE
- **S** Pull-Up Resistor
- **O** Open Collector

HOUSING TYPE
- **S** 2.25" Standard Housing
- **S1** 2.25" Standard Housing with IP50 Felt Shaft Seal[1]
- **IND12** Industrial Housing with IP66 Shaft Seal
- **HD1** 3" x 3" x 6" Heavy Duty Housing[2]
- **HD3** Heavy Duty Housing with Conduit Connector & Terminal Strip
- **HD5** Heavy Duty Housing with 10 mm Outer Bearing[2]
- **HD10** Heavy Duty Housing with Ultra Heavy Duty Bearings, 0.625" or 0.500" Shaft[2]
- **HD12** Heavy Duty Housing with IP66 Outer Shaft Seal[2]
- **HD14** Heavy Duty Housing with IP66 Shaft Seal and with Conduit Connector & Terminal Strip
- **5PY** Standard Cube with 5PY Adaptor[3]
- **EX** Explosion-proof housing

SHAFT DIAMETER[4]
- **4** 1/4", 0.250"[5]
- **5** 5/16", 0.3125"[6]
- **6** 3/8", 0.375"
- **8** 1/2", 0.500"[7]
- **10** 5/8", 0.625"[7]

SHAFT TYPE
- **S** Single
- **D** Double ended[8]

CONNECTOR TYPE[9]
- **S** Standard 6-pin MS
- **J** 5-pin M12 (12 mm)[8]
- **K** 8-pin M12 (12 mm)[8]
- **G** Gland Nut – 18" Cable[10]
- **T** Solder or Screw Terminal[11]
- **B** Solder Terminal with Conduit Box

MATING CONNECTOR
- **N** No Connector
- **Y** Yes

MODEL 715 PPR OPTIONS

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

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 Only available with 6-pin MS or Screw Terminal Connector Types.
3 Only available with 5/16", 0.3125" shaft.
4 Contact Customer Service for custom shaft lengths and diameters.
5 Standard housing only.
6 Standard or 5PY housing only.
7 HD10 housing only.
8 Not available for HD or EX housings.
9 For mating connectors, cables, and cordsets see **Accessories** at encoder.com. For Connector Pin Configuration Diagrams, see Technical Information or see **Connector Pin Configuration Diagrams** at encoder.com.
10 For non-standard cable lengths, add a forward slash (/) plus cable length expressed in feet. Example: G/6 = 6 feet of cable.
11 Screw terminals available for HD and EX housings. Solder terminals available for S and S1 housings.

MODEL 715 SPECIFICATIONS

Common to All Cube Housing Styles

Electrical

Input 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	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 timed output
Output Types	Open Collector – 250 mA max per channel Pull-Up – Open collector with 1.5K ohm internal resistor, 250 mA max per channel
Max Frequency	0 to 125 kHz
Electrical Protection	Reverse voltage and output short circuit protected. NOTE: Sustained reverse voltage may result in permanent damage.
Rise Time	Less than 1 microsecond
Accuracy	Within 0.05° mechanical from one cycle to any other cycle, or 3 arc minutes

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	0 to 85° 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

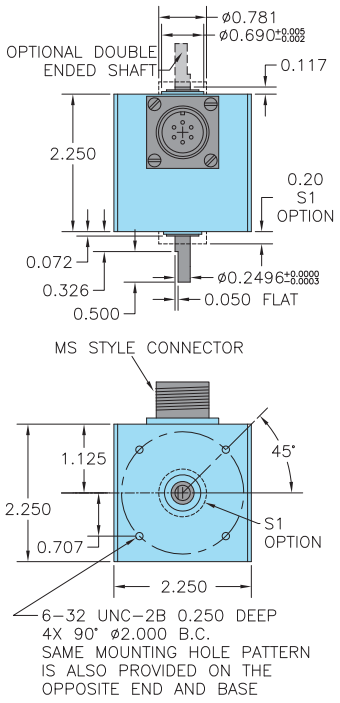
STANDARD CUBE HOUSING (S, S1) SPECIFICATIONS

Mechanical

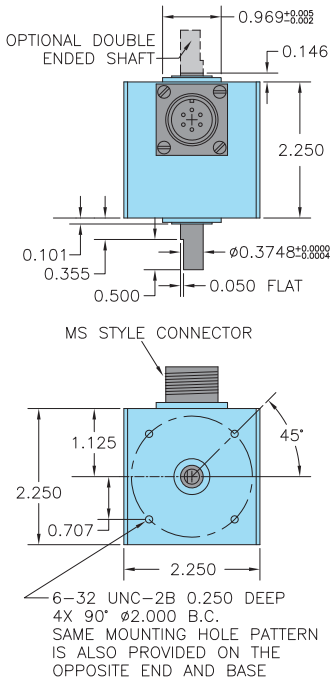
Shaft Type	Single or double-ended (specify choice)
Radial Loading	15 lb maximum (0.250" diameter shaft) 40 lb maximum (0.375" diameter shaft)
Axial Loading	10 lb maximum (0.250" diameter shaft) 30 lb maximum (0.375" diameter shaft)
Starting Torque	0.13 oz-in typical for 0.250" shaft 0.38 oz-in typical for 0.375" shaft
Moment of Inertia	6.5 x 10^{-6} oz-in-sec^2
Weight	10 oz for standard housing

STANDARD CUBE HOUSING (S, S1)

Cube Housing with 1/4" Shaft (4)



Cube Housing with 3/8" Shaft (6)



WIRING TABLE

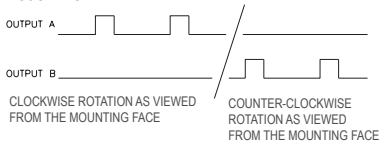
For EPC-supplied mating cables, refer to wiring table provided with cable.
Trim back and insulate unused wires.

Function	Gland Cable† Wire Color	5-pin M12	8-pin M12	6-pin MS	Term. Block
Com	Black	3	7	A,F	1,6
+VDC	Red	1	2	B	2
A	White	4	1	D	4
B	Blue	2	4	E	5
Shield	Bare	--	--	--	--

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

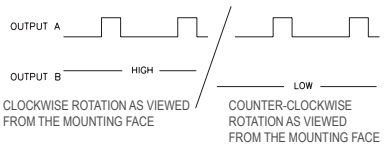
WAVEFORM DIAGRAMS

Model 715-1



Model 715-1 Bi-Directional Encoder
The 715-1 provides two output channels. A constant pulse width is generated on one channel with clockwise shaft rotation, and on the other channel with counter-clockwise shaft rotation. Specify PPR in any even numbered value between 2 and 10,000. Specify any pulse width from 10 microseconds to 100 milliseconds and pulse polarity. Some options require Heavy Duty housing. The Line Driver output option is not available.

Model 715-2

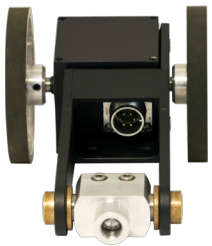


Model 715-2 Bi-Directional Encoder
The 715-2 provides two output channels. One channel has a constant pulse width output regardless of shaft rotation direction. The other channel indicates direction with logic level "1" for clockwise shaft rotation, and level "0" for counter-clockwise shaft rotation. Options are the same as for the Model 715-1.

CUBE PIVOT MOUNTING BRACKETS

176430-01 Single Pivot
176431-01 Double Pivot
176430-02 Spring Loaded Single Pivot
176431-02 Spring Loaded Double Pivot

Encoder sold separately.



Dual Wheel

Single Wheel
(shown with Torsion Spring)

ENCODER PRODUCTS COMPANY

CUBE HOUSINGS

INDUSTRIAL CUBE HOUSING (IND12)

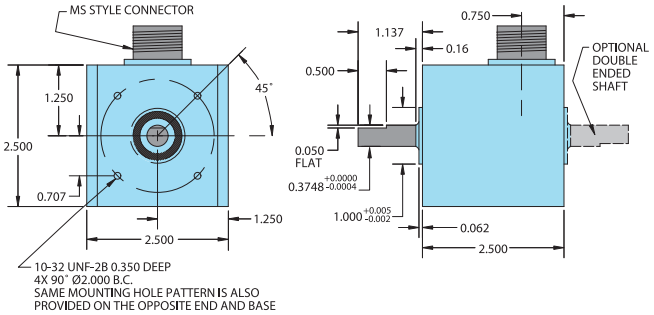
This more robust unit meets requirements between Standard and Heavy Duty housings while retaining the Cube design. The Industrial 12 (IND12) model features an IP66 shaft seal. The tough, sealed aluminum housing has a wall thickness of 0.187" and offers greater protection from wash down, sprays, dust, 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/IP66 Shaft Seal



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

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

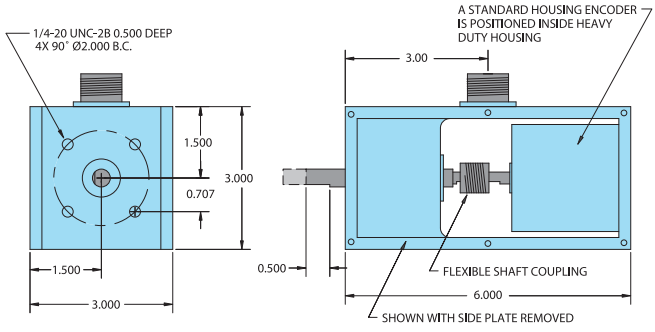
HD 1 Heavy Duty 3" x 6" housing
HD 3 Heavy Duty w/conduit connector (threaded for 0.500" NPT Conduit) and terminal strip
HD 5 Heavy Duty w/10 mm outer bearing
HD 12* Heavy Duty w/IP66 rated outer shaft seal
HD 14* Heavy Duty w/IP66 rated outer shaft seal, conduit connector (threaded for 0.500" NPT Conduit), 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/IP66 seal
Mounting	Tapped holes face and base
Weight	3.25 lb



ULTRA HEAVY DUTY CUBE HOUSING (HD10)

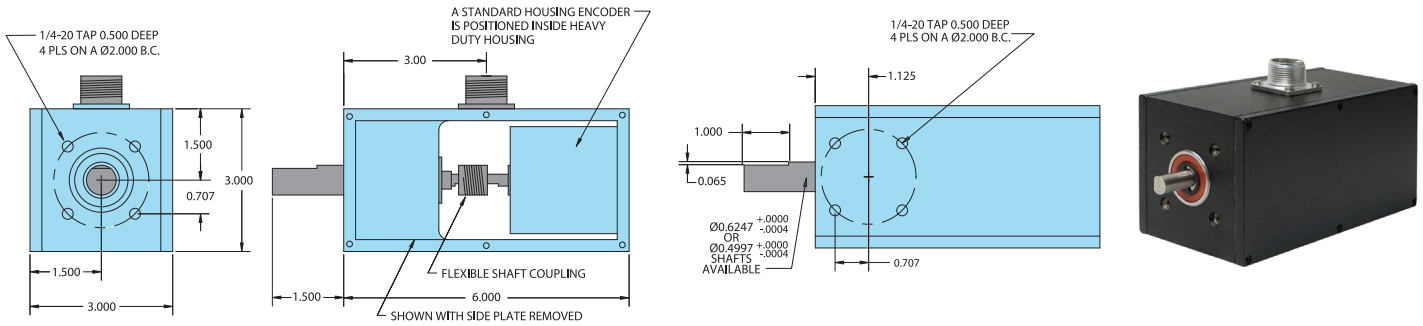
The HD 10 Ultra Heavy Duty encoder is designed for use in applications with severe shaft loading conditions. The HD 10 offers two shaft sizes: 0.500" and 0.625". Shaft material is 303 stainless steel. Bearings are conservatively rated at 95 lb radial and 60 lb axial shaft loading. IP66 shaft seal is 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

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 IP66 rated
Mounting	Tapped holes face and base
Weight	3.85 lb

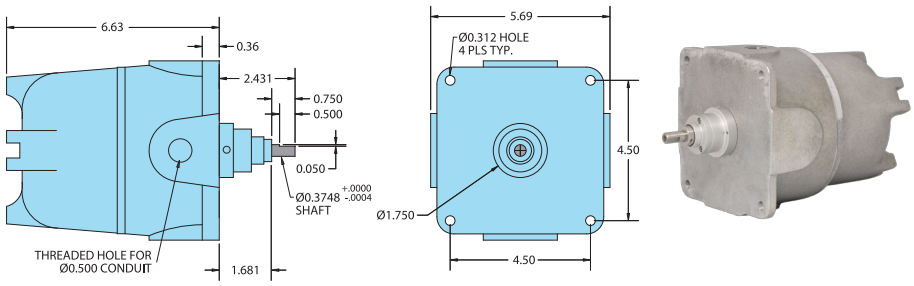
ULTRA HEAVY DUTY CUBE HOUSING (HD10)—CONT'D



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

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

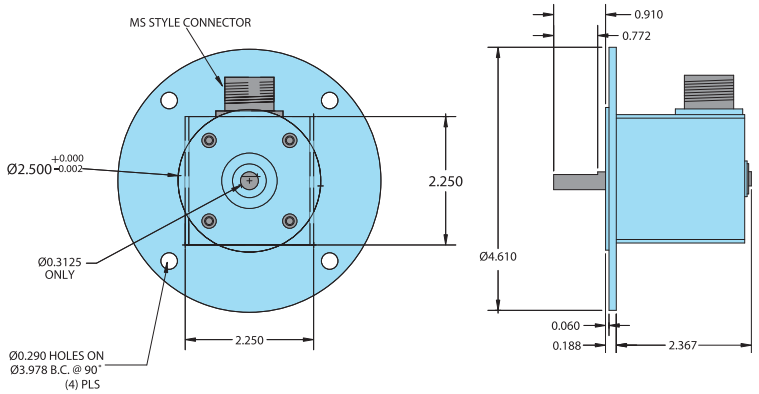
Refer to all cube specifications except as follows:

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.



Order standard housing Cube Series Accu-Coder™ with 5/16" shaft and specify part #175443.

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