

# Model 711 Single Channel Model 716 Quadrature



Incremental Shaft Encoders



## Features

- The Original Industry-Standard Cube
- Wide Choice of PPR's
- Enhanced Technology Using Opto-ASIC Circuitry
- Industrial and Heavy Duty Options Available

The Model 711/716 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.

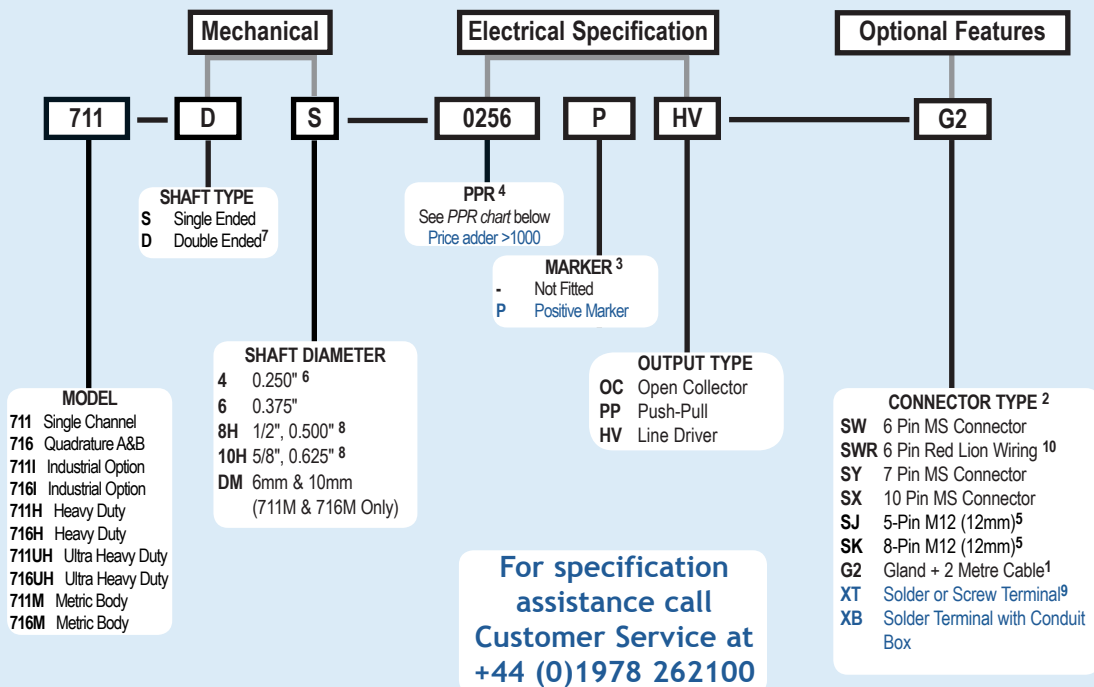
The new Opto-ASIC version increases critical performance specifications for the most popular resolutions. This version features advanced Opto-ASIC circuitry, a single chip design that eliminates many board level components. This increases the reliability of an already dependable and durable encoder. With new options continually being added, the 711/716 just keeps getting better and better.

## Common Applications

Feedback for counters, PLC's & Motors, Cut to Length, Labelling, Measuring for Packaging, Filling & Materials Handling Machines, Wire Winding, Film Extrusion.

## Model 711/716 Ordering Guide

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



## Model 711/716 PPR Options

Standard Cube: All resolutions from 1 to 900 except where Opto-ASIC resolutions are available

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	1500	1800*	2000	2048	2500	3000
3600*	4096	5000	6000	7200*	8192	10000

\*Contact Customer Service for Availability.

Contact Customer Service for other disc resolutions; not all disc resolutions available with all output types See [Note 4](#) for Details

## NOTES:

- 1 For Non-standard cable lengths - call the sales office.
- 2 For mating connectors - see accessories pages.
- 3 Call sales office for marker availability and configuration options.
- 4 For PPR between 0001 and 0189 call sales office for availability.
- 5 Not Available in Heavy Duty and Ultra Heavy Duty Housing.
- 6 Standard 711/716 Only.
- 7 Double ended not available in Heavy Duty and Ultra Heavy Duty Housing.
- 8 Ultra Heavy Duty Housing only.
- 9 Screw Terminals available for Heavy Duty housing Solder Terminals available for Standard Housing
- 10 See Wiring Tables for Red Lion Configuration Options.

# Model 711 Single Channel Model 716 Quadrature



## Model 711/716 Specifications

### Electrical

Input Voltage ..... 4.75 to 24 Vcc max to temperatures up to 70°C  
 Input Current ..... 100 mA max (65 mA typical) with no output load  
 Input Ripple ..... 100 mV peak to peak at 0 to 100 kHz  
 Output Format ..... 711. Square wave with single channel  
 716. Quadrature two square waves, channel A leading B for clockwise shaft rotation, as viewed from the encoder mounting face. See *Waveform Diagrams* below.  
 Output Types ..... Open Collector- 20 mA max per channel  
 Push-Pull- 20 mA max per channel  
 20 mA max per channel  
 Line Driver- 20 mA max per channel  
 (Meets RS 422 at 5 VCC supply)  
 Index ..... Once per revolution.  
 Freq. Response ..... 20 kHz standard  
 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° (±18°) electrical  
 Quad. Phasing ..... 90° (±22.5°) electrical  
 Min. Edge Sep ..... 67.5° electrical  
 Accuracy ..... Within 0.10° mechanical or 6 arc-minutes from true position  
 Electrical Conn ..... Refer to ordering guide notes

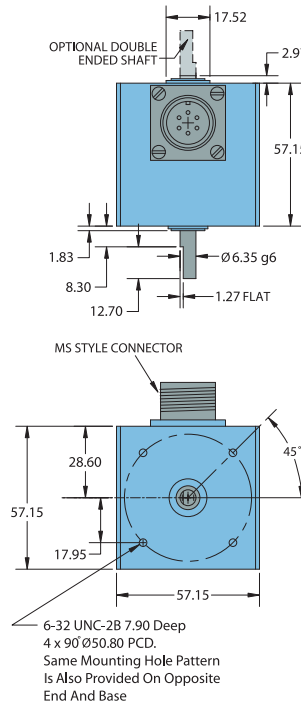
### Mechanical

Shaft Size ..... 0.250" or 0.375"  
 Shaft Type ..... Single or double-ended (specify choice)  
 Shaft Material ..... 303 stainless steel  
 Radial Loading ..... 7 Kg maximum (0.250" diameter shaft)  
 18 Kg maximum (0.375" diameter shaft)  
 Axial Loading ..... 4.5 Kg maximum (0.250" diameter shaft)  
 13.6 Kg maximum (0.375" diameter shaft)  
 Starting Torque ..... 9.18 x 10<sup>-4</sup> Nm typical for 0.250" shaft  
 2.68 x 10<sup>-3</sup> Nm typical for 0.375" shaft  
 Housing ..... Black non-corrosive finished 6063-T6 aluminum  
 Bearings ..... Precision ABEC Ball Bearings  
 Mounting ..... Tapped mounting holes on three sides for base or face mounting  
 Weight ..... 300 grams typical

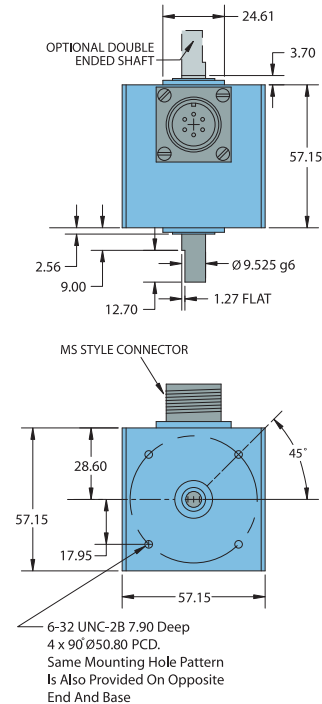
### Environmental

Operating Temp ..... 0° to +70° C standard models  
 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

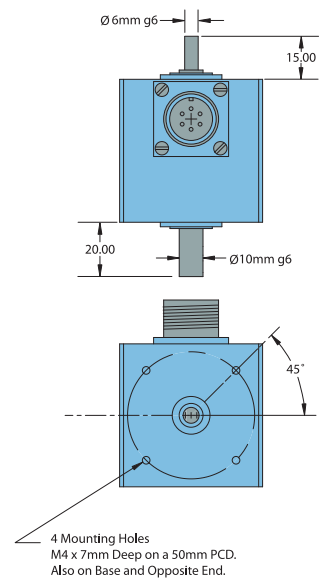
## Model 711/716 Encoder 711/716 Housing With 1/4" Shaft



## 711/716 Housing With 3/8" Shaft

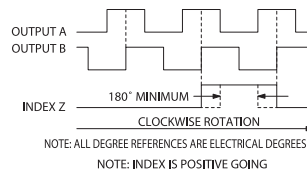


## 711M/716M Metric Housing

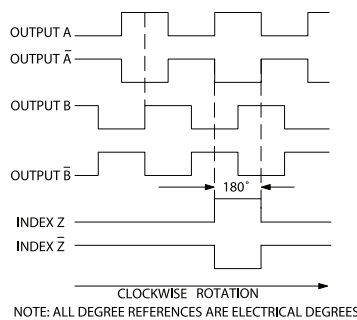


## Waveform Diagrams

### Open Collector and Push Pull



### Line Driver (HV)



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

## Wiring Table

Function	Gland Cable Wire Color	5-pin M12	8-pin M12	10-pin MS	7-pin MS HV	7-pin MS OC PP	6-pin MS HV A+B	6-pin MS OC PP	6-pin MS HV A+Z	Term. Block HV No Marker	Term. Block OC PP
0 Volts	Black	3	7	F	F	F	A	A	A	1	1, 6
+Vcc	Red	1	2	D	D	D	B	B	B	2	2
A	White	4	1	A	A	A	D	D	D	3	4
A'	Brown	—	3	H	C	—	C	—	C	4	—
B	Blue	2	4	B	B	B	E	E	—	5	5
B'	Violet	—	5	I	E	—	F	—	F	6	—
Z	Orange	5	6	C	—	C	—	C	E	—	3
Z'	Yellow	—	8	J	—	—	—	—	F	—	—
Case	Bare	—	—	G	G	G	—	—	—	—	—
Shield	Bare	—	—	—	—	—	—	—	—	—	—

## SWR Red Lion Wiring Options

Function	711R HV OC PP	711RZ HV OC PP	716R HV OC PP	716RZ HV OC PP
0 Volts	B	B	B	B
+Vcc	A	A	A	A
A	C	C	C	C
A'	E*	E*	E*	---
B	---	---	D	D
B'	---	---	F*	---
Z	---	F	---	E
Z'	---	D*	---	---
Case	---	---	---	---
Shield	---	---	---	---

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

# Model 711/716 Cube Housings and Brackets



## Industrial Cube Housing (711I/716I)

### Industrial Housing Features

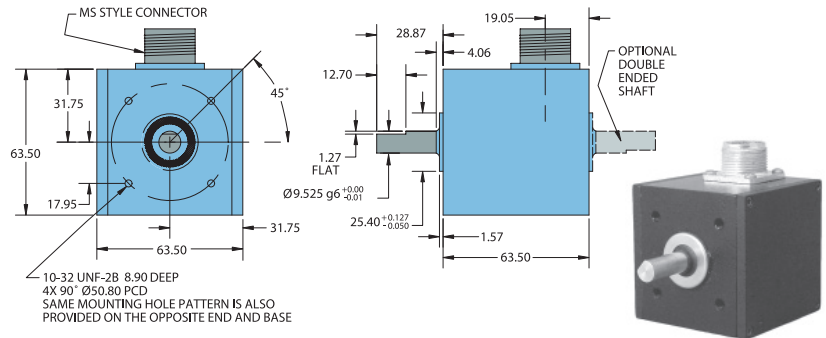
This more robust unit meets requirements between Standard and Heavy Duty housings while retaining the Cube design. The Industrial model features an IP65 shaft seal. The tough, sealed aluminium housing has a wall thickness of 4.75mm and offers greater protection from wash down, sprays, dust, moisture, shock, vibration, and other hazards found in industrial environments.

### Industrial Cube Housing (711I/716I) 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.....10 Kg Maximum  
 Axial Loading.....5 Kg Maximum  
 Starting Torque.....0.0219 Nm Starting Torque w/IP65 Shaft Seal



## Heavy Duty Cube Housing (711H/716H)

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 6.35mm aluminium walls protect the encoder from external shock, vibration, and the outside environment.

### Heavy Duty Housing Measurement

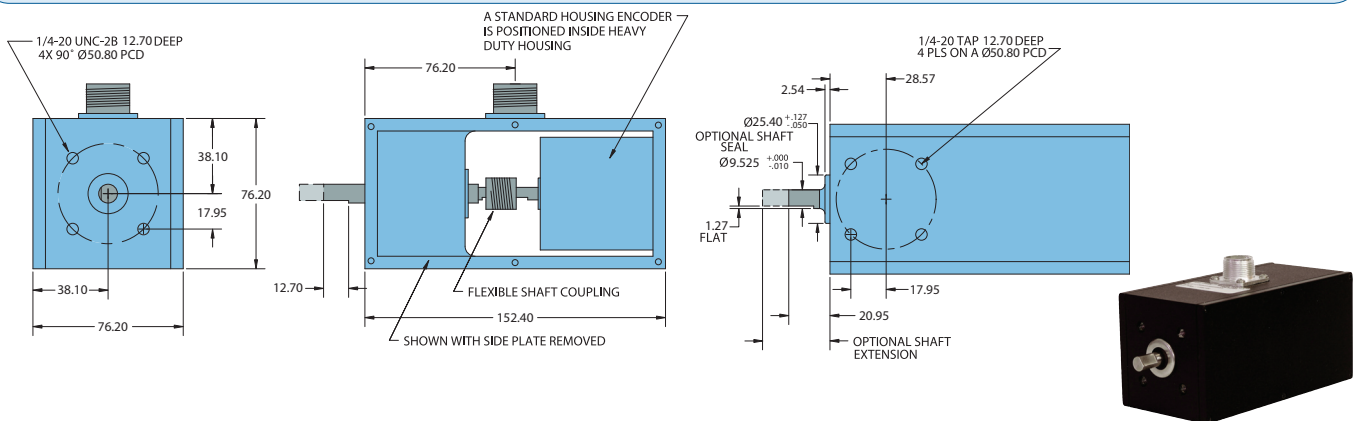
- Heavy Duty 76.20mm X 152.40mm housing

### Heavy Duty Cube Housing (711H/716H) Specifications

Refer to all cube specifications except as follows:

#### Mechanical

Max Speed.....6000 RPM  
 Shaft Size.....0.375"  
 Rotation.....Either direction  
 Radial Loading.....15 Kg maximum  
 Axial Loading.....10 Kg maximum  
 Bearings.....Precision ABEC ball bearings  
 Mounting.....Tapped holes face and base  
 Weight.....2.0 Kg



## Ultra Heavy Duty Cube Housing (711UH/716UH)

The Ultra Heavy Duty Encoder is designed for use in applications with severe shaft loading conditions. The 711UH/716UH offers two shaft sizes: 0.500" and 0.625". Shaft material is 303 stainless steel, Bearings are conservatively rated at 43Kg radial and 27Kg axial shaft loading. IP65 is standard on all units.

The 711UH/716UH 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" aluminium walls protect the encoder from shock, vibration and the outside environment.

### Heavy Duty Cube Housing (711UH/716UH) Specifications

Refer to all cube specifications except as follows:

#### Mechanical

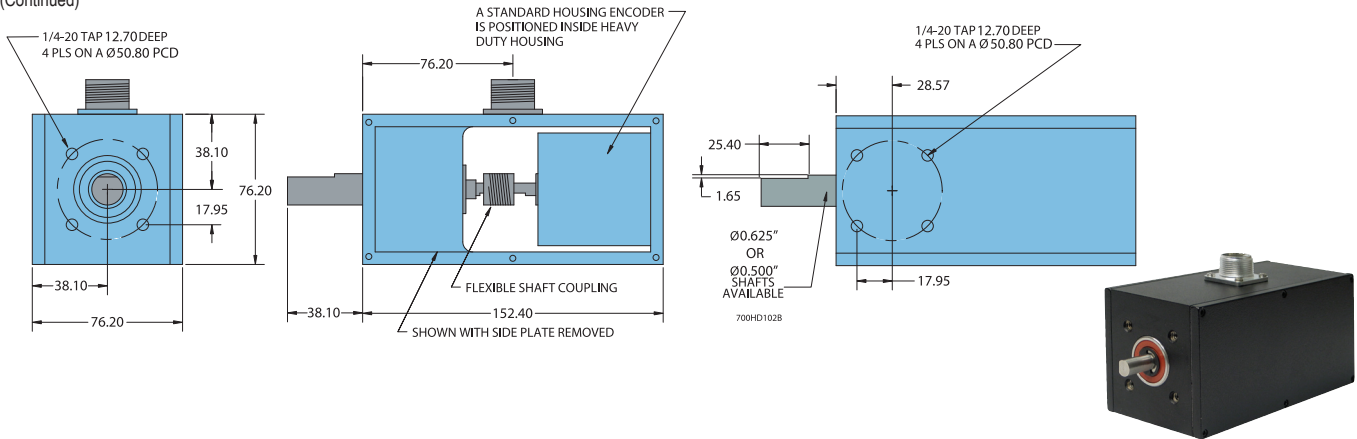
Max Speed.....6000 RPM  
 Shaft Size.....0.500" or 0.625"  
 Rotation.....Either direction  
 Radial Loading.....43 Kg maximum  
 Axial Loading.....27 Kg maximum  
 Bearings.....Precision ABEC ball bearings  
 Starting Torque.....0.0211 Nm IP65 Rated  
 Mounting.....Tapped holes face and base  
 Weight.....1.78 Kg

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## Ultra Heavy Duty Cube Housing (711UH/716UH)

(Continued)



## Pivot Brackets

### 700 Series Pivot Brackets

Gravity Driven Pivot Brackets allow an Encoder and Measuring Wheel to adjust to variations in the material surface being measured.

A spring loaded version is also available

These Brackets replace our original Pivot brackets (140039 & 140040)

These are for Standard Cube and Industrial Cube Housing's Only

### 176430-01

Single Pivot Mounting Bracket

### 176431-01

Double Pivot Mounting Bracket

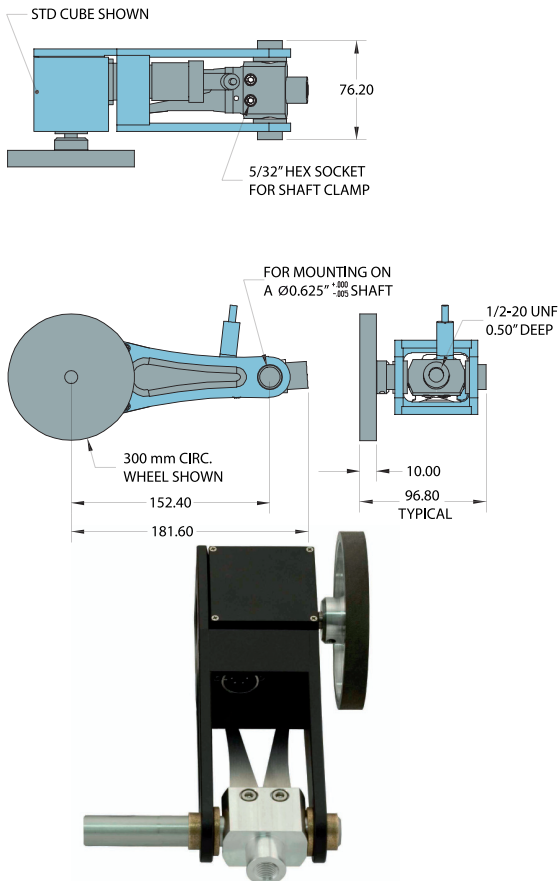
### 176430-02

Spring Loaded Single Pivot Mounting Bracket

### 176431-02

Spring Loaded Double Pivot Mounting Bracket

## Single Wheel Bracket



## Dual Wheel Bracket

