FEATURES

The original industry-standard Cube
Versatile housing styles
Quadrature output
New resolutions to 10,000 CPR

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. Critical performance specifications for the most popular resolutions and advanced Opto-ASIC circuitry – a single chip design that eliminates many board level components – increase the reliability of an already dependable and durable encoder. With new options continually being added, the Model 716 excels in a wide variety of industrial applications.

COMMON APPLICATIONS

Feedback for counters, PLCs & motors, cut-to-length, labeling, measuring for packaging, filling & material 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.

<table>
<thead>
<tr>
<th>MODEL 716 Quadrature Cube</th>
<th>INDEX PULSE Blank</th>
<th>OUTPUT TYPE S Pull-Up resister O Open Collector PP Push-Pull HV Line Driver</th>
</tr>
</thead>
<tbody>
<tr>
<td>CYCLES PER REVOLUTION (CPR) 1-10,000 See CPR Options below for available resolutions. (601 and above is a price adder)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| HOUSING TYPE S 2.25" Standard housing S1 2.25" Standard housing with IP50 felt shaft seal²
IND12 Industrial housing with IP66 shaft seal HD1 3" x 3" x 6" Heavy Duty housing³ HD3 Heavy Duty housing with conduit connector & terminal strip
HDS Heavy Duty housing with 10 mm outer bearing¹ HD10 Heavy Duty housing with ultra heavy duty bearings, 0.625" or 0.500" shaft³ HD12 Heavy Duty housing with IP66 outer shaft seal¹ HD14 Heavy Duty housing with IP66 shaft seal and with conduit connector & terminal strip
SPY Standard Cube with SPY adaptor⁴ EX Explosion-proof housing |
| SHAFT DIAMETER S 1/4", 0.250" S 5/16", 0.3125"⁵
5/8", 0.625" |
| CONNECTOR TYPE¹ S Standard 6-pin MS Y 7-pin MS X 10-pin MS J 5-pin M12 (12 mm)³ K 8-pin M12 (12 mm)³ G Gland nut – 18" cable¹¹ T Solder or screw terminal¹² |
| MATING CONNECTOR N No connector Y Yes |

### MODEL 716 CPR Options

| 0001 thru 0189" | 0193 | 0198 | 0200 | 0205 | 0210 | 0240 | 0250 | 0256 |
| 0298 | 0300 | 0305 | 0315 | 0333 | 0336 | 0350 | 0360 | 0400 | 0480 |
| 0500 | 0512 | 0600 | 0700 | 0720 | 0800 | 0960 | 1000 | 1024 | 1200 |
| 1250 | 1270 | 1500 | 1800" | 2000 | 2048 | 2500 | 3000 | 3600" | 4096 |

5000 | 6000 | 7200" | 8192 | 10,000 |

¹Contact Customer Service for availability.

### NOTES:

1. Complete only if Index Pulse option is selected.
2. Available with 0.250" shaft only.
3. Only available with 6-pin MS or Screw Terminal Connector Types.
4. Only available with 6/16", 0.3125" shaft.
5. Contact Customer Service for custom shaft lengths and diameters.
6. Standard housing only.
7. Standard or SPY housing only.
8. HD10 housing only.
9. Not available for HD or EX housings.
10. For mating connectors, cables, and conduits see Accessories at encoder.com. For Connector Pin Configuration Diagrams, see Technical Information or see Connector Pin Configuration Diagrams at encoder.com.
11. For non-standard cable lengths, add a forward slash (/) plus cable length expressed in feet. Example: G/6 = 6 feet of cable. For CPR > 2500. Standard cable length only.

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MODEL 716 SPECIFICATIONS

Common to all Cube Housing Styles

Electrical

- **Input Voltage**: 4.75 to 28 VDC max for temperatures up to 85°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 – Open Collector with 1.5K ohm internal resistor, 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).
- **Max Frequency**: 1 to 2500 CPR at 125 kHz, 2501 to 5000 CPR at 250 kHz, 5001 to 10,000 CPR at 500 kHz.
- **Electrical Protection**: Reverse voltage and output short circuit protected. NOTE: Sustained reverse voltage may result in permanent damage.
- **Index**: Once per revolution. 1 to 400 CPR: Ungated 401 to 10,000 CPR: Gated to output A See Waveform Diagrams.
- **Quadrature Edge Separation**: 67.5° electrical or better is typical, 54° electrical minimum at temperatures > 99°C.
- **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.

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STANDARD CUBE HOUSING (S, S1) SPECIFICATIONS

Mechanical

- **Shaft Type**: Single or double-ended (specify choice).
- **Radial Loading**: 15 lb maximum (0.250” diameter shaft).
- **Axial Loading**: 10 lb maximum (0.250” diameter shaft).
- **Starting Torque**: 0.13 oz-in typical for 0.250” shaft.
- **Moment of Inertia**: 6.5 x 10⁻⁶ oz-in².
- **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)**

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WAVEFORM DIAGRAM

Line Driver and Push-Pull

Open Collector and Pull-Up

CLOCKWISE ROTATION AS VIEWED FROM THE MOUNTING FACE

NOTE: ALL DEGREE REFERENCES ARE ELECTRICAL DEGREES. Waveform shown with optional complementary signals A, B, Z for HV output only.

WIRING TABLE

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

<table>
<thead>
<tr>
<th>Function</th>
<th>Gland Cable† Wire Color</th>
<th>5-pin M12</th>
<th>8-pin M12</th>
<th>10-pin MS HV</th>
<th>7-pin MS HV</th>
<th>7-pin MS O, S, PP</th>
<th>6-pin MS HV, No index</th>
<th>6-pin MS O, S, PP</th>
<th>Term. Block HV, No index</th>
<th>Term. Block O, S, PP</th>
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</thead>
<tbody>
<tr>
<td>Com</td>
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<td>7</td>
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<td>F</td>
<td>F</td>
<td>A</td>
<td>A,F</td>
<td>1</td>
<td>1,6</td>
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<tr>
<td>+VDC</td>
<td>Red</td>
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<td>2</td>
<td>D</td>
<td>D</td>
<td>D</td>
<td>B</td>
<td>B</td>
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<td>A</td>
<td>A</td>
<td>C</td>
<td>D</td>
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<td>4</td>
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<tr>
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<td>--</td>
<td>3</td>
<td>H</td>
<td>C</td>
<td>--</td>
<td>D</td>
<td>--</td>
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<tr>
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<tr>
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<tr>
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<td>6</td>
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<td>C</td>
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<td>Shield</td>
<td>Bare</td>
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</tbody>
</table>

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

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.