# Model 15T/H - Incremental Encoder

## Features
- **High Performance Economical Encoder**: Low Profile – 1.0" (25.4 mm) Height and 1.5" (38 mm) Diameter
- **Thru-Bore or Hollow Bore (Blind) with sizes up to 0.375" (10 mm)**
- **Simple, Innovative Flex Mounting System** (Global Mounting Standards)
- **Up to 12 Pole Commutation Optional for Brushless Motor Control**

The Model 15T or 15H Accu-Coder™ offers a high performance feedback solution in a low profile package. Unlike modular or kit encoders, the Model 15 utilizes an integral bearing set and an innovative flexible mounting system, which are much more tolerant to axial misalignment or radial shaft runout. The slotted flex mounts provide 20 to 30 degrees of rotational adjustment for commutation or index pulse timing. Installation is quick and easy; for brushless servo motor applications, three 120° electrical phase tracks can provide up to 12 pole commutation feedback. The optional 100° C and 120° C temperature options allow servo motors to operate at higher power outputs and duty cycles. With its stable and reliable operation, the Model 15 is an excellent replacement modular encoder when you need a high-performance solution.

## Common Applications
- Servo Motor Control, Robotics, Specialty Assembly Machines, Digital Plotters, High Power Motors

## Model 15T/H Ordering Guide

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<th>Optional Features</th>
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<td><strong>Ordering Guide</strong></td>
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<td><strong>15T</strong></td>
<td><strong>13H</strong></td>
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<tr>
<td><strong>Thru-Bore</strong></td>
<td><strong>Hollow Bore (Blind)</strong></td>
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<td><strong>13</strong></td>
<td><strong>Ordering Guide</strong></td>
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<tr>
<td><strong>3/16&quot;</strong></td>
<td><strong>0.1875&quot;</strong></td>
<td><strong>Ordering Guide</strong></td>
</tr>
<tr>
<td><strong>1/16&quot;</strong></td>
<td><strong>0.250&quot;</strong></td>
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<tr>
<td><strong>3/32&quot;</strong></td>
<td><strong>0.3125&quot;</strong></td>
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<tr>
<td><strong>5/64&quot;</strong></td>
<td><strong>0.375&quot;</strong></td>
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<td><strong>0.4 mm</strong></td>
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<tr>
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<td><strong>0.8 mm</strong></td>
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</tr>
<tr>
<td><strong>1.0 mm</strong></td>
<td><strong>10 mm</strong></td>
<td><strong>Ordering Guide</strong></td>
</tr>
</tbody>
</table>

**NOTES:**
1. Contact Customer Service for additional options not shown.
2. This mount requires button head screws and a modified Hex wrench. Order appropriate Installation Kit listed in Specifications.
3. Not available in all configurations, and not available with 5V Input Voltage. Contact Customer Service for availability.
4. Contact Customer Service for non-standard index gating or phase relationship options.
5. Reverse Quadrature not available with Line Driver Output type.
6. With Input Voltage above 16VDC, operating temperature is limited to 85°C.
7. For mating connectors, cables, and cordsets see Accessories at encoder.com. For Connector Pin Configuration Diagrams, see Connector Pin Configuration Diagrams at encoder.com.
8. Not available with commutation. 5-pin not available with Line Driver (HV, OD, LO) outputs.
11. Pin Header available with 5V Input Voltage. HV Line Driver and standard quadrature phasing only. Not available with CE Certification. IP50 sealing option only.
12. Only available with 5VDC Input Voltage. Not available with commutation. 5-pin not available with Line Driver (HV, OD, LO) outputs.
MODEL 15T/H SPECIFICATIONS

Electrical
Input Voltage .......... 5 VDC ±10% Fixed Voltage
4.75 to 28 VDC max for temperatures up to 85° C
4.75 to 24 VDC for temperatures between 85° and 100° C
Input Current .......... 140 mA max (65 mA typical for most configurations) 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 Waveform Diagrams.
Output Types .......... Open Collector – 20 mA max per channel
Push-Pull – 20 mA max per channel
Pull-Up – Open Collector with 2.2K ohm internal resistor, 20 mA max per channel
Line Driver – 20 mA max per channel (Meets RS 422 at 5 VDC supply)
Index .................. Once per revolution
1 to 189 CPR: Ungated
190 to 10,000 CPR: Gated to output A
See Waveform Diagrams.
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
Electrical Protection .......... Reverse voltage and output short circuit protected. NOTE: Sustained reverse voltage may result in permanent damage.
Noise Immunity .......... Tested to BS EN61000-6-2;
BS EN50081-2; BS EN61000-4-2;
BS EN61000-4-3; BS EN61000-4-6;
BS EN50081-1
Quadrature ............ 67.5° electrical or better is typical,
Edge Separation S4° electrical minimum at temperatures > 99° C
Waveform Symmetry 180° ±18° electrical (single channel encoder)
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 ............. 3° mechanical
Mechanical
Max Shaft Speed .......... 8000 RPM. Higher speeds may be achievable, contact Customer Service.
Bore Tolerance .......... 0.0000” / 0.0006”
User Shaft Tolerances
Radial Runout .......... 0.008” max
Axial Endplay .......... 0.030” max
Starting Torque ......... IP50 Hollow Bore: 0.2 oz-in
IP50 Thru-Bore: 0.3 oz-in
IP64: 0.6 oz-in
Moment of Inertia ....... 6.7 x 10⁻⁶ oz-in-sec² (4.8 gm-cm²)
Weight .................. 3 oz typical
Environmental
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 15T/H 1.811” (46 MM) TWO HOLE FLEX MOUNT (SA)

MODEL 15T/H 1.811” (46 MM) SLOTTED FLEX MOUNT (SF)

MODEL 15T/H SMALL DIAMETER SLOTTED FLEX MOUNTS

1.142” (29 mm) SB*
1.2796” (32.5 mm) SC*
1.575” (40 mm) SD*

*Order Appropriate No Charge Mounting and Installation Kit for SB, SC, or SD Option. Each kit contains 10 screws for mounting 5 encoders.
176150-01 Installation Kit, 4-40 Buttonhead Screws with 0.062” Shortened Hex Wrench
176149-01 Installation Kit, M2.5 Buttonhead Screws with 1.5 mm Shortened Hex Wrench

Encoder length and diameter are the same as SF and SA mounts detailed above. All dimensions are in inches with a tolerance of ±0.005” or ±0.01” unless otherwise specified. Metric dimensions are given in brackets (mm).
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>Flying Leads</th>
<th>Cable†</th>
<th>Wire Color</th>
<th>5-pin M12**</th>
<th>8-pin M12**</th>
<th>15-pin Header</th>
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</thead>
<tbody>
<tr>
<td>Com</td>
<td>Black</td>
<td>3</td>
<td>7</td>
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<tr>
<td>+VDC</td>
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<tr>
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<td>2</td>
<td>4</td>
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<tr>
<td>B’</td>
<td>Green</td>
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<td>13</td>
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<tr>
<td>W</td>
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<tr>
<td>Shield</td>
<td>Bare*</td>
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*CE Option: Cable shield (bare wire) is connected to internal case.
†Standard cable for non-commutated models is 24 AWG For commutated units, conductors are 28 AWG.
**CE Option: Use cable cordset with shield connected to M12 connector coupling nut.

WAVEFORM DIAGRAMS
Incremental Signals

Commutation Signals

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 AND OD OUTPUTS ONLY.