

# Model 15T Thru-Bore Encoder Model 15H Hollow Blind Bore



Incremental Thru-Bore  
& Motor Mount Encoders



## Features

- Very High Performance Economical Encoder
- Low Profile 25.4 mm Height and 38 mm Diameter
- Thru-Bore sizes up to 10 mm
- Simple, Innovative Flex Mounting System (Global Mounting Standards)
- Up To 12 Pole Commutation Optional (for brushless motor control)

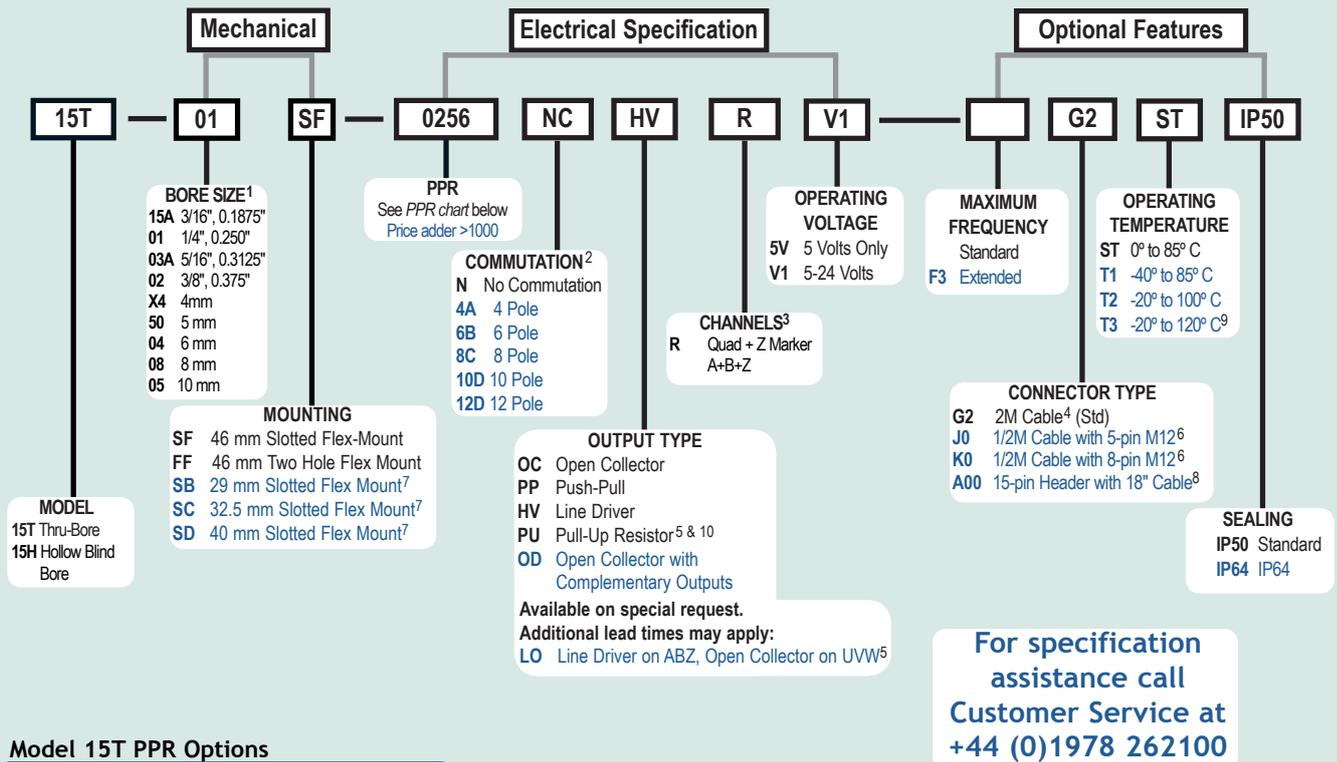
The Model 15T or 15H offer a high performance feedback solution in a low profile package. Unlike modular or kit encoders, the Model 15 utilizes an integral bearing set, and an innovative flexible mounting system which is much more tolerant to axial misalignment or radial shaft run-out. The slotted flex mounts provide 20 or 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 temperature options allow servo motors to operate at higher power outputs and duty cycles. The Model 15 provides stable and reliable operation and is an excellent replacement for other manufacturer's modular encoders where a high performance solution is desired.

## Common Applications

Servo Motor Control, Robotics, Speciality Assembly Machines, Digital Plotters, High Power Motors

## Model 15T/H Ordering Guide

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



### Model 15T PPR Options

0001 thru 0189*	0198	0200	0250
0256	0300	0315	0360
0500	0512	0580	0600
0800	1000	1024	1125
1250	1500	1800	2000
2500	2540	3000	3600
4096	5000	6000	7200
10,000			8192

\* Contact customer service for availability

New PPR 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 (12D Only Available with 80 ppr).
- 3 Contact Customer Service for non-standard marker gating or phase relationship options.
- 4 For non-standard cable lengths contact sales for availability and cost.
- 5 With Input Voltage above 16 Vcc, operating temperature is limited to 85° C.
- 6 Not available with commutation. 5-pin not available with Line Driver (HV, OD, LO) outputs. Additional cable lengths available. Please consult Customer Service.
- 7 This mount requires button head screws and a modified Hex wrench. Order appropriate Installation Kit listed under Specifications.
- 8 Pin Header available with 5 VDC Input Voltage, HV Line Driver and standard quadrature phasing only. Not available with CE Certification. IP50 sealing option only.
- 9 Only available with 5 Vcc Input Voltage.
- 10 Reverse Quadrature not available with PU output type.

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## Model 15T/H Specifications

**Electrical**

Input Voltage ..... 5 Vcc  $\pm 10\%$  Fixed Voltage for Commutation  
4.75 to 24 Vcc max for temperatures up to 85° C  
4.75 to 24 Vcc 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 *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 Pull-Up 20 mA max per channel  
Line Driver- 20 mA max per channel (Meets RS 422 at 5 Vcc supply)

Marker/Index ..... Once per revolution.  
190 to 10,000 PPR: Gated to output A  
1 to 189 PPR: Ungated  
See *Waveform Diagrams*.

Max. Frequency ..... Standard Frequency Response is 200 kHz for PPR 1 to 2540  
500 kHz for PPR 2541 to 5000  
1 MHz for PPR 5001 to 10,000  
Extended Frequency Response (optional) is 300 kHz for PPR 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 PPR > 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.

Bore Size ..... 0.1875" through 0.375", 5 mm through 10 mm

Bore Tolerance ..... H7 (Sliding Fit for g6)

User Shaft Tolerances  
Radial Runout ..... 0.20mm max  
Axial Endplay .....  $\pm 0.75$ mm max

Starting Torque ..... IP50 Hollow Bore:  $1.4123 \times 10^{-3}$  Nm  
IP50 Thru-Bore:  $2.1185 \times 10^{-3}$  Nm  
IP64:  $4.2370 \times 10^{-3}$  Nm

Electrical Conn ..... 2M cable (foil and braid shield, 24 AWG conductors non-commutated, 28 AWG commutated), 5- or 8-pin M12 (12 mm) in-line connector with 0.5M cable (braid shield), 15-pin Header with 18" cable

Mounting ..... 46 mm Slotted Flex mount  
46 mm Two Hole Flex Mount  
29 mm Slotted Flex Mount  
32.5 mm Slotted Flex Mount  
40 mm Slotted Flex Mount  
15-pin Single Row PCB Mount Connector (See mechanical drawings for dimensions)

Weight ..... 100 grams typical

**Environmental**

Operating Temp ..... -20° to +85° C 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

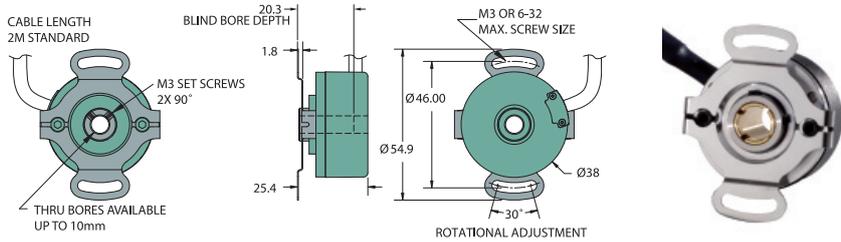
Humidity ..... 98% RH non-condensing

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

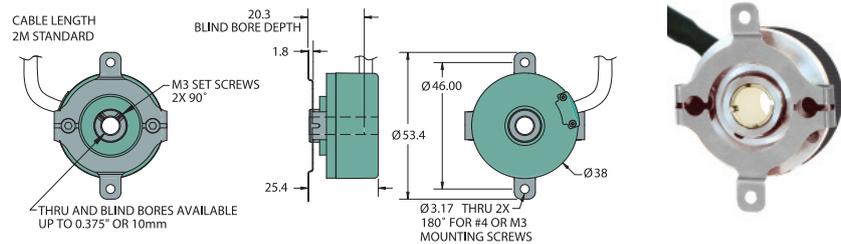
Shock ..... 80 g @ 11 ms duration

Sealing ..... IP50 standard; IP64 available

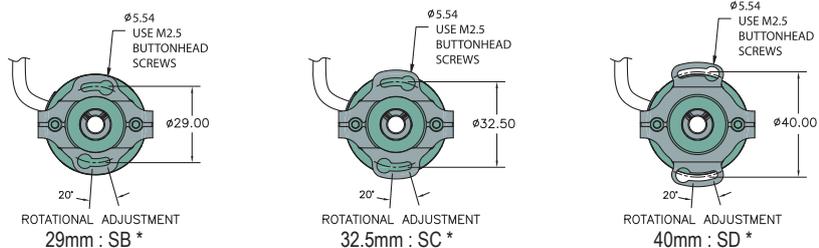
## Model 15T/H 46mm Slotted Flex Mount (SF)



## Model 15T/H 46mm Two Hole Flex Mount (FF)



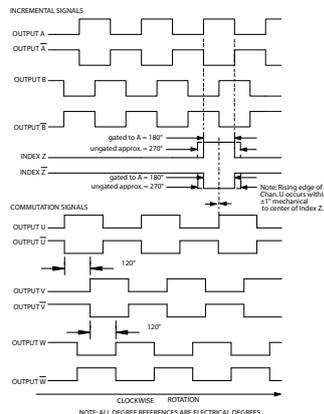
## Model 15T/H Small Diameter Slotted Flex Mounts



\* Order Appropriate Mounting and Installation Kit for SB, SC, or SD Option  
**176149-01** Installation Kit, M 2.5 Buttonhead Screws with 1.5 mm Shortened Hex Wrench  
Each kit contains 10 screws for mounting 5 encoders

Encoder Length and Diameter are the same as SF and FF mounts detailed above. All dimensions are in mm with a tolerance of  $\pm 0.254$  unless otherwise specified.

## Waveform Diagrams

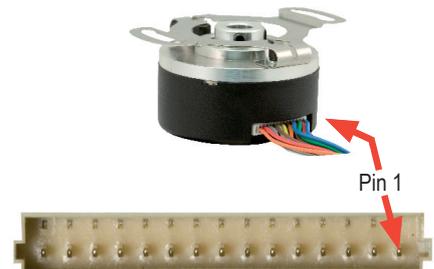


## Wiring Table

Function	Cable Wire Color	5-pin M12 <sup>1</sup>	8-pin M12 <sup>1</sup>	15-pin Header
0 Volts	Black	3	7	1
+ Vcc	White	1	2	2
A	Brown	4	1	4
A'	Yellow	--	3	3
B	Red	2	4	6
B'	Green	--	5	5
Z	Orange	5	6	7
Z'	Blue	--	8	8
U	Violet	--	--	10
U'	Gray	--	--	9
V	Pink	--	--	14
V'	Turquoise	--	--	13
W	Red/Green	--	--	12
W'	Red/Yellow	--	--	11
Shield	Bare	--	--	--

<sup>1</sup>Cable shield (bare wire) is connected to internal case.  
<sup>2</sup>Cable shield and M12 connector body is connected to internal case.

## 15 Pin Header



## In-Line Connector Pin-Outs

