Model 15T Thru-Bore
Model 15H Hollow Bore

EPC ENCODER PRODUCTS COMPANY

ACCU-CODER by Encoder Products Company

Ø1.5"

Features

- Very High Performance Economical Encoder
- Low Profile 1.0" (25.4 mm) Height and 1.5" (38 mm) Diameter
- Thru-Bore (sizes up to 0.375" or 10 mm)
- Simple, Innovative Flex Mounting System (Global Mounting Standards)
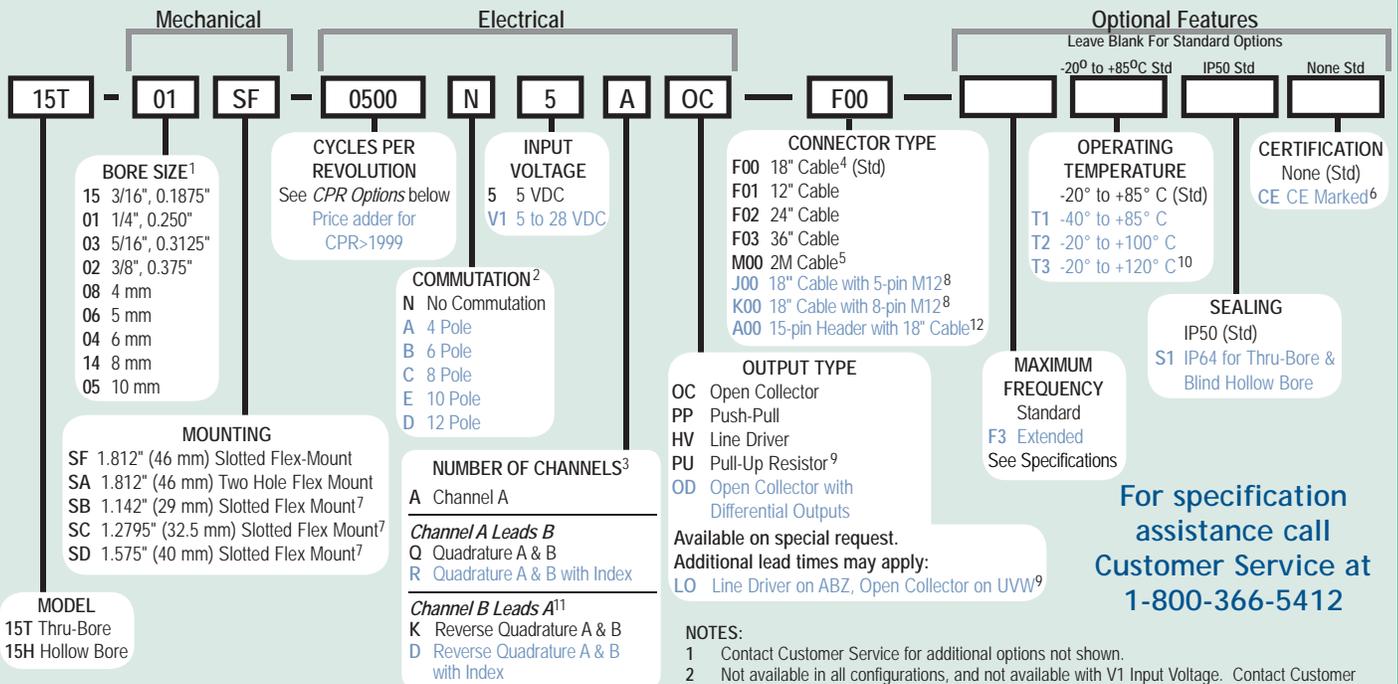- Up To 12 Pole Commutation Optional (for brushless motor control)

The Model 15T or 15H 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 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 and 120° 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 manufacturers modular encoders where a high performance solution is desired.

Common Applications

Servo Motor Control, Robotics, Specialty 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.

Mechanical			Electrical					Optional Features				
									Leave Blank For Standard Options			
										-20° to +85°C Std	IP50 Std	None Std
15T	- 01	SF	- 0500	N	5	A	OC	- F00	-			

BORE SIZE[1]
- 15 3/16", 0.1875"
- 01 1/4", 0.250"
- 03 5/16", 0.3125"
- 02 3/8", 0.375"
- 08 4 mm
- 06 5 mm
- 04 6 mm
- 14 8 mm
- 05 10 mm

MOUNTING
- SF 1.812" (46 mm) Slotted Flex-Mount
- SA 1.812" (46 mm) Two Hole Flex Mount
- SB 1.142" (29 mm) Slotted Flex Mount[7]
- SC 1.2795" (32.5 mm) Slotted Flex Mount[7]
- SD 1.575" (40 mm) Slotted Flex Mount[7]

MODEL
- 15T Thru-Bore
- 15H Hollow Bore

CYCLES PER REVOLUTION
See *CPR Options* below
Price adder for CPR>1999

INPUT VOLTAGE
- 5 5 VDC
- V1 5 to 28 VDC

COMMUTATION[2]
- N No Commutation
- A 4 Pole
- B 6 Pole
- C 8 Pole
- E 10 Pole
- D 12 Pole

NUMBER OF CHANNELS[3]
- A Channel A

Channel A Leads B
- Q Quadrature A & B
- R Quadrature A & B with Index

Channel B Leads A[11]
- K Reverse Quadrature A & B
- D Reverse Quadrature A & B with Index

CONNECTOR TYPE
- F00 18" Cable[4] (Std)
- F01 12" Cable
- F02 24" Cable
- F03 36" Cable
- M00 2M Cable[5]
- J00 18" Cable with 5-pin M12[8]
- K00 18" Cable with 8-pin M12[8]
- A00 15-pin Header with 18" Cable[12]

OUTPUT TYPE
- OC Open Collector
- PP Push-Pull
- HV Line Driver
- PU Pull-Up Resistor[9]
- OD Open Collector with Differential Outputs

Available on special request.
Additional lead times may apply:
- LO Line Driver on ABZ, Open Collector on UVW[9]

OPERATING TEMPERATURE
- Standard -20° to +85° C (Std)
- T1 -40° to +85° C
- T2 -20° to +100° C
- T3 -20° to +120° C[10]

MAXIMUM FREQUENCY
- Standard
- F3 Extended
See Specifications

CERTIFICATION
- None (Std)
- CE CE Marked[6]

SEALING
- IP50 (Std)
- S1 IP64 for Thru-Bore & Blind Hollow Bore

For specification assistance call Customer Service at 1-800-366-5412

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.
3. Contact Customer Service for non-standard index gating or phase relationship options.
4. For non-standard English cable lengths enter 'F' plus cable length expressed in feet. Example: F06 = 6 feet of cable. Frequency above 300 kHz standard cable lengths only.
5. For non-standard metric cable lengths enter 'M' plus cable length expressed in meters. Example: M06 = 6 meters of cable.
6. Please refer to **Technical Bulletin TB100:** *When to Choose the CE Option* at www.encoder.com.
7. This mount requires button head screws and a modified Hex wrench. Order appropriate Installation Kit listed under Specifications.
8. Not available with commutation. 5-pin not available with Line Driver (HV, OD, LO) outputs. Additional cable lengths available. Please consult Customer Service.
9. With Input Voltage above 16 VDC, operating temperature is limited to 85° C.
10. Only available with 5 VDC Input Voltage.
11. Reverse Quadrature not available with PU output type.
12. 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.

Model 15T/H CPR Options

0001 thru 0189*	0198	0200	0250
0256	0300	0315	0360	0400
0500	0512	0580	0600	0750
0800	1000	1024	1125	1200
1250	1500	1800	2000	2048
2500	2540	3000	3600	4000
4096	5000	6000	7200	8192
10,000			

New CPR 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.

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ENCODER
PRODUCTS COMPANY

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° 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 VDC supply)

Index ....Once per revolution.
190 to 10,000 CPR: Gated to output A
1 to 189 CPR: Ungated
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

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

Quadrature ....67.5° electrical or better is typical, 54°
Edge Separation   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.
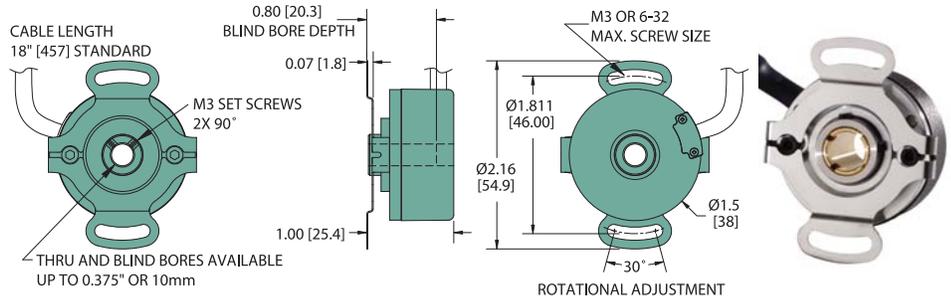Comm. Accuracy.......1° mechanical

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 ....-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......6.7×10^{-5} oz-in-sec^2 (4.8 gm-cm^2)
Max Acceleration.......1×10^5 rad/sec^2
Electrical Conn ....18" cable (foil and braid shield, 24 AWG conductors non-commutated, 28 AWG commutated), 5- or 8-pin M12 (12 mm) in-line connector with 18" cable (braid shield), 15-pin Header with 18" cable
Mounting...................1.812" (46 mm) Slotted Flex mount
1.812" (46 mm) Two Hole Flex Mount
1.142" (29 mm) Slotted Flex Mount
1.2795" (32.5 mm) Slotted Flex Mount
1.575" (40 mm) Slotted Flex Mount
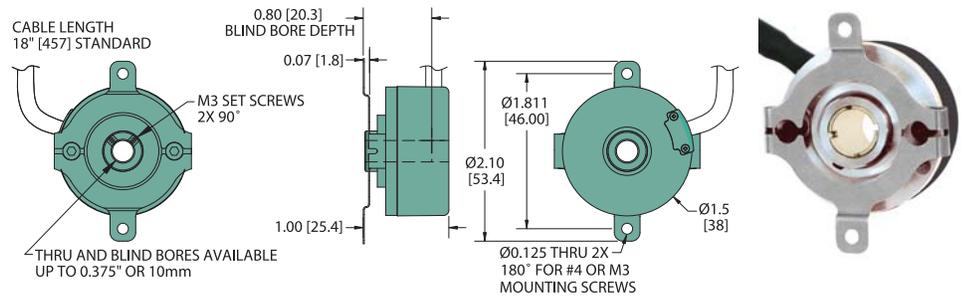15-pin Single Row PCB Mount Connector (See mechanical drawings for dimensions)
Weight ....3 oz typical

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 1.811" (46 mm) Slotted Flex Mount (SF)

CABLE LENGTH 18" [457] STANDARD

0.80 [20.3] BLIND BORE DEPTH

0.07 [1.8]

M3 OR 6-32 MAX. SCREW SIZE

M3 SET SCREWS 2X 90°

Ø1.811 [46.00]

Ø2.16 [54.9]

Ø1.5 [38]

1.00 [25.4]

THRU AND BLIND BORES AVAILABLE UP TO 0.375" OR 10mm

30°

ROTATIONAL ADJUSTMENT

Model 15T/H 1.811" (46 mm) Two Hole Flex Mount (SA)

CABLE LENGTH 18" [457] STANDARD

0.80 [20.3] BLIND BORE DEPTH

0.07 [1.8]

M3 SET SCREWS 2X 90°

Ø1.811 [46.00]

Ø2.10 [53.4]

Ø1.5 [38]

1.00 [25.4]

THRU AND BLIND BORES AVAILABLE UP TO 0.375" OR 10mm

Ø0.125 THRU 2X 180° FOR #4 OR M3 MOUNTING SCREWS

Model 15T/H Small Diameter Slotted Flex Mounts

1.142" (29 mm): SB*

Ø0.218 [Ø5.54] USE 4-40 or M2.5 BUTTONHEAD SCREWS

Ø1.142 [29.00]

20°

ROTATIONAL ADJUSTMENT

1.2795" (32.5 mm): SC*

Ø0.218 [Ø5.54] USE 4-40 OR M2.5 BUTTONHEAD SCREWS

Ø1.280 [32.50]

20°

ROTATIONAL ADJUSTMENT

1.575" (40 mm): SD*

Ø0.218 [Ø5.54] USE 4-40 OR M2.5 BUTTONHEAD SCREWS

Ø1.575 [40.00]

20°

ROTATIONAL ADJUSTMENT
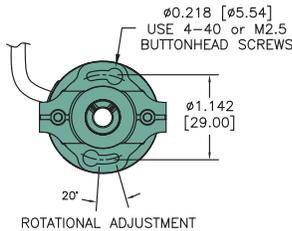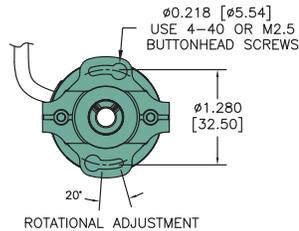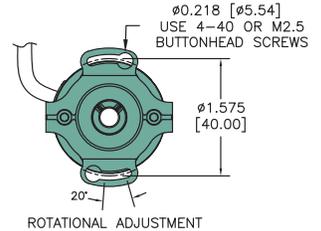
* Order Appropriate No Charge Mounting and Installation Kit for SB, SC, or SD Option

176150-01   Installation Kit, 4-40 Buttonhead Screws with 0.062" Shortened Hex Wrench
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
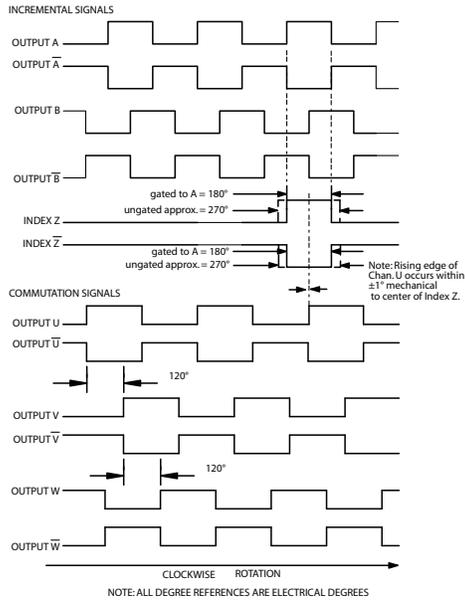
"SB" Slotted Flex Mount

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].

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Waveform Diagrams

INCREMENTAL SIGNALS

OUTPUT A

OUTPUT Ā

OUTPUT B

OUTPUT B̄

gated to A = 180°
ungated approx. = 270°

INDEX Z

INDEX Z̄

gated to A = 180°
ungated approx. = 270°

Note: Rising edge of
Chan. U occurs within
±1° mechanical
to center of Index Z.

COMMUTATION SIGNALS

OUTPUT U

OUTPUT Ū

120°

OUTPUT V

OUTPUT V̄

120°

OUTPUT W

OUTPUT W̄

CLOCKWISE   ROTATION

NOTE: ALL DEGREE REFERENCES ARE ELECTRICAL DEGREES

Wiring Table

Function	Cable Wire Color	5-pin M12[2]	8-pin M12[2]	15-pin Header	
Com	Black	3	7	1	[1]CE Option: Cable shield (bare wire) is connected to internal case.
+VDC	White	1	2	2	
A	Brown	4	1	4	
A'	Yellow	--	3	3	
B	Red	2	4	6	[2]Non-CE Option: Cable shield is connected to M12 connector body. CE Option: Cable shield and M12 connector body is connected to internal case.
B'	Green	--	5	5	
Z	Orange	5	6	7	
Z'	Blue	--	8	8	
U	Violet	--	--	10	
U'	Gray	--	--	9	
V	Pink	--	--	14	
V'	Tan	--	--	13	
W	Red/Green	--	--	12	
W'	Red/Yellow	--	--	11	
Shield	Bare[1]	--	--	--	

In-Line Connector Pin-Outs

5-pin
M12

8-pin
M12

15-pin Header

Pin 1