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15T / 15H Encoder

Hollow Bore Performance Encoder

Flex Mount Options

Slotted Flex Mount (SF)

Two Hole Flex Mount (SA)

Small Diameter Slotted Flex (SB, SC, SD)

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.

Key Features

- 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)

Applications

- Servo motor control
- Robotics
- Specialist assembly machines
- Digital plotters
- High power motors

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Ordering Information

Blue type indicates price adder options. Not all configuration combinations may be available.

Mechanical			Electrical					Optional Features			
								Leave Blank For Standard Options	-20º to +85ºC Std	IP50 Std	None Std
15T	01	SF	0500	N	12	A	OC	F00			

MODEL
15T Thru-Bore
15H Hollow Bore

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

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

CYCLES PER REVOLUTION
See *CPR Options* below

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

INPUT VOLTAGE
5 5 VDC
12 12 VDC
V1 5 to 28 VDC

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
K Reverse Quadrature A & B
D Reverse Quadrature A & B with Index

OUTPUT TYPE
OC Open Collector[9]
PP Push-Pull
HV Line Driver
PU Pull-Up Resistor[9]
OD Open Collector with Differential Outputs[9]
Available on special request. Additional lead time may apply:
LO Line Driver on ABZ, Open Collector on UVW[9]

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]

MAXIMUM FREQUENCY
Standard
F3 Extended
See Specifications

OPERATING TEMPERATURE
-20º to +85ºC (Std)
T1 -40º to +85ºC
T2 -20º to +100ºC
T3 -20º to +120ºC[10]

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

CERTIFICATION
None (Std)
CE CE Marked[6]

Model 15T/H CPR Options:

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

*Contact Customer Service For Availability
+Not available in 12V option

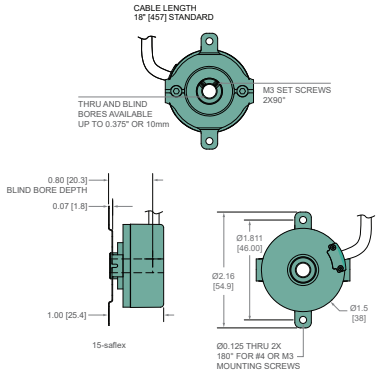
New CPR values are periodically added to those listed. Contact Customer Service to determine all currently available values. Special disk resolutions are available upon request and may be subject to a one-time NRE fee.

NOTES:

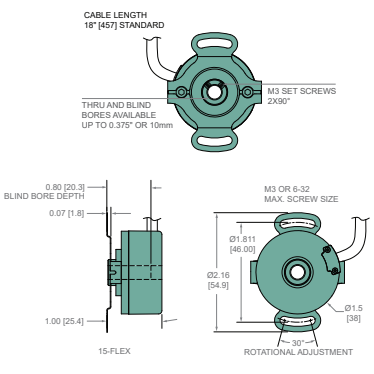
[1] Contact Customer Service for additional options not shown.
[2] Not available in all configurations, and not available with V1 Input Voltage. Contact Customer Service for availability.
[3] Contact Customer Service for non-standard index gating or phase relationship options.
[4] For non-standard English 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
[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 85o C.
[10] Only available with 5 VDC Input Voltage.

Dimensions

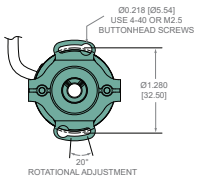
Model 15T/H 1.811" (46 mm) Two Hole Flex Mount (SA)



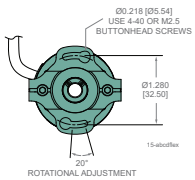
Model 15T/H 1.811" (46 mm) Slotted Flex Mount (SF)



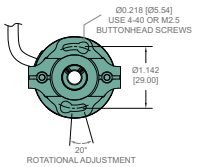
1.142" (29mm): SB*



1.2795" (32.5mm): SC*



1.575" (4mm): SD*



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].

*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

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Specifications

Electrical

Input Voltage	5 VDC ±10% Fixed Voltage 12 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 quadra-ture with channel A leading B for clockwise shaft rotation, as viewed from the encoder mount-ing 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 22K 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
Symmetry	180° (±18°) electrical
Quad. Phasing	90° (±22.5°) electrical
Min. Edge Sep	67.5° electrical
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

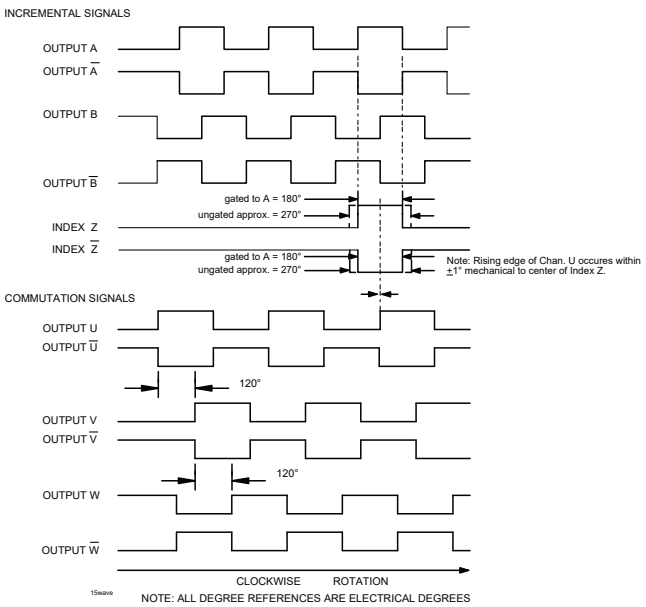
Mechanical

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: 02 oz-in IP50 Thru-Bore: 0.3 oz-in IP64: 0.6 oz-in
Moment of Inertia	6.7 x 10-5 oz-in-sect (4.8 gm-cm 2)
Max Acceleration	1 x 105 rad/sec2
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)
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 (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	10g@58 to 500 Hz
Shock	80 g @ 11 ms duration
Sealing	IP50 standard; IP64 available

Waveform Diagrams



NOTE: ALL DEGREE REFERENCES ARE ELECTRICAL DEGREES

Wiring Table

Function	Cable Wire Color	5-pin M12**	8-pin M12**
COM	Black	3	7
+VDC	White	1	2
A	Brown	4	1
A’	Yellow	--	3
B	Red	2	4
B’	Green	--	5
Z	Orange	5	6
Z’	Blue	--	8
U	Violet	--	--
U’	Gray	--	--
V	Pink	--	--
V’	Tan	--	--
W	Red/Green	--	--
W’	Red/Yellow	--	--
Shield	Bare*	--	--

*CE Option: Cable shield (bare wire) is connected to internal case

**Non-CE Option: Cable shield is connected to M12 connector body.

CE Option: Cable shield and M12 connector body is connected to internal case.