

MODEL 15S - INCREMENTAL SHAFT ENCODER



Ø1.5"

FEATURES

High performance economical encoder
Low profile – less than 1.0" (25.4 mm) height and 1.5" (38 mm) diameter
Extended temperature operating ranges available
Up to 12 pole commutation optional (for brushless motor control)

The Model 15S Accu-Coder™ offers a high performance feedback solution in a low profile package, making the Model 15S ideal for commercial and light-duty industrial applications. This industry standard Size 15 (1.5" diameter) encoder features a precision bearing set, sealing available to IP64, a durable stainless steel shaft, and a selection of servo, flange, and face mount options. The Model 15S may also be specified with features such as extended operating temperatures from -40° C to 120° C, and up to 12 pole commutation for brushless motor control. The Model 15S features EPC's Opto-ASIC circuitry for a clean, reliable signal. Its durable yet economical design makes it an ideal encoder for high precision OEM applications.

COMMON APPLICATIONS

Servo Motor Control, Robotics, Medical Diagnostic Equipment, Specialty Assembly Machines, Digital Plotters, Printers, Typesetting Equipment

MODEL 15S 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			
15S	19	M1	0500	N	5	A	OC	F00	-20° to 85° C Std	IP50 Std	None Std
MODEL 15S Shaft mount		CYCLES PER REVOLUTION See CPR Options below Price adder for >1800		INPUT VOLTAGE 5 5 VDC V1 5 to 28 VDC				CONNECTOR TYPE⁶ F00 18" Cable ⁷ (Std) F01 12" Cable F02 24" Cable F03 36" Cable M00 2M Cable ⁷ J00 18" Cable with 5-pin M12 ⁸ K00 18" Cable with 8-pin M12 ⁸ A00 15-pin Header with 18" Cable ⁹	OPERATING TEMPERATURE -20° to 85° C (Std) T1 -40° to 85° C T2 -20° to 100° C T3 -20° to 120° C ¹⁰ T7 -40° to 120° C ¹⁰	CERTIFICATION None (Std) CE CE Marked ¹¹	
SHAFT SIZE¹ 21 3/16", 0.1875" 23 4 mm 19 1/4", 0.250" 20 6 mm				COMMUTATION² N No commutation A 4 Pole B 6 Pole C 8 Pole E 10 Pole D 12 Pole						MAXIMUM FREQUENCY Standard F3 Extended See Specifications	SEALING IP50 (Std) S1 IP64
MOUNTING M1 3 hole 28 mm BC Servo Mount M2 3 hole 1.210" BC Servo Mount M3 2.093" Square Flange M4 2.096" Servo Mount M5 4 hole 1.100" Servo Mount M6 4 hole 1.000" Servo Mount M7 4 hole 1.181" Servo Mount M8 3 hole 1.181/1.260" Servo Mount M9 3 hole 1.210" BC Servo Mount				NUMBER OF CHANNELS³ A Channel A Channel A Leads B Q Quadrature A & B R Quadrature A & B with Index Channel B Leads A ⁴ K Reverse Quadrature A & B D Reverse Quadrature A & B with Index		OUTPUT TYPE OC Open Collector PP Push-Pull HV Line Driver PU Pull-Up Resistor ⁵ OD Open Collector with Differential Outputs Available on special request. Additional lead times may apply: LO Line Driver on ABZ Open Collector on UVW ⁵					
Model 15S CPR Options											
0001 thru 0189 0198 0200 0250 0256											
0300 0315 0360 0400 0500 0512											
0580 0600 0750 0800 1000 1024											
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.											

NOTES:

- Contact Customer Service for additional options not shown.
- Not available in all configurations, and not available with V1 Input Voltage. Contact Customer Service for availability.
- Contact Customer Service for non-standard index gating or phase relationship options, or see Quadrature Phasing and Index Gating Options at encoder.com.
- Reverse Quadrature not available with PU output type.
- With Input Voltage above 16 VDC, operating temperature is limited to 85° C.
- For mating connectors, cables, and cordsets see Accessories at encoder.com. For Connector Pin Configuration Diagrams, see Connector Pin Configuration Diagrams at encoder.com.
- For non-standard English cable lengths enter 'F' plus cable length expressed in feet. Example: F06 = 6 feet of cable. For non-standard metric cable lengths enter 'M' plus cable length expressed in meters. Example: M06 = 6 meters of cable. Frequency above 300 kHz standard cable lengths only.
- Not available with commutation. 5-pin not available with Line Driver (HV, OD, LO) outputs. Additional cable lengths available. Please contact Customer Service.
- 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.
- Only available with 5 VDC Input Voltage.
- Please refer to Technical Bulletin TB100: When to Choose the CE Mark at encoder.com.

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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MODEL 15S 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.....	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 400 CPR: Ungated 401 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 EN500811
Quadrature.....	.67.5° electrical or better is typical,
Edge Separation.....	.54° 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

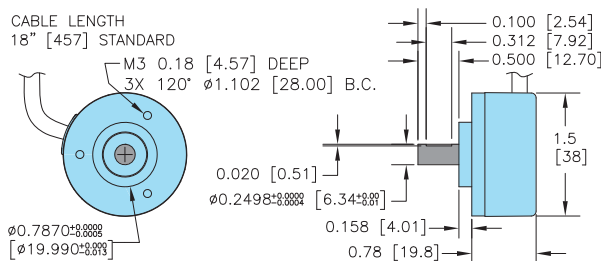
Mechanical

Max Shaft Speed.....	8000 RPM. Higher speeds may be achievable, contact Customer Service.
Shaft Material.....	Stainless Steel
Radial Shaft Load.....	.5 lb max. Rated load of 2 to 3 lb for bearing life of 1.2 x 10 ¹⁰ revolutions
Axial Shaft Load.....	.5 lb max. Rated load of 2 to 3 lb for bearing life of 1.2 x 10 ¹⁰ revolutions
Starting Torque.....	IP50- 0.05 oz-in IP64- 0.4 oz-in
Moment of Inertia.....	.67 x 10 ⁻⁵ oz-in-sec ² (4.8 gm-cm ²)
Weight.....	.3 oz typical

Environmental

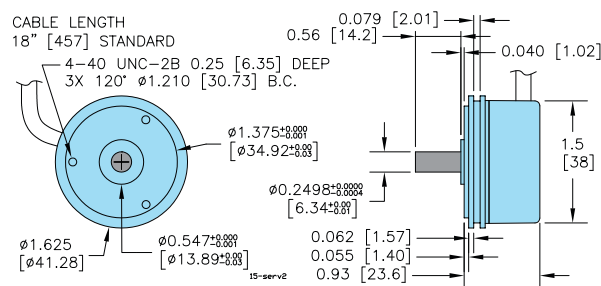
Storage Temp.....	-25° to 85° C
Humidity.....	.98% RH non-condensing
Vibration.....	10 g @ 58 to 500 Hz
Shock.....	.80 g @ 11 ms duration
Sealing.....	IP50 standard; IP64 available

MODEL 15S STANDARD SERVO MOUNT M1

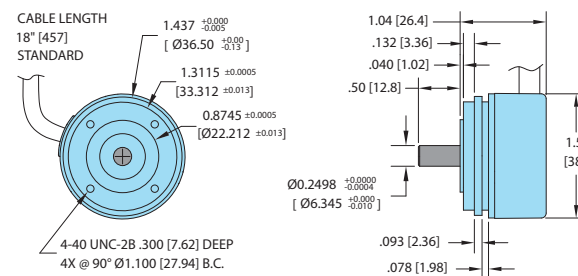


MODEL 15S SERVO MOUNT M2 & M9*

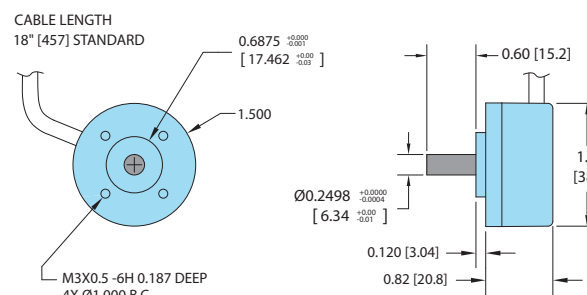
*M9 mount includes a 0.750" boss



MODEL 15S SERVO MOUNT M5



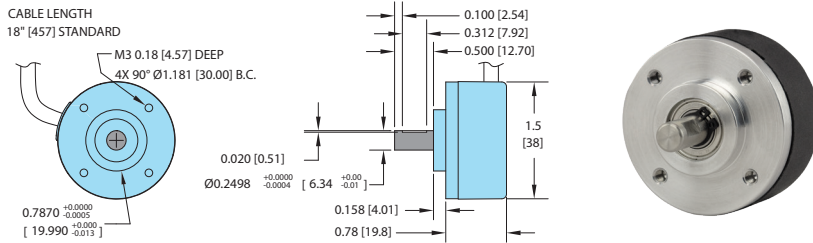
MODEL 15S SERVO MOUNT M6



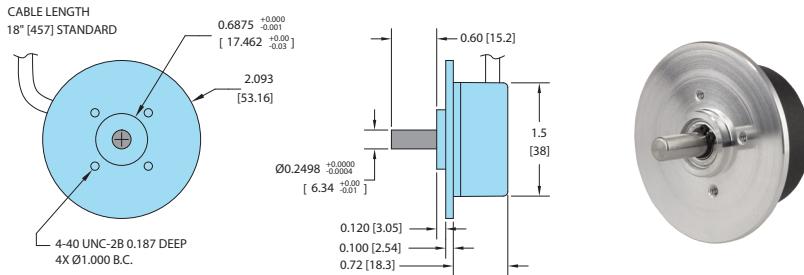
All dimensions are in inches with a tolerance of ±0.005" or ±0.01" unless otherwise specified. Metric dimensions are given in brackets [mm].

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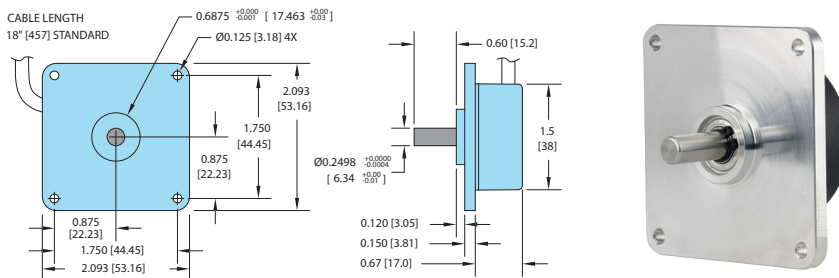
MODEL 15S STANDARD SERVO MOUNT M7



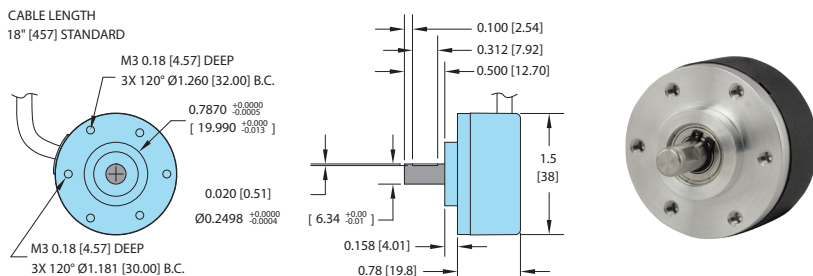
MODEL 15S SERVO MOUNT M4



MODEL 15S SERVO MOUNT M3



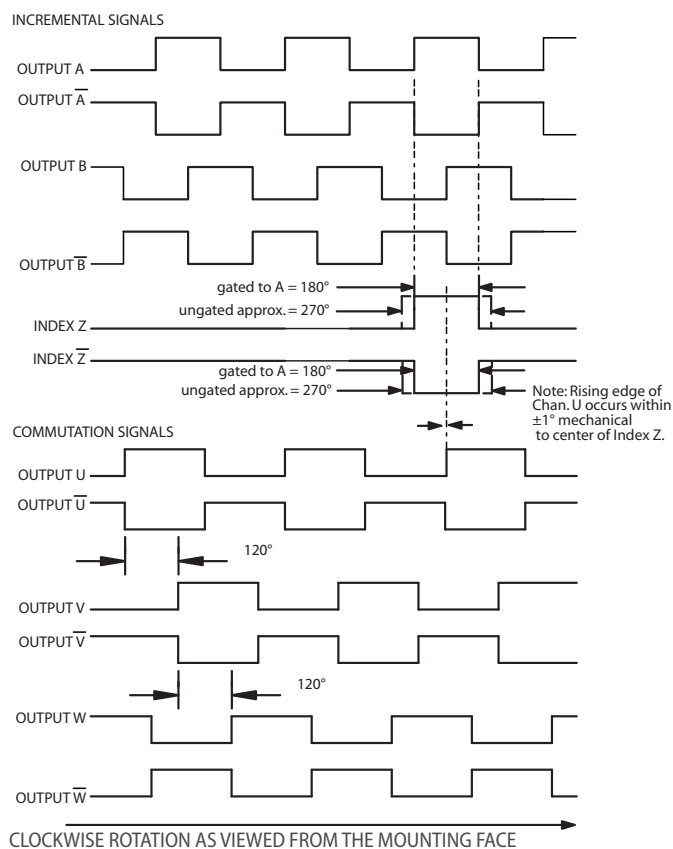
MODEL 15S SERVO MOUNT M8



All dimensions are in inches with a tolerance of ± 0.005 " or ± 0.01 " unless otherwise specified. Metric dimensions are given in brackets [mm].

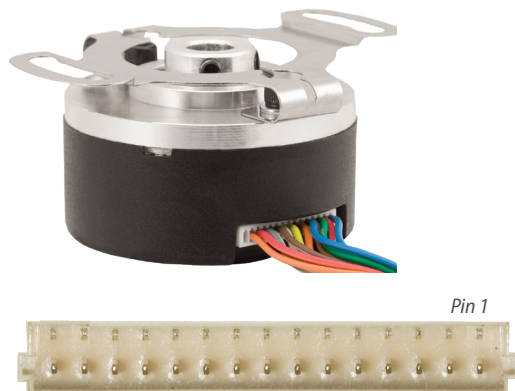
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WAVEFORM DIAGRAMS



NOTE: ALL DEGREE REFERENCES ARE ELECTRICAL DEGREES. Waveform shown with optional complementary signals $\bar{A}$, $\bar{B}$, $\bar{Z}$ for HV and OD outputs only.

15-pin header



WIRING TABLE

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

Function	Flying Leads Cable† Wire Color	5-pin M12**	8-pin M12**	15-pin Header
Com	Black	3	7	1
+VDC	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'	Tan	--	--	13
W	Red/Green	--	--	12
W'	Red/Yellow	--	--	11
Shield	Bare*	--	--	--

*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.