



## E25 | INCREMENTAL OPTICAL ENCODER



### Introduction

The E25 has been designed as a light duty encoder for applications such as robotics, precision computer peripherals and OEM motors and controls. It is designed with an integrated mounting ring and shaft coupling. The integrated mounting ring and shaft coupling allow for simplified installation and a low overall profile when the unit is mounted on a motor. These self-contained mounting and coupling features can result in reduced interface cost.



### SPECIFICATIONS

#### Electrical

<b>Code</b>	Incremental
<b>Output Format</b>	2 channels in quadrature, 1/2 cycle index gated with negative B channel
<b>Cycles Per Shaft Turn</b>	1 to 28,800 For resolutions above 3,600 consult factory for interpolation options
<b>Supply Voltage</b>	5 to 28 VDC available
<b>Current Requirements</b>	100 mA typical +output load, 250 mA (max)
<b>Voltage/Output</b>	(see note 5) 28V/V: Line Driver, 5–28 VDC in, Vout = Vin 28V/5: Line Driver, 5–28 VDC in, Vout = 5 VDC 28V/OC: Open Collector, 5–28 VDC in, OCout
<b>Protection Level</b>	Reverse, overvoltage and output short circuit (see note 5)
<b>Frequency Response</b>	100 kHz, up to 800 KHz with interpolation option (see note 7)
<b>Output Terminations</b>	(See Table 1 at the end of the datasheet)
<b>Note</b>	Consult factory for other electrical options



## SPECIFICATIONS (CONTINUED)

### Mechanical

<b>Coupling Bore</b>	1/4" and 3/8" nominal, standard
<b>Starting Torque at 25°C</b>	0.07 in-oz typical shielded; 2.0 in-oz typical SB
<b>Bearings</b>	Class ABEC 5
<b>Coupling Material</b>	Aluminum with protective finish
<b>Bearing Housing</b>	Die cast aluminum with protective finish
<b>Cover</b>	Drawn aluminum, 0.060" wall, protective finish standard. Die cast aluminum with protective finish for EM, SM, ECS and SCS terminations
<b>Bearing Life</b>	1 X 10 <sup>9</sup> revs (6,700 hrs at 2500 RPM) at rated load
<b>Maximum RPM</b>	10,000
<b>Weight</b>	13 oz., typical
<b>Enclosure Rating</b>	NEMA 2 (IP43)

### Environmental

<b>Temperature</b>	Operating, 0° to 70° C; extended temperature testing available (see note 8); Storage, -25° to 90°C unless extended temperature option called out.
<b>Shock</b>	50 g's for 11 msec duration
<b>Vibration</b>	5 to 2000 Hz @ 20 g's
<b>Humidity</b>	98% RH without condensation

**NOTES & TABLES:** All notes and tables referred to in the text can be found at the end of the datasheet.



## COUPLING PERFORMANCE DATA

Coupling Data	High-Performance Coupling		
	Standard Coupling Type 4H	Type 4R	Type 6R
Coupling Bore	.250/.251	.2500/.2505	.3750/.3755
Dimension A1(E25BA only)	.16	.08	.08
Dimension A2 (E25BB & BC)	.10	.02	.02
Axial Motion (Inches Max.)	±.010	±.020	±.030
Parallel Offset (Inches Max.)	.010	.010	.010
Angular Misalignment (Degrees Max.)	2	2	2
Torsional Spring Rate (arc-sec/oz-in)	52	15	21

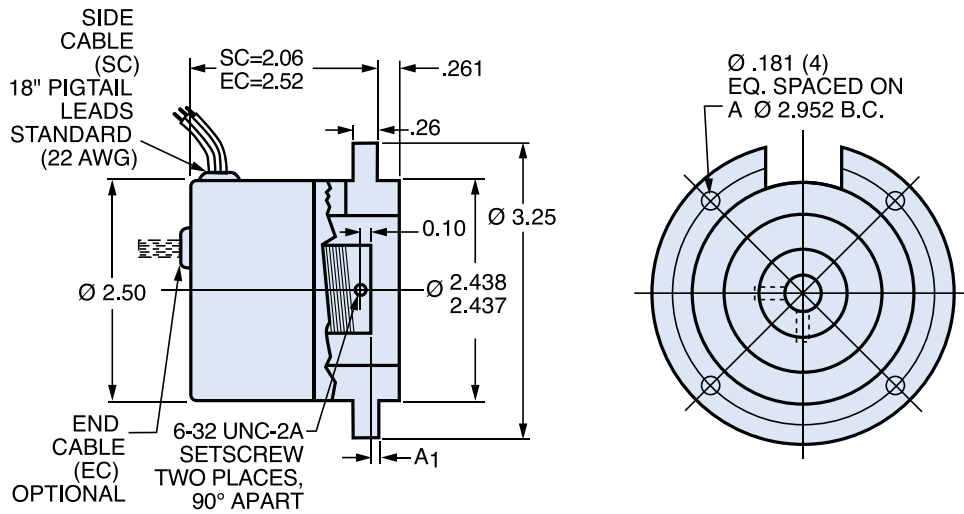
**Installation Note:** To prevent damage, the coupling must be operated without excessive axial compression or extension. For proper installation, rotate the coupling on the mating shaft prior to tightening the set screws.



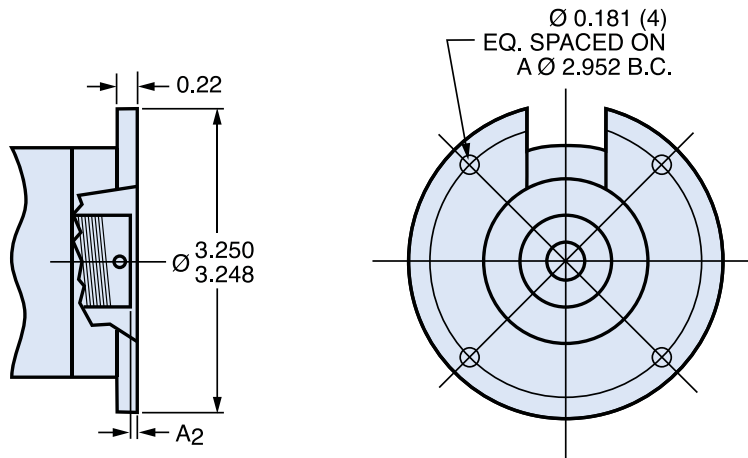
# DIMENSIONS

Dimensions in inches

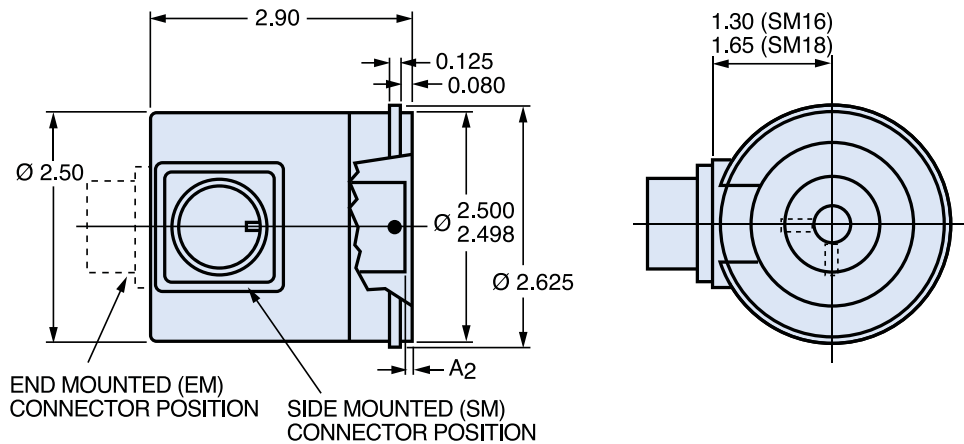
## E25BA



## E25BB (NEMA 34/42 Compatible)



## E25BC





Contact the factory for special versions, ex: special flanges, electronics, connections...

**Family** E25 BB - 4H - 500 - ABZ C - 28V/V - S M18 -

**E: Economy**  
**25:** 2.500" Dia.

**Housing Config. Letter**  
**BA, BB, or BC**

**Optional Face Mounts**  
**4H:** 0.250 I.D., Std  
**4R:** 0.250 I.D., High Performance  
**6R:** 0.375 I.D., High Performance

**Shaft Seal Configuration**  
**SB:** Seal Integral with Bearing  
**Blank:** Shielded Bearing  
*See note 2*

**Cycles Per Turn**  
1, 2, 3, 5, 6, 7, 8, 10, 13, 16, 20, 24, 25, 26, 30, 32, 33, 34, 36, 37, 40, 45, 48, 50, 51, 56\*, 60, 64, 66, 72, 75, 80, 86, 88, 90, 100, 102, 120, 122, 125, 127, 128, 132, 144, 148, 150, 158, 160, 175, 176, 180, 187, 192, 200, 202, 204\*, 217, 220, 240, 250, 254, 255, 256, 264\*, 274, 280, 283, 288, 292, 300, 312, 320, 321, 325, 360, 366, 372, 375, 377, 380, 381, 384, 385, 393, 400, 430, 432, 450, 462, 480, 490, 500, 502, 508, 512, 522, 530, 550, 560\*, 576, 598, 600, 604, 625, 628, 635, 638, 640, 660, 672, 676, 680, 687, 690, 700, 720, 725, 735, 740, 744, 748, 750, 762, 768, 780, 785, 800, 812, 825, 850, 864, 878, 888, 900, 912, 914, 938, 942, 955, 960, 1000, 1016, 1024, 1030, 1035, 1036, 1040, 1054, 1056, 1074, 1076, 1080, 1088, 1100, 1101, 1125, 1136, 1200, 1237, 1250, 1257, 1270, 1280, 1300, 1314, 1332, 1333, 1390, 1400, 1414, 1427, 1440, 1484, 1500, 1562, 1570, 1596, 1600, 1650, 1666, 1718, 1745, 1774, 1800, 1840\*, 1850, 1855, 1875, 1894, 1920, 1952, 1968, 1979, 1995, 2000, 2048, 2080, 2094, 2100, 2160, 2164, 2199, 2200, 2250, 2356, 2400, 2485, 2500, 2514, 2519, 2540, 3000, 3125, 3600, 4000, 4096, 5000

*\*AB or ABC output only.*  
*Note: Resolutions up to 72,000 are available*

**No. of Channels**  
**A:** Single Channel  
**AB:** Dual Quad. Ch.  
**ABZ:** Dual with Index  
**AZ:** Single with Index  
*See note 3*

**Complements**  
**C:** Complementary Outputs  
**Blank:** None  
*See note 4*

**Voltage/Output**  
**15V/V:** 5-15 V<sub>in/out</sub>  
**28V/V:** 5-28V<sub>in/out</sub>  
**28V/5:** 5-28V<sub>in</sub>, 5V<sub>out</sub>  
**28V/OC:** 5-28V<sub>in</sub>, OC<sub>out</sub>  
*See note 5*

**Output Termination Location**  
**E:** End  
**S:** Side

**Output Termination**  
**M16:** MS3102R16S-1P, 7-Pin  
**M18:** MS3102R18-1P, 10-Pin  
**C:** Pigtail Cable  
**CS:** Cable with seal  
Cable length specified in inches  
(i.e. C18 = Pigtail 18" long)  
*See table 1*

**Special Features**  
**S:** Special features specified on purchase order (consult factory)  
*See note 6*



## TABLE 1: INCREMENTAL OUTPUT TERMINATIONS

The connector style will determine pinouts. For example, an encoder with ABC channels and an M18 connector uses the table below.

M14 Connector PIN	M16 Connector PIN	Channels Designated in Model No.	
		ABZ	ABC
E	A	A	A
D	B	B	B
C	C	Z	$\bar{A}$
B	D	+V (Supply Voltage)	
F	E	-	$\bar{B}$
A	F	0 V (Circuit Common)	
	G	Case Ground (CG) (except H20)	

M18 Connector	
PIN	Channel
A	A
B	B
C	Z
D	+V
E	-
F	0V
G	CG
H	$\bar{A}$
I	$\bar{B}$
J	$\bar{Z}$

Wire Color (22AWG)	DA 15P Connector	Channels Designated in Model No.		
		ABZ	ABC	ABZC
YEL	13	A	A	A
BLUE	14	B	B	B
ORN	15	Z	-	Z
W-Yel	10	-	$\bar{A}$	$\bar{A}$
W-Blu	11	-	$\bar{B}$	$\bar{B}$
W-Orn	12	-	-	$\bar{Z}$
RED	6	+V (Supply Voltage)		
BLK	1	0 V (Circuit Common)		
GRN	9	Case Ground (CG) (except H20)		
WHITE		Shield Drain (Shielded Cable Only)		



## NOTES

1. Mounting is usually done either using the D-style square flange mount, E- or G-style servo mounts, or one of the standard face mounts, F1 for example. Consult factory for additional face mount options.
2. The shaft seal is recommended in virtually all installations. The most common exceptions are applications requiring a very low starting torque or those requiring operation at both high temperature and high speed.
3. Non-standard index widths and multiple indices are available by special order. Consult factory.
4. Complementary outputs are recommended for use with line driver type (source/sink) outputs. When used with differential receivers, this combination provides a high degree of noise immunity.
5. Output IC's: Output IC's are available as either Line Driver (LD) or NPN Open Collector (OC) types. Open Collectors require pull-up resistors, resulting in higher output source impedance (sink impedance is similar to that of line drivers). In general, use of a Line Driver style output is recommended. Line Drivers source or sink current and their lower impedance mean better noise immunity and faster switching times. **Warning:** Do not connect any line driver outputs directly to circuit common/OV, which may damage the driver. Unused outputs should be isolated and left floating. Our applications specialists would be pleased to discuss your system requirements and the compatibility of your receiving electronics with Line Driver type outputs.