

# ENC-A5SN Single-Ended Encoder without Index Channel



## FEATURES

- Accepts +/- 0.010" Axial Shaft Play
- 32 to 1024 Cycles per Revolution (CPR)
- Tracks 0 to 100,000 Cycles per Second
- 128 to 4,096 Pulses per Revolution (PPR)
- 2-Channel Quadrature TTL Squarewave Outputs
- Operating Temperature of -40° to +100° C
- RoHS Compliant and REACH Certified



## DESCRIPTION

The ENC-A5SN is a single-ended, transmissive optical encoder module designed to detect the rotary position with a code wheel. The ENC-A5SN requires a minimum shaft length of 0.445" and can be attached to the end of any shaft size ranging from 0.790" to 0.394" in diameter to provide digital feedback information. This single-ended encoder consists of a LED source lens and a monolithic detector IC enclosed in a small mance and tolerances over traditional aperture mask type encoders. The ENC-A5SN series provides digital quadrature squarewave outputs on all resolutions and are capable of sinking or sourcing 8 mA each. These encoders are powered from a single +5VDC power supply and are RoHS compliant and REACH certified.

## ORDERING INFORMATION

# ENC - A5SN - 0050 - 394 - H - G

CPR		
0032	0192	0500
0050	0200	0512
0096	0250	0540
0100	0256	1000
0110	0360	1016
0120	0400	1024

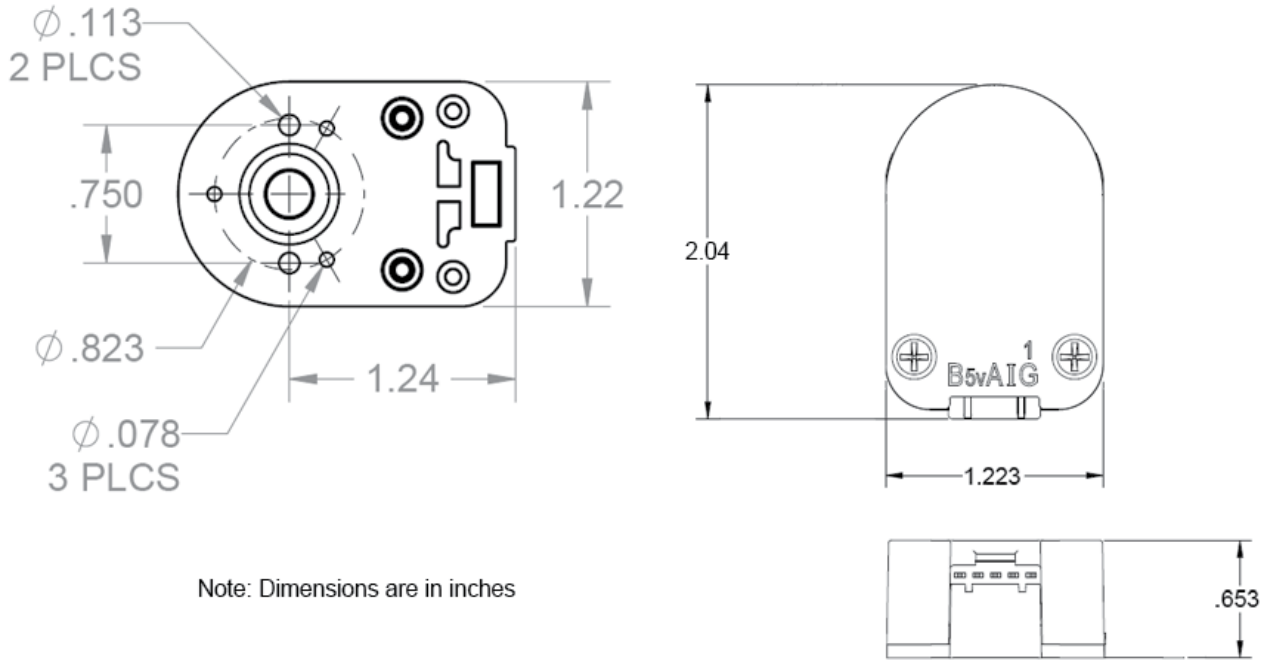
Bore Size	
079=2mm	236=6mm
118=3mm	250=1/4"
125=1/8"	276=7mm
157=4mm	313=5/15"
188=3/16"	375=3/8"
197=5mm	394=10mm

Cover Options
E = Cover Extension
H = Hole in Cover
Blank = Default

Base Options
3 = Base Mounting Holes Become 0.125"
A = Adds Self-Aligning Shoulder to Base
G = Adds 1.812" Mounting Ears to Base
R = Adds 3-Slot Adapter to Bottom of Base
T = Transfer Adhesive
Blank = Default

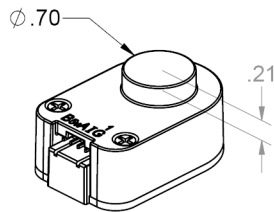
L010732

**DEFAULT OPTION:**

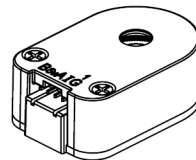


Note: Dimensions are in inches

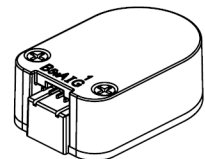
E-Option:



H-Option:



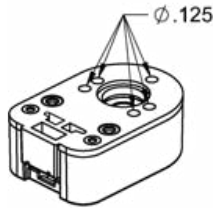
Default Option:



Note: Dimensions are in inches

Cover Options:	Description
E - Option	E-Option provides a cylindrical extension cover for larger shafts. The required shaft length is $.445"$ to $.750"$ . Note: E-option + R-Option the required shaft length is $.570"$ to $.875"$ .
H - Option	Shafts 2mm to 1/4", a $.295"$ diameter hole is supplied. Shafts 5/16" to 10mm, a $.438"$ diameter hole is supplied. Required shaft length $> 0.445"$ Note: H-Option + R-Option the required shaft length is $> .570"$
Default Option	The required length is $.445"$ to $.570"$ Note: Default Option + R-Option the required shaft length is $.570"$ to $.695"$

**3-OPTION:**



3-Option: Makes all five hole diameters .125"

**T-OPTION:**



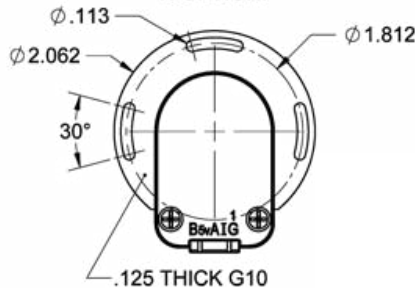
T-Option: A pre-applied transfer adhesive (with peel-off backing) is available for "stick-on" mounting.

**A-OPTION:**



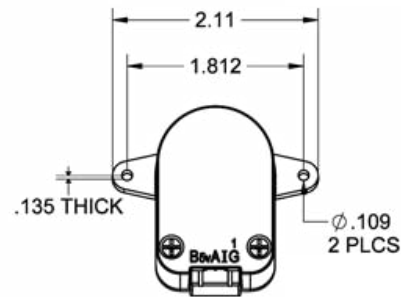
A-Option: Adds a .497" diameter alignment shoulder designed to slip into a .500" diameter recess in the mounting surface centered around the shaft.

**R-OPTION:**



R-Option: Adapter is an 1/8" thick fiberglass adapter which is pre-mounted to the base of the encoder. It allows the encoder to rotate +/- 15 degrees. \*This option adds 1/8" to the required shaft length.

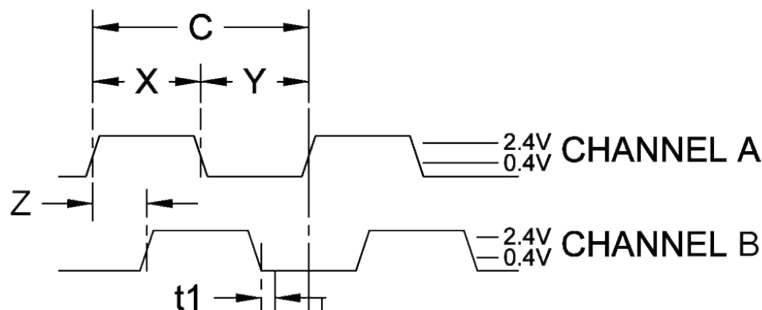
**G-OPTION:**



G-Option: Includes molded ears which enables it to be mounted to a 1.812" diameter bolt circle. Mounting holes are designed to fit 4-40 screws. Will work with shaft lengths of .445" to .570" and does not add to the required shaft length.

Note: All dimensions are in inches

**SINGLE-END ENCODER TIMING DIAGRAMS**



**ROTATION:**  
CW - B LEADS A, CCW - A LEADS B

**SINGLE-ENDED ENCODER PINOUT**  
TOP OF ENCODER FACING PLUG

Pin #	Function
1	Ground
2	No Connection
3	Channel A
4	+5VDC Input
5	Channel B

Model #	Description
CPR(N):	The Number of Cycles Per Revolution
One Shaft Rotation:	360 mechanical degrees, N cycles
One Electrical Degree (°e):	1/360th of one cycle
One Cycle (C):	360 electrical degrees (°e). Each cycle can be decoded into 1 or 4 codes, referred to as X1 or X4 resolution multiplication
Symmetry:	A measure of the relationship between (X) and (Y) in electrical degrees, nominally 180 °e
Quadrature (Z):	The phase lag or lead between channels A and B in electrical degrees, nominally 90 °e
Index (CH I):	The Index Output goes high once per revolution, coincident with the low states of channels A and B, nominally 1/4 of one cycle (90°e)

Parameter	Min	Typ	Max	Units
<b>Supply Current</b>				
CPR < 500, no load	-	27	30	mA
CPR ≥ 500, no load	-	55	57	mA
<b>Output Low</b> (I <sub>OL</sub> = 8mA max)	-	-	0.5	Volts
<b>Output High*</b>				
I <sub>OL</sub> = -8mA max	2.0	-	-	Volts
no load	4.2	4.8	-	Volts
<b>Output Current Per Channel</b>	-8.0	-	8.0	mA
<b>Output Rise Time</b>		110		nS
<b>Output Fall Time</b>		35		nS

\* Unloaded high level output voltage is 4.80V typically, 4.2V minimum.

Timing Characteristics	Symbol	Min	Typ	Max	Units
Cycle Error	C	-	3.0	5.5	°e
Symmetry	X,Y	150	180	210	°e
Quadrature	Z	60	90	120	°e
Index Pulse Width	Po	60	90	120	°e
Ch. I Rise After Ch. B or Ch. A Fall	t1	10	100	250	ns
Ch. I Fall After Ch. B or Ch. A Rise	t2	70	150	300	ns

Recommended Operating Conditions	Min	Max	Units
Temperature	-40	100	°C
Supply Voltage	4.5	5.5	Volts
Load Capacitance	-	100	pF
Count Frequency	-	100	kHz

Parameter	Max	Units
Vibration (5 to 2kHz)	20	g
Shaft Axial Play	+/- 0.01	in.
Shaft Eccentricity Plus Radial Play	0.004	in.
Acceleration	250,000	rad/sec <sup>2</sup>

## Centering Tools:

Centering tools are optional, but recommended for a more precise installation.

# ENC-CTOOL - 250

Bore Size	
079=2mm	236=6mm
118=3mm	250=1/4"
125=1/8"	276=7mm
157=4mm	313=5/15"
188=3/16"	375=3/8"
197=5mm	394=10mm