ENC-A5SI Single-Ended Encoder with Index Channel

FEATURES

- 50 to 5,000 Cycles Per Revolution (CPR)
- Tracks 0 to 300,000 Cycles Per Second
- Powered From a Single +5VDC Power Supply
- Accepts +/- 0.010” Axial Shaft Play
- 2-Channel Quadrature TTL Squarewave Outputs
- Third Index Channel
- Operating Temperature of -40° to +100° C
- RoHS Compliant and REACH Certified

DESCRIPTION

The ENC-A5SI is a single-ended, transmissive optical encoder module designed to detect the rotary position with a code wheel. The ENC-A5SI requires a minimum shaft length of .445” and maximum shaft length of .570”, and can be attached to the end of any shaft size ranging from .079” to .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 polymer package. These modules implement phased array detector technology providing superior performance and tolerances over traditional aperture mask type encoders. The ENC-A5SI 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.

ORDERING INFORMATION

ENC - A5SI - 0050 - 394 - H - G

Index
I = Index (3rd Channel)

CPR		
50	400	1250
96	500	2000
100	512	2048
192	540	2500
200	720	4000
250	900	4096
256	1000	5000
360	1024	

Bore Size	
079 = 2mm	236 = 6mm
118 = 3mm	250 = 1/4”
125 = 1/8”	276 = 7mm
156 = 5/32”	313 = 5/16”
157 = 4mm	315 = 8mm
188 = 3/16”	375 = 3/8”
197 = 5mm	394 = 10mm

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

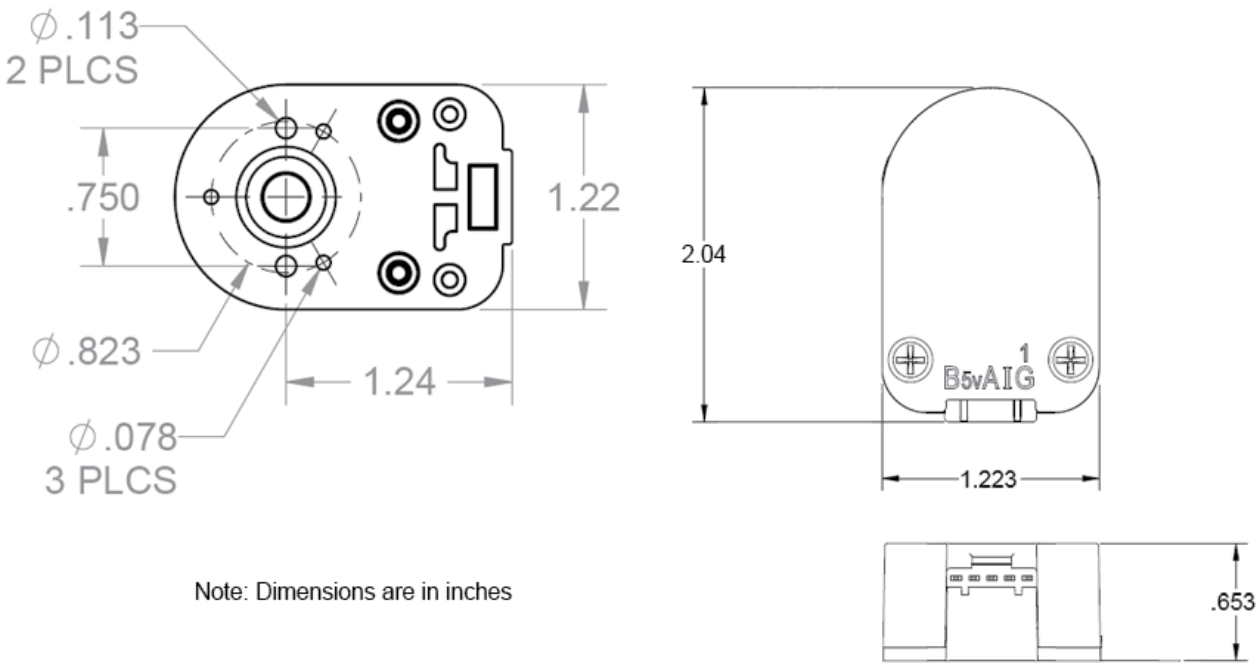
Base Options
3 = Base Mounting Holes Become 0.125”
A = Adds Self-Aligning Shoulder to Base
G = Adds 1.812” Mounting Ears to Base
R = Adds 3-Slot Adapter to Bottom of Base
Blank = Default

L010726

4985 East Landon Drive Anaheim, CA 92807 **Tel. (714) 992-6990** Fax. (714) 992-0471 **www.anaheimautomation.com**

DIMENSIONS

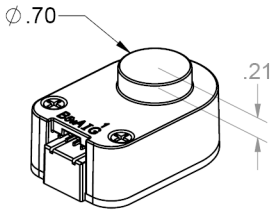
DEFAULT OPTION:



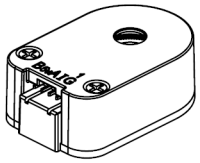
Note: Dimensions are in inches

COVER OPTIONS

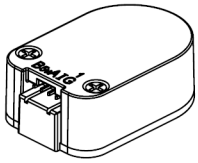
E-Option:



H-Option:



Default Option:

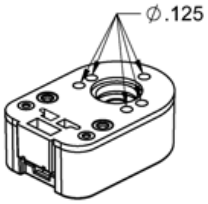


Note: Dimensions are in inches

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”

BASE OPTIONS

3-OPTION:

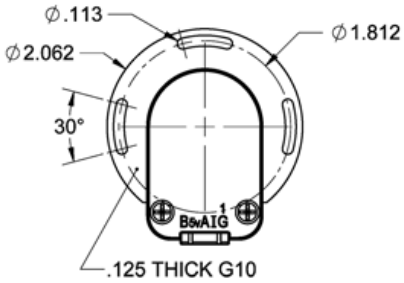


3-Option: Makes all five hole diameters .125"

A-OPTION:

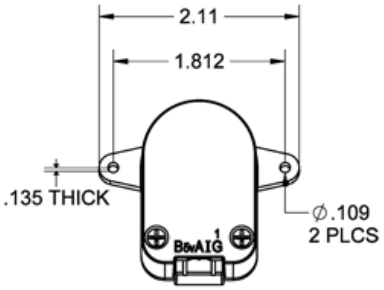
A-Option: Adds a .497" diameter alignment shoulder designed to slip into a .500" diameter recess in the mounting surface centered around the shaft.

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

(Note: Base Mounting Screws are NOT included. #2-56 or #4-40 screws can be used to mount the base to your mounting surface.)

PIN/TIMING DIAGRAMS

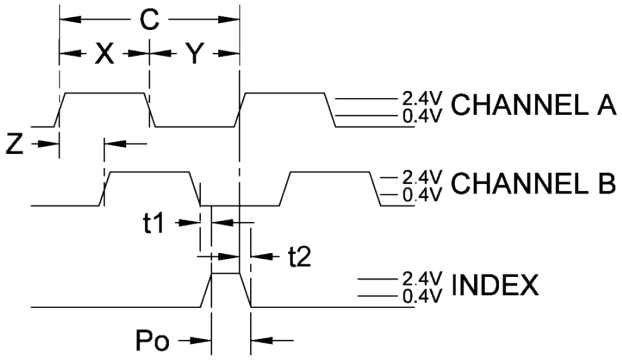
SINGLE-ENDED ENCODER PINOUT

TOP OF ENCODER FACING PLUG

Pin #	Function
1	Ground
2	Index
3	Channel A
4	+5VDC Input
5	Channel B

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

SINGLE-END ENCODER TIMING DIAGRAMS



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

SPECIFICATIONS

Terminology	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)

Recommended Operating Conditions	Min	Max	Units
Temperature (CPR < 2000)	-40	100	°C
Temperature (CPR ≥ 2000)	-25	100	°C
Load Capacitance	-	100	pF
Count Frequency (CPR ≤ 1250)	-	300	kHz
Count Frequency (CPR 2000-2500)	-	360	kHz
Count Frequency (CPR 4000+)	-	720	kHz

Parameter	Min	Typ	Max	Units
Supply Voltage	4.5	5.0	5.5	Volts
Supply Current CPR < 500, no load CPR ≥ 500 and < 2000, no load CPR ≥ 2000, no load	 - - -	 27 50 72	 33 62 85	mA
Output Low I_{OL} = 8mA max (CPR < 2000) I_{OL} = 5mA max (CPR ≥ 2000) no load (CPR ≥ 2000)	 - - -	 - - 0.25	 0.5 0.5 -	Volts
Output High* I_{OL} = -8mA max (CPR < 2000) I_{OL} = -5mA max (CPR ≥ 2000) no load (CPR < 2000) no load (CPR ≥ 2000)	 2.0 2.0 - -	 - - 4.8 3.5	 - - - -	Volts
Output Current Per Channel (CPR < 2000)	-8.0	-	8.0	mA
Output Current Per Channel (CPR ≥ 2000)	-5.0	-	5.0	mA
Output Rise Time (CPR < 2000)	-	110	-	nS
Output Rise Time (CPR ≥ 2000), ± 5mA load	-	50	-	
Output Fall Time (CPR < 2000)	-	110	-	
Output Fall Time (CPR ≥ 2000), ± 5mA load	-	50	-	nS

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

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^2

Speed Calculation		Units
CPR ≤ 1250	18x10^6 / CPR	RPM
CPR 2000-2500	21.6x10^6 / CPR	RPM
CPR 4000+	43.2x10^6 / CPR	RPM

*60,000 RPM is the maximum RPM due to mechanical limitations.

ACCESSORIES

Cables:

The following cables are compatible with Anaheim Automation's A5SI series encoder. Select a cable length from the table below:

Cable Part Number	Length
ENC-CBL-AA5939	1 ft.
ENC-CBL-AA5939-5	5 ft.
ENC-CBL-AA5939-10	10 ft.

NOTE: For pricing and other information on cables and centering tools, please visit Accessories on our website.

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"
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