

ENC-A5DI Differential Encoder with Index Channel



FEATURES

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



DESCRIPTION

The ENC-A5DI is a differential encoder designed for quick and simple assembly to any minimum shaft length 0.445" and maximum shaft length of .570", and shaft size ranging from 0.079" to 0.394" in diameter. The ENC-A5DI module is designed to detect the rotary position with a code wheel. When attached to the end of a shaft, the encoder provides digital feedback information. This differential 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-A5DI series provides digital quadrature differential 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

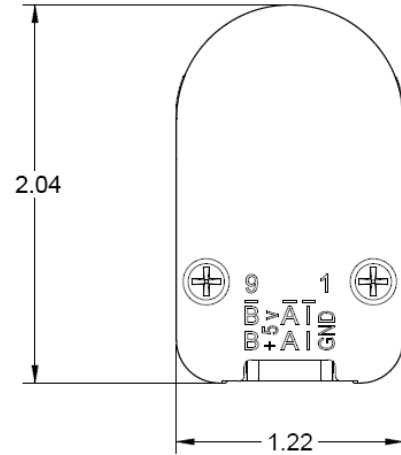
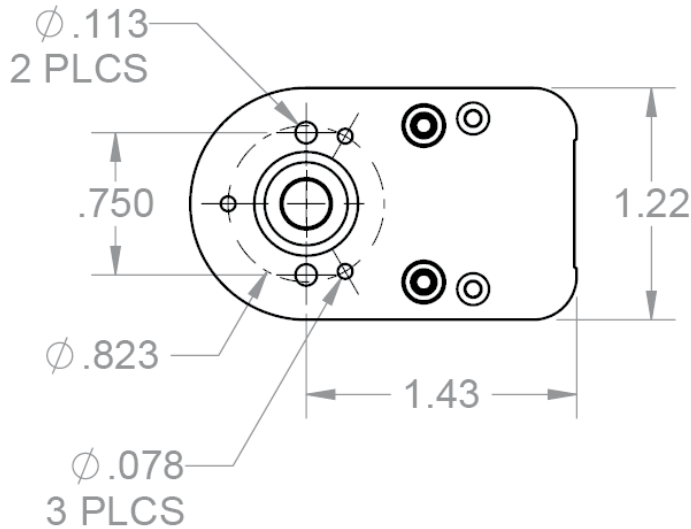
ENC - A5DI - 0050 - 394 - H - G

Index	CPR			Bore Size		Cover Options
I = Index (3rd Channel)	50	400	1250	079 = 2mm	236 = 6mm	E = Cover Extension
	96	500	2000	118 = 3mm	250 = 1/4"	H = Hole in Cover
	100	512	2048	125 = 1/8"	276 = 7mm	Blank = Default
	192	540	2500	156 = 5/32"	313 = 5/16"	
	200	720	4000	157 = 4mm	315 = 8mm	
	250	900	4096	188 = 3/16"	375 = 3/8"	
	256	1000	5000	197 = 5mm	394 = 10mm	
	360	1024				

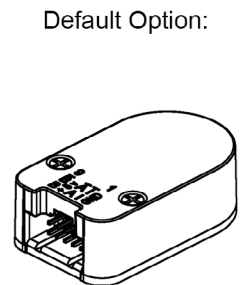
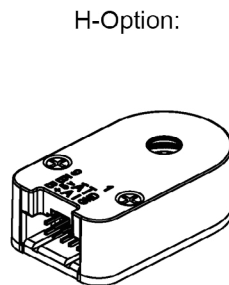
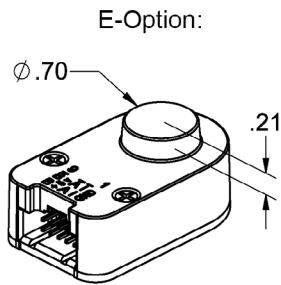
Base Options
3 = Base Mounting Holes Become 0.125"
A = Adds Self-Aligning Shoulder to Base
G = Adds 1.812" Mounting Ears to Base
R = Adds 3-Slot Adapter to Bottom of Base
Blank = Default

L010727

DEFAULT OPTION:



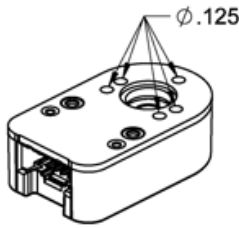
Note: Dimensions are in inches



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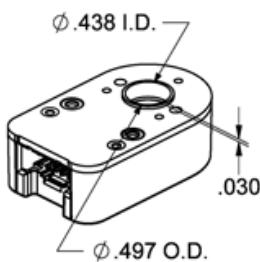
Cover Options:	Description
E - Option	E-Option provides a cylindrical extension cover for larger shafts. The required shaft length is .445" to .750". Note: E-option + R-Option the required shaft length is .570" to .875".
H - Option	Shafts 2mm to 1/4", a .295" diameter hole is supplied. Shafts 5/16" to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



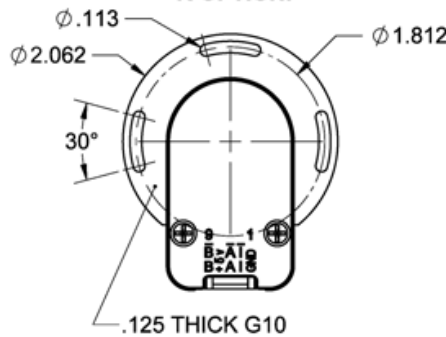
3-Option: Makes all five hole diameters .125"

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.

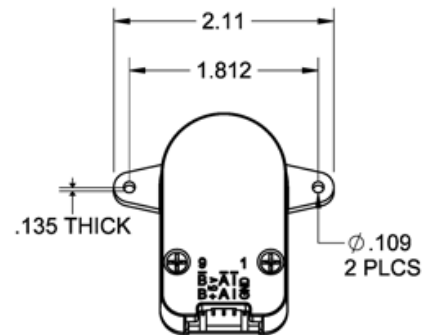
R-OPTION:



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:

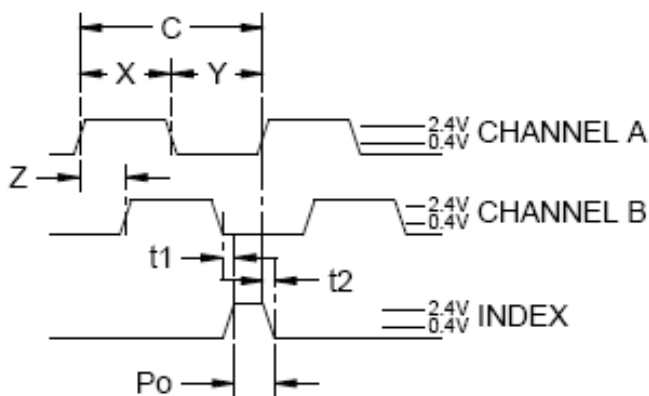


G-Option: Includes molded ears which enables it to be mounted to a 1.812" diameter bolt circle. Mounting holes are designed to fit 4-40 screws. Will work with shaft lengths of .445" to .570" and does not add to the required shaft length.

Note: All dimensions are in inches

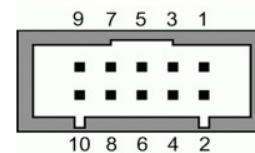
(Note: Base Mounting Screws are NOT included. #2-56 or #4-40 screws can be used to mount the base to your mounting surface.)

Differential Encoder Timing Diagram



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

DIFFERENTIAL ENCODER PINOUT
TOP OF ENCODER FACING PLUG



Pin #	Function
1	Ground
2	Ground
3	I-Channel
4	I+Channel
5	A-Channel
6	A+Channel
7	Power
8	Power
9	B-Channel
10	B+Channel

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)

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

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

Parameter	Min	Typ	Max	Units
Supply Voltage	4.5	5.0	5.5	Volts
Supply Current				
CPR < 500, no load	-	29	36	mA
CPR ≥ 500 and < 2000, no load	-	57	65	
CPR ≥ 2000	-	73	88	
Output Low (I _{OL} = 8mA max)	-	0.2	0.4	Volts
Output High*				
I _{OL} = -8mA max	2.4	3.4	-	Volts
Differential Output Rise/ Fall Time	-	-	15	nS

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

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

Speed Calculation	Units
CPR < 2000	18x10 ⁶ / CPR RPM
CPR ≥ 2000 and < 4000	21.6x10 ⁶ / CPR RPM
CPR ≥ 4000	43.2x10 ⁶ / CPR RPM

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

Cables:

The following cables are compatible with Anaheim Automation's A5DI series encoder. Select a cable length from the table below:

Cable Part Number	Length
ENC-CBL-AA4706	1 ft.
ENC-CBL-AA4706-5	5 ft.
ENC-CBL-AA4706-10	10 ft.
ENC-CBL-AA4706-20	20 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-C TOOL - 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