FEATURES

- Small Size, Pre-Mounted to Dual Shaft Motor
- 50 to 5,000 Cycles Per Revolution (CPR)
- 200 to 20,000 Pulses Per Revolution (PPR)
- Tracks 0 to 100,000 Cycles Per Second
- 2-Channel Quadrature Differential Squarewave Outputs
- Third Index Channel
- Allows + / - .010" Axial Shaft Play
- Powered From a Single +5VDC Power Supply
- Operating Temperature of -40º to +100º C
- RoHS Compliant and Reach Certified

DESCRIPTION

Our Differential Encoders with Index Channel are transmissive optical encoder modules. These modules are designed to detect rotary position with a codewheel when added to the end of an Anaheim Automation dual shaft motor. These differential encoders consist of a lensed LED source and a monolithic detector IC enclosed in a small polymer package. These modules use phased array detector technology to provide superior performance and greater tolerances over traditional aperture mask type encoders. They provide digital quadrature differential outputs on all resolutions. These encoders are powered from a single +5VDC power supply.

DIMENSIONS AND PINOUTS

To order a differential encoder with index, add a " - ", the CPR number, and a DI on the end of any Anaheim Automation dual shaft motor.
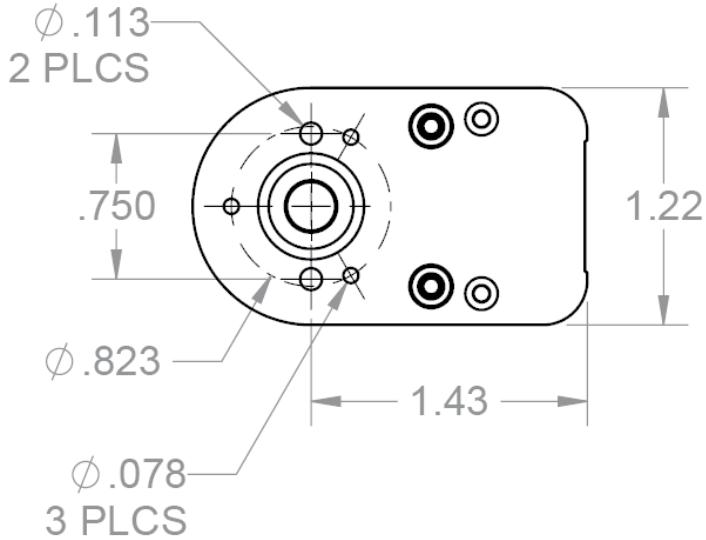
23Y106D-LW8-0400DI

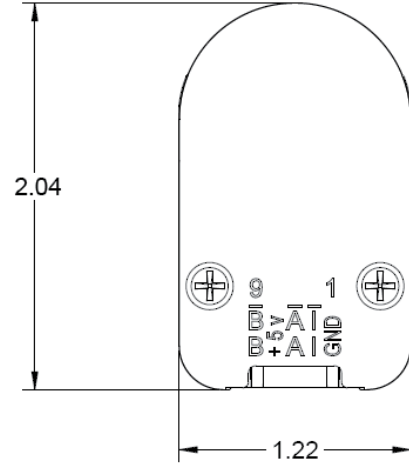| CPR		
50	400	1250
96	500	2000
100	512	2048
192	540	2500
200	720	4000
250	900	4096
256	1000	5000
360	1024	

Example: The part number for a 400 CPR encoder mounted on a 23Y106D-LW8 stepper motor would be 23Y106D-LW8-0400DI.
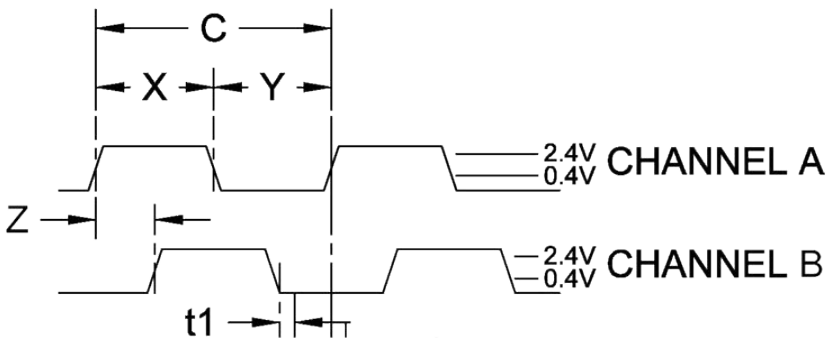
L010387

DIMENSIONS

∅ .113
2 PLCS

.750

∅ .823

∅ .078
3 PLCS

1.22

1.43

Note: Dimensions are in inches

2.04

9   1

B̄ Ā
B+5V A GND

1.22

.65

PIN/TIMING DIAGRAMS

Differential Encoder Timing Diagram

C

X   Y

Z

2.4V CHANNEL A
0.4V

2.4V CHANNEL B
0.4V

t1

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

DIFFERENTIAL ENCODER PINOUT
TOP OF ENCODER FACING PLUG

Pin #	Function	Color
1	Ground	Drain (Con. One End)
2	Ground	Green W/ White Stripe
3	I-Channel	White W/ Orange Stripe
4	I+Channel	Orange W/ White Stripe
5	A-Channel	White W/ Blue Stripe
6	A+Channel	Blue W/ White Stripe
7	Power	White W/ Green Stripe
8	Power	No Connection
9	B-Channel	White W/ Brown Stripe
10	B+Channel	Brown W/ White Stripe

9 1
10 2
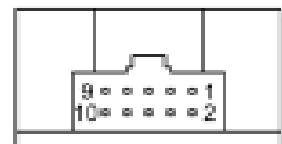
Model #	Description
CPR(N):	The Number of Cycles Per Revolution
One Shaft Rotation:	360 mechanical degrees, N cycles
One Electrical Degree (°e):	1/360th of one cycle
One Cycle (C):	360 electrical degrees (°e). Each cycle can be decoded into 1 or 4 codes, referred to as X1 or X4 resolution multiplication
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
Supply Voltage	4.5	5.0	5.5	Volts
Supply Current CPR < 500, no load	-	29	36	mA
CPR ≥ 500, no load	-	57	65	mA
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.

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 (CPR < 2000)	-40	100	°C
Temperature (CPR ≥ 2000)	-25	100	°C
Load Capacitance	-	100	pF
Count Frequency (CPR ≤ 1250)	-	100	kHz
Count Frequency (CPR 2000-2500)	0	360	kHz
Count Frequency (CPR 4000+)	0	720	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/sec²

Cables:

The following cables are compatible with Anaheim Automation's differential series encoder with index. 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.