

# High-Resolution Encoders Without Index For 23AV Linear Actuators



FEATURES

- 64 to 2,500 Cycles Per Revolution (CPR)
- 256 to 10,000 Pulses Per Revolution (PPR)
- Tracks 0 to 100,000 Cycles Per Second
- 2-Channel Quadrature TTL Squarewave Outputs
- Allows +/- .010" Axial Shaft Play
- Operating Temperature of -40° to +100° C
- Powered From a Single +5VDC Power Supply
- RoHS Compliant and REACH Certified



DESCRIPTION

### New Optical Encoder Module:

This new transmissive optical encoder module was designed to be an improved replacement for the Avago HEDS-9000 series encoder module. This module is designed to detect rotary position when used with a code wheel. The new module consists of a lensed LED source and a monolithic detector IC enclosed in a small polymer package. The new module uses phased array detector technology to provide superior performance and greater tolerances over traditional aperture mask type encoders. The new module provides digital A & B quadrature outputs with an optional third output index channel. Each module is resolution specific and is matched to the resolution of a code wheel. All standard resolutions offered by the HEDS-9000 series encoder module, as well as additional resolutions, are now supported by the new module. The new module operates with a single 5V supply and provides single ended outputs which are capable of both sinking and sourcing 8mA at TTL levels. An internal 0.1 uF decoupling capacitor is designed into the new module to provide enhanced noise immunity over the HEDS-9000 series encoder modules. Physically, the new module has no external wire loops which can interfere when mounting. The connector pins are 0.051" shorter than HEDS modules, while still providing .30" insertion depth.

Anaheim Automation's 23AV lead screw stepper motors are one of the most versatile linear positioning motors on the market. Coupled with a High Resolution Single-Ended Encoder without Index, this combination eliminates components, reduces costs, and delivers quality performance. The digital squarewave output provides digital feedback information for applications that require position, speed and/or direction control.

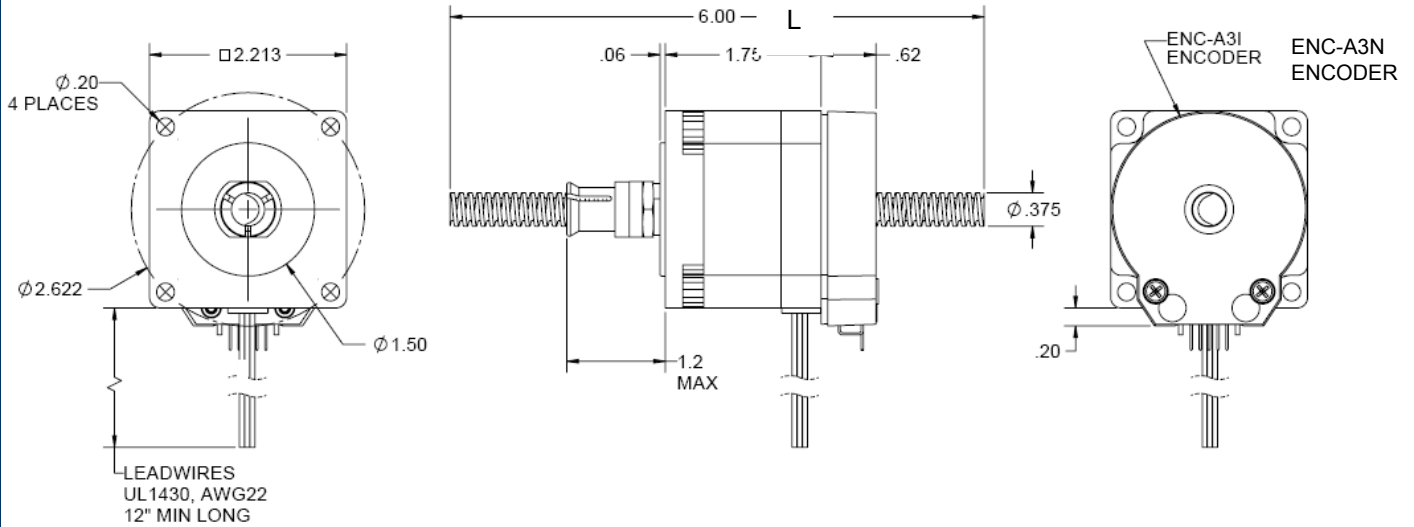
CUSTOM ORDER LAYOUT

To order a high resolution encoder without index, add a " - ", the CPR number, and an SN3 on the end of a 23AV series linear actuator.

# 23AV104AX06 - AE - 400SN3

CPR	
64	1000
100	1024
200	1800
400	2000
500	2048
512	2500

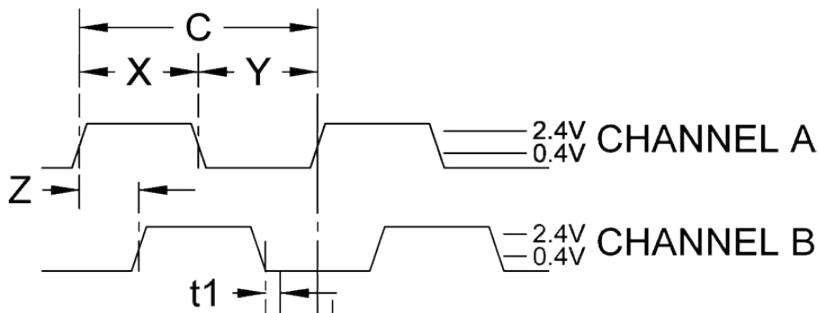
Example: The part number for a 400 CPR encoder mounted on a 23AV104AX06-AE linear actuator would be 23AV104AX06-AE-400SN3.  
L010898



Note: All dimensions are in inches

Note: The above dimensions are the for Anti-Backlash option. For more information on 23AV options, see Stepper Linear Actuators on our website.

**SINGLE-END ENCODER TIMING DIAGRAMS**



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

**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

Terminology	Definition
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 <sup>2</sup>

Parameter	Min	Typ	Max	Units
<b>Supply Current</b>				
CPR < 1000, no load	-	27	30	mA
CPR ≥ 1000, 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.

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

## Cables:

The following cables are compatible with Anaheim Automation's 23AV linear actuator without index encoder. Select a cable length from the table below:

Cable Part Number	Length
ENC-CBL-AA4175	1 ft.
ENC-CBL-AA4175-02	2 ft.
ENC-CBL-AA4175-05	5 ft.
ENC-CBL-AA4175-10	10 ft.

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