

## MX21 INSTA-MOUNT™ | SERIES

### MODULAR INCREMENTAL ROTARY OPTICAL ENCODER



### Introduction

By the time you have read this first sentence, you could have installed the model MX21 INSTA-MOUNT™ modular optical encoder. In addition to its quick and easy installation, the MX21 is designed to operate with jitter-free output signals without tight controls on shaft endplay, runout, or perpendicularity. The new INSTA-MOUNT™ encoder is capable of operating within a temperature range of -10°C to +70°C, requiring less than 30 milliamps of L.E.D. current, without degradation of output signals and is short circuit protected.

The MX21 is perfectly suited for motor manufacturers and other high volume OEMs. The INSTA-MOUNT™ Series encoder offers 5V TTL compatible quadrature outputs with index and complements as options. Axial shaft movements during operation, of  $\pm 0.010$ ", will not adversely affect the output signals. Shaft runouts of 0.005" TIR can also be absorbed by this device without affecting output signal performance.



### SPECIFICATIONS

#### Mechanical

<b>Dimensions</b>	See Figure 1
<b>Weight</b>	2.1 oz. (Approx.)
<b>Moment of Inertia</b>	$2.6 \times 10^{-5}$ oz in sec <sup>2</sup>
<b>Bore Size</b>	see "Ordering Options"

#### Motor Interface

<b>Mount Holes</b>	#4-40 or M3 x 0.5 @ 180° on 1.812" dia. B.C.
<b>Mount Hardware</b>	2 socket head cap screws
<b>Perpendicularity Shaft to Mount</b>	0.002" TIR
<b>Shaft Runout</b>	0.005" max (each 0.0001 degrades accuracy by 0.5 arc minutes)
<b>Shaft Endplay Dynamic or Static</b>	$\pm 0.010$ "
<b>Shaft Finish</b>	16 micro inches or better. End must be chamfered or rounded
<b>Shaft Tolerance</b>	nominal -0.0002"/-0.0007"
<b>Shaft Length</b>	0.56" minimum (remove cover button for motor through-shafts)

## Electrical

<b>Code</b>	Incremental
<b>Pulses per revolutions (PPR)</b>	See Ordering Options
<b>Index Pulse Options</b>	MX212: No Index MX213, MX216: U = Ungated Index, G = Gated Index
<b>Supply Voltage</b>	5 volts $\pm 5\%$ @ 80mA max.
<b>Output Format</b>	MX212: Dual channel in quadrature MX213: Dual channel in quadrature with index MX216: Dual channel in quadrature with index and complements
<b>Output Type</b>	<b>MX212 &amp; 213</b> : square wave TTL. 16mA sink 500 $\Omega$ A source. Short circuit protected <b>MX216</b> : TTL differential line driver (26LS31 or equiv.) should be terminated into a line receiver (26LS32, or equivalent circuit)
<b>Frequency Response</b>	Frequency (kHz) = (RPM X PPR)/60
<b>Rise Time</b>	1.0 $\mu$ sec. max.

## Enviromental

<b>Temperature</b>	Operating: -10°C to +70°C Storage: -40°C to +125°C
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## Terminations

<b>Ribbon</b>	28 AWG flat ribbon cable with 10 position connector Berg P/N 65863-165 or equiv. Mates with Berg P/N65863-165 or equiv) (mating connector not provided)
<b>Round Cable</b>	28AWG 8 Conductor shielded cable

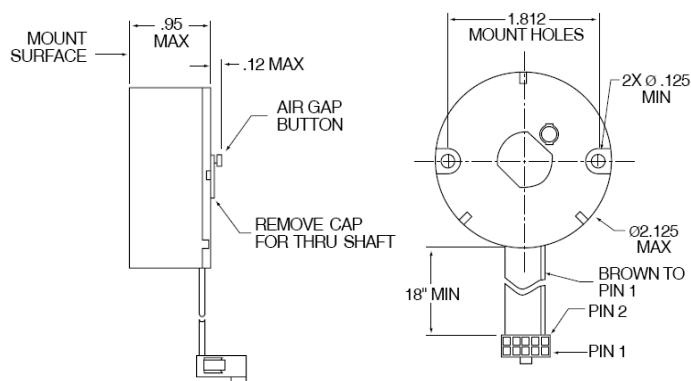
\*NOTE: See pinout tables, under "Terminations" section.



## DIMENSIONS

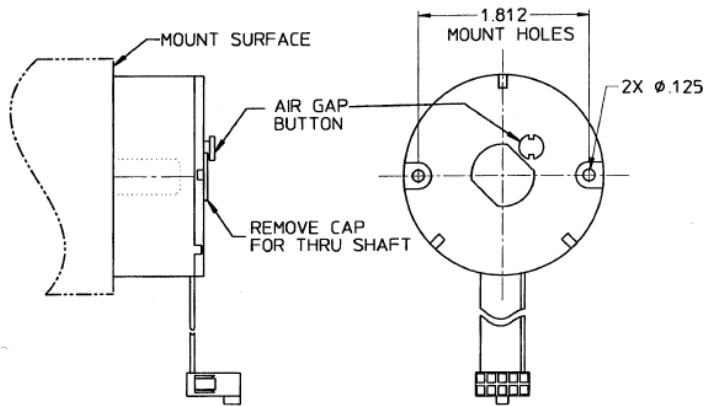
All dimensions are in: inches .xx =  $\pm 0.02$ , .xxx =  $\pm 0.005$

Fig.1





## INSTALLATION INSTRUCTIONS



### Preparation

1. Inspect motor interface per MX21 Data Sheet or specification drawing.
2. Motor shaft must be free of burrs & other surface defects.

### Installation

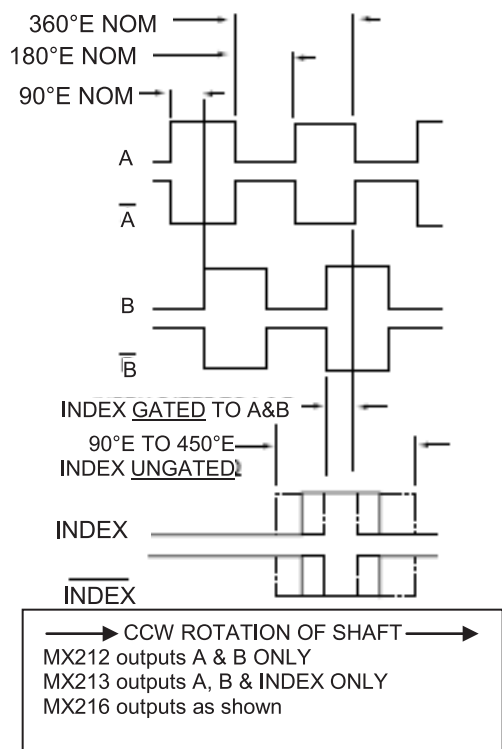
1. Motor shaft should NOT be rotating during initial encoder installation.
2. Hold encoder perpendicular to motor shaft. Guide the encoder onto the motor shaft, pushing encoder STRAIGHT on until it is flush against the mount surface. Do NOT rock side to side.
3. Install two #4-40 mount screws. Do not fully tighten at this point. (Note: A thread sealant should be applied to the screw threads)
4. Rotate the motor shaft (300 RPM, minimum). Press the air-gap button until it bottoms to the top of the encoder momentarily, then release.  
CAUTION: DO NOT press air-gap button while motor shaft is stationary. Button should only be pressed for one or two seconds while shaft is rotating.
5. Tighten mounting screws fully. (recommended torque is 30 to 40 ounce inches.)
6. This completes the mechanical installation. Proceed with electrical connections as indicated on product data sheet or specification drawing.

### Removal

1. Motor shaft may be stationary or rotating up to 1000 RPM during encoder removal.
2. Remove two mounting screws.
3. Grasp encoder firmly and pull STRAIGHT off of the motor shaft. Do NOT rock side to side.



## OUTPUT WAVEFORM



## TERMINATIONS

Pinout MX212/213			
PIN #	Signal	PIN #	Signal
1	Channel A	6	NC
2	+5 volts	7	NC
3	Ground	8	Channel B
4	NC	9	NC
5	NC	10	Index (213)

Pinout MX216			
PIN #	Signal	PIN #	Signal
1	NC	6	Channel A
2	+5 volts	7	Channel $\bar{B}$
3	Ground	8	Channel B
4	NC	9	$\bar{INDEX}$
5	Channel $\bar{A}$	10	Index

Color Codes	
Red	+5 volts
Black	Ground
White	A
Green	B
Orange	Index
Blue	$\bar{A}$
White/Black	$\bar{B}$
Red/Black	$\bar{INDEX}$



Use this diagram, working from left to right to construct your model number

<b>MX21</b>	<b>X</b>	<b>-</b>	<b>XX</b>	<b>-</b>	<b>XXXX</b>	<b>-</b>	<b>X</b>	<b>-</b>	<b>XXX</b>
<b>Output Format</b>									
2 = Quadrature									
3 = Quadrature w / index									
6 = Quadrature w / index & complements									
<b>Bore Size</b>									
25 = .25"									
38 = .375"									
6M = 6mm									
8M = 8mm									
10M = 10mm									
<b>Pulses Per Revolution (PPR)</b>									
200, 400, 500, 512, 1000, 1024									
<b>Index Option</b>									
*For Output Formats 3 and 6 ONLY									
G = gated to data A & B									
U = ungated									
<b>Electrical Termination</b>									
Cxx = Round Shielded Cable									
Rxx = Ribbon Cable with 10 Pin Socket Header									
(xx = length of cable in inches; 18 inches standard)									

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