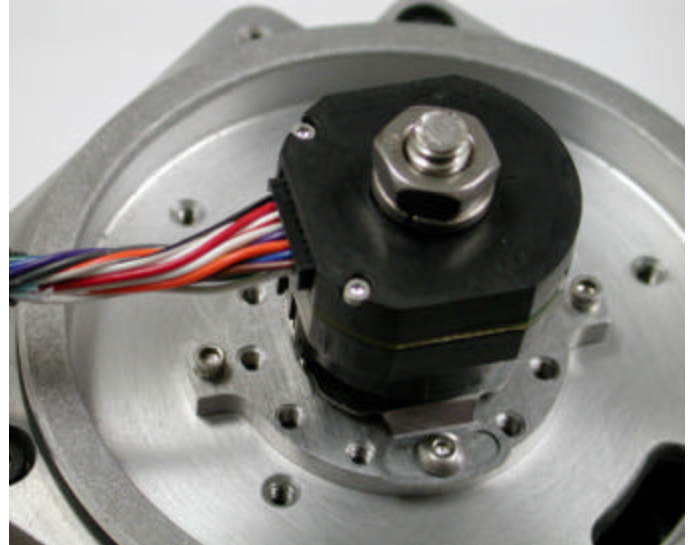


## JR12 Jam Nut Mount Optical Encoder

### Design Features:

- Replaces Size 15 Pancake Resolver
- Bearing design simplifies encoder attachment
- Resolutions up to 20,000 lines per revolution
- 4, 6 or 8 pole commutation
- Eliminates expensive mounting servo clamps
- Accommodates resolver type 1/4" threaded shafts
- High Noise Immunity
- Cost Competitive with Modular Encoders
- 500 kHz Frequency Response
- RoHS Construction



### Description:

Quantum Devices, Inc. Model JR12 provides an improved feedback solution in applications typically using pancake resolvers with same threaded shaft and jam nut mounting. With an over all height of less than one inch and the stability of a bearing encoder design, the model JR12 can provide significant performance upgrades in applications limited by traditional resolvers or modular encoder solutions. Output options consist of a quadrature with index pulse and three-phase commutation. A flexible member allows for much greater tail shaft run out and TIR than can be tolerated by modular encoder designs, plus the mounting flange eliminates the need for expensive servo mounting clips.

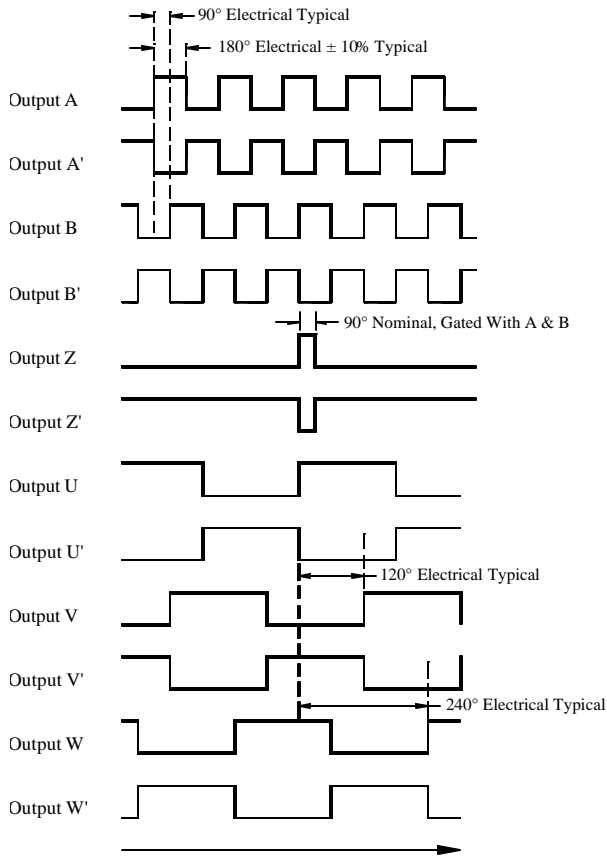
## Ordering Information

Sample: JR12-1000-4-A-R-N-R-A

Model	PPR	Poles	Electrical	Hub Configuration	Hub Size	Mounting	Index	
JR12	24*	2048	0= 0	A= RS422 (TTL)	B= Hole in Cover	R = .250"	C= SS 1.280" Flex	A= Gated to AB, 90deg
	256	2500	4= 4	B= oc UVW				
	360	4000	6= 6					
	500	4096	8= 8					
	512	5000						
	1000	8192						
	1024	10000						
	1250	16384						
	2000	20000						

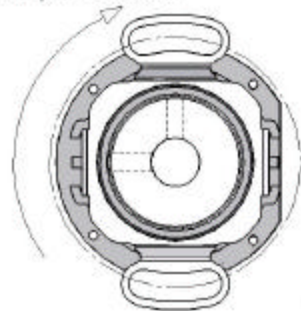
Consult Factory For Configurations Not Shown, \* 24PPR only available 0 poles.

## Output Waveforms



Clockwise Shaft Rotation as Viewed Looking at the Encoder Face. See Figure Below.

CW Rotation for Output Waveforms



**ISO 9001**

**CERT. NO. FM 52711**

## Electrical Specifications

Input Voltage	5 VDC $\pm$ 5%
Input Current Requirements	65mA Typ., 100mA Max Plus Interface Loads
Input Ripple	2% Peak to Peak @ 5 VDC
Output Circuits	(A) 26C31 RS 422A Line Driver (TTL Compatible) (B) ABZ Line Driver, UVW Open Collector (No U' V' W')
Incremental Output Format	Quadrature with A leading B for CW rotation. Index Pulse true over A and B High.
Frequency Response	500 kHz
Symmetry	180 Degrees $\pm$ 10% Typical
Minimum Edge Separation	< 4000PPR = 54 electrical degrees $\geq$ 4000PPR = 45 electrical degrees
Commutation Format	Three Phase 4, 6 or 8 poles
Commutation Accuracy	$\pm$ 1° mechanical
Z channel to U channel	$\pm$ 1° mechanical

## Environmental Specifications

Storage Temperature	-40 to 125° C
Operating Temperature	-20 to 115° C
IP Rating	40
Humidity	90% Non-Condensing
Vibration	20 g's @ 50 to 500 CPS
Shock	50 g's @ 11mS Duration

## Mechanical Specification

Through Shaft Diameter	0.250" Tolerance: -0.0000, + 0.0010"
Radial Shaft Movement	0.007" TIR
Axial Shaft Movement	$\pm$ 0.030"
Maximum Shaft Speed	8000 RPM, Contact Customer Service for Higher RPM
Interface Connector	Connector: JAE P/N F1-W15P-HFE
Mounting	Size 15 Pancake Resolver
Moment of Inertia	$9.1 \times 10^{-5}$ oz-in-S <sup>2</sup>
Acceleration	$1 \times 10^5$ Radians/S <sup>2</sup>
Accuracy	Instrument Error 1.5 arc min. max

## 15 Pin Connector

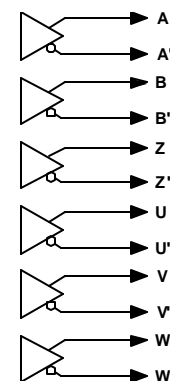
JAE P/N: F1-W15P-HFE

Pin Number	Function
1	A
2	A -
3	B
4	B -
5	Z
6	Z -
7	U
8	U - *
9	V
10	V - *
11	W
12	W - *
13	Vcc
14	GND
15	Open

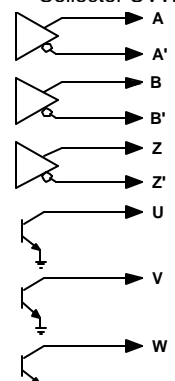
\* U-, V- and W- not present for open-collector UVW Electrical Option.

## Electrical Output Circuits

A) 26C31 (RS422)



B) 26C31 ABZ, Open Collector UVW



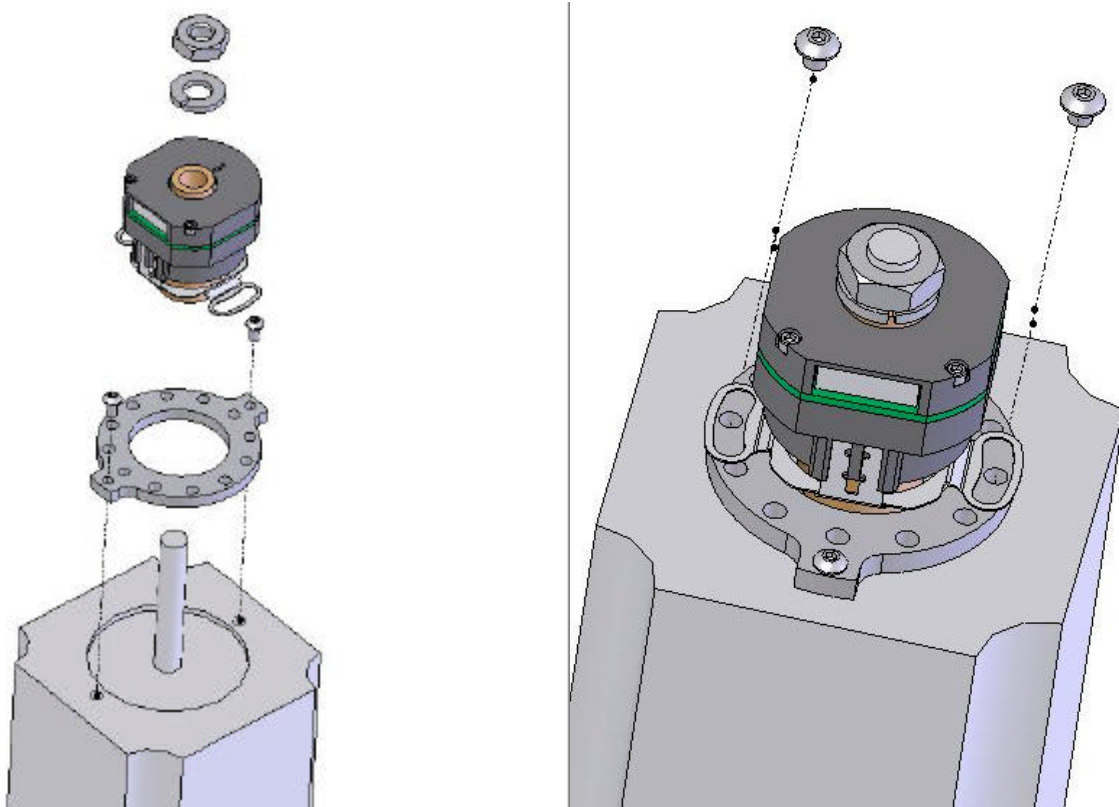
- ◆ 26C31 Sink/Source Current (max) = 20ma (meets RS-422 at 5vdc supply).
- ◆ Open Collector Sink Current (max) = 30ma
- ◆ Open Collector Pull Up Voltage (max) = 30vdc

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\*Quantum Devices, Inc. reserves the right to make changes in design, specifications and other information at any time without prior notice.

## **MOUNTING**

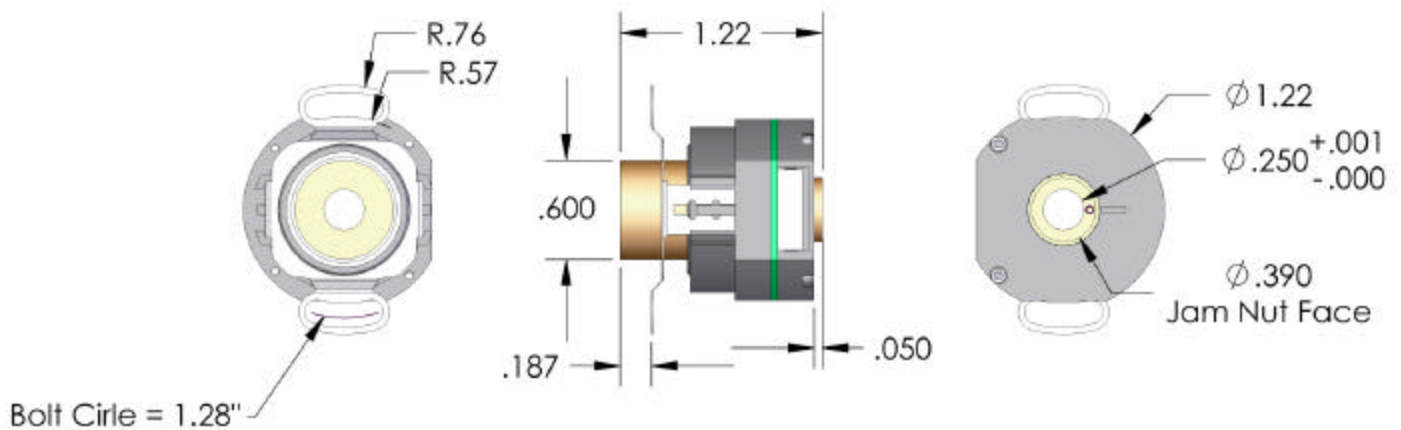
Motor resolver pocket to be same depth as motor shaft shoulder used as a mounting stop for the encoder, .062" (+/- .025") below motor rear face.



Install Resolver Adapter with 2-56 socket head screws. Slide encoder over 1/4" threaded shaft and secure with lock washer and jam nut to a torque of 40 – 60 in-lbs. Use thread lock or second jam nut if additional retention is required. Install (2) 4-40 button head screws to encoder flex mount to secure encoder body.

## **DIMENSIONS**

### **JR12 JAM NUT MOUNT .250" BORE**



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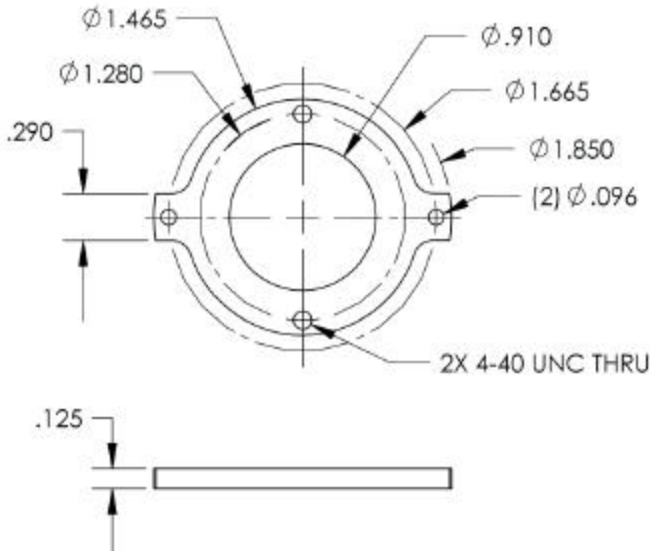
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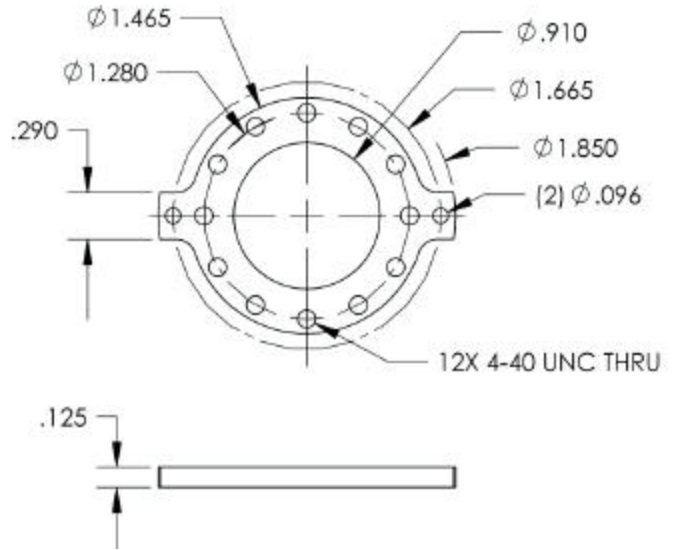
# DIMENSIONS

## Optional Aluminum Resolver Adapters

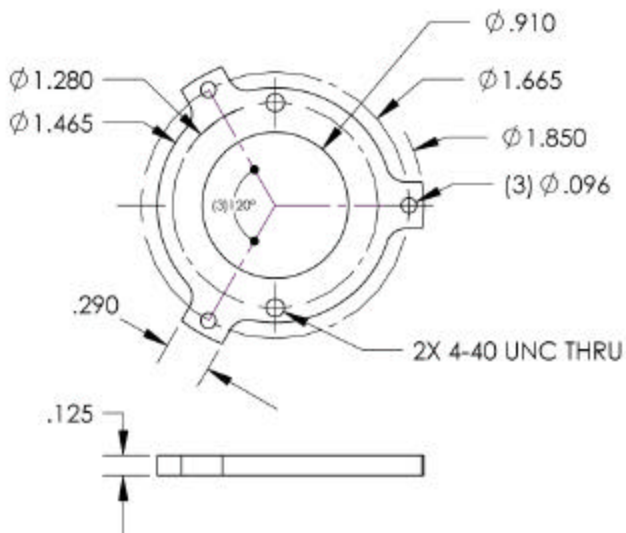
2074D024 – Two Point 30 Degree  
Commutation Adjustment Range



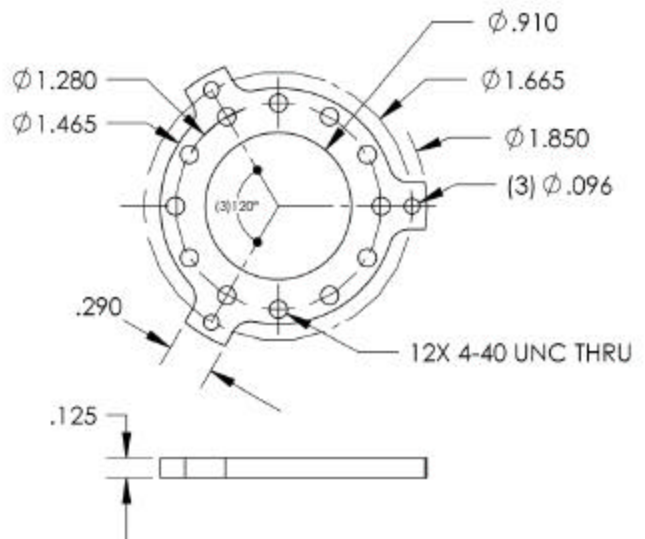
2074D025 – Two Point 360 Degree  
Commutation Adjustment Range



2074D026 – Three Point 30 Degree  
Commutation Adjustment Range



2074D027 – Three Point 360 Degree  
Commutation Adjustment Range

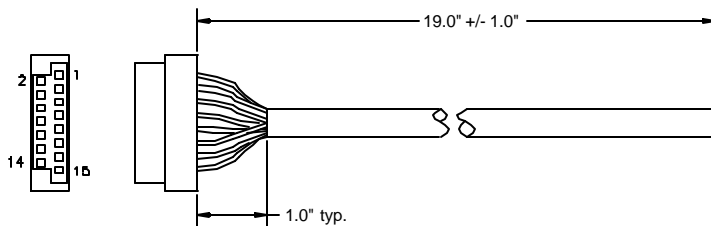
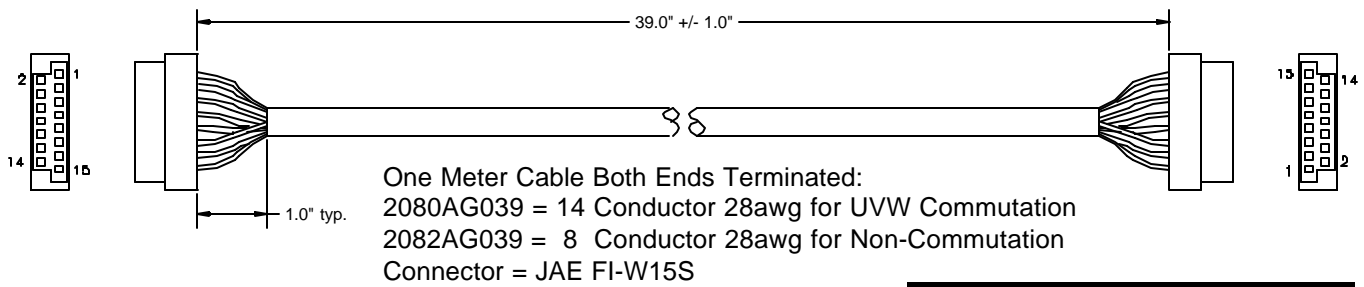


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# CABLE OPTIONS

(2080AG039, 2082AG039, 2081AG019, 2083AG019)

Consult Factory for Custom Lengths



Half Meter Cable One End Terminated:  
 2081AG019 = 14 Conductor 28awg for UVW Commutation  
 2083AG019 = 8 Conductor 28awg for Non-Commutation  
 Connector = JAE FI-W15S

Pin Number	Signal Function	2080AG039	2082AG039
		2081AG019	2083AG019
		Wire Color	Wire Color
1	A	Brown	Brown
2	A -	White	White
3	B	Blue	Blue
4	B -	Green	Green
5	Z	Orange	Orange
6	Z -	Yellow	Yellow
7	U	Violet	
8	U -	Gray	
9	V	White/Brown	
10	V -	White/Red	
11	W	White/Orange	
12	W -	White/Yellow	
13	Vcc	Red	Red
14	GND	Black	Black
15	No Connect		

Note:

1. Cable has internal foil shield with 28awg drain wire trimmed to jacket edge.
2. Unused wires to be locally isolated from adjacent signal wires, Vcc and GND to prevent damage to encoder signals.

## For brushless motors requiring commutation timing:

- Encoder drawings indicate position of encoder hub to encoder body at Z (index). Rotating the hub to this position allows for known U channel transition state, prior to assembling to motor shaft.
- Power appropriate motor windings to lock motor shaft location to match the appropriate U transition, prior to assembly to motor shaft.
- Flex mount screws can be loosened to allow rotation of encoder body. While mechanically back driving the motor, monitor motor winding EMF position to the powered encoder commutation position. Rotate the encoder body to achieve accurate timing of encoder commutation feedback channels to the appropriate motor winding EMF. Mounting slots in encoder flex mount allow for 30 mechanical degrees of rotation. Retighten the flex mount screws.

Additional installation and handling instruction available at: [www.quantumdev.com](http://www.quantumdev.com)

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