

# Quantum Devices

## Quantum Devices Encoder Mounting Instructions

### Applicability:

This guide applies to the following encoders: LP12, QR12, QR145 & QR200. Please refer to the specific encoder spec sheet for more detailed information.

### Shaft & Endplate Requirements:

In order to ensure proper operation and longevity, QDI encoders must be mounted so that the following specifications are not exceeded:

- Radial Shaft Runout 0.007"
- Axial Shaft Movement  $\pm 0.030$ "
- External forces to body of encoder cannot exceed 1 pound of force
- Shaft must be perpendicular to the endplate within 0.5 degrees
- Mounting surfaces for shafts and end plates should be smooth and free from burs, debris, liquid, including grease and oil.

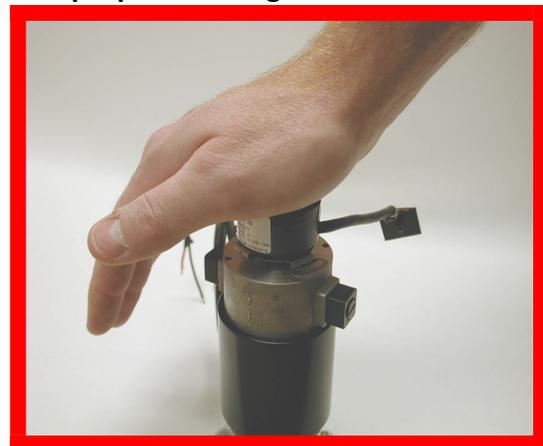
### Mounting:

The encoder should slide freely onto the mounting shaft. We recommend using a "Two-finger" method to ensure that excessive force is not applied to the encoder. In instances where the encoder does not slide onto a shaft, the encoder shaft should not be reamed or modified, as this will damage the encoder. The mounting shaft should instead be altered to accommodate the encoder.

Proper "Two Finger" Method



Improper: Pushing & Excessive Force



## Centering:

The encoder should be left to find its own center of placement on the shaft. Flex should be flush with mounting surface. Encoder should have no bias or springiness.

### Encoder Relaxing to Center



## Tighten Set Screws:

If using a thread-locking compound, it is advisable to use a type that can be easily removed in case the encoder needs to be taken off. Standard recommended torque is as follows:

LP12	0.050" hex socket	1.9 inch pounds
QR12 and QR145	0.050" hex socket	4.3 inch pounds
QR200	1/16" hex socket	7.9 inch pounds

### Tighten Set Screws



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### Timing Mark:

Aligning the marks on the shaft and cover of the encoder indicate the firing of the index or Z pulse. This is also the beginning of the firing of the U channel. This general alignment may aid in motor or machine timing.

**Timing Mark Alignment**



### Fine Alignment:

Encoder may be rotated to fine tune motor or machine timing. A typical application would be to use an oscilloscope to view the back driving of a motor.

**Rotating to Time Encoder**



## Tighten Down the Flex:

Tighten down the flex mount screws, taking care not to bias or apply force to the encoder. The mounting screws must not push the position of the flex towards or away from center. This condition will transfer an uncontrolled radial load to the encoder bearings.

**Tightening Down the Flex**



**Fully Mounted**

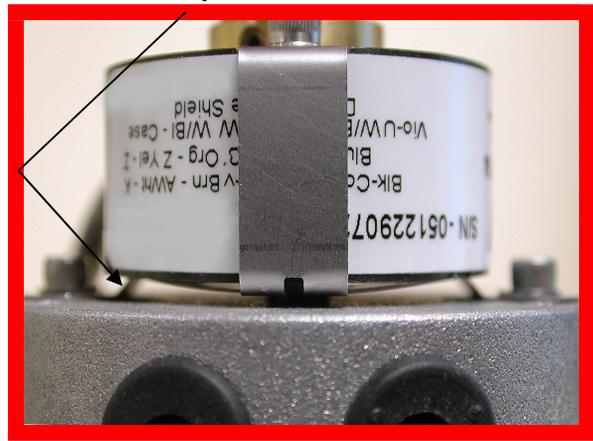


Normal spacing underneath the encoder is shown in the lower left photo. The photo at the lower right shows improper spacing due to a compressed flex mount.

**Correct Spacing**



**Compressed Flex Mount**



## Cable Routing

When done incorrectly cable routing can hinder proper encoder functioning. Cables should be routed as short as possible and not routed so that the encoder's ability to move is limited. Improper mounting includes; pinching cable between the end bell and the encoder body, routing a cable across the encoder or next to a rotating shaft, and routing the encoder cable under the encoder.

**Proper Cable Routing**



**Improper: Run Past Shaft**



**Improper: Run Under Encoder**



## Handling Equipment After Encoder is Mounted

Care should be taken when handling or lifting equipment after the encoder is mounted. The following photographs show a typical motor mounting.

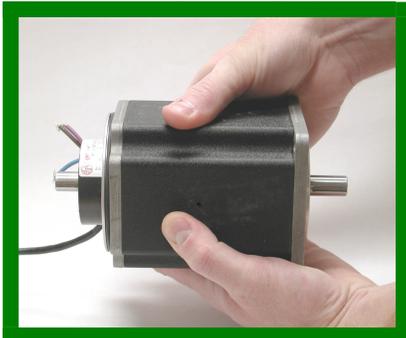
### **Proper Handling Method:**

The motor is lifted with two hands by the housing. No force is applied to the encoder.

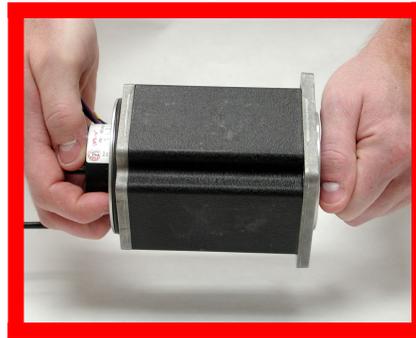
### **Improper Handling:**

The motor is being lifted by the encoder. Due to the mass of the motor, the preload of the encoder bearings will be compromised and ultimately lead to premature failure of the encoder.

**Proper Handling: Lifting by Housing**



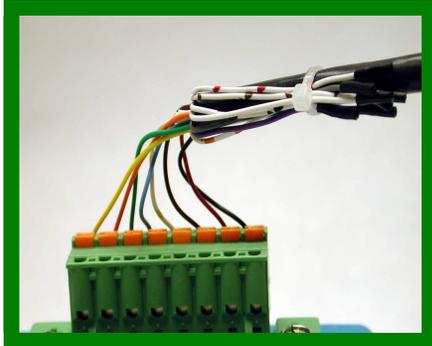
**Improper Handling: Lifted by Encoder**



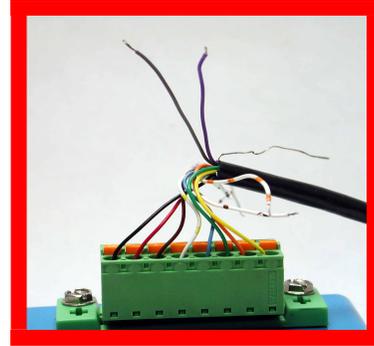
## Encoder Wiring

Encoder wiring that is not terminated should be electrically isolated using heat shrink tubing or other method and tied off. Wires that are unprotected may short to + Voltage, Ground, or each other. This will damage the encoder.

**Proper Wiring**



**Improper Wiring**



## Encoder Removal

When removal of the encoder is needed, care must be taken so that undue force is not applied to the body of the encoder. If no other alternative exists, the brass shaft is the only portion of the encoder that can withstand relatively low impact prying. The encoder should not be heated to aid in removal. Notice in the following photograph how the tip of the screwdriver is in contact with only the brass shaft.

### **Improper Prying:**

The tip of the screwdriver is contacting the encoder housing, creating undue stress on the internal bearing assembly.

### **Improper Pulling:**

Excessive force should not need to be used when removing encoder.

**Proper Prying**



**Improper: Prying on Body**



**Improper: Pulling**

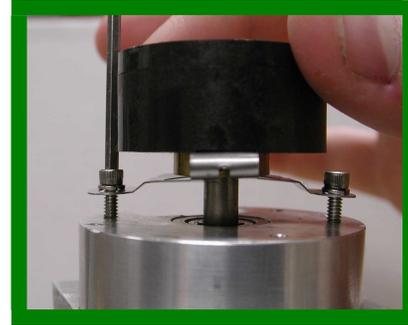


## QR145 1.575" Bolt Circle Flex Mount Mounting Instructions

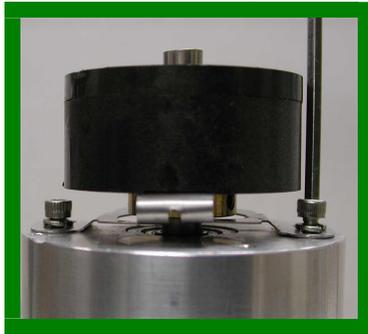
For QR145 encoders utilizing the 1.575" BC flex mount, a special method should be followed to avoid mounting hardware to encoder interference during the assembly process.

### **Proper QR145 1.575" BC Flex Mounting:**

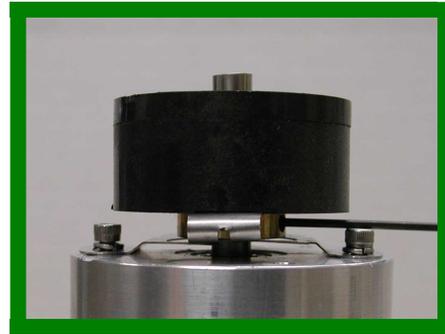
- 1) Locate mounting hardware through flex without starting screw.
- 2) Gently lift up on encoder body and start mounting hardware with body of encoder above bolt heads.



- 3) Tighten hardware while letting encoder relax into natural position.



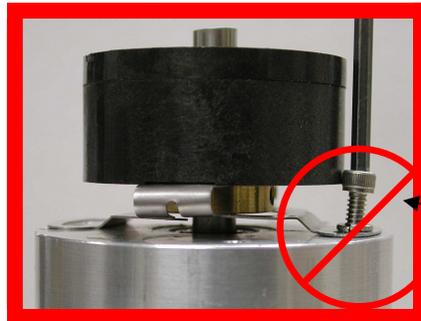
- 4) After adjusting for position, Tighten set screws



### **Improper QR145 1.575" BC Flex Mounting:**

The mounting hardware improperly contacts edge of the encoder and is driven at an angle.

#### **Improper: Mounting Hardware Contacts Encoder**



Machine Screw Head is interfering with side of encoder.