# INSTALLATION INSTRUCTIONS FOR HOLLOW SHAFT STYLE ENCODERS USING A TETHER PIN

Overview:

The mechanical workings of an encoder are straightforward. The rotor portion is coupled to a shaft, so that it will turn without slippage, and the encoder body, or stator, is prevented from rotating so that it serves as a physical reference for the rotation of the rotor.

Within this framework, certain physical properties associated with mechanical coupling must be observed to ensure a long operating life. The stator of the encoder and any connector and cable loop are supported by the rotating shaft by ball bearings. Mechanical processes are not perfect and no matter how smoothly a rotating shaft may appear to turn, it will wobble when rotated. This small amount of movement is referred to as runout and is usually a few thousandths of an inch (maximum) for most industrial installations. This same principle applies to the encoder shaft as well. And here lies the heart of the installation problem: we need to allow the wobble to occur without allowing the stator to rotate.

If you were to hard couple the encoder shaft to a motor shaft and also hard couple the encoder body to the motor casing, the runout of the motor shaft would fight against the smaller, more accurate encoder bearings. This is a perfect “bearing grinding” machine! The motor bearings will “win” in this contest and you will be replacing encoders on a regular basis.

The solution, of course, is to ensure that some part of the assembly is flexible to minimize the stress on the encoder bearings. In the case of a shafted encoder, there is typically a flexible coupling between the encoder shaft and the motor shaft. For hollow shaft encoders, a flexible tether is used between the encoder body and the motor casing. Armed with this knowledge, you are ready to install your encoder.

 

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Before you begin:

Ensure that you have the correct hardware for your installation and that it all fits properly. Mating parts should line up, bolt thread pitches and lengths should be appropriate and all the tools should be the correct type and size and should be at hand. Also, have these installation instructions so you don't miss any important installation steps.

Step 1

Verify that the mating shaft is the correct size nominal minus 0.002 inch max. is preferred. (Example: 5/8" shaft should be 0.6250 to 0.6230 inch diameter) Check that there are no burrs on the mating shaft and that the shaft length is correct for the encoder. Also, check shaft runout is less than 0.005" TIR. Less runout = less wobble. Excessive runout may cause premature bearing or tether damage.

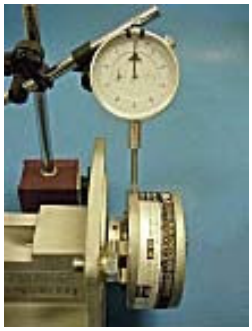
Step 2

Drill a hole in the casing to accept a tether pin. For HS25 and HS35 use a 0.25" diameter dowel pin, for HS45, use 0.375" diameter dowel pin. Locate the pin center at radius 1.125 inch for HS25, 1.5 inch for HS35 and 3.0 inch for HS45. Make sure it is in the proper orientation relative to the tether block placement so that the finished installation will be "clocked" correctly. Insert the tether pin to the correct depth and secure with a press fit or adhesive.

Step 3

Use the appropriate hardware to secure the slotted tether block firmly to the encoder body and slide the assembly onto the mating shaft. Rotate the encoder body so that the tether block engages the pin. Do not bottom out the pin in the tether block. Leave at least 1/16 inch between the tether pin and the block. Tighten the shaft clamp screw to between 20-30 in-lbs for HS25, HS35 and HS45 for best results.

Step 4



Sometimes wobble of the encoder housing may be visible and is not unusual. With an indicator on the outside of the encoder body, rotate the mating shaft slowly. If the reading exceeds 0.02 inch TIR (total indicator reading) it is recommended that you reinstall the encoder after adjusting the stub shaft concentricity.

Step 5

Connect the mating connector and your installation is complete.

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