DELEVAN™
A REGAL REXNORD BRAND

Frameless Resolver Installation and Mounting

Installation of the Resolver is normally a two-step process.

1) Firmly secure the resolver rotor to the motor shaft, aligning the electrical zero mark so that the resolver stator will have the lead exit in the approximate desired position when marks coincide. Then attach the resolver stator to the motor end-bell with a temporary snug fit.

2) Align the resolver zero position with a motor pole for commutation. This can be accomplished several different ways. One common method is to apply a DC current across two motor phases, which "locks" the motor shaft at a pole position. The resolver is then connected to an angle position indicator, and the resolver stator is rotated until the indicated angle is zero degrees. The resolver stator is then firmly secured.
   A second method is to mechanically drive the motor with a second motor. While spinning, the back EMF of the motor being configured is viewed on an oscilloscope. The resolver signals are also viewed on the scope, and the resolver stator is rotated until the zero crossing of the back EMF coincides with the resolver zero position signal. The resolver stator is then firmly secured.

Mounting Considerations

Frameless resolvers are supplied as separate rotor and stator assemblies to be directly mounted to the application housing and the shaft of the user's system. The user application will provide the mounting surfaces and bearings in the design of the mounting system and should consider the following guidelines:

1) Eccentricities between the rotor and the stator mounting surfaces should not exceed .003 inch.

2) Mounting shoulders should be perpendicular to the bores and shafts within .0005 inch

3) The fit between the bore and the maximum housing OD and between the shaft and the rotor ID should be from .0002 to .001 inch loose. This will assure that there is no line to line fit or interference fit.

4) Axial misalignment or variation in the mounting dimensions between the rotor and the housing mounting surfaces should not exceed .015 inches.

5) The designer should select housing and shaft materials with thermal coefficients of expansion that are similar to that of the resolver rotor and stator.

The above guidelines are for a typical application. Depending on the unit size, air gap clearance, accuracy and other electrical requirements, these guidelines may require looser or tighter tolerances.

Effects of Improper Mounting

If due to system tolerance build up or defective system hardware, the preceding guidelines are exceeded, some changes in the electrical characteristics can be anticipated. The magnitude of these changes will depend on the resolver size, air gap clearance and whether it is a single speed or multispeed resolver. The performance of the unit will generally be affected as follows:

1) For Axial offset:
   - Accuracy (electrical error) will increase only slightly
   - Null Voltage will change
   - Transformation ratio will decrease
   - Phase shift will increase
   - Input current and power will increase

2) For Radial offset
   - Accuracy (electrical error) will increase proportionally
   - Null Voltage will change
   - Transformation ratio will show small change
   - Phase shift will show small change
   - Input current and power will show small change

3) For Rotor or Housing Tilt

   If the rotor or housing tilt is slight (about .0001 or .0002 inches with respect to each other), very little change will occur in any parameter. Tilts greater than this must be avoided in units with a small air gap clearance to prevent contact between the Rotor assembly and the Stator assembly. In addition, increased tilt between rotor and stator will yield an increased position and velocity error.

JLP - Resolver Install

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