

WP0310

Dodge® Tigear-2 straight bore reducers: rigid mounting

Dodge Customer/Order Engineering

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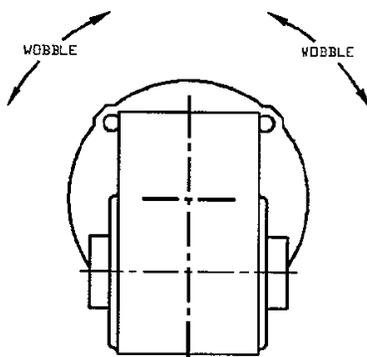
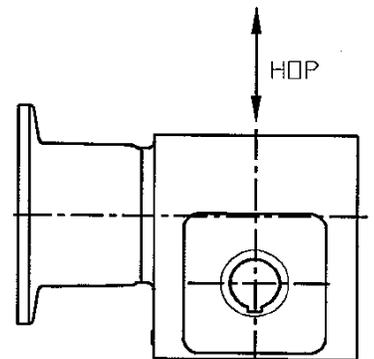


This paper is designed to address issues of rigidly mounting a Tigear-2 straight bore shaft mounted speed reducer.

There are three main reasons to avoid rigidly mounting a Tigear-2 shaft mounted speed reducer and they are listed below.

The first issue with rigid mounted speed reducers has to do with “hop”. Hop is the movement of the mounted speed reducer in a direction perpendicular to the axis of shaft rotation as shown below.

Hop occurs because the axis of the shaft is not concentric to the axis of the output bore of the reducer. This is caused by the machine tolerances of the customer shaft, the machine tolerances of the reducer bore size, and the machine tolerances of the reducer bearing journals. As an example, consider a Tigear-2 reducer with a nominal 1” hollow bore. The actual hollow bore would be machined to 1.0025” / 1.0005” and the customer’s shaft would typically measure 1.000” / 0.998”. This would result in a 0.0045” clearance between the reducer bore and the shaft. The reducer is retained onto the shaft by two set screws in the hollow bore of the Tigear-2 reducer. As the set screws are tightened, the reducer is pushed to the opposite side away from the set screws and eliminates the clearance between the reducer hollow bore and the shaft. Once this is done, the axis of the reducer and the shaft are no longer concentric but are now offset by 0.0023”. This does not account for the bearing journals which could add additional error.



The second consideration is “wobble”. Wobble, shown in the next illustration, is the side to side or rocking movement of the shaft mounted reducer due to run-out in the reducer bore and the customer shaft. Even though every reducer is precision machined, there will be some inherent error in the manufacturing process due to machining tolerances. This same error also applies to the customer shaft. Both hop and wobble will to some extent be present in all straight bore shaft mounted reducers and is considered normal. All shaft mounted reducers are intended to “float” with the customer’s shaft during operation and must be unrestrained to provide the longest life.

Because of the issues listed above, it is not recommended to rigidly mount a Tigear-2 straight bore reducer. The reducer is intended to float as the driven shaft rotates. By allowing the reducer to float, issues associated with hop and wobble will be minimized and the base-to shaft center errors will be eliminated.

