

Thrust Bearing Orientation

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Pump manufacturers use a wide variety of styles and mounting arrangements for the bearings in their equipment based on applications and load carrying requirements. On smaller general purpose and process pumps, it is usual to see a single row radial bearing and a double row thrust bearing.

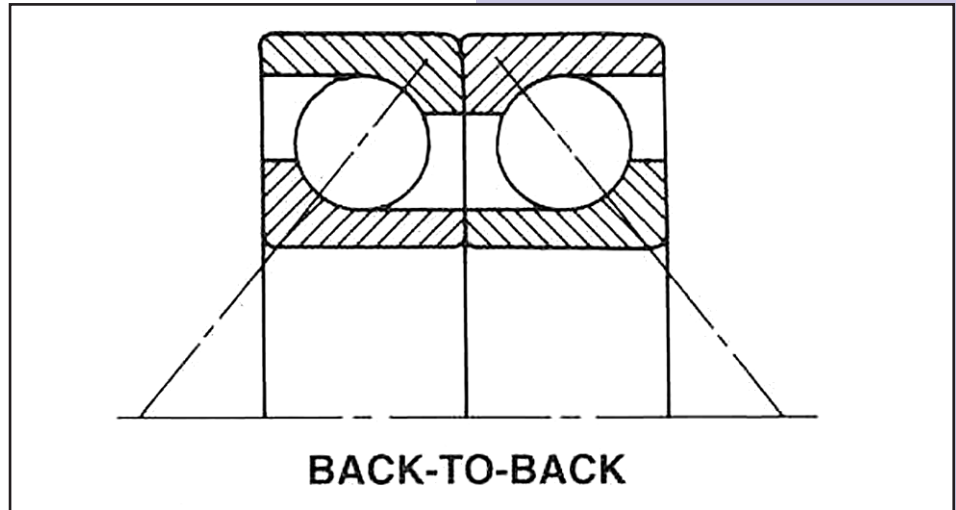
As the machines become larger, run faster and more axial and radial load is imposed on the shaft and bearing assembly, manufacturers often shift to larger ball or roller radial bearings and duplex pairings of angular contact bearings to handle the increased forces. Inevitably, when the subject of duplex angular contact ball bearings comes up, the questions about how to correctly mount them also comes up.

Back-to-Back

Many manufacturers mount the pair of angular contact bearings on the shaft in the "back-to-back" configuration. This is where the wider outside races are touching each other and the bearings are clamped together on the shaft by a locknut and lockwasher. This makes a very strong radial bearing and a thrust bearing capable of withstanding axial loading in both directions. In a typical installation, when you look at the bearings mounted on the shaft correctly, you can see quite a bit of the balls since the outer, wider flange of the one bearing is touching the wider flange of the other bearing.

Face-to-Face

Another equally effective method is to mount the bearings on the shaft in the "face-to-face" orientation. In this case the inner races are held together with the locknut and lockwasher but the rugged load carrying capability of the arrangement is not realized until the outer races of the bearings are also "clamped" in place. This is done usually with a separate bearing retainer although sometimes springs are used to load the bearing races. With a separate retainer the procedure may call for shimming between the retainer and the bearing housing to establish a certain "preload" or internal running clearance. If springs are used, it is imperative to use ones with the correct spring rates, not just any spring. While this set up is a bit more complicated, the "face-to-face" mounting arrangement can accommodate more shaft-to-housing misalignment and still provide a rigid radial bearing thrust load capability in both directions and a long useful life.

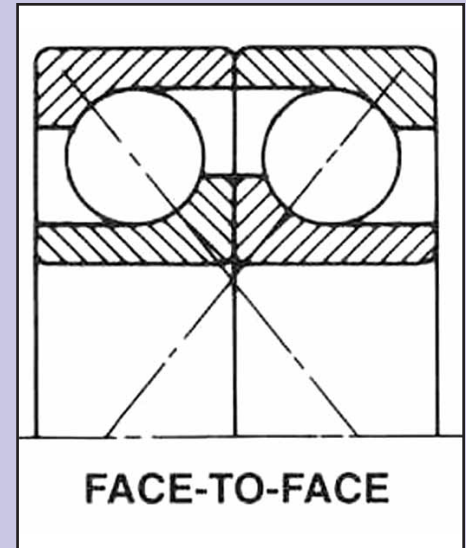


Back-to-Back Mounting

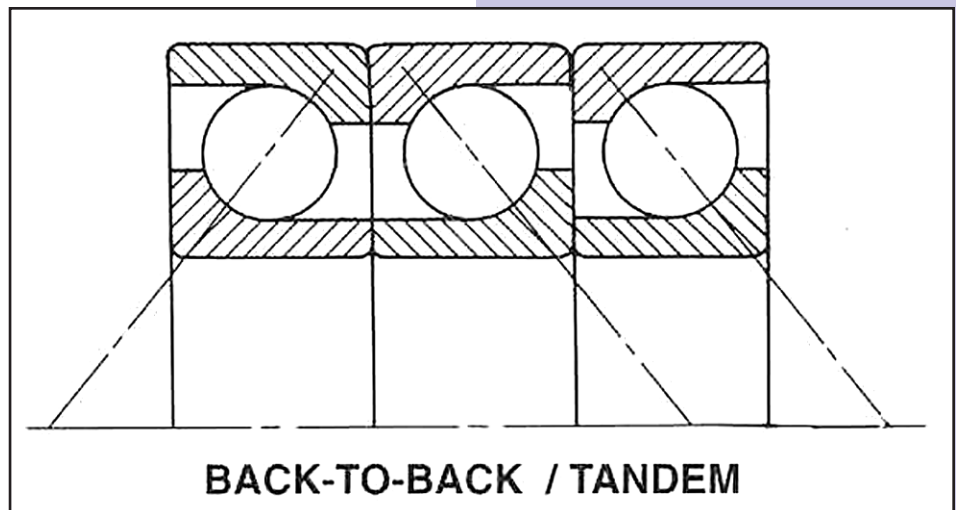
Tandem

The third method is to mount the angular contact bearings on the shaft in tandem. This is where both bearings are facing in the same direction. This arrangement makes a very heavy duty thrust bearing arrangement, but it will not carry any radial load and accepts thrust loading in only one direction. A third angular contact bearing or radial bearing must be added to the stack to accept the radial loads. This provides the maximum load carrying capability in the axial direction coupled with a very robust radial bearing.

The information from the equipment manufacturer should always be consulted for the correct orientation of any multiple bearing stack to assure their proper installation. Carefully installed, these arrangements will provide a very long and useful life. Incorrectly installed, they can fail almost immediately. ■



Face-To-Face Mounting



Back-to-Back / Tandem Mounting