

Selection and Installation of HIWIN Ballscrews

(1) A ballscrew must be thoroughly cleaned in white spirit and oil to protect against corrosion. Trichloroethylene is an acceptable degreasing agent, ensuring the ball track free from dirt and damage (paraffin is not satisfactory). Great care must be taken to ensure that the ball track is not struck by a sharp edged component or tool, and metallic debris does not enter the ball nut (Fig. 1.1).

(2) Select a suitable grade ballscrew for the application (ref. Table 1.5). Install with corresponding mounting disciplines. That is, precision ground ballscrews for CNC machine tools demand accurate alignment and precision bearing arrangement, where the rolled ballscrews for less precision applications, such as packaging machinery, require less precise support bearing arrangement.

It is especially important to eliminate misalignment between the bearing housing center and the ballnut center, which would result in unbalanced loads (Fig. 1.2). Unbalanced loads include radial loads and moment loads (Fig. 1.2a). These can cause malfunction and reduce service life (Fig.1.2b).

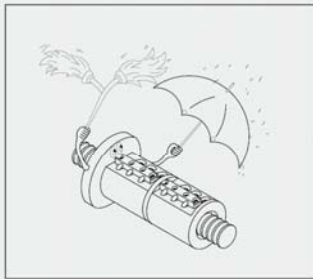


Fig 1.1 Carefully clean and protect

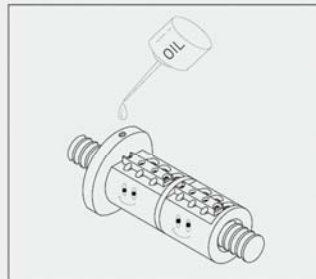


Fig 1.2 Oil lubrication method.

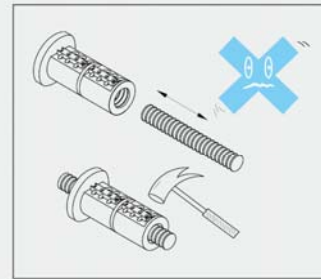


Fig 1.3 Carefully protect the nut

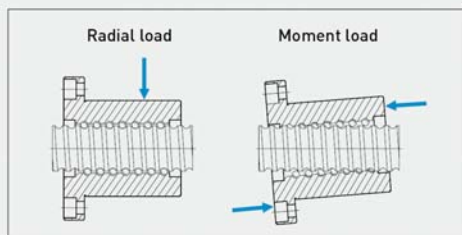


Fig 1.2(a) Unbalance load caused by misalignment of the support bearings and nut brackets, inaccurate alignment of the guide surface, inaccurate angle or alignment of the nut mounting surface

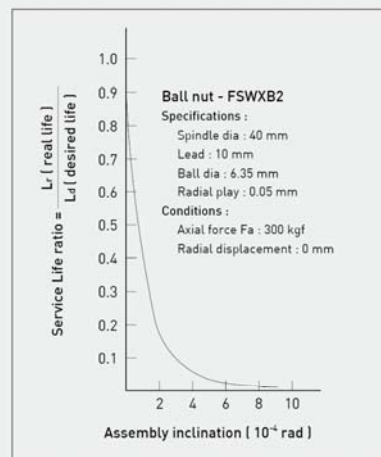
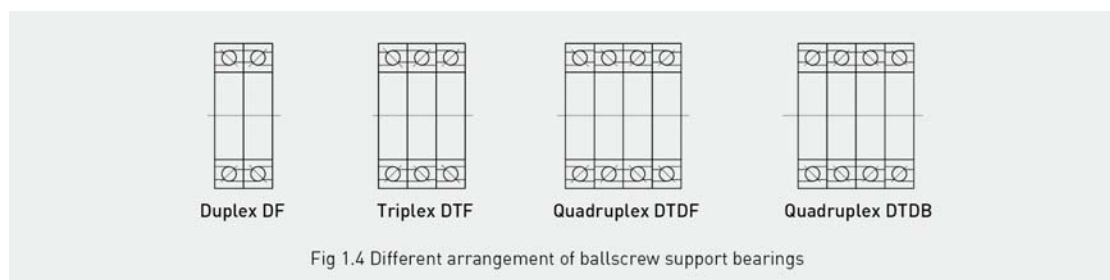


Fig 1.2(b) The effect on service life of a radial load caused by misalignment

(3) To achieve the ballscrews' maximum life, recommend the use of antifriction bearing oils. Oil with graphite and MoS₂ additives must not be used. The oil should be maintained over the balls and the balltracks.

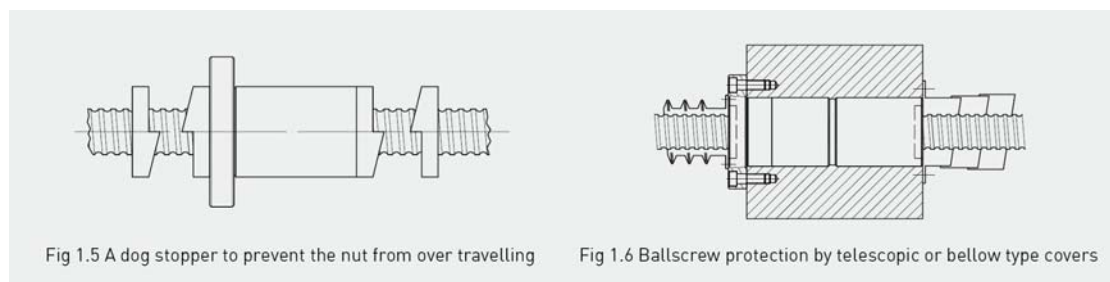
(4) Oil mist bath or drip feeds are acceptable. However, direct application to the ball nut is recommended (Fig. 1.3).

(5) Select a suitable support bearing arrangement for the screw spindle. Angular contact ball bearings (angle=60°) are recommended for CNC machinery. Because of higher axial load capacity and ability to provide a clearance-free or preloaded assembly (Fig. 1.4).



(6) A dog stopper should be installed at the end to prevent the nut from over-travelling which results in damage to ballscrew assembly (Fig 1.5).

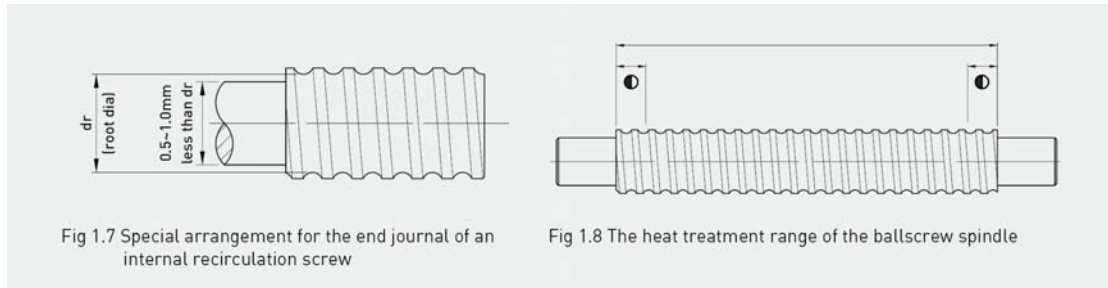
(7) In environments contaminated by dust or metallic debris, ballscrews should be protected using telescopic or bellow-type covers. The service life of a ballscrew will be reduced to about one-tenth normal condition if debris or chips enter the nut. The bellow type covers may need to have a threaded hole in the flange to fix the cover. Please contact engineers when special modifications are needed (Fig 1.6).



(8) If you select an internal recirculation type or an endcap recirculation type ballscrew, one end of the ball thread must be cut through to the end surface. The adjacent diameter on the end journal must be 0.5 ~ 1.0 mm less than the root diameter of the balltracks (Fig 1.7).

(9) After heat treating the ballscrew spindle, both ends of the balltracks adjacent to

the journal have about 2 to 3 leads left soft, for the purpose of machining. These regions are shown in (Fig. 1.8) with the mark on HIWIN drawings. Please contact engineers if special requirements are needed in these regions.



(10) Excessive preload increases the friction torque and generates heat which reduces the life expectancy. But insufficient preload reduces stiffness and increases the possibility of lost motion. Recommends that the maximum preload used for CNC machine tools should not exceed 8% of the basic dynamic load C.

(11) When the nut needs to be disassembled from/assembled to the screw spindle, a tube with an outer dia. 0.2 to 0.4 mm less than the root diameter (ref. M37) of the balltracks should be used to release/connect the nut to from/to the screw spindle via one end of the screw spindle shown in Fig. 1.9.

(12) As shown in Fig 1.10, the support bearing must have a chamfer to allow it to seat properly and maintain proper alignment. HIWIN suggests the DIN 509 chamfer as the standard construction for this design (Fig. 1.11).

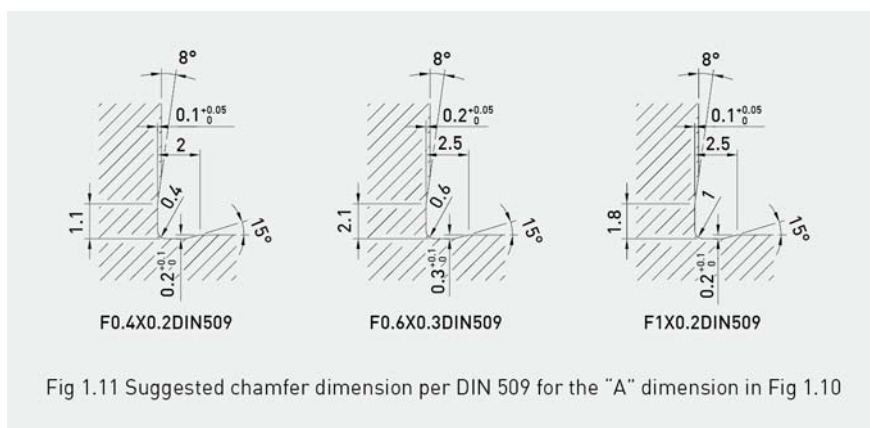
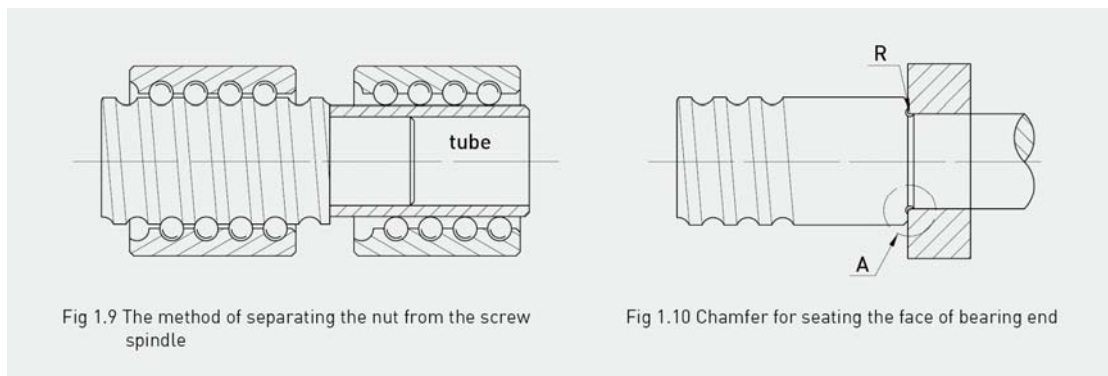


Fig 1.11 Suggested chamfer dimension per DIN 509 for the "A" dimension in Fig 1.10