

Automotive TechTips

TIMKEN
Where You Turn

Volume 5 • Issue 3

Maximizing bearing performance and life remains an objective throughout The Timken Company, from design teams and manufacturing associates to our field sales team and distributors. TechTips helps you install and maintain Timken® bearings, seals and components to take full advantage of their performance and the systems in which they operate. For more information regarding Timken automotive products and services, visit www.timken.com or contact your local Timken distributor.

BALL BEARING INSTALLATION



Internal Clearance

In the manufacture of ball bearings, it is standard practice to assemble rings and balls with a specified internal clearance. This characteristic is necessary to provide some pre-engineered extra clearance that is necessary to compensate for the tight fit effects of press fitting the bearing rings on shafts or housings at installation.

Internal clearances are often utilized to compensate for

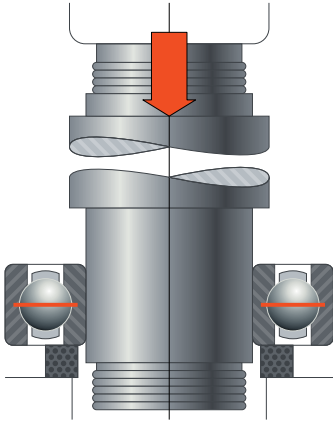
thermal expansion of bearings, shafts and housings or to provide a contact angle in the bearing after installation. Radial clearance used to create a contact angle is typically used in angular contact ball bearings.

Radial measurement is accepted as the more significant characteristic because it is more directly related to shaft and housing fits. It also is the method prescribed by the American Bearing Manufacturers Association (ABMA).

Proper Installation Procedures

While installing a bearing, force should always be exerted against the ring being installed. In other words, when installing a bearing tight fit on a shaft, the pressure should be applied against the inner ring. When installing a bearing tight fit in a housing, press against the outer ring. The ring having the tight fit should be pressed. Always be sure to apply pressure slowly and evenly. Following are three different scenarios of how ball bearings can be installed.

Proper Shaft Mounting



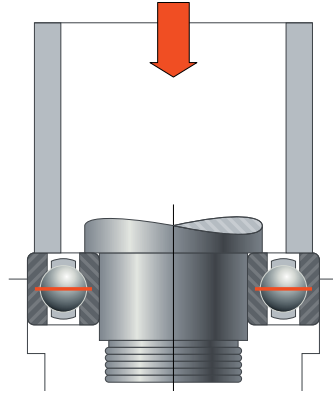
Proper Shaft Installation

Support the bearing's inner ring as the shaft is pressed into the bearing.

Proper Housing Installation – Rotating Housing and Loose Shaft

Press through the outer ring to overcome the tight fit between the outer ring and the housing

Proper Housing Mounting – Rotating Housing and Loose Shaft

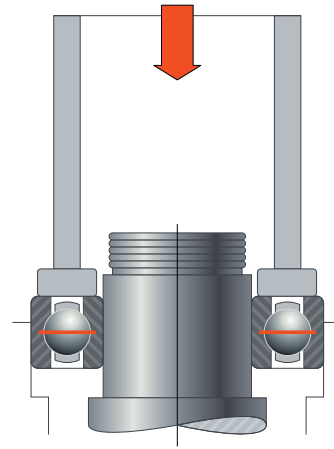


bore. Note that in this scenario the shaft does not rotate and is loose fit in the inner ring, while the outer ring is tight because it rotates in this application.

Proper Simultaneous Housing/Shaft Installation

Press through both rings simultaneously to overcome tight fits on either or both the shaft

Proper Simultaneous Housing/Shaft Mounting



and/or housing. Note that in this scenario, the shaft is already in place. Attention must be given to any bearing on the other end of the shaft to ensure it is properly supported and not damaged. Make sure there is no contact (or any damage) with the bearing cage. Any indication of a bent bearing cage renders the bearing unusable.

Did You Know?

- 1) A Timken® Conrad deep-groove ball bearing is a standard single-row, deep-groove bearing. It also is referred to as a radial ball bearing. This type of Timken ball bearing is capable of handling radial and axial loads. A wide variety of sizes are available in extra-light to heavy series. Various shield and seal configurations help protect internal bearing components and retain lubricants.
- 2) The various types of damage that may occur in ball bearings are basically the same as damage that may occur in other anti-friction bearings, including cylindrical, spherical, needle and tapered designs. Refer to Timken TechTips Version 3, Issue 2; Tapered Roller Bearing Damage Analysis to learn more about damage modes.

⚠ WARNING Failure to observe the following warning could create a risk of serious injury.

Proper maintenance and handling procedures are critical. Always follow installation instructions and maintain proper lubrication.

TechTips is not intended to substitute for the specific recommendations of your equipment suppliers. Every reasonable effort has been made to ensure the accuracy of the information contained in this writing, but no liability is accepted for errors, omissions or for any other reason.

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10-09 Order No. 10127