Proper Installation of Bearing Components

This information describes the right way to install the bearing cones (inner races) on shafts (spindles) and the bearing cups (outer races) in housings to maximize bearing performance.

Proper Inner Race Installation

Before installing the inner race it is important to check the shaft for any signs of wear. A worn shaft can lead to bearing misalignment, which may reduce bearing life. Check for adequate seating of a inner race against a shaft shoulder (Example A). Ensure proper inner race seating by using a 0.002 in. (0.05 mm) feeler gauge. Check for any gap between the inner race backface and the shaft shoulder.

Bearing cage damage may cause problems early in the bearing's service life. Do not use cages showing deviation from factory shape and roundness; replace inner race assembly if damaged. Press inner races on the shaft using the proper drives to mount them with a tight fit (Examples B and C). These drivers are commercially available, or are easily makeable from mild (soft) steel. Inner race drivers do not contact the cage. For a press fit, cool or heat tapered roller bearings to aid in assembly or removal. Temperature extremes can cause permanent metallurgical damage to the bearing so take proper precautions and use correct methods when heating and cooling bearings. Never heat bearings above 250°F (129°C). Electric ovens and electrically heated oil baths are commonly used. Protect the bearings from the heat source with a simple wire screen holder or ceramic plate.

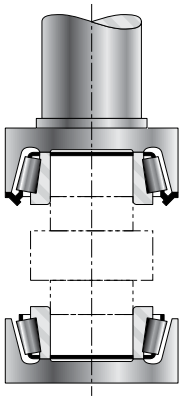


Hot oil pots, with a tray or hook to support the bearing cone (inner race), effectively ease the installation of tight inner races on shafts.

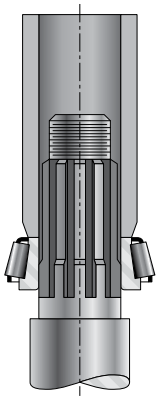
Place the heated inner race solid against the cold shoulder on the shaft until the inner race grabs on to the shaft. The heated inner race will pull away from the cold shoulder unless held in position. Use feeler gauges to seat the inner race fully against the shoulder after the parts cool. Many loose bearing settings (excessive end play) are caused by an unseated inner race working away from the shoulder in service.



Example A



Example B



Example C

Skill Level: Difficult | Special Tools: Oil Bath or Electric Heater, Outer Race Drivers

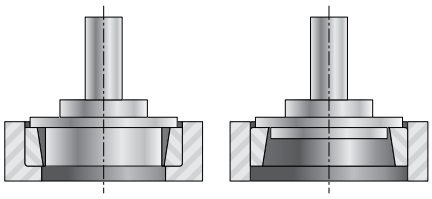
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Proper Outer Race Installation

Use a properly designed driver when installing a tightly fitted outer race into a hub or housing. Consult your Timken representative for the proper sizes and details of outer race drivers. The outer race drivers only contact the face of the outer race, never the raceway surface. Contact with the raceway may cause scratches, dents or raised metal that may lead to premature bearing fatigue (Examples D and E). Check the outer race for proper seating against the housing shoulder using feeler gages.

Outer races that will be installed into hubs or housings with a press fit, particularly aluminum hubs, may be shrunk in a deep freeze unit, cooled to -65°F (-53.9°C) for one hour before incurring potential damage. Use a thermostat along with a freezer unit or a properly calibrated thermometer to control temperature. Use commercial refrigeration equipment to chill outer races down to about -20°F (-28.9°C). To reach colder temperatures use a bath of dry ice (solid CO_2) and automotive antifreeze (ethylene glycol) in about a 50/50 mixture.

NOTE: Do not add water. Some dry ice contains embedded water ice and will not have the cooling ability of pure dry ice. In such a case, use a higher proportion of dry ice and less antifreeze. Consult your Timken service representative for additional details.



Example D Example E



Thermostatically-controlled freezer units aid in the installation of tight-fitted cups in hubs.

⚠WARNING
Failure to observe the following warnings could create a risk of death or serious injury.

Never spin a bearing with compressed air. The components may be forcefully expelled.
Proper maintenance and handling practices are critical. Always follow installation instructions and maintain proper lubrication.
A bearing/component should not be put into service if its shelf life has been exceeded.

CAUTION
Failure to follow these cautions may result in property damage

Use of improper bearing fits may cause damage to equipment.
Do not use damaged bearings.

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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