

Food Grade Mounted Ball Bearing Installation Manual (TP, TPC, SUC, SNA and IP69K series)



Food grade TP, TPC, SUC, and SNA series and IP69K food safe bearings are flange mounted thermoplastic and stainless ball bearings for use in corrosive and washdown environments common to chemical, food handling and pharmaceutical industries. All mounted ball bearings arrive factory lubricated, sealed, and ready to install. IP69K rated bearings take corrosion and contamination protection to the next level for the most challenging dust and waterproof requirements.

TP/TPC/SU/SN and IP69K Bearings Are Best For:

Speed: 0-3600 RPM, based on the bearing inserts limiting speed with an h7 tolerance shaft

Temperature: -10 ° F to 212° F

Normal service/PM conditions: Receive regular PM or easily inspected

Environment: Wet and corrosive environments. IP69K inserts are rated for close range high temperature and pressure caustic washdown and frequent temporary submersion.

Axial shaft movement: Limited or no axial shaft movement expected. For low-speed applications removal of the shaft locking mechanism will allow for limited axial displacement.

Ball Bearing Temperature Limits:

Temperature Range	Product Category	Bearing Type
-10 °F to 248 °F	Food Grade and Stainless Mounted Ball Bearings	TP, TPC , SUC, SNA Series Mounted Ball bearings
		440 C Stainless C3 Mounted Ball Bearing, Standard duty sealing
-10 °F to 212 °F	IP69K Food Safe Mounted Ball Bearings	TP-IP, TPC-IP IP69K Food Safe Mounted Ball Bearings
		440 C Stainless C3 Mounted Ball Bearing, IP69K rated protection

Coefficient of friction mounted ball bearing: $f=0.001$

Coefficient of friction NT polymer sleeve on Steel: $f=0.03$

Coefficient of friction HT750/1000 carbon-graphite sleeve on Steel: $f=0.2$

Shafting Recommendations:

- Shaft tolerance should be (h7) $+0.000/-0.002$ " ($+0.000/-0.051$ millimeters) or better
- Smooth shafting, resistant to corrosion for the service conditions

Installation:

Warning: Because of the possible danger to person(s) or property from accidents which may result from the improper use of products, it is important that correct procedures be followed: Products must be used in accordance with the engineering information specified in the catalog. Proper installation, maintenance and operation procedures must be observed. The instructions in the instruction manuals must be followed. Inspections should be made as necessary to assure safe operation under prevailing conditions. Proper guards and other suitable safety devices or procedures as may be desirable or as may be specified in safety codes should be provided, and are neither provided by High Temp Bearings, Inc. nor are the responsibility of High Temp bearings Inc. This unit and its associated equipment must be installed, adjusted and maintained by qualified personnel who are familiar with the construction and operation of all equipment in the system and the potential hazards involved. When risk to persons or property may be involved, a fail-safe device must be an integral part of the driven equipment beyond the speed reducer output shaft.

1. Clean the shaft and bearing bore thoroughly. If using a setscrew locking bearing, file flats on shaft at set screw locations to improve setscrew engagement with the shaft.
2. Slip the bearing into position. Be sure that the bearing is not on a worn section of the shaft. For tighter fit shafting, tap inner ring face with a soft driver. Do not hammer on the outer ring or housing, as this may damage the bearing races.
3. The bearing outer race is spherical and swivels in the housing to accommodate misalignment. Snug the flange bolts and use the shaft to swivel each bearing until its final position is in the center of free movement top to bottom as well as side to side. Pass the shaft through both bearings without forcing. This will prevent unintended axial or radial preloading. Auxiliary load carrying devices are advisable for side or end loading of pillow blocks and radial loads for flange units where normal to heavy loading or shock loading is encountered.
4. **Use SAE Grade 2 “dry bolts” with a washer under the head or sanitary bolts when necessary;** follow the torque specifications on **Chart 1** to prevent housing fracture or damage. Once tight, turn the shaft by hand. Resistance to turning should be the same as before tightening hold-down bolts.
 - a. For sanitary/hygienic applications: The use of sanitary bolts with a rubber seal under the bolt head is recommended to increase the overall cleanliness and safety of the product.
 - b. Standard Grade 2 bolts should be tightened carefully with flat washers under the head to prevent damage to the housing
5. **For setscrew mounted bearings:** After the shaft is aligned, hand-tighten both setscrews and then tighten the setscrews alternately until the torque is reached according to **Chart 1**. After 24 hours of operation, the setscrews should be re-tightened to assure full locking of the shaft. Wrenches or drivers should be in good condition (flats not rounded over), as this could damage the screws and not allow proper tightening. Screws may be re-tightened many times without damaging the bearings. Setscrews can be replaced to achieve maximum holding power.
6. **For eccentric collar mounted bearings:** Slide the collar against the mating cam end of the inner race of the bearing. Use a steel bar in the hole provided in the collar; tap the collar sharply in the direction of shaft rotation. Tighten setscrew(s) to the proper torque shown in **Chart 1**. To remove bearings, loosen the setscrew(s) and tap the collar in the direction opposite shaft rotation.

Grease Lubrication Guide:

Proper lubrication of the bearing will have the largest impact on achieving a long bearing life. Industry studies have shown that 48% of bearing failures occur due to inadequate lubrication, by both under and over lubrication. Grease allows for supporting bearing loads without excessive stress on the bearing raceways, maintains seal surfaces and provides protection from corrosion.

Stainless ball bearing inserts (SU and SN): Standard mounted stainless steel inserts are lubricated at the factory with H1 certified *ISO VG 220 PAO base oil, NLGI No. 2, aluminum complex thickened grease*. Typical use temperature range is -10°F-248°F. These units can be greased/PM'd

Food Safe IP69K Stainless ball bearing inserts(SUI): Food safe ball bearing Inserts where maximum protection against contamination of the bearing and bearing surfaces are required. These units are factory lubricated for life with H1 certified *ISO VG 220 PAO base oil, NLGI No. 2, aluminum complex thickened grease*. Typical use temperature range is -10°F-212°F. These units **cannot** be greased/PM'd. All lubrication holes have been removed from the insert to prevent contamination intrusion.

PM Schedule: When establishing a lubrication schedule, small amounts of grease at frequent intervals are preferable to a large quantity at infrequent intervals. The correct PM schedule must be based on the application. We have provided some common industry examples as a starting point. **Chart 2** provides recommended lubrication intervals based on an open bearing in a low contamination environment, less than 120 °F using PAO based grease. However, lubrication for mounted ball bearings must also account for temperature effects, environmental contamination, and the ability to lubricate all contacting surfaces effectively. Typical bearing surfaces requiring lubrication include: the raceways, balls, cage and contact seal edges if equipped. Elastomer contact seals are further from the bulk of the grease inside the bearing and receive the majority of the impact from the environment, they will require more frequent lubrication intervals to preserve them.

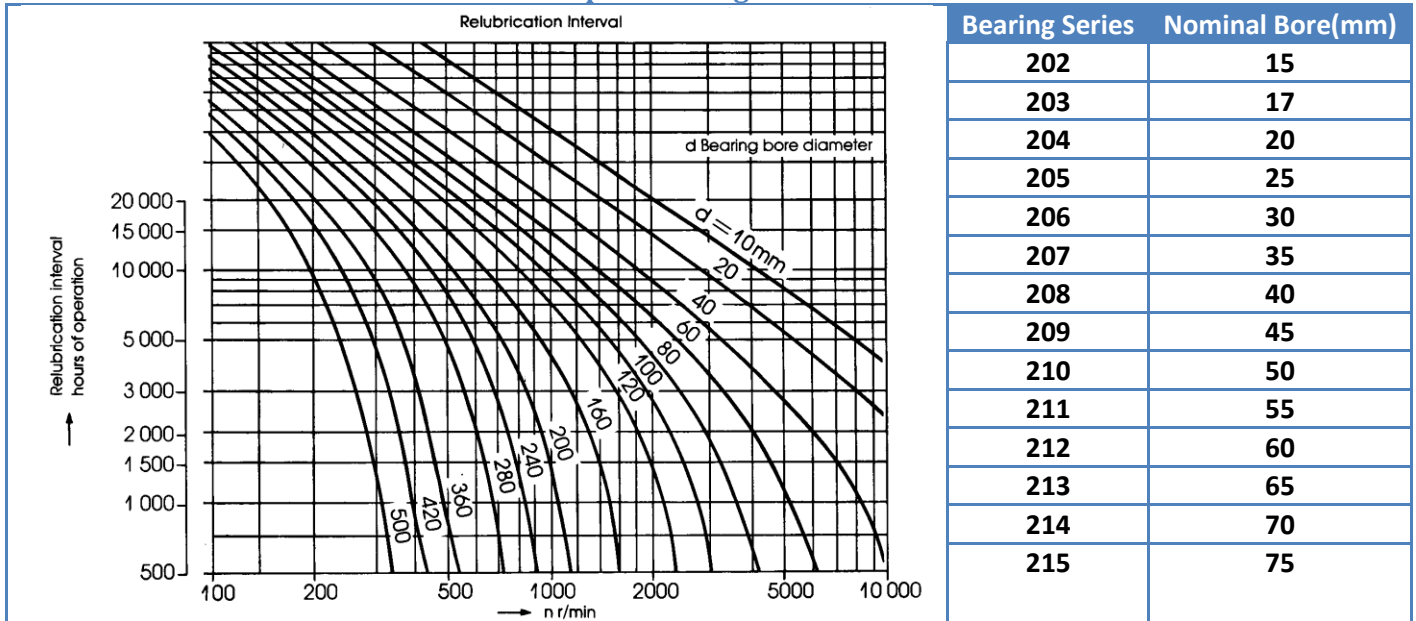
Supplemental 1: is an example PM lubrication schedule for typical conditions using a sealed mounted ball bearing ((UC, NA, UCX, SUC, SNA series) running at 1760 RPM. Exact lubrication periods are best determined by experience, but high heat and contamination will require more frequent replenishment and be purged regularly to prevent wear. The chart takes into account contamination and evaporative oil loss from heat and shorter periods in general to protect the seals from wear.

For low speed applications fewer than 20 RPMS, up to 100% grease fill and a slight show of purged grease at the bearing seals is normal and helps keep contaminants out of the unit.

Chart 1: Torque Specification

Setscrews			Housing Mounting Bolts					
Dry Thread Torque for Stainless Steel Bearing Inserts			Cast Stainless Housings		Thermoplastic Housings			
					Mounted flanges, pillow blocks, and brackets		Tap-Base Pillow Block	
Setscrew Size (in)	Hex Key (in)	Torque (in-lbs.)	Bolt Size (in)	Dry Thread Torque (Grade 2 Bolts) (in-lbs)	Bolt Size (in)	Torque (in-lbs)	Bolt Size (in)	Max Torque (in-lbs)
#10	3/32	25	3/8-16	240	3/8-16	225	3/8-16	175
¼	1/8	60	7/16-14	384	7/16-14	350	7/16-14	350
5/16	5/32	117	1/2-13	600	1/2-13	500	1/2-13	400
3/8	3/16	206	5/8-11	1200	9/16-12	650		
7/16	7/32	321	3/4-10	1950	5/8-11	1000		
			7/8-9	2890				
Setscrew Size (mm)	Hex Key (mm)	Torque (N-m)	Bolt Size (mm)	Dry Thread Torque (N-m)	Bolt Size (mm)	Torque (N-m)		
M5	2.5	2.8	M10	29	M8	15		
M6	3	5.8	M12	50	M10	25		
M8	4	13.4	M16	124	M12	50		
M10	5	23	M20	238	M14	75		
M12	6	43	M22	322	M18	125		

Chart 2: Ideal Lubrication PM Period for Open Bearings



Example: a UC204 bearing is based on a 20mm bore; running at 1760 RPM it has a lubrication period of 15000 hours. Ideal conditions: Clean environment, 32°F-120°F when using common grease.

Supplemental 1: Example Lubrication PM schedule for Mounted Sealed Ball Bearings

Operating Conditions	Bearing Temperature	Grease Interval
Clean	32°F-120°F	6-10 months
	120°F-150°F	1-3 months
	150°F-200°F	1-4 weeks
Dirty	32°F-120°F	1-4 weeks
	120°F-150°F	Daily to 1 week
	150°F-200°F	Daily to 1 week
Moisture	32°F-200°F	Daily to 1 week