



Cap Screw Tightening Torques

Chart 6

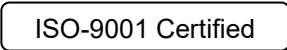
Screw Size	Recommended Torque (in-lbs)
8-32 x 5/8	60
10-24 x 3/4	90
1/4-20 x 1	185
5/16-18 x 1	400

Other PTI Stock Products

- Metric & Inch Mounted Ball Bearings
- Standard, Stainless Steel & Thermoplastic Housings
- Set Screw, Eccentric Collar, Adapter Mount & Concentric Collar Locking Types
- SAF, SAFS, SDAF Pillow Blocks
- SNG, SNHF & SN Standard Metric Plummer Blocks
- SD & S3000K Heavy Duty Metric Plummer Blocks
- Metric & Inch Adapters, Standard & Hydraulic
- Hydraulic Mounting Nuts
- Winkel Linear Combined Bearings and Profiles - Linear Motion
- Metric Spur Gears & Gear Racks
- Metric (DIN), ANSI, Stainless and Maintenance Free (No Lube) Roller Chain
- TL Taper Bushings - Inch & British Standard Metric
- Metric (DIN) Sprockets - Pilot Bore, Taper Bushed, Stainless, Hardened
- Weld on Hubs for Sprockets & Gears
- Metric Sheaves - SP Metric, Taper Bushed, and Variable Pitch
- AK & BK Sheaves
- Metric Timing Pulleys
- HTD, Synchronous, Super Torque, T/AT Series – Pilot Bore & TL Bushed
- HRC Shaft Couplings, Pilot and TL Bushed Hubs
- European Metric Product Sourcing
- See PTI Catalog for Full Product Offering

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**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 in accordance with the engineering information specified in the catalog. Proper installation, maintenance and operation procedures must be observed. All 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 P.T. International, nor are the responsibility of P.T. International. This unit and associated equipment in the system 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 invoked, a holding device must be an integral part of the driven equipment beyond the speed reducer output shaft.

Instruction Manual for PTI Mounted Ball Bearing Units

Includes Set Screw, Eccentric Locking Collar, Adapter Mount & Concentric Locking Collar Units

Installation

**Warning:** To ensure the drive is not unexpectedly started, turn off and lockout the power source before proceeding. Failure to observe these precautions could result in bodily injury. Under certain operating conditions it is possible for a static charge to build-up on Polymer (Thermoplastic) Housing. Do not operate these bearings in any environment where a sudden static discharge may cause either an operating hazard or personal discomfort.



1. Clean shaft and bearing bore thoroughly. (For Set Screw and Eccentric Lock types, consider to file flats on the shaft at set screw locations to assist removal of bearing.)
2. Slip bearing into position. Be sure that the bearing is not on a worn section of the shaft. If the shaft fit is snug, tap gently on the inner ring of the bearing face only with a soft driver. **DO NOT HAMMER ON THE OUTER RING OR HOUSING.**
3. The bearing outer ring OD is spherical and swivels in the housing to accommodate misalignment if any from the frame on which it is mounted. Snug the hold-down bolts and insert the shaft to where it will eventually be installed. Adjust the housing if needed to align belts or other drives. If units that allow for expansion are being installed, insure there is axial float in both directions after the locking set screws or collars are tightened. This will prevent possible pre-loading of the bearings. Auxiliary load carrying devices such as shear bars positioned next to the pillow block foot are advisable for side or end loads, or for radial loads on flange units where normal to heavy shock loads are possible. **NOTE:** On non-metallic housings, hold-down bolts should be tightened carefully with flat washers to prevent damage.
4. Tighten hold-down bolts to the proper torque (see chart 5). Turn shaft by hand. Resistance to turning should be the same as before tightening hold-down bolts.
5. **For Set Screw mounted bearings: After the shaft is aligned,** tighten both set screws hand tight, then tighten the set screws alternately until the torque is reached according to Chart 4. After 24 hours of operation, the set screw torque should be checked and re-tightened if needed to assure full locking to 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 bearing. Set screws may be replaced to achieve maximum holding power. Tap on the inner ring to move the bearing or to remove it from the shaft. Go to Step 9.
6. **For Eccentric Locking Collar units:** Slide the eccentric collar against the mating end of the insert inner race and snug the collar on the mating eccentric in the direction of shaft rotation. Use a mild steel bar in the hole provided in the collar, tap the collar sharply in the direction of shaft rotation and perpendicular to the shaft. Tighten the set screw in the collar to the proper torque shown in Chart 4. To remove a bearing, loosen the set screw tap the collar in the direction opposite shaft rotation. Go to step 9.
7. **For Adapter Mount Bearing Unit:** Slide the assembly onto the shaft. **Hold-down bolts for adapter mounted units should be tightened after the bearing is locked to the shaft.** Snug locking nut by hand on each bearing noting the hold-down bolt hole position. The adapter will grab the shaft as the nut is tightened. The bearing will shift axially slightly as the nut is



## Instruction Manual for Mounted Ball Bearings (cont.)

tightened. The axial movement will be less than 1/32" inch if starting from a snug position. Check mounting bolt holes to insure adequate bolt clearance will remain after tightening. Repositioning the bearing if necessary. Care must be taken to ensure that the locknut is not over tightened as this can eliminate the bearing internal clearance, resulting in premature failure. A lock-washer is provided which prevents the locknut from "backing-off" when one of the tabs is engaged with the corresponding notch in the locknut. **Caution: Flange Bearing Units may require a shim behind the flange if a gap remains after mounting to avoid bearing pre-load.** See Chart 3 for recommended tightening torques for locknuts. Go to step 9.

**8. For Concentric Locking Collar Units,** tighten the cap screw in the concentric collar to the recommended torque level listed in Chart 6.

**9. For all bearing types:** Re-check tightness of all screws and hold down bolts after 24 hours of operation to insure nothing has loosened. This check should become part of periodic maintenance including re-lube intervals suggested below.

### Lubrication

Standard Mounted Ball Bearings have been filled to approximate 35% full. This allows initial operation at all speed ranges. For lower speeds, additional grease may be added. For higher speeds some grease may appear at the seals during start up. Bearings seek desired grease operating levels. A light showing of grease at the seals is normal and recommended. Small amounts of grease given at frequent intervals (while the bearing is running) is preferred rather than large quantities at infrequent intervals. If the bearing runs hot to the touch after re-greasing, remove a lube fitting to let excess purge more quickly. Re-install the fitting after excess grease purges. Establish a re-lubrication schedule. For normal applications, use a No. 2 or 3 Lithium base grease or equivalent. See Chart 1.

Chart 2 provides lubrication guidelines based on conditions. Re-lube periods are better determined by experience. A slight show of purged grease at the bearing seals is normal and also help keep contaminants out of the unit. Monitor and record such maintenance.

### Lubrication Guide by Bearing Speed Suggested Lubrication Period in Weeks

Chart 1

Hours Run per Day	1 to 250 RPM	250 to 500 RPM	500 to 750 RPM	750 to 1000 RPM	1000 to 1500 RPM	1500 to 2000 RPM	2000 to 3000 RPM
8	12	12	10	7	5	4	3
16	12	7	5	4	2	2	1
24	10	5	3	2	1	1	1

### Lubrication Guide by Bearing Temperatures & Conditions

Chart 2

Operating Conditions	Bearing Temperatures	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 – 150°F	1-4 weeks
	150°F – 200°F	Daily to 1 week
Moist	32°F – 200°F	Daily to 1 week



## Recommended Tightening Torques Adapter Sleeve Units—Nut Torque

Chart 3

Sleeve Bore Size	Torque Nm	Torque In-lbs	Torque Ft-lbs
20mm, 3/4	30	265	22
25mm, 15/16, 1	40	355	30
30mm, 1-1/8, 1-3/16	50	440	36
35mm, 1-1/4, 1-3/8	60	530	44
40mm, 1-7/16, 1-1/2	65	575	48
45mm, 1-11/16, 1-3/4	75	660	55
50mm, 1-15/16, 2	85	750	62

### Set Screw Tightening Torques

Chart 4

Set Screw Size	Socket Size Across Flats	Carbon Class 8 Torque In-lbs	Stainless Torque In-lbs
8-32 UNC	9/64	20	15
10-24 UNC	5/32	33	25
1/4-20 UNC	1/8	80	60
1/4-28 UNF	1/8	85	65
5/16-18 UNC	5/32	156	117
5/16-24 UNF	5/32	156	120
3/8-16 UNF	3/16	275	206
7/16-20 UNF	7/32	428	321
1/2-20 UNF	1/4	625	468
M6 x 0.75	3mm	68	51
M8 x 1.0	4mm	156	118
M10 x 1.25	5mm	274	203
M12 x 1.25	6mm	504	380

### Hold Down Bolt Tightening Torques (for Stainless x 0.9)

Chart 5

Metallic Housings			Polymer Housings		
Bolt Size	Torque (ft-lbs)	Torque (Nm)	Bolt Size	Torque (ft-lbs)	Torque (Nm)
3/8-16	20	27	3/8-16	18	25
7/16-14	32	43	7/16-14	28	38
1/2-13	50	68	1/2-13	40	56
5/8-11	100	135	5/8-11	83	113
3/4-10	175	235	M10	18	25
7/8-9	208	280	M12	36	50
M10	22	30	M16	90	125
M12	36	50	M20	175	240
M16	90	125	The torque in this chart is for Grade 2 bolts. Consult fastener manufacturer for other bolts and/or sizes.		
M20	175	240			