Browning®

Ball and Roller Bearings Installation Instructions

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⚠ WARNING

- Read and follow all instructions carefully.
- Disconnect and lock-out power before installation and maintenance. Working on or near energized equipment can result in severe injury or death.
- Do not operate equipment without guards in place. Exposed equipment can result in severe injury or death.

⚠ CAUTION

- Periodic inspections should be performed. Failure to perform proper maintenance can result in premature product failure and personal injury.

These instructions cover the set screw, eccentric locking and BOA™ concentric lock ball and setscrew roller bearings. It is important that they be read in their entirety before attempting installation or removal. The procedures indicated should be carefully followed. Failure to do so can result in misinstallation which could cause bearing performance problems as well as serious personal injury.

BEARINGS IN BOLT-ON HOUSINGS (UNITS)

1. **CHECK AREA -** Clean and organize bearing installation area, and keep well lit. Be sure mounting surfaces are clean and flat.
2. **CHECK SHAFT -** Shaft should be within tolerance range shown in Table 1, clean, and free of nicks and burrs. Mount bearing on unused section of shafting or repair/replace shafting as required.

Table 1

Ball Bearing Recommended Shaft Tolerances	
Nominal Bore Diameter	Tolerance (Inches)
1/2 - 1 15/16	+0.0000 / -0.0005
2 - 2 7/16	+0.0000 / -0.0010

Roller Bearing Recommended Shaft Tolerances	
Nominal Bore Diameter	Tolerance (Inches)
1 1/8 - 2	+0.0000 / -0.0005
2 3/16 - 4	+0.0000 / -0.0010
4 7/16 -5	+0.0000 / -0.0015

3. **INSTALL UNIT -** Slide unit onto shaft. If it is difficult to mount bearing on shaft, use a piece of emery cloth to reduce any high spots on shaft. ***Do not hammer on any component of the bearing***
4. **FASTEN UNIT IN PLACE -** Install housing mounting bolts, check and align bearing and tighten mounting bolts to recommended fastener torques. Exercising extreme caution and safety, rotate shaft slowly to center bearing.

5.1 SET SCREW INSERTS

a. Setscrews in a multiple bearing setup should be aligned.
b. Torque first set screw to one half recommended torque in Table 2. Torque second set screw to full torque. Torque first set screw to full torque.
c. Repeat step 5b on opposite end of inner ring for roller bearings.

Table 2

Ball Bearing Recommended Torque		
Screw Size	Hex Size	Inch-Pounds
1/4-28	1/8	65 - 85
5/16-24	5/32	125 - 165
3/8-24	3/16	230 - 300
7/16-20	7/32	350 - 450
1/2-20	1/4	500 - 650
5/8-18	5/16	1100 - 1440

Roller Bearing Lock Collar Setscrew Torque	
Bore Size	Foot-Pounds
1 3/16 - 1 11/16	12
1 3/4 - 2 1/2	19
2 11/16 - 3 1/2	45
3 15/16 - 4	95
4 7/16 - 5	150

5.2 ECCENTRIC LOCK INSERTS

a. Place collar on inner race and rotate by hand in direction of shaft rotation until eccentrics are engaged.
b. Insert drift pin into the hole in the collar O.D. and lock in direction of shaft rotation with the aid of small hammer.
c. Torque single setscrew to recommended torque in Table 3.

Table 3

Eccentric Locking Recommended Torque		
Screw Size	Hex Size	Inch-Pounds
1/4-28	1/8	65 - 85
5/16-24	5/32	125 - 165
3/8-24	3/16	230 - 300
7/16-20	7/32	350 - 450
1/2-20	1/4	500 - 650
5/8-18	5/16	1100 - 1400

5.3 BOA CONCENTRIC INSERTS

a. Be sure that the BOA collar is fitted square and snug against the shoulder on the inner ring.
b. Torque the BOA collar cap screw to torque recommended in Table 4.

Table 4

BOA Concentric Locking Collar Cap Screw Torque		
Screw Size	Hex Size	Inch-Pounds
# 8-32	T-25	70
# 10-24	T-27	100
1/4-20	T-30	240
5/16-18	T-45	495

6. **MONITOR INSTALLED BEARING -** After bearing has been run for several minutes, and again after several hours, check bearing for excessive noise or vibration. Shutdown machine and check housing temp: typical applications operate at 100°F - 150°F (38°C - 66°C). Check tightness of all locking devices after 500 hours or 3 months, whichever comes first.

CYLINDRICAL OD INSERTS AND INSERTS IN CYLINDRICAL OD HOUSINGS

INSTALL INSERT- Be sure housing bore is clean and free of debris. Press bearing into housing by applying force to face of outer ring. **Do not hammer on any component of the bearing or apply force to inner ring**. Proceed with Step #1- 6 above. For recommended housing bore tolerance, consult catalog or contact Application Engineering.

SPHERICAL OD AND BALL BEARINGS

Important: Replacement Browning bearing inserts are intended for use in Browning housings. Housings should be thoroughly inspected for damage such as cracks, excessive wear or galling of the spherical seat, obstruction of grease port, etc. prior to installation.

INSTALL INSERT- Housing bearing seat should be wiped clean. Check grease port and clean free of debris. Wet housing bearing seat with oil or grease. Secure housing in a vise.

For Spherical OD:

a. Place the bearing insert into the housing load slots, positioning the anti rotation rivet on the outer ring in the load slot as to not shear it off when swinging insert into place. Also, position the outer ring lubrication hole so it will install in line with the housing lubrication hole.
b. Using a bar placed in the insert bore as a lever, swing the insert into place within the housing. Insert should have a snug fit in the housing. If insert can be made to swivel by hand in the housing bore, fit is too lose and entire unit should be replaced. If heavy force is required, fit is too tight and entire unit should be replaced.
c. Ensure alignment of the anti rotation rivet in the load slot and outer ring lubrication hole in the housing lubrication hole.

RELUBRICATION INSTRUCTIONS

All Browning Ball bearings and E920 Tapered Roller bearings are delivered with a high quality lithium complex grease with an EP additive. The bearing is ready for use with no initial lubrication required. The grease consists of a lithium complex thickener, mineral oil, and NLGI grade 2 consistency.

Compatibility of grease is critical; therefore consult with Application Engineering and your grease supplier to insure greases are compatible. For best performance it is recommended to relubricate with lithium complex thickened grease with a comparable NLGI consistency and base oil properties.

Relubricatable Browning bearings are supplied with grease fittings or zerks for ease of lubrication with hand or automatic grease guns. Always wipe the fitting and grease nozzle clean.

CAUTION: If possible, it is recommended to lubricate the bearing while rotating, until grease purge is seen from the seals. If this is not an option due to safety reasons, follow the alternate lubrication procedure below.

Re-Lubrication Procedure:

Stop rotating equipment. Add one half of the recommended amount shown in Table 5 or 6. Start the bearing and run for a few minutes. Stop the bearing and add the second half of the recommended amount. A temperature rise after lubrication, sometimes 30°F (17°C), is normal. Bearing should operate at temperatures less than 200°F (94°C) and should not exceed 250° (121°C) for intermittent operation. For lubrication guidelines, see Table 7.

Note: Grease charges in Table 5 and 6 are based on the use of lithium complex thickened grease with a NLGI grade 2 consistency.

Note: Table 7 contains general recommendations. Experience and testing may be required for specific applications.

Table 5

Ball Bearing

Recommended Lubrication Grease Charge

Shaft Size		Grease Charge (Mass - Ounces)
100 & 200 Series	300 Series	
Intermediate & Standard Duty	Medium Duty	
1/2 -5/8	x	0.02
3/4	x	0.03
13/16 - 1	x	0.03
1 1/16 -1/4S	15/16 - 1	0.06
1 1/4 - 1 7/16	1 3/16	0.09
1 1/2 - 1 9/16	1 7/16	0.14
1 5/8 - 1 3/4	1 1/2	0.16
1 13/16 - 2S	1 11/16 - 1 3/4	0.18
2 - 2 3/16	1 15/16	0.25
2 1/4 - 2 7/16	2 3/16	0.35

Table 6

Roller Bearing

Recommended Lubrication Grease Charge

Bore Size	Grease Charge (Mass - Ounces)
1 3/16 - 1 1/4	0.26
1 3/8 - 1 7/16	0.30
1 1/2 - 1 11/16	0.36
1 3/4 - 2	0.42
2 3/16	0.69
2 1/4 - 2 1/2	0.75
2 11/16 - 3	0.92
3 3/16 - 3 1/2	1.50
3 15/16 - 4	1.92
4 7/16 - 4 1/2	2.79
4 15/16 - 5	4.17

Table 7

Ball and Roller Bearing

General Lubrication Schedule

Environment	Temperature (°F)	Speed (% Catalog Max)	Frequency
Dirty	-20 to 250	0 - 100%	Daily to 1 Week
Clean	-20 to 125	0 - 25%	4 to 10 Months
		26 - 50%	1 to 4 Months
		51 - 75%	1 Week to 1 Month
		76 - 100%	Daily to 1 Week
	125 to 175	0 - 25%	2 to 6 Weeks
		26 - 50%	1 Week to 1 Month
		51 - 75%	Daily to 1 Week
		76 - 100%	
	175 to 250	0 - 100%	Daily to 1 Week

Table 8

Ball Bearing

Maximum Operational Speed

100 & 200 Series		300 Series	
Bore Size	Speed (RPM)	Bore Size	Speed (RPM)
1/2 -5/8	7500	1	4500
3/4	6500	1 3/16 - 1 1/4	4000
7/8 - 1	5500	1 7/16	3500
1 1/6 -1 1/4S	4500	1 1/2 - 1 3/4	3000
1 1/4 - 1 7/16	4000	1 15/16 - 2 3/16	2500
1 1/2 - 1 9/16	3500	-	-
1 5/8 - 2S	3000	-	-
2 - 2 7/16	2500	-	-

Table 9

Roller Bearing

Maximum Operational Speed

Maximum Operational Speed	
Bore Size	Speed (RPM)
1 3/16 - 1 1/4	3500
1 3/8 - 1 7/16	3000
1 1/2 - 1 11/16	2500
1 3/4 - 2 3/16	2000
2 1/4 - 2 1/2	1750
2 11/16 - 3	1500
3 3/16 - 4	1000
4 7/16 - 5	750

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