

RBS SERVICE MANUAL

This service manual was prepared to insure proper installation and performance of the RBS ball screw assembly throughout the life of the screw. It is only meant as a convenient reference and not a complete guide of the topics within.

The products shown in this catalog are intended for industrial use only and should not be used to lift, support or otherwise transport people, unless you obtain a written authorization for each individual application from Rockford Ball Screw Co. The specifications and data in this publication are believed to be accurate and reliable. However, it is the responsibility of the product user to determine the suitability of Rockford Ball Screw products for a specific application.

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Assembly of a Standard Ballnut

1. Remove the return tube clamp and the return tube from the ballnut.
2. Place the nut mid-way on the screw and align the ball grooves in the nut with those on the screw.
3. Place a short length of rod or dowel into one return tube hole to prevent loss of balls.
4. Place balls successively into the other return tube hole, rotating the screw so that the balls are fed along the thread and through the nut until the ball circuit is completely full.
5. Remove rod or dowel, being careful not to rotate the nut. The balls must not be in the return tube holes. Balls should only be in the mesh between the ball nut and screw.
6. On both ends of the return tube, place a small amount of light grease.
7. Load this half tube full of balls.
8. Place the second half of the return tube over the balls and hold the two halves tightly together.
9. Place the return tube ends into the ball circuit holes in the nut (the grease in the tube holes will prevent the balls from dropping out).
10. Place the tube clamp over the tube (taking care to keep the two halves together) and secure with the clamp screws.

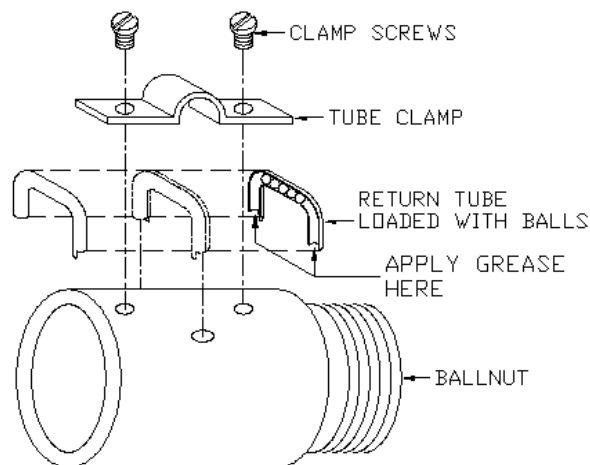


FIGURE 1
BALLNUT ASSEMBLY

Mounting a Standard Ballnut

(Not a preload nut or Bridgeport nut)

1. Remove the tie from the ballnut/arbtor assembly.
2. Butt the assembly onto the end of the screw while continuously holding the arbor (cardboard tube) steady. Align the bottom of the return tube with the beginning of the first thread. Do not allow arbor to come out of contact with screw thread. Failure to do so could result in the loss of balls from within the assembly. (See figure 1).
3. If you find that the arbor does not fit up to the beginning of the thread due to interference from the journal. (See figure 2). Then it is recommended that the journal be wrapped in masking tape or something similar so that the journal OD equals that of the arbor. This in effect would act as an extension to the arbor and would fill the same role.
4. Then gently rotate and apply pressure onto the nut to mount the nut. The arbor should only lose contact with the end of the screw when the ballnut is engaged on the screw.

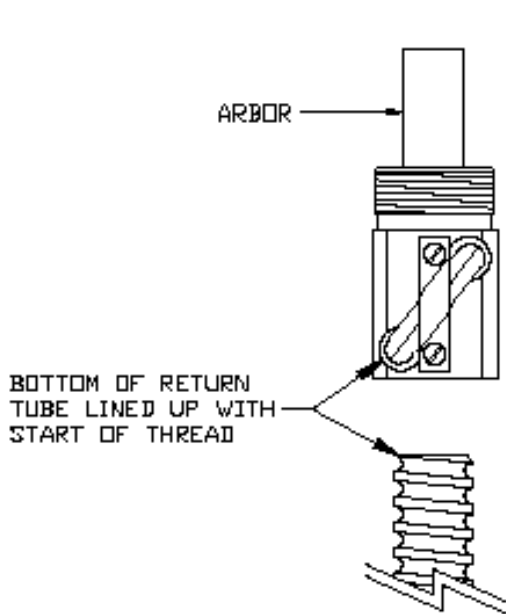


FIGURE 1
MOUNTING ALIGNMENT

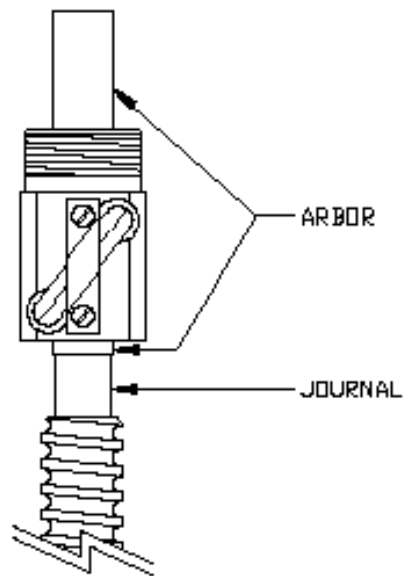
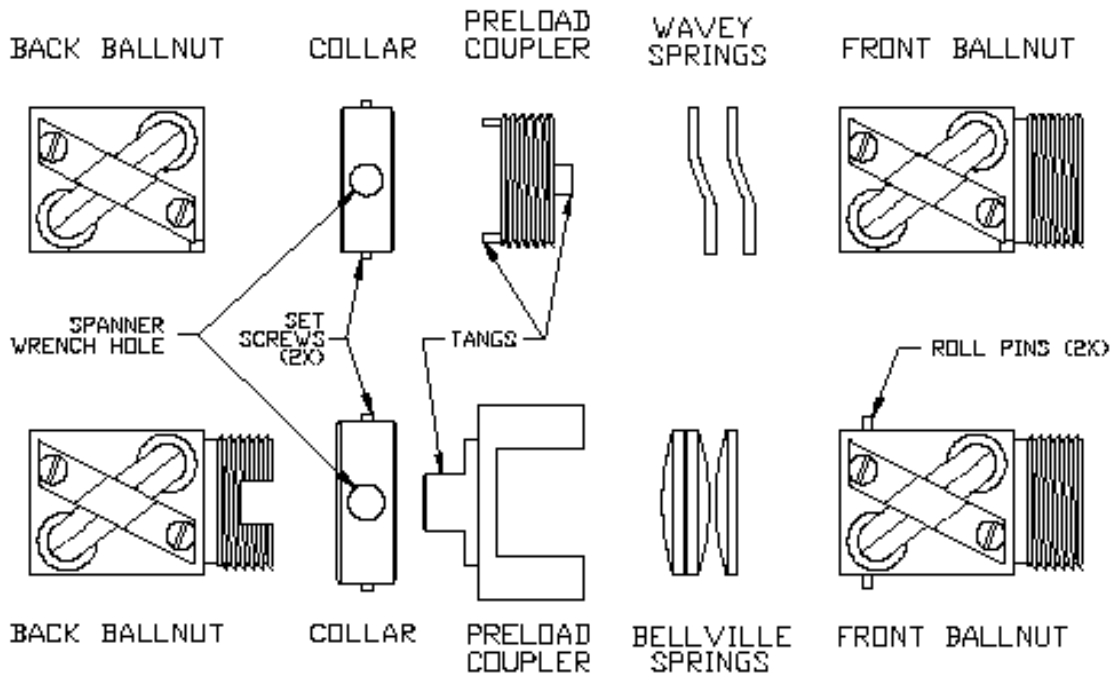


FIGURE 2
JOURNAL INTERFERENCE

Instruction for Preload Installation

1. Remove the tie that is through the arbor, being careful not to let the arbor from sliding out from within the assembly.
2. Align the nut assembly to appear like drawing figure 4.
3. The tangs of the coupler are to be aligned so as to mate with the ballnuts. An external preload coupler needs to engage the roll pins to prevent rotation.
4. Transfer the assembly to the screw with some downward pressure till the threads are engaged then roll the nut on. Be sure to hold the arbor while transferring the screw. The arbor should not come out of contact with the screw until the nuts are fully engaged. The preload nut is now ready to be set.

SQUARE NUTS



ROUND NUTS

FIGURE 4
DISSASSEMBLED PRELOAD

Setting the Preload Ballnut

1. Remove the setscrews in the adjusting collar.
2. With a spanner wrench (see table 2, next page), tighten the collar until the desired load is achieved (see table 1).
3. Put the set screws back in and tighten the set screws in order to not let the adjusting collar back off. It is preferred not to tighten the setscrews on the tang section of the coupler.

Setting the preload increases the torque on the screw by $.034 \times \text{preload setting} \times \text{lead of the screw}$. For more information see the technical data on page 22 of the RBS catalog.

Table 1: Preload Settings

model no.	Recommended		Maximum		model no.	Recommended		Maximum	
	preload (lbs.)	# of turns	preload (lbs.)	# of turns		preload (lbs.)	# of turns	preload (lbs.)	# of turns
RP-10	13	.1	39	.25	RP-45	245	.6	735	2.2
RP-11	26	.2	78	.5	Bridg.	145	.55	435	1.7
RP-15	3	.05	9	.08	RP-46	44	.24	132	.33
RP-16	5	.1	15	.1	RP-50	905	.8	2715	2.5
RP-20	70	.25	210	1.2	RP-50a	1290	1.2	3870	3.2
RP-21	14	.1	42	.2	RP-53,54	435	.81	1359	2.5
RP-30,31	73	.75	219	1.5	RP-54a	662	.9	1986	2.7
RP-32	30	.5	90	.8	RP-55,56	690	.6	2070	2.1
RP-34	190	.32	570	1.1	RP-58	724	.65	2172	2.3
RP-35	95	.2	285	.5	RP-60	1980	.74	5940	2
RP-36	16	.1	48	.2	RP-60a	2820	1.1	8460	2.1
RP-37	315	.53	945	1.25	RP-61	2300	.71	6900	1.5
RP-38	57	.13	171	.33	RP-62	1800	.67	5400	1.3
RP-40,41	150	.33	450	.5	RP-70	2250	.55	6750	1.7
RP-40a	300	.4	900	.8	RP-71	2650	.67	7950	1.8
RP-42	345	.81	1035	2	RP-74	630	.72	1890	1.75
RP-43	430	1.1	1290	2.2	RP-80	4240	1.1	12720	2.4
RP-44	205	.33	615	.65					

Note: Due to spring load tolerances, these figures are $\pm 20\%$ use the number of turns as a guide only.

Table 2: Spanner Wrench Sizing

Model #	Spanner wrench hole size
RP-10 to RP-16	1/8"
RP-20 to RP-46	3/16"
RP-50 to RP-58	1/4"
RP-60 to RP-74	3/8"
RP-80	1/2"

Lubrication

Apply lubrication between the ball & raceway to avoid friction failure, deformation, and the shortening of life of the ball screw. It is only necessary to prevent the ball nut assembly from becoming dry. Lubrication should be applied on the surface of the shaft or through the fitting into the nut. A 90% reduction in ball bearing screw life should be allowed where dry operation is unavoidable.

At speeds greater than 200 in./min. it is recommended oil be used. Grease can be used for speeds below 200 in./min. In the event that oil or grease is not an option, dry film lubrication is recommended. Surfaces should be phosphate coated before being coated with a dry film lubrication.

For a list of acceptable lubricants see table 4.

Table 4: Acceptable Lubricants

Lubricant	Brand name	Manufacturer
Grease	Alvania No. 2 Mobilux No .2 Beacon 2	Shell Mobil Esso
Oil	Tellus 33 D.T.E. Heavy Medium Teresso 52	Shell Mobil Esso
Dry film	Dow Corning 321 Perma-Silk	Dow Corning EM Corporation

Note: For general application use, the range of NLGI 2-3 of lithium base grease or the range of 46-100 CST at 40 °C of oil is recommended. Graphite based lubricants are not recommended due to their abrasive qualities.

Bellows and Wipers

Conditions for wipers, wiper installation

Wipers are recommended in any conditions where the ball nut and/or screws are exposed to debris.

Slide two wipers into the ballnut along the screw. Make sure the brush and wiper is held entirely within the nut. Push the snap ring into the snap ring groove just inside the nut. Repeat this process for the other side.

Installation of ballnut onto the screw would be made more difficult if wipers are already installed in the ballnut. If you prefer the wiper could be temporarily removed to ease installation. However, it is not possible to remove wipers that have been installed in the nut with epoxy.

Bellows

Bellows (or boot) should be considered when a wiper is unable to adequately prevent the entry of debris into the nut. Here is a list of manufactures to consider when ordering a bellows.

A&A Manufacturing Company, Inc.
2300 S. Calhoun Rd.
New Berlin, WI 53151
phone: (414) 786-1500 fax: (414) 786-3280

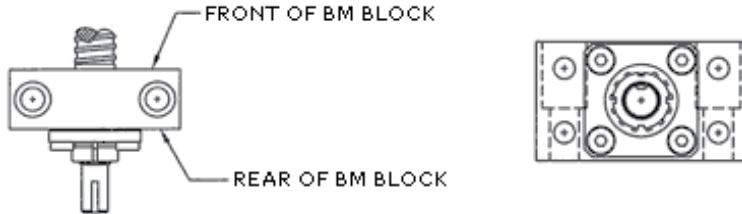
Heeco Protekto Boots
5450 W. Crenshaw St.
P.O. Box 151166
Tampa, FL 33684
phone: (813)886-7584 fax: (813) 885-2350

Hennig Inc.
2500 N. Church St.
Rockford, IL 61103
phone: (815) 962-5942 fax: (815) 962-6483

Bearing and Mounts

ROCKFORD BALL SCREW - BM BEARING SERIES

INSTALLATION INSTRUCTIONS



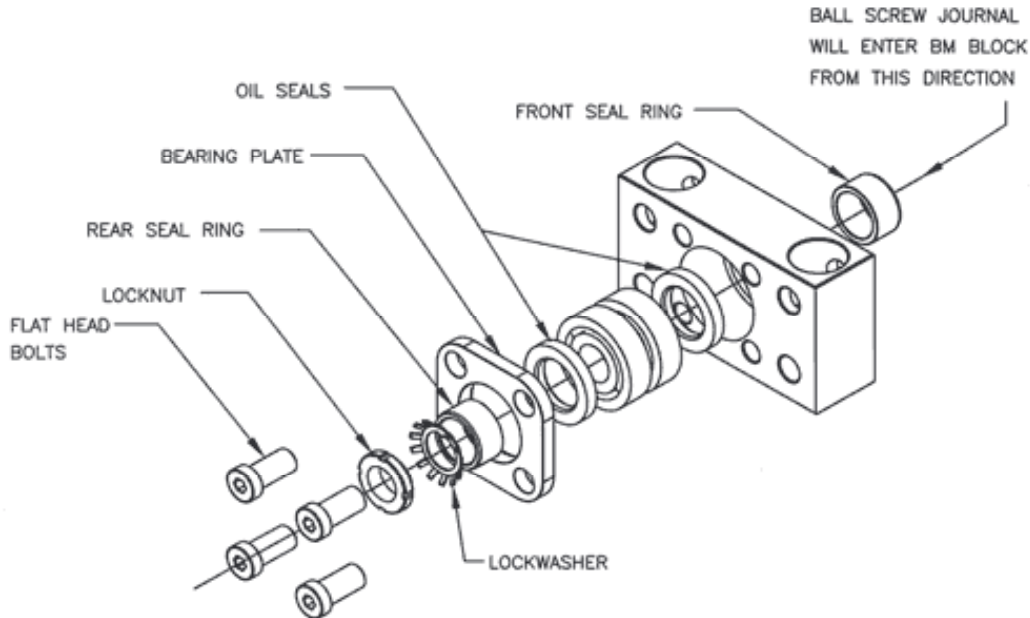
BM Bearing Blocks are engineered to be used as (simple) support for critical speed and column load calculation.

1.) Install the entire BM block either horizontal or vertical onto the journal of the screw until the bearings and front ring seal are seated against the shoulder of the ball screw's journal. **Note: A tubular arbor should be made from aluminum to prevent damage to the journal and bearings. The arbor's O.D. to be the same dia. as rear seal ring and I.D. to have clearance on journal.**

2.) Next, install the lock nut and washer and torque the lock nut to the proper setting. (see torque table below for your BM model number and recommended torque.)

Lock nut torque table & BM model #	Bearing Mount #	BM 12	BM 15	BM 20	BM 25	BM 30
	Torque (ft-lb)	10-20	10-20	12-35	23-50	32-60

3.) Tighten the four flat bolts until there is no axial or radial play in the BM bearing block, this will cause a slight increase in drag of the bearings. **Note: Do not over tighten the bearings, this will increase the drag torque and shorten the life of the bearings.**



Note: Rockford Ball Screw is not responsible for damage or personal injury due to incorrect assembly, sizing or mounting of R/B/S bearing block assemblies.

TROUBLE-SHOOTING GUIDE

BALLSCREW WOBBLES/VIBRATES DURING OPERATION:

1. Inspect mounts, check to make sure ballnut and end supports are tight and properly aligned.
2. Check critical speed and column loading per R/B/S catalog. Do not exceed the safe critical speed or column loading as stated in the catalog.
3. Check straightness of screw.
4. Consult Factory.

BALLSCREW MAKING EXCESSIVE NOISE:

1. Make sure adequate and proper lubrication is present on screw.
2. Check for excessive debris on screw or in nut.
3. Check alignment and mounting areas for adequate rigidity. Be sure to inspect for moment (cocking) loading on the nut. This could cause ball binding and reduction in life.
4. Consult factory.

EXCESSIVE BACKLASH IN SYSTEM:

1. Inspect mounting areas for tight assembly.
2. Inspect support bearing backlash to determine if backlash is coming from bearings.
3. If preloaded ballnut assembly, tighten per pages 4 & 5 in this manual.
4. Consult factory.

BALLNUT DRIFTING (BACK-DRIVING) UNDER LOAD:

1. Install motor brake to hold load. Consult catalog to determine torque required
2. Consult factory (a screw with a finer lead may be required).

BALLSCREW EXPERIENCING PREMATURE FAILURE:

1. Premature failure may be caused by many reasons such as , lack of lubrication, misalignment, metal chips or other debris, over loading of screw and excessive speed.
2. Consult R/B/S catalog or WEB Site.

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