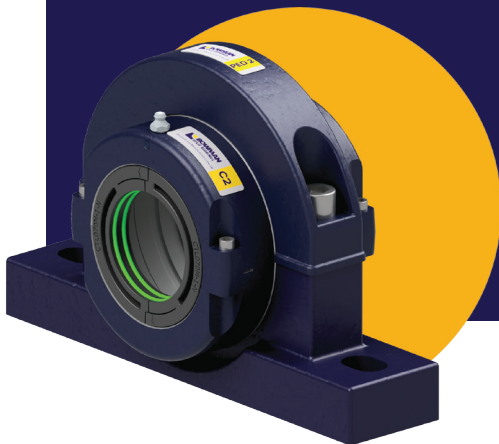


ASSEMBLY AND LUBRICATION INSTRUCTIONS

ADVANCED SPLIT ROLLER BEARING

www.bowmansplitbearings.com

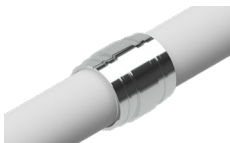
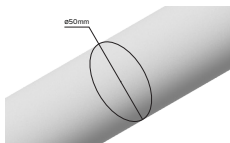


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BOWMAN[®]
SPLIT BEARINGS

PRELIMINARY NOTES

- Wipe clean all bearing parts to remove preservative oil
- Take note of the marking numbers on each split component to identify matching halves
- Determine the bearing positions
- Lightly oil the shaft with thin oil and lubricate all other interfaces and threads
- Where possible, install the fixed bearing first to locate the shaft axially



STAGE 1

Clean and inspect the shaft at the bearing seating. Determine the tolerance required from the table provided. When the two halves of the inner race are assembled around the shaft there should be a gap at each joint.

This feature ensures the race is gripped to the shaft securely by the clamp ring halves. Maintain even joint gaps on the inner race and clamp rings. Soft packing can be used to equalise the inner race joint gaps. Fit the clamp rings with their joints approximately 90° to the inner race joints.

Progressively tighten the clamp ring joint screws keeping all gaps equalised. With a soft faced hammer, tap the clamp ring halves to seat in their grooves. Finally, tighten the joint screws to the torque figure indicated in the provided table.

For expansion bearings, the inner race can be offset according to the amount of shaft thermal expansion, so that when operating temperature is reached, the rollers will run central to the outer race. When fitted, re-check the inner race and clamp ring joint gaps are equal and the race is correctly positioned axially.



STAGE 2

The radial cage is supplied with loose rollers to join the cage halves together once assembled on the inner race. Apply a film of grease to the roller path and bore of the cage before placing the cage around the race. Insert the joint coupler with its bevel edge toward the shaft. The cage halves do not have matching numbers. With the two halves around the inner race, fit the loose rollers with firm pressure until they lock in the pockets and retain the halves of the cage. Couplers can be fitted to one half of the cage before the cage is fitted. Rotate the cage to assemble the second joint.

STAGE 3

Apply a film of grease to the side face of the clamping ring and axial rollers.

The axial cage halves are joined using clips. Place halves around the shaft then push the clip into the slots.

(applicable only for a fixed bearing)



STAGE 4

Individual instructions are supplied with each seal. Separate the seal halves using the release tool provided. Lubricate the bore of the seal and the shaft with a thin film of grease. Place the two seal halves around the shaft ensuring the male / female joints correspond and compress the 'O' rings to clip the halves together. Once fitted, the seals can be moved axially to position them relative to the housing grooves (when the housing is fitted).

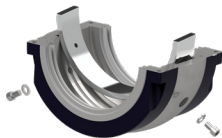
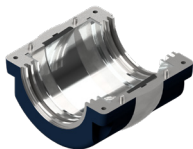
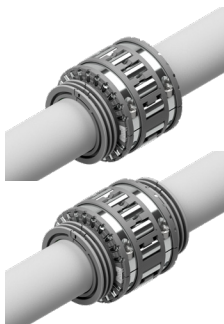
STAGE 5

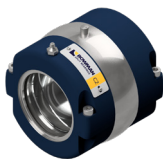
Prime the small radial groove of the cartridge with grease. Fit the radial outer race halves and identify the upper half by the radial lubrication holes. This must be fitted in the housing top half which has the lubrication nipple. Push the race halves into the seating grooves ensuring matching numbers coincide. The race joints will protrude slightly beyond the housing joints. Protect these faces when handling the halves.

For fixed bearings, place the axial races in their recesses as shown. When pushed fully into their seating the joints of the axial races will be slightly below the face of the housing.

STAGE 5A

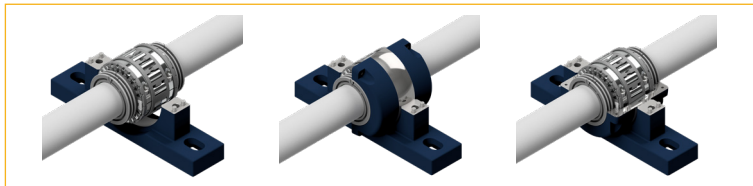
For cartridges sizes C13 to C17A, additional radial hold back screws and washers are required to retain the radial outer race in the cartridge. Insert the screws and washers supplied with the bearing, through the cartridge into the race but do not fully tighten. Assemble the two halves of the cartridge together, with their radial outer races fitted, fully tighten cartridge joint screws then fully tighten radial hold back screws. Then disassemble the cartridges halves ready for installation around the bearing. Only use the screws and washers provided and do not exceed the torque values listed within this instruction leaflet.





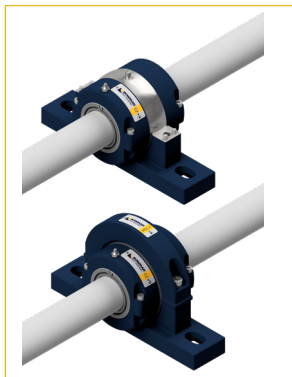
STAGE 6

Apply lubricant to the inside surface of the cartridge, covering the fitted races. Coat the assembled cages and rollers on the inner race and add some grease to the labyrinths of the seals. The quantity of grease to be used in the bearing can be determined from the grease weights table.



STAGE 7

With the pedestal base located in position, place the lower half of the cartridge on top of the shaft. Lubricate the spherical surfaces of the pedestal and cartridge. Align the two spherical surfaces, ensure the labyrinth seals mate with their corresponding grooves and rotate the cartridge around the shaft into the pedestal base until both joint faces are aligned. It may be necessary to manually guide the axial rollers between the clamp rings and axial outer races whilst rotating the cartridge into position.



STAGE 8

Place the upper half of the cartridge on top of the shaft in position, ensuring the axial rollers & races align. Lower gently into position, then fit and progressively tighten the cartridge joint screws to the torque settings provided.

Shaft supports or jacks can now be removed.

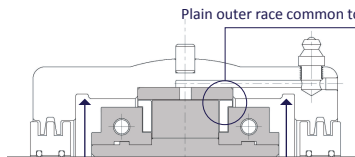
Apply a thin film of grease to the spherical surfaces of the pedestal cap and upper half of the cartridge. Pedestal cap can now be fitted, ensuring matching numbers are together. Fit the joint screws, tighten then release approximately half a turn.

Rotate the shaft by hand or under power for a few revolutions before finally tightening the cap screws to the torque settings provided. This allows the cartridge to align the bearing with the shaft.

ASSEMBLY CHECK LIST

- Clean bearing parts and shaft before installation
- Measure shaft to ensure it is within tolerance
- Keep matched component halves together
- Equalise joint gaps on both sides of inner race and clamp rings
- Inner race must be fully tightened
- Lubricate bearing during assembly NOT after
- Lubricate seal bores, labyrinths and housing spherical surfaces
- Tighten screws according to torque figures provided

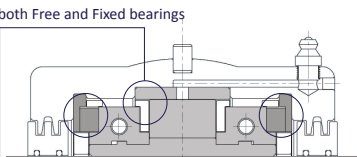
FREE (NON-LOCATING) BEARING



Machined grooves in inner housing

Both Free and Fixed bearings share the same radial bearing components (inner races, clamp rings, radial cage and roller assemblies AND plain radial outer races). For the Free bearing this plain outer race accommodates axial expansion as the radial rollers are not axially constrained.

FIXED (LOCATING) BEARING



Free bearings can be converted into Fixed bearings by adding axial bearing components (axial cage and roller assemblies and axial outer races) between the clamp rings of the free bearing and machined grooves in the cartridge.

TIGHTENING TORQUES

PEDESTAL	JOINT SCREW	TORQUE (Nm)	PEDESTAL	JOINT SCREW	TORQUE (Nm)	PEDESTAL	JOINT SCREW	TORQUE (Nm)
PED1	M10	52.5	PED11	M20	420	PED9A	M24	712
PED2	M10	52.5	PED12	M20	420	PED10A	M24	712
PED3	M12	90	PED13	M20	420	PED11A	M24	712
PED4	M16	225	PED14	M20	420	PED12A	M24	712
PED5	M20	420	PED15	M20	712	PED13A	M24	712
PED6	M20	420	PED16	M24	712	PED14A	M24	712
PED7	M24	712	PED17	M24	712	PED15A	M24	712
PED8	M24	712				PED16A	M24	712
PED9	M24	712				PED17A	M24	712
PED10	M24	712						

SCREW SIZES AND TIGHTENING TORQUES

(All screws are metric coarse thread, socket-head cap screws grade 12.9)

SIZE GROUP	BEARING BORE Ø		CLAMP RING JOINT SCREW	TORQUE (Nm)	CARTRIDGE JOINT SCREW	TORQUE (Nm)	CARTRIDGE RADIAL SCREW	TORQUE (Nm)
	(mm)	(inch)						
108	30, 35, 40	1.1875 - 1.5	M5	8.5	M5	6.5	-	-
200	45, 50	1.6875 - 2.0	M5	8.5	M5	6.5	-	-
208	55, 60, 65	2.1875 - 2.5	M5	8.5	M5	6.5	-	-
300	70, 75	2.6875 - 3.0	M6	15	M6	11	-	-
308	80, 85, 90	3.1875 - 3.5	M6	15	M6	11	-	-
400	95, 100, 105	3.6875 - 4.0	M6	15	M6	11	-	-
408	110, 115	4.1875 - 4.5	M8	35	M8	26	-	-
500	120, 125, 130	4.6875 - 5.0	M8	35	M8	26	-	-
508	135, 140	5.1875 - 5.5	M8	35	M8	26	-	-
600	150, 155, 160	5.6875 - 6.0	M8	35	M8	26	-	-
608	170	6.4375 - 6.5	M10	70	M10	52.5	-	-
700	175, 180	6.9375 - 7.0	M10	70	M10	52.5	-	-
800	190, 200	7.9375 - 8.0	M12	120	M12	90	M12	60
900	220, 230	9.0	M12	120	M12	90	M12	60
1000	240, 250, 260	10.0	M12	120	M12	90	M12	60
1100	270, 275, 280	11.0	M16	300	M16	225	M12	60
1200	290, 300	12.0	M16	300	M16	225	M12	60

LUBRICANT TYPE

Greases of NLGI No. 2 designation are recommended for most applications. For centrally pumped systems a No. 1 grease may be used for increased dispensation.

Greases with extreme pressure (EP) additives are recommended. However, Bowman Advanced Split Bearing units do not rely upon EP greases being used to achieve the axial capacities listed, unlike other manufacturers units.

Grease with a lithium complex thickener is usually used for normal applications operating at temperatures between 0°C - 100°C (32°F - 176°F). When water resistance is required a grease with an aluminium complex thickener can be used. Some greases are immiscible with each other so if changing lubricants, the bearing unit must be solvent-cleaned of the old lubricant before using the new lubricant.

Please contact our Technical Department if lubrication advice is required.

FULLY PACKED GREASE QUANTITY

GROUP SIZE	INNER HOUSING REF	FIXED BEARING GREASE QUANTITY (G)	FREE BEARING GREASE QUANTITY (G)
108	C1	45	80
200	C2 / C2A	55	100
208	C3 / C3A	70	150
300	C4 / C4A	90	165
308	C5 / C5A	150	325
400	C6 / C6A	170	400
408	C7 / C7A	310	640
500	C8 / C8A	420	770
508	C9 / C9A	450	950
600	C10 / C10A	465	1000
608	C11 / C11A	710	1275
700	C12 / C12A	750	1350
800	C13 / C13A	750	1360
900	C14 / C14A	1165	2020
1000	C15 / C15A	1310	2240
1100	C16 / C16A	1735	2855
1200	C17 / C17A	1925	3170

GREASE QUANTITY FOR INITIAL LUBRICATION

The quantity of grease required for initial lubrication is dependent upon operating speed. For slow applications, the bearing and housing can be packed full of grease, however at higher speeds excessive grease will cause the bearing to overheat.

The following table shows the fully packed quantity of grease for each housing size. The actual amount should be estimated using the percentage of this quantity factored according to the shaft speed.

ESTIMATING GREASE QUANTITY

Estimation of the quantity required depending on the speed can be made using the tables below:

SPEED RANGE	PERCENTAGE
0 - 50,000dn	100%
50,000dn - 100,000dn	75%
150,000dn - 200,000dn	50%
Above 200,000dn	25%

The routine greasing interval is dependent upon operating speed, temperature and environment. As a guide, the re-lubrication quantity should be around 2 – 3 grams given at the following interval:

- Radial bearing with axial bearing (fixed or thrust arrangement) re-grease every 100 hours
- Radial bearing only (expansion arrangement) re-grease every 400 hours



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