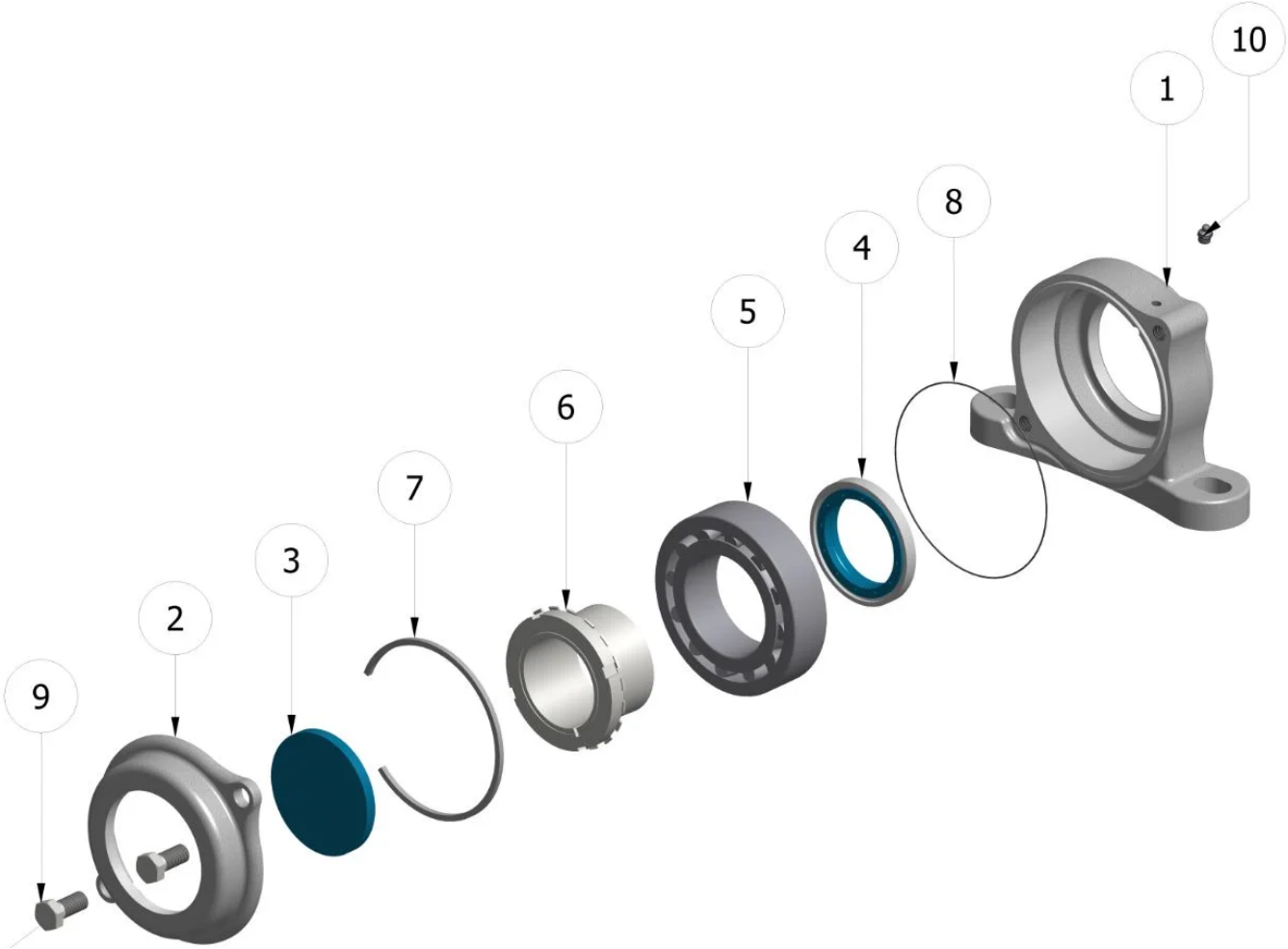
MOUNTING INSTRUCTIONS FOR EXTREME BEARINGS

A guide for mounting Extreme Bearings

Partnames

1. Mounting
2. Part name
3. Housing
4. Cover
5. Cover seal
6. Back seal
7. Bearing
8. Adapter sleeve
9. Locating ring
10. Oring
11. Bolts
12. Grease nipple



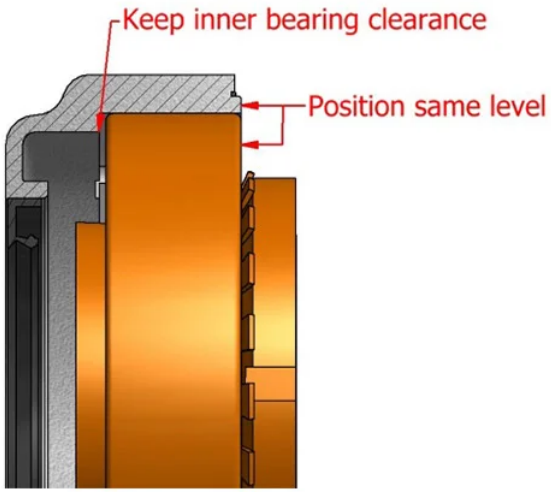


Fig. 1

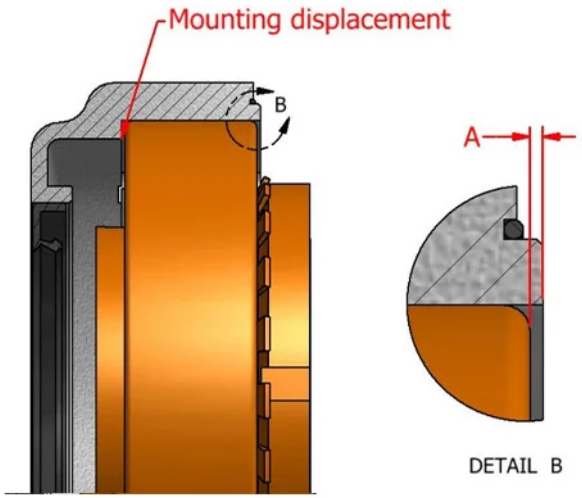


Fig. 2

Shaft Ø	A
20	1,65
25	1,6
30	1,55
35	1,55
40	1,55
45	2
50	2
55	2
60	2
70	1,15
80	1,16
100	6,5

Step by step

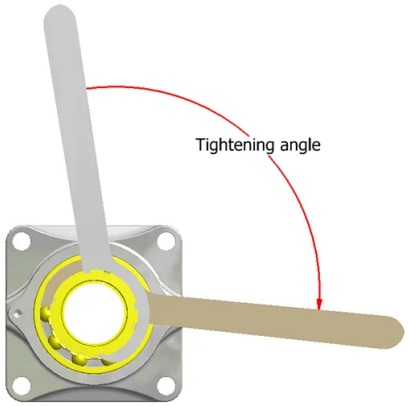
1. Put some grease on the seal lip.
2. Position both bearing units onto the shaft and bolt the bearing housing to the machine frame but do not tighten the bolts all the way yet.
3. Check if the shaft has the correct level on the machine frame.
4. Tighten the attachment bolts of the housing to the frame.
5. Start the clamping procedure on the drive (fixed) side, never on both sides at the same time!
6. *Method 1:* As shown in the diagram (fig. 1), position the outer edge of the bearing race exactly level with the outer edge of the bearing housing to maintain inner bearing clearance after tightening the bearing adapter sleeve.
   Method 2: In case you want highly accurate axial positioning on the shaft, position only the bearing on the fixed side in the casing. As shown in figure 2, the position of the outer edge of the bearing race is not exactly level with the outer edge of the bearing housing after tightening the bearing adapter sleeve. This difference is indicated by A in figure 2 and the table shows the recommended values for A in mm depending on the diameter of the shaft.
7. The locking mechanism for the bearing is based on an adapter sleeve. First put some grease on the locking nut, both on the thread and the front surface.
8. Lift the shaft a little so that the bearing is free from load and the adapter sleeve can move freely.
9. Place the locating ring in position and then screw on the locking nut with its chamfer side facing the bearing. Before starting the final tightening procedure, the bearing should be pushed up onto the tapered seat until the bearing inner ring cannot be rotated relative to the shaft. Then turn the nut through the tightening angle as given in the table for spherical roller bearings. The bearing will be displaced axially (inwards) on the tapered seat during tightening. The residual clearance of the roller bearing should be checked if possible.

Fig. 3

Dimensions		Reduction of radial clearance		Axial displacement				Tightening angle
				On the shaft		On the sleeve		
Bearing No.	Bore	min.	max.	min.	max.	min.	max.	
22206 EK + H306	25	0,02	0,025	0,35	0,4	0,35	0,45	100
22207 EK + H307	30	0,02	0,025	0,35	0,4	0,35	0,45	110
22208 EK + H308	35	0,02	0,025	0,35	0,4	0,35	0,45	120
22209 EK + H309	40	0,02	0,025	0,35	0,4	0,35	0,45	120
22210 EK + H310	45	0,02	0,025	0,35	0,4	0,35	0,45	130
22211 EK + H311	50	0,03	0,04	0,45	0,6	0,5	0,7	130
22212 EK + H312	55	0,03	0,04	0,45	0,6	0,5	0,7	110
22213 EK + H313	60	0,03	0,04	0,45	0,6	0,5	0,7	110
22215 EK + H315	65	0,04	0,05	0,6	0,75	0,7	0,85	110
22216 EK + H316	70	0,04	0,05	0,6	0,75	0,7	0,85	130
22217 EK + H317	75	0,04	0,05	0,6	0,75	0,7	0,85	130
22218 EK + H318	80	0,045	0,06	0,7	0,9	0,75	1	130
22219 EK + H319	85	0,045	0,06	0,7	0,9	0,75	1	150
22220 EK + H320	90	0,045	0,06	0,7	0,9	0,75	1	150
22221 EK + H321	100	0,045	0,06	0,7	0,9	0,75	1	150

Fig. 4

10. Put some grease on the locking nut. (figure 3)
11. Place a spanner wrench in the groove in the locking nut and use it to tighten the bearing onto the shaft. Tightening angles are given in the table (Figure 4)
12. Make sure that the O-ring is mounted properly.
13. Check that the shaft is not too long in case you want to use a closed blue cover seal. If you have a bearing for a drive situation, use an open cover with a shaft seal. In that case, put some grease on the seal lip and carefully push the seal over the shaft.
14. When you have chosen Method 1 at step 6 in the instructions, the shaft with the bearing shall have about one millimeter clearance backwards by mounting on the fixed side. In case your construction demands Method 2 with highly accurate axial positioning, check the position. If there is too much displacement, undo steps 6-14, correct the position and repeat the steps again.
15. Tighten the cover with the attachment bolts.
16. The last step is to fill up the bearings with grease. Slowly pump the grease into the bearing unit while rotating it by hand and stop pumping as soon as you notice that no air is gradually passing the seals. If you pump too fast, the trapped air will push the excess grease out of the bearing before it is full.



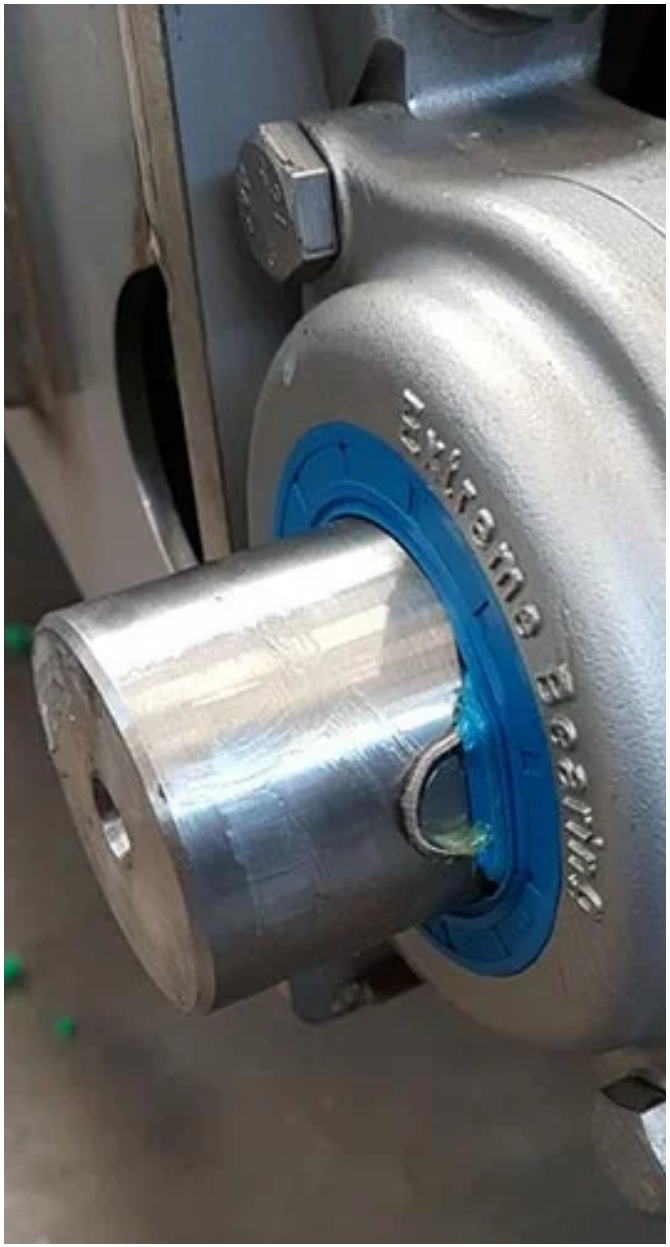
IMPORTANT INFORMATION FOR INITIAL GREASING IF IT IS A PRESSURE-TIGHT BEARING UNIT

In some configurations, the bearing units from Extreme Bearing are pressure-tight. Therefore it is necessary to keep the cover a little bit open while you do the initial greasing. Otherwise problems like in the picture shown here can occur.

In addition, whenever it is necessary to add some more grease later, you should always take care not to create over pressure in the housing. The Extreme Bearing units are pressure-tight when used with the following configurations of seals: AS/AS, AS/VK, CL/CL and CL/VK.

Please inform your maintenance crew about this special service operating instruction. After filling with grease, it could be helpful to take away the grease nipples completely and exchange them with a standard stainless steel bolt, so it will be impossible to make mistakes.

GREASE : All Extreme Bearing version accepts all types of lubricants currently used in the power transmission equipement.



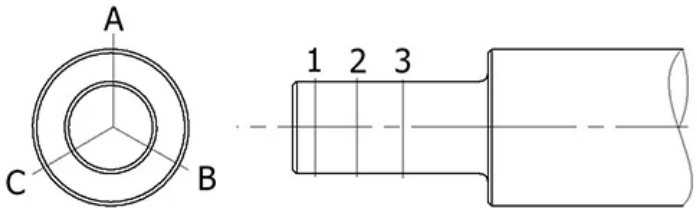
POINTS TO CONSIDER PRIOR TO MOUNTING

1. Check the tolerance of the shaft

The shaft should be clean, dry and free from grease.

Make sure that the shaft is free of any surface damage such as burrs from set screws and scratches. If not, remove the burrs and scratches with a fine file. We prefer a fine file over emery cloth so that you only take away the high spots without affecting the main shaft tolerance.

Check if the shaft bearing seat is within tolerance, preferably at three cross-sections 20 mm apart in the position where the bearing will be placed. These positions are shown as 1, 2 and 3 in the diagram and three measurements should be taken around the cross-section at A, B and C. Measure the cylindricality with a micrometer in these three locations on the circumference: A, B and C.



	1	2	3
A			
B			
C			

2. Check the hardness and surface roughness of the shaft
The hardness of the shaft should be a minimum of HRc 55. In general, shafts of carbon steel or stainless steel are most suitable. What's even more important than a correct interference fit of the oil seal, is a perfectly smooth shaft in the region of the seal. The surface roughness of the shaft (Ra value) depends on the average profile depth of the tool marks caused by the machining process.

For normal circumstances, the shaft in the region of the seal must have a surface roughness of approximately:

- **Ra = 0.4 to 0.8 mm**
- **CLa = 8 to 25 mm**
- **Rz = 1.0 to 4.0 mm**
- **Rmax ≤ 6.3 mm**

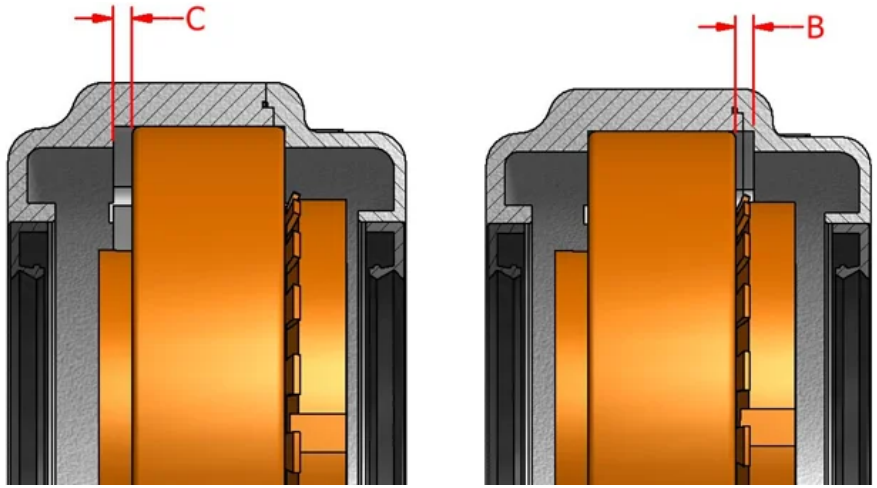
3. Decide on the fixed side

Each shaft will have a fixed bearing location (mounted first) and a floating location (mounted second). If an Extreme Bearing is to be used on a drive shaft, it is required that the fixed side be the motor drive side. To minimize the risk of any confusion, we strongly recommend the fixed side be the drive side, as depicted in the diagram.

4. Allow for thermal expansion and contraction

There is a total clearance available for thermal expansion that is equal to the thickness of the location ring. The expansion and contraction of material must be considered in order to maintain the clearance that is required to operate the bearing well. In the diagram, the clearance for contraction by cooling is indicated by C and the clearance for expansion by heating is indicated by B. The table shows the maximum values for C and B depending on the diameter of the shaft.

More information about thermal expansion you can find here



Shaft Ø	C, Max. Cooling shrinkage mm	B, Max. Heating expansion mm
20	3,5	3,5
25	3,5	3,5
30	3,5	3,5
35	3,5	3,5
40	3,5	3,5
45	4	4
50	4	4
55	4	4
60	4	4
70	5	5
80	5	5
100	10	10

HEATING AND COOLING EXPANSION

Calculate the maximum shaft length depending on the temperature in your application. In case you need to mount a long shaft, it is necessary to calculate the thermal expansion or contraction and adjust the bearing position to take this into account. As an example, a stainless steel shaft of 1 meter will become 0.023 mm longer when the temperature rises by 1°C and a carbon steel shaft of 1 meter will become 0.016 mm longer when the temperature rises by 1°C. The table shows the maximum shaft length depending on how the temperature changes during operation after the time of installation.

Shaft Ø	Max. shaft length by cooling contraction from moment of installation in Meter/degrees Kelvin C									
	10C		20C		40C		50C		60C	
	SS	Steel	SS	Steel	SS	Steel	SS	Steel	SS	Steel
20	9,38	12,50	4,69	6,25	2,34	3,13	1,88	2,50	1,56	2,08
25	9,38	12,50	4,69	6,25	2,34	3,13	1,88	2,50	1,56	2,08
30	9,38	12,50	4,69	6,25	2,34	3,13	1,88	2,50	1,56	2,08
35	9,38	12,50	4,69	6,25	2,34	3,13	1,88	2,50	1,56	2,08
40	9,38	12,50	4,69	6,25	2,34	3,13	1,88	2,50	1,56	2,08
45	9,38	12,50	4,69	6,25	2,34	3,13	1,88	2,50	1,56	2,08
50	9,38	12,50	4,69	6,25	2,34	3,13	1,88	2,50	1,56	2,08
55	9,38	12,50	4,69	6,25	2,34	3,13	1,88	2,50	1,56	2,08
60	9,38	12,50	4,69	6,25	2,34	3,13	1,88	2,50	1,56	2,08
70	18,75	25,00	9,38	12,50	4,69	6,25	3,75	5,00	3,13	4,17
80	18,75	25,00	9,38	12,50	4,69	6,25	3,75	5,00	3,13	4,17
100	14,38	19,17	7,19	9,58	3,59	4,79	2,88	3,83	2,40	3,19
	Max. shaft length by heating expansion from moment of installation in Meter/degrees Kelvin C									
20	12,50	16,67	6,25	8,33	3,13	4,17	2,50	3,33	2,08	2,78
25	12,50	16,67	6,25	8,33	3,13	4,17	2,50	3,33	2,08	2,78
30	12,50	16,67	6,25	8,33	3,13	4,17	2,50	3,33	2,08	2,78
35	12,50	16,67	6,25	8,33	3,13	4,17	2,50	3,33	2,08	2,78
40	12,50	16,67	6,25	8,33	3,13	4,17	2,50	3,33	2,08	2,78
45	15,63	20,83	7,81	10,42	3,91	5,21	3,13	4,17	2,60	3,47
50	15,63	20,83	7,81	10,42	3,91	5,21	3,13	4,17	2,60	3,47
55	15,63	20,83	7,81	10,42	3,91	5,21	3,13	4,17	2,60	3,47
60	15,63	20,83	7,81	10,42	3,91	5,21	3,13	4,17	2,60	3,47
70	12,50	16,67	6,25	8,33	3,13	4,17	2,50	3,33	2,08	2,78
80	12,50	16,67	6,25	8,33	3,13	4,17	2,50	3,33	2,08	2,78
100	48,13	64,17	24,06	32,08	12,03	16,04	9,63	12,83	8,02	10,69