SKF Cooper split spherical roller bearings

Contents

1. Safety information

Read this section carefully in order to be able to use this product safely.

1.1. Warning symbols

In this document, rules that must be followed in order to prevent injury or financial loss and for the safe usage of this unit, are labeled with the following markings. Make sure to understand the content of these cautions and to follow the guidance provided.

⚠ DANGER

This symbol is used to warn against the possibility of serious or fatal injury. Always follow the instructions to ensure safety.

⚠ WARNING

This symbol is used to warn of the possibility of injury. Always follow the instructions to ensure safety.

⚠ CAUTION

This symbol is used to draw attention to the potential for damage. Always follow these instructions to prevent damage to equipment.

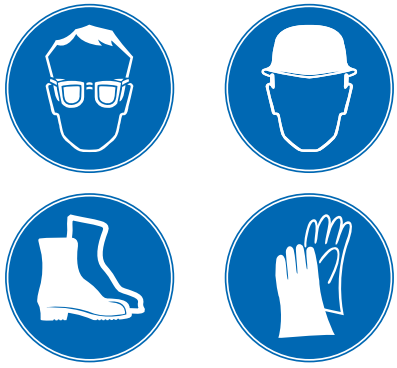
NOTE

This symbol is used to emphasize important items or to provide useful information.

2. General recommendations

⚠ CAUTION

- All care must be taken to prevent personal injury.
- The required personal protection equipment (PPE) is to be worn by the persons performing the work, e.g. safety glasses, safety shoes, leather gloves, rubber gloves, hearing protection, hard hat, safety vest, face shield, etc. Bearing parts can have sharp edges. Handle with care.
- **Only persons trained and experienced in doing bearing mounting should perform the work.**



⚠ CAUTION

- This work includes handling of heavy components. All lifting and handling equipment must be in correct working condition and suitable for the weight of the bearings and components that are to be handled.
- **Only persons trained and experienced in operating cranes/ hoisting equipment, using handling slings, and handling and hoisting heavy components should perform this work.**

2.1. Work area recommendations

The work area where the bearing(s) will be handled and assembled onto the shaft should be clean and free of airborne dust, dirt, and moisture. No welding, grinding, or other operations that can cause dust or dirt should be performed in the work area.

The bearing(s) should be kept in the original packaging until just prior to mounting on the shaft.

The bearing(s) should be protected and wrapped in clean plastic sheets after removal from the packaging until entirely enclosed into the bearing housing.

3. Recommendations

NOTE
Be sure to have the proper hexagon wrench, drivers and calibrated torque wrench for the bearing. See **Table 1** for the screw size and tightening torque specifications.

These recommendations are intended as a guide to allow fitters and engineers to understand the assembly process and if necessary to assist them to produce appropriate documentation for their own applications.

3.1. Preliminary notes

NOTE
Do not remove the bearing from its packaging until ready to make the assembly.

Each component is marked with a match number each side of the split. When assembling these numbers must match and coincide.

NOTE
Parts are not interchangeable between bearings.

The bearing is a precision product; protect the bearing surfaces from scratches and damage when handling and during assembling.

Check List

- ✓ Read these instructions fully before assembling.
- ✓ Shaft size and condition are important.
- ✓ Component match marking numbers must coincide.
- ✓ Do not interchange parts between bearings.
- ✓ Protect bearing surfaces from damage.
- ✓ Oil threads and component interfaces.
- ✓ Fully tighten the inner ring clamping screws.
- ✓ Work safely and beware of sharp edges
- ✓ Lubricate the bearing before closing the housing.
- ✓ Only use SKF Cooper recommended grease.
- ✓ Keep the components clean and protected until you are ready to fit them.

4. Mounting Instructions

4.1. Preparation

Clean the work area, housing and shaft.

⚠ CAUTION
Be sure the machine is properly locked-out and tagged-out so it cannot operate. Make certain the shaft cannot rotate.

Remove the top half of the bearing housing. Raise the shaft approximately 1 mm above its normal working height and **securely block shaft in this position**.

If necessary, remove the old bearing and shaft seals.

Thoroughly clean the housing, bearing seating and shaft.

NOTE
The shaft must be in good condition, clean, undamaged and within SKF Cooper stated size and tolerances.

Unpack the bearing. Remove the inner ring clamping ring screws and then remove the clamping rings.
Do not remove the rollers from the cage. The outer ring and shroud are supplied pre-assembled. Remove the shroud joint screws only. **Do not** remove the radial screws that fasten the outer ring halves into the shroud halves. Otherwise follow procedure given in step 2.

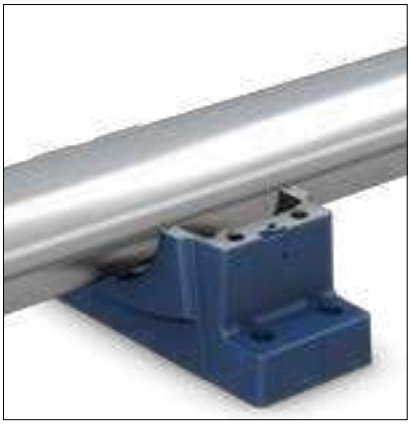


Figure 1. Shaft in split housing

NOTE
For clarity the housing base or other parts may not be shown in each illustration.

4.2. Shroud and outer ring sub-assembly

The individual outer ring and shroud halves are normally supplied pre-assembled. **If not or if the radial screws have been removed** then proceed as follows: Wipe the parts and then lightly oil the surface of the shroud bore and outside diameter of the outer ring. Assemble a half outer ring with a half shroud. Check that the radial holes align. With the two shroud radial screws, loosely fasten the shroud half with the outer ring half. Do not tighten the radial screws. Repeat the above sequence with the other halves.

NOTE
Check that the match numbers coincide.

Figure 2. Outer ring and shroud with radial screws and shroud joint screws

With a light oil, lubricate the joint interfaces and then place the halves together and insert the shroud joint screws. Loosen the radial screws slightly **before** fully tightening the joint screws. Then fully tighten the radial screws to the specified torque using a torque wrench. See **Table 1**.

NOTE
It is important to tighten the shroud joint screws before tightening the radial screws to ensure correct alignment of the outer ring joints. There should be no gap at the joints.

Loosen and remove the shroud joint screws ONLY and separate the sub assemblies. **Do not loosen the radial screws**. The radial screws must remain fully tightened.

4.3. Mount inner ring (step A)

Prior to fitting, ensure that the shaft surface is in good condition, parallel and conforms to SKF Cooper stated tolerances.

With a clean cloth, wipe and lightly oil the shaft surface and inner ring bore. Place the inner ring halves on the shaft (match mark numbers must coincide). Use a wooden wedge or similar non-scratch material between the ring and housing to safely support the ring. The split gap is a feature of the design and should be approximately equal on each split (A soft packing on the joint interface or feeler gauges can be used to assist with gap spacing). If using a soft packing, ensure that that the packing does not become trapped between the bore of the inner ring and the shaft.

Position the inner ring joints near top and bottom to allow access to the clamping ring joint screws when they are fitted. (The clamping rings are fitted at approximately 90° to the inner ring joints).

NOTE

The clamping rings are to be fitted with their joints at approximately 90° to the inner ring joints.

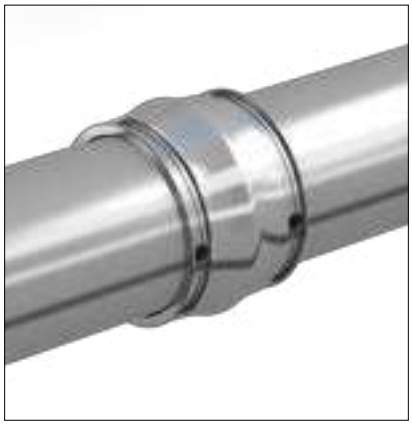


Figure 3. Inner ring halves on shaft

4.4. Fit the clamping rings

Insert the clamping ring halves with threaded holes into the bottom half of the housing and into their inner ring seating grooves. Position the clamp ring and inner ring splits approximately 90° apart. Then fit the other clamp ring half. Insert the pre-cut soft packing (supplied) into the joint gaps and insert the joint screws. Check the position of the inner ring on the shaft and then tighten the screws sufficiently to hold the rings in place, but do not clamp the inner ring to the shaft at this stage.

4.5. Insert outer/shroud lower (threaded) half

Lubricate the bearing seating in the housing and the outside surface of the shroud. Insert (rotate 180°), in a controlled way, the half shroud/outer ring with threaded holes in the joint face into the bottom half of the housing, until the shroud and housing joint faces align.

For a **locating** bearing; the shroud should be positioned against the housing shoulder and locating ring/rings inserted.

For a **non-locating** bearing the shroud should be positioned centrally between the housing shoulders. Use a soft-faced mallet to tap the inner ring along the shaft until it perfectly aligns with the outer ring. To check/assist alignment, place a half cage onto the inner ring then rotate it carefully into the lower half outer ring. Then tighten clamping ring screws and **remove the half cage**.

Figure 4. Bearing inner ring, clamp rings, rollers and cage in lower outer ring and shroud

4.6. Inner ring (step B)

Using a soft-headed mallet, tap down each half of the clamping rings to ensure the rings are fully seated and then using a torque wrench tighten the clamping ring screws to the specified torque. As you do so, check that the clamping ring joint gaps are approximately equal and the inner ring joint gaps are approximately equal. If not then adjust and repeat as above. Repeat the tightening procedure until the screws are fully tighten to the specified torque.
See **Table 1**.

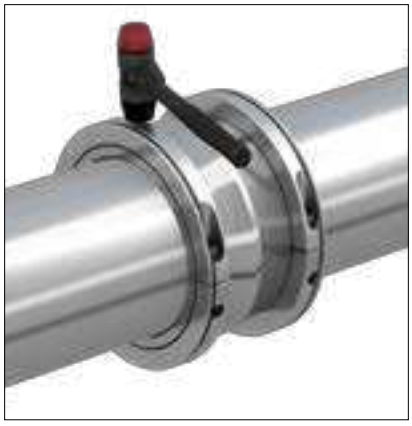


Figure 5. Tap the clamp rings with soft mallet at assembly

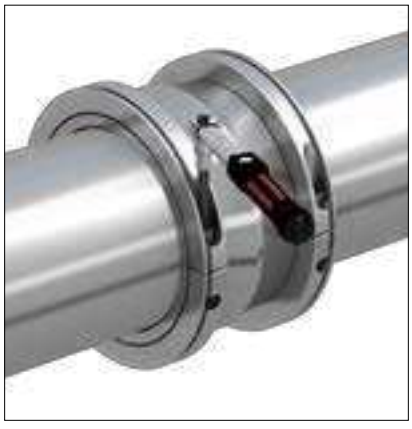


Figure 6. Inner ring and clamp rings on shaft. Note the gap between the rings

If soft joint packing was used to assist with inner race gap equalization then carefully trim off any excess that may protrude. If shims were used then remove them.

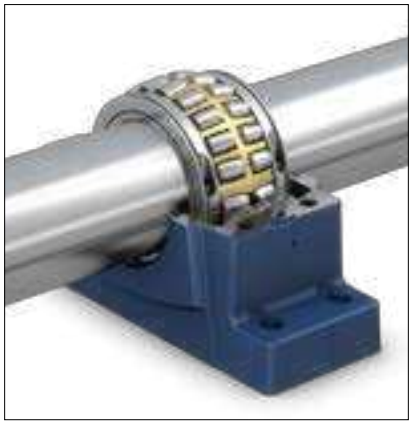


Figure 7. Bearing rollers and cage in position

4.7. Fit cage and roller assembly

Apply a **liberal coating of grease** around the roller paths of the inner race and inside of the cage. Place the cage half with threaded holes in joint face into the bottom of housing and other cage half onto the inner race. Pull the two halves together and then insert and tighten the cage joint screws to the specified torque. See **Table 1**. Rotate the cage by hand and apply a **liberal coating of grease** around the outside of the cage.

4.8. Fit shroud and outer ring (top) half

Apply additional grease as necessary to pack the bearing. Place the top half of the shroud/ outer ring assembly onto the bearing. Insert the shroud joint screws; check that the outer is not binding on the rollers as you progressively tighten the screws to the specified torque. See **Table 1**. There should be no gap at the shroud joints. Apply additional grease as necessary to pack the bearing.

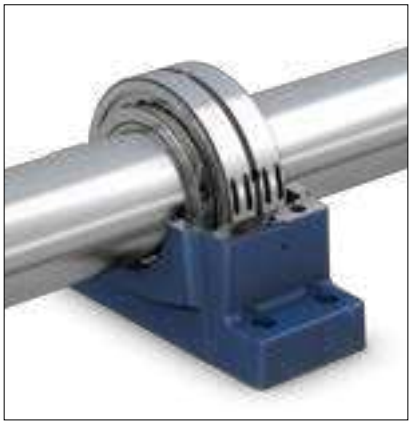


Figure 8. Fully assembled bearing in housing

4.9. Seals

Bearing seals (Optional Extra): The bearing seals, if supplied, are pre-cut to length. The steel banding clip requires cutting to length. Follow the instructions supplied with the banding. Apply a liberal coating of grease around the outside faces of the bearing outer ring and cage. Insert/thread the bearing seals into the seal location groove around each clamping ring. Position the seal split so that it is fully supported (offset from the screw pockets, joints etc)

Fit the steel banding clip into the recess around the outside of the seal. Ensure that the seal and steel banding are properly located in their respective grooves and then tighten the banding clip screws. Check around the seal and clip to ensure they are correctly located. Trim off any excess steel clip banding as necessary.

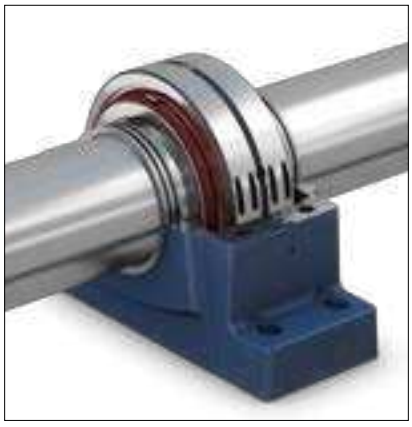


Figure 9. Bearing seal on inner clamp ring

Housing seals

The original split block housing seals can be used. Alternatively, use the SKF TX (metric) machined contact seals with the SKF SNL, SNLD or SKF Mining Specific housing (VZ2N7 suffix) split block housings or the SKF A12 (inch) machined contact seal with the SAF, SAFD, or SDAF split block housings. These seals can be split at installation as required. Follow the fitting instructions supplied with the seals.

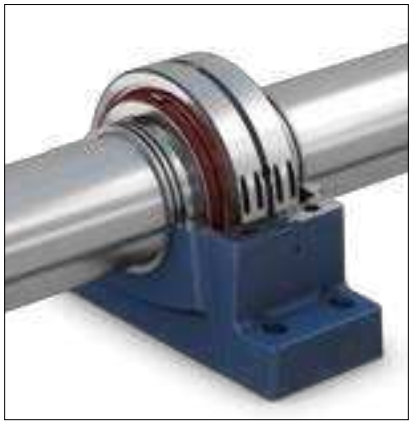


Figure 10. Sealed bearing in housing base

4.10. Lubrication

Pack the bottom half of the housing 50% full of grease. Use a SKF Cooper approved grease.

4.11. Fit shroud and outer ring (top) half

The shroud should be rotated so that the joints are at 90° to the direction of the radial load. If the load is perpendicular to the base of the housing (i.e. the shroud and housing joints coincide) then rotate the shroud to offset the shroud joints relative to the housing joints by approximately 10°.

Lightly oil the split housing joint interface. Place the housing cap on the base ensuring that the match marks coincide. Insert the housing joint screws.

NOTE
Ensure that the shaft supports have been removed and the shaft lowered before fully tightening the housing screws to the specified torque. There should be no gap at the housing joints.

NOTE
The caps and bases of individual split block housings are not interchangeable with other housings.

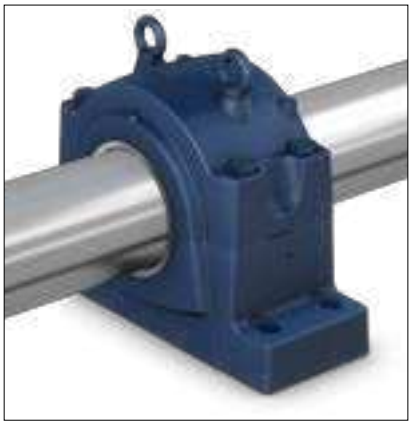


Figure 11. Split block housing with bearing on shaft

4.12. Technical specifications

Screw size and tightening torque								Designation	
Clamping Ring		Cage		Shroud					
Joint Screws		Joint Screws		Joint Screws		Radial Screws		Open	Sealed
Size	Nm	Size	Nm	Size	Nm	Size	Nm	–	–
M14	195	M5	7,25	M8	35	M10	35	**231S240M**	**231S240M-2SRS**
M12	120	M6	12,75	M6	15	M8	17,5	**231S260M**	**231S260M-2SRS**
M16	300	M6	12,75	M8	35	M10	35	**231S280M**	**231S280M-2SRS**
M16	300	M6	12,75	M10	70	M12	60	**231S300M**	**231S300M-2SRS**
M16	300	M8	29,75	M10	70	M12	60	**231S320M**	**231S320M-2SRS**
M16	300	M8	29,75	M8	35	M10	35	**231S340M**	**231S340M-2SRS**
M16	300	M8	29,75	M8	35	M10	35	**231S360M**	**231S360M-2SRS**
M20	560	M10	59,5	M10	70	M12	60	**231S380M**	**231S380M-2SRS**
M20	560	M8	29,75	M12	120	M16	150	**231S400M**	**231S400M-2SRS**
M20	560	M8	29,75	M12	120	M16	150	**231S410M**	**231S410M-2SRS**
M20	560	M10	59,5	M12	120	M16	150	**231S430M**	**231S430M-2SRS**
M20	560	M10	59,5	M16	300	M16	150	**231S450M**	**231S450M-2SRS**

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