

# Bearing maintenance guidelines

For top segment roll lines in slab casters fitted with CARB toroidal roller bearings



# CARB toroidal roller bearings – general information

A CARB bearing can accommodate misalignment and axial displacement at the same time (→ **fig. 1**). Full complement bearings with very high load carrying capacity are available in both open and sealed versions (→ **fig. 2**).

## Snap ring inside a CARB bearing

- The snap ring's only function is to prevent rollers from falling out during transportation and mounting (→ **fig. 3**)
- It can be safely removed before operation as it has no further function
- Limits axial displacement in one direction – bearing orientation can be important in some roll designs

CARB bearings can be supplied without snap ring, indicated with the designation suffix VM 118.

## Bearing fits

- **Loose fit on the shaft:**  
f7 standard recommendation
- **Loose fit in the housing/roll mantle:**  
H7 standard recommendation
- **Inner ring and outer ring are axially located**

## Benefits of sealed bearings

- Extended bearing service life
- More predictable service life
- Reliable operation, no blocked rolls
- Reduction of grease consumption
- Less hazardous waste
- Maintenance friendly
- The seal material and grease are not toxic

Fig. 1

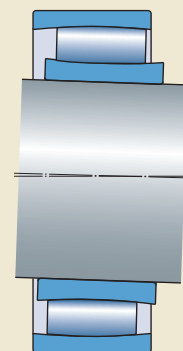


Fig. 2

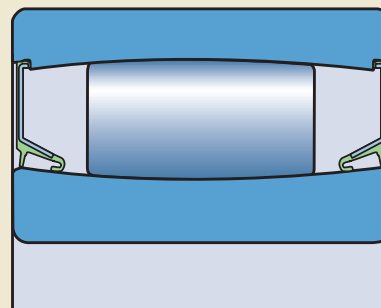
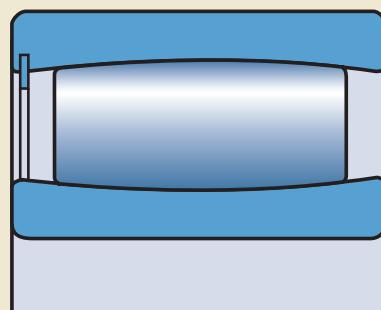


Fig. 3



## Bearing seat checking

- Bearing seat dimension tolerances
  - loose fits f7/H7 is our standard recommendation
  - enables easy mounting and dismounting
- Bearing seat form tolerance
  - shape of shaft and housing bore is important to support the bearing rings
  - cylindricity (roundness, taper) specification IT6
- Measuring the bearing seat (→ **fig. 4**):
  - 2 or 3 planes, (1, 2 and 3), 3 or 4 positions (A, B, C and D) = min. 6/max. 12 measurements to check the form tolerance

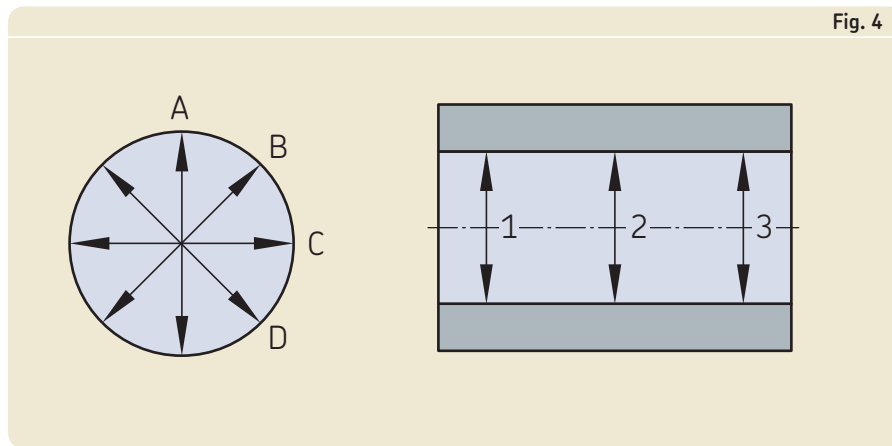


Fig. 4

For additional information about SKF grease, refer to the catalogue "SKF Maintenance and Lubrication"

- printed version MP 3000
- online at [www.mapro.skf.com](http://www.mapro.skf.com)

## Lubrication

**Important:** Bearings and housings must be 100 % filled prior to operation.

### Recommended grease properties

- Good sealing performance (stiffness, water resistance) while still being pumpable.
  - Consistency grade NLGI 2 if possible
- Excellent protection against corrosion
- Base oil viscosity > 400 mm<sup>2</sup>/s (cSt)
- Excellent load carrying capability and anti-wear performance from thickener

### Lubrication recommendation

#### Open and one side sealed

- lubrication flows through the bearing
- SKF LGHB 2 grease
- regreasing volume per bearing position, typical rate = 4.5 cm<sup>3</sup>/hour (= 0.8 cm<sup>3</sup>/10 min, alt. 1.5 cm<sup>3</sup>/20 min)

#### Fully sealed

- only external seal (housing) is re-lubricated (→ **fig. 5**)
- regreasing volume 1,5 cm<sup>3</sup>/hour (=0,5 cm<sup>3</sup>/20 min)

These values can be adjusted depending on the experience in the specific caster.

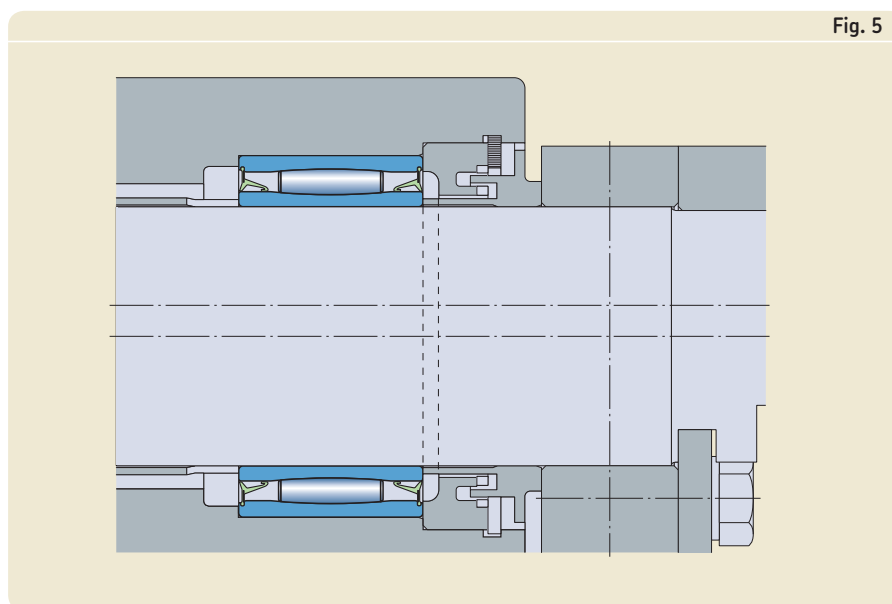


Fig. 5

# Top segment roll lines – mounting bearings

- Insert the intermediate sleeve loosely into the roll mantle (→ fig. 6).
- Fit the dismounting rings in the bearing seat. The dismounting rings radially centre the intermediate sleeve (→ fig. 6).

**At this stage of the mounting procedure, grease the bearings. The bearings should be completely filled with grease.**

- Press the bearings into the bearing seat in the roll mantle (→ fig. 7). Force must only be applied to the outer rings.
- Fit a support block on the shaft in a position close to the centre.
- Mount the pre-assembled roll from the end of the shaft. Push the roll via the outer stationary seal ring all the way until the inner stationary seal ring is resting against the support block (→ fig. 8).
- **Important:** To avoid risk of damage to or seizure of the bearing, press only on the outer stationary seal ring and not the roll.

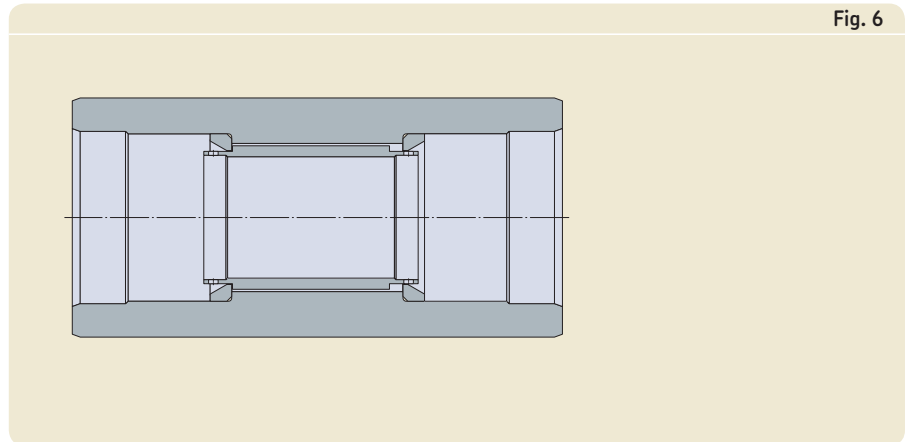


Fig. 6

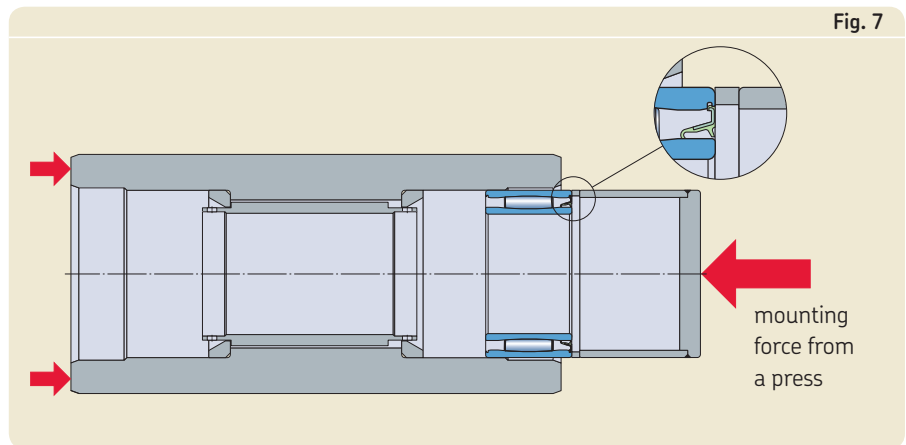


Fig. 7

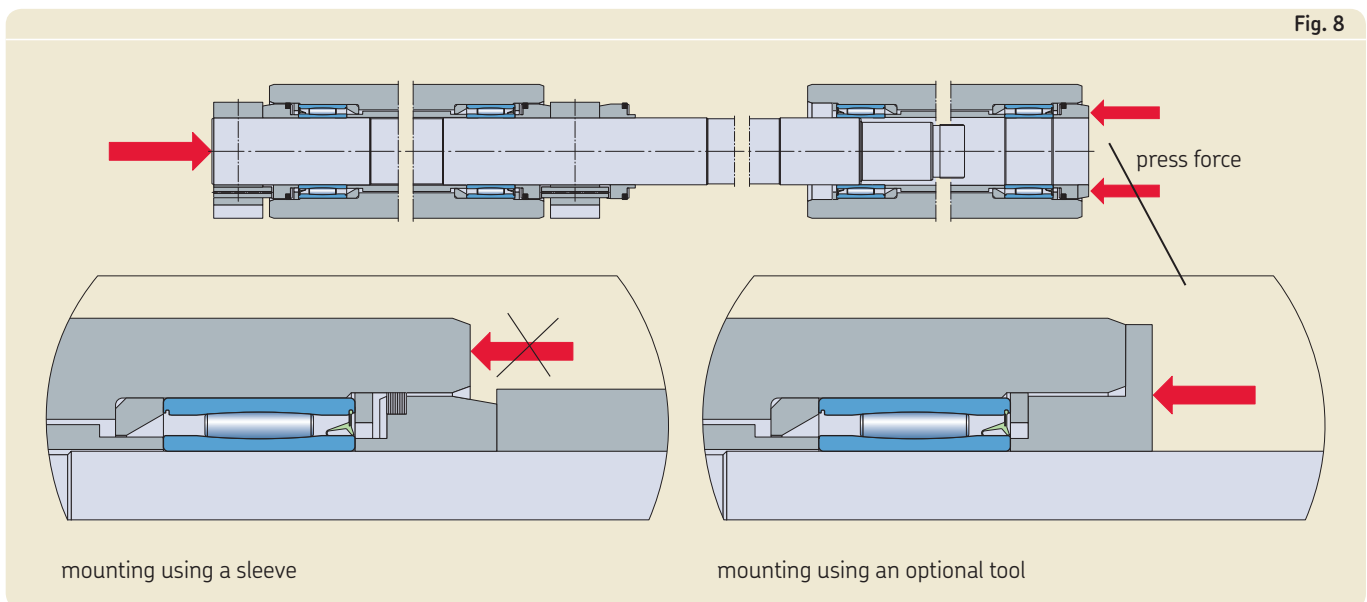


Fig. 8

# Top segment roll lines – dismounting bearings

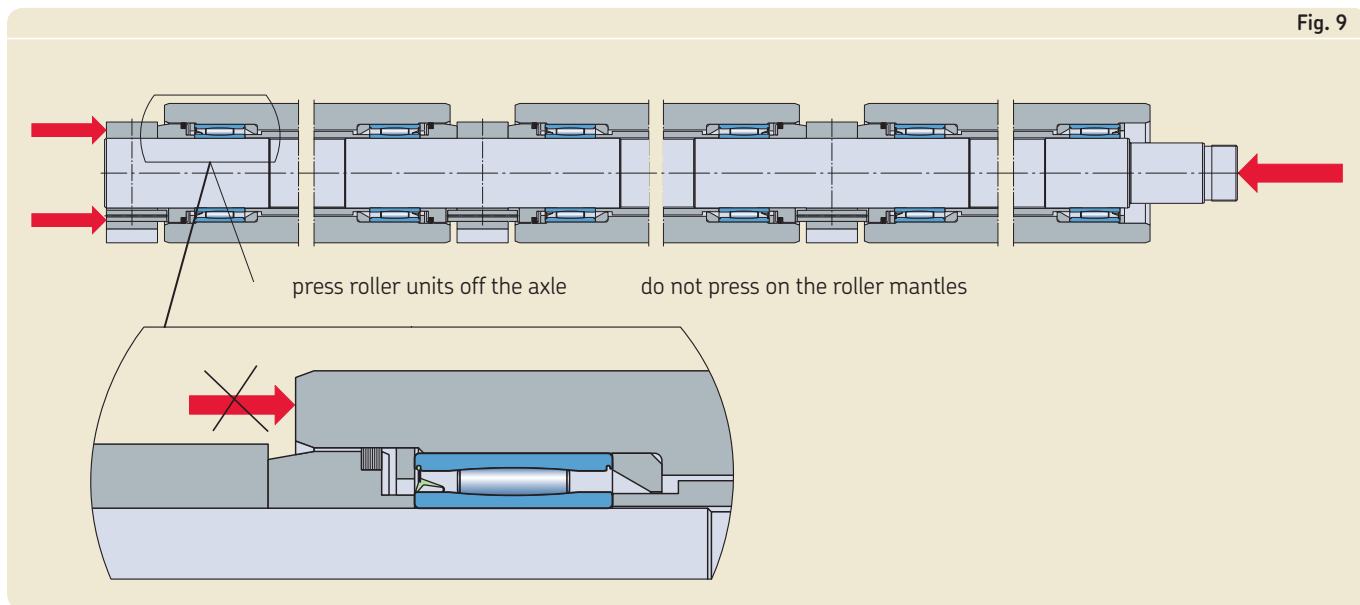


Fig. 9

## Pushing the shaft out through all rolls

- Disassemble one of the support blocks at one end of the shaft.
- Pull off a roll from the shaft, either by just pulling the roll or by using the support block inside the roll as a “pulling tool”. Continue until all the rolls are pulled off.
- In some mills, the shaft is pushed out through all the rolls while one outer support block is resting against a stand, as shown in **fig. 9**.

## Dismounting the bearings from the roll mantle

- The roll is now put in a press set-up with one end resting against a stop that has an opening sufficiently large for an outer ring to be pressed out.
- Use a dismounting tool as shown in (**→ fig. 10**). This tool is a stepped sleeve with an abutment to face the end of the intermediate sleeve. When the stepped sleeve is squeezed, the abutment diameter is of course small enough to pass the bore of the bearing, and the length of this stepped sleeve is sufficient to press out the bearing at the other end of the roll.

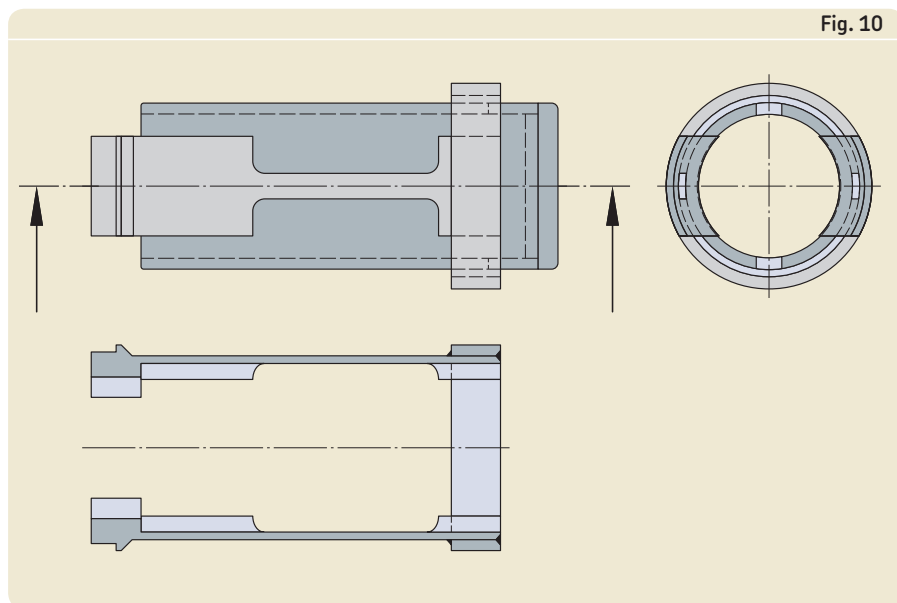


Fig. 10

*The tool part number is PUSH-CARB-X where X is the bearing bore diameter. For example PUSH-CARB-75 for bearing C 5915 V/C4S3.*

To order the dismounting tool, define the CARB bearing size used and contact SKF.

Fig. 11

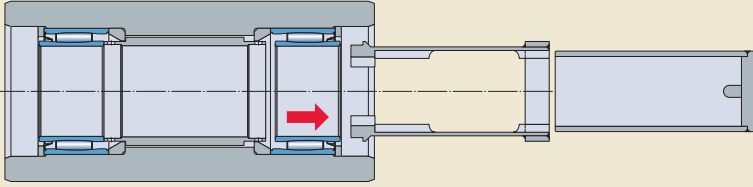


Fig. 12

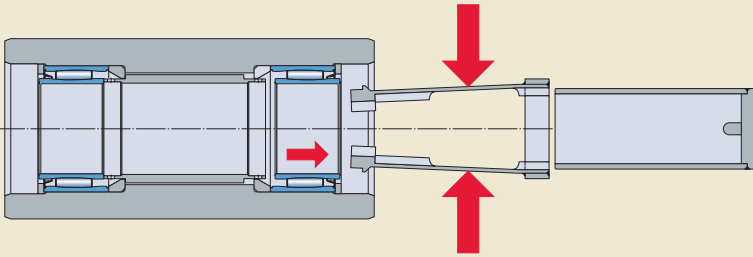


Fig. 13

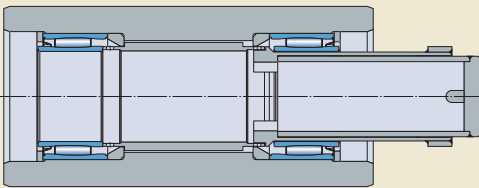


Fig. 14

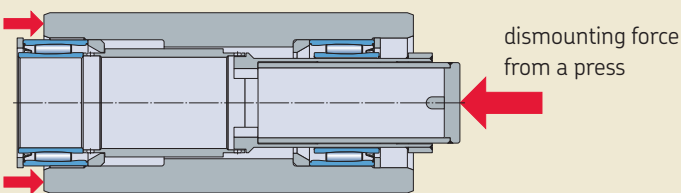
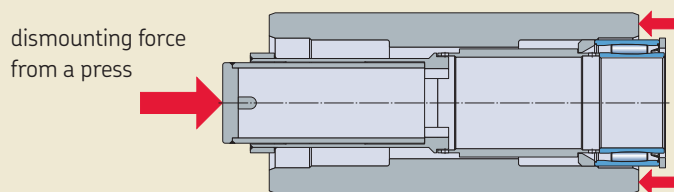


Fig. 15



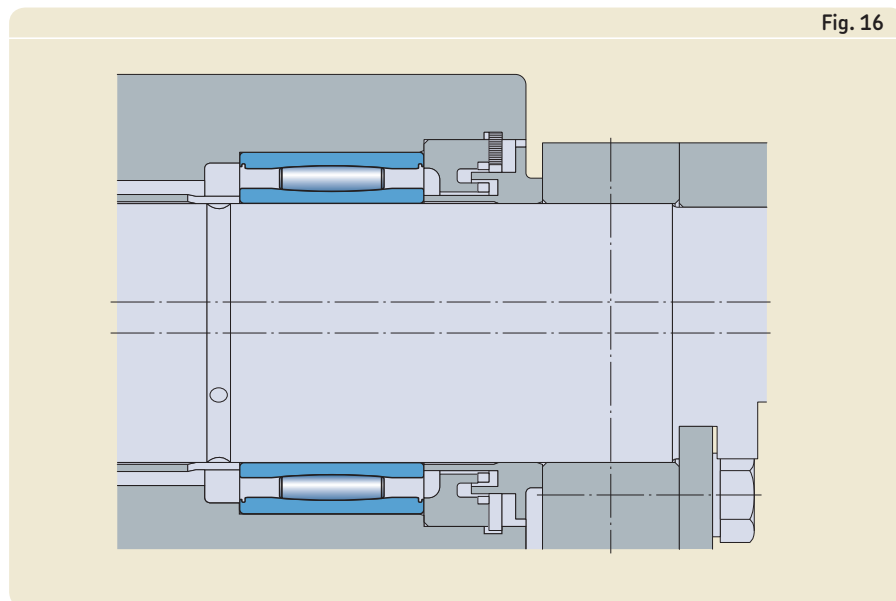
- The tool is inserted at the opposite side of the stop (→ fig. 11).
- Move the inner ring of the bearing closest to the tool towards the end of the roll (→ fig. 11).
- Squeeze the tool arms together (→ fig. 12).
- Insert the tool until the abutment diameter fits behind the bearing inner ring and abuts the stepped sleeve (→ fig. 13).
- Press out the first bearing (→ fig. 14). The press force is transmitted from the stepped sleeve tool to the bearing outer ring via the intermediate sleeve and the dismantling ring.
- Turn the roll around and press the remaining bearing out, using the same method (→ fig. 15).

For additional information about mounting and dismantling, refer to [www.skf.com/mount](http://www.skf.com/mount)

# Dismounting bearings from roll mantles that are not fitted with a dismounting ring

- When the rolls are not fitted with a dismounting ring, a different dismounting method needs to be applied.
- In this case, there is a distance ring between the bearings that has two slots (→ **fig. 16**).
- The shafts are dismantled in the same way as described above.
- A special puller is used. The puller arms pass through the slots in the sleeve and grab behind the outer ring.

SKF recommends roll line assemblies with a dismounting ring.



*Bearing arrangement without a dismounting ring*

## Remanufacturing of used bearings

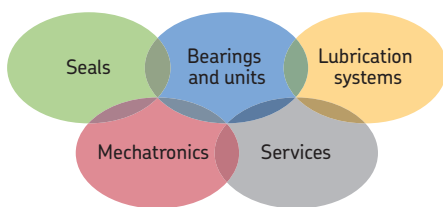
The decision about whether a bearing can be remanufactured or not should be based on a proper visual inspection of internal surfaces.

Bearings can often be remanufactured if there are:

- no visible cracks
- no spalling (flaking)
- no significant wear, which can be easily felt (no "steps" in the raceways or on the rollers)
- no deep corrosion lines in the raceways (→ **fig. 17**)

Remanufacturing is preferably carried out in a SKF Service Centre. Contact your local SKF distributor to get information about the capabilities of the nearest SKF Service Centre.





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