

The SKF OKC coupling for shafts 100-1000 mounting and dismounting instruction

Instruction No.:

81489

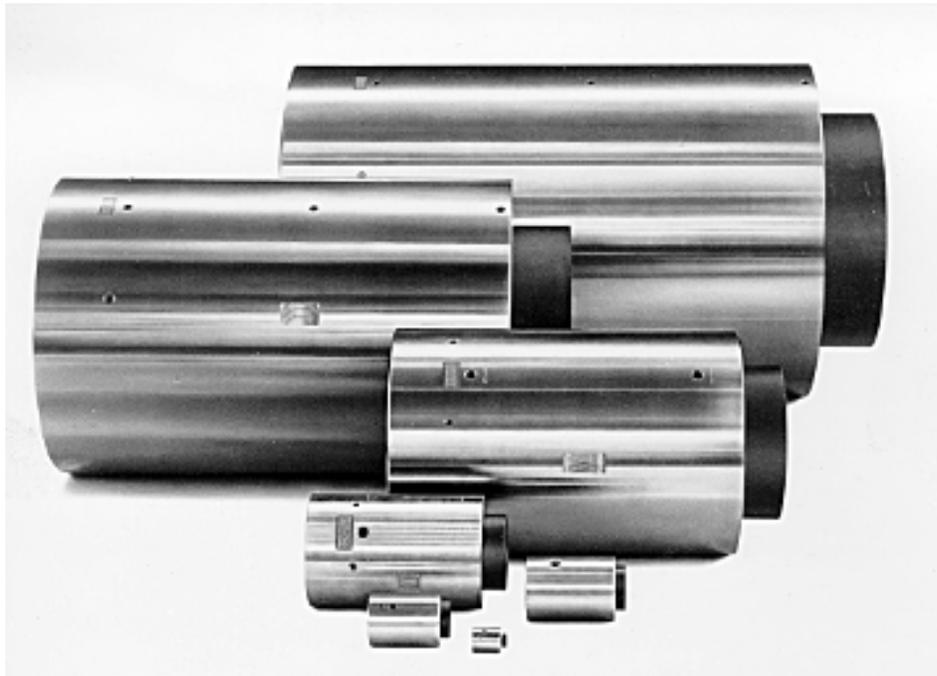
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CONTENTS

1	CAUTIONS AND PERSONAL SAFETY	3
2	THE PRINCIPLE OF THE COUPLING	4
3	OIL RECOMMENDATION	5
4	DESIGNATION OF THE COUPLING	5
5	COUPLING DETAILS	5
6	EQUIPMENT FOR MOUNTING AND DISMOUNTING	7
7	MOUNTING INSTRUCTIONS	9
8	DISMOUNTING INSTRUCTIONS	15
9	REPLACING OF THE HYDRAULIC CHAMBER SEALING	15
10	ASSEMBLY DRAWING	16

1 CAUTIONS AND PERSONAL SAFETY

- When using the hydraulic equipment and injectors, always wear eye protection and gloves.
- Use the correct oil as shown in the instructions.
- Use all equipment strictly in accordance with the instructions, or the instructions supplied by the equipment manufacturer.
- Inspect all equipment for damage before use.
- As a precaution, when mounting/dismounting the coupling, the area in front of and behind the coupling must be kept clear of all personnel.

2 THE PRINCIPLE OF THE COUPLING

The OKC type coupling consists basically of two sleeves of high quality steel, a thin inner sleeve and a thick outer sleeve.

The outer surface of the inner sleeve is slightly tapered and the bore of the outer sleeve has a corresponding taper.

The inner sleeve bore is somewhat larger than the diameter of the shafts, so that the sleeve can be passed over them with ease.

The coupling is mounted by driving the outer sleeve up on the taper of the inner sleeve using the hydraulic unit incorporated in the coupling.

This action compresses the inner sleeve onto shaft creating a powerful interference fit.

To allow this drive-up, the friction of the matching tapered surfaces is overcome by injecting oil at high pressure between them, where it forms a load-carrying film separating the two components.

When the outer sleeve has reached the correct drive up position, the injection pressure is released and the oil is drained off between the mating tapered surfaces, restoring normal friction between the sleeves.

Dismounting the coupling is equally simple. Oil is injected between the coupling sleeves to overcome the friction. As a result of the taper, the compressive force has an axial component which causes the outer sleeve to slide down the taper, forcing the oil out of the hydraulic unit.

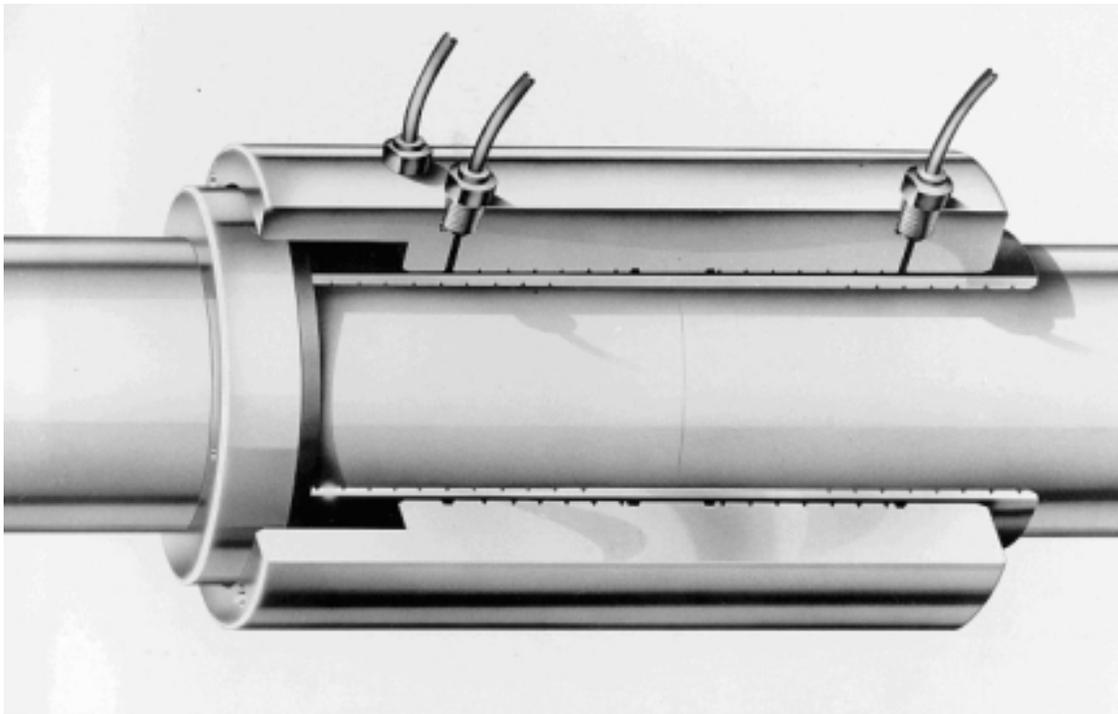


Fig. 2-1

3 OIL RECOMMENDATION

The oil to be used for the injector should have a viscosity of 300 mm²/s (300cS) at the temperature of the coupling. If the oil used for mounting is too thick, there is a risk that it will remain between the sleeves, resulting in a considerably deteriorated grip. The adequate viscosity will generally be obtained with sufficient accuracy if the oil is chosen as follows:

<i>Temperature range</i>		<i>Viscosity in SAE</i>	
0	- 8°C	Motor Oil	SAE 10 W
8	- 18°C	Motor Oil	SAE 20 W
18	- 27°C	Motor Oil	SAE 30
24	- 32°C	Motor Oil	SAE 40
32	- 38°C	Motor Oil	SAE 50

Alternative usable oil:

-10	- +20 °C	Motor oil	0W – 40 (Syntetic)
+15	- +25 °C	Motor oil	5W – 40 (Syntetic)

4 DESIGNATION OF THE COUPLING

The coupling is designated as "Type OKC"; "OKCE"; "OKCA" or "OKCK". OKCE and OKCA is elongated and OKCK is shortened compared with standard OKC.

Coupling sizes are specified using the following system:

OKC (E,A,K) , shaft diameter / drawing number.

For example: OKC 280/xxxxx

COUPLING DETAILS

For details see enclosed assembly drawing.

5 COUPLING DETAILS

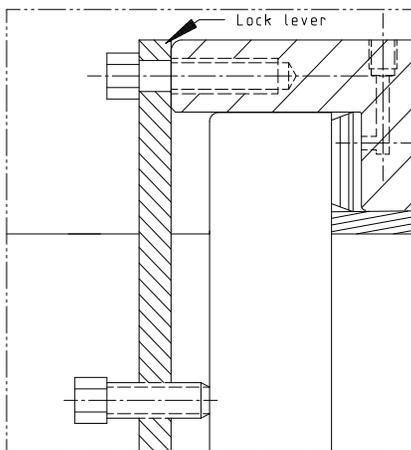
5.1 Locating device for outer sleeve

All couplings for shafts with diameters $\geq 200\text{mm}$ are equipped with lock levers which prevent the outer sleeve from being driven up unintentionally on the inner sleeve during transport and when the coupling is placed on the shaft. The lock levers must be removed before the mounting procedure. When the coupling is final mounted, the lock levers are remounted on the coupling and are now used as a locking device for the nut.

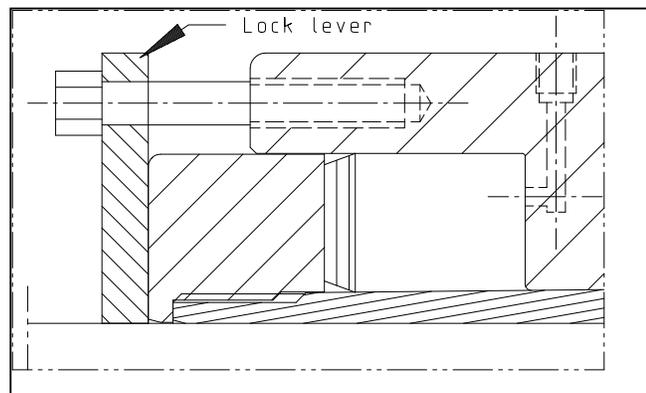
5.1.1 Stainless steel coupling

As described in 5.1 but the lock levers **should not be remounted** when the coupling is final mounted. On stainless couplings the nut is locked with grub screws (see chapter 7.4.1).

Transport and handling mode.

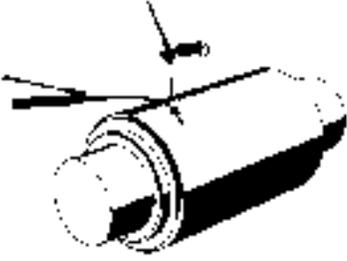
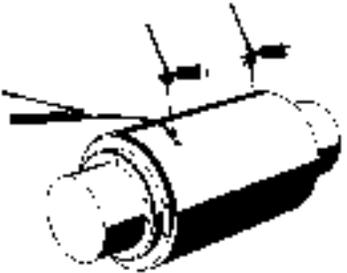
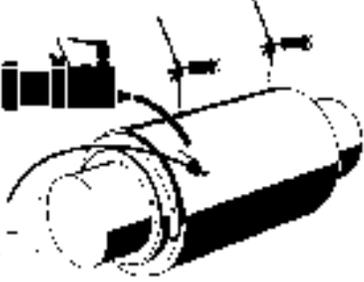


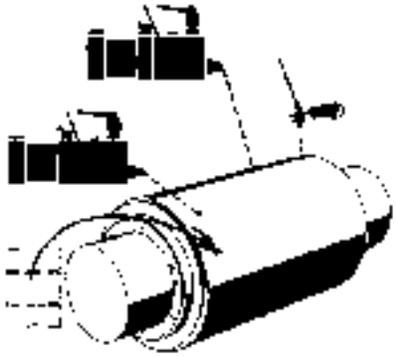
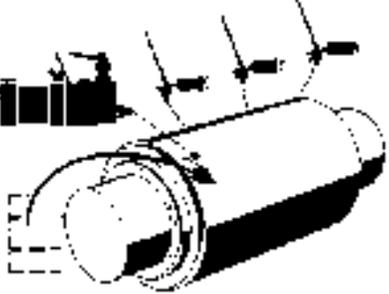
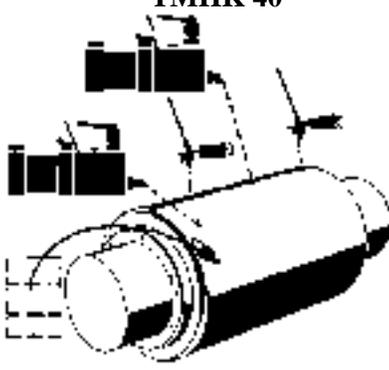
After final mounting on shaft.

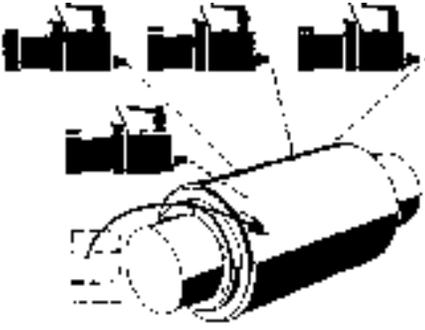


6 EQUIPMENT FOR MOUNTING AND DISMOUNTING

For mounting and dismounting of the coupling, a number of tool kits have been assembled. The kit to be used is selected with reference to the coupling size.

Coupling size	Description	SKF set no.
<p>OKC / OKCA / OKCE 100 - 170</p> <p>OKCS 178 - 360</p>	<p>1 Tool case 728245-3 1 Oil injector 226400 1 Hand operated pump TMJL 50 1 Set of hex keys 1 Spare parts for injector 226400 Mass: 19 kg.</p>	<p>TMHK 36</p> 
<p>OKC / OKCA / OKCE 180- 250</p>	<p>1 Tool case 728245-3 2 Oil injector 226400 1 Hand operated pump TMJL 50 1 Pipe 227958A 1 Adapter block 226402 1 Set of hex keys 1 Spare parts for injector 226400 Mass: 28.1 kg. Set TMHK 38 can also be used for these coupling sizes. The set contains a hydraulic pump driven by compressed air which enables the coupling to be mounted more quickly.</p>	<p>TMHK 37</p> 
<p>OKC / OKCA / OKCE 180- 490</p>	<p>1 Air driven pump set: THAP 030/SET 1 Return hose 729147A 2 Oil injectors 226400 1 Set of hex keys 1 Spare parts for injector 226400 Mass: 32.1 kg</p>	<p>TMHK 38</p> 

<p>OKC / OKCA / OKCE 180- 490</p>	<p>1 Air driven pump set: THAP 030/SET 1 Return hose 729147A 1 Air-driven pump THAP 300E 1 Oil injector 226400 1 Set of hex keys 1 Spare parts for injector 226400 Mass: 76.2 kg including weight of pallet</p>	<p>TMHK 38S</p> 
<p>OKC / OKCA / OKCE 500 ></p>	<p>1 Air driven pump set: THAP 030/SET 1 Return hose 729147A 3 Oil injectors 226400 1 Set of hex keys 1 Spare parts for injector 226400 Mass: 35.1 kg. This set is intended for use on board ship where dismantling and mounting is only carried out infrequently. For shipyards and workshops TMHK 40 or TMHK 41 is recommended.</p>	<p>TMHK 39</p> 
<p>OKC / OKCA / OKCE 500 ></p>	<p>1 Air driven pump set: THAP 030/SET 1 Return hose 729147A 1 Air-driven pump THAP 300E 2 Oil injectors 226400 1 Set of hex keys 1 Spare parts for injector 226400 Mass: 78.2 kg including weight of pallet This set or also set TMHK 41 are recommended for shipyards and workshops. The air-driven high pressure pump simplifies works considerably.</p>	<p>TMHK 40</p> 

<p>OKC / OKCA / OKCE 500 ></p>	<p>1 Air driven pump set: THAP 030/SET 1 Return hose 729147A 3 Air-driven pump THAP 300E 1 Set of hex keys Mass 126.7 kg including weight of pallet. This set is recommended for shipyards and workshops.</p>	<p>TMHK 41</p> 
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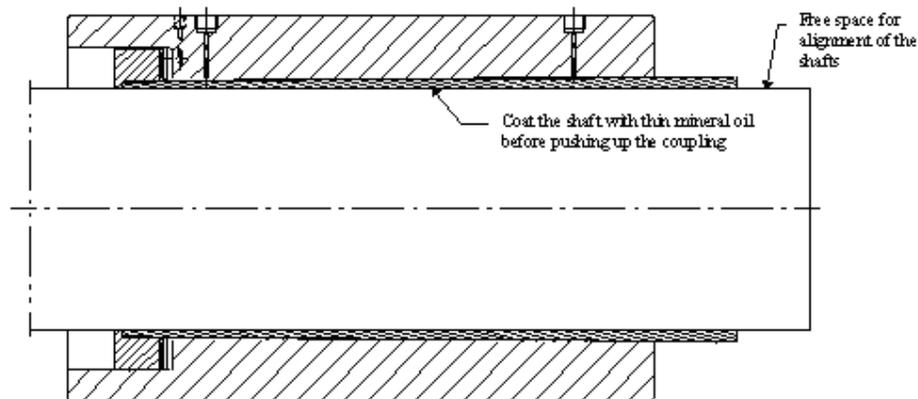
7 MOUNTING INSTRUCTIONS

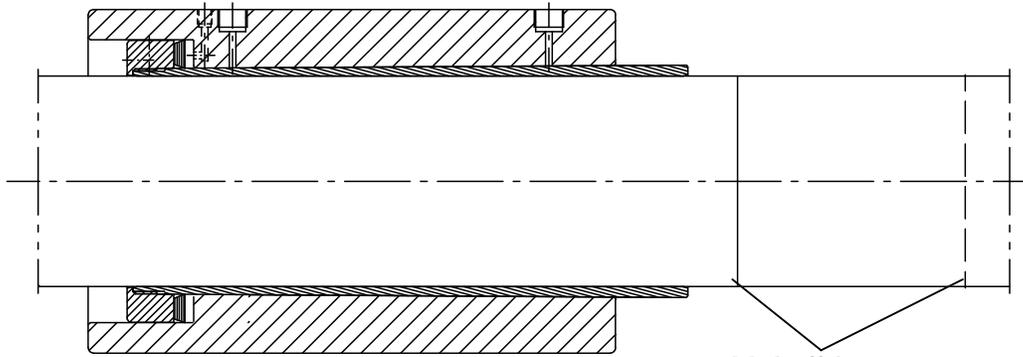
See enclosed assembly drawing for references.

Remove any burrs on the coupling seating on the shaft. **Clean and wash the inner sleeve bore and the coupling seating with white spirit, so that the anticorrosive agent is removed.**

7.1 Positioning of the Coupling on shaft.

Suspend the coupling opposite the shaft on which dimension A_2 has been marked off, ensuring that the large end of the inner sleeve faces this shaft and that the connection holes are at the top of the coupling. Couplings ≥ 200 mm shaft size have locating devices, as described in chapter 5.1, and those should be mounted on the coupling. Slide the coupling on, guiding it carefully to prevent it from damaging the shaft. Push the coupling on until so much of the seating emerges that the shafts can be aligned accurately.



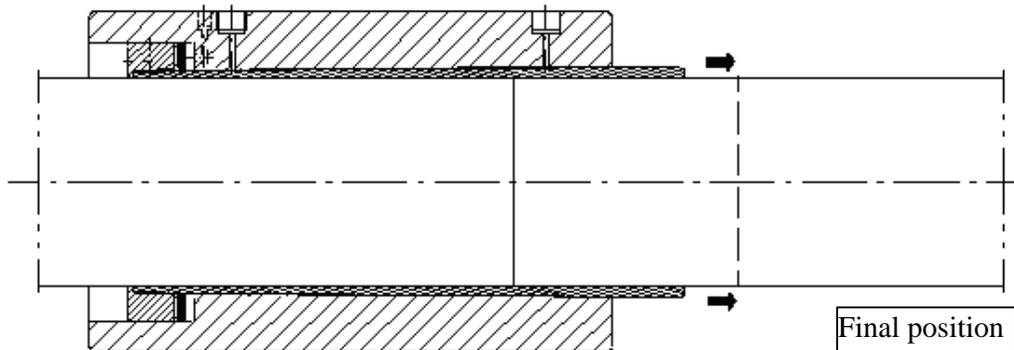


Mark off the dimension A2 (see assembly drawing) to indicate the final position of the large end of the inner sleeve.

7.2

Align the shafts with precision, vertically and horizontally and ensure that the gap between the shaft ends is not more than 1% of the shaft diameter. Support the shafts and the coupling during the mounting process so that no misalignment appear. Coat the seating on the shaft with thin mineral oil to prevent scraps on the shafts when sliding the coupling in position.

Slide the coupling back along the shafts until the large end face of the inner sleeve coincides with the A2 mark on the shaft. See 7.1

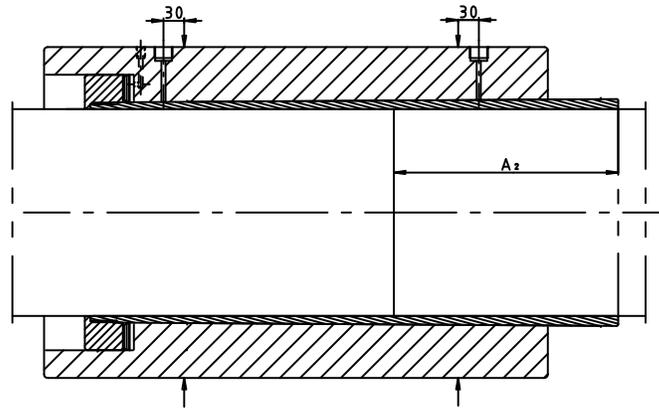


Final position for the thick end of the inner sleeve

Note: The coupling must not weigh upon the shafts

7.3

When the coupling is in position on the shaft and before mounting, measure the outside diameter of coupling and record it. The recommended place for measure is shown below.



7.4 Drive up procedure

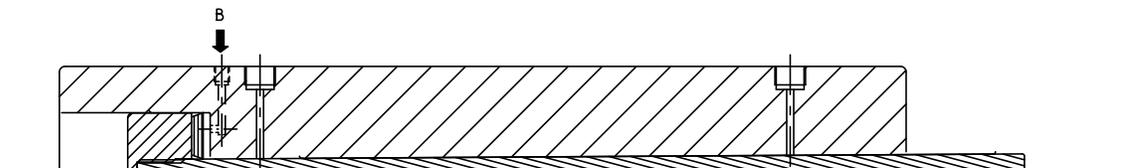
Position the coupling so that one of the two 1/4" plugs connected to the oil chamber is in top position (12⁰⁰ a clock). Couplings ≥ 500 has one 1/2" and one 1/4" hole and the 1/2" hole should be in top position. Unscrew the plugs and connect the low pressure pump to the lower 1/4" hole. Connect the high pressure injectors to the 3/4" holes on the coupling hub.

Stainless steel coupling.

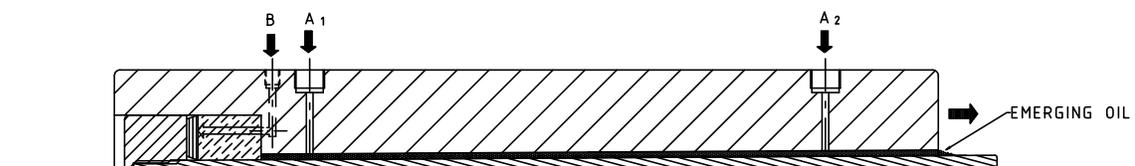
The stainless steel coupling is delivered with plastic plugs mounted and one steel plug is supplied for the venting hole (1/4" alt. 1/2"). When the coupling is final mounted the plastic plugs should be remounted.

Calculate the final diameter of the coupling after drive up. Use the measured outside diameter + delta value stamped on the coupling or see the assembly drawing for the delta value.

7.4.1 Couplings using 1 or 2 injectors (size 100 - 490)

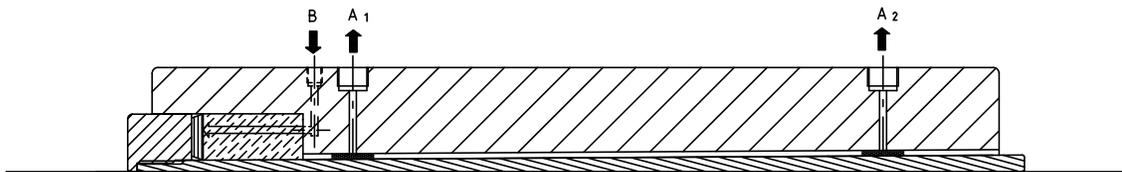


Start pumping oil to the hydraulic chamber (B) until oil escapes through the open 1/4" hole (or the 1/2" hole for larger couplings) without any air bubbles and close that hole with the plug.

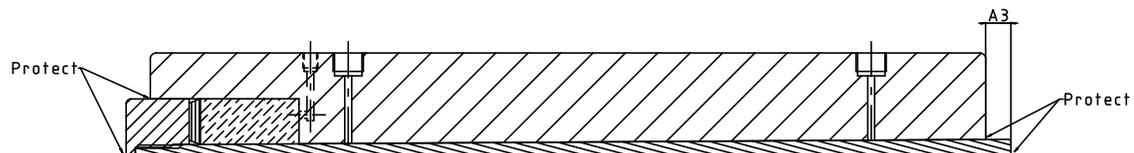


Begin working the high pressure injectors connected to the $\frac{3}{4}$ " hole (A). If it is more than one injector, start with the injector A₁ nearest to hydraulic chamber B. When oil emerges around the periphery at the large end of the inner sleeve, or after 5 minutes work of the injector A₁, start injection also with the second injector A₂ and work both for a couple of minutes.

Start the pump connected to the oil chamber (B) to begin the drive up of the outer sleeve. **It is important to continue working the high pressure injectors during the entire drive up operation.** If it is necessary to refill the container of injector 226400 during the drive up procedure, always stop the pump connected to the oil chamber first and after refilling start the injectors first until oil emerges again around the periphery at the large end of the inner sleeve. Continue the drive up procedure until the diameter of the outer sleeve has increased by the dimension delta. See 7.4. As the delta value should be confirmed after the oil is drained out, the value measured before draining should be 5% higher.

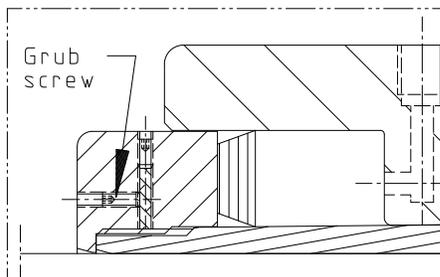


Stop the pump connected to the hydraulic chamber B, but keep the pressure. Open the return valves on the injectors (A). Keep the pressure (B) in the hydraulic chamber. After 10 minutes, measure the delta value again, to confirm the correct diameter increase according to 7.4. Remove the injectors connected to the $\frac{3}{4}$ " hole (A). Open the return valve on the pump connected to the oil chamber (B) slowly to release the pressure, make sure that the outer sleeve is not moving. Disconnect the pump. When oil is not draining out from connections A any more, refit all plugs.

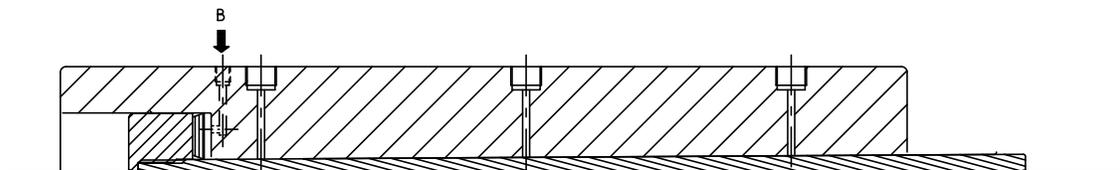


After this first mounting of the coupling the distance A3 (distance from the end of the inner sleeve to the end of the outer sleeve) should be measured and recorded. This can be used as a confirmation at the next mounting of the coupling instead of measuring the delta value increase. Protect the ends of the coupling at the shaft and the clearance between the nut and the outer sleeve using silicon or similar protective. This will prevent moisture from penetrating the coupling parts. Refit the lock levers as described in chapter 5.1.

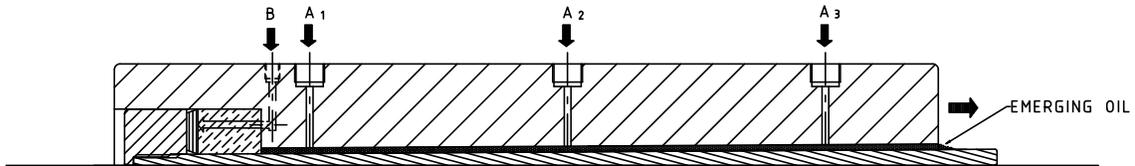
Couplings with size 100-190 has a built in rubber locking plug in the nut. After the initial mounting of the coupling, release the axial grub screw and retighten the nut, if possible, and retighten the axial grub screw.



7.4.2 Couplings using 3 injectors (size >500).

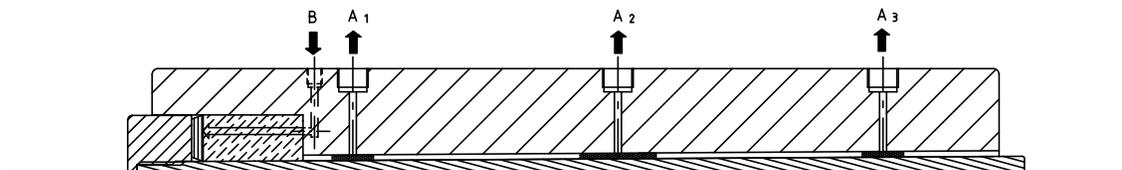


Start pumping oil to the hydraulic chamber (B) until oil escapes through the open 1/2" hole without any air bubbles and close that hole with the 1/2" plug.

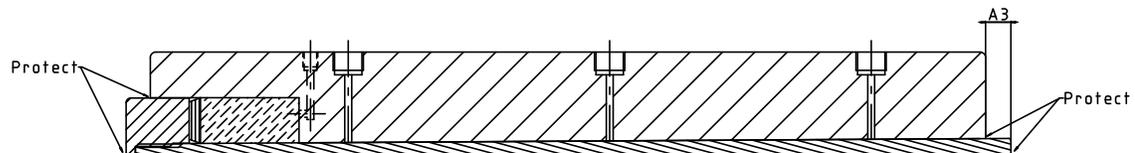


Begin working the high pressure injector connected to the $\frac{3}{4}$ " hole A₂ located in the middle of the coupling. When oil emerges around the periphery at the large end of the inner sleeve, start injection also with the other two injectors A₁ and A₃. Work all injectors for a couple of minutes.

Start the pump connected to the oil chamber to begin the drive up of the outer sleeve. **It is important to continue working the high pressure injectors during the entire drive up operation.** If it is necessary to refill the container of injector 226400 during the drive up procedure, always stop the pump connected to the oil chamber first and after refilling start the injectors first until oil emerges again around the periphery at the large end of the inner sleeve. Continue the drive up procedure until the diameter of the outer sleeve has increased by the dimension delta. See 7.4. As the delta value should be confirmed after the oil is drained out, the value measured before draining should be 5% higher.



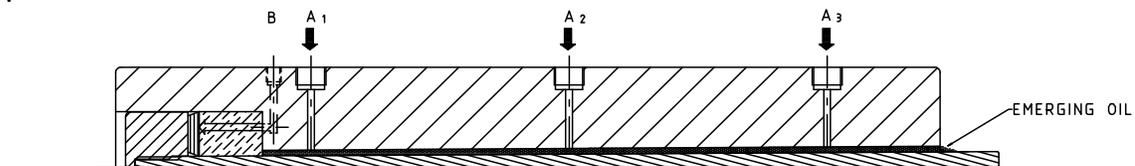
Stop the pump connected to the hydraulic chamber B, but keep the pressure. Open the return valves on the injectors (A). Keep the pressure (B) in the hydraulic chamber. After 10 minutes, measure the delta value again, to confirm the correct diameter increase according to 7.4. Remove the injectors connected to the $\frac{3}{4}$ " hole (A). Open the return valve on the pump connected to the oil chamber (B) slowly to release the pressure, make sure that the outer sleeve is not moving. Disconnect the pump. When oil is not draining out from connections A any more, refit all plugs.



After this first mounting of the coupling the distance A₃ (distance from the end of the inner sleeve to the end of the outer sleeve) should be measured and recorded. This can be used as a confirmation at the next mounting of the coupling instead of measuring the delta value increase. Protect the ends of the coupling at the shaft and the clearance between the nut and the outer sleeve using silicon or similar protective. This will prevent moisture from penetrating the coupling parts. Refit the lock levers as described in chapter 5.1.

8 DISMOUNTING INSTRUCTIONS

- 1 Support the shafts on both sides of the coupling. Dismount the lock levers on the coupling, see chapter 5.1.
- 2 Connect the pump and injectors as for mounting and fill up the oil chamber with oil as the procedure for mounting, see chapter 7.4.1 or 6.4.2 . Connect also the extra return pipe to the ½” or the other ¼” vent hole at the hydraulic chamber.
- 3 Pressurise the oil chamber to 15 MPa and start the high pressure injectors following the procedure for mounting. See 7.4.1 or 7.4.2 .
- 4 Continue work the high pressure injectors until oil emerges around the periphery at the large end of the inner sleeve. Open the return valve on the pump connected to the hydraulic chamber and at the same time the valve on the extra return pipe, this while the injectors are working, and the outer sleeve will slide down on the inner sleeve. **The high pressure injectors must be working until the full dismounting position is obtained in order to maintain a good oil film between the sleeves.**



9 REPLACING OF THE HYDRAULIC CHAMBER SEALING

The OKC coupling is a unit which should normally not be disassembled. However, should it become necessary because of a damaged sealing, the nut must first be removed.

9.1 Coupling removed from the shaft

Remove the lock levers or slacken the grub screw in the nut as described in chapter 5.1 and 7.4.1.

Unscrew the nut and remove the sealing using a tool with rounded edges to avoid damaging the surfaces. Replace it with the new sealing and guide it carefully over the inner sleeve threads not to destroy the sealing edge. Push it against the bottom of the chamber. Correctly mounted the sealing outer edge and inner edge will have good contact against the bottom and the face will have a convex form.

Remount the nut and tighten it properly. With a blast of compressed air in one ¼ " hole, the sealing will be forced in position. Remount the lock levers or retighten the grub screw in the nut.

9.2 Coupling mounted on the shaft.

If there is a leakage from the oil chamber when preparing for dismounting procedure , it is necessary to replace the sealing.

Follow the above mentioned procedure for removing the coupling nut and removal of the sealing . Place the nut on the shaft to get good access to the chamber. The new sealing must be cut to get it around the shaft. Do this with a long knife so that it will be a straight and smooth cut. Place the sealing around the shaft with the smallest outer diameter facing the nut. The flat surface of the nut should be used as a template. Use a Cyanoacrylat glue for rubber to glue the cutted surface together. Place the sealing in the chamber guiding it carefully over the threads and 10mm up on the taper of the inner sleeve. Try to get the sealing as straight and flat as possible. Remount the nut and position the sealing with a blast of compressed air in one of the ¼ " hole .

10 ASSEMBLY DRAWING