# SERVICE MANUAL

## VOLVO
## P 1800

*Export Service Department*

AKTIEBOLAGET

VOLVO

GÖTEBORG · SWEDEN

PART 4

# PROPELLER SHAFT

## DESCRIPTION

The propeller shaft on the P 1800 is of the divided, tubular type, see Fig. 4-1.

The forward section of the propeller shaft terminates in a slip joint at the rear end. In this there is a spline shaft which also forms one of the yokes on the intermediate universal joint.

The rear end of the forward section of the propeller shaft is carried in a ball bearing see Fig. 4-2. The ball bearing is carried in a bearing housing which is rubber-mounted on two pins.

The propeller shaft is fitted with three universal joints. Each joint consists of a cross with four ground trunnions which are carried in the yokes by means of needle bearings.

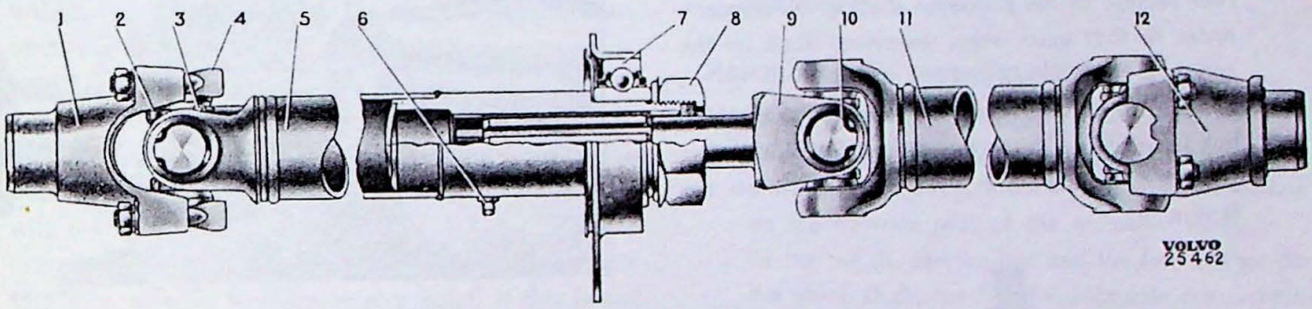


Fig. 4-1. Propeller Shaft

1. Flange on transmission
2. Universal joint
3. Lubricating nipple
4. Clamp
5. Forward section propeller shaft
6. Lubricating nipple
7. Center bearing
8. Nut
9. Spline shaft
10. Lock ring
11. Rear section of propeller shaft
12. Flange on rear axle

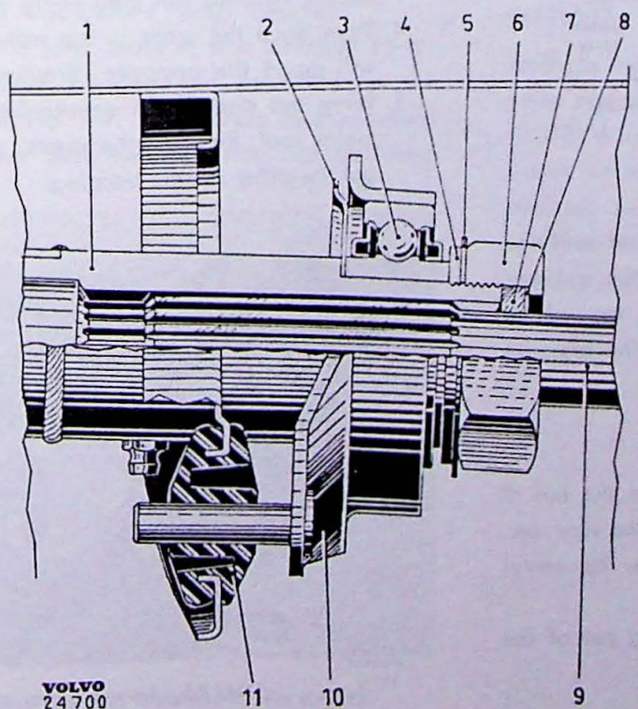


Fig. 4-2. Center Bearing

1. Front section of propeller shaft
2. Cover plate
3. Ball bearings
4. Thrust washer
5. Lock washer
6. Nut
7. Felt washer
8. Washer
9. Spline shaft
10. Retainer
11. Rubber bushing

# REPAIR INSTRUCTIONS

## REPLACING THE CENTER BEARING

1. Jack up the car and block up the front and rear axles. Loosen the clamps retaining the rear universal joint to the rear axle flange (12, Fig. 4-1). Release the lock washer and remove the nut (8). Pull out the propeller shaft to the rear.
2. Pull out the retainer with the center bearing (7) to the rear. Press the center bearing out of the retainer with a suitable tool. Press the new bearing into the retainer with the help of ring SVO 4081, see Fig. 4-3. If the diameter of the press tool is less than the hole in the ring, lay a plate (1, Fig. 4-3) over the ring.
3. Fit the retainer with the center bearing and the rear section of the propeller shaft in the opposite order to that used when removing. Hook on the spring, if fitted. Lower the car.

   NOTE. When re-assembling make sure that the band (1, Fig. 4-9) on the rear universal joint is correctly positioned in the recess for it on the flange.

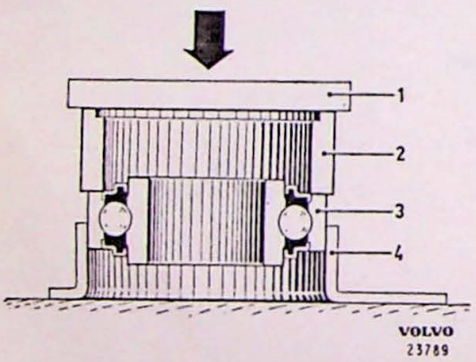


Fig. 4-3. Fitting the center bearing

1. Plate
2. Ring SVO 4081
3. Center bearing
4. Retainer

## REMOVING

Jack up the car and block up the front and rear axles. Remove the clamps retaining the universal joints to the rear axle flange and the transmission flange. Loosen any springs fitted. Slide the propeller shaft to the rear and remove it.

## DISASSEMBLING

1. Loosen the lock washer and remove the nut (8) for the center bearing (7). Remove the rear section of the propeller shaft. Remove the center bearing.
2. If necessary, press the center bearing out of the retainer with a suitable tool.

### Disassembling the Universal Joints

The same disassembly principle is used on all the three universal joints. The only difference is that on the center universal joints, there are two yokes from which the cross is loosened.

1. Remove the snap rings (10) retaining the needle bearings in the yokes, see Fig. 4-4. Remove the lubricating nipple from the cross.
2. Set up the shaft in a vise, so that the universal joint is as near the vise as possible. Remember that the propeller shaft is in the form of a tube and can easily be deformed.
3. Use a hammer and a metal drift to drive the cross as far as it will go in one direction. The needle bearing will then come about halfway out.
4. Then drive the cross in the same way as far as it will go in the opposite direction, see Fig. 4-5.
5. Drive out one of the needle bearings with a thin metal tool. Remove the cross, see Fig. 4-6. Drive out the other needle bearing.

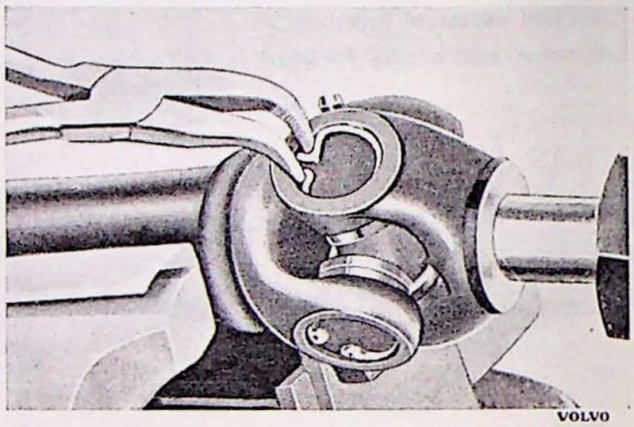


Fig. 4-4. Removing the snap rings

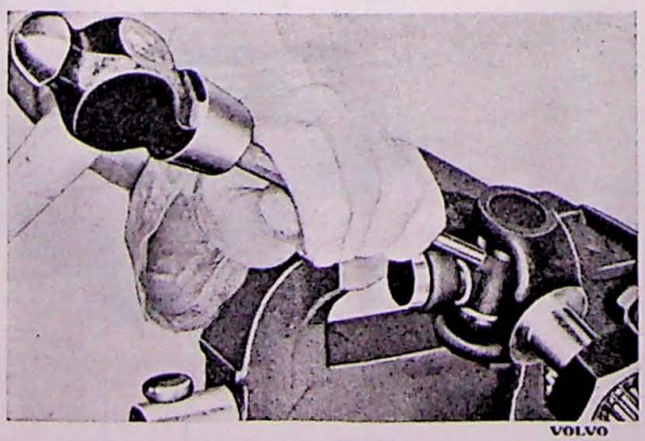


Fig. 4-5. Removing the cross

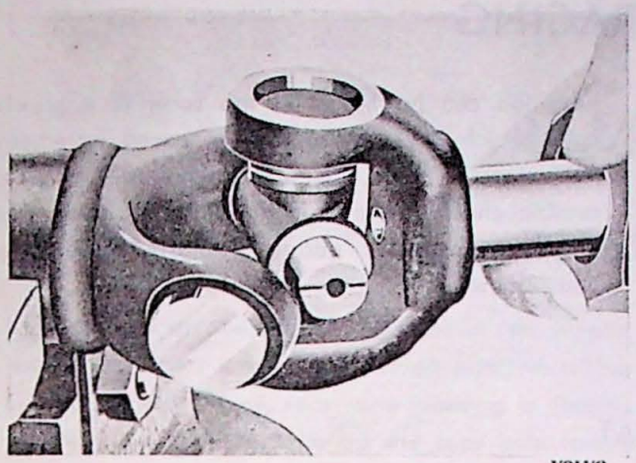

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Fig. 4-6. Disassembling the cross

## INSPECTION

Inspect the propeller shaft. Set the shaft up between centers and check it with an indicator along its entire length while it is rotating. If the run-out should exceed 0.25 mm (0.010") then the shaft should be replaced. **NOTE. No attempt should be made to straighten a damaged propeller shaft — it should be replaced with a new shaft.**

Inspect the center bearing. The bearing should run smoothly without binding at any point. If this is not the case, fit a new bearing.

## ASSEMBLING

### Assembling the universal joints

1. Fit new cork washers on the joint cross trunnion. Fit the cross in the flange yoke in the same position as it was before being removed.
2. Move over the joint cross in one direction so far that the needle bearing can be fitted on the trunnion, see Fig. 4-7. Then press in the needle bearing so far that the snap ring can be fitted.

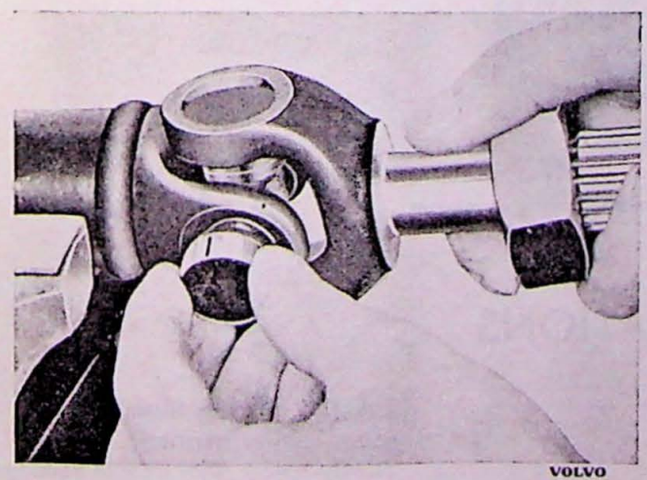

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Fig. 4-7. Fitting the joint cross and needle bearing

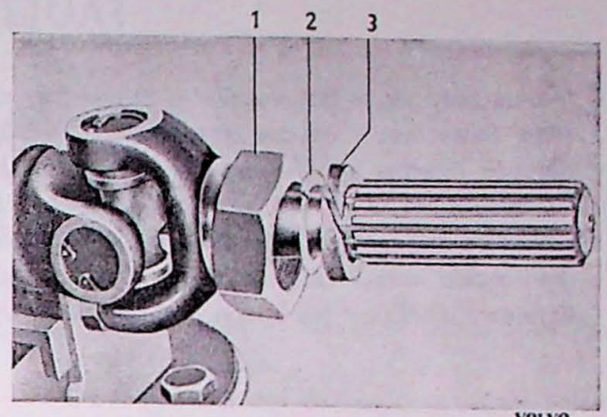


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Fig. 4-8. Spline Shaft
1. Nut 2. Washer 3. Felt Washer

3. Fit the other needle bearing and snap ring in the same way.

### Assembling the propeller shaft

1. Press the center bearing (7) in the retainer by using the ring SVO 4081, see Fig. 4-3. Fit the cover plate, center bearing, thrust washer and lock washer on the forward part of the propeller shaft.
2. Fit the nut (8), the washer and the felt washer on the spline shaft, see Fig. 4-8. Lubricate the surface of the slip joint with a thin layer of molybdenum disulphide. Fit together the forward and rear sections of the propeller shaft. NOTE. Make sure that the yoke on the forward section of the propeller shaft and the yoke on the spline shaft are correctly lined up, see Fig. 4-1.

## FITTING

Fitting is carried out in the reverse order to that used when removing.

NOTE. When fitting be very careful to ensure that the bands on the forward and rear universal joints are correctly positioned in the recesses on the flanges in question, see Fig. 4-9. Tighten the nuts on the clamp to a torque of 1.4—1.65 kgm (10—12 lb.ft.).

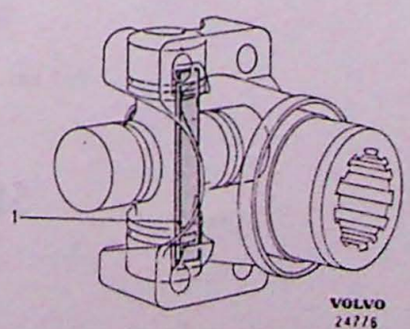


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Fig. 4-9. Fitting the needle bearings
1. Metal band

# FAULT TRACING

Trouble occurring in the propeller shaft and the universal joints usually consists of noisiness caused by vibration together with thumping or clicking sounds. No attempt should be made to repair or straighten a broken or damaged propeller shaft. A new propeller shaft should always be fitted. Vibration can depend on wear, insufficient lubrication or faulty assembly.

Vibration can be heard in the form of a growling noise which becomes louder as speed increases. If the universal joints are worn, there will be clearly audible clicking sounds if the car is driven slowly and the accelerator pedal is alternately depressed and released.

| FAULT | |
|---|---|
| **Cause** | **Remedy** |
| Center bearing casing loose on locating pins. | Change the rubber bushings. |
| Center bearing dry or worn. | Replace the bearing. |
| Center bearing loose in casing. | Replace the bearing and bearing casing. |
| Needle bearings in universal joints dry or worn. | Lubricate with chassis grease or replace. |
| Metal band for needle bearings on forward or rear universal joints faultily fitted. | Fit the band correctly. See Fig. 4-9. |
| Clamps on flange loose. | Replace the spring washers and tighten the nuts. |
| Propeller shaft bent. | Replace propeller shaft. |
| Clicking noise from propeller shaft depending on binding splines. | Disassemble and lubricate the slip joint with a thin coating of molybdenum disulphide. |
| Faulty assembly. | Study the instructions for assembly and fitting. Compare the relative positions of the universal joints with Fig. 4-1. |

# TOOLS

The following tools are used for repair work on the propeller shaft.


SVO 4081 Ring for fitting center bearing in retainer

# SPECIFICATIONS

| | |
|---|---|
| Type | Tubular, divided, three universal joints, center bearing |
| Universal joints, make and type | Hardy-Spicer with needle bearings |
| Lubricant | Special chassis grease |