

GROUP 76 SHOCK ABSORBERS, STABILIZERS AND SUSPENSION COMPONENTS

Description

Shock absorbers

The shock absorbers are of the hydraulic, double-operating, telescopic type. They are maintenance-free but cannot be disassembled for repairs. If they leak or function poorly, the shock absorbers are replaced complete.

Design

The design of the shock absorbers can be seen from Fig. 76-1. The outer cylinder (1) protects against dust and dirt. The other two cylinders (2) and (4) are arranged concentrically with the one entirely pushed into the other. The inner cylinder (2) is the real working cylinder and has a valve (6) at its lower end. A piston (5) with channels regulated by valves run inside the inner cylinder. This piston is attached to a piston rod (3) at the opposite end of which there is a ring (9) for attaching the shock absorber to the frame. At the other end of the shock absorber there is a similar ring fixed to a cylinder (4). The intermediate space between the cylinders (2) and (4) serves as a reservoir and is only partly filled with fluid. The inner cylinder (2) is entirely filled with fluid on both sides of the piston (5). The cover (8) provides the sealing and guide for the piston rod (3). The ring (7) acts as a baffle for the fluid.

Function

When a shock absorber is compressed or extended according to the weight on the vehicle, the piston (5) moves in the inner cylinder (2). This causes fluid to flow through the valve-regulated channels in the piston. The speed at which the piston can move in the cylinder will depend on how fast the fluid flows through the channels from one side of the piston to the other side. Since the drilled channels are very narrow, the fluid can only pass through them slowly and this brakes the movement of the piston. It also has a damping effect on the movement of the spring. When a shock absorber is suddenly compressed or extended, further braking effect is caused by turbulence in the fluid passing through the channels in the piston. When the shock absorber is compressed or extended, this does not alter the volume equally on both sides of the piston due to the fact that the piston rod occupies a certain space. During compression of the absorber, some of the fluid flows through the valve (6) out into the reservoir, and when

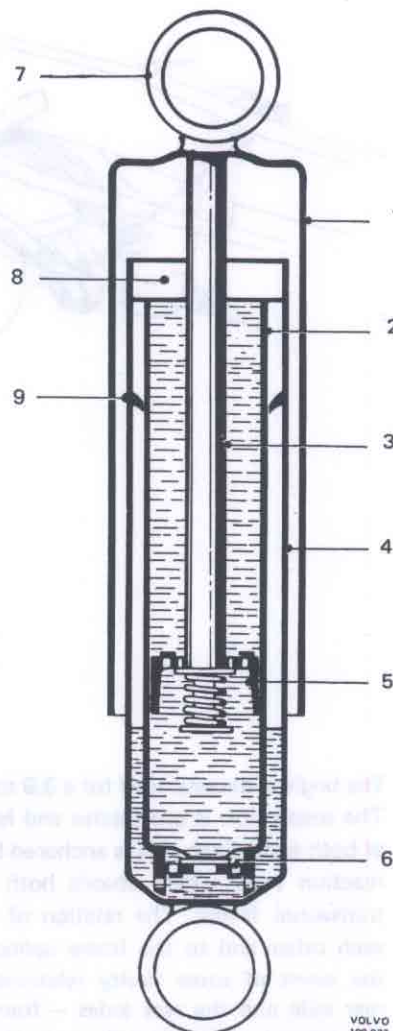
VOLVO
100 033

Fig. 76-1. Shock absorber

- | | |
|--------------------------|----------|
| 1. Outer cylinder | 6. Valve |
| 2. Inner cylinder | 7. Ring |
| 3. Piston rod | 8. Cover |
| 4. Intermediate cylinder | 9. Ring |
| 5. Piston | |

extension takes place, fluid is re-sucked into the cylinder (2) on the underside of the piston.

Reaction rods

2-axle vehicle

Two reaction rods have been fitted to the rear axle for more stable location.

The reaction rods are fixed at both ends with rubber bushings.

3-axle vehicle

See under the heading "Bogie"

Bogie

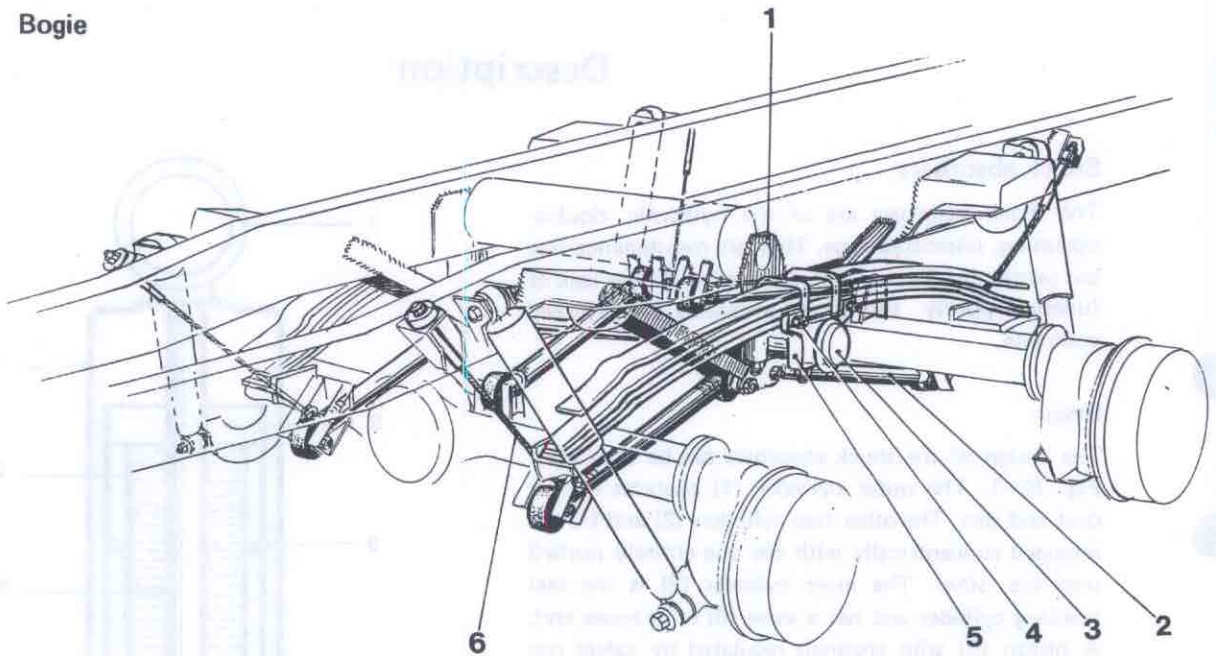


Fig. 76-2. Bogie

- | | |
|--------------------|--------------|
| 1. Bogie anchorage | 4. Lock bolt |
| 2. Reaction rod | 5. Cradle |
| 3. Cover | 6. Stop line |

The bogie is dimensioned for a 3.9 ton bogie pressure. The suspension is progressive and has slip suspension at both ends. Each axle is anchored by means of three reaction rods. These absorb both longitudinal and transversal forces. The relation of the rear axles to each other and to the frame cannot be adjusted. In the event of some faulty relationship between the rear axle and the rear axles - frame, examine what the defect is and replace the parts that are defective.

The cradle (5, Fig. 76-2) is journalled on the bogie attachment's (1) journal pin with needle bearings (4 and 8, Fig. 76-3) for radial forces and with synthetic thrust washers (3 and 9) for axial forces. Axial clearance is adjusted with the help of the nut (10).

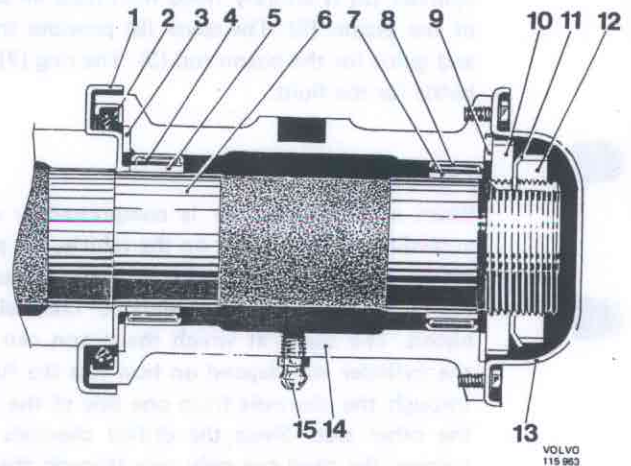


Fig. 76-3. Cradle journalling

- | | |
|--------------------------|------------------------|
| 1. Dust protective plate | 9. Outer thrust washer |
| 2. Sealing ring | 10. Inner nut |
| 3. Inner thrust washer | 11. Lock washer |
| 4. Inner needle bearing | 12. Outer nut |
| 5. Inner bearing race | 13. Cover |
| 6. Bogie axle | 14. Cradle |
| 7. Outer bearing race | 15. Lubricating nipple |
| 8. Outer needle bearing | |

Service Procedures

Shock absorbers

Removing

To remove a shock absorber, first remove the upper and lower anchorage bolts. A rear wheel must be removed in order to remove a rear shock absorber.

Installing

Before installing a shock absorber, bleed it by holding it in the vertical position with the protective cover upwards and pump 4–5 complete strokes or until you feel there is a certain amount of resistance in both directions. When installing a shock absorber, hold the dust protective cover upwards all the time.

Reaction rods

2-axle vehicle

Special tool:

6125 Drift

Replacing reaction rod rubber bushings

1. Unscrew the reaction rod.
2. Place the reaction rod in a press and press out the bushings with drift 6125, see Fig. 76-4.
3. Press in the bushings with the same drift used for pressing them out.
4. Screw tight the reaction rod with the vehicle loaded to a straight rear spring.

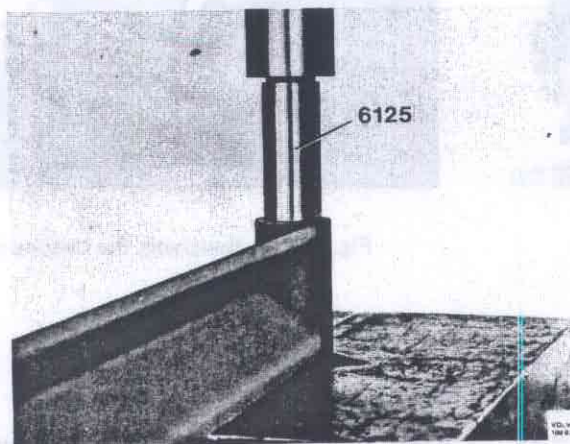


Fig. 76-4. Pressing out the bushing

3-axle vehicle

If any of the rod ends is loose, replace the rod complete.

Bogie

Special tools:

2952 Drift
1801 Standard handle
2494 Drift
2132 Sleeve
6142 Sleeve

Removing the cradle

1. Jack up the vehicle and remove the wheels.
2. Release the U-bolts and the lock bolts, see Fig. 76-5. Lift out the spring.
3. Screw off the cover (13, Fig. 76-3).
4. Knock up the lock washer (11) and screw off the outer nut (12) with a wrench, see Fig. 76-6.
5. Screw off the inner nut with a wrench and pull off the cradle. Remove the outer axial washer (9) and clean the cradle and bogie axle.

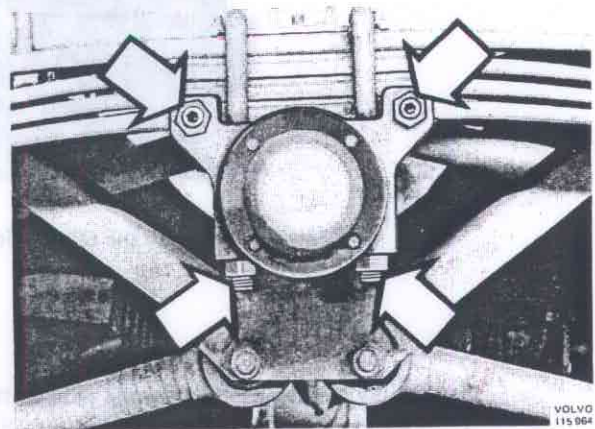


Fig. 76-5. Removing the spring

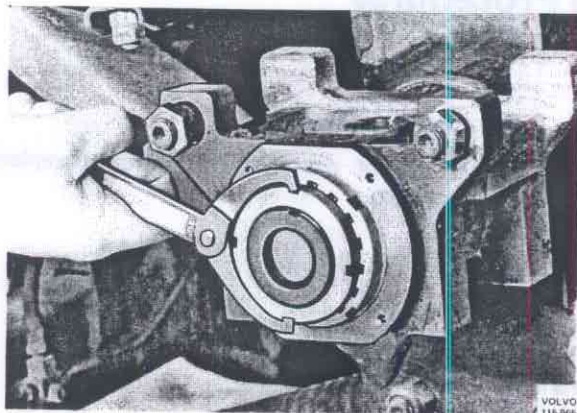


Fig. 76-6. Removing the outer nut

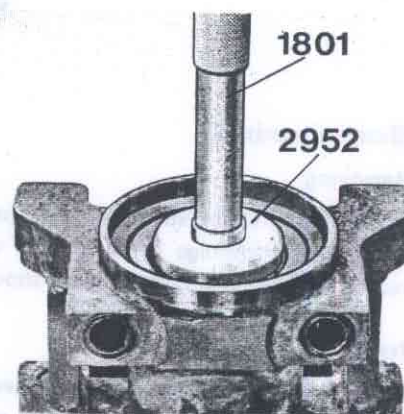


Fig. 76-8. Removing the needle bearing

Disassembling the cradle and removing the bearing races

1. Knock out the sealing ring with a chisel, see Fig. 76-7. If there is any burr underneath the sealing ring, remove it with a shaver.

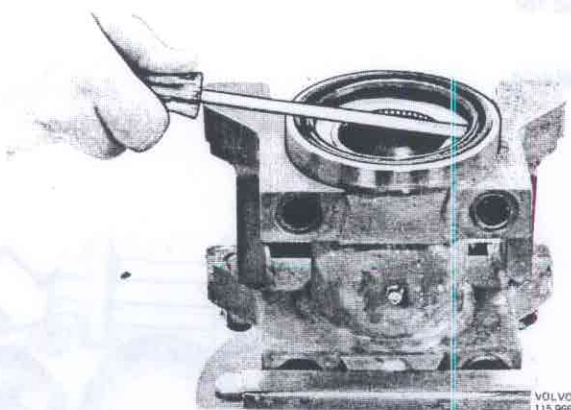


Fig. 76-7. Removing the sealing ring

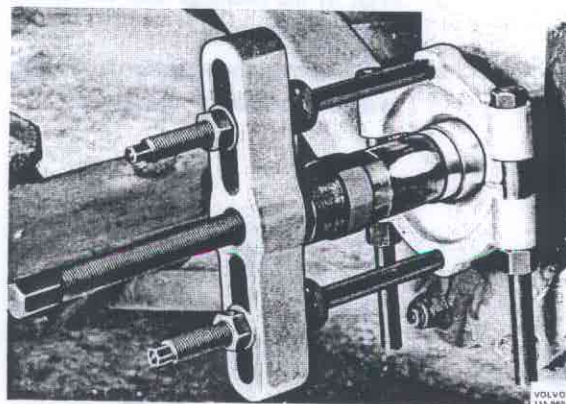


Fig. 76-9. Removing the bearing races

2. Press out the needle bearings with drift 2952 and standard handle 1801, see Fig. 76-8. Press out both the bearings at the same time. Pluck out the inner axial washer (3).
3. Pull off the bearing races (5 and 7) with a jackknife tool, see Fig. 76-9. Pull off both the races at the same time. Remove the dust protective plate by hand.

Inspection

Clean all the parts thoroughly. Check the bearings, bearing races, axial washers and bearing surfaces. Check the dust cover plate at the sealing surface for the sealing ring and the slide surface for the inner axial washer. The shaft pin where the dust cover plate sits must be properly cleaned.

Assembling and installing the cradle, also installing the bearing races

1. Press in the needle bearings with drift 2494 and standard handle 1801, see Fig. 76-10. Press in the bearings so that they are flush with the cradle.

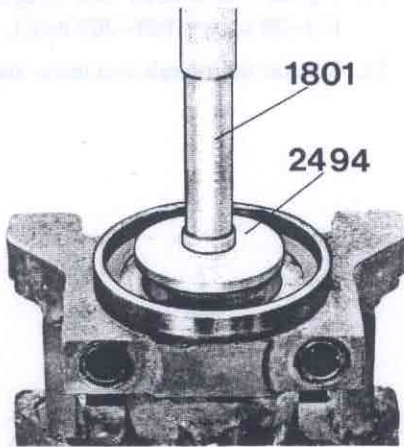


Fig. 76-10. Installing the needle bearing

2. Place the inner axial washer with a little grease on and press in the sealing ring with sleeve 2132, see Fig. 76-11.

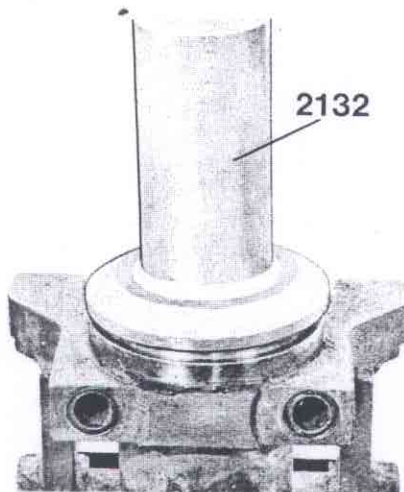


Fig. 76-11. Installing the sealing ring

3. Place the dust protective plate in position and fit the inner bearing race with sleeve 6142. Tap the inner bearing race until it bottoms, see Fig. 76-12.

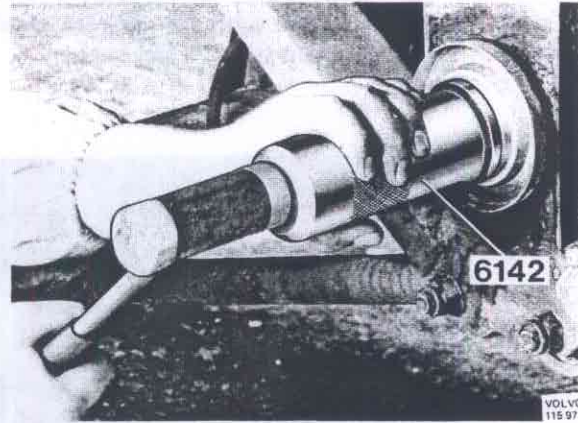


Fig. 76-12. Installing the inner bearing race

4. Tap in the outer bearing race halfway. Grease the lips of the sealing ring and the bearings with a little grease and place the cradle in position. Tap in the bearing race with sleeve 6142 until the sleeve goes against the cradle, see Fig. 76-13.

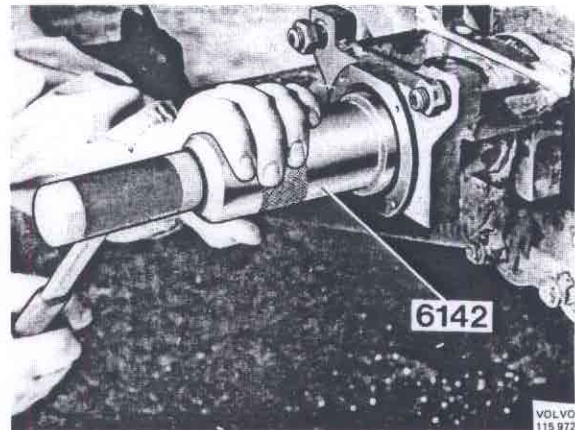


Fig. 76-13. Installing the outer bearing race

5. Grease the outer axial washer with a thin layer of grease and place it in position.
6. Screw on the inner nut and place the lock washer in position. Screw on the outer nut and tighten it against the inner nut when the hub has a little clearance. Do not lock the lock washer.
7. Position a dial indicator according to Fig. 76-14. Turn the cradle while pressing it inwards at the same time and zero-set the dial indicator. Turn the cradle and pull it outwards. Read off the clearance. The correct clearance should be 0.1 mm (0.0039"). If necessary, adjust the clearance. When correct clearance has been obtained, lock both the nuts with the lock washer.
8. Grease the cradle journalling through the lubricator underneath the cradle. Lubricate until grease squeezes out at one of the cradle ends.
9. Fill the cover halfway with grease and screw it into position.
10. Place the spring in position and fit the U-bolts. Do not tighten up the U-bolts. Tighten the lock bolts to a torque of 230–280 Nm (23–28 kpm = 166–202 lbftf) and tighten up the lock nuts.
11. Tighten the U-bolts to a torque of 230–280 Nm (23–28 kpm = 166–202 lbftf).
12. Bolt on the wheels and lower the vehicle.

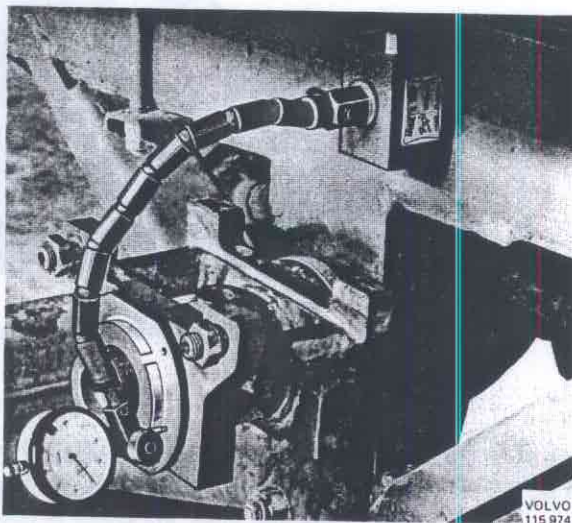


Fig. 76-14. Measuring the axial clearance

GROUP 77 WHEELS, HUBS

Description

Tyres

The tyres are balanced at the factory. The tyre tube should have its valve opposite (180°) the red centre of gravity marking on the tyre.

The front tyres should be fitted with the "points" on the tyre pattern facing opposite the direction of rotation, while they should be facing in the direction of rotation on the rear tyres.

Rims

The rims are of the disc type. They can be used for tyres with or without tubes.

Hubs

The front wheel and rear wheel hubs (Fig. 77-1) are of the same type. The stub axle (11) is journalled in the hub (10) by means of two tapered roller bearings (3 and 4). Oil sealing is provided by a sealing ring (1), which seals against a wear ring (2) and against the stub axle, as well as a sealing ring (9) which seals against the gear wheel (5).

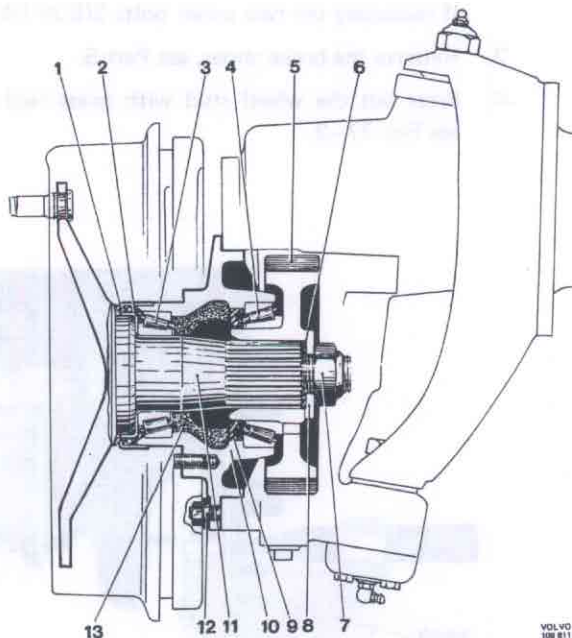


Fig. 77-1. Hub

- | | |
|------------------|-------------------|
| 1. Sealing ring | 8. Washer |
| 2. Wear ring | 9. Sealing ring |
| 3. Outer bearing | 10. Hub housing |
| 4. Inner bearing | 11. Stub axle |
| 5. Gear wheel | 12. Retaining nut |
| 6. O-ring | 13. Grease |
| 7. Nut | |

Service Procedures

Wheels

Removing a wheel

1. Slacken the wheel nuts several turns.
2. Jack up the front or rear end with a jack so high that the wheel to be removed comes off the ground.
3. Unscrew the wheel nuts and lift off the wheel.

Fitting a wheel

1. Clean thoroughly the contact surfaces on the rim and wheel nuts.
2. Lift the wheel in position and screw on the wheel nuts a couple of turns or so.
3. Lower the vehicle and tighten up the wheel nuts crosswise a little at a time until all are tightened to a torque of 160–210 Nm (16–21 kpm = 115–152 lbft).

Replacing a wheel stud*Special tool:*

2862 Press tool

1. Jack up the vehicle.
2. Remove the wheel, adjust down the brake shoes and remove the brake drum.

If necessary use two puller bolts 3/8-24 UNF.

3. Remove the brake shoes, see Part 5.
4. Press out the wheel stud with press tool 2862, see Fig. 77-2.

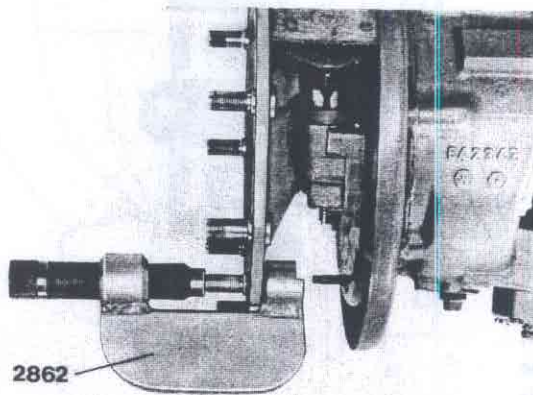


Fig. 77-2. Pressing out the wheel stud

5. Press in the new wheel stud with press tool 2862, see Fig. 77-3.

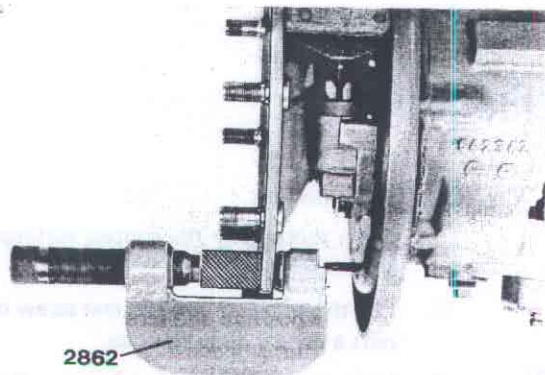


Fig. 77-3. Pressing in the wheel stud

6. Fit the brake shoes, see Part 5.
7. Fit the brake drum and adjust up the brake shoes.
8. Mount the wheel and tighten the wheel nuts crosswise to a torque of 160–210 Nm (16–21 kpm = 115–152 lbftf).
9. Lower the vehicle.

Hubs*Special tools:*

- 6132 Press washer
- 2564 Drift
- 1801 Standard handle
- 2490 Drift
- 2337 Drift
- 6134 Puller
- 6107 Drift
- 6106 Sleeve
- 6130 Drift
- 2910 Sleeve
- 2022 Sleeve

Checking, adjusting the wheel bearings

1. Jack up the vehicle.
2. Remove the wheel for the hub or hubs to be checked.
3. Apply a dial indicator as shown in Fig. 77-4. Press in and rotate the hub, zero-set the dial indicator. Pull out and rotate the hub, read off any clearance in the bearings. If clearance exceeds 0.08 mm (0.0032"), adjust the wheel bearings as follows:

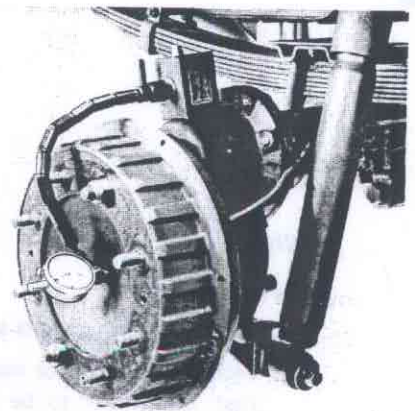


Fig. 77-4. Checking wheel bearing clearance

4. Remove the hub according to the instructions given under the heading "Removing a hub".
5. Disassemble the hub according to the instructions given under the heading "Disassembling a hub".
6. Check the wheel bearings. If damaged, replace the bearings according to the instructions given under the heading "Replacing wheel bearings".
7. Assembling, which also includes adjusting, is to be carried out according to the instructions given under the heading "Assembling a hub".
8. Installing is according to the instructions given under the heading "Installing a hub".

Removing a hub

1. Jack up the vehicle.
2. Remove the wheel for the hub concerned.
3. Drain the oil in the wheel carrier housing.
4. Disconnect the brake lines and plug them.
5. Unscrew the nuts between hub and wheel carrier housing.
6. Remove the plug on the reverse side of the wheel carrier housing and screw in a M10 bolt with thread length minimum 50 mm (2"), see Fig. 77-5. Screw in the bolt so that the hub releases fully.

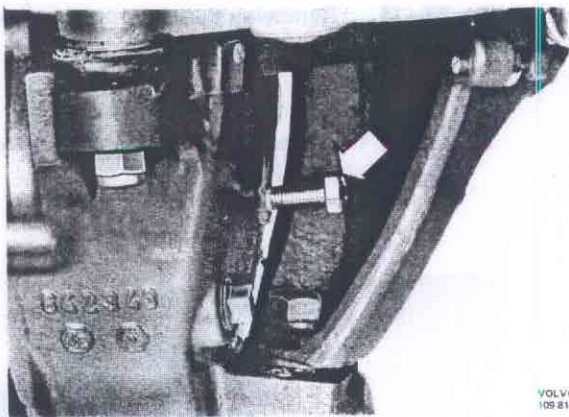


Fig. 77-5. Pressing out the hub

Disassembling a hub

1. Knock up the lock ring on the nut (7, Fig. 77-1) with a hammer and drift and unscrew the nut. Remove the washer (8) and the O-ring (6).

2. Pull off the gear wheel (5) with the Kukko standard jackknife 20-2, see Fig. 77-6. Lift off the hub (10) together with the brake backing plate.

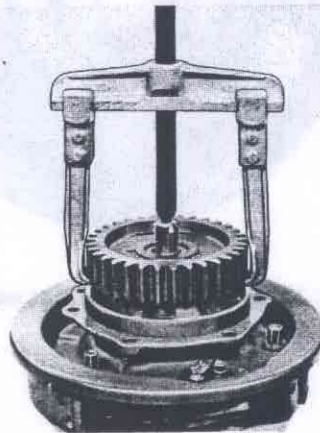


Fig. 77-6. Removing the gear wheel

3. Clean all the parts thoroughly. Clean the surface between the hub and the wheel carrier housing well so that no old sealing agent remains.

Replacing wheel bearings

1. Press out the inner bearing outer ring and inner sealing ring with two 6132, drift 2564 and standard handle 1801, see Fig. 77-7. Place tool 6132 as shown in Fig. 77-8.

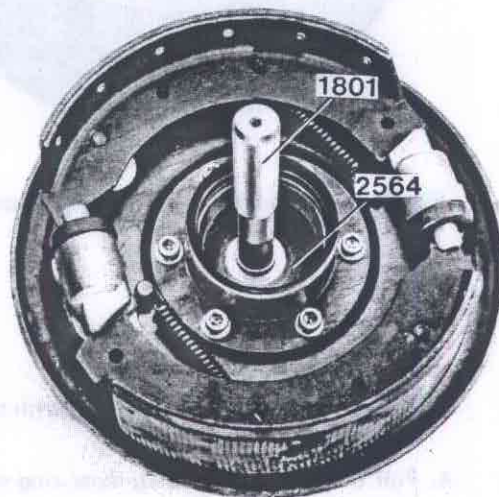


Fig. 77-7. Removing the inner bearing outer ring and inner sealing ring