1992 Volvo 940

Submodel: | **Engine Type:** L4 | **Liters:** 2.3
Fuel Delivery: FI | **Fuel:** GAS

NOTE: Some vehicles may be equipped dual piston calipers. The procedure to overhaul the caliper is essentially the same with the exception of multiple pistons, O-rings and dust boots.

1. Remove the caliper from the vehicle and place on a clean workbench.

   CAUTION
   NEVER place your fingers in front of the pistons in an attempt to catch or protect the pistons when applying compressed air. This could result in personal injury!

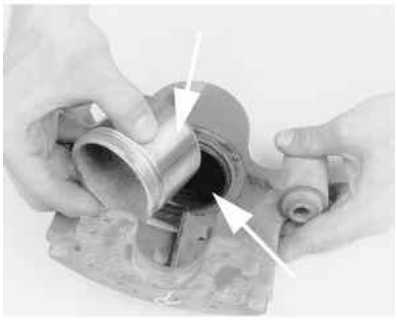
   NOTE: Depending upon the vehicle, there are two different ways to remove the piston from the caliper. Refer to the brake pad replacement procedure to make sure you have the correct procedure for your vehicle.

2. The first method is as follows:

   A. Stuff a shop towel or a block of wood into the caliper to catch the piston.
   B. Remove the caliper piston using compressed air applied into the caliper inlet hole. Inspect the piston for scoring, nicks, corrosion and/or worn or damaged chrome plating. The piston must be replaced if any of these conditions are found.

Fig. 1: For some types of calipers, use compressed air to drive the piston out of the caliper, but be sure to keep your fingers clear

Fig. 2: Withdraw the piston from the caliper bore



3. For the second method, you must rotate the piston to retract it from the caliper.
4. If equipped, remove the anti-rattle clip.

Fig. 3: On some vehicles, you must remove the anti-rattle clip

5. Use a prytool to remove the caliper boot, being careful not to scratch the housing bore.

Fig. 4: Use a prytool to carefully pry around the edge of the boot . . .

Fig. 5: . . . then remove the boot from the caliper housing, taking care not to score or damage the bore

6. Remove the piston seals from the groove in the caliper bore.

Fig. 6: Use extreme caution when removing the piston seal; DO NOT scratch the caliper bore

7. Carefully loosen the brake bleeder valve cap and valve from the caliper housing.
8. Inspect the caliper bores, pistons and mounting threads for scoring or excessive wear.
9. Use crocus cloth to polish out light corrosion from the piston and bore.
10. Clean all parts with denatured alcohol and dry with compressed air.

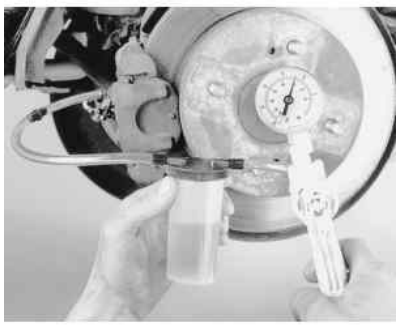
To assemble:

11. Lubricate and install the bleeder valve and cap.
12. Install the new seals into the caliper bore grooves, making sure they are not twisted.
13. Lubricate the piston bore.
14. Install the pistons and boots into the bores of the calipers and push to the bottom of the bores.
15. Use a suitable driving tool to seat the boots in the housing.

Fig. 7: Use the proper size driving tool and a mallet to properly seal the boots in the caliper housing

16. Install the caliper in the vehicle.
17. Install the wheel and tire assembly, then carefully lower the vehicle.
18. Properly bleed the brake system.

Fig. 8: There are tools, such as this Mighty-Vac, available to assist in proper brake system bleeding



1992 Volvo 940

Submodel: | **Engine Type:** L4 | **Liters:** 2.3
Fuel Delivery: FI | **Fuel:** GAS

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240 Series

1. Raise and safely support the vehicle.
2. Remove the front wheel(s).
3. Disconnect any ABS wires, if equipped.
4. Clean the caliper to ensure that no dirt gets into the brake line.
5. Disconnect the brake lines, and remove the two caliper mounting bolts.

NOTE: If the brake line is seized to the caliper, it should be replaced.

To install:

6. Install the caliper using new mounting bolts.
7. Check the location of the caliper in relation to the disc.
   A. Use feeler gauges to check the distance between the disc and the caliper support stubs on both sides.
   B. The difference between the two measurements must not exceed 0.001 in. (0.25mm).
   C. Repeat the measurements using the upper and lower support stubs to check if the caliper is mounted parallel to the disc.
   D. If the caliper is not correctly aligned, shims can be used to adjust its position.
8. Install the brake pads and make sure that the disc can rotate freely between the pads.
9. Connect any ABS wires unfasten during removal.
10. Bleed the brake system.
11. Install the wheels.
12. Lower the vehicle.
13. Check the brake pedal function before driving vehicle.

700 Series, 900 Series, S90 and V90 Models

1. Raise and safely support the vehicle.
2. Remove the wheels.
3. Disconnect the ABS lead and brake hose from their clips.
4. Clean the brake hose and line connection.
5. Disconnect the hose from the line.
6. Disconnect the hose from the caliper.
7. Remove the lower caliper guide pin bolt, swing the caliper up and remove the brake pads.
8. Remove the caliper mounting bolts and lift the caliper off.
9. Remove the upper caliper guide pin bolt to separate the caliper from the mounting bracket.
10. Clean the guide pins and inspect for wear or damage. Replace as necessary.

To install:

11. Lubricate the guide pins with silicone grease.
12. Reassemble the caliper and mounting bracket using one guide pin bolt, but do not tighten.
13. Install the bleed nipple and brake hose.
14. Mount the caliper with new bolts and tighten to 74 ft. lbs. (100 Nm).
15. Install the brake pads and guide pin bolt.
16. Tighten the guide pin bolts to 20 ft. lbs. (27 Nm).
17. Reconnect brake hose to line and ABS lead to the hose.

NOTE: Make sure that the brake hoses are not twisted.

18. Bleed the brake system.
19. Install the wheels.
20. Lower the vehicle.
21. Check brake pedal function before driving vehicle.

850, S70, C70 and V70 Series

1. Turn the ignition switch **OFF** and, if equipped with ABS, remove the key to prevent accidental pump activation.
2. Raise and safely support the vehicle.
3. Remove the wheel(s).
4. Disconnect any ABS wires, if equipped.
5. Loosen the brake hose a half turn.
6. Remove the caliper bolts, lift the caliper off and unscrew the caliper from the hose.
7. Drain the remaining brake fluid from the caliper.
8. Remove the brake pads.

To install:

9. Grease the caliper bolts with lithium grease and insert them into the sleeves.
10. Screw the caliper onto the brake hose.
11. Install the brake pads and mount the caliper.
12. Tighten the caliper bolts to 22 ft. lbs. (30 Nm) and install the dust caps.
13. Install the retaining clip.
14. Tighten the brake hose to 13 ft. lbs. (18 Nm).

NOTE: Make sure that the brakes hose is not twisted.

15. Fill the master cylinder and bleed the brake system. Check the system for leaks and proper function.
16. Connect any ABS wires which were previously removed.
17. Install the wheels.
18. Lower the vehicle.
19. Check the brake function before driving the car.

Fig. 1: Loosen and remove the caliper carrier retaining bolts, usually using a 17mm socket or wrench . . .

Fig. 2: . . . and remove the caliper carrier

1992 Volvo 940

Submodel: | **Engine Type:** L4 | **Liters:** 2.3
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Inspect the brake rotor for scoring and wear; minor scoring or disc pad lining build-up does not require rotor machining or replacement. If heavy scoring, cracks or other damage is evident, replace or have the rotor machined, as necessary.

Glaze on the rotor can be removed by hand-sanding it with medium grit garnet paper or aluminum oxide sandpaper.

The minimum thickness of each brake rotor is indicated on the rotor itself. Do not utilize a rotor which is worn below the minimum allowable thickness. If rotor damage cannot be corrected by grinding to these minimums, the rotor must be replaced.

Rotor lateral run-out must not be more than 0.001 in. (0.035mm).

1992 Volvo 940

Submodel: | **Engine Type:** L4 | **Liters:** 2.3
Fuel Delivery: FI | **Fuel:** GAS

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240 Series

1. Raise and safely support vehicle.
2. remove the front wheel(s).
3. Remove the brake caliper and hang it from the spring with a piece of wire.
4. Remove the two screws securing the disc.
5. Lift the disc off, it may be necessary to tap on the disc with a soft headed hammer.

To install:

6. Install the new disc, make sure the mating surfaces of the disc and hub are clean and dry.
7. Install the caliper using new mounting bolts.
8. Check the location of the caliper in relation to the disc. Use feeler gauges to check the distance between the disc and the caliper support stubs on both sides. The difference between the two measurements must not exceed 0.001 in. (0.0013mm). Repeat the measurements using the upper and lower support stubs to check if the caliper is mounted parallel to the disc. If the caliper is not correctly aligned, shims can be used to adjust the caliper's position.
9. Install the brake pads and make sure that the disc can rotate freely between the pads.
10. Install the disc securing screws.
11. Install the wheels.
12. Check brake pedal function before driving vehicle.

700 Series, 900 Series, S90 and V90 Models

1. Raise and safely support the vehicle.
2. Remove the wheels.
3. Remove the caliper and brake pads.
4. Hang the caliper from the spring, to avoid damaging the brake hose.
5. Remove the wheel pin guide and brake disc.
6. Clean the hub flange, remove the corrosion with a scraper and or wire brush.
7. Clean the ABS pick-up and toothed wheel using a soft brush.

To install:

8. Ensure that the mating surfaces on the hub and disc are clean.
9. Insert guide pin and tighten to 6 ft. lbs. (8 Nm). Reinstall the ring gauge and cross tighten the lug nuts to 63 ft. lbs. (85 Nm).
10. Measure disc run-out. Measure on the disc surface 0.60 in. (15mm) in from the edge. Maximum run-out is 0.0023 in. (0.060mm). Remove the measuring equipment.
11. Install the caliper carrier using new mounting bolts, then install the caliper and brake pads.
12. Operate the brake pedal several times and check the fluid level.
13. Install the wheels.
14. Check brake function before driving vehicle. Limit hard braking whenever possible during the 500 miles (800 km) after pad replacement.

850, S70, C70 and V70 Series

1. Raise and safely support the vehicle.
2. Remove the wheels.
3. Remove the brake caliper and brake pads.
4. Remove the carrier.
5. Remove the guide pin bolt.
6. Remove the rotor and clean the hug flange of all corrosion and dirt.
7. Check the hub run-out by mounting gauge ring (Volvo tool 5419 from tool kit 5418) or equivalent.
8. Install the dial indicator on the spindle (using the caliper bracket bolt holes). Place the probe end to the gauge ring.
9. Turn hub slowly and identify the highest point. If the run-out exceeds 0.0007 in. (0.020mm), the hub must be replaced.
10. Remove the measuring equipment.

To install:

11. Install the brake rotor.
12. Tighten the guide pin bolt to 72 inch lbs. (8 Nm).
13. Install the caliper carrier using new bolts.
14. Install the brake caliper and brake pads.
15. Depress the brake pedal several times and check the brake fluid reservoir.
16. Install the wheels.
17. Check the brake function before driving vehicle.

Fig. 1: Remove the wheel guide pin bolt . . .

Fig. 2: . . . and remove the brake disc from the hub

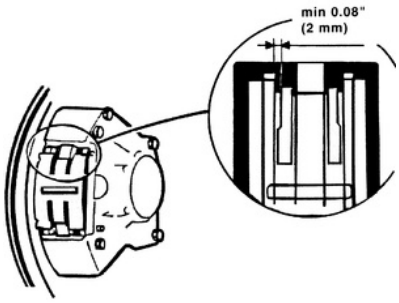
1992 Volvo 940

Submodel: | **Engine Type:** L4 | **Liters:** 2.3
Fuel Delivery: FI | **Fuel:** GAS

CAUTION
Older brake pads or shoes may contain asbestos, which has been determined to be cancer causing agent. Never clean the brake surfaces with compressed air! Avoid inhaling any dust from any brake surface! When cleaning brake surfaces, use a commercially available brake cleaning fluid.

Check the width of the brake pads using a thickness gauge, available at most auto parts stores. Minimum brake pad thickness is 0.08 inch (2mm).

Fig. 1: Pad thickness is measured from the disc to the edge of the pad



1992 Volvo 940

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CAUTION
Older brake pads or shoes may contain asbestos, which has been determined to be cancer causing agent. Never clean the brake surfaces with compressed air! Avoid inhaling any dust from any brake surface! When cleaning brake surfaces, use a commercially available brake cleaning fluid.

240 Series

1. Raise and safely support the vehicle.
2. Remove the front wheels.
3. Remove the spring clips and retaining pins. Remove the retaining springs and brake pads.

   NOTE: If the brake pads are difficult to remove, tool 2917 or equivalent can be used to collapse the caliper pistons to ease removal.
4. Clean the caliper where the brake pads sit and inspect the dust caps for damage, and replace if necessary.
5. Check the brake rotor surface for signs of wear, warping or variations in thickness.
6. Compress the caliper pistons using a large pair of pliers or a C-clamp.

   NOTE: It may be necessary to remove some brake fluid from the reservoir when depressing the piston.

   To install:
7. Before replacing the pads:

   A. Check the rubber dust caps for the brake pistons, replace if defective. If dirt has penetrated into the cylinders, due to a defective dust cap, recondition the caliper.
   B. Check the friction surface of the disc, if required, replace or machine the rotor surface.
   C. Check the rubber seals on the guide pins, replace them if they are defective.
8. Install the brake pads, retaining springs, retaining pins, and spring clips.
9. Check the brake fluid level and pump the brake pedal several times. It may be necessary to bleed the brake system.
10. Install the wheels.
11. Check the brake pedal operation before driving the vehicle.

700 Series, 900 Series, S90 and V90 Models

1. Raise and safely support the vehicle.
2. Remove the wheels.
3. Remove the lower caliper guide pin bolt and swing the caliper upwards.
4. Remove the brake pads.

   NOTE: Do not depress the brake pedal while pads are removed.

   To install:

   NOTE: The fluid level can rise in the reservoir when the piston is compressed.
5. Remove some brake fluid to prevent spillage. Air may be trapped in the dust seal of the piston. To avoid damage to the boot, it may be necessary to release the trapped air.
6. Press the piston back into the caliper.
7. Inspect the piston dust cap, if it is damaged, the caliper must be overhauled or replaced.
8. Check the disc brake surface for distortion or variation in thickness. Replace if not within specification.
9. Check to see that the metal guide plates are in position and install the pads. Check the guide pin boots for damage and replace them if necessary.
10. Swing the caliper down into position, being careful not to damage the guide pin boots. Tighten the guide pin bolt to 20 ft. lbs. (27 Nm).
11. Check the reservoir fluid level and add as necessary.
12. Operate the brake pedal repeatedly.
13. Install the wheels.

850, S70, C70 and V70 Series

1. Raise and safely support the vehicle.
2. Remove the front wheels.
3. Carefully remove retaining spring, without bending.
4. Remove the protective caps from the guide pin bolts.
5. Use an appropriate size Allen wrench (typically 7mm) to remove the guide pins.
6. Remove caliper from the carrier.
7. Remove the brake pads. Hang the caliper from the spring so that the hose is not damaged.

   WARNING
   Do not depress the brake pedal while the pads are removed.
8. Clean the caliper carrier where the brake pads sit.
9. Check the piston dust boot for damage or dirt. If the boot is damaged, the caliper should be overhauled or replaced.
10. Check the brake rotor for signs of wear or damage.
11. Check the guide pin bolt rubber sleeves for damage and replace if necessary.

    To install:
12. Press the piston back into the caliper cylinder using a suitable tool.
13. Lubricate the caliper guide pins with silicone grease.
14. Insert the brake pads and slide the caliper on over them.
15. Tighten the guide pins to 22 ft. lbs. (30 Nm) and replace the dust caps.
16. Install the retaining spring.
17. Install the wheels.
18. Lower the vehicle.
19. Depress the brake pedal several times and check the brake fluid reservoir level.

20. Check brake pedal function before driving vehicle.

Fig. 1: Remove the retaining spring

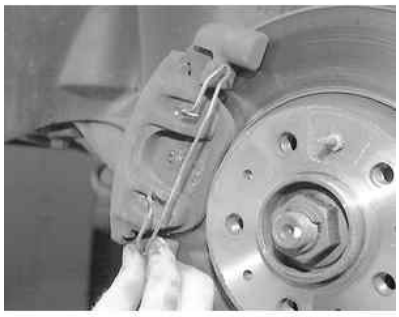

Fig. 2: Remove the protective caps over the caliper guide pins . . .

Fig. 3: . . . and use an appropriate size Allen wrench (typically 7mm) . . .

Fig. 4: . . . to loosen and remove the caliper guide pins

Fig. 5: A large C-clamp is a useful tool to compress the piston

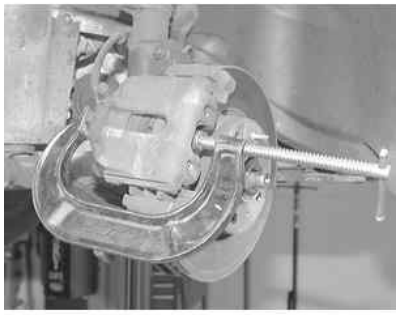

Fig. 6: Pull the caliper off and remove the brake pads

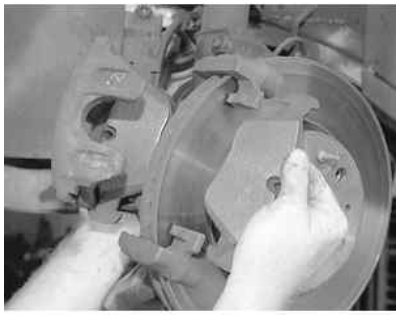

Fig. 7: The inboard pad is held into the caliper by metal tabs

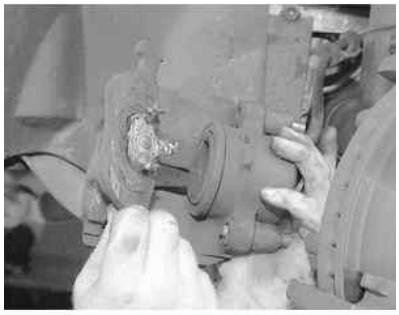

Fig. 8: Thoroughly brush and clean the caliper carrier before replacing the pads

Fig. 9: Volvo recommends that a high temperature grease be applied to the pad contact points on the caliper carrier . . .

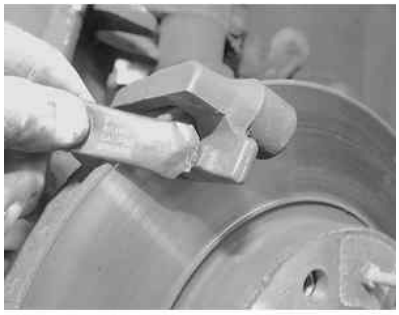

Fig. 10: . . . and caliper pins prior to pad installation

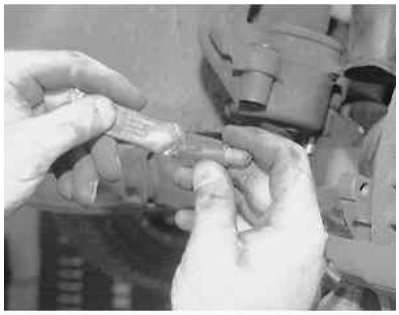

Fig. 11: Inspect the rubber sleeves for damage and cracking