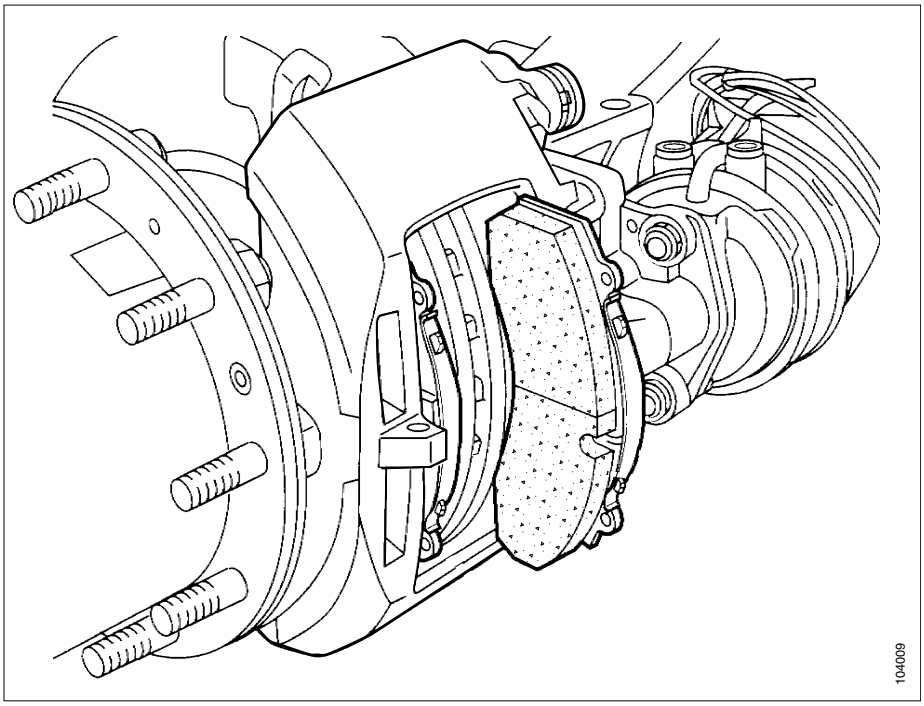
SCANIA

# 10:02-10

Issue 6 **en**

# Disc brakes

## Function and work description




1 587 145

# Contents

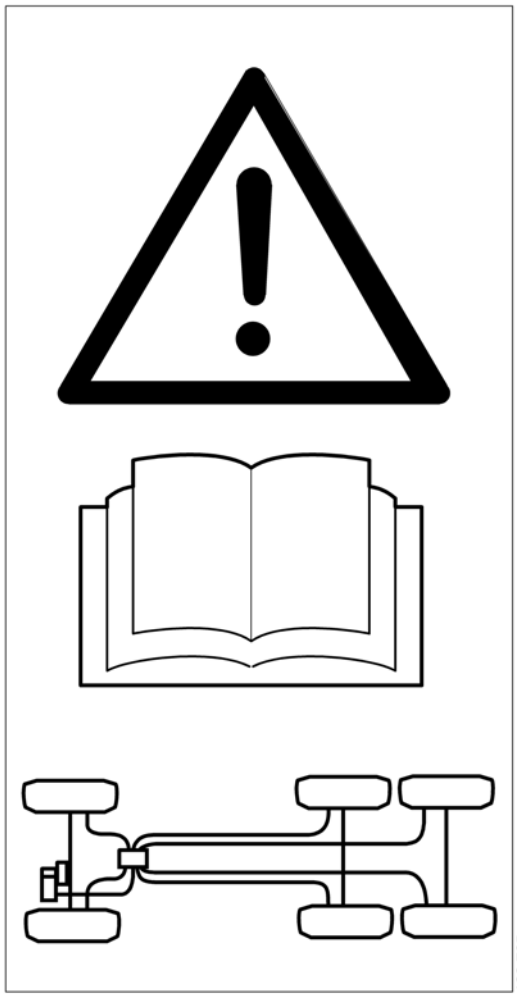
# Safety

**WARNING!**

**Work on the brake system is only to be carried out by personnel with sufficient training and knowledge. If problems arise, contact your supervisor for assistance.**

**When working on the brake system, it is important to follow the instructions to avoid accidents and injury.**

**It is also important to use the correct components when carrying out work on the brakes. A brake system which fails due to faulty components can have disastrous consequences on the road.**



# Function Description

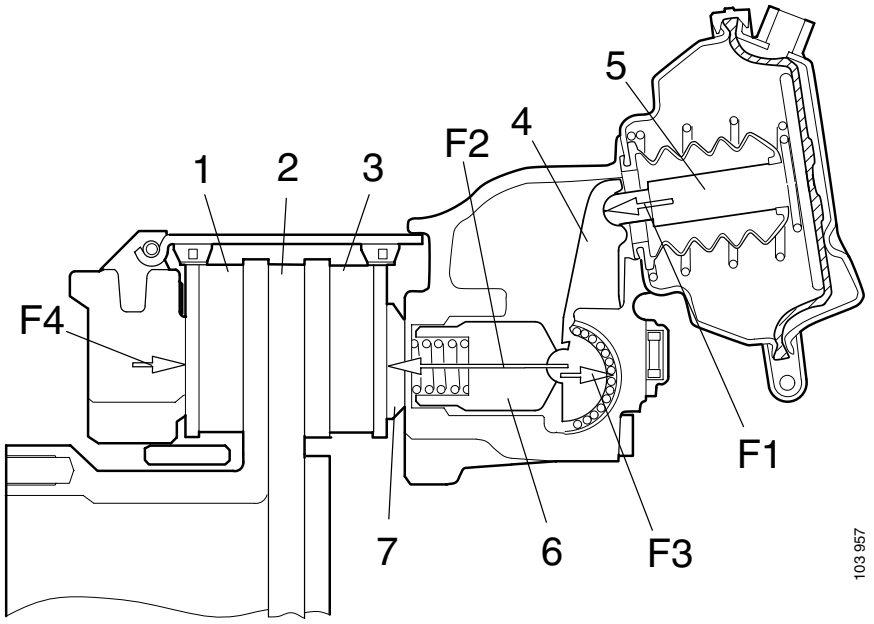
## Disc brake

The disc brake consists of a ventilated brake disc, a "floating" brake caliper, and a compressed air operated brake chamber which applies the brakes via a lever in the brake caliper.

The brake chamber push rod applies force F1 to the caliper lever. The lever applies force F2 to the adjusting mechanism, then onto the pistons and the inner brake pad. The lever mounting in the caliper gives an opposing force F3, which via the sliding fit in the caliper, creates a force F4, that is applied to the outer brake pad. Both brake pads are pressed against the brake disc and the vehicle begins to brake.

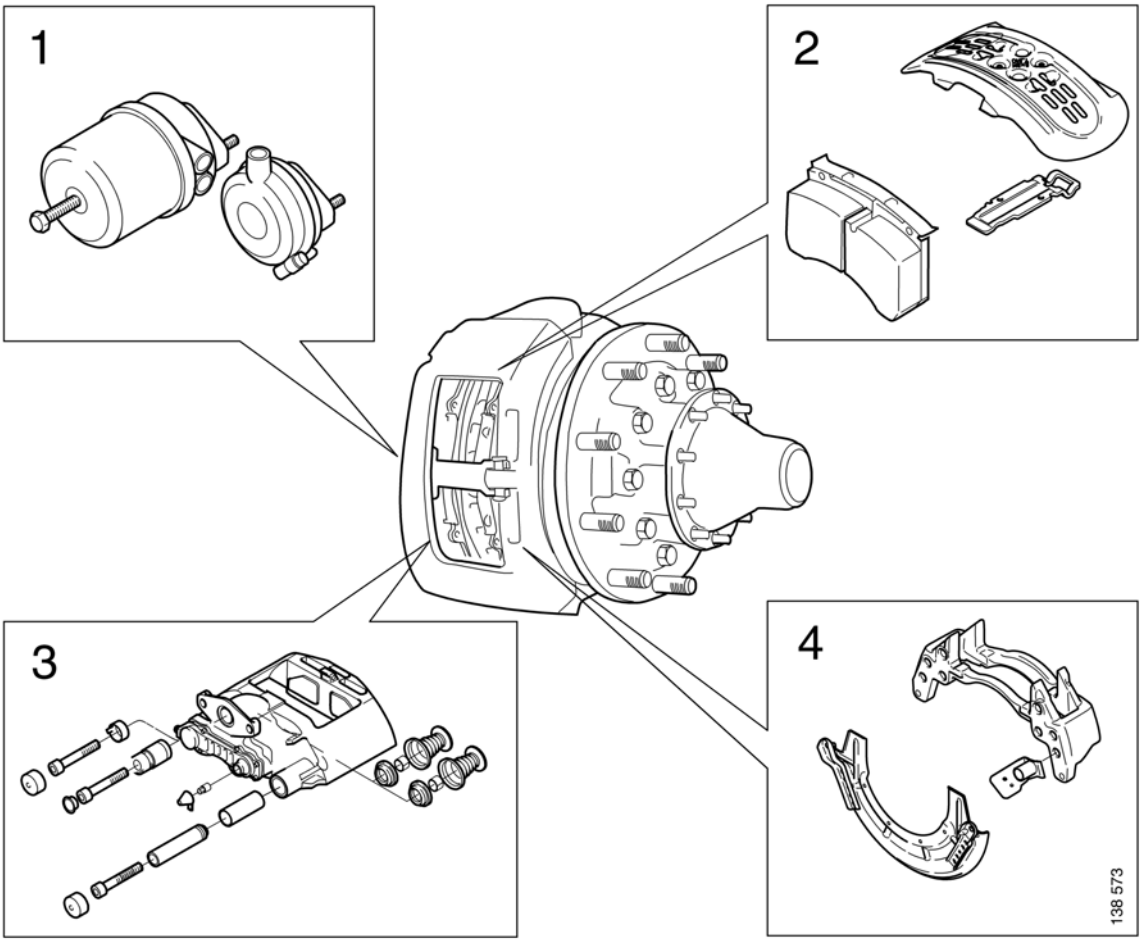
In order to ensure correct clearance at all times between brake pads and brake disc, the caliper is self-adjusting.

The adjusting mechanism cannot be dismantled or repaired, so if it fails the complete caliper must be renewed.




*1 Outer brake pad*
*2 Brake disc*
*3 Inner brake pad*
*4 Lever*
*5 Pushrod*
*6 Adjustment mechanism*
*7 Pistons*

## Overview




*1. Brake chamber and spring brake chamber.*
*2. Brake pad with cover.*
*3. Brake caliper.*
*4. Brake pad carrier with brake shield.*

# Brake caliper

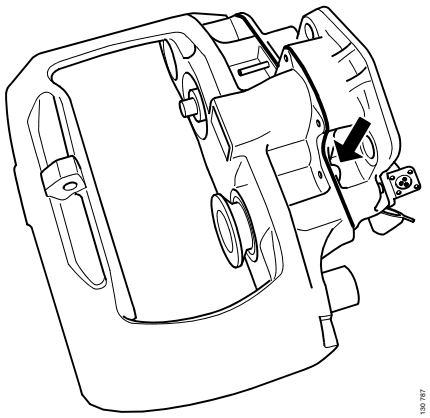
There are two types of brake calipers: SB 7, which consists of two pieces bolted together, and the newer SN 7, which is cast in one piece.

The brake caliper is a floating caliper on slide pins.

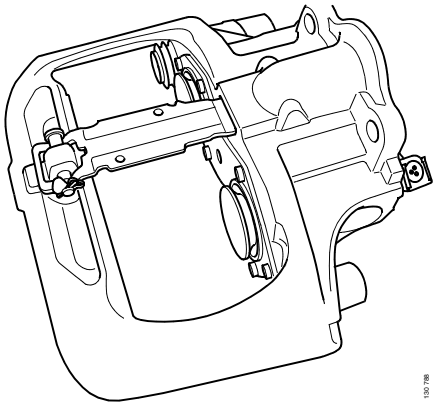
The slide pins are mounted in bearings using bushings so that the brake caliper can move laterally more easily and so reduce wear on the metal surface of the slide pins. In addition, the bushings reduce friction in the brake caliper.

A cover can be attached to the brake caliper to protect the brake pads from dirt.

The brake pad carrier can also be equipped with a brake shield to protect the disc against dirt.

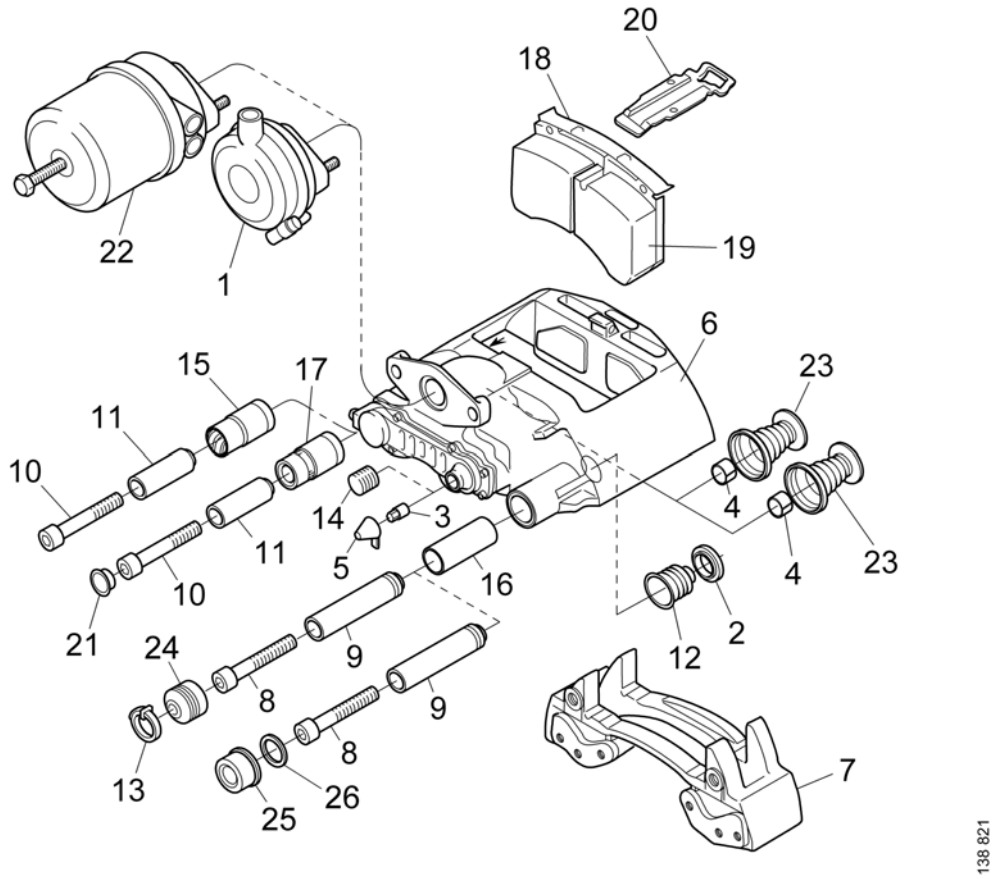


*Brake caliper SB 7, two-piece*



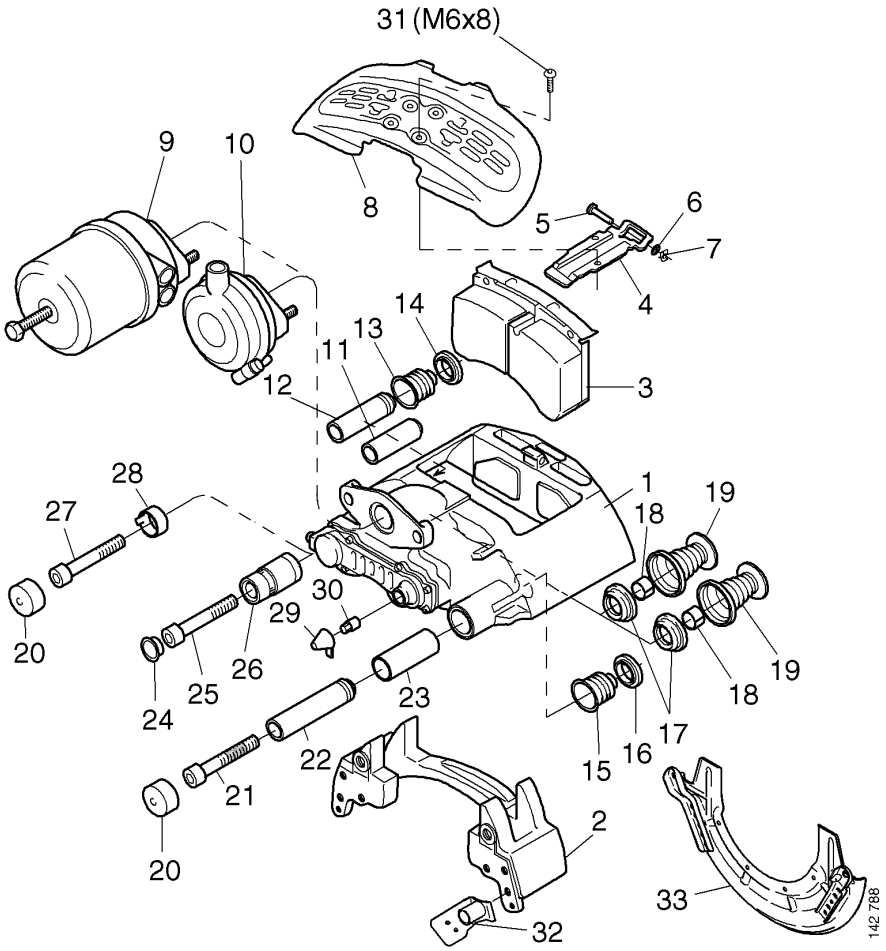
*Brake caliper SN 7, one-piece casting*

## Brake caliper SB 7




*1. Brake chamber*
*2. Plastic washer*
*3. Adjusting sleeve*
*4. Clamp ring*
*5. Cover*
*6. Brake caliper*
*7. Brake pad carrier*
*8. Bolt*
*9. Slide pin*
*10. Bolt*
*11. Slide pin*
*12. Boot*
*13. Clamp*
*14. Plug*
*15. Bushing, long open*
*16. Bronze bushing*
*17. Bushing, new*
*18. Leaf spring*
*19. Brake pad*
*20. Latch clamp*
*21. Protection cover*
*22. Spring brake chamber*
*23. Boot with pressure plate*
*24. Protective cap*
*25. Cover*
*26. O-ring*

## Brake caliper SN 7

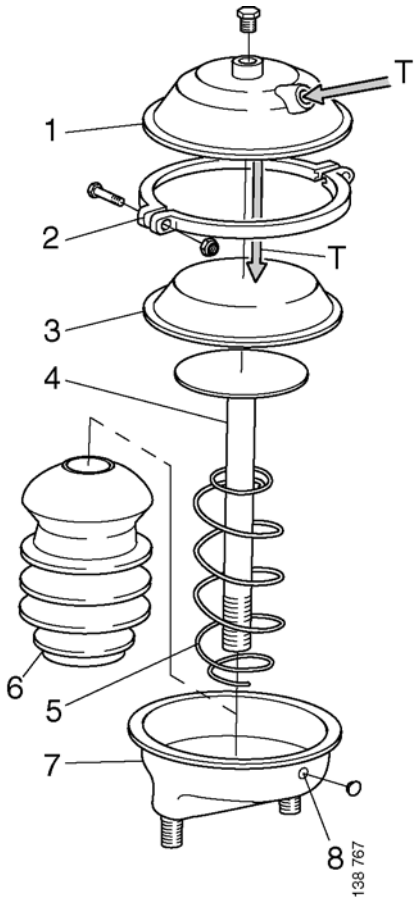



*1. Brake caliper*
*2. Brake pad carrier*
*3. Brake pad*
*4. Latch clamp*
*5. Pin*
*6. Washer*
*7. Lock pin*
*8. Cover*
*9. Spring brake chamber*
*10. Brake chamber*
*11. Slide pin*
*12. Slide pin*
*13. Boot*
*14. Plastic washer*
*15. Boot*
*16. Plastic washer*
*17. Inner seals*
*18. Clamp ring*
*19. Boot with pressure plate*
*20. Protective cover*
*21. Bolt*
*22. Slide pin*
*23. Bronze bushing*
*24. Protection cover*
*25. Bolt*
*26. Rubber bushing*
*27. Bolt*
*28. DU-bushing*
*29. Cover*
*30. Adjusting sleeve*
*31. Bolt M6x8*
*32. Bracket*
*33. Brake shield*

# Brake chamber

The brake chamber unit includes a cover, a pushrod, a compression spring and a chamber. The brake chamber is separated by a diaphragm.

When braking, compressed air (T) flows into the brake chamber. Using the pressure, the brake chamber diaphragm presses out the pushrod. The pushrod in turn is connected to the brake caliper lever. When the brake pedal is released, the air flows out and the compression spring returns the diaphragm and push rod to the rest position.




1 *Cover*
2 *Clamp*
3 *Diaphragm*
4 *Pushrod*
5 *Compression spring*
6 *Boot*
7 *Chamber*
8 *Drain hole*

# Spring brake chamber

The spring brake chamber is available in three different versions: Before 04/99, from 04/99, and from 04/04.

The spring brake chamber consists of a spring brake section (A) and a service brake section (B). The service brake section works in the same way as a separate brake chamber.

The spring brake section in the spring brake chamber has a compression spring for activating the parking brake. The compression spring presses the piston down which in turn presses on the pushrod and applies the brakes. The parking brake is operated via a manual control valve and is automatically applied when there is no brake pressure in the vehicle's compressed air system.

The spring brake chamber is equipped with a release bolt with which the parking brake can be deactivated, so that the vehicle can be moved even if there is no compressed air available.

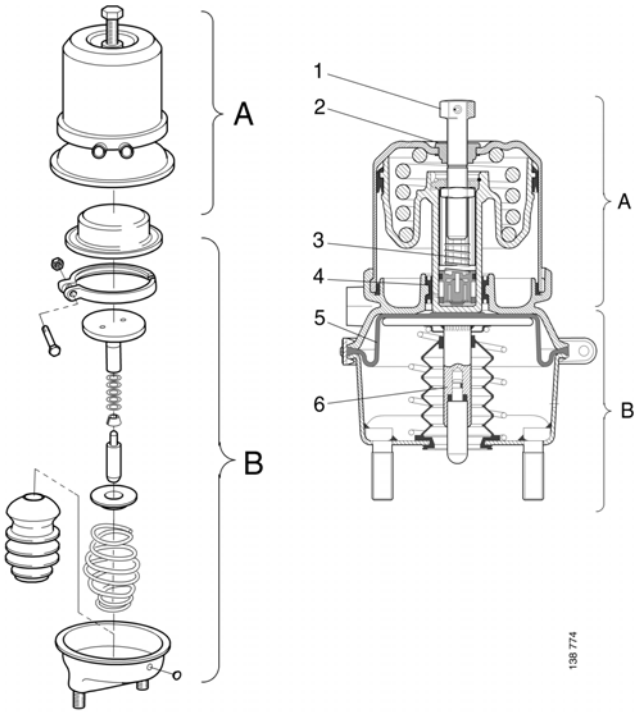
The release bolt is available in three different versions:

1 The release bolt is screwed out half its length until it stops.

2 The release bolt is screwed out its entire length.

3 A red pin in the release bolt centre indicates that the bolt is screwed out from its normal position.

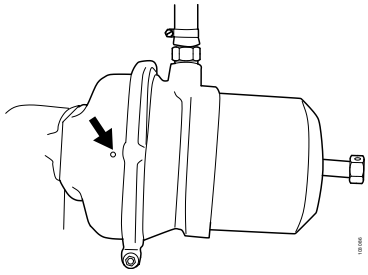
The normal position for the release bolt is when it is screwed clockwise to the end position.




*1 Release bolt*
*2 Castle nut*
*3 Compression spring*
*4 Piston with seal*
*5 Diaphragm*
*6 Pushrod*

## Draining plug

Check that the draining plug under the spring brake chamber is removed and that there is a draining plug on the top of the spring brake chamber.



**IMPORTANT!** If the lower draining plug is not removed, or if the upper draining plug is removed, the brake chamber or the spring brake chamber service brake section can be filled with water, which leads to the following:

- Reduced braking effect on the wheels.
- Ice is formed. If the parking brake is applied, it is not possible to release the brakes. When driving, the disc brakes heat up and can catch fire.
- Moist air from the brake chamber or the spring brake chamber service brake section blows into the brake caliper which can then rust.

# Work Description

## Removing the wheels

In most instances, the wheels must be removed whilst work is carried out on the disc brakes.

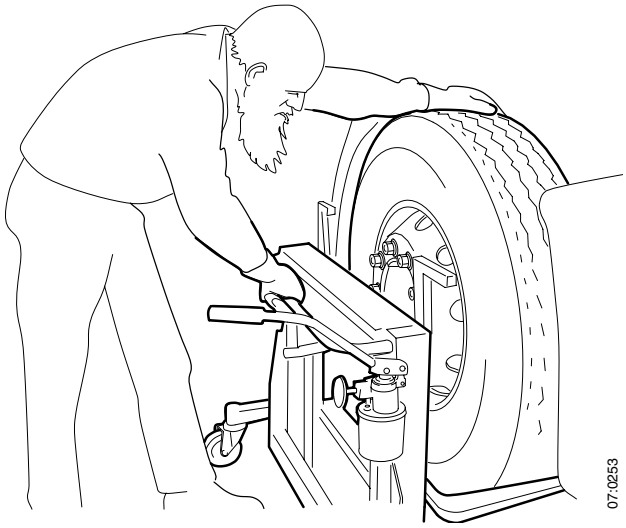
1 Support the axle on stands.

**WARNING!**

**Never work under a vehicle supported by jacks only. Always use stands. If the axle is air suspended, the air bellows must be emptied.**

2 Release the parking brake.

3 Remove the wheels. Use wheel hoist trolley 587 121.



# Brake caliper

## General

**Note:** Release the parking brake before starting work on the brake caliper.

To remove the front axle brake caliper, the cab must be tilted and the mudguards removed.

When the brake adjuster is screwed anticlockwise it is normal that a clicking sound is heard.

Brake caliper with brake pad carrier:

- Should be removed when renewing brake discs, overhauling hubs etc.

Brake caliper without brake pad carrier:

- Should be removed when only the brake caliper is to be overhauled or renewed.

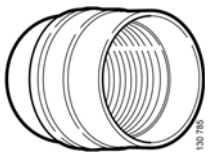
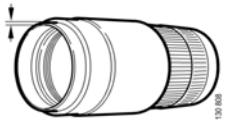
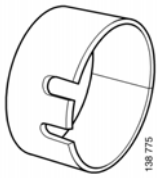
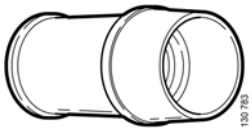
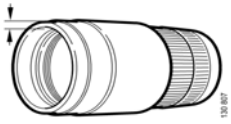
  Brake calipers can be overhauled either on the vehicle, or on a work bench in a clean environment.

## Bushings

There are different types of bushings in brake calipers. The earlier version is made of rubber, while later versions have an external metal sleeve. DU bushings consist exclusively of metal.

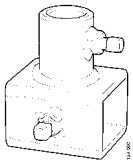
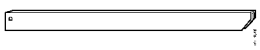
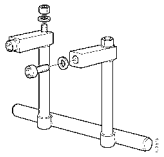
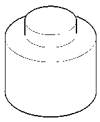
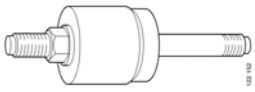
When overhauling brake calipers, earlier version bushings should always be replaced with the newer version, except in the following cases:

Brake calipers with vertical brake chambers with 95 mm long bushings and 120 mm long slide pins.

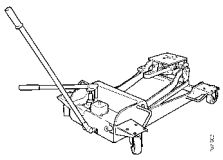
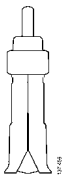
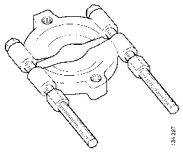
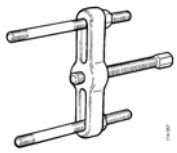
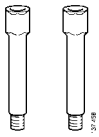
| Rubber bushing | Rubber bushing (with metal) | DU-bushing |
|---|---|---|
| Open short | Thin ring | Metal |
|  |  |  |
| Open long | Thick ring | |
|  |  | |

# Tools

## Special tools

| Number | Designation | Picture | Tool board |
|---|---|---|---|
| 98 402 | Retainer for fixture shafts |  | F1 (included in 98 400) |
| 98 405 | Fastener for fixture beam |  | F1 (included in 98 400) |
| 98 450 | Shank |  | R2, AD2, AM1 |
| 99 344 | Lifting tool |  | B2 |
| 99 346 | Drift |  | B2 |
| 99 357 | Drift |  | B2 |
| 99 395 | Drift |  | D2 |
| 99 549 | Assembly tool |  | B2 |

## Other tools

| Number | Designation | Picture | Tool board |
|---|---|---|---|
| 587 313 | Gearbox jack |  | - |
| 587 430 | Counterhold<br>5-40 mm |  | - |
| 587 431 | Expanding sleeve<br>28-40 mm |  | - |
| 587 516 | Extractor plate<br>5-60 mm |  | - |
| 587 518 | Bearing puller<br>50-110 mm |  | - |
| 587 521 | Extension bolts (2 off)<br>L = 100 |  | - |

## Specifications

### Tightening torque

| | |
|---|---|
| Brake pad carrier | 200 Nm +45° |
| Brake chamber | 180 Nm |
| Slide pins | 290 Nm |

# Renewing the brake caliper

## Removal

1 Disconnect the wear wire and potentiometer connectors.

**IMPORTANT!** Be careful with the screws in the potentiometer aluminium housing. They might have oxidised and will snap off easily.

2 Remove the brake chamber from the caliper.

3 Cover the push rod hole with tape or similar.

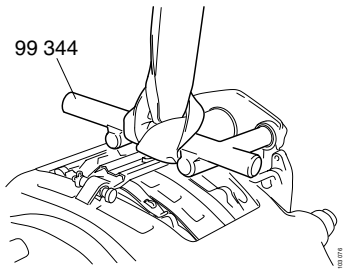
4 Remove the protection over the brake adjuster and adjust the brake pads out using the adjusting screw.

5 Remove the brake pads.

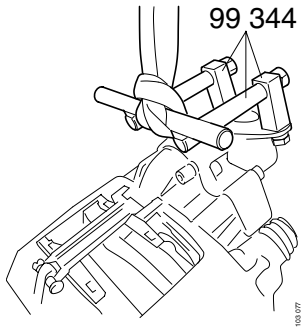
6 Secure lifting tool 99 344 to the brake caliper.

**IMPORTANT!** Attach the lifting tool to an overhead hoist using a loop or alternatively in the gearbox jack, before the brake caliper is removed. It will otherwise fall off.

On the front brake calipers, the lifting tool is screwed into the brake chamber screw holes on the brake caliper.

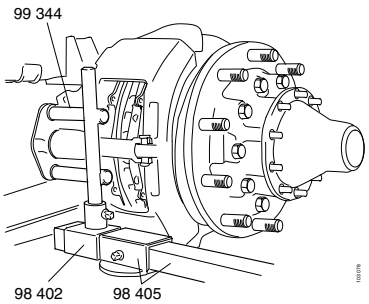



*Horizontal brake chamber*




*Vertical brake chamber*

On the rear brake calipers, the lifting tool is mounted in the gearbox jack using 98 402 and 98 405.




*Rear brake caliper*

7 **Select one of the following alternatives**:

7a. Brake caliper with brake pad carrier

- Remove the bolts holding the pad carrier.
- Remove the brake caliper with pad carrier.

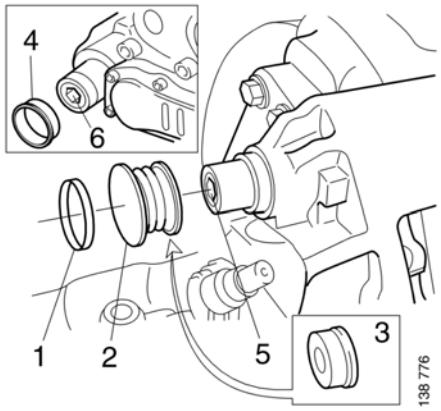
7b. Brake caliper without brake pad carrier

- SB7: Remove the clip and the protective cap or cover.

**Note:** Take care not to damage the rubber seal under the protection.

SN7: If there is a cover, prise it off with a screwdriver.

- Remove bolts 5 and 6 that hold the slide pins.
- Remove the brake caliper from the brake pad carrier.

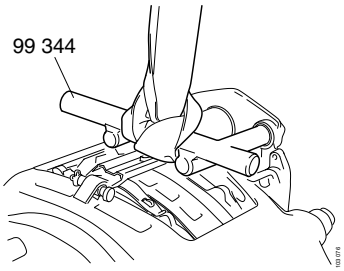



*1 Clamp*
*2 Protective cap*
*3 Cover*
*4 Protection cover*
*5 Bolt*
*6 Bolt*

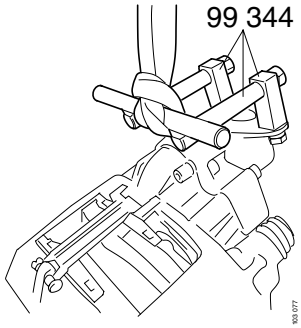
## Fitting

1 Attach lifting tool 99 344 to the brake caliper. Lift the brake caliper into position using a lifting strap and overhead hoist or a gearbox jack.

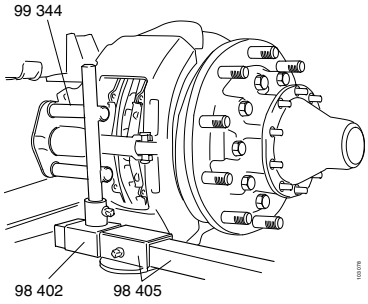
**Note:** Ensure that the slide pin inner boot is not damaged.




*Horizontal brake chamber*




*Vertical brake chamber*




*Rear brake caliper*

2 **Select one of the following alternatives:**

### 2a. Brake caliper with brake pad carrier

- Tighten the brake pad carrier bolts. Use a torque wrench and angle tighten.

Continue to point 3, page 23.

### 2b. Brake caliper without brake pad carrier

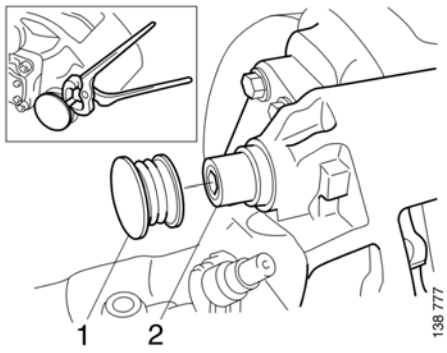
- SN 7: Fit the plastic washer the right way around, as shown in the picture.

- Tighten the slide pin bolts in the brake pad carrier. Use new bolts.

**IMPORTANT!** The threads on the bolts and in the brake pad carrier must be clean and dry, i.e. free from grease or solvents. Penetrating oil or grease must under no circumstances be used when fitting the bolts.

Press the brake caliper towards the brake pad carrier to prevent air being compressed.

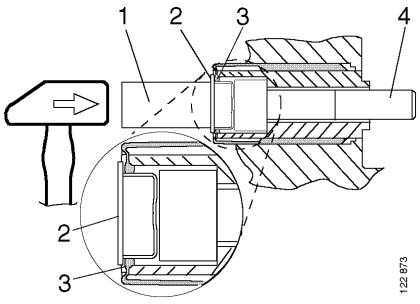
- SB 7: Fit the protective cap over the slide pin. Fit the clamp and clamp it with a pair of pliers.




*1 Protective cap*
*2 Slide pin*

- SN 7 with rubber bushing: Fit the cap above the bolt by tapping it with tool 99 395 and a hammer.

The lip seal on the bushing is pinched between the slide pin and the cover, providing a good seal.




*1 Tool 99 395*
*2 Cover*
*3 Rubber seal*
*4 Bolt*

- SN 7 with DU bushing: Tap the cover onto the slide pin. The cover is press fit.

3 Remove lifting tool 99 344.

4 Fit the brake pads.

5 Adjust the brake pads clockwise, using the adjusting screw, until the brake pads are just touching the brake disc. Undo the adjustment two clicks anticlockwise.

6 Fit the wear wire and potentiometer connectors.

7 Fit the brake chamber.

# Repairing brake calipers

## Renewing the long open bushing and slide pin on brake caliper SB 7

Applies to vehicles with vertical brake chamber, spring brake, front axle with air suspension and low or normal chassis height.

If only the long open bushing is to be renewed, this can be carried out with the brake caliper fitted to the vehicle (on the front and tag axle).

1 Remove the brake caliper from the brake pad carrier.

2 Remove the slide pin from the bushing.

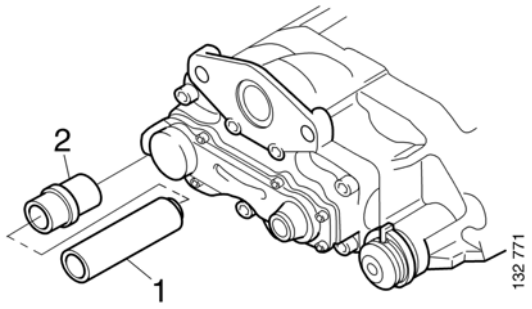
3 Remove the bushing with, for example, a screwdriver.

4 Remove any rust from the hole using, for example, a rotating steel brush.

5 Lubricate the inside and outside of the bushing with green synthetic grease.

**IMPORTANT!** There are two types of grease: One mineral based type (white) and one synthetic type (green). The pin and rubber bushing must be lubricated with green synthetic grease.

6 Lubricate the slide pin with green synthetic grease and press it into the bushing. Check that the slide pin moves freely.




*1 Slide pin*
*2 Bushing*

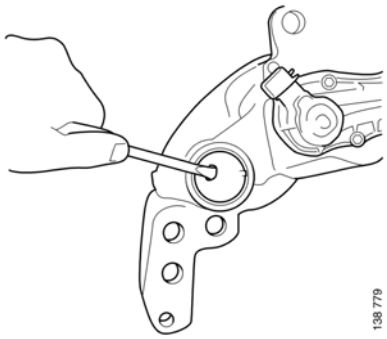
## Renewing the bushing and slide pin on brake calipers SB 7 and SN 7

The bushing can be renewed either with the brake caliper removed, or when the caliper is fitted to the brake pad carrier. On the front or tag axle, the bushing can be renewed while the caliper is still fitted to the vehicle.

This description applies to a brake caliper which has been removed.

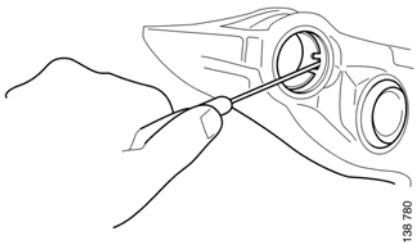
1 Remove the protection or the protection cover. Remove the protection cover by tapping a screwdriver into the protection cover's centre and prising it off.

2 Remove the bolt and the slide pin.



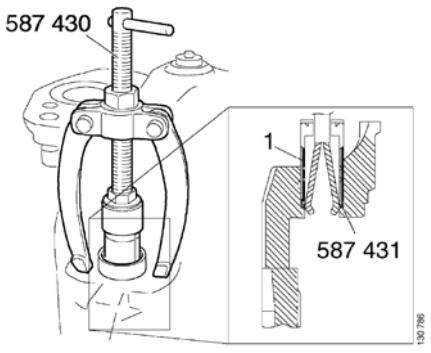

3 Remove the brake caliper from the brake pad carrier.

DU bushing: Break out the anchorage lip on the bushing using a screwdriver.




4 Remove the bushing using counterhold 587 430 and expanding sleeve 587 431.

**Note:** Make sure that the expanding sleeve only engages the bushing and is not overtightened to prevent it from getting stuck in the caliper.

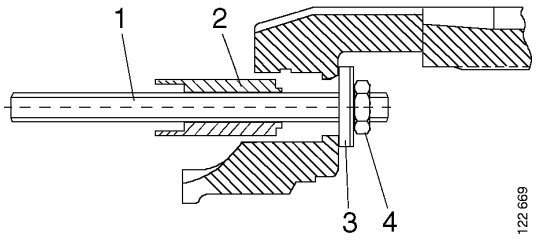



*1. Bushing*

5 Fit the bolt from tool 99 549 with the fine threaded part inwards. Fit a washer with an inside diameter of **at least 25 mm** and an outer diameter of 45 mm and a M16x1.5 nut.

   If the caliper is attached to the pad carrier, screw the fine threaded part into the pad carrier.

6 Grease the outside of the new slide pin and fit it on the bolt. Make sure it fits in the washer.



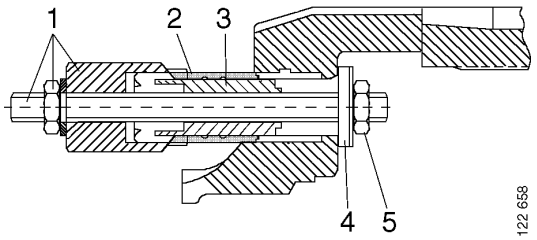

*1 Tool 99 549*
*2 Slide pin*
*3 Washer*
*4 Nut M16x1.5*

7 Lubricate the outside of the bushing with a thin layer of white mineral grease.

8 Slide the bushing, sleeve 99 549 and the washer onto the bolt.

**Note:** DU bushing: Position the bushing edge to edge with the sleeve. Point the bushing's anchorage lip towards the groove in the bushing seat.

9 Screw the nut on by hand.




*1 Tool 99 549*
*2 Bushing*
*3 Slide pin*
*4 Washer*
*5 Nut M16x1.5*

10 Draw in the bushing.

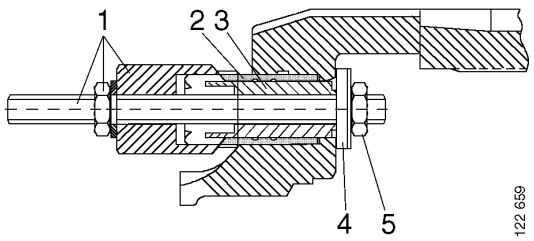
Rubber bushing: Torque tighten the nut to 8-32 Nm.

**Note:** If the required tightening torque is less than 8 Nm the hole is worn and the brake caliper should be renewed.

DU bushing: Tighten until the bushing bottoms. Hold the sleeve stable while the nut is threaded in so that the bushing does not turn.

11 Remove tool 99 549, the washer and the nut.

DU bushing: Tap the bushing anchorage lip into the groove using a drift.



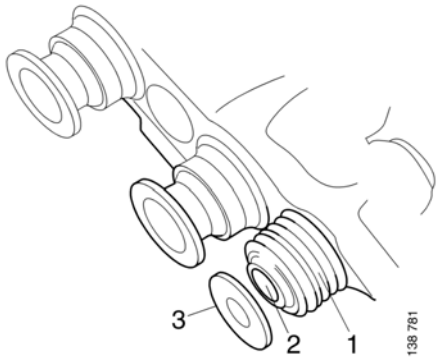

1 *Tool 99 549*
2 *Bushing*
3 *Slide pin*
4 *Washer*
5 *Nut 16x1.5*

12 Lubricate the boot with white mineral grease and press it home with your fingers.

13 Lubricate the inside of the bushing with white grease. Insert slide pin. Ensure that the boot fits into the groove in the slide pin.

14 Fit the plastic washer.

15 If the brake pad carrier is removed, fit the brake caliper. See Renewing brake calipers, Fitting, Brake calipers without brake pad carrier.



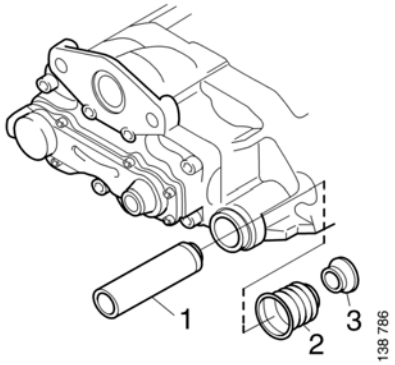

1 *Boot*
2 *Slide pin*
3 *Plastic washer*

## Replacing bronze bushing and slide pin

1 Remove the brake caliper from the brake pad carrier.

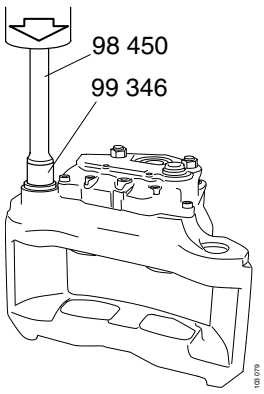
2 Pull out the slide pin from the housing.

3 Prise out the boot with a screwdriver. Also remove the plastic washer.

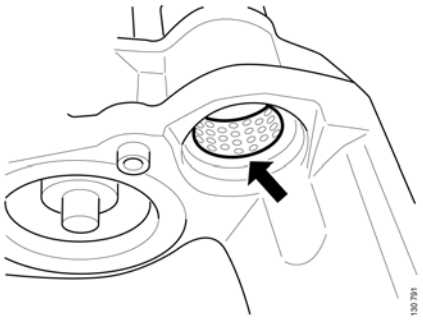



*1 Slide pin*
*2 Boot*
*3 Plastic washer*

4 Press out the bronze bushing using handle 98 450 and drift 99 346.



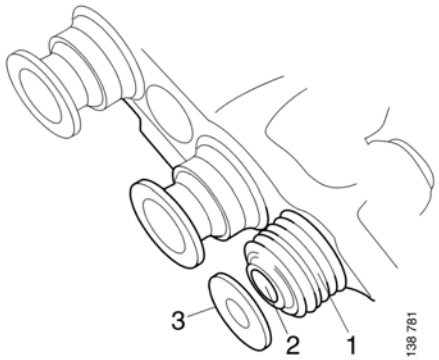

5 Fit a new bronze bushing using drift 99 346. Ensure that the bronze bushing enters and goes in straight. Press until the bronze bushing is flush with the surface of the housing.



6 Lubricate the boot with white mineral grease and press it home with your fingers.

7 Lubricate the inside of the bronze bushing with white grease. Insert slide pin. Ensure that the boot fits into the groove in the slide pin.

8 Fit the plastic washer.




*1 Boot*
*2 Slide pin*
*3 Plastic washer*

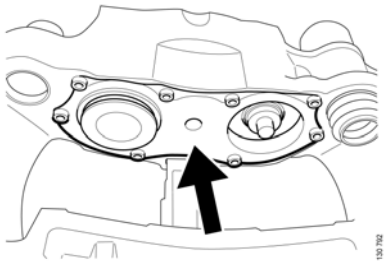
## Renewing boots with pressure plate and inner seals

The boot and the pressure plate are fitted together and must be renewed as a complete unit.

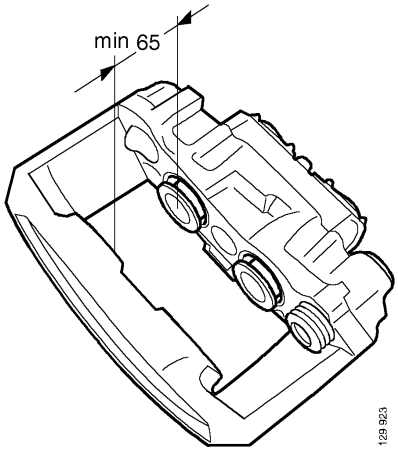
1 Remove the brake caliper from the brake pad carrier.

2 Place the brake caliper in a vice.

3 Unscrew the brake adjuster. Make a 65 mm long gauge block to prevent the push rods from being unscrewed too far.

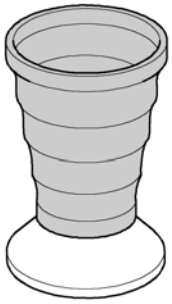


**IMPORTANT!** Never unscrew the pressure plates so that the measurement between the brake caliper and the pressure plate is less than 65 mm. If the pressure plates are screwed out too far the push rods inside the caliper come loose, and the entire brake caliper must then be replaced.



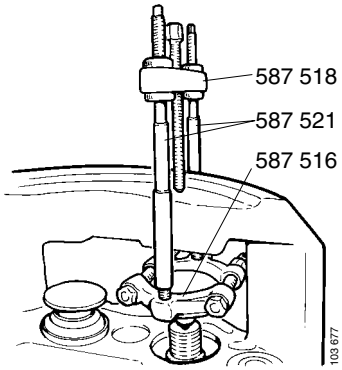

4 Insert a small screwdriver at the outer ring of the boot and prise it off.

**IMPORTANT!** Do not remove the screwed cover, applies to brake caliper SN 7.



5 Fit the tools 587 516, 587 518, 587 521 around one of the pressure plates.

6 Pull out the pressure plate and the boot.




7 Check the inner seals. If the inner seals are damaged:

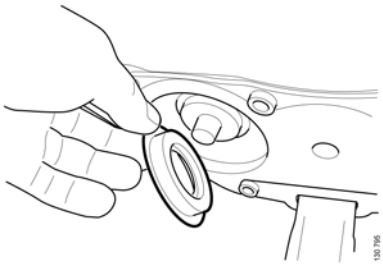
SB 7: Renew the entire brake caliper.

SN 7: Renew the inner seals.

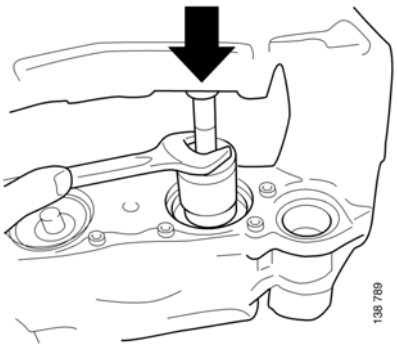
### Renewing the inner seal on SN 7.

Inner seals are renewed in a clean environment. Take care so that the thread, the seal seat or the boot seat are not damaged.

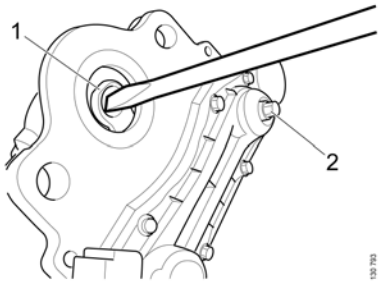
- Prise off the old seals using a screwdriver.
- Fit the new seal with your fingers.




- Press the seal down using the sleeve for tool 99 549, a M16x1.5 nut and the shorter slide pin bolt.



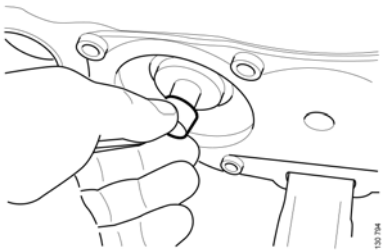
8 Check the self-adjustment by pressing on 1 and check if the adjusting screw 2 moves.




9 Lubricate the push rod threads with the supplied grease.

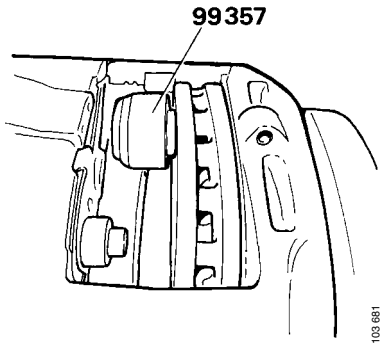
10 Fit the brake caliper to the brake pad carrier.

11 Fit new clamp rings to the threaded push rods.



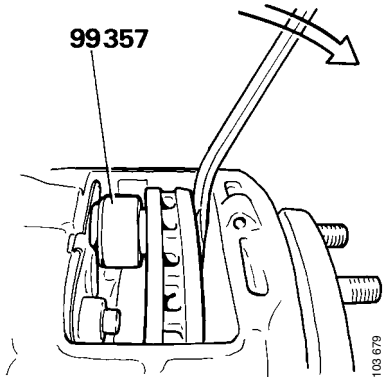
12 Fit the new boot and pressure plate on drift 99 357 and position the pressure plate against the push rod.

13 Unscrew the brake adjuster until the pressure plate reaches the bottom of the drift.




14 Move the pad carrier over so that the back of the drift contacts the disc and press the pressure plate securely into position by prising out the caliper further with a crowbar. Check that the pressure plate reaches the push rod.

15 Screw the brake adjuster fully home. Press the outer edge of the boot into position with the drift whilst prising again with the crowbar.

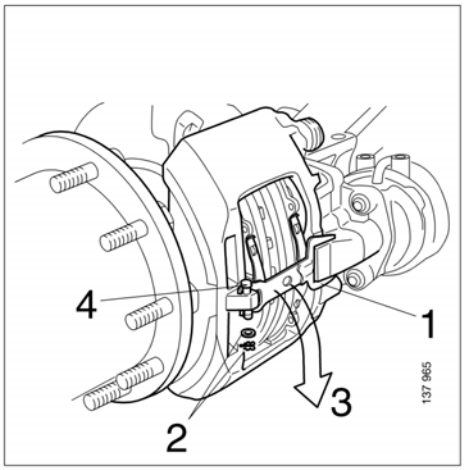


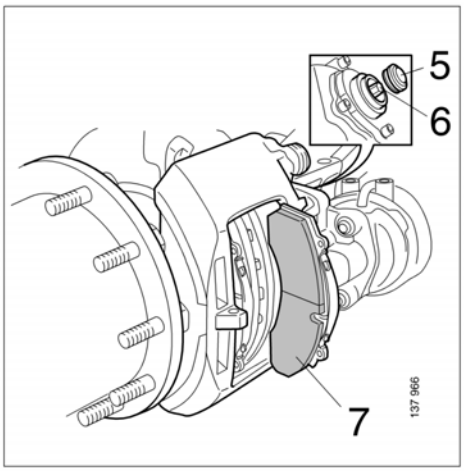
# Renewing the brake pads

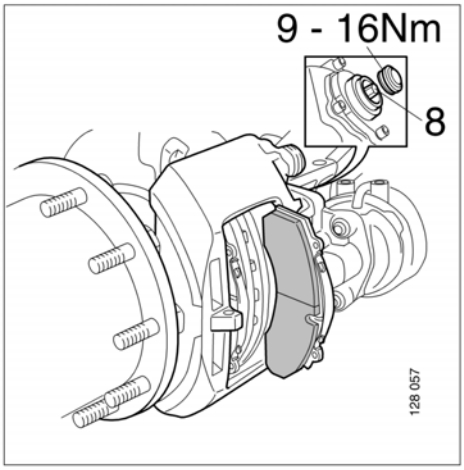
## General

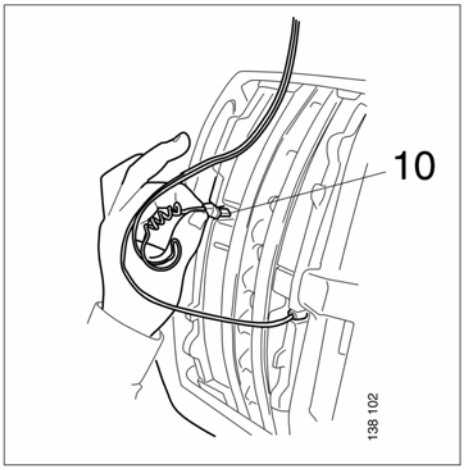
Do not forget to check brake calipers, brake disc thickness and crack formation.

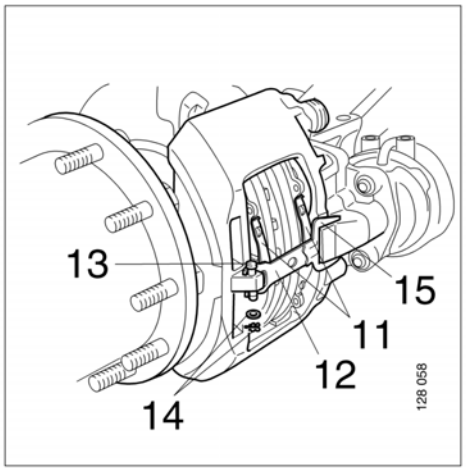
Release the parking brake.



1 If there is a wear wire, remove the connections and remove the protective plate from the latch clamp.

2 Remove lock pin and washer.

3 Press down the latch clamp.

4 Remove the pin and the latch clamp.

**Note:** The latch clamp is spring loaded.

5 Remove the cover.

6 Screw the brake adjuster anticlockwise. Use a ring spanner:

SB 7: 8 mm

SN 7: 10 mm

The clicking sound is normal.

7 Remove the old brake pads.

Carry out the checks below:
- Checking the brake caliper seal.
- Checking brake disc thickness.
- Checking brake discs for cracks.

Fit the new brake pads. Always fit the outer brake pad first.

8 Screw the brake adjuster clockwise until the brake pads are just touching the brake discs. Undo the adjustment two clicks anticlockwise.

9 Refit the cover.

**Note:** New brake calipers have a sleeve that will break if the tightening torque is too high. If the sleeve breaks, borrow from another brake caliper. If two sleeves break, renew the brake caliper.

**IMPORTANT!** If a torque greater than 16 Nm is used when adjusting the pads, the brake adjuster may break. Since the brake adjuster cannot be repaired, the entire brake caliper must be renewed.

10 If there are wear wires, fit them to the brake pads. The coiled wire should be located in the inner brake pad.

11 Fit the leaf springs to the brake pads. If there are wear wires, the cables should be routed on the outside of the leaf springs.

12 Press down the latch clamp.

13 Fit the pin.

14 Fit the washer and the lock pin.

15 Fit the protective plate to the latch clamp. If wear wires are fitted, check that the wear sensor lead is not trapped and then connect.

Apply the brakes a few times and check that the wheels rotate freely. Apply the parking brake.

# Brake disc

Measure the brake discs **before** they are removed from the vehicle. This allows the work to be carried out, as (for example) vibrations or brake disc thickness differences do not always occur on both sides of the same axle.

If **one** brake disc is replaced due to varying thickness or run-out, and the other brake disc on the same axle has a thickness of 40 mm, this should also be replaced in order to increase the service life of the brake discs and brake pads. If brake discs are replaced, the brake pads on the same axle should also be replaced.

## Renewal of brake discs on the front or rear wheel hubs

For removing and fitting brake discs on front or rear wheel hubs, see Workshop Manual main group 9, Hubs and wheels.

To renew brake pads and check brake calipers, see:

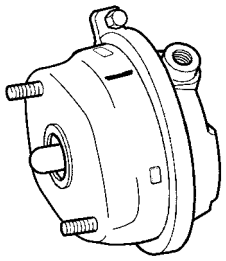
- Renewing the brake pads
- Checking brake calipers

# Brake chamber

## Replacing diaphragm

### General

The service brake section in the spring brake chamber works in the same way as a separate brake chamber.



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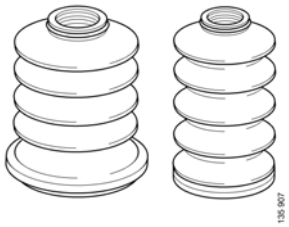
**WARNING!**

**Never dismantle the spring brake section in the spring brake chamber. There is a risk of serious injuries or death. The spring force in the spring brake section is very high.**

**Note:** The pushrod boot is available in two versions.



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1 Mark the air connection holes.

2 Remove the clamp. Place the brake chamber in a press or a vice to prevent components flying out. Use soft jaw protectors.

**IMPORTANT!** Due to spring tension in the brake chamber, components may fly out!

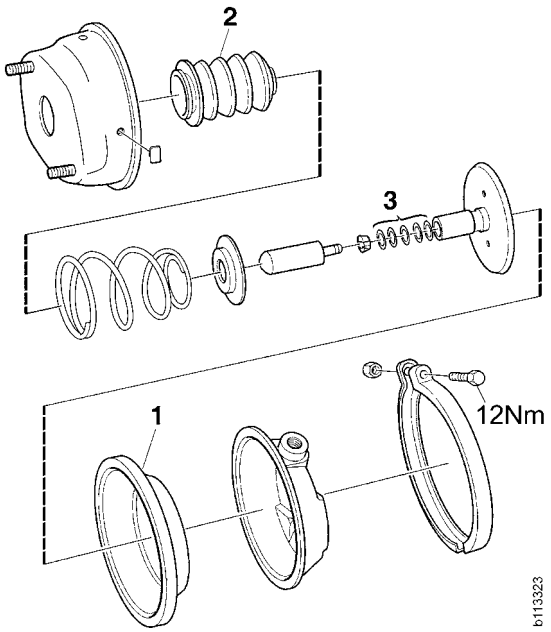
3 Disassemble the brake chamber.

4 Renew the diaphragm.

5 Fit the spring to the push rod - the small end should be facing the diaphragm.

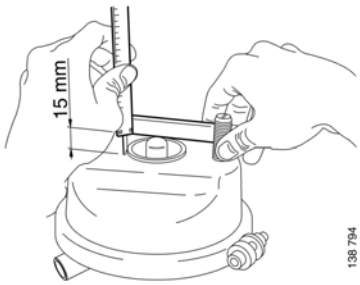
Fit the boot on the push rod, and be careful so that the circlip does not come off from the boot.

6 Press the brake chamber together using, for example, a press or a vice. Lock the brake chamber with the clamp. Tightening torque 12 Nm.




*1 Diaphragm*
*2 Boot*
*3 Shims*

7 Measure the push rod protrusion. It should be 15 mm from the brake chamber half. Adjust with the shims if required.




8 Pull the upper edge of the boot through the hole in the brake chamber.

# Spring brake chamber

## Renewal

### Specifications

**Tightening torque**

| | |
|---|---|
| Spring brake chamber | 180 Nm |
| Release bolt | 45 Nm |
| Clamp | 20 Nm |

**WARNING!**

**Always ensure that the parking brake is released before removing the spring brake chamber. Check this by rotating the brake disc.**

**WARNING!**

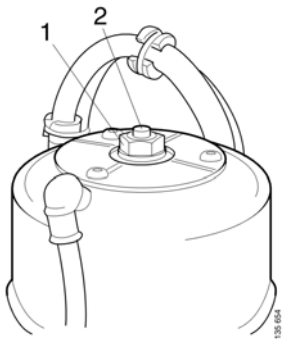
**The parking brake is deactivated when the release bolt is screwed out. Use wheel chocks to prevent stationary vehicles from moving. Use a towing bar when towing.**

**WARNING!**

**If the spring brake chamber is filled with water it may freeze. If this occurs when the parking brake is applied, the brake will not release at the wheel. When driving away the disc brake then heats up and may cause a fire.**

The parking brake is deactivated when release bolt 1 is screwed anticlockwise to its end position. The parking brake is reset when the release bolt is screwed clockwise to its end position.

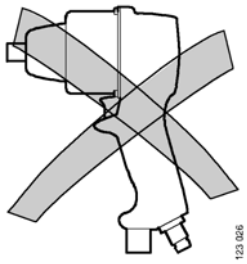
A red pin 2 in the release bolt centre indicates that the bolt is screwed out from its normal position.




1 Release the parking brake and unscrew the release bolt.

2 Clean and lubricate the release bolt to avoid having to recut the thread.

Do not use a nut runner! The release bolt may be damaged if the tightening torque is too high. If the bolt is damaged, the parking brake will not release even though the bolt is unscrewed.



3 Apply the parking brake.

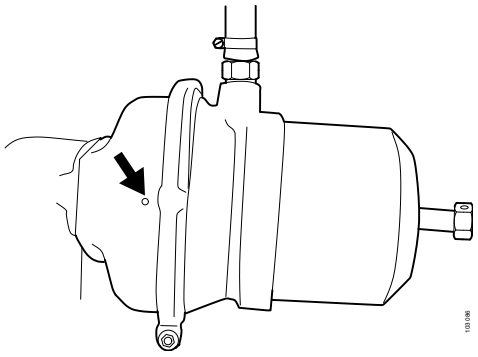
4 Detach the hose connections.

5 Undo the two nuts which attach the spring brake chamber. If there are wear wires, move the wear sensor cable retainer to the side.

6 Remove the spring brake chamber.

7 Check the caliper for moisture by looking in the spring brake chamber opening. If moisture is present, renew the caliper to avoid rust in the adjustment mechanism. Also check the spring brake chamber rubber boot.

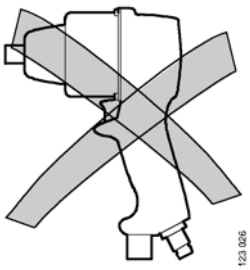
8 Fit drain plugs in all drain holes except the hole underneath the new spring brake chamber. Check that no other plugs have been removed as this may cause the brake chamber to blow damp air into the caliper, which will then rust.



9 Lubricate the end of the push rod with multi-purpose grease containing zero molybdenum, and fit the spring brake chamber.

10 If wear wires are fitted, fit the cable retainer.

11 Fit the spring brake chamber. Tightening torque 180 Nm. Do not use a nut runner!



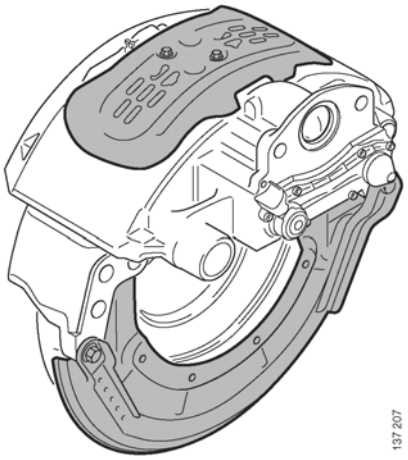
12 Connect the hoses.

13 Release the parking brake and screw in the release bolt.

# Brake shield and cover

External affects such as dirt and water can lead to vibrations and uneven brake wear.

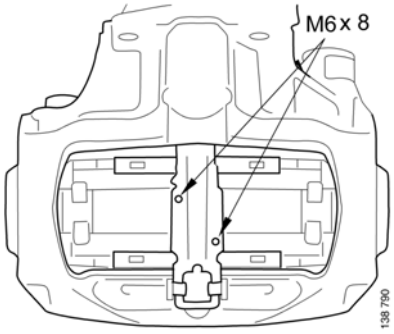
The brake shield together with a cover prevent unequal braking effect between the inner and outer brake pads by protecting the brake disc and the brake pads.




## Renewal

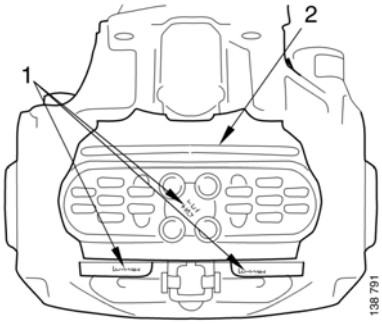
The brake pad carrier must have a mounting hole for the brake shield to be fitted. If the brake pad carrier does not have a mounting hole, the brake pad carrier must be renewed.

1 Screw the cover into place in the brake pad latch clamp. **Use M6x8 without washers**.




**IMPORTANT!** Only use M6x8 bolts. Bolts longer than M6x8 will rest against the brake pad springs and prevent the disc brake caliper from moving. Do not use washers! There is a risk that the bolt head will catch the rim.

2 Turn the straight embossing 2 on the cover towards the inside of the brake caliper, and so that the text 1 on the cover can be read from the outside of the brake caliper.



# Tag axle brake shield

## General

Applies only to vehicles with tag axle behind the rear driving axle.

The tag axle brake shield prevents snow and ice from being packed in the rim when the tag axle is raised.

If the brake caliper and the hub freeze, the wheel is prevented from turning when the tag axle is lowered, which leads to heavy tyre wear.

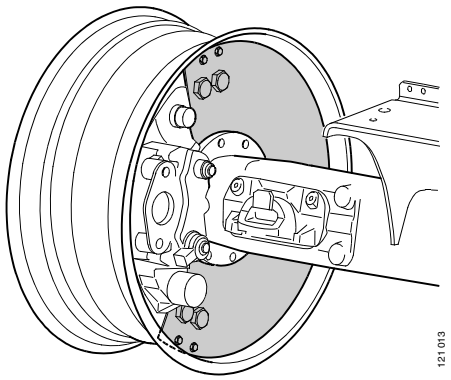
## Fitting the brake shield

**IMPORTANT!** The brake shield must only be used together with pressed steel rims with dimensions 9.00 R22.5 and 8.25 R22.5. Otherwise there is a risk that the brake shield contacts the rim, which then is weakened and at worst may split.

The opening in the rim is covered with a brake shield.

- On ARA900 and ASA700D the brake shield is fitted with the existing brake caliper bolts.
- On ASA1000 four of the existing brake bracket bolts are replaced with longer M20x75 bolts. The longer bolts are required for the spacers that are fitted between the brake shield and brake bracket.

The brake shields can be fitted all year round.




*Brake shield on tag axle ASA1000*

# Checks

## Troubleshooting schedule

The checks are subdivided into groups for troubleshooting on brake calipers and brake discs. When troubleshooting vibrations or uneven braking, for example, all the checks within the relevant group should be carried out.

| | Brake disc | Brake caliper |
|---|---|---|
| Checking the brake caliper seal | | x |
| Checking the brake caliper adjustment mechanism | | x |
| Checking the slide pin bushings | | x |
| Checking the brake pads | x | x |
| Checking brake disc run-out | x | |
| Checking brake disc thickness | x | |
| Checking the variation in brake disc thickness | x | |
| Checking brake discs for cracks | x | |

# Checking the brake caliper seal

## Instructions

1 **Check the slide pin and boot**

Remove the brake pads and check that the brake caliper can be moved back and forth on the slide pins. It should be possible to move the brake caliper by hand. Also check the slide pin boots. Renew the slide pins if it is too heavy. Refer to Repairing brake calipers.

2 **Check the boot and pressure plate**

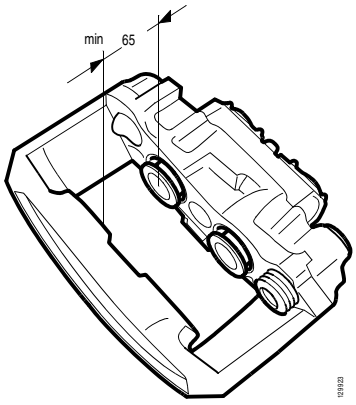
Move the caliper outwards. Fit a new brake pad in the **outer** holder. Move the caliper inwards again

Unscrew the brake adjuster until the pressure plates protrude enough for an inspection of the boots. Renew them if they are damaged. Refer to Repairing brake calipers. Use a ring spanner.

- 8 mm on SB 7
- 10 mm on SN 7

**Note:** The clicking sound is normal.

The measurement between the brake caliper and pressure plate must **never be less than 65 mm**. If they are screwed out too far the push rods inside the brake caliper come loose, and the entire caliper must be replaced.



# Checking the brake adjuster on the brake caliper

**IMPORTANT!** Check that the parking brake is released.

1 Check the brake adjuster by turning it inwards, not allowing the pressure plates to contact the brake disc.

Use a ring spanner:

- 8 mm on SB 7
- 10 mm on SN 7

**Note:** The clicking sound is normal.

2 Leave the tool on the brake adjuster and apply the service brake a few times. The tool should move back slightly each time. If the brake adjuster is damaged, replace the entire caliper.

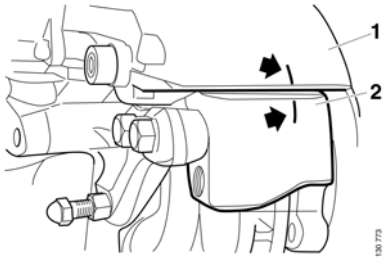
# Checking the slide pin bushings

## Instructions

1 Fit the brake pads in the brake caliper.

2 Adjust the brake pads roughly to the brake disc.

3 Scribe the caliper 1 and the pad carrier 2.

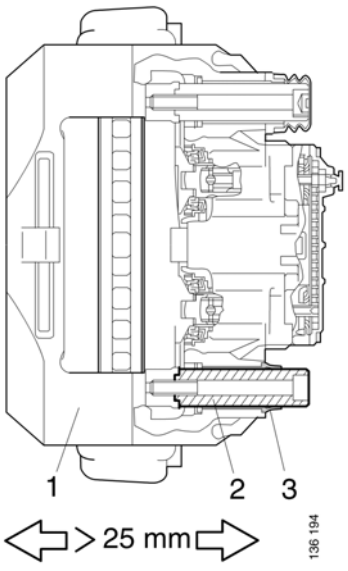



4 Remove the brake pads.

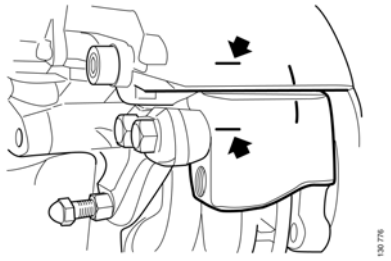
5 Adjust the components so that the line on the caliper is directly opposite the line on the pad carrier.

6 It should be possible to move caliper 1 by hand along the entire length of slide pin 2. If it is not possible to move the caliper at least 25 mm, the sliding surfaces must be checked.

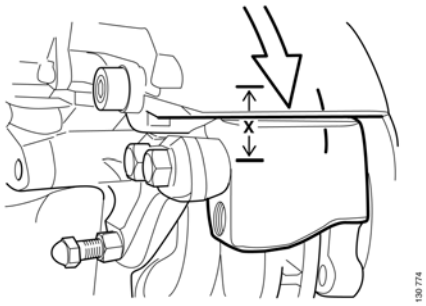
7 If the caliper is against the pad carrier, the bushing 3 should be replaced. See Renewing bushings.



8 Scribe two new lines on the caliper and pad carrier.



9 Prise apart the caliper and pad carrier with a ca 350 mm screwdriver. At the same time, measure the distance X between the two lines.

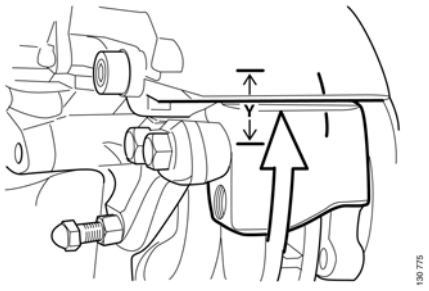



10 Push the brake caliper towards the pad carrier by hand and measure the distance Y between the two lines.

11 The bushing must be renewed if the difference between measurements X and Y is greater than:

DU bushing: 1 mm

Rubber bushing: 2 mm



# Checking the brake pads

### Specifications

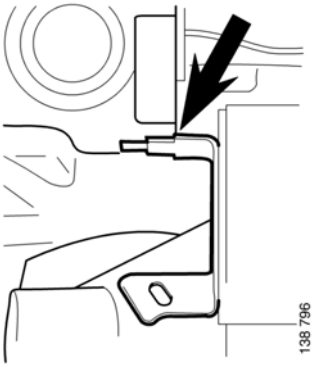
| Brake disc, thickness | Minimum permissible brake pad lining thickness |
|---|---|
| > 40 mm | 2 mm |
| 37-40 mm | 4 mm |

## Instructions

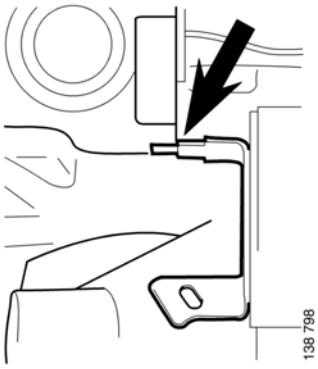
### General

The brake caliper position indicates the wear of the brake disc and the brake pads.

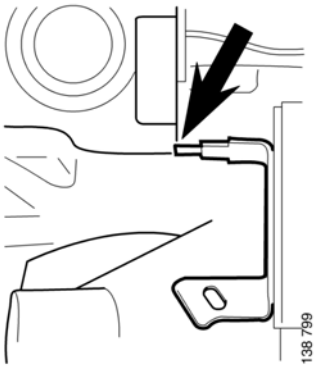
DU bushing with wear indicator




*Brake caliper position when the brake pads are new.*

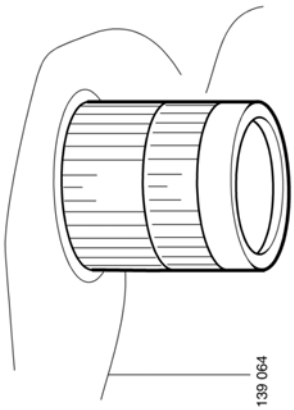



*Brake caliper position when the brake pads are moderately worn. Remove the wheel and visually check whether the brake pads are unevenly worn.*

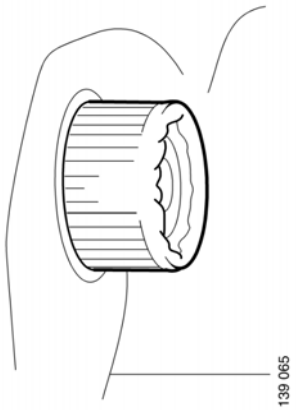



*Brake caliper position when 1 mm remains of brake pad wear surface.*

Rubber bushings with wear indicators



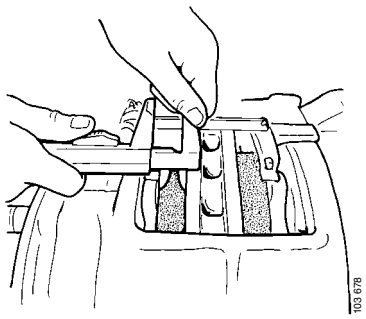

*Rubber bushing position for new brake pads.*




*Rubber bushing position at maximum brake pad wear.*

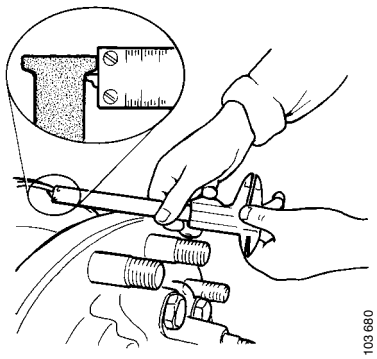
1 Measure the brake pad lining thickness between the brake disc and the brake pad backing plate using a vernier caliper.

**Note:** Look carefully for signs of uneven wear.




2 Measure any wear edge on the disc and add it to the brake pad thickness.

3 Renew the pads if you think that they may wear out before the next inspection.



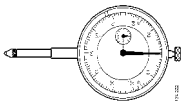
# Checking brake disc run-out

## Specifications

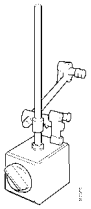
### Control measurements

| | |
|---|---|
| Maximum permissible run-out | 0.20 mm |

## Special tools

| Number | Designation | Picture | Tool board |
|---|---|---|---|
| 98 075 | Dial gauge |  | D2 |

## Other tools

| Number | Designation | Picture | Tool board |
|---|---|---|---|
| 857 250 | Indicator stand with precision adjustment |  | - |

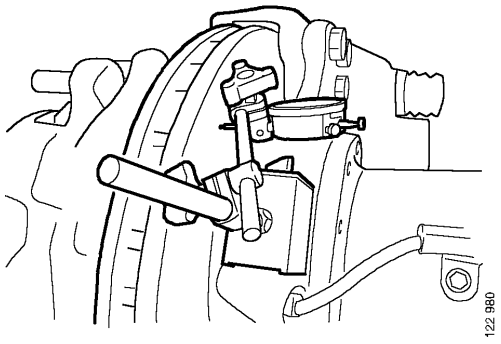
## General

Drive the vehicle until normal operating temperature for the brakes is achieved. If both brake discs on the front axle are above the specified values, all brake discs on all axles must be measured.

### Check the run-out

1 Fit the indicator stand in a suitable place and set the dial gauge against the brake disc with smallest possible angle.

2 Rotate the brake disc slowly and read the dial gauge at the same time. Brake disc run-out must not exceed 0.20 mm.



# Checking brake disc thickness

## Specifications

**Control measurements**

| | |
|---|---|
| New brake disc | 45 mm |
| Minimum permissible brake disc thickness | 37 mm |

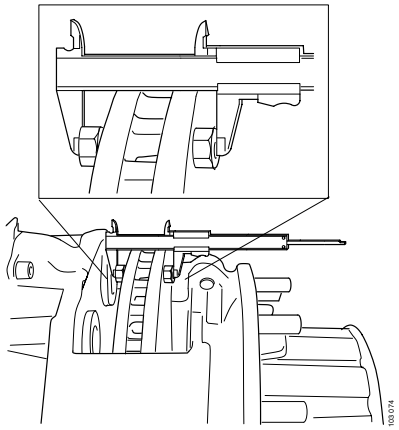
## General

Drive the vehicle until normal operating temperature for the brakes is achieved.

### Thickness

- A wear edge may have formed on the outer circumference of the disc. Measure on the inside using spacers, e.g. two nuts.
- Renew the brake disc if there is a risk that it will wear down to 37 mm before the next inspection.

  **Example**: Two 10 mm thick nuts. Brake disc + nuts = 64 mm. The thickness of the disc is therefore 64 - (2x10) mm = 44 mm.



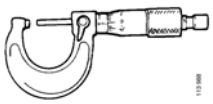
# Checking the variation in brake disc thickness

## Specifications

### Control measurements

| | |
|---|---|
| New brake disc | 45 mm |
| Minimum permissible brake disc thickness | 37 mm |
| Maximum permissible thickness variance per brake disc | 0.08 mm |

### Other tools

| Number | Designation | Picture | Tool board |
|---|---|---|---|
| 587 081 | Micrometer 25-50 mm |  | - |

## General

Drive the vehicle until normal operating temperature for the brakes is achieved. If both brake discs on the front axle are above the specified values, all brake discs on all axles must be measured.

**IMPORTANT!** Ensure that the measurements are taken at the same distance from the disc centre on both sides.

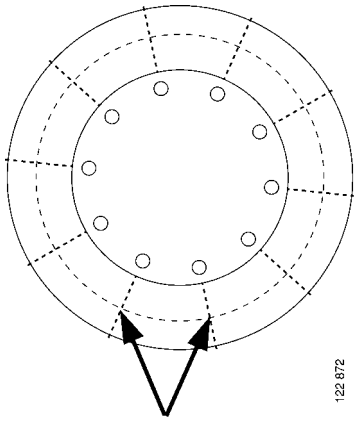
## Check the variation in thickness

1 Mark 10 measurements on the brake disc at the same distance from the centre, one measurement for each wheel bolt. It is important that the distance from the centre is the same for all measurements and that the reading is taken at the same radius on both sides.

2 Measure the thickness with a micrometer and note the results.

3 Deduct the smallest value from the largest. The difference must not exceed 0.08 mm. The disc must otherwise be replaced.

   If the variation in brake disc thickness between the two front axle discs exceeds 0.08 mm, repeat the measurement on all axles.




*Measurements*

# Checking brake discs for cracks

## Specifications

### Control measurements

| | |
|---|---|
| Maximum permissible length of cracks | 40 mm |
| Maximum permissible width of cracks | 1.5 mm |

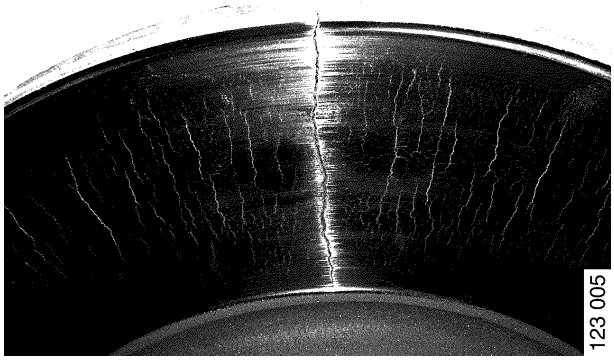
## Instructions

- Check that cracks on the brake disc do not exceed permitted levels. Cracks up to a maximum of 40 mm in length are permitted, provided that they do not reach the edge. If the cracks are wider than 1.5 mm, the disc must be ground or replaced. After grinding, the thickness of the disc must not fall below 40 mm.

**IMPORTANT!** Brake discs with a prohibited crack formation must be replaced.

Permitted crack formation


Prohibited crack formation



# Specifications

**Tightening torque**

| | |
|---|---|
| Brake pad carrier | 200 Nm +45° |
| Brake chamber | 180 Nm |
| Slide pins | 290 Nm |
| Spring brake chamber | 180 Nm |
| Release bolt (spring brake chamber) | 45 Nm |
| Clamp (spring brake chamber) | 20 Nm |

**Control measurements**

| | |
|---|---|
| New brake disc | 45 mm |
| Minimum permissible brake disc thickness | 37 mm |
| Maximum permissible thickness variance per brake disc | 0.08 mm |
| Maximum permissible run-out | 0.20 mm |
| Maximum permissible length of brake disc cracks | 40 mm |
| Maximum permissible width of brake disc cracks | 1.5 mm |
| Minimum permissible pad thickness for brake discs > 40 mm | 2 mm |
| Minimum permissible pad thickness for 37-40 mm thick brake discs | 4 mm |