

**SAAB**

**900**

**SERVICE  
MANUAL**

**5 Brakes**

**M 1979—86—**



# SERVICE MANUAL

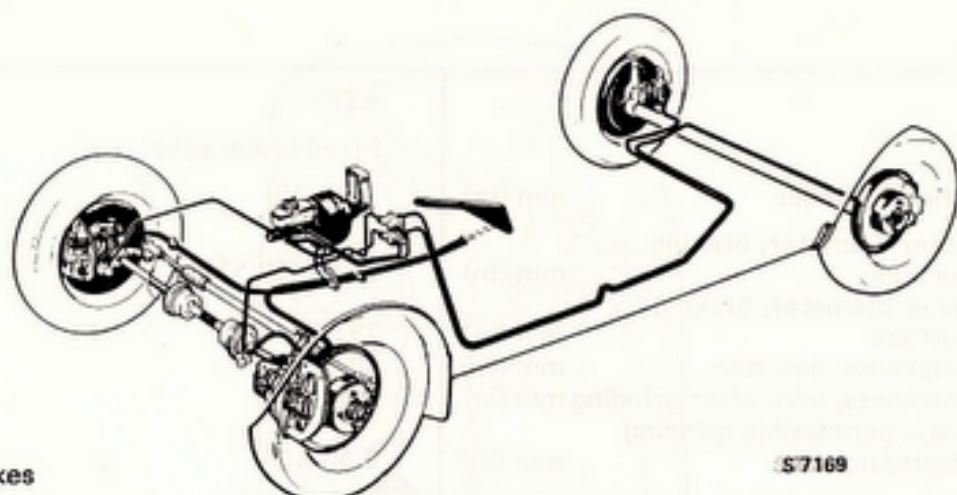
## 5 Brakes

M 1979-86-

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# Technical data



Front brakes

S7169

Make		Girling	
Type		Hydraulic disc, vacuum servo assisted. Double diagonal brake circuits.	
Diameter, wheel cylinder	mm (in)	54 (2.13)	
Brake disc, outer diameter, braking (non ventilated)	surface	276 (10.87)	
	inner diameter, braking surface	177 (6.97)	
	thickness, new disc	12.7 (0.50)	
	thickness, min. after grinding	11.7 (0.46)	
	max. permissible grinding depth/side	0.5 (0.02)	
	max. permissible lateral throw of mounted disc (1979-1980)	0.10* (0.004)	
	max. variation in disc thickness	0.015 (0.0006)	
Brake disc, outer diameter, braking (ventilated)	surface	276 (10.87)	
	inner diameter, braking surface	177 (6.97)	
	thickness, new disc	20.0 (0.79)	
	thickness, min. after grinding	18.9 (0.74)	
	max. permissible grinding depth/side	0.55 (0.0222)	
	max. permissible lateral throw of mounted disc	0.08 (0.003)	
	max. variation in disc thickness	0.015 (0.0006)	
Brake pad, lining thickness, new pad	mm (in)	10.8 (0.425)	
	min. brake lining thickness	1 (0.04)	
	friction surface/pad	37 (5.74)	
Brake pad, lining thickness, new pad asbestos-free	mm (in)	8.8 (0.346)	
	min. brake lining thickness	1 (0.04)	
	friction surface/pad	29 (4.50)	

## Note

The inner and outer brake pads have different braking and should not be interchanged.

\*)0.08 (0.003) as from 1981 models

## Rear brakes

Make		ATE
Type		Fixed brake yoke
Diameter, wheel cylinder	mm (in)	30 (1.18)
Brake disc, outer diameter, braking surface	mm (in)	267.5 (10.53)
inner diameter, braking surface	mm (in)	191.5 (7.54)
thickness, new disc	mm (in)	10.5 (0.41)
thickness, min. after grinding	mm (in)	9.5 (0.37)
max. permissible grinding depth/side	mm (in)	0.5 (0.02)
Brake pad, lining thickness, new pad	mm (in)	8.5 (0.335)
min. brake lining thickness	mm (in)	1 (0.04)
friction surface/pad	cm <sup>2</sup> (in <sup>2</sup> )	20 (3.10)
Brake pad, lining thickness, new pad	mm (in)	8.5 (0.335)
asbestos- min. brake lining thickness	mm (in)	1 (0.04)
free friction surface/pad	cm <sup>2</sup> (in <sup>2</sup> )	20 (3.10)
Total area of friction material, front and rear brakes	cm <sup>2</sup> (in <sup>2</sup> )	228* (35.34)

\*)Asbestos-free 196 (30.38)

## Hydraulic fluid

Specification		To DOT 4
Brake system capacity	l	0.58 approx.

## Master cylinder

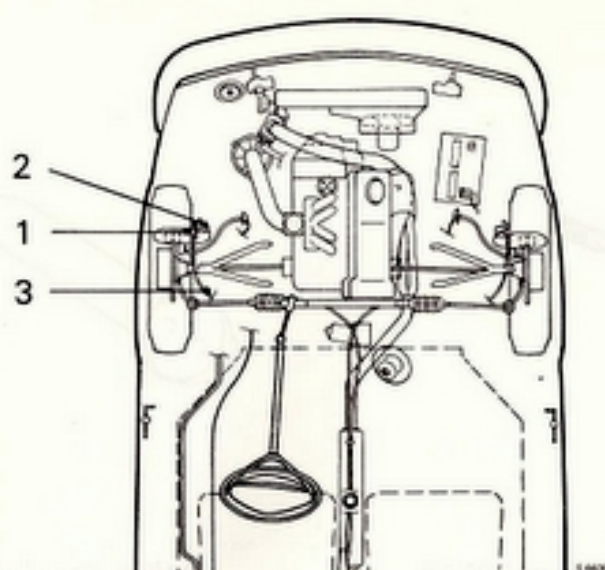
Make		Girling
Type		Tandem cylinder
Diameter	mm (in)	22.2 (7/8)

## Brake servo

Make		Girling
Type		Braking power increased using partial vacuum from inlet manifold.
Diameter	mm (in)	229 (9)
Power increase with 25 kp (55 lb) pedal force		3,5:1



## Special tools



Pos	Lubricating point	Lubricant
1	Front brake yoke sliding surfaces	Gleitmo 540
2	Automatic handbrake adjusting mechanism	Girling Special Grease
3	Hand brake cables (protective sheath)	Chassis grease

## Special tools



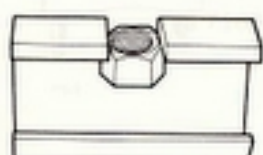
89 96 043 Key, brake, piston



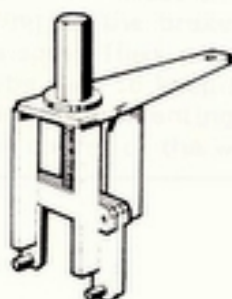
83 90 270 Slide hammer



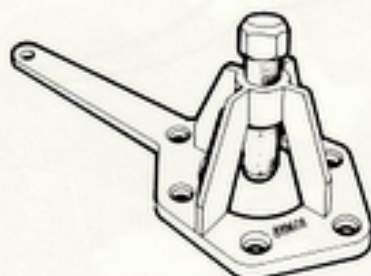
89 95 607 Tool, removal and installation of brake spring



89 96 175 Removing tool, pad retaining pin



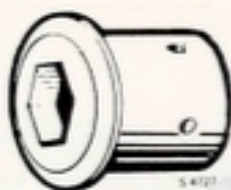
89 95 771 Removing tool, brake pad



89 96 084 Puller, wheel hub



## Special tools



89 95 805 Sleeve, wheel nut



(45)30 08 612 Grease, brake yoke  
89 94 782 Grease, handbrake mechanism



89 96 191 Grinding set, brake disc



89 95 342 Template

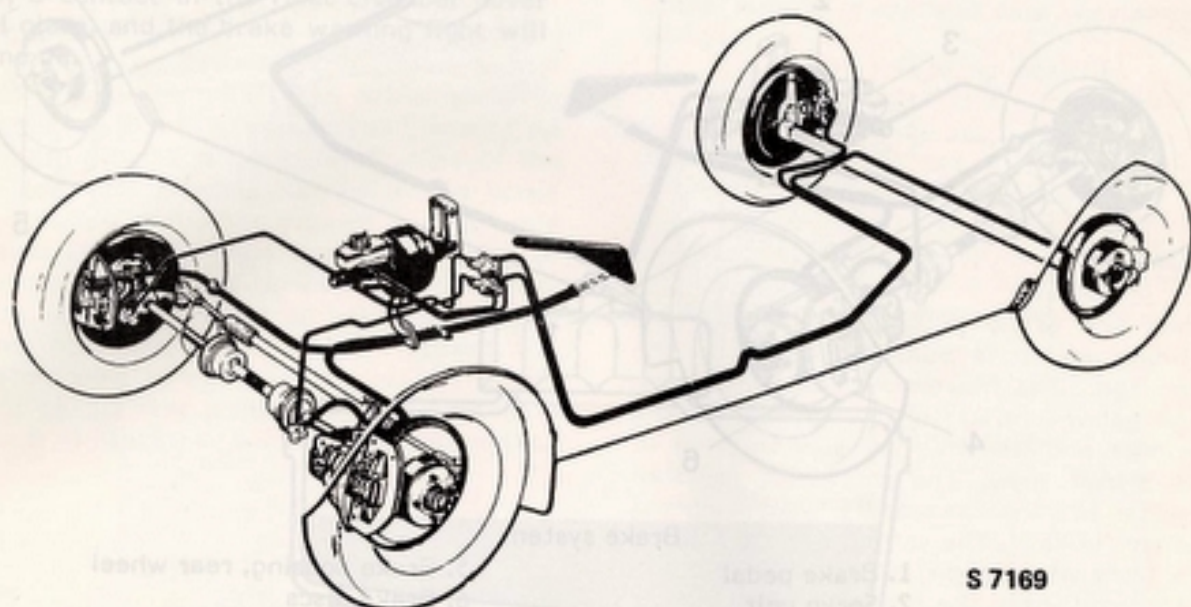


89 95 367 Piston pliers, rear brake piston

# Technical description

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Handbrake system . . . . .	500-2
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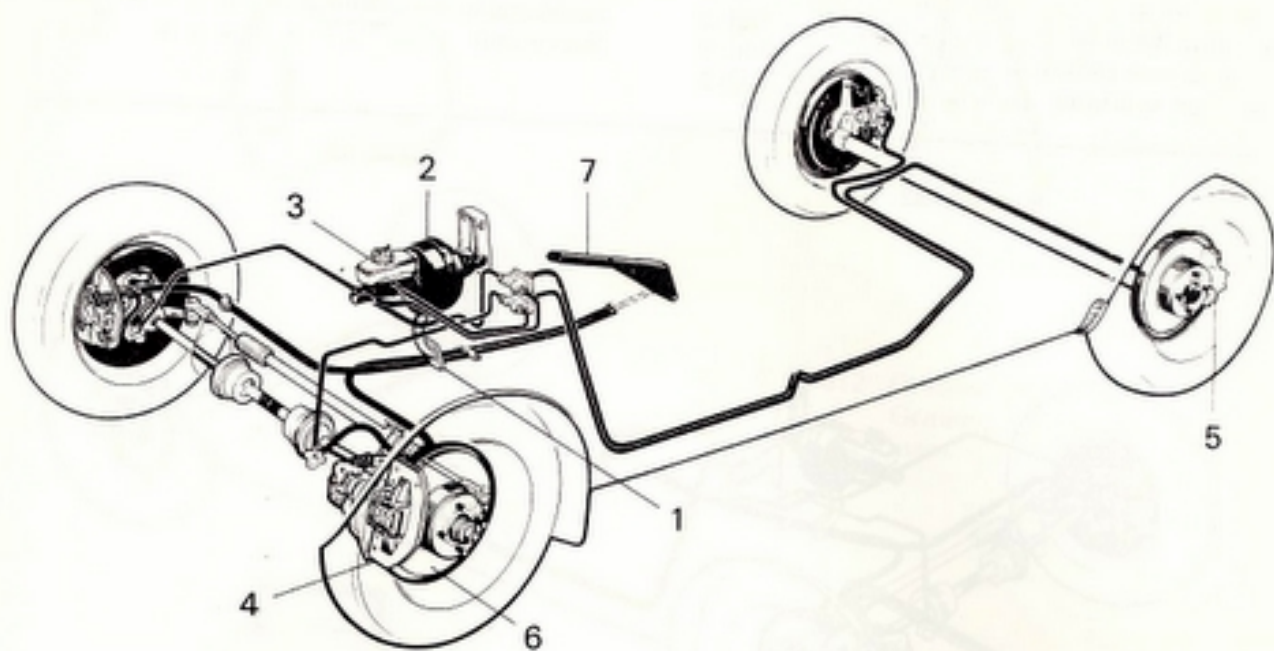
The car has two independent brake systems: the footbrake or driving brake, which is hydraulic and acts on all four wheels, and the handbrake or parking brake, which is mechanical and acts on the front wheels.

## Note

We recommend that you use the wet method when working on the brakes. For this you will need a spray flask containing water, which can be used to keep the components moist, thereby preventing dust from rising during the course of the work.







Brake system

- |                               |                              |
|-------------------------------|------------------------------|
| 1. Brake pedal                | 5. Brake housing, rear wheel |
| 2. Servo unit                 | 6. Brake discs               |
| 3. Master cylinder            | 7. Handbrake lever           |
| 4. Brake housing, front wheel |                              |

### Footbrake system

When the brake pedal (1) is depressed, it acts on two pistons in the master cylinder (3) via the servo unit (2); the latter increases the pedal pressure and transmits the motion to the master cylinder which acts simultaneously but independently on two hydraulic circuits to the front (4) and rear (5) wheel brakes. Each circuit acts on a diagonally opposed pair of wheels, i.e. right front and left rear, and left front and right rear.

The pressure is transmitted through the brake lines and hoses to the wheel cylinders, where the pistons force the brake pads against the discs (6). The braking effort is greater on the front wheels, and this reduces the risk of the rear wheels locking. If there is a leak in the system, braking effort will be lost on one diagonal pair of wheels only, the other pair being

unaffected. A float in the fluid reservoir senses the level of the fluid in the master cylinder. In the event of leakage, a contact in the float chamber cover will close, and the brake warning light will come on.

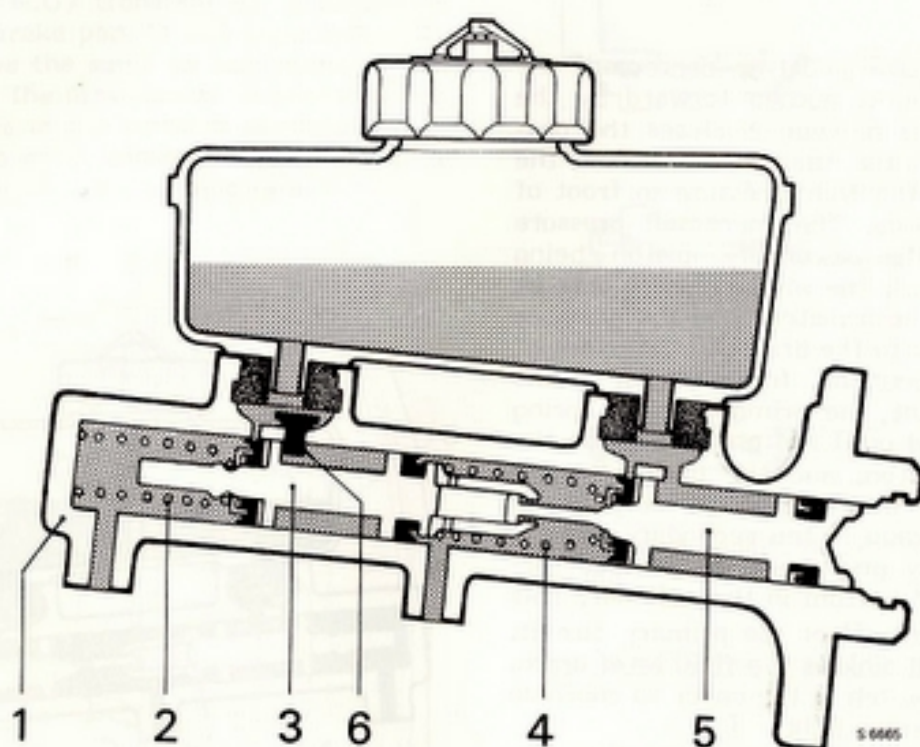
### Handbrake system

The action of the handbrake lever (7) is transmitted mechanically by a link mechanism and two wires to the front wheel brakes (4) where a push rod acts mechanically on the pistons, which force the brake pads against the discs.

A warning lamp on the instrument panel comes on when the handbrake is applied.

### Master cylinder

The master cylinder comprises a cylinder housing in which two pistons, one for each brake circuit, transmit the force from the push rod hydraulically. A float in the fluid reservoir senses the level of the fluid in the master cylinder. In the event of leakage, a contact in the float chamber cover will close, and the brake warning light will come on.



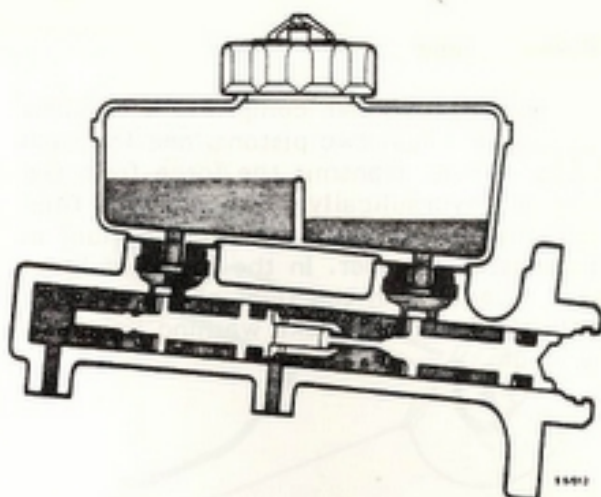
Section through master cylinder

1. Cylinder housing
2. Return spring, secondary piston
3. Secondary piston
4. Return spring, primary piston
5. Primary piston
6. Stop pin



### Rest position

In the rest position, the two pistons are held at the rear limit of travel by means of the return spring. The passages between the brake fluid reservoir and the two brake circuits are open.

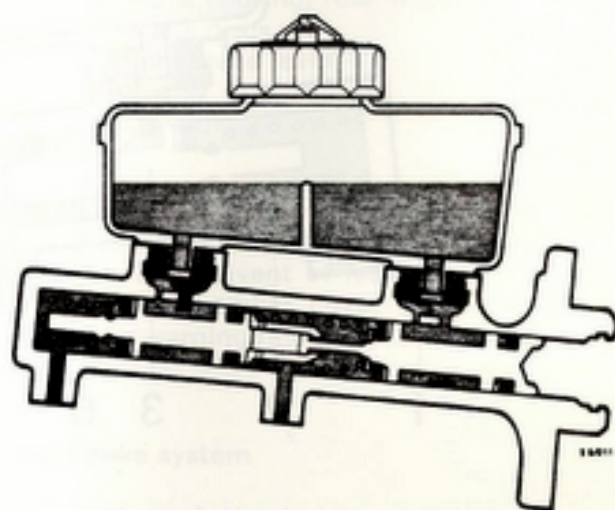


### Braking

When the brake pedal is depressed, the primary piston is pushed forward by the push rod. This movement closes the passage between the fluid reservoir and the cylinder and the fluid pressure in front of the piston rises. The increased pressure results in the secondary piston being pushed forward. The same pressure acts on the front of both pistons and the pressure is transmitted to the brake. In the event of a leakage occurring, for example, in the primary circuit, the primary piston spring is compressed until the piston acts on the secondary piston, and the brakes in the secondary circuit function normally. In the event of leakage in the secondary circuit, the secondary piston will be pressed forward and will bottom in the cylinder. This will in no way affect the primary circuit. The float will sink as the fluid level drops, causing the switch in the cover to energize the brake warning light.

The brake fluid reservoir comprises two mutually independent compartments. In the event of leakage in one circuit, only one of the compartments will therefore be emptied.

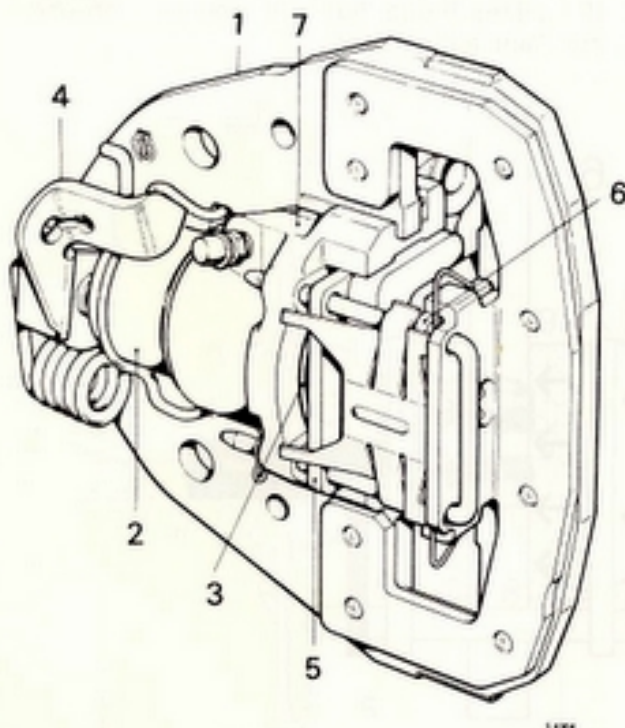
The fluid remaining in the undamaged circuit is sufficient for the car to be driven safely to a workshop. As the two brake circuits act diagonally, about half of the braking effect always remains in the event of leakage in one of the circuits. This also provides greater safety in steering the car as one front and one rear wheel always run free and do not lock.



## Wheel brakes

### Front wheel brake assembly

Each wheel brake assembly comprises a brake housing with two pistons, a yoke and two brake pads. The front brake housings contain the handbrake mechanism and are securely mounted on the steering knuckle housings. The rear brake housings are mounted to special mounting points on the rear axle. The yokes slide in grooves in the brake housings. When the brake pedal is depressed, the fluid pressure is transmitted to both pistons in the cylinder. One of the pistons acts directly on one of the brake pads while the other presses on the yoke which indirectly transfers the pressure to the other brake pad. In this way, the pressure will be the same on both sides of the disc. When the brake pedal is released, the piston seals in the cylinder return the pistons to the rest position. Adjustment as a result of brake pad wear is thus automatic.



Front wheel brake assembly, left

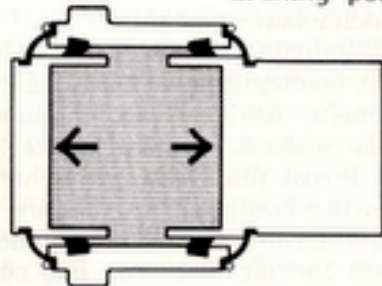
1. Yoke
2. Piston (indirect)
3. Piston (direct)
4. Handbrake lever
5. Brake pad (inner)
6. Brake pad (outer)
7. Cylinder housing

### Front wheel brake assembly with ventilated discs

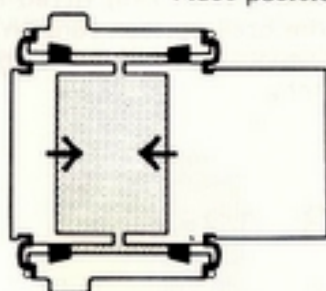
(N/A Sweden and Japan specs.)

New brake yokes with a wider aperture have been introduced as from 1986 models to accommodate the new brake discs. The brake assemblies are also of a heavier-duty design.

Braking position

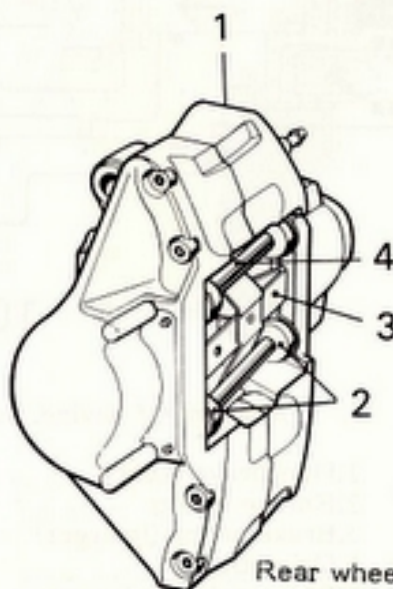


Rest position



Piston seals, positions at rest and during braking

### Rear wheel brake assembly



Rear wheel assembly, left

1. Cylinder housing
2. Brake pad
3. Retaining spring
4. Locking pin



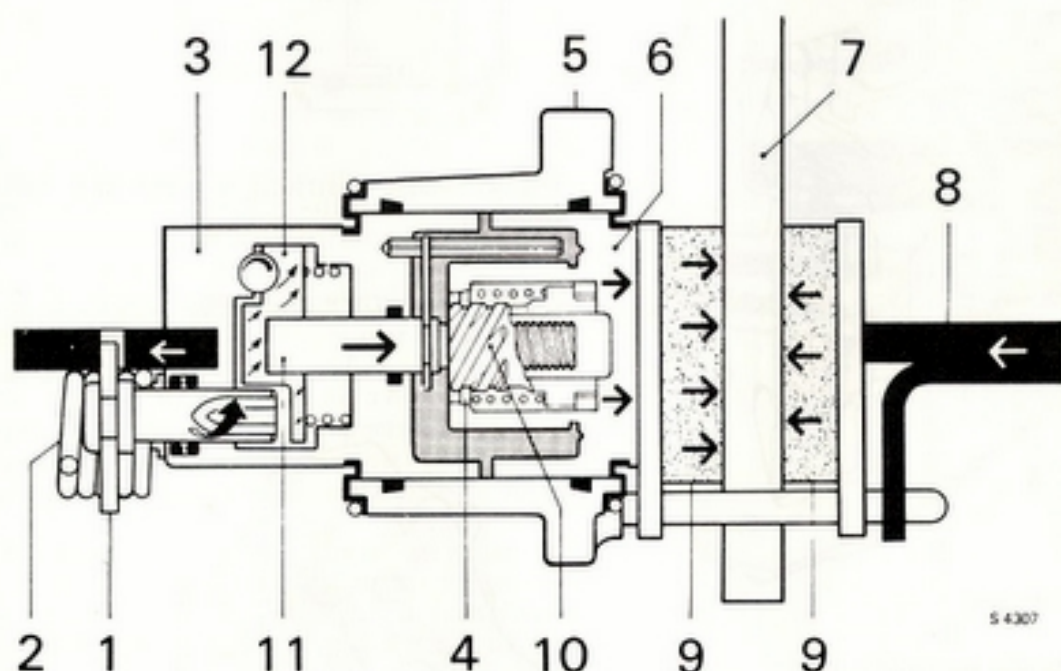
Each wheel brake assembly consists of a brake housing comprising two parts which are bolted together. Each half is equipped with a brake cylinder. When the brake pedal is depressed, both pistons act directly on the brake pads, pushing them against the disc.

When the brake pedal is released, the piston seals will return the pistons to the rest position.

### Handbrake mechanism

The handbrake mechanisms and their automatic adjustment devices are combined with two brake pistons. The handbrake lever acts on a thrust plate which mechanically actuates the two pistons by means of a push rod. The automatic adjustment device is built into the direct piston and consists of a sleeve with internal and external threads. The push rod is screwed into the internal thread and a drive ring fitted to a conical hole in the brake piston runs on the external thread which is specially designed with a coarse pitch.

When the brake is applied, the increase in hydraulic pressure between the pistons acts on the threaded end of the push rod. As the other end of the push rod is not affected by the pressure, the push rod and the direct piston will be forced apart. The play between the push rod thread and the internal thread of the sleeve even out and the same applies to the external thread of the sleeve and the drive ring. The pressure of the drive ring against the conical hole increases and, as a result of its special shape, the sleeve turns in relation to the indirect piston and the push rod. As the brake is released, the brake pistons are returned in the cylinder as a result of the seals. The sleeve and push rod are returned by spring washers, the drive ring makes contact with the other side of the thread on the sleeve and the pressure against the conical seating is reduced, with the result that the drive ring revolves on the external thread of the sleeve. When the pistons are pressed further apart in the cylinder as a result of wear on the brake pads, rotation of the sleeve in relation to the push rod results in the latter being fed out, and this ensures constant adjustment.



Adjustment device, handbrake mechanism

- |                            |                  |
|----------------------------|------------------|
| 1. Handbrake lever         | 7. Brake disc    |
| 2. Return spring           | 8. Yoke          |
| 3. Brake piston (indirect) | 9. Brake pad     |
| 4. Drive ring              | 10. Sleeve       |
| 5. Brake cylinder housing  | 11. Push rod     |
| 6. Brake piston (direct)   | 12. Thrust plate |

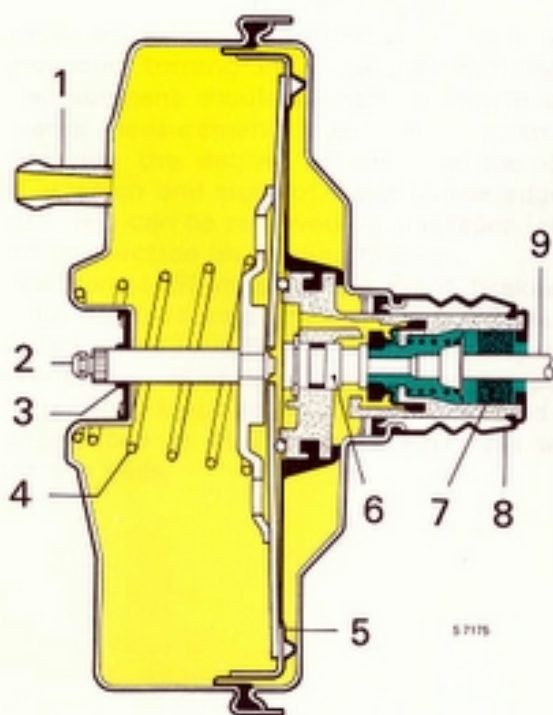


## Servo unit

The servo unit is designed to increase the pedal pressure when the brakes are applied. The increase in pressure from the servo unit is obtained from the vacuum in the inlet manifold of the engine. The inlet manifold is connected to the servo unit by means of a hose. The master cylinder is fitted between the brake pedal and the brake master cylinder and connected to these parts by means of push rods. If a leak should occur in the servo unit, the two push rods will then act as a simple push rod. The brakes will still work as usual, but considerably more pressure on the brake pedal will be required.

### Rest position

In the rest position the diaphragm and valve piston are held at the rear limit of travel by the return spring. The same vacuum acts on both sides of the diaphragm since the by-pass passage in the diaphragm is open.



Servo unit, rest position

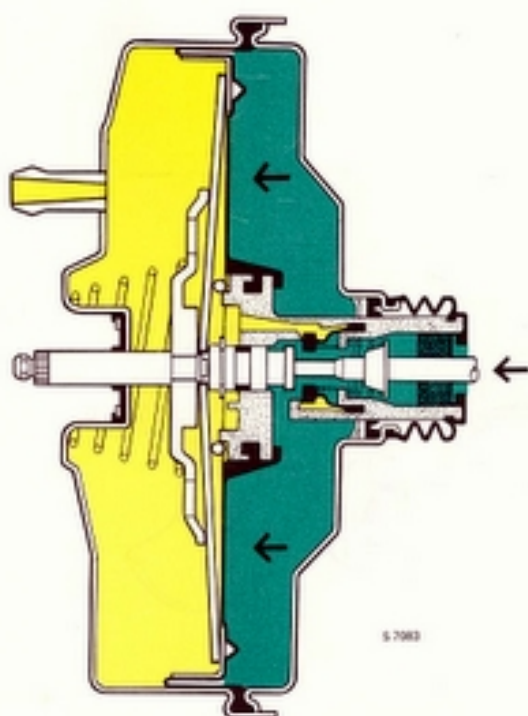
1. Non-return valve
2. Push rod (master cylinder)
3. Seal
4. Return spring
5. Diaphragm

## Braking

When the brake pedal is depressed, the push rod pushes the valve piston and diaphragm, forward, closing the by-pass passage. The valve piston then opens a passage which enables air to flow through the filter and to the rear of the diaphragm.

The power boost is derived from the difference between the vacuum in front of the diaphragm and the atmospheric pressure behind it.

When the brake pedal is released, the by-pass passage opens immediately and the air at atmospheric pressure flows from behind the diaphragm to the front and on through the non-return valve to the inlet manifold. The atmospheric passage closes and the return spring returns the diaphragm, valve piston, and push rod to the brake pedal, to the rest position. The non-return valve prevents air at atmospheric pressure from being drawn from the inlet manifold to the servo unit. The valve opens only when the vacuum in the inlet manifold is greater than that in the servo cylinder.



Servo unit, braking

6. Valve piston
7. Filter
8. Dust cover
9. Push rod (brake pedal)
10. Pressure-equalizing valve



# Brake discs

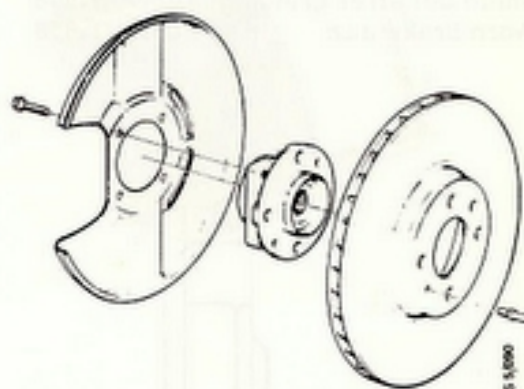
Checking and adjustment . . . . .	516-1
Removal . . . . .	516-4

Assembly . . . . .	516-6
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## Checking and adjustment

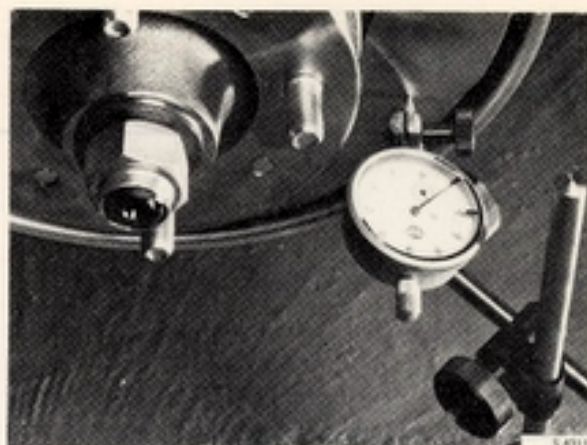
The condition of the discs should be inspected when the thickness of the brake pad linings is checked. Some scoring will be present on the brake discs after normal use and should be ignored. When pads with asbestos-free linings are fitted, the discs will become coated with a layer of graphite. Intermittent and irregular braking action as a result of lateral throw or variations in disc thickness should be rectified by grinding with sanding blocks (refer to the separate section on this). In more severe cases, turning in a special machine or replacement of the disc must be considered. Consideration must then be given to the amount of wear on the disc, which implies that check measurements must first be made. Where wear is more pronounced turning in a special machine or replacement should be considered. In such cases measurements must be taken to determine the degree of wear on the disc. Corrosion and signs of wear on the edge of the disc can be removed by a scraper (refer to the section on sanding blocks).

As from 1986 models, the front brakes on 900 Turbo 16 cars are equipped with ventilated discs (N/A Sweden and Japan specs.). Ventilated discs operate at lower temperatures than conventional brake discs and are less prone to fading and create less wear on the pads.



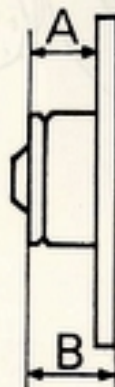
## Check measurements

Use a dial indicator to measure the lateral throw of the brake disc. The maximum permissible throw is 0.004 in (0.10 mm). The amount of wear on the disc can be measured with the disc in position or removed from the car. If measuring is to be carried out with the disc in situ, the brake assembly must be slackened and any corrosion or signs of wear on the disc scraped off. Vernier calipers and a straightedge should be used to make the measurements. The following dimensions should be checked.



Measuring the brake disc throw

Brake disc with hub:	mm in		Ventilated disc	
	mm	in	mm	in
<b>Dimension A</b>				
New brake disc	52.7	2.075	50.4	1.984
Maximum after grinding	53.2	2.095	50.9	2.005
Worn brake disc	53.4	2.102	51.4	2.024
<b>Dimension B</b>				
New brake disc	65.4	2.575	70.4	2.773
Minimum after grinding	64.9	2.555	69.9	2.752
Worn brake disc	64.7	2.547	69.4	2.732
<b>Brake disc removed from car:</b>				
<b>Dimension C</b>				
New brake disc	34.7	1.366		
Maximum after grinding	35.2	1.386		
Worn brake disc	35.4	1.394		
<b>Dimension D</b>				
New brake disc	47.4	1.866		
Minimum after grinding	46.9	1.846		
Worn brake disc	46.7	1.838		



Brake disc with hub



Brake disc



Ventilated disc

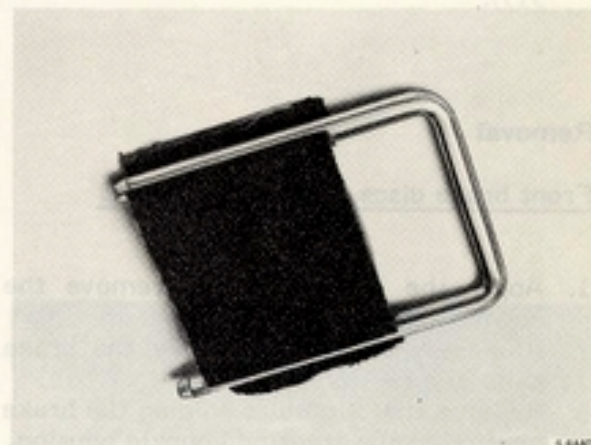


### Dimensions for grinding and replacing of brake discs

	Non-ventilated		Ventilated		Rear	
	mm	in	mm	in	mm	in
Thickness, new brake discs	12.7	0.500	20	0.784	9,0	0.354
Minimum thickness, worn brake discs	11.2	0.441	18	0.709	7.0	0.276
Maximum wear per side (See check measurements)	0.7	0.028	1.0	0.039	1.0	0.039
Grinding of brake discs, minimum thickness	11.7	0.461	18.9	0.744	7.5	0.295
Maximum grinding cut per side (See check measurements)	0.5	0.020	0.55	0.022	0.7	0.028

### Grinding with sanding blocks

1. Lift the front suspension and remove the wheels. The front assembly must be kept level, so that lubrication of the differential will not be adversely affected.
2. Remove the brake pads and disconnect the handbrake cable on the same side of the car as the disc to be ground. Refer to Section 517.
3. Reset the automatic adjustment mechanism for the handbrake by screwing back the direct-acting brake piston.
4. Fit a piece of No. 50 grain emery cloth to each of the sanding blocks included in grinding kit 899691. Clamp the emery cloth to the block by means of a pad retaining pin.
5. Fit the sanding blocks with the deeper groove up and press the hub cover onto the wheel studs.
6. Lock the wheel on the opposite side of the car by applying the handbrake.
7. Set the automatic handbrake adjusting mechanism, on the same side as the disc to be ground, in the operating position.

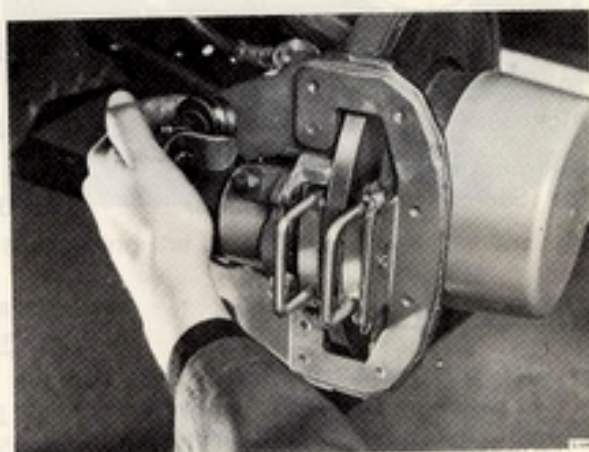




8. Start the engine and engage 1st gear. Adjust the idling speed using the idling screw. Because the grinding effect deteriorates with the speed of rotation of the disc, have the disc rotate as slowly as possible. The speed will have to be slightly higher if the car has automatic transmission, to obviate slipping in the transmission.
9. Grind the disc by pressing on the hand-brake lever.

#### Note

Apply enough pressure to cause the brake assembly to oscillate up and down. This indicates that the thickest part of the disc is being ground. Excessive pressure on the handbrake lever will reduce the grinding effect.



10. After about 30 seconds of grinding, withdraw the sanding blocks to clear them of grindings and then return them.
11. Repeat the procedure until the oscillating movement of the brake assembly has ceased.
12. Fit the brake pads and reset the foot-brake and handbrake (refer to section 517).

#### Removal

##### Front brake discs, up to 1980 models

1. Apply the handbrake and remove the nut from the end of the shaft.
2. Release the brake. Remove the brake pads (see section 517).
3. Remove the two bolts holding the brake housing to the steering knuckle housing.

Brake disc with hub

Brake disc

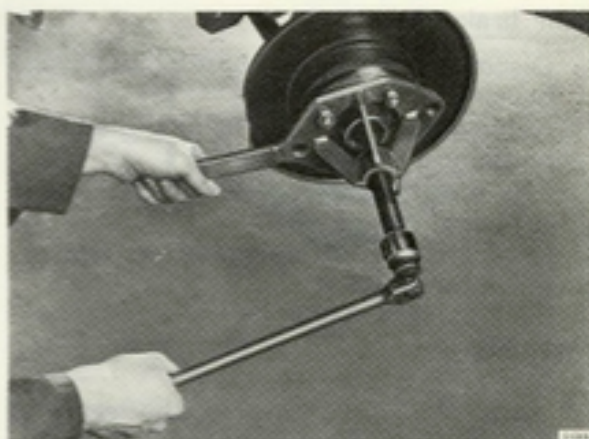
Ventilated disc



4. Lift the brake hose or handbrake cable. Suspend the brake housing on steel wire to avoid damage to the brake hose.



5. Remove the brake disc from the shaft using puller 89 96 084.
6. Remove the four screws holding the brake disc to the hub.

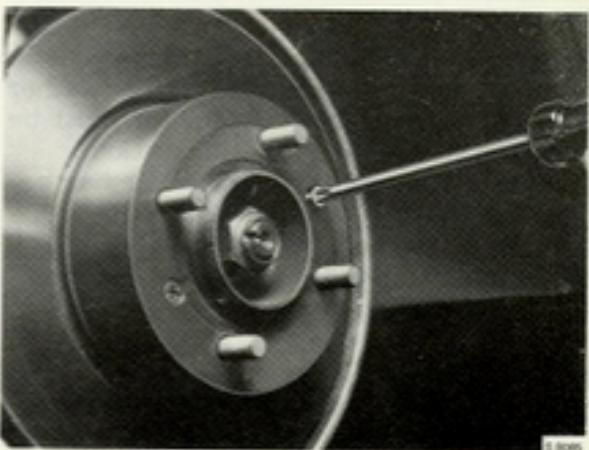


As from 1983 models

The design of the asbestos-free brake pads enables the pads to be used as inner or outer ones.

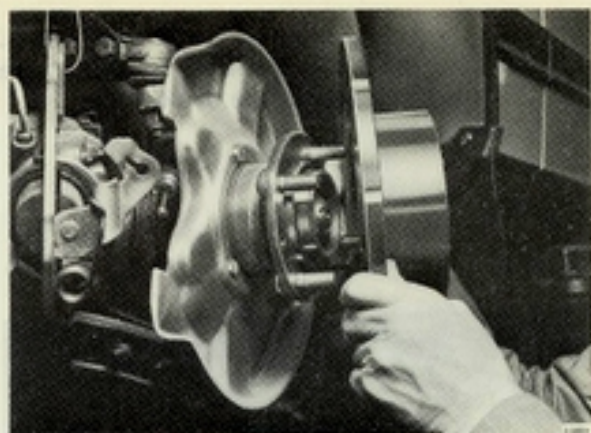
#### Front brake discs, as from 1981 models

1. Remove the brake pads (refer to section 517).
2. Separate the brake housing from the steering knuckle housing and suspend it on a length of wire to avoid the brake hose being damaged or stretched.
3. Remove the Phillips screws holding the disc on the hub.





4. Remove the brake disc from the hub.



#### Rear brake discs

1. Disconnect the brake hose at the brake housing.
2. Remove the two bolts holding the brake housing to the rear axle.
3. Lift off the brake housing and suspend it by a length of wire.
4. Unscrew both retaining screws and remove the disc.

#### Assembly

To refit the disc, reverse the removal procedure. If necessary, use a new locknut. Lock the nut by peening it into the groove in the shaft. Always use a new locking plate for the bolts in the brake housing. Tighten the hub nut to the correct torque using a hand tool (wrench, socket etc.) rather than a power tool, to prevent the threads being damaged.

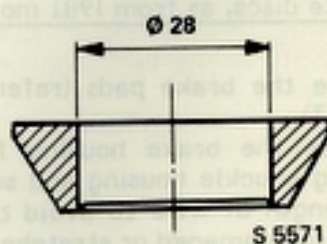
**Torque:**  
340-360 Nm (250-265 ft.lbs)

#### Tightening nut with pneumatic nut tightener

If the nut is tightened using a pneumatic nut tightener, a modified dished washer with an enlarged inside diameter must be used as a special tool (see illustration).

1. Mount the modified dished washer between the nut and the hub.
2. Tighten the nut.
3. Back off the nut and remove the modified washer.
4. Mount the standard washer.
5. Replace the nut and tighten to the correct torque.

**Torque:**  
340-360 Nm (250-265 ft.lbs)





# Brake pads

Checking the brake pads . . . . . 517-1  
Changing the front brake pads . . 517-2

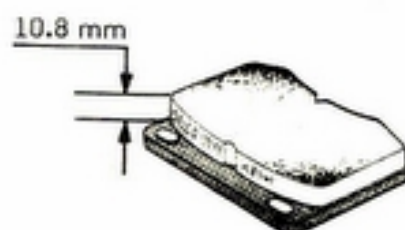
Changing the rear brake pads . . 517-5

Because both the footbrake and handbrake are self-adjusting, it is not possible to judge by the pedal stroke or by the lever movement whether the brake linings are worn. It is therefore most important to remove the wheels at the interval stated in the service programme to check the thickness of the linings.

## Checking the brake pads

Up to and including 1982 models:

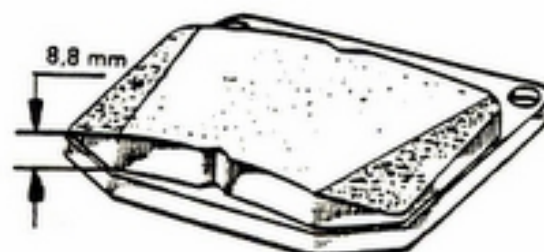
Inner and outer pads can be distinguished by the fact that inner pads have a groove in the outer edge, and outer pads in the inner one.



Pad lining -1982

As from 1983 models:

The design of the asbestos-free brake pads enables the pads to be used as inner or outer ones.



Pad lining 1983-

All pads must be replaced before the lining thickness is down to 1 mm (0.039 in).



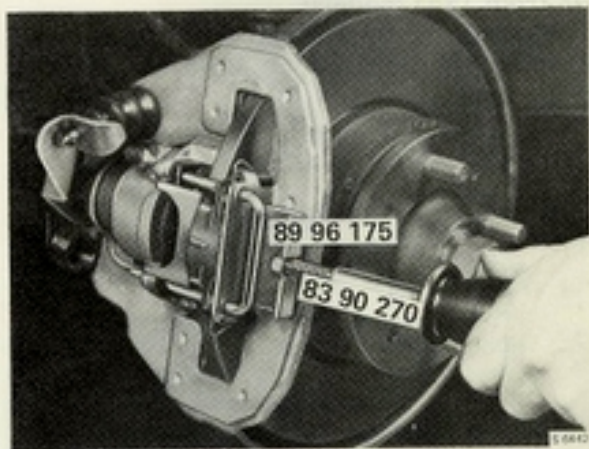
If the thickness of the pads (excluding shims) at the 15 000 km inspection is no less than that shown in the table then the pads need not be replaced before the next 15 000 km service.

Model	Turbo, up to and incl. 1982 models		Other cars, up to and incl. 1982 models		Turbo, as from 1983 models		Other cars, as from 1983 models	
	mm	in	mm	in	mm	in	mm	in
Outer pads	4	0.1575	4	0.1575	5	0.1575	4	0.1575
Inner pads	6	0.2362	5	0.1969	5	0.1969	4	0.1575
Rear pads	4	0.1575	5	0.1969	4	0.1575	3	0.1181

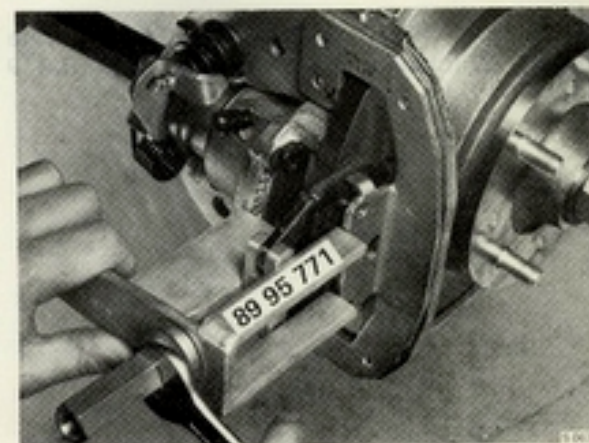
## Changing the front brake pads

### Removal

1. Clean the brake housing.
2. Rotate the brake disc so that one of the recesses in the edge of the disc is in line with the brake pads.
3. Remove the damper spring, pin retaining clip and pad retaining pin. If the pad retaining pin is difficult to remove, use tapping-out tool 83 90 270 and removal tool 89 96 175.



4. Withdraw the brake pads. If the pads are seated firmly, extractor 89 95 771 can be used.





## Assembly

### Note

When pads with semi-metallic linings are to be fitted to 1979-82 model cars, the dust cap on the direct-acting brake piston must be replaced by dust cap with part No. 84 93 255. The brake fluid must be to DOT 4.

1. Lubricate the brake yoke's bearings by moving the yoke backwards and forwards against the yoke spring and applying the lubricant (Gleitmo 540) to the sliding surfaces (see illustration).
2. Check that the dust cover retainer is properly in position and is in good condition. Loose damaged or split dust covers should be replaced. If there are signs of dirt having entered the cylinders or of the pistons having corroded, new pistons and seals should be installed.

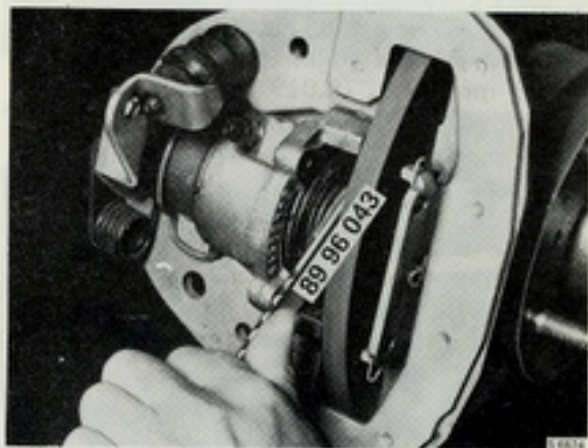
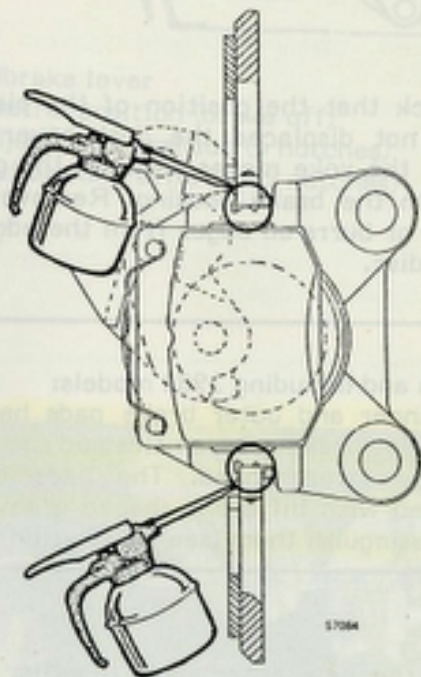
### Note

Corroded pistons should never be polished.

3. To fit new brake pads the brake pistons must be pushed back in the cylinder by rotating the direct piston by means of tool 89 96 043 at the same time as the piston is pressed into the cylinder.

### Note

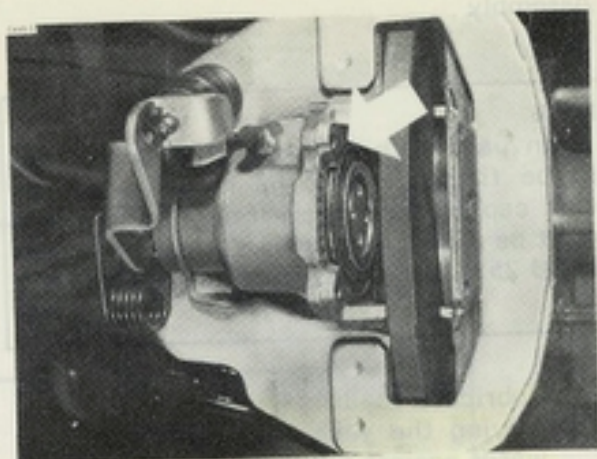
When the brake pistons are pushed back into the cylinder, the level in the brake fluid reservoir will rise. If the reservoir is full, some of the fluid must therefore be siphoned off before the pistons are screwed into the cylinder housing.





#### Note

The piston seal can be damaged if the direct piston is inserted too far. Consequently, do not push the piston past the point where it is in line with the plane of the hole for the pad retaining pin in the brake housing (see illustration).

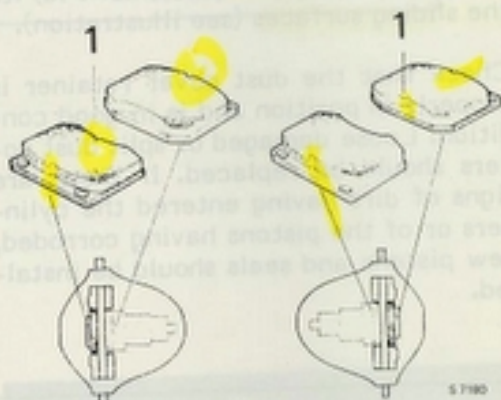


4. Check that the position of the pistons has not displaced the dust cover and that the yoke moves easily in the groove on the brake housing. Remove any rust or burrs ed edges from the edge of the disc.

#### Note

Up to and including 1982 models:

The inner and outer brake pads have different braking capacities and should not be interchanged. The pads are marked with different shaped grooves to distinguish them (see illustration).



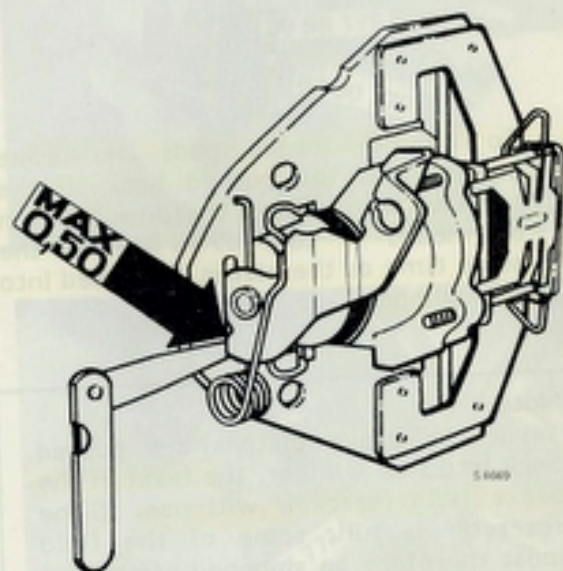
#### Brake pad markings

1. V-groove in outer pads

5. Fit the new brake pads together with the pad retaining pin, pin retaining clip and the damper spring.

6. Check the adjustment of the handbrake cable. Check the distance between the lever and the yoke. Clearance should be 0.5 mm max. (0.019 in) on both sides. Adjustment, if required, should be made on the adjusting nut on the handbrake lever.

Note that the cables cross over, which implies that the right-hand adjusting nut should be used to adjust the left-hand brake mechanism and vice versa.



7. With the engine switched off, pump the brake pedal repeatedly until the foot-brake starts to operate.



## Hydraulic footbrake system

8. Pull the handbrake lever up five notches. Continue to pump the brake pedal until the handbrake operates after having been pulled up a further two to four notches.

### Workshop technique

Scrupulous cleanliness is essential when the brake system or any part of it is dismantled. Clean any dismantled parts in brake fluid or in a special cleaning solution for hydraulic brake components. Wipe the parts with lint-free cloth. All rubber parts, hoses and seals, etc., are available in repair kits and should be replaced. Before a unit is installed, all components should be checked in clean brake fluid or in

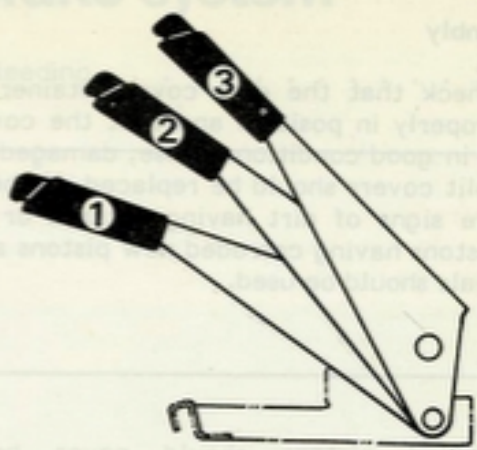
### Changing the rear brake pads

#### Removal

1. Clean the brake housing.
2. Tap out the brake pad retaining pins using a 2.5 mm (0.11 in) drift. Save retaining spring.

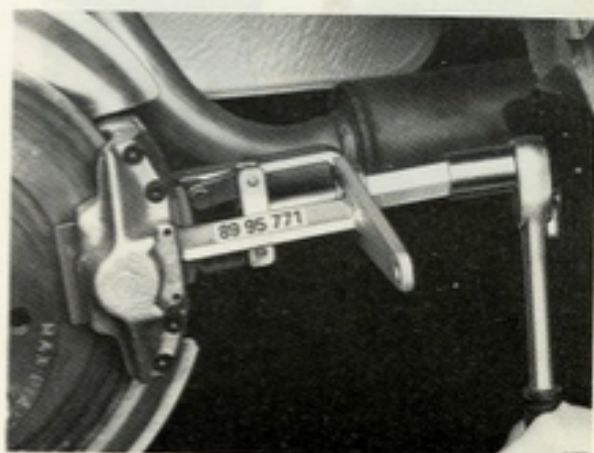
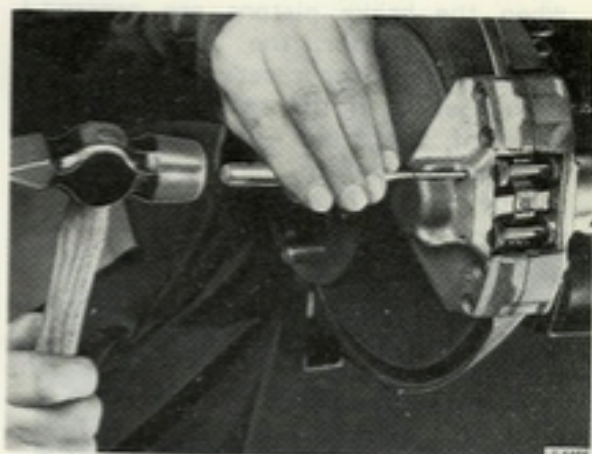
1. Open the breather nipples for the secondary circuit (right front wheel/left rear wheel) one turn and connect suitable hoses to them placing the other ends in a container.

3. Withdraw the brake pads. If they are difficult to remove, use extractor 89 95 771.



Handbrake lever

1. Neutral position (brake off)
2. Adjustment position (5 notches)
3. Full braking effort (7-9 notches)





## Assembly

1. Check that the dust cover retainer is properly in position and that the cover is in good condition. Loose, damaged or split covers should be replaced. If there are signs of dirt having entered or of pistons having corroded new pistons and seals should be used.

### Note

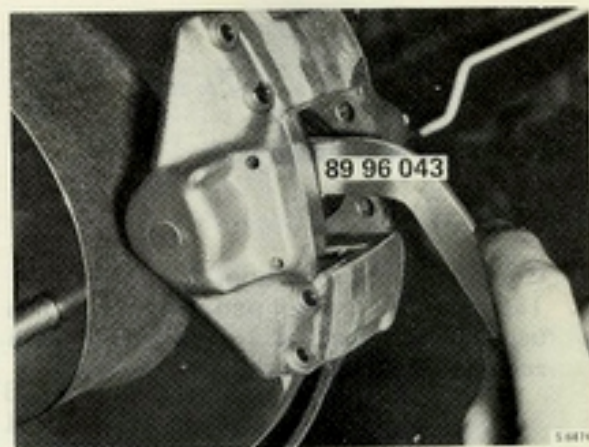
Corroded pistons should never be polished.

2. Use the handle to wrench 89 96 043 and push the pistons back no further than is necessary to enable the new pads to be fitted.

### Note

When the brake pistons are pressed into the cylinder, the level of the brake fluid in the reservoir will rise. Consequently, if the reservoir is full, some of the fluid will have to be siphoned off before the brake pistons can be pressed into the cylinder.

3. Fit the pad retaining pins and pin retaining clip. Repeat the procedure on the opposite wheel and then top up the brake fluid reservoir as necessary.
4. To put the brake in the operating position, lightly pump the brake pedal.



brake pedal repeatedly until the foot-brake starts to operate.



# Hydraulic footbrake system

Workshop technique . . . . .	520-1
Changing the brake fluid . . . . .	520-1

Bleeding . . . . .	520-2
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## Workshop technique

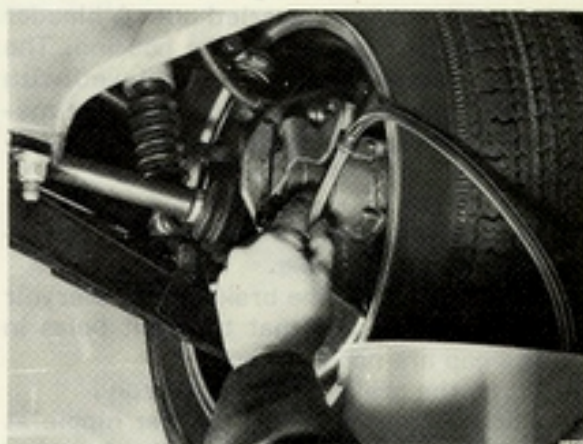
Scrupulous cleanliness is essential when the brake system or any part of it is dismantled. Clean any dismantled parts in brake fluid or in a special cleaning solution for hydraulic brake components. Wipe the parts with a clean, lint-free cloth. All rubber parts and seals, etc., are available in repair kits and should be replaced. Before a unit is installed, all components should be dipped in clean brake fluid of the recommended specification.

## Changing the brake fluid

All brake fluids deteriorate with time through oxidation and water absorption. The boiling point is lowered and a build-up of vapour is possible after repeated hard braking and this may result in brake failure. The brake fluid should therefore be changed at regular intervals. Refer to section 120.

The brake fluid must be to DOT 4.

1. Open the bleeder nipples for the secondary circuit (right front wheel/left rear wheel) one turn and connect suitable hoses to them placing the other ends in a container.





2. Pump the brake pedal until the front half of the fluid reservoir is nearly empty.
3. Top up with new fluid (to DOT 4) and continue pumping until the reservoir is nearly empty.
4. Top up the reservoir once again and close the bleeder nipples.
5. Repeat the same procedure for the primary circuit (left front/right rear).
6. Bleed the brake system

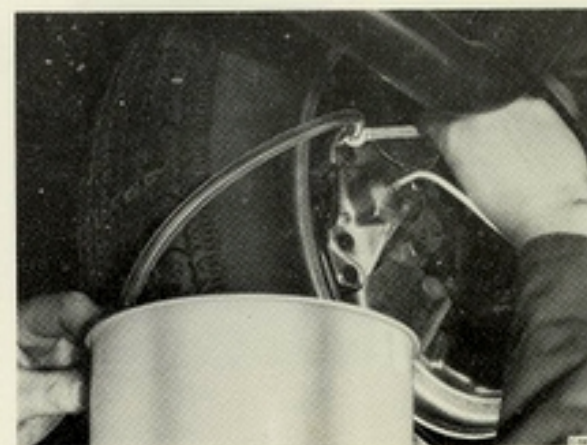
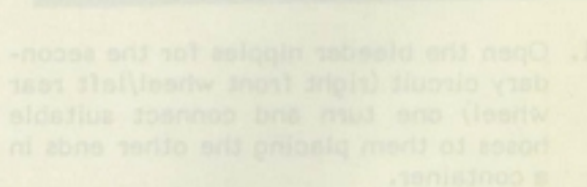
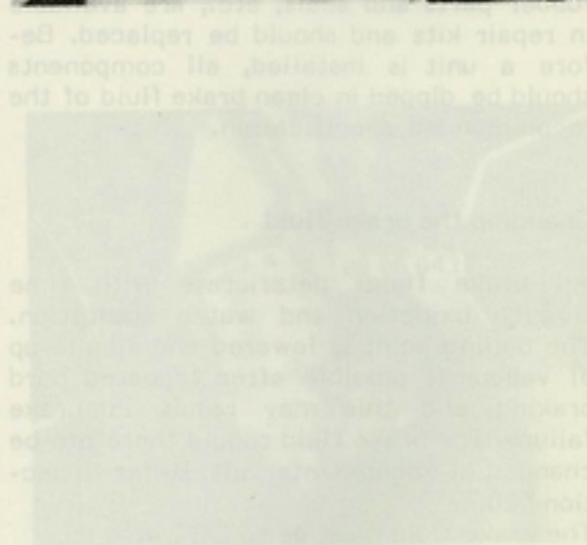
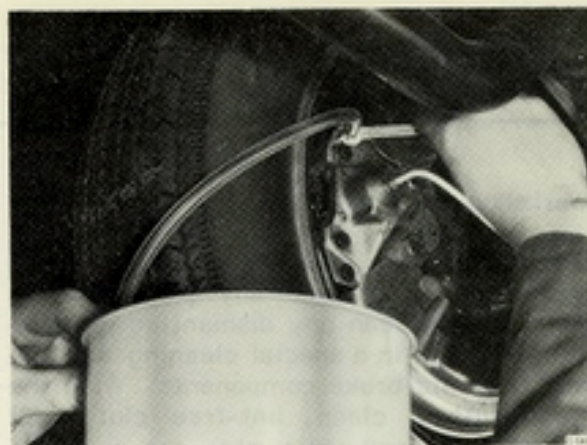
#### Notes

Corroded pistons should never be polished.

### Bleeding

If air has entered the system, this can be detected by sponginess in the brake pedal, the need to press the pedal several times before the brake grips or by a lack of resistance. Checking by depressing the pedal should be carried out with the engine switched off and with no assistance from the servo unit. If small quantities of air are present in one of the circuits, this may result in uneven braking of the car but without any sponginess being felt in the brake pedal. Bleeding must be carried out after any component in the system has been removed. It is usually sufficient to bleed the brake housing or the circuit in which work has been carried out. A bleeder nipple is fitted to each brake housing. The best and fastest results are achieved with bleeding equipment, in which case the manufacturer's instructions should be followed.

1. Place chocks under the wheels and release the handbrake.
2. Make sure that the brake fluid reservoir is well filled and that the vent holes in the cap are not blocked.
3. Pump the brake pedal repeatedly.
4. Connect a hose to the bleeder nipple at the left rear wheel. Place the free end of the hose in container part filled with brake fluid. The end of the hose must be kept below the surface of the liquid in the container at all times. Open the bleeder screw one to two turns.





## Master cylinder

5. Fully depress the brake pedal, and then release it after a pause of a few seconds. Wait a few seconds then repeat the procedure. Continue in this way until all air bubbles have been expelled from the hose.

Tighten the nipple immediately after the last downward stroke of the pedal.

6. Repeat the procedure described in points 4 and 5 on the right front wheel. Then change to the primary circuit by bleeding first the right rear wheel and then the left front wheel.

For hydraulic brake components, wipe the

Assembly ..... 521-4  
Fitting ..... 521-5

parts with a clean, lint-free cloth. All



7. Top up the fluid reservoir.

### Note

New clean brake fluid of the recommended specification should always be used for topping up the brake fluid reservoir. The brake fluid must be to DOT 4.

The brake fluid which has been pumped out during bleeding should never be reused.

Master cylinder, exploded view

1. Cap
2. Fluid level switch
3. Float
4. Sealing ring
5. Brake fluid reservoir
6. Pin
7. Sealing ring
8. Stop pin

9. Cylinder housing
10. Spring, secondary piston
11. Secondary piston
12. Sleeve
13. Spring, primary piston
14. Primary piston
15. Lock ring

# Master cylinder

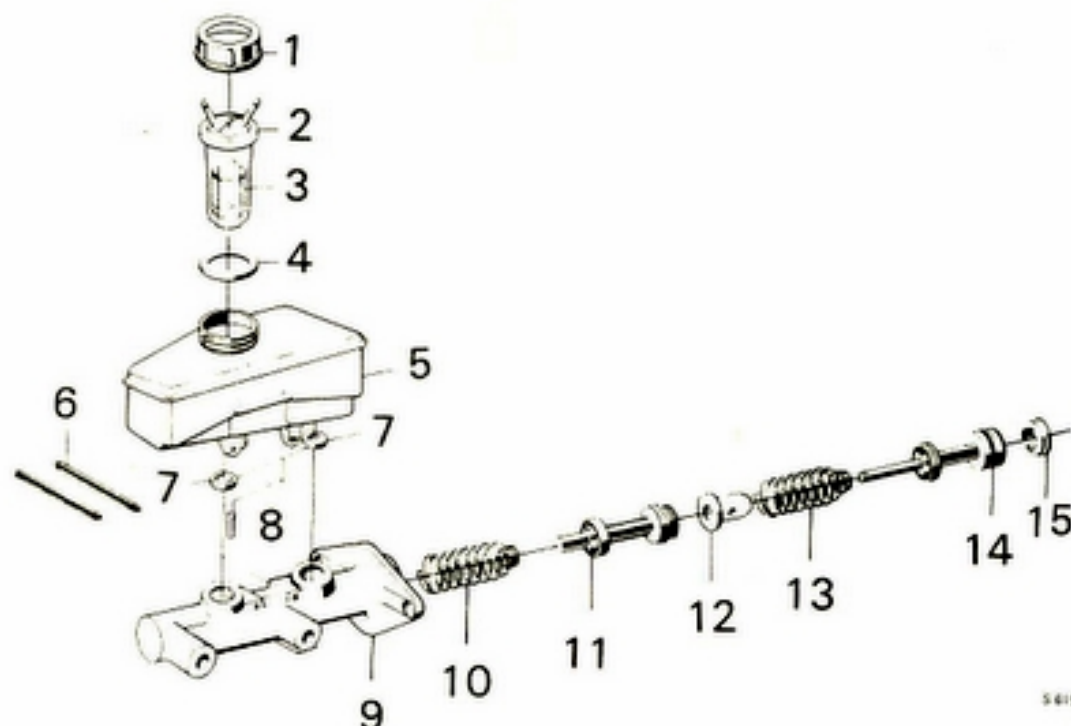
Workshop technique . . . . .	521-1
Removal . . . . .	521-2
Dismantling . . . . .	521-2

Assembly . . . . .	521-4
Fitting . . . . .	521-5

## Workshop technique

Scrupulous cleanliness is essential when the brake system or any part of it is dismantled. Clean any dismantled parts in brake fluid or in a special cleaning solution for hydraulic brake components. Wipe the

parts with a clean, lint-free cloth. All rubber parts and seals, etc., are available in repair kits and should be replaced. Before a unit is installed, all components should be dipped in clean brake fluid of the recommended specification.



54152

Master cylinder, exploded view

- |                          |                              |
|--------------------------|------------------------------|
| 1. Cap                   | 9. Cylinder housing          |
| 2. Fluid level switch    | 10. Spring, secondary piston |
| 3. Float                 | 11. Secondary piston         |
| 4. Sealing ring          | 12. Sleeve                   |
| 5. Brake fluid reservoir | 13. Spring, primary piston   |
| 6. Pin                   | 14. Primary piston           |
| 7. Sealing ring          | 15. Lock ring                |
| 8. Stop pin              |                              |



## Removal

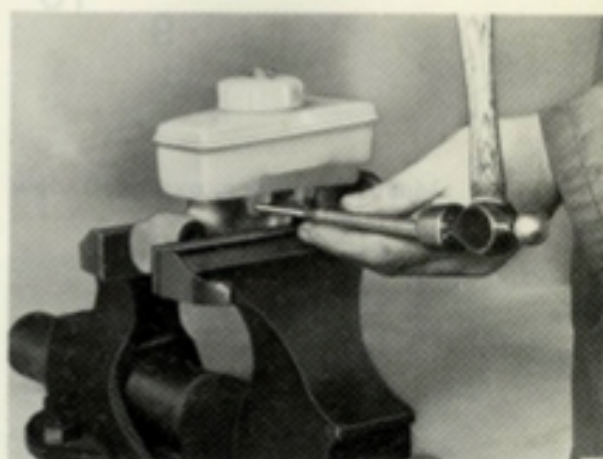
1. Cover the front fender and place rags under the master cylinder to obviate damage to the paintwork in case the brake fluid should be spilt.
2. Disconnect the electric cable to the filler cap.



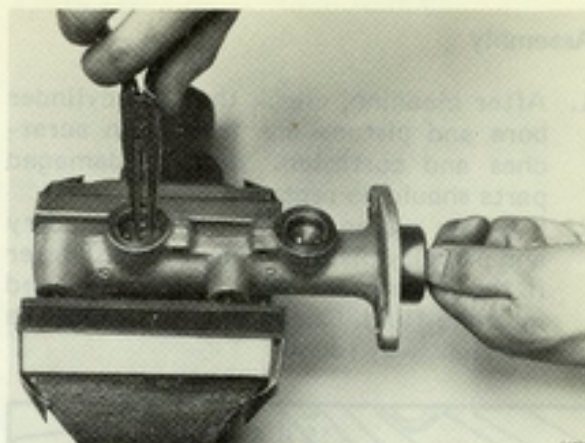
3. Disconnect the hose from the clutch master cylinder to the fluid reservoir. Insert a plastic stopper in the nipple of the reservoir.
4. Disconnect the two brake lines at the master cylinder.
5. Remove the two nuts which hold the master cylinder to the servo unit and remove the master cylinder.

## Dismantling

1. Empty the brake fluid reservoir and mount the master cylinder in a vice.
2. Tap out the tubular pins securing the reservoir to the cylinder body.



3. Remove the reservoir and by means of a small screwdriver remove the rubber seals from the hole for the fluid reservoir.
4. Push the primary piston into the master cylinder and withdraw the stop pin on the secondary piston.



5. Remove the circlip on the primary piston and take out the primary piston.



6. Remove the cylinder housing from the vice and knock it carefully against a wooden surface so that the secondary piston falls out. Alternatively, the secondary piston can be forced out with compressed air.
7. Remove the springs and seal rings from the two pistons. Keep the pistons and their rings apart so that they can be fitted back into the cylinders from which they have been removed.

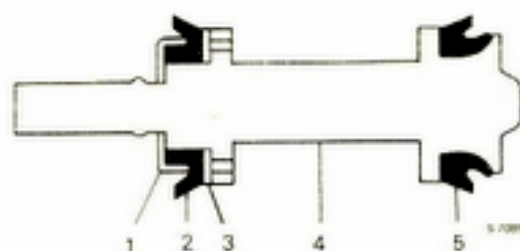
#### Caution

Never attempt to extract the seals with sharp-edged tools which may scratch the pistons. If necessary, use a small screwdriver with smoothly rounded edges.



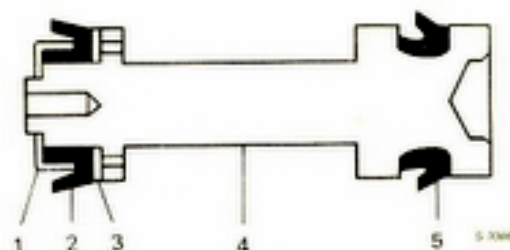
## Assembly

1. After cleaning, check that the cylinder bore and pistons are free from scratches and corrosion. Worn or damaged parts should be replaced.
2. Fit new piston seals to the secondary and primary pistons. This is made easier if the pistons and seals are first dipped in brake fluid. Check that the seals are the right way round.



Secondary piston with seals

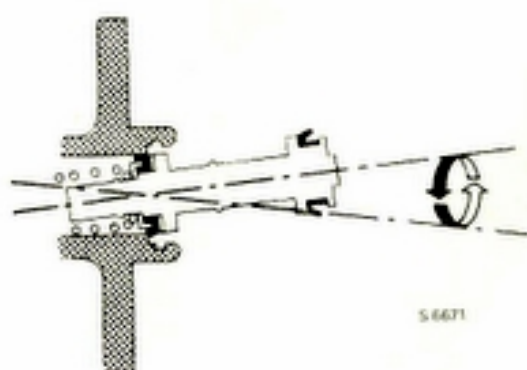
1. Spring seat
2. Piston seal
3. Washer
4. Piston
5. Piston seal



Primary piston with seals

1. Spring seat
2. Piston seal
3. Washer
4. Primary piston
5. Piston seal

3. Mount the master cylinder in a vice, thoroughly lubricate the cylinder bore and carefully insert the complete secondary piston with the spring. Great care must be taken to avoid damage to the piston seals. Push in the secondary piston by means of a clean screwdriver and insert the stop pin.
4. Insert the complete primary piston in the same way and fit the circlip.



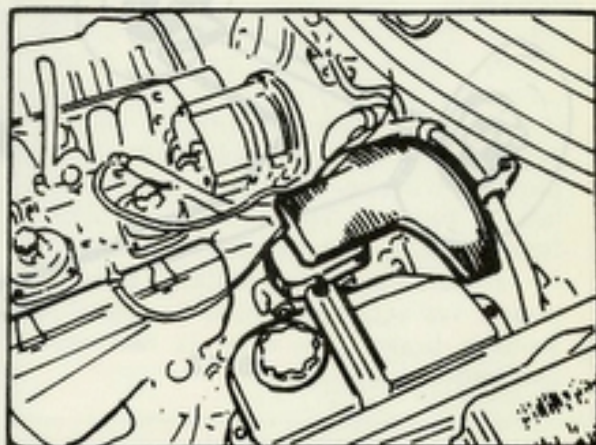
## Brake lines

### Fitting

1. Secure the nuts holding the master cylinder to the servo unit.
2. Connect the brake line connections, the pipe from the clutch master cylinder and the electric cables to the filling cap.
3. Bleed the brake system.

### Splash guard over master cylinder

A splash guard should be fitted over the master cylinder in 1979-80 model cars and early 1981 models.



### Level warning system

Check the level warning system by using a finger to depress the switch in the fluid container cover.



### Removal

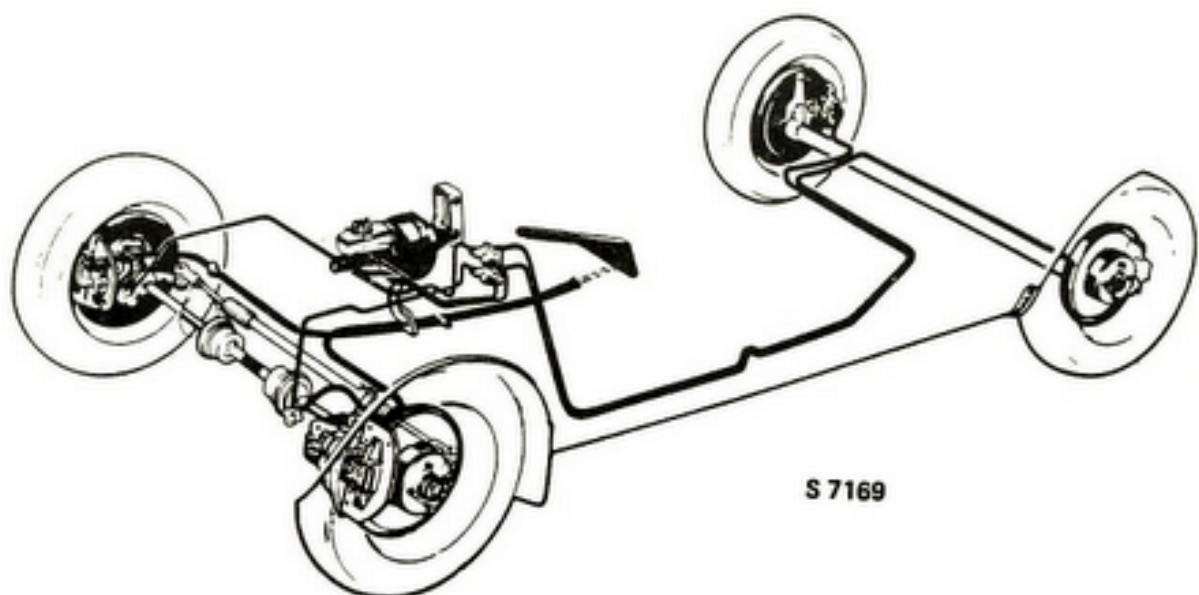
1. Clean all connections to the damaged pipe.
2. Unscrew the connecting nuts on the pipe together with any clips.
3. Insert plastic stoppers in the open ends and then remove the damaged pipe.



# Brake lines

Checking . . . . .	522-1
Removal . . . . .	522-1

Fitting . . . . .	522-2
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## Checking

For reasons of safety, all pipes, rubber hoses, connections, etc., in the brake line system must always be kept in first class condition. It is therefore essential that these parts be checked regularly in conjunction with the service program. Brake pipes fitted to the body by means of clips must not be corroded or fitted in such a way that they can chafe against other parts; nor should they show any visible signs of damage. All hoses and connection should be secure and free from leaks. Damaged parts should be replaced.

## Removal

1. Clean all connections to the damaged pipe.
2. Unscrew the connecting nuts on the pipe together with any clips.
3. Insert plastic stoppers in the open ends and then remove the damaged pipe.

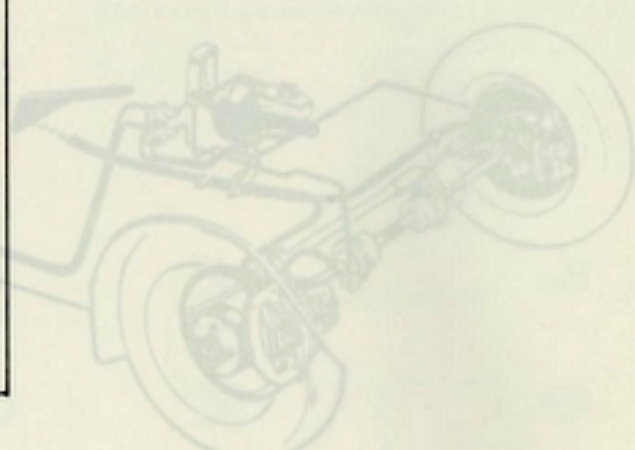
## Fitting

1. Clean a new brake pipe internally by blowing clean, moisture-free compressed air through it.
2. Position the pipe, remove the plastic stoppers and tighten the connecting nuts.
3. Bleed the brake system.

### Caution

When fitting brake hoses, it is highly important to position them correctly, thereby ensuring that steering or suspension movements do not bring them into contact with other parts of the car. The brake hoses must not be twisted. To fit the front brake hoses, ensure that the wheels are freely suspended and pointing straight ahead. No attempt should be made to bend a brake line once it has been secured.

Checking ..... 522-1  
Removal ..... 522-1



### Checking

For reasons of safety, all pipes, rubber hoses, connections, etc., in the brake line system must always be kept in first class condition. It is therefore essential that these parts be checked regularly in conjunction with the service program. Brake pipes fitted to the body by means of clips must not be corroded or fitted in such a way that they can chafe against other parts; nor should they show any visible signs of damage. All hoses and connections should be secure and free from leaks. Damaged parts should be replaced.

### Removal

1. Clean all connections to the damaged pipe.
2. Unscrew the connecting nuts on the pipe together with any clips.
3. Insert plastic stoppers in the open ends and then remove the damaged pipe.



# Brake housings and wheel cylinders

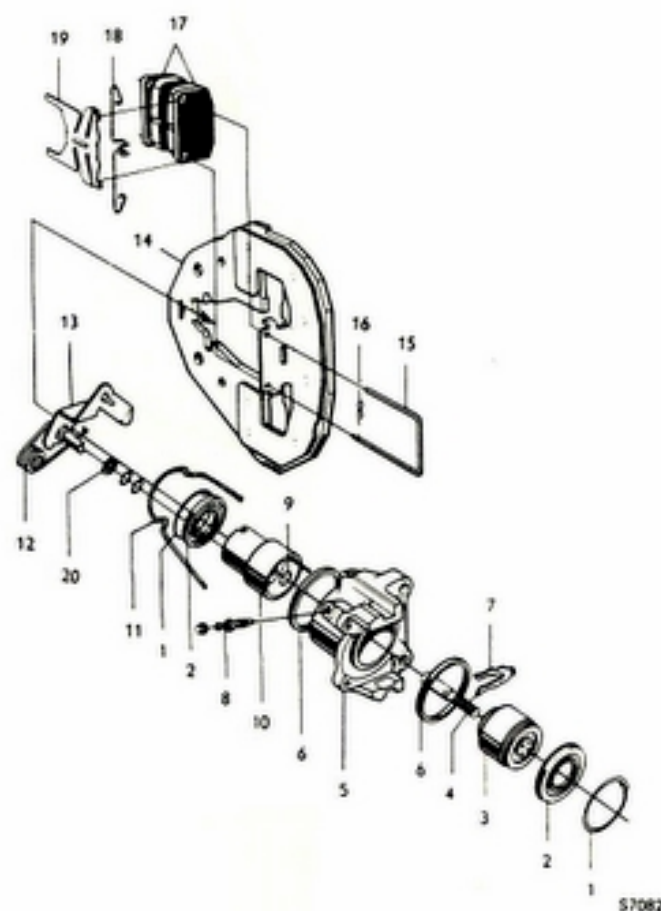
Workshop technique . . . . . 523-1  
Front brake housing. . . . . 523-2

Rear-wheel brake assembly. . . . 523-6

## Workshop technique

Scrupulous cleanliness is essential when the brake system or any part of it is dismantled. Clean any dismantled parts in brake fluid or in a special cleaning solution for hydraulic brake components. Wipe the parts with a clean, lint-free cloth. All

rubber parts and seals, etc., are available in repair kits and should be replaced. Before a unit is installed, all components should be dipped in clean brake fluid of the recommended specification.



Front brake housing, exploded view

- |                      |                              |
|----------------------|------------------------------|
| 1. Dust cover holder | 11. Yoke spring              |
| 2. Dust cover        | 12. Spring (handbrake lever) |
| 3. Piston (direct)   | 13. Handbrake lever          |
| 4. Push rod          | 14. Yoke                     |
| 5. Brake housing     | 15. Pad retaining pin        |
| 6. Piston seal       | 16. Lock clip                |
| 7. Guide clip        | 17. Brake pad                |
| 8. Bleeder nipple    | 18. Spring                   |
| 9. O-ring            | 19. Damper spring            |
| 10. Piston           | 20. Retainer (two O-rings)   |

## Front brake housing

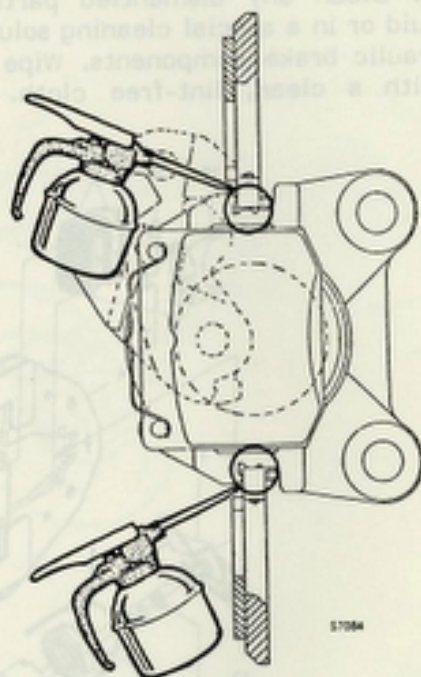
### Lubrication

The sliding surfaces between the yoke and the brake housing should be lubricated in accordance with the service inspection programme and whenever work is carried out on the front brake assemblies. Lubrication can be carried out without removing the assemblies or brake pads.

1. Scrape away any dirt around the sliding surfaces of the yoke on the brake housing.
2. Apply drops of Gleitmo 540, Part No. (45) 30 08 612, to the sliding surfaces, sliding the yoke back and forth simultaneously.

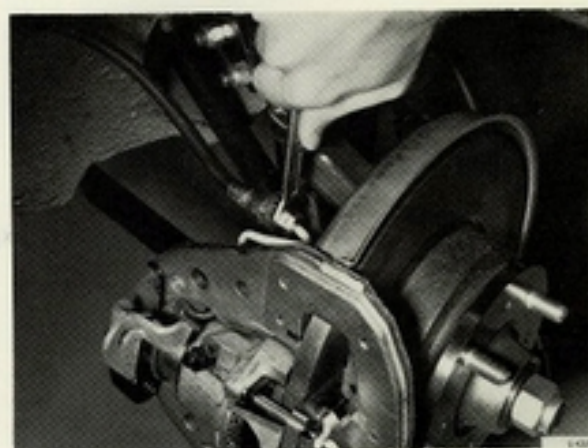
Workshop technique  
Front brake housing  
523-1  
523-2

Workshop technique  
Scrupulous cleanliness is essential when the brake system or any part of it is dismantled. Clean any dismantled parts in brake fluid or in a special cleaning solution for hydraulic brake components. Wipe the parts with a clean lint-free cloth. All



### Removal

1. Remove the brake pads. See Section 517.
2. Disconnect the handbrake cable from the brake housing.
3. Unscrew the brake pipes to the brake housing at the hose connection. Insert a rubber stopper in the connection to obviate spillage from the pipe.
4. Remove the two bolts which hold the brake housing to the steering knuckle housing.



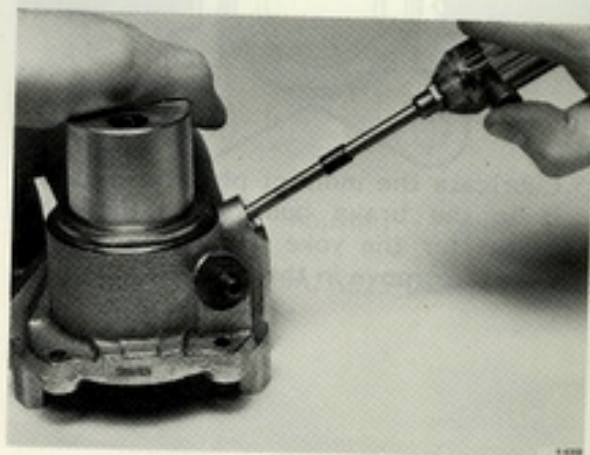
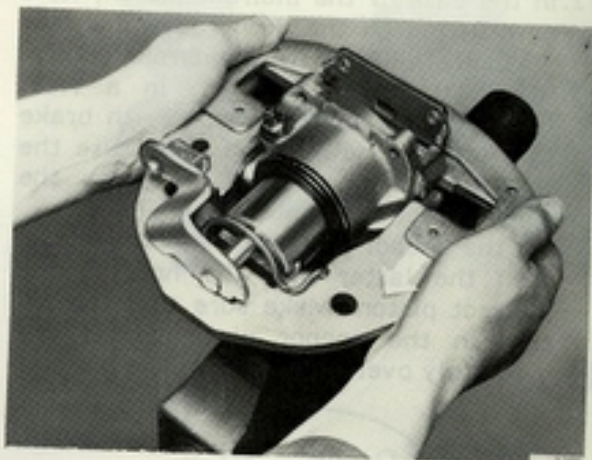


### Dismantling

1. Clean the brake housing and mount it in a vice.
2. Remove the return spring from the handbrake lever.
3. Remove the yoke from the brake housing and extract the yoke spring and the handbrake lever.
4. Remove the dust cover retaining ring and the dust cover.
5. Force out the indirect piston by means of compressed air.
6. Press the push rod by hand to separate the direct piston from the cylinder.
7. Remove the O-rings and seal rings from the pistons and from the cylinder bore. Remove the retainer (two O-rings) from the aperture for the handbrake lever, to enable a new one to be fitted.

#### **Note**

The indirect piston and internal parts comprise an integral unit and must not be rinsed in brake fluid or any other cleaning fluid but should only be wiped clean; the lubricating grease for the handbrake mechanism will otherwise be washed off.





## Assembly

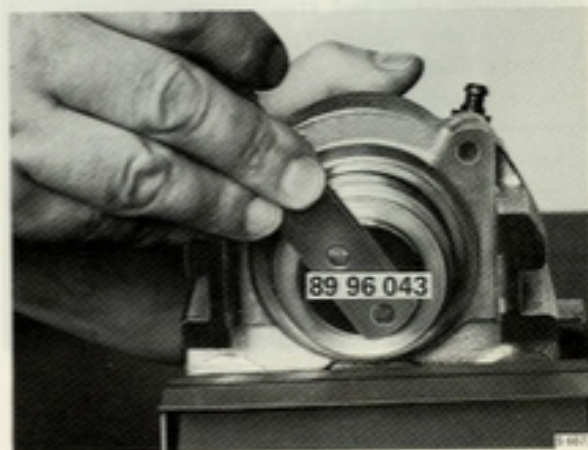
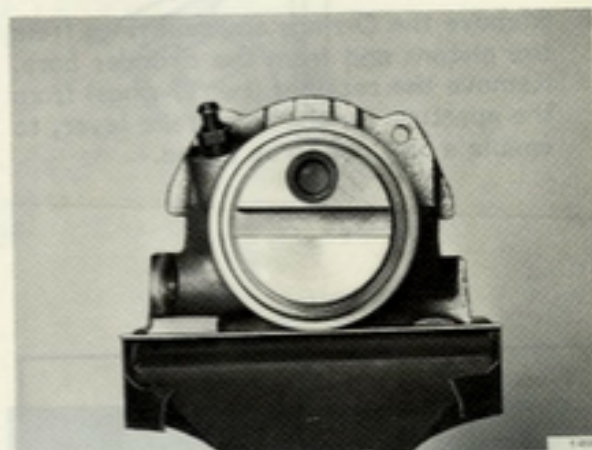
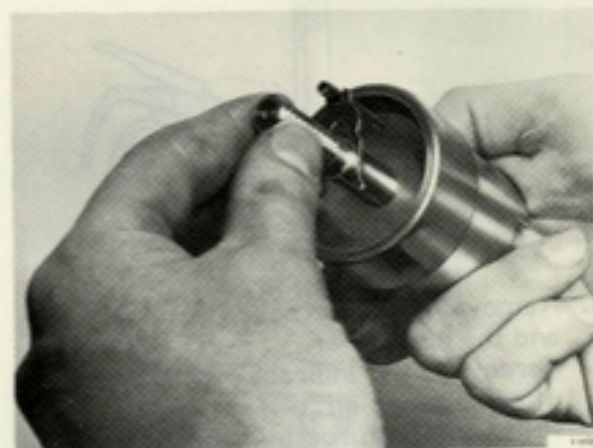
1. Replace any worn, damaged or corroded parts.
2. In the case of the indirect piston, fit a new O-ring on the push rod and a new O-ring retainer at the handbrake lever.
3. Mount the brake housing in a vice. Lubricate the cylinder bore with brake fluid and fit new piston seals. Use the recommended grease to lubricate the aperture for the handbrake lever.
4. Fit the anchor plate to the push rod and push the latter into the hole in the indirect piston. Make sure that the recess in the anchor plate comes immediately over the spring in the piston.

5. Lubricate the indirect piston and insert it in the brake housing so that the recess for the yoke is directly in line with the groove in the cylinder housing.

## Removal

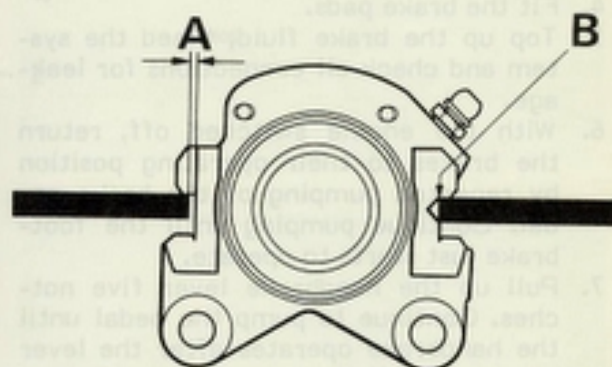
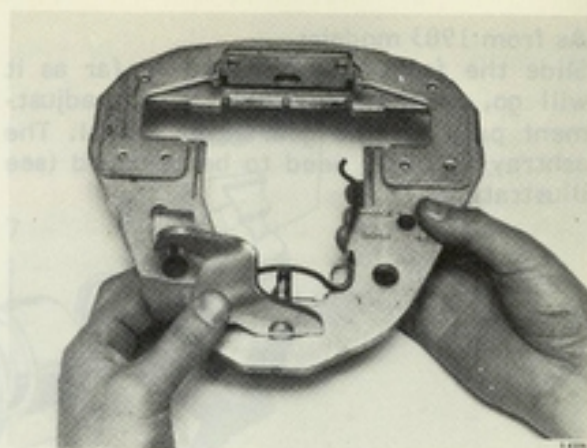
1. Remove the brake pads and screws 517.
2. Disconnect the handbrake cable from the brake housing.
3. Unscrew the brake pipes to the brake housing at the hose connection. Insert a rubber stopper in the connection to prevent leakage.
6. In the same way, push the direct piston into the cylinder and, by means of tool 89 96 043, screw together the piston and push rod. Screw and push in the two pistons until the edges of the dust cover grooves are flush with the brake housing.
7. Fit new dust covers and retaining rings.

4. Remove the two bolts which hold the brake housing to the steering knuckle housing.





8. Fit the yoke spring and the handbrake lever to the yoke.
9. Brush the recommended grease onto the yoke's sliding surfaces. Also apply the grease to the seating of the pad retaining disc in the brake housing.
10. Align the yoke guide edges with the grooves in the brake housing. Lift the handbrake lever and fit the end of the axle pin into the hole in the indirect piston. At the same time, ensure that the yoke fits into the recess in the indirect piston.
11. Fit the handbrake lever return spring.
12. Check the clearance between the sliding surfaces of the yoke and the brake housing as shown in the diagram. Greater play can result in vibration and noise when the brake is applied.



Clearance brake housing - brake yoke, front wheel brake

- A = 0.006-0.012 in. (0.15-0.30 mm)  
B = No clearance

#### Rear brake housing, exploded view

- |                  |                   |
|------------------|-------------------|
| 1. Brake housing | 6. Bleeder nipple |
| 2. Damper spring | 7. Piston         |
| 3. Lock pin      | 8. Twist stop     |
| 4. Piston seal   | 9. Brake pad      |
| 5. Rubber cap    |                   |

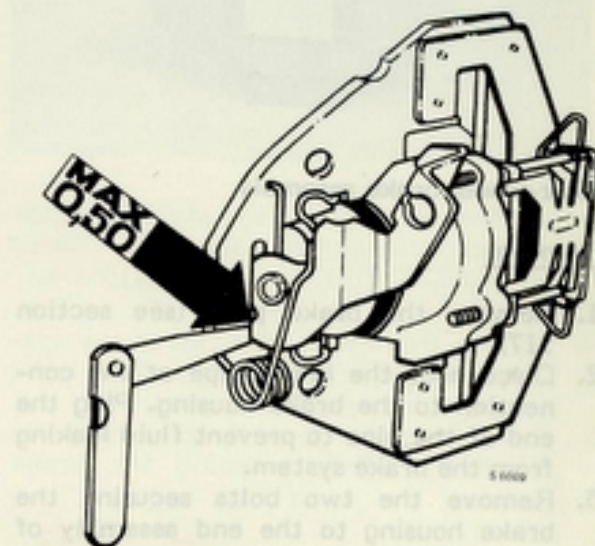
#### Dismantling

1. Clean the wheel hub.
2. Remove the dust cover and grease cap.
3. Remove the brake lines and handbrake cable.

#### Fitting

1. Check that the dust cover has not slipped out of position. Bolt the complete brake assembly to the steering knuckle housing. Use a new locking plate.
2. Connect the brake lines.
3. Adjust the handbrake cable so that the clearance between the lever and the yoke (see illustration) is 0.5 mm max. (0.019 in) with the handbrake in the off position.

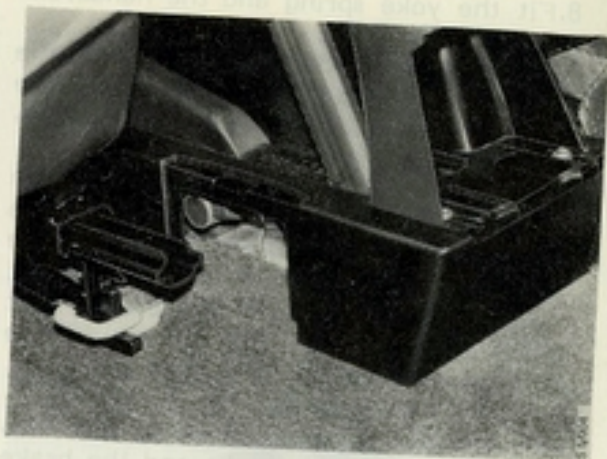
First apply the handbrake lever a few times to stretch the cable. Adjustment is made at the lever. The cables are crossed which means that adjustment of the left handbrake mechanism is made by means of the right adjustment nut and vice versa.





As from 1983 models:

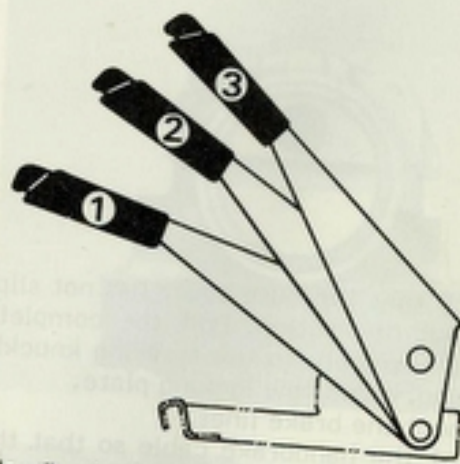
Slide the front seat forward as far as it will go, to provide access to the adjustment panel in the gear lever tunnel. The ashtray will also need to be removed (see illustration).



4. Fit the brake pads.
5. Top up the brake fluid, bleed the system and check all connections for leakage.
6. With the engine switched off, return the brakes to their operating position by repeated pumping of the brake pedal. Continue pumping until the footbrake just starts to operate.
7. Pull up the handbrake lever five notches. Continue to pump the pedal until the handbrake operates after the lever has been pulled up a further two-to-four notches.

**Caution**

The car must not be used before both the footbrake and handbrake are operating properly.



Handbrake lever

1. Neutral position (brake off)
2. Adjustment position (5 notches)
3. Full braking effort (7-9 notches)

**Rear-wheel brake assembly**

Removal

1. Remove the brake pads (see section 517).
2. Disconnect the brake pipe at the connection to the brake housing. Plug the end of the pipe to prevent fluid leaking from the brake system.
3. Remove the two bolts securing the brake housing to the end assembly of the rear axle.



# Footbrake mechanism

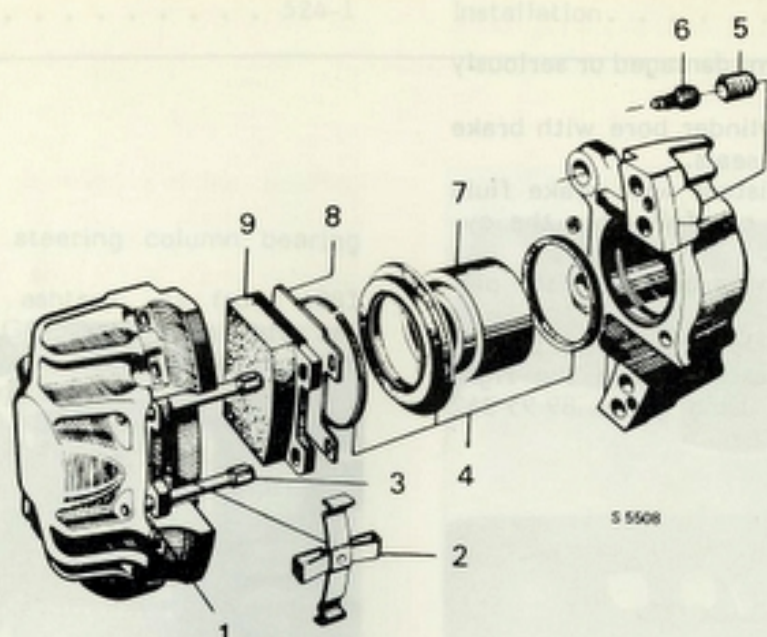
Removal . . . . . 524-1

Installation . . . . .

## Brake pedal

### Removal

1. Remove the steering column cover.
2. Remove the . . . . .
3. Remove . . . . .
4. Remove . . . . .
5. With a . . . . .
6. Remove . . . . .

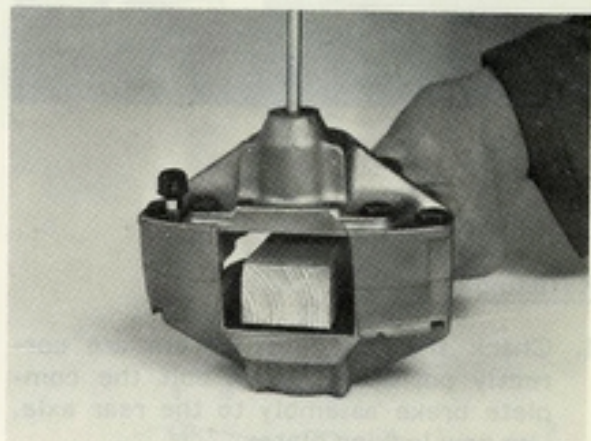


Rear brake housing, exploded view

- |                  |                   |
|------------------|-------------------|
| 1. Brake housing | 6. Bleeder nipple |
| 2. Damper spring | 7. Piston         |
| 3. Lock pin      | 8. Twist stop     |
| 4. Piston seal   | 9. Brake pad      |
| 5. Rubber cap    |                   |

### Dismantling

1. Clean the wheel brake assembly.
2. Remove the dust covers and press out the brake pistons by means of compressed air blown through the brake pipe connection. Take care not to damage the groove or cylinder.
3. Remove the seals from the cylinder using a screwdriver. Take care not to damage the sealing groove or cylinder bore.



## Brake operation

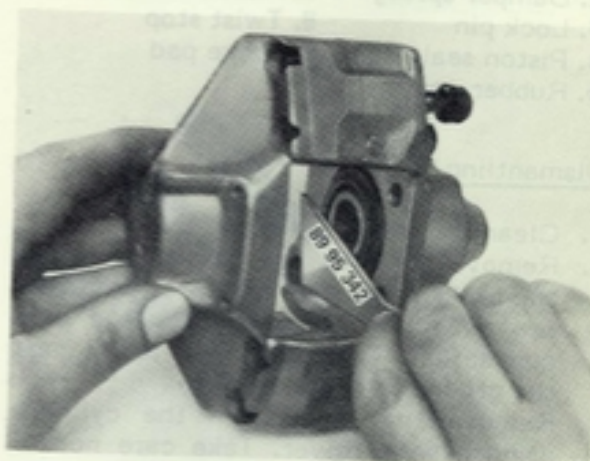
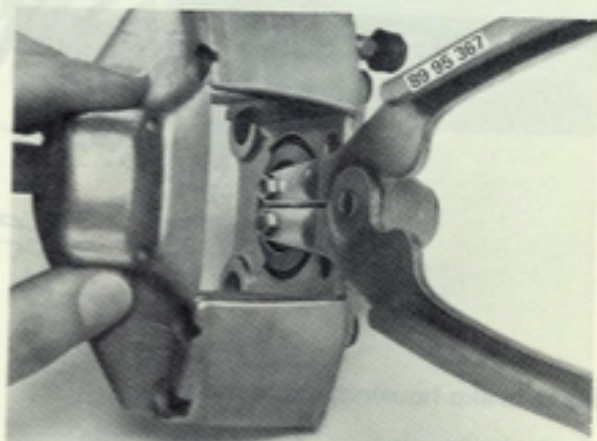
1. Brake pedal
2. Return spring
3. Spindle bolt

### Caution

Never separate the halves of the brake housing.

## Assembly

1. Replace any worn, damaged or seriously corroded parts.
2. Lubricate the cylinder bore with brake fluid and fit new seals.
3. Lubricate the pistons with brake fluid and insert them carefully into the cylinder.
4. Fit new dust covers and press the pistons fully home.
5. Using tool 89 95 367, rotate the pistons so that the recesses are in the right position. Check using gauge 89 95 342 (see illustration).



## Refitting

1. Check that the dust covers are correctly positioned. Then bolt the complete brake assembly to the rear axle. Use new locking plates.
2. Connect the brake line.
3. Fit the brake pads. The stamped areas of the backing plates should be turned to coincide with the recess in the pistons.
4. Top up the brake fluid, bleed the system and check that there are no leakages in the brake line connections.
5. Return the brakes to the operating position by lightly pumping the brake pedal.



# Footbrake mechanism

Removal . . . . . 524-1

Installation . . . . . 524-1

## Brake pedal

### Removal

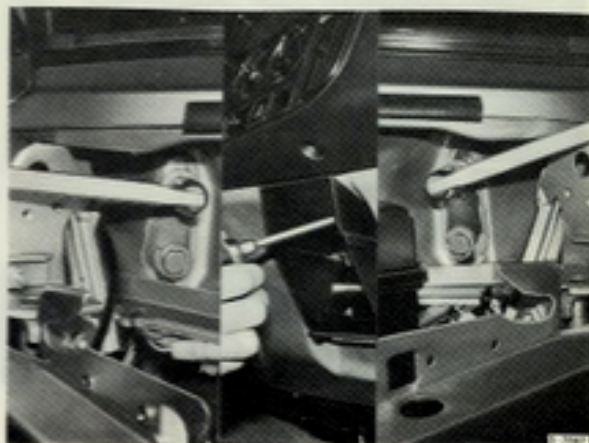
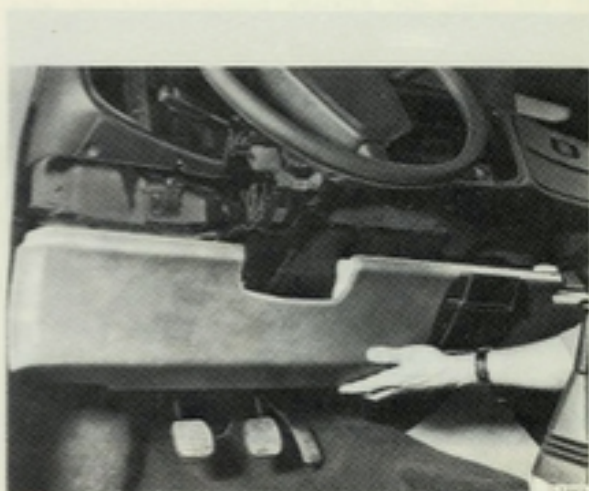
1. Remove the steering column bearing cover.
2. Remove the ashtray. As from 1983 model EMS, GLE and Turbo cars, remove the central console. Remove the safety padding retaining screw.
3. Remove the safety padding retaining screws in the engine compartment.
4. Remove the brake pedal return spring.
5. Withdraw the cotter pin from the servo unit push rod.
6. Remove the locknut from the pedal spindle bolt and withdraw the spindle.

the lines to prevent brake fluid from escaping.

7. Remove the cotter pin from the servo unit push rod at the brake pedal.

8. Remove the servo unit complete with master cylinder. The servo unit is secured to the bulkhead and pedal assembly by means of four nuts, accessible from inside the car.

9. Separate the master cylinder from the servo unit.

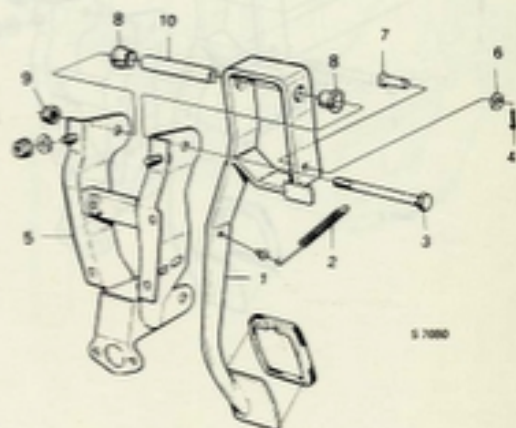


### Assembly

Install in the reverse order.

### Brake operation

1. Brake pedal
2. Return spring
3. Spindle bolt
4. Cotter pin (servo connection)
5. Pedal bracket
6. Washer
7. Clevis pin (servo connection)
8. Bushing
9. Locknut
10. Spacer tube





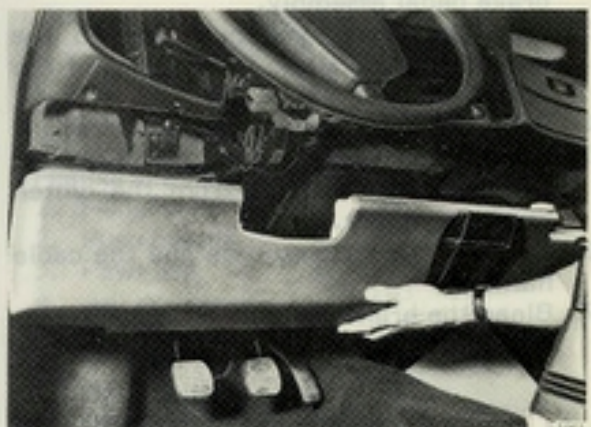
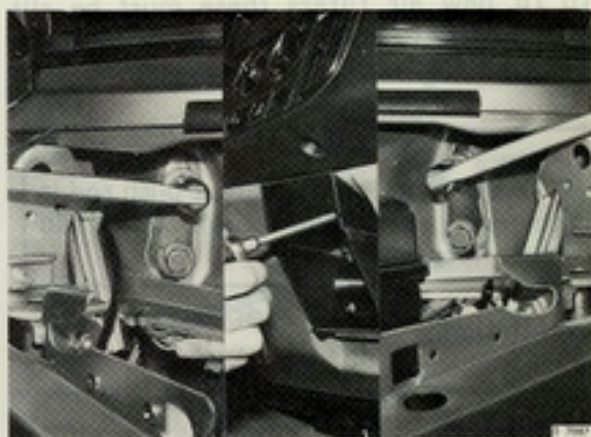
# Brake servo unit

Removal . . . . . 541-1

Installation . . . . . 541-2

## Removal

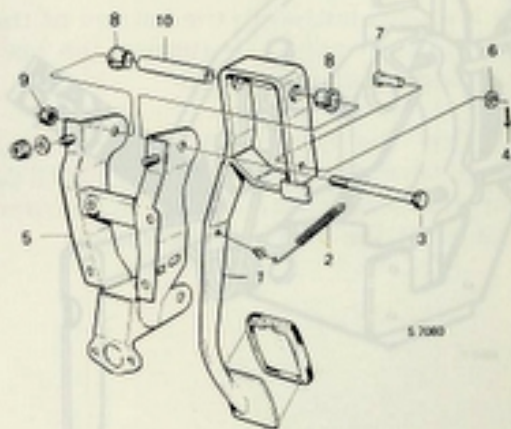
1. Remove the steering column bearing cover.
2. Remove the ashtray. As from 1983 model EMS, GLE and Turbo cars, remove the central console. Remove the safety padding retaining screw.
3. Remove the safety padding screws in the engine compartment.
4. Disconnect the vacuum hose from the non-return valve on the servo unit.
5. Disconnect the cable harness from the servo unit.
6. Disconnect the brake lines from the master cylinder at the fluid reservoir. Insert plastic plugs in the openings in the lines to prevent brake fluid from escaping.
7. Remove the cotter pin from the servo unit push rod at the brake pedal.
8. Remove the servo unit complete with master cylinder. The servo unit is secured to the bulkhead and pedal assembly by means of four nuts, accessible from inside the car.
9. Separate the master cylinder from the servo unit.



9. Handbrake cable

## Fitting

1. Fitting is carried out in the reverse order. The cables should cross each other at the rear of the passenger compartment.
- Brake operation**
1. Brake pedal
  2. Return spring
  3. Spindle bolt
  4. Cotter pin (servo connection)
  5. Pedal bracket
  6. Washer
  7. Clevis pin (servo connection)
  8. Bushing
  9. Locknut
  10. Spacer tube





The servo unit is an integral unit and cannot be taken apart. Only the non-return valve, dust cover, filter and one seal ring can be removed and replaced.

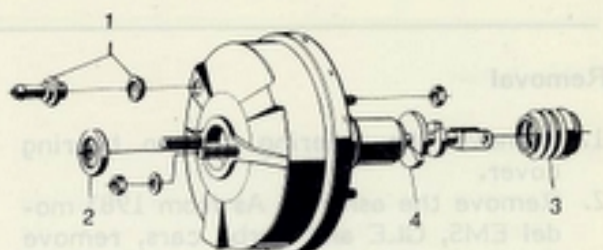
To fit new air filters these must be slit with a knife to enable them to fit over the input push rod.

## Note

The dome nut on the output push rod is correctly set by the manufacturer and must never be adjusted.

## Installation

1. Fit the master cylinder to the servo unit.
2. Fit the servo unit to the bulkhead and brake pedal assembly.
3. Link the servo unit push rod to the brake pedal, securing it by means of the cotter pin.
4. Refit the safety padding and ashtray.
5. Connect the brake lines to the master cylinder and the hose from the clutch master cylinder.
6. Connect the vacuum hose and the cable harness.
7. Bleed the brake system.



## Servo

1. Return valve
2. Sealing ring
3. Dust cover
4. Filter

## Brake operation

1. Brake pedal
2. Return spring
3. Spindle bolt
4. Cotter pin (servo connection)
5. Pedal bracket
6. Washer
7. Clevis pin (servo connection)
8. Bushing
9. Locknut
10. Spacer tube

# Handbrake system

Handbrake cable . . . . . 551-1

Handbrake lever . . . . . 551-2

## Handbrake cable

### Removal

1. Remove the driver's seat. Remove the scuff plates and fold the carpet to provide access to the heater ducts.
2. Remove the gear lever cover. Take care not to damage the ignition switch light.
3. Remove the air ducts and remove the air ducts, cover plate and then the air ducts.
4. Disconnect the cable from the adjustment nut on the handbrake lever.
5. Remove the clip holding the two cables to the floor.
6. Remove the rubber bush in the side of the wheel housing and disconnect the cable from the handbrake lever at the brake cylinder housing.
7. Pull out the cable. The simplest method is to with draw either end of the cable from underneath in the engine compartment.

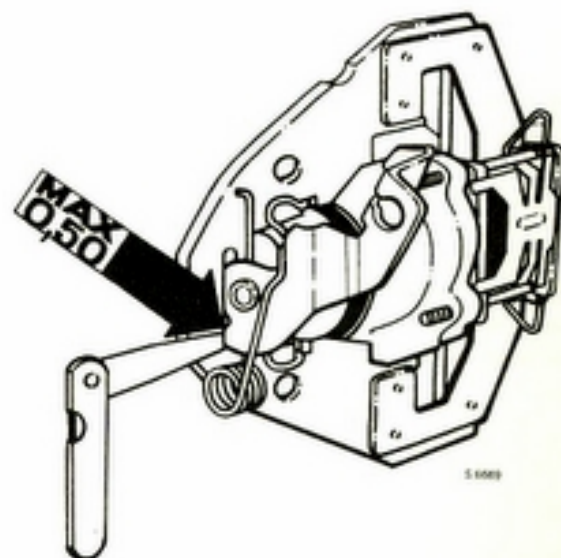


### Handbrake operation

1. Handbrake lever
2. Push button
3. Pawl rod
4. Adjusting nut
5. Pivot pin
6. Circlip
7. Cable clip
8. Wheel housing grommet
9. Handbrake cable

### Fitting

1. Fitting is carried out in the reverse order. The cables should cross each other on the floor of the passenger compartment.
2. After the new cable has been fitted, apply the handbrake lever a few times to stretch the cable. Use the adjusting nut on the handbrake lever inside the car to adjust the cable such that it will give a maximum clearance between the handbrake lever (at the brake housing) and the yoke of 0.5 mm (0.19 in), as shown in the illustration. The clearance should be the same on both sides.





## Handbrake lever

### Removal

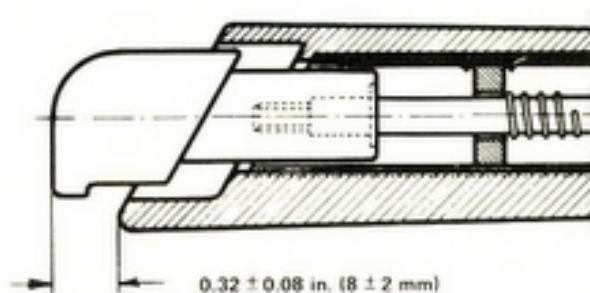
1. Disconnect the two cables from the adjusting nuts.
2. Remove the locking pin from the pivot pin and pull out the latter.

### Fitting

To refit the handbrake lever, reverse the removal procedure. If the pawl button, pawl rod or any other component of the handbrake lever has been removed, the position of the pawl button must be checked.

Up to and including 1982 models:

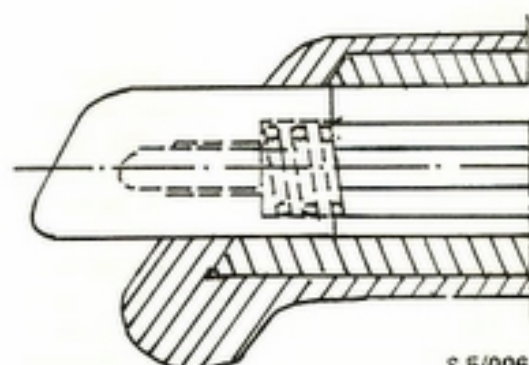
After the lever has been fitted and the brake applied, the distance between the top of the pawl button and the end of the handbrake lever should be  $8 \pm 2$  mm ( $0,32 \pm 0,08$  in). To adjust the pawl button, screw it in or out on the pawl rod.



As from 1983 models:

Screw the pawl button to the bottom of the thread and then adjust by turning the button a maximum of one turn.

Check that the handbrake warning lamp comes on when the lever has been pulled up two or three notches. Adjust the switch located under the lever, as necessary.



S 5/006

Saab-Scania AB  
Saab Car Division  
Nyköping, Sweden

Ⓢ American edition, Ordering No. **331082**. Printed in Sweden by Graphic Systems AB, Göteborg 1985.





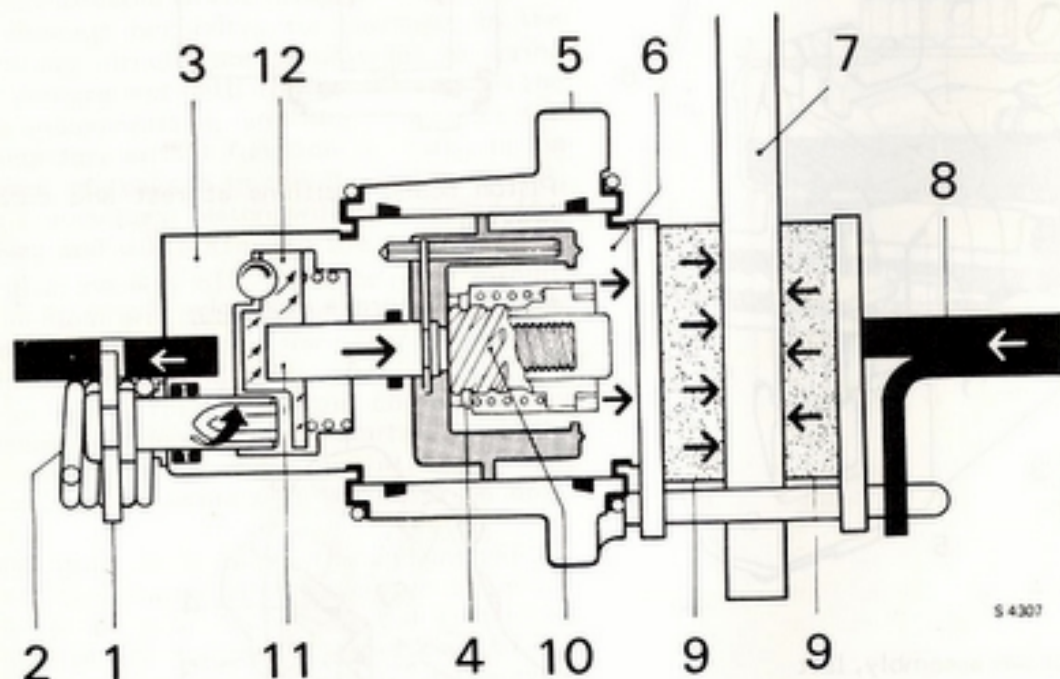
Each wheel brake assembly consists of a brake housing comprising two parts which are bolted together. Each half is equipped with a brake cylinder. When the brake pedal is depressed, both pistons act directly on the brake pads, pushing them against the disc.

When the brake pedal is released, the piston seals will return the pistons to the rest position.

### Handbrake mechanism

The handbrake mechanisms and their automatic adjustment devices are combined with two brake pistons. The handbrake lever acts on a thrust plate which mechanically actuates the two pistons by means of a push rod. The automatic adjustment device is built into the direct piston and consists of a sleeve with internal and external threads. The push rod is screwed into the internal thread and a drive ring fitted to a conical hole in the brake piston runs on the external thread which is specially designed with a coarse pitch.

When the brake is applied, the increase in hydraulic pressure between the pistons acts on the threaded end of the push rod. As the other end of the push rod is not affected by the pressure, the push rod and the direct piston will be forced apart. The play between the push rod thread and the internal thread of the sleeve even out and the same applies to the external thread of the sleeve and the drive ring. The pressure of the drive ring against the conical hole increases and, as a result of its special shape, the sleeve turns in relation to the indirect piston and the push rod. As the brake is released, the brake pistons are returned in the cylinder as a result of the seals. The sleeve and push rod are returned by spring washers, the drive ring makes contact with the other side of the thread on the sleeve and the pressure against the conical seating is reduced, with the result that the drive ring revolves on the external thread of the sleeve. When the pistons are pressed further apart in the cylinder as a result of wear on the brake pads, rotation of the sleeve in relation to the push rod results in the latter being fed out, and this ensures constant adjustment.



Adjustment device, handbrake mechanism

- |                            |                  |
|----------------------------|------------------|
| 1. Handbrake lever         | 7. Brake disc    |
| 2. Return spring           | 8. Yoke          |
| 3. Brake piston (indirect) | 9. Brake pad     |
| 4. Drive ring              | 10. Sleeve       |
| 5. Brake cylinder housing  | 11. Push rod     |
| 6. Brake piston (direct)   | 12. Thrust plate |



### Dismantling

1. Clean the brake housing and mount it in a vice.
2. Remove the return spring from the handbrake lever.
3. Remove the yoke from the brake housing and extract the yoke spring and the handbrake lever.

4. Remove the dust cover retaining ring and the dust cover.
5. Force out the indirect piston by means of compressed air.
6. Press the push rod by hand to separate the direct piston from the cylinder.
7. Remove the O-rings and seal rings from the pistons and from the cylinder bore. Remove the retainer (two O-rings) from the aperture for the handbrake lever, to enable a new one to be fitted.

#### **Note**

The indirect piston and internal parts comprise an integral unit and must not be rinsed in brake fluid or any other cleaning fluid but should only be wiped clean; the lubricating grease for the handbrake mechanism will otherwise be washed off.

