

Torque wrench settings	Nm	lbf ft
ABS modulator securing nuts	15	11
ABS wheel sensor securing bolts*:		
Phase I and Phase II models:		
Front sensor	12	9
Rear sensor:		
Saloon and Hatchback models	12	9
Estate models	20	15
Phase III models:		
Front sensor	20	15
Rear sensor	30	22
Brake fluid hose union banjo bolts	20	15
Brake fluid pipe union nuts	18	13
Brake hydraulic system bleed screws	10	7
Brake servo/pedal bracket securing nuts	15	11
Front brake caliper guide pin bolts*:		
Phase I and Phase II models:		
Saloon and Hatchback models:		
Bendix caliper	35	26
Lucas Girling caliper	25	18
Estate models	25	18
Phase III models	25	18
Front brake caliper mounting bracket bolts	80	59
Handbrake lever mounting bolts:		
Phase I and Phase II models	10	7
Phase III models	18	13
Master cylinder securing nuts	15	11
Master cylinder stop-bolt	2	1
Rear brake backplate bolts (drum brake models):		
Phase I and Phase II models:		
Saloon and Hatchback models	45	33
Estate models	90	66
Phase III models	55	41
Rear brake caliper guide pin bolts*	25	18
Rear brake caliper mounting bracket bolts:		
Phase I and Phase II models	45	33
Phase III models	38	28
Rear brake caliper handbrake lever cam nut	25	18
Rear brake caliper handbrake lever stop-bolt	10	7
Rear brake pressure-regulating valve securing bolts:		
Phase I and Phase II models	18	13
Phase III models (dual proportioning valve)	6	4
Rear wheel cylinder mounting bolts	10	7

*Use locking compound on the bolt threads.

1 General information

The braking system is of the servo-assisted, dual-circuit hydraulic type. The arrangement of the hydraulic system is such that each circuit operates one front and one rear brake from a tandem master cylinder. Under normal circumstances, both circuits operate in unison. However, in the event of hydraulic failure in one circuit, full braking force will still be available at two diagonally-opposite wheels (see illustrations overleaf). An anti-lock braking system (ABS) is available as an option on certain early models, and is standard equipment on all Phase II and Phase III models

(refer to Section 21 for further details of the ABS system).

All models are fitted with front disc brakes and either rear drum or rear disc brakes according to model and export territory.

The front disc brakes are actuated by single-piston sliding type calipers, which ensure that equal pressure is applied to each disc pad.

The rear drum brakes incorporate leading and trailing shoes, which are actuated by twin-piston wheel cylinders. A self-adjust mechanism is incorporated, to automatically compensate for brake shoe wear. As the brake shoe linings wear, the footbrake operation automatically operates the adjuster mechanism, which effectively lengthens the shoe strut and repositions the brake shoes, to remove the

lining-to-drum clearance. The mechanical handbrake linkage operates the brake shoes via a lever attached to the trailing brake shoe.

The rear disc brakes are actuated by single-piston sliding type calipers, and incorporate a mechanical handbrake mechanism.

To prevent the possibility of the rear wheels locking before the front wheels under heavy braking, pressure regulating valves are incorporated in the hydraulic circuit to the rear brakes. Depending on model, the valves are either of the load-sensitive type which regulate rear brake hydraulic pressure according to the load being carried in the vehicle, or pressure-sensitive type which regulate rear brake hydraulic pressure proportionally, depending on the pressure applied to the front brakes.

from motor accessory shops. It is recommended that one of these kits is used whenever possible, as they greatly simplify the bleeding operation, and also reduce the risk of expelled air and fluid being drawn back into the system. If such a kit is not available, the basic (two-man) method must be used, which is described in detail below.

9 If a kit is to be used, prepare the vehicle as described previously, and follow the kit manufacturer's instructions, as the procedure may vary slightly according to the type being used; generally, they are as outlined below in the relevant sub-section.

10 Whichever method is used, the same sequence must be followed (paragraphs 11 and 12) to ensure that the removal of all air from the system.

Bleeding sequence

11 If the system has been only partially disconnected, and suitable precautions were taken to minimise fluid loss, it should be necessary to bleed only that part of the system (ie the primary or secondary circuit).

12 If the complete system is to be bled, then it should be done working in the following sequence:

Right-hand drive models:

- Left-hand rear wheel.
- Right-hand front wheel.
- Right-hand rear wheel.
- Left-hand front wheel.

Left-hand drive models:

- Right-hand rear wheel.
- Left-hand front wheel.
- Left-hand rear wheel.
- Right-hand front wheel.

Caution: On models equipped with ABS, switch off the ignition and disconnect the battery negative terminal (refer to *Disconnecting the battery in the Reference Section of this manual*), before carrying out the bleeding procedure.

Bleeding - basic (two-man) method

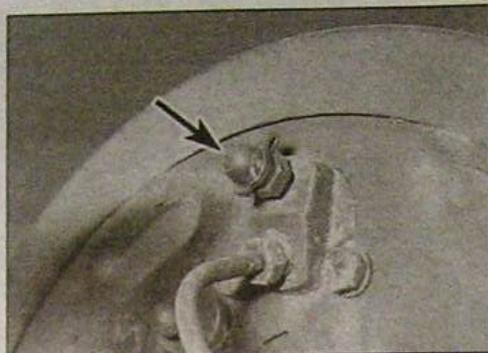
13 Collect a clean glass jar, a suitable length of plastic or rubber tubing which is a tight fit over the bleed screw, and a ring spanner to fit the screw. The help of an assistant will also be required.

14 Remove the dust cap from the first screw in the sequence (if not already done) (see illustrations). Fit a suitable spanner and tube to the screw, place the other end of the tube in the jar, and pour in sufficient fluid to cover the end of the tube.

15 Ensure that the master cylinder reservoir fluid level is maintained at least above the 'MIN' level line throughout the procedure.

16 Have the assistant fully depress the brake pedal several times to build up pressure, then maintain it on the final downstroke.

17 While pedal pressure is maintained, unscrew the bleed screw (approximately one turn) and allow the compressed fluid and air to flow into the jar. The assistant should maintain



2.14a Bleed screw dust cap (arrowed) - rear drum brake shown



2.14b Removing the dust cap from a front caliper bleed screw

pedal pressure, following the pedal down to the floor if necessary, and should not release the pedal until instructed to do so. When the flow stops, tighten the bleed screw again, have the assistant release the pedal slowly, and recheck the reservoir fluid level.

18 Repeat the steps given in paragraphs 16 and 17 until the fluid emerging from the bleed screw is free from air bubbles. If the master cylinder has been drained and refilled, and air is being bled from the first screw in the sequence, allow approximately five seconds between cycles for the master cylinder passages to refill.

19 When no more air bubbles appear, tighten the bleed screw securely, remove the tube and spanner, and refit the dust cap (where applicable). Do not overtighten the bleed screw.

20 Repeat the procedure on the remaining screws in the sequence, until all air is removed from the system, and the brake pedal feels firm again.

Bleeding - using a one-way valve kit

21 As their name implies, these kits consist of a length of tubing with a one-way valve fitted, to prevent expelled air and fluid being drawn back into the system; some kits include a translucent container, which can be positioned so that the air bubbles can be more easily seen flowing from the end of the tube.

22 The kit is connected to the bleed screw, which is then opened. The user returns to the driver's seat, depresses the brake pedal with a smooth, steady stroke, and slowly releases it; this is repeated until the expelled fluid is clear of air bubbles (see illustration).

23 Note that these kits simplify work so much that it is easy to forget the master cylinder reservoir fluid level; ensure that this is maintained at least above the 'MIN' level line at all times.

Bleeding - using a pressure-bleeding kit

24 These kits are usually operated by the reservoir of pressurised air contained in the spare tyre. However, note that it will probably be necessary to reduce the pressure to a

lower level than normal; refer to the instructions supplied with the kit.

25 By connecting a pressurised, fluid-filled container to the master cylinder reservoir, bleeding can be carried out simply by opening each screw in turn (in the specified sequence), and allowing the fluid to flow out until no more air bubbles can be seen in the expelled fluid.

26 This method has the advantage that the large reservoir of fluid provides an additional safeguard against air being drawn into the system during bleeding.

27 Pressure-bleeding is particularly effective when bleeding 'difficult' systems, or when bleeding the complete system at the time of routine fluid renewal.

All methods

28 When bleeding is complete, and firm pedal feel is restored, wash off any spilt fluid, tighten the bleed screws securely, and refit their dust caps (where applicable).

29 Check the hydraulic fluid level in the master cylinder reservoir, and top-up if necessary.

30 Discard any hydraulic fluid that has been bled from the system; it will not be fit for reuse.

31 Check the feel of the brake pedal. If it feels at all spongy, air must still be present in the system, and further bleeding is required. Failure to bleed satisfactorily after a reasonable repetition of the bleeding procedure may be due to worn master cylinder seals.



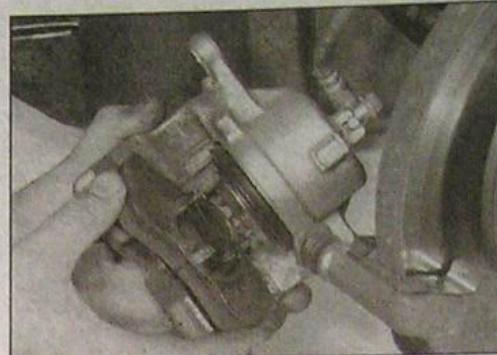
2.22 One-way valve brake bleeding kit connected to a front caliper



4.12a Refit the anti-rattle clips to the caliper mounting bracket - Girling-type caliper



4.12b Refit the outboard pad to the caliper mounting bracket ...



4.12c ... and engage the inboard pad with the caliper piston - Girling-type caliper

keep a careful watch on the fluid level while retracting the piston. If the fluid level rises above the 'MAX' level line at any time, the surplus should be siphoned off or ejected via a plastic tube connected to the bleed screw (see Section 2).

Warning: Do not siphon the fluid by mouth, as it is poisonous; use a syringe or an old poultry baster.

11 Apply a little anti-squeal brake grease to the contact surfaces of the pad backing plates and the shims (where applicable), but take great care not to allow any grease onto the pad friction linings. Similarly, apply brake grease to the contact surfaces of the anti-rattle clips - again take care not to apply excess grease, which may contaminate the pads.

12 Refit the anti-rattle clips to the caliper

mounting bracket, then refit the pads and shims (where applicable), in the positions noted before removal, ensuring that the pad friction material is against the disc. Note that the outboard pad should be fitted to the caliper mounting bracket, and the inboard pad should be fitted to the caliper. Ensure that the inboard pad retaining clip is securely engaged with the caliper piston (see illustrations).

13 Slide the caliper into position on the mounting bracket, then apply a little locking fluid to the threads of the caliper guide pin bolts, and refit the bolts (see illustrations). Tighten the bolts to the specified torque wrench setting.

14 Check that the caliper body slides smoothly on the guide pins.

15 Repeat the procedure on the remaining front caliper.

16 With both sets of front brake pads refitted, depress the brake pedal repeatedly until the pads are pressed into firm contact with the brake disc, and normal pedal pressure is restored.

17 Refit the roadwheels, and lower the vehicle to the ground.

18 Finally, check the hydraulic fluid level as described in Chapter 1.

Models with Bendix-type front caliper

19 Unscrew the caliper lower guide pin bolt (if necessary, use a slim open-ended spanner to counterhold the head of the guide pin), then remove the bolt (see illustration).

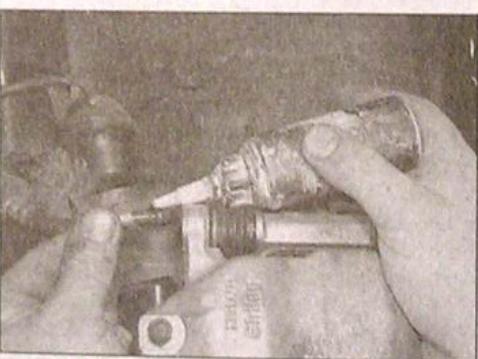
20 Pivot the caliper body upwards to expose the brake pads (see illustration). **Do not depress the brake pedal until the caliper is refitted. Take care not to strain the brake fluid hose.**

21 Note the locations and orientation of the shims fitted to the rear of each pad, and the anti-rattle clips fitted to the top and bottom of the pads.

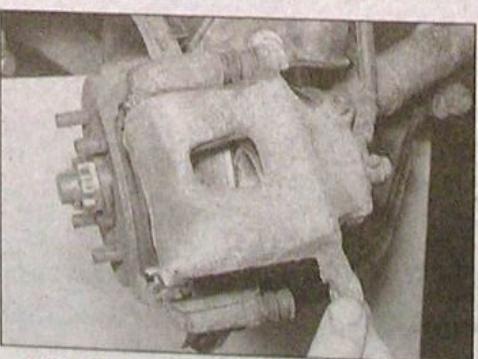
22 Withdraw the pads and shims (see illustration).

23 Proceed as described in paragraphs 6 to 11 inclusive.

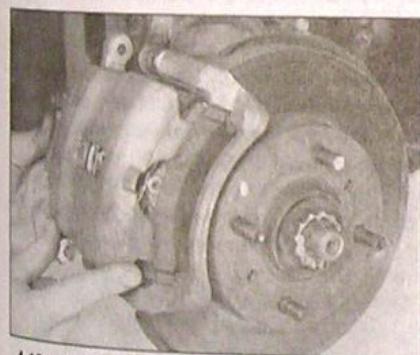
24 Refit the anti-rattle clips to the caliper mounting bracket, then refit the pads and shims, in the positions noted before removal,



4.13b Apply locking fluid to the threads of the caliper guide pin bolts - Girling caliper



4.20 Pivot the caliper body upwards to expose the brake pads - Bendix caliper



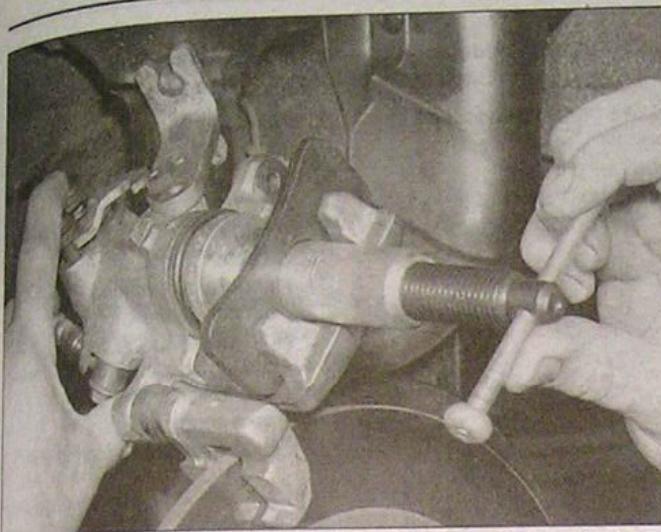
4.13a Sliding the caliper into position on the mounting bracket - Girling-type caliper



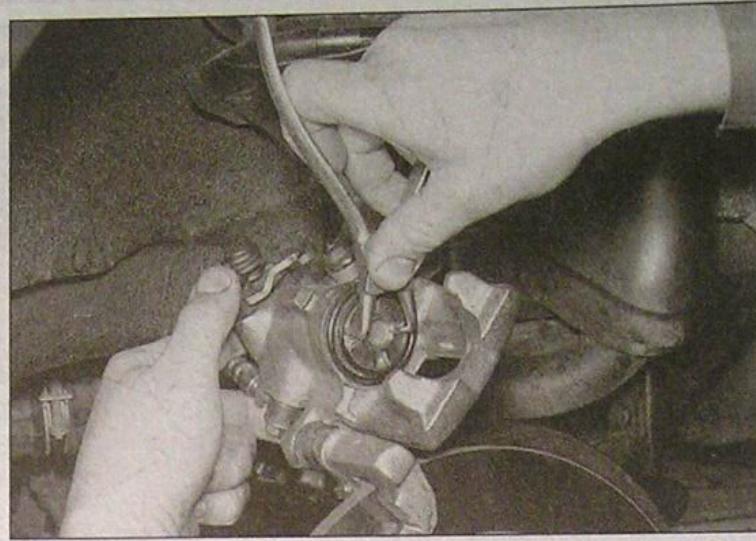
4.19 Removing the caliper lower guide pin bolt - Bendix-type caliper



4.22 Withdraw the pads and shims - Bendix caliper



5.10a Using a retractor tool to retract a rear caliper piston



5.10b Using a pair of long-nosed pliers (circlip pliers shown) to retract a rear caliper piston

then turn the piston clockwise (viewed from the outboard end of the caliper), whilst simultaneously pushing it into the caliper (see illustrations). Take care not to damage the surface of the piston, or twist the dust seal. Provided that the master cylinder reservoir has not been overfilled with hydraulic fluid, there should be no spillage, but keep a careful watch on the fluid level while retracting the piston. If the fluid level rises above the 'MAX' level line at any time, the surplus should be siphoned off or ejected via a plastic tube connected to the bleed screw (see Section 2).

Warning: *Do not syphon the fluid by mouth, as it is poisonous; use a syringe or an old poultry baster.*

11 Apply a little anti-squeal brake grease to the contact surfaces of the pad backing plates and the shims (where applicable), but take great care not to allow any grease onto the pad friction linings. Similarly, where applicable, apply brake grease to the contact

surfaces of the anti-rattle springs - again take care not to apply excess grease, which may contaminate the pads. Note that new pads may be supplied with an anti-squeal coating on their contact faces, in which case there is no need to apply brake grease.

12 Where applicable, refit the anti-rattle springs to the caliper mounting bracket, then refit the pads and the shims (where applicable), in the positions noted before removal (see illustrations). Ensure that the pad friction material is against the disc.

13 Pivot the caliper body downwards over the brake pads. Ensure that the peg on the back of the inboard pad engages with the nearest notch in the piston. It may be necessary to rotate the piston as described in paragraph 10 to align the nearest notch with the peg.

14 Coat the threads of the caliper lower guide pin bolt with locking fluid, then refit the bolt, and tighten it to the specified torque.

15 Check that the caliper body slides smoothly on the guide pins.

16 Reconnect the end of the handbrake cable to the lever. Refit the cable and mounting bracket to the caliper, or alternatively secure the cable to the bracket with the spring clip. Where applicable, ensure that the locating peg on the mounting bracket engages with the corresponding hole in the caliper body.

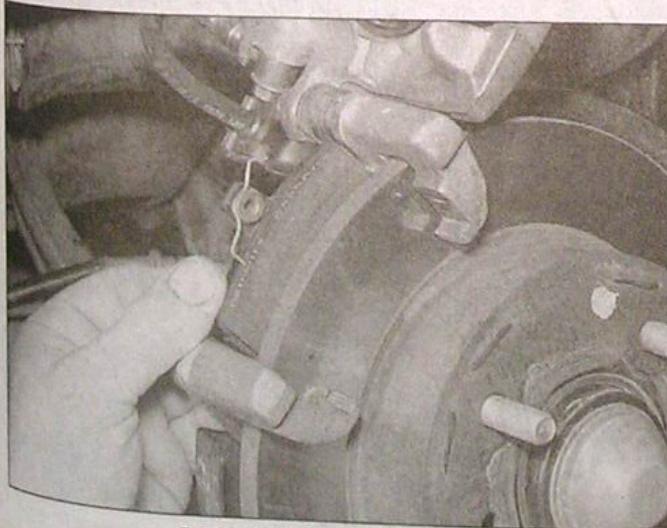
17 Repeat the procedure on the remaining rear caliper.

18 With both sets of rear brake pads refitted, operate the handbrake repeatedly until the correct brake pad-to-disc clearance is established (adjustment occurs automatically when the handbrake is operated).

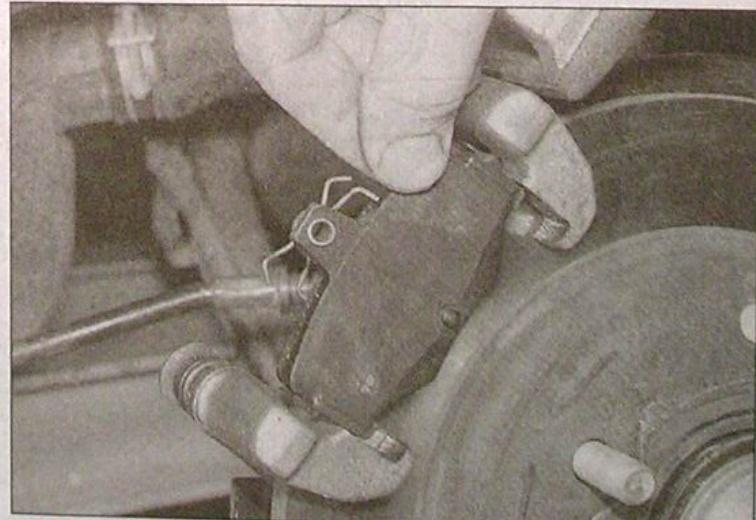
19 Depress the brake pedal repeatedly to ensure that normal pedal pressure is restored.

20 Refit the roadwheels, and lower the vehicle to the ground.

21 Finally check the hydraulic fluid level as described in Chapter 1.



5.12a Refit the inboard ...



5.12b ... and outboard pads to the caliper

6 Rear brake shoes - renewal

Warning: Renew BOTH sets of rear brake shoes at the same time. NEVER renew the shoes on only one wheel, as uneven braking may result.

Warning: Before starting work, refer to the warning given at the beginning of Section 4, concerning the dangers of asbestos dust.

1 Remove the rear brake drums, as described in Section 8.

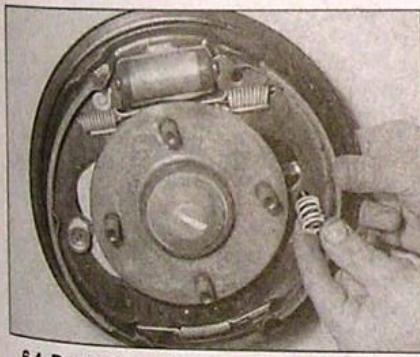
2 Working on one side of the vehicle, brush the dirt and dust from the brake backplate and drum. Do not inhale the dust, as it may be a health hazard.

3 Note the position of each shoe, and the location of the return and steady springs. Also make a note of the adjuster component locations, in case the components are disturbed during the removal procedure (see illustrations).

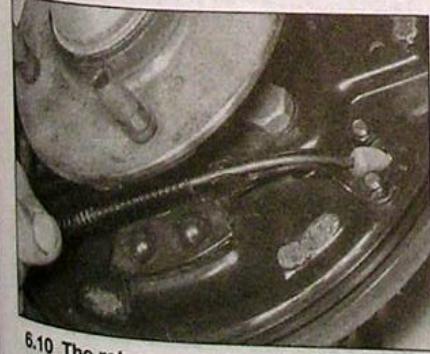
4 Remove the shoe hold-down springs (see illustration). Use pliers to depress the outer spring cups, and turn them through 90°.

5 Recover the springs and cups (and where applicable, the spring seats), and remove the spring retainer pins from the backplate.

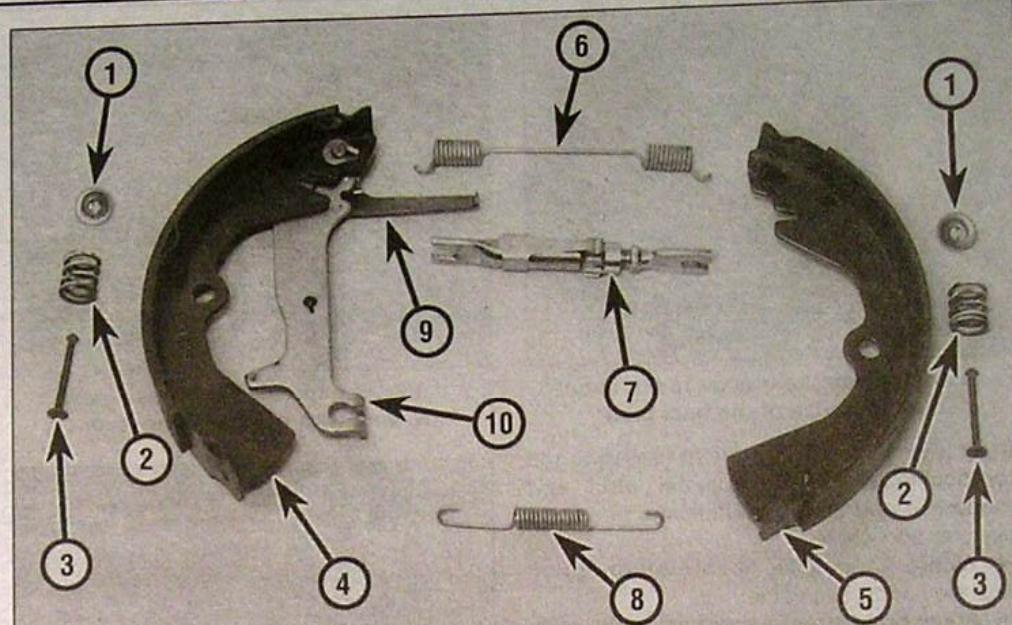
6 Carefully pull the leading brake shoe forwards from the backplate, and using a suitable pair of pliers, unhook and remove the lower return spring.



6.4 Removing a brake shoe hold-down spring



6.10 The return spring can be withdrawn from the handbrake cable



6.3c Exploded view of rear drum brake components - right-hand side shown

- 1 Hold-down spring cup
- 2 Hold-down spring
- 3 Hold-down spring retainer pin
- 4 Trailing brake shoe
- 5 Leading brake shoe

- 6 Upper return spring
- 7 Adjuster strut
- 8 Lower return spring
- 9 Adjuster operating lever
- 10 Handbrake operating lever

7 Disengage the lower ends of the shoes from the bottom anchor, and the pull the upper ends of the shoes from the wheel cylinder, then withdraw the shoe assembly, complete with the adjuster and handbrake operating components, and unhook the handbrake cable from the lever on the trailing brake shoe. Where applicable, recover the return spring fitted over the cable.

8 If necessary, position a rubber band or a cable-tie over the wheel cylinder, to prevent the pistons from being ejected. If there is any evidence of fluid leakage from the wheel cylinder, renew it or overhaul it as described in Section 11.

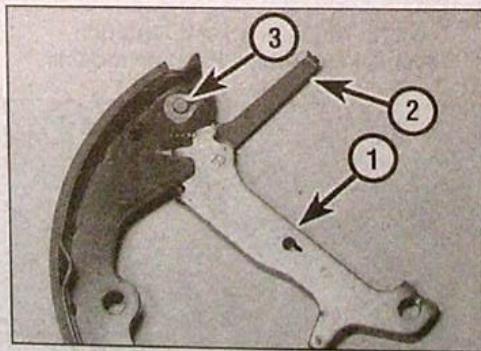
9 Unhook the upper return spring from the shoes, then withdraw the adjuster strut components, noting their locations and orientation. Unhook the adjuster spring.

10 If desired, the return spring can be withdrawn from the handbrake cable (see illustration).

11 Working on the trailing brake shoe, prise off the retaining clip, then remove the pivot pin and withdraw the handbrake operating lever, and where applicable, the adjuster operating lever.

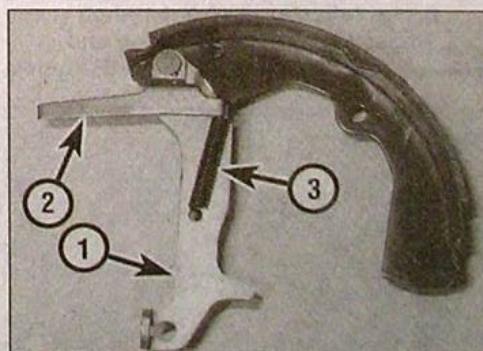
12 Transfer the handbrake operating lever, and where applicable, the adjuster operating lever, to the new trailing shoe as required, and secure with a new retaining clip. Note that the levers and adjuster strut components are different on each side of the vehicle - take care not to mix up the components. Make sure that the handbrake operating lever spring is correctly located (see illustrations).

13 Shorten the adjuster strut to its minimum length by turning the toothed wheel, and



6.12a Front view of trailing shoe components

- 1 Handbrake operating lever
- 2 Adjuster operating lever
- 3 Retaining clip



6.12b Rear view of trailing shoe components

- 1 Handbrake operating lever
- 2 Adjuster operating lever
- 3 Handbrake lever spring

- 20 Refit the hold-down pin, spring and cup to secure the leading shoe (see illustration).
- 21 Check that all components have been correctly refitted, and check that the adjuster mechanism operates correctly.
- 22 Turn the adjuster wheel to ensure that the diameter of the shoes is less than that of the drum.
- 23 Repeat the procedure on the remaining side of the vehicle, then refit the brake drums as described in Section 8.

7 Brake disc - inspection, removal and refitting



Warning: Before starting work, refer to the warning at the beginning of Section 4 concerning the dangers of asbestos dust.

Front disc

Inspection

Note: If either disc requires renewal, BOTH should be renewed at the same time, to ensure even and consistent braking. New brake pads should also be fitted.

1 Apply the handbrake, then jack up the front of the car and support it on axle stands (see *Jacking and Vehicle Support*). Remove the appropriate front roadwheel.

2 Slowly rotate the brake disc so that the full area of both sides can be checked; remove the brake pads (see Section 4) if better access is required to the inboard surface. Light scoring is normal in the area swept by the brake pads, but if heavy scoring or cracks are found, the disc must be renewed.

3 It is normal to find a lip of rust and brake dust around the disc's perimeter; this can be scraped off if required. If, however, a lip has formed due to excessive wear of the brake pad swept area, then the disc's thickness must be measured using a micrometer. Take measurements at several places around the disc, at the inside and outside of the pad swept area; if the disc has worn at any point to the specified minimum thickness or less, the disc must be renewed.

4 If the disc is thought to be warped, it can be checked for run-out. Either use a dial gauge mounted on any convenient fixed point, while the disc is slowly rotated, or use feeler blades to measure (at several points all around the disc) the clearance between the disc and a fixed point, such as the caliper mounting bracket. If the measurements obtained are at the specified maximum or beyond, the disc is excessively warped, and must be renewed; however, it is worth checking first that the hub bearing is in good condition (Chapters 1 and/or 10). Also try the effect of removing the disc and turning it through 180°, to reposition it on the hub; if the run-out is still excessive, the disc must be renewed.

6.20 Refitting the leading shoe hold-down spring

5 Check the disc for cracks, especially around the wheel stud holes, and any other wear or damage, and renew if necessary.

Removal

6 If not already done, apply the handbrake, then jack up the front of the car and support it on axle stands (see *Jacking and Vehicle Support*). Remove the appropriate front roadwheel.

7 Unscrew the two bolts securing the caliper mounting bracket to the hub carrier. Withdraw the caliper assembly, and suspend it using wire or string. Take care not to strain the brake fluid hose - if necessary release the hose from the securing clip(s).

HAYNES HINT

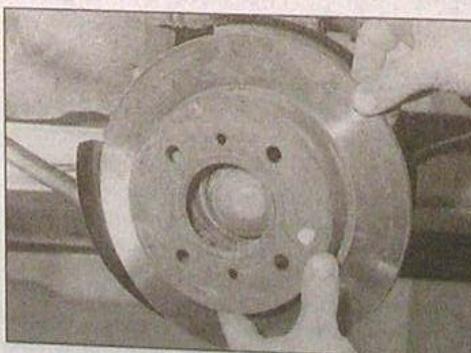
Place a clean spacer (of the same thickness as the disc) between the pads, to prevent them from being dislodged.

8 If the original disc is to be refitted, mark the relationship between the disc and the hub, then pull the disc from the roadwheel studs (see illustration).

9 If the disc is stuck, it can be pushed off by screwing two M8 bolts into the holes provided in the disc, and evenly tightening the bolts to push the disc from the hub.

Refitting

10 Ensure that the mating faces of the disc and the hub are clean and flat. If necessary, wipe the mating surfaces clean.



7.8 Removing a front brake disc

11 If the original disc is being refitted, align the marks made on the disc and hub before removal, then refit the disc.

12 If a new disc has been fitted, use a suitable solvent to wipe any preservative coating from the disc.

13 Refit the caliper, ensuring that the pads locate correctly over the disc, then tighten the caliper bracket securing bolts to the specified torque. Where applicable, refit the brake fluid hose to the clip(s).

14 Depress the brake pedal repeatedly until the pads are pressed into firm contact with the brake disc, and normal pedal pressure is restored.

15 Refit the roadwheel, and lower the vehicle to the ground.

Rear disc

Inspection

Note: If either disc requires renewal, BOTH should be renewed at the same time, to ensure even and consistent braking. New brake pads should also be fitted.

16 Chock the front wheels, then jack up the rear of the car and support it on axle stands (see *Jacking and Vehicle Support*). Remove the appropriate rear roadwheel.

17 Fully release the handbrake.

18 Proceed as described for the front disc in paragraphs 2 to 5, but refer to Section 5 if the brake pads are to be removed.

Removal

19 If not already done, chock the front wheels, then jack up the rear of the car and support it on axle stands (see *Jacking and Vehicle Support*). Remove the appropriate rear roadwheel.

20 Unbolt the handbrake cable mounting bracket from the caliper, then disconnect the end of the cable from the lever on the caliper. It may be necessary to release the spring clip securing the cable to the mounting bracket to enable the cable to be disconnected.

21 Proceed as described for the front brake disc in paragraphs 7 to 9.

Refitting

22 Proceed as described for the front brake disc in paragraphs 10 to 13.

23 Reconnect the handbrake cable to the lever on the caliper, then refit the cable mounting bracket, and where applicable, the spring clip. Where applicable, ensure that the locating peg on the mounting bracket engages with the corresponding hole in the caliper body.

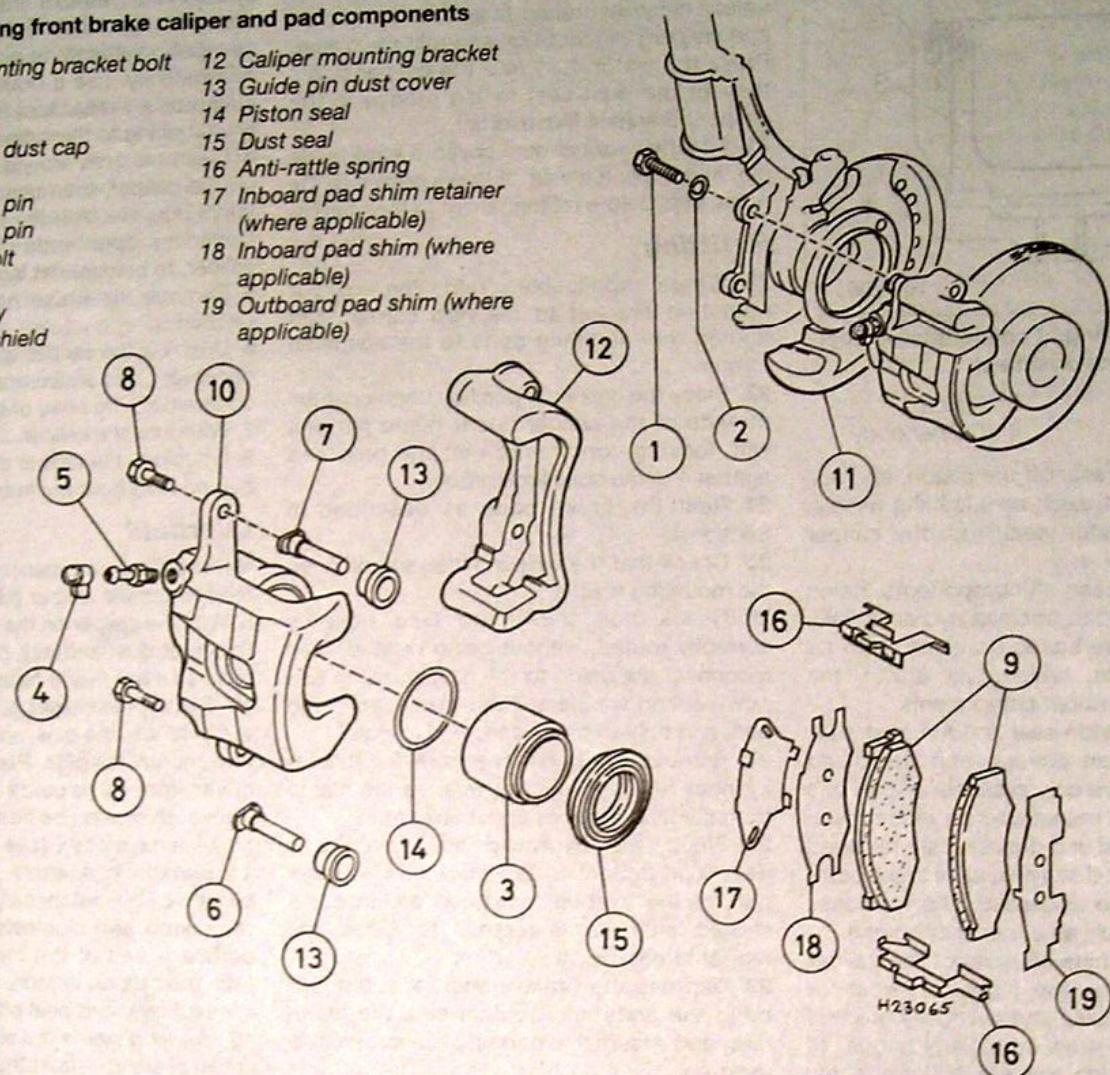
24 Operate the handbrake repeatedly until the correct brake pad-to-disc clearance is established (adjustment occurs automatically when the handbrake is operated).

25 Depress the brake pedal repeatedly to ensure that normal pedal pressure is restored.

26 Refit the roadwheel, and lower the vehicle to the ground.

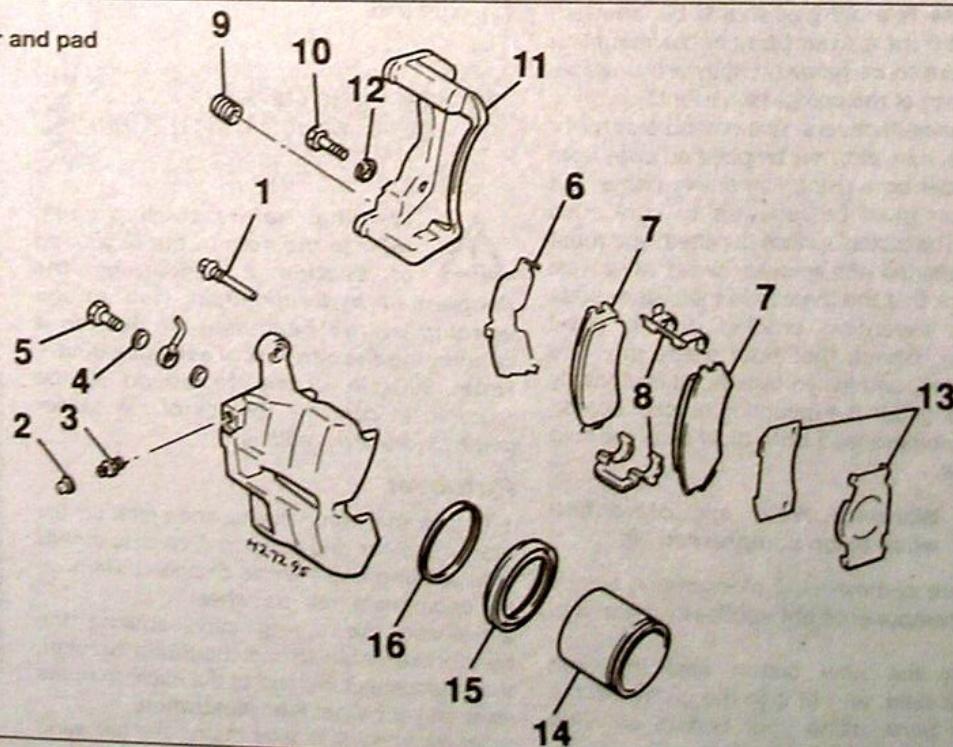
9.9a Girling front brake caliper and pad components

1 Caliper mounting bracket bolt	12 Caliper mounting bracket
2 Washer	13 Guide pin dust cover
3 Piston	14 Piston seal
4 Bleed screw dust cap	15 Dust seal
5 Bleed screw	16 Anti-rattle spring
6 Lower guide pin	17 Inboard pad shim retainer (where applicable)
7 Upper guide pin	18 Inboard pad shim (where applicable)
8 Guide pin bolt	19 Outboard pad shim (where applicable)
9 Brake pads	
10 Caliper body	
11 Brake disc shield	



9.9b Bendix front brake caliper and pad components

1 Guide pin bolt	9
2 Bleed screw dust cap	10
3 Bleed screw	11
4 Copper washers	12
5 Banjo union bolt	1
6 Inboard pad shim	13
7 Brake pads	6
8 Anti-rattle spring	7
9 Guide pin dust cover	8
10 Caliper mounting bracket bolt	7
11 Caliper mounting bracket	13
12 Washer	5
13 Outer pad shims	4
14 Piston	2
15 Dust seal	3
16 Piston seal	



15 Use circlip pliers to extract the remaining circlip, then withdraw the key plate, the pushrod and the plunger. Prise the sealing O-ring off the pushrod.

16 Using a blunt instrument such as a knitting needle, extract the piston seal from the caliper cylinder bore.

17 Ensure that the pushrod and plunger have been removed (paragraph 15), then unhook the return spring from the handbrake lever, and prise the lever and, where applicable, the cam assembly from the caliper body. On Phase I and Phase II Saloon and Hatchback models, and all Phase III models, it will be necessary to unscrew the stop-bolt before the lever can be withdrawn.

18 On Phase I and Phase II Estate models, clamp the cam gently in a soft-jawed vice, then unscrew the retaining nut, and withdraw the spring washer, the return spring, the lever, and the dust cover, from the cam.

19 Thoroughly clean all components, using only methylated spirit or clean hydraulic fluid. Never use mineral-based solvents such as petrol or paraffin, which will attack the hydraulic system rubber components.

20 Discard all seals, cups, dust covers and other rubber components. These are available as part of a caliper seal kit, and should be renewed as a matter of course whenever they are disturbed.

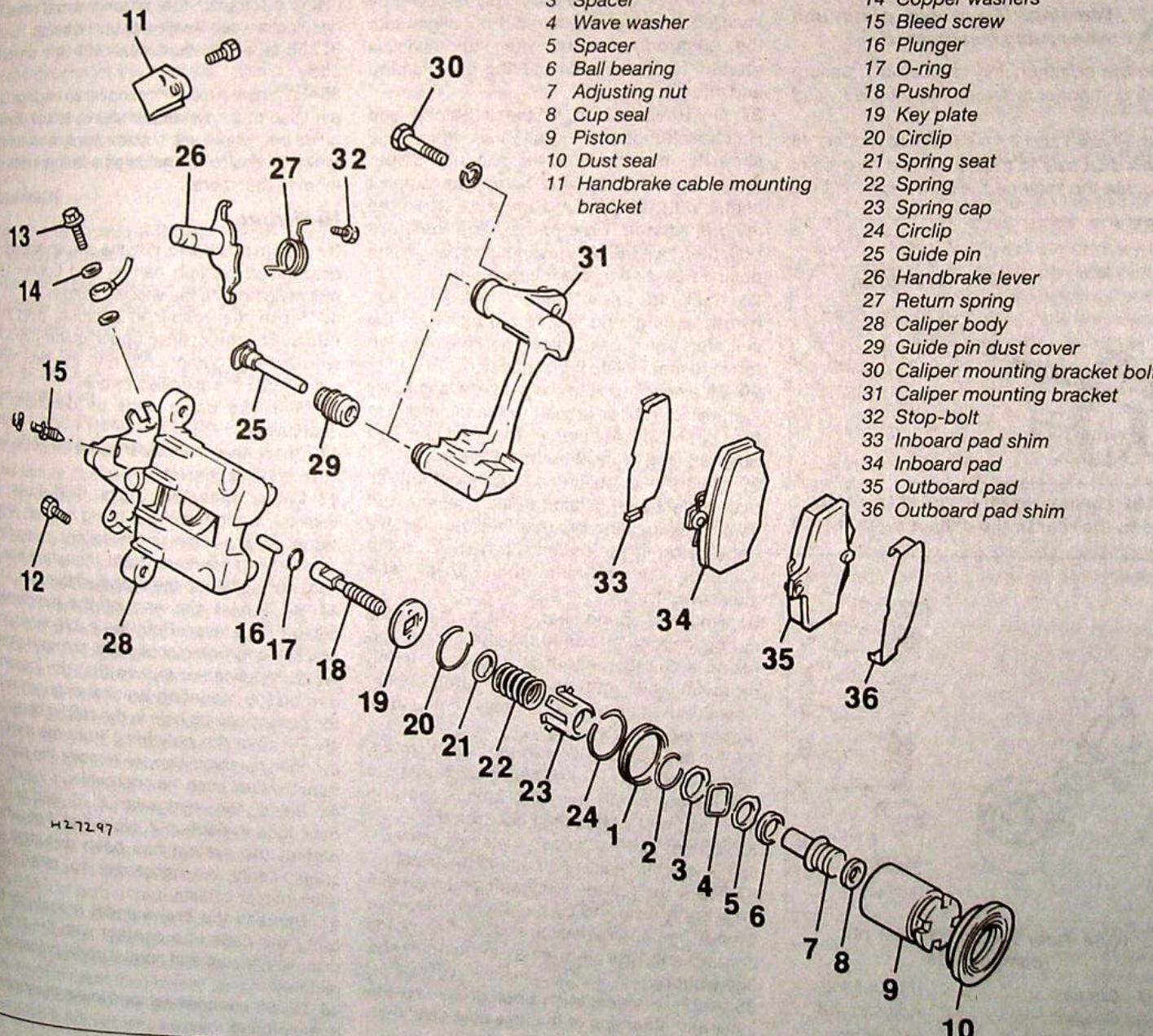
21 Carefully examine all parts of the caliper

assembly, looking for signs of wear or damage. In particular, the cylinder bore and piston must be free from any signs of scratches, corrosion or wear. If there is any doubt about the condition of any part of the caliper, the relevant part should be renewed. Note that if the caliper body or the mounting bracket are to be renewed, they are available only as part of the complete assembly.

22 Minor scratches, rust, etc, may be polished away from the cylinder bore using fine emery paper, but the piston must be renewed to cure such defects. The piston surface is plated, and **must not** be polished with emery or similar abrasives.

23 Check that the threads in the caliper body

10.10 Rear brake caliper and pad components



11 Rear wheel cylinder - removal, overhaul and refitting

Warning: Before starting work, refer to the note at the beginning of Section 2 concerning the dangers of hydraulic fluid, and to the warning at the beginning of Section 4 concerning the dangers of asbestos dust.

Removal

- 1 Remove the brake drum as described in Section 8.
- 2 Remove the brake shoes as described in Section 6.
- 3 To minimise fluid loss during the following operations, remove the master cylinder reservoir cap, then tighten it down onto a piece of polythene, to obtain an airtight seal.
- 4 Clean the brake backplate around the wheel cylinder mounting bolts and the hydraulic pipe union, then unscrew the union nut and disconnect the hydraulic pipe. Cover the open ends of the pipe and the master cylinder to prevent dirt ingress.
- 5 Remove the securing bolts, then withdraw the wheel cylinder from the backplate.

Overhaul

Phase I and Phase II Saloon and Hatchback models

6 The rear brake pressure-regulating valves are integral with the rear wheel cylinders, and the cylinders **must not** be dismantled. No spare parts are available, and if a cylinder is faulty or damaged, the complete assembly must be renewed.

Phase I and Phase II Estate models, and all Phase III models

Note: Before commencing work, ensure that the appropriate wheel cylinder overhaul kit is obtained.

- 7 Clean the assembly thoroughly, using only methylated spirit or clean brake fluid.
- 8 Peel off both rubber dust covers, then use paint or similar to mark one of the pistons so that the pistons are not interchanged on reassembly.
- 9 Withdraw both pistons and the spring.
- 10 Discard the rubber piston cups and the dust covers. These components should be renewed as a matter of course, and are available as part of an overhaul kit, which also includes the bleed nipple dust cap.
- 11 Check the condition of the cylinder bore and the piston - the surfaces must be perfect and free from scratches, scoring and corrosion. It is advisable to renew the complete wheel cylinder if there is any doubt as to the condition of the cylinder bore or piston.
- 12 Ensure that all components are clean and dry. The pistons, spring and cups should be fitted wet, using hydraulic fluid as a lubricant - soak them in clean fluid before installation.
- 13 Fit the cups to the pistons, ensuring that they are the correct way round. Use only your

fingers (no tools) to manipulate the cups into position.

14 Fit the first piston to the cylinder, taking care not to distort the cup. If the original pistons are being re-used, the marks made on dismantling should be used to ensure that the pistons are refitted to their original bores.

15 Refit the spring and the second piston.

16 Apply a smear of rubber grease to the exposed end of each piston and to the dust cover sealing lips, then fit the dust covers to each end of the wheel cylinder.

Refitting

17 Refitting is a reversal of removal, bearing in mind the following points:

- a) **Tighten the mounting bolts to the specified torque.**
- b) **Refit the brake shoes as described in Section 6, and refit the brake drum as described in Section 8.**
- c) **Before refitting the roadwheel and lowering the vehicle to the ground, remove the polythene from the fluid reservoir, and bleed the hydraulic system as described in Section 2. Note that if no other part of the system has been disturbed, it should only be necessary to bleed the relevant rear circuit.**

12 Master cylinder - removal, overhaul and refitting

Note: Before starting work, refer to the warning at the beginning of Section 2 concerning the dangers of hydraulic fluid.

Removal

1 Remove the master cylinder fluid reservoir cap, and syphon the hydraulic fluid from the reservoir. Alternatively, open any convenient bleed screw in the system, and gently pump the brake pedal to expel the fluid through a tube connected to the screw (see Section 2). Disconnect the wiring connector from the brake fluid level sender unit (see illustration).

Warning: Do not syphon the fluid by mouth, as it is poisonous; use a syringe or an old poultry baster.

2 Wipe clean the area around the brake pipe unions on the side of the master cylinder, and



12.1 Disconnecting the brake fluid level sender wiring connector

place absorbent rags beneath the pipe unions to catch any surplus fluid. Make a note of the correct fitted positions of the unions, then unscrew the union nuts and carefully withdraw the pipes. Plug or tape over the pipe ends and master cylinder orifices, to minimise the loss of brake fluid, and to prevent the entry of dirt into the system. Wash off any spilt fluid immediately with cold water.

3 Slacken and remove the two nuts securing the master cylinder to the vacuum servo unit, then withdraw the unit from the engine compartment.

4 Where applicable, recover the seal from the rear of the master cylinder, and discard it.

Overhaul

Note: Before attempting overhaul of the master cylinder, ensure that the appropriate overhaul kit is obtained - a number of different master cylinder assemblies may be fitted, depending on model.

5 Pull the fluid reservoir from the top of the master cylinder. Prise the reservoir seals from the reservoir or the master cylinder, as applicable.

6 Using a suitable screwdriver, bend back the tangs securing the master cylinder end cap, then withdraw the end cap (see illustration overleaf).

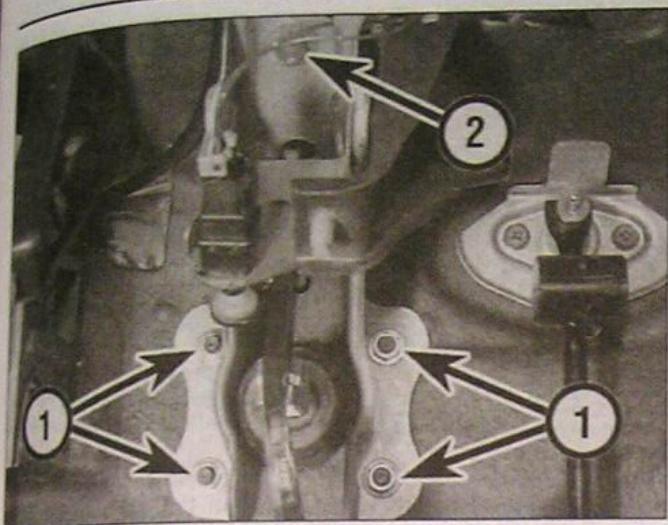
7 On models with ABS, push on the end of the primary piston assembly using a suitable wooden dowel to compress the primary and secondary piston assemblies, then unscrew the stop-bolt from the side of the master cylinder.

8 Noting the order of removal, and the direction of fitting of each component, withdraw the washer and the piston assemblies with their springs and seals, tapping the body onto a clean wooden surface to dislodge them. If necessary, clamp the master cylinder body in a vice (fitted with soft jaw covers) and use compressed air (applied through the secondary circuit fluid port) to assist the removal of the secondary piston assembly.

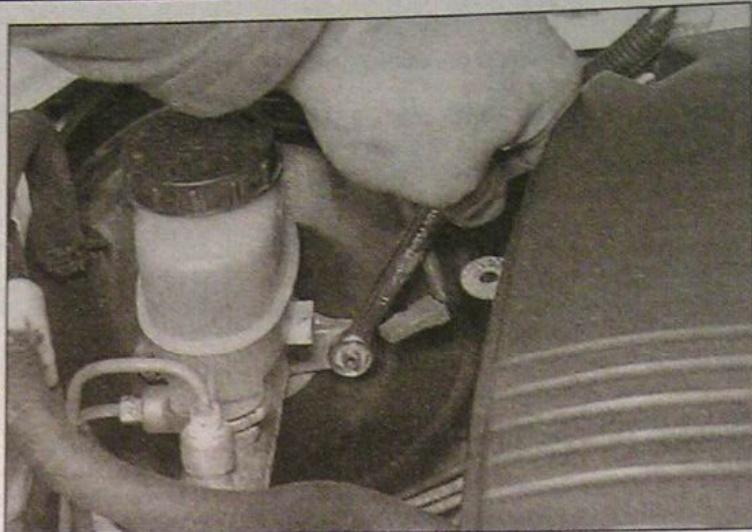
Warning: Wear eye protection when working with compressed air.

9 Thoroughly clean all components, using only methylated spirit, isopropyl alcohol or clean hydraulic fluid as a cleaning medium. Never use mineral-based solvents such as petrol or paraffin, as they will attack the hydraulic system rubber components. Dry the components immediately, using compressed air or a clean, lint-free cloth.

10 Check all components, and renew any that are worn or damaged (note that individual seal components are not available - the overhaul kit will contain complete primary and secondary piston assemblies, complete with all seals, washers, etc). Check particularly the cylinder bores and pistons; the complete assembly should be renewed if these are scratched, worn or corroded. If there is any doubt about the condition of the assembly or of any of its components, renew it. Check that the cylinder body fluid passages are clear.



13.13 Brake pedal bracket securing nuts (1) and bolt (2)



14.6a Unscrew the securing nuts ...

5 If the height of the pedal requires adjustment, proceed as follows.

6 Loosen the locknut on the servo pushrod, and turn the pushrod as required until the specified height is achieved. Retighten the locknut on completion.

7 Check the free play of the pedal by pressing the pedal slowly until resistance is felt. The free play should be as specified.

8 Check that the stop-lights go out when the pedal is released. Note that the switch (a bayonet fit in the pedal bracket) cannot be adjusted, and if faulty must be renewed.

9 On completion, refit the carpet and the trim panel(s).

Removal

10 To improve access, if not already done, remove the driver's side lower facia panel as described in Chapter 11.

11 Working in the driver's footwell, remove the split-pin from the end of the servo pushrod clevis pin, then withdraw the clevis pin.

12 Disconnect the wiring plug from the stop-light switch.

13 Unscrew the four nuts securing the pedal bracket to the bulkhead (note that these nuts also secure the vacuum servo) (see illustration).



14.6b ... and pull the master cylinder from the servo

14 Unscrew the pedal bracket upper securing bolt, then withdraw the pedal/bracket assembly from the footwell.

15 The brake pedal is integral with the bracket assembly, and cannot be renewed individually.

Refitting

16 Refitting is a reversal of removal but, on completion, check the pedal height as described previously in this Section.

14 Vacuum servo unit - removal and refitting



Removal

1 Disconnect the battery negative terminal (refer to *Disconnecting the battery* in the Reference Section of this manual).

2 On carburettor and single-point fuel injection models, it should be possible to remove the servo unit without removing the inlet manifold or the master cylinder.

3 On multi-point fuel injection models, it may be necessary to remove the inlet manifold (see Chapter 4C) to gain sufficient clearance to remove the servo unit.

4 On carburettor models, to improve access,

remove the air cleaner as described in Chapter 4A.

5 Where applicable, disconnect the power steering fluid pressure switch wiring plug, and/or unbolt the power steering fluid hose bracket from the body for improved access.

6 Disconnect the wiring plug from the brake fluid level sensor, then remove the two nuts securing the master cylinder to the servo. Release the master cylinder fluid pipes from any securing clips, then pull the master cylinder forwards from the servo (see illustrations).

7 If this does not provide sufficient clearance to remove the servo, the master cylinder must be removed completely with reference to Section 12.

8 Disconnect the vacuum hose from the servo (see illustration).

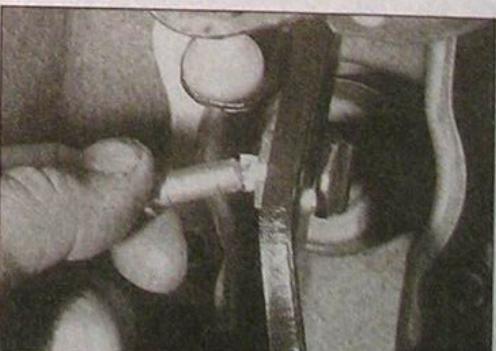
9 Working in the driver's footwell, remove the spring clip from the end of the servo pushrod clevis pin, then withdraw the clevis pin (see illustration). If desired, remove the driver's side lower facia panel, as described in Chapter 11, to improve access.

10 Again working in the driver's footwell, unscrew the four nuts securing the brake pedal mounting bracket to the servo studs.

11 Working in the engine compartment, withdraw the servo.



14.8 Disconnecting the vacuum hose from the servo

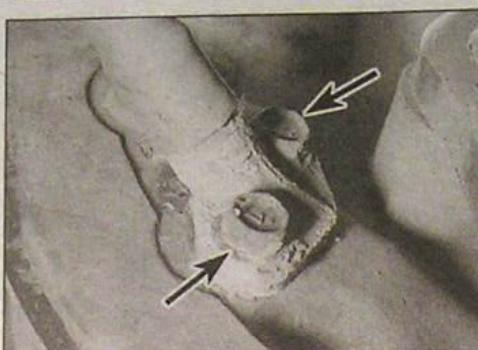


14.9 Removing the servo pushrod clevis pin

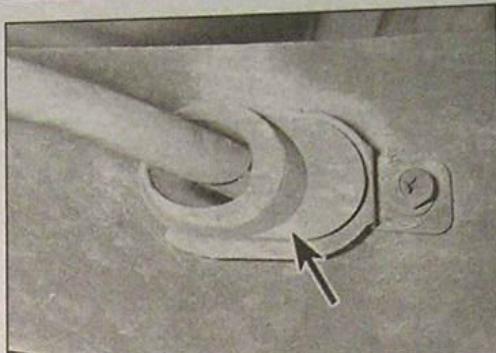
Refitting

1 Refitting is a reversal of removal, bearing in mind the following point:

- Screw the adjuster nut onto the cable adjuster rod to give the number of exposed threads noted before removal, then check the handbrake operation, and adjust if necessary, as described in Chapter 1.
- Before refitting the centre console, check the operation of the handbrake 'on' warning light.

17 Handbrake cables - removal and refitting

17.3 Handbrake cable bracket-to-brake backplate securing bolts (arrowed)



17.6 Handbrake cable grommet in trailing arm (arrowed)

Rear cables**Removal**

1 There are two rear handbrake cables, one on each side of the vehicle. To renew either rear cable, proceed as follows.

2 Chock the front wheels, then jack up the rear of the car and support it on axle stands (see *Jacking and Vehicle Support*). Release the handbrake fully.

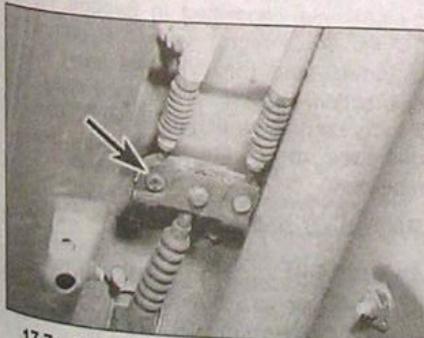
3 On models with rear drum brakes, remove the brake shoes, and disconnect the end of the handbrake cable from the lever on the trailing shoe, as described in Section 6. Recover the return spring from the end of the cable, then unbolt the cable bracket from the brake backplate (see illustration).

4 On models with rear disc brakes, release the spring clip securing the cable to the mounting bracket, then disconnect the end of the cable from the lever on the caliper.

5 Unscrew the nuts and bolts securing the handbrake cable brackets to the underbody, and to the suspension, where applicable.

6 On Phase I and Phase II Estate models, unbolt the bracket securing the cable grommet to the trailing arm (see illustration).

7 Disconnect the front of the cable from the cable equaliser at the front of the vehicle, then withdraw the cable (see illustrations). Note that on certain models, it will be necessary to remove the exhaust heat shield for access to the handbrake cable equaliser.



17.7a Exhaust heat shield removed to expose handbrake cable equaliser (arrowed)

Refitting

8 Refitting is a reversal of removal, bearing in mind the following points:

- On models with rear disc brakes, where applicable, when refitting the cable mounting bracket to the caliper, ensure that the locating peg on the bracket engages with the corresponding hole in the caliper body.
- On models with rear drum brakes, reconnect the cable end to the lever on the trailing shoe, and refit the brake shoes, as described in Section 6.
- On completion, check the handbrake adjustment, as described in Chapter 1.

Front cable**Removal**

9 Disconnect the battery negative terminal (refer to *Disconnecting the battery* in the Reference Section of this manual).

10 Chock the rear wheels and fully release the handbrake.

11 Working inside the vehicle, remove the centre console as described in Chapter 11.

12 Disconnect the wiring plug from the handbrake 'on' warning light switch.

13 Count the number of exposed threads on the cable adjuster rod (to ease adjustment on refitting), then unscrew the adjuster nut, and disconnect adjuster rod from the handbrake lever (see illustration).

14 For improved access, apply the handbrake, then jack up the front of the car and support it on axle stands (see *Jacking and Vehicle Support*).



17.7b Disconnecting a front handbrake cable from the equaliser

15 Working under the vehicle, disconnect the two rear cables from the cable equaliser, then withdraw the front section of the cable (which includes the cable equaliser and the adjuster rod) down through the floor panel. Note that on certain models, it will be necessary to remove the exhaust heat shield for access to the handbrake cable equaliser.

Refitting

16 Refitting is a reversal of removal, bearing in mind the following points:

- Screw the adjuster nut onto the cable adjuster rod to give the number of exposed threads noted before removal, then check the handbrake adjustment as described in Chapter 1.
- Before refitting the centre console, check the operation of the handbrake 'on' warning light.

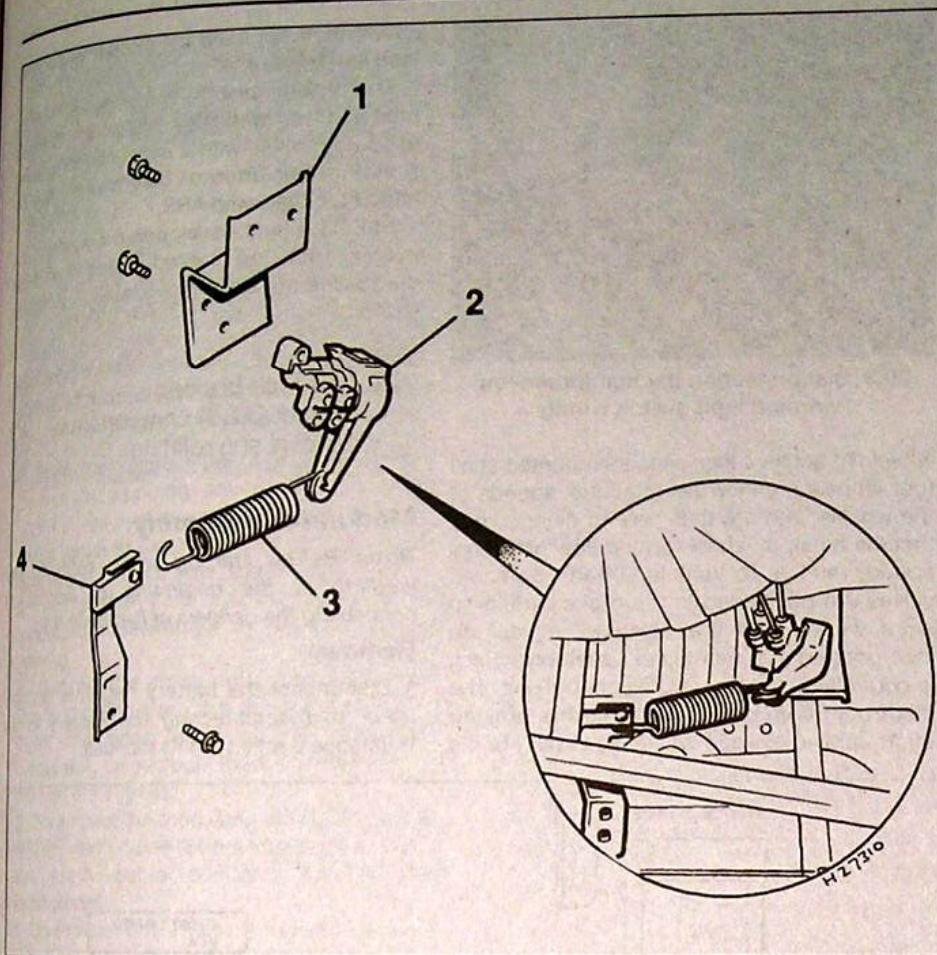
18 Rear brake pressure-regulating valves - adjustment, removal and refitting**Phase I and Phase II Saloon and Hatchback models with rear disc brakes****Adjustment**

Note: Two valves are fitted, and the two valve spring lengths **must** be the same.

1 Twin valves are fitted on the right- and left-hand sides, between the rear suspension parallel links and the body (see illustration).

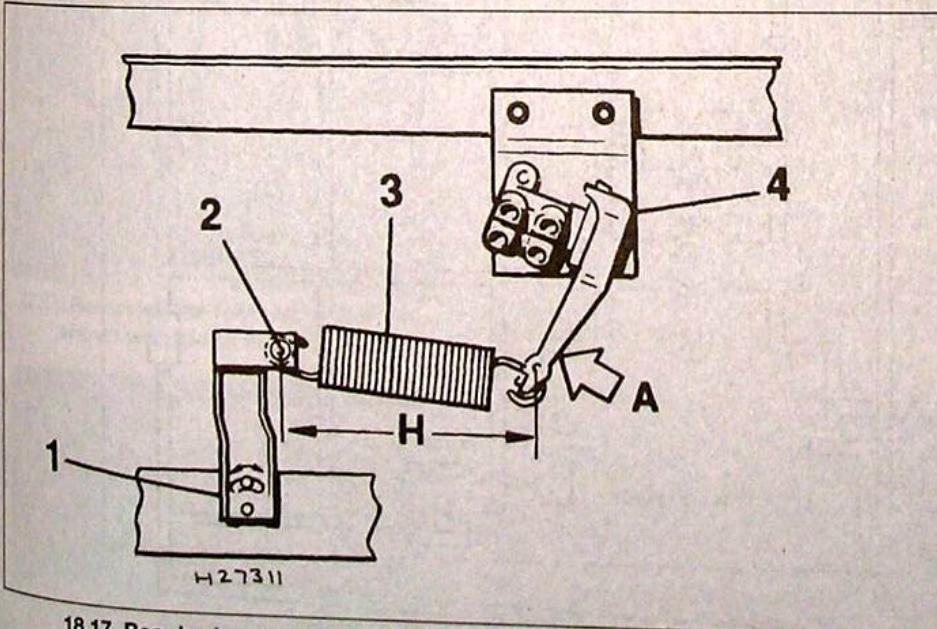


17.13 Unscrewing the handbrake cable adjuster nut



18.16 Rear brake pressure-regulating valve components - Phase I and Phase II Estate models

1 Valve mounting bracket	3 Spring
2 Valve assembly	4 Spring bracket



18.17 Rear brake pressure-regulating valve spring length measurement - Phase I and Phase II Estate models

$H = 157.7$ to 160.7 mm

1 Spring bracket	A Push lever in direction arrowed
2 Pin	3 Spring
	4 Valve operating lever

Removal

22 To improve access, chock the rear wheels, then jack up the front of the car and support it on axle stands (see *Jacking and Vehicle Support*).

23 Before proceeding, place a suitable container under the valve, to collect the brake fluid which will escape as the fluid pipes are disconnected.

24 Unscrew the fluid pipe unions from the valve body, and disconnect the pipes from the valve, taking care not to strain them. Note the locations of the pipes, to ensure correct refitting. Plug or cover the open ends of the pipes and valve, to reduce fluid spillage and to prevent dirt ingress. **Do not** depress the brake pedal whilst the valve is removed.

25 Unscrew the bolt securing the valve to the underbody and withdraw the valve.

Refitting

26 Refitting is a reversal of removal, but bleed the brake hydraulic circuit as described in Section 2 on completion.

19 Stop-light switch - adjustment, removal and refitting



Adjustment

- 1 The switch plunger operates on a ratchet.
- 2 If adjustment is required, pull the plunger fully out - the switch is then self-adjusting.

Removal

3 Disconnect the battery negative terminal (refer to *Disconnecting the battery* in the Reference Section of this manual).

4 For improved access, remove the driver's side lower facia panel, as described in Chapter 11.

5 Disconnect the wiring plug from the switch.

6 Twist the switch anti-clockwise, and withdraw the switch from the pedal bracket.

Refitting

- 7 Refitting is a reversal of removal, but pull the switch plunger fully out before refitting (see paragraph 2).

20 Handbrake 'on' warning light switch - removal and refitting



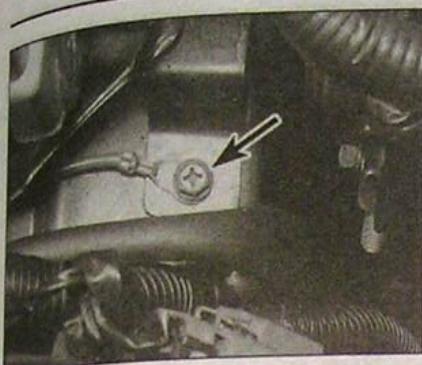
Removal

1 Disconnect the battery negative terminal (refer to *Disconnecting the battery* in the Reference Section of this manual).

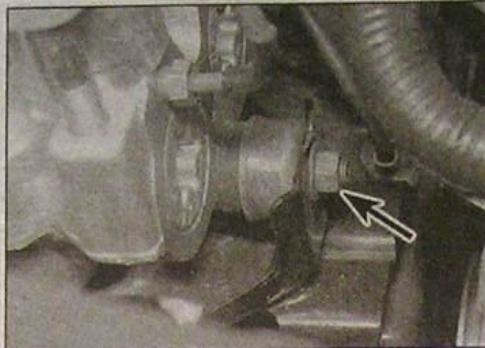
2 Remove the centre console as described in Chapter 11.

3 Disconnect the wiring plug from the switch (see illustration).

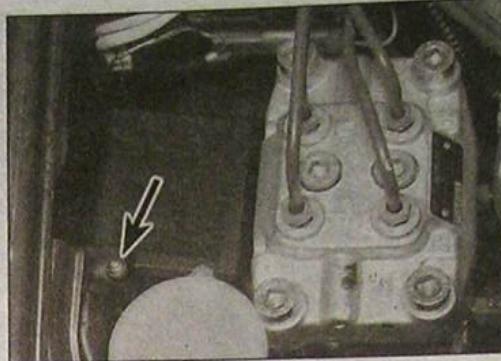
4 Remove the securing screw, and withdraw the switch.



22.5 ABS modulator earth cable securing screw (arrowed)



22.6 ABS modulator securing nut (arrowed)



22.11 ABS modulator relay cover securing screw (arrowed)

2 Drain the brake fluid from the hydraulic system by opening any convenient bleed screw in the system, and gently pumping the brake pedal to expel the fluid through a tube connected to the screw (see Section 2).

3 Identify each fluid pipe connected to the modulator assembly, to ensure correct refitting.

4 Unscrew the union nuts, and disconnect the fluid pipes from the modulator. Plug or cover the open ends of the pipes and modulator, to reduce fluid spillage and to prevent dirt ingress.

5 Disconnect the modulator wiring connector, and the earth cable (where applicable, remove the earth cable securing screw) (see illustration).

6 On Phase I and Phase II models, unscrew the three securing nuts, and withdraw the modulator assembly (see illustration). On Phase III models, undo the modulator

mounting bracket retaining nuts and bolts, and remove the modulator and bracket. If necessary the modulator may be removed from the bracket after slackening the mounting nuts.

Refitting

7 Refitting is a reversal of removal, bearing in mind the following points:

- Ensure that the fluid pipes are correctly reconnected to the modulator, as noted before removal.
- On completion, bleed the brake hydraulic system as described in Section 2.

Modulator relays

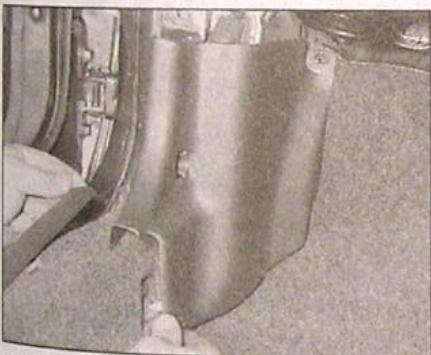
Removal

8 On Phase I and Phase II models, the relays are mounted on the modulator assembly, and on Phase III models they are located in the engine compartment relay box. To remove the relays from the engine compartment relay box, open the lid and simply pull the relevant relay from its location. To remove the relays mounted on the modulator, proceed as follows.

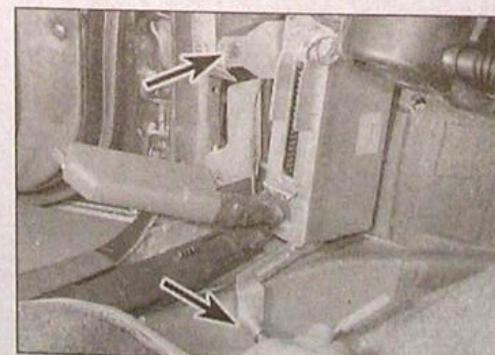
9 Disconnect the battery negative terminal (refer to *Disconnecting the battery* in the Reference Section of this manual).

10 To provide sufficient clearance to remove the relay cover, it will be necessary to release the modulator assembly from its mountings, and move it away from the wing panel (see paragraph 6).

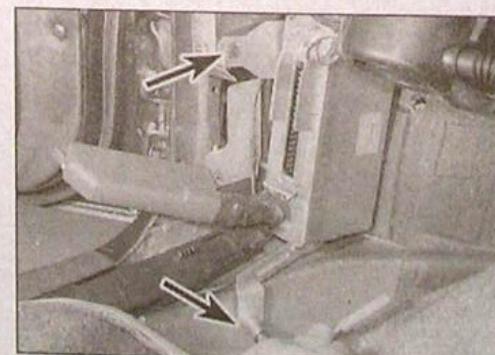
11 Remove the securing screw (see illustration), and withdraw the cover to expose the relays.



22.17 Removing the footwell trim panel - shown with glovebox removed



22.18 Disconnecting the wiring plug from the ABS control unit



22.19a Unscrew the two securing bolts (arrowed) ...



22.19b ... and withdraw the ABS control unit

12 Pull the relevant relay from its location. Note that the black relay controls the modulator motor, and the silver relay controls the solenoid valves.

Refitting

13 Refitting is a reversal of removal, but ensure that the modulator mounting nuts are securely tightened.

Electronic control unit

Removal

14 The unit is located under the passenger's side lower facia.

15 Disconnect the battery negative terminal (refer to *Disconnecting the battery* in the Reference Section of this manual).

16 Working in the passenger's footwell, using a screwdriver, carefully prise out the trim plate to reveal the trim panel securing screw. Remove the screw.

17 Twist the rear securing nut to release it, then withdraw the clip, and pull the trim panel from the footwell (see illustration).

18 Depress the securing clip, and disconnect the wiring plug from the control unit (see illustration).

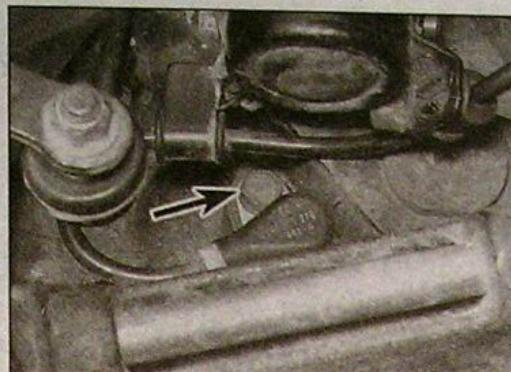
19 Reach up under the facia, and remove the two bolts securing the control unit bracket to the footwell (pull back the carpet panel for access to the lower bolt), then withdraw the unit, complete with the bracket, from the footwell (see illustrations).

Refitting

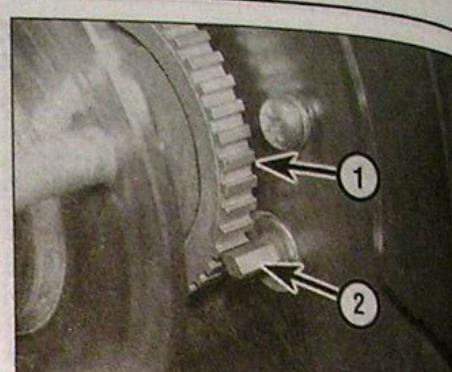
20 Refitting is a reversal of removal.



22.24 Removing an ABS front wheel sensor



22.27 ABS rear wheel sensor mounting bolt (arrowed)



22.29 Rear ABS sensor rotor (1) and sensor (2)

Front wheel sensor

Note: Suitable thread-locking compound must be applied to the sensor securing bolt on refitting.

Removal

21 To improve access, chock the rear wheels, apply the handbrake, then jack up the front of the car and support it on axle stands (see *Jacking and Vehicle Support*). Remove the relevant roadwheel.

22 Trace the wiring back from the sensor, and remove the screws securing the wiring brackets to the suspension and/or body.

23 Locate the wiring connector, and separate the two halves of the connector (where

applicable, feed the wiring through the grommet in the wheel arch, noting its routing).

24 Unscrew the bolt securing the sensor to the hub carrier, and withdraw the sensor complete with the wiring and brackets (see illustration).

Refitting

25 Refitting is a reversal of removal, but ensure that the faces of the sensor and hub carrier are clean, and tighten the securing bolt to the specified torque.

Rear wheel sensor

Removal

26 To improve access, chock the front

wheels, then jack up the rear of the car and support it on axle stands (see *Jacking and Vehicle Support*).

27 Proceed as described for the front wheel sensor in paragraphs 22 to 24 (see illustration).

Refitting

28 Proceed as described in paragraph 25.

Sensor rotors

29 The sensor rotors are integral with the driveshafts (front) and the hubs (rear), and cannot be removed independently (see illustration). Removal and refitting details for the driveshafts and rear hubs are given in Chapters 8 and 10 respectively.

Refitting

5 Refitting is a reversal of removal, but before refitting the centre console, check that the warning light comes on after the specified number of handbrake clicks (see Specifications). If necessary, bend the switch bracket to give the correct adjustment.

21 Anti-lock braking system (ABS) - general information

ABS is fitted to certain Phase I models, and to all Phase II and Phase III models. Two different systems are fitted, however the operation of each is virtually identical, as are the repair procedures contained in the following Sections.

The system is fail-safe, and is fitted in addition to the conventional braking system, meaning that the vehicle retains conventional braking in the event of an ABS failure.

To prevent wheel locking, the system provides a means of modulating (varying) the hydraulic pressure in the braking circuits, to control the amount of braking effort at each



20.3 Disconnecting the handbrake 'on' warning light switch wiring

wheel. To achieve this, sensors mounted at all four wheels monitor the rotational speeds of the wheels, and are thus able to detect when there is a risk of wheel locking (low rotational speed, relative to vehicle speed). Solenoid valves are positioned in the brake circuits to each wheel, and the solenoid valves are incorporated in a modulator assembly, which is controlled by an electronic control unit. The electronic control unit controls the braking effort applied to each wheel, according to the

information supplied by the wheel sensors (see illustration).

The braking system components used on models fitted with ABS are similar to those used on models with a conventional braking system. Rear drum or disc brakes may be fitted to models with ABS.

Should a fault develop in the system, the system can be tested using specialist diagnostic equipment available to a Nissan dealer.

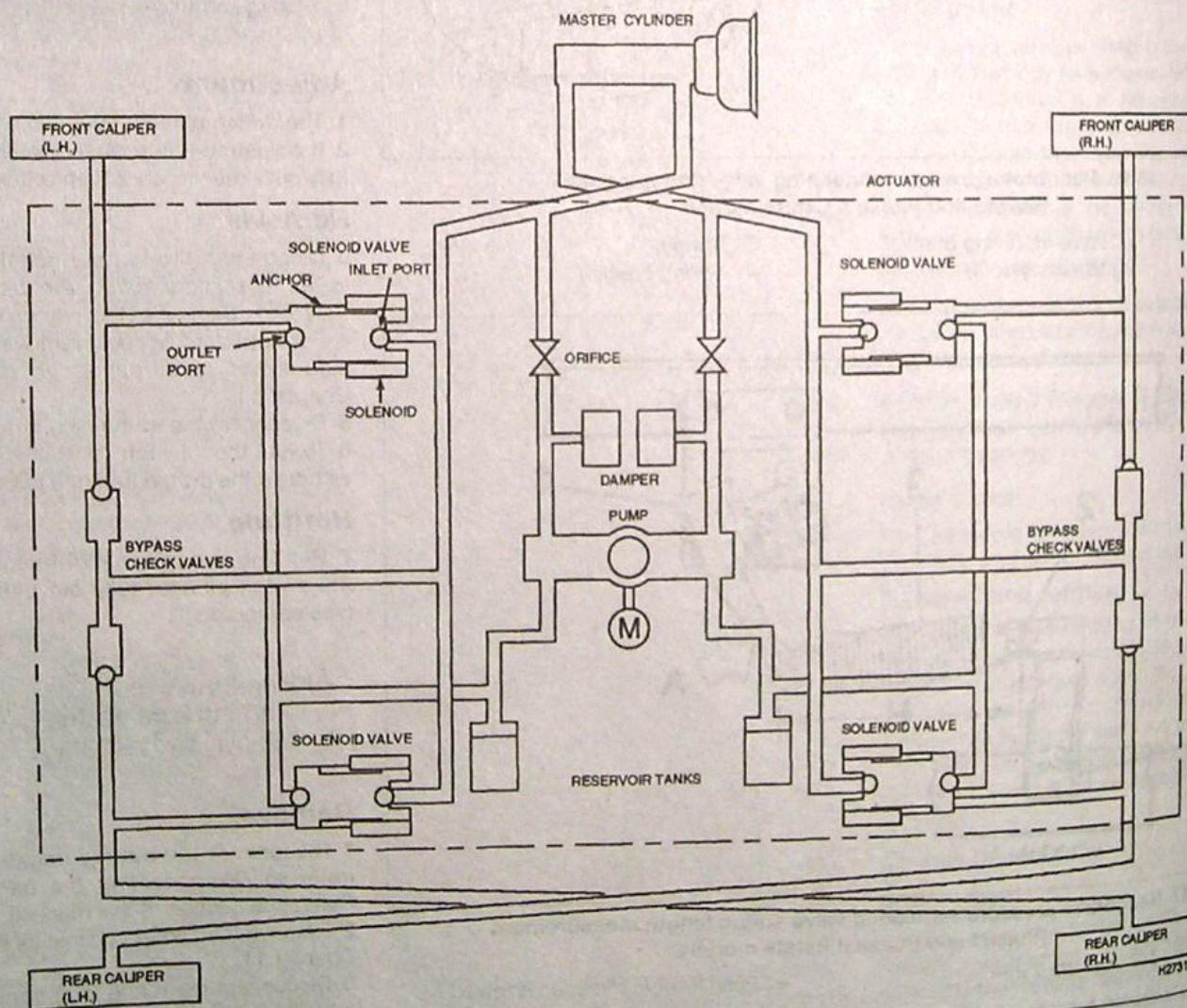
22 Anti-lock braking system (ABS) components - removal and refitting

Modulator assembly

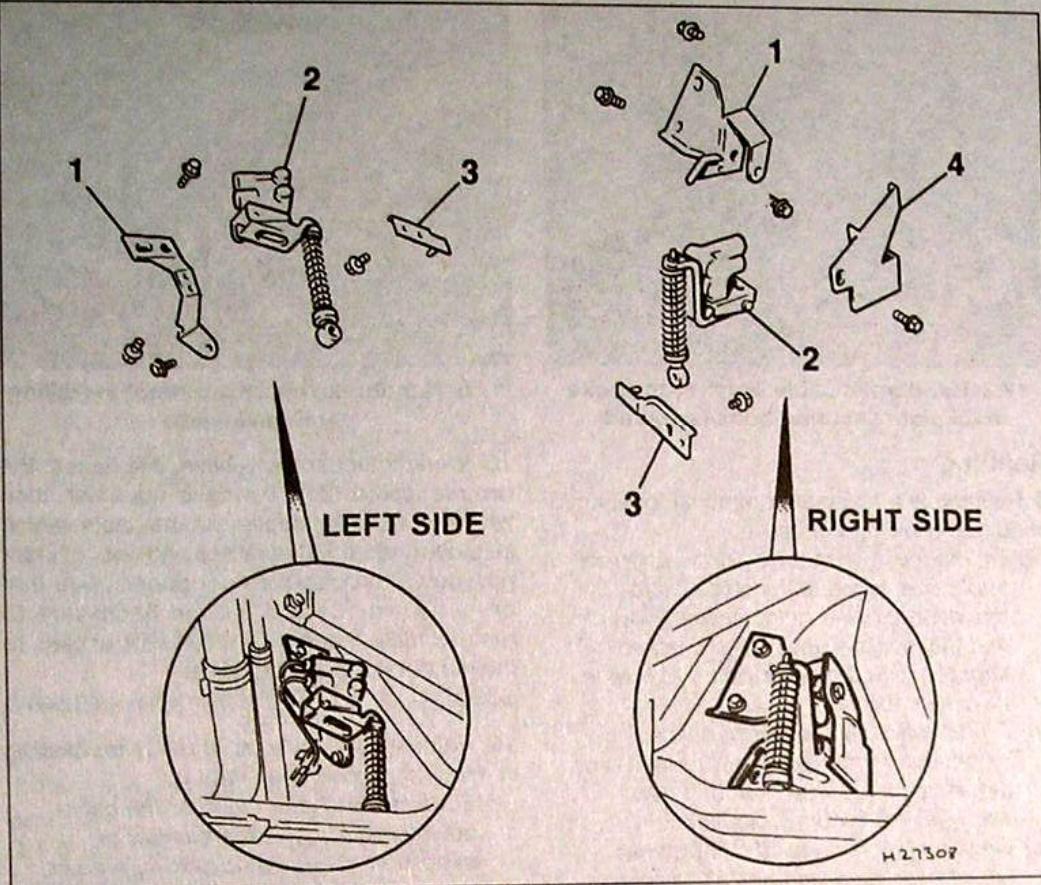
Note: Before starting work, refer to the warning at the beginning of Section 2 concerning the dangers of hydraulic fluid.

Removal

- 1 Disconnect the battery negative terminal (refer to *Disconnecting the battery* in the Reference Section of this manual).



21.3 Schematic layout of ABS hydraulic system components



18.1 Rear brake pressure-regulating valve components - Phase I and Phase II Saloon and Hatchback models with rear disc brakes

1 Valve mounting bracket
2 Valve assembly

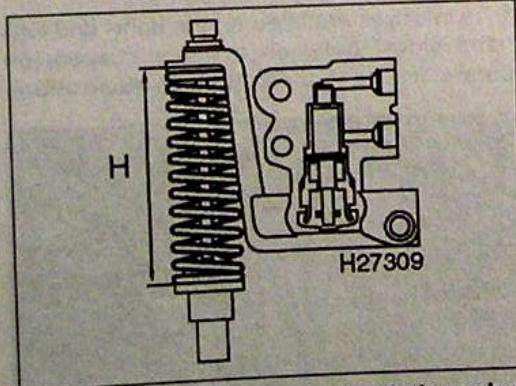
3 Lower spring bracket
4 Heat shield

Note that on certain models, it will be necessary to remove the exhaust heat shield for access to the handbrake cable equaliser.

2 To check the adjustment of the valves, the following conditions must be met:

- A full fuel tank.
- Engine oil and coolant levels normal.
- Spare wheel, jack and tools fitted in correct positions.

3 With the vehicle parked on flat ground, release the handbrake, then roll the vehicle backwards and forwards, and bounce the vehicle to settle the suspension.



18.4 Rear brake pressure-regulating valve spring length measurement - Phase I and Phase II Saloon and Hatchback models with rear disc brakes

H = 86.0 to 90.0 mm

11 Unscrew the fluid pipe unions from the valve body, and disconnect the pipes from the valve, taking care not to strain them. Note the locations of the pipes, to ensure correct refitting. Plug or cover the open ends of the pipes and valve, to reduce fluid spillage and to prevent dirt ingress. **Do not depress the brake pedal whilst the valve is removed.**

12 Unscrew the bolts securing the valve to its mounting bracket, and withdraw the valve.

13 Removal and refitting of the valve brackets is self-explanatory.

14 Note that the valve spring cannot be renewed independently of the valve - the components are only available as an assembly.

Refitting

15 Refitting is a reversal of removal, bearing in mind the following points:

- After refitting all the components, bleed the brake hydraulic circuit as described in Section 2.
- On completion, check the adjustment of both valves as described previously in this Section.

Phase I and Phase II Estate models

Adjustment

16 A single valve is fitted between the rear axle and the body (see illustration).

17 The procedure is as described previously in this Section for Saloon and Hatchback models, noting that only one valve is fitted. Note also that the valve operating lever should be pushed towards the spring bracket when measuring the spring length (see illustration).

Removal and refitting

18 The procedure is as described previously for Saloon and Hatchback models, noting that only one valve is fitted.

Phase I and Phase II Saloon and Hatchback models with rear drum brakes

Adjustment

19 The valves are integral with the rear wheel cylinders, and no adjustment is possible.

Removal and refitting

20 Removal and refitting of the rear wheel cylinders is described in Section 11. The valves are integral with the rear wheel cylinders, and the cylinders must not be dismantled. No spare parts are available, and if a pressure-regulating valve is faulty or damaged, the complete assembly must be renewed.

Phase III models

Adjustment

21 The valve is a sealed unit and does not require adjustment. If the operation is suspect, the vehicle should be taken to a Nissan dealer for the valve to be pressure tested.

Refitting

12 Refitting is a reversal of removal, bearing in mind the following points:

- Before refitting the servo, check that the length of the pushrod is as specified (see Specifications), and adjust if necessary by loosening the locknut and turning the pushrod (see illustration).
- Where applicable, tighten all fixings to the specified torque.
- Where applicable, refit the master cylinder as described in Section 12.
- Where applicable, refit the inlet manifold as described in the relevant Part of Chapter 4.
- On completion, check the brake pedal height as described in Section 13.

15 Vacuum servo unit check valve - removal, testing and refitting



Models with servo-mounted valve

Removal

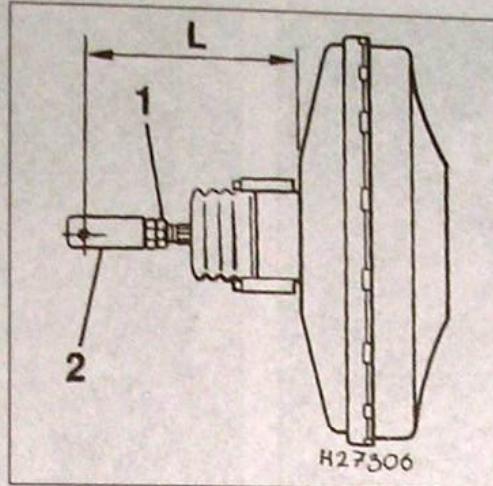
- The valve is a push-fit in the front of the servo unit.
- Release the securing clip, and disconnect the vacuum hose from the valve.
- Withdraw the valve from its rubber sealing grommet, using a pulling and twisting motion. Remove the grommet from the servo.

Testing

- Examine the check valve for signs of damage, and renew if necessary. The valve may be tested by blowing through it in both directions. Air should flow through the valve in one direction only - when blown through from the servo unit end of the valve. Renew the valve if this is not the case.
- Examine the rubber sealing grommet and flexible vacuum hose for signs of damage or deterioration, and renew as necessary.

Refitting

- Fit the sealing grommet into position in the servo unit.



14.12 Ensure that the vacuum servo pushrod length is as specified

L Approx 125.0 mm

1 Locknut
2 Pushrod clevis

7 Carefully ease the check valve into position, taking great care not to displace or damage the grommet. Reconnect the vacuum hose to the valve and, where necessary, securely tighten its retaining clip.

8 On completion, start the engine, and check the check valve-to-servo unit connection for signs of air leaks.

Models with vacuum-hose mounted valve

Removal

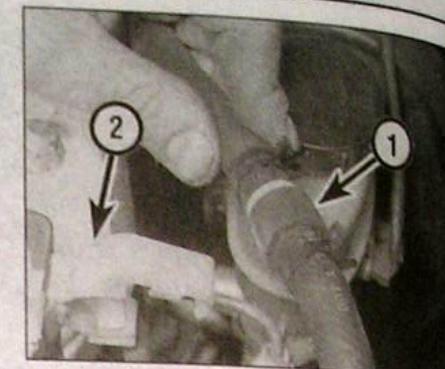
9 The valve is located in the vacuum hose leading to the servo, and is secured to the body panel by a clip.

10 Release the valve from the securing clip (see illustration). Take note of the direction of the arrow on the valve body, which should point in the direction of the hose connected to the engine.

11 Release the retaining clips (where fitted), and disconnect the vacuum hoses from the valve, then withdraw the valve.

Testing

- Proceed as described in paragraph 4.



15.10 Removing the non-return valve (1) from the securing clip (2)

Refitting

13 Refitting is a reversal of removal, ensuring that the arrow on the valve body points towards the engine (see illustration).

14 On completion, start the engine and check the hose connections to the valve for air leaks.

16 Handbrake lever - removal and refitting



Removal

1 Disconnect the battery negative terminal (refer to *Disconnecting the battery* in the Reference Section of this manual).

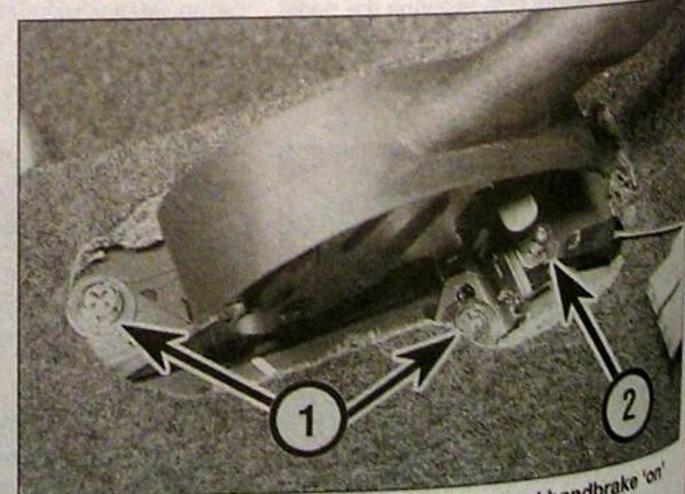
2 Remove the centre console as described in Chapter 11.

3 Chock the wheels, and fully release the handbrake.

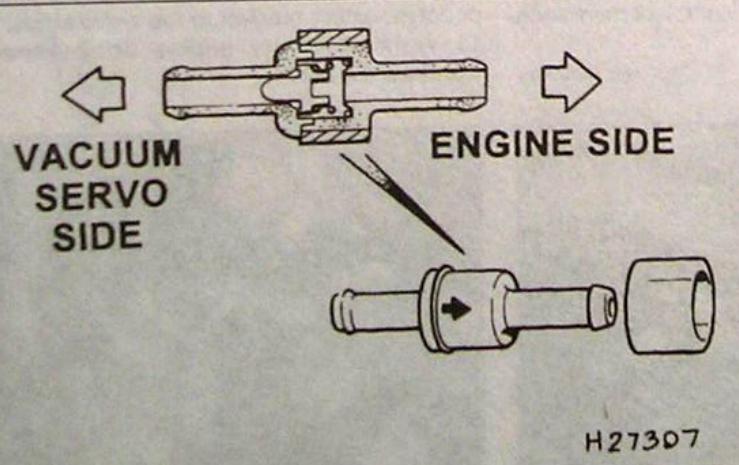
4 Disconnect the wiring plug from the handbrake 'on' warning light switch.

5 Count the number of exposed threads on the cable adjuster rod (to ease adjustment on refitting), then unscrew the adjuster nut, and disconnect adjuster rod from the handbrake lever.

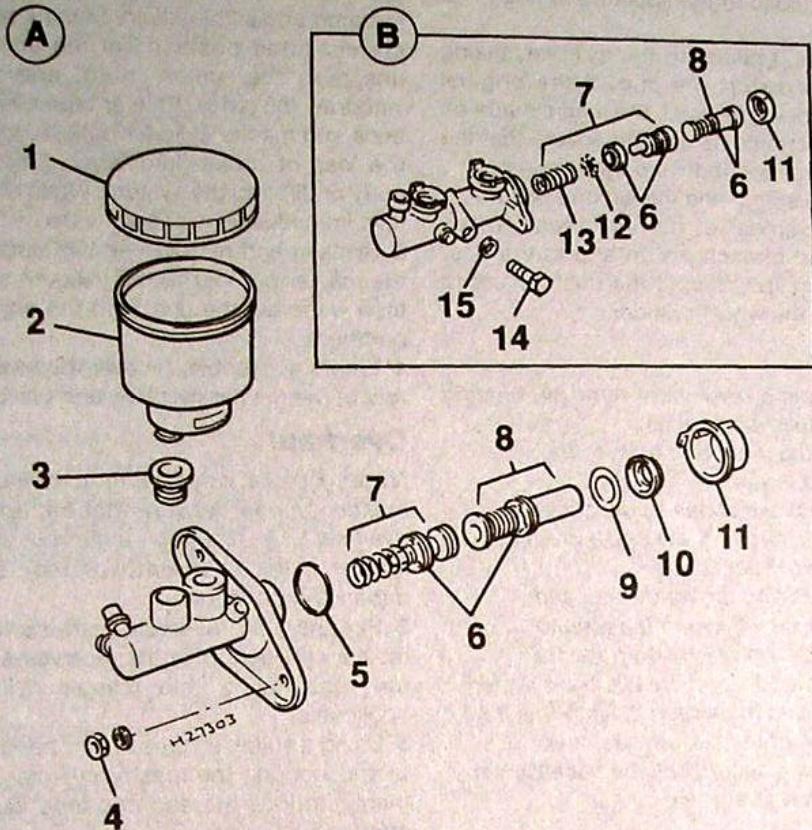
6 Remove the two securing bolts, and withdraw the handbrake lever assembly (see illustration).



16.6 Handbrake lever securing bolts (1) and handbrake 'on' warning light switch (2)



15.13 The arrow on the vacuum servo unit check valve must point towards the engine - models with ABS



12.6 Master cylinder components

A Models without ABS

- 1 Fluid reservoir cap
- 2 Fluid reservoir
- 3 Seal
- 4 Master cylinder securing nut
- 5 Seal

B Models with ABS

- 6 Piston cup
- 7 Secondary piston assembly
- 8 Primary piston assembly
- 9 Shim
- 10 Seal
- 11 End cap
- 12 Spring seat
- 13 Secondary return spring
- 14 Stop-bolt
- 15 O-ring

11 Before reassembly, soak the pistons and the new seals in clean hydraulic fluid. Smear clean fluid into the cylinder bore.

12 Insert the piston assemblies into the cylinder bore (make sure that the assemblies are inserted squarely), using a twisting motion to avoid trapping the seal lips. Ensure that all components are refitted in the correct order

and the right way round, then fit the washer to the end of the primary piston. Where applicable, follow the assembly instructions supplied with the repair kit. On models with ABS, ensure that the slot in the secondary piston assembly aligns with the stop-bolt hole in the side of the master cylinder.

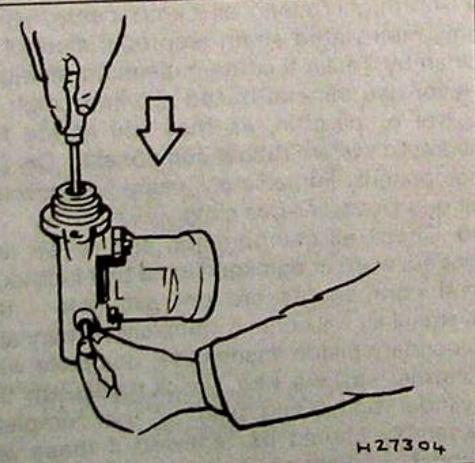
13 On models with ABS, compress the piston assemblies into the cylinder bore, using a clean wooden dowel as during removal, then refit the stop-bolt, ensuring that it engages with the slot in the secondary piston assembly (see illustration).

14 Press the piston assemblies fully into the bore using a clean wooden dowel, and secure them in position with the new end cap (supplied in the overhaul kit). Bend the tangs into position to secure the end cap.

15 Examine the fluid reservoir seals, and if necessary renew them. Fit the reservoir seals to the master cylinder body, then refit the reservoir.

Refitting

16 Remove all traces of dirt from the master cylinder and servo unit mating surfaces, and where applicable, fit a new seal between the master cylinder body and the servo.



12.13 Compress the piston assemblies into the cylinder bore, and refit the stop-bolt - models with ABS

17 Fit the master cylinder to the servo unit, ensuring that the servo unit pushrod enters the master cylinder bore centrally. Refit the master cylinder mounting nuts, and tighten them to the specified torque.

18 Wipe clean the brake pipe unions, then refit them to the correct master cylinder ports, as noted before removal, and tighten the union nuts securely.

19 Refill the master cylinder reservoir with new fluid, and bleed the complete hydraulic system as described in Section 2.

13 Brake pedal - adjustment, removal and refitting

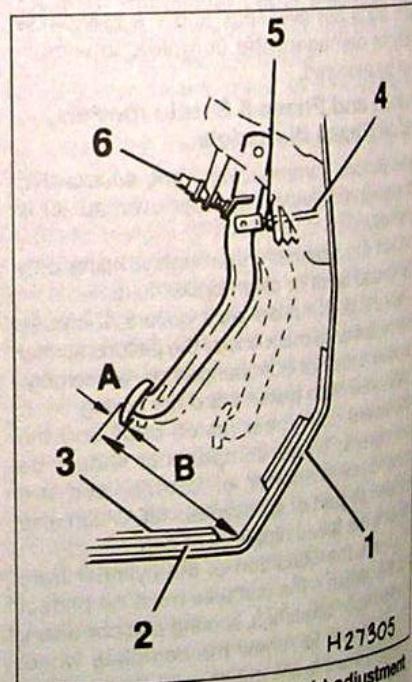
Adjustment

1 The pedal free height should be measured from the top face of the pedal to the floor reinforcement panel.

2 If desired, to improve access, remove the driver's side lower facia panel, as described in Chapter 11.

3 To take the measurement, remove the driver's side footwell trim panel, with reference to Chapter 11 if necessary, then release the securing clip(s) and lift the carpet trim panel to expose the flap in the floor insulation.

4 Lift the flap in the floor insulation, and measure the pedal free height as shown (see illustration). Check the measured height against the value given in the Specifications



13.4 Brake pedal free height adjustment

A Pedal free play	B Pedal free height
1 Floor reinforcement panel	3 Carpet panel
2 Sound insulation	4 Servo pushrod
	5 Locknut
	6 Stop-light switch



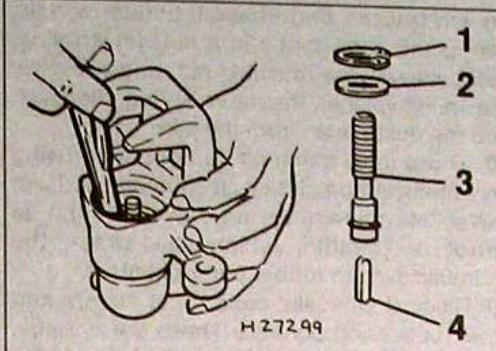
10.27 Fit the handbrake lever return spring in the order shown

and the mounting bracket are in good condition. Check that both guide pins are undamaged, and (when cleaned) a reasonably tight sliding fit in the mounting bracket bores. **24** Use compressed air to blow clear the fluid passages.

Warning: Wear eye protection when using compressed air.

25 Before commencing reassembly, ensure that all components are spotlessly-clean and dry.

26 On Phase I and Phase II Estate models, fit the new dust seal to the handbrake lever cam, and locate the lever on the cam flats. Refit the



10.30 Rear caliper pushrod components

1 Circlip	3 Pushrod
2 Key plate	4 Plunger

return spring, spring washer, and nut. Tighten the nut securely, taking care not to overtighten it. Apply a smear of brake grease to the cam, then slide the cam into the caliper body. Check that the assembly is correctly installed, and that the cam cut-out aligns with the pushrod aperture when the lever is rotated. Hook the return spring over its stop and into the lever.

27 On Phase I and Phase II Saloon and Hatchback models, and all Phase III models, slide the handbrake lever into the caliper body, ensuring that the lever cam cut-out aligns with the pushrod aperture when the lever is rotated. Refit and tighten the stop-bolt, then refit the return spring, hooking it into position as shown (see illustration).

28 Soak the new piston seal in clean hydraulic fluid, and fit it to the groove in the cylinder bore, using your fingers only (no tools) to manipulate it into position.

29 Fit a new O-ring to the pushrod, and apply a smear of rubber grease to the plunger and the pushrod. Assemble the plunger and pushrod, and fit them to the caliper body.

30 Refit the key plate so that its cut-out fits over the squared section of the pushrod, and its convex locating pip matches the concave depression in the caliper body. Secure the assembly by refitting the circlip (see illustration).

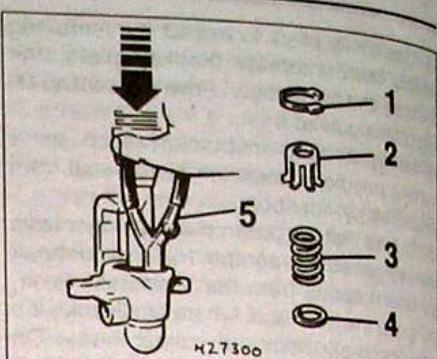
31 Refit the spring seat, the spring and the spring cap, then compress the spring cap (using a suitable length of tubing as during removal) while refitting the securing circlip. Check that the circlip is correctly seated in its groove (see illustration).

32 Fit the new cup seal to the adjusting nut, using only your fingers (no tools) to manipulate it into position. Ensure that the seal is correctly fitted (see illustration).

33 Smear rubber grease over the cup seal lips, and fit the adjusting nut into the piston.

34 Pack the ball bearing with brake grease and refit it, followed by the spacer, the wave washer, and the remaining spacer. Secure the components with the remaining circlip (see illustration).

35 Apply a smear of rubber grease to the inner and outer lips of the new dust seal, then fit it to the piston.



10.31 Rear caliper spring components

1 Circlip	4 Spring seat
2 Spring cap	5 Tube
3 Spring	

36 Smear clean hydraulic fluid over the piston and the caliper cylinder bore, then refit the piston assembly, and screw it in clockwise (using a retractor tool or long-nosed pliers if necessary - see Section 5) until it seats.

37 Engage the dust seal with the caliper body.

38 Fit a new rubber dust cover to each guide pin (also fit a new rubber sleeve to the upper guide pin, where applicable). Apply a smear of brake grease to the guide pins before refitting them to their bores.

Refitting

39 Where applicable, refit the caliper mounting bracket to the hub carrier, and tighten the mounting bolts to the specified torque.

40 Place the caliper in position, coat the threads of the caliper upper guide pin bolt with locking compound, refit the bolt, and tighten it to the specified torque.

41 Refit the brake pads as described in Section 5.

42 Check that the caliper slides smoothly on the mounting bracket.

43 Check that the brake fluid hose is correctly routed, without being twisted, then reconnect the union to the caliper, using two new sealing washers. Refit the union banjo bolt, and tighten to the specified torque.

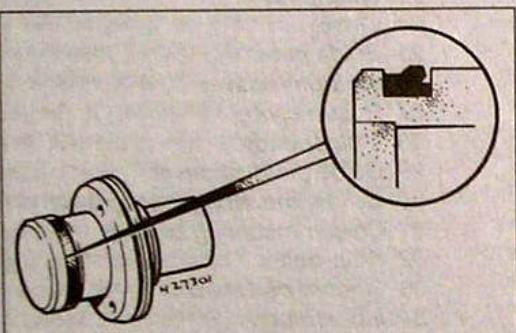
44 Reconnect the end of the handbrake cable to the lever. Refit the cable mounting bracket, and where applicable, the spring clip. Where applicable, ensure that the locating peg on the mounting bracket engages with the corresponding hole in the caliper body.

45 Remove the polythene from the master cylinder reservoir cap, or remove the clamp from the fluid hose, as applicable.

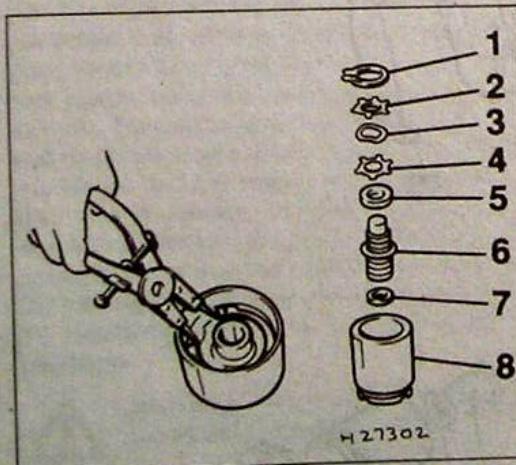
46 Bleed the hydraulic fluid circuit as described in Section 2. Note that if no other part of the system has been disturbed, it should only be necessary to bleed the relevant rear circuit.

47 Depress the brake pedal repeatedly to bring the pads into contact with the brake disc, and ensure that normal pedal pressure is restored.

48 Refit the roadwheel, and lower the vehicle to the ground.

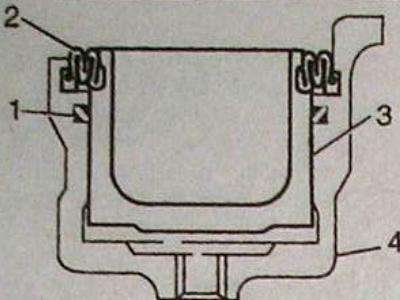


10.32 Ensure that the seal is correctly fitted to the rear brake caliper adjuster nut



10.34 Rear caliper adjuster nut components

1 Circlip	5 Ball bearing
2 Spacer	6 Adjuster nut
3 Wave washer	7 Cup seal
4 Spacer	8 Piston



H27296

9.20 Correct fitting of caliper piston seal and dust seal

1 Piston seal 3 Piston
2 Dust seal 4 Caliper body

11 Peel the dust seal off the piston, and use a blunt instrument, such as a knitting needle, to extract the piston seal from the caliper cylinder bore.

12 Thoroughly clean all components, using only methylated spirit or clean hydraulic fluid. Never use mineral-based solvents such as petrol or paraffin, which will attack the hydraulic system rubber components.

13 The caliper piston seal and the dust seal, the guide pin dust covers, and the bleed nipple dust cap, are only available as part of a seal kit. Since the manufacturers recommend that the piston seal and dust seal are renewed whenever they are disturbed, all of these components should be discarded, and new ones fitted on reassembly as a matter of course.

14 Carefully examine all parts of the caliper assembly, looking for signs of wear or damage. In particular, the cylinder bore and piston must be free from any signs of scratches, corrosion or wear. If there is any doubt about the condition of any part of the caliper, the relevant part should be renewed; note that if the caliper body or the mounting bracket are to be renewed, they are available only as part of the complete assembly.

15 The manufacturers recommend that minor scratches, rust, etc, may be polished away from the cylinder bore using fine emery paper, but the piston must be renewed to cure such defects. The piston surface is plated, and **must not** be polished with emery or similar abrasives.

16 Check that the threads in the caliper body and the mounting bracket are in good condition. Check that both guide pins are undamaged, and (when cleaned) a reasonably tight sliding fit in the mounting bracket bores.

17 Use compressed air to blow clear the fluid passages.



Warning: Wear eye protection when using compressed air.

18 Before commencing reassembly, ensure that all components are spotlessly-clean and dry.

19 Soak the new piston seal in clean hydraulic fluid, and fit it to the groove in the cylinder bore, using your fingers only (no tools) to manipulate it into place.

20 Fit the new dust seal to the piston groove, smear clean hydraulic fluid over the piston and caliper cylinder bore, and refit the piston. Press the piston fully into the caliper body, then fit the dust seal to the groove in the caliper body (see illustration).

21 Fit a new rubber dust cover to each guide pin, and apply a smear of brake grease to the guide pins before refitting them to their bores.

Refitting

22 Where applicable, refit the caliper mounting bracket to the hub carrier, and tighten the mounting bolts to the specified torque.

23 Place the caliper in position, then coat the threads of the caliper upper guide pin bolt with locking compound, refit the bolt, and tighten it to the specified torque.

24 Refit the brake pads as described in Section 4.

25 Check that the caliper slides smoothly on the mounting bracket.

26 Check that the brake fluid hose is correctly routed, without being twisted, then reconnect the union to the caliper, using two new sealing washers. Refit the union banjo bolt, and tighten to the specified torque.

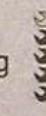
27 Remove the polythene from the master cylinder reservoir cap, or remove the clamp from the fluid hose, as applicable.

28 Bleed the hydraulic fluid circuit as described in Section 2. Note that if no other part of the system has been disturbed, it should only be necessary to bleed the relevant front circuit.

29 Depress the brake pedal repeatedly to bring the pads into contact with the brake disc, and ensure that normal pedal pressure is restored.

30 Refit the roadwheel, and lower the vehicle to the ground.

10 Rear brake caliper - removal, overhaul and refitting



Warning: Before starting work, refer to the note at the beginning of Section 2 concerning the dangers of hydraulic fluid, and to the warning at the beginning of Section 4 concerning the dangers of asbestos dust.

Note: Suitable locking compound will be required to coat the threads of the caliper guide pin bolts on refitting.

Removal

1 Chock the front wheels, then jack up the rear of the car and support it on axle stands (see *Jacking and Vehicle Support*). Remove the appropriate rear roadwheel.

2 Release the spring clip securing the handbrake cable to the mounting bracket, then disconnect the end of the cable from the lever on the caliper (see illustration).

3 To minimise fluid loss during the following

operations, remove the master cylinder reservoir cap, then tighten it down onto a piece of polythene, to obtain an airtight seal. Alternatively, use a brake hose clamp, a G-clamp or a similar tool to clamp the flexible hose running to the caliper.

4 Clean the area around the fluid hose union on the caliper, then unscrew the hose union banjo bolt. Recover the two sealing washers. Cover the open ends of the banjo and the caliper, to prevent dirt ingress.

5 Remove the brake pads as described in Section 5.

6 Unscrew the caliper upper guide pin bolt. If necessary, use a slim open-ended spanner to counterhold the head of the guide pin.

7 Withdraw the caliper.

8 If desired, the caliper mounting bracket can be unbolted from the hub carrier.

Overhaul

Note: Before commencing work, ensure that the appropriate caliper overhaul kit is obtained.

9 With the caliper on the bench, wipe away all traces of dust and dirt, but *avoid inhaling the dust, as it is a health hazard*.

10 Extract the caliper guide pins by screwing the bolts into the pins, and pulling on the bolts to withdraw the pins. Peel off the rubber dust cover from each guide pin, and the rubber sleeve which may be fitted to the upper guide pin of some models (see illustration).

11 Engage a suitable pair of long-nosed pliers with the notches in the piston, then turn the piston anti-clockwise (viewed from the outboard end of the caliper), to unscrew it from the caliper. Withdraw the piston from the caliper body, and peel off the dust seal.

12 Working inside the rear of the piston, use circlip pliers to extract the circlip, then remove the first spacer, the wave washer, the second spacer, the ball bearing, and the adjusting nut. Prise the cup seal off the adjusting nut.

13 Working inside the caliper cylinder bore, use circlip pliers to extract the circlip, whilst using a suitable length of tubing to compress the spring cap against the spring pressure.

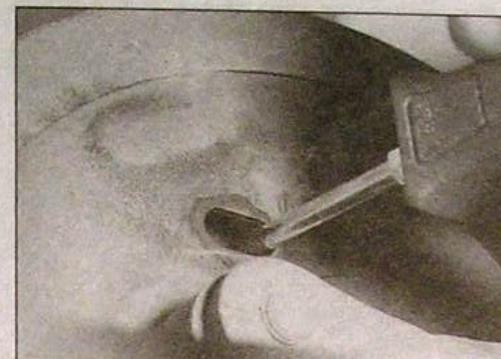
14 With the circlip removed from its groove, allow the spring to push out the components until pressure is relaxed, then withdraw the circlip, the spring cap, the spring and the spring seat.



10.2 Disconnecting the handbrake cable from the bracket on the rear caliper



8.4a Remove the blanking plug from the brake backplate ...



8.4b ... and use a screwdriver to free the handbrake adjuster mechanism

8 Rear brake drum - removal, inspection and refitting



Warning: Before starting work, refer to the warning at the beginning of Section 4 concerning the dangers of asbestos dust.

Removal

1 Chock the front wheels, then jack up the rear of the car and support it on axle stands (see *Jacking and Vehicle Support*). Remove the appropriate rear roadwheel.

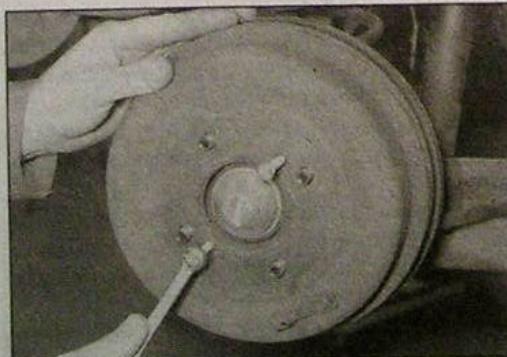
2 Fully release the handbrake.

3 If the drum cannot easily be pulled from the wheel studs, retract the brake shoes as follows.

4 Remove the blanking plug from the rear of the brake backplate. Insert a suitable tool through the hole in the backplate and through the hole in the shoe, until the tool contacts the handbrake operating lever. Lightly tap the tool in order to free the adjuster mechanism and retract the shoes (see **illustrations**).

5 If the original drum is to be refitted, mark the relationship between the drum and the hub, then pull the drum from the roadwheel studs.

6 If the drum is still tight, it can be pushed off by screwing two M8 bolts into the holes provided in the drum, and evenly tightening the bolts to push the drum from the hub (see **illustration**).



8.6 Using two M8 bolts to remove a brake drum

expand the brake shoes against the drum, and ensure that normal pedal pressure is restored.

15 Check and if necessary adjust the handbrake cable as described in Chapter 1.

16 Refit the roadwheel, and lower the vehicle to the ground.

9 Front brake caliper - removal, overhaul and refitting



Warning: Before starting work, refer to the note at the beginning of Section 2 concerning the dangers of hydraulic fluid, and to the warning at the beginning of Section 4 concerning the dangers of asbestos dust. Note: Suitable locking compound will be required to coat the threads of the caliper guide pin bolts on refitting.

Removal

1 Apply the handbrake, then jack up the front of the car and support it on axle stands (see *Jacking and Vehicle Support*). Remove the appropriate front roadwheel.

2 To minimise fluid loss during the following operations, remove the master cylinder reservoir cap, then tighten it down onto a piece of polythene, to obtain an airtight seal. Alternatively, use a brake hose clamp, a G-clamp or a similar tool to clamp the flexible hose running to the caliper.

3 Clean the area around the fluid hose union on the caliper, then unscrew the hose union banjo bolt. Recover the two sealing washers. Cover the open ends of the banjo and the caliper, to prevent dirt ingress.

4 Remove the brake pads as described in Section 4.

5 Unscrew the caliper upper guide pin bolt. If necessary, use a slim open-ended spanner to counterhold the head of the guide pin.

6 Withdraw the caliper.

7 If desired, the caliper mounting bracket can be unbolted from the hub carrier.

Overhaul



Before commencing work, ensure that the appropriate caliper overhaul kit is obtained.

8 With the caliper on the bench, wipe away all traces of dust and dirt, but avoid inhaling the dust, as it is a health hazard.

9 Extract the caliper guide pins, if necessary by screwing the bolts into the pins, and pulling on the bolts to withdraw the pins. Peel off the rubber dust cover from each guide pin (see **illustrations**).

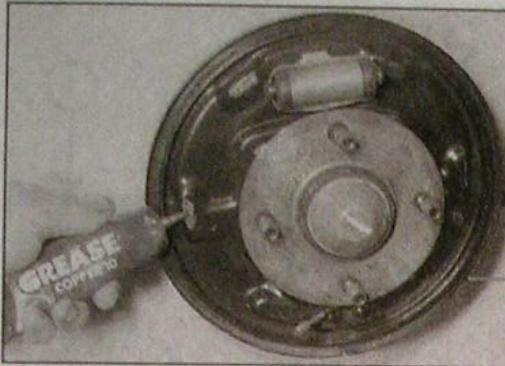
10 Place a small block of wood between the caliper body and the piston. Remove the piston, including the dust seal, by applying a jet of low-pressure compressed air, such as that from a tyre pump, to the fluid inlet port.

Refitting

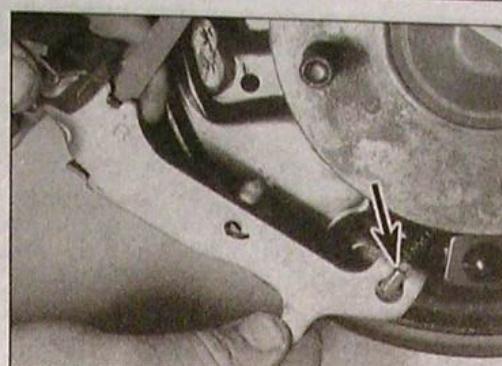
12 If a new brake drum is to be installed, use a suitable solvent to remove any preservative coating that may have been applied to its internal friction surfaces. Note that it may also be necessary to shorten the adjuster strut length, by rotating the strut wheel, to allow the drum to pass over the brake shoes.

13 If the original drum is being refitted, align the marks made on the drum and hub before removal, then fit the drum over the wheel studs.

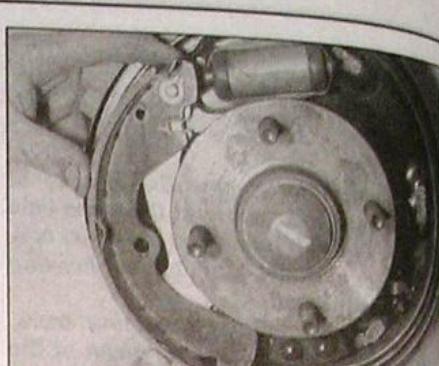
14 Depress the footbrake repeatedly to



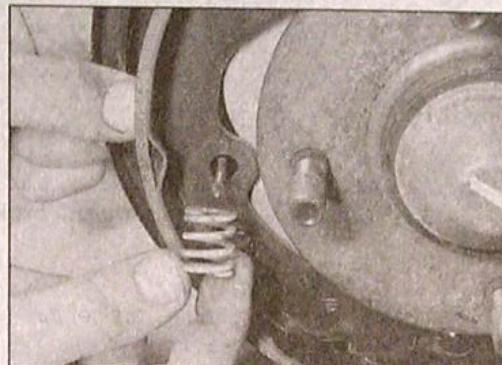
6.15 Apply brake grease to the shoe contact faces of the backplate



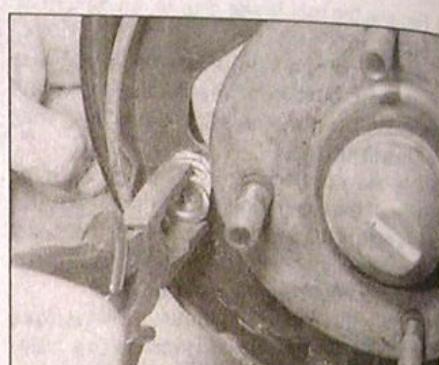
6.16a Engage the handbrake cable (arrowed) with the operating lever ...



6.16b ... then manipulate the shoe into position ...



6.16c ... and secure with the hold-down pin, spring ...



6.16d ... and cup

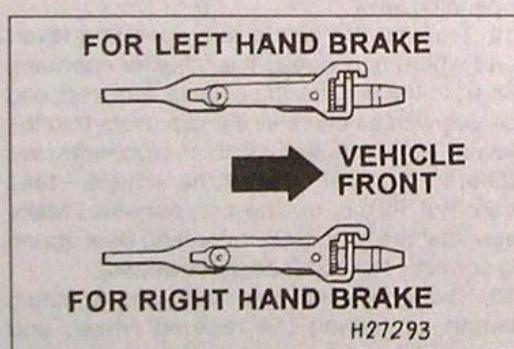
apply a small amount of brake grease to the contact faces of the adjuster strut and handbrake operating lever/adjuster operating lever, as applicable.

14 Where applicable, fit the return spring over the handbrake cable.

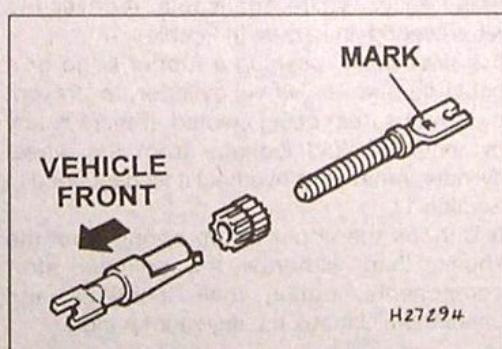
15 Apply brake grease sparingly to the shoe contact surfaces of the brake backplate (see illustration).

16 Offer up the trailing shoe to the backplate, then engage the handbrake cable with the operating lever on the shoe. Manipulate the shoe into position, and secure with the hold-down pin, spring and cup (see illustrations).

17 Engage the adjuster strut with the relevant cut-out in the trailing shoe. Ensure that the adjuster strut is fitted the correct way round. Where applicable, refit the adjuster spring, and on Estate models, ensure that the adjuster lever engages with the toothed wheel (see illustrations).



6.17a Adjuster strut orientation - Phase I and Phase II Saloon and Hatchback models and all Phase III models



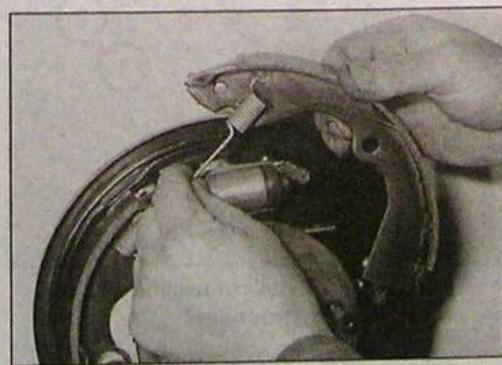
6.17b Adjuster strut orientation - Phase I and Phase II Estate models



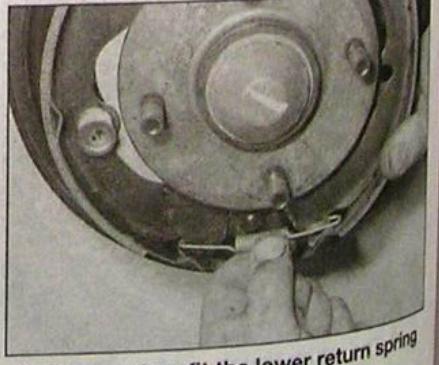
6.17c Engaging the adjuster strut with the trailing shoe



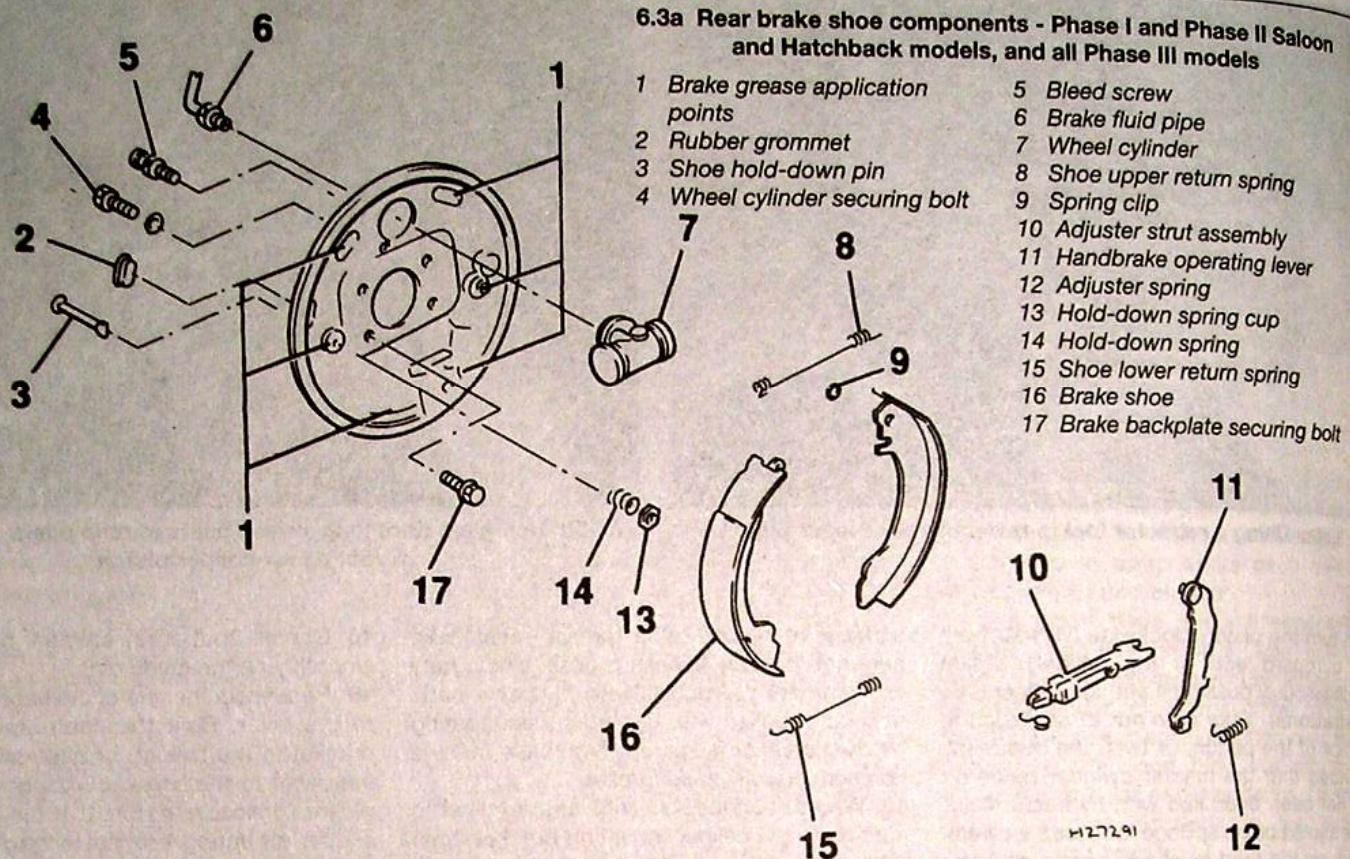
6.18 Engage the upper return spring with the trailing shoe



6.19a Engage the return spring with the leading shoe ...



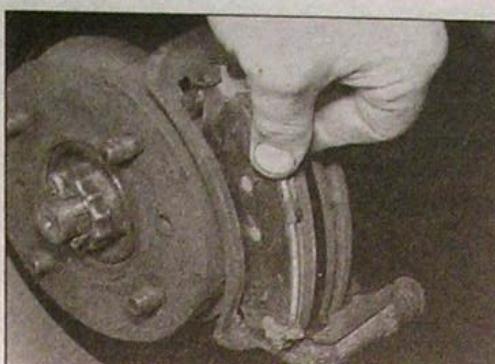
6.19b ... then fit the lower return spring

**6.3b Rear brake shoe components - Phase I and Phase II Estate models**

1 Rubber grommet
 2 Shoe hold-down pin
 3 Wheel cylinder securing bolt
 4 Rubber grommet
 5 Brake backplate
 6 Spring
 7 Bleed screw dust cover
 8 Bleed screw
 9 Wheel cylinder body
 10 Piston cup
 11 Piston
 12 Dust cover
 13 Wheel cylinder assembly
 14 Adjuster/handbrake operating lever assembly
 15 Washer
 16 Spring clip
 17 Hold-down spring
 18 Hold-down spring cup
 19 Brake drum
 20 Shoe lower return spring
 21 Shoe upper return spring
 22 Brake shoe
 23 Adjuster strut assembly
 24 Brake backplate securing bolt



4.24a Refit the anti-rattle clips to the caliper mounting bracket - Bendix caliper



4.24b Refit the outboard ...



4.24c ... and inboard pads - Bendix caliper

ensuring that the pad friction material is against the disc (see illustrations).

25 Pivot the caliper back into position, over the pads and mounting bracket.

26 Apply a little locking fluid to the threads of the caliper lower guide pin bolt, then refit the bolt and tighten to the specified torque.

27 Proceed as described in paragraphs 14 to 18 inclusive.

5 Rear brake pads - renewal



Warning: Renew BOTH sets of rear brake pads at the same time - NEVER renew the pads on only one wheel, as uneven braking may result.



Warning: Before starting work, refer to the warning given at the beginning of Section 4, concerning the dangers of asbestos dust.

Note: Suitable locking compound will be required to coat the threads of the caliper guide pin bolt(s) on refitting.

1 Chock the front wheels, then jack up the rear of the car and support it on axle stands (see *Jacking and Vehicle Support*). Remove the rear roadwheels, and release the handbrake fully.

2 Working on one side of the vehicle, release

the spring clip securing the handbrake cable to the bracket on the brake caliper, then release the cable from the bracket, and disconnect the end of the cable from the lever on the caliper (see illustrations). Alternatively, undo the bracket retaining bolt and release the bracket and cable from the caliper.

3 Push the caliper piston into its bore by pulling the caliper outwards.

4 Unscrew the caliper lower guide pin bolt (see illustration). If necessary, use a slim open-ended spanner to counterhold the head of the guide pin.

5 Pivot the caliper body upwards to expose the brake pads. Do not depress the brake pedal until the caliper is refitted. Take care not to strain the brake fluid hose. Where applicable, note the locations and orientation of the shims fitted to the rear of each pad and, where applicable, the anti-rattle shims fitted to the top and bottom of the pads.

6 Withdraw the pads, and where applicable, the shims and the anti-rattle springs.

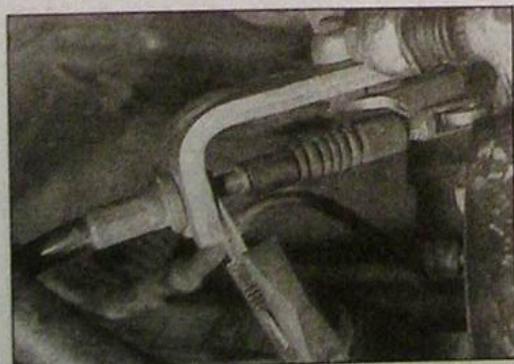
7 First measure the thickness of each brake pad's friction material. If either pad is worn at any point to the specified minimum thickness or less, all four pads must be renewed. Also, the pads should be renewed if any are fouled with oil or grease; there is no satisfactory way of degreasing friction material, once contaminated. If any of the brake pads are worn unevenly, or are fouled with oil or

grease, trace and rectify the cause before reassembly. New brake pads and shim/spring kits are available from Nissan dealers. Do not be tempted to swap brake pads over to compensate for uneven wear.

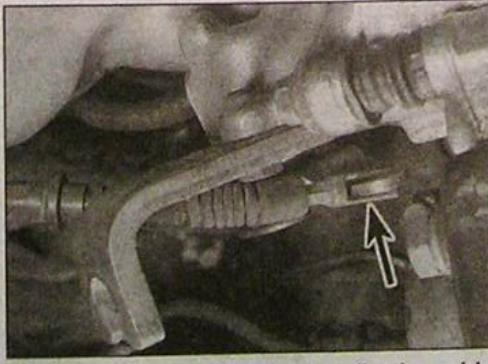
8 If the brake pads are still serviceable, carefully clean them using a clean, fine wire brush or similar, paying particular attention to the sides and back of the metal backing. Where applicable, clean out the grooves in the friction material, and pick out any large embedded particles of dirt or debris. Carefully clean the pad locations in the caliper body/mounting bracket.

9 Prior to fitting the pads, check that the guide pins are free to slide easily in the caliper body/mounting bracket, and check that the rubber guide pin gaiters are undamaged. Brush the dust and dirt from the caliper and piston, but do not inhale it, as it is a health hazard. Inspect the dust seal around the piston for damage, and the piston for evidence of fluid leaks, corrosion or damage. If attention to any of these components is necessary, refer to Section 5.

10 If new brake pads are to be fitted, the caliper piston must be pushed back into the cylinder, to make room for them. To retract the piston, ideally a suitable retractor tool should be used (available from motor factors). Alternatively, engage a suitable pair of long-nosed pliers with the notches in the piston,



5.2a Release the spring clip ...



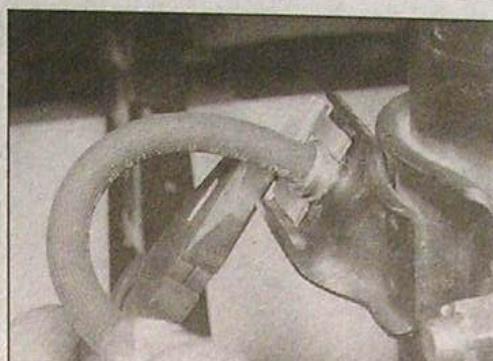
5.2b ... then release the handbrake cable from the bracket and the lever on the caliper (arrowed)



5.4 Removing the caliper lower guide pin bolt



3.2a Brake pipe union-to-bracket securing clip (arrowed)



3.2b Removing a front brake hose-to-bracket securing clip

3 Hydraulic pipes and hoses - renewal



Note: Before starting work, refer to the note at the beginning of Section 2 concerning the dangers of hydraulic fluid.

1 If any pipe or hose is to be renewed, minimise fluid loss by first removing the master cylinder reservoir cap, then tighten the cap down onto a piece of polythene to obtain an airtight seal. Alternatively, flexible hoses can be sealed, if required, using a proprietary brake hose clamp; metal brake pipe unions can be plugged (if care is taken not to allow dirt into the system) or capped immediately they are disconnected. Place a wad of rag under any union that is to be disconnected, to catch any spilt fluid.

2 If a flexible hose is to be disconnected, unscrew the brake pipe union nut before removing the spring clip which secures the hose to its mounting bracket (see illustrations).

3 To unscrew the union nuts, it is preferable to obtain a brake pipe spanner of the correct size; these are available from most large motor accessory shops. Failing this, a close-fitting open-ended spanner will be required, though if the nuts are tight or corroded, their flats may be rounded-off if the spanner slips. In such a case, a self-locking wrench is often the only way to unscrew a stubborn union, but it follows that the pipe and the damaged nuts must be

renewed on reassembly. Always clean a union and surrounding area before disconnecting it. If disconnecting a component with more than one union, make a careful note of the connections before disturbing any of them.

4 If a brake pipe is to be renewed, it can be obtained, cut to length and with the union nuts and end flares in place, from Nissan dealers. All that is then necessary is to bend it to shape, following the line of the original, before fitting it to the vehicle. Alternatively, most motor accessory shops can make up brake pipes from kits, but this requires very careful measurement of the original, to ensure that the replacement is of the correct length. The safest answer is usually to take the original to the shop as a pattern.

5 On refitting, do not overtighten the union nuts. It is not necessary to exercise brute force to obtain a sound joint.

6 Ensure that the pipes and hoses are correctly routed, with no kinks, and that they are secured in the clips or brackets provided. After fitting, remove the polythene from the reservoir, and bleed the hydraulic system as described in Section 2. Wash off any spilt fluid, and check carefully for fluid leaks.

1 Apply the handbrake, then jack up the front of the car and support it on axle stands (see *Jacking and Vehicle Support*). Remove the front roadwheels.

2 Working on one side of the vehicle, push the caliper piston into its bore by pulling the caliper outwards.

Models with Girling-type front caliper

3 Unscrew the upper and lower caliper guides pin bolts (if necessary, use a slim open-ended spanner to counterhold the head of the guide pin), then lift the caliper from the hub/disc assembly (see illustration). Note that the outboard pad may be retained in the caliper bracket. Do not depress the brake pedal until the caliper is refitted.

4 Ensure that the caliper is adequately supported (do not allow the caliper to hang from the brake hose), then withdraw the brake pads. Note that the inboard pad is clipped into the caliper piston.

5 Where applicable, recover the shims from the rear of the pads.

6 First measure the thickness of each brake pad's friction material. If either pad is worn at any point to the specified minimum thickness or less, all four pads must be renewed. Also, the pads should be renewed if any are fouled with oil or grease; there is no satisfactory way of degreasing friction material, once contaminated. If any of the brake pads are worn unevenly, or are fouled with oil or grease, trace and rectify the cause before reassembly. New brake pads and shim/clip kits are available from Nissan dealers. Do not be tempted to swap brake pads over to compensate for uneven wear.

7 If the brake pads are still serviceable, carefully clean them using a clean, fine wire brush or similar, paying particular attention to the sides and back of the metal backing. Where applicable, clean out the grooves in the friction material, and pick out any large embedded particles of dirt or debris.

8 Remove the anti-rattle clips from the caliper bracket, and clean the surfaces of the bracket, clips, and the pad locations in the caliper body/mounting bracket.

9 Prior to fitting the pads, check that the guide pins are free to slide easily in the caliper body/mounting bracket, and check that the rubber guide pin gaiters are undamaged. Brush the dust and dirt from the caliper and piston, but do not inhale it, as it is a health hazard. Inspect the dust seal around the piston for damage, and the piston for evidence of fluid leaks, corrosion or damage. If attention to any of these components is necessary, refer to Section 9.

10 If new brake pads are to be fitted, the caliper piston must be pushed back into the cylinder, to make room for them. Either use a G-clamp or similar tool, or use suitable pieces of wood as levers. Provided that the master cylinder reservoir has not been overfilled with hydraulic fluid, there should be no spillage, but



4.3 Removing the caliper lower guide pin bolt (arrowed) - Girling-type caliper

4 Front brake pads - renewal



Warning: Renew **BOTH** sets of front brake pads at the same time - **NEVER** renew the pads on only one wheel, as uneven braking may result.



Warning: Note that the dust created by wear of the pads may contain asbestos, which is a health hazard. Never blow it out with compressed air, and don't inhale any of it. An approved filtering mask should be worn when working on the brakes. **DO NOT** use petrol or petroleum-based solvents to clean brake parts; use brake cleaner or methylated spirit only.

Note: Suitable locking compound will be required to coat the threads of the caliper guide pin bolt(s) on refitting.

Note: When servicing any part of the system, work carefully and methodically; also observe scrupulous cleanliness when overhauling any part of the hydraulic system. Always renew components (in axle sets, where applicable) if in doubt about their condition, and use only genuine Nissan replacement parts, or at least those of known good quality. Note the warnings given in Safety first and at relevant points in this Chapter concerning the dangers of asbestos dust and hydraulic fluid.

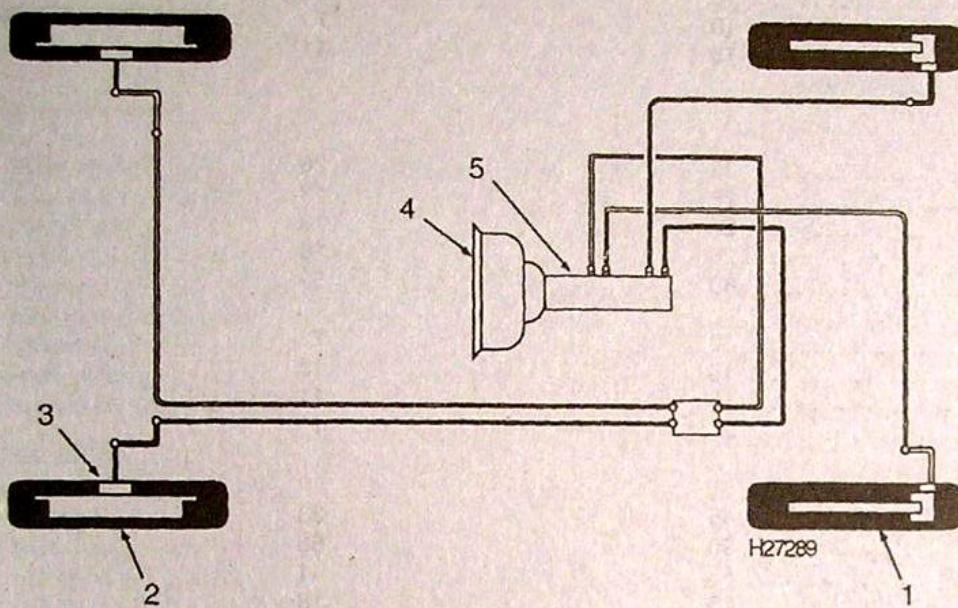
Note: Throughout this Chapter references are made to Phase I, Phase II and Phase III models according to year of production. This classification has been necessary where modifications to the model range affect the repair procedure being described. The Phases relate to the model years as follows:

Phase I - 1990 to June 1993

Phase II - June 1993 to October 1996

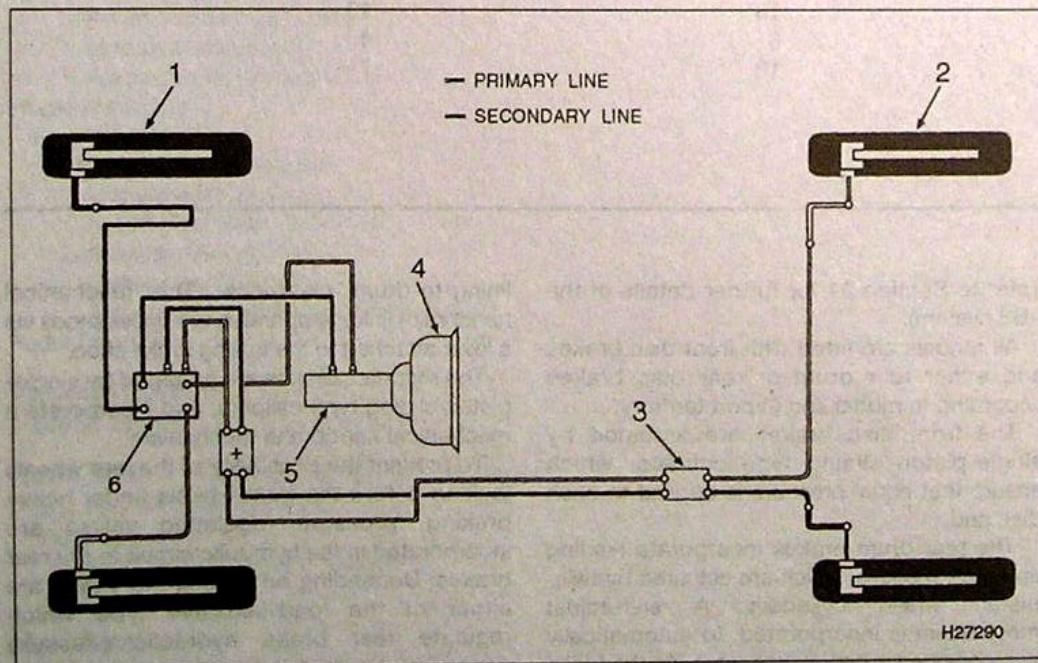
Phase III - October 1996 to September 1999

2 Hydraulic system - bleeding



1.1a Braking system layout - Phase I and Phase II models without ABS

1 Front disc brake	3 Rear brake pressure-regulating valve (in wheel cylinder)	4 Vacuum servo
2 Rear drum brake		5 Master cylinder



1.1b Braking system layout - Phase I and Phase II models with ABS

1 Front disc brake	3 Rear brake pressure-regulating valves	5 Master cylinder
2 Rear disc brake		6 Modulator assembly
	4 Vacuum servo	

Warning: Hydraulic fluid is poisonous; wash off immediately and thoroughly in the case of skin contact, and seek immediate medical advice if any fluid is swallowed, or gets into the eyes. Certain types of hydraulic fluid are inflammable, and may ignite when allowed into contact with hot components. When servicing any hydraulic system, it is safest to assume that the fluid is inflammable, and to take precautions against the risk of fire as though it is petrol that is being handled. Hydraulic fluid is also an effective paint stripper, and will attack plastics; if any is spilt, it should be washed off immediately, using copious quantities of fresh water. Finally, it is hygroscopic (it absorbs moisture from the air) - old fluid may be contaminated and unfit for further use. When topping-up or renewing the fluid, always use the recommended type, and ensure that it comes from a freshly-opened sealed container.

General

1 The correct operation of any hydraulic system is only possible after removing all air from the components and circuit; and this is achieved by bleeding the system.

2 During the bleeding procedure, add only clean, unused hydraulic fluid of the recommended type; never re-use fluid that has already been bled from the system. Ensure that sufficient fluid is available before starting work.

3 If there is any possibility of incorrect fluid being already in the system, the brake components and circuit must be flushed completely with uncontaminated, correct fluid, and new seals should be fitted throughout the system.

4 If hydraulic fluid has been lost from the system, or air has entered because of a leak, ensure that the fault is cured before proceeding further.

5 Park the vehicle on level ground, switch off the engine and select first or reverse gear (or 'P'), then chock the wheels and release the handbrake.

6 Check that all pipes and hoses are secure, unions tight and bleed screws closed. Remove the dust caps (where applicable), and clean any dirt from around the bleed screws.

7 Unscrew the master cylinder reservoir cap, and top the master cylinder reservoir up to the 'MAX' level line; refit the cap loosely. Remember to maintain the fluid level at least above the 'MIN' level line throughout the procedure, otherwise there is a risk of further air entering the system.

8 There are a number of one-man, do-it-yourself brake bleeding kits currently available

Rear disc brakes

Type	Solid disc with single-piston sliding caliper
Disc diameter	258.0 mm
Disc thickness:	
New:	
All except Phase I and Phase II Estate models	10.0 mm
Phase I and Phase II Estate models	9.0 mm
Minimum thickness (0.02 mm maximum variation between sides):	
All except Phase I and Phase II Estate models	9.0 mm
Phase I and Phase II Estate models	8.0 mm
Maximum disc run-out	0.07 mm
Minimum pad friction material thickness	2.0 mm

Rear drum brakes

Type	Drum, with leading and trailing shoes operated by twin-piston wheel cylinder
Drum inner diameter:	
New:	
Phase I and Phase II Saloon and Hatchback models	203.2 mm
Phase I and Phase II Estate models	228.6 mm
Phase III models	228.6 mm
Maximum diameter after machining:	
Phase I and Phase II Saloon and Hatchback models	204.5 mm
Phase I and Phase II Estate models	230.0 mm
Phase III models	230.0 mm
Maximum out-of-round	0.03 mm
Minimum shoe lining thickness	1.5 mm

Brake pedal

Phase I and Phase II models:

Free height:	
Right-hand drive Saloon and Hatchback models:	
Manual transmission	162.0 to 172.0 mm
Automatic transmission	170.5 to 180.5 mm
Right-hand drive Estate models:	
Manual transmission	153.0 to 163.0 mm
Automatic transmission	162.0 to 172.0 mm
Left-hand-drive Saloon and Hatchback models:	
Manual transmission	151.0 to 161.0 mm
Automatic transmission	159.0 to 169.0 mm
Left-hand drive Estate models:	
Manual transmission	143.0 to 153.0 mm
Automatic transmission	151.5 to 161.5 mm

Phase III models:

Free height:	
Right-hand drive models:	
Manual transmission	160.0 to 170.0 mm
Automatic transmission	169.0 to 179.0 mm
Left-hand-drive models:	
Manual transmission	151.0 to 161.0 mm
Automatic transmission	160.0 to 170.0 mm
Pedal free-play	1.0 to 3.0 mm

Vacuum servo

Pushrod length

125.0 mm

Rear brake pressure-regulating valve

Phase I and Phase II models:

Valve spring length:	
Saloon and Hatchback models	86.0 to 90.0 mm
Estate models	157.7 to 160.7 mm

Handbrake

Number of handbrake clicks required to operate handbrake 'on' warning light:

Phase I and Phase II models:	
Saloon and Hatchback models	1 to 2 clicks
Estate models	0 to 1 click
Phase III models	1 to 2 clicks

Chapter 9

Braking system

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Degrees of difficulty

Easy, suitable for novice with little experience		Fairly easy, suitable for beginner with some experience		Fairly difficult, suitable for competent DIY mechanic		Difficult, suitable for experienced DIY mechanic		Very difficult, suitable for expert DIY or professional	
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Specifications

General

System type

Dual hydraulic circuit. Anti-lock braking system fitted to certain Phase I and all Phase II and Phase III models. Front ventilated disc brakes on all models. Rear drum or rear disc brakes according to model and territory. Vacuum servo-assistance on all models. Cable-operated handbrake acting on rear wheels.

Front brakes

Type

Ventilated disc, with single-piston sliding caliper

Disc diameter:

Phase I and Phase II models:

Saloon and Hatchback models:

All except 1.6 litre models without ABS

257.0 mm

1.6 litre models without ABS

242.0 mm

Estate models

257.0 mm

Phase III models:

1.6 litre models

257.0 mm

2.0 litre (SR20De engine) models

257.0 mm

2.0 litre (SR20DE engine) models

280.0 mm

Disc thickness:

New:

257.0 mm and 280.0 mm diameter disc

22.0 mm

242.0 mm diameter disc

20.0 mm

Minimum thickness (0.02 mm maximum variation between sides):

257.0 mm and 280.0 mm diameter disc

20.0 mm

242.0 mm diameter disc

18.0 mm

Maximum disc run-out

0.07 mm

Minimum pad friction material thickness

2.0 mm