






# Chapter 10

## Braking system

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### Degrees of difficulty

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

#### System

Standard type	Discs all round, dual hydraulic circuit supplied by main hydraulic system, automatic rear brake limitation. Front pad wear warning system. Cable operated handbrake to front wheel discs
ABS type	Electro-hydraulic controlled anti-lock brake system, complementary to standard system

#### Front brakes

Disc diameter	266 mm
Disc thickness:	
Standard:	
New	10 mm
Wear limit	7 mm
ABS:	
Ventilated	20.4 mm
Maximum disc run-out	0.2 mm
Minimum pad lining thickness	Indicated by warning lamp

#### Rear brakes

Disc diameter	224 mm
Disc thickness:	
New	7 mm
Wear limit	4 mm
Maximum disc run-out	0.2 mm
Minimum pad lining thickness	2 mm - suggested

#### Pedal

Brake pedal-to-compensator valve clearance:	
1st type	1.0 to 3.0 mm
2nd type	0.1 to 1.0 mm

#### Wheel sensor - ABS

Air gap (non-adjustable):	
Front	0.30 to 1.0 mm
Rear	0.50 to 1.10 mm

### Electronic control unit - ABS

Make .....	Teves
Reference .....	ATE 100901 -0014-4

### Torque wrench settings

	Nm	lbf ft
Compensator control valve .....	18	13
Rear brake disc screws .....	45	32
Rear caliper bolts .....	45	32
Front caliper bolt .....	110	80
Wheel sensor (front) - ABS .....	10	7

## 1 General information and precautions

### General information

#### Standard system

This dual circuit system, with disc brakes fitted to all wheels, is hydraulically operated from the main hydraulic system. The front brakes are supplied from the hydraulic pressure regulator and the rear brakes are supplied from the rear suspension system. This arrangement favours the front brakes and imposes a braking effort limitation on the rear axle in relation to the load. The braking action is applied through the brake pedal operating a hydraulic control valve which allows pressure to the braking system.

The front brake pads are equipped with internal electric leads which operate a warning lamp on the instrument panel when the linings are due for renewal.

The front brake calipers comprise outer halves which are removable and inner halves which are integral with the steering knuckles.

The rear brake pads and calipers are mounted on the rear suspension arms. The pads do not incorporate a warning system.

The handbrake is operated by a floor mounted lever. Cables run to and operate each front caliper to force the friction pads against the discs.

#### Anti-lock braking system (ABS)

An anti-lock braking system is fitted to the BX 19 GTi from November 1986. The function of the ABS is to prevent the brakes from locking the roadwheels when applied, thereby retaining steering control and giving the shortest-possible stopping distance for emergency braking. The system operates at speeds in excess of 5 mph and when in operation, controls the vehicle deceleration until it is brought to a halt.

The ABS monitors the rotational speed of each roadwheel during braking. If any wheel begins to slow at a faster rate than the others thereby showing that it is on the point of locking, the ABS reduces the hydraulic pressure to that wheel's brake caliper. As the wheel grips again, its rotational speed matches the others and hydraulic pressure to

the caliper is restored. This cycle can be repeated several times per second.

The ABS is operated by the following hydraulic and electronic components, which are complementary to the standard brake system.

- Front and rear wheel sensor units - on the driveshaft joints/wheel hubs.*
- Hydraulic control block unit - on the left-hand wheel arch in the engine compartment.*
- Electronic control unit (ECU) - under the front passenger seat.*

In common with the standard system, the front and rear brake hydraulic circuits are separate but the ABS differs in also separating the right and left-hand front brake circuits. The remaining brake system components and layout are otherwise the same as standard.

The hydraulic control block contains six electro-valves, each of the three brake circuits having its own idle and return valve which work in accordance with the ECU.

The electronic part of the system comprises the ECU and a speed sensor unit for each roadwheel. Each driveshaft outer CV joint and each rear wheel hub has a toothed rotor, the speed of which is recorded by the adjacent sensor unit. This unit in turn relays the signal to the ECU. From the signals received by the ECU from each roadwheel, the average road speed is calculated and any sudden acceleration or deceleration accounted.

An automatic checking device is built into the electronic control unit. Any faults in the ABS will illuminate the yellow warning light on the instrument panel and cancel the ABS (but still allow normal braking). The yellow warning light will also light up when the ignition is initially switched on but will cancel as soon as the engine is started.

If a fault develops or is suspected in the ABS, then the system must be checked by a Citroën dealer at the earliest opportunity.

#### Precautions

When servicing any part of the system, work carefully and methodically whilst observing scrupulous cleanliness. Always renew components (in axle sets, where applicable) if in doubt about their condition and use only genuine Citroën replacement parts, or at least those of known good quality.

### Hydraulic fluid

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 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, hydraulic fluid is hygroscopic (it absorbs moisture from the air). Old fluid may be contaminated and unfit for further use. When topping-up or renewing fluid, always use the recommended type and ensure that it comes from a freshly-opened sealed container.

### Brake components

When working on brake components, take care not to disperse brake dust into the air or to inhale it, since it may contain asbestos which is injurious to health.

## 2 Brake pads - renewal



**Warning:** When working on brake components, take care not to disperse brake dust into the air or to inhale it, since it may contain asbestos which is injurious to health.

### Front

1 The brake pad wear warning lamp will indicate that the front brake pads have worn down to the specified limit. The pads must be renewed as a set.

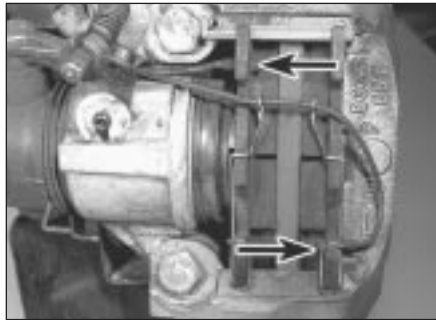
2 Chock the rear roadwheels, jack up the front of the vehicle and support it on axle stands (see "Jacking and vehicle support"). Remove the front roadwheels.

3 Release the handbrake and turn the steering so that the brake caliper is facing outboard.





2.4a Disconnect the pad wear warning leads . . .



2.4b . . . and pull wire from spring clip eyes. Note pad wear indicator studs (arrowed)



2.5a Extract the lock plate pin . . .



2.5b . . . and withdraw the lock plate



2.6 Removing a front brake pad



2.7 Method used to move caliper piston back into cylinder

4 Disconnect the pad wear warning lamp wires from the wiring loom and the outer wire from the spring clip eyes (see illustrations).

5 Using pliers, grip and extract the pin locating the lock plate then withdraw the lock plate (see illustrations). Pressing down on the pad plates at the lower end will ease removal of the locking plate.

6 Each pad, together with its spring clip, can now be withdrawn from the caliper unit (see illustration).

7 The caliper piston must now be moved back into its cylinder to allow room for the new pads. To do this, turn it in a clockwise direction whilst simultaneously applying pressure to it. To rotate the piston, engage a screwdriver with a 7 mm square shaft into the groove in the piston end face. Insert a second

screwdriver or suitable lever between the disc outer face and the caliper frame and lever it outwards, but take care not to apply pressure on the disc friction surface (see illustration).

8 Remove any dust or dirt from the pad recesses in the caliper. Refer to "Precautions".

9 Locate the springs onto each pad.

10 Set the piston position so that the pad engagement slot is aligned correctly (see illustration).

11 Fit the brake pads into position, together with their springs (see illustrations).

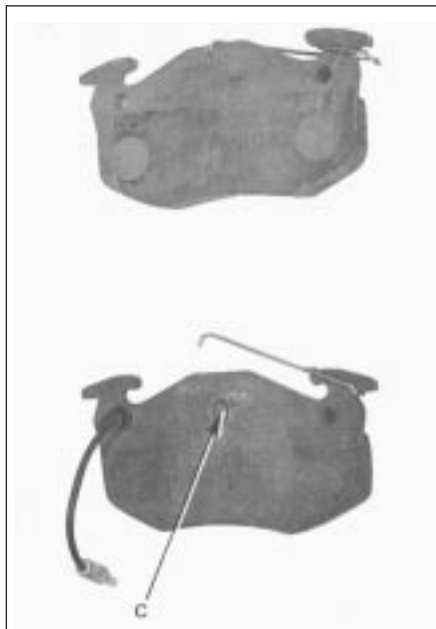
12 Slide the lock plate into position and insert the retaining pin.

13 If new brake pads have been fitted, check that a 1 mm clearance exists between the disc and pads. If required, adjust the piston position accordingly (see illustration). Note that this clearance is to allow the handbrake self-adjusting mechanism to operate correctly and is not the normal running clearance between the pads and disc.

14 Pass the outer pad wear indicator wire through the pad spring eyes, through the insulation sleeve (together with the inner pad



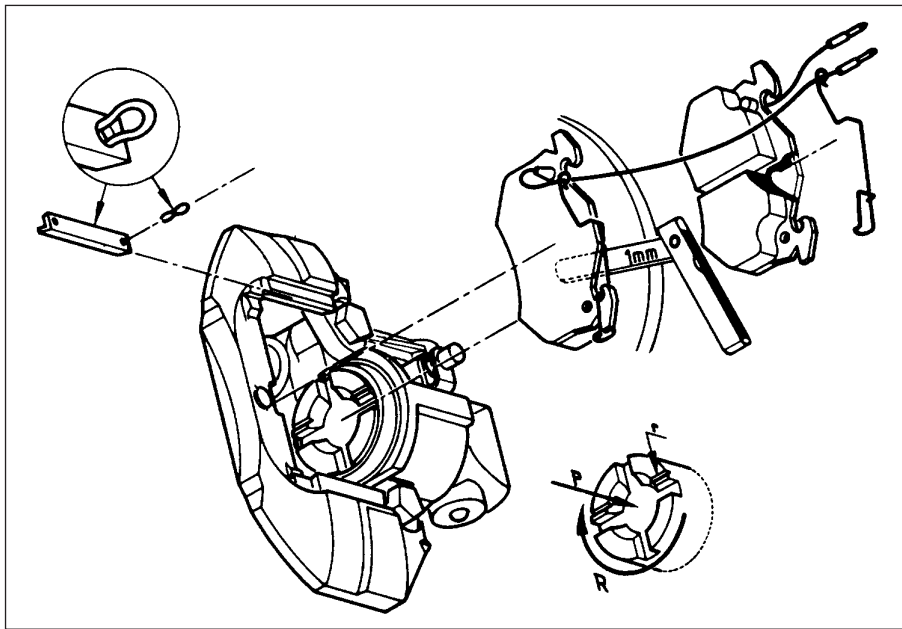
2.10 Piston alignment position with identification mark (a) above (or below) piston groove (b)



2.11a Pad peg (c) must engage in piston groove when fitted  
*Pad springs correctly fitted*



2.11b Brake pads and springs fitted



2.13 Front brake pad reassembly - check clearance between disc and pad with feeler blade



2.14 Reconnect pad wear wiring and locate as shown

wire) and reconnect to the wiring loom connector (see illustration).

15 On completion, refit the roadwheel(s) and lower the vehicle to the ground.

16 Avoid harsh braking as far as possible for a few hundred miles to allow the new pads to bed in.

### Rear

**Modifications:** From October 1988, modified rear brake calipers and pads are fitted. These

calipers are modified to provide increased clearance for the disc (now 12.2 mm). The thicknesses of the pad backing plate and friction material are modified accordingly. The pad backing plate is now 5 mm thick (instead of 4 mm previously) and the friction material thickness is now reduced by 1 mm. Vehicles with the early-type calipers can be fitted with the later type pads. It is possible to fit the later-type calipers to early vehicles, in which case the later-type pads must be fitted. Note

that the early-type pads must not be fitted to models with the later calipers.

17 Apply the handbrake, jack-up the rear of the vehicle and support it on axle stands (see "Jacking and vehicle support"). Remove the roadwheels.

18 Unscrew and remove the retaining bolt and withdraw the pad cover from the caliper (see illustration).

19 Remove the spring clip and pull out the two pads with a pair of pliers (see illustrations).

20 Brush any accumulated dust and dirt from the pads and caliper recesses. Refer to "Precautions".

21 Examine the pads for wear. If the friction material thickness is less than the specified minimum, the pads must be renewed as a set.

22 When inspecting the pads, it is strongly recommended that they be removed and cleaned even if they appear unworn. Rear pad wear is very slow if the vehicle is driven mostly unladen and it is possible for the pads to seize in place if they are not removed periodically.

23 If new pads are to be fitted, the caliper pistons must be retracted to accommodate the extra friction material. To do this, partially insert the old pads, then lever them apart to depress the pistons.

24 Fit the new pads with the friction surfaces towards the disc.

25 Locate the spring clip with the crossbar at the bottom of the caliper and retain it in position with the through-bolt (see illustration).

26 Refit the pad cover and tighten the bolt.

27 Refit the roadwheels and lower the vehicle to the ground.



2.18 Remove rear brake disc pad cover ...



2.19a ... withdraw spring retainer clip ...



2.19b ... to extract brake outer pad ...



2.19c ... and inner pad



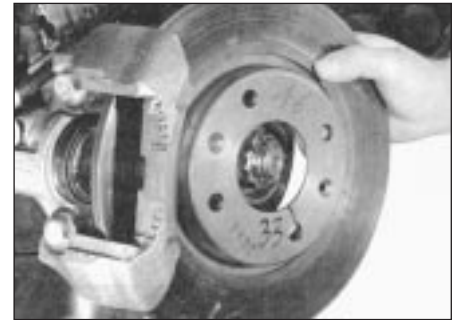
2.25 Locating the through-bolt



3.0a Ventilated type brake disc



3.0b Locating pip (arrowed) on onboard pad



3.2 Front brake disc removal

### 3 Brake discs - removal and refitting



#### Front

**Note:** Discs fitted to BX 19 GTi 16 valve models are of the ventilated type. Operations detailed in this Section for standard discs apply (see illustrations)

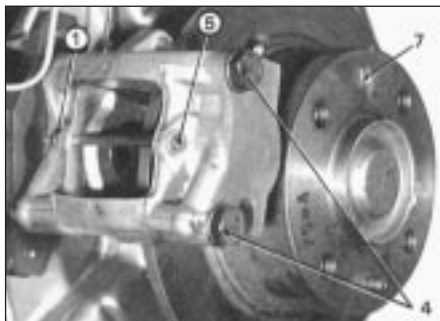
1 Remove the brake pads.

2 Unscrew and remove the disc-to-hub retaining screws and withdraw the disc (see illustration).

3 Clean and examine the disc for deep scoring or grooving. Light scoring is normal but if it is severe, the disc must be refaced by a competent engineering works or, if worn to the specified wear limit, renewed.

4 Check the disc for run-out to determine whether it is distorted or buckled. To do this accurately, a dial gauge will be necessary. If a gauge is not available, feeler blades can be used against a fixed block as the disc is rotated slowly. Do not confuse wear in the hub bearings with disc run-out. To check run-out, refit the disc to the wheel hub and fully tighten the retaining screws. The mating surfaces of the hub and disc must be perfectly clean or a false reading could be given.

5 Refit in the reverse order to removal. Ensure that no oil or grease come into contact with the disc or pads during assembly.



3.7 Rear brake disc removal showing nut and pad/spring bolt (1 and 5), caliper bolts (4) and disc screw (7)

#### Rear

**Modification:** From October 1988, modified rear brake calipers and pads are fitted. These calipers are modified to provide increased clearance for the disc (now 12.2 mm).

6 Remove the brake pads.

7 Reinsert the pad/spring retaining bolt and tighten the securing nut to close the half calipers together (see illustration).

8 Unscrew and remove the two caliper retaining bolts.

9 Undo the disc-to-hub retaining screw. Withdraw the disc and simultaneously raise the caliper unit a fraction to allow the disc to be removed (see illustration).

10 If the disc is difficult to separate from the hub, remove the backplate and tap the disc off from behind. Be careful not to fracture or distort the disc if it is to be re-used.

11 Clean and inspect the disc as described for the front.

12 Prior to refitting the disc, check that the mating faces of both the disc and hub are clean. Smear the mating faces and the retaining screw threads with grease. Do not allow any grease to contact the disc friction surfaces.



3.9 Rear brake disc removal

### 4 Front brake caliper unit - removal, overhaul and refitting



**Warning:** Hydraulic fluid may be under pressure in a pipeline, take care not to allow hydraulic fluid to spray into the face or eyes when loosening a connection

Never refit old seals when reassembling brake system components.

#### Removal

1 Loosen the front roadwheel bolts on the side concerned, place chocks against the rear wheels, then raise and support the vehicle at the front so that the roadwheels are clear of the ground (see "Jacking and vehicle support").

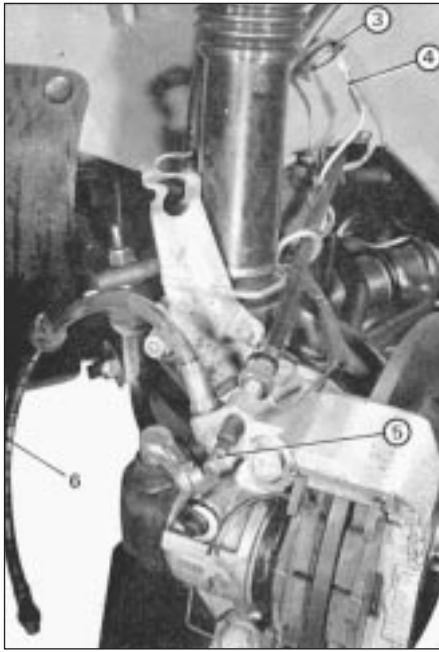
2 Remove the roadwheel bolts and withdraw the roadwheels.

3 Loosen the pressure release screw on the hydraulic pressure regulator unit by 1 to 1.5 turns. Set the ground clearance height control lever to the "low" position.

4 Unscrew and detach the rigid brake line from the bracket union on the inner wheel arch (see illustration). Plug the exposed pipe and union port to prevent fluid loss and the ingress of dirt.



4.4 Rigid brake line connection under front wheel arch



4.5 Front caliper removal

- 3 Plate
- 4 Hydraulic supply pipe (rigid)
- 5 Handbrake cable
- 6 Hydraulic supply hose (flexible)

5 Detach the flexible hose from the locating bracket by pulling the retaining plate free, then disconnect the hose from the support lug forward of the suspension strut (see illustration).

6 Detach the brake pad wear leads from the main harness connector on the top face of the caliper unit.

7 Fully release the handbrake then disconnect the handbrake cable from the operating lever at the caliper.

8 Unbolt and remove the deflector plate (see illustration).

9 Undo the two retaining bolts (on the inner face) and remove the caliper unit, together with the plate.



4.15 Prise free the cylinder inner seal



4.8 Front brake caliper deflector (1) and retaining bolt (2)

### Overhaul

10 Clean the caliper unit externally. Avoid breathing in any brake dust, see "Precautions".

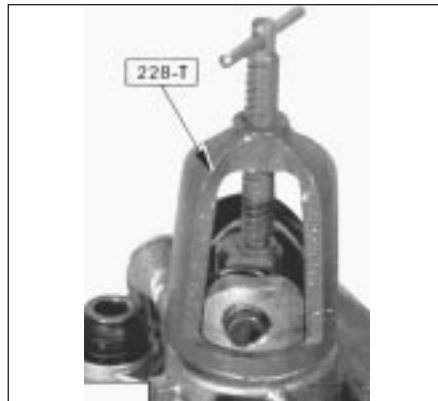
11 Remove the brake pads.

12 Before dismantling the caliper unit, check that the following repair kits are available, depending on the extent of the overhaul:

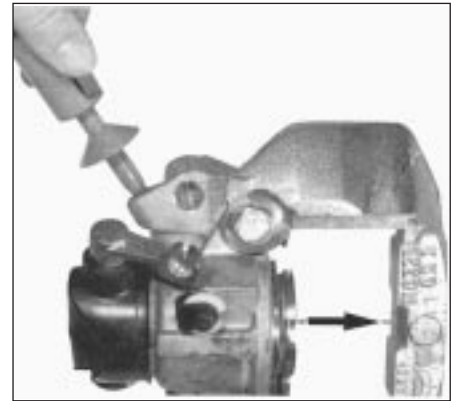
- a) Piston seal replacement kit
- b) Handbrake control repair kit
- c) Caliper sliding mechanism repair kit

13 If the control mechanism is to be dismantled it will be necessary to obtain Citroën tool 228-T.

14 Prise free and remove the piston outer seal, then apply low air pressure (eg. from a foot pump) through the fluid inlet pipe aperture to eject the piston. Catch the piston in a cloth to prevent damaging it as it is removed (see illustration).



4.20a Using special tool to compress the dished spring washers



4.14 Piston removal from caliper

15 Prise free the inner seal from the cylinder (see illustration).

16 Inspect the cylinder walls and the piston for signs of damage or excessively deep score marks. If such damage is apparent, renew the caliper unit.

17 To remove the automatic handbrake control mechanism, prise free the rubber cover and withdraw it from the handbrake cable fork arm.

18 Unscrew and remove the brake bleed screw and remove the protective cover.

19 Extract the retaining circlip from the exposed end of the handbrake pivot arm.

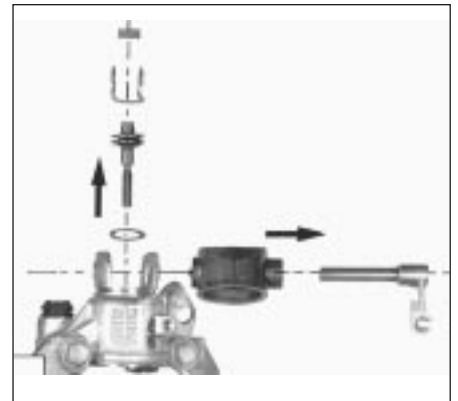
20 Locate the compression tool 228-T as shown (see illustration) and compress the dished spring washers. Withdraw the handbrake cable pivot arm (see illustration).

21 Remove the compression tool then withdraw the peg, spring, piston locator/adjuster dished spring washers and flat washer.

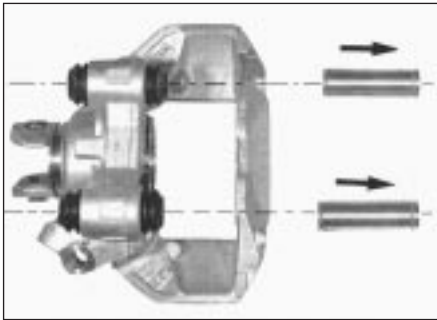
22 Withdraw the caliper sliding bushes and prise free the rubber gaiters (see illustration).

23 Clean the caliper body thoroughly before reassembling. New repair kits must always be used during reassembly.

24 Relocate the sliding mechanism gaiters (using the new ones from the kit) then



4.20b Remove these handbrake components



4.22 Remove the caliper sliding bushes and gaiters

lubricate the bushes with grease from the sachet supplied and push them into position. Check that they are correctly located.

25 Locate the new dished spring washers into position on the piston locator/adjuster, together with the flat washer. The washers must be orientated as shown (see illustration).

26 Lubricate the locator/adjuster with LHM fluid, then fit it into position in the caliper body, passing it through the lower washer. The end slot must be orientated as shown (see illustration). Locate the spring and peg and fit the compression tool (228-T) into position as during dismantling.

27 Locate the new cover onto the handbrake pivot arm and invert it so that it is folded over the cable lever arm to allow fitting.

28 With the dished spring washers held under compression, insert the handbrake pivot arm and position it so that the peg engages with the ratchet as shown (see illustration) and the spring end engages as shown (see illustration). Prise the spring down to engage it in the lip of the ratchet.

29 Locate the circlip into the groove in the exposed section of the pivot arm to secure it.

30 Lubricate the pivot arm and adjuster mechanism with grease from the sachet in the repair kit, then fold over the protective rubber cover and engage it in the caliper body groove.

31 Lubricate the cylinder wall and the piston with LHM fluid. Similarly, lubricate and fit the inner piston seal into position in its groove in the cylinder wall. Check that when fitted it is not distorted.

32 Press and screw the piston into position so that, when fitted, the horizontal groove is in line with the bleed screw. To rotate the piston, engage a screwdriver with a 7 mm square shaft into the piston groove in the end face.

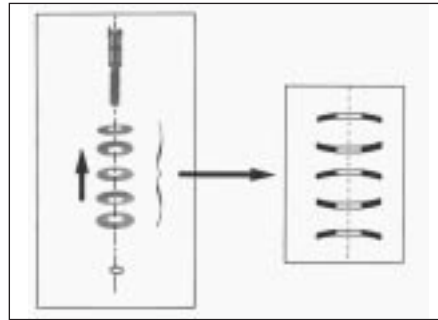
33 Lubricate the outer seal with brake grease from the sachet and then fit it in position. When fitted, check that it is fully engaged and not distorted.

34 Refit the bleed screw and protector.

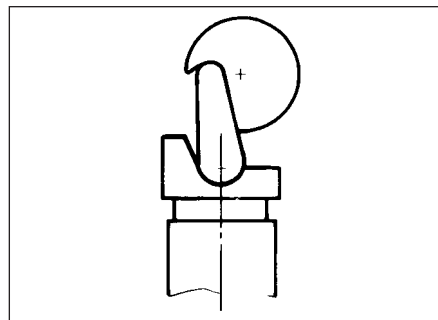
### Refitting

35 Refitting is a reversal of the removal procedure but note the following:

- a) Tighten the caliper retaining bolts to the specified torque setting



4.25 Caliper washer orientation



4.28a Engage peg with ratchet

b) Ensure that the brake hose is correctly located and secured in the location brackets. When reconnecting the rigid supply pipe use a new seal sleeve

c) On completion, bleed the brakes then refit the roadwheel and lower the vehicle

d) Remove the chocks from the rear roadwheels and check that the handbrake operates correctly

## 5 Rear brake caliper unit - removal, overhaul and refitting

### Removal

1 Loosen the rear roadwheel bolts, check that the handbrake is fully applied, then place chocks against the front roadwheels.

2 Raise the rear of the vehicle and support it with safety stands (see "Jacking and vehicle support"). Remove the rear roadwheel(s).

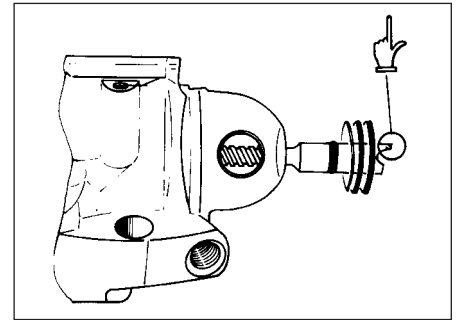
3 Loosen the pressure release screw on the hydraulic pressure regulator unit by 1 to 1.5 turns. Set the ground clearance height control to the "low" position.

4 Clean the hydraulic pipe union to caliper connection then unscrew and detach the pipe at the union. Plug the pipe to prevent the ingress of dirt.

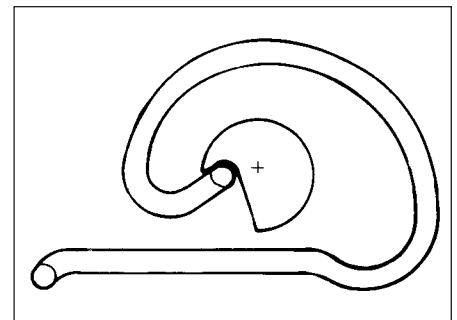
5 Undo the caliper retaining bolts and withdraw the caliper unit.

### Overhaul

6 Remove the brake pads and separate the two halves of the caliper unit.



4.26 Correct fitting position of locator/adjuster in caliper



4.28b Engage spring end with ratchet

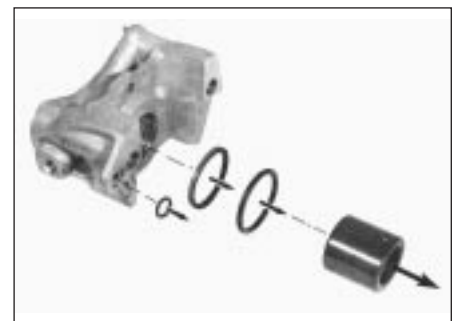
7 To remove the pistons, apply low air pressure (eg. from a foot pump) through the hydraulic pipe connection port whilst holding a piece of rag over the piston face to catch and cushion the piston in as it is ejected from its bore (see illustration).

8 Clean the caliper and piston components. If, on inspection, the cylinder bore or piston is badly scored, damaged or corroded, then the caliper unit must be renewed.

9 Note the position of the seals and their orientation before removing them. These must always be renewed.

10 Reassemble the caliper in the reverse order to removal. Lubricate each part as it is fitted with LHM fluid and ensure absolute cleanliness.

11 Compress the pistons back into their bores to ease fitting of the brake pads.



5.7 Rear brake caliper piston and seals removed



6.3 Brake compensator control valve

**Refitting**

12 Refitting is a reversal of the removal procedure.

13 Tighten the caliper retaining bolts to the specified torque.

14 On completion, bleed the brakes before refitting the roadwheel(s) and lowering the vehicle to the ground.

**6 Brake compensator control valve - removal and refitting**



**Pre October 1988**

1 Raise the vehicle at the front end and support it on safety stands (see "Jacking and vehicle support"). Chock the rear wheels.

2 Move the ground clearance control lever to the front ("low" position) then unscrew the hydraulic system pressure regulator bleed screw 1 to 1.5 turns. Operate the brake pedal a few times to release the pressure.

3 Clean the control valve and the hydraulic pipe connections then identify each pipe before detachment to ensure correct reassembly (see illustration).

4 Unscrew the union nuts and pull the pipes clear of the valve.

5 Disconnect the overflow and return pipes from the valve.

6 Working from within the vehicle, unscrew the valve retaining bolts at the bulkhead (directly in front of the brake/pedal assembly) then withdraw and remove the valve.

7 If the internal slide valves are worn, the valve must be renewed. If only the seals are worn, they can be removed separately. Check with a Citroën garage before removing the old seals.

8 Dismantling is straightforward (see illustration). Note that there are several different types of valve, identification being by various paint marks on the valve body. The return outlet is located in different positions on the various types.

9 Refitting is a reversal of removal. Bleed the braking system and make sure that the pressure regulator bleed screw is tightened before using the vehicle on the road.

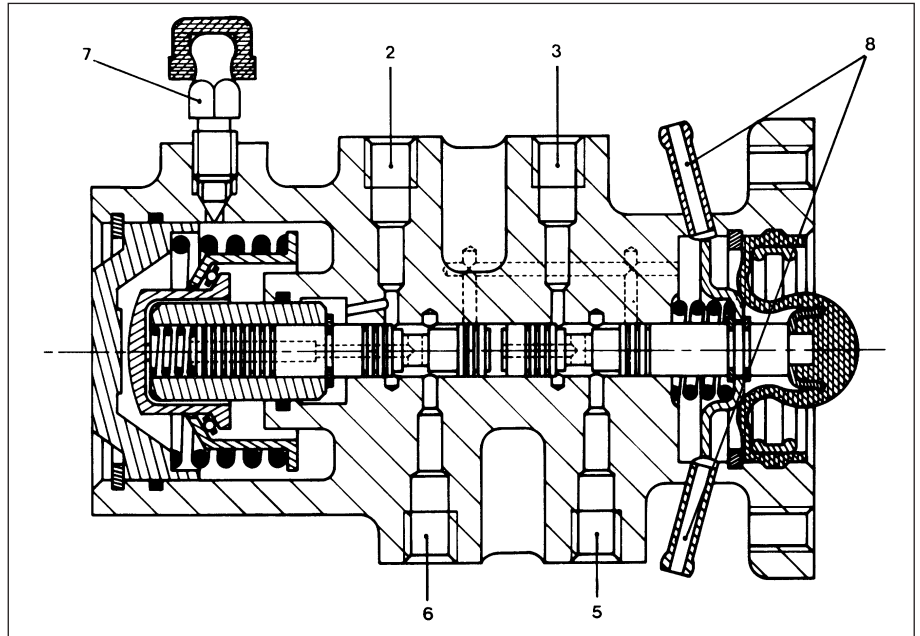
10 On completion, check that the pedal-to-operating rod clearance is as specified according to type (see illustrations). Adjust as necessary.

**From October 1988**

11 From October 1988, all models are fitted with a new type of valve, which incorporates three slide valves instead of the previous two.

12 If the new type of valve is being fitted as a replacement for the older assembly, then remove the calibrating plug (see illustration) and connect the rear brake pipe to the tapped port.

13 If a new type is being renewed, it will be supplied with a bleed valve screwed into the rear brake pipe connecting port. Remove the bleed screw.



6.8 Sectional view of brake compensator control valve showing connections

2 Rear suspension pressure line (from 4-way union)

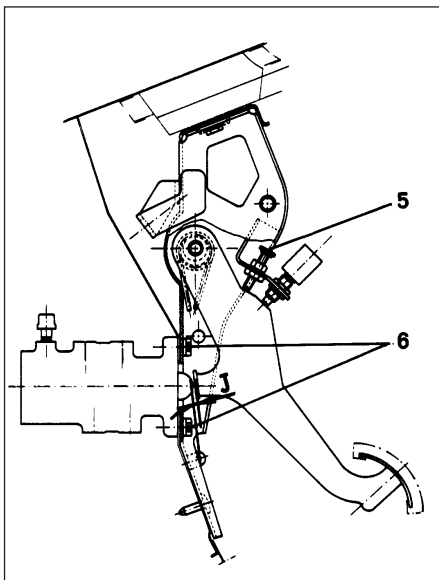
3 High pressure connection to front brakes (from security valve)

5 Operating pressure to front brakes

6 Operating pressure to rear brakes

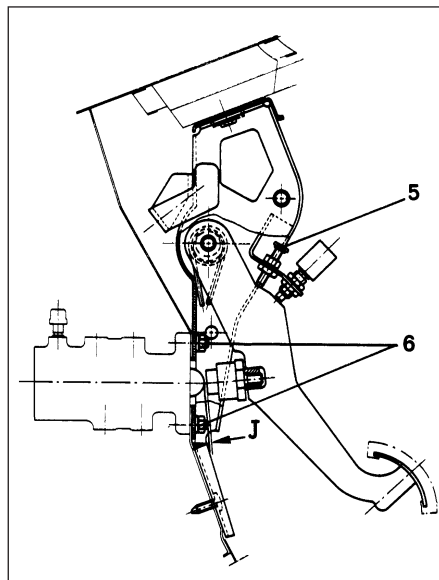
7 Bleed screw

8 Reservoir return



6.10a Footbrake pedal adjustment - type 1

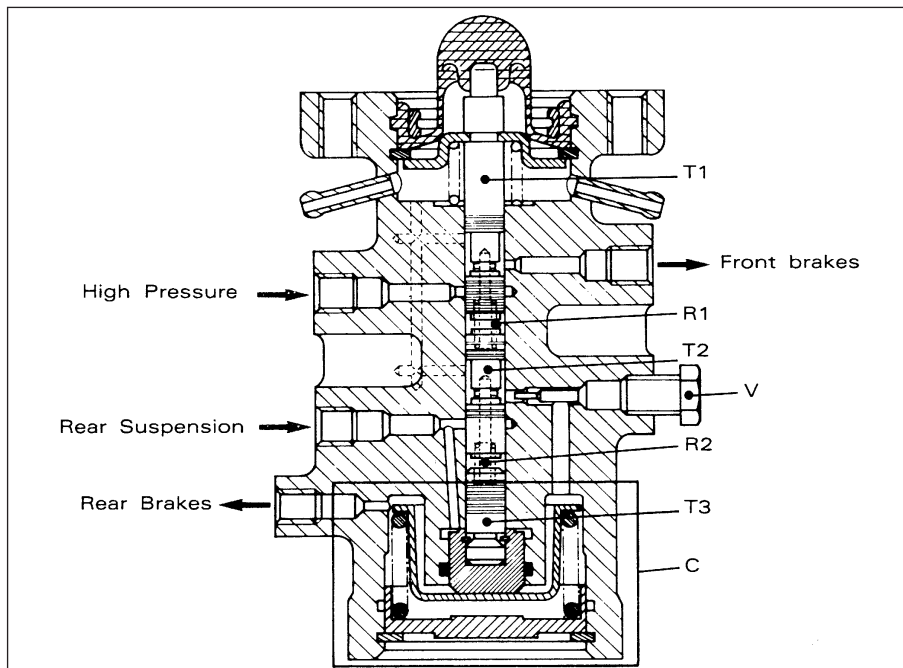
5 Pedal adjustment stop screw  
6 Brake compensator retaining bolts  
J = 1.0 to 3.0 mm



6.10b Footbrake pedal adjustment - type 2

5 Pedal adjustment stop screw  
6 Brake compensator retaining bolts  
J = 0.1 to 1.0 mm





6.12 Sectional view of three slide valve type brake control valve

- |              |                      |                             |                      |
|--------------|----------------------|-----------------------------|----------------------|
| C Valve body | R2 Spring            | T2 Intermediate slide valve | T3 Lower slide valve |
| R1 Spring    | T1 Upper slide valve | V Calibrating plug          |                      |



7.2 ABS electronic control unit

- 2 Disconnect the sensor wiring plug and free the wiring from any clips or ties (see illustrations).
- 3 Undo the retaining bolt and remove the sensor.

**Refitting**

- 4 Refitting is a reversal of the removal procedure but note the following additional procedure when fitting a new sensor to the front hub swivel.
- 5 Fit the sensor with the adjuster screw loosened off. Position a feeler blade, of a thickness corresponding to the specified air gap, between the tip of the sensor and the toothed wheel. Tighten the retaining bolt to the specified torque. Make sure that the sensor tip, feeler blade and toothed wheel are in contact, then tighten the adjuster screw until its head shears off. Withdraw the feeler blade.
- 6 Refit the roadwheel and lower the vehicle.

**7 ABS electronic control unit - removal and refitting**

**Modification:** Later models are fitted with a modified ECU and hydraulic unit. The brake stop-light switch is connected to the ECU by means of pin No. 12, as shown in the relevant wiring diagram

**Removal**

- 1 Unbolt and remove the front passenger seat for access to the electronic control unit (ECU).
- 2 Unbolt the ECU and its cover plate from the brackets (see illustration).



8.2a ABS wheel sensor - front brake

- |                               |                 |
|-------------------------------|-----------------|
| 1 Wiring                      | 4 Toothed wheel |
| 2 Retaining bolt              | 5 Air gap       |
| 3 Adjuster screw (shear type) |                 |

- 3 Disconnect the multi-plug and remove the ECU.

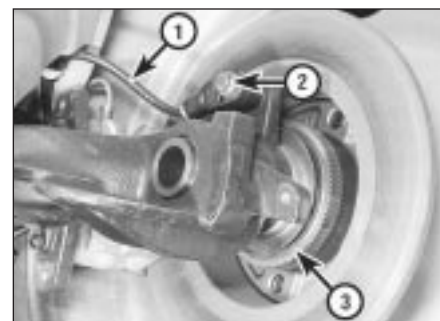
**Refitting**

- 4 Refit by reversing the removal operations.

**8 ABS wheel sensor - removal and refitting**

**Removal**

- 1 Raise and support the vehicle at the front and/or rear as applicable (see "Jacking and vehicle support"). Removal of the appropriate roadwheel will provide improved access.



8.2b ABS wheel sensor - rear brake

- |                             |
|-----------------------------|
| 1 Wiring                    |
| 2 Retaining bolt and sensor |
| 3 Toothed wheel             |

**9 ABS hydraulic control block - removal and refitting**

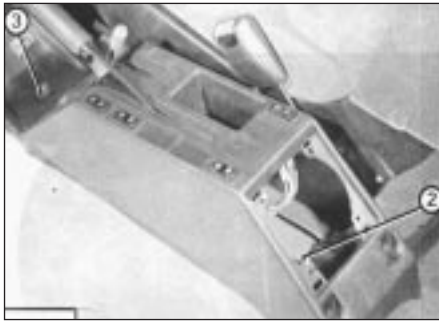
**Removal**

- 1 The hydraulic control block cannot be repaired. If it develops a malfunction then it must be renewed (see illustration).
- 2 Detach the wiring connectors from the block.
- 3 Clean and disconnect the hydraulic pipes from the block.



9.1 ABS hydraulic control block

## 10•10 Braking system



**10.2 Handbrake console retaining screw positions (2 and 3)**

4 Undo its retaining bolts and remove the block.

### Refitting

5 Refitting is a reversal of the removal procedure. On completion, the brake hydraulic system will need to be bled.

## 10 Handbrake cable - removal, refitting and adjustment

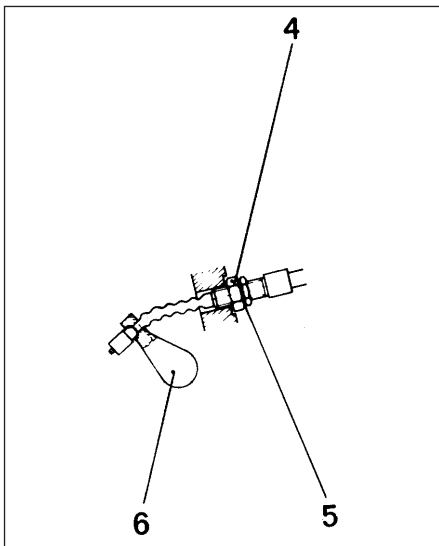


### Removal

1 Position chocks against the rear roadwheels, loosen the front roadwheel bolts, raise the front of the vehicle and support on safety stands (see "Jacking and vehicle support"). Remove the front roadwheels.

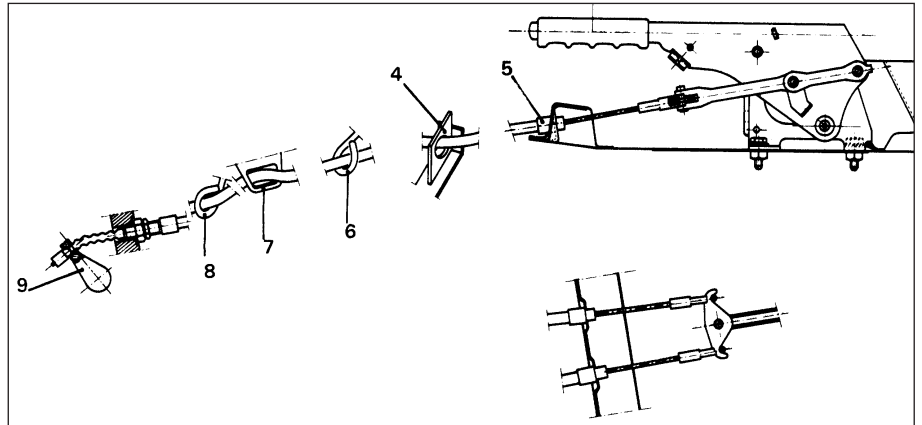
2 Working inside the vehicle, prise free the rear cubby from the centre console. Reach through the cubby aperture and undo the console retaining bolt at the rear (see illustration).

3 Remove the rubber bung and unscrew and



**10.14a Handbrake cable adjustment at link rod end**

4 Adjuster nut 5 Locknut 6 Lever



**10.4 Handbrake cable attachment and location points**

4 Cable guide on exhaust screen  
5 Sheath stop  
6 Scuttle panel guide

7 Wheel arch guide  
8 Swivel arm guide  
9 Connection to link rod

remove the console retaining bolt at the front. Lift the console clear, disconnecting any switch wires as necessary.

4 Release the handbrake then, at the caliper end of the cable, unhook the cable from the link rod (see illustration).

5 Back inside the vehicle, pull the cable and disengage it from the compensator.

6 Withdraw the cable, passing it through the various location guides in the body.

### Refitting

7 Refit in the reverse order of removal. As the cable is fitted, pass it through the guides in the following order.

- Cable swivel guide
- Cable wheel arch guide
- Cable scuttle panel guide
- Cable exhaust screen guide

8 When the cable is refitted and hooked onto

the compensator, check that the sheath stop is correctly positioned in its housing.

9 Lubricate the link rod and compensator cable connections but take care not to get grease onto the brake disc. Also lubricate the cable/wheel arch guide.

10 Check that the handbrake operates in a satisfactory manner and adjust if necessary.

### Adjustment

11 Handbrake adjustment is automatic, being taken up when the handbrake travel reaches 12 to 15 notches.

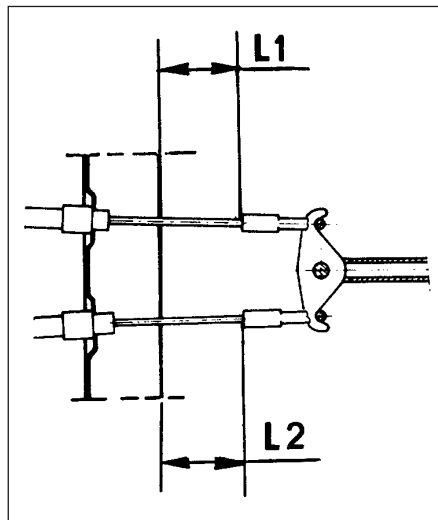
12 Adjustment is possible after a new cable has been fitted by depressing the brake pedal and bringing the pads into contact with the discs. Release the pedal then move the handbrake lever to the 4th notch position.

13 Adjustment is now made at the link rod end of the cable. Loosen the locknut and turn the adjuster nut in the required direction to bring the lever (on the side being adjusted) into contact with the cam. Tighten the locknut.

14 Repeat the procedure with the cable to the other front wheel brake then check that the cable compensator is equalised (see illustrations).

15 Check that, when the handbrake is released, the pads do not contact the disc irrespective of steering position. Tighten the locknuts then operate the handbrake several times to ensure that the handbrake is satisfactory. Refit the roadwheels and the console inside the vehicle.

16 Lower the vehicle, apply the handbrake and remove the chocks.



**10.14b Check cables at compensator for equal adjustment**

Distances at L1 and L2 to be equal (within 1.5 mm)

## 11 Brake pedal - adjustment



1 The clearances between the footbrake pedal and the rubber damper of the brake compensator control valve must be as specified. If not, loosen the locknut and adjust

the stop screw located over the pedal as necessary. Tighten the locknut when adjustment is complete (see illustrations 6.10a and 6.10b).

2 The pedal must now be checked for correct operation. First move the ground clearance lever fully to the minimum height position.

3 Loosen the pressure regulator bleed screw 1 to 1.5 turns.

4 Depress the brake pedal several times to release the pressure.

5 Fully depress the pedal three or four times, making sure that it returns to its stop freely.

6 Check that the clearance adjusted in paragraph 1 has not altered. The pedal operation is correct if the clearance remains the same.

7 Tighten the pressure regulator bleed screw.

## 12 Stop-lamp switch - adjustment



1 Before adjusting the stop-lamp switch, the footbrake pedal must be adjusted.

2 The stop-lamp switch is located beneath the footbrake pedal. The internal contacts should switch on the stop-lamps as soon as the pedal touches the brake valve.

3 If adjustment is necessary, loosen the switch locknut and turn the adjuster nut in the required direction. When the adjustment is correct retighten the locknut.

## 13 Hydraulic system - bleeding



**Note:** When bleeding the system on models fitted with ABS, the procedure is the same as given below for the standard braking system.

1 The system must be bled after renewing any components. If this procedure is not carried out, air will be trapped in the circuit and the brakes will not function correctly.

2 Before starting work, check all brake lines and connections for possible leakage.

3 If there is any possibility of fluid other than genuine LHM type being in the system, then drain the complete hydraulic system as described in Chapter 9 and fill it with the special rinsing solution obtainable from Citroën. Bleed the system and leave the solution in the circuit for approximately 600 miles (1000 km), then drain it out and fill with LHM fluid. If the rubber seals are damaged by the incorrect fluid, it will also be necessary to renew these items at the same time.

4 The brake bleeding procedure for the front and rear brakes differs, the procedures and requirements being given separately as follows.

### Front brakes

5 When bleeding the front brakes, there must be no pressure in the hydraulic system. Undo the release screw by 1 to 1.5 turns on the pressure regulator (engine switched off).

6 You will now need two lengths of bleed tubing long enough to connect over the caliper bleed screws at one end, and to the reservoir at the other. The tubes must be transparent and clean.

7 Get an assistant to sit in the vehicle and depress the brake pedal.

8 Loosen the front brake bleed screws and restart the engine. Run the engine at idle speed and then, with the brake pedal still depressed, tighten the pressure regulator relief screw.

9 When the fluid flowing through each bleed hose to the reservoir shows no signs of air bubbles, retighten the bleed screws and release the brake pedal.

10 Switch off the engine and detach the bleed tubes from the calipers.

### Rear brakes

11 The rear brakes draw their hydraulic fluid from the rear suspension system circuit and therefore, when bleeding the rear brakes, the circuit must be under pressure.

12 Check that the handbrake is fully applied and chock the front roadwheels.

13 Loosen the rear roadwheel bolts then raise and support the rear of the vehicle using safety stands (see "Jacking and vehicle support"). Remove the rear roadwheels.

14 Clean each rear brake bleed nipple then attach a length of transparent and clean hose to the nipple on each side. Place the free end of each hose into a clean container.

15 Allow the pressure in the rear suspension to drop, then move the height control lever within the vehicle fully rearwards to the "high" position.

16 Get an assistant to sit in the vehicle and depress the brake pedal. Restart the engine.

17 Loosen the bleed nipples approximately half a turn. The fluid will then flow through the bleed nipples into the jars.

18 When no more air bubbles are visible in the fluid, tighten the bleed nipples immediately then release the brake pedal. The pressure should now build up in the hydraulic system, with the suspension arms assuming the "high" position. If this fails to occur, increase the engine speed to 3000 rpm,

unscrew the pressure regulator bleed screw and leave it open for 30 seconds. Close the bleed screw, allow the engine to idle and recheck the position of the suspension arms.

### Front and rear brakes

19 Remove the bleed tubes and locate the rubber caps over the bleed nipples.

20 Check the bleed nipples for leakage by fully depressing the brake pedal.

21 Switch off the engine, refit the roadwheels and lower the vehicle to the ground (where applicable).

22 Check and top-up the hydraulic fluid level in the reservoir.

### Compensator control valve

23 Note that on some models fitted with ABS, the bleed nipple for the compensator control valve is located in the hydraulic line connection bracket on the bulkhead (see illustration).

### Two slide valve type

24 Have the engine running and the hydraulic circuit pressurised with the brake pedal depressed.

25 Bleed at each of the three bleed screws, as follows:

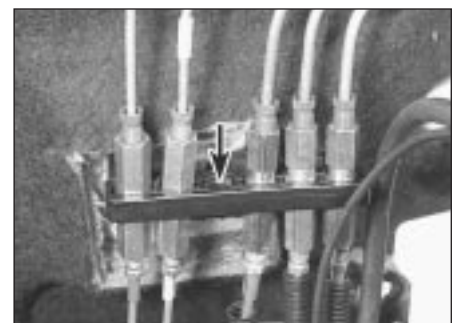
- a) Control valve.
- b) Front brakes.
- c) Rear brakes.

### Three slide valve type

26 Bleed at the two bleed screws.

27 If the compensator is removed and refitted for any reason, it will be necessary to bleed both it and the front and rear brakes. The compensator has a bleed nipple fitted into its top face towards the front.

28 When bleeding, the hydraulic system must be under pressure.



13.23 Brake hydraulic line connection bracket at bulkhead. Compensator valve bleed screw on some ABS models (arrowed)