Section G15

Front and rear disc brakes

Introduction

Disc brakes are fitted to all four wheels; each front wheel being fitted with two twin cylinder calipers and each rear wheel with a large four cylinder caliper.

The calipers are divided between the two hydraulic systems, providing an integrated braking system in which each system can operate independently in the event of system failure.

Bleed screws are fitted to the inner faces of each caliper to facilitate bleeding of the two systems.

The rear brake calipers have the mechanically operated parking brake pads situated beneath them. On application of the parking brake the wedge shaped brake pads act on each side of the rear brake disc (refer to Section G16 for details).

Inspection of all brake pads must be carried out at the specified service intervals; for details reference should be made to the Service Schedule Manual publication number T.S.D. 4117.

In order to obtain maximum efficiency and safety from the braking systems it is important that only replacement disc pads of approved design and material specification are fitted.

It is important when changing brake pads that the friction material of the new pads is of the same type and grade as that fitted to the other brake calipers; otherwise it will be necessary to renew all the brake pads.

Brake pads of different specification or different manufacturers vary in their friction, wear and operating characteristics and if mixed could have an adverse effect on braking performance.

The brake pads must be renewed when the brake pad linings are worn to within 3,18 mm. (0.125 in.) of the back plate.

After fitting new brake pads an initial running-in period of between 1100 kilometres and 1300 kilometres (700 miles and 800 miles) should be observed.

During this initial running-in period, the brakes should not be applied harshly or for prolonged periods from high speeds except in an emergency. The force with which the brakes are applied may be progressively increased towards the end of the running-in period.

Note
If the brakes are to be relined with pads which have different recommended linings from those previously fitted the disc faces should be cleaned prior to fitting the new pads. All traces of the old pad material should be removed by hand rotating the disc whilst applying fine emery cloth to the disc faces. Do not emery the disc radially. **It is again stressed that the same type and grade of pad linings must be fitted to all six brake calipers.**

Front wheel brake pads - To renew

1. Depressurise the hydraulic system as described in Section G2.

Note
This operation is not essential for brake pad renewal but is recommended as a safety precaution in the event of the brake pedal being accidentally depressed whilst the brake pads are removed.

2. Slacken but do not remove the front road wheel retaining nuts.
3. Securely chock the rear road wheels, then jack up the front of the car. Support the car with stands and sill blocks.
4. Remove the front road wheels.
5. Remove the spring clips from the two brake pad retaining pins (see Fig. G35) and withdraw the pins.
6. Using extractor tool (RH 8928) withdraw the brake pads from the caliper.
7. Prior to fitting the new brake pads, inspect the caliper piston dust seals for signs of damage or heat hardening and renew as necessary.
8. Carefully press the caliper pistons back into their bores, taking care not to damage or trap the piston seals. Ensure that the seal retaining clips are correctly located.
9. Fit the new pads by reversing the removal procedure, ensuring that the spring clips are correctly located in the pad retaining pins.

On later cars a 'M' shaped anti-rattle spring is fitted onto the brake pad retaining pin, on the leading side of the caliper pad i.e. upper pin on the front wheel, front brake caliper and lower pin on the front wheel, rear brake caliper (see Fig. G36). One spring only is fitted to each brake caliper.

The brake pads differ from those fitted to the earlier type of brake caliper in that an additional hole is incorporated to accommodate the 'M' spring.

Always ensure that the 'M' spring is fitted correctly as follows.

1. Fit the brake pads into the caliper and insert the trailing, pad retaining pin. Secure the pin with the retaining clip.
2. Locate the ends of the 'M' spring into the central holes of the brake pad back plate.

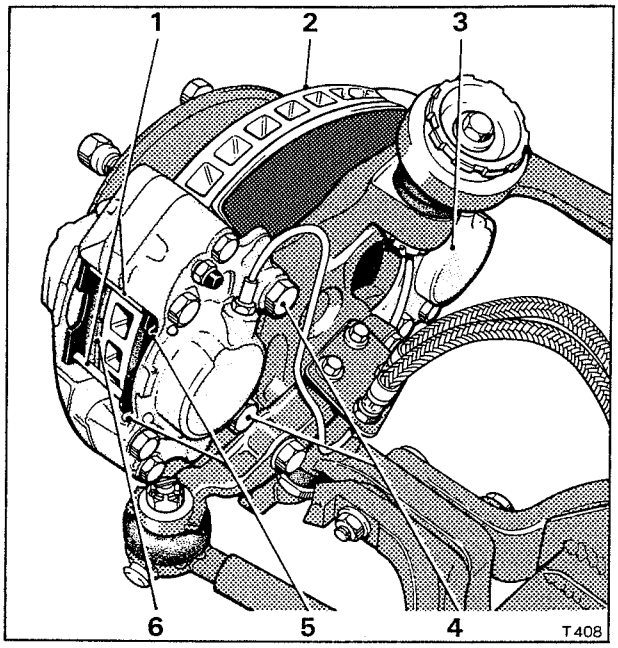

Fig. G35 Front wheel brake calipers
1 Brake pad retaining pins
2 Brake disc
3 Rear caliper
4 Caliper retaining bolts
5 Spring clips
6 Brake pad

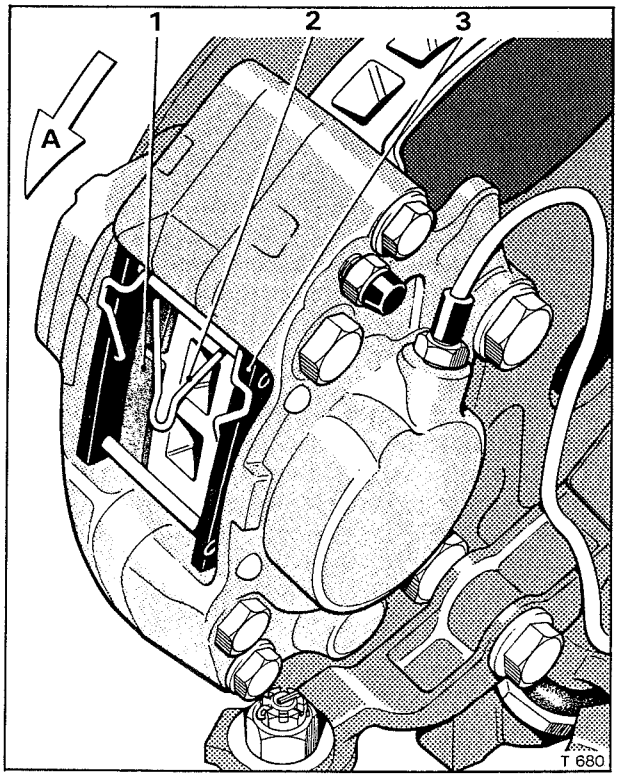

Fig. G36 Front wheel brake caliper 'M' spring type
1 Brake pad
2 'M' spring
3 Brake pad backing plate
A Direction of forward rotation of brake disc

3. Ease the spring into position and secure with the leading pad retaining pin. Fit the pin retaining clip.
4. Ensure that the centre of the 'M' spring points in the same direction as the forward rotation of the brake disc.

Note
When fitting the 'M' spring the 'ears' of the spring must rest on the edge of the brake pad backing plate, with the bends at the top of the 'M' figuration butting against the caliper body.

Do not compress the two bends of the spring more than the normal gap between the two brake pads otherwise the spring may become permanently set.

Due to inherent distortion during pad wear new 'M' springs must be fitted whenever replacement brake pads are fitted.

Rear wheel brake pads - To renew
1. Depressurise the hydraulic system as described in Section G2.

Note
This operation is not essential for brake pad renewal but is recommended as a safety precaution in the event of the brake pedal being accidentally depressed whilst the brake pads are removed.

2. Securely chock the front road wheels, then jack up the rear of the car as necessary. Support the car with stands and sill blocks.
3. Remove the rear road wheels.
4. Remove the spring clips from the two brake pad retaining pins (see Fig. G38) and withdraw the pins. Collect the anti-rattle spring clip from the rear of each brake pad.
5. Withdraw the brake pads from the caliper using the extractor tool (RH 8929).
6. Prior to fitting the new pads, inspect the caliper piston dust seals for signs of damage or heat hardening and renew as necessary.
7. Carefully press the caliper pistons back into their bores, taking care not to damage or trap the seal. Ensure that the seal retaining clips are correctly located.
8. Fit the new pads by reversing the removal procedure, ensuring that the anti-rattle spring clips and pad retaining pin clips are correctly located (see Fig. G38).

Front brake caliper - To remove (refer to Fig. G35)
1. Depressurise the hydraulic systems as described in Section G2.
2. Securely chock the rear road wheels.
3. Remove the wheel disc, (see Section R1) then slacken but do not remove the wheel retaining nuts.
4. Raise the front of the car on a hydraulic jack. Securely support the car on stands and sill blocks.
5. Remove the road wheel.
6. Disconnect the caliper feed pipe and blank off the pipe end and caliper port against the ingress of dirt.

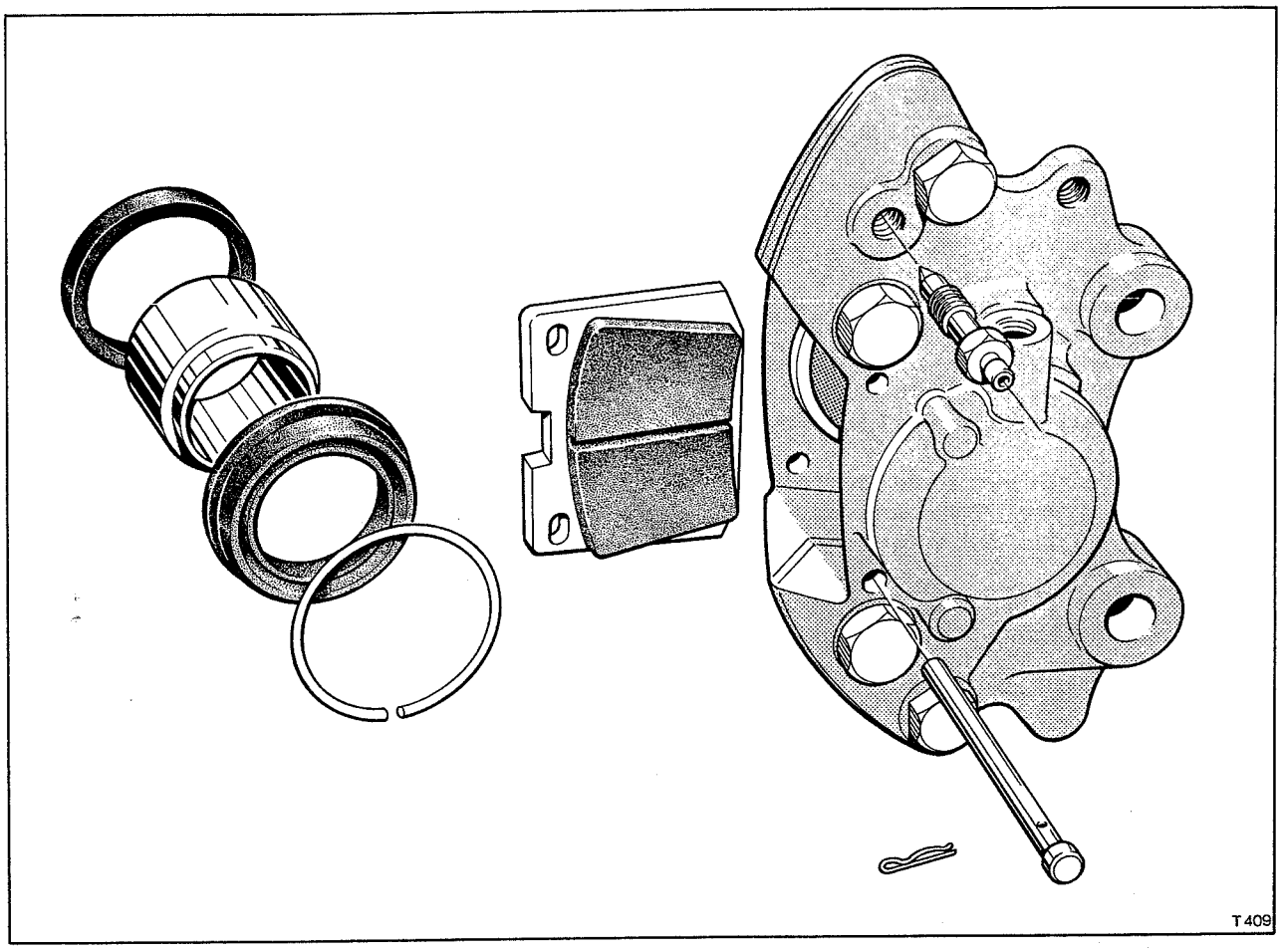

Fig. G37 Front wheel brake caliper

7. Remove the fitted bolts which secure the caliper to the axle yoke. Remove the caliper from the car.
8. It is recommended that a distance piece is fitted between the caliper pads after removal to prevent the pistons from easing out of their bores.

Rear brake caliper - To remove (refer to Fig. G38)
1. Depressurise the hydraulic systems as described in Section G2.
2. Securely chock the front wheels of the car.
3. Remove the wheel disc (see Section R1) then slacken but do not remove the wheel retaining nuts.
4. Raise the rear of the car on a hydraulic jack. Securely support the car on stands and sill blocks. Do not allow the full load of the suspension to hang on the rebound straps.
5. Remove the road wheel.
6. Disconnect the two caliper feed pipes from the caliper and blank off the pipe ends and caliper ports against the ingress of dirt.
7. Remove the split pin and clevis pin from the twin links on the parking brake caliper linkage. Collect the waved anti-rattle washer.
8. Remove the fitted bolts securing the caliper to the hub yoke. Remove the caliper from the car.
9. Fit a distance piece between the caliper pads to prevent the pistons easing out of their bores.

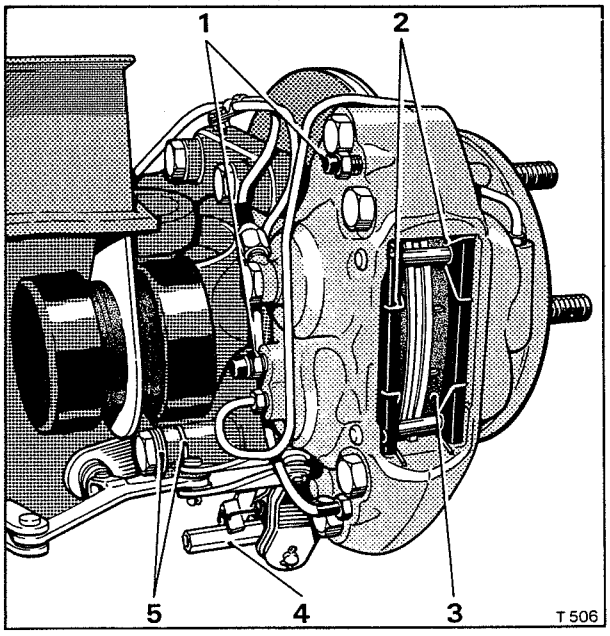

Fig. G38 Rear wheel brake caliper
1 Bleed screws
2 Anti-rattle spring clips
3 Brake pad
4 Parking brake adjuster
5 Parking brake lever adjustment washers

Brake caliper piston seals - To renew
The brake caliper seals should be renewed at the intervals specified in the Service Schedule Manual publication number T.S.D. 4117.
1. Depressurise the hydraulic systems as described in Section G2.
2. Remove the brake caliper from the car and remove the brake pads as described previously.
3. Remove the spring clip retaining the caliper piston dust seal; remove the dust seal.
4. Ease the piston from its bore taking care not to damage the piston.
5. Remove the piston seal from the caliper bore.
6. Clean the caliper bore and piston with methylated spirits and dry thoroughly using dry compressed air.
7. Immerse the new piston seal in approved brake fluid (refer to Chapter D), then carefully insert it into the groove in the caliper bore, ensuring it is correctly seated.
8. Lubricate the piston outside diameter with a small quantity of approved brake fluid, then carefully fit the piston.
9. Fit a new dust seal around the piston top and over the caliper bore flange. Fit the spring ring taking care not to 'pinch' the seal with the ends of the ring.

Brake calipers - To fit
Fit the brake calipers by reversing the respective removal procedure noting the following points.
1. All setscrews and pipe connections must be torque tightened in accordance with the figures quoted in Chapter P.
2. Ensure that a minimum clearance of 8,00 mm. (0.312 in.) is maintained between the caliper bridge pipe and the brake disc when fitting rear brake calipers.
3. When fitting is completed bleed the hydraulic systems as described in Section G4.

Note
The supply pipe connection ports on the front wheel brake calipers are a metric threaded fitting and only pipes fitted with the correct metric pipe nuts should be used.

Brake disc - To remove
1. Depressurise the hydraulic systems as

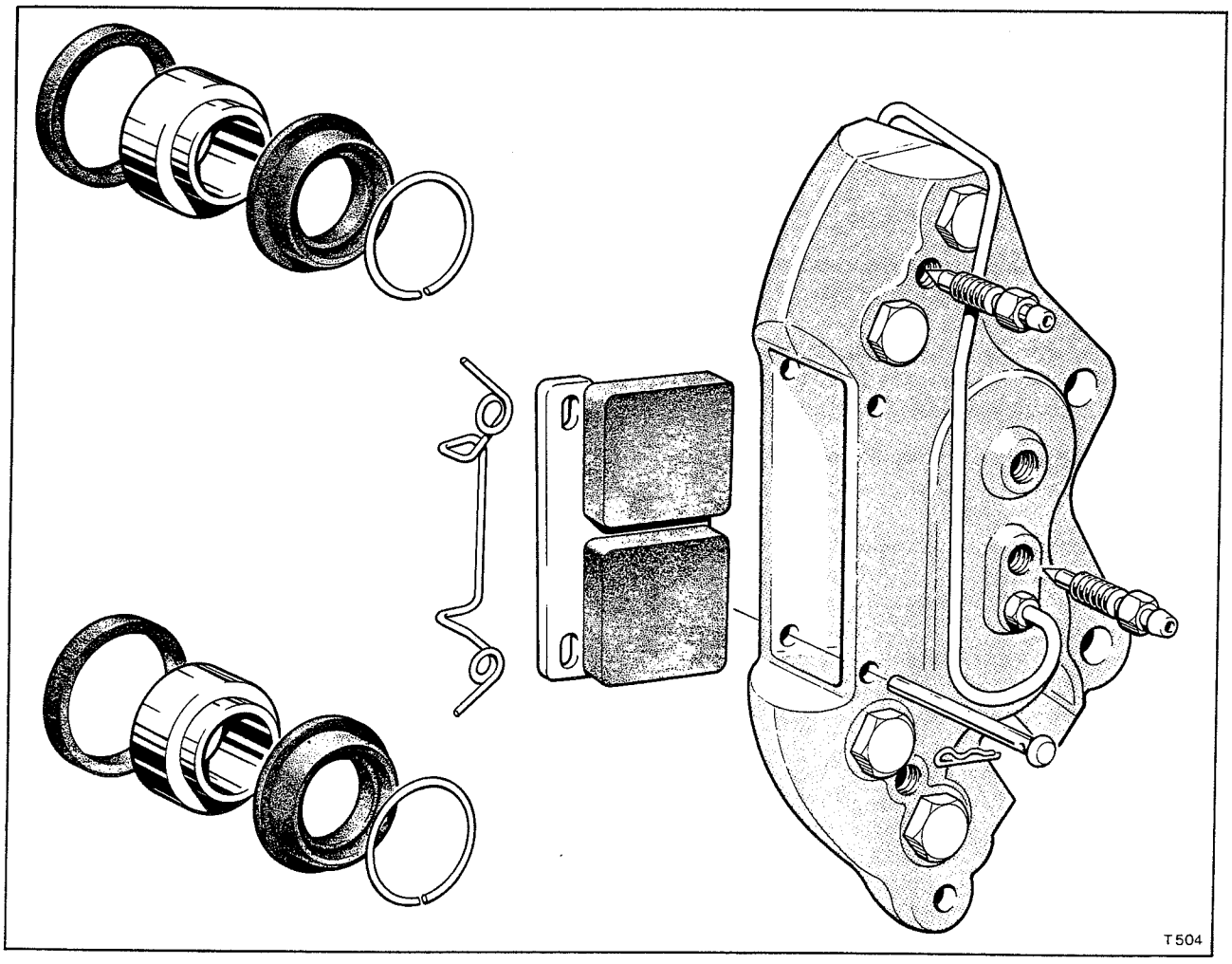

Fig. G39 Rear wheel brake caliper

described in Section G2.
2. Remove the front or rear hub as necessary, following the procedure described in Chapter J Rear hubs or Chapter H Front hubs.
3. To remove a front brake disc remove the set-screws securing the disc to the hub.
4. To remove a rear brake disc dismantle the rear hub as described in Chapter J then unscrew the disc retaining setscrews.

Brake disc - To fit
Fit the brake disc by reversing the procedure for removal noting the following points.
1. All setscrews must be torque tightened in accordance with the figures quoted in Chapter P.
2. The hubs must be assembled and fitted as described in their respective Chapter H or J.
3. On completion the hydraulic systems must be bled as described in Section G4.

Note
New brake discs are treated with a protective film. When a new disc has been fitted the brakes should be gently applied until the protective film has been removed from the working surface of the disc by the first few brake applications.

If only one front brake disc has been replaced the car will gently pull to the side opposite the new disc until the protective film has been removed.