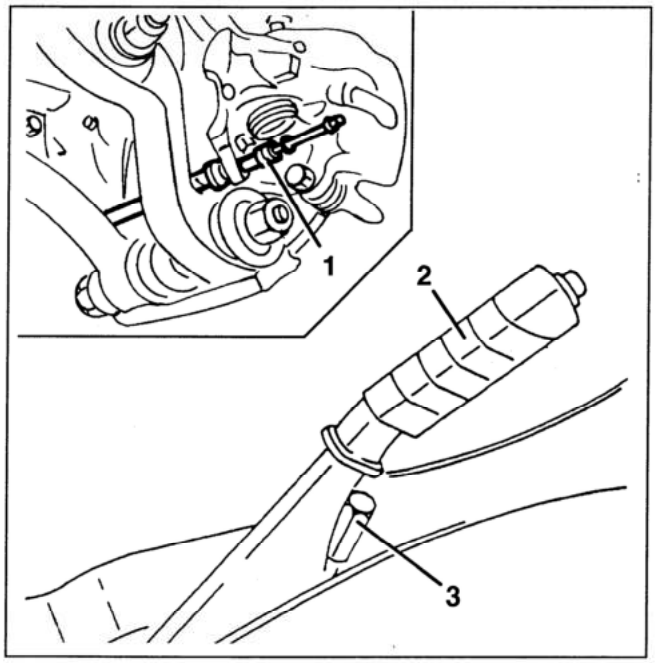
ADJUSTING THE CONTROL CABLES

The parking brake should only be adjusted after changing the brake pads, or the control cables or the brake caliper, as play takeup due to wear is automatic.

1. Disconnect the parking brake cables from the brake calipers and operate the brake pedal forcefully at least ten times.
– Reconnect the parking brake cables to the calipers.
2. Move the parking brake control lever to the third notch on the toothed sector.
3. Tighten the adjustment nut until the rear wheels are braked.

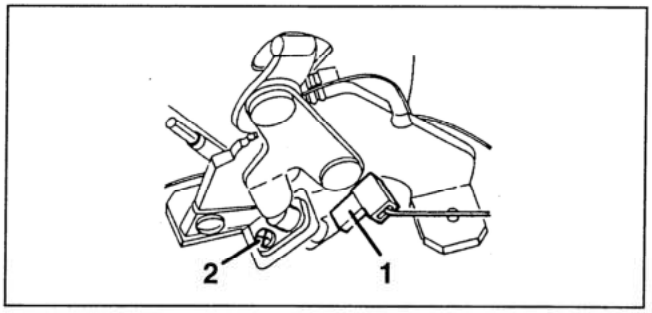
With the lever in the rest position, check that the wheels are free.



HANDBRAKE ON WARNING SWITCH

REMOVAL/REFITTING

– Disconnect the battery (-) terminal.
– Remove the parking brake lever cover (see GROUP 70).
1. Disconnect the electrical connection from the switch.
2. Slacken the fastening screw and remove the switch.



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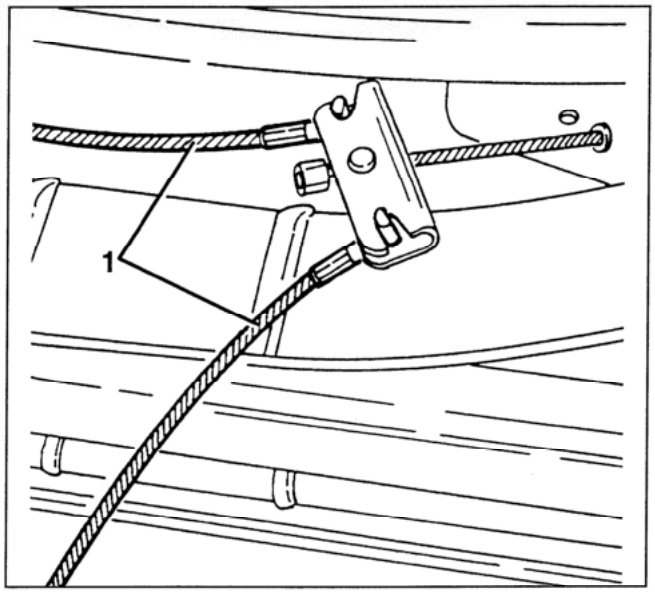
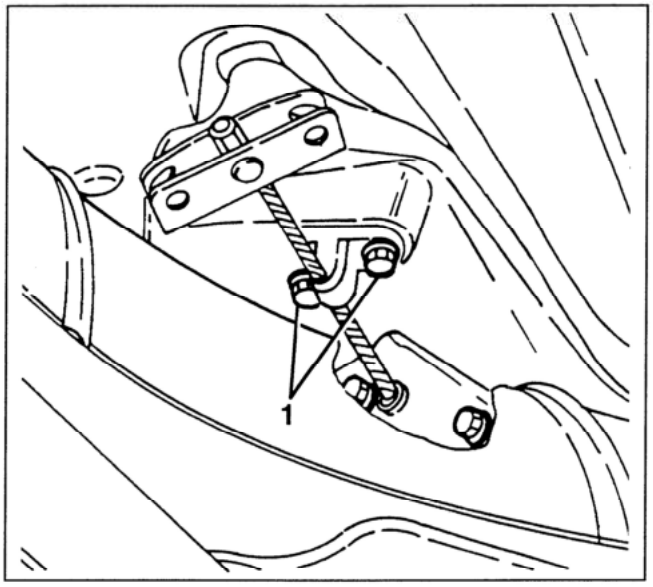
– Raise the car.

1. Disconnect the parking brake cables from the clamping bracket.



– Slacken the fastenings of the exhaust pipe heat guards. (If necessary remove them, see GROUP 10).

1. Slacken the two screws fastening the front parking brake cable support.



– Retrieve the front parking brake cable withdrawing it from the cable lead grommet.

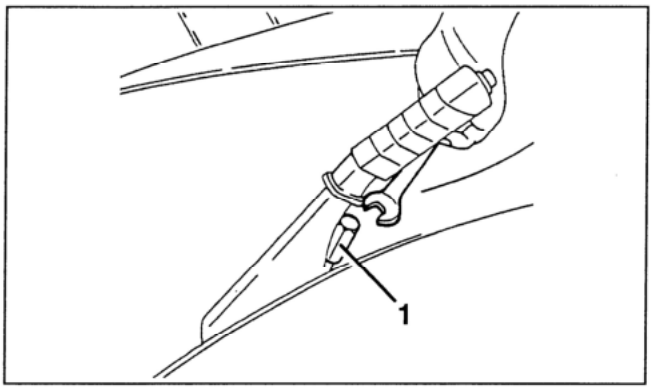
When refitting, make sure of the presence and correct positioning of the cable lead grommet.

REAR CONTROL CABLES

REMOVAL / REFITTING

– Remove the lever cover (see GROUP 70).

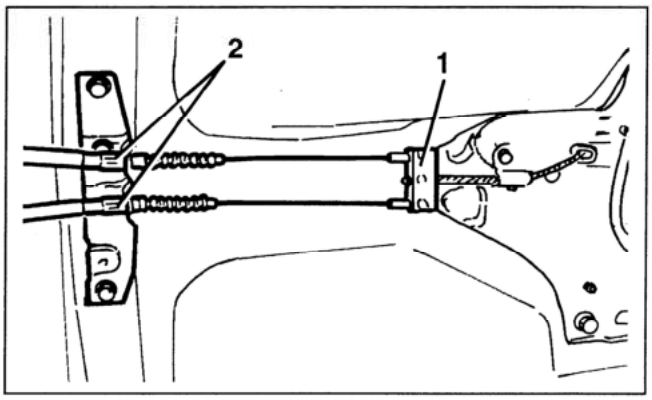
1. Working on the adjustment nut loosen the tension of the parking brake cables.



– Raise the car.

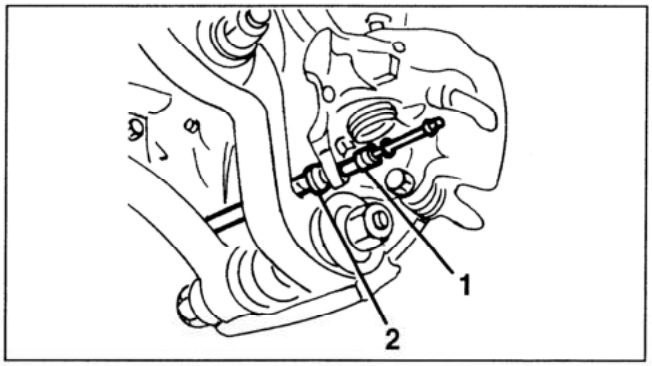
1. Disconect the parking brake cables from the clamping bracket.

2. Disconnect the cables from the body fastening bracket.



1. Disconnect the parking brake rear cables from the brake calipers.

2. Release the rear parking brake cables.



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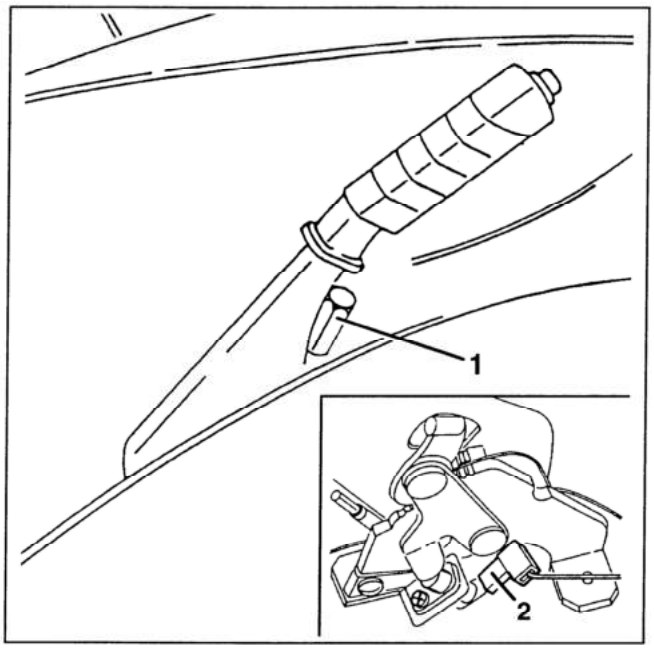
PARKING BRAKE

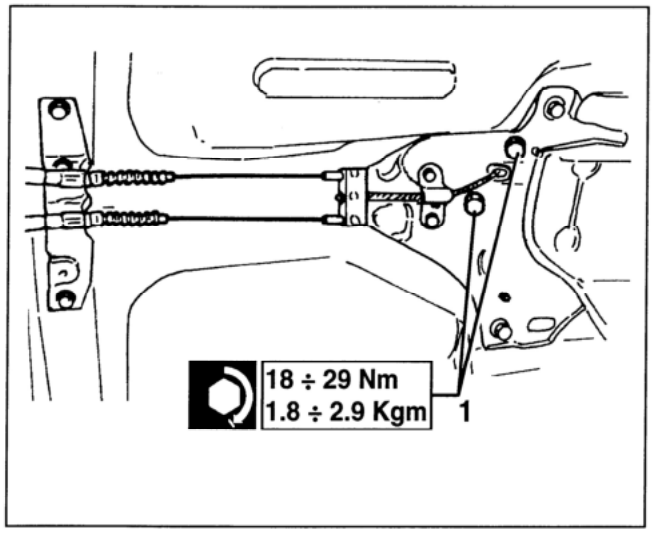
CONTROL LEVER

REMOVAL/REFITTING

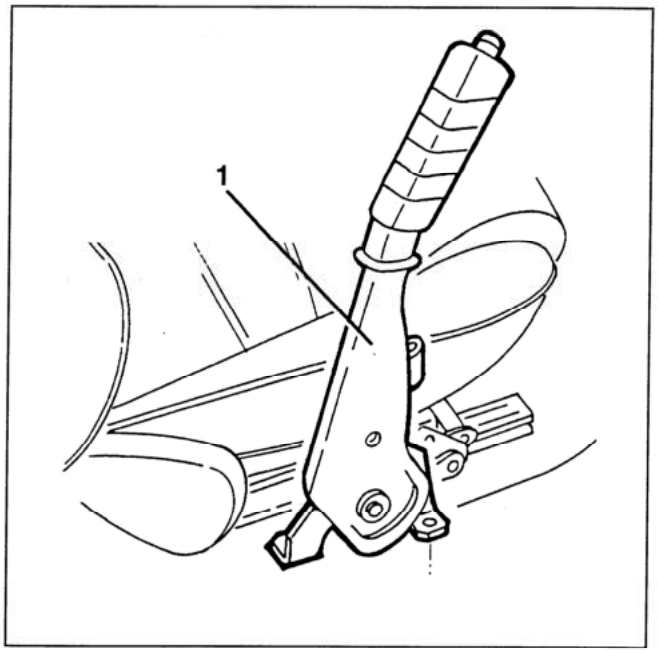
– Set the car on a lift.
– Remove the lever cover (see GROUP 70).
1. Completely slacken the parking brake lever adjustment nut and release the control cable.
2. Disconnect the electrical connection from the parking brake switch.



– Raise the car.
– Slacken the fastenings of the exhaust pipe heat guards. (If necessary remove them see GROUP 10).
1. Slacken the two screws fastening the parking brake lever.



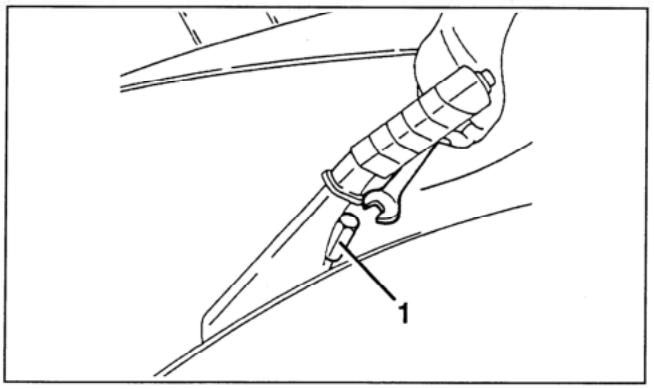
– Lower the car and work from inside.
1. Remove the parking brake control lever.



FRONT CONTROL CABLE

REMOVAL/REFITTING

– Set the car on a lift.
– Remove the parking brake control lever cover.
1. Slacken completely the parking brake lever adjustment nut and free the control cable.



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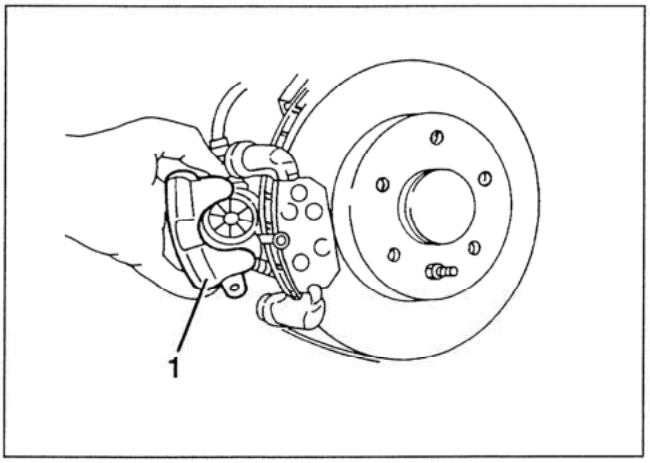
CHECKS AND INSPECTIONS

– The piston and caliper body should show no signs of scrapes or seizing; otherwise replace the caliper complete with piston.
– Always replace the protection boot and the seal.
– Make sure the bleed screw is not clogged.
– Make sure that the hose is not swollen or cracked.
– Change the brake pads if the thickness of the friction material is below 1.5 mm.
– Check the brake caliper support bracket for cracks and distorsion.
– If the handbrake cable automatic stroke adjustment device is not working properly replace the complete caliper.

CHANGING THE REAR BRAKE PADS

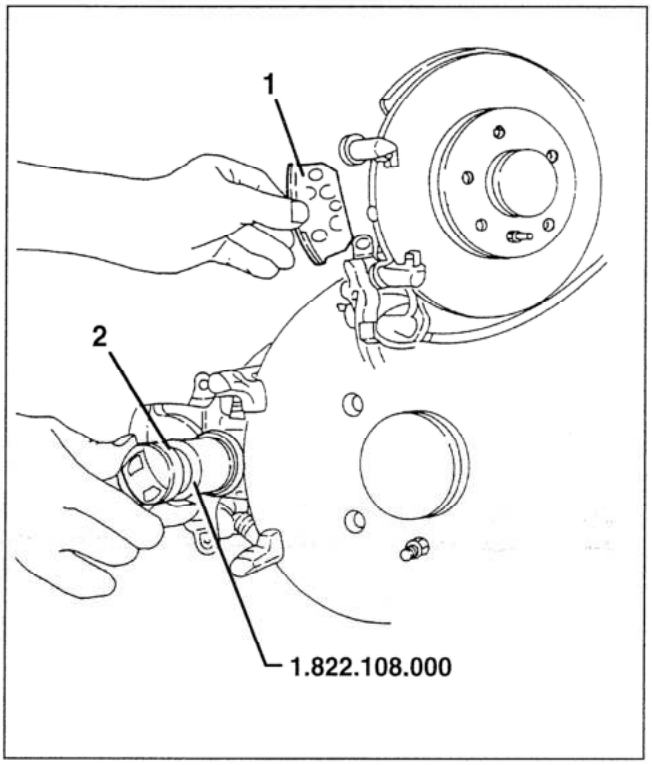
– Remove the rear wheel.
1. Slacken the two screws fastening the caliper body and move it to facilitate replacement of the pads.



1. Change the brake pads.

NOTE: There is no particular direction of assembly for the rear brake pads.

2. Using tool no.1.822.108.000 move back the piston to simplify assembly of the caliper, then refit the caliper.



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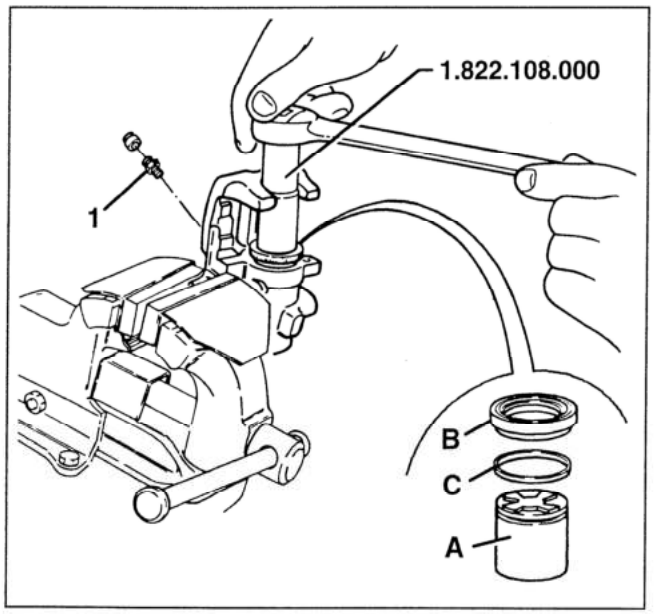
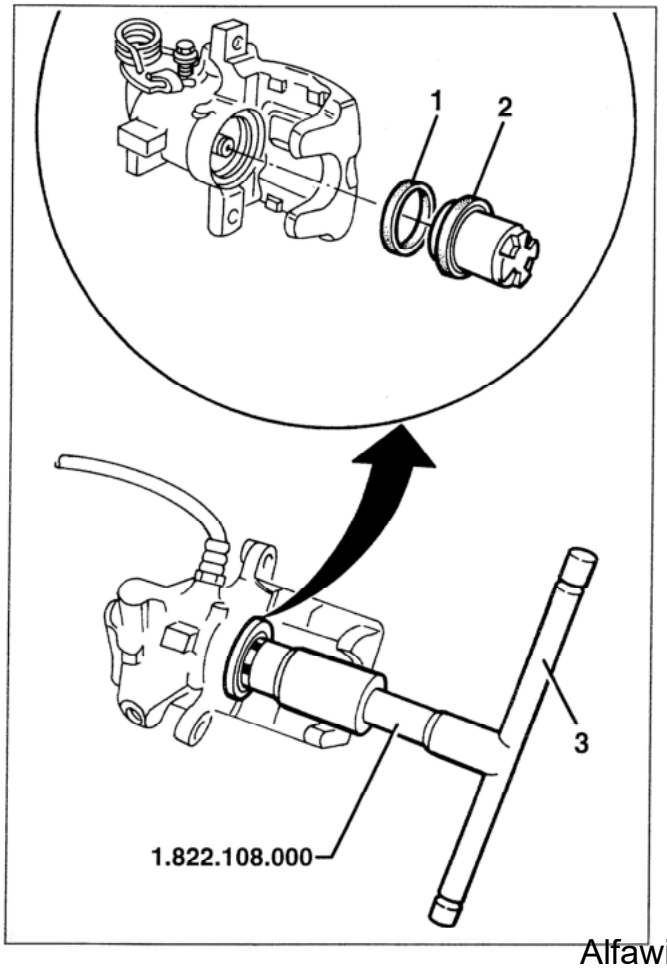
1. Remove the bleed screw.
– Using tool no. 1.822.108.000, remove the piston (A), protection boot (B) and seal ring (C).

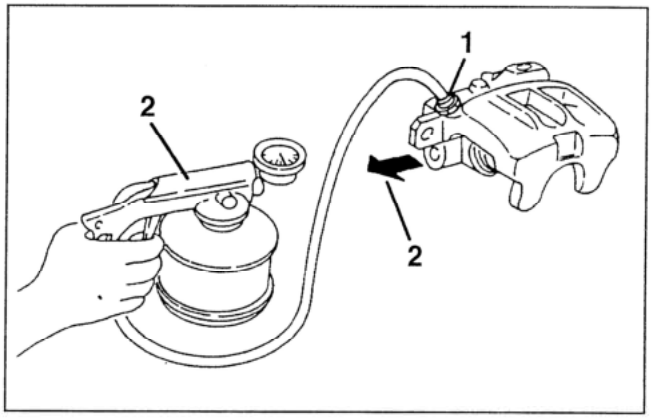


REASSEMBLY

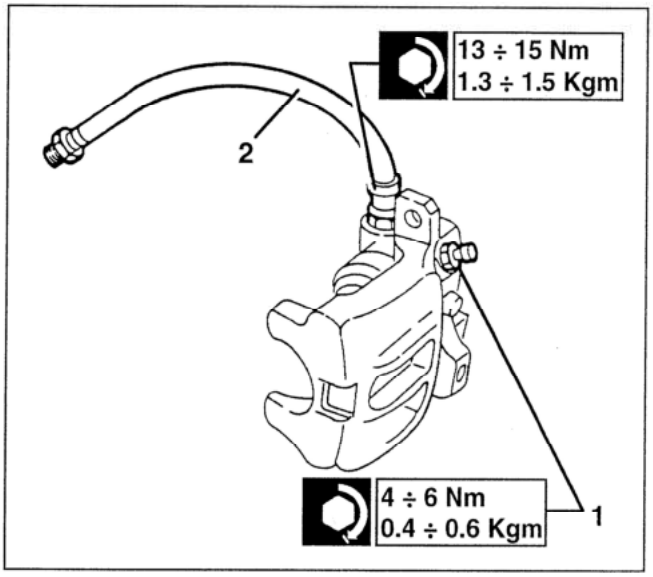
1. Fit the seal ring in the caliper body.
2. Position the protection boot on the rear of the piston.
3. Assemble the piston and adjust its position using tool no. 1.822.108.000.



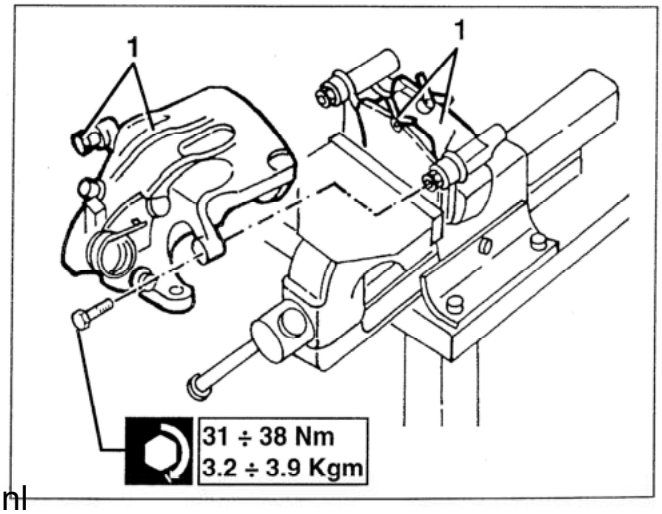
1. Partially tighten the bleed screw.
2. Fill the caliper with the specified brake fluid until fluid without air bubbles comes out of the connection hole of the hose.



1. Tighten the bleed screw to the specified torque.
2. Assemble the hose and lock the fitting to the specified torque.



1. Position the brake pads, then assemble the brake caliper on the support tightening the new fastening screws to the specified torque.



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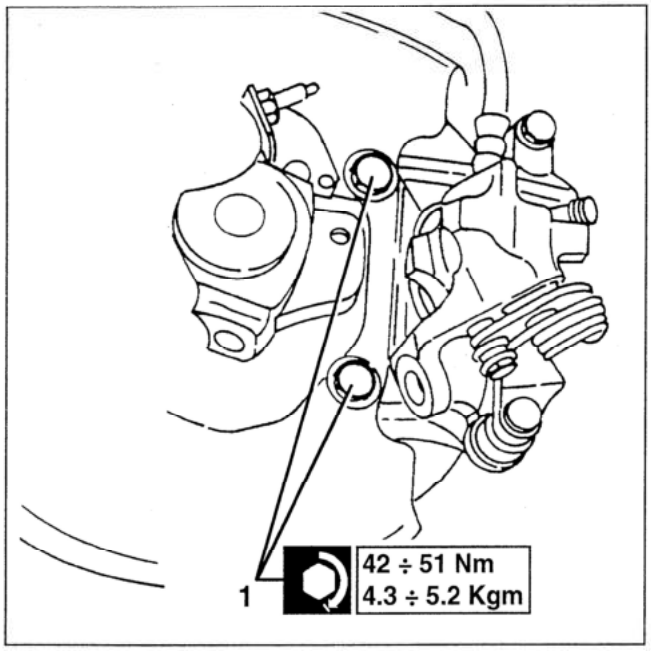
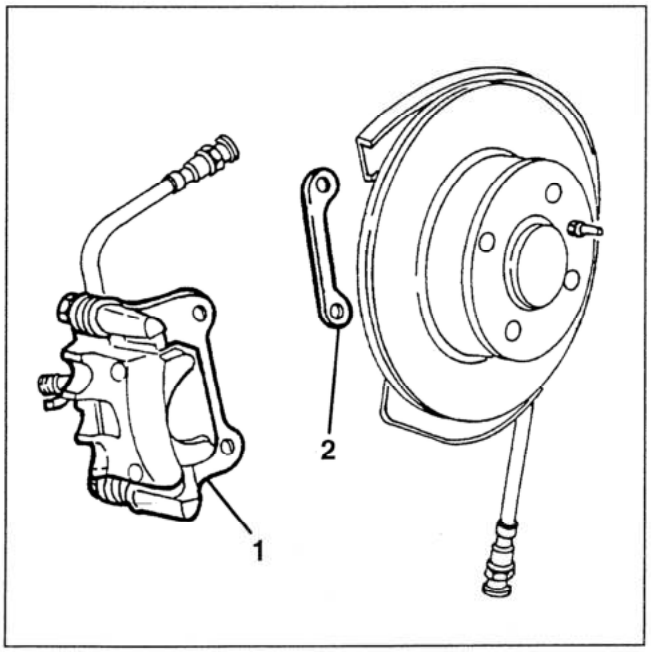
1. Slacken the two screws fastening the complete brake caliper.

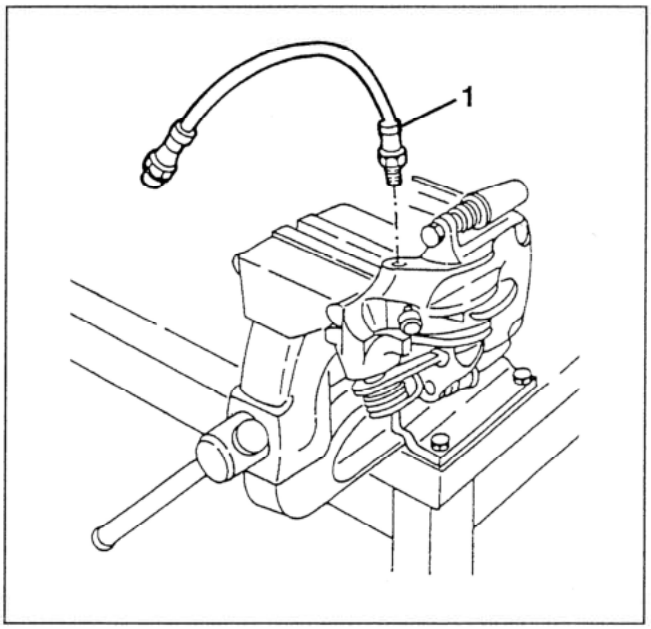


1. Remove the complete brake caliper.
2. Retrieve the thickness.

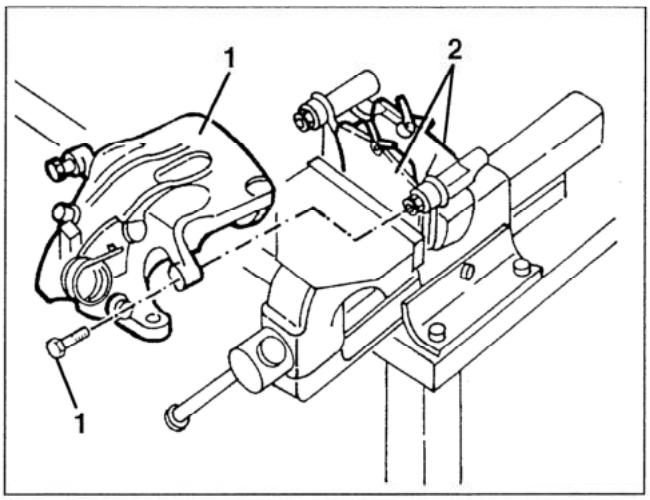


DIS-ASSEMBLY

1. Disconnect the brake caliper hose fitting.



1. Slacken the two screws fastening the brake caliper to the support bracket and remove it.
2. Retrieve the brake pads.



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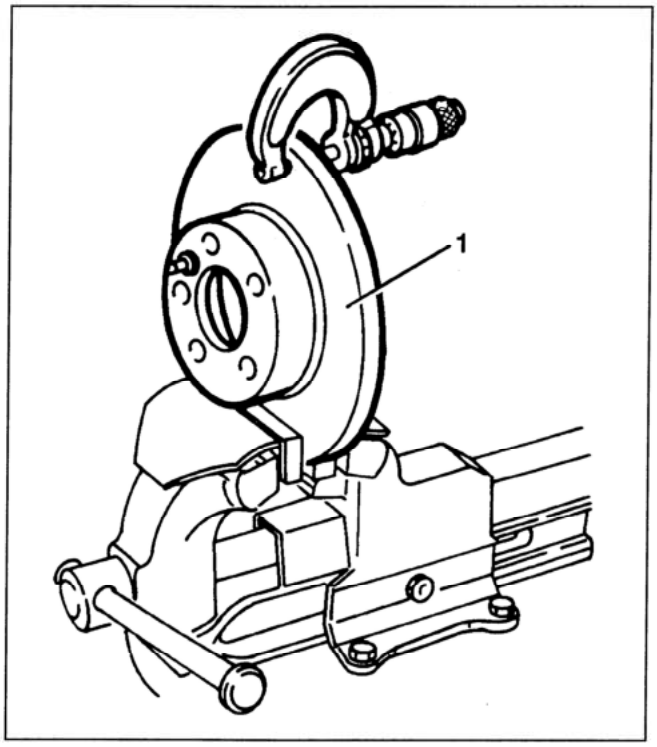
CHECKS AND INSPECTIONS

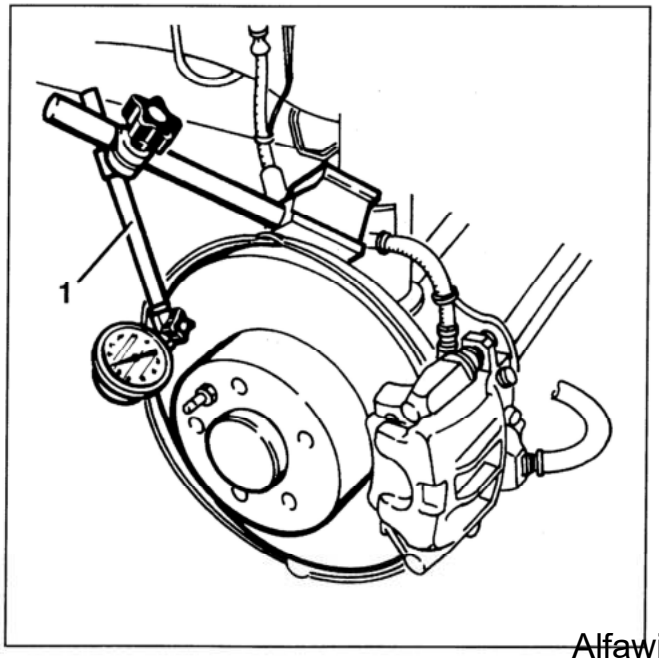
1. Check the thickness of the disks and check that the working surfaces have no deep scores or porosity. If necessary grind within the specified tolerances.

At use limit	At grinding limit
9.2 mm	10.65 mm



1. When changing the brake pads only, check that disk oscillation, with respect to the axis of rotation, is within the specified limits (0.15 mm max.).

NOTE: The value must be measured 2 mm from the outside diameter of the disk.

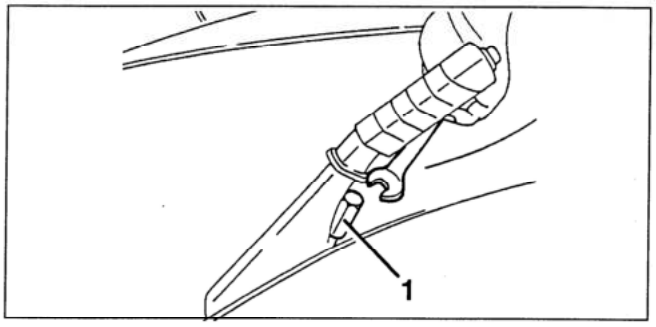


REAR BRAKE CALIPER

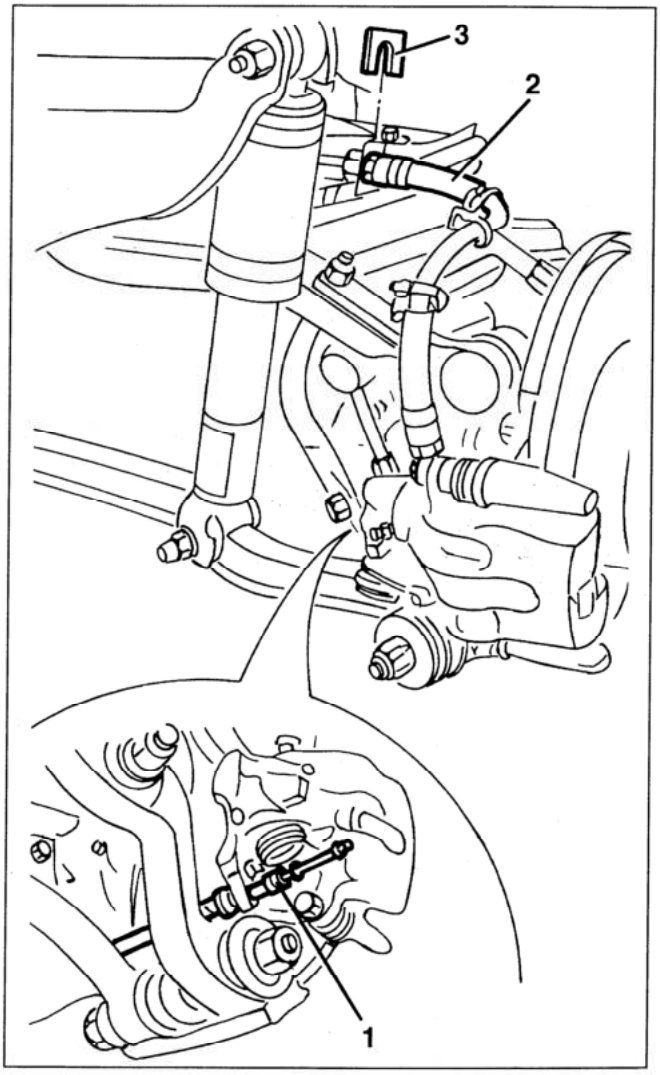
REMOVAL / REFITTING

- Set the car on a lift.
- Empty the brake - clutch fluid reservoir.
- Remove the wheel on the side concerned.
- Remove the handbrake lever cover.

1. Working on the special adjustment nut on the handbrake lever, loosen the tension of the cables.



1. Disconnect the handbrake cable from the brake caliper.
2. Slacken the hose fitting.
3. Prise the brake and withdraw the hose fitting.



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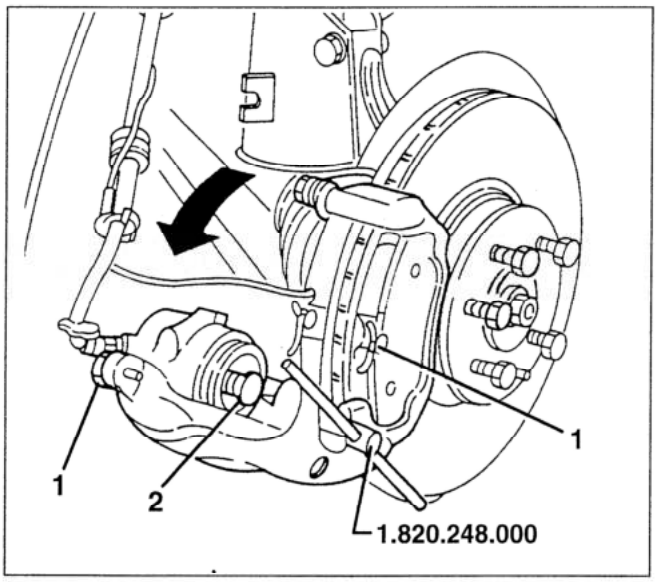
1. Turn the caliper as illustrated and change the brake pads.

NOTE: The brake pad, with the wear sensorn must be fitted on the inner side of the disk (brake caliper piston side); at the same time, check the relief machined on the outer part of the pad, which should be positioned at the rear with respect to the direction of travel.

2. When refitting the caliper adjust the position of the piston using tool no. 1.820.248.000.

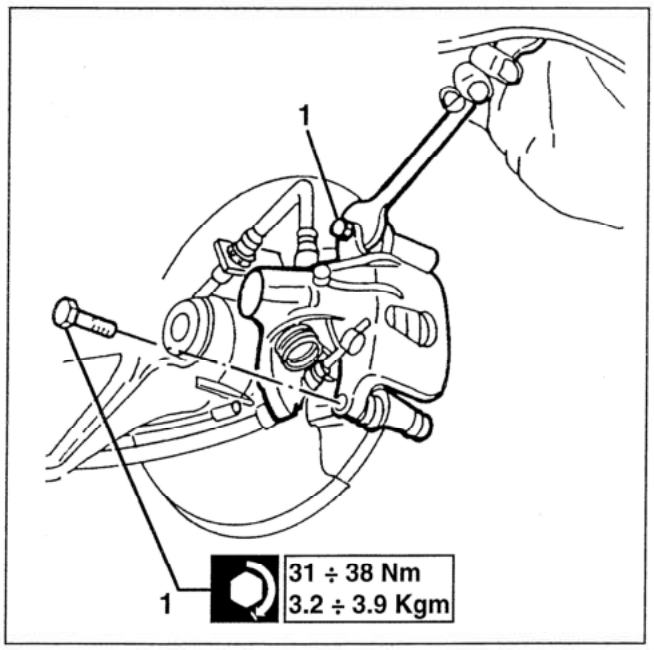


REAR BRAKE DISK

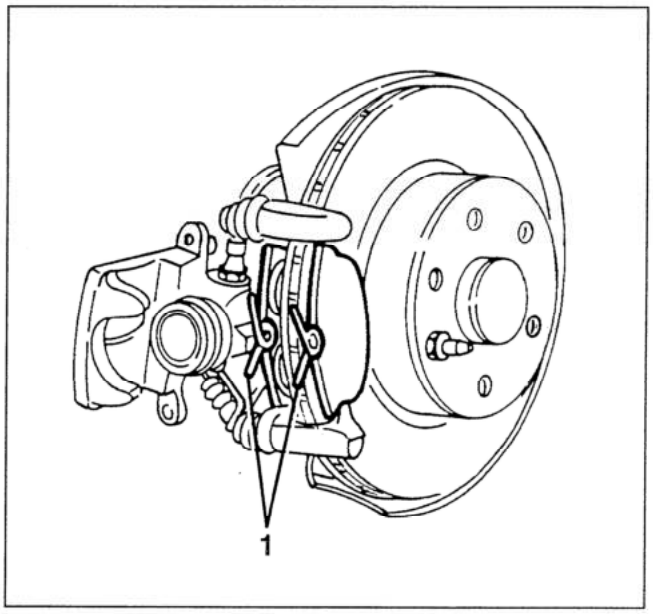
REMOVAL / REFITTING

– Set the car on a lift.
– Remove the wheel on the side concerned.

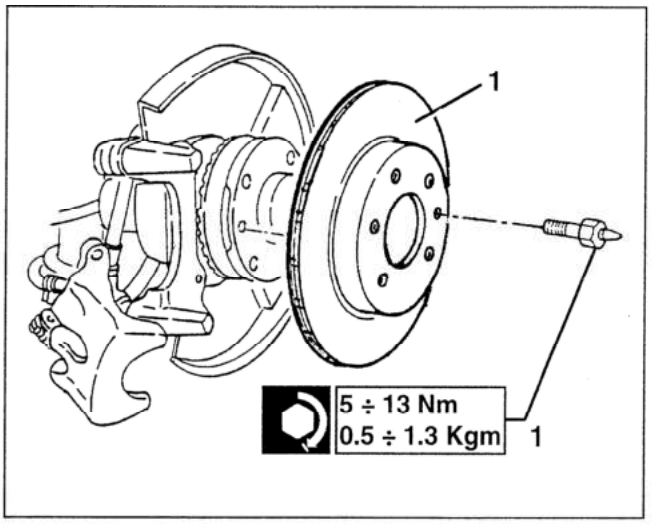
1. Slacken the two screws fastening the brake caliper to its support and move it to one side without disconnecting the piping and the handbrake cable.



1. Remove the brake pads.



1. Slacken the fastening pin and remove the brake disk.



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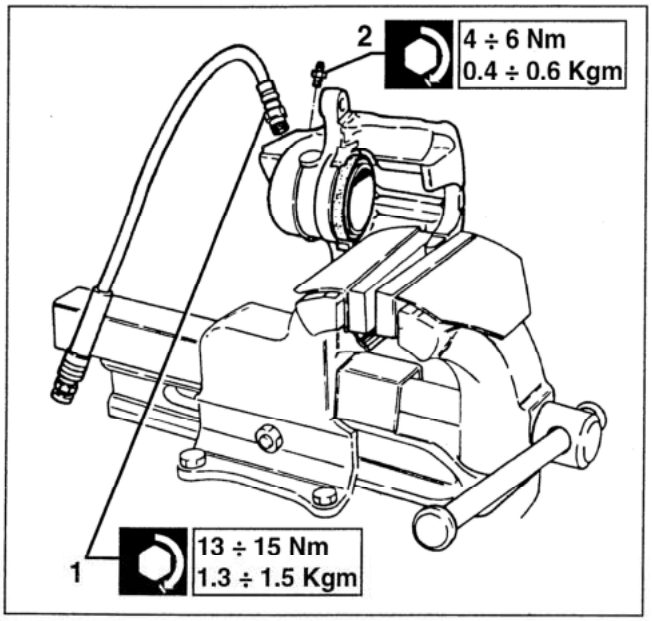
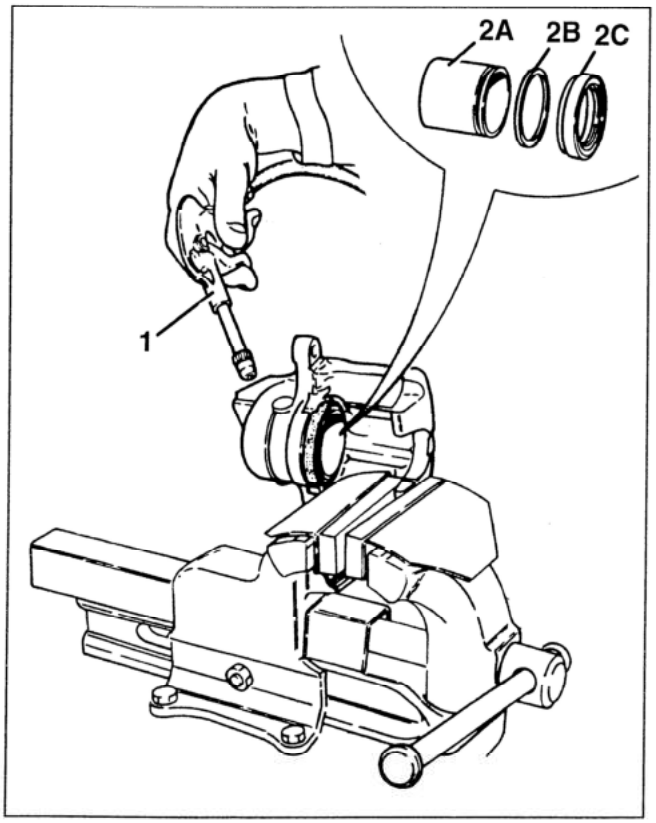
DISASSEMBLY / REASSEMBLY

1. Disconnect the hose fitting from the caliper.
2. Remove the bleed screw.



1. Blow a jet of compressed air in the brake fluid filler hole to make the piston come out.
2. Remove the piston (2A), the seal (2B) and the protective boot (2C).

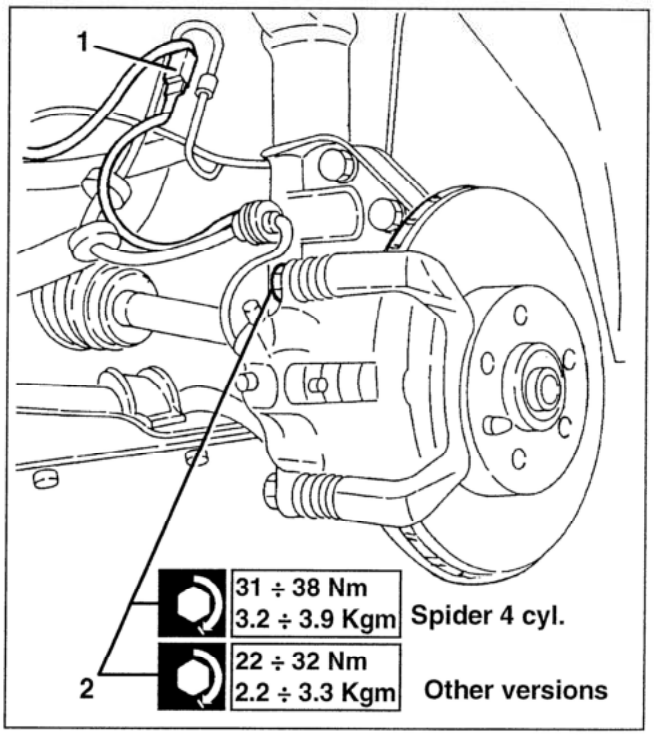


CHECKS AND INSPECTIONS

– The piston and body should not show signs of scrapes or seizure; otherwise replace the caliper complete with piston.
– Always replace the protection boot and the seal.
– Make sure the bleed screw is not clogged.
– Make sure that the hose is not swollen or cracked.
– Change the brake pads if the thickness of the friction material turns on the instrument cluster warning light.
– Check the brake caliper support bracket for cracks and distorsion.

CHANGING THE FRONT BRAKE PADS

– Remove the front wheel.
1. Disconnect the electrical connection of the brake pad wear sensor.
2. Slacken the caliper body upper fastening screw.



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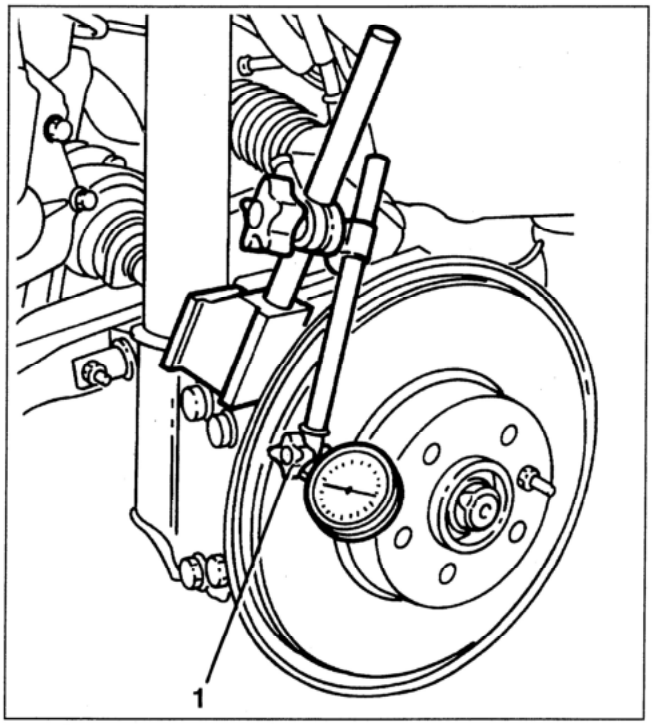
1. When changing the brake pads only, check that the oscillation of the disk, in relation to the axis of rotation, is within the specified limits (0.15 mm max).

NOTE: The value must be measured 2 mm from the outside diameter of the disk.

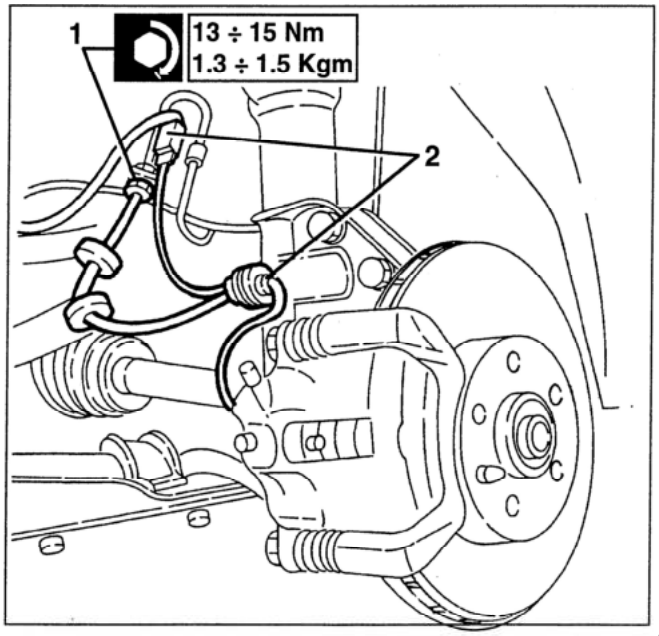


FRONT BRAKE CALIPER

REMOVAL / REFITTING

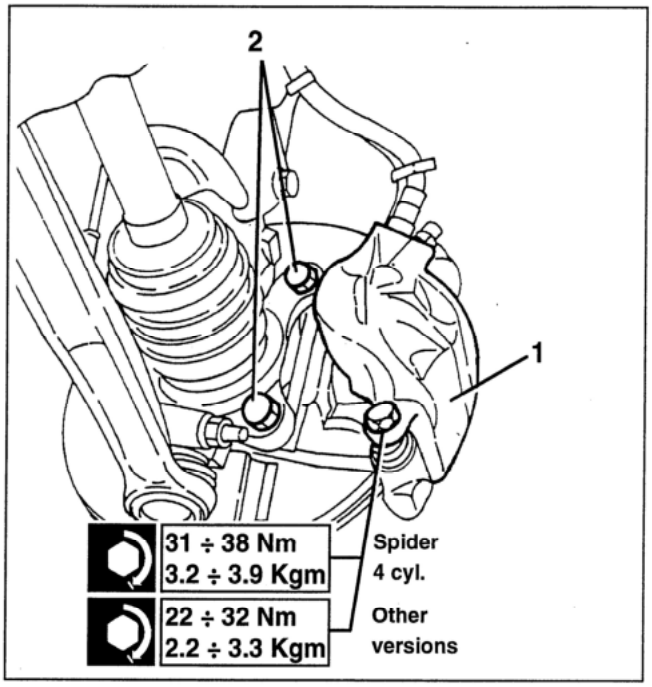
- Set the car on a lift.
- Disconnect the battery (-) terminal.
- Remove the wheel on the side concerned.

1. Disconnect the intermediate union between the stiff pipe and the fluid delivery hose to the brake caliper.
2. Disconnect the electrical connection of the brake pad wear sensor, then free them from the fastening on the shock absorber.



1. Slacken the two fastening screws and remove the brake caliper and pads.
2. If necessary also remove the caliper body, slackening the two hub fastening screws.

NOTE: When refitting replace the caliper body fastening screws, tightening them to the specified torque.



WARNING:
When refitting check that the rubber protection bellows of the fastening pin threads are intact, otherwise replace them.
When refitting the brake pad, with the wear sensor, it must be installed on the inner side of the disk (brake caliper piston side): at the same time check that the relief, machined on the outer side of the pad, is positioned at the rear with respect to the direction of travel.

When refitting bleed the air from the braking system (see specific paragraph).

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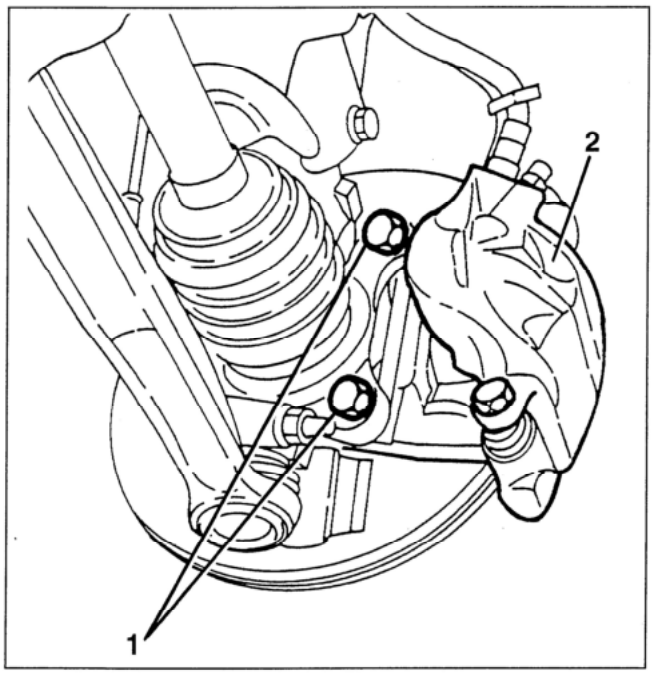
BRAKE GROUPS

FRONT BRAKE DISK

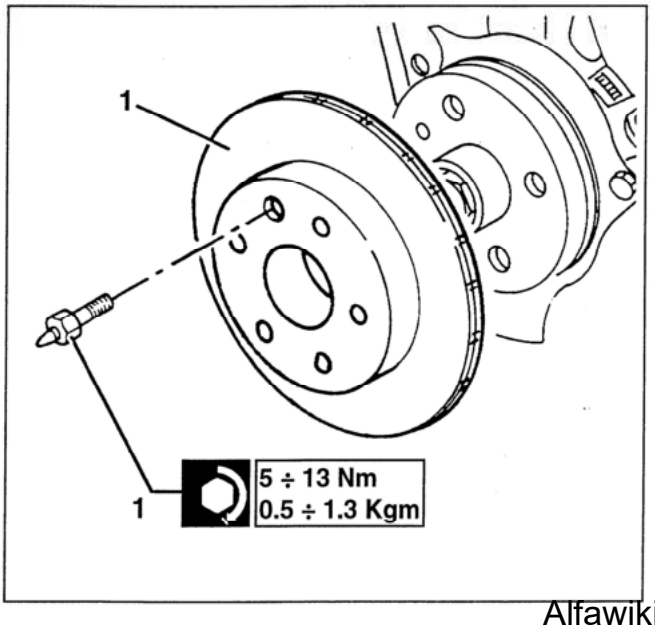
REMOVAL / REFITTING

– Set the car on a lift.
– Remove the wheel on the side concerned.
1. Slacken the two screws fastening the brake caliper support plate.
2. Remove and move aside the complete brake caliper without removing the piping and wiring.



When refitting change the screws and tighten them to the specified torque (see GROUP 00).

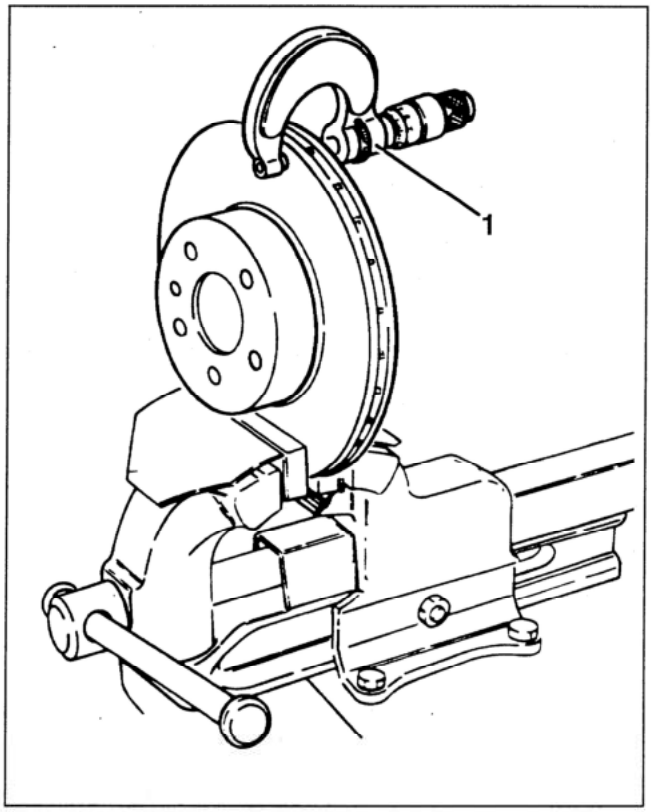
1. Slacken the fastening pin and remove the brake disk.



CHECKS AND INSPECTIONS

1. Check the thickness of the disks and check that the working surfaces have no deep scores or porosity. If necessary, grind respecting the specified tolerances.

Disk thickness	At use limit	Minimum after grinding
Spider 4 cyl.	18.2 mm	19.2 mm
Other versions	20.2 mm	21.9 mm



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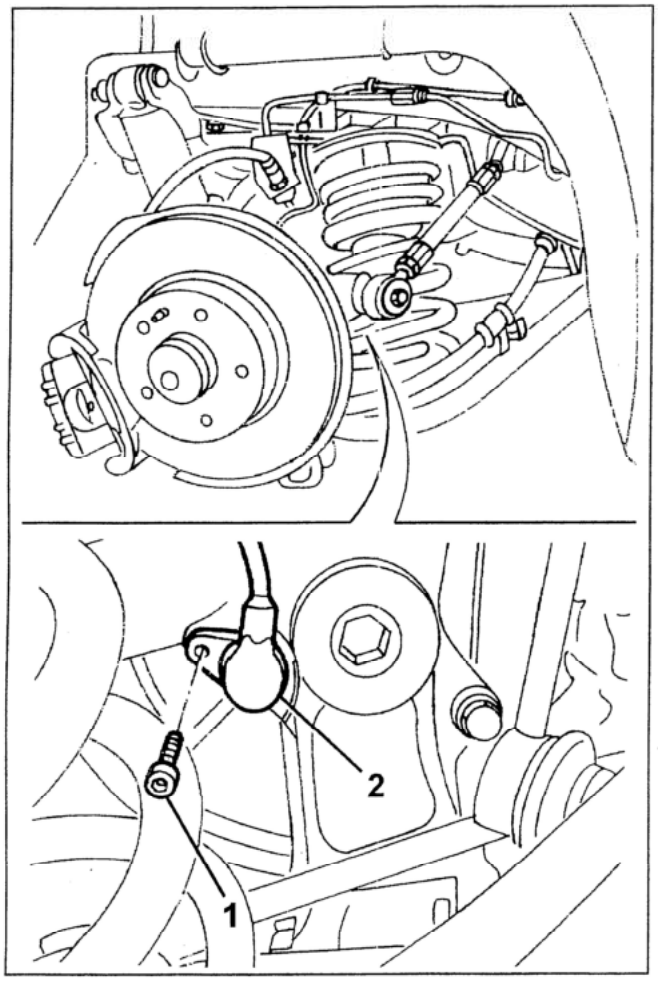
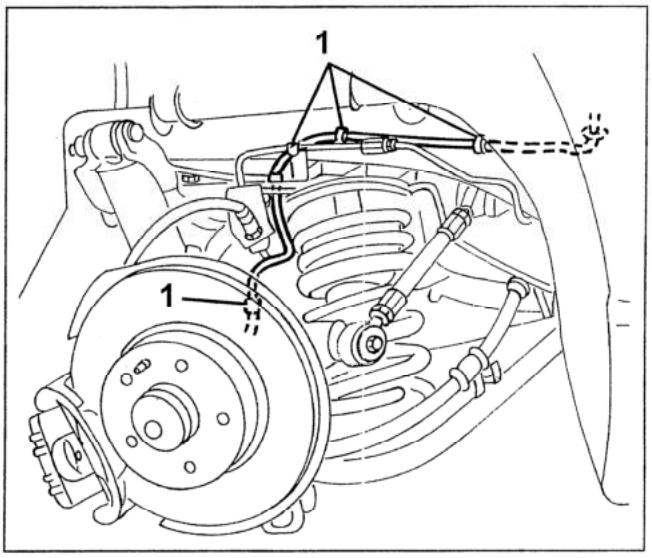
REAR ACTIVE SENSORS (6 Cylinder Version)

REMOVING / REFITTING

– Remove the wheel.
1. Undo the bolt fixing the active sensor.
2. Remove the active sensor from the housing.



1. Disconnect the wiring for the active sensor from the retainers.



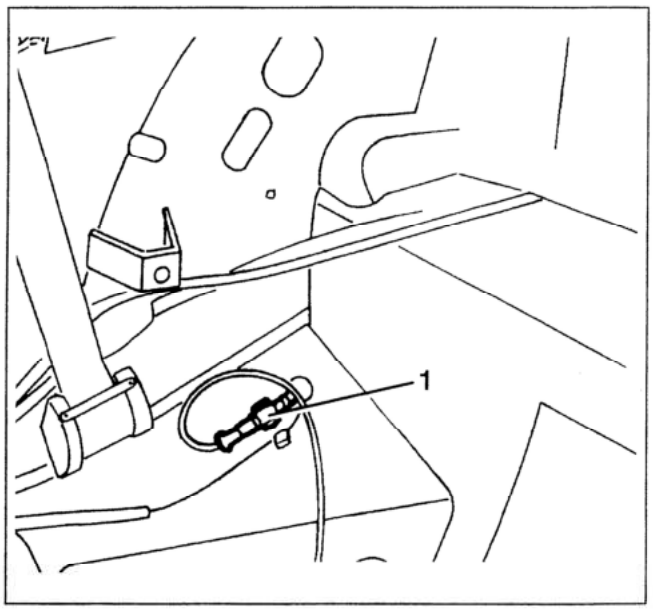
Spider

– Open the rear lid, lift up the side cover and gain access to the connector.

Gtv

– Remove the side panel (see GROUP 70)

1. Disconnect the electrical connection for the sensor. Remove the sensor, extracting the connector from the lower side of the vehicle.



Proceed with the refitting, reversing the order of the operations carried out for the removal.

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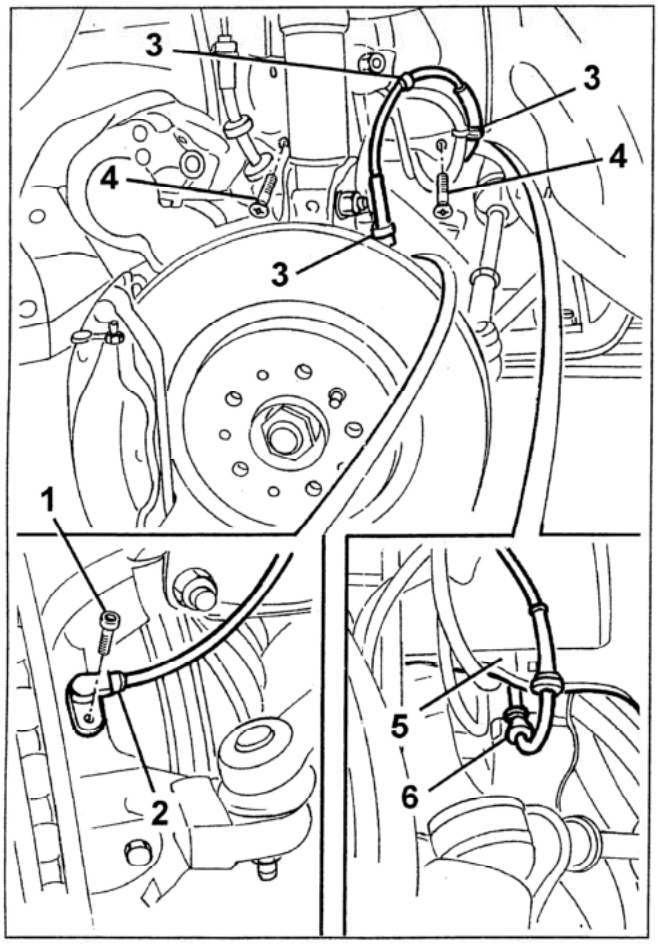
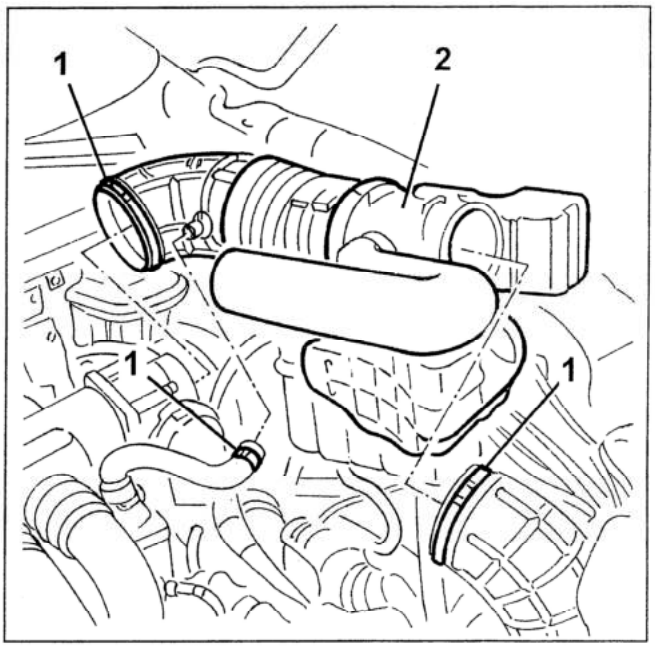
LEFT FRONT ACTIVE SENSOR (6 Cylinder Version)

REMOVING / REFITTING

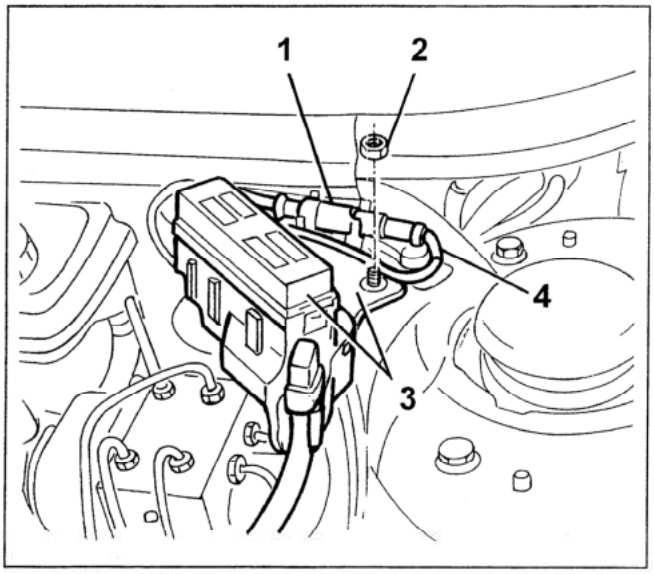
– Remove the wheel.
1. Undo the bolt fixing the active sensor.
2. Remove the active sensor from the housing.
3. Disconnect the wiring for the active sensor from the retainers.
4. Undo the bolts
5. Move the protection.
6. Disconnect the wiring for the sensor from the inner retainer.



– Open the bonnet lid.
1. Open the retaining bands.
2. Remove the corrugate pipe connecting the chamber with the flow meter, complete with resonator.



1. Disconnect the electrical connection for the sensor after having released it from the retainers.
2. Undo the nut.
3. Move the support with the fuse carrier.
4. Remove the sensor with the wiring.



Proceed with the refitting, reversing the order of the operations carried out for the removal.

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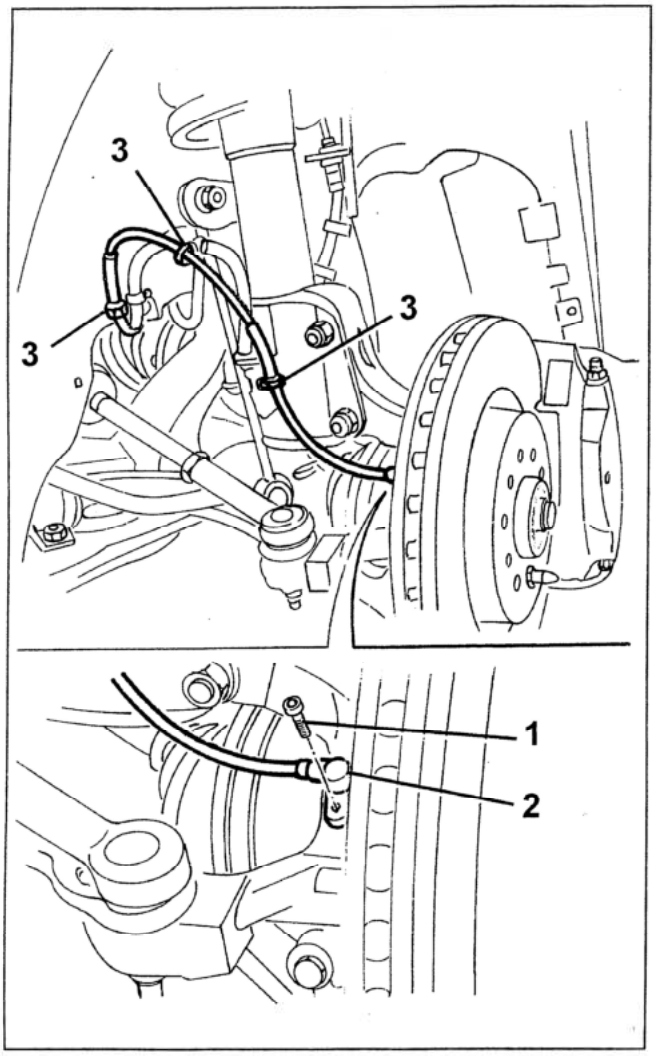
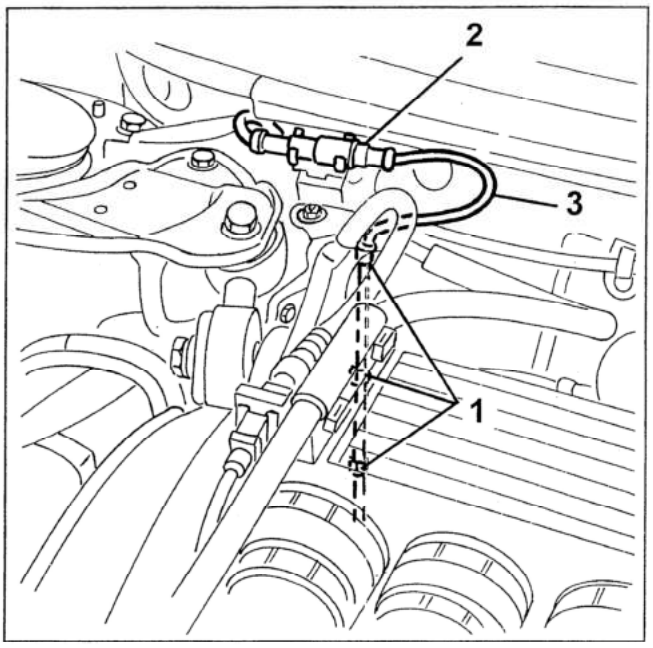
RIGHT FRONT ACTIVE SENSOR (6 Cylinder Version)

REMOVING / REFITTING

– Remove the wheel.
1. Undo the bolt fixing the active sensor.
2. Remove the active sensor from the housing.
3. Disconnect the wiring for the active sensor from the retainers.



– Open the bonnet lid.
1. Disconnect the wiring from the retainers.
2. Disconnect the electrical connection for the sensor.
3. Remove the sensor with the wiring.



Proceed with the refitting, reversing the order of the operations carried out for the removal.

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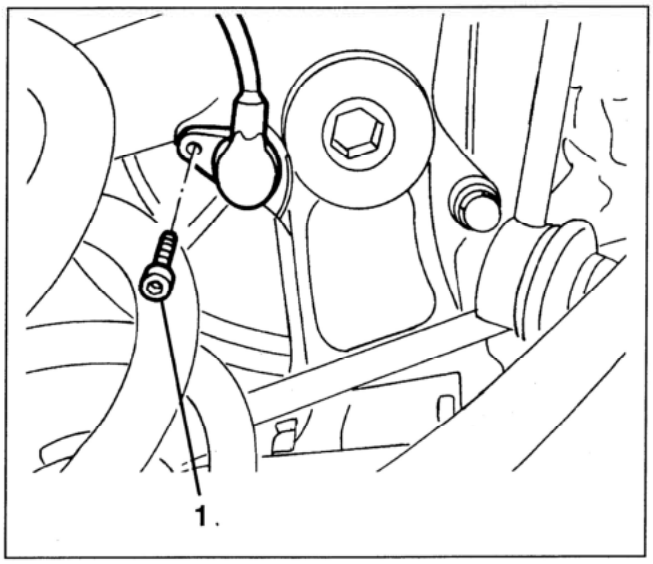
REAR INDUCTIVE SENSORS

REMOVAL / REFITTING

1. Slacken the screw fastening the inductive sensor to the brake disk boot.



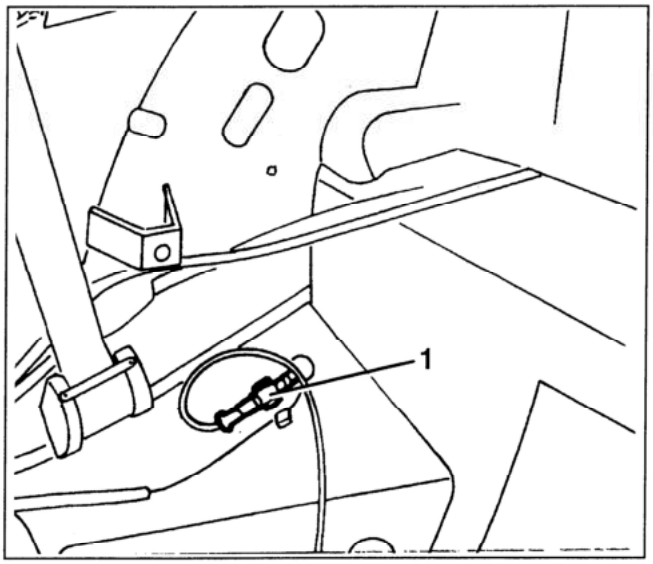
Spider

– Open the boot, raise and gain access to the connector.

Gtv

– Remove the side panel (see GROUP 70).

1. Disconnect the electrical connection of the inductive sensor and remove it.



When refitting grease the seat of the inductive sensor with the specified grease.

CHECKING THE GAP

– Using a thickness gauge, check the gap between the inductive sensor and the corresponding phonic wheel

Front gap	Rear gap
0.3 ÷ 1.05 mm	0.37 ÷ 0.9 mm

WARNING:
The gap is not adjustable as no thicknesses are supplied for this purpose. Check that the sensor and the phonic wheel teeth are intact and if they are not within the specified tolerance.

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RECOVERY IN THE CASE OF AIR IN THE PISTON

Should air enter the brake control cylinder as a result of an incorrect air bleeding procedure, proceed as follows:

– Press the brake pedal quickly and repeatedly and bleed the air in the following sequence:
1. RH rear wheel
2. LH rear wheel
3. LH front wheel
4. RH front wheel

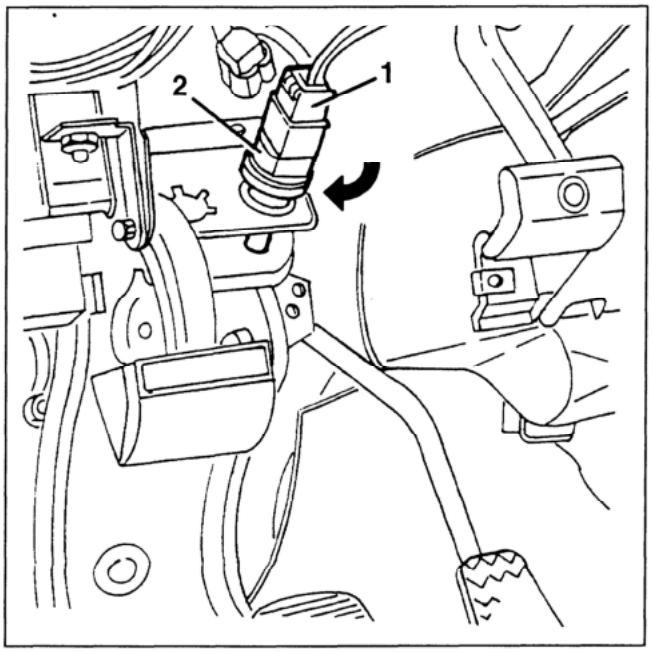
WARNING
The operation should be repeated five times for each wheel before going on to the next.

– Lastly carry out the normal air bleed procedure in the following sequence.
1. LH front wheel
2. RH front wheel
3. LH rear wheel
4. RH rear wheel

STOP LIGHTS SWITCH

REMOVAL / REFITTING

– Disconnect the battery (-) terminal.
1. Disconnect the electrical connection from the switch.
2. Turn the switch 45° clockwise and remove it.

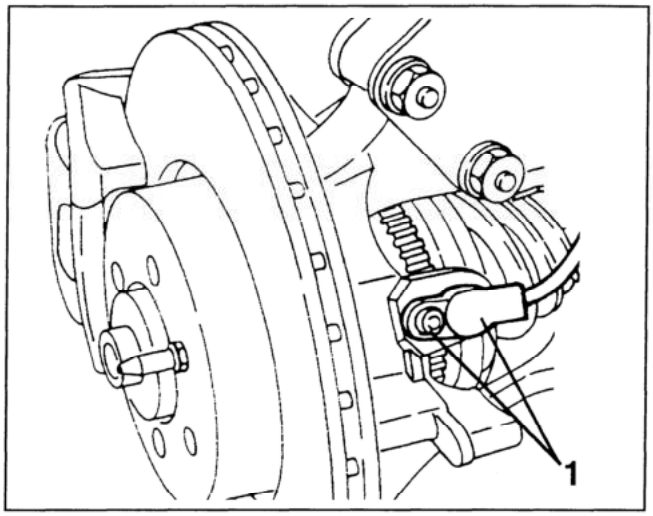


When refitting adjust the stroke of the "mobile part" using the special lockring.

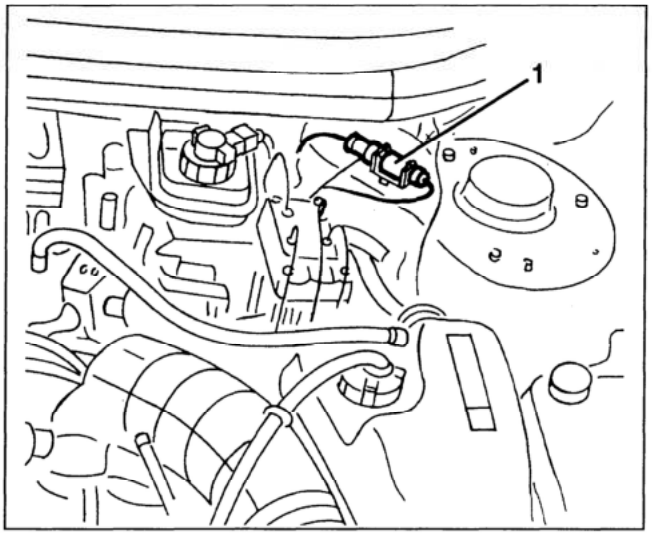
FRONT INDUCTIVE SENSORS

REMOVAL / REFITTING

1. Slacken the inductive sensor fastening screw from the wheel upright.



1. Disconnect the electrical connection next to the shock absorber dome and remove the inductive sensor together with the wiring, after releasing from the fastenings.



When refitting grease the inductive sensor seat with the specified grease.

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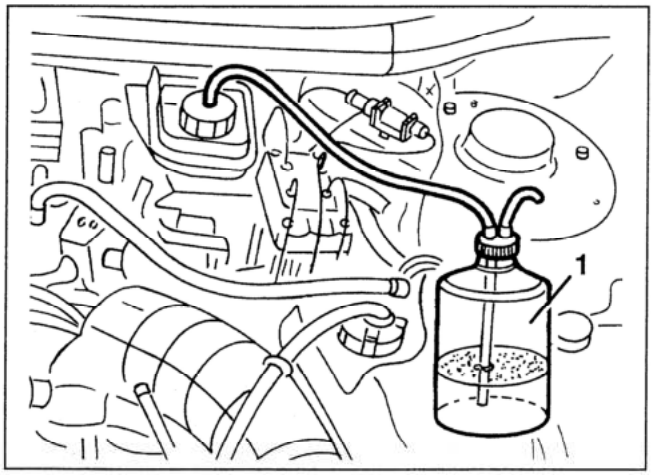
BLEEDING THE AIR FROM THE SYSTEM

When filling the hydraulic circuit or doing any work on it, proceed as described below.

1. Using the special air relief device fitted on the brake fluid reservoir bleed the air in the following sequence:
1. LH front wheel
2. RH front wheel
3. LH rear wheel
4. RH rear wheel



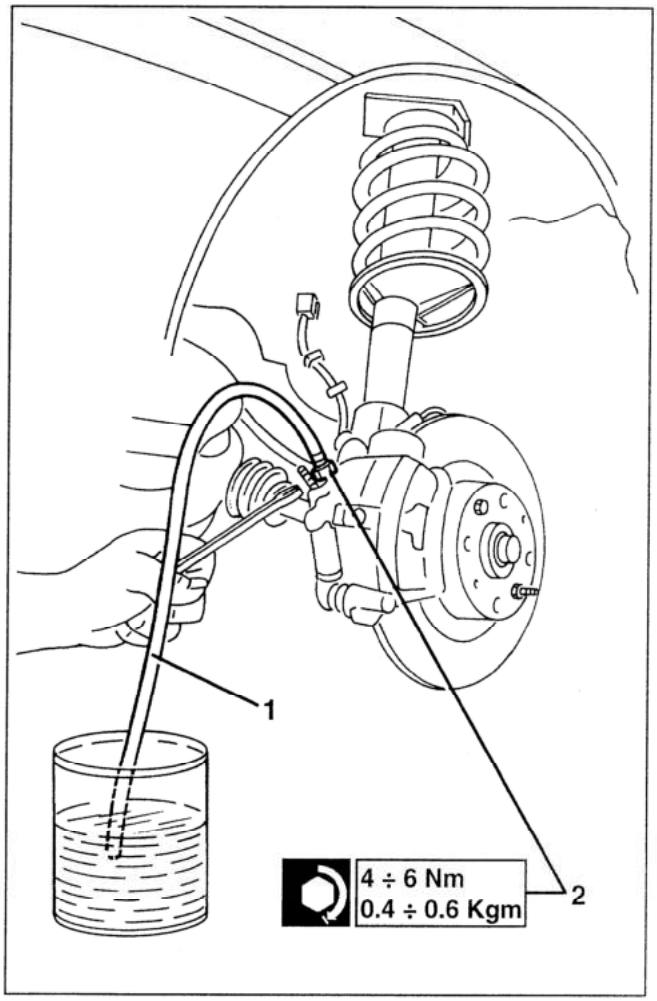
For each wheel proceed as follows:

– Fill the brake-clutch fluid reservoir up to the "MAX" level withe the specified fluid.

– If necessary, remove the wheel concerned.

1. Fit a tube on the bleed screw. Dip the end of the tube in a recipient containing the specified fluid.

2. Slacken the bleed screw and repeatedly depress the brake pedal (wait a few seconds between one press and the next). When fluid free of bubbles goes into the recipient, depress the pedal completely and lock the bleed screw to the specified torque.



NOTE: The air should be relieved separately on each wheel.

WARNING:
When relieving the air check that the fluid does not fall below the minimum level.
Never re-use the fluid discharged during this operation.
Prevent the fluid from contacting painted parts and damaging them.

NOTE: If the above procedure is not followed, air might get into the piston leading to lengthening of the brake pedal stroke, in which case proceed as follows.
Air may also get into the ABS hydraulic unit from which any kind of air bleeding is impossible.

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BRAKING LOAD PROPORTIONING VALVE (from chassis no.6023216 to chassis no.___)

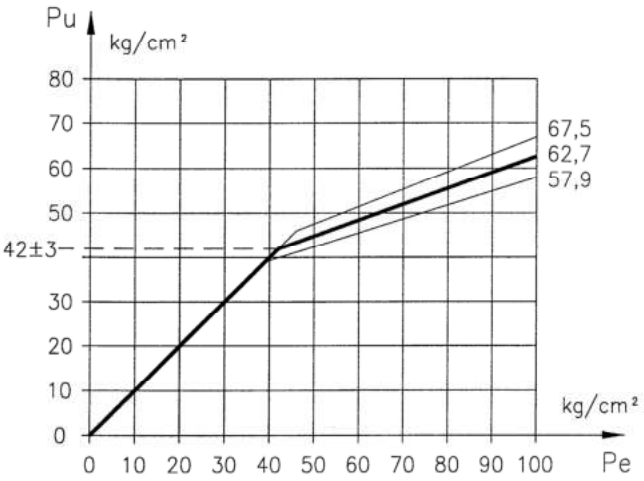
DESCRIPTION

The braking load proportioning valve is assembled in the same way as the previous one, but it is without the control spring; since the operating procedure depends on the pressure in the braking circuit and not on the position of the suspension.

In fact, up to a pressure in the circuit of 42 kg/cm, the output pressure (Pu) equals the inlet pressure (Pe).

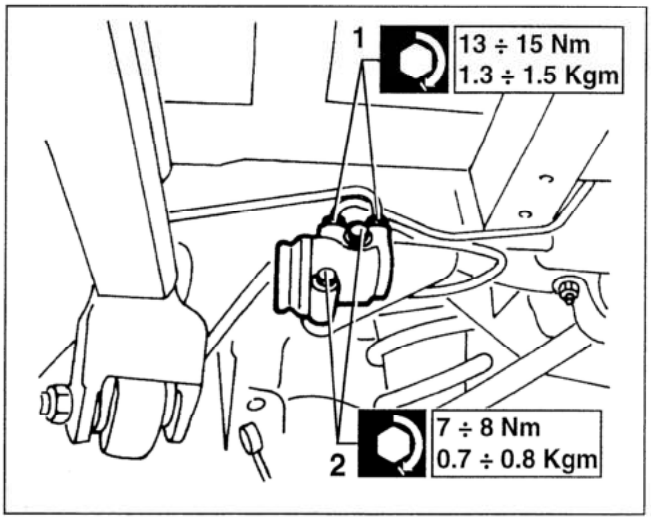
The further increase of inlet pressure, acting on the surfaces of the piston inside the proportioning valve, determines a reduction in the growth of the outlet pressure as shown below.

Therefore the proportioning valve needs no adjustment and it is fastened by two screws in the same housing as the previous version.



REMOVING/REFITTING

– Set the car on a lift.
– Drain the brake/clutch fluid reservoir.
– Remove the rear section of the exhaust piping (see Group 10).
1. Slacken the stiff pipe fittings from the braking load proportioning valve.
2. Slacken the two fastening screws and remove the braking load proportioning valve.



When refitting, relieve the air from the braking system (see specific paragraph).

WARNING:
From chassis no. ... the braking load proportioning valve is NOT present on cars fitted with BOSCH 5.3 ABS system with EBD as the rear axle brake distributing function is controlled by the ABS system itself.

BRAKE SYSTEM PIPES

CHECKS AND INSPECTIONS

– Check the stiff pipes and hoses for cracks, swellings, rust and fluid leaks.
– When changing the pipes, empty the brake-clutch fluid reservoir using a syringe and plug the ends of the actual pipes to prevent foreign substances from getting in.
– When refitting fill the brake-clutch fluid reservoir and bleed the air from the brake system (see specific paragraph).

The stiff pipes must never be bent or twisted.

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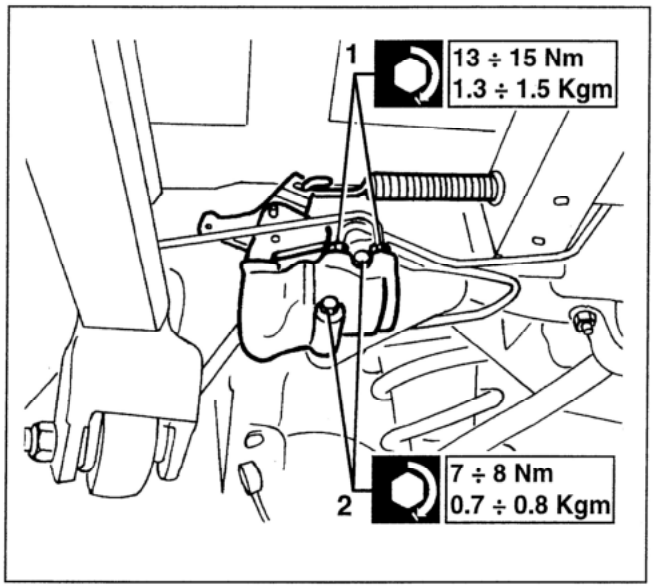
BRAKING LOAD PROPORTIONING VALVE (up to chassis no.6023215)

REMOVAL / REFITTING

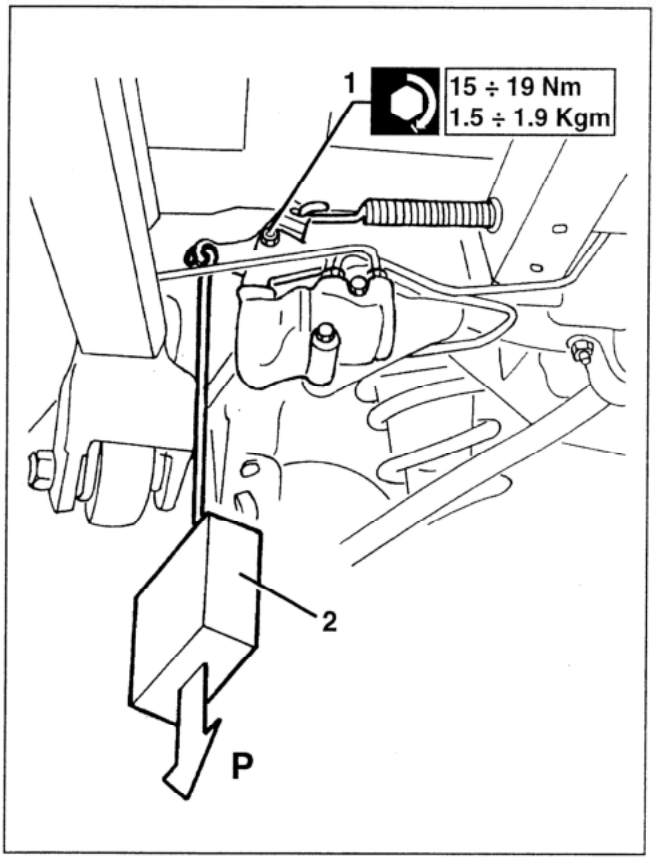
– Set the car on a lift.
– Empty the brake-clutch fluid reservoir.
– Remove the exhaust pipe rear section (see Group 10).
1. Slacken the fittings of the stiff pipes from the braking load proportioning valve.
2. Slacken the two fastening screws and remove the il braking load proportioning valve after disconnecting the spring.



When refitting bleed the air from the braking system (see specific paragraph).

ADJUSTMENT

– Set the car in running order with driver) and set it on a horizontal surface with the wheels on the ground, in order to settle the suspensions.
1. Slacken the screw fastening the braking load proportioning valve bracket.
2. On the eyelet of the bracket apply a weight **P** of **4.5 kg**.
– Keeping the bracket in this position, lock the fastening screw to the specified torque.



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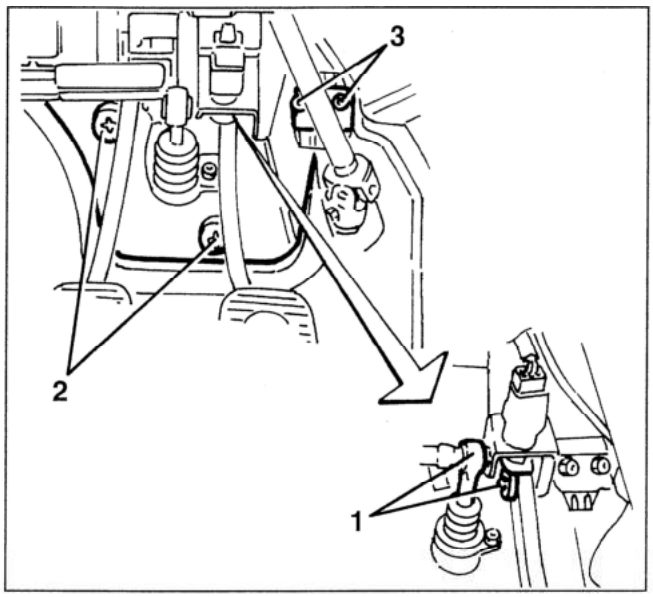
SERVOBRAKE

REMOVAL / REFITTING

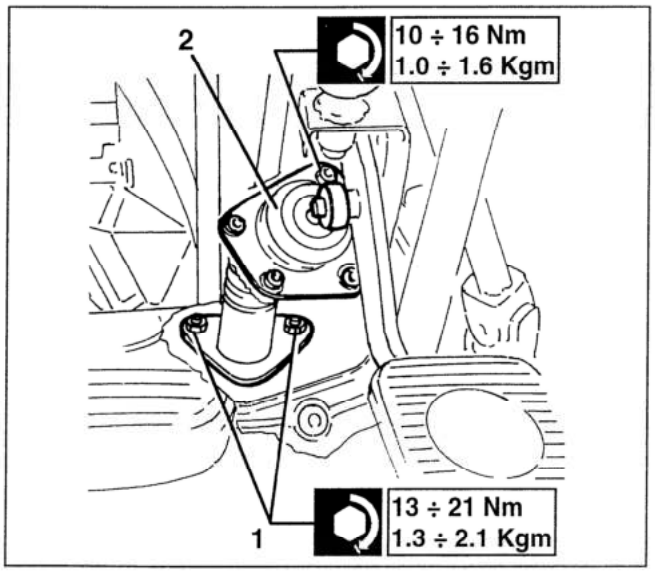
– Empty and remove the brake - clutch fluid reservoir (see specific paragraph).
– Remove the il ABS hydraulic unit/electronic control unit(see specific paragraph).

Working in the car:

1. Remove the brake pedal fastening clamp, releasing it from the servobrake control rod.
2. Remove the lower part of the pedal protection detaching the two rubber fastening plugs.
3. Slacken the two nuts and remove the accelerator pedal bracket.

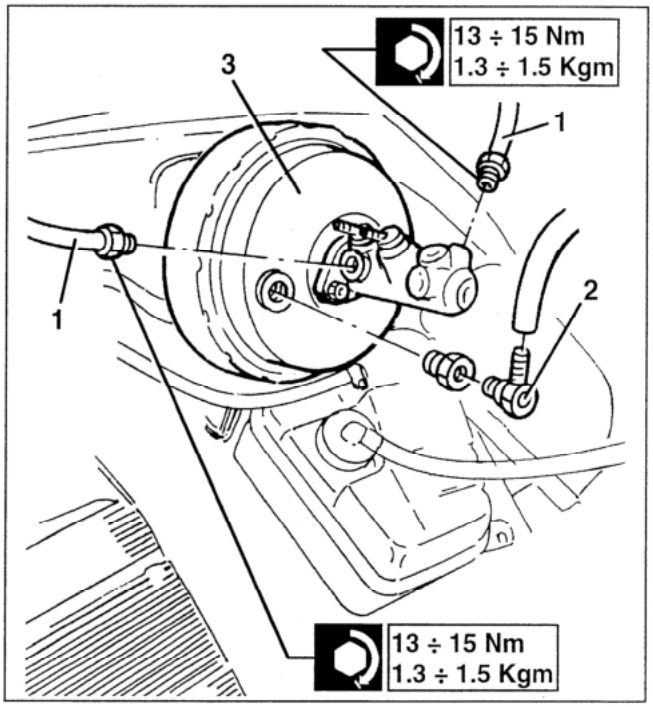


1. Slacken the two nuts fastening the clutch pump, to gain access to the nut below.
2. Slacken the four fastening nuts and free the servobrake pump.



Working in the engine compartment

– Remove the right-hand engine compartment protection
– Disconnect the engine coolant fluid reservoir from the side panel (N.B. do NOT disconnect the pipes: it is not necessary to empty the system).
1. Disconnect the two stiff delivery pipes from the brake pump.
2. Disconnect the servobrake vacuum takeoff pipe
3. Retrieve the servobrake together with the brake pump



– If necessary, separate the unit disconnecting the pump from the servobrake; Spares however supply a single servobrake-pump unit.

When refitting bleed the air from the system; after bleeding the air, restore the correct level in the reservoir.

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either depending on braking pressure (fixed cut) or according to the elongation of the rear suspension.

As a result of this new strategy the control unit controls the tendency of the rear wheels to skid through the ABS sensors, reducing the braking pressure only when this is needed.

The result is better adaptation of the braking force to the conditions of the road surface and maximised efficiency of braking at the rear.

Any fault on the EBD system is shown by the turning on of the "low brake fluid level/handbrake on" warning light on the instrument cluster.

In these conditions the pressure reduction function at the rear wheels is not active. Use the vehicle with extreme caution (see Group 55 - Electric System Diagnosis).

REPAIR OPERATIONS ON THE UNIT

Instructions for correct repairing

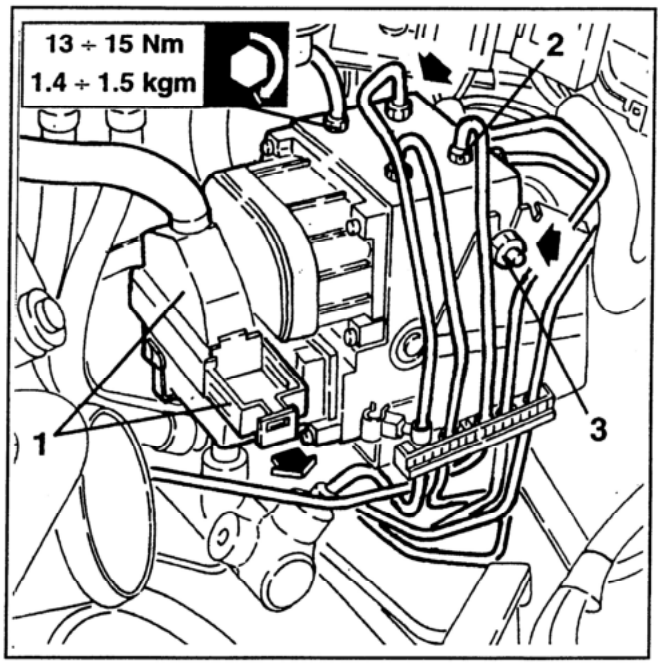
- **To replace the electronic control unit it is necessary to disassemble the whole hydraulic unit, owing to reasons of space and to avoid damaging the internal connector.**
- **The electrohydraulic control unit cannot be overhauled and it is fault-proof until it is tampered with. It must be replaced if found to be faulty.**
- **After each replacement of a hydraulic unit, rpm sensor, electronic control unit or wiring (especially if after an accident) the entire A.B.S. system must be checked with the Tester.**
- **After all operations on the hydraulic system of the A.B.S. or brake system, it is necessary to fill with DOT 4 brake fluid, relieve the air, and check the tightness of all the connection points.**
- **The electrohydraulic control unit is supplied filled with DOT 4 brake fluid and with the solenoid valves not supplied. The operation for filling with fluid and relieving the air is the same as for a conventional system, but requires more time.**
- **During removal of the electrohydraulic unit avoid overturning it to prevent spilling the oil contained in the hydraulic part.**
- **When refitting pay attention to the unions: to prevent mistakes in connecting the various parts of the braking circuit during repair operations, the connections of the hydraulic modulator unit are of different sizes (M10x1 and M12x1), the unions are also identified by the codes stamped on them.**

ABS HYDRAULIC UNIT/ELECTRONIC CONTROL UNIT

Removing/Refitting

— Disconnect the battery
— Remove the corrugated air intake pipe (see group 10).
— Drain the brake-clutch fluid.
— Remove the components that prevent free access to the hydraulic unit.

1. Pull control unit comb locking device forward, then remove it from its housing.
2. Disconnect the pipe fittings from the hydraulic aggregate.
3. Slacken the two fastening nuts and remove the hydraulic aggregate.



When refitting relieve the air from the braking system (see specific paragraph).

NOTE: For further details about system operation and diagnosis, see "GROUP 55 - ELECTRIC SYSTEM DIAGNOSIS".
Diagnosis for seeking any faults must be carried out using the ALFA ROMEO TESTER.

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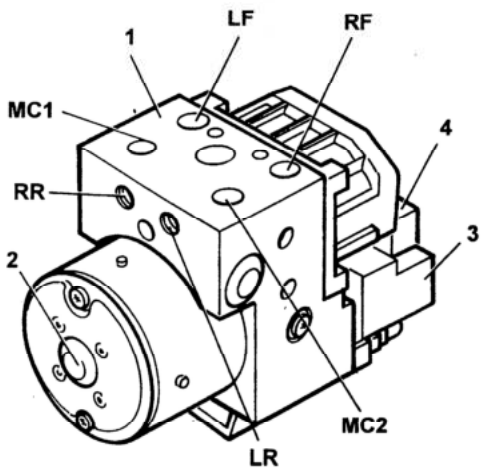
In these conditions the microprocessors process a strategy connected with the changes of speed of the wheels of these particular moments, bringing braking back to the correct parameters. Since these are particular conditions of braking control, the lack of connection of the switch on the brake pedal to the control unit does not compromise the efficiency of the system. For this reason it is not signalled by the warning light, nor is the A.B.S. system disabled.

Electrohydraulic control unit



1. *Electrohydraulic control unit*
2. *Elecric recovery pump*
3. *Electronic control unit*
4. *Control unit connector*

The electrohydraulic control unit is connected to the brake pump and to the brake caliper cylinders through the brake system lines and together with the electronic control unit it fosrms the electrohydraulic control unit.

Its task is to change the pressure of the brake fluid in the brake caliper cylinders according to the command signals leading from the electronic control unit.

It comprises eight two-way solenoid valves (two for each hydraulic circuit) and an electric recovery pump (2) with double circuit. The eight solenoid valves and the electric recovery pump are driven by the electronic control unit depending on the signals of the four rpm sensors. The pump makes it possible to recover the brake fluid during the pressure reduction phase making it available again upstream of the solenoid valves for the next pressure increase phase.

The accumulators absorb the brake fluid during pressure reduction.

The unit is connected to the braking system through unions identified by the codes stamped on them as illustrated.

Pipe outlets

MC1 Supply union from brake pump- circuit 1
MC2 Supply union from brake pump - circuit 2
LF Delivery union to left front brake caliper
LR Delivery union to left rear brake caliper
RF Delivery union to right front brake caliper
RR Delivery union to right rear brake caliper

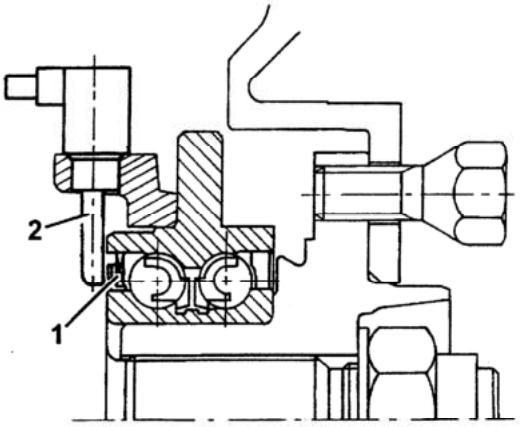
Inductive sensors (up to October '99)

These are quite the same as those used for the previous versions.

Active sensors (from November '99)

These are made up of two basic elements:
- a multipolar magnetic codifier (1) integrated in the wheel hub bearing;
- a Hall effect receiver (2) facing the codifier.

Active sensors offer the following advantages:
- reducing sensitivity to electro-magnetic interference;
- resistance to interference produced by the heating of the road surface;
- savings in weight and size;
- simplifying the transmission couplings to eliminate flywheels.



EBD Function

The EBD function (Electronic braking force Distribution) in the system logic also integrates the function of reducing the pressure at the rear brakes to prevent the wheels from locking when the load is transferred to the front axle as the vehicle is braked in the typical ABS braking control strategy.

This way the conventional pressure regulator (braking distributor) has been eliminated which, depending on the types, reduced the pressure at the rear brakes

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COMPONENTS

Electrohydraulic control unit

The electrohydraulic control unit comprises two sections fastened to one another: an electronic control unit and an electrohydraulic control unit.

On the basis of the signals received from the sensors and with the help of characteristic programmes mapped in its memories, the electronic control unit commands the electrohydraulic control unit.

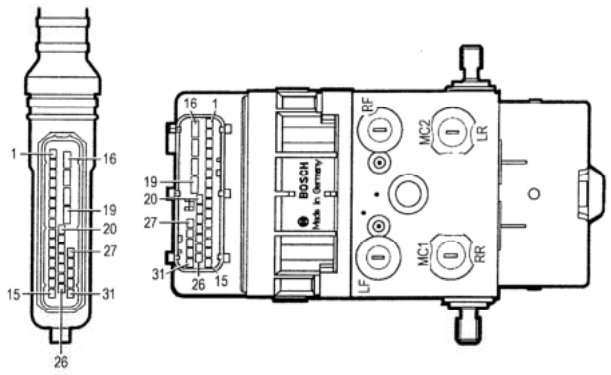
The electrohydraulic control unit is connected to the brake pump and to the A.B.S. system components through the pipes of the braking system.

The main change with respect to the previous versions is the replacement of the three-way valves with two 2-way solenoid valves for each wheel.

Electronic control unit

The electronic control unit is formed of hybrid circuits with resistances, diodes, transistors and integrated logic circuits. The heart of the system are two CMOS microprocessors with 12K ROM which autonomously carry out the same programme and monitor one another mutually. Both receive the same input signals which each processes individually and only when the results obtained are identical, the control unit sends the operative command to the electrohydraulic control unit.

Conversely, if for example there is a fault in the wheel anti-lock system, the device cuts itself out and braking takes place conventionally: simultaneously, the fault warning light on the check panel comes on.



Operating logic

The signals (alternate or analogue) sent by the rpm sensors to the electronic control unit are transformed by the input amplifier into square wave signals.

The frequency of these signals gives the control unit the corresponding values of speed, acceleration or deceleration of the single wheels.

From the combination of the single wheel peripheral speeds, a reference speed is processed which is continuously updated and indicates the speed of the car at all times.

When the driver presses the brake pedal the wheels can each decelerate to a different extent: comparison of the peripheral speed of each wheel with the reference speed keeps the skidding of each wheel constantly under control.

If the braking force causes a wheel to skid with respect to the others, the electronic control unit sends the command to the solenoid valves of the electrohydraulic control unit to reduce the braking force on the wheel that has lost grip. This way the wheel concerned regains speed.

The memory of the electronic control unit also contains threshold acceleration and deceleration values that none of the wheels may ever exceed.

Therefore, through systematic, very rapid comparison of the wheel skidding, deceleration and acceleration values, rolling of the tyre during braking is kept under control.

As soon as the foreseen combined acceleration/deceleration and skid values are exceeded, the electronic control unit intervenes with commands to the solenoid valves of the electrohydraulic control unit, in the three adjustment phases to lower, maintain or return the pressure generated by the driver on the brake pedal to the brake calipers, bringing the braking condition to the optimum values set by the system.

These phases determine an intermittent but extremely fast adjustment cycle which is repeated until the car stops. The electronic control unit commands the different phases supplying the solenoid valves pulses with different current intensities. It also makes sure that both rear wheels are given the same braking force applicable to the rear wheel that is more subjected to locking, i.e. the one with lower grip (to ensure stability).

If a fault is detected, the wheel anti-lock device cuts out and alerts the driver by turning on the warning light on the check panel, while however ensuring operation of the conventional braking system.

The electronic control unit is informed that the driver is braking by the signal from the switch on the brake pedal. Besides controlling braking, this information is also helpful under certain particular conditions, such as for eaxmple if a sharp acceleration that makes the wheels skid is followed by heavy braking, or in the case of irregular road surfaces (humps, steps) that can involve changes in speed of the wheel due to causes not linked with the braking in progress.

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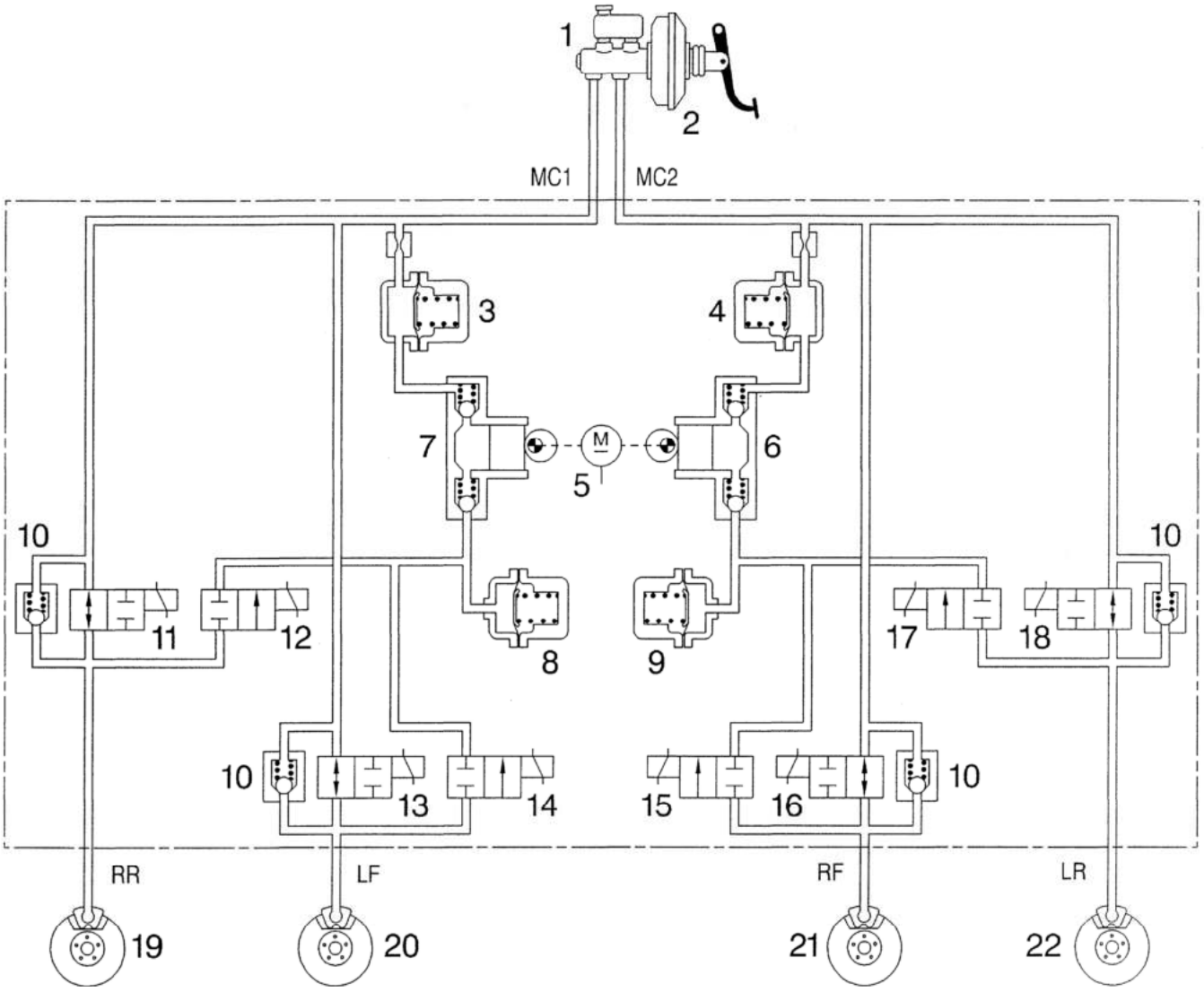
Hydraulic layout of BOSCH 5.3 A.B.S. System



Braking system with double crossed circuit

1. *Brake control pump*
2. *Servobrake*
3. *High pressure accumulator (damping chamber)*
4. *High pressure accumulator (damping chamber)*
5. *Recovery pump drive motor*
6. *Recovery pump*
7. *Recovery pump*
8. *Low pressure accumulator (reservoir)*
9. *Low pressure accumulator (reservoir)*
10. *Fast pressure reduction valve*
11. *Right rear charge solenoid valve*
12. *Right rear discharge solenoid valve*
13. *Left front charge solenoid valve*
14. *Left front discharge solenoid valve*
15. *Right front charge solenoid valve*
16. *Right front discharge solenoid valve*
17. *Left rear charge solenoid valve*
18. *Left rear discharge solenoid valve*
19. *Right rear drum brake*
20. *Left front disk brake*
21. *Right front disk brake*
22. *Left rear drum brake*

MC1. Supply union for brake pump 1st stage
MC2. Supply union for brake pump 2nd stage
RR. Delivery union to right rear cylinder
FL. Delivery union to left front caliper
FR. Delivery union to right front caliper
RL. Delivery union to left rear cylinder

BOSCH 5.3 ABS WITH EBD

(from chassis no. ...)

DESCRIPTION

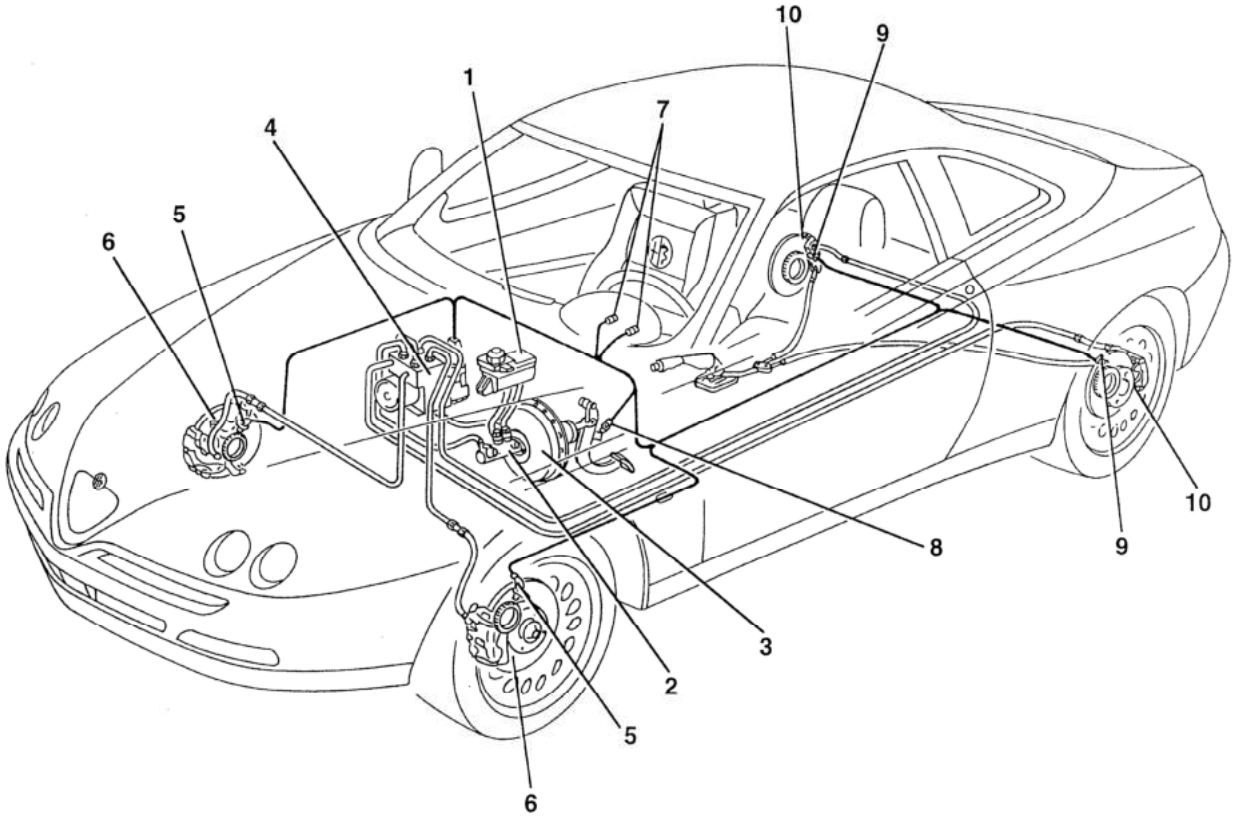
The BOSCH 5.3 ABS optimises the compactness (ease of assembly), lightness and reliability of the previous versions of anti-lock systems.

The use of new micro-hybrid electronic components, optimisation of the flows owing to the study of new more compact shapes of the valve bodies and the reduction of the number of hydraulic components, have made it possible to improve the characteristics of the solenoid valves.

An EBD (Electronic Braking force Distribution) function has also been implemented in the system which makes adjustment of the braking force at the rear wheels directly by the electronic control unit, eliminating the mechanical pressure regulator.

The main components of the system are:
- new electronic control unit which is more powerful and versatile than the previous models, integrated in the electrohydraulic control unit;
- electrohydraulic control unit which modulates the braking pressure at the brake calipers through eight solenoid valves, two per wheel.
- four sensors, one per wheel, which detect the angular rotation speed of the wheels themselves.

The system is completed by:
- hydraulic system piping;
- a specific wiring loom;
- a switch on the brake pedal to detect the braking condition;
- two warning lights on the check panel.



Layout of the Bosch 5.3 A.B.S. anti-lock system

1. *Brake fluid reservoir*
2. *Brake pump*
3. *Vacuum servobrake*
4. *Electrohydraulic control unit with incorporated electronic control unit*
5. *Front wheel revolution sensor*
6. *Front brakes*
7. *Failure warning lights*
8. *Stop lights control switch*
9. *Rear wheel revolution sensor*
10. *Rear brakes*

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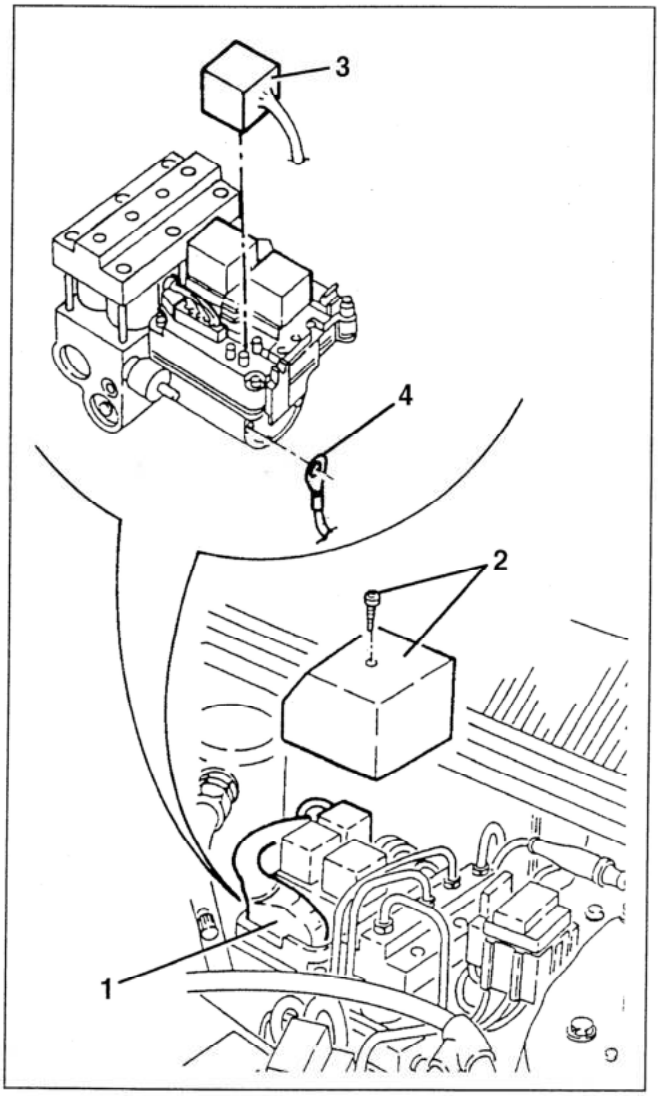
BRAKE - CLUTCH FLUID MINIMUM LEVEL SENSOR

(See GROUP 18).

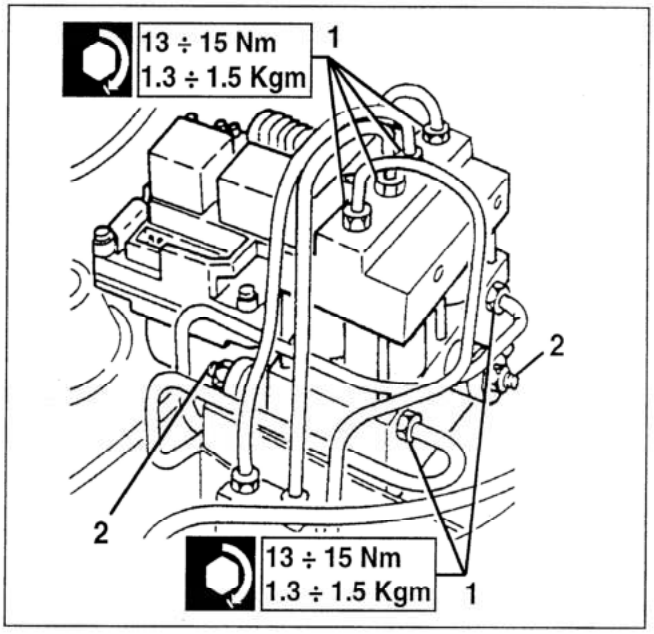
ABS BOSCH 2Si (up to chassis no.___) HYDRAULIC UNIT/ ELECTRONIC CONTROL UNIT

REMOVAL / REFITTING

– Disconnect the battery negative terminal.
– Remove the corrugated air inlet pipe (see GROUP 10).
– Empty and then remove the brake - clutch fluid reservoir (see specific paragraph).
1. Disconnect the connection of the ABS control unit
2. Remove the protective cover.
3. Disconnect the connection of the relays.
4. Disconnect the earth cable.



1. Disconnect the four stiff pipes from the valve unit (grey) and the two pipes from the pump (black).
2. Slacken the two screws and remove the unit from the bracket



When refitting relieve the air from the braking system (see specific paragraph)

NOTE: For further details about operation and system diagnosis see "GROUP 55 - ELECTRIC SYSTEM DIAGNOSIS".
Diagnosis for fault-finding should be carried out using the ALFA ROMEO TESTER.

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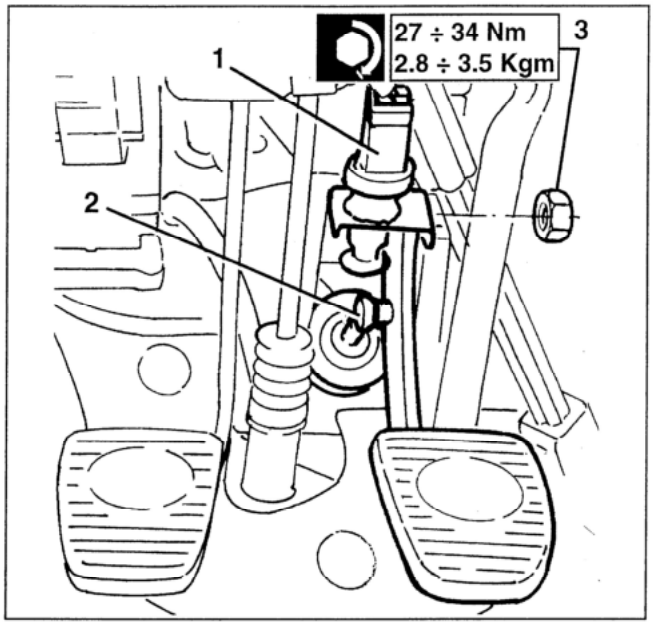
BRAKE PEDAL

REMOVAL/REFITTING

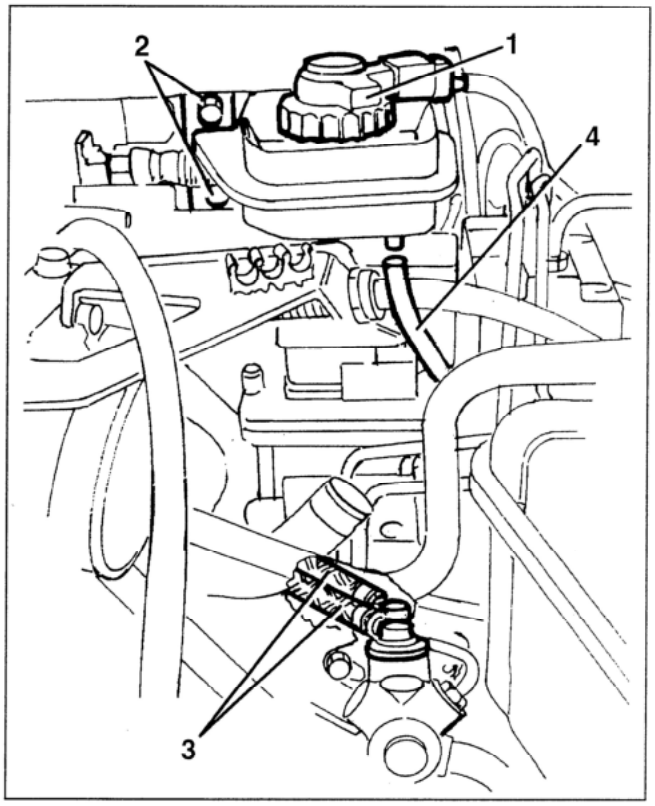
1. Twist and remove the stop light switch from its housing.
2. Remove the pin fastening the brake pedal to the servobrake.
3. Slacken the fastening nut and remove the brake pedal.



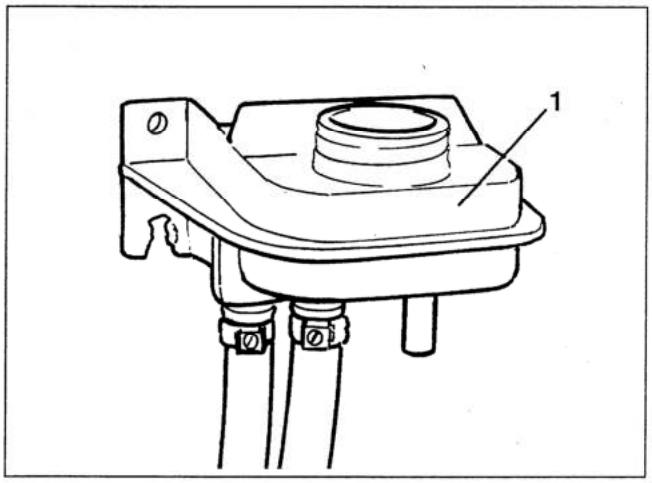
BRAKE-CLUTCH FLUID RESERVOIR

REMOVAL/REFITTING

– Disconnect the battery negative terminal.
– Remove the air inlet corrugated pipe (see GROUP 10).
1. Disconnect the low fluid level warning device.
– Empty the reservoir using a syringe.
2. Disconnect the reservoir from the services tray slackening the two screws; remove the clip.
3. Disconnect the two pipes leading from the reservoir from the pump.
4. Disconnect the clutch circuit pipe from the reservoir



1. Remove the reservoir



When refitting bleed the air from the system; then top up the level in the reservoir.

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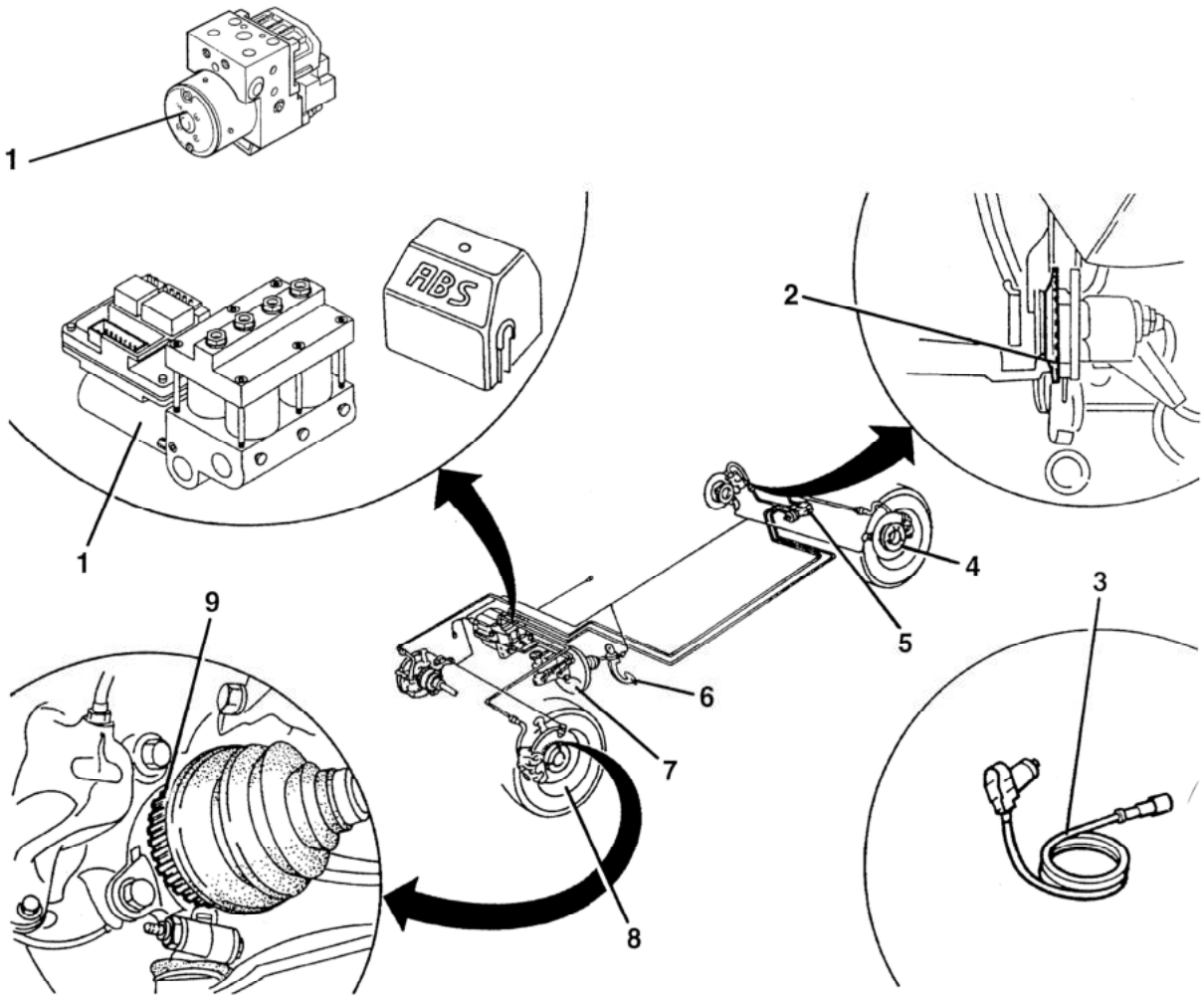
HYDRAULIC BRAKE SYSTEM

DESCRIPTION

For the braking system particular solutions have been adopted in all the components to ensure **stable and powerful braking** suited to the high performance of the car.

The main features of the system are the following:

- **BOSCH 2Si ABS** (up to chassis no.___).
- **BOSCH 5.3 ABS** with EBD (from chassis no. ___).
- Large disk diameter (front ventilated): ensure high heat dispersion thus effectiveness also during prolonged braking.
- **Crossed circuit with braking load proportioning valve**: ensuring high levels of safety in the event of a failure and preventing the rear wheels from locking.
- **Servobrake with reduced loadless stroke**: limits the pedal stroke and warrants quicker accurate braking.
- **Brake linings in ecological material:** in keeping with current environmental regulations.



Hydraulic brake circuit

1. *ABS hydraulic unit/electronic control unit*
2. *Rear phonic wheel*
3. *Inductive sensor*
4. *Rear disk*
5. *Braking load proportioning valve (up to chassis no.___)*
6. *Brake pedal*
7. *Servobrake*
8. *Ventilated front disk*
9. *Front phonic wheel*

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