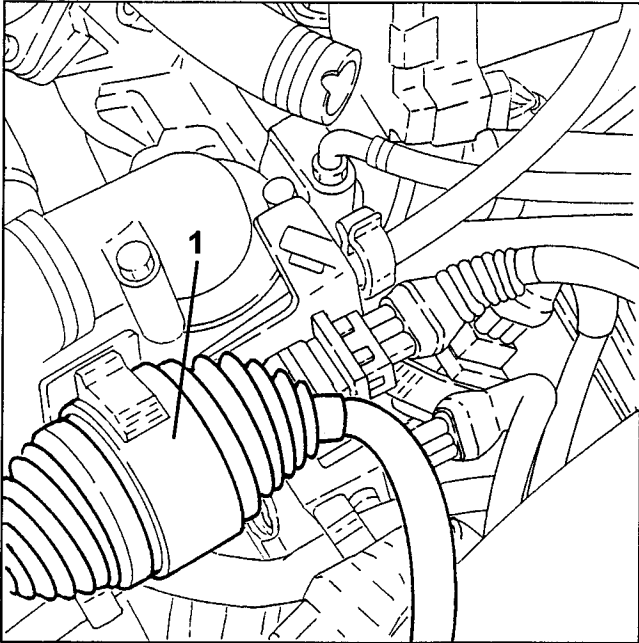
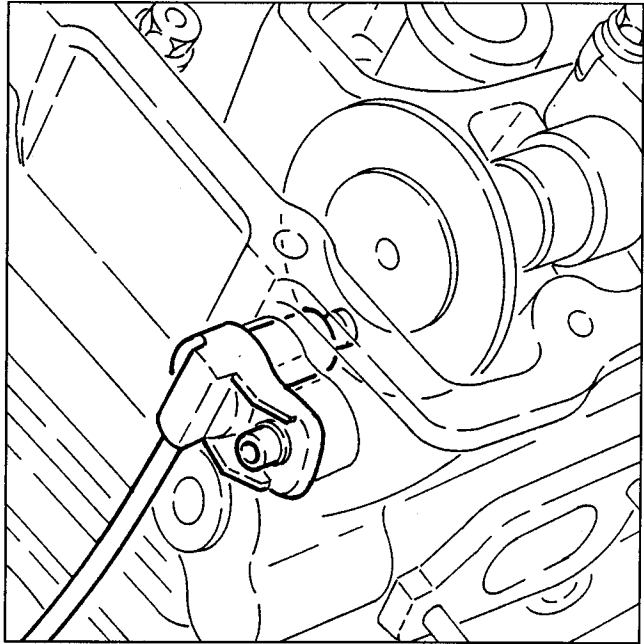


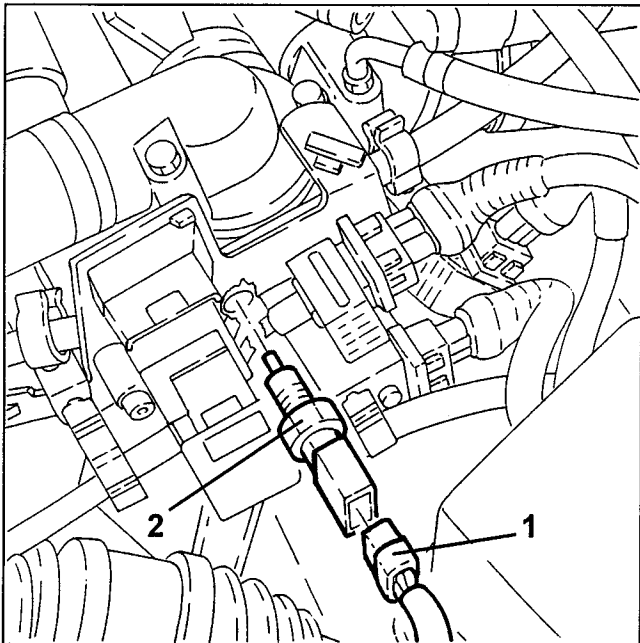
1. Disconnect the injection wiring and move it aside.



The disc is fitted with a pin which allows the sensor to signal the engine stroke position. The injection ECU uses the signal to acknowledge TDCs at the end of compression stroke.



1. Disconnect the engine coolant sensor electrical connection.
2. Loosen and remove the engine coolant sensor from the thermostat cup.



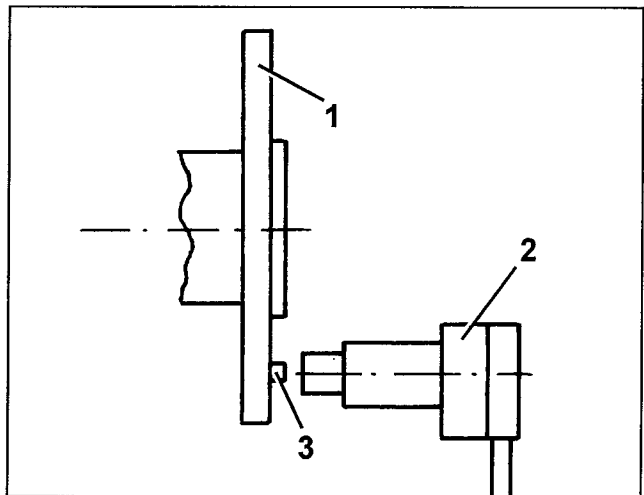
### Operation

A semiconductor layer is crossed by current and submerged in a normal magnetic field (perpendicular force lines with respect to the current) generates a potential difference at the poles called "Hall" voltage.

When disc (1) revolves, pin (3) crosses sensor (2) and blocks the magnetic field.

This generates a low output signal. On the other hand, when sensor (2) reads the pin (3), the output signal is up.

Consequently, the up signal alternates with the down signal once every two engine revolutions, precisely when cylinder 1 is 58° before TDC.



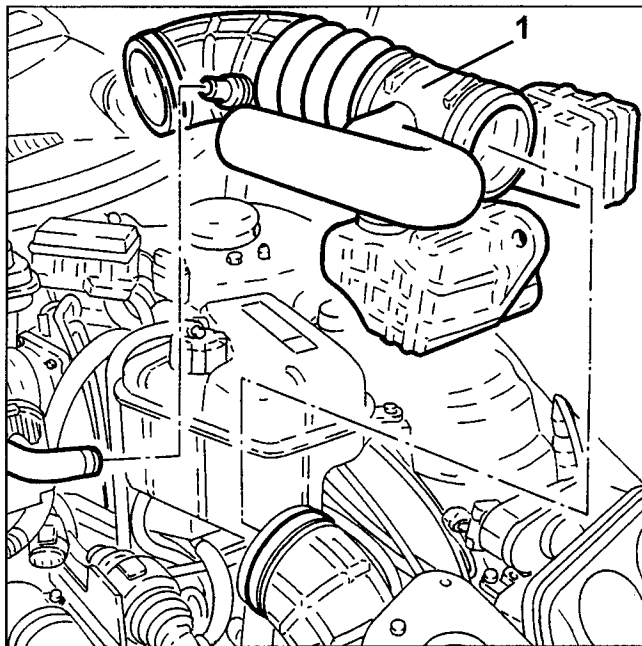
## CAM ANGLE SENSOR

This Hall effect sensor is fitted on the right-hand cylinder head and faces the disc on the right-hand cylinder head rear exhaust side.

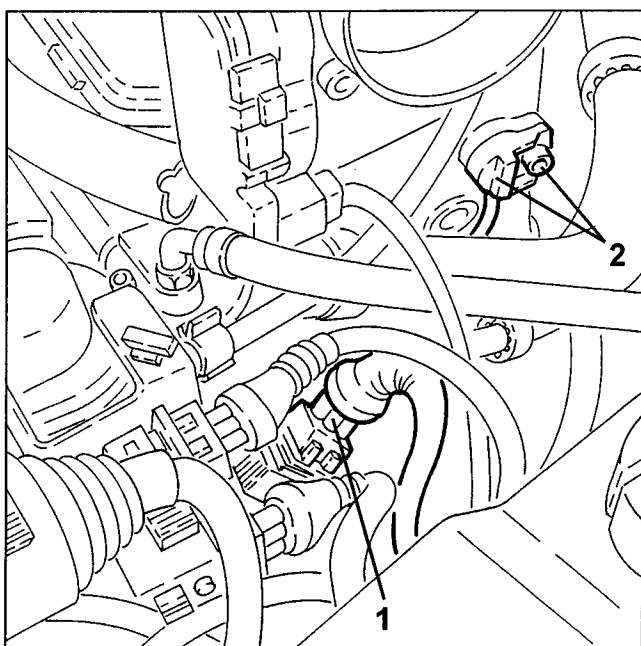
### REMOVAL/REFITTING

- Make sure the ignition key is at "STOP" and disconnect the (-) battery terminal.
- Loosen the screws and remove the left engine compartment guard.

1. Loosen the clips and remove the corrugated sleeve with resonators after releasing the intermediate resonator from the fastening pin.



1. Disconnect the cam angle sensor electrical connection.
2. Loosen the fastening screw and remove the cam angle sensor with electrical wiring.



### ACCELERATOR PEDAL POTENTIOMETER

The accelerator pedal is fitted with two built-in potentiometers:

- one main potentiometer
- one back up potentiometer.

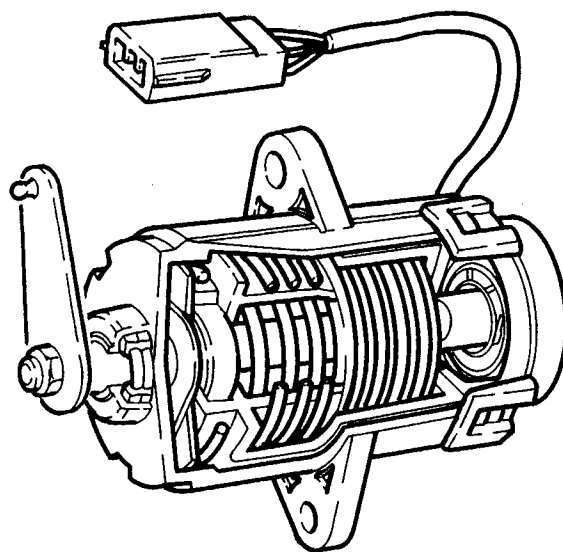
The injection ECU performs the following recovery strategies:

- if one of the two potentiometers fails, the throttle is opened to a maximum of 40° over a long time
- if both potentiometers fail completely the throttle is closed.

The accelerator pedal is adjusted by excluding the respective stop (which should not exceed the notch).

#### Operation

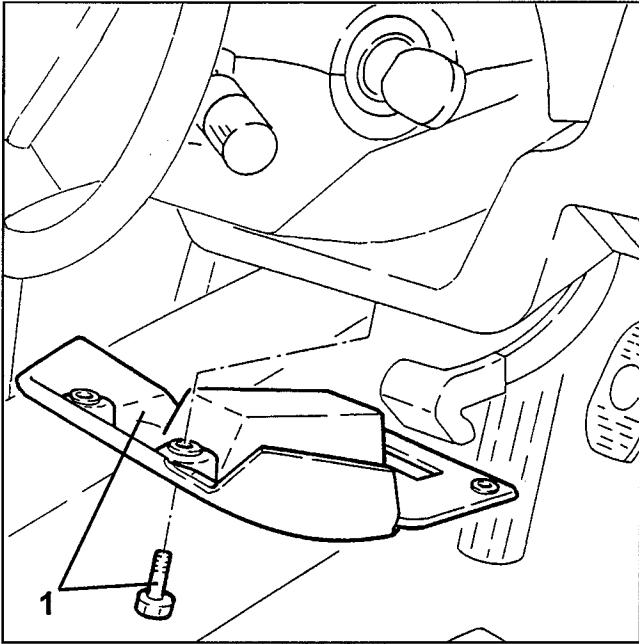
The sensor consists of a casing (1) fastened to the pedal board by means of a flange inside which a shaft (2) is axially connected to the double track potentiometer (3). A helicoid spring on the shaft ensures the correct pressure resistance while a second spring ensures return when released. Operative field from 0° to 70°; mechanical stop at 88°.



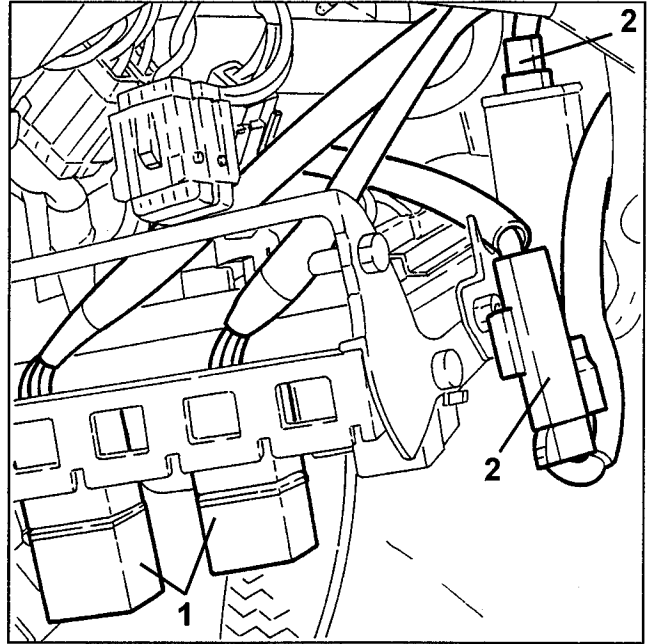
### REMOVAL/REFITTING

- Make sure the ignition key is at "STOP" and disconnect the (-) battery terminal.
- Remove the valve guard (see Assembly 70).

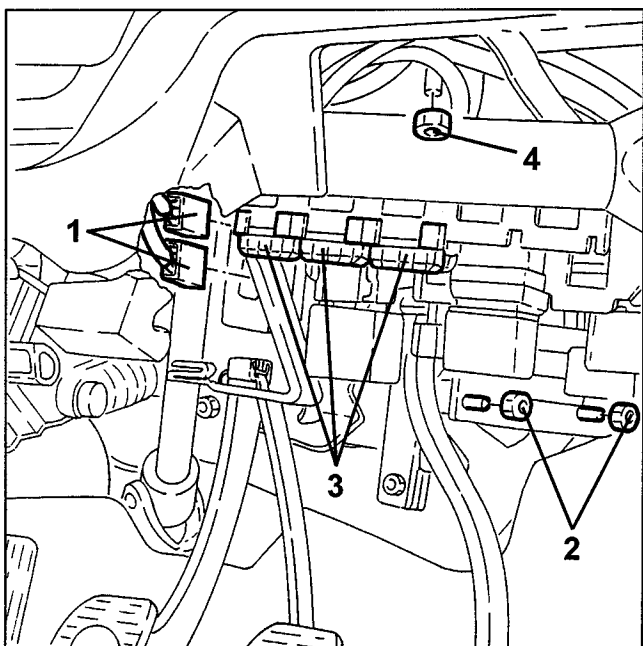
1. Remove the fastening screws and remove the guard under the dashboard.



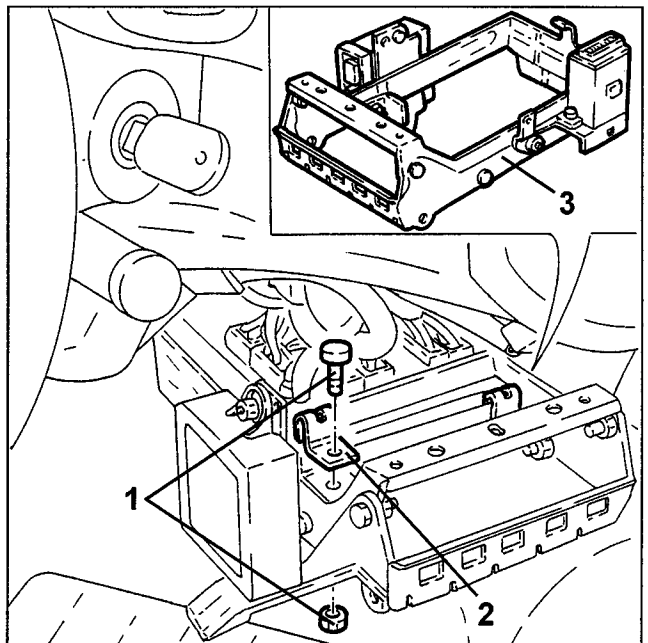
1. Disconnect the two relays.
2. Disconnect the valve electrical connections.



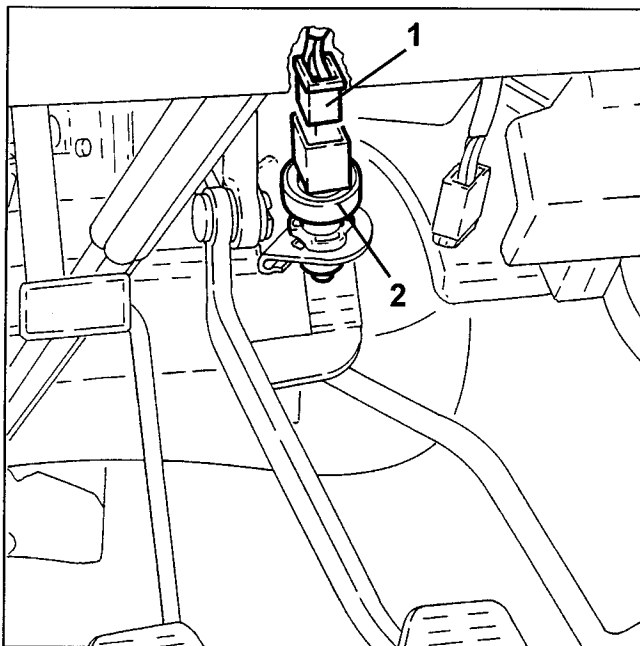
1. Disconnect the Alfa Romeo CODE ECU electrical connections.
2. Loosen the bolts fastening the valve bracket to the brake booster bracket.
3. Remove the indicated relays to reach the nut fastening the valve bracket to the dashboard.
4. Loosen the nut fastening the valve bracket to the dashboard.



1. Loosen the bolts fastening the valves to the bracket.
2. Remove the clips.
3. Remove the valve bracket.



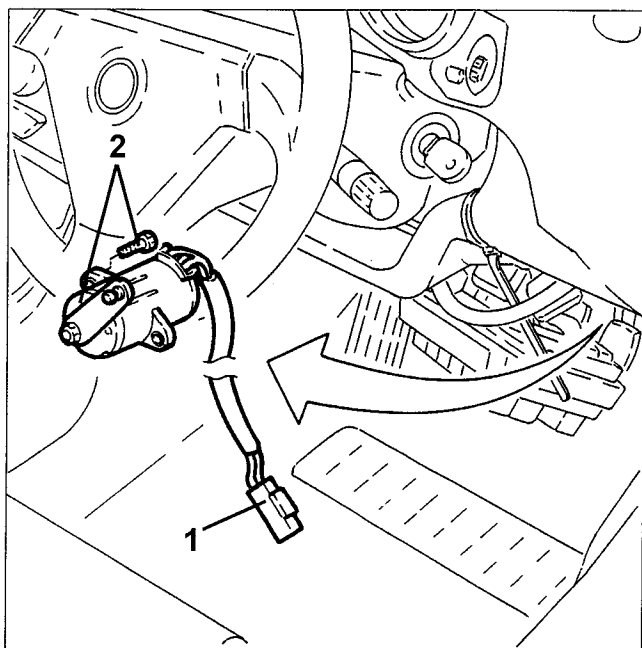
1. Disconnect the brake pedal switch electrical connection.
2. Remove the brake pedal switch.



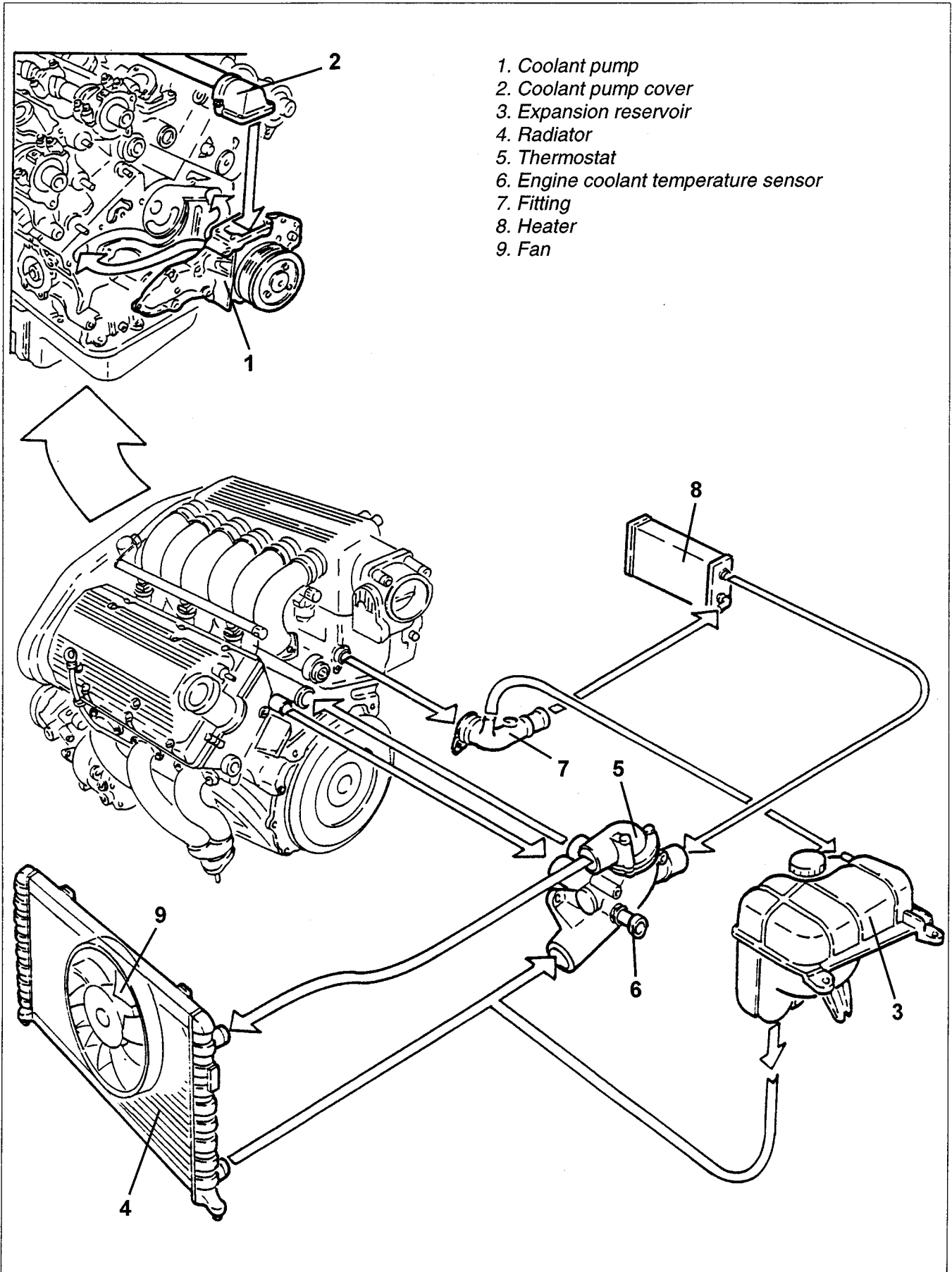
**NOTE:** After refitting the accelerator pedal potentiometer, calibrate as shown below.

- Make sure the ignition key is at STOP.
- Connect tool no. 1.806.365.000 to the diagnostic socket and turn the knob to 3.
- Connect Examiner.
- Turn the ignition key to MAR.
- With Examiner, go to "Parameters".
- Press "Select" and select the parameter "Accelerator position track 1".
- Check whether the potentiometer calibration values correspond to prescriptions:  
 idling (accelerator pedal released),  $8\% \pm 1\%$   
 - maximum opening (accelerator pedal fully pressed),  $64,3\% \pm 1\%$ .
- Remove the diagnostic tool.

1. Disconnect the accelerator pedal potentiometer electrical connection.
  - Fasten the valves suitably to the side.
  - Disconnect the accelerator pedal potentiometer from the tie-rod.
2. Loosen the fastening screws and remove the accelerator pedal.



**ENGINE COOLING SYSTEM**



## DESCRIPTION

The cooling system is sealed and of the forced circulation type. It features a centrifuge pump (1) operated by the crankshaft by means of a Poly-V belt.

A thermostat valve (5) located on the rear of the engine ensures optimal engine temperature. It opens when the coolant reaches a temperature of  $87 \pm 2$  °C.

The radiator (4) cools the fluid by means of dynamic air and a two speed fan. The fan is controlled by the injection-ignition ECU according to a specific logic.

The expansion reservoir (3) feeds the circuit if the level decreases and absorbs the fluid variations in volume according to the temperature. Furthermore, it acts as a circuit air bleeder.

The circuit is equipped with a single engine coolant temperature sensor which measures coolant temperature by means of a double NTC thermistor with negative resistance value. One NTC thermistor sends a signal to the injection ECU while the other sends a signal to the instrument panel temperature gauge and warning light.

## CIRCUIT OPERATION

The fluid cools the engine and reaches the thermostat (5) via the cylinder head. If its temperature is lower than 87 °C, the coolant is sucked by the pump (1) via a longitudinal return manifold located between the two cylinder heads. If the temperature is higher than this value, the coolant is conveyed to the radiator via the thermostat opening. After being cooled in the radiator, the coolant returned to the thermostat from where it is conveyed to the pump via the longitudinal manifold. A specific fitting (7) on the right-hand cylinder head receives the coolant from a supplementary duct on the head and sends it via two specific pipes to the climate control system heater (8) and to the expansion reservoir (3).

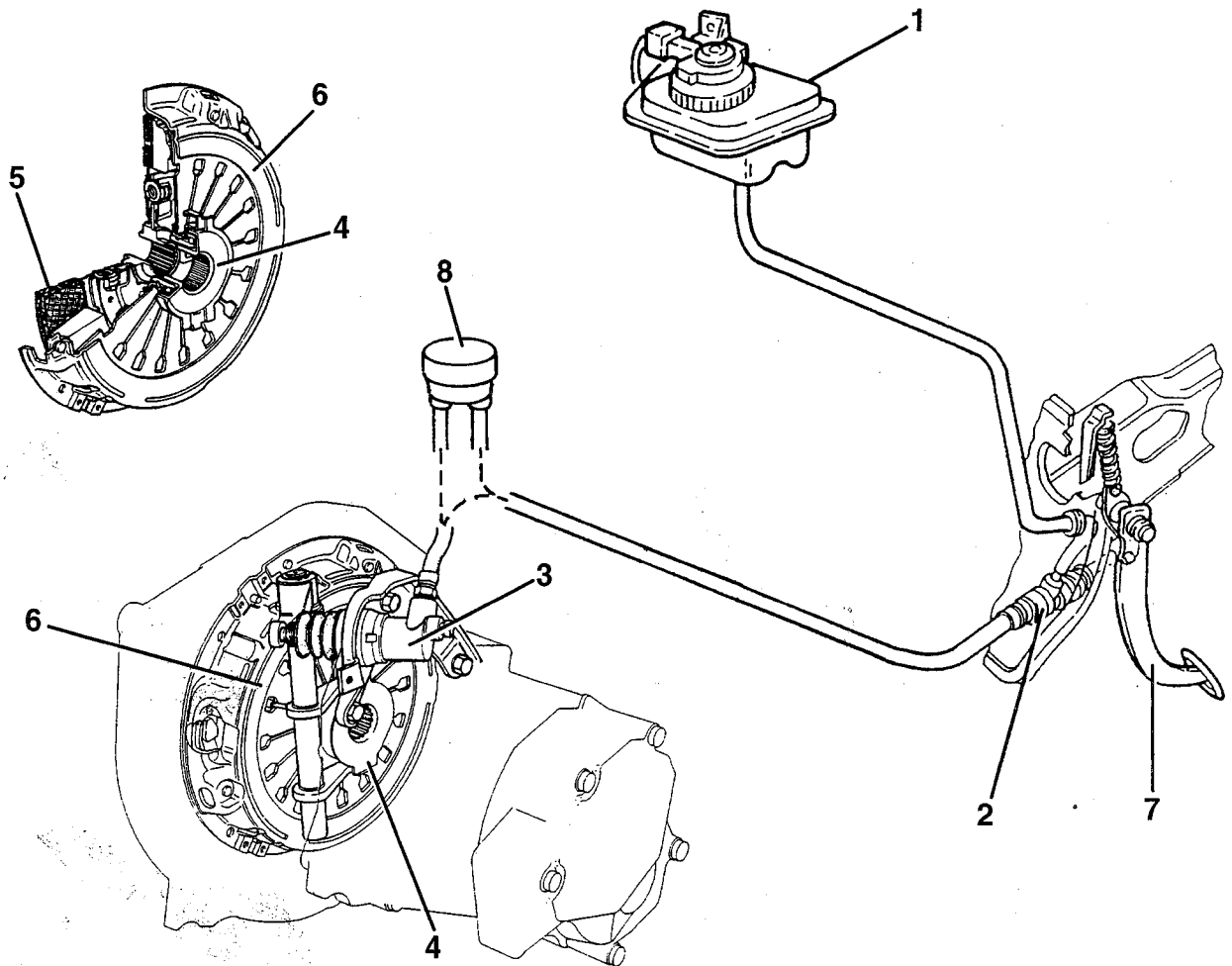
## CLUTCH SYSTEM

### DESCRIPTION

The clutch adopted is a dry single-plate type with diaphragm pressure plate springs and operated by hydraulic control.

The conventional single-plate dry solution is fitted with hydraulic control with pul disengagement in order to reduce the effort exerted on the clutch pedal to operate it.

This type of control is characterised by the fact that pressing the pedal the clutch is pulled by the coupled thrust bearing rather than pushed in the conventional manner. This solution has been adopted because, owing to the need to transmit a high torque, it would be necessary to increase the dimensions of the clutch assembly to leave the effort on the pedal unchanged during disengagement.

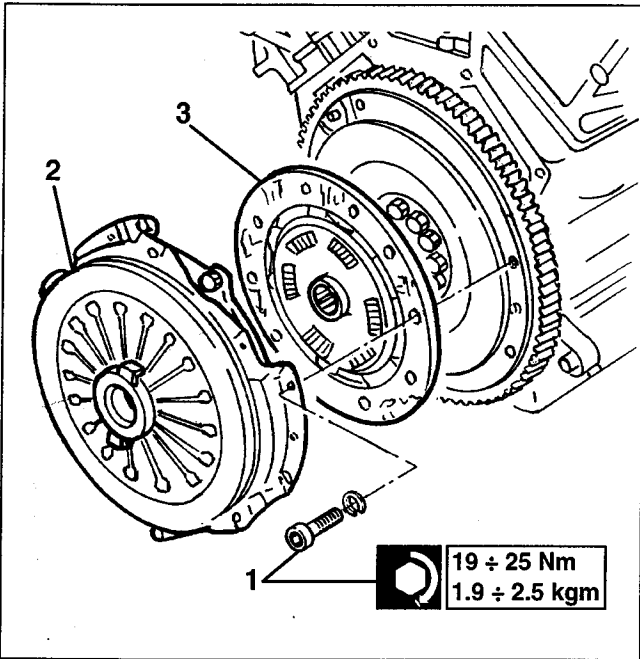


1. Brake-clutch system reservoir
2. Clutch pump
3. Clutch control cylinder
4. Thrust bearing
5. Clutch plate
6. Pressure plate
7. Clutch control pedal
8. Damper

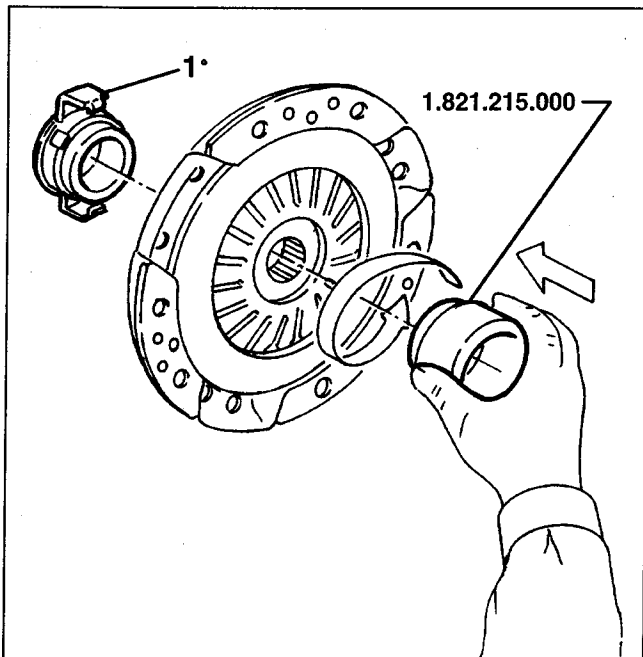
## CLUTCH PLATE AND PRESSURE PLATE

### REMOVING/REFITTING

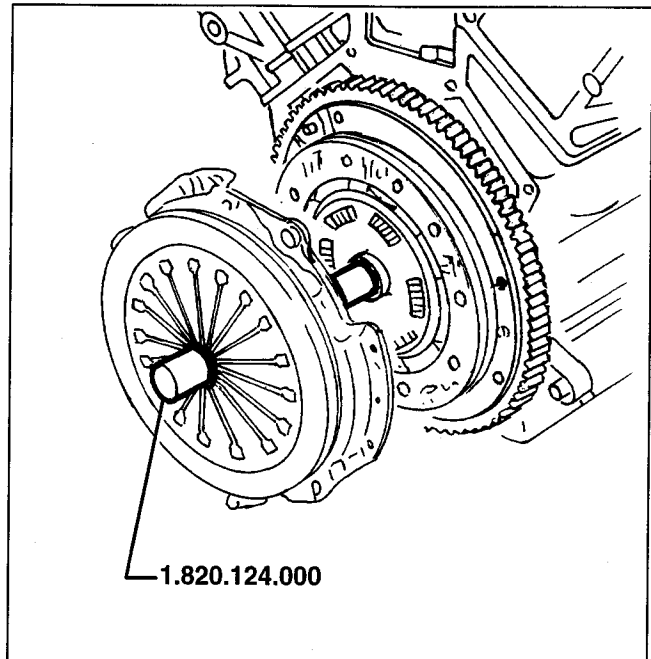
- Remove the gearbox-differential unit (see GROUP 21).
  - When changing only the clutch plate, mark the position between the pressure plate and flywheel to facilitate refitting operations.
1. Slacken the screws fastening the pressure plate to the flywheel.
  2. Remove the pressure plate.
  3. Remove the clutch plate.



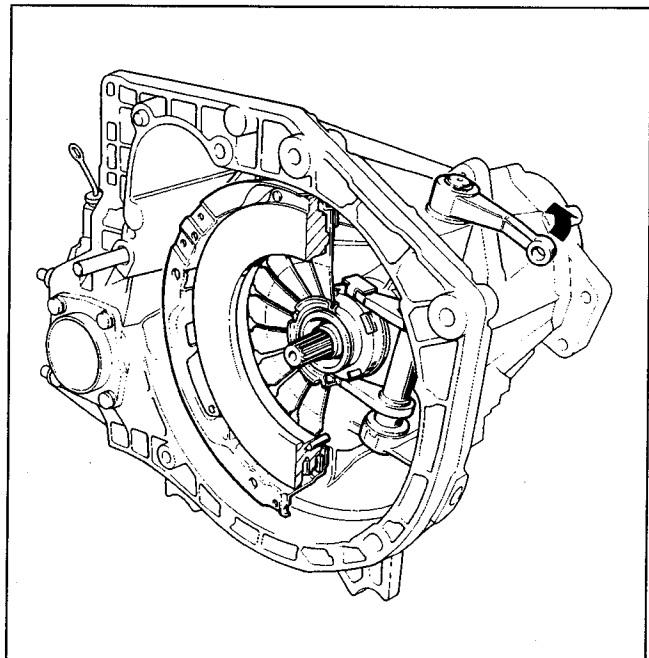
1. Using tool 1.821.215.000 remove the thrust bearing from the diaphragm spring.



When refitting use tool 1.820.124.000 to centre the clutch plate correctly.



After refitting the gearbox to the crankcase, move the control lever in the direction of the arrow to position the thrust bearing in its housing.



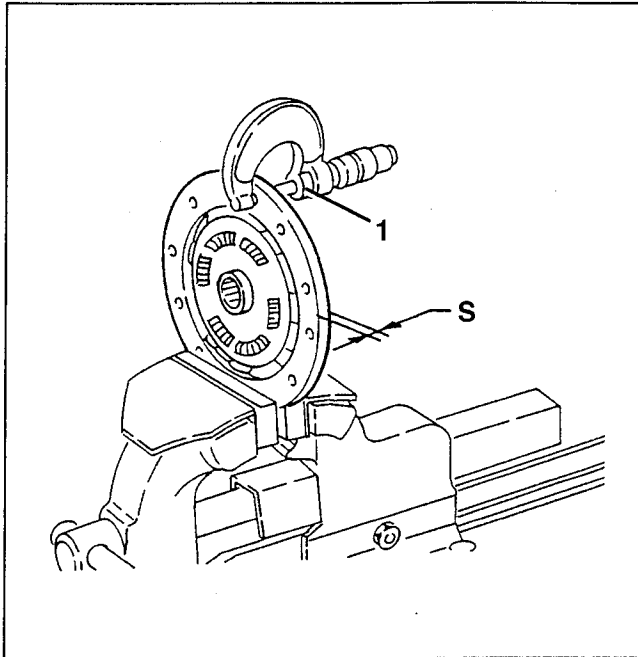


## CHECKS AND INSPECTIONS

1. Check the gaskets for even wear and that the thickness of the clutch plate is no lower than the minimum specified.



Thickness "S" of clutch plate (mm)	
New	At wear limit
7.1 ÷ 7.7	6.3



- Check that there are no signs of burning or vitrification, that fastening is correct and that the springs are intact.
- Check that the clutch plate hub is intact, runs smoothly and that there is no excessive play on the drive shaft.
- Check the working surfaces of the flywheel and pressure plate for signs of overheating, uneven wear, nicks or missing parts.
- Check the thrust bearing for noise, excessive play and that it runs smoothly on the sleeve.
- Check the fork for cracks, distortion, freedom of movement and excessive wear of the working surfaces.

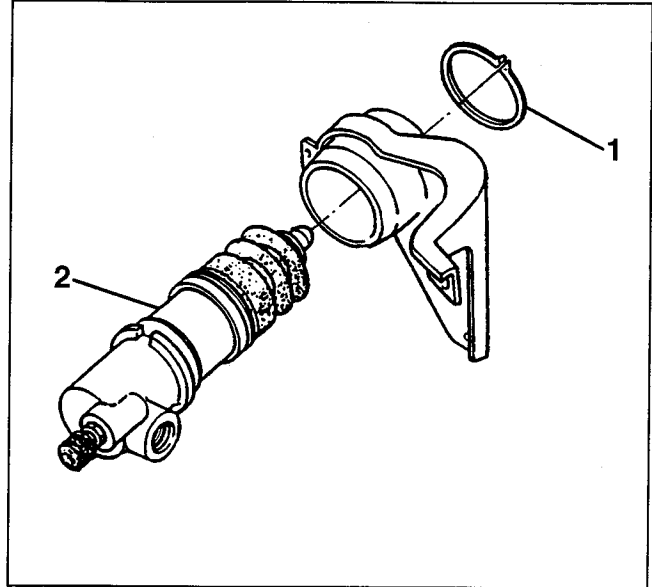
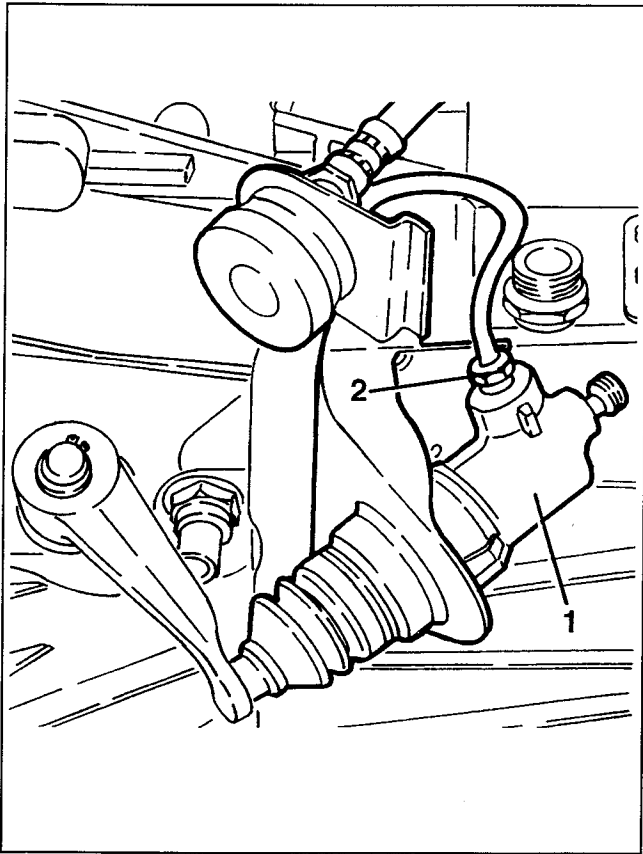
## CLUTCH CONTROL

### CLUTCH CONTROL CYLINDER

#### REMOVING/REFITTING

- Disconnect the battery
  - Working from the engine compartment, remove the air cleaner cover and intake manifold (see Group 10).
  - Drain the clutch-brake fluid reservoir using a suitable syringe.
1. Slacken the screws fastening the cylinder support bracket to the gearbox.
  2. Slacken the hydraulic union of the stiff pipe from the control cylinder.

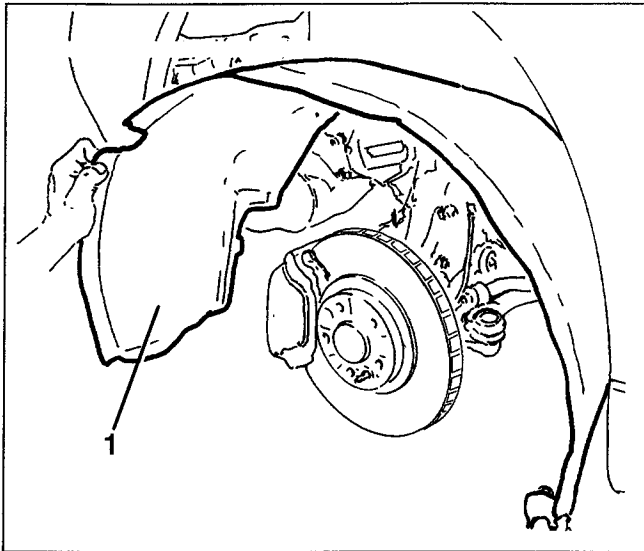
1. Remove the retainer ring.
2. Withdraw the clutch cylinder.



## GEARBOX UNIT

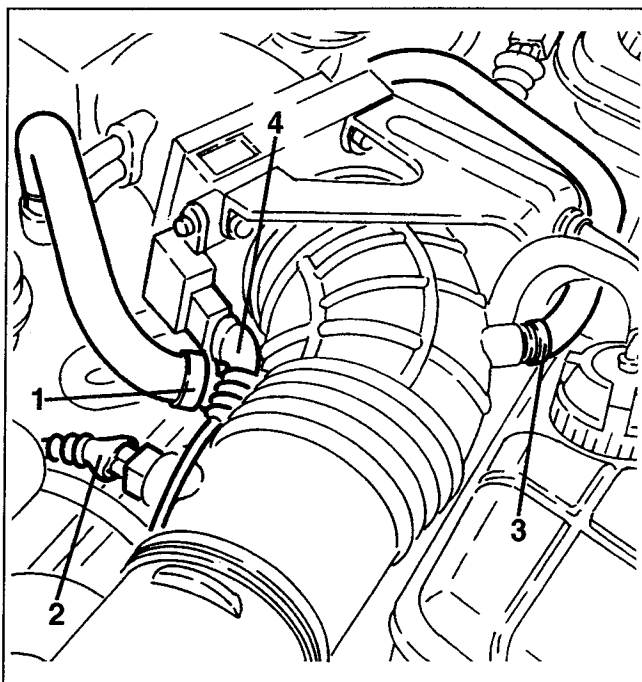
### REMOVING/REFITTING

- Set the car on a lift.
  - Disconnect the battery.
  - Remove the front wheels.
1. Remove the left front gravel guard.

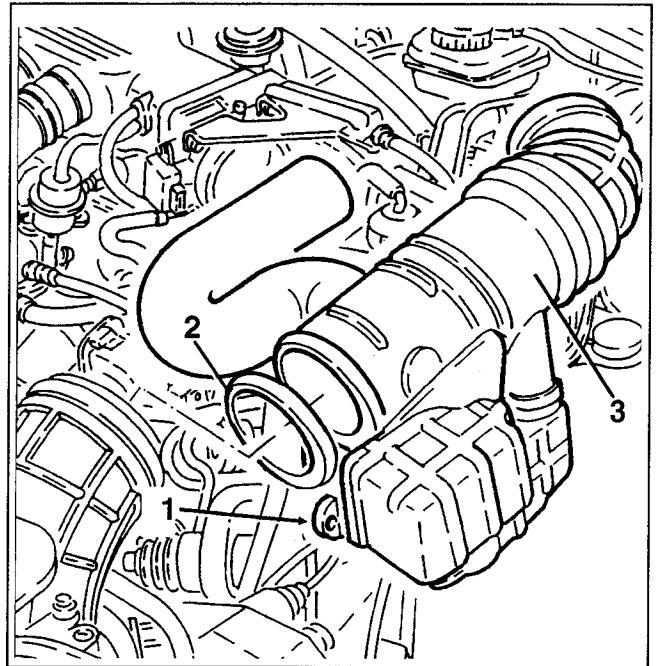


- Remove the engine compartment guard on the lefthand side (see GROUP 70).

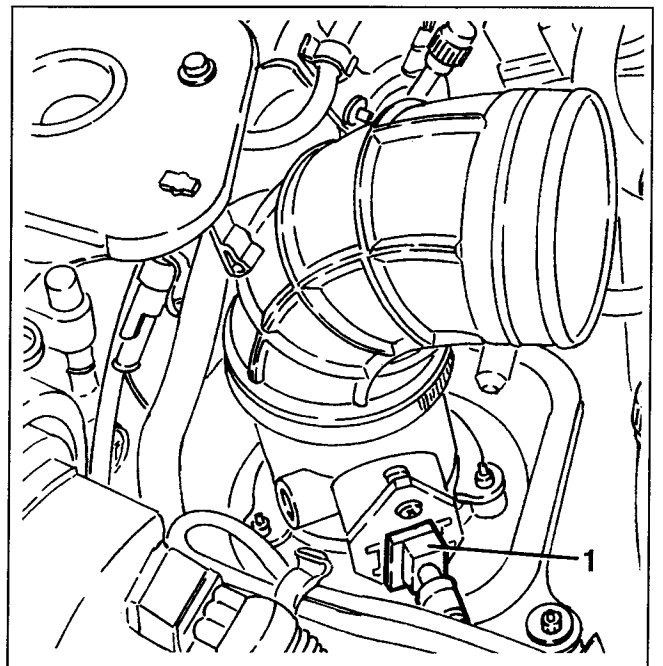
1. Disconnect the oil vapour recovery pipe leading from the right cylinder head from the corrugated sleeve.
2. Disconnect the electrical connection from the intake air temperature sensor.
3. Disconnect the air takeoff pipe for the constant idle device from the corrugated sleeve.
4. Disconnect the electrical connection from the throttle potentiometer.



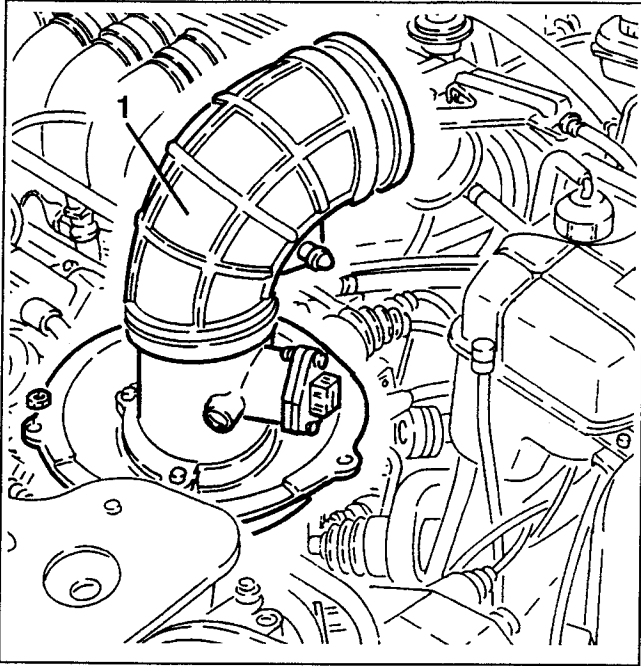
1. Prise off the button fastening the first section of corrugated sleeve to the resounder.
2. Slacken the two fastening clamps.
3. Remove the second section of corrugated sleeve complete with resonators.



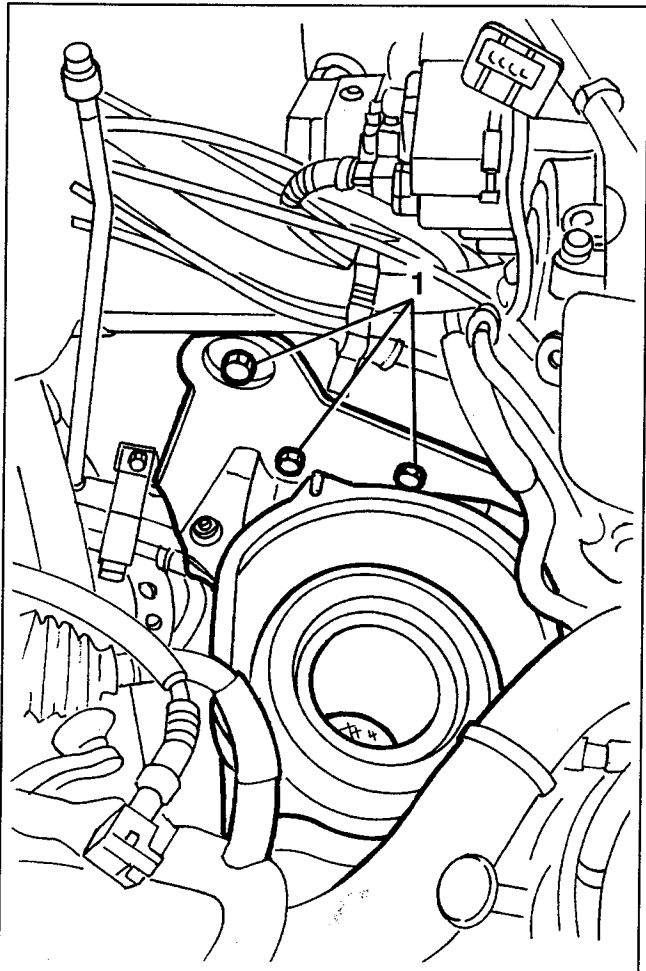
1. Disconnect the electrical connection from the hot film air flow meter.



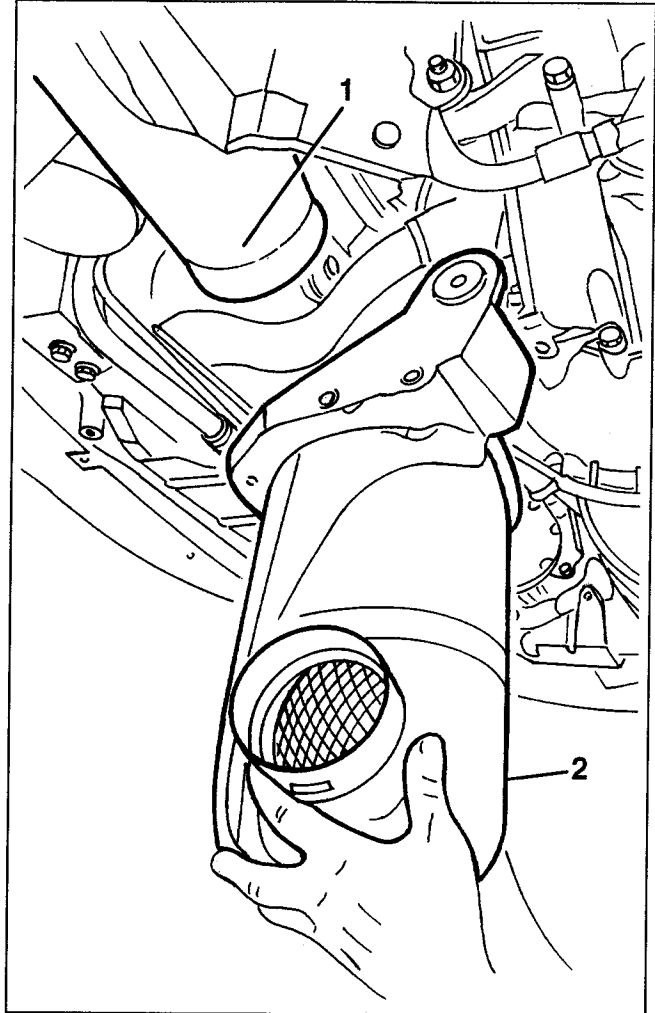
1. Slacken the three fastening nuts and remove the air cleaner cover complete with hot film air flow meter and the first section of corrugated sleeve.



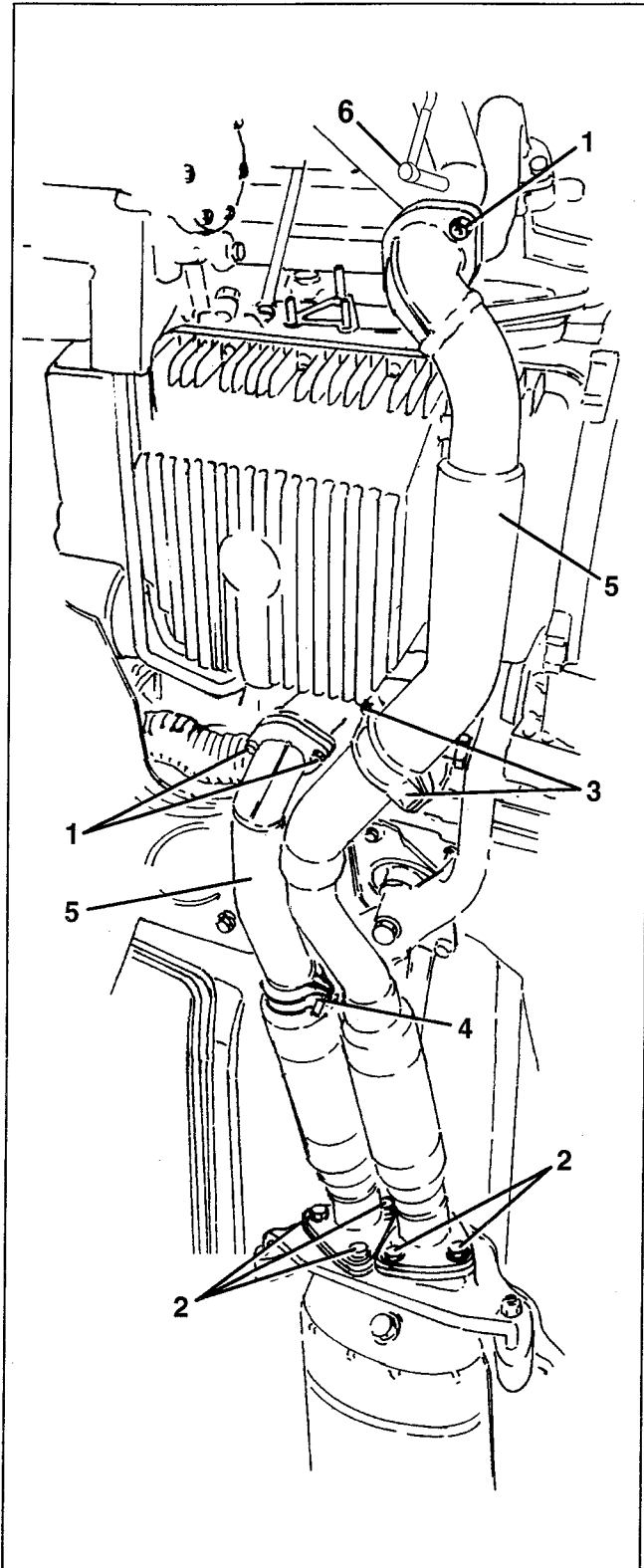
1. Slacken the three fastening screws and release the air cleaner container support bracket.



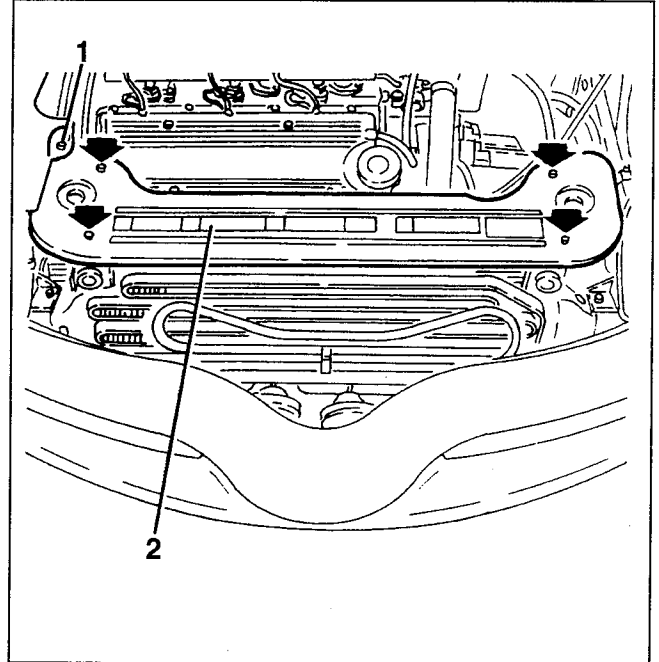
- Raise the car.
1. Release the air takeoff pipe from the cleaner container.
  2. Retrieve the container complete with bracket from below.



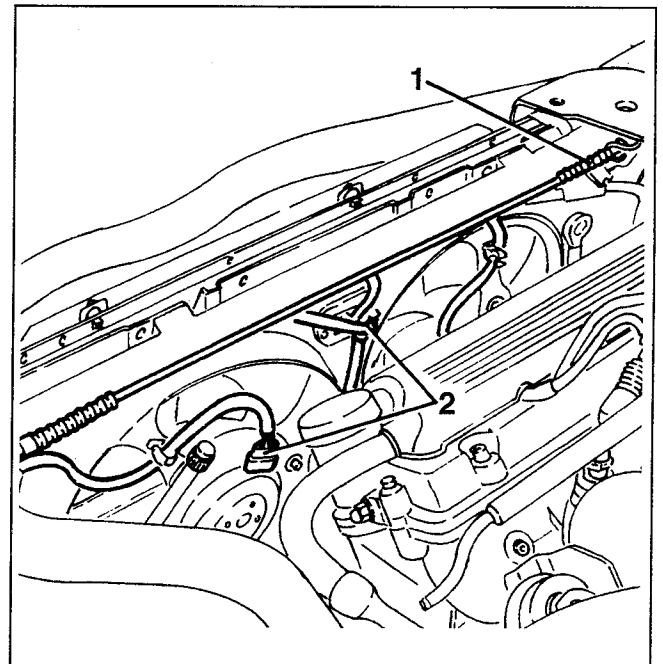
1. Slacken the nuts fastening the front exhaust pipes to the exhaust manifolds.
2. Slacken the bolts fastening the pipes to the catalytic converter.
3. Slacken the bolt and disconnect the collar.
4. Slacken the nut and remove the collar.
5. Retrieve the front exhaust pipes.
6. Disconnect the EGR valve pipe fitting from the exhaust manifold.



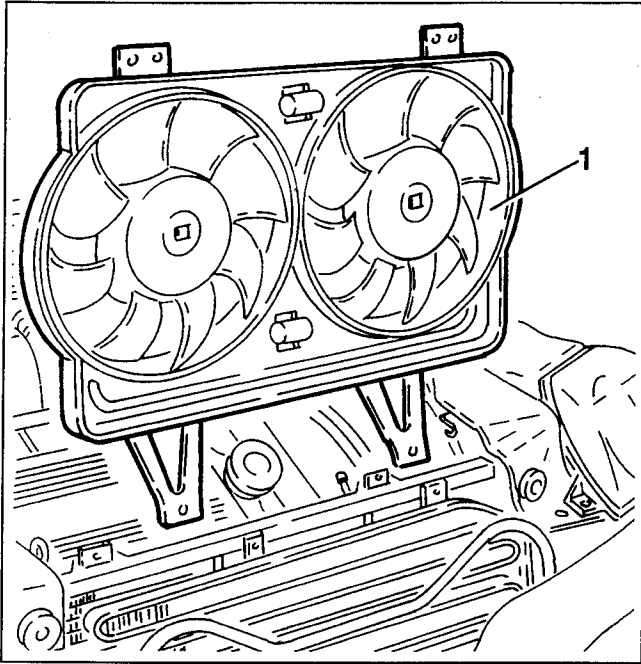
- Lower the car.
1. Slacken the screw fastening the right engine compartment guard.
  2. Slacken the fastening screws and remove the upper radiator crossmember.



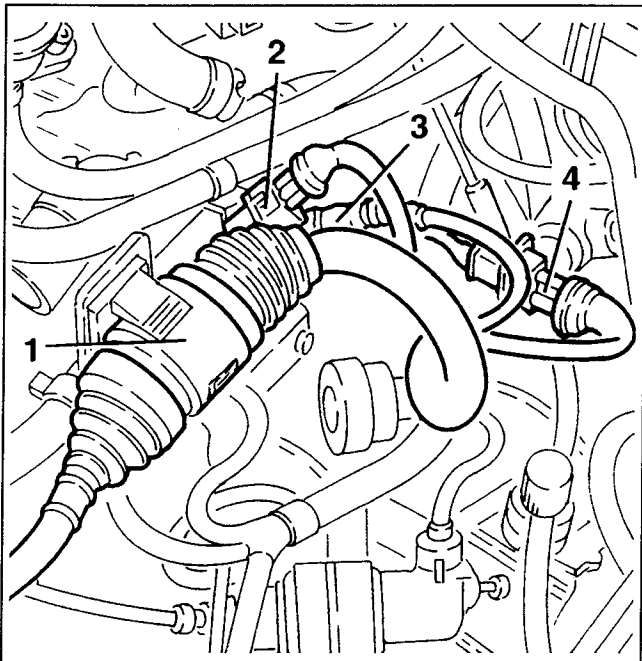
1. Disconnect the bonnet opening cable and move it aside so that it does not hinder the following operations.
2. Disconnect the electrical connections from the fans and additional resistances, then release the cables from the fastening clamps and groove.



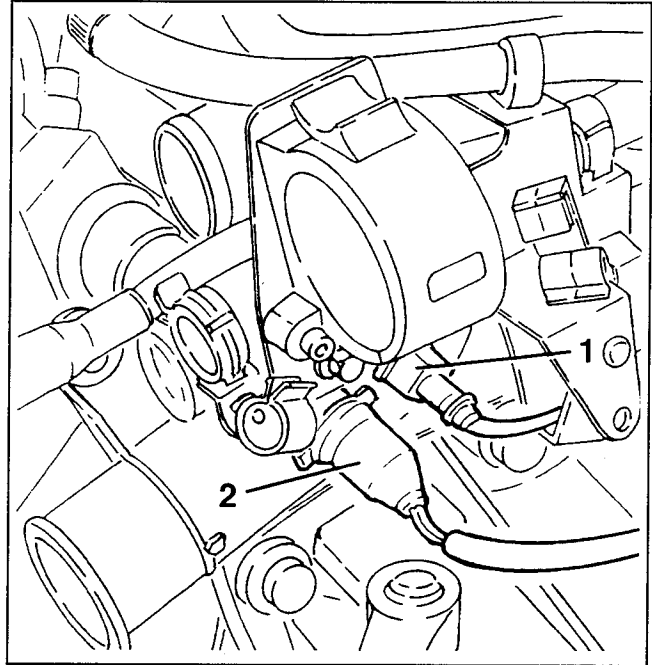
1. Slacken the fastening screws and remove the cooling fans withdrawing them upwards.



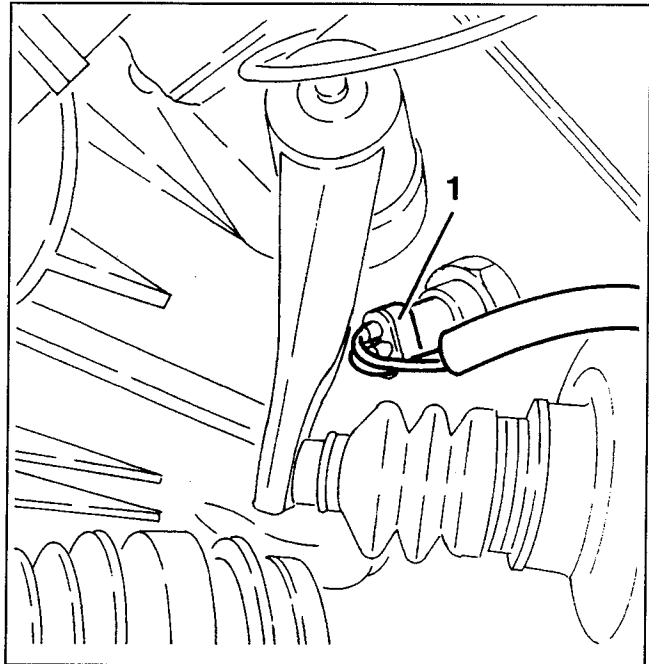
1. Release the injection wiring connector.
2. Disconnect the electrical connection of the rear pinging sensor.
3. Disconnect the electrical connection of the rpm and timing sensor.
4. Disconnect the electrical connection of the cam angle sensor.



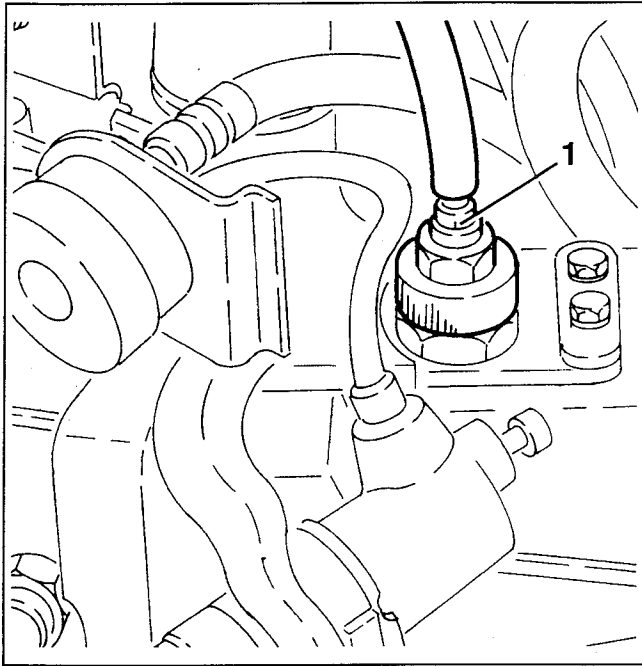
1. Disconnect the electrical connection from the engine coolant temperature sensor (NTC).
2. Disconnect the electrical connection from the coolant temperature transmitter and maximum temperature thermal contact.



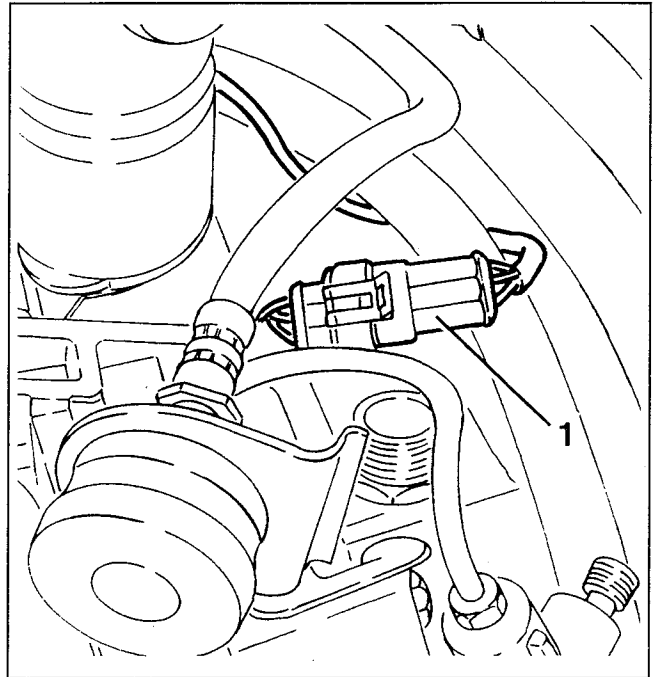
1. Disconnect the electrical connection from the reverse gear sensor.



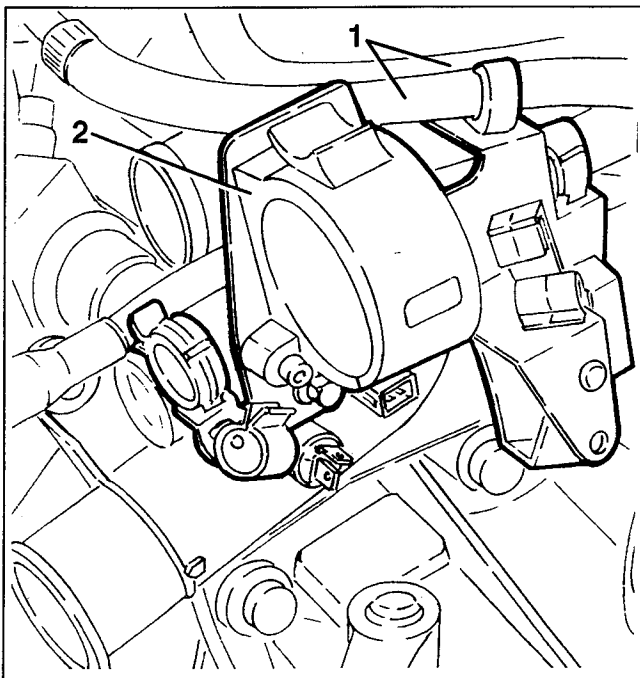
1. Disconnect the cable for synchronised reverse gear engagement.



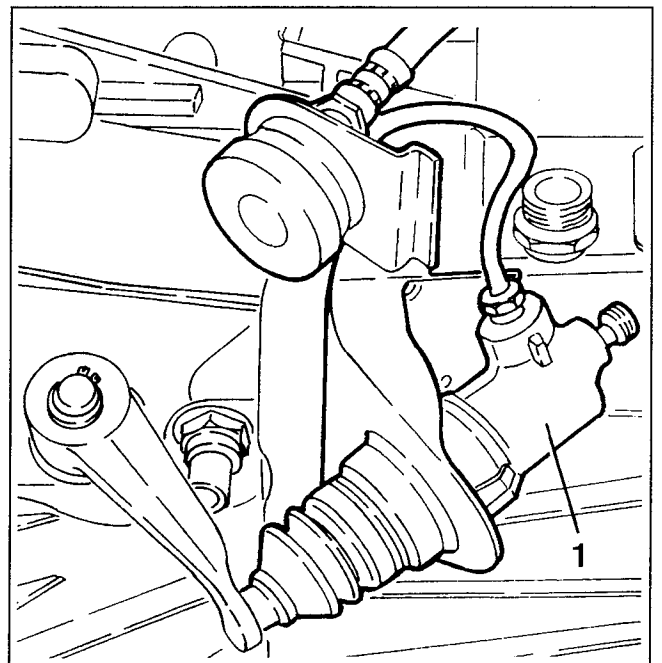
1. Disconnect the electrical connection of the tachometric sensor.



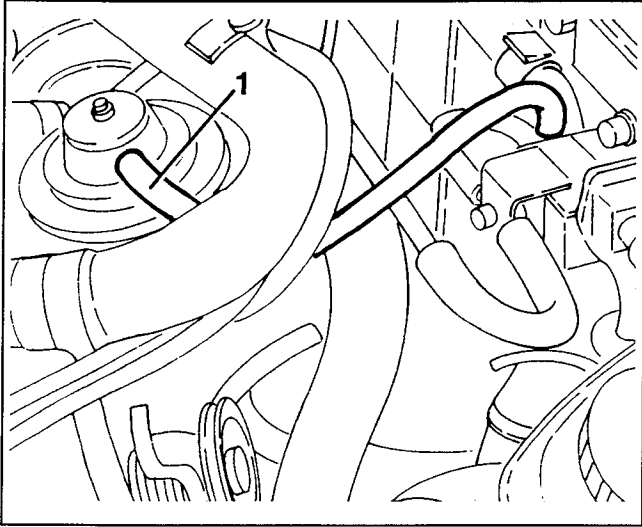
1. Release the fuel pipes.  
2. Slacken the fastenings and remove the injection wiring support bracket and pipe fasteners.



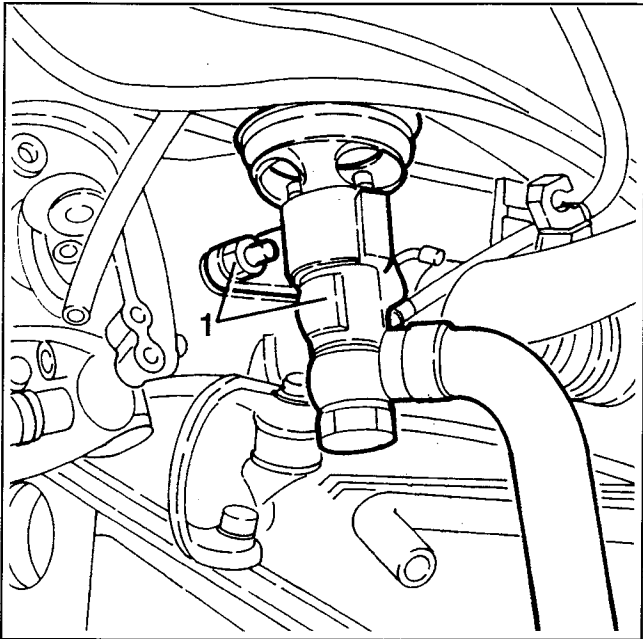
1. Slacken the fastening screws of the clutch control cylinder support bracket, then move the pipe aside without disconnecting the pipes.



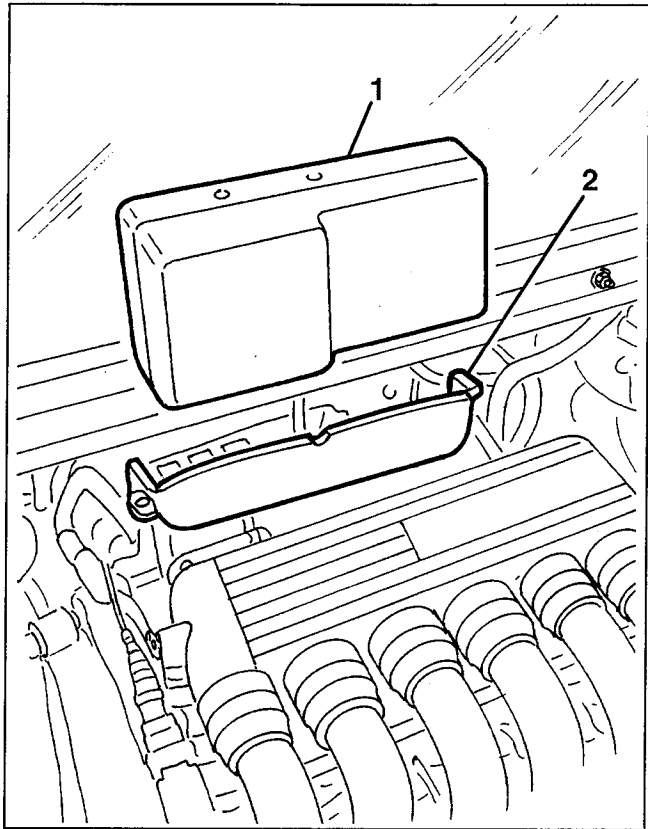
1. Disconnect the modulated vacuum pipe leading from the solenoid valve from the E.G.R. valve.



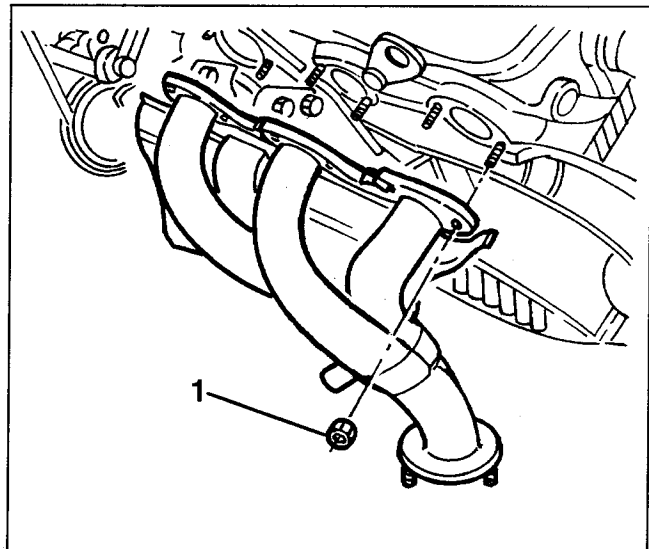
1. Slacken the two fastening nuts and remove the E.G.R. valve complete with exhaust gas takeoff pipe from the intake box.
  - Retrieve the seal.



1. Slacken the screws and remove the relay unit cover.
2. Retrieve the cover.

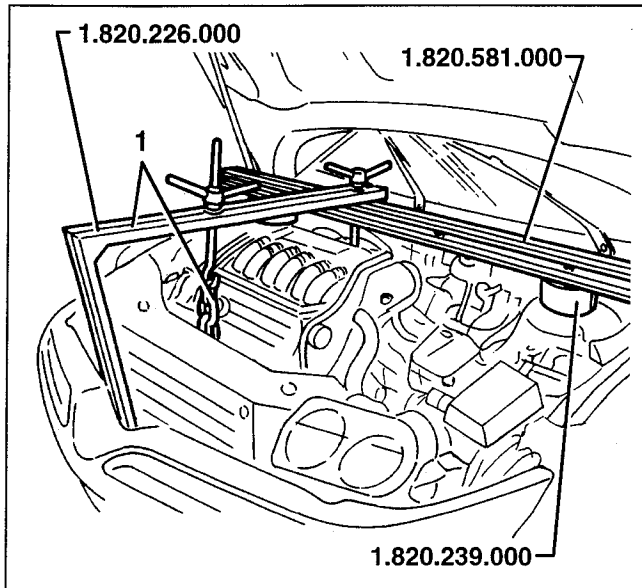


1. Slacken the six nuts fastening the rear exhaust manifold, complete with heat shield, to the cylinder head.



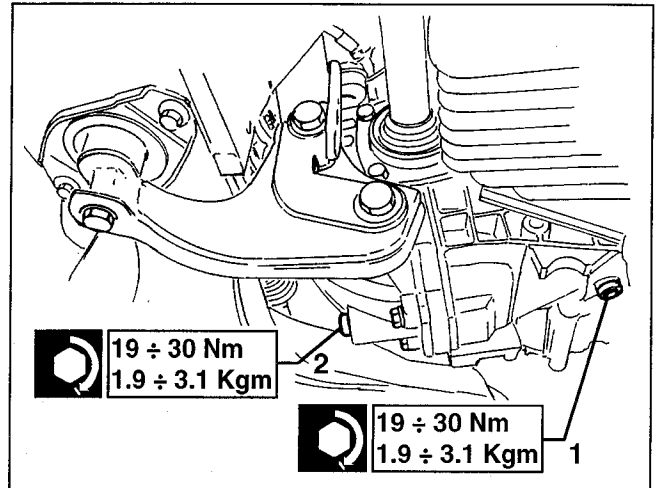
1. Using tools 1.820.239.000, 1.850.581.000 and 1.820.226.000 support the engine appropriately with a chain.



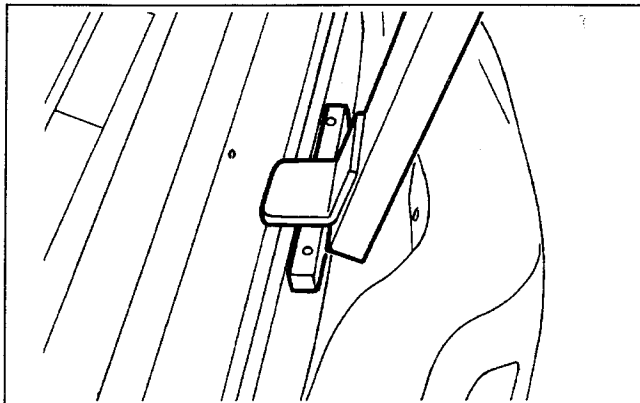


**⚠ WARNING:**  
To avoid damaging the power steering piping housed at the front of the radiator, place a suitable thickness between the front connection of the tool and its resting surface.

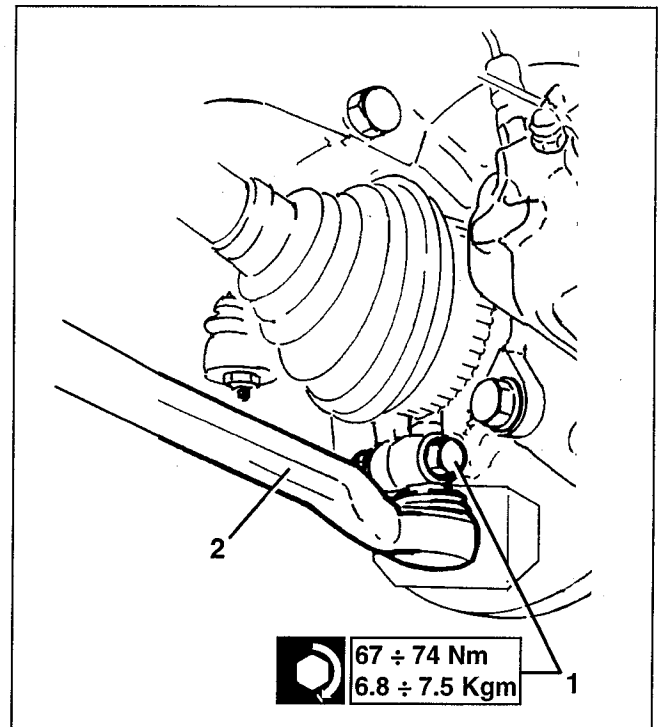
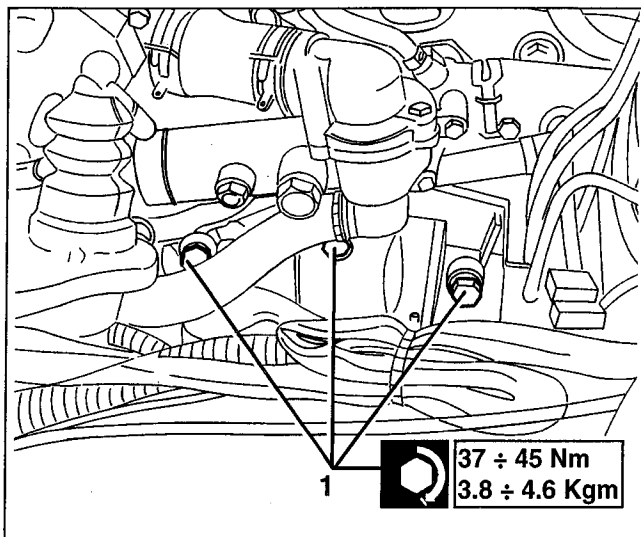
- Raise the car.
  - Place a suitable container under the engine compartment.
1. Slacken the plug and drain the gearbox oil.
  2. Slacken the plug and drain the differential oil.



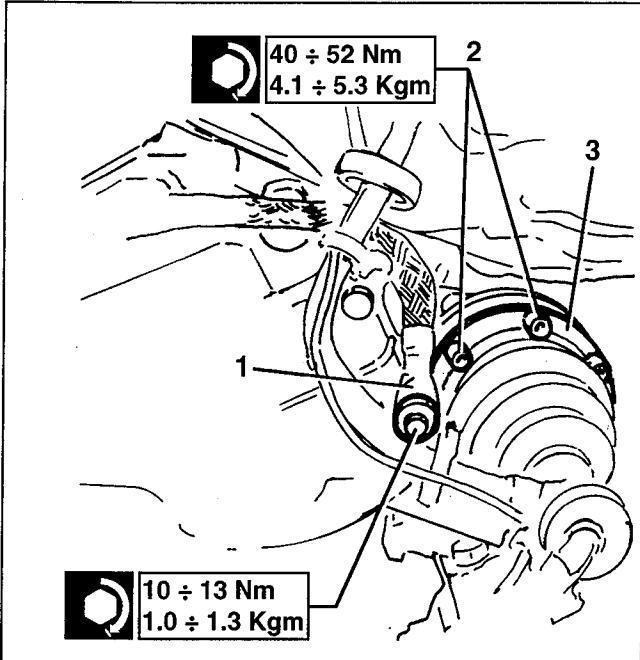
1. Working from both sides of the car, slacken the bolt fastening the wishbone to the wheel hub.
2. Withdraw the wishbone ball pin.



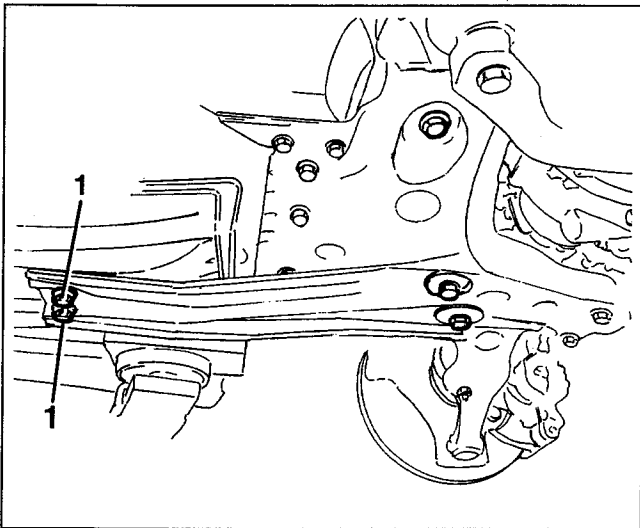
1. Slacken the three upper screws fastening the gearbox cover to the crankcase.
- Raise the gearbox oil dipstick.



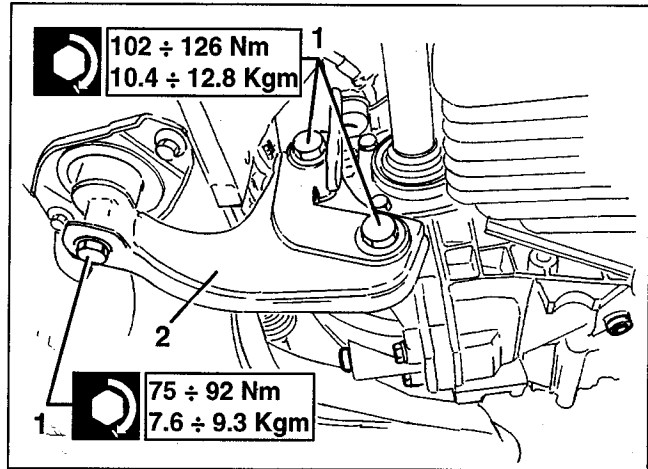
1. Working on the left side of the car, slacken the nut and disconnect the earth braid from the gearbox.
2. Slacken the six bolts and disconnect the axle shaft from the differential.
3. Retrieve the safety plates.



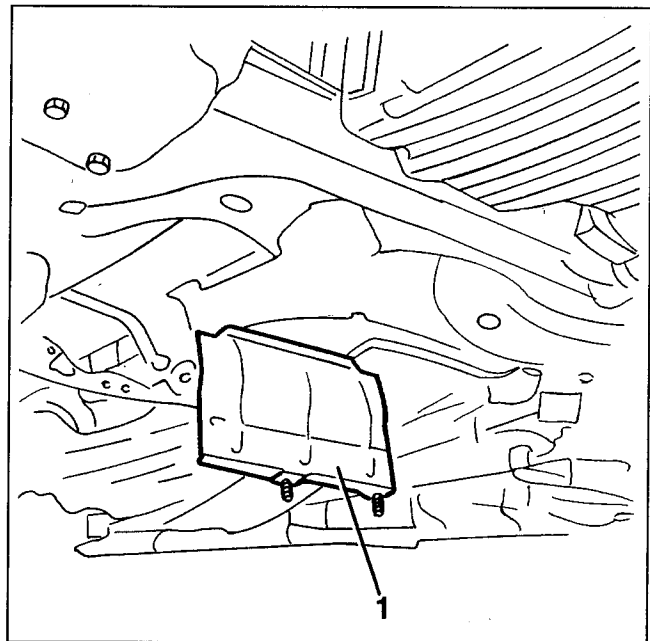
1. Working from under the car, slacken the two screws fastening the rear of each of the two front crossmember reinforcement struts.



1. Slacken the three fastening screws.
2. Remove the rear engine support.

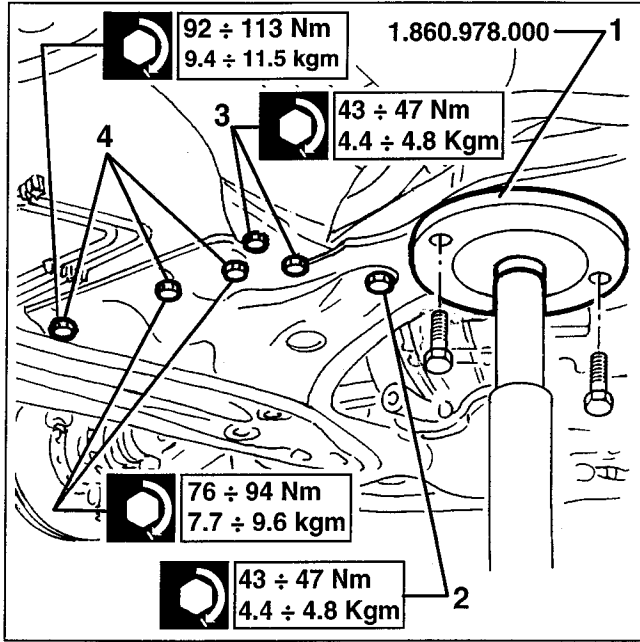


1. Remove the heat shield from the crossmember.

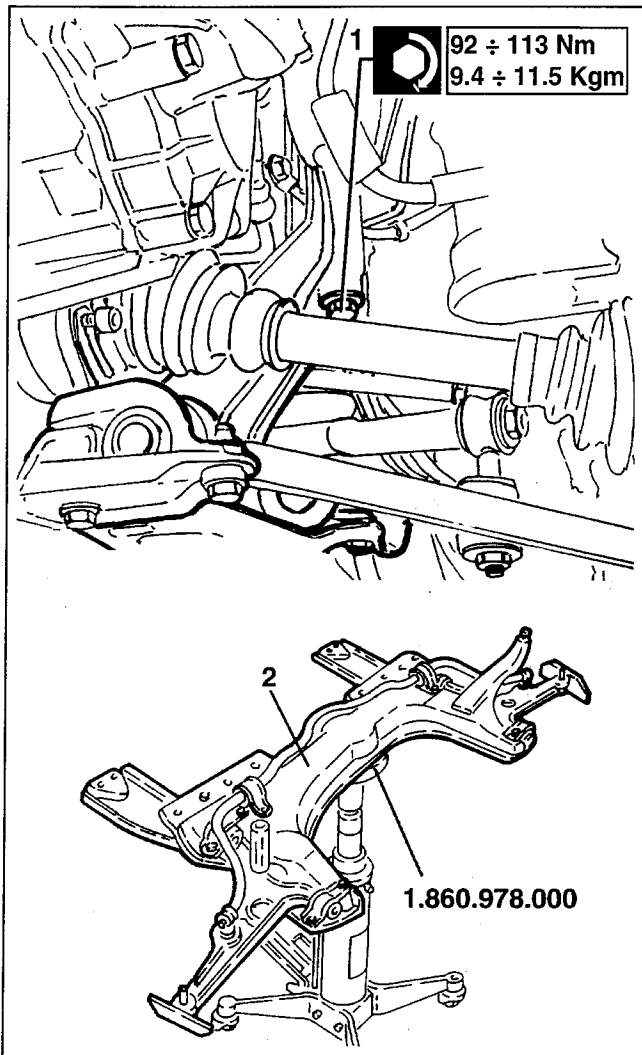


- Install tool no. 1.860.978.000 on a hydraulic jack.

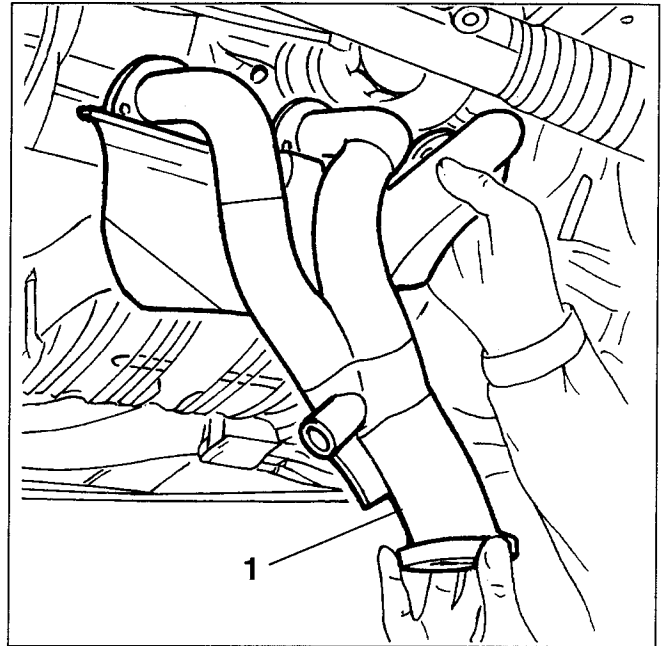
  1. Fasten the tool to the centre of the crossmember.
  2. Slacken the screws fastening the steering box to the crossmember.
  3. Slacken the nuts fastening the crossmember to the gearbox controls support.
  4. Slacken the screws fastening the crossmember to the body.



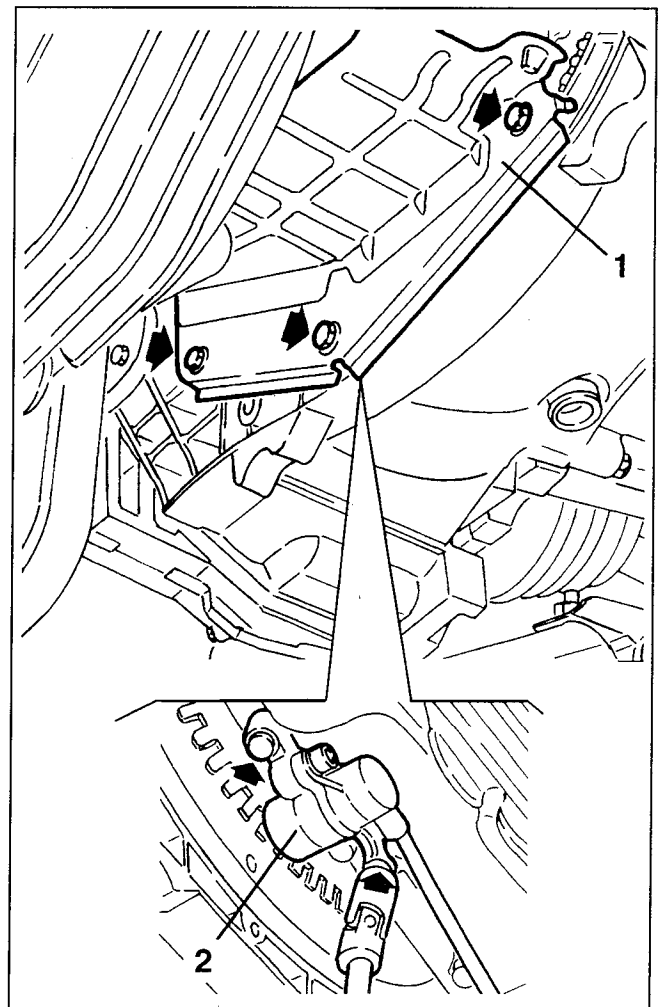
1. Slacken the upper crossmember fastening screw on each side.
2. Slowly lower the hydraulic jack and remove the crossmember complete with wishbones and stabiliser bar.



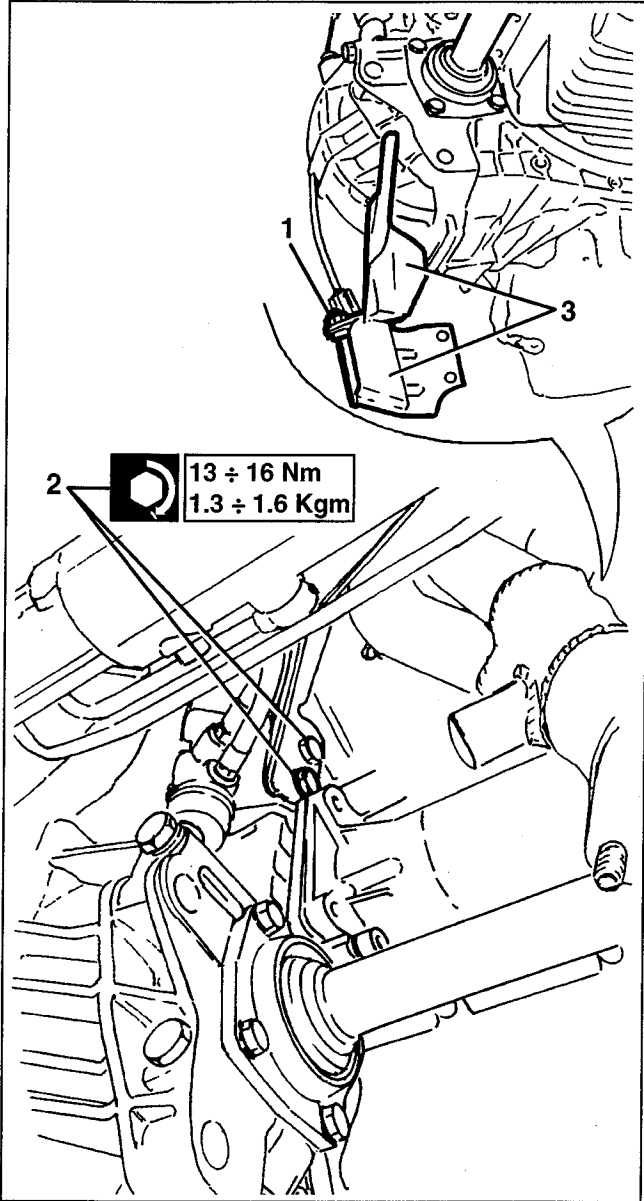
1. Retrieve the exhaust manifold complete with heat shield.



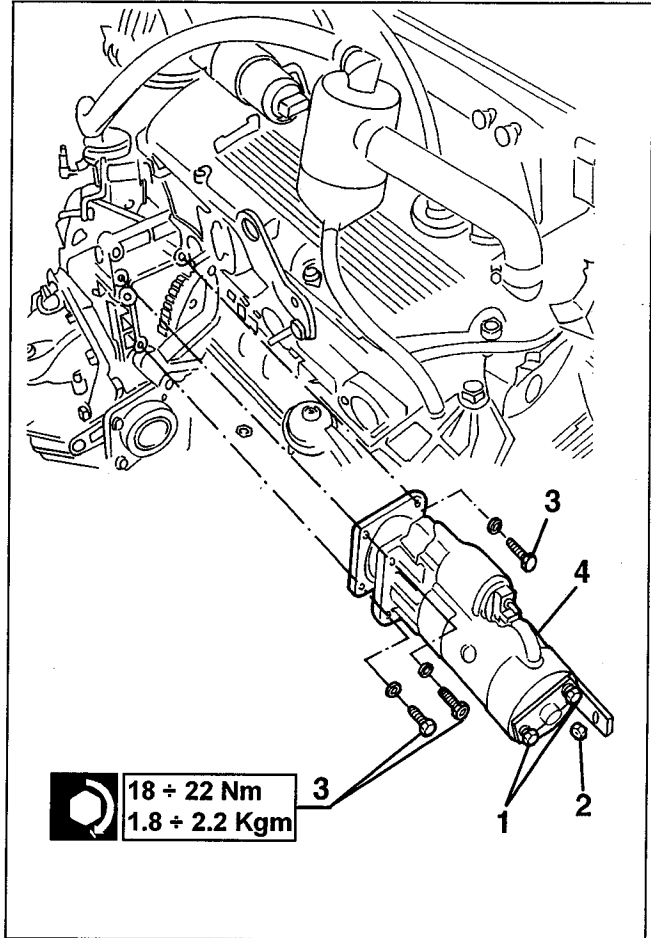
1. Slacken the fastening screws and remove the fly-wheel cover.
2. Slacken the fastening screws and remove the rpm and timing sensor.



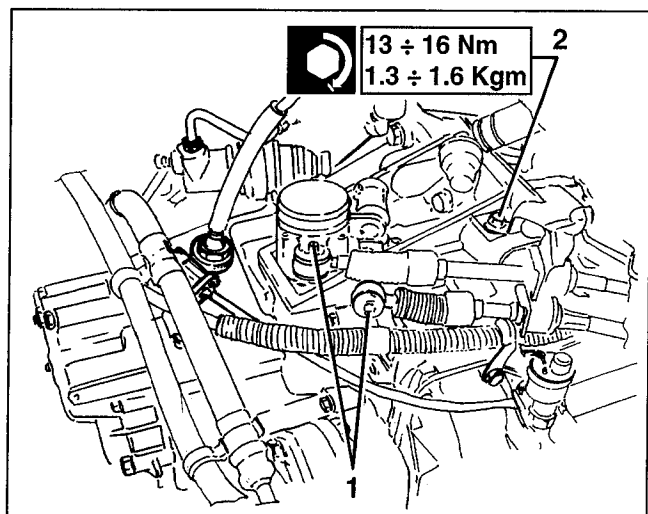
1. Slacken the two nuts fastening the upper gearbox control cable cover.
2. Slacken the two screws fastening the lower gearbox control cable cover.
3. Retrieve the two covers.



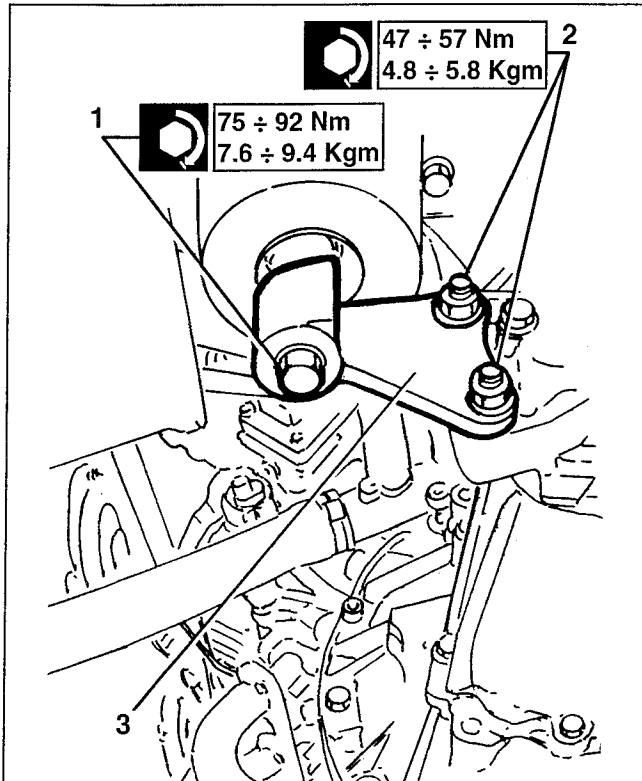
1. Slacken the two nuts fastening the rear starter motor.
2. Slacken the nut fastening the square.
3. Slacken the starter motor fastening screws.
4. Retrieve the starter motor complete with square.



- Work from above.
1. Remove the retainer clips and withdraw the gear control cables from the pin.
  2. Slacken the upper screw of the gearbox control cable support bracket.

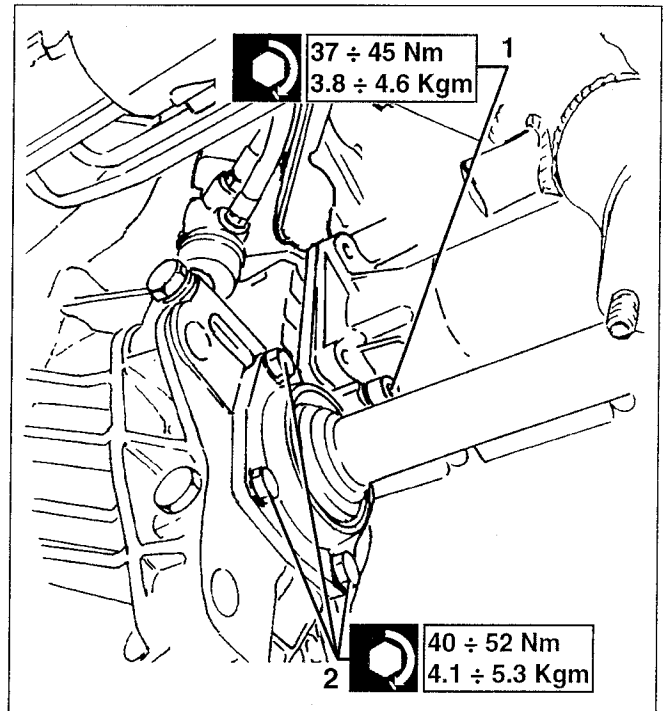


1. Slacken the screw fastening the gearbox rear support.
2. Slacken the nuts fastening the support to the gearbox.
3. Remove the support.

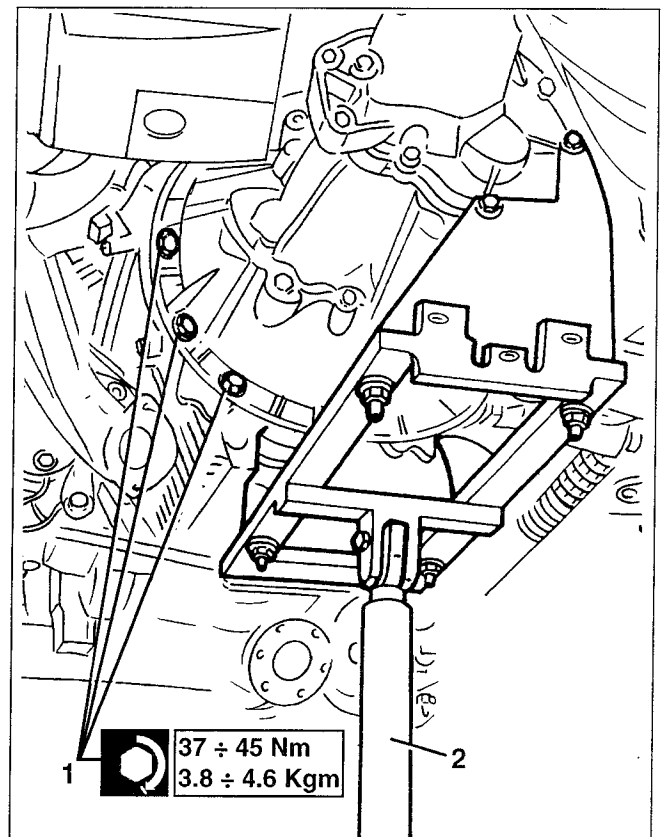
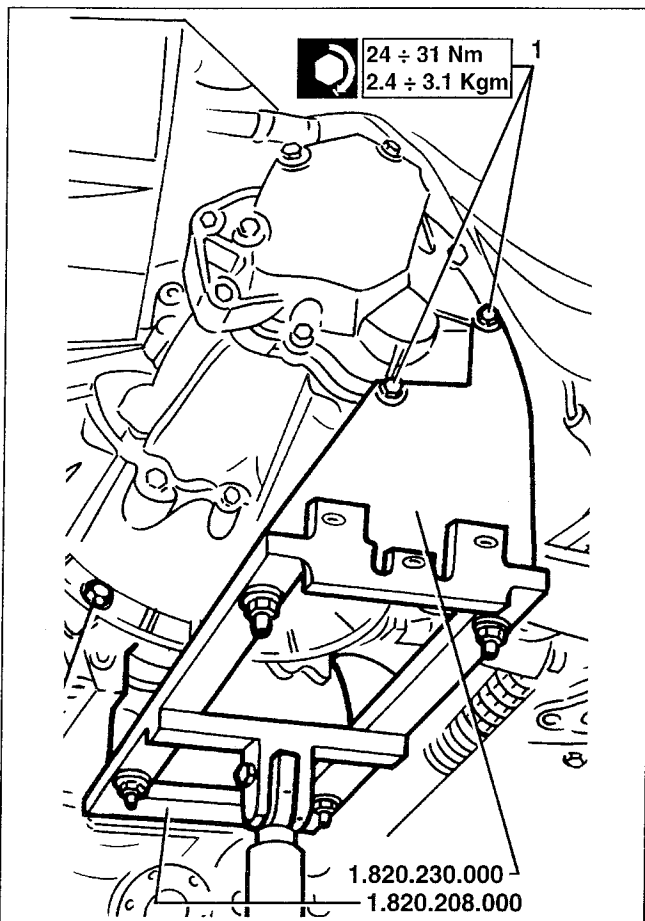


1. Slacken two of the gearbox cover fastening screws and fasten brackets no. 1.820.230.000 and no. 1.820.208.000.
2. Use a hydraulic lift to support the gearbox unit.

1. Slacken the rear Allen screw fastening the engine-gearbox.
2. Slacken the four screws fastening the layshaft support to the differential.



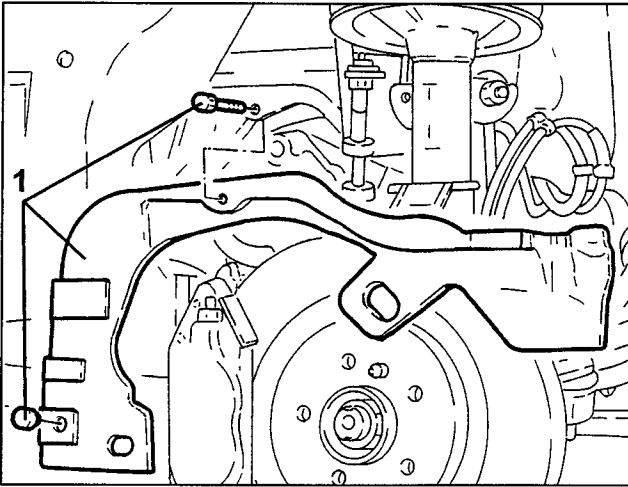
1. Slacken the three remaining screws fastening the gearbox to the engine.
2. Move away the gearbox from the engine and lower it using the hydraulic jack.



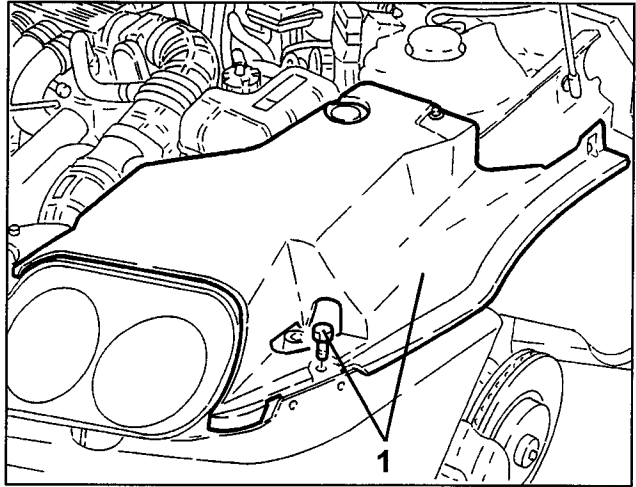
## GEARBOX ASSEMBLY

### REMOVAL/REFITTING

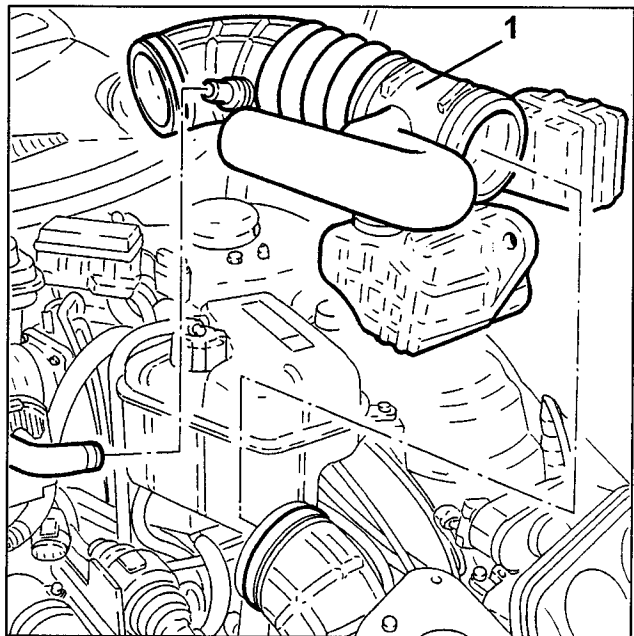
- Position the vehicle on a shop jack.
  - Make sure the ignition key is at "STOP" and disconnect the (-) battery terminal.
  - Remove the front wheels.
1. Remove the button, loosen the screws and remove the front left-hand wheel compartment dust guard.



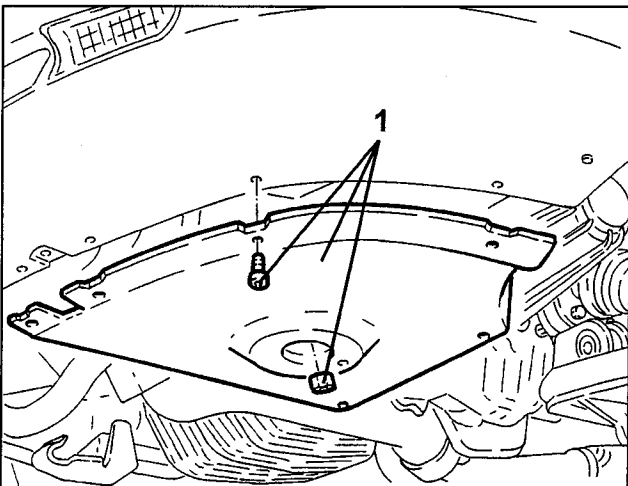
1. Loosen the screws and remove the left-hand side engine compartment guard.



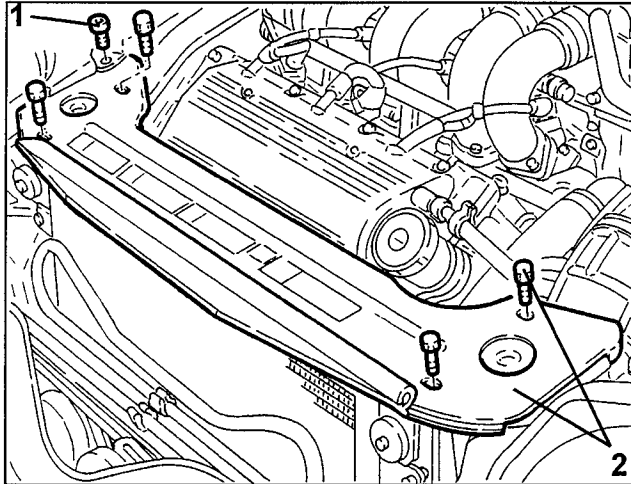
1. Loosen the clips and remove the corrugated sleeve and resonators after releasing the intermediate resonator from the fastening pin.



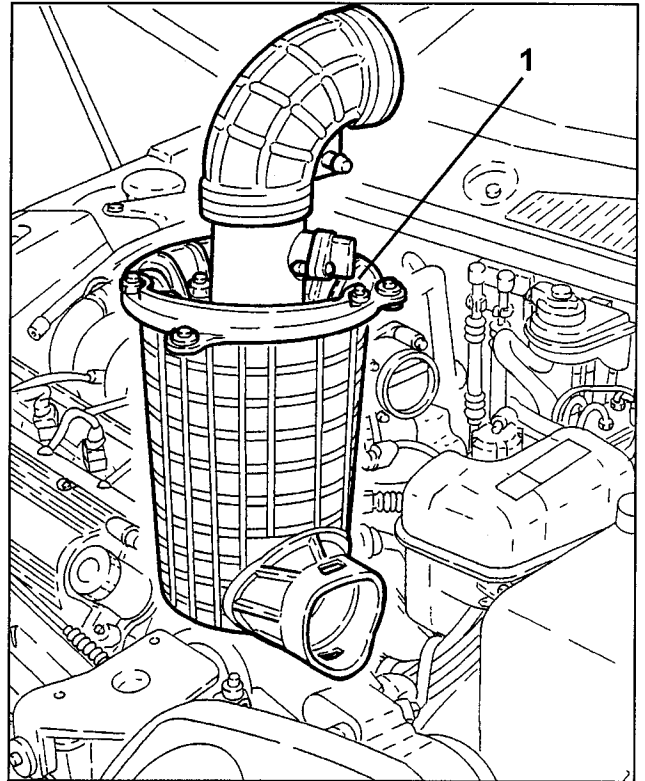
1. Loosen the screws and the nut and remove the lower air cleaner guard.



- Release the engine cooling fan from the fastenings on the upper radiator crossmember.
- 1. Loosen the screw fastening the right-hand side engine compartment guard to the upper radiator crossmember.
- 2. Loosen the fastening screws and remove the upper radiator crossmember.

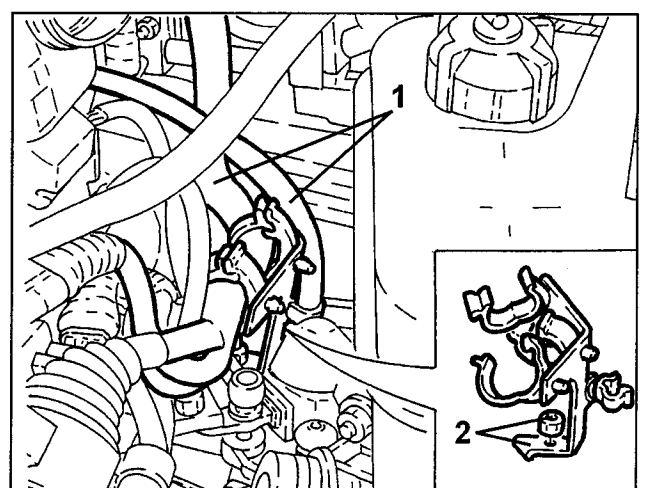
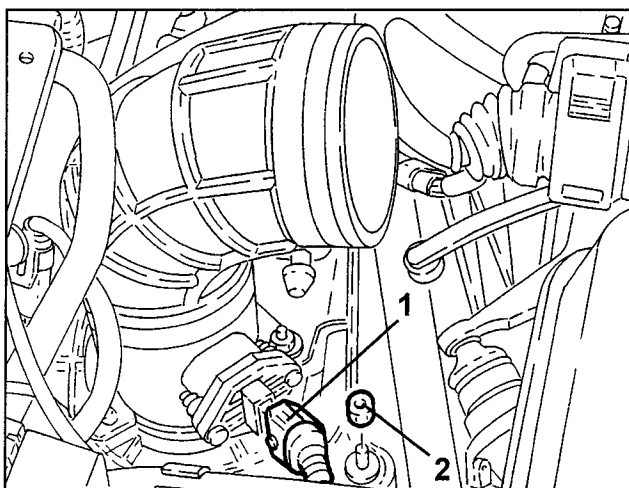


- Release the air cleaner from the lower resonator sleeve.
- 1. Remove the complete air cleaner.

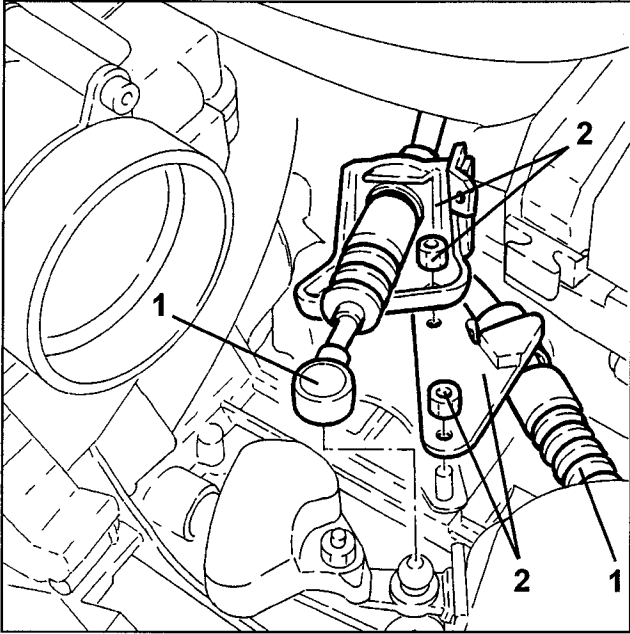


- 1. Disconnect the air flow meter electrical connection.
- 2. Loosen the air cleaner fastening nuts.

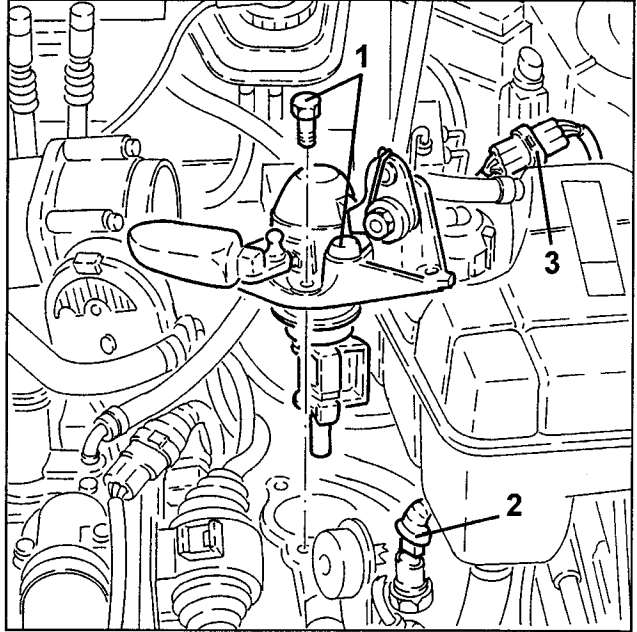
- 1. Release the electrical wiring from the fastening clips on the bracket.
- 2. Loosen the fastening nut and remove the electrical wiring bracket.



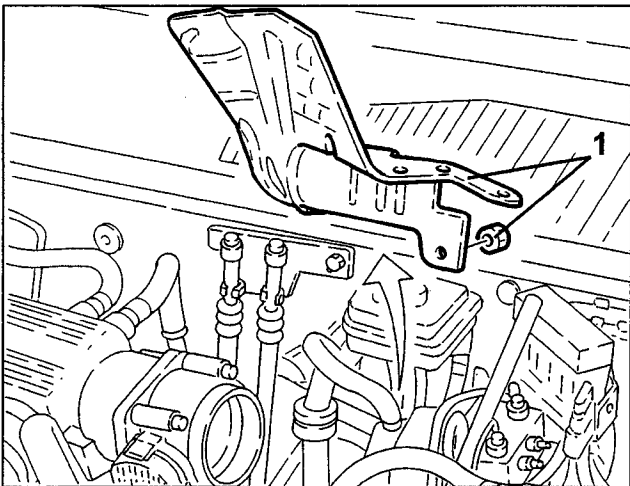
1. Disconnect the gear selection and engagement wires.
2. Loosen the nuts and move the brackets and selection/engagement wires aside.



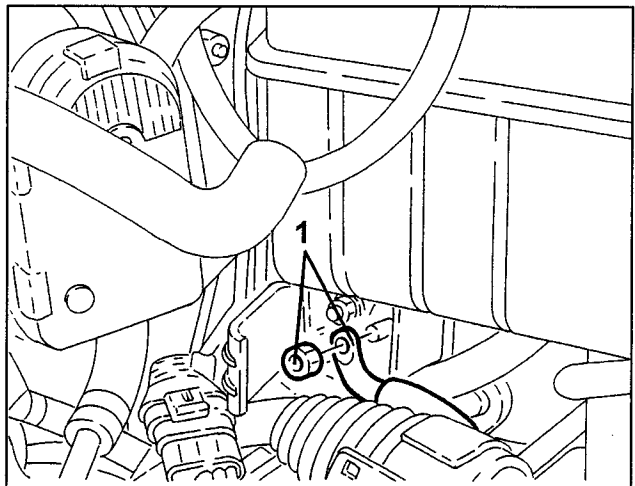
1. Loosen the screws and remove the gear selection and engagement assembly.
2. Disconnect the reversing light switch electrical connection.
3. Disconnect the starter motor power electrical connection.



1. Loosen the nut and remove the upper firewall from the right-hand exhaust manifold.

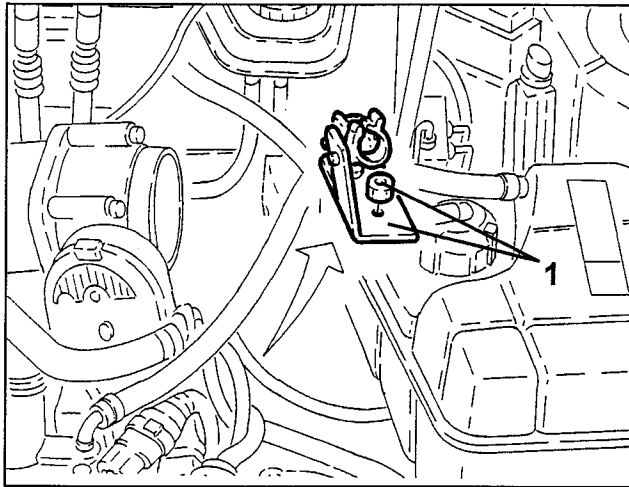


1. Open the junction unit and disconnect the starter motor power wire.

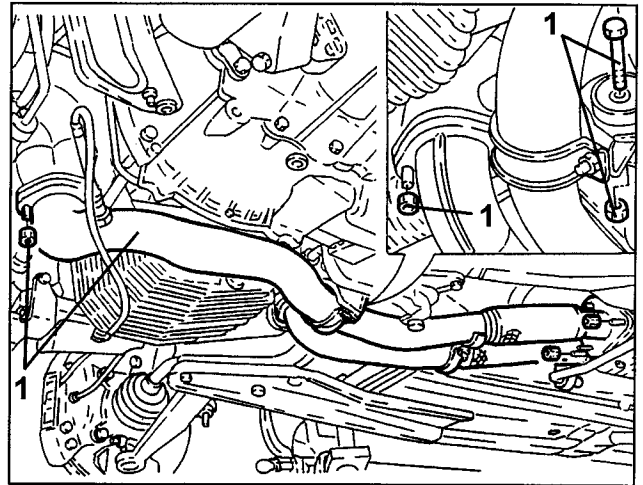




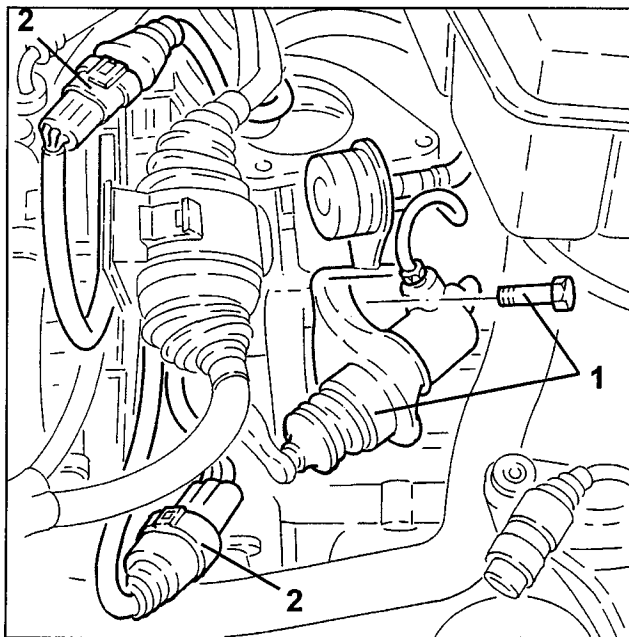
- Release the starter motor power wiring from the fastening clips and move it aside.
- 1. Loosen the fastening nut and remove the starter motor wiring bracket.



- 1. Loosen the fasteners and remove the exhaust pipe front section.

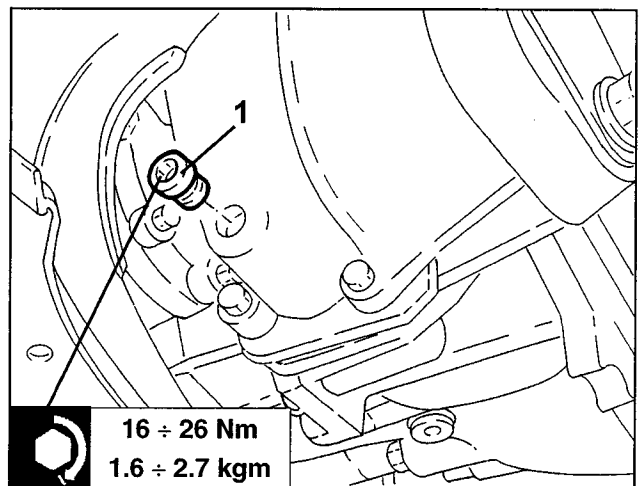


- 1. Loosen the fastening screws and move the bracket with clutch cylinder and vibration damper aside without disconnecting the respective pipes.
- 2. Disconnect the lambda sensor electrical connections and release the electrical wiring from the fastening clips.



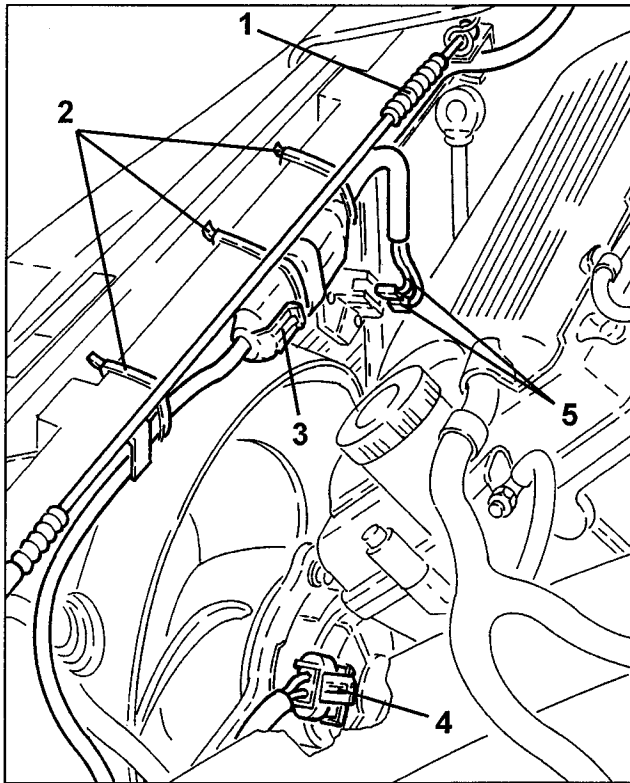
- 1. Loosen the cap and drain the gearbox-differential oil.

**NOTE: Collect the oil in a suitable container.**

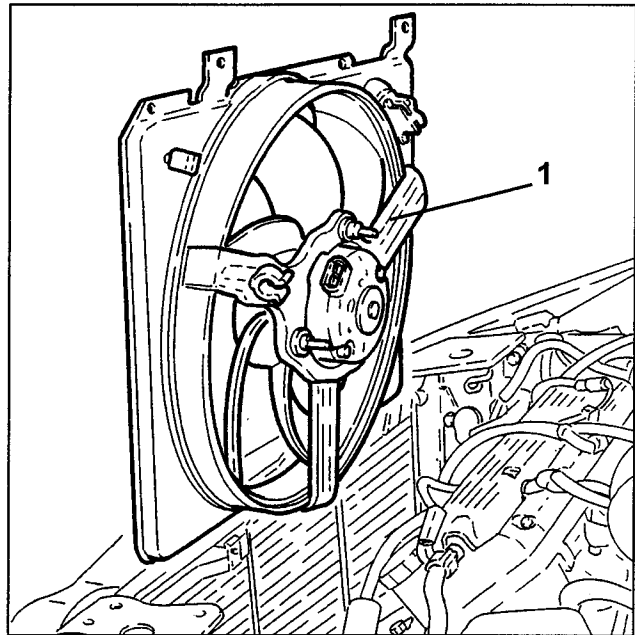


- Loosen the nuts fastening the right-hand exhaust manifold to the cylinder heads.

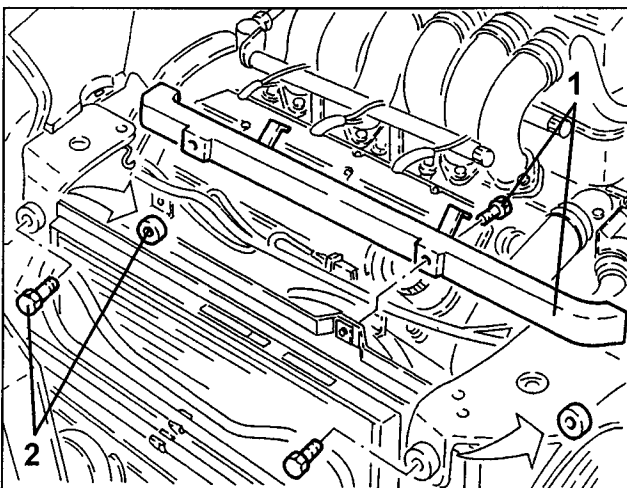
1. Disconnect the bonnet lock wire and move it aside.
2. Release the electrical wiring from the fastening clips and the duct.
3. Disconnect the electrical connection.
4. Disconnect the engine cooling fan electrical connection.
5. Disconnect the engine cooling fan resistor electrical connection and move the electrical wiring aside.



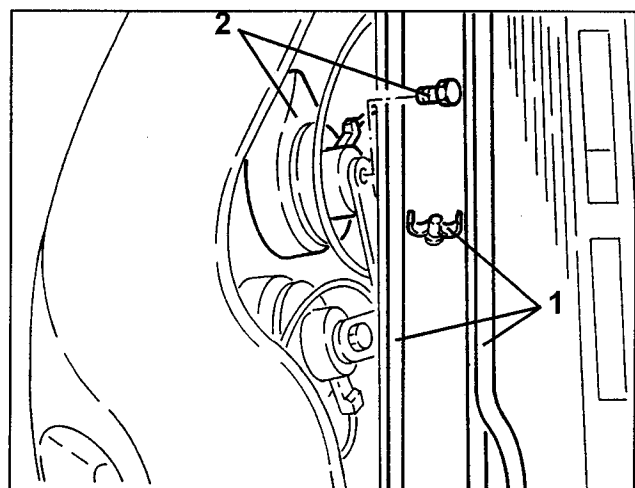
1. Move the radiator from the engine just enough to remove the engine cooling fan.



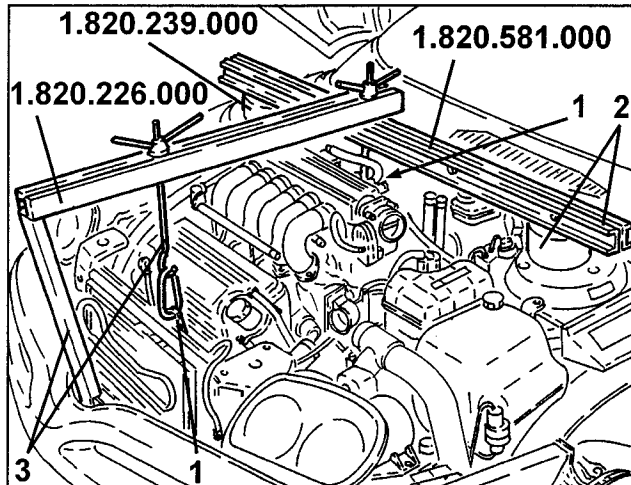
1. Loosen the screws and remove the electrical wiring duct.
2. Loosen the two upper engine cooling radiator fastening screws and take the respective shims.



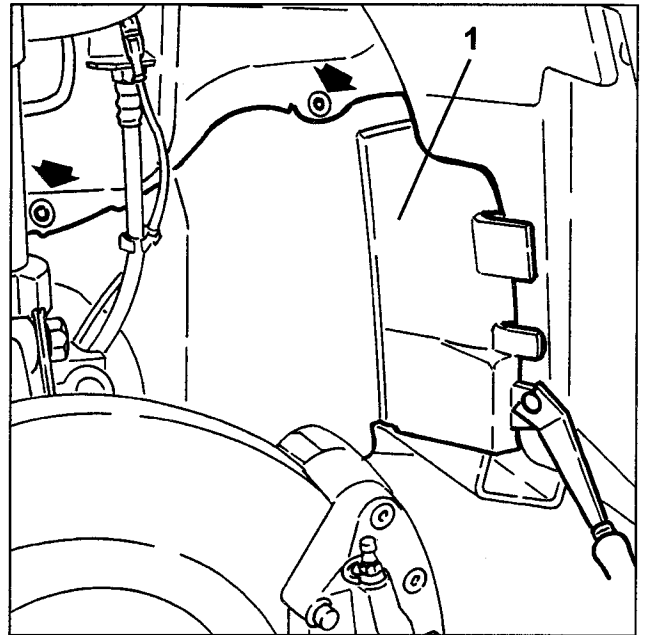
1. Release the power steering cooling serpentine from the fasteners on the underbody front crossmember.
2. Loosen the fastening screw and move the right-hand horn aside.



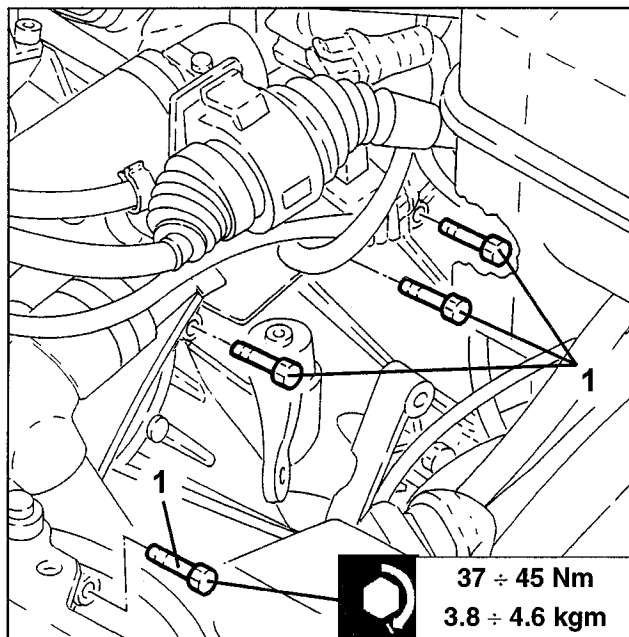
1. Fit the two specific engine brackets on the cylinder heads.
2. Fit crossmember no. 1.820.581.000 with brackets no. 1.820.239.000.
3. Fit bracket no. 1.820.226.000 and connect the respective tie-rods to the brackets previously fitted on the cylinder heads.



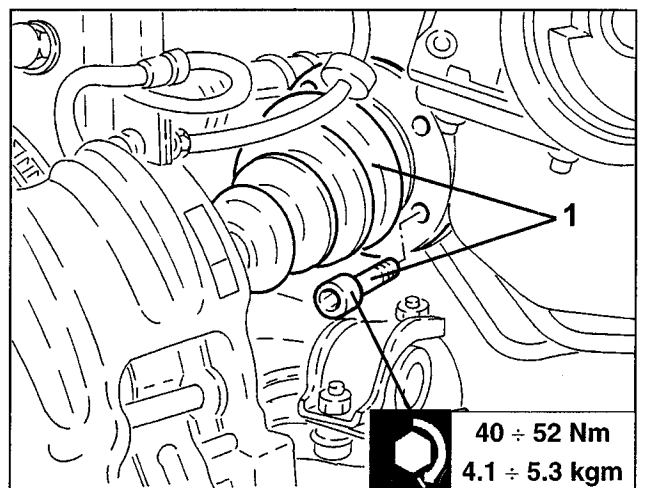
1. Remove the button, loosen the screws and remove the dust guard from the right-hand front wheel compartment.



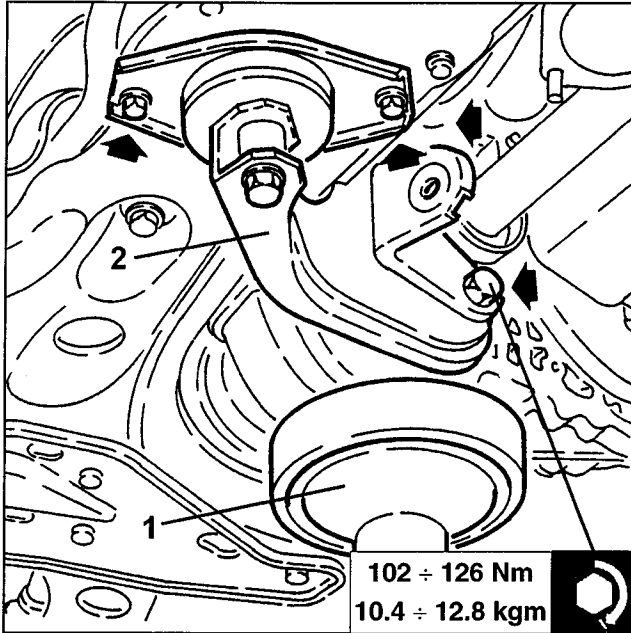
1. Loosen the upper screws fastening the gearbox-differential to the engine.



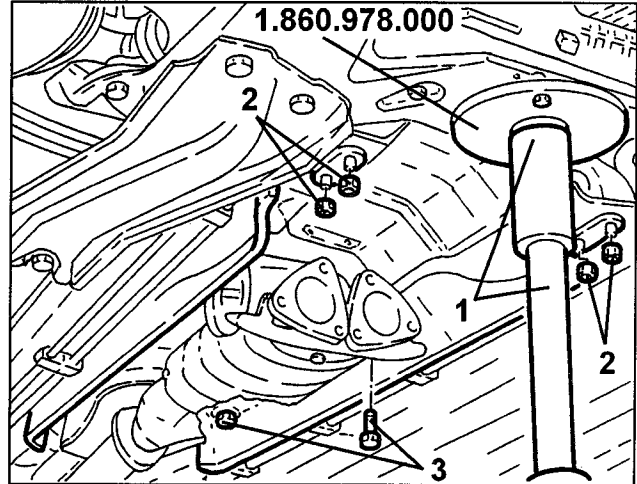
1. Loosen the fastening bolts and disconnect the drive shafts.



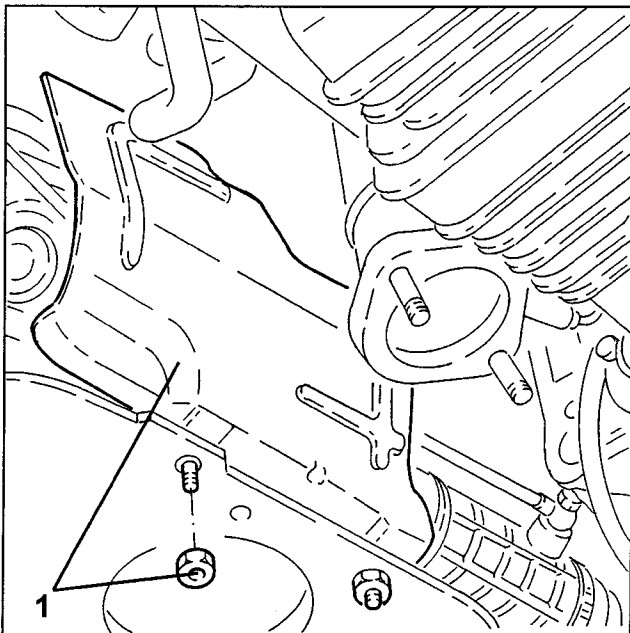
1. Position a hydraulic jack under the differential.
  2. Loosen the fastening screws and remove the complete engine rear mount.
- Remove the hydraulic jack from under the differential.



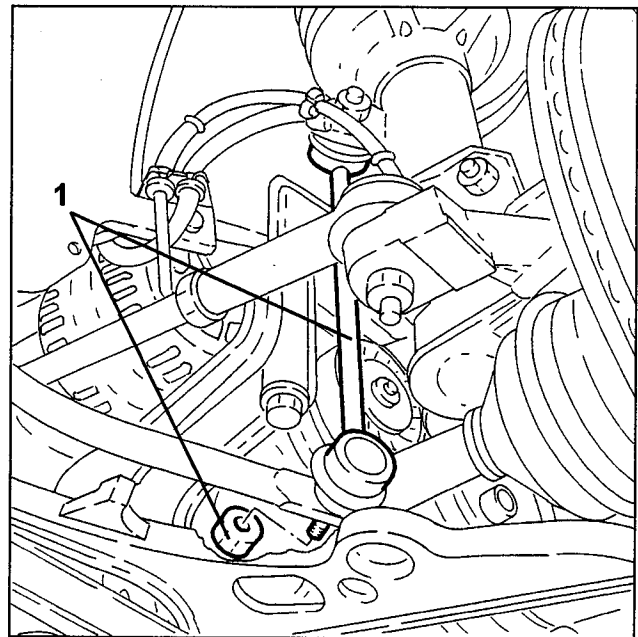
1. Use a hydraulic jack to support the crossmember by means of tool no. 1.860.978.000.
2. Loosen the gear lever bracket front fastening nuts.
3. Loosen the rear screws and loosen the remaining gear lever screws.



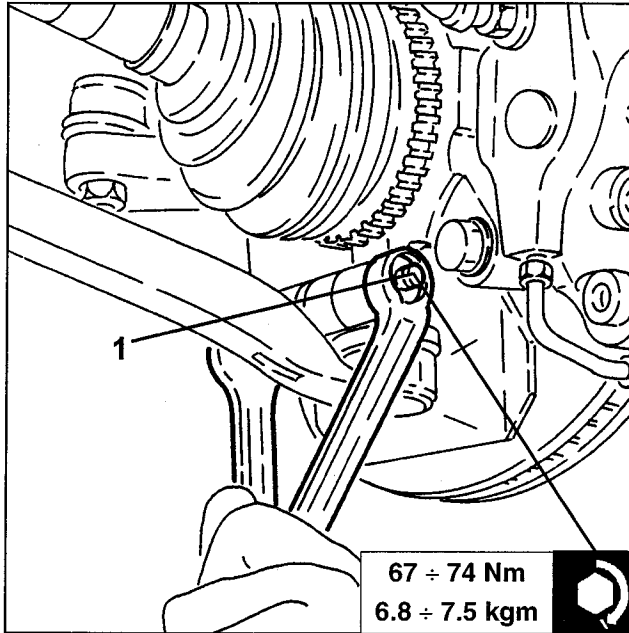
1. Loosen the fastening nuts and remove the power steering unit firewall.



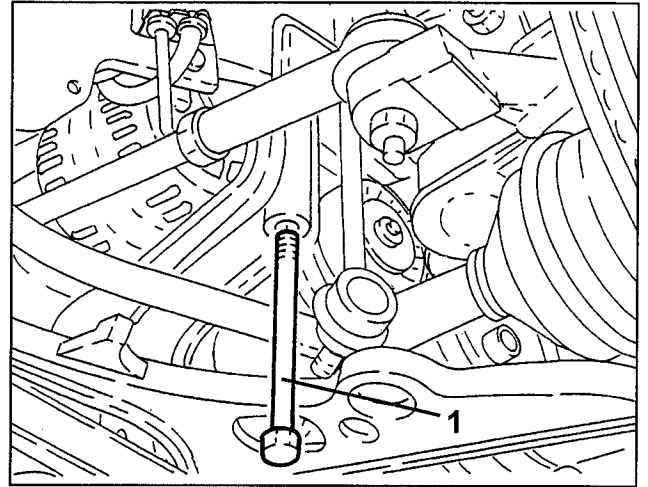
1. Loosen the nuts and disconnect the stabiliser bar tie-rods.



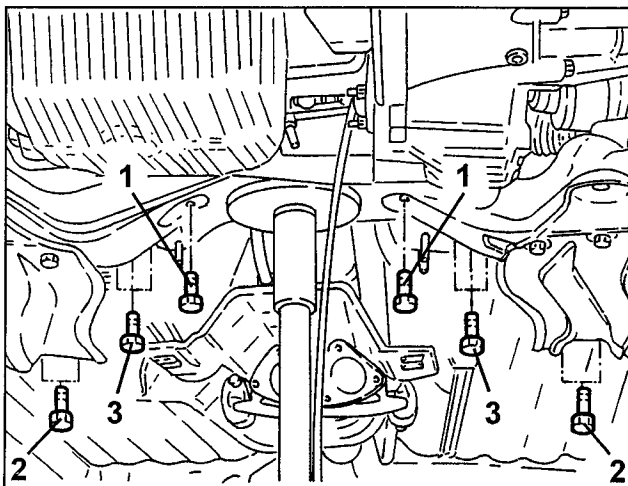
1. Loosen the bolts fastening the wishbones to the wheel risers.



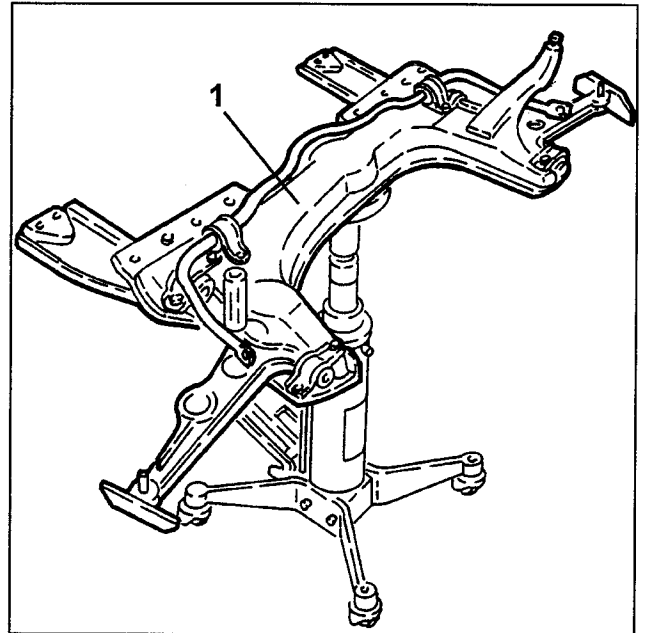
1. Loosen the side screws fastening the crossmember to the underbody.



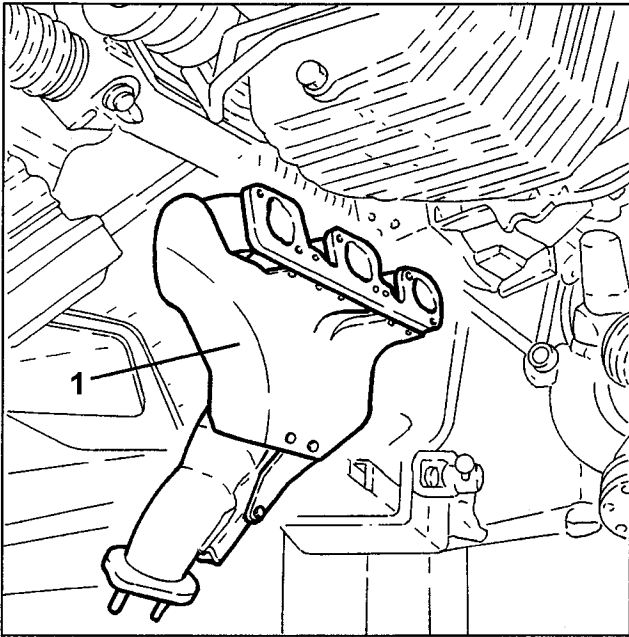
1. Loosen the screws fastening the power steering unit to the crossmember.
2. Loosen the rear screws fastening the crossmember to the underbody.
3. Loosen the central screws fastening the crossmember to the underbody.



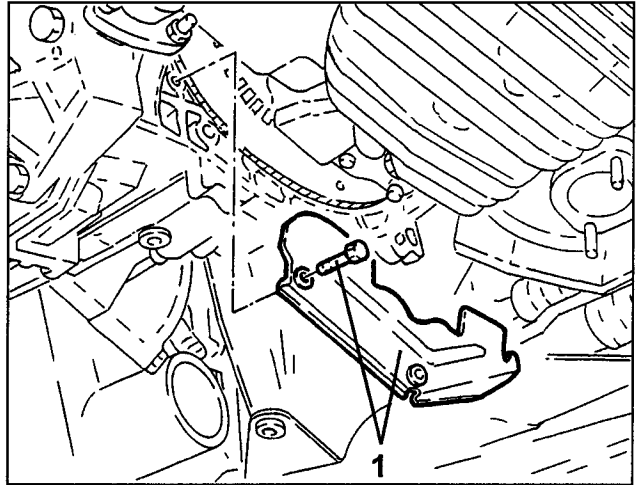
1. Lower the hydraulic jack and remove the crossmember with wishbone, stabiliser bar and reinforcements.



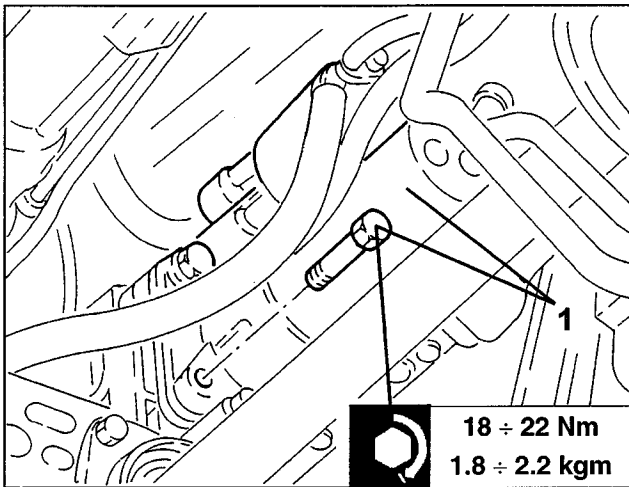
1. Remove the right-hand exhaust manifold.



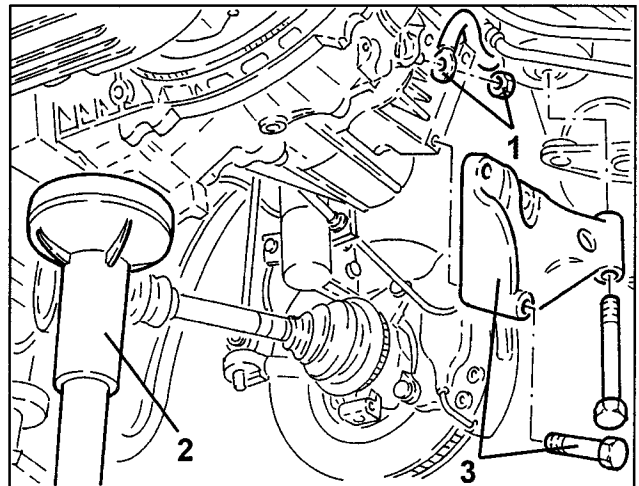
1. Loosen the fastening screws and remove the flywheel guard.



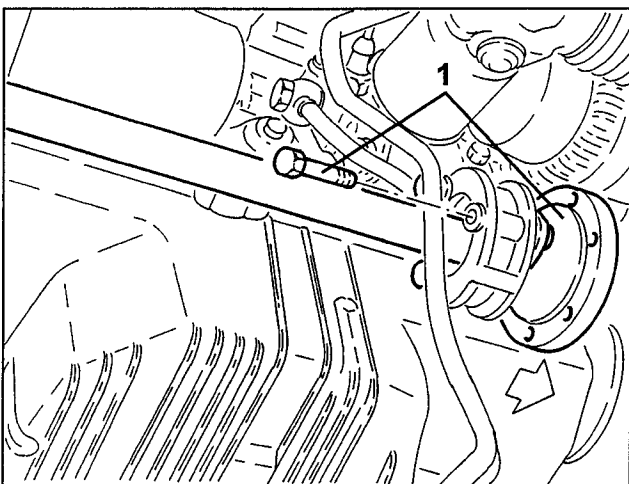
1. Loosen the fastening screws and release the starter motor from the gearbox.



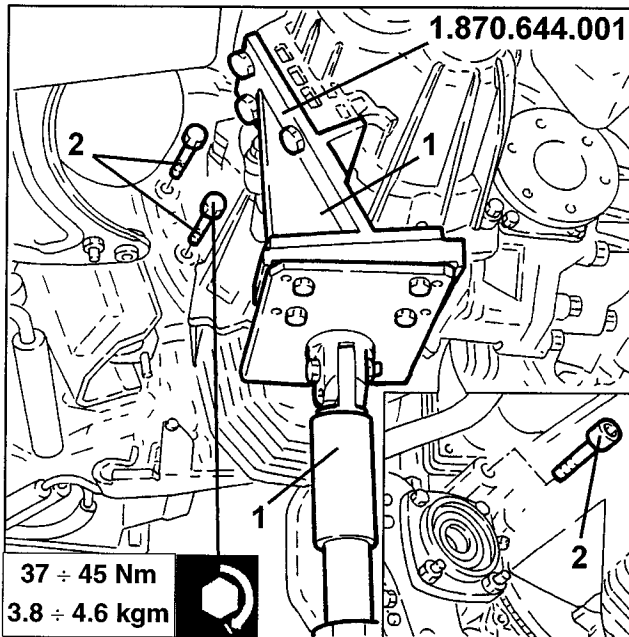
1. Disconnect the gearbox earth braid.  
 2. Position a hydraulic jack under the differential.  
 3. Loosen the screws and remove the gearbox bracket, engine side.  
 - Remove the hydraulic jack from under the differential.



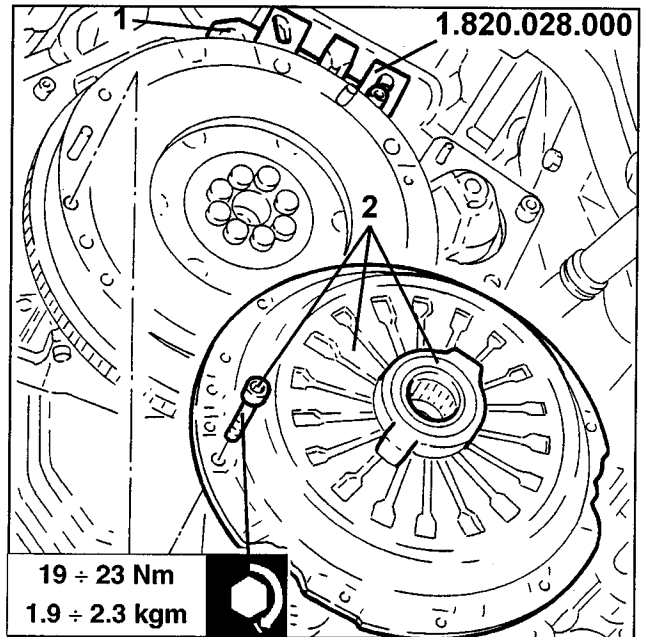
1. Loosen the fastening screws and remove the intermediate drive shaft.



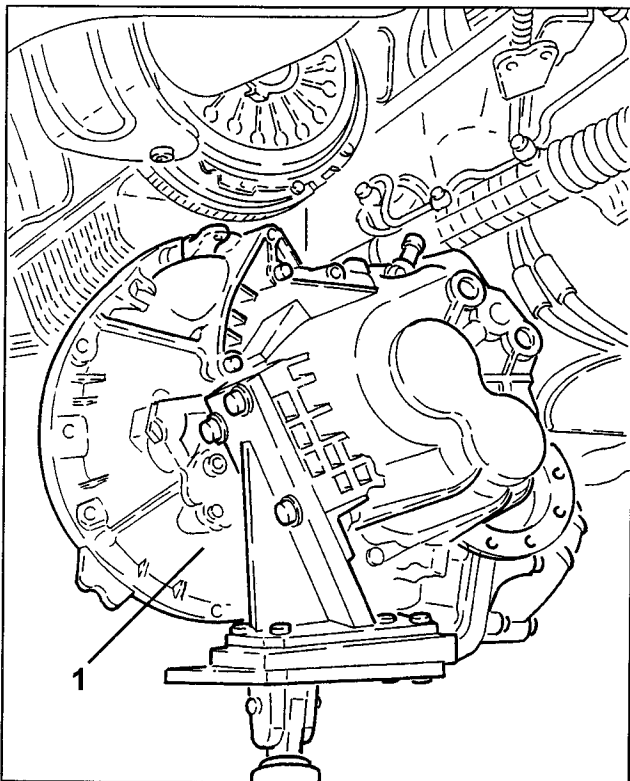
1. Support the gearbox-differential with a hydraulic jack and tool no. 1.870.644.001.
2. Loosen the remaining lower gearbox-differential fastening screws.



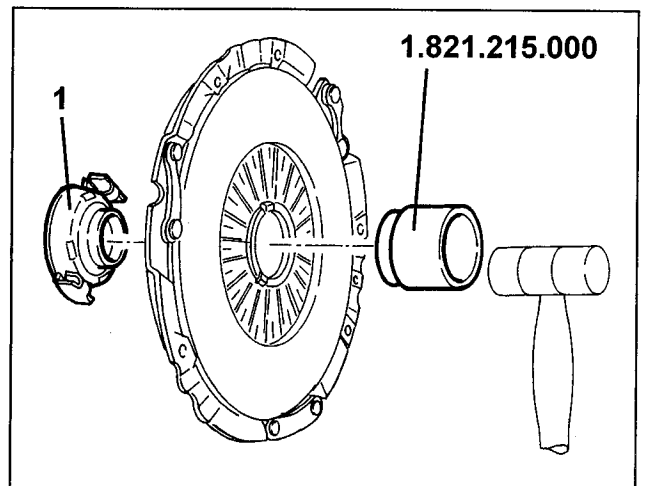
1. Fit flywheel retainer tool no. 1.820.028.000.
2. Loosen the screws and remove the clutch frame with thrust bearing and clutch plate.



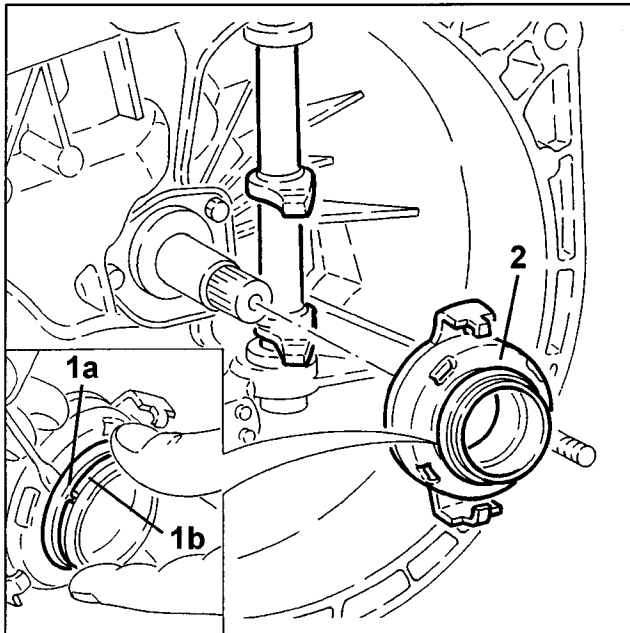
1. Lower the hydraulic jack and remove the gearbox-differential assembly.



- Attain to the following precautions when refitting.
1. Remove the thrust bearing from the clutch frame with tool no. 1.821.215.000.

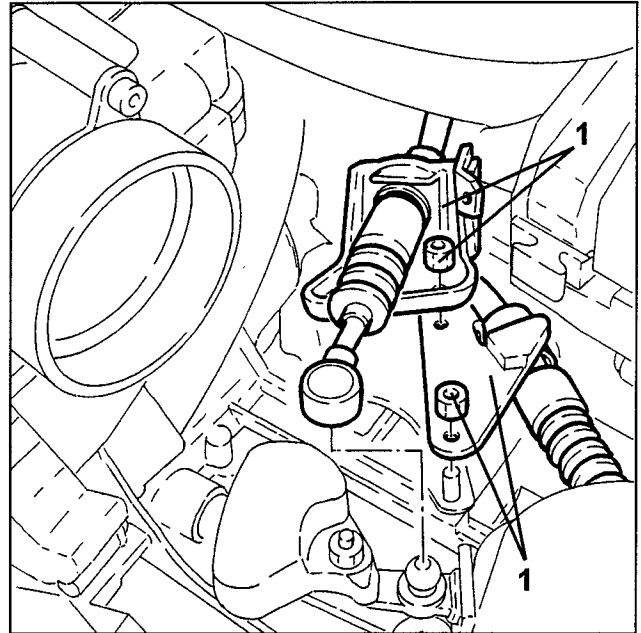


1. Lift the thrust bearing taper ring (1a) to cover spring (1b).
2. Fit the thrust bearing on the primary shaft and couple it with the fork pin.

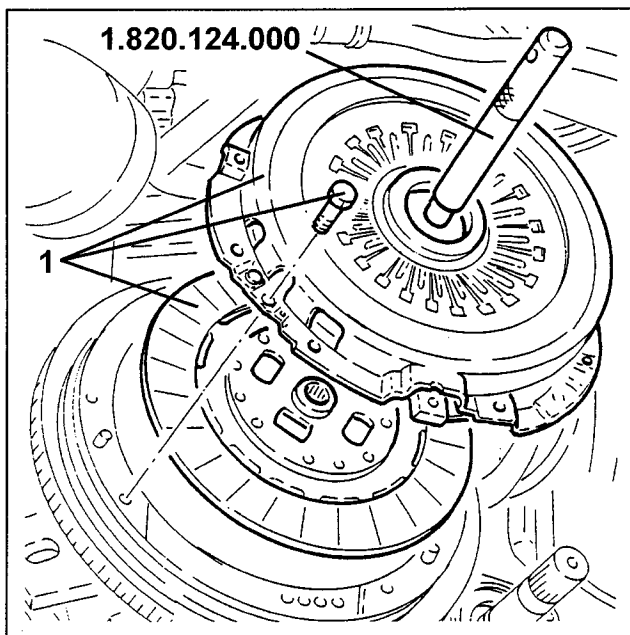


- Complete refitting by reversing the removal sequence until the gear selection/engagement assembly step. Then adjust the gear selection/engagement wires as follows.

1. Position the bracket and gear selection/engagement wires. Fasten the respective nuts.



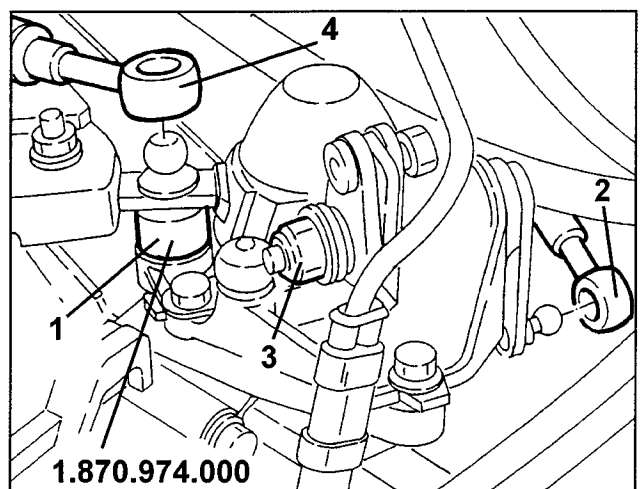
1. Fit the clutch plate and clutch frame centring them with tool no. 1.820.124.000.



1. Fit tool no. 1.870.974.000 under the gear engagement wire ball coupling.
2. Connect the gear selection wire.
3. Loosen the gear selection/engagement assembly adjustment nut.

- Torque the gear selection/engagement assembly adjustment nut after positioning the gear lever in neutral and shifting it all to the right.

4. Connect the gear engagement wire.
- Position the gear lever in reverse and remove tool no. 1.870.974.000.



- After fitting the gearbox and fastening it with the respective screws, operate the clutch lever to engage the thrust bearing on the clutch.

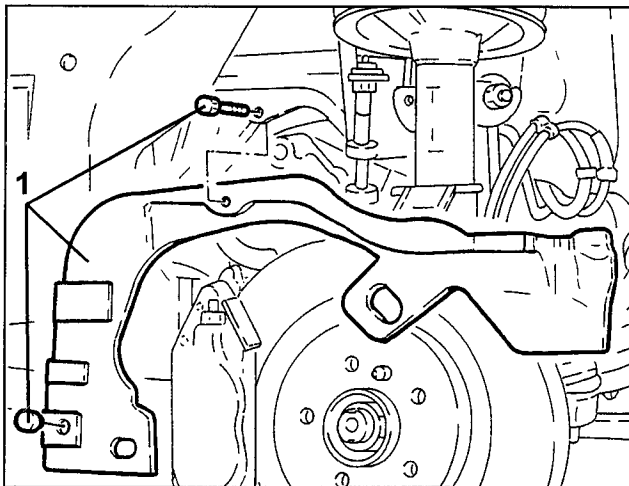
- Complete refitting by reversing the removal sequence.



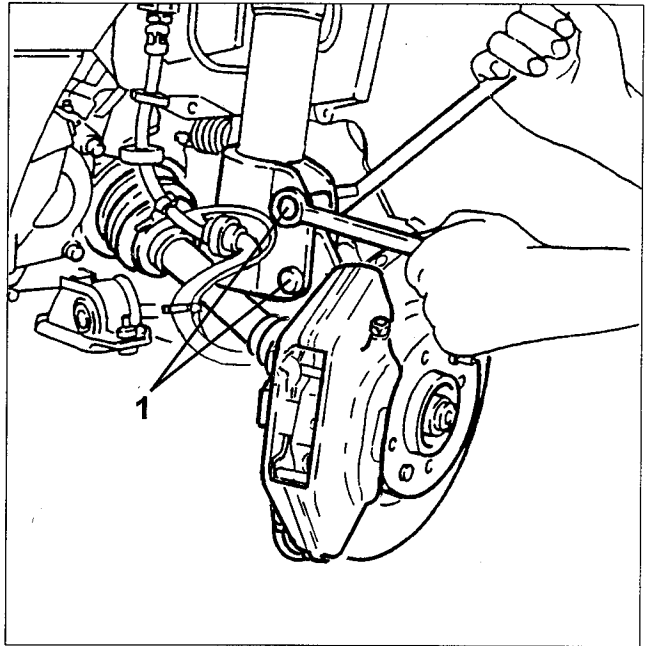
**VEHICLE OPERATIONS**

**DIFFERENTIAL CASING OIL SEAL, GEARBOX SIDE**

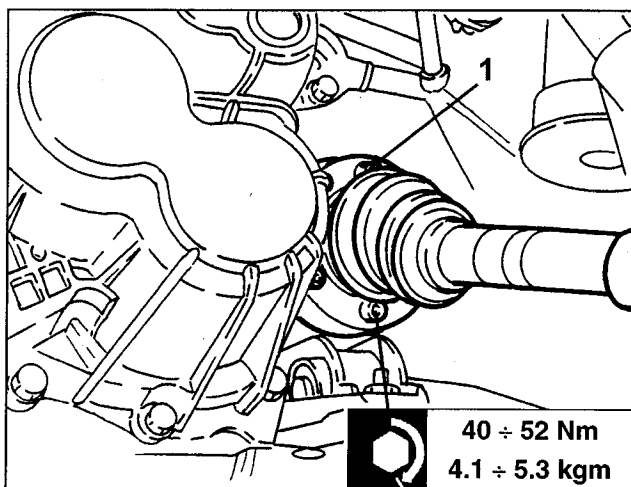
- Position the vehicle on a shop jack.
  - Make sure the ignition key is at "STOP" and disconnect the (-) battery terminal.
  - Remove the front left-hand wheel.
1. Remove the button, loosen the screws and remove the front left-hand wheel compartment dust guard.



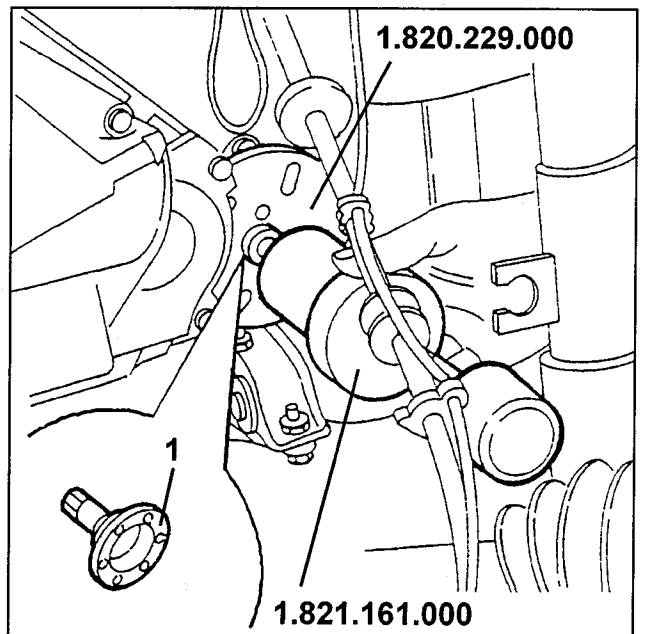
1. Loosen the two bolts fastening the left-hand riser to the shock absorber, and remove only the upper bolt.



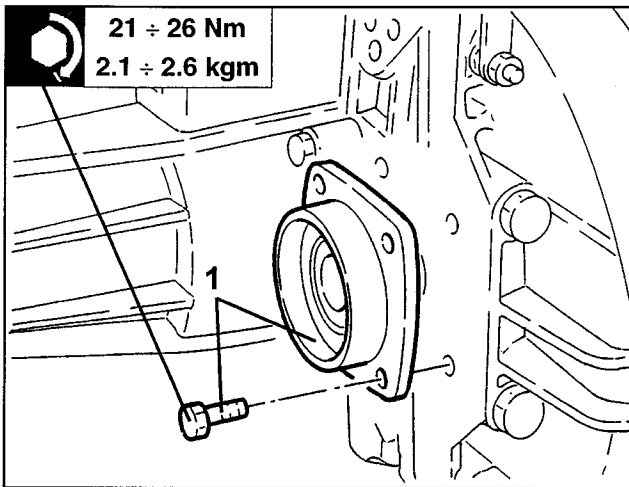
- From the left-hand wheelhouse, disconnect the brake pad wear sensor electrical connection.
  - Release the ABS inductive sensor wire from the bracket.
1. Loosen the bolts fastening the left-hand drive shaft to the internal differential shaft.



1. Use tools no. 1.820.229.000 and no. 1.821.161.000 to remove the differential internal drive shaft.

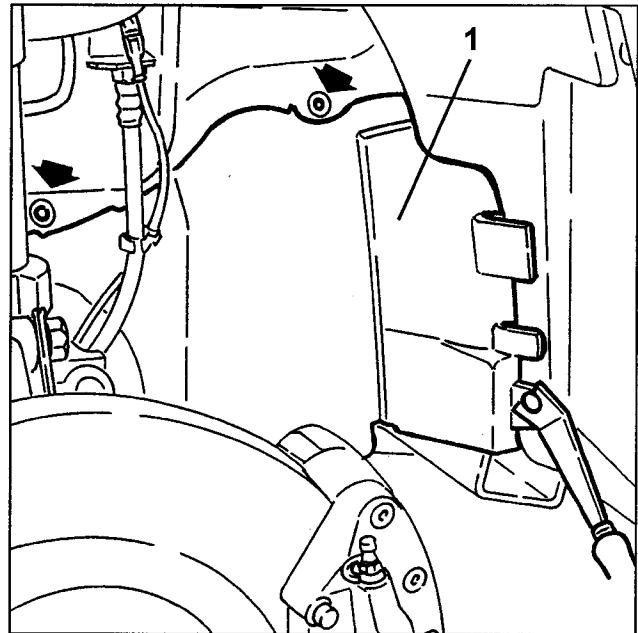


1. Loosen the fastening screws and remove the differential left-hand flange and oil seal.



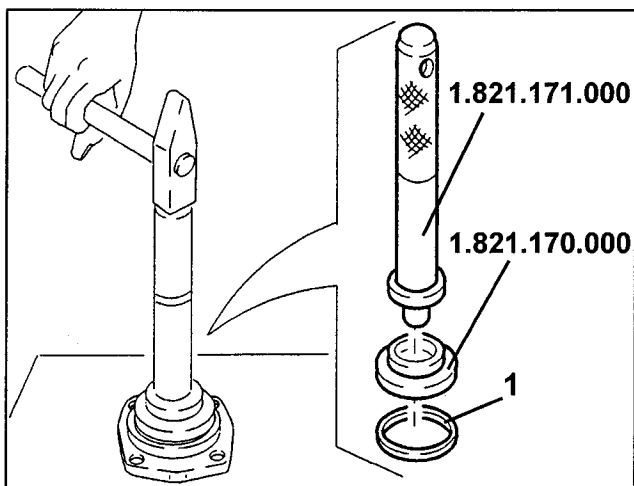
### DIFFERENTIAL CASING OIL SEAL, ENGINE SIDE

- Position the vehicle on a shop jack.
- Make sure the ignition key is at "STOP" and disconnect the (-) battery terminal.
- Remove the front right-hand wheel.
- 1. Remove the button, loosen the screws and remove the front right-hand wheel compartment dust guard.



- At the bench, remove the oil seal from the differential left-hand flange.

1. Fit a new oil seal on the left-hand differential flange with tools no. 1.821.170.000 and no. 1.821.171.000.

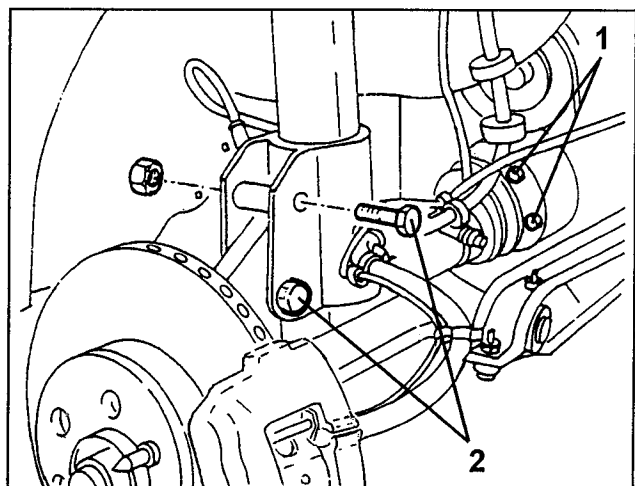


- From the right-hand wheelhouse, disconnect the brake pad wear sensor electrical connection.
- Release the ABS inductive sensor wire from the bracket.

1. Loosen the two bolts fastening the right-hand drive shaft to the intermediate drive shaft.

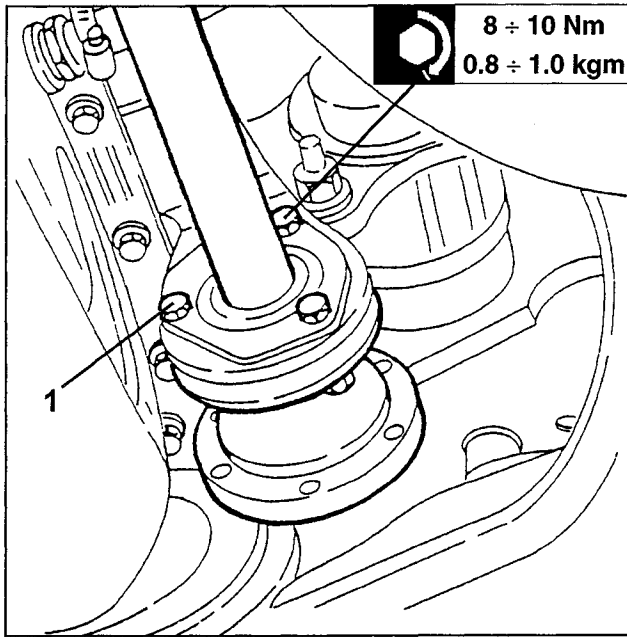
2. Loosen the two bolts fastening the right-hand riser to the shock absorber, and remove only the upper bolt.

- Push the right-hand drive shaft just enough to disconnect it from the intermediate drive shaft.



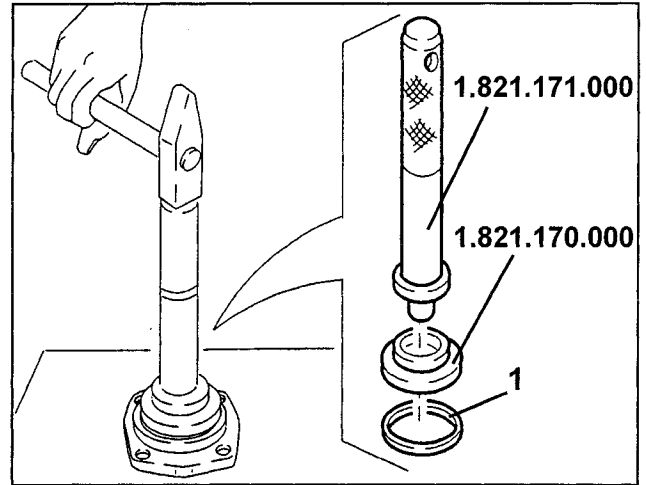
- Complete refitting by reversing the removal sequence.

1. Loosen the intermediate shaft fastening screws.

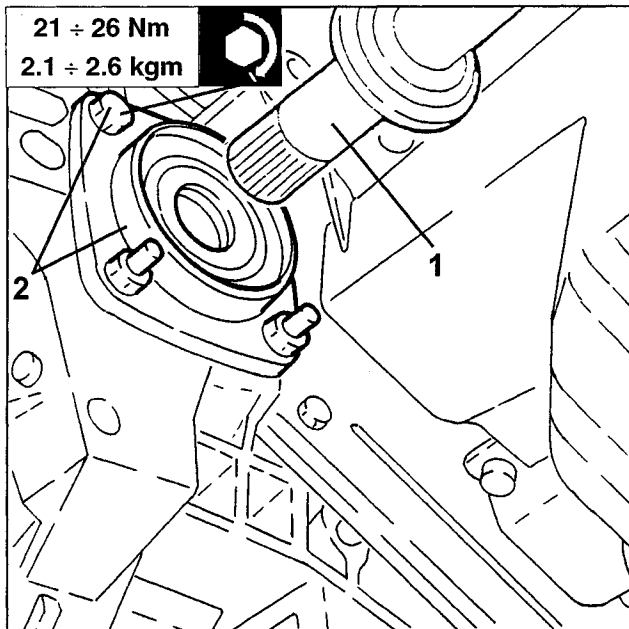


- At the bench, remove the oil seal from the differential right-hand flange.

1. Fit a new oil seal on the right-hand differential flange with tools no. 1.821.170.000 and no. 1.821.171.000.



1. Remove the intermediate shaft from the differential.  
2. Loosen the fastening screws and remove the differential right-hand flange and oil seal.



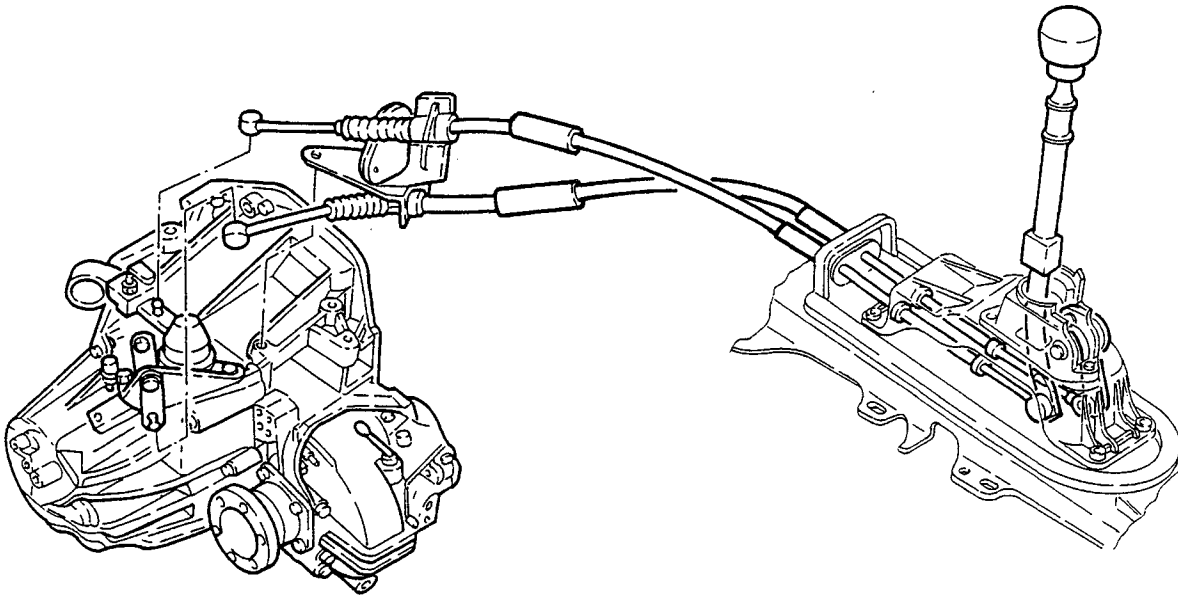
- Complete refitting by reversing the removal sequence.

## GEARBOX EXTERNAL CONTROLS

### DESCRIPTION

The double wire external control is made with high-feature plastic material (fatigue resistant, self-lubricating, low-weight). This type of control, combined with inertia distribution towards the gearbox, ensures:

- high comfort, thanks to the vibration filtering action and light-weight external components
  - accurate manoeuvres and reduced coupling play.
- The external control is equipped with a reverse engagement stroke inhibiting device which ensures additional safety in preventing involuntary manoeuvres.

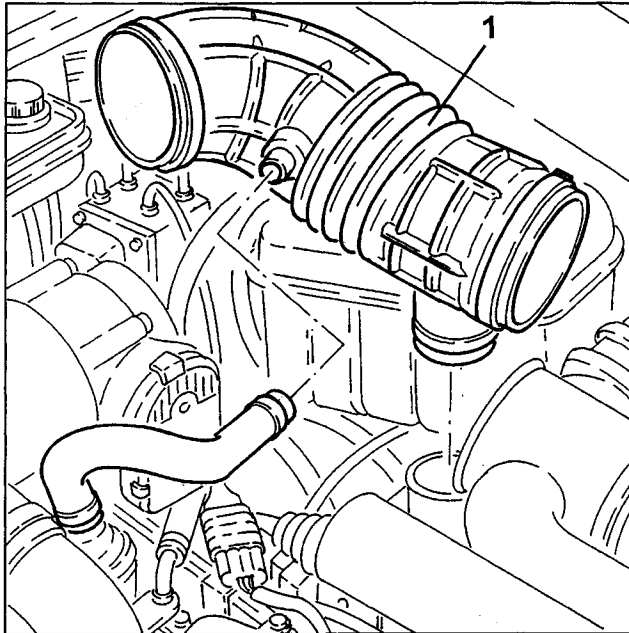


## GEARBOX LEVER AND HANDBRAKE BRACKET

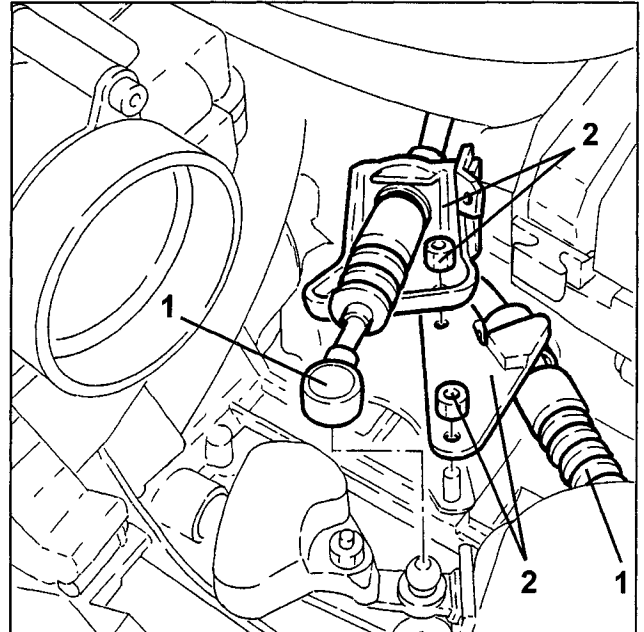
### REMOVAL

- Position the vehicle on a shop jack.
- Make sure the ignition key is at "STOP" and disconnect the (-) battery terminal.

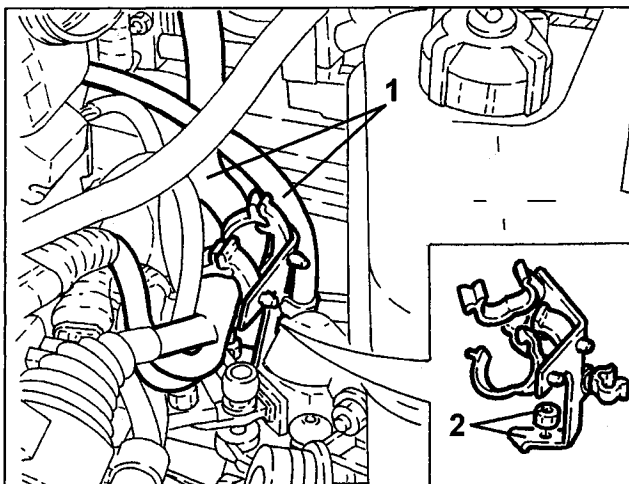
1. Loosen the fastening clips and remove the corrugated sleeve.



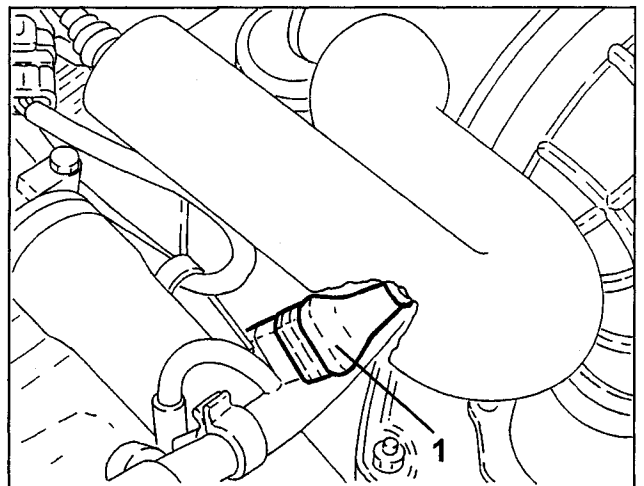
1. Disconnect the gear selection and engagement wires.
2. Loosen the nuts and release the bracket and gear selection and engagement wires.



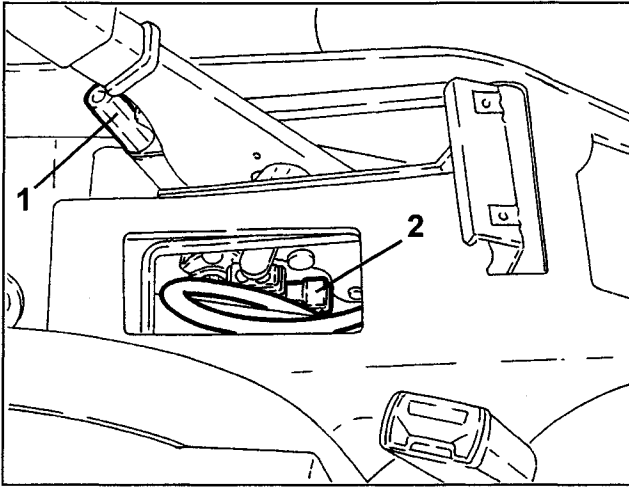
1. Release the electrical wiring from the bracket fastening clips.
2. Loosen the nut and remove the electrical wiring bracket.



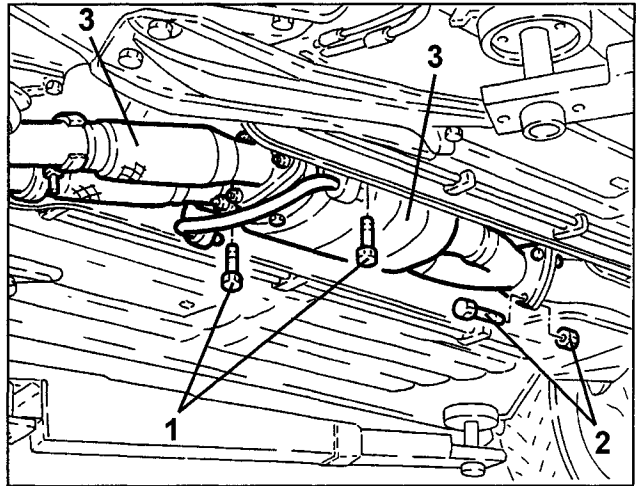
1. Disconnect the left-hand lambda sensor electrical connection.



- Remove the tunnel unit (see Assembly 70).
- 1. Lift the handbrake lever and loosen the handbrake wire tension nut.
- 2. Disconnect the handbrake warning light switch electrical connection.



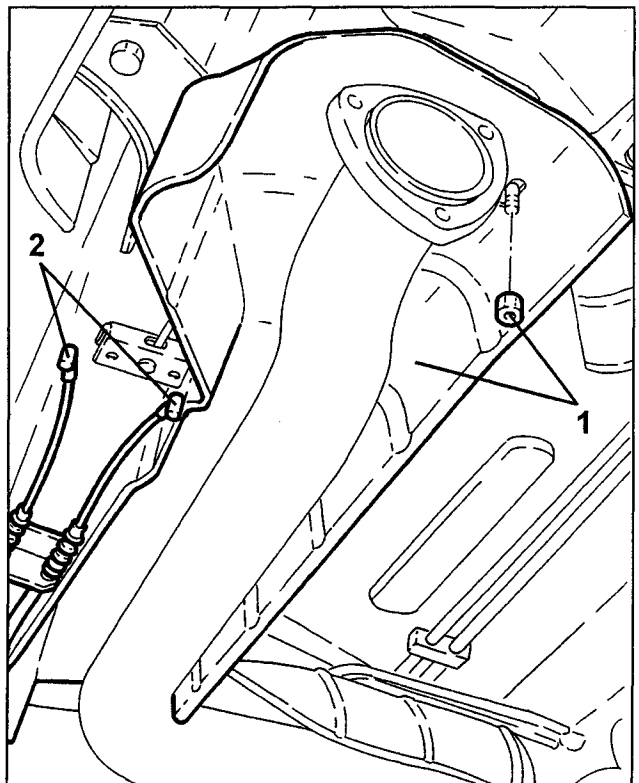
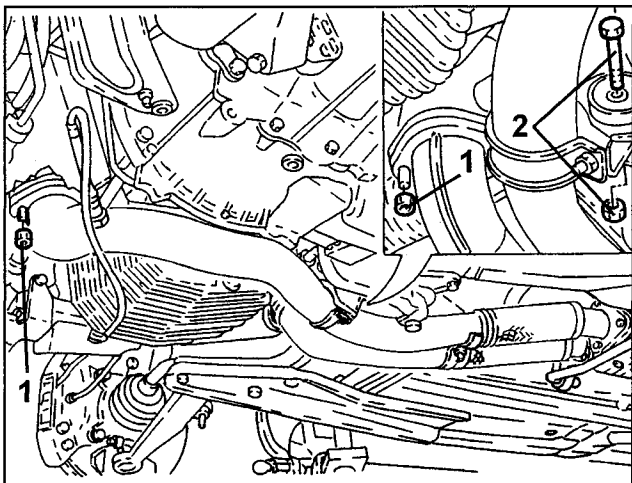
- 1. Loosen the catalytic converter bracket fastening screws.
- 2. Loosen the bolts fastening the catalytic converter to the mufflers.
- 3. Remove the exhaust pipe front section and catalytic converter with the hydraulic jack.
- Remove the respective seals.



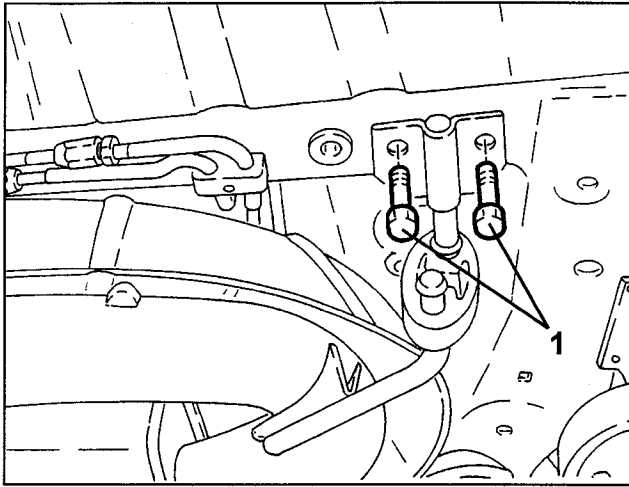
- Position a hydraulic jack to support the exhaust pipe.

- 1. Loosen the exhaust manifold exhaust pipe front section fastening nuts.
- 2. Loosen the bolt fastening the exhaust pipe front section to the respective rubber mount.

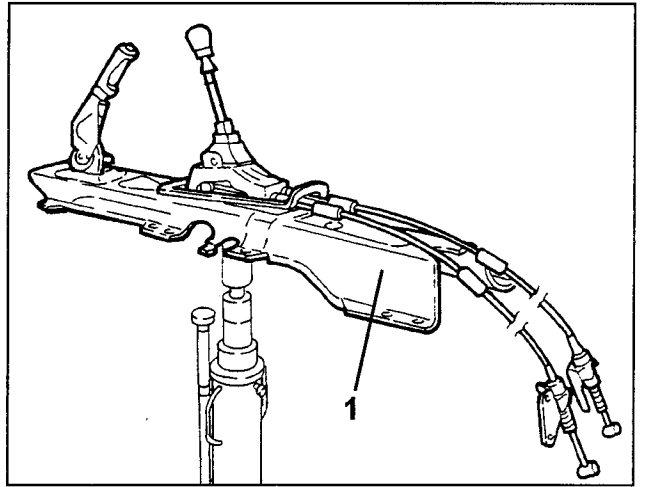
- 1. Loosen the fastening nuts and remove the exhaust pipe firewall.
- 2. Disconnect the handbrake wires.



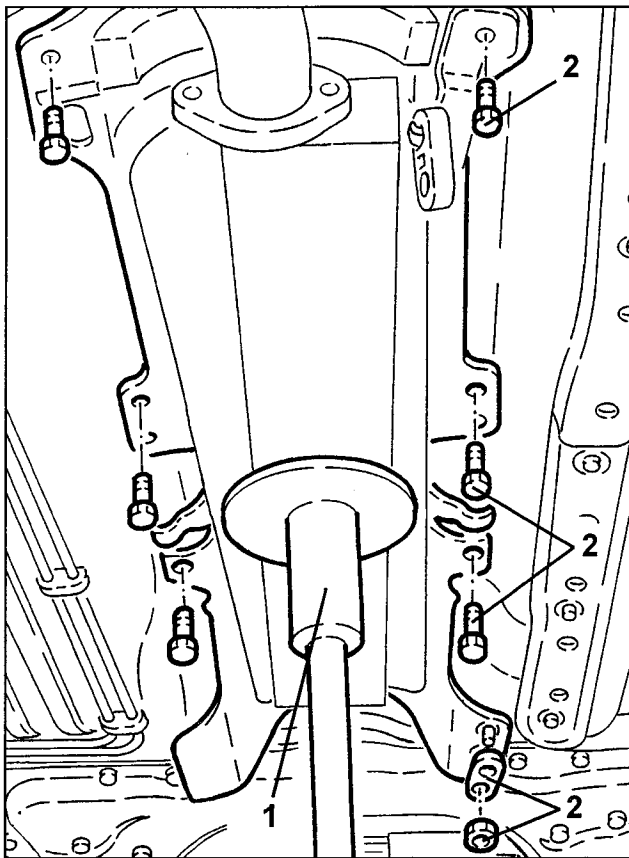
1. Loosen the intermediate exhaust bracket fastening screws.



1. Lower the hydraulic jack and remove the gearbox and handbrake lever assembly.

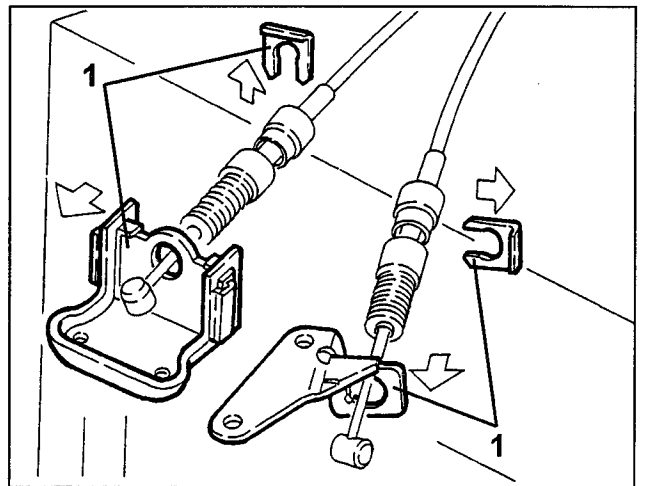


1. Position a hydraulic jack under the handbrake lever bracket.  
2. Loosen the gearbox and handbrake levers fastening screws and nuts from the underbody.

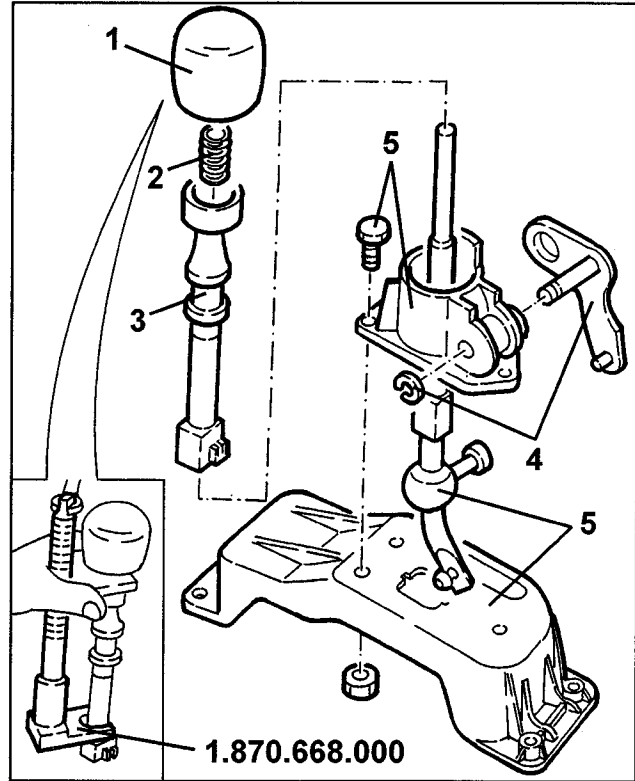
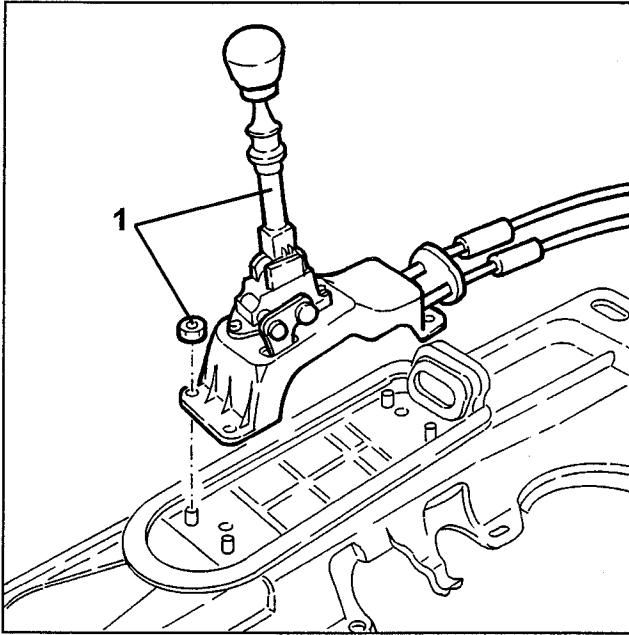


**DISASSEMBLY/RE-ASSEMBLY**

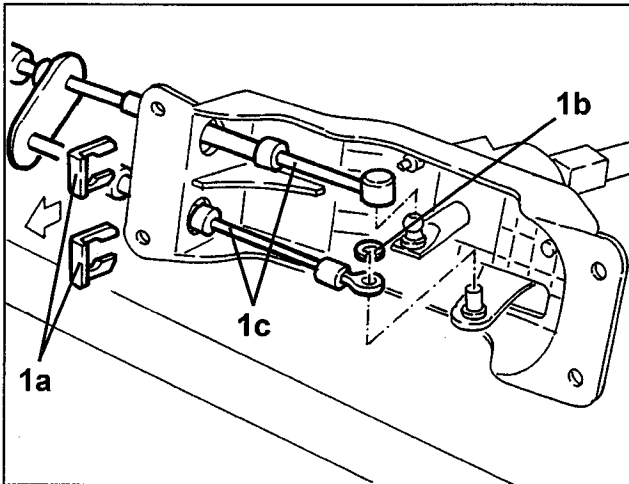
1. Loosen the retainer plates and remove the gear selection/engagement brackets.



1. Loosen the fastening nuts and remove the gearbox lever bracket with gear selection/engagement wires.



1. Remove the retainer plates (1a), washer (1b). Then disconnect and remove the gear selection/engagement wires (1c).



**REFITTING**

- Refit by reversing the removal sequence to the brackets and gear selection/engagement wires and fasten with the respective nuts refitting step.

1. Fit tool no. 1.870.974.000 under the gear engagement wire ball coupling.

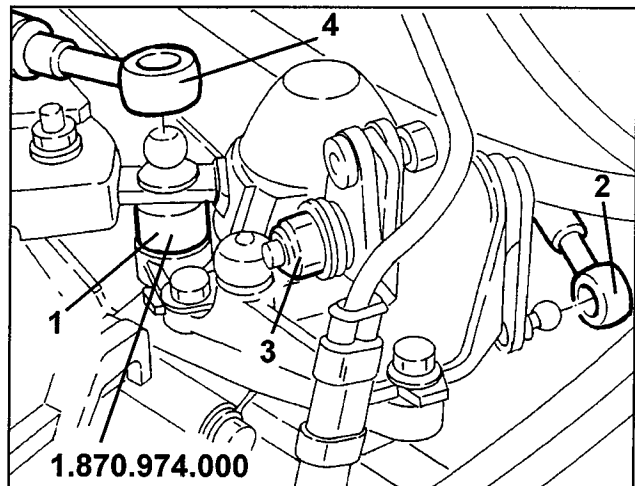
2. Connect the gear selection wire.

3. Loosen the gear selection/engagement assembly adjustment nut.

- Torque the gear selection/engagement assembly adjustment nut after positioning the gear lever in neutral and shifting it all to the right.

4. Connect the gear engagement wire.

- Position the gear lever in reverse and remove tool no. 1.870.974.000.



1. Remove the gear lever knob with tool no. 1.870.668.000.

2. Remove the spring.

3. Remove the reverse inhibitor.

4. Remove the washer and remove the lever.

5. Loosen the bolts and disassemble the gear rod from the respective brackets.

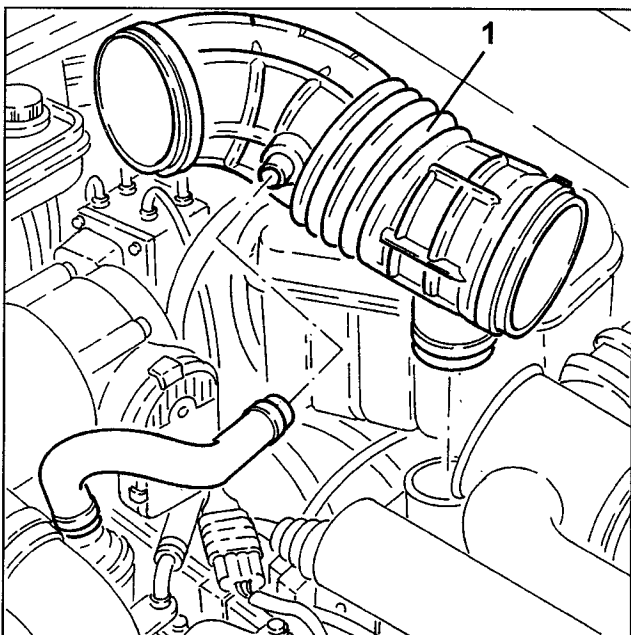


- Complete refitting by reversing the removal sequence.

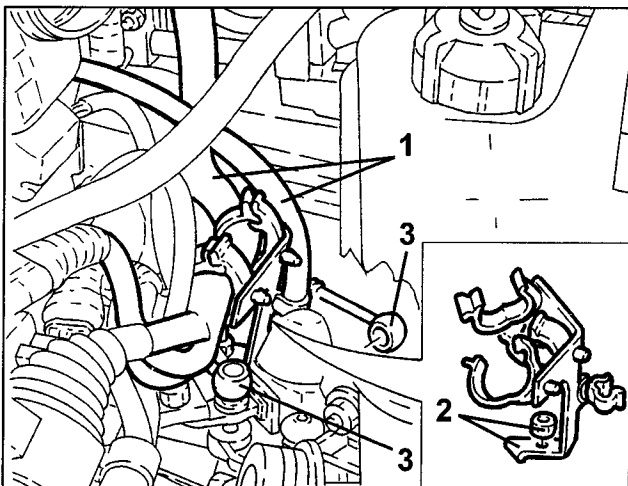
**GEAR SELECTION AND ENGAGEMENT ASSEMBLY**

**REMOVAL/REFITTING**

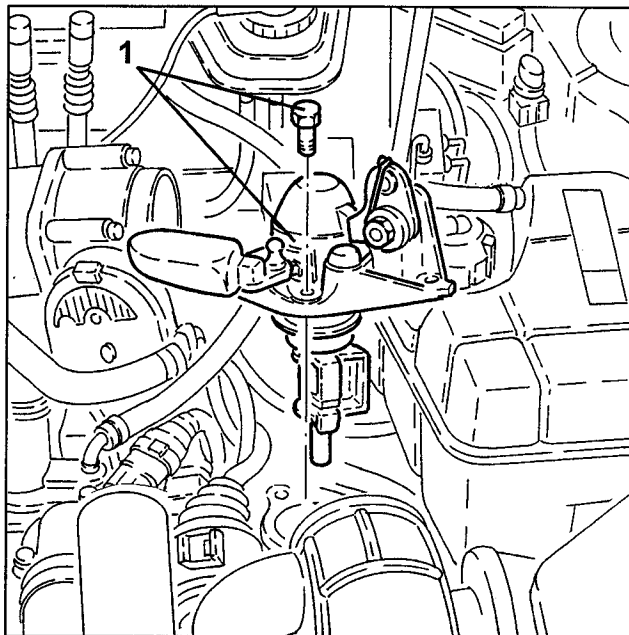
1. Loosen the fastening clips and remove the corrugate sleeve.



1. Release the electrical wiring from the bracket fastening clips.  
2. Loosen the nut and remove the electrical wiring bracket.  
3. Disconnect the gear selection and engagement wires.



1. Loosen the screws and remove the gear selection and engagement assembly.



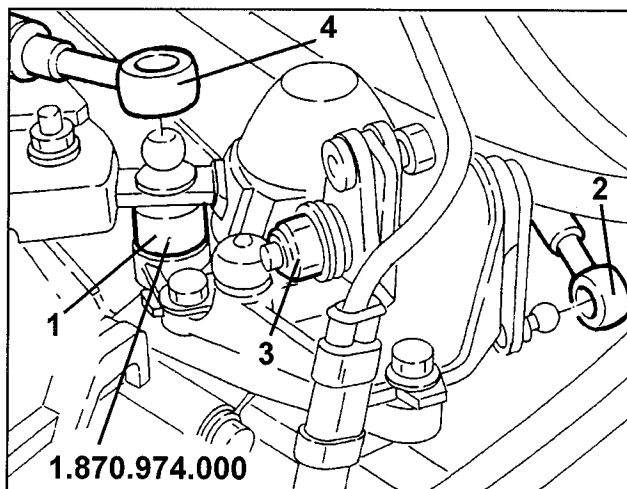
- Refit by reversing the removal sequence to the gear selection and engagement assembly fitting in its seat step.

1. Fit tool no. 1.870.974.000 under the gear engagement wire ball coupling.  
2. Connect the gear selection wire.  
3. Loosen the gear selection/engagement assembly adjustment nut.

- Torque the gear selection/engagement assembly adjustment nut after positioning the gear lever in neutral and shifting it all to the right.

4. Connect the gear engagement wire.

- Position the gear lever in reverse and remove tool no. 1.870.974.000.

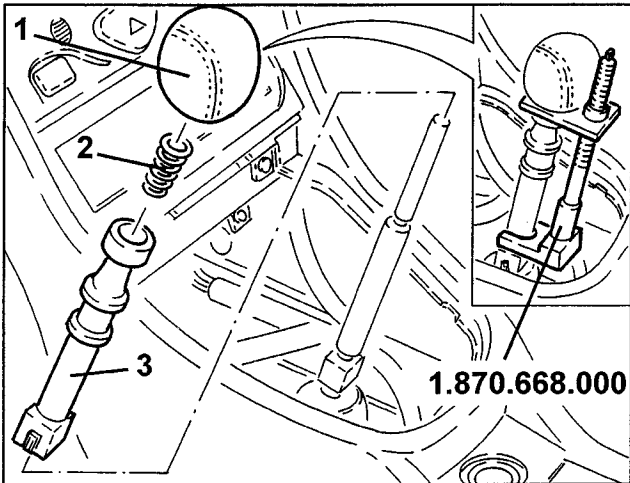


- Complete refitting by reversing the removal sequence.

## REVERSE INHIBITOR ON THE GEAR LEVER BRACKET

### REMOVAL/REFITTING

- Lift and remove the gear lever cap.
- 1. Remove the gear lever knob with tool no. 1.870.668.000.
- 2. Remove the spring.
- 3. Remove the reverse inhibitor.



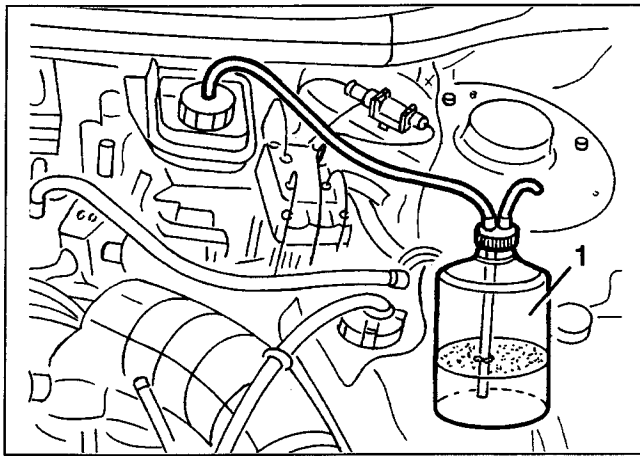
## BRAKE HYDRAULIC SYSTEM

### RELIEVING THE AIR FROM THE SYSTEM

When filling the hydraulic system or doing any work on it, it is necessary to proceed as described below.

1. Using the special device applied to the brake fluid reservoir, relieve the air in the following sequence:

1. LH front wheel
2. RH front wheel
3. LH rear wheel
4. RH rear wheel



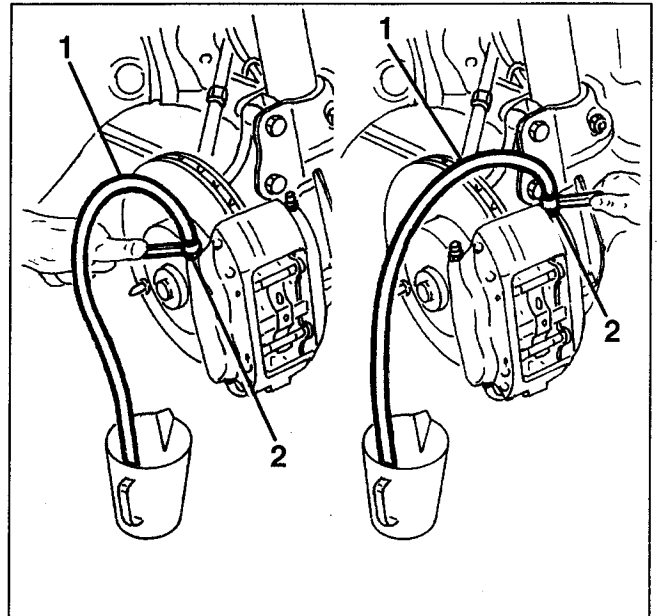
**For each wheel proceed as follows:**

- Fill the brake-clutch fluid reservoir to the "max" level with the specified fluid.
  - If necessary, remove the wheel on which you are working.
1. Fit a tube on the relief screw. Put the other end of the tube in a container of the specified fluid.
  2. Slacken the relief screw and pump the brake pedal (wait for a few seconds between one press and the next). When the fluid comes out with no bubbles, fully depress the brake pedal and lock the relief screw to the specified torque.



**WARNING**

The front brake calipers have a relief screw for each caliper half body. Relieve the air on both half bodies.



**NOTE:** The above operation is carried out on each wheel separately.



**WARNING:**

When relieving the air make sure that the fluid level never falls below the minimum level.

Do not re-use the fluid drained off during this operation.

Prevent the fluid from contacting painted parts and damaging them.

**NOTE:** If the above procedure is not carried out correctly, air is likely to get into the piston resulting in longer brake pedal travel, in which case proceed as described.

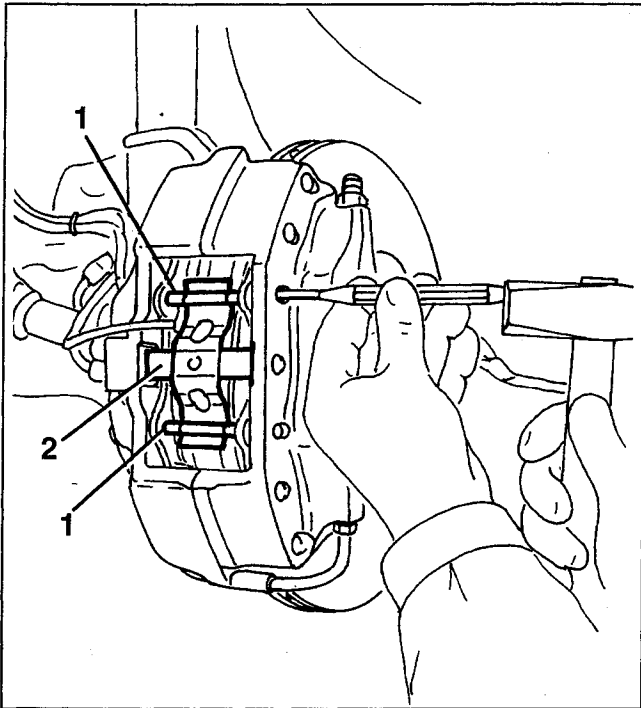
Air could also get into the ABS hydraulic unit resulting in the impossibility of carrying out any type of air relieving operation.

## FRONT BRAKE UNIT

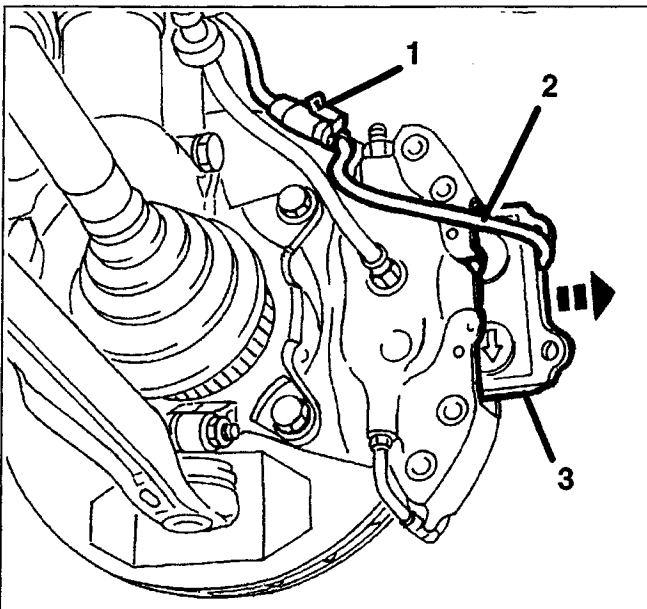
### BRAKE PADS

#### REPLACEMENT

- Set the car on a lift.
- Remove the wheel on the side concerned.
- 1. Using a punch, withdraw the two brake pad fastening pins.
- 2. Remove the cross spring.



1. Disconnect the brake pad wear sensor electrical connection.
2. Release the cable from the retainer on the caliper.
3. Remove the brake pads.



#### WARNING

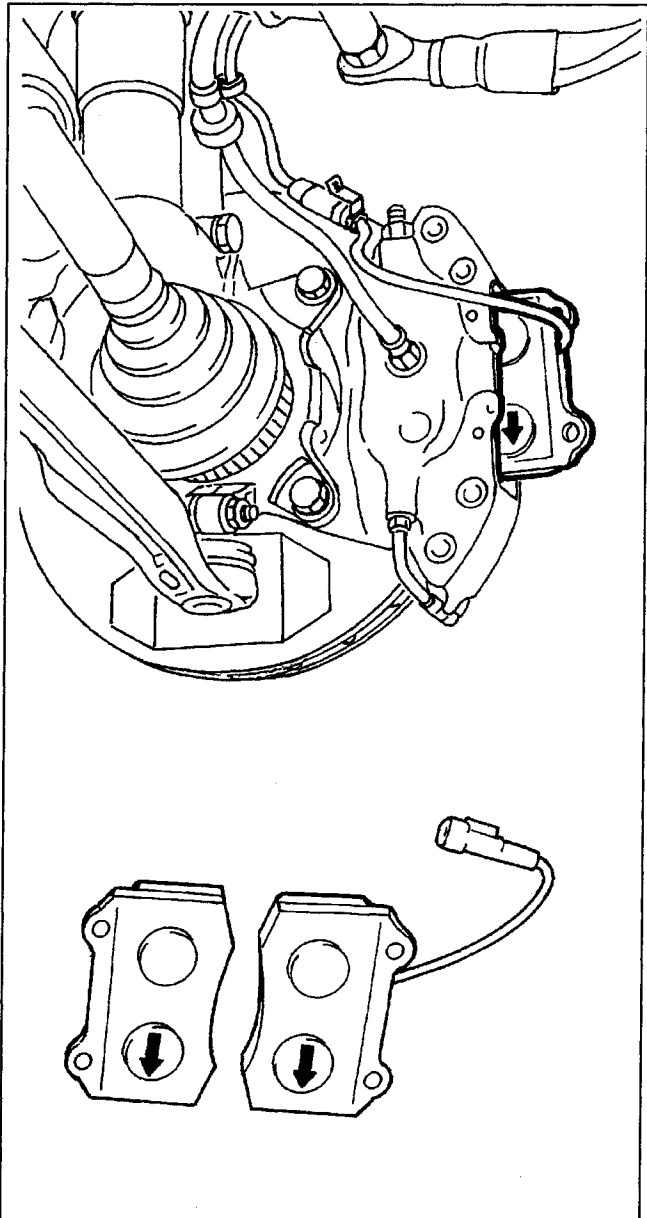
Take the utmost care not to damage the control piston boots. Push the pistons into their housings using a stick as lever, make sure that the brake fluid does not spill out of the reservoir during this operation.



#### WARNING

When refitting, the brake linings are to be assembled with the arrows downwards, as illustrated.


The wear sensor should be installed on the inner side of the disk with the cable on the upper side.

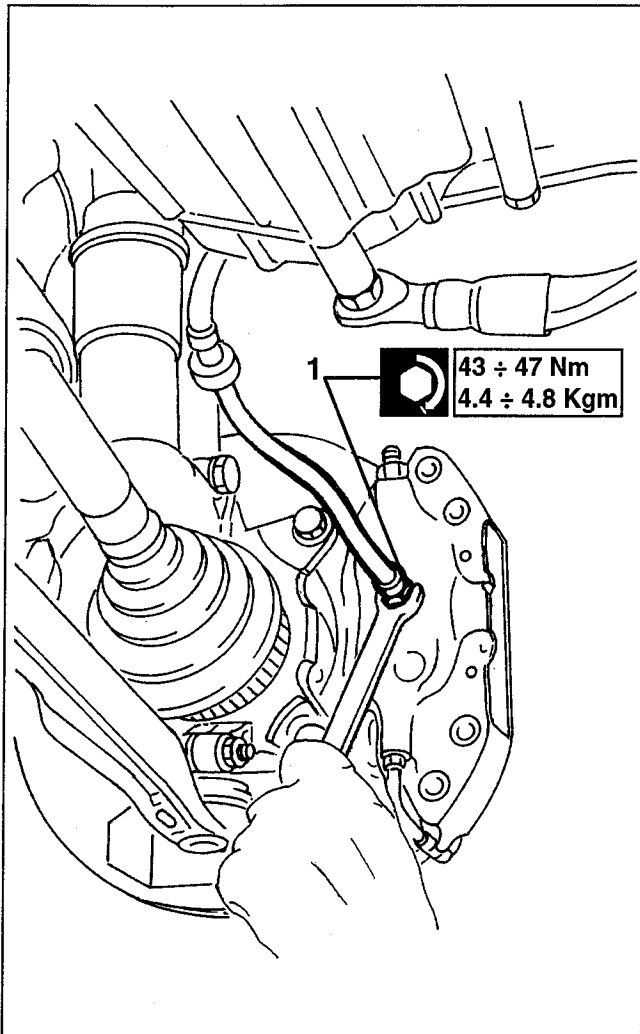


## BRAKE CALIPER


### REMOVING/REFITTING

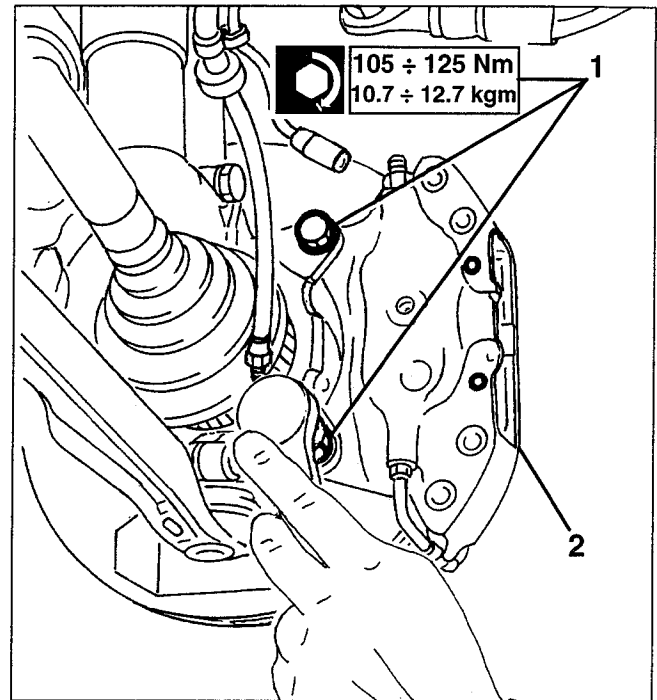
- Set the car on a lift.
  - Remove the wheel on the side concerned.
  - Remove the brake pads (see specific paragraph).
1. Slacken the fitting and disconnect the brake fluid pipe from the caliper.


 Suitably plug the pipe to avoid spilling the brake fluid.



1. Remove the two brake caliper fastening screws.
2. Remove the brake caliper complete.

 The brake caliper cannot be disassembled. Avoid disassembling the brake caliper, it must be changed entirely.

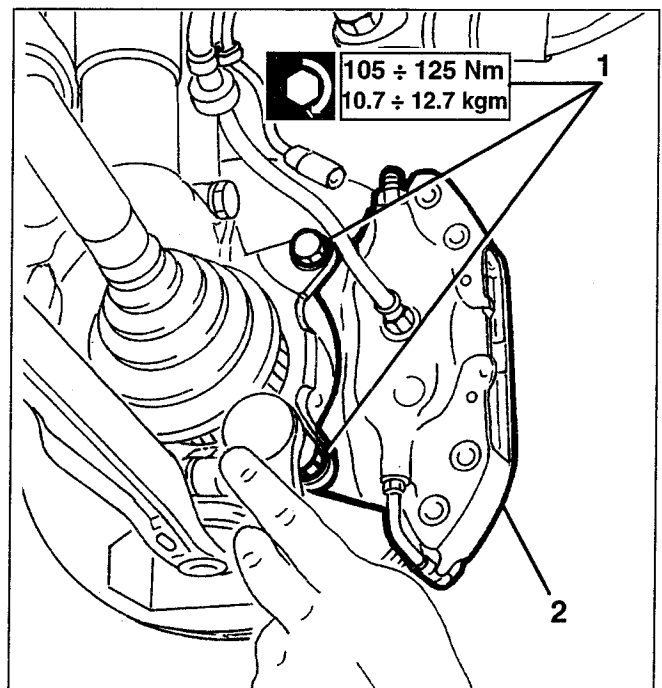


 After refitting, relieve the air from the braking system (see specific paragraph).

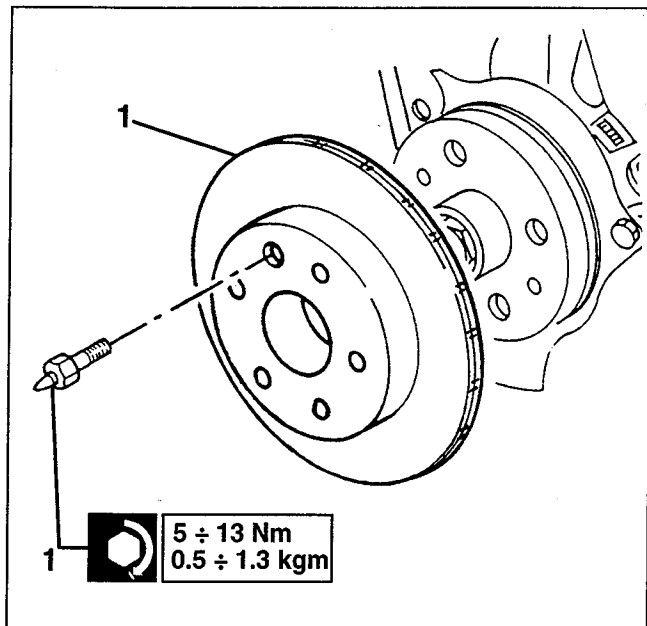
## BRAKE DISK

### REMOVING/REFITTING

- Set the car on a lift.
  - Remove the wheel on the side concerned.
  - Remove the brake pads (see specific paragraph).
1. Remove the two brake caliper fastening screws.
  2. Remove and move aside the brake caliper complete, without disconnecting the piping.



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



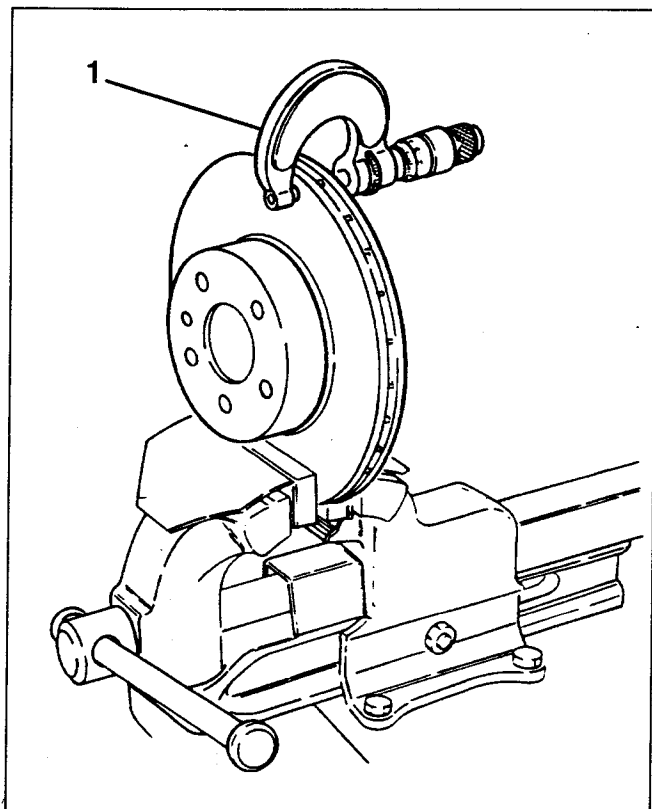
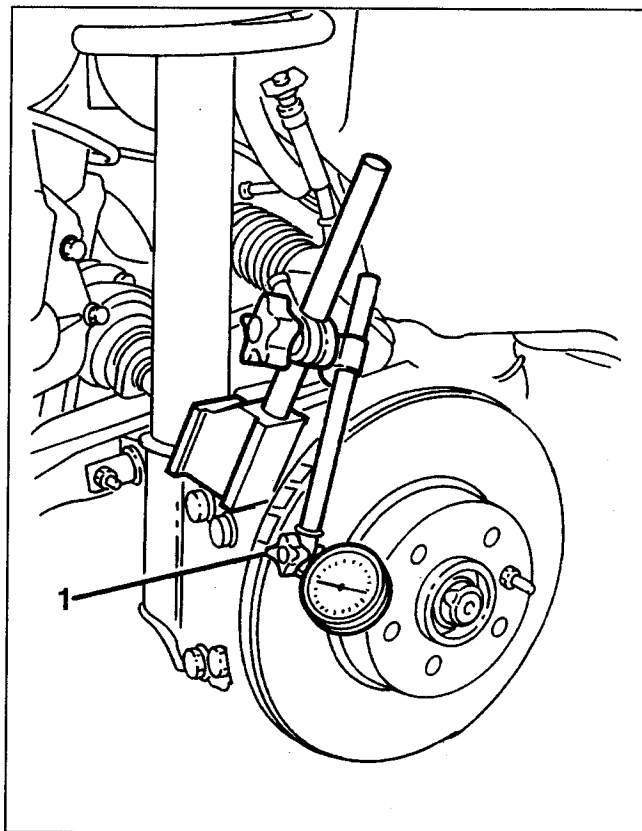
**CHECKS AND INSPECTIONS**

1. Check the thickness of the disks and that the working surfaces have no deep scores or porosity.

Thickness of disk	At wear limit
	26.4 mm

1. When replacing only the brake pads, check that disk oscillation 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 disk outside diameter.



## STEERING CONTROL

### STEERING WHEEL

#### REMOVING / REFITTING

- Remove the Air Bag module (see GROUP 55).



**WARNING:**

Before doing any work on the system carefully follow the **SAFETY RULES** concerning the Air Bag system given in Group "55 - ELECTRIC SYSTEM DIAGNOSIS", Section "Air Bag and Pretensioners".

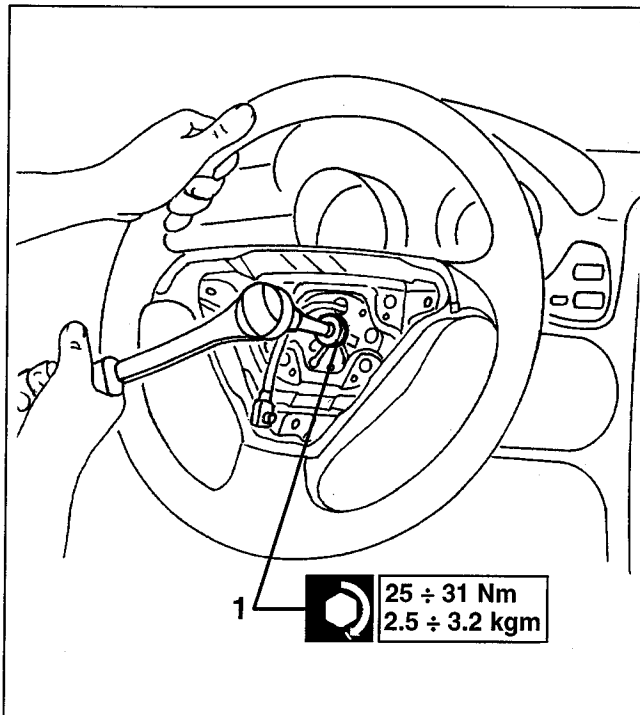
Disconnect both battery terminals, isolate them accurately and wait for 10 minutes before proceeding.

1. Remove the steering wheel fastening nut.

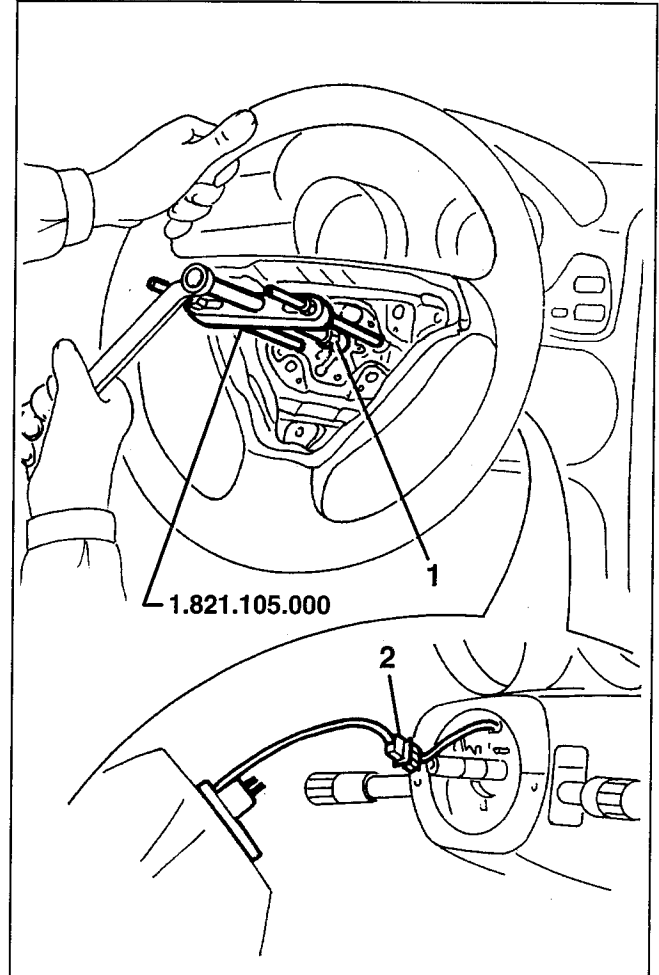


**CAUTION:**

Before doing this check that the wheels are perfectly straight.



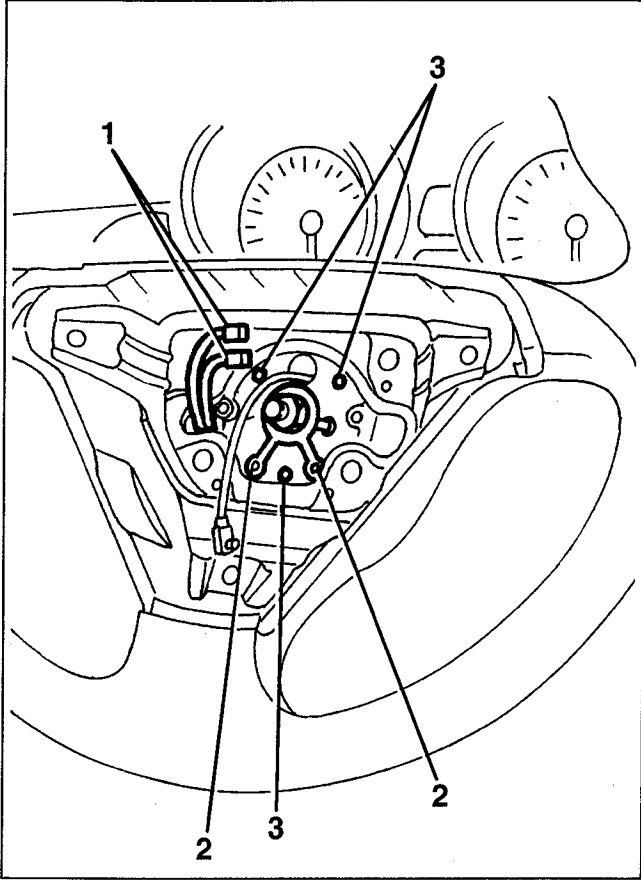
1. Using tool no. 1.821.105.000 remove the steering wheel from the steering column.
2. Disconnect the connection of the clock spring



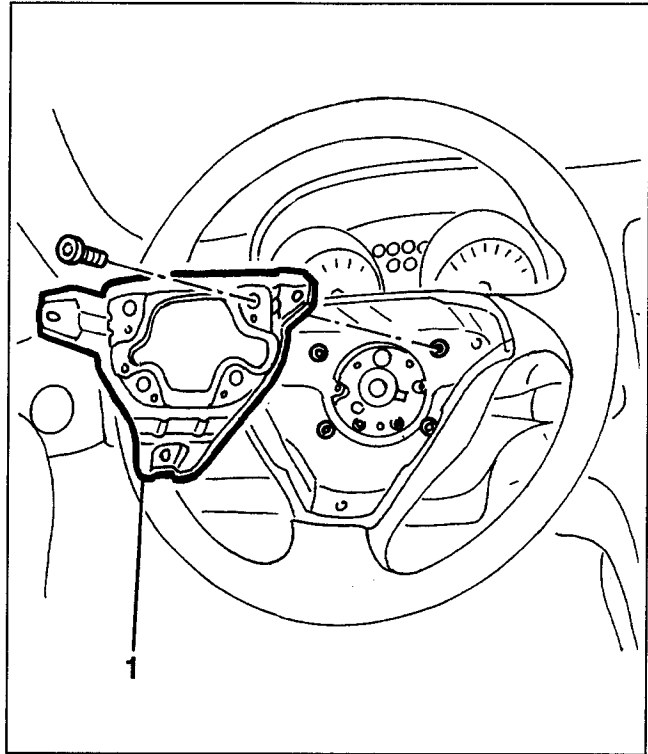
**CAUTION:**

Take the utmost care not to turn the clock spring in relation to the steering wheel, as the device is locked only when it is separated from the steering wheel (see next step). Therefore, it is advisable to restrain it to the steering wheel with adhesive tape for example.

1. Disconnect the connections of the horns.
2. Slacken the two screws and remove the safety clip.
3. Slacken the three screws and separate the clock spring from the steering wheel.



1. Slacken the four screws and separate the horn control from the steering wheel.



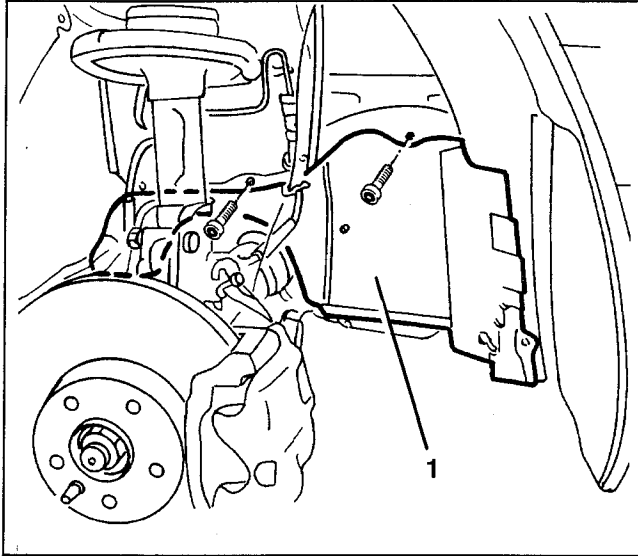


## POWER STEERING

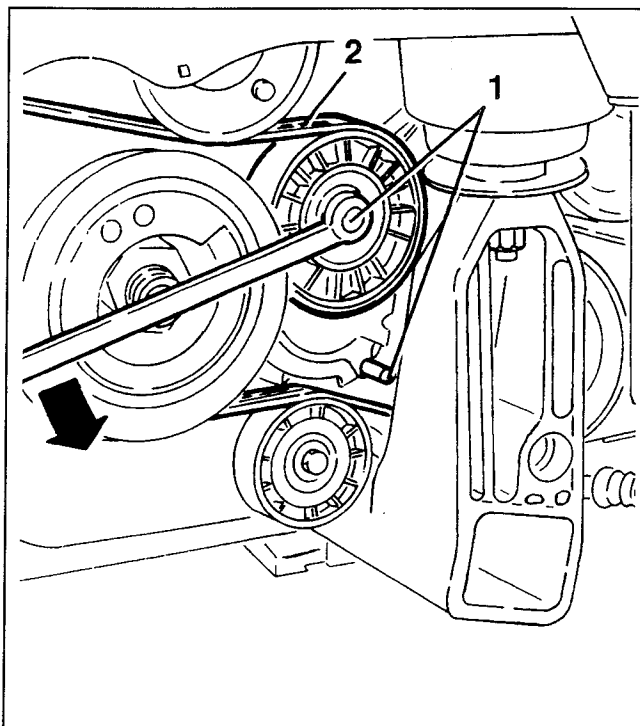
### POWER STEERING PUMP

#### REMOVING/REFITTING

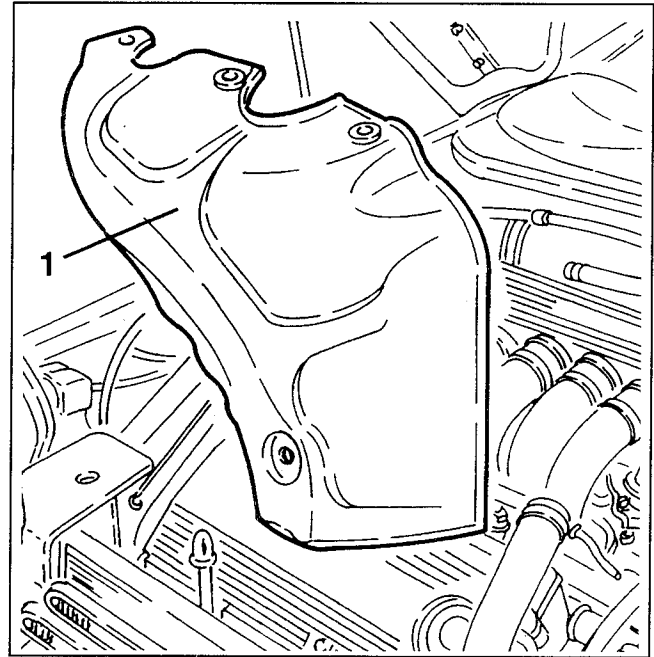
- Set the car on a lift.
- Remove the right front wheel and gravel guard (see GROUP 70).
- 1. Remove the engine compartment bulkhead.



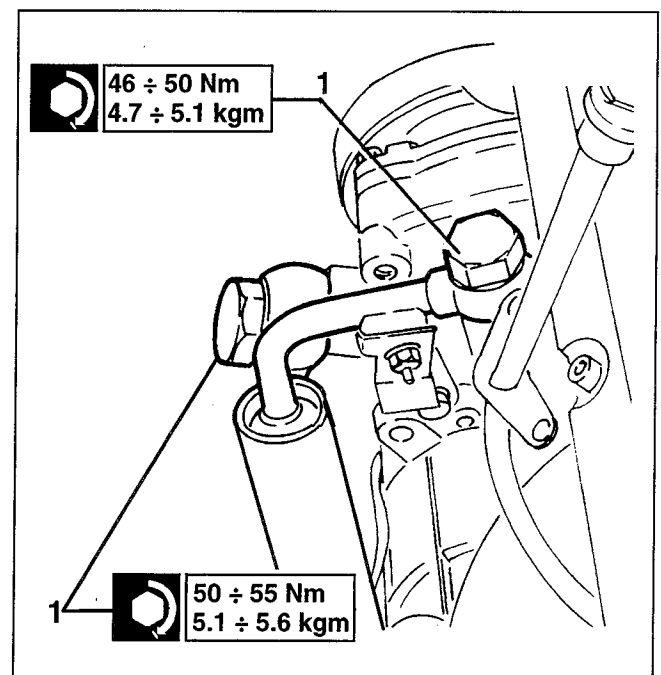
1. Using a wrench on the belt tensioner pulley fastening screw, del tendicinghia, overcome the force of the automatic tensioner and lock it in this position (belt slack) inserting the special pin as illustrated.
2. Prise and remove the auxiliary components drive belt.



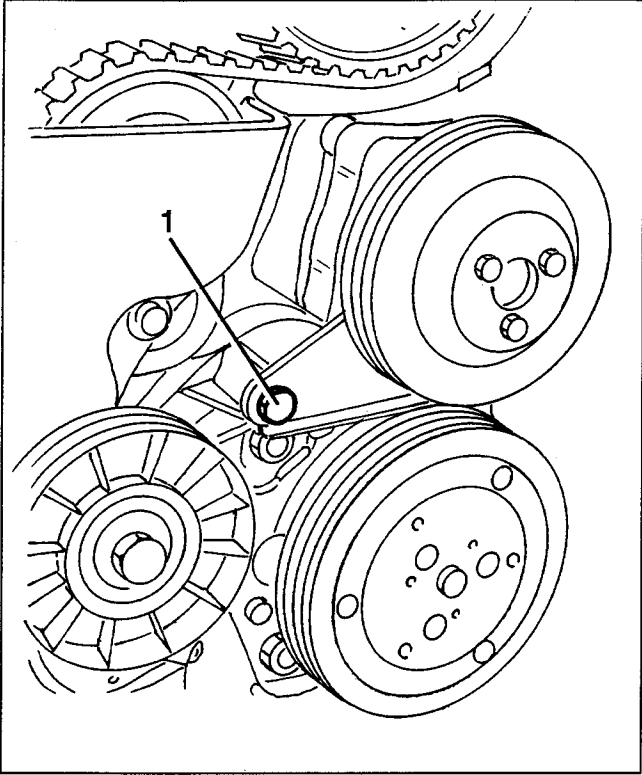
- Remove the right hand engine compartment cover.
- Using a syringe, siphon the oil from the power steering system reservoir.
- Remove the upper radiator crossmember and the engine cooling fans (see GROUP 10).
- 1. Slacken the fastenings and remove the heat shield from the exhaust manifold of the left cylinder head.



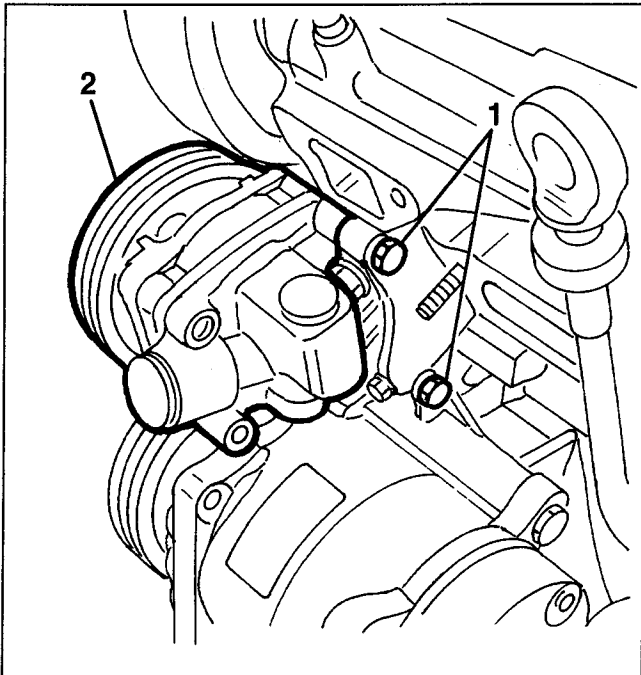
1. Disconnect the oil inlet and delivery pipe fittings from the power steering pump.



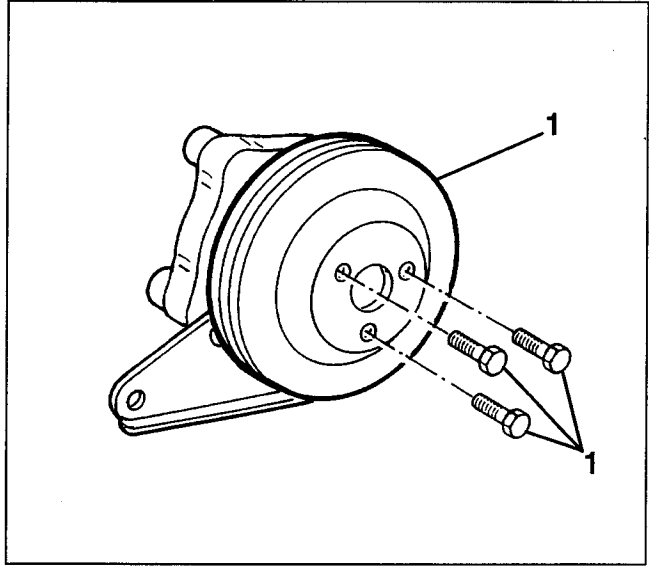
1. Slacken the screw fastening the power steering pump plate.



1. Slacken the two screws fastening the rear power steering pump.
2. Remove the power steering pump.



1. If necessary, slacken the three screws and separate the pulley.



## CHECKS AND INSPECTIONS

### CAUTION:

The power steering pump, like the steering box must not be disassembled for any reason whatsoever. They are to be sent to the Manufacturer for overhauling.

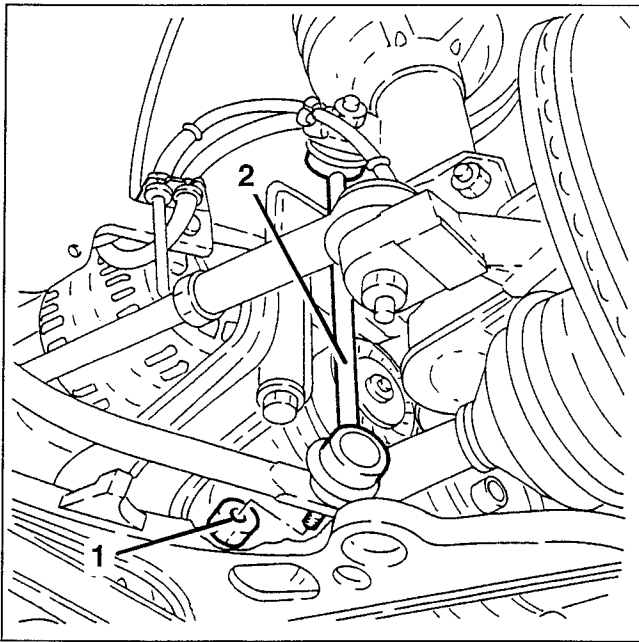
Check the steering wheel rolling torque with the car stationary and the engine running. The torque must be between 0.6 daN with the engine at idle speed and 0.75 daN with the engine at top rpm: if these values are exceeded check the pressure of the system with the wheels steered completely. To do this insert a pressure gauge using an appropriate Tee union on the pressurised oil delivery pipe to the power steering leading from the pump, and steer completely to one side. Forcing the steering wheel to turn further, the pressure reading should rise to appr. 85 bar. If this fails to occur there is an operating fault in the pump or in the distributor valve of the power steering box.

## FRONT SUSPENSION

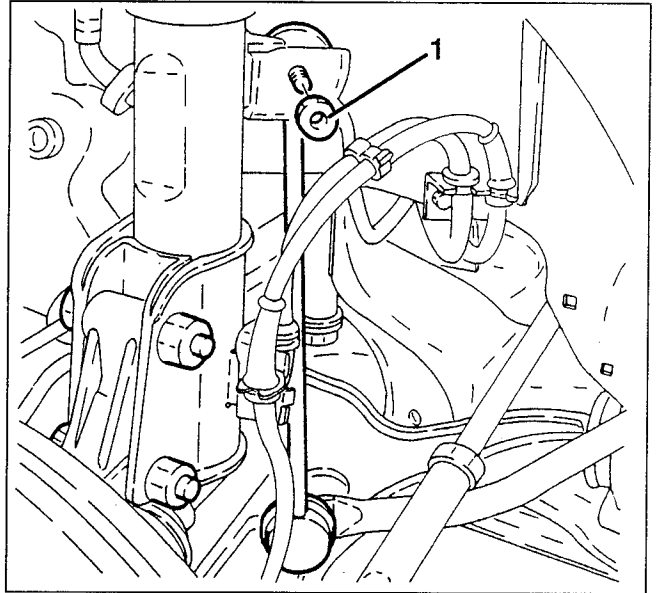
### STABILISER BAR CONNECTING ROD

#### REMOVAL/REFITTING

- Position the vehicle on a shop jack.
  - Remove the front right-hand wheel.
1. Loosen the shock-absorber connecting rod fastening nut.



1. Loosen the nut fastening the connecting rod to the stabiliser bar.
2. Remove the connecting rod.



Refit the connecting rod by reversing the removal sequence.



# SUSPENSION AND WHEELS **44**

## Front suspension

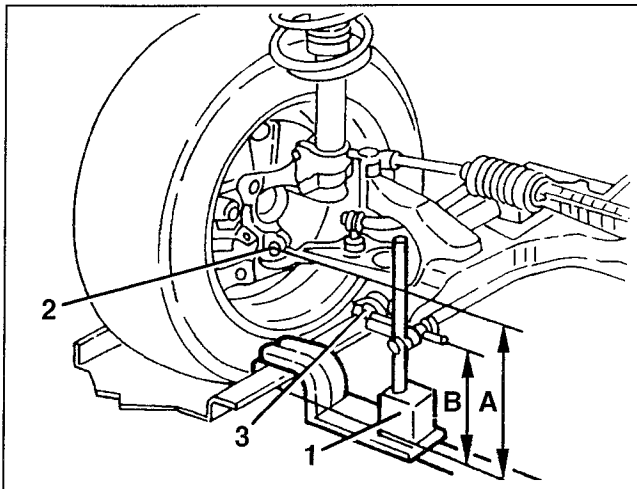
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## WHEEL ALIGNMENT

### CHECKING THE FRONT WHEEL ALIGNMENT

- Inflate the tyres to the specified pressure.
- Fill with fuel and the specified oils and fluids.
- Set the car on a lift.
- Sway the car a few times to settle the suspensions.

1. Position the reference tool on the on the car resting surface.
2. Using a surface gauge measure the distance "A" between the car resting surface and the centre of the steering knuckle fastening screw.
  - With the help of a millimetred rule measure the distance found.
3. Using the surface gauge measure the distance "B" between the car resting surface and the centre of the wishbone pin.
  - With the help of the millimetred rule measure the distance found.



- Calculate the difference between dimension "B" and dimension "A" and check that it is with the specified limits.



Front alignment B-A
GTV 3.0 24V
-36 ± 5 mm*
-45 ± 5 mm**

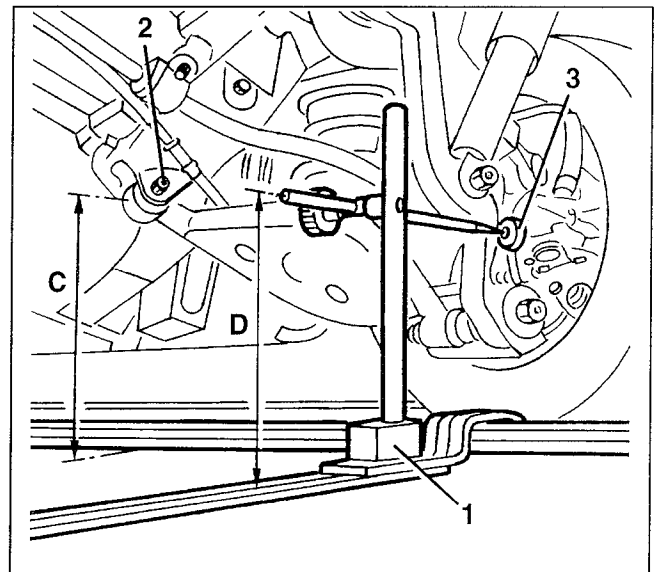
\* to '97 versions  
\*\* '98 versions

**NOTE: If the alignment values are not within the specified values change both suspension springs.**

### CHECKING THE REAR WHEEL ALIGNMENT

- Inflate the tyres to the specified pressure.
- Fill with fuel and the specified oils and fluids.
- Set the car on a lift.
- Sway the car a few times to settle the suspensions.

1. Position the reference tool on the car resting surface.
2. Using a surface gauge measure the distance "C" between the car resting surface and the fulcrum of the spring carrier arm.
  - With the help of a millimetred rule measure the distance found.
3. Using the surface gauge measure the distance "D" between the car resting surface and the rear wheel centre.
  - With the help of the millimetred rule measure the distance found.



- Calculate the difference between dimension "C" and dimension "D" and check that it is with the specified limits.



Rear alignment C - D
GTV 3.0 24V
-74 ± 5 mm*
-69 ± 3 mm**

\* to '97 versions  
\*\* '98 versions

**NOTE: If the alignment values are not within the specified values change both suspension springs.**

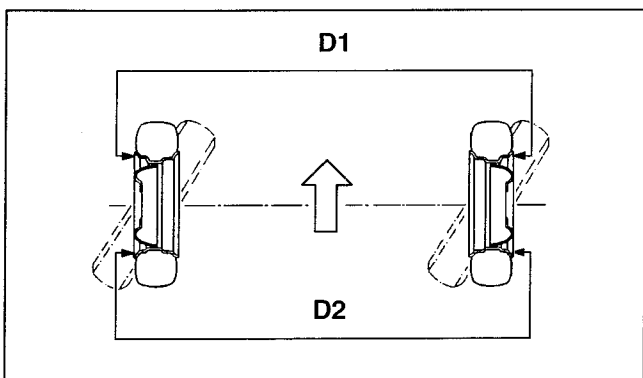
## CHECKING THE CHARACTERISTIC ANGLES

### Preliminary operations

- Inflate the tyres to the specified pressure.
- Fill with fuel and the specified oils and fluids.
- Check that the eccentricity and orthogonality of the wheel rims does not exceed:
  - 1 mm for steel rims
  - 0.3 mm for alloy rims

### CHECKING THE FRONT WHEEL TOE-IN

- Using suitable tools, check that the toe-in is within the specified limits.



<b>Front wheel toe-in D2 - D1</b>
<b>GTV 3.0 24V</b>
-1.5 ± 0.5 mm*
-2.0 ± 1 mm**

\* to '97 versions  
\*\* '98 versions

If the toe-in is other than specified, proceed as follows:  
1. Slacken the fastenings for adjusting the track rods.

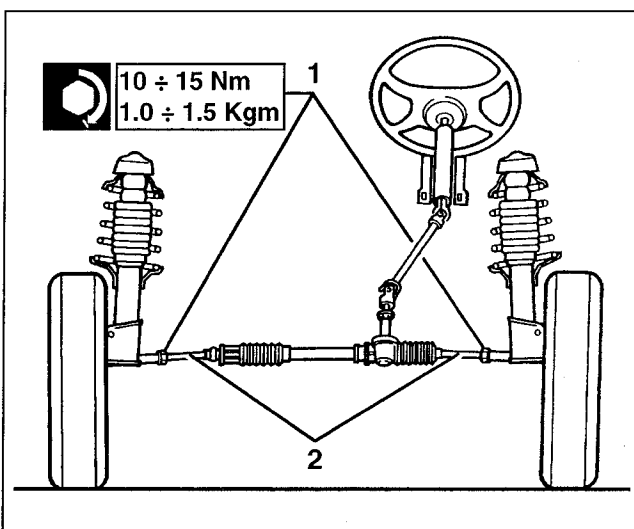


**WARNING:**  
Each time the front wheel toe-in is adjusted, it is necessary to check that the boots turn freely on the rod and if necessary remove them and lubricate with the specified grease.

2. Turn the rods, until reaching the specified value without changing the position of the steering wheel spokes

**NOTE: Adjustment should be carried out on the rods of both wheels.**

- Tighten the track rod adjustment fastenings to the specified torque.



### CHECKING THE FRONT WHEEL CAMBER AND CASTER

- Check that the camber and caster angles (not adjustable) are within the specified limits.



<b>Front wheel camber "α"</b>
<b>GTV 3.0 24V</b>
-0°1' ± 20'*
-0°56' ± 20'**

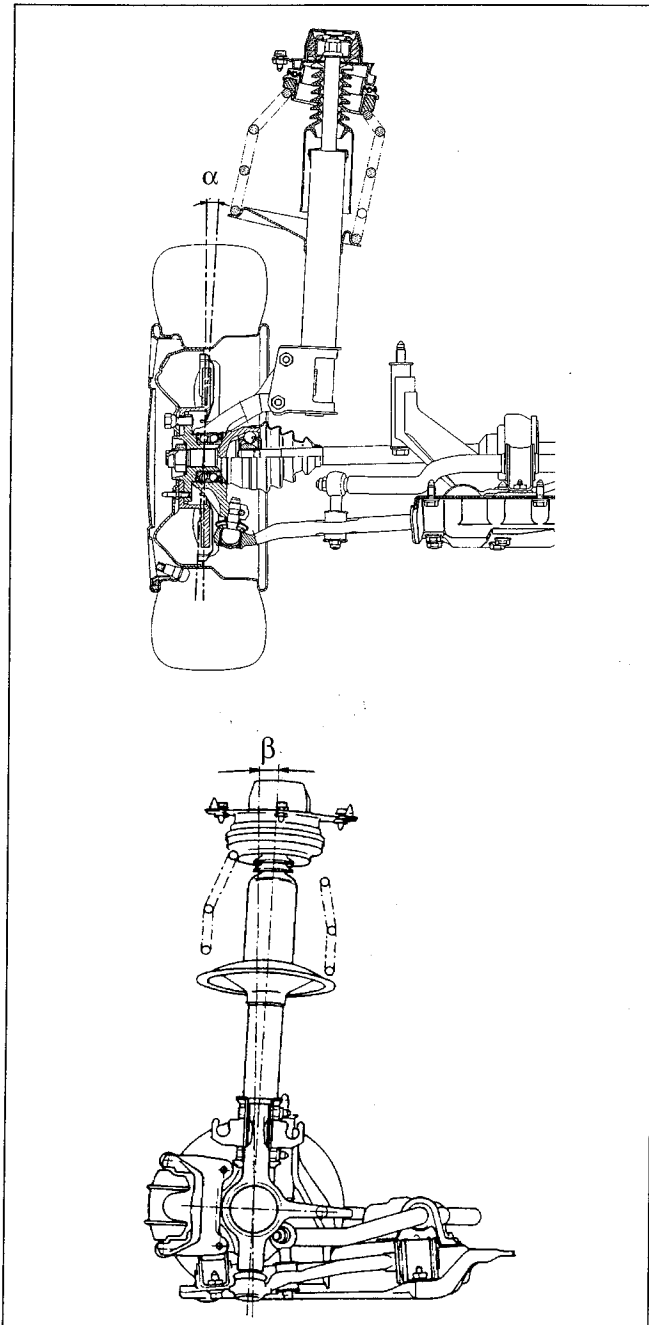
\* to '97 versions  
\*\* '98 versions



<b>Caster "β"</b>
<b>GTV 3.0 24V</b>
$3^{\circ}5' \pm 30''^*$
$2^{\circ}42' \pm 30''^{**}$

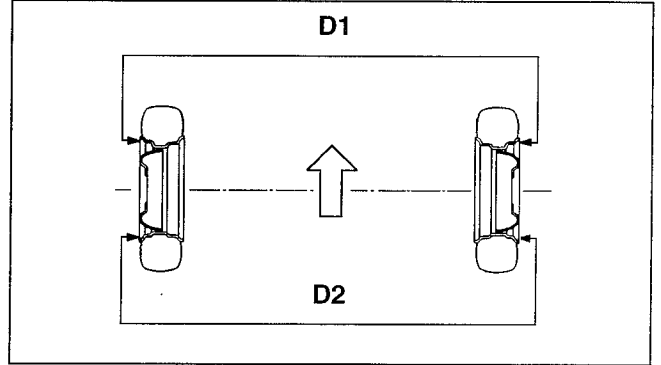
\* to '97 versions  
\*\* '98 versions

**NOTE:** If the values are not within the specified limits, body squaring should be checked (see GROUP 70).



**CHECKING THE REAR WHEEL TOE-IN**

– Using suitable tools, check that the toe-in is within the specified limits.



<b>Rear wheel toe-in D2 - D1</b>
<b>GTV 3.0 24V</b>
$2.5 \pm 0.5 \text{ mm}^*$
$3.0 \pm 1 \text{ mm}^{**}$

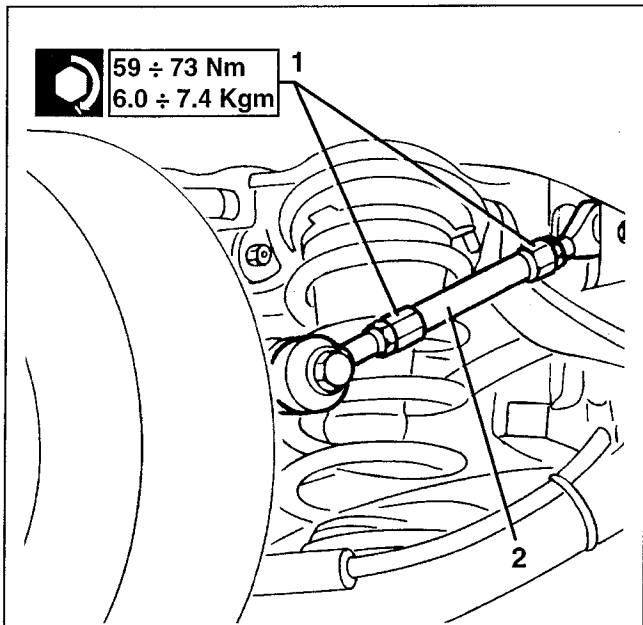
\* to '97 versions  
\*\* '98 versions

If the toe-in is other than specified proceed as follows:

1. Slacken the fastenings of the adjustment rods.
2. Turn the rods, until reaching the specified value

**NOTE: Adjustment should be carried out working on the rods of both wheels.**

- Tighten the rod fastenings to the specified torque.



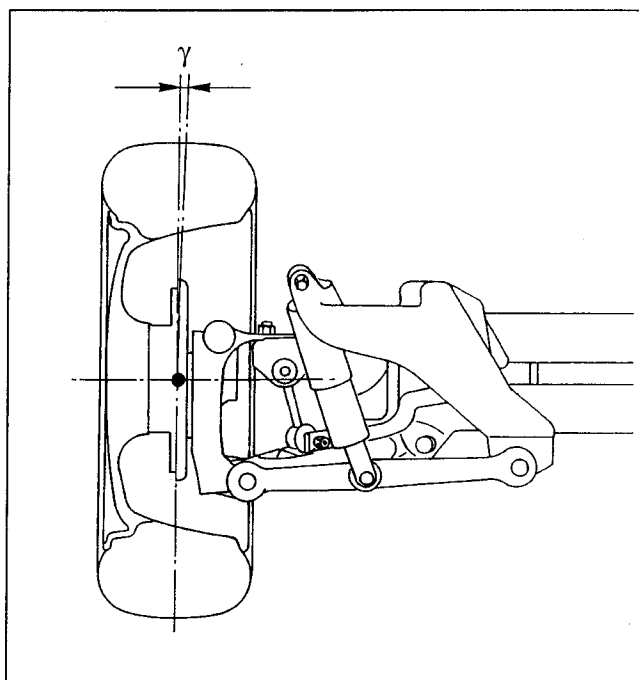
### CHECKING THE REAR WHEEL CAMBER

- Check that the camber angle (not adjustable) is within the specified limit.



<b>Rear wheel camber "γ"</b>
<b>GTV 3.0 24V</b>
-2°3' ± 20*
-1°47' ± 20**

\* to '97 versions  
\*\* '98 versions





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(\*): See GTV  TB

(•): See Spider  V6

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(\*): See GTV  TB

(•): See Spider  V6

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(\*): See GTV  TB

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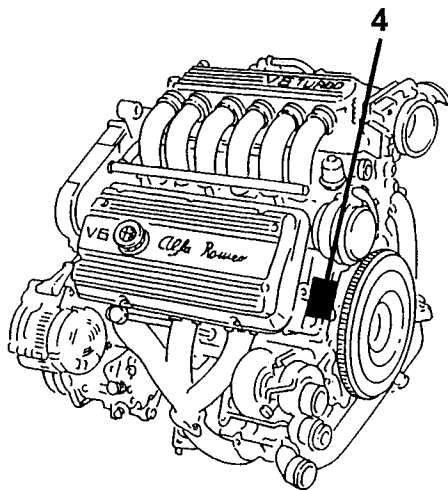
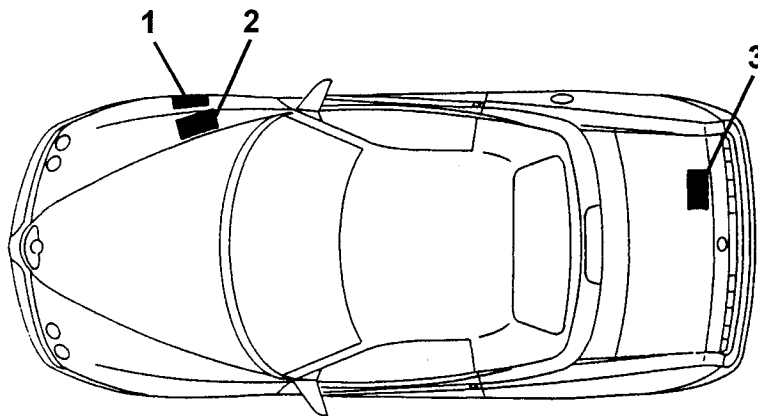
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(\*) See GTV  TB

### MODEL IDENTIFICATION

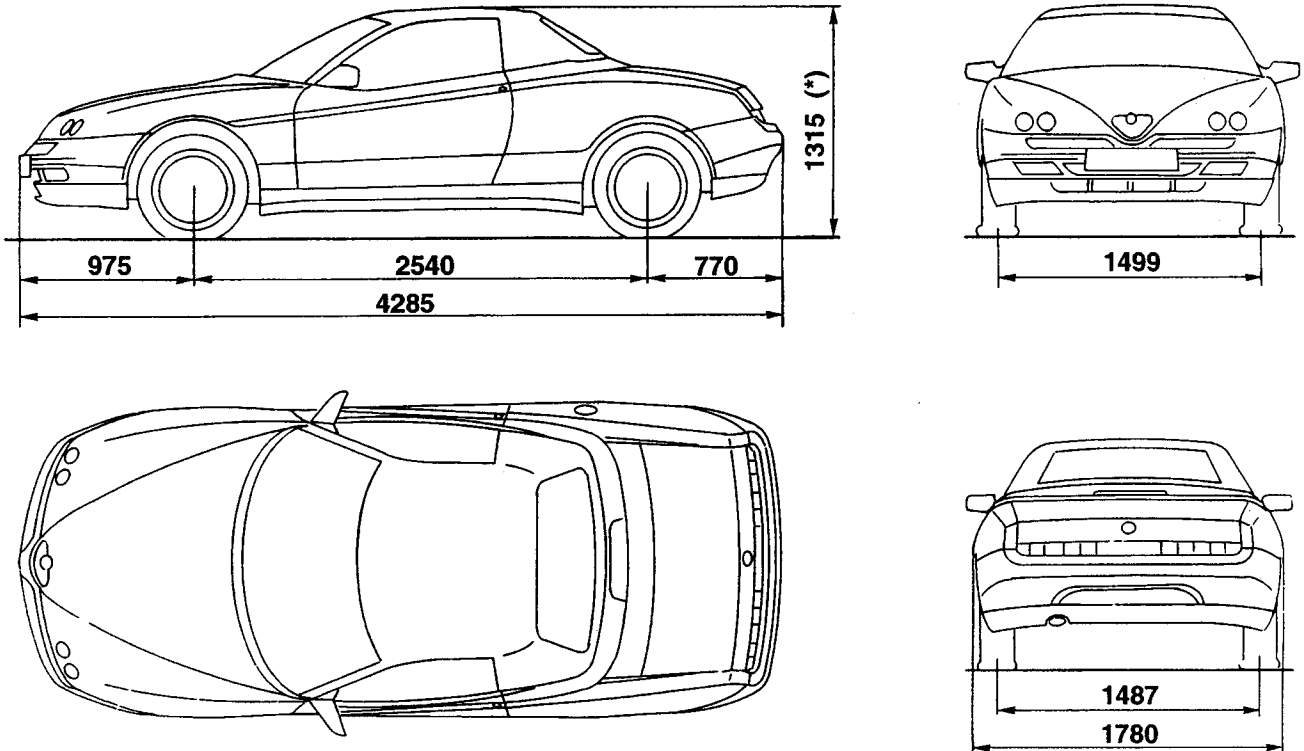
Brand name	Spider 2.0 V6 TB
Version	Spider
Version (on identification plate)	916 S2A
Chassis (in engine compartment, on upper right-hand shock absorber bracket)	-
Progressive chassis number	6000001
Engine (code)	AR 16202
Engine symbol	 TB
Gearbox (code)	C.503.5.29.21

### IDENTIFICATION PLATE LOCATION



1. Identification data plate
2. Chassis marking
3. Paintwork identification plate
4. Engine marking

**DIMENSIONS**



(\*): Unladen vehicle

**WEIGHTS AND LOADS**

Unit: kg

Features		Version	916S2A
Kerb weight (without driver)			1430
Maximum admitted load			1680
Load			260
Maximum weight allowed on each axle	front		1060
	rear		870
Towable weight	trailer with brakes		1000
	trailer without brakes		500
Maximum load on tow hitch			50

## WHEELS AND TYRES

Features		Version	916S2A
Rim size			6.5J x 16"
Tyre size			205/50 R16 87Y
Tyre pressure (cold)		bar (kg/cm <sup>2</sup> )	front 2.7 rear 2.5
Space saver spare wheel	Rim size		4J x 15" C26
	Tyre size		T125/80 R15 96M
	Tyre pressure	bar (kg/cm <sup>2</sup> )	4.2

**IMPORTANT:** Increase pressure by 0.3 bar in the event of constant driving at top speed.

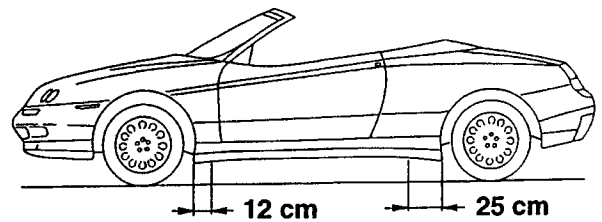
## JACKING POINTS

With arm hoist or shop jack.

- Position the arms or the jack in the areas shown.



**IMPORTANT:**  
Be very careful when positioning the arms or the jack in the front jacking points to avoid squeezing the brake and fuel lines.



**INDICATIVE CAPACITIES**

Capacity		Version	916S2A
Fuel tank			70 litres
Fuel reserve			~ 9 litres
Engine oil	Sump + filter (for regular replacement)		6.5 litres
Gearbox-differential oil			2 litres
Power steering system oil			1.3 kg
Brake and clutch circuit oil			0.4 kg
Engine coolant			11.7 litres
Climate control compressor oil			240 ± 15 cm <sup>3</sup>
Climate control system fluid			0.700 kg + 0.05 kg (1)

(1): Additional amount to be computed considering the fluid which remains the recharge device lines.

**ENGINE TECHNICAL FEATURES**

**FEATURES**

Engine		AR 16202
Cycle		Otto, four-stroke
Fuel feed/ignition		Motronic ML4.1 / EZ212K
Firing order		1 - 4 - 2 - 5 - 3 - 6
Capacity	cm <sup>3</sup>	1996
Number of cylinders		6 at V 60°
Bore	mm	80
Stroke	mm	66.2
Maximum power	CV CEE (kW CEE) rpm	200 (147) 6000
Maximum torque	kgm CEE Nm CEE rpm	27.6 (28.5 *) 271 (280 *) 2400
Compression ratio		8 : 1
Engine oil pressure (oil at 100°C)		
- Idling	bar	0.7
- 4000 rpm		3.8
Idling ratio	rpm	800 ± 20

(\*): With overboost.

**NOTE: For other "Engine technical features", see GTV  TB**

### SERVICE SCHEDULE

Operations to be performed at the indicated km	Km x 1,000								
	20	40	60	80	100	120	140	160	180
Check tyre conditions and wear	●	●	●	●	●	●	●	●	●
Check front disc brake pad wear warning light operation	●	●	●	●	●	●	●	●	●
Check rear disc brake pad wear		●		●		●		●	
Check intactness of drive shaft bellows, power steering, joint caps and tightness of fuel and brake lines	●	●	●	●	●	●	●	●	●
Inspect conditions of: external bodywork and underbody protection (exhaust - fuel feed - brakes); rubber parts (boots - sleeves - bushings - etc.)	●	●	●	●	●	●	●	●	●
Inspect conditions of accessory drive Poly-V belt		●							●
Check tension of accessory drive belt and adjust, if required	●						●		
Check handbrake lever travel		●		●		●		●	
Check/adjust tappet clearance	●	●	●	●	●	●	●	●	●
Check exhaust emissions		●		●		●		●	
Check evaporation system operation				●				●	
Replace air cleaner cartridge		●		●		●		●	
Check fluids and top up if required (brakes, hydraulic clutch, power steering, windscreen washer, battery, engine coolant, etc.)	●	●	●	●	●	●	●	●	●
Replace timing belt and accessory drive Poly-V belt						●			
Replace spark plugs	●	●	●	●	●	●	●	●	●
Check engine control system operation (via diagnostic socket)		●		●		●		●	
Check gearbox and differential oil level				●				●	
Change engine oil and filter (*)	●	●	●	●	●	●	●	●	●
Change brake fluid (or every 24 months)			●			●			●
Check dust/pollen filter	●	●	●	●	●	●	●	●	●
Operations on hood: - open/close functional check, oil seal inspection, check adherence of windows to hood seal and adjust if required (or every 18 months)	●	●	●	●	●	●	●	●	●
- for version with automatic hood, check oil pump level and top up, if required (or every 12 months)	●	●	●	●	●	●	●	●	●

(\*): Or every 18 months for lower mileage.



**IMPORTANT:**

Perfect operation and long working life of a car is strictly related to its good use and, above all, to the care with which regular service is performed. Considering product evolution, new service schedules have been adopted. The scheduled service coupons are planned at 20,000 km.

It is, however, important to note that the car requires ordinary precautions, such as systematic fluid checks and topping up, tyre pressure checks, etc.

In any case, remember that the correct car maintenance is certainly the best way to ensure performance, safety, environmental friendliness and low running costs in time.

**Additional operations**

The following precautions are required in addition to the operations shown in the Service Schedule to ensure good operation of the car:

Every 1000 km or before long trips, check and top up if required:

- engine oil
- engine coolant
- brake/clutch fluid
- power steering fluid
- battery electrolyte
- tyre pressure
- windscreen washer fluid.

**Engine oil**

If the car is mainly used in one of the following especially demanding conditions:

- towing trailers
  - dusty roads
  - short, repeated trips (less than 7-8 km) with temperature below zero degrees centigrade
  - engine frequently idling or long distances at slow speed (or after a long storage period)
- we recommend changing the engine oil more frequently than shown in the Service Schedule.

**Air cleaner**

Replace the air cleaner more frequently than prescribed if the car is mainly used on dusty roads.

**Brake pads**

The brake pads are subject to different use and wear, according to conditions of use and to driving style. Have the pad thickness checked at an Alfa Romeo Dealership as soon as the front brake pad warning light comes on.

As the car is equipped with front brake pad wear sensors only, check the rear pads when the front pads are replaced. According to the car use, the rear brake pads may not need to be replaced immediately. We recommend in this case to check them later.

**Brake/clutch fluid**

Brake fluid is hygroscopic, i.e. it absorbs moisture. To prevent faulty braking, change the brake fluid every two years, regardless of the mileage (see the Service Schedule).

**Battery**

Check the battery charge status, preferably at the beginning of winter, to prevent the electrolyte from freezing. Perform this check more frequently if the car is mainly used for short trips or if permanent intake devices also running when the key is removed are fitted, especially those fitted after market.

**Climate control system**

To keep the system in perfect shape, simply turn it on once every fortnight - also in winter - and run the compressor for a few minutes. Furthermore, we recommend having the system checked before the summer, when the system will be used.

**Dust/pollen filter (cars with climate control only)**

Have the filter checked once a year, preferably at the beginning of summer, by an Alfa Romeo Dealership. If the car is frequently used in dusty or very polluted environments, we recommend you have the filtering element checked more frequently than shown in the Service Schedule. The filter should be replaced in particular if decreased air intake into the passenger compartment is noticed.

**Anti-freeze**

We recommend topping up with Climafluid Super Permanent -40°C Alfa Romeo to preserve the protective features of the mixture.

**Rubber hoses**

The rubber hoses in the brake, power steering, fuel feed lines, etc. should be carefully checked at the frequency shown in the Service Schedule.

**Wheels**

Periodically and before long trips, check the pressure of each tyre, including the spare. Check pressure on cold tyres.

Periodically check that the depth of the tread complies with the minimum legal prescriptions. Periodically check that the tyres are not cut, swollen or present irregular wear. If this is so, go to an Alfa Romeo Dealership.

If a tyre is punctured, stop immediately and replace it to prevent damage to the tyre, the rim, the suspension and the steering.

The factory fitted wheels (rims and tyres) are suited to the features of the car and ensure maximum safety and comfort in all normal conditions of use. Before replacing the rims or tyre fitted on the car, check the allowed type table. However, observe the rim-tyre coupling of the original fitting. Always fit new tyres. Avoid tyres from unknown sources.



**VARIANTS FOR EURO 3 MODELS**

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**FOR INFORMATION NOT GIVEN HERE, REFER TO THE CORRESPONDING SPIDER - GTV ASSEMBLY**

**FOR THE DESCRIPTION OF THE NEW ME7.3.1 INJECTION/IGNITION SYSTEM, REFER TO PRINT NO. 507137 "EMISSION CONTROL SYSTEMS EOB D ON BOARD DIAGNOSTIC MANUAL"**

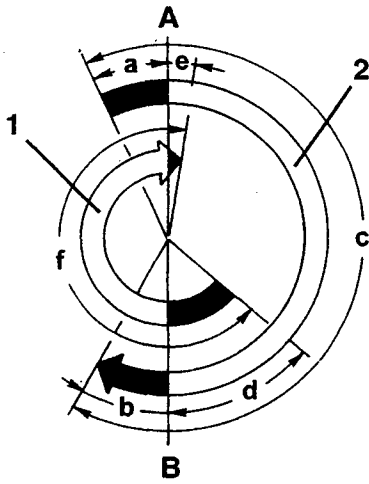
**MODEL IDENTIFICATION - EURO 3**

Brand name	Spider 2.0 T. Spark	GTV 2.0 T. Spark
Version	Spider	Coupé
Version (on identification plate)	916S2C00 34	916C200 35
Chassis (in engine compartment, on upper right-hand shock absorber bracket)	-	-
Progressive chassis number	6000001	6000001
Engine (code)	AR 32310	AR 32310
Engine symbol	T. SPARK 16V	T. SPARK 16V
Gearbox (code)	C.510.5	C.510.5

**ENGINE TECHNICAL FEATURES - EURO 3****CHARACTERISTIC DATA**

Engine		AR 32310
Cycle		Otto, four stroke
Injection / Ignition		Multi-Point BOSCH ME7.3.1 EOBD
Firing order		1 - 3 - 4 - 2
Capacity	cm <sup>3</sup>	1970
Number of cylinders		4 in line
Bore	mm	83
Stroke	mm	91
Maximum power	kW CEE rpm	110 6300
Maximum torque	Nm CEE rpm	181 3800
Compression ratio		10 : 1
Engine oil pressure		
- Idling ratio	bar	≥ 1.5
- At 4000 rpm		≥ 4.5
Idling ratio	rpm	840 ± 50

**ACTUAL TIMING ANGLE VALUE DIAGRAM - EURO 3**



(1) Exhaust (2) Intake  
 (A) TDC (B) BDC

Intake	Opens (before TDC)	"a"	3°
	Closes (after BDC)	"b"	51°
	Intake angle value	"c"	228°
Exhaust	Opens (before BDC)	"d"	47°
	Closes (after TDC)	"e"	0°
	Exhaust angle value	"f"	231°

**VARIANTS FOR EURO 3 MODELS**

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**FOR INFORMATION NOT GIVEN HERE, REFER TO THE CORRESPONDING GTV 3.0 24V ASSEMBLY**

**FOR THE DESCRIPTION OF THE NEW ME3.1 INJECTION/IGNITION SYSTEM, REFER TO PRINT NO. 507137 "EMISSION CONTROL SYSTEMS EOBD ON BOARD DIAGNOSTIC MANUAL"**

**MODEL IDENTIFICATION - EURO 3**

Brand name	SPIDER 3.0 24V	GTV 3.0 24V
Version	Spider	Coupé
Version (on identification plate)	916S1B00 32	916C1B00 33
Chassis (in engine compartment, on upper right-hand shock absorber bracket)	-	-
Progressive chassis number	-	-
Engine (code)	AR 16105	AR 16105
Engine symbol	 24V	 24V
Gearbox (code)	C.530.6	C.530.6

**WEIGHTS AND LOADS - EURO 3**

Unit: kg

Version		SPIDER 3.0 24V	GTV 3.0 24V
<b>Features</b>			
Kerb weight (without driver) (*)		1415	
Maximum admitted load (*)		1680	1820
Load		260	405
Maximum weight allowed on each axle	front	1000	1060
	rear	800	870
Towable weight	trailer with brakes	1000	
	trailer without brakes	500	
Maximum load on tow hitch		50	

(\*): Without optional equipment

**WHEELS AND TYRES - EURO 3**

		Version	SPIDER 3.0 24V	GTV 3.0 24V
		Features		
Rim size	standard	6.5J x 16"		
	optional	7J x 17" 7.5J x 17"		
Tyre size	standard	205/50 R16 87Y		
	optional	225/45 ZR17 91Y		
Tyre pressure (cold)		bar (kg/cm <sup>2</sup> )	front 2.7 rear 2.5	
Space saver spare wheel	Rim size		4J x 16" C24	
	Tyre size		T125/80 R16 97M	
	Tyre pressure bar (kg/cm <sup>2</sup> )		4.2	

**Snow chain tyres:** snow chains can only be used with 205/45 ZR16 REINFORCED tyres or 205/45 R16 87W REINFORCED tyres.

**Snow chains cannot be fitted on 225/45 ZR17 91Y tyres**

**IMPORTANT:**

Increase pressure by 0.3 bar in the event of constant driving at top speed.

**ENGINE TECHNICAL FEATURES - EURO 3**

**CHARACTERISTIC DATA**

Engine	AR 16105	
Cycle	Otto, four stroke	
Injection / Ignition	Multi Point BOSCH ME3.1 EOBD	
Firing order	1 - 4 - 2 - 5 - 3 - 6	
Capacity	cm <sup>3</sup>	2959
Number of cylinders	6 at V 60°	
Bore	mm	93
Stroke	mm	72.6
Maximum power	kW CEE	160
	rpm	6300
Maximum torque	Nm CEE	265
	rpm	5000
Compression ratio	10.0 : 1	
Engine oil pressure (at 100°C)		
- Idling ratio	bar	> 0.8
- At 4000 rpm		> 4.5
Idling ratio	rpm	700 ± 20

**GEAR RATIOS - EURO 3**

Axle ratio	Gear engaged	Gear ratio	Total ratio
16/57 1 : 3.563	1 <sup>st</sup>	1 : 3.500	1 : 12.470
	2 <sup>nd</sup>	1 : 2.235	1 : 7.963
	3 <sup>rd</sup>	1 : 1.520	1 : 5.416
	4 <sup>th</sup>	1 : 1.161	1 : 4.136
	5 <sup>th</sup>	1 : 0.971	1 : 3.460
	6 <sup>th</sup>	1 : 0.811	1 : 2.889
	Reverse	1 : 3.545	1 : 12.631

**SPARK PLUGS - EURO 3**

Type	NGK RPFR6B
------	------------



**VARIANTS FOR EURO 3 MODELS**

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- Right-hand lambda sensor upstream of the catalytic converter ..... 11
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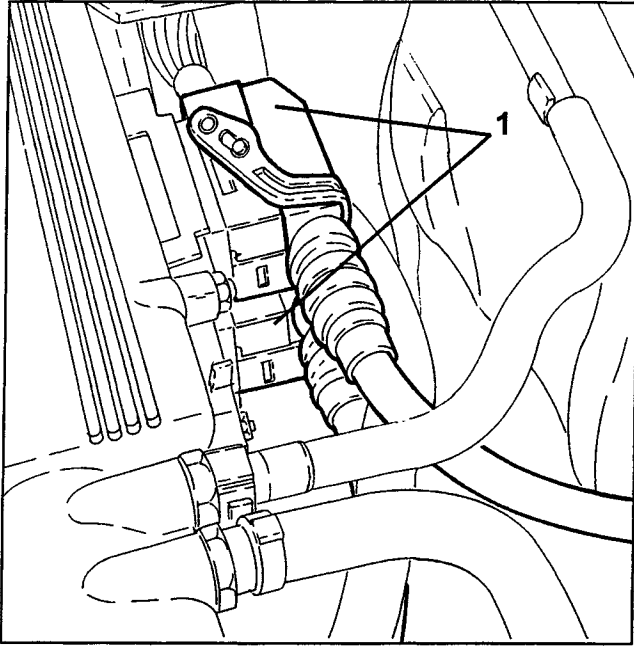
**FOR INFORMATION NOT GIVEN HERE, REFER TO THE CORRESPONDING GTV 3.0 24V ASSEMBLY**

**FOR THE DESCRIPTION OF THE NEW ME3.1 INJECTION/IGNITION SYSTEM, REFER TO PRINT NO. 507137 "EMISSION CONTROL SYSTEMS EOBOD ON BOARD DIAGNOSTIC MANUAL"**

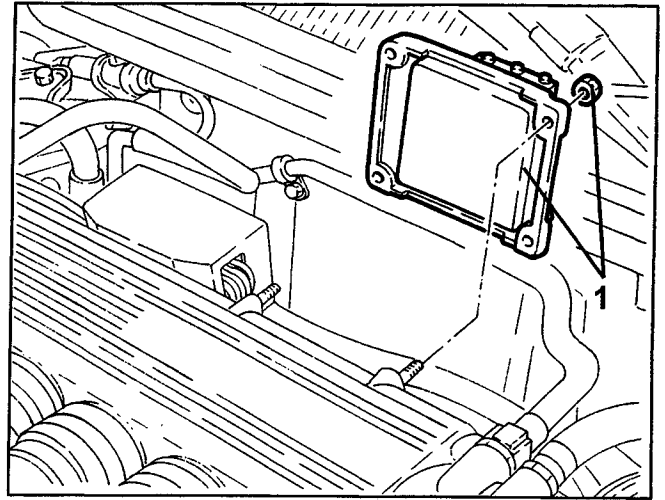
## INJECTION - IGNITION CONTROL UNIT

### REMOVING/REFITTING

- Ensure the ignition key is turned OFF, then disconnect the battery negative terminal (-).
- 1. Disconnect the injection-ignition control unit electrical connections.



- 1. Unscrew the nuts and remove the injection - ignition control unit.

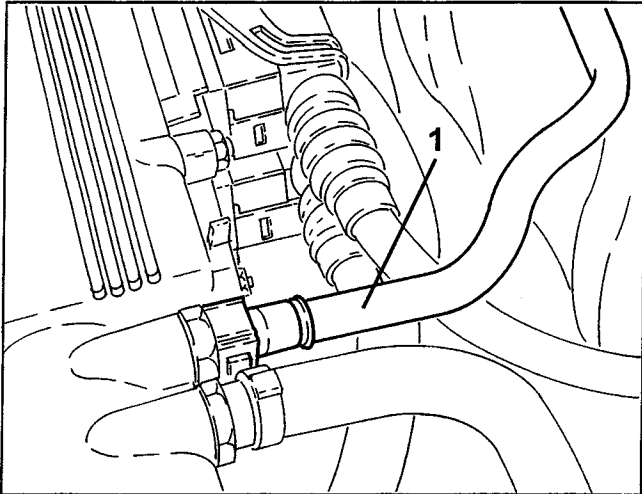


### AIR CAPACITY CHAMBER

#### REMOVING/REFITTING

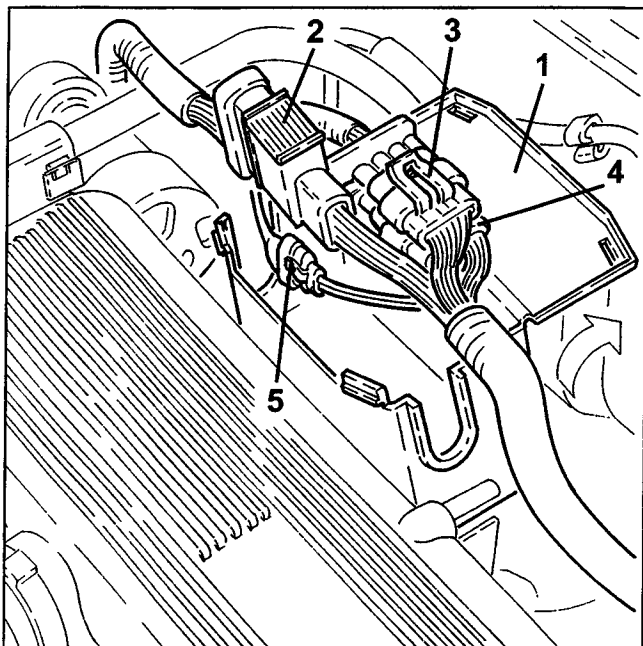
- Ensure the ignition key is turned OFF, then disconnect the battery terminal (-).

1. Disconnect the fuel vapour recovery pipe from the air capacity chamber and move to one side.

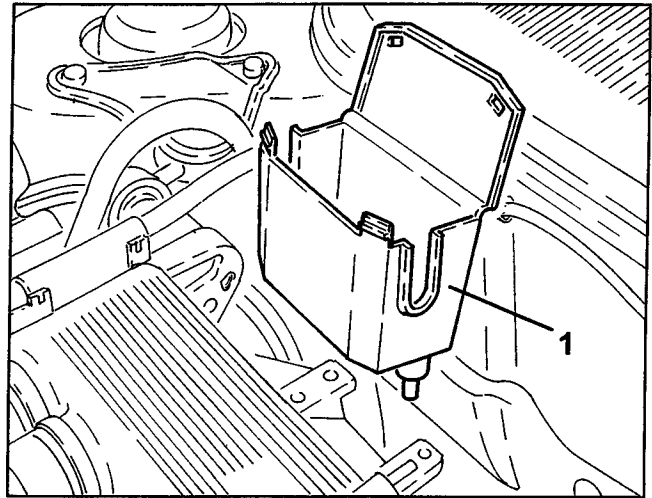


- Remove the injection-ignition control unit (see specific paragraph).

1. Open the connection carrier box.
2. Disconnect the engine electrical wiring junction.
3. Disconnect the electrical connection of the left lambda sensor downstream of the catalytic converter (black).
4. Disconnect the electrical connection of the right lambda sensor downstream of the catalytic converter (grey).
5. Disconnect the electrical connection of the front knock sensor (black).

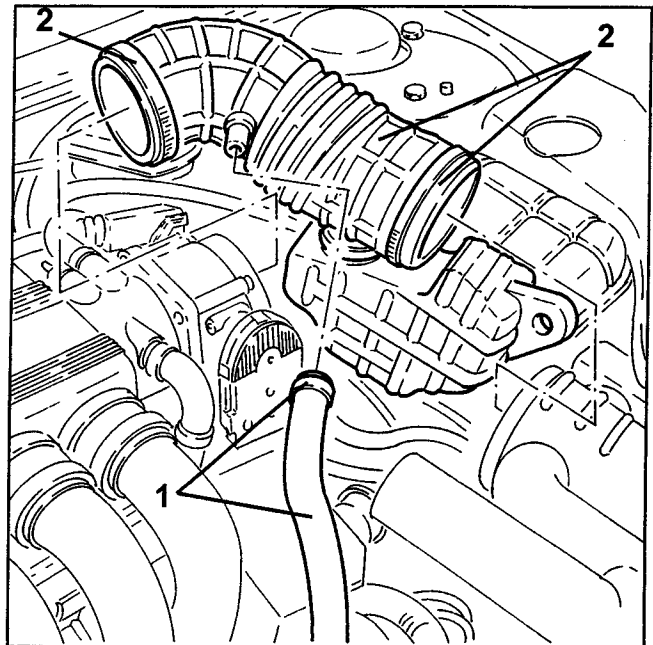


1. Remove the connection carrier box.



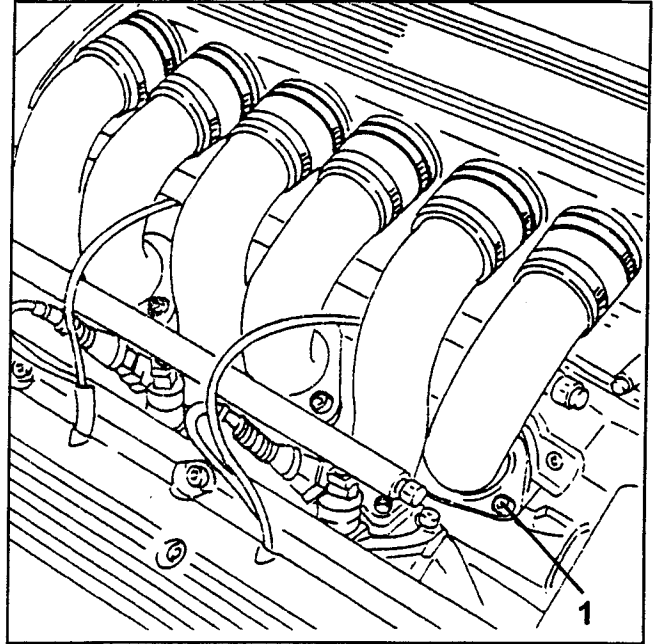
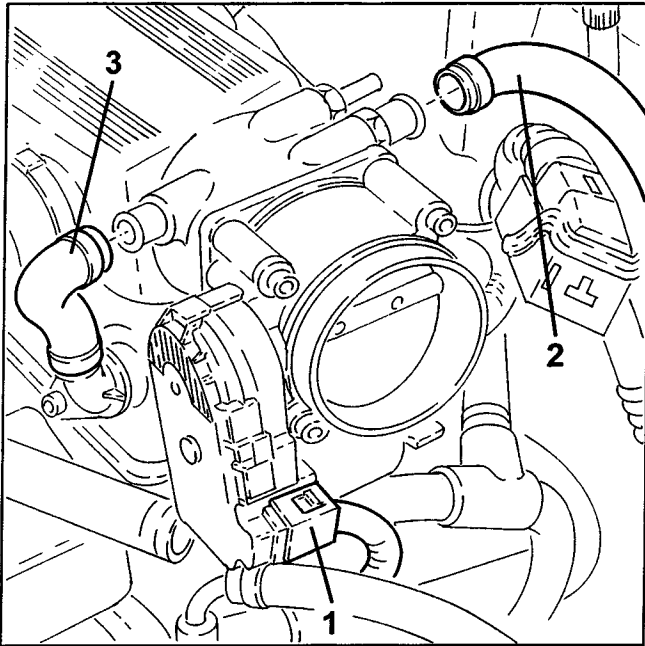
1. Loosen the collar and disconnect the engine oil vapour recirculation pipe from the corrugated sleeve.

2. Loosen the collars and remove the corrugated sleeve complete with resonator.



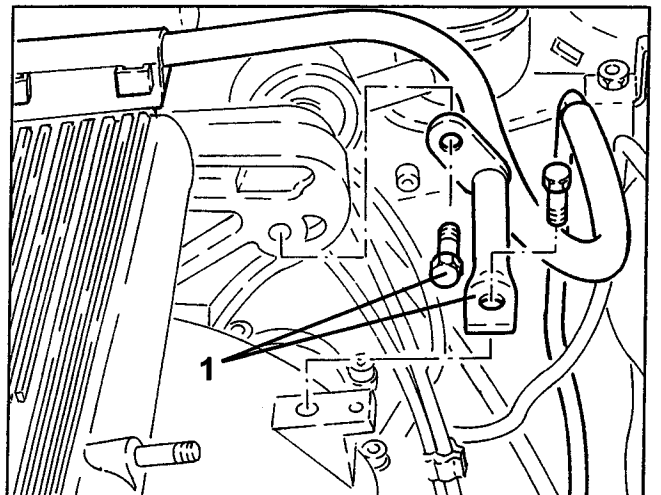
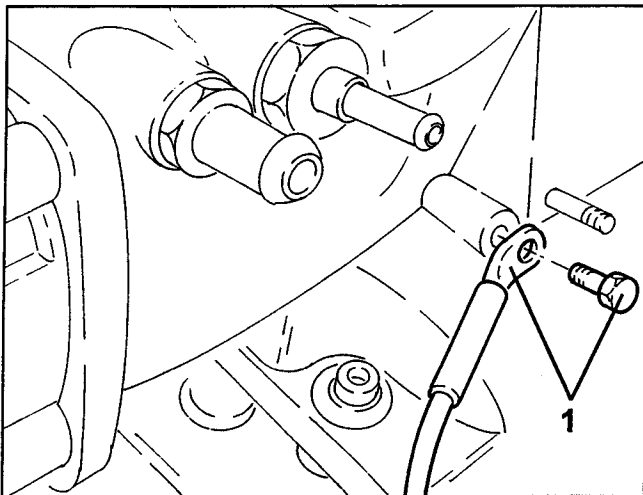
1. Disconnect the electrical connection from the motorised throttle body.
2. Disconnect the brake servo vacuum intake pipe from the air capacity chamber.

3. Loosen the collar and disconnect the oil vapour recovery pipe from the air capacity chamber.



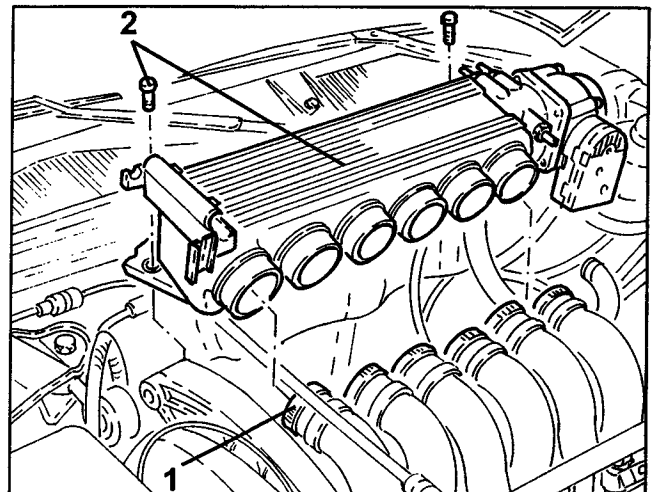
1. Unscrew the fastenings and remove the reinforcement between the air capacity chamber and the engine vibration-proof bar mount.

1. Unscrew the bolt and disconnect the earth lead from the air capacity chamber.



1. Loosen the collar securing the air intake duct retaining collars to the air capacity chamber.  
2. Unscrew the bolts and remove the air capacity chamber.

1. Loosen the bolts securing the intake ducts to the manifolds.



**ATTENTION:**

During engine operation, all exhaust pipes and particularly the catalytic converter become very hot.

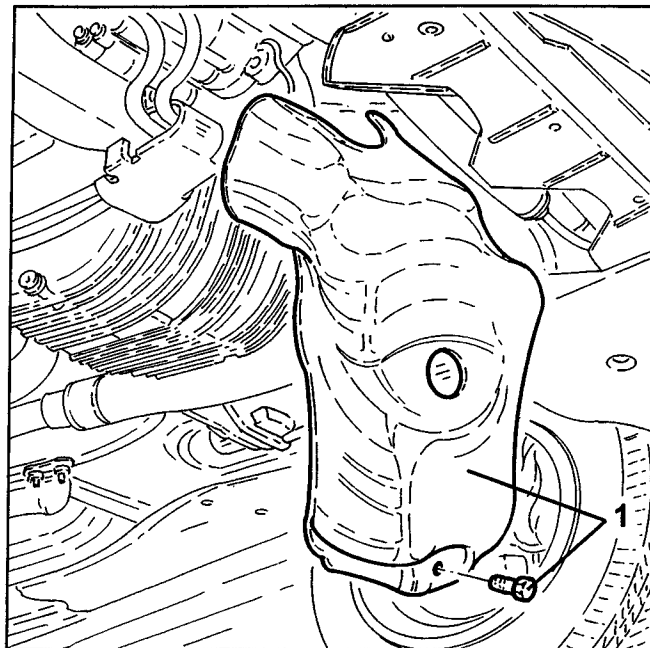
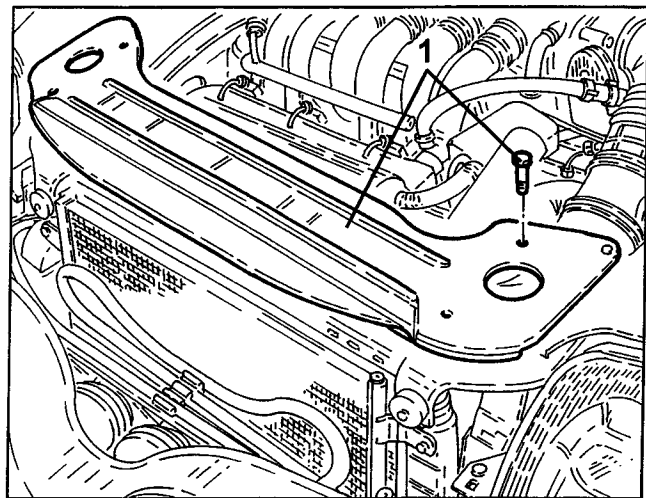
Before beginning work, therefore, leave the engine off for long enough for it to cool down. Never touch the catalytic converter unless you are wearing proper protection such as gloves etc. Never bring easily inflammable material close to the catalytic converter.

## LEFT CATALYTIC CONVERTER WITH BUILT-IN CATALYTIC PRECONVERTER

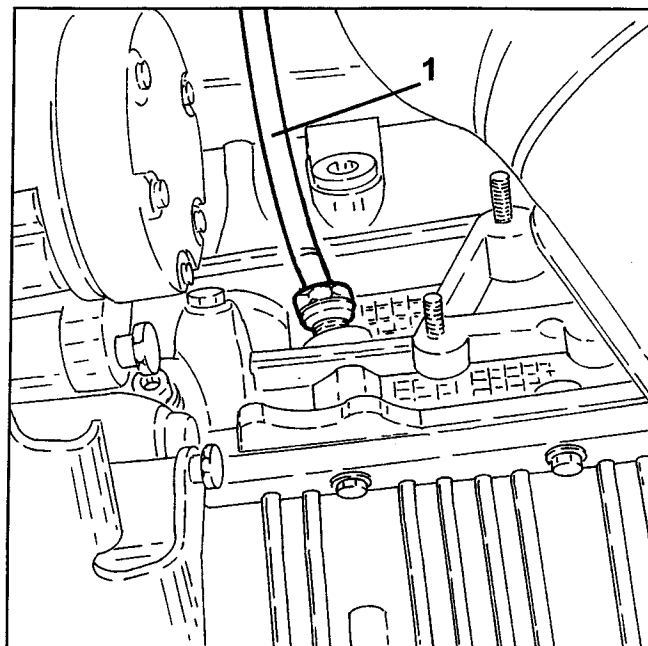
### REMOVING/REFITTING

- Remove the left lambda sensor upstream of the catalytic converter (see specific paragraph).

1. Unscrew the bolts and remove the upper radiator bream.



1. Remove the engine oil dipstick guide tube.

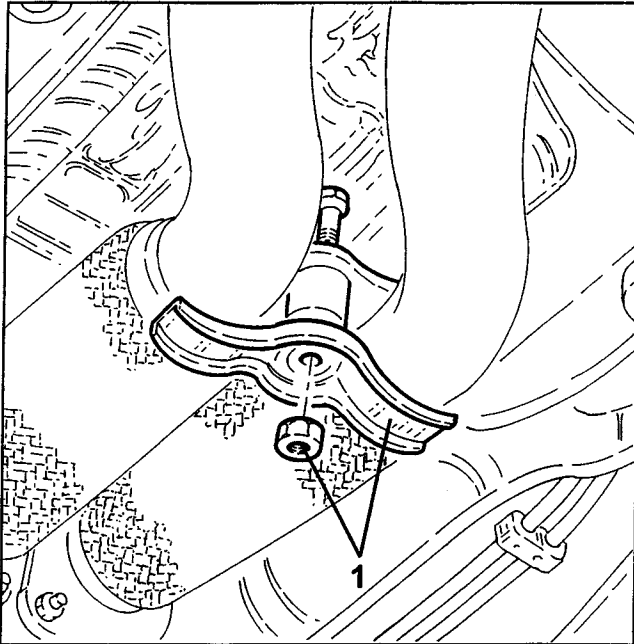


- Undo the upper bolts securing the left cylinder head exhaust manifold bulkhead.

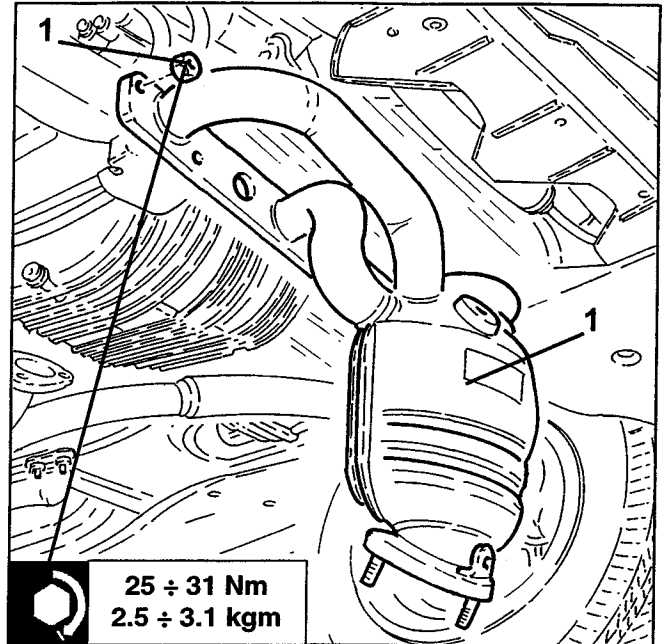
- Withdraw the engine oil dipstick.

1. Unscrew the lower bolt and remove the left cylinder head manifold bulkhead.

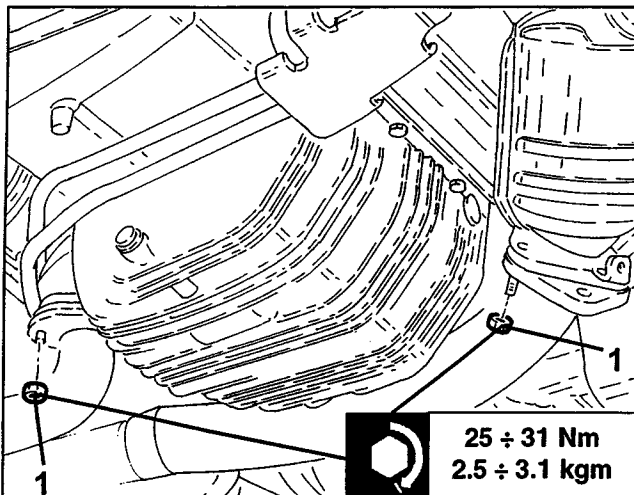
1. Undo the bolt and remove the bracket joining front sections of the exhaust pipe.



1. Unscrew the nuts and remove the left exhaust manifold with built-in catalytic converter.  
- Remove the gasket.



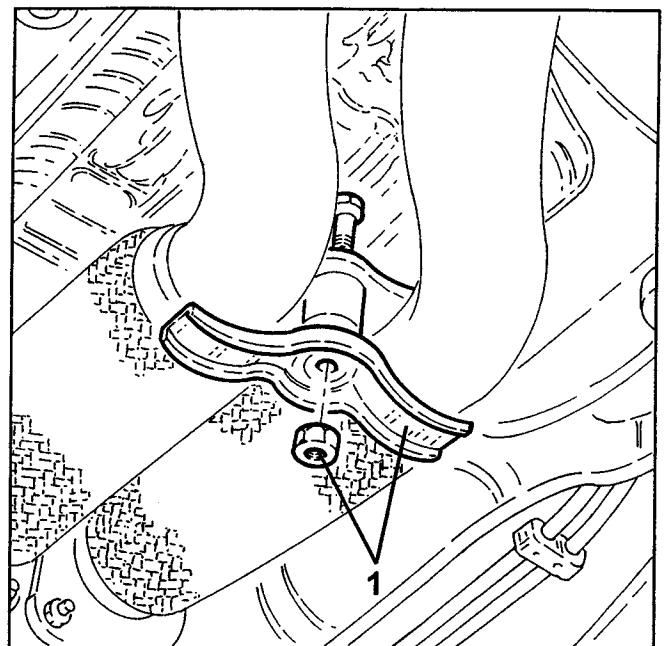
1. Undo the bolts securing front sections of the exhaust pipe to the exhaust manifolds with built-in catalytic preconverters.



## RIGHT EXHAUST MANIFOLD WITH BUILT-IN CATALYTIC CONVERTER

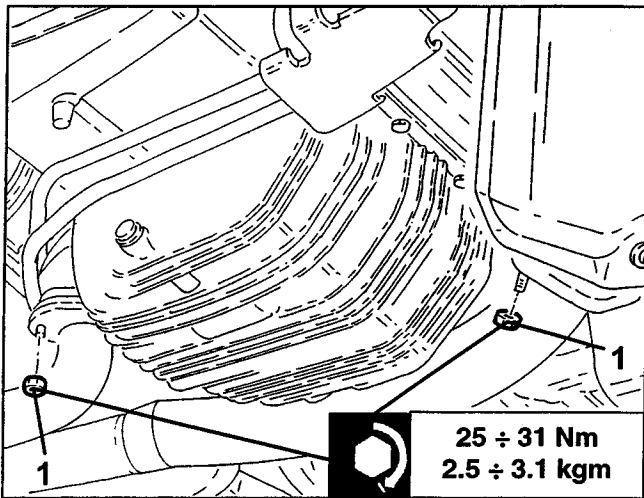
### REMOVING/REFITTING

- Place the vehicle on a lift.  
1. Undo the bolt and remove the bracket joining front sections of the exhaust pipe.

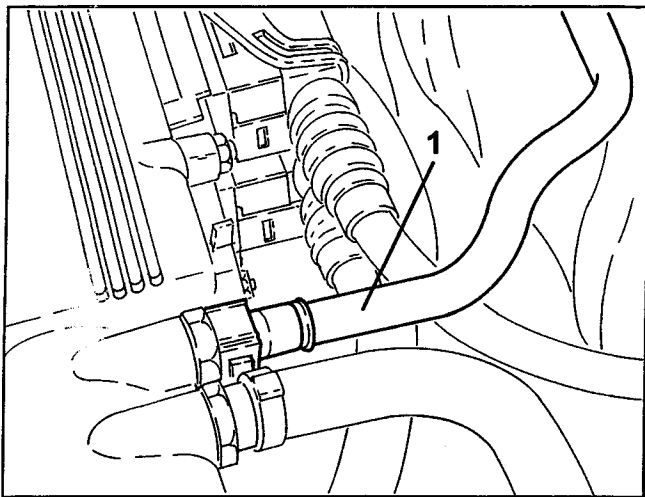


- Release the front exhaust pipe section from the studs on the left exhaust manifold with built-in catalytic preconverter and set aside.  
- Remove the gasket.

1. Undo the bolts securing front sections of the exhaust pipe to the exhaust manifolds with built-in catalytic preconverters.  
- Remove the gaskets.

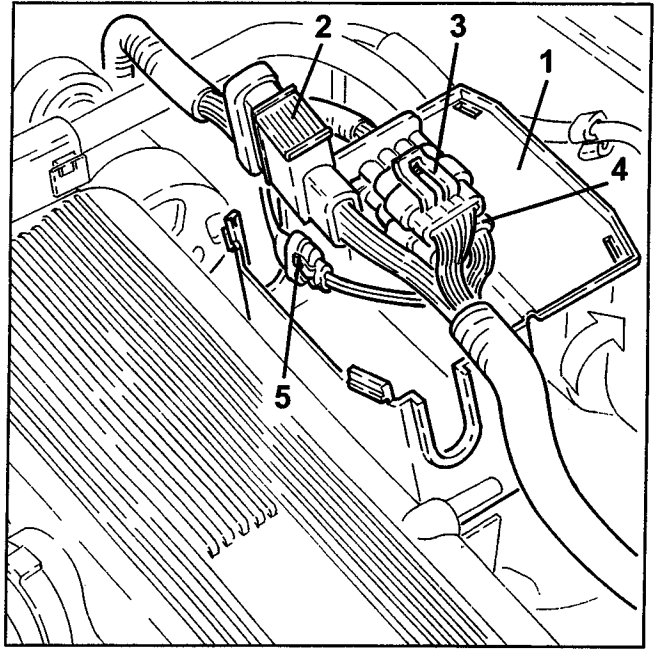


- Remove the right cylinder head exhaust manifold bulkhead (see specific paragraph).
1. Disconnect the fuel vapour recovery pipe from the air capacity chamber and move side.

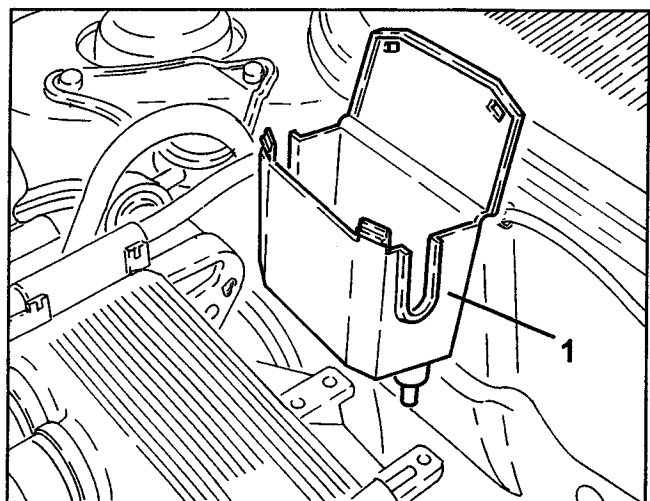


- Remove the injection-ignition control unit (see specific paragraph).
1. Open the connection carrier box.
  2. Disconnect the engine electrical wiring junction.

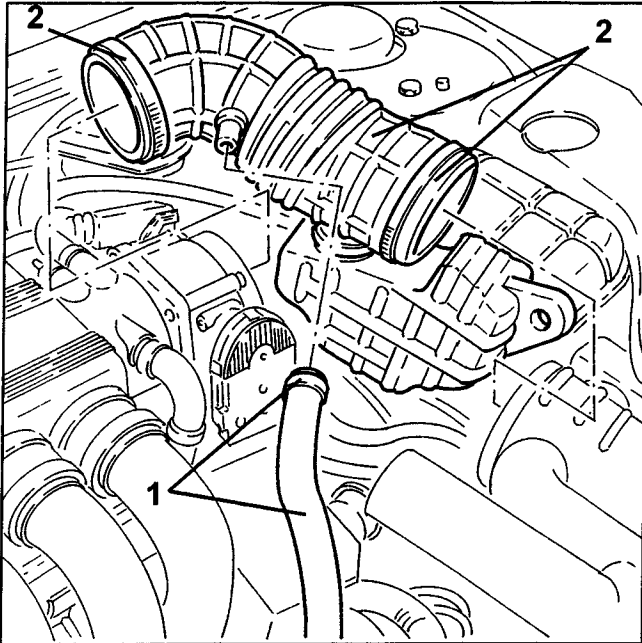
3. Disconnect the electrical connection of the left lambda sensor downstream of the catalytic converter (black).
4. Disconnect the electrical connection of the right lambda sensor downstream of the catalytic converter (grey).
5. Disconnect the electrical connection of the front knock sensor (black).



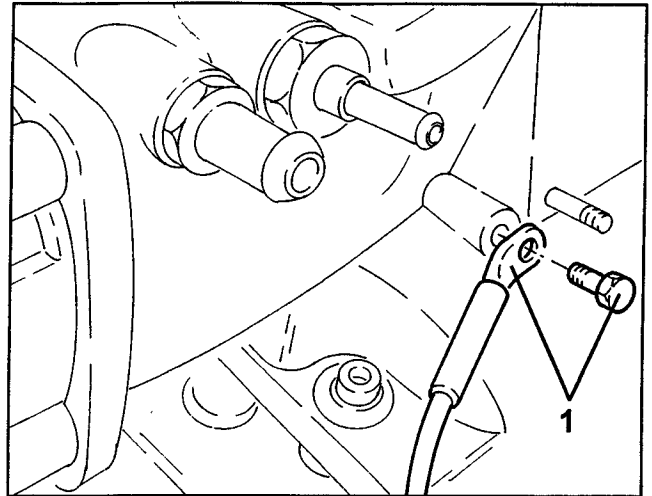
1. Remove the connection carrier box.



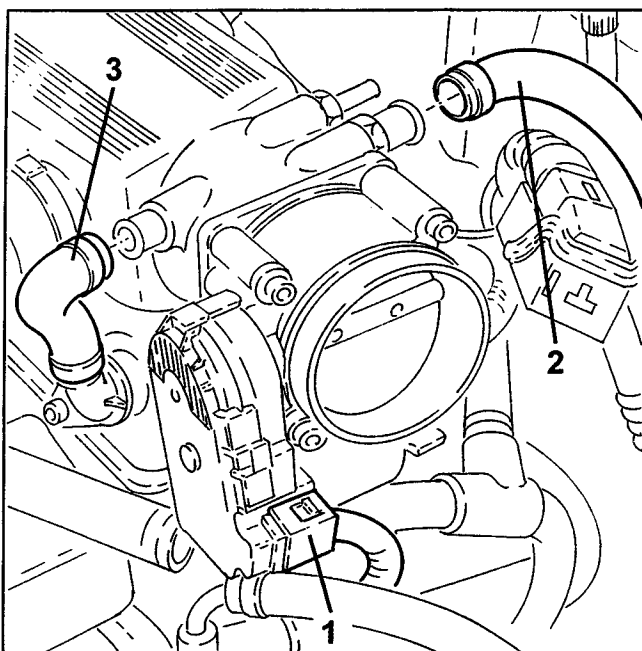
1. Loosen the collar and disconnect the engine oil vapour recirculation pipe from the corrugated sleeve.
2. Loosen the sleeve and remove the corrugated sleeve complete with resonator.



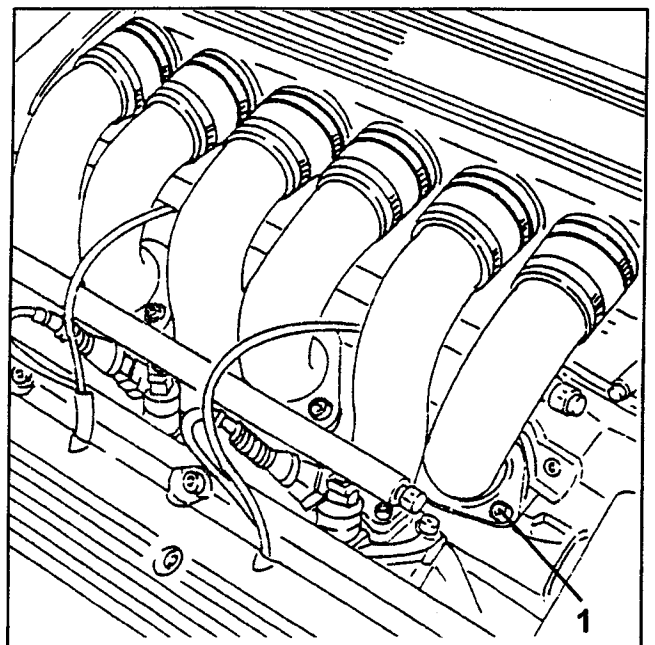
1. Unscrew the bolt and disconnect the earth lead from the air capacity chamber.



1. Disconnect the electrical connection from the motorised throttle body.
2. Disconnect the brake servo vacuum intake pipe from the air capacity chamber.
3. Loosen the collar and disconnect the oil vapour recovery pipe from the air capacity chamber.

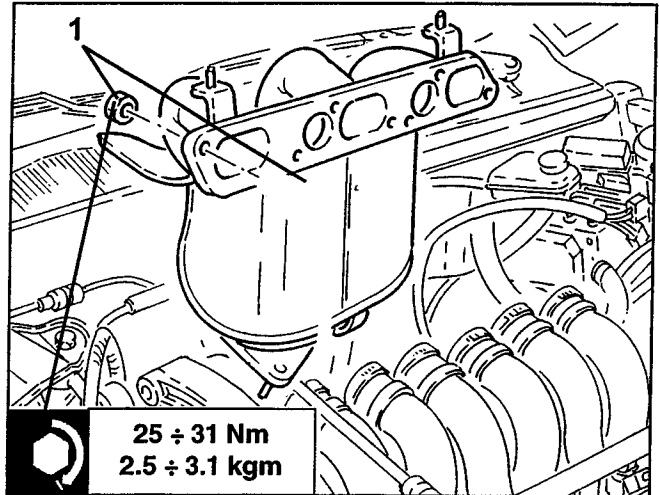
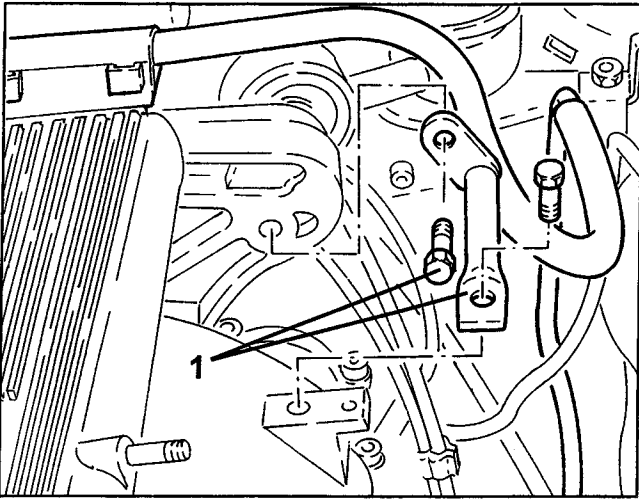


1. Loosen the bolts securing the air intake ducts to the manifolds.

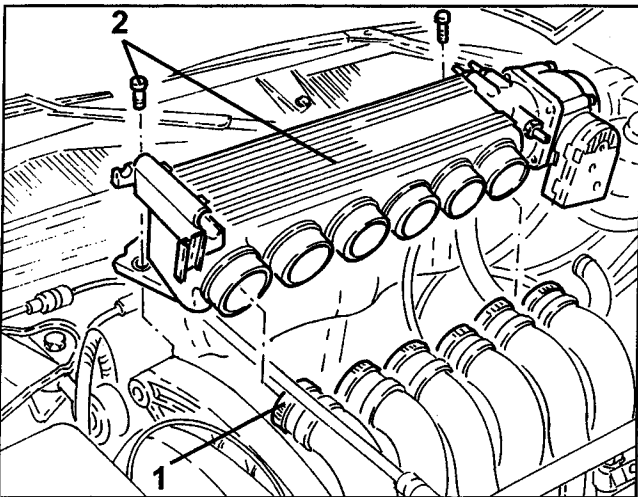




1. Undo the bolts and remove the reinforcement between air capacity chamber and engine vibration-proof bar mount.



1. Loosen the collars securing the air intake ducts to the air capacity chamber.  
2. Undo the bolts and remove the air capacity chamber.

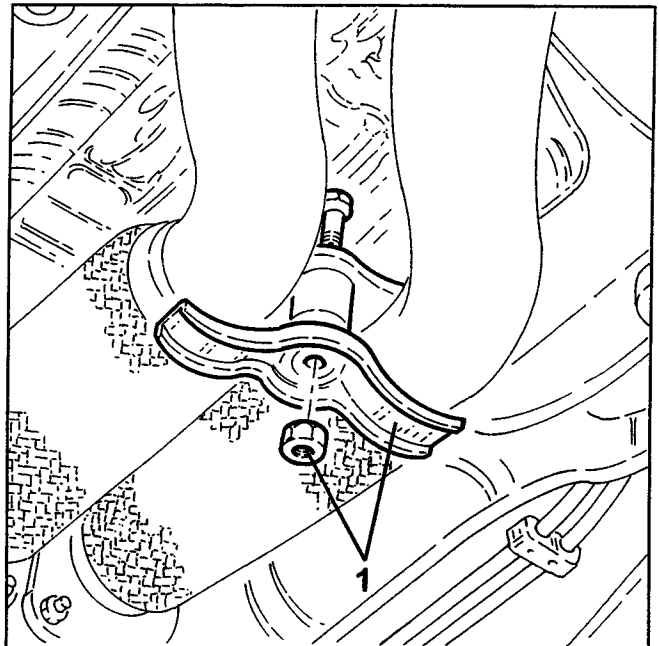


## FRONT EXHAUST PIPE SECTIONS

### REMOVING/REFITTING

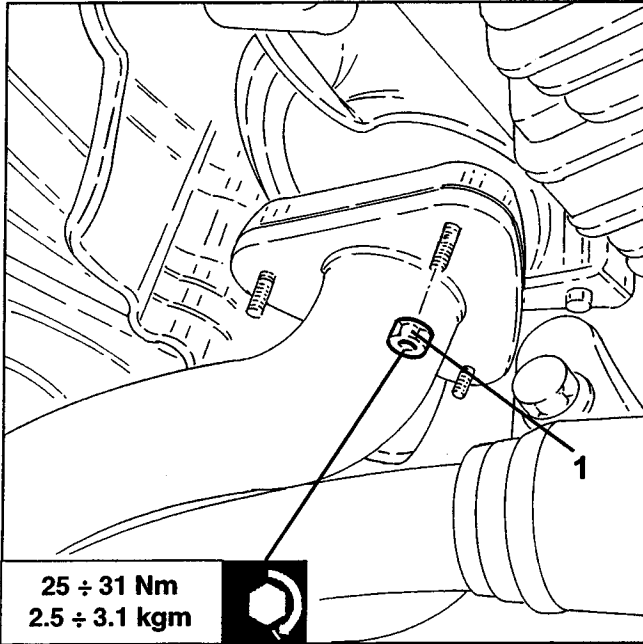
- Position the vehicle on a lift.

1. Undo the bolt and remove the bracket joining front sections of the exhaust pipe.

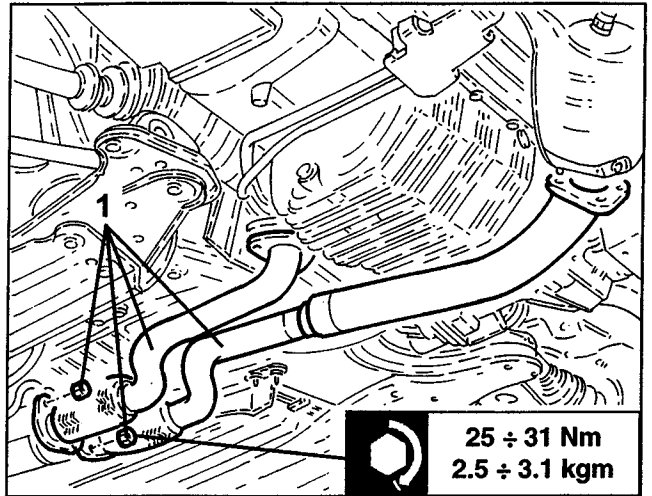


1. Undo the nuts and remove the right exhaust manifold with built-in catalytic preconverter.  
- Remove the gasket.

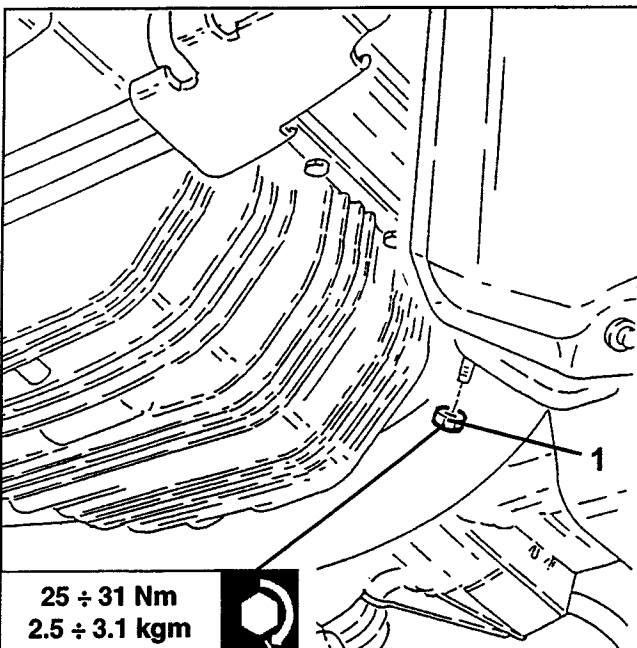
1. Undo the bolts securing the front section of the exhaust pipe to the right exhaust manifold with built-in catalytic preconverter.



1. Undo the nuts securing the front exhaust pipe sections to the catalytic converters, then remove.  
- Remove the gaskets.



1. Undo the nuts securing the front exhaust pipe section to the left exhaust manifold with built-in catalytic preconverter.

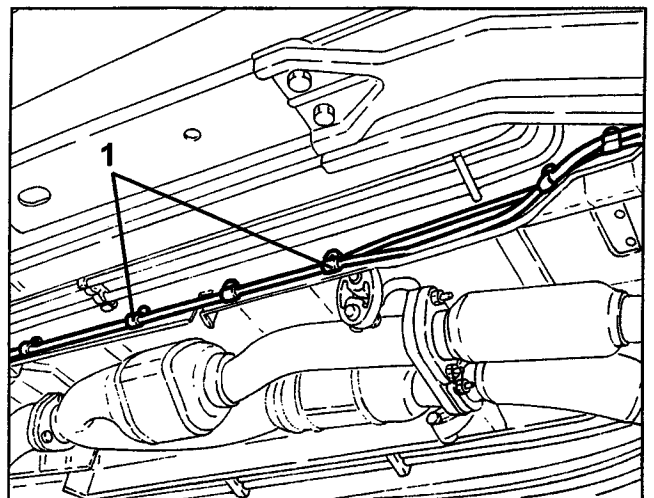


## CATALYTIC CONVERTERS

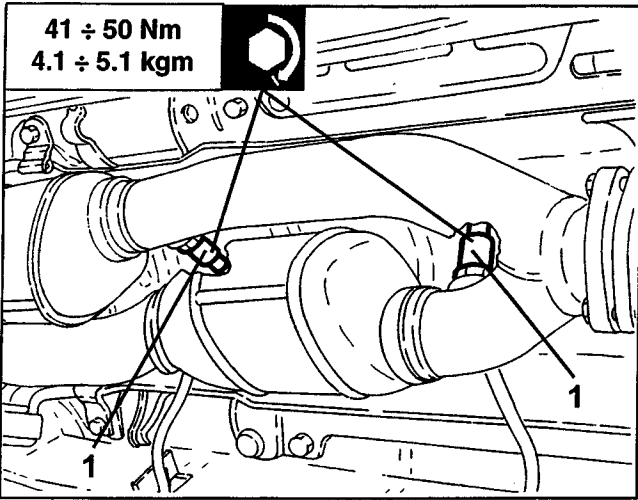
### REMOVING/REFITTING

- Place the vehicle on a lift.

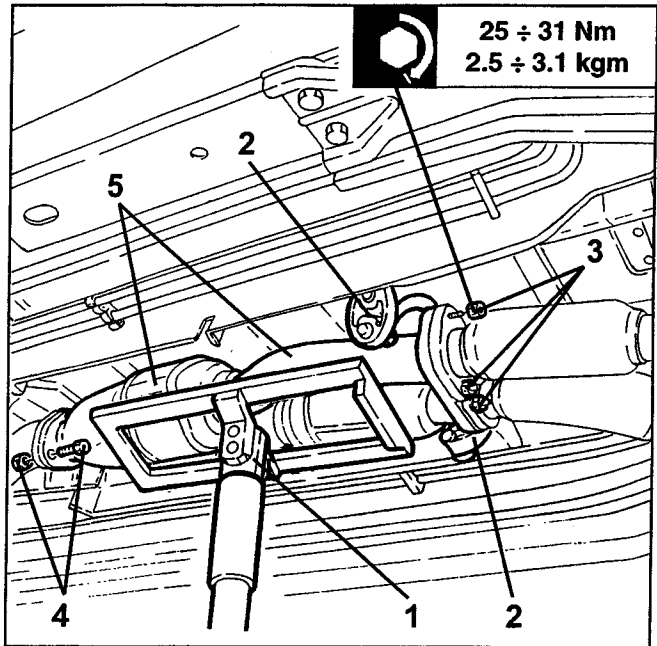
1. Release the electrical wiring of lambda sensors downstream of the catalytic converters from their underbody clips.



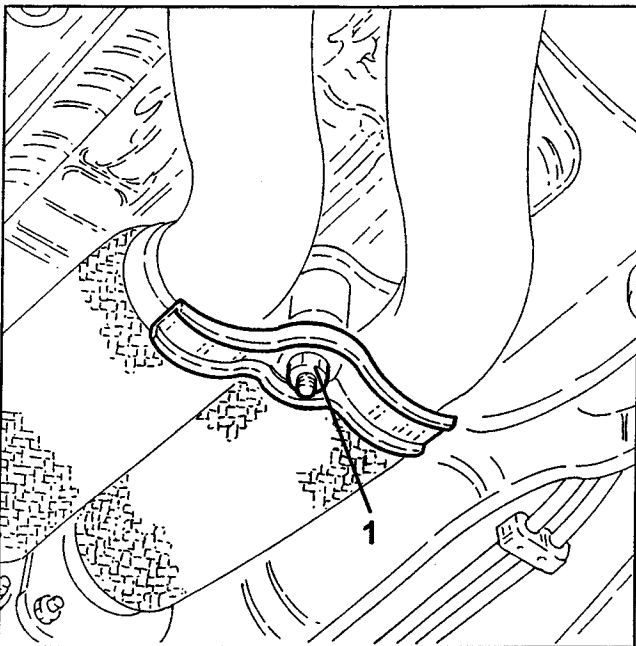
1. Unscrew the lambda sensors downstream of the catalytic converters and place them to one side.



5. Move the catalytic converters back sufficiently to release the front studs from the front exhaust pipe sections and remove.  
- Remove the gaskets.



1. Loosen the bolt of the bracket joining the front exhaust pipe sections.

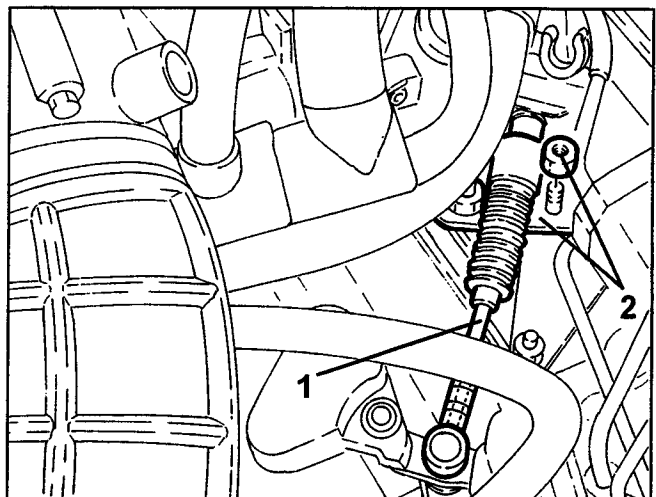


### RIGHT-HAND CYLINDER HEAD EXHAUST MANIFOLD BULKHEAD

#### REMOVING/REFITTING

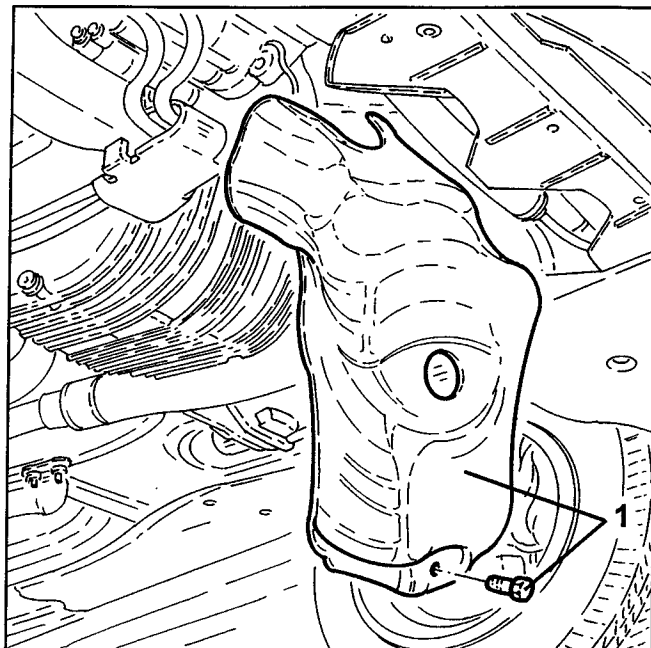
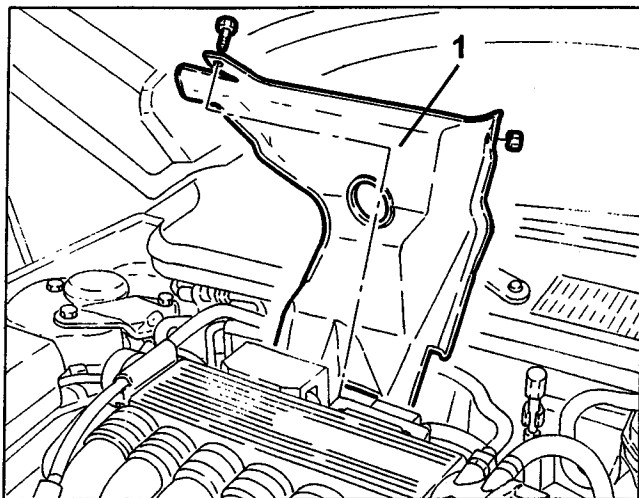
- Remove the right lambda sensor upstream of the catalytic converter (see specific paragraph).

1. Disconnect the gear engagement cable.
2. Unscrew the nuts and move the bracket with gear engagement cable to one side.



1. Position a hydraulic jack beneath the catalytic converters.
2. Release the catalytic converters from their flexible mounts.
3. Unscrew the nuts securing front exhaust pipe sections to the catalytic converters.
4. Undo the bolts securing the catalytic converters to the intermediate exhaust silencer.

1. Undo the nuts and remove the right cylinder head exhaust manifold bulkhead.

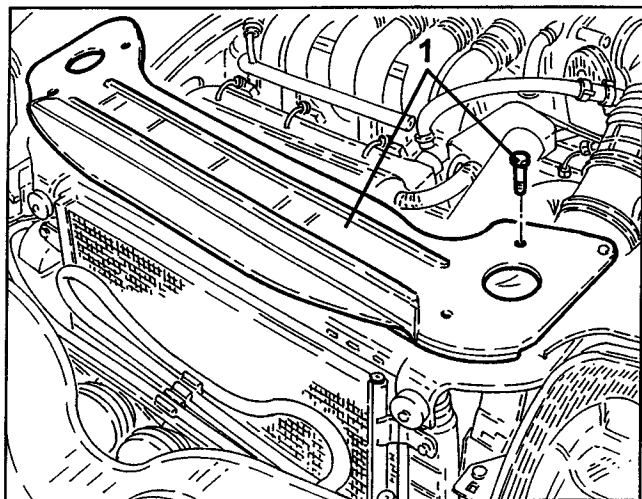


### LEFT CYLINDER HEAD EXHAUST MANIFOLD BULKHEAD

#### REMOVING/REFITTING

- Remove the left lambda sensor upstream of the catalytic converter (see specific paragraph).

1. Unscrew the bolts and remove the upper radiator beam.

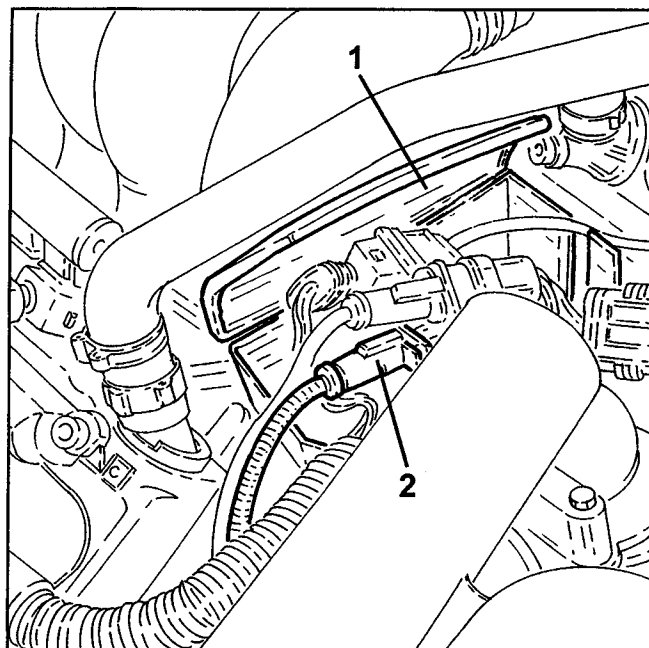


- Undo the upper nuts securing the left cylinder head exhaust manifold bulkhead.  
 - Withdraw the engine oil dipstick.  
 1. Unscrew the lower bolt and remove the left cylinder head exhaust manifold bulkhead.

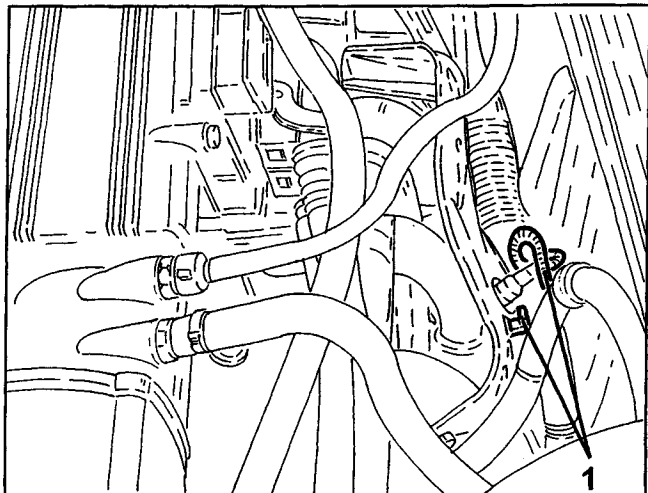
### RIGHT-HAND LAMBDA SENSOR UPSTREAM OF THE CATALYTIC CONVERTER

#### REMOVING/REFITTING

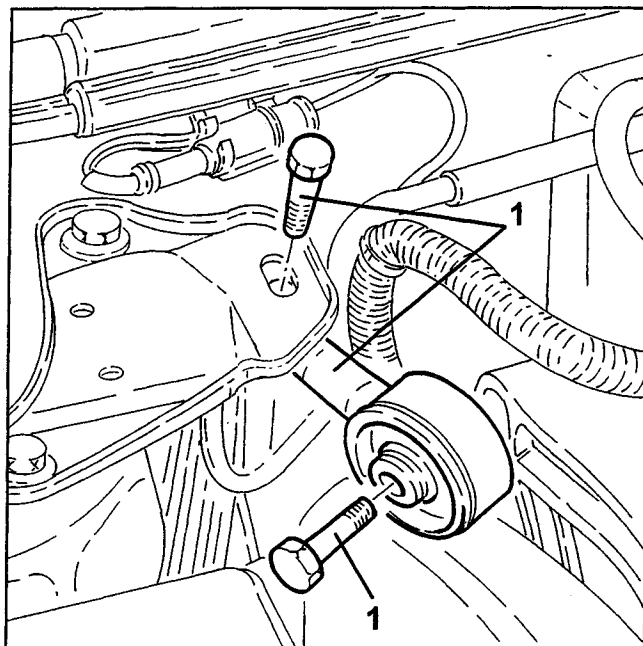
- Place the vehicle on a lift.  
 - Ensure the ignition key is turned OFF, then disconnect the battery terminal (-).  
 1. Open the connection carrier box.  
 2. Disconnect the electrical connection of the right-hand lambda sensor upstream of the catalytic converter (grey).



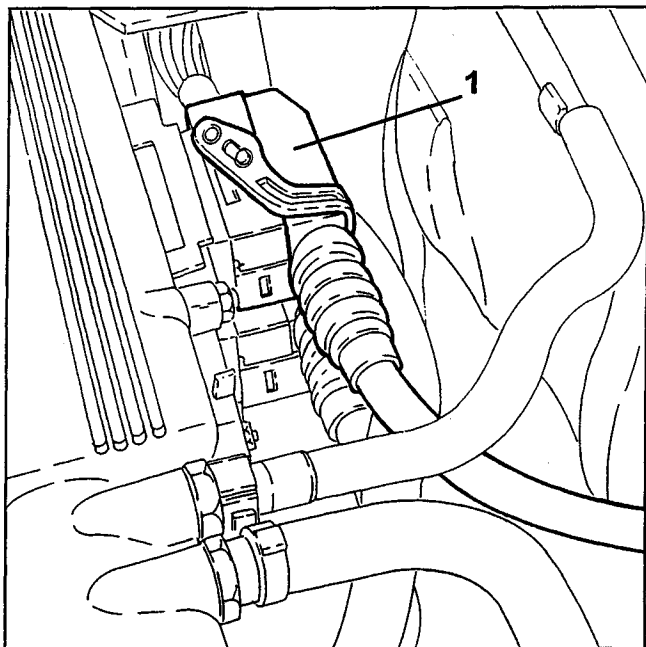
1. Release the electrical wiring of the right-hand lambda sensor upstream of the catalytic converter from the retaining clips.



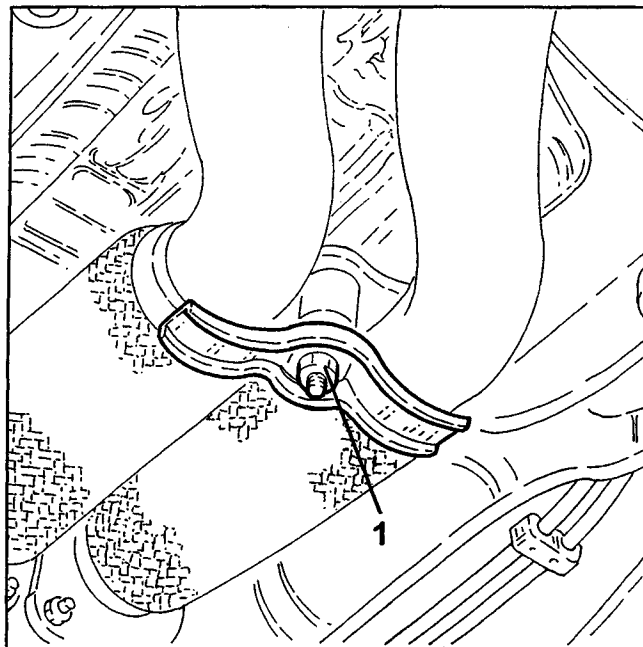
1. Unscrew the bolts and remove the engine vibration-proof bar.



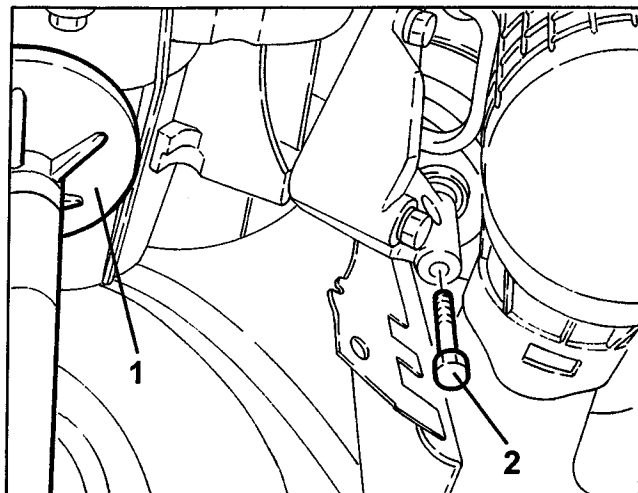
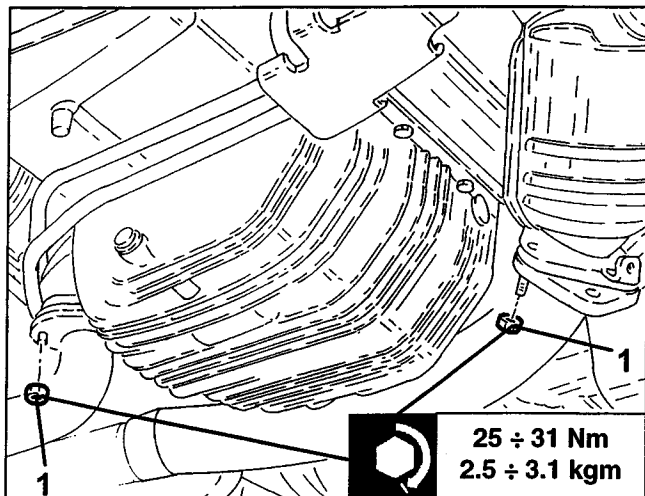
1. Disconnect the upper electrical connection from the injection - ignition control unit.



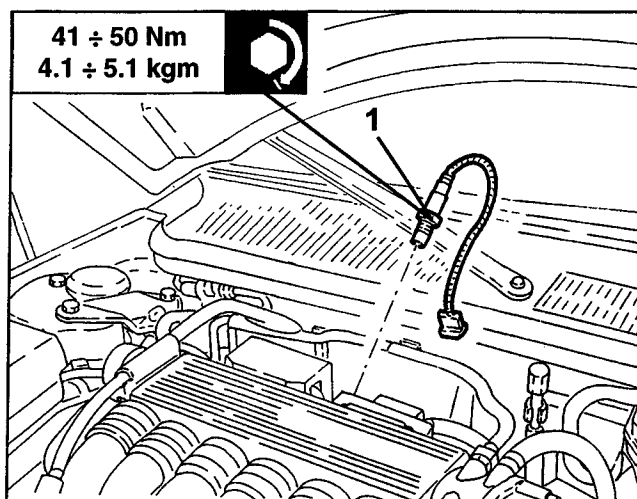
1. Loosen the bolt joining the front exhaust pipe sections.



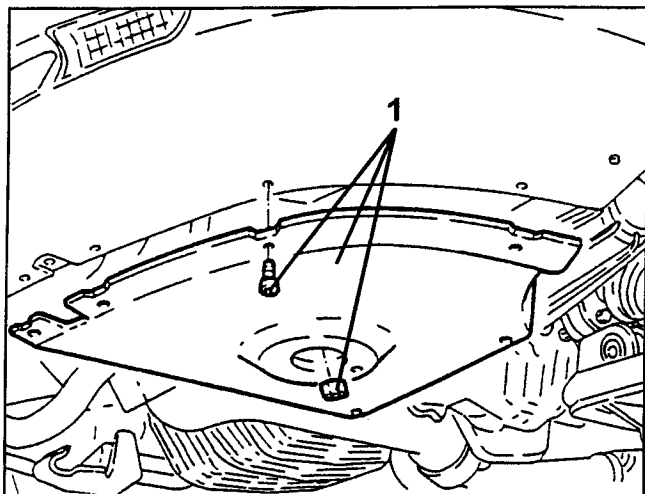
1. Unscrew the nuts securing the front exhaust pipe sections to their exhaust manifolds with built-in catalytic preconverters.



1. Unscrew and remove the right-hand lambda sensor upstream of the catalytic converter.



1. Unscrew the nut and screws, then remove the lower air cleaner protection.



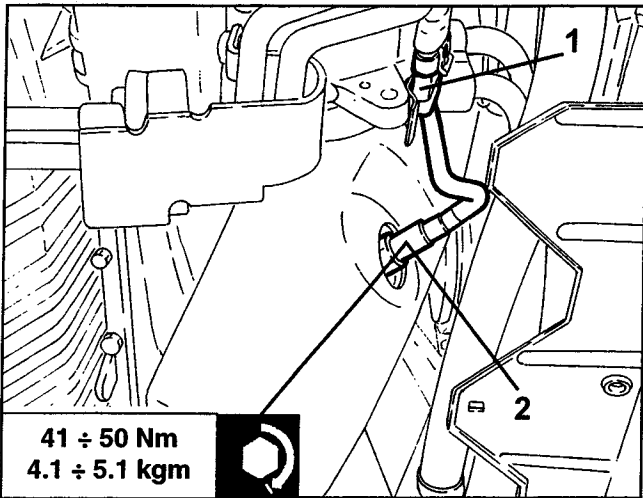
1. Position a hydraulic jack beneath the gearbox.  
2. Unscrew the bolt securing the power unit gearbox side rigid mount to its flexible block.  
- Lower the hydraulic jack slowly and remove.

## LEFT-HAND LAMBDA SENSOR UPSTREAM OF THE CATALYTIC CONVERTER

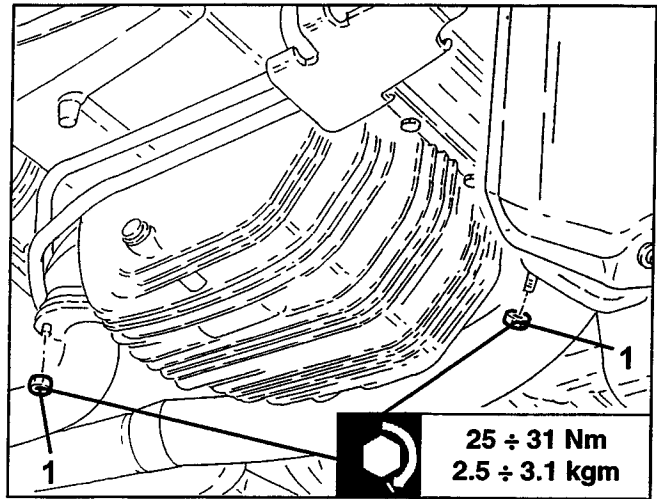
### REMOVING/REFITTING

- Position the vehicle on a lift  
- Ensure the ignition key is turned OFF, then disconnect the battery terminal (-).  
1. Disconnect the electrical connection of the left-hand lambda sensor upstream of the catalytic converter.

2. Unscrew and remove the left-hand lambda sensor upstream of the catalytic converter.



1. Undo the nuts securing the front exhaust pipe sections to the exhaust manifolds with built-in catalytic preconverters.  
- Remove the gaskets.



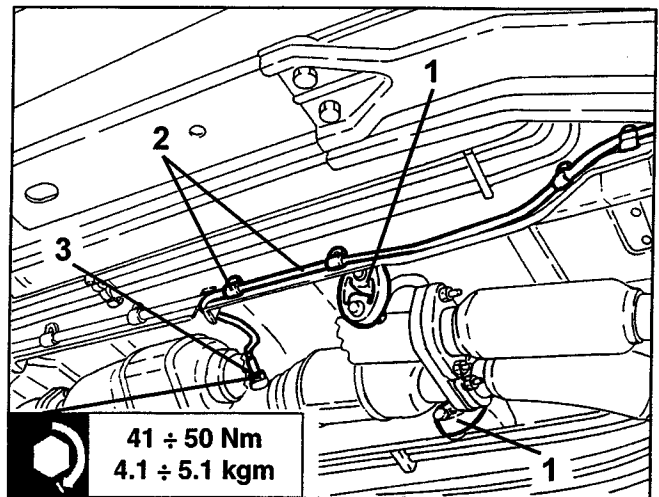
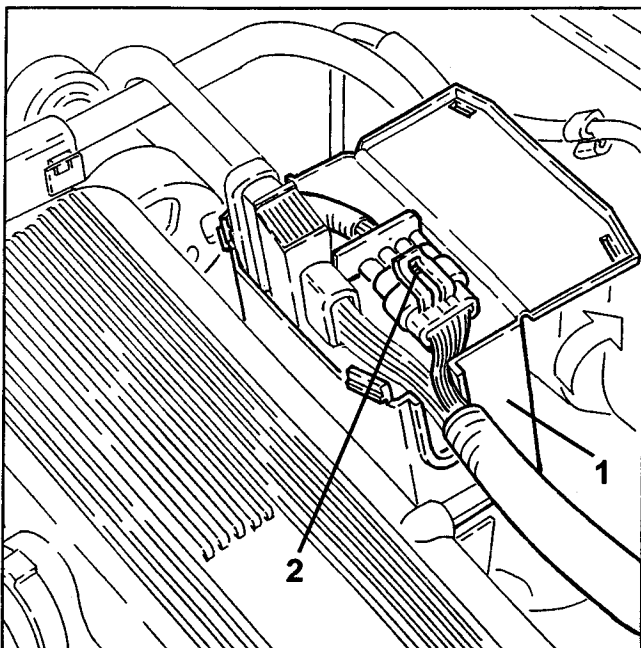
## LAMBDA SENSOR DOWNSTREAM OF CATALYTIC CONVERTER

### REMOVING/REFITTING

**NOTE:** removal of the left-hand lambda sensor is shown below; proceed in the same way to remove/refit the right-hand lambda sensor.

- Position the vehicle on a lift.
- Ensure the ignition key is turned OFF, then disconnect the battery terminal (-).
- 1. Open the connection carrier box.
- 2. Disconnect the electrical connection of the left-hand lambda sensor upstream of the catalytic converter (black).

1. Release the catalytic converters from their flexible mounts.
2. Release the electrical wiring of the left lambda sensor downstream of the catalytic converter from its fastenings.
3. Unscrew and remove the left lambda sensor downstream of the catalytic converter.





SERVICE

**DIREZIONE POST-VENDITA**  
SERVIZI ASSISTENZIALI  
Viale Alfa Romeo 20020 Arese (MI)  
Fiat Auto S.p.A.

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