

CHECKS AND INSPECTIONS

WARNING:

The power steering pump, like the steering box, should never be dis-assembled for any reason whatsoever, they must be sent to the Manufacturer for overhauling.

Check the steering wheel rolling torque with the car stationary and the engine running. The torque should be between 0.6 daN with the engine running at idle speed and 0.75 daN with the engine at top speed: if this value is exceeded check the pressure of the system with the wheels completely steered.

For this purpose, insert a pressure gauge using a suitable "Tee" union on the pressurised oil delivery pipe to the power steering leading from the pump, and steer completely to one side. Further forcing the steering wheel to turn, the pressure reading on the gauge should rise to approx. 85 bar. If this fails to occur there is an operating failure in the pump or in the distributor valve from the power steering box

FILLING THE POWER STEERING CIRCUIT AND BLEEDING AIR

- Remove the plug and fill the tank with the specified oil.
- With the engine at idle speed, making sure that the tank does not empty, turn the steering wheel a few complete turns to bleed the air. Then top up the tank to the maximum level mark.

WARNING:

The power steering tank is self-relieving; this is obtained by completely turning the steering wheel to the right and to the left with the engine running and the vehicle stationary. This operation should be carried out each time the connection pipes are removed and refitted.

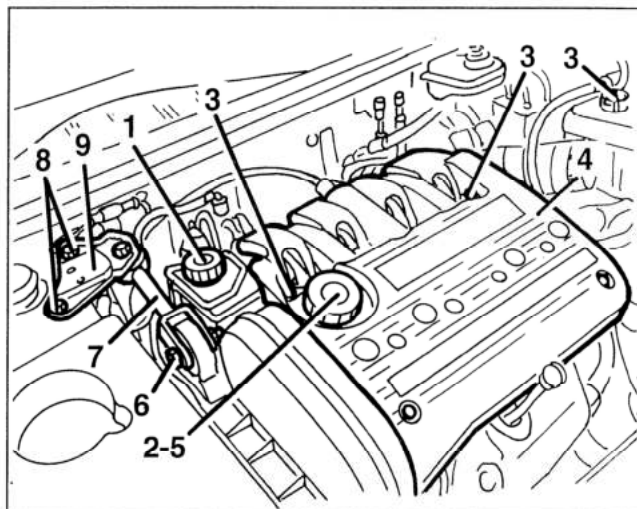
Steering stiffness may be due to slipping of the pump pulley belt or low oil level. In the event of an operating failure on the pump, operating cylinder or distributor valve, the power steering system will operate as a normal mechanical steering box.

POWER STEERING OIL RESERVOIR (1.8 - 2.0 TS engines - '98 versions)

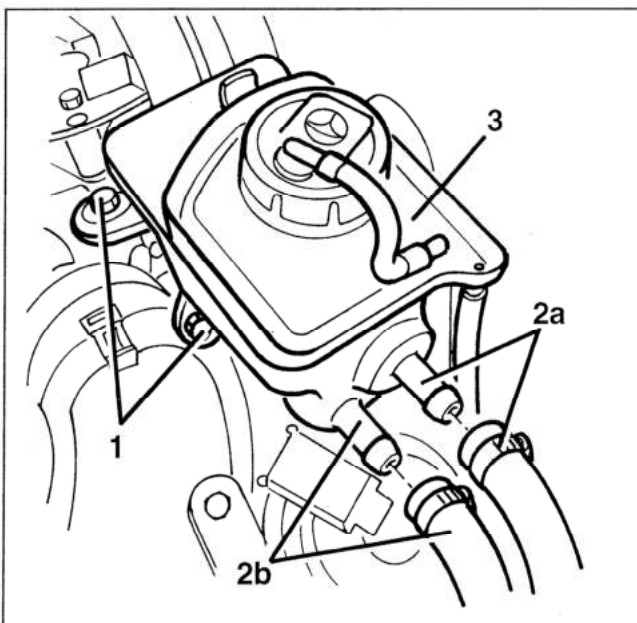
REMOVAL/REFITTING

- Open the bonnet.
- 1. Remove the power steering reservoir cap and suck the oil with a suitable syringe. Refit the cap.
- 2. Remove the engine oil filler cap.
- 3. Loosen the engine cover fastening screws.
- 4. Remove the cover.
- 5. Refit the engine oil filler cap.
- 6. Loosen the engine tie-rod fastening screws.
- 7. Remove the tie-rod.

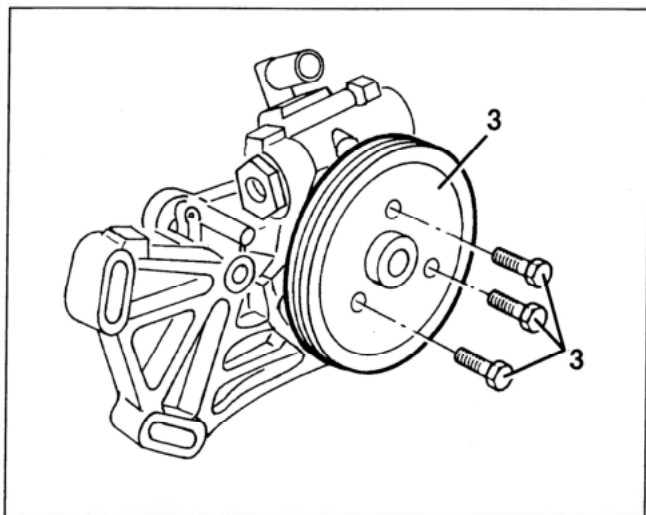
- 8. Loosen the upper bracket fastening screws.
- 9. Remove the bracket.



- 1. Loosen the power steering reservoir fastening screws.
- 2. Open the clips and disconnect the reservoir-pump return (2a) and delivery (2b) pipes.
- 3. Take the reservoir.



Refit the power steering oil reservoir by reversing the removal sequence.



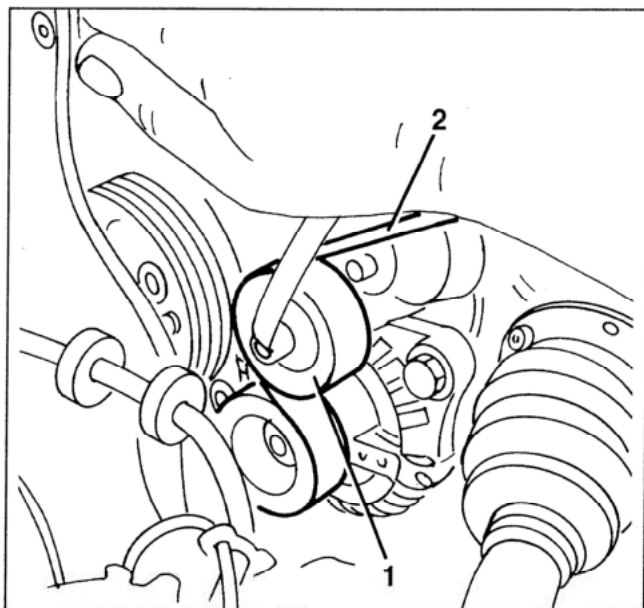
Refit the pump reversing the sequence followed for removal. Tension the belt as described in GROUP 00.
Fill the hydraulic circuit and bleed the air (see specific paragraph).

POWER STEERING PUMP

REMOVING/REFITTING

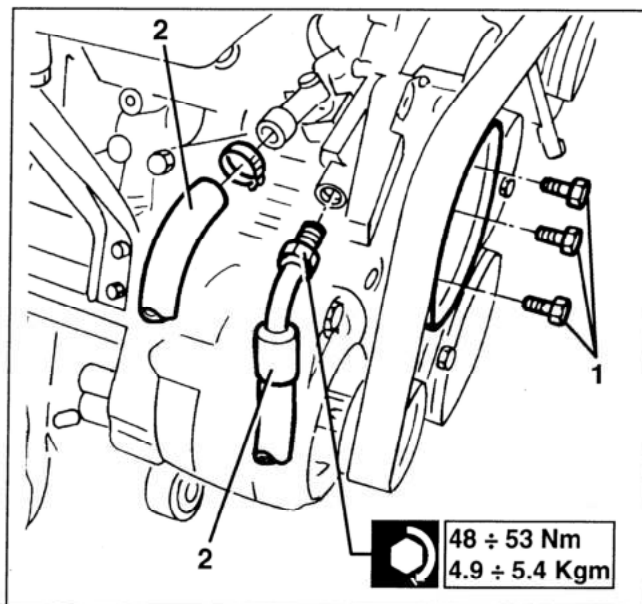
(4-CYLINDER ENGINE)

- Set the car on a lift.
 - Remove the right front wheel with gravel guard (see GROUP 70).
 - Remove the engine compartment protection, right-hand side.
 - Using a syringe, withdraw the oil from the power steering tank
1. Slacken the belt tensioner and remove the guide pulley
 2. Remove the services drive belt.



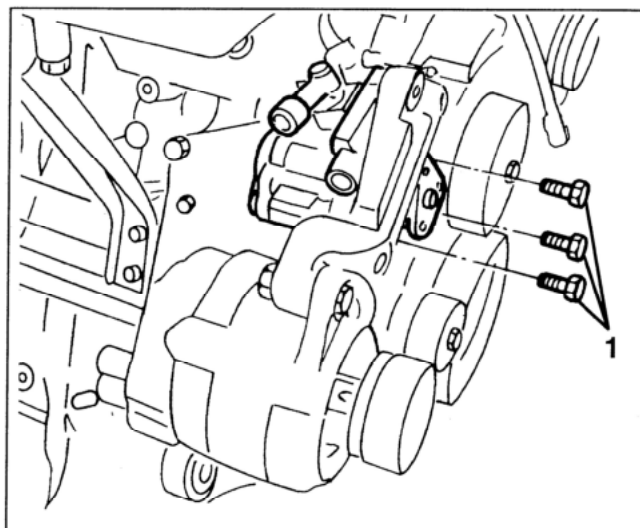
1. Holding the pump shaft still, slacken the three screws fastening the power steering pump pulley and remove it.

2. Working from above, disconnect the two pump suction and delivery pipes.



$48 \div 53 \text{ Nm}$
 $4.9 \div 5.4 \text{ Kgm}$

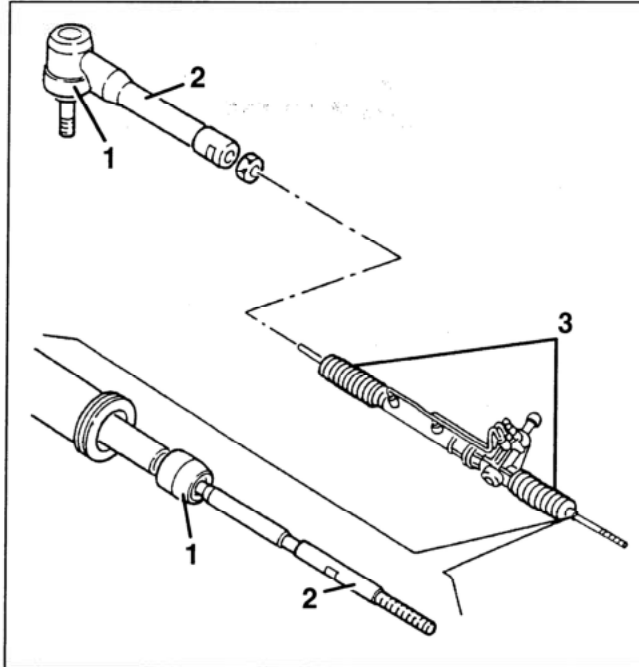
1. Slacken the three fastening screws and remove the power steering pump.



Refit the pump reversing the sequence followed for removal. Tension the belt as described in GROUP 00.
Fill the hydraulic circuit and bleed the air (see specific paragraph).

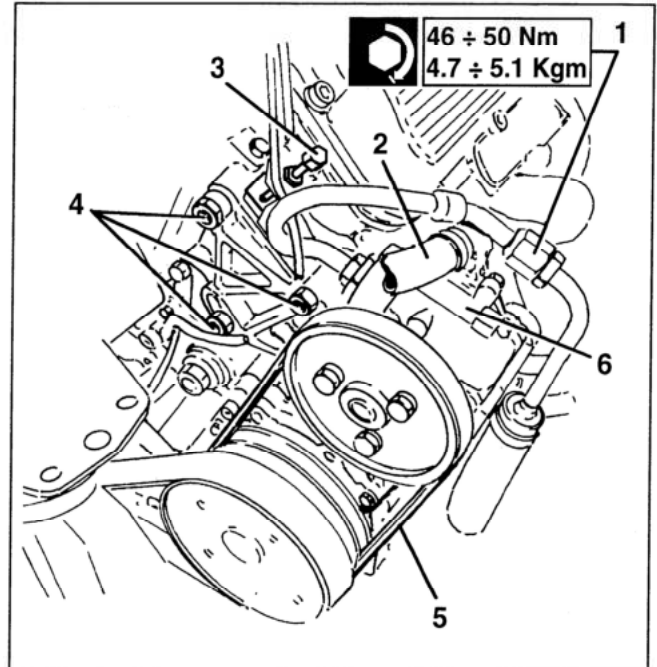
CHECKS AND INSPECTIONS

1. Check the ball joints for damage or wear and that they turn in their housings without jamming or excessive play.
2. Check the track rods for damage or distortion.
3. Make sure the bellows are intact.

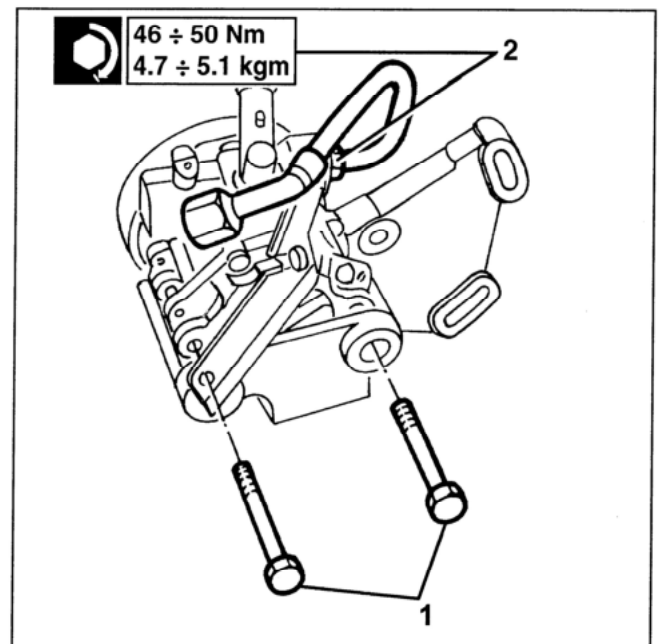
**POWER STEERING PUMP****REMOVAL / REFITTING****(6-CYLINDER ENGINE)**

- Set the car on a lift.
- Remove the right front wheel with gravel guard (see GROUP 70).
- Remove the engine compartment protection, right-hand side.
- Using a syringe, withdraw the oil from the power steering tank.
- Remove the upper radiator crossmember and engine cooling fans (see GROUP 10).

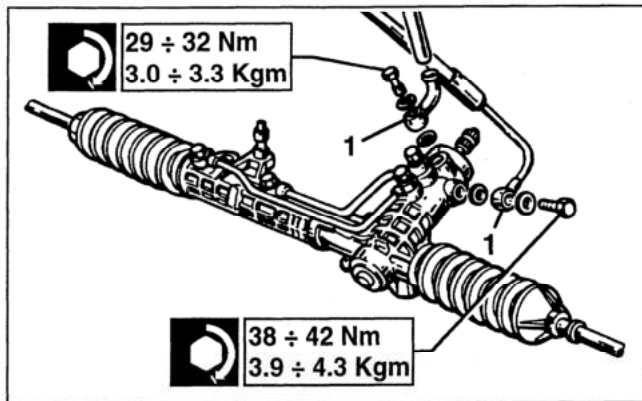
1. Disconnect the oil delivery intermediate union.
2. Disconnect the oil suction pipe from the pump.
3. Slacken the belt tensioner prod.
4. Slacken the three pump support fastening screws.
5. Prise off the belt.
6. Remove the pump complete with support.



1. Slacken the screws and separate the pump from the support.
2. Slacken the oil delivery union.
3. If necessary, slacken the three screws and separate the pulley.

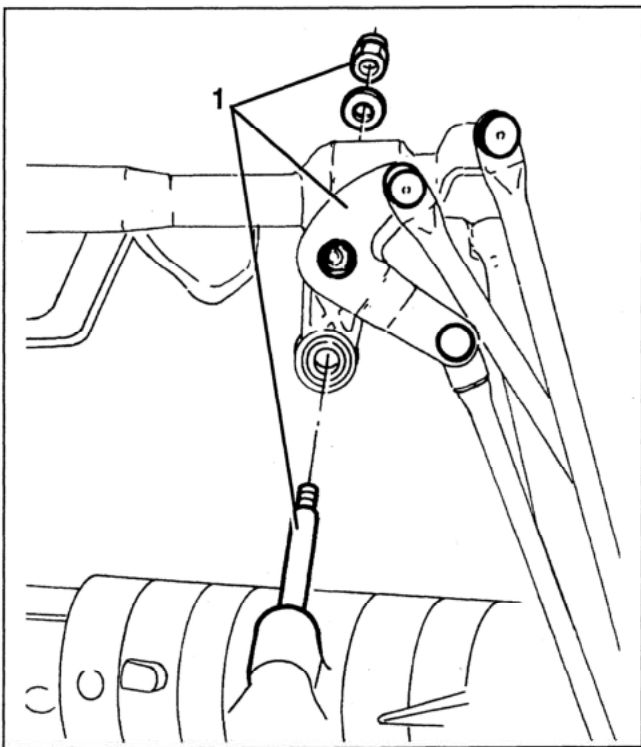


1. Disconnect the unions of the oil inlet and outlet pipes from the power steering box.

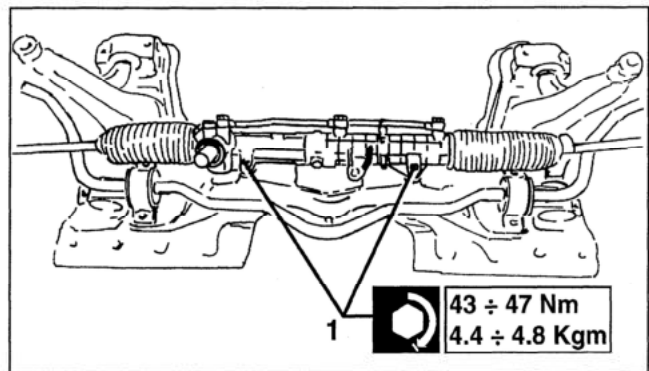


Only for version with 4-cylinder engine

1. Disconnect the relay rod of the gear engagement rods from the pin on the steering box.
— Remove the front crossmember (see GROUP 44).



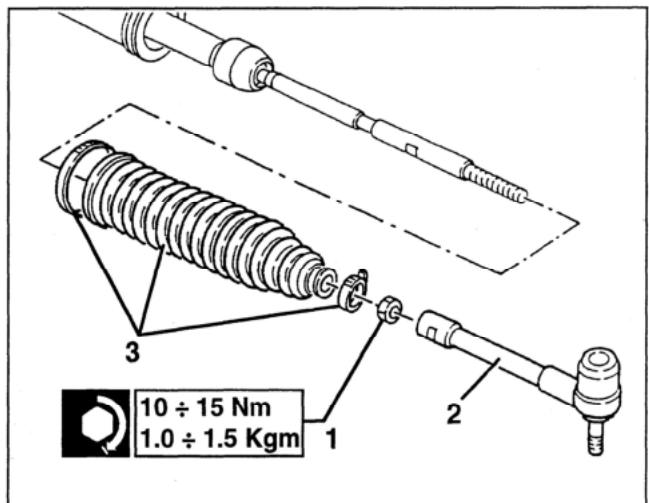
1. Slacken the two screws and separate the steering box from the crossmember.



When refitting, if necessary, adjust the track rods to the correct toe-in value as described in GROUP 44.

DIS-ASSEMBLY/REASSEMBLY

1. Slacken the track rod locknut.
2. Slacken the track rods and remove them from the arm.
3. Slacken the clamps and remove the bellows.



When reassembling lubricate the contact area between the bellows and the shaft with silicone grease so that with the clamp installed and closed at the next to last or third to last tooth, the side arm turns freely inside the bellows.

POWER STEERING

POWER STEERING BOX

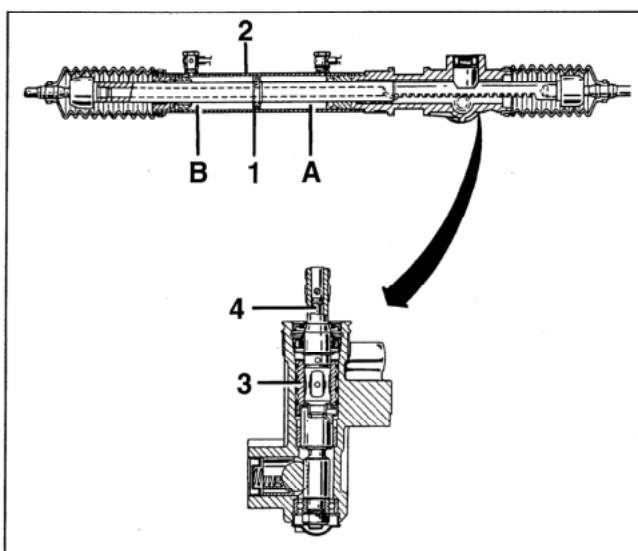
DESCRIPTION

The steering box assembly comprises a rack and pinion steering box assisted by the hydraulic oil under pressure supplied by a special pump operated by the engine.

In the steering box there is an operating cylinder (2) in which a double-acting piston (1) runs which is integral with the rack and pinion rod.

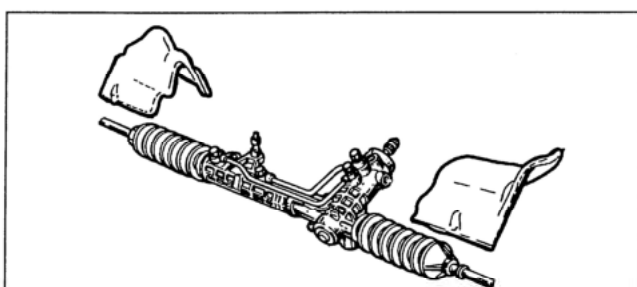
In the seat of the worm screw there is a distributor valve (3) with the corresponding ducts which is controlled by a torsion device (4) on the end of the worm screw.

Depending on the torsion transmitted to the device by the steering wheel, the pump oil is sent to the tank or to one of the two chambers A or B of the operating cylinder. The thrust generated by the pressure of the oil on the side surface of the piston causes it to move, thus also the rack and pinion.



1. Double-acting piston
2. Operating cylinder
3. Distributor valve
4. Torsion device
- A. Operating cylinder right chamber
- B. Operating cylinder left chamber

Two guards made of sound deadening material are fitted at the ends of the power steering box as illustrated.

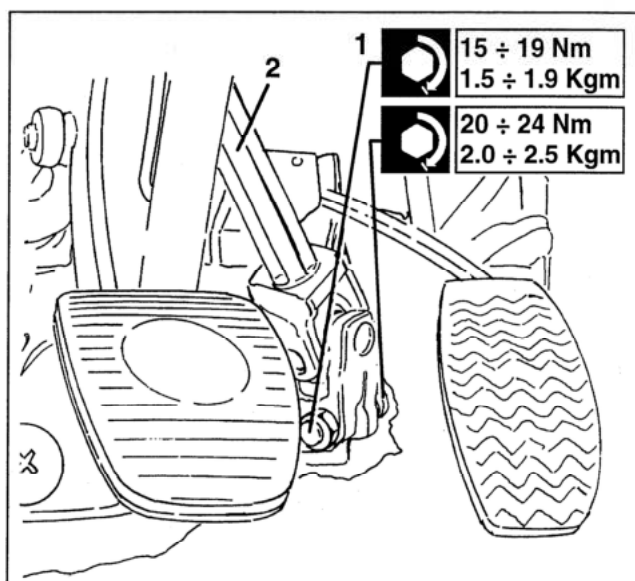


REMOVING/REFITTING

– Using a suitable syringe, empty the power steering system tank.

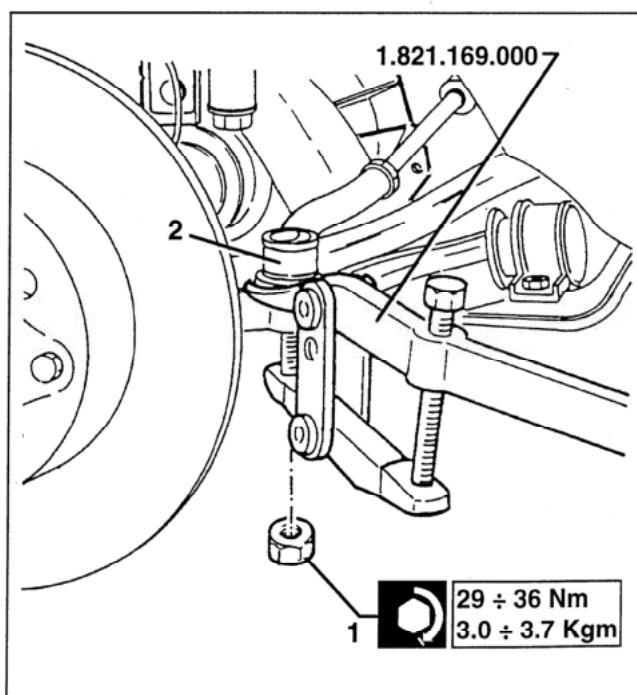
– Remove the front wheels.

1. Working from inside the car, slacken the bolt fastening the steering column to the power steering box pinion.

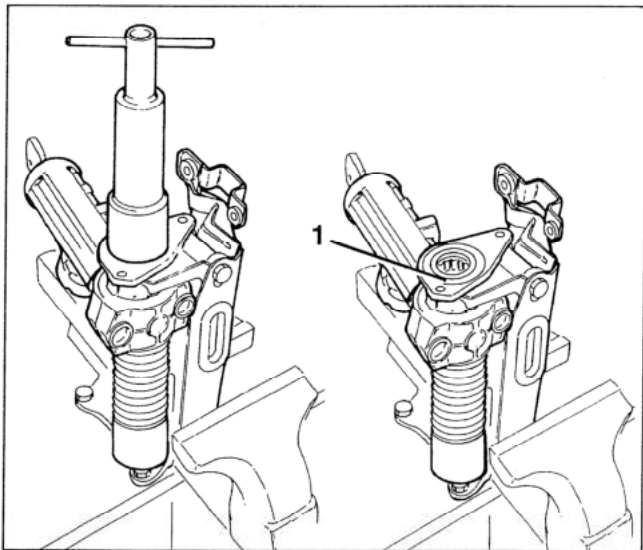


1. Slacken the nuts fastening the track ball joints to the wheel hubs.

2. Using tool no. 1.821.169.000 disconnect the track rod joints from the hubs.



1. If necessary, using a suitable puller tool, remove the steering column upper bearing.

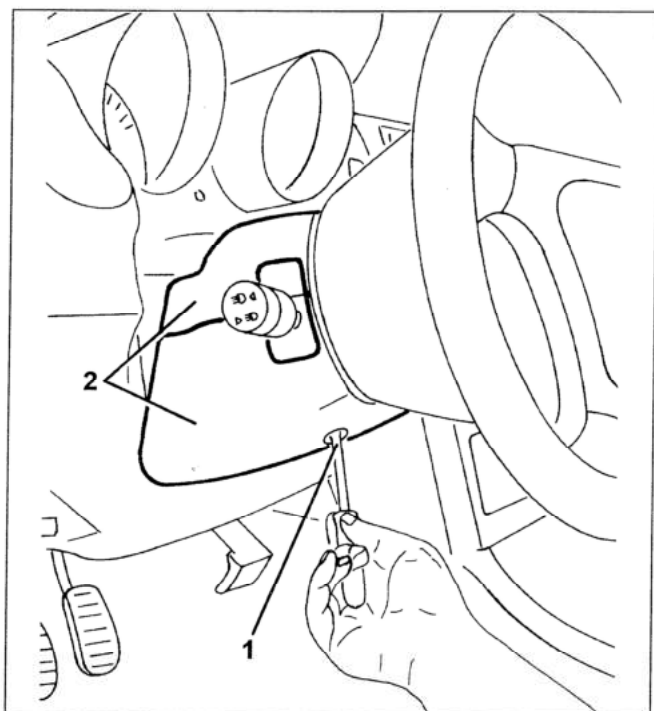


Re-assemble reversing the sequence followed for dis- assembly.

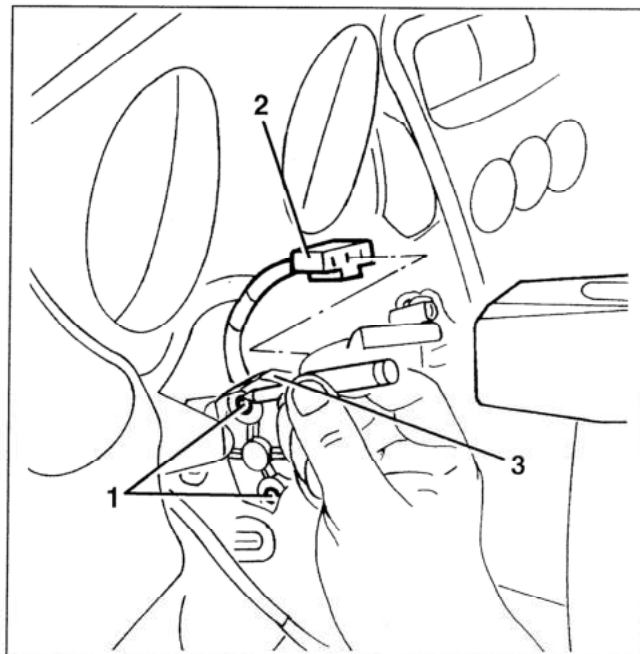
STEERING LOCK

REMOVING/REFITTING

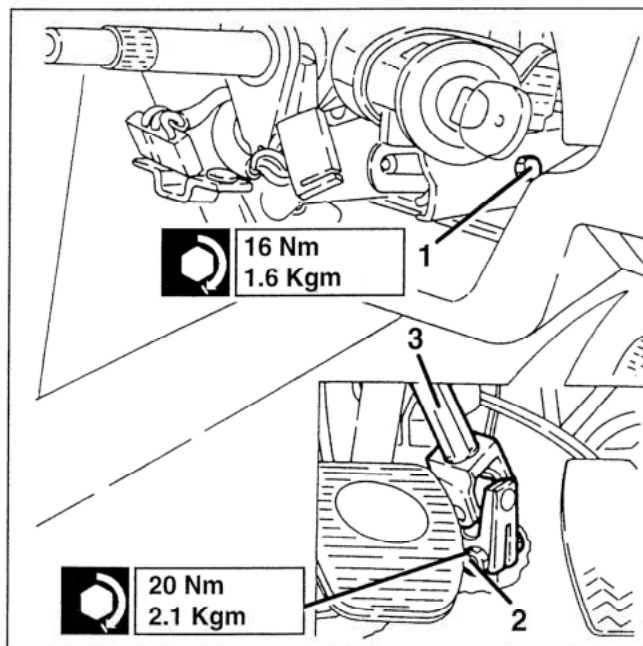
- Insert the key in the ignition switch and check that the steering wheel is released.
 - Move the steering wheel as near as possible to the driver and lock the steering column in this position.
 - Disconnect the battery.
1. Slacken from below the screws fastening the steering column half covers.
 2. Remove the cover halves.



1. Using a punch, slacken the two safety screws and remove the collar.
2. Disconnect the steering lock electrical connection and remove the aerial of the "ALFA ROMEO CODE" system.
3. Remove the steering lock.

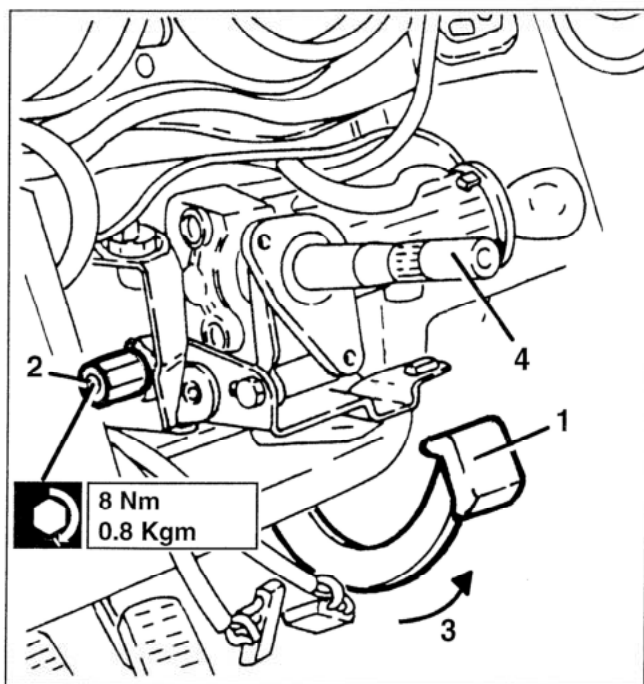


When refitting the steering lock, preverse the procedure followed for removal. Fasten the steering lock with the special safety screws supplied as spares, tightened until the head breaks.



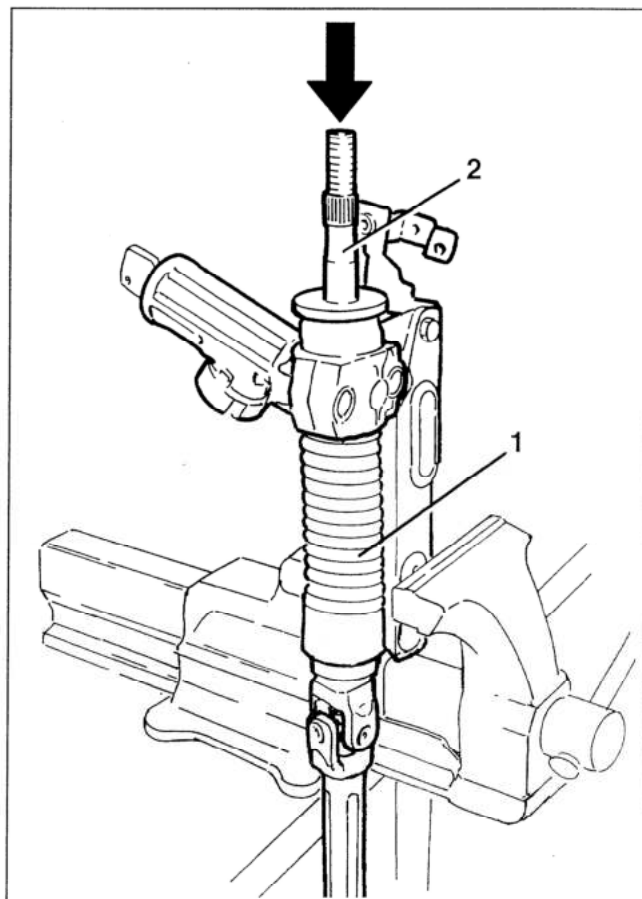
– Check the steering wheel adjustment device as follows:

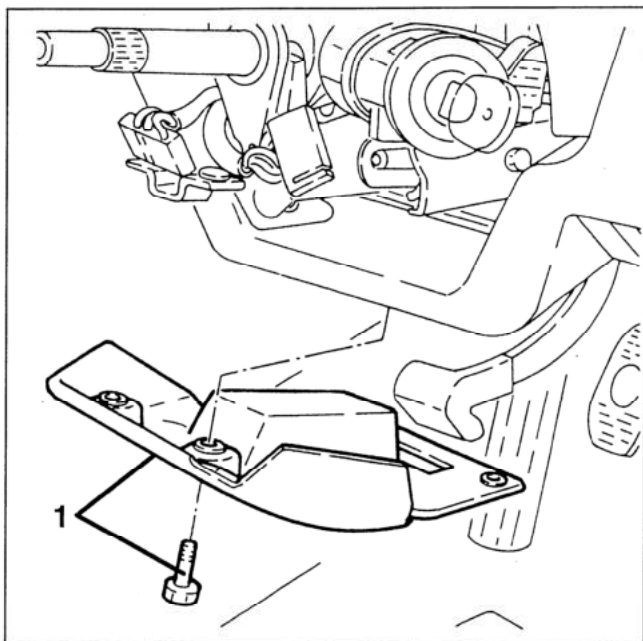
1. Move the lever to the locked position.
 2. Screw the nut and tighten it to the specified torque.
 3. Move the lever to the release position.
 4. Check that steering column adjustment takes place correctly.
- Move the lever back to the locked position.



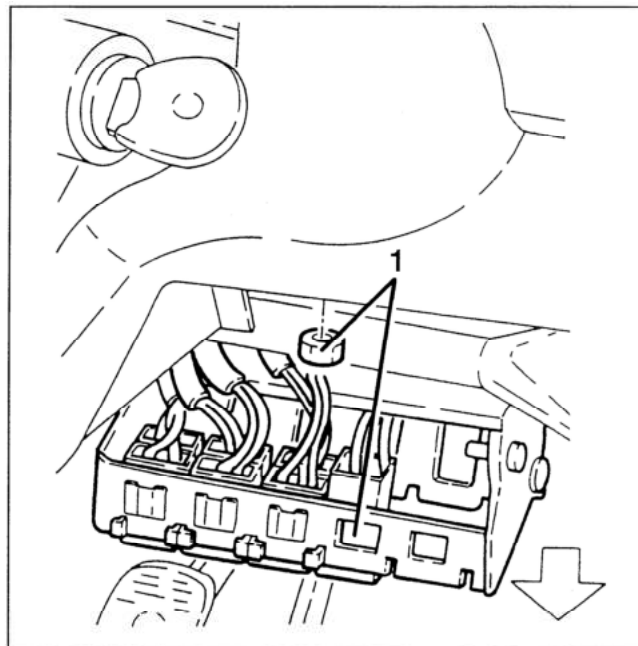
DIS-ASSEMBLY/REASSEMBLY

1. Clamp the steering column in a vice.
2. Using a resin hammer, remove the steering column shaft.

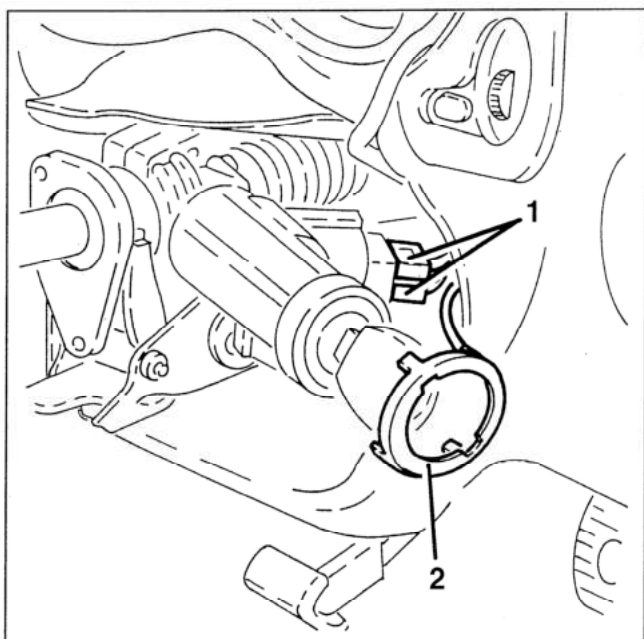




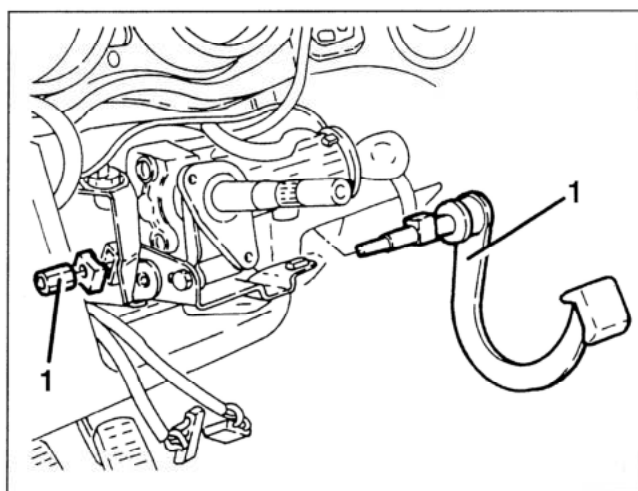
1. Disconnect the ignition switch electrical connections.
2. Remove the Alfa Romeo CODE system aerial.



1. Loosen the nut and remove the steering wheel adjustment lever and pin.

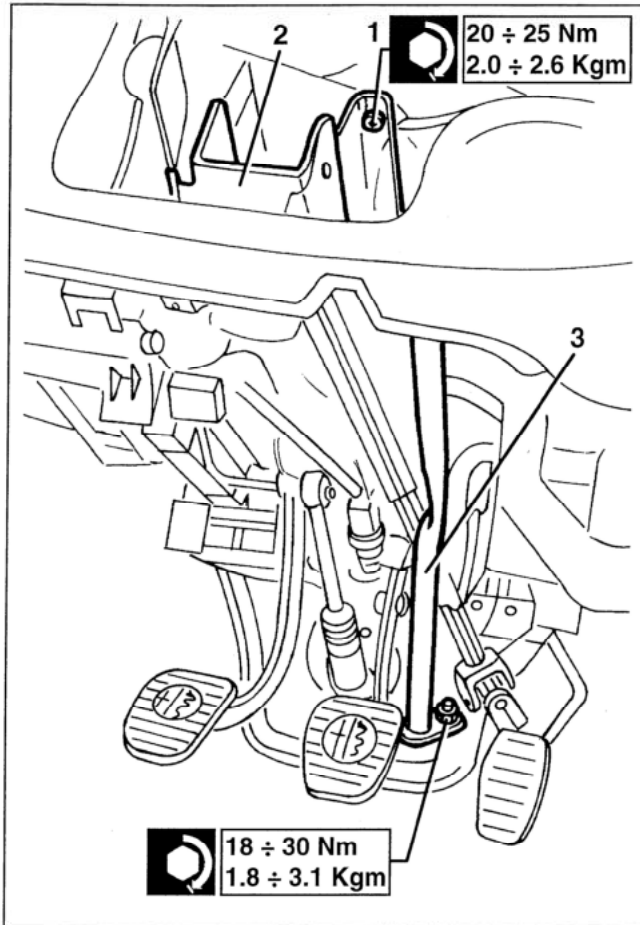


1. Loosen the fastening nut and lower the fuse bracket.



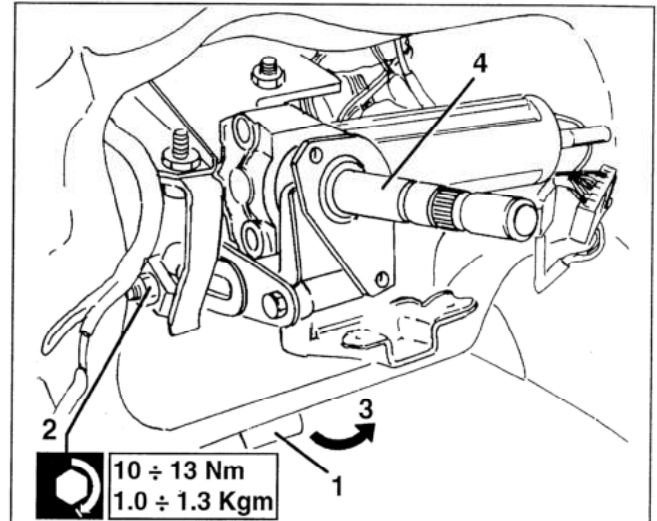
1. Loosen the steering column fastening bolt from the bracket.
2. Loosen the bolt fastening the lower CV joint to the steering unit pinion.
3. Extract the complete steering column.

1. If necessary, slacken the four bolts connecting the steering column support.
2. Retrieve the steering column support.
3. Slacken the lower nut and remove the reaction rod.



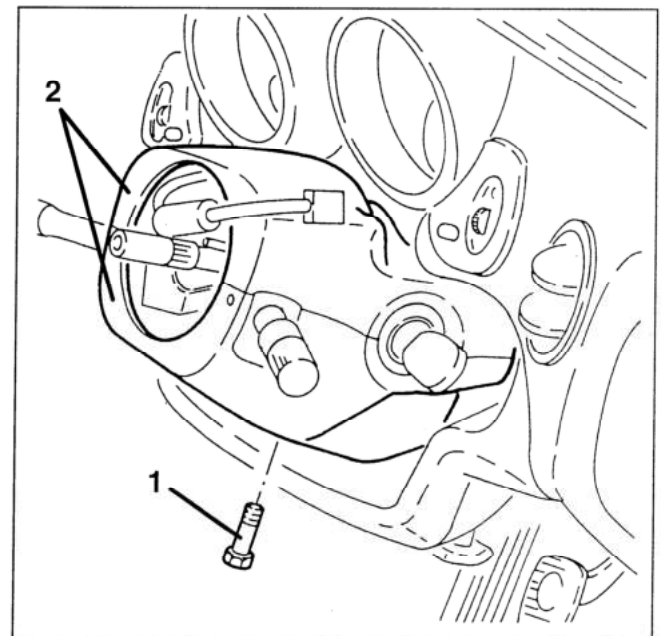
Refit reversing the sequence followed for removal and observing the following instructions.

- Check the steering wheel adjustment device as follows:
 1. Move the lever to the locked position.
 2. Screw the nut and tighten it to the specified torque.
 3. Move the lever to the release position.
 4. Check that steering column adjustment takes place correctly.
- Move the lever back to the locked position.



REMOVAL/REFITTING ('98 versions)

- Remove the steering wheel (see specific paragraph).
- 1. Loosen the steering column half casings lower side fastening screws.
- 2. Take the half casings.

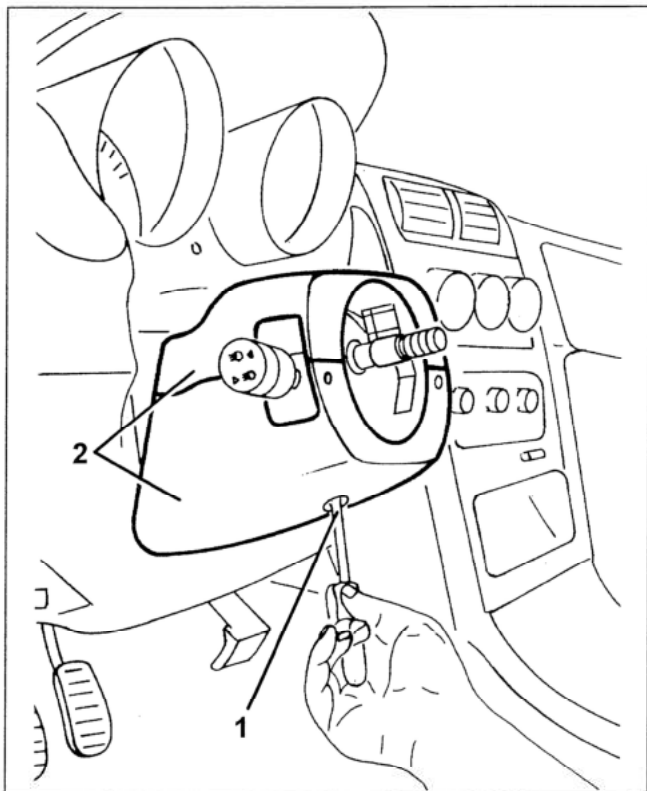


- Remove the steering column stalk assembly (see ASSEMBLY 55).
- Remove the valve guard from the panel under the dashboard (see ASSEMBLY 70).
- 1. Loosen the screws and remove the panel under the dashboard.

REMOVING/REFITTING (to '97 versions)

– Remove the steering wheel (see specific paragraph).

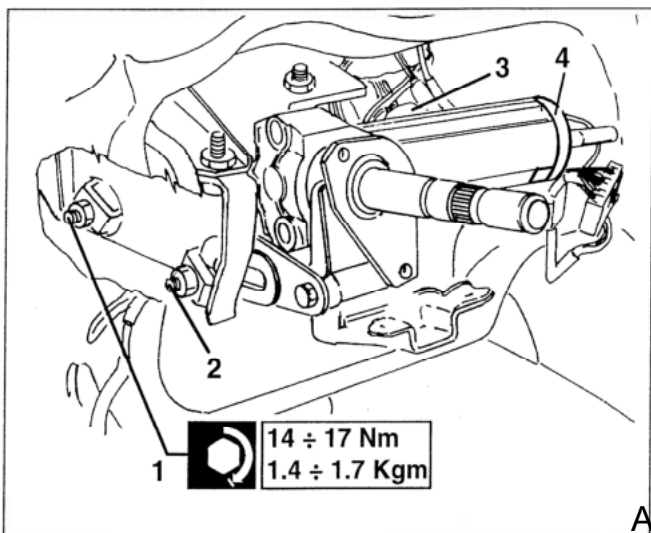
1. Slacken from below the screws fastening the steering column cover halves.
2. Remove the steering column cover halves.



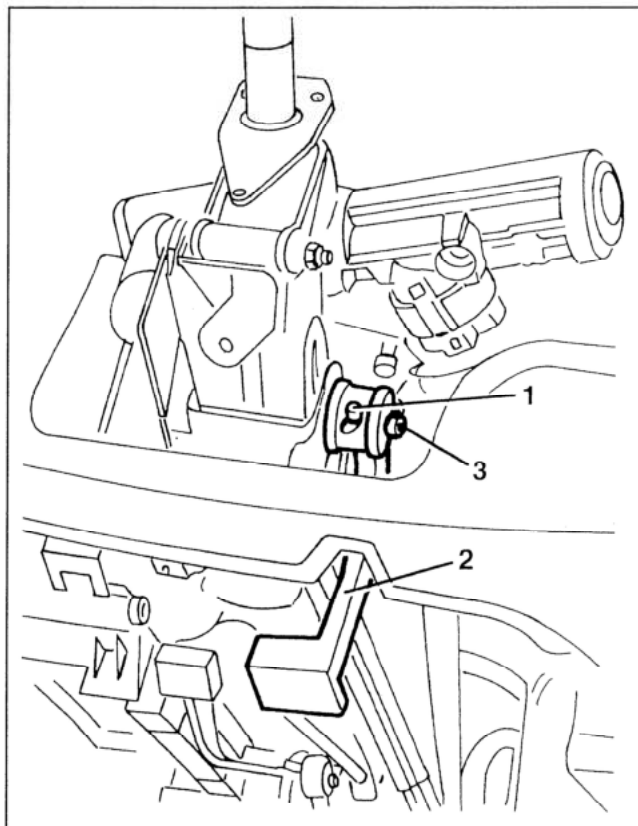
– Remove the steering column lever unit (see GROUP 55).

– Remove the fusebox cover from the dashboard lower panel (see GROUP 70).

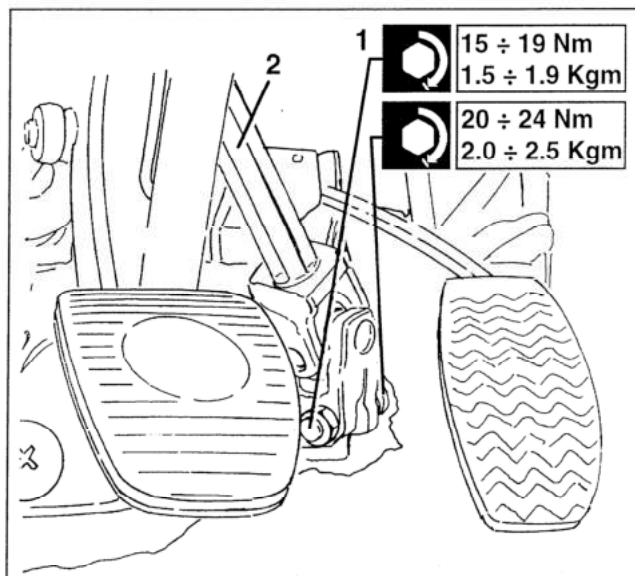
1. Slacken and remove the bolt of the lower slotted bracket for axial steering column adjustment.
2. Slacken the nut of the upper bracket.
3. Disconnect the connection of the ignition switch.
4. Withdraw the aerial of the "ALFA ROMEO CODE" system.



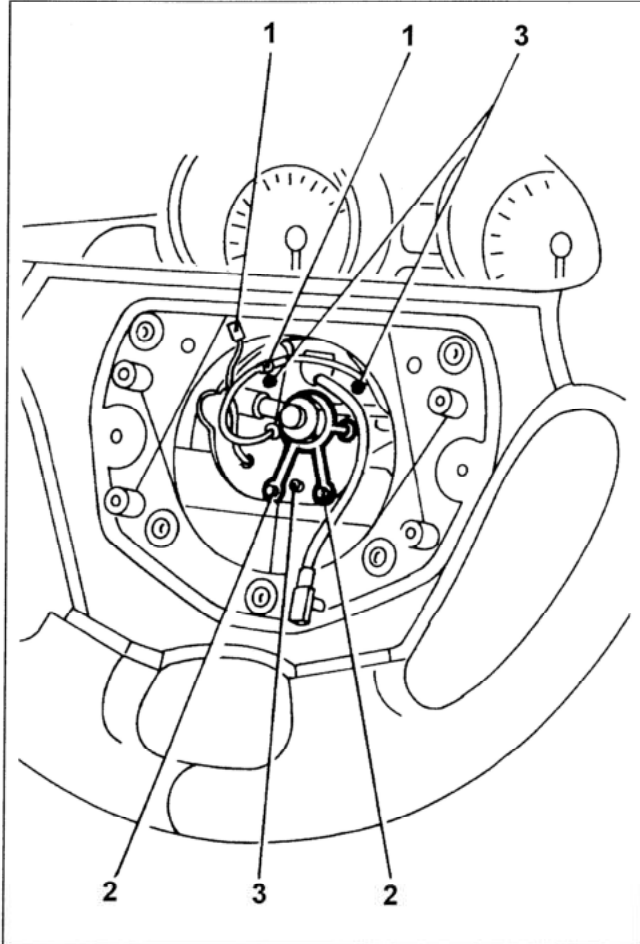
1. Withdraw the retainer pin.
2. Withdraw the steering wheel adjustment lever.
3. Remove the pin from the upper slotted bracket.



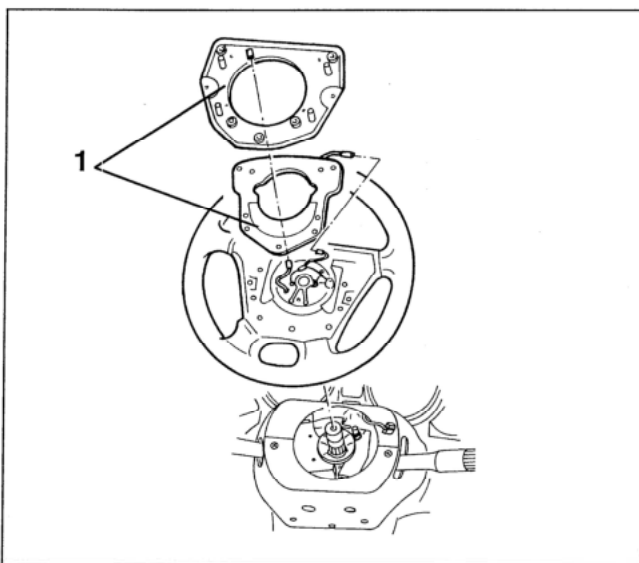
1. Slacken the bolt fastening the lower cardan joint to the steering box shaft.
2. Remove the complete steering column.



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



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



STEERING COLUMN

DESCRIPTION

In order to higher the degree of passive safety of the vehicle, a new "collapsible" steering column has been designed which considerably improves behaviour in all types of front crashes.

This sophisticated project involves splitting the control shaft in two trunks. The lower section is by telescopic sliding sleeve (collapse stroke: max 80 mm) with absorption of the movements leading from the steering box.

The upper section is supported by a corrugated sleeve which absorbs energy.

In fact, in the event of a crash the impact of the driver's head and chest against the steering wheel results in distortion of the coils of the corrugated sleeve, thus the steering column "gives in" upon impact.

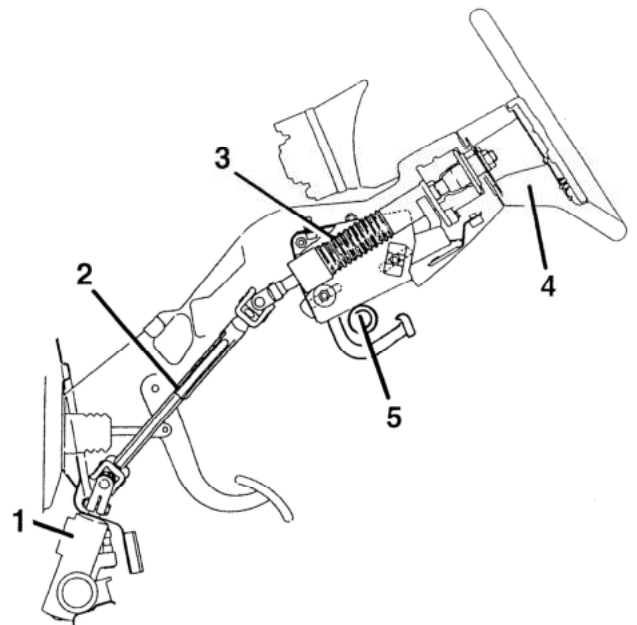
To '97 versions

Next to the steering column there is a reaction rod which also has an easily deformable section.

The purpose of this rod is to make the fastening of the steering column more rigid in the event of impact.

'98 versions

The steering column is supported by a specific cross-member.



1. Steering box
2. Sliding sleeve
3. Corrugated sleeve
4. Steering wheel
5. Steering column crossmember

STEERING WHEEL**REMOVING / REFITTING**

NOTE: From chassis no. ____ the steering wheel is of the type with three spokes, but the procedure remains unchanged.

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

**WARNING:**

Before doing any work on the system closely adhere to the **SAFETY INSTRUCTIONS** concerning the Air Bag system described in Group "55 - ELECTRIC SYSTEM DIAGNOSIS", Section "Air Bag and Pre-tensioners".

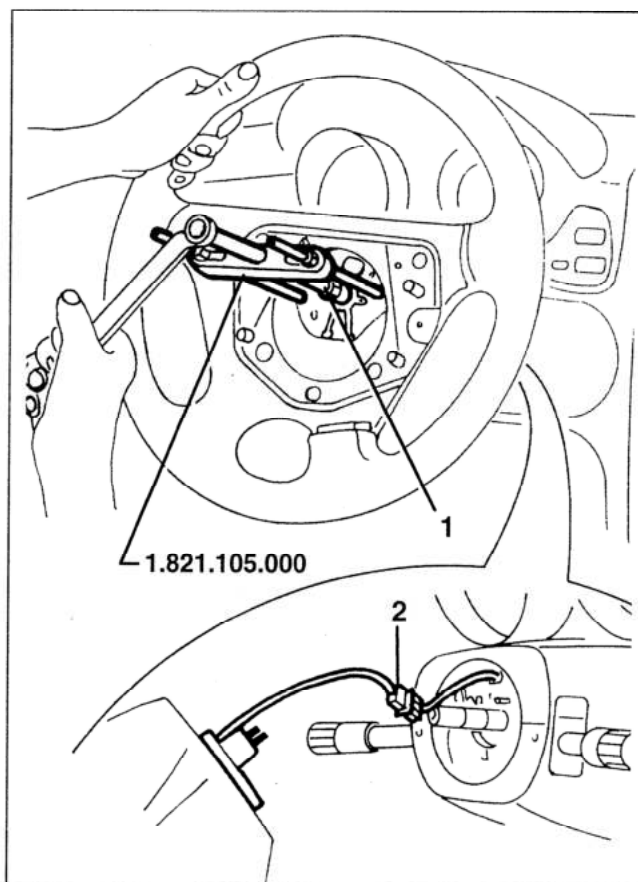
Disconnect both the battery terminals, isolate them accurately and wait for 10 minutes before doing any work.

1. Remove the steering wheel fastening nut.

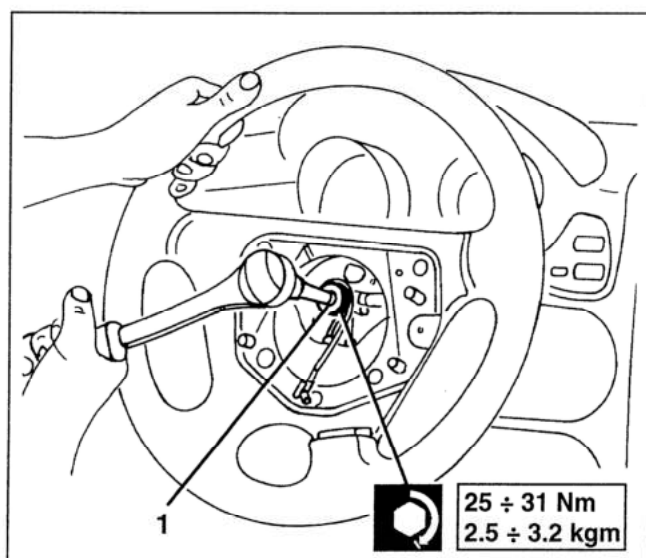
**CAUTION:**

Before carrying out this operation make sure that the wheels are perfectly straight ("spoked" steering wheel).

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

**CAUTION:**

Take care at this stage not to turn the clock spring with respect to the steering wheel, as the device is locked only when separated from the steering wheel (see next step). Therefore, you are advised to fix the clock spring to the steering wheel, for example using adhesive tape



STEERING CONTROL

DESCRIPTION

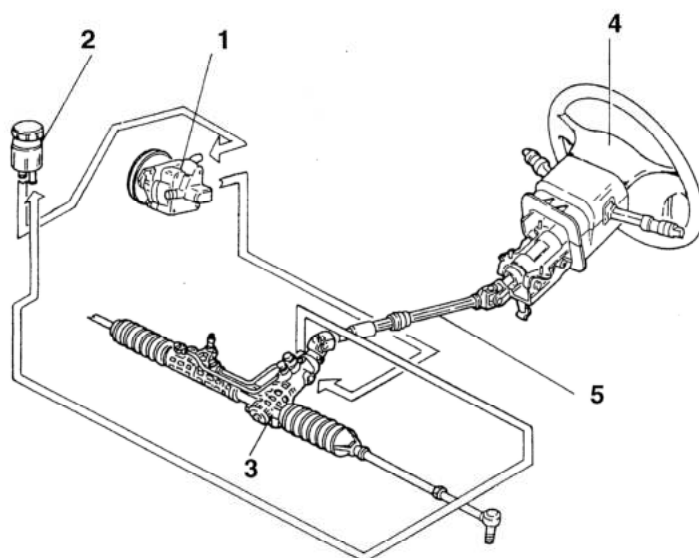
The power-assisted steering system enables the effort required to turn the steering wheel to be reduced when manoeuvring at low speeds and keeps the steering steady at high speeds.

The system comprises a pump (1) operated directly by the engine through a belt. The pump draws fluid through the inlet pipe from the reservoir (2) located in

the engine compartment and sends it under pressure through the delivery hose to the distribution valve located on the power steering box (3).

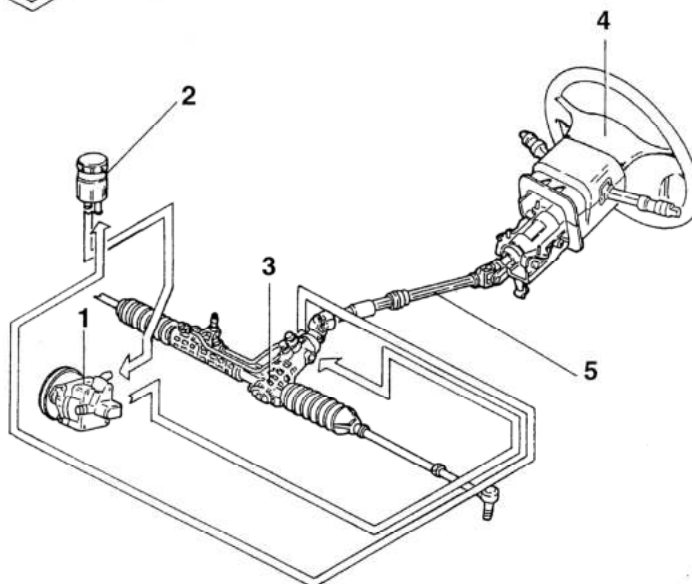
The distribution valve, operated by the rotation of the steering wheel, sends the oil under pressure from one side or the other of the hydraulic cylinder which is integral with the rack and pinion inside the steering box.

A hose allows the fluid to return to the reservoir, thereby closing the circuit.



4-CYLINDER ENGINE

6-CYLINDER ENGINE



- 1 Power steering pump
- 2 Reservoir
- 3 Power steering box
- 4 Steering wheel
- 5 Steering column

INDEX

STEERING CONTROL

- Description 1
- Steering wheel 2
 - Removing / refitting 2
- Steering column 3
 - Description 3
 - Removing/refitting (to '97 versions) 4
 - Removing/refitting ('98 versions) 4/1
 - Dis-assembly/reassembly 5
- Steering lock 6
 - Removing/refitting 6

POWER STEERING

- Power steering box 7
 - Description 7
 - Removing/refitting 7
 - Dis-assembly/reassembly 8
 - Checks and inspections 9
- Power steering pump 9
 - Removal / refitting (6-cylinder engine) 9
 - Removing/refitting (4-cylinder engine) 10
 - Checks and inspections 11
- Filling the power steering circuit and bleeding air 11
- Power steering oil reservoir (1.8 - 2.0 TS engines - '98 versions) 11
 - Removing/refitting 11