

Chapter 10

Suspension and steering

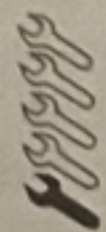
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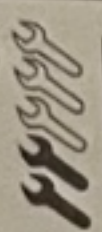
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Degrees of difficulty

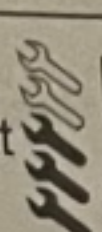
Easy, suitable for novice with little experience



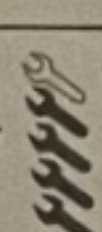
Fairly easy, suitable for beginner with some experience



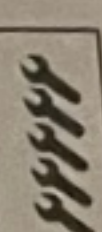
Fairly difficult, suitable for competent DIY mechanic



Difficult, suitable for experienced DIY mechanic



Very difficult, suitable for expert DIY or professional



Specifications

General

.....	Independent with MacPherson struts, hub carriers and anti-roll bar. Struts incorporate gas-filled shock absorbers and coil springs.
.....	Subframe with lower arms and balljoints
.....	Independent with struts and anti-roll bar. The struts incorporate gas-filled shock absorbers and coil springs. Subframe with upper and lower transverse links to trailing arms
.....	Rack-and-pinion, hydraulic power assistance on all models

Front

..... wheels	2.0 ± 0.6 mm
16 in wheels	2.2 ± 0.6 mm
17 in wheels	2.2 ± 0.6 mm
Camber:	
15 in wheels	-0.8° (at body height of 600 mm)
16 in wheels	-0.9° (at body height of 610 mm)
17 in wheels	-0.8° (at body height of 630 mm)
Castor	2.9° ± 0.5°
Swivel pin inclination	12.6° ± 0.5°

Rear:

Toe-in:	
15 in wheels	3.0 ± 1.4 mm
16 in wheels	3.2 ± 1.4 mm
17 in wheels	3.4 ± 1.4 mm
Camber:	
15 in wheels	-0.9° (at body height of 590 mm)
16 in wheels	-0.8° (at body height of 605 mm)
17 in wheels	-0.8° (at body height of 620 mm)
Steering angle toe-out on turns:	
Outer wheel	20.0°
Inner wheel	21.25° ± 0.5°

Roadwheels

Size:

Standard

Compact spare

6 x 15, 6.5 x 16 or 7 x 17
4.0 x 16

10•2 Suspension and steering

Tyres

Size

Tyre pressures

195/65R15, 205/65R15, 215/55R16, 225/45R17 & 235/45R17
See end of Weekly checks on page 0•16

Power steering

Steering wheel turns, lock-to-lock

2.9 turns

Torque wrench settings

Front suspension

Anti-roll bar link

Anti-roll bar to subframe

Engine rear mounting to engine bracket

Engine rear mounting to subframe

Hub bearing and backplate to carrier:

Stage 1

Stage 2

Hub (driveshaft) nut (new)

Lower arm rear mounting to lower arm

Lower arm mounting to subframe:

Stage 1

Stage 2

Lower balljoint to hub carrier

Lower balljoint to lower arm:

Stage 1

Stage 2

Shock absorber piston rod upper retaining nut

Strut to hub carrier:

Stage 1

Stage 2

Strut top mounting bolts

Subframe mounting to underbody:

Stage 1

Stage 2

Subframe rear crossmember support bracket

Rear suspension

Anti-roll bar to crossmember

Hub assembly to trailing arm:

Stage 1

Stage 2

Shock absorber/strut lower mounting bolt

Shock absorber/strut piston rod top mounting

Shock absorber/strut to body

Subframe:

Stage 1

Stage 2

Trailing arm bracket to underbody:

Stage 1

Stage 2

Trailing arm to mounting bracket:

Stage 1

Stage 2

Upper and lower transverse links to trailing arm:

Stage 1

Stage 2

Steering

Power steering pump

Power steering pump delivery pipe support

Power steering pump delivery pipe union nut

Steering column

Steering column-to-pinion gear clamp bolt

Steering gear mounting bolts

Steering gear supply and return pipe union bolts

Steering wheel

Track rod end locknut

Track rod end to steering arm

Wheels

Roadwheel bolts

Nm

lbf ft

90

66

25

18

50

37

25

18

90

66

Angle-tighten 45°

230

170

75

55

120

89

Angle-tighten 90°

49

36

20

15

Angle-tighten 90°

75

55

100

74

Angle-tighten 90°

30

22

100

74

Angle-tighten 45°

65

48

50

37

50

37

Angle-tighten 30°

190

140

20

15

55

41

90

66

Angle-tighten 60°

90

66

Angle-tighten 30°

90

66

Angle-tighten 60°

90

66

Angle-tighten 60°

25

18

30

22

30

22

25

18

30

22

95

70

30

22

38

28

70

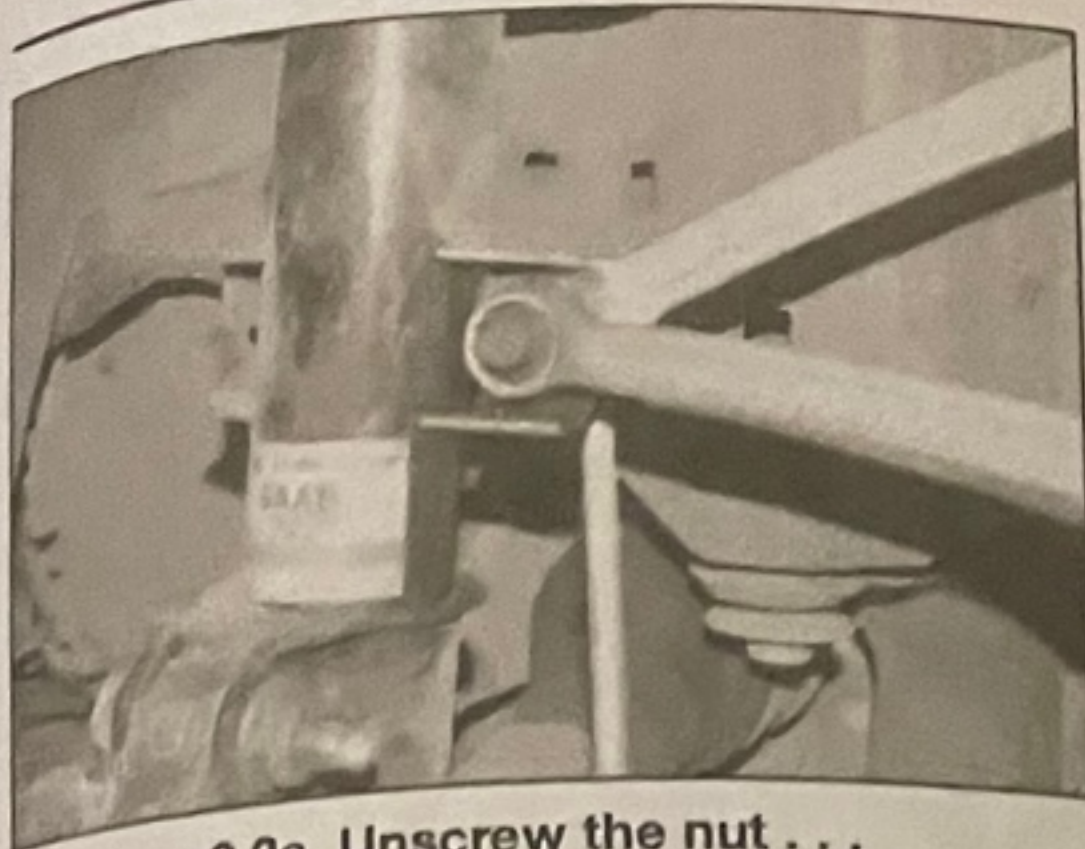
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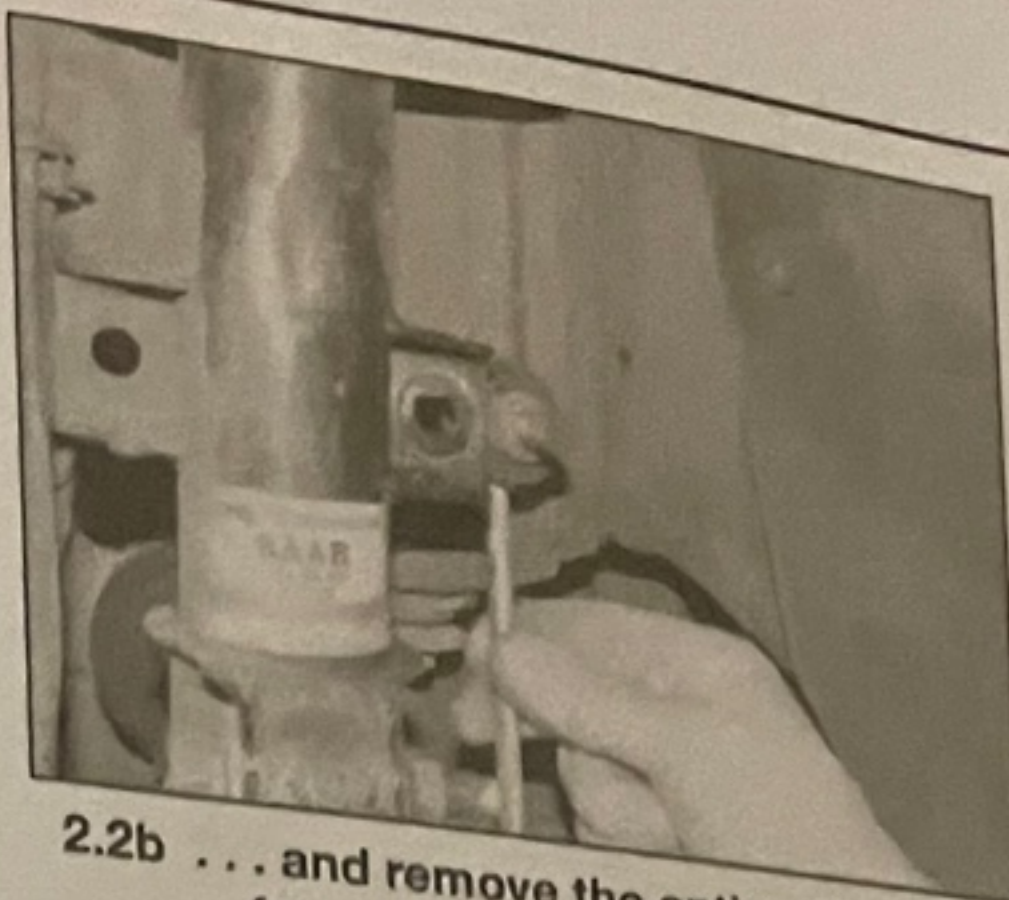
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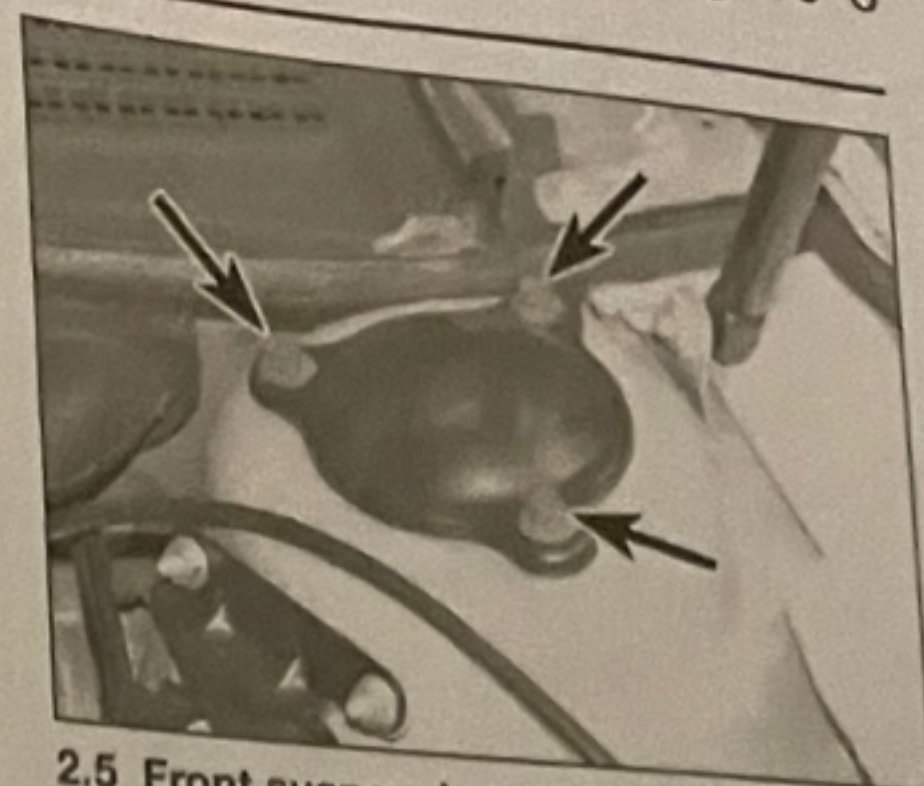
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2.2a Unscrew the nut . . .



2.2b . . . and remove the anti-roll bar link from the suspension strut



2.5 Front suspension strut upper mounting bolts

1 General information

The front suspension is fully independent, with MacPherson struts and an anti-roll bar. The struts incorporate shock absorbers and gas-filled coil springs, and the hub carriers are bolted to the bottom of the struts. The hub carriers are located on the outer ends of the lower arms by renewable balljoints bolted onto the arms. The hub bearings can be renewed separately, although, on later models the hub and bearings are integral, and are bolted to the carriers separately. The lower arms and anti-roll bar are mounted on the front suspension subframe located beneath the engine compartment.

The rear suspension is fully independent, with trailing arms, struts, upper and lower transverse links and an anti-roll bar. The struts incorporate shock absorbers and coil springs, and the hubs are bolted to the trailing arms. The transverse links and anti-roll bar are mounted on the rear suspension subframe. The rear hubs have double-row bearings and are supplied as integral units that cannot be dismantled; they are attached to the trailing arms by studs and nuts. Each rear hub incorporates an internal ABS sensor to monitor the wheel speed.

Power-assisted steering is fitted to all models. The steering rack is essentially a hydraulic ram, which is actuated mechanically by a pinion gear, and hydraulically by pressurised hydraulic

fluid, supplied by the power steering pump. The steering column transmits effort applied at the steering wheel to the pinion, and a control valve supplies hydraulic fluid to the steering rack ram. When the steering wheel is turned, the valve directs fluid to the appropriate side of the ram, assisting the movement of the rack. The power steering pump is mounted externally on the engine, and is driven by the auxiliary drivebelt.

The design and mounting position of the steering column are such that, in the event of a head-on collision, it will absorb impact by crumpling longitudinally, and will also be deflected away from the driver.

2 Front strut – removal, overhaul and refitting

Removal

- 1 Apply the handbrake, then jack up the front of the vehicle and support it on axle stands (see *Jacking and vehicle support*). Remove the roadwheel.
- 2 Unscrew the nut and remove the anti-roll bar link from the suspension strut. Hold the link spindle with one spanner while the nut is being loosened (see illustrations).
- 3 Note that the bolts securing the strut to the hub carrier are fitted with their heads facing forwards. Unscrew and remove the bolts, and move the holder for the ABS wheel sensor and brake hydraulic hose to one side. The bolts have small location splines on their shanks,

and must not be turned within the hub carrier; hold the bolt head stationary and unscrew the nut from it.

4 Hold the strut inwards while the hub carrier is tilted outwards from it. Do not strain the brake flexible hydraulic hose.

5 Support the strut, and then unscrew the upper mounting bolts on the suspension tower in the rear corner of the engine compartment. Note that the mounting bolts also secure an upper cover. Withdraw the strut from under the front wing (see illustration).

Overhaul

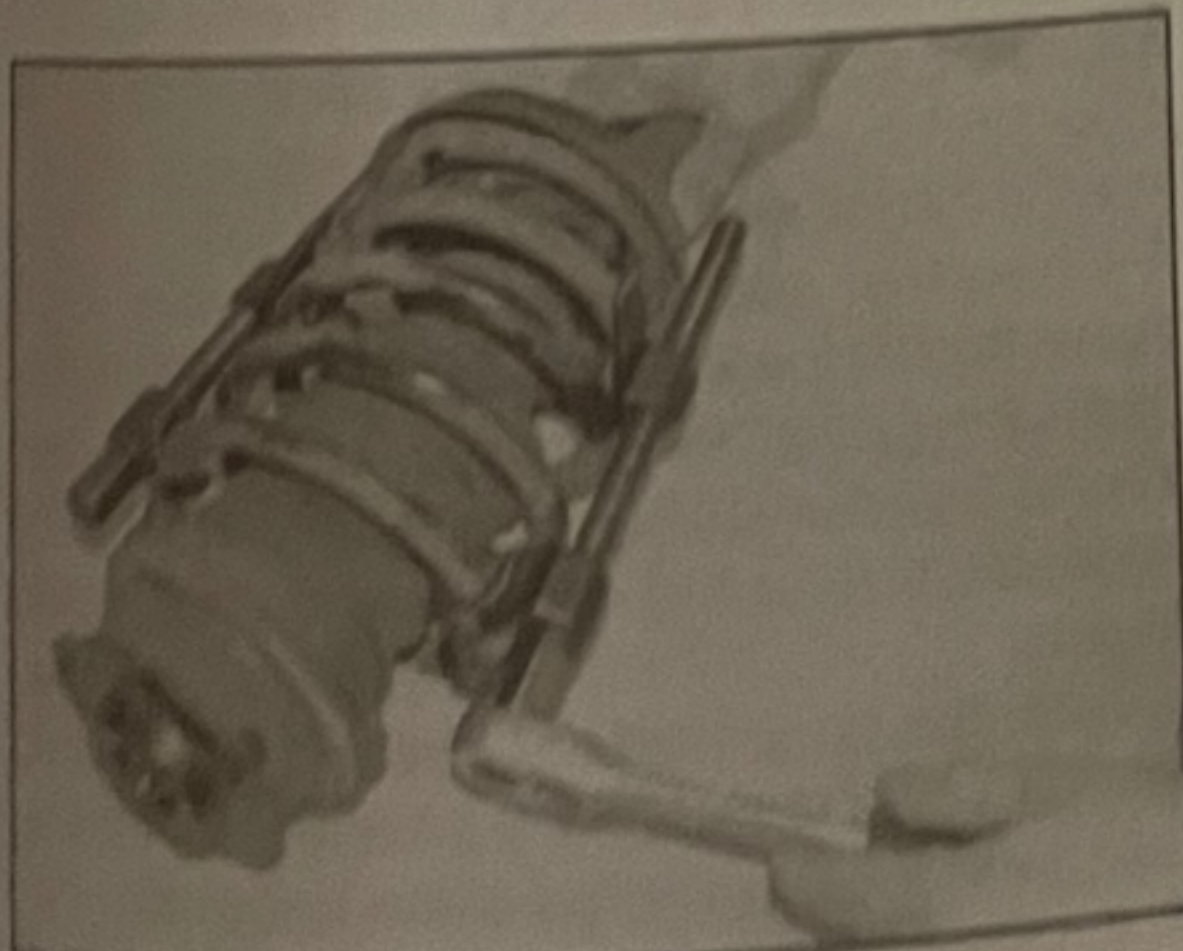
Warning: Before attempting to dismantle the front suspension strut, the coil spring must be first held in compression, using a purpose-made tool. Universal coil spring compressors are available from motor factors or car accessory shops, and are essential for this operation. DO NOT attempt to dismantle the strut without such a tool, as damage and/or personal injury is likely.

Note: A new top-mounting nut must be used on reassembly.

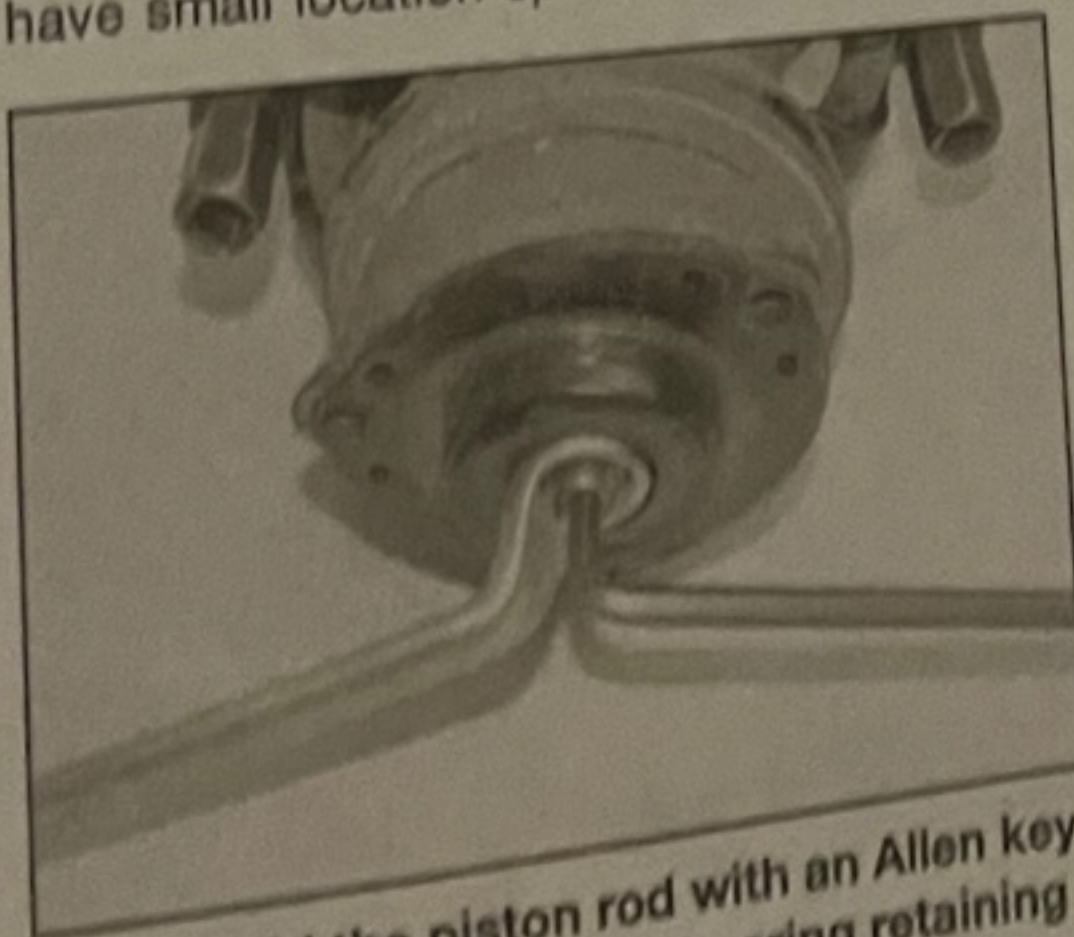
6 Support the strut by clamping it in a soft-jawed vice.

7 Using the spring compressor, compress the coils of the spring just enough to relieve all pressure from the upper spring seat (see illustration).

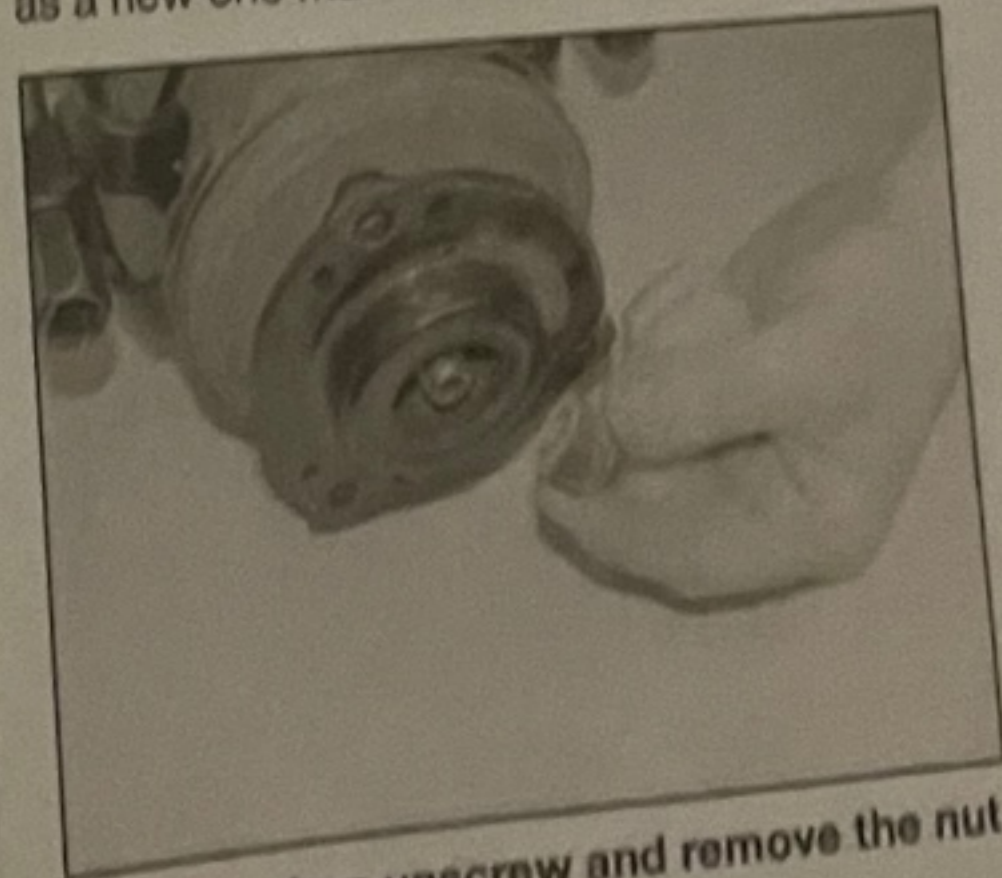
8 The shock absorber piston rod must be held stationary while the top bearing retaining nut is unscrewed. To do this, use a ring spanner and Allen key (see illustrations). Discard the nut, as a new one must be fitted on reassembly.



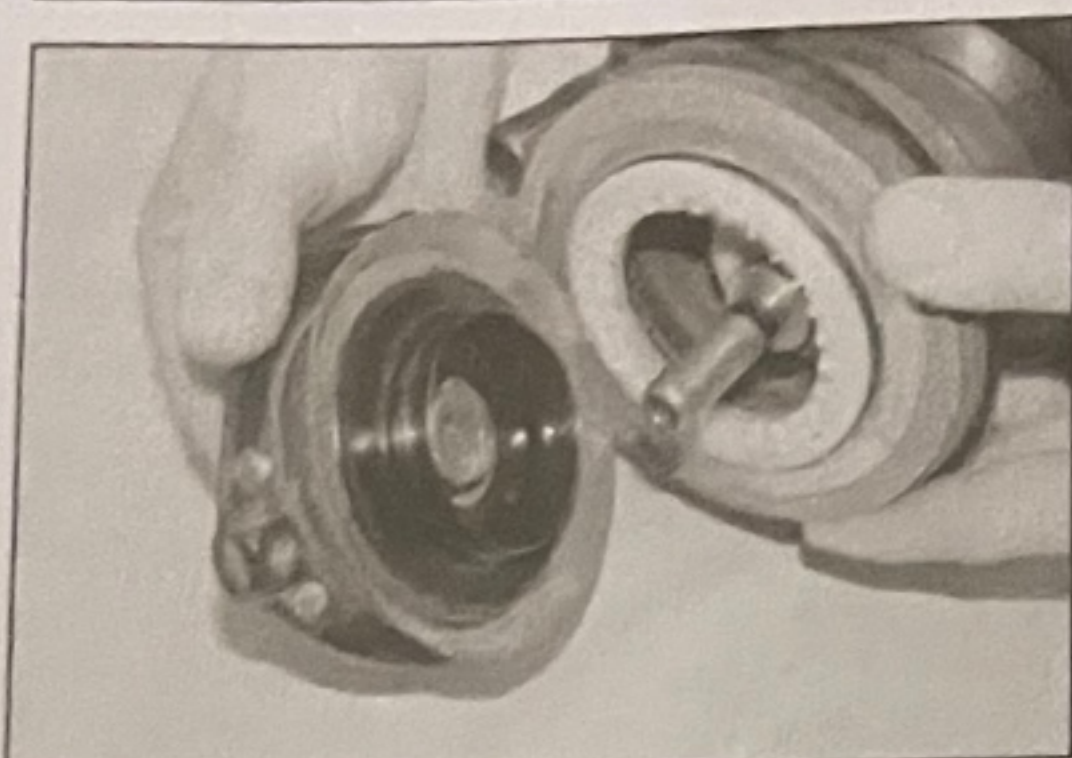
2.7 Compressing the coil spring using the spring compressor tools



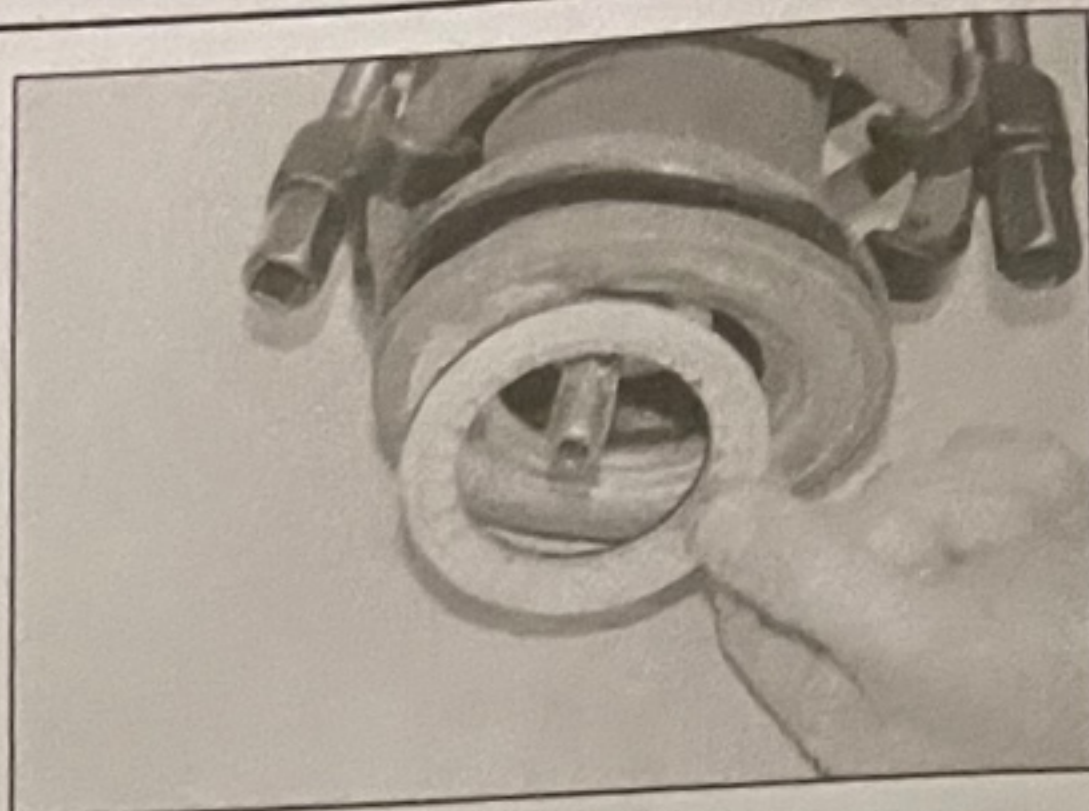
2.8a Hold the piston rod with an Allen key while loosening the top bearing retaining nut . . .



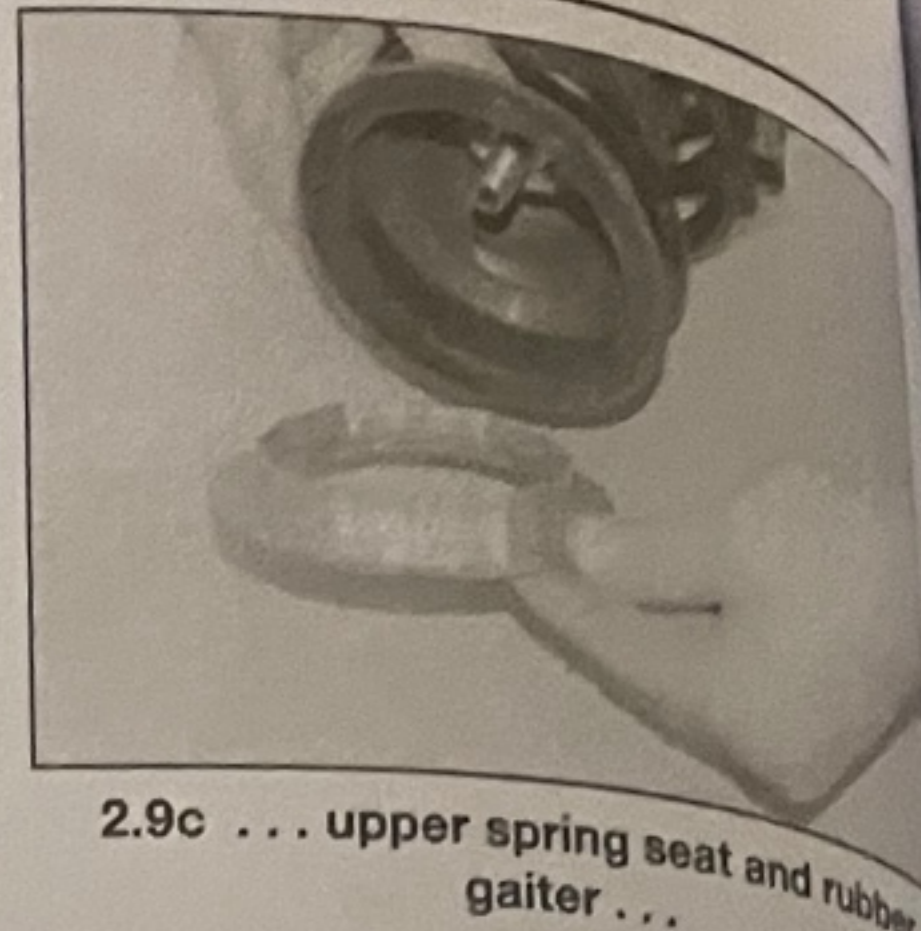
2.8b . . . then unscrew and remove the nut



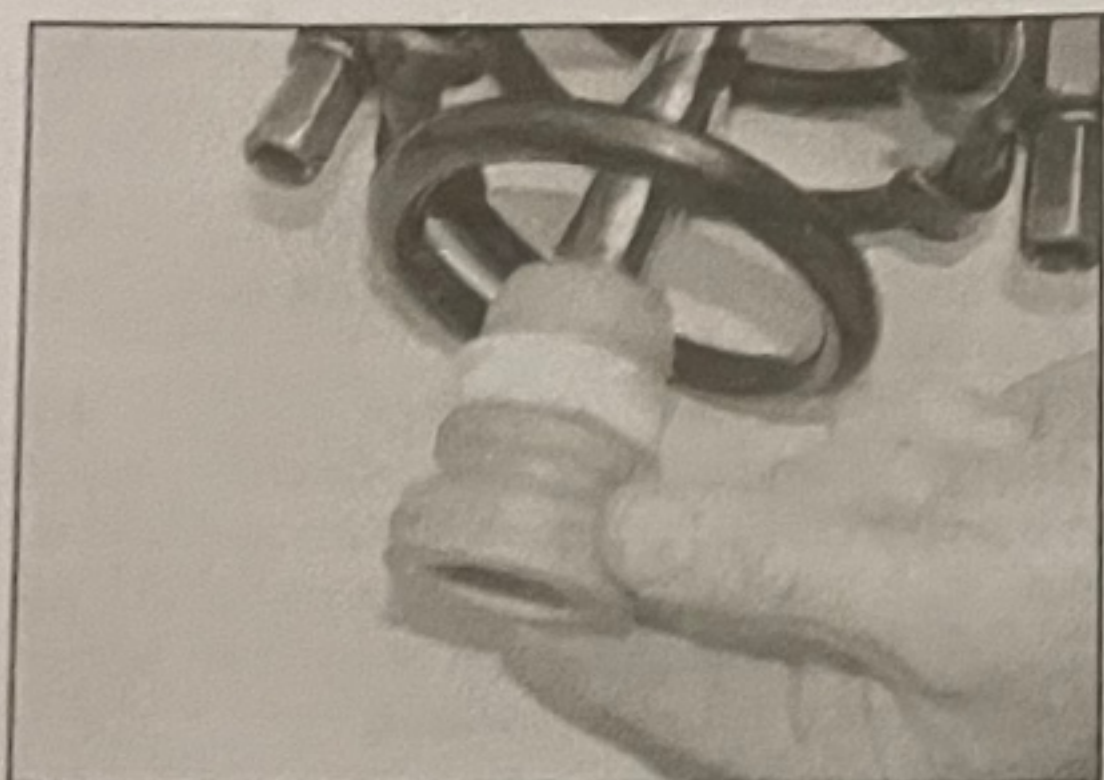
2.9a Remove the top mounting ...



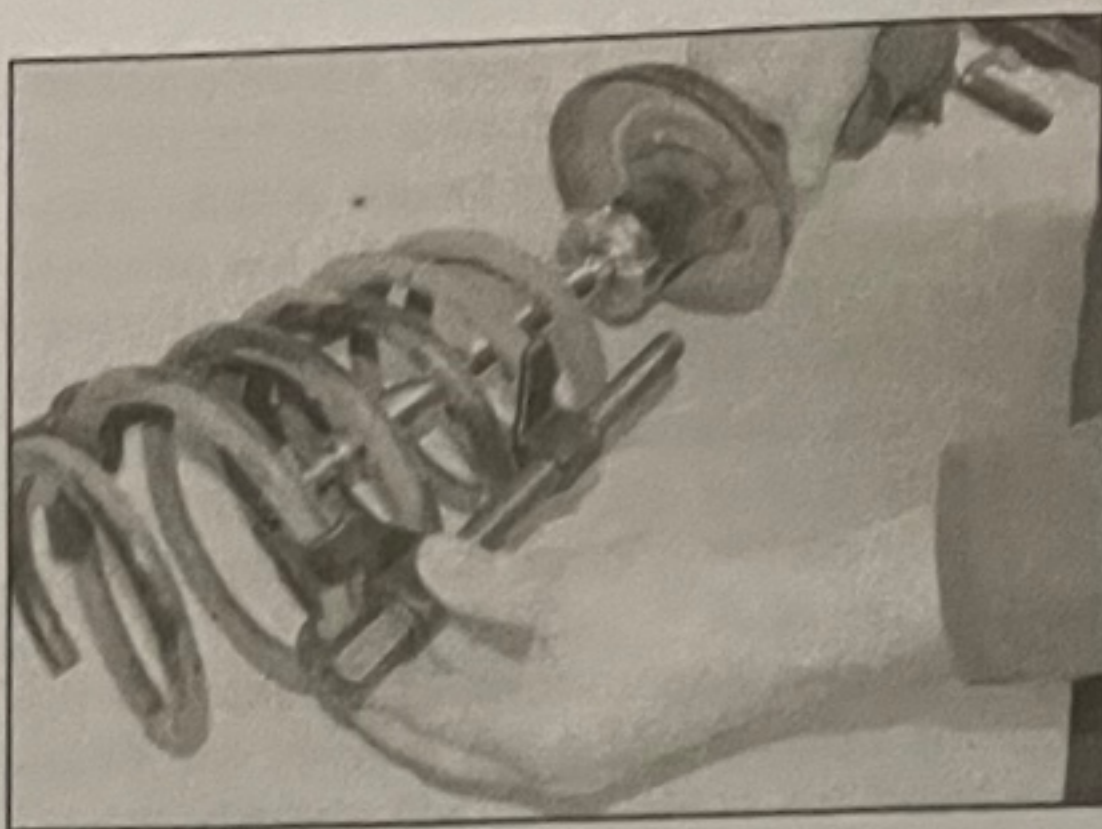
2.9b ... race ...



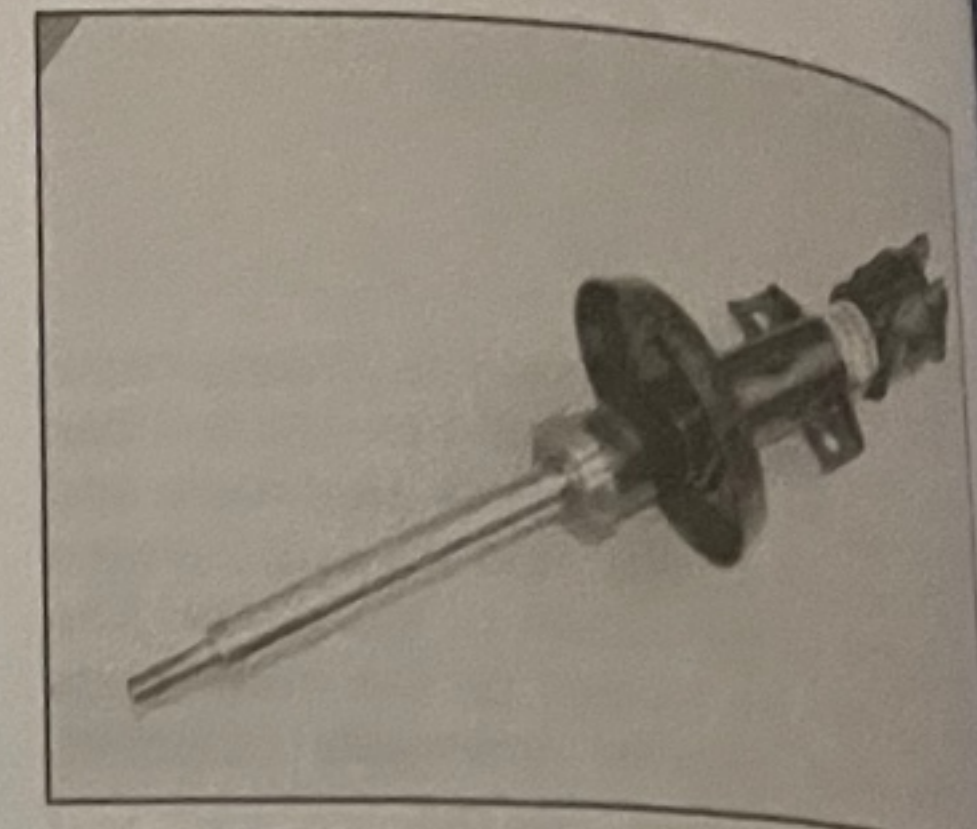
2.9c ... upper spring seat and rubber gaiter ...



2.9d ... followed by the bump stop ...



2.9e ... and coil spring



2.10 Front suspension strut with coil spring removed

9 Remove the top mounting, race, upper spring seat and rubber gaiter, followed by the bump stop and coil spring (see illustrations).

10 Further dismantling of the strut is not possible; therefore if the shock absorber is faulty, the strut itself must be renewed (see illustration).

11 Clean all the components and examine them for wear and damage. Check the upper mounting bearing for smooth operation by turning it by hand. Renew the components as necessary.

12 Locate the bottom end (small diameter) of the coil spring onto the strut; making sure its end abuts the location stop on the lower spring seat (see illustration). **Note:** If a new spring is being fitted, first compress the coils using the spring compressor.

13 Fit the bump stop over the piston rod, followed by the rubber gaiter.

14 Fit the upper spring seat on top of the

spring, followed by the bearing race, top mounting and a new retaining nut.

15 Tighten the nut to the specified torque while holding the piston rod stationary with the Allen key.

16 Carefully loosen the spring compressor while at the same time making sure that the bottom of the spring remains located correctly in the lower spring seat. Remove the compressor.

Refitting

17 Locate the strut under the front wing and lift it into position. Note that the small hole is used for locating the upper bearing in the strut tower. Insert the upper mounting bolts and tighten them to the specified torque.

18 Tilt the hub carrier inwards and engage it with the bottom of the strut. Insert the bolts from the front and refit the ABS wheel sensor/brake hose holder. Apply locking fluid to the

threads of the bolts, then screw on the nuts and tighten them to the specified torque. Hold the bolt heads stationary while the nuts are tightened.

19 Refit the anti-roll bar link to the strut and tighten the nut to the specified torque.

20 Refit the roadwheel and lower the vehicle to the ground.

3 Front lower arm – removal, overhaul and refitting

Removal

1 Apply the handbrake, then jack up the front of the vehicle and support it on axle stands (see *Jacking and vehicle support*). Remove the roadwheel.

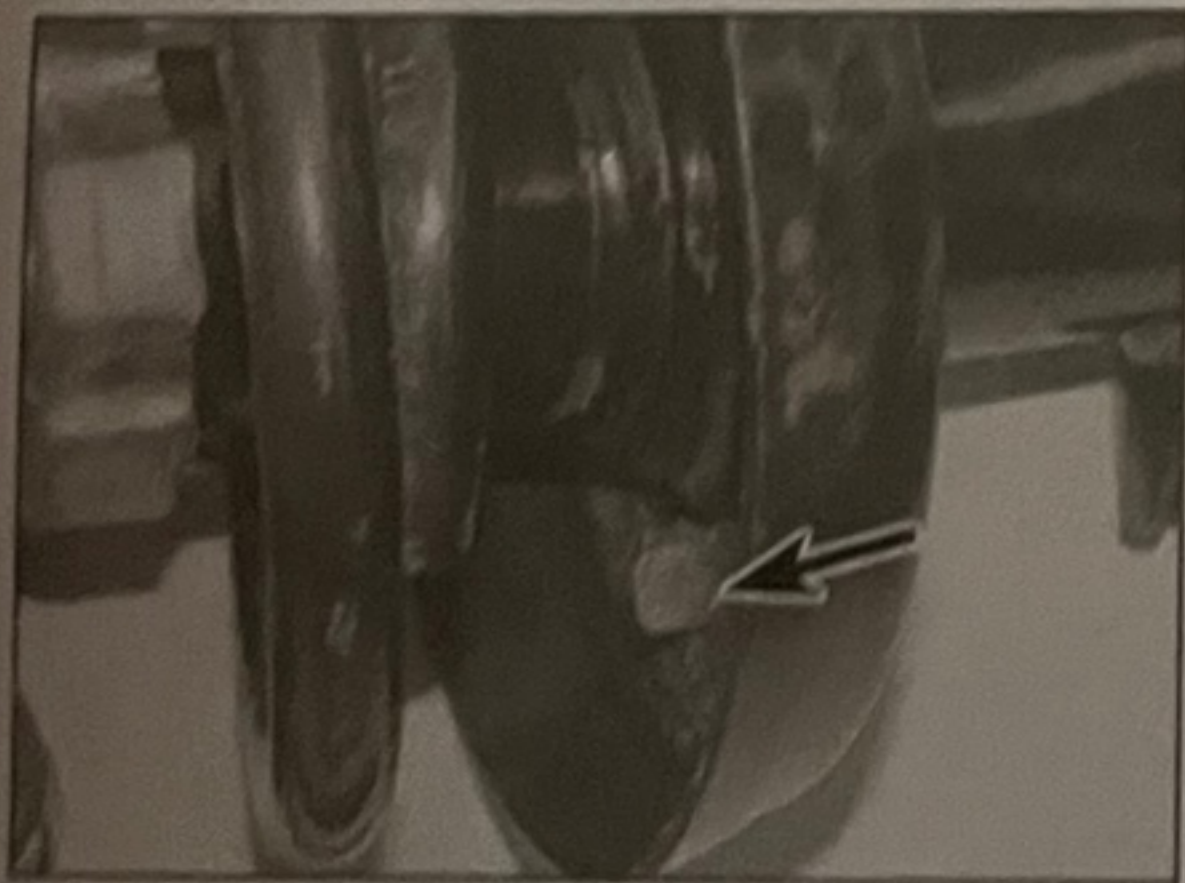
2 Unscrew and remove the bolts securing the lower arm rear mounting to the subframe.

3 Unscrew and remove the lower arm front mounting bolt, and pull the lower arm down from the subframe.

4 Unscrew and remove the clamp bolt securing the lower arm balljoint to the bottom of the hub carrier. If necessary, prise the clamp apart slightly using a screwdriver or lever. Withdraw the lower arm from the hub carrier.

5 Note the fitted position of the rear mounting on the lower arm, then unscrew the nut and remove the mounting (see illustration).

6 Unscrew the bolts and remove the front suspension lower balljoint from the lower arm (see illustration).



2.12 Location stop on the lower spring seat



3.5 Nut securing the rear mounting to the front suspension lower arm

Overhaul

7 Clean the components and examine them for wear and damage.

8 If the front mounting bush is worn excessively, press out the old bush and similarly press in the new bush. If a standard press is not available, use a long bolt together with tubing and washers to complete the task. Saab technicians use a tapered tool for the fitting procedure; the outer rubber is compressed to a diameter less than that of the bore in the lower arm.

9 Check the rear mounting for wear, and renew it if necessary.

10 Check the lower arm for damage and if necessary renew it.

11 Check the lower balljoint stub for good articulation. If it is dry or seized, renew it. Also, check that the balljoint rubber boot is not damaged.

Refitting

12 Fit the lower balljoint to the arm and tighten the bolts to the specified torque.

13 Locate the rear mounting on the lower arm so that its axis is in line with the arm (see illustration). Refit the nut and tighten to the specified torque.

14 Insert the lower arm into position and insert the balljoint stub into the bottom of the lower arm. Make sure that the stub is fully seated so that the annular groove is opposite the clamp bolt hole. Insert the clamp bolt and tighten to the specified torque and angle.

15 Insert the inner end of the lower arm on the subframe and insert the front mounting bolt at this stage.

16 Tighten the rear mounting bolt hand-tight, then tighten the outer end of the lower arm with a torque wrench until the weight of the front of the vehicle is on the front suspension, and fully tighten the arm mounting bolts to their specified torque. If preferred, the bolts can be fully tightened after lowering the vehicle to the ground.

17 Refit the roadwheel and lower the vehicle to the ground.

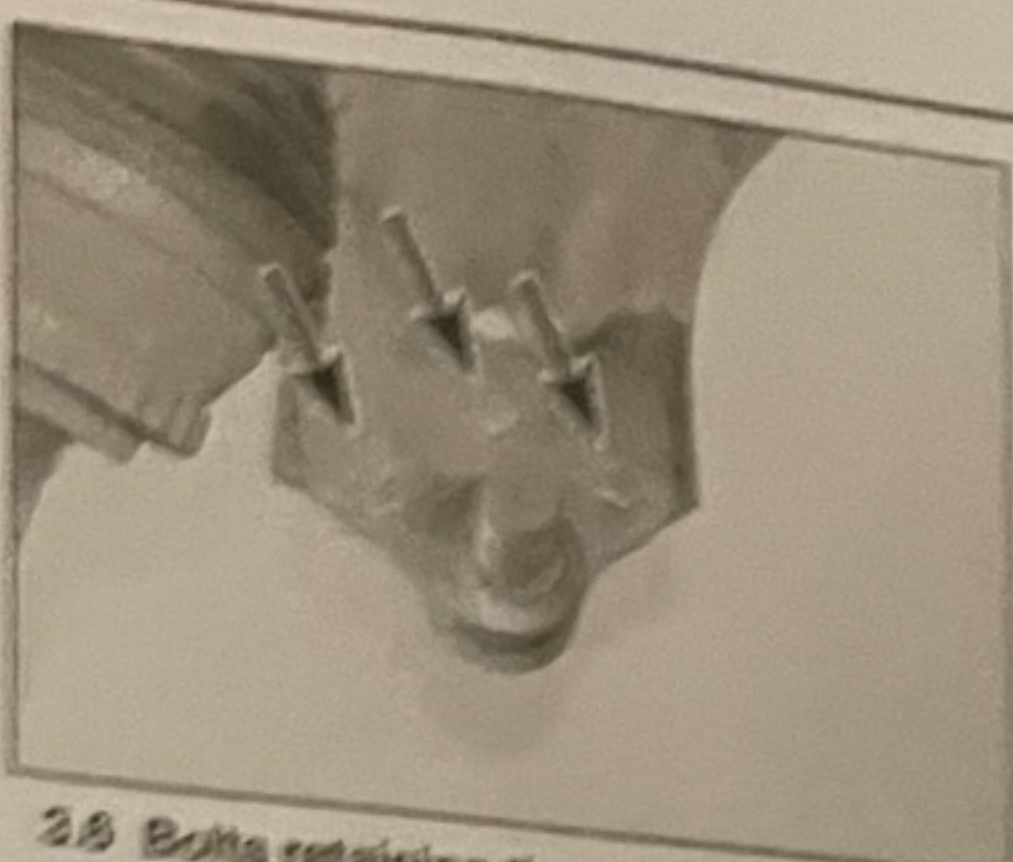
18 Have the front wheel alignment checked and if necessary adjusted at the earliest opportunity.

4 Front anti-roll bar - removal, overhaul and refitting

Removal

1 Apply the handbrake, then jack up the front of the vehicle and support it on axle stands (see *Jacking and vehicle support*). Remove both front roadwheels.

2 The engine assembly must be supported while the rear of the subframe is lowered. To do this, use a suitable hoist or engine support bar that straddles the engine compartment. Slightly lift the engine assembly so that its weight is supported.



3.8 Bolts retaining the suspension lower balljoint to the lower arm

3 At the rear of the engine, unscrew the nut securing the rear engine mounting to the engine bracket, then unbolt the mounting from the subframe and remove it.

4 Working under the vehicle, unbolt the crossmember from the rear of the subframe.

5 The exhaust front section must be lowered before lowering the subframe. To do this, refer to Chapter 4A or 4B and either remove the exhaust or separate it at the joint and release it from the rubber mountings.

6 Unscrew and remove the two bolts securing the steering gear to the subframe.

7 Support the subframe with a trolley jack, then unscrew and remove the centre mounting bolts and lower the rear of the subframe as far as possible for access to the front anti-roll bar mountings.

8 Note the fitted position of the side links on the anti-roll bar, then unscrew the nuts and detach them. If preferred, the side links may be detached from the strut.

9 Note the position of the two anti-roll bar mounting clamps, then unscrew the bolts and remove the clamps (see illustration).

10 Withdraw the anti-roll bar from one side of the vehicle, taking care not to damage the brake hoses and wiring.

11 Note the fitted position of the split clamp mounting rubbers, and then prise them from the anti-roll bar.

Overhaul

12 Check the anti-roll bar and mountings for signs of wear and damage. Also check the side links.

13 Check the split clamp mounting rubbers and renew them if necessary.

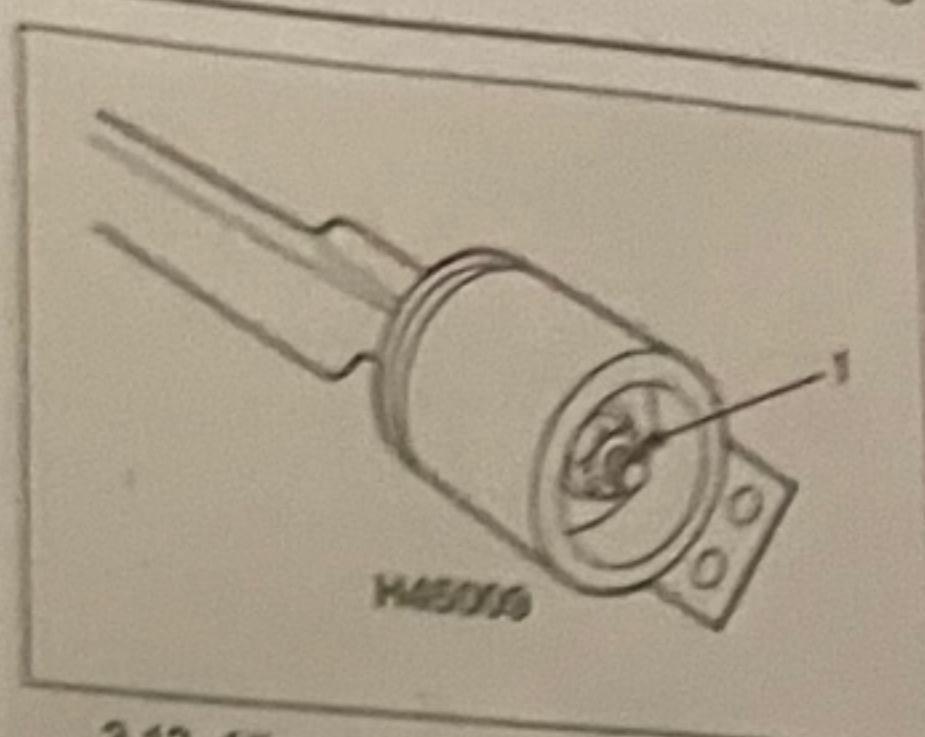
Refitting

14 Clean the anti-roll bar, then dip the split clamp mounting rubbers in soapy water and fit them with their splits facing rearwards.

15 Locate the anti-roll bar onto the subframe and refit the mounting clamps. Insert the mounting bolts and tighten them to the specified torque.

16 Refit the side links to the anti-roll bar (or strut if applicable) and tighten the nuts to the specified torque.

17 Raise the subframe and refit the centre mounting bolts. Tighten the bolts to the specified torque and angle. Remove the trolley jack.



3.12 Align the front suspension rear mounting bush before tightening the retaining nut (1)

18 Insert the steering gear mounting bolts and tighten them to the specified torque.

19 Refit the exhaust front section with reference to Chapter 4A or 4B.

20 Refit the crossmember to the rear of the subframe and tighten the mounting bolts to the specified torque.

21 Refit the rear engine mounting and tighten the bolts to the specified torque.

22 Remove the hoist or support bar.

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

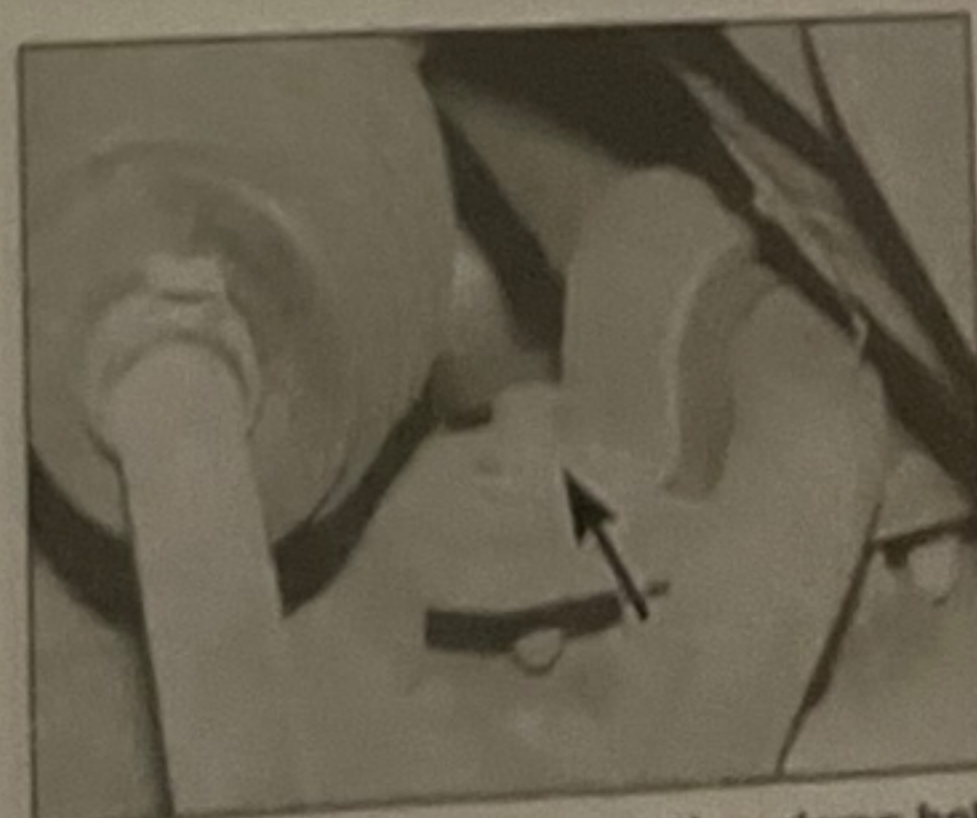
5 Front hub carrier - removal and refitting

Removal

1 Jack up the front of the vehicle and support it on axle stands (see *Jacking and vehicle support*). Remove the relevant roadwheel and, where applicable, the engine undershield.

2 Where applicable, tap off the metal dust cover for access to the hub nut. Note that the cover cannot be removed with the roadwheel in position, so it is not possible to loosen the hub nut before raising the front of the vehicle.

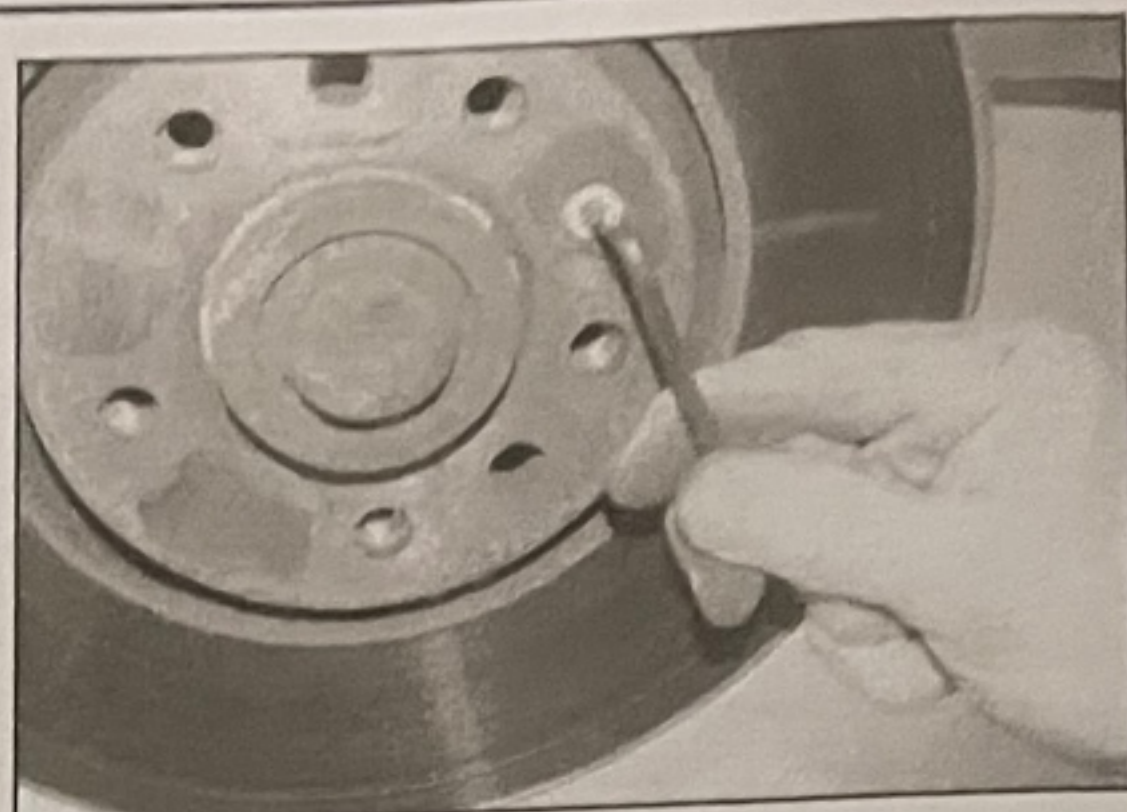
3 Temporarily refit two of the roadwheel bolts and tighten them to hold the brake disc onto the hub flange, then have an assistant depress the footbrake pedal, while the hub nut is being loosened. Unscrew and remove the hub nut. Discard the nut as a new one must be used on refitting.



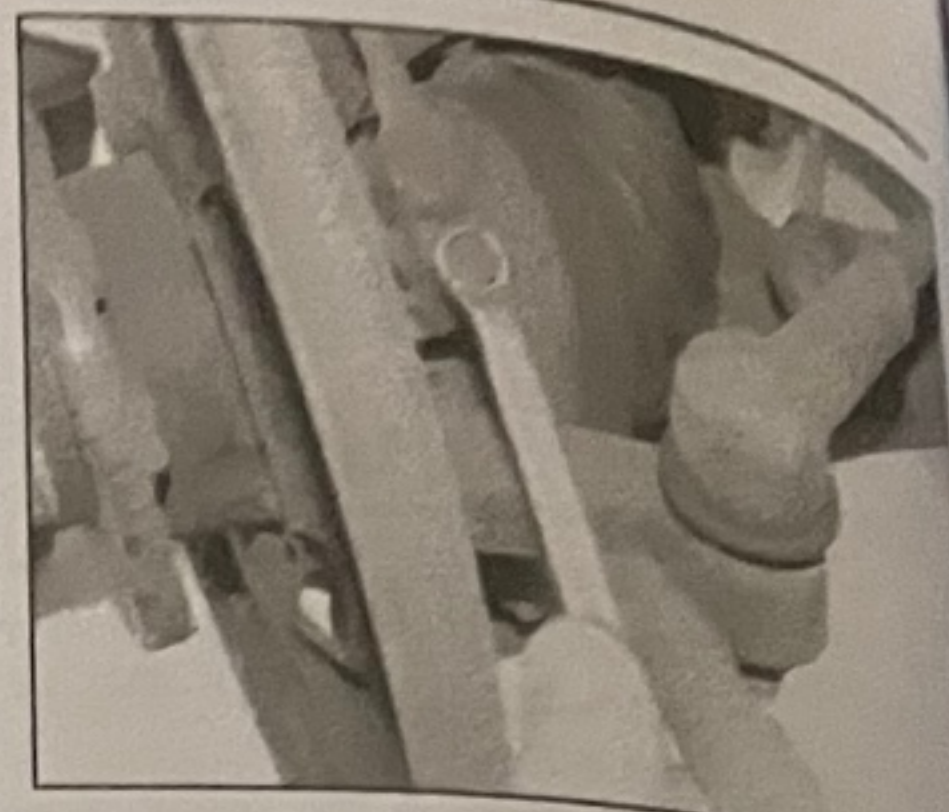
4.9 Front anti-roll bar mounting clamp bolt



5.4 Disconnect the sensor arm from the lower arm



5.5 Removing the front brake disc



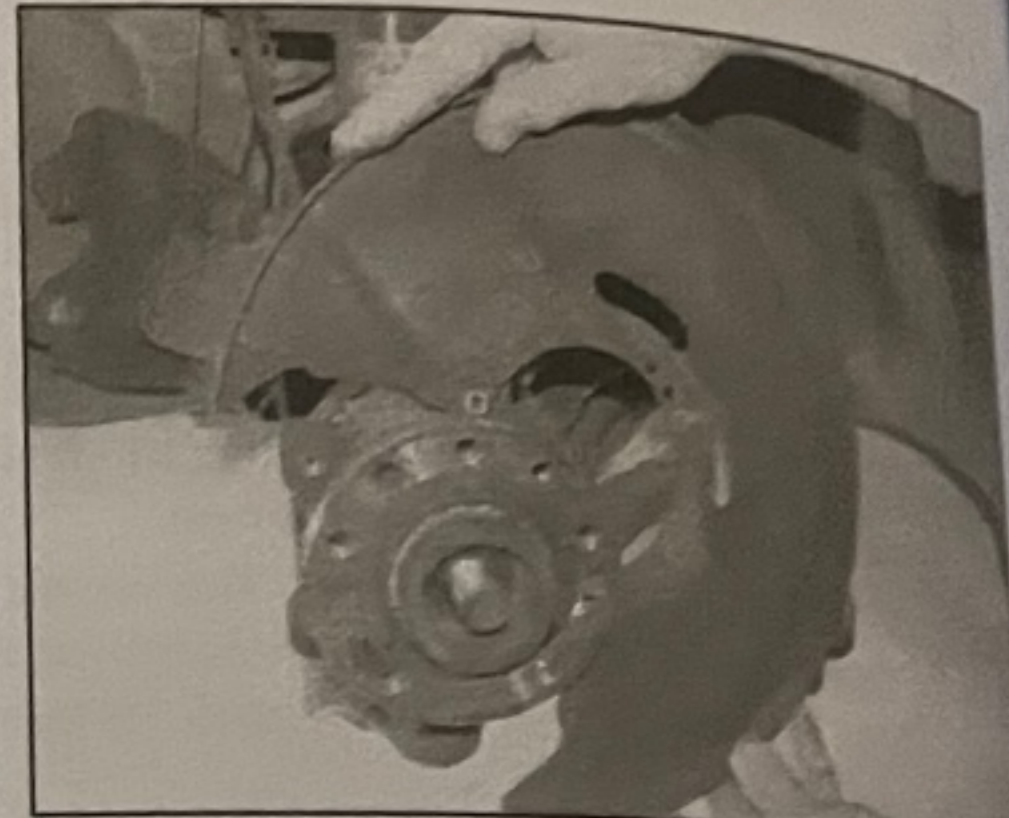
5.6a Unscrew the bolt...



5.6b ... and remove the ABS sensor from the hub carrier



5.8a Undo the screws...



5.8b ... and remove the brake backplate

4 On models fitted with a headlamp position sensor, carefully unclip the sensor arm from the lower suspension arm and position it to one side (see illustration).

5 Refer to Chapter 9 and remove the front brake disc (see illustration). Suspend the

caliper from the front coil spring with a piece of wire or cable-tie, without disconnecting the flexible hydraulic fluid hose.

6 Unscrew the bolt and remove the ABS sensor from the hub carrier (see illustrations). Position it to one side.

7 Detach the steering track rod end from the hub carrier with reference to Section 21.

8 Undo the screws and remove the brake backplate from the hub carrier – access to the screws is gained through the holes in the hub flange (see illustrations).

9 Note that the bolts securing the strut to the hub carrier are fitted with their heads facing forwards. Unscrew and remove the bolts, and move the holding plate for the ABS wheel sensor wiring and brake hydraulic hose to one side (see illustration). The bolts have fine location splines on their shanks, and must not be turned within the hub carrier; hold the bolt head stationary and unscrew the nut from it. Lower the assembly so that the driveshaft is resting on the front subframe.

10 Unscrew and remove the clamp bolt securing the lower arm balljoint to the bottom of the hub carrier (see illustration).

11 Push the splined section of the driveshaft out of the hub. If it is tight, temporarily refit the hub nut onto the threads and tap the end of the driveshaft using a soft-faced mallet to free it. Lift the hub carrier from the lower balljoint and withdraw from the vehicle (see illustrations). If necessary, prise the clamp apart slightly using a screwdriver or lever.

12 If required, remove the hub bearing from the carrier as described in Section 6.

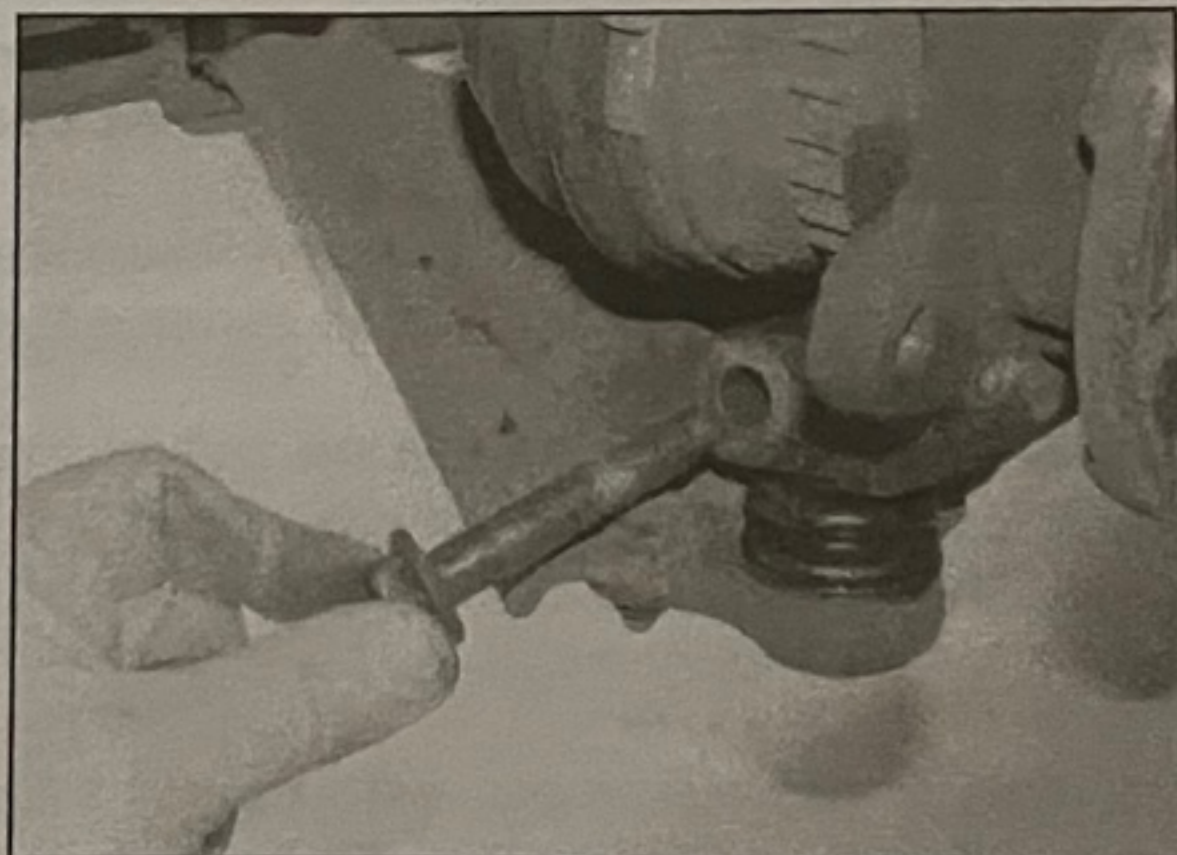
Refitting

13 Refit the hub bearing to the carrier with reference to Section 6.

14 Locate the hub onto the end of the driveshaft and engage the hub splines with the driveshaft splines. Draw the hub onto the



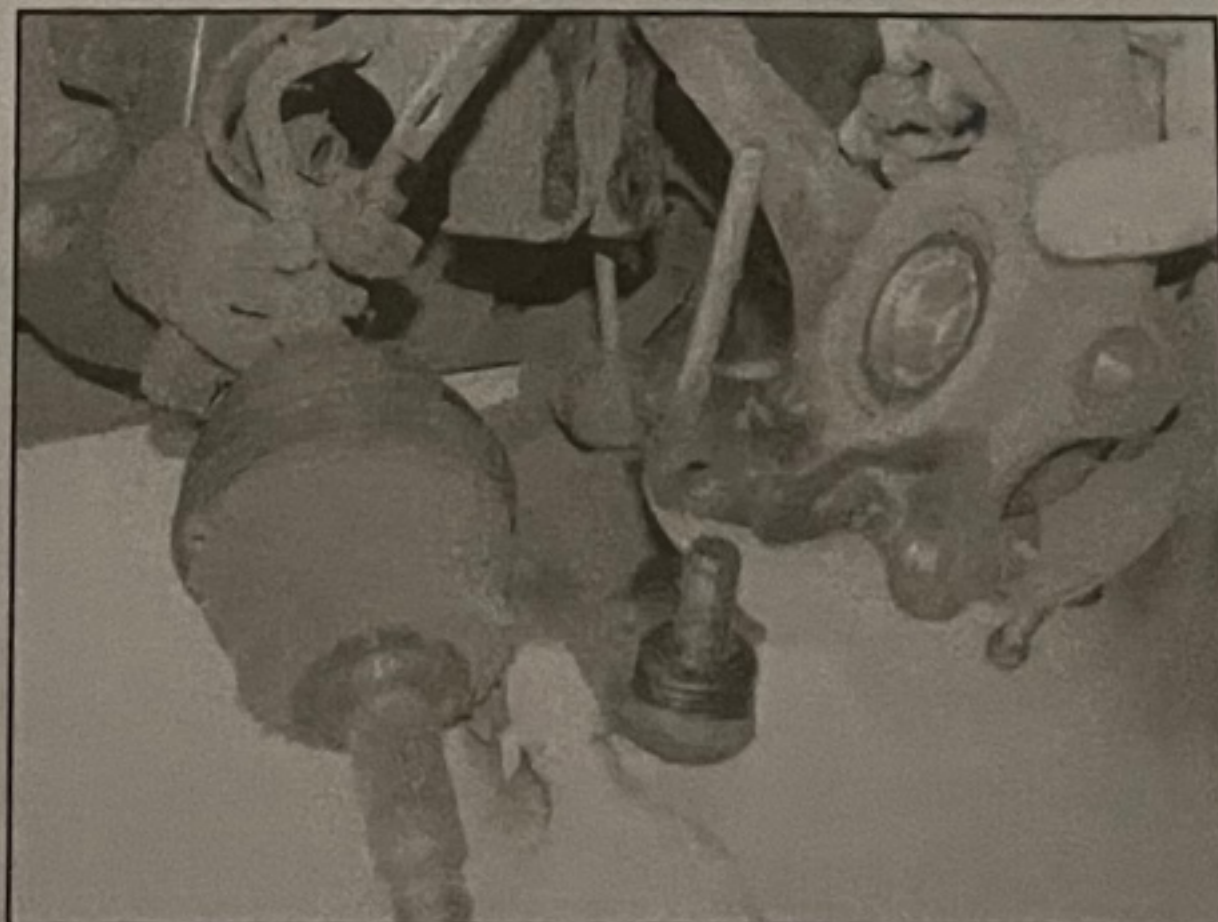
5.9 Removing the strut-to-hub carrier bolts together with the wiring/hose holding plate



5.10 Removing the lower arm balljoint clamp bolt



5.11a Slide the driveshaft from the hub...



5.11b ... and lift the hub carrier from the lower balljoint

driveshaft using the new hub centre nut, but do not fully-tighten the nut at this stage.

15 Locate the top of the hub carrier in the bottom of the strut, and insert the bolts with their heads facing forwards, together with the holder for the ABS wheel sensor and brake hydraulic hose. Apply locking fluid to the threads of the bolts, then screw on the nuts and tighten them to the specified torque. Hold the bolt heads stationary while the nuts are tightened.

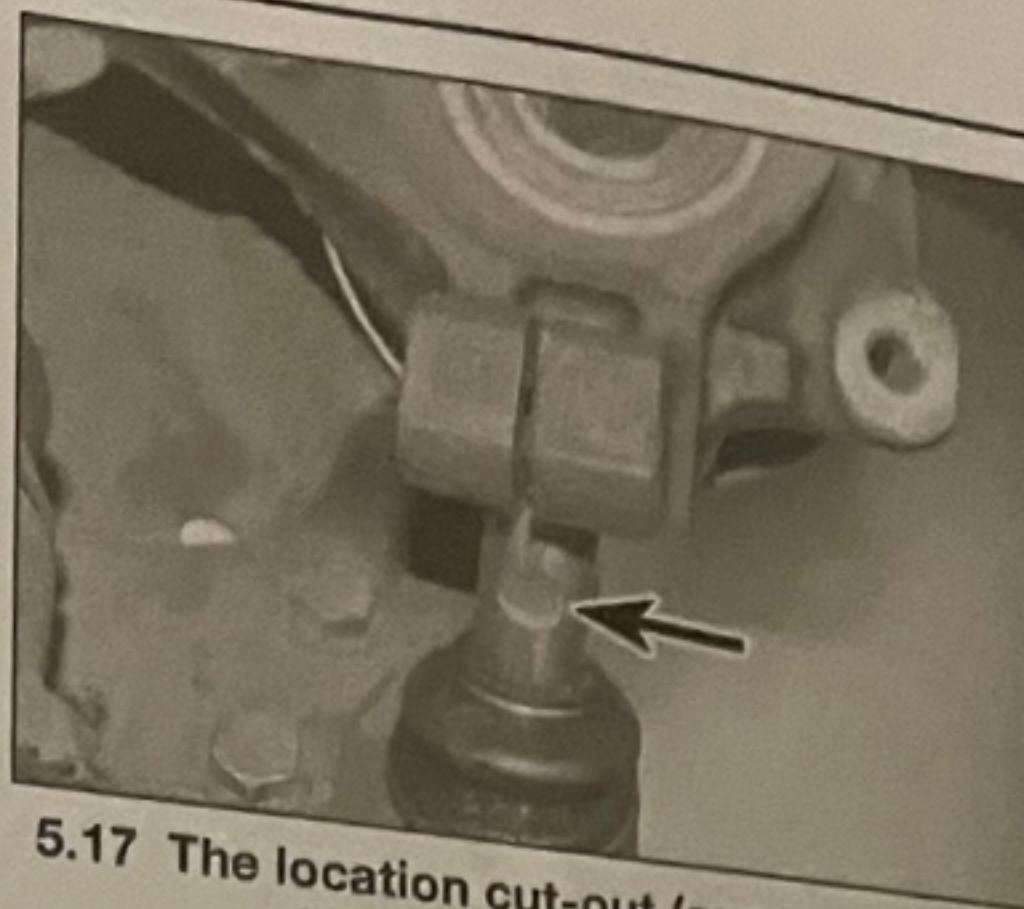
16 Refit the brake backplate and tighten the retaining screws securely.

17 Lift the lower arm into position and insert the lower balljoint stub into the bottom of the hub carrier. Make sure that the stub is fully entered and the location cut-out is opposite the clamp bolt hole (see illustration). Insert the clamp bolt and tighten to the specified torque and angle.

18 Refit the steering track rod end to the hub carrier and tighten the nut to the specified torque.

19 Refit the ABS sensor to the hub carrier and tighten the bolt securely.

20 Refit the front brake caliper and disc with reference to Chapter 9.



5.17 The location cut-out (arrowed) must align with the bolt hole

21 Refit the headlamp position sensor and inner splash cover as applicable.

22 With two of the roadwheel bolts holding the brake disc in position, have an assistant depress the footbrake pedal, and then tighten the hub nut to the specified torque.

23 Where fitted, tap the metal dust cover onto the hub flange.

24 Refit the undershield where applicable, then refit the roadwheel and lower the vehicle to the ground. Tighten the wheel bolts to the specified torque.

6 Front hub bearing – renewal

1 The hub and bearing assembly is bolted to the carrier separately (see illustration). With the vehicle parked on a level surface, remove the wheel trim (and hub dust cap where applicable). Loosen the hub centre nut half a turn.

2 Apply the handbrake, then jack up the front of the vehicle and support it on axle stands (see *Jacking and vehicle support*). Remove the roadwheel.

3 Fully unscrew and remove the hub centre nut. Discard the nut, as a new one must be used on refitting.

4 Refer to Chapter 9 and remove the front brake disc. Suspend the caliper from the front coil spring with a piece of wire or cable-tie, without disconnecting the flexible hydraulic fluid hose.

5 Unscrew the bolt and remove the ABS sensor from the hub carrier. Position it to one side.

6 Detach the steering track rod end from the hub carrier with reference to Section 21.

7 Unscrew and remove the clamp bolt securing the lower arm balljoint to the bottom of the hub carrier. If necessary, prise the clamp apart slightly using a screwdriver or lever. Pull down the lower arm from the hub carrier.

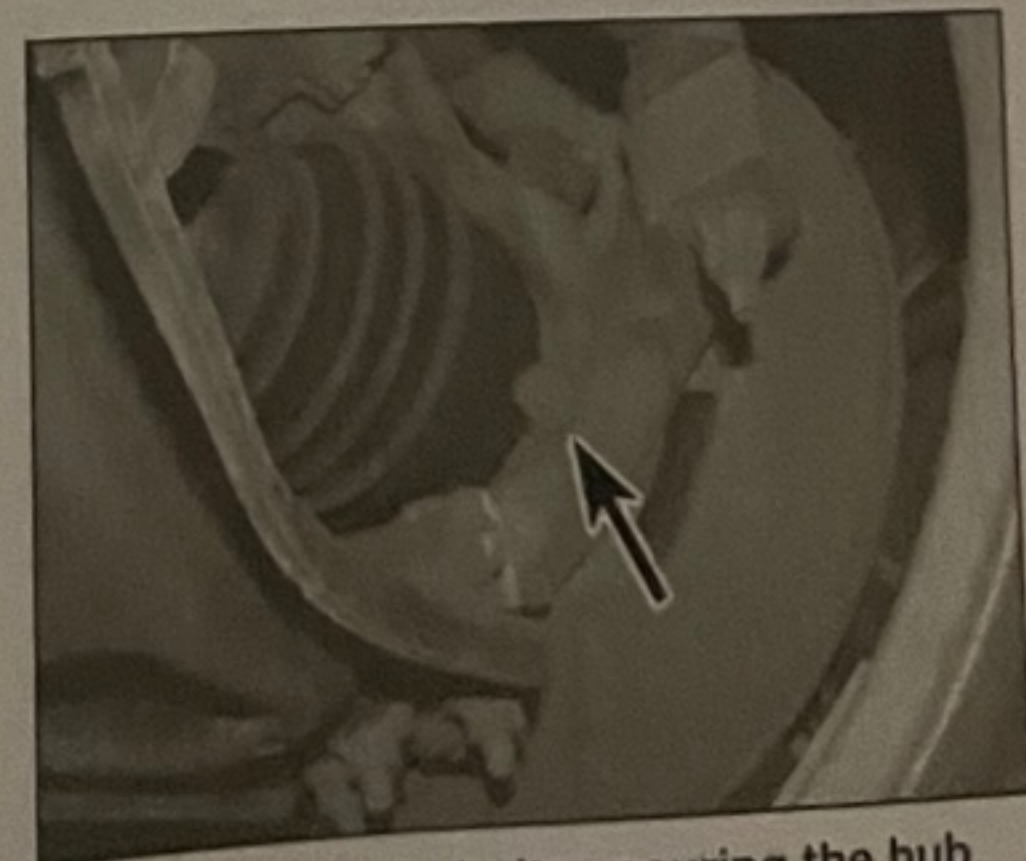
8 Push the splined section of the driveshaft out of the hub. If it is tight, temporarily refit the hub nut onto the threads and tap the end of the driveshaft using a soft-faced mallet to free it, while supporting the hub carrier.

9 Unscrew the bolts and withdraw the hub bearing and backplate assembly from the carrier (see illustration).

10 Clean the carrier, then locate the new hub bearing and backplate assembly on the carrier and tighten the mounting bolts to the specified torque.

11 Locate the hub and carrier onto the end of the driveshaft and engage the hub splines with those of the driveshaft. Draw the hub onto the driveshaft using the new hub centre nut, but do not fully-tighten the nut at this stage.

12 Lift the lower arm into position and insert the lower balljoint stub into the bottom of the



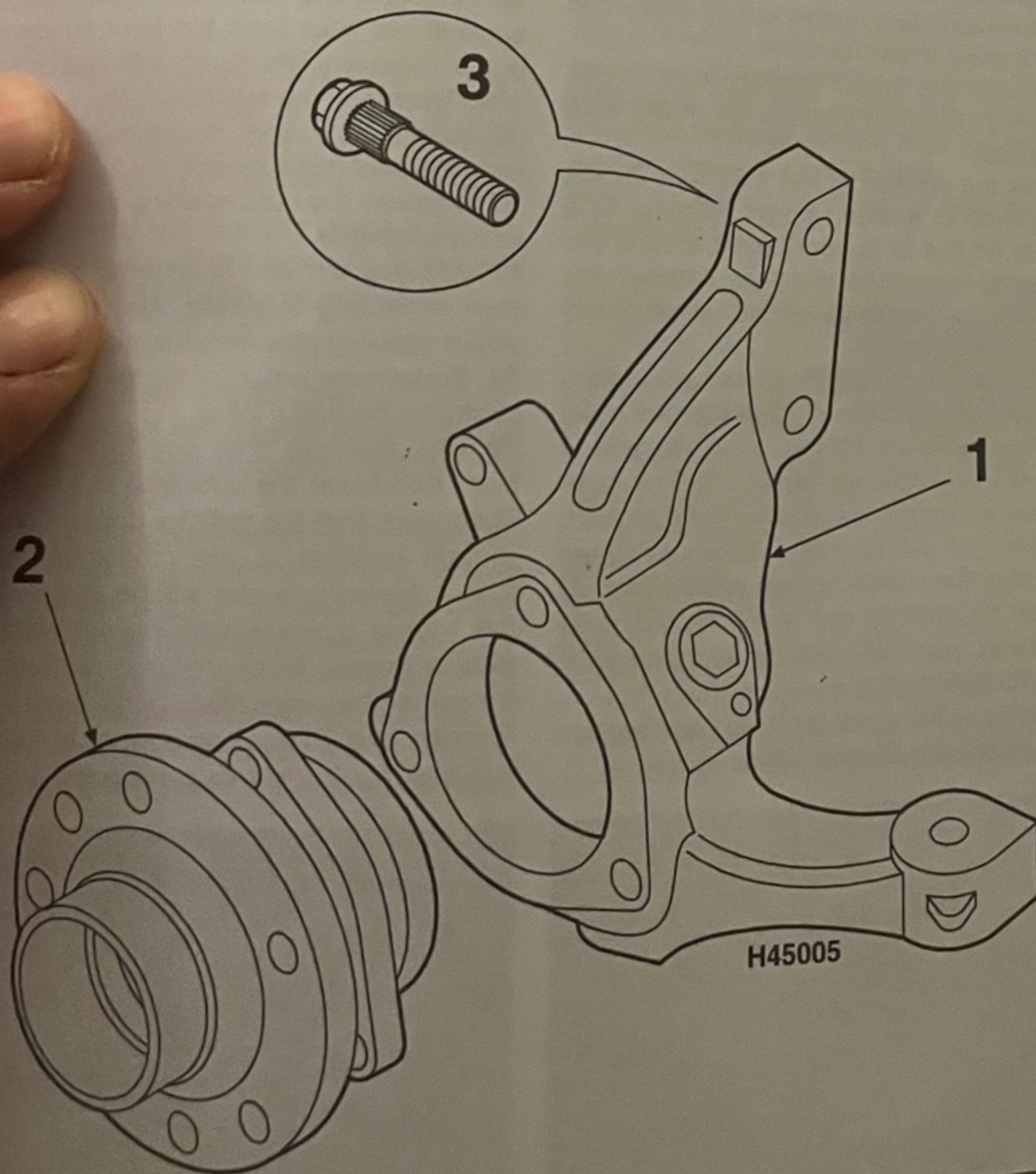
6.9 One of the bolts securing the hub bearing to the carrier

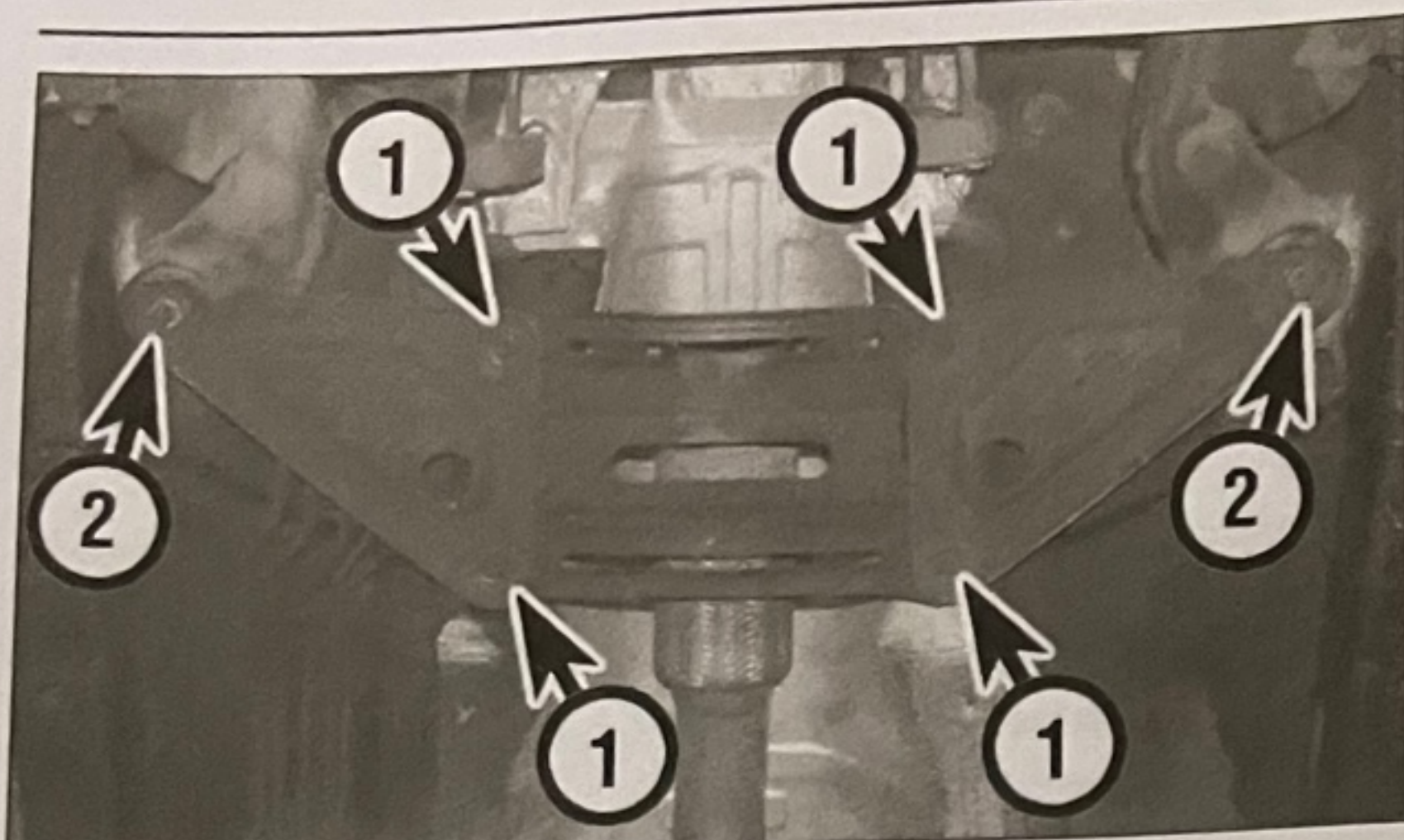
6.1 Front hub carrier components

1 Hub carrier

2 Hub and bearing assembly

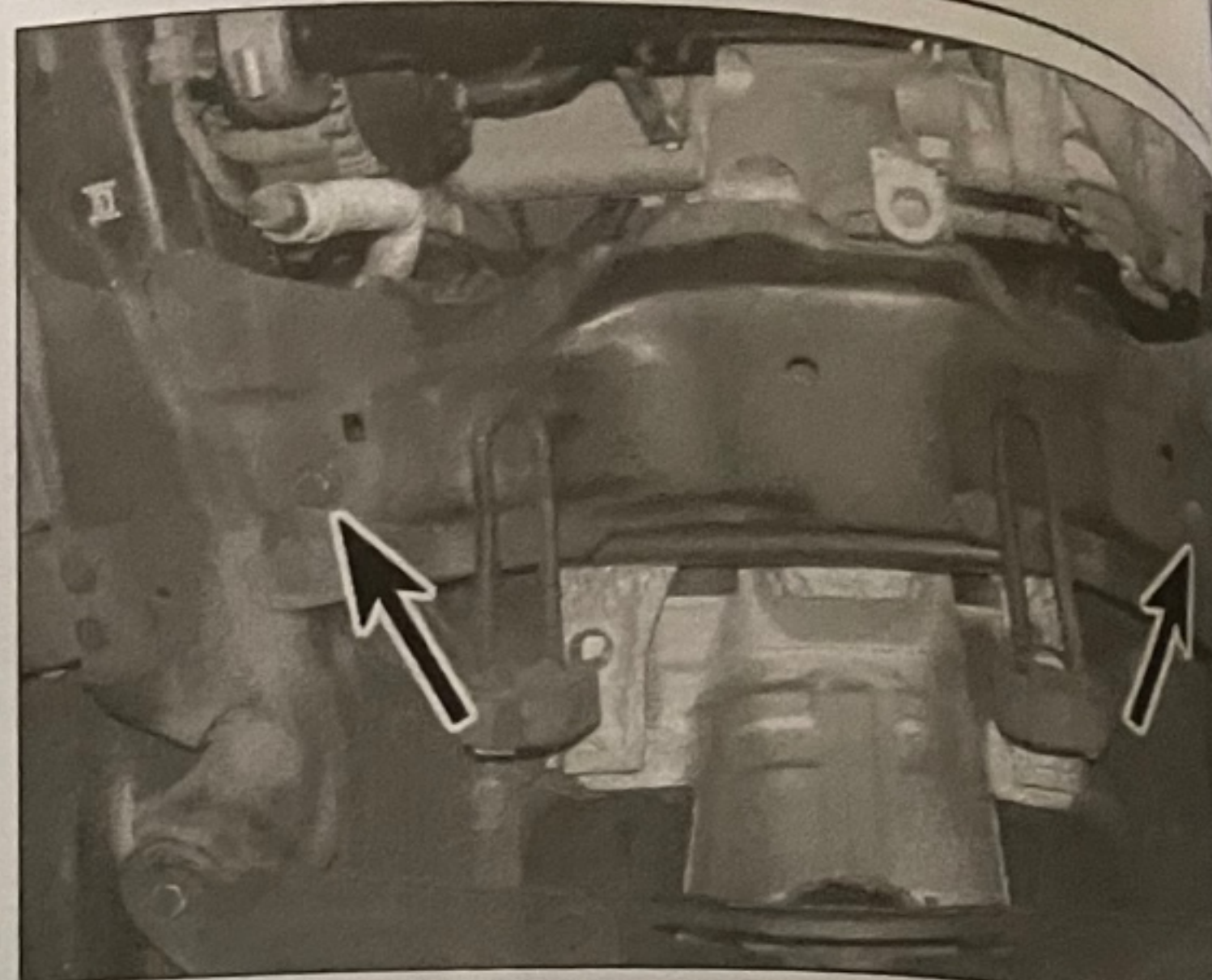
3 Splined bolt securing the hub carrier to the front suspension strut





7.9 Reinforcement crossmember on the rear of the subframe

- 1 Bolts retaining the centre section and inner ends of the triangular plates
- 2 Bolts retaining the outer ends of the triangular plates and the rear of the subframe



7.10 Steering gear mounting bolts on the subframe

hub carrier. Make sure that the stub is fully entered so that the annular groove is opposite the clamp bolt hole. Insert the clamp bolt and tighten to the specified torque.

13 Refit the steering track rod end to the hub carrier and tighten the nut to the specified torque.

14 Refit the ABS sensor to the hub carrier and tighten the bolt securely.

15 Refit the front brake caliper and disc with reference to Chapter 9.

16 Refit the roadwheel and lower the vehicle to the ground.

17 Tighten the hub centre nut to the specified torque.

7 Front subframe – removal, overhaul and refitting



Removal

1 Apply the handbrake, then jack up the front of the vehicle and support it on axle stands (see *Jacking and vehicle support*). Remove both front wheels, and then remove the underbody splash covers.

2 Unbolt the engine rear mounting from the subframe with reference to Chapter 2A or 2B.

3 Support the weight of the engine and

transmission with a hoist attached to the rear engine lifting eye.

4 Support the radiator and air conditioning condenser on the engine compartment front crossmember using cable-ties.

5 Disconnect the wiring connector for the oxygen sensors.

6 Where applicable, unbolt the oil cooler and allow it to hang from its hoses.

7 Unscrew the power steering fluid cooler mounting bolts and support the cooler with cable-ties.

8 Mark the position of the subframe on the underbody to ensure correct refitting. One way to do this is to spray paint around the subframe mountings using an aerosol; the outline of the mountings will be marked clearly on the underbody.

9 Unbolt the reinforcement crossmember from the rear of the subframe. Note that the outer bolts are also the subframe rear mounting bolts (see illustration). **Note:** The two outer triangles are separate from the centre section.

10 Unscrew the steering gear mounting bolts from the subframe (see illustration). To support the steering gear while the subframe is lowered, use cable-ties between the track rods and underbody.

11 Remove the exhaust front pipe section with reference to Chapter 4A or 4B.

12 Unbolt the front engine mounting/transmission torque arm from the subframe.

13 Unscrew and remove the clamp bolts securing the lower arm balljoints to the bottom of the hub carriers. If necessary, prise the clamps apart slightly using a screwdriver or lever. Pull down the lower arms from the hub carriers.

14 Unscrew the nuts and disconnect the anti-roll bar links from the front suspension struts. Hold the link stubs with one spanner while loosening the retaining nuts.

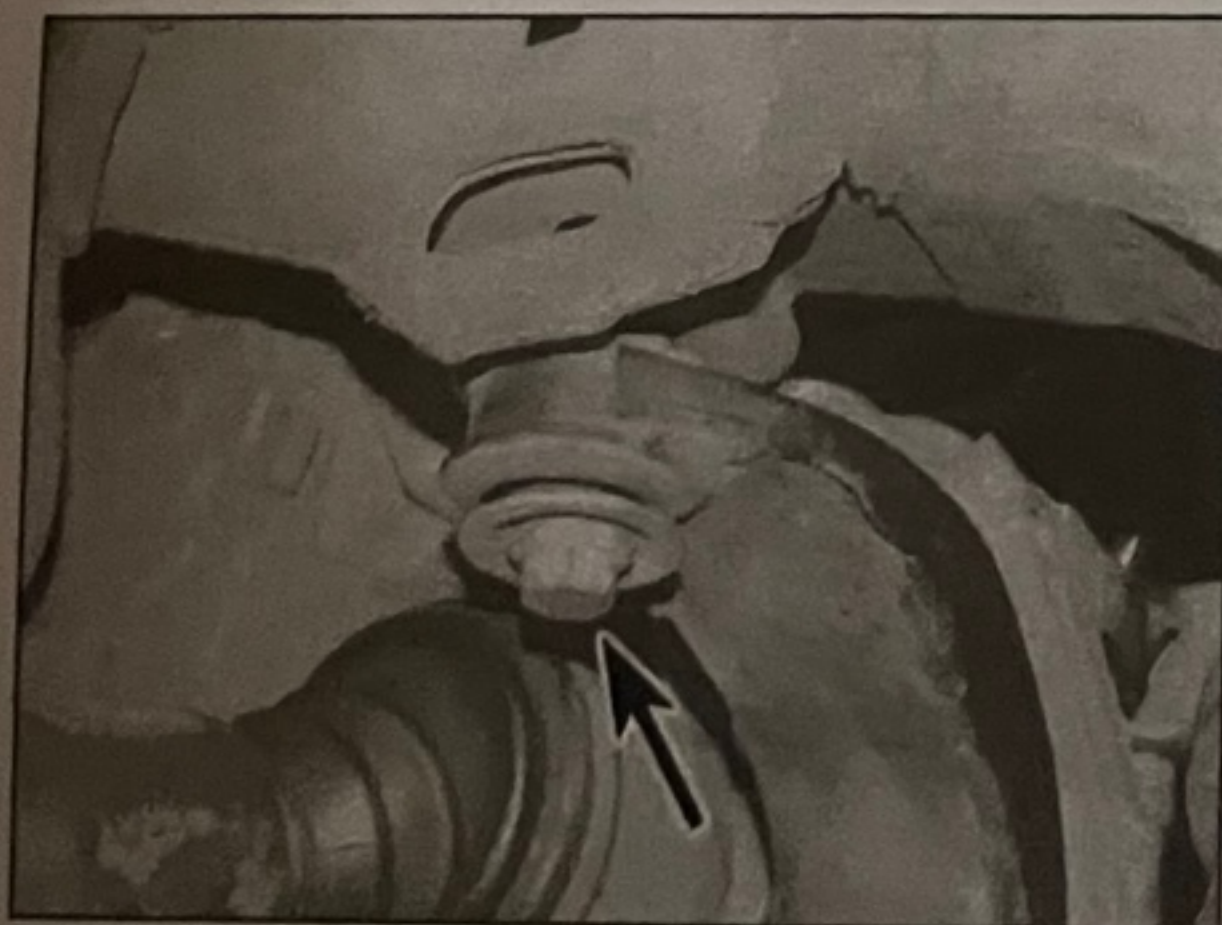
15 Where applicable, disconnect the wiring from the load angle sensor.

16 Unscrew the nuts retaining the air cleaner to the subframe.

17 Remove the air conditioning pipes from their mounting brackets. Also, detach the power steering pipe from the support clips.

18 Support the weight of the front suspension subframe on trolley jacks.

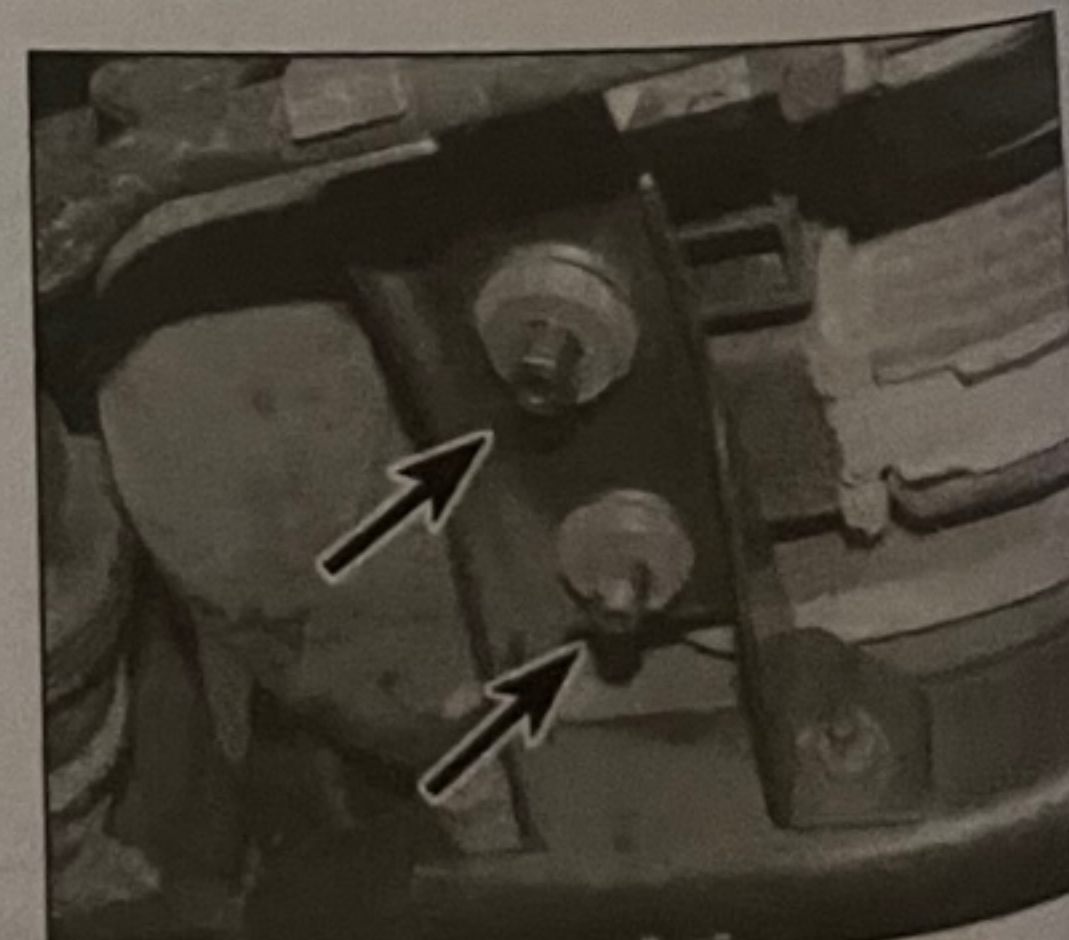
19 Unscrew the side and front mounting bolts and lower the subframe to the ground. Make sure that the radiator upper mountings remain located in the crossmember; the lower mounting stubs will be released from the rubber grommets in the subframe (see illustrations). Note that the reinforcement crossmember mounting bolts have smaller washers and 20 mm heads when compared to the main subframe mounting bolts.



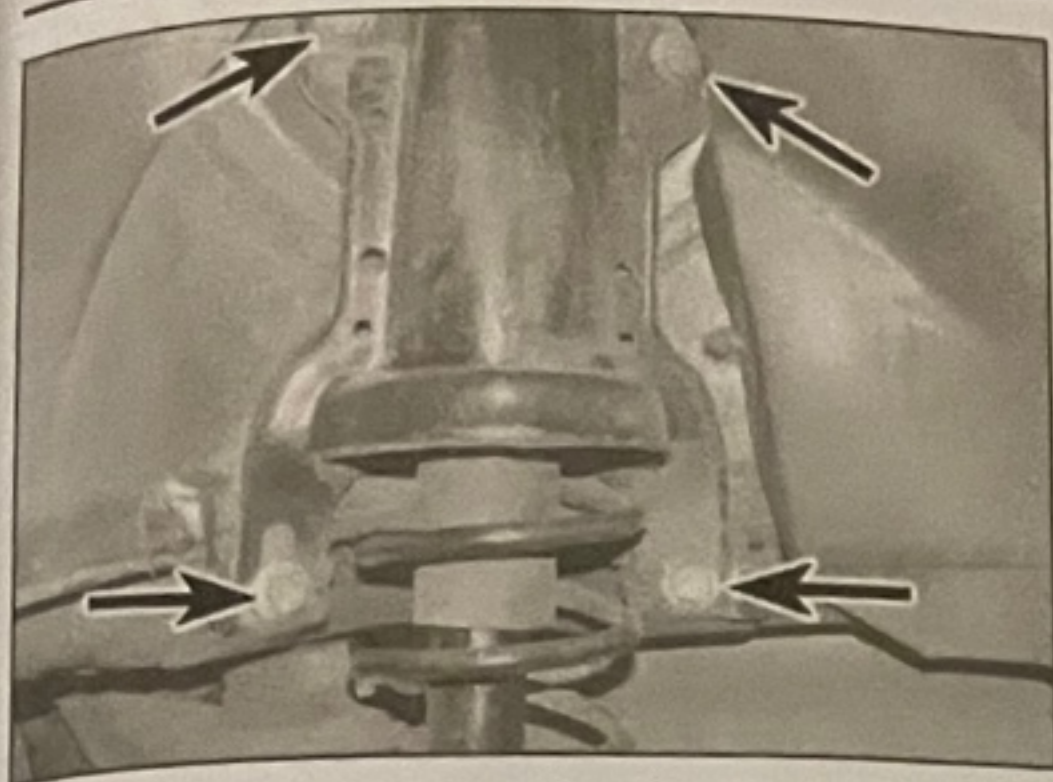
7.19a Subframe side mounting bolt



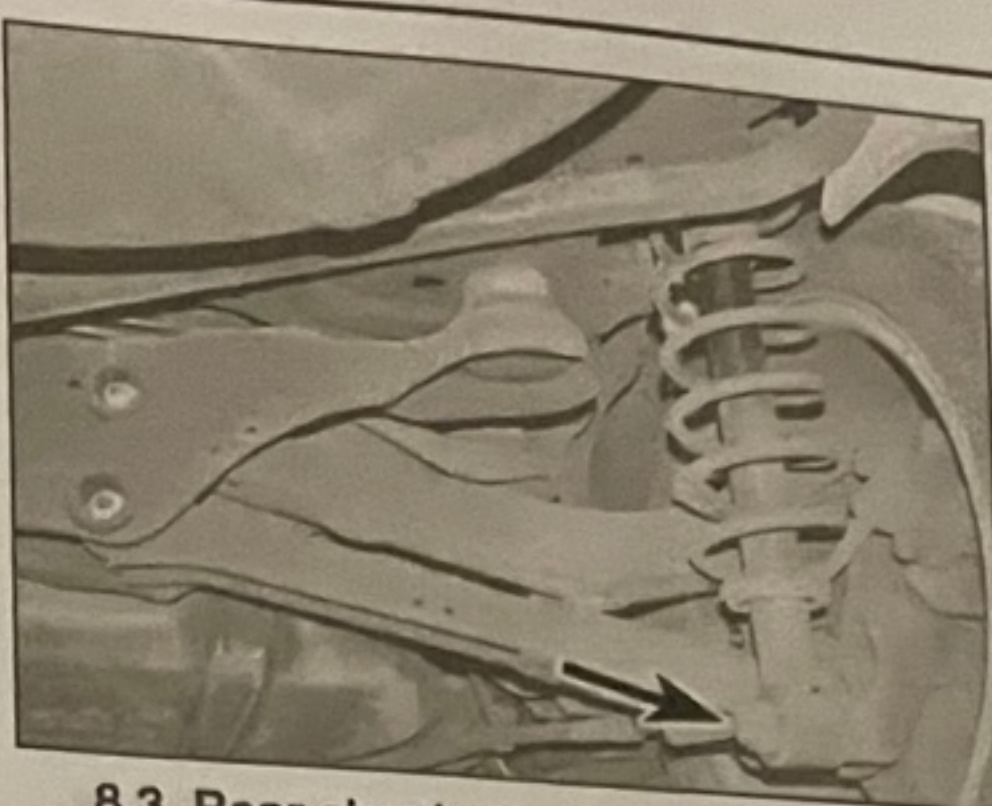
7.19b Subframe front mounting bolt



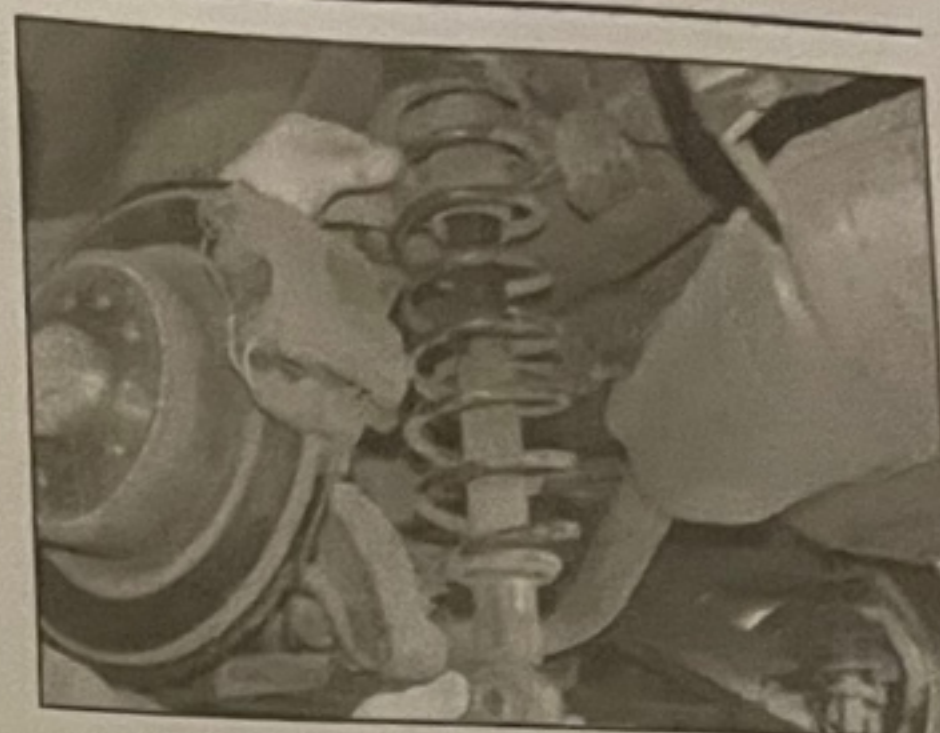
7.19c Radiator and air conditioning mounting stubs and rubber grommets



8.2 Rear shock absorber/strut mounting bolts



8.3 Rear shock absorber/strut lower mounting bolt



8.4 Removing the rear shock absorber/strut from the vehicle

Overhaul

20 Check the subframe and mounting bushes for wear and damage, and renew as necessary.

21 The mounting bushes can be renewed if necessary using a press or, alternatively, metal tubing, washers and a long bolt. Press in the new bushes using the same method.

Refitting

22 Refitting is a reversal of removal, but position the subframe as noted before removal, and tighten the mounting bolts to the specified torque.

8 Rear strut/shock absorber - removal, overhaul and refitting



For self-levelling rear suspension for certain markets; at the time no information was available.

Removal

1 Jack up the wheels then jack up the and support on axle stands (see vehicle support). Remove the shock absorber/strut is mounted on 4 bolts; unscrew and remove the lower bolts and loosen the upper two or three turns (see illustration). The upper bolt holes are open-ended, however, with the lower bolts removed, the rear anti-roll bar will still exert some upward pressure.

3 Support the strut, then unscrew and remove

the mounting bolt securing the rear shock absorber/strut to the trailing arm, and recover the washer (see illustration). Discard both the bolt and washer as new ones must be used on refitting.

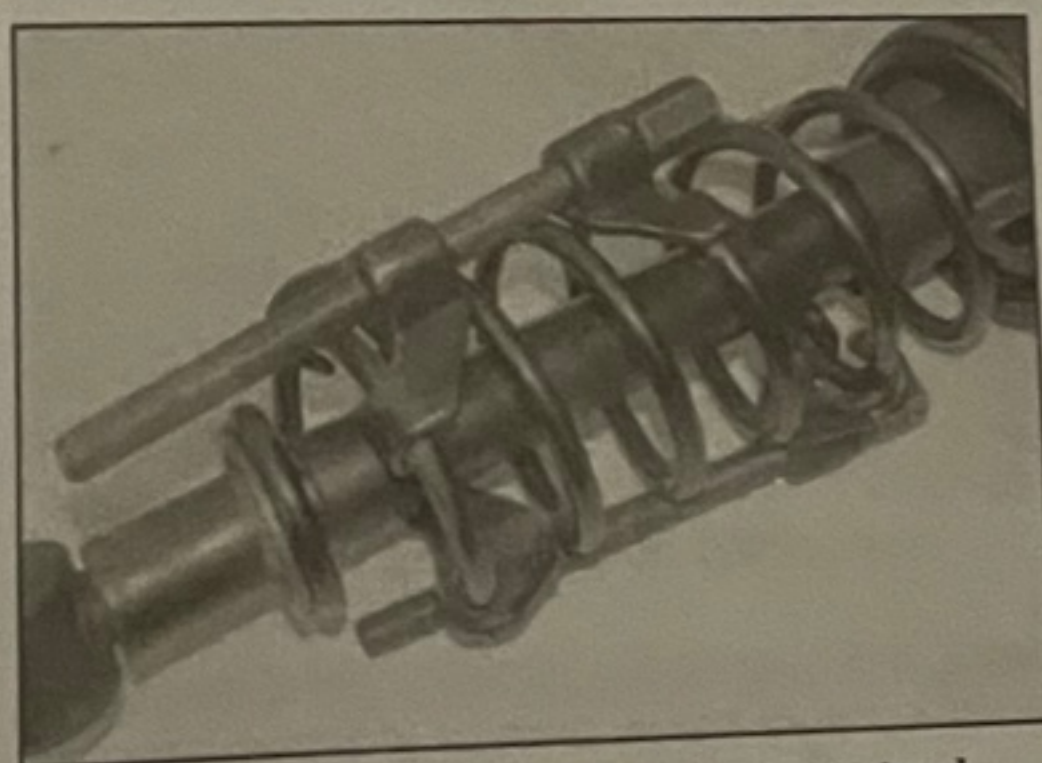
4 Withdraw the rear shock absorber/strut from the vehicle (see illustration).

Overhaul

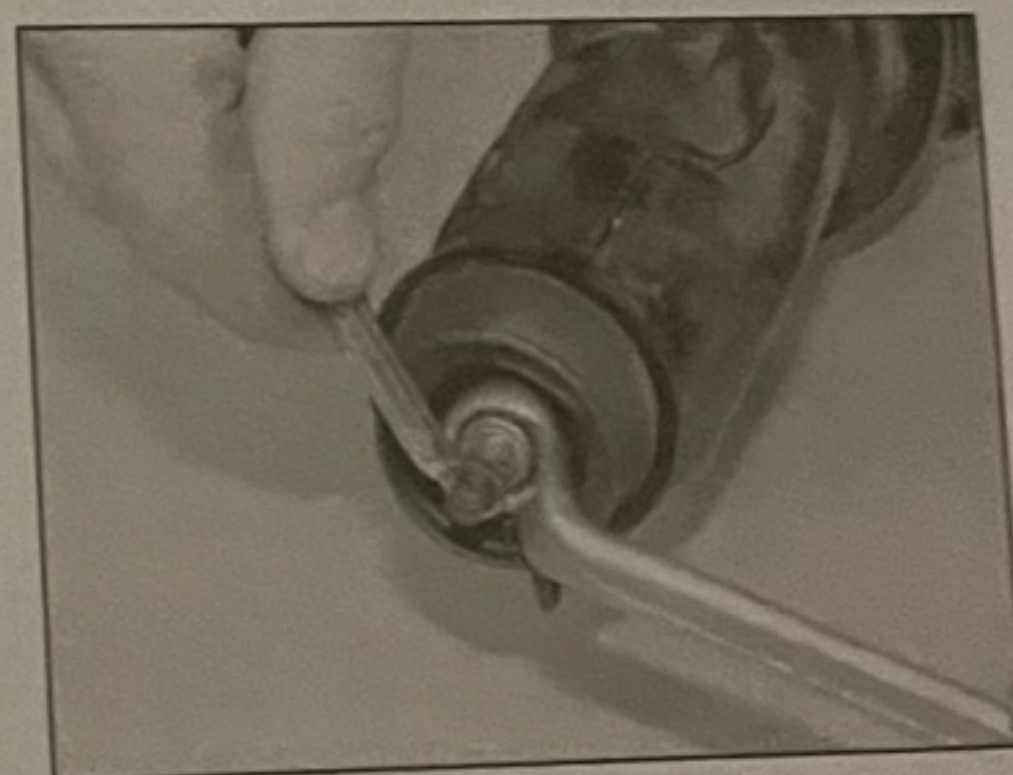


Warning: Before attempting to dismantle the rear shock absorber/strut, the coil spring must be first held in compression, using a purpose-made tool. Universal coil spring compressors are available from motor factors or car accessory shops, and are essential for this operation. DO NOT attempt to dismantle the strut without such a tool, as damage and/or personal injury is likely.

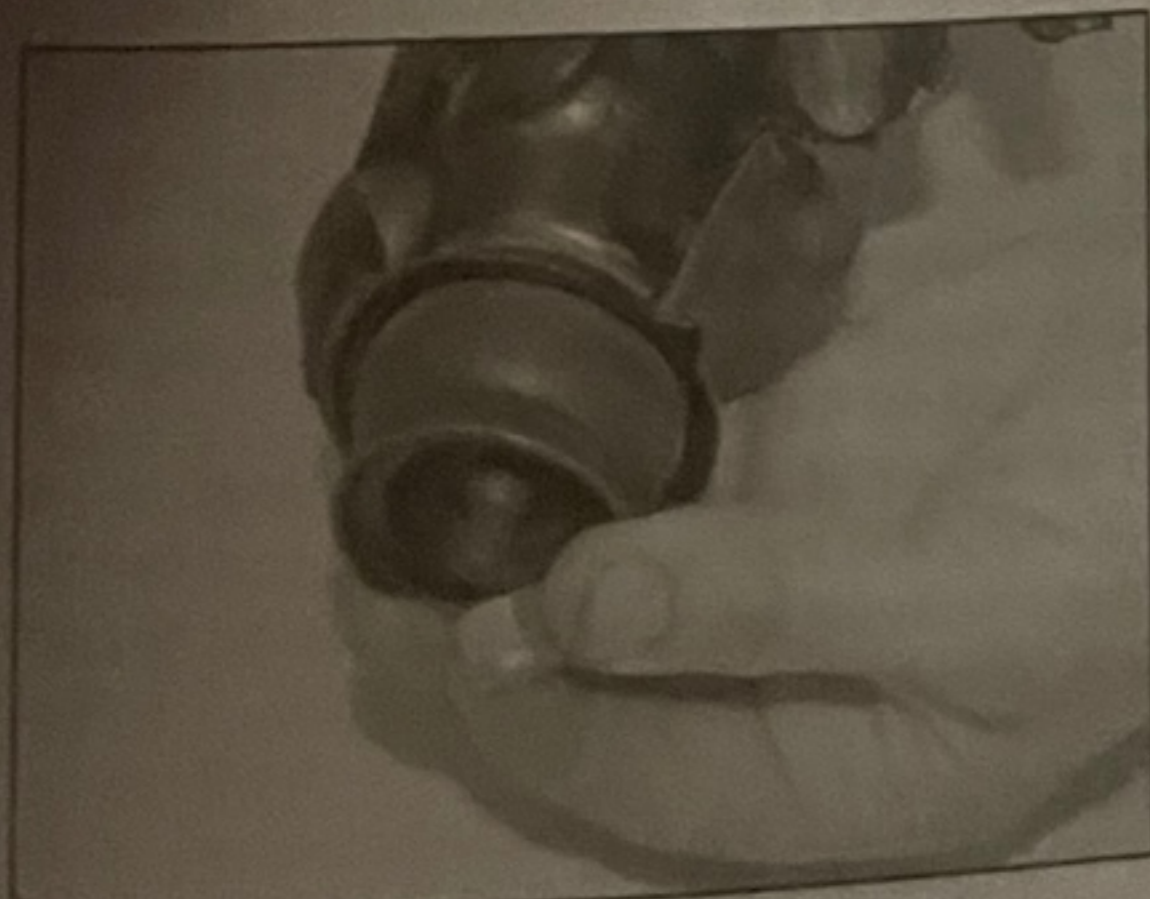
Note: A new top mounting nut must be used on reassembly.



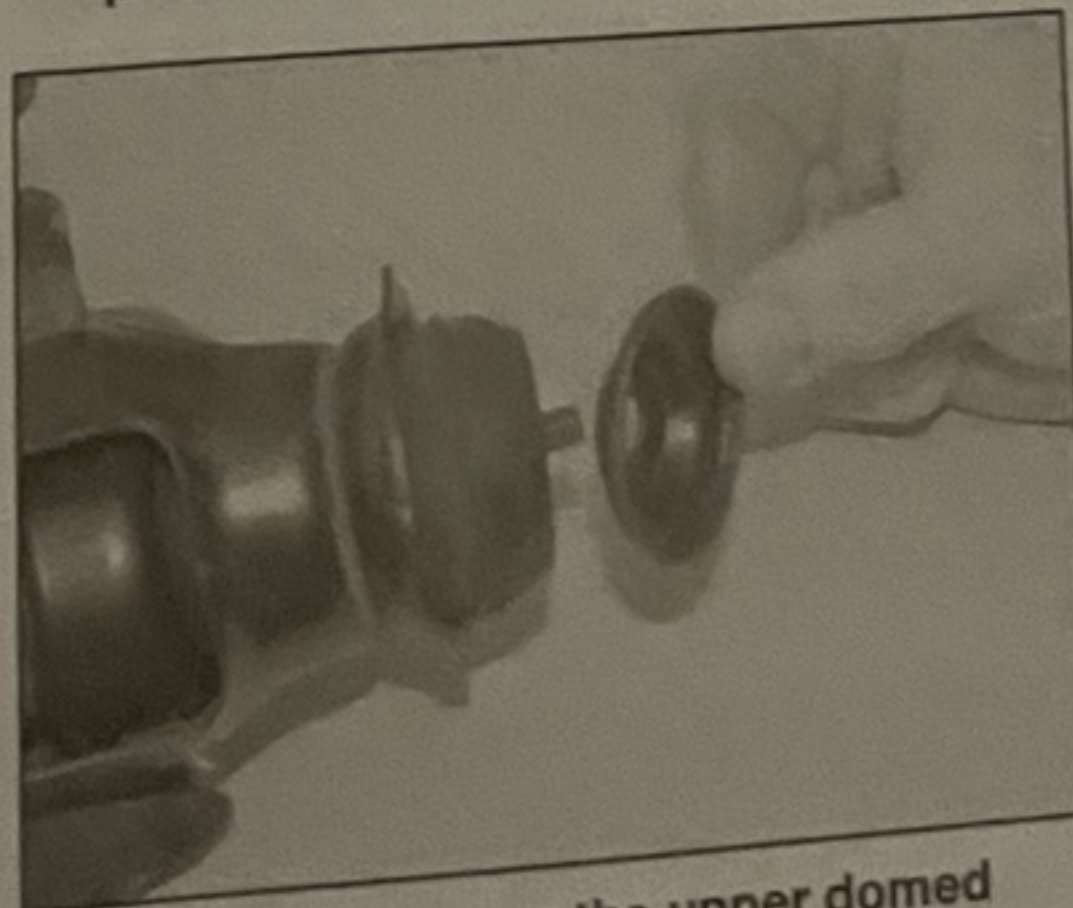
8.7 Using a spring compressor tool, compress the coil sufficiently to relieve all pressure from the upper spring seat



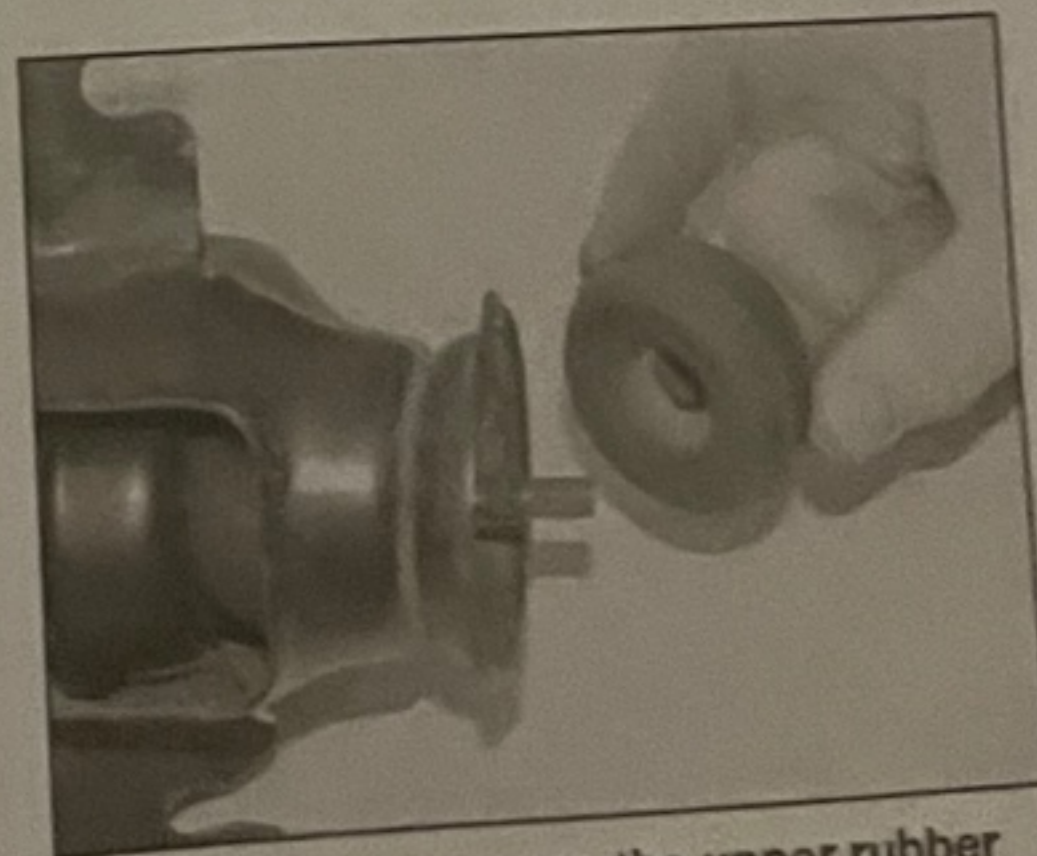
8.8 Using a ring spanner and Allen key to loosen the top bearing retaining nut



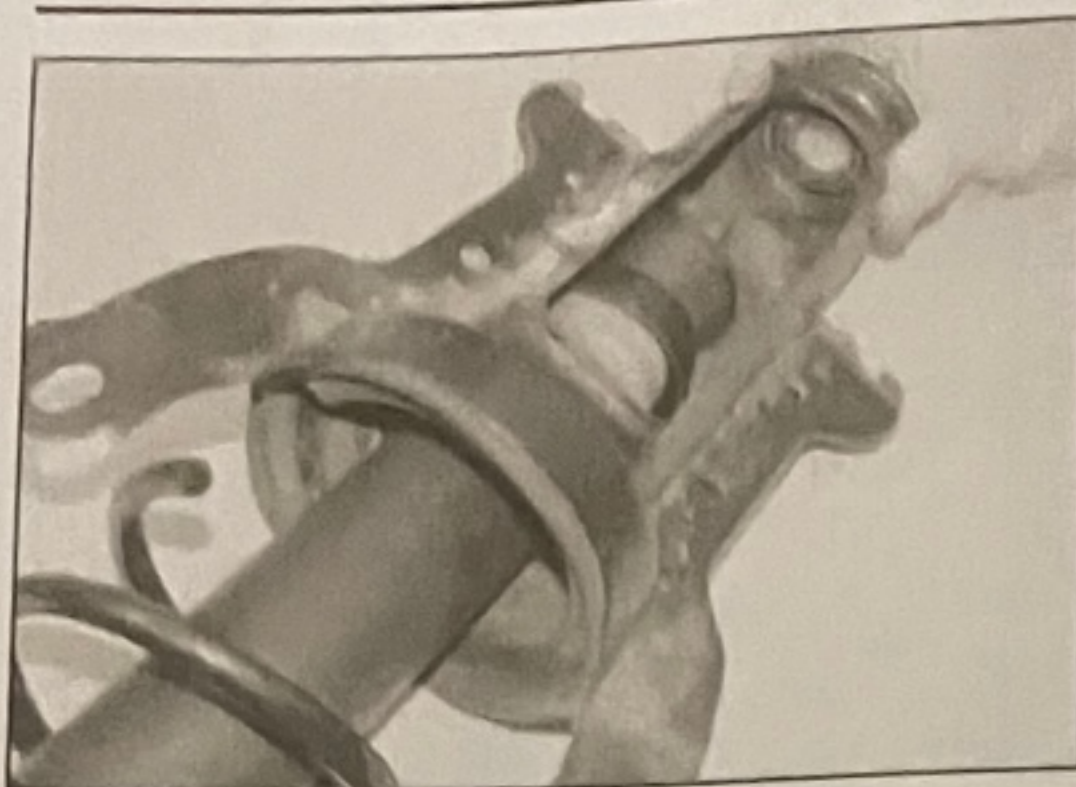
8.9a Unscrew and remove the nut...



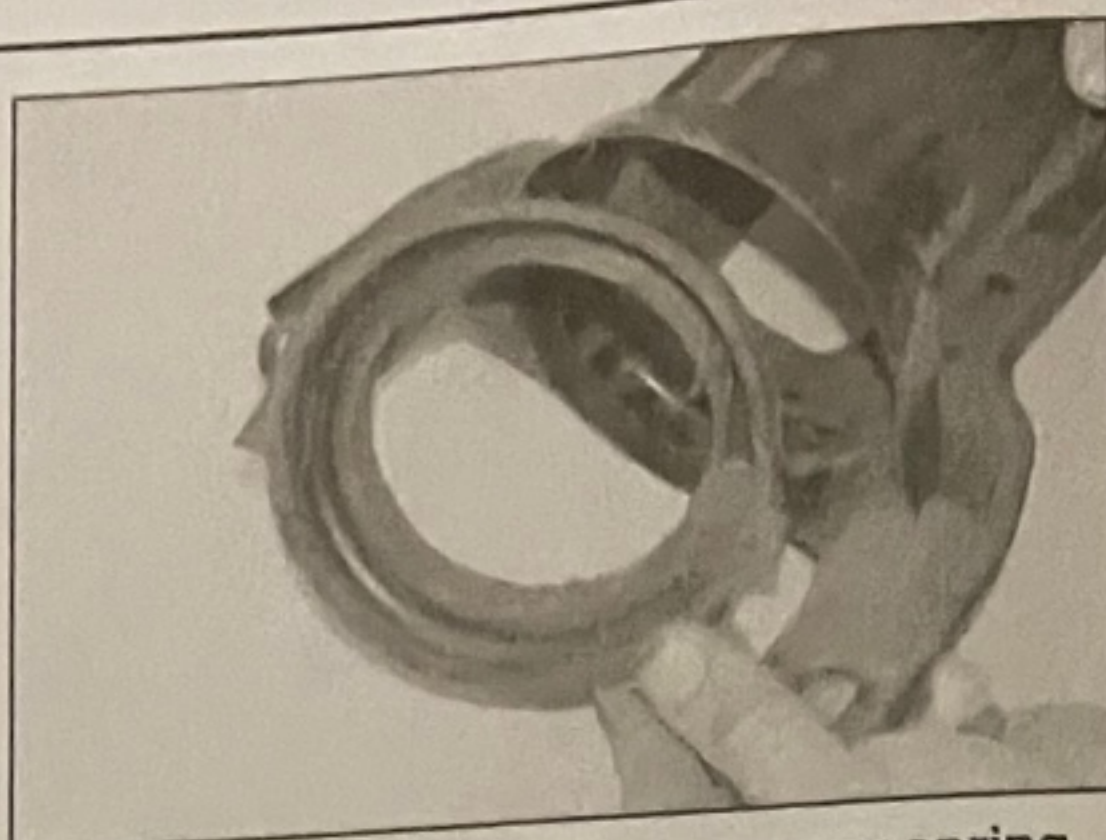
8.9b ... recover the upper domed washer ...



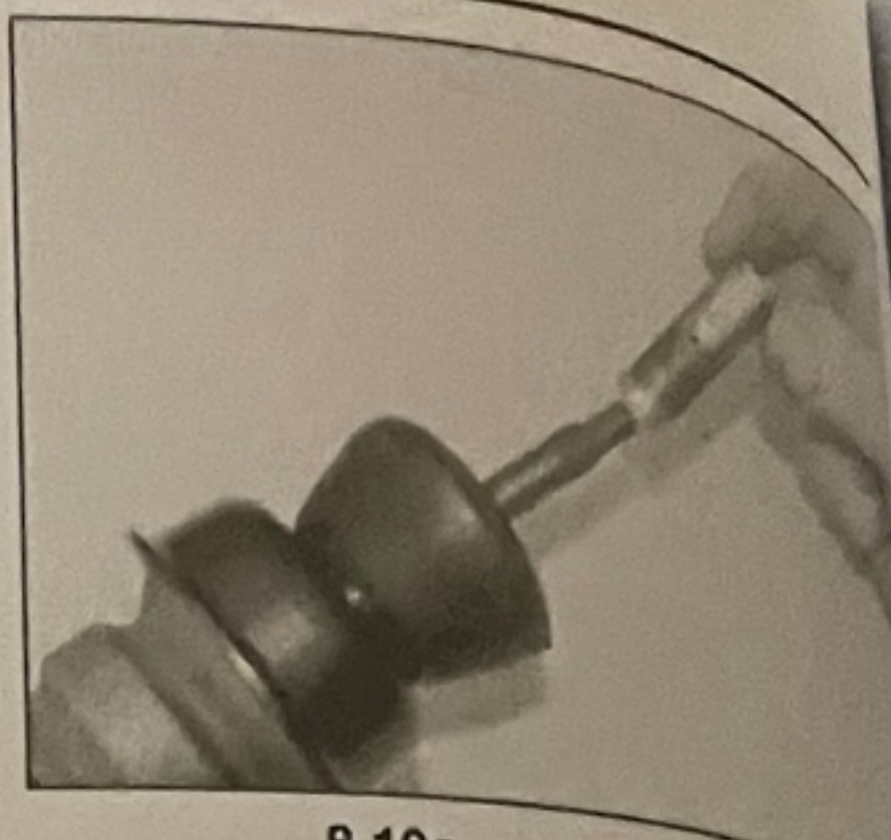
8.9c ... and remove the upper rubber bush



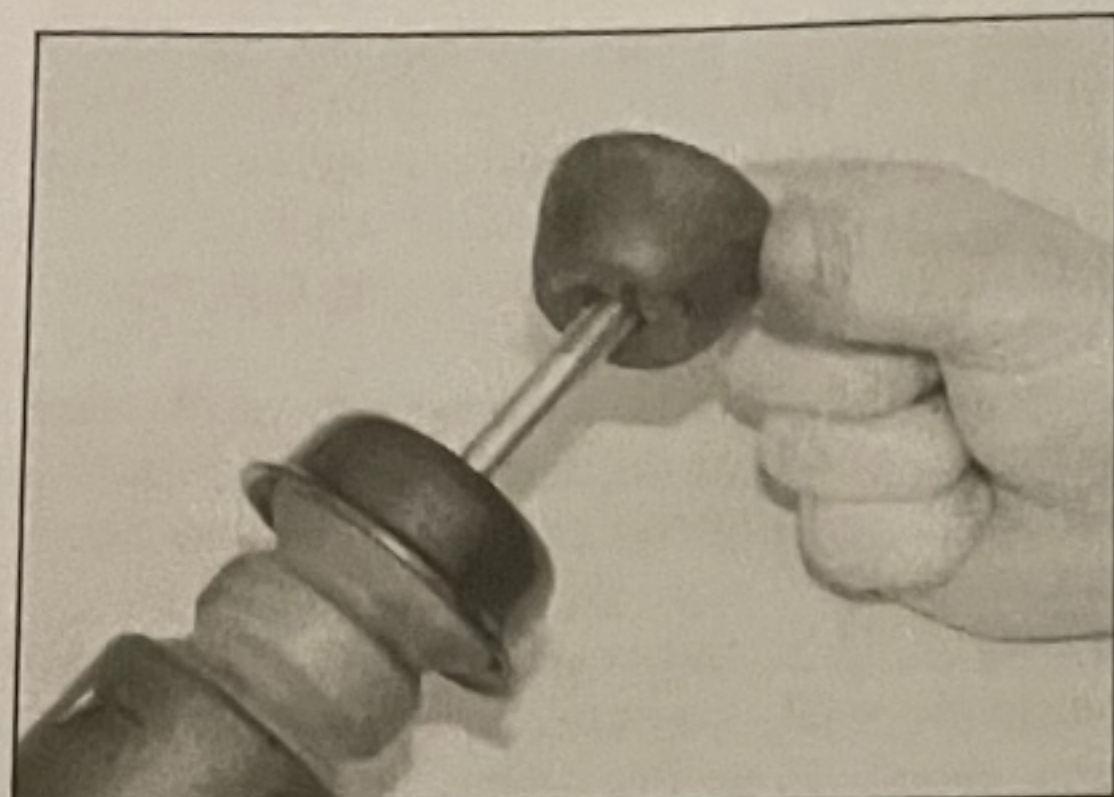
8.10a Lift off the upper bracket ...



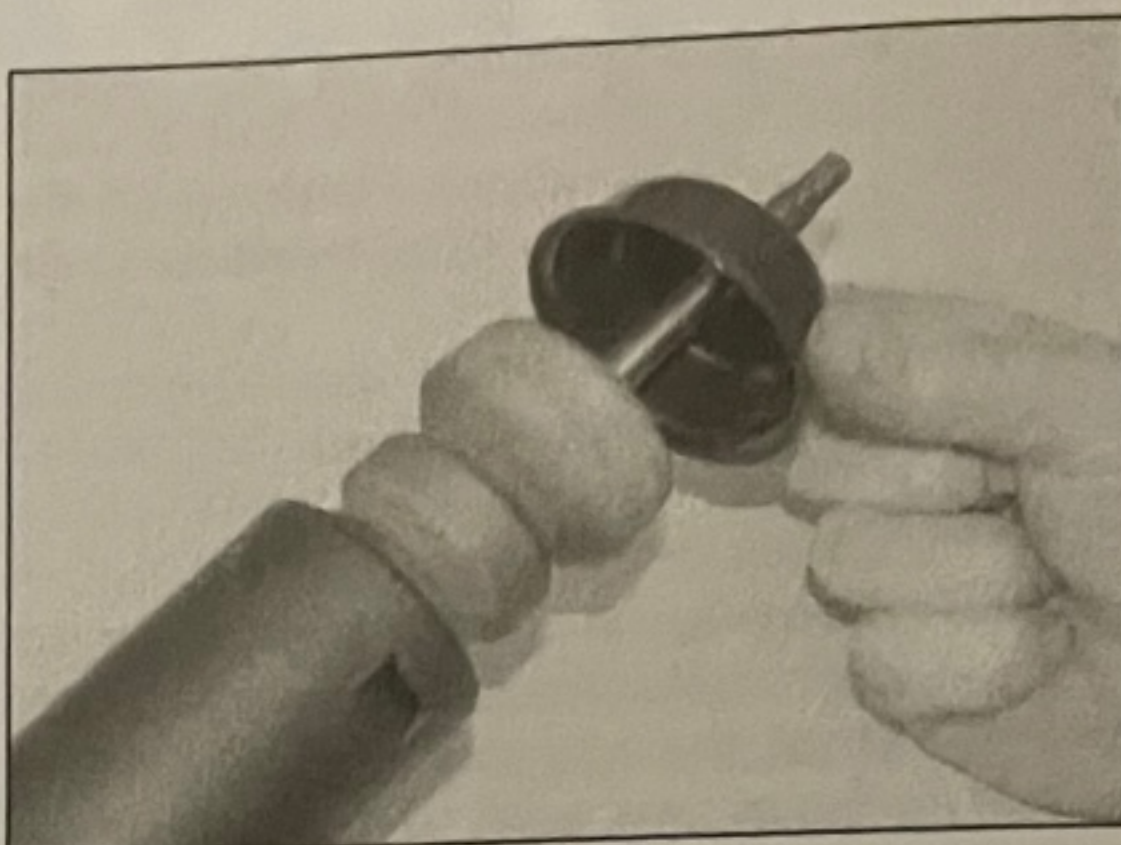
8.10b ... and remove the upper spring seat ...



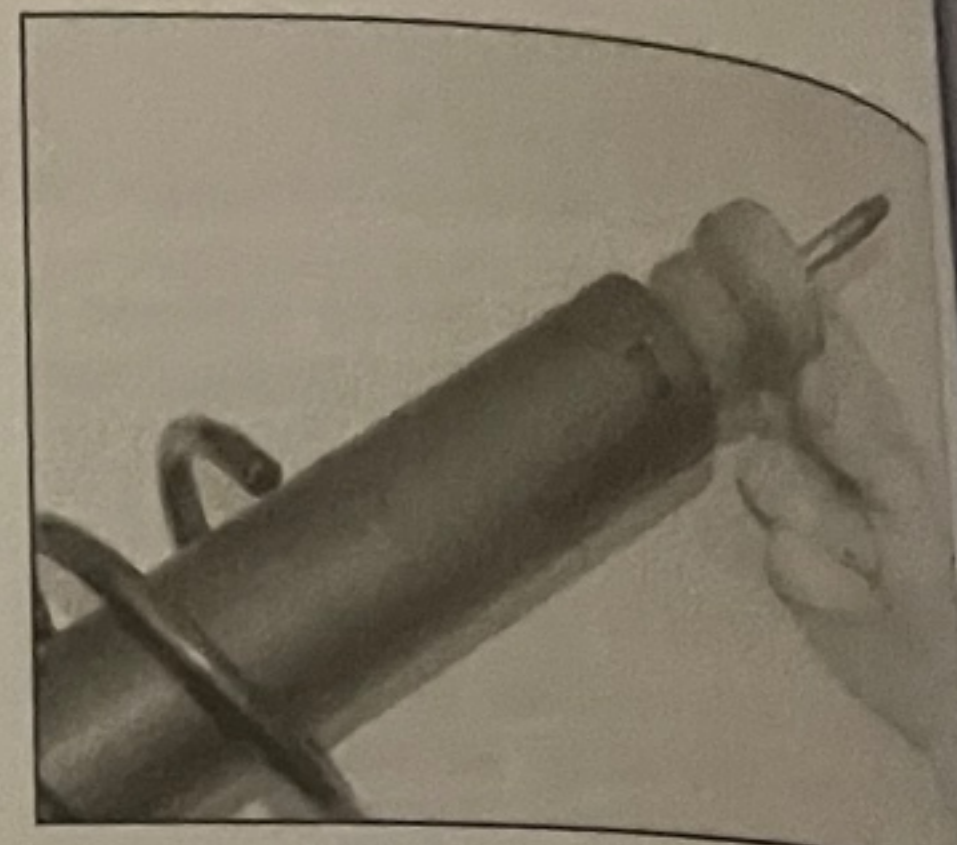
8.10c ... spacer ...



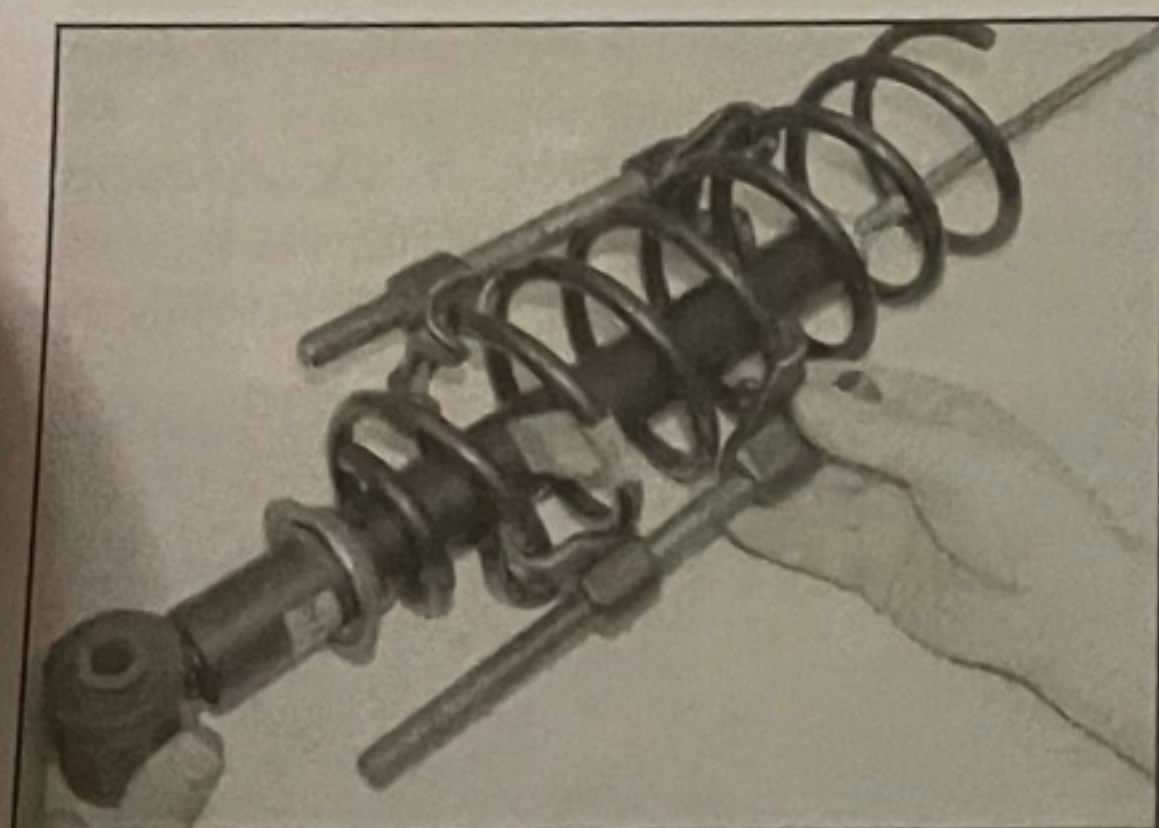
8.10d ... lower rubber bush ...



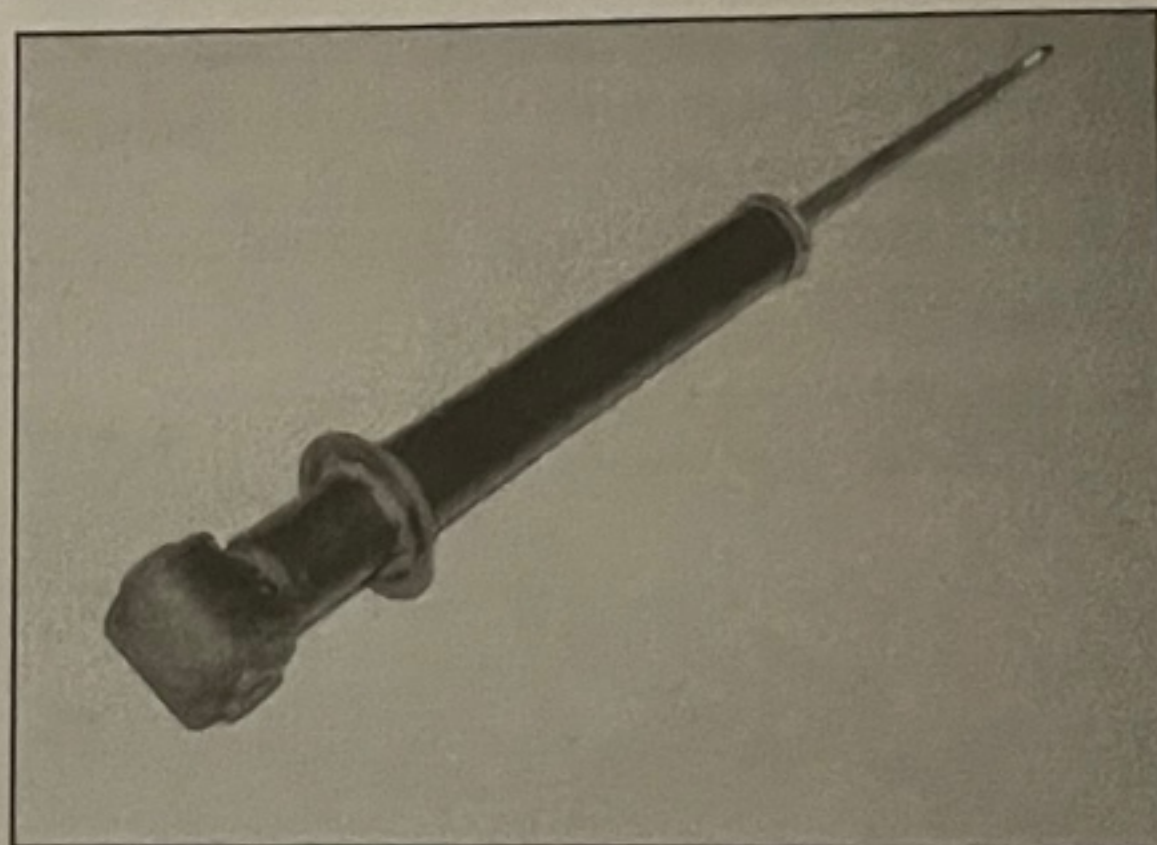
8.10e ... lower domed washer ...



8.10f ... buffer stop ...



8.10g ... and coil spring ...



8.10h ... rear shock absorber/strut with coil spring components removed

buffer stop and coil spring, noting their fitted locations (see illustrations).

11 Clean all the components and examine them for wear and damage. With the shock absorber mounted in the vice, operate the



9.2 Bolt securing the rear anti-roll bar link to the trailing arm

piston rod over its full stroke several times and check for tight spots or seizing. The rod should move smoothly with constant resistance. Renew the components as necessary.

12 Refit the coil spring with its small diameter coils downwards, making sure that its lower end locates correctly on the lower spring seat.

13 Refit the buffer stop, followed by the washer, lower rubber bush and spacer.

14 Refit the upper spring seat to the upper bracket, then locate the assembly on the coil spring, making sure that the end of the coil locates in the special recess in the spring seat.

15 Screw on the new top mounting nut by hand as far as possible.

16 Hold the piston rod stationary (as for dismantling) and tighten the mounting nut to the specified torque.

Refitting

17 Locate the shock absorber/strut on the loose upper mounting bolts, then insert the lower mounting bolts loosely. Push the strut upwards, and then tighten the bolts to the specified torque.

18 Fit the new lower mounting bolt and washer on the trailing arm, and tighten to the specified torque.

19 Refit the roadwheel and lower the vehicle to the ground.

9 Rear anti-roll bar - removal, overhaul and refitting

Removal

1 Chock the front wheels then jack up the rear of the vehicle and support on axle stands (see *Jacking and vehicle support*). Remove both rear roadwheels.

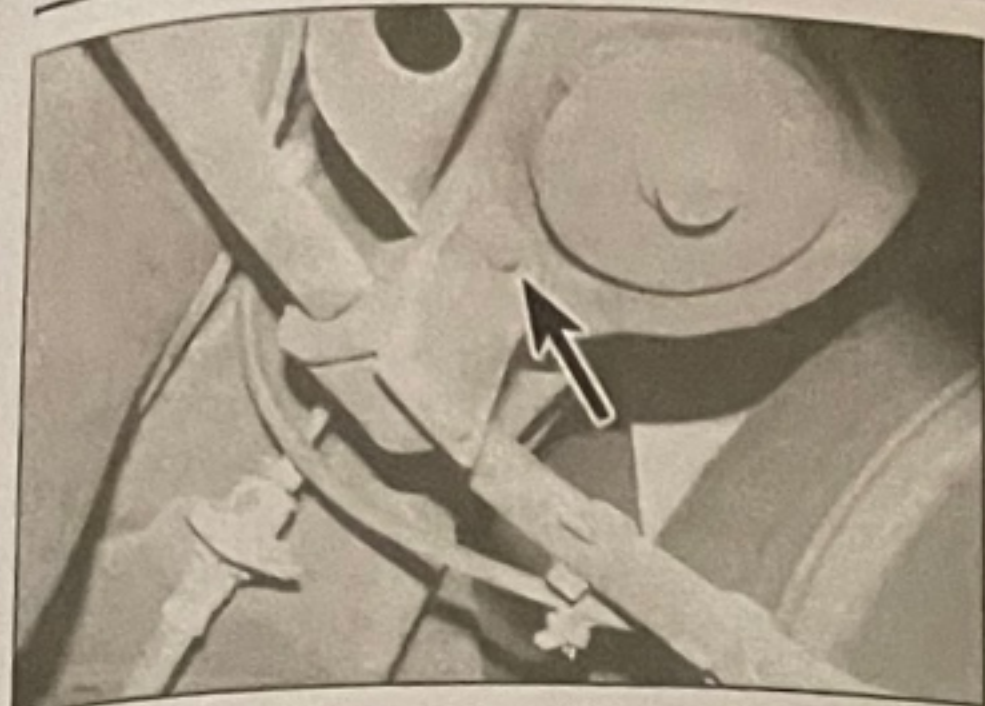
2 Unscrew the bolts securing the anti-roll bar links to the trailing arms (see illustration).

3 As applicable, release the ABS wiring from the clips on the rear anti-roll bar.

4 Unscrew the nuts and bolts from the clamps, and remove the anti-roll bar from the rear crossmember (see illustration). The bolts will probably remain in the clamps.

Overhaul

5 Check the split mounting rubbers and shock links mountings for wear and damage, and renew them as necessary.



9.4 Clamp bolt securing the anti-roll bar to the rear crossmember

6 To renew the split mounting rubbers, first note their fitted position on the anti-roll bar. To remove them, mount the clamps in a vice and tap out the bolts, then unhook the clamp retaining plates from the slot in the intermediate plates. Prise the rubbers from the anti-roll bar. Clean the bar, then dip the split clamp mounting rubbers in soapy water and fit them in the previously-noted positions. Assemble the intermediate plates and hook on the retaining plates. Make sure that the split sides of the rubbers contact the intermediate plates.

7 To renew the side links, mount the anti-roll bar in a vice then press off the links. It may be possible to renew the link mountings, but check with your Saab dealer first. To remove the link mountings, press them out using metal in a vice. Press in the new mountings using the same method.

Refitting

1 Mount the anti-roll bar on the rear crossmember, insert the nuts and bolts and tighten to the specified torque.

2 Tighten the bolts securing the anti-roll bar to the trailing arms and tighten securely. Reconnect the ABS wiring to the anti-roll bar as applicable.

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

10 Rear hub assembly - removal and refitting

Note: The rear hub bearings cannot be renewed separately; if they are worn excessively, the hub assembly must be renewed.

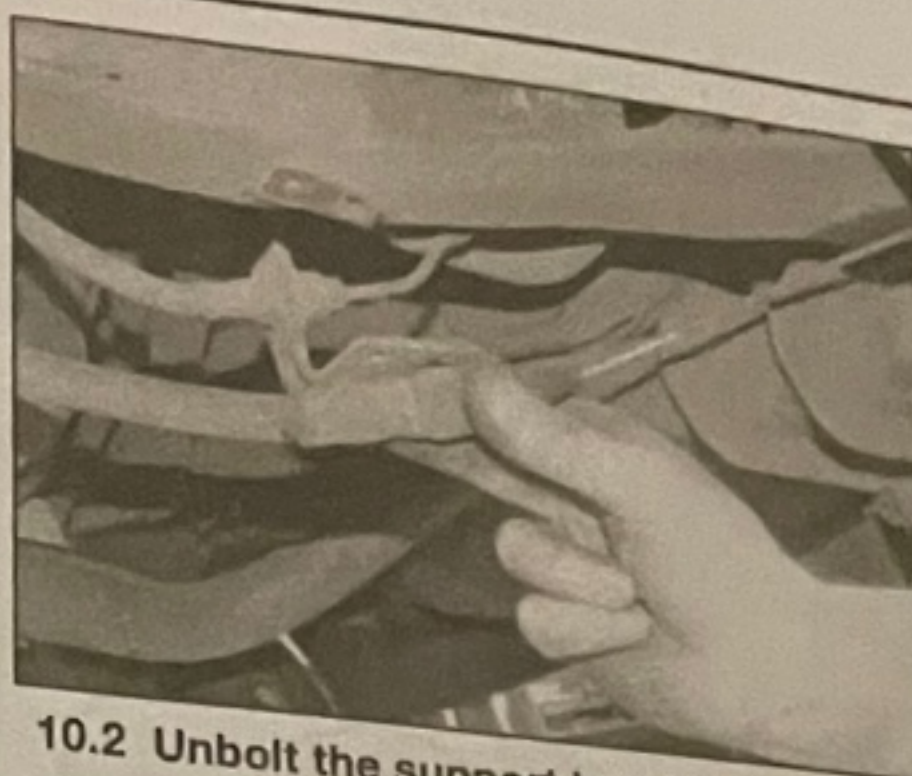
Removal

1 Remove the rear brake disc as described in Chapter 9.

2 Where fitted, remove the protective cover from the bottom of the rear suspension trailing arm, and unbolt the handbrake cable, wiring and brake pipe support brackets (see illustration).

3 Disconnect the wiring from the ABS sensor located on the rear of the hub assembly.

4 Unscrew the nuts securing the rear hub assembly to the trailing arm, noting the



10.2 Unbolt the support bracket from the trailing arm

location of the bracket on one of the hub studs, then withdraw the hub assembly, leaving the brake backplate suspended by the handbrake cable (see illustration). Recover the two shims located between the backplate and trailing arm. Discard the nuts, as new ones must be used on refitting.

Refitting

5 Clean the contact surfaces of the hub, backplate and trailing arm.

6 Locate the backplate on the hub studs, followed by the shims, then locate the assembly on the trailing arm and tighten the new nuts to the specified torque. Make sure the shims are positioned correctly between the backplate and trailing arm.

7 Reconnect the wiring to the ABS sensor.

8 Where applicable, refit the support brackets for the handbrake cable, wiring and brake pipe, then refit the protective cover to the bottom of the rear suspension lower arm.

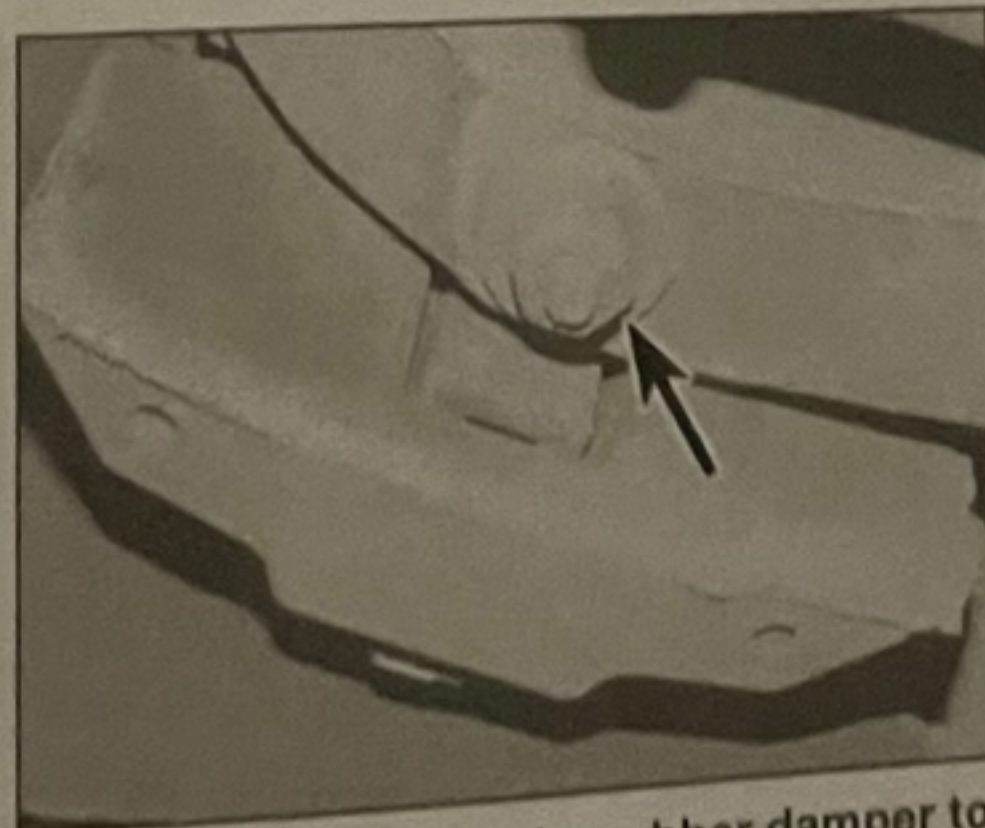
9 Refit the rear brake disc with reference to Chapter 9.

11 Rear trailing arm - removal, overhaul and refitting

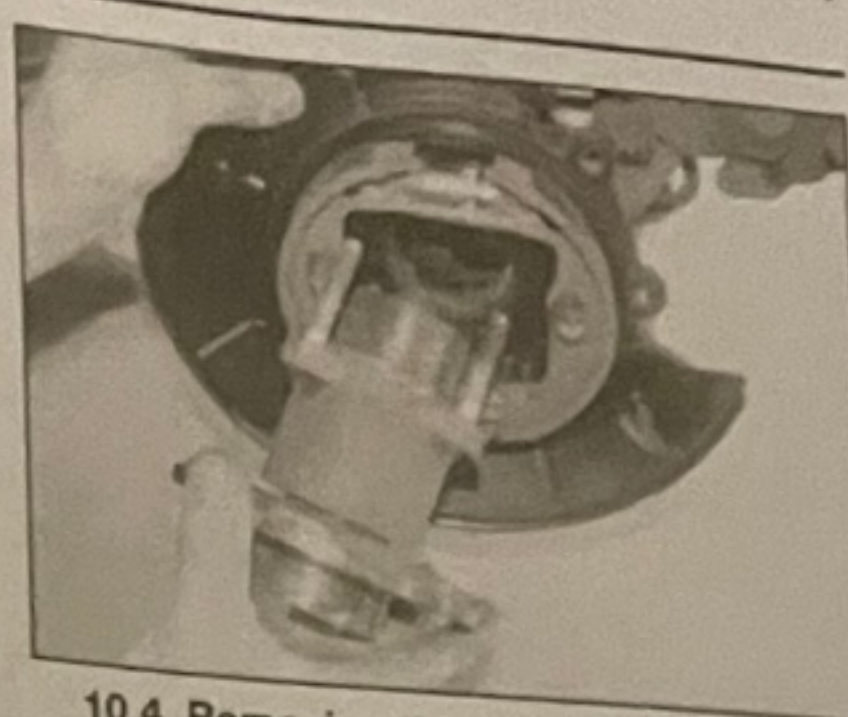
Removal

1 Remove the hub assembly as described in Section 10.

2 Unscrew and remove the lower mounting bolt securing the rear shock absorber/strut to the trailing arm, and recover the washer.



11.10 Nut securing the rubber damper to the front of the trailing arm



10.4 Removing the rear hub assembly from the trailing arm and brake backplate

Discard both the bolt and washer as new ones must be used on refitting.

3 Unscrew the bolt and remove the lower transverse link from the trailing arm. Note that the bolt head faces forward.

4 Unbolt the handbrake cable support bracket from the trailing arm.

5 Unhook the handbrake cable return spring and remove the cable.

6 Unscrew the bolt and remove the anti-roll bar link from the trailing arm.

7 Unscrew the bolt and remove the upper transverse link from the trailing arm. Note that the bolt head faces forward.

8 Mark the trailing arm front mounting bracket in relation to the underbody, then unscrew and remove the bolts and withdraw from the vehicle.

9 At this stage, Saab technicians fit a small jig tool to hold the trailing arm in its normal position in relation to the mounting bracket. If this tool is not available, mark the two parts in relation to each other to ensure correct refitting. Unscrew the nut and bolt and remove the mounting bracket from the trailing arm. Note that the bolt head faces the outside of the arm.

10 Where fitted, unscrew the nut and remove the rubber damper from the front of the trailing arm (see illustration).

Overhaul

11 Check the trailing arm for wear and damage, and renew if necessary.

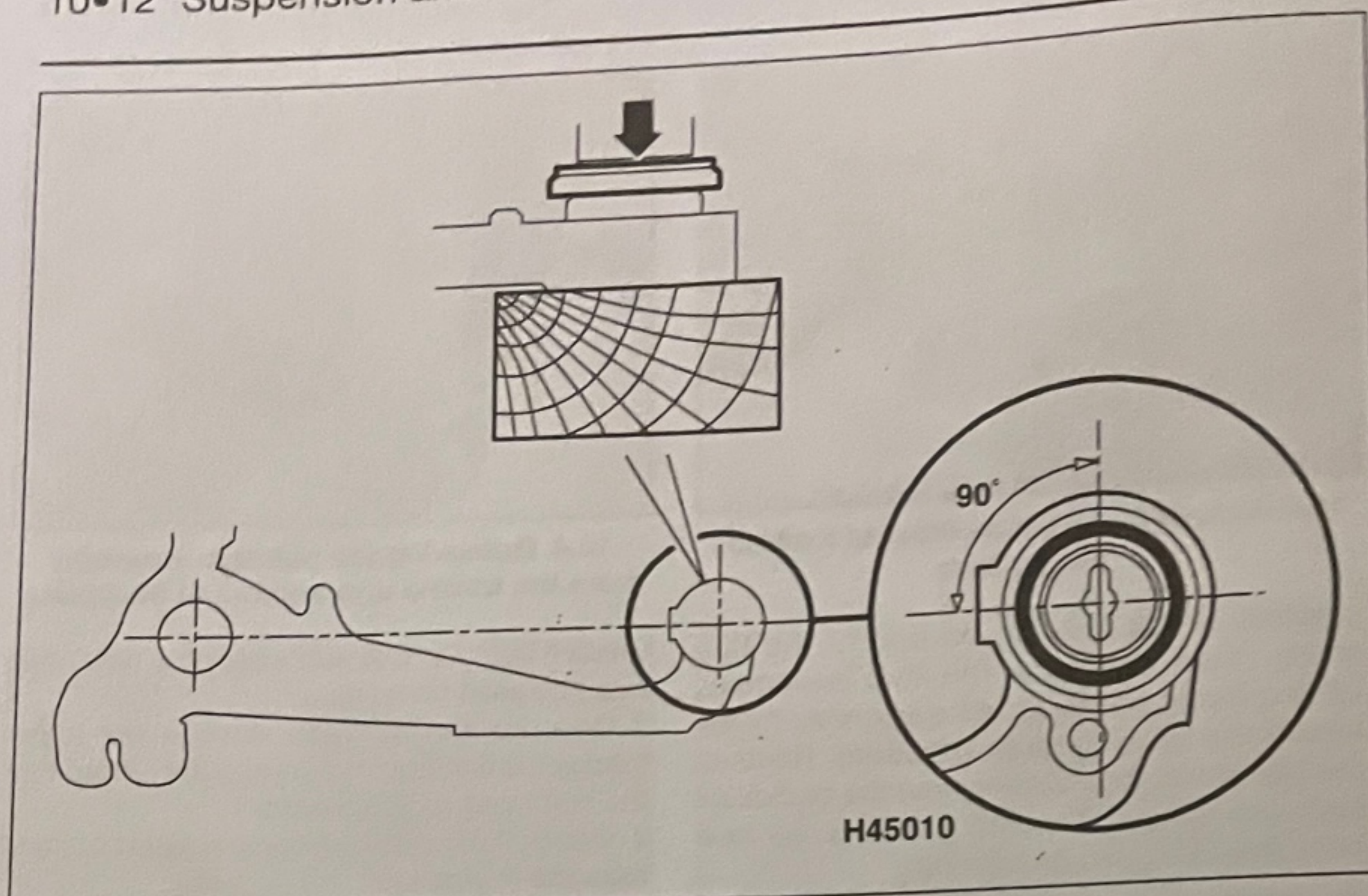
12 The front mounting bush can be renewed if necessary using metal tubing and a vice to press it out. First, cut off the edges of the rubber bush with a hacksaw for ease of removal. The transverse link bushes can also be renewed in the same way.

13 Press in the new bush using the same method, but position it correctly (see illustration). Note that the rubber bush outer sides will swell, and this is quite normal.

Refitting

14 Where fitted, refit the rubber damper to the front of the trailing arm and tighten the nut securely.

15 Locate the bracket on the front of the trailing arm and insert the bolt. Position the bracket and arm in their previously-noted



11.13 Rear suspension trailing arm bush renewal

position, and tighten the bolt to the specified torque and angle.

16 Lift the trailing arm and bracket onto the underbody and insert the mounting bolts. Position the bracket to align the previously-made marks, then insert the bolts and tighten them to the specified torque and angle.

17 Refit the upper transverse link and tighten the bolt to the specified torque.

18 Refit the anti-roll bar link and tighten the bolt securely.

19 Refit the handbrake cable and reconnect the return spring.

20 Refit the handbrake cable support bracket, and tighten the bolt securely.

21 Refit the lower transverse link and tighten the bolt to the specified torque.

22 Refit the rear shock absorber/strut to the trailing arm, and secure with a new lower mounting bolt and washer. Tighten the bolt to the specified torque.

23 Refit the hub assembly with reference to Section 10.

24 Have the rear wheel alignment checked and adjusted at the earliest opportunity.

12 Rear upper transverse link – removal and refitting

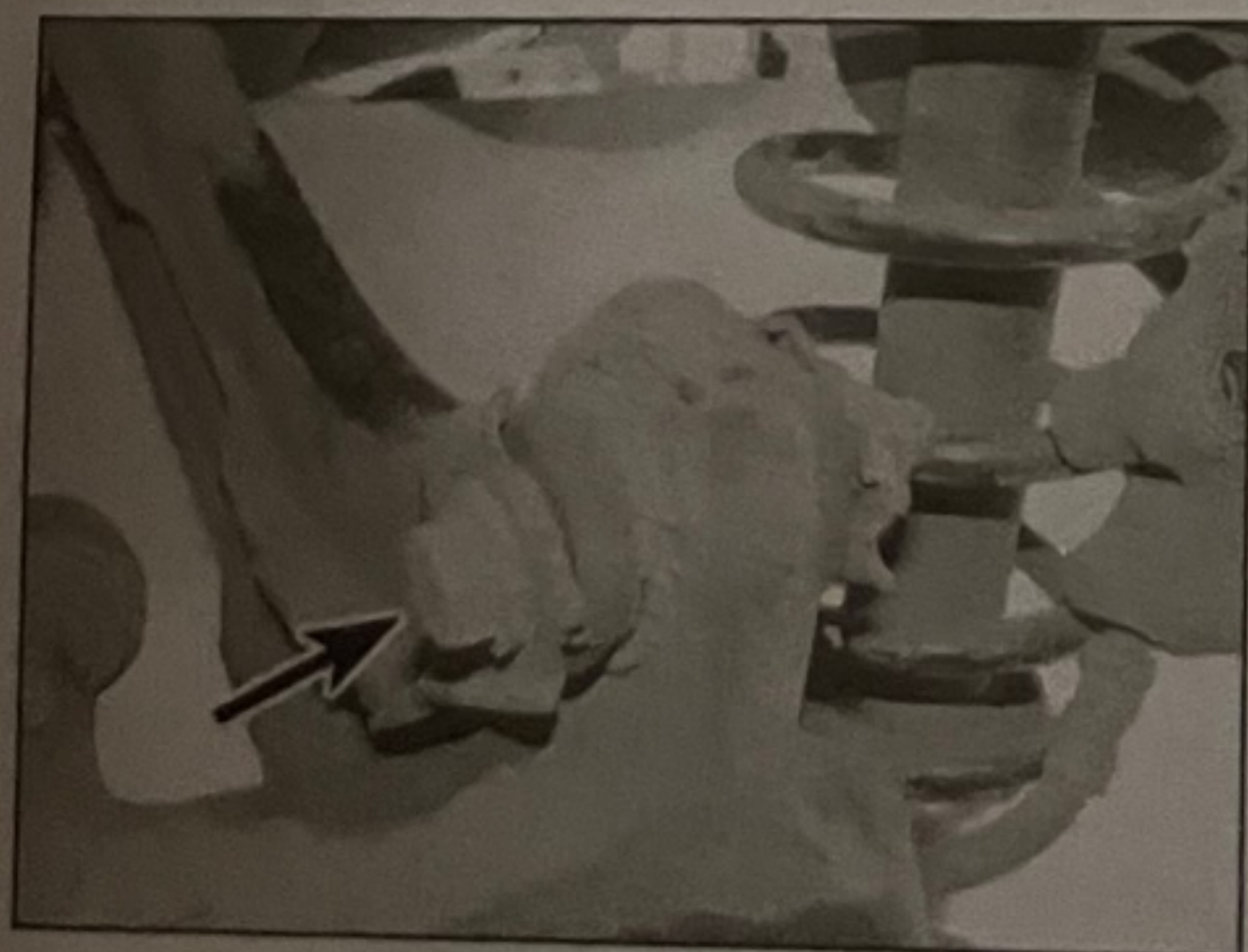
Removal

1 Chock the front wheels then jack up the rear of the vehicle and support on axle stands (see *Jacking and vehicle support*). Remove the roadwheel.

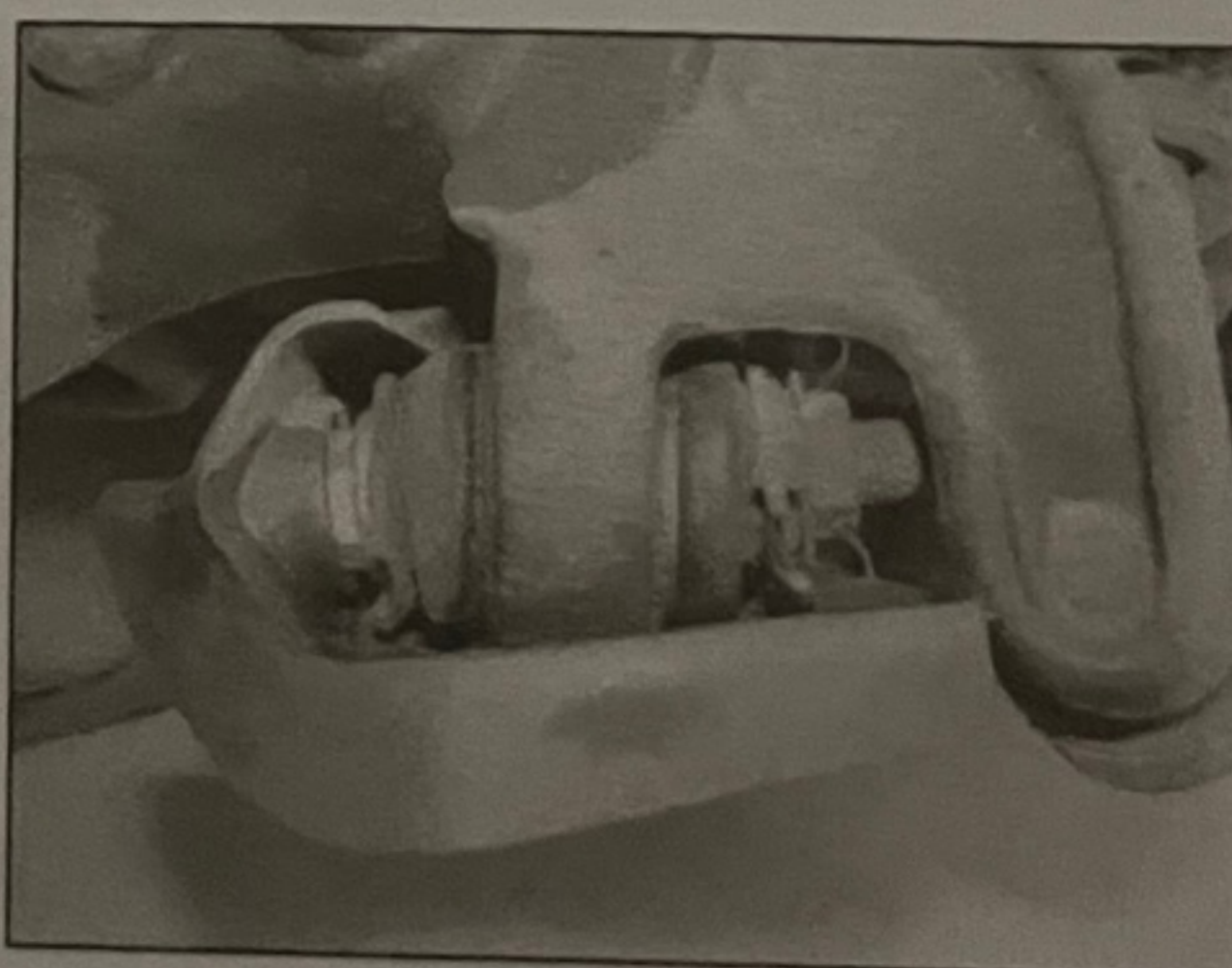
2 If removing the left-hand transverse link, unhook the exhaust system central and rear mounting rubbers and lower the exhaust onto axle stands. Make sure that the front flexible section is not unduly strained.

3 Unscrew the nut and bolt, and remove the lower transverse link from the trailing arm. Note that the bolt head faces forward. Discard the nut, as a new one must be used on refitting.

4 Unscrew the bolt and remove the upper transverse link from the trailing arm (see *illustration*). Note that the bolt head faces forward. Discard the nut, as a new one must be used on refitting.



12.4 The bolt head for the upper transverse link must face forward



13.3 Lower transverse link mounting on the trailing arm

5 Unscrew the bolt and remove the anti-roll bar link from the trailing arm.

6 Support the rear suspension on a trolley jack, then unscrew and remove the crossmember-to-underbody bolts on the side being worked on. Loosen the crossmember mounting bolts on the opposite side. Lower the crossmember slightly.

7 Unscrew the bolt and remove the lower transverse link from the trailing arm. Note that the bolt head faces forward. Discard the nut, as a new one must be used on refitting.

8 Unscrew the bolt and remove the upper transverse link from the trailing arm. Note that the bolt head faces forward. Discard the nut, as a new one must be used on refitting.

Refitting

9 Refitting is a reversal of removal, but tighten all nuts and bolts to the specified torque where given. Note that the transverse link crossmember mounting bolts and (new) should initially be tightened by hand only, finally fully-tightened with the full weight of the vehicle on the rear suspension. Note the bolts incorporate special sleeves to protect the fuel tank and fuel filler pipe in the event of a collision; **do not** use different types of bolts.

10 Have the rear wheel alignment checked and adjusted at the earliest opportunity.

13 Rear lower transverse link – removal and refitting

Removal

1 Chock the front wheels then jack up the rear of the vehicle and support on axle stands (see *Jacking and vehicle support*). Remove the roadwheel.

2 If removing the left-hand transverse link, unhook the exhaust system central and rear mounting rubbers and lower the exhaust onto axle stands. Make sure that the front flexible section is not unduly strained.

3 Unscrew the nut and bolt, and remove the lower transverse link from the trailing arm (see *illustration*). Note that the bolt head faces forward. Discard the nut, as a new one must be used on refitting.

4 Unscrew the bolt and remove the upper transverse link from the trailing arm. Note that the bolt head faces forward. Discard the nut, as a new one must be used on refitting.

5 Unscrew the bolt and remove the anti-roll bar link from the trailing arm.

6 Support the rear suspension on a trolley jack, then unscrew and remove the crossmember-to-underbody bolts on the side being worked on. Loosen the crossmember mounting bolts on the opposite side. Lower the crossmember slightly.

7 Unscrew the bolt and remove the lower transverse link from the trailing arm.

crossmember (see illustration). Note that the bolt head faces forward. Discard the nut, as a new one must be used on refitting.

Refitting

8 Refitting is a reversal of removal, but tighten all nuts and bolts to the specified torque where given. Note that the transverse link-to-crossmember mounting bolts and (new) nuts should initially be tightened by hand only, and finally fully-tightened with the full weight of the vehicle on the rear suspension. Note that the bolts incorporate special sleeves to protect the fuel tank and fuel filler pipe in the event of a collision; **do not** use a different type of bolt.

9 Have the rear wheel alignment checked and adjusted at the earliest opportunity.

14 Rear subframe – removal, overhaul and refitting

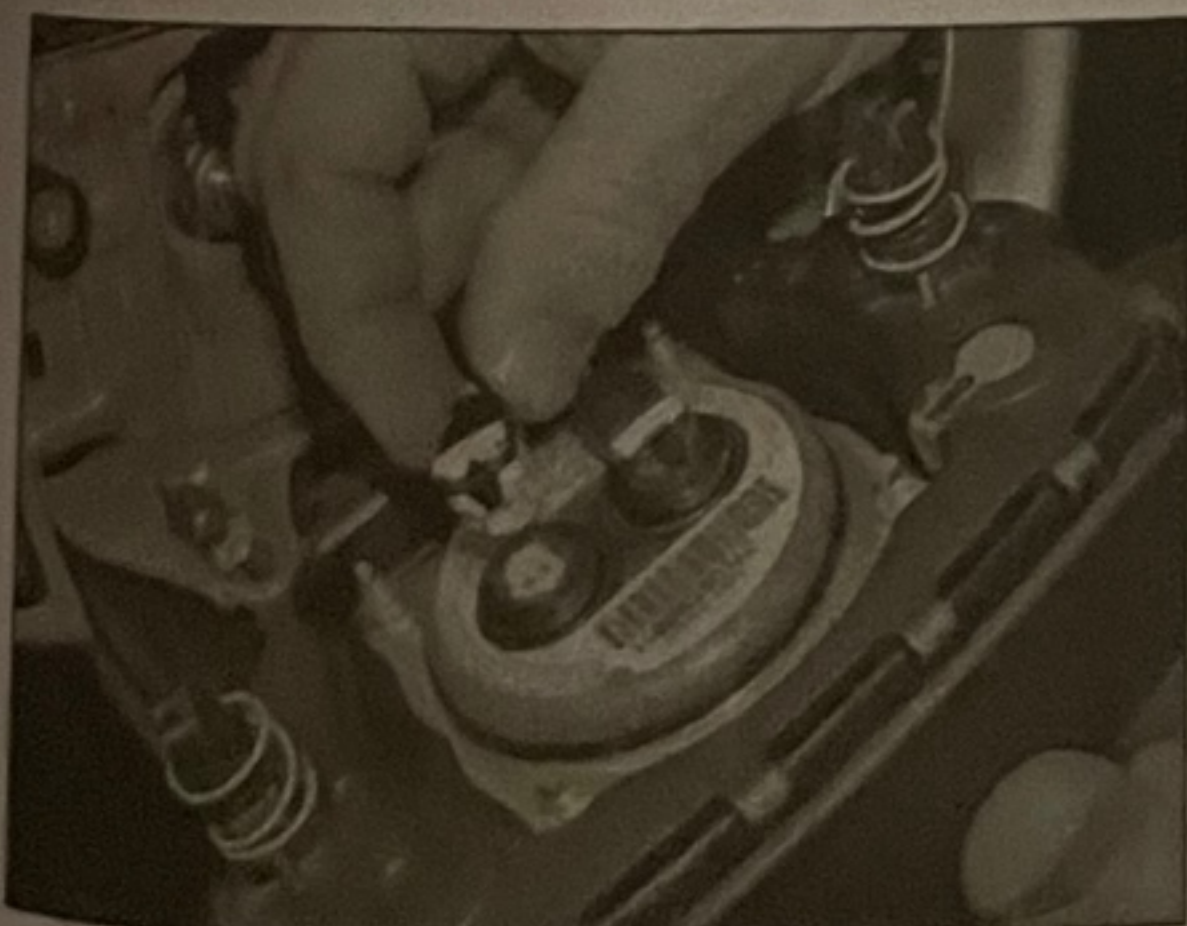
Removal

- 1 Remove the rear suspension anti-roll bar as described in Section 9.
- 2 Remove the right-hand and left-hand rear suspension upper and lower transverse links as described in Sections 12 and 13, however, **do not** remove the subframe mounting bolts.
- 3 Support the subframe with a trolley jack of adequate length of wood.
- 4 Unscrew and remove the subframe mounting bolts and washers (see illustration).
- 5 Lower the subframe from the underbody and support it from beneath the vehicle.

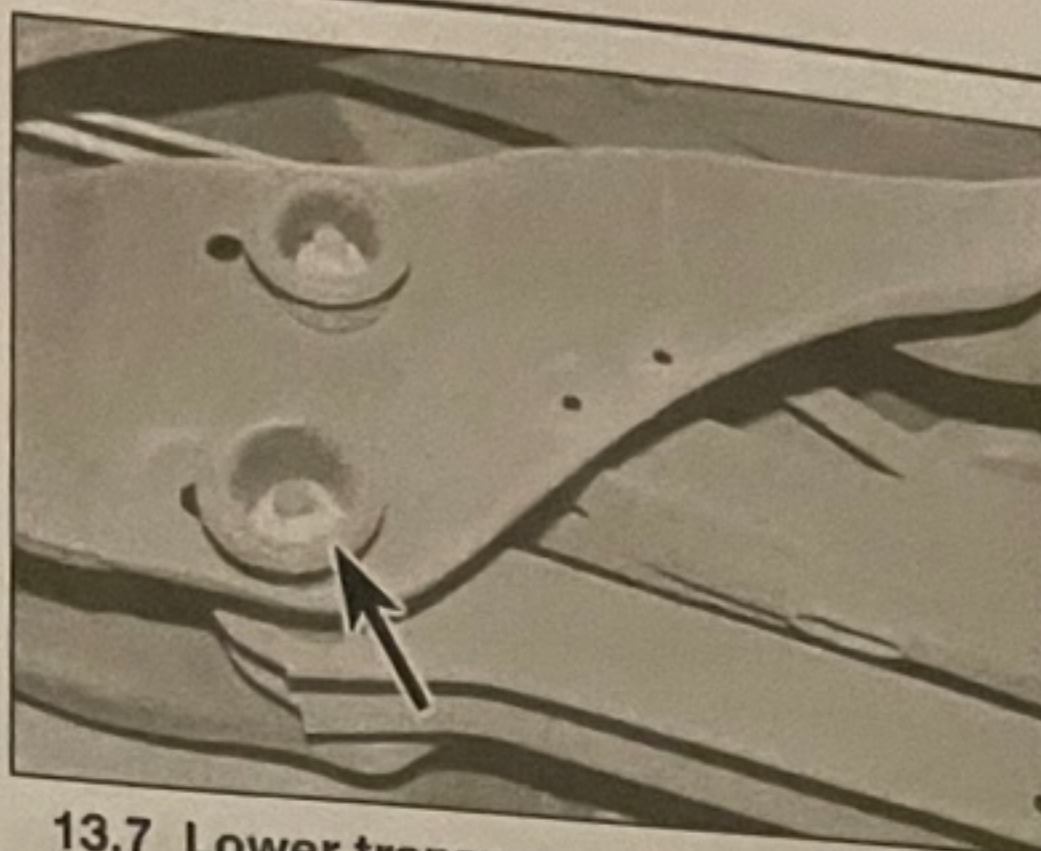
6 Remove the subframe and mounting bushes and inspect for wear and damage, and renew as necessary. The mounting bushes can be renewed if necessary using a press or alternatively, metal tubing, washers and a long bolt. Press in the new bushes using the same method.

Refitting

- 8 Raise the subframe onto the underbody, and insert the mounting bolts hand-tight at this stage.
- 9 Refit the right-hand and left-hand rear suspension upper and lower transverse links with reference to Sections 12 and 13.



15.3 Disconnect the airbag wiring connectors



13.7 Lower transverse link mounting on the crossmember

- 10 Refit the rear suspension anti-roll bar with reference to Section 9.
- 11 Fully-tighten the subframe mounting bolts to the specified torque, and lower the vehicle to the ground.

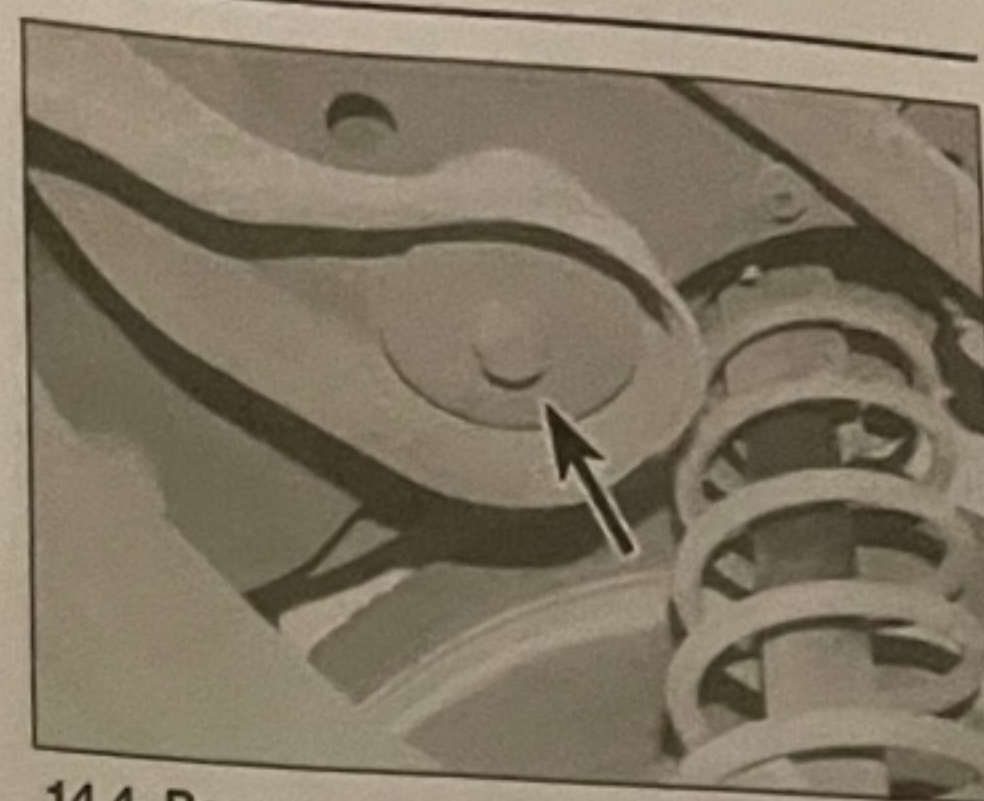
15 Steering wheel – removal and refitting

Removal

- 1 Turn the ignition to the OFF position, leaving the key in the switch, with the steering lock released, turn the steering wheel 90° to the left.
- 2 At the lower part of the steering wheel, insert a small screwdriver through the hole in the rear of the steering wheel to release the securing clip. Turn the steering wheel through 180° and insert a small screwdriver through the hole in



15.2a insert the screwdriver...

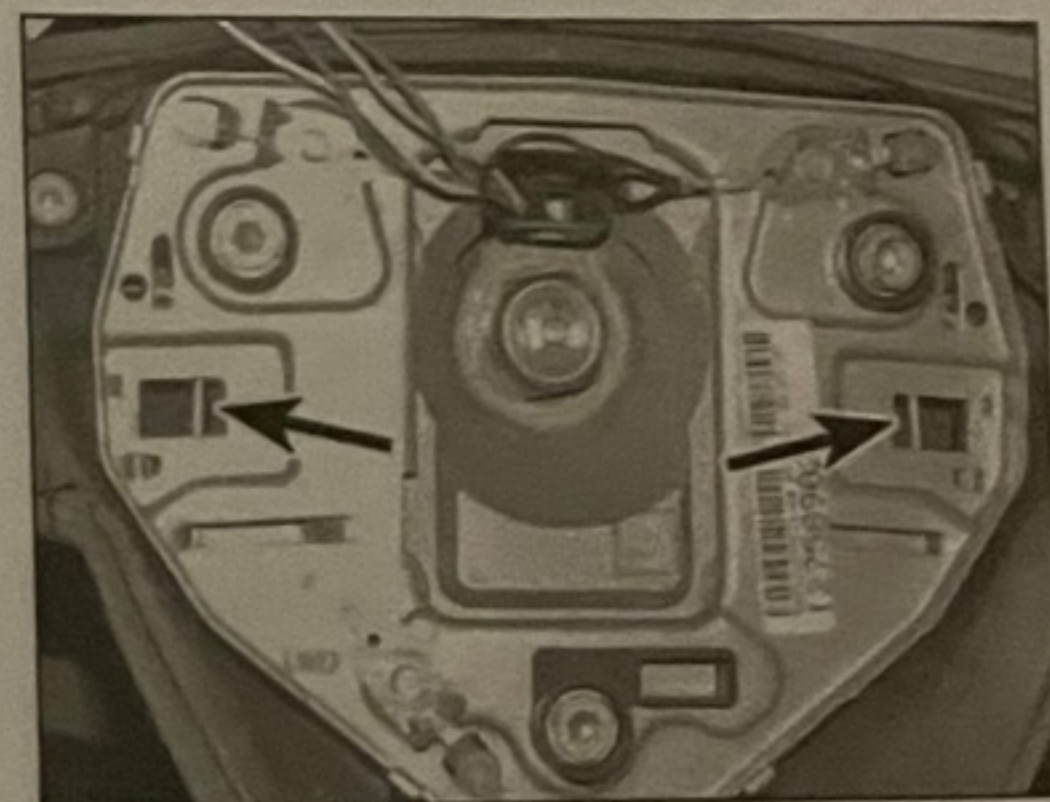


14.4 Rear suspension subframe mounting bolt

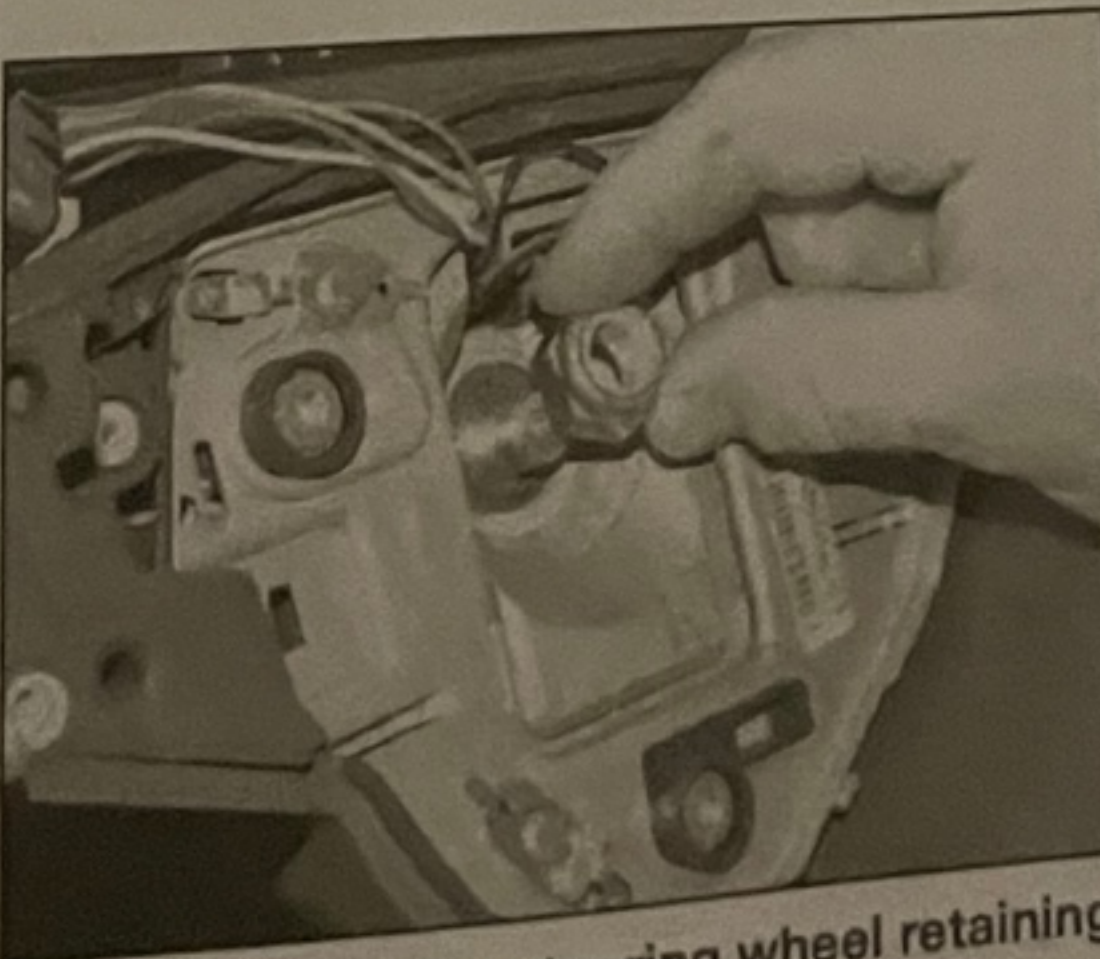
the rear of the steering wheel to release the second securing clip (see illustrations).

3 With the two securing clips released, withdraw the airbag module from the steering wheel, and then disconnect the airbag wiring connectors as it is removed (see illustration). **Caution: Observe the safety instructions given in Chapter 11.**

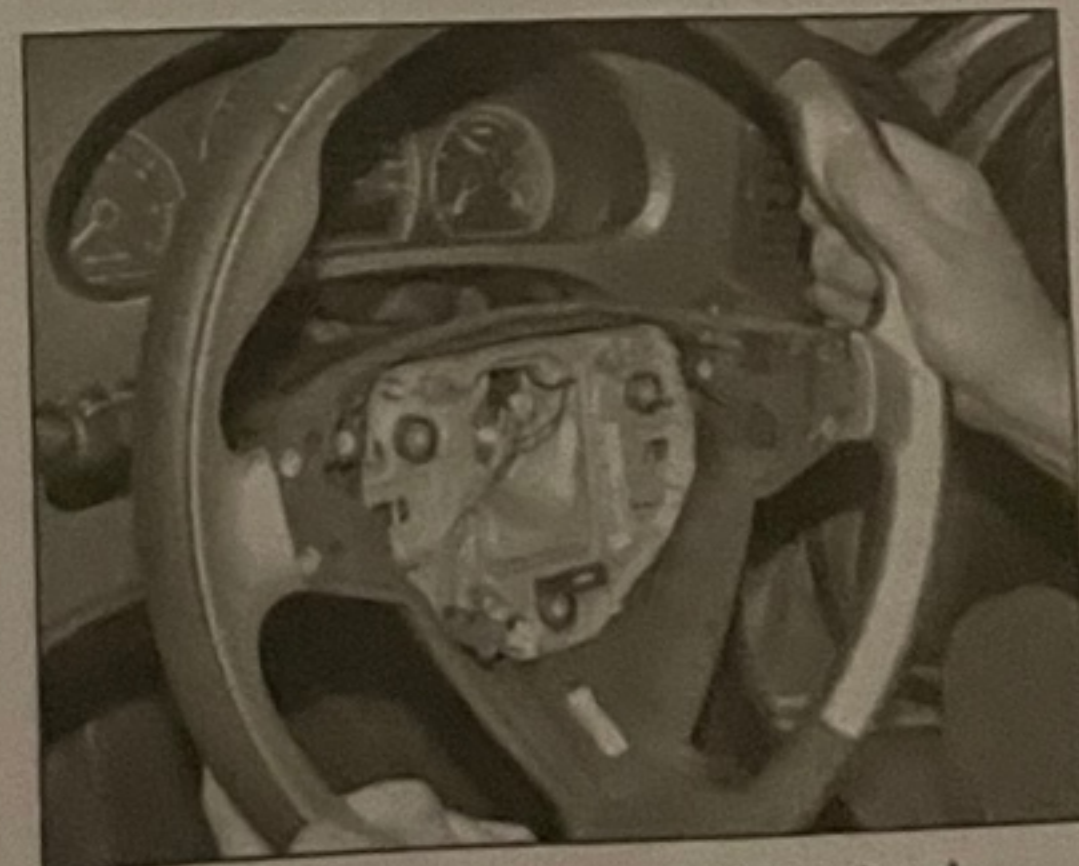
- 4 Turn the steering wheel back to the straight-ahead position. Mark the relationship between the steering wheel and steering column with a dab of paint, then unscrew the steering wheel retaining nut, and washer where fitted (see illustration).
- 5 Carefully ease the steering wheel from the column splines, and disconnect the wiring connector as the steering wheel is removed (see illustrations). **Note: If the steering**



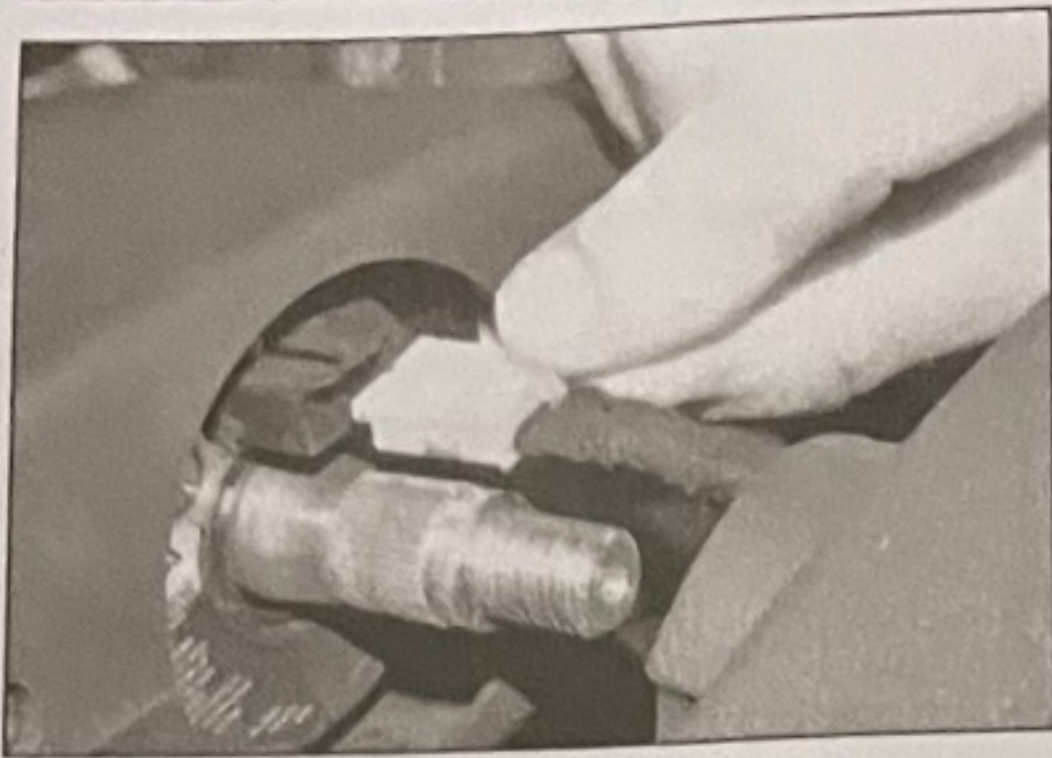
15.2b ... and release the securing clips (arrowed)



15.4 Unscrew the steering wheel retaining nut



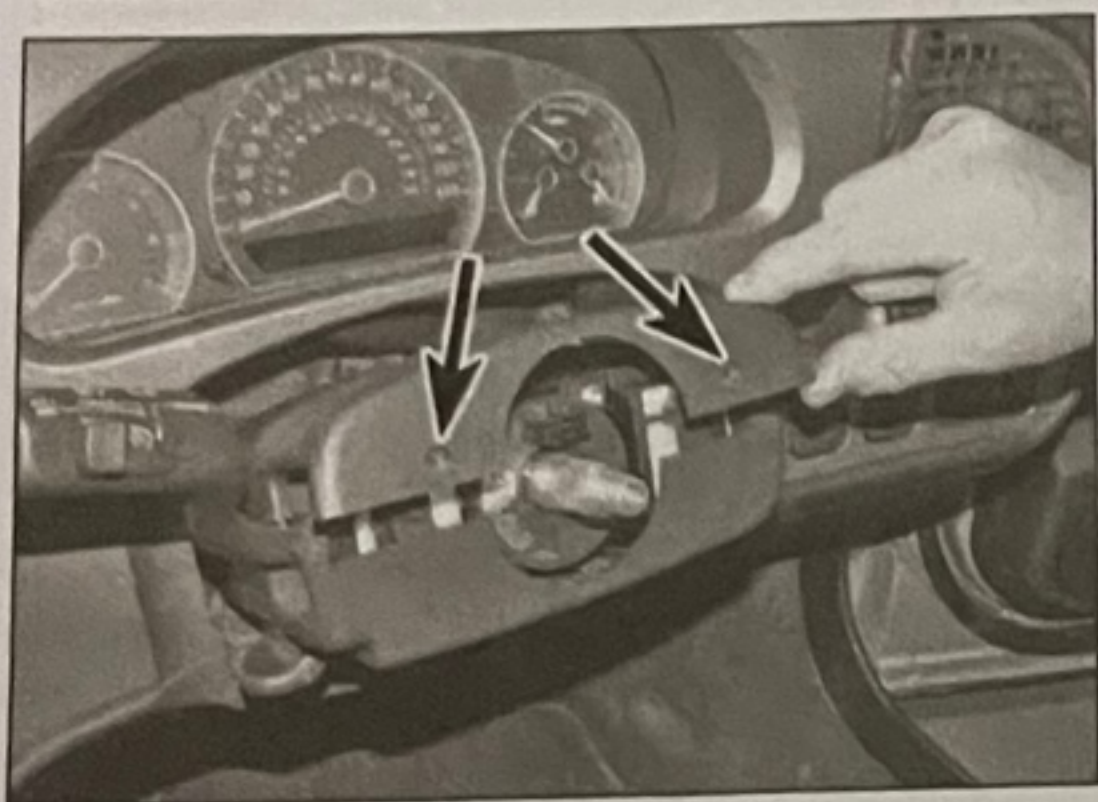
15.5a Withdraw the steering wheel...



15.5b ... and disconnect the wiring connector

wheel is a tight fit on the splines, temporarily leave the retaining nut and washer on the last few threads, to prevent any damage when it releases from the column splines.

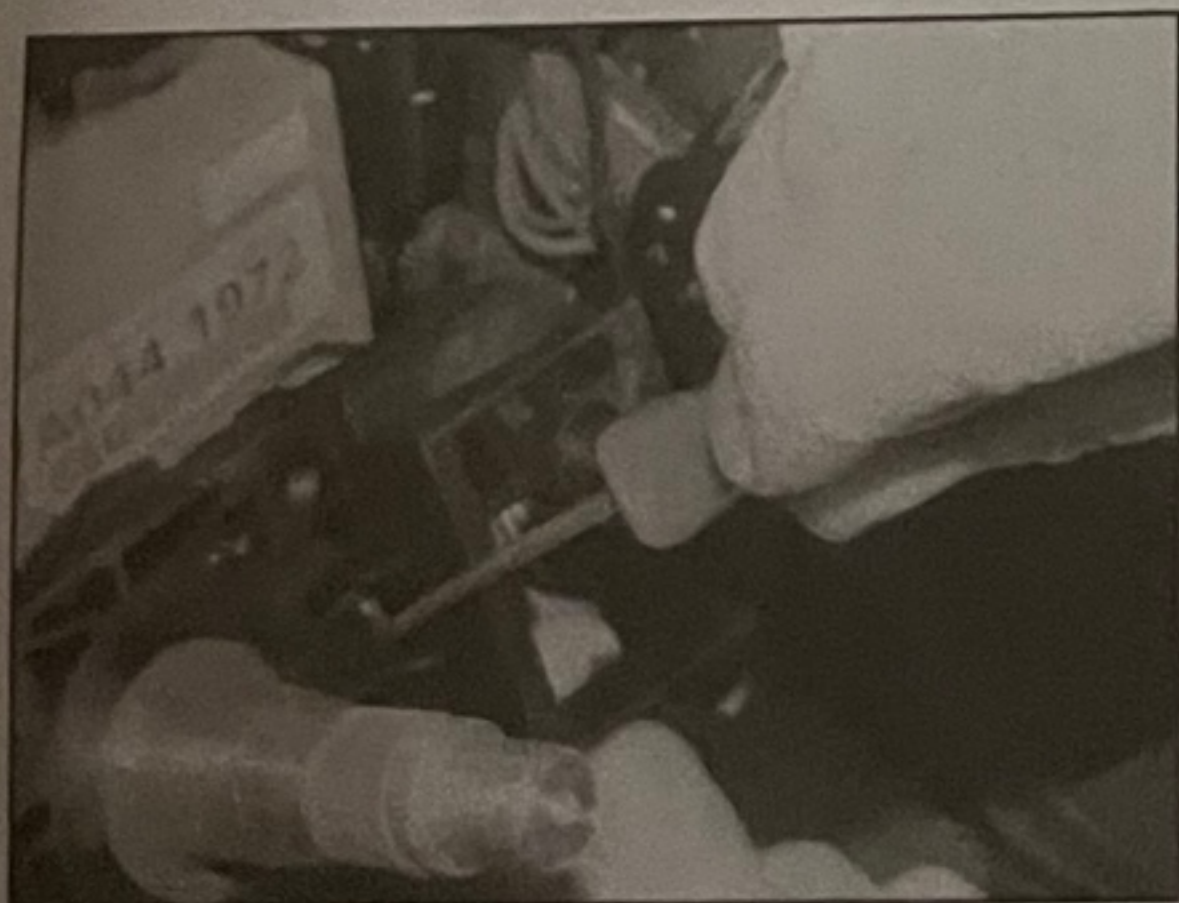
Caution: Do not drive the steering wheel



16.3a Undo the upper screws ...



16.3c ... then remove the shrouds



16.6c ... and use a screwdriver to release the airbag socket ...

from the splines, as this may damage the collapsible inner column. Also take care not to damage the airbag contact spring unit located over the top of the column.

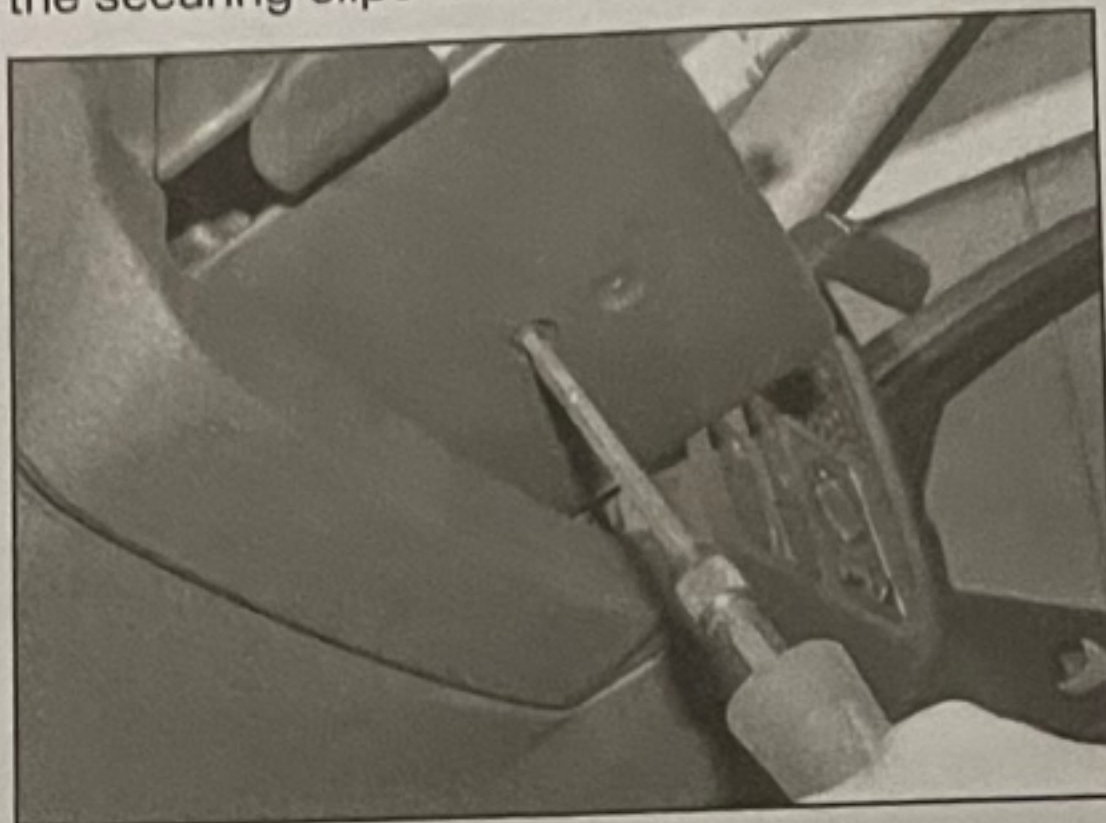
Refitting

6 First check that the front wheels are still pointing in the straight-ahead position.

7 Locate the steering wheel on the column splines, while connecting the wiring connector to the steering contact spring unit. Make sure the previously-made marks are correctly aligned.

8 Refit the retaining nut and washer (where applicable) and then tighten the nut to the specified torque.

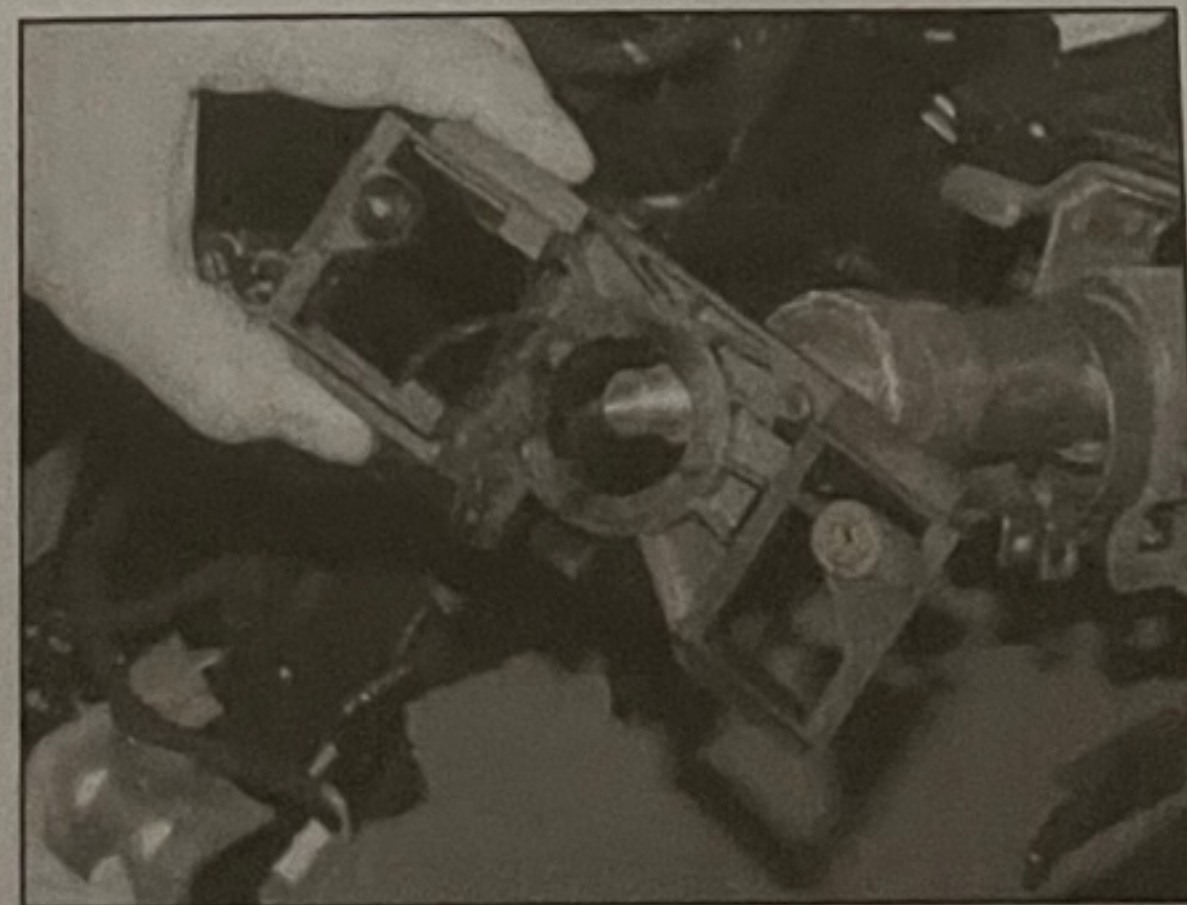
9 Locate the driver's airbag module on the steering wheel, and reconnect the airbag wiring connectors. Secure the airbag unit to the steering wheel, by pressing it firmly until the securing clips are located.



16.3b ... and lower screw ...



16.6a Use a felt-tip pen to mark the position of the holder on the steering column ...



16.6d ... withdraw the contact spring holder ...

10 Have the vehicle electronic control system checked for fault codes by a Saab dealer.

16 Steering column - removal and refitting



Warning: Do not separate the steering intermediate shaft from the inner column during removal of the steering column.

Removal

1 Remove the steering wheel as described in Section 15.

2 Release the steering wheel height adjustment lever.

3 Remove the steering column upper and lower shrouds. There are two screws facing upwards in the upper shroud, and one screw located beneath the lower shroud (see illustrations).

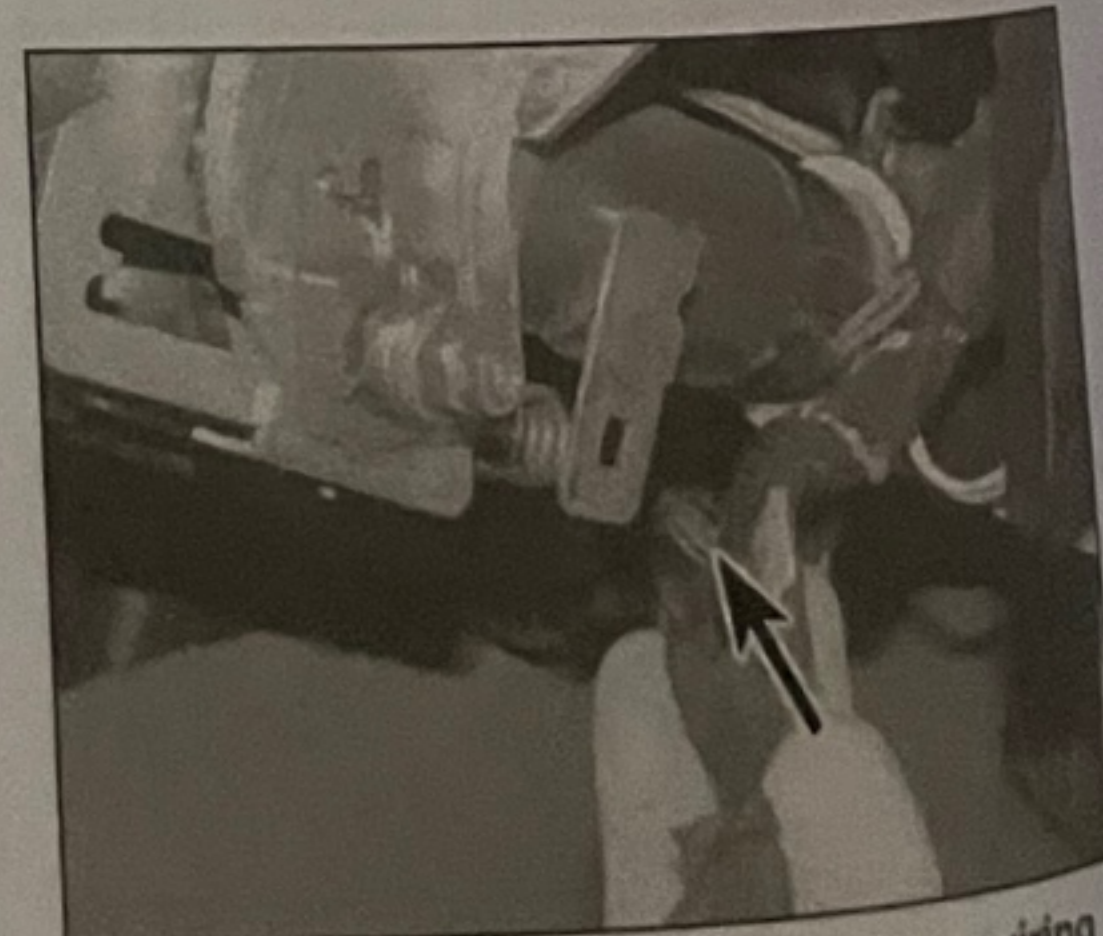
4 Remove the lighting and wiper combination switches from the column and disconnect the wiring with reference to Chapter 12. Where applicable, unclip the wiring conduit from the steering column.

5 Disconnect the wiring then remove the airbag contact spring unit (see Chapter 11).

6 Mark the position of the holder for the contact spring unit and combination switches on the steering column, and then loosen the clamp screw. Using a screwdriver, release the airbag wiring socket from the holder, then withdraw the holder from the steering column. Also release the airbag wiring socket from the support (see illustrations).



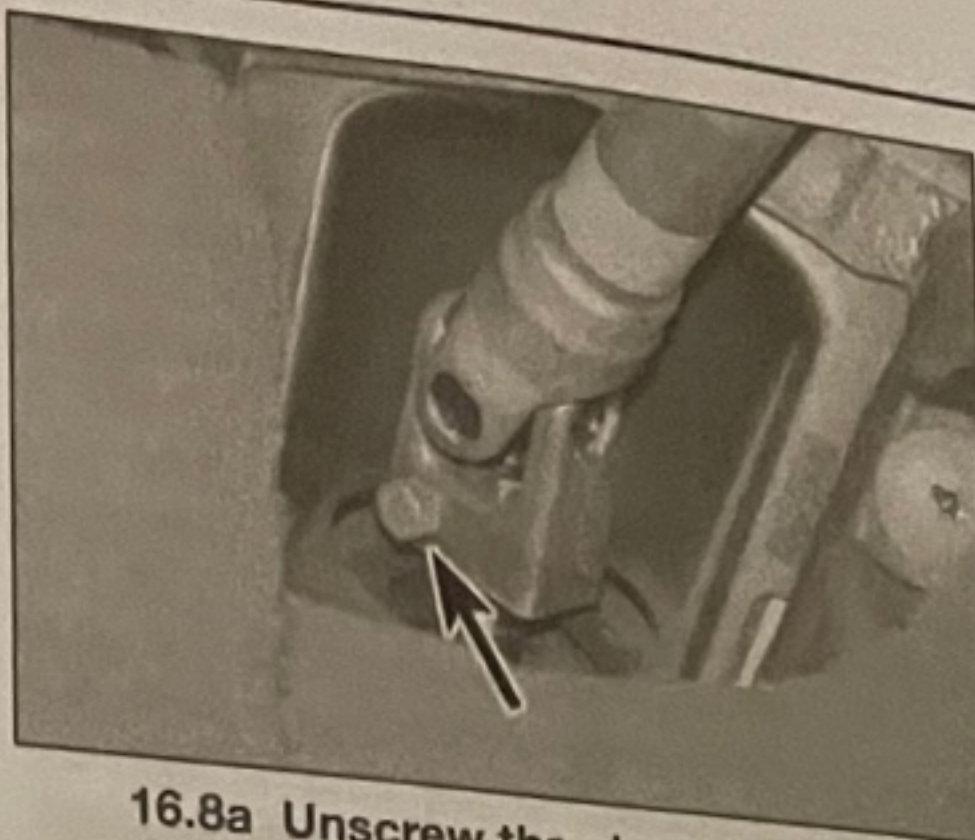
16.6b ... then loosen the clamp screw ...



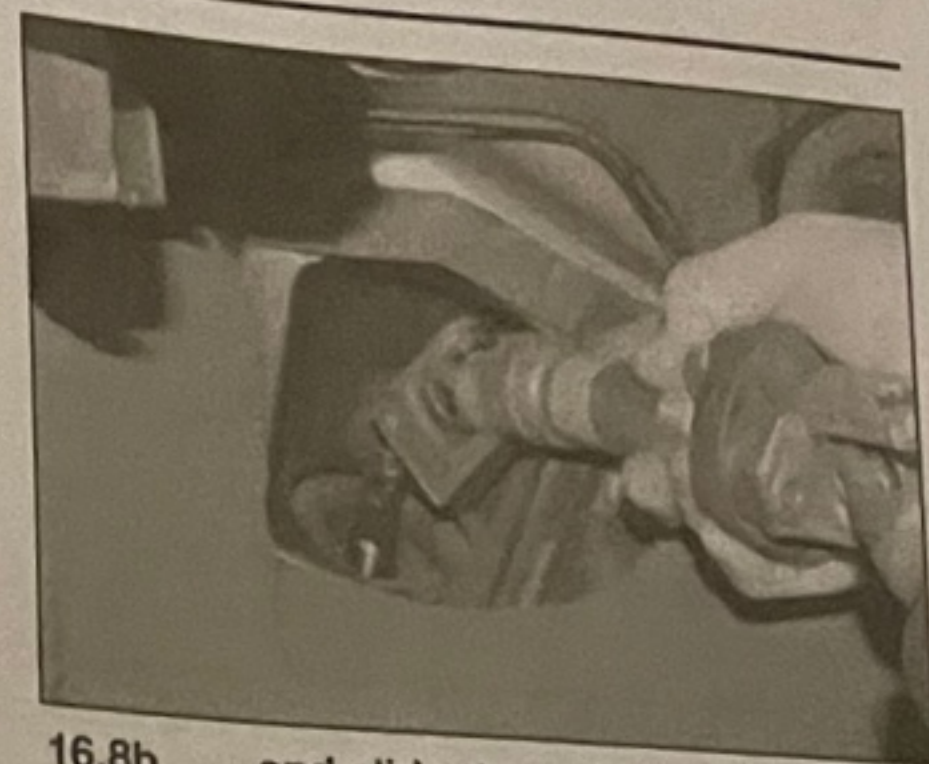
16.6e ... and release the airbag wiring socket from the support



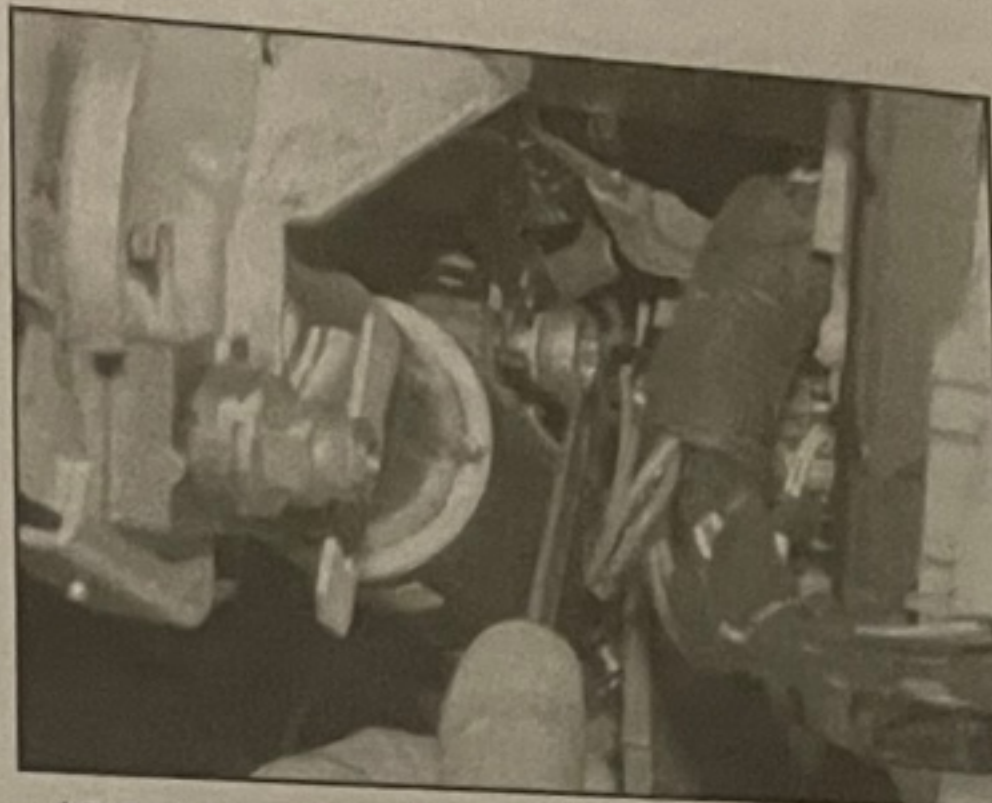
16.7 Removing the knee protector



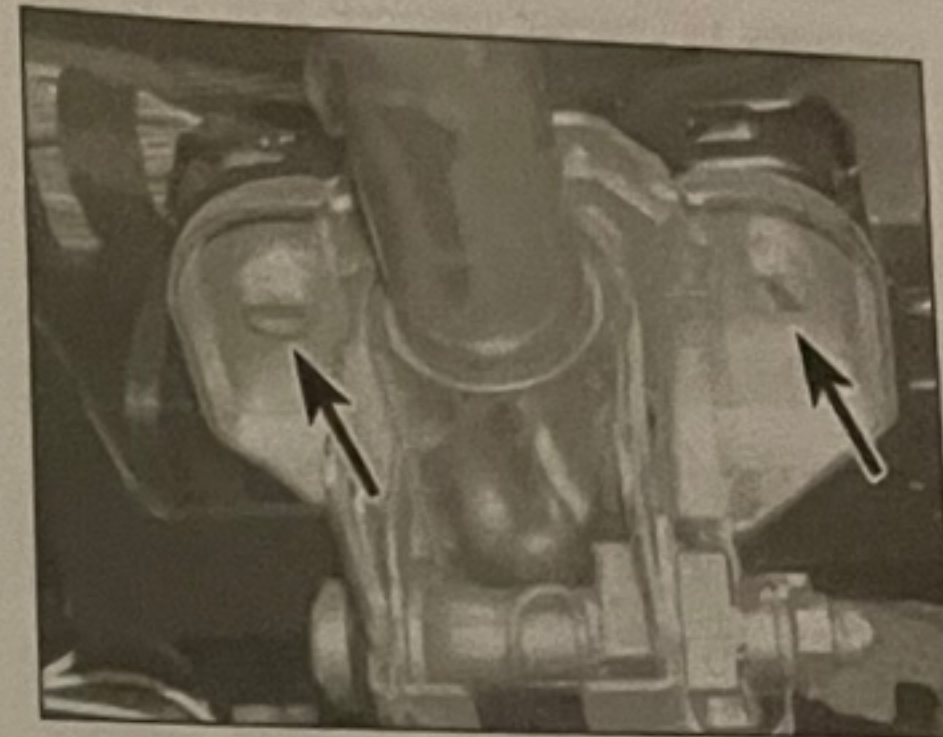
16.8a Unscrew the clamp bolt ...



16.8b ... and slide the universal joint from the steering gear pinion shaft



16.9 Unscrew the steering column lower mounting bolt (note it cannot be removed completely at this stage)



16.12 Steering column upper mounting bolts

7 Remove the facia lower trim panel and air duct on the driver's side with reference to Chapter 11. Where applicable, remove the knee protector from the steering column (see illustration).

8 At the bottom of the steering column, unscrew and remove the clamp bolt and slide the universal joint from the steering gear pinion shaft (see illustrations). Mark the shaft and column if necessary to ensure correct refitting. Make sure that the column intermediate shaft remains together with the upper column for the period when the steering column is removed.

9 Unscrew the steering column lower mounting bolt. The bolt cannot be removed completely at this stage (see illustration).

10 Release the relevant wiring from the plastic cable-ties, and move to one side.

11 Manoeuvre the rubber dust excluder gaiter over the steering wheel height adjustment lever, to allow the lever to be removed together with the steering column.

12 Unscrew and remove the upper mounting bolt (see illustration) and withdraw the column from inside the vehicle. The mounting bolt can now be removed completely.

Refitting

13 Locate the lower mounting bolt in the steering column, then position the steering column onto the bulkhead and hand-tighten the bolt to hold the assembly. Insert the upper mounting bolts, and then fully-tighten all the bolts to the specified torque.

14 Engage the universal joint on the bottom of the column with the splines on the steering gear pinion shaft, making sure that the bolt hole is aligned with the cut-out in the shaft and the alignment marks are adjacent as previously-noted. Tighten the clamp bolt to the specified torque.

15 Reposition the rubber dust excluder gaiter over the steering wheel height adjustment lever, so that the lever protrudes through its hole in the gaiter.

16 Secure the relevant wiring with new plastic cable-ties. Secure the wiring conduit to the steering column.

17 Refit the facia lower trim panel and air duct on the driver's side with reference to Chapter 11. Refit the knee protector to the steering column.

18 Refit the holder for the contact spring unit and combination switches with the groove uppermost, and tighten the bolts. Make sure that it is still held in its central position with the adhesive tape.

19 Reconnect the wiring for the airbag contact spring unit at the connector.

20 Refit the lighting and wiper combination switches and reconnect the wiring with reference to Chapter 12.

21 Refit the steering column upper and lower shrouds and tighten the screws.

22 Refit the steering wheel with reference to Section 15.

17 Steering gear assembly - removal and refitting

Removal

1 Apply the handbrake, then jack up the front of the vehicle and support it on axle stands (see *Jacking and vehicle support*). Remove both front roadwheels.

2 Drain the hydraulic fluid from the power steering system as described in Section 18, then return the steering to the straight-ahead position. The steering wheel must remain in its central position during the following procedure; use adhesive tape to secure it to the facia.

Caution: Damage will occur to the airbag contact spring unit if the steering wheel is not secured in its central position.

3 Disconnect the battery negative lead.

4 At the bottom of the steering column, unscrew and remove the clamp bolt and slide the universal joint from the steering gear pinion shaft. Mark the shaft and column if necessary to ensure correct refitting. Make sure that the column intermediate shaft remains together with the upper column for the period when the steering gear is removed.

5 The engine assembly must be supported while the rear of the subframe is lowered. To do this, use a suitable hoist or engine support bar that straddles the engine compartment. Slightly lift the engine assembly so that its weight is supported. If a support bar is being used, it may be necessary to remove the cover from over the intake manifold.

6 At the rear of the engine, unscrew the nut securing the rear engine mounting to the engine bracket, then unbolt the mounting from the subframe and remove it.

7 If the track rod ends are to be removed from the steering gear, loosen the adjusting nuts securing the ends to the track rods a quarter of a turn at this stage.

8 Using a balljoint separator tool, disconnect the steering track rod ends from the steering arms on the hub carriers with reference to Section 21. If required, unscrew the track rod ends from the track rods, counting the exact number of turns necessary to remove them, to ensure correct refitting.

9 Working under the vehicle, unbolt the crossmember and support bracket from the rear of the subframe.

10 The exhaust front section must be lowered

before lowering the subframe. To do this, refer to Chapter 4A or 4B and either remove the exhaust or separate it at the joint and release it from the rubber mountings.

11 Support the subframe with a trolley jack, then unscrew and remove the centre mounting bolts and lower the rear of the subframe as far as possible.

12 Position a container beneath the steering gear to catch spilt fluid. Identify the supply and return hydraulic pipes for location, then unscrew the union nuts and carefully position the pipes to one side. Recover the O-ring seals and valve body dust cover. Tape over or plug the ends of the pipes and the steering gear apertures to prevent entry of dust and dirt. Where applicable, cut the plastic cable-ties securing the wiring to the pipes.

13 Unscrew and remove the two nuts and bolts securing the steering gear to the subframe. Note the position of the nut retaining the support bracket for the delivery pipe.

14 Withdraw the steering gear from one side of the vehicle, taking care not to damage the rubber gaiters.

15 Examine the mounting rubbers for wear and damage and renew them if necessary. If a new steering gear is to be fitted, transfer the internal pipes from the old unit and fit new O-ring seals. Tighten the union nuts securely. Check the bulkhead rubber gaiter and renew if necessary.

Refitting

16 Before refitting the steering gear make sure that its rack is in its central position, and that the front wheels are still pointing straight-ahead.

17 Locate the steering gear onto the subframe and connect the supply and return hydraulic pipes together with new O-ring seals. Do not fully-tighten the union bolts at this stage.

18 Insert the steering gear mounting bolts from under the subframe and screw on the nuts, but do not fully-tighten them at this stage. Make sure the delivery pipe support bracket is fitted as previously-noted.

19 Fully-tighten the supply and return hydraulic pipe union bolts to their specified torque. Hold the pipes against rotation while the bolts are tightened.

20 Fully-tighten the steering gear mounting bolts to the specified torque.

21 Secure the wiring to the hydraulic pipes with new plastic cable-ties.

22 Raise the subframe and refit the centre mounting bolts. Tighten the bolts to the specified torque and angle. Remove the trolley jack.

23 Refit the exhaust front section with reference to Chapter 4A or 4B.

24 Refit the crossmember and support bracket to the rear of the subframe and tighten the mounting bolts to the specified torque.

25 If removed, screw on the track rod ends to the track rods the exact number of turns previously-noted.

26 Refit the track rod ends to the steering arms on the hub carriers, then refit the nuts and tighten to the specified torque. With the track rod ends held in their central positions, tighten the locknuts securely.

27 Refit the rear engine mounting and tighten the bolts to the specified torques.

28 Remove the hoist or support bar, and where necessary refit the cover over the intake manifold.

29 Make sure that the steering wheel is still in its central position, then engage the universal joint on the bottom of the column with the splines on the steering gear pinion shaft, making sure that the bolt hole is aligned with the cut-out in the shaft and the alignment marks are adjacent as previously-noted. Tighten the clamp bolt to the specified torque. Remove the adhesive tape from the steering wheel.

30 Reconnect the battery negative lead.

31 Fill the power steering system with the specified hydraulic fluid and bleed the system with reference to Section 18.

32 Refit the front roadwheels and lower the vehicle to the ground.

33 Have the front wheel alignment checked at the earliest opportunity.

18 Power steering hydraulic system – draining, refilling and bleeding

Note: The power steering hydraulic system must be bled if any part of the system has been disconnected.

Draining

1 To drain the complete hydraulic system of fluid, position a container (having a capacity of at least one litre) beneath the power steering pump on the right-hand front of the engine. Unclip the reservoir from its mounting, then loosen the clip and disconnect the return hose from the pump. Allow the fluid to drain into the container from the return hose.

2 Secure the container in the engine bay, away from any moving components and direct sources of heat. Start the engine, and allow the hydraulic fluid to be pumped into the container. Turn the steering wheel lock-to-lock several times, to purge the fluid from the steering rack. When the flow of fluid ceases, turn off the engine immediately; **do not** allow the power steering pump to run dry for any length of time.

3 Reconnect the return hose and tighten the clip, then reposition the reservoir on its mounting.

Refilling

4 Remove the fluid reservoir filler cap, and top-up to the maximum level mark with fluid of the specified type and grade; refer to *Lubricants and fluids* for guidance.

Bleeding

5 Park the vehicle on a level surface and apply the handbrake.

6 With the engine stopped, slowly move the steering from lock-to-lock several times to purge any trapped air, then top-up the level in the fluid reservoir. Repeat this procedure until the fluid level in the reservoir does not drop any further.

7 Start the engine, then slowly move the steering from lock-to-lock several times to purge out any remaining air in the system. Repeat this procedure until bubbles cease to appear in the fluid reservoir.

8 If an abnormal noise is heard from the pump or fluid pipes when the steering is operated, this is an indication that there is still air in the system. Confirm this by turning the wheels to the straight-ahead position and switching off the engine. If the fluid level in the reservoir rises, then air is present in the system, and further bleeding will be necessary. Repeat the above procedure as necessary.

9 Once all traces of air have been purged from the power steering hydraulic system, stop the engine and allow the system to cool. Finally, check that the fluid level is up to the maximum mark on the reservoir, and top-up if necessary.

19 Power steering pump – removal and refitting

Removal

1 Drain the hydraulic fluid from the power steering system as described in Section 18, then return the steering to the straight-ahead position and refit the fluid reservoir.

2 At the right-hand front corner of the engine compartment, loosen the clips and disconnect the air intake hose and mass airflow meter. Place the hose and meter to one side.

3 Remove the auxiliary drivebelt as described in Chapter 1A or 1B.

4 Place a container beneath the power steering pump, then loosen the clip and disconnect the fluid reservoir-to-pump hose.

5 Unscrew the bolt securing the delivery pipe support to the pump, then unscrew the union nut and disconnect it from the pump. Access to the support bolt is gained through the hole in the pulley. Recover the O-ring seal.

6 Unscrew the bolts securing the power steering pump to the mounting bracket, and withdraw it from the engine. Wrap the pump in cloth rag to prevent fluid dropping onto the vehicle paintwork.

Refitting

7 Locate the pump on the engine, then insert the mounting bolts and tighten them to the specified torque.

8 Fit a new O-ring seal to the delivery pipe end fitting, and then locate it on the pump. Tighten the union nut and support bolt to the specified torque.

9 Reconnect the reservoir-to-pump hose and tighten the clip.

- 10 Refit the auxiliary drivebelt as described in Chapter 1A or 1B.
- 11 Refit the air intake hose and mass airflow meter.
- 12 Refill and bleed the power steering hydraulic system with reference to Section 18.

20 Steering rack rubber gaiter - renewal

- 1 Apply the handbrake, then jack up the front of the vehicle and support it on axle stands (see *Jacking and vehicle support*). Remove the relevant roadwheel.
- 2 Loosen the track rod end locknut on the track rod a quarter of a turn.
- 3 Using a balljoint separator tool, disconnect the steering track rod end from the steering arm on the hub carrier (see illustration).
- 4 Unscrew the track rod end from the track rod, counting the exact number of turns necessary to remove it, to ensure correct refitting.
- 5 Note the position of the track rod end locknut, and then unscrew it from the track rod.
- 6 Wipe clean the track rod, and then loosen the rubber gaiter retaining clips on the rod and steering gear housing.
- 7 Release the gaiter from the housing groove and slide it from the track rod.
- 8 Wipe clean the steering gear housing and track rod, and lubricate the track rod inner balljoint with lithium grease. Smear a little grease on the track rod to assist sliding on the gaiter.
- 9 Fit the new gaiter and locate it in the housing. Fit and tighten the retaining clips. If new Saab clips are fitted, they must be tightened by crimping with a pair of pliers or a crimping tool.
- 10 Screw on the track rod end locknut to its original position.
- 11 Screw on the track rod end by the number of turns previously-noted.
- 12 Locate the track rod end on the steering arm, and tighten the nut to the specified torque.
- 13 Tighten the track rod end locknut to the specified torque.
- 14 Refit the roadwheel and lower the vehicle to the ground.
- 15 Have the front wheel alignment checked at the earliest opportunity.

21 Track rod end - removal and refitting

Removal

- 1 Apply the handbrake, then jack up the front of the vehicle and support it on axle stands (see *Jacking and vehicle support*). Remove the relevant roadwheel.

- 2 Note that the track rod ends are 'handed', and curve slightly rearwards in relation to the track rods. They are marked LH and RH on top of the balljoint for identification.
- 3 Loosen the track rod end locknut on the track rod a quarter of a turn.
- 4 Using a balljoint separator tool, disconnect the steering track rod end from the steering arm on the hub carrier.
- 5 Unscrew the track rod end from the track rod, counting the exact number of turns necessary to remove it, to ensure correct refitting.

Refitting

- 6 Screw on the track rod end the exact number of turns noted on removal.
- 7 Locate the track rod end stub on the steering arm, then tighten the nut to the specified torque.
- 8 Tighten the track rod end locknut to the specified torque.
- 9 Refit the roadwheel and lower the vehicle to the ground.
- 10 Have the front wheel alignment checked at the earliest opportunity.

22 Wheel alignment and steering angles - general information

- 1 Accurate front wheel alignment is essential to provide positive steering, and to prevent excessive tyre wear. Before considering the steering/suspension geometry, check that the tyres are correctly inflated, that the wheels are not buckled, and that the steering linkage and suspension joints are in good order, without slackness or wear. Alignment of the front subframe is also critical to the front suspension geometry.

- 2 Wheel alignment consists of four factors (see illustration):

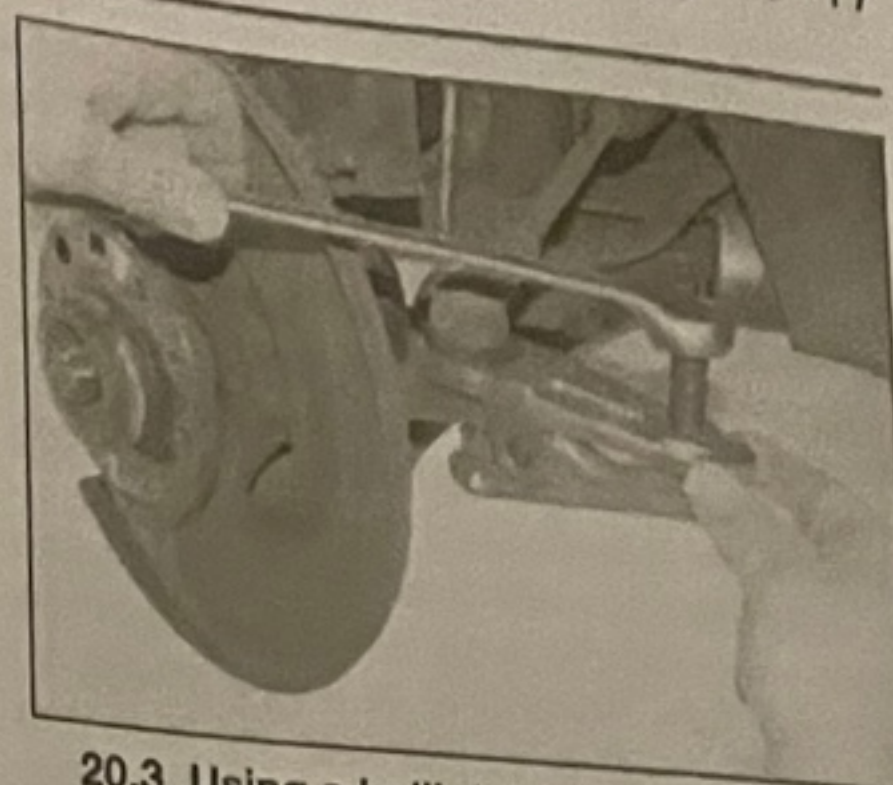
Camber is the angle at which the front wheels are set from the vertical, when viewed from the front of the vehicle. 'Positive camber' is the amount (in degrees) that the wheels are tilted outward at the top of the vertical.

Castor is the angle between the steering axis and a vertical line, when viewed from each side of the car. 'Positive castor' is when the steering axis is inclined rearward at the top.

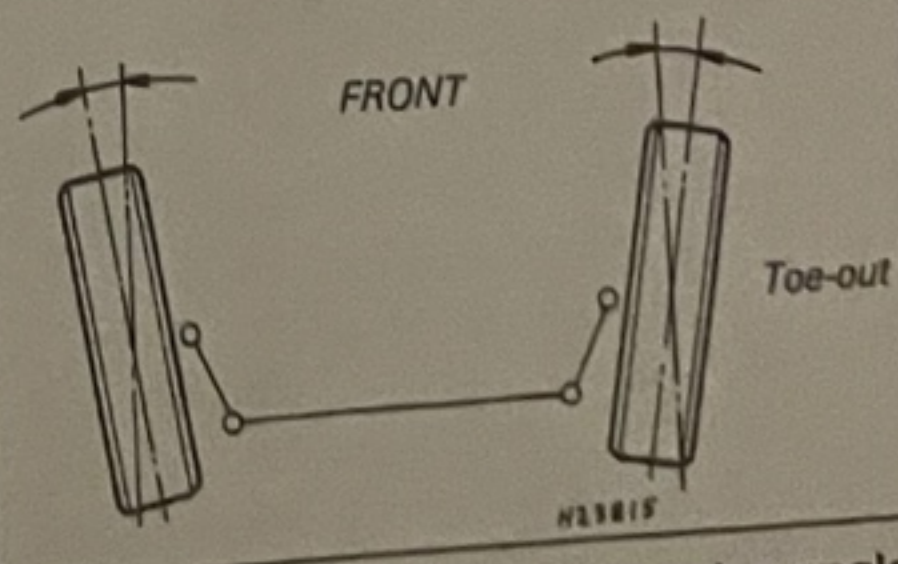
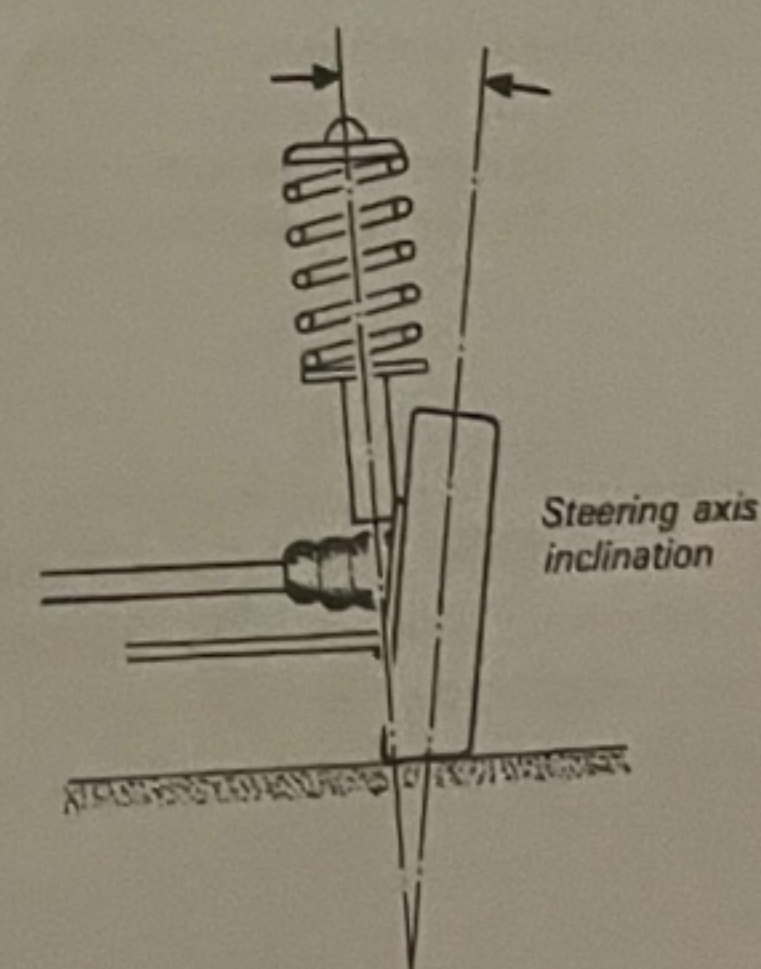
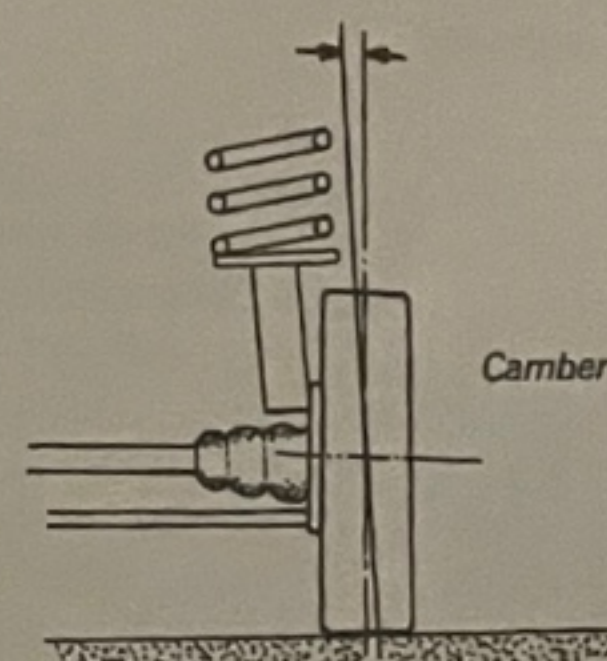
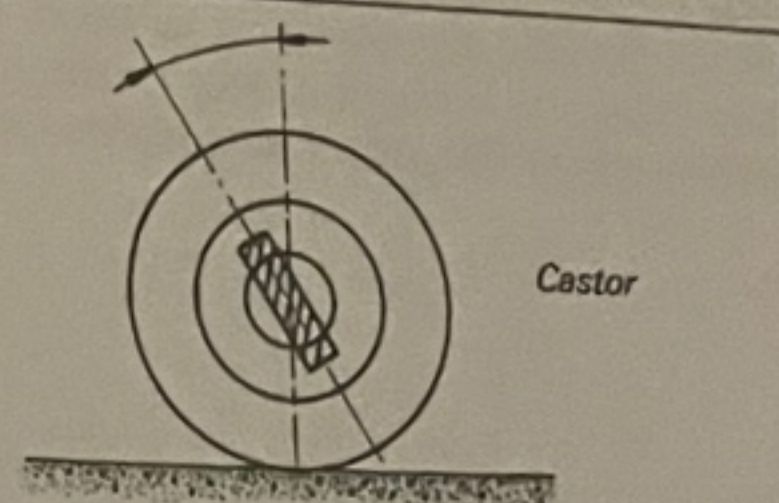
Steering axis inclination is the angle (when viewed from the front of the vehicle) between the vertical and an imaginary line drawn through the suspension strut upper mounting and the lower suspension arm balljoint.

Toe setting is the amount by which the distance between the front inside edges of the roadwheel rims (measured at hub height) differs from the diametrically opposite distance measured between the rear inside edges of the roadwheel rims.

- 3 Owing to the need for precision gauges to measure the small angles of the steering and suspension settings, the checking of camber,



20.3 Using a balljoint separator tool to release the track rod end balljoint



22.2 Wheel alignment and steering angles

castor and steering axis inclination must be carried out by a service station having the necessary equipment. The readings vary according to wheel size and body height as given in the Specifications; the heights are measured on the underbody, just inside of the roadwheels. Any deviation from the specified angle will be due to accident damage or gross wear in the suspension mountings.

4 Two methods are available to the home mechanic for checking the front wheel toe setting. One method is to use a gauge to measure the distance between the front and rear inside edges of the roadwheels. The other method is to use a scuff plate, in which each front wheel is rolled across a movable plate which records any deviation, or scuff, of the tyre from the straight-ahead position as it moves across the plate. Relatively inexpensive

equipment of both types is available from accessory outlets.

5 If, after checking the toe setting using whichever method is preferable, it is found that adjustment is necessary, proceed as follows.

6 Turn the steering wheel onto full-left lock, and record the number of exposed threads on the right-hand track rod. Now turn the steering onto full-right lock, and record the number of threads on the left-hand track rod. If there are the same number of threads visible on both sides, then subsequent adjustment can be made equally on both sides. If there are more threads visible on one side than the other, it will be necessary to compensate for this during adjustment. After adjustment, there must be the same number of threads visible on each track rod. This is most important.

7 To alter the toe setting, slacken the locknuts on the track rods, and turn the track rods using self-locking pliers to achieve the desired setting. Only turn the track rods by a quarter of a turn each time, and then recheck the setting.

8 After adjustment, tighten the locknuts and check that the exposed thread on each track rod is the same. Reposition the steering gear rubber gaiters, to remove any twist caused by turning the track rods.

Rear wheel alignment

9 The rear wheel toe setting may also be checked and adjusted, but as this additionally requires alignment with the front wheels, it should be left to a service station having the necessary equipment.

Chap Body

Conter

Body exterior fit
Bonnet lock - re
Bonnet release
Bonnet, struts a
Boot lid, support
Boot lid tailgate
Centre console
Door handle and
Door inner trim
Door window c
Door window v
Doors - remov
Driver's seat c
Exterior door
Facia assemb
Front bumper

Degre

Easy, su
novice wi
experien

Spec

Torque v
Front seat
Front seat
Fuel
Shake
Rear turn
Rear seat
Rear seat
Rear seat
Side airbag
Side-imp