Chapter 10 Suspension and steering systems

Contents

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

Front wheel alignment

Toe setting:	
Tolerance allowed before resetting required	0.5 mm to 3.5 mm toe-out (0°05' to 0°35' toe-out)
Adjustment setting (if required)	2.0 mm ± 1.0 mm toe-out (0°20' ± 0°10' toe-out)

Rear wheel alignment

Toe setting:	
Tolerance allowed before resetting required:	
Saloon/Hatchback	3.9 mm toe-in to 0.1 mm toe-out (0°38' toe-in to 0°02' toe-out)
Estate	2.7 mm toe-in to 1.3 mm toe-out (0°27' toe-in to 0°13' toe-out)
Adjustment setting (if required):	
Saloon/Hatchback	1.9 mm ± 1.2 mm toe-in (0°18' ± 0°12' toe-in)
Estate	0.7 mm ± 1.2 mm toe-in (0°07' ± 0°12' toe-in)

Roadwheels and tyres

Wheel sizes:	
Steel	14 x 5 1/2
Alloy	14 x 5 1/2 or 15 x 6
Tyre sizes:	
Wheel size 14 x 5 1/2	185/65/14 or 195/60VR/14
Wheel size 15 x 6	205/55VR/15
Tyre pressures	See Chapter 1 Specifications

Torque wrench settings

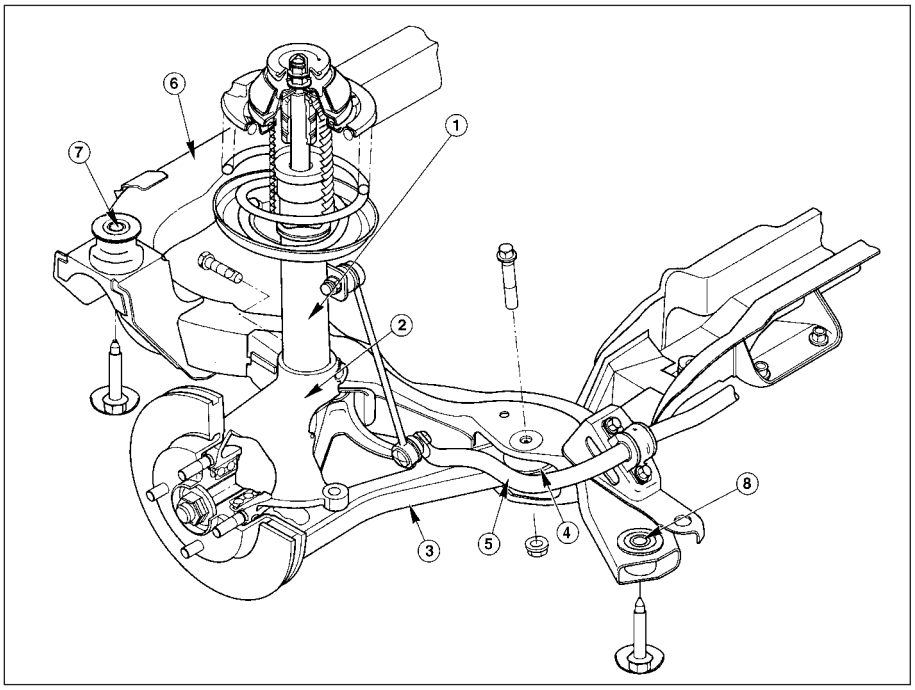
	Nm	lbf ft
Front suspension		
Front subframe	110 to 150	81 to 111
Lower arm balljoint to lower arm (service replacement, bolted on)	58	43
Lower arm balljoint-to-steering knuckle clamp bolt	48 to 60	35 to 44
Lower arm to subframe:		
Stage 1 (used components)	50	37
Stage 1 (new components)	70	52
Stage 2	Slacken completely	
Stage 3	50	37
Stage 4	Tighten through further 90°	
Anti-roll bar	24	18
Anti-roll bar link	41 to 58	30 to 43
Suspension strut-to-steering knuckle pinch-bolt	84	62
Suspension strut upper mounting nut	46	34
Suspension strut thrust bearing retaining nut	59	44
Driveshaft/hub retaining nut	340	251
Rear suspension (Saloon/Hatchback)		
Crossmember mounting bolts	102 to 138	75 to 102
Front lower arm to knuckle and to crossmember	70 to 98	52 to 72
Rear lower arm to knuckle	102 to 138	75 to 102
Rear lower arm to crossmember	70 to 98	52 to 72
Anti-roll bar	19 to 26	14 to 19
Anti-roll bar link	30 to 40	22 to 30
Suspension strut to knuckle	70 to 98	52 to 72
Drum brake backplate	45 to 54	33 to 40
Disc brake splash shield	90	66
Hub nut	290	181
Tie-bar and tie-bar bracket	102 to 138	75 to 102
Suspension strut upper mounting bolts	23 to 30	17 to 22
Suspension strut upper nut	41 to 58	30 to 43
Rear suspension (Estate)		
Same as for Saloon/Hatchback, except for the following.		
Crossmember mounting bolts	120	89
Front lower arm to knuckle and to crossmember	120	89
Upper arm to knuckle	120	89
Upper arm to crossmember	84	62
Rear lower arm to knuckle and to crossmember	84	62
Anti-roll bar	25	19
Anti-roll bar link	35	26
Hub assembly-to-knuckle retaining bolts	65	48
Tie-bar to bracket	120	89
Tie-bar bracket to underbody	120	89
Tie-bar to knuckle	84	62
Shock absorber upper mounting bolt	84	62
Shock absorber lower mounting bolt	120	89
Steering		
Steering gear mounting bolts	114 to 159	84 to 117
Track rod end to steering knuckle	25 to 30	18 to 22
Track rod end locknut	34 to 47	25 to 35
Steering wheel	45 to 55	33 to 41
Flexible coupling-to-pinion shaft clamp bolt	23 to 32	17 to 24
Power steering pipe unions to valve body	27 to 35	20 to 26
Steering column-to-coupling clamp bolt	20 to 27	14 to 20
Steering column mounting bolts	20 to 27	14 to 20
Steering pump mounting bolts	21 to 28	15 to 21
Steering pump pressure line	57 to 73	42 to 54
Roadwheel nuts	85	63

1 General information

The independent front suspension is of MacPherson strut type, incorporating coil springs, integral telescopic shock absorbers, and an anti-roll bar. The struts are attached to steering knuckles at their lower ends, and the knuckles are in turn attached to the lower suspension arm by balljoints. The anti-roll bar is bolted to the rear of the subframe, and is connected to the front suspension struts by links **(see illustration)**.

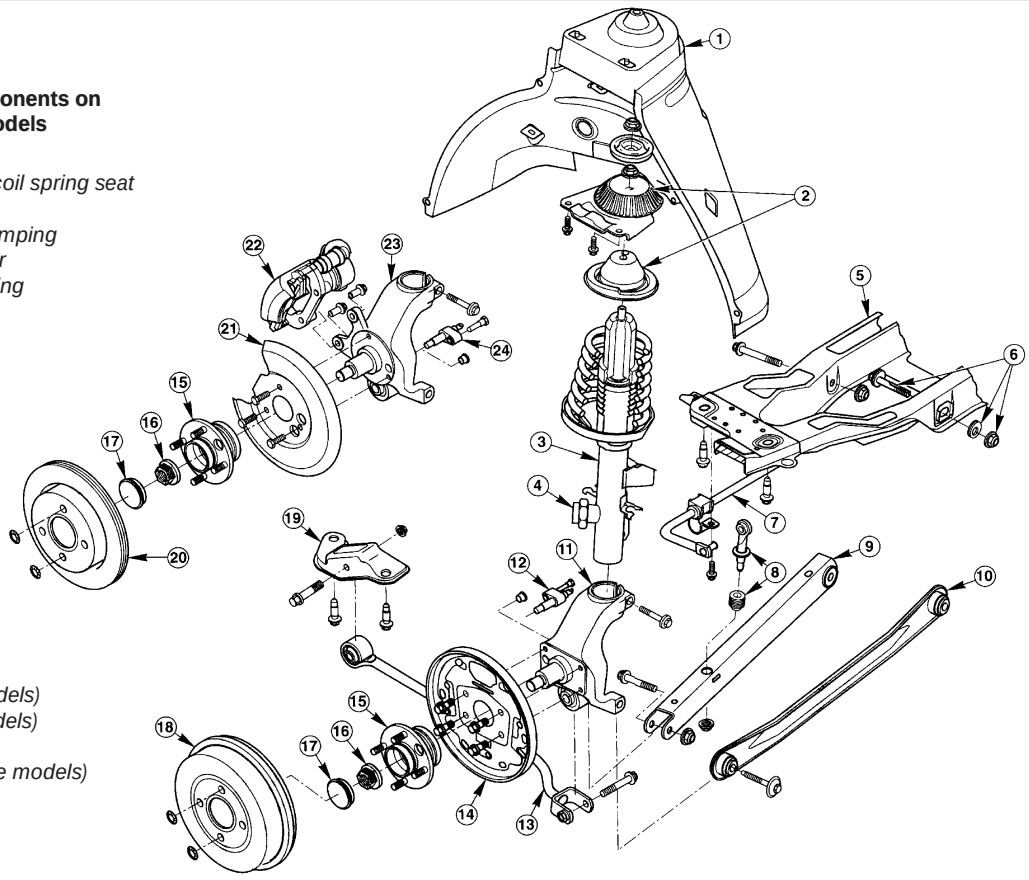
On Saloon/Hatchback models, the independent rear suspension is of "Quadralink" type, having four mounting points on each side of the vehicle. The two lower arms are attached to the rear suspension knuckle at their outer ends, and to the rear crossmember at their inner ends. A tie-bar, located between the bottom of the knuckle and the floor, counteracts braking and acceleration forces on each side **(see illustration)**.

On Estate models, the independent rear suspension is of "SLA" (Short and Long Arm) type. This allows a larger load area, since there are no suspension points projecting into the luggage area. There are three side arms on each side: one forged upper arm, and two



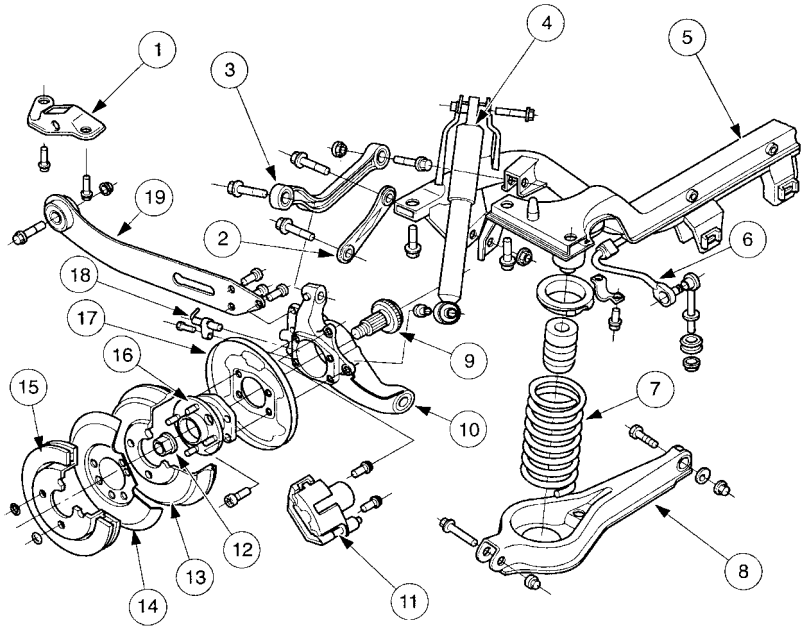
1.1 Front suspension components

1 MacPherson strut
2 Steering knuckle
3 Lower arm
4 Vertical silent bush on lower arm
5 Anti-roll bar
6 Front subframe
7 Front subframe rubber bush
8 Rear subframe rubber bush



1.2 Rear suspension components on Saloon/Hatchback models

1 Wheel housing
2 Upper mounting bracket and coil spring seat
3 Strut
4 Solenoid valve for adaptive damping
5 Rear suspension crossmember
6 Eccentric bolt for rear toe setting
7 Anti-roll bar
8 Link
9 Front lower arm
10 Rear lower arm
11 Knuckle (drum brake models)
12 ABS wheel sensor (drum brake models)
13 Tie-bar
14 Backplate
15 Hub and bearing assembly
16 Hub nut
17 Grease cap
18 Brake drum
19 Tie-bar mounting bracket
20 Brake disc
21 Splash shield (disc brake models)
22 Brake caliper (disc brake models)
23 Knuckle (disc brake models)
24 ABS wheel sensor (disc brake models)



1.3 Rear suspension components on Estate models

1 Tie-bar bracket
2 Short front lower arm
3 Long front upper arm
4 Shock absorber
5 Crossmember
6 Anti-roll bar
7 Coil spring
8 Rear lower arm
9 Stub axle (part of hub and bearing assembly)
10 Knuckle
11 Brake caliper (disc brake models)
12 Hub nut
13 Brake drum
14 Splash guard (disc brake models)
15 Brake disc
16 Hub and bearing assembly
17 Backplate (drum brake models)
18 ABS wheel sensor
19 Tie-bar

pressed-steel lower side arms. A tie-bar on each side supports the rear suspension knuckles. The coil springs are separate from the shock absorbers **(see illustration)**.

A rear anti-roll bar is fitted to all models. On SI models, the front and rear shock absorbers are gas-filled; on other models, they are filled with fluid. Self-levelling rear shock absorbers are fitted as standard to Ghia Estate models.

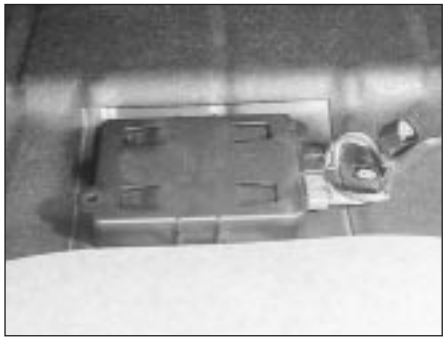
A variable-ratio type rack-and-pinion steering gear is fitted, together with a conventional column and telescopic coupling, incorporating two universal joints. Power-assisted steering is fitted to all models. A power steering system fluid cooler is fitted, in front of the cooling system radiator on the crossmember **(see illustration)**. On models with adaptive damping, a steering position sensor with sensor disc is located above the upper universal joint.

On models with adaptive damping, it is possible to select a hard or soft setting for the front and rear shock absorbers. The system is computer-controlled; a switch is provided near the handbrake lever for selection of "Sport" or "Normal" mode. With this system, a solenoid valve is fitted to each suspension strut. When the valve is open, the hydraulic oil inside the shock absorber is routed through a bypass channel, making the action "softer". When the solenoid valve is closed, the shock absorber action becomes "harder". The system takes into consideration the roadspeed of the vehicle; at high speeds, the shock absorbers are automatically set to "hard". The adaptive damping computer module is located in the luggage compartment, behind the rear seat, and incorporates a self-test function. Adaptive damping is not available on Estate models **(see illustrations)**.

When working on the suspension or steering, you may come across nuts or bolts which seem impossible to loosen. These nuts and bolts on the underside of the vehicle are continually subjected to water, road grime, mud, etc, and can become rusted or seized, making them extremely difficult to remove. In order to unscrew these stubborn nuts and bolts without damaging them (or other components), use lots of penetrating oil, and allow it to soak in for a while. Using a wire brush to clean exposed threads will also ease removal of the nut or bolt, and will help to prevent damage to the threads. Sometimes, a sharp blow with a hammer and punch will break the bond between a nut and bolt, but care must be taken to prevent the punch from slipping off and ruining the threads. Heating the nut or bolt and surrounding area with a blow lamp sometimes helps too, but this is not recommended, because of the obvious dangers associated with fire. Extension bars or pipes will increase leverage, but never use one on a ratchet, as the internal mechanism could be damaged. Actually *tightening* the nut or bolt first may help to break it loose. Nuts or bolts which have required drastic measures to remove them should always be renewed.

1.5 The power steering system fluid cooler is located in front of the radiator

1.6A Adaptive damping switch located near the handbrake lever



1.6B Adaptive damping computer module located in the luggage compartment

Since most of the procedures dealt with in this Chapter involve jacking up the vehicle and working underneath it, a good pair of axle stands will be needed. A hydraulic trolley jack is the preferred type of jack to lift the vehicle, and it can also be used to support certain components during removal and refitting operations.

Warning: Never, under any circumstances, rely on a jack to support the vehicle while working beneath it. When jacking up the vehicle, do not lift or support it beneath the front or rear subframes.

2 Steering knuckle and hub assembly - removal and refitting

Removal

1 Apply the handbrake. Remove the wheel cover from the relevant front wheel, and loosen (but do not remove) the driveshaft/hub nut. This nut is very tight.
2 Loosen the front wheel nuts, jack up the front of the vehicle and support it on axle stands. Remove the front wheel.
3 Extract the split pin from the track rod end balljoint nut. Unscrew the nut, and detach the rod from the arm on the steering knuckle using a conventional balljoint removal tool. Take care not to damage the balljoint seal.
4 Remove the ABS sensor (when fitted) as described in Chapter 9.
5 Remove the brake caliper and brake disc as described in Chapter 9, but do not disconnect the flexible hose from the caliper. Suspend the caliper from a suitable point under the wheel arch, taking care not to strain the hose.
6 Unscrew and remove the driveshaft/hub nut. Note that the nut is of special laminated design, and should only be re-used a maximum of 5 times. (It is a good idea to file a small notch on the nut every time it is removed.) Obtain a new nut if necessary.
7 Note which way round the lower arm balljoint clamp bolt is fitted, then unscrew and remove it from the knuckle assembly. Lever the balljoint down from the knuckle; if it is tight, prise the clamp open using a large flat-bladed tool. Take care not to damage the balljoint seal during the separation procedure.
8 Unscrew and remove the pinch-bolt securing the steering knuckle assembly to the front suspension strut, noting which way round it is fitted. Prise open the clamp using a wedge-shaped tool, and release the knuckle from the strut. If necessary, tap the knuckle downwards with a soft-headed mallet to separate the two components. Support the knuckle on an axle stand.
9 Pull the steering knuckle and hub assembly from the driveshaft splines. If it is tight, connect a universal puller to the hub flange, and withdraw it from the driveshaft. When the driveshaft is free, support it on an axle stand, or suspend it from a suitable point under the wheel arch, making sure that the inner constant velocity joint is not turned through more than 18°. (Damage may occur if the joint is turned through too great an angle.)

Refitting

10 Lift the steering knuckle and hub assembly onto the driveshaft splines, and support the assembly on an axle stand.
11 Locate the assembly on the front suspension strut. Insert the pinch-bolt with its head facing forwards. Fit the nut and tighten it to the specified torque.
12 Refit the lower arm balljoint to the knuckle assembly, and insert the clamp bolt with its head facing forwards. Refit the nut and tighten it to the specified torque.
13 Refit the driveshaft/hub nut, and tighten it moderately at this stage. Final tightening of the nut is made with the vehicle lowered to the ground.
14 Refit the brake caliper and brake disc as described in Chapter 9.
15 Where fitted, refit the ABS sensor as described in Chapter 9.
16 Reconnect the track rod end balljoint to the steering arm, and tighten the nut to the specified torque. Check that the split pin holes are aligned; if necessary, turn the nut to the nearest alignment, making sure that the torque wrench setting is still within the specified range. Insert a new split pin, and bend it back to secure.
17 Refit the front wheel, and lower the vehicle to the ground. Tighten the wheel nuts to the specified torque.
18 Tighten the driveshaft/hub nut to the specified torque, and refit the wheel cover.

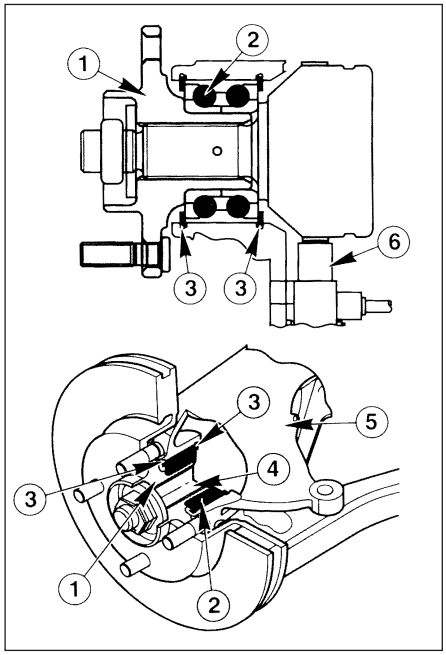
3 Front hub and bearings - inspection and renewal

Inspection

1 The front hub bearings are non-adjustable, and are supplied already greased.
2 To check the bearings for excessive wear, apply the handbrake, jack up the front of the vehicle and support it on axle stands.
3 Grip the front wheel at top and bottom, and attempt to rock it. If excessive movement is noted, it may be that the hub bearings are worn. Do not confuse wear in the driveshaft outer joint or front suspension lower arm balljoint with wear in the bearings. Hub bearing wear will show up as roughness or vibration when the wheel is spun; it will also be noticeable as a rumbling or growling noise when driving.

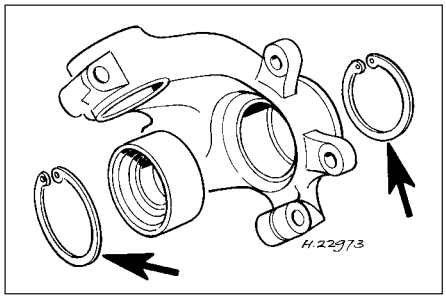
Renewal

4 Remove the steering knuckle and hub assembly as described in Section 2.
5 The hub must now be removed from the bearing inner races. It is preferable to use a press to do this, but it is possible to drive out the hub using a length of metal tube of suitable diameter **(see illustration)**.
6 Part of the inner race will remain on the hub, and this should be removed using a puller.
7 Note that if this procedure is being used to renew the hub only (ie it is not intended to renew the bearings), then it is important to check the condition of the bearing balls and races, to see if they are fit for re-use. It is difficult to be sure that no damage has occurred, especially if makeshift methods have been used during removal; in practice, it is probably false economy not to renew the bearings in any case, having got this far.
8 Using circlip pliers, extract the inner and outer circlips securing the hub bearing in the steering knuckle **(see illustration)**.
9 Press or drive out the bearing, using a length of metal tubing of diameter slightly less than the bearing outer race.
10 Clean the bearing seating faces in the steering knuckle.



3.5 Front hub and bearing

1 Hub
2 Double-row ball-bearing
3 Circlips
4 Stub axle
5 Steering knuckle
6 ABS sensor



3.8 Front wheel bearing retaining circlips (arrowed)

4.2 Removing the brake hose support bracket from the front of the front suspension strut

4.7 Removing the anti-roll bar link and ABS sensor wiring bracket

4.10 Front suspension strut upper mounting nut

11 Locate one of the circlips in the outer groove of the knuckle.
12 Press or drive the new bearing into the knuckle until it contacts the circlip, using a length of metal tube of diameter slightly less than the outer race. Do not apply any pressure to the inner race.
13 Locate the remaining circlip in the inner groove of the knuckle.
14 Support the inner race on a length of metal tube, then press or drive the hub fully into the bearing.
15 Refit the steering knuckle and hub assembly as described in Section 2.

4 Front suspension strut - removal and refitting

Removal

1 Apply the handbrake, then jack up the front of the vehicle and support it on axle stands. Remove the appropriate front wheel.
2 Unbolt the brake hose support bracket from the front of the suspension strut **(see illustration)**.
3 Remove the brake caliper as described in Chapter 9, but do not disconnect the flexible hydraulic hose from the caliper. Suspend the caliper from a suitable point under the wheel arch, taking care not to strain the hose.
4 Extract the split pin from the track rod end balljoint nut. Unscrew the nut, and detach the rod from the arm on the steering knuckle using a conventional balljoint removal tool. Take care not to damage the balljoint seal.
5 Remove the ABS sensor (when fitted) from the steering knuckle, as described in Chapter 9.
6 Remove the clip securing the driveshaft inner gaiter to the inner CV joint. Disconnect the gaiter from the CV joint housing.
7 Remove the nut and disconnect the anti-roll bar link from the strut. Note that, on models fitted with ABS, the ABS wheel sensor wiring support bracket is located beneath the nut **(see illustration)**.
8 Note which way round the lower arm balljoint clamp bolt is fitted, then unscrew and remove it from the knuckle assembly. Lever the balljoint down from the knuckle; if it is tight, prise the clamp open carefully using a large flat-bladed tool. Take care not to damage the balljoint seal during the separation procedure.
9 Where applicable, disconnect the adaptive damping wiring multi-plug at the strut, and unclip the wire.
10 Support the strut and steering knuckle on an axle stand. Working inside the engine compartment, remove the strut cap (if fitted). Unscrew and remove the front suspension strut upper mounting nut, holding the piston rod stationary with an 8 mm Allen key **(see illustration)**.
11 Lower the suspension strut, together with the driveshaft and steering knuckle, from under the wheel arch, withdrawing the tripod on the inner end of the driveshaft from the CV joint housing.

4.12A Steering knuckle-to-strut pinch-bolt

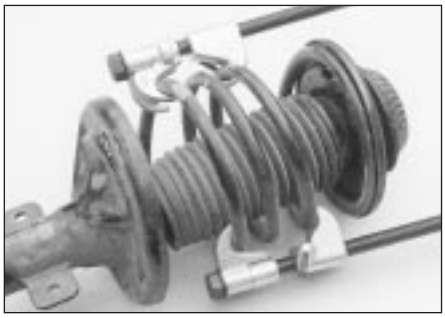
4.12B Releasing the knuckle from the strut

12 Unscrew and remove the pinch-bolt securing the steering knuckle assembly to the front suspension strut, noting which way round it is fitted. Prise open the clamp using a wedge-shaped tool, and release the knuckle from the strut **(see illustrations)**.

Refitting

13 With the clamp prised open, locate the front suspension strut on the steering knuckle, and refit the pinch-bolt with its head facing forwards. Tighten the bolt to the specified torque.
14 Locate the suspension strut (together with the driveshaft and steering knuckle) in its upper mounting, and loosely screw on the nut.
15 Locate the tripod on the inner end of the driveshaft in the CV joint housing, then manipulate the gaiter onto the housing, and fit a new clip.
16 Where applicable, reconnect the adaptive damping multi-plug, and fit the wire in the clip.
17 Locate the lower arm balljoint fully in the bottom of the steering knuckle. Refit the clamp bolt and tighten it to the specified torque.
18 Reconnect the anti-roll bar link to the strut, and tighten the nut to the specified torque. On models fitted with ABS, do not forget to locate the sensor wiring support bracket beneath the nut.
19 Where fitted, refit the ABS sensor as described in Chapter 9.
20 Refit the track rod end balljoint to the steering knuckle, and tighten the nut to the specified torque. Check that the split pin holes are aligned; if necessary, turn the nut to the nearest alignment, making sure that the torque wrench setting is still within the specified range. Insert a new split pin, and bend it back to secure.
21 Refit the brake caliper as described in Chapter 9.
22 Refit the brake hose support bracket to the strut, and tighten the bolt.
23 Refit the wheel, and lower the vehicle to the ground. Tighten the wheel nuts to the specified torque.
24 Tighten the suspension strut upper mounting nut to the specified torque, while

4.24 Final tightening of the front suspension strut upper mounting nut



5.3 Coil spring compressor tools fitted to the coil spring

5.4 Unscrewing the nut from the top of the strut

holding the piston rod with an 8 mm Allen key. If the adaptor needed to do this is not available, the nut can be tightened initially with a ring spanner while the piston rod is held. Final tightening can then be carried out using a torque wrench and a conventional socket **(see illustration)**.

5 Front suspension strut - overhaul

Warning: Before attempting to dismantle the front suspension strut, a tool to hold the coil spring in compression must be obtained. Do not attempt to use makeshift methods. Uncontrolled release of the spring could cause damage and personal injury. Use a high-quality spring compressor, and carefully follow the tool manufacturer's instructions provided with it. After removing the coil spring with the compressor still fitted, place it in a safe, isolated area.

1 If the front suspension struts exhibit signs of wear (leaking fluid, loss of damping capability, sagging or cracked coil springs) then they should be dismantled and overhauled as necessary. The struts themselves cannot be serviced, and should be renewed if faulty, but the springs and related components can be renewed. To maintain balanced characteristics on both sides of the vehicle, the components on both sides should be renewed at the same time.

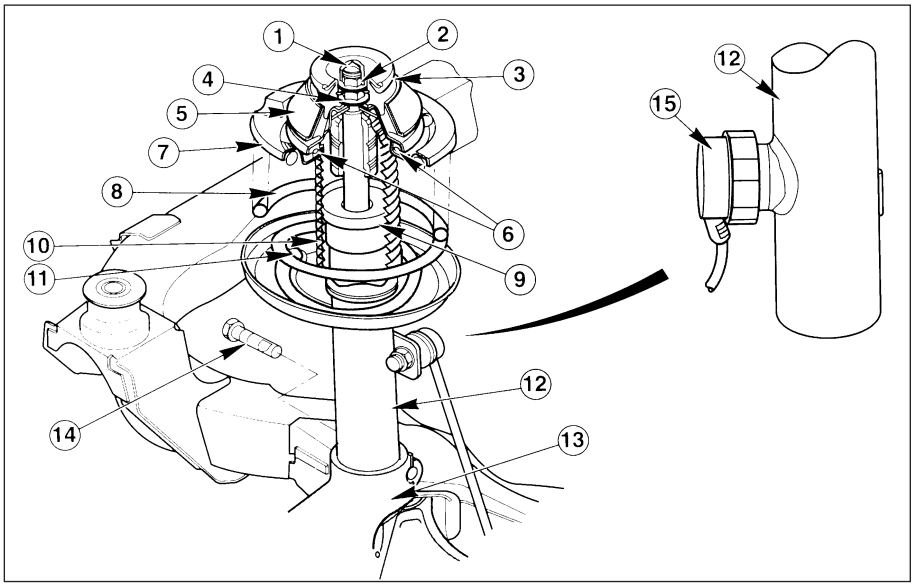
2 With the strut removed from the vehicle, clean away all external dirt, then mount it in a vice.

3 Fit the coil spring compressor tools (ensuring that they are fully engaged), and compress the spring until all tension is relieved from the upper mounting (see illustration).

4 Hold the strut piston with an Allen key, and unscrew the thrust bearing retaining nut with a ring spanner **(see illustration).**

5 Withdraw the top mounting, thrust bearing, upper spring seat and spring, followed by the gaiter and the bump stop **(see illustrations).**

6 If a new spring is to be fitted, the original



5.5A Front suspension strut components

1 Cap
2 Nut
3 Retainer
4 Nut
5 Top mounting
6 Thrust bearing
7 Upper spring seat
8 Spring
9 Bump stop
10 Gaiter
11 Lower spring seat
12 Strut
13 Steering knuckle
14 Clamp bolt
15 Solenoid valve for models with adaptive damping

5.5B Removing the top mounting from the strut

5.5C Removing the gaiter

5.5D Removing the bump stop

spring must now be carefully released from the compressor. If it is to be re-used, the spring can be left in compression.

7 With the strut assembly now completely dismantled, examine all the components for wear and damage, and check the bearing for smoothness of operation. Renew components as necessary.

8 Examine the strut for signs of fluid leakage. Check the strut piston for signs of pitting along its entire length, and check the strut body for signs of damage. Test the operation of the strut, while holding it in an upright position, by moving the piston through a full stroke, and then through short strokes of 50 to 100 mm. In both cases, the resistance felt should be smooth and continuous. If the resistance is jerky, uneven, or if there is any visible sign of wear or damage to the strut, renewal is necessary.

9 Reassembly is a reversal of dismantling, noting the following points:

(a) Make sure that the coil spring ends are correctly located in the upper and lower seats before releasing the compressor.

(b) Check that the bearing is correctly fitted to the piston rod seat.

(c) Tighten the thrust bearing retaining nut to the specified torque.

6 Front anti-roll bar and links - removal and refitting

Removal

1 Apply the handbrake, jack up the front of the vehicle and support it on axle stands. Remove both front wheels.

2 Unscrew the nuts, and disconnect the anti-roll bar links from the front suspension struts on both sides of the vehicle. Note that, on models with ABS, the wheel sensor wiring support brackets are located beneath the nuts **(see illustrations)**.

3 Unscrew and remove the anti-roll bar mounting bolts from the engine subframe on both sides of the vehicle.

4 Withdraw the anti-roll bar from one side of the vehicle, taking care not to damage the surrounding components.

6.2A Unscrew the nut . . .

6.2B . . . and disconnect the anti-roll bar link and (on ABS models) the sensor wiring support bracket

5 If necessary, unscrew the nuts and remove the links from the anti-roll bar.

Refitting

6 Refitting is a reversal of the removal procedure.

7 Front suspension lower arm - removal, overhaul and refitting

Removal

1 Apply the handbrake, jack up the front of the vehicle and support it on axle stands. Remove the appropriate wheel.

2 If removing the right-hand side lower arm, remove the auxiliary drivebelt cover where necessary.

3 Unscrew and remove the nuts and bolts securing the lower arm to the subframe **(see illustration)**.

4 Unscrew the nuts and disconnect the anti-roll bar links from the anti-roll bar on both sides. Swivel the anti-roll bar upwards away from the lower arm.

5 Extract the split pin from the track rod end balljoint nut. Unscrew the nut, and detach the rod from the arm on the steering knuckle using a conventional balljoint removal tool. Take care not to damage the balljoint seal.

6 Remove the clip securing the driveshaft inner gaiter to the inner CV joint, and disconnect the gaiter from the CV joint housing. This is necessary to prevent damage to the gaiter when the steering knuckle is moved outwards to remove the lower arm.

7 Note which way round the front suspension lower arm balljoint clamp bolt is fitted, then unscrew and remove it from the knuckle assembly. Lever the balljoint down from the knuckle; if it is tight, prise the joint open carefully using a large flat-bladed tool. Take care not to damage the balljoint seal during the separation procedure. Support the inner end of the driveshaft on an axle stand **(see illustrations)**.

8 Remove the lower arm from the subframe, and withdraw it from the vehicle.

Overhaul

9 Examine the rubber bushes and the suspension lower balljoint for wear and damage. The balljoint may be renewed as described in Section 8. The rubber bushes may be removed using a press, or a length of metal tubing together with a long bolt, washers and nut.

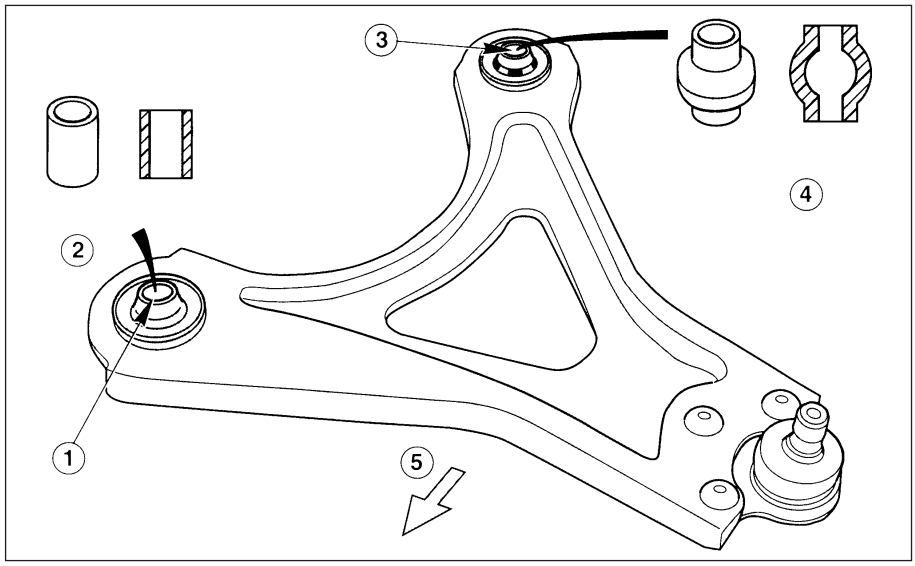
10 Note that the front and rear bushes are different. The front one has a solid rubber bush with a cylindrical inner tube, whereas the rear one has a voided rubber bush with a barrel-shaped inner tube **(see illustration)**.

11 Press the new bushes into the lower arm, using the same method as used for removal. Note that, when fitting the rear bush, the voids must be in line with the front bush location. On later models, a pip on the rear bush must be aligned with a triangular alignment mark on the arm.

7.3 One of the nuts and bolts securing the lower arm to the subframe

7.7A Unscrew the lower arm balljoint clamp bolt . . .

7.7B . . . and disconnect the balljoint from the knuckle



7.10 Front suspension lower arm bushes

1 Front bush
2 Cylindrical inner tube
3 Rear bush
4 Barrel-shaped inner tube
5 Front of vehicle

Refitting

12 Locate the lower arm on the subframe, and insert the mounting bolts. Fit the nuts and tighten them in stages, first to the specified torque and then through the angle specified.
13 If removed, locate the tripod on the inner end of the driveshaft in the CV joint housing, then refit the gaiter, together with a new clip.
14 Refit the front suspension lower arm balljoint to the knuckle assembly, and insert the clamp bolt with its head facing forwards. Refit the nut and tighten to the specified torque.
15 Refit the track rod end balljoint to the steering knuckle, and tighten the nut to the specified torque. Check that the split pin holes are aligned; if necessary, turn the nut to align the holes, making sure that the torque wrench setting is still within the specified range. Insert a new split pin, and bend it back to secure.
16 Swivel the anti-roll bar down, then reconnect the links to the bar and tighten the nuts to the specified torque.
17 If working on the right-hand side, refit the auxiliary drivebelt cover where necessary.
18 Refit the wheel, and lower the vehicle to the ground.

8 Front suspension lower arm balljoint - renewal

Note: *If the lower arm balljoint is worn, either the complete lower arm or the balljoint alone can be renewed. If the balljoint has already been renewed, it will be bolted in position; if the original balljoint is being renewed, then it will be riveted in position* ***(see illustration)****. This Section describes the renewal of a riveted balljoint.*

1 Remove the front suspension lower arm as described in Section 7. It is not recommended that the balljoint be replaced with the lower arm in position on the vehicle; the accurate drilling necessary may not be possible, and the holes in the arm may be enlarged.
2 With the lower arm on the bench, use a 3 mm drill to make a pilot hole through each of the three rivets. Now use a 9 mm drill to drill the rivets to a depth of 12 mm, then use a 7 or 8 mm drift to drive the rivets out of the arm.
3 Clean any rust or dirt from the rivet holes.
4 The new balljoint is supplied with a protective plastic cover over the rubber boot and stub, and it is recommended that this remains in position until it is time to connect the balljoint to the steering knuckle.
5 Locate the new balljoint on the lower arm, and use three new bolts to secure it, inserting the bolts from the top of the arm. Tighten the nuts to the specified torque. Make sure that the location lug on the balljoint engages the hole in the lower arm **(see illustration)**.
6 Refit the front suspension lower arm as described in Section 7.

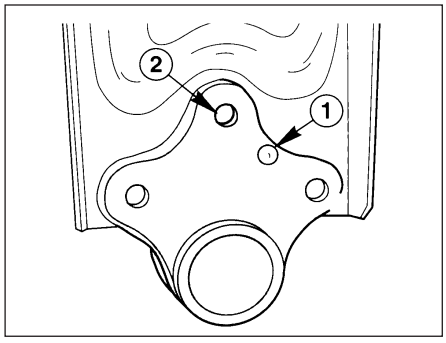
9 Rear hub and bearings (Saloon/Hatchback models) - inspection and renewal

Note: *Removal of the rear hub damages the bearings, and renders them unserviceable for future use. The hub and bearing assembly* ***must*** *always be renewed if it is removed.*

Inspection

1 The rear hub bearings are non-adjustable, and are supplied complete with the hub. It is not possible to renew the bearings separately from the hub.
2 To check the bearings for excessive wear,

8.0 Original riveted front suspension lower arm balljoint



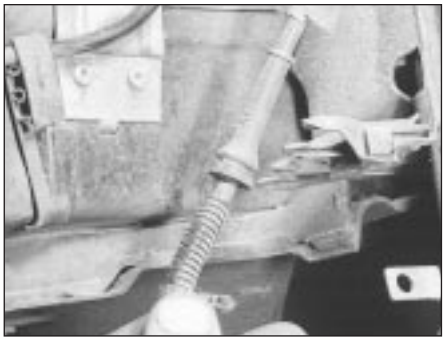
8.5 Location lug (1) and bolt hole (2) in the front suspension lower arm balljoint

chock the front wheels, then jack up the rear of the vehicle and support it on axle stands. Fully release the handbrake.
3 Grip the rear wheel at the top and bottom, and attempt to rock it. If excessive movement is noted, or if there is any roughness or vibration felt when the wheel is spun, it is indicative that the hub bearings are worn.

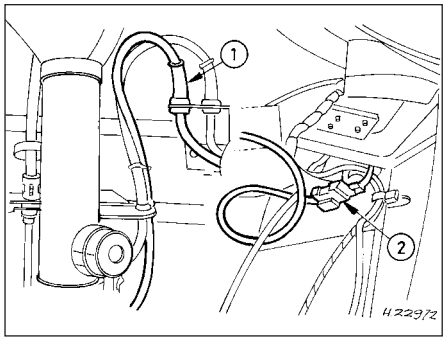
Renewal

4 Remove the rear wheel.
5 On models fitted with rear brake drums, remove the rear brake drum as described in Chapter 9.
6 On models fitted with rear brake discs, remove the rear brake disc as described in Chapter 9.
7 On all models, tap off the dust cap and unscrew the hub nut. Note that the nut is of special laminated design, and should only be re-used a maximum of 5 times. It is a good idea to mark the nut with a file every time it is removed. Obtain a new one if necessary.
8 Using a suitable puller, draw the hub and bearing assembly off the stub axle. Note that this procedure renders the bearings unserviceable for future use.
9 Locate the new rear hub and bearing assembly on the stub axle, then refit the hub nut and tighten it to the specified torque.
10 Tap the dust cap fully onto the hub.
11 Refit the rear brake disc or drum as applicable, as described in Chapter 9.
12 Refit the rear wheel, and lower the vehicle to the ground.

10.5 Two of the bolts securing the brake backplate to the rear suspension knuckle



11.3 Unclipping the ABS sensor wiring from the strut



11.4 Location of the adaptive damping lead (1) and multi-plug (2)

10 Rear suspension knuckle (Saloon/Hatchback models) - removal and refitting

Note: *Removal of the rear hub from the knuckle damages the bearings, and renders them unserviceable for future use. The hub and bearing assembly* ***must*** *always be renewed if it is removed.*

Removal

1 Chock the front wheels, then jack up the rear of the vehicle and support it on axle stands. Remove the appropriate rear wheel.
2 When applicable, remove the ABS sensor from the knuckle as described in Chapter 9.
3 Remove the rear hub and bearing assembly as described in Section 9.

Drum brake models

4 Fit a brake hose clamp to the flexible brake hose, then release the clip and detach the flexible hose from the strut. Unscrew the union nut, and detach the rigid brake pipe from the wheel cylinder. If preferred (to eliminate any bleeding procedure during refitting) the rigid brake pipe may remain attached to the wheel cylinder, provided that care is taken to prevent damage to both the rigid and flexible brake pipes.
5 Unbolt the backplate from the rear suspension knuckle **(see illustration)**, and support it to one side on an axle stand. The brake shoes and handbrake cable can remain attached.

Disc brake models

6 Unbolt the splash shield from the rear suspension knuckle.

All models

7 Unscrew and remove the bolt securing the tie-bar to the bottom of the knuckle, and move the tie-bar downwards.
8 Unscrew and remove the bolts securing the front and rear lower arms to the knuckle, and move the arms to one side.
9 Support the knuckle on an axle stand, then unscrew and remove the clamp bolt securing the knuckle to the strut.
10 Prise the top of the knuckle apart carefully using a large flat-bladed tool, and withdraw the knuckle downwards from the strut. Withdraw the knuckle from under the rear wheel arch.

Refitting

11 Locate the knuckle fully on the strut, then insert the clamp bolt and tighten to the specified torque.
12 Refit the front and rear lower arms to the knuckle, and insert the bolts finger-tight at this stage.
13 Refit the tie-bar to the bottom of the knuckle, and insert the bolt finger-tight at this stage.
14 Refit the backplate (or splash shield, as applicable) to the rear suspension knuckle, and tighten the bolts to the specified torque.

Drum brake models

15 Reconnect the rigid brake pipe to the wheel cylinder (if disconnected), and tighten the union nut.
16 Attach the flexible hose to the strut, refit the clip, and remove the hose clamp.

All models

17 Fit a new rear hub and bearing assembly as described in Section 9.
18 Where applicable, refit the ABS sensor as described in Chapter 9.
19 Refit the wheel, and lower the vehicle to the ground.
20 With the weight of the vehicle on the suspension, fully tighten the mounting bolts for the tie-bar and lower arms.
21 Where applicable, bleed the hydraulic brake circuit as described in Chapter 9.

11 Rear suspension strut (Saloon/Hatchback models) - removal and refitting

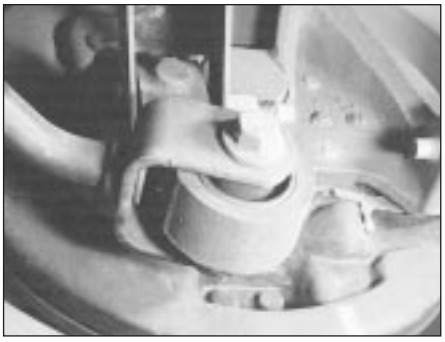
Note: *Before attempting to remove the rear suspension strut, a tool to hold the coil spring in compression must be obtained. Careful use of conventional coil spring compressors will prove satisfactory.*

Removal

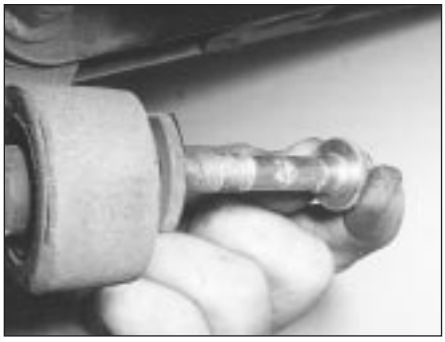
1 In order to remove the rear suspension strut, the coil spring must be temporarily compressed. This will enable the piston rod to be retracted into the strut, and will provide additional room for releasing the strut from the bump stop on top of the rear suspension crossmember.

Warning: It is important to only use a high-quality spring compressor; carefully follow the tool manufacturer's instructions provided with it.

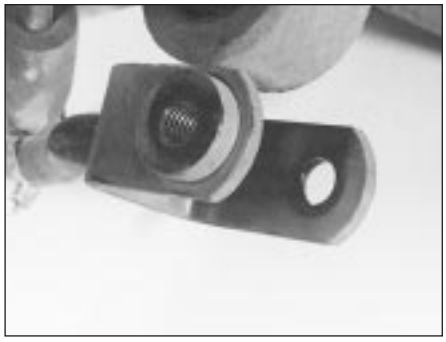
2 Chock the front wheels, then jack up the rear of the vehicle and support it on axle stands. Remove the appropriate wheel.
3 Where fitted, unclip the ABS sensor wiring from the strut, and remove the sensor from the knuckle as described in Chapter 9 (see illustration).
4 On models fitted with adaptive damping, unclip the wiring from the strut and disconnect the multi-plug (see illustration).
5 On drum brake models, fit a brake hose clamp to the rear flexible brake hose, then unscrew the union nut securing the rigid brake pipe to the flexible hose on the strut. Extract the clip, and disconnect the flexible hose from the strut.
6 On models fitted with rear disc brakes, unbolt the caliper from the knuckle as described in Chapter 9, but leave the hydraulic hose attached. Support the caliper on an axle stand, making sure that the flexible hose is not strained.
7 Unscrew the nut securing the rear anti-roll bar link to the front lower arm on the appropriate side. Hold the actual link with an adjustable spanner or grips while unscrewing the nut, to prevent damage to the link joint.
8 Unscrew and remove the bolt securing the tie-bar to the bottom of the knuckle. Move the tie-bar downwards (see illustrations).
9 Unscrew and remove the bolts securing the front and rear lower arms to the knuckle, and move the arms to one side (see illustrations).
10 Support the knuckle on a trolley jack, then unscrew and remove the clamp bolt securing the knuckle to the strut (see illustrations).
11 Prise the clamp on the knuckle apart using a large flat-bladed tool. Disconnect the knuckle from the strut, and lower it on the trolley jack as far as possible, taking care not to damage the handbrake cable (see illustration).



11.8A Tie-bar mounting bolt on knuckle



11.8B Remove the bolt . . .



11.8C . . . and move the tie-bar downwards

12 Fit the coil spring compressor tool (ensuring that it is fully engaged), and compress the coil spring until all tension is relieved from the upper and lower mountings (see illustration). This will also release the bracket on the strut from the bump stop rubber on the top of the rear crossmember.

13 Support the strut, then reach up under the wheel arch, and unscrew the two bolts securing the upper mounting to the underbody (see illustration).

14 Slightly lift the strut, to force the piston into the shock absorber and release the strut bracket from the bump stop on the crossmember. Lower the strut assembly and withdraw it from under the vehicle (see illustration).

11.9A Unscrew the bolt . . .

11.9B . . . and remove the rear lower arm from the knuckle

11.10A Support the knuckle on a trolley jack . . .

11.10B . . . and remove the knuckle-to-strut clamp bolt

11.11 Separating the knuckle from the strut

11.12 Compressor tools fitted to the rear coil spring

11.13 Bolts (arrowed) securing the strut upper mounting to the underbody

11.14 Removing the rear suspension strut

12.1A Rear strut dismantling - unscrew the upper mounting nut . . .

12.1B . . . remove the cup . . .

12.1C . . . upper mounting bracket and seat . . .

12.1D . . . gaiter and bump stop . . .

12.1E . . . and coil spring

Refitting

15 Locate the strut assembly (together with the coil spring compressor tool) under the wheel arch, and locate the bracket on the bump stop on the rear suspension crossmember. Insert the two bolts securing the upper mounting to the underbody tower, and tighten them to the specified torque.

16 Carefully release the coil spring compressor tool, making sure that the spring locates correctly in the upper and lower seats, and that the strut bracket locates on the crossmember bump stop. The bump stop is tapered inwards, and the strut bracket should be fully engaged with it before releasing the coil spring.

17 Raise the knuckle and engage it with the strut, then insert the clamp bolt and tighten to the specified torque.

18 Reconnect the front and rear lower arms to the knuckle, and finger-tighten the bolts at this stage.

19 Reconnect the tie-bar to the bottom of the knuckle, and finger-tighten the bolt at this stage.

20 Refit the anti-roll bar link to the lower arm, and tighten the nut to the specified torque.

21 On disc brake models, refit the caliper bracket to the knuckle, and tighten the mounting bolts to the specified torque (see Chapter 9). Make sure that the flexible brake hose is not twisted.

22 On drum brake models, connect the flexible hose to the strut, insert the clip, then insert the rigid brake line and tighten the union nut. Remove the brake hose clamp, then bleed the hydraulic brake circuit as described in Chapter 9.

23 Where applicable, reconnect the wiring multi-plug for the adaptive damping, and clip the wiring to the strut.

24 Where applicable, refit the ABS sensor as described in Chapter 9, and clip the wiring to the strut.

25 Refit the wheel, and lower the vehicle to the ground.

26 With the weight of the vehicle on the rear suspension, fully tighten the lower arm and tie-bar mounting bolts.

12 Rear suspension strut (Saloon/Hatchback models) - overhaul

1 The procedure is similar to that for the front suspension strut, and reference should be made to Section 5. Note that the spring compressor tools will already be in position on the coil spring following the removal operation. Refer also to the accompanying illustrations for details of the separate components **(see illustrations)**.

13 Rear anti-roll bar and links (Saloon/Hatchback models) - removal and refitting

Removal

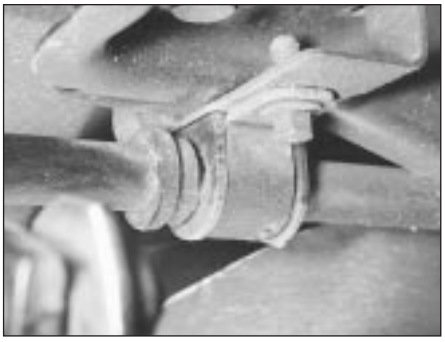
1 Chock the front wheels, then jack up the rear of the vehicle and support it on axle stands. Remove both rear wheels.

2 Unscrew the nuts securing the anti-roll bar links to the front lower arms on both sides. Hold the upper part of the links with a spanner while loosening the nuts. Recover the rubber bushes **(see illustrations)**.

13.2A Loosen the nut . . .

13.2B . . . remove the nut and rubber bush . . .

13.2C . . . and remove the anti-roll bar link from the lower arm



13.3 Rear anti-roll bar mounting clamp

14.9 Bolt securing the rear lower arm to the crossmember

14.11 "TOP" marking on the rear lower arm

3 Unscrew the bolts securing the anti-roll bar mounting clamps to the rear suspension crossmember, then unhook the clamps and withdraw the anti-roll bar from under the vehicle **(see illustration)**.
4 Examine the rubber bushes for the mounting clamps and links, and if necessary renew them. The links are available individually.

Refitting

5 Locate the anti-roll bar on the rear crossmember, hook the mounting clamps in position, and insert the bolts. Tighten the bolts to the specified torque.
6 Locate the anti-roll bar links in the front lower arms on both sides, making sure that the rubber bushes are in position. Refit the nuts and tighten them to the specified torque.
7 Refit the rear wheels, and lower the vehicle to the ground.

14 Rear suspension lower arms (Saloon/Hatchback models) - removal and refitting

Removal

1 Chock the front wheels, then jack up the rear of the vehicle and support it on axle stands. Remove the appropriate rear wheel.

Front lower arm

2 To remove the front lower arm, it is necessary to remove the fuel tank first. Refer to Chapter 4 for details.
3 Unscrew the nut and disconnect the anti-roll bar link from the lower arm. Hold the actual link with an adjustable spanner or grips while unscrewing the nut, to prevent damage to the link joint. Recover the rubber bush.
4 Unscrew and remove the bolt securing the front lower arm to the knuckle.
5 Unscrew and remove the bolt securing the front lower arm to the crossmember.
6 Withdraw the front lower arm from under the vehicle.

Rear lower arm

7 Unscrew and remove the bolt securing the rear lower arm to the knuckle.
8 The bolt securing the rear lower arm to the crossmember has an eccentric head and spacer, which are used to adjust the rear toe setting. Before removing this bolt, mark its position, using a scriber or similar sharp instrument through the aperture in the crossmember.
9 Unscrew and remove the bolt securing the rear lower arm to the crossmember **(see illustration)**. The bolt may be removed through the aperture in the crossmember. Recover the eccentric spacer.
10 Withdraw the rear lower arm from under the vehicle.

Refitting

11 Refitting is a reversal of the removal procedure, but the arm mounting bolts should be finger-tightened initially, and only fully tightened after the vehicle is lowered to the ground, so that its weight is on the rear suspension. Note that the rear lower arm is marked "TOP" for correct refitting **(see illustration)**. The rear toe setting should be checked, and if necessary adjusted, at the earliest opportunity.

15 Rear suspension tie-bar (Saloon/Hatchback models) - removal and refitting

Removal

1 Chock the front wheels, then jack up the rear of the vehicle and support it on axle stands. Remove the appropriate rear wheel.
2 Disconnect the handbrake cable from the tie-bar bracket on the underbody.
3 Unscrew and remove the bolt securing the tie-bar bracket to the rear suspension knuckle.
4 Unscrew the bolts securing the tie-bar bracket to the underbody, and withdraw the bracket from the vehicle **(see illustration)**.
5 Mount the bracket in a vice, then unscrew and remove the bolt, and remove the tie-bar from the bracket.
6 It is not possible to renew the rubber bushes - if they are worn excessively, the tie-bar should be renewed complete.

Refitting

7 Refitting is a reversal of the removal procedure. The bracket-to-underbody bolts should be fully tightened to the specified torque before lowering the vehicle. The bolts securing the tie-bar to the bracket and knuckle should be finger-tightened initially, and only fully tightened after the vehicle is lowered to the ground, so that its weight is on the rear suspension.

16 Rear suspension crossmember (Saloon/Hatchback models) - removal and refitting

Note: *Before attempting to remove the rear suspension crossmember, tools to hold the coil springs in compression must be obtained. Careful use of conventional coil spring compressors will prove satisfactory.*

Removal

1 Chock the front wheels, then jack up the rear of the vehicle and support it on axle stands. Remove both rear wheels.
2 Remove the complete exhaust system as described in Chapter 4.
3 Unscrew and remove the bolts securing the tie-bars to the rear suspension knuckles, and disconnect the tie-bars.
4 Unscrew the nuts securing the rear anti-roll bar links to the front lower arms. Hold the

15.4 Tie-bar bracket on the underbody

16.8 One of the rear suspension crossmember mounting bolts

actual links stationary while the nuts are being unscrewed, to prevent damage to the joints. Swivel the anti-roll bar upwards, and recover the rubber bushes.

5 Where applicable, remove the ABS wheel sensor from the rear suspension knuckle as described in Chapter 9.

6 Unscrew and remove the bolts, and disconnect both lower arms from the rear suspension knuckle.

7 To allow the rear suspension struts to be released from the rubber stops on the top of the crossmember, it is necessary to fit coil spring compressor tools to both of the rear coil springs, and compress them until all tension is removed from the upper and lower mountings.

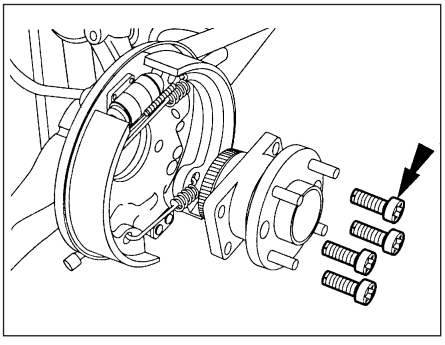
Warning: It is important to only use high-quality spring compressors, and to carefully follow the tool manufacturer's instructions provided with them. With the compressor tools fitted, support the struts to one side.

8 Support the rear suspension crossmember on a trolley jack, then unscrew the four mounting bolts from the underbody **(see illustration)**.

9 Lower the crossmember to the ground.

10 Unscrew the bolts securing the anti-roll bar clamps to the crossmember, then remove the clamps and withdraw the anti-roll bar.

11 Remove the lower arms from the crossmember as described in Section 14.



17.7 Mounting bolts (arrowed) for the rear hub on Estate models

Refitting

12 Refitting is a reversal of the removal procedure. Ford specify the use of a special tool (tool number 15-097) to accurately align the crossmember onto the underbody before tightening the mounting bolts. This tool should be obtained if possible, since inaccurate alignment would result in bad handling and excessive tyre wear. The tie-bar and arm mounting bolts should be finger-tightened initially, and only fully tightened after the vehicle is lowered to the ground, so that its weight is on the rear suspension. The rear toe setting should be checked, and if necessary adjusted, at the earliest opportunity.

17 Rear hub and bearings (Estate models) - inspection and renewal

Inspection

1 The rear hub bearings are non-adjustable, and are supplied complete with the hub. It is not possible to renew the bearings separately from the hub.

2 To check the bearings for excessive wear, chock the front wheels, then jack up the rear of the vehicle and support it on axle stands. Fully release the handbrake.

3 Grip the rear wheel at the top and bottom, and attempt to rock it. If excessive movement is noted, or if there is any roughness or vibration felt when the wheel is spun, it is indicative that the hub bearings are worn.

Renewal

4 Remove the rear wheel.

5 On drum brake models, remove the rear brake drum as described in Chapter 9.

6 On disc brake models, remove the rear brake disc as described in Chapter 9.

7 Turning the hub as necessary, line up the hole in the flange with the each of the bolts securing the hub assembly to the rear suspension knuckle; unscrew and remove the bolts **(see illustration)**.

8 Withdraw the hub and bearing assembly. Refit two of the hub mounting bolts, to hold the backplate/splash shield in place.

9 If necessary, the stub shaft may be removed from the hub for inspection of the bearing, by unscrewing the hub nut. Note that the hub nut is of special laminated design, and may only be re-used a maximum of five times. (It is a good idea to file a small notch on the nut every time it is removed; obtain a new nut if necessary.) Tighten the nut on reassembly.

10 Fit the new hub and bearing assembly using a reversal of the removal procedure. Tighten all nuts and bolts to the specified torque.

18 Rear suspension knuckle (Estate models) - removal and refitting

Removal

1 Chock the front wheels, then jack up the rear of the vehicle and support it on axle stands. Remove the appropriate rear wheel, and release the handbrake.

2 Position a trolley jack or axle stand beneath the rear suspension lower arm, to keep the coil spring in compression.

3 Where applicable, remove the ABS sensor as described in Chapter 9.

Drum brake models

4 Remove the rear brake drum as described in Chapter 9.

5 Disconnect the flexible hydraulic brake hose at the bracket on the rear suspension crossmember as described in Chapter 9.

Disc brake models

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

All models

7 Remove the rear hub as described in Section 17.

8 Remove the backplate or splash shield, as applicable. On drum brake models, support the backplate assembly on an axle stand, to prevent damage to the handbrake cable.

9 Unscrew and remove the shock absorber lower mounting bolt.

10 Unscrew and remove the three bolts securing the tie-bar to the knuckle.

11 Unscrew and remove the bolt securing the front lower arm to the knuckle.

12 Unscrew and remove the bolt securing the upper arm to the knuckle.

13 Support the knuckle, then unscrew and remove the bolt securing the rear lower arm to the knuckle, and withdraw the knuckle.

Refitting

14 Refitting is a reversal of the removal procedure, but delay fully tightening the rubber bush mounting bolts until the weight of the vehicle is on the suspension. Tighten all bolts to the specified torque. Where the flexible rear brake hose was disconnected, bleed the hydraulic system as described in Chapter 9. Finally check, and if necessary adjust, the rear wheel toe setting as described in Section 36.

19 Rear shock absorber (Estate models) - removal, testing and refitting

Removal

1 Chock the front wheels, then jack up the rear of the vehicle and support it on axle stands. Remove the appropriate wheel.

2 Position a trolley jack under the coil spring area of the rear lower suspension arm, to keep the coil spring in compression.
3 Unscrew and remove the shock absorber lower mounting bolt **(see illustration)**.
4 Unscrew and remove the upper mounting bolt, and withdraw the shock absorber from under the vehicle.

Testing

5 Check the mounting rubbers for damage and deterioration. If they are worn, they may be renewed separately from the shock absorber body.
6 Mount the shock absorber in a vice, gripping it by the lower mounting. Examine the shock absorber for signs of fluid leakage. Test the operation of the shock absorber by moving it through a full stroke, and then through short strokes of 50 to 100 mm. In both cases, the resistance felt should be smooth and continuous. If the resistance is jerky or uneven, the shock absorber should be renewed.

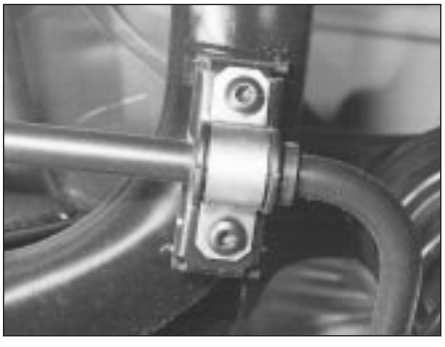
Refitting

7 Refitting is a reversal of the removal procedure, but tighten the mounting bolts to the specified torque.

20 Rear anti-roll bar and links (Estate models) - removal and refitting

Removal

1 Chock the front wheels, then jack up the rear of the vehicle and support it on axle stands. Remove both rear wheels.
2 Unscrew the nuts, and remove the washers and bushes securing the anti-roll bar links to the rear lower arms **(see illustrations)**.
3 Using a Torx key, unscrew the bolts securing the anti-roll bar mounting clamps to the rear suspension crossmember; release the clamps, and withdraw the anti-roll bar from under the vehicle **(see illustration)**.
4 Examine the rubber bushes for the mounting clamps and links, and if necessary renew them. The links are available individually.



20.3 Anti-roll bar mounting clamp on the rear suspension crossmember

19.3 Rear shock absorber lower mounting bolt (Estate)

Refitting

5 Locate the anti-roll bar on the rear crossmember, then refit the clamps and tighten the bolts to the specified torque.
6 Refit the anti-roll bar links to the rear lower arms, together with the bushes and washers. Tighten the nuts to the specified torque, while holding the actual links stationary in their central position.
7 Refit the rear wheels, and lower the vehicle to the ground.

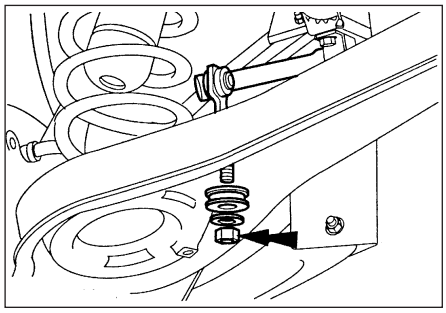
21 Rear coil spring (Estate models) - removal and refitting

Note: *Before attempting to remove the rear suspension coil spring, a tool to hold the coil spring in compression must be obtained. Careful use of conventional coil spring compressors will prove satisfactory.*

Removal

1 Chock the front wheels, then jack up the rear of the vehicle and support it on axle stands. Remove the appropriate wheel.
2 Support the weight of the rear lower arm beneath the coil spring position with a trolley jack.
3 Fit the coil spring compressor tool (ensuring that it is fully engaged), and compress the coil spring until all tension is relieved from the upper mounting.
4 Unscrew the nut, and remove the washer and bush attaching the anti-roll bar link to the rear lower arm.
5 Unscrew and remove the bolt securing the rear lower arm to the knuckle **(see illustration)**.
6 Unscrew and remove the bolt securing the front lower arm to the knuckle **(see illustration)**.
7 Lower the rear lower arm, and withdraw the coil spring from under the vehicle. Take care to keep the compressor tool in full engagement with the coil spring **(see illustration)**.
8 If a new coil spring is to be fitted, the original coil spring must be released from the compressor. If it is to be re-used, the coil spring can be left in compression.

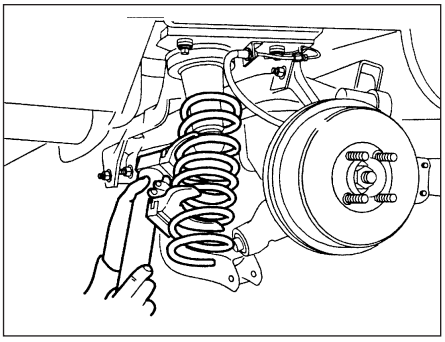
21.5 Rear lower arm-to-knuckle mounting bolt



20.2A Mounting nut (arrowed) and rubber bush securing the rear anti-roll bar link to the rear lower arm

20.2B View of the anti-roll bar link nut through the rear lower arm

21.6 Front lower arm-to-knuckle mounting bolt



21.7 Removing the coil spring, with compressor tool attached, from under the vehicle

21.9 Correct location of the coil spring in the upper seat (arrowed)

22.3 Bolts securing the rear lower arms to the crossmember - note the eccentric spacers

Refitting

9 Refitting is a reversal of the removal procedure, but make sure that the coil spring is located correctly in the upper and lower seats **(see illustration)**. Delay fully tightening the two lower arm mounting bolts until the weight of the vehicle is on the rear suspension. Finally check, and if necessary adjust, the rear wheel toe setting as described in Section 36.

22 Rear suspension rear lower arm (Estate models) - removal and refitting

Removal

1 Remove the rear suspension coil spring as described in Section 21.
2 The bolt securing the rear lower arm to the crossmember has an eccentric head and spacer, which are used to adjust the rear toe setting. Before removing this bolt, mark its position, using a scriber or similar sharp instrument through the aperture in the crossmember.
3 Unscrew and remove the bolt securing the rear lower arm to the crossmember. The bolt may be removed through the aperture in the crossmember. Recover the eccentric spacer **(see illustration)**.
4 Withdraw the rear lower arm from under the vehicle.

Refitting

5 Refitting is a reversal of the removal procedure, but delay fully tightening the lower arm mounting bolts until the weight of the vehicle is on the rear suspension. Finally check, and if necessary adjust, the rear wheel toe setting as described in Section 36.

23 Rear suspension front lower arm (Estate models) - removal and **refitting**

Removal

1 Chock the front wheels, then jack up the rear of the vehicle and support it on axle stands. Remove the appropriate wheel.
2 Unscrew and remove the bolt securing the front lower arm to the crossmember **(see illustration)**.
3 Unscrew and remove the bolt securing the front lower arm to the knuckle, and withdraw the arm from under the vehicle **(see illustration)**.

Refitting

4 Refitting is a reversal of the removal procedure, but delay fully tightening the mounting bolts until the weight of the vehicle is on the rear suspension.

24 Rear suspension upper arm (Estate models) - removal and refitting

Removal

1 Chock the front wheels, then jack up the rear of the vehicle and support it on axle stands. Remove the appropriate wheel.
2 Using a trolley jack, support the rear lower arm beneath the coil spring position.
3 Unscrew and remove the bolt securing the upper arm to the knuckle **(see illustration)**.
4 Unscrew and remove the bolt securing the upper arm to the crossmember, and withdraw the arm from under the vehicle.

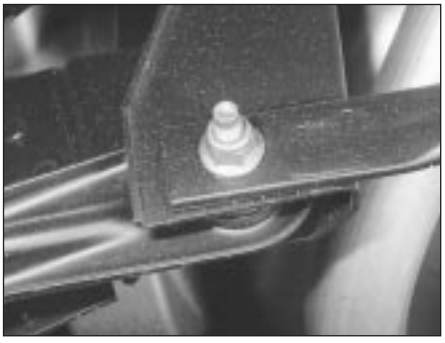
Refitting

5 Refitting is a reversal of the removal procedure, but delay fully tightening the mounting bolts until the weight of the vehicle is on the rear suspension.

25 Rear suspension tie-bar (Estate models) - removal and refitting

Removal

1 Chock the front wheels, then jack up the rear of the vehicle and support it on axle stands. Remove the appropriate wheel.

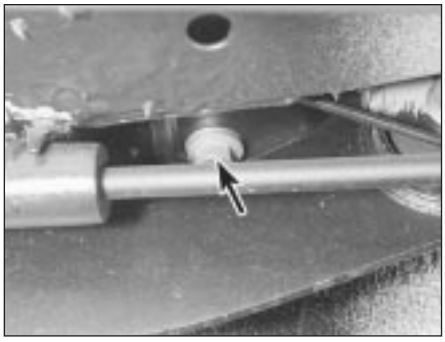


23.2 Front lower arm-to-crossmember securing bolt

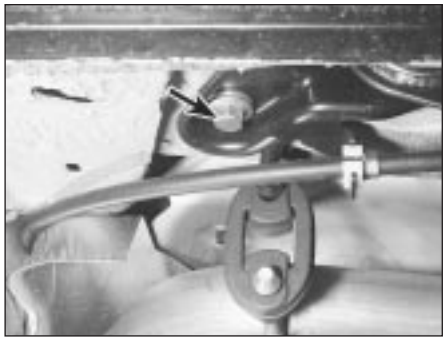
23.3 Front lower arm (arrowed)

24.3 Bolt (arrowed) securing the upper arm to the knuckle

25.7 Bolts (arrowed) securing the rear suspension tie-bar to the knuckle



25.8A Tie-bar bracket front bolt (arrowed) on the underbody



25.8B Tie-bar bracket rear bolt (arrowed) on the underbody

2 Using a trolley jack, support the rear lower arm beneath the coil spring position.
3 Unscrew and remove the bolt securing the rear shock absorber to the knuckle.
4 Where applicable, release the ABS wheel sensor lead from the tie-bar.
5 Detach the handbrake cable from the tie-bar bracket.
6 Refer to Chapter 9, and disconnect the handbrake cable from the rear brake shoes or rear caliper, as applicable. Pass the cable through the hole in the tie-bar.
7 Unscrew and remove the three bolts securing the tie-bar to the knuckle **(see illustration)**.
8 Unbolt the tie-bar bracket from the underbody, and withdraw the assembly from under the vehicle **(see illustrations)**.
9 Mount the tie-bar in a vice, then unscrew the bolt, and separate the tie-bar from its bracket.
10 It is not possible to renew the rubber bush in the tie-bar, and if it is excessively worn, the complete tie-bar must be renewed.

Refitting

11 Refitting is a reversal of the removal procedure, but delay fully tightening the bolt which secures the arm to the bracket until the weight of the vehicle is on the rear suspension. On completion, check the operation of the handbrake.

26 Rear suspension crossmember (Estate models) - removal and refitting

Removal

1 Chock the front wheels, then jack up the rear of the vehicle and support on axles stands. Remove both rear wheels. Make sure that the vehicle is supported high enough for the crossmember to be removed.
2 Disconnect the handbrake rear cables from the front primary cable, as described in Chapter 9.
3 Where applicable, remove the ABS wheel sensors from the rear knuckles, and disconnect the wiring leads from the clips as described in Chapter 9.
4 Disconnect the flexible brake hoses from the brackets on both sides of the crossmember, as described in Chapter 9.
5 Working on each side of the vehicle, unbolt the tie-bar brackets from the underbody.
6 Support the rear suspension crossmember on a trolley jack.
7 Unscrew the mounting bolts, and lower the crossmember to the ground **(see illustrations)**.
8 If necessary, remove the suspension components from the crossmember as described in the appropriate Sections of this Chapter.

Refitting

9 Refitting is a reversal of the removal procedure, noting the following points:
*(a) When raising the crossmember, note that guide pins are provided to ensure correct alignment **(see illustration)**.*
(b) Delay fully tightening the suspension mounting bolts until the weight of the vehicle is on the rear suspension.
(c) Tighten all bolts to the specified torque.
(d) Bleed the brake hydraulic system as described in Chapter 9.
(e) Check, and if necessary adjust, the rear wheel toe setting as described in Section 36.

27 Steering wheel - removal and refitting

Warning: All models are equipped with an air bag system. Make sure that the safety recommendations given in Chapter 12 are followed, to prevent personal injury.

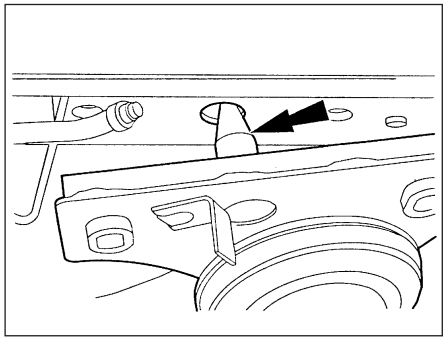
Removal

1 Disconnect the battery negative (earth) lead (refer to Chapter 5, Section 1).

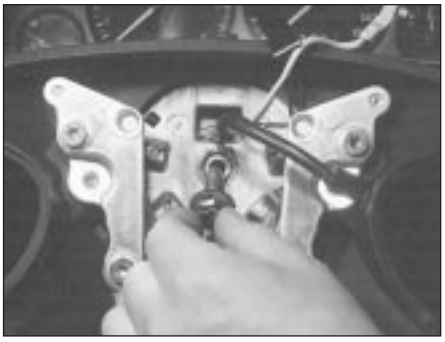
Warning: Before proceeding, wait a minimum of 15 minutes, as a precaution against accidental firing of the air bag unit. This period ensures that any stored energy in the back-up capacitor is dissipated.

26.7A Rear suspension crossmember rear mounting bolt

26.7B Rear suspension crossmember front mounting bolt



26.9 Guide pin (arrowed) for correct alignment of the rear crossmember



27.6 Removing the steering wheel retaining bolt

27.7 Feeding the horn and air bag wiring through the hole in the steering wheel hub

27.9 Tightening the steering wheel retaining bolt

2 Turn the steering wheel so that the front wheels are in the straight-ahead position.
3 Unscrew the screws, and remove the steering column upper and lower shrouds.
4 From the rear of the steering wheel, unscrew the air bag module mounting screws.
5 Carefully lift the module from the steering wheel, and disconnect the air bag multi-plug and horn wiring connections.

Warning: Position the air bag module in a safe place, with the mechanism facing downwards as a precaution against accidental operation.

6 Make sure that the steering lock is not engaged. Unscrew the retaining bolt from the centre of the steering wheel **(see illustration)**.
7 Remove the steering wheel from the top of the column, while feeding the horn and air bag wiring through the hole in the steering wheel hub **(see illustration)**.

Refitting

8 Make sure that the front wheels are still facing straight-ahead, then locate the steering wheel on the top of the steering column.
9 Refit the retaining bolt, and tighten it to the specified torque while holding the steering wheel **(see illustration)**. Do not tighten the bolt with the steering lock engaged, as this may damage the lock.
10 Reconnect the horn wiring connections and air bag multi-plug.
11 Locate the air bag module/horn contact on the steering wheel, then insert the mounting screws and tighten them.
12 Refit the steering column upper and lower shrouds. Insert and tighten the screws.
13 Reconnect the battery negative lead.

28 Steering column - removal, inspection and refitting

Warning: All models are equipped with an air bag system. Make sure that the safety recommendations given in Chapter 12 are followed, to prevent personal injury.

Removal

1 Disconnect the battery negative (earth) lead (refer to Chapter 5, Section 1).

Warning: Before proceeding, wait a minimum of 15 minutes, as a precaution against accidental firing of the air bag unit. This period ensures that any stored energy in the back-up capacitor is dissipated.

2 Turn the steering wheel so that the front wheels are in the straight-ahead position.
3 Remove the ignition key, then turn the steering wheel slightly as necessary until the steering lock engages.
4 Unscrew the screws, and remove the steering column lower and upper shrouds. As the lower shroud is being removed, it will be necessary to remove the rubber ring from the ignition switch/steering lock **(see illustrations)**.

28.4A Unscrew the screws from the lower shroud . . .

28.4B . . . remove the rubber ring . . .

28.4C . . . and remove the lower shroud

28.4D Upper shroud retaining screws (arrowed)

28.4E Removing the upper shroud

28.6A Unscrew the clamp plate bolt . . .

28.6B . . . and swivel the clamp plate around

28.7A Disconnecting the multi-plug from the ignition switch

5 Remove the driver's side lower facia panel (see Chapter 11).
6 Unscrew the clamp plate bolt securing the steering column shaft to the flexible coupling. Swivel the clamp plate around, and disengage it from the flexible coupling stub **(see illustrations)**.
7 Release the cable tie from the wiring loom at the steering column, and disconnect the multi-plugs **(see illustrations)**.
8 Unscrew and remove the steering column mounting bolts, then slide the column upwards to disengage the retaining tab from the groove in the cross-beam bracket, and withdraw it from inside the vehicle **(see illustrations)**.

Inspection

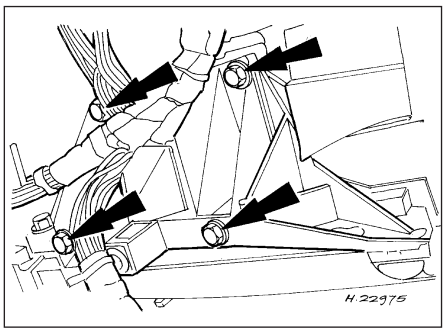
9 With the steering column removed, check the universal joints for wear, and examine the column upper and lower shafts for any signs of damage or distortion **(see illustration)**. Where evident, the column should be renewed complete.
10 Examine the height adjustment lever mechanism for wear and damage **(see illustration)**.
11 With the steering lock disengaged, turn the inner column, and check the upper and lower bearings for smooth operation. The bearings are obtainable separately, and should be renewed if necessary. Dismantling and reassembly of the column assembly is a relatively easy operation.

Refitting

12 Locate the steering column on its bracket, making sure that the tab slides down into the groove correctly.
13 Insert the mounting bolts and tighten to the specified torque **(see illustration)**.
14 Reconnect the multi-plugs, and secure the wiring loom with the cable tie.

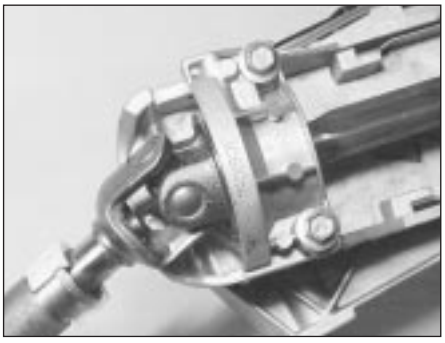
28.7B Disconnecting the small multi-plug . . .

28.7C . . . and main multi-plug from the steering column

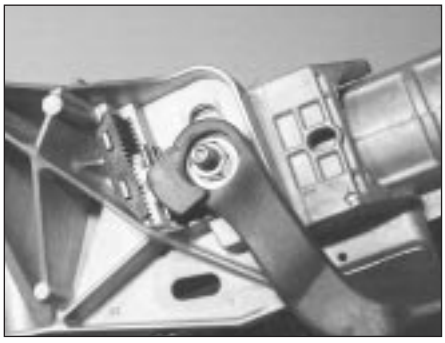


28.8A Steering column mounting bolt locations (arrowed)

28.8B Removing the steering column



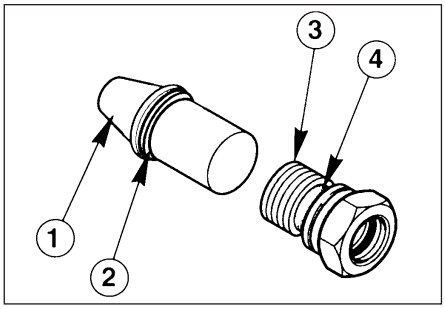
28.9 Steering column and universal joint



28.10 Height adjustment lever mechanism

28.13 Tightening the steering column mounting bolts

30.6 U-shaped Ford spanner for unscrewing the steering gear mounting bolts



30.8 Using an adaptor to fit the Teflon rings to the union nuts

1 Adaptor 2 Teflon ring 3 Union nut
4 Groove location for the Teflon ring

30.9 Tightening the steering gear mounting bolts using the U-shaped spanner (arrowed)

15 Locate the steering column shaft on the flexible coupling, swivel the clamp plate round, then insert the bolt and tighten to the specified torque.
16 Refit the driver's side lower trim panel.
17 Refit the steering column upper and lower shrouds.
18 Reconnect the battery negative lead.

29 Steering column flexible coupling - removal and refitting

Removal

1 Disconnect the battery negative (earth) lead (refer to Chapter 5, Section 1).
2 Turn the steering wheel so that the front wheels are in the straight-ahead position. Remove the ignition key, then turn the steering wheel slightly as necessary until the steering lock engages.
3 Unscrew the clamp plate bolt securing the steering column shaft to the flexible coupling. Swivel the clamp plate around, and disengage it from the flexible coupling stub.
4 Carefully prise the rubber boot from the bulkhead, and withdraw it into the passenger compartment. Take care not to damage the sealing lip of the boot.
5 Using an Allen key, unscrew the clamp bolt securing the flexible coupling to the pinion shaft on the steering gear, and withdraw the coupling from inside the vehicle.

Refitting

6 Refitting is a reversal of the removal procedure, but tighten the clamp bolts to the specified torque. Make sure that the rubber boot engages correctly in the bulkhead and on the flexible coupling.

30 Power steering gear (all except left-hand-drive models with ABS) - removal and refitting

Removal

1 Remove the steering column flexible coupling as described in Section 29.
2 Apply the handbrake, then jack up the front of the vehicle and support it on axle stands. Remove both front wheels.
3 Working beneath the vehicle, unbolt the rear engine mounting from the transmission and underbody.
4 Extract the split pins from the track rod end balljoint nuts, then unscrew the nuts, and detach the rods from the arms on the steering knuckles using a conventional balljoint removal tool. Take care not to damage the balljoint seals.
5 Position a suitable container beneath the steering gear, then unscrew the union nuts securing the power steering fluid supply, return, and cooler lines to the steering gear. Identify the lines for position, then unbolt the clamps, disconnect the lines, and allow the fluid to drain into the container. Cover the apertures in the steering gear and also the ends of the fluid pipes, to prevent the ingress of dust and dirt into the hydraulic circuit.
6 Unscrew and remove the steering gear mounting bolts. The bolts are located on top of the steering gear, and are difficult to reach. Ideally, the special U-shaped Ford spanner should be used, but it is just possible to reach them with a normal spanner **(see illustration)**.
7 Withdraw the steering gear through the wheel arch.

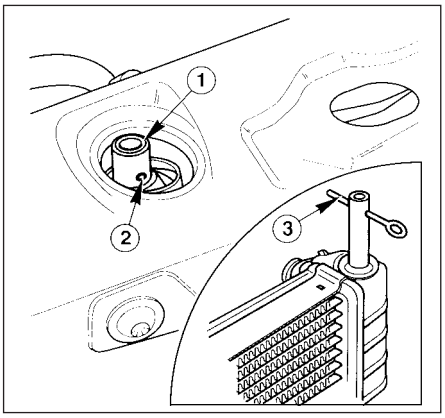
Refitting

8 If the steering gear is being replaced with a new one, the new unit will be supplied together with union nuts already fitted. The new nuts must only be used with new feed and return lines - otherwise, they must be removed and discarded. If the original lines and union nuts are being used, the Teflon rings on the union nuts must be renewed. To do this, the rings must be expanded individually onto a fitting adaptor **(see illustration)**, then located in the grooves of the union nuts.
9 Locate the steering gear on the subframe, and insert the two mounting bolts. Tighten the bolts to the specified torque **(see illustration)**. Note that, if the special Ford tool is being used, the bottom of the tool must be turned anti-clockwise in order to tighten the mounting bolts.
10 Remove the covers from the apertures on the steering gear, then reconnect the fluid lines and tighten the union nuts to the specified torque. Refit the clamps and tighten the bolts.
11 Refit the track rod end balljoints to the steering knuckles, and tighten the nuts to the specified torque. Check that the split pin holes are aligned; if necessary, turn the nuts to the nearest alignment, making sure that the torque wrench setting is still within the specified range. Insert new split pins, and bend them back to secure.
12 Refit the rear engine mounting to the transmission and underbody, and tighten the bolts to the specified torque.
13 Refit the front wheels, and lower the vehicle to the ground.
14 Refit the steering column flexible coupling with reference to Section 29.
15 Bleed the power steering hydraulic system as described in Section 33.
16 Have the front wheel alignment checked, and if necessary adjusted, at the earliest opportunity (refer to Section 36).

31 Power steering gear (left-hand-drive models with ABS) - removal and refitting

Removal

1 Disconnect the battery negative (earth) lead (refer to Chapter 5, Section 1).
2 Working inside the vehicle, unscrew the clamp plate bolt securing the steering column shaft to the flexible coupling. Swivel the clamp plate around, and disengage it from the flexible coupling stub.
3 Apply the handbrake, then jack up the front of the vehicle and support it on axle stands. Remove both wheels.
4 On manual transmission models, disconnect the gearchange linkage and support rods from the transmission, as described in Chapter 7, Part A.
5 Remove the exhaust downpipe complete, as described in Chapter 4.
6 Remove the cover from under the radiator by unscrewing the screws and releasing the clips.



31.7 Method of supporting the radiator in its raised position

1 Radiator upper mounting extension
2 Small hole
3 Pin or split pin inserted through hole

7 Support the radiator in its raised position, by inserting split pins through the small holes in the radiator mounting extensions which protrude through the upper mountings **(see illustration)**.
8 Unbolt and remove the radiator lower mounting brackets.
9 Where applicable, unscrew the bolts securing the air conditioning accumulator to the subframe.
10 Working beneath the vehicle, unbolt the engine rear mounting from the transmission and underbody.
11 Unscrew the front engine mounting-to-cylinder block bolts, and also the through-bolt.
12 Extract the split pins from the track rod end balljoint nuts, then unscrew the nuts, and detach the rods from the arms on the steering knuckles using a conventional balljoint removal tool. Take care not to damage the balljoint seals.
13 Working on each side in turn, unscrew the mounting nuts, and remove the anti-roll bar links from the front suspension struts. Note that, on models fitted with ABS, the ABS sensor wiring support brackets are located beneath the nuts.
14 Working on each side in turn, note which way round the front suspension lower arm balljoint clamp bolt is fitted, then unscrew and remove it from the knuckle assembly. Lever the balljoint down from the knuckle - if it is tight, prise the joint open carefully using a large flat-bladed tool. Take care not to damage the balljoint seal during the separation procedure.
15 Support the weight of the front subframe assembly on two trolley jacks (or two scissor jacks).
16 Unscrew and remove the subframe mounting bolts, then lower the subframe sufficiently to gain access to the power steering fluid pipes on top of the steering gear. Note that the front subframe mounting bolts are gold in colour - the rear ones are silver.
17 Position a suitable container beneath the steering gear, then unscrew the union nuts securing the power steering fluid supply, return, and cooler lines to the steering gear. Identify the lines for position, then unbolt the clamps, disconnect the lines, and allow the fluid to drain into the container. Cover the apertures in the steering gear and also the ends of the fluid pipes, to prevent the ingress of dust and dirt into the hydraulic circuit.
18 Lower the subframe, together with the power steering gear, to the ground.
19 Unscrew the mounting bolts and remove the power steering gear from the subframe.
20 Using a suitable Allen key, unscrew the clamp bolt securing the flexible coupling to the pinion shaft on the steering gear, and withdraw the coupling.
21 Refer to Section 30, paragraph 8 for details of renewing the Teflon rings.

Refitting

22 Refit the flexible coupling to the pinion shaft on the steering gear, then insert and tighten the clamp bolt using an Allen key.
23 Locate the power steering gear on the subframe, then insert the mounting bolts and tighten to the specified torque.
24 Raise the subframe until it is possible to refit the fluid lines. Tighten the union nuts and clamps.
25 Raise the subframe, making sure that the alignment holes are in line with the holes in the underbody. At the same time, make sure that the flexible coupling locates correctly on the steering column. Ford technicians use a special tool to ensure that the subframe is correctly aligned - refer to Chapter 2 for more details of the alignment procedure. With the subframe aligned, insert and tighten the mounting bolts to the specified torque. Note that the front mounting bolts are gold in colour - the rear bolts are silver.
26 Working on each side in turn, refit the front suspension lower arm balljoint to the knuckle assembly, and insert the clamp bolt with its head facing forwards. Refit the nut and tighten to the specified torque.
27 Working on each side in turn, refit the anti-roll bar links and tighten the mounting nuts to the specified torque. On models fitted with ABS, don't forget to locate the wheel sensor wiring support brackets beneath the nuts.
28 Refit the track rod end balljoints to the steering knuckles, and tighten the nuts to the specified torque. Check if the split pin holes are aligned, and if necessary turn the nuts to the nearest alignment, making sure that the torque wrench setting is still within the specified range. Insert new split pins, and bend them back to secure.
29 Refit and tighten the engine front mounting bolts.
30 Refit the engine rear mounting and tighten the bolts.
31 Where applicable, insert and tighten the air conditioning accumulator bolts.
32 Refit the radiator lower mounting brackets and tighten the bolts.
33 Remove the split pins supporting the radiator in its raised position.
34 Refit the cover under the radiator.
35 Refit the exhaust downpipe as described in Chapter 4.
36 On manual transmission models, reconnect the gearchange linkage and support rods.
37 Refit the front wheels, and lower the vehicle to the ground.
38 Working inside the vehicle, reconnect the steering column clamp plate, then insert the bolt and tighten to the specified torque.
39 Reconnect the battery negative lead.
40 Bleed the power steering hydraulic system as described in Section 33.
41 Have the front wheel alignment checked, and if necessary adjusted, at the earliest opportunity (refer to Section 36).

32 Power steering gear rubber gaiters - renewal

1 Remove the track rod end and its locknut from the track rod, as described in Section 35. Make sure that a note is made of the exact position of the track rod end on the track rod, in order to retain the front wheel alignment setting on refitting.
2 Release the outer retaining clip and inner plastic clamp band, and disconnect the gaiter from the steering gear housing.
3 Disconnect the breather from the gaiter, then slide the gaiter off the track rod.
4 Scrape off all grease from the old gaiter, and apply to the track rod inner joint. Wipe clean the seating areas on the steering gear housing and track rod.
5 Slide the new gaiter onto the track rod and steering gear housing, and reconnect the breather.
6 Fit a new inner plastic clamp band and outer retaining clip.
7 Refit the track rod end as described in Section 35.
8 Have the front wheel alignment checked, and if necessary adjusted, at the earliest opportunity (refer to Section 36).

33 Power steering hydraulic system - bleeding

1 Following any operation in which the power steering fluid lines have been disconnected, the power steering system must be bled, to remove any trapped air.
2 With the front wheels in the straight-ahead position, check the power steering fluid level in the reservoir and, if low, add fresh fluid until it reaches the "MAX" or "MAX COLD" mark. Pour the fluid slowly, to prevent air bubbles forming, and use only the specified fluid (refer to Chapter 1 Specifications).

3 Start the engine, and allow it to run at a fast idle. Check the hoses and connections for leaks.
4 Stop the engine, and recheck the fluid level. Add more if necessary, up to the "MAX" or "MAX COLD" mark.
5 Start the engine again, allow it to idle, then bleed the system by slowly turning the steering wheel from side to side several times. This should purge the system of all internal air. However, if air remains in the system (indicated by the steering operation being very noisy), leave the vehicle overnight, and repeat the procedure again the next day.
6 If air still remains in the system, it may be necessary to resort to the Ford method of bleeding, which uses a vacuum pump. Turn the steering to the right until it is near the stop, then fit the vacuum pump to the fluid reservoir, and apply 0.15 bars of vacuum. Maintain the vacuum for a minimum of 5 minutes, then repeat the procedure with the steering turned to the left.
7 Keep the fluid level topped-up throughout the bleeding procedure; note that, as the fluid temperature increases, the level will rise.
8 On completion, switch off the engine, and return the front wheels to the straight-ahead position.

34 Power steering pump - removal and refitting

Removal

1 Disconnect the battery negative (earth) lead (refer to Chapter 5, Section 1).
2 Unscrew and remove the bolt securing the hydraulic fluid line support to the engine lifting bracket on the right-hand side of the engine.
3 Unscrew and remove the bolt securing the hydraulic fluid line support to the pump mounting bracket.
4 Position a suitable container beneath the power steering pump, to catch spilt fluid.
5 Loosen the clip, and disconnect the fluid supply hose from the pump inlet. Plug the hose, to prevent the ingress of dust and dirt.
6 Unscrew the union nut, and disconnect the high-pressure line from the pump. Allow the fluid to drain into the container.
7 Apply the handbrake, then jack up the front of the vehicle and support it on axle stands. Remove the right-hand front wheel.
8 Unbolt and remove the lower drivebelt cover.
9 Using a spanner, rotate the drivebelt tensioner in a clockwise direction to release the belt tension, then slip the drivebelt off the pulleys and remove from the vehicle. Refer to Chapter 1 if necessary.
10 Unscrew and remove the four mounting bolts, and withdraw the power steering pump from its bracket. Access to the bolts on the right-hand side of the engine is gained by turning the pump pulley until a hole lines up with the bolt.

Refitting

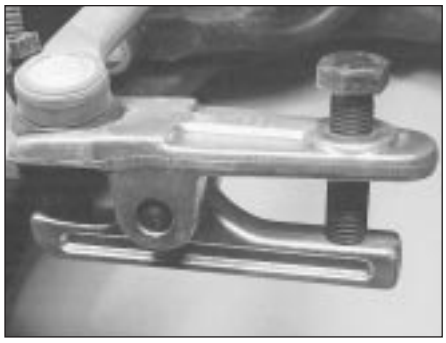
11 Locate the power steering pump on the mounting bracket, and secure with the four bolts. Tighten the bolts to the specified torque.
12 Slip the drivebelt over the pulleys, then rotate the drivebelt tensioner in a clockwise direction, and locate the drivebelt on it. Release the tensioner to tension the drivebelt.
13 Refit the lower belt cover.
14 Refit the right-hand front wheel, and lower the vehicle to the ground.
15 If necessary, the sealing ring on the high-pressure outlet should be renewed, using the same procedure as described in Section 30, paragraph 8.
16 Reconnect the high-pressure line to the pump, and tighten the union nut.
17 Reconnect the fluid supply hose to the pump inlet, and tighten the clip.
18 Refit the hydraulic fluid line support to the pump mounting bracket, and tighten the bolt.
19 Refit the hydraulic fluid line support to the engine lifting bracket on the right-hand side of the engine, and tighten the bolt.
20 Reconnect the battery negative lead.
21 Bleed the power steering hydraulic system as described in Section 33.

35 Track rod end - renewal

1 Apply the handbrake, then jack up the front of the vehicle and support it on axle stands. Remove the appropriate front roadwheel.
2 Using a suitable spanner, slacken the locknut on the track rod by a quarter-turn. Hold the track rod end stationary with another spanner engaged with the special flats while loosening the locknut.
3 Extract the split pin, then unscrew and remove the track rod end balljoint retaining nut.
4 To release the tapered shank of the balljoint from the steering knuckle arm, use a balljoint separator tool (if the balljoint is to be re-used, take care not to damage the dust cover when using the separator tool) **(see illustration)**.
5 Count the number of exposed threads visible on the inner section of the track rod, and record this figure.
6 Unscrew the track rod end from the track rod, counting the number of turns necessary to remove it. If necessary, hold the track rod stationary with grips.

Refitting

7 Screw the track rod end onto the track rod by the number of turns noted during removal, until it just contacts the locknut.
8 Engage the shank of the balljoint with the steering knuckle arm, and refit the nut. Tighten the nut to the specified torque. If the balljoint shank turns while the nut is being tightened, press down on the balljoint. The tapered fit of the shank will lock it, and prevent rotation as the nut is tightened.



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

9 Check that the split pin holes in the nut and balljoint shank are aligned. If necessary turn the nut to the nearest alignment, making sure that the torque wrench setting is still within the specified range. Insert a new split pin, and bend it back to secure.
10 Now tighten the locknut, while holding the track rod end as before.
11 Refit the roadwheel, and lower the vehicle to the ground.
12 Finally check, and if necessary adjust, the front wheel alignment as described in Section 29.

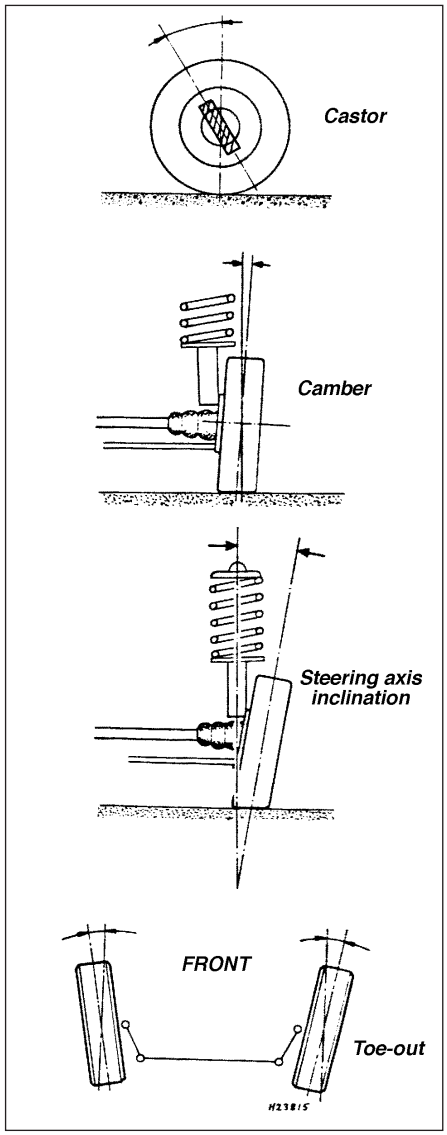
36 Wheel alignment and steering angles - general information

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 front wheels are not buckled, and that the steering linkage and suspension joints are in good order, without slackness or wear.
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 roadwheels (measured at hub height) differs from the diametrically-opposite distance measured between the rear inside edges of the front roadwheels.
3 With the exception of the toe setting, all other steering angles are set during manufacture, and no adjustment is possible. It



36.2 Wheel alignment and steering angles

can be assumed, therefore, that unless the vehicle has suffered accident damage, all the preset steering angles will be correct. Should there be some doubt about their accuracy, it will be necessary to seek the help of a Ford dealer, as special gauges are needed to check the steering angles.

4 Two methods are available to the home mechanic for checking the 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 locknut on the track rod, and turn the track rod using self-locking pliers to achieve the desired setting. When viewed from the side of the car, turning the rod clockwise will increase the toe-in, turning it anti-clockwise will increase the toe-out. Only turn the track rods by a quarter of a turn each time, and then recheck the setting.

8 After adjustment, tighten the locknuts. Reposition the steering gear rubber gaiters, to remove any twist caused by turning the track rods.

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 Ford garage or specialist having the special equipment required.