Chapter 10
Suspension and steering systems

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Specifications

Torque specifications

	Nm
Front suspension	
Leaf spring bolts	76 to 102
Panhard rod to frame bolt	157 to 186
Panhard rod to axle bolt	127 to 167
Radius rod rear nut	93 to 123
Radius rod front nuts	157 to 216
Shock absorber nuts	
Leaf spring models	
Upper	20 to 23
Lower	47 to 65
Coil spring models	45 to 52
Stabiliser bar bracket bolts	25 to 32
Stabiliser end nuts	20 to 23
U-bolt nuts	108 to 118

Rear suspension	
Leaf spring bolts	76 to 102
Panhard rod to frame bolt	137 to 167
Panhard rod to axle bolt	117 to 158
Radius arm to axle bolts	98 to 137
Radius rod to frame bolts	
Upper	98 to 137
Lower	147 to 177
Shock absorber nuts	
Leak spring	
Upper	47 to 65
Lower	17 to 23
Coil spring	30 to 40
Spring U-bolt nuts	108 to 147
Stabiliser bar link nuts	25 to 32
Stabiliser bar bracket nuts	32 to 38
Steering	
Pitman arm-to-steering shaft nut	235 to 265
Power steering pump bolts	31 to 42
Power steering pulley nut	54 to 68
Steering shaft pinch bolts	39 to 49
Steering gear mounting nuts	84 to 96
Steering wheel-to-steering shaft hub nut	29 to 39
Rod end ball stud nuts	46 to 54
Wheel lug nuts	See Chapter 1

1 General information

Front suspension

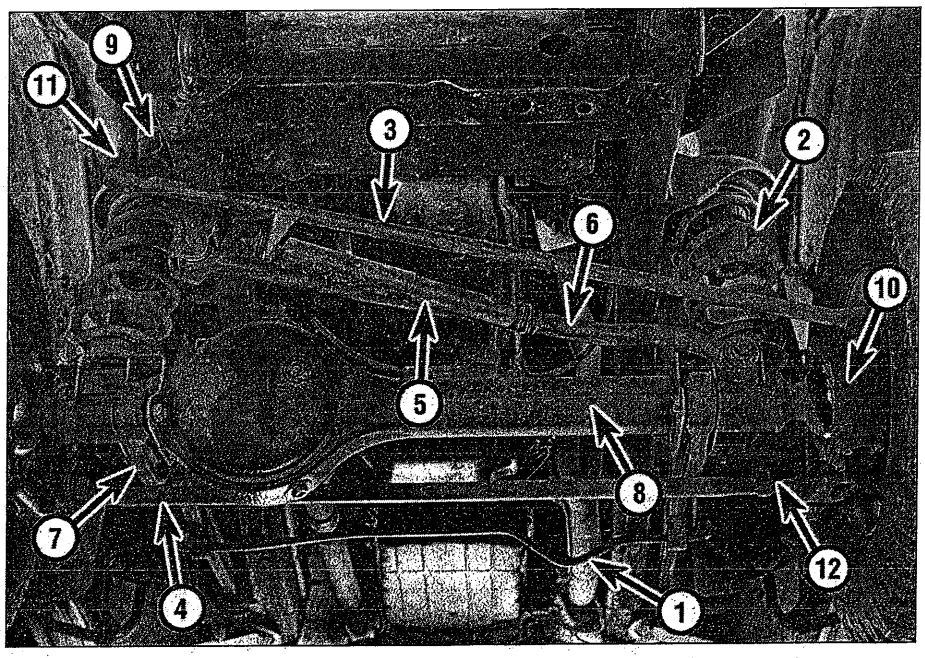
Refer to illustration 1.1

All of the vehicles covered by this manual utilise a solid front axle. The front axle consists of a one piece steel housing and axle tube assembly (for more information on the internal components of the front axle, see Chapter 8). Most utility and cab chassis models use a pair of shock absorbers and a pair leaf springs to control vertical and lateral movement of the front axle. All other models use two control arms, a pair of shock absorbers and coil springs to control vertical and fore/aft movement of the front axle while lateral movement is prevented by a Panhard bar. A stabiliser bar controls body roll on some models. Each steering knuckle is positioned by a pair of tapered roller bearings to upper and lower ends of a yoke welded to the end of the axle **(see illustration)**.

Rear suspension

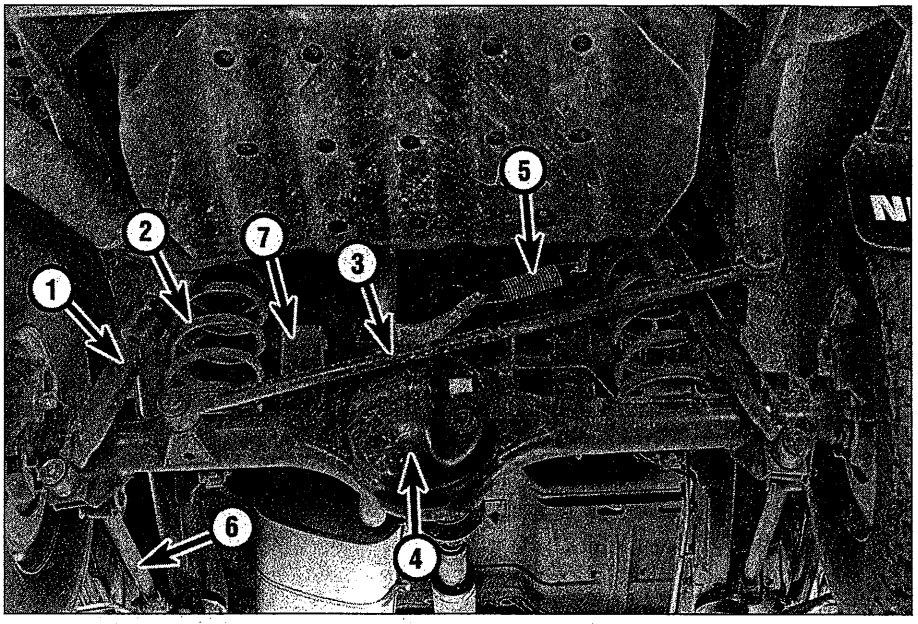
Refer to illustration 1.2

The rear axle also consists of a one piece steel housing and axle tube assembly (for more information on the internal components of the rear axle, see Chapter 8). Most utility and cab chassis models use a pair of



1.1 Front suspension and steering components - coil spring model

1 *Stabiliser bar*
2 *Coil spring*
3 *Relay rod*
4 *Tie rod*
5 *Steering damper*
6 *Panhard bar*
7 *Suspension arm*
8 *Differential and axle housing*
9 *Steering gear*
10 *Swivel hub (knuckle flange)*
11 *Pitman arm*
12 *Tie-rod end*



1.2 Rear suspension components - coil spring model

1 *Shock absorber*
2 *Coil spring*
3 *Panhard bar*
4 *Differential and axle housing*
5 *Stabiliser bar release spring*
6 *Lower suspension arm*
7 *Upper suspension arm*

shock absorbers and a pair leaf springs to control vertical and lateral movement of the rear axle. All other models use four control arms, a pair of shock absorbers and coil springs to control vertical and fore/aft movement of the rear axle while lateral movement is prevented by a Panhard bar. A stabiliser bar controls body roll on all models **(see illustration)**. The rear stabiliser bar can be disconnected by the driver on some models.

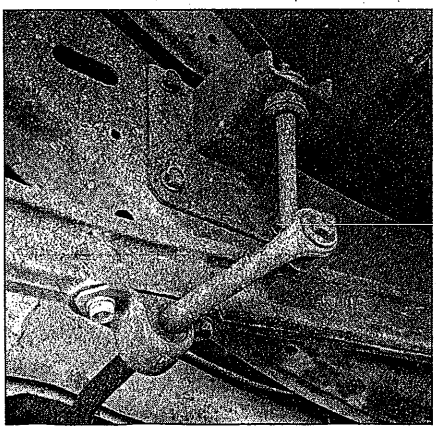
Steering

The power steering system uses a recirculating-ball type steering gearbox which transmits turning force through the steering linkage (Pitman arm and relay rod assembly) to the left steering knuckle arm. The tie-rod connects the front wheel to each other. A steering damper refitted in the linkage reduces unwanted kick-back and shimmy of the steering wheel. A flexible coupling connects the steering column to the steering gearbox. The steering column is designed to collapse in the event of an accident.

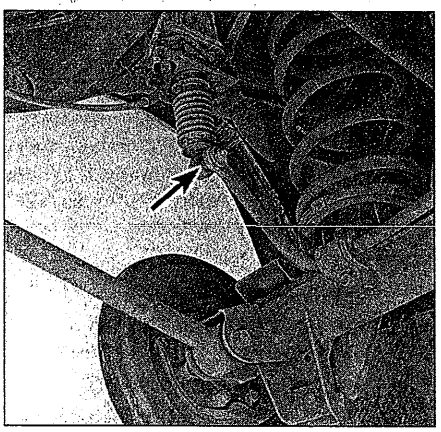
Frequently, when working on the suspension or steering system components, you may come across fasteners which seem impossible to loosen. These fasteners on the underside of the vehicle are continually subjected to water, road grime, mud, etc., and can become rusted or "seized," making them extremely difficult to remove. In order to unscrew these stubborn fasteners without damaging them (or other components), be sure to 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 prevent damage to the threads. Sometimes a sharp blow with a hammer and punch is effective in breaking the bond between a nut and bolt threads, but care must be taken to prevent the punch from slipping off the fastener and ruining the threads. Heating the stuck fastener and surrounding area with a torch sometimes helps too, but isn't recommended because of the obvious dangers associated with fire. Long breaker bars and extension, or "cheater," pipes will increase leverage, but never use an extension pipe on a ratchet - the ratcheting mechanism could be damaged. Sometimes, turning the nut or bolt in the tightening (clockwise) direction first will help to break it loose. Fasteners which require drastic measures to unscrew should always be renewed.

Since most of the procedures that are dealt with in this Chapter involve jacking up the vehicle and working underneath it, a good pair of jackstands will be needed. A hydraulic floor jack is the preferred type of jack to lift the vehicle, and it can also be used to support certain components during various operation. **Warning:** *Never, under any circumstances, rely on a jack to support the vehicle while working on it.*

Whenever any of the suspension or steering fasteners are loosened or removed they must be inspected and, if necessary, renewed with ones of the same part number or of original equipment quality and design. Torque specifications must be followed for proper reassembly and component retention. Never attempt to heat or straighten any suspension or steering components. Instead, renew any bent or damaged parts.



2.2a Front stabiliser bar end link mounting details (coil spring model). Not all front suspensions use a stabiliser bar



2.2b Disconnect the ends of the bar from the link or the release device (arrow)

2 Stabiliser bar and bushes (front and rear) - removal and refitting

Note 1: *Some models are not equipped with a front and/or rear stabiliser bar.* **Note 2:** *Some models are equipped with a rear stabiliser bar disconnection/release device. Refer to Section 8 for information about servicing this component.*

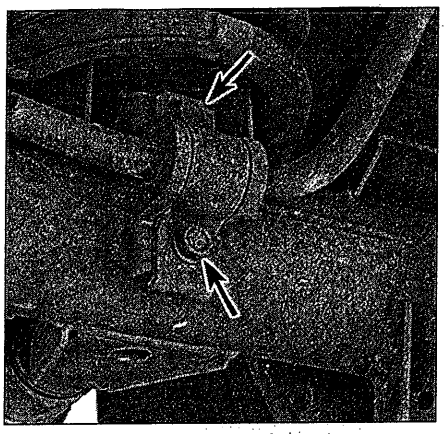
Removal

Refer to illustrations 2.2a, 2.2b and 2.3

1 Apply the parking brake. Raise the vehicle and support it securely on jackstands. It will be easier to remove the stabiliser bar if the jackstands are placed under the axle housing in order to let the vehicle rest at normal ride height.

2 Disconnect the stabiliser bar from the end links **(see illustrations)**. Note the order in which the upper and lower retainers and grommets are refitted on the links. If it is necessary to remove the links, simply unbolt them from the axle brackets. **Note:** *Some models use a swivel joint at the end of the stabiliser bar. These units are serviced in a similar manner, but the joint itself must be inspected for deterioration like a tie-rod end would be.*

3 Remove the retaining bolts from the sta-



2.3 To disconnect the stabiliser bar from the axle housing, remove the bush clamp bolts (arrows); inspect the rubber bushes and renew them if they're hard, cracked or otherwise deformed

biliser bar bush clamps and detach the bar from the vehicle **(see illustration).**

4 Pull the bushes off the stabiliser bar and inspect them for cracks, hardness and other signs of deterioration. If the bushes are damaged, renew them. Inspect the bushes in the lower ends of the links, renewing them if necessary.

Refitting

5 Position the stabiliser bar bushes on the bar.

6 Push the brackets over the bushes and raise the bar up to the frame. Refit the bracket bolts but don't tighten them completely at this time.

7 Refit the stabiliser bar end links (or joints) in the reverse order of removal. Tighten the nuts to the torque listed in this Chapter's Specifications.

8 Tighten the bracket bolts to the torque listed in this Chapter's Specifications.

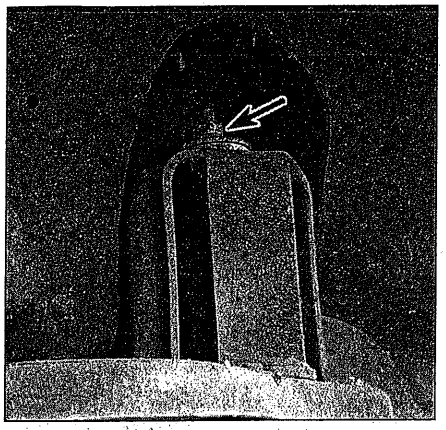
3 Shock absorbers (front and rear) - removal and refitting

Removal

Refer to illustrations 3.2a, 3.2b, 3.2c and 3.2d

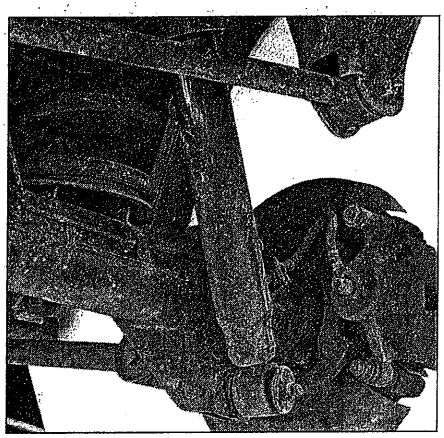
1 Loosen the wheel lug nuts, raise the vehicle and support it securely on jackstands. It will be necessary to place the jackstands under the axle housing in order to let the vehicle rest at normal ride height. Apply the parking brake. Remove the wheel.

2 Remove the upper shock absorber nuts or bolts **(see illustrations).** On stud mounted shock absorbers, use an open end spanner to keep the stem from turning. If the nut won't loosen because of rust, apply some penetrating oil on the stud threads and allow it to soak in for awhile. It may be necessary to keep the stud from turning with a pair of locking pliers, since the flats provided for a spanner are quite small.



3.2a Upper shock coil spring models (arrow)

3.2b Lower front shock mount for coil spring-equipped vehicles



3.2c All models use a conventional stud and nut for the lower rear shock absorber mount

3.2d The upper rear shock absorber is mounted directly to the frame rail with a nut and bolt

3 Remove the lower shock mount nuts or bolts and pull the shock absorber out from the wheel well.

Refitting

4 Follow the mounting instructions according to the manufacturer. If you're renewing the old shocks with gas filled shock absorbers, do not cut the retaining strap on the new shock until the top of the shock has been firmly mounted.

5 Move the shock absorber back-and-forth to ensure the grommets are centred in the mounts. Tighten the nut loosely, then guide the lower end into position.

6 Release the retaining strap (if equipped).

7 Refit the lower mounting bolts or nuts and tighten the fasteners to the torques listed in this Chapter's Specifications.

4 Leaf springs and bushes - removal and refitting

Bush - check and renewal

1 All leaf springs are fitted with a two piece bush that is pressed into each spring eye. The bushes should be inspected for cracks, damage and looseness indicating excessive wear. To check for wear, jack up the frame until the weight is removed from the spring bush. Prise the spring eye up and down with a long bar to check for movement. If there is considerable movement, the bush is worn and should be renewed.

2 The leaf spring bushes have a two piece design and can be removed by inserting a screwdriver into the inner diameter of the bush half and pushing outward. If the bushes won't loosen because of dirt and rust, apply some penetrating oil between the spring eye and bush and allow it to soak in for awhile.

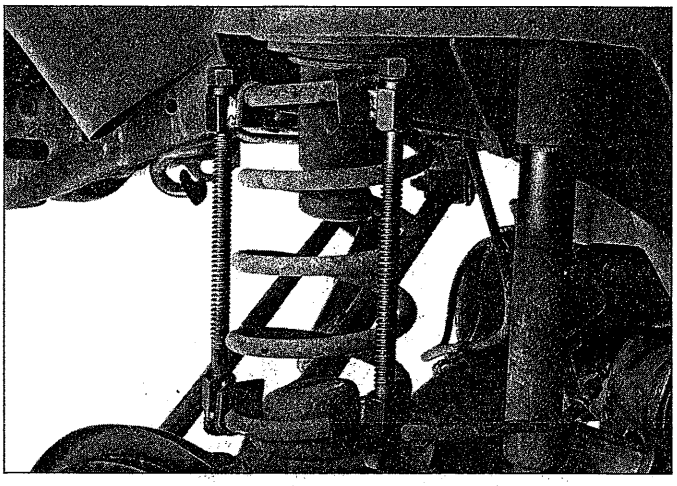
3 Coat the inside of the spring eye with a thin layer of chassis grease and press the new bush into position.

Spring

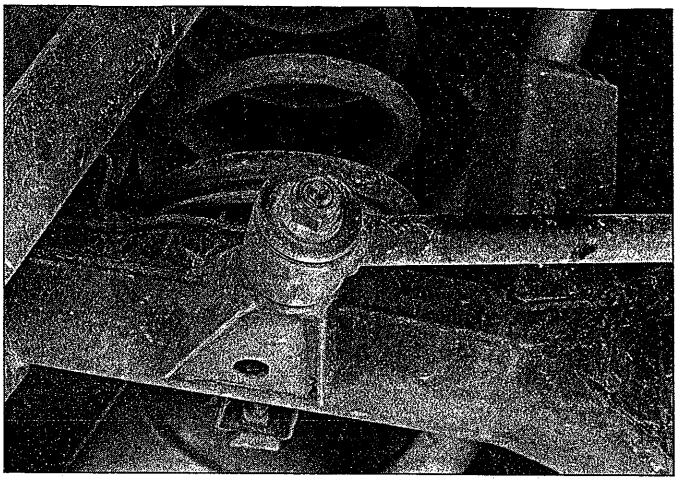
Removal

Note: *This procedure applies to both the front and rear leaf spring assemblies. We recommend that you do one side at a time, to keep the axle under control and so you'll have one side to use as a "guide" to reassembly.*

4 Loosen the front or rear wheel lug nuts, raise the front or rear of the vehicle and support it securely on jackstands. Position the jackstands under the chassis in order to allow the springs to extend. Remove the wheel.



5.5 Compress the coil spring evenly until it can be removed. The bump stop inside the spring has to be disconnected and dropped inside the spring first



6.3 Remove the retaining nut and bolt securing the lower end of the Panhard bar to the rear axle housing

5 Position a floor jack under the axle and raise the jack just enough to support the weight of the axle.
6 Remove the lower shock mounting fasteners (see Section 3) and move the shock absorber aside.
7 Unscrew the U-bolt nuts, then remove the spring tie plate and the U-bolts from the axle.
8 Remove the spring-to-shackle bolt.
9 Remove the spring eye-to-frame bracket bolt and remove the spring from the vehicle.

Refitting

10 Refitting is the reverse of the removal procedure. Be sure to tighten the spring mounting bolts and the spring tie plate U-bolt nuts to the torques listed in this Chapter's Specifications. The U-bolt nuts must be tightened gradually to avoid distorting the hardware. **Note:** *The vehicle must be sitting at normal ride height before tightening the front and rear spring mounting bolts. Normal ride height can be attained by supporting the vehicle with a floor jack under the axle housing.*

5 Coil springs - removal and refitting

Front

Refer to illustration 5.5

Caution: *This procedure requires a special coil spring compressor tool available at most auto part stores. Attempts to perform this procedure without the spring compressor tool may result in personal injury.*

1 Loosen the front wheel lug nuts, raise the front of the vehicle and support it securely on jackstands. The jackstands must be positioned under the chassis, not the axle. Remove the wheels.
2 Remove the cover from above the axle bump stop.
3 Remove the nut from the bump stop stud and allow the stop to fall to the base of the spring.
4 Obtain a coil spring compressor.
5 Refit the spring compressor and compress the coil spring **(see illustration)**.
6 Remove the coil spring from the vehicle.
7 Check the spring for deep nicks and corrosion, which will cause premature failure of the spring. Renew the spring if these or any other questionable conditions are evident.
8 Refit the spring compressor tool and compress the new coil spring. Place the bump stop into the spring. Insert the upper end of the coil spring and align the lower spring end with the stop in the lower spring seat.
9 The remainder of the refitting is the reverse of removal. Tighten all fasteners to the torque listed in this Chapter's Specifications.

Rear

10 Loosen the rear wheel lug nuts, raise the rear of the vehicle and support it securely on jackstands. Place the jackstands under the chassis, not the axle. Remove the wheels.
11 Support the axle assembly with a floor jack under the differential.
12 Unbolt the stabiliser bar and the shock absorbers from the rear axle housing (see Sections 2 and 3).
13 Disconnect the rear axle housing breather hose.
14 Slowly lower the axle assembly until the coil springs are almost fully extended. Grasp the lower end of the spring and remove the spring from the vehicle. **Caution:** *Be careful not to rupture the rear brake hose.*
15 Check the spring for deep nicks and corrosion, which will cause premature failure of the spring. Renew the spring if these or any other questionable conditions are evident.
16 Refitting is the reverse of removal. Make sure the coil spring is properly seated. Tighten all fasteners to the torque listed in this Chapter's Specifications.

6 Panhard bar (coil spring models) - removal and refitting

Refer to illustration 6.3

Note: *This procedure applies to front and rear bars.*

1 Raise the front or rear of the vehicle and support it securely on jackstands.
2 Remove the retaining nut and bolt from the frame rail bracket. **Note:** *Some models have the steering damper connected to the Panhard rod. On these models, disconnect the steering damper from the Panhard rod and tie it out of the way with wire before removing any other bolts.*
3 Remove the retaining nut and bolt from the axle tube bracket **(see illustration)**.
4 Remove the Panhard bar.
5 Refitting is the reverse of removal. Be sure to tighten the fasteners to the torque listed in this Chapter's Specifications. **Note:** *The vehicle must be sitting at normal ride height before tightening the mounting fasteners.*

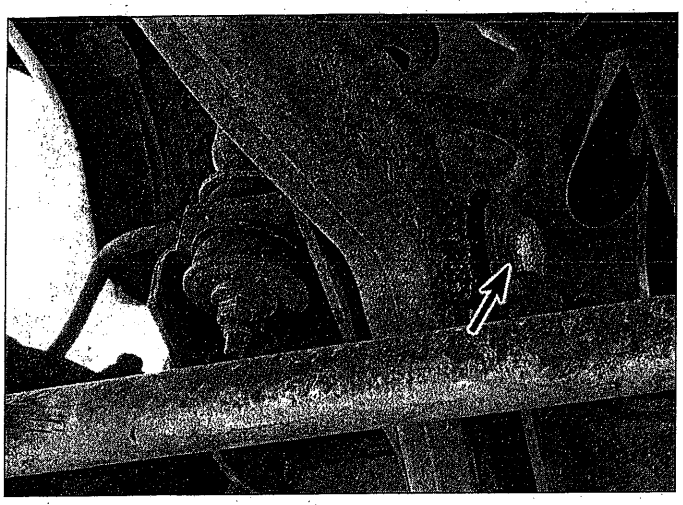
7 Suspension arms (coil spring models) - removal and refitting

Note: *Remove and refit only one suspension arm at a time to avoid the possibility of the axle housing shifting out of position, which would make reassembly much more difficult. If it is absolutely necessary to remove more than one at a time, support the axle with a floor jack.*

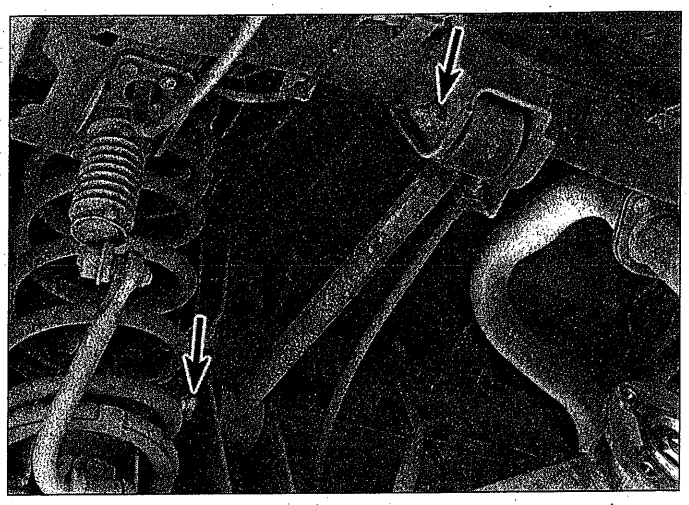
Front

Refer to illustration 7.7

1 Raise the front of the vehicle and support it securely on jackstands. Place the jackstands under the chassis.
2 Remove the wheel.
3 Support the axle assembly with either a floor jack under the differential or, preferably, two jacks, one at each end of the axle (the latter option provides better balance).



7.7 To remove the front suspension arm, detach the nuts and bolts from the axle housing bracket (arrow)



7.13a To remove the upper rear suspension arm, detach the nuts and bolts (arrows) from the axle housing bracket and the frame bracket

4 Disconnect the stabiliser bar from the arm if the vehicle is equipped with one.
5 Disconnect the tie-rod from the knuckle (refer to Section 10).
6 Remove the retaining nut from the frame rail bracket. Remove the washer and bush.
7 Remove the retaining nuts and bolts from the axle housing **(see illustration)**.
8 Remove the front suspension arm. If it is difficult to remove the suspension arm, use the jack to take weight from the suspension arm and drive the bolts out using a brass drift with a hammer.
9 Inspect the bush in the suspension arm for cracking, hardness and general deterioration. If it is in need of renewal, take the arm to a dealer service department or an automotive machine shop to have it renewed. Because of the hydraulic press and adapters required for this job, it is difficult to do at home.
10 Refitting is the reverse of removal. Be sure to tighten the fasteners to the torque listed in this Chapter's Specifications. **Note:** *The vehicle must be sitting at normal ride height before tightening the mounting fasteners.*

Rear

Refer to illustrations 7.13a, 7.13b and 7.13c

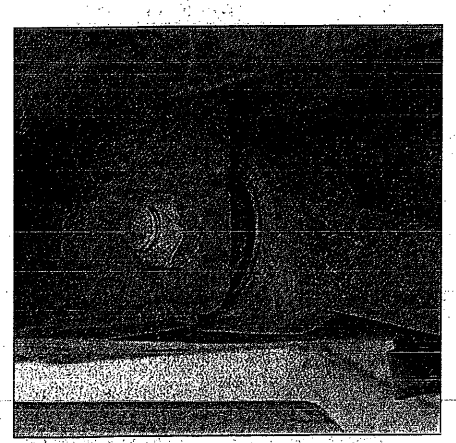
11 Raise the rear of the vehicle and support it securely on jackstands.
12 Support the axle assembly with either a floor jack under the differential or, preferably, two jacks, one at each end of the axle (the latter option provides better balance).
13 Remove the nuts and bolts securing the suspension arm to the axle housing bracket and to the frame bracket **(see illustrations)**. Remove the suspension arm from the vehicle.
14 Inspect the bush in the suspension arm for cracking, hardness and general deterioration. If it is in need of renewal, take it to a dealer service department or an automotive machine shop to have it renewed. Because of the hydraulic press and adapters required for this job, it is difficult to do at home.
15 Refitting is the reverse of removal. Be sure to tighten the fasteners to the torque listed in this Chapter's Specifications. **Note:** *The vehicle must be sitting at normal ride height before tightening the mounting fasteners.*

8 Rear stabiliser release - removal, refitting and adjustment

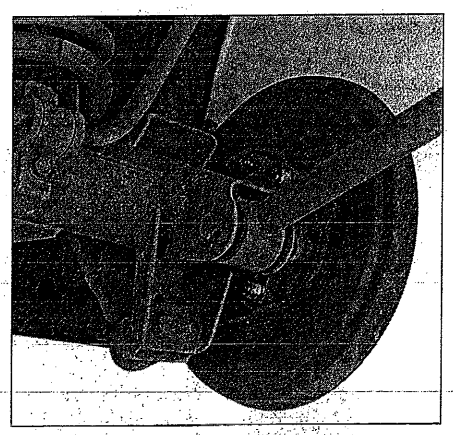
Refer to illustration 8.3

Note: *This device is fitted to some coil spring suspension models for use at slow speeds over very rough terrain.*

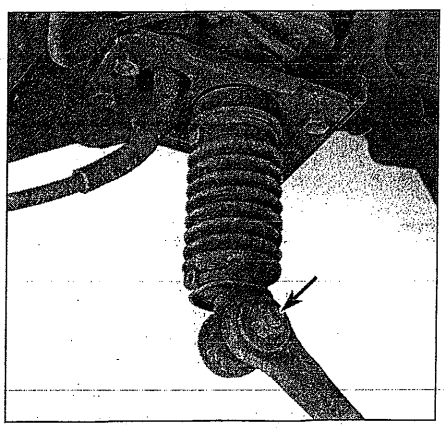
1 Raise the vehicle and support it securely with jackstands. Place the jackstands under the rear axle housing.
2 Set the operating handle to ENGAGE.
3 Disconnect the stabiliser bar from the link attached to the release assembly **(see illustration)**.
4 Disconnect the operating cables from each other at the cable adjuster.
5 Remove the clamps that secure the rear cable to the chassis and place the cable so it is free of obstructions.
6 Disconnect the wiring from the release unit.
7 Remove the unit from the chassis.
8 Check the cable for signs of damage. Make certain that it locks and unlocks easily. Renew the entire assembly if necessary.



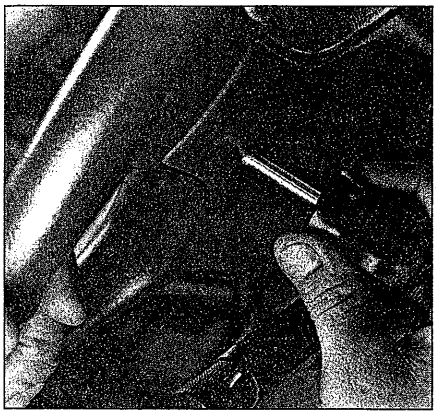
7.13b To remove the lower rear suspension arm, detach the nut and bolt from the frame bracket . . .



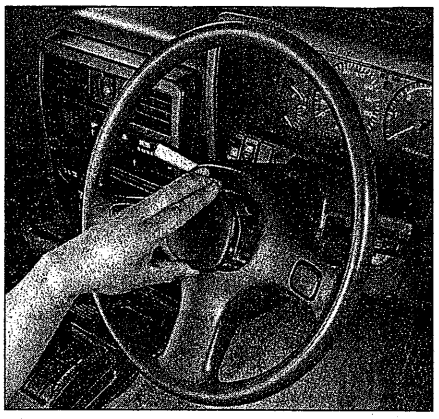
7.13c . . . and the axle housing



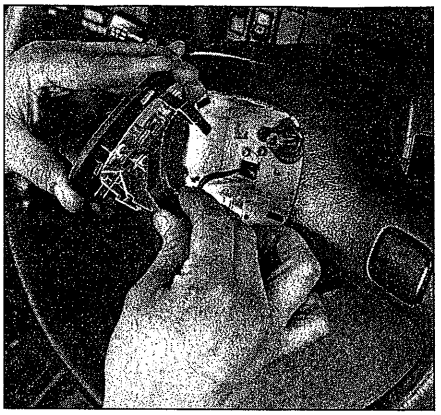
8.3 Disconnect the stabiliser bar from the release assembly at this point (arrow)



9.2 Detach the steering wheel cover retaining screws (on most models) located on the backside of the steering wheel



9.3 Lift the centre cover off



9.4 Disconnect the wiring. Make sure that the negative battery cable has been disconnected first

9 Refitting is the reverse of removal.

10 Assemble the cable together at the adjuster. Adjust the cable length so that the dash handle has less than 1 mm of freeplay.

9 Steering wheel - removal and refitting

Removal

Refer to illustrations 9.2, 9.3, 9.4, 9.5 and 9.6

1 Park the vehicle with the wheels pointing straight ahead. Disconnect the cable from the negative terminal of the battery.

2 Remove the screws securing the steering wheel centre cover from the back of the steering wheel, if equipped **(see illustration)**.

3 On some models, the cover has no screws. In this case, simply use a small screwdriver to prise it free. Lift the cover off **(see illustration)**.

4 Disconnect the wiring **(see illustration)**.

5 Remove the steering wheel retaining nut, then mark the relationship of the steering shaft to the hub (if marks don't already exist or don't line up) to simplify refitting and ensure steering wheel alignment **(see illustration)**.

6 Use a puller to detach the steering wheel from the shaft **(see illustration)**. Don't hammer on the shaft to dislodge the steering wheel.

Refitting

7 To refit the wheel, align the mark on the steering wheel hub with the mark on the shaft and slip the wheel onto the shaft. Refit the nut and tighten it to the torque listed in this Chapter's Specifications.

8 Plug in the electrical connectors and refit the steering wheel pad.

9 Connect the negative battery cable.

10 Steering linkage - inspection, removal and refitting

Inspection

1 The steering linkage connects the steering gear to the front wheels and keeps the wheels in proper relation to each other. The Pitman arm, fastened to the steering gear shaft, moves the relay rod back and forth. The back-and-forth motion of the relay rod is transmitted directly to the steering knuckle on hardtop and wagon models. On utility and cab chassis models, there is also a relay arm unit which acts as a support for a shorter relay rod. It transmits the action to the drag link, which operates the steering knuckle.

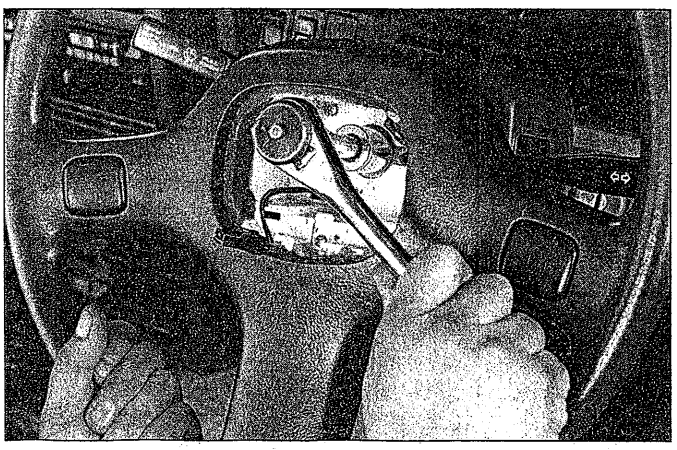
2 A tie-rod assembly connects the steering knuckles of each wheel together. The tie-rod is made up of a tube, clamps and two tie-rod ends. A steering damper reduces shimmy and unwanted forces to the steering gear.

3 Set the wheels in the straight ahead position and lock the steering wheel.

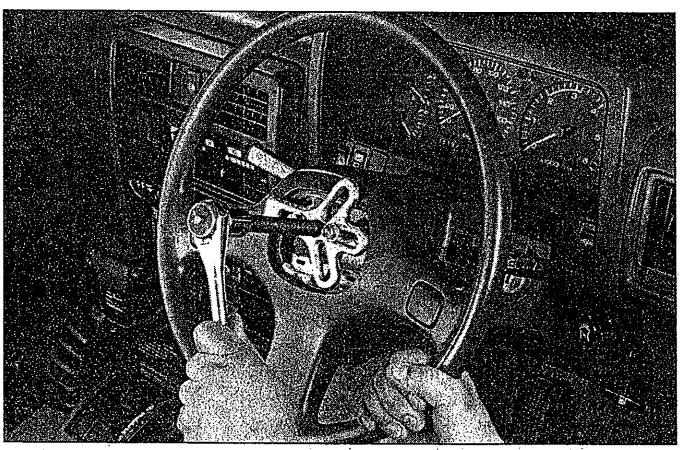
4 Raise one side of the vehicle until the tyre is slightly off the pavement.

5 Mount a dial indicator with the needle resting on the outside edge of the wheel. Grasp the front and rear of the tyre and using light force, wiggle the wheel back-and-forth and note the dial indicator reading. The gauge reading should be less than 5 mm. If the play in the steering system is more than specified, inspect each steering linkage pivot point and ball stud for looseness and renew parts if necessary.

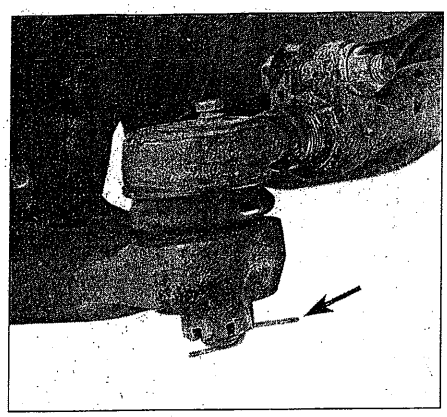
6 Raise the vehicle and support it on jackstands. Check for torn ball stud boots, seized joints and bent or damaged linkage components.



9.5 Remove the nut and then mark the shaft and the steering wheel so they can be reassembled in exactly the same position



9.6 It is necessary to use a puller for this operation. Do not attempt to hammer the steering wheel off



10.8 Use a pair of needle nose pliers to remove the split pin from the tie rod end castle nut (arrow)

Removal and refitting

Tie-rod ends

Refer to illustration 10.8

7 Loosen the wheel lug nuts, raise the vehicle and support it securely on jackstands. Apply the parking brake. Remove the wheels.

8 Remove the split pin and loosen, but do not remove, the castle nut from the ball stud **(see illustration)**.

9 Using a small puller, separate the ball stud from the steering knuckle. Remove the castle nut and pull the tie-rod end from the steering knuckle. **Caution:** *The use of a fork-separator-type balljoint separator will most likely cause damage to the balljoint boot.*

10 If a tie-rod end must be renewed, count the number of threads showing and jot down this number to maintain correct toe-in during reassembly. Loosen the adjuster tube clamp and unscrew the tie-rod end.

11 Lubricate the threaded portion of the tie-rod end with chassis grease. Screw the new tie-rod end into the adjuster tube and adjust the distance from the tube to the ball stud by threading the tie-rod into the adjuster tube until the same number of threads are showing as before (the number of threads showing on both side of the adjuster tube should be within three threads of each other). Don't tighten the adjuster tube clamps yet.

12 To refit the tie-rod end, insert the tie-rod end ball stud into the steering knuckle. Make sure the ball stud is fully seated. Refit the nut and tighten it to the torque listed in this Chapter's Specifications. If a ball stud spins when attempting to tighten the nut, force it into the tapered hole with a large pair of pliers.

13 Refit new split pins. If necessary, tighten the nut slightly more to align a slot in the nut with the hole in the ball stud. **Note:** *DO NOT loosen the castle nut to align the split pin hole.*

14 Tighten the adjuster tube clamp nuts.

15 Refit the wheels and lug nuts, lower the vehicle and tighten the lug nuts to the torque listed in the Chapter 1 Specifications. Drive the vehicle to an alignment shop to have the front end toe-in alignment checked and, if necessary, adjusted.

10.18a It is best to use a two-jaw puller to release all linkage ends. If such a tool is not available, use a "picklefork" type separator, but realise that the rubber boot on the end of the fitting will be damaged. If neither tool is available, try striking the side of the joint sharply with a hammer, just below the nut (not on the swiveling part)

Relay rod

Refer to illustrations 10.18a and 10.18b

16 Raise the front of the vehicle and support it securely on jackstands. Apply the parking brake. Remove the left wheel.

17 Remove the steering damper (refer to Steps 31 through 35).

18 Separate the relay rod ends from the Pitman arm and the steering knuckle using the same technique described in Steps 7 and 8 **(see illustrations)**.

19 If the ends are in need of renewal, the entire rod must be renewed.

20 Refitting is the reverse of the removal procedure. If the ball studs spin when attempting to tighten the nuts, force them into the tapered holes with a large pair of pliers. Be sure to tighten all fasteners to the torque listed in this Chapter's Specifications.

Relay arm and drag link (utility and cab chassis models)

21 The drag link is removed using the same method as used for the relay rod, except that there is no need to remove the steering damper. Refer to Steps 15 through 19.

22 To remove the relay arm, first raise the vehicle and support it securely with jackstands.

23 Disconnect both ball studs from the relay arm (refer to Steps 7 and 8).

24 Disconnect the steering damper, if it connects to the relay arm on your model.

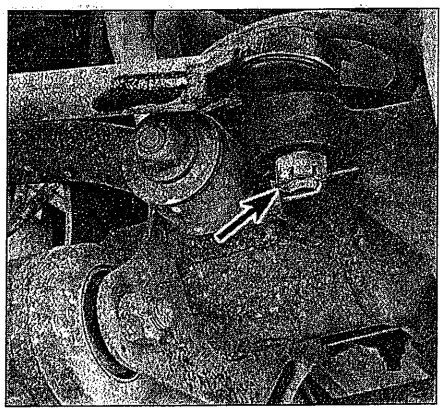
25 Unbolt the relay arm assembly and remove it from the vehicle.

26 Refitting is the reverse of removal. **Note:** *The relay arm is rebuildable, however it is not a practical job for the home workshop. Obtain a new or factory rebuilt unit if your relay arm has excessive freeplay, cracks or is binding.*

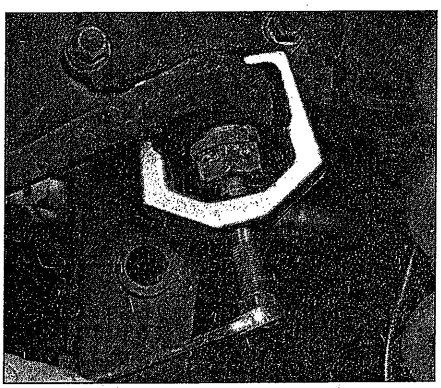
Pitman arm

Refer to illustration 10.29

27 Disconnect the relay rod from the Pitman arm (see above).



10.18b The opposite end of the relay rod attaches to the steering knuckle at this point (arrow)



10.29 Use a Pitman arm puller to detach the Pitman arm - notice the nut has been loosened but not removed; this will prevent the components from separating violently

28 Loosen - but don't remove - the Pitman arm retaining nut. Mark the relationship of the Pitman arm to the steering shaft with a small dab of paint.

29 Refit a Pitman arm removal tool and pull off the Pitman arm **(see illustration)**.

30 Remove the Pitman arm retaining nut and remove the Pitman arm.

31 Refitting is the reverse of removal. Make sure the marks you made before removal are aligned when refitting the Pitman arm.

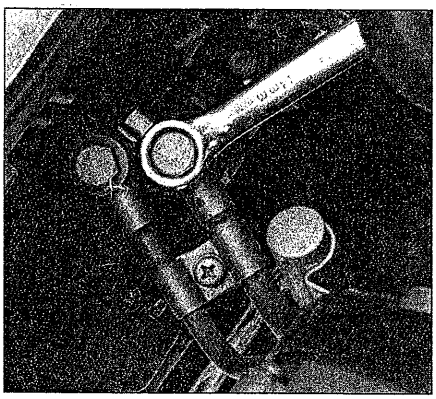
Steering damper

32 Raise the vehicle and support it securely with jackstands.

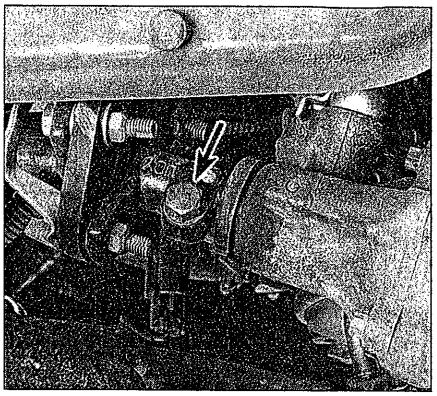
33 Remove the nuts and washers securing the steering damper at each end. On some models, it will be necessary to hold the shaft of the damper near the end with pliers while loosening the nut. **Note:** *There are several mounting points used for various years and models. The damper may be connected to the relay rod, Panhard rod or the chassis.*

34 Remove the steering damper from the vehicle. Keep the washers and bushes in order and facing the proper directions for reassembly.

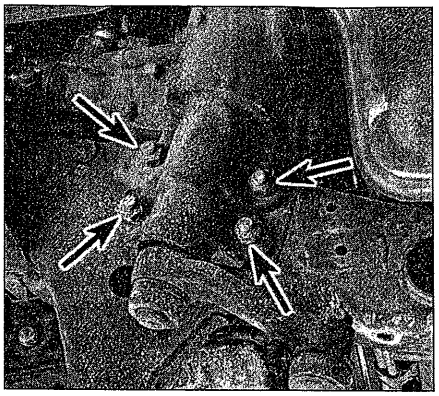
35 Operate the damper by hand. It should



11.2 Loosen these fittings and disconnect the power steering fluid lines from the steering gearbox



11.3 Mark the relationship of the flex joint to the steering gear input shaft and loosen the pinch bolt (arrow)



11.5 The steering gear is mounted to the frame rail with four bolts (arrows)

have a smooth resistance throughout its stroke. If there is any obvious damage or if the resistance is not firm and even, renew it.

36 Refitting is the reverse of removal.

11 Steering gear - removal and refitting

Caution: *Make sure the steering shaft is not turned while the steering gear is removed. One way to prevent the shaft from turning is to place the ignition key in the LOCK position.*

Removal

Refer to illustrations 11.2, 11.3 and 11.5

1 Raise the front of the vehicle and support it securely on jackstands. Apply the parking brake. Point the wheels straight ahead.

2 Place a drain pan under the steering gear. Disconnect the power steering line fittings and cap the ends to prevent excessive fluid loss and contamination **(see illustration)**.

3 Mark the relationship of the steering gear shaft to the flexible coupling with paint. Remove the shaft lower pinch bolt **(see illustration)**. **Note:** *Slightly spread the pinch coupling to ease removal of the shaft.*

4 Mark the position of the Pitman arm to the shaft with paint. Remove the Pitman arm nut and washer, then remove the Pitman arm (see Section 10). It is not necessary to disconnect the relay rod from the Pitman arm.

5 Support the steering gear and remove the mounting bolts **(see illustration)**. Lower the unit slightly, separate the intermediate steering shaft and flexible coupling from the steering gear input shaft and remove the steering gear from the vehicle.

Refitting

6 Raise the steering gear into position and connect the flexible coupling, aligning the marks.

7 Refit the mounting bolts and washers and tighten them to the torque listed in this Chapter's Specifications.

8 Slide the Pitman arm onto the shaft. Make sure the marks previously made are aligned. Refit the washer and nut and tighten the nut to the torque listed in this Chapter's Specifications.

9 Refit the intermediate shaft lower pinch bolt and tighten it to the torque listed in this Chapter's Specifications.

10 Connect the power steering hoses/lines to the steering gear using new copper washers. Fill the power steering pump reservoir with the recommended fluid (see Chapter 1).

11 Lower the vehicle and bleed the steering system (see Section 13).

12 Power steering pump - removal and refitting

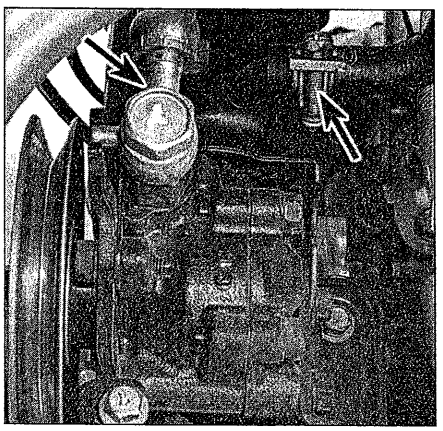
Refer to illustrations 12.3, 12.4a and 12.4b

1 Disconnect the negative battery cable.

2 Loosen the pump adjuster and slip the belt over the pulley (see Chapter 1).

3 Using a suction gun, withdraw as much power steering fluid from the reservoir as possible. Position a drain pan under the pump and disconnect the high pressure line and fluid return hose **(see illustration)**. Cap the ends of the lines to prevent excessive fluid leakage and the entry of contaminants.

4 Remove the adjusting and mounting bolts **(see illustrations)**. Remove the pump from the vehicle.

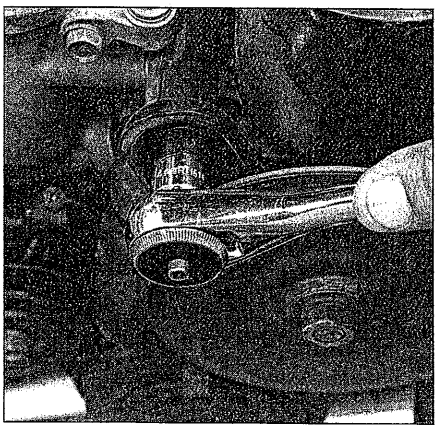


12.3 Remove the power steering pump pressure line and return hose connections (arrows) after placing a drain pan under the assembly

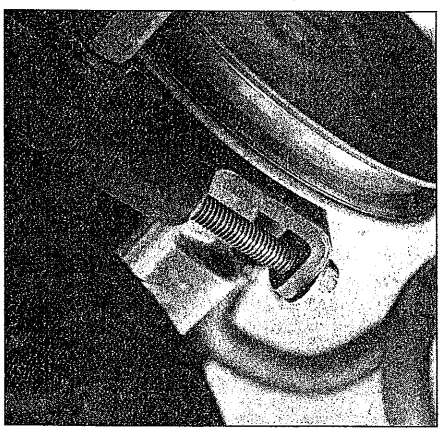
5 Refitting of the power steering pump is the reverse of the removal procedure. Renew the copper washers at the high pressure hose connection. Check the condition of the return hose clamp and renew it if necessary.

6 Adjust the belt tension (refer to Chapter 1).

7 Add the proper amount of the correct fluid and bleed the power steering system following the procedure in Section 13.



12.4a Remove the mounting bolts . . .



12.4b . . . and the adjuster bolts from the power steering pump

10

13 Power steering 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 all air and obtain proper steering performance.

2 With the front wheels in the straight ahead position, check the power steering fluid level and, if low, add fluid until it reaches the Cold (C) mark on the dipstick.

3 Start the engine and allow it to run at fast idle. Recheck the fluid level and add more if necessary to reach the Cold (C) mark on the dipstick.

4 Bleed the system by turning the wheels from side-to-side. Do not hold the steering wheel against the stops for more than a few seconds at a time. This will work the air out of the system. Keep the reservoir full of fluid as this is done.

5 When the air is worked out of the system, return the wheels to the straight ahead position and leave the vehicle running for several more minutes before shutting it off.

6 Road test the vehicle to be sure the steering system is functioning normally and noise-free.

7 Recheck the fluid level to be sure it is up to the Hot (H) mark on the dipstick while the engine is at normal operating temperature. Add fluid if necessary (see Chapter 1).

14 Wheels and tyres - general information

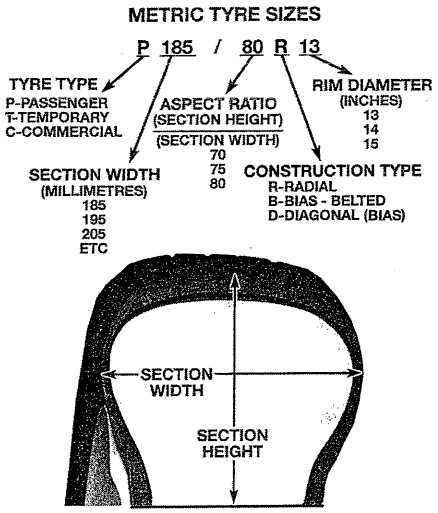
Refer to illustration 14.1

Most vehicles covered by this manual are equipped with metric-sized fiberglass or steel-belted radial tyres **(see illustration)**. Use of other size or type of tyres may affect the ride and handling of the vehicle. Don't mix different types of tyres, such as radials and bias belted, on the same vehicle as handling may be seriously affected. It is recommended that tyres be renewed in pairs on the same axle, but if only one tyre is being renewed, be sure it's the same size, structure and tread design as the other.

Because tyre pressure has a substantial effect on handling and wear, the pressure on all tyres should be checked at least once a month or before any extended trips (see Chapter 1).

Wheels must be renewed if they are bent, dented, leak air, have elongated bolt holes, are heavily rusted, out of vertical symmetry or if the lug nuts won't stay tight. Wheel repairs that use welding or peening are not recommended.

Tyre and wheel balance is important to the overall handling, braking and performance of the vehicle. Unbalanced wheels can adversely affect handling and ride characteristics as well as tyre life. Whenever a tyre is refitted on a wheel, the tyre and wheel should be balanced by a shop with the proper equipment.



14.1 Metric tyre size code

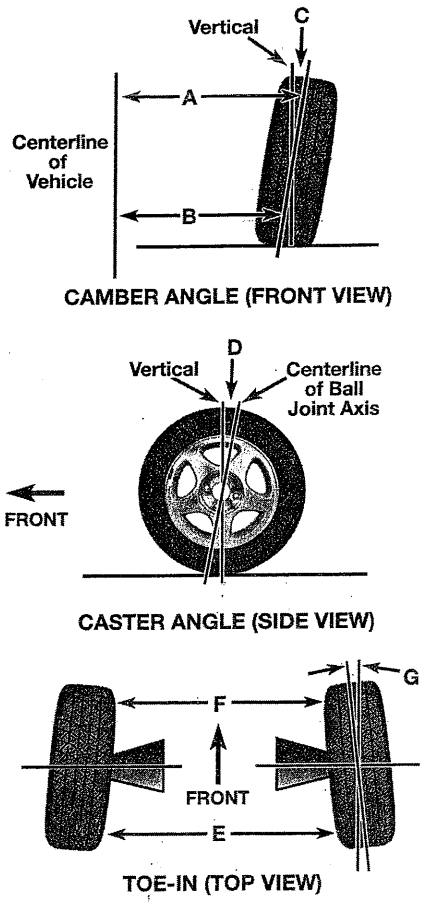
15 Front end alignment - general information

Refer to illustration 15.3

A front end alignment refers to the adjustments made to the front wheels so they are in proper angular relationship to the suspension and the ground. Front wheels that are out of proper alignment not only affect steering control, but also increase tyre wear. The only front end adjustments normally done on these vehicles are caster and toe-in.

Getting the proper front wheel alignment is a very exacting process, one in which complicated and expensive machines are necessary to perform the job properly. Because of this, you should have a technician with the proper equipment perform these tasks. We will, however, use this space to give you a basic idea of what is involved with front end alignment so you can better understand the process and deal intelligently with the shop that does the work.

Toe-in is the turning in of the front wheels **(see illustration)**. The purpose of a toe specification is to ensure near-parallel rolling of the front wheels without wandering. In a vehicle with zero toe-in, the distance between the front edges of the wheels will be the same as the distance between the rear edges of the wheels. The actual amount of toe-in is normally zero to two millimetres (with radial tyres). Toe-in adjustment is controlled by the tie-rod end positions on the tie-rod. Incorrect toe-in will cause the tyres to wear improperly by making them scrub against the road surface.



15.3 Front end alignment details

A minus B = C *(degrees camber)*
D = caster *(measured in degrees)*
E minus F = toe-in *(measured in inches or millimetres)*
G = toe-in *(expressed in degrees)*

Caster is the tilting of the top of the front steering axis from the vertical. A tilt toward the rear is positive caster and a tilt toward the front is negative caster. If this angle isn't correct on leaf spring suspensions, it can be adjusted by adding caster adjusting shims between the axle and the leaf springs. Normal settings vary between two and three degrees positive.

Camber (the tilting of the front wheels from vertical when viewed from the front of the vehicle) is factory present at zero degrees and is not adjusted. If the camber angle isn't correct, the components causing the problem must be renewed. **Caution:** *Never attempt to adjust the camber angle by heating or bending the axle or any other suspension component!*