Chapter 1 Tune-up and routine maintenance

Contents

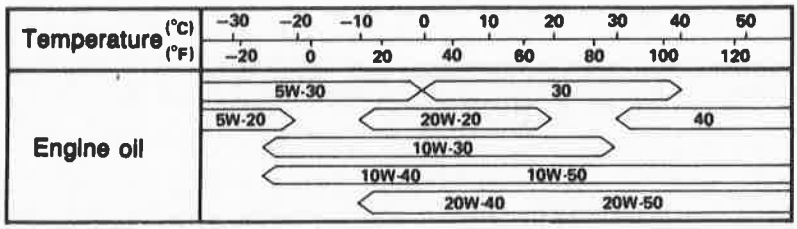
Specifications

Recommended lubricants and fluids

Note: *Listed here are the manufacturer recommendations at the time this manual was written. Manufacturers occasionally upgrade their fluid and lubricant specifications, so check with your local auto parts store for current recommendations.*

Engine oil type	SF, SF/CC or SF/CD
Engine oil viscosity	See accompanying chart
Automatic transmission fluid type*	
1972 thru 1986	ATF type F automatic transmission fluid
1987 on	Dexron II automatic transmission fluid

*Correct fluid type is printed on the dipstick



ENGINE OIL VISCOSITY

86 Miscellaneous noises

1 Improper tire pressures.
2 Insufficiently lubricated balljoint or steering linkage.
3 Loose or worn steering gear, steering linkage or suspension components.
4 Defective shock absorber.
5 Defective wheel bearing.
6 Worn or damaged upper or lower link or tension rod bushing.
7 Damaged leaf spring.
8 Loose wheel lug nuts.
9 Worn or damaged rear axleshaft spline.
10 Worn or damaged rear shock absorber mounting bushing.
11 Incorrect rear axle end play.
12 See also causes of noises at the rear axle and driveshaft.
13 Worn or damaged driveaxle joints (4WD models).

87 Excessive tire wear (not specific to one area)

1 Incorrect tire pressures.
2 Tires out of balance. Have them balanced on the vehicle.
3 Wheels damaged. Inspect and replace as necessary.
4 Suspension or steering components worn (Chapter 1).

88 Excessive tire wear on outside edge

1 Incorrect tire pressure.
2 Excessive speed in turns.
3 Front end alignment incorrect (excessive toe-in).

89 Excessive tire wear on inside edge

1 Incorrect tire pressure.
2 Front end alignment incorrect (toe-out).
3 Loose or damaged steering components (Chapter 1).

90 Tire tread worn in one place

1 Tires out of balance. Have them balanced on the vehicle.
2 Damaged or buckled wheel. Inspect and replace if necessary.
3 Defective tire.

Manual transmission lubricant type	API GL-4 SAE 75W90W or 80W90W gear oil
Differential lubricant type	API GL-5 SAE 80W90W hypoid gear oil
Brake fluid type	DOT 3 brake fluid
Clutch fluid type	DOT 3 brake fluid
Power steering system fluid	ATF type F automatic transmission fluid
Steering gear box oil	API GL-4 SAE 90W
Transfer case lubricant type	API GL-4 or GL-5 SAE 80W or 90W gear oil
Suspension and steering balljoint grease	NLGI No. 1 or 2 molybdenum-disulfide lithium base grease
Driveshaft	
Slip yokes	Molybdenum-disulfide base, NLGI No. 2
Universal joints	Lithium base multi-purpose, No.1
Steering gear box oil	API GL-4 SAE 90W
Wheel bearing grease	NLG1 No. 2 lithium base multi-purpose grease

Ignition system

Spark plug type and gap*	
1600 and 1800 engines	BPR6ES or equivalent @ 0.032-inch
2000 and 2200 engines	BPR5ES or equivalent @ 0.032-inch
2600 engines	BPR5ES-11 or equivalent @ 0.044-inch
Ignition timing	Refer to the *Emission Control Information* label
Engine firing order	1-3-4-2
Ignition contact point gap	0.020-in (0.5 mm)
Dwell angle	49 to 55-degrees

* Refer to the *Vehicle Emission Control Information* label in the engine compartment and follow the information on the label if it differs from that shown here.

Carburetor

Idle speed	Refer to the *Emission Control Information* label
Idle speed switch voltage	
At idle	12V
Above 1000 to 1200 rpm	Below 1.5V

Cooling system

Drivebelt (fan belt) deflection	
Air pump	
New	0.39 to 0.59 in (10 to 15 mm)
Used	0.59 to 0.70 in (15 to 18 mm)
Alternator	
New	0.28 to 0.32 in (7 to 8 mm)
Used	0.32 to 0.36 in (8 to 9 mm)
Air conditioning compressor	
New	0.39 to 0.47 in (10 to 12 mm)
Used	0.47 to 0.55 in (12 to 14 mm)
Power steering pump	
New	0.32 to 0.39 in (8 to 10 mm)
Used	0.43 to 0.51 in (11 to 13 mm)

Clutch

Clutch pedal free play	0.02 to 0.12 in (0.5 to 3.0 mm)
Clutch pedal height	
1600/1800/2000/2200 engine	8.43 to 8.62 in (214 to 219 mm)
2600 engine	8.82 to 9.02 in (224 to 229 mm)

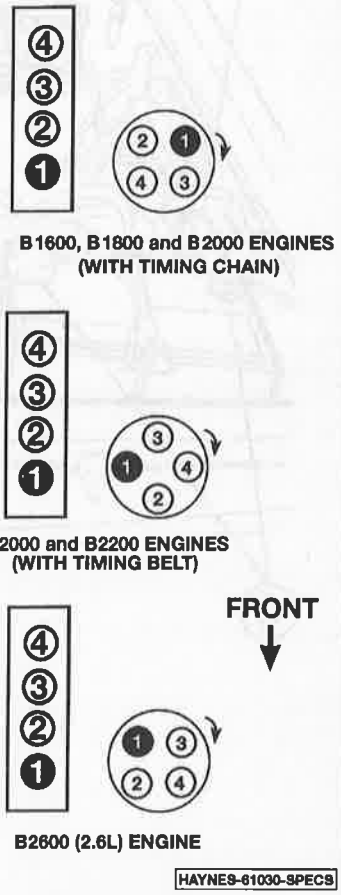
Brakes

Disc brake pad lining thickness (minimum)	0.040 in (1 mm)
Drum brake shoe lining thickness (minimum)	0.040 in (1 mm)
Brake pedal	
Height	8.1 in (205 mm)
Free travel	
1972 through 1979	0.02 to 0.12 in (0.5 to 3.0 mm)
1980 on	0.28 to 0.35 in (7 to 9 mm)

Valve clearances

1600/1800/2000/2200 engine

1972 through 1984	
Valve side	
Intake valve	0.012 in (0.3 mm)
Exhaust valve	0.012 in (0.3 mm)
Cam side	
Intake valve	0.009 in (0.2 mm)
Exhaust valve	0.009 in (0.2 mm)



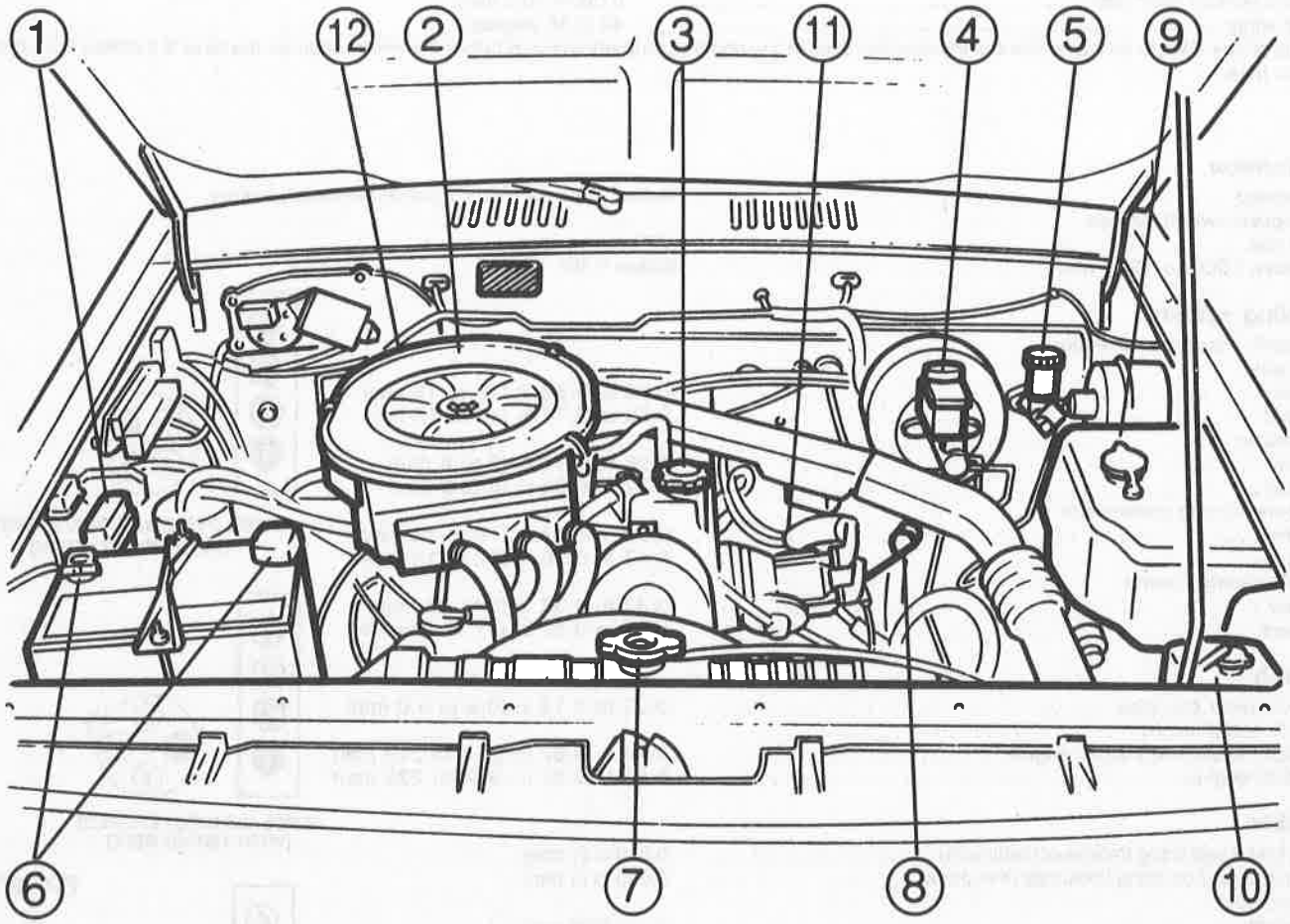
Cylinder location and distributor rotation

1985 through 1987	
Valve side	
Intake valve	0.012 in (0.3 mm)
Exhaust valve	0.012 in (0.3 mm)
Cam side	
Intake valve	0.012 in (0.3 mm)
Exhaust valve	0.012 in (0.3 mm)
1988 and later 2200 engine	Self-adjusting hydraulic lifters

2600 engine

Intake and exhaust valves	Self-adjusting hydraulic lifters
Jet valve (1988 and earlier models)	0.010 in (0.2 mm)

Torque specifications	**Ft-lbs**
Automatic transmission pan bolts	4 to 7
EGR valve bolt	5 to 9
Front wheel bearing nut preload (2WD)	14 to 22



1.1a Typical underhood component layout (2200 engine)

1 Main fuse block
2 Air cleaner
3 Oil filler cap
4 Brake fluid reservoir
5 Clutch fluid reservoir
6 Battery terminals
7 Radiator cap
8 Engine oil dipstick
9 Windshield washer fluid reservoir
10 Engine coolant reservoir
11 Power steering fluid reservoir
12 Automatic transmission fluid dipstick

1 Introduction

This Chapter is designed to help the home mechanic maintain the Mazda pick-up with the goals of maximum performance, economy, safety and reliability in mind.

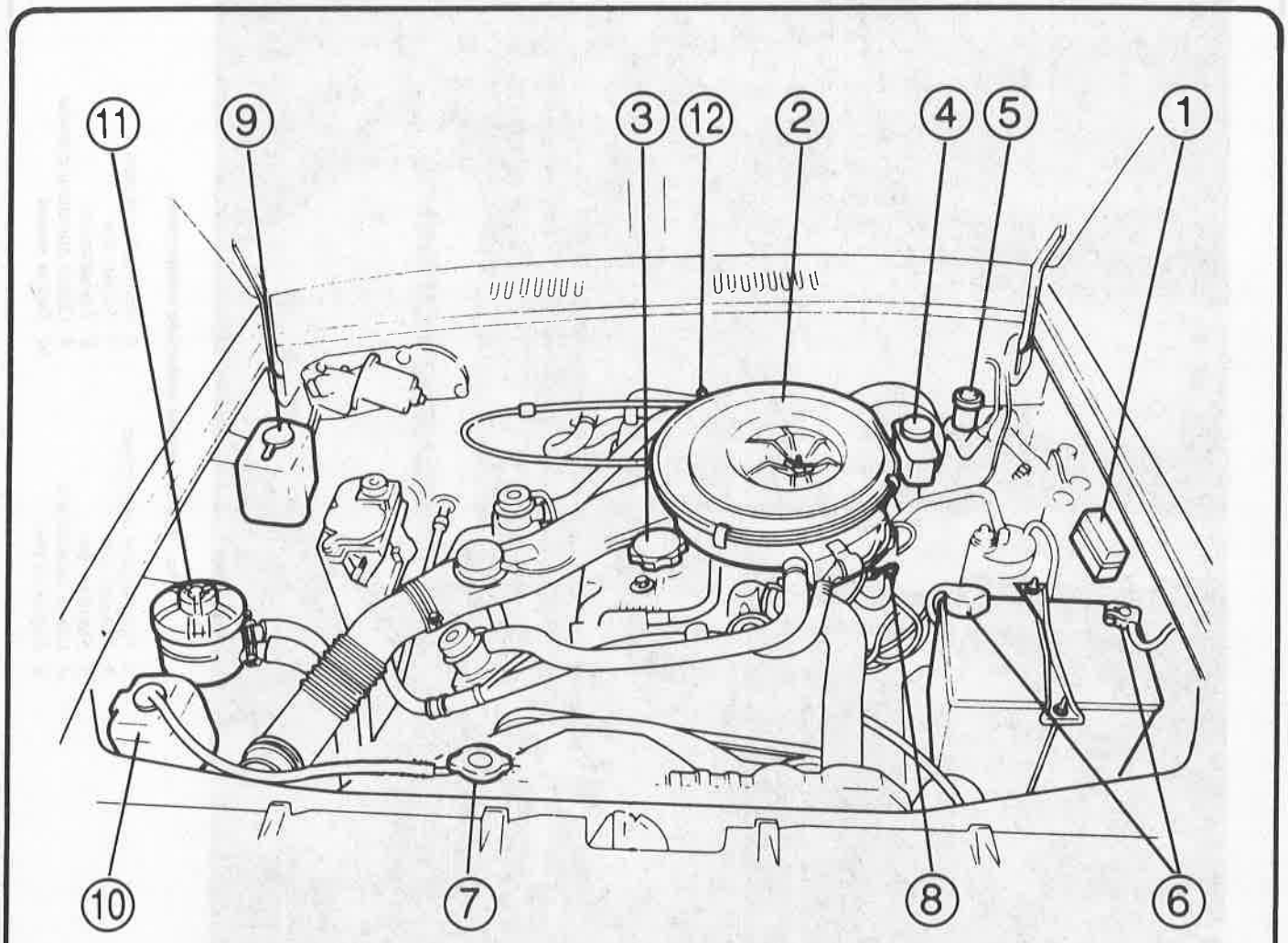
Included is a master maintenance schedule, followed by procedures dealing specifically with each item on the schedule. Visual checks, adjustments, component replacement and other helpful items are included. Refer to the accompanying illustrations of the engine compartment and the underside of the vehicle for the locations of various components.

Servicing your vehicle in accordance with the planned mileage/time maintenance schedule and the step-by-step procedures should result in maximum reliability and extend the life of your vehicle. Keep in mind that it's a comprehensive plan — maintaining some items but not others at the specified intervals will not produce the same results.

As you perform routine maintenance procedures, you'll find that many can, and should, be grouped together because of the nature of the procedures or because of the proximity of two otherwise unrelated components or systems.

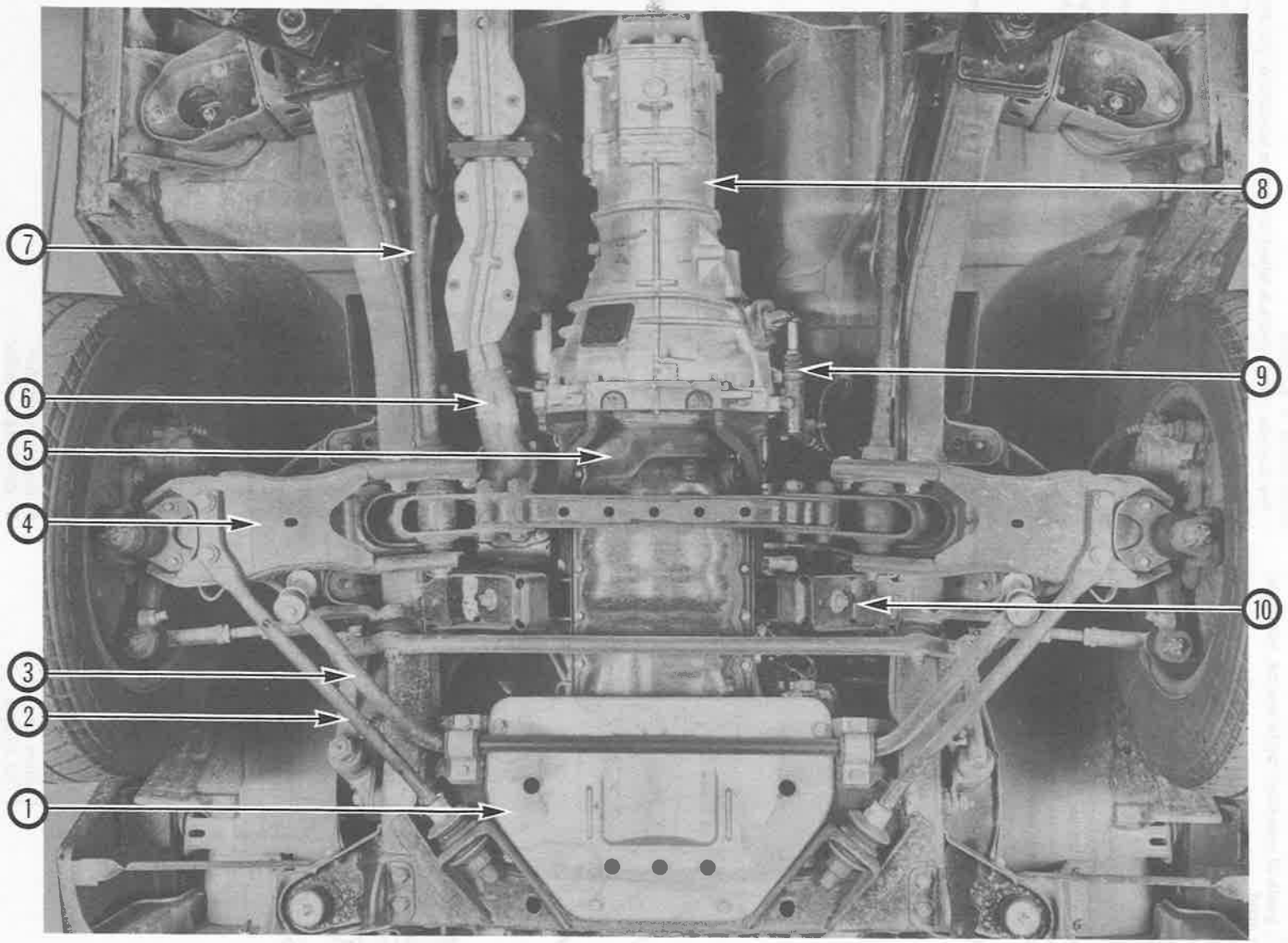
For example, if the vehicle is raised for chassis lubrication, you should inspect the exhaust, suspension, steering and fuel systems while you're under the vehicle. When you're rotating the tires, it makes good sense to check the brakes since the wheels are already removed. Finally, let's suppose you have to borrow or rent a torque wrench. Even if you only need it to tighten the spark plugs, you might as well check the torque of as many critical fasteners as time allows.

The first step in this maintenance program is to prepare yourself before the actual work begins. Read through all the procedures you're planning to do, then gather up all the parts and tools needed. If it looks like you might run into problems during a particular job, seek advice from a mechanic or experienced do-it-yourselfer.



1.1b Typical underhood component layout (2600 engine)

1 *Main fuse block*
2 *Air cleaner*
3 *Oil filler cap*
4 *Brake fluid reservoir*
5 *Clutch fluid reservoir*
6 *Battery terminals*
7 *Radiator cap*
8 *Engine oil dipstick*
9 *Windshield washer fluid reservoir*
10 *Engine coolant reservoir*
11 *Power steering fluid reservoir*
12 *Automatic transmission fluid dipstick*



1.1c Typical engine underside components

1 *Front engine undercover*
2 *Tension rod*
3 *Stabilizer bar*
4 *Lower control arm*
5 *Engine oil pan*
6 *Front exhaust pipe*
7 *Torsion bar*
8 *Transmission*
9 *Clutch operating cylinder*
10 *Engine mount*

2 Mazda pick-up Routine maintenance schedule

The following maintenance intervals are based on the assumption that the vehicle owner will be doing the maintenance or service work, as opposed to having a dealer service department do the work. Although the time/mileage intervals are based on factory recommendations, most have been shortened to ensure, for example, that such items as lubricants and fluids are checked/changed at intervals that promote maximum engine/driveline service life. Also, subject to the preference of the individual owner interested in keeping his or her vehicle in peak condition at all times and with the vehicle's ultimate resale in mind, many of the maintenance procedures may be performed more often than recommended in the following schedule. We encourage such owner initiative.

When the vehicle is new it should be serviced initially by a factory authorized dealer service department to protect the factory warranty. In many cases the initial maintenance check is done at no cost to the owner – check with your dealer service department for more infomation.

Every 250 miles or weekly, whichever comes first

Check the engine coolant level (Section 4)
Check the windshield washer fluid level (Section 4)
Check the brake fluid and clutch fluid levels (Section 4)
*Check the automatic transmission fluid level (Section 5)
*Check the power steering fluid level (Section 6)
Check the tires and tire pressures (Section 7)
Check the engine oil level (Section 4)

Every 7500 miles or 12 months, whichever comes first

All items listed above plus:

Check and service the battery (Section 8)
Check the cooling system (Section 9)
Inspect and replace if necessary the windshield wiper blades (Section 10)
Inspect and replace if necessary all underhood hoses (Section 11)
*Change the engine oil and oil filter (Section 12)

Every 15,000 miles or 12 months, whichever comes first

All items listed above plus:

Check the choke operation and clean the linkage (Section 13)
Replace the ignition points (Section 14)
Check and adjust the valve clearances (Section 15)
Lubricate the chassis components (Section 16)
*Inspect the suspension and steering components (Section 17)
*Inspect the exhaust system (Section 18)
Check the clutch pedal height and freeplay (Section 19)
*Check the manual transmission oil level (Section 20)
*Check the transfer case oil level (Section 21)
*Check the differential oil level (Section 22)
Rotate the tires (Section 23)
*Check the brakes (Section 24)
Inspect the fuel system (Section 25)
Check the thermostatically-controlled air cleaner (Section 26)
Check and adjust if necessary, the engine drivebelts (Section 27)
Check the seat belts (Section 28)

Every 30,000 miles or 24 months, whichever comes first

All items listed above plus:

Replace the air and PCV filter (Section 29)
Replace the fuel filter (Section 30)
Check the evaporative emissions system (Section 31)
Check the carburetor mounting torque (Section 32)
Check and adjust if necessary the engine idle speed (Section 33)
Check and adjust if necessary, the engine idle switch (1985 and later carbureted models) (Section 34)
Check and adjust if necessary, the carburetor float level (1600/1800/2000/2200 engine) (Section 35)
Change the transfer case oil (Section 36)
Change the manual transmission oil (Section 37)
Change the differential oil (Section 38)
**Change the automatic transmission fluid and filter (Section 39)
Check and repack the front wheel bearings (2WD models) (Section 40 or 41)
Service the cooling system (drain, flush and refill) (Section 42)
Inspect and replace if necessary the PCV valve (Section 43)
Replace the spark plugs (Section 44)
Inspect the spark plug wires (Section 45)
Inspect the distributor cap and rotor (Section 46)
Check and adjust if necessary the ignition timing (Section 47)

Every 60,000 miles or 24 months, whichever comes first

Replace the oxygen sensor (1985 through 1987 models with 2000/2200 engine) (Section 48)
Replace the EGR valve (1985 and later models with 2000/2200 engine) (Section 49)

Every 80,000 miles or 36 months, whichever comes first

Replace the oxygen sensor (1988 and later models with 2200 engine) (Section 48)

** This item is affected by "severe" operating conditions as described below. If your vehicle is operated under "severe" conditions, perform all maintenance indicated with a * at 3000 mile/3 month intervals.*

Severe conditions are indicated if you mainly operate your vehicle under one or more of the following conditions:
Operating in dusty areas
Towing a trailer
Idling for extended periods and/or low speed operation
Operating when outside temperatures remain below freezing and when most trips are less than 4 miles

** If operated under one or more of the following conditions, change the automatic transmission fluid every 15,000 miles:
In heavy city traffic where the outside temperature regularly reaches 90-degrees F (32-degrees C) or higher
In hilly trailer pulling
Frequent trailer pulling

3 Tune-up general information

The term *tune-up* is used in this manual to represent a combination of individual operations rather than one specific procedure.

If, from the time the vehicle is new, the routine maintenance schedule is followed closely and frequent checks are made of fluid levels and high wear items, as suggested throughout this manual, the engine will be kept in relatively good running condition and the need for additional work will be minimized.

More likely than not, however, there will be times when the engine is running poorly due to lack of regular maintenance. This is even more likely if a used vehicle, which has not received regular and frequent maintenance checks, is purchased. In such cases, an engine tune-up will be needed outside of the regular routine maintenance intervals.

The first step in any tune-up or diagnostic procedure to help correct a poor running engine is a cylinder compression check. A compression check (see Chapter 2 Part B) will help determine the condition of internal engine components and should be used as a guide for tune-up and repair procedures. If, for instance, a compression check indicates serious internal engine wear, a conventional tune-up will not improve the performance of the engine and would be a waste of time and money. Because of its importance, the compression check should be done by someone with the right equipment and the knowledge to use it properly.

The following procedures are those most often needed to bring a generally poor running engine back into a proper state of tune.

Minor tune-up

Check all engine related fluids
Clean and check the battery (Section 8)
Check and adjust the drivebelts (Section 27)
Replace the spark plugs (Section 44)
Check the cylinder compression (Chapter 2)
Inspect the distributor cap and rotor (Section 46)
Inspect the spark plug and coil wires (Section 45)
Replace the air and PCV filters (Section 29)
Check and adjust the idle speed (Section 33)
Check the carburetor float level (Section 35)
Check the idle speed switch (1985 through 1988 2000/2200 engine (Section 34)
Check and adjust the ignition timing (Section 47)
Replace the fuel filter (Section 30)
Check the PCV valve (Section 43)
Adjust the valve clearances (Section 15)
Check and service the cooling system (Section 42)

Major tune-up

All items listed under Minor tune-up plus . . .
Check the EGR system (Chapter 6)
Check the charging system (Chapter 5)
Check the ignition system (Chapter 5)
Replace the ignition points (if equipped) (Section 14)
Check the fuel system (Section 25 and Chapter 4)
Replace the spark plug wires, distributor cap and rotor (Sections 45 and 46)

4 Fluid level checks

Note: *The following are fluid level checks to be done on a 250 mile or weekly basis. Additional fluid level checks can be found in specific maintenance procedures which follow. Regardless of how often the fluid levels are checked, watch for puddles under the vehicle — if leaks are noted, make repairs immediately.*

1 Fluids are an essential part of the lubrication, cooling, brake, clutch and windshield washer systems. Because the fluids gradually become depleted and/or contaminated during normal operation of the vehicle, they must be periodically replenished. See *Recommended lubricants and fluids* at the beginning of this Chapter before adding fluid to any of the following components. **Note:** *The vehicle must be on level ground when fluid levels are checked.*

Engine oil

Refer to illustrations 4.4a, 4.4b and 4.6

2 The engine oil level is checked with a dipstick that extends through a tube and into the oil pan at the bottom of the engine.

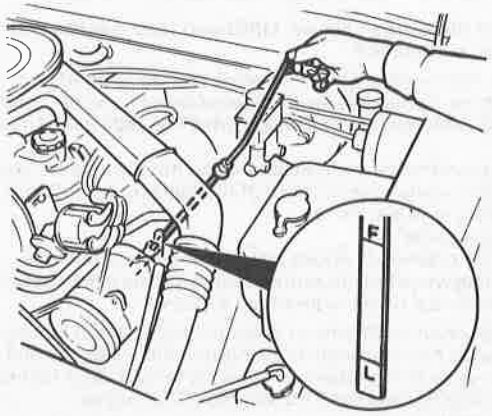
3 The oil level should be checked before the vehicle has been driven, or about 15 minutes after the engine has been shut off. If the oil is checked immediately after driving the vehicle, some of the oil will remain in the upper engine components, resulting in an inaccurate reading on the dipstick.

4 Pull the dipstick from the tube **(see illustration)** and wipe all the oil from the end with a clean rag or paper towel. Insert the clean dipstick all the way back into the tube, then pull it out again. Note the oil at the end of the dipstick. Add oil as necessary to keep the level between the L (low) mark and the F (full) mark on the dipstick **(see illustration)**.

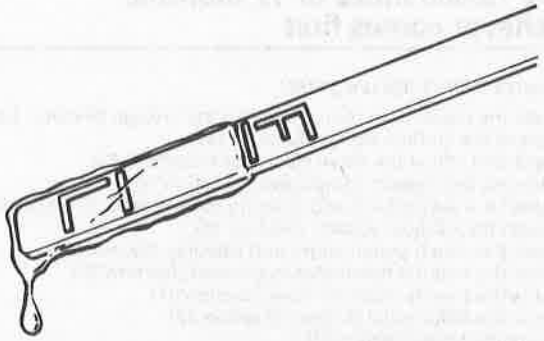
5 Don't overfill the engine by adding too much oil since this may result in oil fouled spark plugs, oil leaks or oil seal failures.

6 Oil is added to the engine after removing a threaded cap from the rocker arm cover **(see illustration)**. An oil can spout or funnel may help to reduce spills.

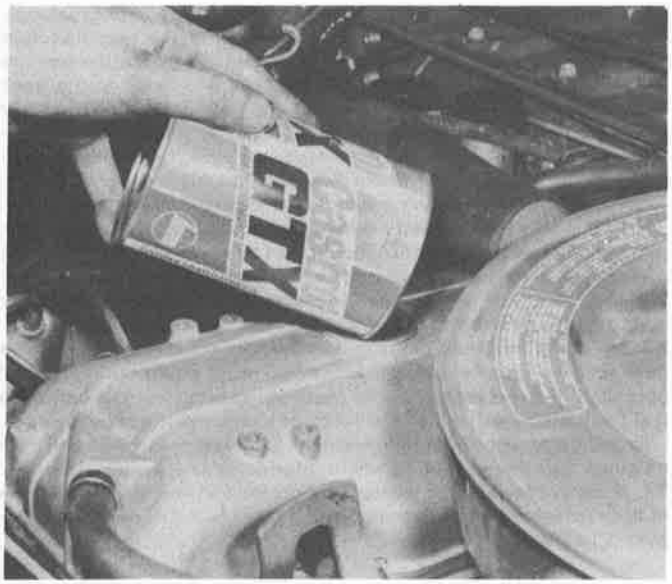
7 Checking the oil level is an important preventive maintenance step. A consistently low oil level indicates oil leakage through damaged seals, defective gaskets or past worn rings or valve guides. If the oil looks milky in color or has water droplets in it, the cylinder head gasket(s) may be blown or the head(s) or block may be cracked. The engine should be checked immediately. The condition of the oil should also be checked. Whenever you check the oil level, slide your thumb and index finger up the dipstick before wiping off the oil. If you see small dirt or metal particles clinging to the dipstick, the oil should be changed (Section 12).



4.4a The oil dipstick is located on the left side of the engine



4.4b The oil level must be kept between the F and L lines on the dipstick



4.6 After unscrewing the filler cap from the rocker arm cover, oil can be added to the engine

Engine coolant

Refer to illustration 4.8

Warning: *Don't allow antifreeze to come in contact with your skin or painted surfaces of the vehicle. Flush contaminated areas immediately with plenty of water. Don't store new coolant or leave old coolant lying around where it's accessible to children or pets — they're attracted by its sweet taste. Ingestion of even a small amount of coolant can be fatal! Wipe up garage floor and drip pan coolant spills immediately. Keep antifreeze containers covered and repair leaks in your cooling system immediately.*

8 All later vehicles covered by this manual are equipped with a pressurized coolant recovery system. A white plastic coolant reservoir located in the engine compartment is connected by a hose to the radiator filler neck **(see illustration)**. If the engine overheats, coolant escapes through a valve in the radiator cap and travels through the hose into the reservoir. As the engine cools, the coolant is automatically drawn back into the cooling system to maintain the correct level.

9 The coolant level in the reservoir should be checked regularly. **Warning:** *Do not remove the radiator cap to check the coolant level when the engine is warm.* The level in the reservoir varies with the temperature of the engine. When the engine is cold, the coolant level should be at or slightly above the lower mark on the reservoir. Once the engine has warmed up, the level should be at or near the upper mark. If it isn't, allow the engine to cool, then remove the cap from the reservoir and add a 50/50 mixture of ethylene glycol-based antifreeze and water.

10 Drive the vehicle and recheck the coolant level. If only a small amount of coolant is required to bring the system up to the proper level, water can be used. However, repeated additions of water will dilute the antifreeze and water solution. In order to maintain the proper ratio of antifreeze and water, always top up the coolant level with the correct mixture. An empty plastic milk jug or bleach bottle makes an excellent container for mixing coolant. Do not use rust inhibitors or additives.

11 If the coolant level drops consistently, there may be a leak in the system. Inspect the radiator, hoses, filler cap, drain plugs and water pump (see Section 9). If no leaks are noted, have the radiator cap pressure tested by a service station.

12 If you have to remove the radiator cap, wait until the engine has cooled, then wrap a thick cloth around the cap and turn it to the first stop. If coolant or steam escapes, let the engine cool down longer, then remove the cap.

13 Check the condition of the coolant as well. It should be relatively clear. If it's brown or rust colored, the system should be drained, flushed and refilled. Even if the coolant appears to be normal, the corrosion inhibitors wear out, so it must be replaced at the specified intervals.

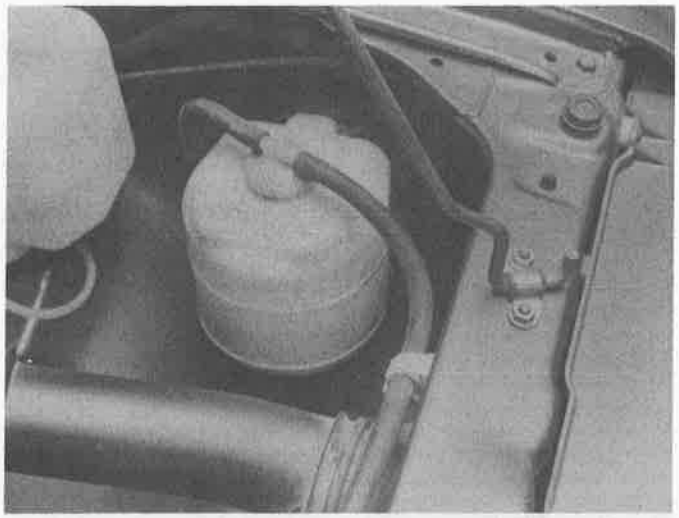
Windshield washer fluid

Refer to illustration 4.14

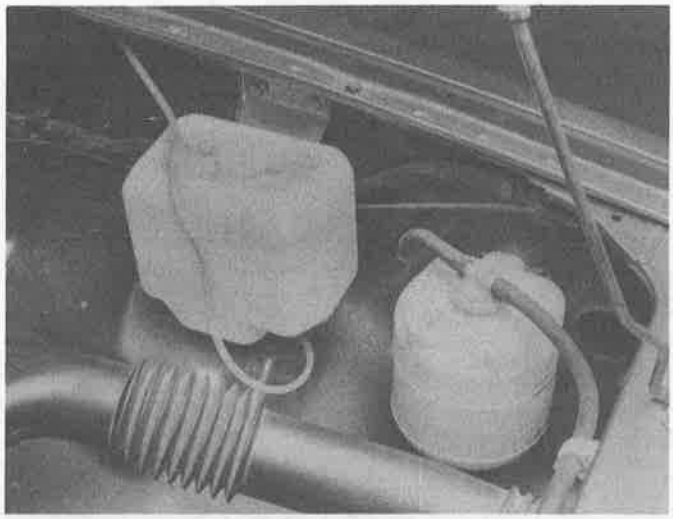
14 Fluid for the windshield washer system is stored in a plastic reservoir located on the driver's side of the engine compartment **(see illustration)**. If necessary, refer to the underhood component illustration(s) at the beginning of this Chapter to locate the reservoir.

15 In milder climates, plain water can be used in the reservoir, but it should be kept no more than 2/3 full to allow for expansion if the water freezes. In colder climates, use windshield washer system antifreeze, available at any auto parts store, to lower the freezing point of the fluid. Mix the antifreeze with water in accordance with the manufacturer's directions on the container. **Caution:** *Don't use cooling system antifreeze — it will damage the vehicle's paint.*

16 To help prevent icing in cold weather, warm the windshield with the defroster before using the washer.



4.8 The coolant level must be kept between the two marks on the side of the reservoir — coolant is added after removing the cap



4.14 The windshield washer level must be near the top of the reservoir, shown here to the left of the coolant reservoir. Fluid is added after snapping the cap up, making sure to close it securely when you're done

Battery electrolyte

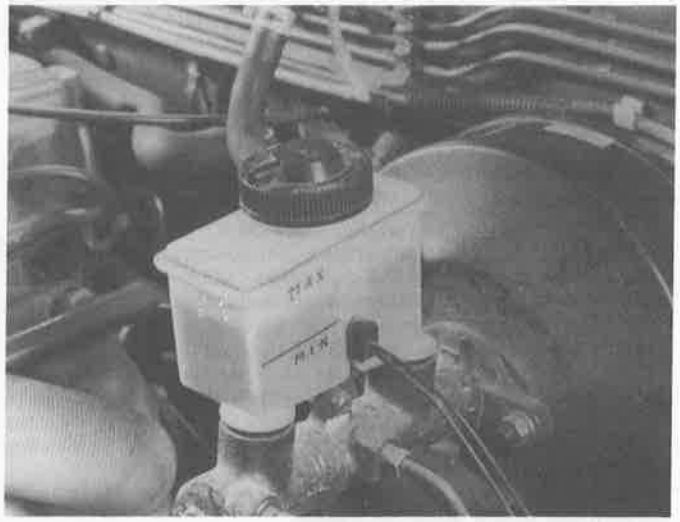
17 To check the electrolyte level in the battery, remove all of the cell caps. If the level is low, add *distilled* water until it's above the plates. Original equipment batteries are translucent so the electrolyte level can be checked by looking at the side of the case **(see illustration)**. Most aftermarket replacement batteries have a split-ring indicator in each cell to help you judge when enough water has been added — don't overfill the cells!

Brake and clutch fluid

Refer to illustrations 4.19a and 4.19b

18 The brake master cylinder is mounted on the front of the power booster unit in the engine compartment. The clutch cylinder used on manual transmissions is mounted adjacent to it on the firewall.

19 The fluid inside is readily visible. The level should be between the MIN and MAX marks on the reservoirs **(see illustrations)**. If a low level is indicated, be sure to wipe the top of the reservoir cover with a clean rag to prevent contamination of the brake and/or clutch system before removing the cover.



4.19a The brake master cylinder fluid level should be kept between the Min and Max marks on the reservoir

4.19b The clutch fluid level should be kept between the Max and Min marks on the reservoir

20 When adding fluid, pour it carefully into the reservoir to avoid spilling it onto surrounding painted surfaces. Be sure the specified fluid is used, since mixing different types of brake fluid can cause damage to the system. See *Recommended lubricants and fluids* at the front of this Chapter or your owner's manual. **Warning:** *Brake fluid can harm your eyes and damage painted surfaces, so be very careful when handling or pouring it. Don't use brake fluid that's been standing open or is more than one year old. Brake fluid absorbs moisture from the air. Excess moisture can cause a dangerous loss of brake efficiency.*

21 At this time the fluid and master cylinder can be inspected for contamination. The system should be drained and refilled if deposits, dirt particles or water droplets are seen in the fluid.

22 After filling the reservoir to the proper level, make sure the cover is on tight to prevent fluid leakage.

23 The brake fluid level in the master cylinder will drop slightly as the pads and the brake shoes at each wheel wear down during normal operation. If the master cylinder requires repeated additions to keep it at the proper level, it's an indication of leakage in the brake system, which should be corrected immediately. Check all brake lines and connections (see Section 24 for more information).

24 If, upon checking the master cylinder fluid level, you discover one or both reservoirs empty or nearly empty, the brake system should be bled (Chapter 9).

5 Automatic transmission fluid level check

Refer to illustration 5.3

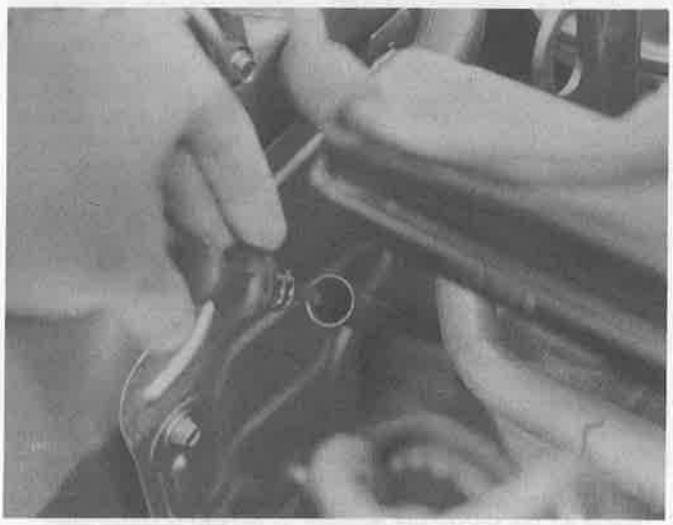
1 The automatic transmission fluid level should be carefully maintained. Low fluid level can lead to slipping or loss of drive, while overfilling can cause foaming and loss of fluid.

2 With the parking brake set, start the engine, then move the shift lever through all the gear ranges, ending in Park. The fluid level must be checked with the vehicle level and the engine running at idle. **Note:** *Incorrect fluid level readings will result if the vehicle has just been driven at high speeds for an extended period, in hot weather in city traffic, or if it has been pulling a trailer. If any of these conditions apply, wait until the fluid has cooled (about 30 minutes).*

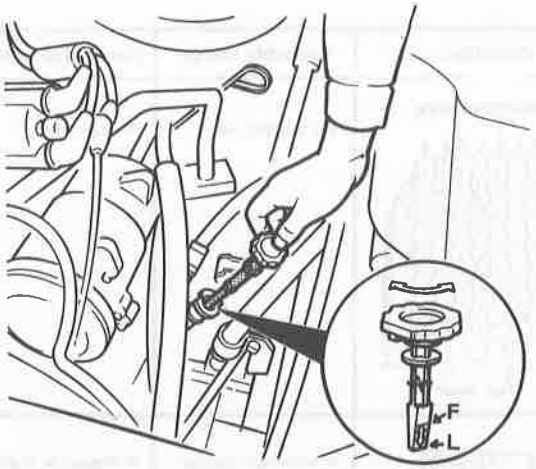
3 With the transmission at normal operating temperature, remove the dipstick from the filler tube. The dipstick is located at the rear of the engine compartment on the passenger's side **(see illustration)**.

4 Carefully touch the fluid at the end of the dipstick to determine if it's cool (86 to 122 °F) or hot (123 to 176 °F). Wipe the fluid from the dipstick with a clean rag and push it back into the filler tube until the cap seats.

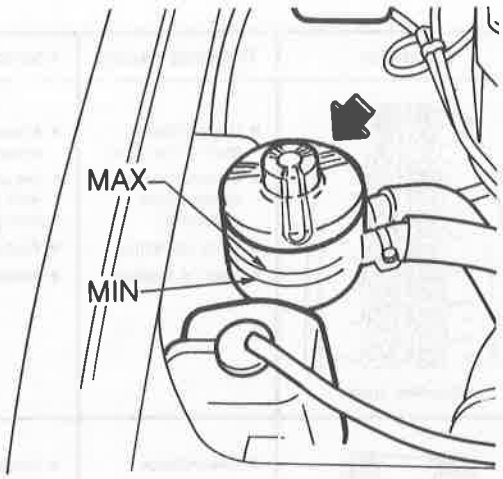
5 Pull the dipstick out again and note the fluid level.



5.3 The automatic transmission dipstick is located at the right rear of the engine compartment



6.5 On 2000/2200 engines, check the power steering fluid level on the dipstick after twisting off the cap



6.7 On 2600 engines, the power steering reservoir is located on the inner fender panel and the fluid level can be checked visually without removing the cap

6 The fluid level should be between the F mark and 1/4-inch below the mark with the transmission fluid at normal operating temperature (hot) **(see illustration 5.3)**.
7 If additional fluid is required, add it directly into the tube using a funnel. It takes about one pint to raise the level from the L mark to the H mark with a hot transmission, so add the fluid a little at a time and keep checking the level until it's correct.
8 The condition of the fluid should also be checked along with the level. If the fluid at the end of the dipstick is a dark reddish-brown color, or if it smells burned, it should be changed. If you are in doubt about the condition of the fluid, purchase some new fluid and compare the two for color and smell.

6 Power steering fluid level check

Refer to illustrations 6.5 and 6.7

1 Unlike manual steering, the power steering system relies on fluid which may, over a period of time, require replenishing.
2 The fluid reservoir for the power steering pump is located on the pump body at the front of the engine. On vehicles with a 2600 V6 engine, the reservoir is separate from the pump and is mounted remotely.
3 For the check, the front wheels should be pointed straight ahead and the engine should be off. The engine and power steering fluid should be cold.
4 Use a clean rag to wipe off the reservoir cap and the area around it. This will help prevent any foreign matter from entering the reservoir during the check.

2000/2200 engine

5 Twist off the cap — it has a dipstick attached to it **(see illustration)**.
6 Wipe off the fluid with a clean rag, reinsert the dipstick, then withdraw it and note the fluid level. The level should be within the range marked on the dipstick. Never allow the fluid level to drop below the lower range mark.

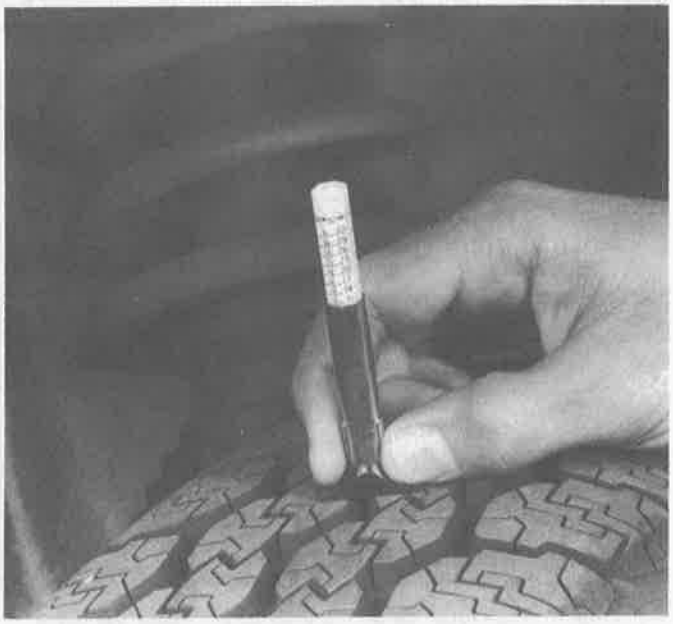
2600 engine

7 On these models, the fluid reservoir is mounted on the inner fender panel. The reservoir is translucent plastic and the level can be checked visually **(see illustration)**.
8 The level must be maintained between the MAX and MIN marks and fluid can be added after twisting off the cap.
9 If additional fluid is required, pour the specified type directly into the reservoir, using a funnel to prevent spills.
10 If the reservoir requires frequent fluid additions, all power steering hoses, hose connections and the power steering pump should be carefully checked for leaks.

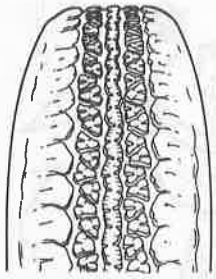
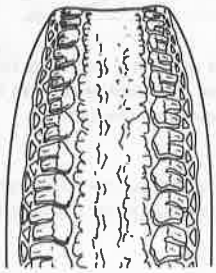
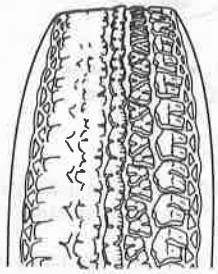
7 Tire and tire pressure checks

Refer to illustrations 7.2, 7.3, 7.4a, 7.4b and 7.8

1 Periodic inspection of the tires may spare you the inconvenience of being stranded with a flat tire. It can also provide you with vital information regarding possible problems in the steering and suspension systems before major damage occurs.
2 The original tires on this vehicle are equipped with wear indicator bars that will appear when tread depth reaches a predetermined limit, usually 1/16-inch, but they don't appear until the tires are worn out. Tread wear can be monitored with a simple, inexpensive device known as a tread depth indicator **(see illustration)**.



7.2 A tire wear tread depth indicator should be used to monitor tire wear — they are available at auto parts stores and service stations and cost very little

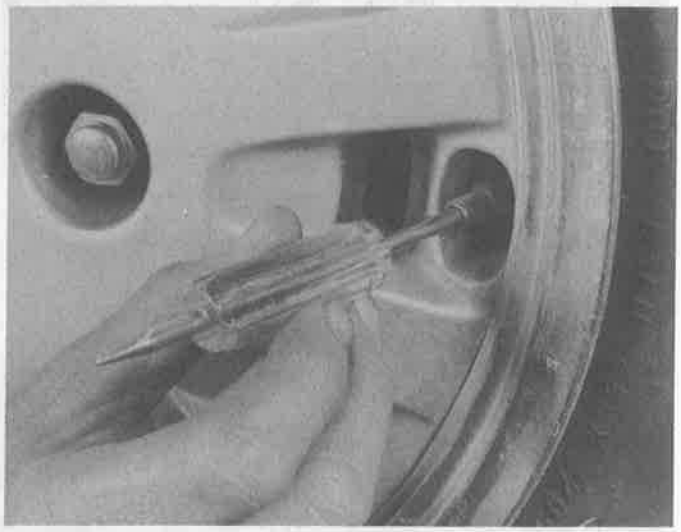
Condition	Probable cause	Corrective action	Condition	Probable cause	Corrective action
 Shoulder wear	• Underinflation (both sides wear) • Incorrect wheel camber (one side wear) • Hard cornering • Lack of rotation	• Measure and adjust pressure. • Repair or replace axle and suspension parts. • Reduce speed. • Rotate tires.	Feathered edge  Toe wear	• Incorrect toe	• Adjust toe-in.
 Center wear	• Overinflation • Lack of rotation	• Measure and adjust pressure. • Rotate tires.	 Uneven wear	• Incorrect camber or caster • Malfunctioning suspension • Unbalanced wheel • Out-of-round brake drum • Lack of rotation	• Repair or replace axle and suspension parts. • Repair or replace suspension parts. • Balance or replace. • Turn or replace. • Rotate tires.

7.3 This chart will help you determine the condition of your tires, the probable cause(s) of abnormal wear and the corrective action necessary

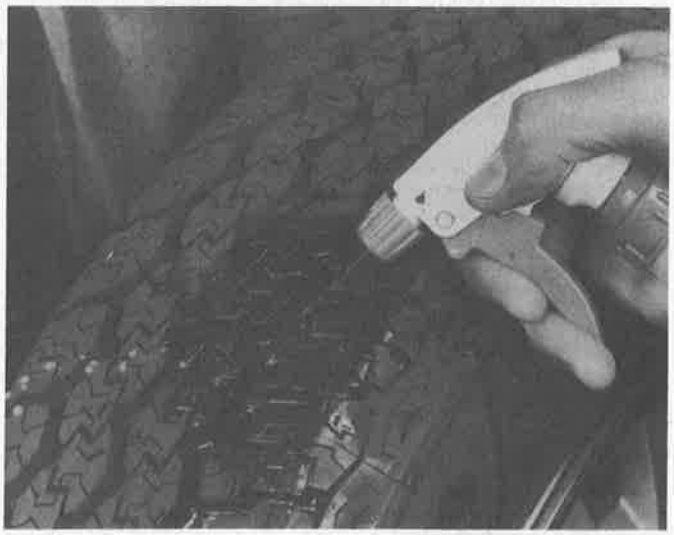
3 Note any abnormal tread wear **(see illustration)**. Tread pattern irregularities such as cupping, flat spots and more wear on one side than the other are indications of front end alignment and/or balance problems. If any of these conditions are noted, take the vehicle to a tire shop or service station to correct the problem.

4 Look closely for cuts, punctures and embedded nails or tacks. Sometimes a tire will hold air pressure for a short time or leak down very slowly after a nail has embedded itself in the tread. If a slow leak persists, check the valve stem core to make sure it's tight **(see illustration)**. Examine the tread for an object that may have embedded itself in the tire or for a "plug" that may have begun to leak (radial tire punctures are repaired with a plug that's installed in a puncture). If a puncture is suspected, it can be easily verified by spraying a solution of soapy water onto the puncture area **(see illustration)**. The soapy solution will bubble if there's a leak. Unless the puncture is unusually large, a tire shop or service station can usually repair the tire.

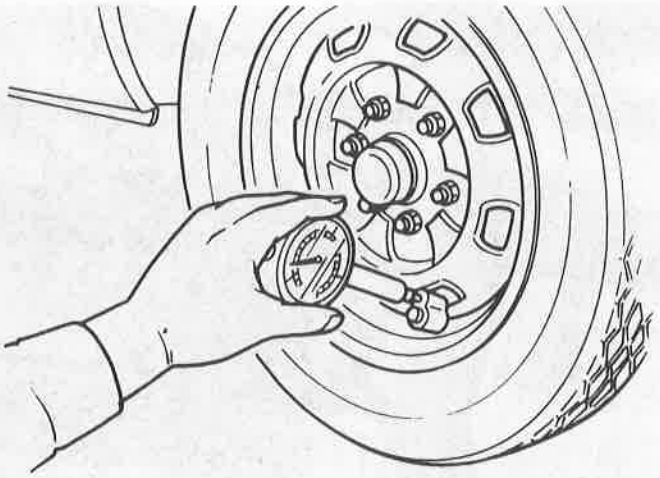
5 Carefully inspect the inner sidewall of each tire for evidence of brake fluid leakage. If you see any, inspect the brakes immediately.



7.4a If a tire loses air on a steady basis, check the valve core first to make sure it's snug (special inexpensive wrenches are commonly available at auto parts stores)



7.4b If the valve core is tight, raise the corner of the vehicle with the low tire and spray a soapy water solution onto the tread as the tire is turned slowly — slow leaks will cause small bubbles to appear



7.8 To extend the life of your tires, check the air pressure at least once a week with an accurate gauge (don't forget the spare!)

6 Correct air pressure adds miles to the lifespan of the tires, improves mileage and enhances overall ride quality. Tire pressure cannot be accurately estimated by looking at a tire, especially if it's a radial. A tire pressure gauge is essential. Keep an accurate gauge in the vehicle. The pressure gauges attached to the nozzles of air hoses at gas stations are often inaccurate.

7 Always check tire pressure when the tires are cold. Cold, in this case, means the vehicle has not been driven over a mile in the three hours preceding a tire pressure check. A pressure rise of four to eight pounds is not uncommon once the tires are warm.

8 Unscrew the valve cap protruding from the wheel or hubcap and push the gauge firmly onto the valve stem **(see illustration)**. Note the reading on the gauge and compare the figure to the recommended tire pressure shown on the placard on the glove compartment door. Be sure to reinstall the valve cap to keep dirt and moisture out of the valve stem mechanism. Check all four tires and, if necessary, add enough air to bring them up to the recommended pressure.

9 Don't forget to keep the spare tire inflated to the specified pressure (refer to your owner's manual or the tire sidewall).

8 Battery check and maintenance

Refer to illustrations 8.1, 8.7a, 8.7b, 8.7c and 8.7d

Warning: *Several precautions must be followed when checking and servicing the battery. Hydrogen gas, which is highly flammable, is always present in the battery cells, so keep lighted tobacco and all other open flames and sparks away from the battery. The electrolyte in the cells is actually dilute sulfuric acid, which will cause injury if splashed on your skin or in your eyes. It'll also ruin clothes and painted surfaces. When removing the battery cables, always detach the negative cable first and hook it up last!*

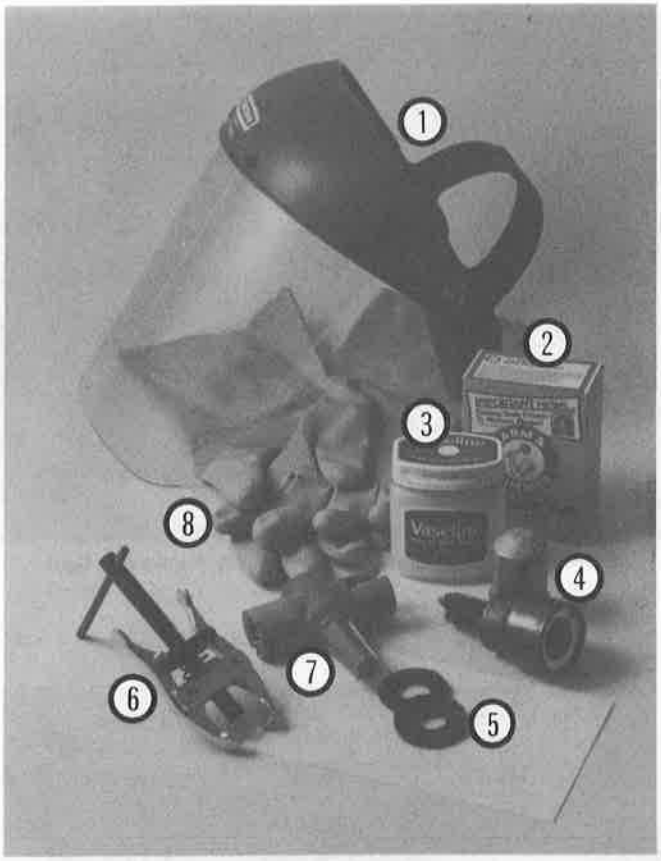
Check

1 Battery maintenance is an important procedure which will help ensure that you aren't stranded because of a dead battery. Several tools are required for this procedure **(see illustration)**.

2 On vehicles equipped with a conventional battery, the electrolyte level should be checked every week (see Section 4).

3 If the vehicle is equipped with a battery electrolyte level warning light, the electrolyte should still be visually checked on a regular basis to make sure all cells are full.

4 On some models a sealed maintenance-free battery is used. Unlike a conventional battery, it has no removable cell caps and is completely sealed except for a small vent hole. Because of its sealed design, water cannot be added to the cells.



8.1 Tools and materials required for battery maintenance

1 ***Face shield/safety goggles*** *— When removing corrosion with a brush, the acidic particles can easily fly up into your eyes*
2 ***Baking soda*** *— A solution of baking soda and water can be used to neutralize corrosion*
3 ***Petroleum jelly*** *— A layer of this on the battery posts will help prevent corrosion*
4 ***Battery post/cable cleaner*** *— This wire brush cleaning tool will remove all traces of corrosion from the battery posts and cable clamps*
5 ***Treated felt washers*** *— Placing one of these on each post, directly under the cable clamps, will help prevent corrosion*
6 ***Puller*** *— Sometimes the cable clamps are very difficult to pull off the posts, even after the nut/bolt has been completely loosened. This tool pulls the clamp straight up and off the post without damage*
7 ***Battery post/cable cleaner*** *— Here is another cleaning tool which is a slightly different version of number 4 above, but it does the same thing*
8 ***Rubber gloves*** *— Another safety item to consider when servicing the battery; remember that's acid inside the battery!*

Maintenance

5 Periodically clean the top and sides of the battery. Remove all dirt and moisture. This will help prevent corrosion and ensure that the battery doesn't become partially discharged by leakage through moisture and dirt. Check the case for cracks and distortion.

6 Check the tightness of the battery cable bolts to ensure good electrical connections. Inspect the entire length of each cable, looking for cracked or abraded insulation and frayed conductors.

7 If corrosion, which usually appears as white, fluffy deposits, is evident, remove tha cables from the terminals, clean them with a battery brush and reinstall them **(see illustrations)**. Corrosion can be kept

8.7a Battery terminal corrosion usually appears as light fluffy powder

8.7b Removing a cable from the battery post with a wrench – sometimes a special battery pliers is required for this procedure if corrosion has caused deterioriation of the nut hex (always remove the ground cable first and hook it up last!)

8.7c Regardless of the type of tool used to clean the battery posts, a clean, shiny surface should be the result

8.7d When cleaning the cable clamps, all corrosion must be removed (the inside of the clamp is tapered to match the taper on the post, so don't remove too much material)

to a minimum by applying a layer of petroleum jelly to the terminals after the cables are in place.

8 Make sure the battery carrier is in good condition and the hold-down clamp is tight. If the battery is removed, make sure that nothing is in the bottom of the carrier when it's reinstalled and don't overtighten the clamp nuts.

9 A temperature-compensated hydrometer is built into the top of maintenance-free batteries. It gives an indication of the electrolyte level and the battery's state of charge. If a blue dot is seen in the indicator window on top of the battery, the battery is properly charged. If the indicator is transparent, the battery should be recharged from an external source and the charging system should be checked (Chapter 5).

10 The freezing point of electrolyte depends on its specific gravity. Since freezing can ruin a battery, it should be kept in a fully charged state to protect against freezing.

11 If you frequently have to add water to a conventional battery and the case has been inspected for cracks that could cause leakage, but none are found, the battery is being overcharged; the charging system should be checked as described in Chapter 5.

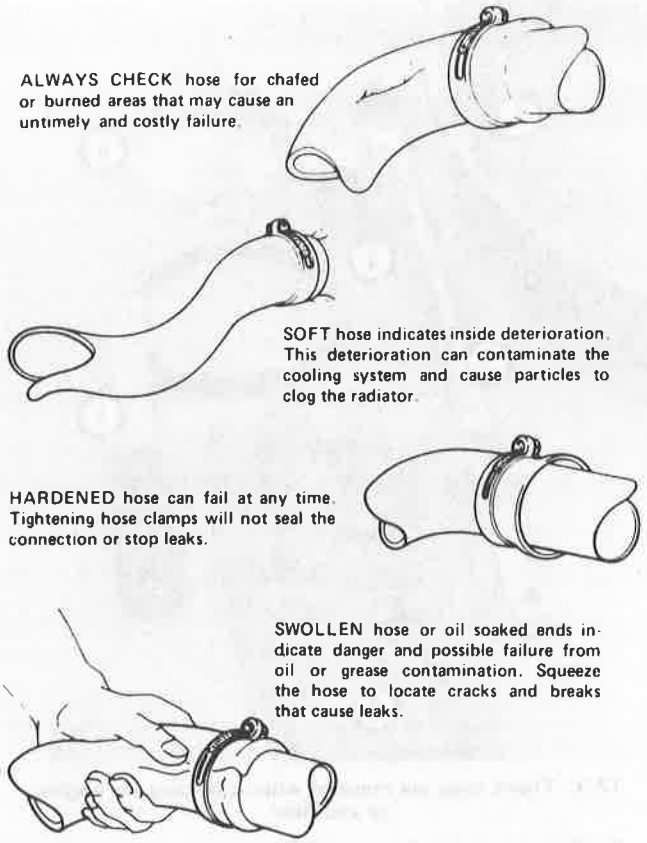
12 If any doubt exists about the battery state of charge, a hydrometer should be used to test it by withdrawing a little electrolyte from each cell, one at a time.

13 The specific gravity of the electrolyte at 80 °F will be approximately 1.270 for a fully charged battery. For every 10 °F that the electrolyte temperature is above 80 °F, add 0.04 to the specific gravity. Subtract 0.04 if the temperature is below 80 °F.

14 A specific gravity reading of 1.240 with an electrolyte temperature of 80 °F indicates a half-charged battery.

15 Some of the common causes of battery failure are:

a) Accessories, especially headlights, left on overnight or for several hours.
b) Slow average driving speeds for short intervals.
c) The electrical load of the vehicle being more than the alternator output. This is very common when several high draw accessories are being used simultaneously (such as radio/stereo, air conditioning, window defoggers, lights, etc.).
d) Charging system problems such as short circuits, slipping drivebelt, defective alternator or faulty voltage regulator.
e) Battery neglect, such as loose or corroded terminals or loose battery hold-down clamp.



9.4 Hoses, like drivebelts, have a habit of failing at the worst possible time — to prevent the inconvenience of a blown radiator or heater hose, inspect them carefully as shown here

Battery charging

16 In winter when heavy demand is placed upon the battery, it's a good idea to occasionally have it charged from an external source.
17 When charging the battery, the negative cable should be disconnected. The charger leads should be connected to the battery *before* the charger is plugged in or turned on. If the leads are connected to the battery terminals after the charger is on, a spark could occur and the hydrogen gas given off by the battery could explode!
18 The battery should be charged at a low rate of about 4 to 6 amps, and should be left on for at least three or four hours. A trickle charger charging at the rate of 1.5 amps can be safely used overnight.
19 Special rapid boost charges which are claimed to restore the power of the battery in a short time can cause serious damage to the battery plates and should only be used in an emergency situation.
20 The battery should be left on the charger only until the specific gravity is brought up to a normal level. On maintenance-free batteries, continue to charge only until the blue dot is seen in the indicator window. Don't overcharge the battery! **Note:** *Some battery chargers will automatically shut off after the battery is fully charged, making it unnecessary to keep a close watch on the state of charge.*
21 When disconnecting the charger, unplug it before disconnecting the charger leads from the battery.

9 Cooling system check

Refer to illustration 9.4

1 Many major engine failures can be attributed to a faulty cooling system. If the vehicle is equipped with an automatic transmission, the cooling system also cools the transmission fluid, prolonging transmission life.
2 The cooling system should be checked with the engine cold. Do this before the vehicle is driven for the day or after it has been shut off for at least three hours.
3 Remove the radiator cap by turning it counterclockwise until it reaches a stop. If you hear a hissing sound (indicating there's still pressure in the system), wait until it stops. Now press down on the cap with the palm of your hand and continue turning until it can be removed. Thoroughly clean the cap, inside and out, with clean water. Also clean the filler neck on the radiator. All traces of corrosion should be removed. The coolant inside the radiator should be relatively transparent. If it's rust colored, the system should be drained and refilled (Section 42). If the coolant level is not up to the top, add additional antifreeze/coolant mixture (see Section 4).
4 Carefully check the large upper and lower radiator hoses along with the smaller diameter heater hoses which run from the engine to the firewall. Inspect each hose along its entire length, replacing any hose that's cracked, swollen or deteriorated. Cracks may become more apparent if the hose is squeezed **(see illustration)**. Regardless of condition, it's a good idea to replace hoses with new ones every two years.
5 Make sure that all hose connections are tight. A leak in the cooling system will usually show up as white or rust colored deposits on the areas adjoining the leak. If wire-type clamps are used at the ends of the hoses, it may be a good idea to replace them with more secure screw-type clamps.
6 Use compressed air or a soft brush to remove bugs, leaves, etc. from the front of the radiator or air conditioning condenser. Be careful not to damage the delicate cooling fins or cut yourself on them.
7 Every other inspection, or at the first indication of cooling system problems, have the cap and system pressure tested. If you don't have a pressure tester, most gas stations and repair shops will do this for a minimal charge.

10 Wiper blade inspection and replacement

1 The windshield wiper and blade assembly should be inspected periodically for damage, loose components and cracked or worn blade elements.
2 Road film can build up on the wiper blades and affect their efficiency, so they should be washed regularly with a mild detergent solution.
3 The action of the wiping mechanism can loosen the bolts, nuts and fasteners, so they should be checked and tightened, as necessary, at the same time the wiper blades are checked.
4 If the wiper blade elements (sometimes called inserts) are cracked, worn or warped, they should be replaced with new ones.
5 Pull the wiper blade/arm assembly away from the glass.
6 Squeeze the latch lock release at the end of the blade and then pull the blade element out of the lever jaws.
7 Compare the new element with the old for length, design, etc.
8 Slide the new element through the lever jaws into place. It will automatically lock at the correct location.
9 Reinstall the blade assembly on the arm, wet the windshield and check for proper operation.

11 Underhood hose check and replacement

General

1 **Caution:** *Replacement of air conditioning hoses must be left to a dealer service department or air conditioning shop that has the equipment to depressurize the system safely. Never remove air conditioning components or hoses until the system has been depressurized.*
2 High temperatures in the engine compartment can cause the deterioration of the rubber and plastic hoses used for engine, accessory and emission systems operation. Periodic inspection should be made for cracks, loose clamps, material hardening and leaks. Information specific to the cooling system hoses can be found in Section 9.
3 Some, but not all, hoses are secured to the fittings with clamps. Where clamps are used, check to be sure they haven't lost their tension, allowing the hose to leak. If clamps aren't used, make sure the hose has not expanded and/or hardened where it slips over the fitting, allowing it to leak.

Vacuum hoses

4 It's quite common for vacuum hoses, especially those in the emissions system, to be color coded or identified by colored stripes molded into them. Various systems require hoses with different wall thicknesses, collapse resistance and temperature resistance. When replacing hoses, be sure the new ones are made of the same material.

5 Often the only effective way to check a hose is to remove it completely from the vehicle. If more than one hose is removed, be sure to label the hoses and fittings to ensure correct installation.

6 When checking vacuum hoses, be sure to include any plastic T-fittings in the check. Inspect the fittings for cracks and the hose where it fits over the fitting for distortion, which could cause leakage.

7 A small piece of vacuum hose (1/4-inch inside diameter) can be used as a stethoscope to detect vacuum leaks. Hold one end of the hose to your ear and probe around vacuum hoses and fittings, listening for the "hissing" sound characteristic of a vacuum leak. **Warning:** *When probing with the vacuum hose stethoscope, be very careful not to come into contact with moving engine components such as the drivebelts, cooling fan, etc.*

Fuel hose

Warning: *There are certain precautions which must be taken when inspecting or servicing fuel system components. Work in a well ventilated area and don't allow open flames (cigarettes, appliance pilot lights, etc.) or bare light bulbs near the work area. Mop up any spills immediately and don't store fuel soaked rags where they could ignite.*

8 Check all rubber fuel lines for deterioration and chafing. Check carefully for cracks in areas where the hose bends and where it's attached to fittings.

9 High quality fuel line, usually identified by the word *Fluroelastomer* printed on the hose, should be used for fuel line replacement. **Warning:** *Never, under any circumstances, use unreinforced vacuum line, clear plastic tubing or water hose for fuel lines!*

10 Spring-type clamps are commonly used on fuel lines. They often lose their tension over a period of time, and can be "sprung" during removal. Replace all spring-type clamps with screw clamps whenever a hose is replaced.

Metal lines

11 Sections of metal line are often used for fuel line between the fuel pump and carburetor or fuel injection unit. Check carefully to be sure the line has not been bent or crimped and look for cracks.

12 If a section of metal fuel line must be replaced, only seamless steel tubing should be used, since copper and aluminum tubing don't have the strength necessary to withstand normal engine vibration.

13 Check the metal brake lines where they enter the master cylinder and brake proportioning unit (if used) for cracks in the lines and loose fittings. Any sign of brake fluid leakage means an immediate thorough inspection of the brake system should be done.

12 Engine oil and filter change

Refer to illustrations 12.3, 12.9a, 12.9b and 12.18

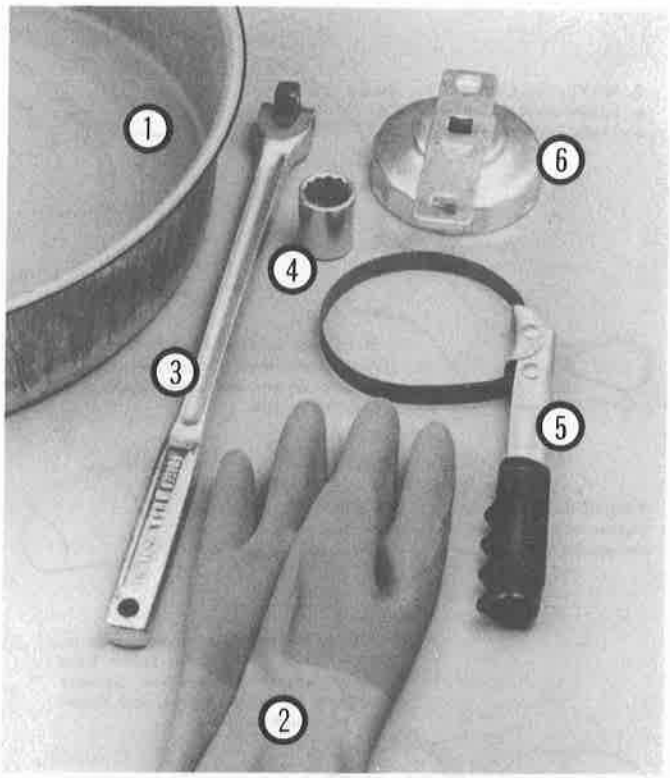
1 Frequent oil changes are the most important preventive maintenance procedures that can be done by the home mechanic. As engine oil ages, it becomes diluted and contaminated, which leads to premature engine wear.

2 Although some sources recommend oil filter changes every other oil change, the minimal cost of an oil filter and the fact that it's easy to install dictate that a new filter be used every time the oil is changed.

3 Gather all necessary tools and materials before beginning this procedure **(see illustration)**.

4 You should have plenty of clean rags and newspapers handy to mop up any spills. Access to the underside of the vehicle is greatly improved if the vehicle can be lifted on a hoist, driven onto ramps or supported by jackstands. **Warning:** *Do not work under a vehicle which is supported only by a bumper, hydraulic or scissors-type jack!*

5 If this is your first oil change, get under the vehicle and familiarize yourself with the locations of the oil drain plug and the oil filter. The engine and exhaust components will be warm during the actual work, so note how they're situated to avoid touching them when working under the vehicle.



12.3 These tools are required when changing the engine oil and filter

1 ***Drain pan*** *— It should be fairly shallow in depth, but wide in order to prevent spills*
2 ***Rubber gloves*** *— When removing the drain plug and filter it is inevitable that you will get oil on your hands (the gloves will prevent burns)*
3 ***Breaker bar*** *— Sometimes the oil drain plug is pretty tight and a long breaker bar is needed to loosen it*
4 ***Socket*** *— To be used with the breaker bar or a ratchet (must be the correct size to fit the drain plug)*
5 ***Filter wrench*** *— This is a metal band-type wrench, which requires clearance around the filter to be effective*
6 ***Filter wrench*** *— This type fits on the bottom of the filter and can be turned with a ratchet or breaker bar (different size wrenches are available for different types of filters)*

6 Warm the engine to normal operating temperature. If the new oil or any tools are needed, use the warm-up time to obtain everything necessary for the job. The correct oil for your application can be found in *Recommended lubricants and fluids* at the beginning of this Chapter.

7 With the engine oil warm (warm engine oil will drain better and more built-up sludge will be removed with it), raise and support the vehicle. Make sure it's safely supported!

8 Move all necessary tools, rags and newspapers under the vehicle. Set the drain pan under the drain plug. Keep in mind that the oil will initially flow from the pan with some force; position the pan accordingly.

9 Being careful not to touch any of the hot exhaust components, use a wrench to remove the drain plug near the bottom of the oil pan **(see illustrations)**. Depending on how hot the oil is, you may want to wear gloves while unscrewing the plug the final few turns.

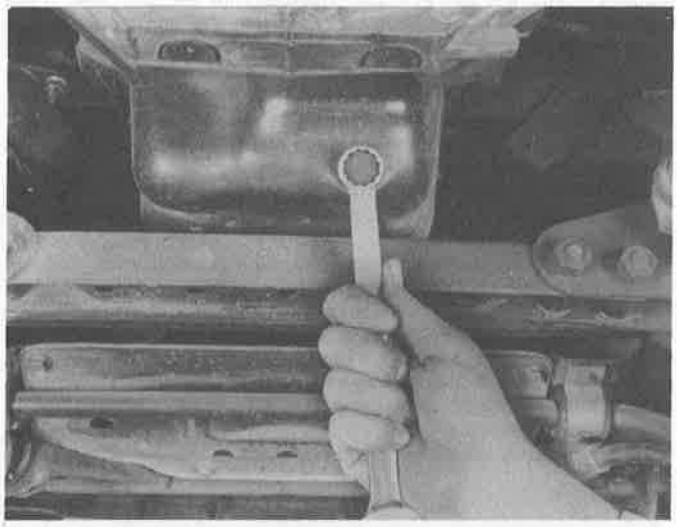
10 Allow the old oil to drain into the pan. It may be necessary to move the pan as the oil flow slows to a trickle.

11 After all the oil has drained, wipe off the drain plug with a clean rag. Small metal particles may cling to the plug and would immediately contaminate the new oil.

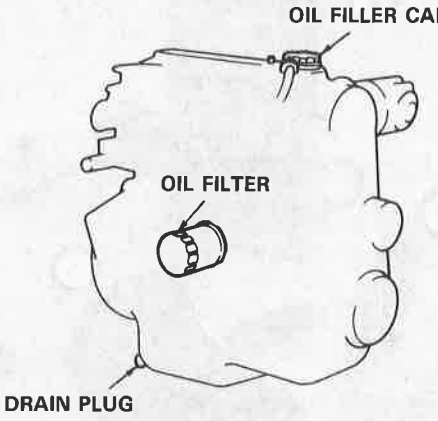
12 Clean the area around the drain plug opening and reinstall the plug. Tighten the plug securely with the wrench. If a torque wrench is available, use it to tighten the plug.

13 Move the drain pan into position under the oil filter.

14 Use the filter wrench to loosen the oil filter. Chain or metal band



12.9a Removing the oil pan drain plug



12.9b Engine oil drain plug location

filter wrenches may distort the filter canister, but it doesn't matter since the filter will be discarded anyway.

15 Completely unscrew the old filter. Be careful; it's full of oil. Empty the oil inside the filter into the drain pan.

16 Compare the old filter with the new one to make sure they're the same type.

17 Use a clean rag to remove all oil, dirt and sludge from the area where the oil filter mounts to the engine. Check the old filter to make sure the rubber gasket isn't stuck to the engine. If the gasket is stuck to the engine, remove it.

18 Apply a light coat of clean oil to the rubber gasket on the new oil filter **(see illustration)**.

19 Attach the new filter to the engine, following the tightening directions printed on the filter canister or packing box. Most filter manufacturers recommend against using a filter wrench due to the possibility of overtightening and damage to the seal.

20 Remove all tools, rags, etc. from under the vehicle, being careful not to spill the oil in the drain pan, then lower the vehicle.

21 Move to the engine compartment and locate the oil filler cap.

22 If an oil can spout is used, push the spout into the top of the oil can and pour the fresh oil through the filler opening. A funnel may also be used.

23 Pour three or four quarts of fresh oil into the engine. Wait a few minutes to allow the oil to drain into the pan, then check the level on the oil dipstick (see Section 4 if necessary). If the oil level is above the L mark, start the engine and allow the new oil to circulate.

24 Run the engine for only about a minute and then shut it off. Immediately look under the vehicle and check for leaks at the oil pan drain plug and around the oil filter. If either one is leaking, tighten it a little more.

12.18 Lubricate the oil filter gasket with clean engine oil before installing the filter on the engine

25 With the new oil circulated and the filter now completely full, recheck the level on the dipstick and add more oil as necessary.

26 During the first few trips after an oil change, make it a point to check frequently for leaks and correct oil level.

27 The old oil drained from the engine cannot be reused in its present state and should be disposed of. Oil reclamation centers, auto repair shops and gas stations will normally accept the oil, which can be refined and used again. After the oil has cooled it can be poured into a container (capped plastic jugs or bottles, milk cartons, etc.) for transport to a disposal site.

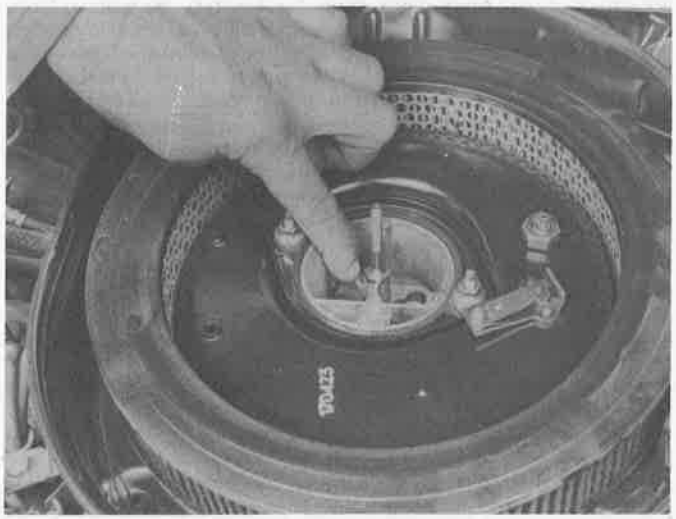
13 Carburetor choke check

Refer to illustrations 13.3 and 13.9

1 The choke operates only when the engine is cold, so this check should be performed before the engine has been started for the day.

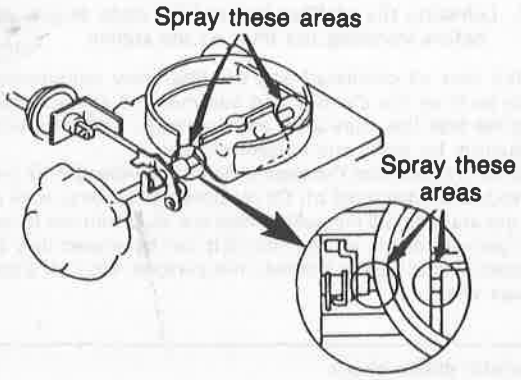
2 Open the hood and remove the top plate of the air cleaner assembly. If any vacuum hoses must be disconnected, tag them to ensure reinstallation in their original positions.

3 Look at the center of the air cleaner housing. You'll notice a flat plate at the carburetor opening **(see illustration)**.



13.3 The carburetor choke plate

4 Have an assistant press the throttle pedal to the floor. The plate should close completely. Start the engine while you watch the plate at the carburetor. Don't position your face near the carburetor, as the engine could backfire, causing serious burns! When the engine starts, the choke plate should open slightly.
5 Allow the engine to continue running at an idle speed. As the engine warms up to operating temperature, the plate should slowly open, allowing more air to enter through the top of the carburetor.
6 After a few minutes, the choke plate should be completely open to the vertical position. Blip the throttle to make sure the fast idle cam disengages.
7 You'll notice that engine speed corresponds to the plate opening. With the plate closed, the engine should run at a fast idle speed. As the plate opens and the throttle is moved to disengage the fast idle cam, the engine speed will decrease.
8 With the engine off and the throttle held half-way open, open and close the choke several times. Check the linkage to see if it's hooked up correctly and make sure it doesn't bind.
9 If the choke or linkage binds, sticks or works sluggishly, clean it with choke cleaner (an aerosol spray available at auto parts stores) **(see illustration)**. If the condition persists after cleaning, replace the troublesome parts.
10 Visually inspect all vacuum hoses to be sure they're securely connected and look for cracks and deterioration. Replace as necessary.
11 If the choke fails to operate normally, but no mechanical causes can be found, check the choke electrical circuits.

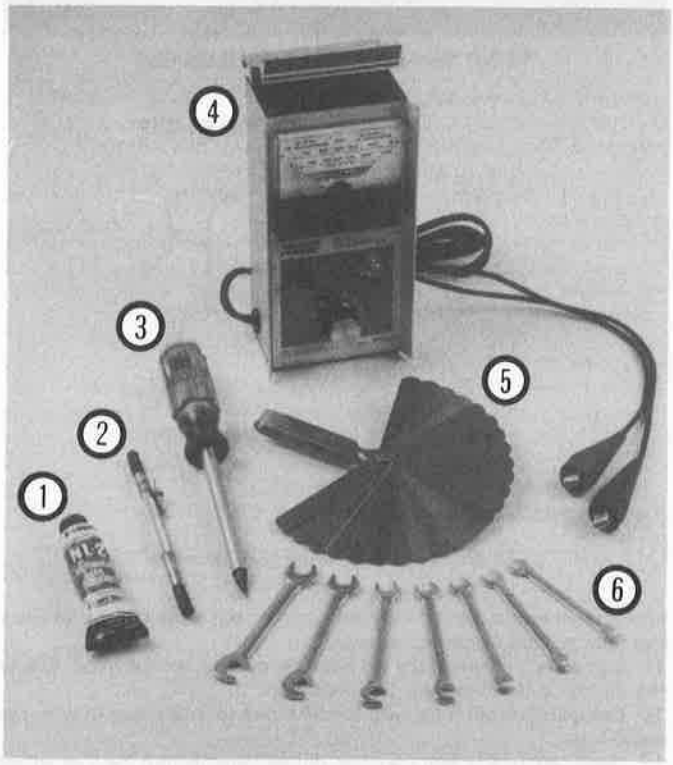


13.9 Use aerosol carburetor spray to clean the choke linkage contact areas

14 Ignition point replacement

Refer to illustration 14.1

1 The ignition points must be replaced at regular intervals on vehicles not equipped with electronic ignition. Occasionally the rubbing block will wear enough to require adjustment of the points. It's also possible to clean and dress them with a fine file, but replacement is recommended since they are relatively inaccessible and very inexpensive. Several special tools are required for this procedure **(see illustration)**.
2 After removing the distributor cap and rotor (Section 46), the ignition points are plainly visible. They can be examined by gently prying them open to reveal the condition of the contact surfaces. If they're rough, pitted, covered with oil or burned, they should be replaced, along with the condenser. **Caution:** *This procedure requires the removal of small screws which can easily fall down into the distributor. To retrieve them, the distributor would have to be removed and disassembled. Use a magnetic or spring-loaded screwdriver and be extra careful.*
3 Note how they are routed, then disconnect the primary circuit and condenser wires from the ignition point assembly quick disconnect terminal.
4 Remove the point assembly mounting screw and detach the points from the breaker plate.
5 Remove the screw and detach the condenser from the distributor body.
6 Before installing the new points and condenser, clean the breaker plate and the cam on the distributor shaft to remove all dirt, dust and oil.
7 Apply a small amount of distributor cam lube (usually supplied with the new points, but also available separately) to the cam lobes. If the cam lubricator is in good shape, several drops of oil can be applied to it instead of using distributor cam lube.
8 Position the new condenser and tighten the mounting screw securely.
9 Install the new points, but don't tighten the mounting screw completely. Make sure the peg on the point assembly fits into the hole in the breaker plate before installing the screw.
10 Reconnect the primary circuit and condenser wires.
11 *If a dwell meter is available*, hook it up by following the manufacturer's instructions.
12 Make sure the point assembly mounting screw is snug, but not tight, then insert a screwdriver into the adjustment slot.
13 Have an assistant crank the engine over with the starter while you note the dwell reading on the meter. If the dwell is incorrect, turn the screwdriver as required to bring it into the specified range, then tighten the point assembly mounting screw and recheck the dwell. Dwell angle specifications can be found at the beginning of this Chapter and on the tune-up decal in the engine compartment. If there's a discrepancy between the two, assume the tune-up decal is correct. **Note:** *When*



14.1 Tools needed for point replacement and dwell angle adjustment

1 ***Distributor cam lube*** *— Sometimes this special lubricant comes with the new points; however, its a good idea to buy a tube and have it on hand*
2 ***Screw starter*** *— This tool has special claws which hold the screw securely as it is started, which helps prevent accidental dropping of the screw*
3 ***Magnetic screwdriver*** *— Serves the same purpose as 2 above. If you do not have one of these special screwdrivers, you risk dropping the point mounting screws down into the distributor body*
4 ***Dwell meter*** *— A dwell meter is the only accurate way to determine the point setting (gap). Connect the meter according to the instructions supplied with it*
5 ***Blade-type feeler gauges*** *— These are required to set the initial point gap (space between the points when they are open)*
6 ***Ignition wrenches*** *— These special wrenches are made to work within the tight confines of the distributor. Specifically, they are needed to loosen the nut/bolt which secures the leads to the points*

adjusting the dwell, aim for the lower end of the dwell specification range. Then, as the points wear, the dwell will remain within the specified range over a longer period of time.

14 If a dwell meter isn't available, the dwell can be set close enough to allow the engine to run by adjusting the point gap. Make sure that the point rubbing block is resting on one of the high points of the cam. If it isn't, turn the ignition switch to Start in short bursts to reposition the cam. You can also turn the crankshaft with a breaker bar and socket attached to the large bolt that holds the vibration damper in place.

15 With the rubbing block on a cam high point (points open), insert the specified feeler gauge between the contact surfaces and turn the screwdriver in the adjustment slot (see Step 13) to open or close the points slightly as needed to change the gap. The gap is correct when a slight amount of drag is felt as the feeler gauge is withdrawn. Tighten the point mounting screw, then recheck the gap.

16 Check the distributor cap and rotor as described in Section 46, then install them, along with the shield (if equipped).

17 Start the engine and allow it to reach normal operating temperature, then check the dwell again. **Note:** *If you don't have a dwell meter, have the dwell checked/adjusted with a meter as soon as possible to ensure optimum performance.*

18 If the dwell isn't as specified, remove the distributor cap, readjust the dwell, reinstall the cap and check it again.

15 Valve clearance check and adjustment

1 Although the valves can be adjusted with the engine cold, it's better to adjust them with the engine hot. If they're adjusted cold they should be rechecked once the engine has warmed up and readjusted if necessary to conform to the hot engine specifications.

1600/1800/2000/2200 engine (1972 thru 1988 only)

Note: *The valves on 1988 and later 2200 engines are not adjustable.*

Refer to illustrations 15.3, 15.4 and 15.7

2 Run the engine until normal operating temperature is reached. Remove the rocker arm cover from the engine as described in Chapter 2.

3 Position the number one piston at top dead center (TDC) on the compression stroke (see Chapter 2). The valve clearances for valves 1 and 2 intake and 1 and 3 exhaust can now be checked **(see illustration)**.

4 Insert the specified feeler gauge between the valve stem and the adjusting screw. If the feeler gauge fits between the stem and screw with a slight amount of drag, the clearance is correct **(see illustration)**.

5 If adjustment is required, loosen the adjusting screw locknut and carefully loosen or tighten the adjusting screw until you feel a slight drag on the feeler gauge as it's withdrawn from between the valve stem and screw.

6 Hold the adjusting screw and tighten the locknut securely. Recheck the clearance to make sure it didn't change.

7 Turn the crankshaft one complete revolution (360-degrees) clockwise so the number four piston is at TDC on the compression stroke. Verify this by checking where the distributor rotor is pointing. Adjust the number 3 and 4 intake and 2 and 4 exhaust valves **(see illustration)**.

8 Install the rocker arm cover.

1988 and earlier (carbureted) 2600 engine (jet valve only)

Refer to illustration 15.13

Note: *1989 and later (2600i) engines do not require periodic valve adjustment).*

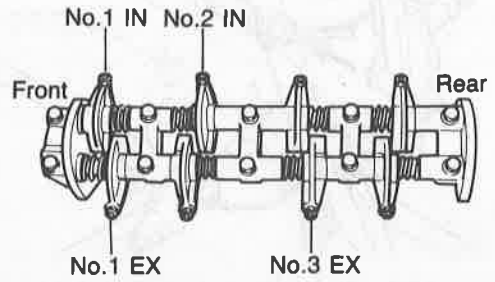
9 Only the small jet valves require adjustment on this engine because the intake and exhaust valves are actuated by self adjusting hydraulic lifters.

10 With the engine at normal operating temperature and the rocker arm cover removed, position the number 1 cylinder at top dead center (TDC) on the compression stroke.

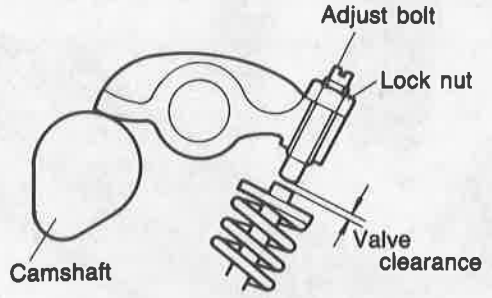
11 On the number 1 cylinder, loosen the jet valve locknut and back off the adjusting screw.

12 Turn the jet valve adjusting screw counterclockwise and insert the appropriate size feeler gauge between the jet valve stem and the adjusting screw.

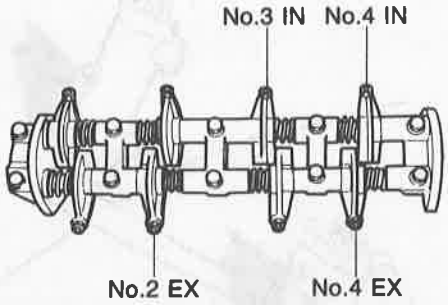
13 Carefully tighten the adjusting screw until you feel a slight drag on the feeler gauge as you withdraw it from between the stem and the adjusting screw **(see illustration)**. Since the jet valve spring is



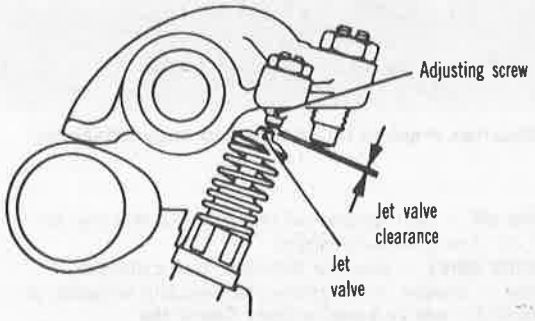
15.3 With the number 1 piston at Top Dead Center (TDC), these valves can be adjusted (1986 and later models shown)



15.4 Insert a feeler gauge between the valve stem and the rocker arm and adjust the valve clearance by turning the adjusting bolt with a screwdriver after loosening the locknut



15.7 When the number 4 piston is at TDC, adjust these valves (1986 and later models shown)



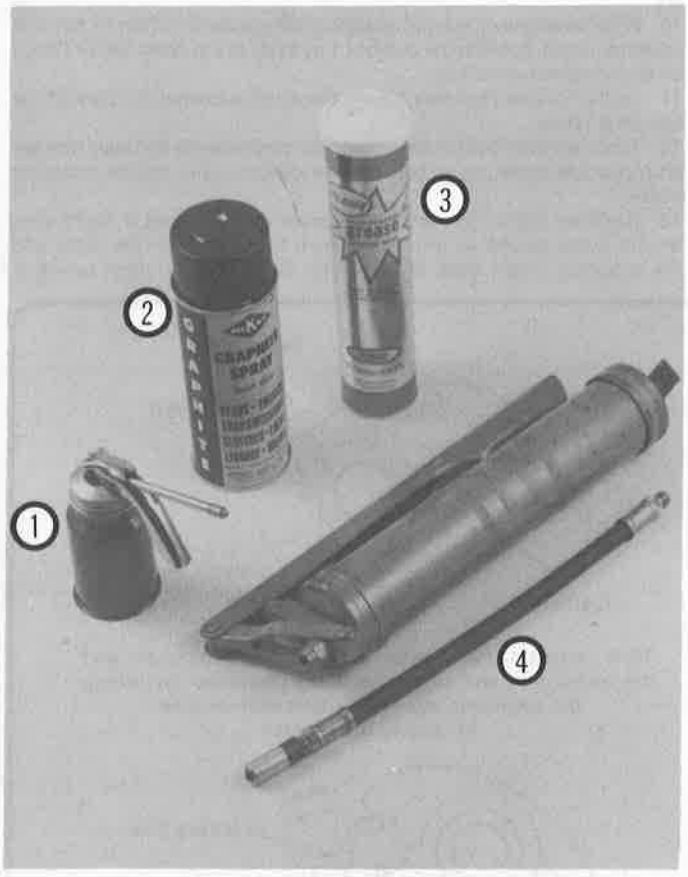
15.13 Jet valve adjustment details (2600 engine)

relatively weak, use special care not to force the valve open.
14 Hold the adjusting screw with a screwdriver and tighten the locknut. Recheck the clearance to make sure it hasn't changed.
15 Repeat the procedure for the remaining jet valves, following the firing order of 1-3-4-2.

16 Chassis lubrication

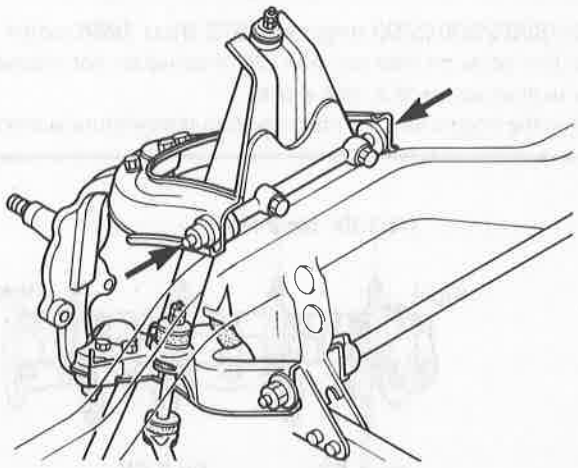
Refer to illustrations 16.1, 16.3a and 16.3b

1 A grease gun and cartridge filled with the recommended grease are the only items required for chassis lubrication other than some clean rags and equipment needed to raise and support the vehicle safely **(see illustration)**.
2 There are several points on the vehicle's suspension, steering and drivetrain components that must be periodically lubricated with lithium or moly based multi-purpose grease. Included are the upper suspension idler arm, the arm shafts on the steering linkage and, on some 4WD models, the front and rear driveshafts.
3 The grease points for each upper suspension arm shaft **(see illustration)** are accessible by removing the front wheel and tire. The steering linkage idler arm is designed to be lubricated **(see illustration)** and the driveshaft sleeve yoke(s) and some universal joints require lubrication as well.
4 For easier access under the vehicle, raise it with a jack and place jackstands under the frame. Make sure the vehicle is safely supported on the stands!
5 If grease fittings aren't already installed, the plugs will have to be removed and fittings screwed into place.
6 Force a little of the grease out of the gun nozzle to remove any dirt, then wipe it clean with a rag.
7 Wipe the grease fitting and push the nozzle firmly over it. Squeeze the trigger on the grease gun to force grease into the component. Both the balljoints and swivel joints should be lubricated until the rubber reservoir is firm to the touch. Don't pump too much grease into the fittings or it could rupture the reservoir. If the grease seeps out around the grease gun nozzle, the fitting is clogged or the nozzle isn't seated all the way. Resecure the gun nozzle to the fitting and try again. If necessary, replace the fitting.
8 Wipe excess grease from the components and the grease fittings.
9 While you're under the vehicle, clean and lubricate the parking brake cable along with the cable guides and levers. This can be done by smearing some of the chassis grease onto the cable and its related parts with your fingers.
10 Lower the vehicle to the ground for the remaining body lubrication process.
11 Open the hood and rear gate and smear a little chassis grease on the latch mechanisms. Have an assistant pull the release knob from inside the vehicle as you lubricate the cable at the latch.
12 Lubricate all the hinges (door, hood, hatch) with a few drops of light engine oil to keep them in proper working order.
13 The key lock cylinders can be lubricated with spray-on graphite, which is available at auto parts stores.

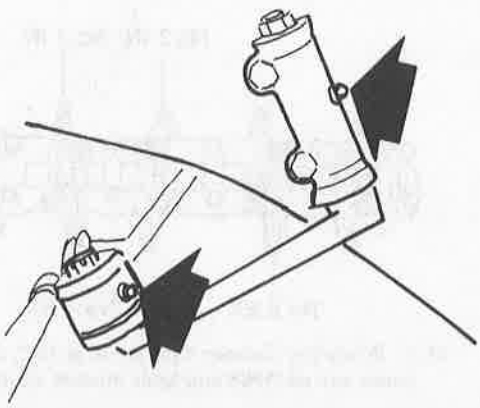


16.1 Materials required for chassis and body lubrication

1 ***Engine oil*** *— Light engine oil in a can like this can be used for door and hood hinges*
2 ***Graphite spray*** *— Used to lubricate lock cylinders*
3 ***Grease*** *— Grease, in a variety of types and weights, is available for use in a grease gun. Check the Specifications for your requirements*
4 ***Grease gun*** *— A common grease gun, shown here with a detachable hose and nozzle, is needed for chassis lubrication. After use, clean it thoroughly!*



16.3a Upper suspension arm shaft lubrication points (arrows)



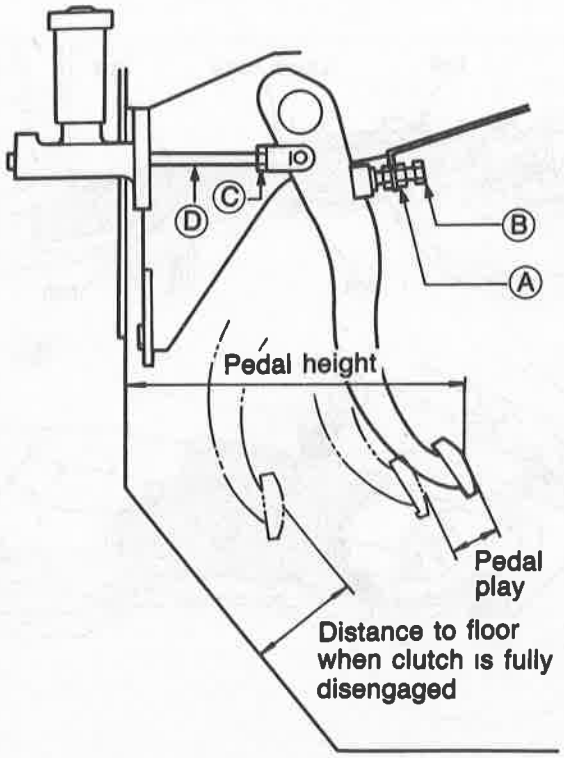
16.3b Idler arm lubrication fittings (arrows)

17 Suspension and steering check

1 Indications of a fault in these systems are excessive play in the steering wheel before the front wheels react, excessive sway around corners, body movement over rough roads or binding at some point as the steering wheel is turned.
2 Raise the front of the vehicle periodically and visually check the suspension and steering components for wear. Because of the work to be done, make sure the vehicle cannot fall from the stands.
3 Check the wheel bearings. Do this by spinning the front wheels. Listen for any abnormal noises and watch to make sure the wheel spins true (doesn't wobble). Grab the top and bottom of the tire and pull in-and-out on it. Notice any movement which would indicate a loose wheel bearing assembly. If the bearings are suspect, refer to Sections 40 and 41 and Chapter 10 for more information.
4 From under the vehicle check for loose bolts, broken or disconnected parts and deteriorated rubber bushings on all suspension and steering components. Look for grease or fluid leaking from the steering assembly. Check the power steering hoses and connections for leaks.
5 On 4WD models, check the fornt wheel driveaxle CV joint boots for damage, leaks and tight clamps.
6 Have an assistant turn the steering wheel from side-to-side and check the steering components for free movement, chafing and binding. If the steering doesn't react with the movement of the steering wheel, try to determine where the slack is located.

18 Exhaust system check

1 With the engine cold (at least three hours after the vehicle has been driven), check the complete exhaust system from the manifold to the end of the tailpipe. Be careful around the catalytic converter, which may be hot even after three hours. The inspection should be done with the vehicle on a hoist to permit unrestricted access. If a hoist isn't available, raise the vehicle and support it securely on jackstands.
2 Check the exhaust pipes and connections for signs of leakage and/or corrosion indicating a potential failure. Make sure that all brackets and hangers are in good condition and tight.
3 Inspect the underside of the body for holes, corrosion, open seams, etc. which may allow exhaust gases to enter the passenger compartment. Seal all body openings with silicone sealant or body putty.
4 Rattles and other noises can often be traced to the exhaust system, especially the hangers, mounts and heat shields. Try to move the pipes, mufflers and catalytic converter. If the components can come in contact with the body or suspension parts, secure the exhaust system with new brackets and hangers.



19.2 Clutch pedal adjusting details

19 Clutch pedal height and free play check and adjustment

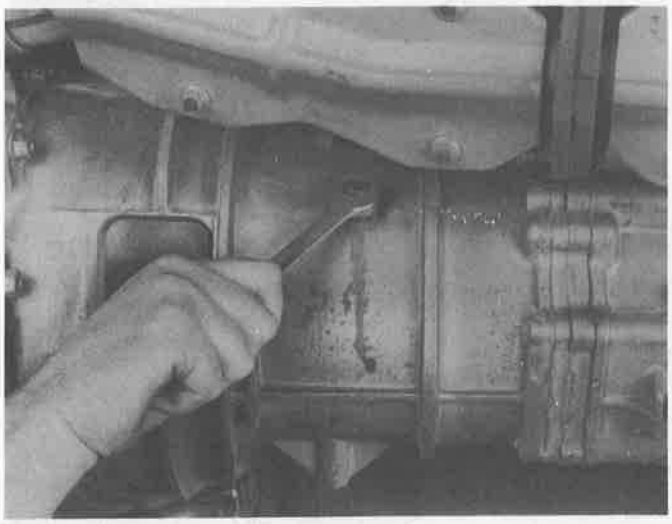
Refer to illustration 19.2

1 On vehicles equipped with a manual transmission, the clutch pedal height and free play must be correctly adjusted.
2 The height of the clutch pedal is the distance the pedal pad sits off the dash bracket **(see illustration)**. The distance should be as specified. If the pedal height is not within the specified range, loosen the locknut (A) on the pedal stopper located to the rear of the clutch pedal and turn the stopper in or out until the pedal height is correct. Retighten the locknut.
3 The free play is the pedal slack, or the distance the pedal can be depressed before it begins to have any effect on the clutch (pedal play in illustration 19.2). The distance should be as specified. If it isn't, loosen the locknut (C) on the clutch master cylinder pushrod, turn the pushrod (D) until the free play is correct, then retighten the locknut.

20 Manual transmission oil level check

Refer to illustration 20.1

1 Manual transmissions don't have a dipstick. The oil level is checked by removing a plug from the side of the transmission case **(see illustration)**. Locate the plug and use a rag to clean the plug and the area around it. If the vehicle is raised to gain access to the plug, be sure to support it safely on jackstands – DO NOT crawl under the vehicle when it's supported only by a jack!
2 With the engine and transmission cold, remove the plug. If lubricant immediately starts leaking out, thread the plug back into the transmission – the level is correct. If it doesn't, completely remove the plug and reach inside the hole with your little finger. The level should be



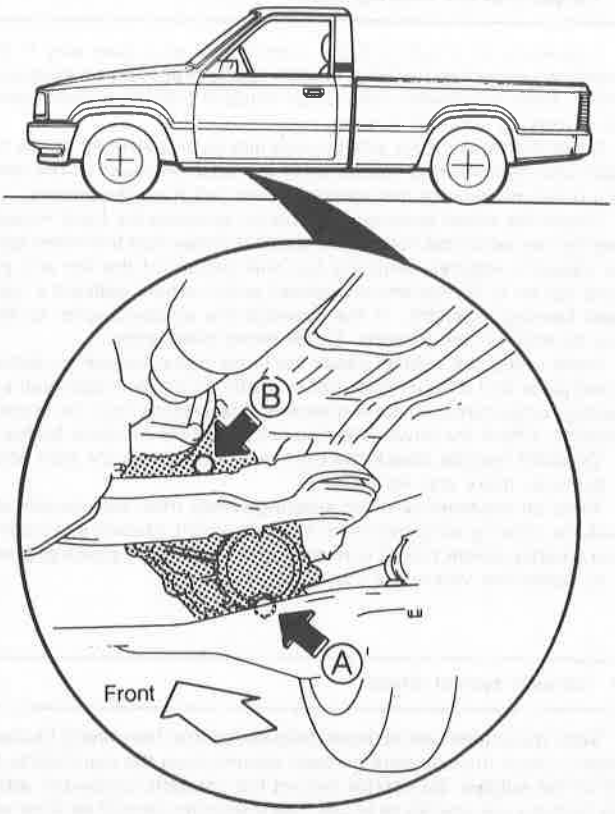
20.1 The manual transmission fill plug is accessible from under the vehicle

even with the bottom of the plug hole.
3 If the transmission needs more lubricant, use a syringe or small pump to add it through the plug hole.
4 Thread the plug back into the transmission and tighten it securely. Drive the vehicle, then check for leaks around the plug.

21 Transfer case oil level check

Refer to illustration 21.1

1 The transfer case oil level is checked by removing a plug from the rear of the case **(see illustration)**. Remove the rock guard (if equipped), then locate the plug and use a rag to clean the plug and the area around it. If the vehicle is raised to gain access to the plug, be sure to support it safely on jackstands — DO NOT crawl under the vehicle when it's supported only by a jack!
2 With the engine and transfer case cold, remove the plug. If lubricant immediately starts leaking out, thread the plug back into the case — the level is correct. If it doesn't, completely remove the plug and reach inside the hole with your little finger. The level should be even with the bottom of the plug hole.
3 If more oil is needed, use a syringe or small pump to add it through the opening.
4 Thread the plug back into the case and tighten it securely. Drive the vehicle, then check for leaks around the plug. Install the rock guard.

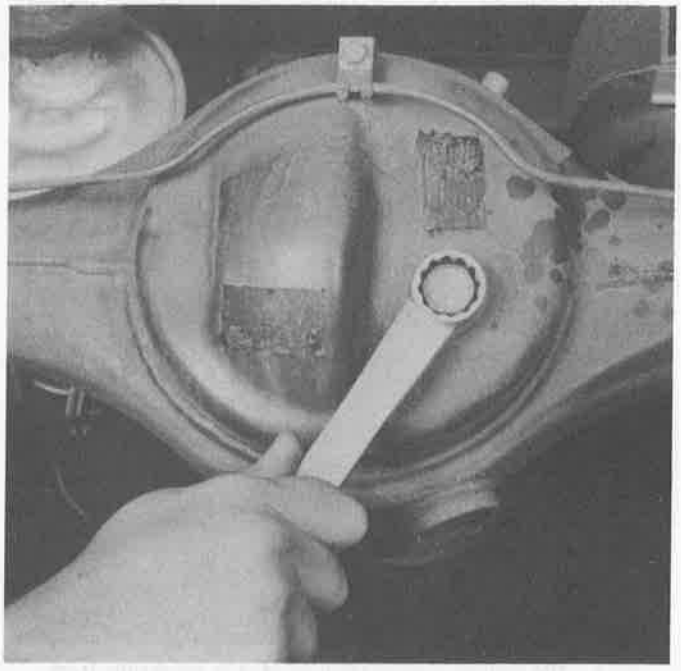


21.1 It may be necessary to remove the transfer case rock guard for access to the oil check/fill plug (B) — DO NOT remove the drain plug (A)

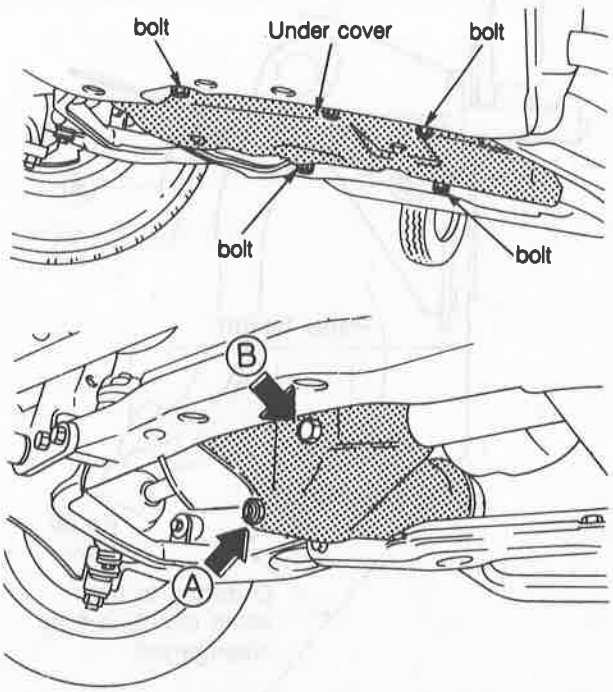
22 Differential oil level check

Refer to illustrations 22.2a and 22.2b

1 The differential has a check/fill plug which must be removed to check the oil level. If the vehicle is raised to gain access to the plug, be sure to support it safely on jackstands — DO NOT crawl under the vehicle when it's supported only by a jack.
2 Remove the oil check/fill plug from the differential **(see illustrations)**.
3 The oil level should be at the bottom of the plug opening. If not, use a syringe to add the recommended lubricant until it just starts to run out of the opening.
4 Install the plug and tighten it securely.



22.2a Removing the rear differential check/fill plug



22.2b Remove the under cover to gain access to the front differential oil check/fill plug (B) — DO NOT remove the drain plug (A)

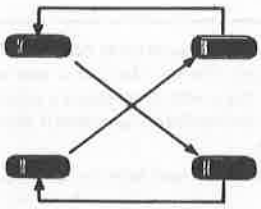
23 Tire rotation

Refer to illustration 23.2

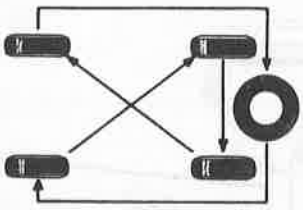
1 The tires should be rotated at the specified intervals and whenever uneven wear is noticed.
2 Refer to the accompanying illustration for the preferred tire rotation pattern.
3 Refer to the information in *Jacking and towing* at the front of this manual for the proper procedures to follow when raising the vehicle and changing a tire. If the brakes are to be checked, don't apply the parking brake as stated. Make sure the tires are blocked to prevent the vehicle from rolling as it's raised.
4 Preferably, the entire vehicle should be raised at the same time. This can be done on a hoist or by jacking up each corner and then lowering the vehicle onto jackstands placed under the frame rails. Always use four jackstands and make sure the vehicle is safely supported.
5 After rotation, check and adjust the tire pressures as necessary and be sure to check the lug nut tightness.
6 For additional information on the wheels and tires, refer to Chapter 10.

BIAS AND BIAS BELTED TIRES

4 wheel rotation

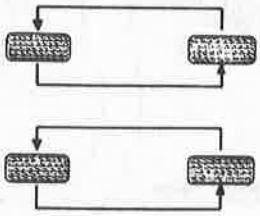


5 wheel rotation

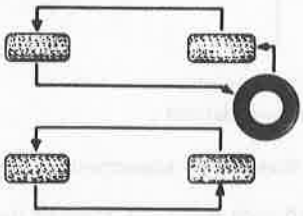


RADIAL TIRES

4 wheel rotation



5 wheel rotation



23.2 Tire rotation diagram

24 Brake check

Refer to illustrations 24.5, 24.11, 24.13 and 24.22

Note: *For detailed photographs of the brake system, refer to Chapter 9.*

1 In addition to the specified intervals, the brakes should be inspected every time the wheels are removed or whenever a defect is suspected.
2 To check the brakes, raise the vehicle and place it securely on jackstands. Remove the wheels (see *Jacking and towing* at the front of the manual, if necessary).

Disc brakes

3 Disc brakes are used on the front wheels of later models. Extensive rotor damage can occur if the pads are not replaced when needed.
4 The disc brake calipers, which contain the pads, are visible with the wheels removed. There is an outer pad and an inner pad in each caliper. All pads should be inspected.
5 The caliper has a "window" to inspect the pads. Check the thickness of the lining by looking into the caliper at each end and down through the inspection window at the top of the housing **(see illustration)**. If the wear sensor is very close to the rotor or the pad material has worn to about 1/8-inch or less, the pads require replacement.
6 If you are unsure about the exact thickness of the remaining lining material, remove the pads for further inspection or replacement (refer to Chapter 9).
7 Before installing the wheels, check for leakage and/or damage (cracking, splitting, etc.) around the brake hose connections. Replace the hose or fittings as necessary, referring to Chapter 9.
8 Check the condition of the rotor. Look for scoring, gouging and burned spots. If these conditions exist, the hub/rotor assembly should be removed for servicing (Chapter 9).

Drum brakes

9 On front drum brakes, remove the hub/drum (see Section 39).
10 On rear brakes, remove retaining screws (early models) and remove the drum by pulling it off the axle and brake assembly. If this proves difficult, make sure the parking brake is released, then squirt penetrating oil around the center hub areas. Allow the oil to soak in and try again to pull the drum off. If the drum still cannot be pulled off, the brake shoes will have to be adjusted. This is done by first removing the plugs from the backing plate.

24.5 The disc brake pads are visible through the opening slot in the caliper

11 Push the lever off the star wheel and then use a small screwdriver to turn the star wheel, which will move the linings away from the drum **(see illustration)**.
12 With the drum removed, do not touch any brake dust. **Warning:** *Brake system dust contains asbestos, which is harmful to your health. Never blow it out with compressed air and do not inhale any of it.*
13 Note the thickness of the lining material on both the front and rear brake shoes. If the material has worn away to within 1/32-inch of the recessed rivets or metal backing, the shoes should be replaced **(see illustration)**. The shoes should also be replaced if they are cracked, glazed (shiny surface) or wet with brake fluid.
14 Check that all the brake assembly springs are connected and in good condition.
15 Check the brake components for any signs of fluid leakage. With your finger, carefully pry back the rubber cups on the wheel cylinders located at the top of the brake shoes. Any leakage is an indication that the wheel cylinders should be overhauled immediately (Chapter 9). Also check brake hoses and connections for signs of leakage.
16 Wipe the inside of the drum with a clean rag and brake cleaner or denatured alcohol. Again, be careful not to breath the dangerous asbestos dust.
17 Check the inside of the drum for cracks, score marks, deep scratches and hard spots, which will appear as small discolorations. If these imperfections cannot be removed with fine emery cloth, the drum must be taken to a machine shop equipped to turn the drums.
18 If after the inspection process all parts are in good working condition, reinstall the brake drum (using a metal or rubber plug if the knockout was removed).
19 Install the wheels and lower the vehicle.

Parking brake

20 The parking brake operates from a hand lever and locks the rear brake system. The easiest, and perhaps most obvious method of periodically checking the operation of the parking brake assembly is to park the vehicle on a steep hill with the parking brake set and the transmission in Neutral. If the parking brake cannot prevent the vehicle from rolling, it is in need of adjustment (see Chapter 9).

Brake pedal height

21 The brakes should be periodically checked for pedal height, which is the distance the brake pedal moves toward the floor from a fully released position. The brakes must be cold while performing this test.
22 Using a ruler, measure the distance from the floor to the brake pedal **(see illustration)**.
23 Pump the brakes at least three times. On power brake models do this without starting the engine. Press firmly on the brake pedal and measure the distance between the floor and the pedal.
24 The distance the pedal travels should not exceed specifications.
25 To adjust the pedal height, unplug the stop light switch, loosen the locknut and turn the switch until the specified height is achieved. Tighten the locknut.

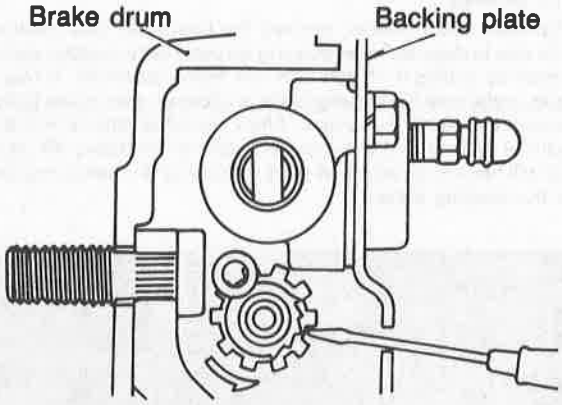
Brake pedal free travel

26 The distance the brake pedal moves before resistance is felt is free travel **(see illustration 24.22)**.
27 To adjust the free travel, loosen the brake pushrod locknut and turn the pushrod until the specified free travel is reached. Tighten the locknut.

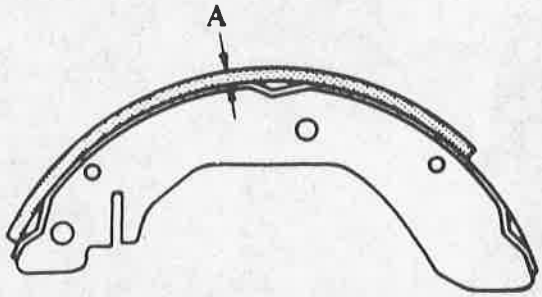
25 Fuel system check

Warning: *There are certain precautions to take when inspecting or servicing the fuel system components. Work in a well ventilated area and don't allow open flames (cigarettes, appliance pilot lights, etc.) in the work area. Mop up spills immediately and don't store fuel soaked rags where they could ignite.*

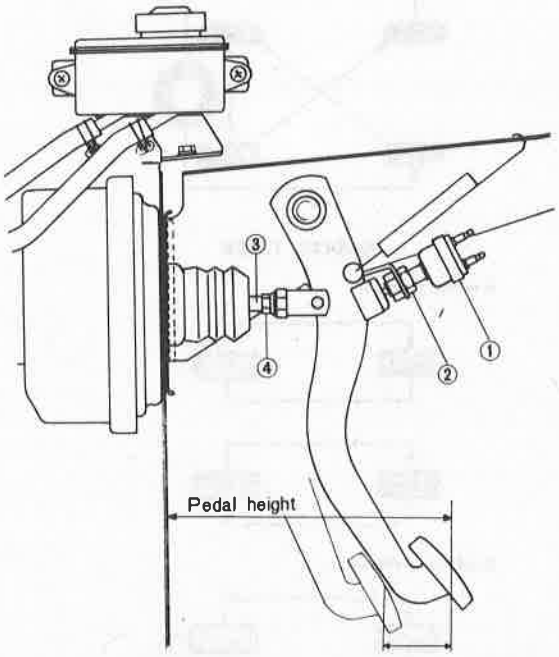
1 On most models the main fuel tank is located at the rear of the vehicle.



24.11 Back off the brake drum adjuster with a screwdriver (the adjuster locking lever must be held away from the starwheel with a punch or rod)



24.13 The rear brake shoe lining thickness (A) is measured from the outer surface of the lining to the metal shoe



24.22 Brake pedal adjustment details

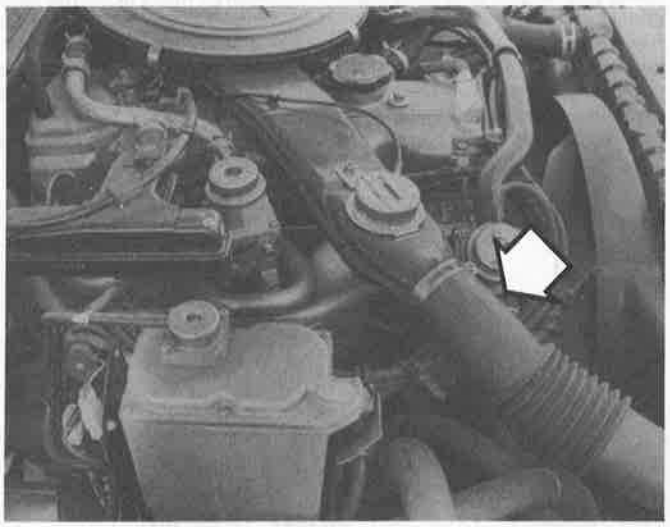
1 Stoplight switch (turn to adjust height)
2 Stoplight switch locknut
3 Pushrod (turn to adjust free travel)
4 Locknut

2 The fuel system should be checked with the vehicle raised on a hoist so the components underneath the vehicle are readily visible and accessible.
3 If the smell of gasoline is noticed while driving or after the vehicle has been in the sun, the system should be thoroughly inspected immediately.
4 Remove the gas tank cap and check for damage, corrosion and an unbroken sealing imprint on the gasket. Replace the cap with a new one if necessary.
5 With the vehicle raised, check the gas tank and filler neck for punctures, cracks and other damage. The connection between the filler neck and the tank is especially critical. Sometimes a rubber filler neck will leak due to loose clamps or deteriorated rubber, problems a home mechanic can usually rectify. **Warning:** *Do not, under any circumstances, try to repair a fuel tank yourself (except rubber components). A welding torch or any open flame can easily cause the fuel vapors to explode if the proper precautions are not taken!*
6 Carefully check all rubber hoses and metal lines leading away from the fuel tank. Look for loose connections, deteriorated hoses, crimped lines and other damage. Follow the lines to the front of the vehicle, carefully inspecting them all the way. Repair or replace damaged sections as necessary.
7 If a fuel odor is still evident after the inspection, refer to Chapter 6 and check the EEC system.

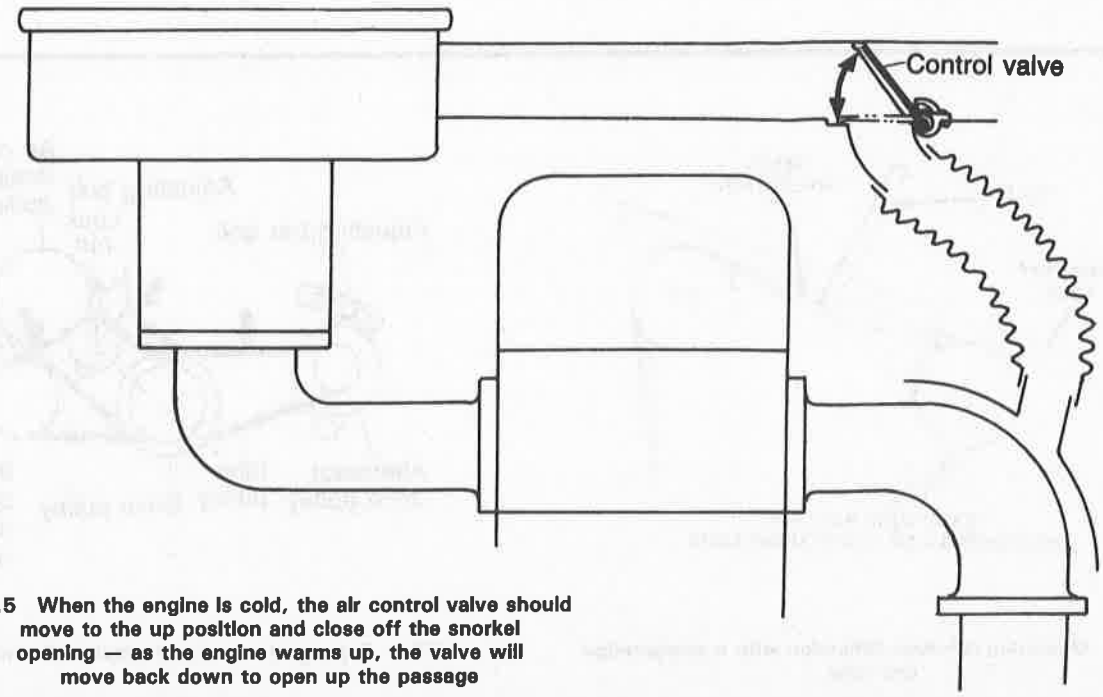
26 Thermostatic air cleaner check

Refer to illustrations 26.4 and 26.5

1 All models are equipped with a thermostatically controlled air cleaner, which draws air to the carburetor from different locations depending on engine temperature.
2 This is a simple visual check. However, if access is tight, a small mirror may have to be used.
3 Open the hood and find the air control valve on the air cleaner assembly. It's located inside the long snorkel portion of the metal air cleaner housing.
4 If there's a flexible air duct attached to the end of the snorkel, disconnect it so you can look through the end of the snorkel and see the air control valve inside **(see illustration)**. A mirror may be needed if you can't safely look directly into the end of the snorkel.
5 The check should be done when the engine and outside air are cold. Start the engine and watch the air control valve, which should move up and close off the snorkel air passage. With the valve closed, air can't enter through the end of the snorkel, but instead enters the air cleaner through the hot air duct attached to the exhaust manifold **(see illustration)**.
6 As the engine warms up to operating temperature, the valve should open to allow air through the snorkel end. Depending on outside air temperature, this may take 10 to 15 minutes. To speed up the check you can reconnect the snorkel air duct, drive the vehicle and then check the position of the valve.
7 If the thermostatic air cleaner isn't operating properly, see Chapter 6 for more information.



26.4 Remove the flexible air inlet duct from the air cleaner to check the thermostatic system



26.5 When the engine is cold, the air control valve should move to the up position and close off the snorkel opening — as the engine warms up, the valve will move back down to open up the passage

27 Drivebelt check, adjustment and replacement

Refer to illustrations 27.3, 27.4 and 27.6

1 The drivebelts, or V-belts as they are often called, are located at the front of the engine and play an important role in the overall operation of the engine and accessories. Due to their function and material make-up, the belts are prone to failure after a period of time and should be inspected and adjusted periodically to prevent major engine damage.

2 The number of belts used on a particular vehicle depends on the accessories installed. Drivebelts are used to turn the alternator, power steering pump (some models), water pump and air conditioning compressor. Depending on the pulley arrangement, more than one of the components may be driven by a single belt.

3 With the engine off, locate the drivebelts at the front of the engine. Using your fingers (and a flashlight, if necessary), move along the belts checking for cracks and separation of the belt plies. Also check for fraying and glazing, which gives the belt a shiny appearance **(see illustration)**. Both sides of each belt should be inspected, which means you'll have to twist each belt to check the underside. Check the pulleys for nicks, cracks, distortion and corrosion.

4 The tension of each belt is checked by pushing on it at a distance halfway between the pulleys. Push firmly with your thumb and see how much the belt moves (deflects) **(see illustration)**. A rule of thumb is that if the distance from pulley center-to-pulley center is between 7 and 11 inches, the belt should deflect 1/4-inch. If the belt travels between pulleys spaced 12-to-16 inches apart, the belt should deflect 1/2-inch.

5 If adjustment is needed, either to make the belt tighter or looser, it's done by moving the belt-driven accessory on the bracket.

6 Each component usually has an adjusting bolt and a pivot bolt. Both bolts must be loosened slightly to enable you to move the component. Some components have an adjusting bolt that can be turned to change the belt tension after the mounting bolt is loosened **(see illustration)**.

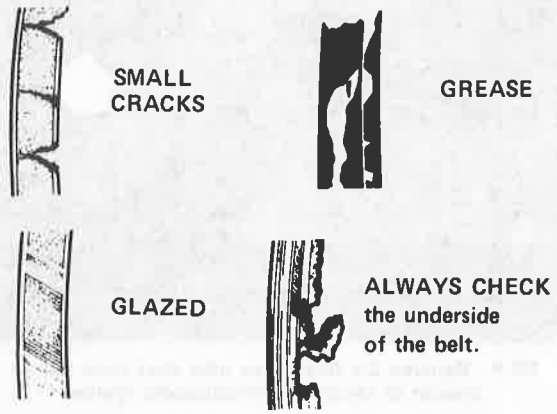
7 After the two bolts have been loosened, move the component away from the engine to tighten the belt or toward the engine to loosen the belt. Hold the accessory in position and check the belt tension. If it's correct, tighten the two bolts until just snug, then recheck the tension. If the tension is correct, tighten the bolts.

8 You may have to use some sort of pry bar to move the accessory while the belt is adjusted. If this must be done to gain the proper leverage, be very careful not to damage the component being moved or the part being pried against.

9 To replace a belt, follow the above procedures for drivebelt adjustment but slip the belt off the pulleys and remove it. Since belts tend to wear out more or less at the same time, it's a good idea to replace all of them at the same time. Mark each belt and the corresponding pulley grooves so the replacement belts can be installed properly.

10 Take the old belts with you when purchasing new ones in order to make a direct comparison for length, width and design.

11 Adjust the belts as described earlier in this Section.



27.3 Here are some of the more common problems associated with drivebelts (check the belts very carefully to prevent an untimely breakdown)

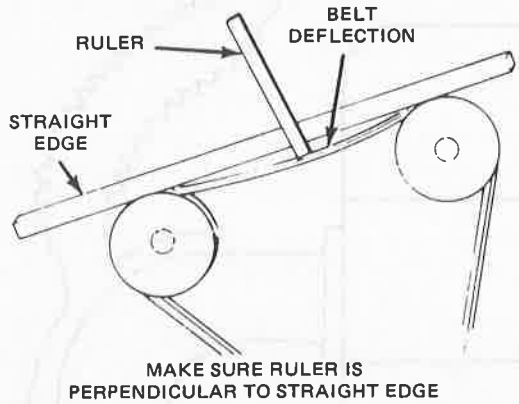
28 Seatbelt check

1 Check the seatbelts, buckles, retractors and anchors for any obvious damage or signs of wear.

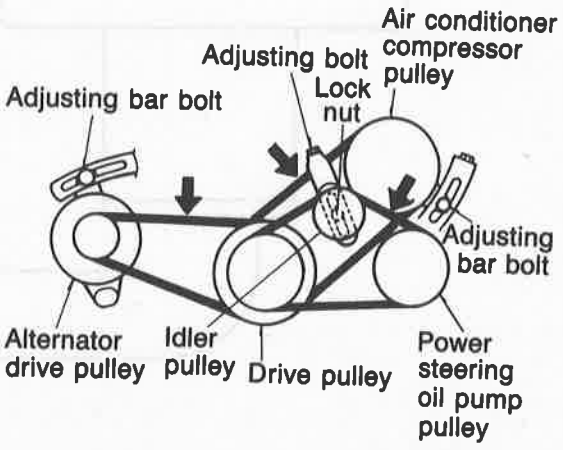
2 Make sure the seatbelt reminder light comes on when the key is turned on.

3 The seatbelts are designed to lock up during a sudden stop or impact, yet allow free movement during normal driving. The retractors should hold the belt against your chest while driving and rewind the belt when the buckle is unlatched.

4 If any of the above checks reveal problems with the seatbelt system, replace parts as necessary.



27.4 Measuring drivebelt deflection with a straightedge and ruler



27.6 Typical later model drivebelt adjustment points

29 Air filter and PCV filter replacement

Refer to illustrations 29.4 and 29.6

1 At the specified intervals, the air filter should be replaced with a new one. A thorough program of preventative maintenance would also call for the filter to be inspected periodically between changes, especially if the vehicle is often driven in dusty conditions.
2 The air filter is located inside the air cleaner which is mounted on top of the carburetor or, on fuel injection-equipped models, in a housing on the driver's side of the engine compartment.
3 Remove the wingnut or bolts that hold the top plate or cover to the air cleaner body, release any clips and lift it off.
4 Lift the air filter out of the housing **(see illustration)**. If it's covered with dirt, replace it with a new one.
5 Wipe out the inside of the air cleaner housing with a rag.
6 Pull out the old PCV filter (if equipped) and press a new one into the housing **(see illustration)**.
7 Place the new filter into the air cleaner housing.
8 Reinstall the top plate on the air cleaner housing and install the nut/bolts and clips.

30 Fuel filter replacement

Refer to illustration 30.4

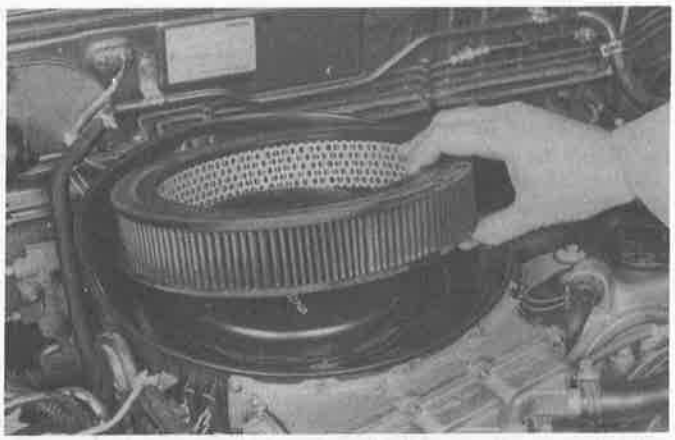
***Warning:** Gasoline is extremely flammable, so extra precautions must be taken when working on any part of the fuel system. DO NOT smoke or allow open flames or bare light bulbs near the work area. Also, don't work in a garage if a natural gas appliance (such as a water heater or clothes dryer) is present.*

1 This job should be done with the engine cold (after sitting for three hours). Place a metal container, rags or newspapers under the filter to catch spilled fuel.
2 Disconnect the cable from the negative battery terminal.
3 Locate the fuel filter, which is located under the vehicle, near the gas tank on early models, or on later models, is mounted on the inner fender panel (carburetor) or on the firewall near the windshield wiper motor (fuel injection).
4 On fuel injected models, depressurize the fuel system (Chapter 4, Section 10). Loosen the clamps and slide the hoses off **(see illustrations)**. Allow the fuel to drain out of the filter.
5 Pull the filter out of the clip (carbureted) or remove the bolts and detach the filter from the bracket (fuel injected), (note the directions of any arrows on the housing). Install the new filter, then hook up the hoses and tighten the clamps securely.

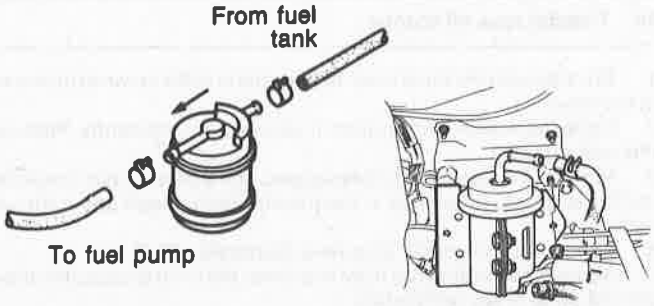
31 Evaporative emissions control system check

Refer to illustration 31.2

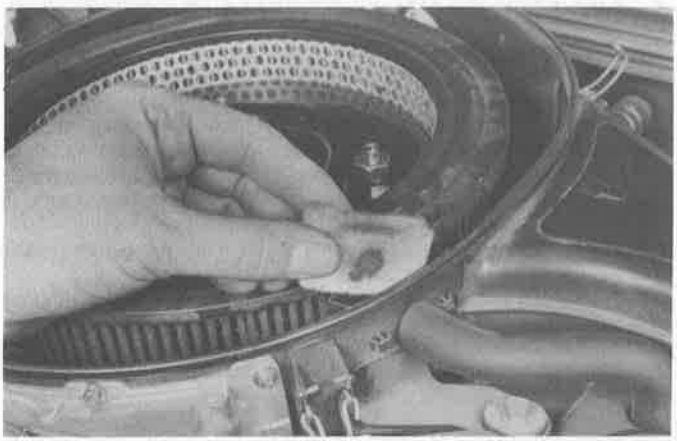
1 The function of the evaporative emissions control system is to draw fuel vapors from the gas tank and fuel system, store them in a charcoal canister and route them to the intake manifold during normal engine operation.
2 The most common symptom of a fault in the evaporative emissions system is a strong fuel odor in the engine compartment. If a fuel odor is detected, inspect the canister, located in the engine compartment **(see illustration)**. Check the canister and all hoses for damage



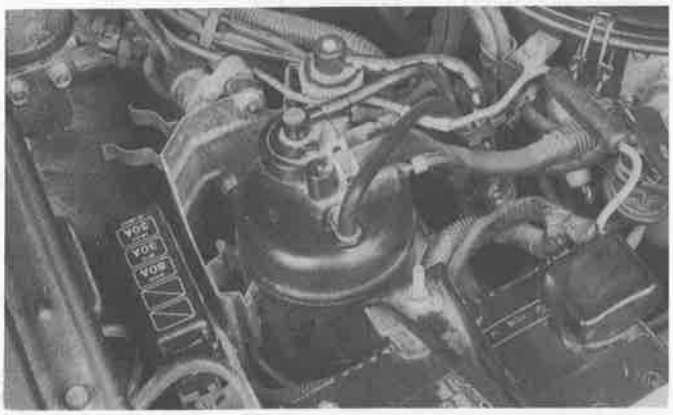
29.4 After the top plate has been removed from the air cleaner housing, lift the air filter out of position — be careful not to drop any dirt, tools, etc. down the center of the carburetor



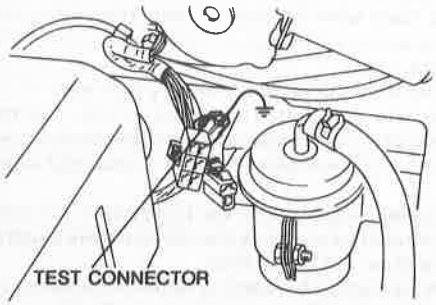
30.4 Fuel filter details (carbureted models – left, fuel injected model – right)



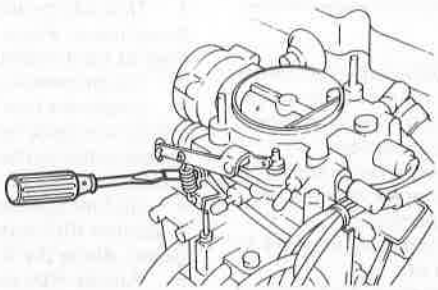
29.6 On models so equipped, grasp the PCV filter and pull it out of the housing inside the air cleaner



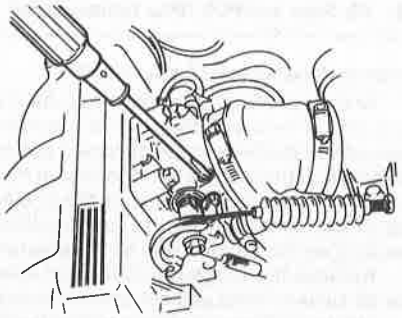
31.2 The evaporative emissions canister is located in the engine compartment — inspect the various hoses attached to it and check the canister itself for damage



33.2 On fuel injected models, ground the test connector before checking the idle speed or ignition timing



33.8a Use a screwdriver to the turn the idle speed adjustment screw on the carburetor



33.8b Adjust the idle speed on fuel injected models by turning the adjusting screw on the top of the throttle body

and deterioration.
3 The evaporative emissions control system is explained in more detail in Chapter 6.

32 Carburetor mounting nut torque check

1 The carburetor is attached to the top of the intake manifold by several bolts or nuts. The fasteners can sometimes work loose from vibration and temperature changes during normal engine operation and cause a vacuum leak.
2 If you suspect that a vacuum leak exists at the bottom of the carburetor or throttle body, obtain a two-foot length of fuel line hose. Start the engine and place one end of the hose next to your ear as you probe around the base with the other end. You'll hear a hissing sound if a leak exists (be careful of hot or moving engine components).
3 Remove the air cleaner assembly, tagging each hose that's disconnected with a piece of numbered tape to make reassembly easier.
4 Locate the mounting nuts or bolts at the base of the carburetor. Decide what special tools or adapters will be necessary, if any, to tighten the fasteners.
5 Tighten the nuts or bolts securely. Don't overtighten them, as the threads could strip.
6 If, after the nuts or bolts are properly tightened, a vacuum leak still exists, the carburetor must be removed and a new gasket installed. See Chapter 4 for more information.
7 After tightening the fasteners, reinstall the air cleaner and return all hoses to their original positions.

33 Idle speed check and adjustment

Refer to illustrations 33.2, 33.8a and 33.8b

1 Engine idle speed is the speed at which the engine operates when no throttle pressure is applied. The idle speed is critical to the performance of the engine, as well as many engine sub-systems.
2 A hand-held tachometer must be used when adjusting the idle speed to get an accurate reading. The exact hook-up for these meters varies with the manufacturer, so follow the particular directions included. On fuel injected models, use a jumper wire to ground the green test connector to the body **(see illustration)**. Fuel injected models also have a tachometer check connector to make this easier.
3 Set the parking brake and block the wheels. Be sure the transmission is in Neutral (manual trans) or Park (automatic trans).
4 Turn off the air conditioner (if equipped), the headlights and any other accessories during this procedure.
5 Start the engine and allow it to reach operating temperature.
6 On automatic transmission equipped models, have an assistant shift to Drive while keeping the brake pedal firmly depressed. Place manual transmission equipped vehicles in Neutral.
7 Check the engine idle speed with the tachometer and compare it to the VECI label.
8 If the idle speed is not correct, turn the idle speed adjusting screw until the idle speed is correct **(see illustrations)**.
9 After adjustment, shift the automatic transmission into Park and turn the engine off. On fuel injected models, remove the jumper wire and plug in the test connector.

34 Idle speed switch (1985 through 1988 2000/2200 engine) – check and adjustment

Refer to illustration 34.2

1 With the engine idling at normal operating temperature, connect a tachometer to the engine.
2 Connect a voltmeter to the terminals (LgB on 1985 through 1987 models, LgR for 1988 models) **(see illustration)**.
3 Increase the speed of the engine above 2000 rpm and then allow it to gradually decelerate.
4 Check the voltmeter reading with the engine at idle and then above 1000 to 1200 rpm to make sure they are as specified. If they are not, turn the adjusting screw **(see illustration 34.2)**.

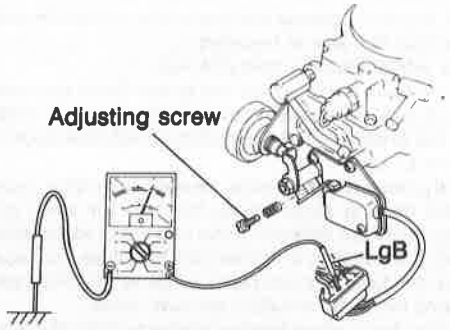
35 Carburetor float level (1600/1800/2000/2200 engine) - check

Refer to illustration 35.1

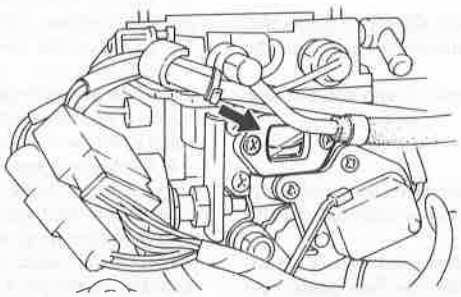
1 With the engine idling at normal operating temperature, check the sight glass on the side of the carburetor to make sure the fuel level is even with the mark on the glass, indicating that the float level is correct **(see illustration)**.

36 Transfer case oil change

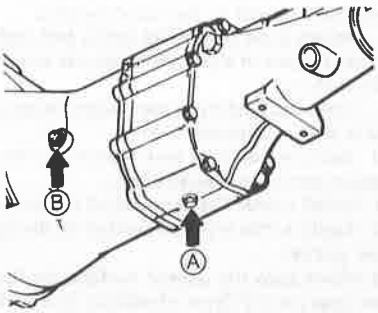
1 Drive the vehicle for at least 15 minutes in 4WD to warm up the oil in the case.
2 Raise the vehicle and support it securely on jackstands. Remove the rock guard.
3 Move a drain pan, rags, newspapers and a breaker bar or ratchet (to fit the square drive hole in the transfer case plugs) under the vehicle.
4 Remove the check/fill plug **(see illustration 21.1)**.
5 Remove the drain plug from the lower part of the case and allow the old oil to drain completely.
6 Carefully clean and install the drain plug after the case is completely drained. Tighten the plug to the specified torque.
7 Fill the case with the specified lubricant until it's level with the lower edge of the filler hole.



34.2 Idle speed switch adjustment details



35.1 Check the carburetor float level by looking through the sight glass



37.3 The manual transmission fill (B) and drain (A) plugs

8 Install the check/fill plug and tighten it securely.
9 Install the rock guard, then lower the vehicle.
10 Check carefully for leaks around the drain plug after the first few miles of driving.

37 Manual transmission oil change

Refer to illustration 37.3

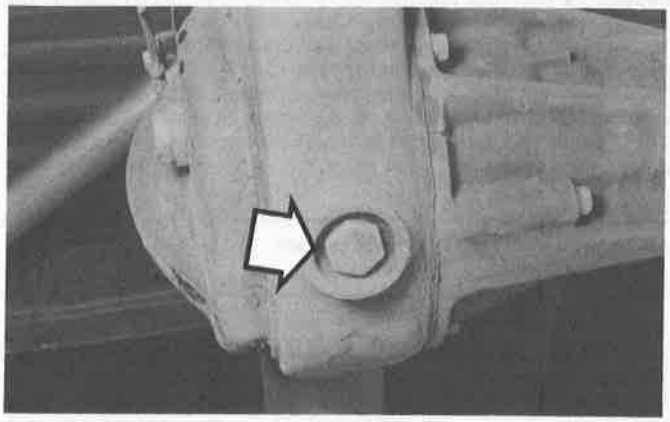
1 Drive the vehicle for a few miles to thoroughly warm up the transmission oil.
2 Raise the vehicle and support it securely on jackstands.
3 Move a drain pan, rags, newspapers and a 1/2-inch drive breaker bar or ratchet with an extension under the vehicle. With the drain pan and newspapers in position under the transmission, use the ratchet and extension to loosen the drain plug located in the bottom of the transmission case **(see illustration)**. Some later models have two drain and two fill plugs. Make sure to remove all four when changing the oil.
4 Once loosened, carefully unscrew it with your fingers until you can remove it from the transmission. Allow all of the oil to drain into the pan. If the plug is too hot to touch, use the wrench to remove it.
5 If the transmission is equipped with a magnetic drain plug, see if there are bits of metal clinging to it. If there are, it's a sign of excessive internal wear, indicating that the transmission should be carefully inspected in the near future. If the transmission isn't equipped with a magnetic drain plug, allow the oil in the pan to cool, then feel with your hands along the bottom of the drain pan for debris.
6 Clean the drain plug, then reinstall it in the transmission and tighten it to the specified torque.
7 Remove the transmission oil check/fill plug (see Section 20). Using a hand pump or syringe, fill the transmission with the correct amount and grade of oil (see the Specifications), until the level is just at the bottom of the plug hole.
8 Reinstall the check/fill plug and tighten it securely.

38 Differential oil change

Refer to illustration 38.3

Note: *The following procedure can be used for the rear differential as well as the front differential used on 4WD vehicles.*

1 Drive the vehicle for several miles to warm up the differential oil, then raise the vehicle and support it securely on jackstands.
2 Move a drain pan, rags, newspapers and a 1/2-inch drive breaker bar or ratchet with an extension and socket under the vehicle. If equipped, remove the under cover.
3 With the drain pan under the differential, use the breaker bar or ratchet and socket to loosen the drain plug. It's the lower of the two plugs **(see illustrations)**.
4 Once loosened, carefully unscrew it with your fingers until you can remove it from the case.
5 Allow all of the oil to drain into the pan, then replace the drain plug and tighten it to the specified torque.



38.3 The drain plug is located at the bottom of the differential housing

6 Feel with your hands along the bottom of the drain pan for any metal bits that may have come out with the oil. If there are any, it's a sign of excessive wear, indicating that the internal components should be carefully inspected in the near future.
7 Remove the differential check/fill plug located above the drain plug. Using a hand pump, syringe or funnel, fill the differential with the correct amount and grade of oil (see the Specifications) until the level is just at the bottom of the plug hole.
8 Reinstall the plug and tighten it securely.
9 Lower the vehicle. Check for leaks at the drain plug after the first few miles of driving.

39 Automatic transmission fluid and filter change

Refer to illustration 39.10

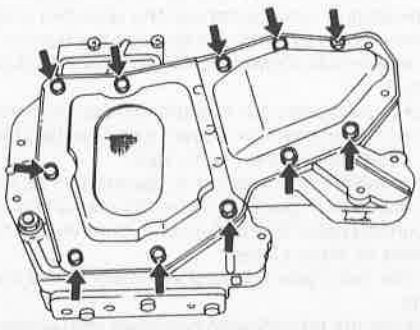
1 At the specified time intervals, the transmission fluid should be drained and replaced. Since the fluid should be hot when it's drained, drive the vehicle for 15 or 20 minutes before proceeding.
2 Before beginning work, purchase the specified transmission fluid (see *Recommended lubricants and fluids* at the front of this Chapter).
Note: *Most vehicle manufacturers also have specific fluid requirements on the dipstick.*
3 Other tools necessary for this job include jackstands to support the vehicle in a raised position, a drain pan capable of holding at least eight pints, newspapers and clean rags.
4 Raise the vehicle and support it securely on jackstands.
5 With a drain pan in place, remove the rear and side transmission fluid pan mounting bolts. Be careful not to burn yourself on anything — it may be wise to wear gloves.
6 Loosen the front pan bolts approximately four turns, but don't remove them.
7 Carefully pry the transmission pan loose with a screwdriver, allowing the fluid to drain. Be very careful not to damage the pan or transmission gasket surfaces! Save the fluid so you can estimate how much

new fluid to add to the transmission.
8 Remove the remaining bolts, pan and gasket. Carefully clean the gasket surface of the transmission to remove all traces of the old gasket and sealant.
9 Drain the fluid from the transmission pan, clean it with solvent and dry it with compressed air.
10 Remove the bolts and detach the filter from the mount inside the transmission **(see illustration)**.
11 Install a new filter and install the bolts. Tighten the bolts securely.
12 Apply a thin layer of sealant to the transmission case side of the new gasket.
13 Make sure the gasket surface on the transmission pan is clean, then apply a thin layer of sealant to it and position the new gasket on the pan. Put the pan in place against the transmission, install the bolts and, working around the pan, tighten each bolt a little at a time until the final torque figure is reached.
14 Lower the vehicle and add new automatic transmission fluid through the filler tube (Section 5). The amount should be equal to the amount of fluid that was drained (you don't want to overfill it).
15 With the transmission in Park and the parking brake set, run the engine at a fast idle, but don't race it.
16 Move the gear selector through each range and back to Park, then check the fluid level (Section 5). Add more fluid as required.
17 Check under the vehicle for leaks during the first few miles of driving.

40 Front wheel bearing check, repack and adjustment (2WD models)

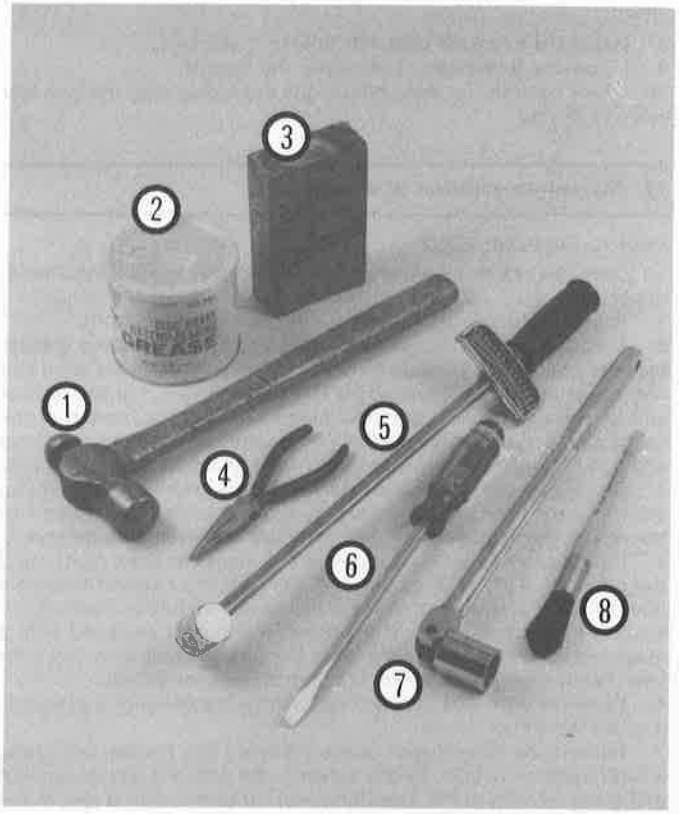
Refer to illustrations 40.1, 40.24, and 40.25

1 In most cases the front wheel bearings will not need servicing until the brake pads are changed. However, the bearings should be checked whenever the front of the vehicle is raised for any reason. Several items, including a torque wrench and special grease, are required for this procedure **(see illustration)**.
2 With the vehicle securely supported on jackstands, spin each wheel and check for noise, rolling resistance and free play.
3 Grasp the top of each tire with one hand and the bottom with the other. Move the wheel in-and-out on the spindle. If there's any noticable movement, the bearings should be checked and then repacked with grease or replaced if necessary.
4 Remove the wheel(s).
5 Fabricate a wood block to slide between the brake pads to keep them separated. Remove the brake caliper (Chapter 9) and hang it out of the way on a piece of wire.
6 Pry the dust cap out of the hub using a screwdriver or hammer and chisel.
7 Straighten the bent ends of the cotter pin, then pull the cotter pin out of the adjusting nut cap. Discard the cotter pin and use a new one during reassembly.
8 Remove the adjusting nut and washer from the end of the spindle.
9 Pull the hub out slightly, then push it back into its original position. This should force the outer wheel bearing off the spindle enough so it can be removed.
10 Pull the hub off the spindle.



39.10 Automatic transmission fluid filter bolt locations (arrows)

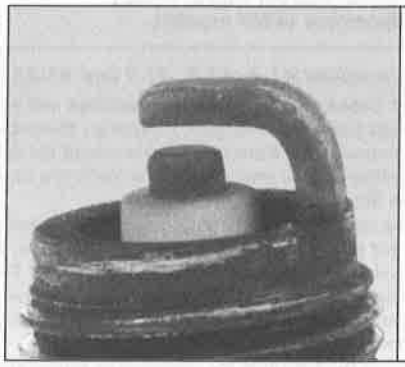
11 Use a screwdriver to pry the grease seal out of the rear of the hub. As this is done, note how the seal is installed.
12 Remove the inner wheel bearing from the hub.
13 Use solvent to remove all traces of the old grease from the bearings, hub and spindle. A small brush may prove helpful; however make sure no bristles from the brush embed themselves inside the bearing rollers. Allow the parts to air dry.
14 Carefully inspect the bearings for cracks, heat discoloration, worn rollers, etc. Check the bearing races inside the hub for wear and damage. If the bearing races are defective, the hubs should be taken to a machine shop with the facilities to remove the old races and press new ones in. Note that the bearings and races come as matched sets and old bearings should never be installed on new races.
15 Use high-temperature front wheel bearing grease to pack the bearings. Work the grease completely into the bearings, forcing it between the rollers, cone and cage from the back side.
16 Apply a thin coat of grease to the spindle at the outer bearing seat, inner bearing seat, shoulder and seal seat.



40.1 Tools and materials needed for front wheel bearing maintenance

1 ***Hammer*** *— A common hammer will do just fine*
2 ***Grease*** *— High-temperature grease which is formulated specially for front wheel bearings should be used*
3 ***Wood block*** *— If you have a scrap piece of 2x4, it can be used to drive the new seal into the hub*
4 ***Needle-nose pliers*** *— Used to straighten and remove the cotter pin in the spindle*
5 ***Torque wrench*** *— This is very important in this procedure; if the bearing is too tight, the wheel won't turn freely — if it is too loose, the wheel will 'wobble' on the spindle. Either way, it could mean extensive damage*
6 ***Screwdriver*** *— Used to remove the seal from the hub (a long screwdriver would be preferred)*
7 ***Socket/breaker bar*** *— Needed to loosen the nut on the spindle if it is extremely tight*
8 ***Brush*** *— Together with some clean solvent, this will be used to remove old grease from the hub and spindle*

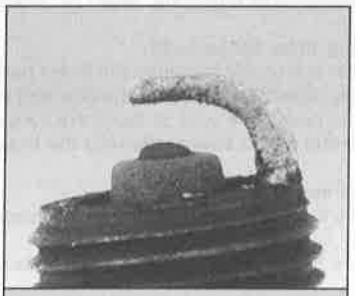
Common spark plug conditions



NORMAL

Symptoms: Brown to grayish-tan color and slight electrode wear. Correct heat range for engine and operating conditions.

Recommendation: When new spark plugs are installed, replace with plugs of the same heat range.



WORN

Symptoms: Rounded electrodes with a small amount of deposits on the firing end. Normal color. Causes hard starting in damp or cold weather and poor fuel economy.

Recommendation: Plugs have been left in the engine too long. Replace with new plugs of the same heat range. Follow the recommended maintenance schedule.

CARBON DEPOSITS

Symptoms: Dry sooty deposits indicate a rich mixture or weak ignition. Causes misfiring, hard starting and hesitation.

Recommendation: Make sure the plug has the correct heat range. Check for a clogged air filter or problem in the fuel system or engine management system. Also check for ignition system problems.

ASH DEPOSITS

Symptoms: Light brown deposits encrusted on the side or center electrodes or both. Derived from oil and/or fuel additives. Excessive amounts may mask the spark, causing misfiring and hesitation during acceleration.

Recommendation: If excessive deposits accumulate over a short time or low mileage, install new valve guide seals to prevent seepage of oil into the combustion chambers. Also try changing gasoline brands.

OIL DEPOSITS

Symptoms: Oily coating caused by poor oil control. Oil is leaking past worn valve guides or piston rings into the combustion chamber. Causes hard starting, misfiring and hesitation.

Recommendation: Correct the mechanical condition with necessary repairs and install new plugs.

GAP BRIDGING

Symptoms: Combustion deposits lodge between the electrodes. Heavy deposits accumulate and bridge the electrode gap. The plug ceases to fire, resulting in a dead cylinder.

Recommendation: Locate the faulty plug and remove the deposits from between the electrodes.

TOO HOT

Symptoms: Blistered, white insulator, eroded electrode and absence of deposits. Results in shortened plug life.

Recommendation: Check for the correct plug heat range, over-advanced ignition timing, lean fuel mixture, intake manifold vacuum leaks, sticking valves and insufficient engine cooling.

PREIGNITION

Symptoms: Melted electrodes. Insulators are white, but may be dirty due to misfiring or flying debris in the combustion chamber. Can lead to engine damage.

Recommendation: Check for the correct plug heat range, over-advanced ignition timing, lean fuel mixture, insufficient engine cooling and lack of lubrication.

HIGH SPEED GLAZING

Symptoms: Insulator has yellowish, glazed appearance. Indicates that combustion chamber temperatures have risen suddenly during hard acceleration. Normal deposits melt to form a conductive coating. Causes misfiring at high speeds.

Recommendation: Install new plugs. Consider using a colder plug if driving habits warrant.

DETONATION

Symptoms: Insulators may be cracked or chipped. Improper gap setting techniques can also result in a fractured insulator tip. Can lead to piston damage.

Recommendation: Make sure the fuel anti-knock values meet engine requirements. Use care when setting the gaps on new plugs. Avoid lugging the engine.

MECHANICAL DAMAGE

Symptoms: May be caused by a foreign object in the combustion chamber or the piston striking an incorrect reach (too long) plug. Causes a dead cylinder and could result in piston damage.

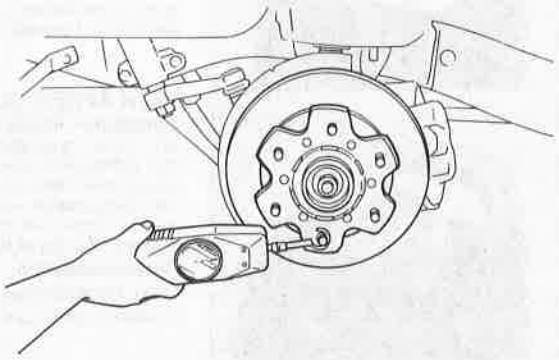
Recommendation: Repair the mechanical damage. Remove the foreign object from the engine and/or install the correct reach plug.

17 Put a small quantity of grease behind each bearing race inside the hub. Using your finger, form a dam at these points to provide for extra grease and to keep thinned grease from flowing out of the bearing.
18 Place the grease-packed inner bearing into the rear of the hub and put a little more grease outside of the bearing.
19 Place a new seal over the inner bearing and tap the seal evenly into place with a hammer and block of wood until it's flush with the hub.
20 Carefully place the hub assembly onto the spindle and push the grease-packed outer bearing into position.
21 Install the washer and adjusting nut. Tighten the nut to the specified torque.
22 Turn the hub to seat the bearings and remove any grease or burrs which could cause excessive bearing play later.
23 Loosen the nut enough that it can be turned by hand.
24 Pull on one of the wheel studs with a spring tension gauge and measure the initial torque necessary to turn the hub **(see illustration)**. This measurement is the frictional force.
25 Adjust the nut using a wrench until the torque required to turn the hub (initial turning torque) measured by the spring scale equals the frictional force measured in step 24 plus 1.3 to 2.4 ft-lb (6 to 11 Nm) **(see illustration)**.
26 Install the adjusting nut cap and see if the hole in the spindle is aligned with the slot in the cap. Install a new cotter pin.
27 Bend the ends of the cotter pin until they're flat against the nut. Cut off any extra length which could interfere with the dust cap.
28 Install the dust cap, tapping it into place with a hammer.
29 Place the brake caliper near the rotor and carefully remove the wood spacer. Install the caliper (Chapter 9).
30 Install the tire/wheel assembly on the hub and tighten the lug nuts.
31 Grasp the top and bottom of the tire and check the bearings in the manner described earlier in this Section.
32 Lower the vehicle.

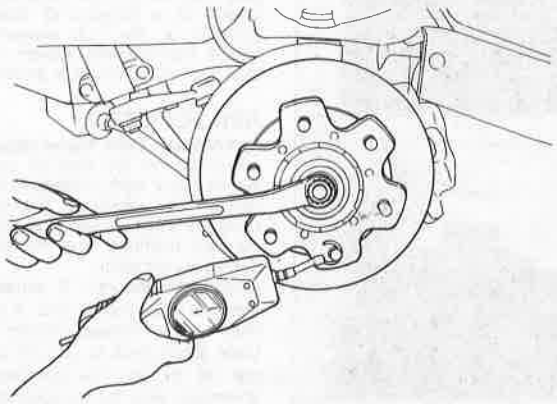
41 Front wheel bearing check, repack and adjustment (4WD models)

Refer to illustrations 41.7, 41.8, 41.9 and 41.23

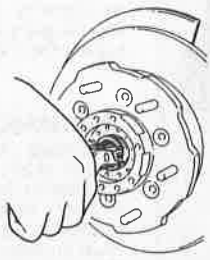
1 In most cases, the front wheel bearings will not need servicing until the brake pads are changed. However, these bearings should be checked whenever the front wheels are raised for any reason. Several items, including grease and a torque wrench are required for this procedure **(see illustration 40.1)**
2 With the vehicle securely supported on jackstands, spin the wheel and check for noise, rolling resistance or free play. Now grab the top of the tire with one hand and the bottom of the tire with the other. Move the tire in and out on the spindle. If it moves more than 0.005 in, the bearings should be checked, then repacked with grease or replaced if necessary.
3 To remove the bearings for replacing or repacking, begin by removing the wheel.
4 Remove the caliper mounting bolts (Chapter 9).
5 Fabricate a wood block which will be slid between the brake pads to keep them separated. Carefully slide the caliper off the disc and insert the wood block between the pads. Use wire to hang the caliper assembly out of the way. Be careful not to kink or damage the brake hose.
6 Remove the free wheel hub assembly (Chapter 8).
7 Using snap-ring pliers, remove the hub bearing snap-ring and spacer **(see illustration)**.
8 Use a screwdriver to remove the set bolts and remove the bearing set plate **(see illustration)**.
9 Remove the bearing locknut and adjusting nut. A special large wheel bearing nut wrench (Mazda special tool number 49 S231 635) is required for this job **(see illustration)**.



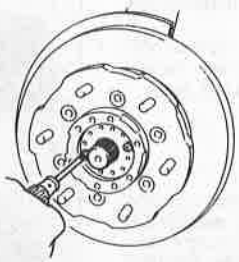
40.24 Pull on one of the wheel studs with a spring scale to measure the initial force required to turn the wheel



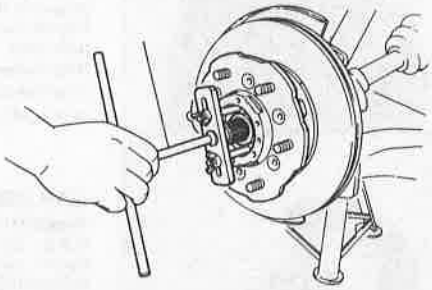
40.25 Adjust the nut while measuring the initial turning torque with the spring scale



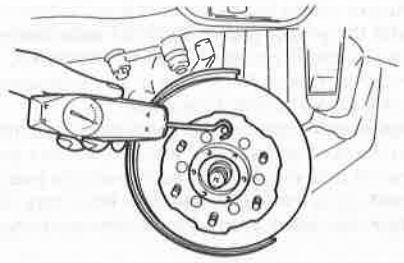
41.7 Remove the hub bearing snap ring and spacer with snap ring pliers



41.8 Unscrew the two bearing set plate bolts with a screwdriver



41.9 A special wrench is required for removing and installing the bearing nuts



41.23 Measure the frictional force required to initially turn the hub by pulling on one of the wheel studs with a spring scale

10 Pull the hub assembly out slightly and then push it back into its original position. This should force the outer bearing off the spindle enough so that it can be removed with your fingers. Remove the outer bearing, noting how it is installed on the end of the spindle.
11 Now the hub assembly can be pulled off the spindle.
12 The inner bearing can now be removed from the hub, again noting how it is installed.
13 Use clean solvent to remove all traces of the old grease from the bearings, hub and spindle. A small brush may prove useful; however, make sure no bristles from the brush embed themselves inside the bearing rollers. Allow the parts to air dry.
14 Carefully inspect the bearings for cracks, heat discoloration, bent rollers, etc. Check the bearing races inside the hub for cracks, scoring or uneven surfaces. If the bearing races are in need of replacement, the job should be left to a repair shop which can press the new races into position.
15 Use an approved high temperature wheel bearing grease (see the Recommended lubricants Section) to pack the bearings. Work the grease fully into the bearings, forcing the grease between the rollers, cone and cage.
16 Apply a thin coat of grease to the spindle at the outer bearing seat, inner bearing seat, shoulder and seal seat.
17 Put a small quantity of grease inboard of each bearing race inside the hub. Using your finger, form a dam at these points to provide extra grease availability and to keep thinned grease from flowing out of the bearing.
18 Place the grease-packed inner bearing into the rear of the hub and put a little more grease outboard of the bearing.
19 Place a new seal over the inner bearing and tap the seal with a block of wood and a hammer until it is flush with the hub.
20 Carefully place the hub assembly onto the spindle and push the grease-packed outer bearing into position.
21 Install the locknut and adjusting nut. Tighten the nuts and turn the hub two or three times to seat the bearings.
22 Loosen the locknut and adjusting nut until they can be turned by hand.
23 Pull on one of the wheel studs with a spring tension gauge and measure and record the initial turning torque required to turn the hub **(see illustration)**. This measurement is the frictional force.
24 Tighten the locknut with the special wrench until the preload is reached. The preload is the frictional force plus 1.3 to 2.6 Ft-lb (6 to 12 Nm).
25 Install the bearing set plate and bolts.
26 Coat the spacer with multi purpose grease and secure it in place with the snap-ring.
27 Remove the wood blocks, slide the caliper over the rotor and install the bolts. Tighten the caliper mounting bolts to the specified torque (Chapter 9).
28 Install the free wheel hub assembly (Chapter 8).
29 Install the wheel on the hub and tighten the mounting nuts.
30 Grab the top and bottom of the tire and check the bearings in the same manner as described at the beginning of this Section.
31 Lower the vehicle to the ground and tighten the wheel nuts.

42 Cooling system servicing (draining, flushing and refilling)

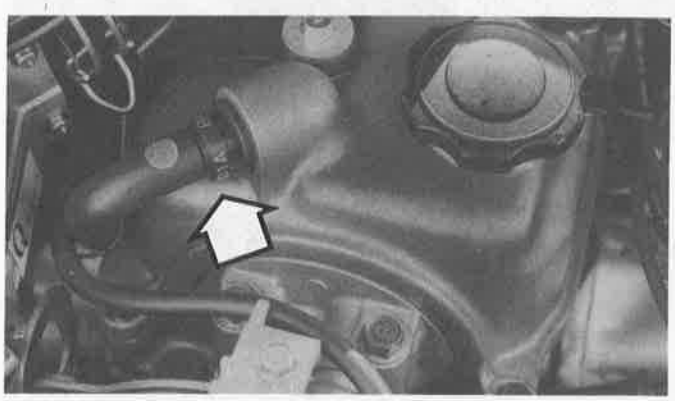
Warning: *Antifreeze is a corrosive and poisonous solution, so be careful not to spill any of the coolant mixture on the vehicle's paint or your skin. If you do, rinse it off immediately with plenty of clean water. Consult local authorities regarding proper disposal of antifreeze before draining the cooling system. In many areas, reclamation centers have been established to collect used oil and coolant mixtures.*

1 Periodically, the cooling system should be drained, flushed and refilled to replenish the antifreeze mixture and prevent formation of rust and corrosion, which can impair the performance of the cooling system and cause engine damage. When the cooling system is serviced, all hoses and the radiator cap should be checked and replaced if necessary.
2 Apply the parking brake and block the wheels. If the vehicle has just been driven, wait several hours to allow the engine to cool down before beginning this procedure.
3 Once the engine is completely cool, remove the radiator cap. Place the heater temperature control in the maximum heat position.
4 Move a large container under the radiator drain to catch the coolant, then unscrew the drain plug (a pair of pliers may be required to turn it).
5 After the coolant stops flowing out of the radiator, move the container under the engine block drain plug, located near the rear of the block. Remove the plug and allow the coolant in the block to drain.
6 While the coolant is draining, check the condition of the radiator hoses, heater hoses and clamps (refer to Section 9 if necessary).
7 Replace any damaged clamps or hoses.
8 Once the system is completely drained, flush the radiator with fresh water from a garden hose until it runs clear at the drain. The flushing action of the water will remove sediments from the radiator but will not remove rust and scale from the engine and cooling tube surfaces.
9 These deposits can be removed with a chemical cleaner. Follow the procedure outlined in the manufacturer's instructions. If the radiator is severely corroded, damaged or leaking, it should be removed (Chapter 3) and taken to a radiator repair shop.
10 Remove the overflow hose from the coolant recovery reservoir. Drain the reservoir and flush it with clean water, then reconnect the hose.
11 Reinstall and tighten the radiator drain plug. Install and tighten the block drain plug.
12 Slowly add new coolant (a 50/50 mixture of water and antifreeze) to the radiator until it's full. Add coolant to the reservoir up to the lower mark.
13 Leave the radiator cap off and run the engine in a well-ventilated area until the thermostat opens (coolant will begin flowing through the radiator and the upper radiator hose will become hot).
14 Turn the engine off and let it cool. Add more coolant mixture to bring the level back up to the lip on the radiator filler neck.
15 Squeeze the upper radiator hose to expel air, then add more coolant mixture if necessary. Replace the radiator cap.
16 Start the engine, allow it to reach normal operating temperature and check for leaks.

43 Positive Crankcase Ventilation (PCV) valve check and replacement

Refer to illustration 43.2

1 The PCV valve is usually located in the rocker arm cover.
2 With the engine idling at normal operating temperature, pull the valve (with hose attached) from the rubber grommet in the cover **(see illustration)**.



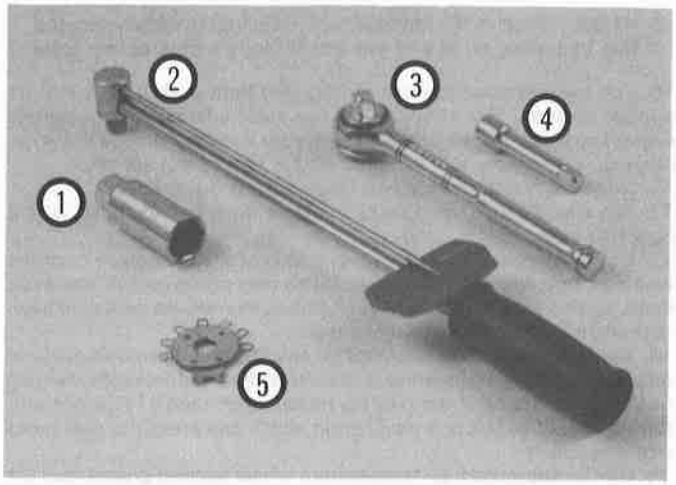
43.2 The PCV valve (arrow) is located in the rocker cover on these models (1988 and later model shown)

3 Place your finger over the valve opening. If there's no vacuum at the valve, check for a plugged hose, manifold port, or the valve itself. Replace any plugged or deteriorated hoses.
4 Turn off the engine and shake the PCV valve, listening for a rattle. If the valve doesn't rattle, replace it with a new one.
5 To replace the valve, pull it from the end of the hose, noting its installed position and direction.
6 When purchasing a replacement PCV valve, make sure it's for your particular vehicle and engine size. Compare the old valve with the new one to make sure they're the same.
7 Push the valve into the end of the hose until it's seated.
8 Inspect the rubber grommet for damage and replace it with a new one if necessary.
9 Push the PCV valve and hose securely into position.

44 Spark plug replacement

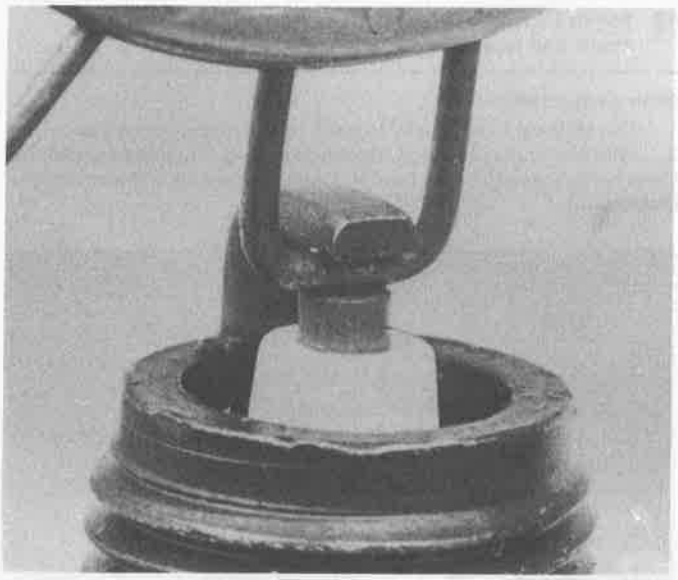
Refer to illustrations 44.2, 44.5a, 44.5b, 44.6 and 44.10

1 Replace the spark plugs with new ones at the intervals recommended in the *Routine maintenance schedule.*
2 In most cases, the tools necessary for spark plug replacement include a spark plug socket which fits onto a ratchet (spark plug sockets are padded inside to prevent damage to the porcelain insulators on the new plugs), various extensions and a gap gauge to check and adjust the gaps on the new plugs **(see illustration)**. A special plug wire removal tool is available for separating the wire boots from the spark plugs, but it isn't absolutely necessary. A torque wrench should be used to tighten the new plugs.
3 The best approach when replacing the spark plugs is to purchase the new ones in advance, adjust them to the proper gap and replace them one at a time. When buying the new spark plugs, be sure to obtain the correct plug type for your particular engine. This information can be found on the *Emission Control Information label* located under the hood and in the factory owner's manual. If differences exist between the plug specified on the emissions label and in the owner's manual, assume the emissions label is correct.
4 Allow the engine to cool completely before attempting to remove any of the plugs. While you're waiting for the engine to cool, check the new plugs for defects and adjust the gaps.
5 The gap is checked by inserting the proper thickness gauge between the electrodes at the tip of the plug **(see illustration)**. The gap between the electrodes should be the same as the one specified on the *Emissions Control Information label*. The wire should just slide between the electrodes with a slight amount of drag. If the gap is incorrect, use the adjuster on the gauge body to bend the curved side electrode slightly until the proper gap is obtained **(see illustration)**. If the side electrode is not exactly over the center electrode, bend it with the adjuster until it is. Check for cracks in the porcelain insulator (if any are found, the plug shouldn't be used).
6 With the engine cool, remove the spark plug wire from one spark plug. Pull only on the boot at the end of the wire – don't pull on the wire. A plug wire removal tool should be used if available **(see illustration)**.
7 If compressed air is available, use it to blow any dirt or foreign material away from the spark plug hole. A common bicycle pump will

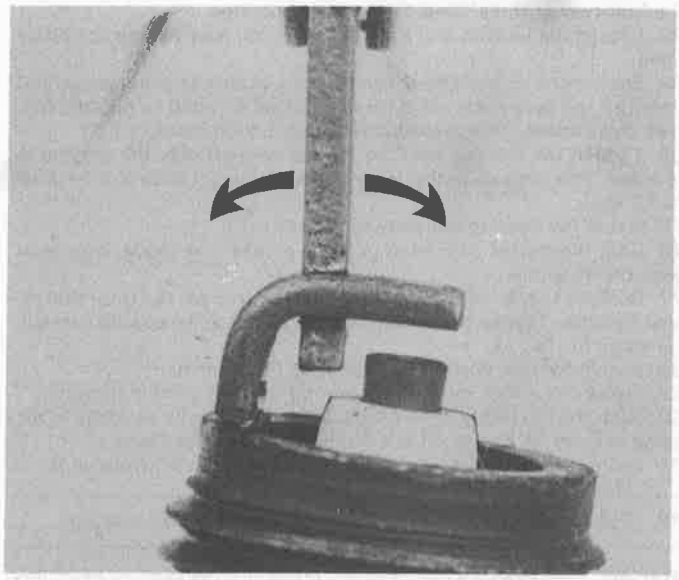


44.2 Tools required for changing spark plugs

1 ***Spark plug socket*** *– This will have special padding inside to protect the spark plug porcelain insulator*
2 ***Torque wrench*** *– Although not mandatory, use of this tool is the best way to ensure that the plugs are tightened properly*
3 ***Ratchet*** *– Standard hand tool to fit the plug socket*
4 ***Extension*** *– Depending on model and accessories, you may need special extensions and universal joints to reach one or more of the plugs*
5 ***Spark plug gap gauge*** *– This gauge for checking the gap comes in a variety of styles. Make sure the gap for your engine is included*



44.5a Spark plug manufacturers recommend using a wire-type gauge when checking the gap – if the wire does not slide between the electrodes with a slight drag, adjustment is required

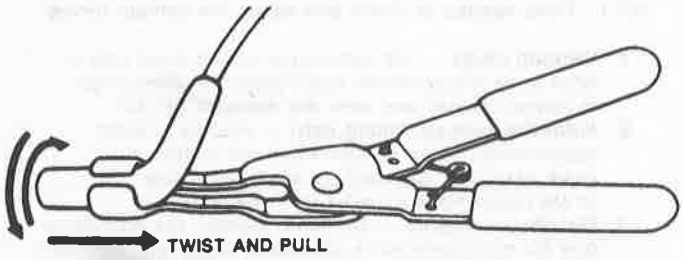


44.5b To change the gap, bend the side electrode only, as indicated by the arrows, and be very careful not to crack or chip the porcelain insulator surrounding the center electrode

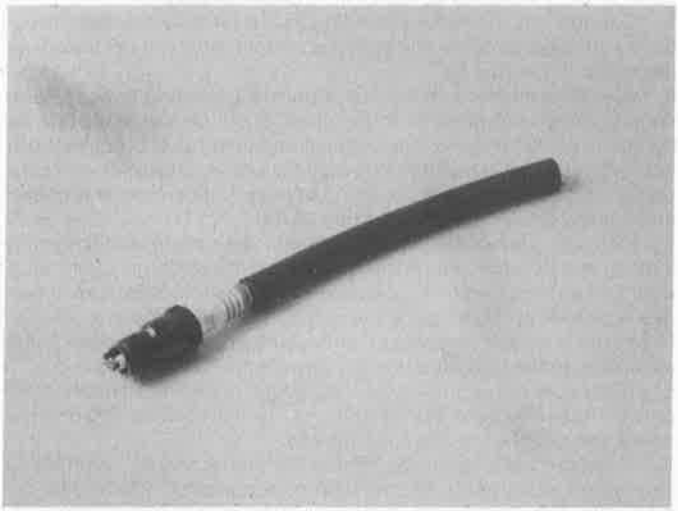
also work. The idea here is to eliminate the possibility of debris falling into the cylinder as the spark plug is removed.
8 Place the spark plug socket over the plug and remove it from the engine by turning it in a counterclockwise direction.
9 Compare the spark plug to those shown in the accompanying photos to get an indication of the general running condition of the engine.
10 Thread one of the new plugs into the hole until you can no longer turn it with your fingers, then tighten it with a torque wrench (if available) or the ratchet. It might be a good idea to slip a short length of rubber hose over the end of the plug to use as a tool to thread it into place **(see illustration)**. The hose will grip the plug well enough to turn it, but will start to slip if the plug begins to cross-thread in the hole – this will prevent damaged threads and the accompanying repair costs.
11 Before pushing the spark plug wire onto the end of the plug, inspect it following the procedures outlined in Section 45.
12 Attach the plug wire to the new spark plug, again using a twisting motion on the boot until it's seated on the spark plug.
13 Repeat the procedure for the remaining spark plugs, replacing them one at a time to prevent mixing up the spark plug wires.

45 Spark plug wire check and replacement

1 The spark plug wires should be checked at the recommended intervals and whenever new spark plugs are installed in the engine.
2 The wires should be inspected one at a time to prevent mixing up the order, which is essential for proper engine operation.
3 Disconnect the plug wire from one spark plug. To do this, grab the rubber boot, twist slightly and pull the wire free. Do not pull on the wire itself, only on the rubber boot **(see illustration 44.6)**.
4 Check inside the boot for corrosion, which will look like a white crusty powder. Push the wire and boot back onto the end of the spark plug. It should be a tight fit on the plug. If it isn't, remove the wire and use a pair of pliers to carefully crimp the metal connector inside the boot until it fits securely on the end of the spark plug.
5 Using a clean rag, wipe the entire length of the wire to remove any built-up dirt and grease. Once the wire is clean, check for holes, burned areas, cracks and other damage. Don't bend the wire excessively or the conductor inside might break.
6 Disconnect the wire from the distributor cap. Again, pull only on the rubber boot. Check for corrosion and a tight fit in the same manner as the spark plug end. Reattach the wire to the distributor cap.
7 Check the remaining spark plug wires one at a time, making sure they are securely fastened at the distributor and the spark plug when the check is complete.
8 If new spark plug wires are required, purchase a new set for your specific engine model. Wire sets are available pre-cut, with the rubber boots already installed. Remove and replace the wires one at a time to avoid mix-ups in the firing order. The wire routing is extremely important, so be sure to note exactly how each wire is situated before removing it.



44.6 When removing the spark plug wires, pull only on the boot and use a twisting/pulling motion – a tool such as the one shown can make the job easier



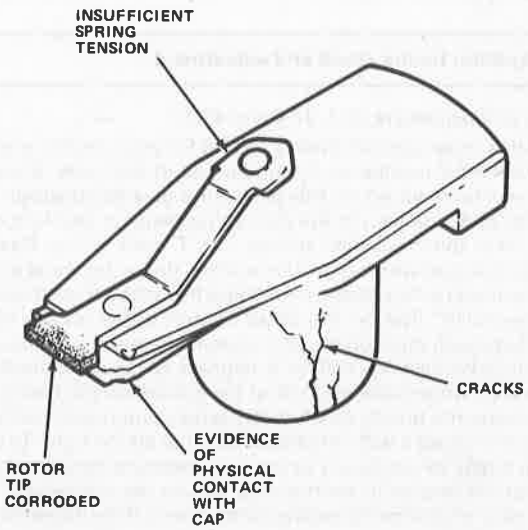
44.10 A length of 3/16-inch rubber hose will save time and prevent damaged threads when installing the spark plugs

46 Distributor cap and rotor check and replacement

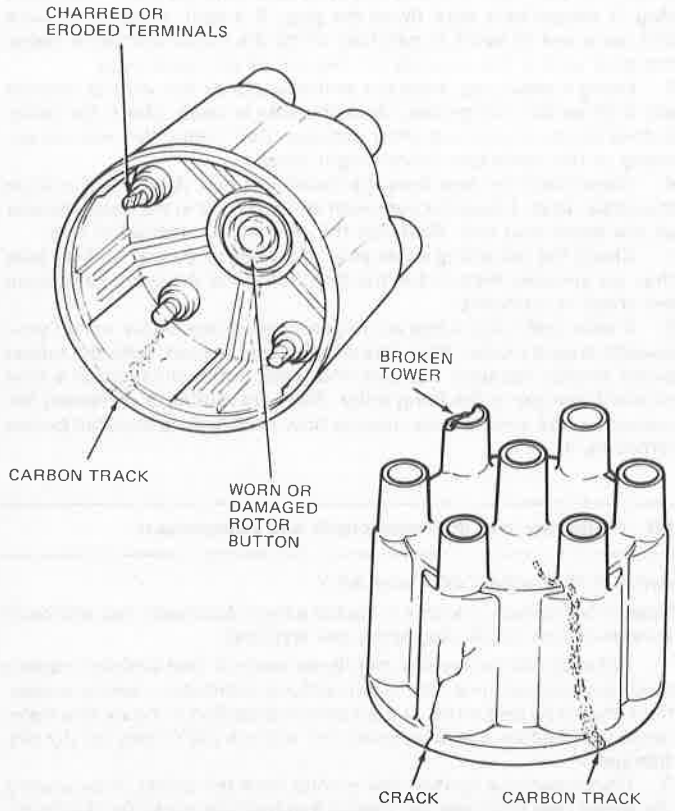
Refer to illustrations 46.4 and 46.7

Note: *It's common practice to install a new distributor cap and rotor whenever new spark plug wires are installed.*

1 Although the breakerless distributor used on later vehicles requires much less maintenance than a conventional distributor, periodic inspections should be performed at the intervals specified in the routine maintenance schedule and whenever any work is performed on the distributor.
2 Disconnect the ignition coil wire(s) from the coil(s), then unsnap the spring clips or loosen the screws that hold the cap to the distributor body. Detach the distributor cap and wires.
3 Place the cap, with the spark plug and coil wires still attached, out of the way. Use a length of wire or rope to secure it, if necessary.
4 The rotor is now visible on the end of the distributor shaft. Check it carefully for cracks and carbon tracks. Make sure the center terminal spring tension is adequate (not all models) and look for corrosion and wear on the rotor tip **(see illustration)**. If in doubt about its condition, replace it with a new one.
5 If replacement is required, detach the rotor from the shaft and install a new one. On some models, the rotor can simply be pulled off the shaft. On some later models, the rotor is retained on the shaft by two screws.
6 While the distributor cap is off, check the air gap on 2600 engine equipped models as described in Chapter 5.



46.4 The ignition rotor should be checked for wear and corrosion as indicated here (if in doubt about its condition, buy a new one)



46.7 Shown here are some of the common defects to look for when inspecting a distributor cap (if in doubt about its condition, install a new one)

7 Check the distributor cap for carbon tracks, cracks and other damage. Closely examine the terminals on the inside of the cap for excessive corrosion and damage **(see illustration)**. Slight deposits are normal. Again, if in doubt about the condition of the cap, replace it with a new one.

9 Reattach the cap to the distributor, then tighten the screws or reposition the spring clips to hold it in place.

8 When replacing the cap, simply transfer the spark plug and coil wires, one at a time, from the old cap to the new cap. Be very careful not to mix up the wires!

47 Ignition timing check and adjustment

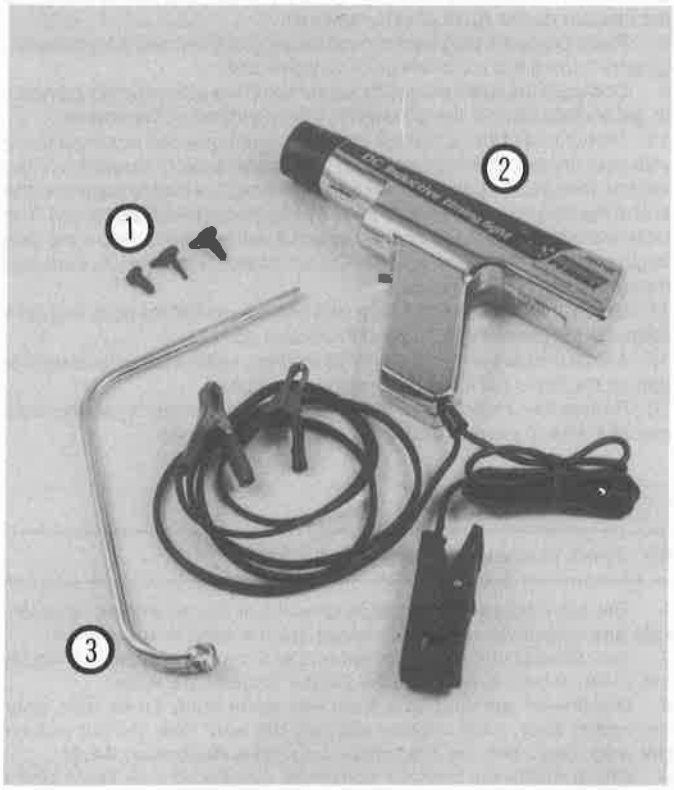
Refer to illustrations 47.1, 47.4 and 47.11

1 The proper ignition timing setting for your vehicle is printed on the VECI label located on the underside of the hood. Some special tools will be required for this procedure **(see illustration)**.

2 On 2600 engines, locate the timing plate on the front of the engine, near the crankshaft pulley. The T mark is Top Dead Center (TDC). To locate which mark the notch in the pulley must line up with for the timing to be correct, count back from the 0 mark the number of degrees BTDC (Before Top Dead Center) noted on the VECI label. Normally each mark on the timing plate equals 5 degrees, so if your vehicle Specifications call for 6-degrees BTDC, you should make a mark with white paint or chalk at the 5 mark on the timing plate.

3 Locate the timing notch in the pulley and mark it with a dab of paint or chalk so it will be visible under the strobe light. To locate the notch it may be necessary to have an assistant temporarily turn the ignition off and on in short bursts to turn the crankshaft. **Warning**: *Stay clear of all moving engine components if the engine is turned in this manner!*

4 On the 1600/1800/2000/2200 engine, the timing mark scale is on the vibration damper and timing indicator (pointer) is stationary, attached to the engine **(see illustration)**. Highlight the pointer and the appropriate mark on the vibration damper with chalk or white paint (refer to the Emissions Control Information label).



47.1 Tools needed to check and adjust the ignition timing

1 ***Vacuum plugs*** *— Vacuum hoses will, in most cases, have to be disconnected and plugged. Molded plugs in various shapes and sizes are available for this*
2 ***Inductive pick-up timing light*** *— Flashes a bright concentrated beam of light when the number one spark plug fires. Connect the leads according to the instructions supplied with the light*
3 ***Distributor wrench*** *— On some models, the hold-down bolt for the distributor is difficult to reach and turn with conventional wrenches or sockets. A special wrench like this must be used*

5 Connect a tachometer according to the manufacturer's instructions and make sure the idle speed is correct. Adjust if necessary as described in Section 33.

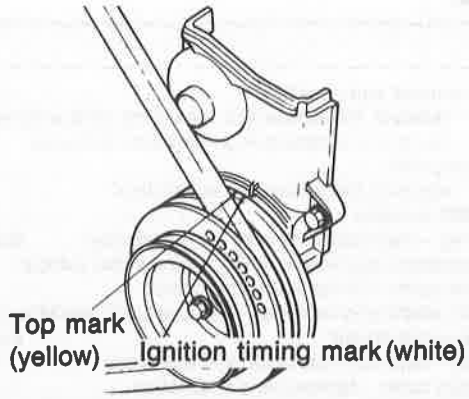
6 Allow the engine to warm up to normal operating temperature. Be sure the air conditioner, if equipped, is off. On some models as noted on the VECI label, you must disconnect the distributor vacuum hose and plug it. On fuel injected models, unplug the green test connector and connect a jumper wire between the connecter terminal and a good ground **(see illustration 33.2a)**.

7 With the ignition switch off, connect the pick-up of the timing light to the number one (front, closest to the radiator) spark plug wire. Use either a jumper lead between the wire and plug or an inductive-type pick-up. Don't piece the wire or attempt to insert a wire between the boot and plug wire. Connect the timing light power leads according to the manufacturer's instructions.

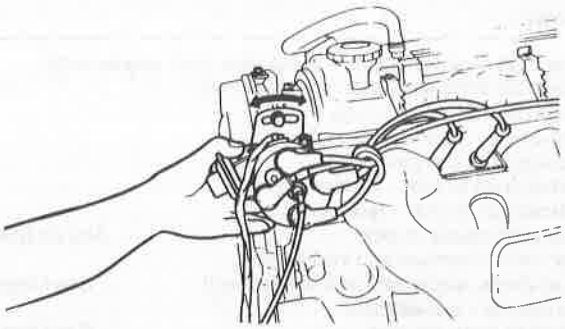
8 Make sure the wiring for the timing light is clear of all moving engine components, then start the engine. Race the engine two or three times, then allow it to idle for a minute.

9 Point the flashing timing light at the timing marks, again being careful not to come in contact with moving parts. The marks you highlighted should appear stationary. If the marks are in alignment, the timing is correct. If the marks aren't lined up, turn off the engine.

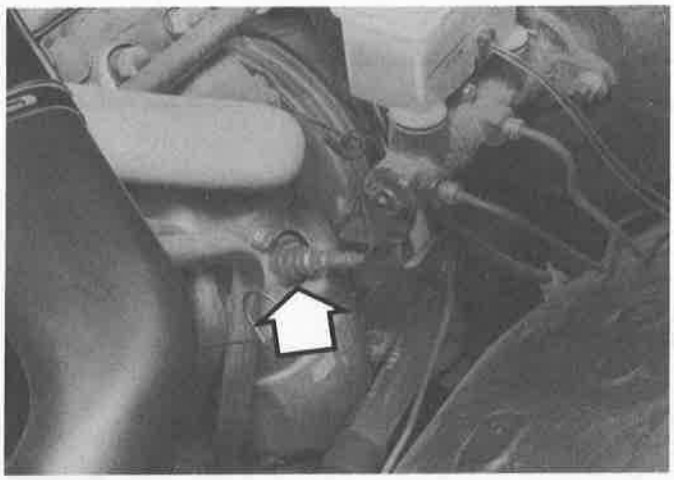
10 Loosen the distributor mounting bolt until the distributor can be rotated.



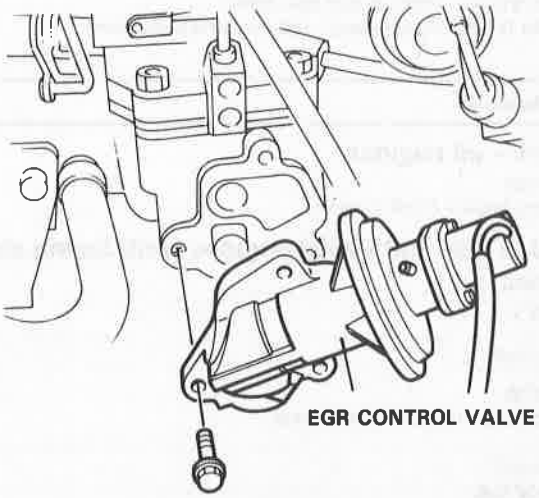
47.4 The timing marks are located on the pulley and the pointer is attached to the engine on 1600/1800/2000/2200 engines



47.11 Ignition timing is adjusted by swiveling the distributor slightly either clockwise or counterclockwise



48.2 The oxygen sensor (arrow) threads into the exhaust manifold and is accessible in the engine compartment



49.2 EGR valve details

11 Start the engine and slowly rotate the distributor either left or right until the timing marks are aligned **(see illustration)**.
12 Shut off the engine and tighten the distributor mounting/adjusting bolts, being careful not to move the distributor.
13 Restart the engine and recheck the timing to make sure the marks are still in alignment.

48 Oxygen sensor replacement

Refer to illustration 48.2

1 The oxygen (exhaust gas) sensor, used on later models, should be replaced at the specified intervals.
2 The sensor is threaded into the exhaust manifold and can be identified by the wires attached to it **(see illustration)**. Replacement consists of disconnecting the wire harness and unthreading the sensor from the manifold. Tighten the new sensor securely, then reconnect the wire harness.

49 EGR valve replacement (1985 and later 2000/2200 engine)

Refer to illustration 49.2

1 With the engine cold, disconnect the vacuum tube from the EGR valve.
2 Remove the retaining bolts and lift the EGR valve from the exhaust manifold **(see illustration)**.
3 To install, place the new EGR valve in position and install the retaining bolts. Tighten the bolts securely.
4 Connect the vacuum hose.
5 Start the engine, run it at idle and check for exhaust leaks.