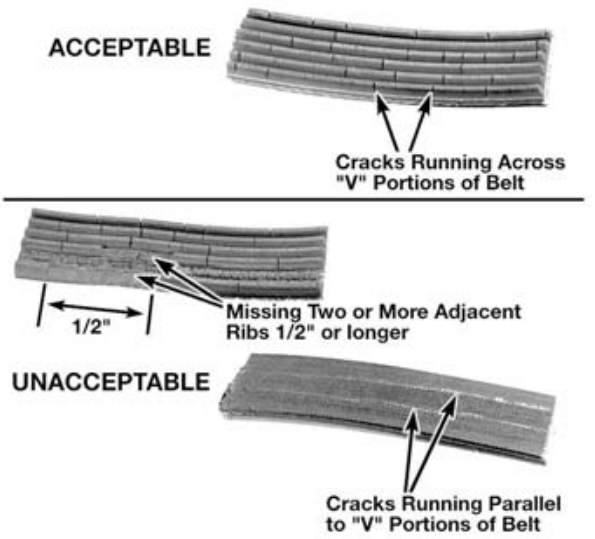
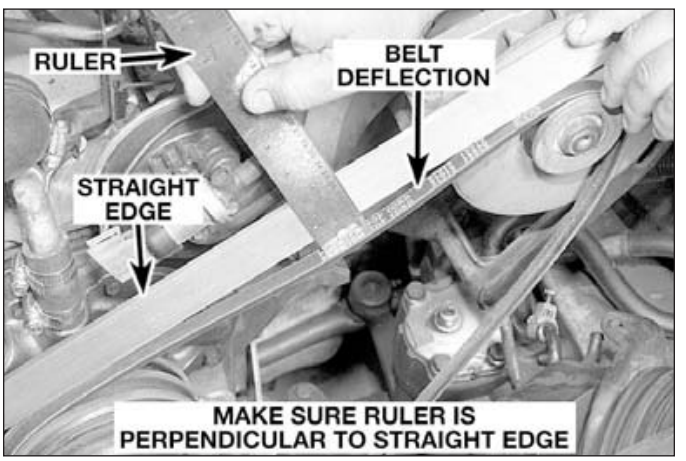
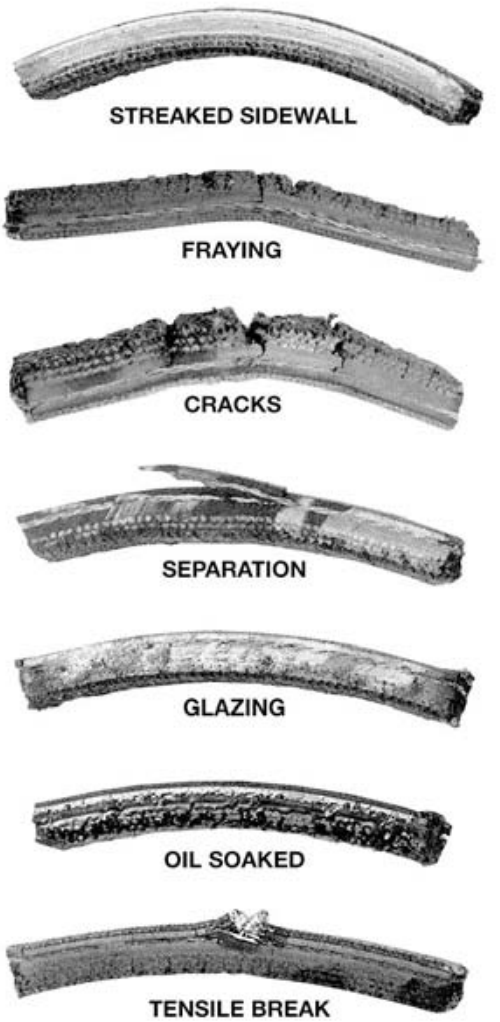


12.2a Check ribbed belts for signs of wear like these



12.4 A ruler and straightedge can be used to determine the belt deflection (tension) between two pulleys



12.2b Look for these signs of wear or damage on V-belt drivebelts

reinstalling the hold-down clamp bolts, do not overtighten them.

9 Any metal parts of the vehicle damaged by corrosion should be covered with a zinc-based primer, then painted.

10 Information on removing and installing the battery can be found in Chapter 5. Information on jump starting can be found at the front of this manual. For more detailed battery checking procedures, refer to the *Haynes Automotive Electrical Manual*.

Charging

Warning: *When batteries are being charged, hydrogen gas, which is very explosive and flammable, is produced. Do not smoke or allow open flames near a charging or a recently charged battery. Wear eye protection when near the battery during charging. Also, make sure the charger is unplugged before connecting or disconnecting the battery from the charger.*

Note: *It is recommended that the battery be removed from the vehicle for charging because the gas that escapes during this procedure can damage the paint. Fast charging with the battery cables connected can result in damage to the electrical system.*

11 Slow-rate charging is the best way to restore a battery that's discharged to the point where it will not start the engine. It's also a good way to maintain the battery charge in a vehicle that's only driven a few miles between starts. Maintaining the battery charge is particularly important in the winter when the battery must work harder to start the engine and electrical accessories that drain the battery are in greater use.

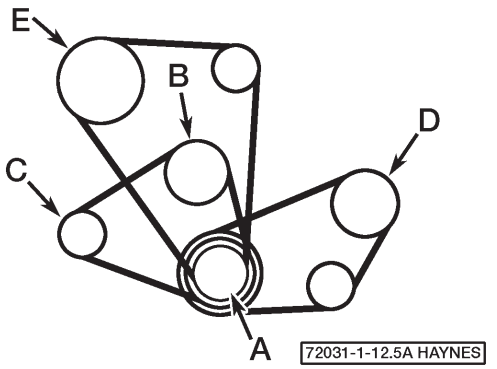
12 It's best to use a one or two-amp battery charger (sometimes called a "trickle" charger). They are the safest and put the least strain on the battery. They are also the least expensive. For a faster charge, you can use a higher amperage charger, but don't use one rated more than 1/10th the amp/hour rating of the battery. Rapid boost charges that claim to restore the power of the battery in one to two hours are hardest on the battery and can damage batteries not in good condition. This type of charging should only be used in emergency situations.

13 The average time necessary to charge a battery should be listed in the instructions that come with the charger. As a general rule, a trickle charger will charge a battery in 12 to 16 hours.

14 Remove all the cell caps (if equipped - see Section 4) and cover the holes with a clean cloth to prevent spattering electrolyte. Disconnect the negative battery cable and hook the battery charger cable clamps up to the battery posts (positive-to-positive, negative-to-negative), then plug in the charger. Make sure it is set at 12-volts if it has a selector switch.

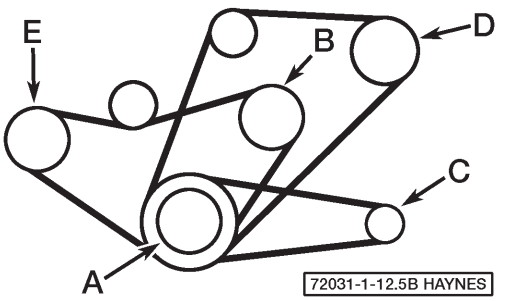
15 If you're using a charger with a rate higher than two amps, check the battery regularly during charging to make sure it doesn't overheat. If you're using a trickle charger, you can safely let the battery charge overnight after you've checked it regularly for the first couple of hours.

16 If the battery has removable cell caps, measure the specific gravity with a hydrometer every hour during the last few hours of



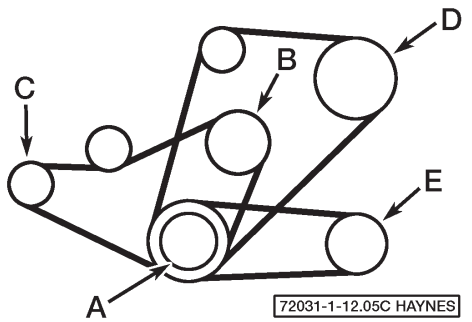
12.5a Drivebelt routing diagram - four-cylinder engine

A Crankshaft pulley
B Water pump
C Alternator
D Air conditioning compressor
E Power steering pump



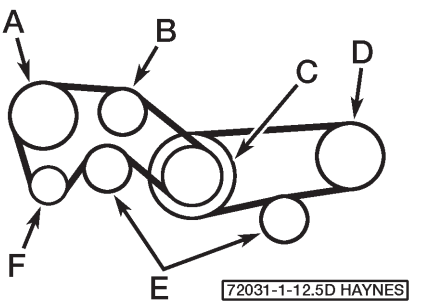
12.5b Drivebelt routing diagram - 3.3L V6 engine (Frontier/Xterra)

A Crankshaft pulley
B Water pump
C Alternator
D Air conditioning compressor
E Power steering pump



12.5c Drivebelt routing diagram - 3.3L V6 engine (Pathfinder)

A Crankshaft pulley
B Water pump
C Alternator
D Air conditioning compressor
E Power steering pump



12.5d Drivebelt routing diagram - 3.5L V6 engine (Pathfinder)

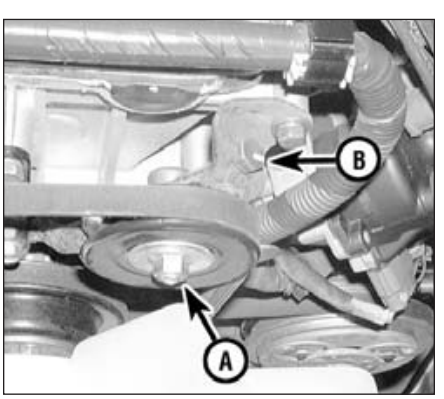
A Power steering pump
B Fan pulley
C Crankshaft pulley
D Air conditioning compressor
E Idler pulley
F Alternator

the charging cycle. Hydrometers are available inexpensively from auto parts stores - follow the instructions that come with the hydrometer. Consider the battery charged when there's no change in the specific gravity reading for two hours and the electrolyte in the cells is gassing (bubbling) freely. The specific gravity reading from each cell should be very close to the others. If not, the battery probably has a bad cell(s).

17 Some batteries with sealed tops have built-in hydrometers on the top that indicate the state of charge by the color displayed in the hydrometer window. Normally, a bright-colored hydrometer indicates a full charge and a dark hydrometer indicates the battery still needs charging.

18 If the battery has a sealed top and no built-in hydrometer, you can hook up a digital voltmeter across the battery terminals to check the charge. A fully charged battery should read 12.5 volts or higher.

19 Further information on the battery and jump-starting can be found in Chapter 5 and at the front of this manual.



12.5e Loosen the nut (A) in the center of the idler pulley, then turn the adjustment bolt (B) to tension (or loosen) the belt

12 Drivebelt check, adjustment and replacement (every 6000 miles or 6 months)

Refer to illustrations 12.2a, 12.2b, 12.4, 12.5a, 12.5b, 12.5c, 12.5d, 12.5e and 12.5f

1 Drivebelts are located at the front of the engine and play an important role in the overall operation of the engine and its components. Due to their function and material make up, the belts are prone to wear and should be periodically inspected. Most models have three belts, while some models only have two.

2 With the engine off, open the hood and use your fingers (and a flashlight, if necessary), to move along the belt checking for cracks and separation of the belt plies. Also check for fraying and glazing, which gives the belt a shiny appearance **(see illustrations)**. Both sides of the belt should be inspected, which means you will have to twist the belt to check the underside.

3 Check the ribs on the underside of multi-ribbed belts. They should all be the same depth, with none of the surface uneven.

4 Belt tension can be checked manually, by pushing on the belt at a distance halfway between two pulleys. Push firmly with your thumb and see how much the belt moves (deflects) **(see illustration)**. As rule of thumb, 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 1/4 to 1/2-inch.

5 Refer to the accompanying illustrations for the belt routing diagram for your vehicle **(see illustrations)**. Belts that are routed over an idler pulley are adjusted by loosening the nut in the center of the idler pulley and turning the adjusting bolt **(see illustration)**. Belts