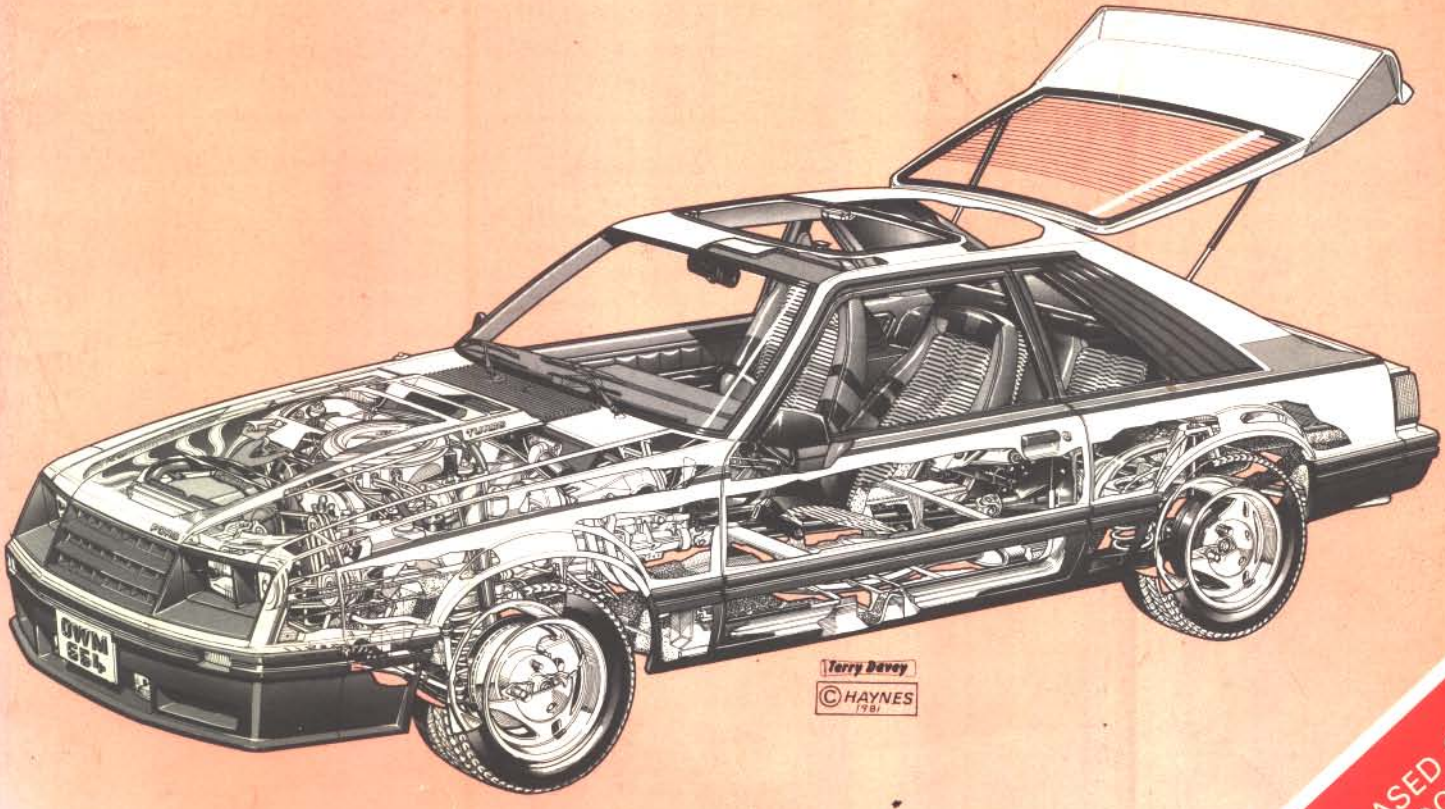
FORD MUSTANG & MERCURY CAPRI

Haynes

654

Ford Mustang □ 1979 thru 1992
Mercury Capri □ 1979 thru 1986

Automotive Repair Manual



EVERY MANUAL BASED ON A COMPLETE TEARDOWN AND REBUILD

It should be noted that many fasteners, especially Grades 0 through 2, have no distinguishing marks on them. When such is the case, the only way to determine whether it is standard or metric is to measure the thread pitch or compare it to a known fastener of the same size.

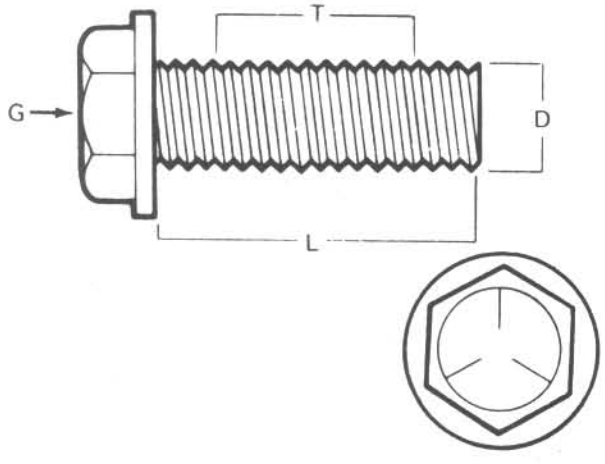
Standard fasteners are often referred to as SAE, as opposed to metric. However, it should be noted that SAE technically refers to a non-metric *fine thread* fastener only. Coarse thread non-metric fasteners are referred to as USS sizes.

Since fasteners of the same size (both standard and metric) may have different strength ratings, be sure to reinstall any bolts, studs or nuts removed from your vehicle in their original locations. Also, when replacing a fastener with a new one, make sure that the new one has a strength rating equal to or greater than the original.

Tightening sequences and procedures

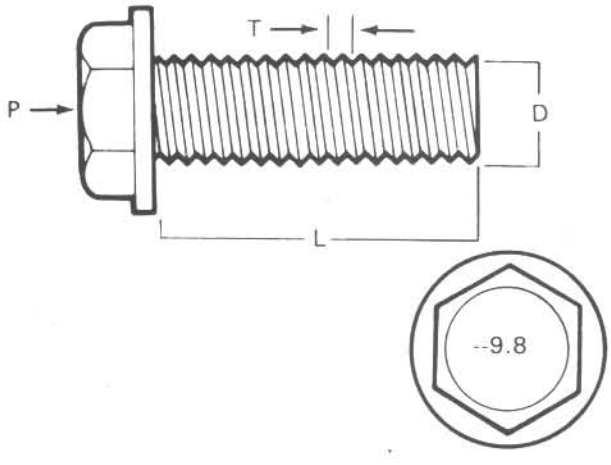
Most threaded fasteners should be tightened to a specific torque value (torque is the twisting force applied to a threaded component such as a nut or bolt). Overtightening the fastener can weaken it and cause it to break, while undertightening can cause it to eventually come loose. Bolts, screws and studs, depending on the material they are made of and their thread diameters, have specific torque values, many of which are noted in the Specifications at the beginning of each Chapter. Be sure to follow the torque recommendations closely. For fasteners not assigned a specific torque, a general torque value chart is presented here as a guide. These torque values are for dry (unlubricated) fasteners threaded into steel or cast iron (not aluminum). As was previously mentioned, the size and grade of a fastener determine the amount of torque that can safely be

Metric thread sizes	Ft-lbs	Nm
M-6	6 to 9	9 to 12
M-8	14 to 21	19 to 28
M-10	28 to 40	38 to 54
M-12	50 to 71	68 to 96
M-14	80 to 140	109 to 154
Pipe thread sizes		
1/8	5 to 8	7 to 10
1/4	12 to 18	17 to 24
3/8	22 to 33	30 to 44
1/2	25 to 35	34 to 47
U.S. thread sizes		
1/4 – 20	6 to 9	9 to 12
5/16 – 18	12 to 18	17 to 24
5/16 – 24	14 to 20	19 to 27
3/8 – 16	22 to 32	30 to 43
3/8 – 24	27 to 38	37 to 51
7/16 – 14	40 to 55	55 to 74
7/16 – 20	40 to 60	55 to 81
1/2 – 13	55 to 80	75 to 108



Standard (SAE and USS) bolt dimensions/grade marks

G Grade marks (bolt length)
L Length (in inches)
T Thread pitch (number of threads per inch)
D Nominal diameter (in inches)



Metric bolt dimensions/grade marks

P Property class (bolt strength)
L Length (in millimeters)
T Thread pitch (distance between threads in millimeters)
D Diameter

Conversion factors

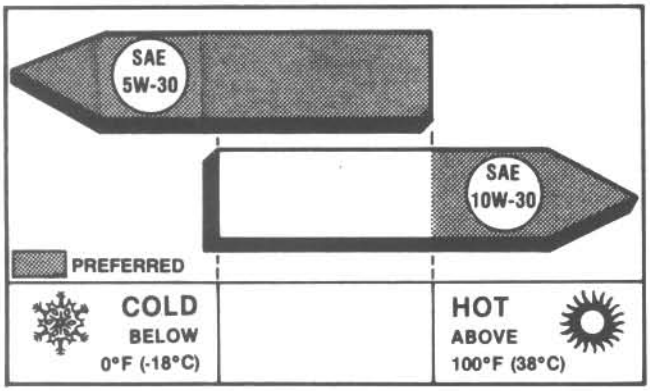
Length (distance)						
Inches (in)	X	25.4	= Millimetres (mm)	X	0.0394	= Inches (in)
Feet (ft)	X	0.305	= Metres (m)	X	3.281	= Feet (ft)
Miles	X	1.609	= Kilometres (km)	X	0.621	= Miles
Volume (capacity)						
Cubic inches (cu in; in^3)	X	16.387	= Cubic centimetres (cc; cm^3)	X	0.061	= Cubic inches (cu in; in^3)
Imperial pints (Imp pt)	X	0.568	= Litres (l)	X	1.76	= Imperial pints (Imp pt)
Imperial quarts (Imp qt)	X	1.137	= Litres (l)	X	0.88	= Imperial quarts (Imp qt)
Imperial quarts (Imp qt)	X	1.201	= US quarts (US qt)	X	0.833	= Imperial quarts (Imp qt)
US quarts (US qt)	X	0.946	= Litres (l)	X	1.057	= US quarts (US qt)
Imperial gallons (Imp gal)	X	4.546	= Litres (l)	X	0.22	= Imperial gallons (Imp gal)
Imperial gallons (Imp gal)	X	1.201	= US gallons (US gal)	X	0.833	= Imperial gallons (Imp gal)
US gallons (US gal)	X	3.785	= Litres (l)	X	0.264	= US gallons (US gal)
Mass (weight)						
Ounces (oz)	X	28.35	= Grams (g)	X	0.035	= Ounces (oz)
Pounds (lb)	X	0.454	= Kilograms (kg)	X	2.205	= Pounds (lb)
Force						
Ounces-force (ozf; oz)	X	0.278	= Newtons (N)	X	3.6	= Ounces-force (ozf; oz)
Pounds-force (lbf; lb)	X	4.448	= Newtons (N)	X	0.225	= Pounds-force (lbf; lb)
Newtons (N)	X	0.1	= Kilograms-force (kgf; kg)	X	9.81	= Newtons (N)
Pressure						
Pounds-force per square inch (psi; lbf/in^2; lb/in^2)	X	0.070	= Kilograms-force per square centimetre (kgf/cm^2; kg/cm^2)	X	14.223	= Pounds-force per square inch (psi; lbf/in^2; lb/in^2)
Pounds-force per square inch (psi; lbf/in^2; lb/in^2)	X	0.068	= Atmospheres (atm)	X	14.696	= Pounds-force per square inch (psi; lbf/in^2; lb/in^2)
Pounds-force per square inch (psi; lbf/in^2; lb/in^2)	X	0.069	= Bars	X	14.5	= Pounds-force per square inch (psi; lbf/in^2; lb/in^2)
Pounds-force per square inch (psi; lbf/in^2; lb/in^2)	X	6.895	= Kilopascals (kPa)	X	0.145	= Pounds-force per square inch (psi; lbf/in^2; lb/in^2)
Kilopascals (kPa)	X	0.01	= Kilograms-force per square centimetre (kgf/cm^2; kg/cm^2)	X	98.1	= Kilopascals (kPa)
Torque (moment of force)						
Pounds-force inches (lbf in; lb in)	X	1.152	= Kilograms-force centimetre (kgf cm; kg cm)	X	0.868	= Pounds-force inches (lbf in; lb in)
Pounds-force inches (lbf in; lb in)	X	0.113	= Newton metres (Nm)	X	8.85	= Pounds-force inches (lbf in; lb in)
Pounds-force inches (lbf in; lb in)	X	0.083	= Pounds-force feet (lbf ft; lb ft)	X	12	= Pounds-force inches (lbf in; lb in)
Pounds-force feet (lbf ft; lb ft)	X	0.138	= Kilograms-force metres (kgf m; kg m)	X	7.233	= Pounds-force feet (lbf ft; lb ft)
Pounds-force feet (lbf ft; lb ft)	X	1.356	= Newton metres (Nm)	X	0.738	= Pounds-force feet (lbf ft; lb ft)
Newton metres (Nm)	X	0.102	= Kilograms-force metres (kgf m; kg m)	X	9.804	= Newton metres (Nm)
Power						
Horsepower (hp)	X	745.7	= Watts (W)	X	0.0013	= Horsepower (hp)
Velocity (speed)						
Miles per hour (miles/hr; mph)	X	1.609	= Kilometres per hour (km/hr; kph)	X	0.621	= Miles per hour (miles/hr; mph)
*Fuel consumption**						
Miles per gallon, Imperial (mpg)	X	0.354	= Kilometres per litre (km/l)	X	2.825	= Miles per gallon, Imperial (mpg)
Miles per gallon, US (mpg)	X	0.425	= Kilometres per litre (km/l)	X	2.352	= Miles per gallon, US (mpg)

Temperature

Degrees Fahrenheit = (°C x 1.8) + 32

Degrees Celsius (Degrees Centigrade; °C) = (°F - 32) x 0.56

**It is common practice to convert from miles per gallon (mpg) to litres/100 kilometres (l/100km), where mpg (Imperial) x l/100 km = 282 and mpg (US) x l/100 km = 235*



Engine oil viscosity chart

For best fuel economy and cold starting, select the lowest SAE viscosity grade oil for the expected temperature range

• **Specifications**

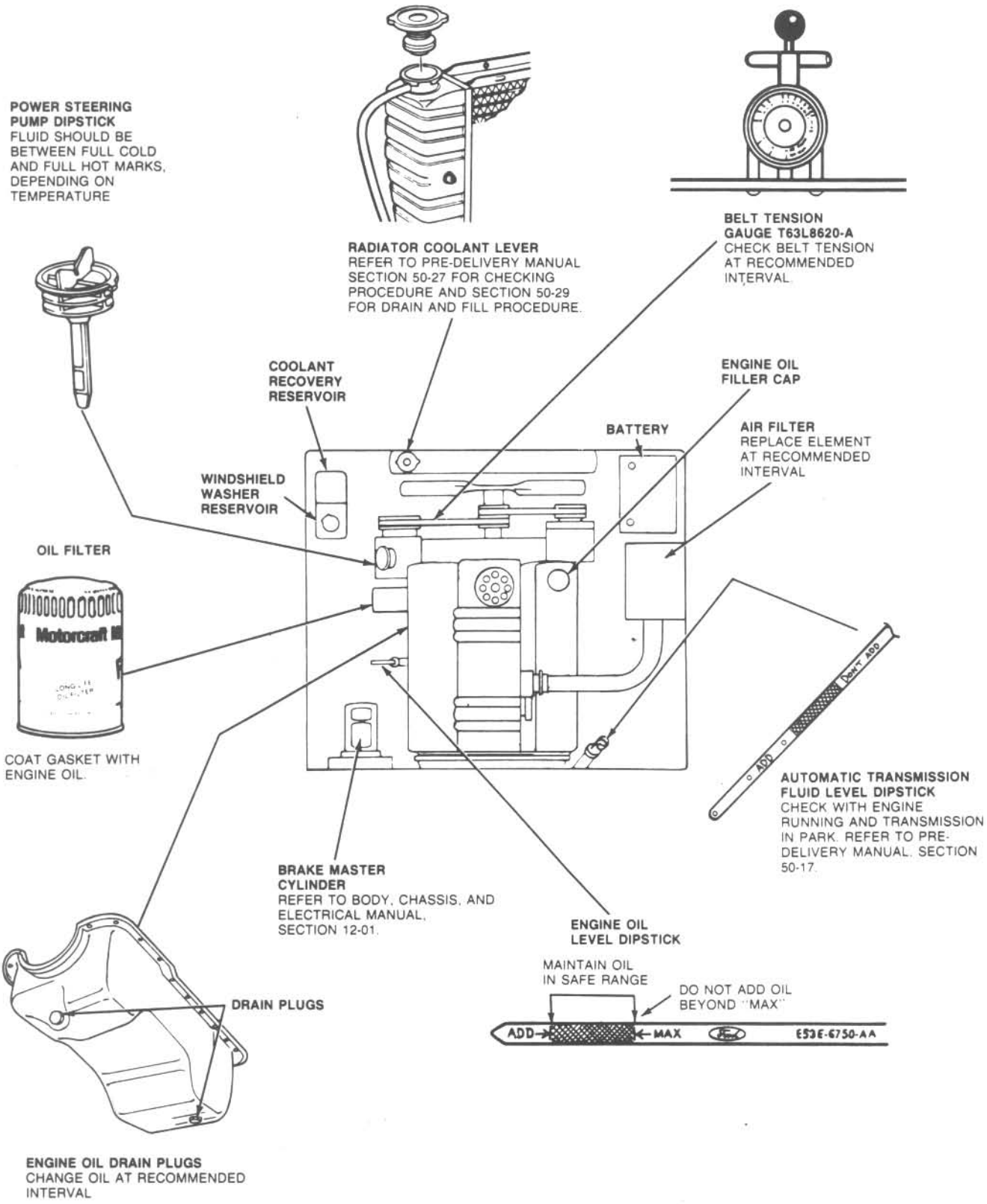
Recommended lubricants and fluids

Engine oil	
Type	API grade SG
Viscosity	See accompanying chart
Power steering fluid type	Motorcraft Type F automatic transmission fluid
Brake fluid type	DOT 3 heavy duty brake fluid
Clutch fluid type	DOT 3 heavy duty brake fluid
Automatic transmission fluid type	
C5 transmission	
Through 1982	DEXRON II automatic transmission fluid
1983 on	Motorcraft Type H automatic transmission fluid
C3, C4, AOD and A4LD transmissions	
Through 1987	DEXRON II automatic transmission fluid
1988 on	MERCON automatic transmission fluid
Manual transmission lubricant type	
T50-D	MERCON automatic transmission fluid
All others	80W gear oil (Ford spec. no. M2C83C/part no. D8DZ-19C547-A)
Coolant type	Ethylene glycol-based antifreeze and water
Front wheel bearing grease	NLGI No. 2 grease (part No. C1AZ-19590-BA)
Chassis grease	Motorcraft multi-purpose grease (part No. C1AZ-19590-B)
Differential lubricant*	Hypoid lubricant (part No. D8DZ-19C547-A)

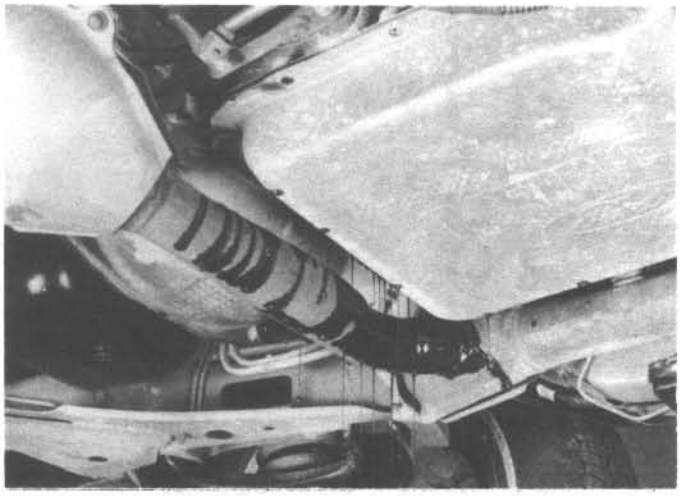
** For Trak-Lok axles add 4 oz. of friction modifier (part C8AZ-19B546-A) when the lubricant is changed.*

Capacities

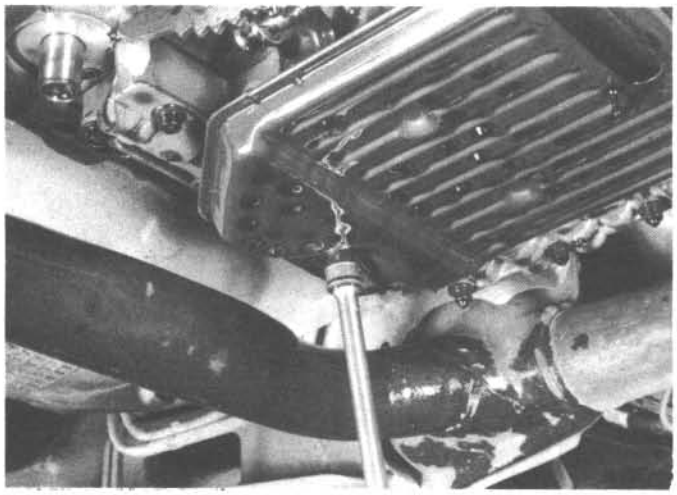
Engine oil*	
All except four-cylinder turbo	
Without filter change	4 qts
With filter change	5 qts
Four-cylinder Turbo	
Without filter change	4.5 qts
With filter change	5.5 qts
Cooling system**	
1979	
Four-cylinder S/C	8.6
Four-cylinder non-turbo A/C	10.0
Four-cylinder turbo A/C	8.6
2.8L V6 M/T S/C	9.2
2.8L V6 (all others)	9.4
5.0L V8 S/C	14.0
5.0L V8 A/C	14.6



Fuel injected V8 engine compartment service points



12.9 With the rear bolts loosened and holding it in place, lower the front of the transmission pan and allow the fluid to drain



12.12 The automatic transmission filter is held in place with small bolt(s)

3 Other tools necessary for this job include jackstands to support the vehicle in a raised position, a large, shallow drain pan capable of holding at least eight pints, newspapers and clean rags.
4 Raise the vehicle and support it securely on jackstands. DO NOT crawl under the vehicle when it is supported only by a jack!
5 Place the drain pan beneath the transmission.
6 On pan-filled C4 and C5 transmissions, disconnect the fluid filler tube from the pan to drain the transmission fluid.
7 On all other models, with the drain pan in place, remove the mounting bolts from the front and sides of the transmission pan.
8 Loosen the rear pan bolts approximately four turns. Let the pan hang down so the fluid can drain.
9 Carefully pry the transmission pan loose with a screwdriver, allowing the fluid to drain **(see illustration)**. Don't damage the pan or transmission gasket surfaces or leaks could develop.
10 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.
11 Drain the fluid from the transmission pan, clean it with solvent and dry it with compressed air (if available).
12 Remove the filter from the mount inside the transmission **(see illustration)**.
13 Install a new filter and gasket. Tighten the mounting bolt(s) securely.
14 Make sure the gasket surface on the transmission pan is clean, then install a new gasket. Put the pan in place against the transmission and install the bolts. Working around the pan, tighten each bolt a little at a time until a final torque is reached. Don't overtighten the bolts! On pan-filled models, re-connect the filler tube to the pan.
15 Lower the vehicle and add automatic transmission fluid through the filler tube (see Section 7). **Caution:** *Refer to Specifications at the front of this Chapter for the correct amount and type of transmission fluid. Use of the wrong type or the wrong amount can cause transmission damage.*
16 With the transmission in Park and the parking brake set, run the engine at a fast idle, but don't race it.
17 Move the gear selector through each range and back to Park. Check the fluid level. Add fluid if needed to reach the correct level.
18 Check under the vehicle for leaks during the first few trips.

13 Underhood hose check and replacement

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 hoses or components until the system has been depressurized.*

General

1 High temperatures under the hood can cause 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.
2 Information specific to the cooling system can be found in Section 21.
3 Most (but not all) hoses are secured to the fitting 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.

PCV system hose

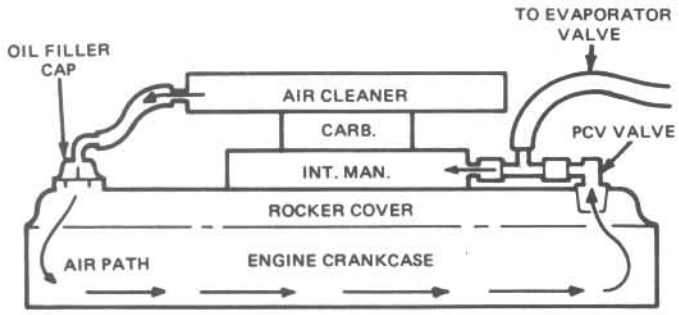
4 To reduce hydrocarbon emissions, crankcase blow-by gas is vented through the PCV valve to the intake manifold via a rubber hose on most models. The blow-by gases mix with incoming air in the intake manifold before being burned in the combustion chambers.
5 Check the PCV hose for cracks, leaks and other damage. Disconnect it from the rocker arm cover and the intake manifold and check the inside for obstructions. If it's clogged, clean it out with solvent.

Vacuum hoses

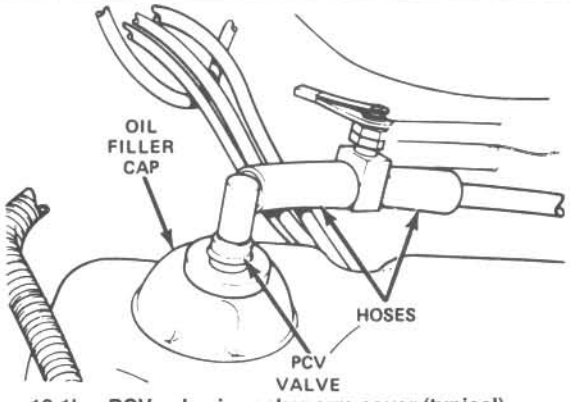
6 It's quite common for vacuum hoses, especially those in the emissions system, to be color coded or identified by colored stripes molded into them. Various systems require hoses with different wall thicknesses, collapse resistance and temperature resistance. When replacing hoses, be sure the new ones are made of the same material.
7 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.
8 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 each fitting for distortion, which could cause leakage.
9 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 careful not to come into contact with moving engine components such as drivebelts, the cooling fan, etc.*

Fuel hoses

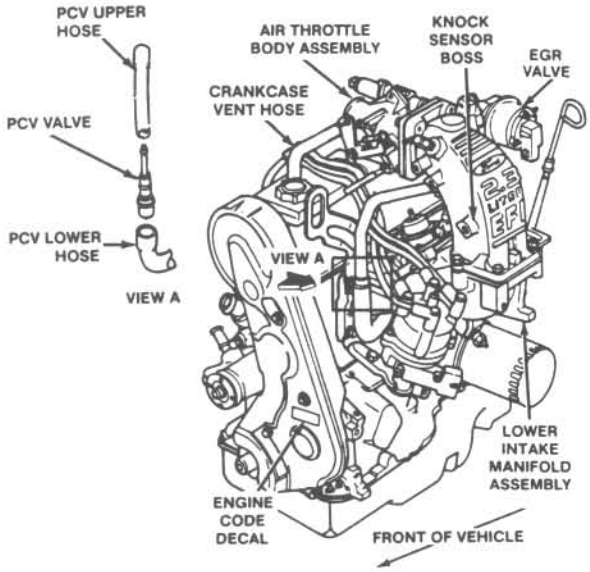
Warning: *Gasoline is extremely flammable, so take extra precautions when you work on any part of the fuel system. Don't smoke or allow open flames or bare light bulbs near the work area, and don't work in a garage where a natural gas-type appliance (such as a water heater or clothes dryer) with a pilot light is present. If you spill any fuel on your skin, rinse it off immediately with soap and water. When you perform any kind of work on*



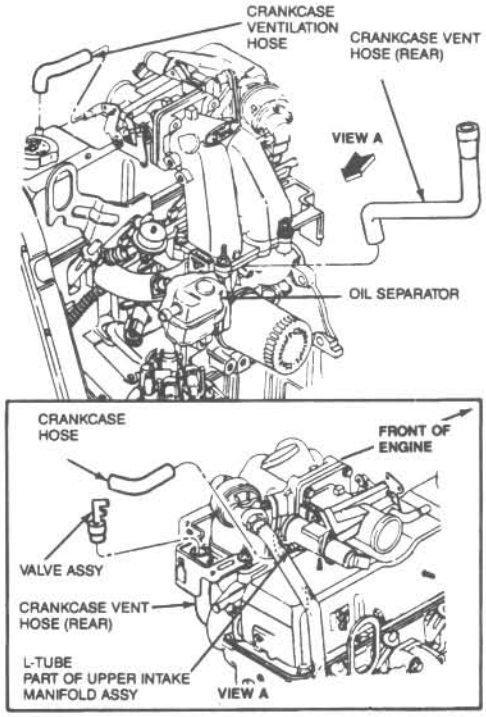
18.1a PCV system (typical)



18.1b PCV valve in rocker arm cover (typical)



18.1c PCV valve and hoses (four-cylinder engine) (1990 and earlier models)



18.1d PCV valve and hoses (four-cylinder engine) (1991 and later models)

18 PCV valve check and replacement

Refer to illustrations 18.1a, 18.1b, 18.1c and 18.1d

Note: *To maintain the efficiency of the PCV system, clean the hoses and check the PCV valve at the intervals recommended in the maintenance schedule. For additional information on the PCV system, refer to Chapter 6.*

1 Locate the PCV valve (see the accompanying illustrations and illustration 17.10). On four-cylinder EFI engines, the air cleaner assembly must be removed (see Chapter 4) to gain access to the PCV valve.

2 To check the valve, first pull it out of the grommet in the rocker arm cover or manifold, or out of the lower hose. Shake the valve. It should rattle, indicating that it is not clogged with deposits. If the valve does not rattle, replace it with a new one. If it does rattle, reinstall it.

3 Start the engine and allow it to idle, then disconnect the PCV hose (from the air cleaner on most models). If vacuum is felt, the PCV/valve system is working properly (see Chapter 6 for additional PCV system information).

4 If no vacuum is felt, the oil filler cap, hoses or rocker arm cover gasket may be leaking or the PCV valve may be bad. Check for vacuum leaks at the valve, filler cap and all hoses.

5 Pull straight up on the valve to remove it. Check the rubber grommet for cracks and distortion (on four-cylinder models, check the hose where the PCV valve seats). If it's damaged, replace it.

6 If the valve is clogged, the hose is also probably plugged. Remove the hose and clean it with solvent.

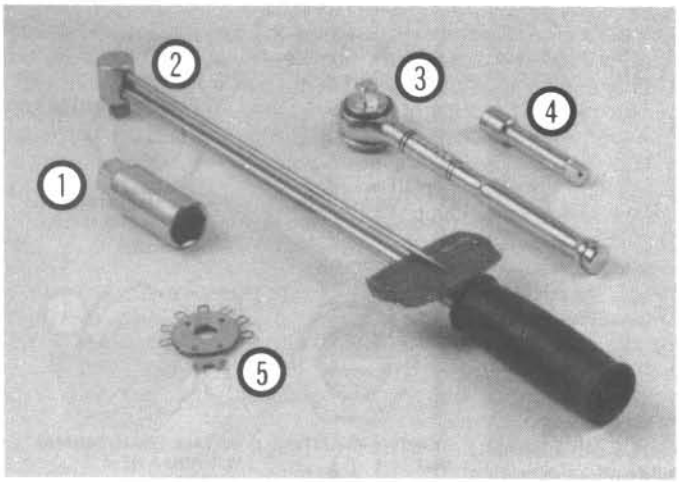
7 After cleaning the hose, inspect it for damage, wear and deterioration. Make sure it fits snugly on the fittings.

8 If necessary, install a new PCV valve. **Note:** *The elbow (models so equipped) is not part of the PCV valve. A new valve will not include the elbow. The original must be transferred to the new valve. If a new elbow is purchased, it may be necessary to soak it in warm water for up to an hour to slip it onto the new valve. Do not attempt to force the elbow onto the valve or it will break.*

9 Install the clean PCV system hose. Make sure the PCV valve and hose are secure.

19 Fuel system check

Warning: *Gasoline is extremely flammable, so take extra precautions when you work on any part of the fuel system. Don't smoke or allow open flames or bare light bulbs near the work area, and don't work in a garage where a natural gas-type appliance (such as a water heater or clothes dryer) with a pilot light is present. If you spill any fuel on your skin, rinse it off*



30.2 Tools required for changing spark plugs

1 ***Spark plug socket*** *– This will have special padding inside to protect the spark plug's porcelain insulator*
2 ***Torque wrench*** *– Although not mandatory, using this tool is the best way to ensure the plugs are tightened properly*
3 ***Ratchet*** *– Standard hand tool to fit the spark 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.*

30 Spark plug replacement

Refer to illustrations 30.2, 30.5a, 30.5b, 30.6 and 30.10

1 The spark plugs are located on the side(s) of the engine.

2 In most cases, the tools necessary for spark plug replacement include a spark plug socket which fits into a ratchet (spark plug sockets are padded inside to prevent damage to the porcelain insulators on the new plugs and to hold the plugs in the socket during removal and installation), 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 the plugs one at a time. When buying the new spark plugs, be sure to obtain the correct 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. Some models have aluminum cylinder heads, which can be damaged if the spark plugs are removed when the engine is hot. While you are 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 plugs should be the same as the one specified on the Emissions Control Information label. The gauge 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 specified 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 should not 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 – do not 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 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 counterclockwise.

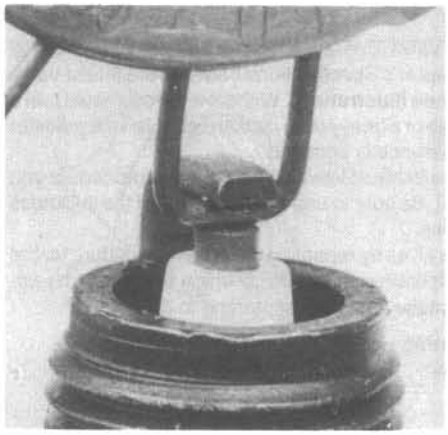
9 Compare the spark plug to those shown in the accompanying photos to get an indication of the general running condition of the engine.

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, particularly if the cylinder head is made of aluminum **(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.

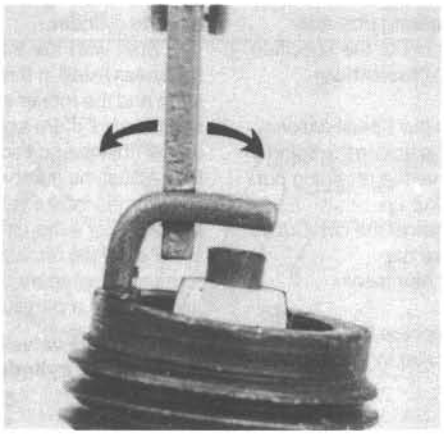
11 Before pushing the spark plug wire onto the end of the plug, inspect it following the procedures outlined in Section 31.

12 Attach the plug wire to the new spark plug, again using a twisting motion on the boot until it is seated on the spark plug.

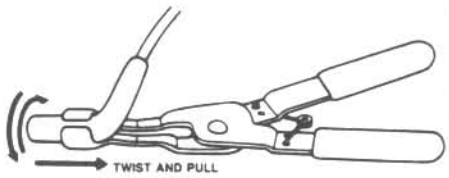
13 Repeat the procedure for the remaining spark plugs, replacing them one at a time to prevent mixing up the spark plug wires.



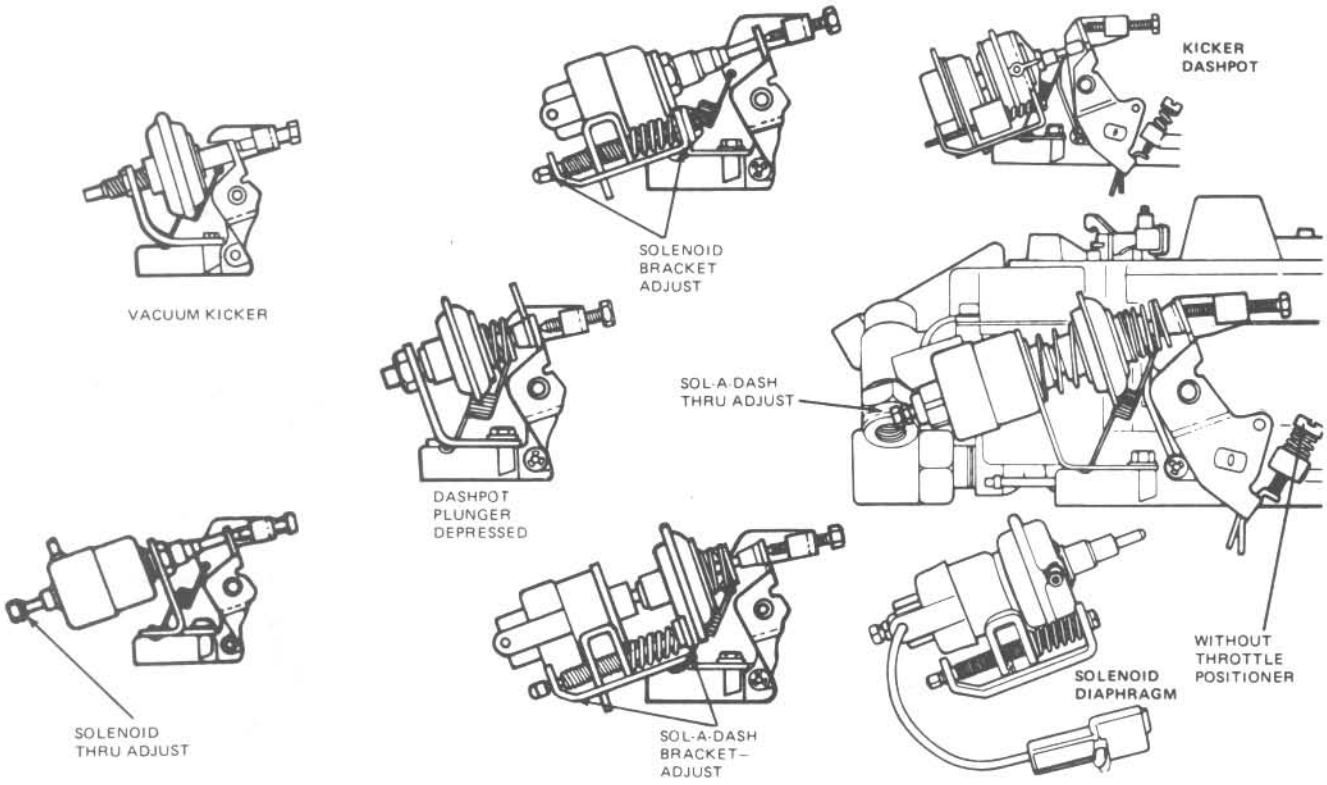
30.5a Spark plug manufacturers recommend using a wire type gauge when checking the gap – if the wire does not slide between the electrodes with a slight drag, adjustment is required



30.5b 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



30.6 When removing the spark plug wires, pull only on the boot and twist it back-and-forth



33.123 The various types of throttle positioners used on carburetor models 2700VV and 7200VV

122 Check the engine fast idle speed as described in Steps 115 through 117.

123 The method of curb idle adjustment is determined by the type of throttle positioning device installed on the carburetor **(see illustration)**. The adjustment procedures are as follows:

a) 2700VV carburetors with solenoid positioners must be in Drive when the curb idle rpm is checked. The curb idle is adjusted by turning the adjustment screw in the bracket

b) On vehicles with no solenoids or positioners, turn the throttle stop adjustment screw to obtain the specified curb idle rpm

c) On dashpot equipped carburetors, adjust the curb idle speed with the throttle stop adjustment screw. Turn the engine off, collapse the dashpot plunger and measure the distance between the throttle lever pad. Adjust to the specifications on the Emissions Control Information label if necessary. Start the engine and check the curb idle speed, repeating the procedure until the proper curb idle speed is obtained

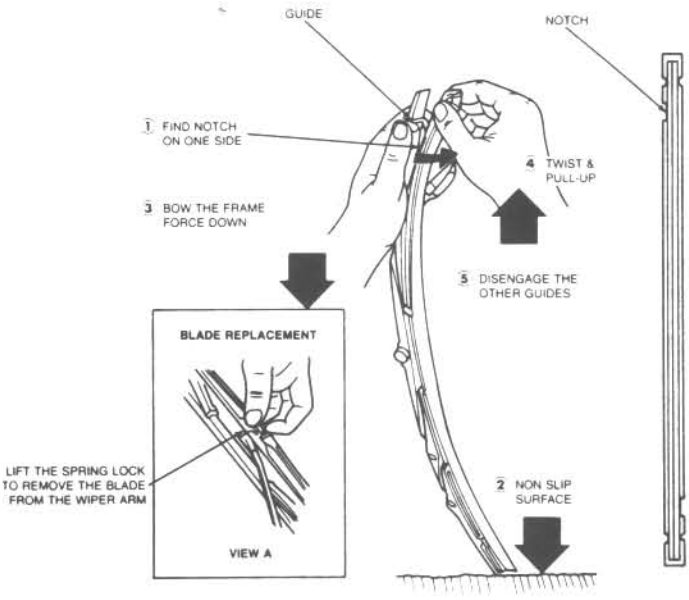
d) On 7200VV carburetors equipped with vacuum-operated throttle modulator (VOTM), turn the throttle stop screw counterclockwise and recheck. If the curb idle rpm is below specifications, shut off the engine and turn the throttle stop screw a full turn clockwise. Start the engine and recheck the curb idle, repeating the procedure until the idle is within specifications.

124 Reconnect all vacuum hoses.

34 Windshield wiper blade check and replacement

Refer to illustrations 34.5 and 34.16

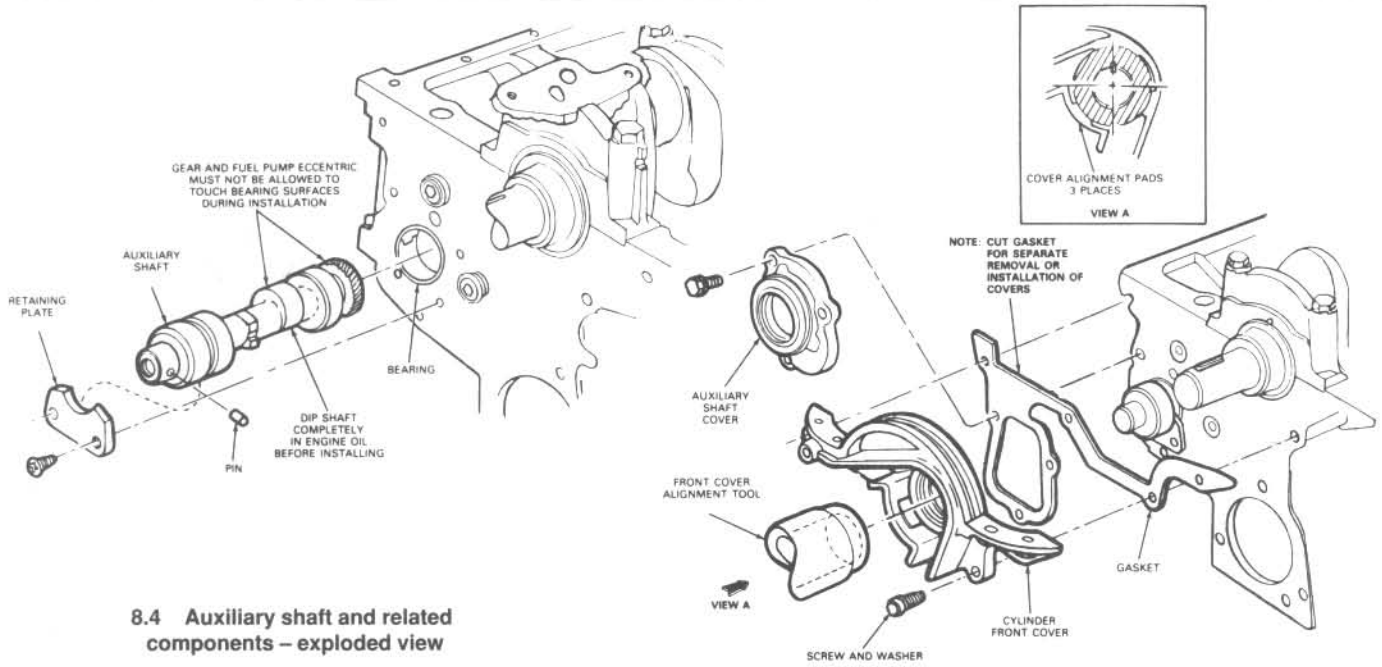
1 Road film can build up on the wiper blades and effect their efficiency, so they should be washed regularly with a mild detergent solution.



34.5 Windshield wiper blade assembly replacement (Tridon type)

Check

2 The windshield wiper and blade assembly should be inspected periodically. Even if you don't use your wipers, the sun and elements will dry out the rubber portions, causing them to crack and break apart. If inspection reveals hardened or cracked rubber, replace the wiper blades. If in-



8.4 Auxiliary shaft and related components – exploded view

move the bolts/screws and detach the outer timing belt cover **(see illustration 6.10)**.

2 Loosen the auxiliary shaft sprocket bolt **(see illustration 6.11a)**. If the shaft turns, immobilize the sprocket by inserting a large screwdriver or 3/8-inch drive extension through one of the sprocket holes. Detach the timing belt (Section 6).

3 Pull off the sprocket (a puller may be required) and remove the pin from the shaft.

4 Remove the three bolts and detach the auxiliary shaft cover **(see illustration)**.

5 Remove the screws and detach the retaining plate.

6 Withdraw the shaft. If it's tight, reinstall the bolt and washer. Use a pry-bar and spacer block to pry out the shaft. Be extremely careful not to damage the bearings as you pull the shaft out of the block.

7 Examine the auxiliary shaft bearing for pits and score marks. Replacement must be done by a dealer service department or a repair shop (although it's easy to remove the old bearing, correct installation of the new one requires special tools). The auxiliary shaft may show signs of wear on the bearing journal or the eccentric. Score marks and damage to the bearing journals cannot be removed by grinding. If in doubt, ask a dealer service department to check the auxiliary shaft and offer advice on replacement. Examine the gear teeth for wear and damage. If either is evident, a replacement shaft must be obtained.

8 Dip the auxiliary shaft in engine oil before installing it in the block. Tap it in gently with a soft-face hammer to ensure that it's seated. Install the retaining plate and the auxiliary shaft cover.

9 The remainder of the procedure is the reverse of removal. Make sure that the auxiliary shaft pin is in place before installing the sprocket. Tighten the sprocket mounting bolt to the torque listed in this Chapter's Specifications.

9 Front oil seals – replacement

Note: *The camshaft, crankshaft and auxiliary shaft oil seals are all replaced the same way, using the same tools, after the appropriate sprocket has been removed. When replacing the sprocket(s), always use a new Ford bolt or clean out the oil hole and use Teflon tape on the old bolt.*

1 Disconnect the negative battery cable from the battery.

2 To remove the camshaft or auxiliary shaft sprockets, referring to Section 7 or 8. Ford manufactures a special puller designed for this purpose.

3 To remove the crankshaft sprocket, use Ford tool no. T74P-6306-A or a gear puller.

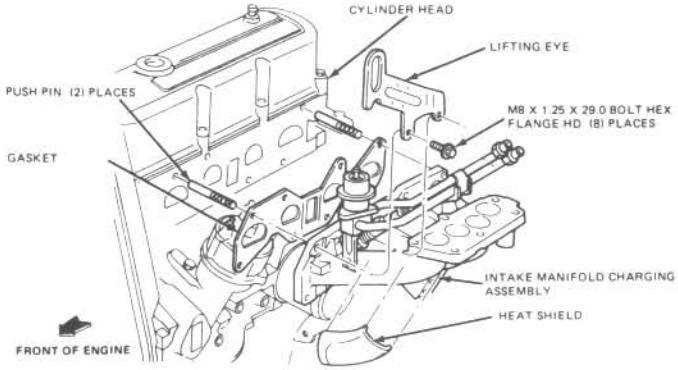
4 Ford tool no. T74P-6700-B or equivalent may be used to remove all the seals. When using the tool, be sure the jaws are gripping the thin edge of the seal very tightly before operating the screw portion of the tool. If the tool isn't available, a hammer and chisel may be used to remove the seal(s) if care is exercised.

5 Clean the seal bore and shaft surface prior to installation of the new seal. Apply a thin layer of grease to the outer edge of the new seal(s).

6 Install the seal(s) with Ford tool no. T74P-6150A. If the special tool isn't available, you may be able to use a large deep socket and a hammer or a short piece of pipe, the sprocket bolt and a large flat washer.

7 Install the components removed to gain access to the seals.

8 If the front cover **(see illustration 8.4)** is removed for any reason, reinstall it without the seal. Before tightening the bolts, center the cover with Ford tool T74P-6019-B or equivalent, then install the seal as described previously.



10.8 Intake manifold and related components – exploded view

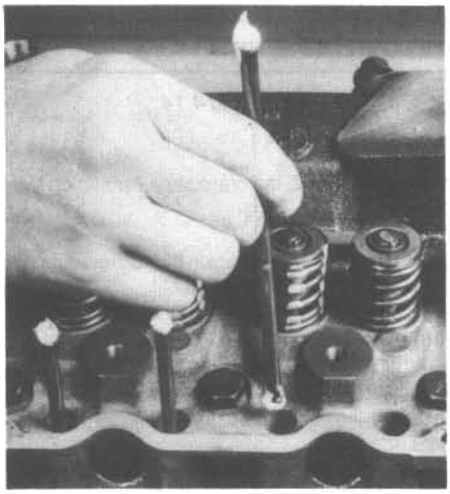
10 Intake manifold – removal and installation

Refer to illustrations 10.8, 10.13a and 10.13b

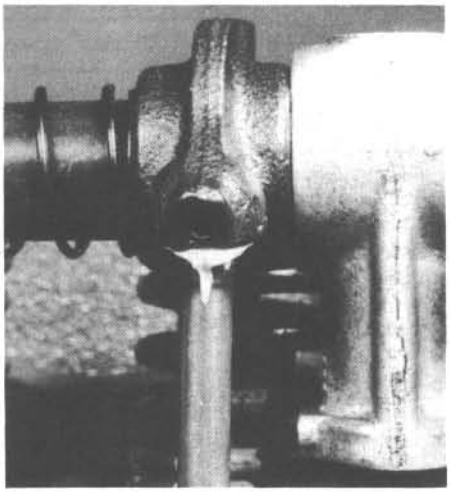
1 Relieve the fuel system pressure (Chapter 4).

2 Disconnect the negative battery cable from the battery.

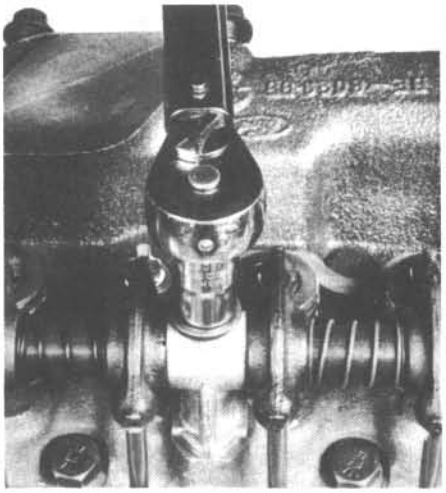
3 Drain the cooling system (Chapter 1).



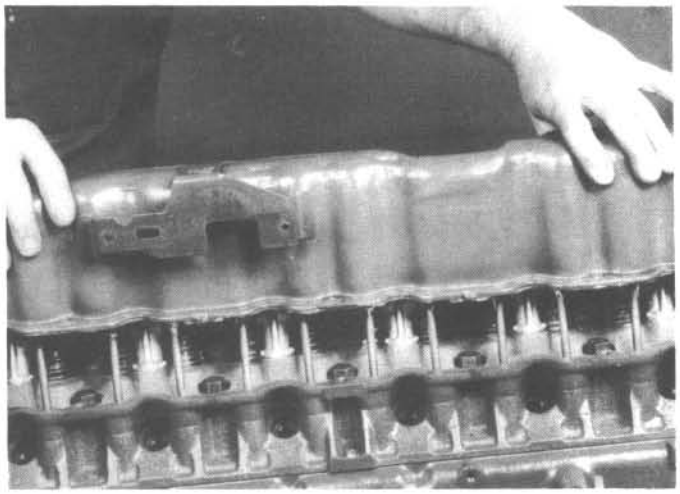
4.8a Lubricate the pushrod ends with moly-base grease or engine assembly lube before installation



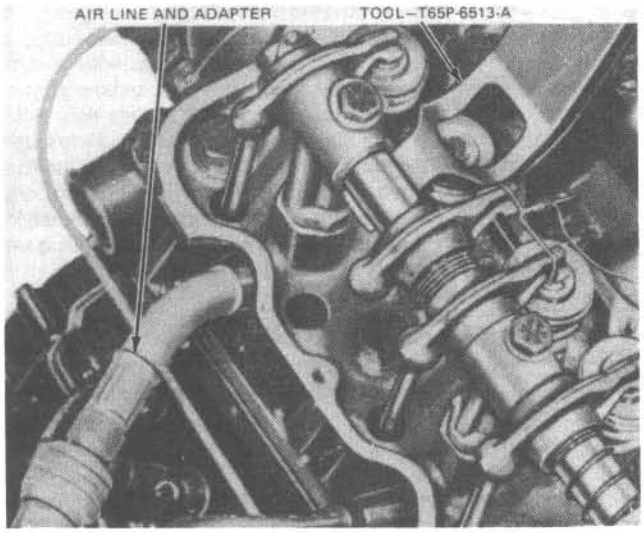
4.8b Make sure the pushrods are engaged in the rocker arms before installing the bolts



4.10 Tighten the rocker arm shaft bolts to the specified torque



4.14 Make sure all gasket surfaces are clean before installing the rocker arm cover – if the cover flange is distorted (this usually happens around the bolt holes), use a hammer and block of wood to flatten and restore it



5.4 Use an air line adapter and compressed air to hold the valve closed while compressing the valve spring

8 Install the pushrods **(see illustrations)** and position the rocker arm shaft assembly on the cylinder head.

9 Install and tighten all the rocker arm support bolts 1/2-turn at a time in the recommended sequence **(see illustration 4.4)** until the supports contact the cylinder head.

10 Tighten the bolts to the specified torque in the same sequence **(see illustration)**.

11 Check the valve clearance following the procedure in Chapter 2, Part E.

12 Clean the rocker arm cover and cylinder head gasket surfaces.

13 Install a new gasket in the cover. Make sure all the gasket tangs are engaged in the notches provided in the cover.

14 Install the cover **(see illustration)** and tighten the bolts in two steps. First tighten the bolts to five ft-lbs, then retighten them to five ft-lbs again two minutes later.

15 Install the accelerator cable bracket.

16 Install the crankcase ventilation system and air cleaner assembly.

5 Valve spring, retainer and seal – replacement

Refer to illustrations 5.4 and 5.10

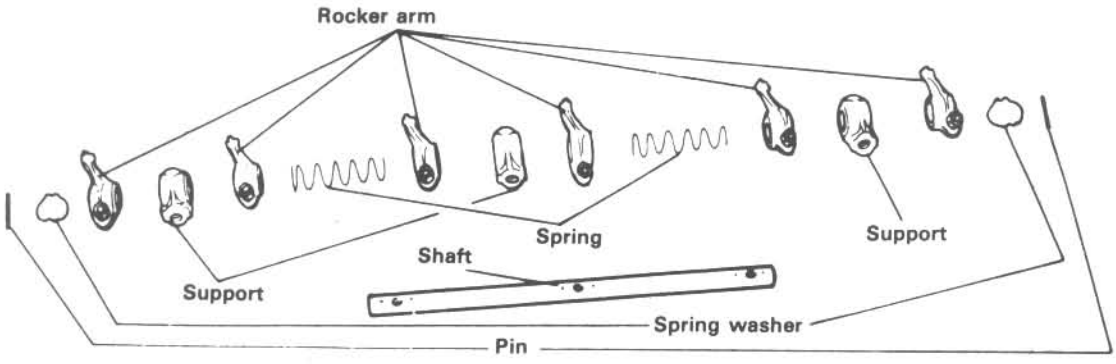
Note: *Broken valve springs and defective valve stem seals can be replaced without removing the cylinder head. Two special tools and a compressed air source are normally required to perform this operation, so read through this Section carefully and rent or buy the tools before beginning the job. If compressed air isn't available, a length of nylon rope can be used to keep the valves from falling into the cylinder during this procedure.*

1 Refer to Section 4 and remove the rocker arm cover from the cylinder head.

2 Remove the spark plug from the cylinder which has the defective component. If all of the valve stem seals are being replaced, all of the spark plugs should be removed.

3 Turn the crankshaft until the piston in the affected cylinder is at top dead center on the compression stroke (refer to Section 3 for instructions). If you're replacing all of the valve stem seals, begin with cylinder number one and work on the valves for one cylinder at a time. Move from cylinder-to-cylinder following the firing order sequence (see this Chapter's Specifications).

4 Thread an adapter into the spark plug hole **(see illustration)** and connect an air hose from a compressed air source to it. Most auto parts stores can supply the air hose adapter. **Note:** *Many cylinder compression gauges utilize a screw-in fitting that may work with your air hose quick-disconnect fitting.*



5.5 Rocker assembly – exploded view

Inspection

Refer to illustration 5.5

5 Remove the pins and disassemble the rocker arm assembly **(see illustration)**. Place the parts in order on a clean workbench.

6 Check each rocker arm for wear, cracks and other damage, especially where the pushrods and valve stems contact the rocker arm faces.

7 Make sure the hole at the pushrod end of each rocker arm is open. Plugging can be cleared with a piece of wire.

8 Check each rocker arm bore, and its corresponding position on the rocker shaft, for wear, cracks and galling. If the rocker arms or shaft are damaged, replace them with new ones.

9 Inspect the pushrods for cracks and excessive wear at the ends. Roll each pushrod across a piece of plate glass to see if it's bent (if it wobbles, it's bent).

10 If necessary, remove the plug from each end of the rocker shaft. Drill into one plug and insert a long steel rod through it to knock out the other plug. Knock out the first plug in the same manner.

11 If the rocker shaft plugs were removed, tap in new ones with a hammer and suitable drift.

12 Assemble the rocker assembly **(see illustration 5.5)**. Lubricate all friction points with engine oil or assembly lube.

13 Install new cotter pins in the ends of the rocker shaft. Be sure the rocker shaft notches face down when the shaft is installed.

Installation

14 Coat each end of each pushrod with assembly lube, then install them in the engine **(see illustration 5.4)**. If you are reinstalling the original pushrods, be sure to return them to their original positions.

15 Coat the rocker arm pads with Lubriplate or equivalent.

16 Loosen the valve adjusting screws several turns.

17 Install the oil baffle and rocker assembly on the engine. The notch on the shaft should face down.

18 Position the rocker arm ball ends in the pushrods.

19 Tighten the rocker shaft support bolts two turns at a time, from the center out, to the torque listed in this Chapter's Specifications.

20 The remainder of installation is the reverse of removal.

21 Adjust the valve clearances (see Chapter 1).

22 Run the engine and check for leaks.

6 Valve springs, retainers and seals – replacement

Refer to illustrations 6.4, 6.9 and 6.10

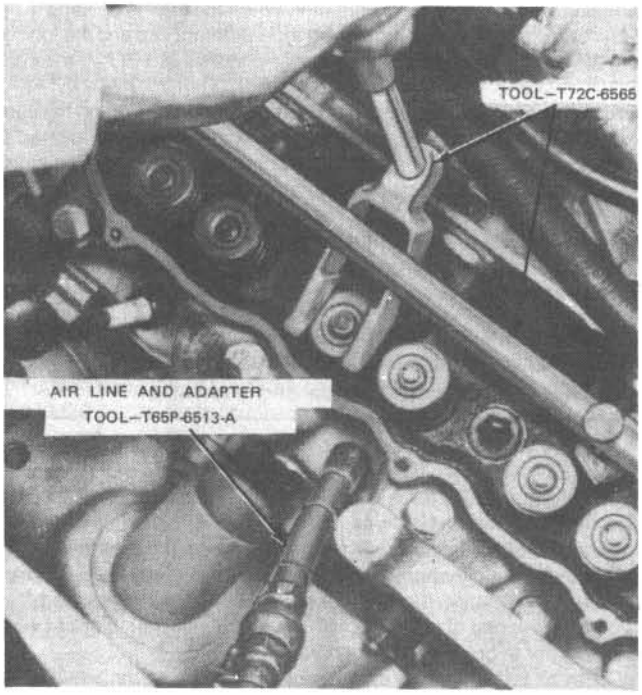
Note: *Broken valve springs and defective valve stem seals can be replaced without removing the cylinder heads. Two special tools and a compressed air source are normally required to perform this operation, so read through this Section carefully and rent or buy the tools before beginning the job. If compressed air isn't available, a length of nylon rope can be used to keep the valves from falling into the cylinder during this procedure.*

1 Refer to Section 4 and remove the rocker arm cover from the affected cylinder head. If all of the valve stem seals are being replaced, remove both rocker arm covers.

2 Remove the spark plug from the cylinder which has the defective component. If all of the valve stem seals are being replaced, all of the spark plugs should be removed.

3 Turn the crankshaft until the piston in the affected cylinder is at top dead center on the compression stroke (refer to Section 3 for instructions). If you're replacing all of the valve stem seals, begin with cylinder number one and work on the valves for one cylinder at a time. Move from cylinder-to-cylinder following the firing order sequence (see this Chapter's Specifications).

4 Thread an adapter into the spark plug hole **(see illustration)** and connect an air hose from a compressed air source to it. Most auto parts stores can supply the air hose adapter. **Note:** *Many cylinder compression gauges utilize a screw-in fitting that may work with your air hose quick-disconnect fitting.*



6.4 Use an air line and adapter to hold the valve closed while compressing the valve spring

Oil pump

Relief valve spring tension	17.1 to 15.2 lbs at 1.20 in
Relief valve-to-bore clearance	0.0017 to 0.0029 in
Gear backlash	0.008 to 0.0012 in
Gear radial clearance	0.002 to 0.0055 in
Gear height (beyond housing)	0.0005 to 0.0055 in

Torque specifications

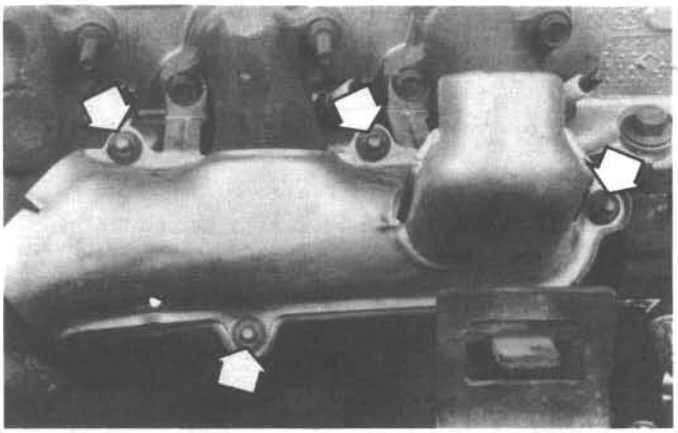
	Ft-lbs (unless otherwise indicated)
Camshaft sprocket bolts	15 to 22
Timing chain cover-to-block bolts	15 to 22
Water pump-to-timing chain cover bolts	15 to 22
Oil pan mounting bolts	80 to 106 in-lbs
Oil pump cover bolts	18 to 22
Cylinder head bolts	
1983	
Step 1	47
Step 2	55
Step 3	63
Step 4	74
Step 5	Loosen all bolts 2 or 3 turns, then repeat tightening sequence
1984 on	
Step 1	37
Step 2	45
Step 3	52
Step 4	59
Step 5	Loosen all bolts 2 or 3 turns, then repeat tightening sequence
Rocker arm fulcrum bolts	
Step 1	5 to 11
Step 2	18 to 26
Intake manifold-to-cylinder head bolts	
1983	
Step 1	5
Step 2	10
Step 3	18
1984 on	
Step 1	7
Step 2	15
Step 3	24
Exhaust manifold bolts	15 to 22
Rocker arm cover-to-cylinder head	
1983 (screw)	36 to 61 in-lbs
1984 on (bolt/stud)	80 to 106 in-lbs
Crankshaft pulley-to-vibration damper bolts	20 to 28
Vibration damper bolt	93 to 121
Flywheel/driveplate mounting bolts	54 to 64

V8 engine

General

Displacement	
1979 and 1983 on	5.0 liters (302 cubic inches)
1980 through 1982	4.2 liters (255 cubic inches)
Cylinder numbers (front to rear)	
Left (driver's) side	5-6-7-8
Right side	1-2-3-4
Firing order	
Except HO	1-5-4-2-6-3-7-8
HO	1-3-7-2-6-5-4-8

Cylinder locations and firing order – V8 engines except HO



8.10 Remove the heat stove cover nuts (arrows) and lift the cover off (V6 engine shown)

6 Remove the air cleaner assembly (Chapter 4) and heat stove tube (if equipped) (Chapter 6).
7 Remove any cruise control brackets that are in the way.

Right side manifold

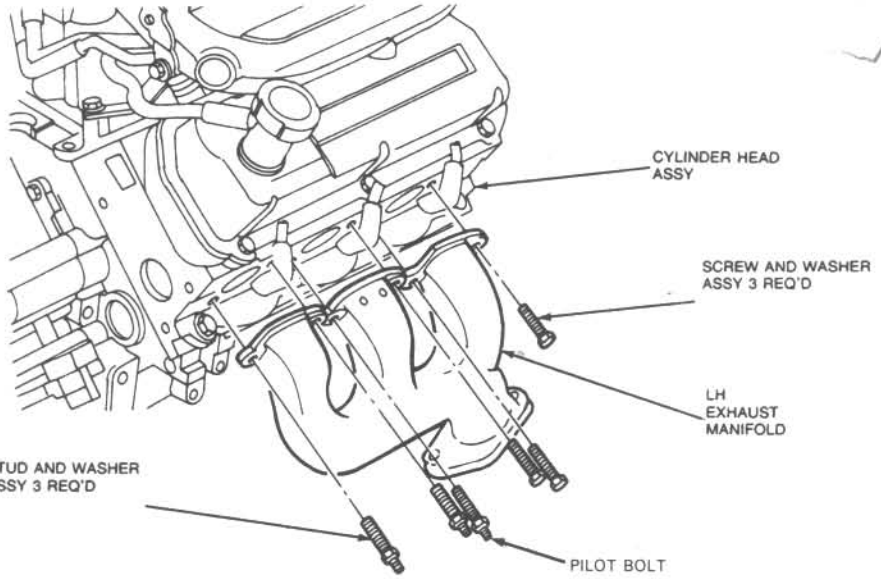
8 Remove the thermactor tube mounted between the air tube check valve and the crossover pipe (Chapter 6).
9 On some vehicles with an automatic transmission, the dipstick and tube must be removed.
10 Remove the outer heat stove cover (if equipped) **(see illustration)**.

Left side manifold

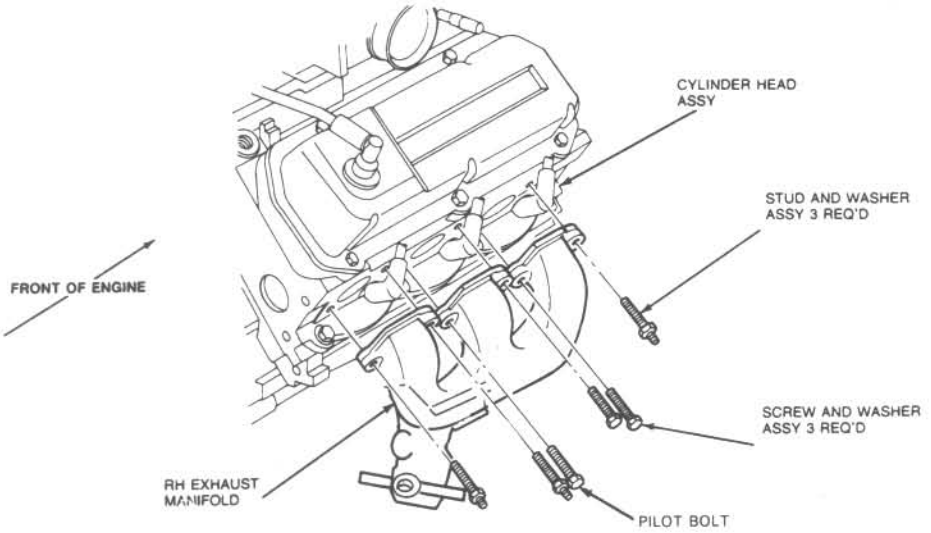
11 If it's in the way, remove the oil dipstick and tube. Also, remove the heat control valve (Chapter 6).

Both manifolds

12 Bend back the locking tabs (if equipped). Remove the mounting bolts and separate the manifold(s) from the head **(see illustrations)**. Note the locations of the pilot bolts.

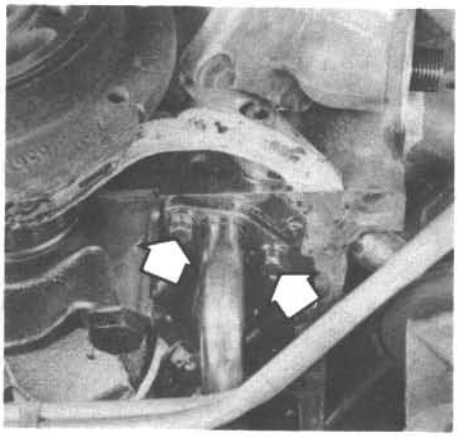


8.12a Pilot bolt location – V6 engine, left exhaust manifold

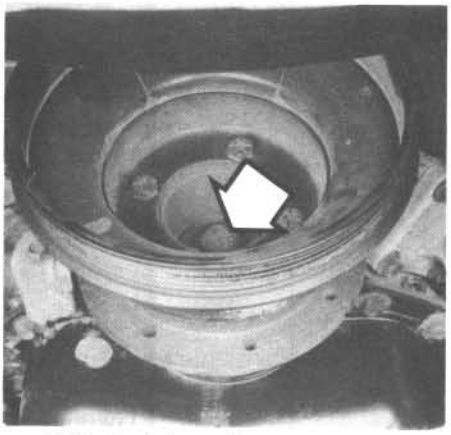


8.12b Pilot bolt location – V6 engine, right exhaust manifold

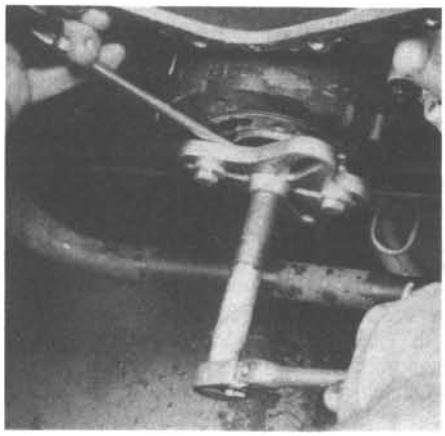
15.11a Remove the nut (arrow) . . .



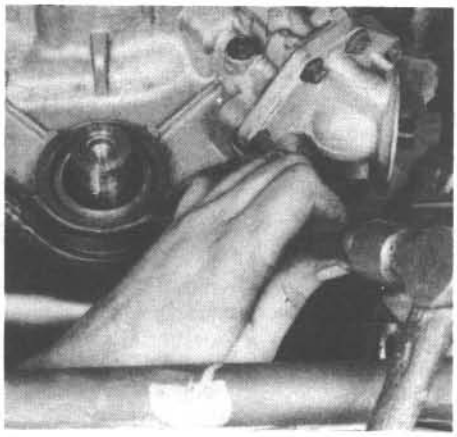
15.11b . . . and the two bolts (arrows) to detach the oil pick-up tube (V6 engine)



16.4 Mark the pulley and vibration damper before removing the four bolts – the large vibration damper bolt (arrow) is usually very tight, so use a six-point socket and a breaker bar to loosen it



16.5 Use the recommended puller to remove the vibration damper – if a puller that applies force to the outer edge is used, the damper will be damaged!



16.6 A chisel and hammer must be used to work the seal out of the timing chain cover – be very careful not to damage the cover or nick the crankshaft!

16.8 Clean the bore, then apply a small amount of oil to the outer edge of the new seal and drive it squarely into the opening with a large socket and a hammer – don't damage the seal in the process and make sure it's completely seated

6 To remove the pressure relief valve, first detach the timing chain cover from the engine (Section 10). Drill a hole in the plug **(see illustration 10.16b)**, then pry it out or remove it with a slide hammer and screw adapter. Remove the spring and valve from the bore.

7 Remove all metal chips from the bore and the valve, then check them carefully for wear, score marks and galling. If the bore is worn or damaged, a new timing chain cover will be required. The valve should fit in the bore with no noticeable side play or binding.

8 If the spring appears to be fatigued or collapsed, replace it with a new one. The tension can be measured and compared to the Specifications to determine its condition.

9 Apply clean engine oil to the valve and install it in the bore, small end first. Insert the spring, then install a new plug. Carefully tap it in until it's 0.010-inch below the machined surface of the cover.

10 Intermediate shaft removal and installation is covered in Section 10.

11 The oil pump pick-up is inside the oil pan. For access, remove the oil pan (Section 14). Remove the pick-up tube nut and the two mounting bolts **(see illustrations)**.

12 Installation is the reverse of removal. **Caution:** *Be sure to pack the oil pump with petroleum jelly (NOT multi-purpose grease) before installing the cover. It must fill all voids between the gears, cavity and cover. If this isn't done, the pump may fail to prime when the engine is started. Install a new cover gasket and tighten the bolts to the torque listed in this Chapter's Specifications in a criss-cross pattern. Use a new pick-up tube gasket and tighten the mounting bolts securely.*

V8 engine

13 Unbolt and lower the oil pan as described in Section 14.

14 Remove the oil pick-up tube-to-main bearing cap nut.

15 Remove the oil pump mounting bolts.

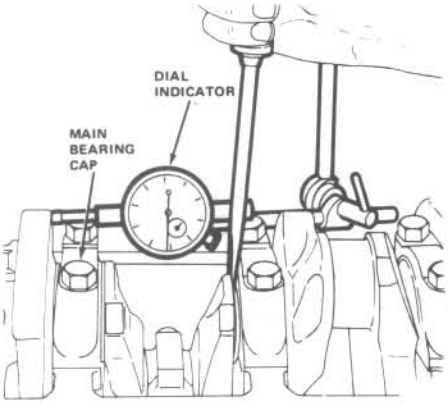
16 Lower the oil pump assembly into the oil pan and lift them both out together. If the pump is faulty, or you suspect that it's faulty, install a new one – do not attempt to repair the original.

17 Prime the oil pump prior to installation. Pour clean oil into the pickup and turn the pump shaft by hand.

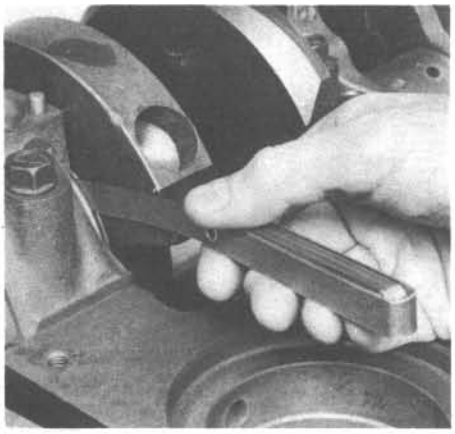
18 If you separate the pump from the pick-up tube, use a new gasket and tighten the bolts securely when reattaching them.

V8 engines (continued)

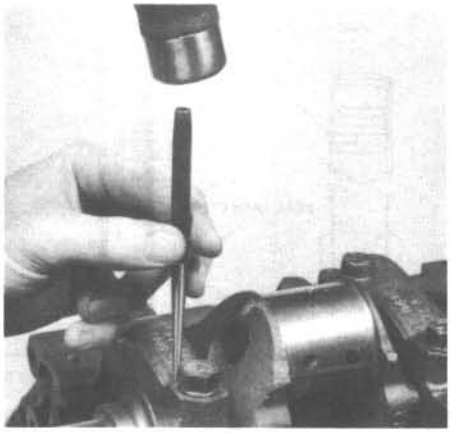
Valve stem-to-guide clearance	
Standard	0.0015 to 0.0032 in
Service limit	0.0055 in
Valve face angle	44-degrees
Valve face runout limit	0.002 in
Valve spring	
Pressure (not including dampener)	
Intake	
1979 and 1980	
Valve open	190 to 212 lbs at 1.36 in
Valve closed	74 to 82 lbs at 1.78 in
1981 and 1982	
Valve open	196 to 214 lbs at 1.36 in
Valve closed	74 to 82 lbs at 1.78 in
1983	
Valve open	
Except HO	196 to 214 lbs at 1.36 in
HO	194 to 214 lbs at 1.33 in
Valve closed	74 to 82 lbs at 1.78 in
1984 through 1987	
Valve open	
Except HO	196 to 214 lbs at 1.36 in
HO	215 to 235 lbs at 1.33 in
Valve closed	
Except HO	74 to 82 lbs at 1.78 in
HO	76 to 84 lbs at 1.79 in
1988 on	
Valve open	211 to 230 lbs at 1.36 in
Valve closed	74 to 82 lbs at 1.78 in
Exhaust	
1979 through 1981	
Valve open	190 to 210 lbs at 1.20 in
Valve closed	76 to 84 lbs at 1.60 in
1982 and 1983	
Valve open	195 to 215 lbs at 1.05 in
Valve closed	71 to 79 lbs at 1.60 in
1984 through 1987	
Valve open	
Except HO	195 to 215 lbs at 1.05 in
HO	210 to 230 lbs at 1.15 in
Valve closed	
Except HO	71 to 79 lbs at 1.60 in
HO	79 to 87 lbs at 1.60 in
1988 on	
Valve open	200 to 226 lbs at 1.15 in
Valve closed	77 to 85 lbs at 1.60 in
Valve spring pressure service limit	10-percent pressure loss at specified length
Out-of-square limit	5/64 in
Installed height	
Intake	
1979 through 1987	
Except HO	1-43/64 to 1-45/64 in
HO	Not available
1988 on	1-3/4 to 1-13/16 in
Exhaust	
1979 through 1987	
Except HO	1-37/64 to 1/39/64 in
HO	Not available
1988 on	1-37/64 to 1-41/64 in
Free length (approximate)	
Intake	
1979 through 1982	2.04 in
1983 through 1987	2.05 in
1988 on	2.02 in
Exhaust	
1979 through 1982	1.85 in
1983 through 1987	1.87 in
1988 on	1.79 in



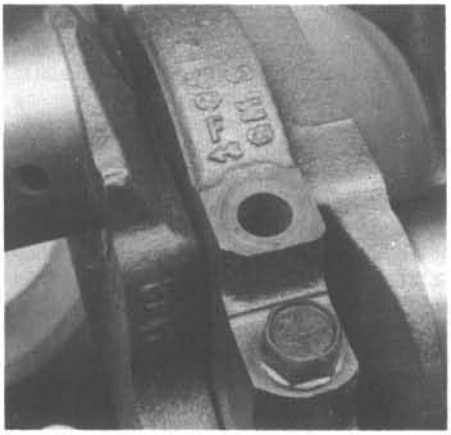
13.1 Checking crankshaft endplay with a dial indicator



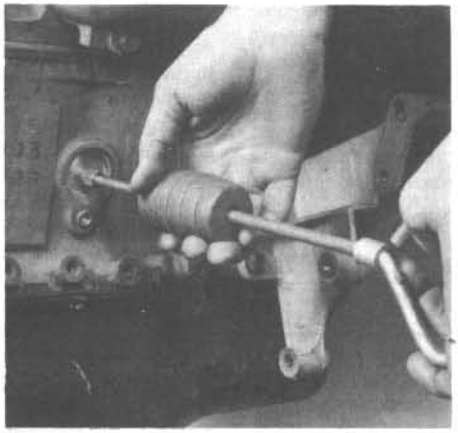
13.3 Checking crankshaft endplay with a feeler gauge



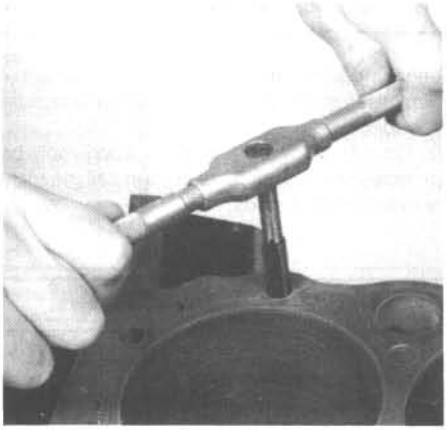
13.4a Use a center punch or number stamping dies to mark the main bearing caps to ensure installation in their original locations on the block (make the punch marks near one of the bolt heads)



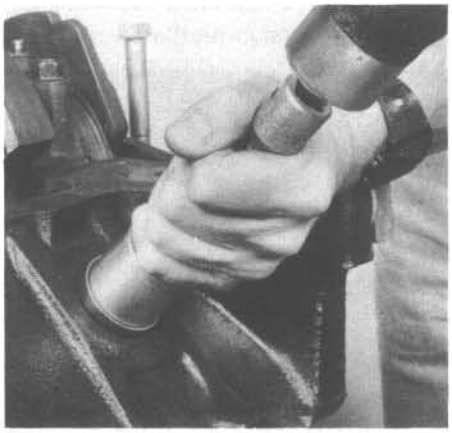
13.4b The arrow on the main bearing cap indicates the front of the engine



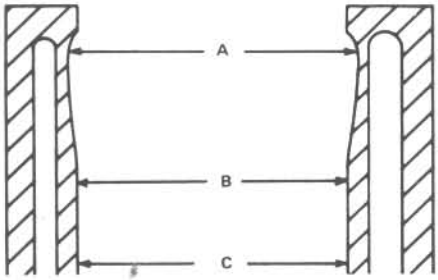
14.1 The core plugs should be removed with a puller – if they're driven into the block, they may be impossible to retrieve



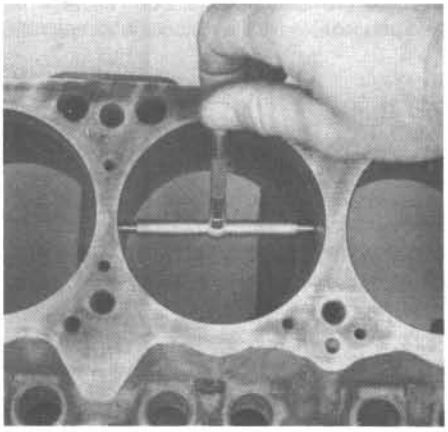
14.8 All bolt holes in the block – particularly the main bearing cap and head bolt holes – should be cleaned and restored with a tap (be sure to remove debris from the holes after this is done)



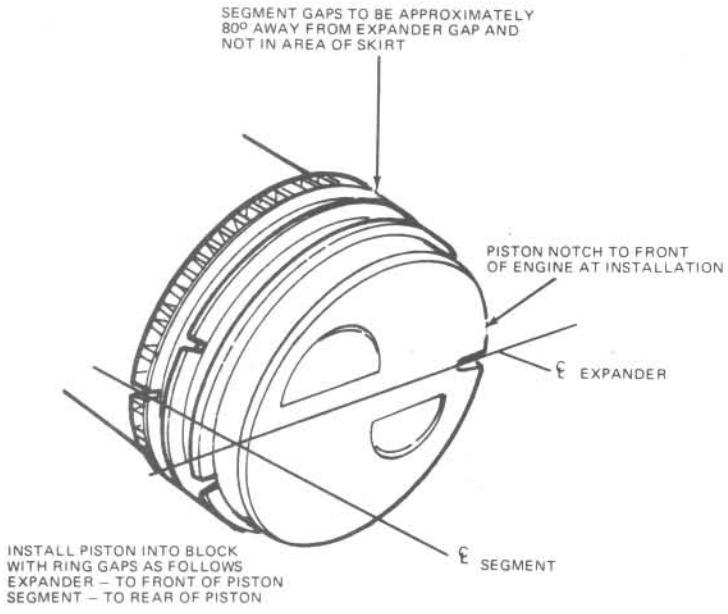
14.10 A large socket on an extension can be used to drive the new core plugs into the bores



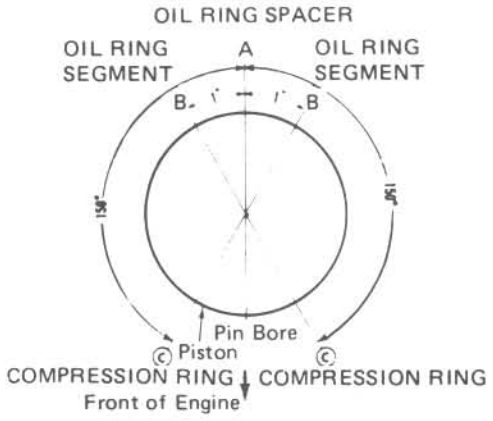
15.4a Measure the diameter of each cylinder just under the wear ridge (A), at the center (B) and at the bottom (C)



15.4b The ability to "feel" when the telescoping gauge is at the correct point will be developed over time, so work slowly and repeat the check until you're satisfied the bore measurement is accurate



24.5a Ring gap position – four-cylinder engine



24.5b Ring gap position – six-cylinder and V8 engines

24 Pistons/connecting rods – installation and rod bearing oil clearance check

Refer to illustrations 24.5a, 24.5b, 24.9, 24.11, 24.13 and 24.17

1 Before installing the piston/connecting rod assemblies, the cylinder walls must be perfectly clean, the top edge of each cylinder must be chamfered, and the crankshaft must be in place.

2 Remove the cap from the end of the number one connecting rod (refer to the marks made during removal). Remove the original bearing inserts and wipe the bearing surfaces of the connecting rod and cap with a clean, lint-free cloth. They must be kept spotlessly clean.

Connecting rod bearing oil clearance check

3 Clean the back side of the new upper bearing insert, then lay it in place in the connecting rod. Make sure the tab on the bearing fits into the recess in the rod. Don't hammer the bearing insert into place and be very careful not to nick or gouge the bearing face. Don't lubricate the bearing at this time.

4 Clean the back side of the other bearing insert and install it in the rod cap. Again, make sure the tab on the bearing fits into the recess in the cap, and don't apply any lubricant. It's critically important that the mating surfaces of the bearing and connecting rod are perfectly clean and oil free when they're assembled.

5 Position the piston ring gaps at intervals around the piston **(see illustrations)**.

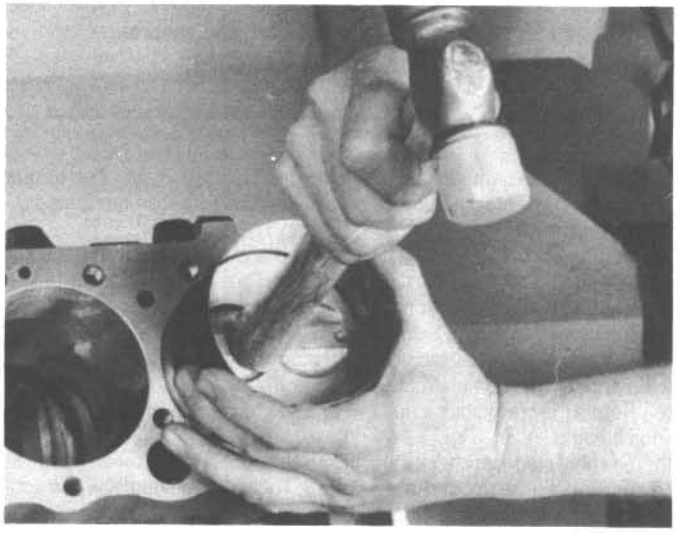
6 Slip a section of plastic or rubber hose over each connecting rod cap bolt.

7 Lubricate the piston and rings with clean engine oil and attach a piston ring compressor to the piston. Leave the skirt protruding about 1/4-inch to guide the piston into the cylinder. The rings must be compressed until they're flush with the piston.

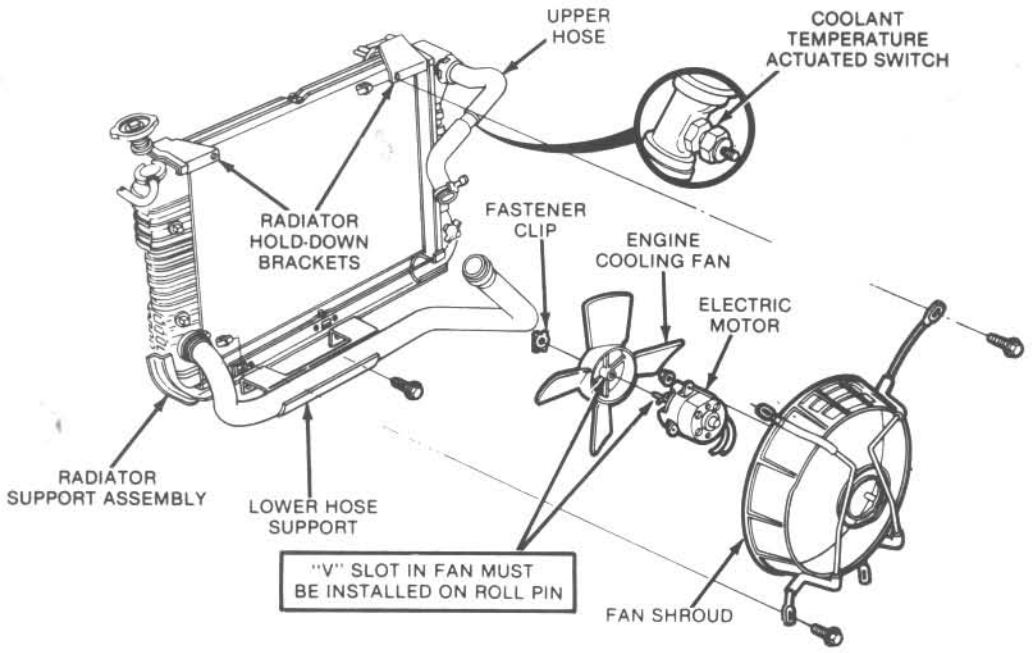
8 Rotate the crankshaft until the number one connecting rod journal is at BDC (bottom dead center) and apply a coat of engine oil to the cylinder walls.

9 With the arrow or notches on top of the piston **(see illustration)** facing the front of the engine, gently insert the piston/connecting rod assembly into the number one cylinder bore and rest the bottom edge of the ring compressor on the engine block.

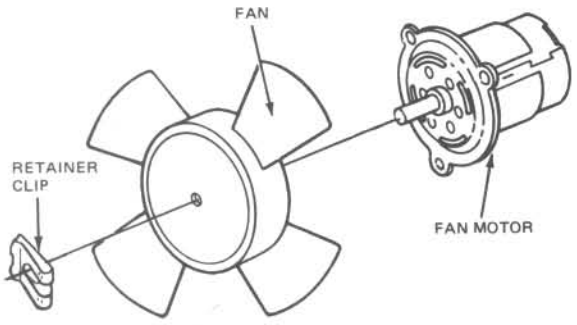
24.9 The notch or arrow in the top of each piston must face the FRONT of the engine as the pistons are installed



24.11 Drive the piston gently into the cylinder bore with the end of a wooden or plastic hammer handle



5.7 Electrodrive cooling fan components – exploded view



5.8 The electrodrive cooling fan is secured to the motor by a retainer clip

7 Remove the fan mounting screws **(see illustration)** and take the fan assembly out.

8 Remove the retainer clip **(see illustration)** and take the fan off the motor shaft. **Note:** *If the motor shaft is burred, remove the burr before attempting to remove the fan.*

9 Remove the fan motor-to-bracket nuts, then separate the motor from the bracket.

10 Installation is the reverse of the removal procedure.

6 Engine-mounted cooling fan – check and replacement

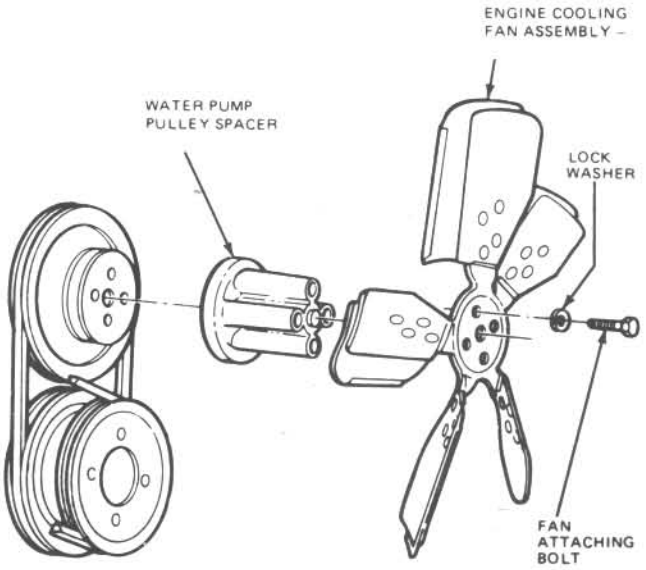
Warning: *DO NOT stand in line with an engine-mounted cooling fan while the engine is running!*

Flex-blade fan

Refer to illustration 6.3

1 A flex-blade fan is used on 1979 through 1981 models. Flexible blades are riveted to a central stamped hub. The blades flatten out at high engine speeds, reducing drag for lower noise and lower fuel consumption.

2 Check the fan carefully for cracks or separation of the blades from the hub. Replace the fan if any cracks or separation are found, no matter how minor the problem may appear. A defective flex-blade fan can break apart in operation, creating a serious safety hazard.



6.3 A typical flex-blade fan and related components

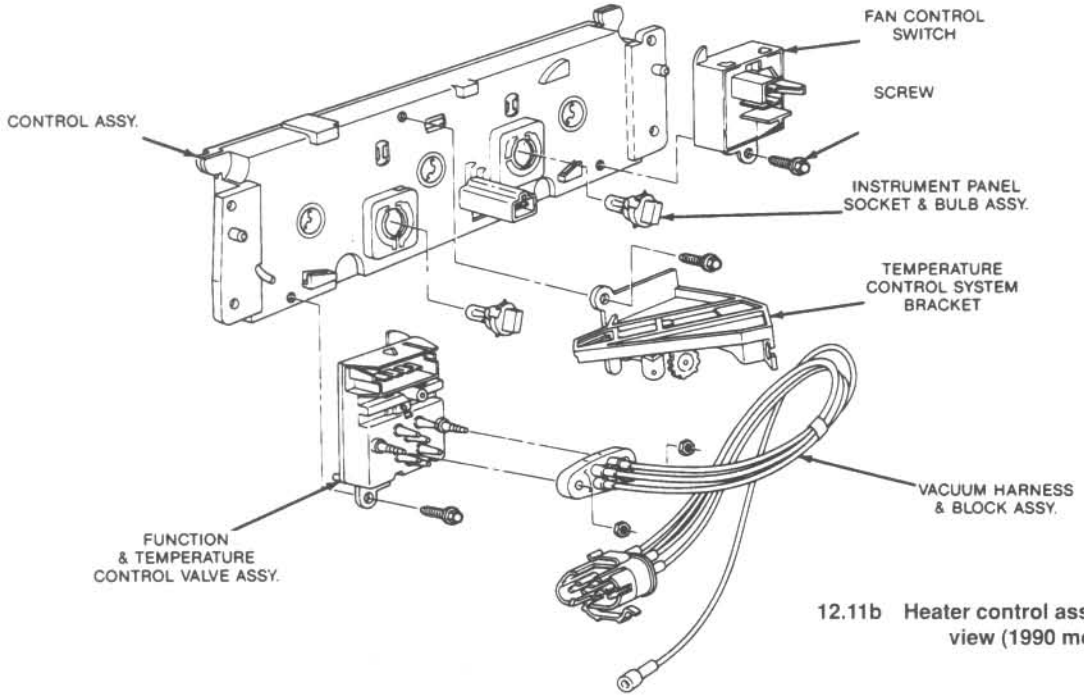
3 To remove the fan, detach the fan shroud from the radiator and push the shroud over the fan. Unbolt the fan and spacer from the water pump pulley **(see illustration)**, then lift the fan, spacer and shroud out of the engine compartment.

4 To install the fan, reverse the removal procedure. Tighten the bolts to the torque listed in this Chapter's Specifications.

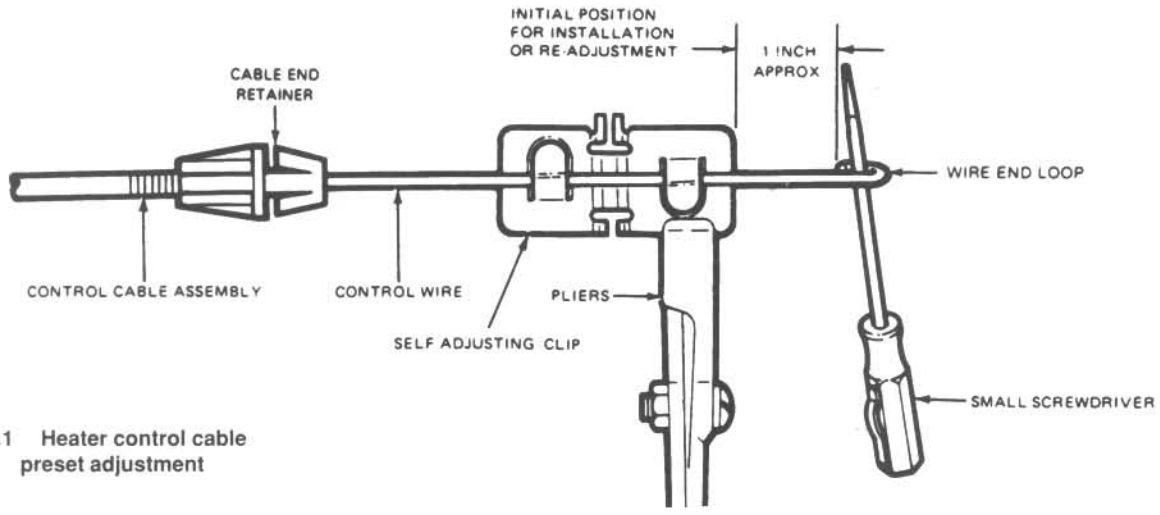
Clutch-type fan

Refer to illustrations 6.10a, 6.10b and 6.11

5 The clutch-type fan employs rigid blades with an aluminum fan clutch at the center (hub). Check the fan carefully for cracks, especially around the base of each blade. Replace a cracked fan immediately.



12.11b Heater control assembly – exploded view (1990 models)



14.1 Heater control cable preset adjustment

3 On 1979 through 1986 models, detach the control lever tang from the knob with a screwdriver and remove the knob.
4 On 1987 and later models, pull the knob off.
5 Remove the switch attaching screw(s) and take the switch out.
6 Installation is the reverse of removal.

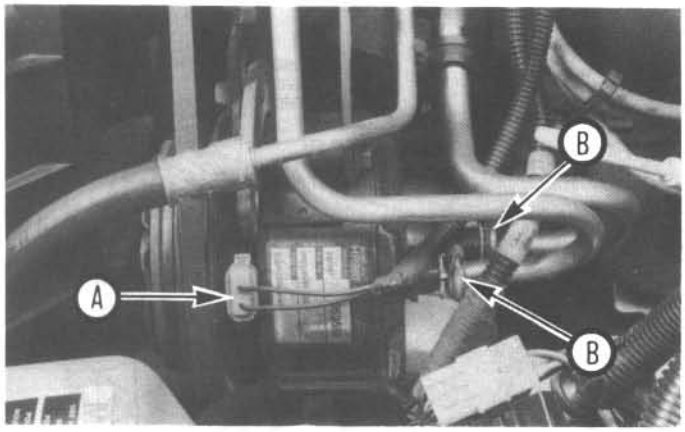
14 Heater control cables – adjustment

Refer to illustration 14.1

1 Before installing the cable:
   a) Slip a small screwdriver blade into the wire coil on the end of the cable **(see illustration)**.
   b) Use pliers to slide the self-adjusting clip along the cable until it is about one inch from the wire loop.
   c) Install the cable (see Section 15).
2 If the cable is already installed:
   a) Move the control lever or knob to the Cool position.
   b) On vehicles equipped with control levers (not rotating knobs), move the function control lever to the Off position.
3 If equipped with control levers, place the temperature control lever in the Warm position and the function control lever in the Def position to adjust the cable.
4 If equipped with rotating control knobs, quickly rotate the knob to the Warm position to adjust the cable.

15 Heater control cables – replacement

1 Detach the cable housing from the heater case. On 1979 through 1986 models, use the special tool or equivalent (see Section 12).
2 Slip the self-adjusting clip off the crank arm at the heater case.
3 Remove the heater control assembly (see Section 12).



22.3 The air conditioning compressor on a V6 model (other models similar)

A Electrical connector B Refrigerant line connections

3 Disconnect the compressor clutch electrical connector **(see illustration)**.
4 Remove the drivebelt (see Chapter 1).
5 Disconnect the refrigerant lines from the rear of the compressor. Plug the open fittings to prevent entry of dirt and moisture. On vehicles having "spring lock" type couplings, slip the special tool of the proper size over the fitting, push the tool into the spring lock and pull the tubing out of the fitting **(see illustrations)**.
6 Unbolt the compressor from the mounting brackets and lift it out of the vehicle.
7 If a new compressor is being installed, follow the directions with the compressor regarding the draining of excess oil prior to installation.
8 The clutch may have to be transferred from the original to the new compressor.
9 Installation is the reverse of removal. Replace all O-rings with new ones specifically made for air conditioning system use and lubricate them with refrigerant oil.
10 Have the system evacuated, recharged and leak tested by the shop that discharged it.

23 Air conditioning system condenser – removal and installation

Warning: *The air conditioning system is under high pressure. DO NOT disassemble any part of the system (hoses, compressor, line fittings, etc.) until after the system has been depressurized by a dealer service department or service station.*

Note: *The accumulator (see Section 24) or receiver/drier (see Section 25) should be replaced whenever the condenser is replaced.*

1979 through 1981 models (receiver/drier system)

Refer to illustration 23.5

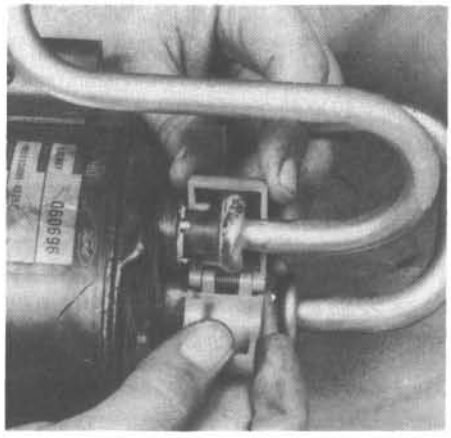
1 Have the air conditioning system discharged (see Warning above).
2 Remove the battery (see Chapter 5).
3 Remove the radiator grille (see Chapter 11).
4 Position the ambient cutoff link out of the way.
5 Disconnect the refrigerant lines from the condenser **(see illustration)**.
6 Unbolt the condenser from the radiator support and lift it out, together with the receiver/drier.
7 Installation is the reverse of removal. If the new condenser does not include a receiver/drier, install one. Use new O-rings, lubricated with air conditioning refrigerant oil, at the condenser line fittings and to install the new receiver/drier.
8 Take the vehicle back to the shop that discharged it. Have the air conditioning system evacuated, charged and leak tested.

1982 and later models (accumulator system)

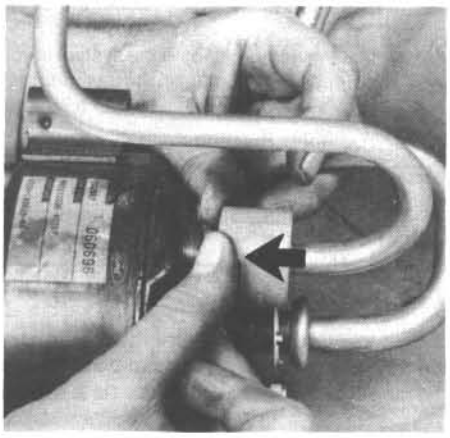
Refer to illustration 23.12

Note: *Whenever the condenser is replaced, the accumulator/drier must be replaced also.*

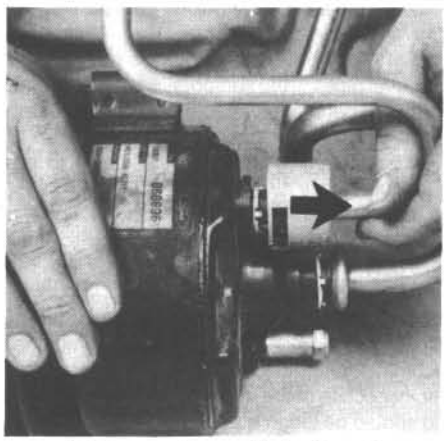
9 Have the air conditioning system discharged (see Warning above).
10 Drain the radiator (see Chapter 1).
11 Remove the battery and its heat shield (see Chapter 5).
12 Disconnect the refrigerant lines from the condenser **(see illustration)**. The lines use spring-lock couplings, which require a special Ford tool for connection and disconnection.
13 Detach the fan shroud and lay it back out of the way.
14 Disconnect the upper radiator hose. Remove the radiator retaining clamps and tilt the radiator back.
15 Remove both condenser mounting screws and lift the condenser out.
16 Cap or plug the condenser and line openings to keep out dirt and moisture.
17 Installation is the reverse of removal. Transfer the rubber isolators from the old condenser to the new one. Add one fluid ounce of clean refrigerant oil to the condenser.
18 Take the vehicle back to the shop that discharged it. Have the air conditioning system evacuated, charged and leak tested.



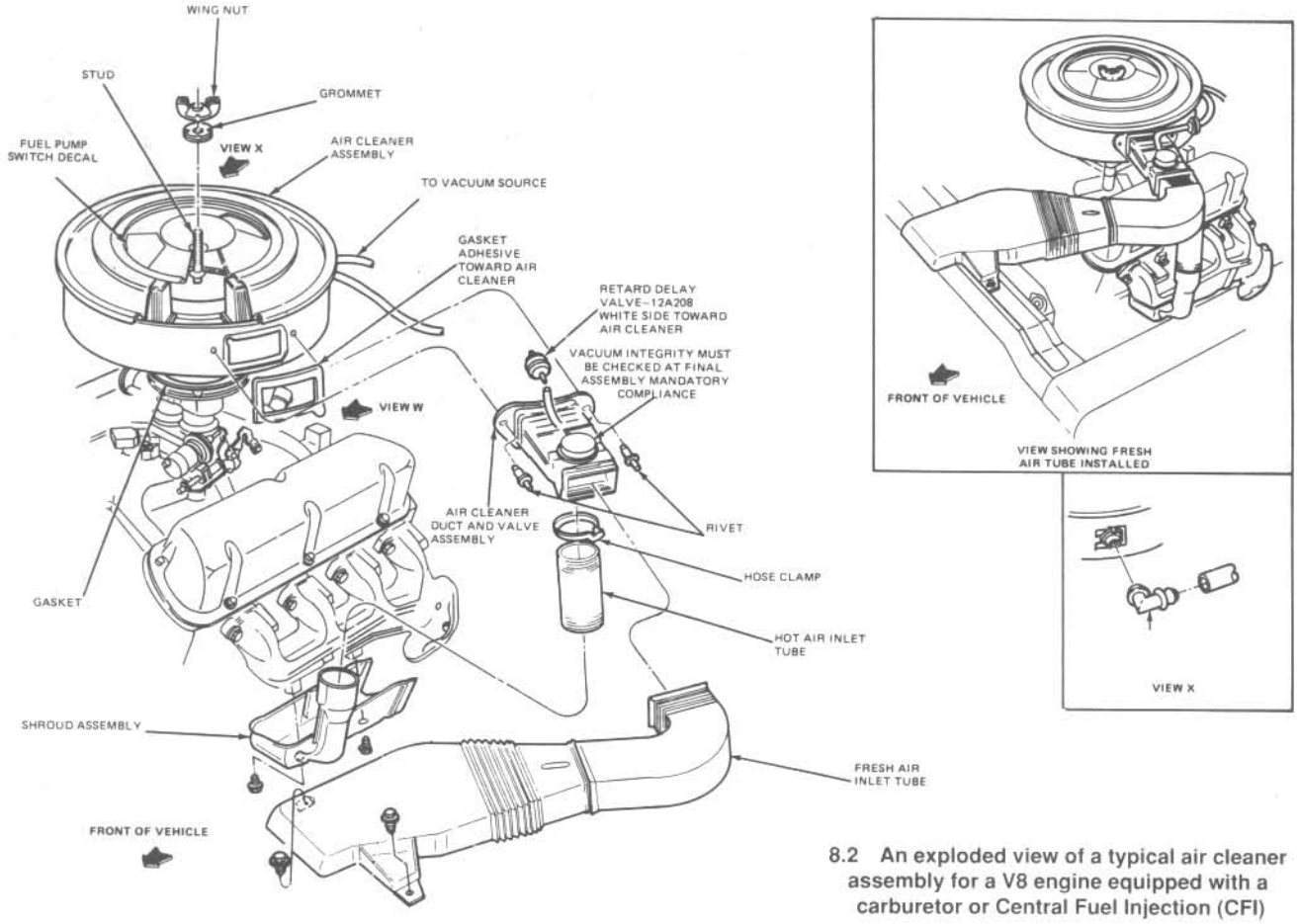
22.5a Slip the proper size tool over the fitting with the tang facing the spring lock, . . .



22.5b . . . close the tool and push it in, . . .



22.5c . . . then pull the line off



8.2 An exploded view of a typical air cleaner assembly for a V8 engine equipped with a carburetor or Central Fuel Injection (CFI)

wash it in clean solvent, then push it back onto the metal pipe on the end of the pump. If you're installing a new pump/sending unit, the assembly will include a new strainer.

16 Clean the fuel pump mounting flange and the tank mounting surface and seal ring groove.

17 Installation is the reverse of removal. Apply a thin coat of heavy grease to the new lock ring gasket to hold it in place during assembly.

Electric chassis-mount fuel pump (fuel-injected models)

18 Depressurize the fuel system as outlined in Section 2 and raise the vehicle with a hoist.

19 Disconnect the electrical connectors from the body harness and remove the inlet and outlet lines from the fuel pump.

20 The fuel pump may now be removed from the assembly by bending the tab out and sliding the pump out of the retaining ring.

21 Remove the electrical wiring harness from the assembly by inserting a screwdriver or knife between the connector and retaining clip and sliding the connector towards the pump inlet.

22 When installing, make sure the fittings on the pump have gaskets in place, that the gaskets are properly positioned and that the fittings have been tightened properly.

23 Check the wiring harness boots to make sure they are pushed into the pump terminals far enough to seal and check that the wire terminals are pushed onto the pump terminals all the way.

24 Wrap the fuel pump retaining ring around the fuel pump. Locate the slot in the ring so that it faces the bracket base and push the pump and ring assembly into the bracket. Make sure the tab on the ring contacts the tab of the bracket and that the bracket tabs do not contact the pump case. When the pump is inserted into the bracket as far as possible and the wiring harness comes out the bottom of the ring, bend the rear tab to prevent the pump from sliding out.

25 Connect the fuel lines to the pump assembly, then attach the electrical harness connector to the body electrical connector.

26 Start the vehicle, check for proper operation of the pump and look for leaks.

8 Air cleaner housing – removal and installation

Carburetor and CFI equipped models

Refer to illustration 8.2

Note: *The air cleaner housing assemblies used with carburetors and CFI are basically similar.*

1 Detach the cable from the negative terminal of the battery.

2 Detach the fresh air inlet tube from the mouth of the air cleaner housing assembly snorkel **(see illustration)**.

3 Clearly label and detach all vacuum hoses, lines and electrical connectors as necessary from the air cleaner housing assembly.

4 Remove the wing nut and grommet (if equipped) from the air cleaner housing and remove the cover.

5 Remove the air cleaner filter element. Inspect it for signs of dust or dirt leaking through holes in the filter material or past the end seals (see Chapter 1).

6 Lift the air cleaner housing assembly off.

7 Installation is the reverse of removal.

EFI and SEFI equipped models

Note: *Because the air cleaner housing assemblies on EFI and SEFI fuel systems are virtually identical, the following procedure applies to both of*

39 Attach the air inlet tube to the turbocharger inlet elbow. Tighten the hose clamp securely.
40 Install the PCV tube fitting and tighten the clamp securely.
41 Attach all vacuum lines.
42 Connect the oxygen sensor.
43 Connect the electrical ground wire to the air inlet elbow.
44 Install the turbocharger oil supply line. Tighten the fitting securely.
45 Install the turbocharger intercooler assembly. Tighten the clamps and the nut securely.
46 Fill and bleed the cooling system (see Chapter 1).
47 Connect the cable to the negative terminal of the battery.
48 Start the engine and check for leaks.

Carbureted models

Refer to illustrations 16.57 and 16.63

49 Disconnect the negative battery cable from the battery.
50 Remove the two nuts which hold the turbocharger heat shield to the turbine housing and remove the shield.
51 Raise the vehicle and position it securely on jackstands.
52 Remove the four bolts which attach the crossover pipes to the turbocharger. Remove the crossover pipe at that end.
53 Disconnect the exhaust pipe from the check valve located just above the catalytic converter.
54 Remove the bolts which attach the crossover pipes to the exhaust manifold. Loosen and lower the crossover pipe. Remove the exhaust pipe retaining bolts at the inlet of the rear catalytic converter.
55 Remove the rear turbocharger brace bolts and the brace.
56 Remove the jackstands and lower the vehicle. Remove the air cleaner and duct assembly. Place a shop rag over the carburetor mouth to prevent dirt and parts from falling in.
57 Disconnect the oil supply line from the turbocharger central housing **(see illustration)**.
58 Disconnect the two hoses from the wastegate actuator diaphragm.
59 Remove the accelerator cable and its two mounting bolts from the intake manifold.
60 Disconnect the turbocharger vacuum line at the intake manifold.
61 Remove the engine oil dipstick bracket bolt to provide removal access.
62 Loosen the flange nuts at both ends of the EGR tube, then remove the tube.
63 Remove three nuts and one bolt that secure the turbocharger to the intake manifold **(see illustration)**.
64 Label and detach any remaining vacuum hoses.
65 Lift the turbocharger out of the engine compartment.
66 Installation is the reverse of removal. Use new O-rings, lightly coated with clean engine oil, at the following points:

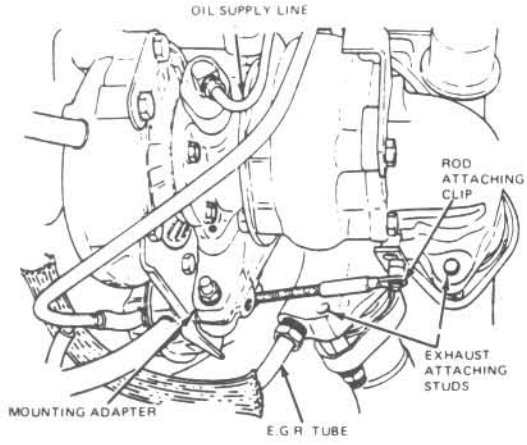
a) Compressor inlet-to-manifold joint
b) Compressor outlet-to-manifold joint
c) Oil drain line adapter-to-intake manifold joint

17 Exhaust system servicing – general information

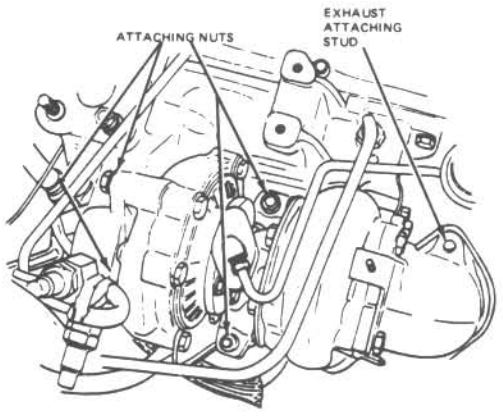
Warning: *Inspection and repair of exhaust system components should be done only after enough time has elapsed after driving the vehicle to allow the system components to cool completely. Also, when working under the vehicle, make sure it is securely supported on jackstands.*

1 The exhaust system consists of the exhaust manifold(s), the catalytic converter, the muffler, the tailpipe and all connecting pipes, brackets, hangers and clamps. The exhaust system is attached to the body with mounting brackets and rubber hangers. If any of the parts are improperly installed, excessive noise and vibration will be transmitted to the body.
2 Conduct regular inspections of the exhaust system to keep it safe and quiet. Look for any damaged or bent parts, open seams, holes, loose connections, excessive corrosion or other defects which could allow exhaust fumes to enter the vehicle. Deteriorated exhaust system components should not be repaired; they should be replaced with new parts.
3 If the exhaust system components are extremely corroded or rusted together, welding equipment will probably be required to remove them. The convenient way to accomplish this is to have a muffler repair shop remove the corroded sections with a cutting torch. If, however, you want to save money by doing it yourself (and you don't have a welding outfit with a cutting torch), simply cut off the old components with a hacksaw. If you have compressed air, special pneumatic cutting chisels can also be used. If you do decide to tackle the job at home, be sure to wear safety goggles to protect your eyes from metal chips and work gloves to protect your hands.
4 Here are some simple guidelines to follow when repairing the exhaust system:

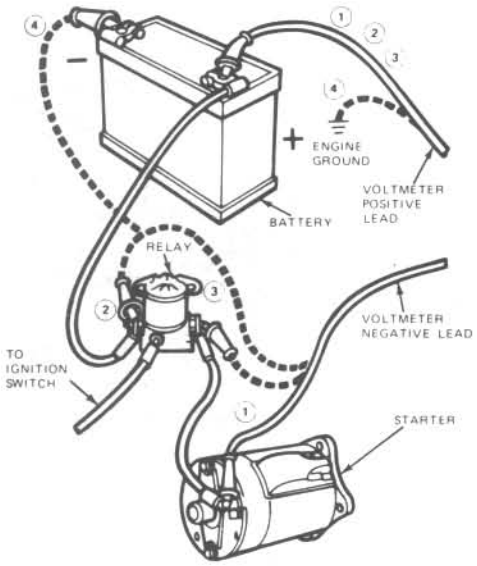
a) Work from the back to the front when removing exhaust system components.
b) Apply penetrating oil to the exhaust system component fasteners to make them easier to remove.
c) Use new gaskets, hangers and clamps when installing exhaust systems components.
d) Apply anti-seize compound to the threads of all exhaust system fasteners during reassembly.
e) Be sure to allow sufficient clearance between newly installed parts and all points on the underbody to avoid overheating the floor pan and possibly damaging the interior carpet and insulation. Pay particularly close attention to the catalytic converter and heat shield.



16.57 Turbocharger connections – carbureted turbo models



16.63 Turbocharger mounting bolts and nuts – carbureted turbo models



19.13 The four test lead connections for the starter cranking circuit test

8 If the starter motor cranks the engine at an abnormally slow speed, first make sure the battery is fully charged and all terminal connections are clean and tight. Also check the connections at the starter relay and battery ground. Eyelet terminals should not be easily rotated by hand. Also check for a short to ground. If the engine is partially seized, or has the wrong viscosity oil in it, it will crank slowly.

Starter cranking circuit test

Refer to illustration 19.13

Note: *To determine the location of excessive resistance in the starter circuit, perform the following simple series of tests.*

9 Disconnect the ignition coil wire from the distributor cap and ground it on the engine.

10 Connect a remote control starter switch from the battery terminal of the starter relay to the S terminal of the relay.

11 Connect a voltmeter positive lead to the starter motor terminal of the starter relay, then connect the negative lead to ground.

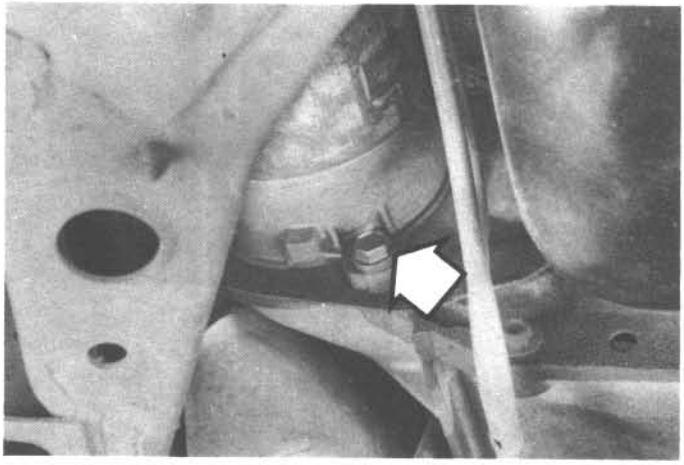
12 Actuate the ignition switch and take the voltmeter readings as soon as a steady figure is indicated. Do not allow the starter motor to turn for more than 30 seconds at a time. A reading of 9-volts or more, with the starter motor turning at normal cranking speed, is normal. If the reading is 9-volts or more but the cranking speed is slow, the motor is faulty. If the reading is less than 9-volts and the cranking speed is slow, the relay contacts are probably burned.

13 Make the test connections as shown **(see illustration)**. Refer to this illustration as you perform the following four tests.

14 Operate the ignition switch and take the voltmeter readings as soon as a steady figure is indicated. Don't allow the starter motor to turn for more than 30 seconds at a time.

15 The voltage drop in the circuit will be indicated by the voltmeter (put the voltmeter on the 0-to-2 volt range). The maximum allowable voltage drop should be:

a) 0.5-volt with the voltmeter negative lead connected to the starter terminal and the positive lead connected to the battery positive terminal (Connection 1 in illustration 19.13).
b) 0.1-volt with the voltmeter negative lead connected to the starter relay (battery side) and the positive lead connected to the positive terminal of the battery (Connection 2).
c) 0.3-volt with the voltmeter negative lead connected to the starter relay (starter side) and the positive lead connected to the positive terminal of the battery (Connection 3).
d) 0.3-volt with the voltmeter negative lead connected to the negative terminal of the battery and the positive lead connected to the engine ground (Connection 4).



20.6 The starter motor lower mounting bolt (arrow) (upper bolt not visible)

20 Starter motor – removal and installation

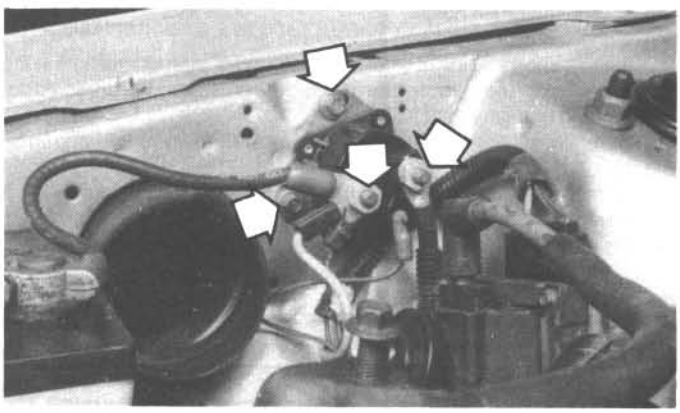
Refer to illustration 20.6

1 Detach the cable from the negative terminal of the battery.
2 Raise the vehicle and support it securely on jackstands.
3 Disconnect the large cable from the terminal on the starter motor.
4 1979 models – remove four bolts that secure the crossmember under the transmission bellhousing. Remove the screw that secures the flex coupling to the steering gear. Detach the flex coupling and pull the steering gear down.
5 4.2L V8 engines – remove the wishbone brace.
6 Remove the starter motor mounting bolts **(see illustration)** and detach the starter from the engine.
7 If necessary, turn the wheels to one side to provide removal access.
8 Installation is the reverse of removal.

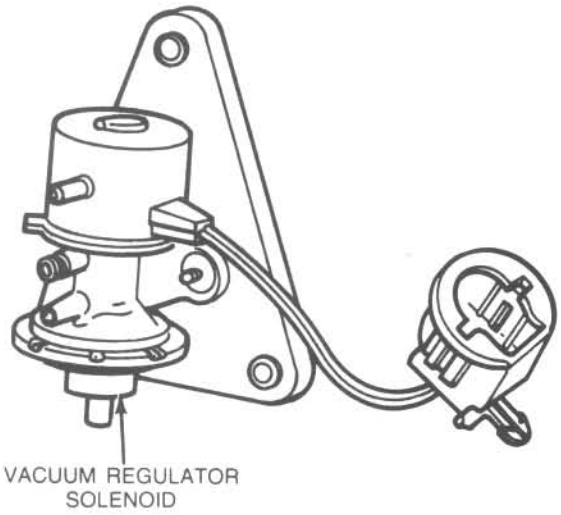
21 Starter relay – removal and installation

Refer to illustration 21.2

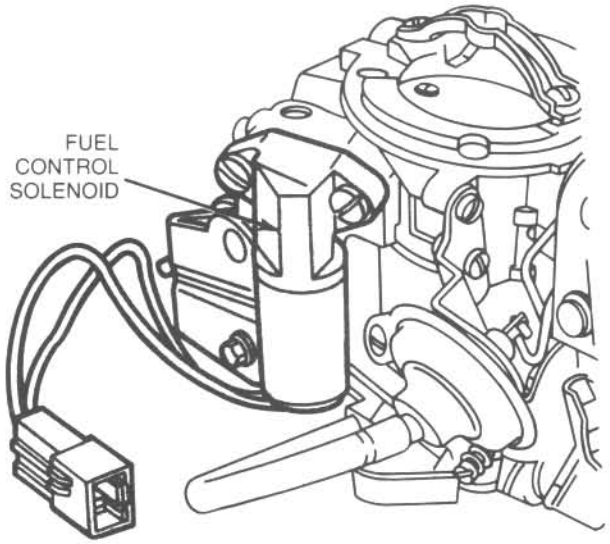
1 Detach the cable from the negative terminal of the battery.
2 Label the wires and the terminals then disconnect the Neutral safety switch wire (automatics only), the battery cable, the fusible link and the starter cable from the relay terminals **(see illustration)**.
3 Remove the mounting bolts and detach the relay.
4 Installation is the reverse of removal.



21.2 To remove the starter relay, detach the Neutral safety switch wire (if equipped with an automatic), the fusible link, the battery positive lead and the starter motor leads (arrows), then remove the relay mounting bracket bolts (arrows)



3.20 The vacuum regulator solenoid is normally mounted to the engine compartment firewall



3.25 The fuel control solenoid is mounted to the carburetor

7 The idle tracking switch is mounted on the carburetor. It indicates prolonged idling or deceleration to the MCU.
8 The tach input signal is sent from the ignition coil's primary circuit to the MCU. It is used by the MCU to prevent over-correction or excessively sudden changes when it adjusts the air-fuel ratio.
9 Coolant temperature switches indicate engine temperature to the MCU.
10 Vacuum switches indicate throttle position to the MCU, as well as preventing the Thermactor system from causing backfires.

Output devices

11 The canister purge solenoid, which is similar to the EEC-IV solenoid, lets manifold vacuum purge fuel vapor from the evaporative emission canister.
12 The Thermactor air solenoids direct air flow from the Thermactor pump upstream, downstream or into the atmosphere.
13 The vacuum regulator solenoid regulates vacuum to the air-fuel mixture control diaphragm on the Model 6500 feedback carburetor used with early 2.3L four-cylinder engines.
14 The fuel control solenoid is mounted directly on the YFA carburetor used on later 2.3L engines. It uses an electrical signal, rather than vacuum, to control fuel mixture.
15 The feedback carburetor actuator is mounted on the Model 7200 VV (variable venturi) carburetor used with V8 engines. It controls the air bleed jet in the carburetor to regulate fuel mixture.
16 The throttle kicker solenoid and actuator are used to open the throttle slightly under specified conditions.

Checking

17 As with the EEC-IV system, MCU system diagnosis is beyond the scope of the home mechanic. If engine performance deteriorates, perform the basic electrical and mechanical checks: Compression, vacuum line condition and connections, ignition system condition and carburetor idle adjustment. If these checks don't find the cause, have the MCU system tested by a dealer service department or other qualified specialist.

Component replacement

18 Exhaust gas oxygen sensors, coolant temperature sensors and the canister purge solenoid are replaced in the same manner as EEC-IV system components (see Section 2).

Vacuum regulator solenoid

Refer to illustration 3.20

19 Disconnect the negative battery cable from the battery.
20 Disconnect the solenoid electrical connector **(see illustration)**.
21 Label and disconnect the solenoid vacuum lines. Check the lines to make sure they are in good condition; if not, replace them.
22 Detach the solenoid from the engine compartment wall and take it out.
23 Installation is the reverse of removal.

Fuel control solenoid

Refer to illustration 3.25

24 Disconnect the negative battery cable from the battery.
25 Disconnect the solenoid electrical connector **(see illustration)**.
26 Detach the solenoid from the carburetor.
27 Installation is the reverse of removal.

Feedback actuator (V8 engines)

28 This is part of the complicated 7200VV carburetor. Removal and installation are beyond the scope of the home mechanic.

Throttle kicker solenoid

29 Throttle kicker solenoids are mounted on the carburetor in a position where they can contact the throttle linkage.
30 Disconnect the negative battery cable from the battery.
31 If necessary, detach the solenoid bracket from the carburetor.
32 Loosen the solenoid locknut. Unscrew the solenoid, making sure to write down the number of turns required.
33 Install the solenoid, turning it the same number of turns required for removal.
34 The remainder of installation is the reverse of removal.

4 Exhaust Gas Recirculation (EGR) system

General description

1 The EGR system is designed to reintroduce small amounts of exhaust gas into the combustion cycle, thus reducing the generation of oxides of nitrogen (NOx) emissions. The amount of exhaust gas reintroduced and the timing of the cycle is controlled by various factors such as engine speed, altitude, manifold vacuum, exhaust system backpressure, coolant temperature and throttle angle. All EGR valves are vacuum actuated (the vacuum diagram for your particular vehicle is shown on the Vehicle Emissions Control Information [VECI] label in the engine compartment). Three types of EGR valves are used on these vehicles: the ported valve, the integral backpressure valve and the electronic type.

If the transmission requires major repair work, it should be left to a dealer service department or an automotive or transmission repair shop. You can, however, remove and install the transmission yourself and save the expense, even if the repair work is done by a transmission specialist.

Models covered in this manual may be equipped with any one of five automatic transmissions. They are the C3, C4, C5, AOD and A4LD, which are of the same fundamental design but with varying power handling capabilities. The A4LD and AOD use electronic controls integrated into the on-board EEC-IV system. These controls operate a piston/plate clutch in the torque converter that eliminates converter slip when applied.

On some models Ford specifies a different grade transmission fluid than other vehicle manufacturers, and this must be used when refilling or adding fluid. The fluid specification for your vehicle can be found embossed on the transmission fluid dipstick.

2 Diagnosis – general

Note: *Automatic transmission malfunctions may be caused by five general conditions: poor engine performance, improper adjustments, hydraulic malfunctions, mechanical malfunctions or malfunctions in the computer or its signal network. Diagnosis of these problems should always begin with a check of the easily repaired items: fluid level and condition (Chapter 1), shift linkage adjustment and throttle linkage adjustment. Next, perform a road test to determine if the problem has been corrected or if more diagnosis is necessary. If the problem persists after the preliminary tests and corrections are completed, additional diagnosis should be done by a dealer service department or transmission repair shop.*

Preliminary checks

1 Drive the vehicle to warm the transmission to normal operating temperature.

2 Check the fluid level as described in Chapter 1:

a) If the fluid level is unusually low, add enough fluid to bring the level within the designated area of the dipstick, then check for external leaks (see below).

b) If the fluid level is abnormally high, drain off the excess, then check the drained fluid for contamination by coolant. The presence of engine coolant in the automatic transmission fluid indicates that a failure has occurred in the internal radiator walls that separate the coolant from the transmission fluid (see Chapter 3).

c) If the fluid is foaming, drain it and refill the transmission, then check for coolant in the fluid or a high fluid level.

3 Check the engine idle speed. **Note:** *If the engine is malfunctioning, do not proceed with the preliminary checks until it has been repaired and runs normally.*

4 Check the throttle valve cable (AOD transmission) for freedom of movement. Adjust it if necessary (Section 3). **Note:** *The throttle cable may function properly when the engine is shut off and cold, but it may malfunction once the engine is hot. Check it cold and at normal engine operating temperature.*

5 Inspect the shift control linkage (Section 5). Make sure that it's properly adjusted and that the linkage operates smoothly.

Fluid leak diagnosis

6 Most fluid leaks are easy to locate visually. Repair usually consists of replacing a seal or gasket. If a leak is difficult to find, the following procedure may help.

7 Identify the fluid. Make sure it's transmission fluid and not engine oil or brake fluid.

8 Try to pinpoint the source of the leak. Drive the vehicle several miles, then park it over a large sheet of cardboard. After a minute or two, you should be able to locate the leak by determining the source of the fluid dripping onto the cardboard.

9 Make a careful visual inspection of the suspected component and the area immediately around it. Pay particular attention to gasket mating surfaces. A mirror is often helpful for finding leaks in areas that are hard to see.

10 If the leak still cannot be found, clean the suspected area thoroughly with a degreaser or solvent, then dry it.

11 Drive the vehicle for several miles at normal operating temperature and varying speeds. After driving the vehicle, visually inspect the suspected component again.

12 Once the leak has been located, the cause must be determined before it can be properly repaired. If a gasket is replaced but the sealing flange is bent, the new gasket will not stop the leak. The bent flange must be straightened.

13 Before attempting to repair a leak, check to make sure that the following conditions are corrected or they may cause another leak. **Note:** *Some of the following conditions (a leaking torque converter, for instance) cannot be fixed without highly specialized tools and expertise. Such problems must be referred to a transmission shop or a dealer service department.*

Gasket leaks

14 Check the pan periodically. Make sure the bolts are tight, no bolts are missing, the gasket is in good condition and the pan is flat (dents in the pan may indicate damage to the valve body inside).

15 If the pan gasket is leaking, the fluid level or the fluid pressure may be too high, the vent may be plugged, the pan bolts may be too tight, the pan sealing flange may be warped, the sealing surface of the transmission housing may be damaged, the gasket may be damaged or the transmission casting may be cracked or porous. If sealant instead of gasket material has been used to form a seal between the pan and the transmission housing, it may be the wrong sealant.

Seal leaks

16 If a transmission seal is leaking, the fluid level or pressure may be too high, the vent may be plugged, the seal bore may be damaged, the seal itself may be damaged or improperly installed, the surface of the shaft protruding through the seal may be damaged or a loose bearing may be causing excessive shaft movement.

17 Make sure the dipstick tube seal is in good condition and the tube is properly seated. Periodically check the area around the speedometer gear or sensor for leakage. If transmission fluid is evident, check the O-ring for damage.

Case leaks

18 If the case itself appears to be leaking, the casting is porous and will have to be repaired or replaced.

19 Make sure the oil cooler hose fittings are tight and in good condition.

Fluid comes out vent pipe or fill tube

20 If this condition occurs, the transmission is overfilled, there is coolant in the fluid, the case is porous, the dipstick is incorrect, the vent is plugged or the drain back holes are plugged.

3 Throttle valve (TV) linkage – description, inspection and adjustment (AOD transmissions only)

Description

1 The throttle valve cable or rod used on AOD transmissions should not be thought of as merely a "downshift" device. The TV linkage controls line pressure, shift points, shift feel, part throttle downshifts and detent downshifts.

2 If the TV linkage is broken, sticky or misadjusted, the vehicle will experience a number of problems such as early and/or soft upshifts and no downshift or a harsh downshift function.

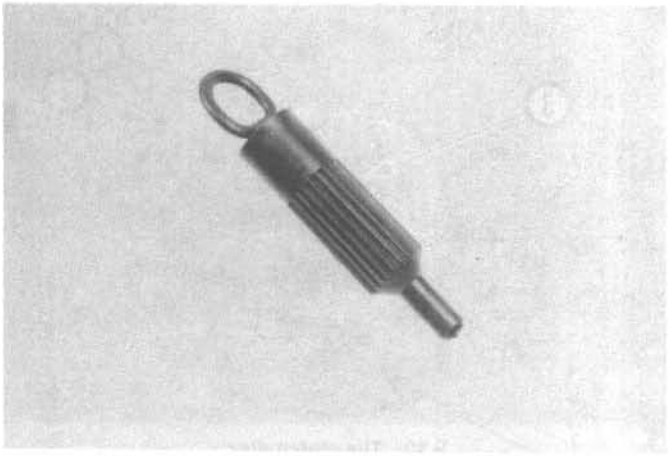
Inspection

Refer to illustration 3.3

3 Grasp the cable or rod a few inches behind where it attaches to the throttle linkage and pull forward. The cable should slide easily through the cable terminal **(see illustration)**.

4 When released the cable should return to its original position.

5 If the TV linkage does not operate as above, the cause is misadjusted or damaged components.



3.16 A clutch alignment tool can be purchased at most auto parts stores and eliminates all guesswork when centering the clutch disc in the pressure plate

Installation

Refer to illustration 3.16

15 Before installation, carefully wipe the flywheel and pressure plate machined surfaces clean. It's important that no oil or grease is on these surfaces or the lining of the clutch disc. Handle these parts only with clean hands.

16 Position the clutch disc and pressure plate with the clutch held in place with an alignment tool **(see illustration)**. Make sure it's installed properly (most replacement clutch plates will be marked "flywheel side" or something similar – if not marked, install the clutch disc with the damper springs toward the transmission).

17 Tighten the pressure plate-to-flywheel bolts only finger tight, working around the pressure plate.

18 Center the clutch disc by inserting the alignment tool through the splined hub and into the pilot bearing in the crankshaft. Tighten the pressure plate-to-flywheel bolts a little at a time, working in a crisscross pattern to prevent distorting the cover. After all of the bolts are snug, tighten them to the specified torque. Remove the alignment tool.

19 Using high temperature grease, lubricate the inner groove of the release bearing (refer to Section 4). Also place grease on the release lever contact areas.

20 Install the clutch release bearing as described in Section 4.

21 Install the bellhousing and tighten the bolts to the proper torque specification.

22 Install the transmission, slave cylinder or release cable and all components removed previously, tightening all fasteners to the proper torque specifications.

4 Clutch release bearing – removal, inspection and installation

Removal

1 Disconnect the negative cable from the battery.

2 Remove the transmission (Chapter 7).

3 Remove the bellhousing (Section 3).

4 Remove the clutch release lever from the ball stud, then remove the bearing from the lever.

Inspection

5 Hold the center of the bearing and rotate the outer portion while applying pressure. If the bearing doesn't turn smoothly or if it's noisy, replace it with a new one. Wipe the bearing with a clean rag and inspect it for damage, wear and cracks. Don't immerse the bearing in solvent – it's sealed for life and to do so would ruin it.

Installation

Refer to illustration 4.6

6 Lightly lubricate with lithium base grease the clutch lever crown and spring retention crown where they contact the bearing. Fill the inner groove of the bearing with the same grease **(see illustration)**.

7 Attach the release bearing to the clutch lever.

8 Lubricate the clutch release lever ball socket with high temperature grease and push the lever onto the ball stud until it's firmly seated.

9 Apply a light coat of high temperature grease to the face of the release bearing, where it contacts the pressure plate diaphragm fingers.

10 Install the bellhousing and tighten the bolts to the specified torque.

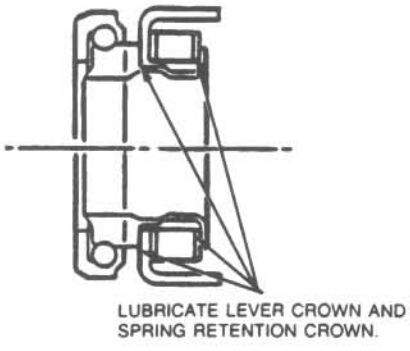
11 Prior to installing the transmission, apply a light coat of grease to the transmission front bearing retainer.

12 The remainder of the installation is the reverse of the removal procedure, tightening all bolts to the specified torque.

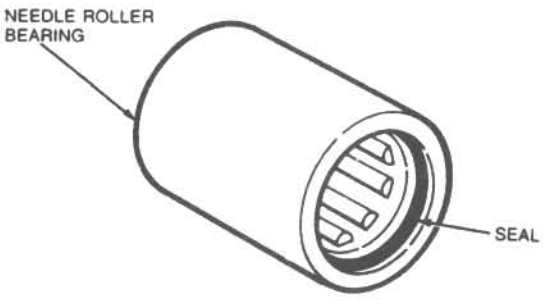
5 Pilot bearing – inspection and replacement

Refer to illustrations 5.1, 5.5 and 5.9

1 The clutch pilot bearing is a needle roller type bearing which is pressed into the rear of the crankshaft **(see illustration)**. It is greased at the factory and does not require additional lubrication. Its primary purpose is to support the front of the transmission input shaft. The pilot bearing should be inspected whenever the clutch components are removed from

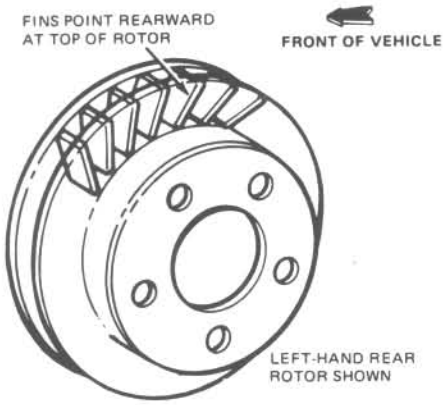


4.6 Lubricate the release bearing and lever at the points shown. Also fill the groove in the inside diameter of the bearing

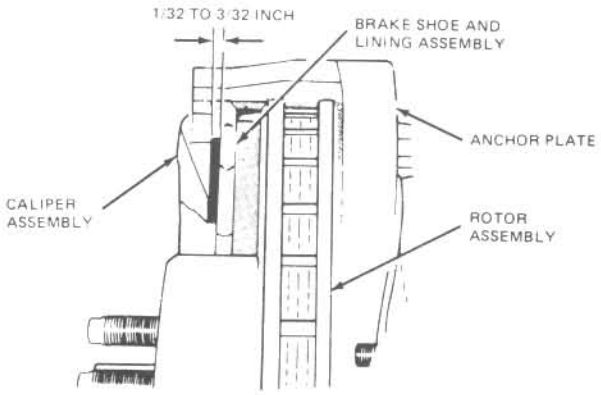


5.1 The pilot bearing incorporates an O-ring seal which cannot be replaced separately. If there is any evidence that the seal has been leaking, or if the bearing is dry, replace it – the bearing must be installed with the seal towards the transmission.

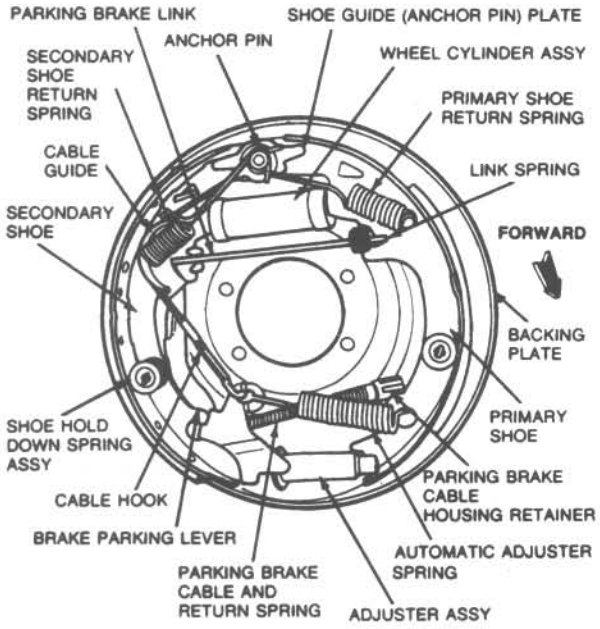
22 Connect the lower ends of the shock absorbers to the rear axle housing and tighten the bolts securely.
23 Connect the driveshaft to the differential flange, aligning the matchmarks. Tighten the bolts to the specified torque.
24 Drum brake models – attach the brake backing plates to the axle housing, tightening the nuts securely.
25 Attach the brake lines to the axle housing.
26 Install the axleshafts (see Section 18).
27 Install the brake drums or rear caliper anchor plates, discs and calipers.
28 Connect the axle vent tube.
29 Install the rear axle cover and fill the differential with the recommended lubricant (see Chapter 1).
30 Attach the brake junction block to the rear axle cover (drum brake models) and tighten the bolt securely. If, in the course of removal, the brake fluid lines were disconnected, bleed the brake system (Chapter 9).
31 Install the wheels and lug nuts. Lower the vehicle and tighten the lug nuts to the specified torque (see Chapter 1).



5.26 The fins of the rear brake discs should point to the rear of the vehicle (at the top of the rotor) when installed



5.30 The lining clearance on rear disc brake pads must be set correctly for proper brake operation



6.4a Drum brake components (right side shown)

26 Install the brake disc and its retaining nuts. Discs are not interchangeable from side to side of the vehicle. The disc fins must face rearward when the disc is installed **(see illustration)**.

27 Install the outer brake pad on the anchor plate with the wear indicator up.

28 If the brake hose was disconnected from the caliper, reconnect it. Use new sealing washers and tighten the bolt to the torque listed in this Chapter's Specifications.

29 Hook the upper end of the caliper into the anchor plate, then rotate the caliper down over the pads and disc. Take care not to damage the piston dust boot.

30 Pull the caliper firmly out to seat the inner pad against the disc. Measure pad-to-caliper clearance **(see illustration)**. If not as specified in the illustration, remove the caliper and rotate the piston to adjust the clearance. Turn the piston counterclockwise to reduce the gap or clockwise to enlarge it. One-quarter turn of the piston changes the gap by approximately 1/16-inch. **Caution:** *Don't skip this adjustment. If the gap is too small, the brakes may drag. If it is too large, the adjuster may fall out of the piston when the brakes are applied. It will then be necessary to overhaul the caliper and replace the adjuster/piston assembly.*

31 Coat the caliper locating pins and the insides of their insulator with silicone grease (Ford silicone dielectric compound D7AZ-19A331-A or equivalent).

32 Apply a single drop of thread locking agent (Ford threadlock and sealer E0AC-19554-A or equivalent) to the threads of each locating pin. Install and start the locating pins by hand only, then tighten them to the torque listed in this Chapter's Specifications.

33 Connect the parking brake cable.

34 If the brake hose was disconnected, bleed the brakes (see Section 11).

35 Recheck the brake fluid level (see Chapter 1) and correct it as needed.

36 To adjust the calipers, pump the brake pedal about 30 times, with at least one second between pumps. Apply light pedal pressure (about 87 lbs).

37 Pull the parking brake lever. If travel is excessive or the lever is extremely easy to pull, repeat the adjustment. If this doesn't work, check the parking brake (see Sections 12 through 15).

38 The remainder of installation is the reverse of the removal steps.

39 Make sure the brake pedal is firm, then carefully road test the foot brake and parking brake.

6 Rear brake shoes – replacement

Refer to illustrations 6.4a through 6.4y

Warning: *Drum brake shoes must be replaced on both wheels at the same time – never replace the shoes on only one wheel. Also, the dust created by the brake system contains asbestos, which is harmful to your health. Never blow it out with compressed air and don't inhale any of it. An approved filtering mask should be worn when working on the brakes. Do not, under any circumstances, use petroleum-based solvents to clean brake parts. Use brake cleaner or denatured alcohol only!*

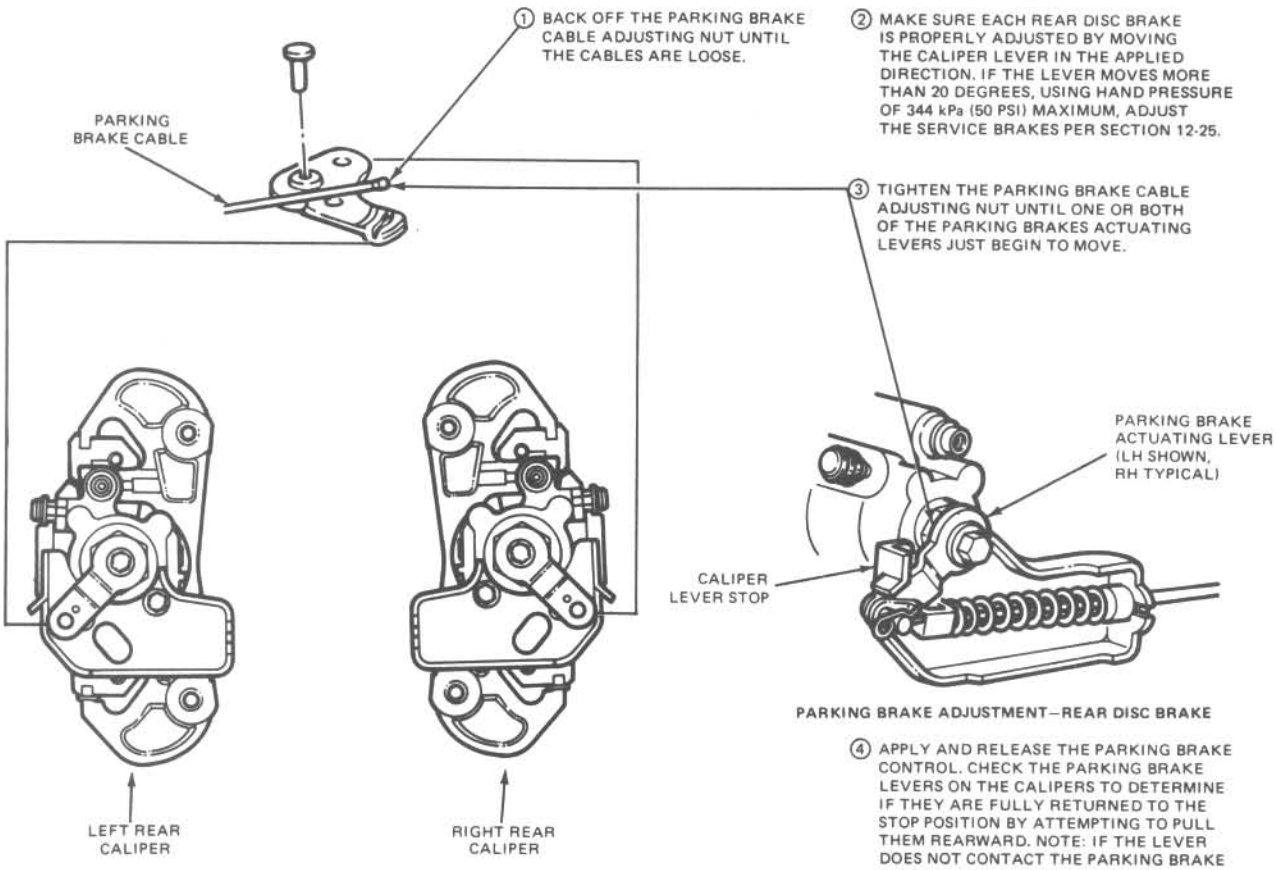
Caution: *Whenever the brake shoes are replaced, the retractor and hold-down springs should also be replaced. Due to the continuous heating/cooling cycle that the springs are subjected to, they lose their tension over a period of time and may allow the shoes to drag on the drum and wear at a much faster rate than normal. When replacing the rear brake shoes, use only high quality nationally recognized brand-name parts.*

1 Loosen the wheel lug nuts, raise the rear of the vehicle and support it securely on jackstands. Block the front wheels to keep the vehicle from rolling.

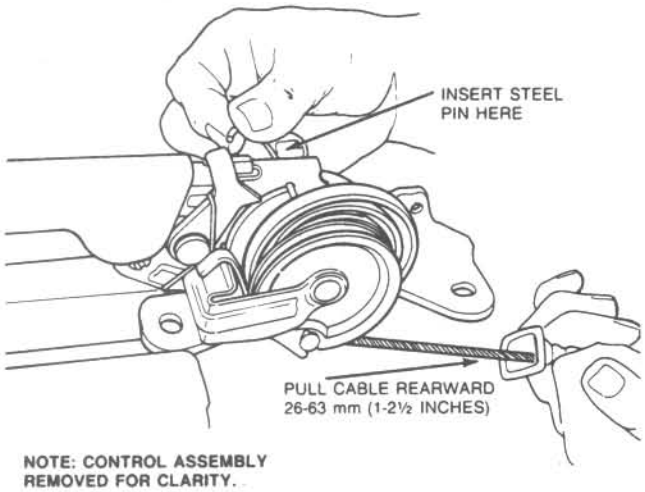
2 Release the parking brake.

3 Remove the wheel. **Note:** *All four rear brake shoes must be replaced at the same time, but to avoid mixing up parts, work on only one brake assembly at a time.*

4 Follow the accompanying photos (illustrations 6.4a through 6.4y) for the inspection and replacement of the brake shoes. Be sure to stay in order and read the caption under each illustration. **Note:** *If the brake drum cannot be easily pulled off the axle and shoe assembly, make sure that the*



12.8 Parking brake adjustment details – models with rear disc brakes



13.1 Have an assistant pull the equalizer cable to the rear while you insert a steel pin into the lever and control assembly to hold the ratchet wheel in the released position

brake control lever **(see illustration)**. **Note:** *If this procedure is not done when required, the ratchet wheel spring will unwind and the control assembly will have to be removed to reset cable tension.*

2 Release the parking brake.

3 Remove the console (see Chapter 11).

4 Jack up the vehicle and support it securely on jackstands. DO NOT get under a vehicle that's supported only by a jack!

5 Have an assistant under the vehicle pull the equalizer approximately 1 to 2-1/2 inches rearward to unwind the ratchet wheel. At the same time, insert a steel pin through the holes in the lever and control assembly to lock the ratchet wheel in the released position. **Caution:** *Do not remove the steel pin unless all parts of the parking brake mechanism are installed and connected.*

14 Parking brake cables – replacement

Refer to illustration 14.5

1 Block both front wheels so the vehicle can't roll. Jack up the rear end of the vehicle and place it securely on jackstands. DO NOT get under a vehicle that's supported only by a jack!

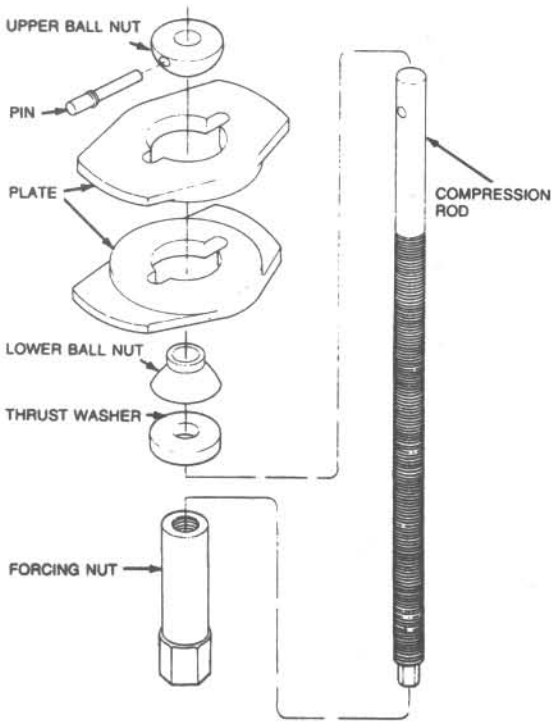
2 Release the parking brake completely.

3 On 1979 through 1986 models, loosen the cable locknut and adjusting nut to completely release cable tension **(see illustration 12.4)**.

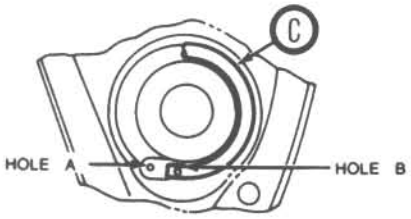
4 On 1987 and later models, release the cable tension (see Section 13).

5 Detach the cable(s) from the equalizer **(see illustration)**.

6 Detach the cable snap fitting(s) and unbolt the cable brackets from the vehicle body.



6.3d Ford tool D78P-5310-A, or equivalent, is used on 1979 through 1981 models and 1988 and later 5.0L models



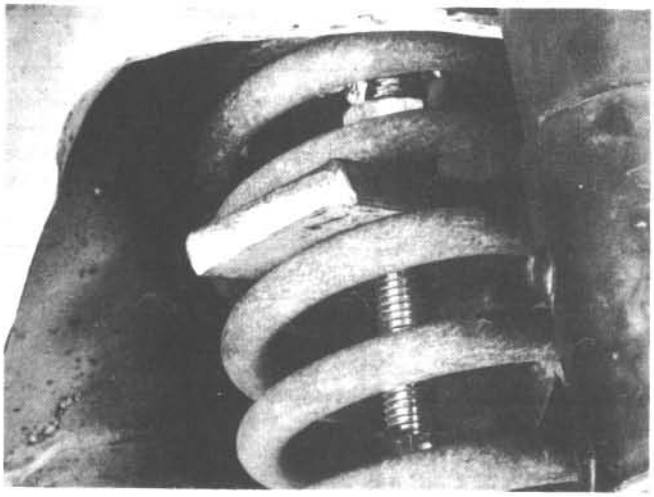
6.9 The bottom of the spring coil must be situated so that the end of the spring coil C covers hole B, but not hole A

b) 1979 through 1981 models and 1988 and later Mustang 5.0 – Use spring compressor No. D78P-5310-A **(see illustration)**. Install the compressor upper plate between two coils near the top of the spring, then mark its location for use during spring installation **(see illustration)**. **Caution:** *Do not nick the spring coils with the upper plate. Guide the compression rod up through the hole in the control arm and the coil spring, then insert the end of the compression rod into the upper plate.*

4 Install the lower plate, ball nut, thrust washer and bearing and the forcing nut on the compression rod. Tighten the forcing nut just enough to feel spring pressure.

5 Remove the control arm-to-crossmember nuts and pivot bolts **(see illustrations 2.2a and 2.2b)**. It may be necessary to remove the steering gear mounting bolts and reposition the gear to allow bolt removal. Loosen the forcing nut on the compressor tool until all of the spring pressure is relieved.

6 Remove the spring compressor compression rod, then maneuver the coil spring out from between the control arm and crossmember.



6.3e When using Ford tool D78P-5310-A, make sure that the spring compressor plates are fully seated before applying pressure; mark the position of the spring plates on the spring coils with chalk for use during installation

Installation

Refer to illustration 6.9

7 Install the coil spring insulator on the top of the spring.

8 Install the spring in between the control arm and the spring upper pocket in the crossmember.

9 Position the bottom of the spring so that the pigtail covers only one of the drain holes, but leaves the other one open **(see illustration)**.

10 Locate the spring in the upper seat in the crossmember. Install the spring compressor tool as described in Steps 3 and 4, then tighten the forcing nut until the control arm bushing holes line up with the pivot bolt holes in the crossmember.

11 Install the pivot bolts and nuts in the direction shown in illustration 2.3, but don't tighten them completely at this time.

12 Remove the spring compressor tool. Position a floor jack under the outboard side of the control arm and raise it to simulate a normal ride position. Now tighten the pivot bolt nuts to the torque listed in this Chapter's Specifications.

13 Reconnect the stabilizer bar link to the control arm.

14 Install the wheel and lug nuts. Lower the vehicle and tighten the nuts to the torque specified in Chapter 1.

7 Front control arms – removal and installation

Note: *The control arm bushings and balljoint are not serviceable.* If they wear out, the entire control arm must be replaced.

1 Loosen the wheel lug nuts, raise the vehicle and support it securely on jackstands. Remove the wheel.

2 Separate the control arm balljoint from the spindle as described in Section 5. Do not remove the balljoint stud nut at this time.

3 Remove the coil spring as described in the previous Section, noting the Warning in that Section.

4 Unscrew the balljoint nut and remove the control arm from the vehicle.

5 Installation is the reverse of the removal procedure. Be sure to tighten all of the fasteners to the torque listed in this Chapter's Specifications.

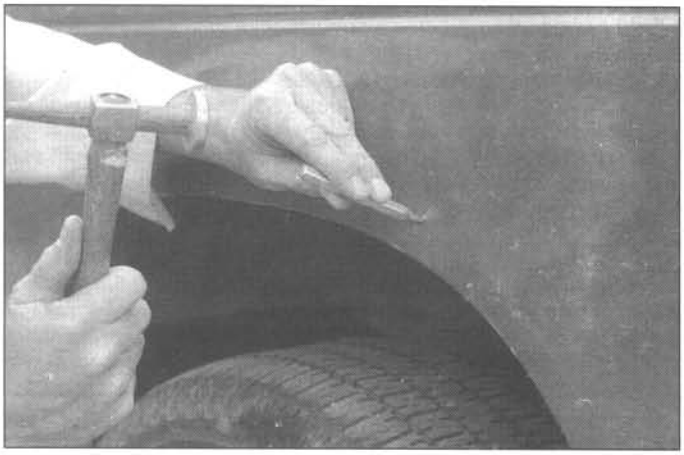
8 Rear stabilizer bar – removal and installation

Refer to illustration 8.2

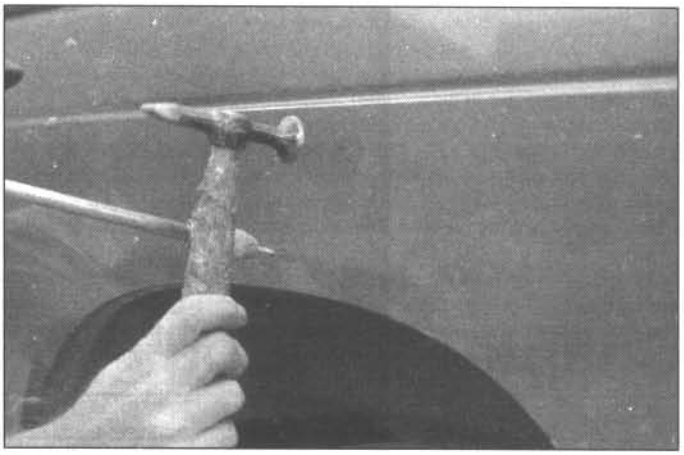
1 Raise the rear of the vehicle and support it securely on jackstands.

2 Support the stabilizer bar and remove the stabilizer bar-to-lower suspension arm bolts **(see illustration)**.

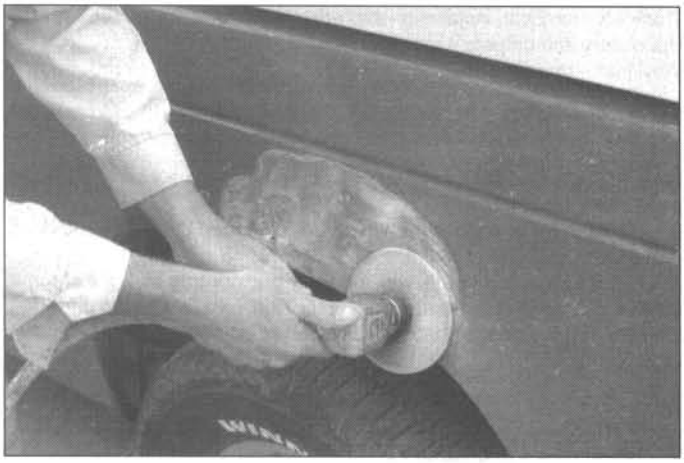
These photos illustrate a method of repairing simple dents. They are intended to supplement *Body repair - minor damage* in this Chapter and should not be used as the sole instructions for body repair on these vehicles.



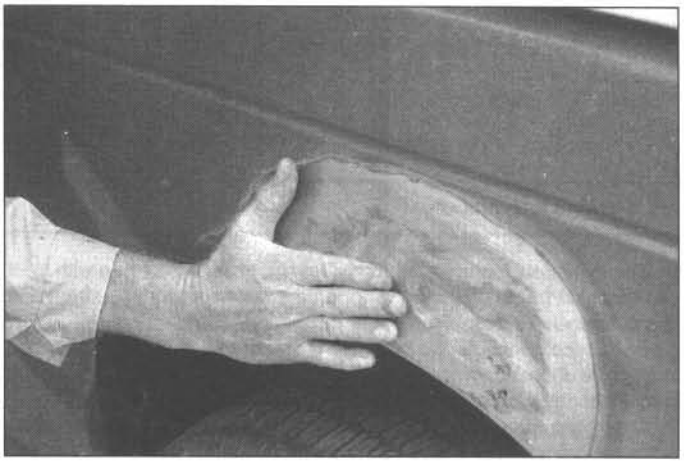
1 If you can't access the backside of the body panel to hammer out the dent, pull it out with a slide-hammer-type dent puller. In the deepest portion of the dent or along the crease line, drill or punch hole(s) at least one inch apart . . .



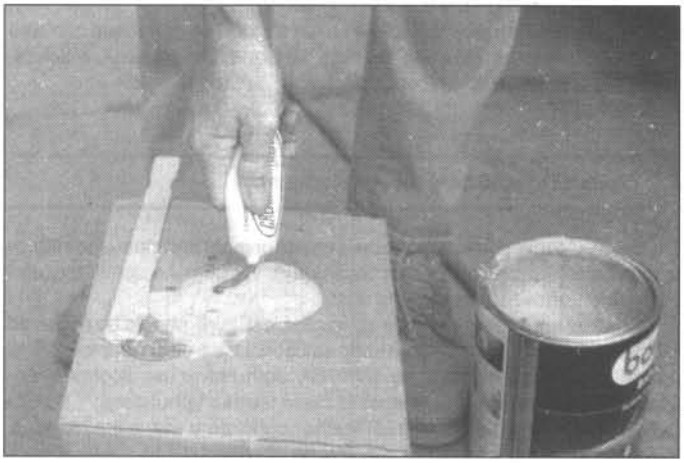
2 . . . then screw the slide-hammer into the hole and operate it. Tap with a hammer near the edge of the dent to help 'pop' the metal back to its original shape. When you're finished, the dent area should be close to its original contour and about 1/8-inch below the surface of the surrounding metal



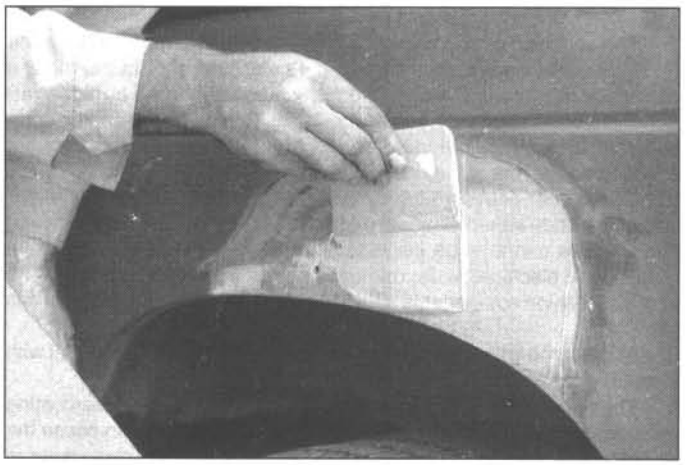
3 Using coarse-grit sandpaper, remove the paint down to the bare metal. Hand sanding works fine, but the disc sander shown here makes the job faster. Use finer (about 320-grit) sandpaper to feather-edge the paint at least one inch around the dent area



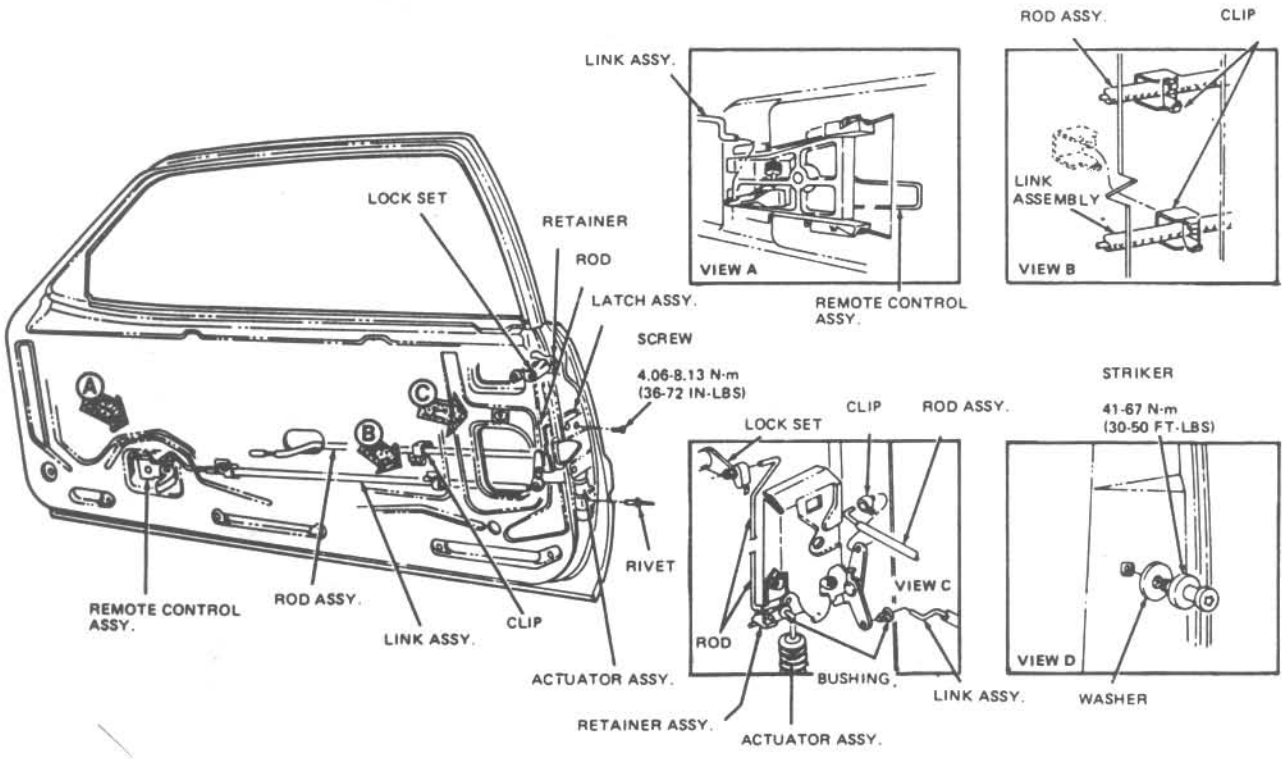
4 When the paint is removed, touch will probably be more helpful than sight for telling if the metal is straight. Hammer down the high spots or raise the low spots as necessary. Clean the repair area with wax/silicone remover



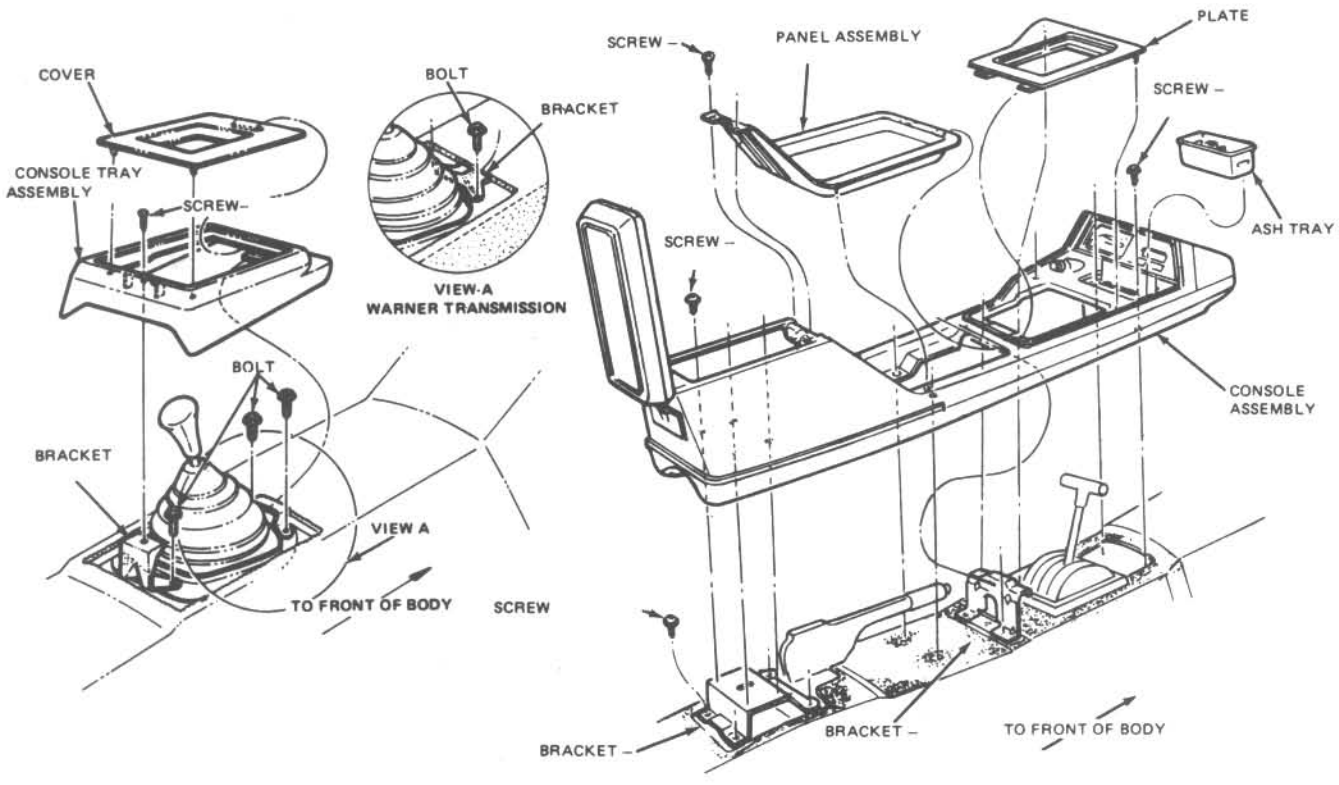
5 Following label instructions, mix up a batch of plastic filler and hardener. The ratio of filler to hardener is critical, and, if you mix it incorrectly, it will either not cure properly or cure too quickly (you won't have time to file and sand it into shape)



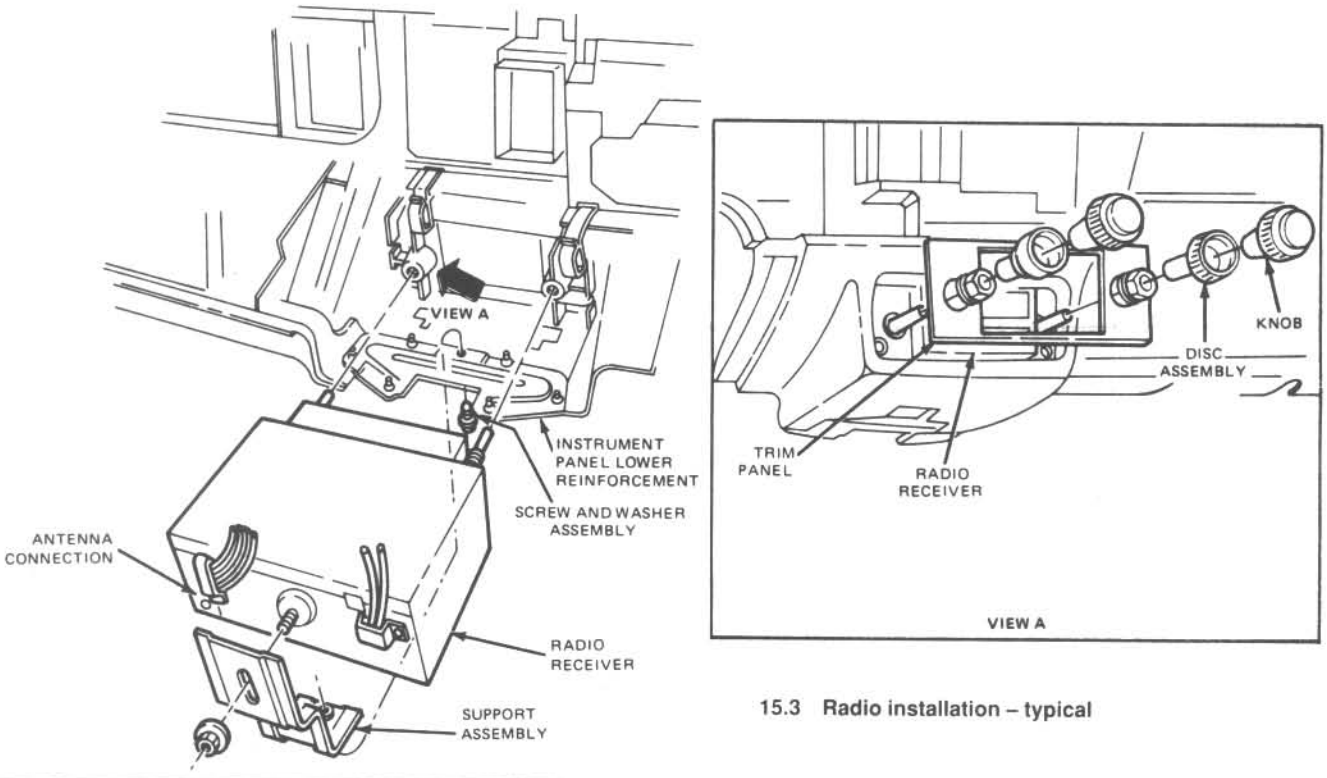
6 Working quickly so the filler doesn't harden, use a plastic applicator to press the body filler firmly into the metal, assuring it bonds completely. Work the filler until it matches the original contour and is slightly above the surrounding metal



14.4 Door lock mechanism – typical



15.1 Center console – exploded view (early models)



15.3 Radio installation – typical

3 Several types of bulbs are used. Some are removed by pushing in and turning them counterclockwise. Others can simply be unclipped from the terminals or pulled straight out of the socket.
4 To gain access to the instrument panel lights, the instrument cluster will have to be removed first.

15 Radio – removal and installation

1979 through 1986 models

Refer to illustration 15.3

1 Disconnect the negative battery cable from the battery.
2 Disconnect the power, speaker and antenna wires from the radio.
3 Pull off the knobs and discs, then remove the radio retaining nuts (if equipped) **(see illustration)**.
4 Remove the upper support screws (if equipped).
5 Remove the rear support nut or screw.
6 Take the radio out.
7 Installation is the reverse of removal.

1987 and later models

8 Radio removal requires special tools and should be left to a properly equipped shop.

16 Instrument cluster – removal and installation

1 Disconnect the negative battery cable from the battery.
2 On 1988 and later models, remove the switch assemblies from either side of the instrument panel (see Section 12).
3 Remove the screws securing the trim panel to the cluster. Remove the trim panel.
4 Remove four cluster retaining screws.
5 Pull the cluster out. Reach behind it and disconnect the speedometer cable.
6 Pull the cluster the rest of the way out and disconnect its wiring connectors.
7 Apply a 3/16-inch diameter ball of silicone damping grease to the drive hole in the speedometer head.
8 The remainder of installation is the reverse of removal.

17 Wiring diagrams and color codes – general information

Since it isn't possible to include all wiring diagrams for every year covered by this manual, the following diagrams are those that are typical and most commonly needed.

Prior to troubleshooting any circuits, check the fuse and circuit breakers (if equipped) to make sure they're in good condition. Make sure the battery is properly charged and check the cable connections (see Chapter 1).

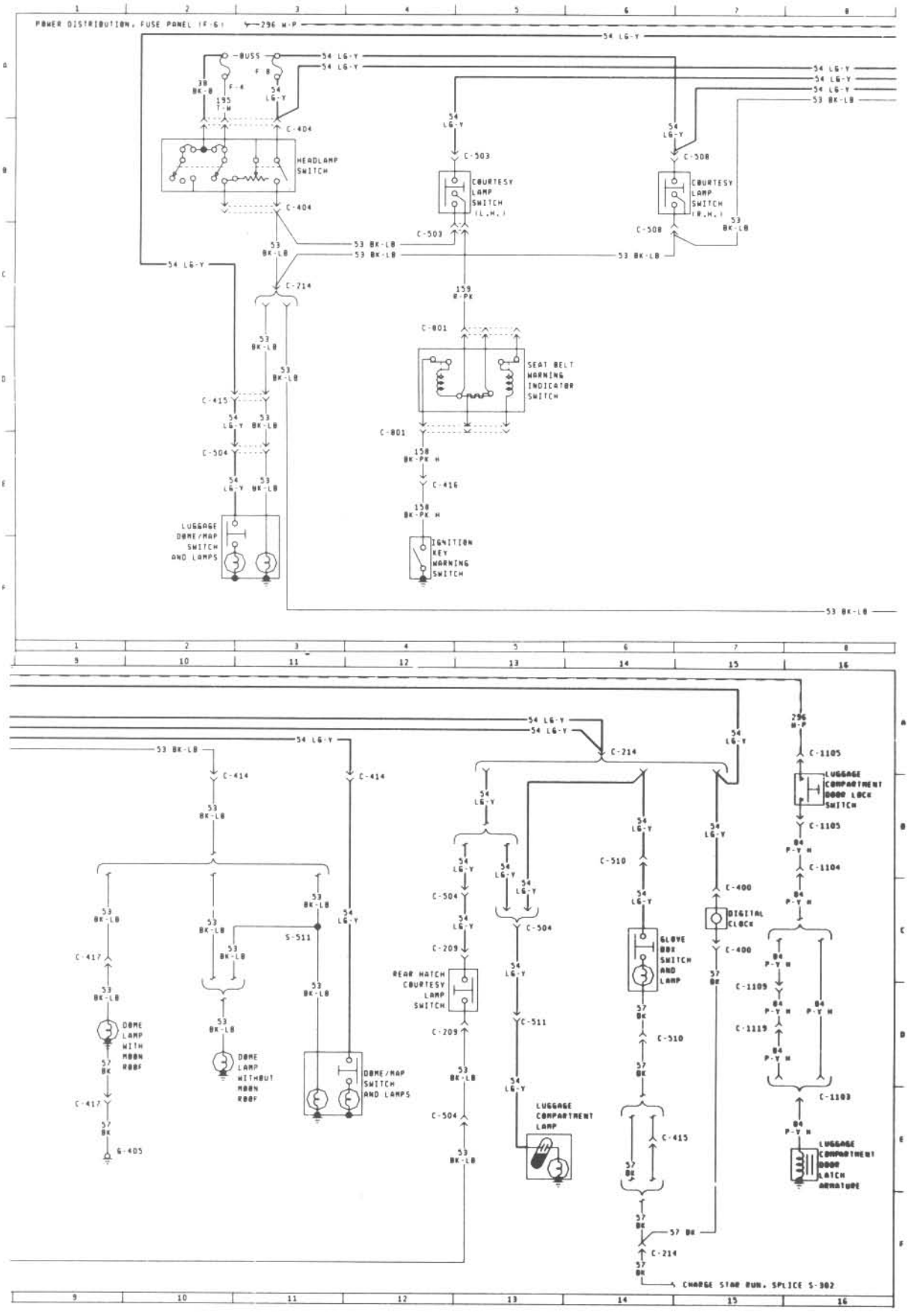
When checking a circuit, make sure that all connectors are clean, with no broken or loose terminals. When unplugging a connector, do not pull on the wires. Pull only on the connector housings themselves.

Color codes

Wire colors in wiring diagrams are identified by one or two-character alphabetical codes. The following list tells the color indicated by each of these codes.

B = Black
BR = Brown
DB = Dark blue
DG = Dark green
GY = Gray
LB = Light blue
LG = Light green
N = Natural
O = Orange
P = Purple
PK = Pink
R = Red
T = Tan
W = White
Y = Yellow
(H) = Hash*
(D) = Dot*

Note: *The presence of a tracer on the wire is indicated by a secondary color followed by an "H" for hash or "D" for dot. A stripe is understood if no letter follows.*



Courtesy and warning lights (9) – 1980 models (1979 similar)