

3. Remove valve rocker arm bolts, oil deflectors, fulcrum seats, rocker arms, and push rods from affected cylinder(s).
4. Install air line with adapter in spark plug hole. Turn on air supply to hold valves closed.
5. Install Tool T70P-6049-A (Fig. 11) and compress valve spring. Remove retainer locks, spring retainer, and spring. Remove and discard valve stem seal (Fig. 12). **If air pressure fails to hold valve in closed position, valve damage affecting sealing is indicated. Remove and inspect cylinder head assembly.**
6. Wrap rubber band, tape or string around end of valve stem to prevent valve from dropping into cylinder when air pressure in cylinder is shut off if piston is at bottom of cylinder. Shut off air pressure.
7. Inspect valve stem for damage. Rotate valve, checking tip for eccentric movement. Move valve up and down through normal travel in valve guide and check for binding. **If valve is damaged, cylinder head must be removed for repairs.**

Installation

1. If valve proves satisfactory, hold valve closed and turn on air pressure in cylinder.
2. Lubricate the valve stems with heavy engine oil SE. Install new valve stem seal (Fig. 12). Use a 5/8" deep socket and a light hammer or mallet to drive seal onto valve stem. Set spring and retainer over valve stem. Compress valve spring (Fig. 11) and install retainer locks. Release spring and remove tool and stud nut.
3. Shut off air pressure and remove air line and adapter. Install spark plug.
4. Apply Lubriplate (or equivalent) to tip of valve stem and each end of push rod. Install push rod. **Be sure lower end of push rod is seated in tappet.**
5. Lubricate fulcrum seats and sockets with Lubriplate or equivalent.
6. Lubricate the push rod socket, fulcrum seat and the valve pad of the rocker arm with heavy engine oil SE.
7. Install the rocker arms using the procedure and sequence given under Rocker Arm Installation.
8. Clean gasket material from rocker arm cover and cylinder head and install the rocker arm cover, using a new gasket.

If the right cover was removed, install the crankcase ventilation regulator (PCV) valve.

9. Install the spark plug and connect the spark plug wires. See Part 23-01 for special installation instructions.
10. Install the air cleaner and intake duct assembly.

INTAKE MANIFOLD

Removal

1. Drain cooling system. Remove air cleaner and intake duct assembly.
2. Disconnect radiator upper hose at engine.
3. Disconnect heater hoses at intake manifold and water pump, and position out of way. Loosen water pump by-pass hose clamp at intake manifold.

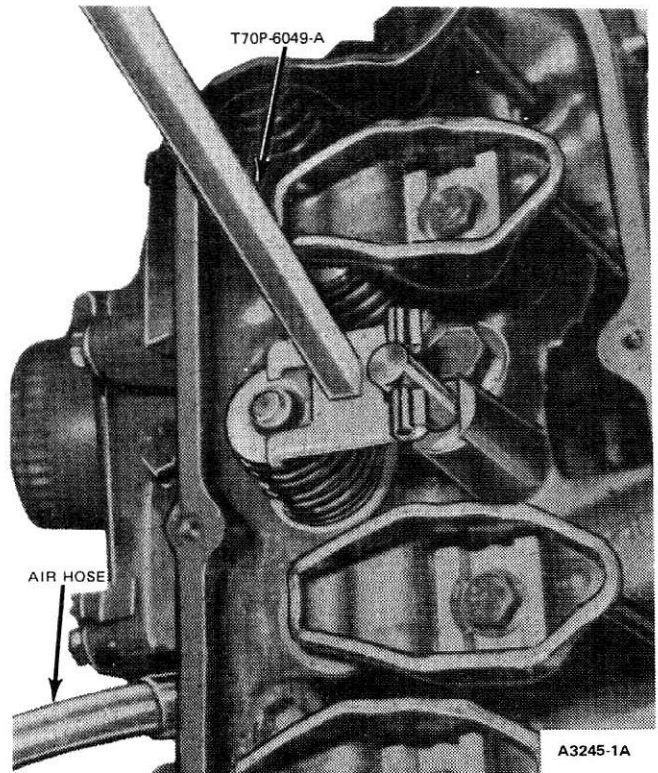


FIG. 11 Compressing Valve Spring—In Chassis

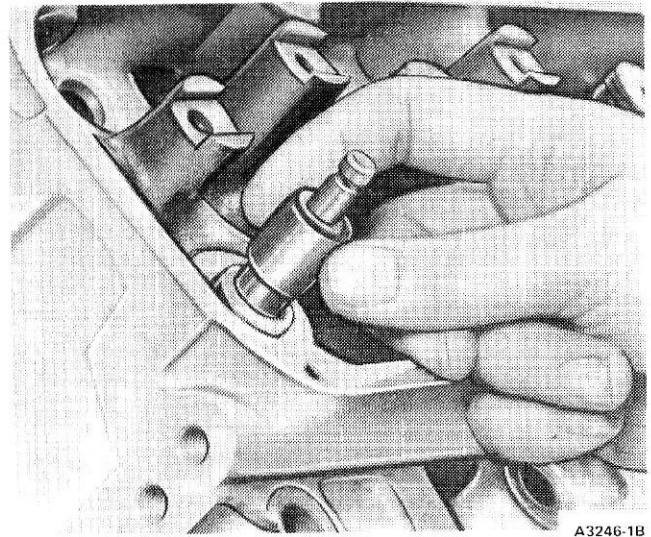


FIG. 12 Removing or Installing Valve Stem Seal

4. Disconnect positive crankcase ventilation valve and hose at right valve rocker arm cover. Disconnect all vacuum lines at rear of intake manifold and tag for proper installation.
5. Disconnect wires at spark plugs by twisting and pulling moulded caps with Tool T74P-6666-A (see Part 23-01). Remove wires from brackets on valve rocker arm covers. Disconnect coil high tension lead at coil and remove distributor cap and wires as an assembly.
6. Disconnect all distributor vacuum lines at carburetor and vacuum control valve and tag for proper installation. Disconnect distributor wiring

connector. Remove distributor and vacuum lines as an assembly.

7. Disconnect accelerator linkage at carburetor. Remove speed control linkage bracket, if so equipped, from intake manifold and disconnect it from the carburetor. Remove bolts holding accelerator cable bracket and position cable out of way.
8. Disconnect fuel line at carburetor.
9. Disconnect wiring harness at coil connector, engine temperature sending unit, oil pressure sending unit, and other connections as necessary. Disengage wiring harness from three clips at left valve rocker arm cover bolts, and position wiring harness out of way.
10. Remove coil and bracket assembly. Remove the Thermactor air supply tubes and check valve from the rear of the cylinder heads.
11. Remove attaching bolts and nuts and remove intake manifold and carburetor as an assembly (Fig. 13). **If necessary to pry manifold away from cylinder heads, do not damage gasket sealing surfaces.**
12. Remove and discard intake manifold gaskets and seals. (See Fig. 15.)
13. If manifold is to be further disassembled (Fig. 16), remove coolant outlet housing, gasket, and thermostat. Remove automatic choke heat tubes, vacuum hoses, carburetor, spacer, EGR valve and gaskets. Remove the thermostatic choke heater tube. Remove engine temperature sending unit. Discard all gaskets.

Remove all gasket material from the machined surfaces of the manifold. Clean the manifold in a suitable solvent and dry it with compressed air.

Inspect the manifold for cracks, damaged gasket surfaces, or other damage that would make it unfit for service. Replace all studs that are stripped or otherwise damaged. Remove all filings and foreign matter that may have entered the manifold as a result of repairs.

Installation

1. If intake manifold assembly was disassembled, install coolant outlet housing, new gasket, and thermostat. Install carburetor, EGR valve spacer, new gaskets, automatic choke heat tubes and thermostatic choke heater tube. Coat threads with electrical conductive sealer and install water temperature sending unit.
2. Clean mating surfaces of intake manifold, cylinder heads, and cylinder block. Use a solvent such as lacquer thinner, chloroethane, trichlor-ethylene or similar degreasing agent.
3. Apply a 1/8 inch diameter bead of silicone rubber sealer in and along the joint, the full width of the cylinder block seal mounting surface (4 corners) as shown in Fig. 14.
4. Install the cylinder head to manifold gaskets and valley baffle assembly (Fig. 15), and the front and rear intake manifold to cylinder block seals. Apply a 1/16 inch bead of sealer at the outer end of each intake manifold seal for the full width of the seal (Fig. 14).

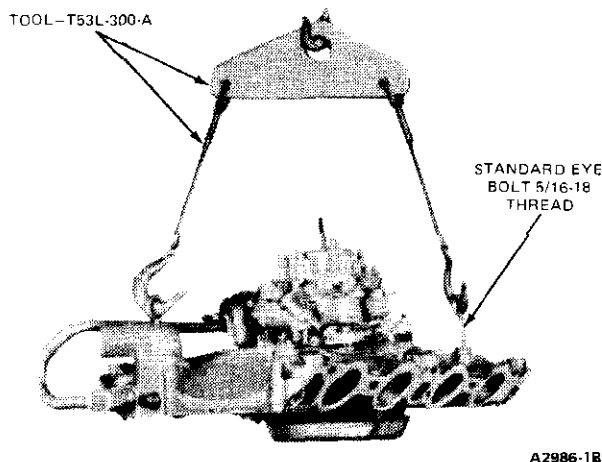


FIG. 13 Removing or Installing Intake Manifold

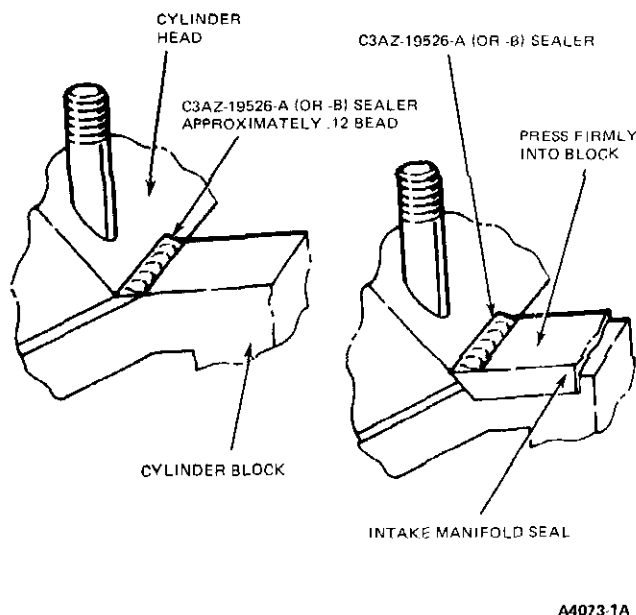


FIG. 14 Sealing Intake Manifold with RTV Sealer

NOTE: This sealer sets up within 15 minutes after application, so assembly should proceed promptly.

5. Carefully lower intake manifold into position over four (4) studs in ends of cylinder heads. **When intake manifold is in place, run finger around seal area to be sure seals are in place. If seals have shifted, remove manifold and reposition seals.**
6. Install attaching bolts and nuts snugly to manifold. Torque bolts and nuts in sequence (Fig. 17) to specification to compress gaskets and seals. Then repeat sequence, torquing bolts and nuts to same specification.
7. Install water pump by-pass hose to intake manifold fitting.
8. Connect radiator upper hose to coolant outlet housing.

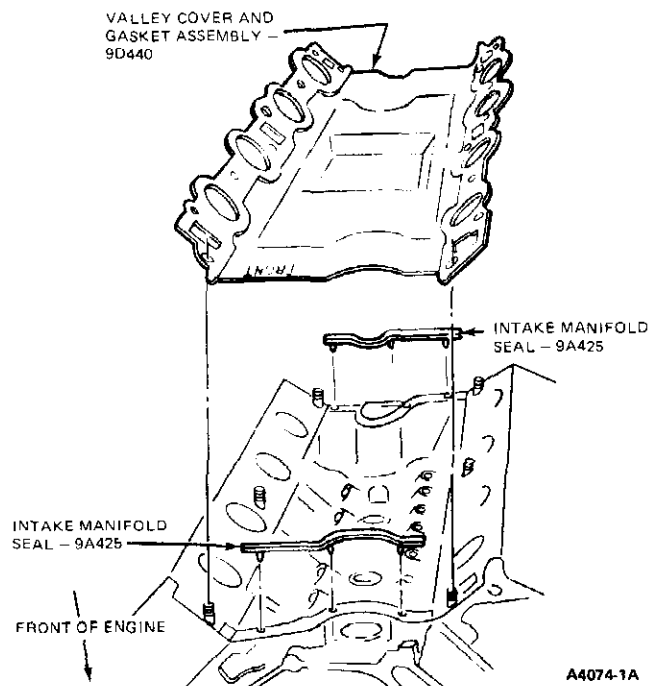


FIG. 15 Installing Intake Manifold Gaskets and End Seals

9. Rotate crankshaft damper until No. 1 piston is at TDC at end of compression stroke. Align the correct timing mark on the damper with the pointer. Position distributor in block with rotor at No. 1 firing position and with the armature tooth centered on the stator coil (see Part 23-01). Install hold-down clamp.
10. Connect heater hose at intake manifold and water pump.
11. Connect positive crankcase ventilation (PCV) valve and hose assembly to right valve rocker arm cover and carburetor.
12. Connect fuel line to carburetor.
13. Install coil and bracket assembly to intake manifold.
14. Fit wiring harness into two (2) clips on left valve rocker arm cover and connect to all terminals.
15. Position accelerator cable bracket on manifold. Attach speed control linkage bracket to intake manifold, if so equipped. Install attaching bolts and connect linkage to carburetor.
16. Connect the vacuum lines to their respective ports on the intake manifold. Install Thermactor air supply tubes and check valve to rear of cylinder heads.
17. Secure distributor cap to distributor. Connect spark plug wires to spark plugs and fit wires into brackets on valve rocker arm covers. Connect coil high tension lead to coil and attach connector to coil terminals.
18. Fill the cooling system.
19. Start engine. Check and adjust ignition timing. Connect distributor vacuum lines to their respective parts.
20. Operate engine at fast idle and check for coolant leaks. Recheck coolant level and refill as necessary.

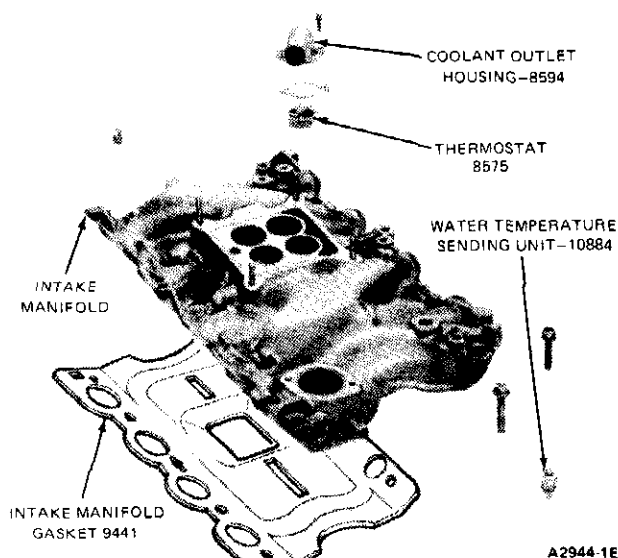


FIG. 16 Intake Manifold Disassembled

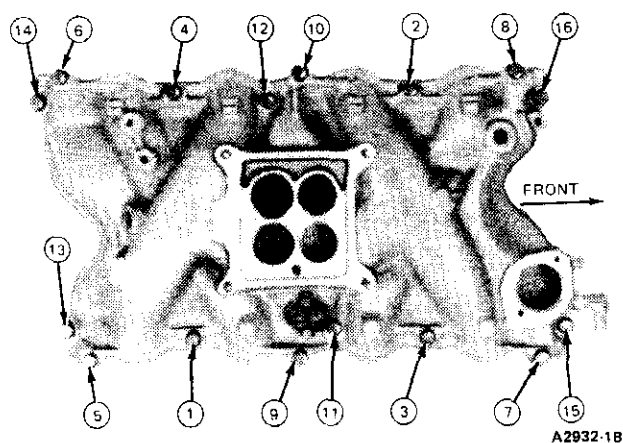


FIG. 17 Intake Manifold Torque Sequence

21. Allow engine to reach normal operating temperature, then retorque the manifold attaching nuts and bolts to specification.
22. Check and adjust carburetor (Group 24 and Group 29) as required. Install air cleaner and intake duct assembly.

HYDRAULIC TAPPETS

The following procedure is applicable for removing one or all of the tappets. Before replacing a hydraulic tappet for noisy operation, be sure the noise is not caused by improper valve clearance or by worn rocker arms and/or push rods.

Removal

1. Remove intake manifold and carburetor as an assembly, following instructions under Intake Manifold.
2. Remove the valve rocker arm covers. Loosen the rocker arm bolts and turn rocker arms to one side.
3. Remove the push rods in sequence.
4. Remove the tappets with a magnet. Place them in a rack in sequence. If the tappets are stuck in bores,

use plier-type Tool (T70P-14151) to remove them. Rotate tappets back and forth to loosen them from gum or varnish deposits.

Refer to Part 21-01 for cleaning, inspection and testing procedure. If necessary to disassemble tappets, refer to Tappet Disassembly and Assembly in this Part.

Installation

1. Clean the outside of tappets. Tappets and bores are to be lubricated with heavy oil SE before installation. Install the tappets in their original bores. Check any new tappet for free fit in bore to which it is to be installed.
2. Install push rods in original positions. Apply Lubriplate or equivalent to valve stem tips and push rod ends.
3. Position the rocker arms over the push rods and tighten the bolts following the procedure under Valve Rocker Arm Installation. Adjust valve clearance.
4. Clean gasket material from rocker arms and cylinder head and install valve rocker arm covers.
5. Install intake manifold and carburetor, following the instructions under Intake Manifold.

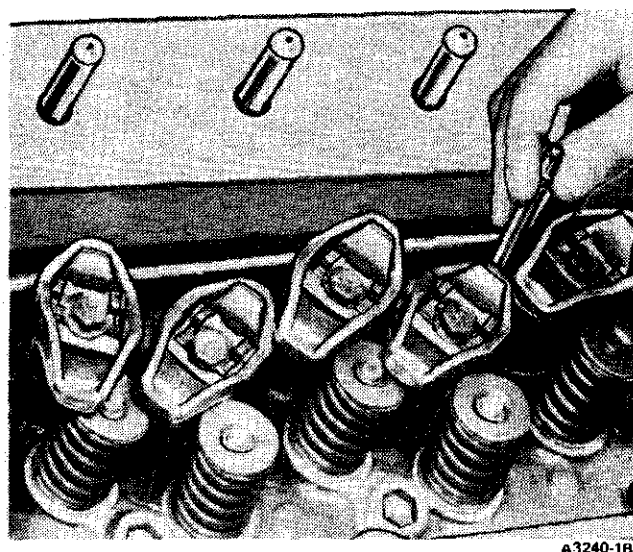
CYLINDER HEADS

Removal

1. Remove intake manifold and carburetor as an assembly, following procedure under Intake Manifold Removal.
2. Disconnect muffler inlet pipe at exhaust manifold.
3. Loosen air conditioning compressor drive belt, if so equipped.
4. Loosen alternator attaching bolts and remove bolt attaching alternator and air pump bracket to right cylinder head.
5. If equipped with air conditioning purge the system of freon. Remove nuts attaching compressor support bracket to water pump. Remove bolts attaching compressor to upper mounting bracket and remove compressor. Remove compressor upper mounting bracket from cylinder head.

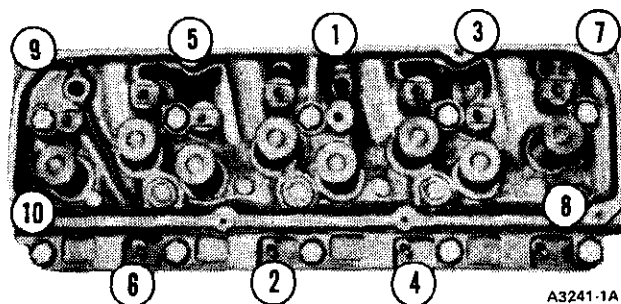
If not equipped with air conditioning, remove bolts attaching power steering reservoir bracket to left cylinder head. Position reservoir and bracket out of way.

6. Remove valve rocker arm covers. Remove rocker arm bolts, rocker arms, oil deflectors, fulcrums and push rods in sequence (Fig. 18) so they can be installed in their original positions.
7. Remove cylinder head attaching bolts. Lift cylinder heads and exhaust manifolds as assemblies from cylinder block with a hoist. **If necessary to loosen cylinder head gasket seal, pry at forward corners of cylinder heads against casting bosses provided on cylinder block. Do not damage machined surfaces of head or block. Discard cylinder head gasket.**
8. If disassembly or machining of cylinder head is required, remove exhaust manifold.



A3240-1B

FIG. 18 Removing Valve Push Rod



A3241-1A

FIG. 19 Cylinder Head Bolt Torque Sequence

Installation

1. Clean cylinder head, intake manifold, valve rocker arm cover, and cylinder block gasket surfaces. If cylinder head was removed for cylinder head gasket replacement, check flatness of cylinder head and block gasket surfaces. If exhaust manifold was removed, coat cylinder head and manifold port areas with film of graphite grease and install manifold to cylinder head.
2. Place two (2) long cylinder head attaching bolts in two rear lower bolt holes of left cylinder head. Place a long cylinder head attaching bolt in rear lower bolt hole of right cylinder head. Use rubber bands to retain bolts in position until cylinder heads are installed.
3. Position new cylinder head gaskets on block over dowels. Do not apply sealer to head gasket surfaces. Place cylinder heads on block, guiding exhaust manifold studs into inlet pipe connections. Install remaining attaching bolts (longer bolts in lower row of bolt holes). Tighten all cylinder head attaching bolts in sequence (Fig. 19) to specification. When this procedure is used, it is not necessary to retorque bolts after extended operation.
4. Clean and inspect push rods, one at a time. Inspect visually or use a dial indicator to read runout. If bent, do not attempt to straighten, but replace.

Clean the oil passage in the push rods with a suitable solvent, and blow out with compressed air.

5. Install push rods in original positions. Apply Lubriplate or equivalent to valve stem tips and push rod ends.
6. Lubricate and install the rocker arms following the procedure under Valve Rocker Arm installation. **Be sure lower ends of push rods remain seated in tappets.**
7. Torque catalyst inlet pipe or muffler inlet pipe stud nuts to specification.
8. Install intake manifold and carburetor assembly, following procedure under Intake Manifold Installation.
9. If valve train components were changed, perform valve clearance adjustment, as detailed under Valve Clearance adjustment (Part 21-01).
10. If equipped with air conditioning, install compressor upper mounting bracket to left cylinder head. Attach compressor to upper mounting bracket. Attach power steering reservoir and compressor mounting bracket to left cylinder head and water pump. Connect hoses to compressor.
If not equipped with air conditioning, attach power steering reservoir bracket to left cylinder head.
11. Apply oil-resistant sealer to one side of new valve rocker arm cover gaskets. Lay cemented side of gaskets in place in covers. Install covers.
12. Install bolt attaching alternator and air pump bracket to right cylinder head. Adjust alternator and air pump drive belt tension to specification and tighten attaching bolts.
13. If equipped with air conditioning, adjust compressor drive belt tension to specification and tighten attaching bolts.
14. Fill radiator and power steering reservoir, as necessary.
15. Start engine and check for leaks.
16. Check and adjust carburetor idle speed and mixture (Group 24 and Group 29) as required.
17. If equipped with air conditioning, evacuate and charge system with refrigerant (Group 36).

EXHAUST MANIFOLDS

Removal

1. If removing right exhaust manifold, remove air cleaner and intake duct assembly.
2. Disconnect exhaust manifold(s) at catalyst or muffler inlet pipe(s).
3. Remove attaching bolts and washers, and remove exhaust manifold(s) and spark plug wire heat shields.

Inspect the cylinder head joining flanges of the exhaust manifold(s) for evidence of exhaust gas leaks.

Inspect the manifold(s) for cracks, damaged gasket surfaces, or other damage or wear that would make them unfit for service.

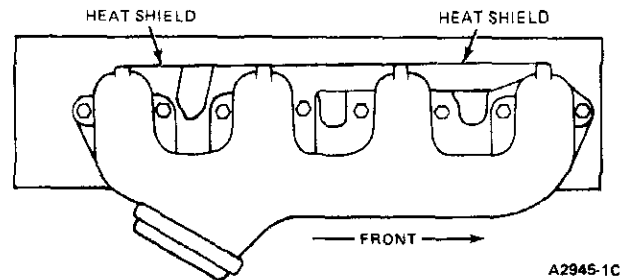


FIG. 20 Right Exhaust Manifold Installation

Installation

1. Clean mating surfaces of exhaust manifold(s) and cylinder head(s). Clean mounting flange of manifold(s) catalyst and inlet pipe(s). Apply light film of graphite grease to exhaust manifold(s).
2. Position spark plug wire heat shields and exhaust manifold(s) on cylinder head(s). Install attaching bolts and washers, starting at fourth bolt hole from front of each manifold. Position lifting bracket under bolts at third exhaust port from front of engine. On right exhaust manifold, install shoulder stud(s) for air intake heat shield at first and sixth bolt holes from front of manifold (Fig. 20). Torque bolts to specification, working from center of manifold to both ends.
3. Place new gasket(s) on resonator or muffler inlet pipe(s). Position inlet pipe(s) to manifold(s). Install attaching nuts and torque to specification.
4. Install air cleaner and intake duct assembly, if removed.
5. Start engine and check for exhaust leaks.

WATER PUMP

Removal

1. Drain cooling system and remove the fan shroud attaching bolts.
2. Remove bolts attaching fan assembly to water pump and remove shroud and fan.
3. Loosen the power steering pump attaching bolts.
4. If vehicle is equipped with air conditioning, loosen compressor attaching bolts. Remove the compressor and power steering pump drive belts.
5. Loosen the alternator pivot bolt. Remove the two attaching bolts and spacer. Remove the belt, then rotate the bracket out of the way. Remove the Thermactor air pump pulley and air pump pivot bolt. Remove the air pump adjusting bracket at the pump. Remove the upper bracket attaching bolt and swing bracket out of way.
6. Remove the three air conditioning compressor attaching bolts and secure the compressor to the left fender brace.
7. Remove the power steering pump attaching bolts and position the pump to one side.
8. Remove the air conditioner bracket attaching bolts and remove the bracket.
9. Disconnect the radiator lower hose and the heater hose from the water pump. On Police Interceptor models, disconnect coolant hose to oil cooler.

10. Loosen the by-pass hose clamp at the pump.
11. Remove remaining water pump attaching bolts and remove water pump from cylinder front cover. Remove cover plate from water pump. Discard gaskets.

Installation

1. Remove any gasket material from water pump, cylinder front cover and pump cover.
2. Position new gaskets coated on both sides with water-resistant sealer.
3. Position water pump on cylinder front cover and install only those bolts not used to attach compressor bracket (if installed) and alternator bracket to water pump. Torque bolts to specification. Install the Thermactor parts removed or loosened in Step 5 of Removal.
4. Connect radiator lower hose, heater return hose, and by-pass hose to water pump. On Police Interceptor models, connect coolant hoses for engine oil cooler. Torque clamps to specification.
5. Position the air conditioner compressor bracket and install and torque the attaching bolts, stud and nuts.
6. Secure the compressor to the bracket.
7. Position the power steering pump bracket and install the three attaching bolts and the nut.
8. Rotate the alternator bracket into position and install the two attaching bolts and spacer. Adjust the belt tension and torque the attaching bolts to specification.
9. Place the water pump pulley on the pump. Position the power steering and compressor drive belts on their respective pulleys.
10. Lower the fan and radiator shroud into position. Install the fan attaching bolts and the shroud attaching bolts. Torque the bolts to specification.
11. Adjust the power steering, alternator and compressor and air pump belt tension. Torque the compressor attaching bolts to specification.
12. Fill the cooling system.
13. Start the engine and check for leaks.

CYLINDER FRONT COVER AND TIMING CHAIN

Removal

Cylinder front cover oil seal replacement is recommended whenever the cover has been removed.

1. Drain cooling system and crankcase.
2. Remove screws attaching radiator shroud to radiator. Remove bolts attaching fan to water pump hub. Remove fan and radiator shroud.
3. Disconnect radiator upper and lower hoses at engine. Disconnect oil cooler lines at radiator.
4. Remove radiator upper support and remove radiator.
5. Loosen alternator and air pump attaching bolts to relieve tension on drive belt. If equipped with air conditioning, loosen compressor idler pulley. Remove drive belts and water pump pulley.

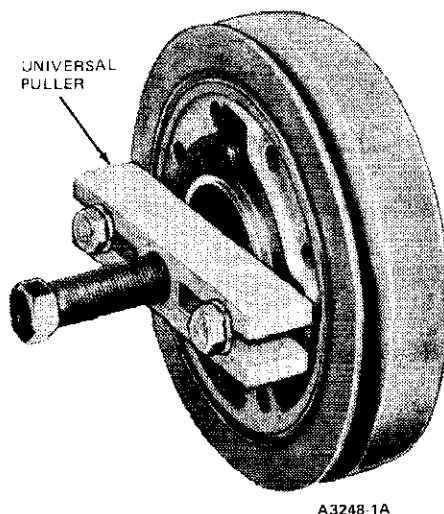


FIG. 21 Removing Crankshaft Vibration Damper

6. Remove bolts attaching compressor support, water pump and compressor, and remove compressor support (if so equipped).
7. Remove the crankshaft pulley from the vibration damper.
8. Remove bolt and washer attaching crankshaft damper. Remove crankshaft damper with a puller (Fig. 21). Remove Woodruff key from crankshaft.
9. Loosen by-pass hose at water pump. Disconnect heater return tube at water pump. On Police Interceptor models, disconnect coolant hoses for engine oil cooler.
10. Disconnect and plug fuel inlet line at fuel pump. Disconnect fuel line to carburetor at fuel pump. Remove fuel pump.
11. Remove bolts attaching cylinder front cover to cylinder block. Using a thin blade knife, cut the oil pan seal flush with cylinder block face prior to separating the cover from the cylinder block. Remove cylinder front cover and water pump as an assembly. Discard cylinder front cover gasket and oil pan seal.
12. If new cylinder front cover is to be installed, remove water pump and install it and a new gasket on the new front cover.
13. Check timing chain deflection as shown in Part 21-07.

If the deflection exceeds specification, replace the timing chain and sprockets.

14. If the timing chain and sprocket are to be removed, crank the engine until timing marks on sprockets are as shown in Fig. 22.
15. Remove camshaft sprocket cap screw, washer, and two piece fuel pump eccentric. Slide timing chain and sprockets forward, and remove as an assembly (Fig. 23).

Refer to Part 21-01 for cleaning and inspection procedures.

Installation

1. Assemble the timing chain and sprockets so sprocket timing marks point directly toward each