

1997 Ford Pickup F150

1997 ENGINES 4.2L V6

1997 ENGINES

4.2L V6

ENGINE IDENTIFICATION

Engine model may be identified by eighth character of Vehicle Identification Number (VIN). VIN is stamped on a plate located on top of instrument panel, near lower left of windshield. VIN number is also stamped on vehicle certification label, located on left front door pillar.

ENGINE IDENTIFICATION CODES

Engine	Code
4.2L SFI	2

ADJUSTMENTS

VALVE CLEARANCE ADJUSTMENT

Hydraulic valve tappets are used. Valve adjustment is not required.

TROUBLE SHOOTING

NOTE: To trouble shoot engine mechanical components, see ENGINE MECHANICAL in BASIC TROUBLE SHOOTING article in GENERAL INFORMATION.

REMOVAL & INSTALLATION

CAUTION: When battery is disconnected, vehicle computer and memory systems may lose memory data. Driveability problems may exist until computer systems have completed a relearn cycle. See COMPUTER RELEARN PROCEDURES article in GENERAL INFORMATION before disconnecting battery.

NOTE: For reassembly reference, label all electrical connectors, vacuum hoses and fuel lines before removal. Also place mating marks on engine hood and other major assemblies before removal.

FUEL PRESSURE RELEASE

WARNING: Fuel system is under pressure. Release pressure before servicing fuel system components.

1. Remove fuel cap to release fuel tank pressure. Remove relief valve cap. Relief valve (service port) is

located on fuel supply manifold. Using Fuel Pressure Gauge (T80L-9974-B), release fuel pressure from relief valve (Schrader valve).

2. If fuel pressure gauge is not available, disconnect electrical connector to Inertia Fuel Shut Off (IFS) switch. IFS switch is located behind passenger side kick panel. Crank engine for 15 seconds to reduce system pressure.
3. To disconnect fuel lines, remove retaining clip from fuel line coupling. Use Spring Lock Coupling Remover (D87L-9280-A) for 3/8" line and (D87L-9280-B) for 1/2" line. Install spring lock coupling remover on fuel line coupling so it enters cage opening. See **Fig. 1**.
4. Push spring lock coupling remover into cage opening to release female fitting from garter spring. Pull couplings apart. Remove spring lock coupling remover.
5. When installing fuel lines, install NEW "O" rings on fuel lines. Use only specified fuel-resistant "O" rings (Brown). Before installing, lightly coat "O" rings with clean engine oil. Clean fittings, and replace garter spring (if necessary).
6. Install female fitting to male fitting and push until garter spring snaps over flared end of female fitting. Ensure lines are locked together and garter spring is over flared end of female fitting. Install retaining clip. Ensure horseshoe portion of clip is over coupling. DO NOT install retaining clip over rubber fuel line.

NOTE: Install Black retaining clip on fuel supply line and Gray clip on fuel return line.

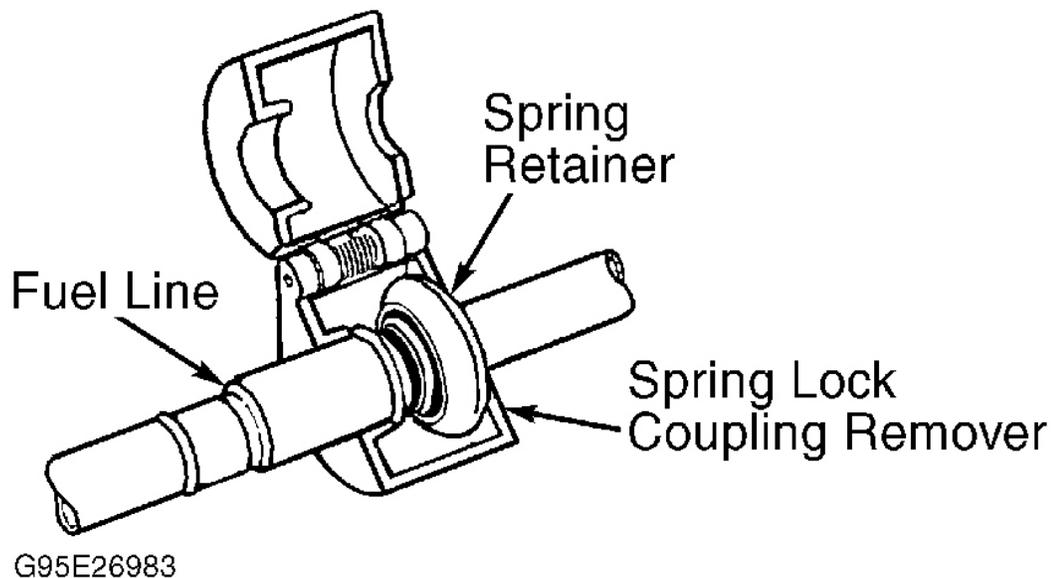


Fig. 1: Disconnecting Fuel Lines
Courtesy of FORD MOTOR CO.

1997 Ford Pickup F150

1997 ENGINES 4.2L V6

Removal (Pickup)

1. Disconnect negative and positive battery cable. Mark hinges and remove hood. Drain cooling system. Discharge A/C system using approved refrigerant recovery/recycling equipment. Release fuel pressure and disconnect fuel lines. See **FUEL PRESSURE RELEASE**.
2. Remove upper front air deflector. Remove air cleaner outlet tube. Remove radiator. Remove fan blade and fan shroud. Disconnect throttle body control cables. Disconnect throttle control cable bracket and position aside.
3. Disconnect necessary vacuum and water lines. Disconnect necessary harness connectors and ground cables. Unbolt power steering reservoir and position aside. Disconnect A/C manifold line at compressor and position aside. Remove power steering pump retaining bolts and position pump aside.
4. Remove upper intake manifold. See **INTAKE MANIFOLD**. Remove fuel injector supply manifold and injectors. Raise and support vehicle. Disconnect exhaust pipes from exhaust manifold. Remove starter.
5. Remove transmission. For A/T (E4OD), see **REMOVAL & INSTALLATION - A/T (E4OD)** article in TRANSMISSION SERVICING. For A/T (4R70W), see **SERVICING - A/T (4R70W)** article in TRANSMISSION SERVICING. For M/T, see appropriate article in CLUTCHES.
6. Remove right and left engine mount through-bolt. Lower vehicle. Install engine lifting equipment. Remove transmission-to-engine retaining bolts. Remove engine.

Installation

1. To install, reverse removal procedure. Tighten all bolts to specification. See **TORQUE SPECIFICATIONS**.
2. When installing fuel lines, fit NEW fuel resistant "O" rings (Brown) on fuel lines. Lightly coat "O" rings with clean engine oil before installing. Clean fittings, and replace garter spring (if necessary).
3. Adjust all control cables and fluid levels. Refill cooling system. Evacuate and recharge A/C system.

Removal (Van)

1. Disconnect negative and positive battery cable(s). Discharge A/C system using approved refrigerant recovery/recycling equipment. Release fuel pressure and disconnect fuel lines. See **FUEL PRESSURE RELEASE**. Remove air cleaner assembly and throttle body inlet tube.
2. Remove radiator air deflector. Remove radiator, fan shroud and cooling fan. Remove radiator inner grille. Remove radiator grille reinforcement panel. Remove stone deflector.
3. Remove headlight and side marker assemblies. Remove power steering cooler and auxiliary transmission cooler. Remove power steering cooler mounting brackets. Remove A/C condenser and plug openings. Disconnect hood latch cable and remove hood latch assembly.
4. Disconnect positive battery cable from power distribution box and position aside. Remove power steering reservoir retaining bolts and position aside. Remove upper and lower core support. Remove oil dipstick tube. Remove upper and lower intake manifold. See **INTAKE MANIFOLD**.
5. Disconnect necessary harness and ground connections. Remove accessory drive belt. Disconnect low-pressure hose at power steering pump. Unbolt power steering pump and position aside. Remove lower radiator hose. Disconnect A/C manifold at compressor and position aside, plug openings. Disconnect A/C high-pressure hose at evaporator and plug openings.

1997 Ford Pickup F150

1997 ENGINES 4.2L V6

6. Raise and support vehicle. Drain engine oil. Remove starter. Remove torque converter nuts. Remove oil pan-to-transmission bolts. Disconnect exhaust pipes at exhaust manifolds. Disconnect shift cable bracket. Remove engine mount nuts.
7. Lower vehicle. Support transmission. Remove transmission dipstick tube. Install engine lifting equipment. Remove transmission-to-engine retaining bolts. Remove engine.

Installation

1. To install, reverse removal procedure. Replace torque converter nuts with NEW ones. Tighten all bolts to specification. See **TORQUE SPECIFICATIONS**.
2. When installing fuel lines, fit NEW fuel resistant "O" rings (Brown) on fuel lines. Lightly coat "O" rings with clean engine oil before installing. Clean fittings, and replace garter spring (if necessary).
3. Adjust all control cables and fluid levels. Refill cooling system. Evacuate and recharge A/C system.

INTAKE MANIFOLD

Removal

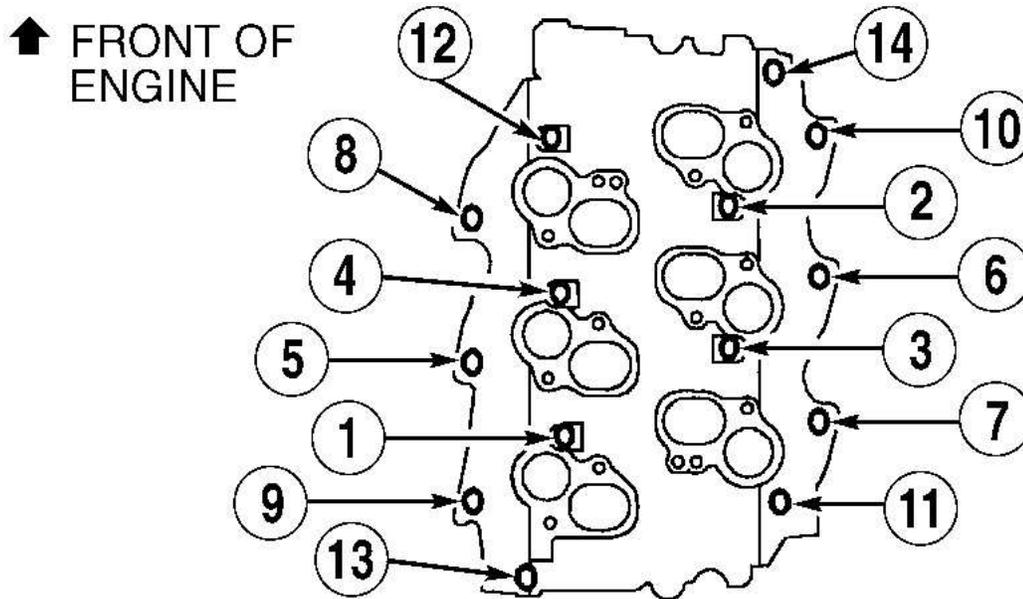
1. Disconnect negative battery cable. Remove air cleaner outlet tube. Disconnect spark plugs wires and harness connectors at ignition coil. Disconnect control cables from throttle body. Remove throttle body control cable bracket and position aside.
2. Disconnect necessary vacuum and water lines. Disconnect necessary harness connectors and ground cables. Remove engine vacuum regulator from intake manifold. Remove upper intake manifold retaining bolts. Remove upper intake manifold and gasket.
3. Disconnect fuel injector harness connectors. Disconnect EGR manifold from EGR valve. Remove IMRC. Release fuel pressure and disconnect fuel lines. See **FUEL PRESSURE RELEASE**.
4. Mark position for installation, remove lower intake manifold retaining bolts in reverse order. See **Fig. 2**. Remove lower intake manifold and gaskets.

Installation

1. To install, reverse removal procedure. Use NEW gaskets and "O" rings. Lubricate fuel injector "O" rings with Light Grade Oil (ESE-M2C39-F) before installing.
2. Ensure alignment tabs on intake manifold gaskets align with holes in cylinder head. Tighten intake manifold bolts to specification in sequence. See **Fig. 2**. See **TORQUE SPECIFICATIONS** table.

CAUTION: Intake manifold bolts must be retightened to specification after engine has reached normal operating temperature.

3. When installing fuel lines, fit NEW fuel resistant "O" rings (Brown) on fuel lines. Lightly coat "O" rings with clean engine oil before installing. Clean fittings, and replace garter spring (if necessary).
4. To install remaining components, reverse removal procedure. Adjust all control cables and fluid levels. Refill cooling system. When installing spark plug wires, ensure wires are in correct position on coils. See **SPECIFICATIONS - 4.2L** article in ENGINE PERFORMANCE.



G97E03642

Fig. 2: Intake Manifold Bolt Tightening Sequence
Courtesy of FORD MOTOR CO.

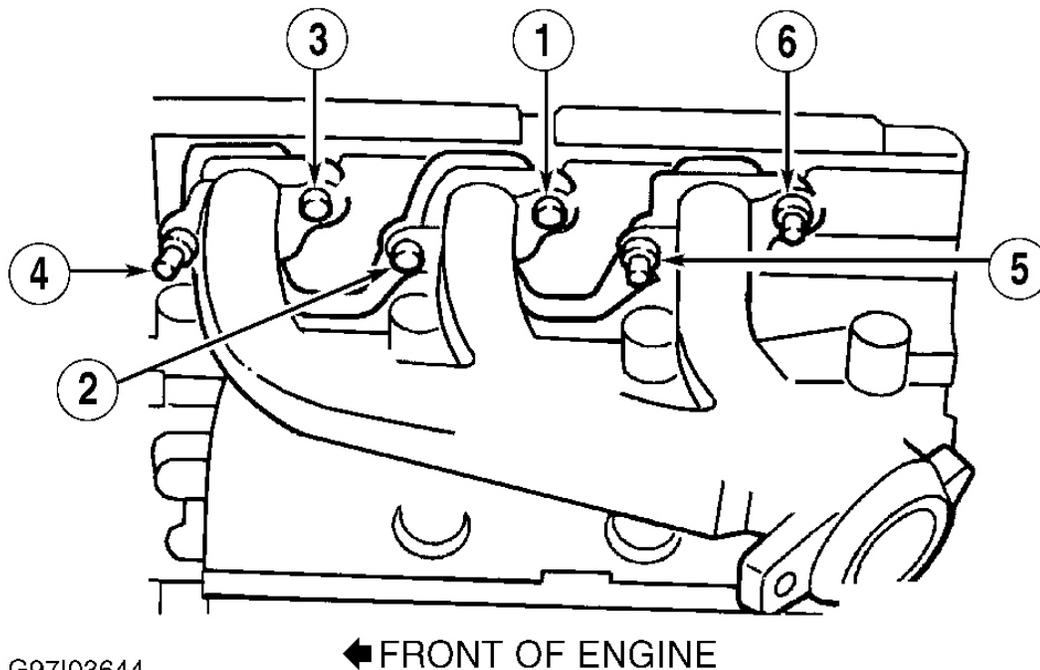
EXHAUST MANIFOLD

Removal

On left manifold, remove oil dipstick tube. On right manifold, remove EGR manifold tube. On both sides, disconnect oxygen sensor. Disconnect exhaust pipe from exhaust manifold. Remove exhaust manifold retaining bolts in reverse order. See **Fig. 3**. Remove exhaust manifold and gasket.

Installation

To install, reverse removal procedure. Tighten exhaust manifold nuts to specification in sequence. See **Fig. 3**. See **TORQUE SPECIFICATIONS** table.



G97103644

Fig. 3: Exhaust Manifold Bolt Tightening Sequence

Courtesy of FORD MOTOR CO.

CYLINDER HEAD**Removal**

1. Disconnect negative battery cable. Remove upper and lower intake manifolds. See **INTAKE MANIFOLD**. Remove valve cover. Remove exhaust manifold. See **EXHAUST MANIFOLD**. Remove accessory drive belt.
2. If removing left cylinder head, unbolt power steering reservoir and position aside. Remove A/C compressor, with hoses attached, and position aside. Remove power steering bracket, with pump and hoses attached, and position aside.
3. If removing right cylinder head, remove generator. Remove accessory drive belt idler pulley. Remove generator bracket.

CAUTION: Mark location of rocker arms and push rod if they are to be reused. Ensure they are installed in their original location.

4. If removing either cylinder head, remove rocker arms and push rods. Remove and discard cylinder head retaining bolts in reverse sequence. See **Fig. 4**. Remove cylinder head and gasket.

1997 Ford Pickup F150

1997 ENGINES 4.2L V6

Inspection

Check cylinder head for warpage, cracks and damage. Maximum warpage information is not available from manufacturer.

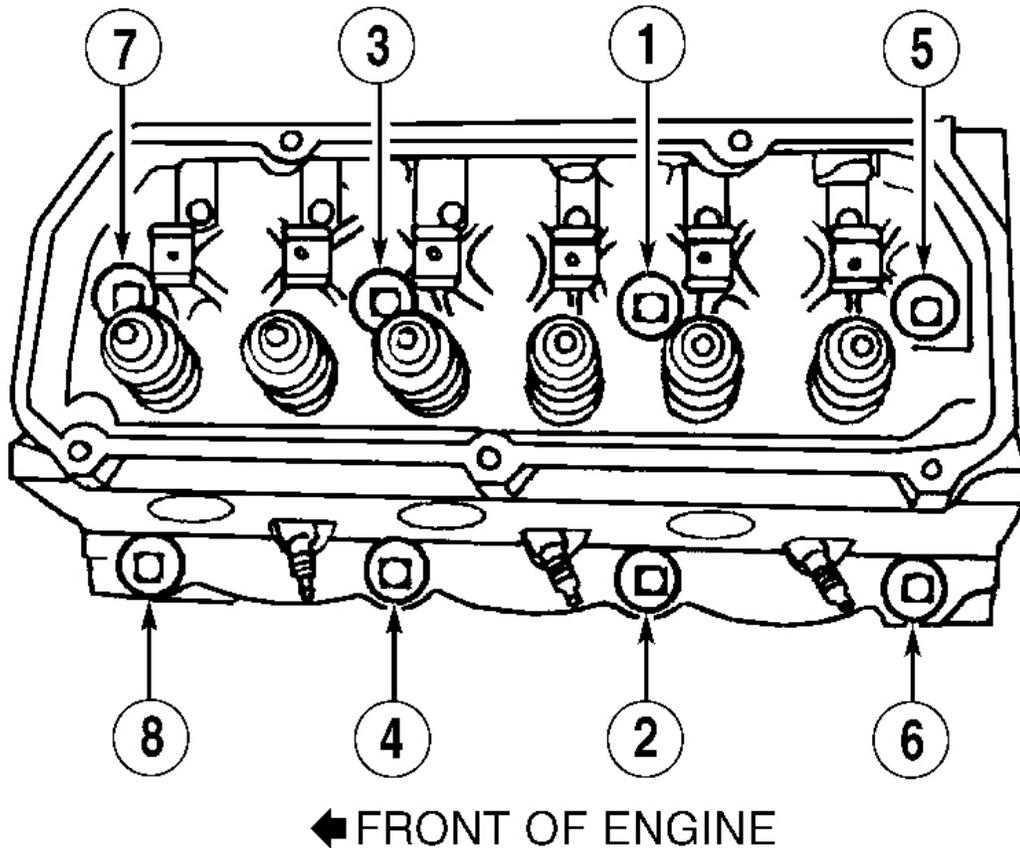
CAUTION: DO NOT reuse cylinder head bolts.

Installation

1. Install NEW cylinder head gaskets on block with small hole at front of engine. Always use NEW cylinder head bolts. Lubricate cylinder head bolts with engine oil prior to installation.
2. Install cylinder head and tighten bolts to 14 ft. lbs. (19 N.m), in sequence. See **Fig. 4**. Repeat sequence again, tightening bolts to 29 ft. lbs. (39 N.m). Repeat sequence again, tightening bolts to 36 Ft. Lbs.

CAUTION: DO NOT loosen all cylinder head bolts at one time. Loosen and tighten each cylinder head bolt before preceding to next.

3. Working in order and on one bolt at a time, loosen bolt 3 revolutions and tighten to specification. See **TORQUE SPECIFICATIONS**. To complete installation, reverse removal procedure.



G97D03646

Fig. 4: Cylinder Head Tightening Sequence
 Courtesy of FORD MOTOR CO.

FRONT COVER OIL SEAL

Removal

1. Disconnect negative battery cable. Remove accessory drive belt. Remove cooling fan and fan shroud. Raise and support vehicle. Mark pulley and damper position. Remove crankshaft pulley. Remove damper bolt.
2. Install Crankshaft Damper Remover (T58P-6316-D) and Crankshaft Damper Remover Adapter (T82P-6316-D). Remove damper. Using Seal Remover (T92C-6700-CH), remove oil seal from front cover.

Installation

To install, reverse removal procedure. Lubricate oil seal bore and seal lip with engine oil before installing. Apply silicone sealant to keyway of crankshaft damper before installing. Install seal. Tighten bolts to

specification. See TORQUE SPECIFICATIONS.

FRONT COVER

CAUTION: When battery is disconnected, vehicle computer and memory systems may lose memory data. Driveability problems may exist until computer systems have completed a relearn cycle. See COMPUTER RELEARN PROCEDURES article in GENERAL INFORMATION before disconnecting battery.

Removal

1. Disconnect the battery ground cable, remove air cleaner assembly.
2. Raise vehicle, drain coolant from radiator, drain the engine oil.
3. Lower vehicle, remove upper radiator hose. Remove the fan shroud and the lower radiator hose.
4. Raise vehicle, remove 2 nuts holding the Crankshaft (CKP) sensor shield in place and remove the shield. Disconnect both the Knock sensor and (CKP) sensor harness connectors. Position wiring harness aside.
5. Remove transmission line support bracket bolt. Remove power steering support bracket bolts. Remove the A/C compressor mounting bracket nuts and position the A/C compressor aside.
6. Mark crankshaft pulley and damper position. Remove crankshaft pulley and damper. See FRONT COVER OIL SEAL.
7. Remove front oil pan bolts that intersect with the front cover.
8. Lower vehicle, remove the supply tube heater hoses. Detach wiring harness from the outlet tube and position aside.
9. Remove the heater water outlet tube (remove bolt). Remove water pump. See WATER PUMP.
10. Remove Cam Position Synchronizer. See CAMSHAFT SYNCHRONIZER.
11. Remove front cover crankshaft oil seal. See FRONT COVER OIL SEAL.
12. Remove the 4 water pump mounting studs.

CAUTION: Failure to remove Cap Screw which may be over looked, may damage the cover if not removed.

13. Remove engine front cover stud bolts and cover bolt, remove CAP SCREW. See Fig. 5
14. Slide the front cover off the dowels, remove the gasket and discard.

Installation

CAUTION: Failure to prevent foreign material from entering the engine block or front engine cover. Will result in engine damage. To prevent damage to engine components, seal coolant and oil passages. Prevent foreign material from entering the oil pan.

1997 Ford Pickup F150

1997 ENGINES 4.2L V6

CAUTION: DO NOT use a surface conditioning pad or any other type of fibrous abrasive disc to clean gasket surfaces. Failure to follow these directions will result in engine damage.

1. Clean off surfaces of the block, front engine cover and exposed oil pan flange.

NOTE: If sealant (F6AZ-19562-A) is exposed for longer than 7 minutes, wipe off sealant and re-apply.

2. Install front engine cover gasket, apply sealant (F6AZ-19562-A) to base of gasket where oil pan and block come together. Apply a bead of sealant in center of oil pan flange and around bolt holes. Apply a thin layer of sealant to front cover gasket mating surface (DO NOT over apply the sealant).

NOTE: There are 13 fasteners securing the front engine cover. The CAP SCREW will be identified as fastener No. 12. DO NOT tighten the CAP SCREW (No. 12) in the first tightening sequence.

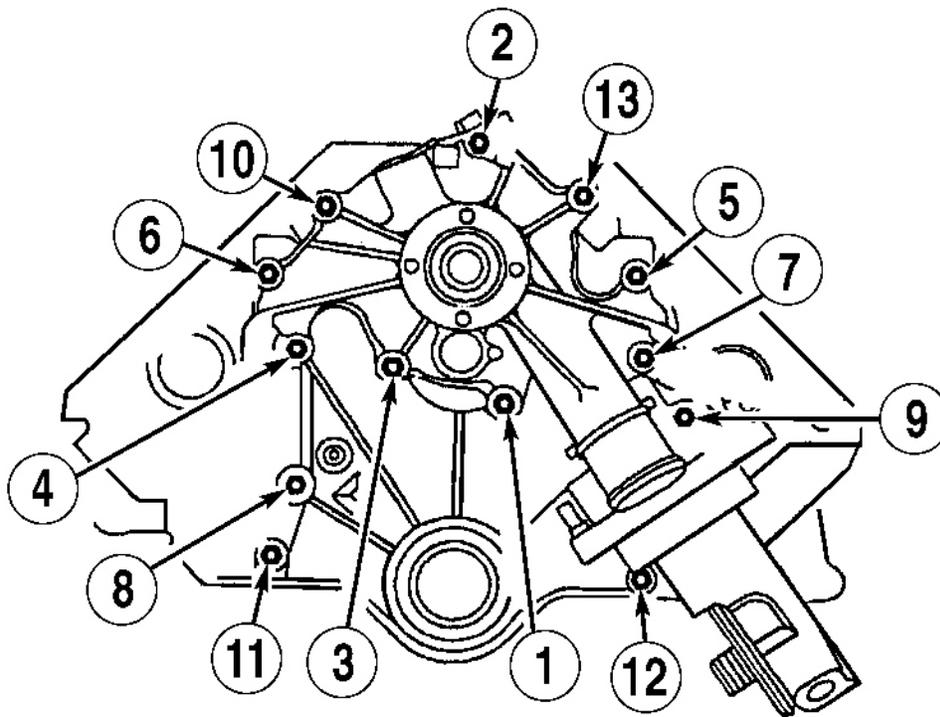
3. Tighten fasteners in 3 stages, as follows:

- Starting with bolt at about the 6 o'clock position (identified as bolt No. 1), tighten fasteners 1-11 and 13 in sequence to 16 Ft. lbs. (22 N.m). See **Fig. 5**.

NOTE: Apply a small amount of loctite® to threads of cap screw (do not over apply compound).

- Tighten CAP SCREW (No. 12) to 89 INCH. lbs. (10 N.m).
 - Tighten all fasteners (except Cap Screw No. 12) an additional 90 degrees, in sequence.
4. Install Cam Position Synchronizer. See **CAMSHAFT SYNCHRONIZER**.
 5. Install the heater water outlet tube, tighten to 71-97 INCH. lbs. (8-11 N.m).
 6. Attach the wiring to the outlet tube, install both supply tube heater hoses.
 7. Raise vehicle, install oil pan bolts, tighten to 80-106 INCH. lbs. (9-12 N.m).
 8. Install NEW front cover crankshaft oil seal. See **FRONT COVER OIL SEAL**.
 9. Install crankshaft pulley and damper. See **FRONT COVER OIL SEAL** and **TORQUE SPECIFICATIONS**.
 10. Connect (CKP) sensor and Knock sensor harness connectors. Install the (CKP) sensor shield (if removed).
 11. Lower vehicle.
 12. Install A/C compressor mounting bracket nuts, tighten to 30-40 Ft. lbs. (40-45 N.m).
 13. Install power steering support bracket bolts, tighten to 30-40 Ft. lbs. (40-45 N.m).
 14. Install accessory drive belt.
 15. Install the lower radiator hose, the fan shroud and upper radiator hose.
 16. Refill coolant system, refill the engine oil. Ensure oil drain plug has been tightened.

17. Reconnect the battery ground cable, install air cleaner assembly.
18. Start vehicle and check for leaks.



NOTE: See text for Torque Spec - Cap Screw #12.

G00025258

Fig. 5: Front Cover Tightening Sequence
Courtesy of FORD MOTOR CO.

TIMING CHAINS

CAUTION: DO NOT rotate engine with timing chain removed. Damage to valve/piston may result.

Removal

Remove front cover. See **FRONT COVER**. Remove camshaft synchronizer. See **CAMSHAFT SYNCHRONIZER**. Rotate crankshaft until timing marks and keyways align. See **Fig. 6**. Compress and install retaining pin to timing chain tensioner. See **Fig. 7**. Remove timing chain and gears as an assembly. Remove timing chain tensioner.

1997 Ford Pickup F150

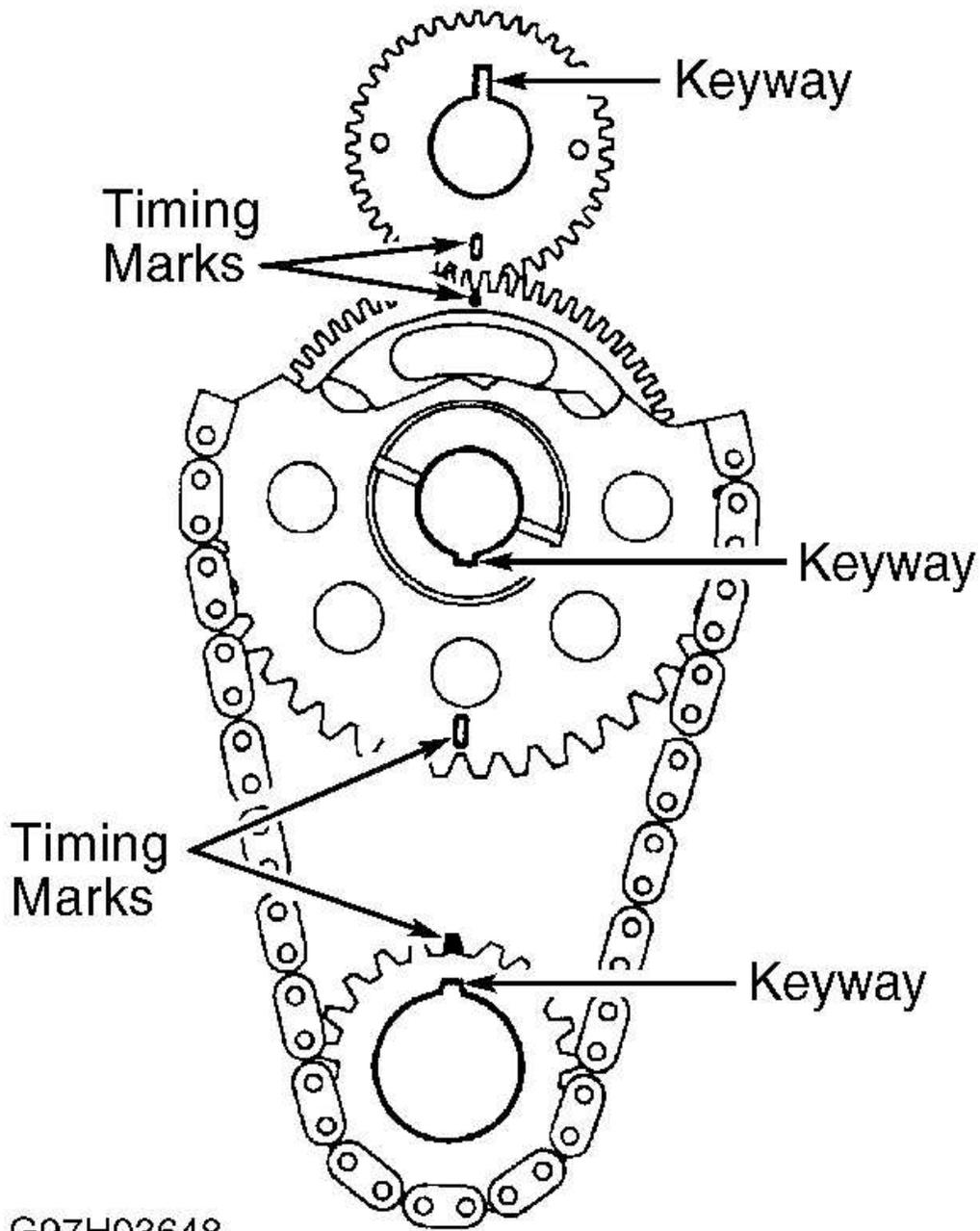
1997 ENGINES 4.2L V6

Inspection

Inspect components for damage. Inspect friction surfaces on tensioner arms and chain guides for wear. Replace components if necessary. If tensioner arms or guides are worn or damaged, remove and clean oil pan. Also, replace oil pump screen cover and tube.

Installation

To install, reverse removal procedure. Ensure all timing marks are properly aligned. See **Fig. 6**. Tighten all nuts and bolts to specification. See **TORQUE SPECIFICATIONS**.



G97H03648

Fig. 6: Identifying Timing Marks
Courtesy of FORD MOTOR CO.

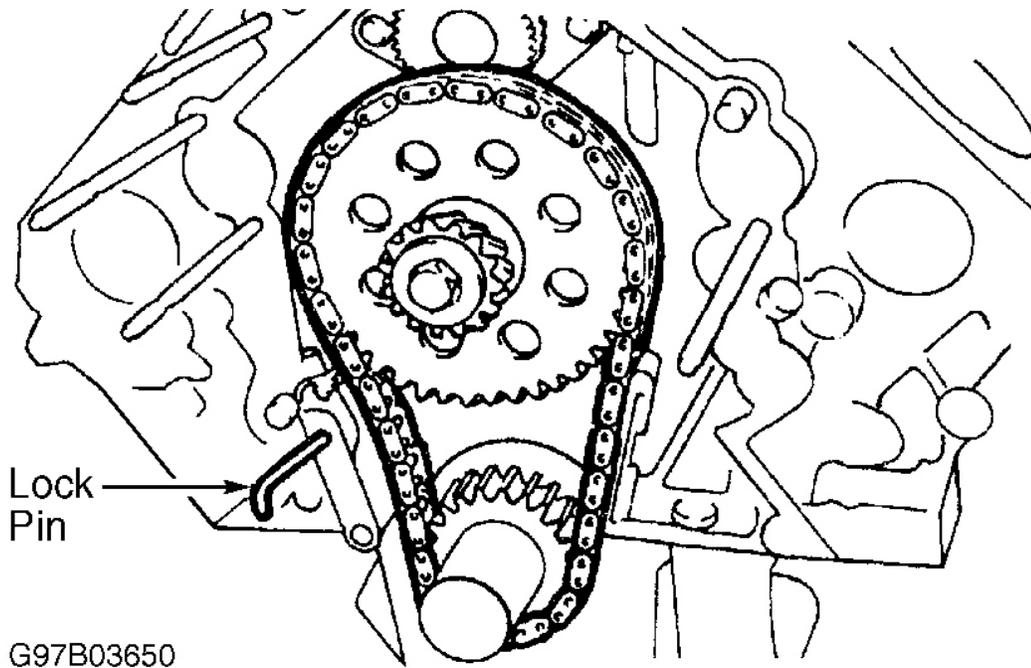


Fig. 7: Installing Timing Chain Tensioner Lock Pin
Courtesy of FORD MOTOR CO.

LIFTER

Removal

Remove upper and lower intake manifolds. See **INTAKE MANIFOLD**. Remove valve covers. Mark position of rockers push rods and lifters for installation reference. Remove rockers and push rods. Remove lifter retainer plates. Remove lifters.

Inspection

Inspect components for damage. Measure lash adjuster O.D. and oil clearance. Replace components if damaged or measurements are not within specification. See **CAMSHAFT** table under ENGINE SPECIFICATIONS.

Installation

To install, reverse removal procedure. Coat components with engine oil before installing. Tighten all nuts and bolts to specifications. See **TORQUE SPECIFICATIONS**.

CAMSHAFT

Removal

1997 Ford Pickup F150

1997 ENGINES 4.2L V6

Remove lifters. See **LIFTER**. Remove timing chains. See **TIMING CHAINS**. Remove balance shaft drive gear from camshaft. Remove camshaft thrust plate. Remove camshaft.

Inspection

Measure camshaft bore I.D., journal O.D., oil clearance and lobe lift. Replace camshaft if measurements are not within specification. See **CAMSHAFT** table under ENGINE SPECIFICATIONS.

Installation

Coat camshaft bearings, journals and lobes with Engine Assembly Lubrication (D9AZ-19579-D). Install camshaft. To complete installation, reverse removal procedures. Tighten all nuts and bolts to specification. See **TORQUE SPECIFICATIONS**.

CAMSHAFT SYNCHRONIZER

CAUTION: DO NOT rotate crankshaft or camshaft during removal and installation procedure or fuel system timing will be out of time. Possible engine damage may occur.

Removal

1. Disconnect negative battery cable(s). Position crankshaft at TDC No. 1 compression stroke. Partially drain cooling system. Remove air cleaner assembly. Disconnect EGR vacuum hose from EGR valve. Remove EGR valve and adapter. Disconnect heater outlet tube and position aside.
2. Disconnect camshaft position sensor harness connector. Mark orientation of camshaft position sensor electrical connector. Remove camshaft position sensor. Remove camshaft synchronizer retaining bolt. Remove camshaft synchronizer.

NOTE: Oil pump driveshaft might come out with camshaft synchronizer. If so, retrieve oil pump driveshaft before proceeding.

CAUTION: Synchro Positioner (T89P-12200-A) must be used during installation of synchronizer assembly. Failure to do so will result in fuel system to be out of time and possible engine damage may occur.

Installation

1. Ensure crankshaft is still at TDC No. 1 compression stroke. Install synchro positioning tool on camshaft synchronizer by rotating tool until it engages notch in camshaft synchronizer housing.

NOTE: During installation, arrow on synchro positioning tool will rotate clockwise as gears engage.

2. Install camshaft synchronizer so arrow on synchro positioning tool is 54 degrees from centerline of

engine. See **Fig. 8**. Install camshaft synchronizer retaining bolt.

3. Remove synchro positioning tool. Install camshaft position sensor. To complete installation, reverse removal procedure. Tighten nuts and bolts to specification. See **TORQUE SPECIFICATIONS**.

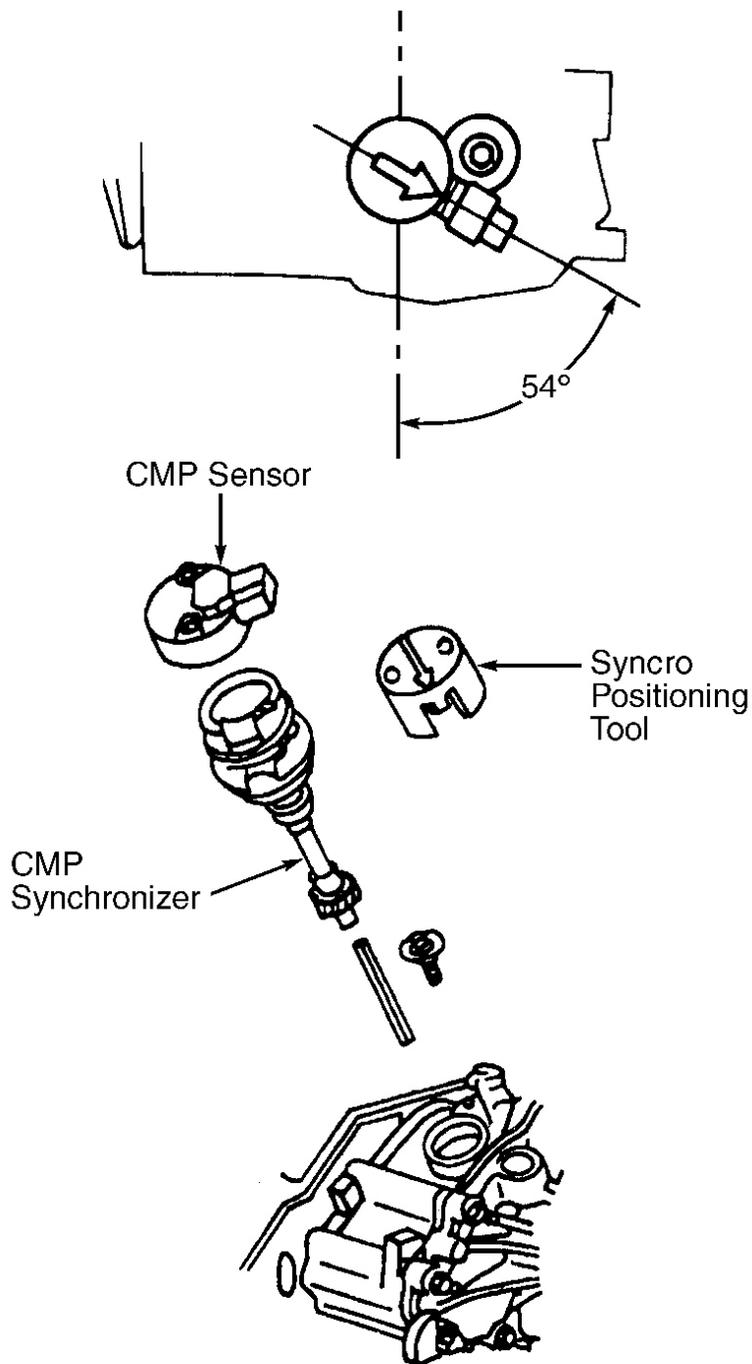


Fig. 8: Aligning Camshaft Synchronizer
Courtesy of FORD MOTOR CO.

BALANCE SHAFTS

Removal

Remove timing chain. See **TIMING CHAINS**. Remove balance shaft drive gear from camshaft. Remove balance shaft thrust plate retaining bolts. Remove balance shaft.

Installation

To install, reverse removal procedure. Tighten nuts and bolts to specification. See **TORQUE SPECIFICATION**. Ensure all timing mark are aligned. See **Fig. 6**.

CRANKSHAFT REAR OIL SEAL

Removal

Remove transmission. For A/T (E4OD), see **REMOVAL & INSTALLATION - A/T (E40D)** article in TRANSMISSION SERVICING. For A/T (4R70W), see **SERVICING - A/T (4R70W)** article in TRANSMISSION SERVICING. For M/T, see appropriate article in CLUTCHES. Remove flywheel. Using Rear Crankshaft Slinger Remover (T95P-6701- EH) and Slide Hammer (T50T-100-A), remove oil seal.

Installation

Clean and inspect all mating surface. Using Rear Seal Replacer (T82L-6701-A), install oil seal. To complete installation, reverse removal procedure. Tighten nuts and bolts to specification. See **TORQUE SPECIFICATIONS**.

WATER PUMP

Removal & Installation

Drain cooling system. Remove cooling fan and shroud. Remove radiator. Remove accessory drive belt. Remove water pump pulley. Disconnect lower radiator hose from water pump. Disconnect water by-pass tube and engine harness clamp from water pump. Remove A/C support bracket from water pump. Remove water pump retaining bolts. Remove water pump and gasket. To install, reverse removal procedure. Tighten all nut and bolts to specifications. See **TORQUE SPECIFICATIONS**.

OIL PAN

Removal (4x2 Pickup)

The oil pan on a 4x2 vehicle cannot be removed in-vehicle. Remove engine. See **ENGINE**. Remove oil pan retaining bolts in reverse sequence. See **Fig. 9**. Remove oil pan and gasket.

1997 Ford Pickup F150

1997 ENGINES 4.2L V6

Removal (4x4 Pickup)

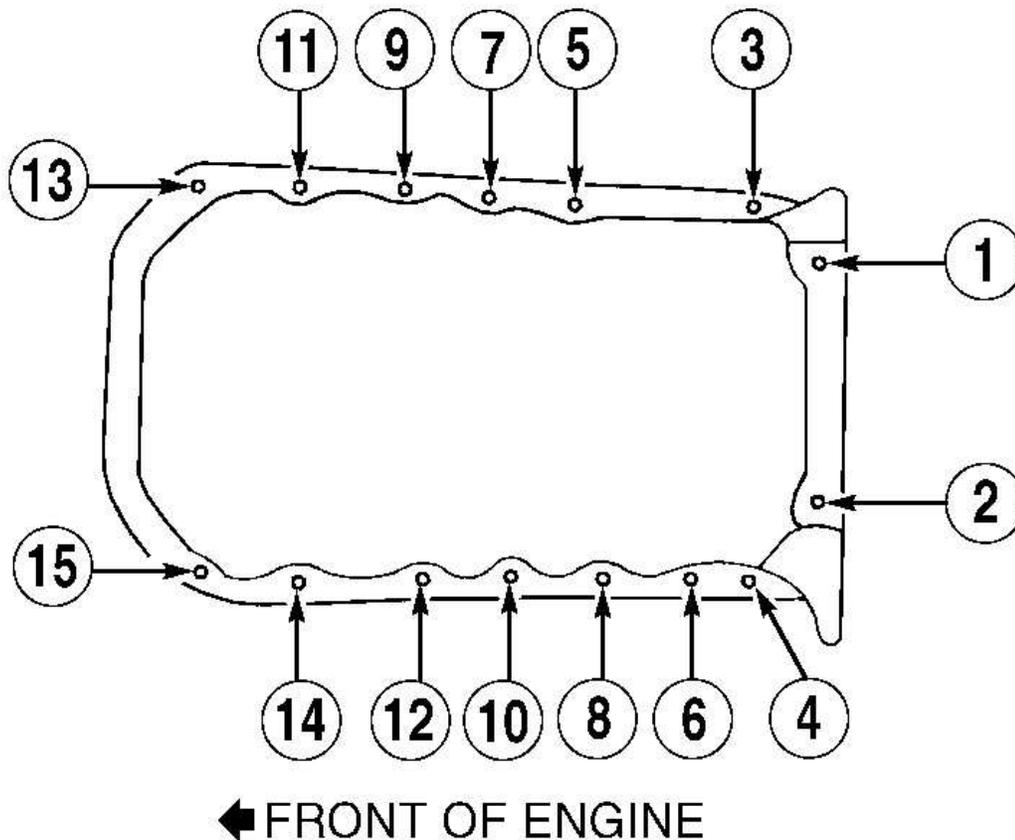
1. With transmission in Neutral, raise and support vehicle. Mark front drive shaft and differential flange for installation. Disconnect front drive shaft from differential and support drive shaft. Disconnect front halfshafts from differential, and support.
2. Disconnect vacuum lines from front axle tube. Using Hi-Lift Jack (014-00210) support front differential. Remove front differential support. Remove front differential mounting bolts. Lower front differential and position aside. Remove oil pan retaining bolts in reverse sequence. See **Fig. 9**. Remove oil pan and gasket.

Removal (Van)

1. Disconnect negative battery cable(s). Drain cooling system. Remove engine cover. Remove air cleaner and outlet tube assembly. Remove cooling fan and fan shroud. Remove oil indicator tube. Remove upper intake manifold. See **INTAKE MANIFOLD**. Raise and support vehicle.
2. Drain engine oil. Loosen transmission mount-to-rear crossmember nuts. Disconnect exhaust pipe at exhaust manifolds. Remove motor mount-to-subframe nuts. Remove flywheel inspection plate. Raise engine about 13" and position blocks between motor mounts and subframe. Remove oil pan retaining bolts. Remove oil pan and gasket.

Installation

To install, reverse removal procedure. Apply silicone sealant on front cover and seal retainer-to-cylinder block areas before installing gasket and oil pan. Tighten all bolts to specification. See **TORQUE SPECIFICATIONS**.



G97J03654

Fig. 9: Oil Pan Bolt Tightening Sequence
 Courtesy of FORD MOTOR CO.

OVERHAUL

CYLINDER HEAD

Cylinder Head

1. Clean head gasket mating surface. Clean carbon from combustion chambers. DO NOT damage surfaces. Check cylinder head for cracks, burrs, nicks and warpage.
2. DO NOT machine more than .010" (.25 mm) from original cylinder head surface to correct warpage. Replace cylinder head as necessary. See **CYLINDER HEAD** table under ENGINE SPECIFICATIONS.

Valve Springs

1997 Ford Pickup F150

1997 ENGINES 4.2L V6

1. Measure valve spring installed height from top of spring seat to underside of spring retainer. Ensure installed height is within specification. See **VALVES & VALVE SPRINGS** table under ENGINE SPECIFICATIONS.
2. If installed height is not within specification, a spacer can be installed between cylinder head and valve spring to obtain correct height. Inspect valve spring free length and pressure. Replace valve spring if free length and pressure are not within specification. See **VALVES & VALVE SPRINGS** table.

CAUTION: DO NOT install valve spring spacers unless necessary. Using more spacers than required can result in spring breakage or worn camshaft lobes.

Valve Stem Oil Seals

When installing NEW valve stem seals, ensure oil seal bottoms on valve guide. Oversized valve stem seals must be installed when oversized valves are used.

Valve Guides

1. Valve guides must be reamed for an oversized valve if valve stem oil clearance exceeds specification. See **CYLINDER HEAD** table under ENGINE SPECIFICATIONS. Valves are available in .015" (.38 mm) and .030" (.76 mm) oversize.
2. If oversized valves or oversized valve stem oil seals are not available, valve guide may be replaced with NEW guide. Always use reamers in proper sequence (smallest first).

NOTE: Always grind valve seat after valve guide has been reamed or new guide has been installed.

Valve Seat

1. Grind valve seat to 45 degrees. If seat width is too wide after grinding, use a 30-degree stone to lower seat or a 75-degree stone to raise seat. See **CYLINDER HEAD** table under ENGINE SPECIFICATIONS.
2. Ensure valve seat angle, seat width and seat runout are within specification. See **CYLINDER HEAD** table under ENGINE SPECIFICATIONS. Valve seats must be ground when valve guide is reamed or replaced. Replacement information is not available from manufacturer.

Valves

Ensure head diameter, valve face runout, stem diameter and valve margin are within specification. See **VALVES & VALVE SPRINGS** table under ENGINE SPECIFICATIONS.

CAUTION: DO NOT remove more than .010" (.25 mm) from end of valve stem when resurfacing tip of valve.

CYLINDER BLOCK ASSEMBLY

1997 Ford Pickup F150

1997 ENGINES 4.2L V6

Piston & Rod Assembly

Ensure pistons and rods are installed in cylinder from which they were removed. Ensure arrow on piston top is pointing toward front of engine.

NOTE: Take measurements with components at a stabilized room temperature of about 70°F (21°C).

Fitting Pistons

Check piston-to-bore clearance. See **PISTONS, PINS & RINGS** table under ENGINE SPECIFICATIONS. If clearance is not within specification, replace pistons and/or block. Oversize pistons are not available at this time.

Piston Rings

1. Select rings for bore diameter. Place ring in cylinder bore in which it will be installed. Use piston to square ring in bore and place ring below normal ring wear area. Measure ring end gap. If ring gap is too small, file end of ring until within specification. If ring gap exceeds specification, try another ring set. See **PISTONS, PINS & RINGS** table under ENGINE SPECIFICATIONS.
2. Check side clearance of rings after installing on piston. Ensure clearance is within specification around entire circumference. Replace piston and/or rings if clearance is not within specification. See **PISTONS, PINS & RINGS** table. Ensure rings are properly spaced on piston before installing pistons into cylinder.

Rod Bearings

Use Plastigage to check rod bearing clearance. If proper oil clearance cannot be obtained, machine or replace crankshaft as necessary. See **CRANKSHAFT, MAIN & CONNECTING ROD BEARINGS** table under ENGINE SPECIFICATIONS.

Crankshaft & Main Bearings

1. When checking main bearing clearance in vehicle, position a jack under adjoining bearing counterweight being checked. Remove only one main bearing cap at a time.
2. Use Plastigage to check main bearing clearance. If proper oil clearance cannot be obtained, machine or replace crankshaft as necessary. Always replace bearings in pairs. See **CRANKSHAFT, MAIN & CONNECTING ROD BEARINGS** table under ENGINE SPECIFICATIONS.
3. Install all bearing caps except thrust bearing cap (No. 3 from front of engine). Tighten main bearing cap bolts to specification. See **TORQUE SPECIFICATIONS**. Install No. 3 bearing cap and tighten bolts finger tight.
4. Pry crankshaft forward and pry No. 3 bearing cap to rear of engine to align thrust bearing. While retaining forward pressure on crankshaft, tighten bearing cap to specification. See **TORQUE SPECIFICATIONS**.
5. Ensure crankshaft end play is within specification. Replace thrust bearing if end play is not within specification. See **CRANKSHAFT, MAIN & CONNECTING ROD BEARINGS** table.

1997 Ford Pickup F150

1997 ENGINES 4.2L V6

Cylinder Block

1. Using a feeler gauge and straightedge, check cylinder block head gasket surface for warpage. Check cylinder bore for wear, taper, out-of-round and piston fit. See **CYLINDER BLOCK** table under ENGINE SPECIFICATIONS.

CAUTION: DO NOT machine more than .010" (.25 mm) of material from original cylinder block head surface.

2. Install all main bearing caps and tighten to specification before honing cylinder bore. See **TORQUE SPECIFICATIONS**. Ensure bearing caps are installed in their original location, with arrow on cap pointing towards front of engine.
3. Use **ONLY** a spring-loaded type cylinder hone. After honing, thoroughly clean bore with detergent and water solution. Rinse solution from bore thoroughly with clean water. Wipe bore clean with lint-free cloth. Lubricate cylinder bores with engine oil.

ENGINE OILING

ENGINE LUBRICATION SYSTEM

Engine lubrication system is a force-feed type. Oil is supplied under full pressure to crankshaft, connecting rods, camshaft bearing and valve lifters. A controlled volume of oil is supplied to rocker arms and push rods. All other moving parts are lubricated by splash or gravity flow. Oil flows through oil filter before entering main oil gallery.

Crankcase Capacity

Crankcase capacity is 5 qts. (4.75L). Add one additional qt. (.95L) when replacing oil filter.

Oil Pressure

Oil pressure specification is 40-125 psi at 2500 RPM at normal operating temperature.

Oil Pressure Test

Disconnect and remove the oil pressure switch from the engine. The oil pressure switch is located at left front of engine, below A/C compressor. Connect the Engine Oil Pressure Gauge (T73L-6600-A) and Transmission Test Adapter (D87C-77000-A), or equivalent, to the oil pressure switch oil galley port. Run the engine until normal operating temperature is reached. Run the engine at 2500 RPM and record the gauge reading. The oil pressure should be 40-125 psi. If the pressure is not 40-125 psi, check the following possible sources:

- Insufficient oil.
- Oil leakage.
- Worn or damaged oil pump.
- Oil pump screen cover and tube.

1997 Ford Pickup F150

1997 ENGINES 4.2L V6

- Excessive main bearing clearance.
- Excessive connecting rod bearing clearance.

OIL PUMP

Removal

Raise and support vehicle. Drain engine oil. Remove oil filter. Remove oil pump retaining bolts. Remove oil pump and "O" ring.

Inspection

Inspect components for damage and wear. Measure gear end height and radial clearance. Replace oil pump assembly if measurements are not within specifications. See **OIL PUMP SPECIFICATIONS** table.

OIL PUMP SPECIFICATIONS

Application	In. (mm)
Gear End Height	.0004-.0033 (.010-.083)
Gear Radial Clearance	.002-.006 (.05-.15)

NOTE: Oil pump is serviced as an assembly only. Replace assembly if measurements are not to specifications.

Reassembly & Installation

1. To reassemble, reverse disassembly procedure. Ensure components are installed in original location. To install, prime oil pump by filling inlet opening with oil, and rotating pump shaft until oil emerges from outlet opening.
2. Install and tighten oil pump-to-front cover bolts to specification. See **TORQUE SPECIFICATIONS**. To complete installation, reverse removal procedure.

CAUTION: If pump and drive shaft do not seat readily, DO NOT force into position. Realign oil pump hex drive with oil pump drive shaft and reinstall.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

Application	Ft. Lbs. (N.m)
Camshaft Sprocket Bolt	30-36 (41-49)
Connecting Rod Cap Bolt ⁽¹⁾	
Step 1	15-18 (20-24)
Step 2	29-33 (39-45)
Step 3	Additional 90-120 Degrees

1997 Ford Pickup F150

1997 ENGINES 4.2L V6

Crankshaft Damper Bolt	103-117 (140-159)
Crankshaft Pulley Bolt	20-28 (27-38)
Cylinder Head Bolt ⁽¹⁾⁽²⁾	
Step 1	14 (19)
Step 2	29 (39)
Step 3	36 (49)
Step 4 ⁽³⁾	Loosen 3 Revolutions
Step 5	
Short Bolt	15-32 (20-43)
Long Bolt	30-36 (41-49)
Step 6	Additional 175-185 Degrees
Engine Mount Through-Bolt	51-67 (69-91)
Engine-To-Transmission Bolts	50-65 (68-88)
Exhaust Manifold Bolt	15-22 (20-30)
Flexplate-To-Torque Converter Bolt	20-34 (27-46)
Flywheel-To-Crankshaft Bolt	54-64 (73-87)
Front Cover Bolt (4)	15-22 (20-30)
Front Engine Mounting Bolts/Nuts	50-70 (68-95)
Idler Pulley Bolt	35-46 (47-62)
Main Bearing Cap Bolt ⁽⁵⁾	
Standard Bolt	81-88 (110-119)
Torque-To-Yield Bolt	
Step 1	37 (50 N.m)
Step 2	Additional 115-125 Degrees
Main Bearing Brace Nut	30-40 (41-54)
Oil Baffle Plate Bolt	30-37 (41-50)
Oil Pan-To-Transmission Bolt	28-38 (38-52)
Oil Pump Inlet Tube	30-40 (41-54)
Oil Pump-To-Front Cover	
Inner	15-22 (20-30)
Outer	(4)
Rocker Arm Fulcrum Bolt	23-29 (31-39)
Water Pump Bolts	15-22 (20-30)
	INCH Lbs. (N.m)
Balance Shaft Thrust Plate Bolt	72-120 (8-14)
Camshaft Thrust Plate Bolt	72-120 (8-14)
Intake Manifold Bolts & Stud	
Lower ⁽⁶⁾	
Step 1	44 (5)

1997 Ford Pickup F150

1997 ENGINES 4.2L V6

Step 2	72-101 (8-11)
Upper	59 (7)
Oil Pan-To-Cylinder Block ⁽⁷⁾	
Step 1	36-44 (4-5)
Step 2	80-106 (9-12)
Timing Chain Tensioner Bolt	72-120 (8-14)
Timing Pointer	72-106 (8-12)
Valve Cover Bolt	72-101 (8-11)
<p>(1) DO NOT reuse bolts.</p> <p>(2) Tighten in sequence. See Fig. 4.</p> <p>(3) DO NOT loosen all bolts at same time. Loosen and torque to specification one bolt at a time.</p> <p>(4) Tighten in sequence. See INSTALLATION under FRONT COVER.</p> <p>(5) Main bearing cap bolts may come from the factory with standard type bolts or torque-to-yield bolts. Torque-to-yield bolts will have a flange on the bolt head. Identify bolts used and use the appropriate torque specification.</p> <p>(6) Tighten in sequence. See Fig. 2.</p> <p>(7) Tighten in sequence. See Fig. 9.</p>	

ENGINE SPECIFICATIONS

GENERAL SPECIFICATIONS

GENERAL SPECIFICATIONS

Application	Specification
Displacement	256 Cu. In. (4.2L)
Bore	3.81" (96.8 mm)
Stroke	3.74" (95.0 mm)
Compression Ratio	9.17:1
Fuel System	SFI
Net Horsepower	205
Torque	255 Ft. Lbs.

CRANKSHAFT, MAIN & CONNECTING ROD BEARINGS

CRANKSHAFT, MAIN & CONNECTING ROD BEARINGS

Application	In. (mm)
Crankshaft	
End Play	.0003-.008 (.008-.20)
Main Bearings	

1997 Ford Pickup F150

1997 ENGINES 4.2L V6

Journal Diameter	2.5190-2.5198 (63.983-64.003)
Journal Out-Of-Round	.0012 (.030)
Journal Taper	.0006 (.015)
Journal Runout	.002 (.05)
Oil Clearance	.0011-.0026 (.028-.066)
Connecting Rod Bearings	
Journal Diameter	2.3103-2.3111 (58.682-58.702)
Journal Out-Of-Round	.0012 (.030)
Journal Taper	.0006 (.015)
Oil Clearance	.0011-.0027 (.028-.069)

CONNECTING RODS**CONNECTING RODS**

Application	Specification
Bore Diameter	
Pin Bore	N/A
Crankpin Bore	2.4266-2.4273" (61.636-61.653 mm)
Center-To-Center Length	
Maximum Bend	.0015" Per .97" (.038 mm Per 25 mm)
Maximum Twist	.002" Per .97" (.051 mm Per 25 mm)
Side Play	
Standard	.004-.014" (.10-.36 mm)
Service Limit	.019" (.48 mm)

PISTONS, PINS & RINGS**PISTONS, PINS & RINGS**

Application	In. (mm)
Pistons	
Clearance	.0007-.0017 (.018-.043)
Diameter	3.8108 (96.794)
Pins	
Diameter	.9055-.9056 (23.000-23.002)
Length	N/A
Piston Fit	N/A
Rod Fit	N/A

1997 Ford Pickup F150

1997 ENGINES 4.2L V6

Rings

End Gap	
No. 1	.007-.013 (.017-.33)
No. 2	.01-.02 (.3-.55)
No. 3	.006-.026 (.15-.65)
Side Clearance	.0012-.0031 (.030-.080)

CYLINDER BLOCK**CYLINDER BLOCK**

Application	In. (mm)
Cylinder Bore	
Standard Diameter	3.8123 (96.8324)
Maximum Taper	.010 (.25)
Maximum Out-Of-Round	.002 (.051)
Maximum Deck Warpage ⁽¹⁾	.003 (.08)
(1) Specification is within a 6" (152 mm) area. Overall warpage is .006" (.15 mm). DO NOT machine more than .010" (.25 mm) from original gasket surface.	

VALVES & VALVE SPRINGS**VALVES & VALVE SPRINGS**

Application	Specification
Face Angle	45°
Face Runout
Head Diameter	N/A
Stem Diameter	Stem Diameter
Intake	.3415-.3423" (8.674-8.694 mm)
Exhaust	.3410-.3418" (8.661-8.682 mm)
Valve Margin	.031" (.79 mm)
Valve Springs	
Free Length	
Intake	1.99" (50.5 mm)
Exhaust	1.99" (50.5 mm)
Installed Height	1.567-1.638" (39.8-41.6 mm)
Out-Of-Square	2 Degrees
	Ft. Lbs. @ In. (N.m @ mm)
Pressure	277 @ 1.65 (375 @ 41.9)

CYLINDER HEAD

1997 Ford Pickup F150

1997 ENGINES 4.2L V6

CYLINDER HEAD

Application	Specification
Maximum Warpage ⁽¹⁾	.003" (.08 mm)
Valve Seats	
Seat Angle	44.75°
Seat Width	.055-.063" (1.4-1.6 mm)
Maximum Seat Runout	.001" (.025 mm)
Valve Guides	
Intake Valve	
Valve Guide Bore I.D.	.3433-.3443" (8.720-8.745 mm)
Valve Stem-To-Guide Oil Clearance	.0010-.0027" (.025-.069 mm)
Exhaust Valve	
Valve Guide Bore I.D.	.3433-.3443" (8.720-8.745 mm)
Valve Stem-To-Guide Oil Clearance	.0015-.0032" (.038-.081 mm)
(1) Specification listed is within 6" (152 mm). Overall warpage is .006" (.15 mm). DO NOT machine more than .010" (.25 mm) from original gasket surface.	

CAMSHAFT**CAMSHAFT**

Application	In. (mm)
Bearing I.D. Diameter	N/A
End Play	.001-.006 (.03-.15)
Journal Diameter	2.0515-2.0505 (52.108-52.083)
Journal Runout	.002 (.05)
Lobe Lift	
Intake	.245 (6.22)
Exhaust	.259 (6.58)
Lobe Wear Limit	.005 (.13)
Oil Clearance	.0006-.0010 (.015-.025)