

1994 Ford Tempo LX

ENGINE OVERHAUL 1994 FORD MOTOR CO. ENGINES 3.0L V6

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ENGINE IDENTIFICATION

Engine may be identified by eighth character of Vehicle Identification Number (VIN), located on top of instrument panel, near lower left corner of windshield. VIN number is also stamped on Vehicle Certification (VC) label, mounted on left door pillar.

An engine identification label is located on engine. This label contains information for engine identification. An emission calibration number label is located on left door or pillar. Information from labels is required when ordering replacement parts.

ENGINE IDENTIFICATION CODES

Application	VIN Code
3.0L V6 SFI	U

ADJUSTMENTS

VALVE CLEARANCE ADJUSTMENT

NOTE: Hydraulic valve lifters are used and no valve adjustment is required. When valve and/or valve seat is machined, valve clearance is reduced and may cause improper valve operation. Valve lifter must be collapsed and clearance checked.

1. Position piston No. 1 at TDC of compression stroke. Slowly apply pressure until valve lifter is completely collapsed on intake valve No. 1.
2. Measure clearance between rocker arm and tip of valve stem, holding lifter in collapsed position. If clearance is not within specification, replace valve, grind valve stem or replace other components as necessary. See **COLLAPSED VALVE LIFTER SPECIFICATIONS** table.

COLLAPSED VALVE LIFTER SPECIFICATIONS

Application	In. (mm)
All Valves	.085-.185 (2.16-4.70)

3. Repeat procedure for exhaust valve No. 1, exhaust valve No. 2, intake valve No. 3, exhaust valve No. 4, and intake valve No. 6. Rotate crankshaft 360 degrees (one revolution). Repeat procedure for intake valve No. 2, exhaust valve No. 3, intake valve No. 4, exhaust valve No. 5, intake valve No. 5, and exhaust valve No. 6.

REMOVAL & INSTALLATION

CAUTION: When battery is disconnected, vehicle computer and memory systems

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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. Place mating marks on engine hood and other major assemblies before removal.

FUEL PRESSURE RELEASE & FUEL LINE CONNECTIONS

WARNING: Fuel system is under pressure. Pressure must be released before servicing fuel system components.

1. Remove fuel tank cap to release fuel tank pressure. Using EFI Pressure Gauge (T80L-9974-B), release fuel pressure from pressure relief valve on fuel rail. See **Fig. 2** .
2. Before disconnecting fuel lines, disconnect negative battery cable. To disconnect fuel lines, remove retaining clip from outside of fuel line coupling.
3. Use Spring Lock Coupling Remover (D87L-9280-A) for 3/8" line, or (D87L-9280-B) for 1/2" line. Install spring lock coupling remover on fuel line coupling so it enters cage opening. See **Fig. 1** .

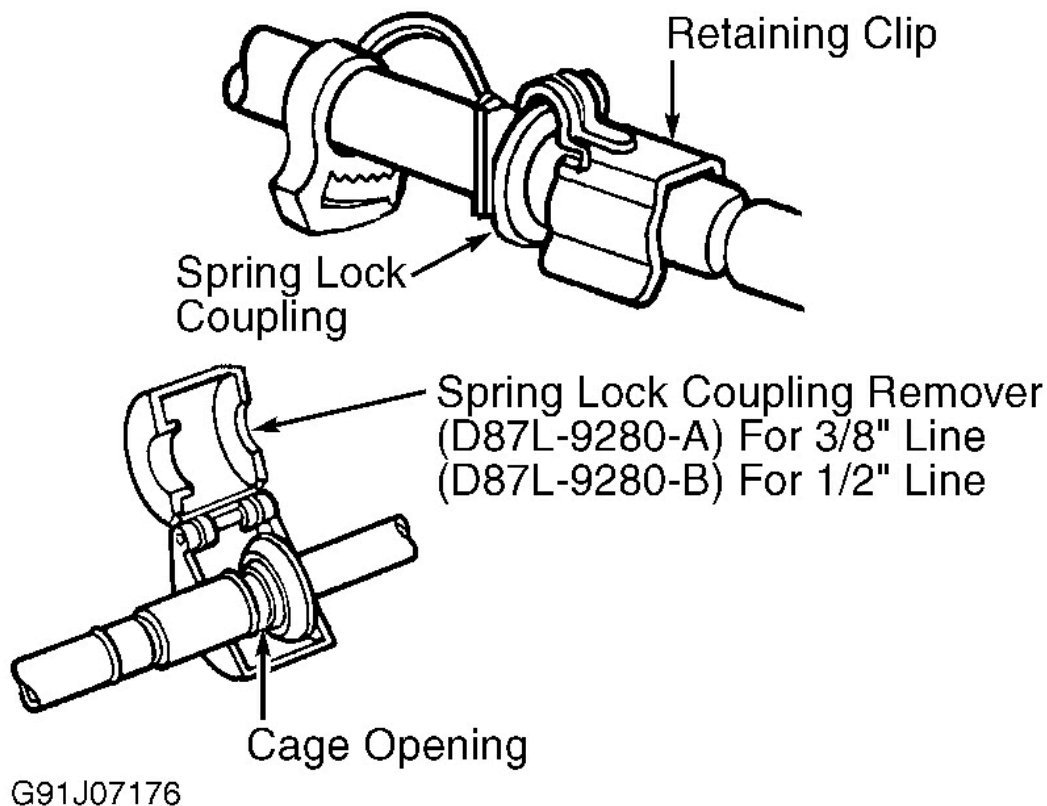


Fig. 1: Disconnecting Fuel Lines
Courtesy of FORD MOTOR CO.

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. To install fuel lines, install new "O" rings on fuel lines. Use only specified fuel resistant "O" rings (Brown in color). 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 female fitting flared end.
7. Install retaining clip. Ensure horseshoe portion of clip is over coupling. **DO NOT** install retaining clip over rubber fuel line.

NOTE: Black retaining clip should be installed on fuel supply line and Gray clip on fuel return line.

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NOTE: On Sable and Taurus vehicles, remove engine with transaxle remaining in vehicle.

NOTE: On Tempo and Topaz, engine and transaxle are removed as an assembly.

Removal

1. Release fuel pressure and disconnect fuel lines. Refer to **FUEL PRESSURE RELEASE & FUEL LINE CONNECTIONS** under REMOVAL & INSTALLATION.
2. Remove battery and battery tray. Drain cooling system. Remove hood and air cleaner assembly. Discharge A/C system using approved refrigerant recovery/recycling equipment.
3. Disconnect wiring harness connectors, coolant hoses, vacuum hoses and ventilation hoses. Disconnect ground straps at intake manifold. Disconnect hoses from power steering pump. Remove power steering reservoir.
4. Disconnect refrigerant line from condenser, leaving line attached to A/C compressor. Disconnect control cables at throttle body. Disconnect cruise control servo and secure aside.
5. On A/T equipped vehicles, disconnect electrical connectors, control cable, oil cooler lines and speedometer cable from transaxle.
6. On M/T equipped vehicles, remove clutch cable. Remove shift control rod and extension bar from transaxle. Disconnect electrical connections at transaxle.
7. On all vehicles, remove radiator hoses, cooling fan and shroud. Raise and support vehicle. Remove front wheels. Disconnect exhaust pipe at exhaust manifold. Remove power steering lines from rear of engine above transaxle. Remove lower radiator hose and starter.
8. Remove stabilizer bar from lower control arm. Remove nut and disconnect tie rod and lower ball joint from steering knuckle.
9. Pull outward on spindle assemblies to disengage axle shafts from transaxle. Install plugs in transaxle openings to hold differential gears in place.
10. Disconnect lower transaxle mount. Lower vehicle. Support engine with hoist. Disconnect engine and transaxle mounts. Lift engine and transaxle assembly from vehicle.

Installation

1. To install, reverse removal procedure. Tighten all bolts to specification. See **TORQUE SPECIFICATIONS** table.
2. Install new clip on end of axle shaft. **DO NOT** reuse original clip. Ensure opening of clip is toward top of axle shaft before installing. Lubricate axle shaft splines with Lubricant (C1AZ-1959-D) before installing.
3. When installing fuel lines, install new "O" rings on fuel lines. Use only specified fuel resistant "O" rings (Brown in color). Lightly coat "O" rings with clean engine oil before installing. Clean fittings and replace garter spring (if necessary).
4. Tighten nut on stabilizer bar bolt until bolt threads protrude through nut approximately .79" (20.1 mm). Adjust all control cables and fluid levels. Refill cooling system. Evacuate and recharge A/C system.

INTAKE MANIFOLD

Removal

1. Release fuel pressure and disconnect fuel lines. Refer to **FUEL PRESSURE RELEASE & FUEL LINE CONNECTIONS** . Remove PCV hose.
2. Disconnect negative battery cable. Drain cooling system. Remove air cleaner flex hose. Disconnect wiring harness connectors, vacuum hoses and coolant hoses as necessary. Disconnect EGR pipe tube (if equipped) and rotate tube away from valve.
3. Remove accessories and/or brackets as necessary. Remove retaining bolts, upper intake manifold and throttle body assembly. See **Fig. 2** .

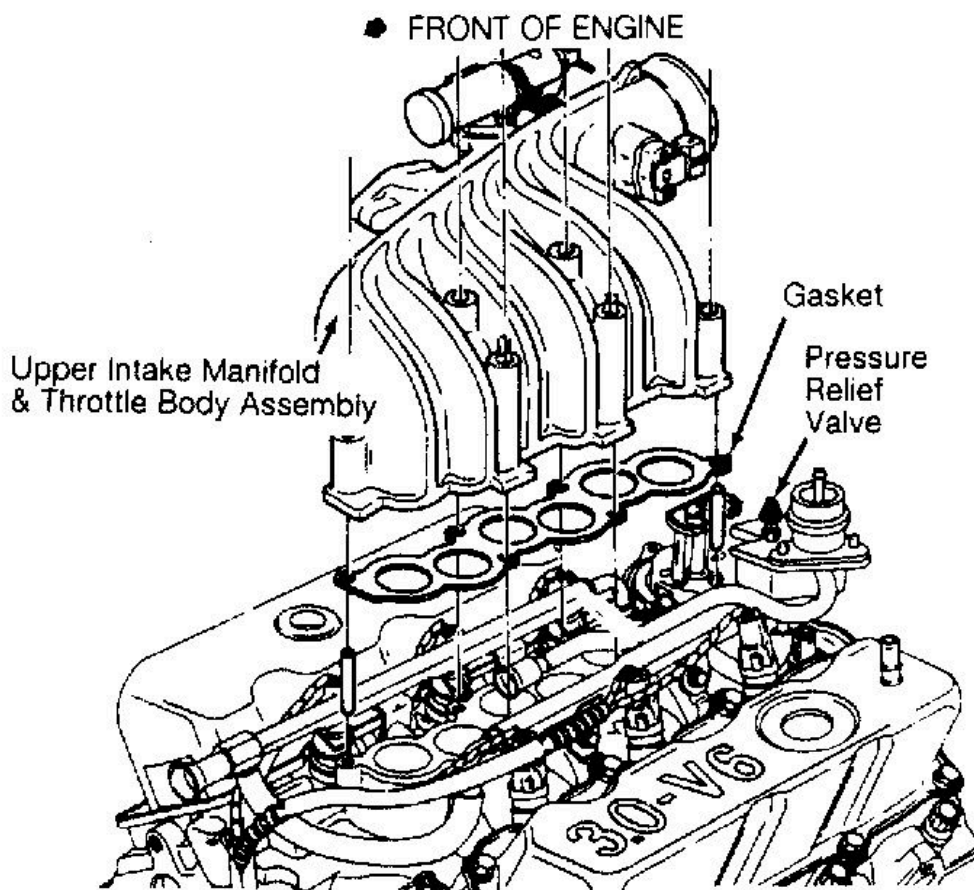


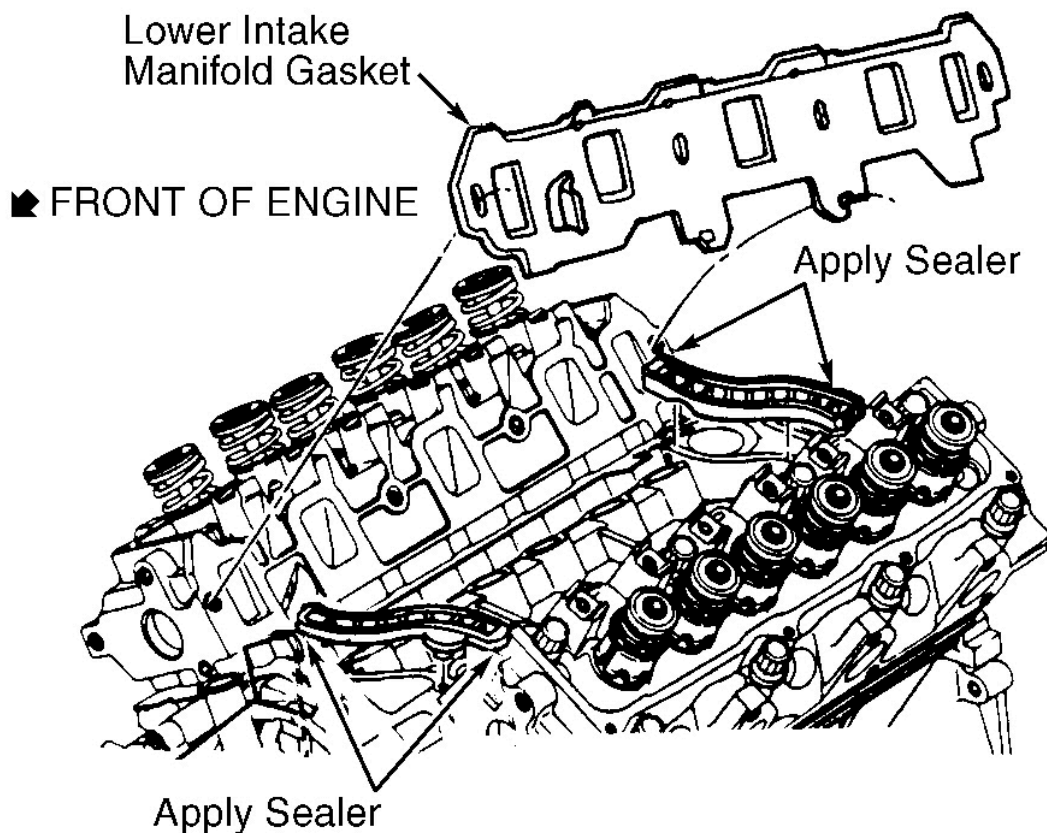
Fig. 2: Removing Upper Intake Manifold & Throttle Body Assembly
Courtesy of FORD MOTOR CO.

4. Remove spark plug wires and distributor cap. Align timing marks to TDC of cylinder No. 1. Place reference mark on distributor and cylinder block for reassembly reference. Remove distributor assembly. Remove ignition coil and bracket from left cylinder head.

5. Remove valve covers. Evenly remove lower intake manifold bolts. Remove lower intake manifold and gaskets.

Installation

1. Clean gasket mating surfaces. Lightly oil attaching bolts and stud threads prior to installation.
2. Apply Silicone Rubber Sealer (D6AZ-19562-AA) at cylinder block and cylinder head junction areas. See **Fig. 3** . When using silicone sealer, assembly must occur within 15 minutes after sealer is applied.



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Fig. 3: Installing Lower Intake Manifold Gaskets

Courtesy of FORD MOTOR CO.

3. Install intake manifold front seal. When installing intake manifold rear seal, position seal with flat side toward distributor hole. Install lower intake manifold gaskets with locking tabs over tabs on cylinder head gaskets.
4. Install lower intake manifold and retaining bolts. Tighten bolts to specification in sequence. See **Fig. 4** . See, at the end of this article, **TORQUE SPECIFICATIONS** . To complete installation, reverse removal

procedure.

5. When installing fuel lines, install new "O" rings on fuel lines. Use only specified fuel resistant "O" rings (Brown in color). Lightly coat "O" rings with clean engine oil before installing.
6. Clean fittings and replace garter spring (if necessary). Adjust all control cables and fluid levels. Refill cooling system.

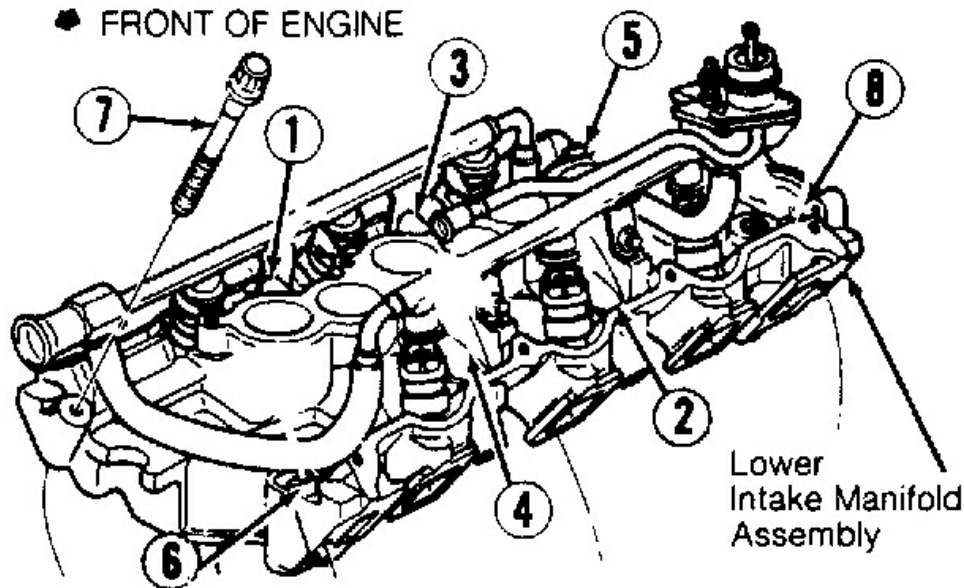


Fig. 4: Lower Intake Manifold Bolt Tightening Sequence
Courtesy of FORD MOTOR CO.

EXHAUST MANIFOLD

Removal

1. Disconnect negative battery cable. On left manifold, remove exhaust manifold shield. Remove engine oil dipstick tube support bracket nut. Carefully rotate or remove dipstick tube away from manifold.
2. On right manifold, remove EGR valve-to-exhaust manifold hoses, and EGR tube from exhaust manifold (if equipped). Remove water pump. See **WATER PUMP** . Remove heat shield.
3. On both manifolds, disconnect exhaust pipe from exhaust manifold. Remove retaining bolts and exhaust manifold.

Installation

To install, reverse removal procedure. Lightly oil threads of bolts and stud before installing. Tighten bolts to

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specification. See **TORQUE SPECIFICATIONS** table. Refill cooling system and check for leaks.

CYLINDER HEAD

Removal

1. Disconnect negative battery cable and drain cooling system. Rotate crankshaft until No. 1 piston is at TDC. Remove intake manifolds. See **INTAKE MANIFOLD** under REMOVAL & INSTALLATION. Remove exhaust manifolds. See **EXHAUST MANIFOLD** under REMOVAL & INSTALLATION.
2. Disconnect wiring harness connectors as necessary. On left cylinder head, remove accessory drive belt and automatic tensioner. Remove power steering pump and bracket with hoses attached, and secure aside.
3. On both cylinder heads, remove valve covers. Loosen rocker arm bolts. Pivot rocker arms from push rods. Remove push rods. Mark component location for reassembly reference. Evenly remove cylinder head bolts and discard. Remove cylinder head and gasket.

Inspection

1. Inspect cylinder head for cracks or warpage. Machine cylinder head if warpage exceeds specification. See **CYLINDER HEAD** table under ENGINE SPECIFICATIONS.

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

2. Check cylinder block deck surface. Machine cylinder block if warpage exceeds specification. See **CYLINDER BLOCK** table under ENGINE SPECIFICATIONS.

Installation

1. Ensure dowels are installed in cylinder block and cylinder head gaskets are installed with UP mark showing. Lightly oil cylinder head bolt threads before installing.

CAUTION: Install new cylinder head bolts. DO NOT reuse bolts.

2. Install cylinder head. Tighten bolts to specification in 4 steps using proper sequence. See **Fig. 5**. See, at the end of this article, **TORQUE SPECIFICATIONS**. Coat ends of push rods with Assembly Lubricant (D9AZ-19579-D) before installing.
3. Install push rods in original location. For each valve, rotate crankshaft until valve lifter and push rod are at lowest point on camshaft lobe.
4. Install rocker arm over push rod. Tighten rocker arm bolt to specification. See **TORQUE SPECIFICATIONS** table.

NOTE: Rocker arms must be fully seated in cylinder head and push rods must be seated in rocker arm sockets prior to final tightening.