

2000 Chrysler Cirrus LX

2000-01 ENGINES 2.4L DOHC 4-Cylinder

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2.4L DOHC 4-Cylinder

ENGINE IDENTIFICATION

2.4L DOHC engines are equipped with 2 balance shafts installed in a carrier attached to lower crankcase. The shafts are interconnected by gears to rotate in opposite directions. Gears are chain driven by the crankshaft at twice crankshaft speed, to counterbalance engine reciprocating masses. See **Fig. 1**.

ENGINE IDENTIFICATION CODES

Engine	VIN Code
Breeze, Cirrus, Sebring Sedan & Stratus Sedan	X
Caravan, PT Cruiser & Voyager	B
Sebring Coupe & Stratus Coupe	G

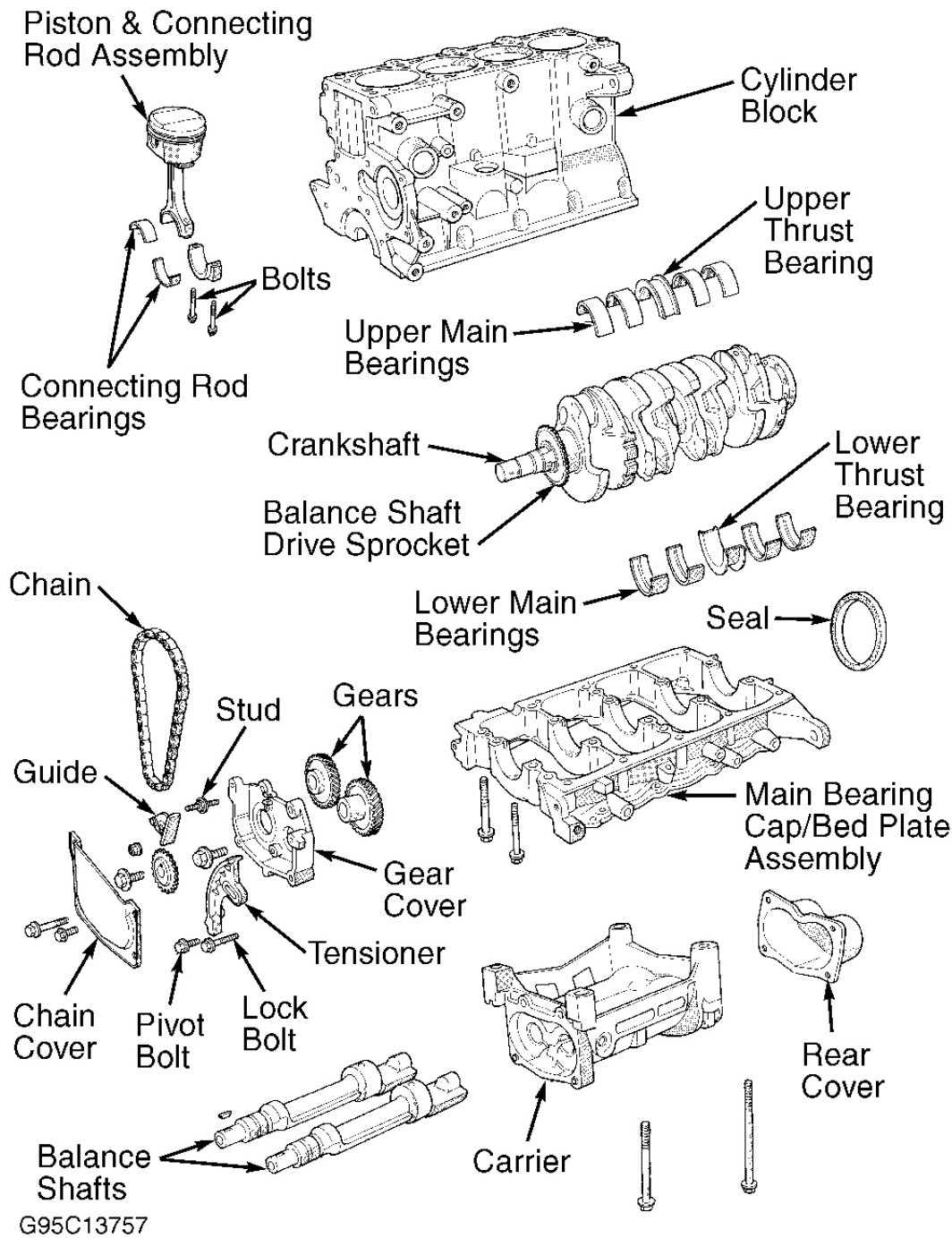


Fig. 1: Exploded View Of 2.4L Cylinder Block
Courtesy of CHRYSLER CORP.

ADJUSTMENTS

VALVE CLEARANCE ADJUSTMENT

Hydraulic valve lash adjusters are used. Valve adjustment is not required.

TROUBLE SHOOTING

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. Before disconnecting battery, for 2000 vehicles, see COMPUTER RELEARN PROCEDURES article in GENERAL INFORMATION. For 2001 vehicles, see CHRYSLER CORP. in COMPUTER RELEARN PROCEDURES article or in GENERAL INFORMATION.

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: During fuel pressure release, wrap shop towels around hose to catch any fuel spillage.

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

Disconnect negative battery cable. Remove filler cap. Remove protective cap from fuel pressure test port on fuel rail. Place open end of Fuel Pressure Release Hose (C-4799-1) into an approved container. Connect fitting end of hose to fuel pressure test port. Fuel pressure will bleed off through hose and into container.

ENGINE

Removal & Installation

1. Release fuel pressure. See FUEL PRESSURE RELEASE. Disconnect and remove battery and tray. Set Power Control Module (PCM) aside. Drain cooling system. Remove upper radiator hose, and remove radiator fan module. Remove lower radiator hose. Disconnect A/T cooler line and plug, if equipped.
2. Disconnect transmission shift linkage. Disconnect throttle body linkage. Disconnect engine wiring harness. Disconnect heater hoses. Discharge A/C system using approved refrigerant recovery/recycling equipment.

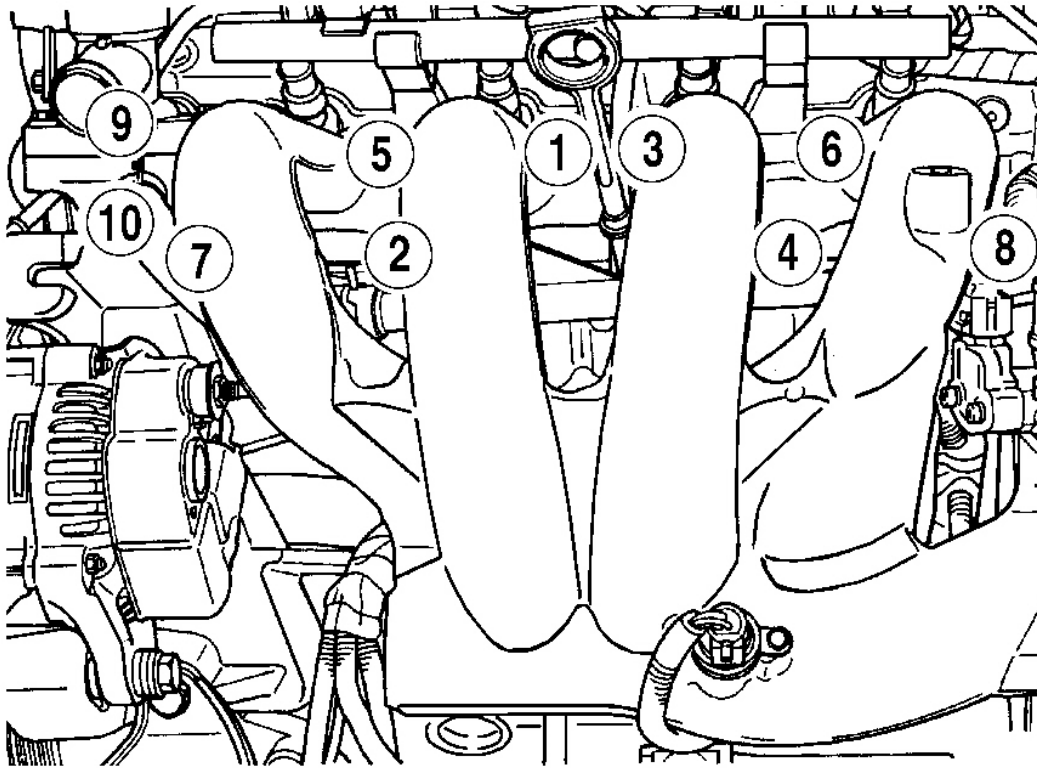
3. Raise vehicle and remove right inner splash shield. Remove accessory drive belts. Remove axle shafts. See appropriate FWD AXLE SHAFTS article in DRIVE AXLES. Disconnect exhaust pipe from manifold. Remove front and rear engine mount brackets from body. Lower vehicle.
4. Remove air cleaner assembly. Remove P/S pump and reservoir and set aside. Remove A/C compressor. Remove ground straps to body. Raise vehicle to allow Dolly and Cradle (6135 and 6710) to be installed under vehicle. Loosen cradle engine mounts to allow movement for positioning into engine locating holes on engine bedplate. Lower vehicle and position cradle mounts until engine is resting on mounts. Tighten cradle frame mounts to prevent movement when removing or installing engine and transmission.
5. Lower vehicle until only the weight of engine and transmission is on the cradle. Remove engine and transmission mount bolts. Raise vehicle slowly. It may be necessary to move engine/transmission assembly on cradle to allow passage past body flanges. To install, reverse removal procedure.

INTAKE MANIFOLD

CAUTION: To prevent damage, do not set fuel injectors on their tips.

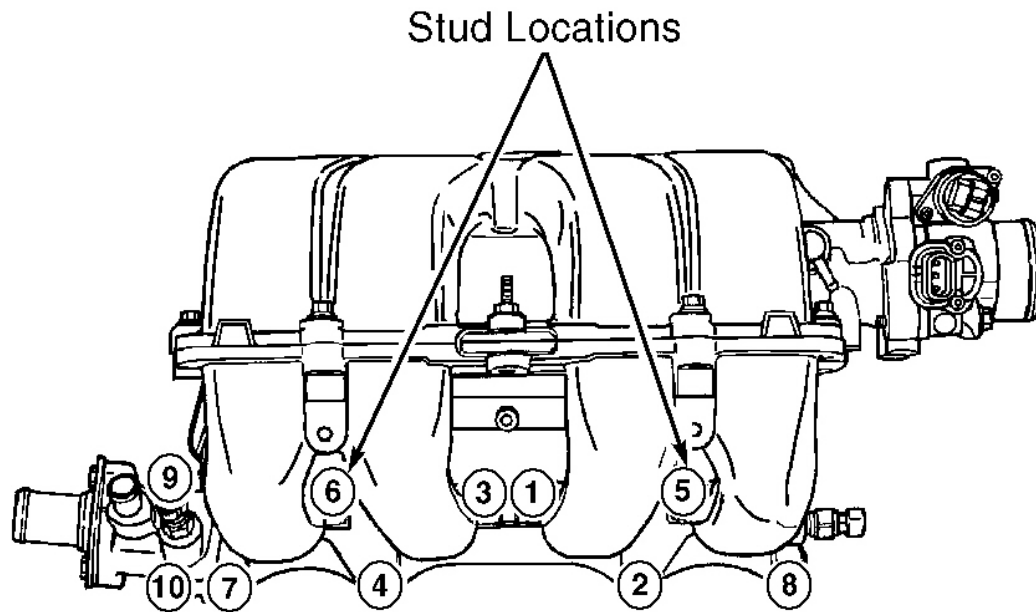
Removal & Installation (Breeze, Cirrus, Sebring & Stratus)

1. Release fuel pressure. See **FUEL PRESSURE RELEASE**. Disconnect negative battery cable. Remove air intake resonator. Disconnect fuel supply line quick-connect at fuel tube assembly. Remove fuel rail assembly attaching screws and remove fuel rail from engine. Cover injector holes to prevent entry of foreign material.
2. Remove accelerator, kickdown and speed control cables from throttle lever and bracket. Disconnect Idle Air Control (IAC) motor and Throttle Position (TP) sensor wiring connectors. Disconnect vacuum hoses from throttle body. Disconnect Manifold Absolute Pressure (MAP) sensor, Inlet Air Temperature (IAT) sensor, and Knock Sensor (KS) connectors. Disconnect vapor and brake booster hoses and wiring harness from tab located on intake manifold.
3. Remove transmission-to-throttle body support bracket fasteners at throttle body and loosen fastener at transmission end. Remove EGR tube bolts at valve and at intake manifold. Remove tube from engine. Remove intake manifold support bracket. Remove intake manifold bolt and washer assemblies. Remove intake manifold.
4. To install, reverse removal procedure. Use NEW gaskets and tighten all fasteners to specification. See **Fig. 2**. See **TORQUE SPECIFICATIONS**.



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Fig. 2: Intake Manifold Tightening Sequence (Breeze, Cirrus, Sebring & Stratus)
Courtesy of CHRYSLER CORP.



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Fig. 3: Intake Manifold Tightening Sequence (Caravan, PT Cruiser & Voyager)
 Courtesy of CHRYSLER CORP.

Removal (Caravan, PT Cruiser & Voyager - Upper Manifold)

1. Disconnect negative battery cable. Remove air intake tube and resonator box from throttle body. Disconnect Idle Air Control (IAC) motor and Throttle Position (TP) sensor wiring connectors. Disconnect Manifold Absolute Pressure (MAP) sensor.
2. Remove vacuum lines for purge solenoid and PCV valve at intake manifold. Remove vacuum lines for power brake booster and speed control vacuum reservoir at upper intake manifold fittings.
3. Remove throttle cable and speed control cable from throttle lever. Remove throttle cables from bracket by compressing retaining tabs. Remove 2 top bolts from intake manifold-to-rear support bracket and spacer. Remove upper bolts from intake manifold-to-front support bracket. Remove dipstick and tube. Remove upper intake manifold bolts. Remove upper intake manifold and cover lower intake manifold to prevent foreign material from entering engine.

Installation (Caravan, PT Cruiser & Voyager - Upper Manifold)

1. Clean mating surfaces. Install NEW upper intake manifold gasket. Center outboard bolt is double sided. Tighten upper intake manifold fasteners starting at center and progressing outward in both directions. Repeat this procedure several times until all fasteners are at specification. See **TORQUE SPECIFICATIONS**.
2. Seal dipstick tube to cylinder block using MOPAR® Stud N' Bearing Mount Adhesive. Ensure manifold

spacer is in place when installing 2 top bolts at intake manifold-to-rear support bracket. To complete installation, reverse removal procedure. Tighten all fasteners to specification. See **TORQUE SPECIFICATIONS**.

Removal (Caravan, PT Cruiser & Voyager - Lower Manifold)

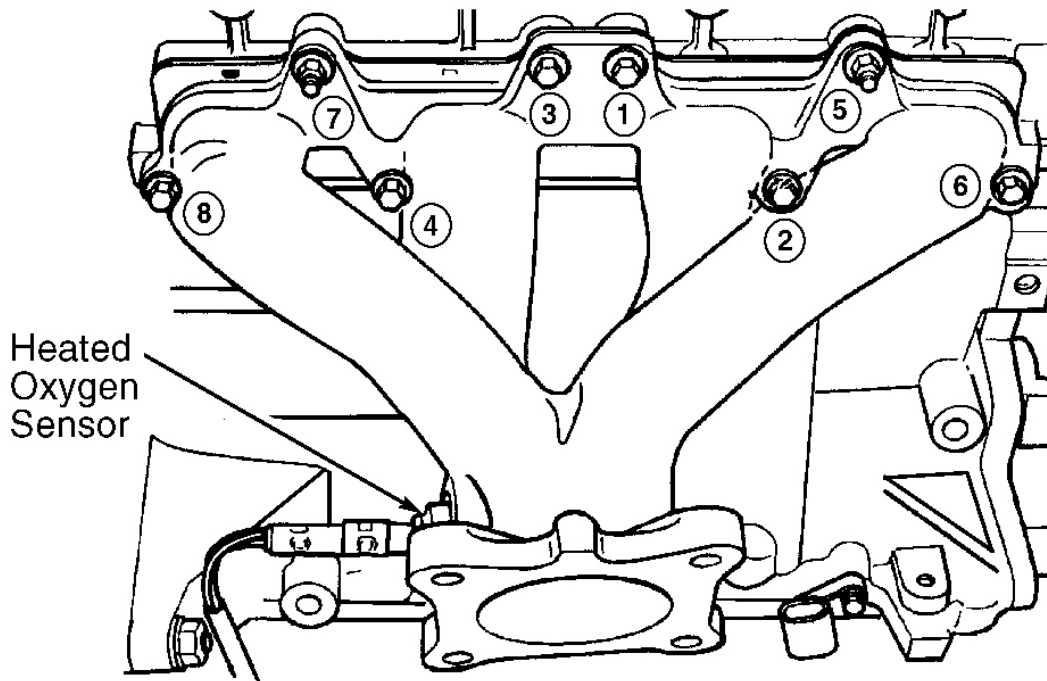
1. Release fuel pressure. See **FUEL PRESSURE RELEASE**. Disconnect negative battery cable. Remove upper intake manifold. Disconnect Inlet Air Temperature (IAT) sensor. Disconnect fuel supply line quick-connect at fuel tube assembly.
2. Drain cooling system. Remove heater, and upper radiator hoses at intake manifold. Disconnect coolant temperature sensor. Remove accessory drive belt. Remove generator bracket-to-cylinder head and block bolts.
3. Remove lower intake manifold center support bracket ("Y" bracket) bolts. Disconnect fuel injector harness. Remove lower intake manifold nuts and lower intake manifold. Clean and inspect lower intake manifold.

Installation (Caravan, PT Cruiser & Voyager - Lower Manifold)

To install, reverse removal procedure. Use NEW gaskets and tighten all fasteners in sequence to specification. See **Fig. 3**. See **TORQUE SPECIFICATIONS**.

EXHAUST MANIFOLD**Removal & Installation**

Remove exhaust pipe from manifold, (it may be necessary to remove entire exhaust system). Remove exhaust manifold heat shield. Remove O2 sensor. Remove exhaust manifold bolts and remove manifold. To install, reverse removal procedure. See **Fig. 4**. See **TORQUE SPECIFICATIONS**.



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Fig. 4: Removing & Installing Exhaust Manifold
Courtesy of CHRYSLER CORP.

CYLINDER HEAD

Removal

CAUTION: A production change introduced a new Multi-Layer Steel (MLS) head gasket. See **TECHNICAL SERVICE BULLETIN 09-05-98**, dated November 6, 1998.

1. Release fuel pressure. See **FUEL PRESSURE RELEASE**. Disconnect negative battery cable. Drain cooling system. Remove air cleaner, and disconnect all vacuum lines, electrical wiring and fuel lines from throttle body. Remove throttle linkage. Remove accessory drive belts. Remove power brake vacuum hose from intake manifold.
2. Raise vehicle and remove exhaust pipe from manifold. Remove P/S pump assembly, and lay aside. Disconnect coil pack wiring connector and remove coil pack and bracket from engine. Remove wiring connectors for cam sensor and fuel injectors. Remove timing belt and camshaft sprockets. See **TIMING BELT**. Remove cam cover. Remove cylinder head bolts. Remove cylinder head.

Inspection

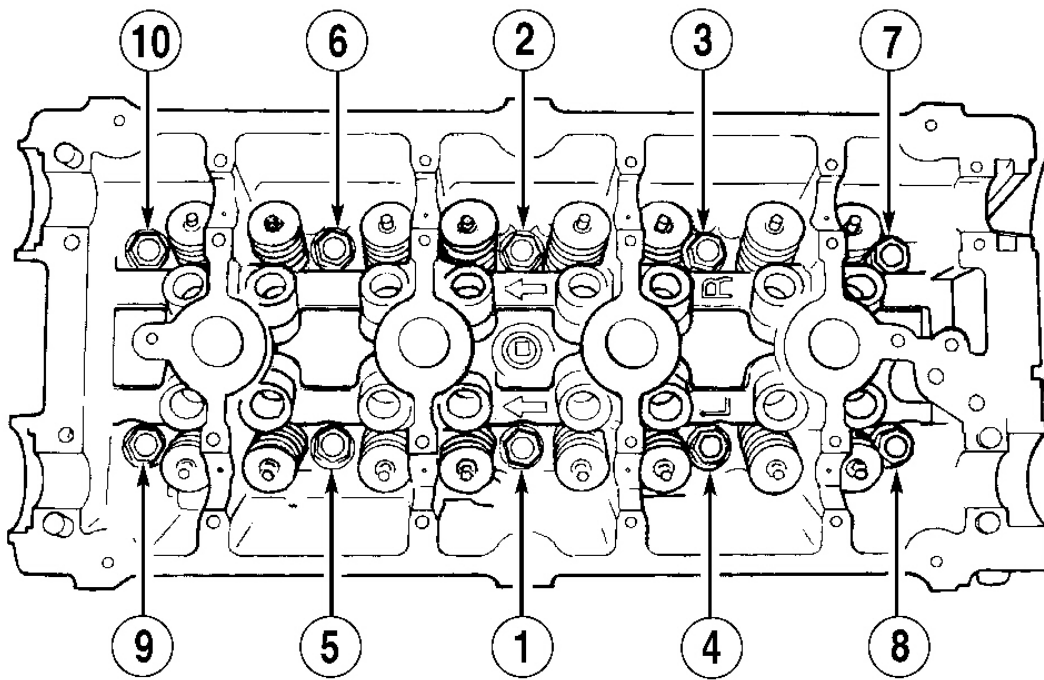
Remove all gasket material from head and block without scratching sealing surface. Inspect camshaft bearing journals for scoring. Ensure head flatness is within .004" (0.1 mm).

Installation

To install, reverse removal procedure. Clean and oil bolt threads before installation. Tighten head bolts in sequence using 4-step method. See **Fig. 5**.

- 1st: Tighten to 25 ft. lbs. (34 N.m).
- 2nd: Tighten to 50 ft. lbs. (68 N.m).
- 3rd: (Repeat Step 2) Tighten to 50 ft. lbs. (68 N.m).
- 4th: Tighten an additional 1/4 turn. (DO NOT use a torque wrench for 4th step).

CAUTION: Examine cylinder head bolts be examined before reuse. If bolt threads are necked down (threads do not contact a straightedge held next to bolt) discard and use NEW head bolts.



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Fig. 5: Cylinder Head Tightening Sequence
Courtesy of CHRYSLER CORP.

FRONT COVER OIL SEAL

Removal

Remove timing belt. See **TIMING BELT**. Using Sprocket Puller (6793) and Puller Insert (C4685), remove crankshaft sprocket. Using Seal Puller (6771), remove front oil seal. Ensure front cover remains undamaged.

CAUTION: DO NOT damage seal surface of shaft or seal bore.

Installation

Using Seal Installer (6780), install new seal until flush with cover. Using Sprocket Installer (6792), install crankshaft sprocket. To complete installation, reverse removal procedure.

TIMING BELT

For 2000 models, refer to **TIMING BELT REPLACEMENT - 2.4L - VIN B** or **TIMING BELT REPLACEMENT - 2.4L - VIN X** article under ENGINE. For 2001 models, refer to **TIMING BELT REPLACEMENT - 2.4L - DOHC, VINs B & S**, **TIMING BELT REPLACEMENT - 2.4L - VIN G - COUPE** or **TIMING BELT REPLACEMENT - 2.4L - VINS B & X** article under ENGINES.

CAM FOLLOWER & VALVE LASH ADJUSTER

Removal & Installation

1. Remove cam cover. See **CAMSHAFT**. Remove timing belt, sprockets and covers. See **TIMING BELT**. Remove camshaft(s). See **CAMSHAFT**. Remove cam follower assemblies from cylinder head. Keep cam followers and lash adjusters in order for reassembly in original positions. Inspect followers for wear or damage. Replace as necessary. Lash adjusters are serviced as an assembly and cannot be rebuilt.
2. Check dry lash (amount of clearance between base circle of cam and rocker arm roller when adjuster is drained of oil and completely collapsed). Dry lash should be .046" (1.17 mm) for intake, and .050" (1.28 mm) for exhaust. After performing dry lash check, refill adjuster with oil and allow 10 minutes for adjuster(s) to bleed down before rotating cam.
3. To install, reverse removal procedure. Lubricate cam follower and lash adjuster with clean oil. When installing lash adjusters, ensure they are at least partially full of oil. This is indicated by little or no plunger travel when adjuster is depressed.

CAMSHAFT

Removal

Remove ignition coil pack. Remove cam cover bolts. Remove cam cover and ground strap. Remove timing belt, sprockets and covers. See **TIMING BELT**. Remove camshaft bearing caps in sequence, one cam at a time. See **Fig. 7**. Remove outside bearing caps first. See **Fig. 6**. Camshafts are not interchangeable. Identify for installation.

Inspection

1. Inspect camshaft bearing journals for damage and binding. If journals are binding, check cylinder head bearing surface for damage, and camshaft bearing oil feed holes in cylinder head for clogging.
2. Check cam surface for abnormal wear and damage. Replace if defective. A visible worn groove in roller path or on cam lobes is cause for replacement. Lubricate camshaft journals with fresh oil and install camshaft without cam follower assemblies. Install rear cam caps and tighten bolts to specification.
3. Install a dial indicator with its probe in-line with camshaft and against camshaft nose. Move camshaft as far as it will go in one direction, and zero indicator. Move camshaft as far in opposite direction as it will go, and read indicator. Acceptable end play is .002-.006" (.05-.17 mm).

Installation

1. Lubricate bearing journal and cam followers with clean oil and install camshafts. Install right and left camshaft bearing caps No. 2-5 and right cap No. 6. Tighten 6-mm bearing cap bolts to 106 INCH lbs. (12 N.m) in sequence. See **Fig. 8**.
2. Apply Mopar Gasket Maker to bearing caps No. 1 and 6. See **Fig. 9**. Install bearing caps and tighten 8-mm bolts to 215 INCH lbs. (24 N.m). Install bearing caps before installing seals. To complete installation, reverse removal procedure.

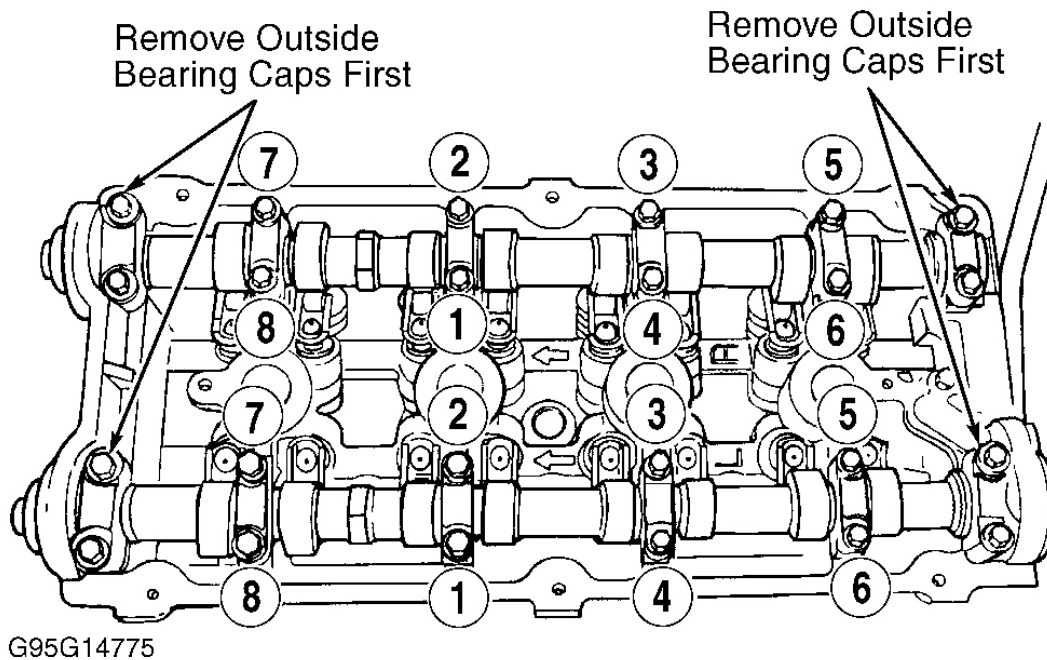
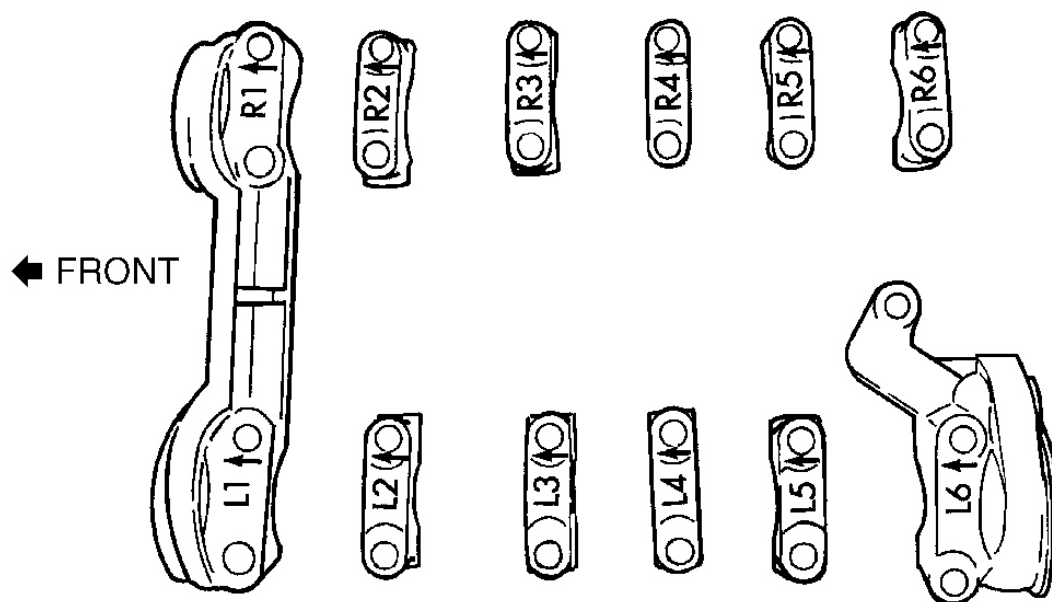
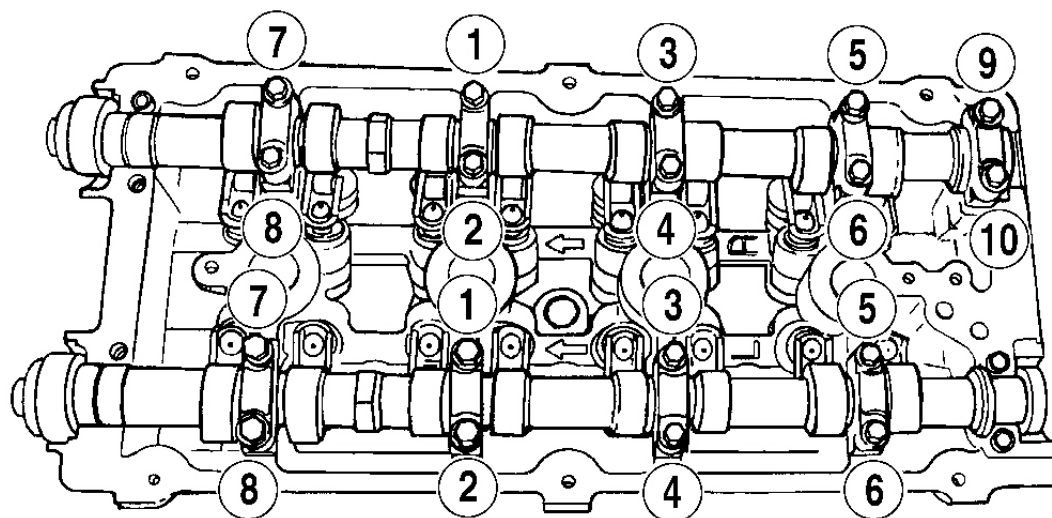


Fig. 6: Removing Camshaft Bearing Caps
Courtesy of CHRYSLER CORP.



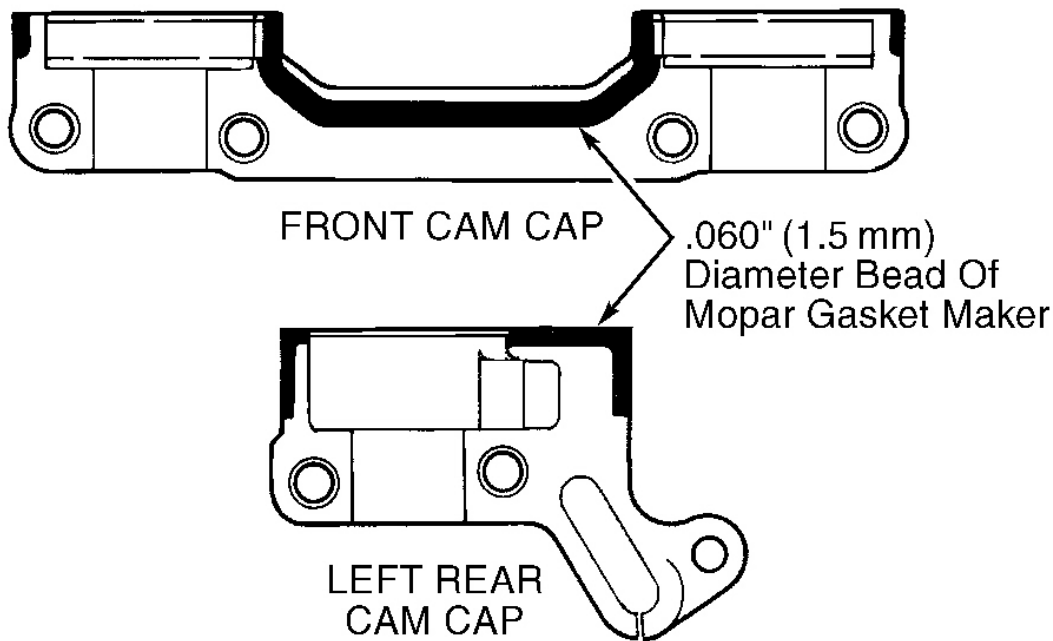
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Fig. 7: Identifying Camshaft Bearing Caps
Courtesy of CHRYSLER CORP.



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Fig. 8: Installing Camshaft Bearing Caps
Courtesy of CHRYSLER CORP.



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Fig. 9: Sealing Cam Bearing Caps
Courtesy of CHRYSLER CORP.

BALANCE SHAFTS

Removal

1. Remove timing belt. See **TIMING BELT**. Remove oil pump. See **OIL PUMP** under ENGINE OILING. Remove rear timing belt cover. Remove oil pan. Remove balance shaft chain cover, chain guide and tensioner. Remove balance shaft gear and chain sprocket retaining screws. Using wide pry bars, remove chain and sprocket assembly.
2. Remove front balance shaft cover and balance shaft gears. Remove rear balance shaft cover and balance shafts. Remove 4 carrier-to-crankcase bolts, and separate balance shaft carrier from engine. Check bearing surfaces and gears for scuffing and wear. Replace as necessary.

Installation

1. To install, reverse removal procedure. Ensure crankshaft-to-balance shaft timing is established. With balance shafts installed in carrier, position carrier on crankcase and install 4 attaching bolts. Tighten attaching bolts to 40 ft. lbs. (54 N.m).
2. Turn balance shafts until both shaft keyways are up. Install short hub (drive) gear on right balance shaft. Install long hub (driven) gear on left balance shaft. Ensure keyways are up and gear alignment dots are meshed after installation. See **Fig. 10**.
3. Install gear cover, and tighten double-ended stud/washer to 105 INCH lbs. (12 N.m). Using Installer

- (6052), install crankshaft sprocket. Turn crankshaft until No. 1 cylinder is at TDC. Timing marks on chain sprocket should align with parting line on left side of No. 1 main bearing cap. See **Fig. 11**.
4. Place chain over crankshaft sprocket so nickel plated link of chain is over No. 1 cylinder timing mark on crankshaft sprocket. See **Fig. 11**. Place balance shaft sprocket into timing chain so timing mark (Yellow dot) mates with lower nickel plated link on chain. See **Fig. 12**.
 5. With balance shaft keyways pointed at 12 o'clock, slide balance shaft sprocket onto nose of balance shaft. Balance shaft may need to be pushed in slightly to provide clearance.

NOTE: Timing mark on sprocket, lower nickel plated link, and arrow on side of gear cover should align when balance shafts are timed correctly.

6. If sprockets are correctly timed, install balance shaft bolts and tighten to 21 ft. lbs. (28 N.m). Place a wood block between crankcase and crankshaft counterbalance to prevent crankshaft and gear rotation.
7. Install chain tensioner loosely. Position guide on double-ended stud, ensuring tab on guide fits into slot on gear cover. Install and tighten nut/washer assembly to 105 INCH lbs. (12 N.m).
8. Place a .039" (1 mm) thick by 2.75" (70 mm) long shim between tensioner and chain. See **Fig. 13**. Apply firm pressure of 5.5-6.6 lbs. (2.5-3.0 kg) against tensioner directly behind adjustment slot. With load applied, tighten top tensioner bolt and then bottom bolt to 105 INCH lbs. (12 N.m). Remove shim stock. Install balance shaft carrier covers and tighten screws to 105 INCH lbs. (12 N.m). To complete installation, reverse removal procedure.

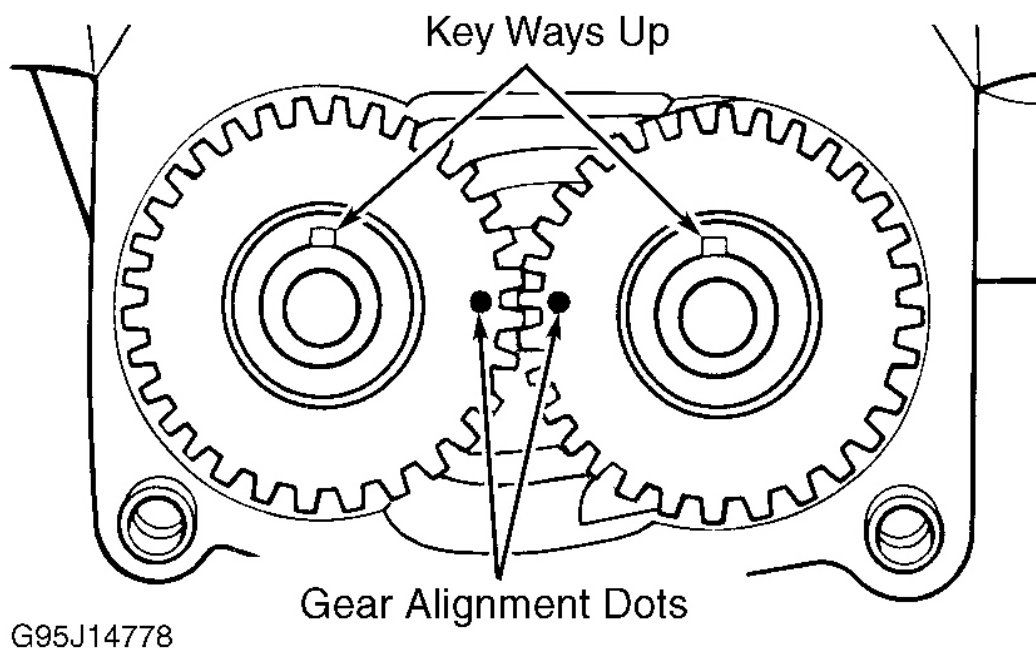
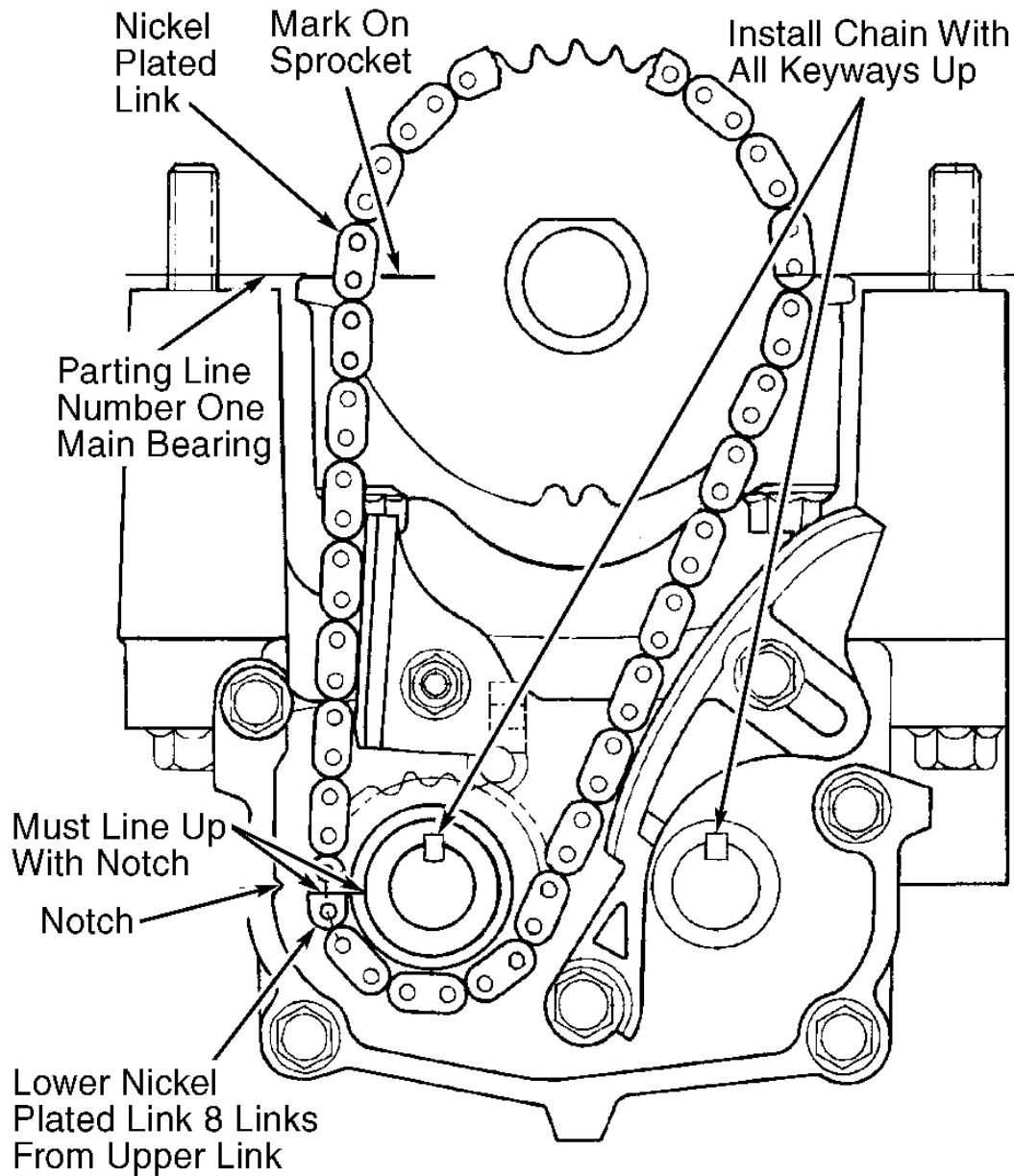


Fig. 10: Timing Balance Shaft Gears
Courtesy of CHRYSLER CORP.



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Fig. 11: Timing Crankshaft To Balance Shafts
Courtesy of CHRYSLER CORP.

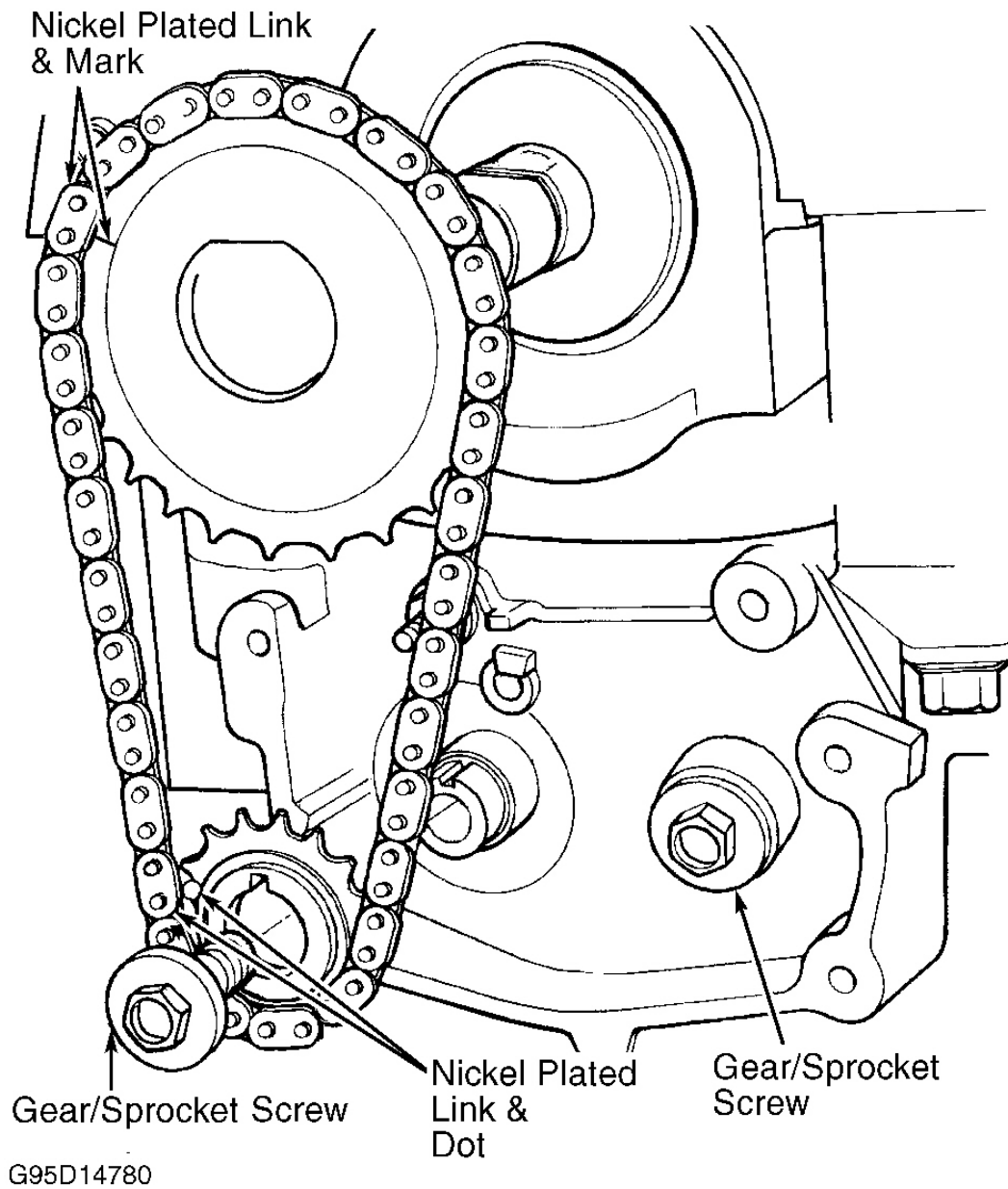
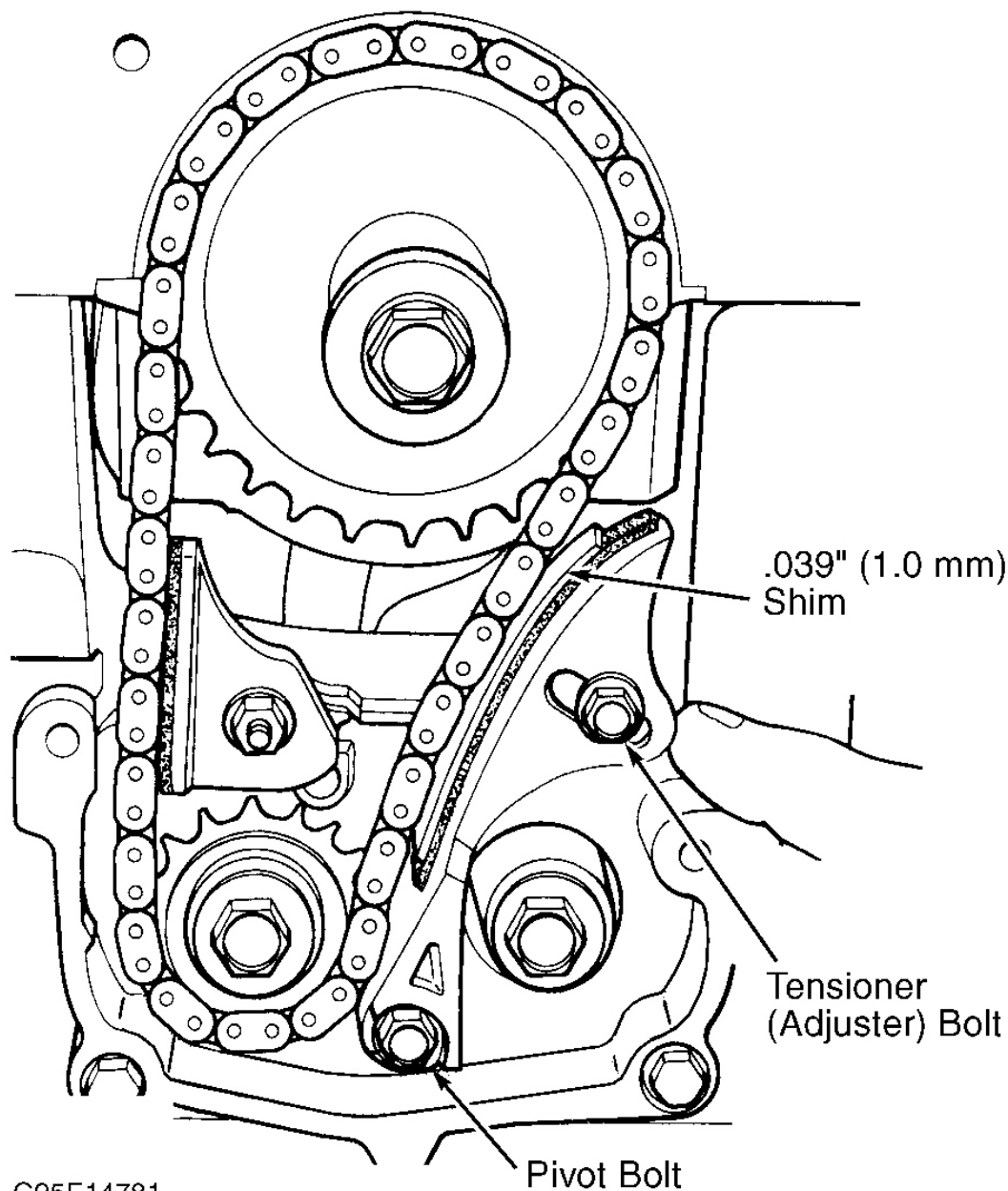


Fig. 12: Identifying Timing Marks
Courtesy of CHRYSLER CORP.



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Fig. 13: Adjusting Balance Shaft Drive Chain
Courtesy of CHRYSLER CORP.

CRANKSHAFT REAR OIL SEAL

Removal & Installation

1. Remove engine from vehicle. See **ENGINE**. Remove transaxle from engine. Remove clutch and drive

plate from crankshaft. Remove transaxle upper cover. Using a screwdriver, carefully pry out rear seal. DO NOT nick or damage crankshaft flange seal surface or retainer bore.

2. Polish shaft seal lip surface with 400 grit paper, if necessary, to eliminate varnish, dirt or nicks. Place seal, with self contained installation sleeve, on crankshaft journal. Using a plastic hammer, lightly tap new seal into place until seal is flush with cylinder block surface. To install, reverse removal procedure.

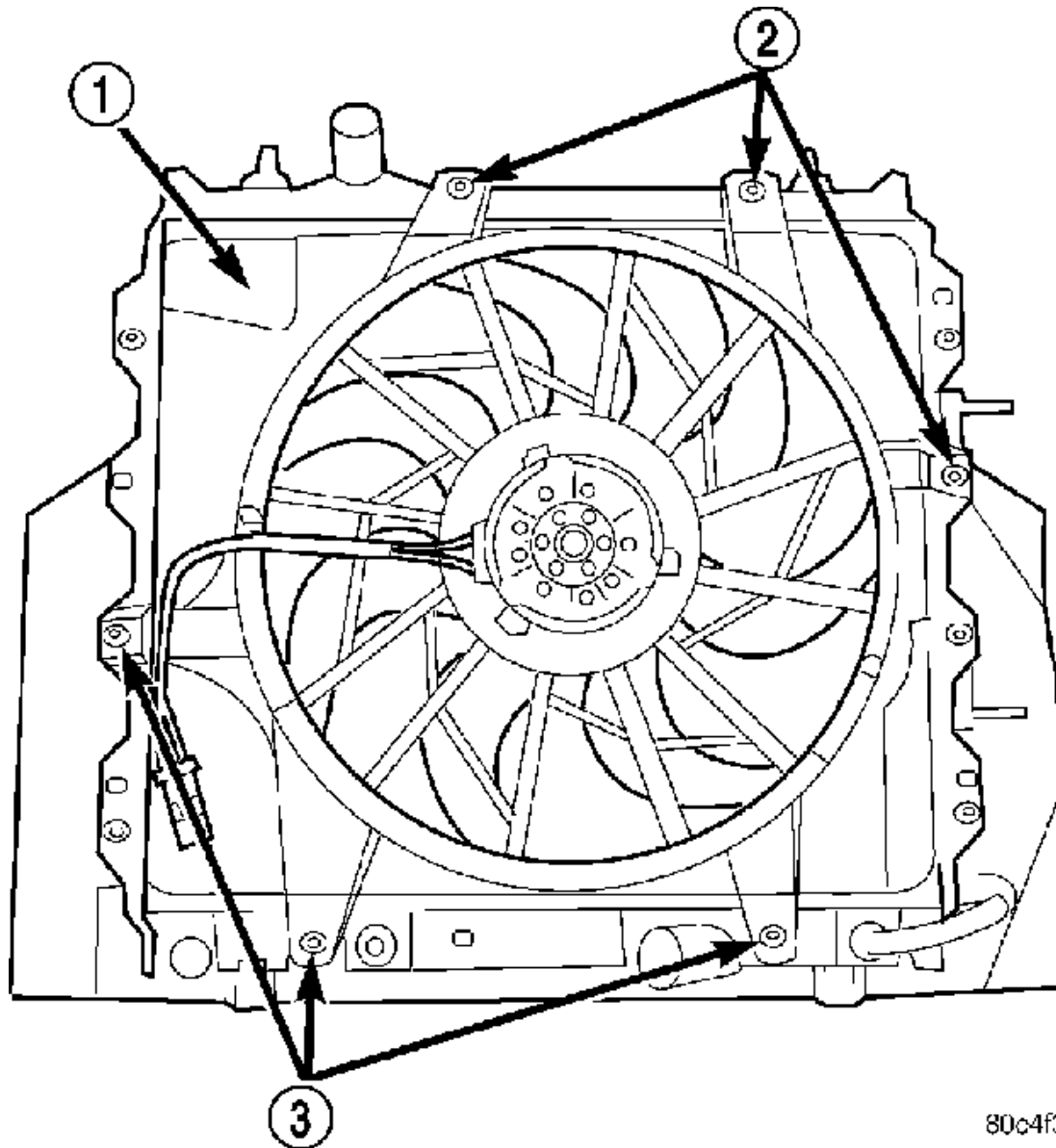
RADIATOR FAN

REMOVAL

NOTE: The fan motor, fan, and the shroud are serviced as an assembly.

WARNING: DO NOT OPEN THE RADIATOR DRAINCOCK WITH THE SYSTEM HOT AND UNDER PRESSURE BECAUSE SERIOUS BURNS FROM COOLANT CAN OCCUR.

1. Disconnect negative cable from battery.
2. Remove battery and battery tray attaching screws. Move tray rearward for radiator fan clearance.
3. Drain cooling system below upper radiator hose level.
4. Remove grill.
5. Remove upper radiator support crossmember.
6. Remove upper radiator hose from radiator.
7. Hoist vehicle.
8. Disconnect radiator fan electrical connector.
9. Remove the two lower and left side radiator fan screws (3). See **Fig. 14**.



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Fig. 14: Locating Radiator Fan Screws

Courtesy of CHRYSLER LLC

10. Lower vehicle and remove the remaining attaching screws (2). See **Fig. 14**.

CAUTION: Care should be taken not to damage the radiator cooling fins and tubes during fan removal.

11. Remove radiator fan by lifting up from the engine compartment.

INSTALLATION

1. Install the radiator fan into position on the radiator.

2. Install the upper and right side radiator fan retaining screws and tighten to 6 N.m (55 in. lbs.).
3. Raise vehicle and install the remaining fan attaching screws. Tighten to 6 N.m (55 in. lbs.).
4. Connect radiator fan electrical connector.
5. Lower vehicle and install the upper radiator hose to radiator. Align hose and position clamp so it will not interfere with the engine or the hood.
6. Install upper radiator support crossmember and grill.
7. Install battery tray and battery.
8. Connect cables to battery.
9. Fill cooling system.

THERMOSTAT

Removal

1. Remove upper intake manifold. See **INTAKE MANIFOLD**.
2. Drain cooling system.
3. Remove upper radiator hose from outlet connector.
4. Remove coolant recovery system hose from outlet connector.
5. Remove thermostat/coolant outlet connector bolts.
6. Remove thermostat assembly.

Installation

1. Clean sealing surface. Place thermostat into coolant outlet connector, aligning air bleed with the location notch on outlet connector.
2. Install coolant outlet connector with thermostat onto thermostat housing. Tighten bolts to specification.
3. Install upper radiator hose.
4. Connect coolant recovery system hose.
5. Install upper intake manifold. See **INTAKE MANIFOLD**.
6. Fill cooling system.

WATER PUMP

Removal

1. Raise vehicle on hoist. Remove right inner splash shield. Remove accessory drive belts and P/S pump. Drain cooling system. Support engine from bottom, and remove right engine support. Remove P/S pump bracket bolts, and set pump and bracket assembly aside (P/S lines need not be disconnected).
2. Remove right engine mount bracket. Remove timing belt. See **TIMING BELT**. Remove inner timing belt cover. Remove water pump-to-engine attaching screws. Remove water pump.

Inspection

Inspect water pump and replace if one or more of the following defects exist:

- Cracks or damage on body.
- Coolant leaks from shaft seal weep hole (evident by coolant traces on pump body).
- Loose or rough bearing.
- Impeller rubs either pump body or engine block.
- Impeller loose or damaged.
- Sprocket or sprocket flange loose or damaged.

Installation

Install NEW "O" ring in water pump body "O" ring groove. Assemble pump body to block and tighten to 106 INCH lbs. (12 N.m). Pressurize cooling system to 15 psi (1.05 kg/cm²) and check pump shaft seal and "O" ring for leaks. Rotate pump by hand to ensure freedom of movement. To complete installation, reverse removal procedure.

OIL PAN

Removal (Except PT Cruiser)

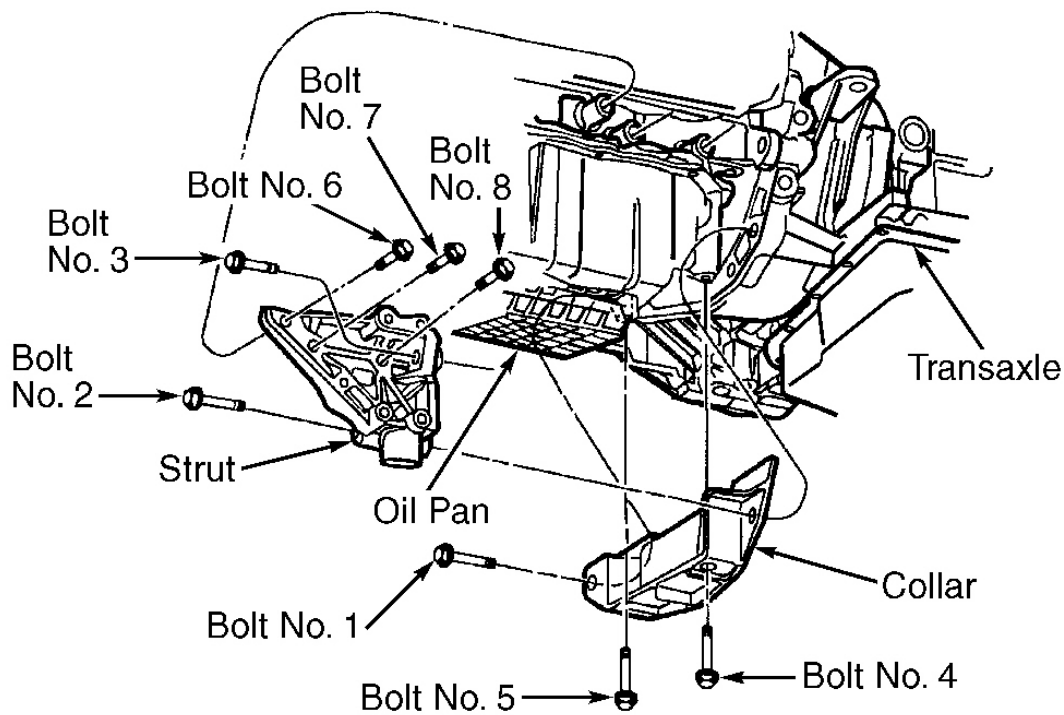
Drain engine oil. Where necessary, remove front engine torque bracket from bending strut and insulator mount. See **Fig. 15**. Remove bolts from structural collar and bending strut. Remove bending strut and structural collar. Remove oil pan. Clean oil pan and engine gasket surfaces.

Removal (PT Cruiser)

Drain engine oil. Remove oil filter. Remove right inner splash shield. Remove structural collar. Remove lower torque strut. Remove oil filter adapter and gasket. Remove oil pan and gasket.

Installation

1. Apply silicone rubber adhesive to engine block parting line. See **Fig. 16**. On PT Cruiser, install oil filter adapter and adapter gasket. On all vehicles, install oil pan gasket to block. Install pan and tighten bolts to 106 INCH lbs. (12 N.m). Where applicable, perform steps in illustration. See **Fig. 15**. Install structural collar and bolt No. 1 (DO NOT tighten).
2. Hand tighten Bolt No. 4. Install bending strut and install (DO NOT tighten) bolt No. 3 into upper transaxle hole. Install (DO NOT tighten) bolt No. 2 through bending strut and structural collar. Hand tighten bending strut-to-cylinder block bolt No. 6. Hand tighten structural collar-to-oil pan bolt No .5.
3. Tighten bolts No. 1-3 to specification. See **TORQUE SPECIFICATIONS**. Install bolts No. 7 and 8 through bending strut and into cylinder block. Tighten bolts No. 4-8 to specification. Install front torque bracket. Tighten torque bracket-to-bending strut bolts to specification. Tighten front engine mount through-bolt to specification. Fill engine oil. To complete installation, reverse removal procedure.



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Fig. 15: Installing Structural Collar & Bending Strut
Courtesy of CHRYSLER CORP.

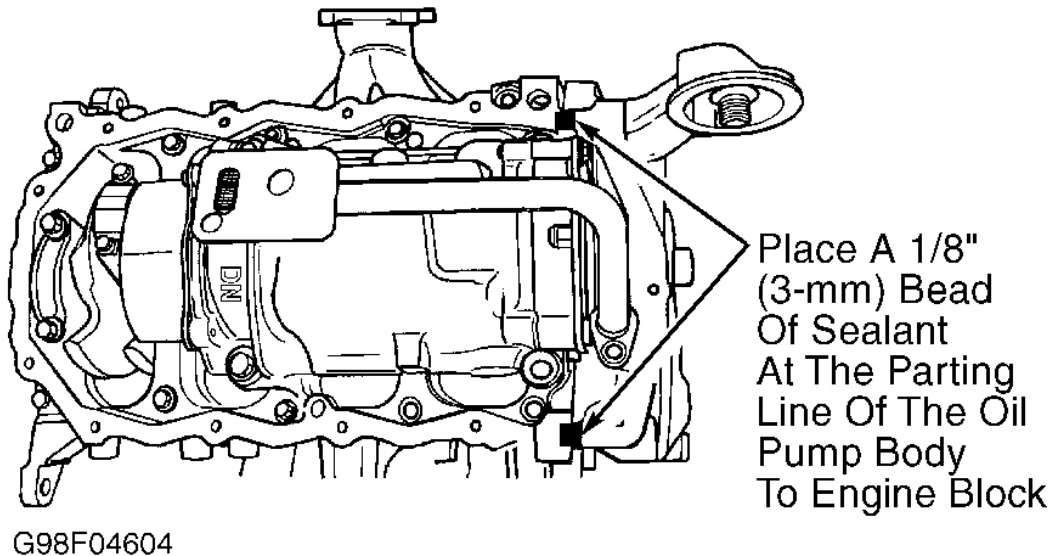


Fig. 16: Applying Silicone Rubber Adhesive To Engine Block Parting Line
Courtesy of CHRYSLER CORP.

OVERHAUL

CYLINDER HEAD

Cylinder Head

1. Inspect cylinder head for cracks and warpage. Repair or replace head if warpage exceeds specification. See **CYLINDER HEAD** table under ENGINE SPECIFICATIONS. After grinding valves or valve seats, install valve into cylinder head and measure distance from spring seat of cylinder head to tip of valve.
2. Distance should be 1.889" (47.99 mm) for exhaust, and 1.891" (48.04 mm) for intake. Grind valve tip and re chamfer if necessary.

Valve Springs

Measure valve spring free length, out-of-square and spring pressure. Measure installed height from valve spring lower edge to upper edge. DO NOT include spring seat or retainer flange. Replace valve spring if not within specification. See **VALVES & VALVE SPRINGS** table under ENGINE SPECIFICATIONS.

Valve Stem Oil Seals

Ensure oversize valve stem seals are used when oversize valves are installed. Ensure oil seal lower edge is against valve guide after installation.

Valve Guides

1. Check valve stem oil clearance. Ensure valve stem diameter is within specification. See **VALVES & VALVE SPRINGS** table under ENGINE SPECIFICATIONS. Ream valve guide for valve with oversize valve stem if clearance exceeds specification. See **CYLINDER HEAD** table under ENGINE SPECIFICATIONS.

NOTE: **DO NOT ream valve guides from standard to maximum in one step. Ream guides to oversize in gradual steps, so guides are reamed true in relation to valve seat.**

2. Valves are available with .006" (.15 mm), .016" (.40 mm) and .031" (.80 mm) oversize valve stems. Replace guides if they cannot be repaired using a .031" (.80 mm) oversize reamer.

Valve Seat

If valve face and/or valve seats have been ground, measure valve tip-to-valve spring seat dimension. Grind valve tip (if necessary) to give a an installed height of 1.889" (47.99 mm) for exhaust valves or 1.891" (48.04 mm) for intake valves when measured from spring seat.

Valves

After grinding valves, inspect remaining margin. Intake valves with less than .047" (1.2 mm) margin and exhaust valves with less than .035" (0.9 mm) margin should be replaced.

Valve Seat Correction Angles

If seat width is too wide after grinding, use a 15-degree or 65-degree stone to alter seat width. A 15-degree stone will lower valve seat, and a 65-degree stone will raise valve seat. For valve seat width, see **CYLINDER HEAD** table under ENGINE SPECIFICATIONS.

CYLINDER BLOCK ASSEMBLY

Piston & Rod Assembly

Install piston with notch or arrow on top of piston toward timing belt end of engine. Note direction of connecting rod installation on piston before removing. Install connecting rod in original direction. Other information for connecting rod-to-piston installation is not available from manufacturer.

Fitting Pistons

1. To determine if piston-to-cylinder clearance is within specification, measure piston skirt diameter .551" (14.0 mm) from bottom of piston skirt, at 90-degree angle to piston pin. Ensure piston diameter is within specification. See **PISTONS, PINS & RINGS** table under ENGINE SPECIFICATIONS.
2. Measure cylinder bore .394" (10.0 mm) below top of cylinder bore, at middle of bore and .394 " (10.0 mm) from bottom of cylinder bore.

Piston Rings

Ensure ring end gap and side clearance are within specification. See **PISTONS, PINS & RINGS** table under ENGINE SPECIFICATIONS. Position ring gaps in proper locations before installing pistons. See **Fig. 17**. Install piston rings with manufacturer's ID marks facing up. See **Fig. 18**.

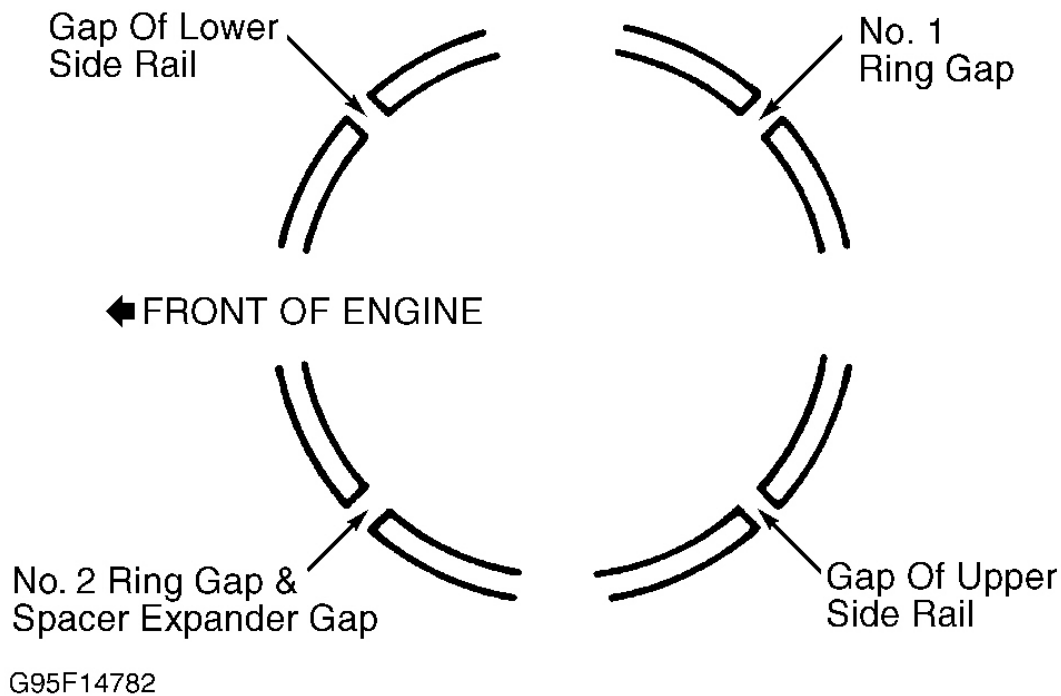
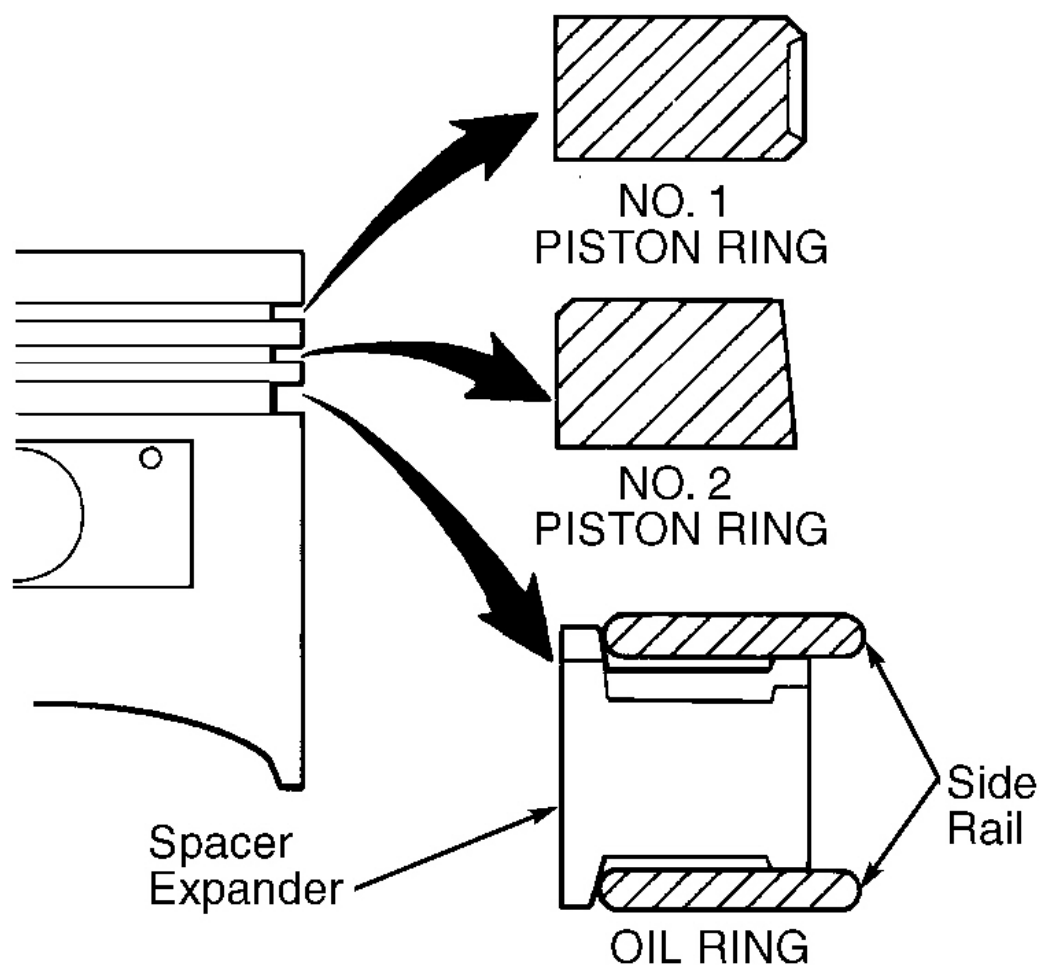


Fig. 17: Positioning Piston Ring Gaps
Courtesy of CHRYSLER CORP.



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Fig. 18: Identifying Piston Ring Installed Position
Courtesy of CHRYSLER CORP.

Rod Bearings

Note direction of connecting rod and cap installation before removal. Install connecting rod in original direction.

Crankshaft & Main Bearings

1. Ensure crankshaft end play is within specification. See **CRANKSHAFT, MAIN & CONNECTING ROD BEARINGS** table under ENGINE SPECIFICATIONS. Install main bearing shells with oil holes aligned with oil holes in block and tabs seated in block tab slots.

CAUTION: DO NOT allow oil on bedplate mating surface. Oil will adversely effect ability of sealer to seal bedplate to cylinder block.

2. Using fresh, clean oil, lubricate bearings and crankshaft journals and install crankshaft. Apply .059-.078" (1.5-2 mm) bead of anaerobic sealer to cylinder block. See **Fig. 19**.

CAUTION: Use only Anaerobic Sealer (4773257) on bedplate or damage to engine may occur.

3. Install lower main bearings into main bearing cap/bedplate. Ensure bearing tabs are seated into bedplate slots. Install main bearing cap/bedplate onto engine. Clean and oil main bearing bolts before installation. Install main bearing bolts No. 11, 17 and 20 finger tight. Tighten these bolts together until bedplate uniformly contacts cylinder block. Tighten bolts No. 11, 17 and 20 to 20 ft. lbs. (27 N.m). See **Fig. 20**.
4. Install main bearing bolts No. 1-10 and tighten in sequence to 30 ft. lbs. (41 N.m). See **Fig. 20**. Install main bearing bolts No. 11-20 and tighten in sequence to 20 ft. lbs. (28 N.m). See **Fig. 20**. After main bearing bedplate is installed, check crankshaft turning torque. Turning torque should not exceed 50 INCH lbs. (5.6 N.m).

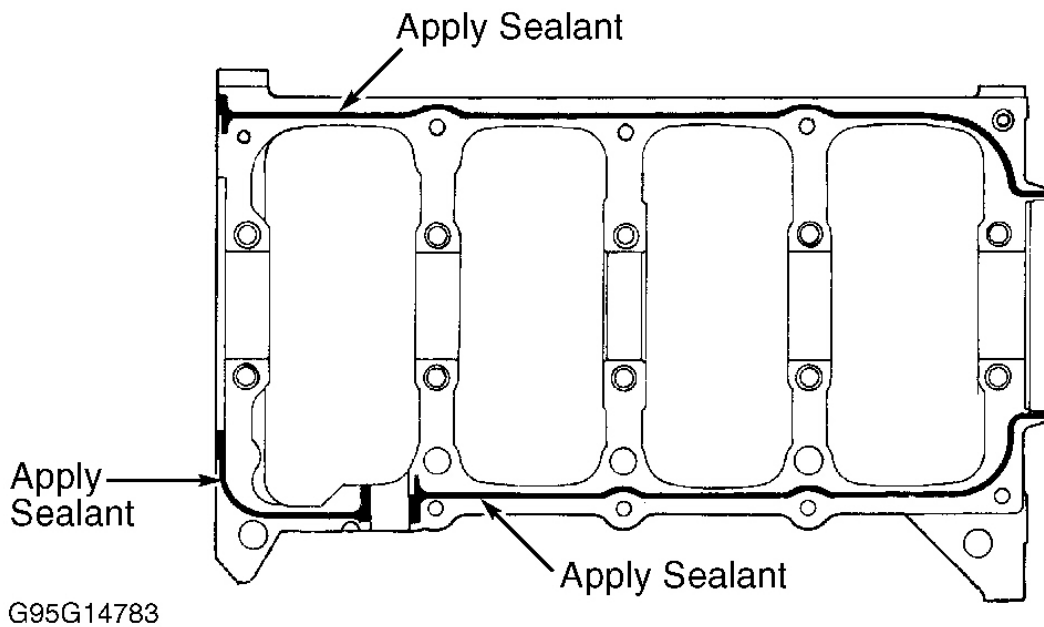
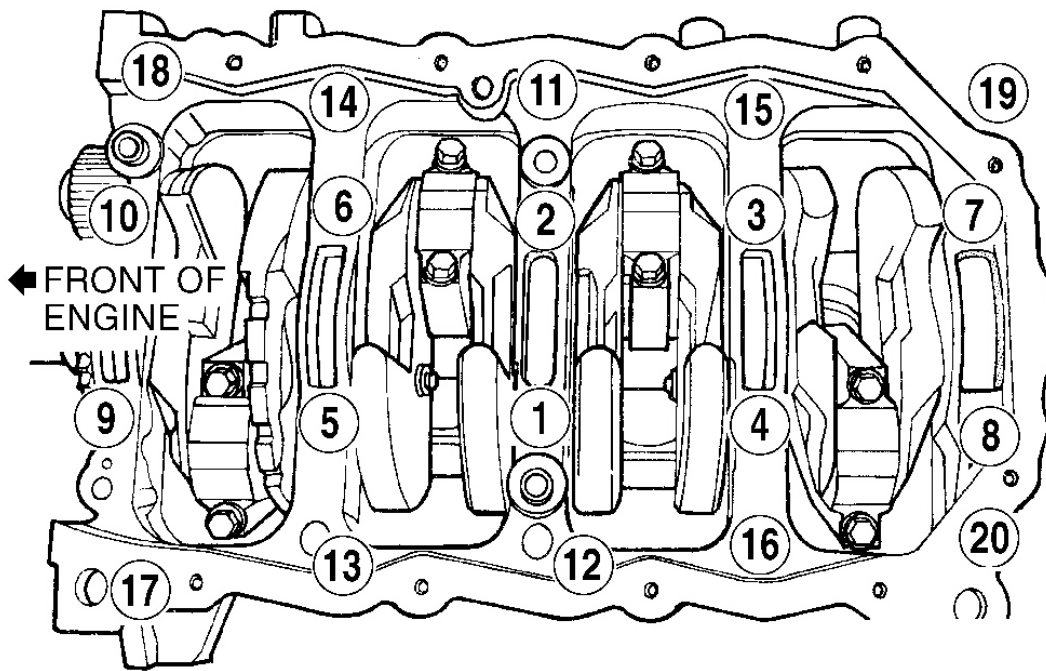


Fig. 19: Applying Sealant
Courtesy of CHRYSLER CORP.



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Fig. 20: Installing Main Bearing Bolts
 Courtesy of CHRYSLER CORP.

Cylinder Block

Measure cylinder bore .394" (10.0 mm) below top of cylinder bore, at middle of bore and .394" (10.0 mm) from bottom of cylinder bore. Check cylinder block deck surface warpage. Resurface cylinder block if warpage exceeds specification. See **CYLINDER BLOCK** table under ENGINE SPECIFICATIONS. DO NOT grind more than .008" (.20 mm) total from surface of cylinder head and deck surface of cylinder block.

ENGINE OILING

ENGINE LUBRICATION SYSTEM

System is a full-flow, filtered, pressure-fed type oil system. Oil pump is mounted in front engine cover and is driven by crankshaft. Pressurized oil is routed through main oil gallery, running length of the cylinder block, supplying main and rod bearings through secondary passages. Pistons are lubricated from slots in connecting rod assemblies and from rod bearing throw off. Camshaft and valve mechanisms are lubricated from a full length oil gallery supplied via crankcase main gallery.

Crankcase Capacity

Oil capacity is 4.5 qts. (4.25L) with filter.

Oil Pressure

Oil pressure is 4 psi (.28 kg/cm²) at curb idle, and 25-80 psi (1.75-5.62 kg/cm²) at 3000 RPM.

OIL PUMP**Removal & Disassembly**

1. Remove timing belt. See **TIMING BELT** under REMOVAL & INSTALLATION. On PT Cruiser, remove timing belt rear cover. On all vehicles, remove oil pan. See **OIL PAN** under REMOVAL & INSTALLATION. On PT Cruiser, remove crankshaft sprocket using Sprocket Puller (6793) and Puller Insert (C4685). On all vehicles, remove oil pump bolts and oil pump.
2. Remove relief valve threaded plug, gasket, spring and valve. See **Fig. 21**. Remove oil pump cover screws, and lift off cover.
3. Remove pump rotors. Wash all parts in solvent and inspect for wear or damage. See **OIL PUMP SPECIFICATIONS** table.

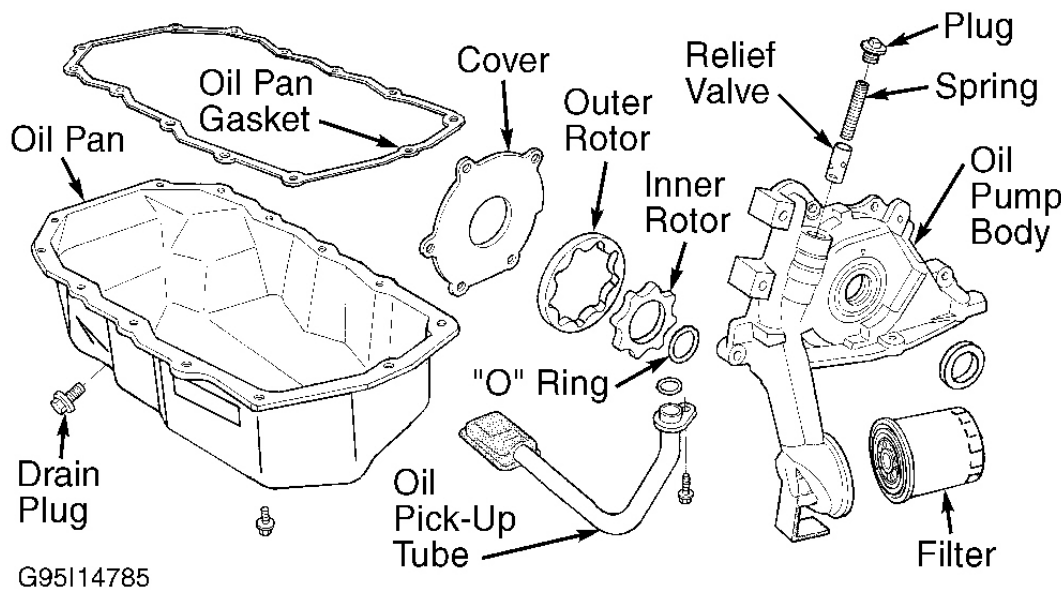


Fig. 21: Exploded View Of Oil Pump
Courtesy of CHRYSLER CORP.

OIL PUMP SPECIFICATIONS

Application	In. (mm)
Gear Side Clearance	
Drive Gear	.004 (.10)
Driven Gear	.004 (.10)

2000 Chrysler Cirrus LX

2000-01 ENGINES 2.4L DOHC 4-Cylinder

Gear-To-Front Cover Clearance

Drive & Driven Gear	.001 (.025)
Inner Rotor Thickness (Minimum)	.370 (9.40)
Outer Rotor	
Clearance (Maximum)	.015 (.39)
Diameter (Minimum)	3.148 (79.95)
Thickness (Minimum)	.370 (9.40)
Tip Clearance (Maximum)	.008 (.20)
Oil Pressure	
At Curb Idle	4 psi (.28 kg/cm ²)
At 3000 RPM	25-80 psi (1.75-5.62 kg/cm ²)

NOTE: Install inner rotor with chamfer facing cast iron oil pump cover.

Reassembly & Installation

1. Using NEW parts as required, assemble pump. Install cover and tighten screws to specification. See **TORQUE SPECIFICATIONS**. Install relief valve, spring, gasket and threaded plug. See **Fig. 21**. Tighten plug to specification.
2. Prime pump by filling rotor cavity with clean engine oil. Install "O" ring into counterbore on oil pump discharge passage. Apply Mopar Gasket Maker to oil pump mating surface.
3. Install oil pump slowly onto crankshaft until seated to engine block. Tighten bolts to specification. See **TORQUE SPECIFICATIONS**. To complete installation, reverse removal procedure.

TORQUE SPECIFICATIONS**TORQUE SPECIFICATIONS**

Application	Ft. Lbs. (N.m)
Camshaft Bearing Cap Bolt	(1)
Camshaft Sensor Pickup Bolts	20 (27)
Camshaft Sprocket Bolt	75 (102)
Connecting Rod Bolts ⁽²⁾	20 (27)
Crankshaft Damper Pulley Bolt	100 (136)
Crankshaft Main Bearing Cap/Bedplate ⁽³⁾	
M8 Bedplate Bolts	20 (27)
M11 Main Cap Bolts	30 (41)
Cylinder Head Bolts ⁽⁴⁾	
1st Step	25 (34)
2nd Step	50 (68)
3rd Step (Repeat Step 2)	50 (68)
4th Step ⁽⁵⁾	Tighten Additional 1/4 Turn

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2000-01 ENGINES 2.4L DOHC 4-Cylinder

Engine Support Bracket Bolts	45 (61)
Exhaust Manifold-To-Cylinder Head Bolts	17 (23)
Front Cover Bolts	15-16 (20-22)
Generator Idler Pulley Bolt	40 (54)
Intake Manifold Nuts/Bolts	
Breeze, Cirrus, Sebring & Stratus	17 (23)
Caravan & Voyager	20 (27)
PT Cruiser (Upper & Lower)	(6)
Oil Filter-To-Engine Block Adapter Bolts	
Except PT Cruiser	41 (56)
PT Cruiser	(6)
Oil Filter	15 (20)
Oil Pan Drain Plug	20 (27)
Oil Pump Pick-Up Tube Screw	21 (28)
Oil Pump Relief Valve Retaining Plug	30 (41)
Spark Plugs	20 (27)
Tensioner Pulley Assembly	45 (61)
Thermostat Housing Bolts	
Except PT Cruiser	17 (23)
PT Cruiser	20 (27)
Timing Belt Tensioner Bolt	21 (28)
INCH Lbs. (N.m)	
Cam Cover Bolts	106 (12)
Exhaust Manifold Heat Shield	106 (12)
Oil Pan Bolts	106 (12)
Oil Pump Cover Screws	106 (12)
Thermostat Outlet Connector-To-Thermostat Housing	110 (12.5)
Timing Belt Cover Bolts	
M6 Outer Cover-To-Inner Cover	40 (4.5)
M6 Inner Cover-To-Head/Oil Pump	106 (12)
Water Pump-To-Engine Block	106 (12)

- (1) See **CAMSHAFT** under REMOVAL & INSTALLATION and tighten bolts as specified. See **Fig. 8**.
- (2) Tighten bolts to specification, then add 1/4 turn.
- (3) Tighten bolts to specification in sequence, then add 1/4 turn. See **Fig. 20**.
- (4) Tighten bolts to specification in sequence. See **Fig. 5**.
- (5) DO NOT use a torque wrench for fourth step.
- (6) Tighten to 105 INCH lbs. (12 Nm)

ENGINE SPECIFICATIONS

2000 Chrysler Cirrus LX

2000-01 ENGINES 2.4L DOHC 4-Cylinder

GENERAL SPECIFICATIONS**GENERAL SPECIFICATIONS**

Application	Specification
Displacement	148 Cu. In. (2.4L)
Bore	3.445" (87.5 mm)
Stroke	3.976" (101 mm)
Compression Ratio	9.4:1
Fuel System	SFI

CRANKSHAFT, MAIN BEARINGS & CONNECTING ROD BEARINGS SPECIFICATIONS**CRANKSHAFT, MAIN & CONNECTING ROD BEARINGS**

Application	In. (mm)
Crankshaft End Play	.0035-.0094 (.090-.240)
Main Bearings	
Journal Diameter	2.3610-2.3625 (59.992-60.008)
Journal Out-Of-Round	.0001 (.003)
Journal Taper	.0001 (.003)
Oil Clearance	.0007-.0023 (.018-.058)
Connecting Rod Bearings	
Journal Diameter	1.967-1.969 (49.984-50.000)
Journal Out-Of-Round	.0001 (.003)
Journal Taper	.0001 (.003)
Oil Clearance	.0009-.0027 (.025-.071)

CONNECTING RODS SPECIFICATIONS**CONNECTING RODS**

Application	In. (mm)
Big End Bore	2.0863-2.0868 (52.993-53.007)
Pin Bore	.8252-.8260 (20.96-20.98)
Side Play	.0051-.0150 (.013-.038)

PISTONS, PISTON PINS & PISTON RINGS SPECIFICATIONS**PISTONS, PINS & RINGS**

Application	In. (mm)
Pistons	
Clearance	.0009-.0022 (.024-.057)
Diameter	3.4434-3.4441 (87.450-87.468)

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Pins

Diameter	.8660-.8662 (21.998-22.003)
Piston Fit	⁽¹⁾ .0001-.0007 (.003-.018)
Rod Fit (Interference) ⁽²⁾	.0007-.0017 (.018-.043)
Ring No. 1	
End Gap	.0098-.0200 (.250-.510)
Side Clearance	.0011-.0031 (.030-.080)
Ring Width	.057-.059 (1.47-1.50)
Ring No. 2	
End Gap	.009-.018 (.23-.48)
Side Clearance	.0011-.0031 (.030-.080)
Ring Width	.057-.059 (1.47-1.50)
Ring No. 3 (Oil)	
End Gap	.0098-.0025 (.250-.640)
Side Clearance	.0004-.0070 (.012-.178)
Ring Width (Pack)	.107-.113 (2.72-2.88)

(1) Resistance to thumb pressure.

(2) Press fit with load of 1653-3858 lbs. (750-1750 kg).

CYLINDER BLOCK SPECIFICATIONS**CYLINDER BLOCK**

Application	In. (mm)
Cylinder Bore	
Standard Diameter	3.3446-3.4452 (87.492-87.508)
Maximum Out-Of-Round & Taper	.002 (.05)
Maximum Deck Warpage	⁽¹⁾ .004 (.10)
(1) Maximum combined total grind limit of cylinder head and cylinder block is .008" (.20 mm).	

ENGINE VALVES & VALVE SPRINGS SPECIFICATIONS**VALVES & VALVE SPRINGS**

Application	Specification
Intake Valves	
Face Angle	44.5-45.0°
Head Diameter	1.364-1.375" (34.67-34.93 mm)
Minimum Margin	.050-.063" (1.28-1.61 mm)
Length	4.439-4.461" (112.76-113.32 mm)
Stem Diameter	.233-.234" (5.93-5.95 mm)

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Installed Tip Height	1.891" (48.04 mm)
Exhaust Valves	
Face Angle	44.5-45°
Head Diameter	1.114-1.122" (28.32-28.52 mm)
Minimum Margin	.038-.051" (.97-1.32 mm)
Length	4.365-4.397" (110.89-111.69 mm)
Stem Diameter	.2325-.2332" (5.906-5.924 mm)
Installed Tip Height	1.889" (47.99 mm)
Valve Springs	
Free Length	1.905" (48.4 mm)
Installed Height	1.496" (38.00 mm)
Out-Of-Square Limit	1/16" (1.5 mm)
Pressure - Lbs. @ In. (kg @ mm)	
Valve Closed	75.98 @ 1.496 (34.50 @ 38.0)
Valve Open	136 @ 1.172 (61.70 @ 29.77)

CYLINDER HEAD SPECIFICATIONS**CYLINDER HEAD**

Application	Specification
Maximum Warpage	⁽¹⁾ .004" (.10 mm)
Valve Seats	
Seat Angle	44.5-45°
Seat Width	.035-.051" (0.90-1.30 mm)
Valve Guides	
Valve Stem-To-Guide Oil Clearance	
Intake Valve	
Standard	.0018-.0025" (.048-.066 mm)
Wear Limit	.010" (.25 mm)
Exhaust Valve	
Standard	.0029-.0037" (.074-.094 mm)
Wear Limit	.010" (.25 mm)
⁽¹⁾ Combined maximum total grind limit of cylinder head and cylinder block is .008" (.20 mm).	

CAMSHAFT SPECIFICATIONS**CAMSHAFT**

Application	In. (mm)
End Play	.0019-.0066 (.050-.170)

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2000-01 ENGINES 2.4L DOHC 4-Cylinder

Journal Diameter	1.021-1.022 (25.95-25.97)
Oil Clearance	.0027-.0030 (.069-.071)
Lift (Zero Lash)	
Intake	.324 (8.25)
Exhaust	.259 (6.6)