

1999-2000 ENGINES

2.0L 4-Cylinder

ENGINE IDENTIFICATION

NOTE: For repair procedures not covered in this article, see **ENGINE OVERHAUL PROCEDURES** article in **GENERAL INFORMATION**.

WARNING: Under normal conditions, vehicle is in 2WD (front wheel drive) mode. Depending on detected wheel speed difference between front and rear wheels, system will instantly transmit driving force to rear wheels. Vehicle could surge forward causing injury and/or damage. Whenever service work requires spinning front or rear wheels with the engine, ensure vehicle is supported and all 4 wheels are off the ground. The real-time 4WD-dual pump system does not have a manual switch to disable 4WD system.

Engine identification number is located on exhaust side of engine block, below cylinder head water outlet. The first 5 characters (B20B4) of engine identification number identify engine type. The 2.0L engine is a 4-cylinder DOHC sequential multiport fuel-injected engine. The last 7 characters of engine identification number are the serial number.

The fourth, fifth and sixth characters (RD1) of Vehicle Identification Number (VIN) identify car line, body style and engine type. VIN is located at left front corner of dashboard, and on upper portion of firewall.

ADJUSTMENTS

VALVE CLEARANCE ADJUSTMENT

CAUTION: Always rotate engine in direction of normal rotation (counterclockwise as viewed from front of engine). Clockwise rotation may cause timing belt to slip.

NOTE: Adjust valves when engine temperature is 100°F (38°C) or less. After adjusting valve clearance, ensure crankshaft pulley bolt is tightened to 130 ft. lbs. (177 N.m).

1. Remove valve cover and middle timing belt cover. Rotate crankshaft counterclockwise until No. 1 piston is at TDC of compression stroke. UP marks on camshaft pulleys will be at top. See **Fig. 1**. Align grooves on camshaft pulleys with top surface of cylinder head.
2. Adjust valve clearance for all valves on No. 1 cylinder to specification. Loosen adjustment screw lock nut. Using a feeler gauge measure valve clearance according to specification. See **VALVE CLEARANCE SPECIFICATIONS** table. Turn adjustment screw until clearance is correct. Tighten lock nut to specification. See **TORQUE SPECIFICATIONS**.

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3. Rotate crankshaft 180 degrees counterclockwise (camshaft pulley will turn 90 degrees). UP marks on camshaft pulley will be on exhaust side of engine. See **Fig. 1**. Adjust valve clearance on all valves for No. 3 cylinder.
4. Rotate crankshaft 180 degrees counterclockwise. Grooves on camshaft pulley will align with cylinder head surface, and UP marks will face downward. See **Fig. 1**. Adjust valve clearance on all valves for No. 4 cylinder.
5. Rotate crankshaft 180 degrees counterclockwise. UP marks on camshaft pulley will be on intake side. See **Fig. 1**. Adjust valve clearance on all valves for No. 2 cylinder. Retighten crankshaft pulley bolt to specification, using 50-mm Holder Attachment (07MAB-PY3010A). See **TORQUE SPECIFICATIONS**.
6. Ensure valve clearances are correct and adjusting screw lock nuts are tightened to specification. Install valve cover. See **VALVE COVER INSTALLATION** under REMOVAL & INSTALLATION.

VALVE CLEARANCE SPECIFICATIONS

Application	In. (mm)
Measured Between Camshaft & Rocker Arm	
Intake Valves	0.003-0.005 (0.08-0.12)
Exhaust Valves	0.006-0.008 (0.16-0.20)
Measured Between Valve & Rocker Arm	
Intake Valves	0.005-0.007 (0.13-0.17)
Exhaust Valves	0.010-0.012 (0.26-0.30)

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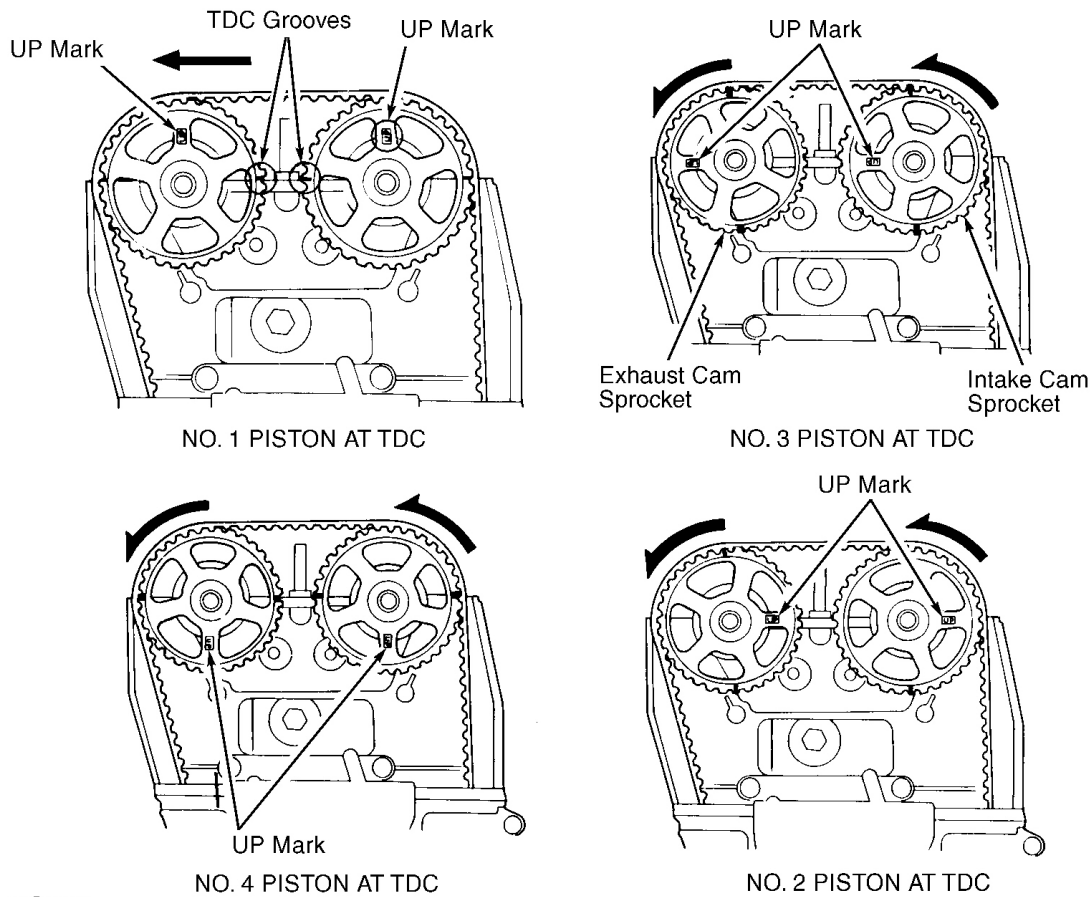


Fig. 1: Camshaft Pulley Positions For Valve Adjustment
Courtesy of AMERICAN HONDA MOTOR CO., INC.

TIMING BELT ADJUSTMENT

CAUTION: Always adjust timing belt tension with engine cold.

Timing Belt Inspection

Remove valve cover. Check for excessive wear at trailing edge of timing belt teeth. Rotate crankshaft counterclockwise to inspect belt. Replace timing belt if damaged, worn, or soaked with oil or coolant. See **TIMING BELT** under REMOVAL & INSTALLATION.

Timing Belt Adjustment

Remove valve cover. Rotate crankshaft counterclockwise 5-6 rotations to set timing belt. Set No. 1 piston to TDC. See **Fig. 1**. Loosen tension adjuster nut approximately 1/2 turn (180 degrees). Rotate crankshaft

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counterclockwise 3 teeth on camshaft pulley. Tighten adjusting nut to specification. See **TORQUE SPECIFICATIONS**. Using 50-mm Holder Attachment (07MAB-PY3010A), retighten crankshaft pulley bolt to specification. See **TORQUE SPECIFICATIONS**. Install valve cover.

TROUBLE SHOOTING

To trouble shoot mechanical engine components, see appropriate table in 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.

NOTE: For installation reference, label all electrical connectors, vacuum hoses, and fuel lines before removal. Also place mating marks on major assemblies before removal to aid in installation.

FUEL PRESSURE RELEASE

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

Turn ignition off. Disconnect negative battery cable. Remove fuel tank filler cap. Place clean shop rag over 12-mm banjo bolt located on fuel filter. Release fuel system pressure by slowly loosening banjo bolt one complete turn. Replace washers and tighten 12-mm banjo bolt to specification. See **TORQUE SPECIFICATIONS**.

COOLING SYSTEM BLEEDING

CAUTION: Do not allow coolant to spill on electrical parts or vehicle paint. If coolant spills, rinse with water immediately.

1. Set heater controls to maximum heat. Ensure radiator drain plug is tight. Ensure engine block coolant drain plug (located next to exhaust manifold) is tightened to specification. See **TORQUE SPECIFICATIONS**.
2. Fill cooling system with a 50/50 mixture of coolant and water to bottom of radiator filler neck. With radiator cap off, start and operate engine until cooling fan comes on at least twice. Stop engine. Add coolant as necessary to fill radiator to bottom of filler neck. Install radiator cap, start engine and check for leaks.

VALVE COVER INSTALLATION

Installation

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1. Clean valve cover gasket and gasket groove in valve cover. Replace gasket if damaged. Inspect valve cover center nut washers and replace as necessary. Seat gasket into camshaft recesses first, then work gasket into groove around outside edges. Ensure valve cover gasket is seated into corners of recesses, with no gap. Ensure mating surfaces are clean and dry.
2. Apply liquid gasket to 8 corners of camshaft recesses of valve cover gasket. Hold gasket in groove by positioning fingers on camshaft holder contacting surfaces (top of semicircles). After valve cover is positioned onto cylinder head, slide cover back and forth slightly to seat gasket.
3. Valve cover must be installed within 5 minutes of liquid gasket application. If more than 5 minutes has passed, remove old liquid gasket and reapply. Tighten nuts to specification in 2-3 steps. Start with center nut in middle row, both ends of middle row and then alternately tighten 4 remaining side nuts. See **TORQUE SPECIFICATIONS**. To complete installation, reverse removal procedure. Wait at least 20 minutes before filling engine with oil.

ENGINE

Removal

1. Open hood as far as possible, and secure. Disconnect negative battery cable, and then positive battery cable. Disconnect battery cables from underhood fuse/relay box. Disconnect positive battery cable. Remove battery and battery base. Remove intake air duct and air cleaner housing.
2. Disconnect Powertrain Control Module (PCM) connectors and main wiring harness connector. Remove grommet and wiring harness clamps, and pull PCM connectors through firewall. Disconnect engine wiring harness connectors on left side of engine compartment.
3. Remove cruise control actuator with cable attached, and move aside. Without disconnecting hoses, remove power steering pump, and position aside. Remove A/C compressor drive belt. Relieve fuel pressure. See **FUEL PRESSURE RELEASE**. Remove EVAP control canister hose from canister and fuel feed hose from fuel filter. Remove brake booster vacuum hose, fuel return hose, and vacuum hose from intake manifold.
4. Remove throttle cable by loosening lock nut, and slipping cable ends out of throttle linkage. It is not necessary to loosen adjusting nut. Disconnect generator connector and terminal. Disconnect Power Steering Pressure (PSP) switch connector, and remove harness clamp.

NOTE: **DO NOT bend throttle cable when removing. DO NOT use pliers to remove cable from linkage. Replace cable if kinked or damaged. Adjust cables when reinstalling.**

5. On M/T models, remove clutch slave cylinder and fluid line bracket. Remove ground cable from transmission. Remove shift control cables and bracket from transmission. On all models, set heater controls to maximum heat, and remove radiator cap. Raise and support vehicle. Remove front wheels and guard bar/splash shield. Loosen radiator drain plug, drain coolant and retighten drain plug.
6. Remove engine block coolant drain plug, located next to exhaust manifold, and drain engine block coolant. See **Fig. 4**. Drain engine oil and transmission fluid. After draining fluids, reinstall all drain plugs with NEW washers, and tighten to specification. See **TORQUE SPECIFICATIONS**. Without disconnecting hoses, remove A/C compressor, and position aside.
7. Disconnect primary HO2S-1 connector, and remove front exhaust pipe. Discard exhaust pipe nuts and

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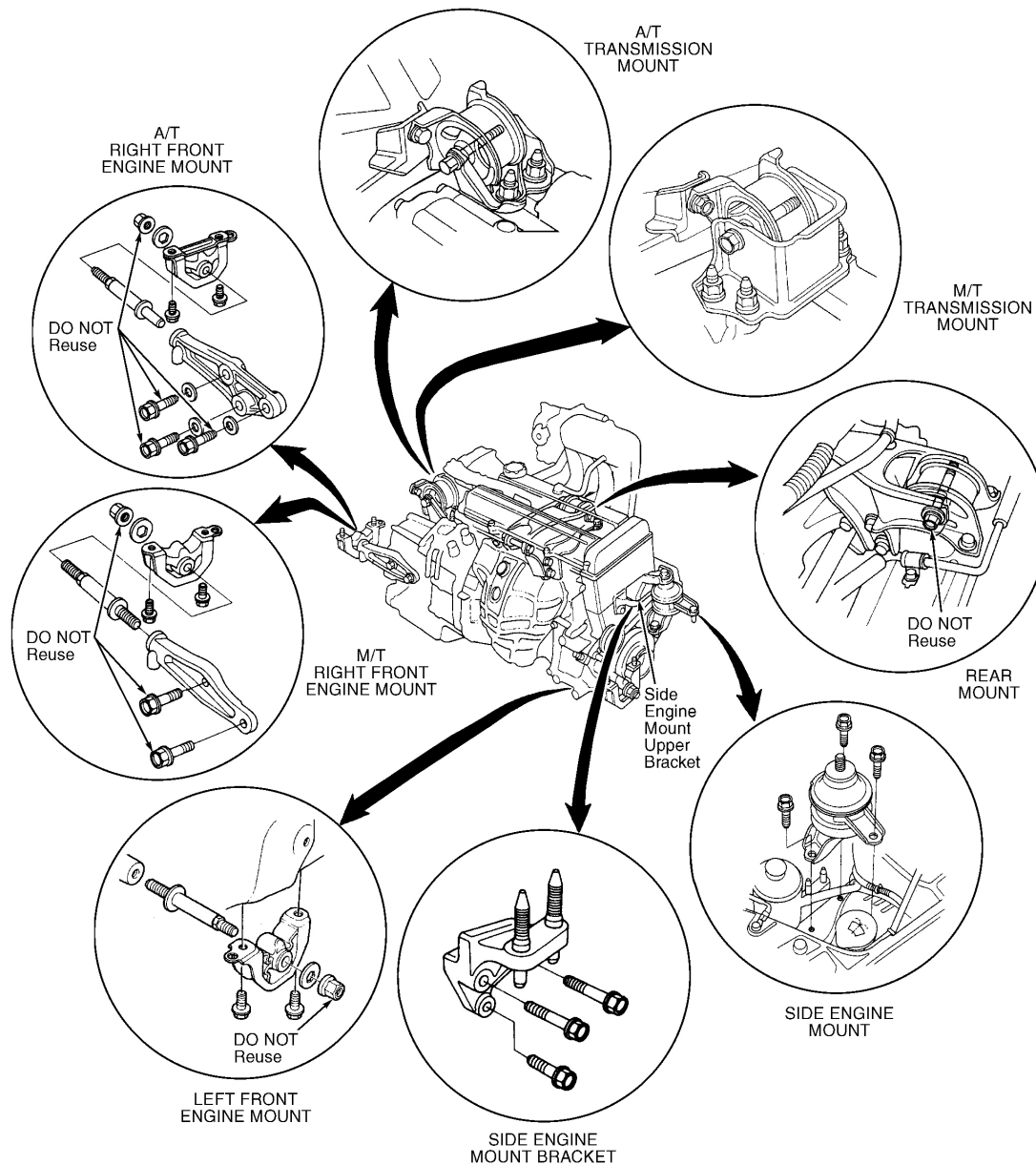
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gaskets. On A/T models, remove shift cable cover and remove shift cable. DO NOT bend shift control cable when removing. Always replace kinked or damaged cable. On all models, remove front axle shafts. See FWD AXLE SHAFTS article in DRIVE AXLES. Remove drive shaft. See 4WD DIFFERENTIAL & AXLE SHAFTS article in DRIVE AXLES. Lower vehicle.

8. Remove upper and lower radiator hoses. Remove heater hoses. On A/T models, disconnect transmission ground cable and hose clamp. Remove ATF cooler hoses, and plug hose openings. On all models, disconnect fan motor connectors. Remove radiator upper brackets and fan shroud. Remove radiator assembly. Remove A/C hose clamp.
9. Attach chain hoist to engine and remove slack. Remove left and right front engine mounts and brackets. Remove rear engine mount bracket 12-mm through-bolt, and discard bolt. See **Fig. 2**.
10. Remove side engine mount upper bracket. Remove transmission mount bracket and transmission mount. Ensure engine/transmission assembly is free of all attachments. Slowly lift engine about 6", and again ensure engine/transmission assembly is free of all attachments. Lift engine/transmission assembly from vehicle.

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Fig. 2: Identifying Engine Mounts & Brackets

Courtesy of AMERICAN HONDA MOTOR CO., INC.

NOTE: Tighten engine/transmission mounting nuts and bolts to specification in sequence. See **TORQUE SPECIFICATIONS**. Improper tightening of engine mounts will result in excessive engine noise and vibration, and premature mount wear. Some engine/transmission mount bolts and nuts are not reusable. See **Fig. 2**.

Installation

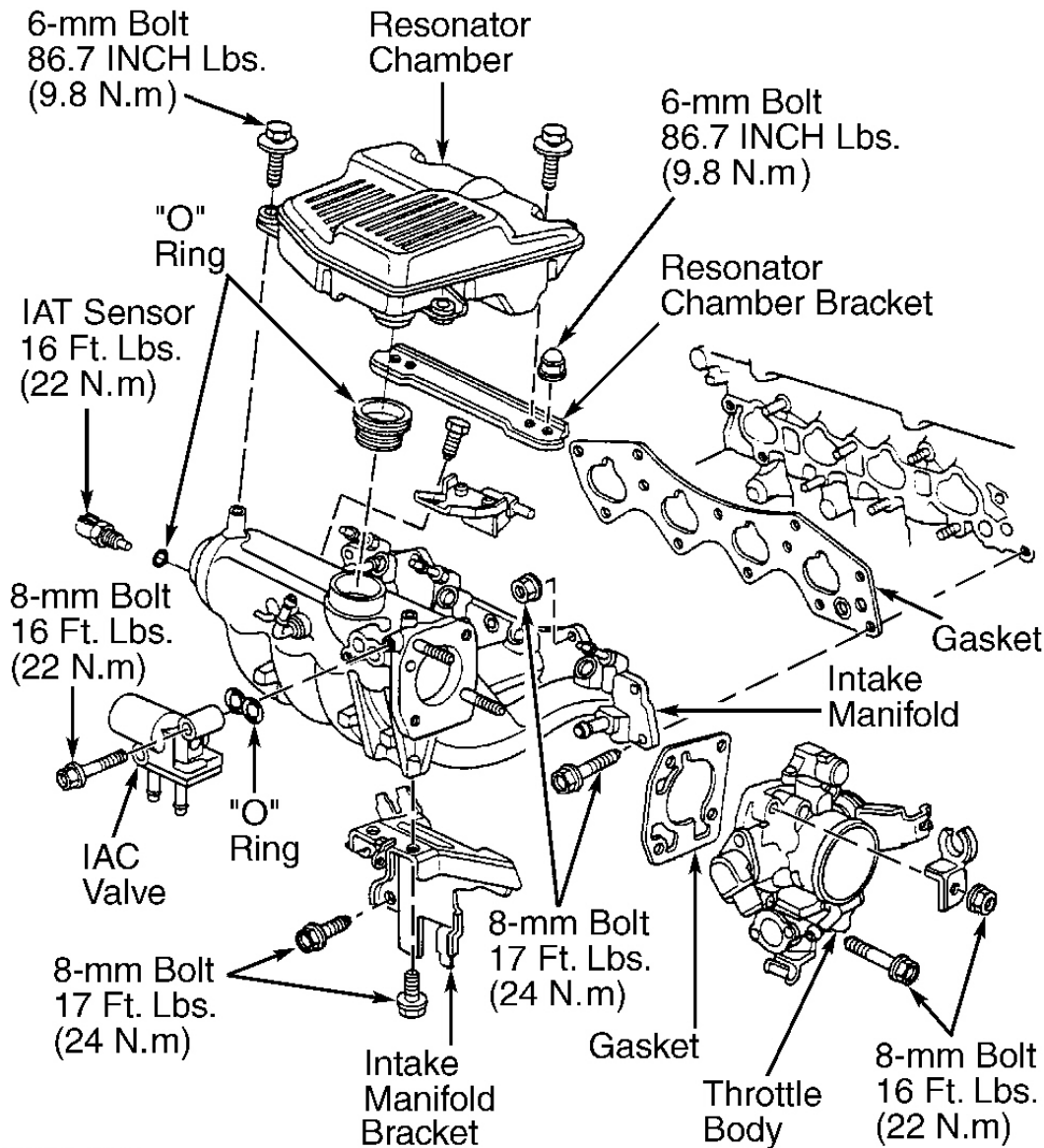
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1. Install transmission mount and bracket, and tighten 12-mm frame side bolts. Install, but do not tighten, transmission side nuts and through-bolt. Install side engine mount upper bracket. Tighten one 12-mm mount (frame side) nut first, and then two 12-mm mount (engine side) nuts. See **Fig. 2**.
2. Install NEW rear mount bracket through-bolt, but do not tighten. Tighten transmission mount bracket 12-mm nuts to transmission side, and then tighten transmission mount 12-mm through-bolt. Tighten NEW rear mount-to-bracket through-bolt. See **Fig. 2**.
3. Install right front mount/bracket. Loosen right front mount/bracket 12-mm bracket-to-mount nut. Tighten NEW 12-mm bracket bolts to engine side, and then tighten 10-mm mount bolts to frame. Install left front mount and through-bolt. Tighten 12-mm through-bolt to engine. Tighten 10-mm mount bolts to frame. Tighten NEW 12-mm through-bolt-to-mount nut. Replace right front mount/bracket 12-mm bracket-to-mount nut and tighten to specification. See **Fig. 2**.
4. To complete installation, reverse removal procedure. Use NEW spring clips when installing axle shafts. Ensure axle shaft spring clip clicks into groove of differential side gear. Ensure all wires and hoses are connected properly. Ensure control cables are mounted properly.
5. Fill and bleed cooling system. See **COOLING SYSTEM BLEEDING**. Fill engine and transmission fluids to proper level. Ensure transmission shifts smoothly, and range indicator agrees with actual transmission range.
6. Adjust tension of accessory drive belts. After installation is complete, turn ignition on for 2 seconds to allow fuel system to pressurize (DO NOT start engine). Repeat procedure 2 or 3 times. Ensure no fuel system leaks exist. Check and adjust wheel alignment. See SPECIFICATIONS & PROCEDURES article in WHEEL ALIGNMENT.

INTAKE MANIFOLD

NOTE: Removal and installation procedure is not available from manufacturer. Use illustration for torque specifications and component locations. See **Fig. 3**



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Fig. 3: Exploded View Of Intake Manifold & Components
Courtesy of AMERICAN HONDA MOTOR CO., INC.

EXHAUST MANIFOLD

Removal

Remove exhaust manifold heat shield. Raise and support vehicle. Remove guard bar/splash shield. Disconnect front exhaust pipe from exhaust manifold. Remove exhaust manifold support bracket. Remove exhaust manifold nuts and manifold. Remove gasket.

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Installation

To install, reverse removal procedure. Clean gasket surfaces. Install exhaust manifold with a NEW gasket and NEW exhaust manifold self-locking nuts. Tighten manifold nuts to specification in 2-3 stages in a crisscross pattern, starting with inner nuts. See **TORQUE SPECIFICATIONS**.

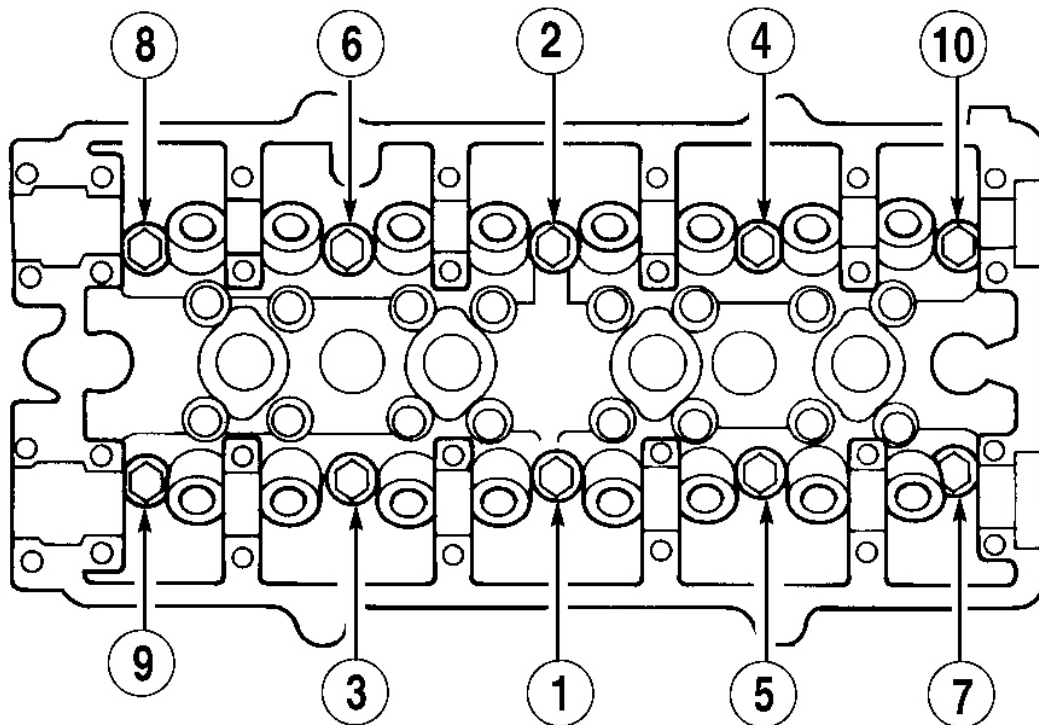
CYLINDER HEAD

CAUTION: To avoid damage to cylinder head, DO NOT remove cylinder head until coolant temperature is less than 100°F (38°C).

NOTE: Ensure all coolant hoses, emission hoses, vacuum hoses, electrical connectors and all other components are marked for installation reference.

Removal

1. Disconnect negative battery cable, and then positive battery cable. Remove radiator cap and drain cooling system. Remove engine block coolant drain plug. Remove intake air duct and air cleaner housing. Remove power steering pump with hoses attached, and set aside. Remove A/C compressor and generator drive belts. Remove power steering pump bracket.
2. Loosen adjustment lock nut and remove throttle cable from throttle body linkage. Release fuel pressure. See **FUEL PRESSURE RELEASE**. Disconnect fuel supply line and fuel return line. Remove upper and lower radiator hoses, coolant by-pass hoses, PCV hose, brake booster vacuum hose, and EVAP control canister hose. Label and remove all other hoses and harness connectors from cylinder head and intake manifold.
3. Remove spark plug wires and distributor. Support engine under oil pan with a padded floor jack, and remove side engine mount upper bracket. Remove valve cover. See **Fig. 5** and **Fig. 6**. Inspect timing belt. See **TIMING BELT ADJUSTMENT** under ADJUSTMENTS.
4. Remove timing belt. See **TIMING BELT**. Remove camshaft pulleys and back cover. Remove exhaust manifold bracket bolts and nuts. Remove exhaust manifold. Remove intake manifold support bracket. Ensure all throttle body and air control components, connectors, wire harnesses, and vacuum and coolant hoses are removed from intake manifold. Remove intake manifold.
5. Loosen valve adjusting screw lock nuts and loosen adjusting screws. Remove camshaft holder bolts, camshaft holders and rocker arms. Ensure location of components are marked for installation reference. Remove cylinder head bolts, 1/3 turn at a time, in reverse order of tightening sequence. See **Fig. 6**. Repeat sequence until all bolts are removed.

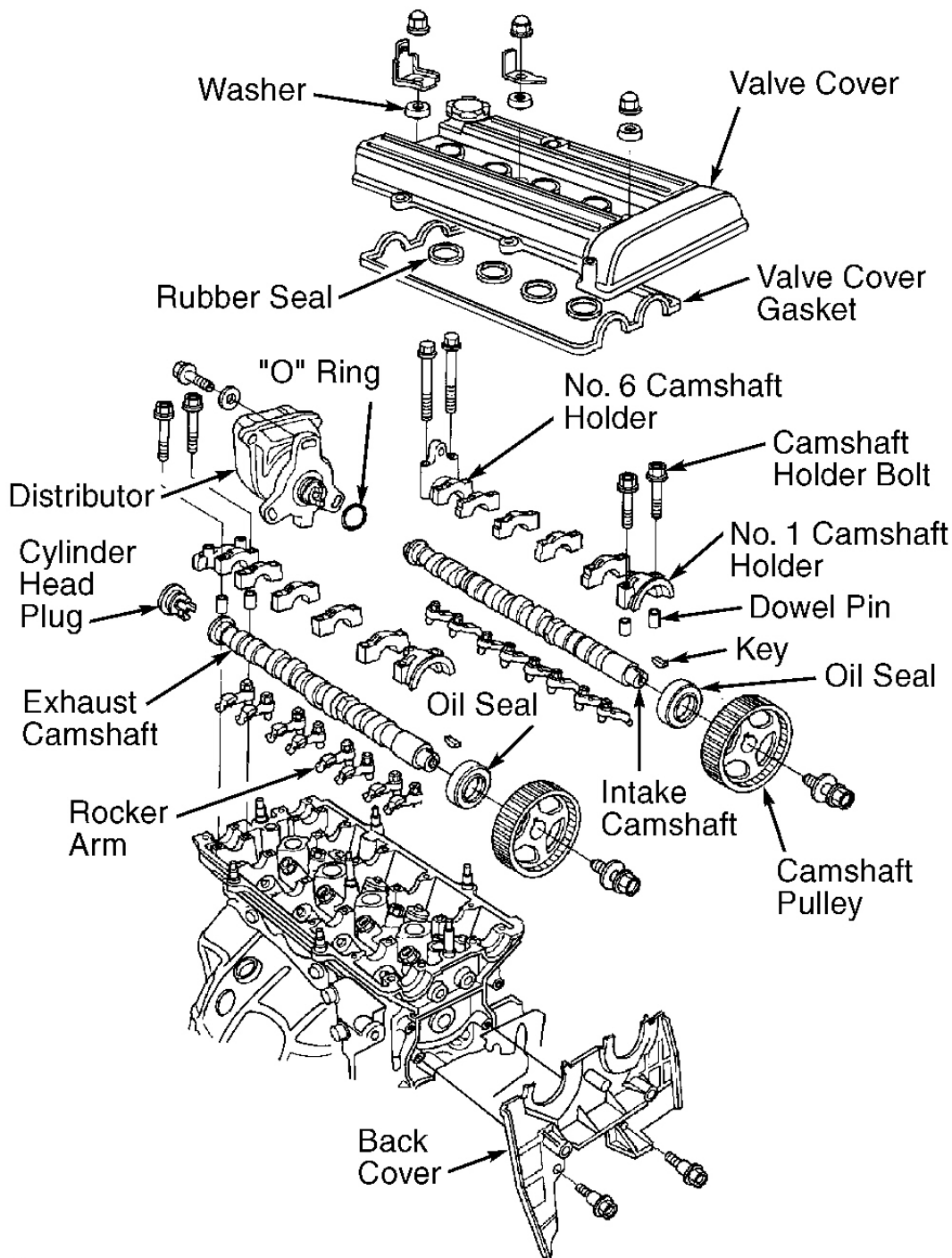


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Fig. 4: Cylinder Head Bolt Tightening Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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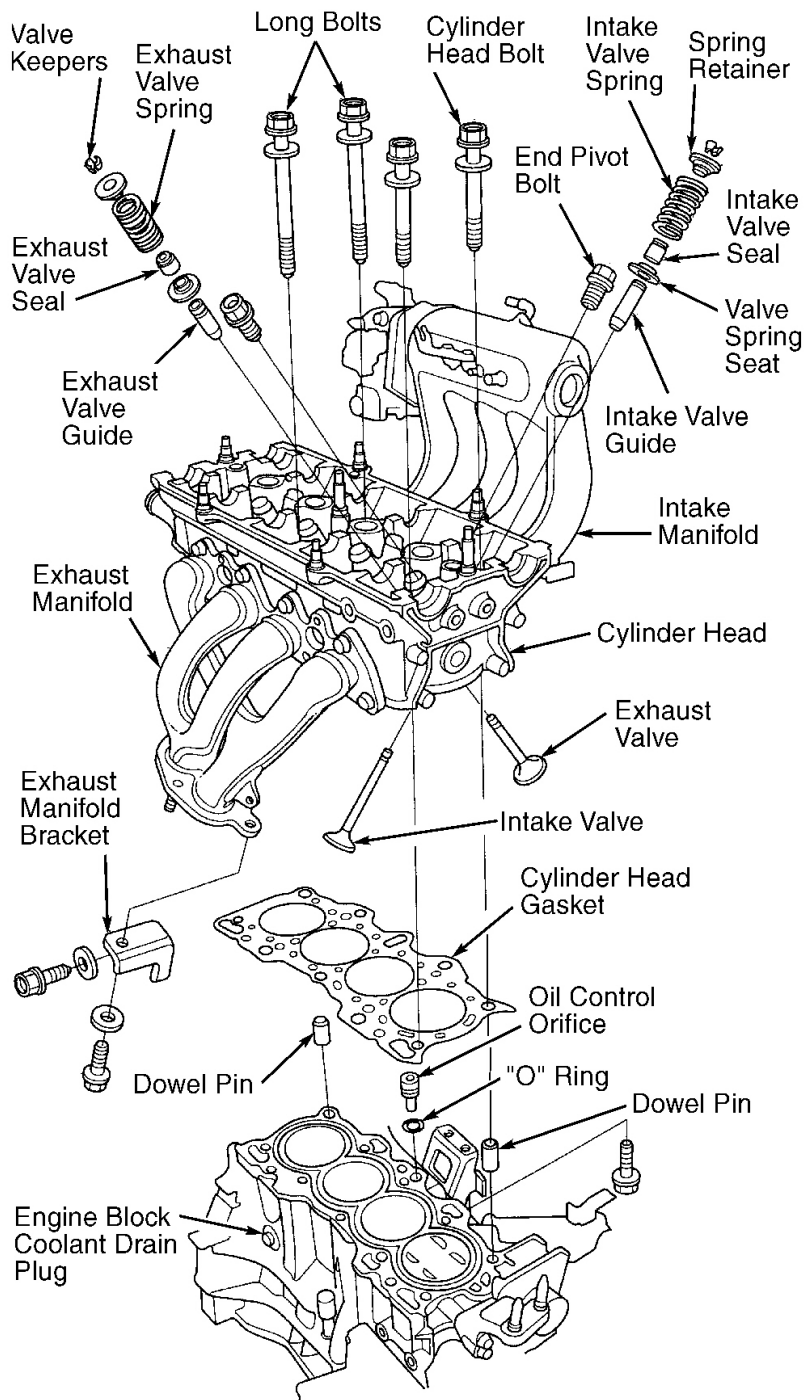


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Fig. 5: Locating Cylinder Head Components (1 Of 2)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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Fig. 6: Locating Cylinder Head Components (2 Of 2)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Inspection

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1. Ensure all mating surfaces are clean. Check intake and exhaust rocker arms at contact points for pitting, scoring or wear. Check camshaft-to-holder oil clearance. See **CAMSHAFT** table under ENGINE SPECIFICATIONS. If camshaft-to-holder oil clearance is within specification, check cylinder head for warpage. If oil clearance is not within specification, cylinder head cannot be resurfaced.
2. Measure cylinder head warpage along 4 edges, and 2 ways across center. See **CYLINDER HEAD** table under ENGINE SPECIFICATIONS. If warpage is less than specification, cylinder head does not need resurfacing. If warpage is greater than service limit, cylinder head cannot be resurfaced. Resurface head if warpage is within normal and service limit specification.

NOTE: Always use a NEW, undamaged cylinder head gasket. Ensure No. 1 piston is at TDC of compression stroke. Ensure oil control orifice (if equipped) is clean before installing in head.

NOTE: Manufacturer recommends using a beam-type torque wrench. When using a preset-type torque wrench, be sure to tighten slowly and not to overtighten. If a bolt makes a noise while tightening, loosen bolt and retighten from first step.

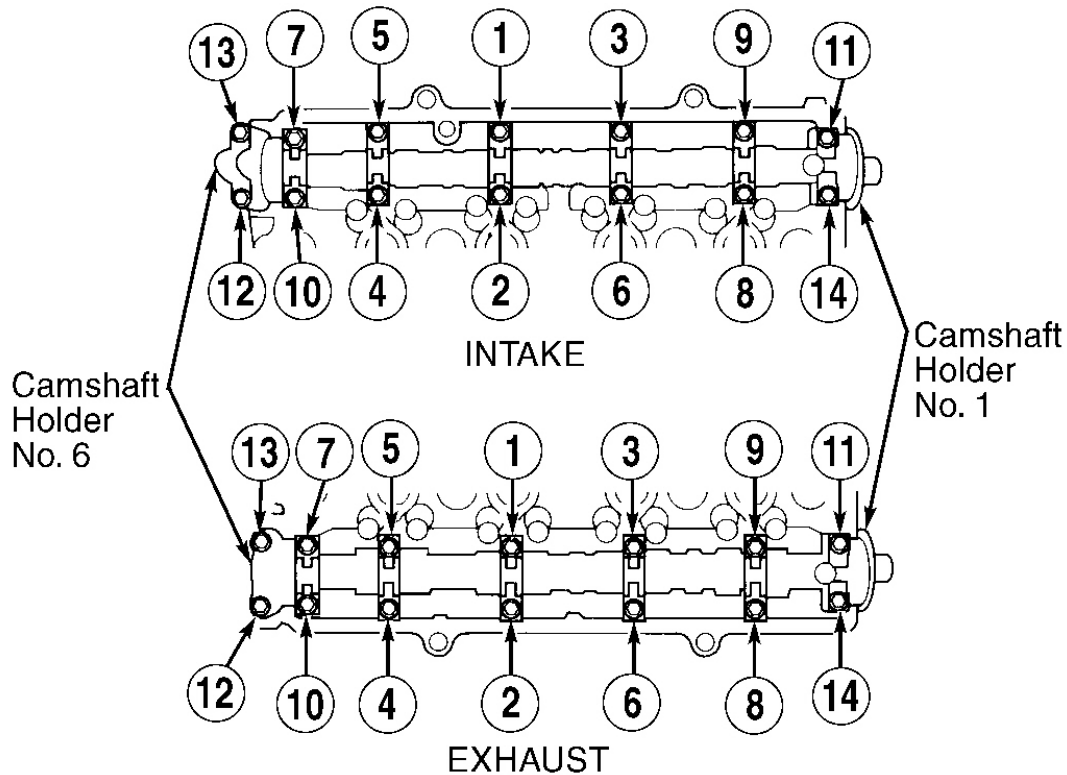
Installation

1. To install cylinder head, reverse removal procedure. Ensure cylinder head and engine block are clean. Install NEW head gasket and dowel pins. Install oil control orifice with NEW "O" ring, between cylinders No. 2 and 3, on intake side. See **Fig. 5** and **Fig. 6**.
2. Lubricate cylinder head bolt threads with clean engine oil. Tighten cylinder head bolts in sequence, to specification, in 2 steps. See **Fig. 4**. See **TORQUE SPECIFICATIONS**. Install intake manifold using a NEW gasket. Tighten intake manifold bolts and nuts to specification in 2-3 steps, beginning with inner bolts/nuts. See **TORQUE SPECIFICATIONS**.
3. Install exhaust manifold bracket and manifold using NEW exhaust gaskets and NEW manifold-to-engine mounting nuts. Tighten exhaust manifold nuts to specification in 2-3 steps, using crisscross pattern, beginning with inner nuts. See **TORQUE SPECIFICATIONS**.
4. Ensure rocker arm adjusting screws and lock nuts are loose. Install rocker arms on pivots and valve stems in their original positions. Install camshafts, and then oil seals onto camshafts with open side (spring) facing in. Ensure camshaft keyways are facing up and No. 1 piston is at TDC. See **Fig. 1**.
5. Clean and dry mating surfaces on cylinder head and intake and exhaust camshaft holders No. 1 and 6. See **Fig. 5**. Apply liquid gasket to mating surfaces of camshaft holder No. 1 and 6. Install camshaft holders within 5 minutes of applying liquid gasket.
6. Install all camshaft holders and bolts in their original positions, with arrows marked on camshaft holders pointing toward timing belt. Camshaft holders are also stamped with "I" (intake) or "E" (exhaust) marks. Tighten camshaft holder bolts in sequence, to specification, in 2 steps. See **Fig. 7**. Ensure rockers do not bind on valves. Clean excess liquid gasket from camshaft holders.
7. Install cylinder head exhaust camshaft plug with marks aligned with upper surface of cylinder head. Install back cover. Ensure camshafts are at TDC position for No. 1 piston. Align holes in camshafts and camshaft holders and insert 5-mm punches into No. 1 camshaft holders to hold camshafts in correct position. Remove punches after timing belt is installed. See **Fig. 8**.
8. Install camshaft pulleys and tighten bolts to specification. See **TORQUE SPECIFICATIONS**. Install

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timing belt. See **TIMING BELT**. Adjust valve clearance. See **VALVE CLEARANCE ADJUSTMENT** under ADJUSTMENTS. Install valve cover. See **VALVE COVER INSTALLATION**. Fill and bleed cooling system. See **COOLING SYSTEM BLEEDING**. Fill engine with oil. To complete installation, reverse removal procedure.



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Fig. 7: Camshaft Holder Bolts Tightening Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

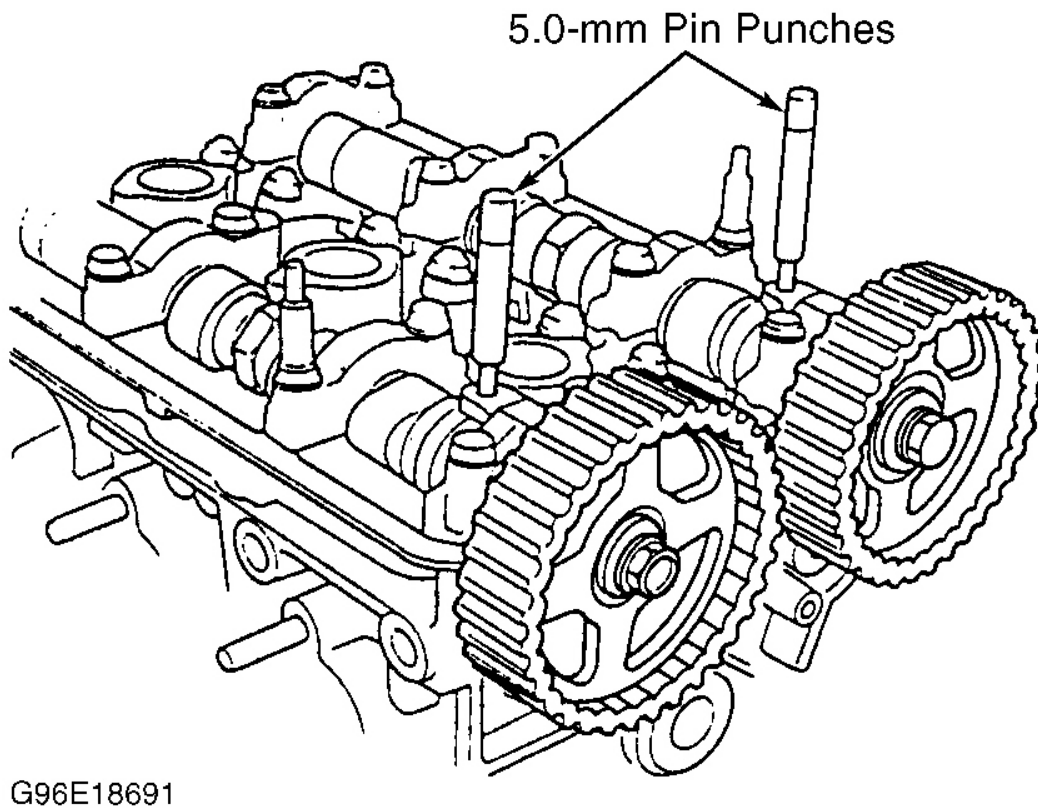


Fig. 8: Identifying Pin Punch Installation Locations
Courtesy of AMERICAN HONDA MOTOR CO., INC.

TIMING BELT

CAUTION: DO NOT rotate crankshaft or camshafts when timing belt has been removed. DO NOT crimp or bend timing belt more than 90 degrees, or to less than a 1" (25.4 mm) radius.

Removal

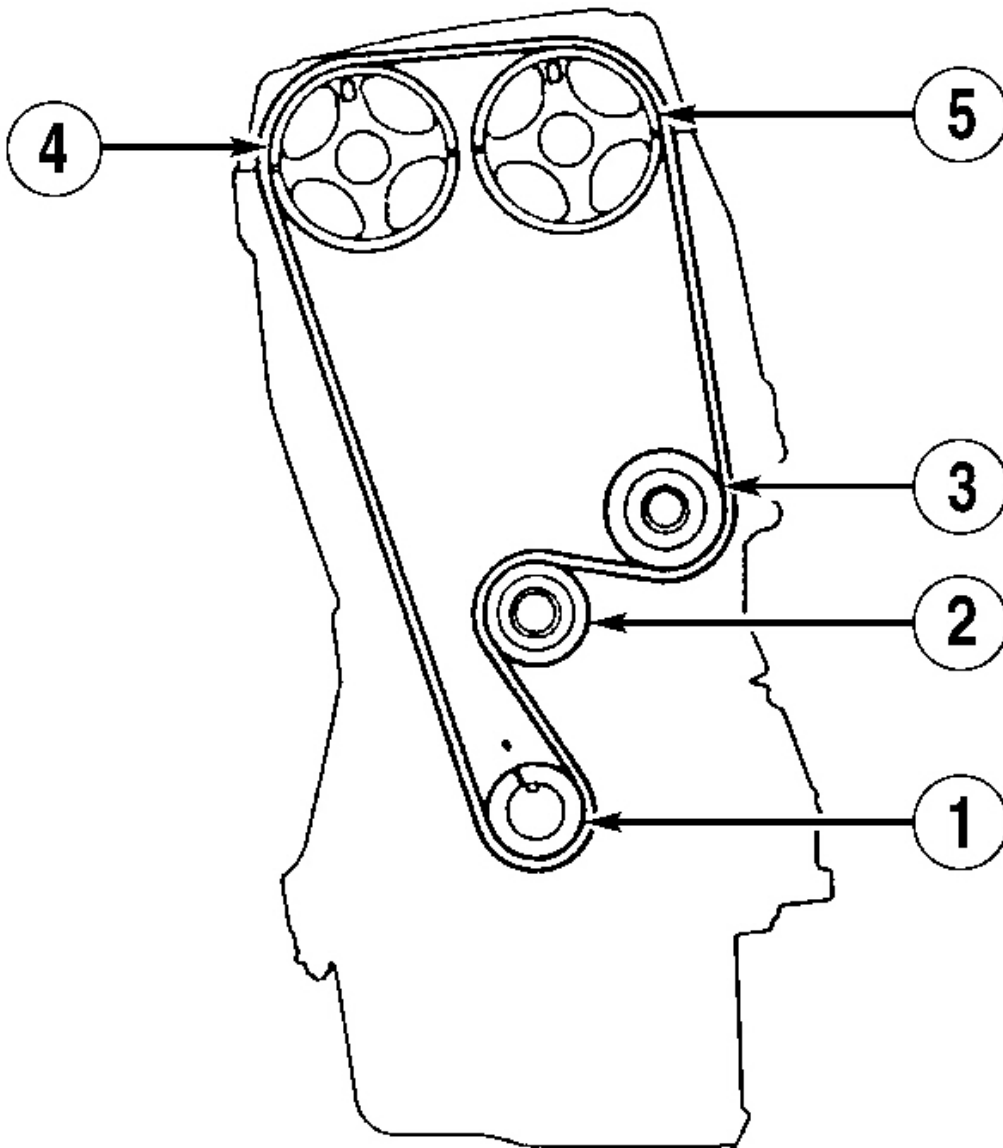
1. Turn crankshaft pulley counterclockwise to position No. 1 piston at TDC of compression stroke. Disconnect negative battery cable, and then positive battery cable. Remove guard bar/splash shield. Remove accessory drive belts. Remove cruise control actuator with cable attached, and move aside.
2. Support engine under oil pan with padded jack, and remove side engine mount upper bracket. Remove valve cover. Remove crankshaft pulley, middle and lower timing belt covers. If timing belt is going to be reused, mark direction of belt rotation. Loosen timing belt adjusting bolt 1/2 turn (180 degrees). Push tensioner to remove tension from timing belt, and retighten adjusting bolt. Remove timing belt.

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Installation

1. To install timing belt, reverse removal procedure. Ensure groove on timing belt drive pulley (crankshaft) is aligned with pointer on oil pump housing so that No. 1 piston is at TDC. See **Fig. 9**. Ensure UP marks on camshaft pulleys are facing up and TDC marks are aligned with pointers on back cover.
2. Tightly install timing belt on pulleys in sequence. Start with timing belt drive pulley (No. 1), tension adjusting pulley (No. 2), water pump pulley (No. 3), camshaft exhaust pulley (No. 4) and camshaft intake pulley (No. 5). See **Fig. 9**. Ensure crankshaft and camshaft pulleys are at TDC. Loosen and retighten tensioner adjusting bolt to tension timing belt.
3. Clean and install lower and middle covers. Install crankshaft drive pulley. Apply engine oil to threads of crankshaft pulley bolt and seating face, and tighten to specification. See **TORQUE SPECIFICATIONS**. Rotate crankshaft pulley counterclockwise 5-6 turns to position timing belt on pulleys. Adjust timing belt. See **TIMING BELT** under ADJUSTMENTS.
4. Ensure camshaft and crankshaft pulleys are at TDC. If either camshaft or crankshaft pulleys are not positioned at TDC, remove timing belt and adjust position. Install valve cover. See **VALVE COVER INSTALLATION**. To complete installation, reverse removal procedures.



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Fig. 9: Identifying Timing Belt Installation Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

FRONT CRANKSHAFT SEALS

NOTE: Front crankshaft seal can be replaced without removing engine. Seal housing

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surface should be dry. Install seal with part number side facing out.

Removal & Installation

1. Ensure No. 1 piston is positioned at TDC of compression stroke. Remove valve cover and middle cover. Remove accessory drive belts. Remove crankshaft pulley and lower cover. Remove timing belt. See **TIMING BELT**. Remove timing belt crankshaft drive pulley.
2. Remove seal from oil pump housing. Apply a light coat of grease to crankshaft and seal lip. Use Seal Driver (07LAD-PT3010A) to install new front crankshaft seal. Gently tap in new seal until seal driver bottoms on oil pump housing. Clean excess grease from crankshaft and ensure oil seal lip is not distorted. To complete installation, reverse removal procedures.

REAR CRANKSHAFT SEAL

NOTE: **Rear crankshaft seal can be replaced without removing engine. Seal housing surface should be dry. Install seal with part number side facing out.**

Removal & Installation

1. Remove transmission and drive plate (A/T) or flywheel (M/T) to gain access to right side cover and rear crankshaft seal. For M/T vehicles, see appropriate article in CLUTCHES. For A/T vehicles, see AUTOMATIC TRANSAXLE REMOVAL & INSTALLATION article in TRANSMISSION SERVICING. Remove rear crankshaft seal.
2. Clean crankshaft seal contact surfaces. Apply a light coat of grease to crankshaft and seal lip. Using Seal Driver (07749-0010000) and Driver Attachment (07948-SB00101) install new seal into rear cover. Align hole in driver attachment with pin on crankshaft. Drive seal into right side cover until clearance between bottom of seal and right side cover is 0.02-0.03" (0.5-0.8 mm) all the way around. Clean excess grease from crankshaft, and ensure oil seal lip is not distorted. To complete installation, reverse removal procedure.

ROCKER ARMS & CAMSHAFT

NOTE: **Identify component locations as rocker arms are removed. Ensure all reused components are installed in original positions.**

Removal & Installation

For rocker arm and camshaft removal and installation, see **CYLINDER HEAD**.

WATER PUMP

Inspection

Remove timing belt. See **TIMING BELT**. Rotate water pump pulley counterclockwise and ensure pump turns smoothly. Replace water pump if it does not turn smoothly or leaks excessively. A small amount of weeping from bleed hole is normal.

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Removal & Installation

Disconnect negative battery cable, and then positive battery cable. Drain cooling system. Remove timing belt. See **TIMING BELT**. Remove water pump bolts, water pump, and "O" ring. Clean and inspect "O" ring groove and cylinder block mating surface. Install NEW "O" ring and water pump. Tighten bolts to specification. See **TORQUE SPECIFICATIONS**. To complete installation, reverse removal procedure. Fill and bleed cooling system. See **COOLING SYSTEM BLEEDING**.

OIL PAN

Removal & Installation

1. Raise and support vehicle. Remove components to gain access to oil pan. Drain engine oil. Remove oil pan bolts and oil pan. Discard oil gaskets and clean all gasket mating surfaces. Install oil pan within 5 minutes of applying liquid gasket. If more than 5 minutes has passed, remove liquid gasket and reapply.
2. Support oil pan by installing 6 oil pan nuts and bolts finger tight (2 at each end and one on each side). Tighten oil pan nuts and bolts to specification, clockwise in 3 steps. See **TORQUE SPECIFICATIONS**. Excessive tightening can cause distortion of gasket and an oil leak. Install and tighten oil pan drain plug. Wait at least 20 minutes before adding oil to engine.

OVERHAUL

NOTE: Identify and label all removed components for installation reference to ensure installation to original positions.

CYLINDER HEAD

NOTE: Before checking cylinder head warpage, ensure camshaft-to-holder oil clearance is within specification. If camshaft-to-holder oil clearance is not within specification, cylinder head cannot be resurfaced.

Cylinder Head

Ensure all mating surfaces are clean. Measure cylinder head warpage along 4 edges and 3 ways across center (corner to corner and end to end). If warpage is less than allowable specification, resurfacing is not necessary. If warpage exceeds allowable specification, resurface cylinder head. Maximum warpage resurface limit is 0.008" (0.20 mm) based on original specified cylinder height. See **CYLINDER HEAD** table under ENGINE SPECIFICATIONS.

Valve Spring Removal

Using an appropriate-size socket and a plastic mallet, lightly tap valve retainers to loosen valve keepers. Using valve spring compressor and Valve Spring Compressor Attachment (07757-PJ1010A), compress valve spring. Remove valve keepers, valve retainer and spring.

Valve Spring Inspection

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Measure valve spring free length. Replace any spring shorter than minimum free length specification. See **VALVES & VALVE SPRINGS** table under ENGINE SPECIFICATIONS. Install springs with closely wound coils toward cylinder head. Check valve stem installed height.

Valve Seal Replacement

1. Remove valve spring. Remove valve seals from valve guides using a valve seal remover. Coat valve stems with engine oil and install valves in valve guides. Ensure valves move smoothly up and down.
2. Install spring seats. Install valve seals using Valve Guide Seal Installer (07GAD-PH70100). Install valve spring with closely wound coils towards cylinder head and retainer. Compress spring using valve spring compressor and install valve keepers. Lightly tap end of each valve stem along its axis to ensure valve and valve keepers are seated properly.

NOTE: Intake and exhaust valve stem seals are not interchangeable. Intake seals have a White spring around neck of seal. Exhaust seals have a Black spring around neck of seal.

Valve Guide Inspection

1. Using wobble method, measure valve stem-to-guide clearance. Lift valve 0.4" (10.0 mm) from seat. Place dial indicator at outside edge of valve head. Rock valve stem back and forth in direction of normal thrust. See **VALVES & VALVE SPRINGS** table under ENGINE SPECIFICATIONS. If clearance exceeds service limit, recheck clearance using a NEW valve. If clearance still exceeds service limit, go to next step. If clearance is within specification, replace old valve.
2. Using alternate checking method (inner diameter/outer diameter) to check valve stem-to-guide clearance, measure outside diameter of valve stem at 3 different places. Measure inside diameter of valve guide at 3 different places. Replace valve and valve guide if clearance is not within specification. See **VALVES & VALVE SPRINGS** table under ENGINE SPECIFICATIONS.

Valve Guide Removal

1. Use a hot plate or oven to heat cylinder head to 300°F (150°C). Use a 6.6-mm Valve Guide Driver (07742-6570100) to remove guide, or fabricate valve guide remover from an air impact chisel. Using an air hammer and valve guide remover, drive valve guide 3/32" (2.0 mm) toward combustion chamber. This will knock off carbon and make removal easier.

CAUTION: Heating cylinder head with a torch, may warp head because of uneven heat. Heating cylinder head to a temperature greater than 300°F (150°C), may loosen valve seats.

2. Turn cylinder head over. Working from combustion chamber side of head, drive valve guide out toward camshaft side of head. Ensure hammer force is directly in line with valve guide to prevent damaging driver. If valve guide does not move, drill valve guide using a 5/16" (8.0 mm) drill bit, then try to drive it out again.

CAUTION: Drill guides in extreme cases only. Cylinder head damage can occur if

valve guide breaks.**Valve Guide Installation**

1. Chill new valve guides in freezer for about one hour. Remove new valve guides from freezer as needed. Apply thin coat of engine oil to outside of valve guide.
2. Install valve guides from camshaft side of cylinder head. Drive each guide into heated cylinder head to specified height. See **CYLINDER HEAD** table under ENGINE SPECIFICATIONS. If replacing all valve guides, reheat cylinder head as necessary.
3. Using cutting oil, ream valve guides by rotating 6.6-mm Valve Guide Reamer (07984-657010D) clockwise the full length of valve guide bore. Continue to rotate reamer clockwise during reamer removal. Wash valve guide sufficiently in detergent and water to remove all cutting residue. Ensure valve stem-to-guide oil clearance is as specified and valve slides easily in guide. See **CYLINDER HEAD** table under ENGINE SPECIFICATIONS.

NOTE: Always reface valve seat after replacing valve guide.

Valve Seats

Valve seats are not replaceable.

Valves

Inspect valve for wear or burning. Measure valve dimensions after refacing. Replace any valve that exceeds service limit specification. See **VALVES & VALVE SPRINGS** table under ENGINE SPECIFICATIONS. Insert valve into head and measure valve stem installed height. Measure valve stem installed height after refinishing valve or seat.

Valve Seat Correction Angles

Replace valve guides, if necessary, before refacing valve seats. Using a 45-degree valve seat cutter, carefully cut seat. Remove only enough material to ensure a smooth and concentric seat. Using Prussian Blue compound, ensure valve seating surface is centered on seat. After refacing, if seat width is too wide, use 60-degree stone to raise seat, or 30-degree stone to lower seat. Final cut should always be made with 45-degree cutter to remove possible burrs. See **CYLINDER HEAD** table under ENGINE SPECIFICATIONS.

Valve Stem Installed Height

After servicing valves, insert valve in cylinder head and measure valve stem installed height. See **Fig. 10**. See **VALVES & VALVE SPRINGS** table under ENGINE SPECIFICATIONS. If valve stem installed height exceeds service limit, replace valve and recheck. If valve stem installed height still exceeds limit, valve seat in head is too deep and cylinder head must be replaced.

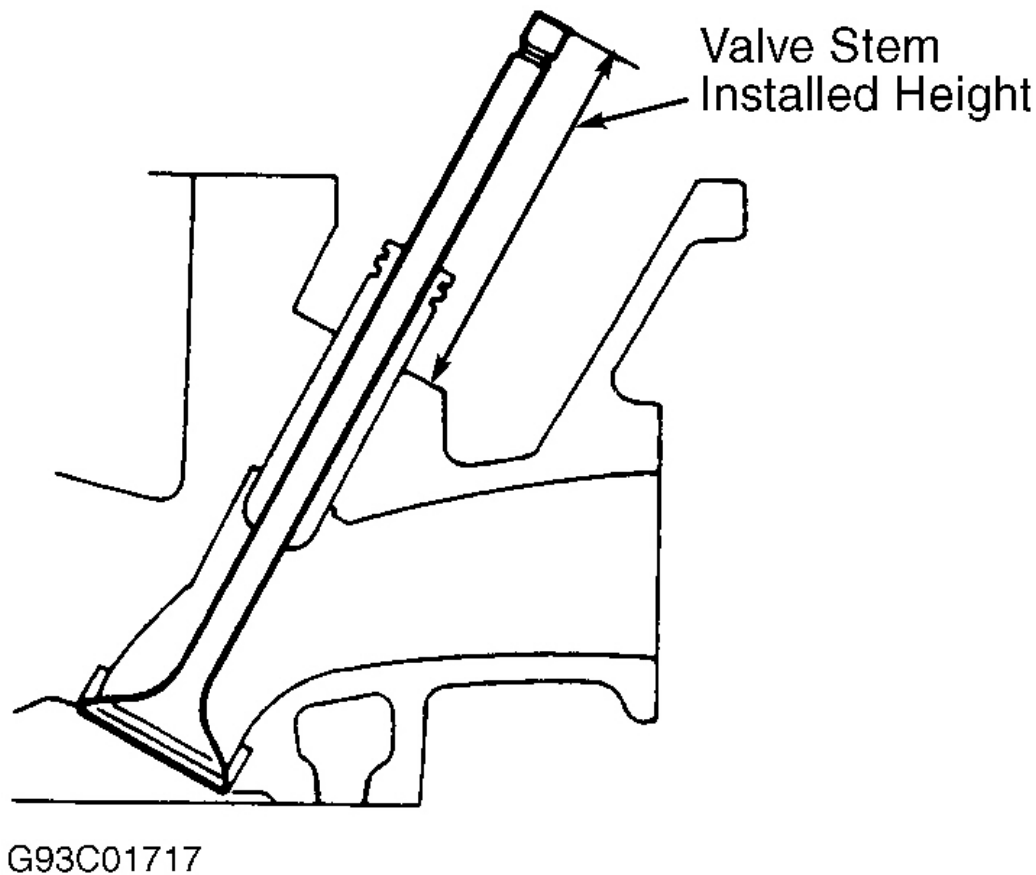


Fig. 10: Measuring Valve Stem Installed Height
Courtesy of AMERICAN HONDA MOTOR CO., INC.

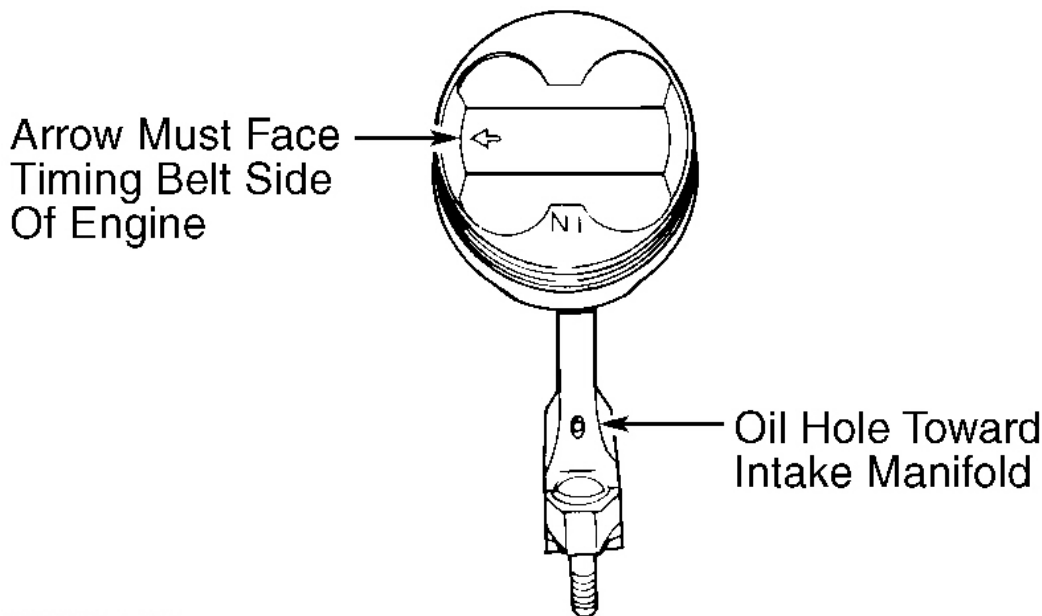
CYLINDER BLOCK ASSEMBLY

NOTE: Reference numbers on connecting rods are for big end bore code, and do not indicate rod position in engine.

Piston & Connecting Rod Assembly

1. Each rod is sorted into one of 4 tolerance ranges between 0.0 and 0.0009" (0.0 and 0.024 mm) in 0.0002" (0.006 mm) increments. Depending on big end bore size, a number between 1 and 4 is stamped on side of connecting rod big end. Any combination of numbers may be found in any engine and numbers do not refer to cylinder position. Stamped number is positioned so that half is on the connecting rod and half is on the bearing cap. Normal big end bore size is 1.89" (48.0 mm).
2. Install piston onto connecting rod so oil hole in shank of connecting rod will be positioned on intake side

of engine. Install piston and connecting rod assembly with arrow on top of piston pointing toward timing belt. See [Fig. 11](#). See **PISTON PIN INSTALLATION**.



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Fig. 11: Positioning Piston Onto Connecting Rod
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Fitting Pistons

1. Remove all rings from piston. Clean piston thoroughly. Inspect piston for distortion and cracks. Measure piston skirt diameter 0.59" (15.0 mm) from bottom of piston. If diameter is not within specification, replace piston. See **PISTONS, PINS & RINGS** table under ENGINE SPECIFICATIONS.
2. Measure cylinder wear and taper in 2 directions, 90 degrees apart and at 3 levels (top, middle and bottom of cylinder). If measurement in any cylinder exceeds service limit, replace cylinder block. Piston-to-cylinder clearance is the difference between piston diameter and cylinder bore. See **PISTONS, PINS & RINGS** and **CYLINDER BLOCK** tables under ENGINE SPECIFICATIONS.
3. If piston clearance is close to or exceeds service limit, inspect cylinder block for excessive wear. Replace piston(s) and or block as necessary.

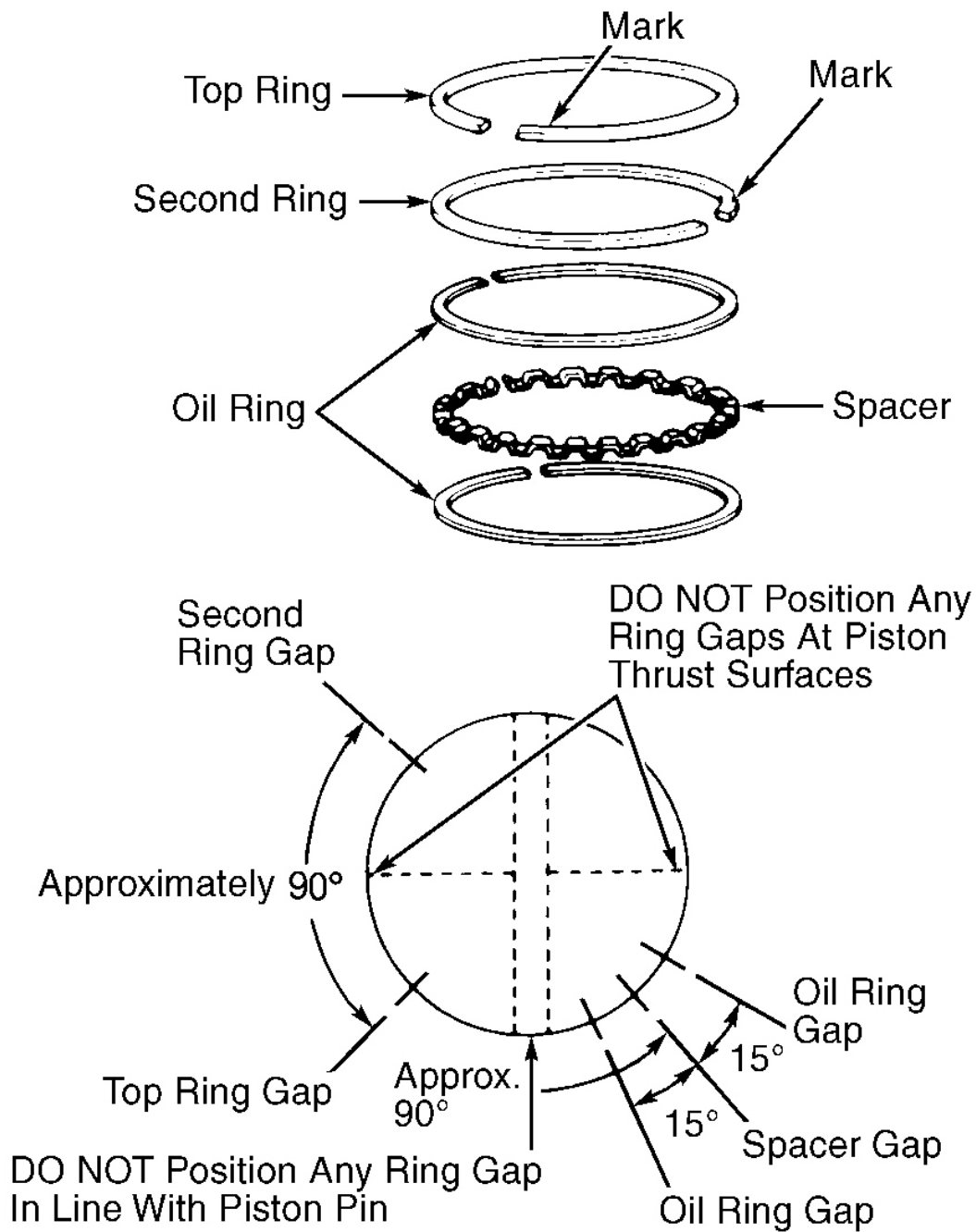
Piston Rings

1. Using inverted piston, push NEW piston ring into cylinder bore 0.59-0.79" (15.0-20.0 mm) from bottom. Measure piston ring end gap using a feeler gauge. Repeat for each ring. See **PISTONS, PINS & RINGS** table under ENGINE SPECIFICATIONS.

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2. Clean piston ring grooves thoroughly. Install piston rings with identification mark facing up. Using a feeler gauge, measure piston ring side clearance between ring and ring groove. If ring grooves are excessively worn, replace piston. See **PISTONS, PINS & RINGS** table under ENGINE SPECIFICATIONS. If piston and connecting rod are to be separated, DO NOT install rings until after reassembly. Ensure piston ring end gaps are properly aligned on piston. See **Fig. 12**.



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Fig. 12: Aligning Piston Rings

Courtesy of AMERICAN HONDA MOTOR CO., INC.

Piston Pin Removal

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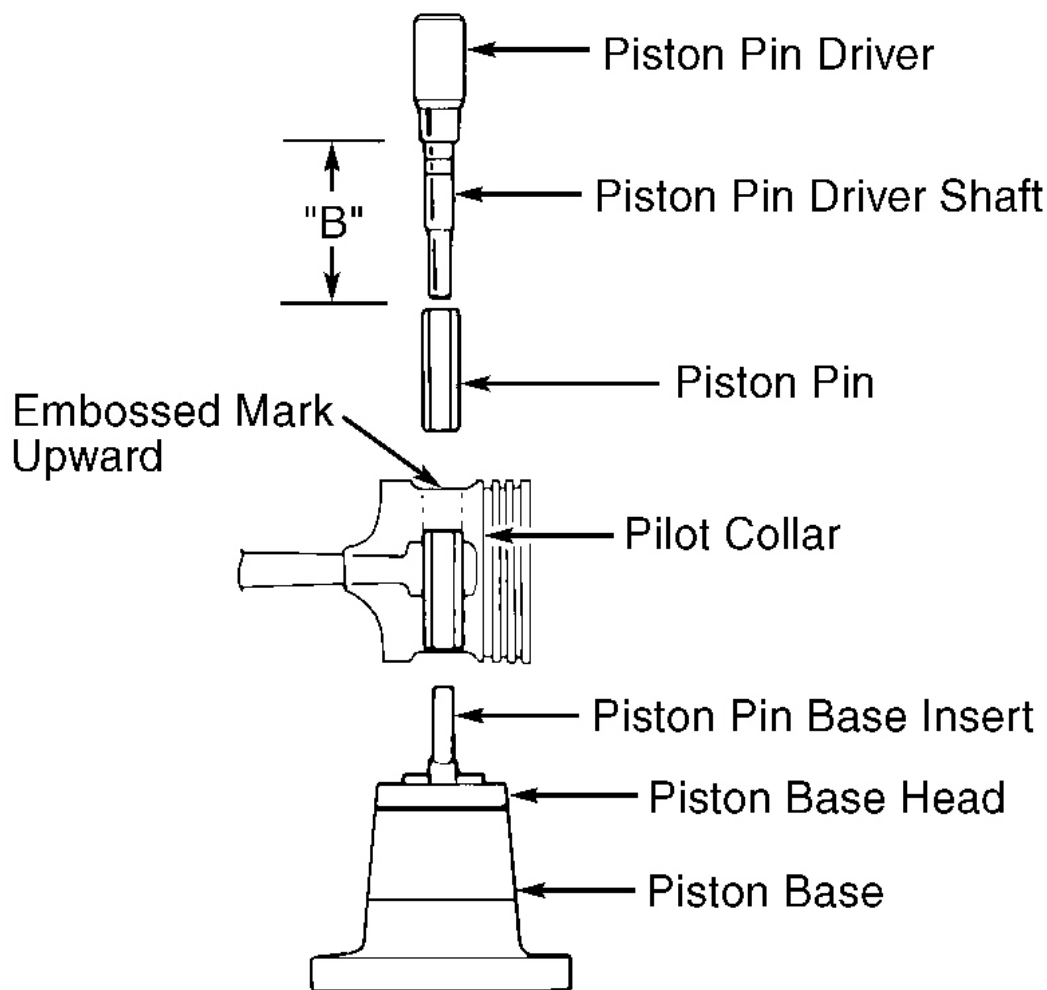
1. Install Piston Base Head (07HAF-PL20102) and Piston Pin Base Insert (07GAF-PH60300) into Base (07973-6570500). Turn handle on Piston Pin Driver Head (07973-PE00320) so piston pin driver shaft length "B" is 1.957" (49.70 mm). See **Fig. 13**.
2. Insert Piston Driver Shaft (07973-PE00310) into Pilot Collar (07LAF-PR30100). Place piston onto base with embossed side facing up. Using a hydraulic press, remove piston pin. Ensure recessed part of piston aligns with lugs on piston pin base head insert.

Piston Pin Inspection

1. Inspect piston pin for cracks, wear and heat damage. Replace as necessary. Measure piston pin diameter and piston pin bore. Piston-to-piston pin clearance is difference between both measurements. See **PISTONS, PINS & RINGS** table under ENGINE SPECIFICATIONS. If piston-to-pin clearance is greater than specification, replace piston pin with an oversize pin, and recheck clearance. Replace piston if necessary.
2. Inspect connecting rod for cracks, wear and heat damage. Replace as necessary. Measure piston pin diameter and connecting rod small end piston pin bore. Piston pin-to-connecting rod interference is difference between both measurements. See **PISTONS, PINS & RINGS** table under ENGINE SPECIFICATIONS. If pin-to-rod interference is greater than specification, replace connecting rod, and recheck interference.

Piston Pin Installation

1. When installing piston onto connecting rod, ensure arrow on top of piston faces timing belt end of engine, and oil hole on connecting rod faces intake side of engine. See Fig. 11. Turn handle on Piston Pin Driver Head (07973-PE00320) so Piston Pin Driver Shaft (07973-PE00310) length "B" is 1.957" (49.70 mm). See **Fig. 13**.
2. Install Pilot Collar (07LAF-PR30100) into piston and connecting rod. Place piston onto base with embossed side facing up. Ensure recessed portion of piston is aligned with lugs on piston base head. See **Fig. 13**. Lightly lubricate new piston pin. Using a hydraulic press and piston pin driver shaft, install piston pin.



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Fig. 13: Installing Piston Pin

Courtesy of AMERICAN HONDA MOTOR CO., INC.

CAUTION: If connecting rod or main bearing codes are unreadable because of an accumulation of dirt, do not scrub with a wire brush or scraper. Clean only with solvent or detergent.

NOTE: A number is stamped on side of each connecting rod and cap as a code indicating connecting rod bore. A letter or bars is stamped on crankshaft counterweights as a code indicating connecting rod journal diameter. See [Fig. 14](#). Both codes are necessary when ordering replacement bearings. Bearing color code is located on edge of bearing.

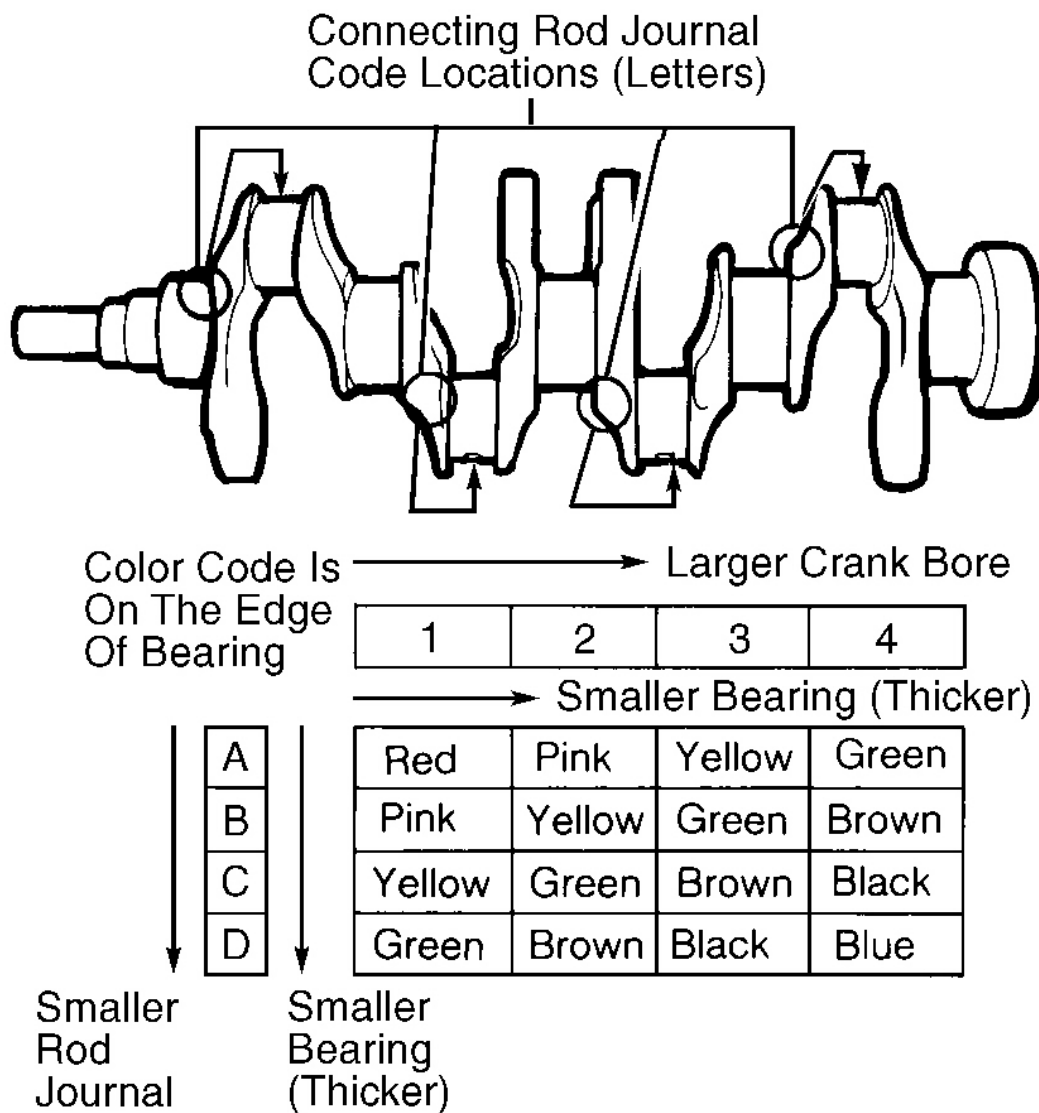
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Rod Bearings

NOTE: **DO NOT rotate crankshaft during bearing-to-journal oil clearance inspection.**
DO NOT file, shim or scrape bearings or caps to modify oil clearance.

1. Remove connecting rod cap and bearing half. Clean crankshaft rod journal and bearing half with a clean shop towel. Place one strip of Plastigage across rod journal and install bearing and connecting rod cap. Tighten connecting rod cap nuts to specification. See **TORQUE SPECIFICATIONS**. Remove cap and measure widest part of Plastigage to determine bearing oil clearance. See **CRANKSHAFT, MAIN & CONNECTING ROD BEARINGS** table under ENGINE SPECIFICATIONS.
2. If oil clearance is incorrect, remove bearing. Install a new bearing with same color code and recheck oil clearance. See **Fig. 14**. If oil clearance is still incorrect, install next larger or smaller bearing set (color listed larger or smaller). Measure oil clearance again. If proper oil clearance cannot be obtained by using appropriate larger or smaller bearings, replace crankshaft and repeat procedure.



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Fig. 14: Connecting Rod Journal & Bearing Identification Codes
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Crankshaft & Main Bearings

NOTE: DO NOT rotate crankshaft during bearing-to-journal oil clearance inspection.
DO NOT file, shim or scrape bearings or caps to modify oil clearance.

NOTE: If engine is in vehicle, support crankshaft under counterweights using a jack,

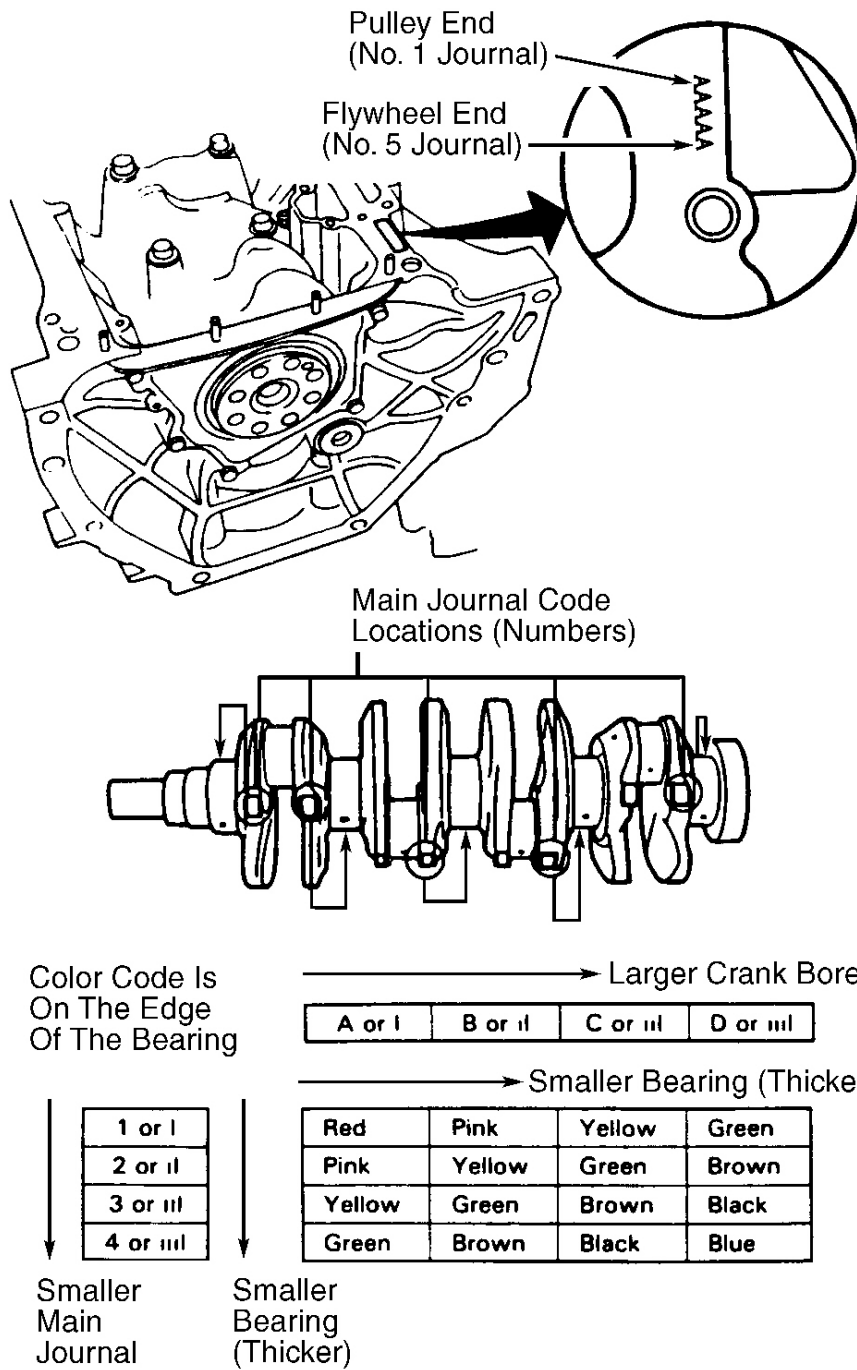
and measure only one bearing at a time. Weight of flywheel and crankshaft will cause an incorrect measurement reading.

1. Loosen the main bearing cap bolts 1/3 turn at a time, in reverse order of tightening sequence, until all bolts are loosened. See **Fig. 16**. Remove main bearing cap bolts and bearing caps. Mark all bearing caps for reassembly reference.
2. Clean each main journal and bearing half with a clean shop towel. Place one strip of Plastigage across each main journal. Install bearing caps. Coat bolt threads with engine oil and install bolts. Tighten bolts to specification, in sequence, in 2 steps. See **TORQUE SPECIFICATIONS**.
3. Remove main bearing caps. Measure widest part of Plastigage to determine bearing oil clearance. See **CRANKSHAFT, MAIN & CONNECTING ROD BEARINGS** table under ENGINE SPECIFICATIONS. If oil clearance is incorrect, remove crankshaft and bearing (remove engine if still in vehicle). Install a new bearing set with same color code, and recheck oil clearance. See **Fig. 15**.
4. If oil clearance is still incorrect, install next larger or smaller bearing (color listed larger or smaller). Measure oil clearance again. If proper oil clearance cannot be obtained by using appropriate larger or smaller bearings, replace crankshaft and repeat procedure.
5. Lift crankshaft from block. DO NOT damage journals. Clean crankshaft oil passages using pipe cleaners or other suitable brush. Ensure keyway and threads are okay. Support crankshaft in "V" blocks or lathe and rotate crankshaft at least 2 complete turns during runout measurements.
6. Measure runout at each main journal. Measure out-of-round in 2 places at middle of each connecting rod and main journal. Measure taper at edge of each connecting rod and main journal. If any measurement exceeds service limit, replace crankshaft. See **CRANKSHAFT, MAIN & CONNECTING ROD BEARINGS** table under ENGINE SPECIFICATIONS.

NOTE: Letters have been stamped on end of cylinder block as a code indicating each main journal bore size. Numbers or bars have been stamped on crankshaft, indicating each crankshaft main journal diameter. See **Fig. 15**. Both codes are necessary when ordering replacement bearings. Bearing color code is located on edge of bearing. If using bearing halves of different colors, it does not matter which color is top or bottom.

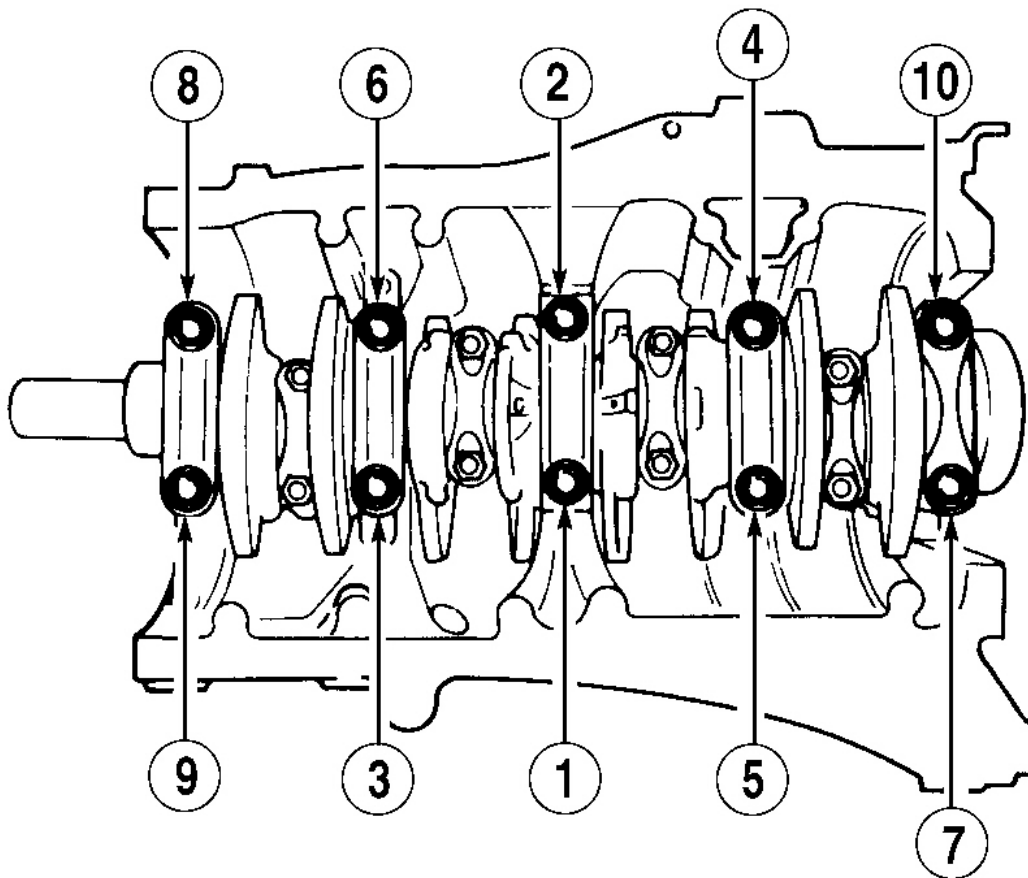
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Fig. 15: Crankshaft Main Journal & Bearing Identification Codes
Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 16: Main Bearing Cap Bolts Tightening Sequence
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

Thrust Washers

Measure crankshaft end play using a dial indicator. See **CRANKSHAFT, MAIN & CONNECTING ROD BEARINGS** table under ENGINE SPECIFICATIONS. If end play exceeds specification, inspect thrust washers and thrust surface of crankshaft journal No. 4. Replace worn components as necessary. Thrust washer thickness is fixed and cannot be changed by grinding or shimming. Install thrust washers with grooved side out.

CAUTION: Whenever any crankshaft bearing or connecting rod bearing is replaced, it is necessary to start engine and idle with no loads and transmission in Park or Neutral, until radiator fan comes on. Allow engine to idle for an additional 15 minutes.

Cylinder Block

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Check cylinder block deck surface for warpage. Measure top of cylinder block along 4 edges and 3 ways across center (corner to corner). See **CYLINDER BLOCK** table under ENGINE SPECIFICATIONS. Measure cylinder wear and taper in 2 directions, 90 degrees apart and at 3 levels (top, middle and bottom of cylinder). If any cylinder block measurement exceeds service limit, replace cylinder block. See **CYLINDER BLOCK** table under ENGINE SPECIFICATIONS.

ENGINE OILING

ENGINE LUBRICATION SYSTEM

A rotor-type oil pump draws oil from oil pan and delivers it under pressure to main and connecting rod bearings. An oil hole in each connecting rod lubricates thrust side of piston and cylinder wall. An oil passage carries oil to camshaft and rocker arms. Oil spray lubricates valve stems.

Crankcase Capacity

Crankcase capacity is 4 qts. (3.8L) including filter. During overhaul, capacity including filter is 4.9 qts. (4.6L).

Checking Oil Pressure

1. If oil pressure warning light stays on when engine is running, ensure oil level is correct. If oil level is correct, connect a tachometer. Remove oil pressure switch located below oil filter, and install an oil pressure gauge. Start engine. Shut engine off immediately if no oil pressure is indicated. Repair as necessary.
2. If oil pressure is indicated, allow engine to idle with no loads and transmission in Park or Neutral, until radiator fan comes on twice. Measure oil pressure with engine temperature at 176°F (80°C). At idle, minimum oil pressure should be 10 psi (0.7 kg/cm²). At 3000 RPM, oil pressure should be 50 psi (3.5 kg/cm²). If oil pressure is not as specified, inspect oil pump. Repair as necessary.

OIL PUMP

Removal & Disassembly

1. Support and Raise vehicle. Drain engine oil. Rotate crankshaft counterclockwise until White groove on crankshaft pulley is aligned with pointer on lower timing belt cover. Remove valve cover and middle timing belt cover. Remove accessory drive belts.
2. Remove crankshaft pulley and lower timing belt cover. Remove timing belt. See **TIMING BELT** under REMOVAL & INSTALLATION. Remove timing belt drive pulley. Remove oil pan, oil screen and oil pump housing. See **Fig. 17**. Remove pump cover from pump rotors. Remove crankshaft front oil seal and "O" ring.

Inspection

1. Check pump clearances. See **OIL PUMP SPECIFICATIONS** table. If inner rotor-to-outer rotor clearance exceeds service limit, replace inner and outer rotors. Using a straightedge and feeler gauge, check pump housing-to-rotor axial clearance. If axial clearance exceeds service limit, replace inner and

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outer rotors and/or pump housing. If pump housing-to-outer rotor radial clearance exceeds service limit, replace inner and outer rotors and/or pump housing. Remove rotors and examine for wear or damage.

2. Remove relief valve sealing bolt and spring. See **Fig. 17**. Ensure relief valve slides freely in housing bore. Replace relief valve scored.

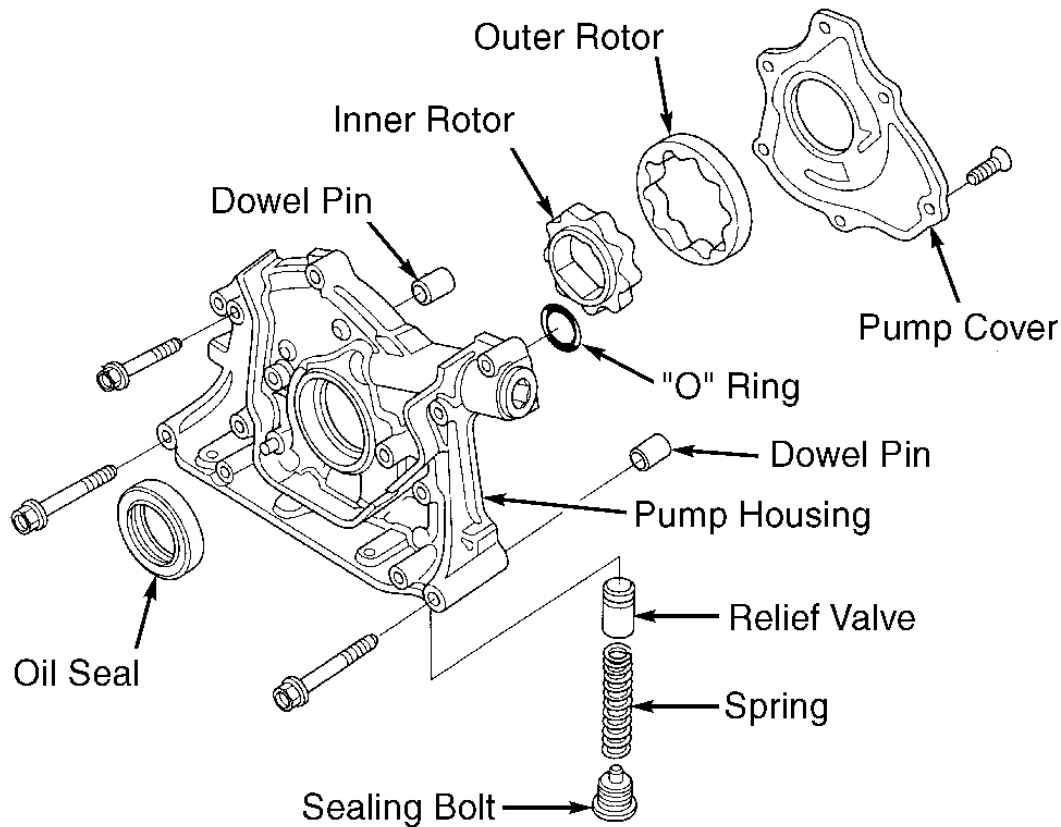
NOTE: If components are not installed within 5 minutes of applying liquid gasket sealer, sealer must be removed and reapplied. After assembly, wait at least 20 minutes before filling engine with oil.

Reassembly & Installation

1. Ensure all mating surfaces are clean and dry. Replace crankshaft oil seal using Seal Driver (07LAD-PT3010A). Position rotors into pump housing. Install rotor cover on pump housing. Apply liquid thread lock to cover screws, and tighten to specification. See **TORQUE SPECIFICATIONS**. Ensure oil pump turns freely. Fit dowel pins into pump housing.
2. Apply engine light coat of oil to NEW "O" ring and install in pump housing. Apply light coat of grease to lip of crankshaft oil seal. See **Fig. 17**. Apply liquid gasket sealer in a thin bead centered on mating surface of pump housing. DO NOT apply liquid gasket to "O" ring grooves. Apply liquid gasket sealer to inner threads of bolts.
3. Install pump onto crankshaft and ensure crankshaft oil seal lip is not distorted. Tighten bolts to specification. See **TORQUE SPECIFICATIONS**. To complete installation, reverse removal procedure.

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Fig. 17: Identifying Oil Pump Components
Courtesy of AMERICAN HONDA MOTOR CO., INC.

OIL PUMP SPECIFICATIONS

Application	Specification
Inner Rotor-To-Outer Rotor Radial Clearance	
Standard	0.0016-0.0063" (0.040-0.160 mm)
Service Limit	0.0079" (0.200 mm)
Pump Housing-To-Rotor Axial Clearance	
Standard	0.0008-0.0028" (0.020-0.070 mm)
Service Limit	0.0059" (0.150 mm)
Pump Housing-To-Outer Rotor Radial Clearance	
Standard	0.0039-0.0075" (0.100-0.190 mm)
Service Limit	0.0079" (0.200 mm)
Minimum Oil Pressure At 176°F (80°C)	
At Idle	10 psi. (0.7 kg/cm ²)

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At 3,000 RPM

50 psi. (3.5 kg/cm²)**TORQUE SPECIFICATIONS****TORQUE SPECIFICATIONS**

Application	Ft. Lbs. (N.m)
A/C Compressor Bracket-To-Engine 10-mm Bolts	33 (45)
A/C Compressor Mounting Bolts	18 (24)
A/C Drive Belt Idler Pulley Adjusting 8-mm Bolt Lock Nut	18 (24)
A/C Drive Belt Idler Pulley Bracket 10-mm Bolt	33 (45)
Battery Tray	18 (24)
Camshaft Pulley 8-mm Bolts	27 (37)
Connecting Rod Cap Nuts	23 (31)
Crankshaft Main Bearing Cap Bolts	
First Step	18 (24)
Second Step	56 (76)
Crankshaft Pulley 14-mm Bolt	130 (177)
Cylinder Head Bolts	
First Step	22 (30)
Second Step	63 (85)
Distributor Mounting Bolts	18 (24)
Drive Plate	54 (73)
Engine Block Coolant Drain Plug	58 (79)
Engine Mounts	
LF Mount-To-Frame 10-mm Bolts	33 (44)
LF Mount-To-Engine 12-mm Through-Bolt	61 (83)
LF Mount Through-Bolt 12-mm Nut ⁽¹⁾	43 (59)
Rear Mount-To-Bracket 12-mm Through-Bolt ⁽¹⁾	43 (59)
Rear Mount-To-Frame 10-mm Bolts	47 (64)
Rear Mount Bracket-To-Engine 12-mm Bolt ⁽¹⁾	43 (59)
Rear Mount Bracket-To-Engine 14-mm Bolts ⁽¹⁾	61 (83)
RF Mount/Bracket-To-Engine 12-mm Bolts ⁽¹⁾	47 (64)
RF Mount-To-Bracket 12-mm Through-Bolt	61 (83)
RF Mount Bracket 12-mm Nut ⁽¹⁾	43 (59)
RF Mount-To-Frame 10-mm Bolts	33 (44)
Side Mount-To-Frame 10-mm Bolts	33 (44)
Side Mount Bracket-To-Engine 10-mm Bolts	40 (54)
Side Mount Upper Bracket 12-mm Nuts	54 (73)
Stiffener 8-mm Bolts	18 (24)

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Stiffener 10-mm Bolt	33 (44)
Transmission-To-Engine Bracket 12-mm Nuts	47 (64)
Transmission Mount-To-Frame 12-mm Bolts	47 (64)
Transmission Mount 12-mm Through-Bolt	54 (73)
Exhaust Manifold	
Manifold Bracket Bolts	33 (44)
Manifold Cover Bolts	(2)
Manifold-To-Cylinder Head 8-mm Nuts ⁽¹⁾	23 (31)
Flywheel	76 (103)
Front Exhaust Pipe-To-Hanger 8-mm Nuts ⁽¹⁾	12 (16)
Front Exhaust Pipe-To-Manifold 10-mm Nuts ⁽¹⁾	40 (54)
Front Exhaust Pipe-To-Rear Pipe 8-mm Nuts ⁽¹⁾	16 (22)
Fuel Filter 12-mm Banjo Bolt	25 (34)
Generator Bracket-To-Engine 10-mm Bolts	33 (44)
Generator Mounting (Lock Nut) 8-mm Nut	17 (23)
Generator Mounting 10-mm Nut	33 (44)
Guard Bar/Splash Shield	
8-mm Bolts	18 (24)
6-mm Bolts	(2)
Intake Manifold	
Intake Air Control (IAC) Valve-To-Manifold Bolt	16 (22)
Intake Air Temp. (IAT) Sensor-To-Manifold	16 (22)
Manifold Bracket Bolts	18 (24)
Manifold-To-Cylinder Head 8-mm Bolts/Nuts	18 (24)
Throttle Body-To-Manifold	16 (22)
Oil Pan Drain Plug	33 (44)
Oil Pump Housing	
6-mm Bolts	(2)
8-mm Bolts	18 (24)
Oil Pump Relief Valve Sealing Bolt	29 (39)
P/S Pump Mounting 8-mm Bolts	18 (24)
P/S Pump Mounting Bracket-To-Engine 10-mm Bolts	33 (44)
Primary HO2S-1	33 (44)
Shift Cable Cover	16 (22)
Timing Belt Adjusting 10-mm Bolt	40 (54)
Transmission Drain Plug	36 (49)
Valve Adjusting Screw Lock Nut	18 (24)
INCH Lbs. (N.m)	
A/C Hose Clamp	86 (10)

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Air Cleaner Housing	86 (10)
Baffle Plate	86 (10)
Camshaft Holder Bolts	86 (10)
Camshaft Speed Fluctuation (CKF) Sensor Bolts	97 (11)
Catalytic Converter Heat Shield	86.7 (9.8)
Generator Terminal Nut	71 (8)
Lower Cover & Middle Cover Bolts	86.7 (9.8)
Oil Pan	104 (12)
Oil Pump Cover Plate Screws	48 (5)
Oil Screen/Pickup	86.7 (9.8)
PCM Wire Harness Firewall Grommet Nuts	97 (11)
Right Side Cover	86.7 (9.8)
Transmission Ground Cable	86.7 (9.8)
Valve Cover Nuts	86.7 (9.8)

(1) Replace nuts/bolts, DO NOT reuse.

(2) Tighten to 86.7 INCH lbs. (9.8 N.m).

ENGINE SPECIFICATIONS**GENERAL SPECIFICATIONS****GENERAL SPECIFICATIONS**

Application	Specification
Displacement	120 Cu. In. (2.0L)
Bore	3.31" (84-mm)
Stroke	3.50" (89-mm)
Compression Ratio	9.6:1
Fuel System	MPFI

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

Application	In. (mm)
Crankshaft	
End Play	
Standard	0.004-0.014 (0.10-0.35)
Service Limit	0.018 (0.45)
Total Runout	
Standard	0.0012 (0.030)
Service Limit	0.0016 (0.040)
Connecting Rod	

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Large End Nominal Bore Size	1.89 (48.0)
Small End Bore Size	0.8255-0.8260 (20.968-20.981)
End Play	
Standard	0.006-0.012 (0.15-0.30)
Service Limit	0.016 (0.40)
Journal Diameter	1.7707-1.7717 (44.976-45.000)
Journal Out-Of-Round	
Standard	0.0002 (0.005)
Service Limit	0.0004 (0.010)
Journal Taper	
Standard	0.0002 (0.005)
Service Limit	0.0004 (0.010)
Journal Oil Clearance	
Standard	0.0008-0.0015 (0.020-0.038)
Service Limit	0.0020 (0.050)
Main Bearings	
Journal Diameter	
Except Journal No. 3	2.1664-2.1654 (54.976-55.000)
Journal No. 3	2.1642-2.1651 (54.970-54.994)
Journal Oil Clearance	
Except Journal No. 3	
Standard	0.0009-0.0017 (0.024-0.042)
Service Limit	0.0024 (0.060)
Journal No. 3	
Standard	0.0012-0.0019 (0.030-0.048)
Service Limit	0.0024 (0.060)
Journal Out-of-Round	
Standard	0.0002 (0.005)
Service Limit	0.0004 (0.010)
Journal Taper	
Standard	0.0002 (0.005)
Service Limit	0.0004 (0.010)

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

Application	In. (mm)
Pin	
Connecting Rod-To-Piston Pin Interference	0.0006-0.0013 (0.015-0.032)
Diameter	
Standard	0.8266-0.8268 (20.996-21.000)

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Oversize	0.8267-0.8268 (20.998-21.002)
Piston-To-Piston Pin Clearance	
Standard	0.0004-0.0007 (0.010-0.017)
Piston ⁽¹⁾	
Piston-To-Cylinder Clearance	0.0004-0.0016 (0.010-0.040)
Diameter	
Standard	3.3063-3.3067 (83.980-83.990)
Service Limit	3.3059 (83.970)
Ring Groove Width	
First Ring	
Standard	0.0488-0.0492 (1.240-1.250)
Service Limit	0.0496 (1.260)
Second Ring	
Standard	0.0480-0.0484 (1.220-1.230)
Service Limit	0.0492 (1.250)
Oil Ring	
Standard	0.1104-0.1112 (2.805-2.825)
Service Limit	0.1118 (2.840)
Rings	
End Gap	
Top Ring	
Standard	0.008-0.012 (0.20-0.30)
Service Limit	0.024 (0.60)
Second Ring	
Standard	0.016-0.022 (0.40-0.55)
Service Limit	0.028 (0.70)
Oil Ring	
Standard	0.008-0.020 (0.20-0.50)
Service Limit	0.028 (0.70)
Groove Clearance	
Top Ring	
Standard	0.0022-0.0031 (0.055-0.080)
Service Limit	0.005 (0.13)
Second Ring	
Standard	0.0014-0.0024 (0.035-0.060)
Service Limit	0.005 (0.13)
(1) Piston diameter is measured 0.6" (15 mm) from bottom of piston skirt.	

CYLINDER BLOCK SPECIFICATIONS

2000 Honda CR-V EX

1999-2000 ENGINES 2.0L 4-Cylinder

CYLINDER BLOCK

Application	In. (mm)
Cylinder Bore⁽¹⁾	
Standard	3.3071-3.3079 (84.000-84.020)
Service Limit	3.3098 (84.070)
Taper Limit ⁽¹⁾	0.002 (0.05)
Block Warpage	
Standard	0.003 (0.07)
Service Limit	0.004 (0.10)
(1) Measure cylinder bore in 2 directions across cylinder and at 3 levels. Taper is difference between first level and third level measurements.	

CAMSHAFT SPECIFICATIONS**CAMSHAFT**

Application	In. (mm)
End Play	
Standard	0.0020-0.0059 (0.050-0.150)
Service Limit	0.02 (0.5)
Camshaft-To-Holder Oil Clearance	
Standard	0.0012-0.0027 (0.030-0.069)
Service Limit	0.0059 (0.150)
Runout	
Standard	0.0012 (0.030)
Service Limit	0.0016 (0.040)
Cam Lobe Height	
Standard	
Intake	1.3274 (33.716)
Exhaust	1.3200 (33.528)

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

Application	In. (mm)
Intake Valves	
Head Diameter	1.217-1.224 (30.90-31.10)
Length	4.087-4.098 (103.80-104.10)
Stem Diameter	
Standard	0.2591-0.2594 (6.58-6.59)
Service Limit	0.258 (6.55)
Face Width	

2000 Honda CR-V EX

1999-2000 ENGINES 2.0L 4-Cylinder

Standard	0.053-0.065 (1.35-1.65)
Service Limit	0.045 (1.15)
Installed Height	
Standard	1.6049-1.6234 (40.765-41.235)
Service Limit	1.6333 (41.485)
Stem-to-Guide Clearance	
Dial Indicator (Wobble Method) ⁽¹⁾	
Standard	0.002-0.004 (0.04-0.10)
Service Limit	0.006 (0.16)
Guide Inner Diameter/Valve Outer Diameter (Micrometer Method)	
Standard	0.001-0.002 (0.02-0.05)
Service Limit	0.003 (0.08)
Exhaust Valves	
Head Diameter	1.098-1.106 (27.90-28.10)
Length	4.094-4.106 (104.00-104.30)
Stem Diameter	
Standard	0.2579-0.2583 (6.550-6.560)
Service Limit	0.2567 (6.520)
Face Width	
Standard	0.065-0.077 (1.65-1.95)
Service Limit	0.057 (1.45)
Installed Height	
Standard	1.6837-1.7022 (42.765-43.235)
Service Limit	1.7120 (43.485)
Stem-to-Guide Clearance	
Dial Indicator Wobble Method ⁽¹⁾	
Standard	0.004-0.006 (0.10-0.16)
Service Limit	0.009 (0.22)
Guide Inner Diameter/Valve Outer Diameter	
Standard	0.0020-0.0031 (0.050-0.080)
Service Limit	0.004 (0.10)
(1) Measured with valve 0.39" (10 mm) out from seat and valve moved in direction of thrust.	

CYLINDER HEAD SPECIFICATIONS**CYLINDER HEAD**

Application	Specification
Head Height	5.195-5.199" (131.95-132.05 mm)
Warpage ⁽¹⁾	
Normal	0.002" (0.05 mm)

2000 Honda CR-V EX

1999-2000 ENGINES 2.0L 4-Cylinder

Service Limit	0.008" (0.20 mm)
Valve Seats	
Width	
Standard	0.049-0.061" (1.25-1.55 mm)
Service Limit	0.079" (2.00 mm)
Angle	(2)
Valve Guide	
Intake	
Inner Diameter	
Standard	0.260-0.261" (6.61-6.63 mm)
Service Limit	0.262" (6.65 mm)
Installed Height	0.541-0.561" (13.75-14.25 mm)
Valve Spring Free Length	1.668" (42.36 mm)
Exhaust	
Inner Diameter	
Standard	0.260-0.261" (6.61-6.63 mm)
Service Limit	0.262" (6.65 mm)
Installed Height	0.620-0.640" (15.75-16.25 mm)
Valve Spring Free Length	1.745" (44.32 mm)
(1) Based on a cylinder head height of 5.20" (132.0 mm).	
(2) Valve seat face angle is 45 degrees.	

2.0L

2000 Honda CR-V EX

2000 SYSTEM WIRING DIAGRAMS Honda - CR-V

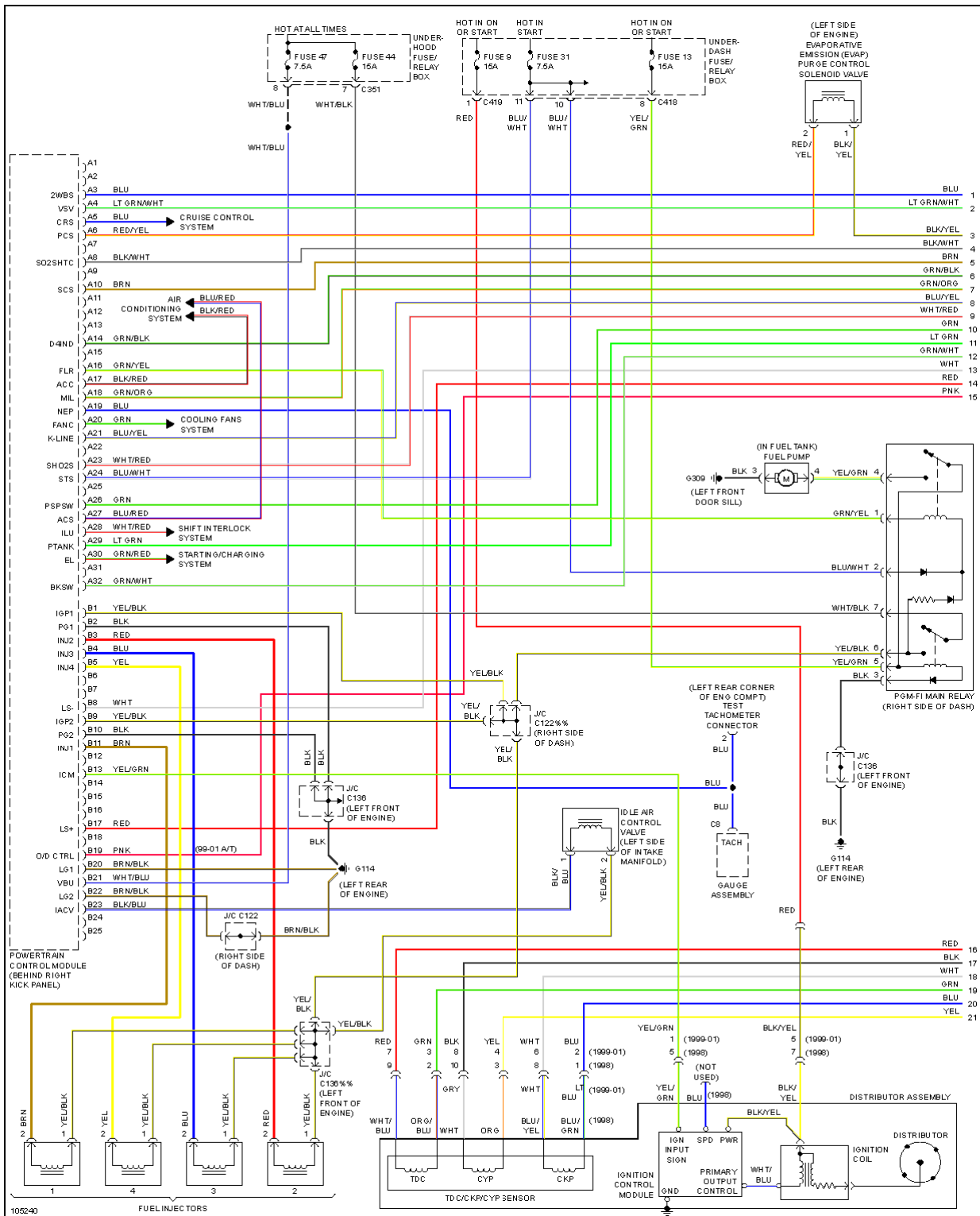


Fig. 9: 2.0L, Engine Performance Circuits (1 of 3)

2000 Honda CR-V EX

2000 SYSTEM WIRING DIAGRAMS Honda - CR-V

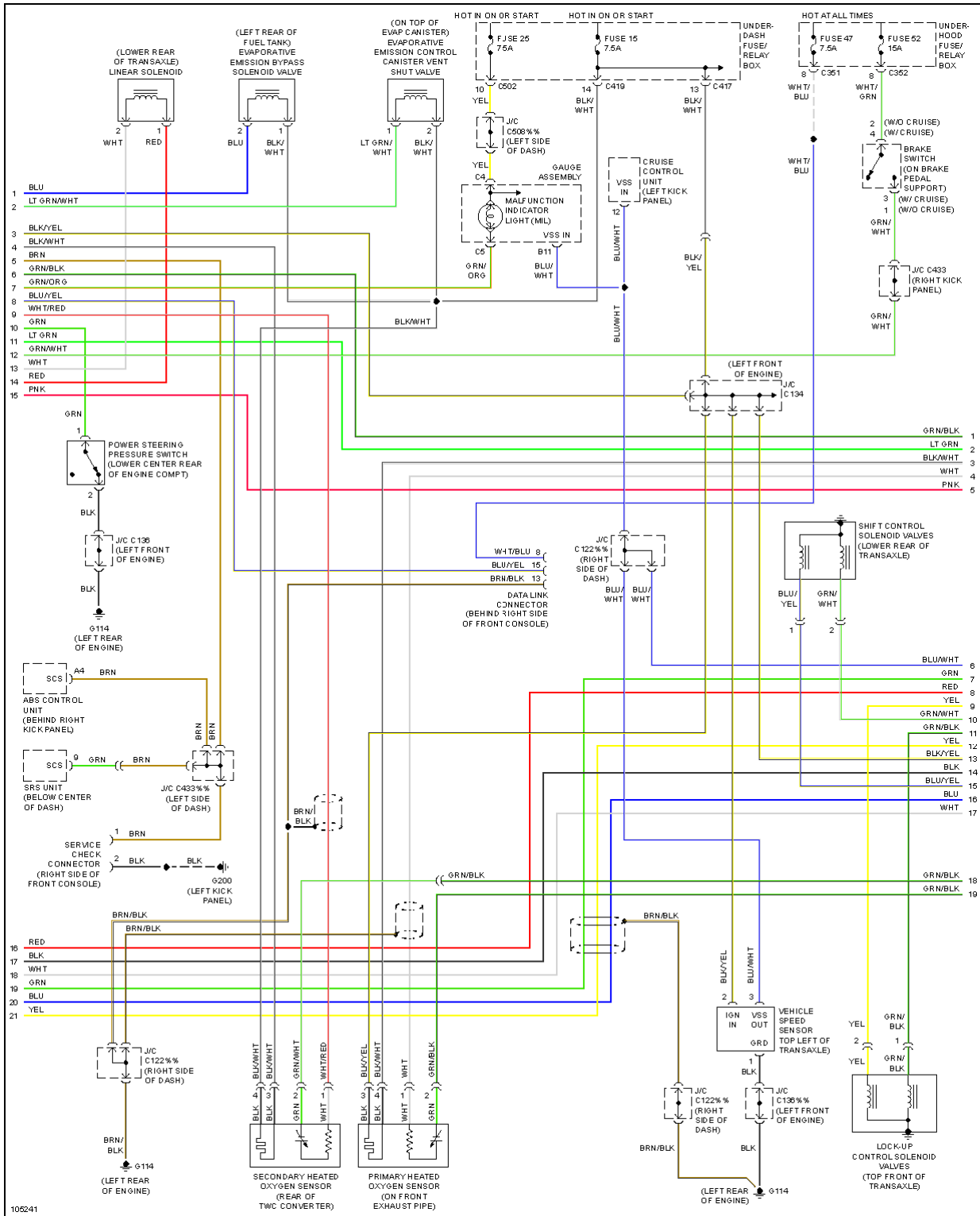


Fig. 10: 2.0L, Engine Performance Circuits (2 of 3)

2000 Honda CR-V EX

2000 SYSTEM WIRING DIAGRAMS Honda - CR-V

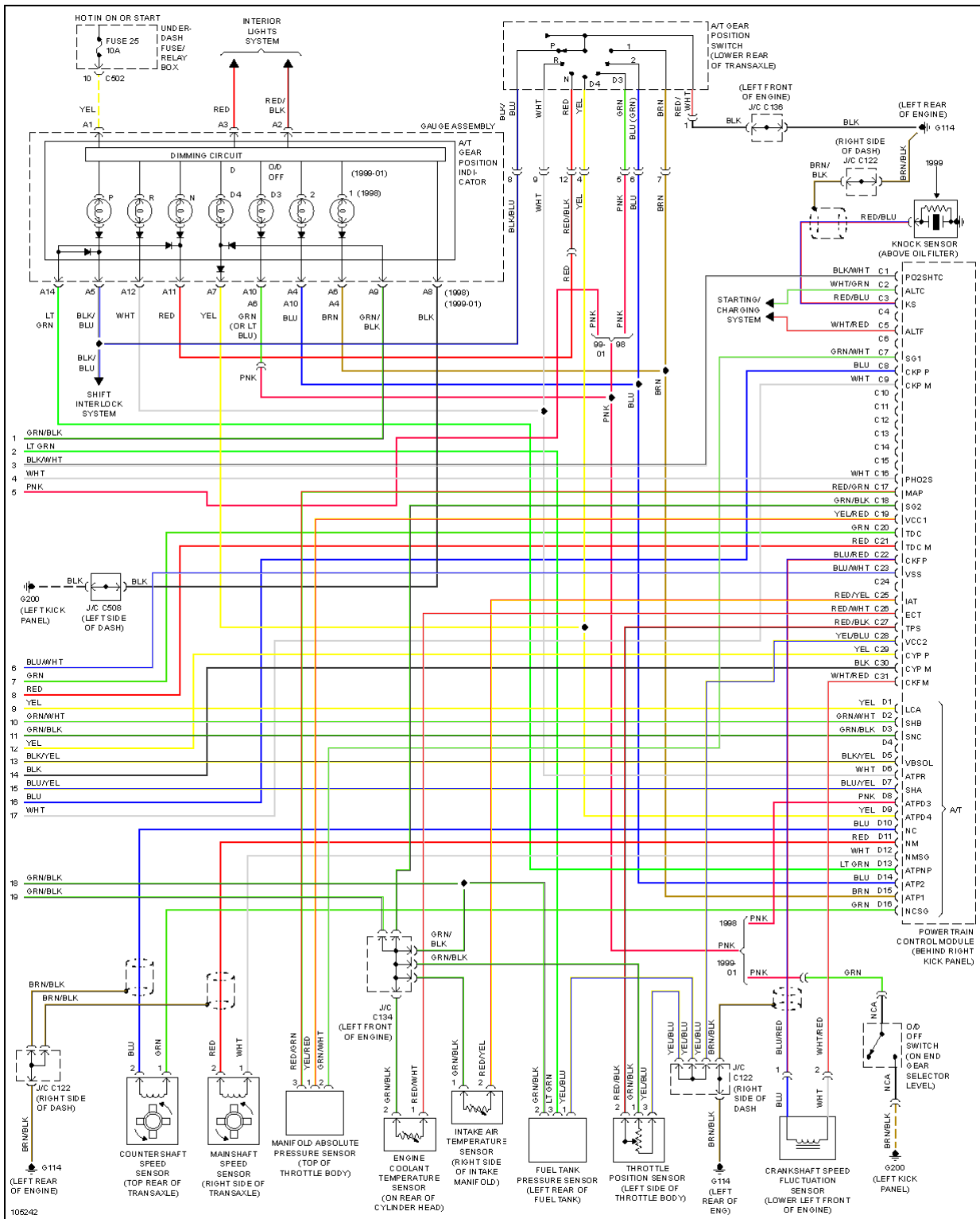


Fig. 11: 2.0L, Engine Performance Circuits (3 of 3)