

1991-2004 ENGINE

3.0L V6 - NSX & NSX-T

ENGINE IDENTIFICATION

WARNING: Vehicles are equipped with air bag supplemental restraint system. Before attempting any repairs involving steering column, instrument panel or related components, see **SERVICE PRECAUTIONS and DISABLING & ACTIVATING AIR BAG SYSTEM** in appropriate **AIR BAG RESTRAINT SYSTEMS** article.

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

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

Engine code is a 12-character number located on left rear side of engine block, below cylinder head mating surface. See **Fig. 1**. First five characters of code are for engine ID. Next seven characters of identification code indicate engine serial number. First two numbers of engine serial number signify U.S. or Canadian applications for 1991-96 vehicles. All models equipped with 3.0L engines are available only with automatic transmissions in 1997 and later vehicles. See **ENGINE CODES** table.

ENGINE CODES

Year	Engine	Engine ID ⁽¹⁾	U.S. Model Code ⁽²⁾	Canadian Model Code ⁽²⁾
1991	3.0L	C30A1	13	17
1992	3.0L	C30A1	23	27
1993	3.0L	C30A1	33	37
1994	3.0L	C30A1	43	47
1995	3.0L	C30A1	53	57
1996	3.0L	C30A1	54	58
1997-2001	3.0L	C30A1	(3)	(3)

(1) First 5 characters of engine code.

(2) First 2 numbers of engine serial number.

(3) No identification numbers to distinguish between U.S. or Canadian markets.

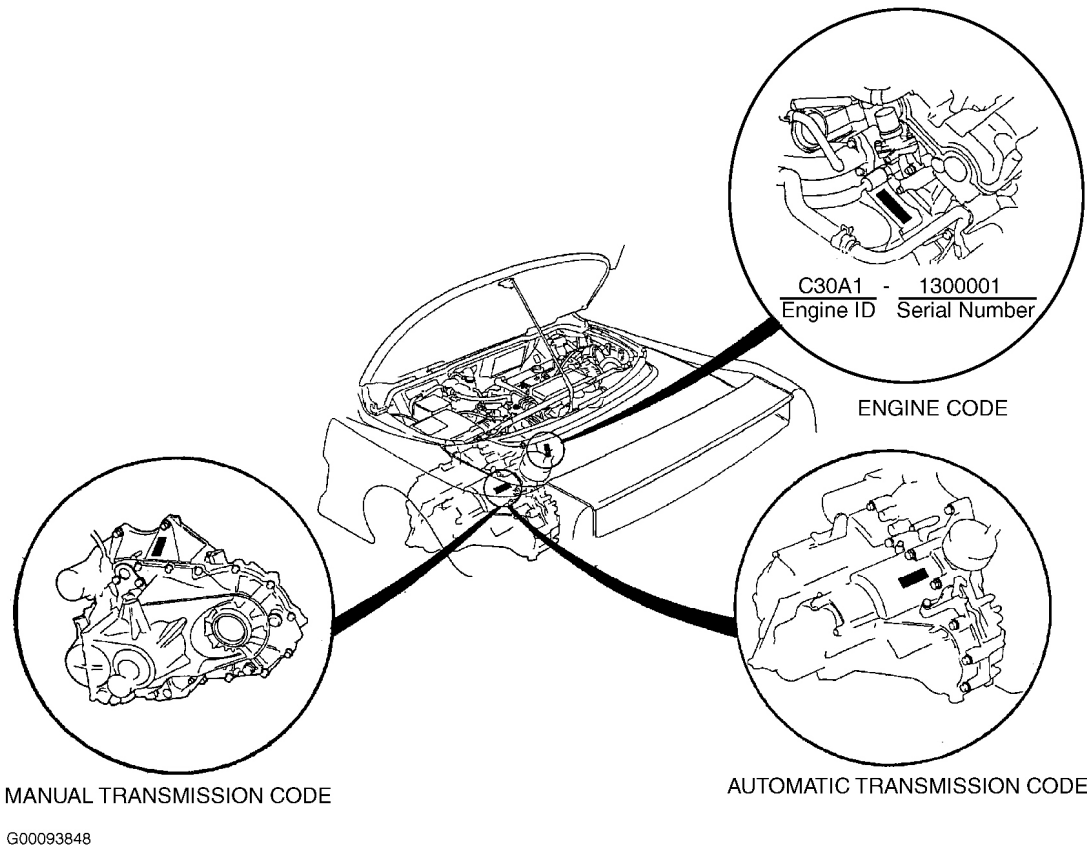


Fig. 1: Locating Engine & Transmission Codes
Courtesy of AMERICAN HONDA MOTOR CO., INC.

BLEEDING

COOLING SYSTEM

Draining & Refilling

CAUTION: To prevent personal injury, always let engine and radiator cool down before removing expansion tank cap.

NOTE: Before draining coolant, turn ignition ON and slowly tune climate control temperature knob to 90°. Turn ignition off. This will allow coolant in heater to drain out with rest of system.

1. Open hood, rear hatch and engine cover. Slowly loosen expansion tank cap to release pressure, then remove expansion tank cap.
2. Raise and support vehicle. Remove cover protecting water pipes and shift cables on underside of vehicle.

3. Loosen drain plug at bottom of radiator, and drain coolant. Remove two drain bolts from water pipes, and drain coolant. See **Fig. 2**.

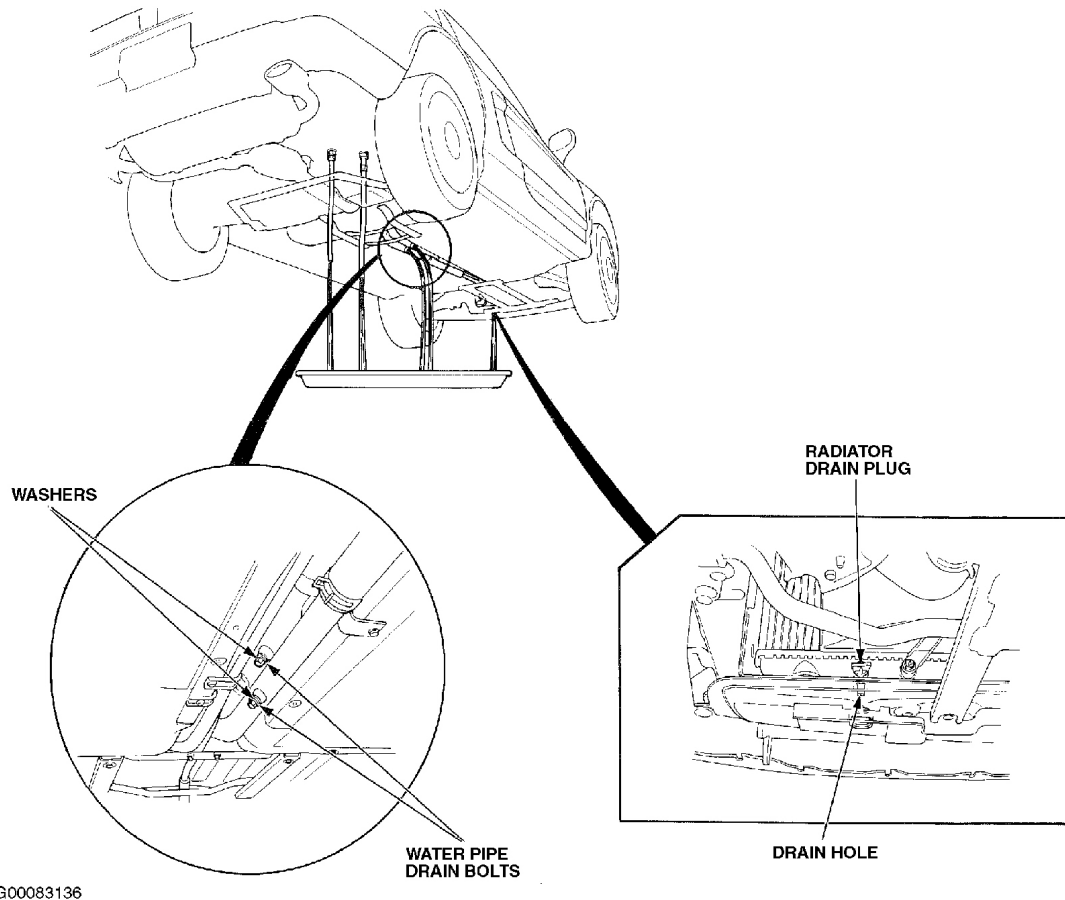


Fig. 2: Locating Radiator Drain Plug & Water Pipe Drain Bolts
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Install rubber hoses to drain bolts located at front and rear of engine under each cylinder bank. Loosen drain bolts to drain coolant. See **Fig. 3**. To drain coolant more quickly, open all bleed bolts, plug and cap AFTER coolant level in expansion tank drops completely to prevent coolant from pouring out the bleed bolts, plug and cap. See **BLEEDING**.
5. When coolant stops draining, tighten radiator drain plug, water pipe drain bolts, and engine drain bolts. Always use NEW water pipe drain bolt washers. Install cover protecting water pipes and shift cables on underside of vehicle. Lower vehicle. Refill and bleed cooling system. See **BLEEDING**.

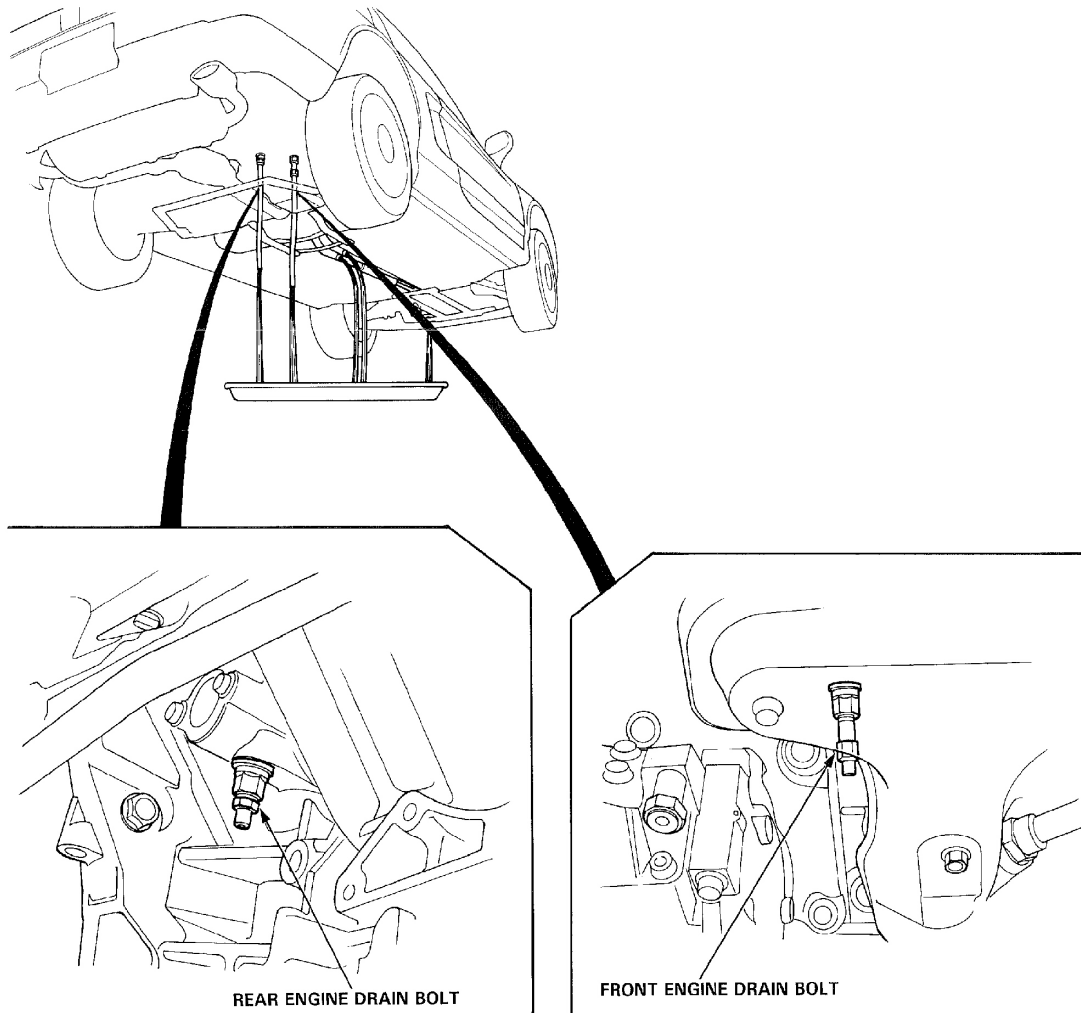
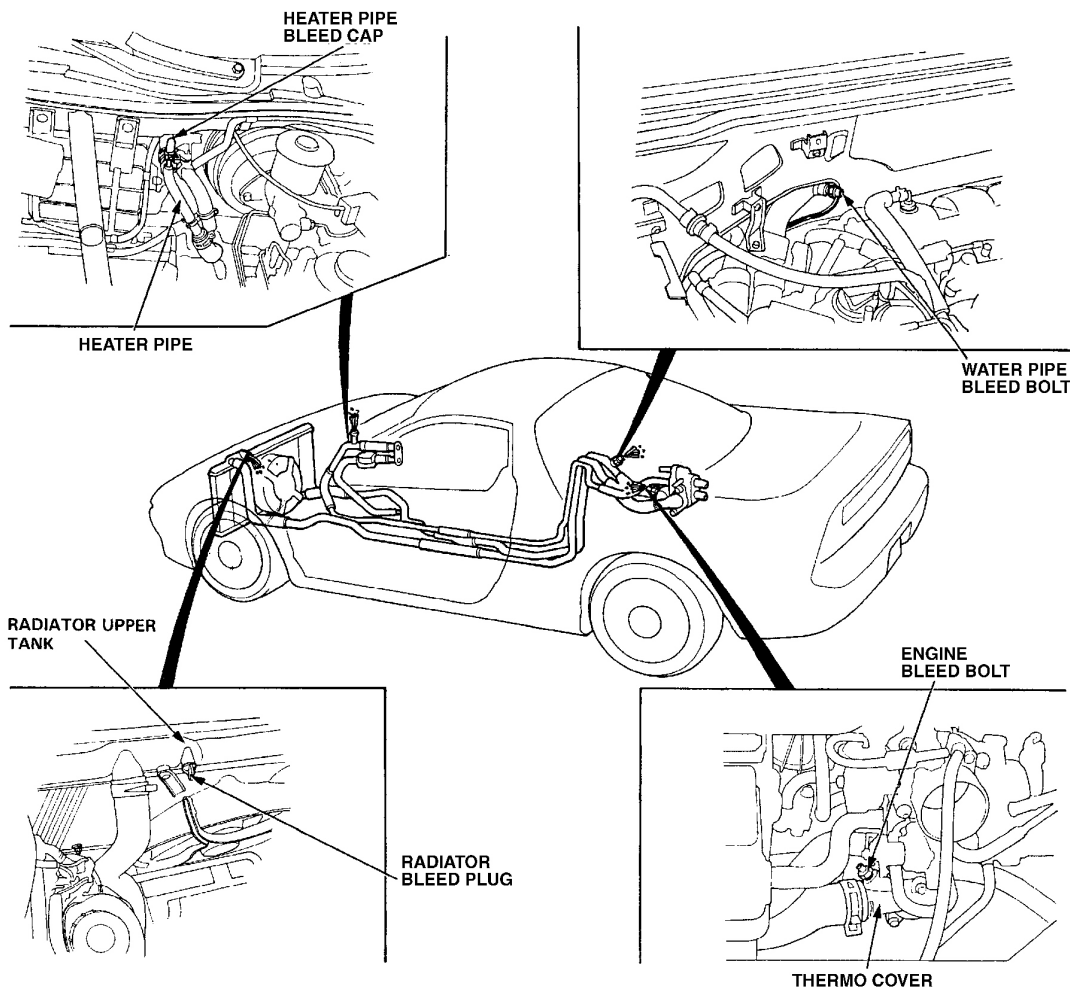


Fig. 3: Locating Engine Coolant Drain Bolts
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

Bleeding

1. Open all four bleeders: See **Fig. 4**.
 - Loosen radiator bleed plug.
 - Remove heater pipe bleed cap.
 - Loosen water pipe bleed bolt.
 - Loosen engine bleed bolt located on thermo cover.
2. Mix recommended anti-freeze/coolant with an equal amount of water in a clean container. DO NOT use additional rust inhibitors or anti-rust products due to possible incompatibility with Honda-recommended coolant.
3. Fill expansion tank with coolant. Tighten bleeders in sequence listed below as coolant starts to run out in a steady stream without bubbles. See **Fig. 4**.

- Engine bleed bolt located on thermo cover.
 - Radiator bleed plug.
 - Heater pipe bleed cap.
 - Water pipe bleed bolt.
4. After tightening all bleeders, fill expansion tank with coolant up to "MAX" line. Loosen thermo cover bleed bolt again to remove air.
 5. When bleeding is completed, retighten thermo cover bleed bolt. Add coolant to expansion tank to 1.1" (30 mm) over "MAX" line.
 6. Install expansion tank cap and turn it 60° (first lock tab of filler neck is engaged). Start engine. Allow engine to run until warmed up (thermostat opens and radiator cooling fan operates).
 7. Turn engine off. Check expansion tank and add coolant to bring it up to "MAX" line, as needed. Tighten expansion tank cap securely.



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Fig. 4: Locating Cooling System Bleed Points
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

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SERVICING**NORMAL SERVICE**

Manufacturer recommends the following maintenance intervals for normal service. See **NORMAL SERVICE REPLACEMENT INTERVALS** table. For severe service information, see **SEVERE SERVICE**.

NORMAL SERVICE REPLACEMENT INTERVALS

Component	Months	Miles
Air Filter	24	30,000
Coolant		
1991-2000	(1) 36	(1) 45,000
2001	(2) 120	(2) 120,000
Engine Oil		
1991-95	6	7500
1996-2001	12	7500
Engine Oil Filter		
1991-95	6	7500
1996-2001	12	15,000
Fuel Filter & Hoses	48	60,000
Spark Plugs		
1991	48	60,000
1992-96	(3) 72	(3) 60,000
1997-2001	84	105,000
Timing Belt		
1991-96	72	90,000
1997-2001	84	105,000
Transmission Fluid		
1991-95	24	30,000
1996-2000	72	90,000
2001	(4) 72	(4) 120,000
(1) First change is at 36 months/45,000 miles. Second change is at 60 months/75,000 miles, then every 24 months/30,000 miles thereafter.		
(2) First change is at 120 months/120,000 miles, then every 60 months/60,000 miles thereafter.		
(3) Replace every 6 years or 60,000 miles, whichever comes first.		
(4) Replace every 72 months/120,000 miles on manual transmission. Replace at 72 months/120,000 miles on automatic transmission, then every 60 months/90,000 miles.		

SEVERE SERVICE

If vehicle is operated under severe conditions, see **SEVERE SERVICE REPLACEMENT INTERVALS**

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table. Severe service is described as the following driving conditions:

- Driving less than 5 miles per trip (less than 10 miles per trip in freezing temperatures).
- Driving in extremely hot (above 90°F/32°C) conditions.
- Extensive idling or long periods of stop-and-go driving.
- Driving in mountainous conditions.
- Driving on rough, muddy, dusty, or roads where salt or other corrosive agents are used for de-icing.

NOTE: If vehicle is only driven **OCCASIONALLY** under severe conditions, follow the normal service schedule. See **NORMAL SERVICE**.

SEVERE SERVICE REPLACEMENT INTERVALS

Component	Months	Miles
Air Filter	24	30,000
Coolant		
1991-2000	(1) 36	(1) 45,000
2001	(2) 120	(2) 120,000
Engine Oil & Filter	6	3750
Fuel Filter & Hoses	48	60,000
Spark Plugs		
1991	48	60,000
1992-96	72	60,000
1997-2001	84	105,000
Timing Belt		
1991-94	72	90,000
1995-96	(3) N/A	(3) 60,000
1997-2001	(4) 84	(4) 105,000
Transmission Fluid		
1991-94	24	30,000
1995	12	15,000
1996-2000	24	30,000
2001	(5) 36	(5) 60,000

(1) First change is at 36 months/45,000 miles. Second change is at 60 months/75,000 miles, then every 24 months/30,000 miles thereafter.

(2) First change is at 120 months/120,000 miles, then every 60 months/60,000 miles thereafter.

(3) Replace every 60,000 miles.

(4) Replace every 60,000 miles if vehicle is REGULARLY driven in very high (over 110°F/43°C) or very low (under -20°F/-29°C) temperatures.

(5) Replace every 36 months/60,000 miles on manual transmission. Replace at 36 months/60,000 miles on automatic transmission, then every 24 months/30,000 miles.

ADJUSTMENTS

A/C COMPRESSOR BELT ADJUSTMENT

NOTE: When installing new belt, adjust deflection/tension to value for **NEW** belt. Run engine for 5 minutes, then readjust deflection/tension to value for **USED** belt.

1. Belt adjustment can be measured using deflection or tension method of measurement. Deflection is measured with 22 lbs. (10 kg) pressure applied midway on longest belt run (between crankshaft pulley and A/C pulley). Tension is measured with a belt tension gauge installed midway on longest belt run.
2. If deflection/tension is not correct, loosen A/C idler pulley center nut. Turn adjusting bolt until deflection/tension is within specification, then tighten A/C idler pulley center nut to specification. See **A/C COMPRESSOR BELT ADJUSTMENT SPECIFICATIONS** table and **TORQUE SPECIFICATIONS**.

A/C COMPRESSOR BELT ADJUSTMENT SPECIFICATIONS

Application	Deflection - In. (mm)	Tension - Lbs. (kg)
3.0L		
1991-94		
(1) New Belt	0.22-0.30 (5.5-7.5)	N/A
(2) Used Belt	0.39-0.47 (10-12)	N/A
1995-2001		
(1) New Belt	0.22-0.30 (5.5-7.5)	154-198 (70-90)
(2) Used Belt	0.39-0.47 (10-12)	77-121 (35-55)
(1) A new belt refers to a belt that has been used less than 5 minutes on a running engine.		
(2) A used belt refers to a belt that has been used 5 minutes or more on a running engine.		

GENERATOR BELT ADJUSTMENT

NOTE: When installing new belt, adjust deflection/tension to value for **NEW** belt. Run engine for 5 minutes, then readjust deflection/tension to value for **USED** belt.

1. Belt adjustment can be measured using deflection or tension method of measurement. Deflection is measured with 22 lbs. (10 kg) pressure applied midway on longest belt run. Tension is measured with a belt tension gauge installed midway on longest belt run.
2. If deflection/tension is not correct, loosen adjusting bolt and mounting bolt lock nuts. Turn adjusting bolt until deflection/tension is within specification, then tighten lock nuts. See **GENERATOR BELT ADJUSTMENT SPECIFICATIONS** table and **TORQUE SPECIFICATIONS**.

GENERATOR BELT ADJUSTMENT SPECIFICATIONS

Application	Deflection - In. (mm)	Tension - Lbs. (kg)
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3.0L

1991-94		
(1) New Belt	0.28-0.35 (7-9)	176-198 (80-90)
(2) Used Belt	0.47-0.55 (12-14)	88-110 (40-50)
1995-2001		
(1) New Belt	0.24-0.31 (6-8)	198-243 (90-110)
(2) Used Belt	0.43-0.53 (11-13.5)	99-143 (45-65)
(1) A new belt refers to a belt that has been installed and has NO running time on engine.		
(2) A used belt refers to a belt that has been installed and used on a running engine.		

SHIFT CABLE ADJUSTMENT

NOTE: To adjust shift cables and select cable (man. trans.), see appropriate **AUTOMATIC or MANUAL TRANSMISSION** article in **TRANSMISSION SERVICING**.

THROTTLE CABLE ADJUSTMENT

1991-94 Models

1. If installing new throttle cable, fully open throttle valve and install throttle cable into throttle linkage and cable housing into cable bracket with lock nut on one side of bracket and adjusting nut on other side of bracket.
2. Warm engine to normal operating temperature (cooling fan comes on). Hold cable sheath and remove all slack from cable. Turn adjusting nut until it is 0.12" (3 mm) away from cable bracket. Tighten lock nut. Throttle cable free play at throttle linkage should be within specification. See **THROTTLE CABLE ADJUSTMENT SPECIFICATIONS** table. If not, proceed to next step.
3. To adjust throttle cable, warm engine to normal operating temperature (cooling fan comes on). Ensure throttle cable operates smoothly without binding or sticking. Check cable free play at throttle linkage. If cable free play at throttle linkage is not within specification, loosen lock nut and turn adjusting nut until free play is within specification. See **THROTTLE CABLE ADJUSTMENT SPECIFICATIONS** table.
4. With cable free play properly adjusted, check to ensure throttle valve opens fully when accelerator pedal is pushed to the floor. Also ensure throttle valve returns to idle position when accelerator pedal is released.

1995-2001 Models

1. If installing new throttle cable, remove accelerator position sensor cover. Accelerator position sensor is located in left rear corner of front compartment. Rotate throttle linkage counterclockwise. Install throttle cable into throttle linkage and cable housing into cable bracket with lock nut on one side of bracket and adjusting nut on other side of bracket.

2. Hold cable sheath and remove all slack from cable. Turn adjusting nut until it is 0.12" (3 mm) away from cable bracket. Tighten lock nut. Throttle cable free play at throttle linkage should be within specification. See **THROTTLE CABLE ADJUSTMENT SPECIFICATIONS** table. If not, proceed to next step.
3. To adjust throttle cable, remove accelerator position sensor cover. Accelerator position sensor is located in left rear corner of front compartment. Ensure throttle cable operates smoothly without binding or sticking. Check cable free play at throttle linkage. If cable free play at throttle linkage is not within specification, loosen lock nut and turn adjusting nut until free play is within specification. See **THROTTLE CABLE ADJUSTMENT SPECIFICATIONS** table.

THROTTLE CABLE ADJUSTMENT SPECIFICATIONS

Application	Free Play - In. (mm)
3.0L	0.39-0.47 (10-12)

TIMING BELT ADJUSTMENT

NOTE: Timing belt is equipped with a self-adjusting auto-tensioner. To reset timing belt auto-tensioner, see **TIMING BELT** under REMOVAL & INSTALLATION.

VALVE CLEARANCE ADJUSTMENT

CAUTION: Ignition coils and plugs can become very hot in use, DO NOT touch them. Handle the ignition coils and plugs carefully.

CAUTION: DO NOT rotate crankshaft counterclockwise. Timing belt could jump a tooth on camshaft pulleys.

NOTE: Valves should be adjusted cold when the cylinder head temperature is less than 100°F (38°C). Adjustment is the same for both intake and exhaust valves. Adjust valve clearance at top dead center (TDC) of each cylinder.

NOTE: Different ignition coils and ignition coil covers are used for front side and rear side. Be sure to use correct ones for side being serviced. Coils and covers for front side are marked "FR". Coils and covers for rear side are marked "RR".

1. Remove spare tire and spare tire holder. Disconnect negative battery cable. Remove engine compartment strut brace, if equipped. Remove ignition coil covers.
2. Remove injector harness and wire harness covers. Disconnect electrical connectors from ignition coils. Remove ignition coils and spark plugs. See **Fig. 5**. Remove cylinder head covers. See **Fig. 6** for valve configuration.

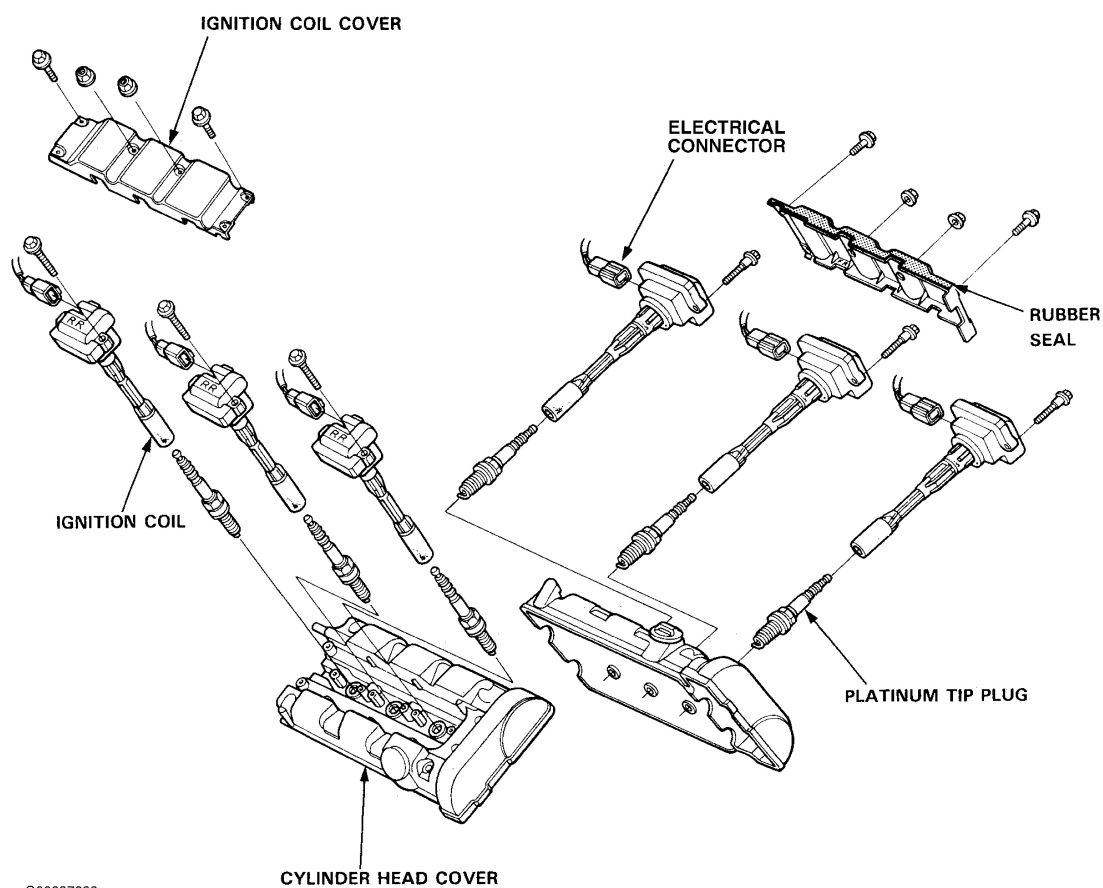
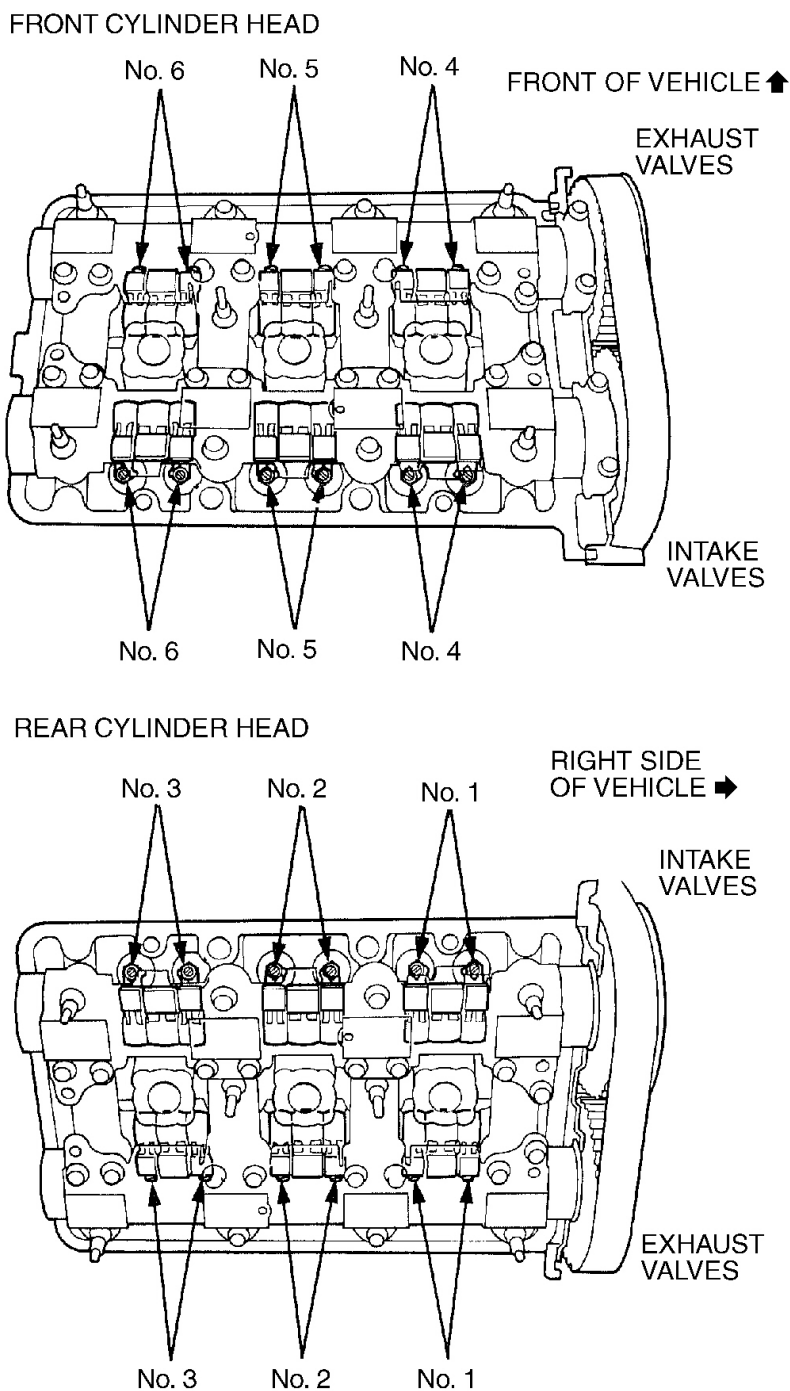


Fig. 5: Removing Ignition Coil Covers & Ignition Coils
Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 6: Identifying Valve Configuration

Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Rotate crankshaft clockwise to set No. 1 piston at TDC. TDC mark (White paint) on crankshaft pulley should align with pointer on timing belt lower cover. With crankshaft pulley aligned at TDC, front and

rear camshaft pulley TDC grooves should align with timing belt cover plates. See **Fig. 7**.

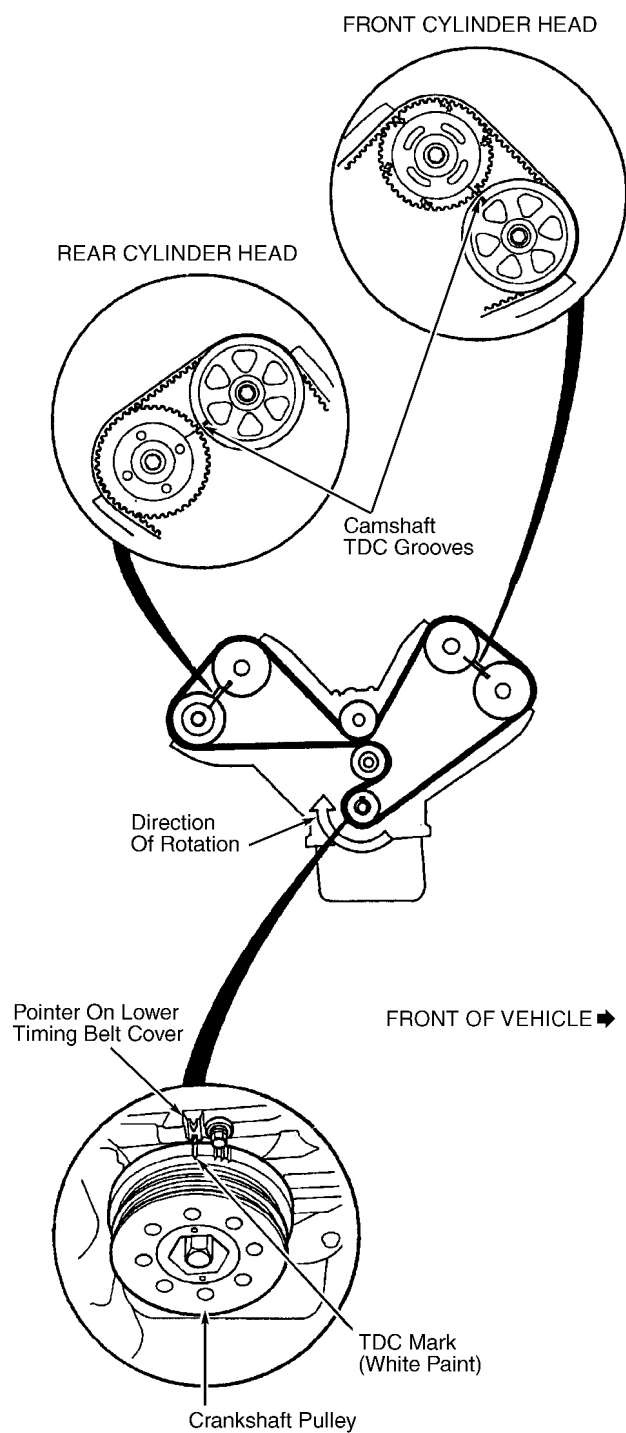
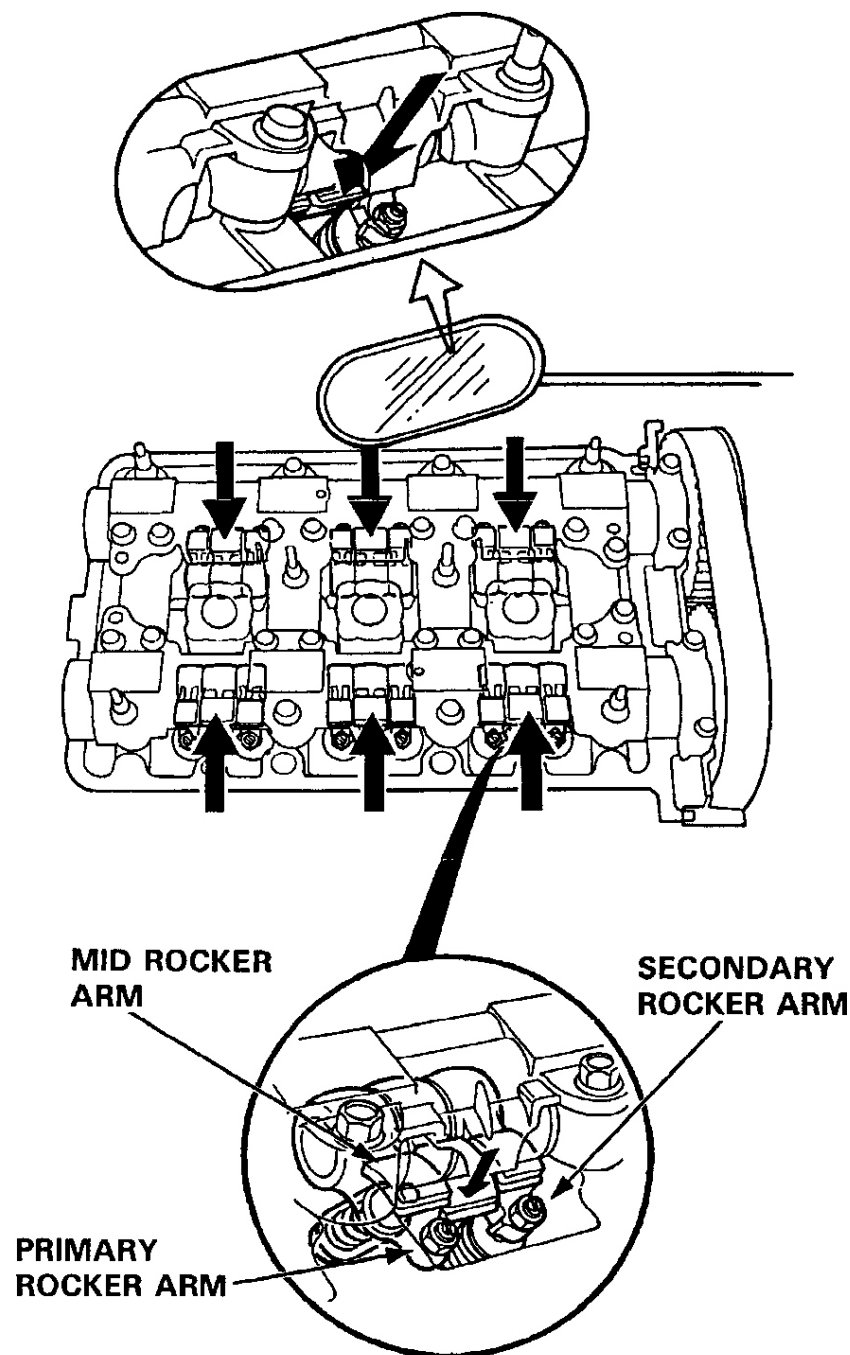


Fig. 7: Identifying Camshaft & Crankshaft Positions With No. 1 Cylinder At TDC
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Manually inspect rocker arms for independent operation by setting cylinder No. 1 to TDC. Ensure intake and exhaust mid rocker arms on cylinder No. 1 move independently of primary and secondary rocker arms. See **Fig. 8**. Use a mirror to check front exhaust rocker arms. Check remaining mid rocker arms with corresponding cylinder at TDC. If mid rocker arms do not move independently of primary and secondary rocker arms, remove suspect rocker arm assembly. See **ROCKER ARMS & SHAFTS** under REMOVAL & INSTALLATION.



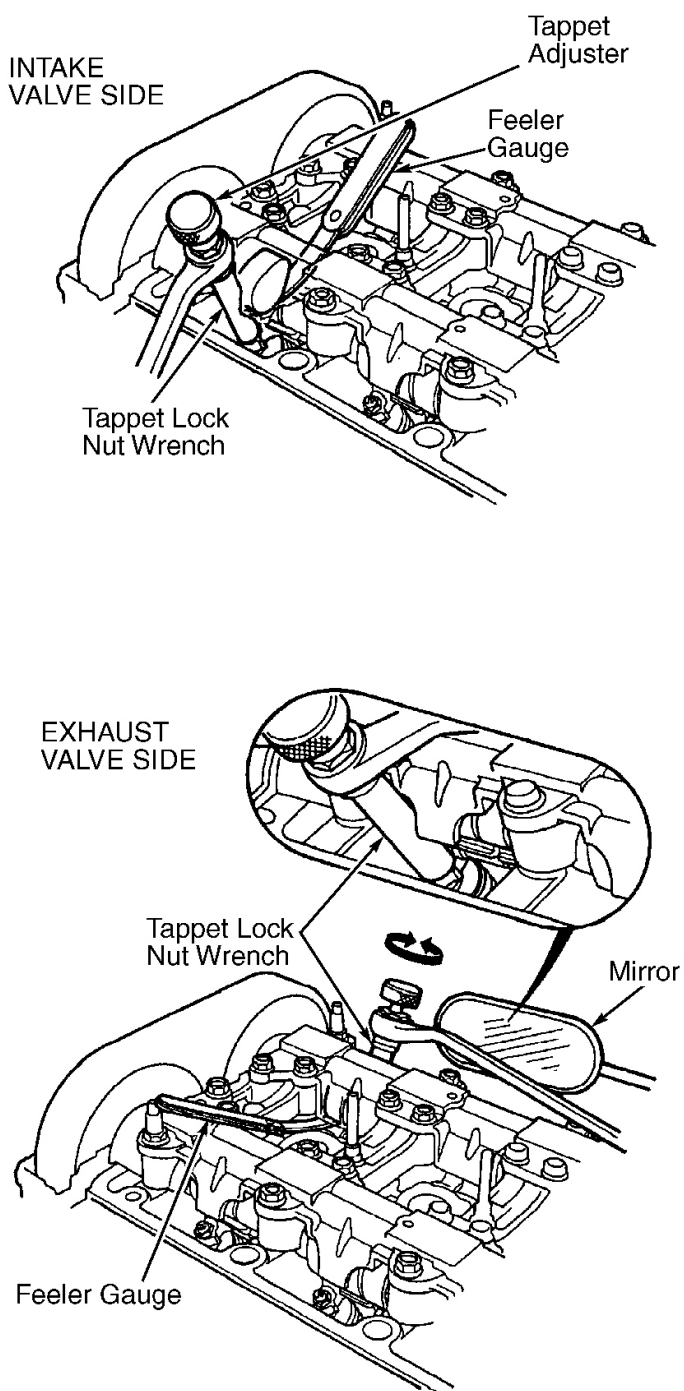
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Fig. 8: Manually Inspecting Rocker Arms

Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Adjust all valves on No. 1 cylinder by turning adjusting screws on primary and secondary rocker arms. Use Tappet Lock Nut Wrench (07MAA-PR70120) to loosen tappet lock nut. Use a mirror on rear

cylinder head to check if tappet lock nut wrench is correctly positioned on lock nut. See **Fig. 9**. Use Tappet Adjuster (07MAA-PR70110) to turn adjusting screw until specified feeler gauge slides back and forth with slight drag. See **VALVE CLEARANCE SPECIFICATIONS (COLD)** table.



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Fig. 9: Adjusting Valve Clearance

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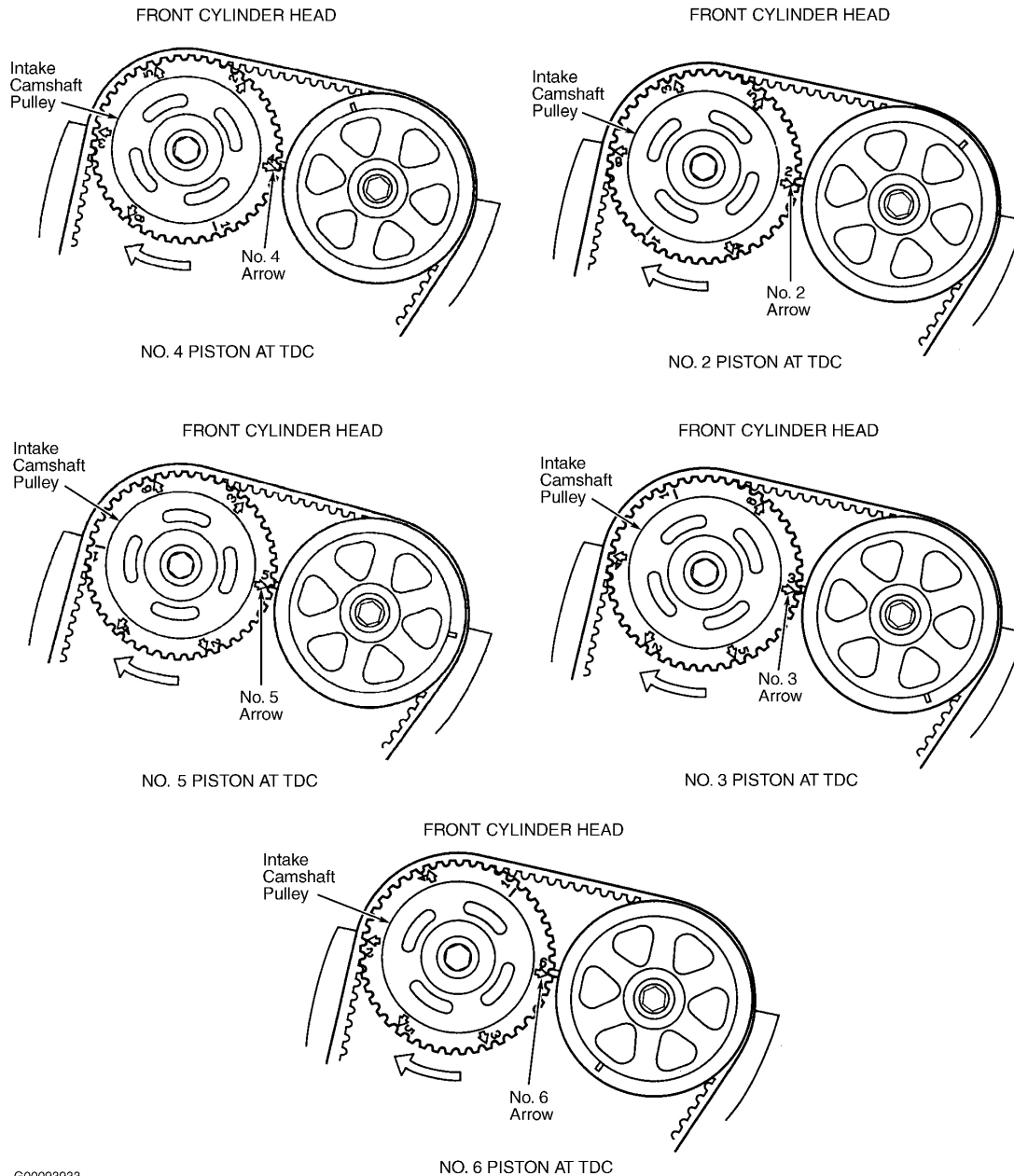
1991-2004 ENGINE 3.0L V6 - NSX & NSX-T

Courtesy of AMERICAN HONDA MOTOR CO., INC.

VALVE CLEARANCE SPECIFICATIONS (COLD)

Application	Intake - In. (mm)	Exhaust - In. (mm)
3.0L	0.006-0.007 (0.15-0.19)	0.007-0.008 (0.17-0.21)

6. Rotate crankshaft 120 degrees clockwise (camshaft pulley will turn 60 degrees). Piston No. 4 arrow on intake camshaft pulley on front cylinder head will be aligned with timing belt cover plate. See **Fig. 10**. Adjust valve clearance for all valves on No. 4 cylinder.



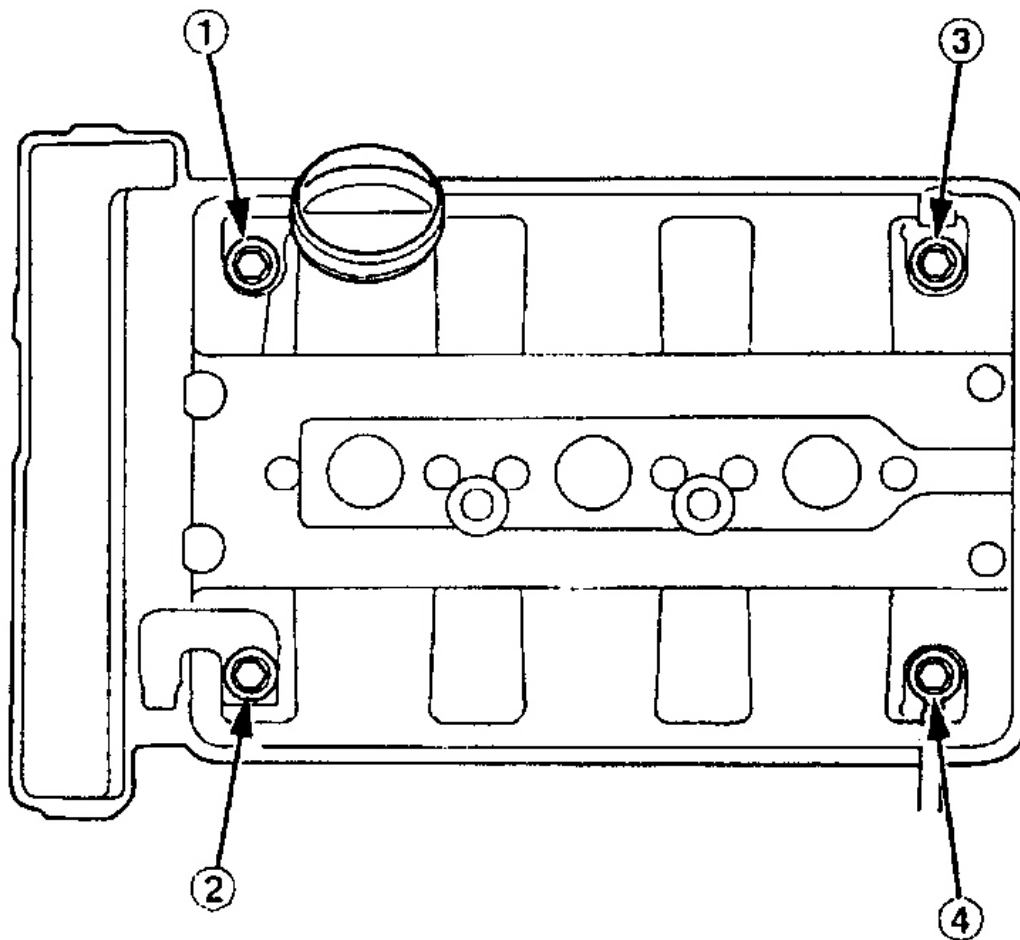
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Fig. 10: Positioning Front Cylinder Head Intake Camshaft Pulleys For Valve Clearance Adjustment

Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Rotate crankshaft 120 degrees clockwise (camshaft pulley will turn 60 degrees). Piston No. 2 arrow on intake camshaft pulley on front cylinder head will be aligned with timing belt cover plate. See **Fig. 10**. Adjust valve clearance for all valves on No. 2 cylinder.
8. Rotate crankshaft 120 degrees clockwise (camshaft pulley will turn 60 degrees). Piston No. 5 arrow on intake camshaft pulley on front cylinder head will be aligned with timing belt cover plate. See **Fig. 10**. Adjust valve clearance for all valves on No. 5 cylinder.

9. Rotate crankshaft 120 degrees clockwise (camshaft pulley will turn 60 degrees). Piston No. 3 arrow on intake camshaft pulley on front cylinder head will be aligned with timing belt cover plate. See **Fig. 10**. Adjust valve clearance for all valves on No. 3 cylinder.
10. Rotate crankshaft 120 degrees clockwise (camshaft pulley will turn 60 degrees). Piston No. 6 arrow on intake camshaft pulley on front cylinder head will be aligned with timing belt cover plate. See **Fig. 10**. Adjust valve clearance for all valves on No. 6 cylinder.
11. After adjustment, attach a rubber seal to intake side of front and rear ignition coil covers. See **Fig. 5**. Complete installation by reversing removal procedures. Tighten cylinder head cover nuts to specification in sequence shown in 2-3 steps. See **Fig. 11** and **TORQUE SPECIFICATIONS**.



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Fig. 11: Tightening Cylinder Head Cover Nuts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

TROUBLE SHOOTING

NOTE: To trouble shoot engine mechanical 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. See **COMPUTER RELEARN PROCEDURES** article in **GENERAL INFORMATION** before disconnecting battery.

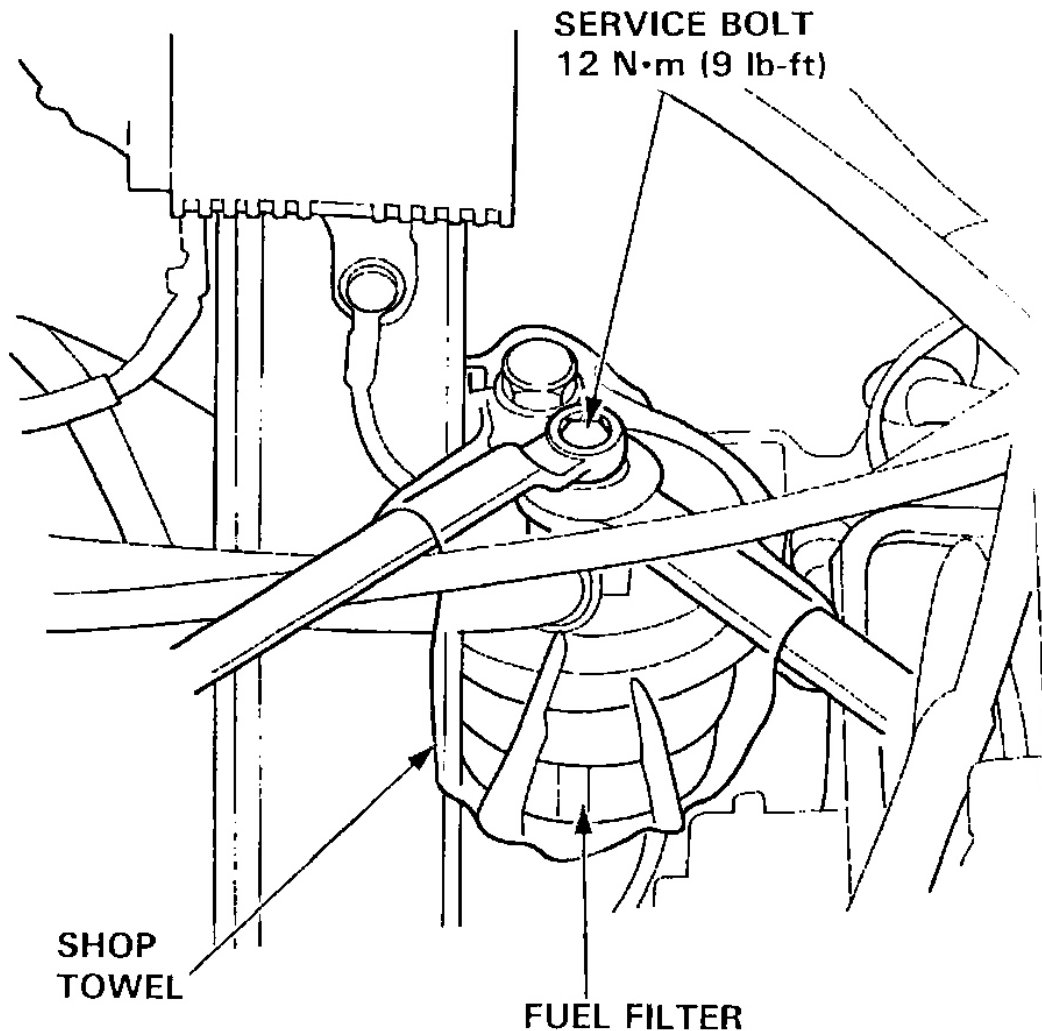
NOTE: For repair procedures not covered in this article, see **ENGINE OVERHAUL PROCEDURES** article in **GENERAL INFORMATION**.

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

FUEL SYSTEM PRESSURE RELEASE

CAUTION: Fuel system is under pressure. Fuel pressure must be released before servicing any fuel system components.

Remove spare tire and spare tire holder. Disconnect negative battery cable. Remove fuel filler cap. Place a rag or shop towel over service bolt on fuel filter. Loosen 6 mm service bolt one complete turn while holding banjo bolt. See **Fig. 12**. Always use NEW washers on both sides of banjo bolt.



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Fig. 12: Relieving Fuel System Pressure
Courtesy of AMERICAN HONDA MOTOR CO., INC.

ENGINE

CAUTION: To prevent personal injury, always allow engine and radiator to cool down before removing expansion tank cap.

Removal

1. Move seat bottoms and backs as far forward as possible. Remove spare tire and spare tire holder. Disconnect negative battery cable. Disconnect positive battery cable. Drain coolant. See **COOLING**

SYSTEM under BLEEDING.

2. Raise and properly support vehicle on hoist. Drain transmission fluid. Reinstall drain plug with NEW washer. Drain engine oil. Reinstall drain plug with NEW washer. Lower vehicle.
3. Open rear hatch. Remove engine cover. Remove harness cover at top of rear hatch. Disconnect rear defogger, antenna lead and ground cable connectors. While assistant holds rear hatch, remove support strut and rear hatch mounting bolts. Remove rear hatch.
4. Remove rear hatch air scoop attaching screws, and remove air scoop. Disconnect high-mount stop light harness connector located at front left side of engine compartment. Remove harness clamp from support strut. Remove trunk lid mounting bolts, and remove trunk lid.
5. Remove engine compartment strut brace, if equipped. On right side of engine compartment, disconnect engine compartment fan motor connector, and remove engine compartment fan assembly. Disconnect fuel pump resistor connector, engine ground cable, and engine wire harness clamps. On 1995 and later models, also disconnect spark plug voltage detection module connectors and injector resistor connector.
6. Working inside vehicle on all models, remove rear trim panels behind passenger seat. Disconnect electrical connectors from Engine Control Module (ECM). Disconnect electrical connectors from floor wire harness.
7. Working in engine compartment on 1991-94 models, remove intake manifold plate and top cover. See **Fig. 13**. Remove throttle cable by loosening lock nut, and slipping cable end out of throttle bracket and accelerator linkage. It is not necessary to loosen throttle cable adjusting nut. DO NOT bend throttle cable while removing. Always replace a kinked throttle cable with a NEW one.

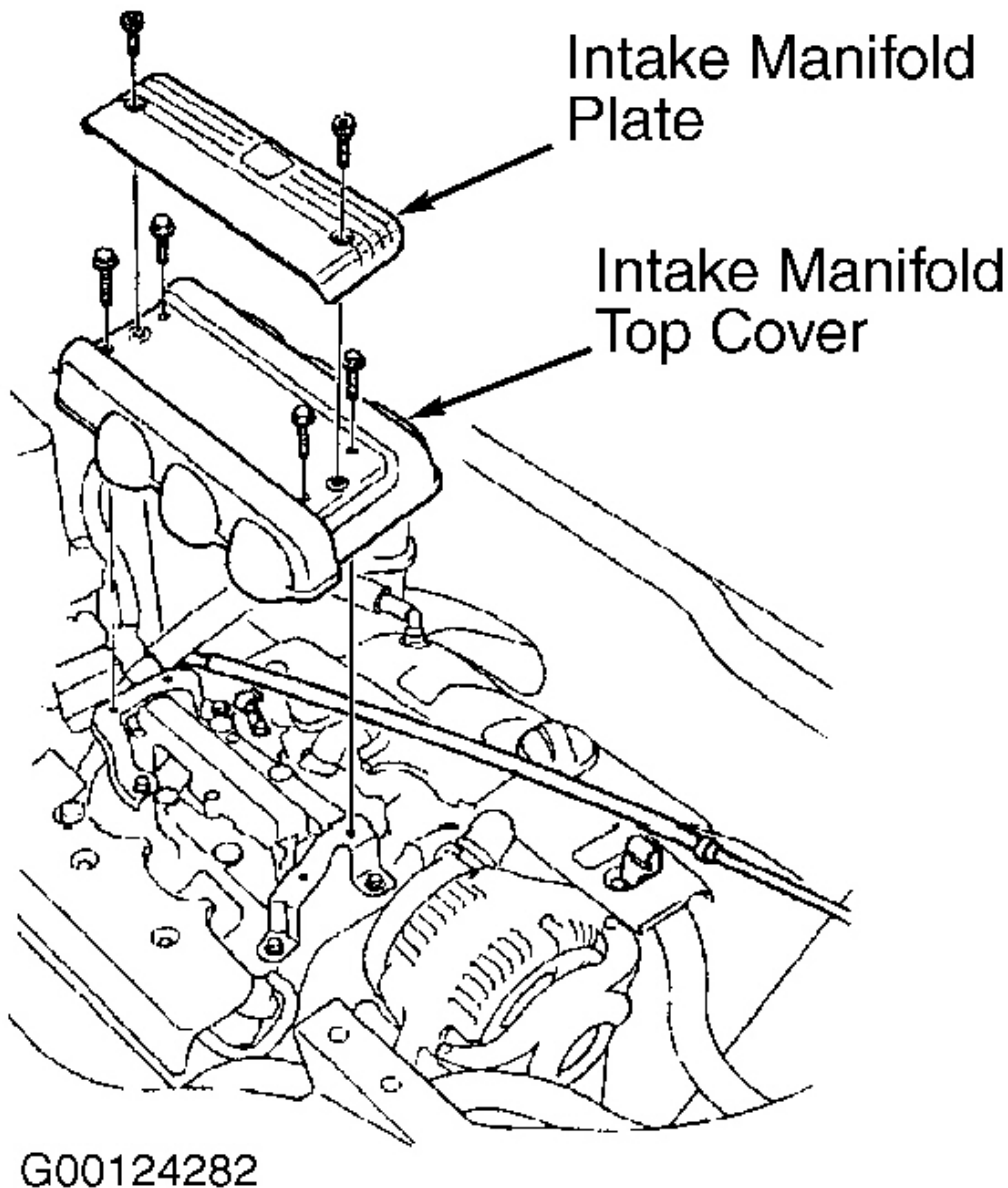
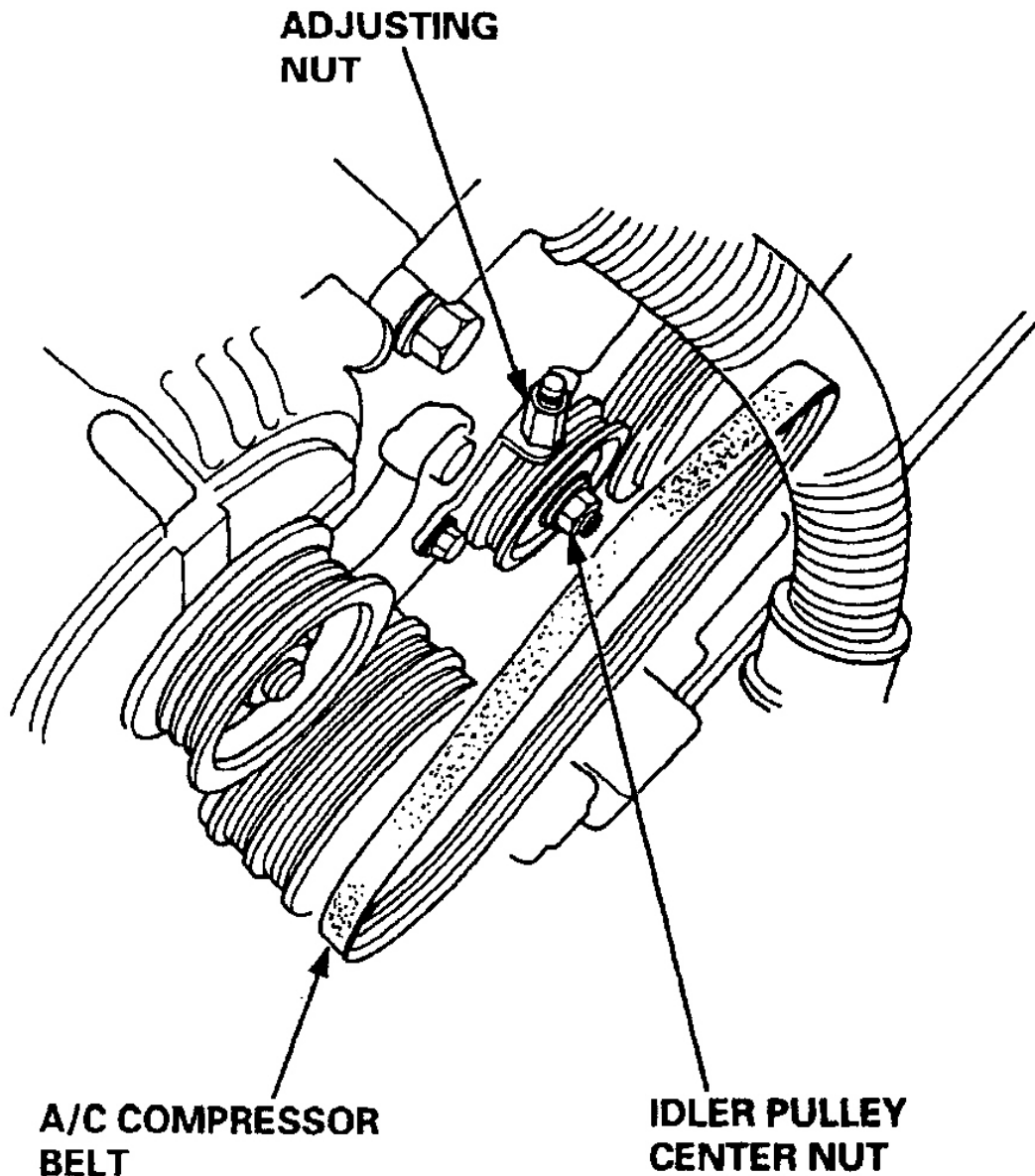


Fig. 13: Removing Intake Manifold Plate & Top Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. On all models, relieve fuel system pressure. See **FUEL SYSTEM PRESSURE RELEASE**. Remove fuel feed pipe, wire harness cover and fuel pipe clamps. Remove fuel return hose from pressure regulator.
9. Working on left side of engine compartment, disconnect coolant hoses from expansion tank, and remove expansion tank. Remove breather hose. Remove air intake duct and air cleaner assembly. Disconnect

EVAP charcoal canister vapor hose from throttle body. Disconnect brake booster vacuum hose from intake manifold.

10. Remove battery cable from main fuse box. Disconnect engine wire harness-to-side wire harness connectors. Remove engine wire harness terminal and starter cable terminal from fuse box. Remove wire harness clamps. Remove ground cable from transmission. On 1995 and later models, disconnect 6-pin electrical connector from throttle body.

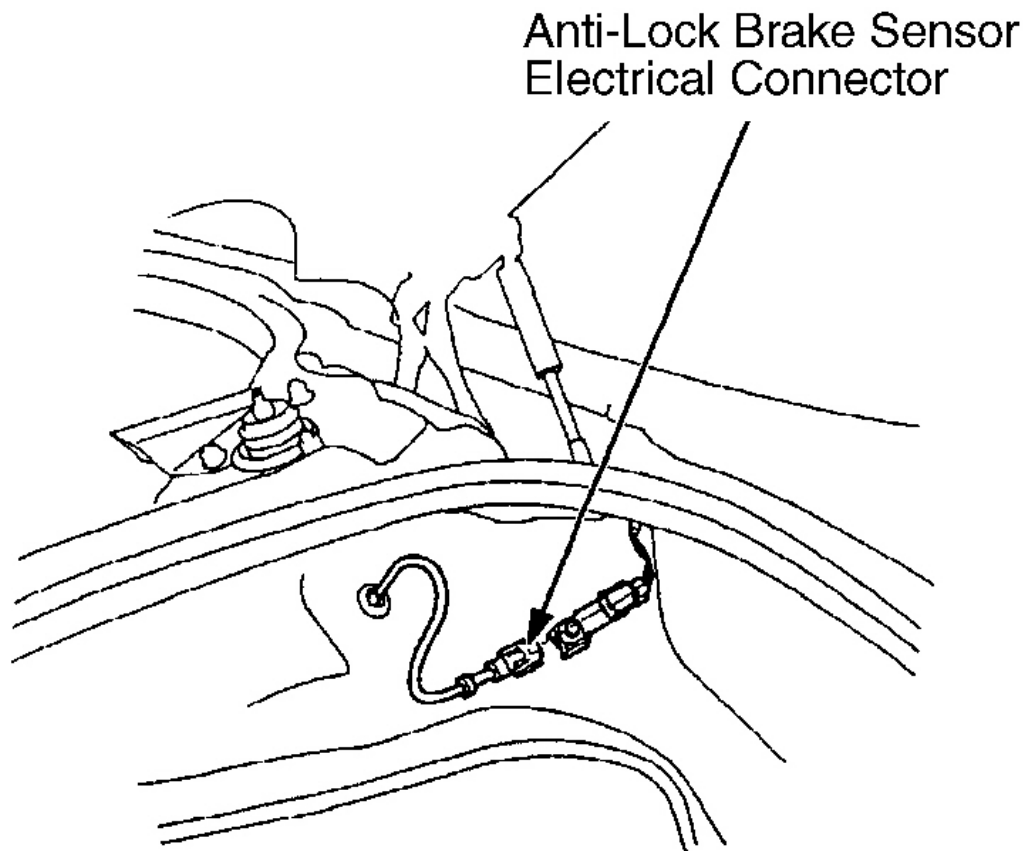


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Fig. 14: Removing A/C Compressor Belt

Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. On all models, remove coolant and heater hoses from water passage. Working on right side of engine compartment, disconnect electrical connectors from emission control box. Attach emission control box to intake manifold. DO NOT disconnect vacuum hoses. Loosen idler pulley center nut and adjusting nut. Remove A/C compressor belt. See **Fig. 14**.
12. Working in right front corner of trunk, move trunk carpet and disconnect right anti-lock brake sensor connector. Push wire and connector through body hole into engine compartment. See **Fig. 15**. Remove rear wheels and tires. Raise hoist to full height.



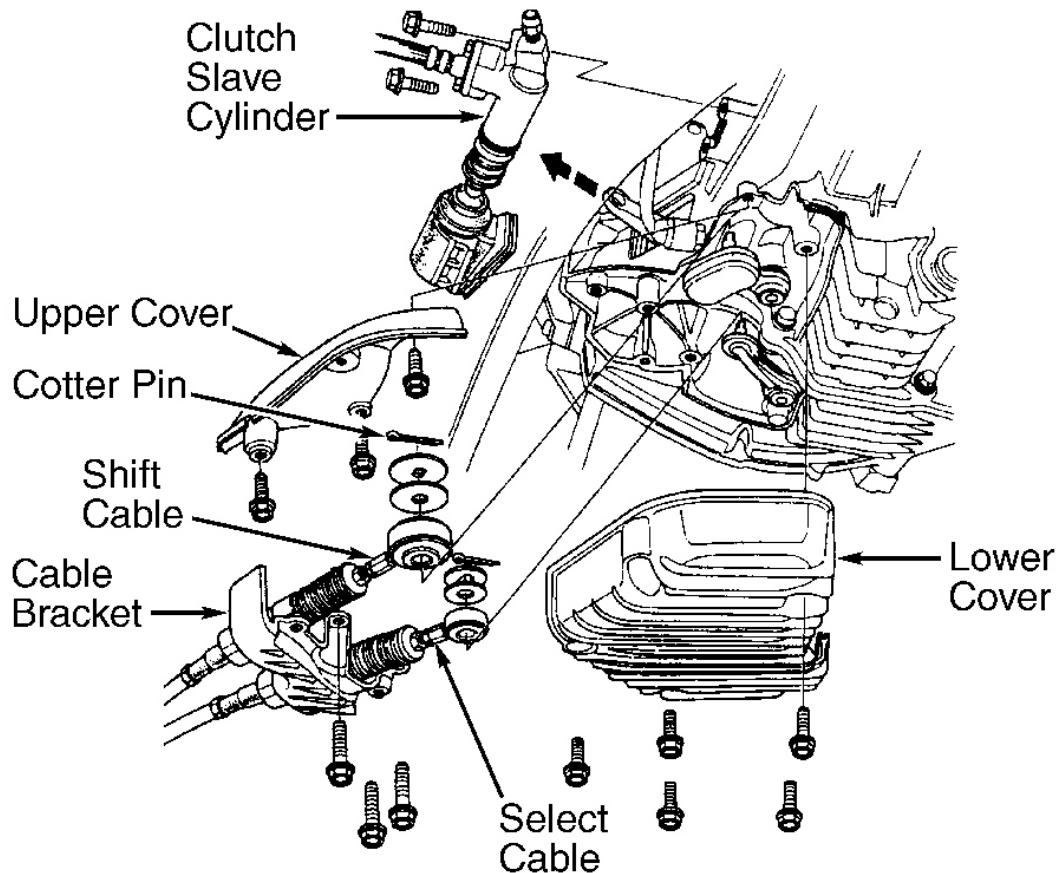
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Fig. 15: Disconnecting Anti-Lock Brake Sensor Electrical Connector

Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. On manual transmission vehicles, remove clutch slave cylinder mounting bolts. Remove slave cylinder and attach out of way. DO NOT remove clutch fluid hose. Remove lower cover. Disconnect shift and

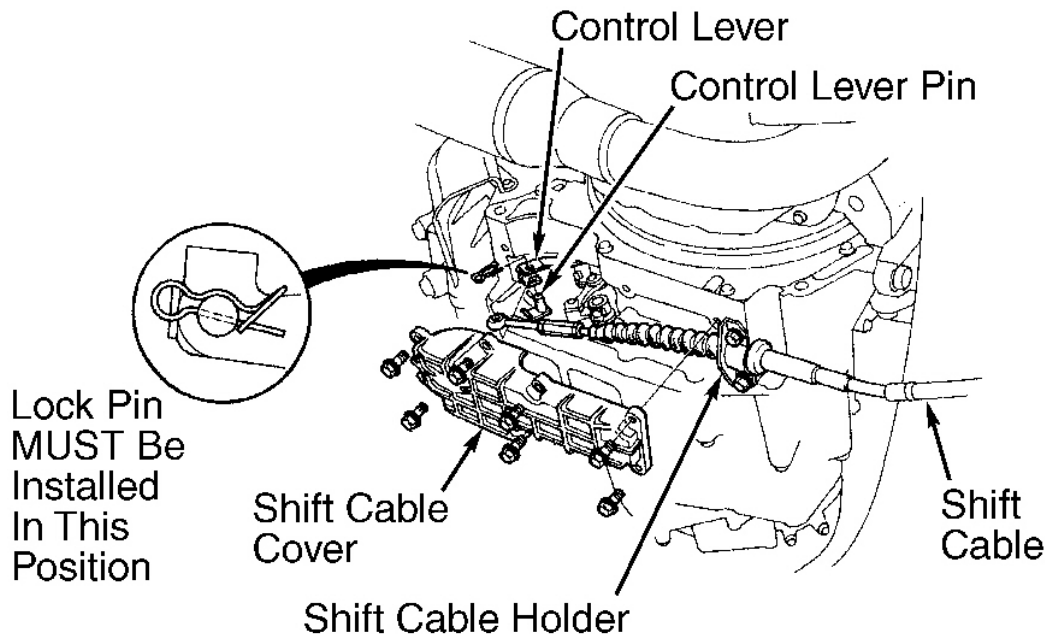
select cables from transmission. Remove cables with cable bracket, and wire out of way. See **Fig. 16**. DO NOT bend or kink cables. Always replace kinked cables with NEW cables.



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Fig. 16: Locating Clutch Slave Cylinder, Shift Cable & Select Cable On Manual Transmission
Courtesy of AMERICAN HONDA MOTOR CO., INC.

WARNING: If gear selector lever in passenger compartment requires access, adhere to safety practices for air bag systems. Wiring for air bag system is located in center console area. See **SERVICE PRECAUTIONS** and **DISABLING & ACTIVATING AIR BAG SYSTEM** in appropriate **AIR BAG RESTRAINT SYSTEMS** article.



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Fig. 17: Locating Shift Cable Connection Points On Automatic Transmission
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. On automatic transmission vehicles, remove shift cable cover. Move selector lever to position "N". Remove control lever pin and lock pin from control lever. Remove shift cables with shift cable holder and wire out of way. See [Fig. 17](#). DO NOT bend or kink cable. Always replace kinked cable with NEW cable.
15. On all models, remove engine under cover and center rod assembly. See [Fig. 18](#). Remove left and right parking brake cables. Remove rear beam rod assembly and parking brake cable clamps. See [Fig. 19](#).
16. Remove front engine mount through-bolt. Remove front beam. See [Fig. 19](#). Remove A/C compressor and wire out of way. DO NOT remove A/C hoses from compressor. DO NOT allow compressor to hang by A/C hoses. Reinstall front beam and front engine mount through-bolt. Tighten nuts and bolts to specification. See [Fig. 19](#) and **TORQUE SPECIFICATIONS**.

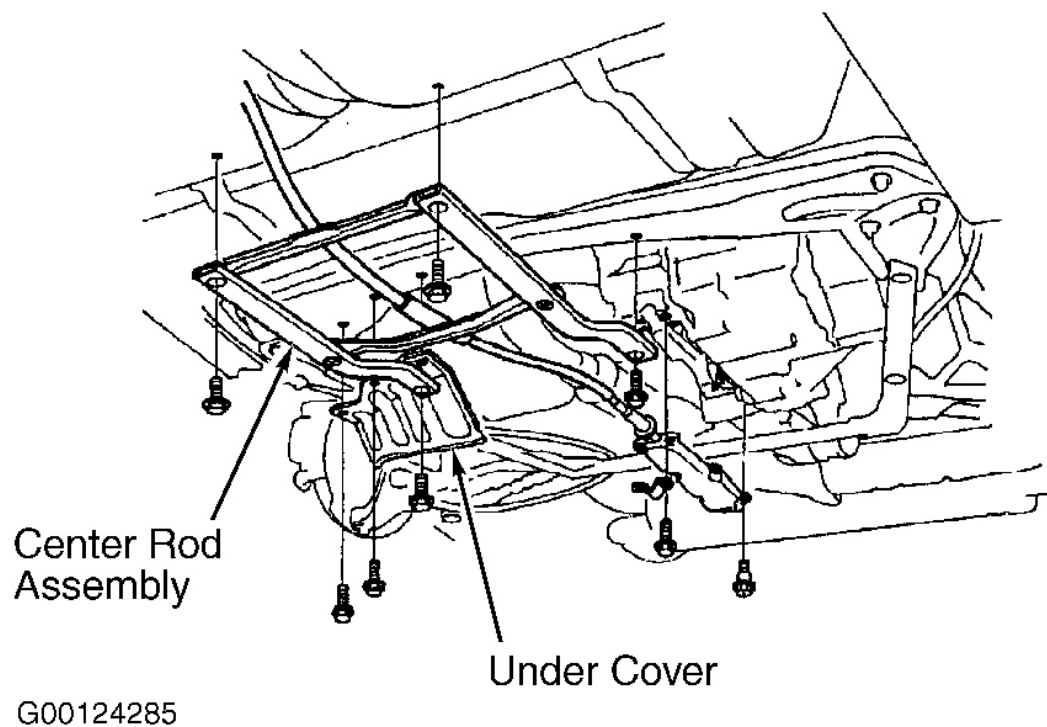
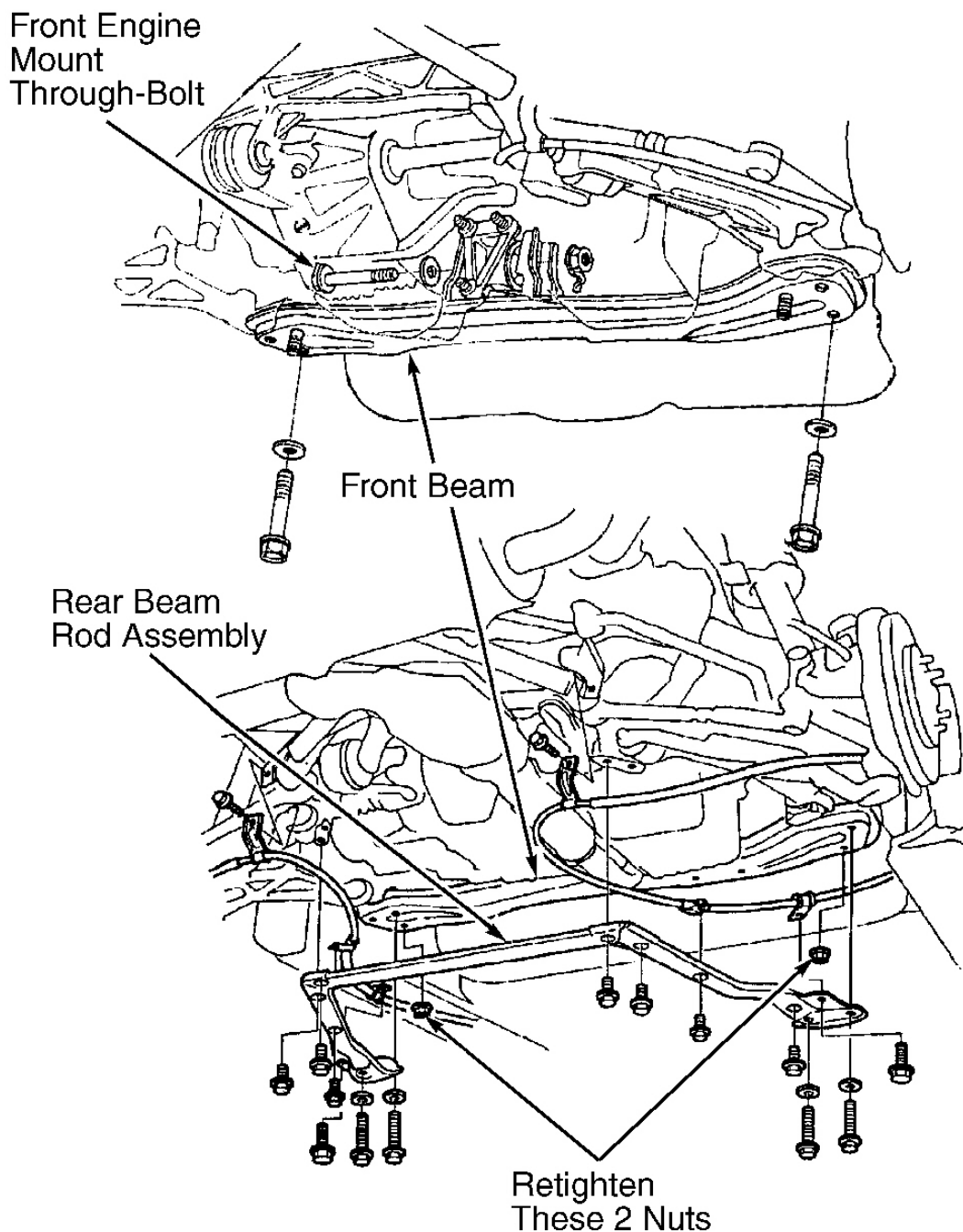


Fig. 18: Removing Engine Under Cover & Center Rod Assembly
Courtesy of AMERICAN HONDA MOTOR CO., INC.



G00093835

Fig. 19: Removing Rear Beam Rod Assembly & Front Beam
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

17. Remove rear brake hoses, and cap brake lines. Remove left and right anti-lock brake sensor connectors, wire clamps and stabilizer links. Remove oxygen sensor electrical connectors. Remove front exhaust pipe

and catalytic converter. Remove self-locking nuts and separate rear catalytic converter from muffler (rear exhaust pipe on 1995 and later models). DO NOT use air wrench or hammer to remove exhaust pipes or converters if oxygen sensors are NOT removed.

18. Loosely install two 12 mm nuts on studs and one 10 mm bolt on engine fixture as shown. See **Fig. 20**. Slide engine fixture into position under engine sub-frame. With help of an assistant, slowly lower hoist until nuts and bolts in engine fixture can be started in engine sub-frame. Install remaining 10 mm bolt. Securely tighten both nuts and both bolts. Adjust engine fixture support pads firmly against oil pan and transmission housing to support engine/transmission/sub-frame assembly.

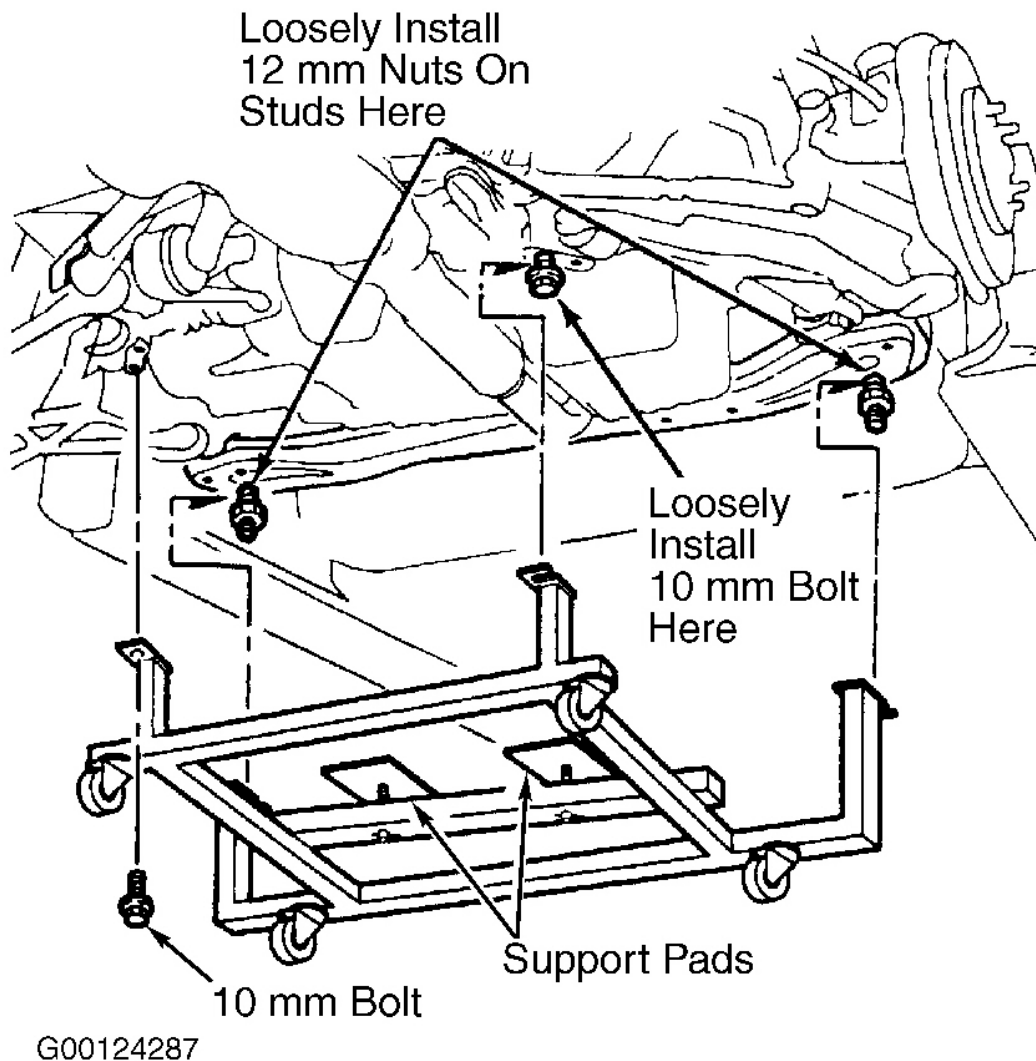
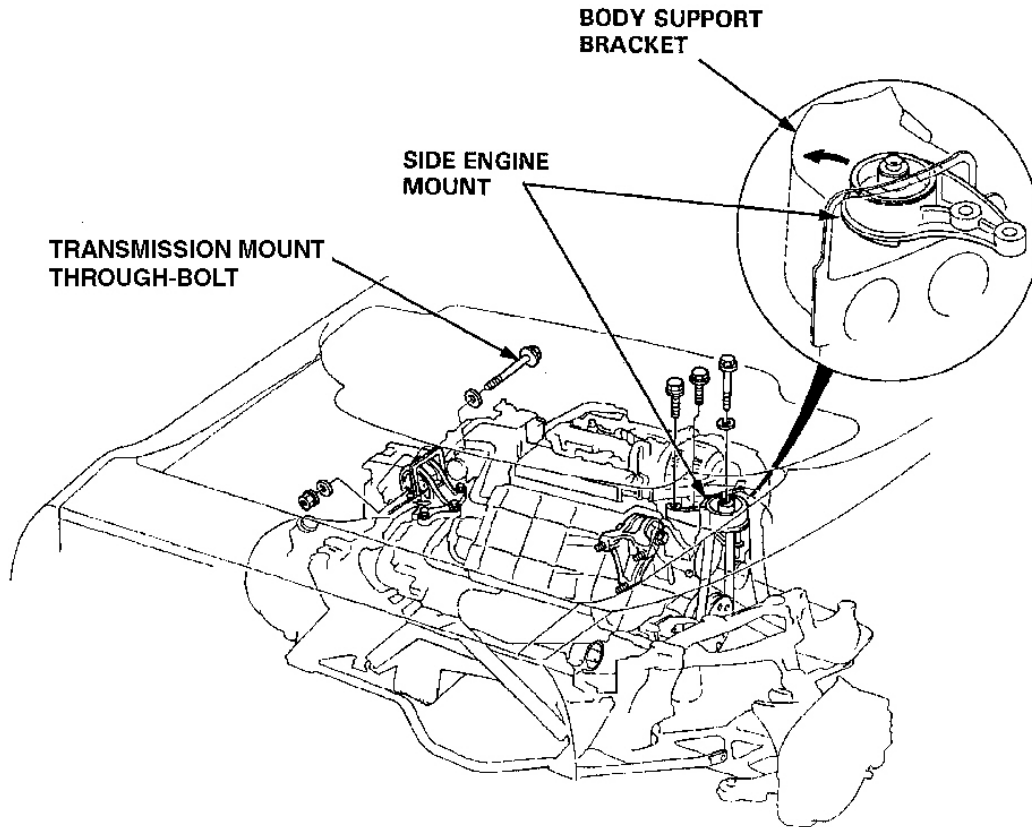


Fig. 20: Installing Engine Fixture

Courtesy of AMERICAN HONDA MOTOR CO., INC.

19. Lower hoist until engine fixture is flat on floor and supporting weight of engine/transmission/sub-frame

assembly. Remove side engine mount bolts. Push side engine mount bracket into body support bracket. Remove transmission mount through-bolt. See **Fig. 21**.

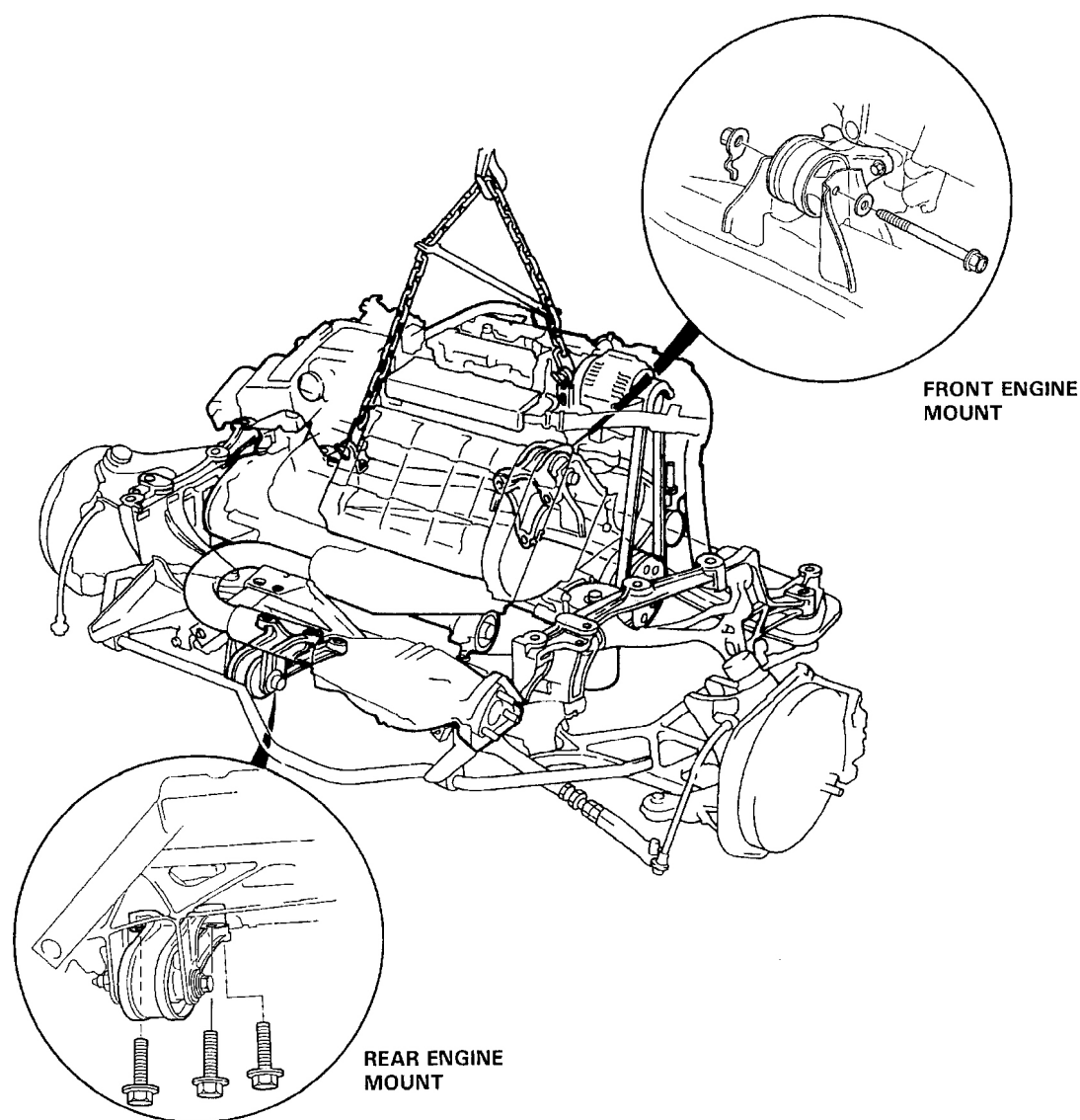


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Fig. 21: Removing Side Engine Mount Bolts & Transmission Mount Through-Bolt
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

20. Remove sub-frame-to-body bolts. Slowly raise hoist a few inches. Ensure all electrical connections and hoses are completely removed and not preventing free movement of engine/transmission/sub-frame assembly. Raise hoist and roll engine fixture out from under vehicle. Perform steps 21 through 23 ONLY if engine is to be separated from sub-frame assembly.
21. Separate lower control arms from sub-frame assembly. See appropriate REAR SUSPENSION article in SUSPENSION. Remove flange bolt and separate toe control arm from sub-frame assembly. See appropriate REAR SUSPENSION article in SUSPENSION.
22. Remove intermediate shaft heat shield. Remove axle shafts. See appropriate AXLE SHAFTS article in DRIVE AXLES. Coat all axle shaft precision-finished surfaces with clean engine oil or grease and tie plastic bags over the ends.
23. Attach a chain sling to engine and take up slack with engine hoist. Remove front and rear engine mounts. See **Fig. 22**. Separate engine from suspension and sub-frame assembly. DO NOT allow engine oil cooler

to hit right rear beam bracket.



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Fig. 22: Locating Front & Rear Engine Mounts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

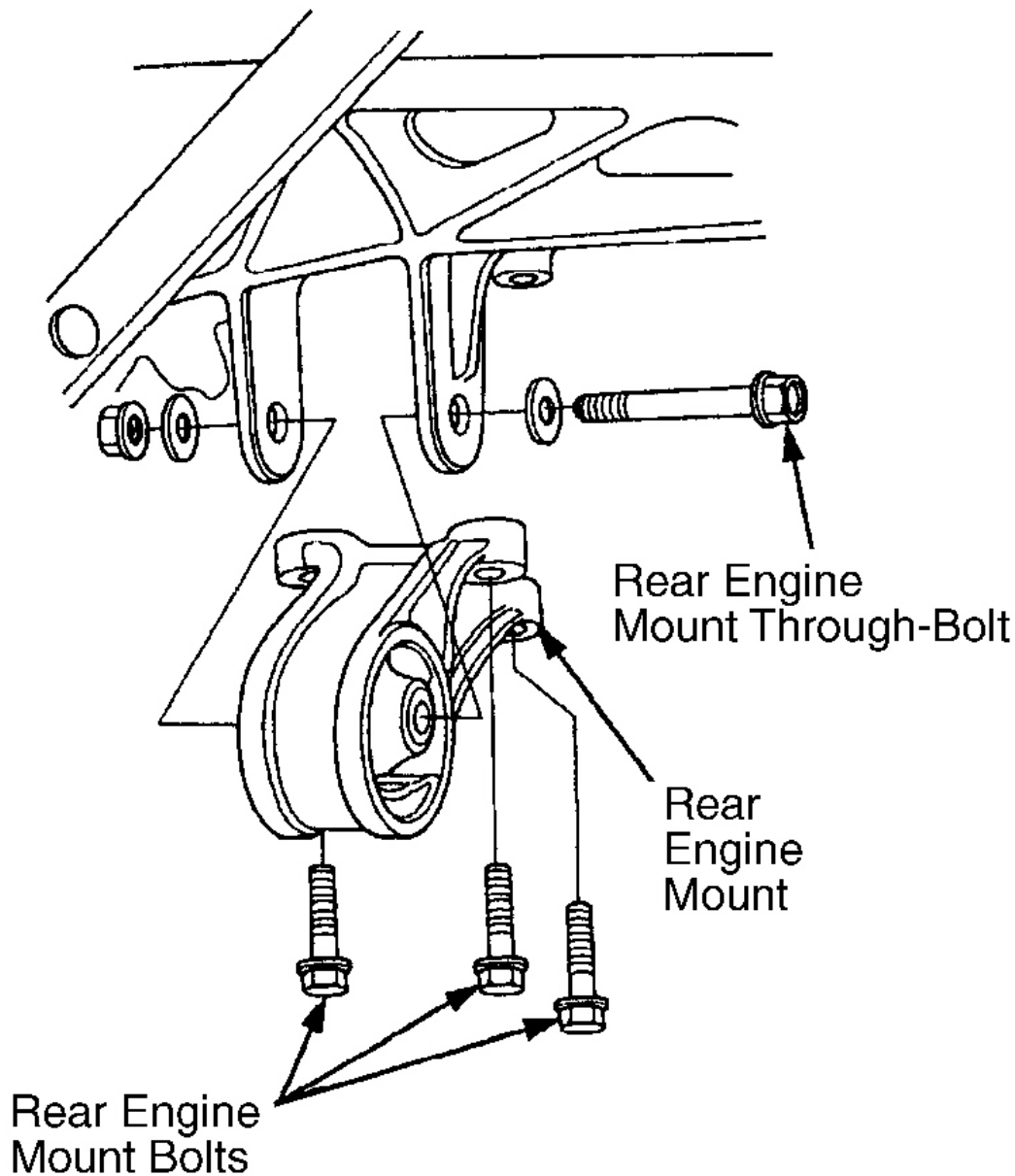
Installation

CAUTION: Engine/transmission mounting point bolts **MUST** be tightened in proper sequence and specification to prevent excessive noise and vibration and to maintain bushing life. See **TORQUE SPECIFICATIONS**.

1. Install engine in reverse order of removal. If engine was NOT separated from sub-frame assembly, go to step 4. If engine was separated from sub-frame assembly, install rear engine mount. Always use NEW

rear engine mount through-bolt. Tighten bolts on transmission side. DO NOT tighten through-bolt. See **Fig. 23** and **TORQUE SPECIFICATIONS**.

2. Install front engine mount. First, install and tighten front engine mount bolts to specification. Next, install NEW through-bolt and tighten to specification. See **Fig. 24** and **TORQUE SPECIFICATIONS**.



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Fig. 23: Installing Rear Engine Mount

Courtesy of AMERICAN HONDA MOTOR CO., INC.

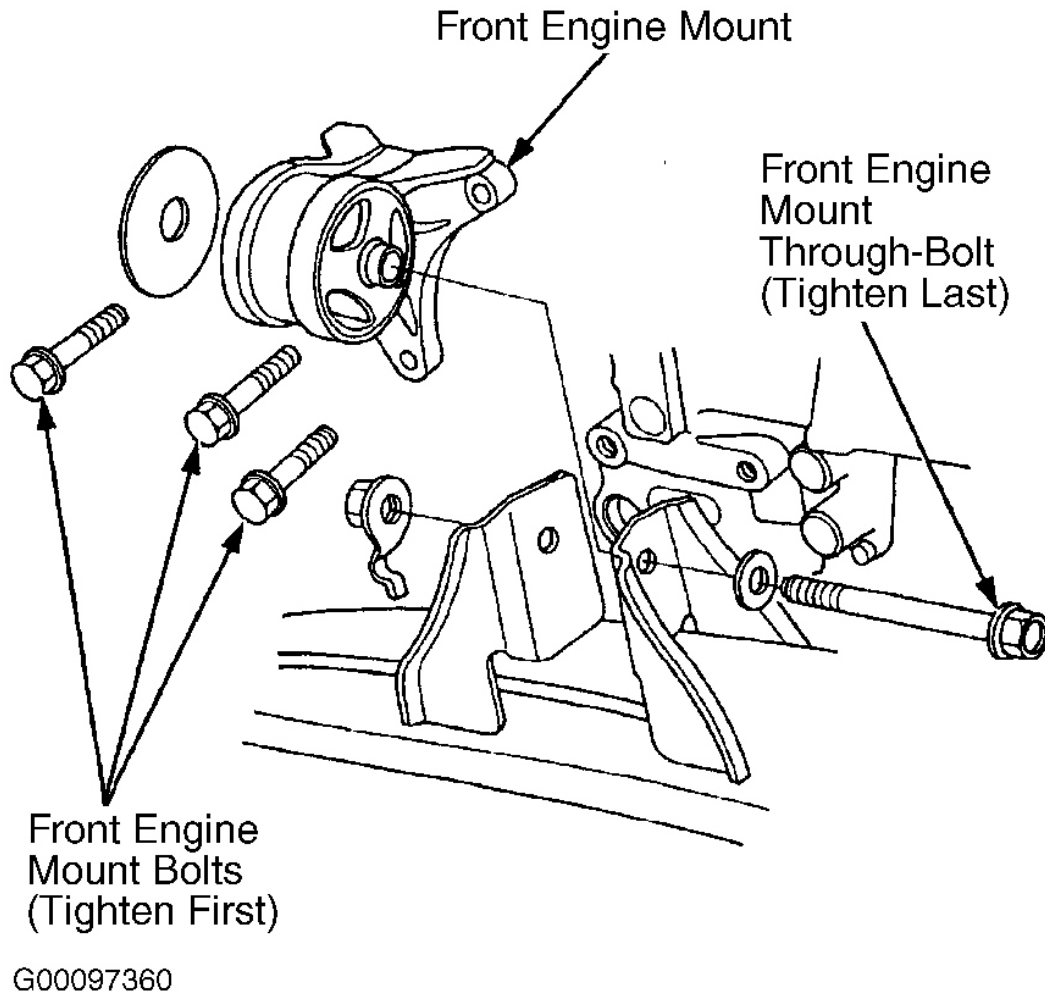
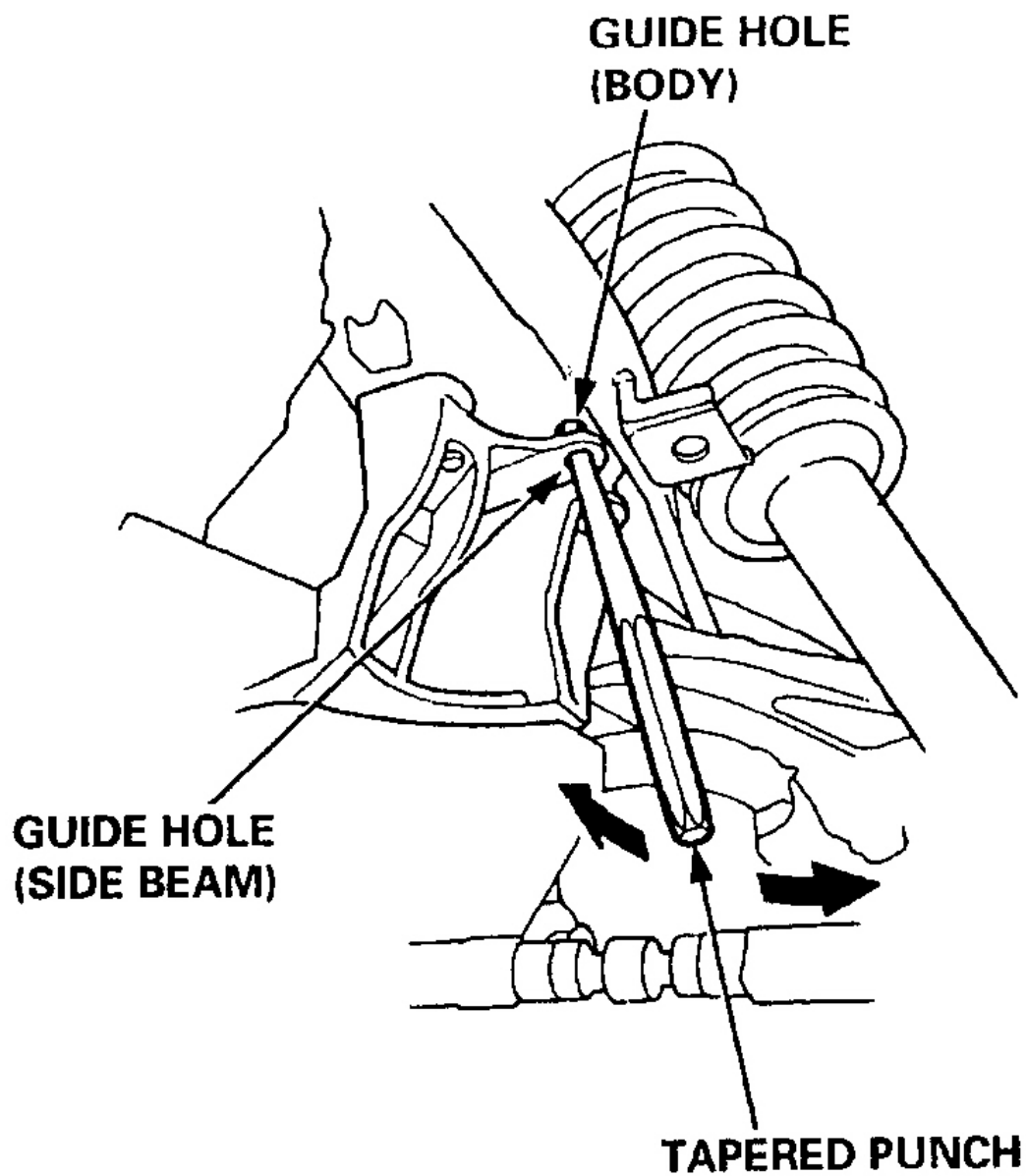


Fig. 24: Installing Front Engine Mount

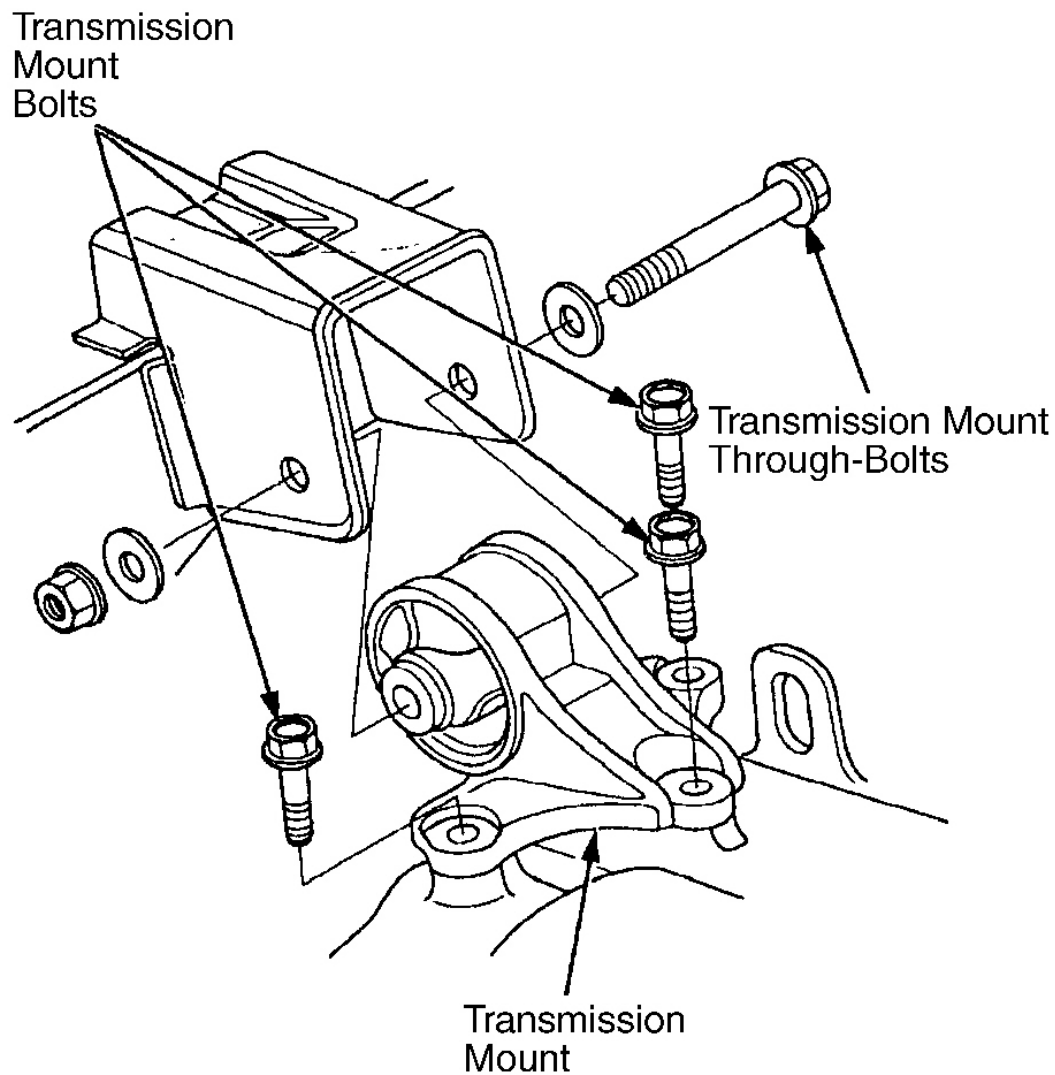
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Attach engine to suspension and sub-frame assembly. Install axle shafts. See appropriate AXLE SHAFTS article in DRIVE AXLES. Ensure NEW spring clips on end of axle shafts snap into place. Install toe control arm and lower control arms to sub-frame assembly. See appropriate REAR SUSPENSION article in SUSPENSION. Tighten all nuts and bolts to specification. See **TORQUE SPECIFICATIONS**.
4. On all vehicles, use a tapered punch to align sub-frame (side beam) with body while slowly lowering hoist over engine/transmission/sub-frame assembly. See **Fig. 25**. Tighten all sub-frame-to-body nuts and bolts to specification. See **TORQUE SPECIFICATIONS**.
5. Install transmission mount bolts and tighten to specification. See **Fig. 26** and **TORQUE SPECIFICATIONS**. Install, but DO NOT tighten, transmission mount through-bolt at this time.



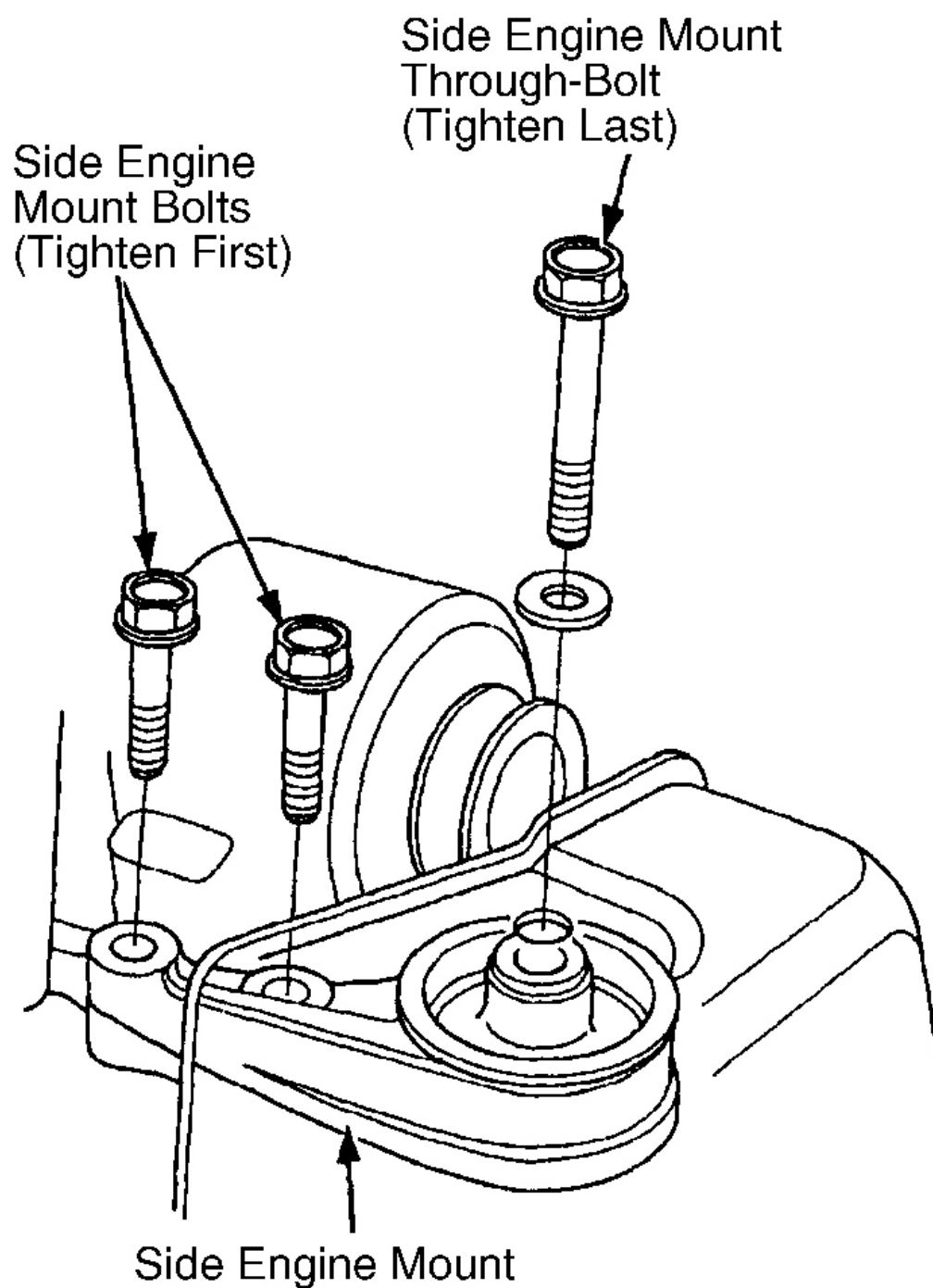
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Fig. 25: Aligning Sub-Frame With Body
Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 26: Installing Transmission Mount
Courtesy of AMERICAN HONDA MOTOR CO., INC.

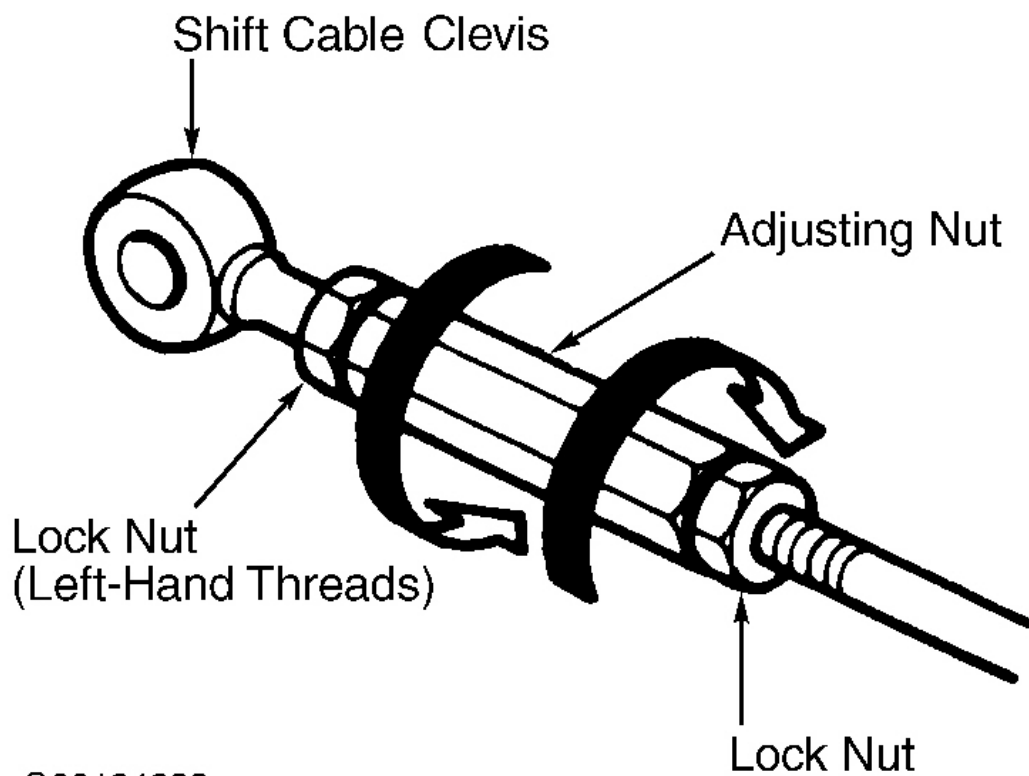
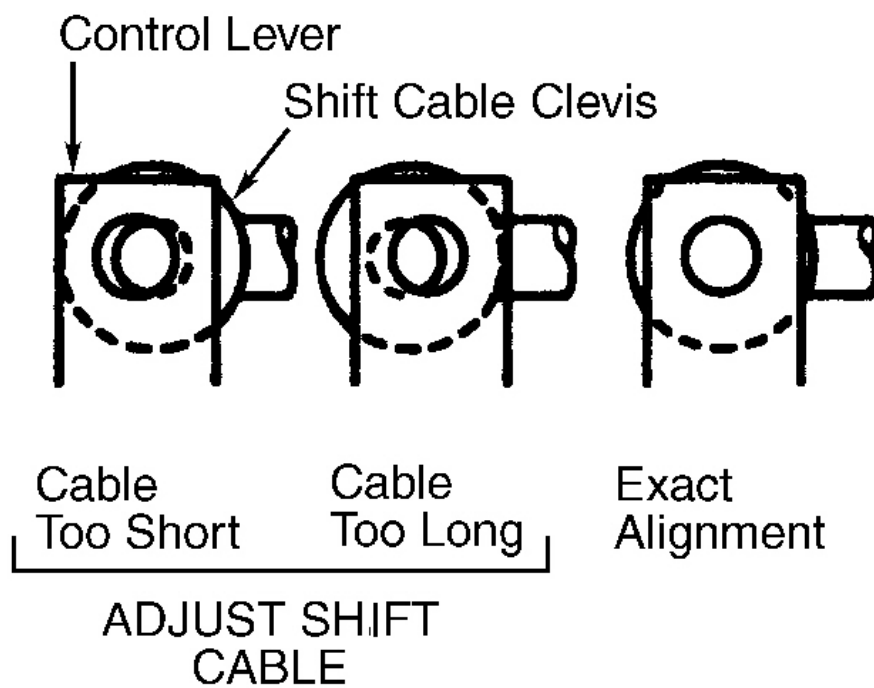


G00097363

Fig. 27: Installing Side Engine Mount

Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Install side engine mount bolts and through-bolt. Always use NEW mount bolts. First, tighten mount bolts to specification. Next, tighten through-bolt to specification. See **Fig. 27** and **TORQUE SPECIFICATIONS**.
7. Tighten transmission mount through-bolt to specification. See **Fig. 26**. Tighten NEW rear engine mount through-bolt. See **Fig. 23**. See **TORQUE SPECIFICATIONS**.
8. After engine has been installed, install other engine related components in reverse order of removal. On automatic transmission vehicles, ensure hole in control lever is aligned with hole in shift cable clevis. If alignment is not exact, loosen lock nuts on shift cable and turn adjusting nut as required. See **Fig. 28**. Tighten lock nuts. Install control lever pin and lock pin. See **Fig. 17**. If control lever pin binds during installation, shift cable still requires adjustment.



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Fig. 28: Installing Shift Cable On Automatic Transmission
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Tighten all fastening devices to specification. See **TORQUE SPECIFICATIONS**. Refill engine with oil. Refill transmission. Bleed brake system. See appropriate BRAKES article. Bleed clutch system. See appropriate CLUTCHES article.
10. After installing fuel system lines and hoses, turn ignition ON but DO NOT start engine. Allow fuel pump to pressurize fuel system for 2-3 seconds. Repeat procedure 2-3 times and check/correct fuel leaks. Bleed cooling system. See **COOLING SYSTEM** under BLEEDING.
11. Check manual transmission clutch pedal free play. See appropriate CLUTCHES article. Check and adjust wheel alignment. See appropriate WHEEL ALIGNMENT article. Adjust generator and A/C compressor belts. Adjust throttle cable. See **ADJUSTMENTS**. Ensure automatic transmission shifts smoothly.

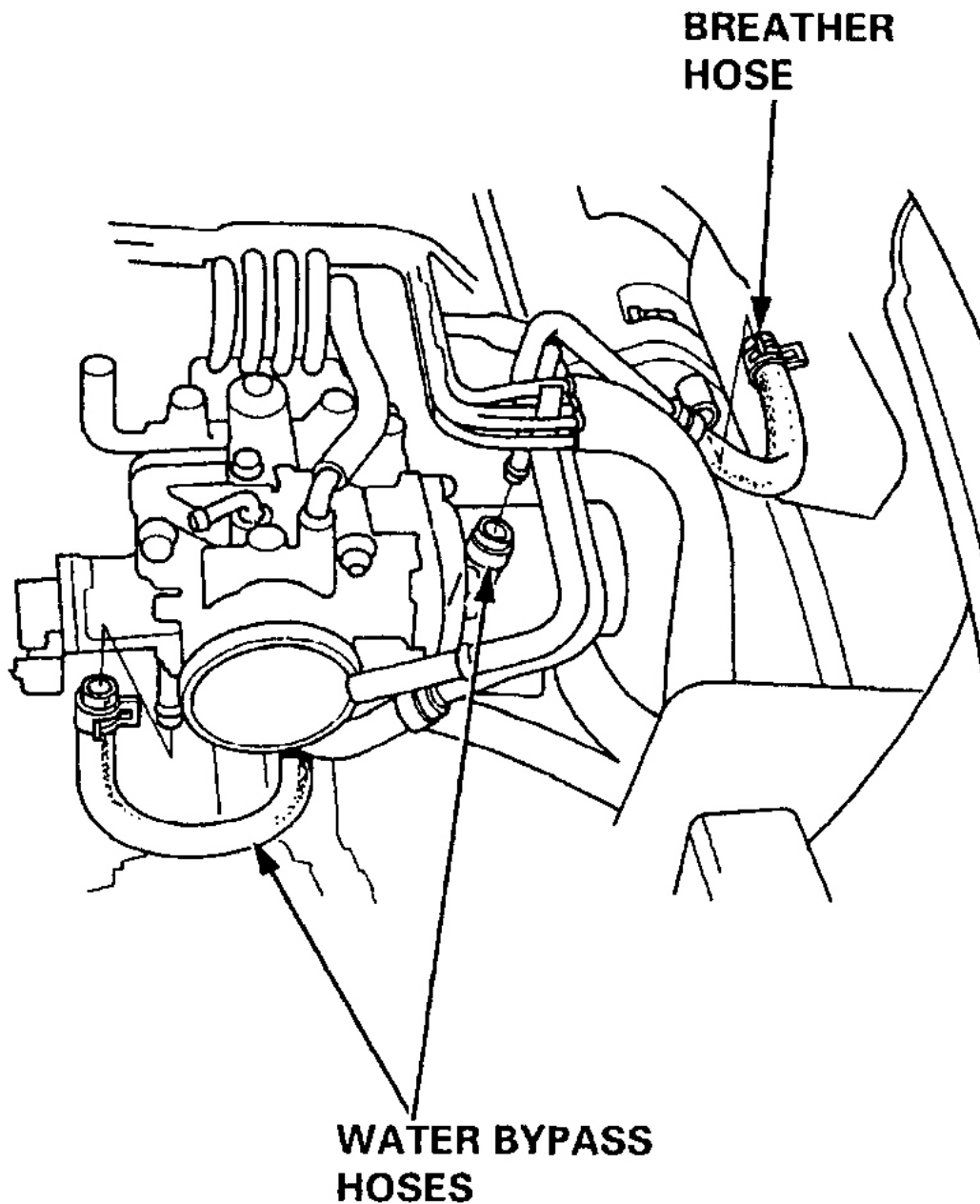
INTAKE MANIFOLD

CAUTION: DO NOT open engine cover on open top and NSX-T models when roof panel is stored.

NOTE: Engine removal is NOT required to remove intake manifold.

Removal

1. Move seat bottoms and backs as far forward as possible. Remove spare tire and spare tire holder. Disconnect negative battery cable. Remove expansion tank cap. Raise vehicle on hoist. Drain engine coolant. See **COOLING SYSTEM** under BLEEDING.
2. Remove engine compartment strut brace, if equipped. Remove engine cover stay from strut brace. On open top and NSX-T models, use shop towel to protect painted surface and place engine cover stay between engine cover and rear hatch latch.
3. On all models, relieve fuel system pressure. See **FUEL SYSTEM PRESSURE RELEASE**. Remove fuel feed pipe, wire harness cover and fuel pipe clamps. Remove fuel return hose from pressure regulator.
4. Disconnect EVAP charcoal canister vapor hose from throttle body. Disconnect brake booster vacuum hose from intake manifold. Remove breather hose. Remove air intake duct and air cleaner assembly. Disconnect coolant hoses from expansion tank, and remove expansion tank.
5. Remove coolant and heater hoses from water passage. Disconnect electrical connectors from emission control box. Wire emission control box out of way. DO NOT disconnect vacuum hoses.
6. Remove intake manifold plate and top cover. **Fig. 13**. On 1991-94 models, remove throttle cable by loosening lock nut, and slipping cable end out of throttle bracket and accelerator linkage. It is not necessary to loosen throttle cable adjusting nut. DO NOT bend throttle cable while removing. Always replace a kinked throttle cable with a NEW one. Disconnect water by-pass hoses and breather hose at throttle body. See **Fig. 29**.

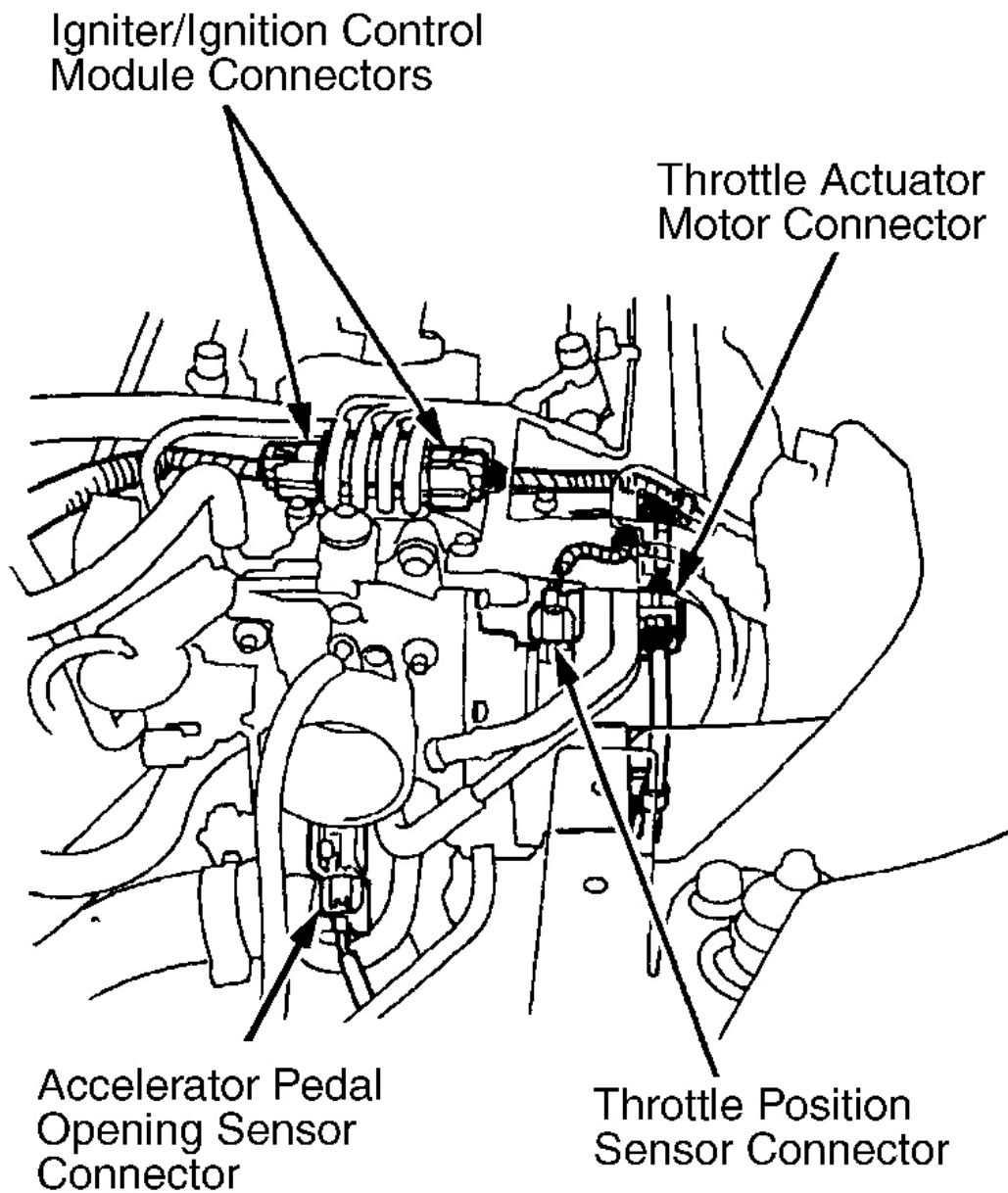


G00097368

Fig. 29: Disconnecting Water By-Pass Hoses & Breather Hose On 1991-94 Models
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. On all models, remove fuel injector covers. Remove ignition coil cover and wire harness cover. Remove PCV hose, vacuum hose and harness clamp from intake manifold. Remove harness covers and ground cables from intake manifold. On 1995 and later models, disconnect throttle body 6-pin connector.

8. On all models, remove and label the following connectors from cylinder heads and intake manifold:
- A/C compressor clutch connector.
 - Injector connectors.
 - Crankshaft Position/Cylinder Position (CKP/CYP) sensor connector.
 - Intake Air Temperature (IAT) sensor connector.
 - Heated Oxygen (HO2) sensor connectors.
 - Igniter/Ignition Control Module (ICM) connectors.
 - Engine Coolant Temperature (ECT) sensor connector.
 - ECT/Coolant temperature gauge sending unit connector.
 - ECT switch/radiator fan control switch connector.
 - Exhaust Gas Recirculation (EGR) valve lift sensor connector.
 - Condenser connector (1991-92 models).
 - Throttle Position (TP) sensor connector.
 - Knock sensor connectors.
 - Engine oil pressure gauge sending unit connector.
 - Throttle actuator motor connector (1991-94 models).
 - Accelerator pedal opening sensor connector (1991-94 models).
 - Engine oil pressure switch (at base of oil cooler) connector.
 - Idle Air Control/Electronic Air Control (IAC/EAC) valve connector.
 - Fast idle thermo valve connector (1991-92 models).
 - VTEC solenoid valve connector.
 - VTEC pressure switch connectors.
 - Generator connector.
 - Generator terminal.
 - Ground cable terminals.
9. Remove ignition coil connectors and ignition coils. Remove EGR pipe and intake manifold. Place shop towels over intake manifold ports to prevent foreign material from getting into cylinders.



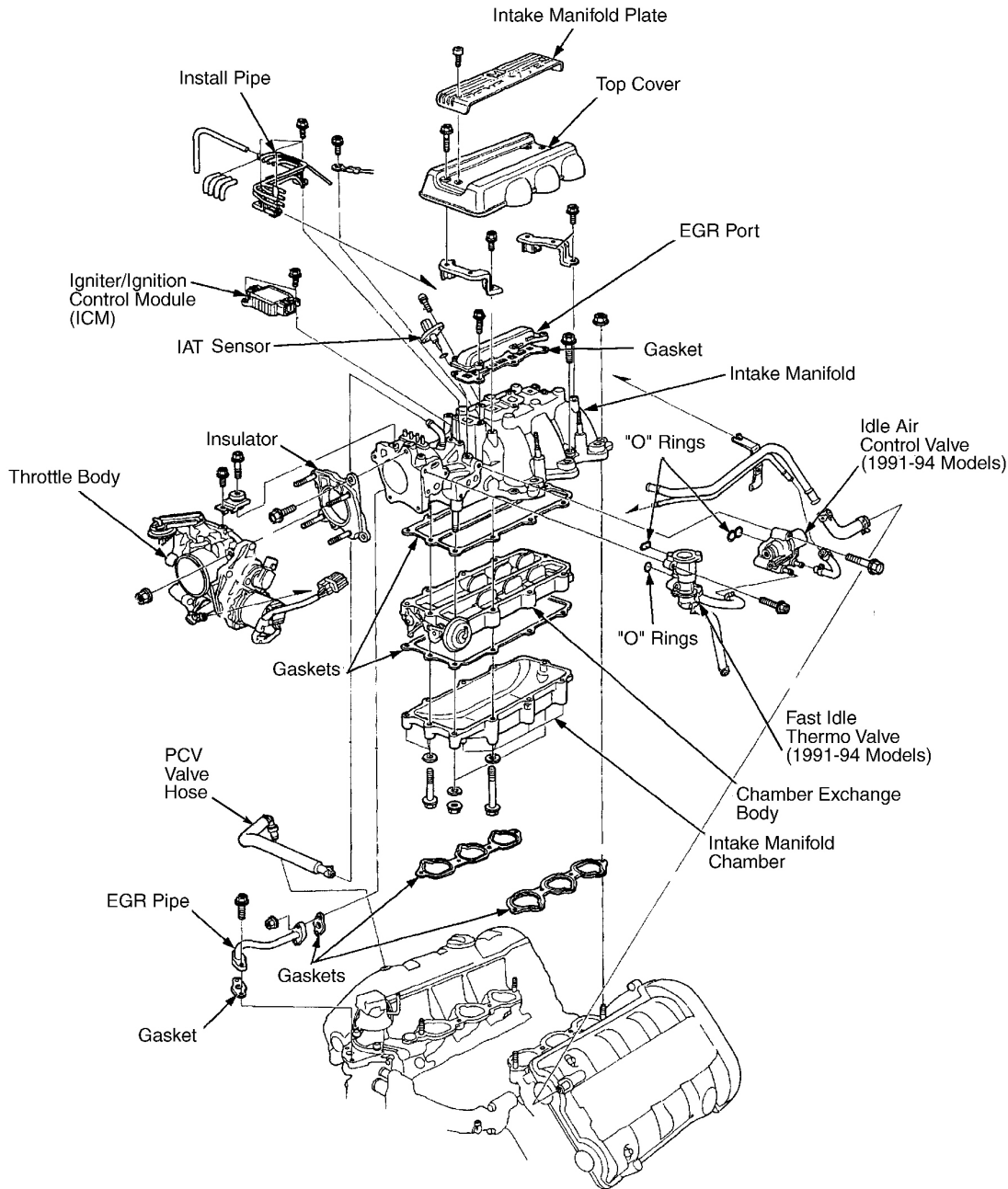
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Fig. 30: Identifying Connectors Around Throttle Body On 1991-94 Models
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Installation

To install intake manifold, reverse removal procedure. Clean intake manifold gasket mating surfaces. Install NEW gaskets. Install and tighten manifold bolts to specification. See **TORQUE SPECIFICATIONS**. On

1991-94 models, check throttle cable adjustment. See **THROTTLE CABLE ADJUSTMENT** under ADJUSTMENTS. Fill and bleed cooling system. See **COOLING SYSTEM** under BLEEDING.



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Fig. 31: Exploded View Of Intake Manifold
Courtesy of AMERICAN HONDA MOTOR CO., INC.

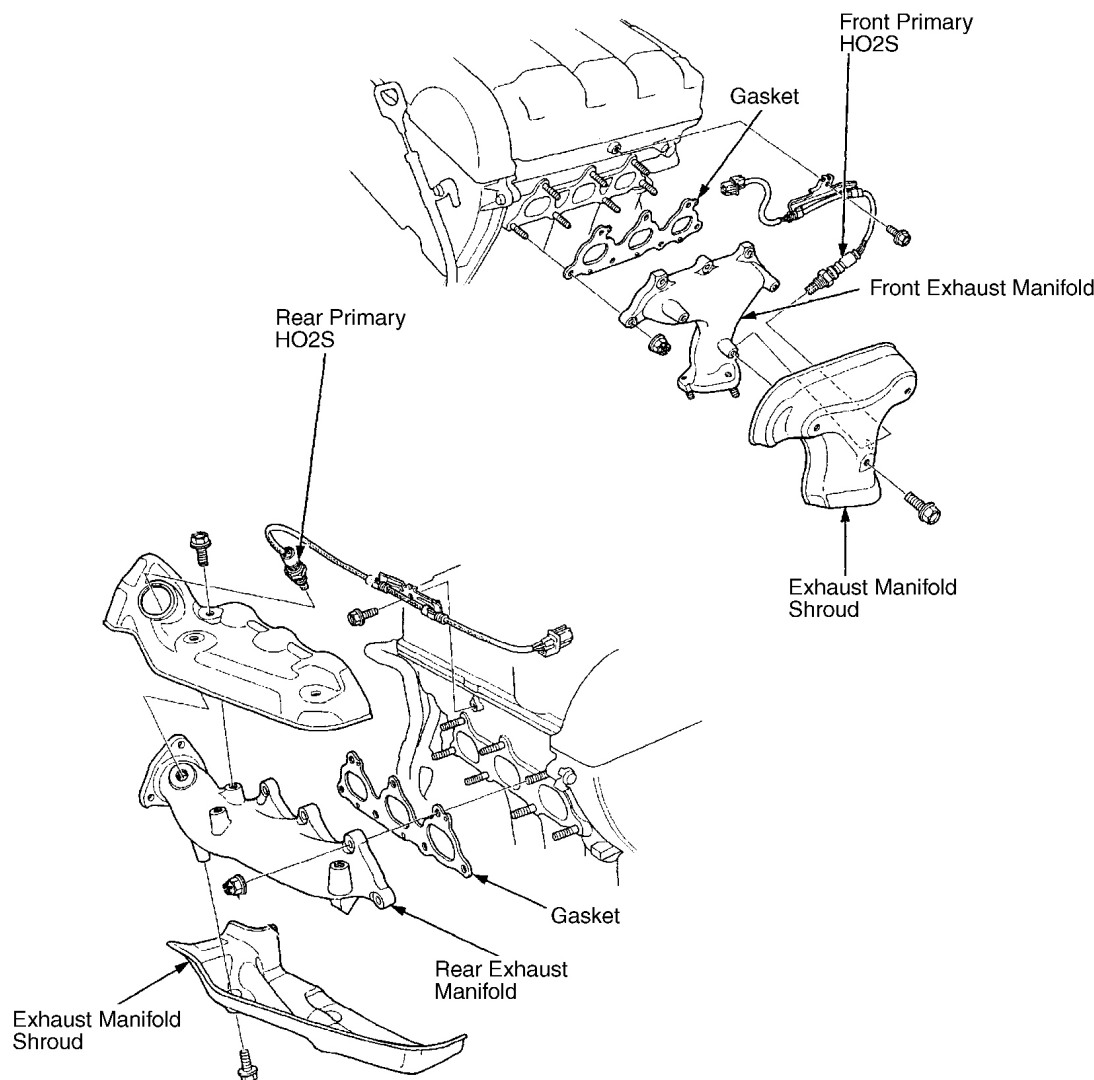
EXHAUST MANIFOLDS

CAUTION: Remove oxygen sensors using Oxygen Sensor Socket (07LAA-PT50101) **BEFORE** removing exhaust manifolds. **DO NOT** use air wrench for removing or installing self-locking nuts if oxygen sensors are **NOT** removed.

NOTE: Engine removal is **NOT** required to remove exhaust manifolds.

Removal & Installation

Removal and installation procedures are not available from manufacturer. Use exploded view illustration for removal and installation of exhaust manifolds. See **Fig. 32**.



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Fig. 32: Exploded View Of Exhaust Manifolds

Courtesy of AMERICAN HONDA MOTOR CO., INC.

TIMING BELT

CAUTION: DO NOT rotate crankshaft or camshafts with timing belt removed because pistons may hit valves, causing damage.

CAUTION: DO NOT rotate crankshaft counterclockwise. Timing belt could jump a tooth on camshaft pulleys.

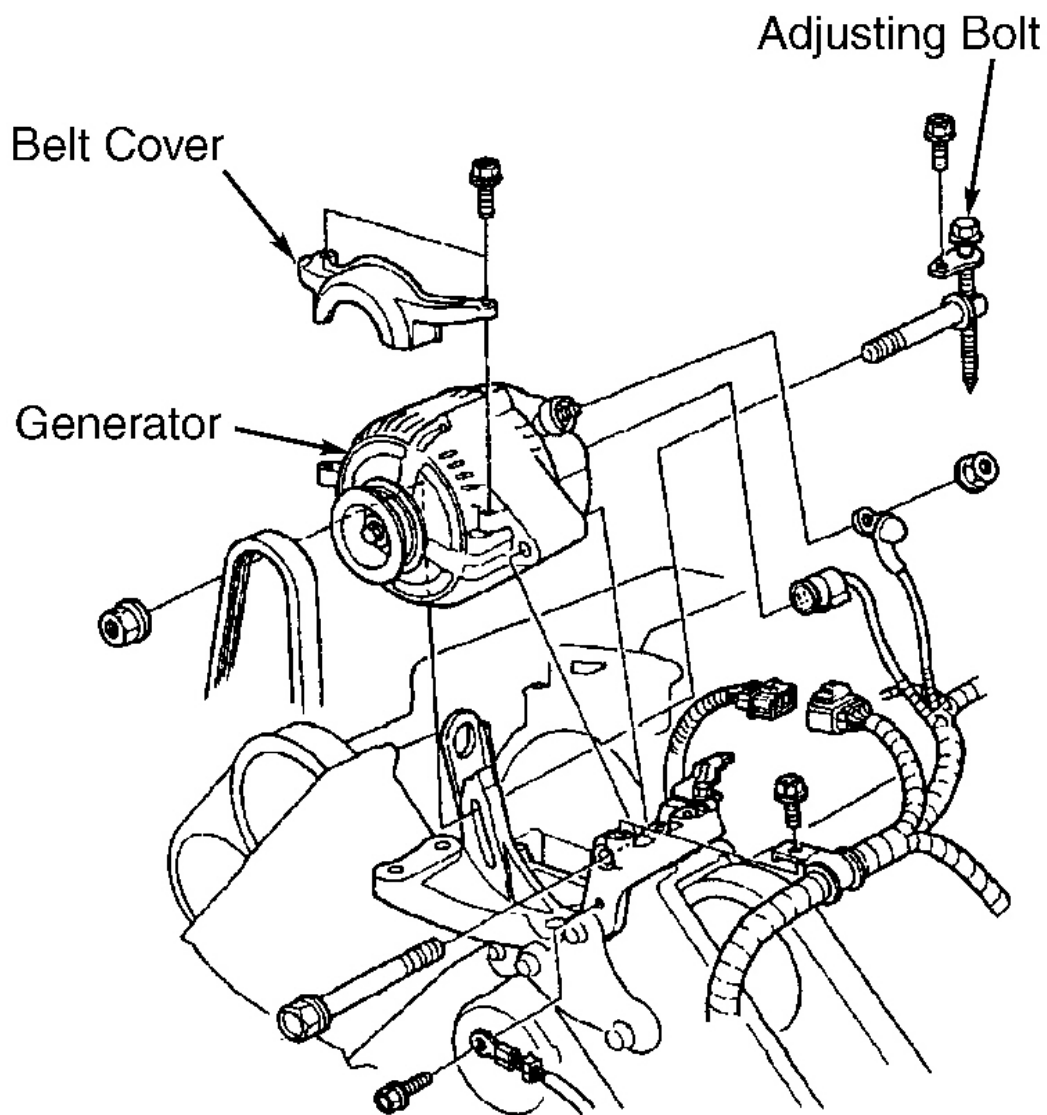
NOTE: Engine removal is NOT required to remove timing belt.

NOTE: Inspect water pump after removing timing belt. See INSPECTION under WATER PUMP.

NOTE: Different ignition coils and ignition coil covers are used for front side and rear side. Be sure to use correct ones for side being serviced. Coils and covers for front side are marked "FR". Coils and covers for rear side are marked "RR".

Removal

1. Mark timing belt direction of rotation BEFORE removal. Remove spare tire and spare tire holder. Disconnect negative battery cable. Disconnect positive battery cable.
2. Raise vehicle on hoist and remove right rear wheel. Remove engine oil cooler base assembly mounting bolts. Wire oil cooler base assembly out of way WITHOUT disconnecting hoses. Lower vehicle. Remove engine compartment strut brace, if equipped.
3. Remove intake manifold plate and top cover. See **Fig. 13**. Remove ignition coil covers, fuel injector covers and wire harness covers. Disconnect electrical connectors from ignition coils. Remove ignition coils and spark plugs. See **Fig. 5**.
4. Rotate crankshaft clockwise until No. 1 piston is at TDC of compression stroke. See **Fig. 7**. Remove expansion tank and set out of way WITHOUT removing coolant hoses.
5. Remove air cleaner assembly and breather hose. Disconnect electrical connectors from generator. Remove belt cover, mounting bolt, adjusting bolt, and mounting nut from generator. Remove generator belt and generator. See **Fig. 33** and **Fig. 34**.
6. Remove cylinder head covers. Remove side engine mount bolts. Push side engine mount bracket into body support bracket. Remove transmission mount. See **Fig. 21**. Place wood brace under front of engine and pad oil pan for protection. Using a floor jack, tilt front of engine 5°. See **Fig. 35**.



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Fig. 33: Removing Generator On 1991-94 Models
Courtesy of AMERICAN HONDA MOTOR CO., INC.

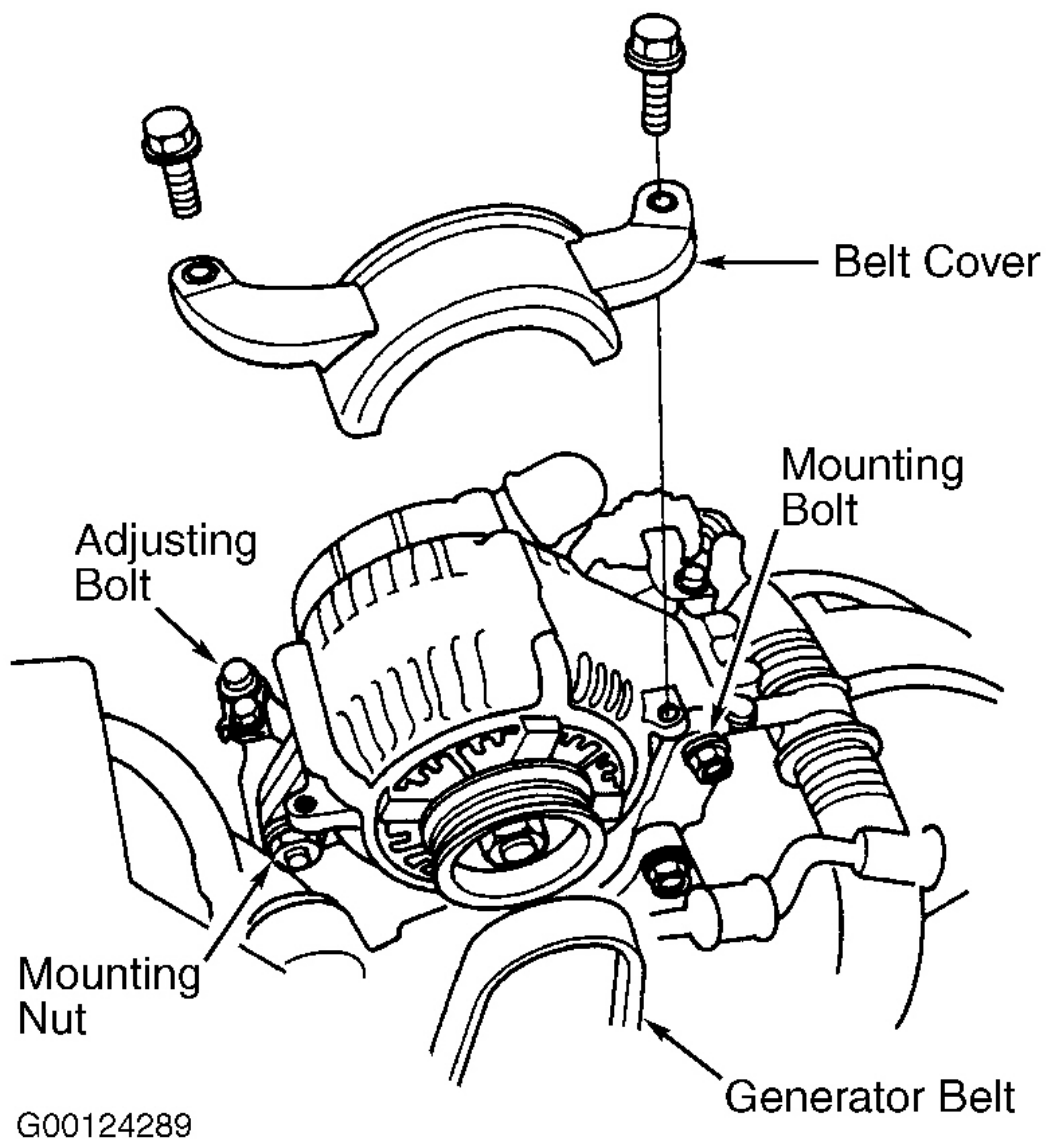
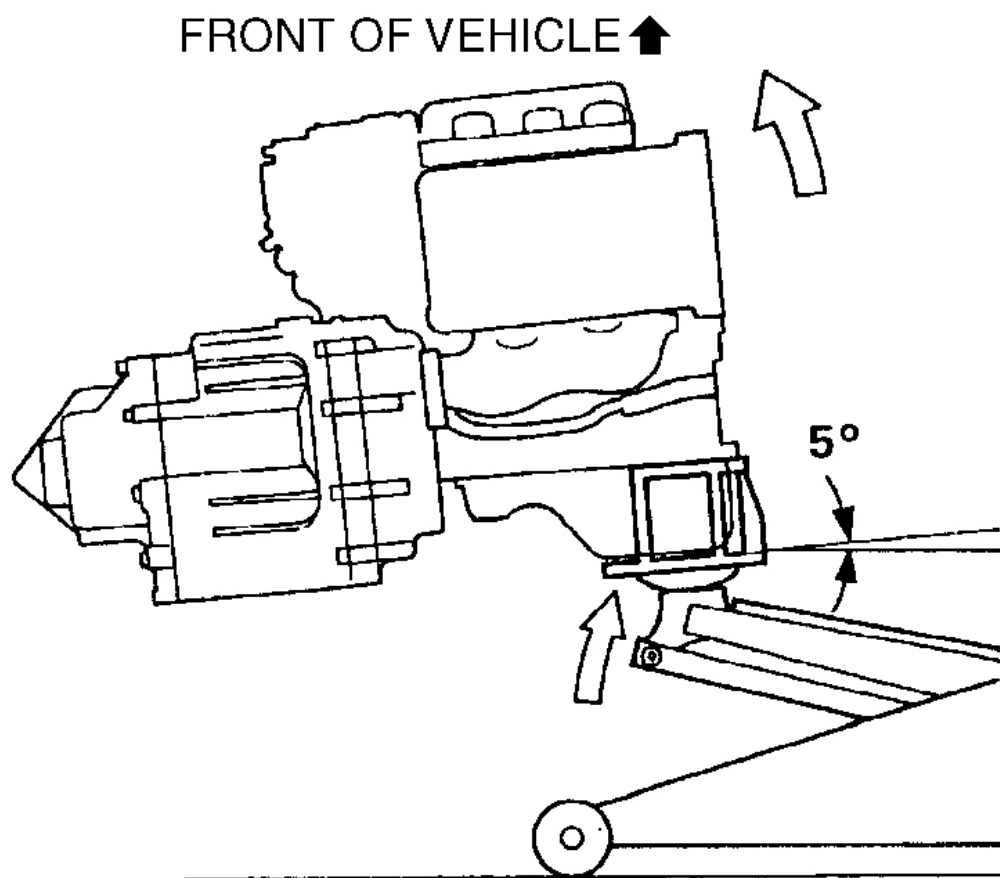
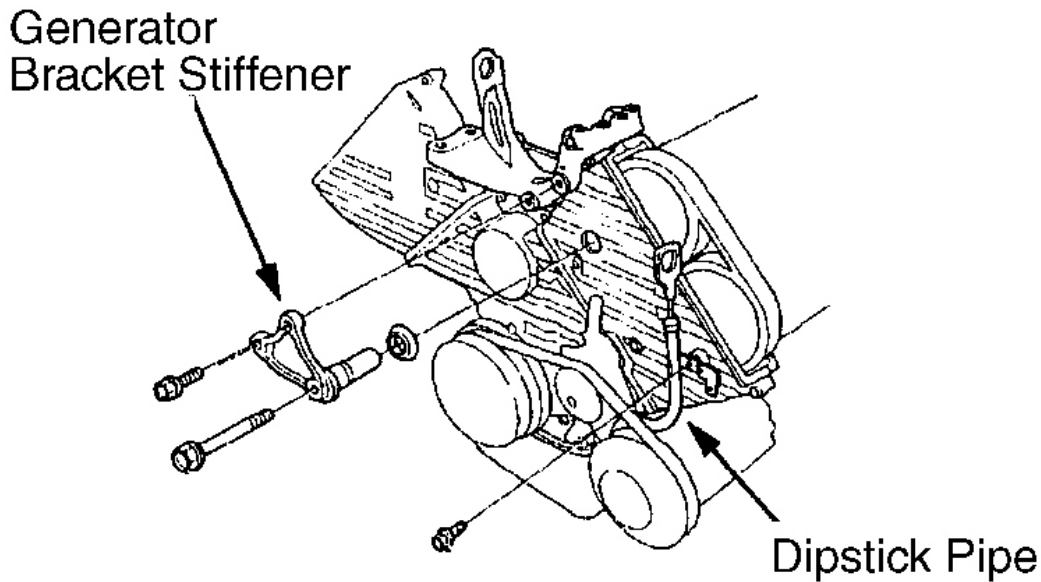


Fig. 34: Removing Generator On 1995-2001 Models
Courtesy of AMERICAN HONDA MOTOR CO., INC.



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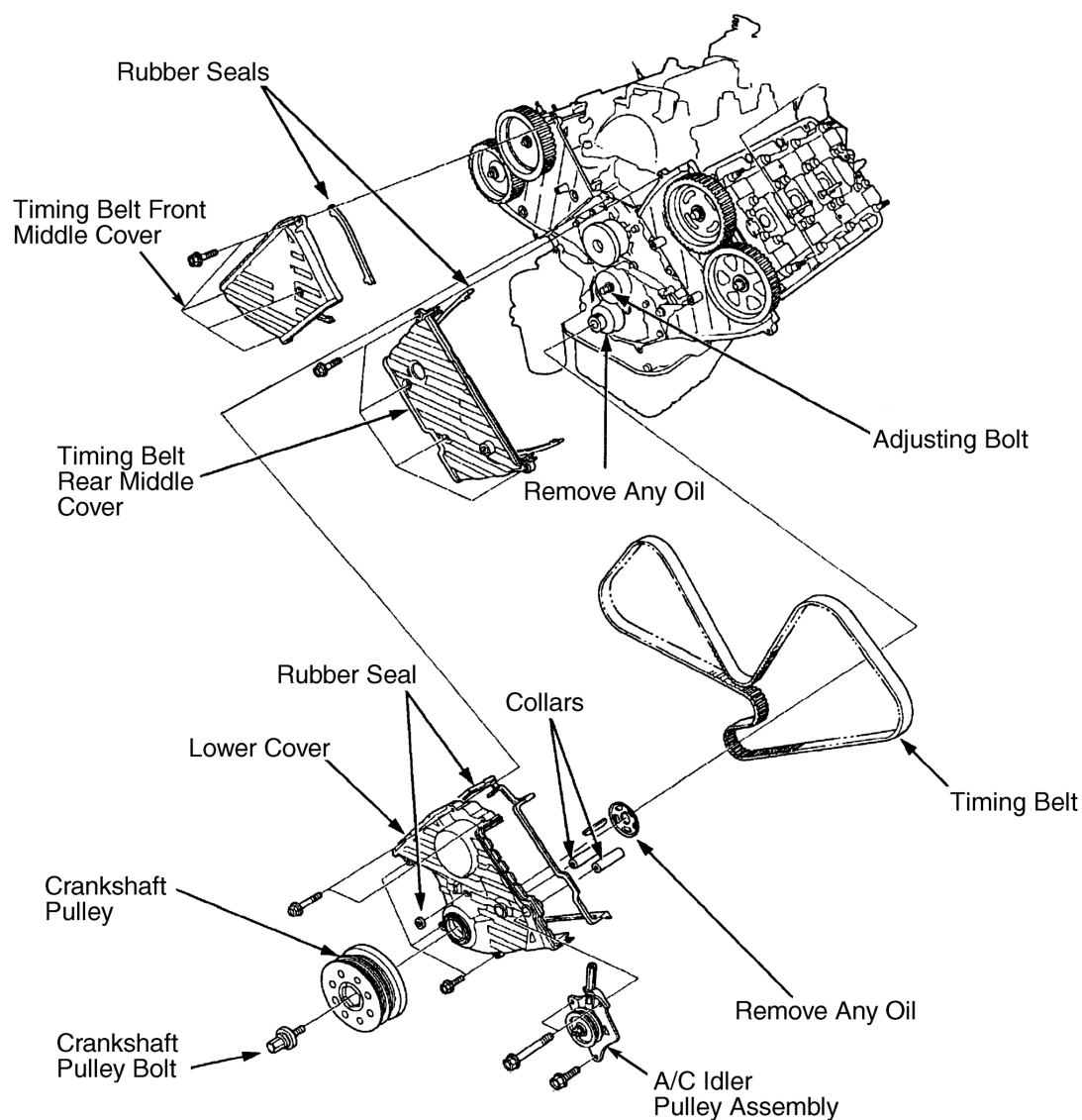
Fig. 35: Tilting Engine For Timing Belt Removal
Courtesy of AMERICAN HONDA MOTOR CO., INC.



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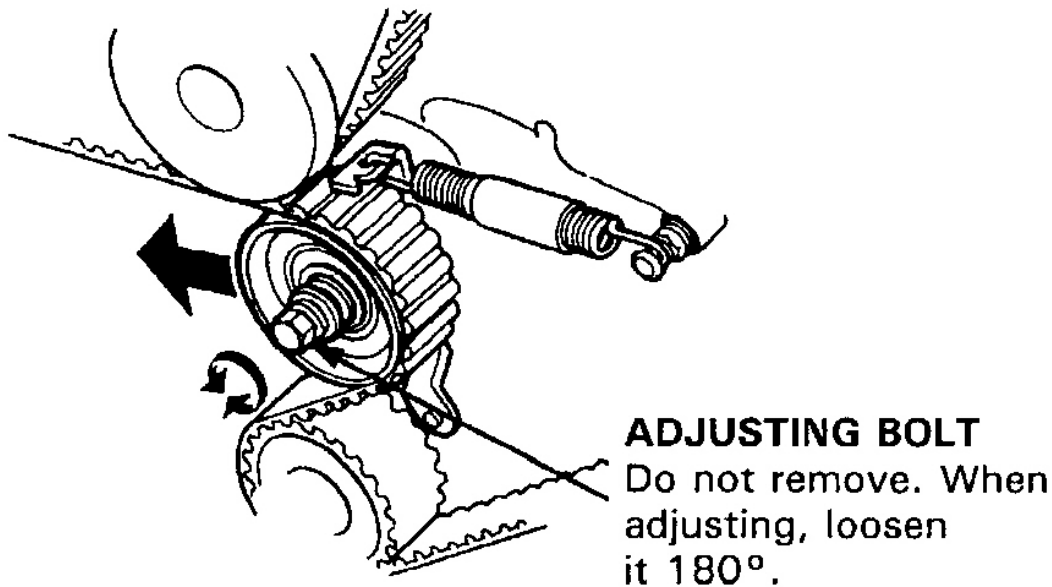
Fig. 36: Removing Generator Bracket Stiffener
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Remove generator bracket stiffener, dipstick and dipstick pipe. See **Fig. 36**. Loosen A/C idler pulley center nut and adjusting nut. See **Fig. 14**. Remove A/C compressor belt.
8. Ensure No. 1 piston is at TDC of compression stroke. See **Fig. 7**. Using Crankshaft Pulley Holder Handle (07JAB-001020A) and Holder Attachment (07NAB-001040A for automatic transmission or 07NAB-001030A for manual transmission), hold crankshaft pulley and remove crankshaft pulley bolt. Remove crankshaft pulley.
9. Remove rubber seal from adjusting bolt, then remove timing belt front middle cover, timing belt rear middle cover, and lower cover. See **Fig. 37**. Loosen timing belt adjusting bolt 180°. Push tensioner to release tension from belt, then retighten adjusting bolt. See **Fig. 38**.
10. Remove timing belt from pulleys. DO NOT crimp or bend timing belt more than 90° or less than 1" (25 mm) in diameter. DO NOT bend, twist or turn timing belt inside out. DO NOT allow belt to contact coolant or oil.



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Fig. 37: Exploded View Of Timing Belt & Components
 Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 38: Releasing Timing Belt Tension

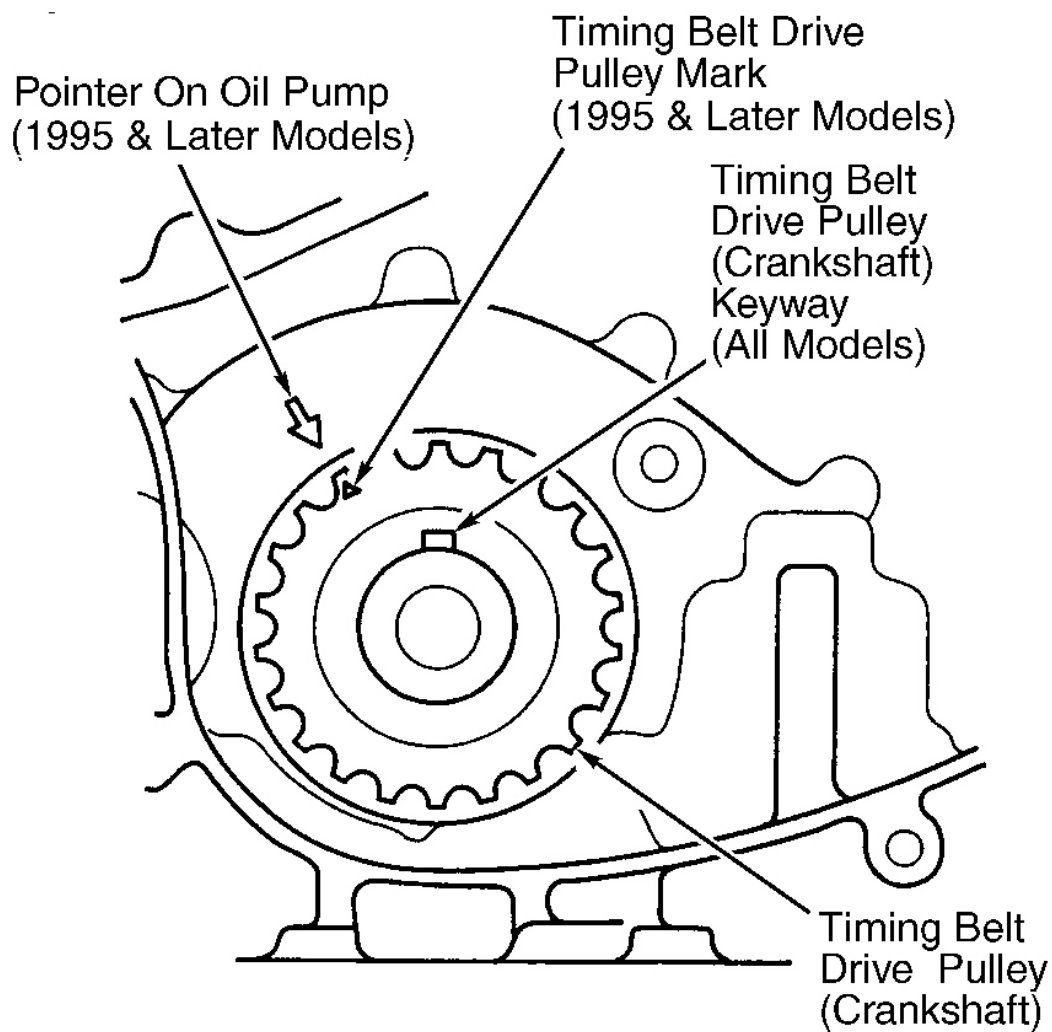
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Inspection

Inspect timing belt for cracks or damaged teeth. Ensure timing belt is not contaminated with oil or coolant. If one edge of belt is damaged, check alignment of gears and tensioner. Replace as necessary.

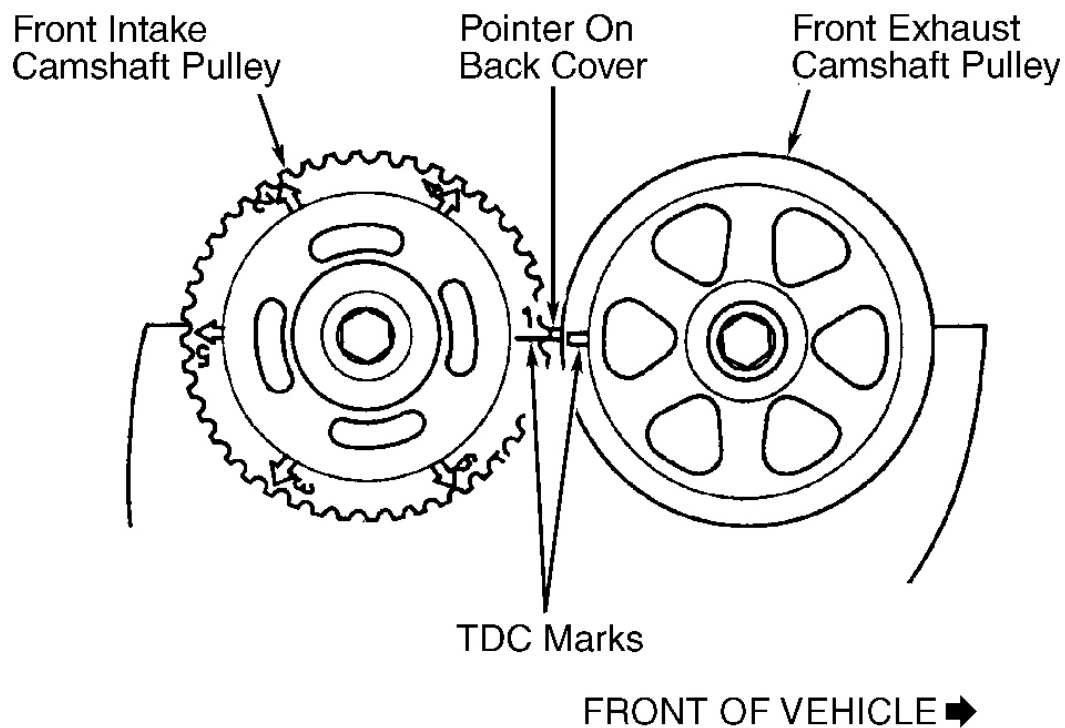
Installation

1. To install, reverse removal procedure. Clean middle and lower timing belt covers, and timing belt drive pulley. Ensure No. 1 piston is at TDC of compression stroke. On 1991-94 models, set timing belt drive pulley (crankshaft) keyway pointing upward. See **Fig. 39**.
2. On 1995-2001 models, set timing belt drive pulley (crankshaft) keyway pointing upward and align mark on tooth side of pulley with pointer on oil pump. See **Fig. 39**.
3. On all models, set front camshaft pulleys so piston No. 1 is at TDC. Align TDC marks on front exhaust camshaft pulley and front intake camshaft pulley to pointer on back cover. See **Fig. 40**. Set rear camshaft pulleys so piston No. 1 is at TDC. Align TDC mark on rear intake camshaft pulley to pointer on back cover. Align rear exhaust camshaft pulley 1/2 tooth clockwise past TDC. See **Fig. 41**.
4. Install timing belt onto timing belt drive pulley (crankshaft), tension adjusting pulley, front exhaust camshaft pulley, front intake camshaft pulley, water pump pulley, rear intake camshaft pulley and rear exhaust camshaft pulley, in that order. See **Fig. 42**. Ensure timing belt drive pulley (crankshaft) and camshaft pulleys are still at TDC. See **Fig. 39-Fig. 41**.



G00124290

Fig. 39: Setting Crankshaft For Timing Belt Installation
Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 40: Setting Front Camshaft Pulleys For Timing Belt Installation
Courtesy of AMERICAN HONDA MOTOR CO., INC.

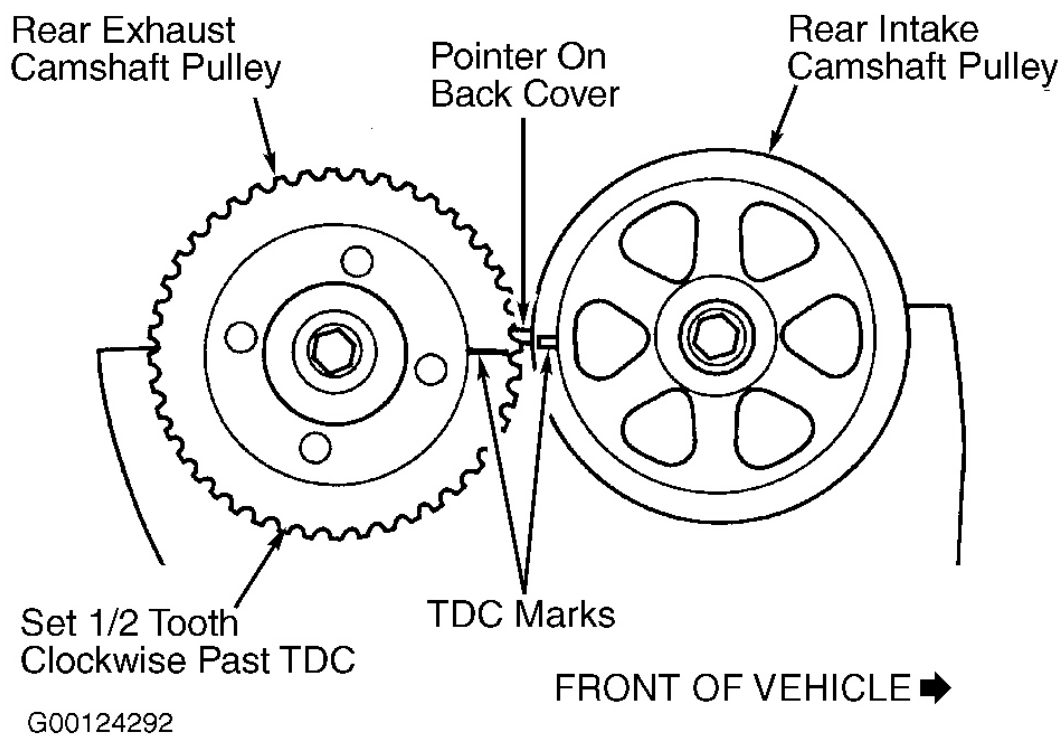
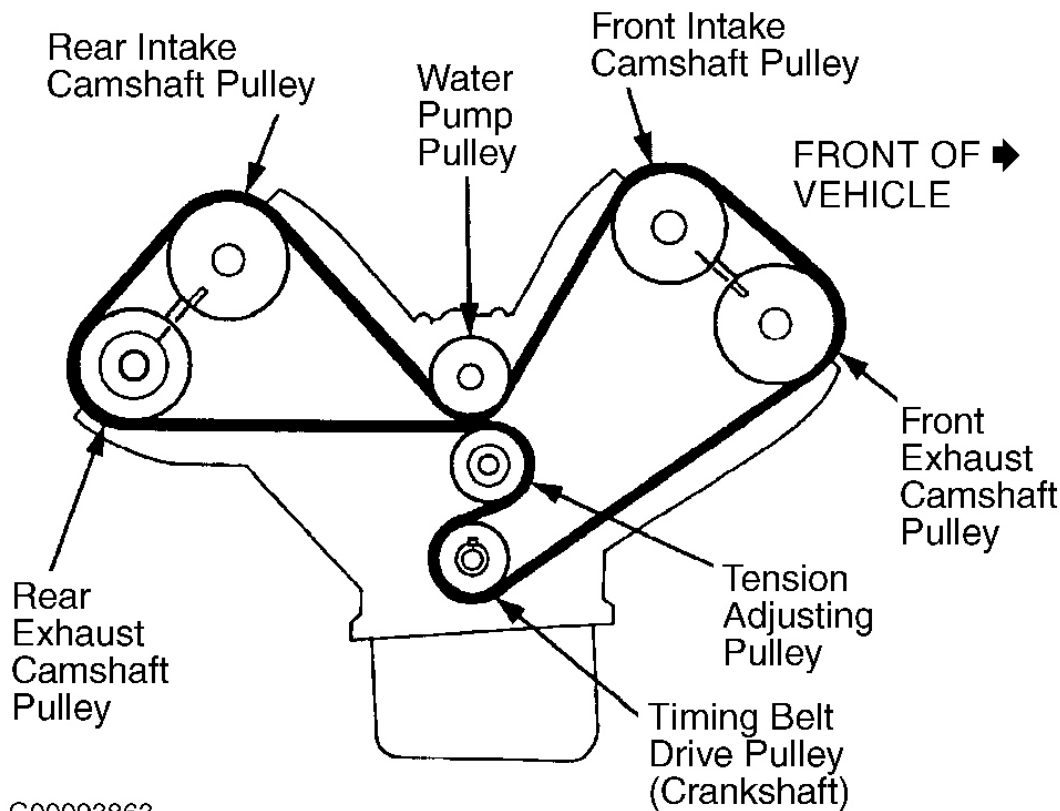


Fig. 41: Setting Rear Camshaft Pulleys For Timing Belt Installation
Courtesy of AMERICAN HONDA MOTOR CO., INC.



G00093863

Fig. 42: Installing Timing Belt

Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Remove slack in timing belt between timing belt drive pulley (crankshaft) and front exhaust camshaft pulley, front exhaust camshaft and front intake camshaft pulleys, front intake camshaft and water pump pulleys, water pump and rear intake camshaft pulleys, and rear intake camshaft and rear exhaust camshaft pulleys, in order, by turning each camshaft pulley **SLIGHTLY**.

NOTE: Do not rotate crankshaft when timing belt adjusting bolt is loose, or timing belt will skid over the teeth of the rear intake camshaft pulley.

6. Loosen timing belt adjusting bolt 180°. Slack between rear exhaust camshaft pulley and tension adjusting pulley should be eliminated. Tighten timing belt adjusting bolt to specification. See **TORQUE SPECIFICATIONS**.
7. If No. 1 piston is at TDC, rotate crankshaft **CLOCKWISE** 9 teeth on camshaft pulley. Blue mark on crankshaft pulley should be aligned with pointer on lower cover, and TDC mark (White mark) on crankshaft pulley should be at about 5 o'clock position. See **Fig. 43**. Loosen adjusting bolt. Retighten adjusting bolt to specification. See **TORQUE SPECIFICATIONS**.
8. Install timing belt lower cover, rear middle cover and front middle cover. Install crankshaft pulley with

No. 1 piston at TDC of compression stroke. Hold crankshaft pulley and tighten crankshaft pulley bolt to specification. See **TORQUE SPECIFICATIONS**.

9. Verify that No. 1 piston and camshaft pulleys are still at TDC. See **Fig. 44**. When camshafts are at TDC, 5.0-mm pin punches can be inserted through camshaft holder hole into camshaft hole to hold camshafts at TDC. See **Fig. 44**. If crankshaft and camshafts are at TDC, go to step 11. If a camshaft is not positioned at TDC, go to next step.

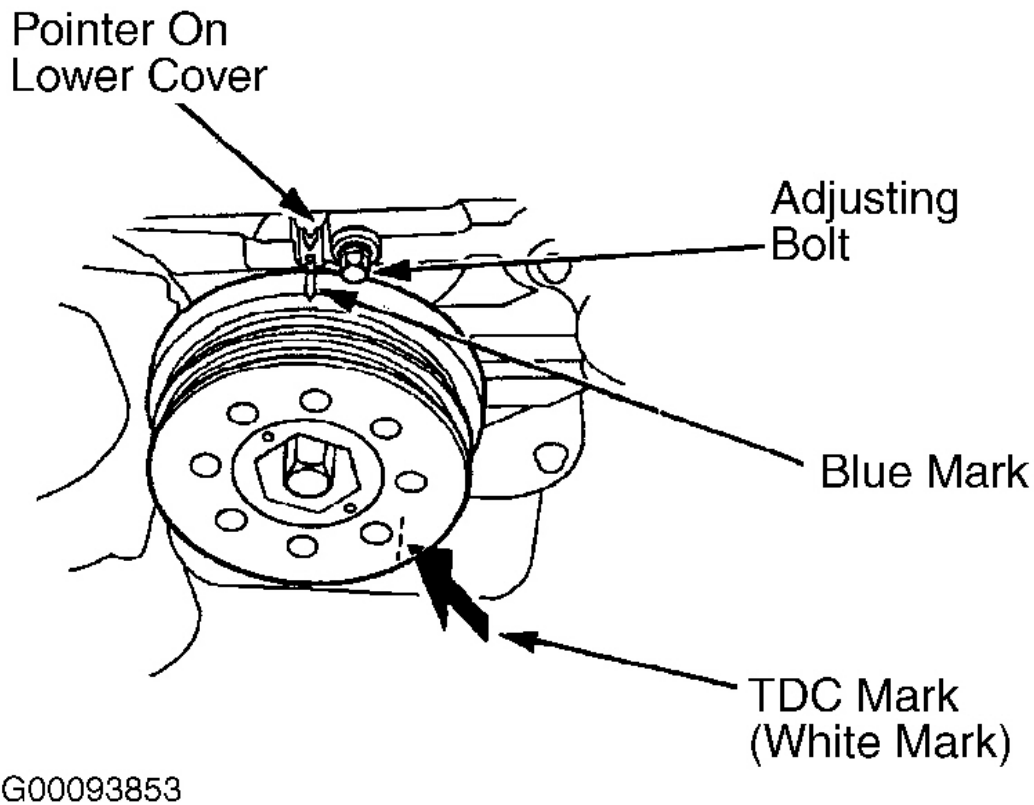
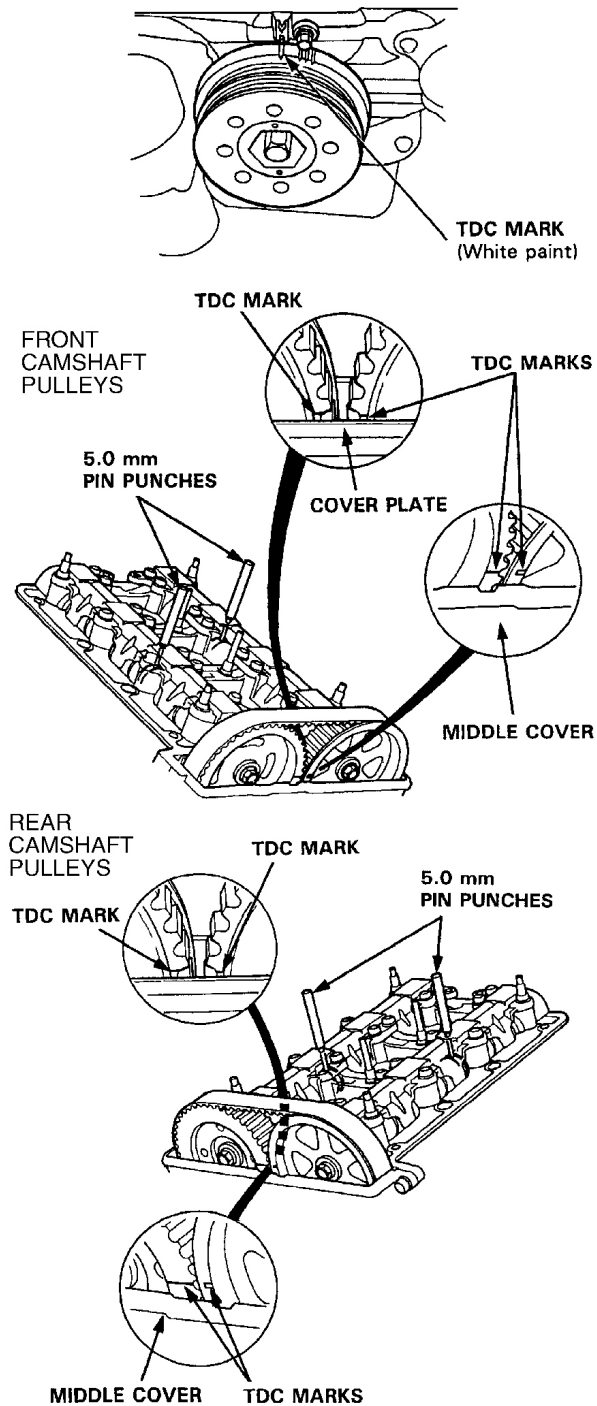


Fig. 43: Final Step Of Adjusting Timing Belt Tension
Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 44: Checking Crankshaft & Camshaft Pulleys At TDC
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. If a camshaft is not positioned at TDC, remove timing belt lower cover, rear middle cover, front middle cover and timing belt. Adjust position of crankshaft and camshaft pulleys, and reinstall timing belt. See

Fig. 39-Fig. 41 . Align holes on camshaft holder with camshaft holes and insert 5.0-mm pin punches to hold camshafts at TDC. Remove pin punches after timing belt has been reinstalled. Go to next step.

11. Complete installation of components in reverse order of removal. Always use NEW "O" ring at engine oil cooler base and NEW rubber seals on intake side of ignition coil covers. Apply thin layer of liquid gasket to cylinder head cover mating surface and rubber seals to hold seals in place. After all nuts and bolts have been tightened to specification, adjust A/C compressor belt and generator belt tension.

ROCKER ARMS & SHAFTS

NOTE: **Ensure all removed parts are marked and identified for reinstallation in original positions. Keep rocker arm assemblies bundled together with rubber bands to maintain as matched sets.**

NOTE: **The VTEC solenoid valve was referred to as spool valve on 1991-92 models.**

Removal

1. Remove camshafts. See **CAMSHAFTS**. Screw a 5 mm bolt into each rocker shaft oil control orifice, then pull out rocker shaft oil control orifice. See **Fig. 45**.

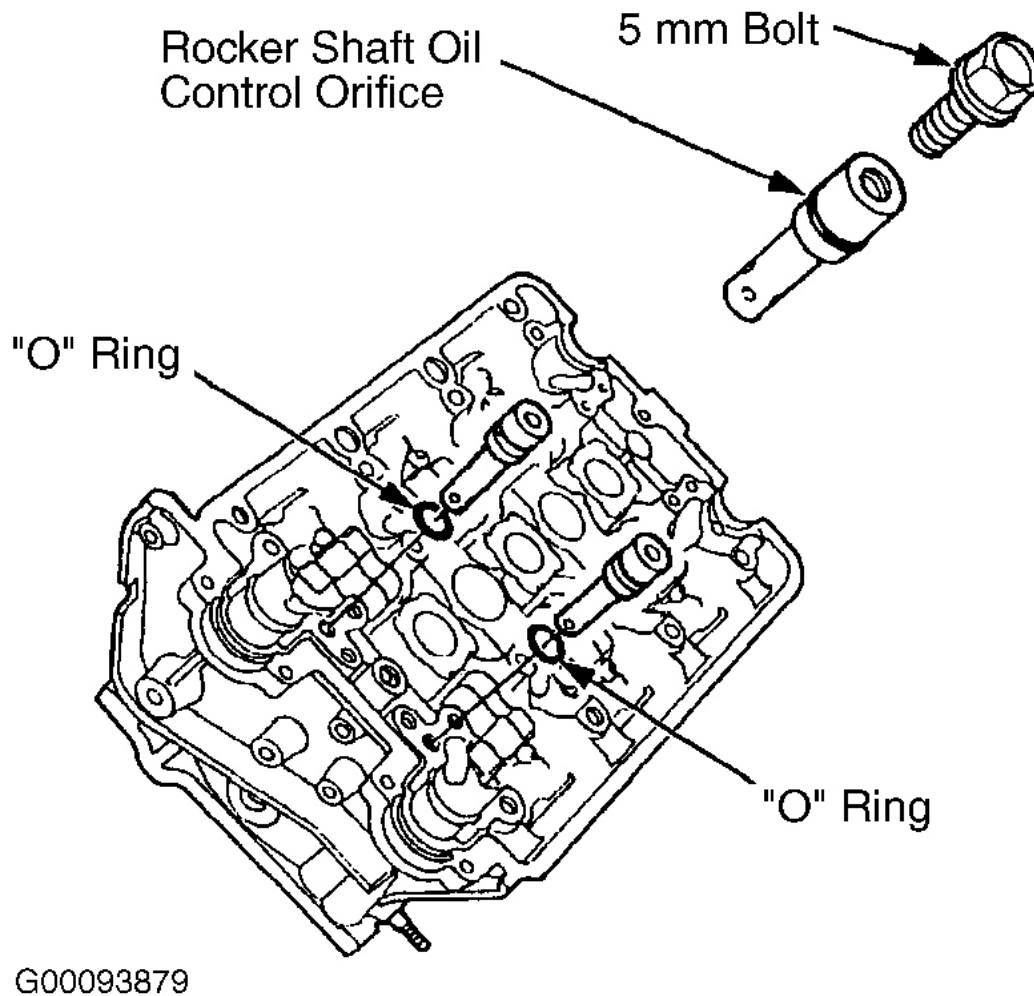
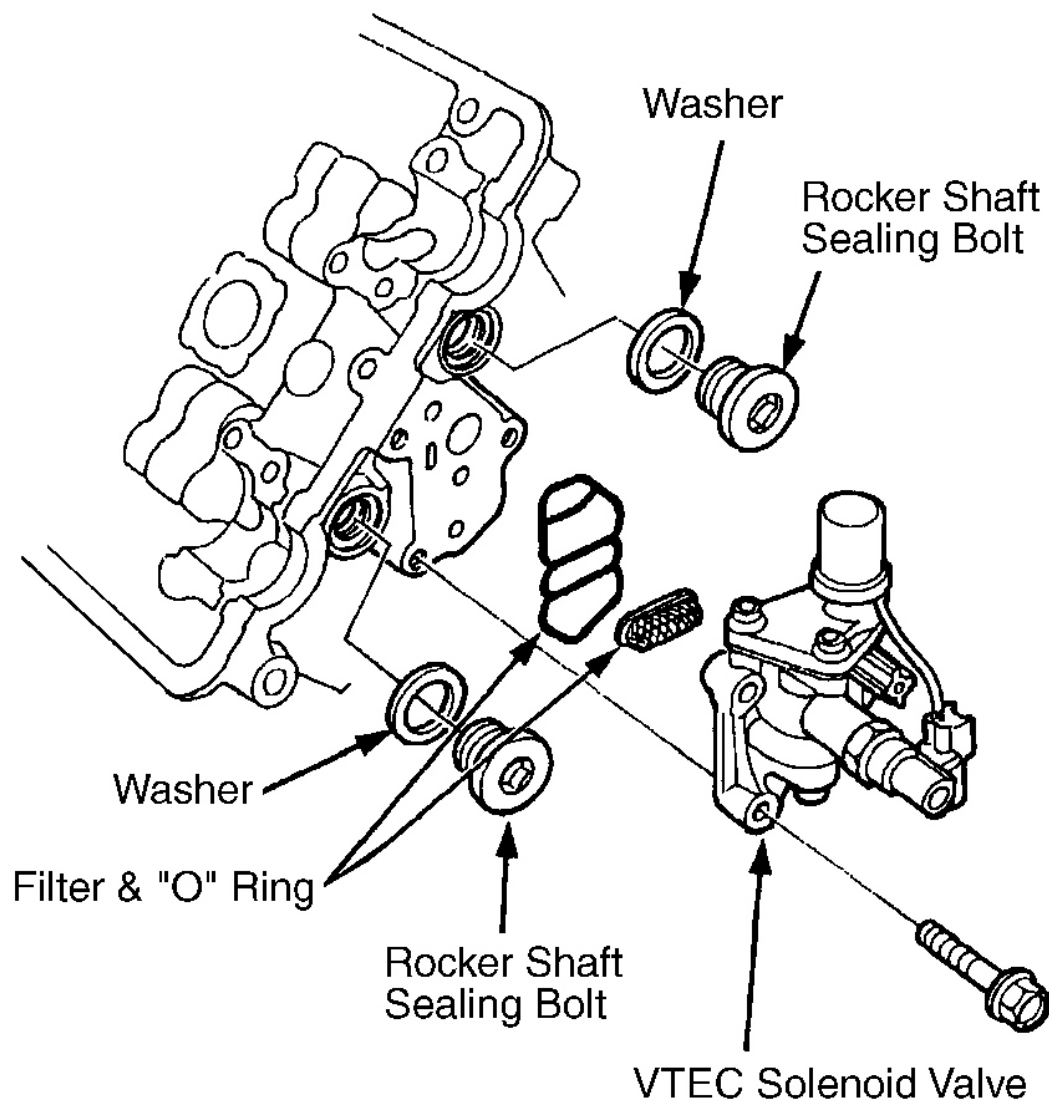


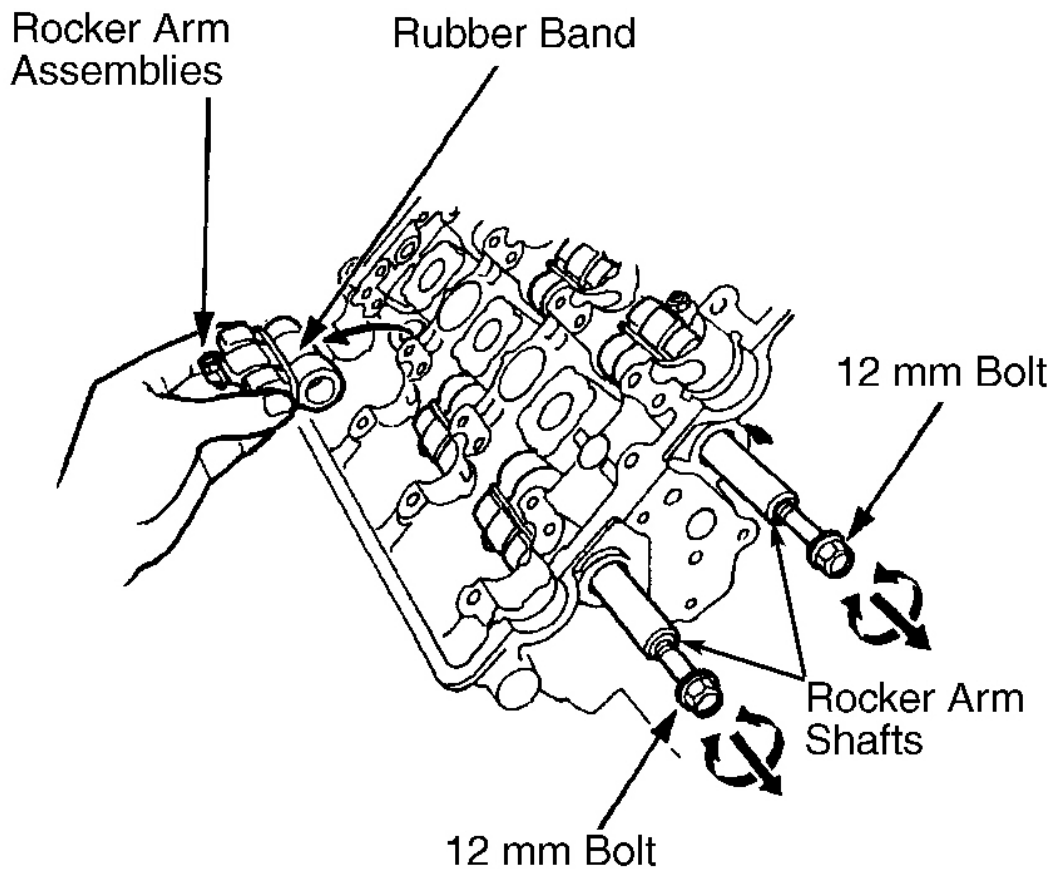
Fig. 45: Removing Rocker Shaft Oil Control Orifice
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Remove VTEC solenoid valve mounting bolts, and remove VTEC solenoid valve. Remove rocker arm shaft sealing bolts. See **Fig. 46**.
3. Using rubber bands, bundle rocker arms together to keep them as matched sets. Screw a 1.25 x 12 mm bolt into each rocker arm shaft sealing bolt. Remove rocker arm assemblies as sets while slowly pulling intake and exhaust rocker arm shafts out of cylinder head toward transmission side of engine. See **Fig. 47**. Identify and mark all components as they are removed to ensure installation in original locations.



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Fig. 46: Removing VTEC Solenoid Valve & Rocker Arm Shaft Sealing Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

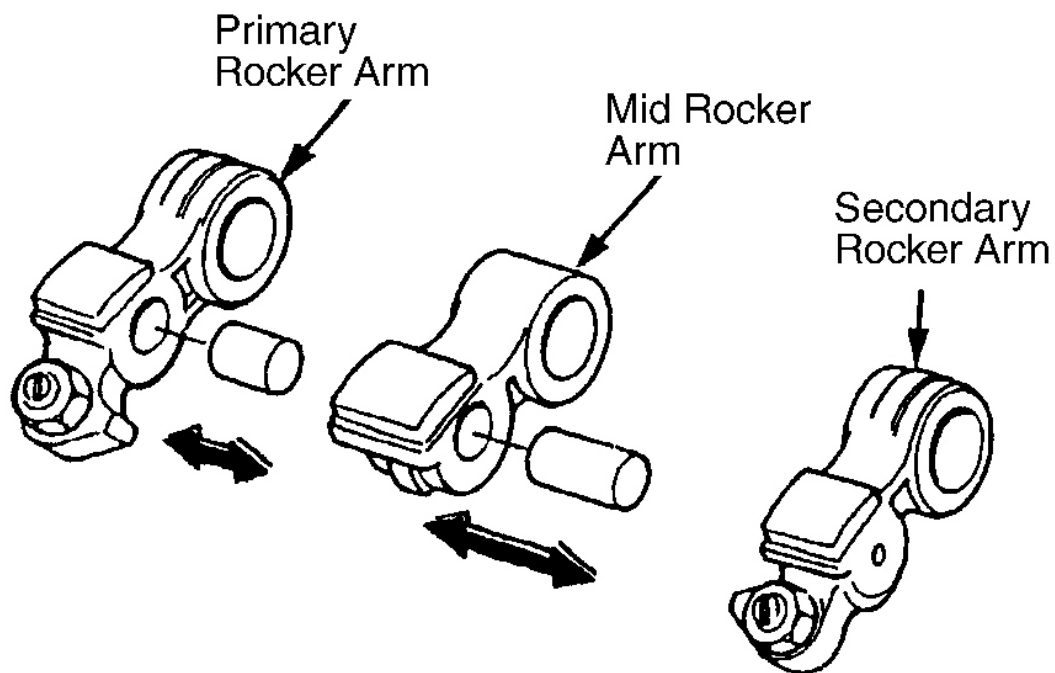


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Fig. 47: Removing Rocker Arm Assemblies & Rocker Arm Shafts
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

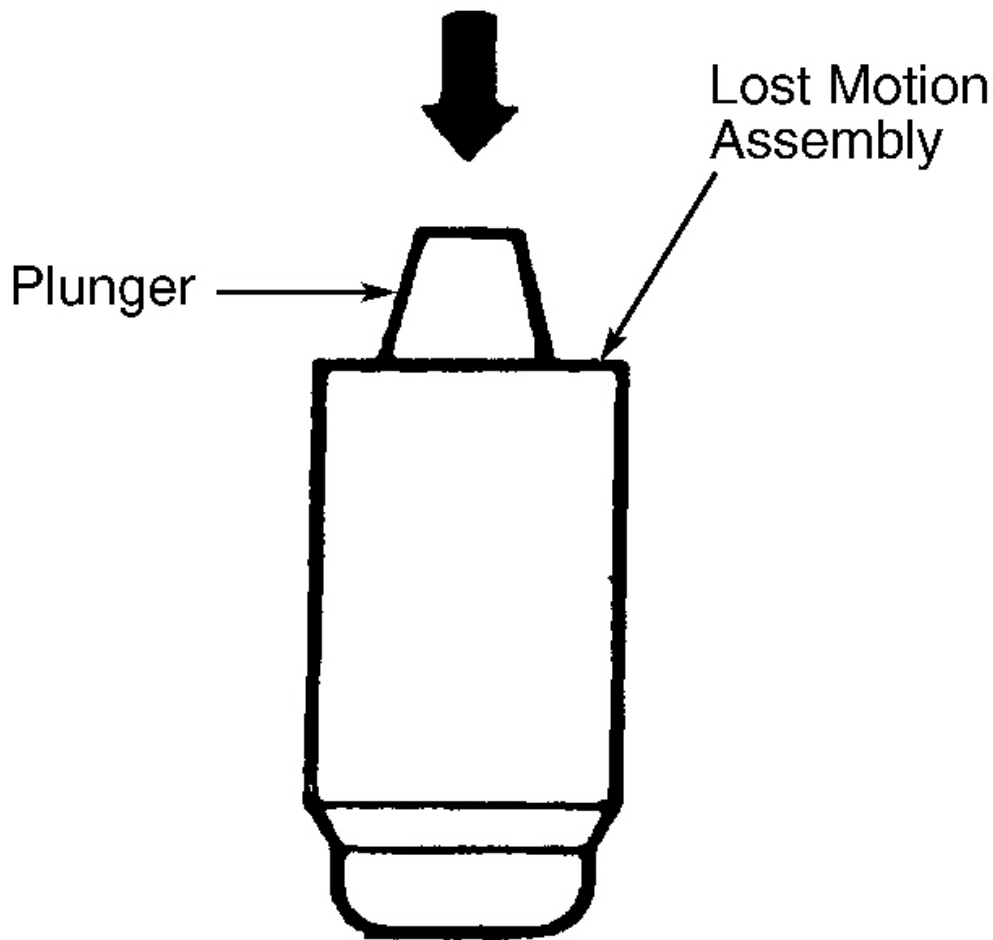
Inspection

1. Manual inspection of rocker arm assemblies **MUST** be performed with camshafts installed. See **VALVE CLEARANCE ADJUSTMENT** under ADJUSTMENTS for checking mid, primary and secondary rocker arm operation.
2. Synchronizing pistons in primary and mid rocker arms should move smoothly when pushed. See **Fig. 48**. Inspect synchronizing pistons for signs of scoring or damage. Replace rocker arms as complete assemblies if necessary.
3. Remove lost motion assembly from cylinder head. Lost motion assembly should be slightly compressed when plunger is lightly pushed. Lost motion assembly should be almost fully compressed when plunger is firmly pushed. See **Fig. 49**. If lost motion assembly plunger does not move smoothly, replace lost motion assembly.



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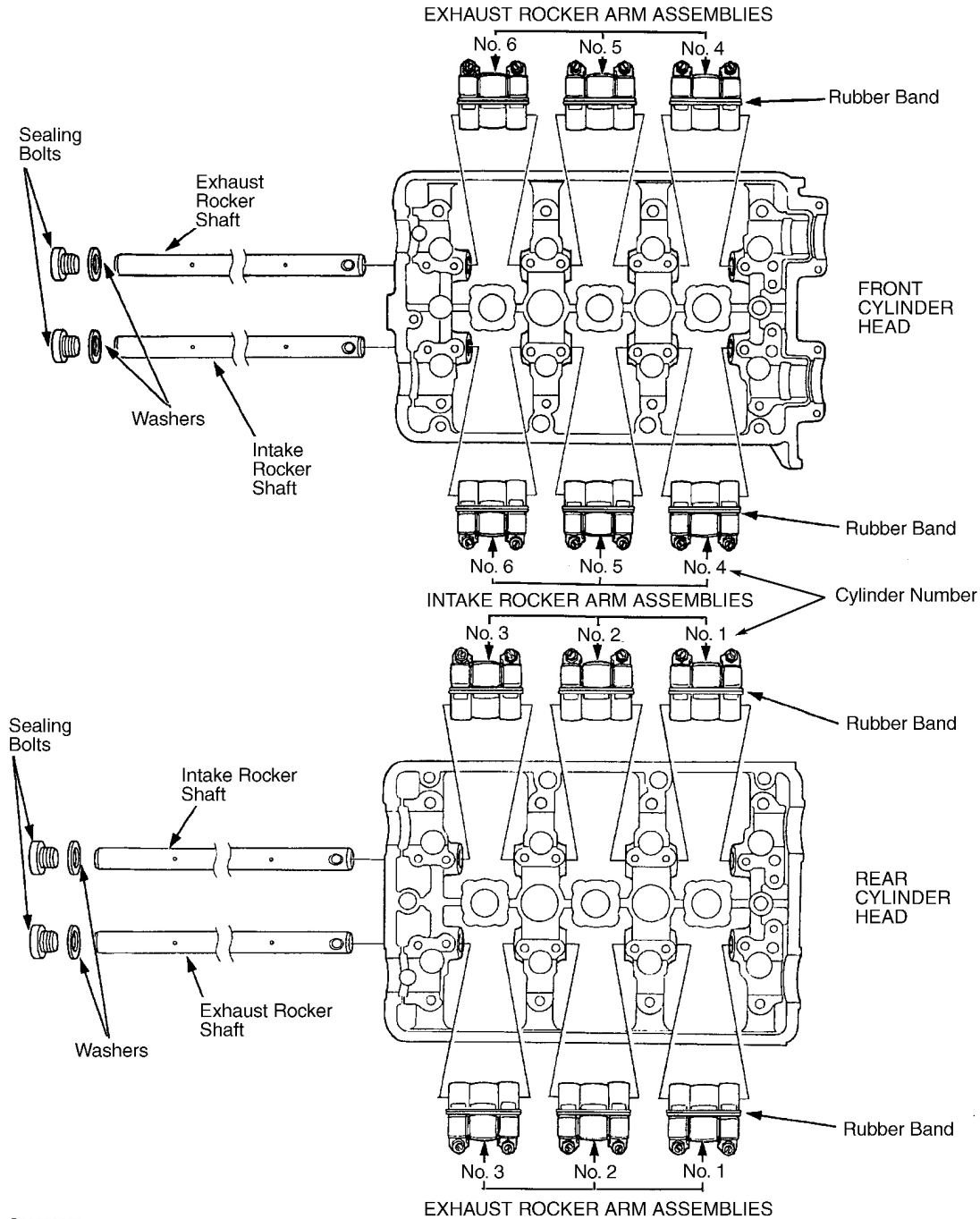
Fig. 48: Inspecting Rocker Arm Synchronizing Pistons
Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 49: Inspecting Lost Motion Assembly Operation
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Inspect intake and exhaust rocker arm shafts for smooth surfaces and wear on face surface. Using a micrometer, measure diameter of rocker arm shaft at each rocker arm location. Using a cylinder bore gauge, measure inside diameter of each rocker arm and check for an out-of-round condition. Compare diameter of rocker arm shaft with corresponding rocker arm inside diameter. See **ROCKER ARMS & ROCKER ARM SHAFTS** table under ENGINE SPECIFICATIONS.
5. Repeat procedure for all rocker arms. If clearance is not within specification, replace rocker arm. If any rocker arm requires replacement, replace all three rockers in that set (primary, mid and secondary).



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Fig. 50: Exploded View Of Rocker Arm & Shaft Assemblies
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

Installation

1. Clean all parts in solvent, dry and apply lubricant to contact surfaces. Loosen valve adjusting lock nuts and back off adjusting screws before installation of rocker arm assemblies. All components **MUST** be

installed in their original locations.

2. Install rocker arms and shafts in reverse order of removal. Install lost motion assemblies in cylinder head. Install rocker arms while passing rocker arm shaft through cylinder head. Install rocker shaft oil control orifices with NEW "O" rings. If holes in rocker shafts do not align with holes in cylinder head, use a 12 x 1.25 mm bolt installed in end of rocker arm shaft to rotate shaft.
3. After installing rocker arm shaft oil control orifices, try to turn rocker arm shaft. If rocker shaft oil control orifice has been correctly inserted in hole of rocker arm shaft, rocker arm shaft should not turn. Remove rubber bands after installing rocker arms.

CAMSHAFTS

CAUTION: Camshaft holders are marked "F" for front cylinder head and "R" for rear cylinder head. Camshaft holders **MUST** be installed in proper position with arrows pointing to timing belt side (right side) of engine.

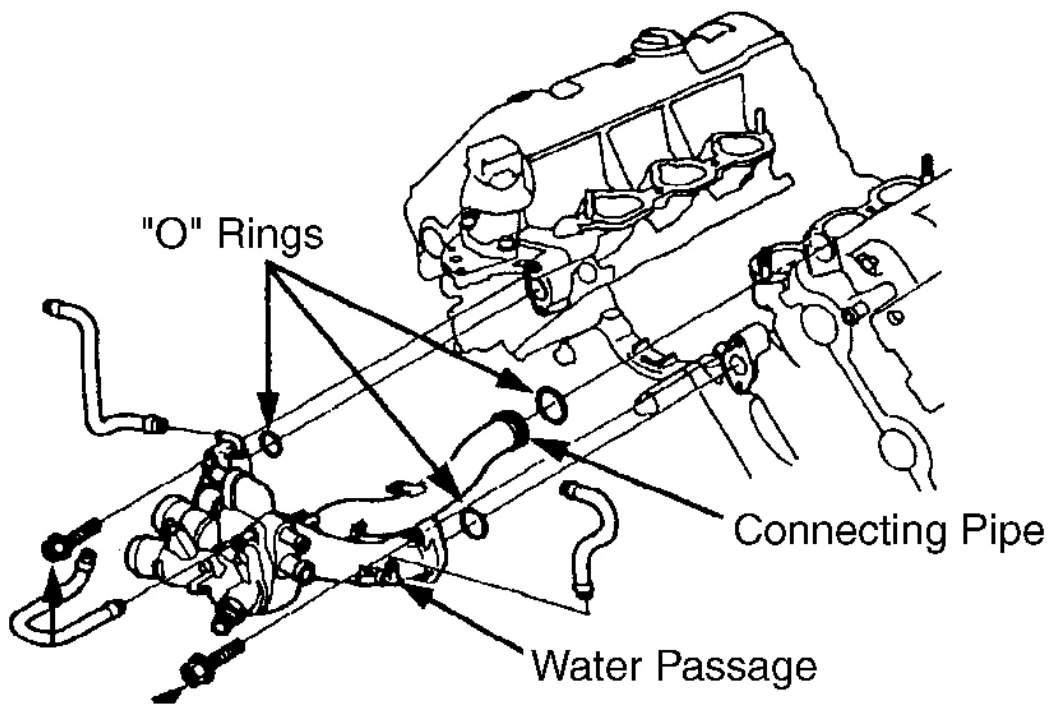
CAUTION: DO NOT open engine cover on open top or NSX-T models when roof panel is stored.

NOTE: Ensure No. 1 piston is at TDC of compression stroke before removing components. See Fig. 7.

NOTE: Engine removal is **NOT** required to remove camshafts.

Removal

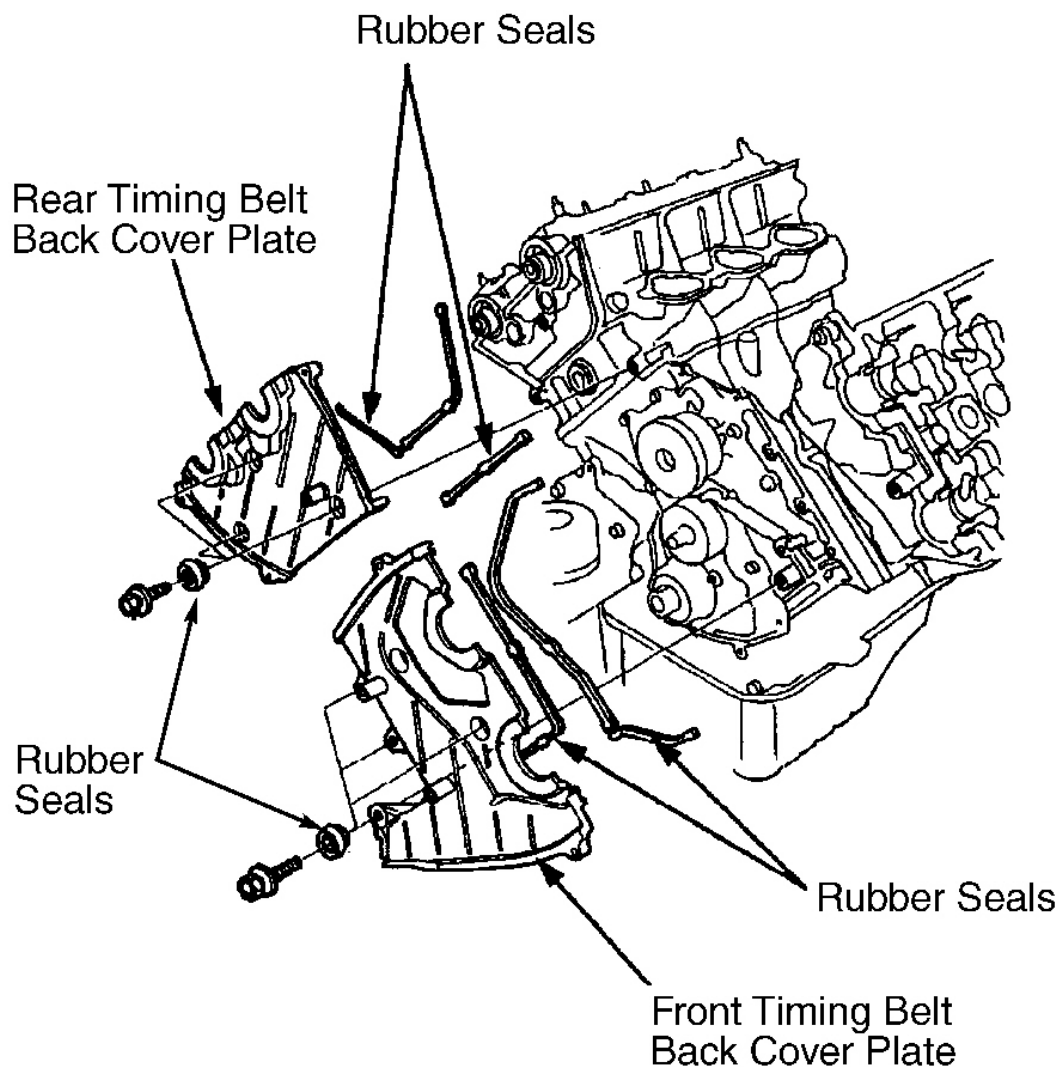
1. Move seat bottoms and backs as far forward as possible. Remove spare tire and spare tire holder. Disconnect negative battery cable. Remove expansion tank cap. Raise vehicle on hoist. Remove right rear wheel. Drain engine coolant. See **COOLING SYSTEM** under BLEEDING.
2. Remove engine under cover. Remove front and rear exhaust pipes. Remove engine oil cooler base assembly **WITHOUT** removing hoses. Wire out of way. Lower vehicle. Remove intake manifold. See **INTAKE MANIFOLD**.
3. Loosen A/C idler pulley center nut and adjusting nut. See **Fig. 14**. Remove A/C compressor belt. Remove belt cover, mounting bolt, and mounting nut from generator. Remove generator belt and generator. See **Fig. 33** and **Fig. 34**.
4. Disconnect knock sensor electrical connectors. Remove knock sensor harness holder, and move harness and holder out of way. Remove water passage and connecting pipe. See **Fig. 51**.



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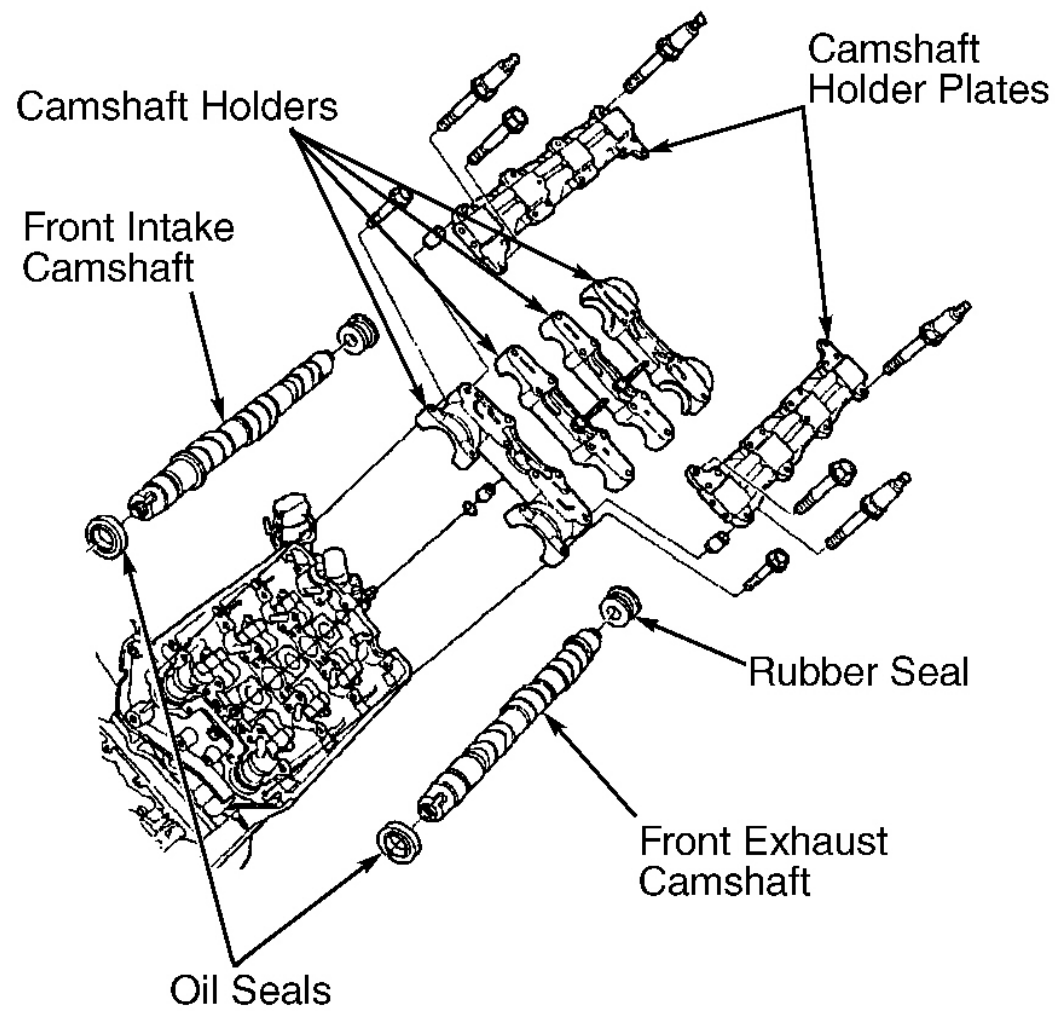
Fig. 51: Removing Water Passage & Connecting Pipe
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Remove cylinder head covers. Remove generator bracket stiffener, dipstick and dipstick pipe. See **Fig. 36**. Remove generator bracket. Remove timing belt. See **TIMING BELT**.
6. Remove camshaft pulley retaining bolts, and remove camshaft pulleys. Remove front timing belt and rear timing belt back cover plates. See **Fig. 52**.
7. Loosen rocker arm lock nuts and adjusting screws. Remove camshaft holder plates, camshaft holders and camshafts. See **Fig. 53**.



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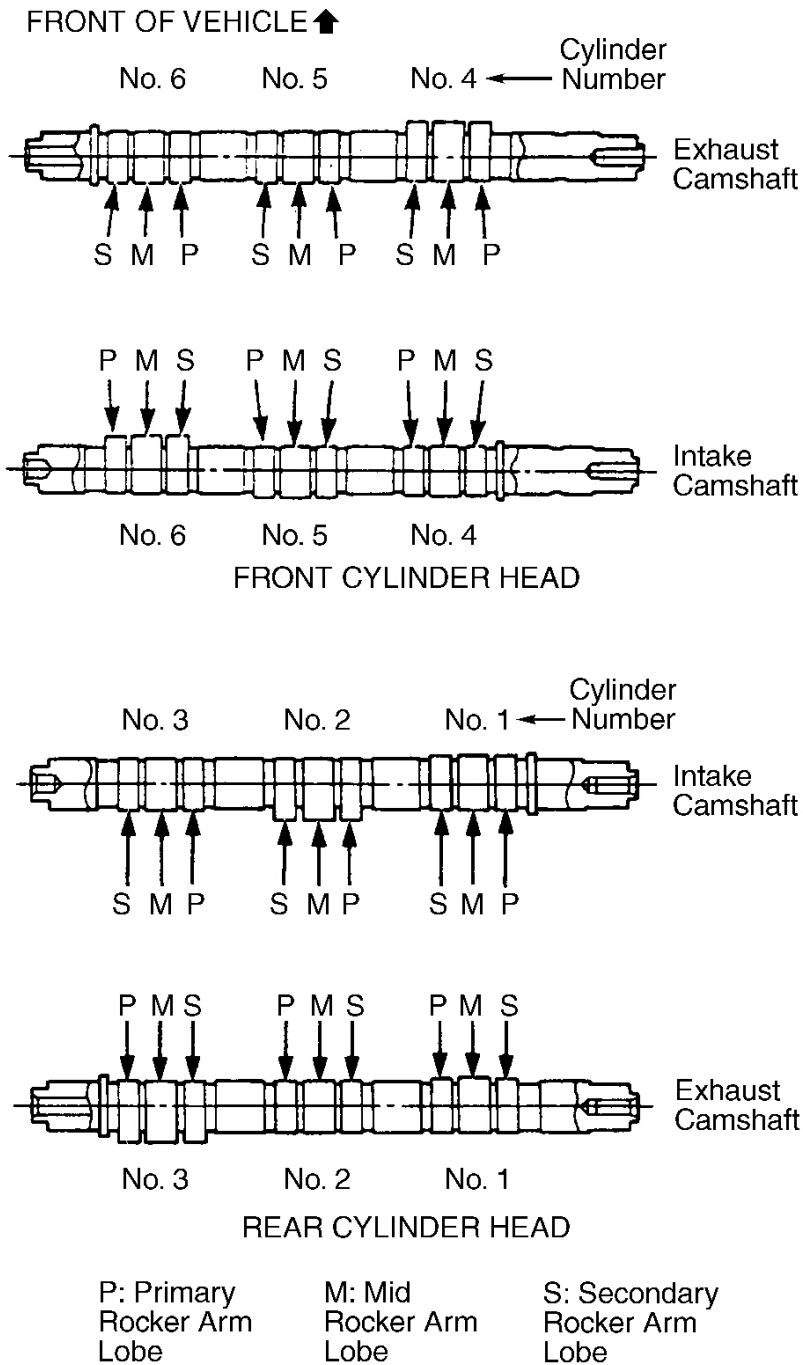
Fig. 52: Identifying Front Timing Belt & Rear Timing Belt Back Cover Plates
Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 53: Removing Camshafts

Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 54: Identifying Camshaft Lobes

Courtesy of AMERICAN HONDA MOTOR CO., INC.

Inspection

CAUTION: Do not rotate camshaft during inspection.

1. Clean camshaft thoroughly and inspect lift ramps and measure lobe height. See **Fig. 54** and **CAMSHAFT** table under ENGINE SPECIFICATIONS. Replace camshaft if lobe height is not within specification or lobes are pitted, scored, or excessively worn. If camshaft is okay, clean camshaft bearing surfaces in cylinder head and go to next step.
2. Remove rocker arms and rocker arm shafts. See **ROCKER ARMS & SHAFTS**. Install camshafts, camshaft holders and camshaft holder plates on cylinder head. Apply clean engine oil to 8 mm bolt threads. Tighten bolts 2 turns at a time to specification in proper sequence. See **Fig. 80** and **TORQUE SPECIFICATIONS**. Bolts numbered 1-24 are 8 mm bolts and bolts numbered 25-28 are 6 mm bolts.
3. Push camshaft toward transmission end of cylinder head. Attach a dial indicator and zero it against pulley end of camshaft. Push camshaft back and forth, and measure end play. See **CAMSHAFT** table under ENGINE SPECIFICATIONS. If end play exceeds limits, replace camshaft.
4. Remove camshaft bolts and holders from cylinder head. Lift camshaft out of cylinder head. Clean camshaft and camshaft bearing surfaces in cylinder head. Reinstall camshaft and place Plastigage across each journal. Install camshaft holders and bolts. Tighten bolts 2 turns at a time in proper sequence to specification. See **Fig. 80** and **TORQUE SPECIFICATIONS**. Bolts numbered 1-24 are 8 mm bolts and bolts numbered 25-28 are 6 mm bolts.
5. Remove camshaft holders and measure camshaft-to-holder oil clearance, using widest section of Plastigage. See **CAMSHAFT** table under ENGINE SPECIFICATIONS. If oil clearance is not within specification and camshaft has been replaced, replace cylinder head. If camshaft has not been replaced, go to next step.
6. If camshaft has not been replaced, measure camshaft total runout with camshaft supported in "V" blocks. If camshaft runout is within specification, replace cylinder head. If camshaft total runout is not within specification, replace camshaft and recheck camshaft-to-holder oil clearance. If oil clearance is still not within specification, replace cylinder head.

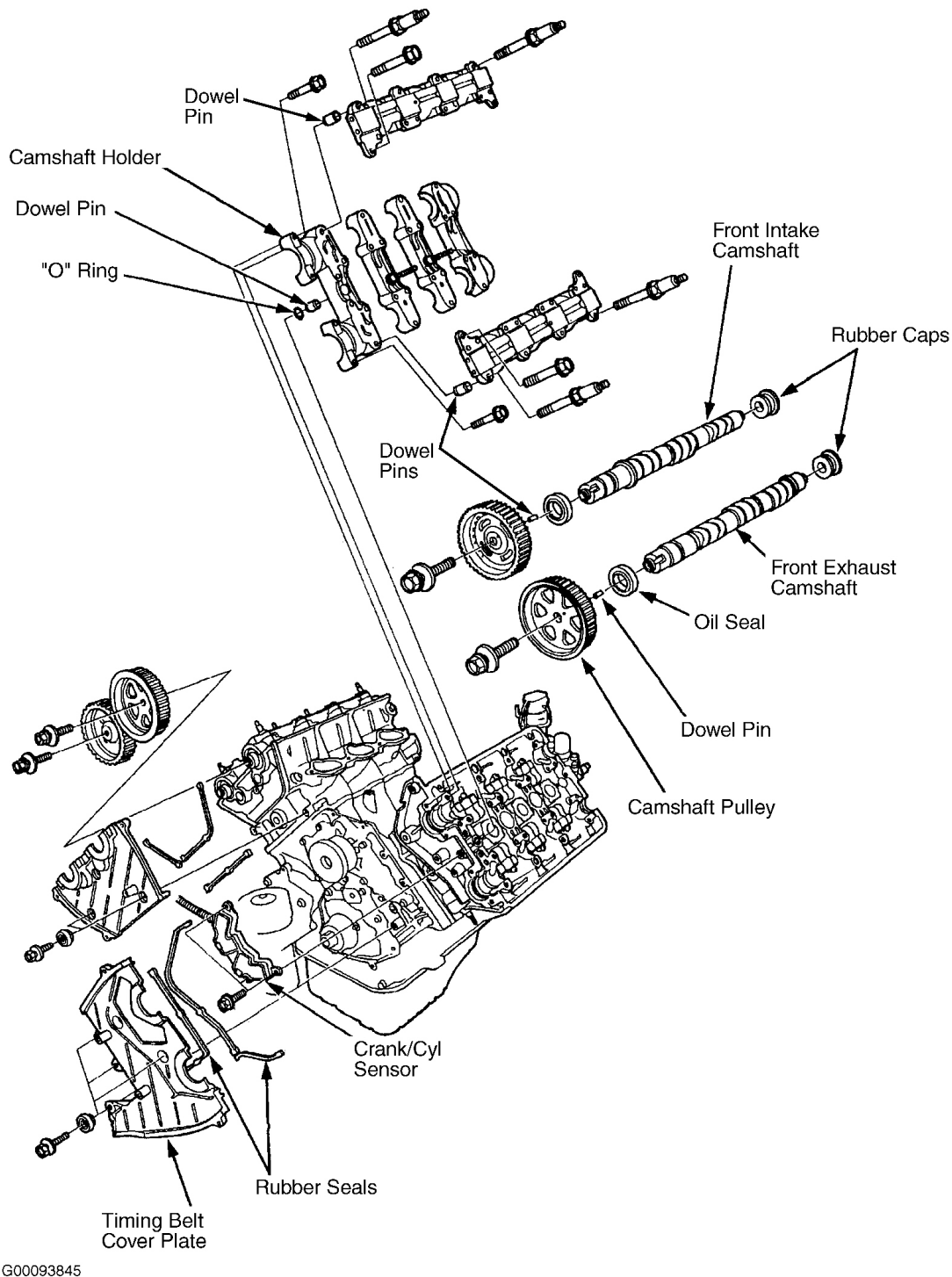
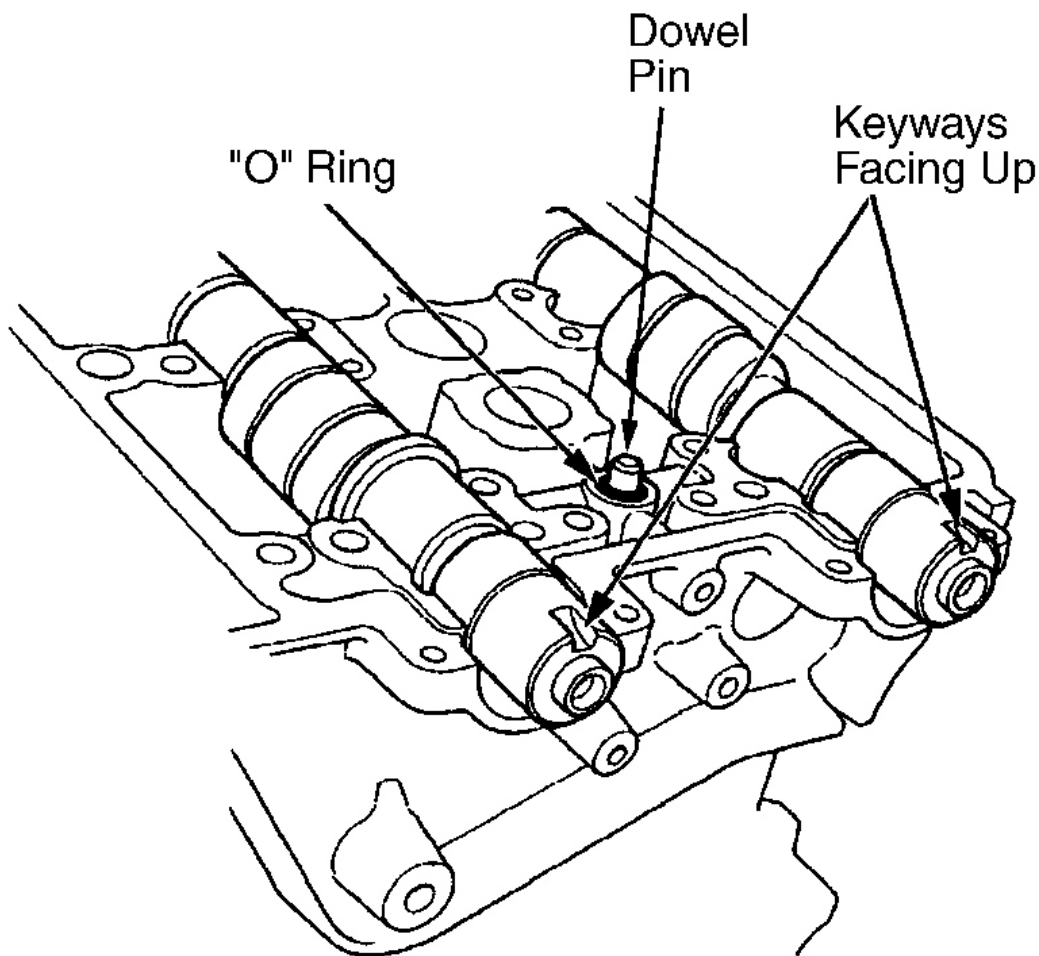


Fig. 55: Exploded View Of Cylinder Head & Valve Train
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

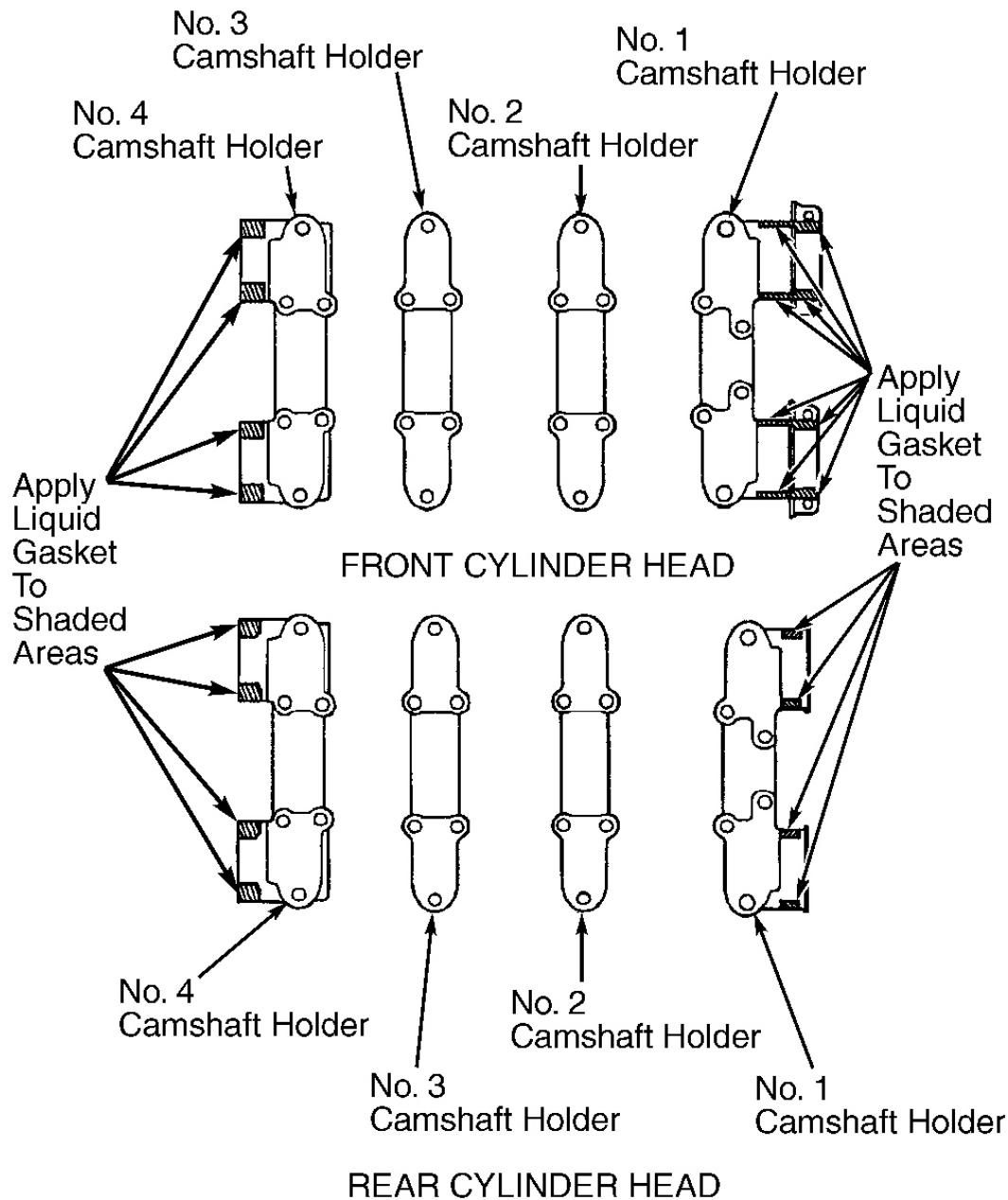
Installation

1. Ensure rocker arms and shafts are properly installed and that oil control orifices are properly aligned. See **ROCKER ARMS & SHAFTS**. Ensure all reused components are installed in original positions. Clean and lubricate all moving components. Install camshafts in reverse order of removal.
2. Install camshafts and rubber caps. Replace rubber caps if required. Apply liquid gasket around caps. Turn camshafts until keyways are facing up (No. 1 cylinder at TDC). Install dowel pin with NEW "O" ring in No. 1 camshaft holder oil passage. See **Fig. 56**.
3. Ensure camshaft seal housing surface is clean and dry. Install camshaft seals with open side (spring) facing in. Apply light coat of oil to camshaft, inner lip of camshaft seal, and cam lobes.
4. Apply liquid gasket to cylinder head mating surfaces of No. 1 and No. 4 camshaft holders. See **Fig. 57**. Insert 2 dowel pins in each camshaft holder. Install camshaft holders in proper position (those marked with "F" for front cylinder head and those marked with "R" for rear cylinder head). Arrows on camshaft holders MUST point to timing belt side (right side) of engine.



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Fig. 56: Installing Camshafts, "O" Ring & Dowel Pin
 Courtesy of AMERICAN HONDA MOTOR CO., INC.



G00093921

Fig. 57: Identifying Camshaft Holders
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Install camshaft holder plates. Apply clean engine oil to 8 mm bolt threads. Tighten bolts 2 turns at a time

in proper sequence to specification. See **Fig. 80** and **TORQUE SPECIFICATIONS**.

6. Install CKP/CYP sensor on front cylinder head. Install front and rear timing belt back cover plates. See **Fig. 52**. Insert dowel pins in camshaft pulleys. See **Fig. 55**. Install camshaft pulleys. Install and tighten camshaft pulley bolts to specification. See **TORQUE SPECIFICATIONS**.
7. Install timing belt. See **TIMING BELT**. Inspect rocker arms and adjust valve clearance. See **VALVE CLEARANCE ADJUSTMENT** under ADJUSTMENTS.
8. Install cylinder head covers with NEW gaskets. Ensure groove in cover and mating surface of cylinder head are clean. Prior to installing cylinder head cover, apply thin layer of liquid gasket (Part No. 08718-0001) to mating surface of cylinder head cover and rubber seals to prevent rubber seals from falling off. Ensure head cover gasket is seated securely in corners of camshaft recesses.
9. After gasket is installed in cylinder head cover, apply liquid gasket to camshaft recess corners. Ensure all mating surfaces are clean and dry before applying liquid gasket. Do not install parts if more than five minutes have elapsed since applying liquid gasket. Remove old liquid gasket residue and reapply.
10. When installing cylinder head cover, hold gasket in place by placing your fingers in camshaft recesses. After cylinder head cover is in place, slide cover back and forth a few millimeters to seat gasket.
11. Install ground cable, washers and nuts. Replace washers if they are deteriorated. Tighten cylinder head cover nuts to specification in sequence shown. See **Fig. 11** and **TORQUE SPECIFICATIONS**.
12. After installation, check that hoses and connectors are installed correctly. Wait 30 minutes after installation and fill engine with oil up to specified level. Run engine for more than 3 minutes and check for oil leakage.

CYLINDER HEADS

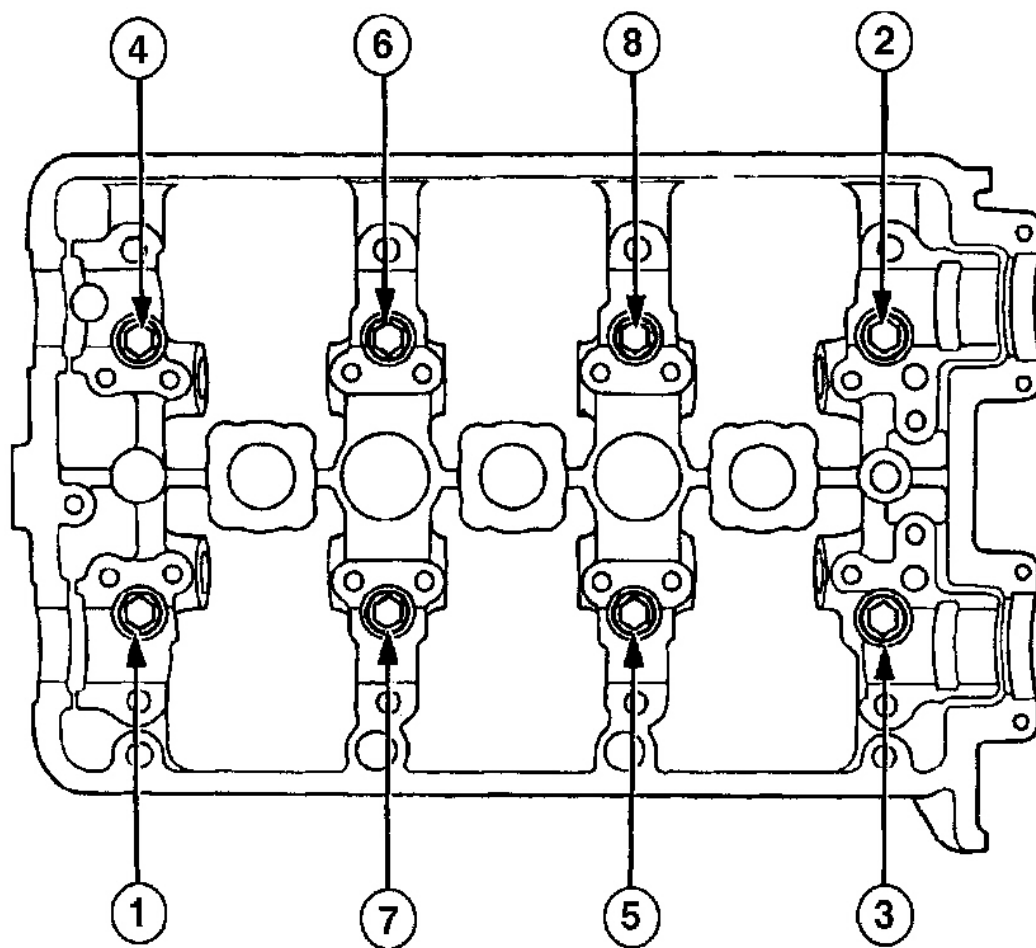
WARNING: To prevent damage to cylinder heads, allow engine coolant temperature to drop below 100°F (38°C) BEFORE loosening cylinder head bolts.

NOTE: Inspect rocker arms BEFORE removing cylinder head. See **VALVE CLEARANCE ADJUSTMENT** under ADJUSTMENTS. Inspect timing belt before removing cylinder heads. See **TIMING BELT**.

NOTE: Engine removal is NOT required to remove cylinder heads.

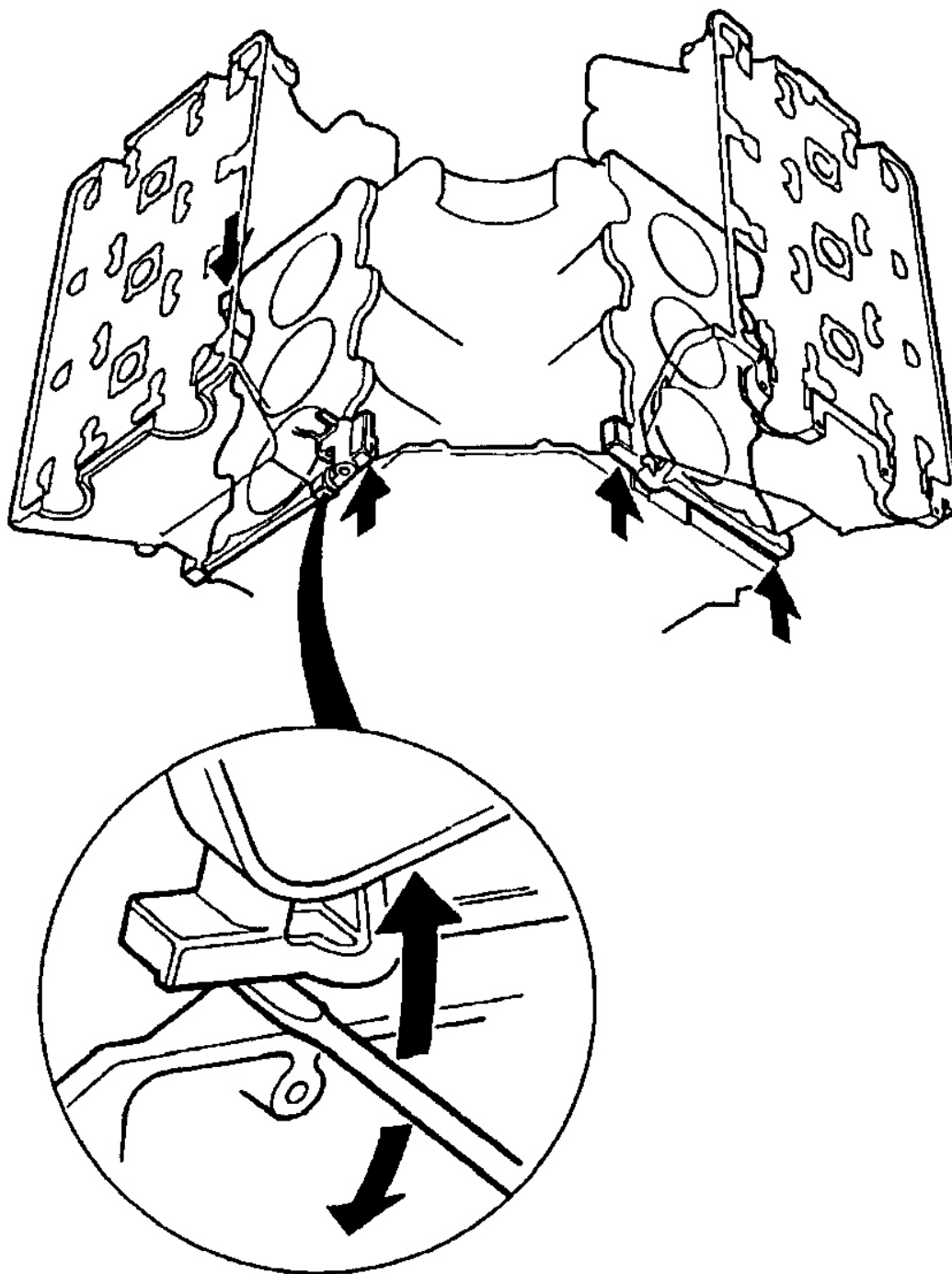
Removal

1. Remove camshafts. See **CAMSHAFTS**. Remove rocker arms and shafts. See **ROCKER ARMS & SHAFTS**. Disconnect connectors and remove engine wire harness.
2. Remove cylinder head bolts by unscrewing bolts in sequence 1/3 turn at a time. Repeat sequence until all bolts are loosened. See **Fig. 58**. Remove cylinder head bolts. Using a flat-bladed screwdriver, separate cylinder head from block at points shown. See **Fig. 59**.



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Fig. 58: Cylinder Head Bolt Removal Sequence
 Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 59: Removing Cylinder Heads

Courtesy of AMERICAN HONDA MOTOR CO., INC.

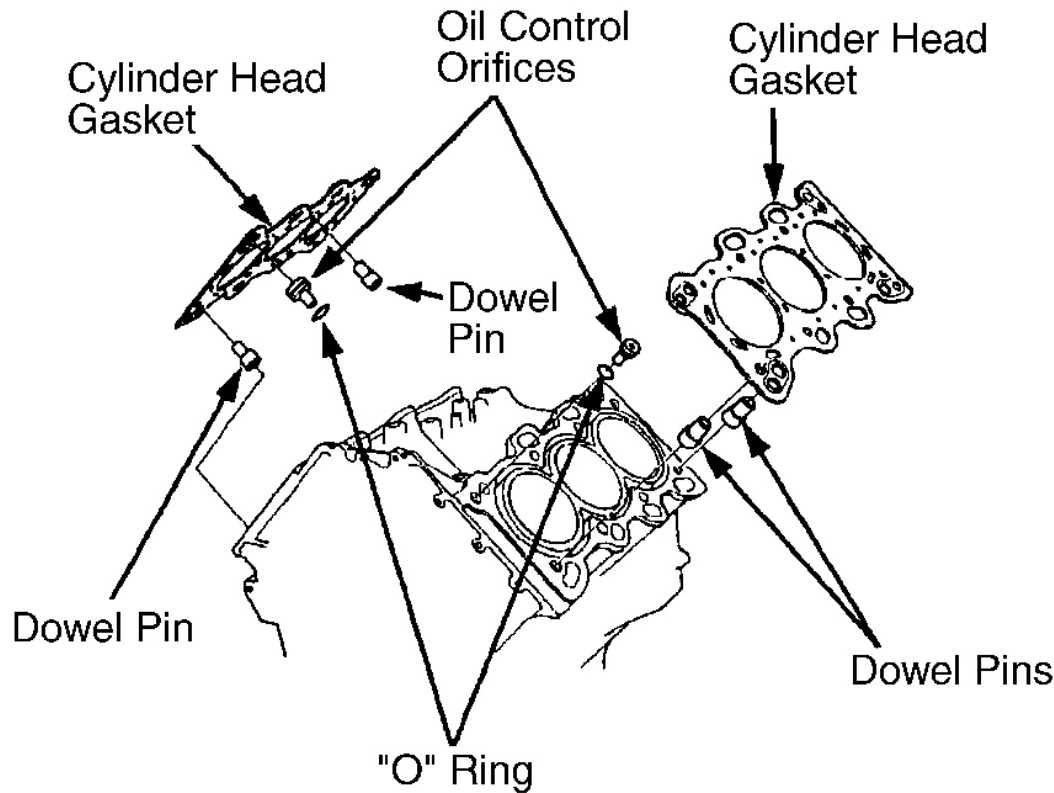
3. Remove exhaust manifold covers. Remove front and rear exhaust manifolds. See **EXHAUST MANIFOLDS**. DO NOT use air wrench or hammer to remove exhaust manifold unless heated oxygen sensors are removed.

Inspection

1. Clean gasket mating surfaces. Check camshaft-to-holder oil clearance. See **CAMSHAFTS**. If camshaft-to-holder oil clearances are not within specification, cylinder head cannot be resurfaced. See **CAMSHAFT** table under ENGINE SPECIFICATIONS.
2. If camshaft-to-holder oil clearances are within specification, measure cylinder head warpage. If warpage is less than 0.002" (0.05 mm), resurfacing is not required. If warpage is 0.002-0.008" (0.05-0.20 mm), resurface cylinder head. Maximum resurface limit is 0.008" (0.20 mm) based on a height of 5.945" (151 mm). Ensure oil control orifices have been removed and cleaned. See **Fig. 60**.

Installation

1. To install cylinder heads, reverse removal procedure. Ensure crankshaft is positioned at TDC for No. 1 piston. Ensure cylinder heads and cylinder block surfaces are clean. Install front and rear exhaust manifolds using NEW gaskets. Apply oil to threads of exhaust manifold self-locking nuts. Using crisscross pattern, tighten self-locking nuts to specification in 2 or 3 steps, starting with inner nut. See **Fig. 32** and **TORQUE SPECIFICATIONS**. Install exhaust manifold covers.
2. Install oil control orifices with NEW "O" rings. See **Fig. 60**. Install cylinder head dowel pins with NEW cylinder head gaskets. Ensure oil control orifices and dowel pins are aligned.



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Fig. 60: Installing Cylinder Head Dowel Pins

Courtesy of AMERICAN HONDA MOTOR CO., INC.

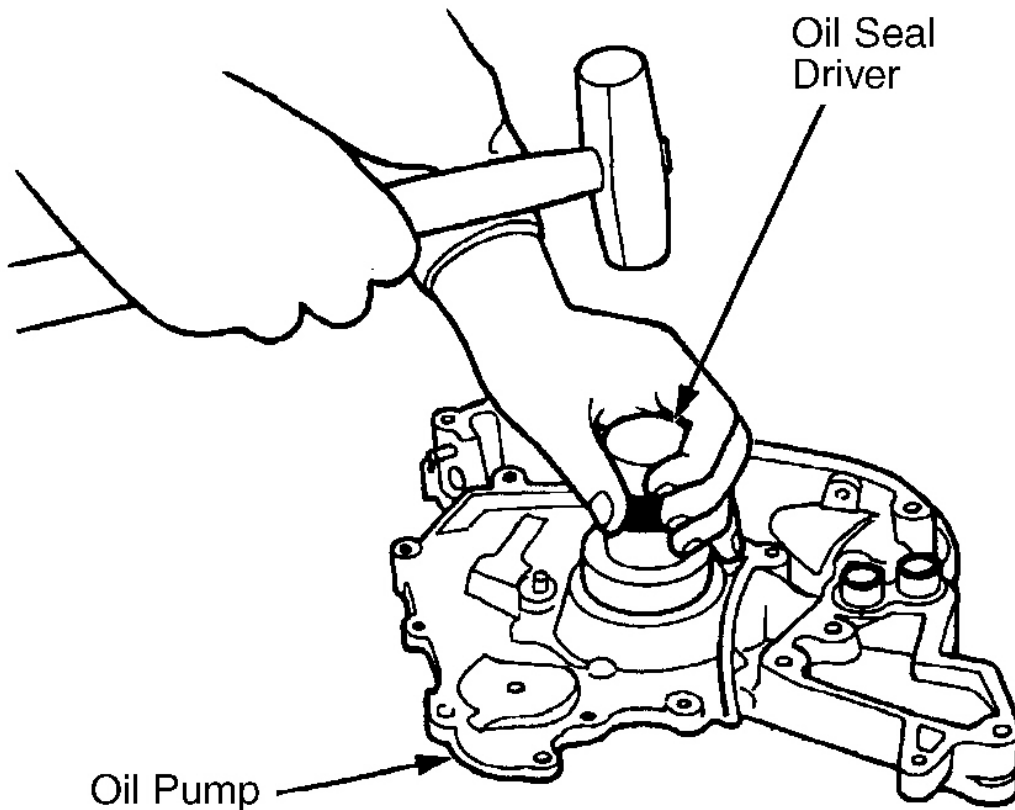
3. Install cylinder heads on engine block. Apply clean engine oil to cylinder head bolt threads and washer contact surfaces. Tighten cylinder head bolts to specification, in sequence, in 2 or 3 steps. See **Fig. 83** and **TORQUE SPECIFICATIONS**.
4. For rocker arms, rocker arm shafts and camshaft installation, see INSTALLATION under **ROCKER ARMS & SHAFTS** and **CAMSHAFTS**.

CRANKSHAFT FRONT OIL SEAL

NOTE: Crankshaft front oil seal is located in oil pump assembly.

Removal & Installation

Remove crankshaft pulley and timing belt. See **TIMING BELT**. Remove oil pump assembly. See **OIL PUMP** under ENGINE OILING. Pry oil seal from the oil pump. Apply light coat of oil to crankshaft and lip on NEW oil seal. Using Oil Seal Driver (07GAD-PH70201), gently tap in new front crankshaft oil seal until driver bottoms on pump. See **Fig. 61**. To complete installation, reverse removal procedure.



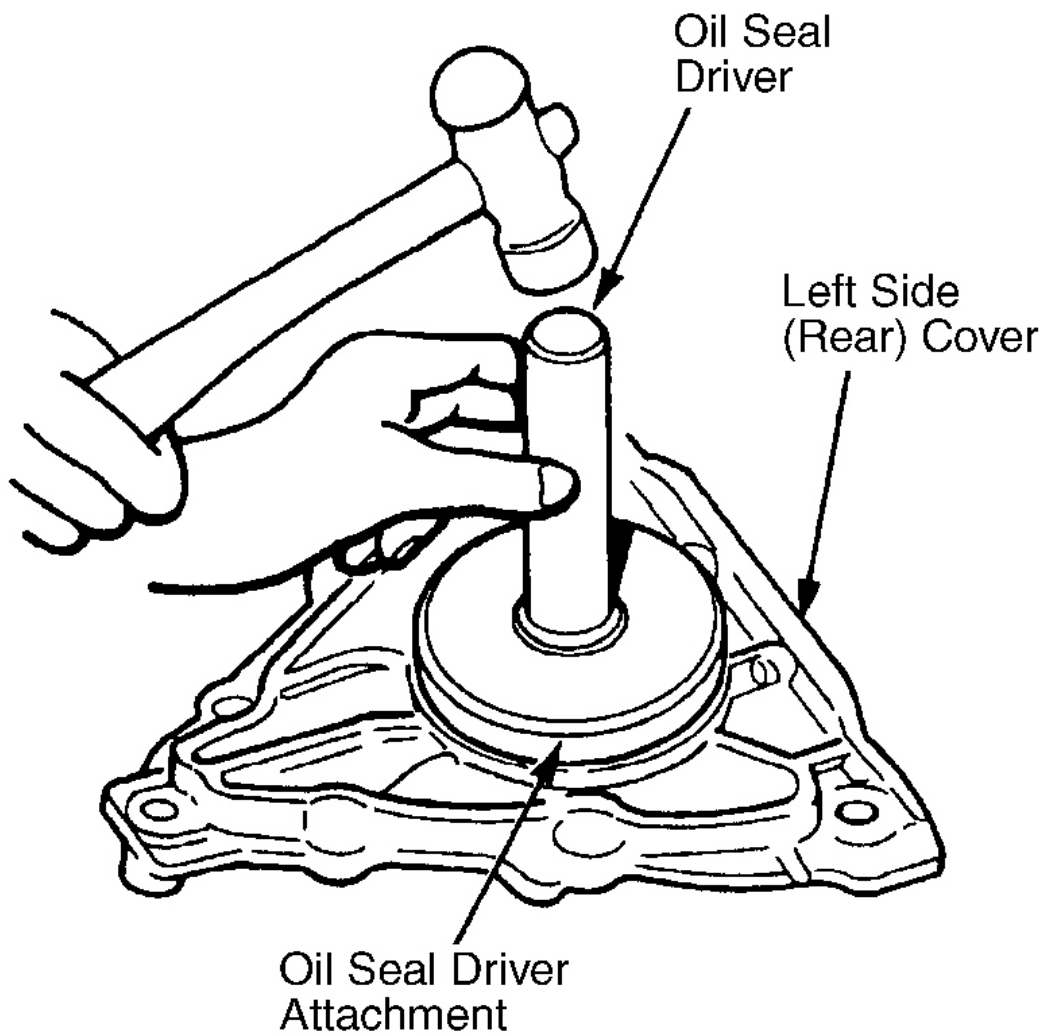
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Fig. 61: Installing Crankshaft Front Oil Seal
Courtesy of AMERICAN HONDA MOTOR CO., INC.

CRANKSHAFT REAR OIL SEAL

Removal & Installation

1. Remove transmission and flywheel (M/T) or drive plate (A/T) to gain access to left side (rear) cover and crankshaft rear oil seal. See appropriate article in CLUTCHES (M/T) or TRANSMISSION SERVICING (A/T). Remove left side (rear) cover and remove crankshaft rear oil seal.
2. Seal contact surface on block should be dry. Apply a light coat of oil to crankshaft and to lip of seal. Using Driver (07749-0010000) and Driver Attachment (07948-SB00101), install crankshaft oil seal into left side (rear) cover with part number facing out until driver bottoms against left side (rear) cover. See **Fig. 62**. Ensure clearance between bottom of seal and left side (rear) cover is 0.008-0.020" (0.2-0.5 mm) all the way around. To complete installation, reverse removal procedure.



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Fig. 62: Installing Crankshaft Rear Oil Seal
Courtesy of AMERICAN HONDA MOTOR CO., INC.

WATER PUMP

Removal

Drain cooling system. See **COOLING SYSTEM** under BLEEDING. Remove timing belt. See **TIMING BELT**. Inspect water pump BEFORE removal. Remove and discard water pump mounting bolts and "O" ring. Remove water pump. See **Fig. 63**.

Inspection

Ensure water pump pulley turns freely (both directions on 1991-94 models; counterclockwise on 1995 and later models). Check for signs of seal leakage. Small amount of "weeping" from bleed holes is normal. See **Fig. 64** and **Fig. 65**.

Installation

To install water pump, reverse removal procedure. Replace "O" ring and mounting bolts. Tighten bolts to specification. See **TORQUE SPECIFICATIONS**. Ensure "O" ring groove and mating surfaces are clean and that dowel pins are properly aligned. Install timing belt. See **TIMING BELT**. Fill and bleed cooling system. See **COOLING SYSTEM** under BLEEDING.

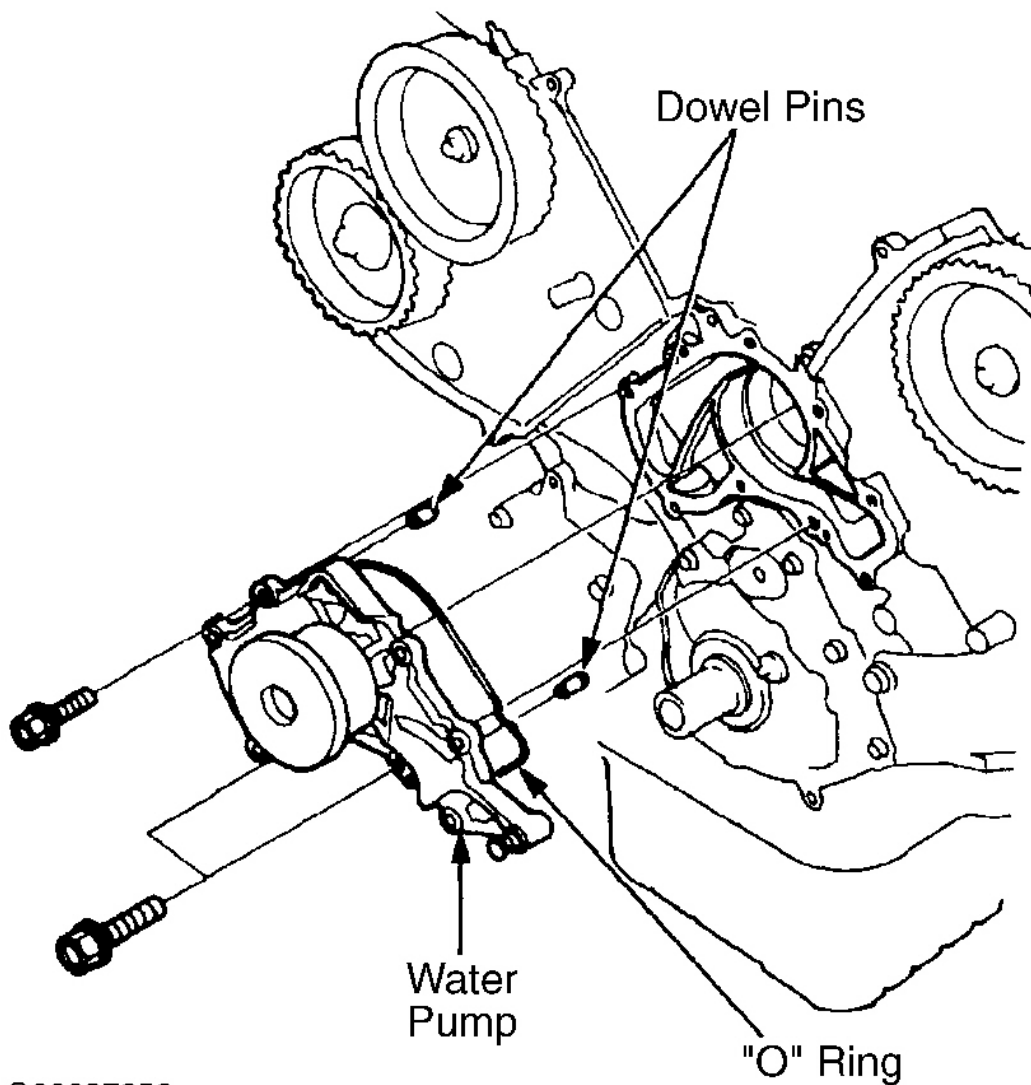
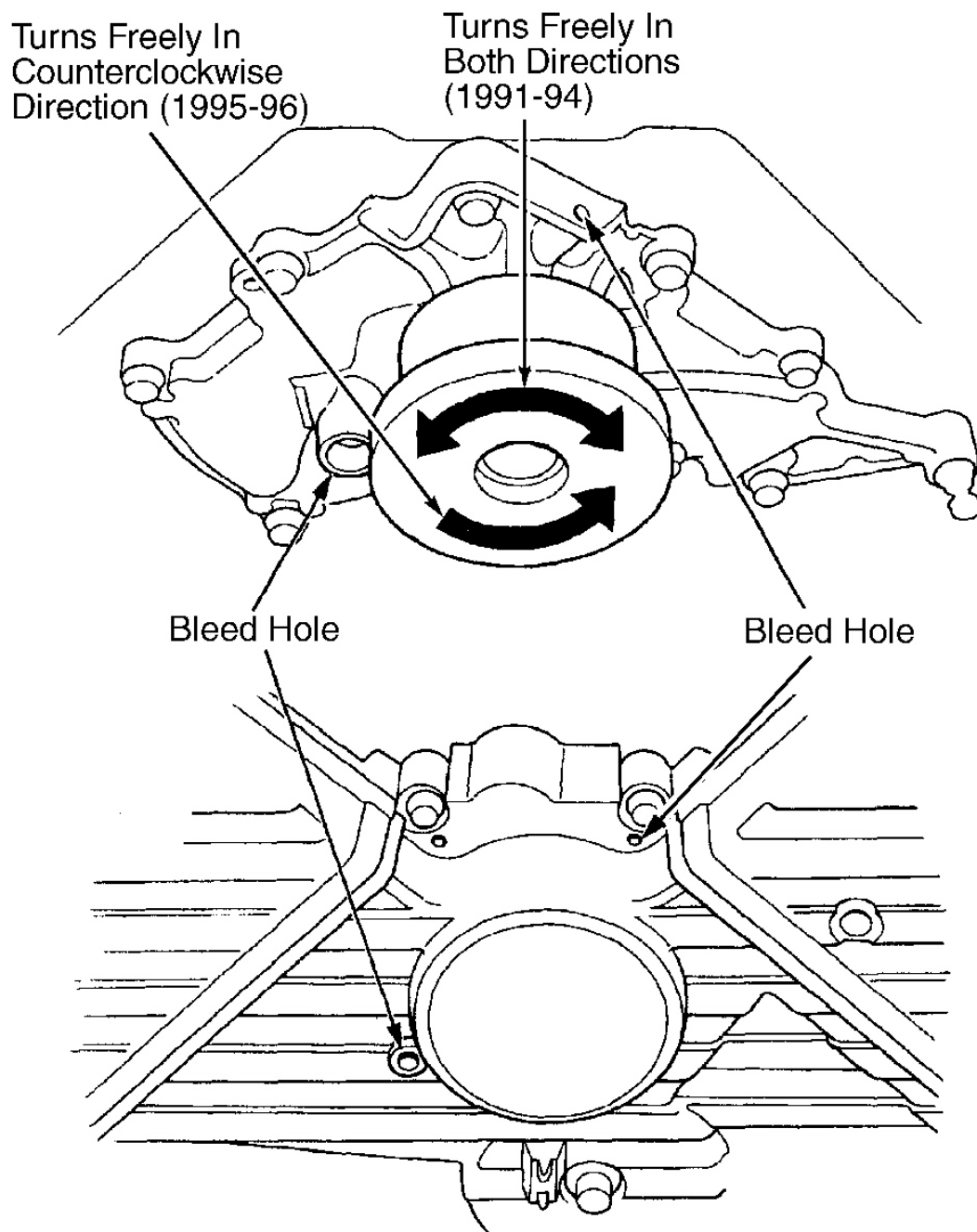


Fig. 63: Replacing Water Pump

Courtesy of AMERICAN HONDA MOTOR CO., INC.



G00097355

Fig. 64: Inspecting Water Pump On 1991-96 Models
Courtesy of AMERICAN HONDA MOTOR CO., INC.

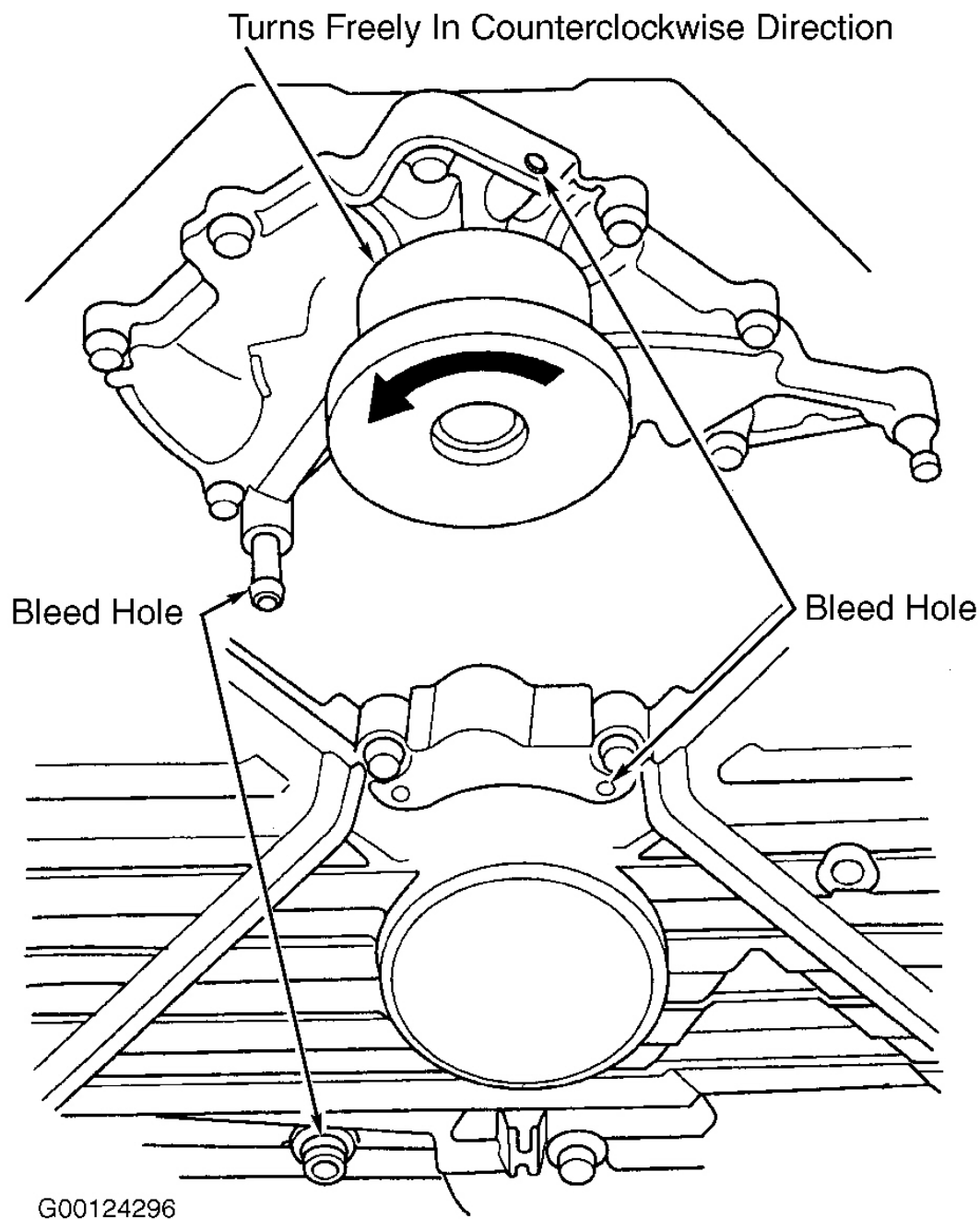


Fig. 65: Inspecting Water Pump On 1997-2001 Models
Courtesy of AMERICAN HONDA MOTOR CO., INC.

THERMOSTAT

Removal

Drain cooling system. See **COOLING SYSTEM** under BLEEDING. Identify and label all connectors and disconnect connectors to access thermo cover. Remove thermo cover bolts and move thermo cover aside. Remove thermostat. See **Fig. 66**.

Inspection

Suspend closed thermostat in container of water with thermometer. DO NOT allow thermometer or thermostat to touch sides or bottom of container. Heat water. Check temperature at which thermostat begins to open and at full open position. Measure lift height of thermostat when fully open. Thermostat should start to open at 169-176°F (76-80°C) and be fully open at 194°F (90°C). When fully open, thermostat lift height should be greater than 0.39" (10 mm). Replace thermostat if not to specification.

Installation

Replace thermostat if it is open at room temperature. To install thermostat, reverse removal procedure. Use NEW gaskets and "O" rings, and make sure thermostat is installed with pin UP. Fill and bleed cooling system. See **COOLING SYSTEM** under BLEEDING.

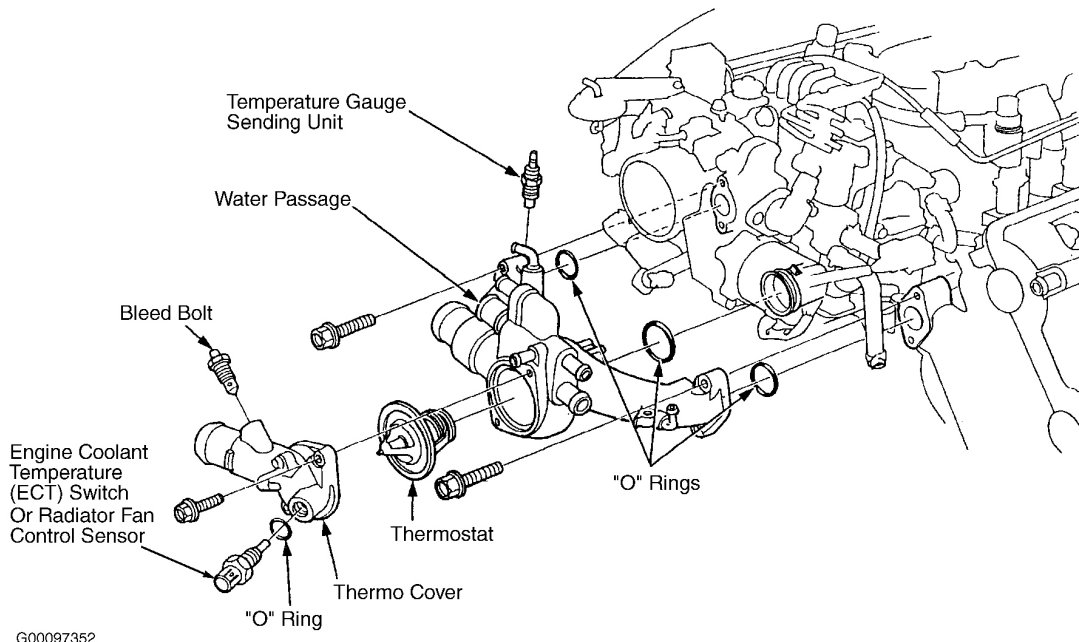


Fig. 66: Exploded View Of Water Passage & Thermo Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

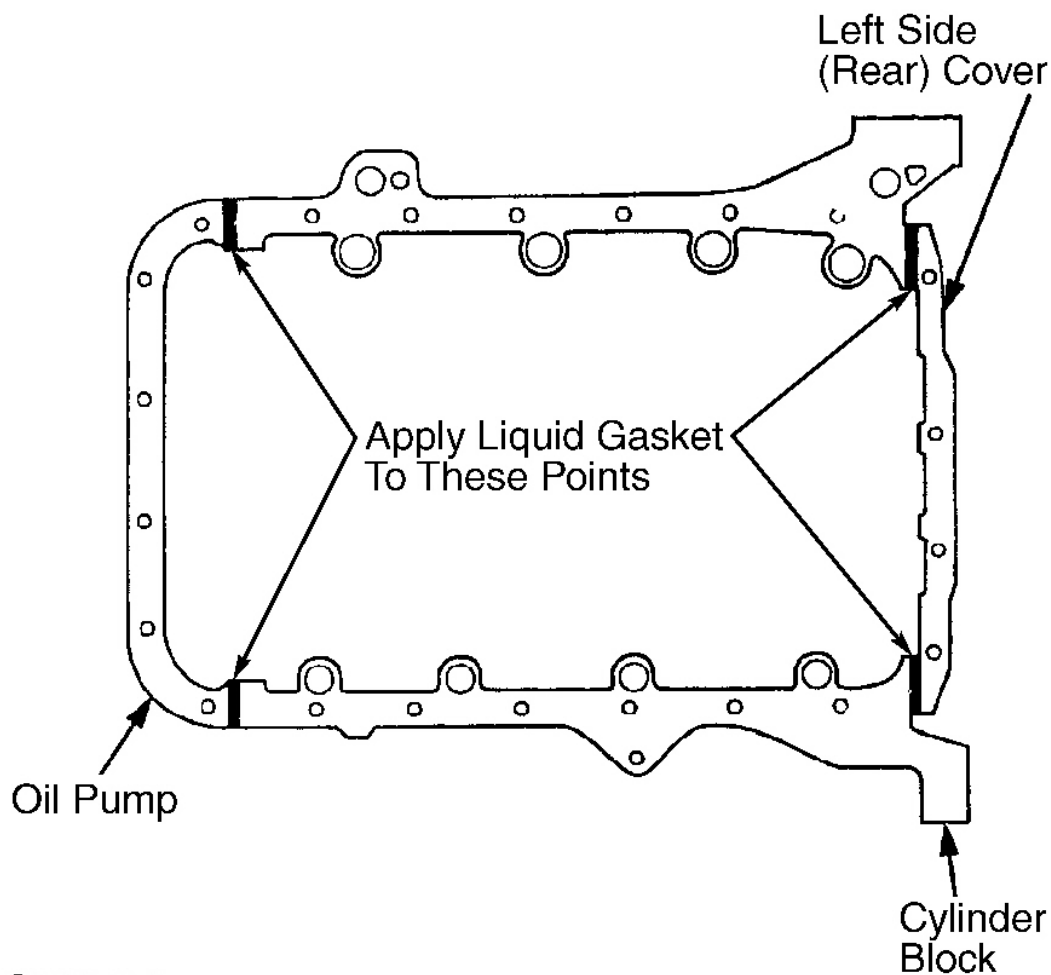
OIL PAN

Removal

Drain engine oil. Remove timing belt. See **TIMING BELT**. Remove dipstick and dipstick pipe. See **Fig. 36**. Remove oil filter assembly. Remove oil pan bolts and oil pan.

Installation

1. To install oil pan, reverse removal procedure. Repair or replace oil pan if deformed to maintain proper clearance between oil pickup screen and bottom of pan. Apply liquid gasket to oil pump and left side (rear) cover mating surfaces as shown. See **Fig. 67**. Install and finger-tighten bolts No. 2, 3, 19, 20, 21 and 22. See **Fig. 84**.
2. Install remaining oil pan bolts. On 1991-94 models, tighten in sequence in 3 steps to proper specification. See **Fig. 84**. On 1995 and later models, tighten in clockwise pattern beginning at bolt No. 1 in 3 steps to proper specification. See **TORQUE SPECIFICATIONS**.



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Fig. 67: Applying Liquid Gasket To Oil Pan Gasket
Courtesy of AMERICAN HONDA MOTOR CO., INC.

OVERHAUL

CYLINDER HEAD

NOTE: Before checking cylinder head warpage, ensure camshaft-to-holder oil clearances are within specification. See **CAMSHAFTS** table under **ENGINE SPECIFICATIONS**. If camshaft-to-holder oil clearances are 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 0.002" (0.05 mm), resurfacing is not necessary. If warpage is 0.002-0.008" (0.05-0.20 mm), resurface cylinder head. Maximum warpage limit to resurface is 0.008" (0.20 mm) based on cylinder height of 5.945" (151 mm). Ensure oil control orifices have been removed and cleaned. See **Fig. 60**.

Valve Springs

Using a socket and plastic mallet, lightly tap valve retainer to loosen valve keeper. Using a valve spring compressor, remove valve keepers. Remove valve seal using valve guide seal remover. Identify valves and valve springs as they are removed so each can be reinstalled in its original position. Measure free length of valve springs. If spring free length is not within specification, replace valve springs. See **VALVES & VALVE SPRINGS** table under **ENGINE SPECIFICATIONS**. Install springs with closely wound end toward cylinder head. Manual transmission vehicles use inner and outer valve springs on intake valves only.

Valve Stem Oil Seals

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

Valve Guide Inspection

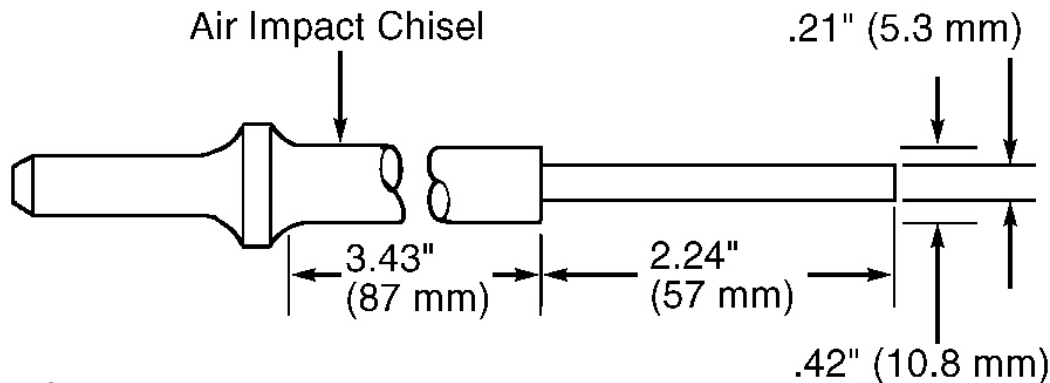
1. Place dial indicator against valve head. Lift valve 0.4" (10 mm) from seat. Rock valve stem from side-to-side, and measure valve wobble.
2. If wobble exceeds 0.006" (0.16 mm) for intake valves or 0.009" (0.22 mm) for exhaust valves, install new valve and recheck clearance. If wobble still exceeds limit, go to next step.
3. Measure Outside Diameter (O.D.) of valve stem and Inside Diameter (I.D.) of valve guide in 3 places. Difference between valve stem O.D. and valve guide I.D. is stem-to-guide oil clearance. Subtract smallest measured valve stem O.D. from largest measured valve guide I.D. If difference exceeds service limit, replace valve and valve guide. See **CYLINDER HEAD** table under **ENGINE SPECIFICATIONS**.

Valve Guide Replacement

1. Use an air hammer and Valve Guide Driver (07742-0010100) to remove and install valve guides. See **Fig. 68**. Chill replacement guides in a freezer for about an hour. Use a hot plate or oven to heat cylinder head evenly to 300°F (150°C). DO NOT heat cylinder head with a torch, as head may warp. DO NOT heat cylinder head to more than 300°F (150°C), as valve seats may be loosened.
2. Working from camshaft side, drive valve guide about 5/64" (2 mm) toward combustion chamber to

dislodge carbon and make removal easier. Turn cylinder head over, and drive valve guide out toward camshaft side. If guide does not move, drill guide with 5/16" drill, and then try again. Drill guides **ONLY** in extreme cases. Cylinder head damage can occur if valve guide breaks.

3. Individually remove new guides, as needed, from freezer. Coat outside of new valve guide with a thin coat of engine oil. Using Valve Guide Driver (07742-0010100), install valve guide into heated cylinder head. Install guides from camshaft side of head. Valve guide (intake and exhaust) height should be 0.54-0.56" (13.75-14.25 mm).
4. If replacing all valve guides, reheat cylinder head as necessary. Using cutting oil, ream new valve guides by rotating Valve Guide Reamer (07HAH-PJ7010B) clockwise the full length of valve guide bore.
5. Continue rotating reamer clockwise while removing it from bore. Thoroughly wash guide in detergent and water to remove any cutting residue. Check valve stem-to-guide oil clearance. See **CYLINDER HEAD** table under ENGINE SPECIFICATIONS.



NOTE: Fabricate valve guide remover to dimensions shown.

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Fig. 68: Fabricating Valve Guide Remover

Courtesy of AMERICAN HONDA MOTOR CO., INC.

Valve Seat

Valve seat replacement procedure is not available. Always reface valve seat after replacing valve guide.

Valves

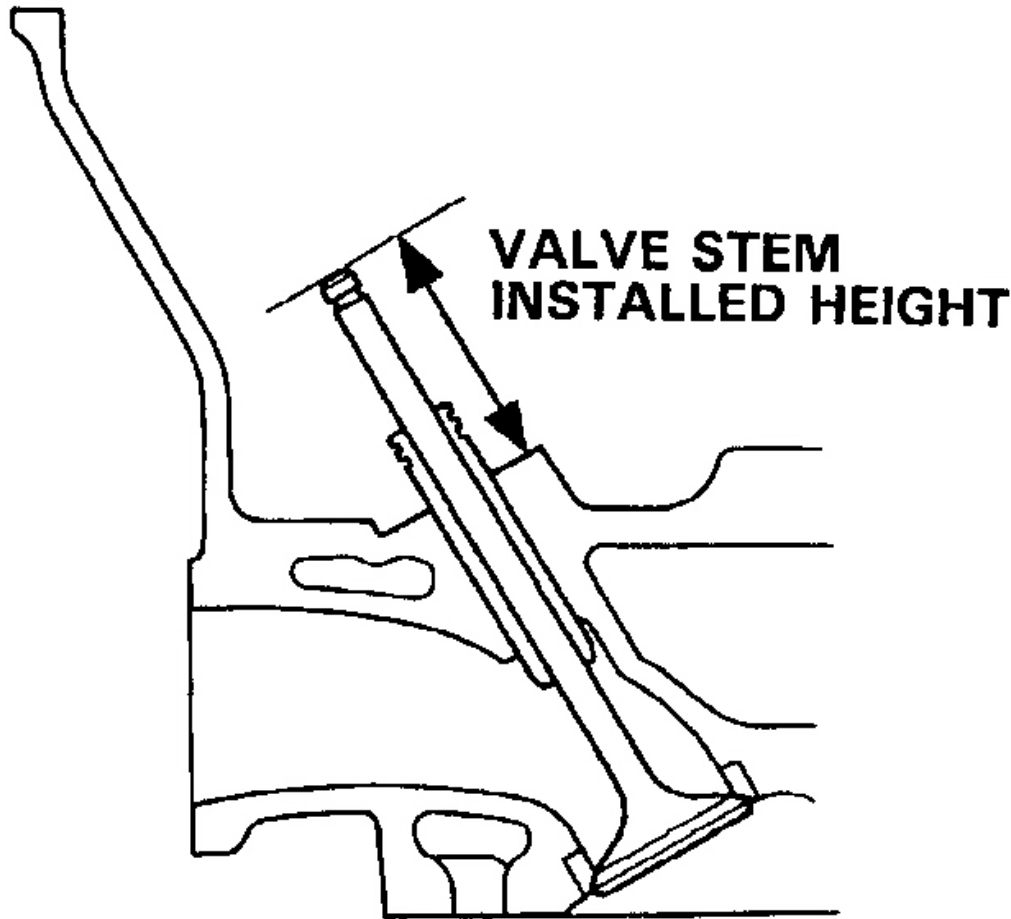
Measure valve stem diameter and margin. Replace valve if not within specifications. See **VALVES & VALVE SPRINGS** table under ENGINE SPECIFICATIONS.

Valve Stem Installed Height

1. Insert valve into cylinder head. Holding valve closed, measure valve stem installed height from base of

valve guide to tip of valve stem. See **Fig. 69**.

2. If valve stem installed height is not within specification, replace valve and re-measure. See **VALVES & VALVE SPRINGS** table under ENGINE SPECIFICATIONS. If installed height is still not within specification, valve seat is too deep. Replace cylinder head.



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Fig. 69: Measuring Valve Stem Installed Height
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Valve Seat Correction Angles

1. Replace valve guides, if worn BEFORE grinding valve seats. Using a valve seat cutter, carefully cut a 45-degree seat, removing only enough material to ensure a smooth and concentric seat. Bevel upper edge of seat with 30-degree cutter and lower edge of seat with 60-degree cutter. Check width of seat and adjust

accordingly. Make one more pass using 45-degree cutter lightly to remove burrs caused by other cutters. Verify seat width is within tolerance. See **CYLINDER HEAD** table under ENGINE SPECIFICATIONS.

2. After resurfacing valve seat, inspect for even valve seating. Apply Prussian Blue compound to valve face. Insert valve in its original location in head. Lift valve and snap closed against seat several times. Actual valve seating will be indicated by location of compound on seat. If valve seating is too high, make a second cut with 60-degree cutter. If valve seating is too low, make a second cut with 30-degree cutter. After either cutter is used, make final cut using 45-degree cutter to restore seat width.

VALVE TRAIN

Rocker Arm Shaft Assembly

1. Before rocker arms are removed, set cylinder No. 1 to TDC. Ensure intake and exhaust mid rocker arms on cylinder No. 1 move independently of primary and secondary rocker arms. See **Fig. 8**. Use a mirror to check front exhaust rocker arms. Check remaining mid rocker arms with corresponding cylinder at TDC. If mid rocker arms do not move independently of primary and secondary rocker arms, remove suspect rocker arm assembly. Check movement of synchronizing pistons.
2. Synchronizing pistons in primary and mid rocker arms should move smoothly when pushed. See **Fig. 48**. Inspect synchronizing pistons for signs of scoring or damage. Replace rocker arms as complete assemblies if necessary.
3. Remove lost motion assembly from cylinder head. Lost motion assembly should be slightly compressed when plunger is lightly pushed. Lost motion assembly should be almost fully compressed when plunger is firmly pushed. See **Fig. 49**. If lost motion assembly plunger does not move smoothly, replace lost motion assembly.
4. Inspect intake and exhaust rocker arm shafts for smooth surfaces and wear on face surface. Using a micrometer, measure diameter of rocker arm shaft at each rocker arm location. Using a cylinder bore gauge, measure inside diameter of each rocker arm and check for an out-of-round condition. Compare diameter of rocker arm shaft with corresponding rocker arm inside diameter. See **ROCKER ARMS & ROCKER ARM SHAFTS** table under ENGINE SPECIFICATIONS.
5. Repeat procedure for all rocker arms. If clearance is not within specification, replace rocker arm. If any rocker arm requires replacement, replace all three rockers in that set (primary, mid and secondary).

CYLINDER BLOCK ASSEMBLY

CAUTION: Handle piston carefully to prevent damage because piston skirt is coated with molybdenum. Connecting rods are made of titanium. DO NOT use conventional shop equipment to remove piston pin or connecting rod damage will occur.

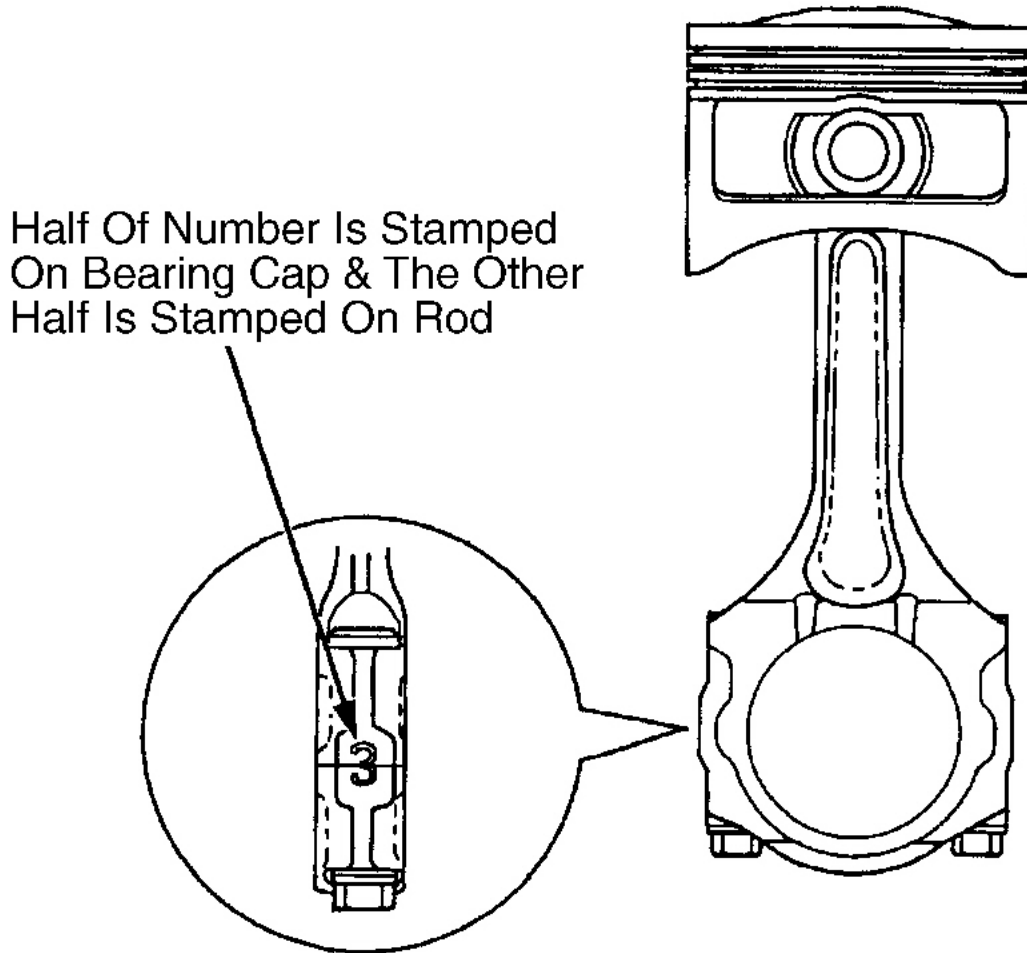
NOTE: If piston, connecting rod or piston pin require replacement, all 3 components MUST be replaced as an assembly.

Piston & Rod Assembly

1. Connecting rods are available in 4 tolerance ranges. Rod size depends on crank journal bore. A reference number between 1 and 4 is stamped on side of rod big end. Any combination of numbers between 1 and 4

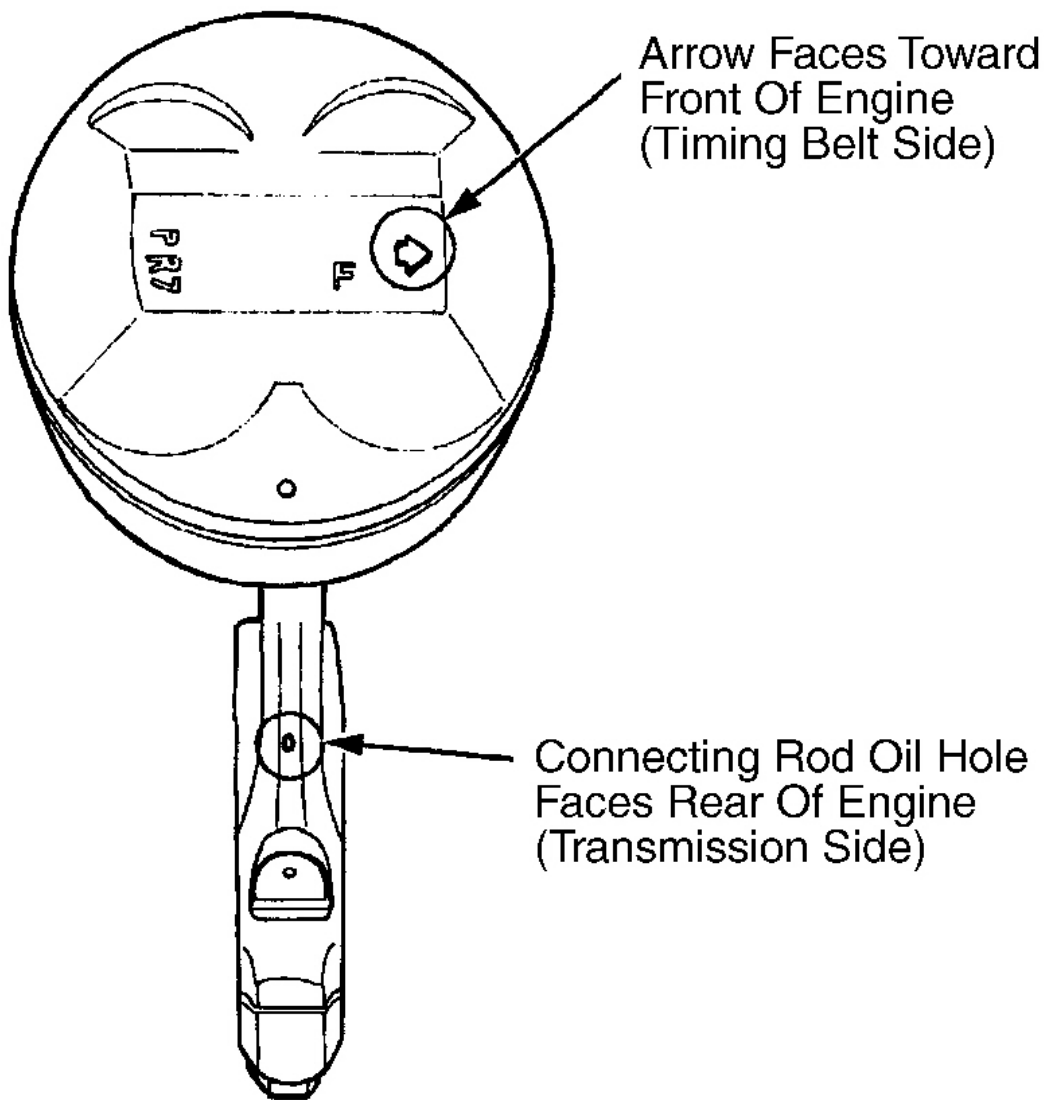
may be found in engine. Reference numbers are for big end bore code. Numbers DO NOT indicate rod position in engine. See **Fig. 70**.

2. Nominal connecting rod big end bore size is 2.09" (53 mm). Install piston and connecting rod with arrow on top of piston toward front of engine (timing belt side), and connecting rod oil hole toward rear of engine (transmission side). See **Fig. 71**.



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Fig. 70: Identifying Connecting Rod Bore Size
Courtesy of AMERICAN HONDA MOTOR CO., INC.



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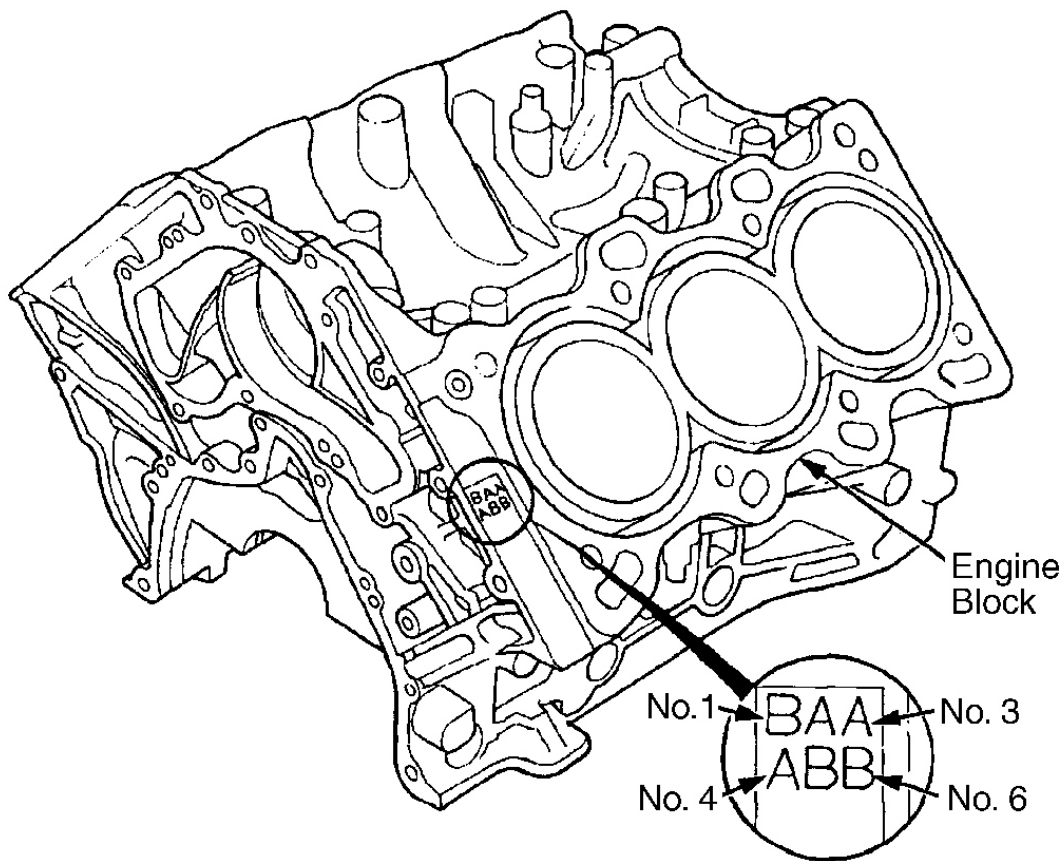
Fig. 71: Positioning Piston On Connecting Rod
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Piston Pin Removal, Inspection & Installation

Connecting rods are made of titanium. DO NOT use conventional shop equipment to remove piston pin or connecting rod damage will occur. Removal, inspection and installation procedures are not available from manufacturer. If piston, connecting rod or piston pin require replacement, all 3 components MUST be replaced as an assembly.

Fitting Pistons

1. Using a feeler gauge, ensure piston-to-cylinder bore clearance is within specification. See **PISTONS, PINS & RINGS** table under ENGINE SPECIFICATIONS. If piston clearance exceeds service limit, re-bore cylinder and install oversize piston.
2. Measure piston diameter at a point 0.67" (17 mm) from bottom of piston skirt. If diameter is not within specification, replace piston. See **PISTONS, PINS & RINGS** table under ENGINE SPECIFICATIONS.
3. Standard size pistons have no marking (indicates "A") or are stamped with letter "B" on piston top. Cylinder block bore size is determined by letter "A" or "B" stamped on cylinder block. Identification letters on block read from front cylinder to rear cylinder. Letters for No. 1 through No. 3 cylinders are on first line, and letters for No. 4 through No. 6 cylinders are on second line. To maintain proper clearance, ensure letters on cylinder block and piston match. See [Fig. 72](#).
4. Subtract piston diameter from cylinder bore diameter to obtain piston clearance. If clearance exceeds service limit, re-bore cylinder and install oversize piston. See **PISTONS, PINS & RINGS** table under ENGINE SPECIFICATIONS. See **CYLINDER BLOCK**. Pistons are available in 0.010" (0.25 mm) and 0.020" (0.50 mm) oversize.



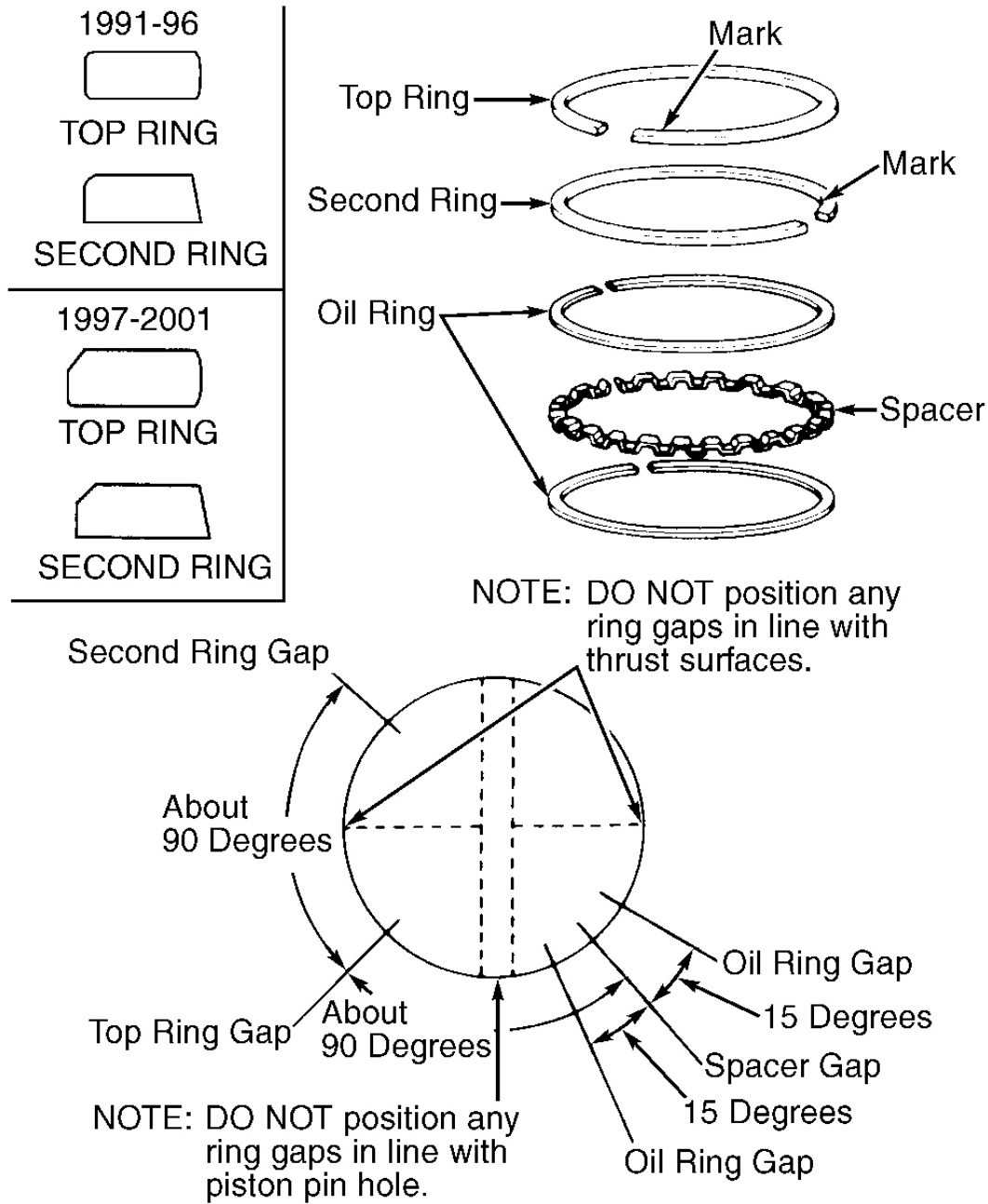
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Fig. 72: Locating Bore Size Markings On Engine Block

Courtesy of AMERICAN HONDA MOTOR CO., INC.

Piston Rings

1. Using inverted piston, push NEW piston ring into cylinder bore 0.6-0.8" (15-20 mm) from bottom. Using a feeler gauge, measure ring end gap. If gap is too large, check cylinder bore diameter and re-bore if necessary. See **PISTONS, PINS & RINGS** table under ENGINE SPECIFICATIONS. If gap is too small, check if ring size is correct.
2. Clean piston ring grooves thoroughly. Install rings onto piston with identification mark toward top of piston. Using a feeler gauge, measure side clearance between ring and ring groove. On 1997 and later models, top ring has an "R1" or "R" mark and second ring has an "R2" or "RN" mark.
3. If ring grooves are excessively worn, replace piston. See **PISTONS, PINS & RINGS** table under ENGINE SPECIFICATIONS. Ensure piston ring end gaps are properly spaced around piston. See **Fig. 73**.



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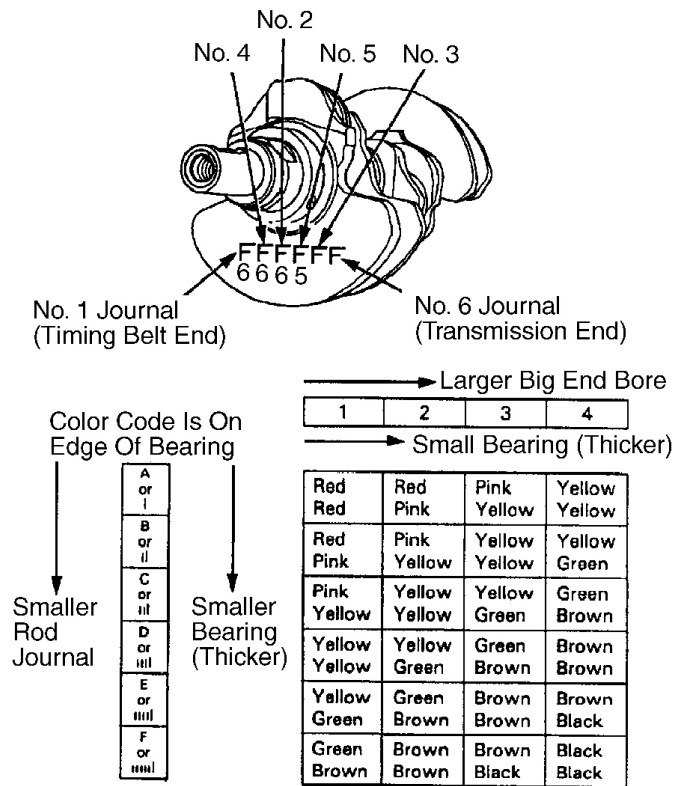
Fig. 73: Installing & Positioning Piston Rings
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

Rod Bearings

1. Measure oil clearance using Plastigage. Tighten bearing cap to 14 ft. lbs. (20 N.m), then using a torque

angle gauge, tighten cap nut 95 degrees. DO NOT rotate crankshaft during inspection. If oil clearance is not within specification, install a new bearing set (same color code) and recheck oil clearance. See **CRANKSHAFT, MAIN & CONNECTING ROD BEARINGS** table under ENGINE SPECIFICATIONS. DO NOT shim or file cap to adjust oil clearance.

2. If oil clearance is still incorrect, try next larger or smaller bearing and measure oil clearance again. If proper oil clearance cannot be obtained using different size bearings, replace crankshaft and repeat procedure.
3. A letter code, indicating connecting rod journal bore, is stamped on side of each connecting rod and cap. Connecting rod journal diameter codes (letters or bars) are stamped on front crankshaft counterweight pad. Use both codes when ordering replacement bearings. See **Fig. 74**. If codes cannot be read because of dirt and dust, DO NOT scrub them with wire brush or scraper. Use only solvent or detergent.



1991-96 MODELS

	1	2	3	4
A or I	Pink Pink	Pink Yellow	Yellow Yellow	Yellow Green
B or II	Pink Yellow	Yellow Yellow	Yellow Green	Green Green
C or III	Yellow Yellow	Yellow Green	Green Green	Green Brown
D or III	Yellow Green	Green Green	Green Brown	Brown Brown
E or III	Green Green	Green Brown	Brown Brown	Brown Black
F or III	Green Brown	Brown Brown	Brown Black	Black Black

1997-2001 MODELS

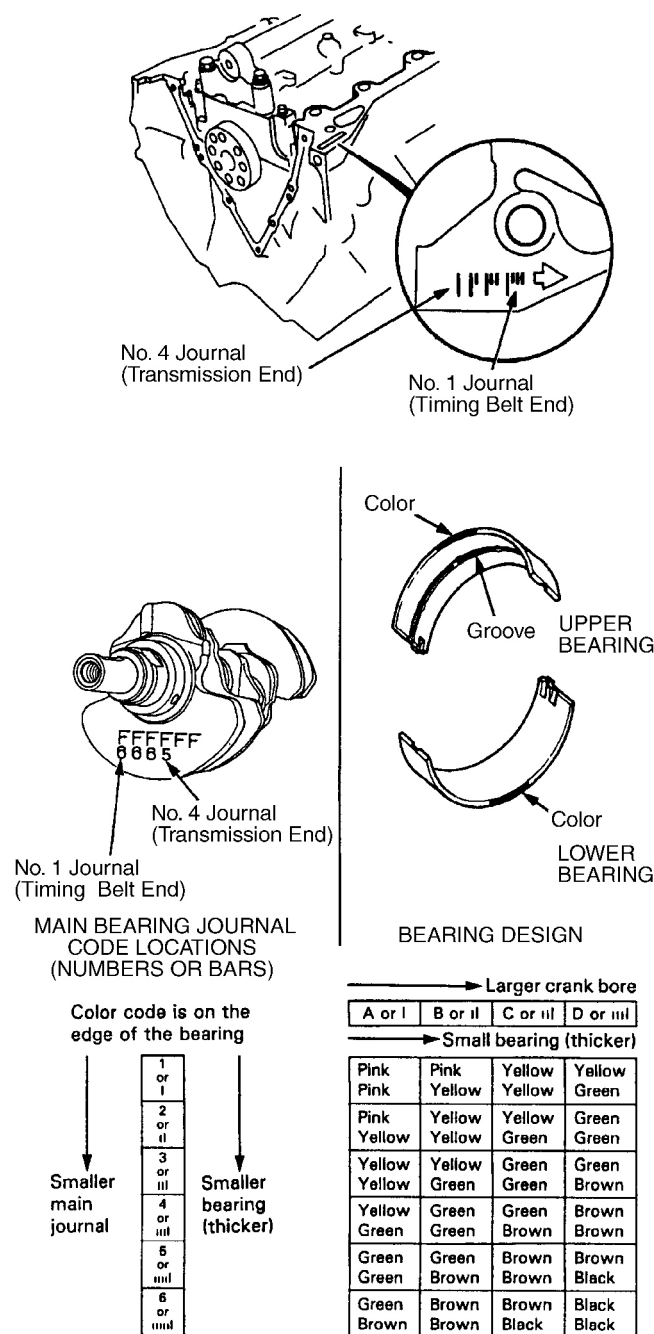
NOTE: On bearing sets with 2 colors, such as Green/Brown, it does not matter which color is in top or bottom as long as set has one of each bearing.

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Fig. 74: Identifying Connecting Rod Journal & Bearing Codes
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Crankshaft & Main Bearings

1. Remove bearing cap bridge bolts and bridge. Mark connecting rod and main bearing caps for identification. Remove all connecting rod caps after setting crankpin at Bottom Dead Center (BDC) for each cylinder. Remove piston and connecting rod assembly without damaging crank pin or cylinder. Remove bearings. Keep bearings, connecting rod caps and piston/connecting rods together and identified by cylinder.
2. Remove main bearing cap bolts and bearing cap side bolts. Remove main bearing caps and bearing halves. Mark all bearing caps for reassembly reference. Lift crankshaft from block, being careful not to damage journals. Clean each main journal and bearing half with a clean shop towel. Place one strip of Plastigage across each main journal. Install bearings, bearing caps and bearing cap bridge.
3. Coat bolt threads with engine oil and install bolts. Tighten cap bolts, then bridge bolts, and finally side bearing cap bolts to specification in sequence. See **Fig. 81** or **Fig. 82** and **TORQUE SPECIFICATIONS**. If engine is in vehicle, support crankshaft under counterweights with a jack and measure only one bearing at a time. Weight of flywheel and crankshaft will cause an incorrect reading. DO NOT rotate crankshaft during inspection.
4. Remove bearing cap bridge and 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 not within specification, install a new bearing set (same color code) and recheck oil clearance. DO NOT shim or file cap to adjust oil clearance.
5. If oil clearance is still incorrect, try next larger or smaller bearing, and check again. If proper clearance cannot be obtained by using different size bearings, replace crankshaft and repeat procedure.
6. A number code, indicating main journal bore diameter, is stamped on cylinder block. Main journal diameter codes (numbers or bars) are stamped on front crankshaft counterweight pad. Use both codes when ordering replacement bearings. See **Fig. 75**. If codes cannot be read because of dirt and dust, DO NOT scrub them with wire brush or scraper. Use only solvent or detergent.



NOTE: On bearing sets with 2 colors, such as Green/Brown, it does not matter which color is in top or bottom as long as set has one of each bearing.

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Fig. 75: Identifying Crankshaft Main Journal & Bearing Codes
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

Thrust Bearings

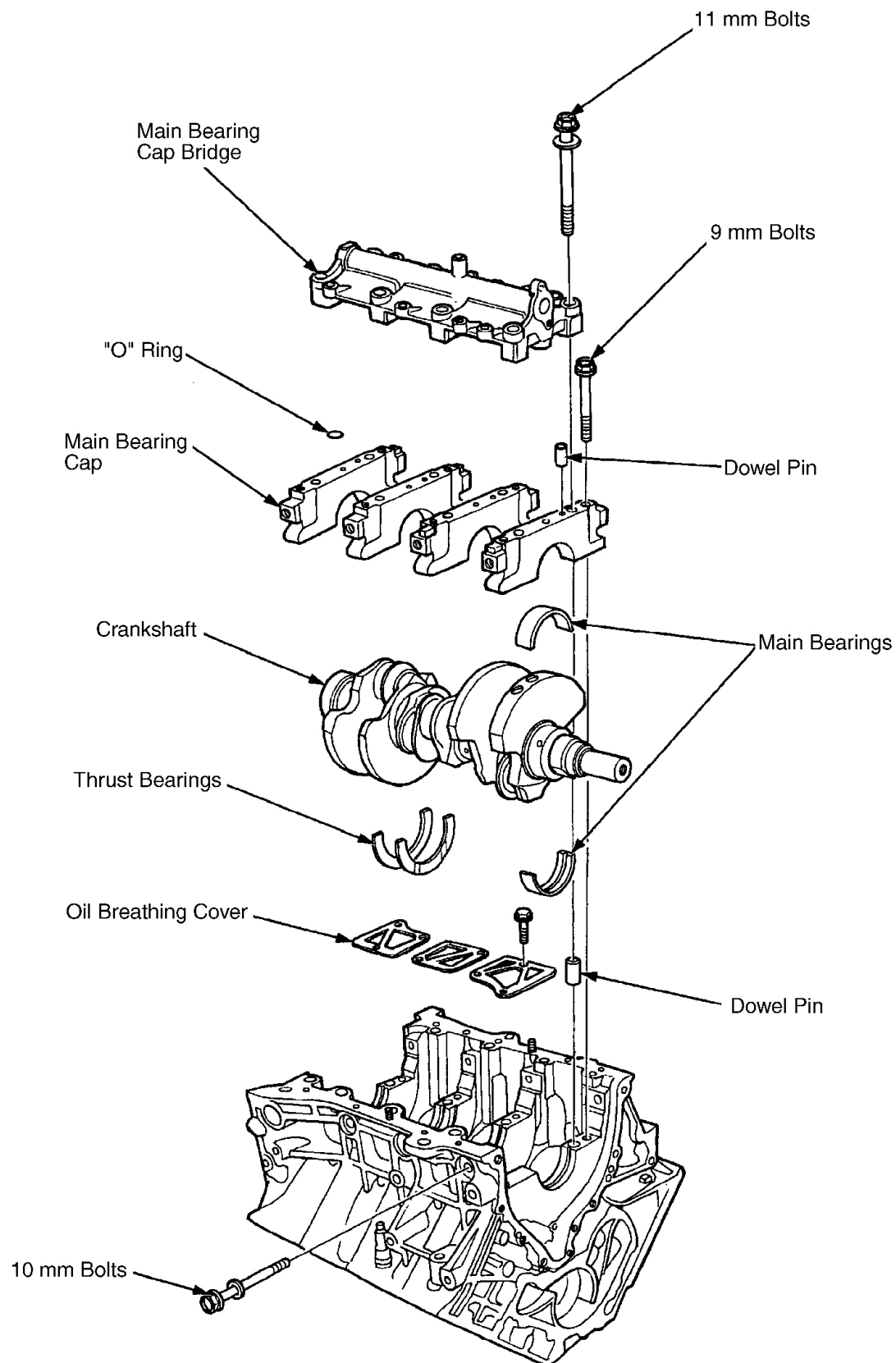
Measure crankshaft end play, using a dial indicator. See **CRANKSHAFT, MAIN & CONNECTING ROD BEARINGS** table under ENGINE SPECIFICATIONS. If end play exceeds specification, inspect thrust bearings and thrust surface of crankshaft located in cylinder block journal No. 3. See **Fig. 76**. Replace worn components as necessary. Thrust bearing thickness is fixed and cannot be changed by grinding or shimming. Install thrust bearings with grooved side out.

Cylinder Block

1. Check cylinder block deck surface for warpage. Measure top of cylinder block along 4 edges and 2 ways across center (corner-to-corner). Measure cylinder wear and taper in 2 directions, 90 degrees apart and at 3 levels (middle and 0.2" (5 mm) from top and bottom of cylinder). Letters or bars have been stamped on end of cylinder block as a code indicating cylinder bore size for each cylinder. See **Fig. 72**.
2. If either wear or taper exceeds specification, rebore cylinder for oversized pistons. If any cylinder block measurement exceeds service limit or oversize bore service limit, replace cylinder block. See **CYLINDER BLOCK** table under ENGINE SPECIFICATIONS.
3. Scored or scratched cylinder bores **MUST** be honed. If cylinder block is okay, hone cylinders to obtain a 60-degree crosshatch pattern. After honing, wash cylinder bores with hot soapy water to remove all metal particles. Dry cylinder bores and apply engine oil immediately to prevent rusting.

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200003095

Fig. 76: Exploded View Of Engine Block**Courtesy of AMERICAN HONDA MOTOR CO., INC.****ENGINE OILING****ENGINE LUBRICATION SYSTEM**

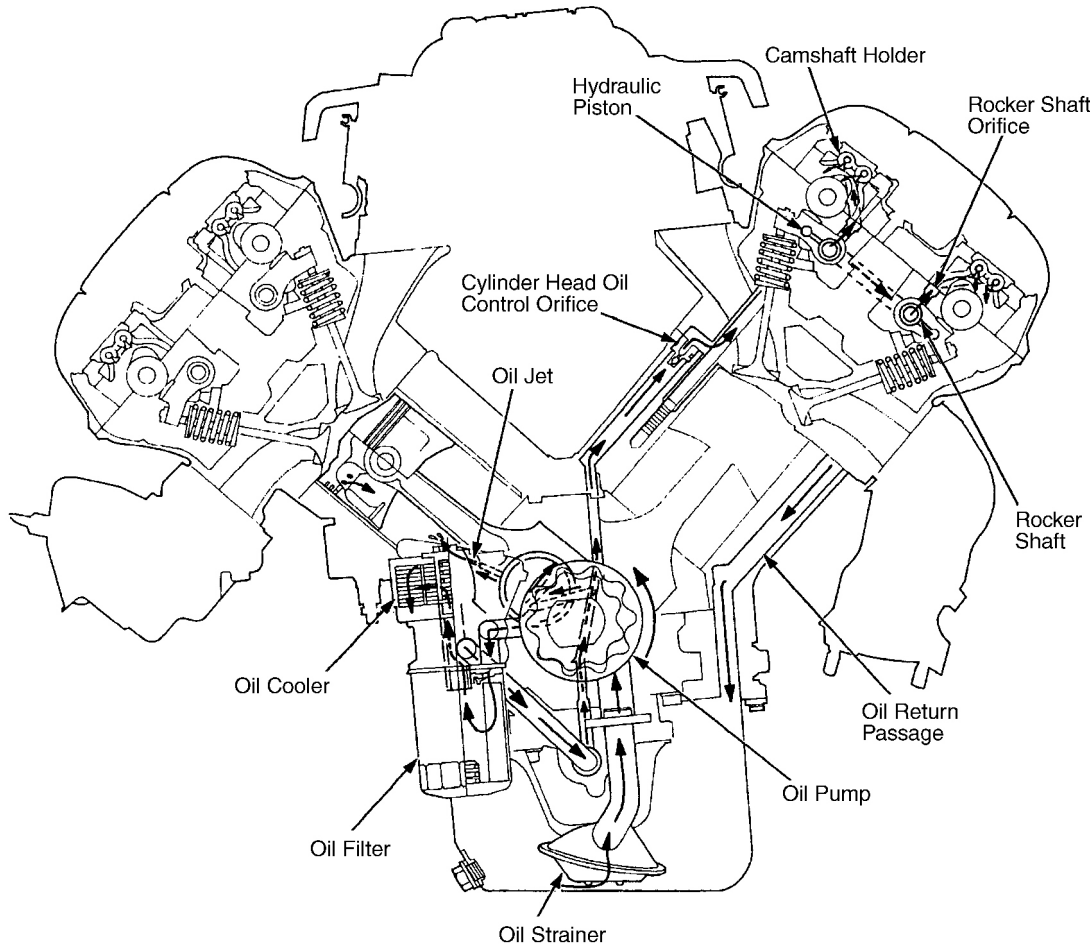
A rotor-type oil pump draws oil from oil pan, and delivers it under pressure to main and connecting rod bearings. An oil hole in each connecting rod lubricates thrust side of piston and cylinder wall. An oil passage carries oil to camshaft and rocker shafts. Oil spray lubricates valve stems.

Crankcase Capacity

Crankcase capacity is 5.3 qts. (5 L) including oil filter. Engine overhaul capacity is 6.7 qts. (6.3 L).

Oil Pressure

With oil temperature at 176°F (80°C), oil pressure should be 10 psi (69 kPa) minimum at idle, and 50 psi (345 kPa) minimum at 3000 RPM.



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Fig. 77: Cross-Sectional View Of Engine Oil System
Courtesy of AMERICAN HONDA MOTOR CO., INC.

OIL PUMP

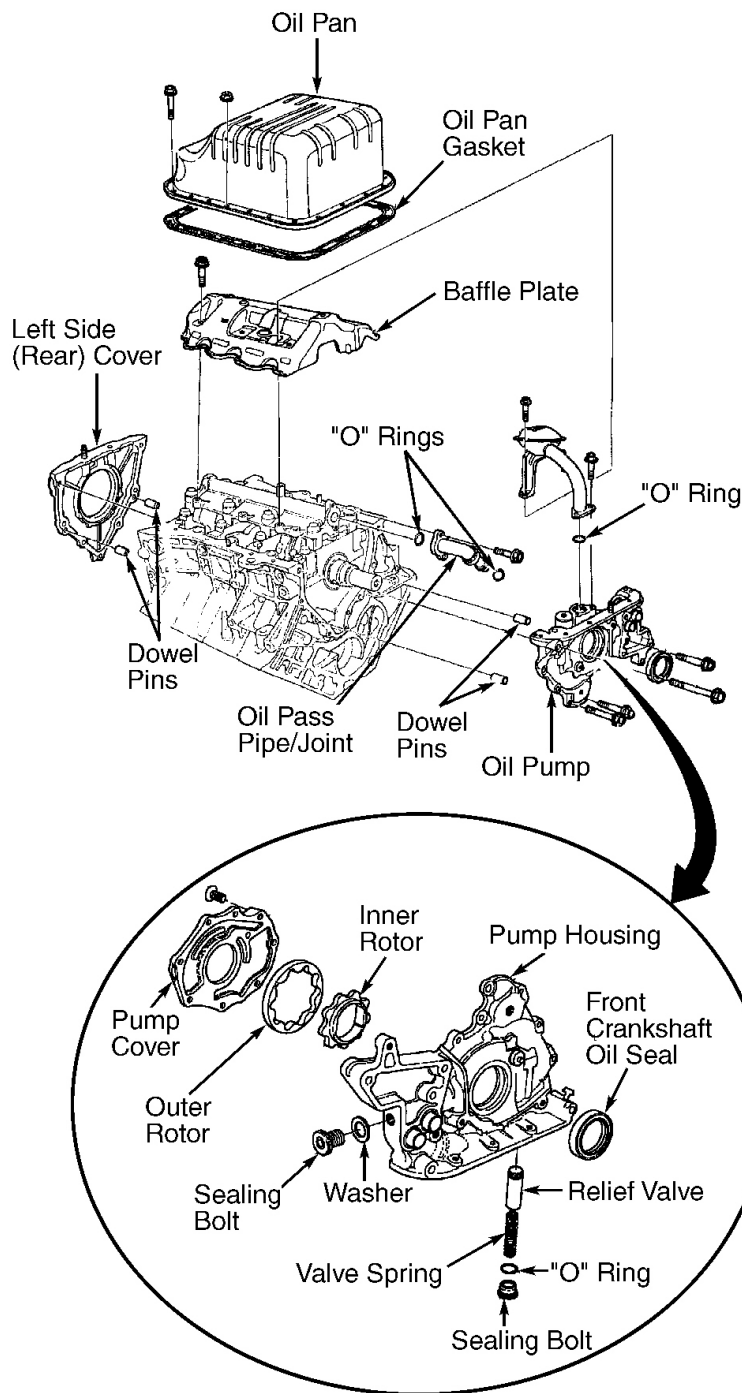
Removal & Disassembly

1. Drain engine oil. Remove timing belt. See **TIMING BELT** under REMOVAL & INSTALLATION.
2. Remove generator bracket stiffener, dipstick and dipstick pipe. See **Fig. 36**. Remove oil filter assembly. Remove oil pan. See **OIL PAN** under REMOVAL & INSTALLATION.
3. Remove oil screen and baffle plate. Remove the oil pass pipe and joint. Remove oil pump mounting bolts, and oil pump assembly. Remove 9 screws from pump housing, and separate housing and cover. Using a screwdriver, pry front crankshaft oil seal from oil pump housing. See **Fig. 78**.

Inspection

Measure inner-to-outer rotor clearance. Measure housing-to-rotor axial clearance. Measure housing-to-outer rotor clearance. Replace components if not within specifications. See **1991-94 OIL PUMP**

SPECIFICATIONS or **1995-2001 OIL PUMP SPECIFICATIONS** table. Inspect both rotors and pump housing for scoring or other damage, and replace if necessary.



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Fig. 78: Exploded View Of Oil Pump Assembly
Courtesy of AMERICAN HONDA MOTOR CO., INC.

1991-94 OIL PUMP SPECIFICATIONS

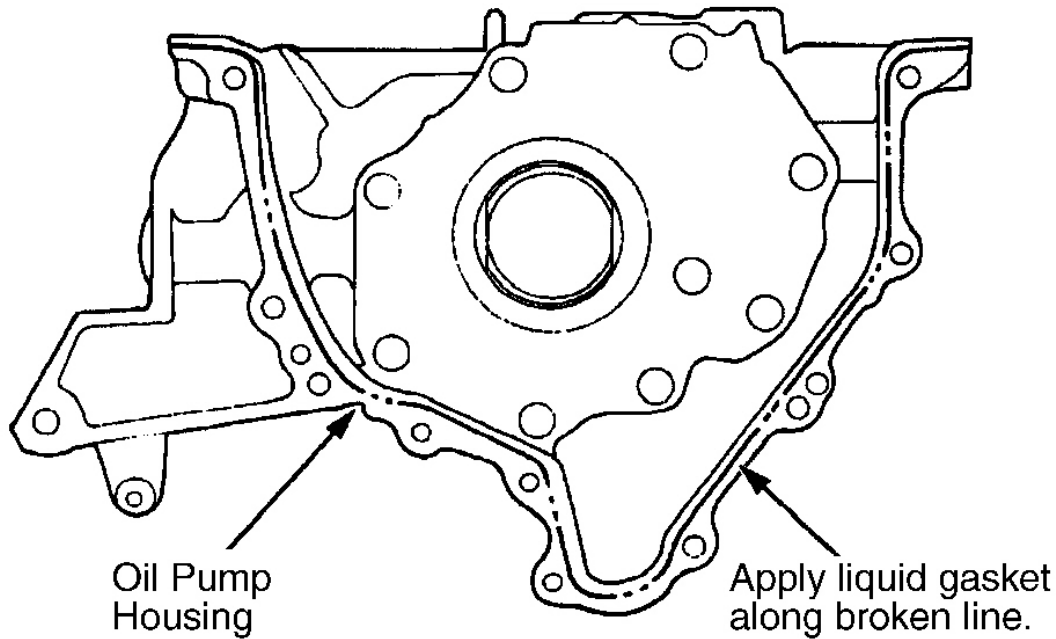
Application	In. (mm)
Inner Rotor-To-Outer Rotor Clearance	
Standard (New)	0.001-0.007 (0.02-0.18)
Service Limit	0.008 (0.20)
Housing-To-Rotor Axial Clearance	
Standard (New)	0.001-0.003 (0.02-0.07)
Service Limit	0.005 (0.12)
Housing-To-Outer Rotor Clearance	
Standard (New)	0.004-0.007 (0.10-0.19)
Service Limit	0.008 (0.20)

1995-2001 OIL PUMP SPECIFICATIONS

Application	In. (mm)
Inner Rotor-To-Outer Rotor Clearance	
Standard (New)	0.002-0.008 (0.05-0.21)
Service Limit	0.009 (0.20)
Housing-To-Rotor Axial Clearance	
Standard (New)	0.001-0.003 (0.02-0.07)
Service Limit	0.005 (0.12)
Housing-To-Outer Rotor Clearance	
Standard (New)	0.004-0.008 (0.11-0.20)
Service Limit	0.008 (0.21)

Reassembly & Installation

1. Lightly coat crankshaft and lip of NEW crankshaft front oil seal, and install seal. See **CRANKSHAFT FRONT OIL SEAL**.
2. Apply liquid thread lock to pump housing screws, and reassemble oil pump. Ensure oil pump turns freely. Install both dowel pins and NEW "O" ring on the cylinder block. Clean and dry oil pump and cylinder block mating surfaces.
3. Apply a narrow bead of Liquid Gasket Sealer (08718-0001) on oil pump housing at cylinder block mating surface. See **Fig. 79**. Also apply sealer to inner threads of bolt holes to prevent oil leakage. Install oil pump before sealer dries. Install and tighten mounting bolts.
4. Install oil pan. See **OIL PAN** under REMOVAL & INSTALLATION. Install timing belt. See **TIMING BELT** under REMOVAL & INSTALLATION. Complete installation by reversing removal procedures. Wait at least 30 minutes before filling crankcase with engine oil.



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Fig. 79: Applying Liquid Gasket To Oil Pump Housing
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

Application	Ft. Lbs. (N.m)
A/C Belt Idler Pulley	
Center Nut	33 (45)
Mounting Bolts	16 (22)
A/C Compressor	
Bracket Bolts	33 (45)
Mounting Bolts	36 (49)
A/T Flex Plate Bolts	⁽¹⁾ 54 (75)
Camshaft Holder Bolts (8 mm) ⁽²⁾	16 (22)
Camshaft Holder Bridge Bolts	16 (22)
Camshaft Pulley Bolts	51 (69)
Catalytic Converter	
-To-Muffler Self-Locking Nuts (1991-94)	25 (34)

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-To-Exhaust Pipe Self-Locking Nuts (1995-2001)	16 (22)
Center Rod Assembly Bolts	43 (59)
Clutch Slave Cylinder Bolts (M/T)	16 (22)
Connecting Rod Nuts	
1991-96	14 (20), Then Additional 95 Degrees
1997-2001	14 (20), Then Additional 116 Degrees
Crankshaft Main Bearings ⁽³⁾	
Bridge Bolts (11 mm)	48 (65)
Cap Bolts (9 mm)	29 (39)
Side Bolts (10 mm)	36 (49)
Crankshaft Pulley Bolt	⁽⁴⁾ 181 (245)
Cylinder Head Bolts ⁽⁵⁾	⁽¹⁾ 56 (76)
ECT Sensor	13 (18)
ECT Switch (1993-96)	20 (27)
EGR Valve Bolts	16 (22)
Engine Coolant Drain Bolts (1991-96)	22 (30)
Engine Compartment Strut Brace	
1991-94	28 (39)
1995-2001	16 (22)
Engine Mounts	
Front	
Through-Bolt	56 (76)
Mounting Bolts	43 (59)
Side	
Through-Bolt	69 (94)
Mounting Bolts	53 (72)
Rear	
Through-Bolt	56 (76)
Mounting Bolts (A/T)	43 (59)
Mounting Bolts (M/T)	76 (103)
Exhaust Manifold Self-Locking Nuts	
1991-96	25 (34)
1997-2001	22 (30)
Exhaust Manifold Cover Bolts	16 (22)
Exhaust Pipe	
-To-Catalytic Converter	
1991-94 Models	25 (34)

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1995-2001 Models	16 (22)
-To-Manifold	40 (55)
-To-Muffler (1995-2001 Models)	25 (34)
Flywheel (M/T) Bolts	⁽¹⁾ 76 (103)
Front Beam Bolts	69 (94)
Fuel Feed Pipe Banjo Bolt	
At Fuel Filter	20 (27)
At Fuel Pump	20 (27)
At Fuel Rail	16 (22)
Fuel Tank	
Drain Bolt	36 (49)
Strap Bolts	28 (38)
Strap Lock Nut	15 (21)
Generator Bracket	
8 mm Bolts	16 (22)
10 mm Bolts	33 (45)
Generator Bracket Stiffener	
8 mm Bolts	16 (22)
10 mm Bolts	33 (45)
Generator Mounting Bolt & Nut	33 (45)
Heated Oxygen Sensor	33 (45)
Idle Air Control Valve (IAC) Valve Mounting Bolts	16 (22)
Intake Manifold Bolts	16 (22)
Intake Manifold Chamber Bolts	16 (22)
Intake Manifold Cover Bolts	16 (22)
Knock Sensor	23 (32)
Oil Cooler	
Center Bolt	36 (49)
Mounting Bolts	16 (22)
Oil Pan	
Drain Plug	33 (45)
Mounting Nuts & Bolts	⁽⁶⁾ 10 (14)
Oil Pressure Gauge	
Sending Unit Bolts	16 (22)
Sending Unit Adapter Bolts	16 (22)
Oil Pressure Switch	13 (18)
Oil Pump	
Housing Side Bolt	36 (49)
Mounting Bolts (8 mm)	16 (22)
Relief Valve Bolt	29 (39)
Radiator Fan Control Sensor	

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1991-92	20 (27)
1997-2001	20 (27)
Rear Beam Rod	
10 mm Bolts	43 (59)
12 mm Bolts & Nuts	69 (94)
Rear Hatch Support Strut Upper Bolt	16 (22)
Rocker Arm Shaft Sealing Bolts	
1991-96	43 (59)
1997-2001	36 (49)
Shift Cable Bracket Bolts (M/T)	19 (26)
Stabilizer Link	
Upper Self-Locking Nut	69 (94)
Lower Self-Locking Nut	61 (83)
Throttle Body	
Mounting Nuts	16 (22)
Insulator Bolts	16 (22)
Timing Belt Adjusting Bolt	31 (42)
Transmission	
Drain Plug	
A/T	36 (49)
M/T	33 (45)
Hanger Bolts	22 (30)
Mount (A/T)	
Through-Bolt	69 (94)
Mounting Bolts	43 (59)
Under Cover Bolts	16 (22)
Valve Lash Adjuster Lock Nut	14 (20)
VTEC (Spool) Solenoid Valve Bolts	
Front Cylinder Head (1991-96)	16 (22)
Water Passage Mounting Bolts	16 (22)
Water Pipe Drain Bolts	11 (15)
Water Pump Mounting Bolts (8 mm)	16 (22)
INCH Lbs. (N.m)	
A/C Belt Adjuster Bolt	
1991-96	106 (12)
Air Cleaner Bolts	88 (10)
Camshaft Holder Bolts (6 mm) ⁽²⁾	88 (10)
Catalytic Converter Cover Bolts	88 (10)
Coolant Temperature Gauge Sending Unit	80 (9)
Cooling System Bleed Bolts	88 (10)
Crank/Cyl Position Sensor Bolts	106 (12)

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Cylinder Head Cover Nuts

1991-96	(1) 88 (10)
1997-2001	(1) 106 (12)
ECM Bolts	88 (10)
EGR Pipe Bolts	106 (12)
Emission Control Box Bolts	88 (10)
Engine Compartment Fan	
Mounting Bolts	88 (10)
Wire Harness Bracket Bolt	88 (10)
Engine Compartment Wiring Harness Bolts	88 (10)
Engine Coolant Drain Bolts (1997-2001)	88 (10)
Expansion Tank Bolts	88 (10)
Fast Idle (Thermo) Valve Bolts	106 (12)
Fuel Feed Pipe Bracket Bolts	106 (12)
Fuel Filter	
Bracket Bolt	88 (10)
Service Bolt	106 (12)
Fuel Injector Cover Bolts	106 (12)
Fuel Pressure Regulator Bolts	106 (12)
Fuel Pump Mounting Bolts	53 (6)
Generator	
Adjusting Bolt (1991-94)	71 (8)
Belt Cover Bolts	106 (12)
Ground Nut	106 (12)
Igniter Mounting Bolts	106 (12)
Ignition Coil	
Cover Bolts	88 (10)
Mounting Bolts	106 (12)
Harness Cover Bolts	106 (12)
Ignition Control Module (ICM) Bolts	106 (12)
Intake Air Temperature (IAT) Sensor	53 (6)
Intake Manifold	
Plate Bolts	106 (12)
Top Cover Bolts	106 (12)
Knock Sensor Wire Holder Bolts	106 (12)
Left Side (Rear) Cover Bolts	106 (12)
Oil Breathing Cap Bolts	106 (12)
Oil Dipstick Tube Bolts	106 (12)
Oil Pan Baffle Plate Bolts	106 (12)
Oil Pass Pipe & Joint Bolts	106 (12)
Oil Pump Mounting Bolt (6 mm)	106 (12)

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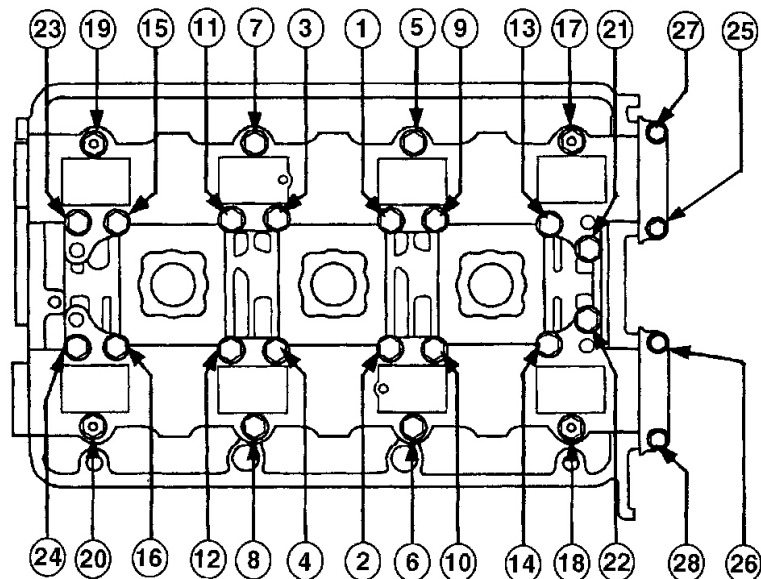
1991-2004 ENGINE 3.0L V6 - NSX & NSX-T

Oil Pump Cover Screws	53 (6)
Oil Pump Screen Bolts	106 (12)
Rear Brake Line Bracket Bolt	88 (10)
Rear Hatch Mounting Bolts	88 (10)
Rear Hatch Support Strut Lower Bolts	88 (10)
Shift Cable Bracket Bolts (M/T)	106 (12)
Shift Cable Cover Bolts (A/T)	71 (8)
VTEC (Spool) Solenoid Valve Bolts	
Front & Rear Cylinder Heads (1997-2001)	106 (12)
Rear Cylinder Head (1991-96)	106 (12)
Thermo Cover Bolts	106 (12)
Throttle Body Bracket Bolts	106 (12)
Throttle Cable Lock Nut	88 (10)
Timing Belt Cover Bolts	106 (12)
Trunk Lid Mounting Bolts	115 (13)
Water Pump Mounting Bolts (6 mm)	106 (12)

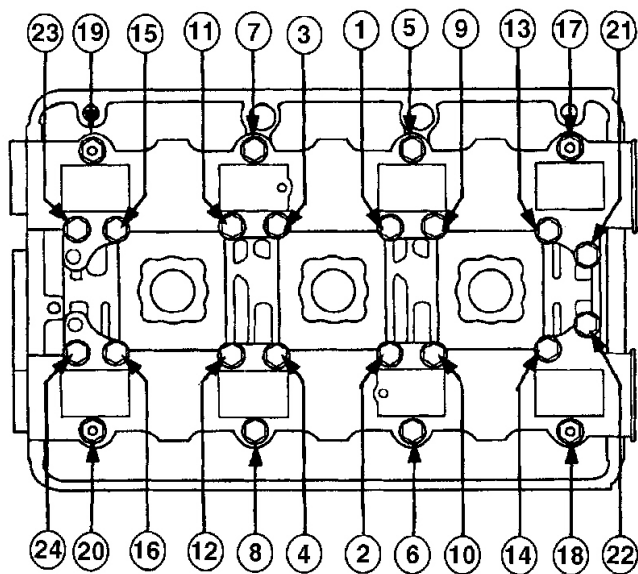
- (1) Tighten in 2 or 3 steps.
- (2) Tighten in sequence. See **Fig. 80**.
- (3) Tighten in sequence. See **Fig. 81** and **Fig. 82**.
- (4) For NEW bolt on 1991-94 models, tighten to 206 Ft. Lbs. (280 N.m), loosen completely and then tighten to 181 Ft. Lbs. (250 N.m).
- (5) Tighten in sequence. See **Fig. 83**.
- (6) Tighten in 3 steps for all models. Tighten in sequence for 1991-94 models. Tighten in clockwise pattern beginning at bolt No. 1 on 1995 and later models. See **Fig. 84**.

FRONT OF VEHICLE ↑

Bolts 1-24 Are 8 x 1.25 mm.
Bolts 25 - 28 Are 6 x 110 mm.



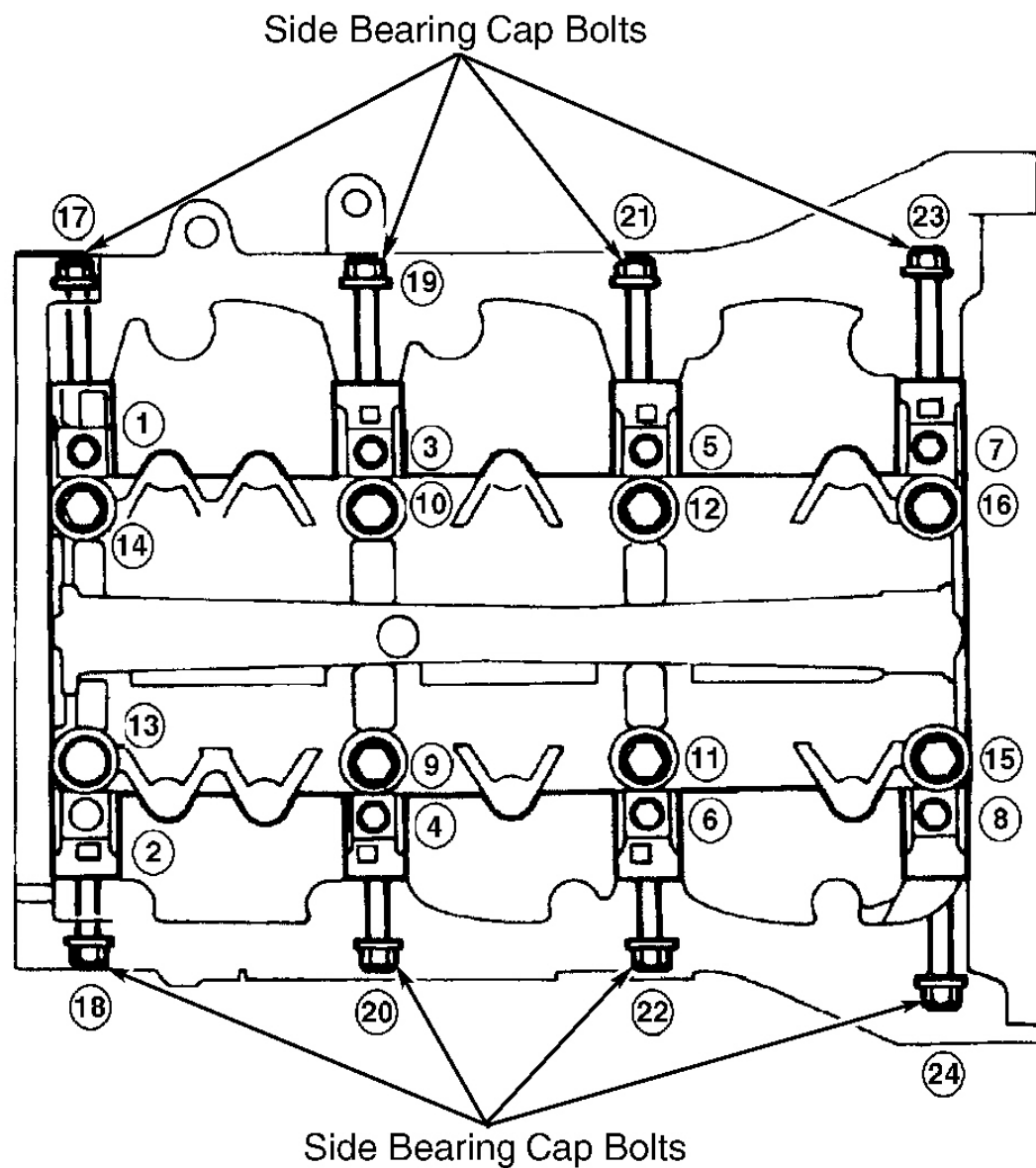
FRONT CYLINDER HEAD



REAR CYLINDER HEAD

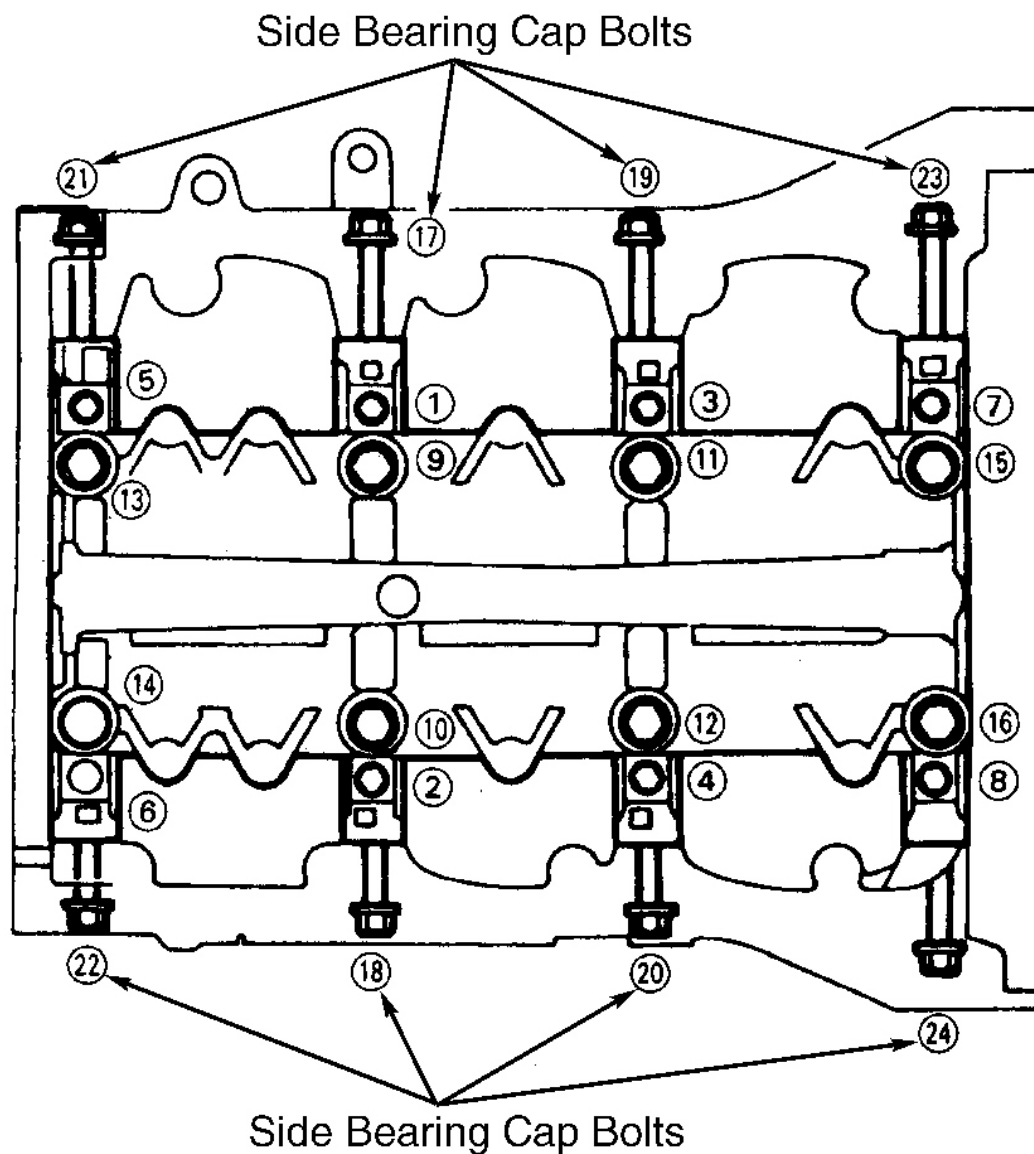
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Fig. 80: Camshaft Holder Bolt Tightening Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.



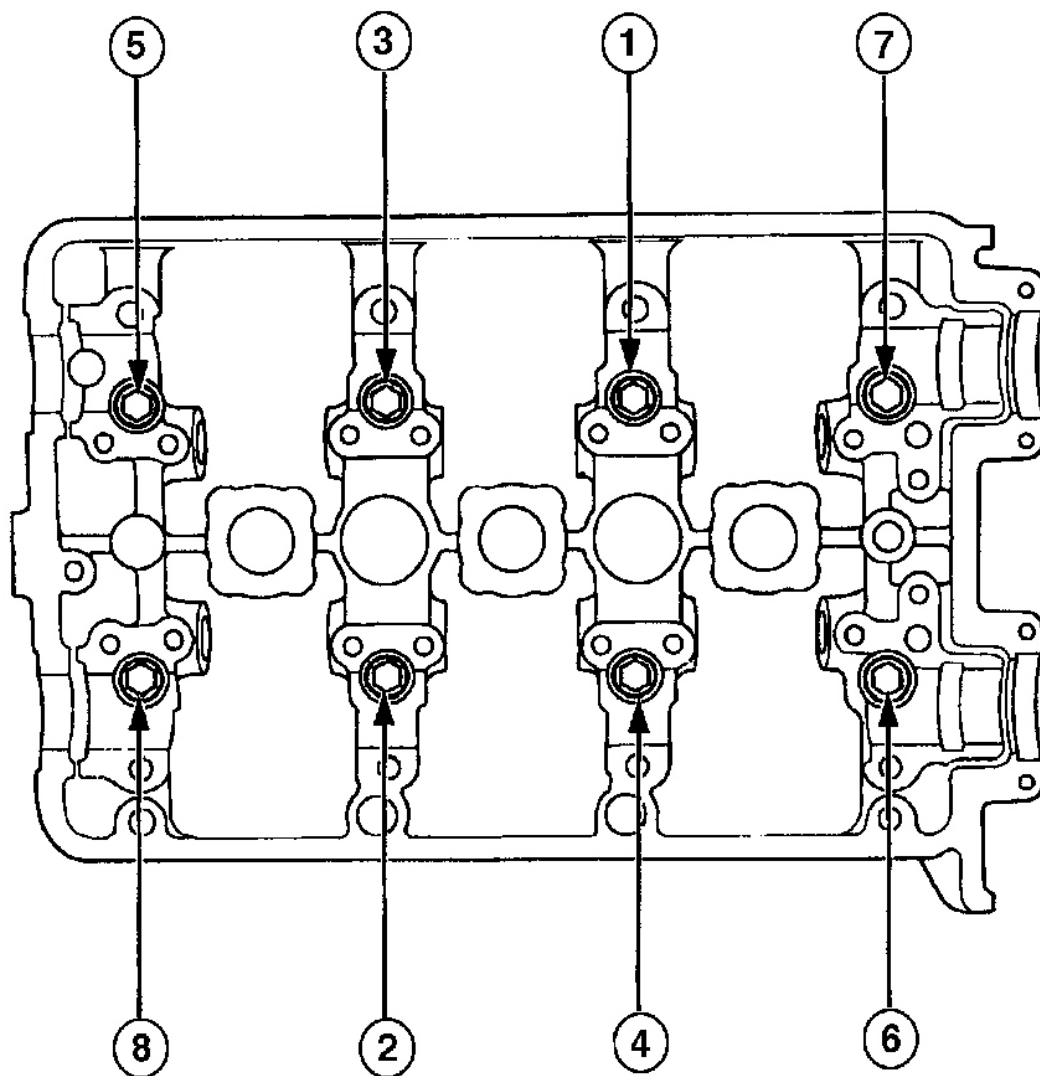
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Fig. 81: Main Bearing Cap & Bridge Bolt Tightening Sequence - 1991-92 NSX
 Courtesy of AMERICAN HONDA MOTOR CO., INC.



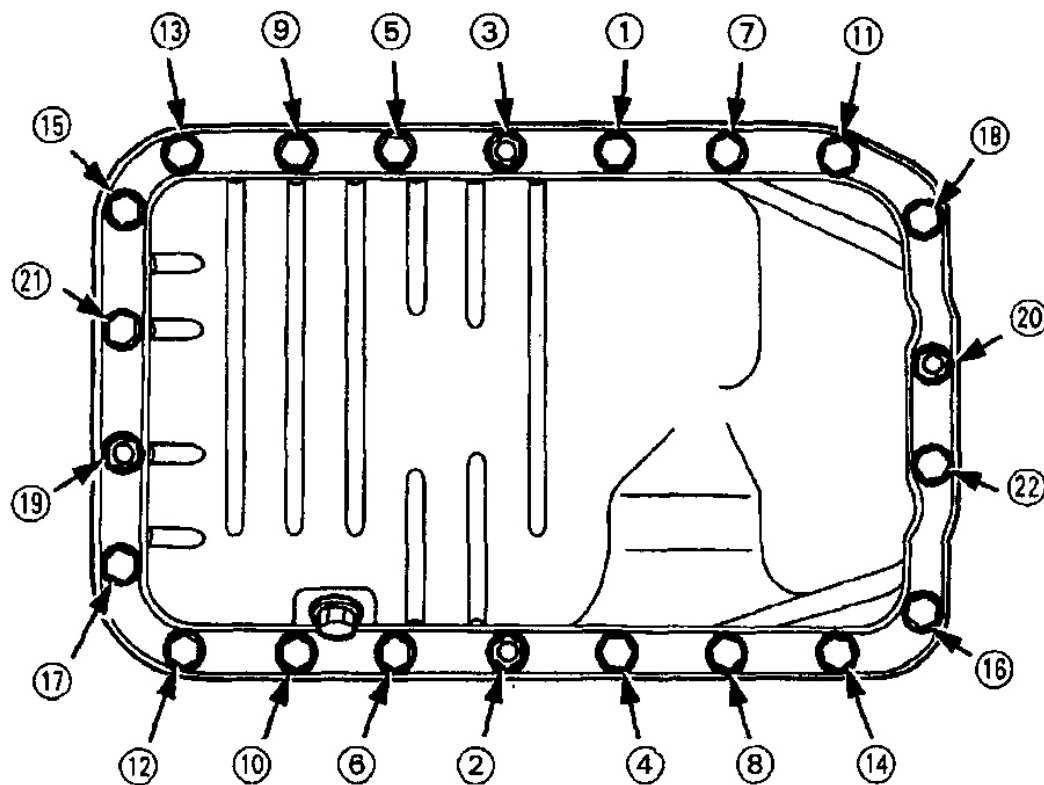
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Fig. 82: Main Bearing Cap & Bridge Bolt Tightening Sequence - 1993-2001 NSX & NSX-T
 Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 83: Cylinder Head Bolt Tightening Sequence
 Courtesy of AMERICAN HONDA MOTOR CO., INC.



G00097347

Fig. 84: Oil Pan Bolt Tightening Sequence For 1991-94 Models
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

ENGINE SPECIFICATIONS

GENERAL SPECIFICATIONS

GENERAL SPECIFICATIONS

Application	Specification
3.0L	
Displacement	181.6 Cu. In. (2.977L)
Bore	3.54" (90 mm)
Stroke	3.07" (78 mm)
Compression Ratio	10.2:1
Fuel System	PFI

CRANKSHAFT, MAIN BEARINGS & CONNECTING ROD BEARINGS SPECIFICATIONS

1997 Acura NSX

1991-2004 ENGINE 3.0L V6 - NSX & NSX-T

CRANKSHAFT, MAIN & CONNECTING ROD BEARINGS

Application	In. (mm)
3.0L	
Crankshaft	
End Play	
Standard	0.004-0.014 (0.10-0.35)
Service Limit	0.018 (0.45)
Runout	
Standard	0.0006 (0.015) MAX.
Service Limit	0.0012 (0.030)
Main Bearings	
Journal Diameter	2.5187-2.5197 (63.976-64.000)
Journal Out-Of-Round	
Standard	0.00016 (0.004) MAX.
Service Limit	0.00024 (0.006)
Journal Taper	
Standard	0.0002 (0.005) MAX.
Service Limit	0.0004 (0.010)
Oil Clearance	
Standard	0.0009-0.0019 (0.024-0.048)
Service Limit	0.002 (0.05)
Connecting Rod Bearings	
Journal Diameter	1.9676-1.9685 (49.976-50.000)
Journal Out-Of-Round	
Standard	0.00016 (0.004) MAX.
Service Limit	0.00024 (0.006)
Journal Taper	
Standard	0.0002 (0.005) MAX.
Service Limit	0.0004 (0.010)
Oil Clearance	
1991-96	
Standard	0.0016-0.0024 (0.040-0.060)
Service Limit	0.0024 (0.060)
1997-2001	
Standard	0.0016-0.0025 (0.040-0.064)
Service Limit	0.0025 (0.064)

CONNECTING RODS SPECIFICATIONS**CONNECTING RODS**

Application	In. (mm)
3.0L	

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Bore Diameter	
1991-96	
Pin Bore	N/A
Crankpin Bore	2.0866-2.0876 (53.000-53.024)
1997-2001	
Pin Bore	N/A
Crankpin Bore	2.1654-2.1663 (55.000-55.024)
Center-To-Center Length	N/A
Maximum Bend	N/A
Maximum Twist	N/A
Side Play	
Standard	0.006-0.012 (0.15-0.30)
Service Limit	0.016 (0.40)

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

Application	In. (mm)
3.0L	
Pistons	
Clearance	
1991-96	
Service Limit	0.0032 (0.0825)
1997-2001	
Standard	0.0002-0.0013 (0.006-0.034)
Service Limit	0.0032 (0.0825)
Diameter ⁽¹⁾	
Standard ⁽²⁾	
"A" Or No Marking Piston	3.5427-3.5435 (89.986-90.004)
Service Limit	3.5421 (89.97)
"B" Piston	3.5424-3.5431 (89.976-89.994)
Service Limit	3.5417 (89.96)
Oversize	
0.010" (0.25 mm)	3.5522-3.5530 (90.226-90.244)
0.020" (0.50 mm)	3.5620-3.5627 (90.476-90.494)

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Pins ⁽³⁾	
Rings	
No. 1	
End Gap	
Standard	0.010-0.016 (0.25-0.40)
Service Limit	0.024 (0.60)
Side Clearance	
Standard	0.001-0.002 (0.030-0.055)
Service Limit	0.005 (0.13)
Ring Groove Width	
Standard	0.0480-0.0484 (1.22-1.23)
Service Limit	0.0492 (1.25)
No. 2	
End Gap	
Standard	0.014-0.020 (0.35-0.50)
Service Limit	0.030 (0.75)
Side Clearance	
Standard	0.001-0.002 (0.030-0.055)
Service Limit	0.005 (0.13)
Ring Groove Width	
Standard	0.0480-0.0484 (1.22-1.23)
Service Limit	0.0492 (1.25)
No. 3 (Oil)	
End Gap	
Standard	0.008-0.028 (0.20-0.70)
Service Limit	0.031 (0.80)
Side Clearance	N/A
Ring Groove Width	
Standard	0.1104-0.1110 (2.805-2.820)
Service Limit	0.1118 (2.840)
(1) Measured 0.67" (17 mm) from bottom of skirt.	
(2) Piston identification letter is stamped on top of piston.	
(3) Piston pins are not serviceable. Piston MUST be replaced as an assembly.	

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1991-2004 ENGINE 3.0L V6 - NSX & NSX-T

CYLINDER BLOCK SPECIFICATIONS**CYLINDER BLOCK**

Application	In. (mm)
3.0L	
Cylinder Bore	
Standard ⁽¹⁾	
"A" Cylinder	3.5437-3.5441 (90.010-90.020)
Service Limit	3.5461 (90.070)
"B" Cylinder	3.5433-3.5437 (90.000-90.010)
Service Limit	3.5461 (90.070)
Oversize	
0.010" (0.25 mm)	3.5531-3.5535 (90.250-90.260)
0.020" (0.50 mm)	3.5630-3.5634 (90.500-90.510)
Maximum Taper	0.002 (0.05)
Maximum Re-Bore Limit	0.02 (0.5)
Deck Warpage	
Standard	0.003 (0.07) MAX.
Service Limit	0.004 (0.10)
(1) Cylinder bore identification letter is stamped on top of block. See Fig. 72 .	

ROCKER ARMS & ROCKER ARM SHAFTS SPECIFICATIONS**ROCKER ARMS & ROCKER ARM SHAFTS**

Application	In. (mm)
3.0L	
Rocker Arm-To-Shaft Clearance	
Primary & Secondary Rocker Arms	
Intake & Exhaust	
Standard	0.0010-0.0020 (0.025-0.052)
Service Limit	0.0031 (0.080)
Mid Rocker Arms	
Intake & Exhaust	
Standard	0.0009-0.0021 (0.024-0.053)
Service Limit	0.0031 (0.080)

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1991-2004 ENGINE 3.0L V6 - NSX & NSX-T

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

Application	Specification
3.0L	
Intake Valves	
Face Angle	45°
Head Diameter	1.374-1.382" (34.90-35.10 mm)
Margin	
Standard	0.041-0.053" (1.05-1.35 mm)
Service Limit	0.033" (0.85 mm)
Stem Diameter	
Standard	0.2156-0.2159" (5.475-5.485 mm)
Service Limit	0.2144" (5.445 mm)
Valve Length	
1991-96	4.372-4.386" (111.05-111.40 mm)
1997-2001	4.374-4.386" (111.10-111.40 mm)
Valve Stem Installed Height	
Standard	1.6358-1.6673" (41.55-42.35 mm)
Service Limit	1.6707" (42.435 mm)
Exhaust Valves	
Face Angle	45°
Head Diameter	1.177-1.185" (29.90-30.10 mm)
Margin	
Standard	0.065-0.077" (1.65-1.95 mm)
Service Limit	0.057" (1.45 mm)
Stem Diameter	
Standard	0.2146-0.2150" (5.45-5.46 mm)
Service Limit	0.2134" (5.42 mm)
Valve Length	4.315-4.327" (109.60-109.90 mm)
Valve Stem Installed Height	
Standard	1.6358-1.6673" (41.55-42.35 mm)
Service Limit	1.6707" (42.435 mm)
Valve Springs	
Free Length	

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Intake	
1991-96	
Man. Trans.	
Outer ⁽¹⁾	1.7020" (43.23 mm)
Outer ⁽²⁾	1.7024" (43.24 mm)
Service Limit	1.6693" (42.40 mm)
Inner ⁽¹⁾	1.5665" (39.79 mm)
Inner ⁽²⁾	1.5677" (39.82 mm)
Service Limit	1.5362" (39.02 mm)
Auto. Trans.	
NH ⁽¹⁾	1.7555" (44.59 mm)
CH ⁽²⁾	1.7559" (44.60 mm)
Service Limit	1.7217" (43.73 mm)
1997-2001	
Auto. Trans.	
NH ⁽¹⁾	1.7555" (44.59 mm)
CH ⁽²⁾	1.7559" (44.60 mm)
Exhaust	
1991-96	
Man. Trans.	
NH ⁽¹⁾	1.8110" (46.00 mm)
CH ⁽²⁾	1.8102" (45.98 mm)
Service Limit	1.7764" (45.12 mm)
Auto. Trans.	
NH ⁽¹⁾	1.8661" (47.40 mm)
CH ⁽²⁾	1.8673" (47.43 mm)
Service Limit	1.8382" (46.69 mm)
1997-2001	
Auto. Trans.	
NH ⁽¹⁾	1.8661" (47.40 mm)
CH ⁽²⁾	1.8673" (47.43 mm)
(1) Manufactured by Nihon Hatsujo.	
(2) Manufactured by Chuo Hatsujo.	

CYLINDER HEAD SPECIFICATIONS**CYLINDER HEAD**

Application	Specification
-------------	---------------

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1991-2004 ENGINE 3.0L V6 - NSX & NSX-T

3.0L

Cylinder Head Height	
Standard	5.9429-5.9468" (150.95-151.05 mm)
Service Limit	5.9370" (150.80 mm)
Maximum Warpage ⁽¹⁾	0.002" (0.05 mm)
Valve Seats	
Intake	
Seat Angle	45°
Seat Width	
Standard	0.031-0.039" (0.80-1.00 mm)
Service Limit	0.059" (1.50 mm)
Exhaust	
Seat Angle	45°
Seat Width	
Standard	0.049-0.061" (1.25-1.55 mm)
Service Limit	0.079" (2.00 mm)
Valve Guides	
Intake & Exhaust	
Valve Guide I.D.	
Standard	0.2169-0.2177" (5.51-5.53 mm)
Service Limit	0.2177" (5.53 mm)
Valve Guide Installed Height	
1991-96	
Standard	0.5413-0.5610" (13.75-14.25 mm)
Service Limit	0.5709" (14.50 mm)
1997-2001	
Standard	0.5413-0.5610" (13.75-14.25 mm)
Valve Stem-To-Guide Oil Clearance	
Intake	
Standard	0.0010-0.0021" (0.025-0.055 mm)
Service Limit	0.0031" (0.08 mm)
Exhaust	
Standard	0.0020-0.0031" (0.05-

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	0.08 mm)
Service Limit	0.0043" (0.11 mm)
(1) Maximum resurface limit is 0.008" (0.20 mm) based on cylinder head height of 5.9449" (151 mm).	

CAMSHAFT SPECIFICATIONS**CAMSHAFT**

Application	In. (mm)
3.0L	
Bore Diameter	N/A
End Play	
Standard	0.0020-0.0059 (0.05-0.15)
Service Limit	0.02 (0.5)
Journal Runout	
1991-92	
Standard	0.0006 (0.015)
Service Limit	0.0012 (0.030)
1993-96	
Standard	0.0012 (0.030)
Service Limit	0.0024 (0.060)
1997-2001	
Standard	0.0012 (0.030) MAX.
Service Limit	0.0016 (0.040)
Lobe Height	
Intake	
1991-96	
Man. Trans.	
Primary	1.4601 (37.086)
Mid	1.4975 (38.037)
Secondary	1.4695 (37.326)
Auto. Trans.	
Primary	1.4672 (37.266)
Mid	1.4825 (37.655)
Secondary	1.4765 (37.504)
1997-2001	
Auto. Trans.	
Primary	1.4672 (37.266)
Mid	1.4825 (37.655)
Secondary	1.4765 (37.504)
Exhaust	
1991-96	

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1991-2004 ENGINE 3.0L V6 - NSX & NSX-T

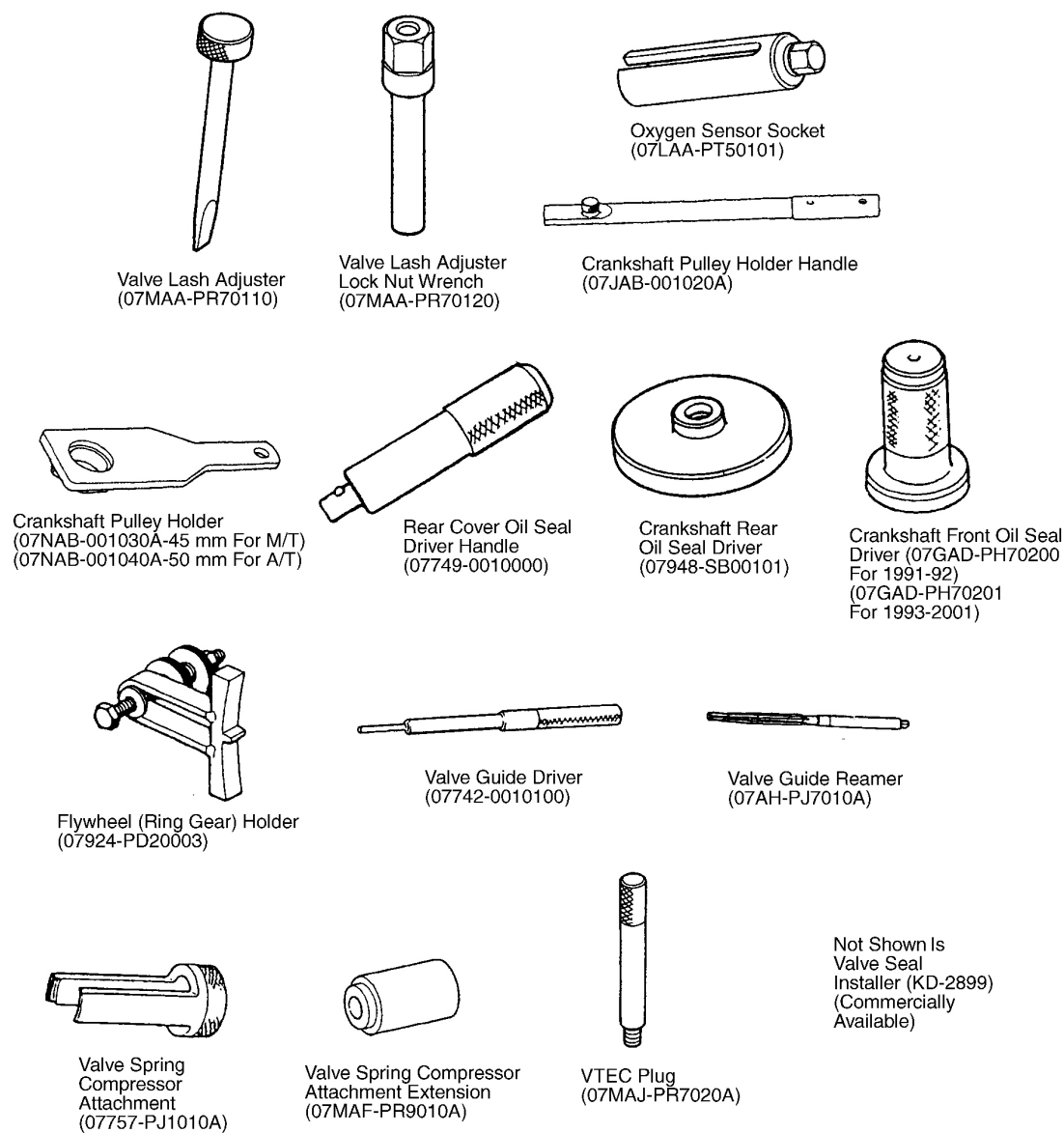
Man. Trans. & Auto. Trans.	
Primary	1.4393 (36.559)
Mid	1.4724 (37.398)
Secondary	1.4465 (36.741)
1997-2001	
Auto. Trans.	
Primary	1.4393 (36.559)
Mid	1.4724 (37.398)
Secondary	1.4465 (36.741)
Oil Clearance	
Standard	0.002-0.004 (0.050-0.089)
Service Limit	0.006 (0.15)

SPECIAL TOOLS

NOTE: For illustration of special tools, see Fig. 85.

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Fig. 85: Special Tools

Courtesy of AMERICAN HONDA MOTOR CO., INC.