

2001-05 ENGINE

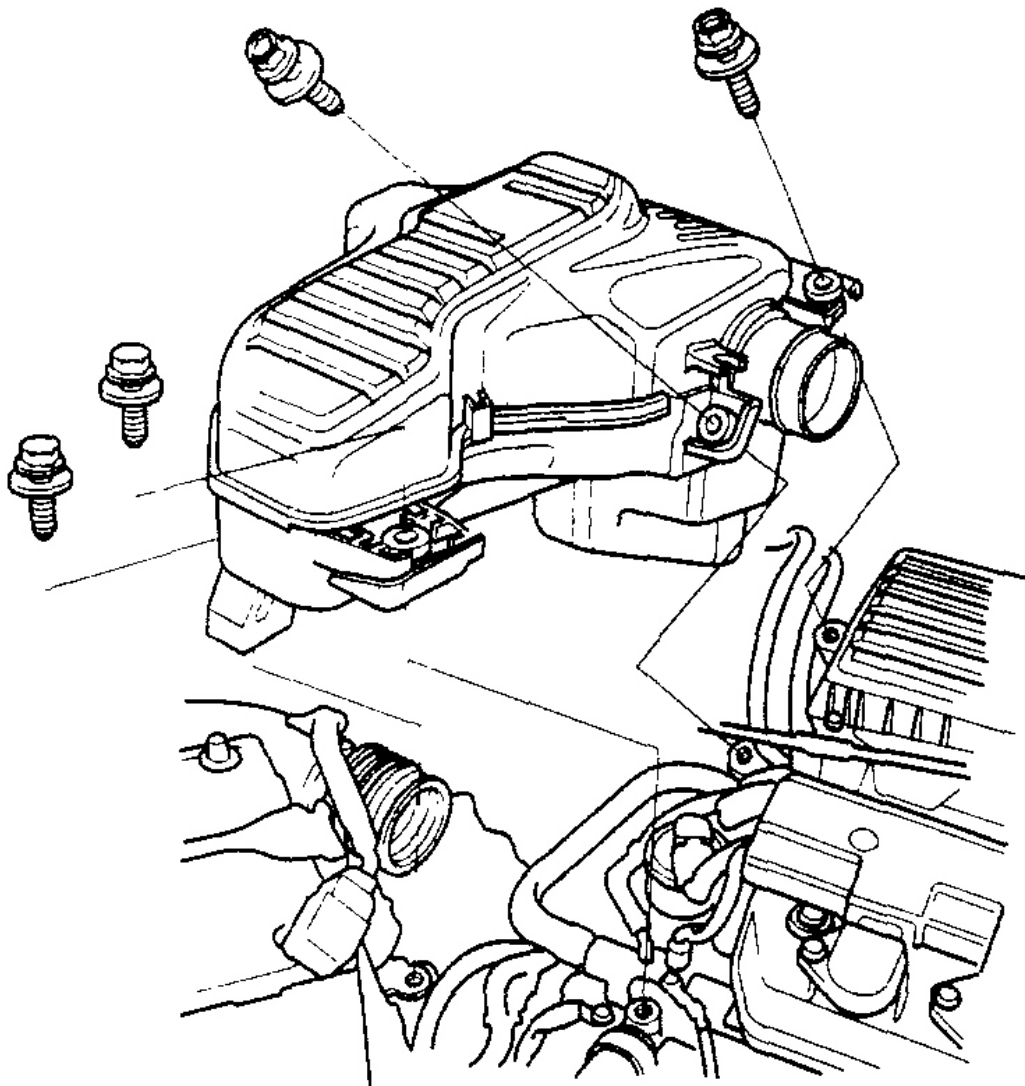
Overhaul - 1.7L

ENGINE REMOVAL

NOTE:

- **Use fender covers to avoid damaging painted surfaces.**
- **To avoid damage, unplug the wiring connectors carefully while holding the connector portion.**
- **Mark all wiring and hoses to avoid misconnection. Also, be sure that they do not contact other wiring or hoses, or interfere with other parts.**

1. Secure the hood in the wide open position (support rod in the lower hole).
2. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.
3. Disconnect the negative cable from the battery first, then disconnect the positive cable.
4. Remove the intake resonator.

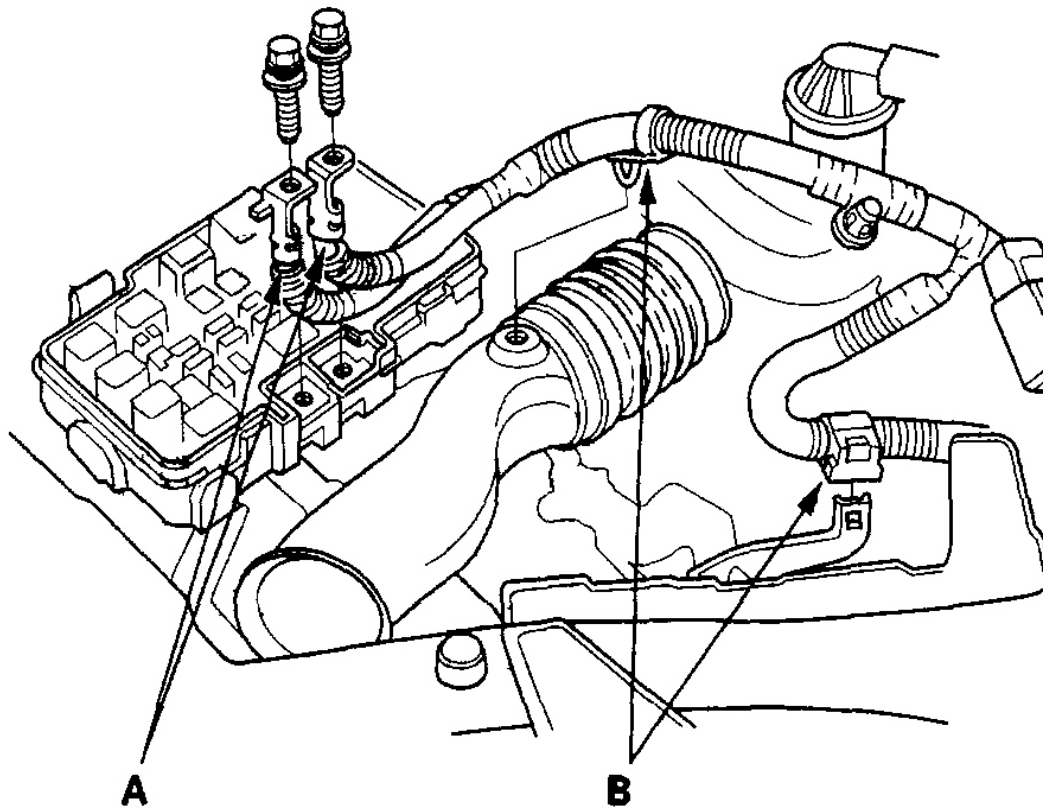


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Fig. 1: Removing Intake Resonator

Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Remove the battery and battery base.
6. Remove the battery cables (A) from the fuse box, and remove the harness clamps (B).

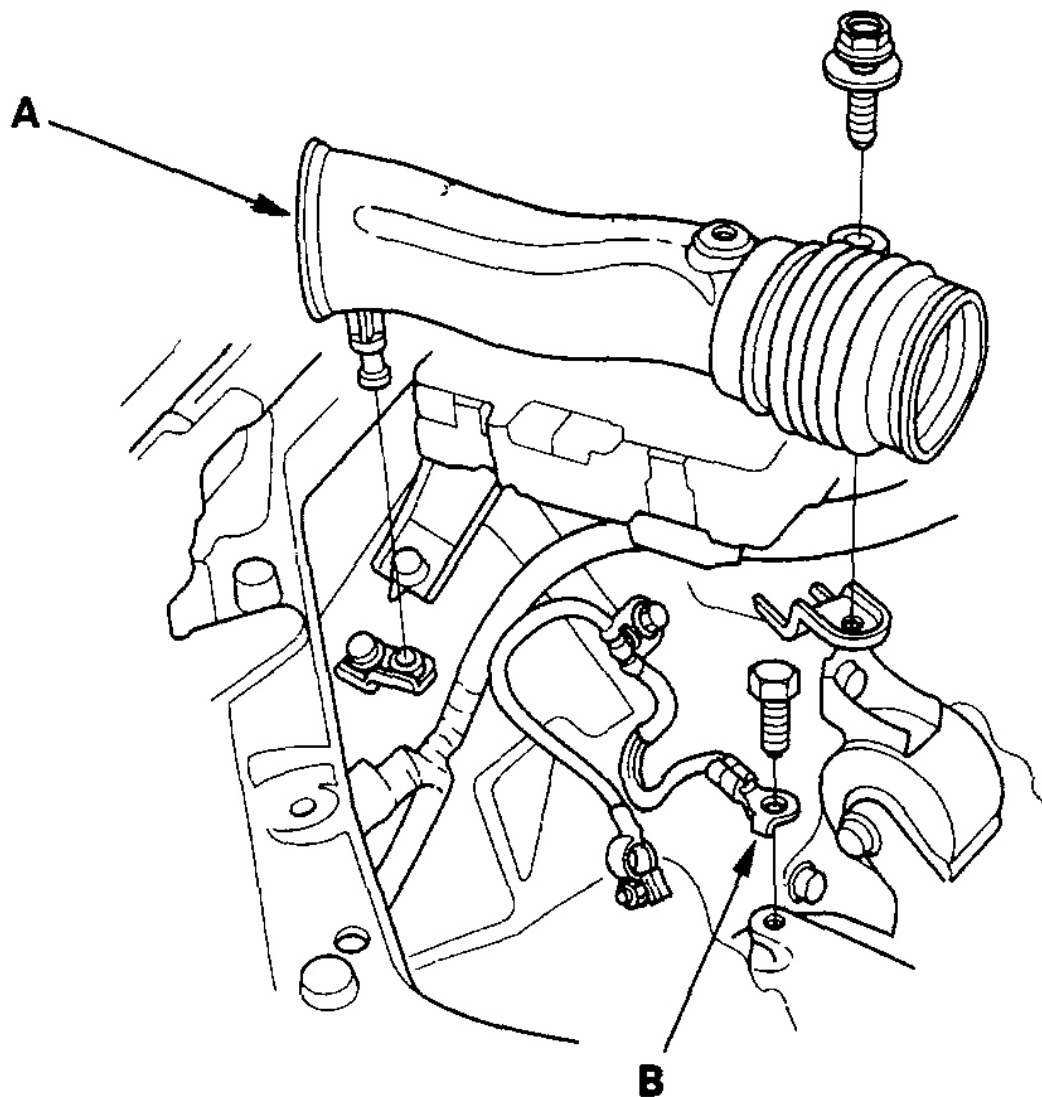


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Fig. 2: Removing Battery Cables

Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Remove the intake air duct (A) and ground cable (B).

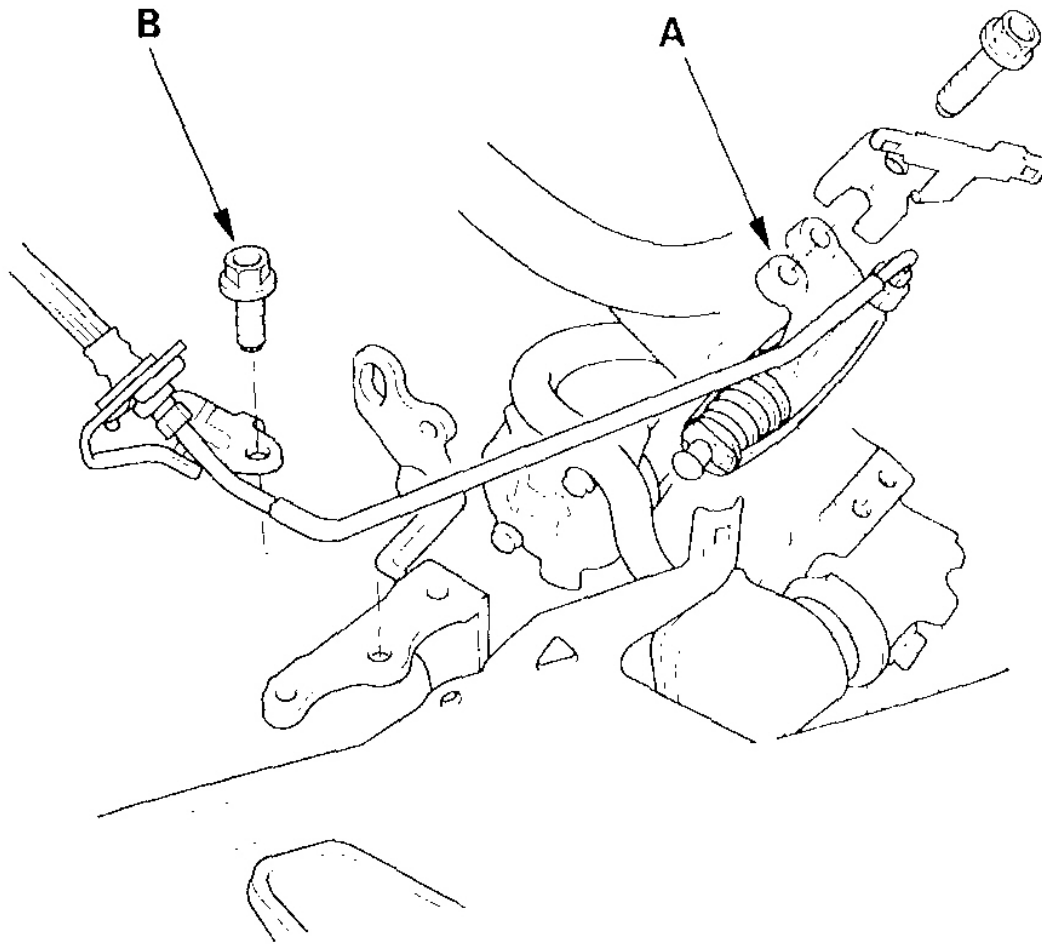


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Fig. 3: Removing Intake Air Duct

Courtesy of AMERICAN HONDA MOTOR CO., INC.

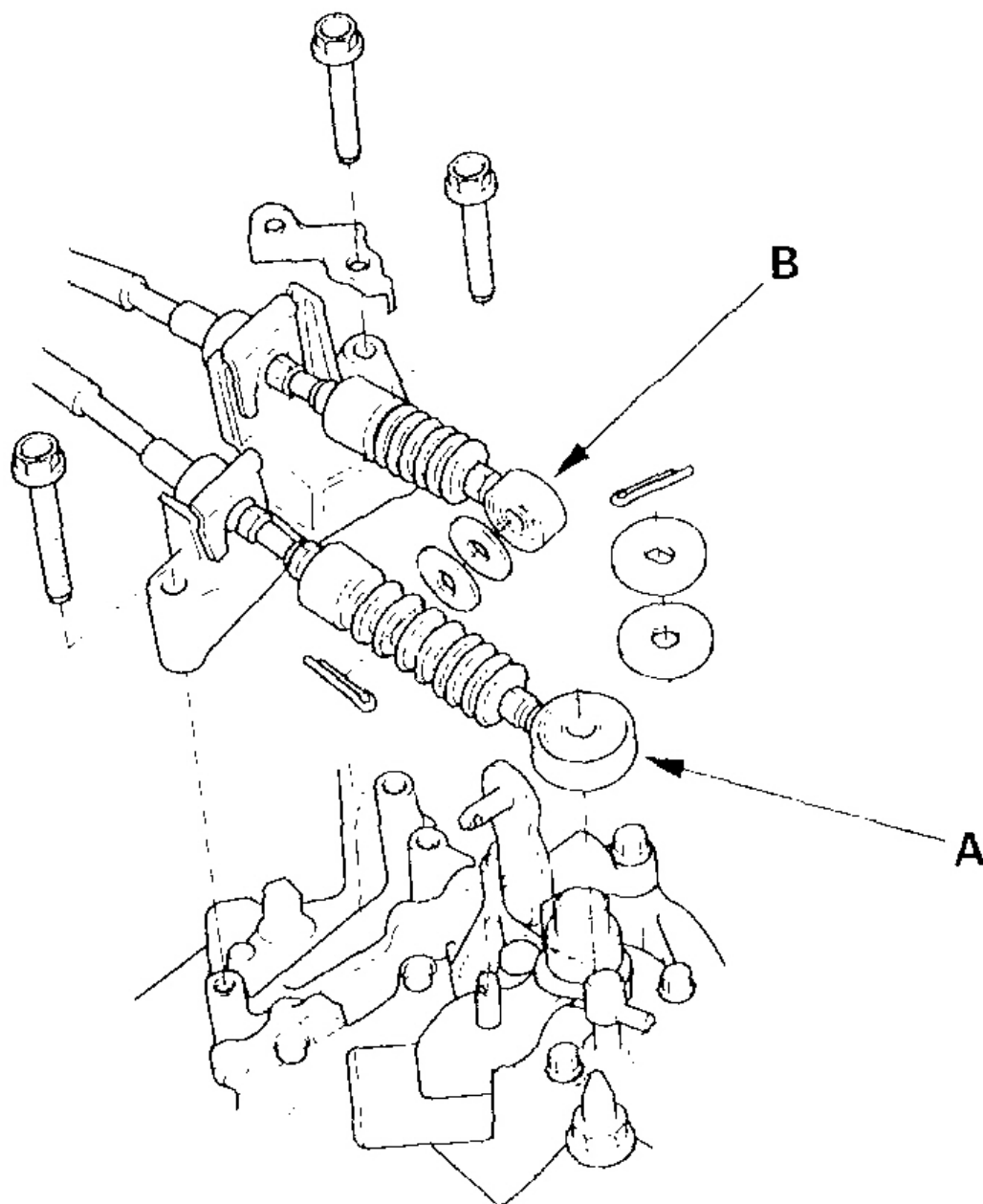
8. M/T: Remove the clutch slave cylinder (A) and clutch line bracket mounting bolt (B).



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Fig. 4: Removing Clutch Slave Cylinder (M/T)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. M/T: Remove the shift cable (A) and select cable (B).

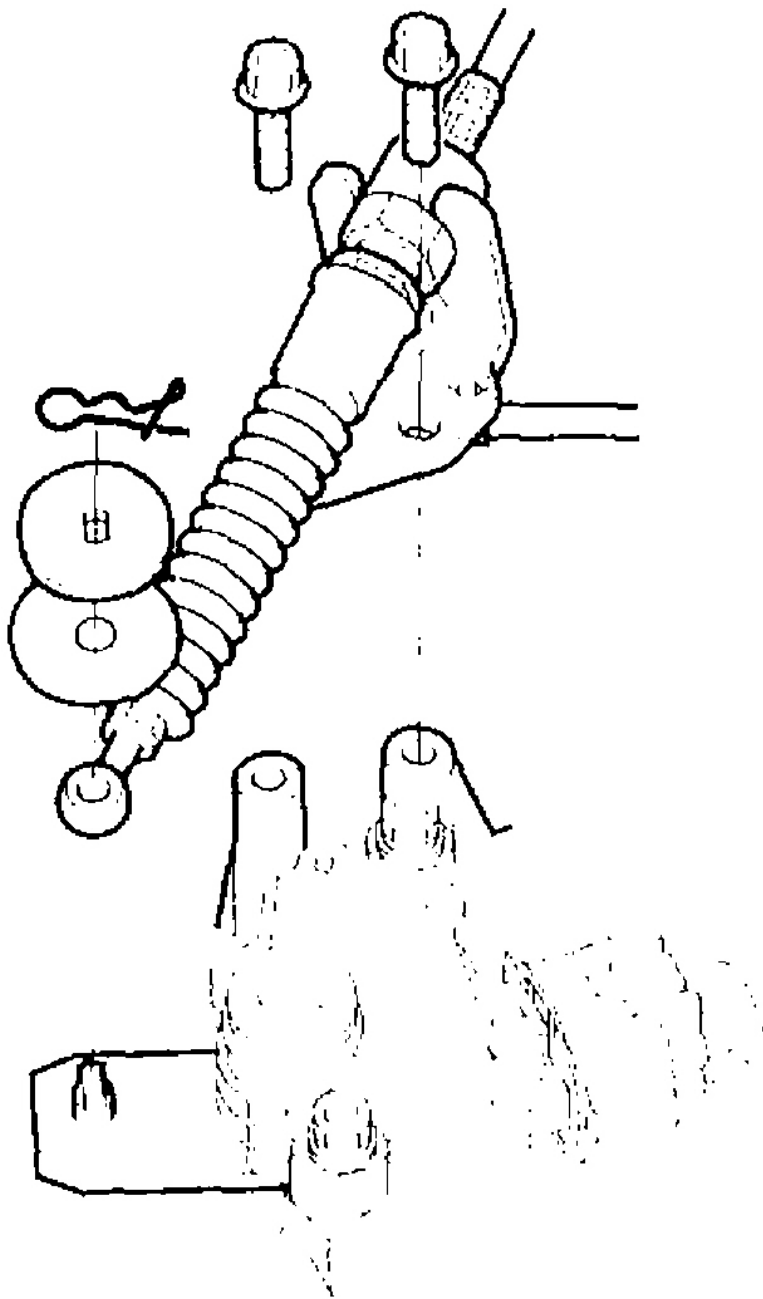


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Fig. 5: Removing Shift Cable (M/T)

Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. CVT: Remove the shift cable.

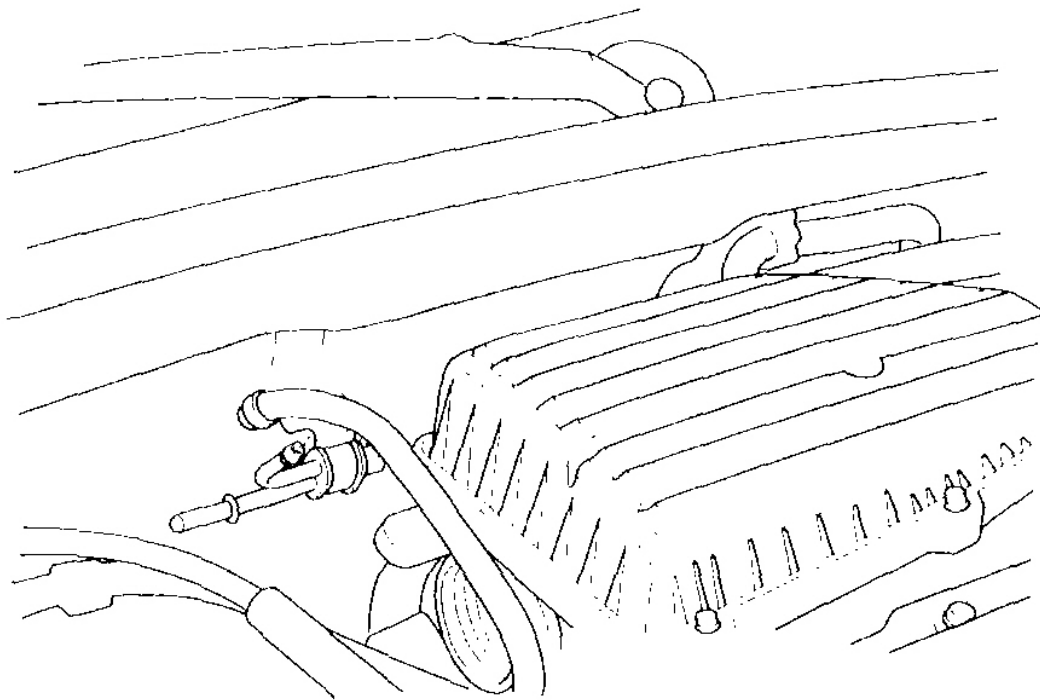


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Fig. 6: Removing Shift Cable (CVT)

Courtesy of AMERICAN HONDA MOTOR CO., INC.

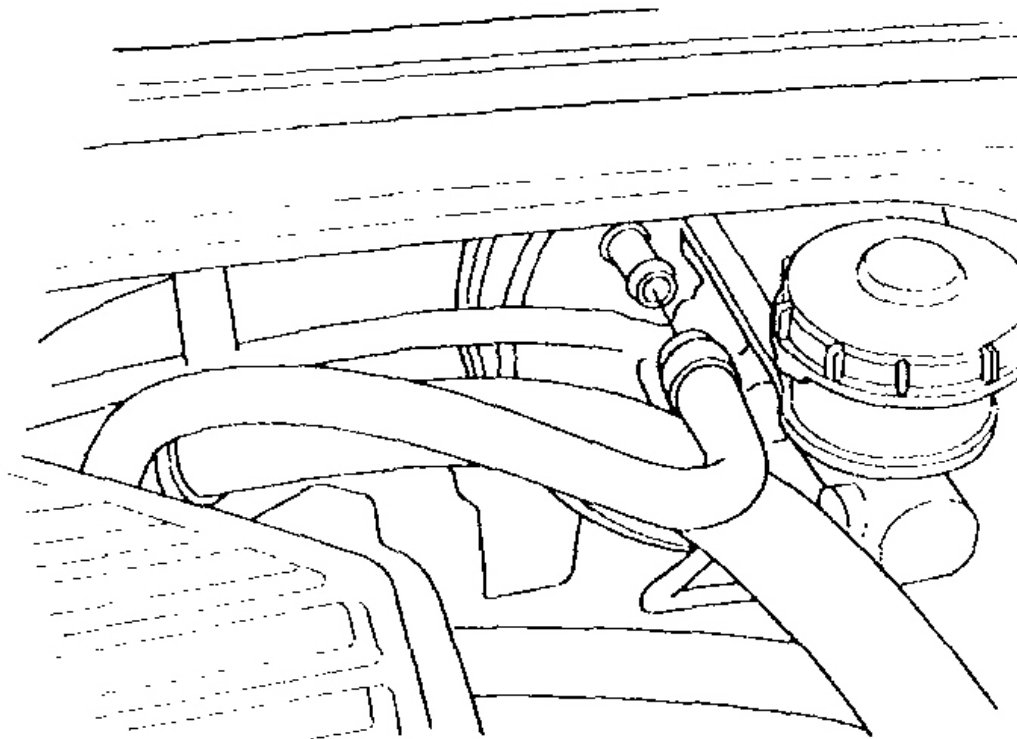
11. Relieve fuel pressure (see **FUEL PRESSURE RELIEVING**).
12. Remove the evaporative emission (EVAP) canister hose.



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Fig. 7: Removing EVAP Canister Hose
Courtesy of AMERICAN HONDA MOTOR CO., INC.

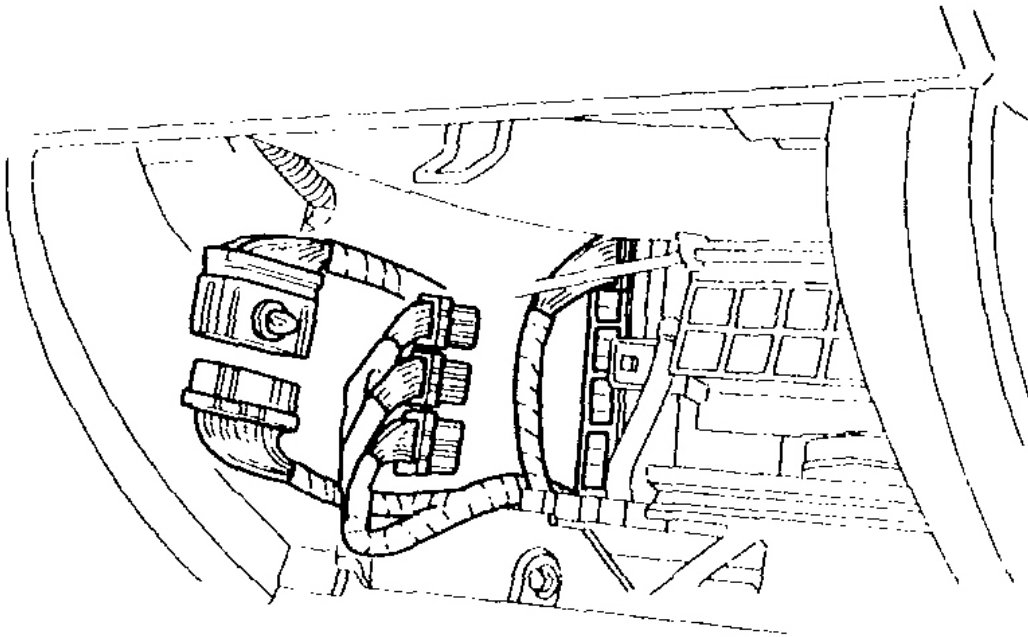
13. Remove the brake booster vacuum hose.



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Fig. 8: Removing Brake Booster Vacuum Hose
Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. Remove the glove box stops, then open the glove box.
15. Disconnect the engine control module (ECM)/powertrain control module (PCM) connectors.

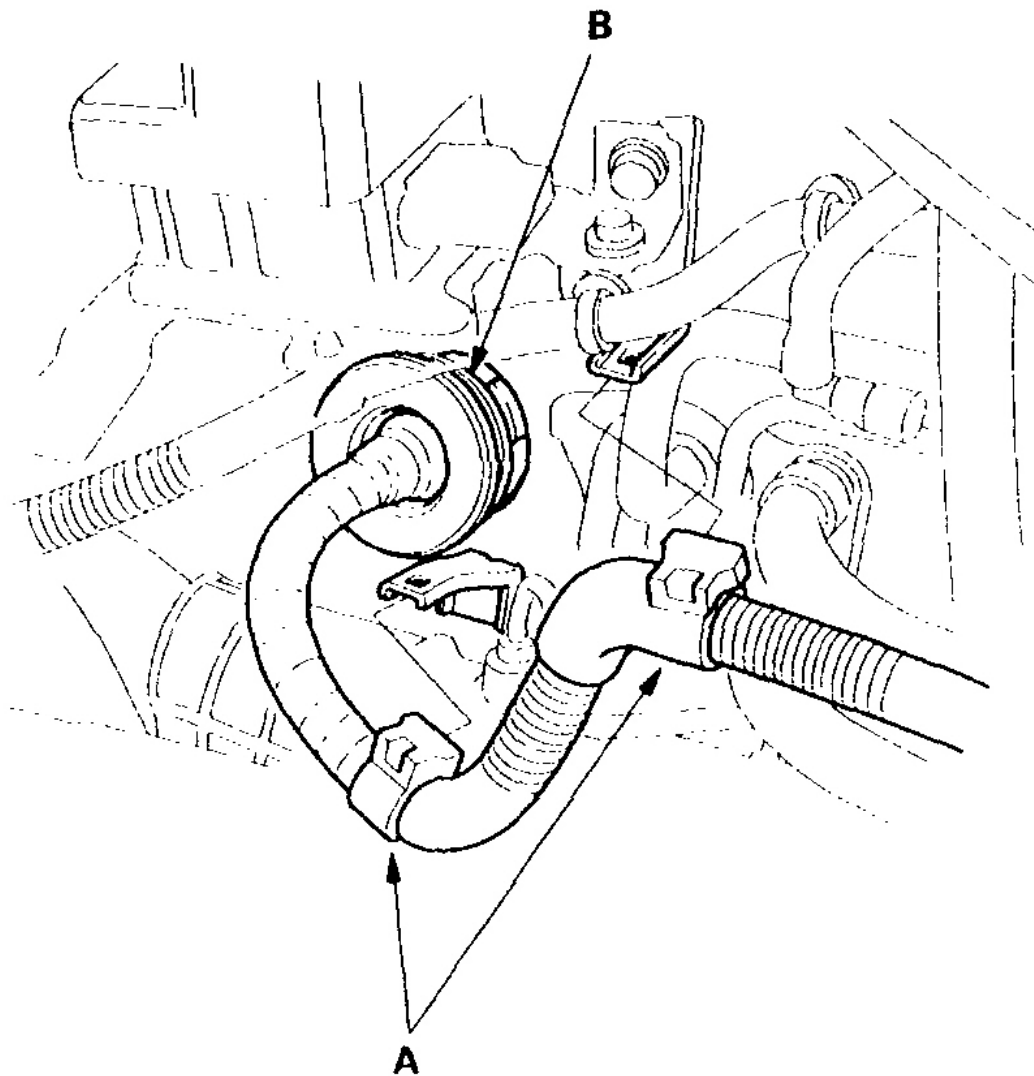


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Fig. 9: Disconnecting ECM/PCM Connectors

Courtesy of AMERICAN HONDA MOTOR CO., INC.

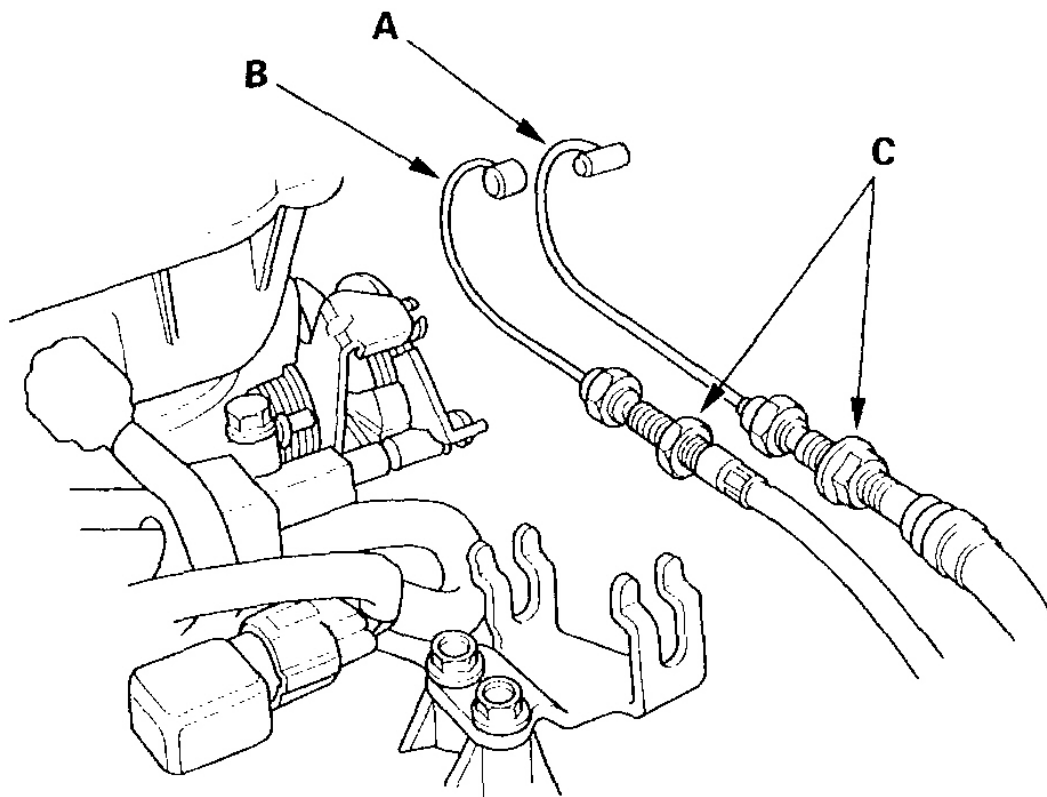
16. Remove the harness clamps (A) and grommet (B), then pull the engine wire harness through the bulkhead.



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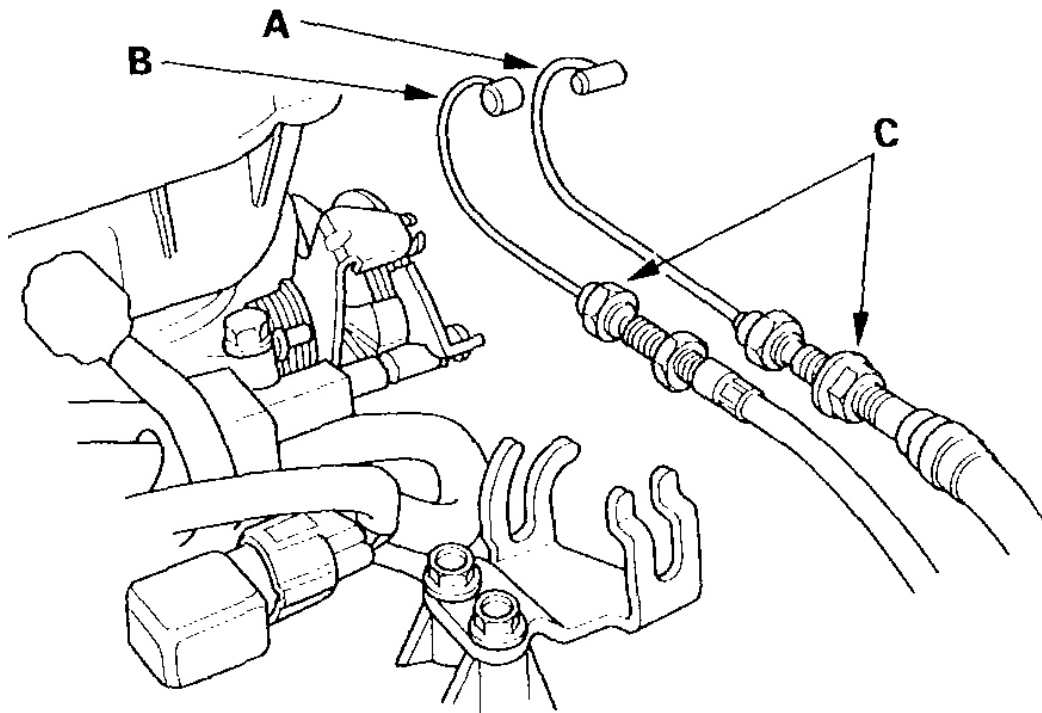
Fig. 10: Removing Harness Clamps**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

17. Remove the throttle cable (A) and cruise control actuator cable (B) by loosening the locknuts (C), then slipping the cable ends out of the accelerator linkage. Take care not to bend the cables when removing them. Always replace any kinked cable with a new one.



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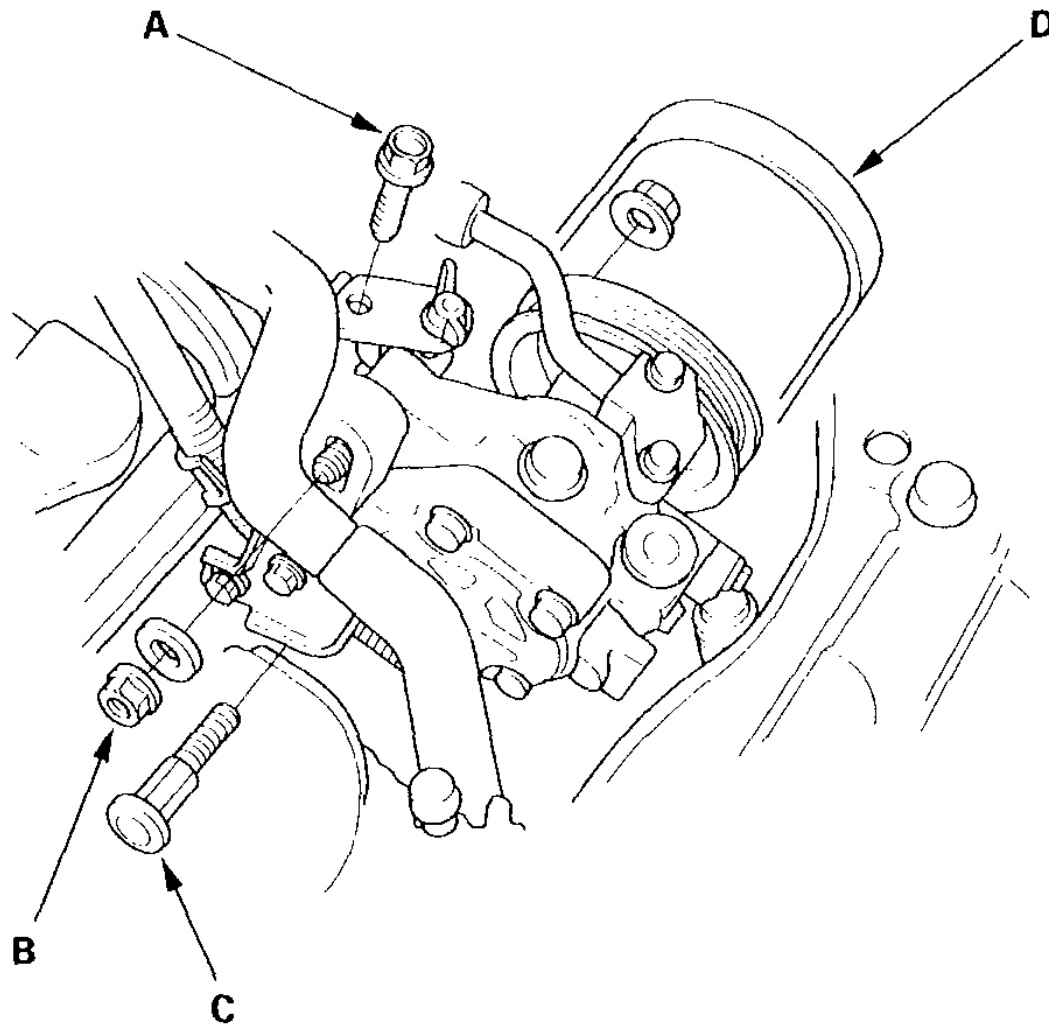
Fig. 11: Removing Throttle Cable (Except 2-Door D17A1, D17A2 Engines)
Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 12: Removing Throttle Cable (2-Door D17A1, D17A2 Engines)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

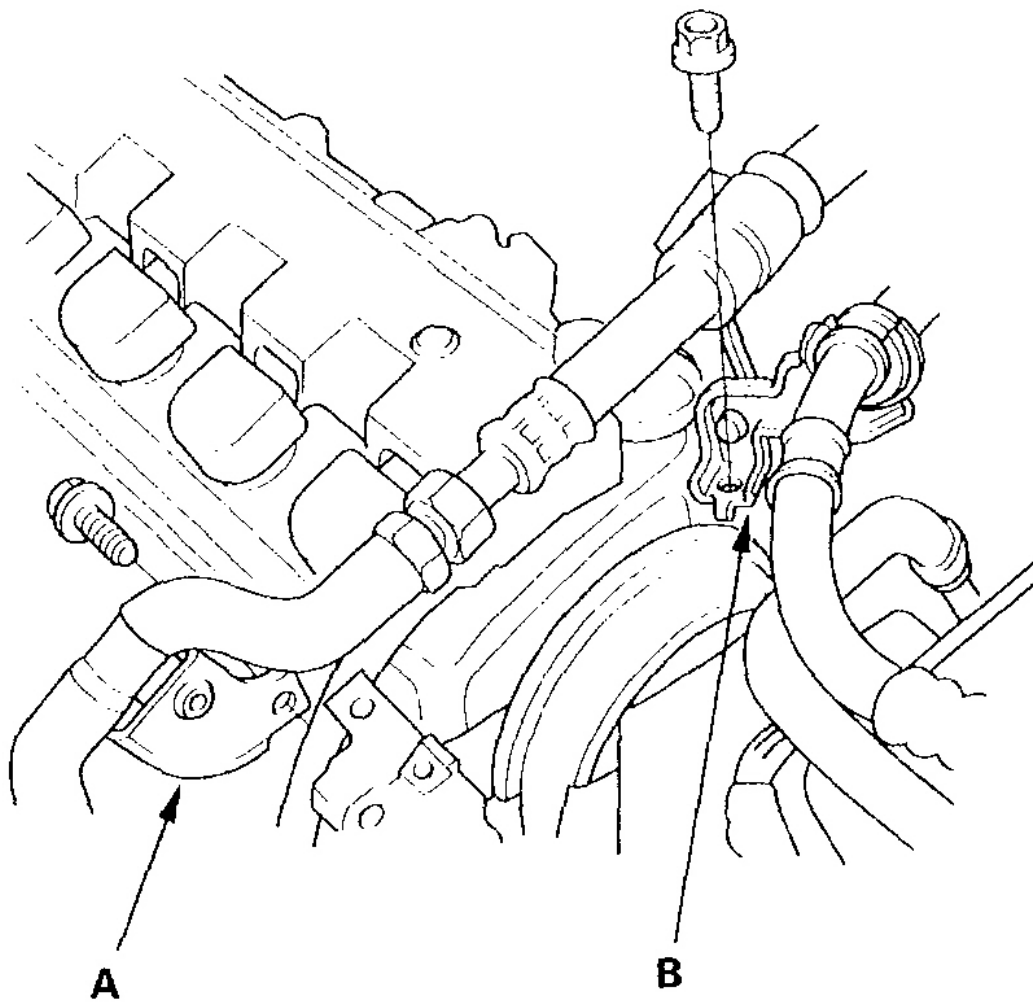
18. Remove the adjusting plate mounting bolt (A), lockout (B) and mounting bolt (C), then remove the power steering (P/S) pump belt (D) and pump without disconnecting the P/S hoses.



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Fig. 13: Removing Adjusting Plate Mounting Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

19. Remove the alternator (see **ALTERNATOR**).
20. Remove the A/C hose bracket (A) and P/S hose bracket (B).

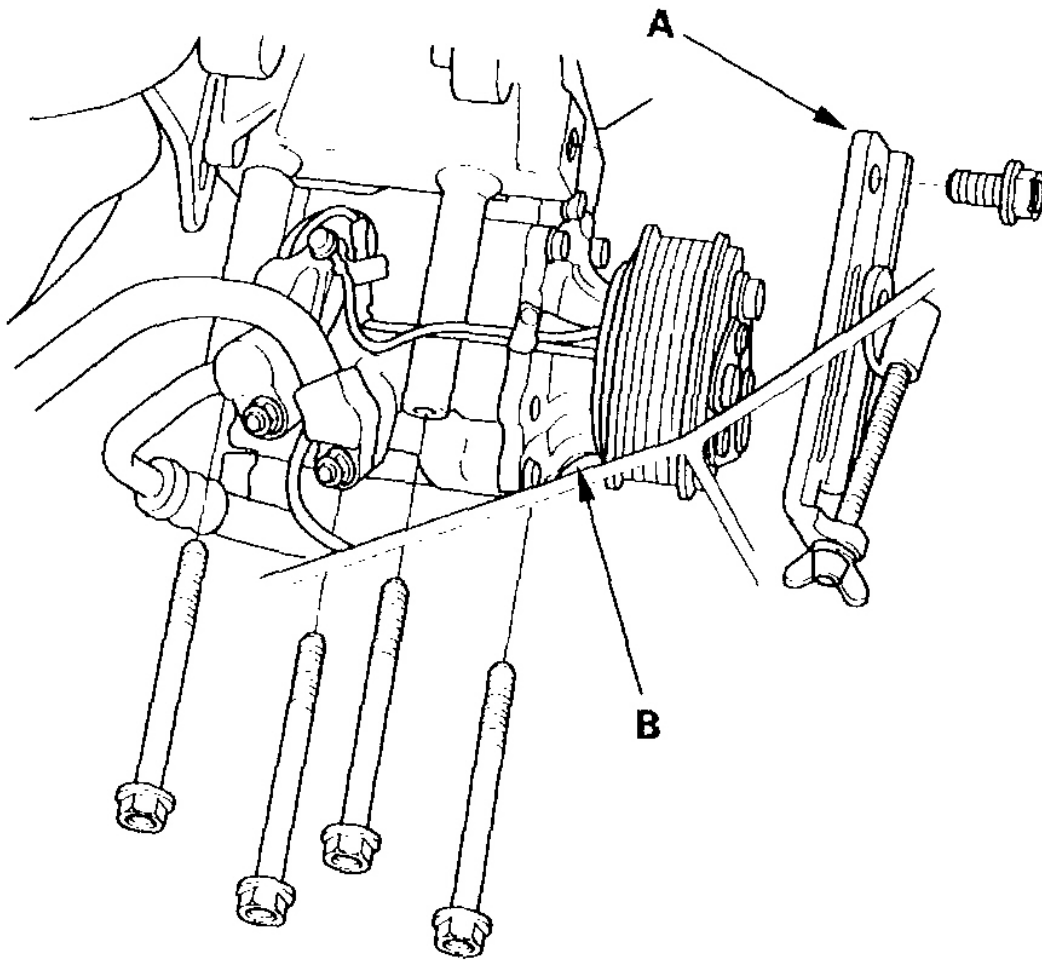


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Fig. 14: Removing A/C Hose Bracket

Courtesy of AMERICAN HONDA MOTOR CO., INC.

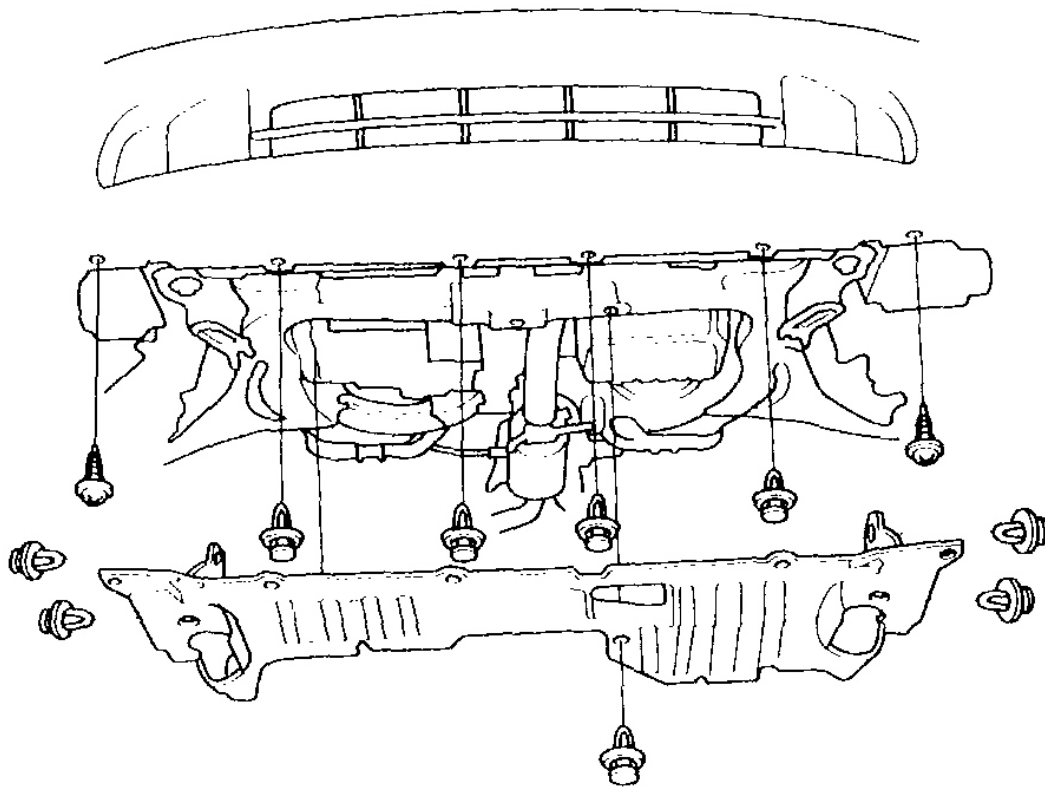
21. Remove the alternator lower bracket (A), then remove the A/C compressor (B) without disconnecting the A/C hoses.



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Fig. 15: Removing Alternator Lower Bracket
Courtesy of AMERICAN HONDA MOTOR CO., INC.

22. Remove the radiator cap.
23. Raise the vehicle on the hoist to full height.
24. Remove the front tires/wheels.
25. Remove the splash shield.

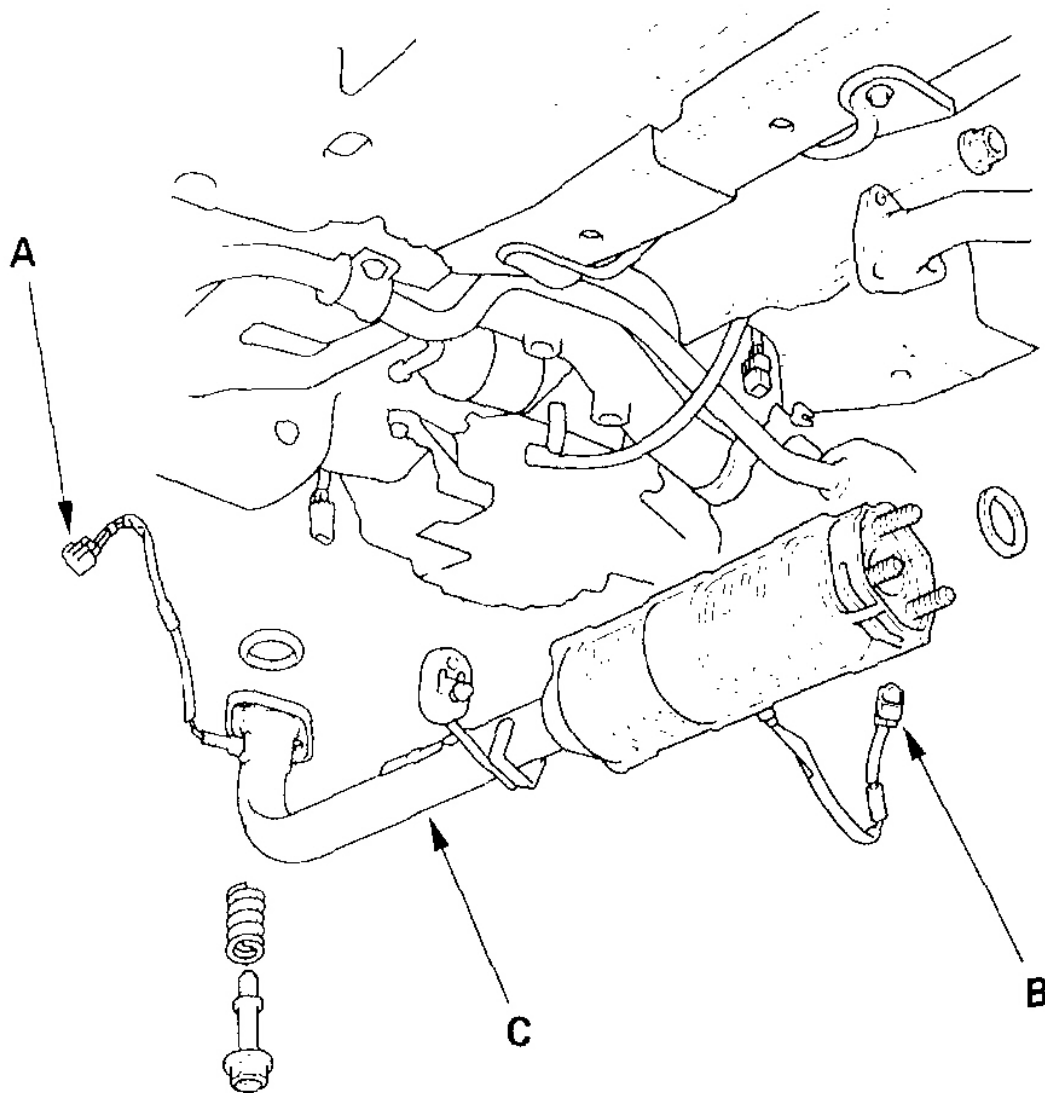


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Fig. 16: Removing Splash Shield

Courtesy of AMERICAN HONDA MOTOR CO., INC.

26. Loosen the drain plug in the radiator, drain the engine coolant (see **COOLANT REPLACEMENT**).
27. Drain the transmission fluid:
 - Manual transmission (see **TRANSMISSION FLUID INSPECTION AND REPLACEMENT**).
 - Automatic transmission (see appropriate SERVICING A/T).
 - CVT (see **ATF REPLACEMENT**).
28. Drain the engine oil. Reinstall the drain bolt using a new washer (see **ENGINE OIL REPLACEMENT**).
29. D17A2 engine: Disconnect the primary heated oxygen sensor (primary HO2S) connector (A) and secondary heated oxygen sensor (secondary HO2S) connector (B), then remove the exhaust pipe A/three way catalytic converter (TWC) (C).

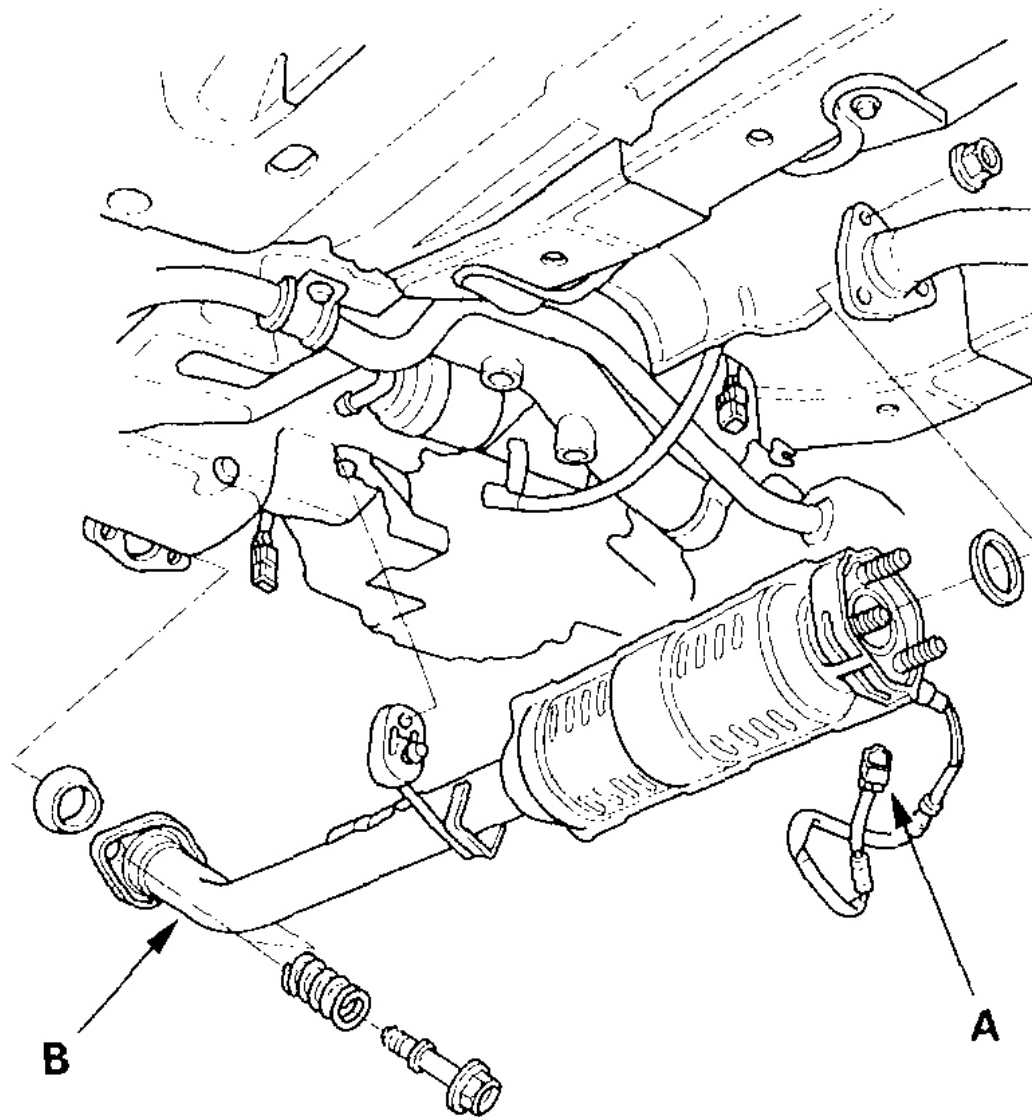


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Fig. 17: Disconnecting Primary HO2S Connector (D17A2 Engine)

Courtesy of AMERICAN HONDA MOTOR CO., INC.

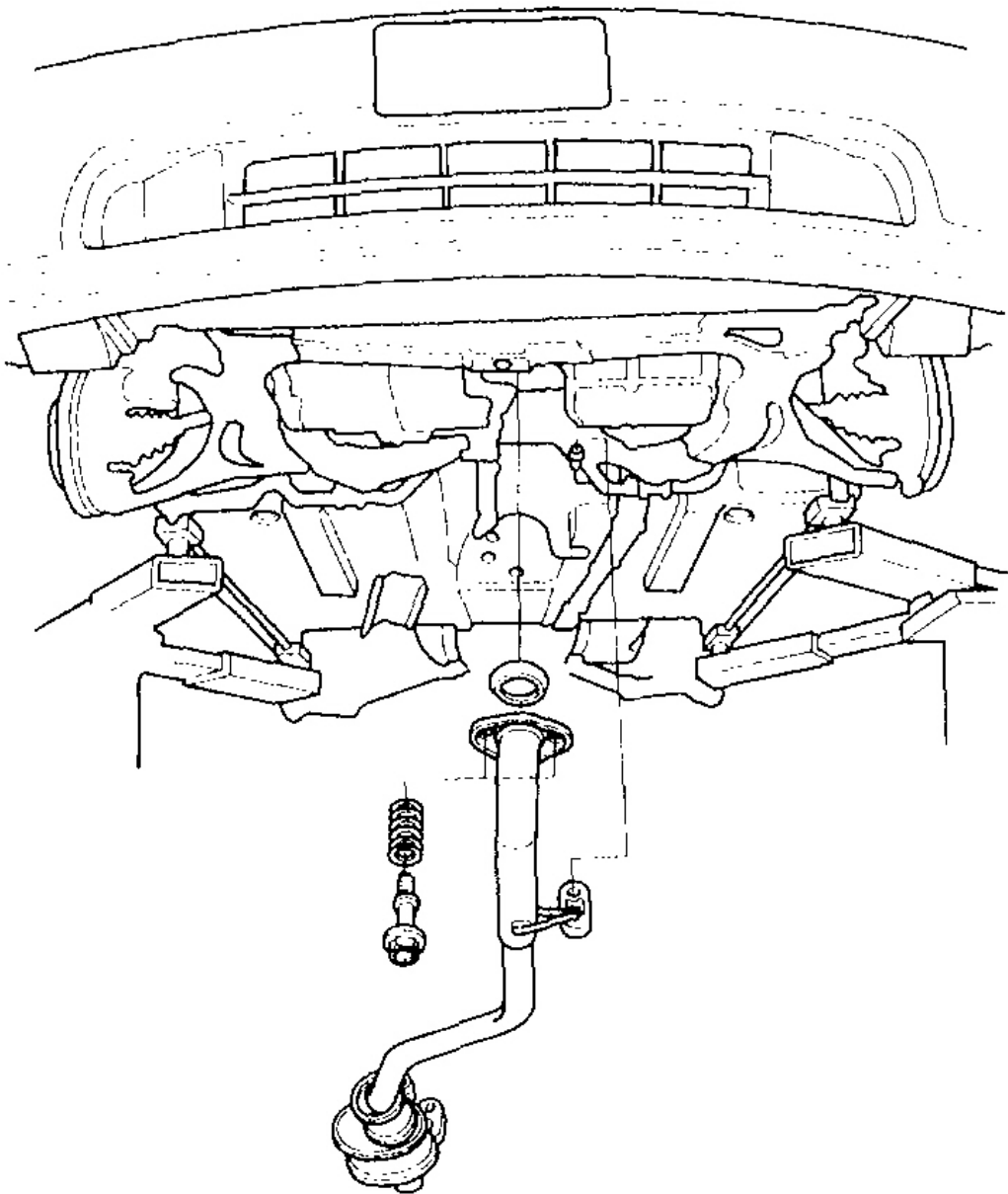
30. D17A6 engine: Disconnect the third heated oxygen sensor (third HO2S) connector (A), remove the exhaust pipe A/TWC assembly (B).



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Fig. 18: Disconnecting Third HO2S Connector (D17A6 Engine)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

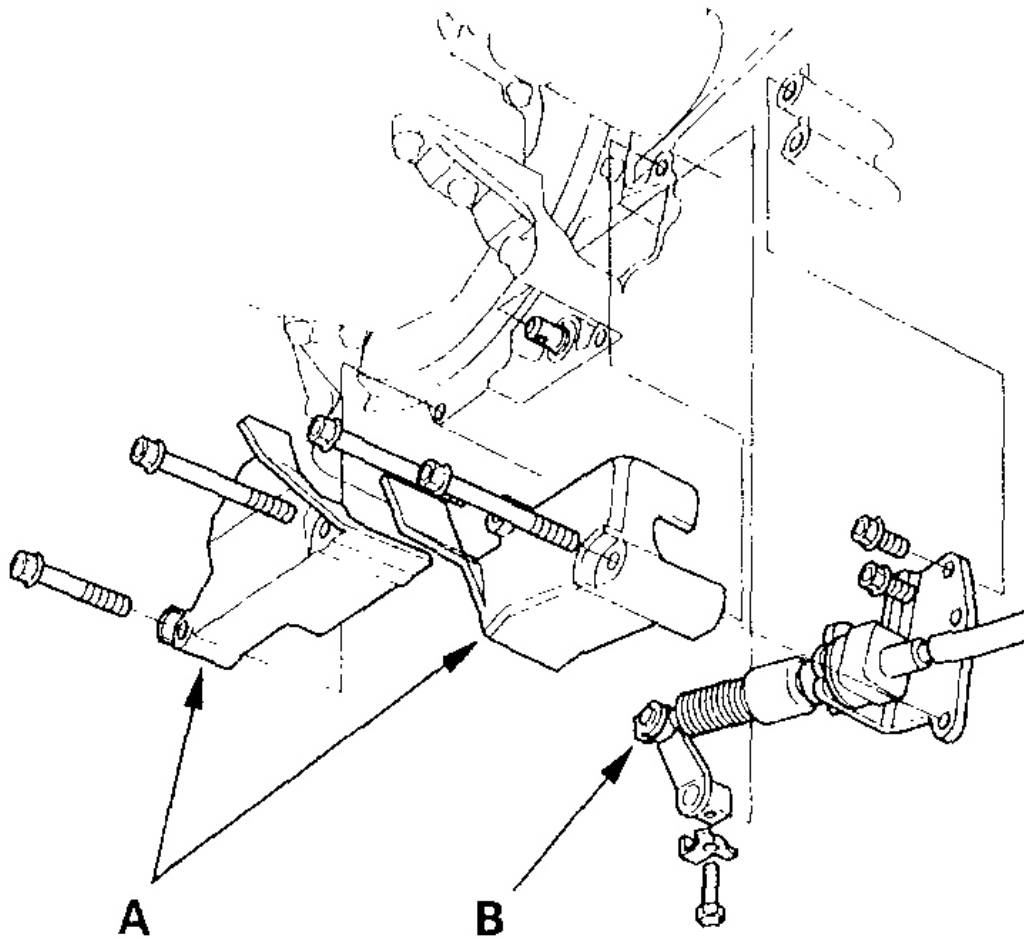
31. D17A1 engine: Remove the exhaust pipe/muffler assembly.



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Fig. 19: Removing Exhaust Pipe/Muffler Assembly (D17A1 Engine)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

32. A/T: Remove the shift cable covers (A), then remove the shift control cable (B).

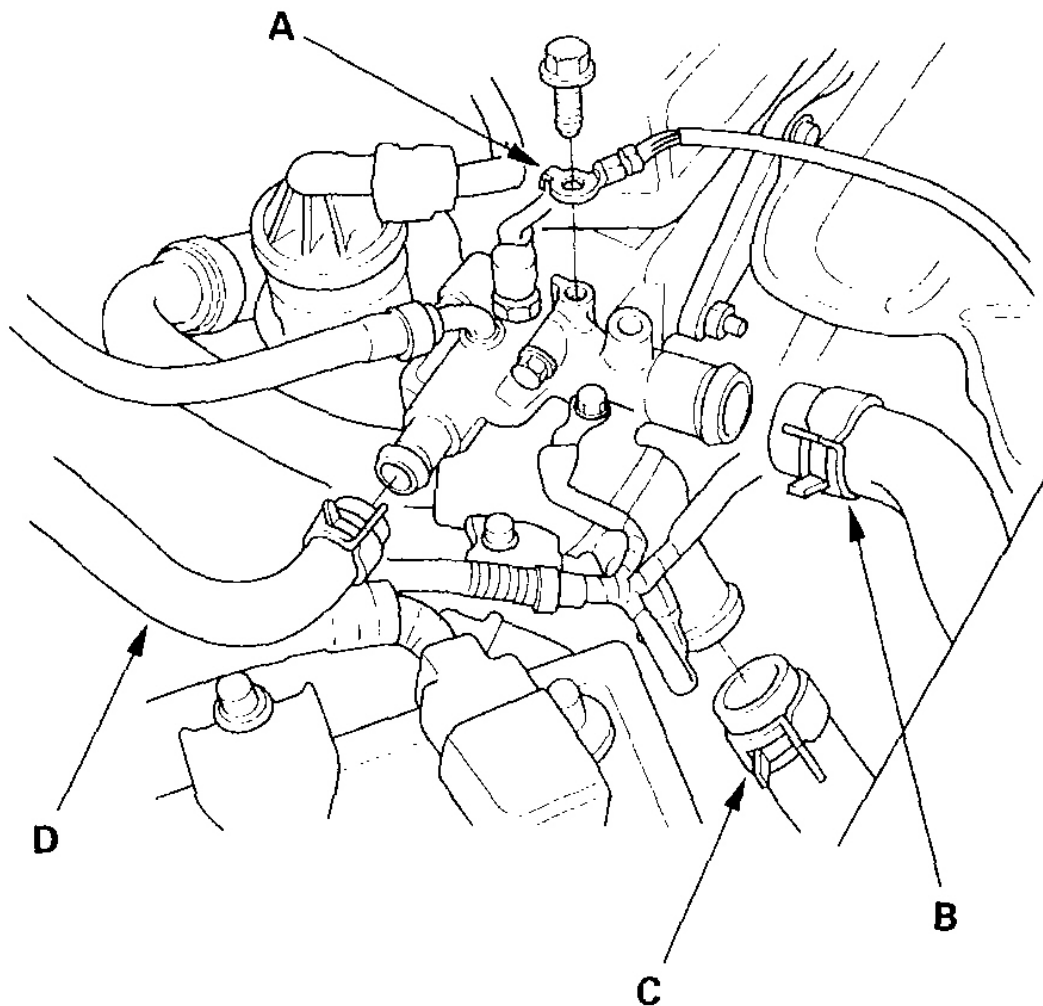


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Fig. 20: Removing Shift Cable Covers (A/T)

Courtesy of AMERICAN HONDA MOTOR CO., INC.

33. Disconnect the suspension lower arm ball joints and stabilizer links (see **LOWER ARM**).
34. Remove the driveshaft (see **REMOVAL & INSTALLATION**). Coat all precision finished surfaces with clean engine oil. Tie plastic bags over the driveshaft ends.
35. Lower the vehicle on the hoist.
36. Remove the ground cable (A), upper radiator hose (B), lower radiator hose (C) and heater hose (D).

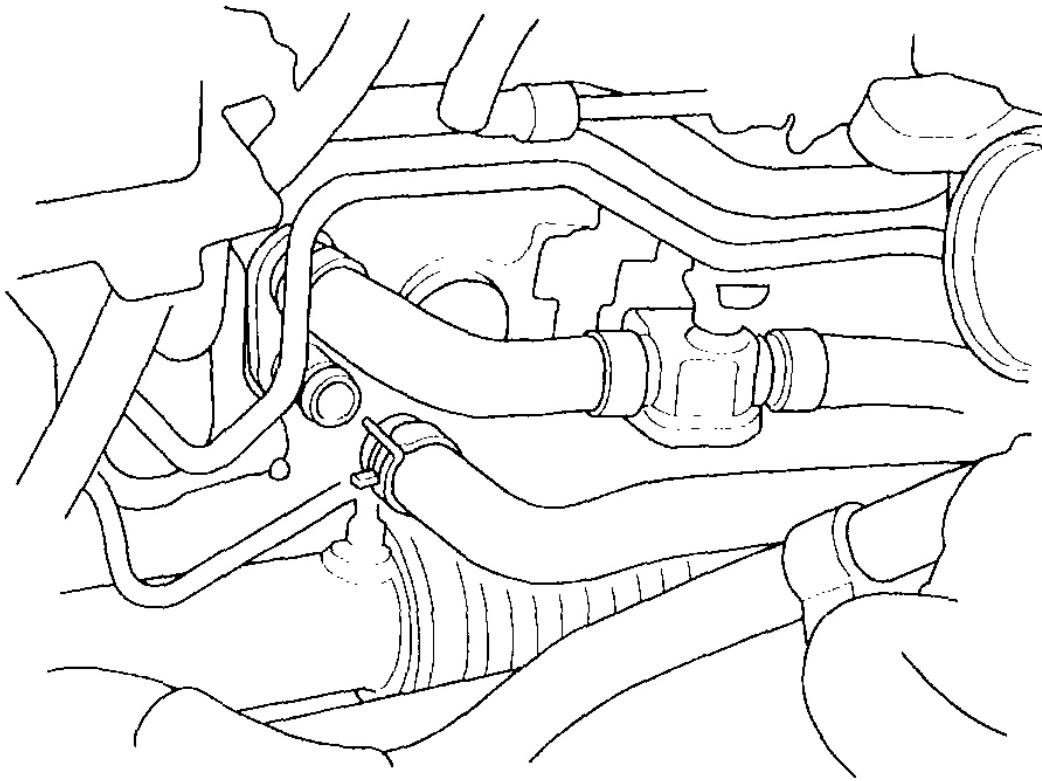


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Fig. 21: Removing Ground Cable

Courtesy of AMERICAN HONDA MOTOR CO., INC.

37. Remove the heater hose.

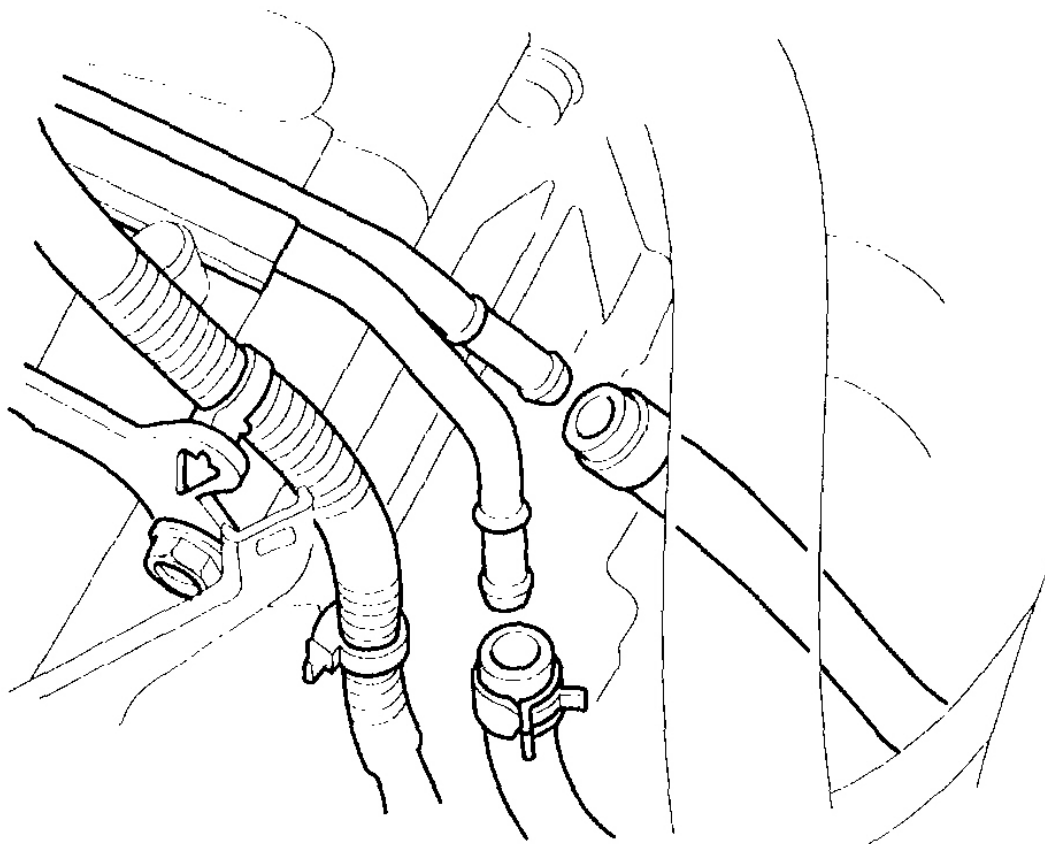


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Fig. 22: Removing Heater Hose

Courtesy of AMERICAN HONDA MOTOR CO., INC.

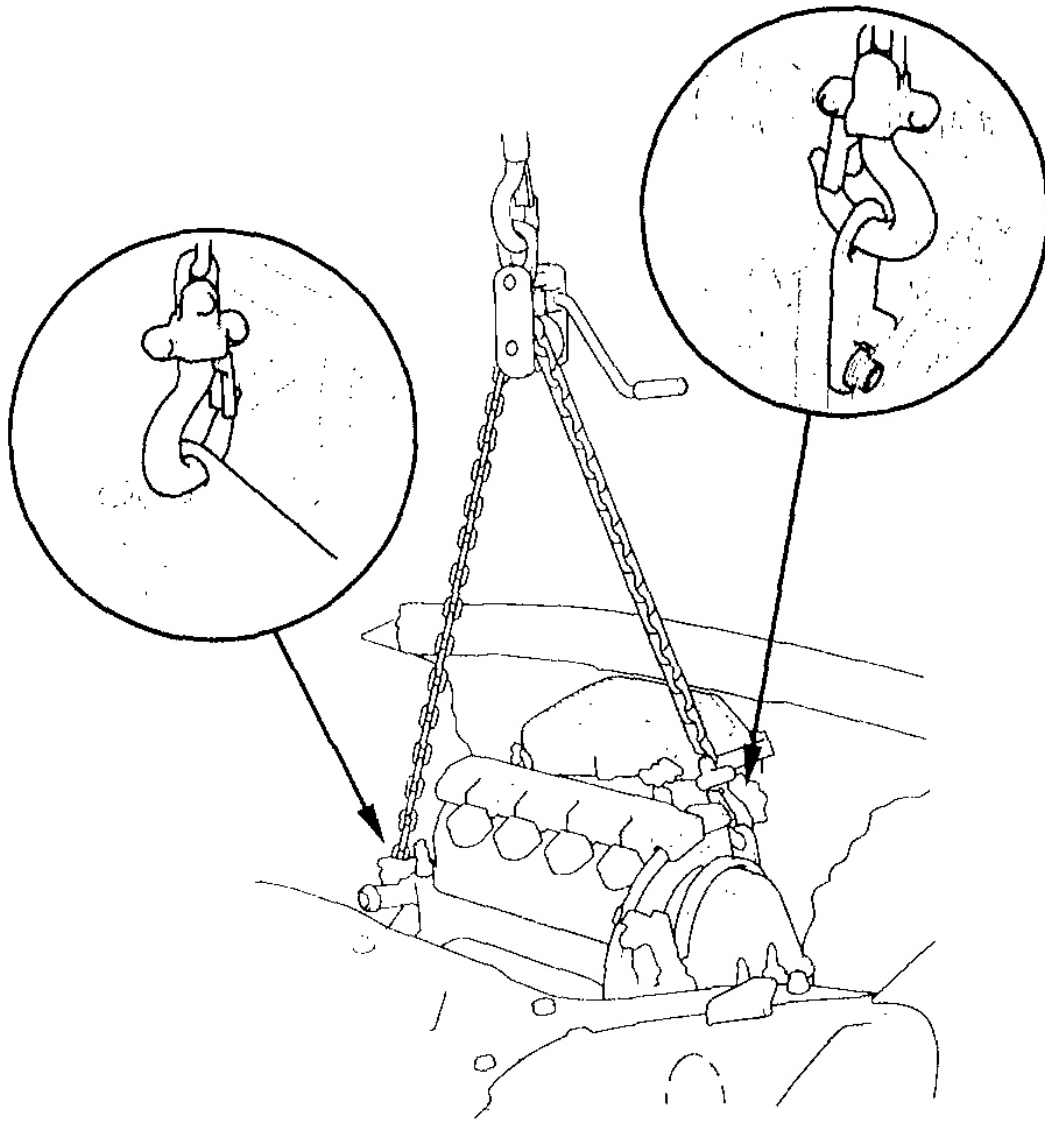
38. A/T, CVT: Remove the automatic transmission fluid (ATF) cooler hoses, then plug the ATF cooler hoses and lines.



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Fig. 23: Removing ATF Cooler Hoses (A/T, CVT)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

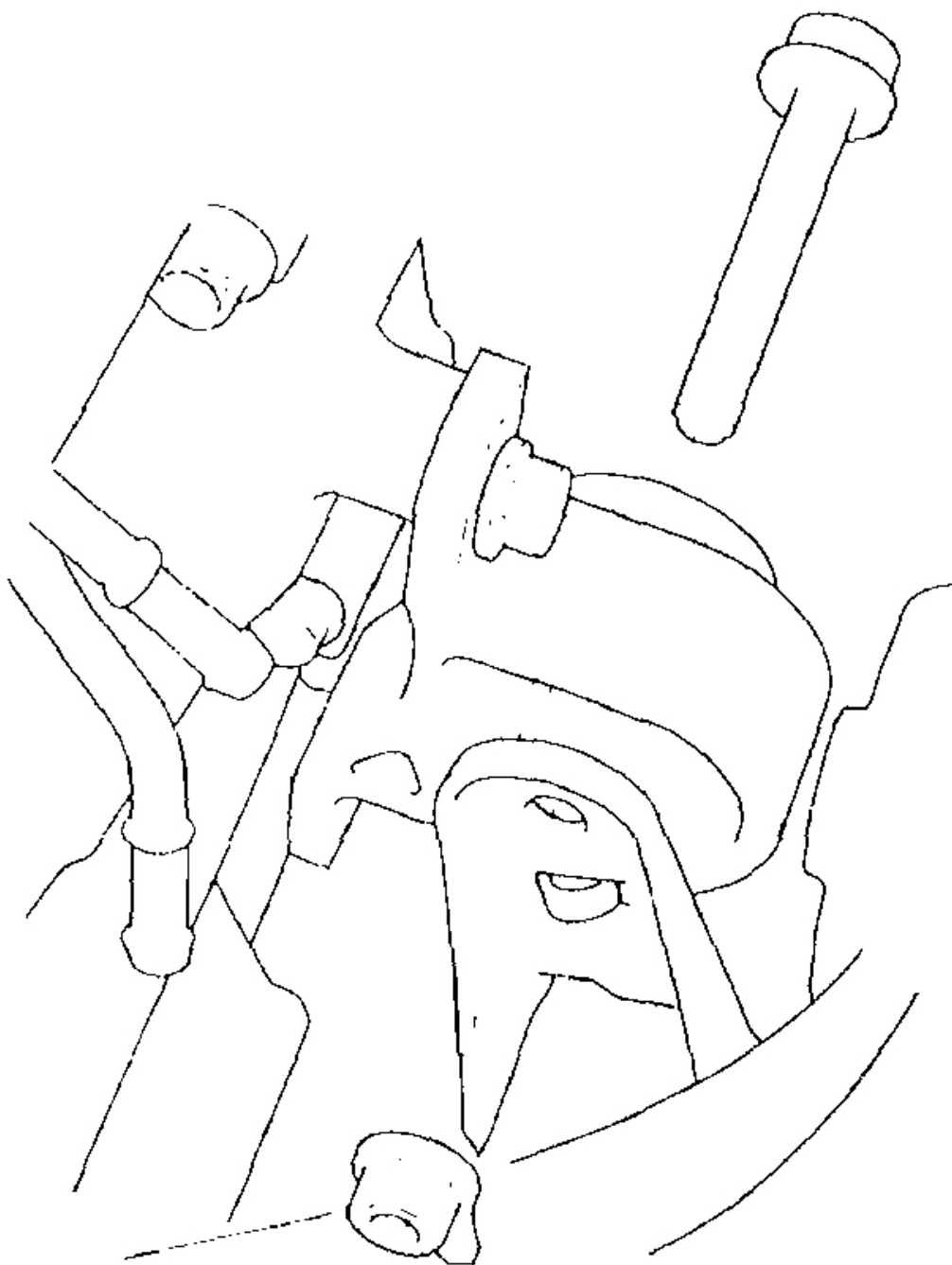
39. Attach the chain hoist to the engine as shown.



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Fig. 24: Attaching Chain Hoist To Engine
Courtesy of AMERICAN HONDA MOTOR CO., INC.

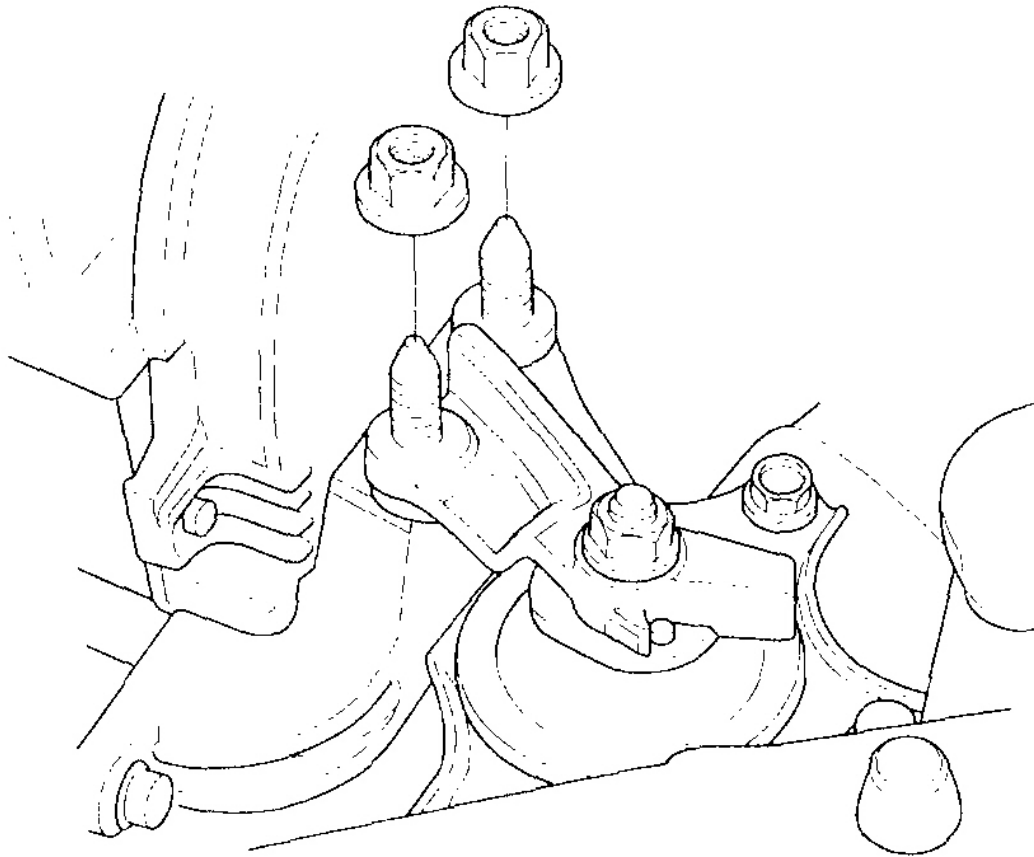
40. Remove the front mount mounting bolt.



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Fig. 25: Removing Front Mount Mounting Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

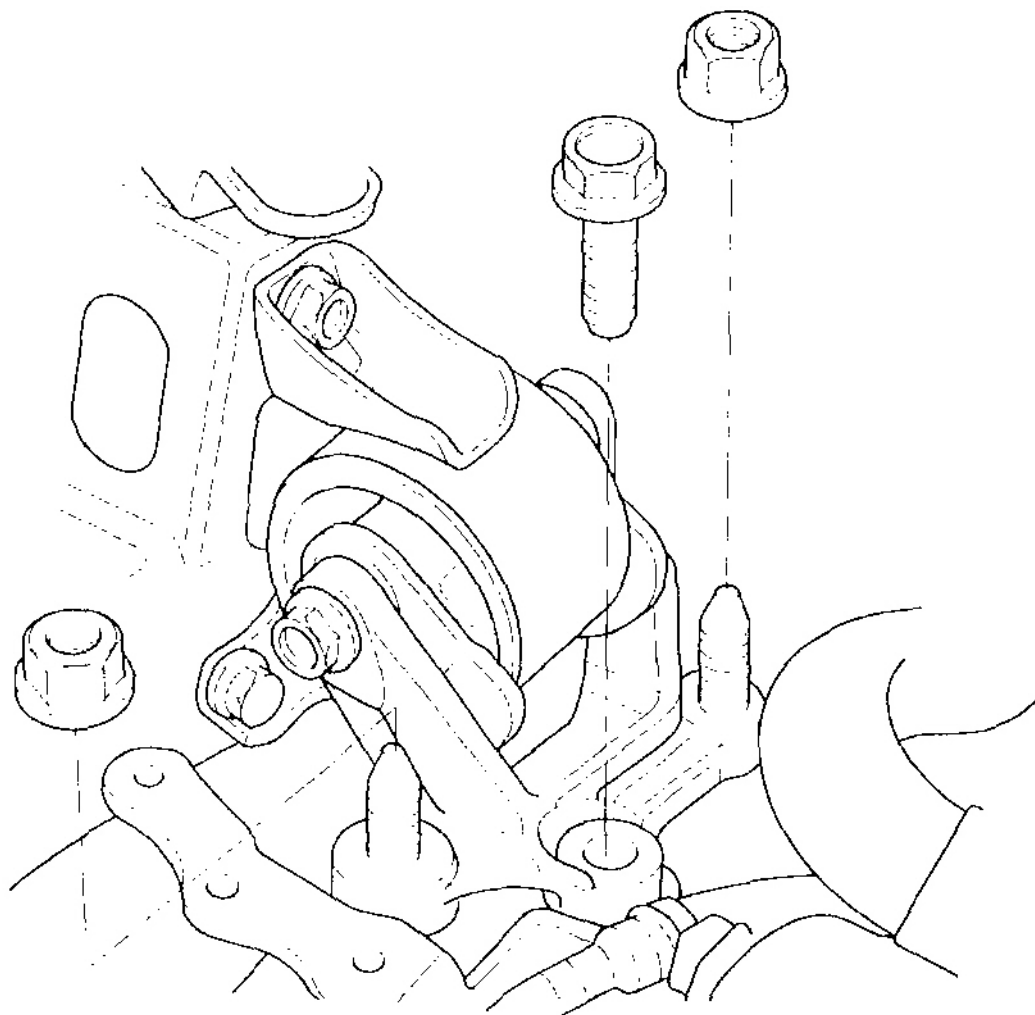
41. Remove the side engine mount bracket mounting nuts.



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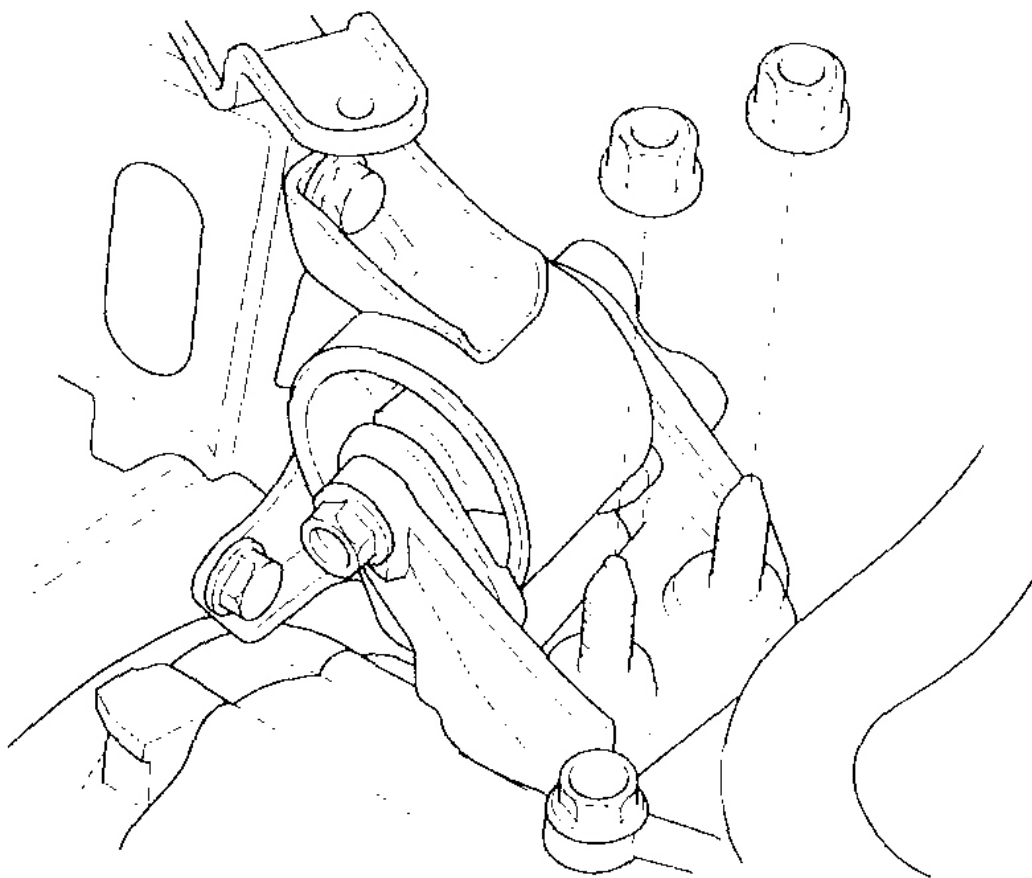
Fig. 26: Removing Side Engine Mount Bracket Mounting Nuts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

42. Remove the transmission mount bracket mounting bolt/nuts.



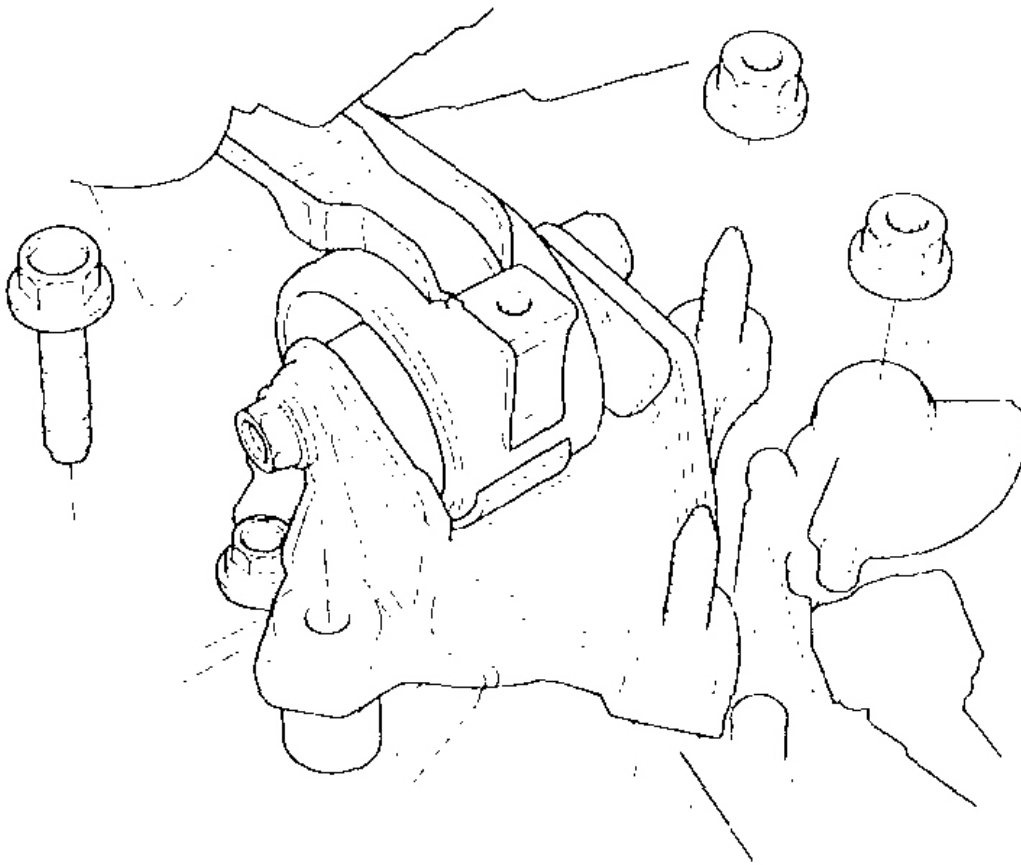
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Fig. 27: Removing Transmission Mount Bracket Mounting Bolt/Nuts (M/T)
Courtesy of AMERICAN HONDA MOTOR CO., INC.



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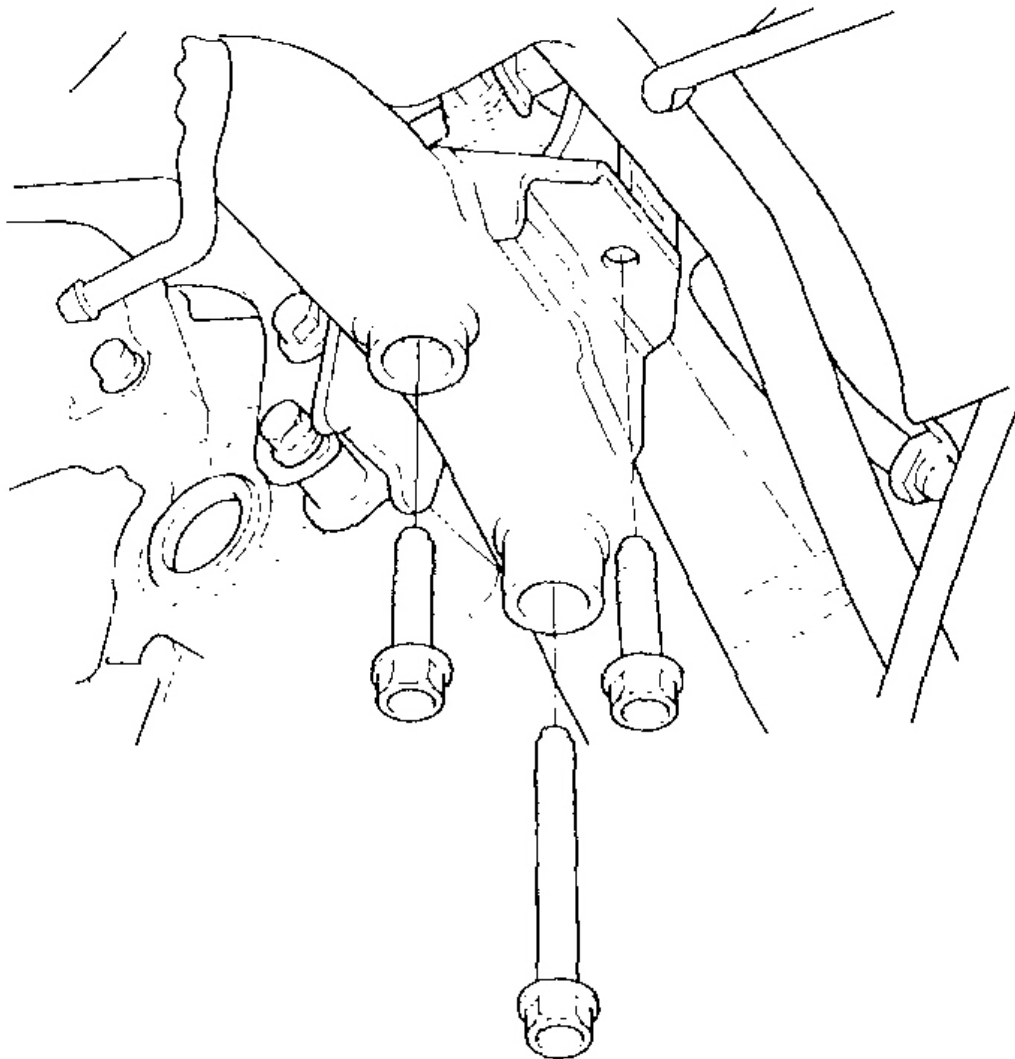
Fig. 28: Removing Transmission Mount Bracket Mounting Bolt/Nuts (A/T)
Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 29: Removing Transmission Mount Bracket Mounting Bolt/Nuts (CVT)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

43. Make sure the hoist brackets are positioned properly. Raise the vehicle on the hoist to full height.
44. Remove the rear mount mounting bolts.



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Fig. 30: Removing Rear Mount Mounting Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

45. Use a marker to make alignment marks on the reference lines (A) that align with the centers of the rear subframe mounting bolts (B).

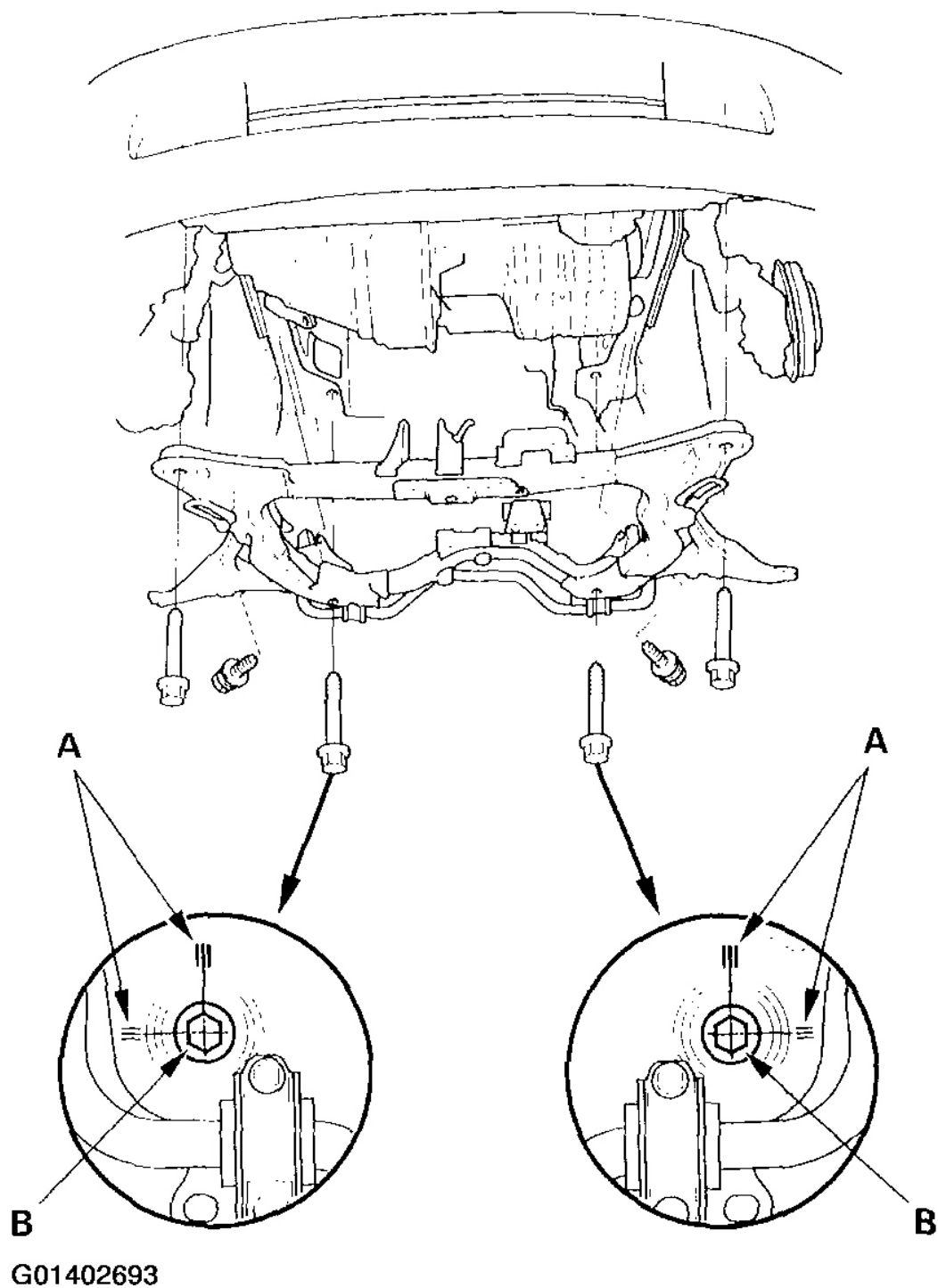


Fig. 31: Using Marker To Make Alignment Marks On Reference Lines
Courtesy of AMERICAN HONDA MOTOR CO., INC.

46. Remove the front subframe.
47. Check that the engine/transmission is completely free of vacuum hoses, fuel and coolant hoses, and electrical wiring.
48. Slowly lower the engine about 150 mm (6 in.). Check once again that all hoses and wires are disconnected from the engine/transmission.
49. Lower the engine/transmission assembly all the way. Remove the chain hoist from the engine.
50. Remove the engine/transmission assembly from under the vehicle.

ENGINE INSTALLATION

1. Install the accessory brackets and tighten their bolts and nuts to the specified torques.

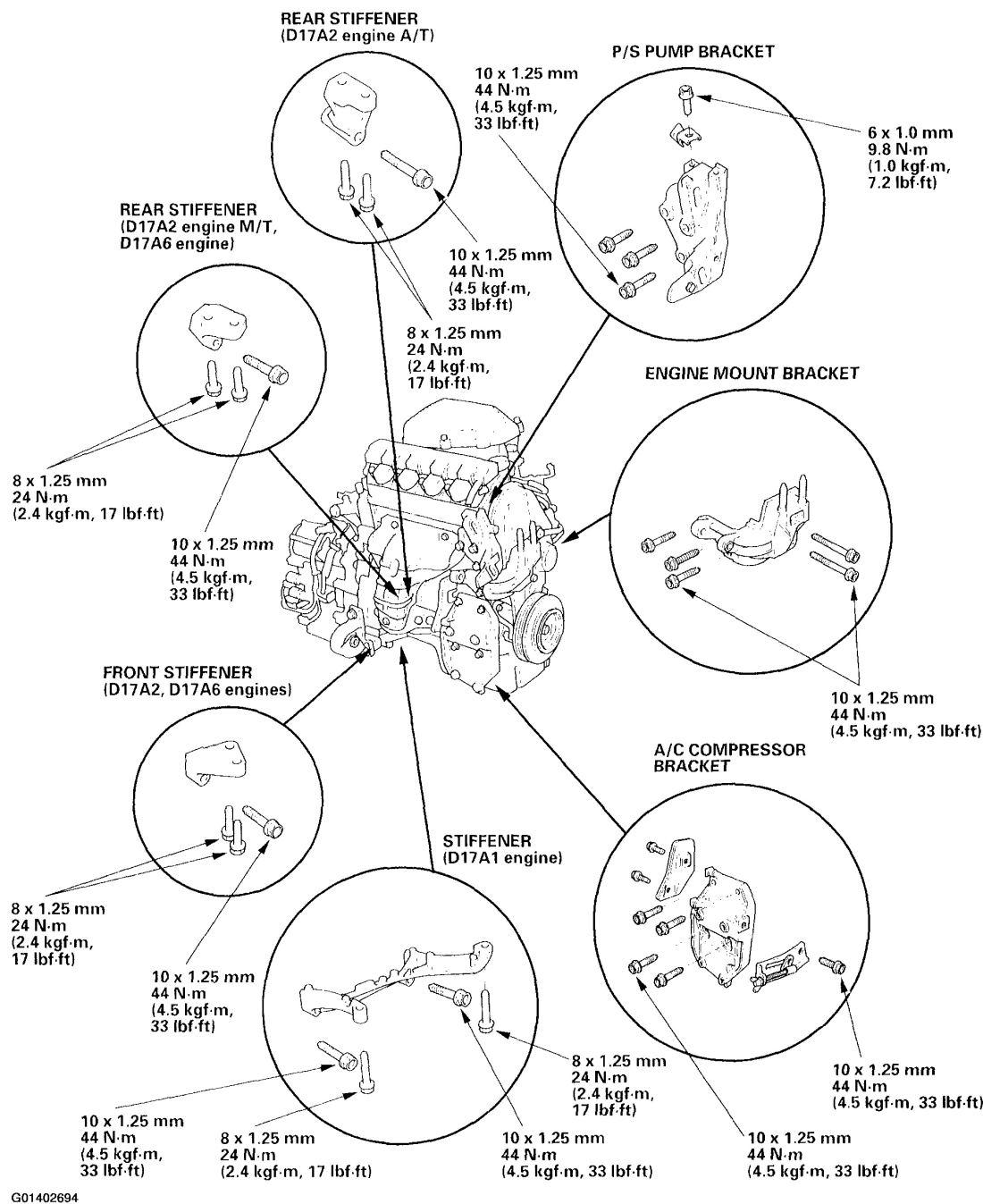


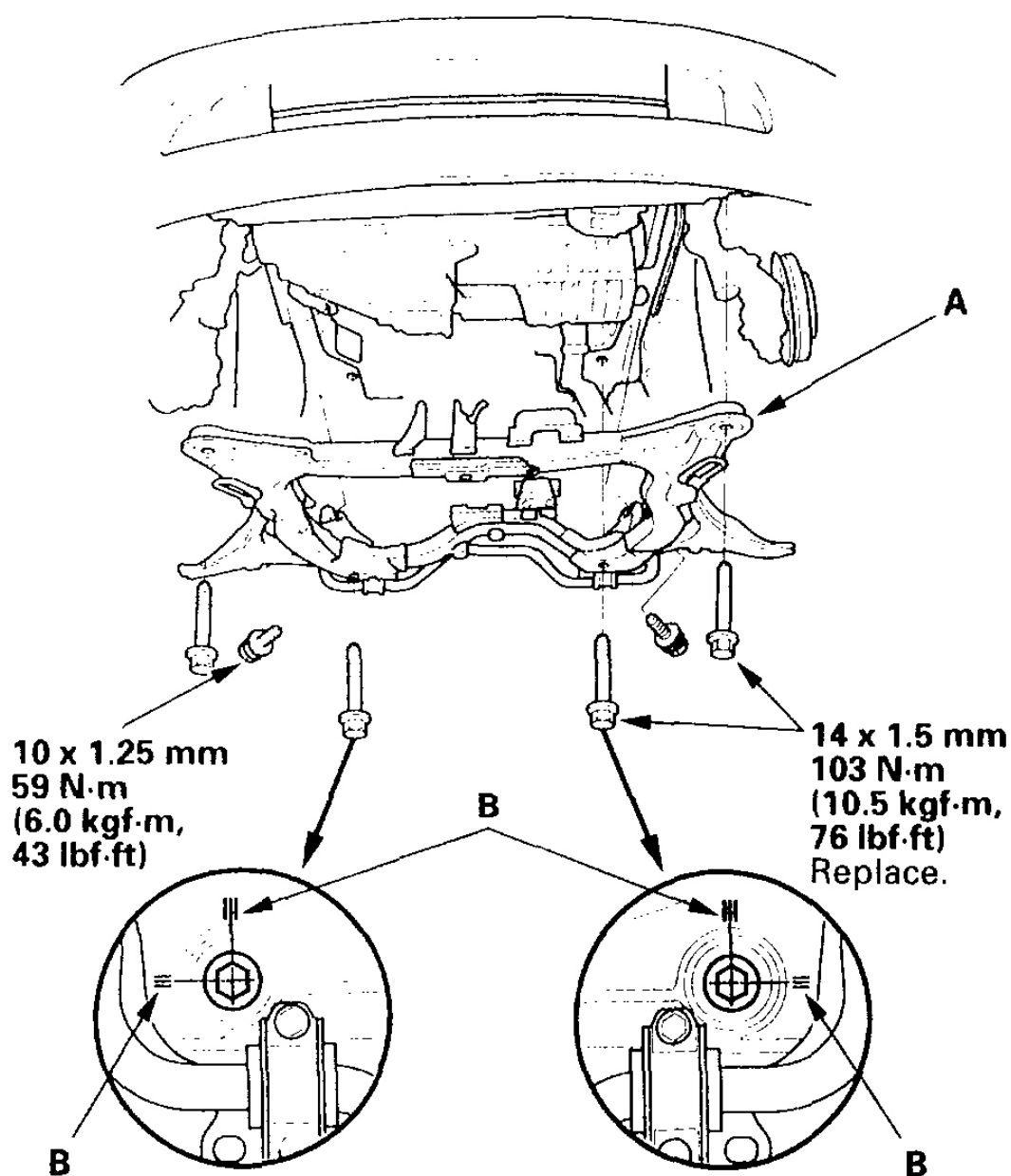
Fig. 32: Installing Accessory Brackets With Torque Specifications
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

- Position the engine/transmission assembly under the vehicle. Attach the chain hoist to the engine, then lift the engine into position in the vehicle.

NOTE: Reinstall the mounting bolts/support nuts in the sequence given. Failure to follow this sequence may cause excessive noise and vibration, and reduce

bushing life.

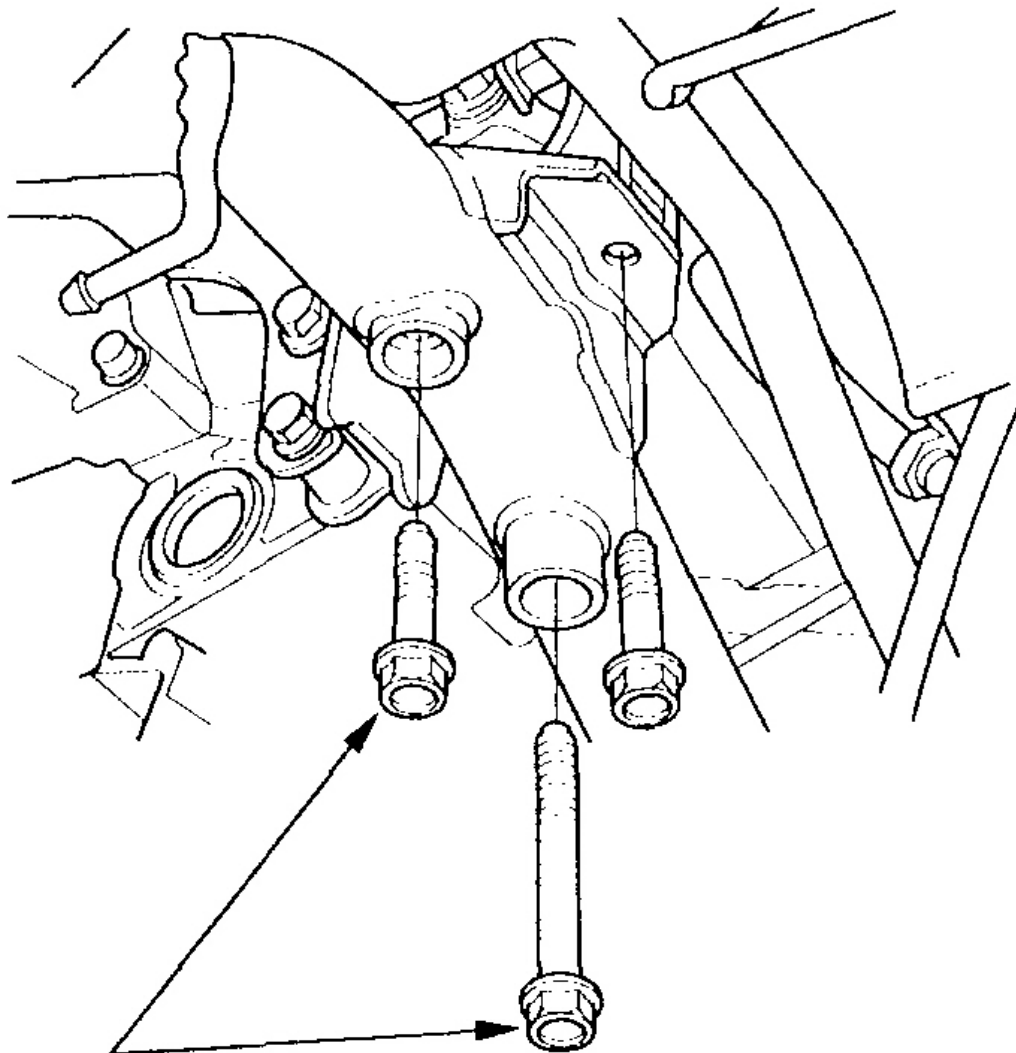
3. Install the subframe (A). Align the reference lines (B) on the subframe with the bolt head center, then tighten the bolts.



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Fig. 33: Installing Subframe With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Tighten the rear mount mounting bolts.



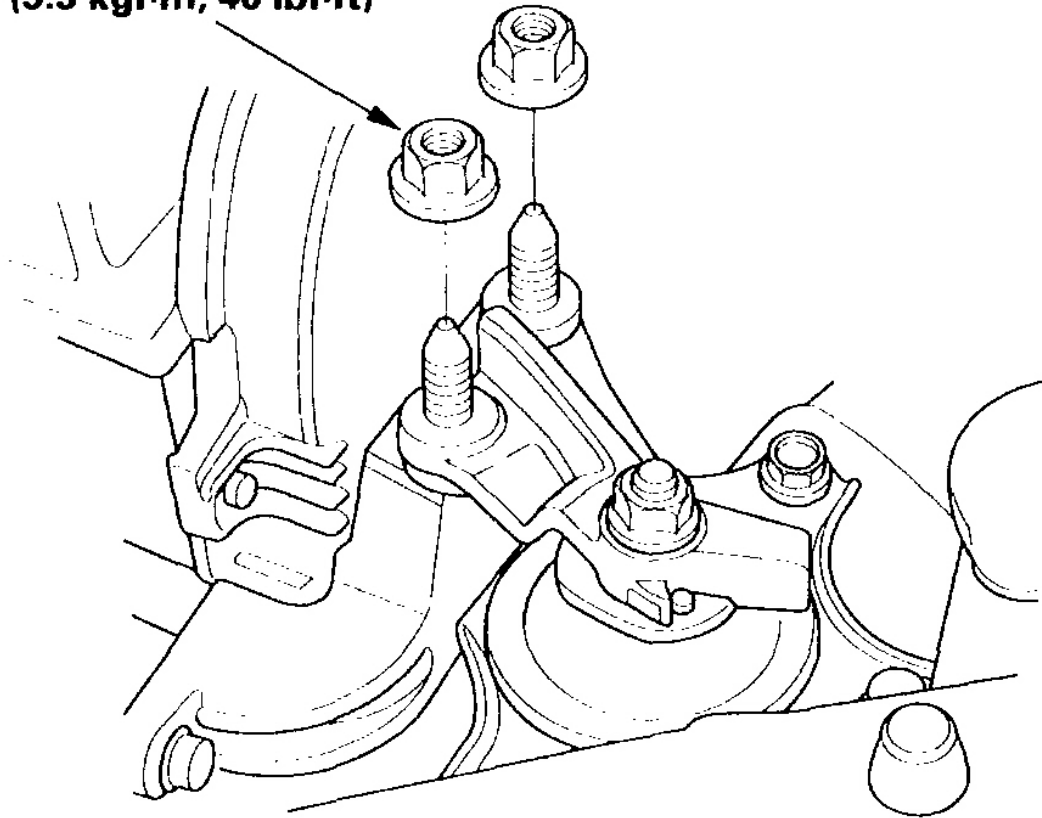
10 x 1.25 mm
59 N·m
(6.0 kgf·m, 43 lbf·ft)

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Fig. 34: Tightening Rear Mount Mounting Bolts With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Lower the vehicle on the hoist.
6. Tighten the side engine mount bracket mounting nuts.

**12 x 1.25 mm
54 N·m
(5.5 kgf·m, 40 lbf·ft)**

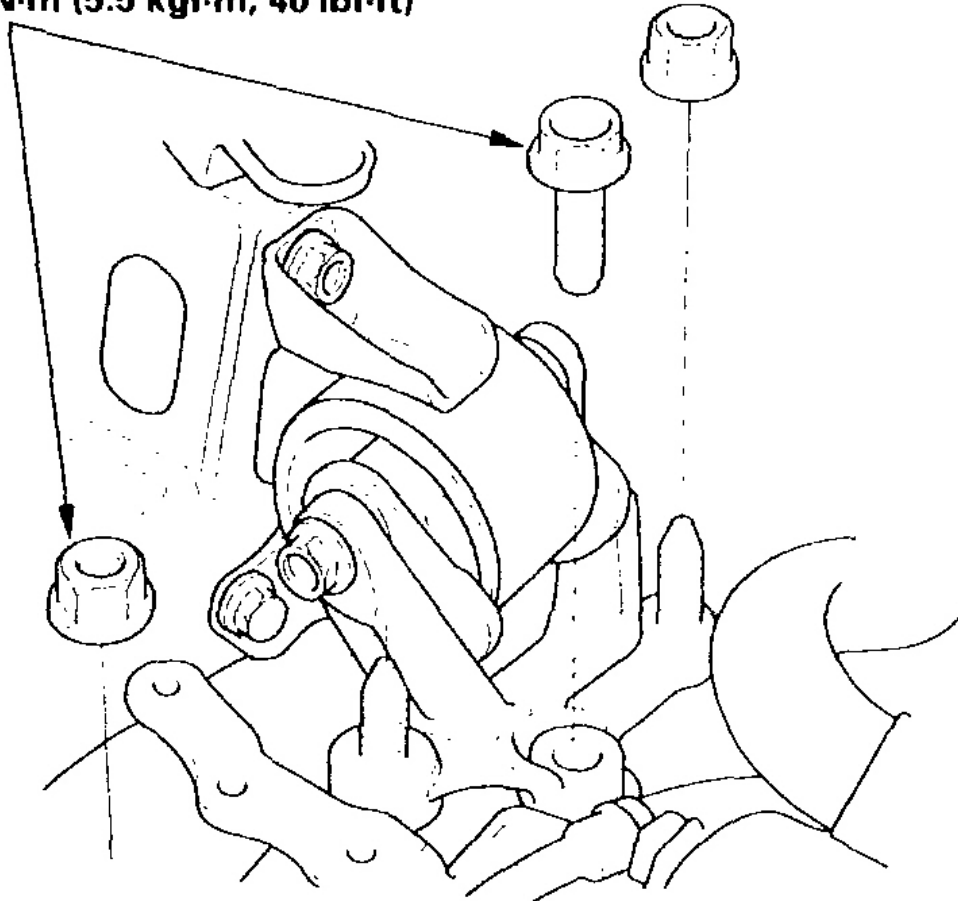


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Fig. 35: Tightening Side Engine Mount Bracket Mounting Nuts With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

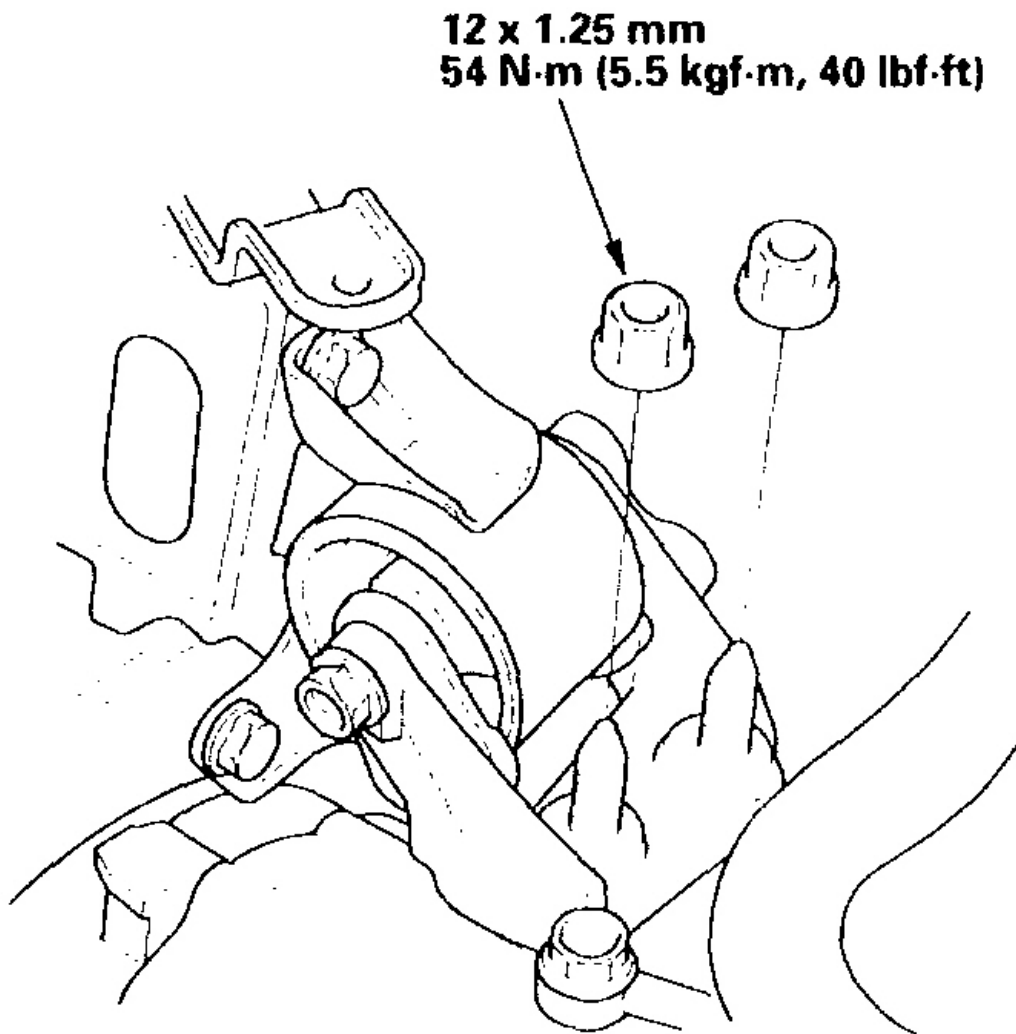
7. Tighten the transmission mount bracket mounting bolt/nuts.

**12 x 1.25 mm
54 N·m (5.5 kgf·m, 40 lbf·ft)**



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Fig. 36: Tightening Transmission Mount Bracket Mounting Bolt/Nuts (M/T) With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

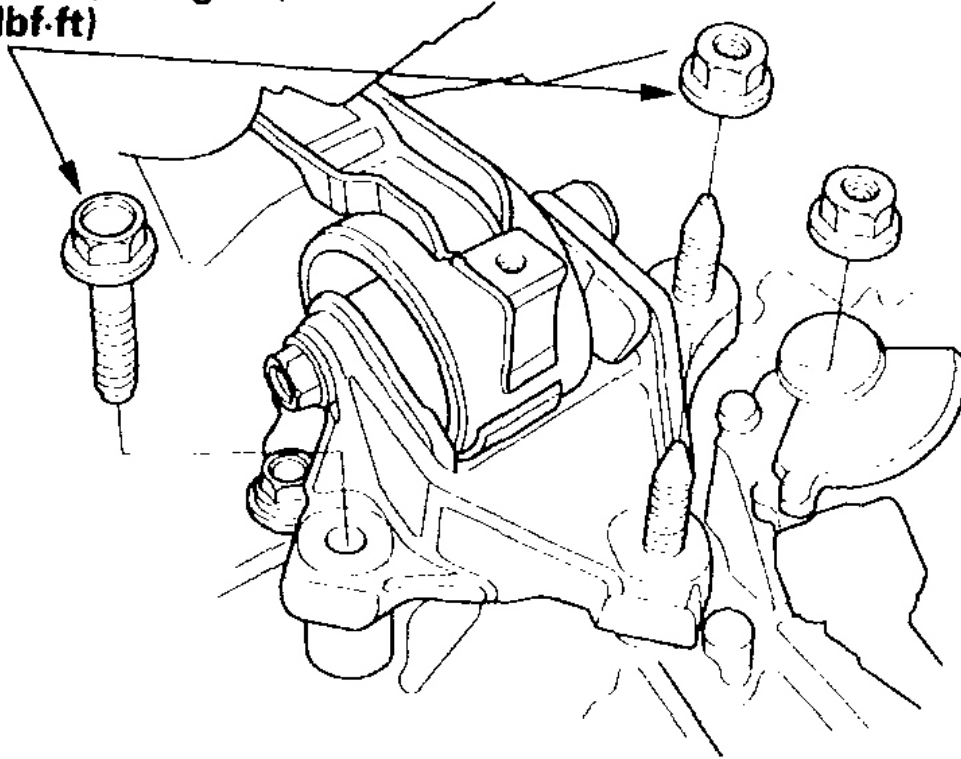


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Fig. 37: Tightening Transmission Mount Bracket Mounting Bolt/Nuts (A/T) With Torque Specifications

Courtesy of AMERICAN HONDA MOTOR CO., INC.

**12 x 1.25 mm
54 N·m (5.5 kgf·m,
40 lbf·ft)**



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Fig. 38: Tightening Transmission Mount Bracket Mounting Bolt/Nuts (CVT) With Torque Specifications

Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Tighten the front mount mounting bolt.

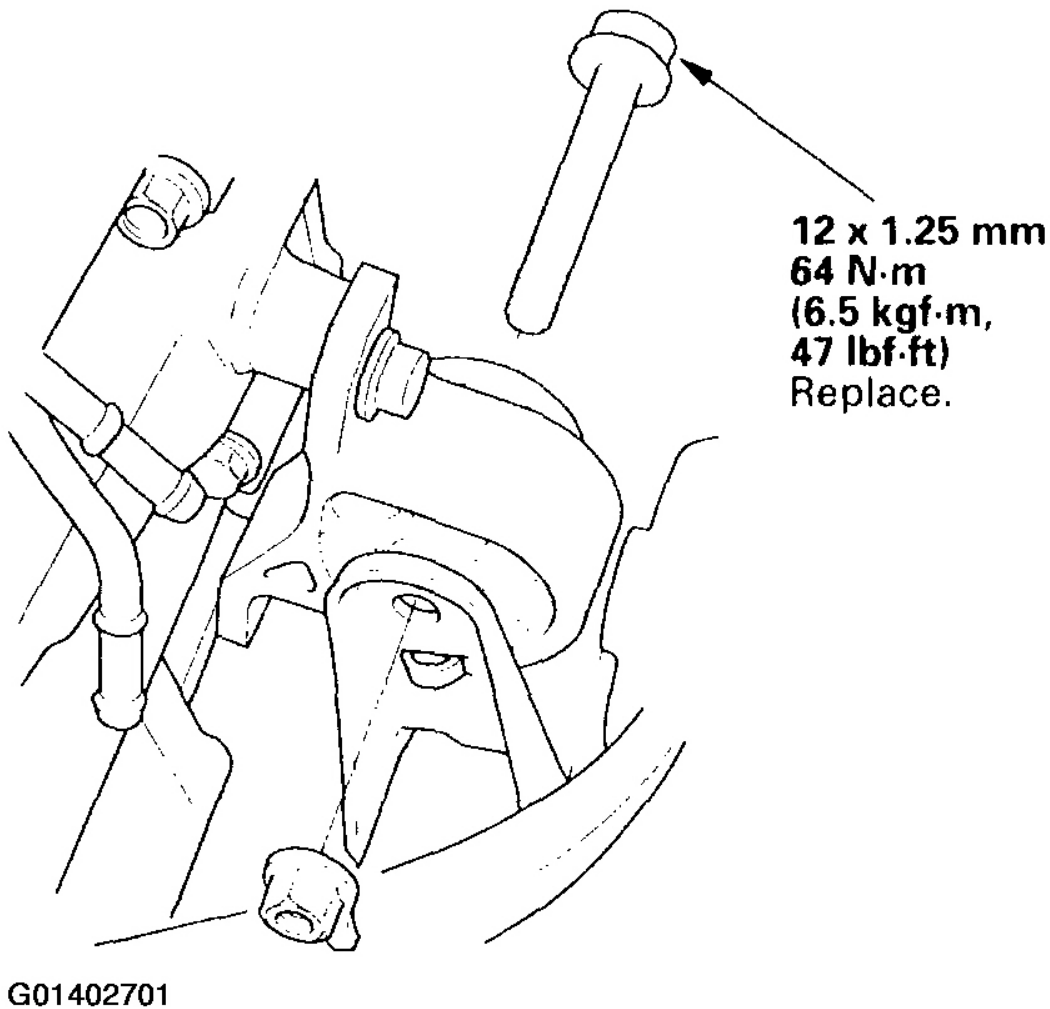
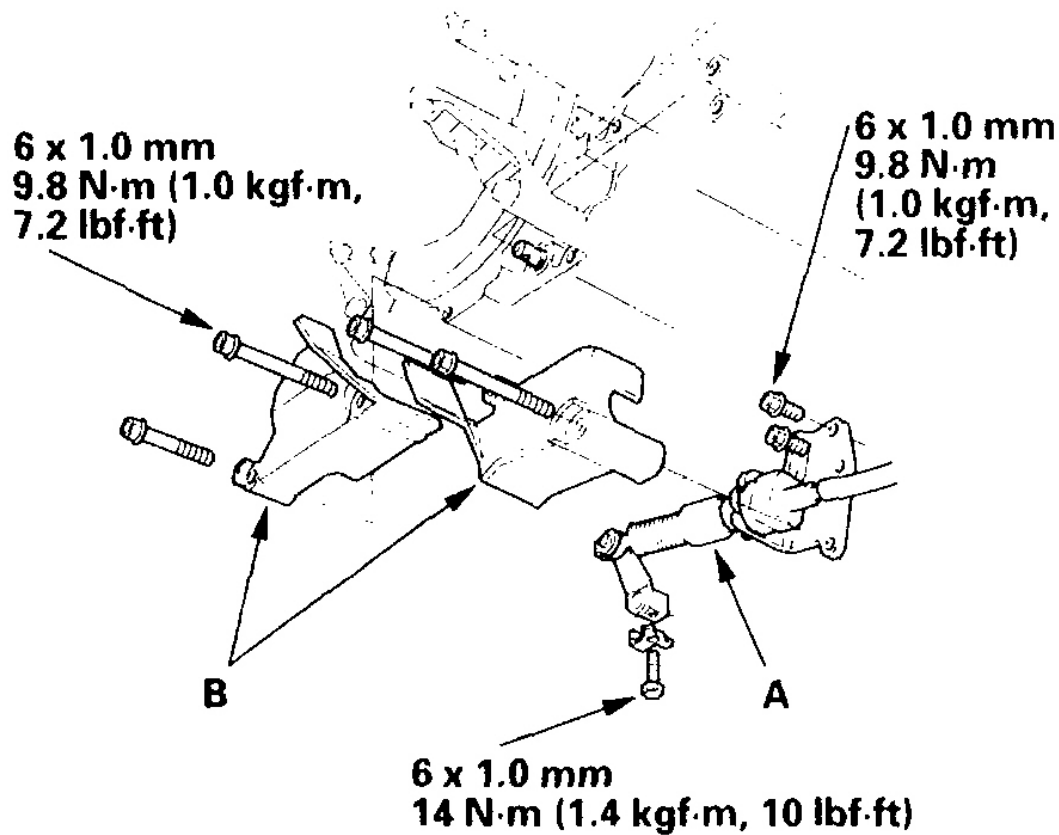


Fig. 39: Tightening Front Mount Mounting Bolt With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

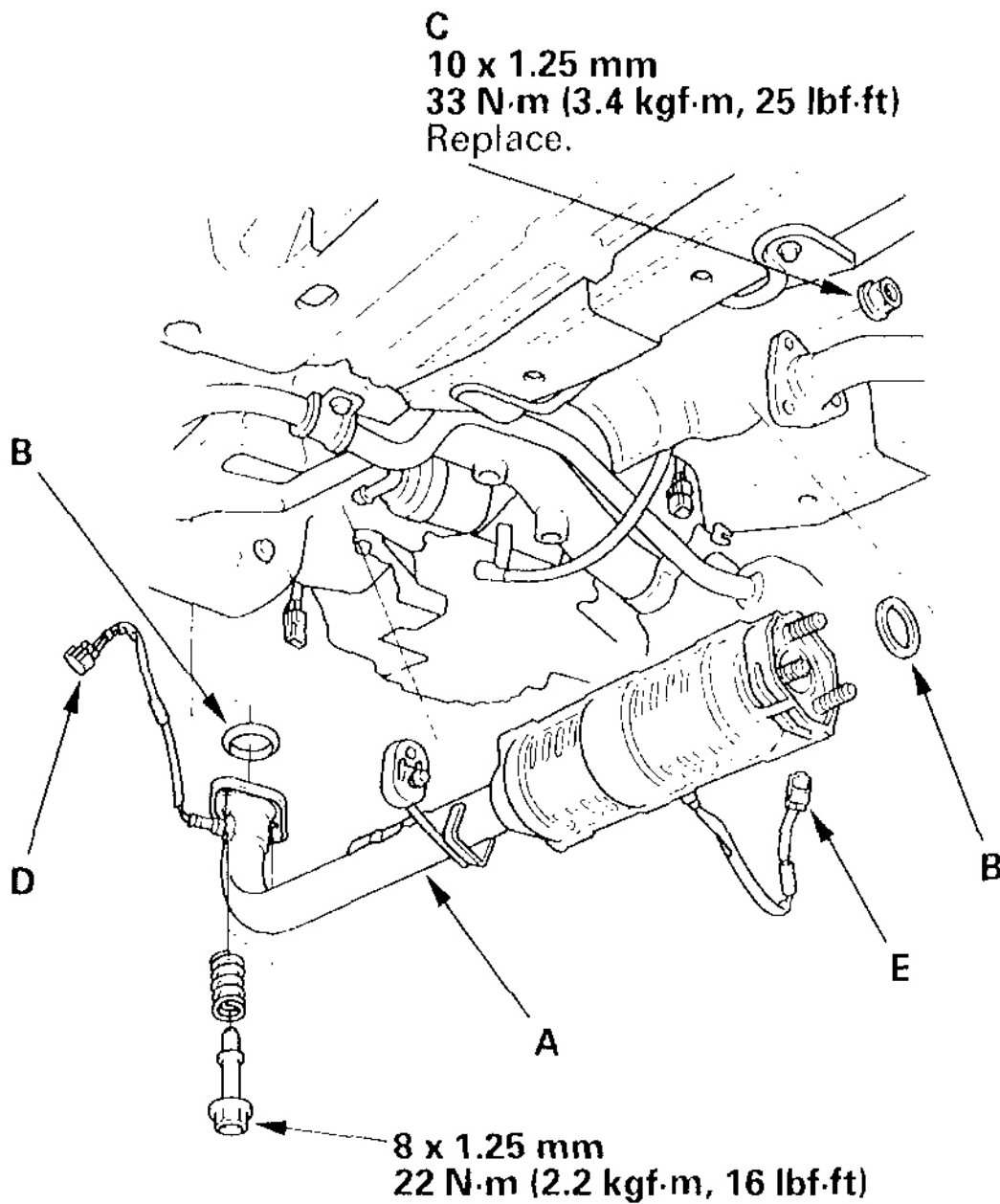
9. Remove the chain hoist from the engine.
10. Raise the vehicle on the hoist to full height.
11. Install a new spring clip on the end of each driveshaft, then install the driveshafts. Make sure each clip "clicks" into place on the differential and intermediate shafts.
12. Connect the suspension lower arm ball joints, and stabilizer links (see **STABILIZER LINK**).
13. A/T: Install the shift control cable (A), then install the shift cable covers (B).



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Fig. 40: Installing Shift Control Cable (A/T) With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

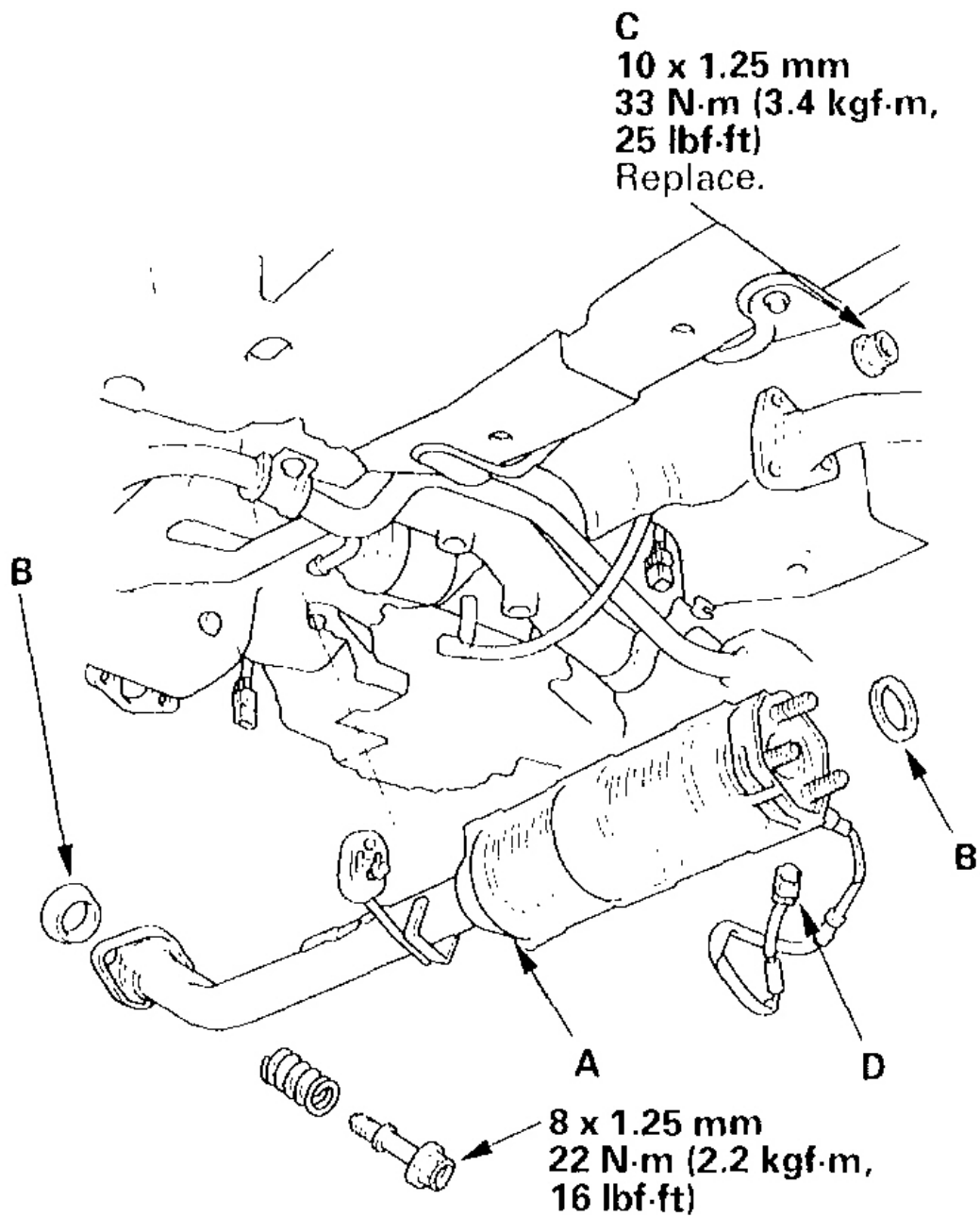
14. D17A2 engine: Install the exhaust pipe A/three way catalytic converter (TWC) assembly (A); use new gaskets (B) and new self locking nuts (C). Connect the primary heated oxygen sensor (primary HO2S) connector (D) and secondary heated oxygen sensor (secondary HO2S) connector (E).



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Fig. 41: Installing Exhaust Pipe A/TWC Assembly (D17A2 Engine) With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

15. D17A6 engine: Install exhaust pipe A/TWC assembly (A); use new gaskets (B) and new self locking nuts (C). Connect the third HO2S connector (D).



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Fig. 42: Installing Exhaust Pipe A/TWC Assembly (D17A6 Engine) With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

16. D17A1 engine: Install the exhaust pipe/muffler assembly (A); use a new gasket (B).

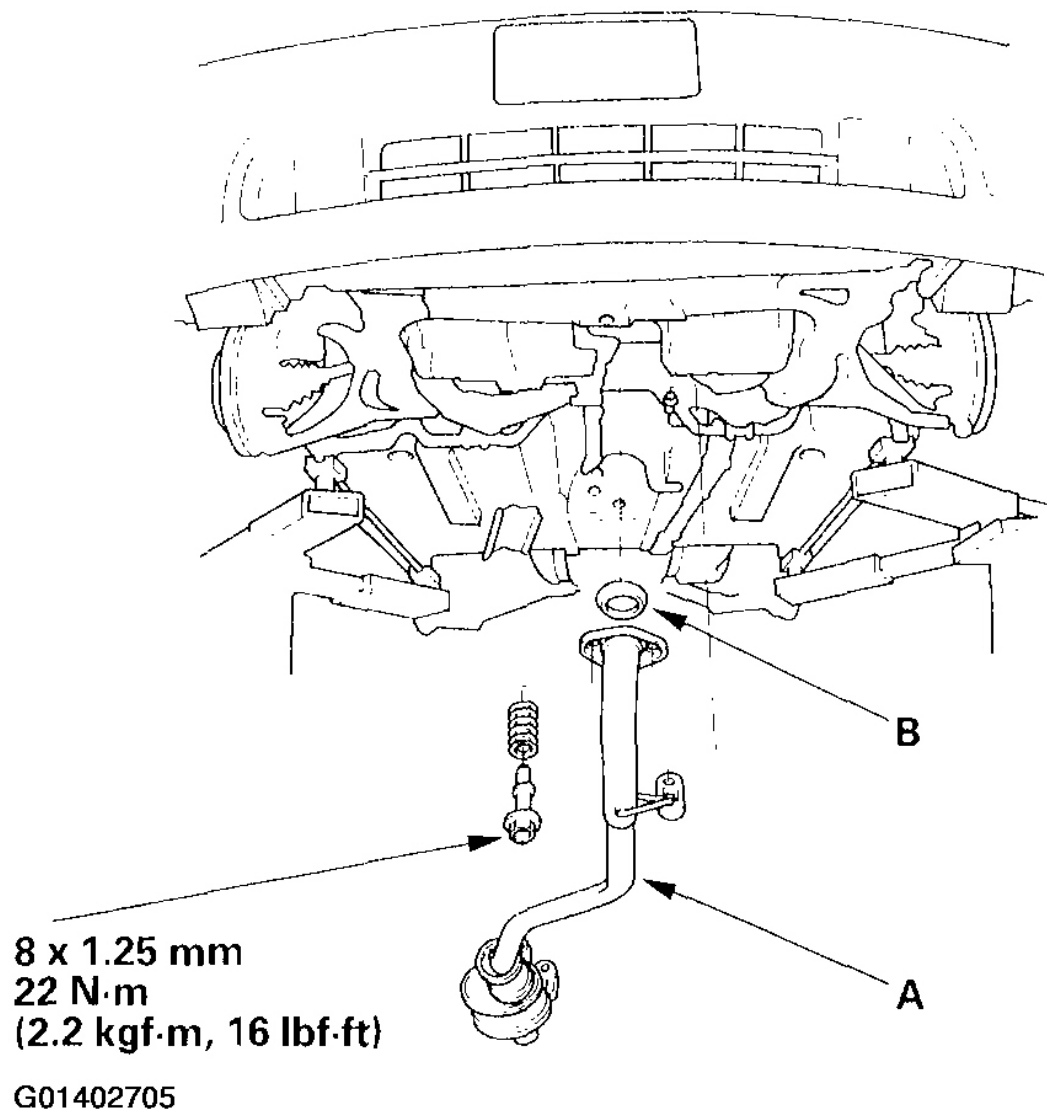
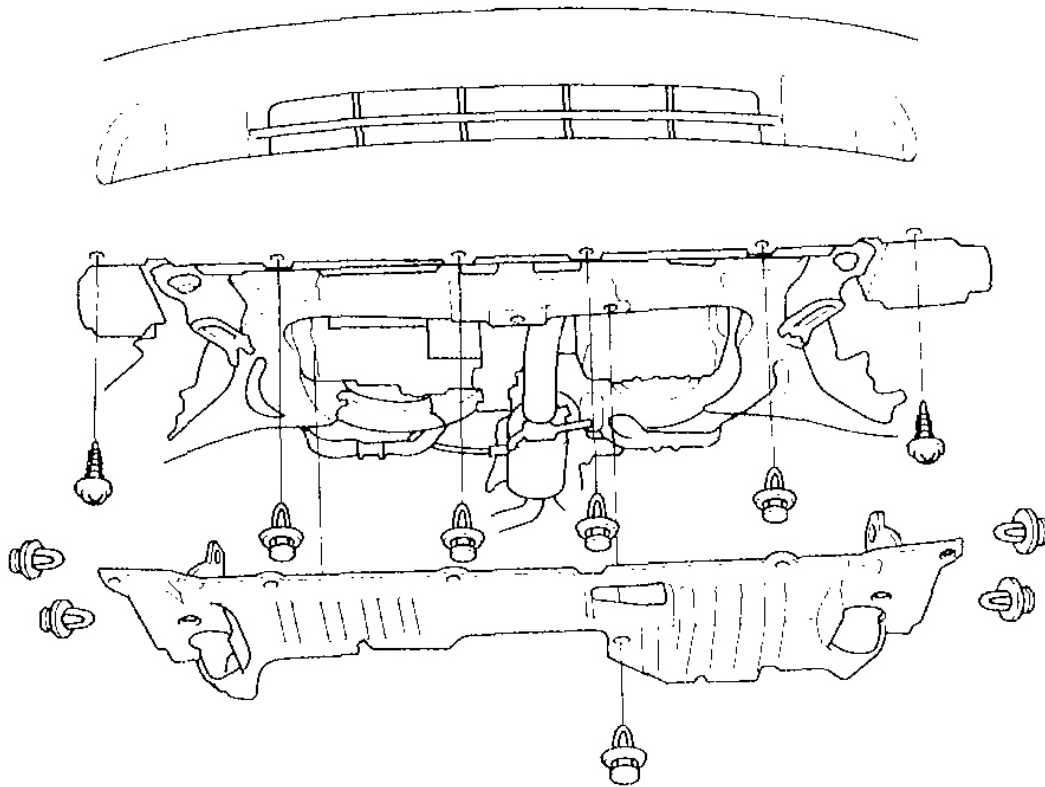
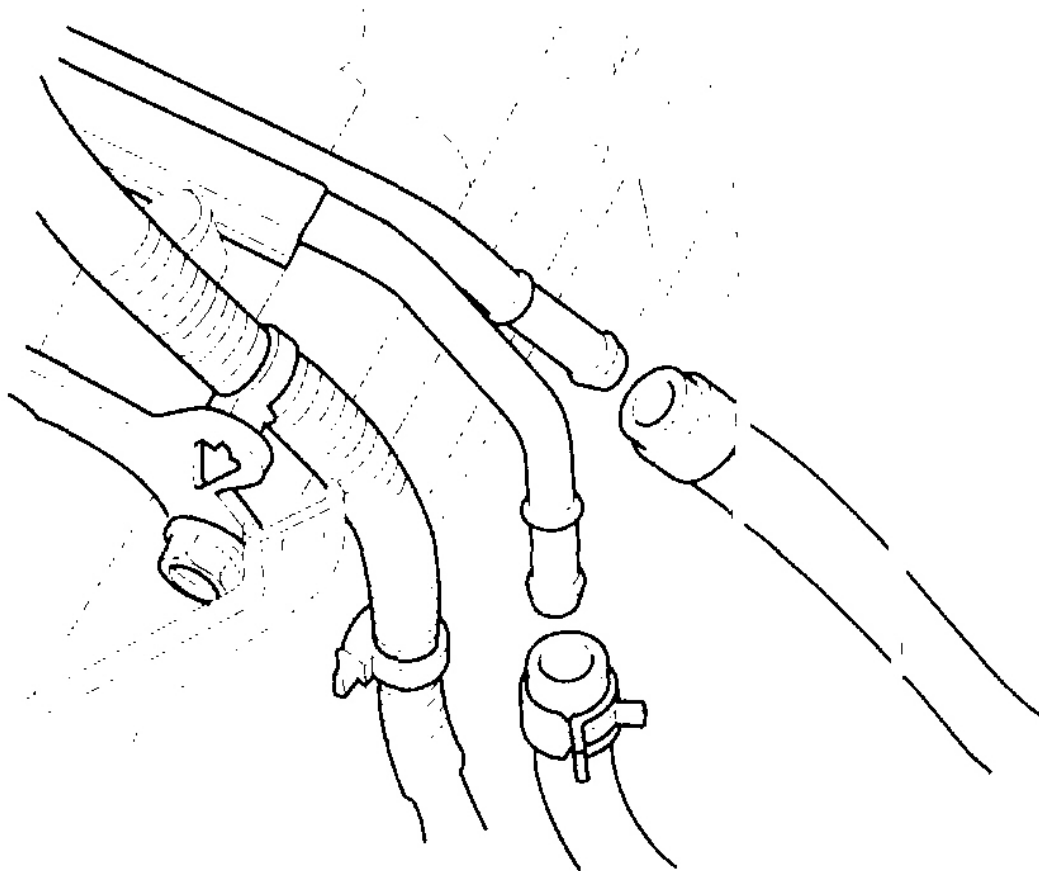


Fig. 43: Installing Exhaust Pipe/Muffler Assembly (D17A1 Engine) With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

17. Install the splash shield.

**G01402706****Fig. 44: Installing Splash Shield****Courtesy of AMERICAN HONDA MOTOR CO., INC.**

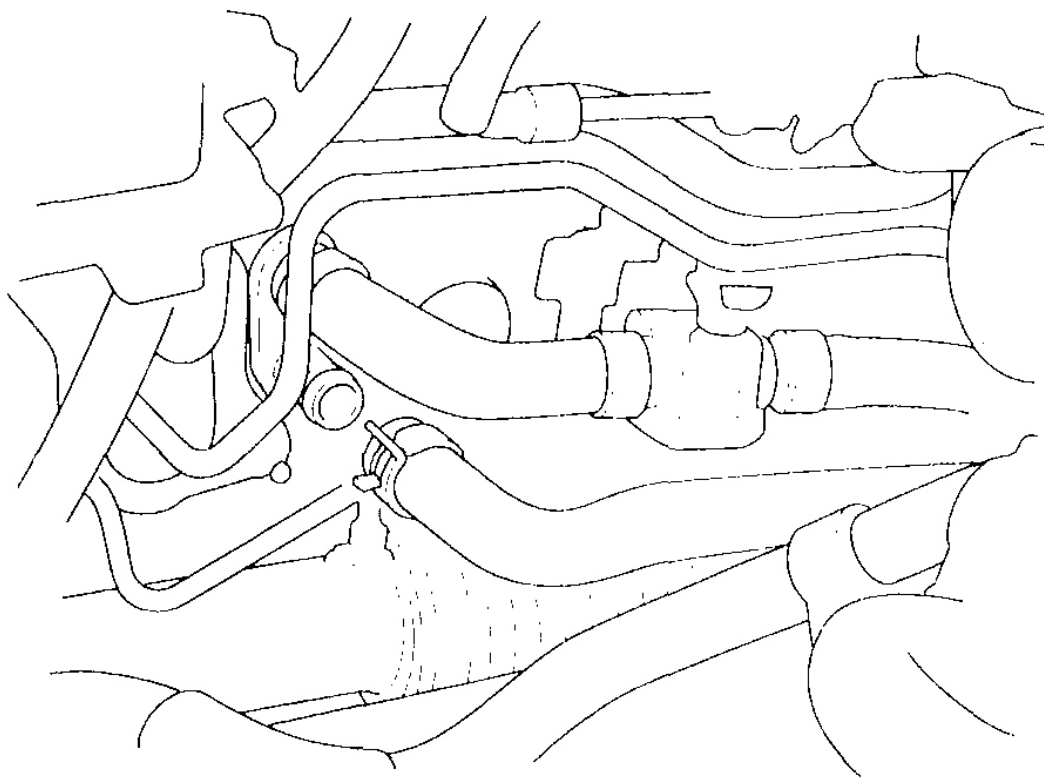
18. Install the front tires/wheels.
19. Lower the hoist.
20. A/T, CVT: Install the automatic transmission fluid (ATF) cooler hoses.



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Fig. 45: Installing ATF Cooler Hoses (A/T, CVT)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

21. Install the heater hose.

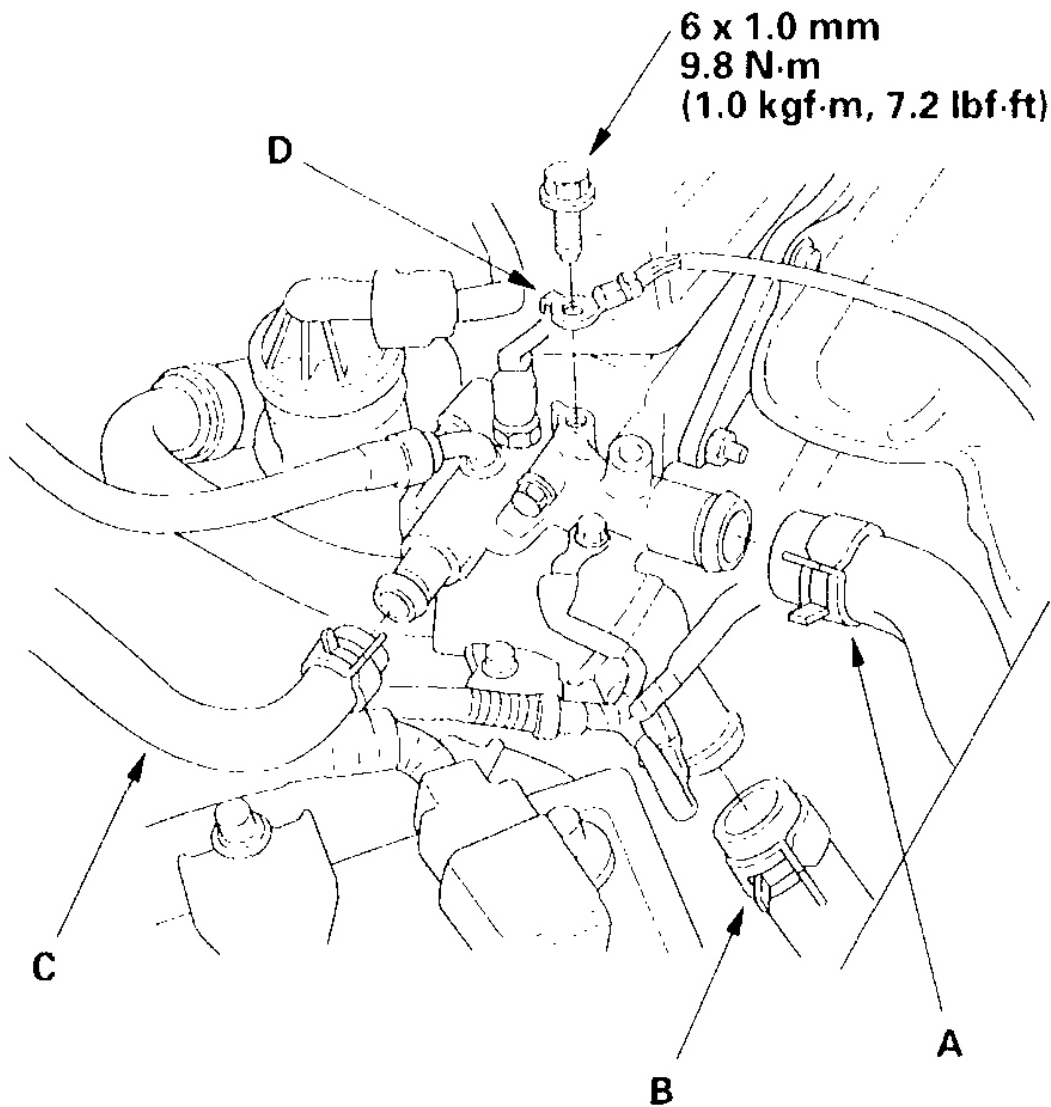


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Fig. 46: Installing Heater Hose

Courtesy of AMERICAN HONDA MOTOR CO., INC.

22. Install the upper radiator hose (A), lower radiator hose (B), heater hose (C), and ground cable (D).



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Fig. 47: Installing Upper Radiator Hose With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

23. Install the A/C compressor (A), then install the alternator lower bracket (B).

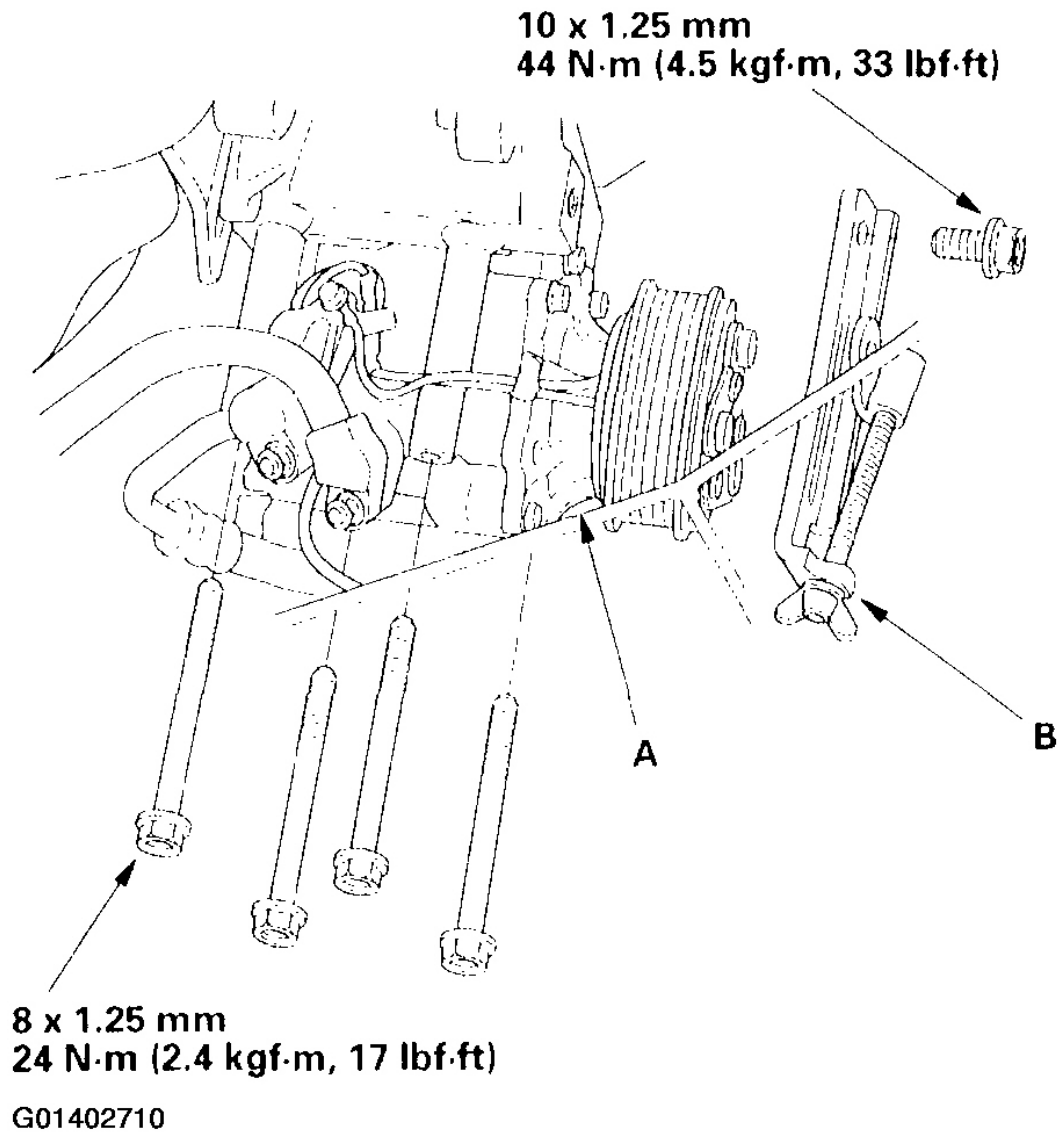
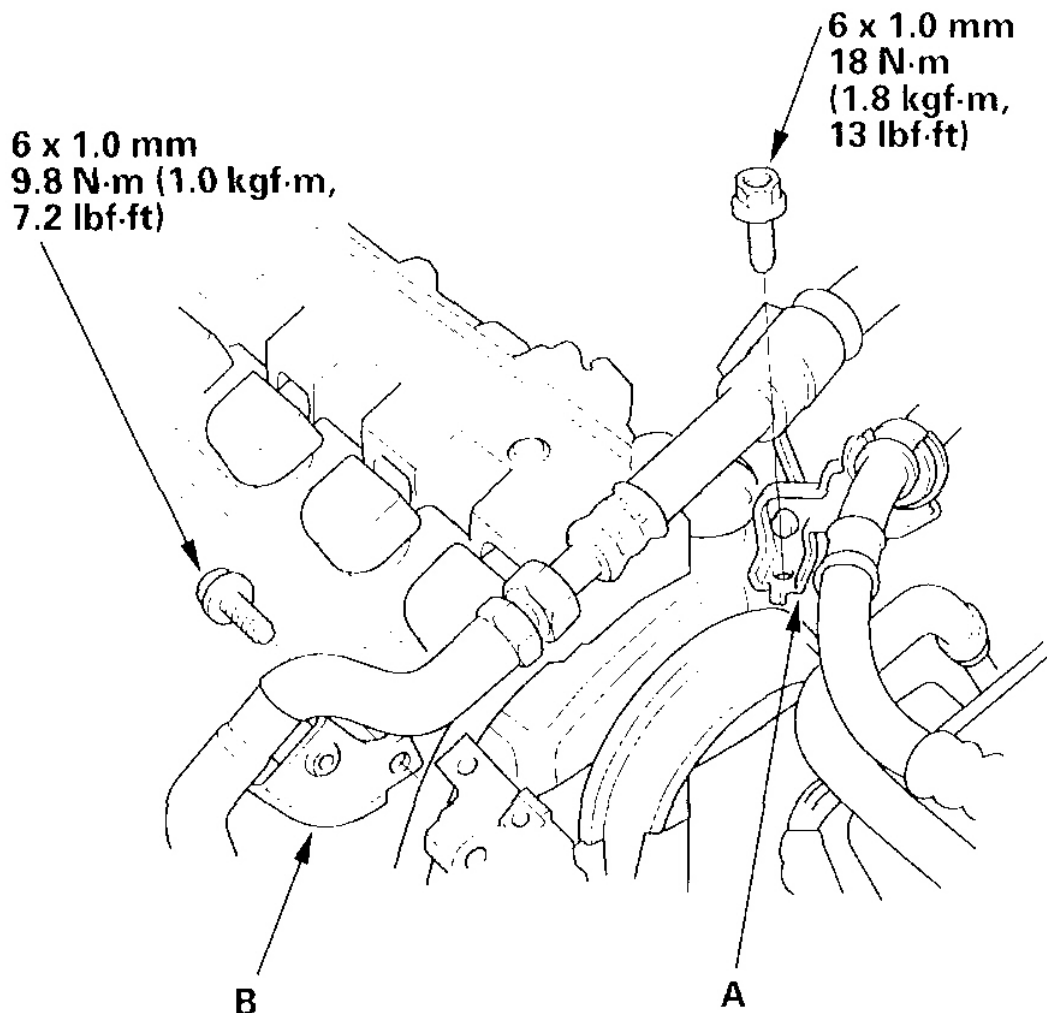


Fig. 48: Installing A/C Compressor With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

24. Install the A/C hose bracket (A) and power steering (P/S) hose bracket (B).

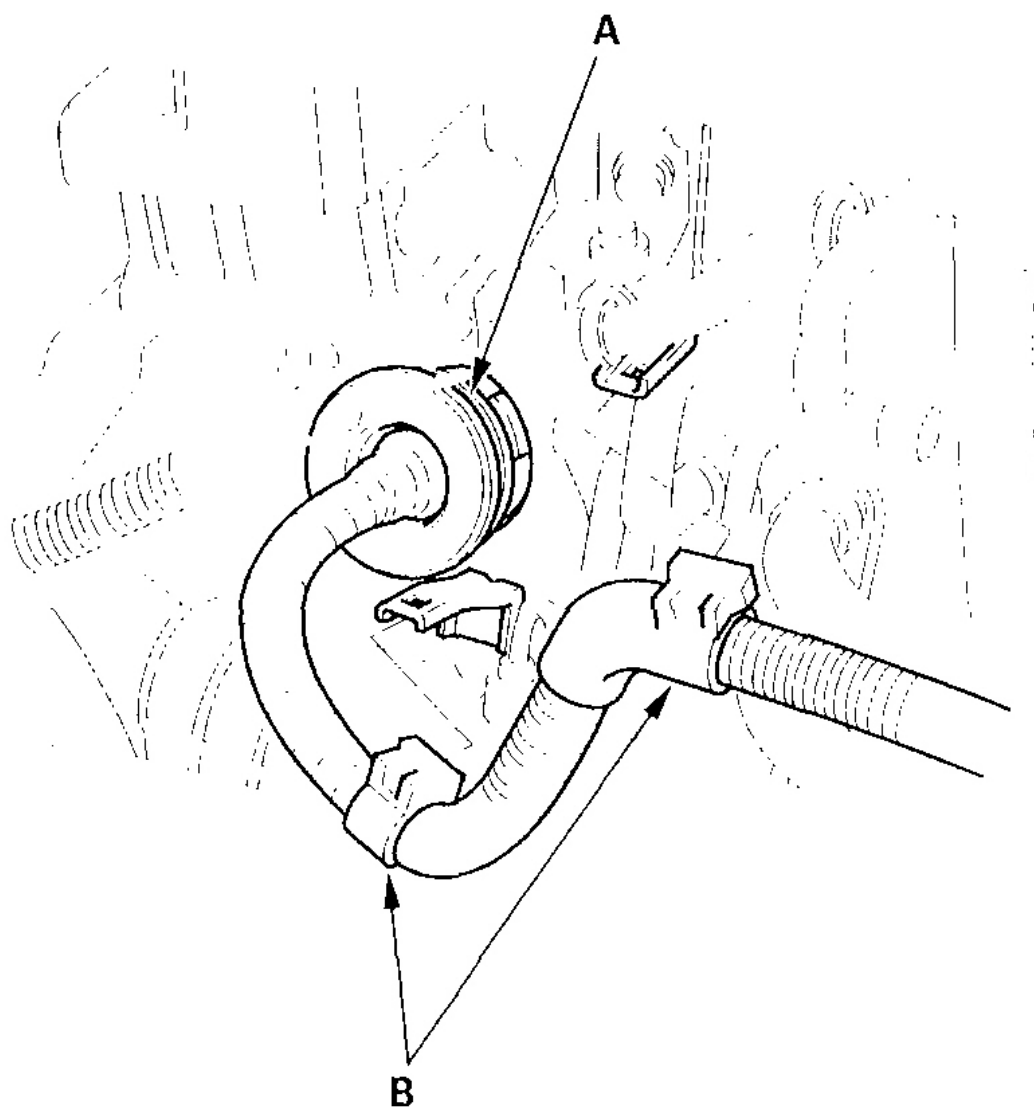


G01402711

Fig. 49: Installing A/C Hose Bracket

Courtesy of AMERICAN HONDA MOTOR CO., INC.

25. Loosely install the alternator.
26. Adjust the alternator belt tension or the alternator-compressor belt tension (see **ALTERNATOR BELT**).
27. Loosely install the P/S pump belt and pump.
28. Adjust the P/S pump belt (see **PUMP BELT INSPECTION AND ADJUSTMENT**).
29. Push the engine control module (ECM)/powertrain control module (PCM) connectors through the bulkhead, then install the grommet (A).

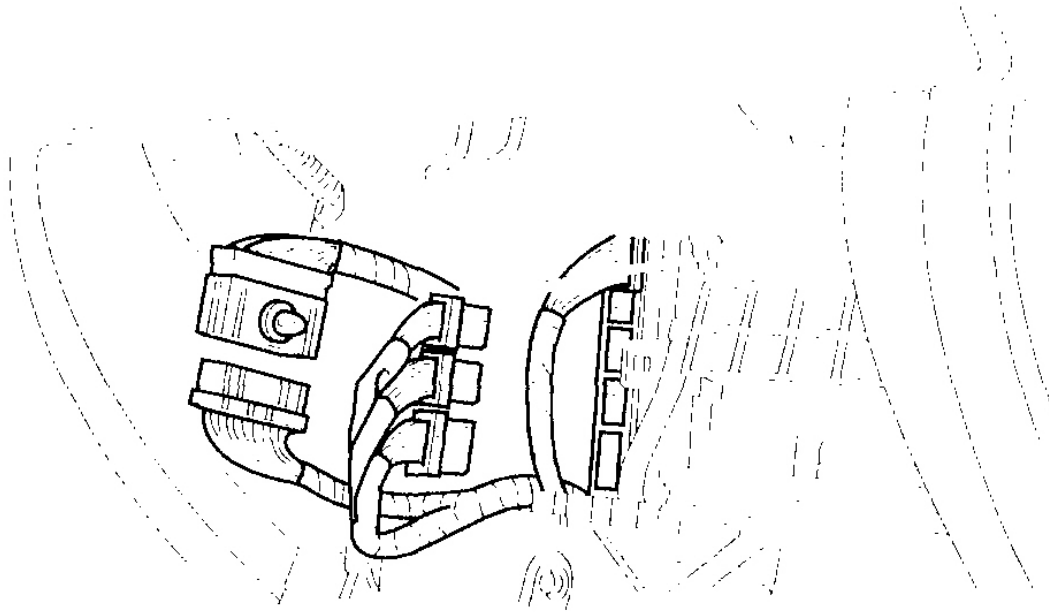


G01402712

Fig. 50: Installing Grommet

Courtesy of AMERICAN HONDA MOTOR CO., INC.

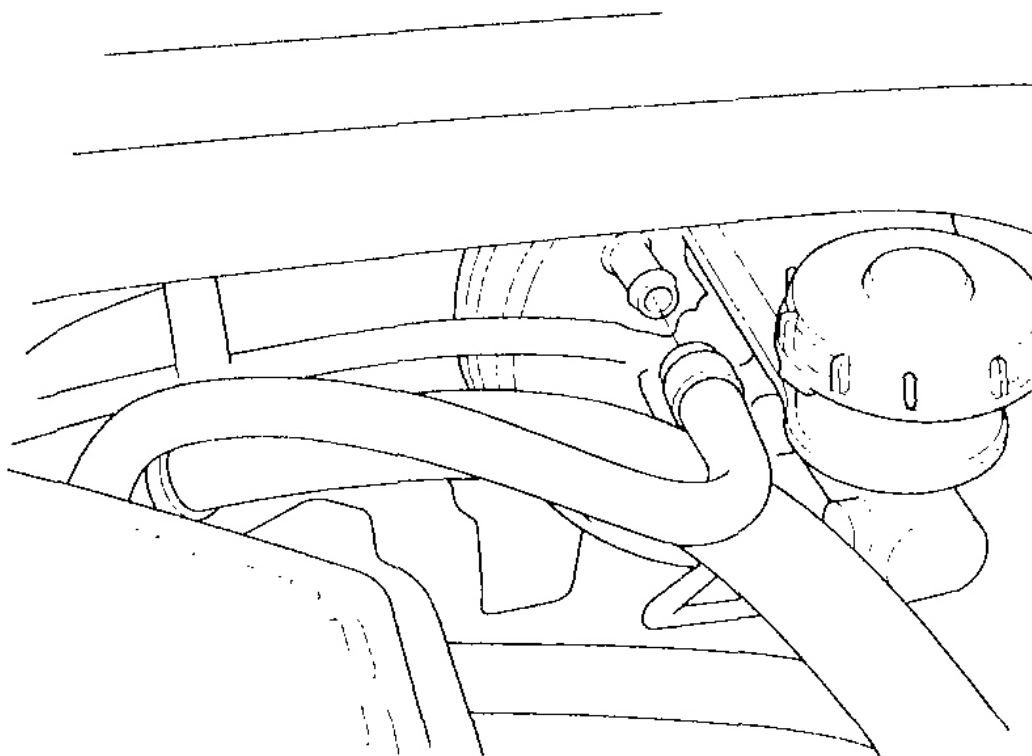
30. Install the harness clamps (B).
31. Connect the ECM/PCM connectors.



G01402713

Fig. 51: Connecting ECM/PCM Connectors
Courtesy of AMERICAN HONDA MOTOR CO., INC.

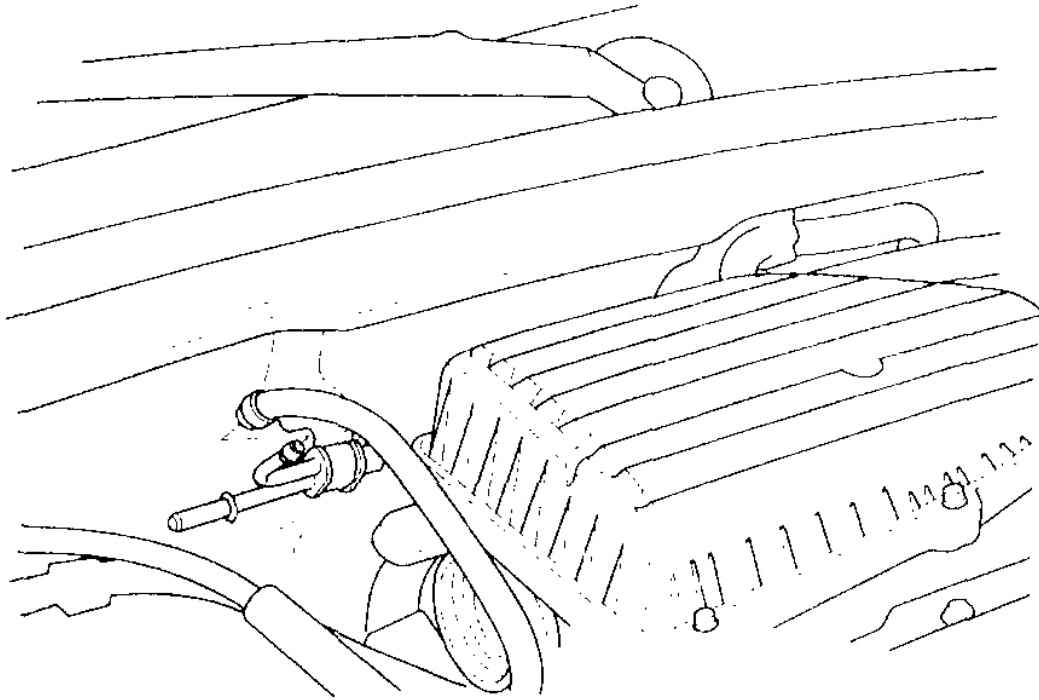
32. Install the glove box stops and glove box.
33. Install the cruise control actuator cable, then adjust it (see **CRUISE CONTROL ACTUATOR CABLE ADJUSTMENT**).
34. Install the throttle cable (see **THROTTLE CABLE REMOVAL/INSTALLATION**), then adjust it (see **THROTTLE CABLE ADJUSTMENT**).
35. Install the brake booster vacuum hose.



G01402714

Fig. 52: Installing Brake Booster Vacuum Hose
Courtesy of AMERICAN HONDA MOTOR CO., INC.

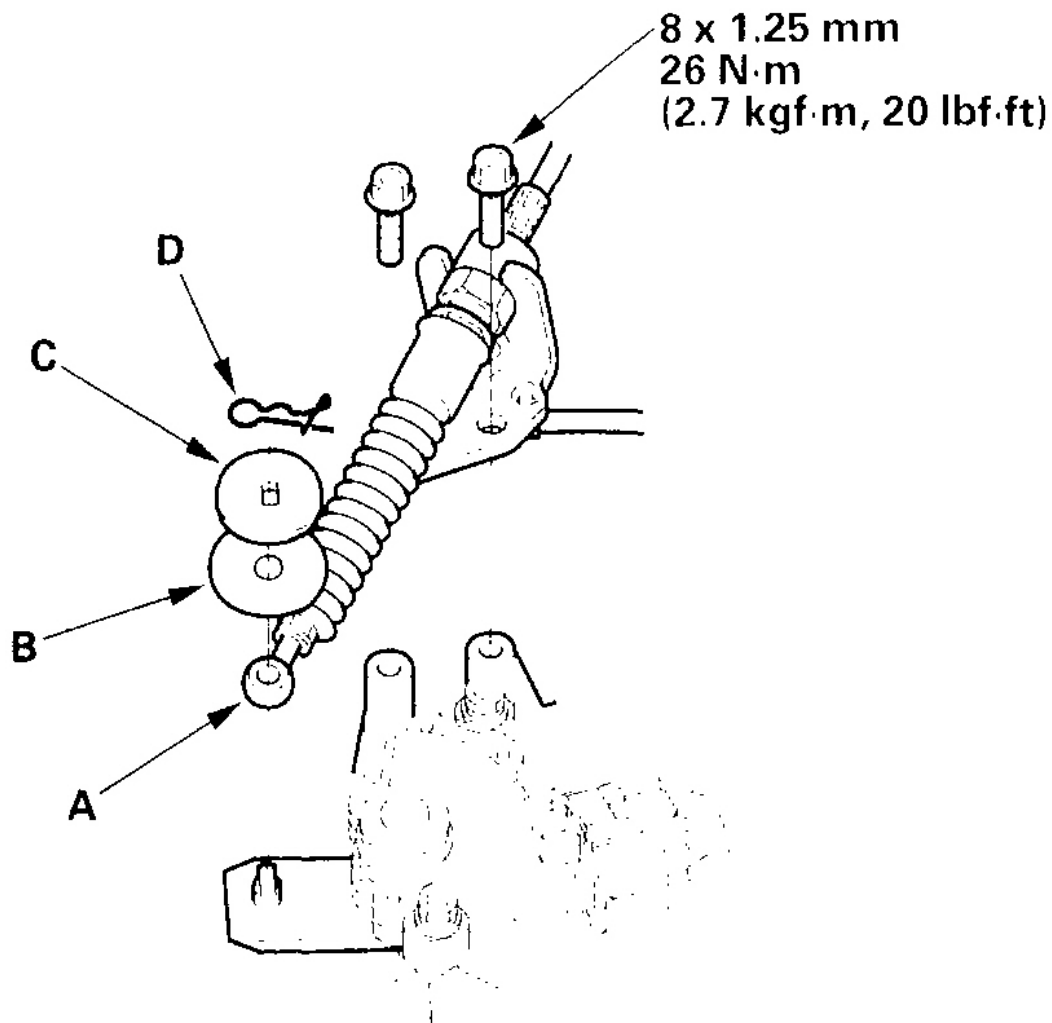
36. Install the evaporative emission (EVAP) canister hose.



G01402715

Fig. 53: Installing EVAP Canister Hose
Courtesy of AMERICAN HONDA MOTOR CO., INC.

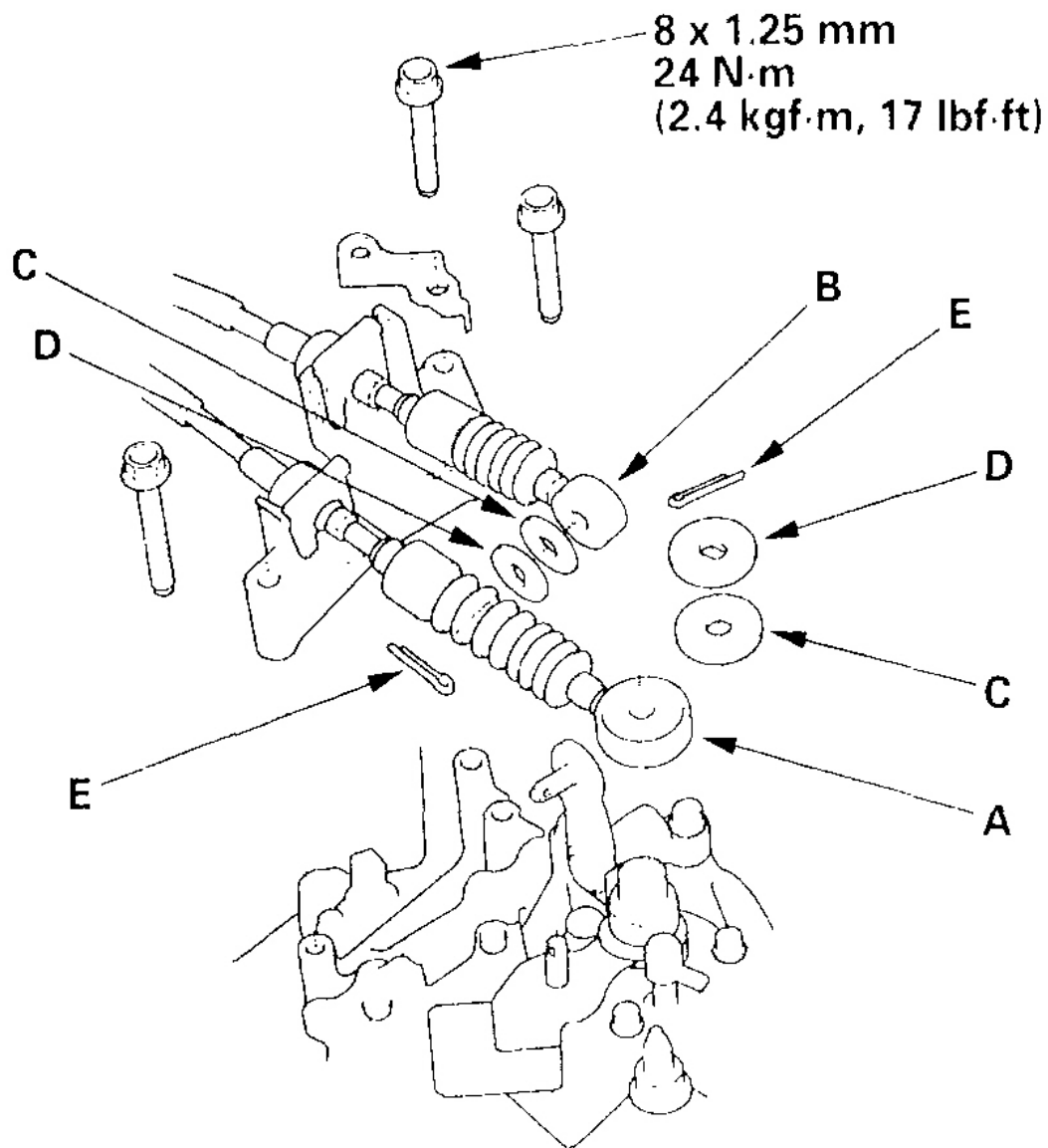
37. CVT: Install the shift cable (A) using the plastic washer (B), washer (C), and spring pin (D).



G01402716

Fig. 54: Installing Shift Cable (CVT) With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

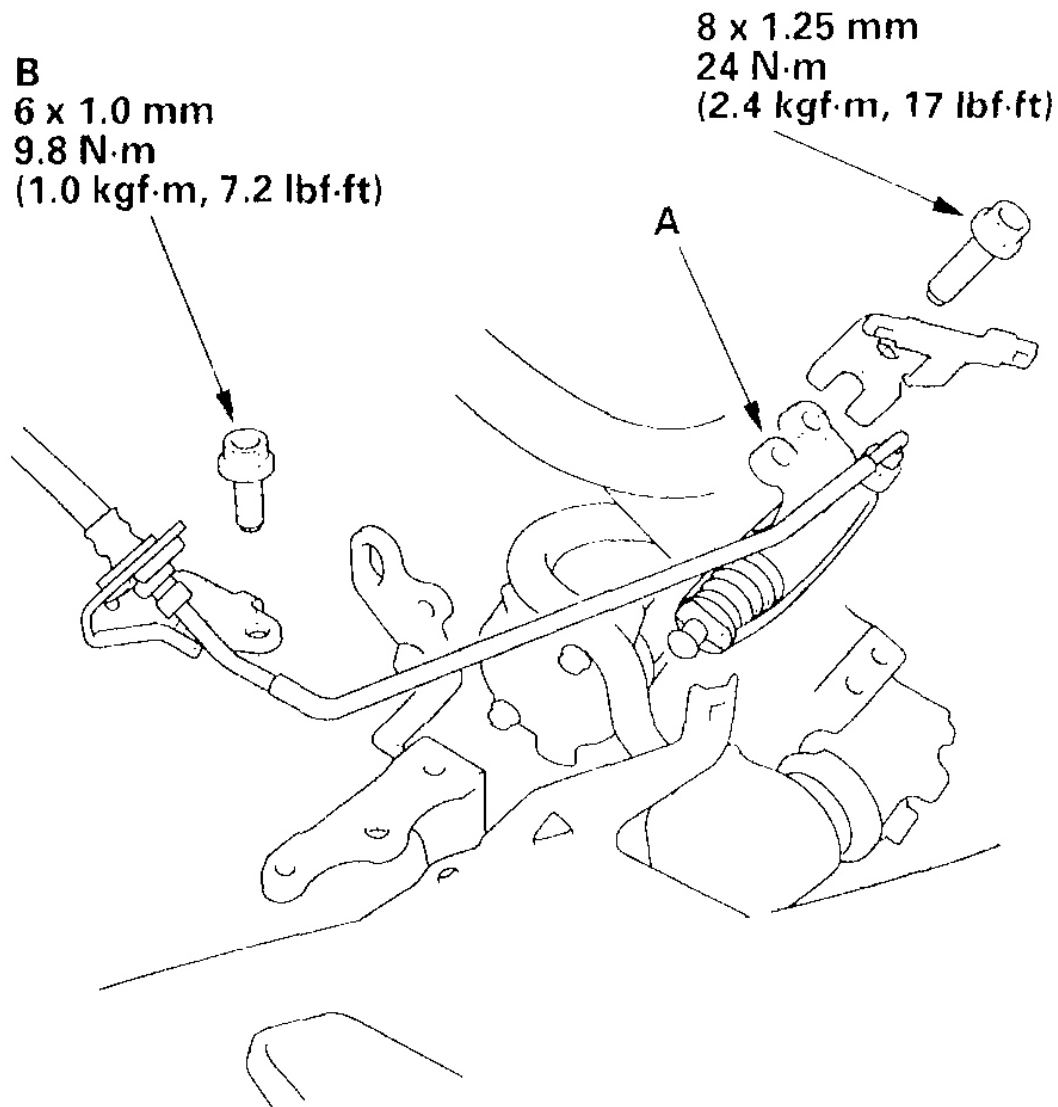
38. M/T: Install the select cable (A) and shift cable (B) using the plastic washers (C), washers (D), and new cotter pins (E).



G01402717

Fig. 55: Installing Select Cable (M/T) With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

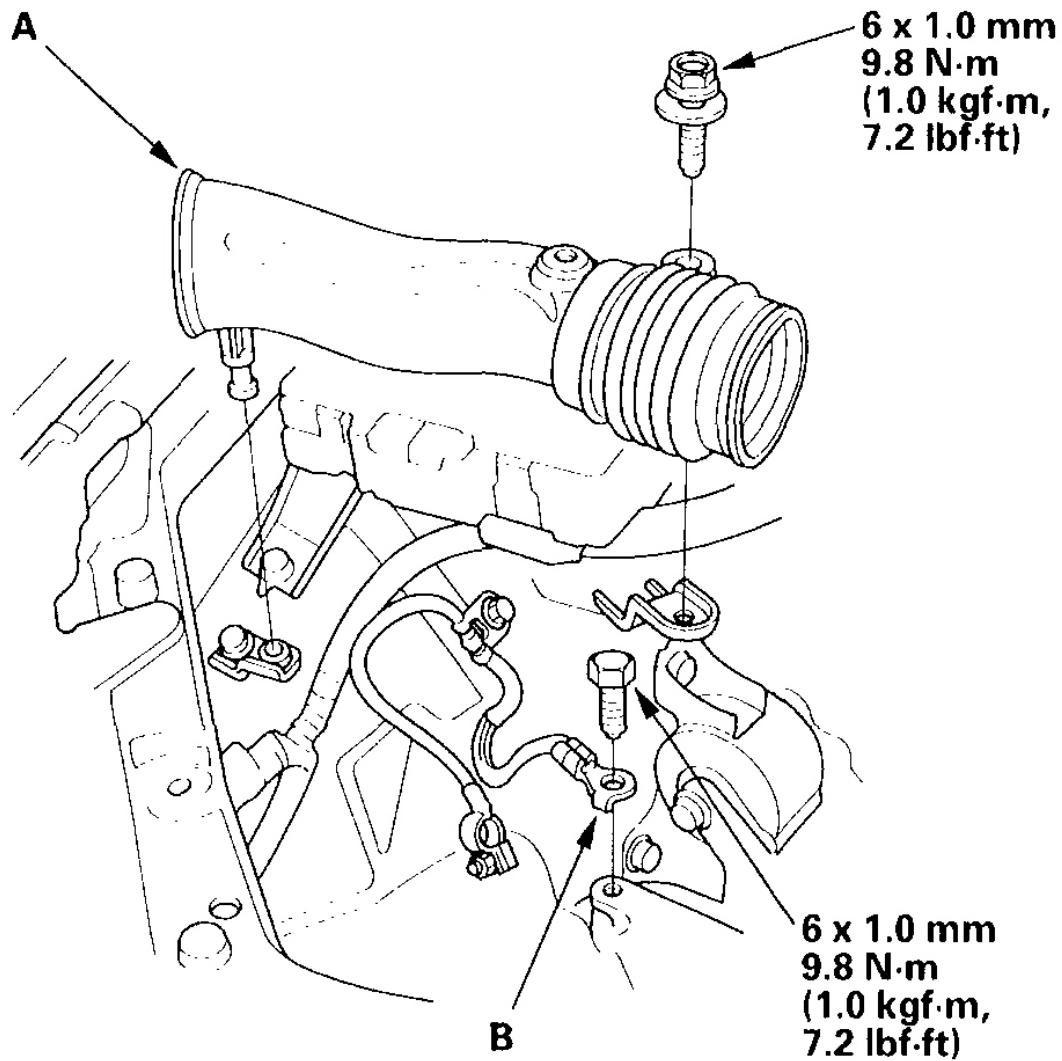
39. M/T: Install the clutch slave cylinder (A) and clutch line bracket mounting bolt (B).



G01402718

Fig. 56: Installing Clutch Slave Cylinder (M/T) With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

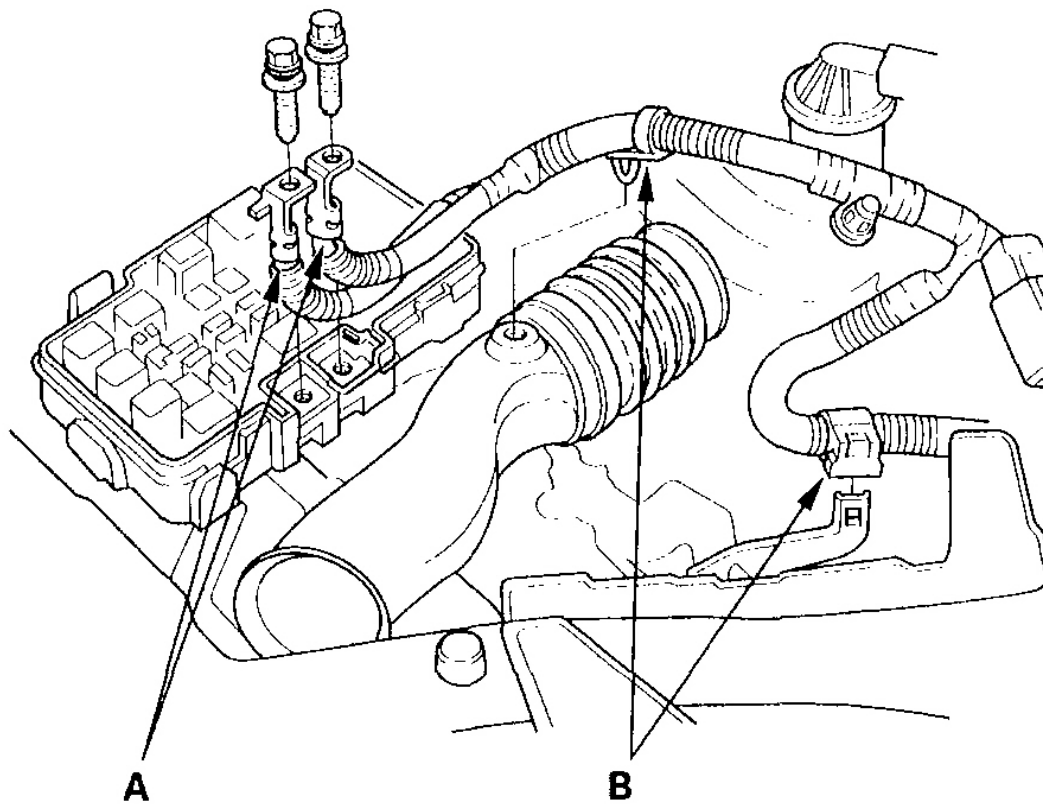
40. Install the battery base.
41. Install the intake air duct (A) and ground cable (B).



G01402719

Fig. 57: Installing Intake Air Duct
Courtesy of AMERICAN HONDA MOTOR CO., INC.

42. Install the battery cable (A) on the under-hood fuse/relay box, then install the harness clamps (B).



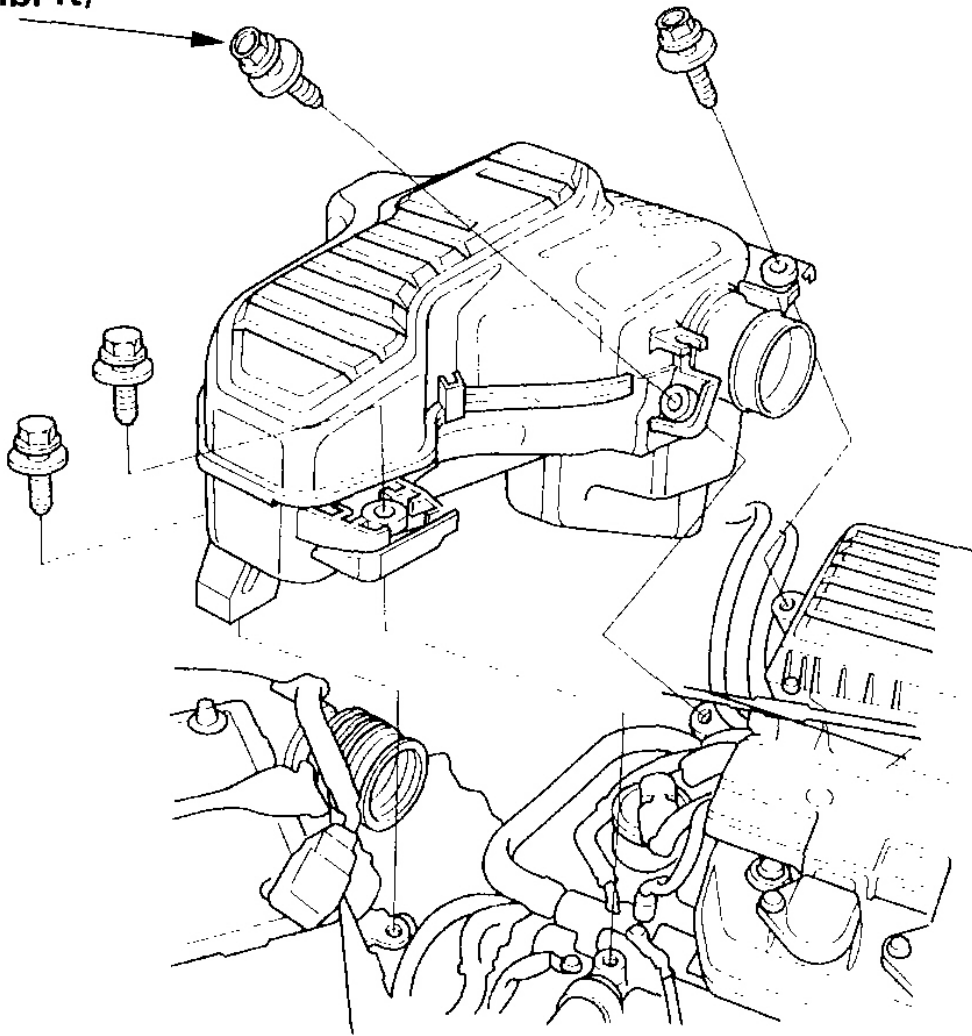
G01402720

Fig. 58: Installing Battery Cable

Courtesy of AMERICAN HONDA MOTOR CO., INC.

43. Install the intake resonator.

6 x 1.0 mm
12 N·m (1.2 kgf·m,
8.7 lbf·ft)



G01402721

Fig. 59: Installing Intake Resonator

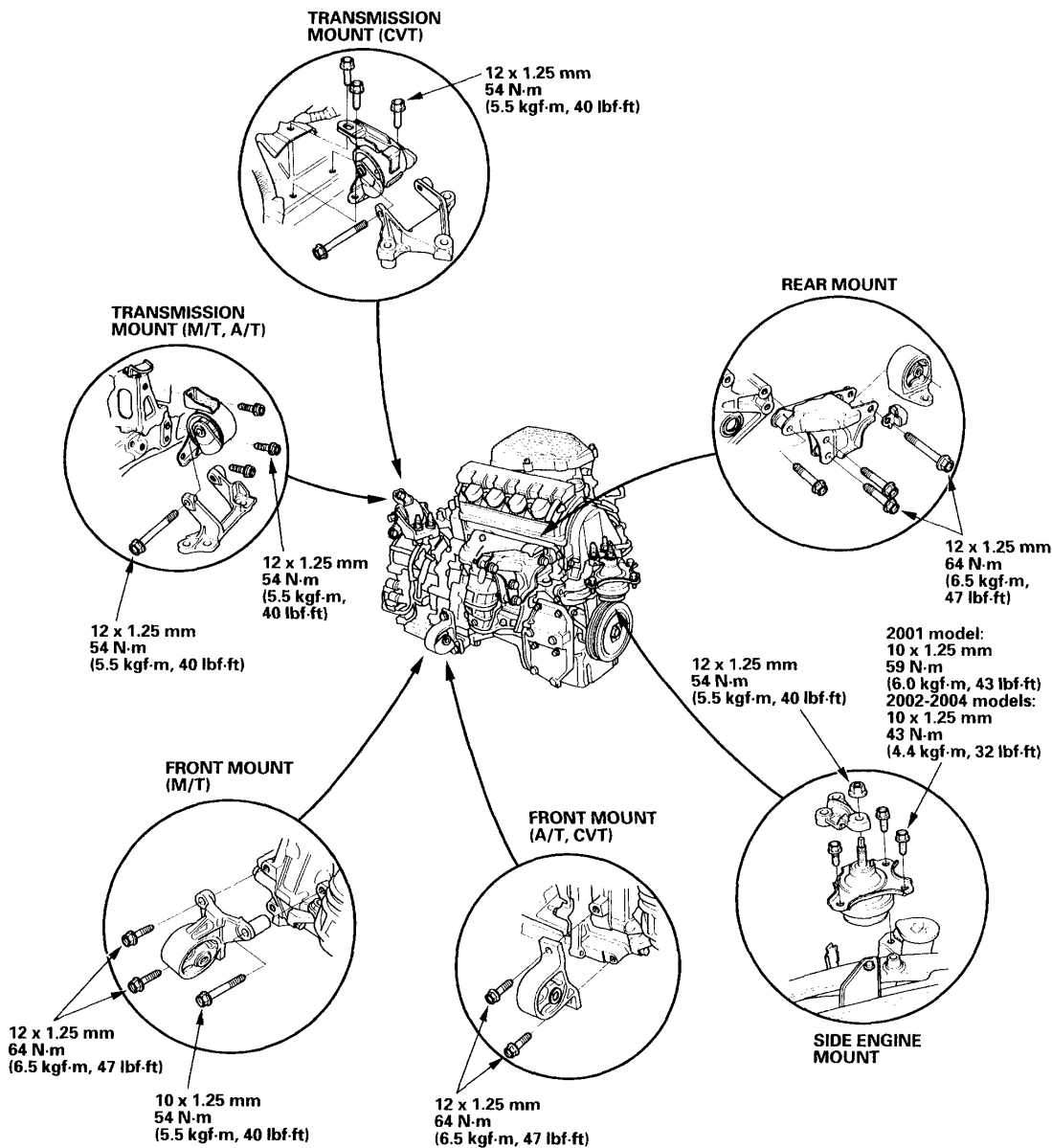
Courtesy of AMERICAN HONDA MOTOR CO., INC.

44. Clean the battery posts and cable terminals with sandpaper. Connect the negative cable, then positive cable and apply grease to prevent corrosion.
45. A/T, CVT: Move the shift lever to each gear, and verify that the A/T gear position indicator follows the transmission range switch.
46. M/T: Check that the transmission shifts into gear smoothly.
47. Inspect for fuel leaks. Turn the ignition switch ON (II) (do not operate the starter) so that the fuel pump

runs for about 2 seconds and pressurizes the fuel line. Repeat this operation two or three times, then check for fuel leakage at any point in the fuel line.

48. Refill the engine with new engine oil (see **ENGINE OIL REPLACEMENT**).
49. Refill the transmission fluid:
 - Manual transmission (see **TRANSMISSION FLUID INSPECTION AND REPLACEMENT**).
 - Automatic transmission (see **TRANSMISSION FLUID INSPECTION AND REPLACEMENT**).
 - CVT (see **ATF REPLACEMENT**).
50. Refill the radiator with engine coolant, and bleed air from the cooling system with the heater valve open (see step 10 on **COOLANT REPLACEMENT**).
51. Perform the ECM/PCM idle learn procedure (see **ECM/PCM IDLE LEARN PROCEDURE**).
52. Check the wheel alignment (see **WHEEL ALIGNMENT PROCEDURES**).
53. Enter the anti-theft code for the radio, then enter the customer's radio station presets.
54. Set the clock.

ENGINE MOUNT REPLACEMENT



G01402722

Fig. 60: Identifying Mount & Bracket Bolts/Nuts With Torque Specifications
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

SPECIAL TOOLS

2001 Honda Civic EX

2001-05 ENGINE Overhaul - 1.7L

Ref. No.	Tool Number	Description	Qty
①	07AAJ-PNAA100	Air Pressure Regulator	1
②	07HAH-PJ7A100	Valve Guide Reamer, 5.5 mm	1
③	07JAA-001020A	Socket, 19 mm	1
④	07JAB-001020B	Holder Handle	1
⑤	07LAJ-PR3020B	Air Stopper	1
⑥	07MAB-PY3010A	Holder Attachment, 50 mm, Offset	1
⑦	07742-0010100	Valve Guide Driver, 5.5 mm	1
⑧	07PAD-0010000	Stem Seal Driver	1
⑨	07757-PJ1010A	Valve Spring Compressor Attachment	1

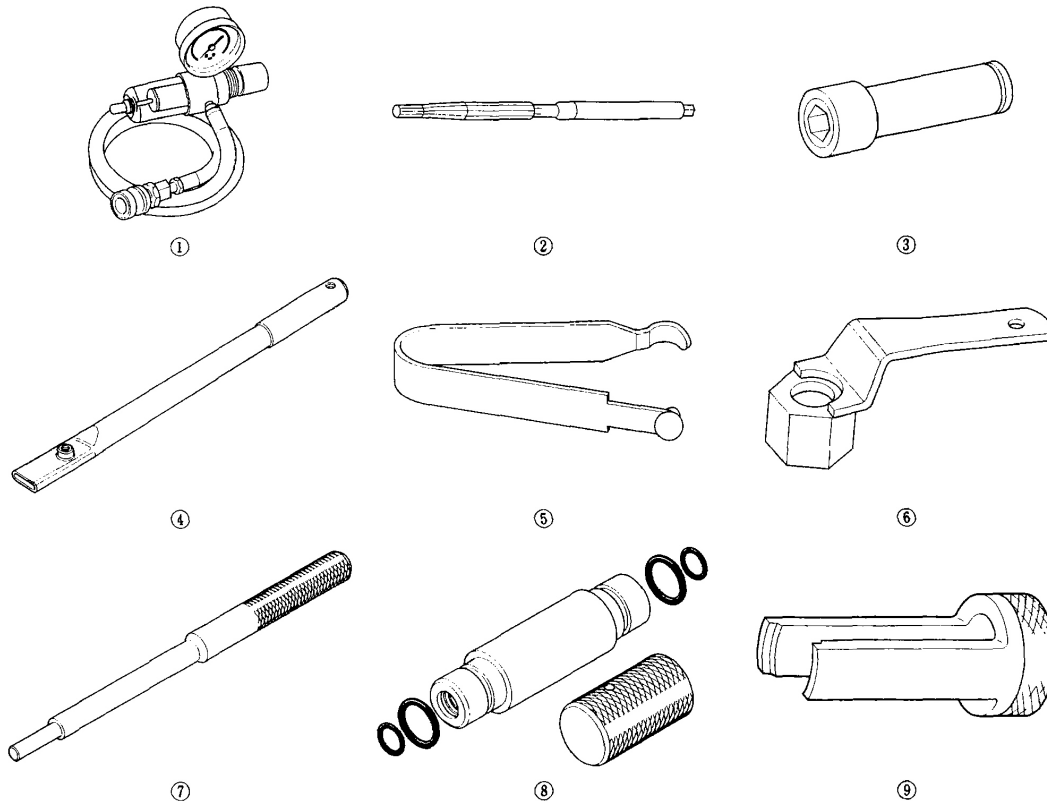
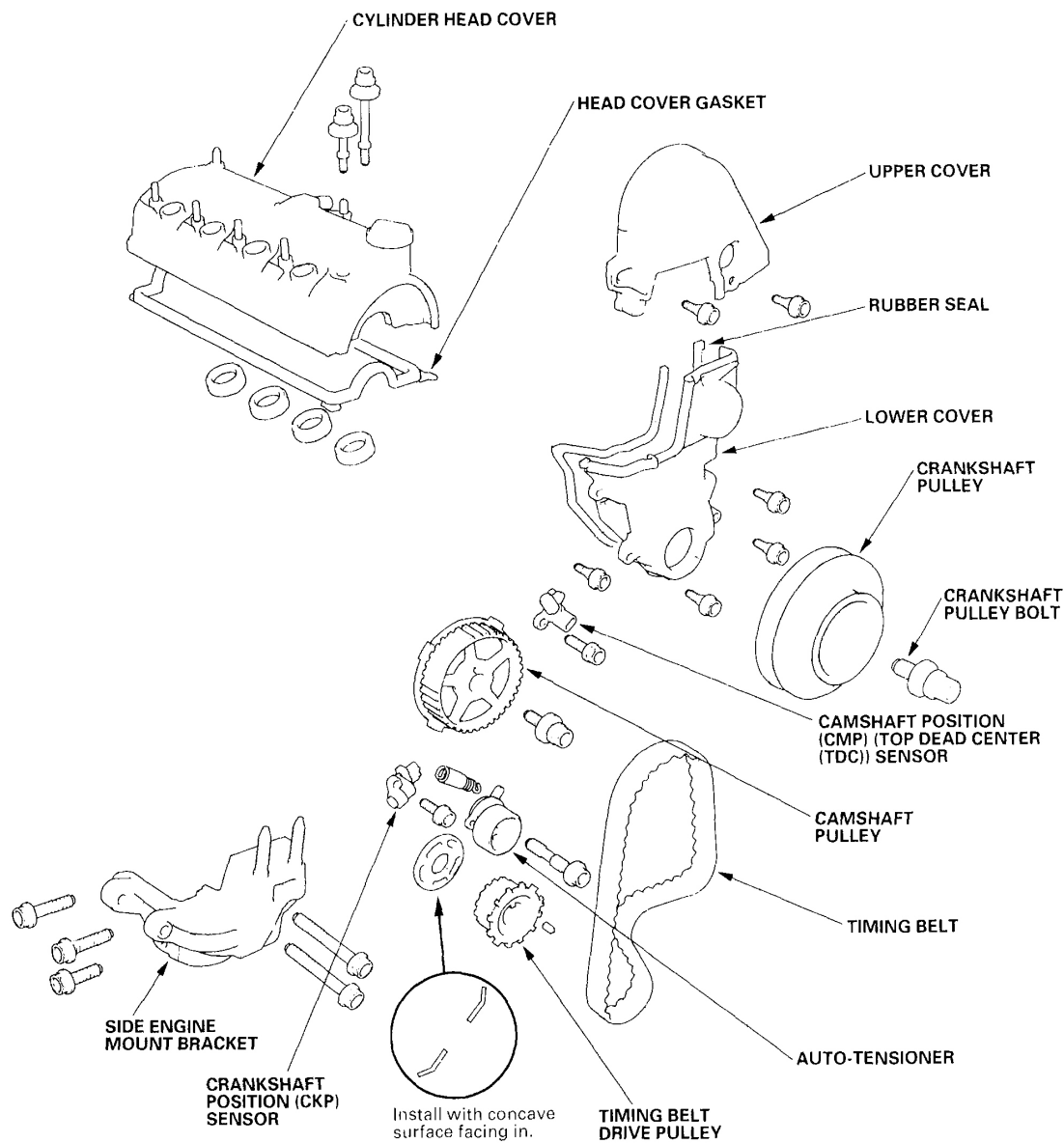


Fig. 61: Cylinder Head Special Tools

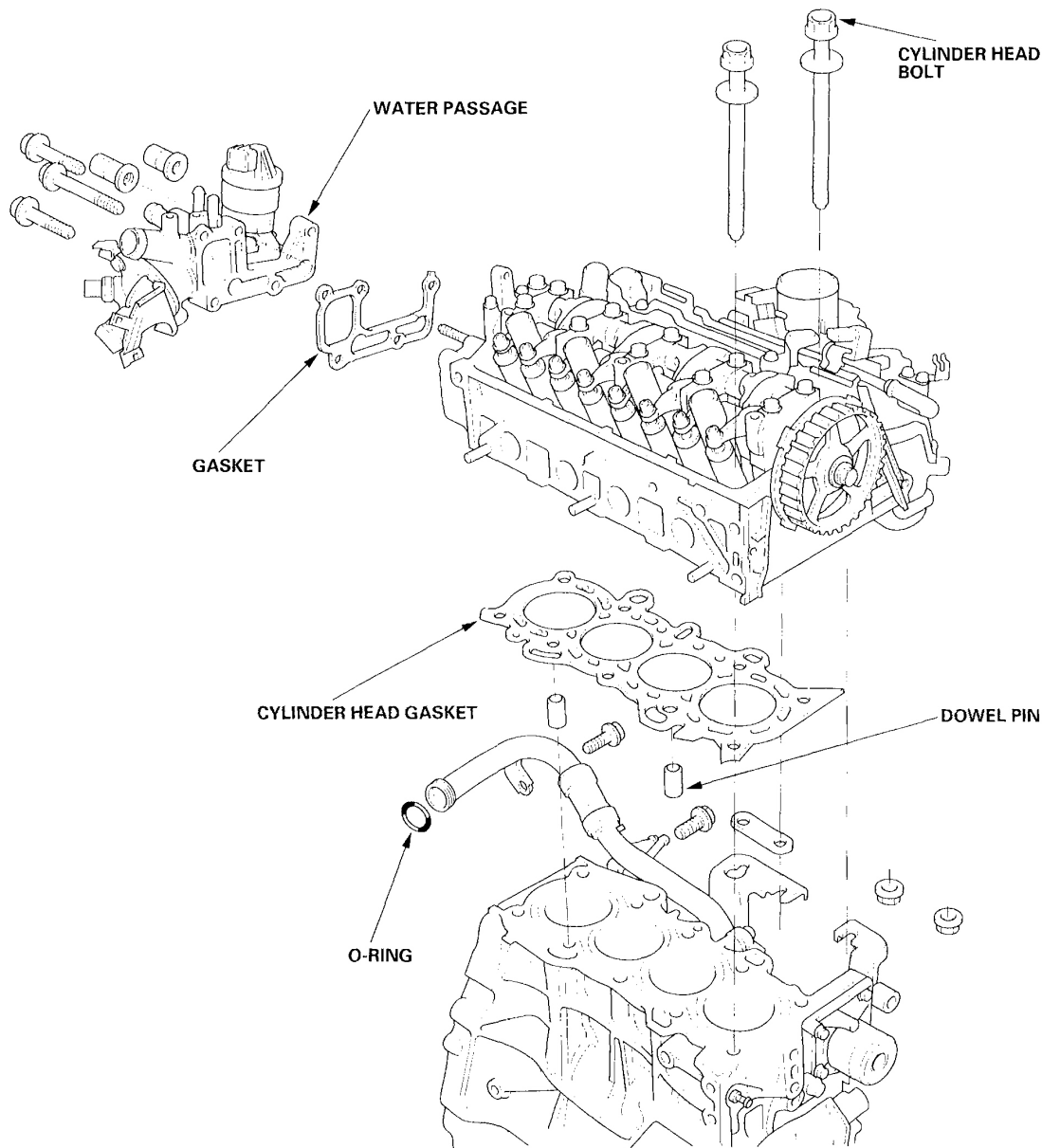
Courtesy of AMERICAN HONDA MOTOR CO., INC.

COMPONENT LOCATION INDEX



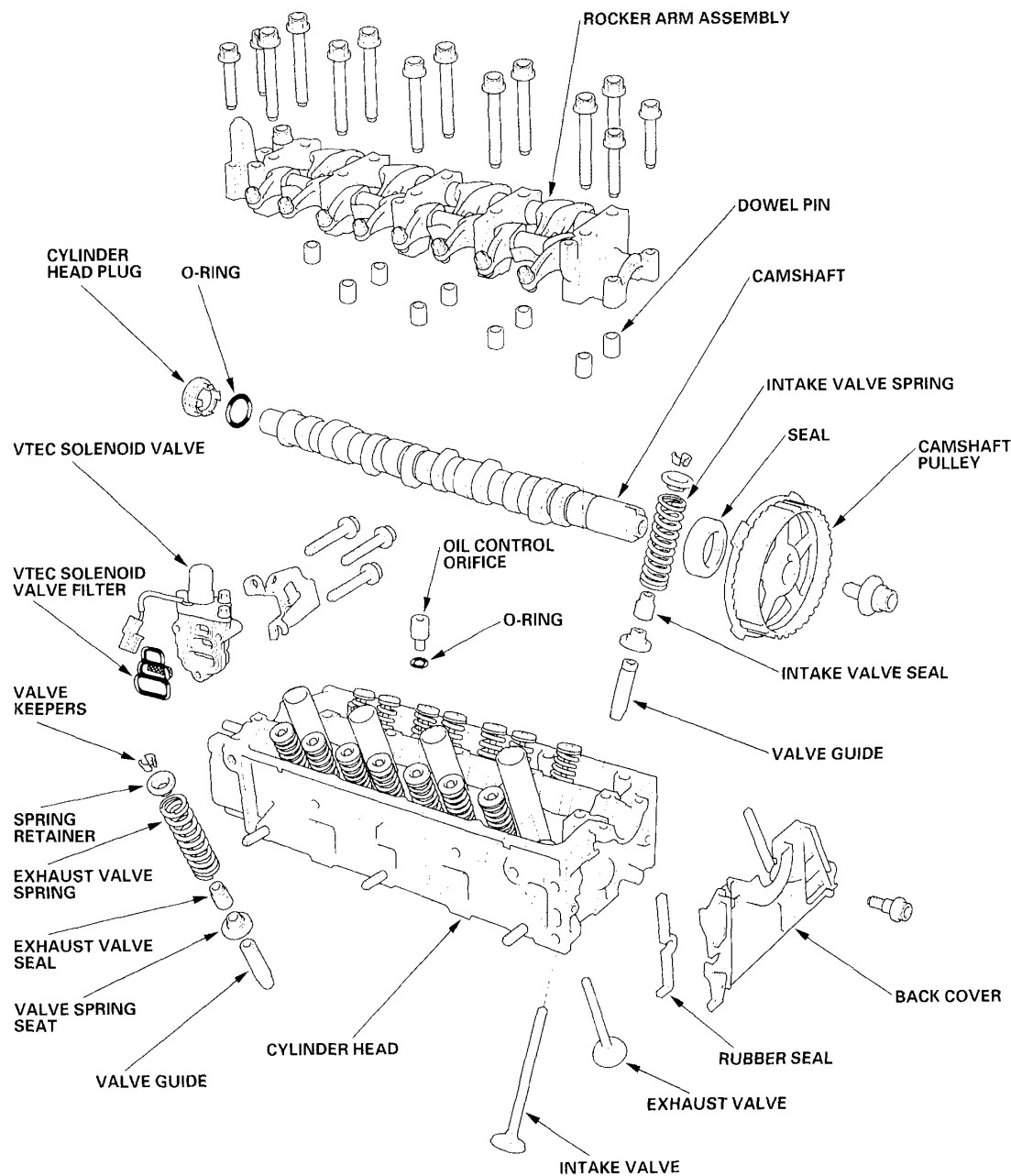
G01401498

Fig. 62: Identifying Cylinder Head Components (D17A1, D17A2, D17A6 Engines - 1 Of 4)
 Courtesy of AMERICAN HONDA MOTOR CO., INC.



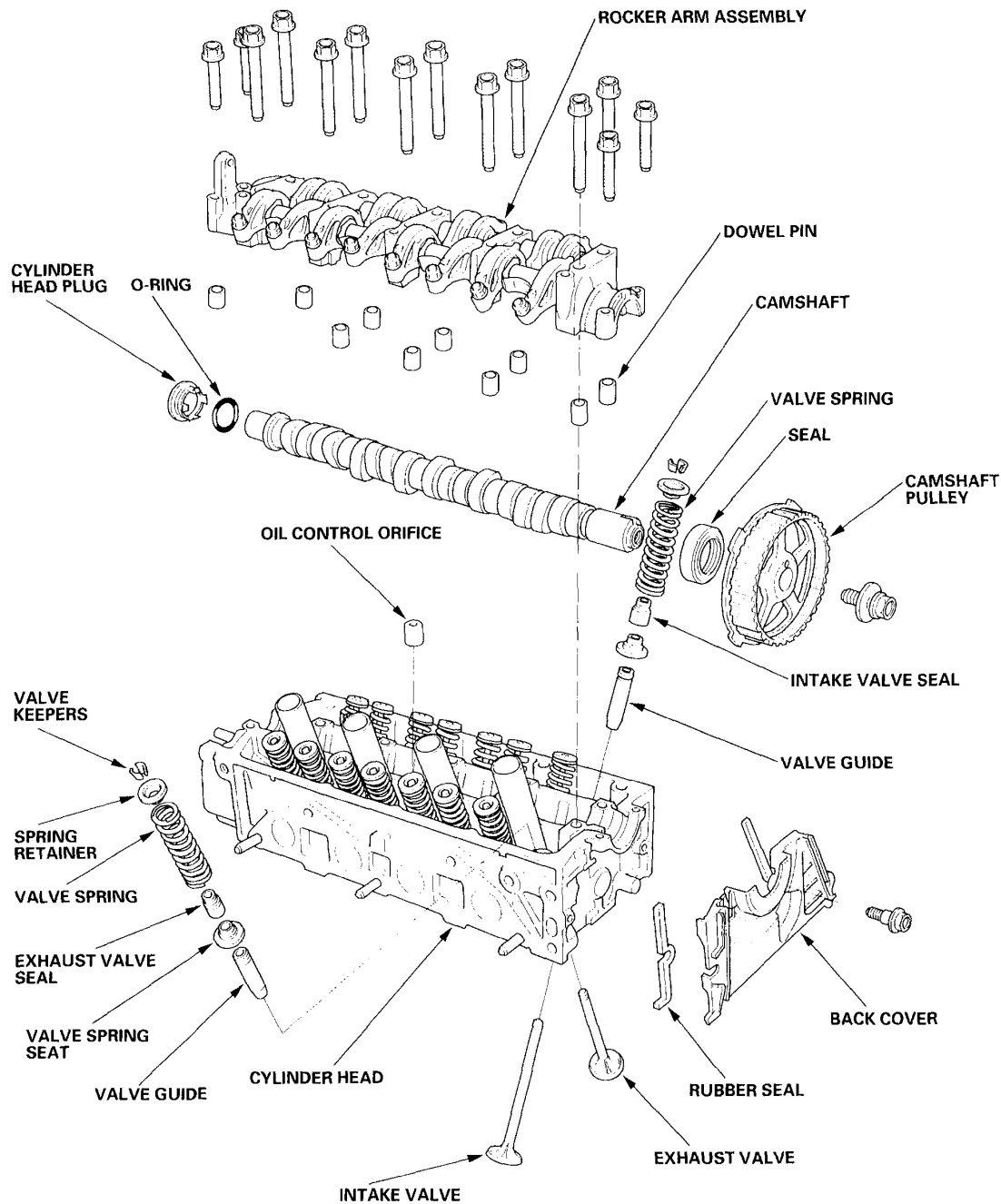
G01401499

Fig. 63: Identifying Cylinder Head Components (D17A1, D17A2, D17A6 Engines - 2 Of 4)
Courtesy of AMERICAN HONDA MOTOR CO., INC.



G01401500

Fig. 64: Identifying Cylinder Head Components (D17A2, D17A6 Engines - 3 Of 4)
 Courtesy of AMERICAN HONDA MOTOR CO., INC.



G01401501

Fig. 65: Identifying Cylinder Head Components (D17A1 Engine - 4 Of 4)
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

ENGINE COMPRESSION INSPECTION

1. Warm up the engine to normal operating temperature (cooling fan comes on).

2. Turn the ignition switch OFF.
3. Remove the air cleaner housing (see step 6 on **Cylinder Head Removal**).
4. Disconnect all four injector connectors.
5. Remove the four ignition coils (see **IGNITION COIL REMOVAL/INSTALLATION**).
6. Remove the four spark plugs.
7. Attach the compression gauge to the spark plug hole.

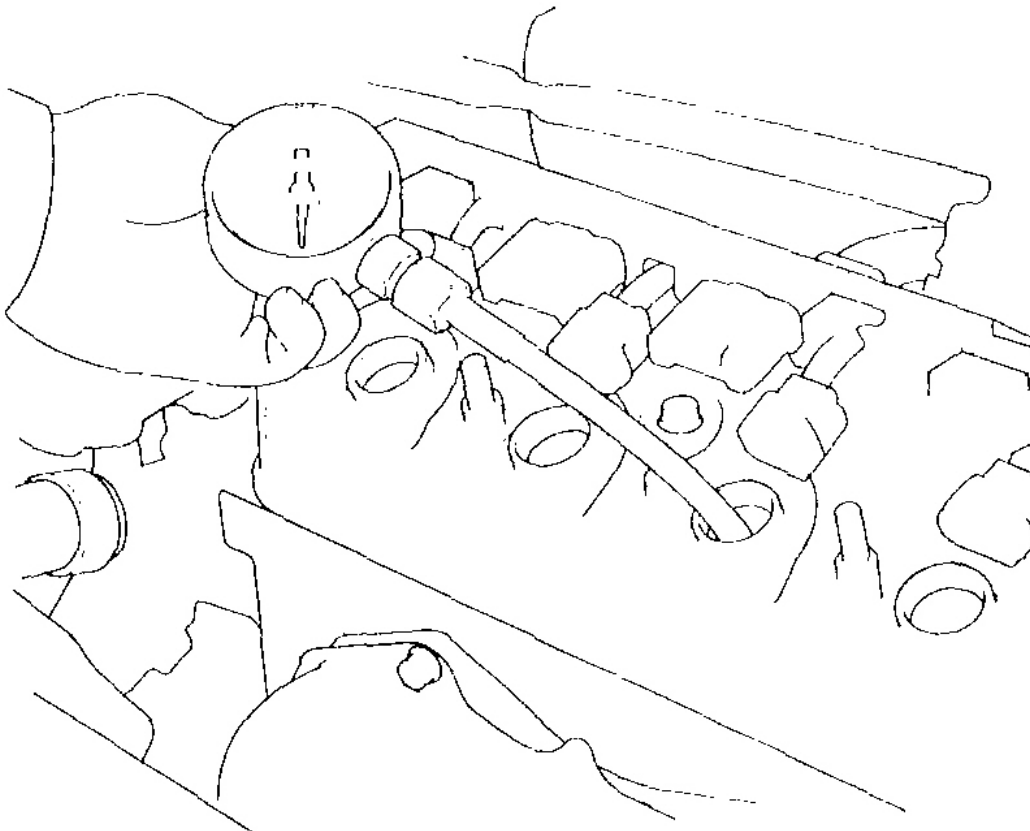
**G01401502**

Fig. 66: Attaching Compression Gauge To Spark Plug Hole
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Connect a tachometer.
9. Open the throttle fully, then crank the engine with the starter motor and measure the compression.

Compression Pressure: Above 930 kPa (9.5 kgf/cm² , 135 psi)

10. Measure the compression on the remaining cylinders.

Maximum variation: Within 200 kPa (2.0 kgf/cm² , 28 psi)

11. If the compression is not within specifications, check the following items, then remeasure the compression.
 - Damaged or worn valves and seats
 - Damaged cylinder head gasket
 - Damaged or worn piston rings
 - Damaged or worn piston and cylinder bore

VTEC OIL PRESSURE SWITCH REPLACEMENT

1. Remove the resonator (see step 5 on **Cylinder Head Removal**).
2. Remove the bolt (A) and loosen the bolt (B) securing the VTEC solenoid valve, then remove the harness bracket (C) from the VTEC solenoid valve.

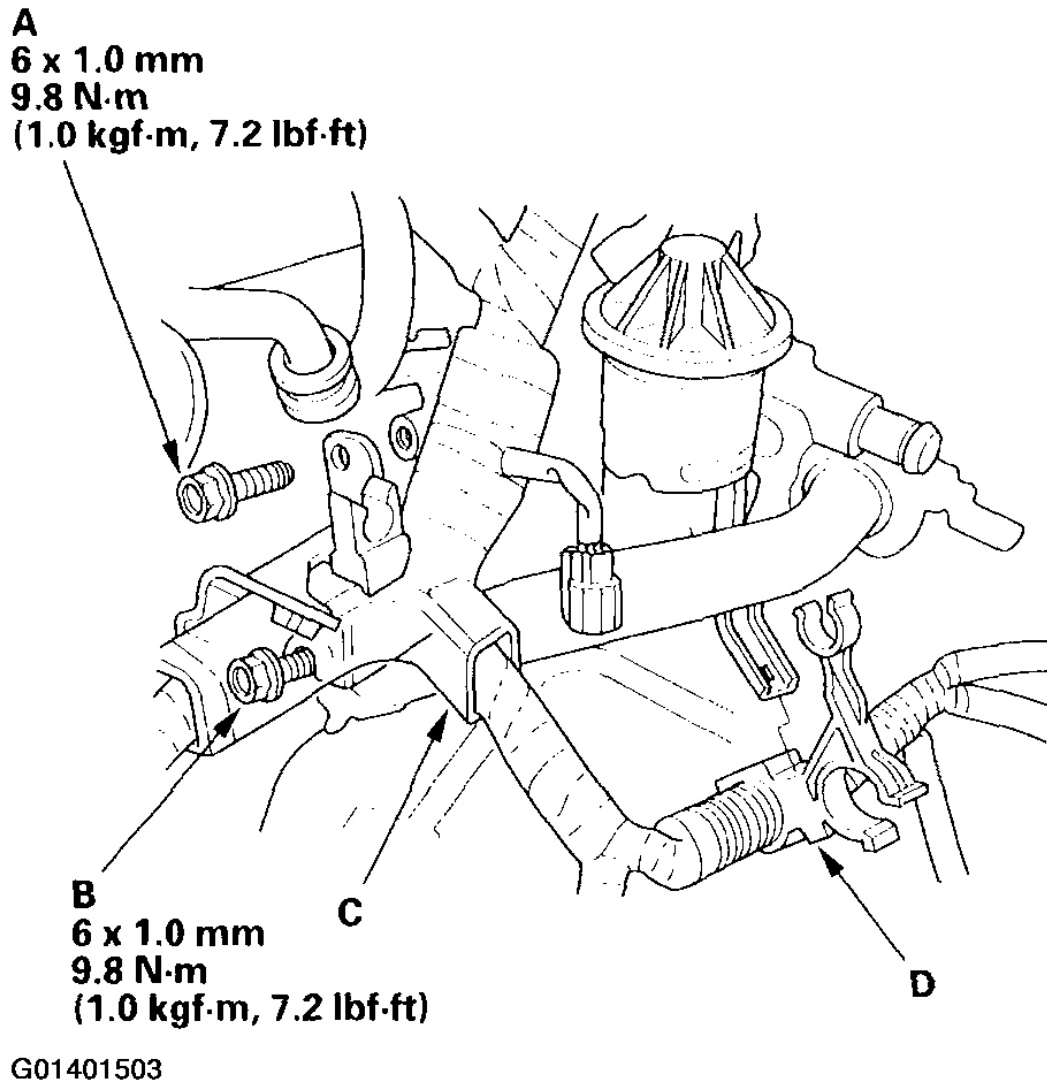


Fig. 67: Removing Bolt & Loosening Bolt Securing VTEC Solenoid Valve With Torque Specifications

Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Remove the harness clamp (D) from the connecting pipe.
4. Disconnect the VTEC oil pressure switch connector, then remove the VTEC oil pressure switch (A).

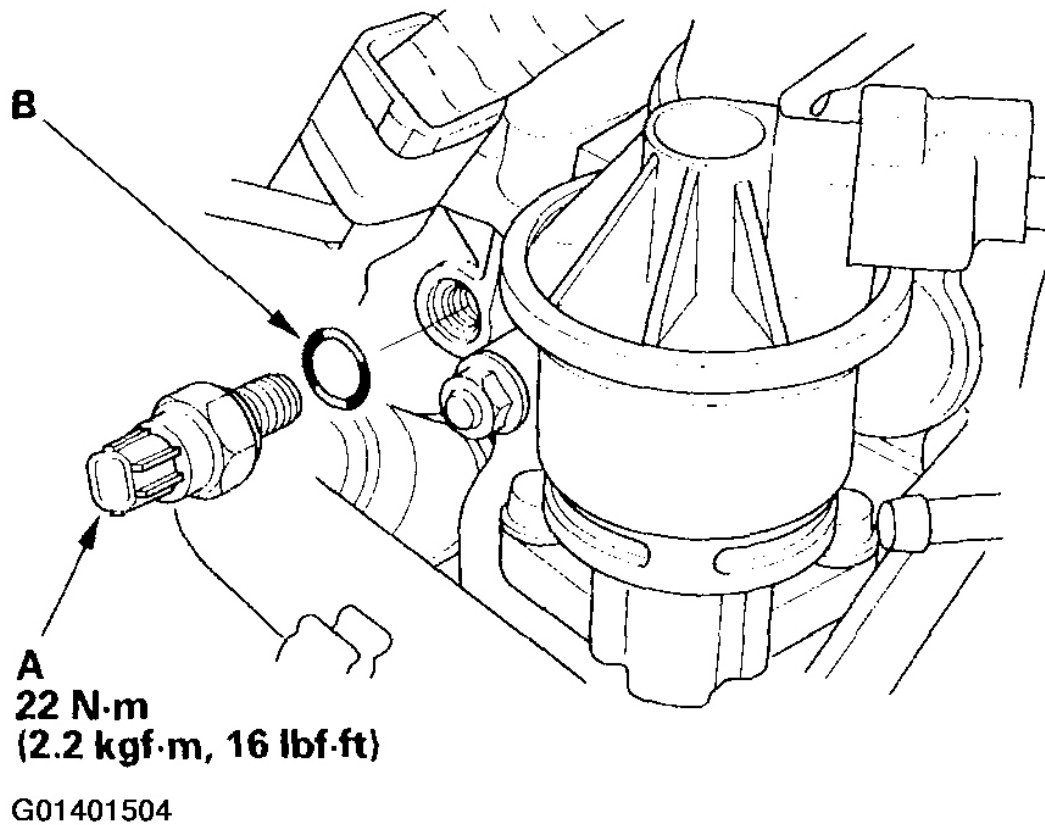


Fig. 68: Removing VTEC Oil Pressure Switch With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

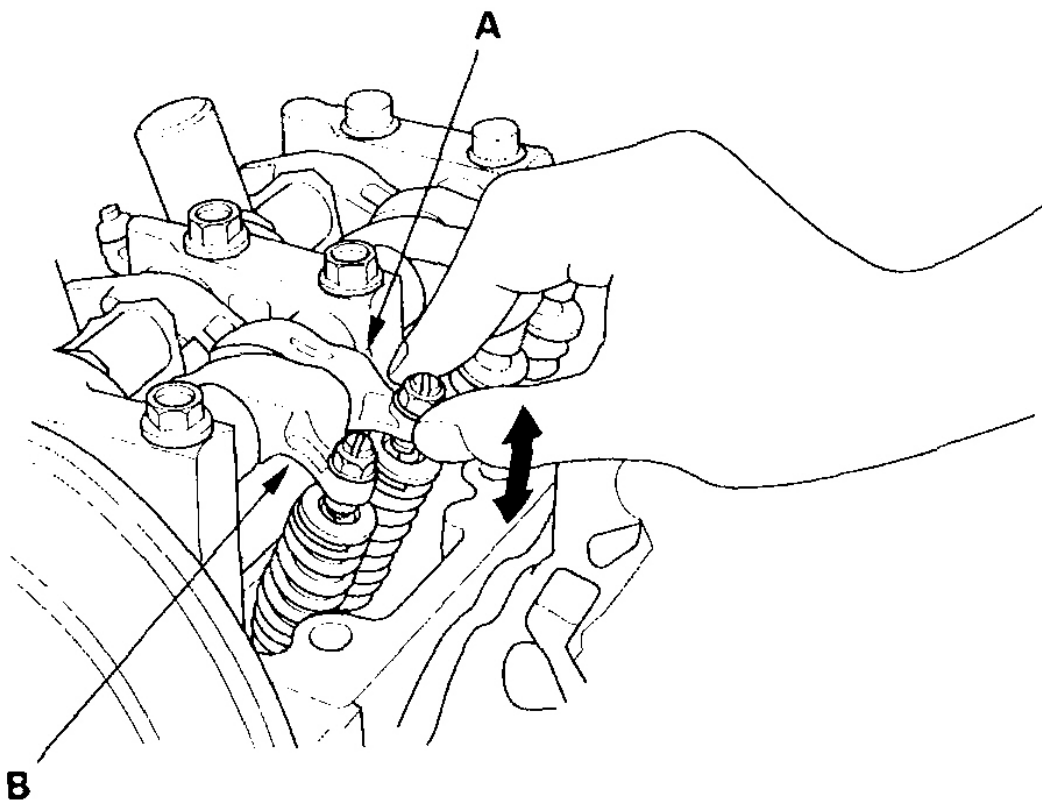
5. Install the VTEC oil pressure switch using a new O-ring (B).

VTEC ROCKER ARM TEST

Special Tools Required

- Air pressure regulator 07AAJ-PNAA100
 - Air stopper 07LAJ-PR3020B
1. Remove the resonator (see step 5 on **Cylinder Head Removal**).
 2. Remove the ignition coil cover, then remove the four ignition coils (see **IGNITION COIL REMOVAL/INSTALLATION**).
 3. Remove the throttle cable clamps and harness holder from the cylinder head cover (see step 9 on **Timing Belt Removal**).
 4. Remove the cylinder head cover (see step 10 on **Timing Belt Removal**).

5. Set the No. 1 piston at Top Dead Center (TDC) (see step 5 on **Valve Clearance Adjustment**).
6. Verify that the intake secondary rocker arm (A) moves independently of the intake primary rocker arm (B).
 - If the intake secondary rocker arm does not move, remove the primary and secondary rocker arms as an assembly and check that the pistons in the secondary and primary rocker arms move smoothly. If any rocker arm needs replacing, replace the primary and secondary rocker arms as an assembly, and retest.
 - If the intake secondary rocker arm moves freely, go to step 7.

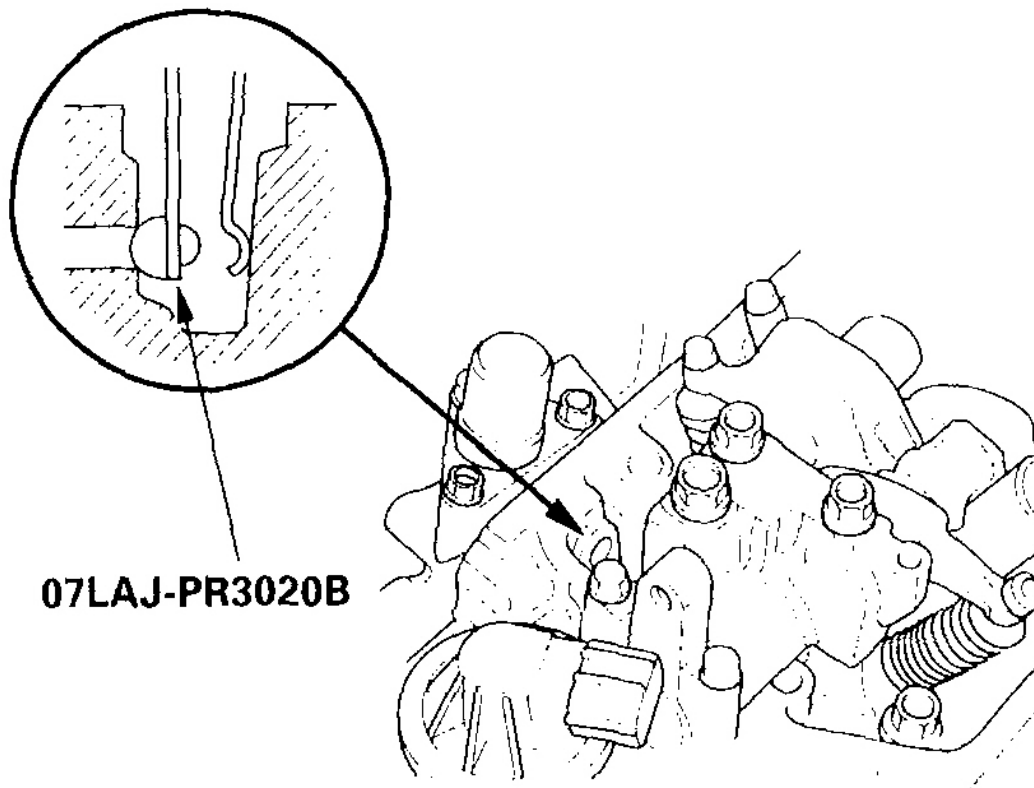


G01401505

Fig. 69: Verifying Intake Secondary Rocker Arms
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Repeat step 6 on the remaining intake secondary rocker arms with each piston at TDC. When all the secondary rocker arms pass the test, go to step 8.
8. Check that the air pressure on the shop air compressor gauge indicates over 400 kPa (4 kgf/cm² , 57 psi).
9. Inspect the valve clearance (see **Valve Clearance Adjustment**).
10. Cover the timing belt with a shop towel to protect the belt.

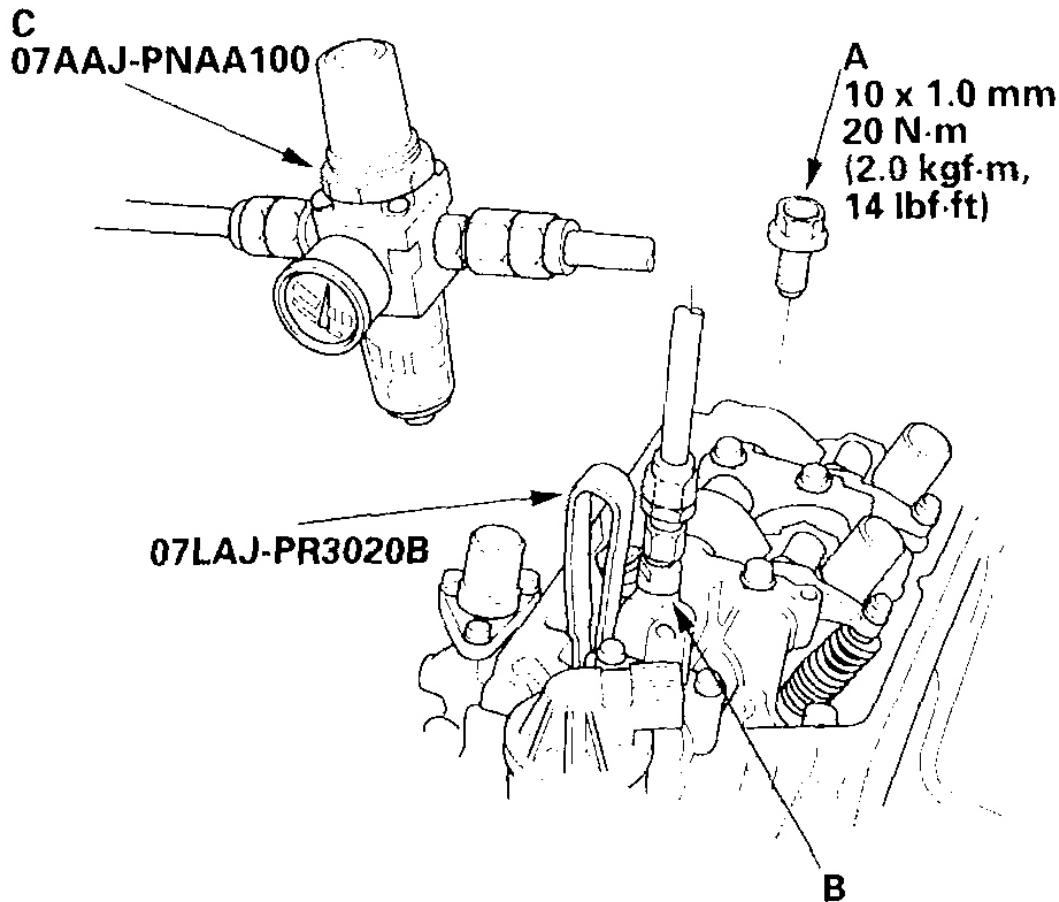
11. Plug the relief hole with the air stopper.



G01401506

Fig. 70: Plugging Relief Hole With Air Stopper
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Remove the sealing bolt (A) from the inspection hole (B), and connect an air pressure regulator with a 0 - 100 psi gauge (C).



G01401507

Fig. 71: Locating Sealing Bolt With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Loosen the valve on the regulator, and apply the specified air pressure.

Specified Air Pressure: 250 kPa (2.5 kgf/cm², 36 psi)

NOTE: If the synchronizing piston does not move after applying air pressure, move the primary or secondary rocker arm up and down manually by rotating the crankshaft counterclockwise.

14. Move the intake secondary rocker arm (A) for the No. 1 cylinder. The primary rocker arm (B) and secondary rocker arm should move together.
- If the intake primary rocker arm does not move, remove the primary and secondary rocker arms as an assembly and check that the pistons in the secondary and primary rocker arms move smoothly. If any rocker arm needs replacing, replace the primary and secondary rocker arms as an assembly,

and retest.

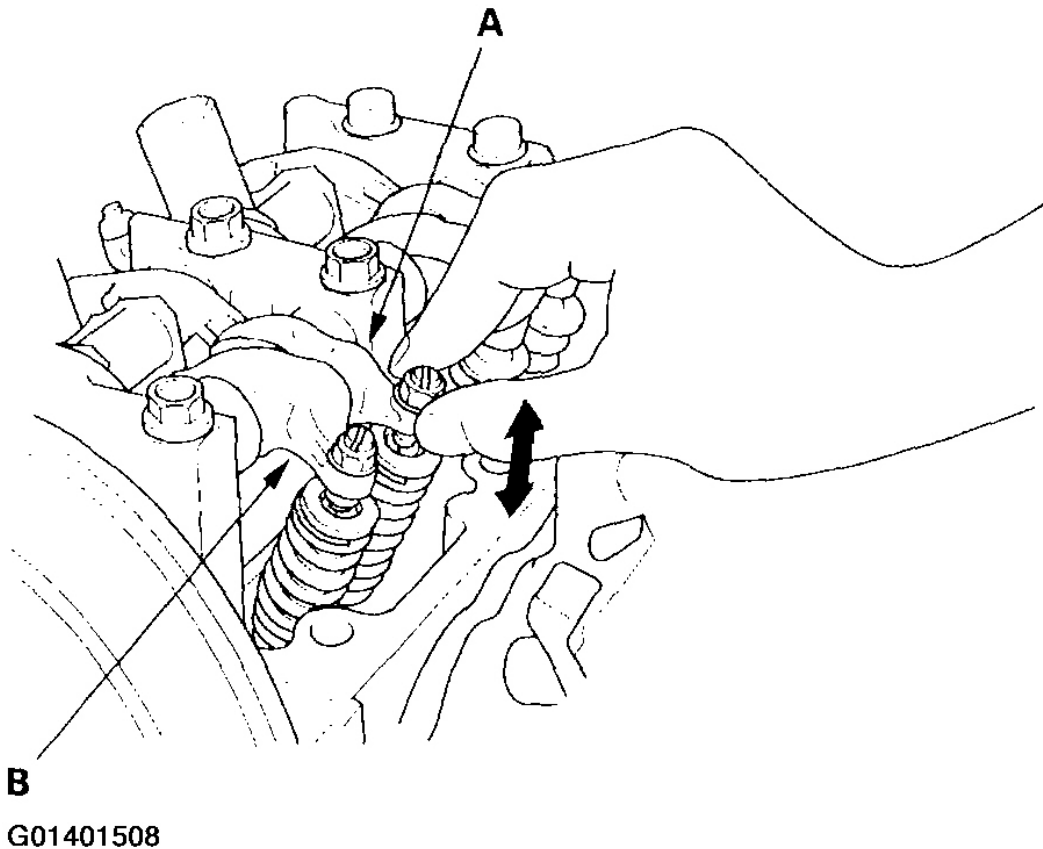


Fig. 72: Moving Intake Secondary Rocker Arm For No. 1 Cylinder
Courtesy of AMERICAN HONDA MOTOR CO., INC.

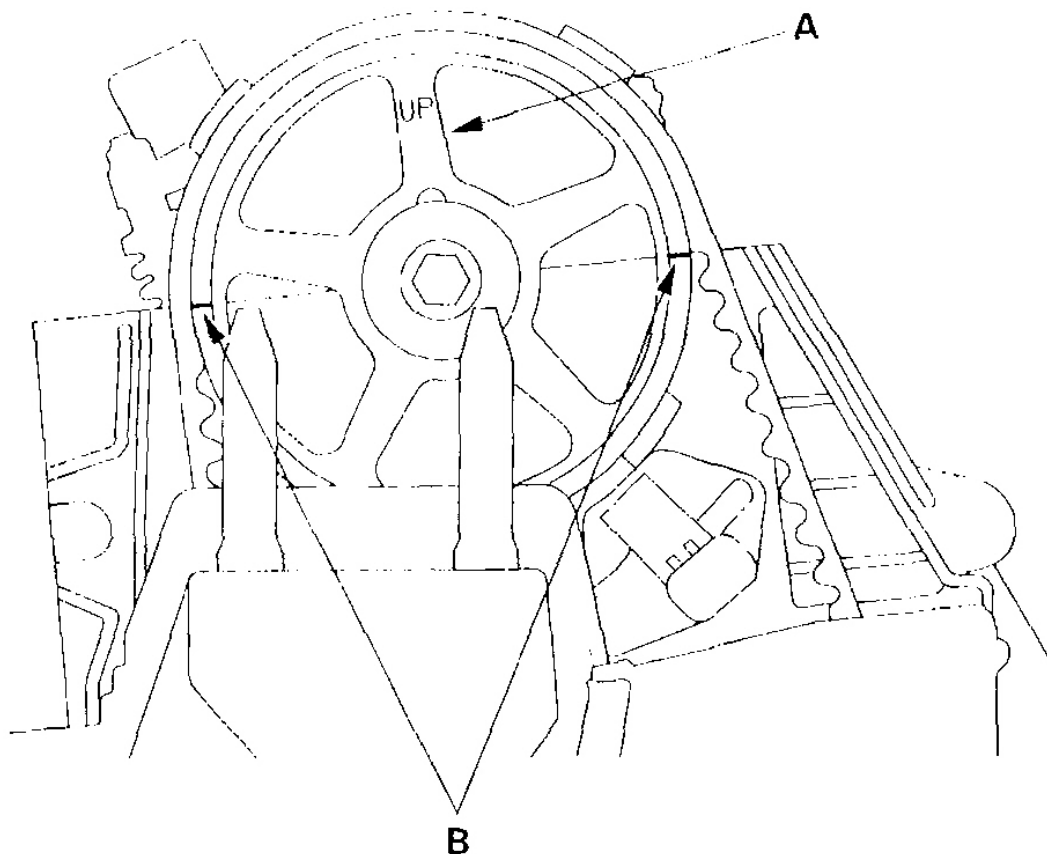
15. Remove the special tools.

VALVE CLEARANCE ADJUSTMENT

NOTE: Adjust the valves only when the cylinder head temperature is less than 100°F (38°C).

1. Remove the ignition coil cover, then remove the four ignition coils (see **IGNITION COIL REMOVAL/INSTALLATION**).
2. Remove the throttle cable clamps and harness holder from the cylinder head cover (see step 9 on **Timing Belt Removal**).
3. Remove the cylinder head cover (see step 10 on **Timing Belt Removal**).
4. Remove the grommet from the upper cover, and disconnect the camshaft position (CMP) (top dead center

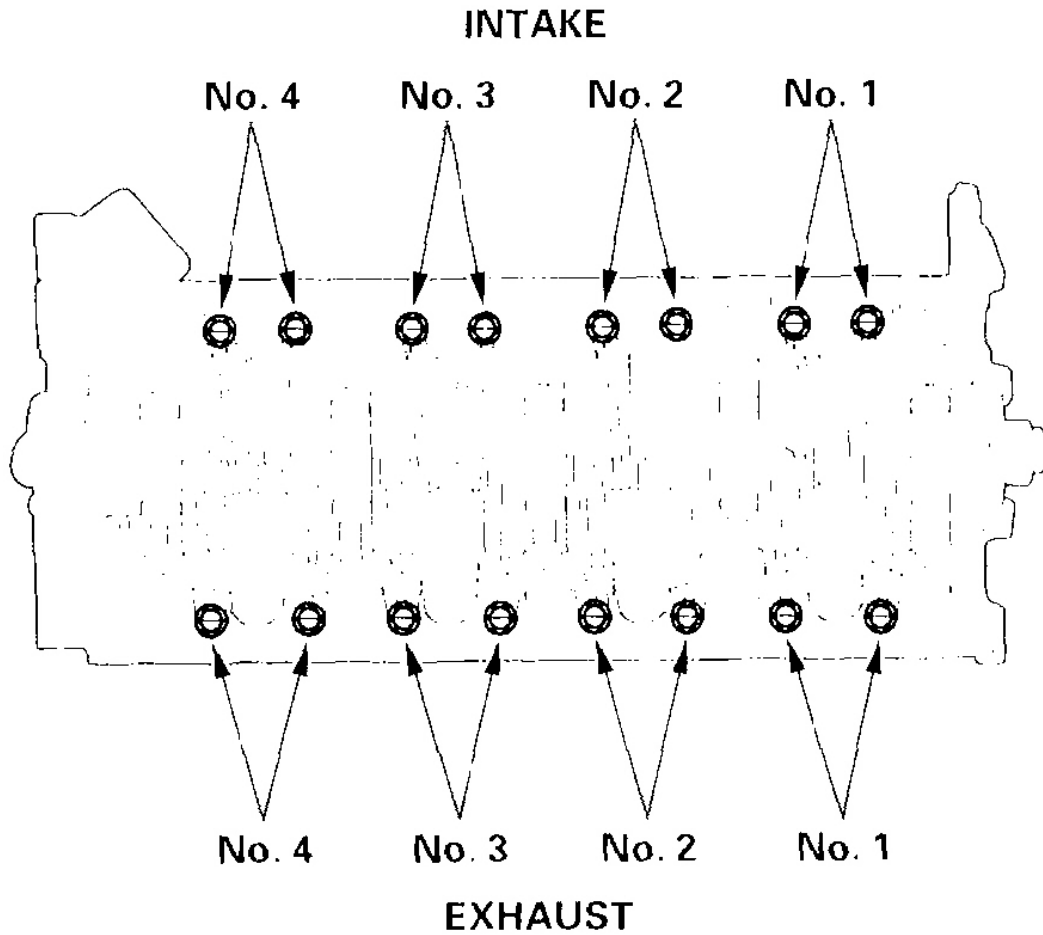
- (TDC)) sensor connector. Remove the upper cover (see step 1 on **CMP (TDC) Sensor Replacement**).
5. Set the No. 1 piston at TDC. The "UP" mark (A) on the camshaft pulley should be at the top, and the TDC marks (B) on the pulley should line up with the top edge of the head.



G01401509

Fig. 73: Marking "UP" On Camshaft Pulley Should Be At Top
Courtesy of AMERICAN HONDA MOTOR CO., INC.

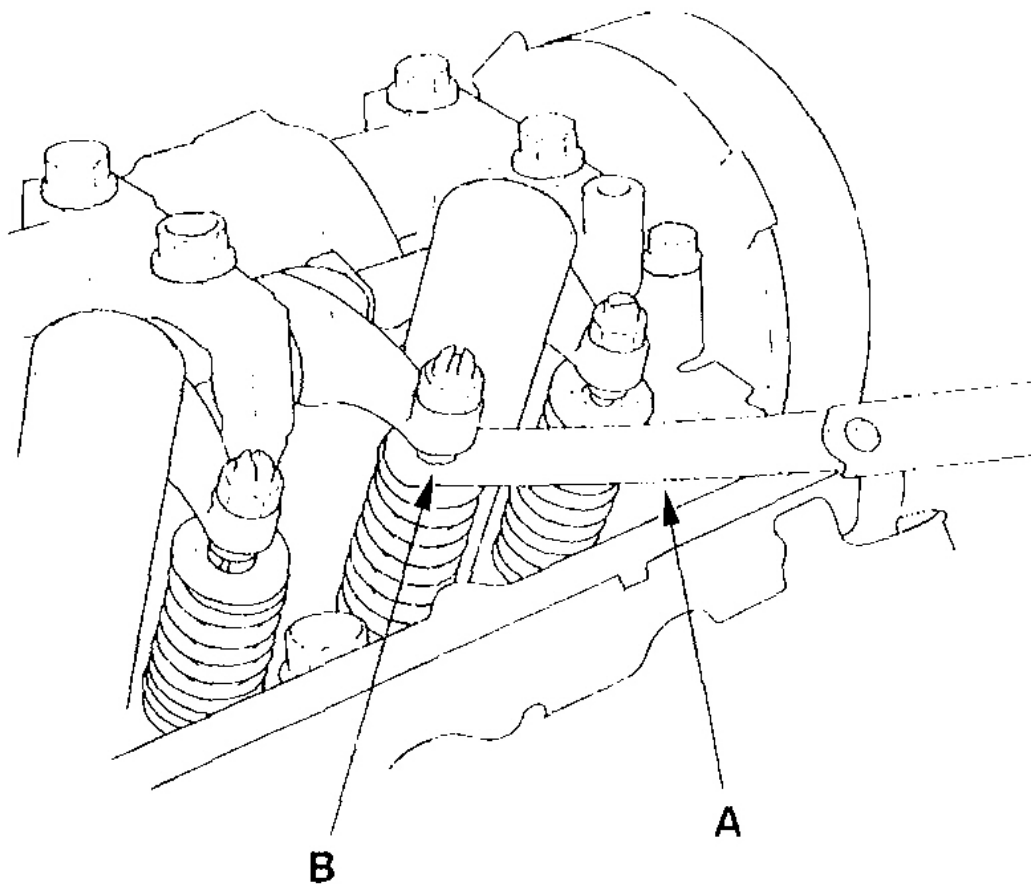
6. Select the correct thickness feeler gauge for the valves you're going to check.
Intake: 0.18 0.22 mm (0.007 0.009 in.)
Exhaust: 0.23 0.27 mm (0.009 0.011 in.)



G01401510

Fig. 74: Selecting Correct Thickness Feeler Gauge For Valves (Adjusting Screw Location)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Insert the feeler gauge (A) between the adjusting screw (B) and the end of the valve stem and slide it back and forth; you should feel a slight amount of drag.



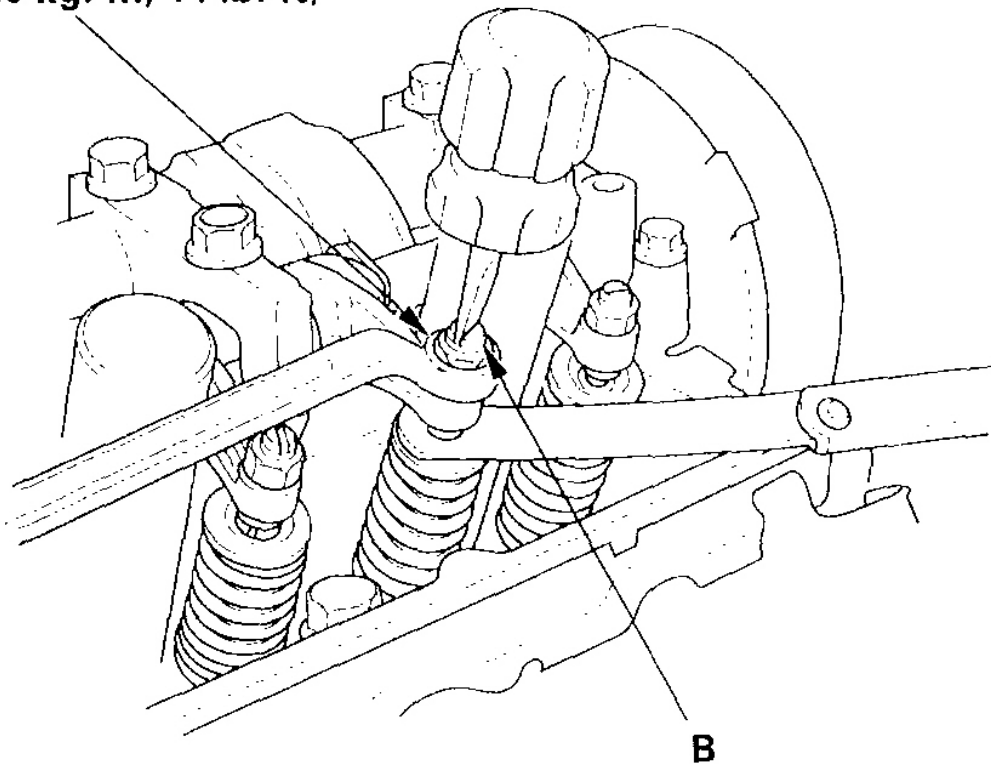
G01401511

Fig. 75: Inserting Feeler Gauge

Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. If you feel too much or too little drag, loosen the locknut (A), and turn the adjusting screw (B) until the drag on the feeler gauge is correct.

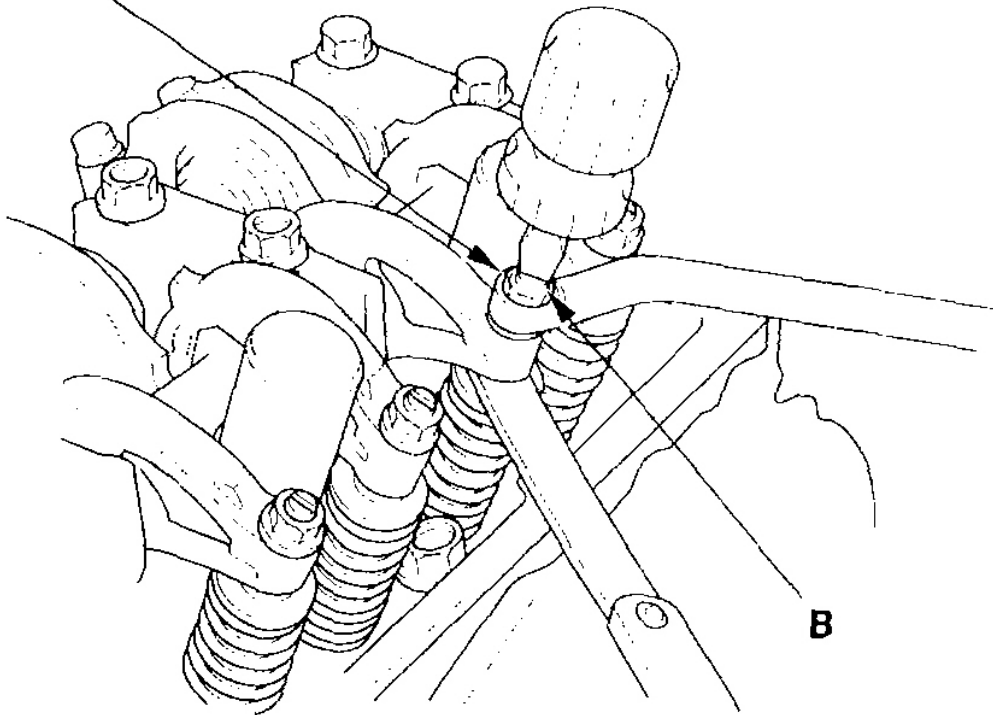
A
7 x 0.75 mm
20 N·m
(2.0 kgf·m, 14 lbf·ft)



G01401512

Fig. 76: Loosening Locknut (D17A2, D17A6 Engines) With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

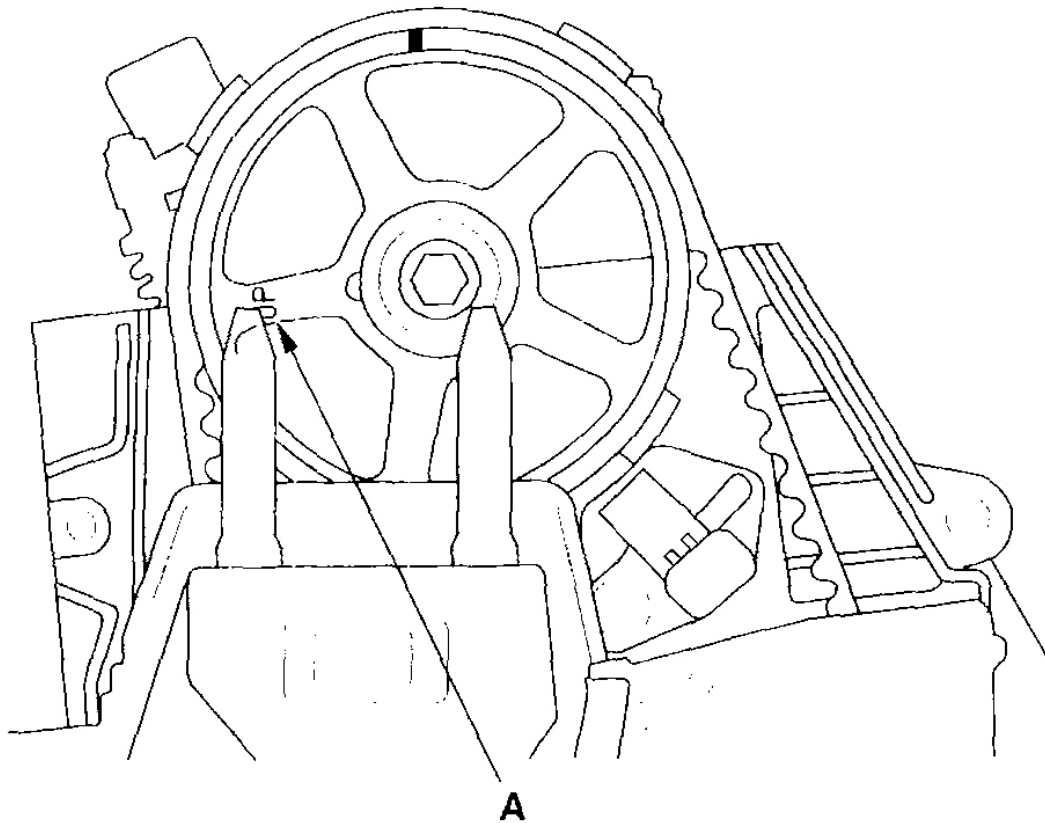
A
7 x 0.75 mm
18 N·m
(1.8 kgf·m, 13 lbf·ft)



G01401513

Fig. 77: Loosening Locknut (D17A1 Engine) With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

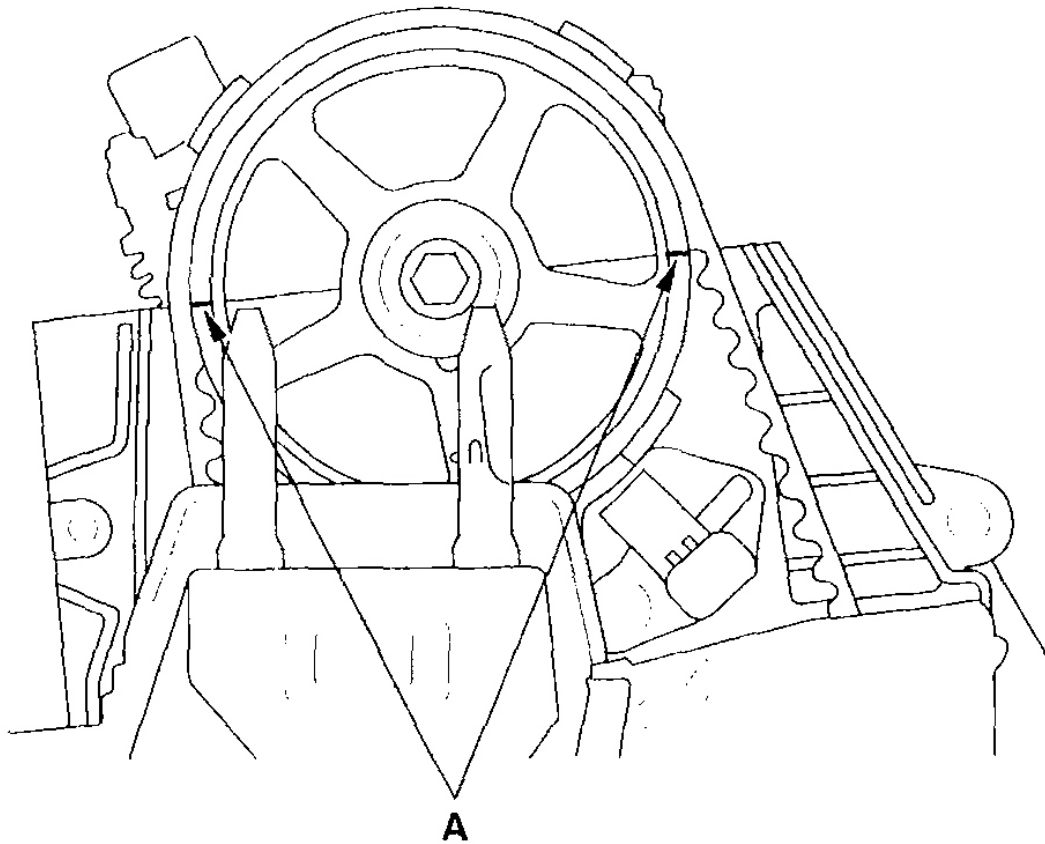
9. Tighten the locknut and recheck the clearance. Repeat the adjustment, if necessary.
10. Rotate the crankshaft 180° counterclockwise (camshaft pulley turns 90°). The "UP" mark (A) on the camshaft pulley should be toward the exhaust side of the head.



G01401514

Fig. 78: Marking "UP" On Camshaft Pulley Should Be Toward Exhaust Side Of Head
Courtesy of AMERICAN HONDA MOTOR CO., INC.

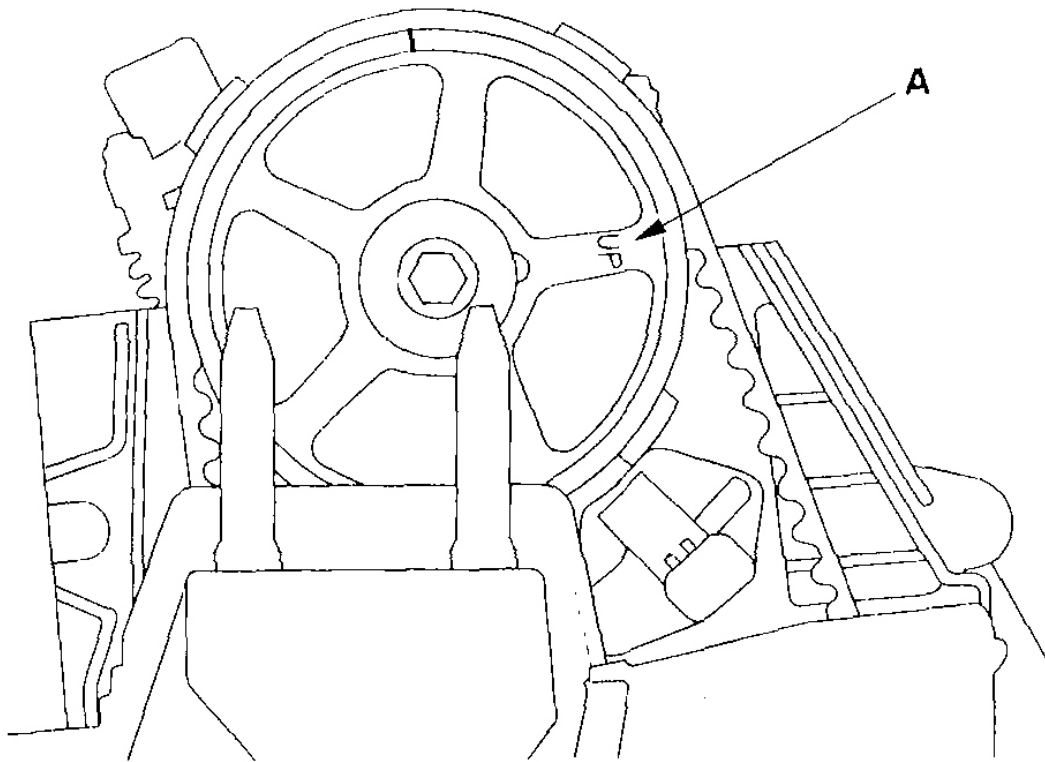
11. Check and, if necessary, adjust the valve clearance on No. 3 cylinder.
12. Rotate the crankshaft 180° counterclockwise to bring No. 4 piston to TDC. TDC marks (A) are visible again.



G01401515

Fig. 79: TDC Marks Are Visible**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

13. Check and, if necessary, adjust the valve clearance on No. 4 cylinder.
14. Rotate the crankshaft 180° counterclockwise to bring No. 2 piston to TDC. The "UP" mark (A) should be on the intake side of the head.



G01401516

Fig. 80: Marking "UP" Should Be On Intake Side Of Head
Courtesy of AMERICAN HONDA MOTOR CO., INC.

15. Check and, if necessary, adjust the valve clearance on No. 2 cylinder.
16. Install the cylinder head cover (see Cylinder Head Cover Installation).

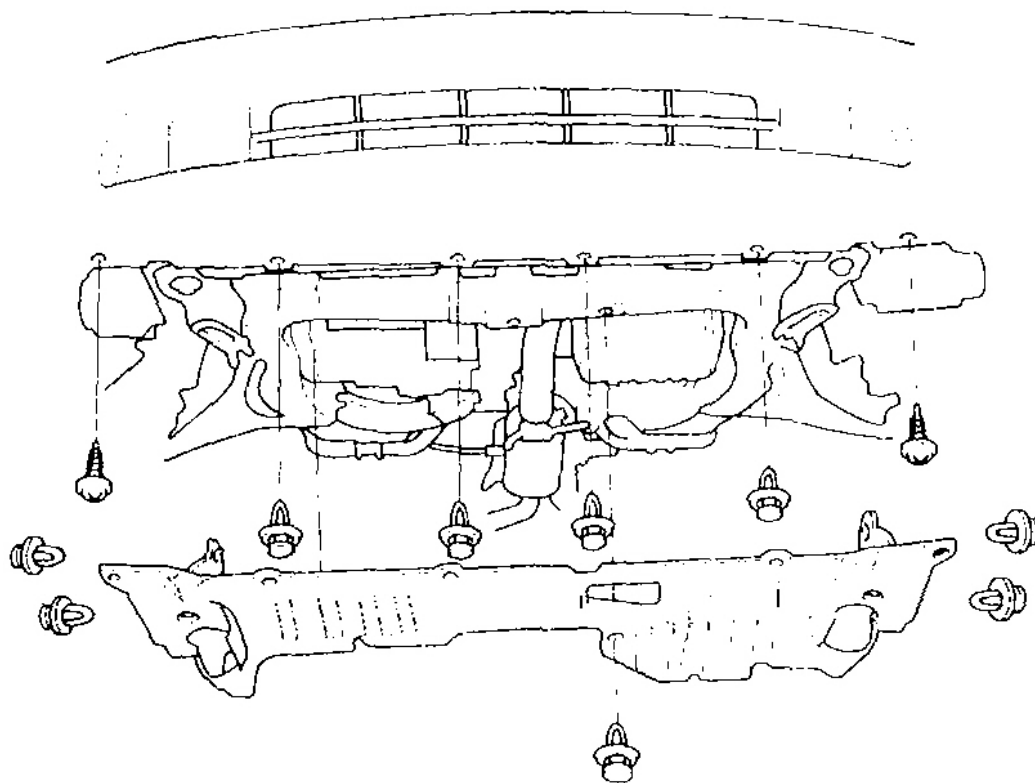
CRANKSHAFT PULLEY REMOVAL AND INSTALLATION

Special Tools Required

- Holder handle 07JAB-001020B
- Holder attachment, 50 mm, offset 07MAB-PY3010A
- Socket, 19 mm 07JAA-001020A or a commercially available 19 mm socket

REMOVAL

1. Remove the left front tire/wheel.
2. Remove the splash shield.

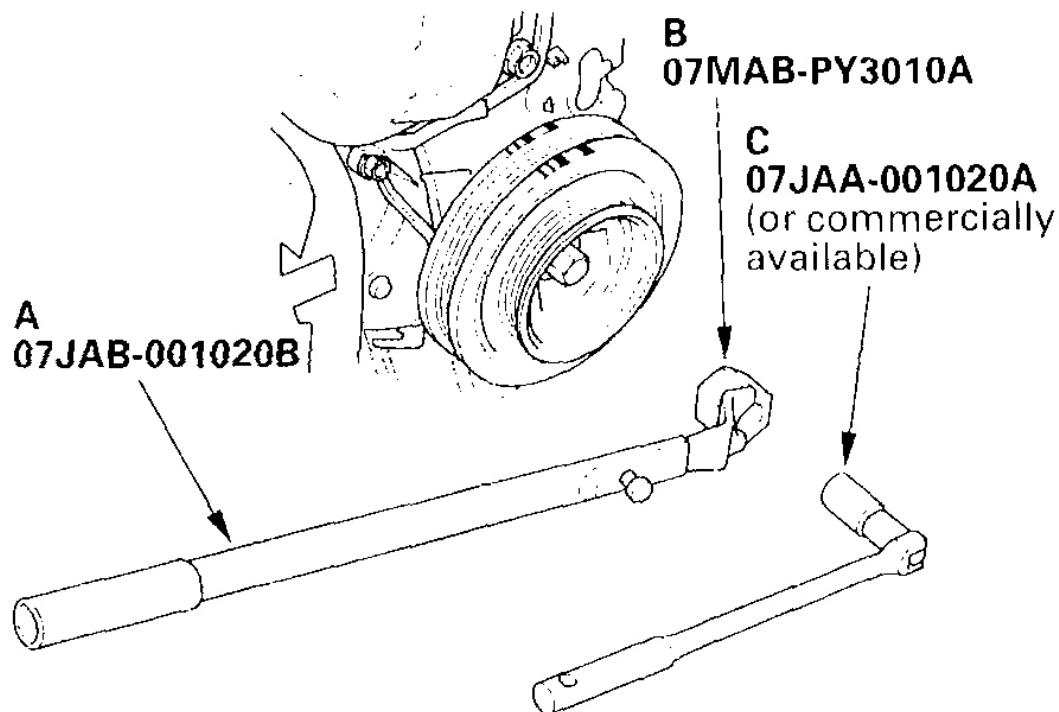


G01401517

Fig. 81: Removing Splash Shield

Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Hold the pulley with holder handle (A) and holder attachment (B).



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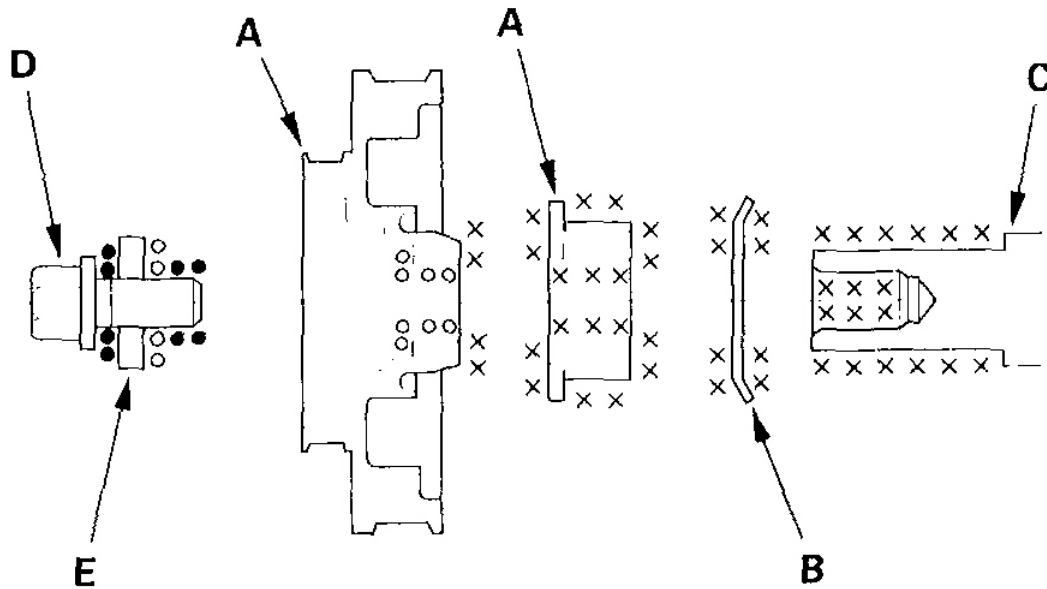
Fig. 82: Holding Pulley With Holder Handle

Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Remove the bolt with a heavy duty 19 mm socket (C) and breaker bar, then remove the crankshaft pulley.

INSTALLATION

1. Clean the pulleys (A), guide plate (B), crankshaft (C), bolt (D), and washer (E). Lubricate with new engine oil as shown.



G01401519

Fig. 83: Identifying Pulley Component Lubrication Points
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Install the crankshaft pulley, and tighten the bolt to 200 N.m (20.3 kgf.m, 148 lbf.ft). Do not use an impact wrench. See **Fig. 84**.
 - 1 Hold the pulley with the holder handle (A) and holder attachment (B).
 - 2 Tighten the bolt with a torque wrench and 19mm socket (C).

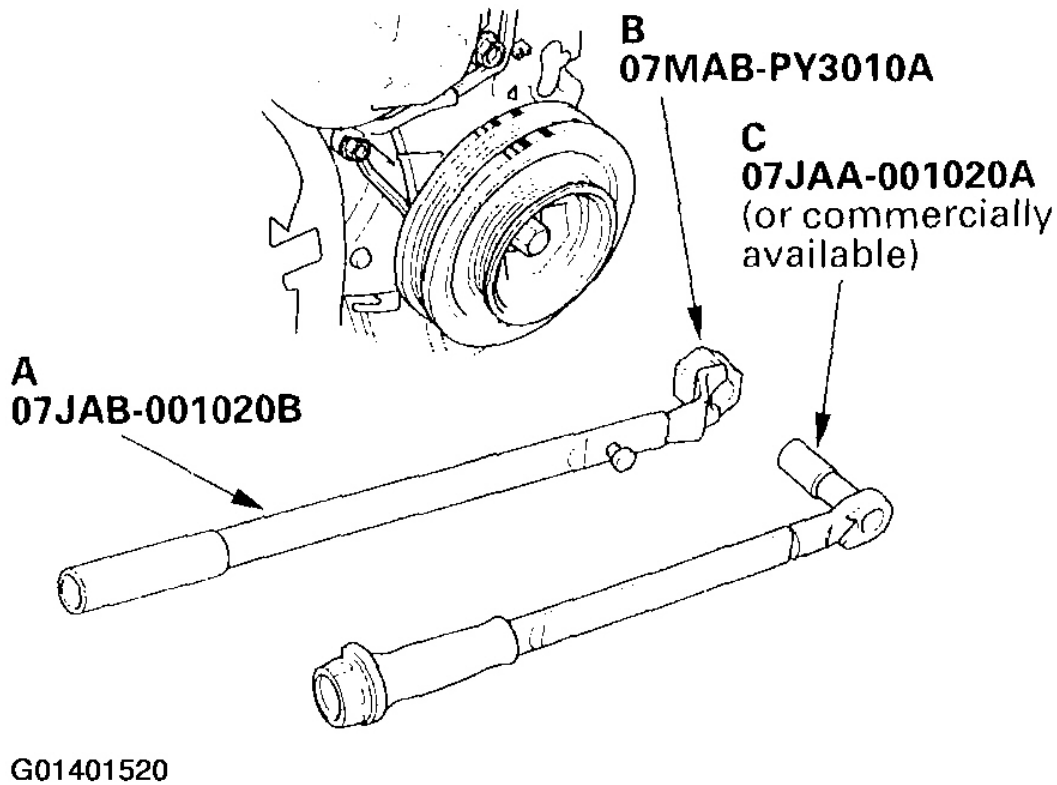


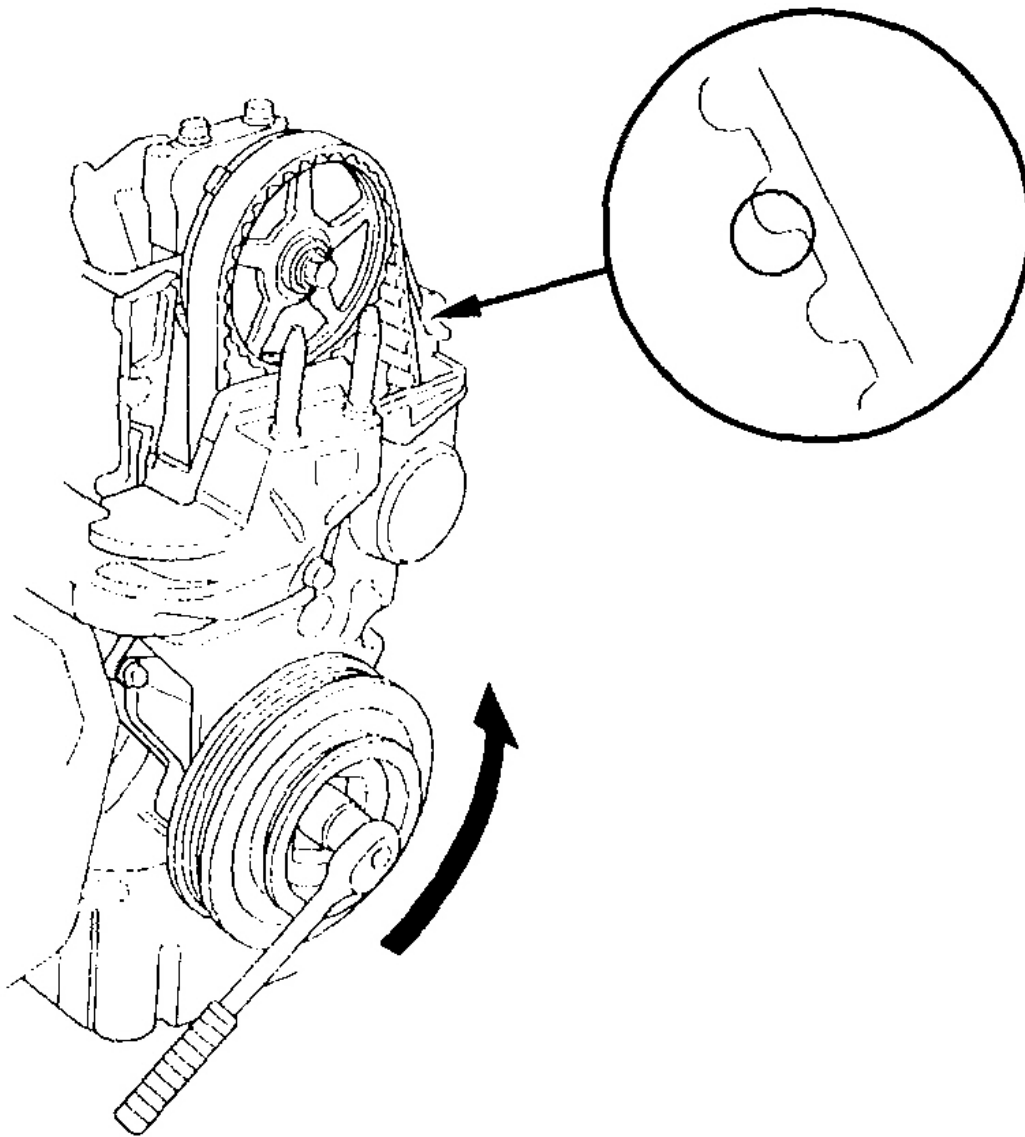
Fig. 84: Installing Crankshaft Pulley

Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Install the splash shield.
4. Install the left front tire/wheel.

TIMING BELT INSPECTION

1. Remove the ignition coil cover, then remove the four ignition coils.
2. Remove the throttle cable clamps and harness holder mounting bolts.
3. Remove the cylinder head cover.
4. Inspect the timing belt for cracks and oil or coolant contamination. Replace the belt if it is oil or coolant contaminated. Remove any oil or solvent that gets on the belt.



G01401521

Fig. 85: Inspecting Timing Belt For Cracks & Oil Or Coolant Contamination
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. After inspecting, retorque the crankshaft pulley bolt (see **Crankshaft Pulley Removal and Installation**).

TIMING BELT REMOVAL

Special Tools Required

- Holder handle 07JAB-001020B
 - Holder attachment, 50 mm, offset 07MAB-PY3010A
 - Socket, 19 mm 07JAA-001020A or a commercially available 19 mm socket
1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.
 2. Disconnect the negative cable from the battery.
 3. Turn the crankshaft pulley so its top dead center (TDC) mark (A) lines up with the pointers (B).

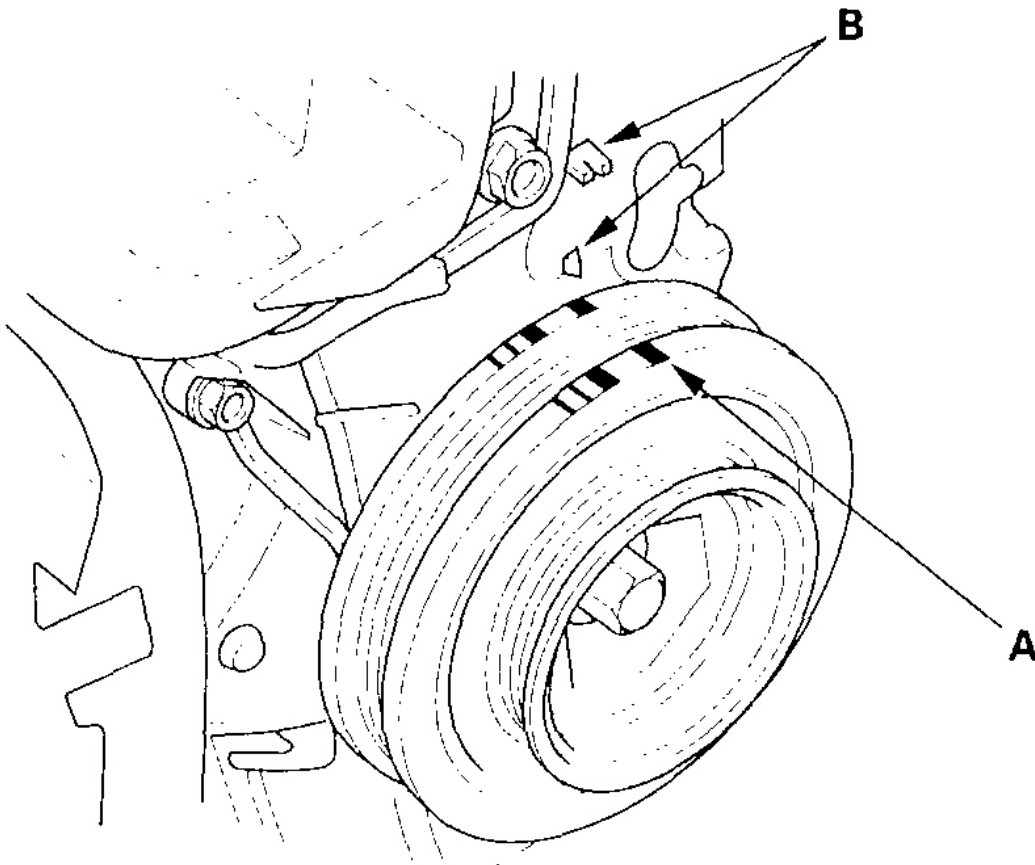
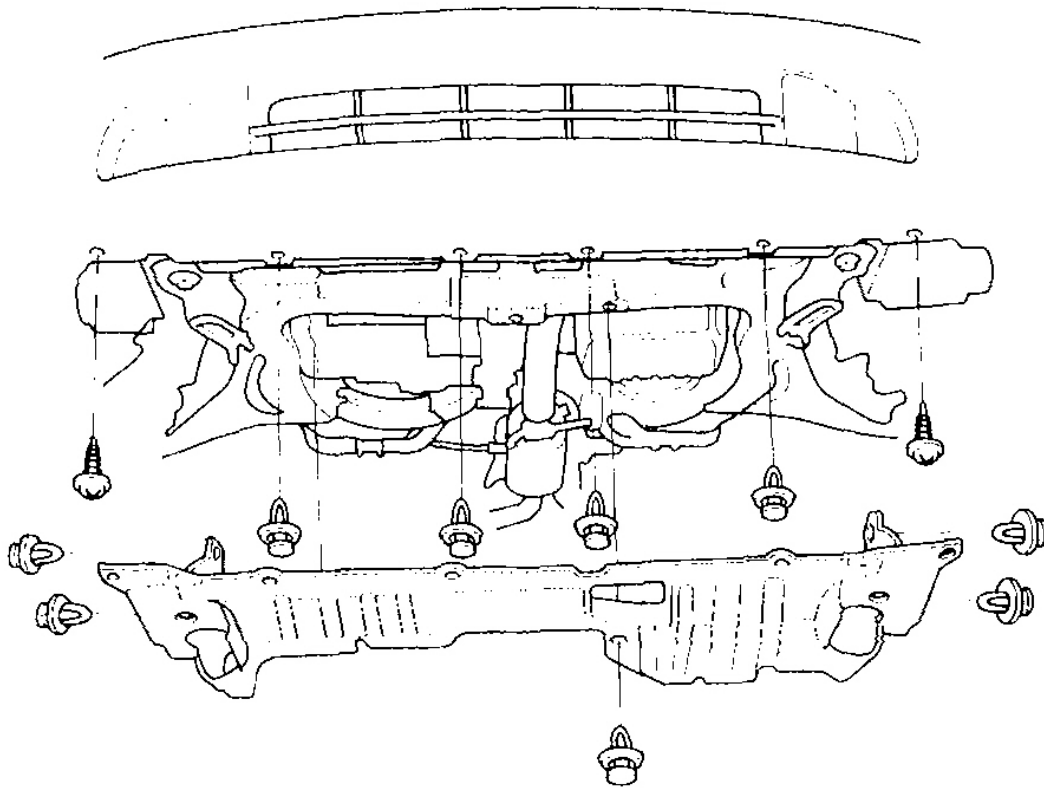
**G01401522**

Fig. 86: Turning Crankshaft Pulley So TDC Mark Lines Up With Pointers
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Remove the left front tire/wheel.

5. Remove the splash shield.

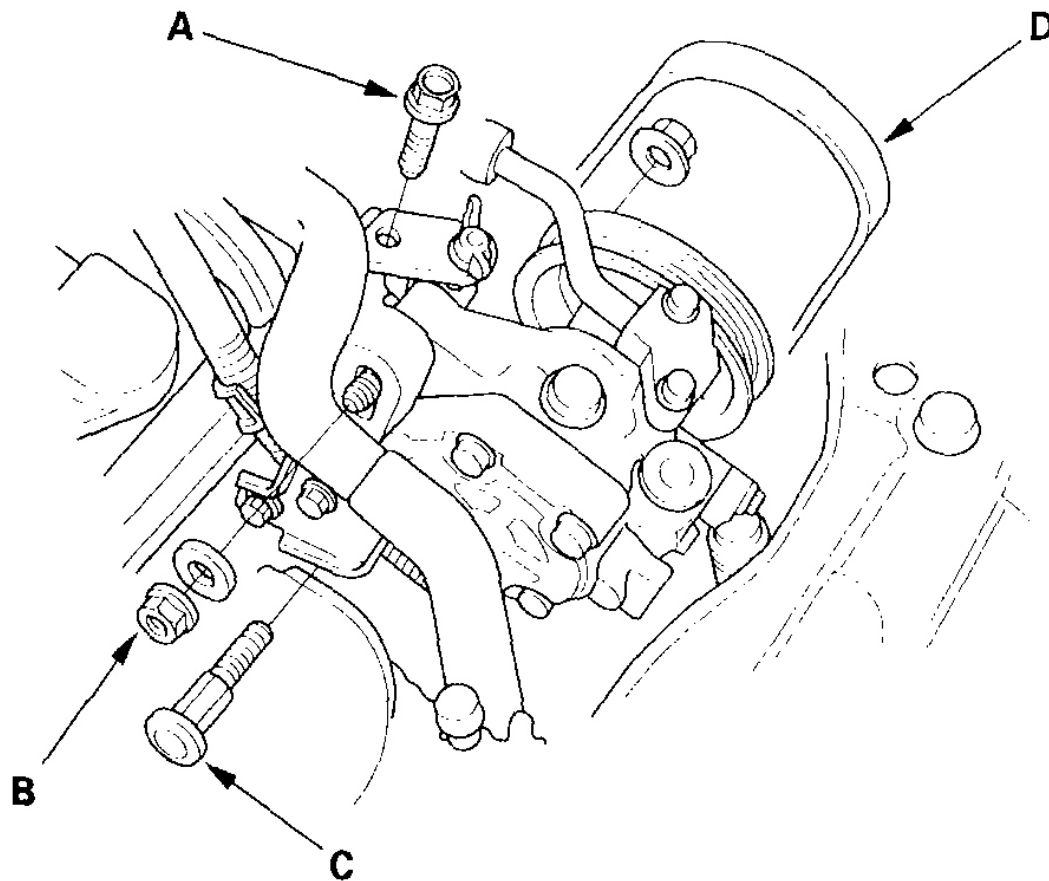


G01401523

Fig. 87: Removing Splash Shield

Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Remove the adjust plate mounting bolt (A), locknut (B), and mounting bolt (C), then remove the power steering (P/S) pump belt (D) and pump without disconnecting the P/S hoses.

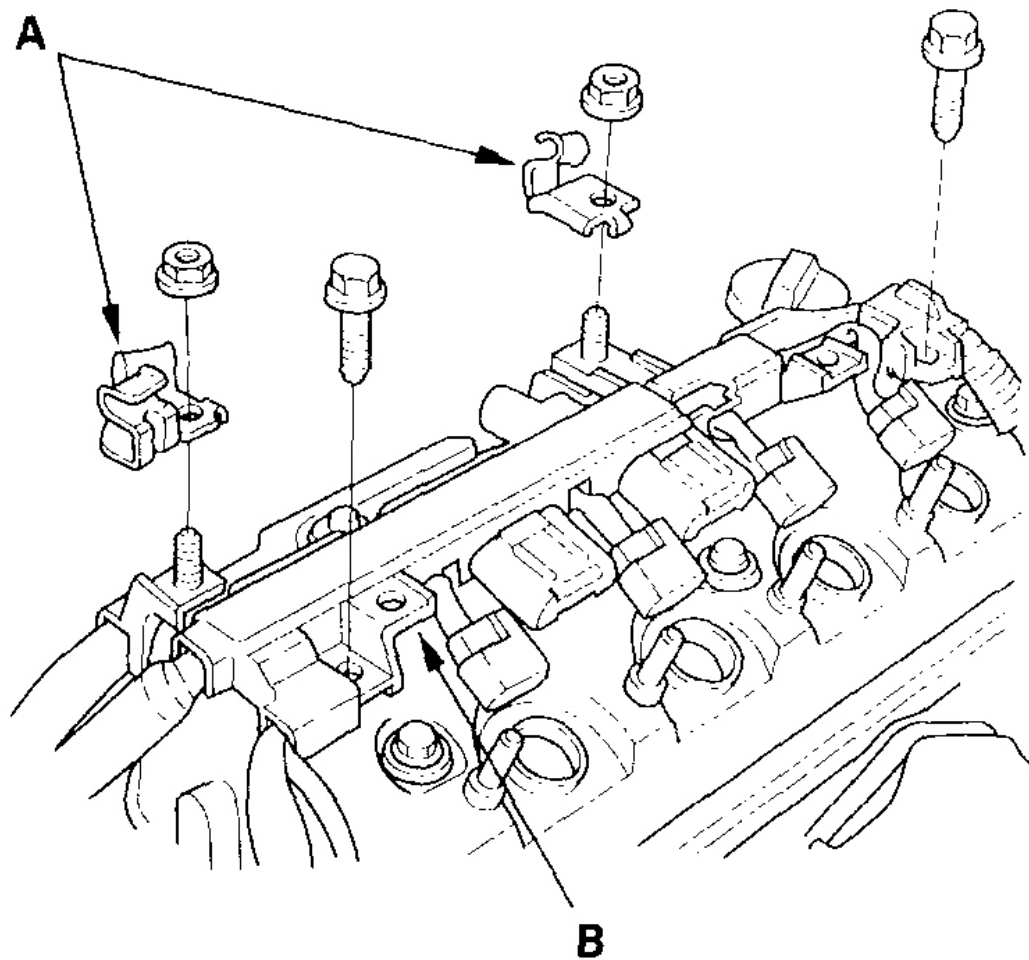


G01401524

Fig. 88: Removing Adjust Plate Mounting Bolt

Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Remove the alternator (see **OVERHAUL**).
8. Remove the four ignition coils (see **IGNITION COIL REMOVAL/INSTALLATION**).
9. Remove the throttle cable clamps (A) and harness holder (B) from the cylinder head cover.

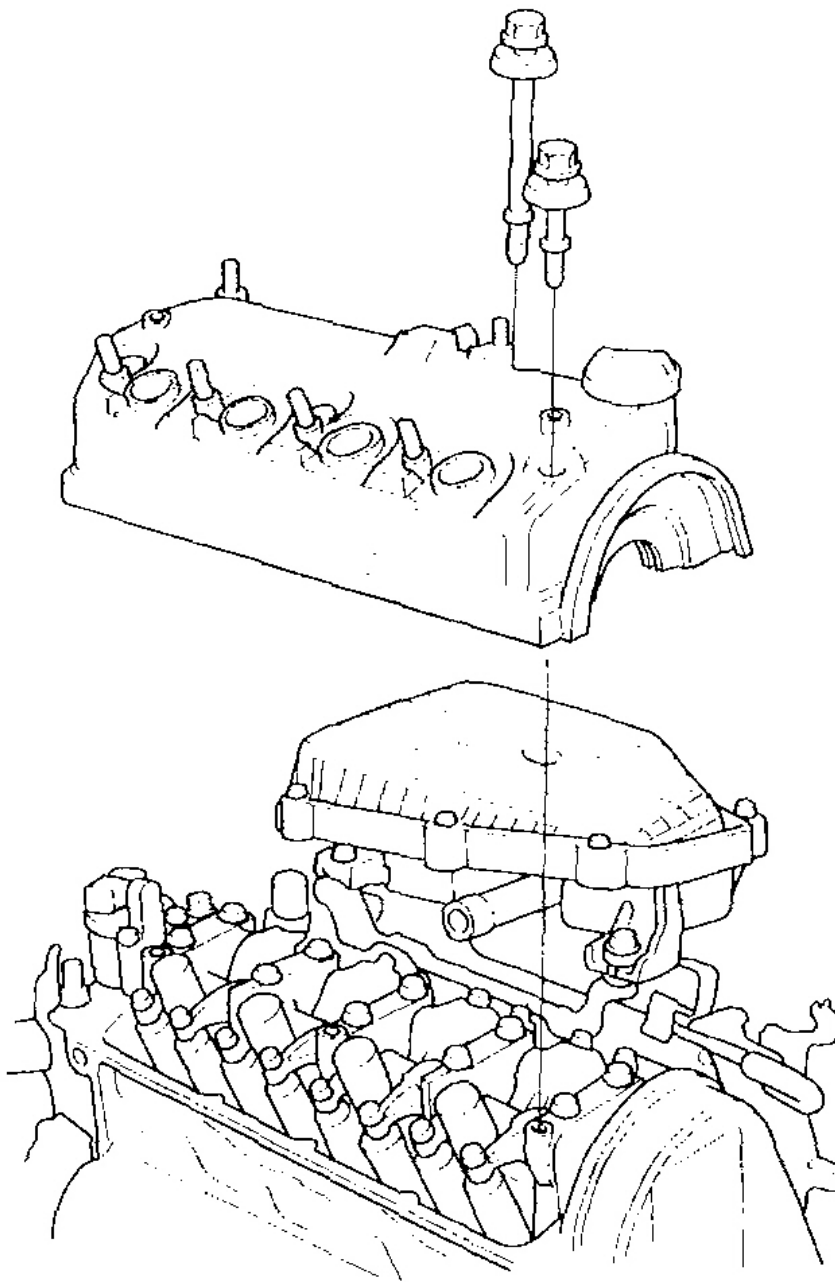


G01401525

Fig. 89: Removing Throttle Cable Clamps

Courtesy of AMERICAN HONDA MOTOR CO., INC.

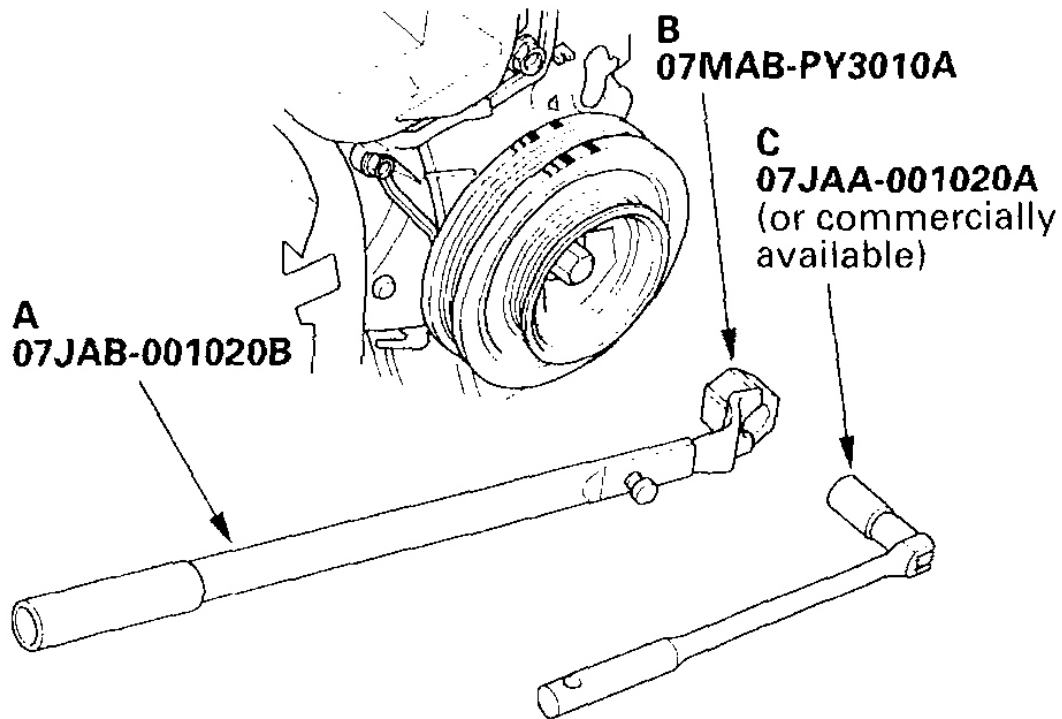
10. Remove the cylinder head cover.



G01401526

Fig. 90: Removing Cylinder Head Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Hold the pulley with holder handle (A) and holder attachment (B).

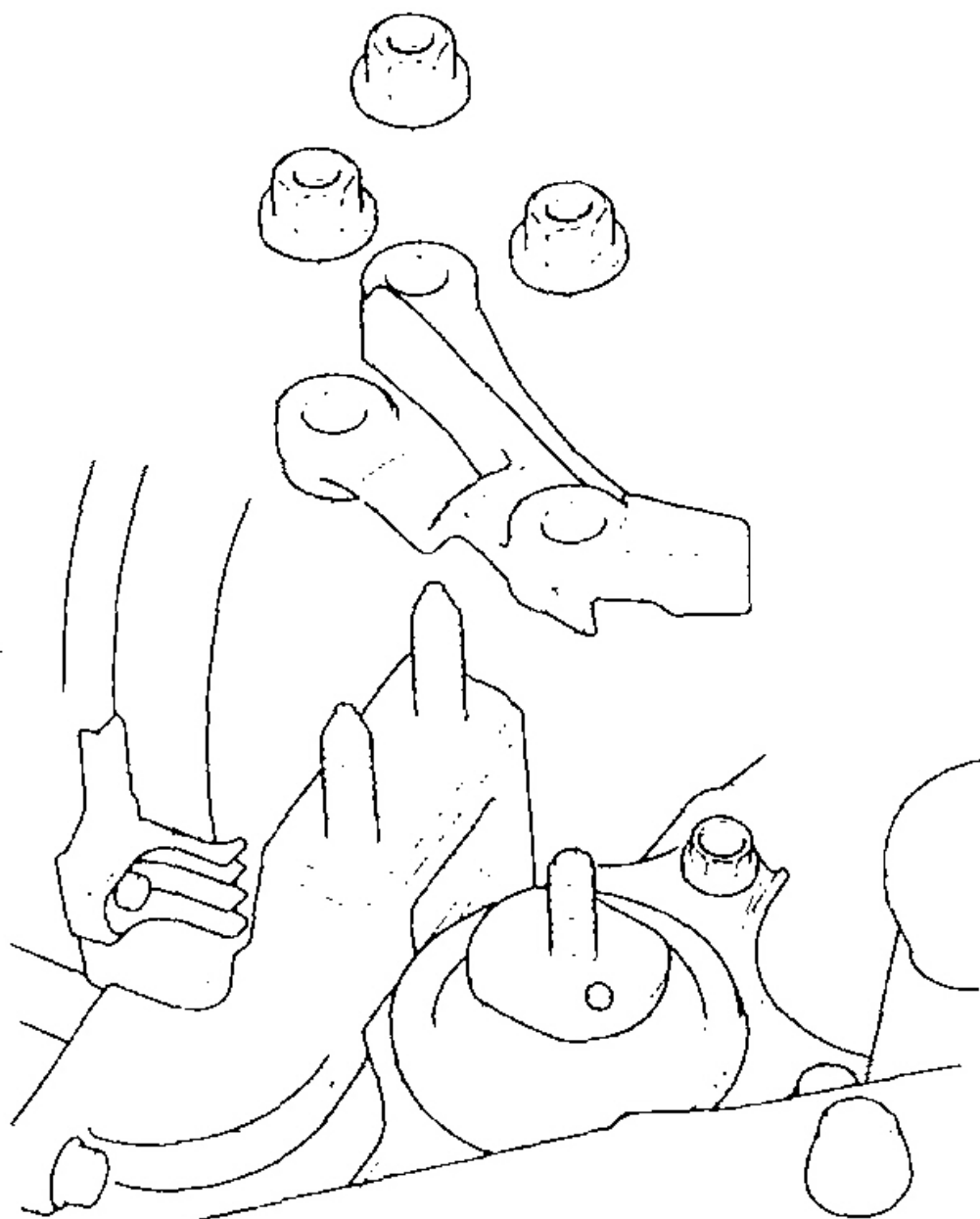


G01401527

Fig. 91: Holding Pulley With Holder Handle

Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Remove the bolt with a heavy duty 19 mm socket (C) and breaker bar, then remove the crankshaft pulley.
13. Support the engine with a jack and wood block under the oil pan.
14. Remove the upper bracket.



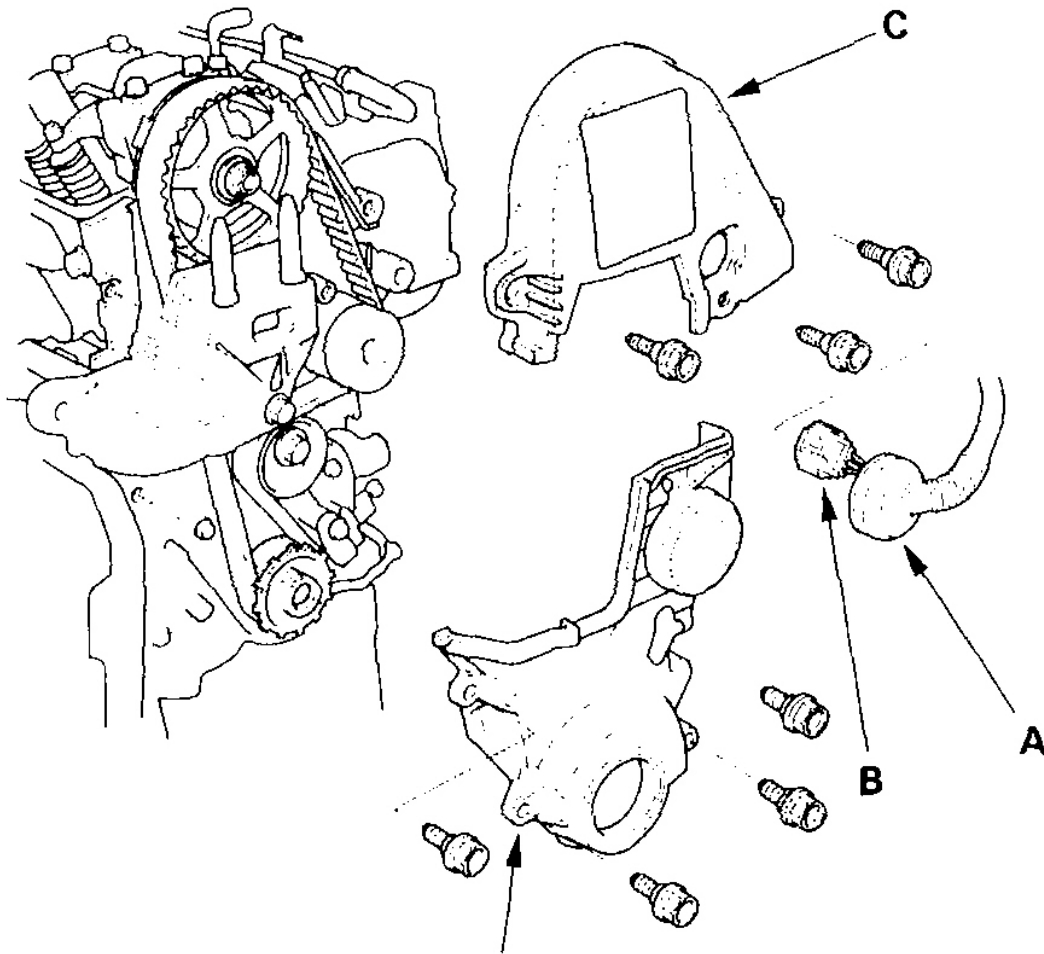
G01401528

Fig. 92: Removing Upper Bracket

Courtesy of AMERICAN HONDA MOTOR CO., INC.

15. Remove the grommet (A) from the upper cover, and disconnect the camshaft position (CMP) (top dead

center (TDC)) sensor connector (B).

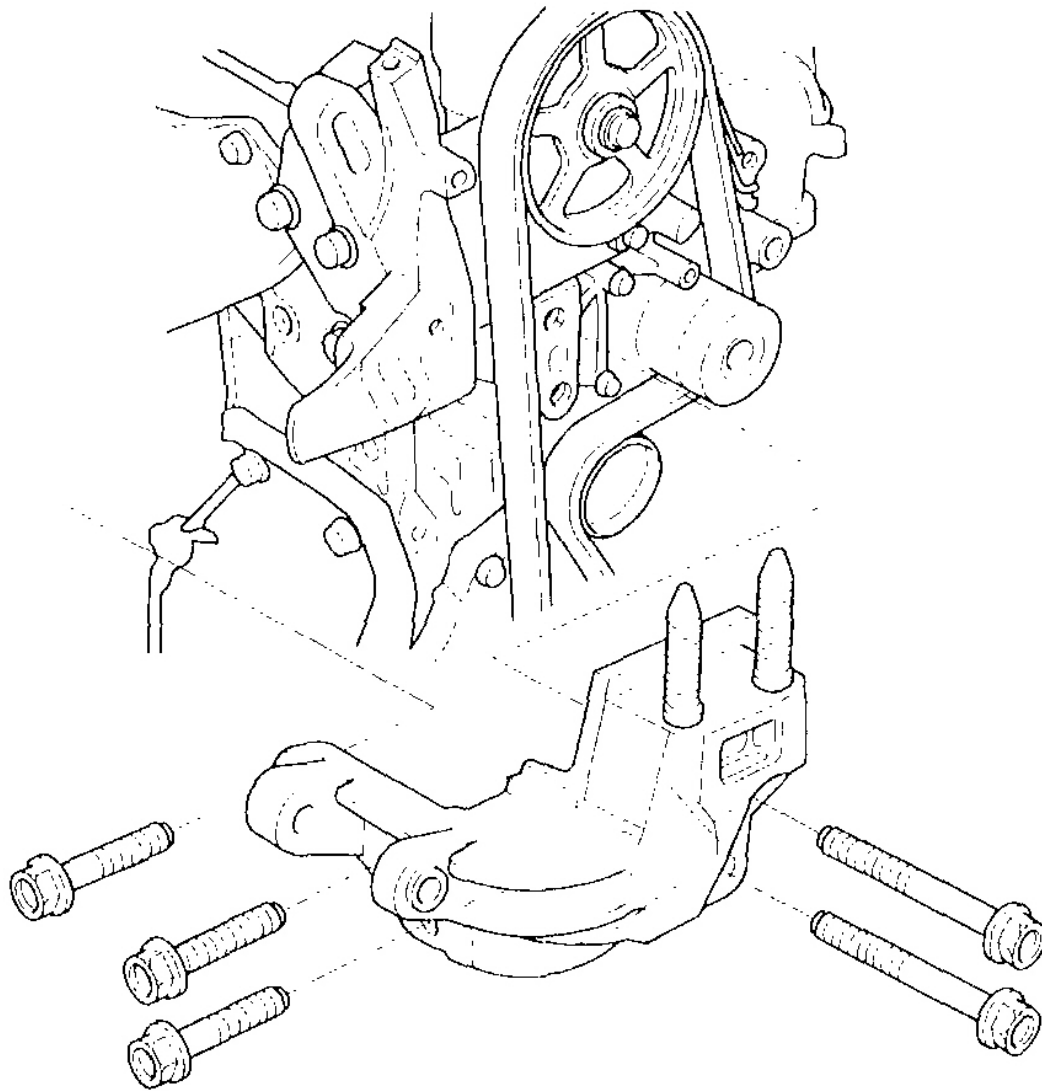


G01401529

Fig. 93: Removing Grommet

Courtesy of AMERICAN HONDA MOTOR CO., INC.

16. Remove the upper cover (C) and lower cover (D).
17. Remove the side engine mount bracket.



G01401530

Fig. 94: Removing Side Engine Mount Bracket

Courtesy of AMERICAN HONDA MOTOR CO., INC.

18. Remove the crankshaft position (CKP) sensor from the oil pump without disconnecting the connector.

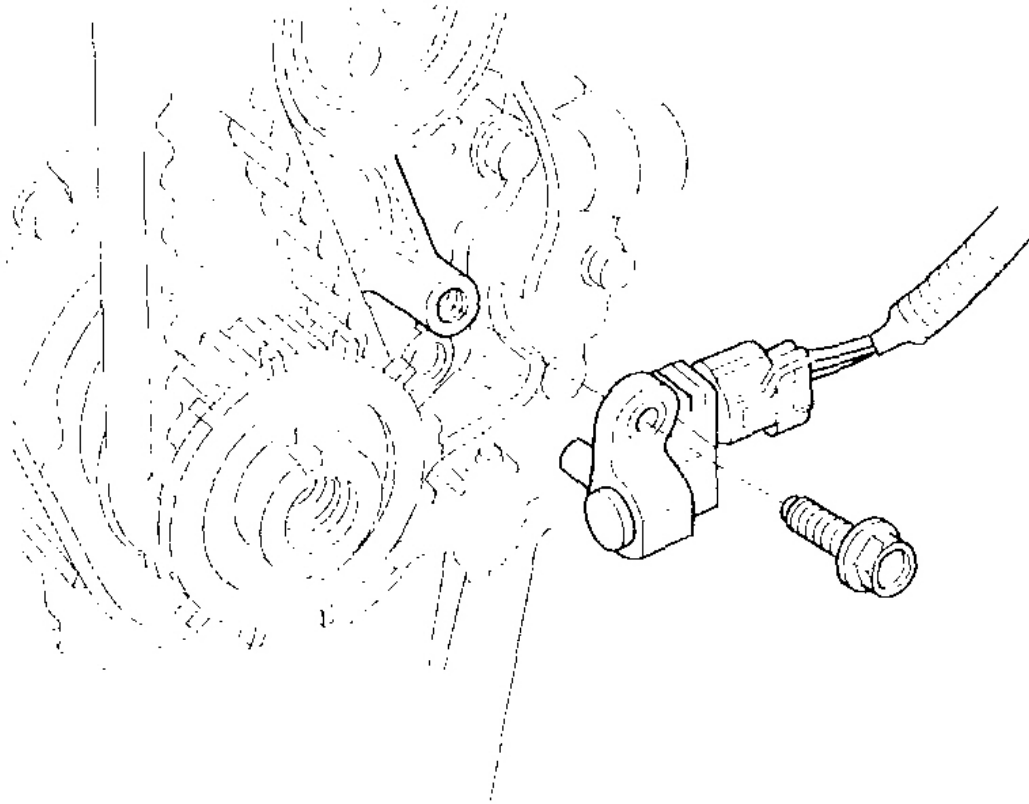
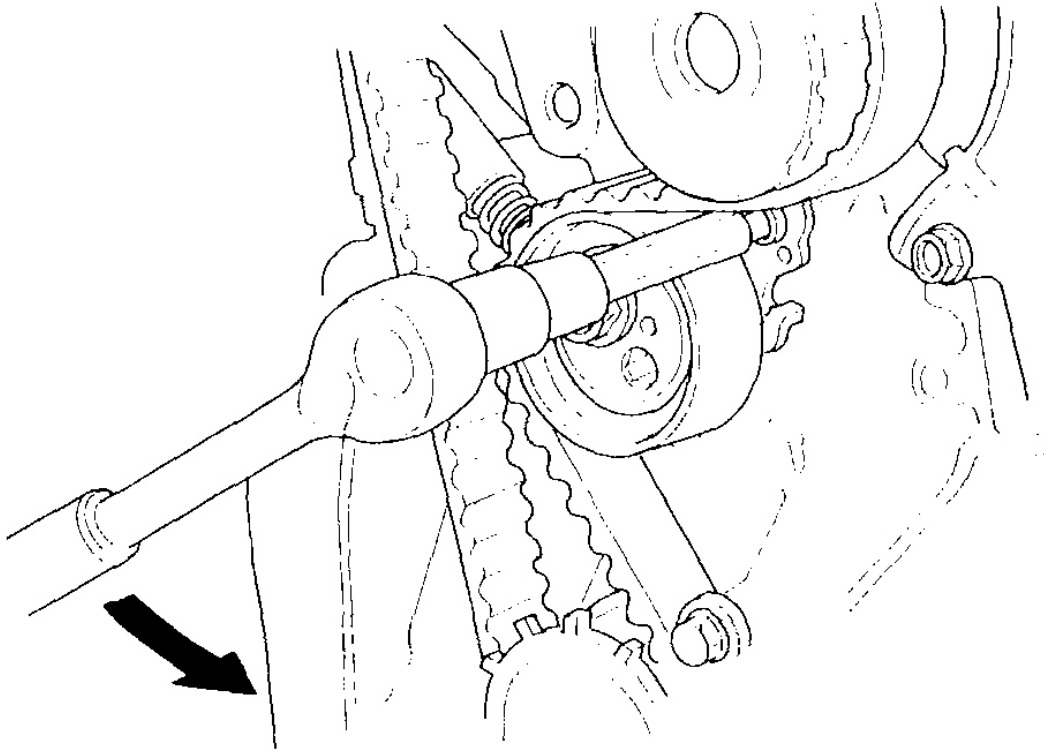
**G01401531**

Fig. 95: Removing CKP Sensor From Oil Pump
Courtesy of AMERICAN HONDA MOTOR CO., INC.

19. Apply a force of 98 N.m (10 kgf.m, 22 lbf.ft) to the timing belt at the midpoint between the camshaft pulley and the water pump pulley and check that the auto-tensioner moves smoothly.
 - If the auto-tensioner does not move smoothly, replace the auto-tensioner.
 - Inspect the auto-tensioner (see **Auto-tensioner Inspection**) when replacing the timing belt.
20. Move the auto-tensioner to remove tension from the timing belt, then remove the timing belt.



G01401532

Fig. 96: Moving Auto-Tensioner To Remove Tension From Timing Belt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

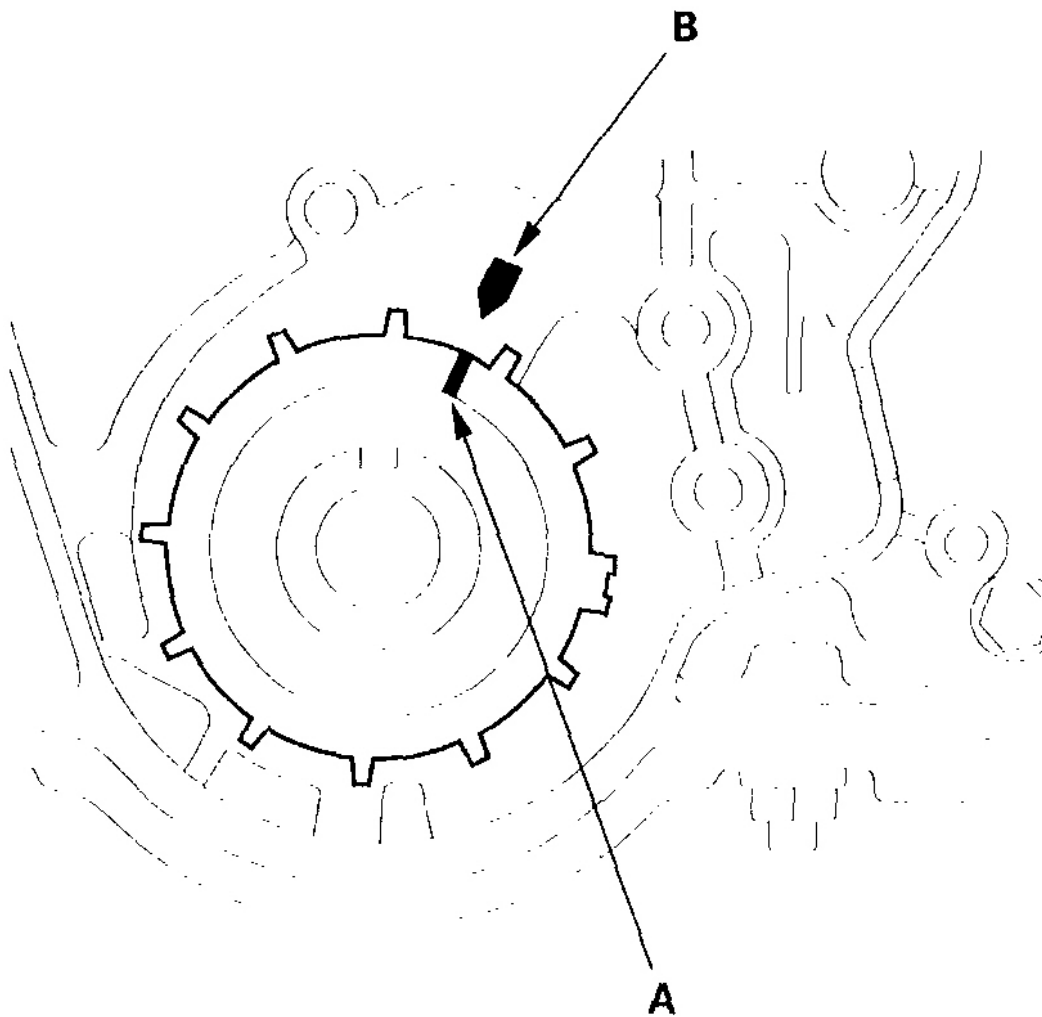
TIMING BELT INSTALLATION

Special Tools Required

- Holder handle 07JAB-001020B
- Holder attachment, 50 mm, offset 07MAB-PY3010A
- Socket, 19 mm 07JAA-001020A or a commercially available 19 mm socket

NOTE: If you are installing the auto-tensioner, refer to the auto-tensioner installation procedure (see page 6-27).

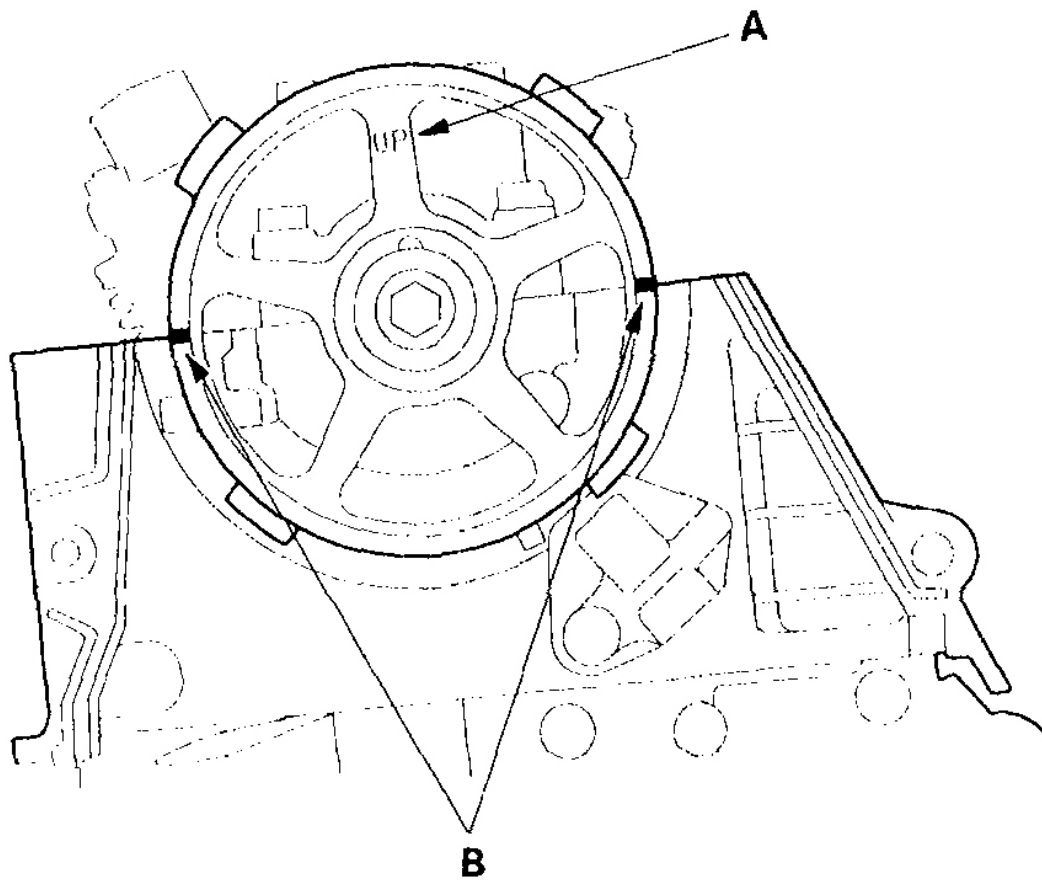
1. Clean the timing belt pulleys, and the upper and lower covers.
2. Set the crankshaft to top dead center (TDC). Align the TDC mark (A) on the timing belt drive pulley with the pointer (B) on the oil pump.



G01401533

Fig. 97: Aligning TDC Mark On Timing Belt Drive Pulley With Pointer
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Clean the camshaft pulley and set it to TDC.
 - 1 The "UP" mark (A) on the camshaft pulley should be at the top.
 - 2 Align the TDC marks (B) on the camshaft pulley with the top edge of the head.

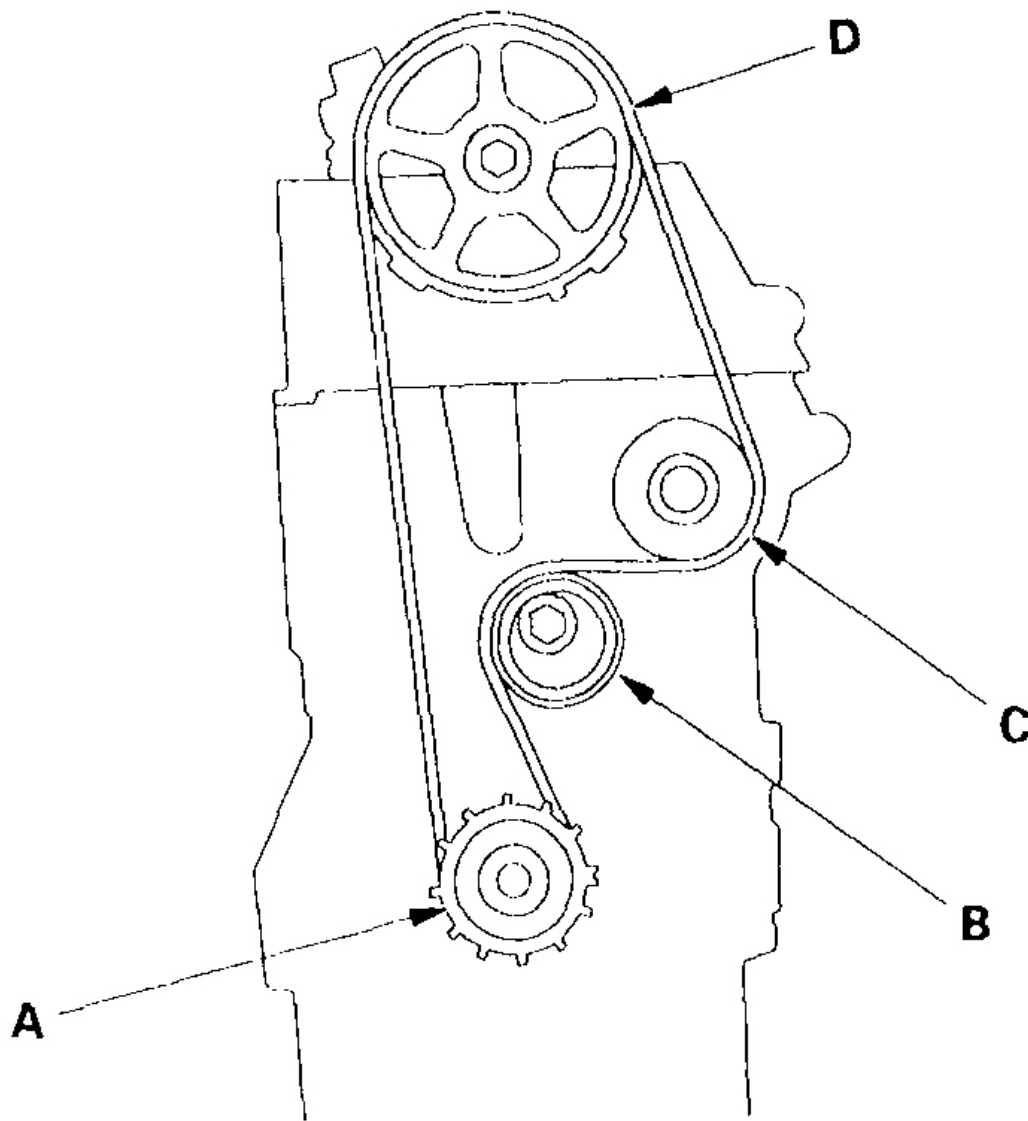


G01401534

Fig. 98: Cleaning Camshaft Pulley

Courtesy of AMERICAN HONDA MOTOR CO., INC.

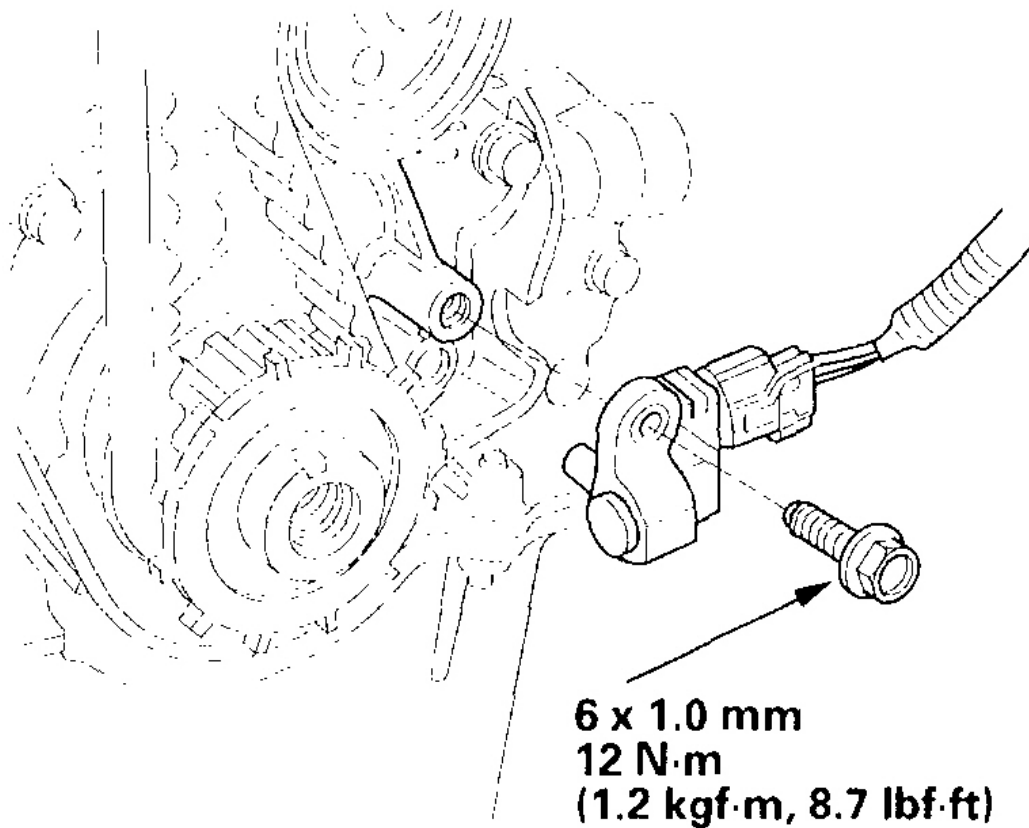
4. Install the timing belt in a counterclockwise sequence, starting with the drive pulley.
 - 1 Drive pulley (A).
 - 2 Tensioner pulley (B).
 - 3 Water pump pulley (C).
 - 4 Camshaft pulley (D).



G01401535

Fig. 99: Installing Timing Belt In Counterclockwise Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

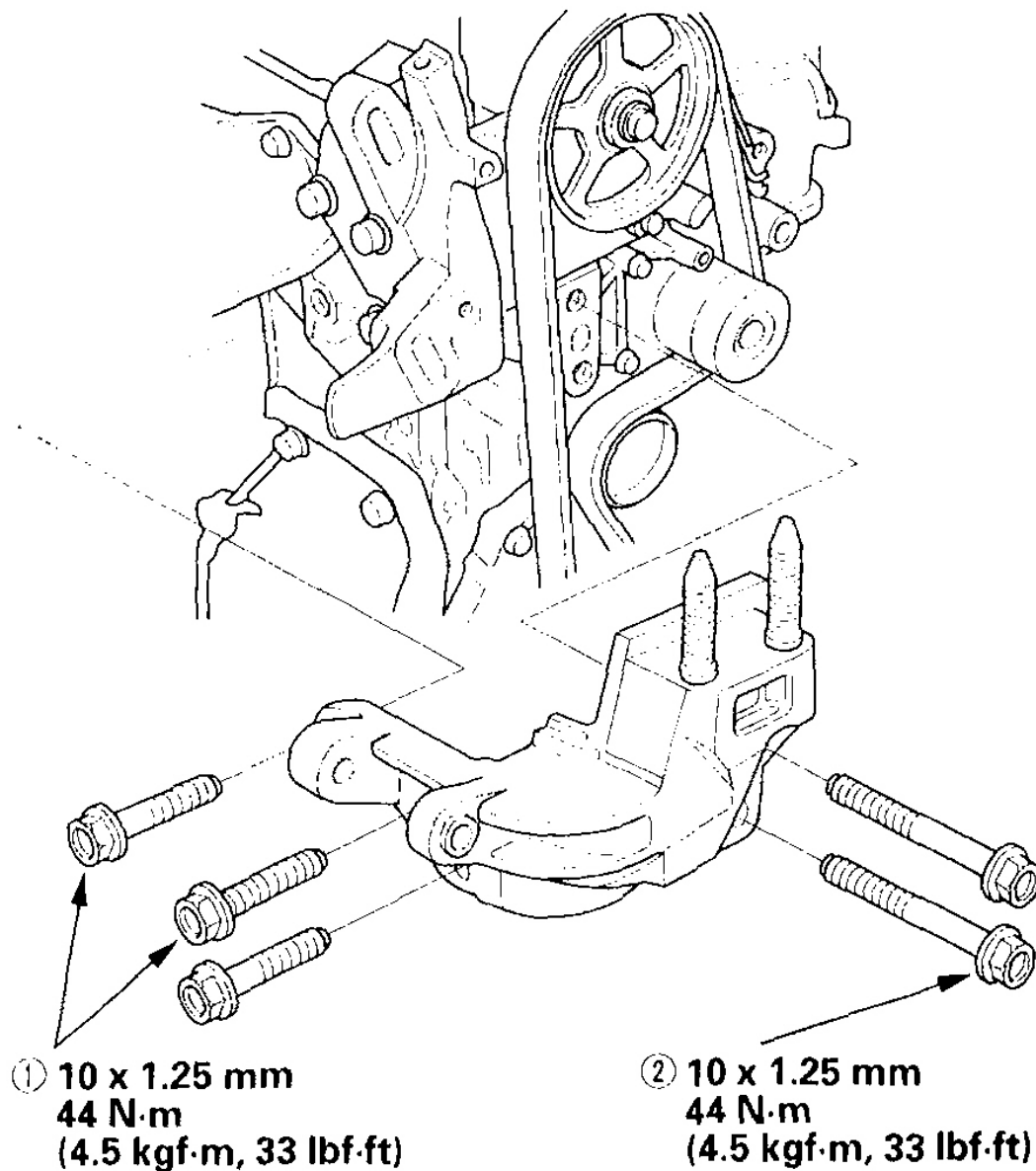
5. Install the crankshaft position (CKP) sensor.



G01401536

Fig. 100: Installing CKP With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

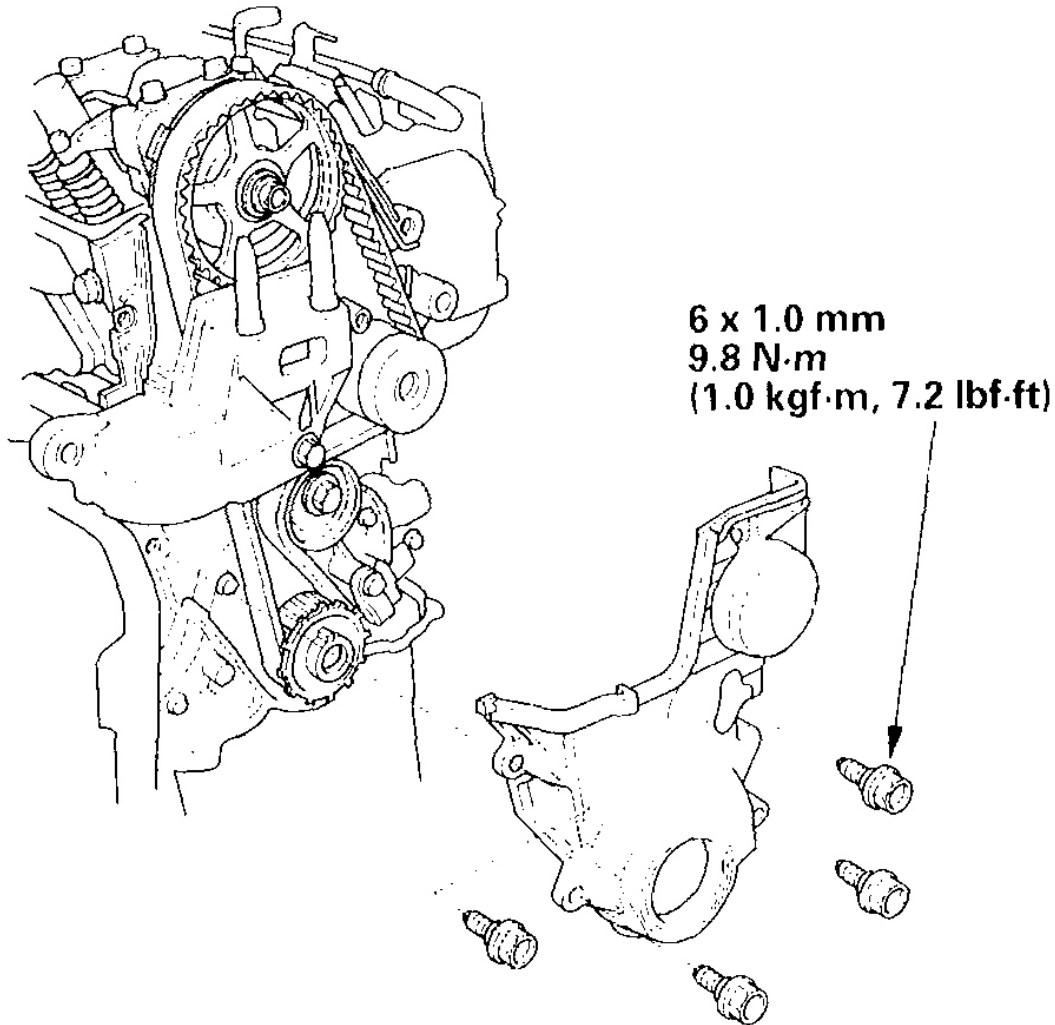
6. Install the bolts loosely, then tighten the side engine mount bracket mounting bolts in the numbered sequence shown.



G01401537

Fig. 101: Tightening Side Engine Mount Bracket Mounting Bolts With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

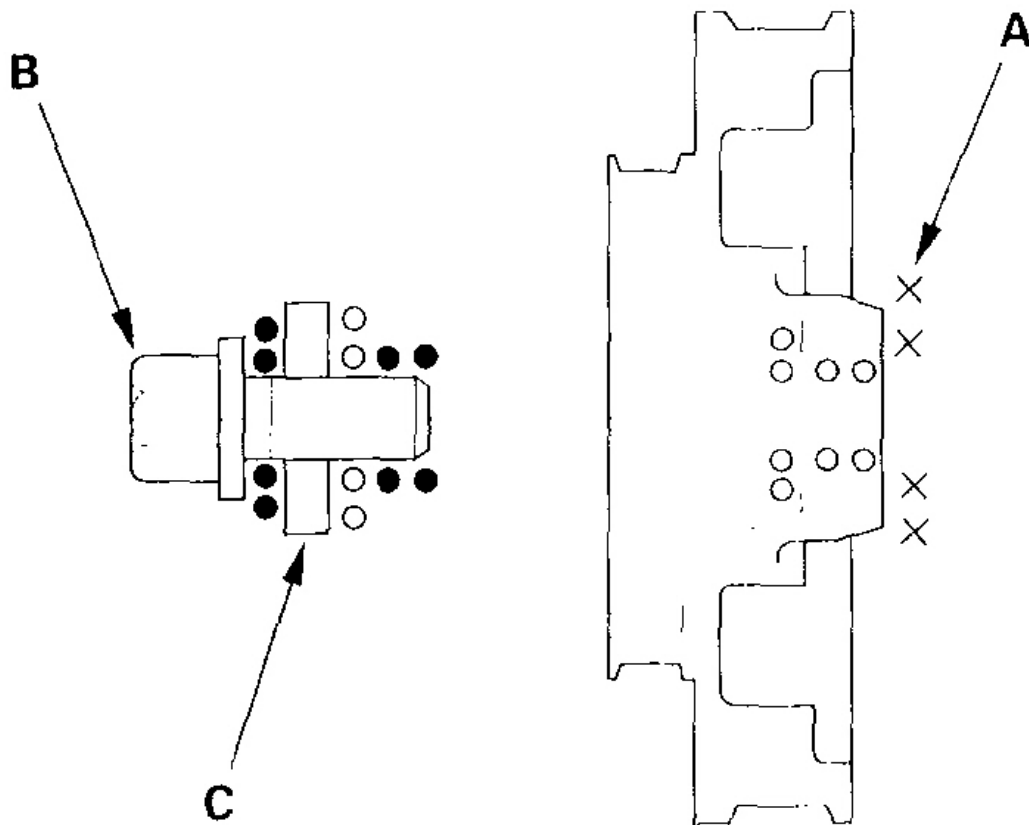
7. Install the lower cover.



G01401538

Fig. 102: Installing Lower Cover With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Clean the pulley bolt and washer.
9. Clean all oil off the inside face (A) of the crankshaft pulley, and apply new engine oil to the pulley bolt (B) and washer (C).



G01401539

Fig. 103: Identifying Crankshaft Pulley Lubrication Points
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Install the crankshaft pulley, and tighten the bolt to 200 N.m (20.3 kgf.m, 148 lbf.ft). Do not use an impact wrench.
 - 1 Hold the pulley with the holder handle (A) and holder attachment (B).
 - 2 Tighten the bolt with a torque wrench and 19 mm socket (C).

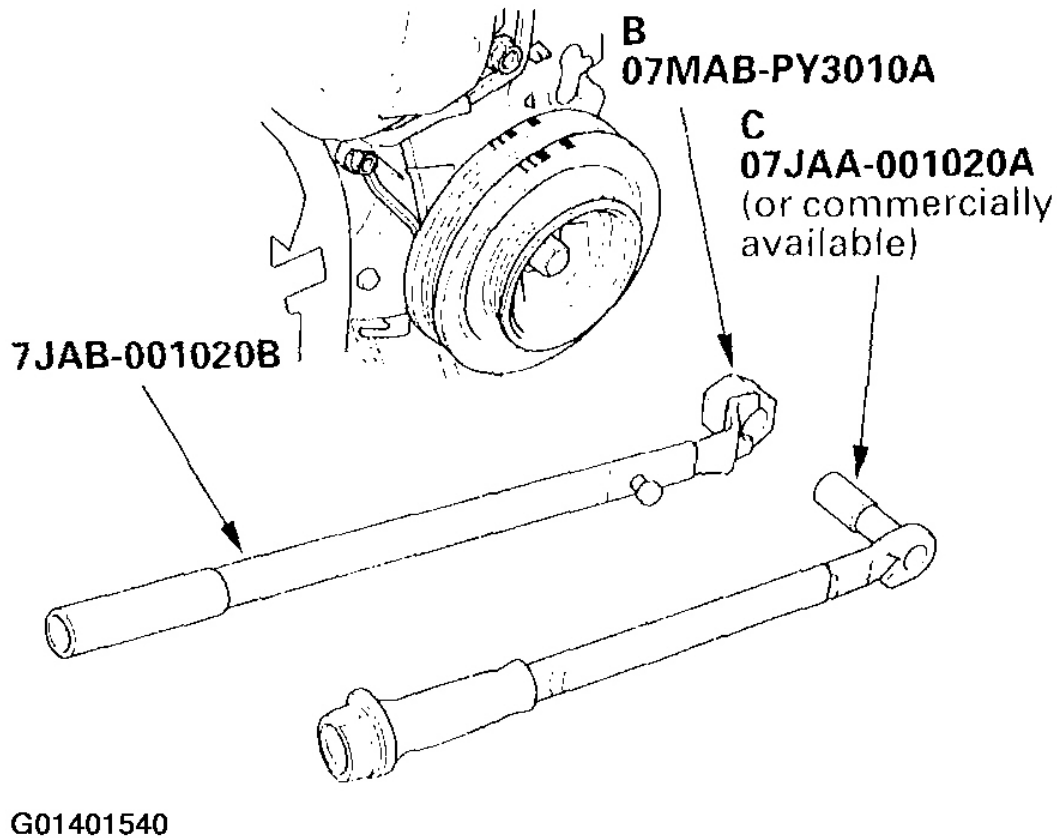
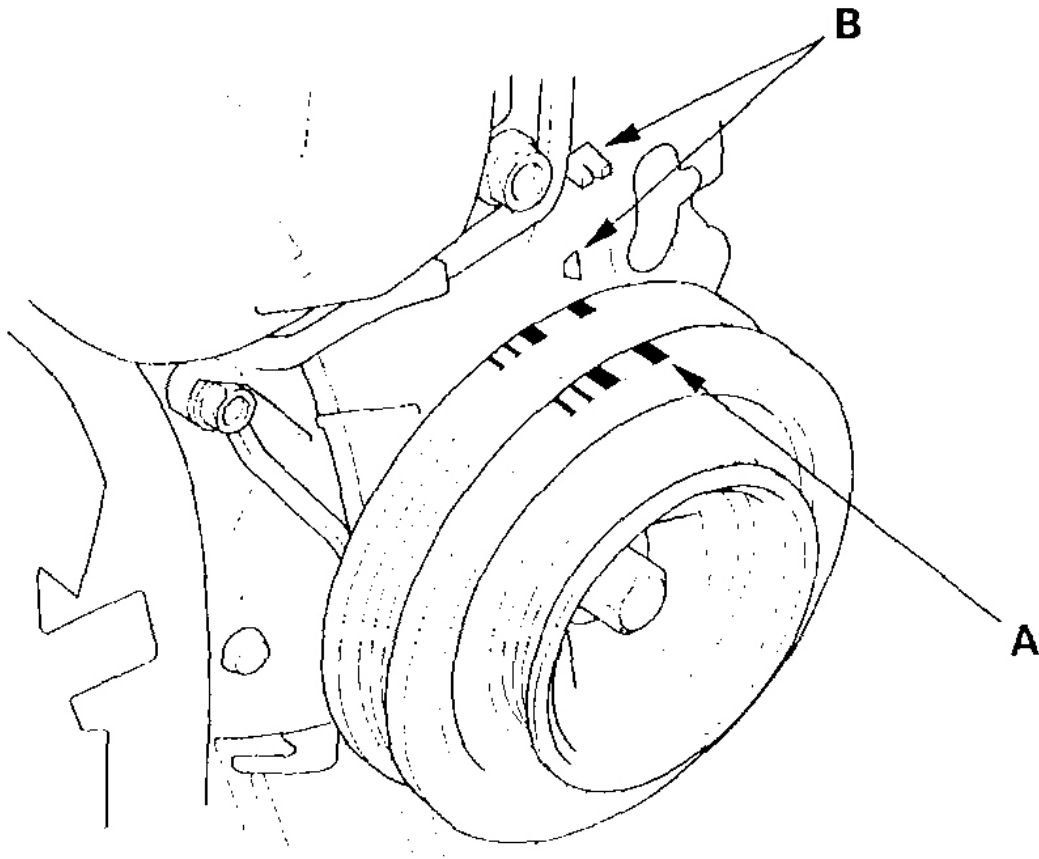


Fig. 104: Installing Crankshaft Pulley

Courtesy of AMERICAN HONDA MOTOR CO., INC.

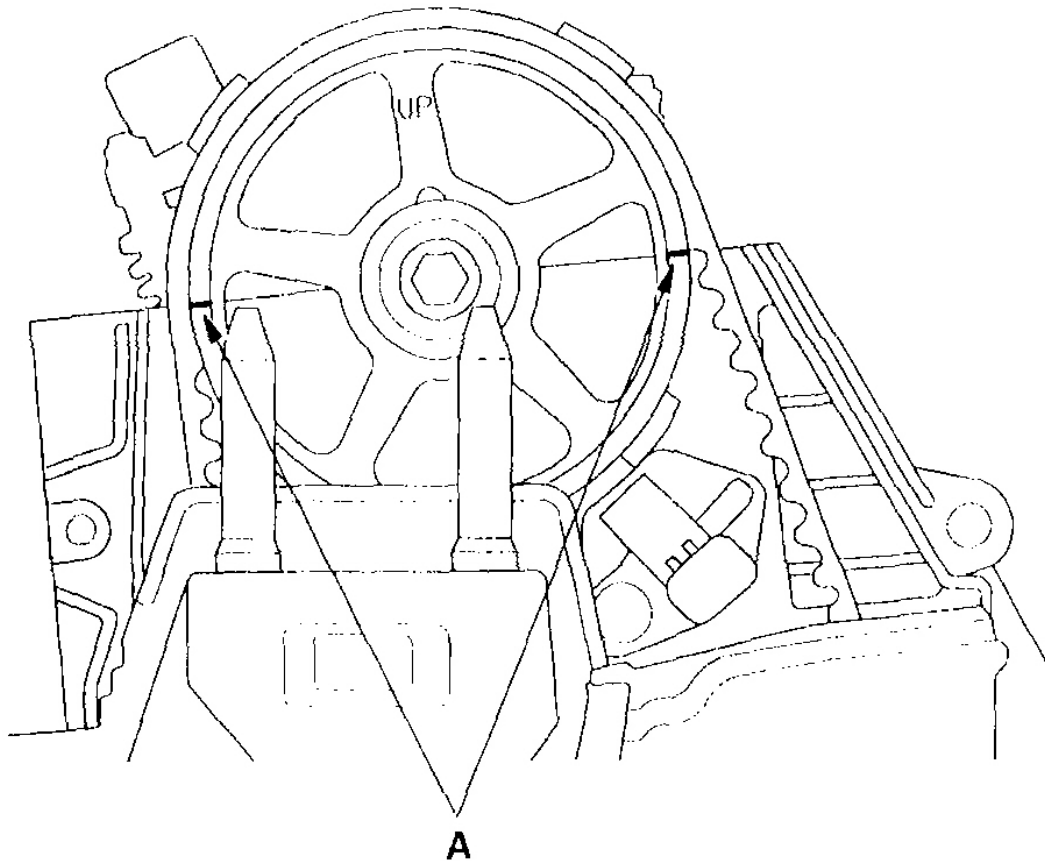
11. Rotate the crankshaft pulley about five or six turns counterclockwise so that the timing belt positions on the pulleys.
12. Turn the crankshaft pulley so its TDC mark (A) lines up with the pointers (B).



G01401541

Fig. 105: Turning Crankshaft Pulley So TDC Mark Lines Up With Pointers
Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Check the camshaft pulley marks (A).
 - If the camshaft pulley marks are also at TDC, go to step 15.
 - If the camshaft pulley marks are not at TDC, remove the timing belt and repeat steps 2 through 10 .

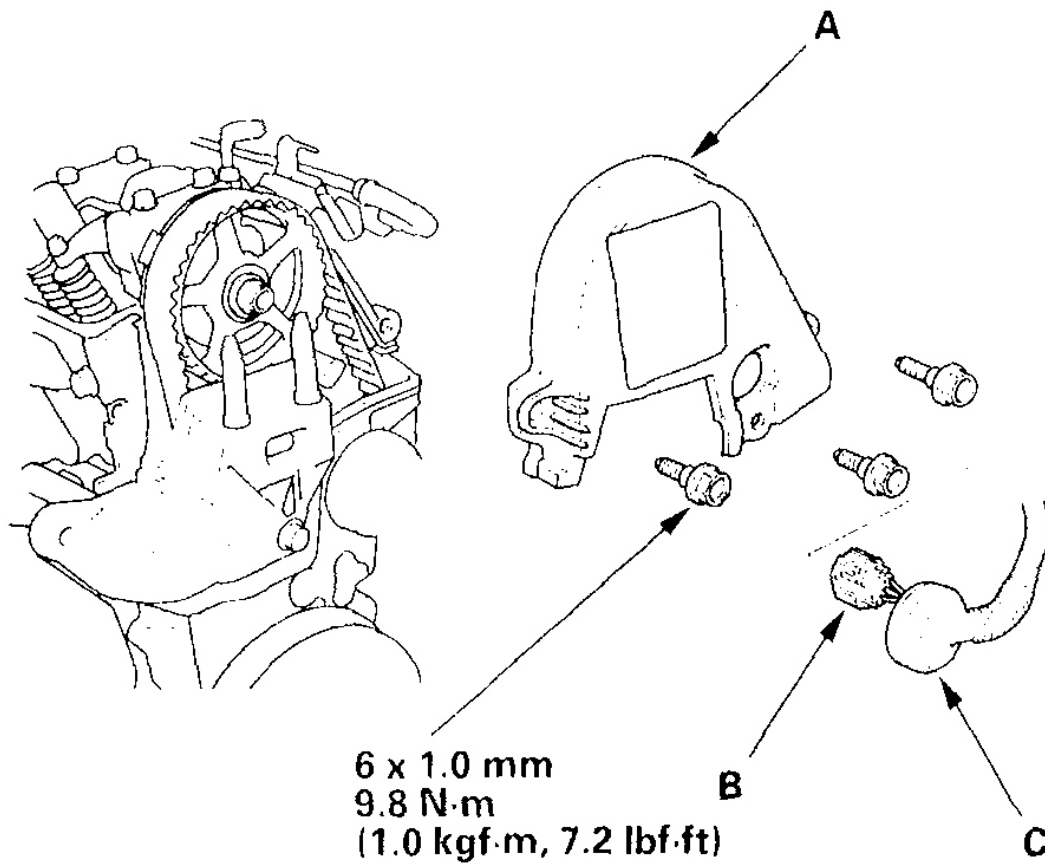


G01401542

Fig. 106: Checking Camshaft Pulley Marks

Courtesy of AMERICAN HONDA MOTOR CO., INC.

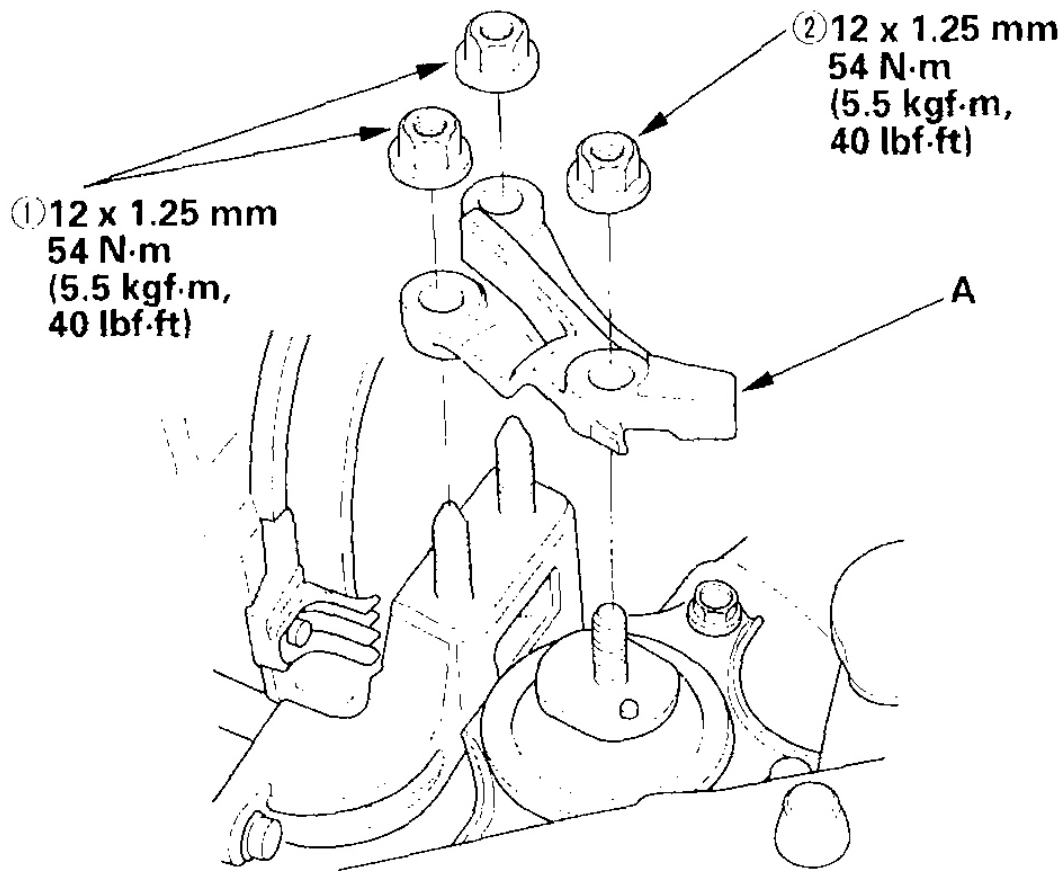
14. Install the upper cover (A), then connect the camshaft position (CMP) (top dead center (TDC)) sensor connector (B), and install the grommet (C).



G01401543

Fig. 107: Installing Upper Cover With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

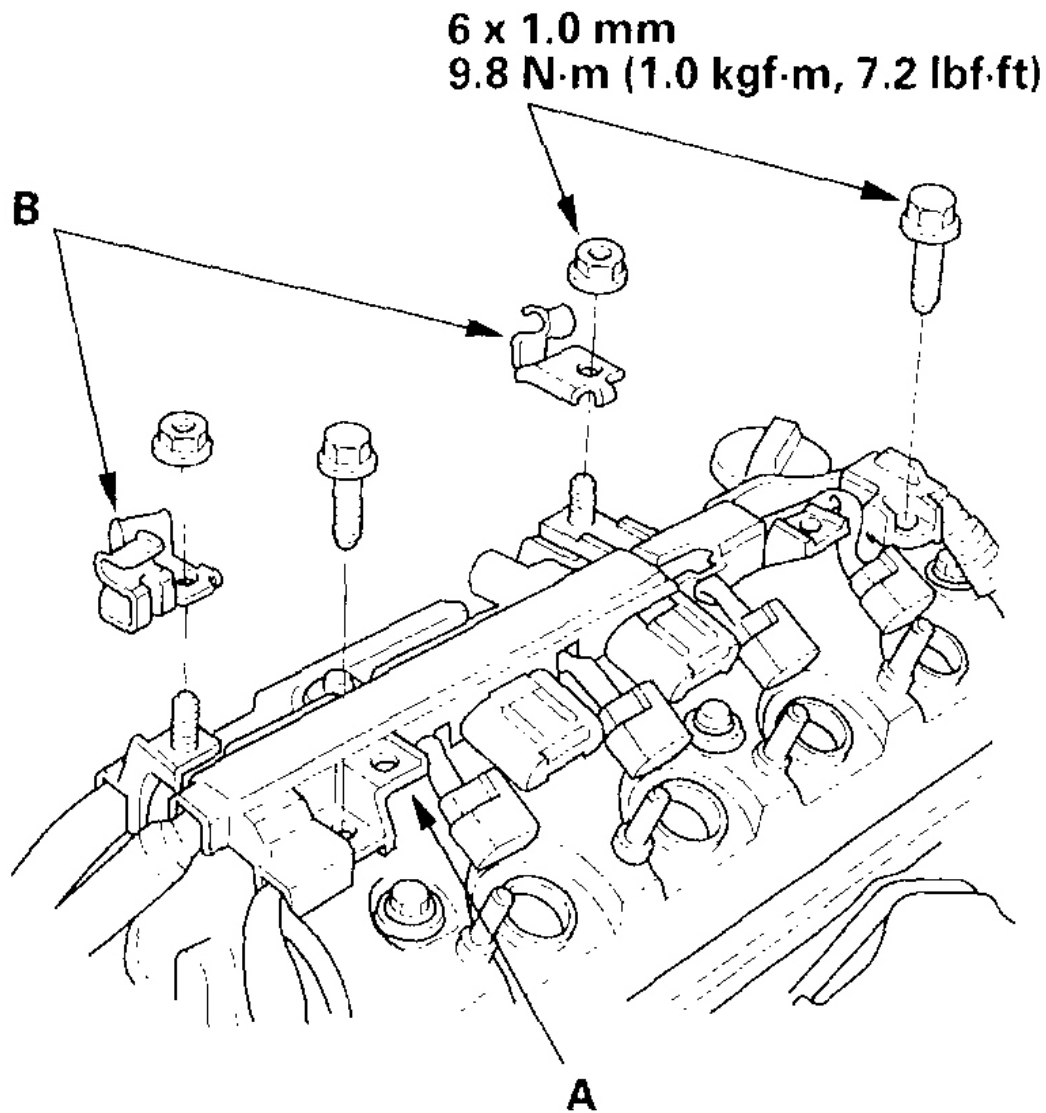
15. Install the upper bracket (A), then tighten the nuts in the numbered sequence shown.



G01401544

Fig. 108: Installing Upper Bracket With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

16. Install the cylinder head cover (see Cylinder Head Cover Installation).
17. Install the harness holder (A) and throttle cable clamps (B).



G01401545

Fig. 109: Installing Harness Holder With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

18. Install the ignition coils (see **IGNITION COIL REMOVAL/INSTALLATION**).
19. Loosely install the alternator.
20. Adjust the alternator belt tension or the alternator-compressor belt tension(see **ALTERNATOR BELT**) .
21. Loosely install the power steering (P/S) pump belt and pump.
22. Adjust the P/S pump belt (see **PUMP BELT INSPECTION AND ADJUSTMENT**).

23. Install the splash shield.
24. Install the front tires/wheels.
25. Clean the battery posts and cable terminals with sandpaper. Connect the negative cable, then positive cable and apply grease to prevent corrosion.
26. Perform the engine control module (ECM)/powertrain control module (PCM) idle learn procedure (see **ECM/PCM IDLE LEARN PROCEDURE**).
27. Enter the anti-theft code for the radio, then enter the customer's radio station presets.
28. Set the clock.

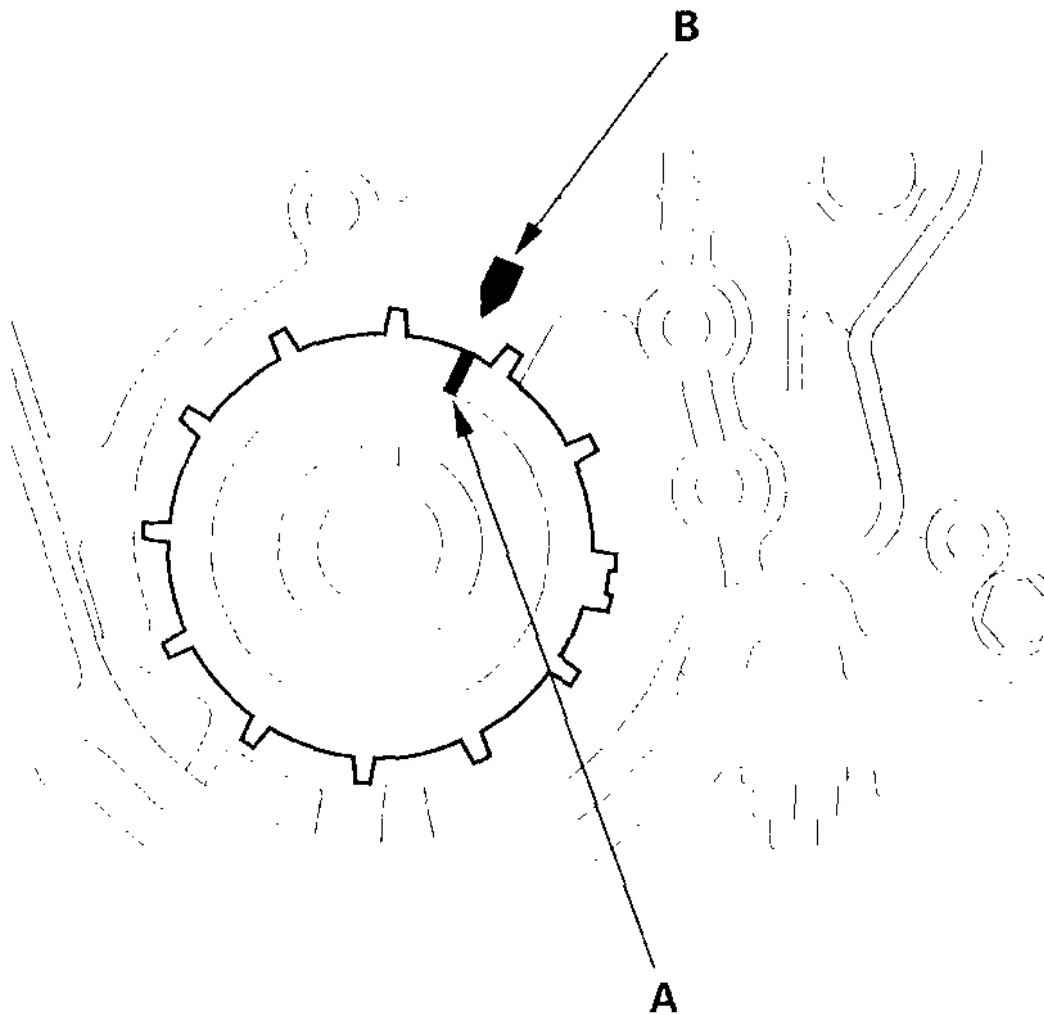
TIMING BELT REPLACEMENT

Special Tools Required

- Holder handle 07JAB-001020B
- Holder attachment, 50 mm, offset 07MAB-PY3010A
- Socket, 19 mm 07JAA-001020A or a commercially available 19 mm socket

NOTE: **If you are removing the auto-tensioner, refer to the auto-tensioner installation procedure (see).**

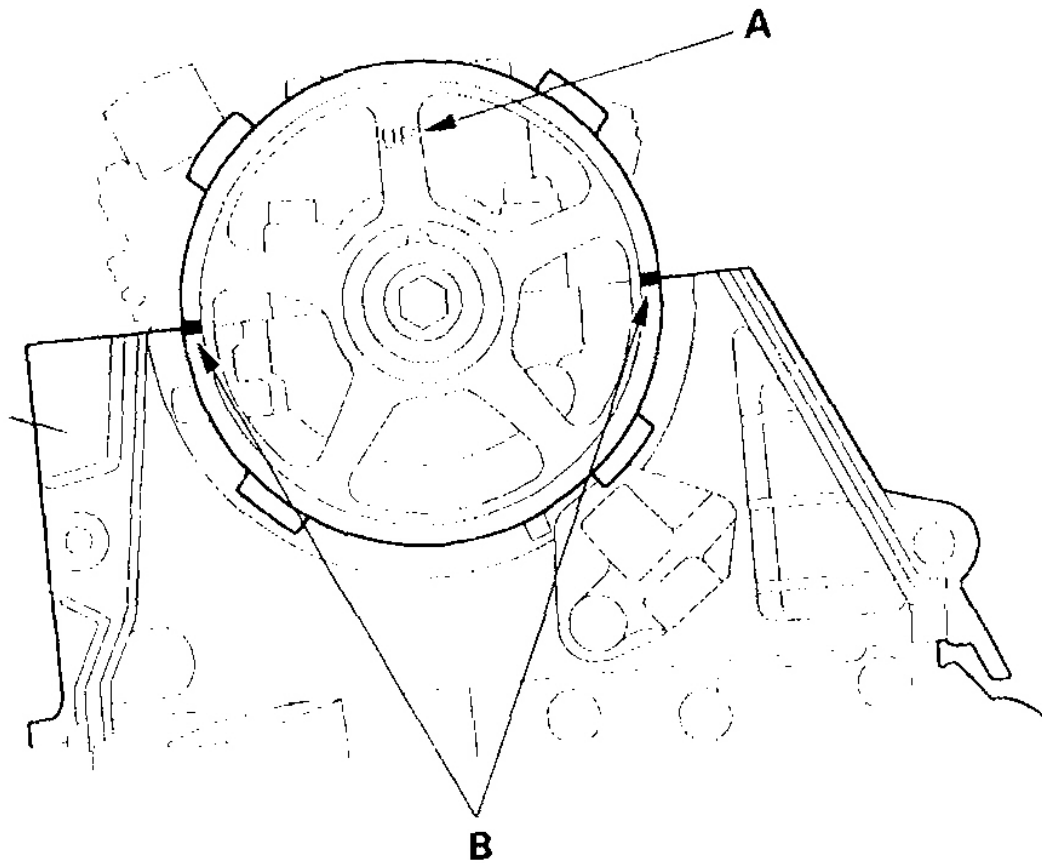
1. Remove the timing belt (see **Timing Belt Inspection**).
2. Clean the timing belt pulleys, and the upper and lower covers.
3. Set the crankshaft to top dead center (TDC). Align the TDC mark (A) on the timing belt drive pulley with the pointer (B) on the oil pump.



G01401546

Fig. 110: Aligning TDC Mark On Timing Belt Driver Pulley Pointer
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Clean the camshaft pulley and set it at TDC.
 - 1 The "UP" mark (A) on the camshaft pulley should be at the top.
 - 2 Align the TDC marks (B) on the camshaft pulley with the top edge of the head.

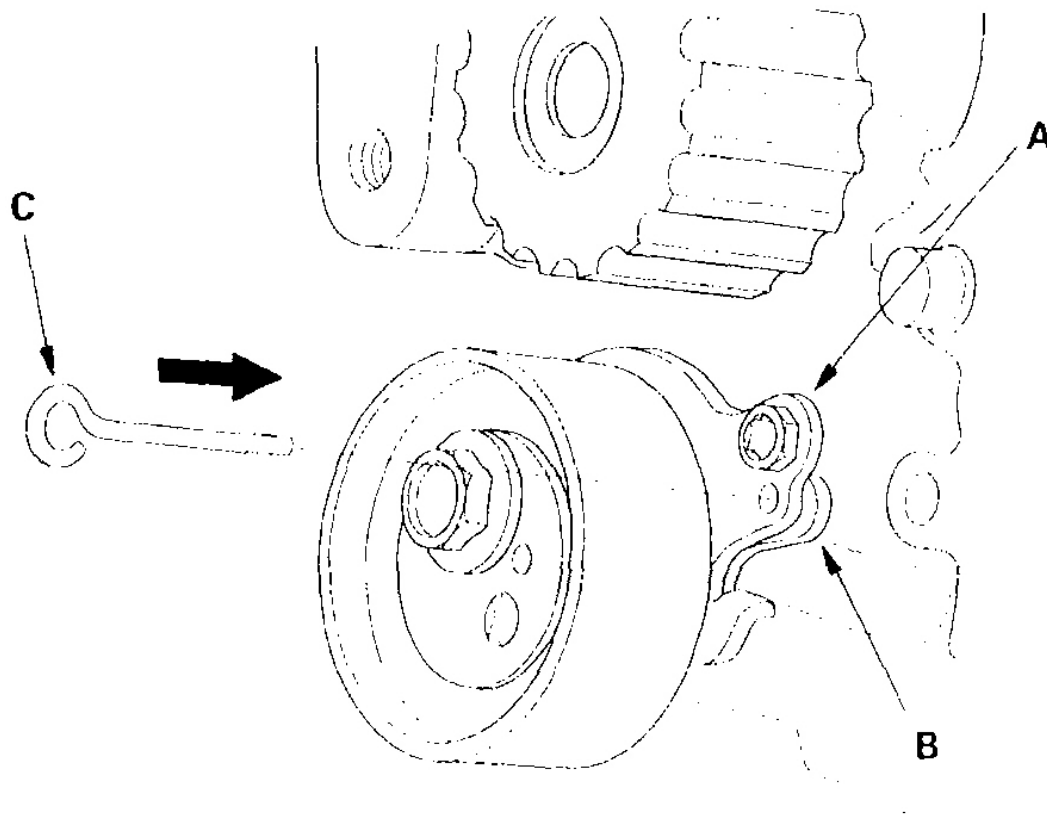


G01401547

Fig. 111: Cleaning Camshaft Pulley

Courtesy of AMERICAN HONDA MOTOR CO., INC.

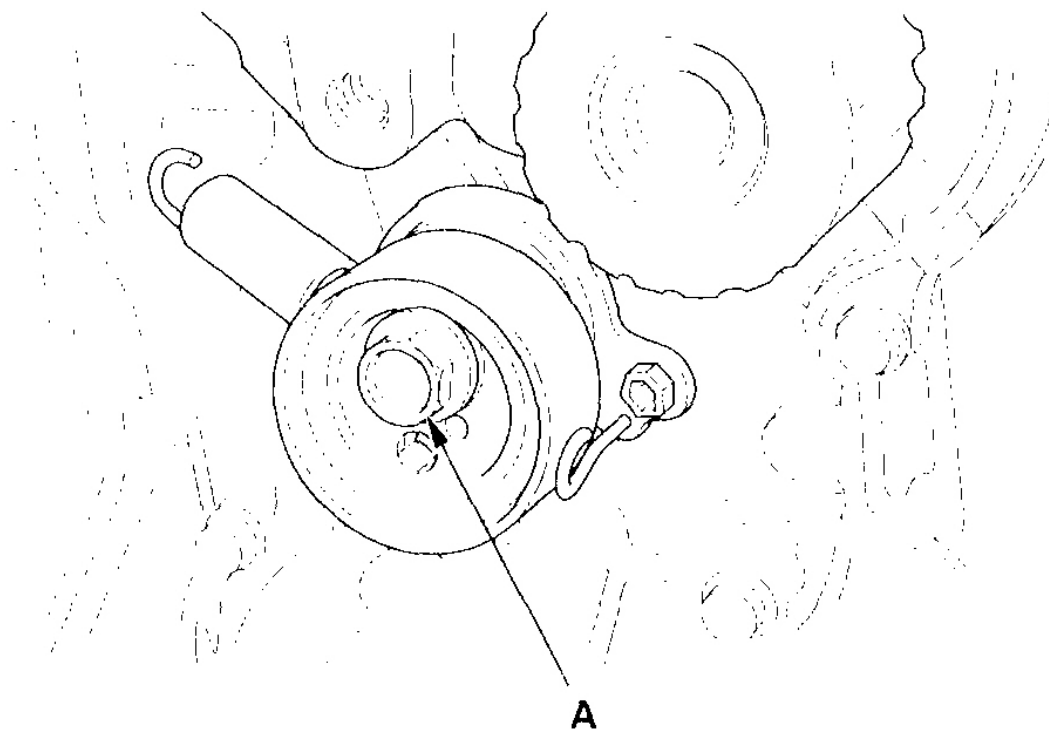
5. Align the holes on the tensioner pulley (A) and tensioner base (B), then insert a 3.0 mm (0.12 in.) diameter pin (C) into the holes.



G01401548

Fig. 112: Aligning Holes On Tensioner Pulley
Courtesy of AMERICAN HONDA MOTOR CO., INC.

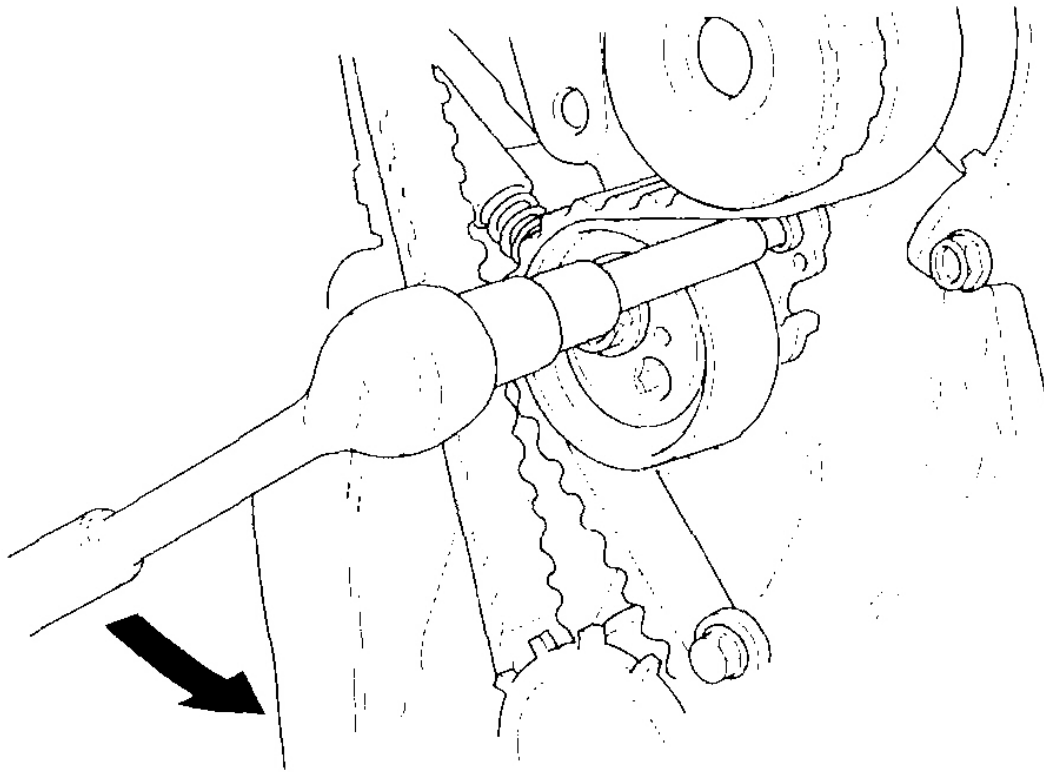
6. Loosen the auto-tensioner mounting bolt (A) 180°.



G01401549

Fig. 113: Loosening Auto-Tensioner Mounting Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

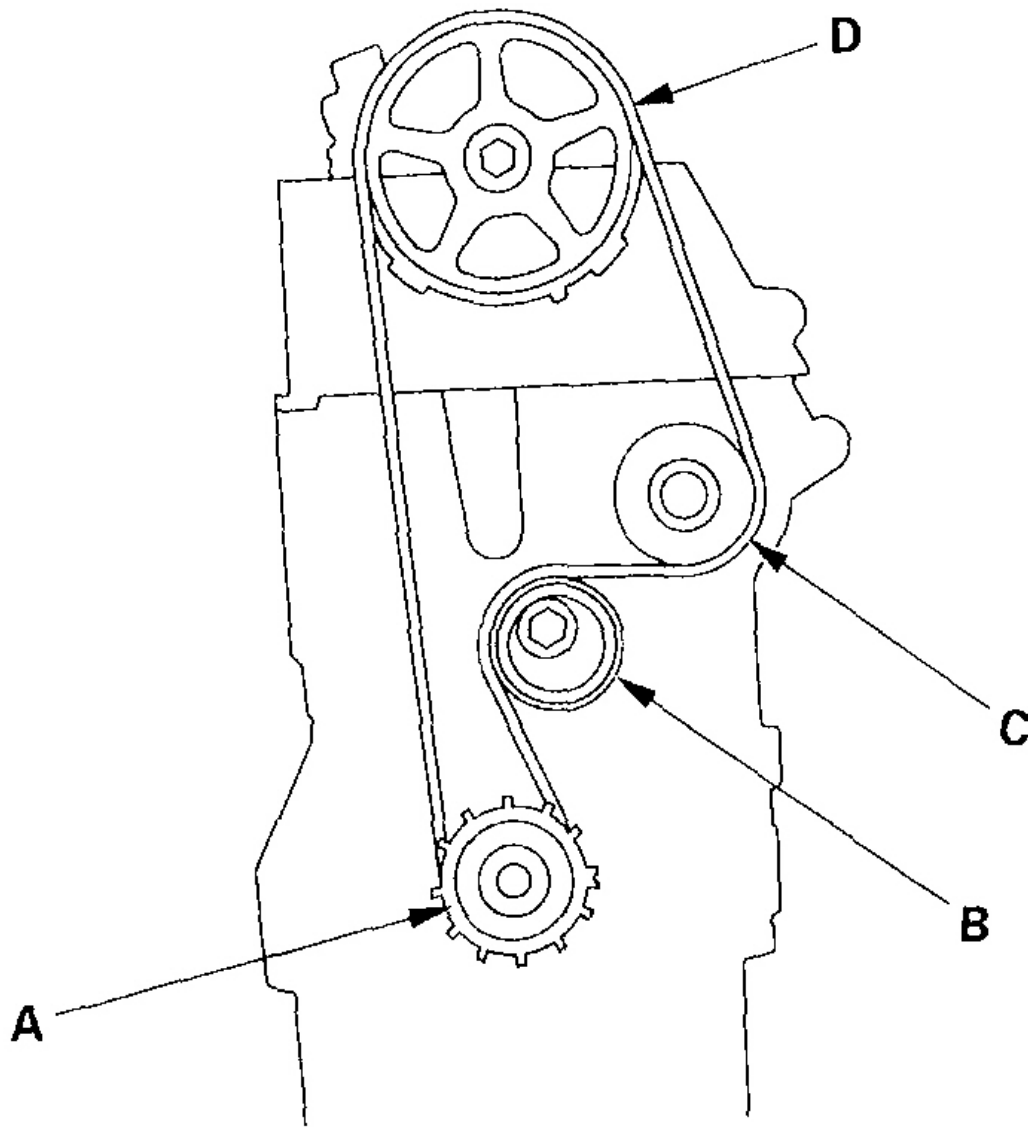
7. Move the auto-tensioner to remove tension from the timing belt.



G01401550

Fig. 114: Moving Auto-Tensioner To remove Tension From Timing Belt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

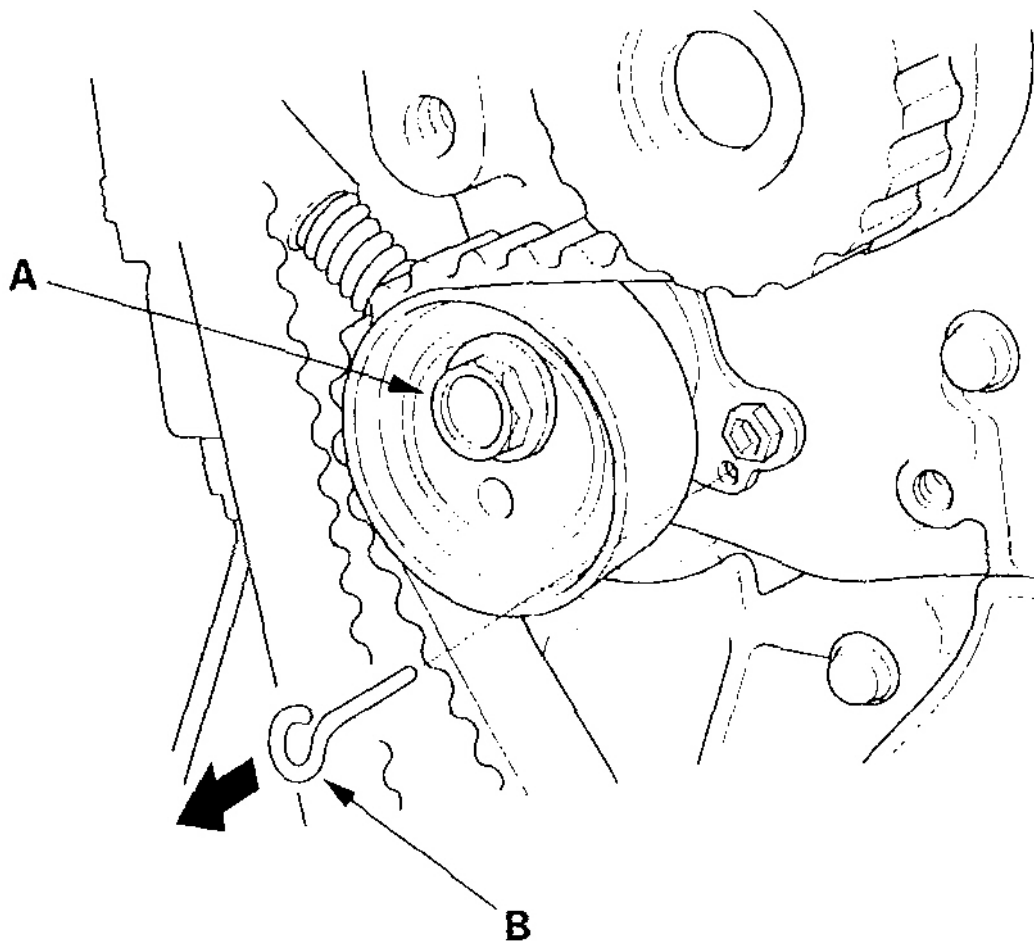
8. Install the timing belt in a counterclockwise sequence, starting with the drive pulley.
 - 1 Drive pulley (A).
 - 2 Tensioner pulley (B).
 - 3 Water pump pulley (C).
 - 4 Camshaft pulley (D).



G01401551

Fig. 115: Installing Timing Belt In Counterclockwise Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

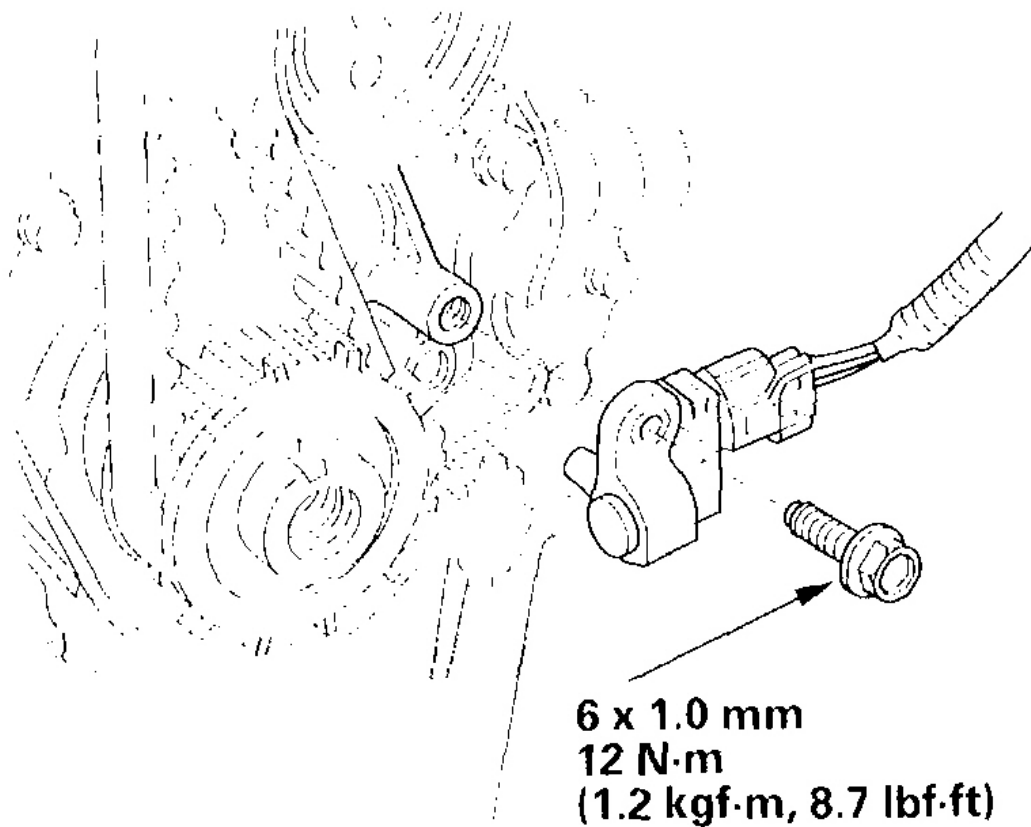
9. Install the crankshaft pulley.
10. Rotate the crankshaft pulley two turns counterclockwise so that the timing belt positions on the pulleys.
11. Set the No. 1 piston at TDC (see step 5 on **Valve Clearance Adjustment**).
12. Tighten the auto-tensioner mounting bolt (A) to 44 N.m (4.5 kgf.m, 33 lbf.ft), then remove the pin (B) from the auto-tensioner.



G01401552

Fig. 116: Tightening Auto-Tensioner Mounting Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

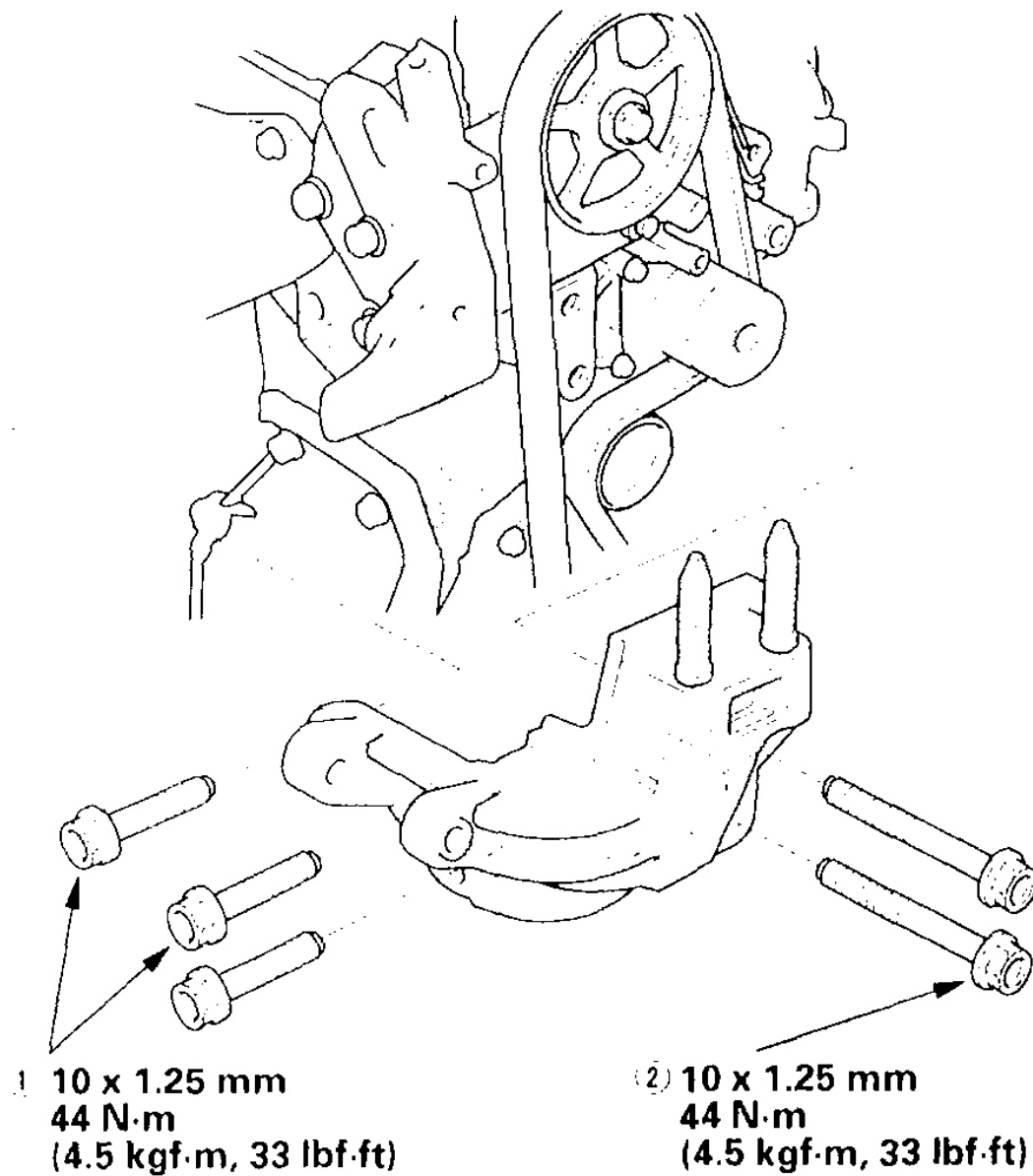
13. Remove the crankshaft pulley.
14. Install the crankshaft position (CKP) sensor.



G01401553

Fig. 117: Installing CKP Sensor With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

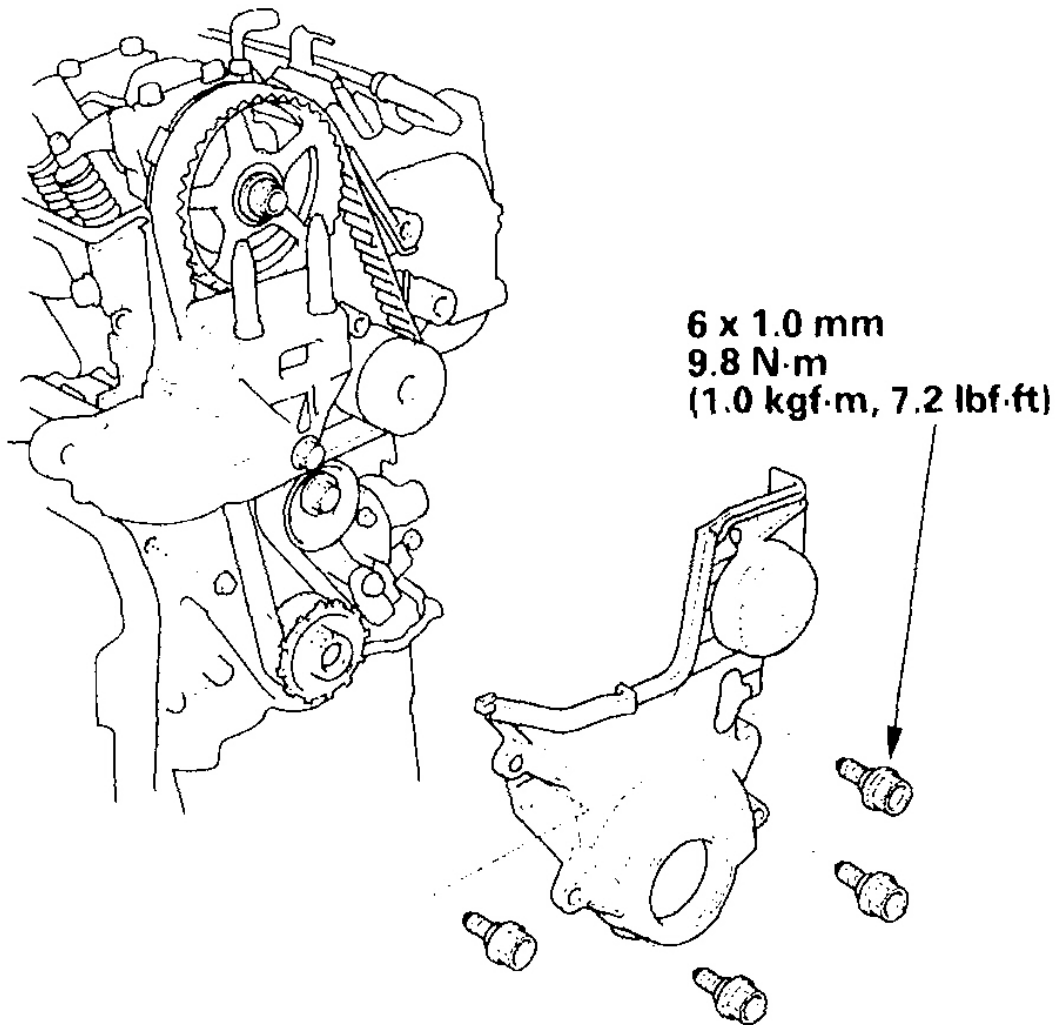
15. Install the bolts loosely, then tighten the side engine mount bracket mounting bolts in the numbered sequence shown.



G01401554

Fig. 118: Tightening Side Engine Mount Bracket Mounting Bolts With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

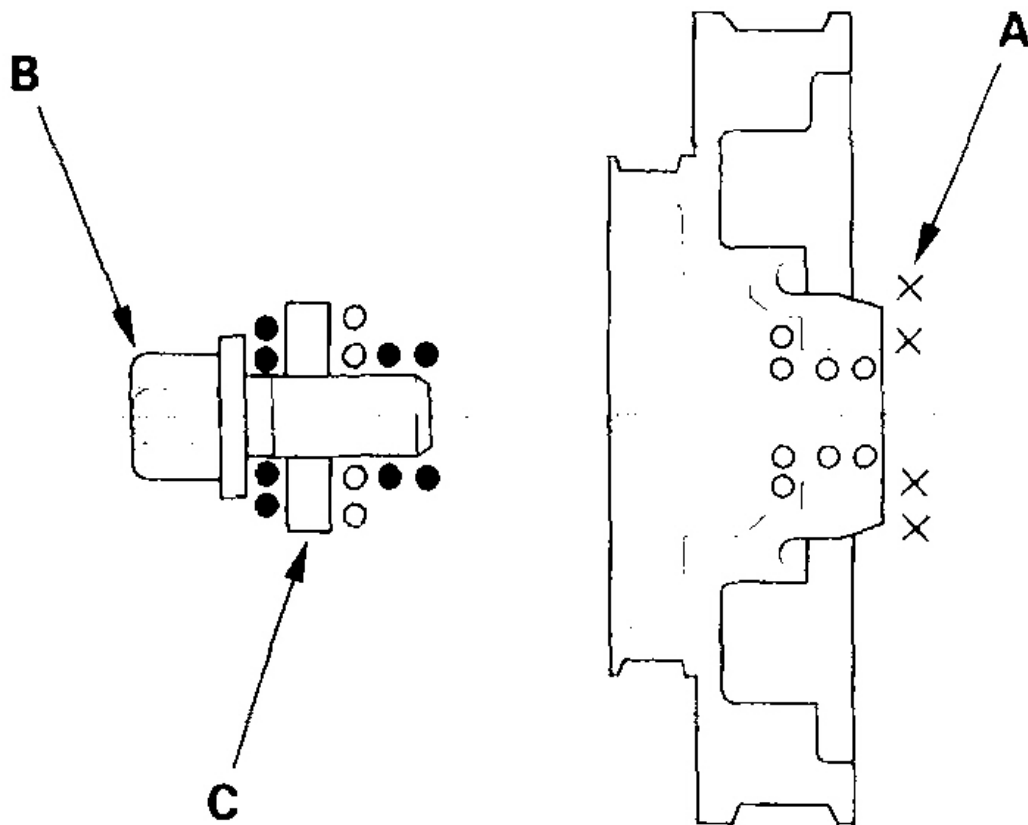
16. Install the lower cover.



G01401555

Fig. 119: Installing Lower Cover With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

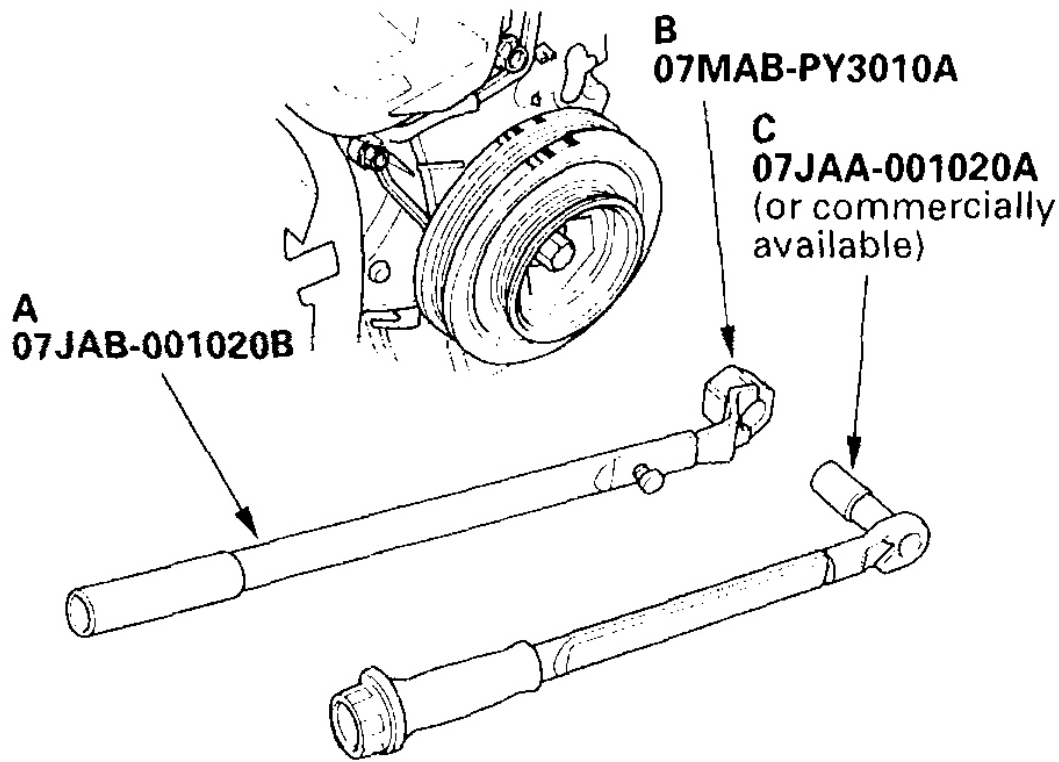
17. Clean the crankshaft pulley bolt and washer.
18. Clean all oil off the inside face (A) of the crankshaft pulley, and apply new engine oil to the pulley bolt (B) and washer (C).



G01401556

Fig. 120: Identifying Crankshaft Pulley Component Lubrication Points
Courtesy of AMERICAN HONDA MOTOR CO., INC.

19. Install the crankshaft pulley, and tighten the bolt to 200 N.m (20.3 kgf.m, 148 lbf.ft). Do not use an impact wrench.
 - 1 Hold the pulley with the holder handle (A) and holder attachment (B).
 - 2 Tighten the bolt with a torque wrench and 19mm socket (C).

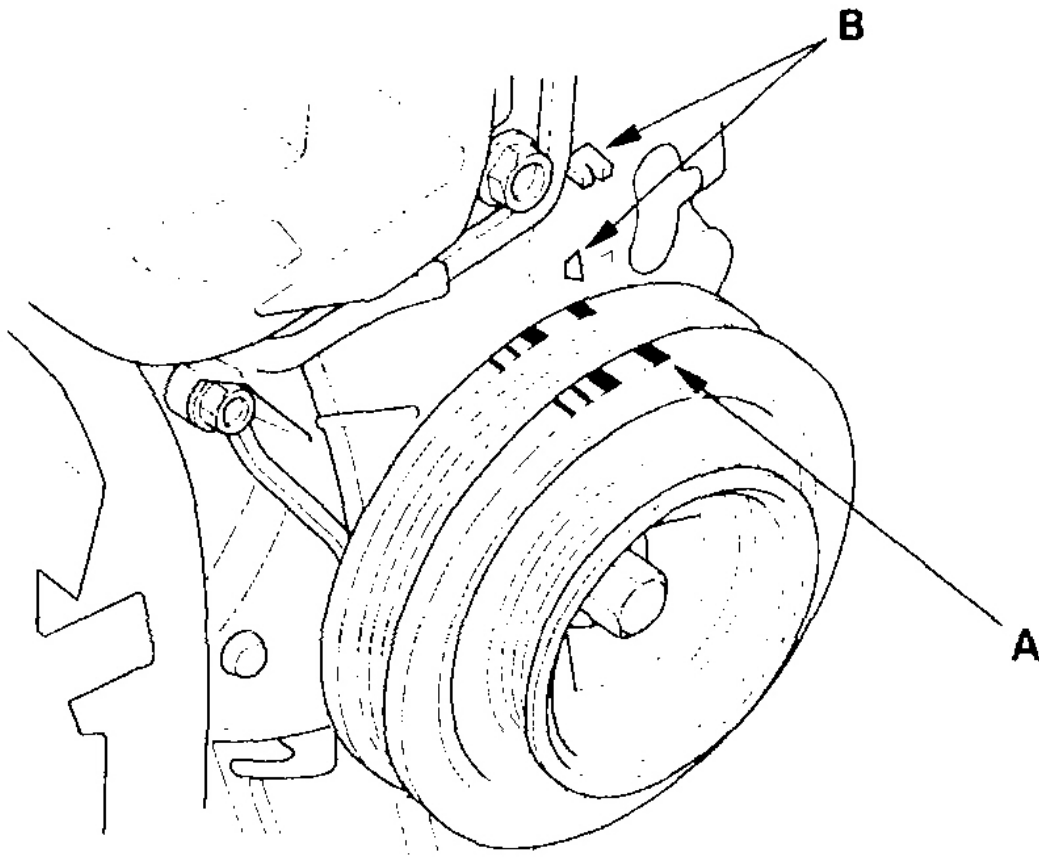


G01401557

Fig. 121: Installing Crankshaft Pulley

Courtesy of AMERICAN HONDA MOTOR CO., INC.

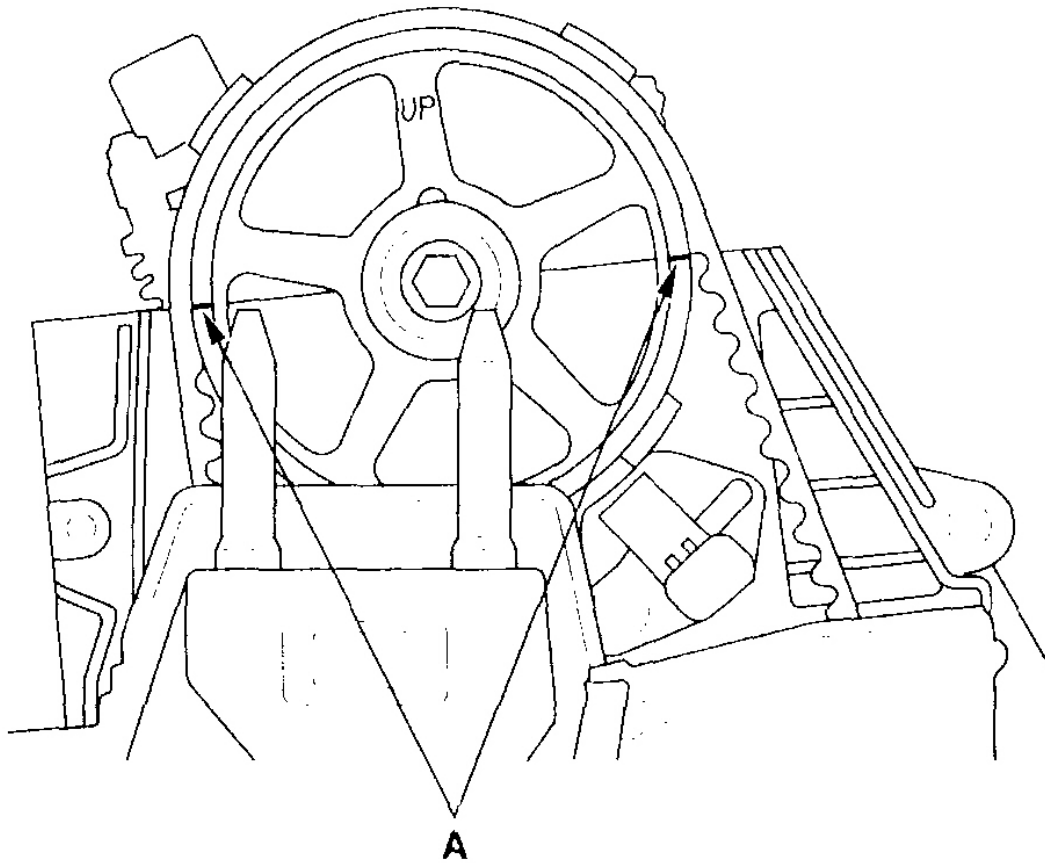
20. Rotate the crankshaft pulley two turns counterclockwise so that the timing belt positions on the pulleys.
21. Turn the crankshaft pulley so its TDC mark (A) lines up with the pointers (B).



G01401558

Fig. 122: Turning Crankshaft Pulley So TDC Mark Lines Up With Pointers
Courtesy of AMERICAN HONDA MOTOR CO., INC.

22. Check the camshaft pulley marks (A).
- If the camshaft pulley marks are also at TDC, go to step 24.
 - If the camshaft pulley marks are not at TDC, remove the timing belt and repeat steps 2 through 11 .

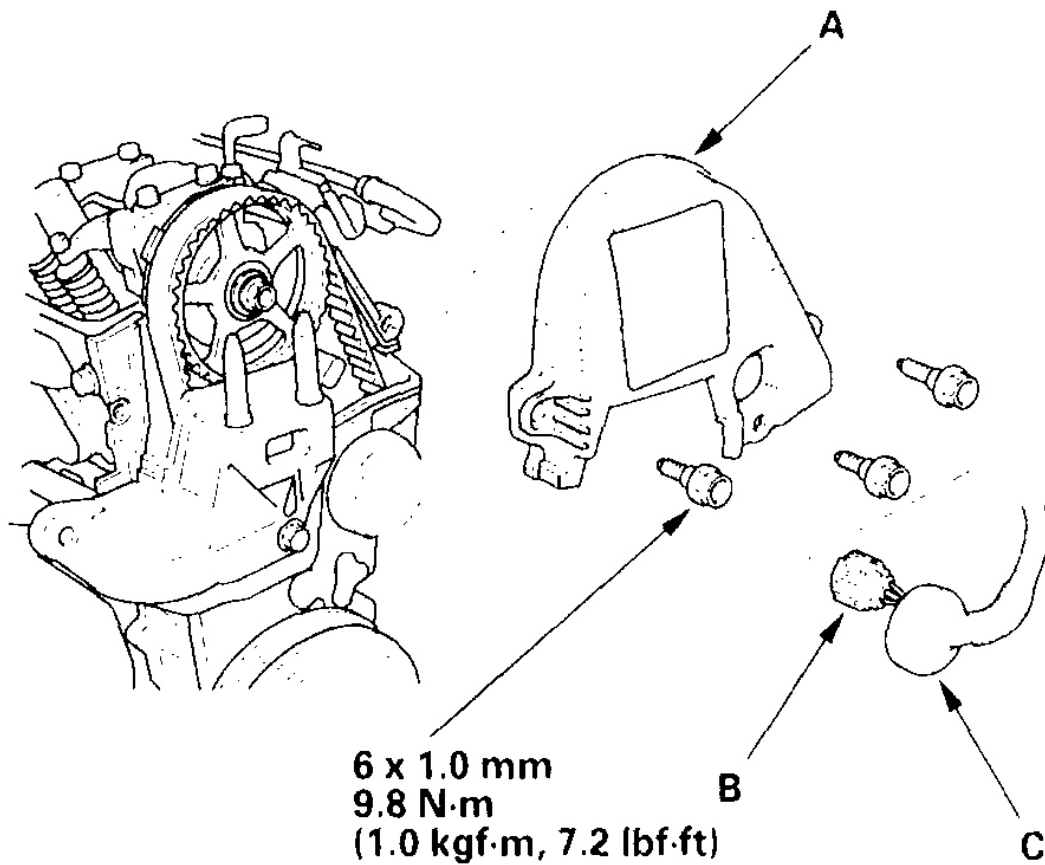


G01401559

Fig. 123: Checking Camshaft Pulley Marks

Courtesy of AMERICAN HONDA MOTOR CO., INC.

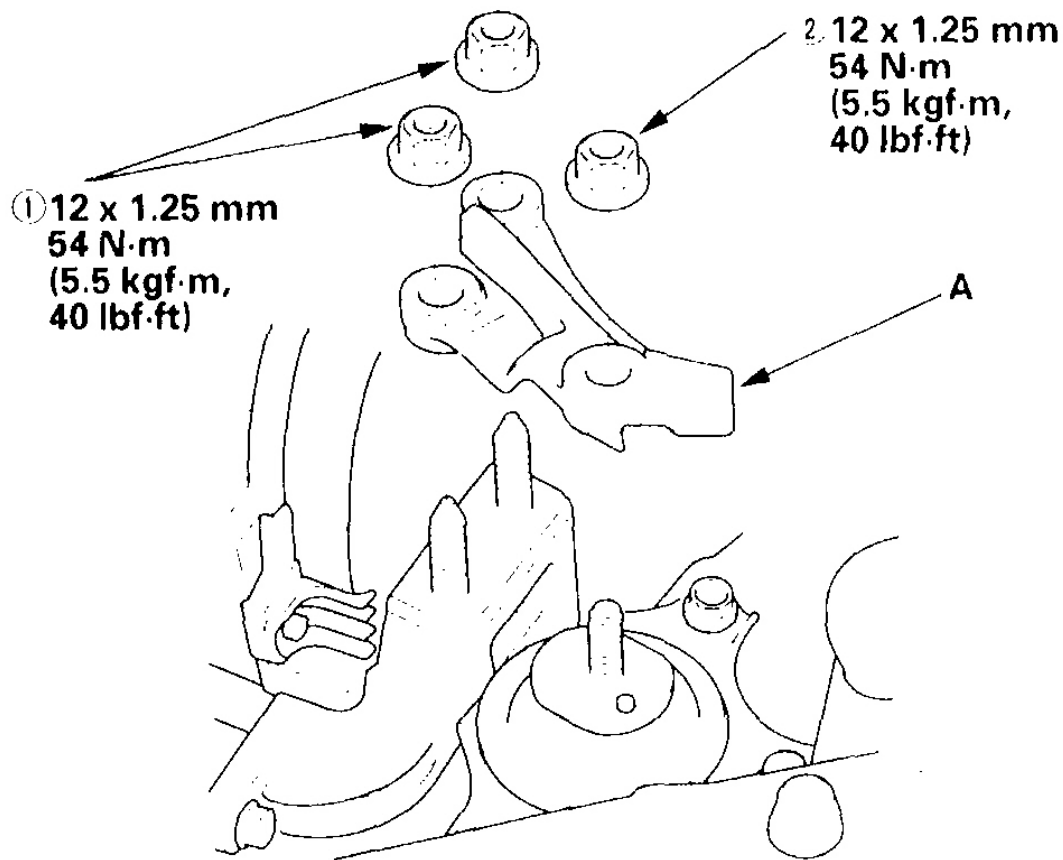
23. Install the upper cover (A), then connect the camshaft position (CMP) (top dead center (TDC)) sensor connector (B), and install the grommet (C).



G01401560

Fig. 124: Installing Upper Cover With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

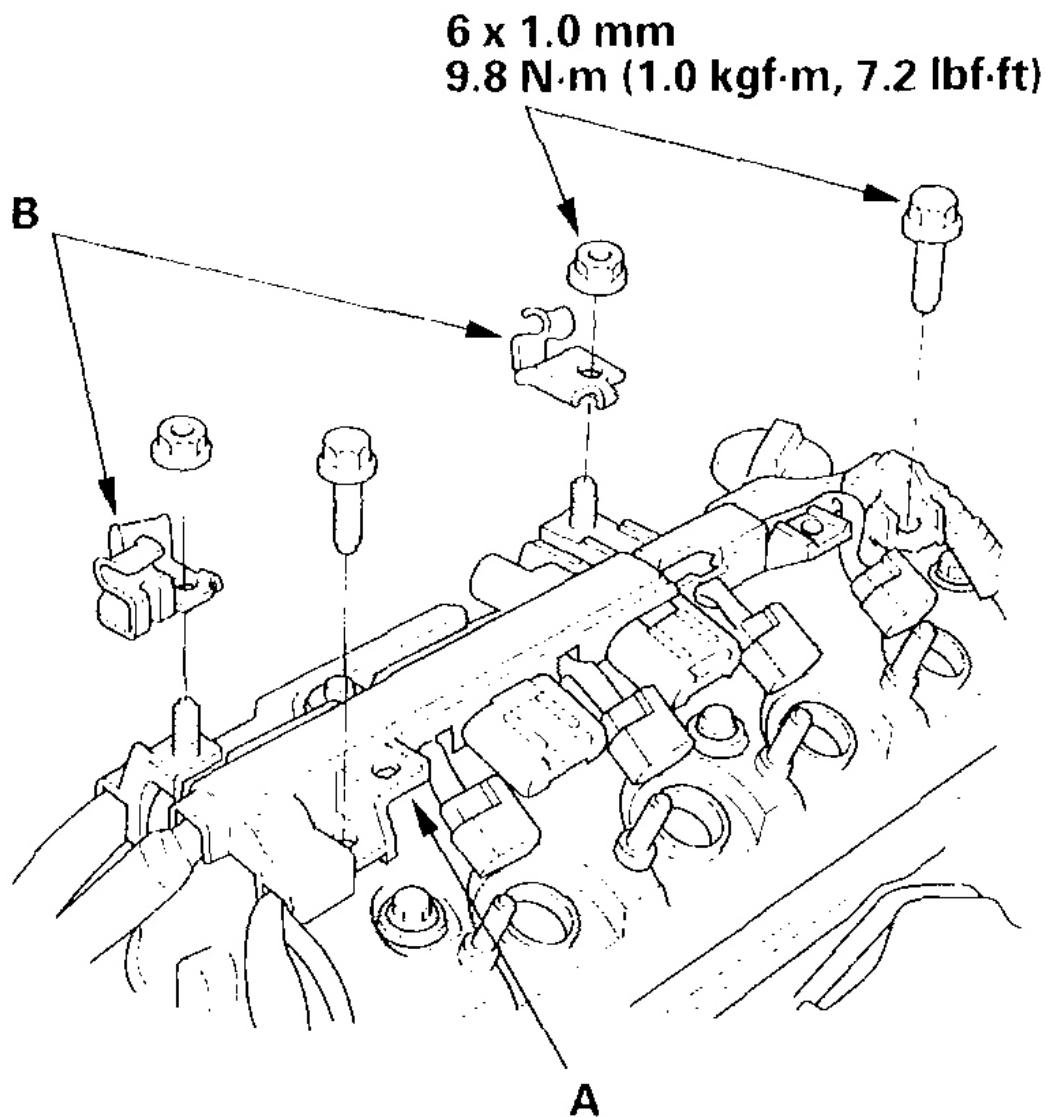
24. Install the upper bracket (A), then tighten the nuts in the numbered sequence shown.



G01401561

Fig. 125: Installing Upper Bracket With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

25. Install the cylinder head cover (see **Cylinder Head Cover Installation**).
26. Install the harness holder (A) and throttle cable clamps (B).



G01401562

Fig. 126: Installing Harness Holder With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

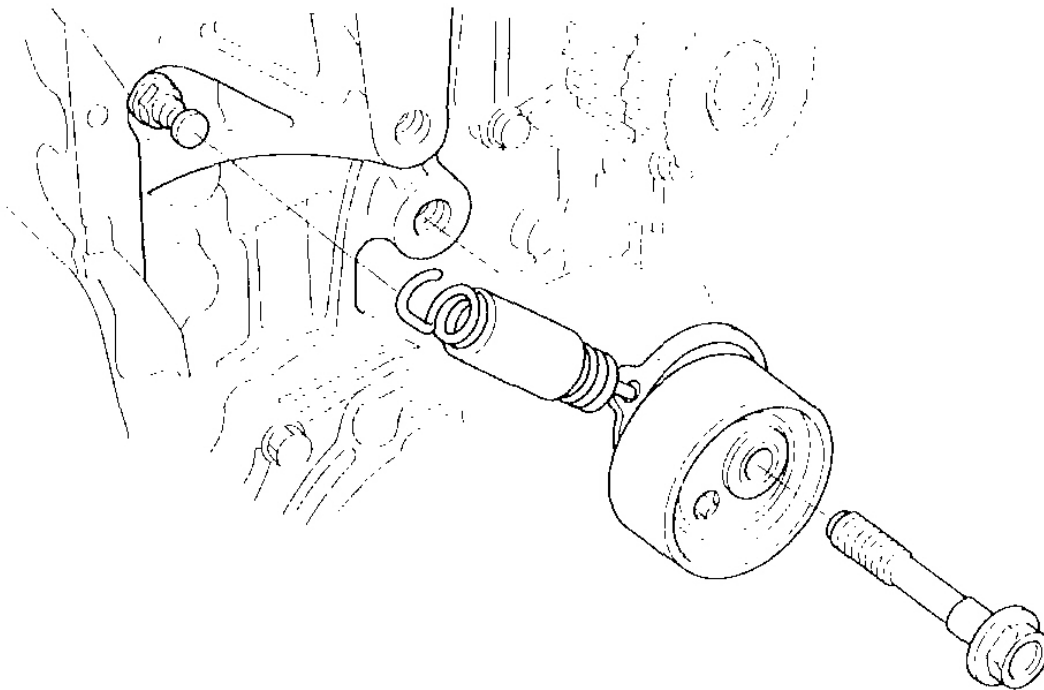
27. Install the ignition coils (see **IGNITION COIL REMOVAL/INSTALLATION**).
28. Loosely install the alternator.
29. Adjust the alternator belt tension or the alternator-compressor belt tension (see **ALTERNATOR BELT**).
30. Loosely install the P/S pump belt and pump.
31. Adjust the P/S pump belt (see **PUMP BELT INSPECTION AND ADJUSTMENT**).

32. Install the splash shield.
33. Install the front tires/wheels.
34. Clean the battery posts and cable terminals with sandpaper. Connect the cables and apply grease to prevent corrosion.
35. Enter the anti-theft code for the radio, then enter the customer's radio station presets.
36. Set the clock.

AUTO-TENSIONER REMOVAL AND INSTALLATION

REMOVAL

1. Remove the timing belt (see **Timing Belt Removal**).
2. Remove the auto-tensioner.



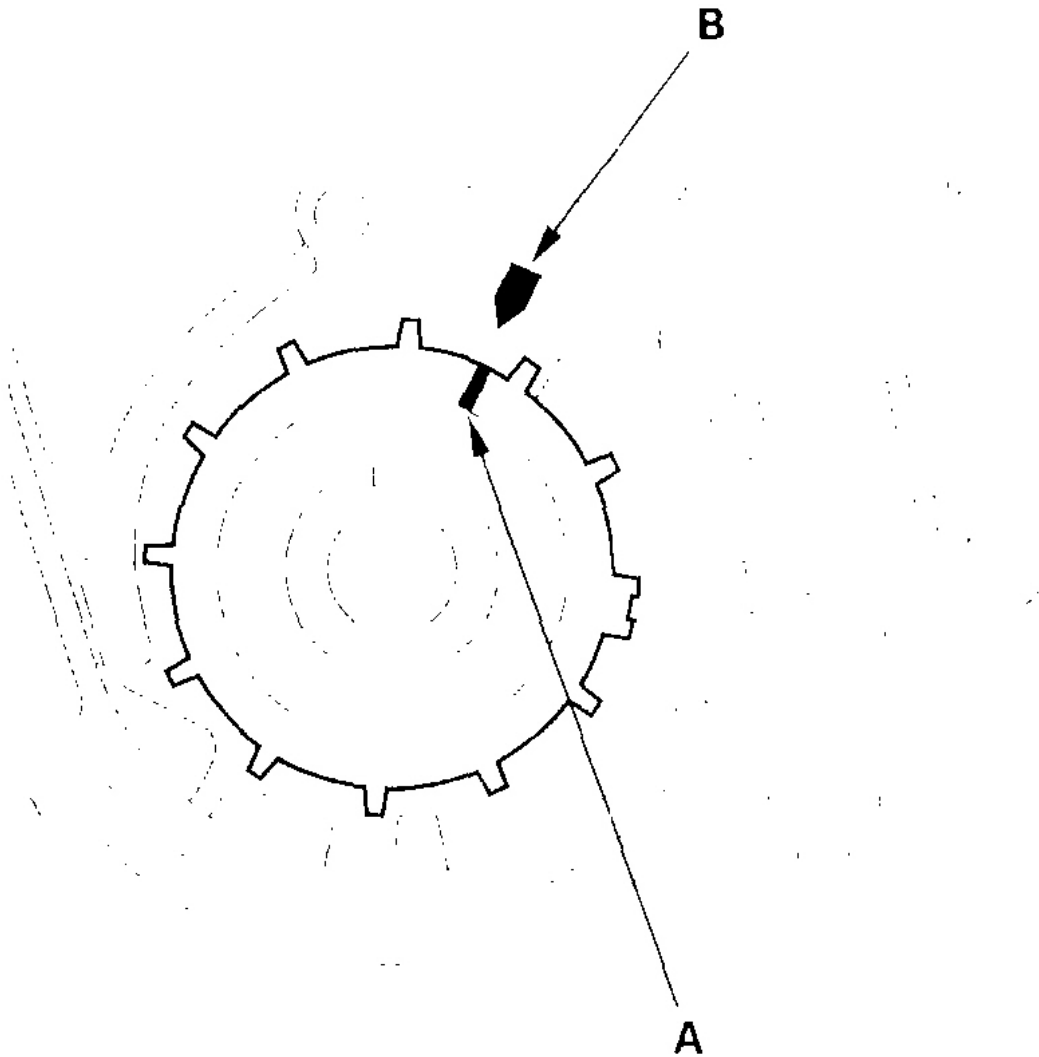
G01401563

Fig. 127: Removing Auto-Tensioner
Courtesy of AMERICAN HONDA MOTOR CO., INC.

INSTALLATION

1. Clean the timing belt pulleys, and the upper and lower covers.

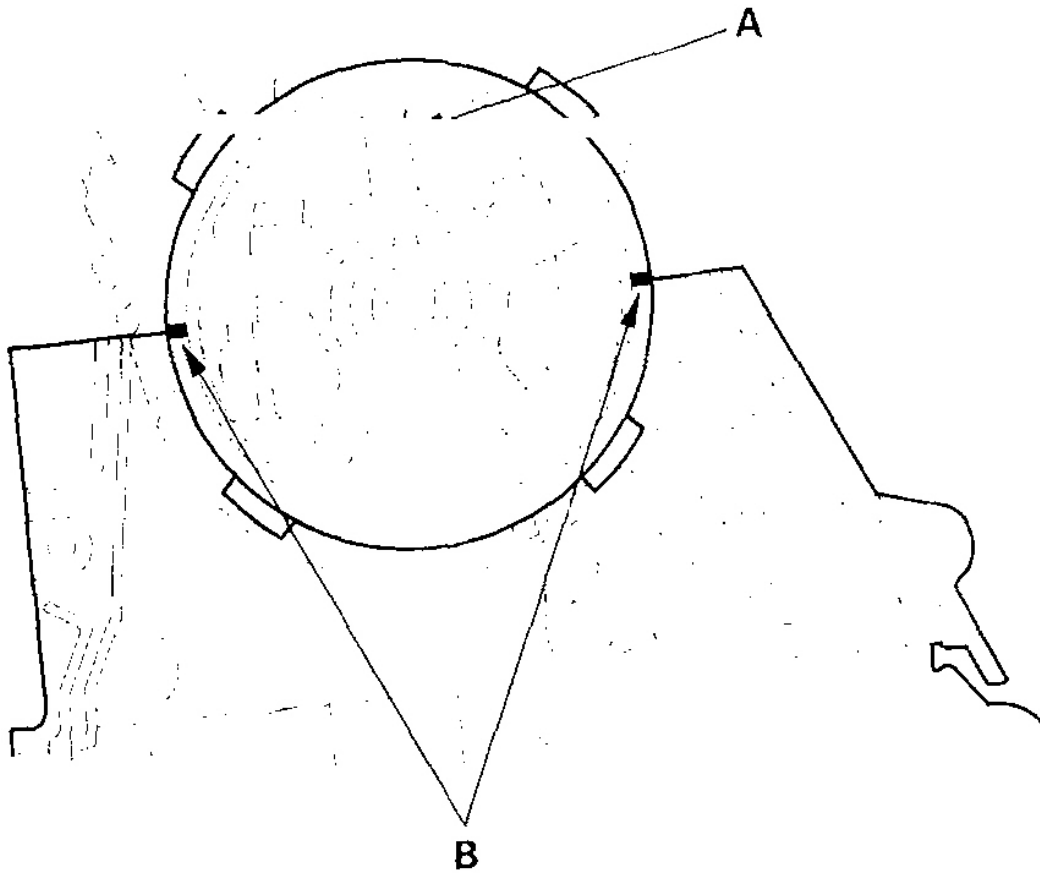
2. Set the crankshaft to TDC. Align the TDC mark (A) on the timing belt drive pulley with the pointer (B) on the oil pump.



G01401564

Fig. 128: Aligning TDC Mark On Timing Belt Drive Pulley With Pointer
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Clean the camshaft pulley and set it to TDC.
 - 1 The "UP" mark (A) on the camshaft pulley should be at the top.
 - 2 Align the TDC marks (B) on the camshaft pulley with the top edge of the head.



G01401565

Fig. 129: Cleaning Camshaft Pulley & Setting To TDC
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Align the holes on the tensioner pulley (A) and tensioner base (B), then insert a 3.0 mm (0.12 in.) diameter pin into the holes.

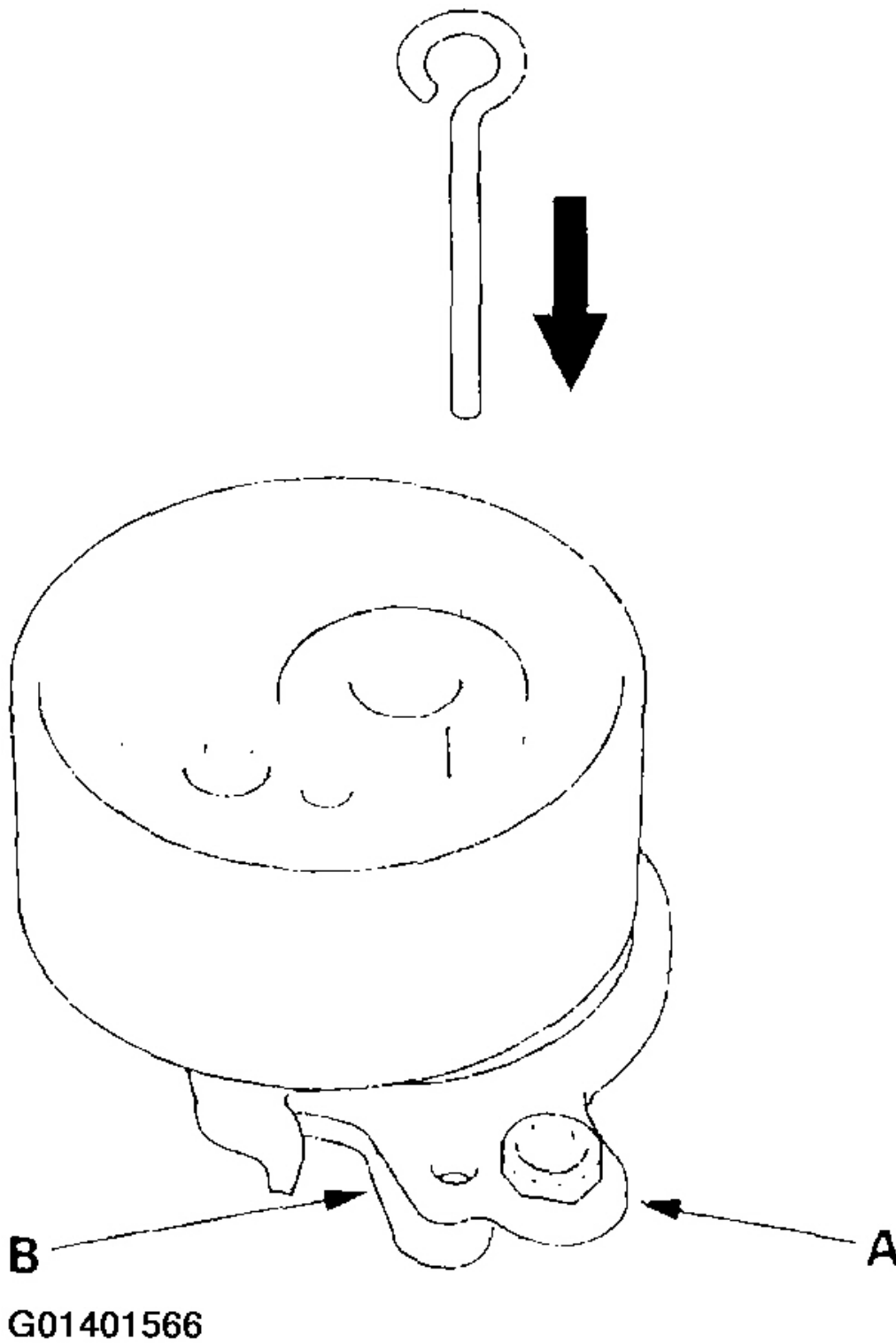
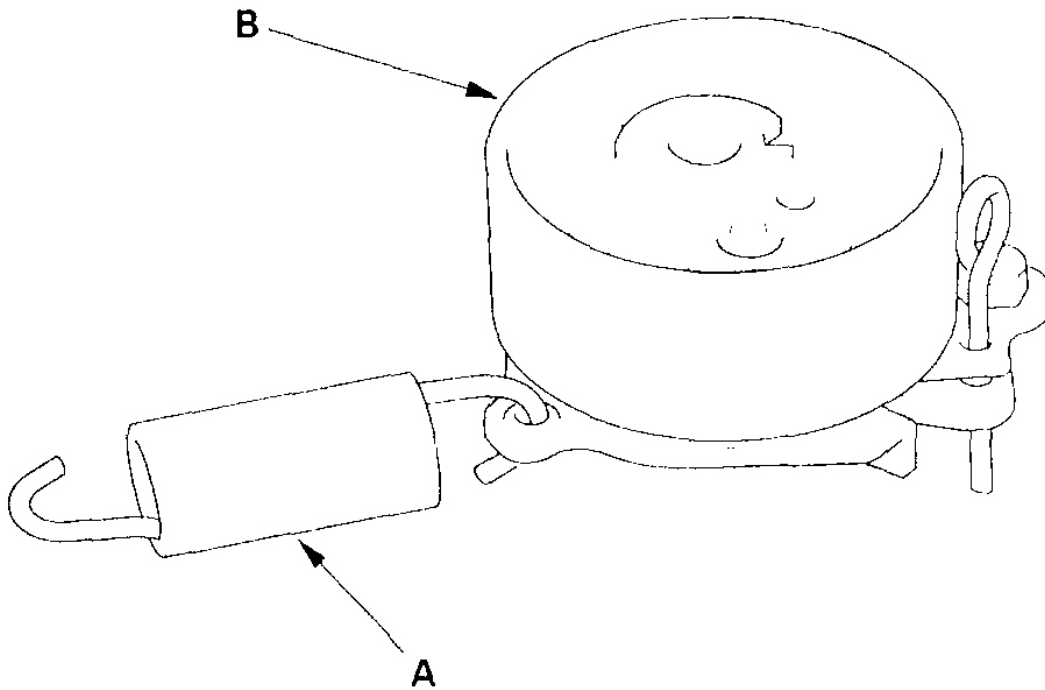


Fig. 130: Aligning Holes On Tensioner Pulley
Courtesy of AMERICAN HONDA MOTOR CO., INC.

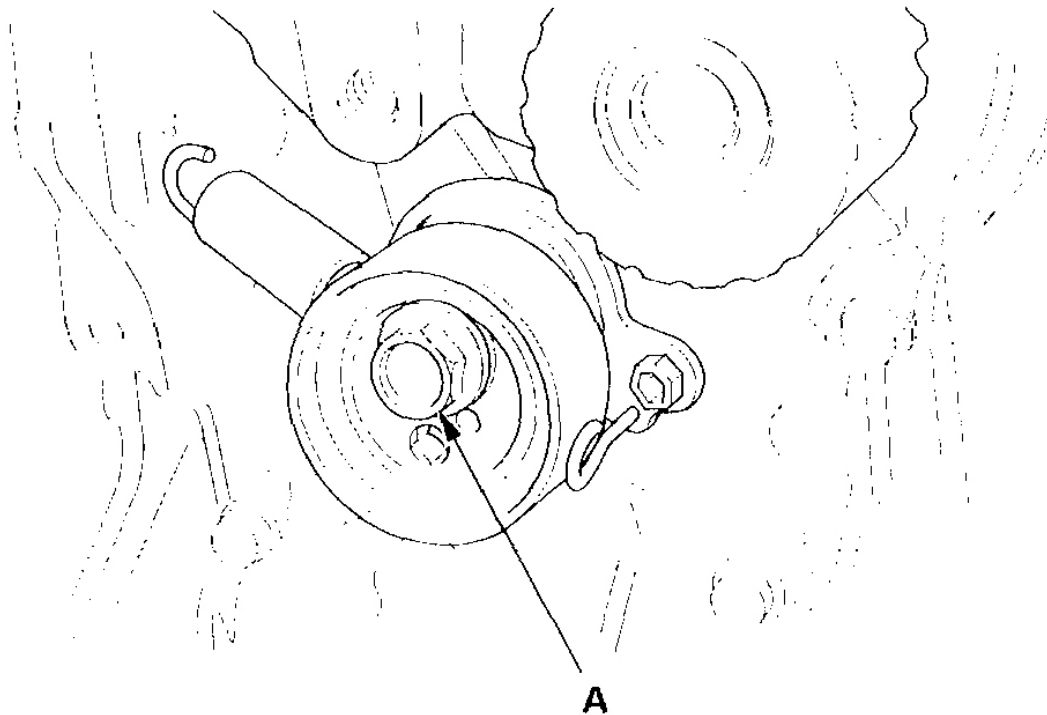
5. Install the tensioner spring (A) on the auto-tensioner (B).



G01401567

Fig. 131: Installing Tensioner Spring
Courtesy of AMERICAN HONDA MOTOR CO., INC.

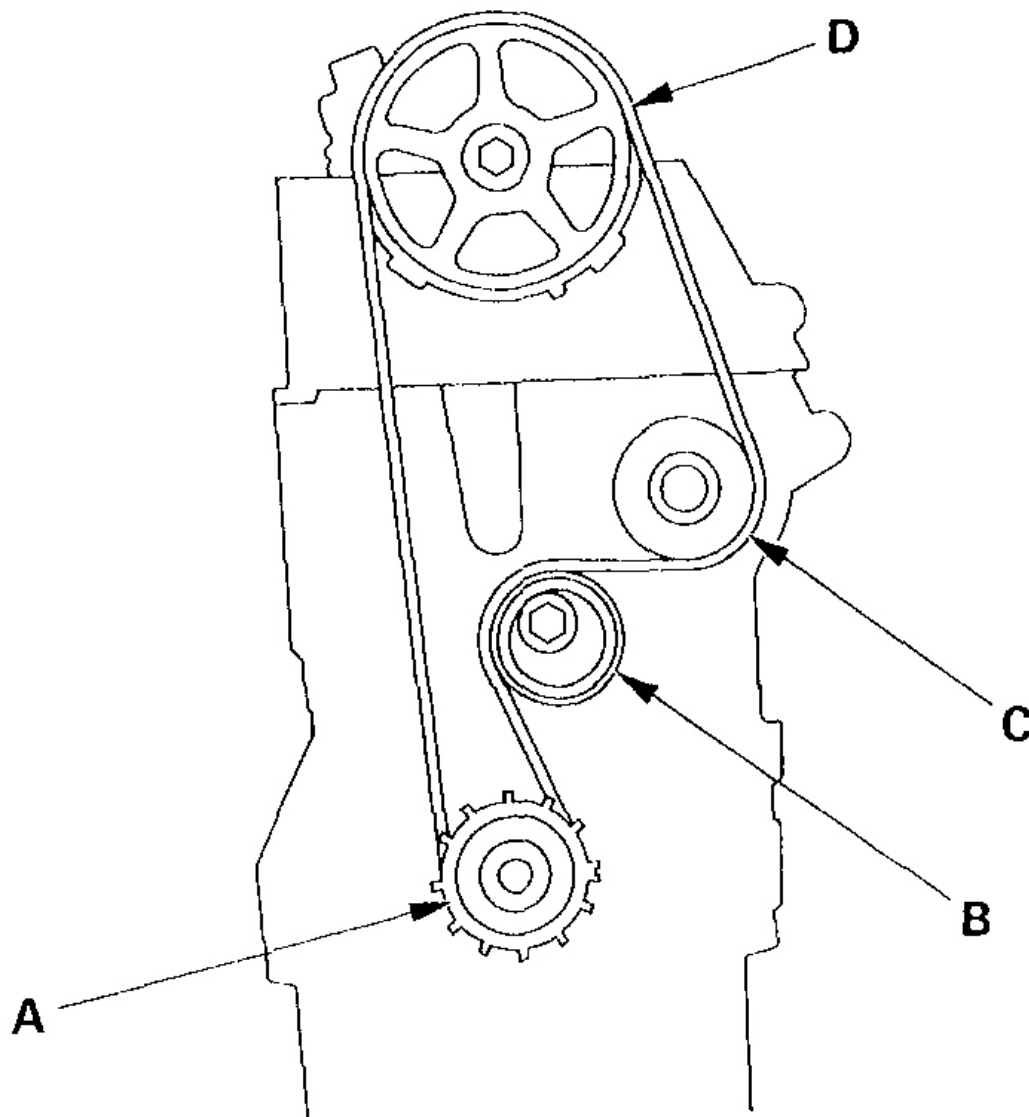
6. Install the auto-tensioner, then tighten the auto-tensioner mounting bolt (A) to 9.8 N.m (1.0 kgf.m, 7.2 lbf.ft).



G01401568

Fig. 132: Tightening Auto-Tensioner Mounting Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

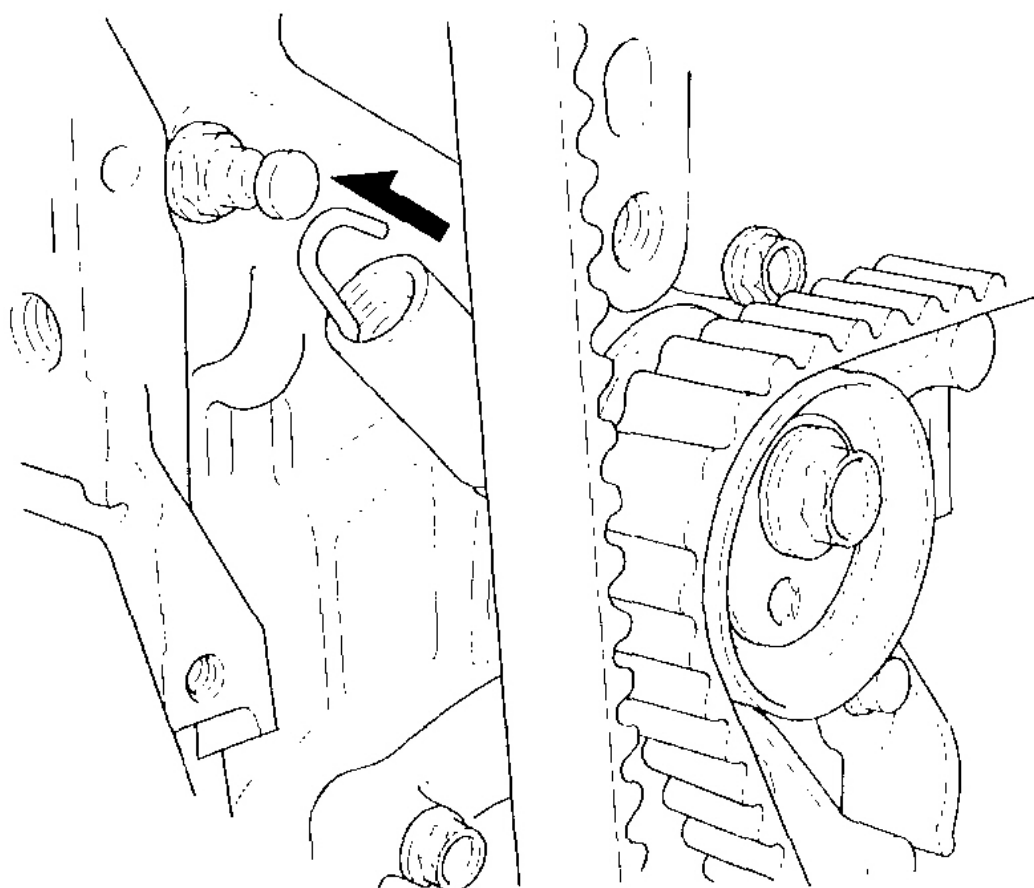
7. Loosen the auto-tensioner mounting bolt 180°.
8. Install the timing belt in a counterclockwise sequence, starting with the drive pulley.
 - 1 Drive pulley (A).
 - 2 Tensioner pulley (B).
 - 3 Water pump pulley (C).
 - 4 Camshaft pulley (D).



G01401569

Fig. 133: Installing Timing Belt In Counterclockwise Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

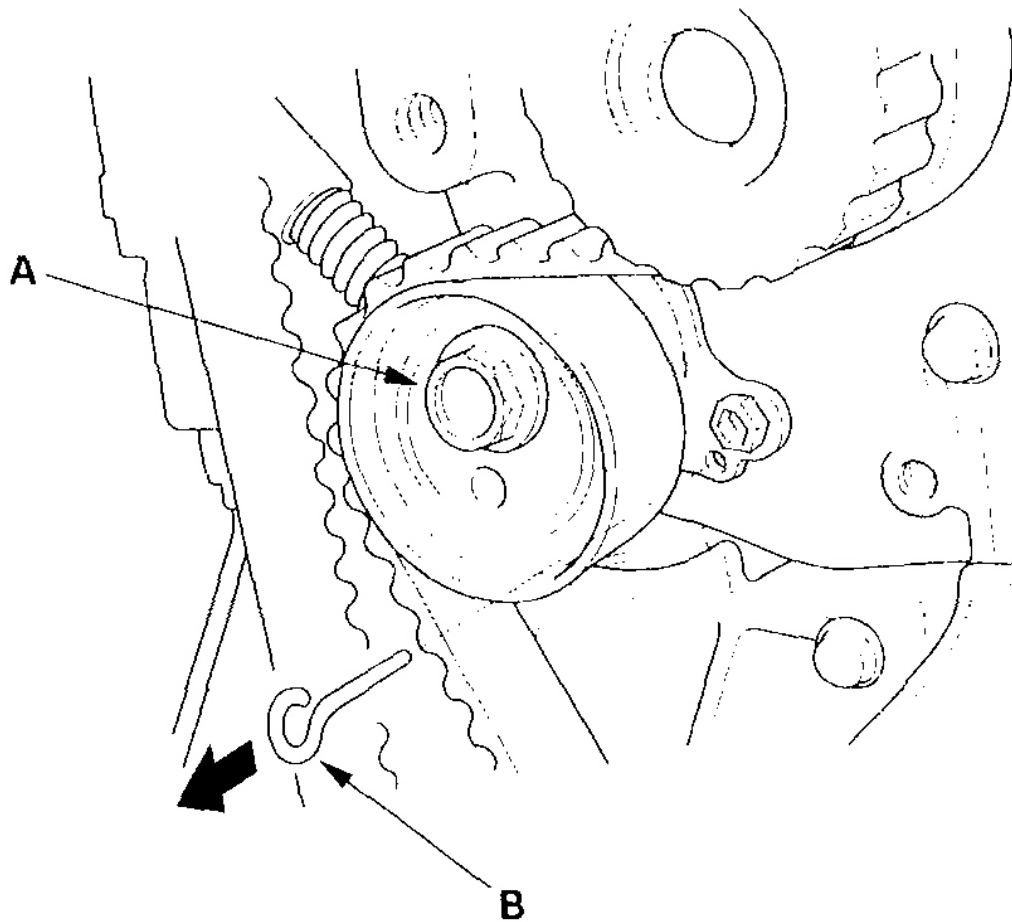
9. Install the tensioner spring on the tensioner bolt.



G01401570

Fig. 134: Installing Tension Spring On Tensioner Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Rotate the crankshaft pulley two turns counterclockwise so that the timing belt positions on the pulleys.
11. Set the No. 1 piston at TDC (see step 5 on **Valve Clearance Adjustment**).
12. Tighten the auto-tensioner mounting bolt (A) to 44 N.m (4.5 kgf.m, 33 lbf.ft), then remove the pin (B) from the auto-tensioner.



G01401571

Fig. 135: Tightening Auto-Tensioner Mounting Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

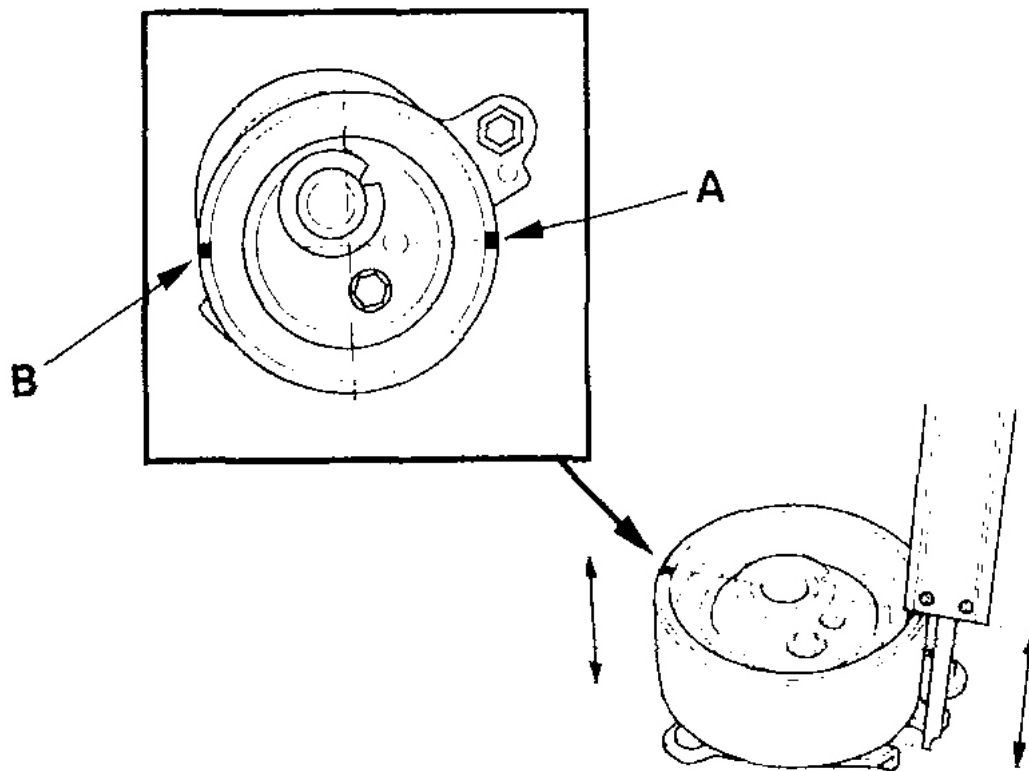
13. Install the remaining timing belt components (see Timing Belt Installation).

AUTO-TENSIONER INSPECTION

1. Remove the auto-tensioner (see Auto-tensioner Removal and Installation).

NOTE: Do not apply force to the tensioner pulley.

2. Put the auto-tensioner on a surface plate.
3. Measure the height at point A (A) and point B (B).



G01401572

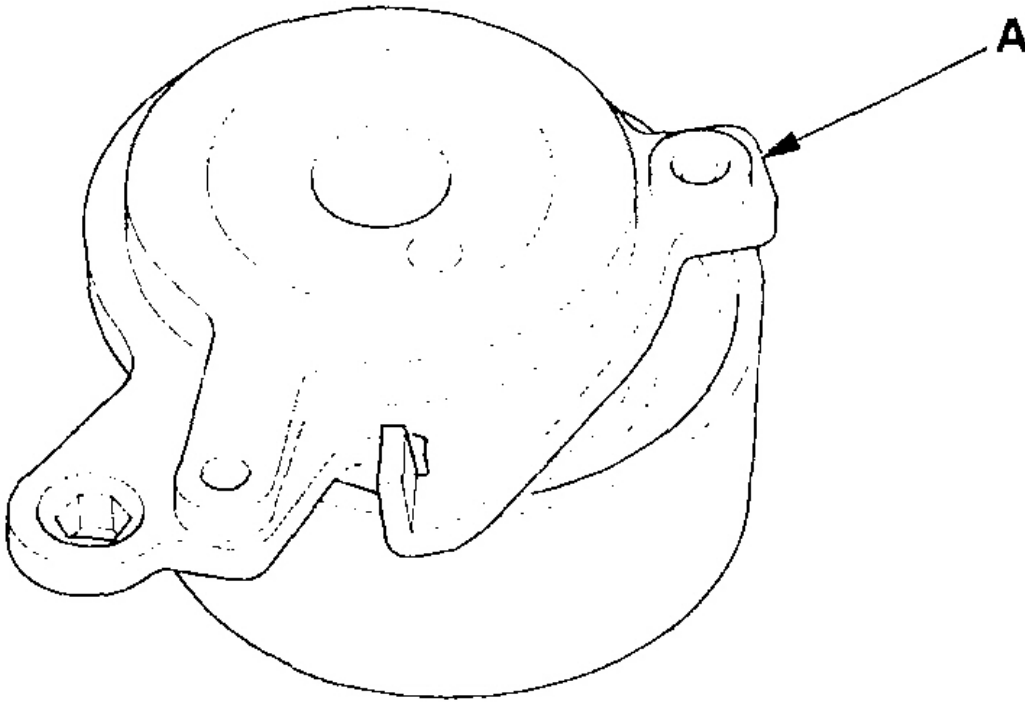
Fig. 136: Measuring Height At Point A & B
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Calculate the difference in height between point A and point B. If the difference in height is out of tolerance, replace the auto-tensioner.

Difference in height

Specification: 0.75 mm (0.030 in.)

5. Inspect the spring grommet (A). If the grommet is damaged or deteriorated, replace the auto-tensioner.



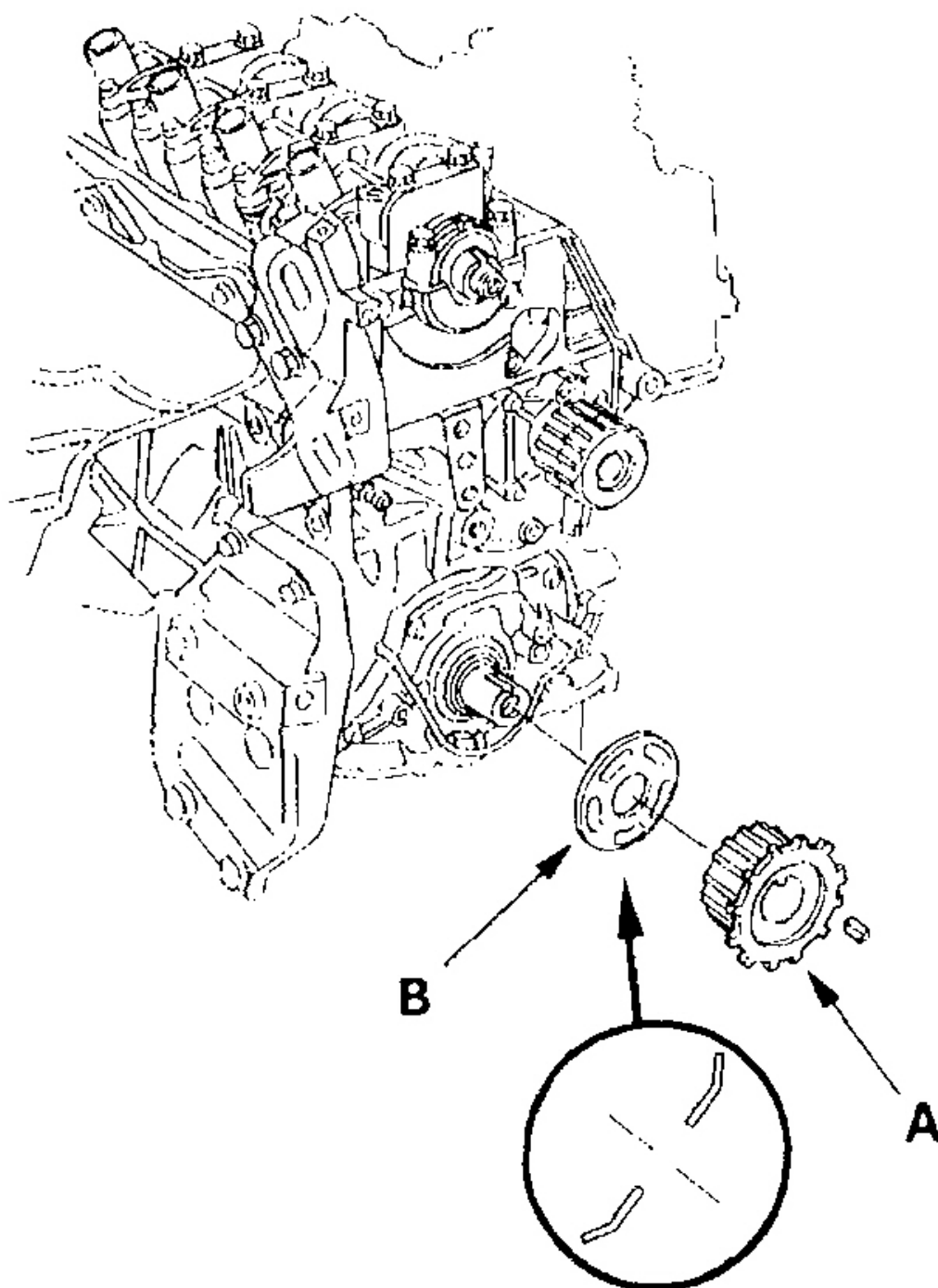
G01401573

Fig. 137: Inspecting Spring Grommet

Courtesy of AMERICAN HONDA MOTOR CO., INC.

TIMING BELT DRIVE PULLEY REPLACEMENT

1. Remove the timing belt (see **Timing Belt Inspection**).
2. Remove the crankshaft position (CKP) sensor (see **CKP SENSOR REPLACEMENT**).
3. Remove the timing belt drive pulley (A).



G01401574

Fig. 138: Removing Timing Belt Drive Pulley**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

4. Inspect the timing belt pulley for damage. Replace the timing belt drive pulley if it is damaged.
5. Install the new timing belt drive pulley.

NOTE: **Install the timing belt guide plate (B) with concave surface facing in.**

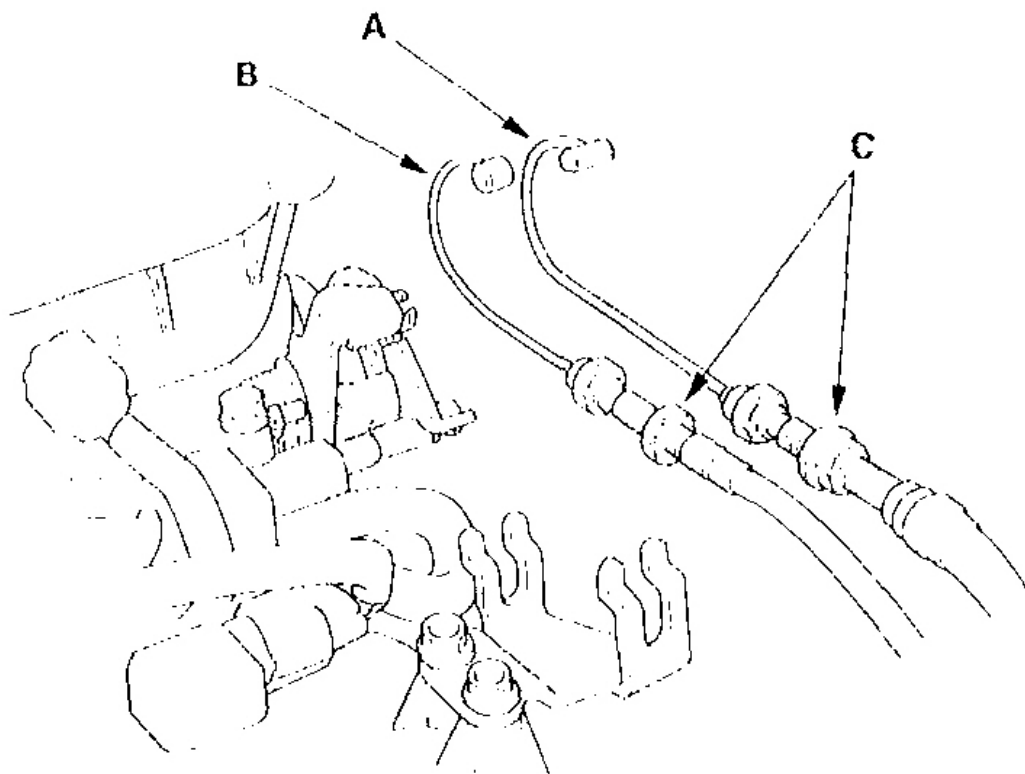
6. Install the CKP sensor (see **CKP SENSOR REPLACEMENT**).
7. Install the timing belt (see **Timing Belt Installation**).

CYLINDER HEAD REMOVAL

NOTE:

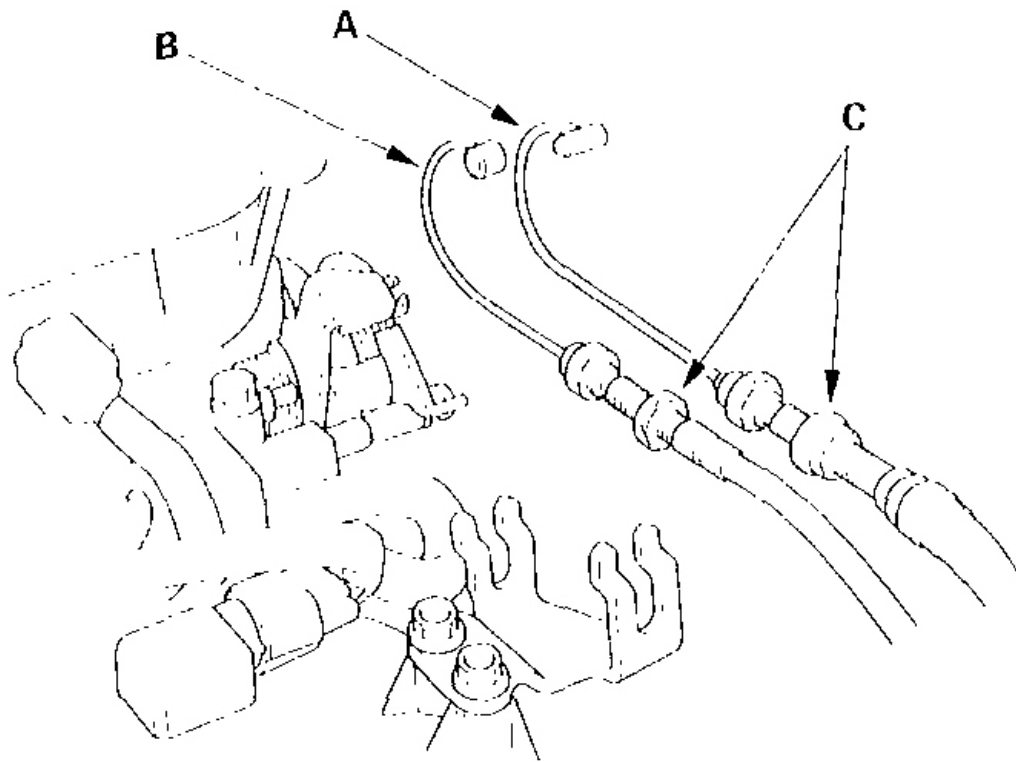
- **Use fender covers to avoid damaging painted surfaces.**
- **To avoid damage, unplug the wiring connectors carefully while holding the connector portion.**
- **To avoid damaging the cylinder head, wait until the engine coolant temperature drops below 100°F (38°C) before loosening the cylinder head bolts.**
- **Mark all wiring and hoses to avoid misconnection. Also, be sure that they do not contact other wiring or hoses, or interfere with other parts.**

1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.
2. Disconnect the negative cable from the battery.
3. Drain the engine coolant (see **COOLANT REPLACEMENT**).
4. Remove the throttle cable (A) and cruise control actuator cable (B) by loosening the locknuts (C), then slipping the cable ends out of the accelerator linkage. Take care not to bend the cables when removing them. Always replace any kinked cable with a new one.



G01401575

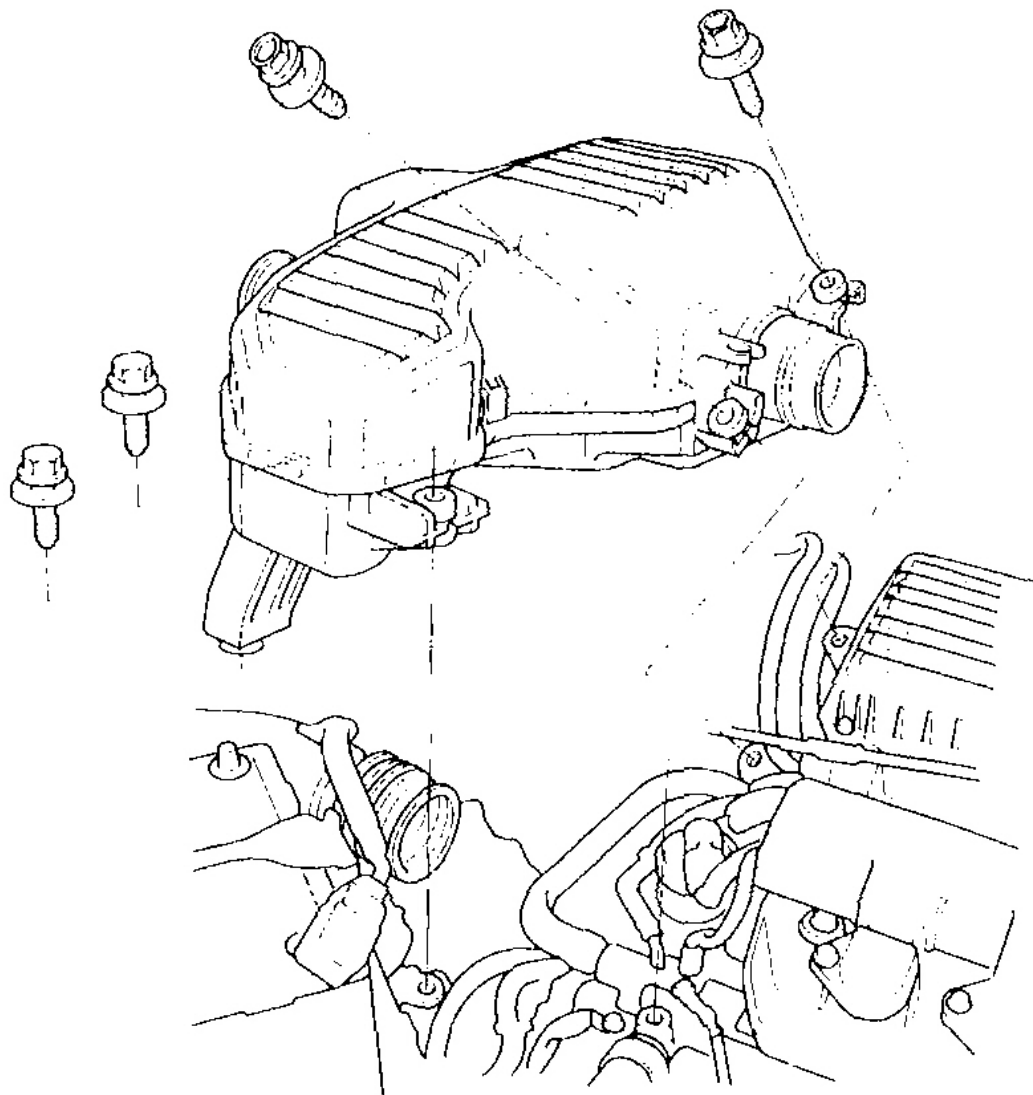
Fig. 139: Removing Throttle Cable (Except 2-Door D17A1, D17A2 Engines)
Courtesy of AMERICAN HONDA MOTOR CO., INC.



G01401576

Fig. 140: Removing Throttle Cable (2-Door D17A1, D17A2 Engines)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Remove the intake resonator.

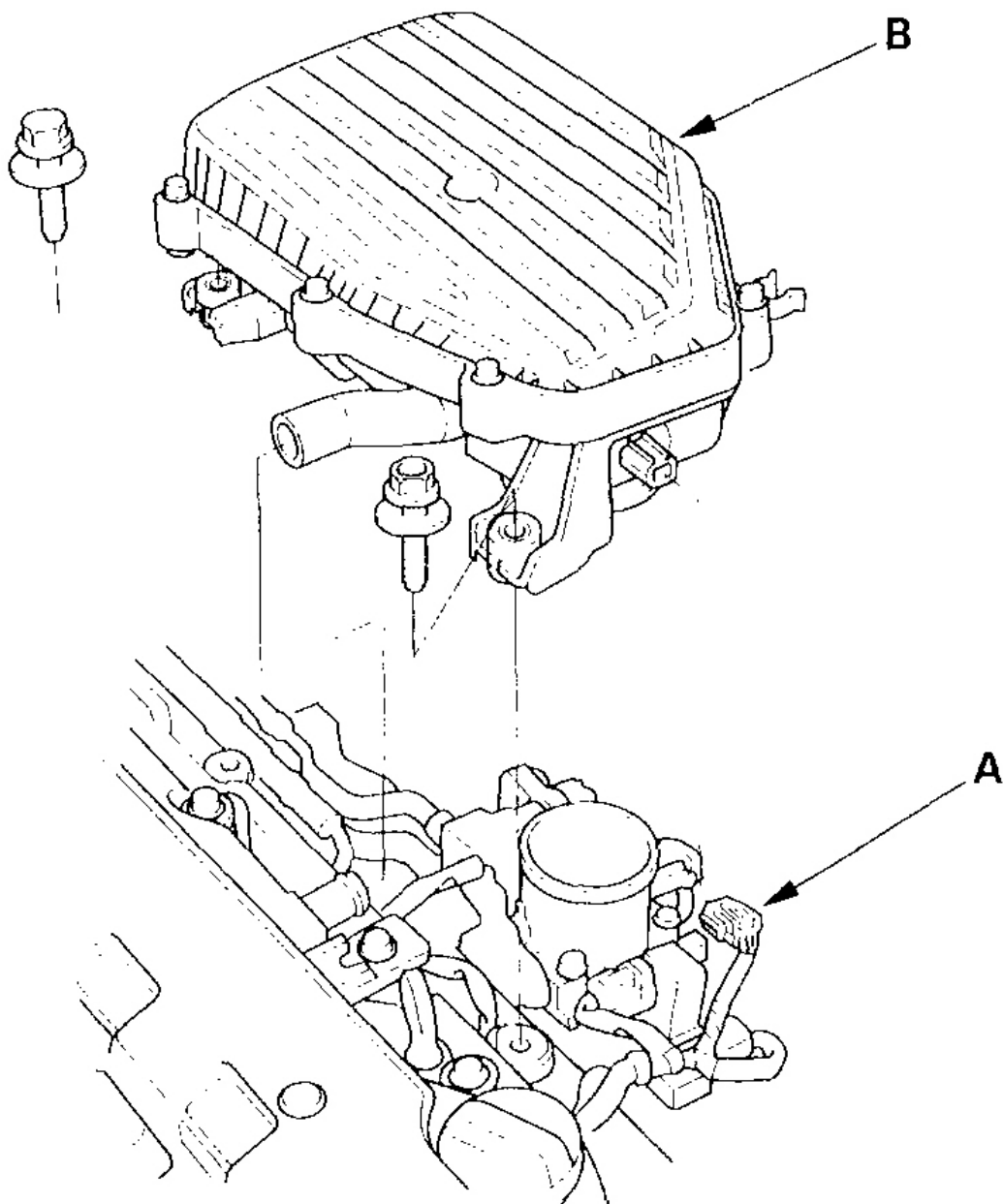


G01401577

Fig. 141: Removing Intake Resonator

Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Disconnect the intake air temperature (IAT) sensor connector (A), and remove the breather hose, then remove the air cleaner housing (B).



G01401578

Fig. 142: Disconnecting IAT Sensor Connector
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Remove the brake booster vacuum hose (A) and positive crankcase ventilation (PCV) hose (B).

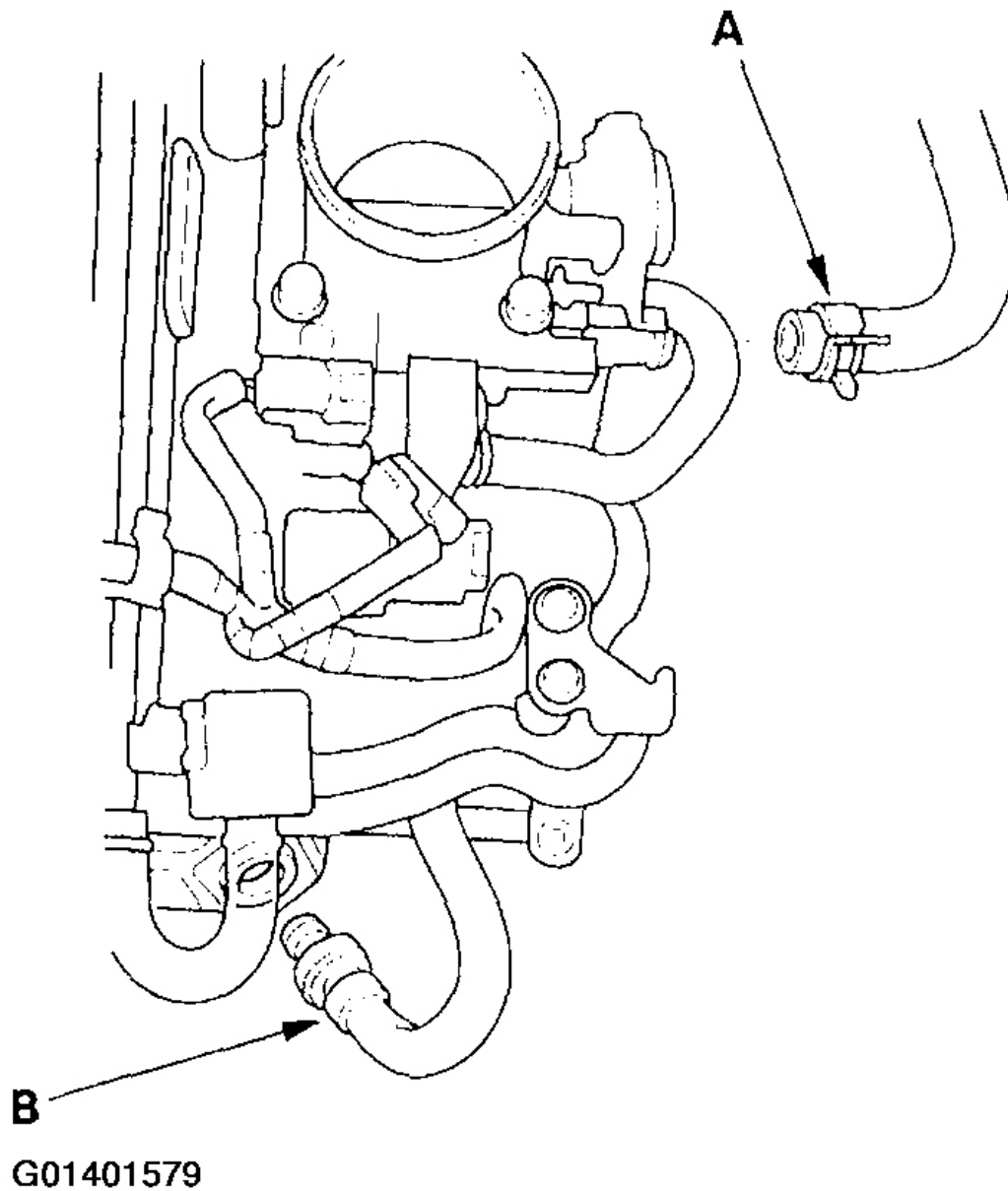
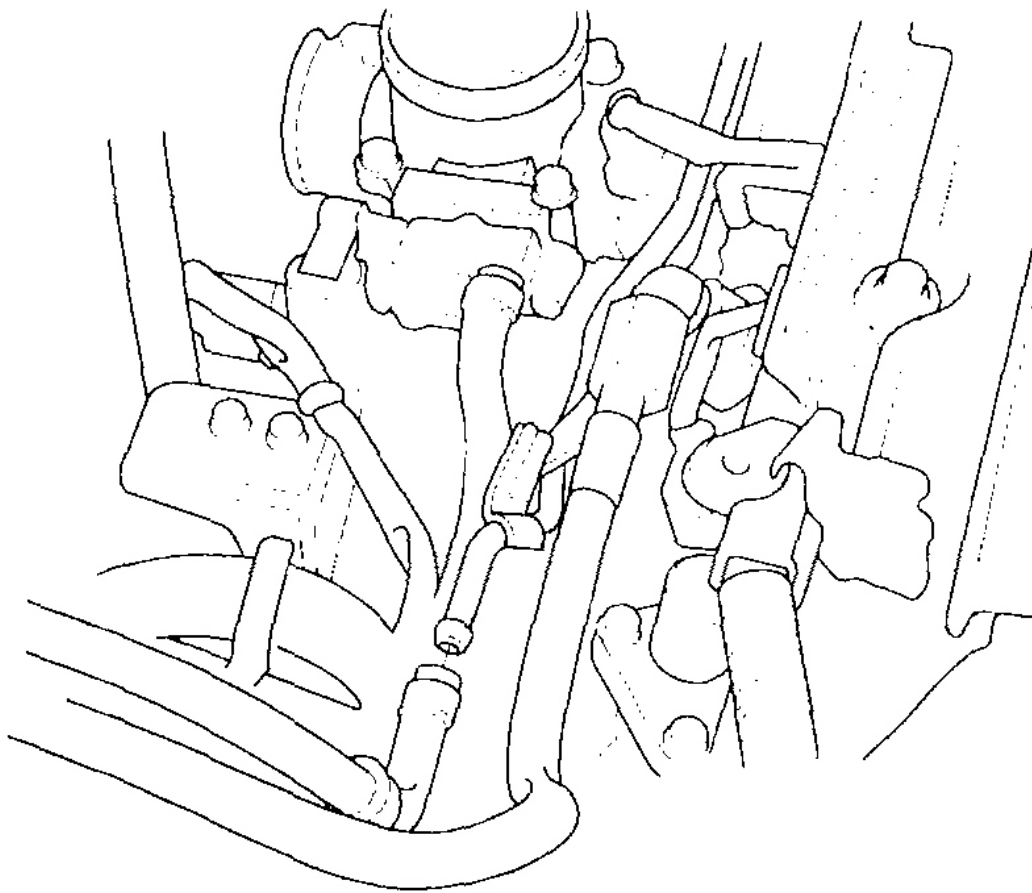


Fig. 143: Removing Brake Booster Vacuum Hose
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Relieve fuel pressure (see **FUEL PRESSURE RELIEVING**).
9. Remove the evaporative emission (EVAP) canister hose.

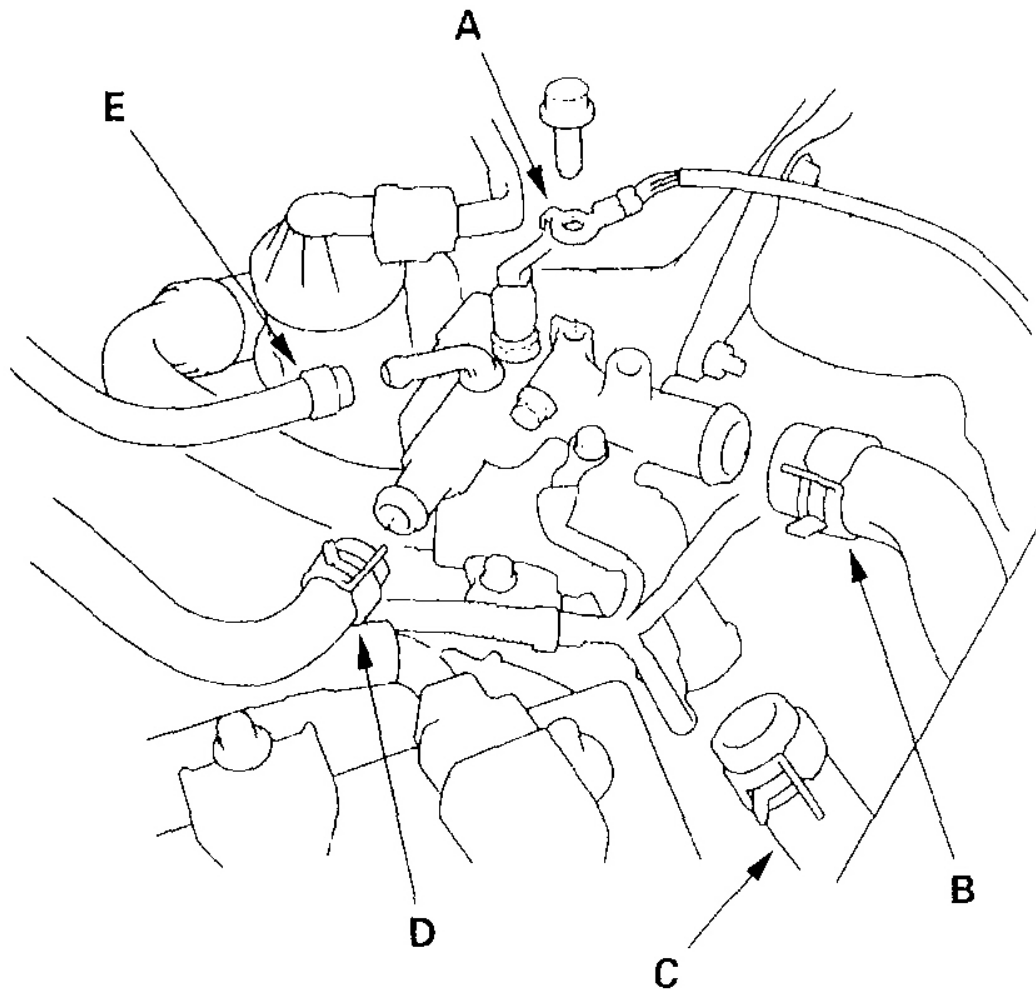


G01401580

Fig. 144: Removing EVAP Canister Hose

Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Remove the ground cable (A), upper radiator hose (B), lower radiator hose (C), heater hose (D), and water bypass hose (E).

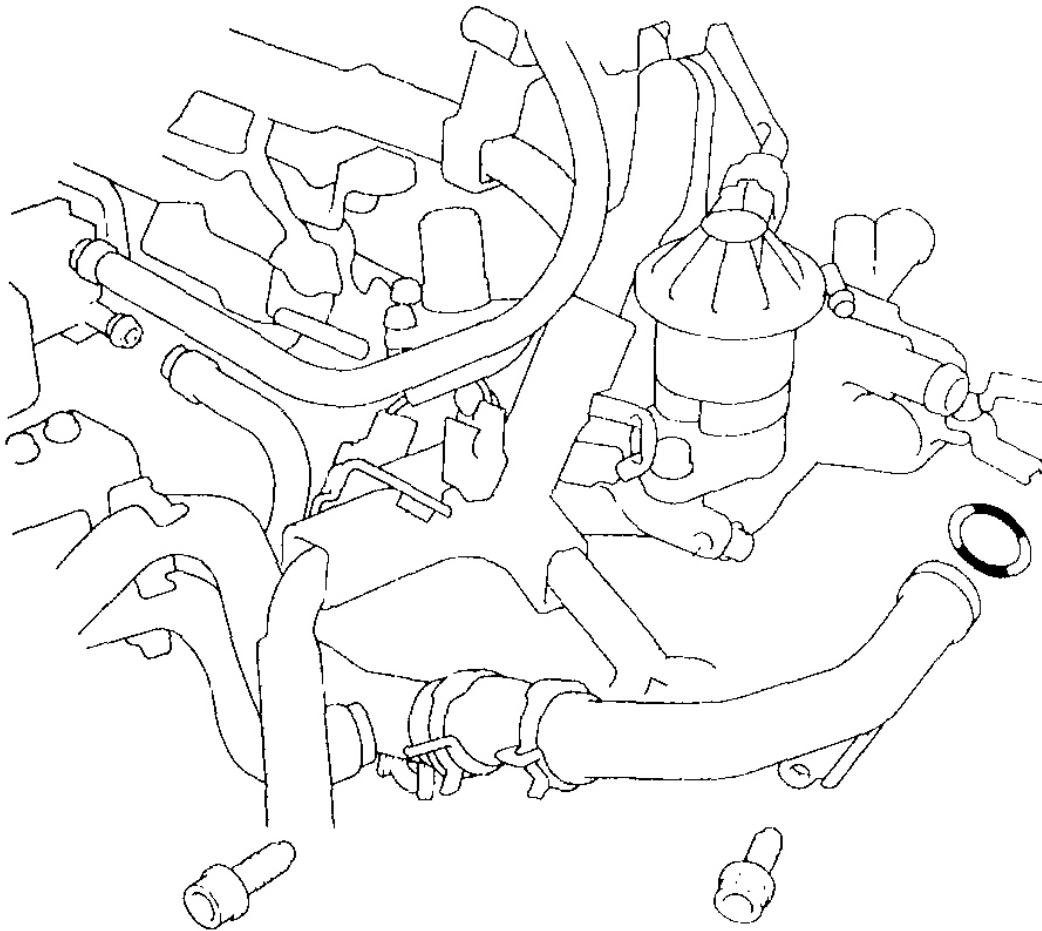


G01401581

Fig. 145: Removing Ground Cable

Courtesy of AMERICAN HONDA MOTOR CO., INC.

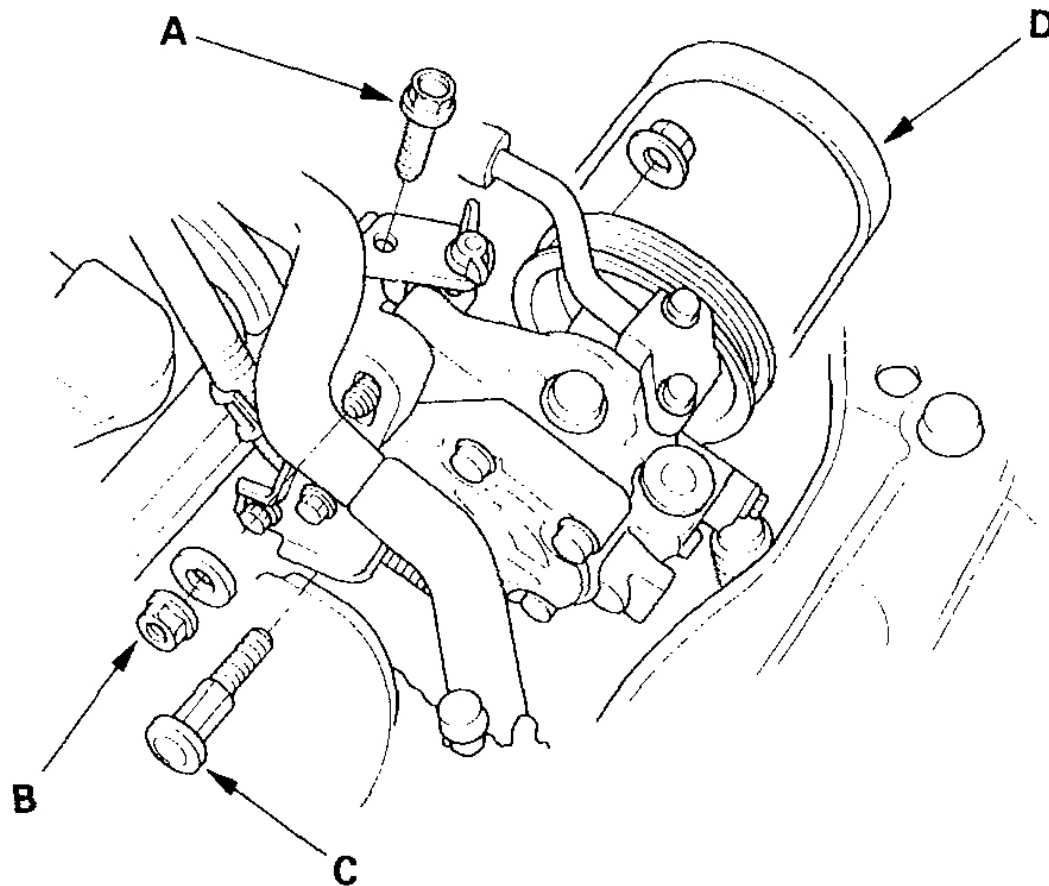
11. Remove the two bolts securing the connecting pipe, then remove the connecting pipe from the water passage.



G01401582

Fig. 146: Removing Bolts Securing Connecting Pipe
Courtesy of AMERICAN HONDA MOTOR CO., INC.

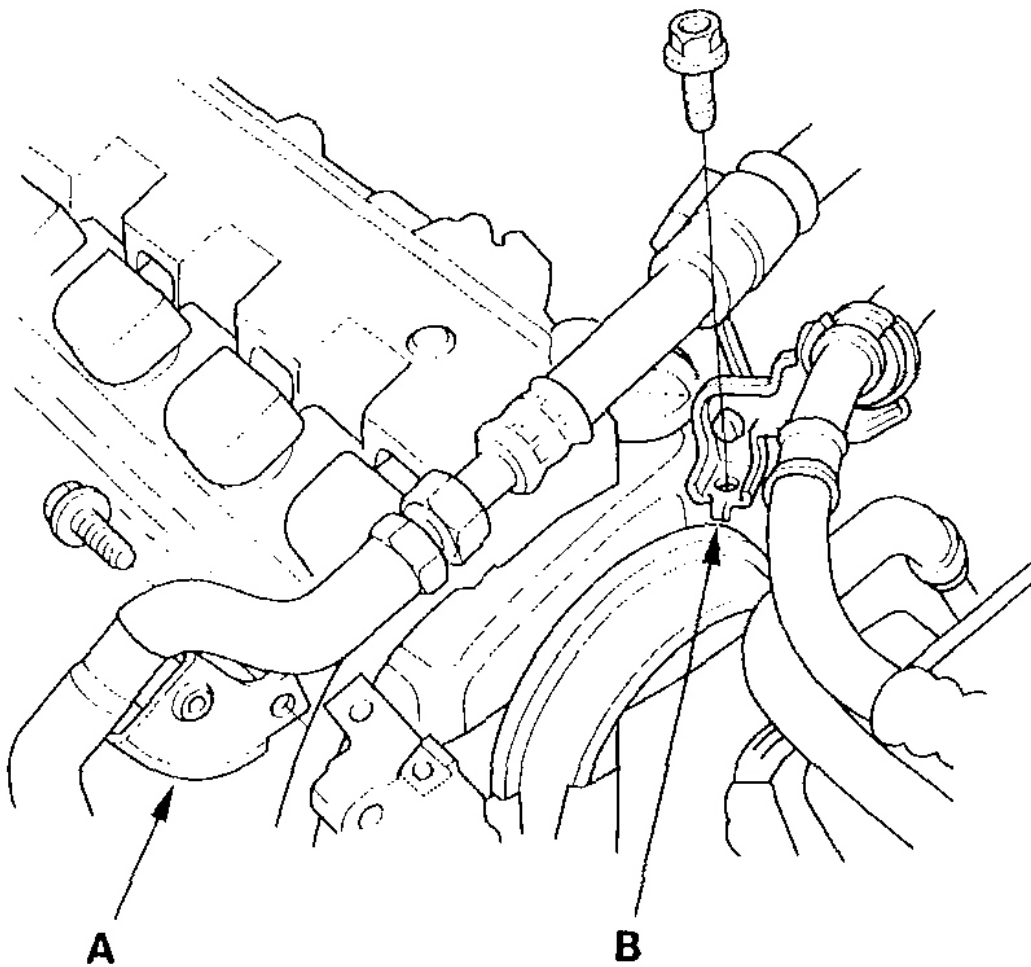
12. Remove the adjusting plate mounting bolt (A), locknut (B) and mounting bolt (C), then remove the power steering (P/S) pump belt (D) and pump without disconnecting the P/S hoses.



G01401583

Fig. 147: Removing Adjusting Plate Mounting Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Remove the alternator (see GENERATORS & REGULATORS) article.
14. Remove the A/C hose bracket (A) and P/S hose bracket (B).



G01401584

Fig. 148: Removing A/C Hose Bracket

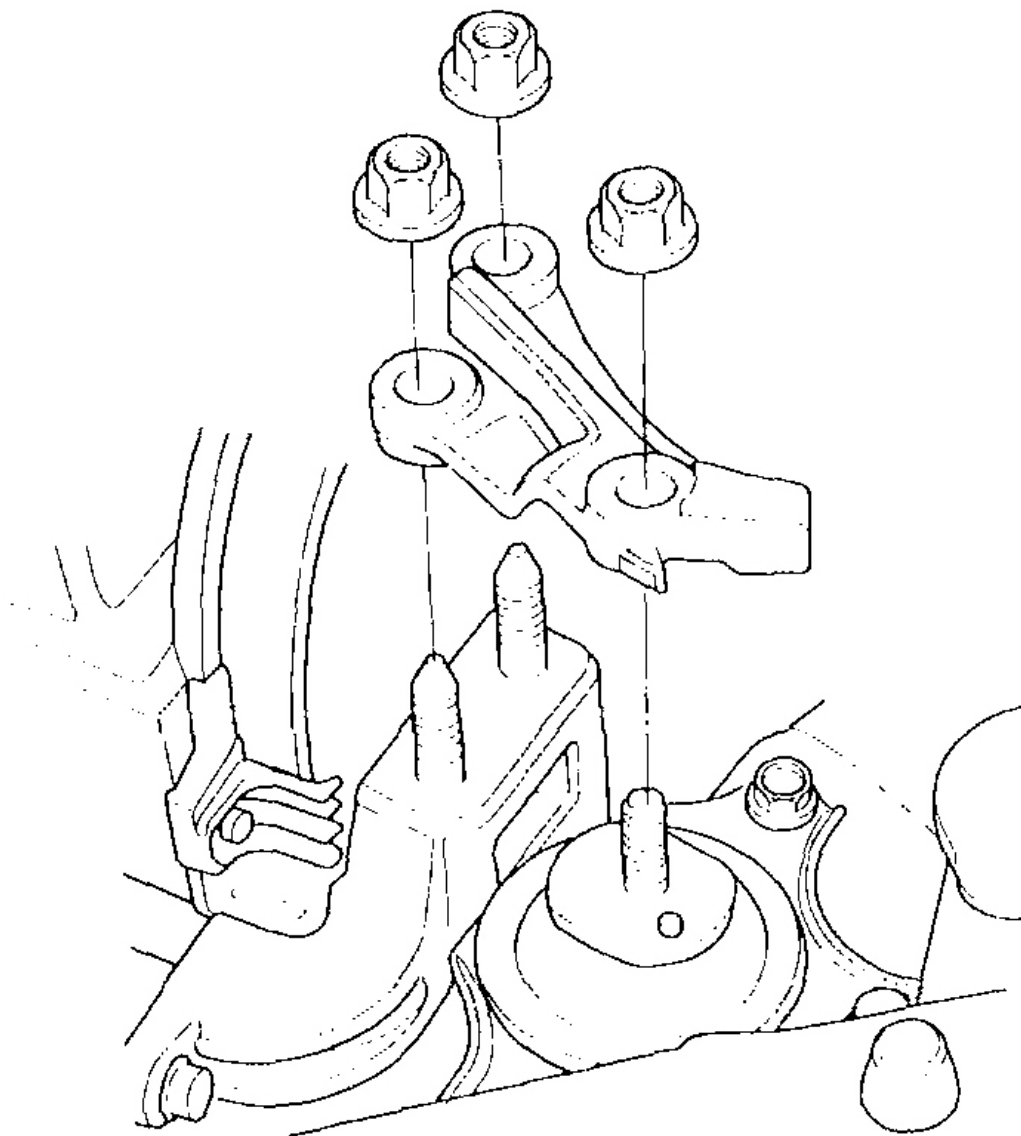
Courtesy of AMERICAN HONDA MOTOR CO., INC.

15. Remove the engine wire harness connectors and wire harness clamps from the intake manifold.
 - Idle air control (IAC) valve connector
 - Throttle position (TP) sensor connector
 - Manifold absolute pressure (MAP) sensor connector
 - Evaporative emission (EVAP) canister purge valve connector
 - Engine coolant temperature (ECT) sensor connector
 - Radiator fan switch connector
 - Crankshaft position (CKP) sensor connector
 - Camshaft position (CMP) (top dead center (TDC) sensor connector

- Exhaust gas recirculation (EGR) connector (D17A2, D17A6 engines and D17A1 engine (2004 model))
- VTEC solenoid valve connector (D17A2, D17A6 engines)
- VTEC oil pressure switch connector (D17A2, D17A6 engines)
- Oil pressure sensor connector

16. Support the engine with a jack and wood block under the oil pan.

17. Remove the upper bracket.

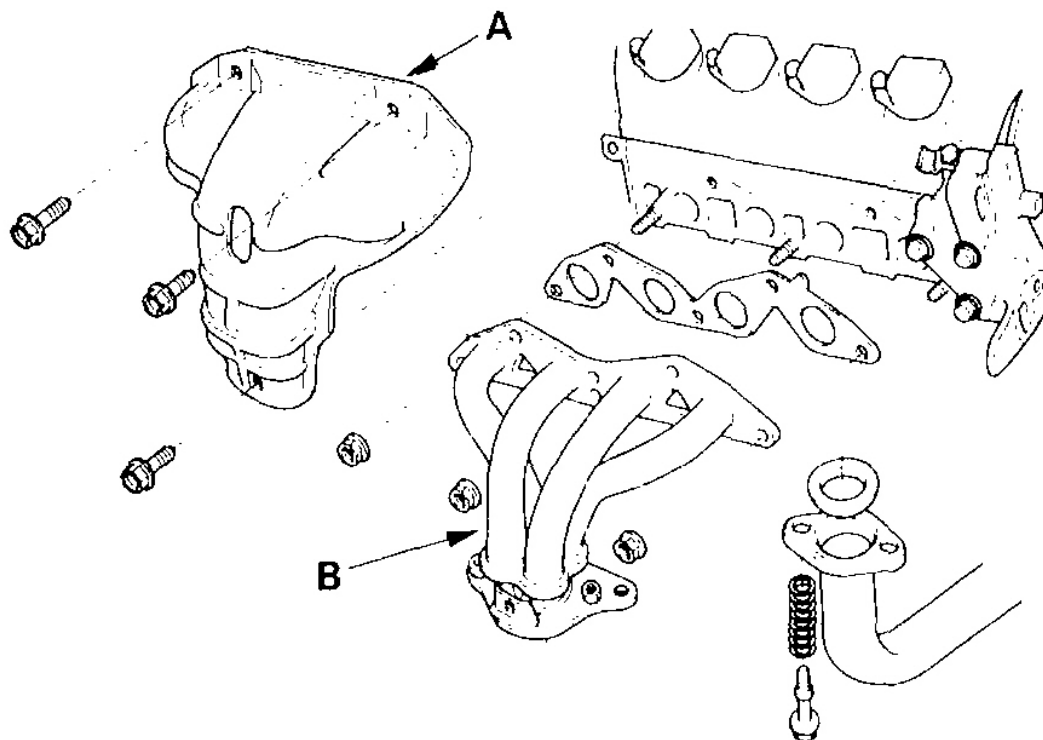


G01401585

Fig. 149: Removing Upper Bracket

Courtesy of AMERICAN HONDA MOTOR CO., INC.

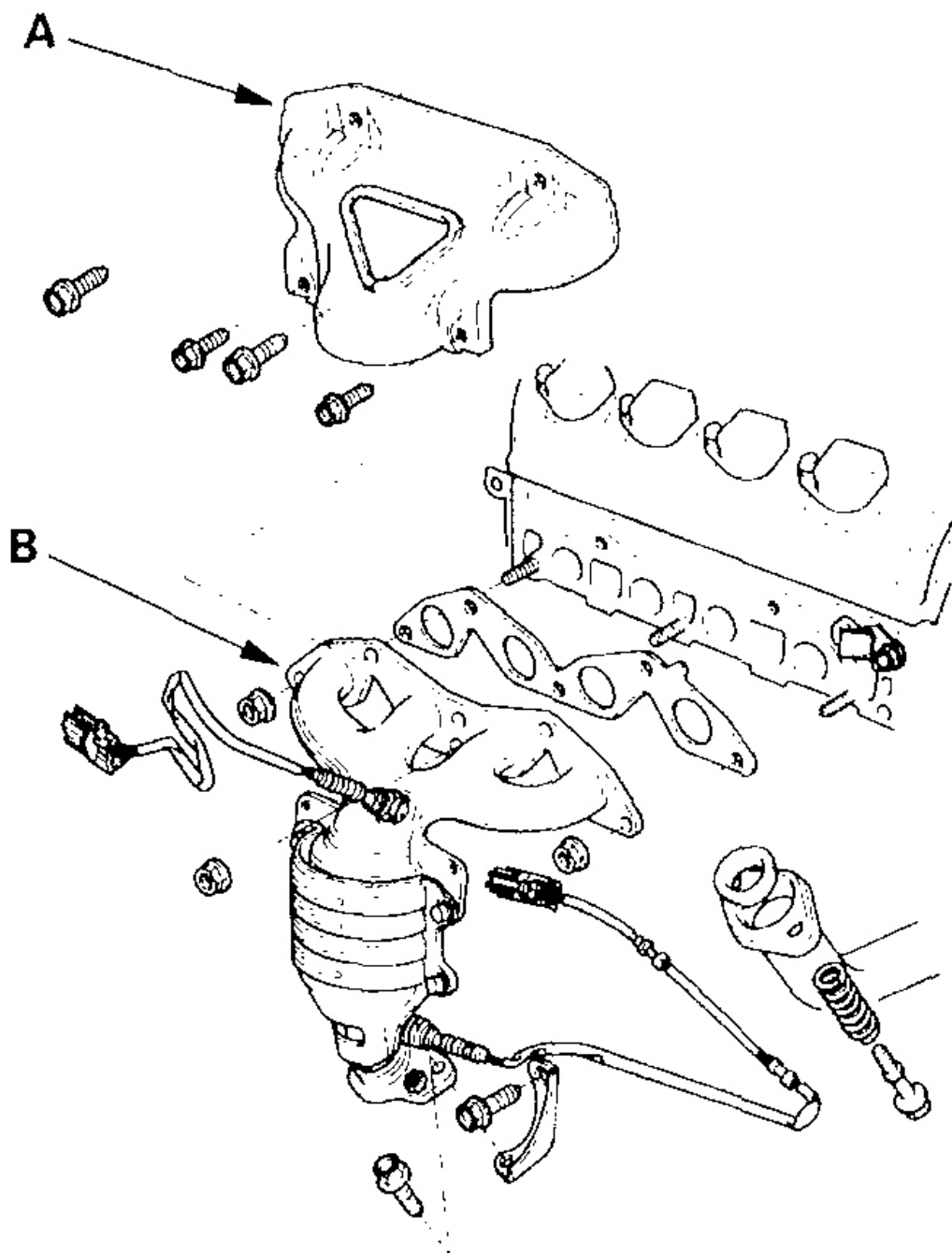
18. Remove the cover (A), then remove the exhaust manifold (B).



G01401586

Fig. 150: Removing Cover (D17A2 Engine)

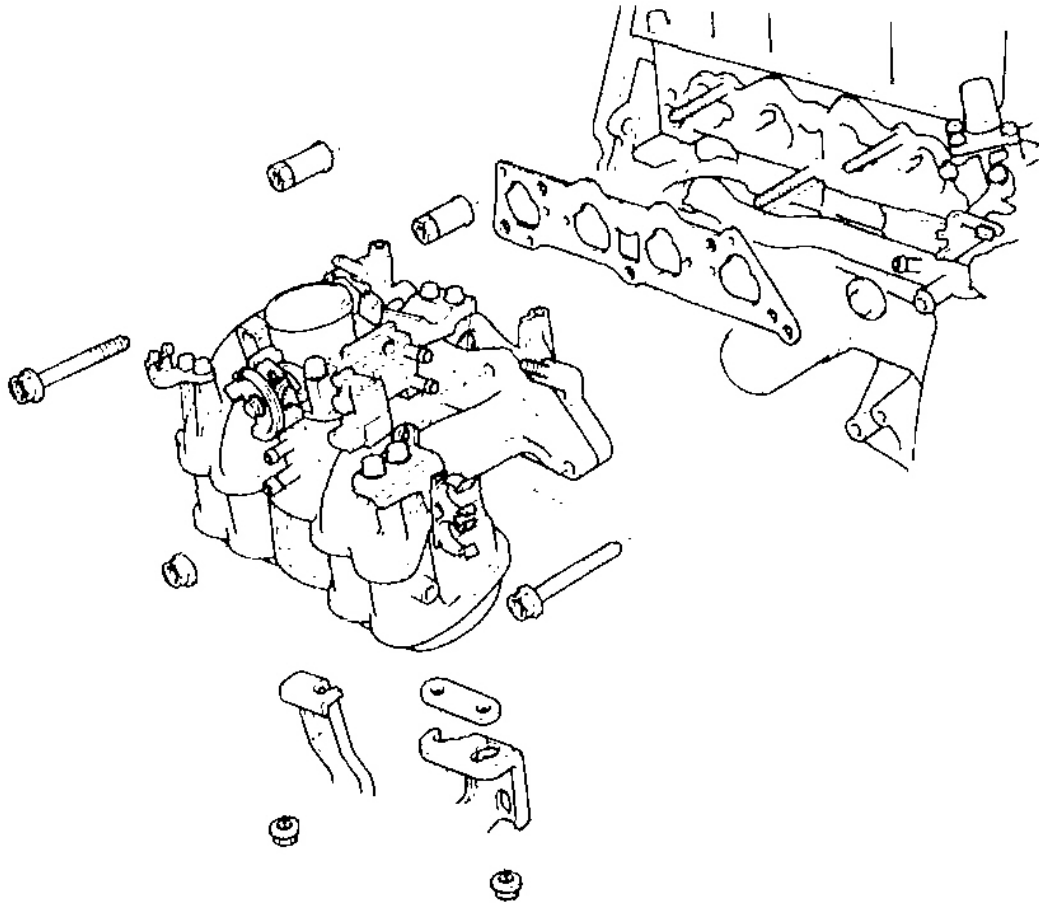
Courtesy of AMERICAN HONDA MOTOR CO., INC.



G01401587

Fig. 151: Removing Cover (D17A1, D17A6 Engines)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

19. Remove the intake manifold.

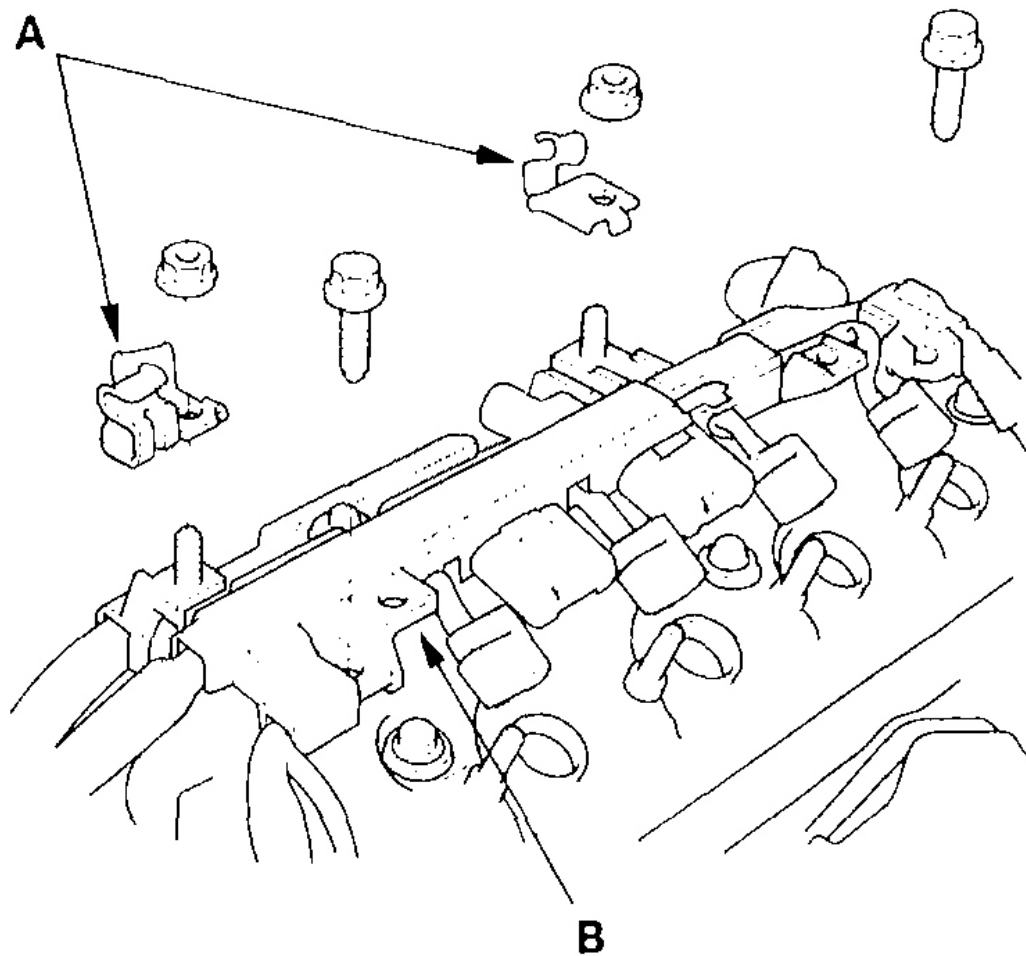


G01401588

Fig. 152: Removing Intake Manifold

Courtesy of AMERICAN HONDA MOTOR CO., INC.

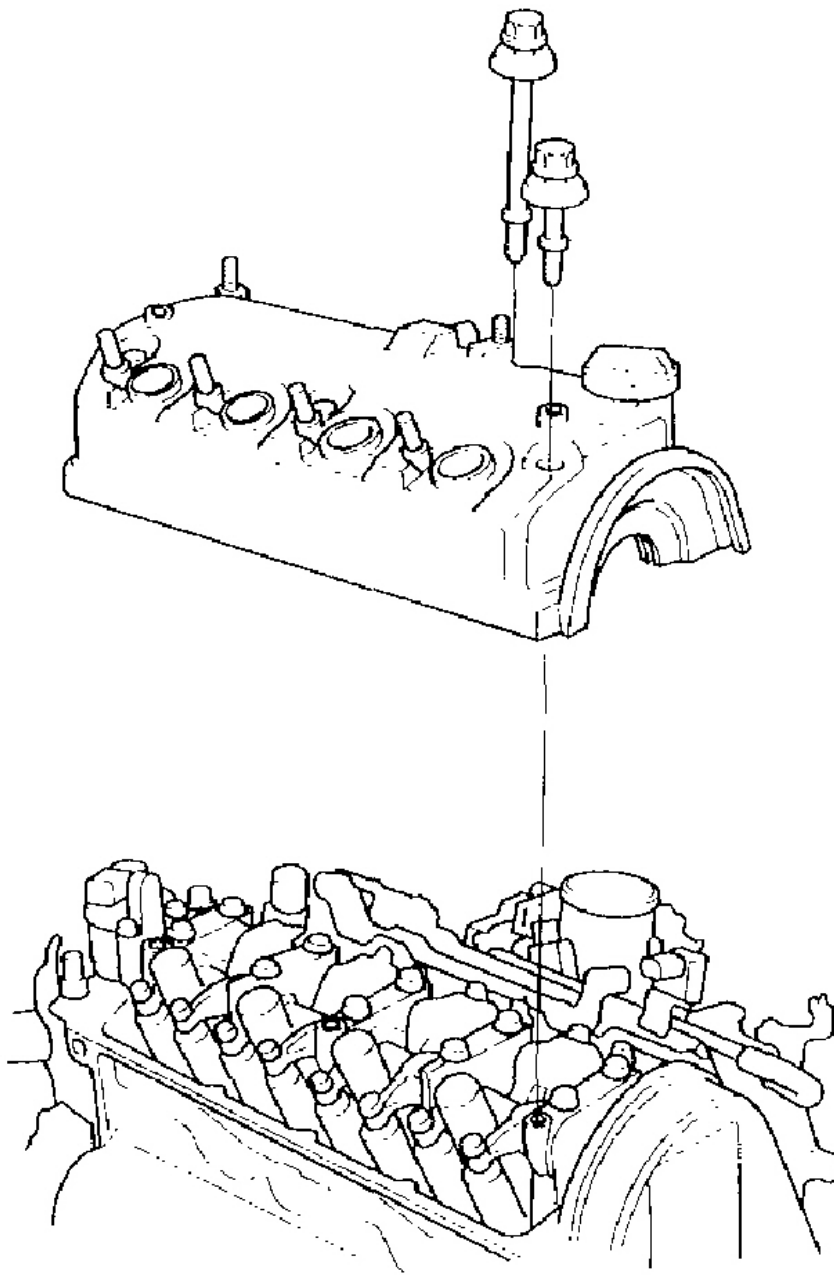
20. Remove the four ignition coils (see **IGNITION COIL REMOVAL/INSTALLATION**).
21. Remove the throttle cable clamps (A) and harness holder (B) from the cylinder head cover.



G01401589

Fig. 153: Removing Throttle Cable Clamps
Courtesy of AMERICAN HONDA MOTOR CO., INC.

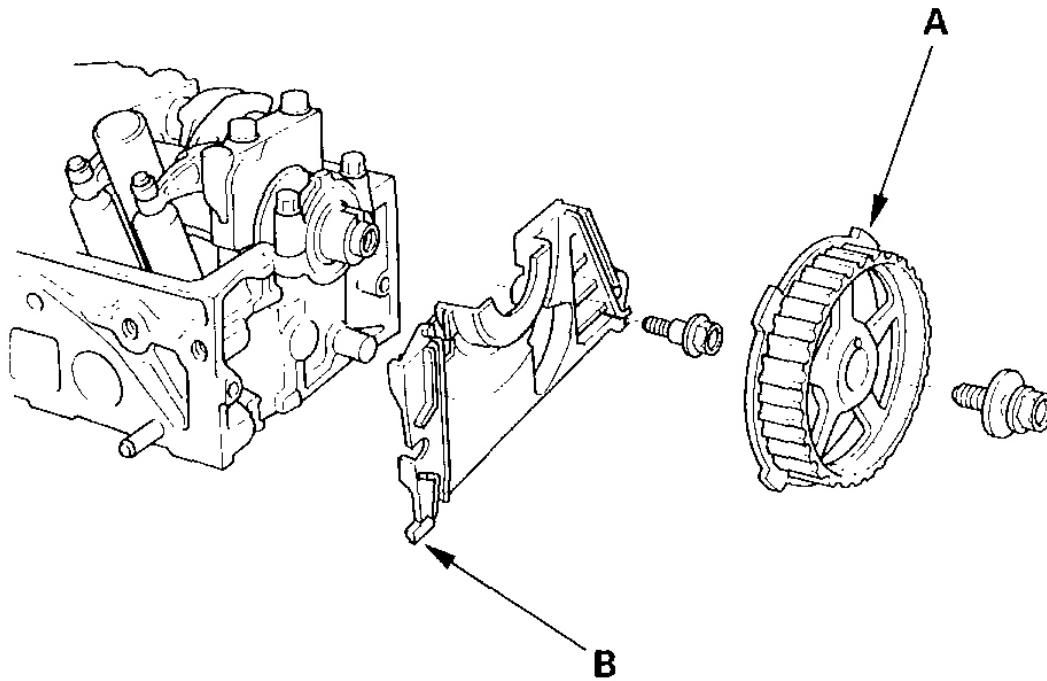
22. Remove the cylinder head cover.



G01401590

Fig. 154: Removing Cylinder Head Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

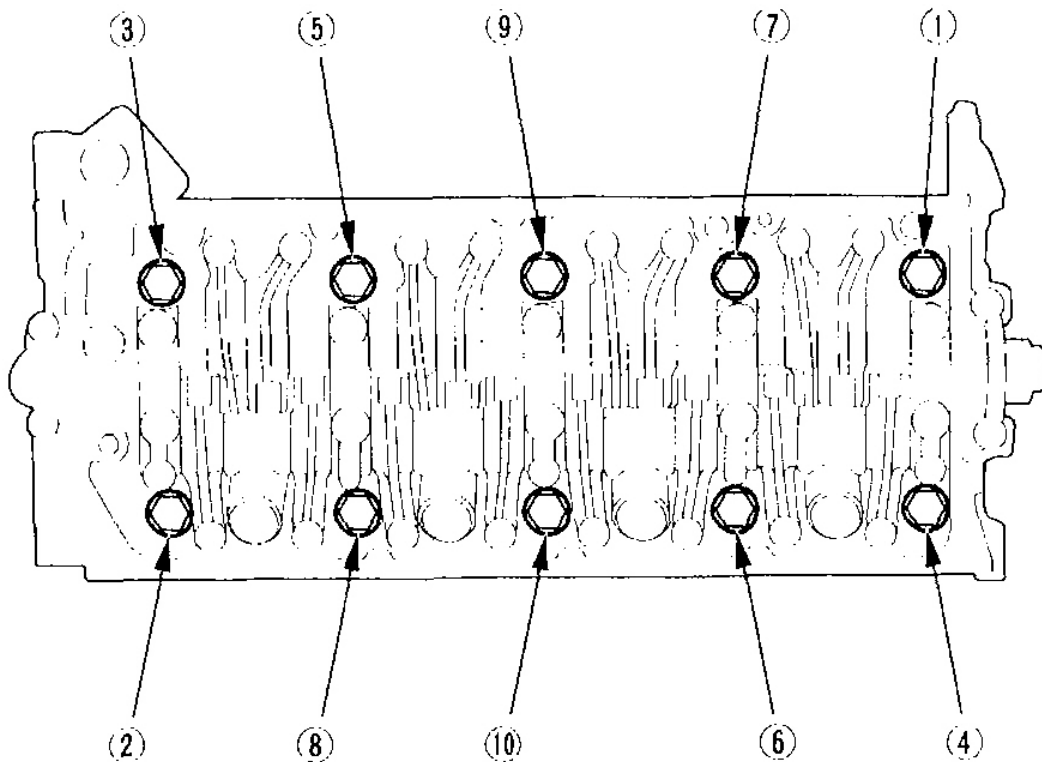
23. Remove the timing belt (see **Timing Belt Inspection**).
24. Remove the camshaft pulley (A) and back cover (B).



G01401591

Fig. 155: Removing Camshaft Pulley**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

25. Remove the cylinder head bolts. To prevent warpage, unscrew the bolts, in sequence, 1/3 turn at a time. Repeat the sequence until all bolts are loosened.



G01401592

Fig. 156: Removing Cylinder Head Bolts (Cylinder Head Bolts Loosening Sequence)
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

26. Remove the cylinder head.

CYLINDER HEAD INSPECTION FOR WARPAGE

NOTE: If camshaft-to-holder oil clearances (see [Camshaft Inspection](#)) are not within specifications, the cylinder head cannot be resurfaced.

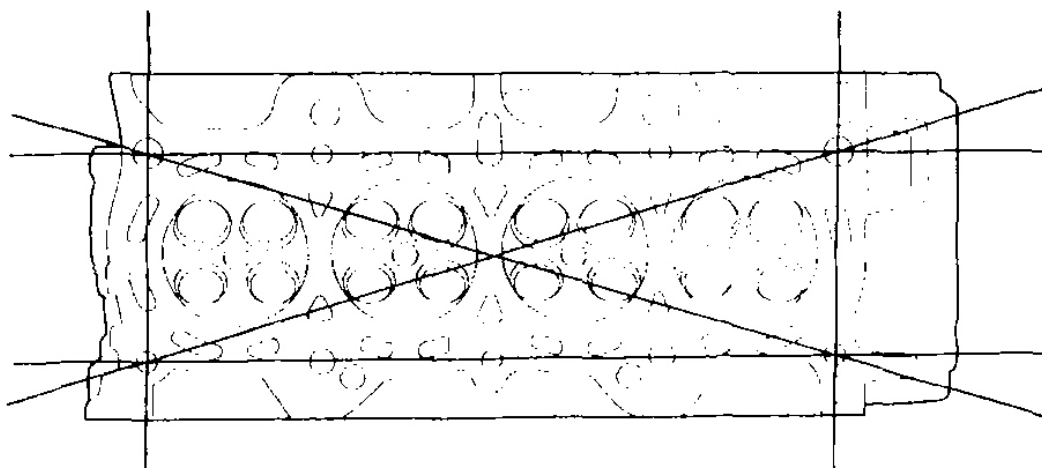
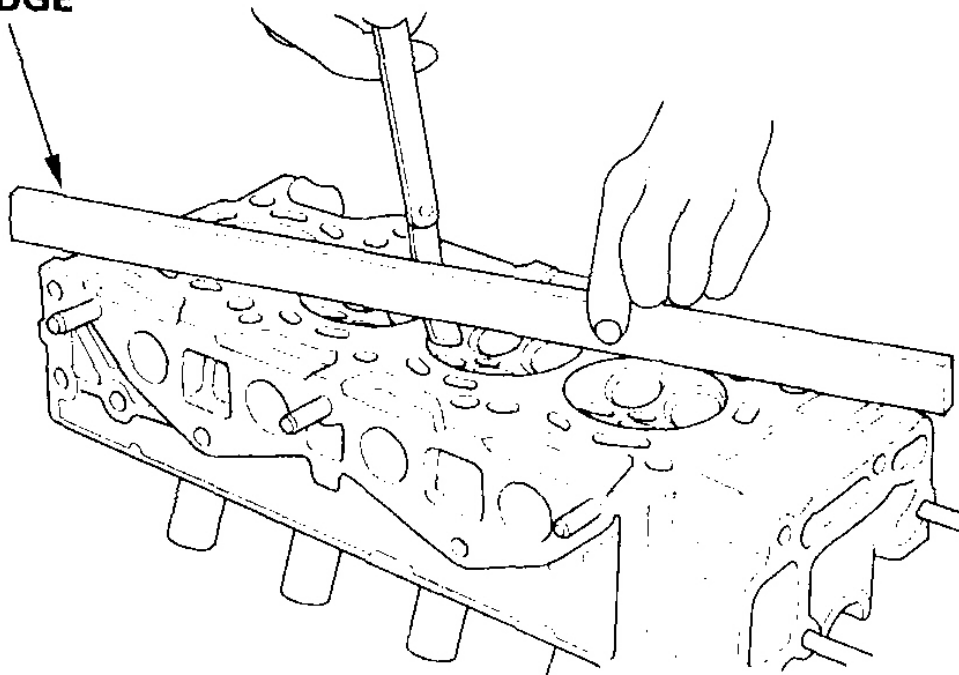
If camshaft-to-holder oil clearances are within specifications, check the cylinder head for warpage. Measure along the edges, and three ways across the center.

- If warpage is less than 0.05 mm (0.002 in.) cylinder head resurfacing is not required.
- If warpage is between 0.05 mm (0.002 in.) and 0.2 mm (0.008 in.), resurface cylinder head.
- Maximum resurface limit is 0.2 mm (0.008 in.) based on a height of 93 mm (3.7 in.).

Cylinder Head Height

Standard (New): 92.95 - 93.05 mm (3.659 - 3.663 in.)

**PRECISION STRAIGHT
EDGE**



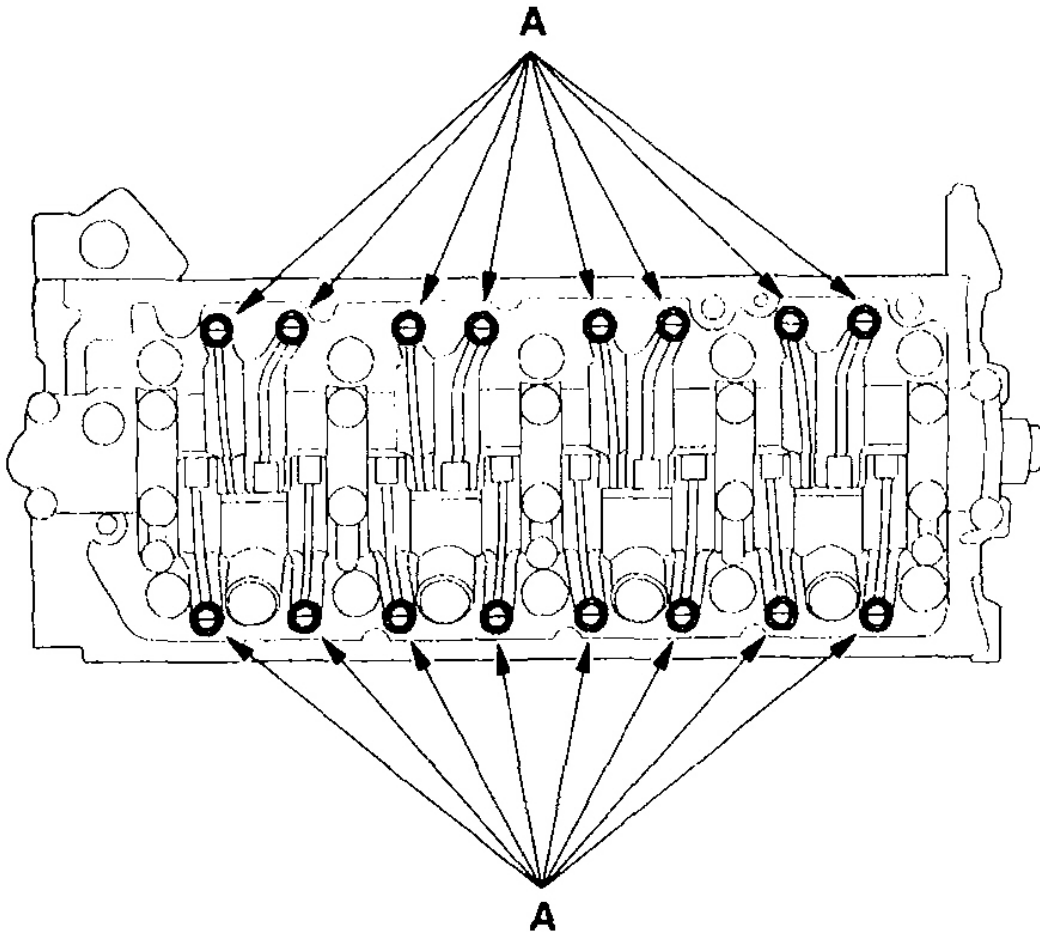
G01401593

Fig. 157: Checking Cylinder Head For Warpage

Courtesy of AMERICAN HONDA MOTOR CO., INC.

ROCKER ARM ASSEMBLY REMOVAL

1. Loosen the adjusting screws (A).



G01401594

Fig. 158: Loosening Adjusting Screws

Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Remove the bolts and the rocker arm assembly.
 - 1 Unscrew the camshaft holder bolts two turns at a time, in a crisscross pattern, to prevent damaging the valves or rocker arm assembly.
 - 2 When removing the rocker arm assembly, do not remove the camshaft holder bolts. The bolts will

keep the camshaft holders, the springs and the rocker arms on the shafts.

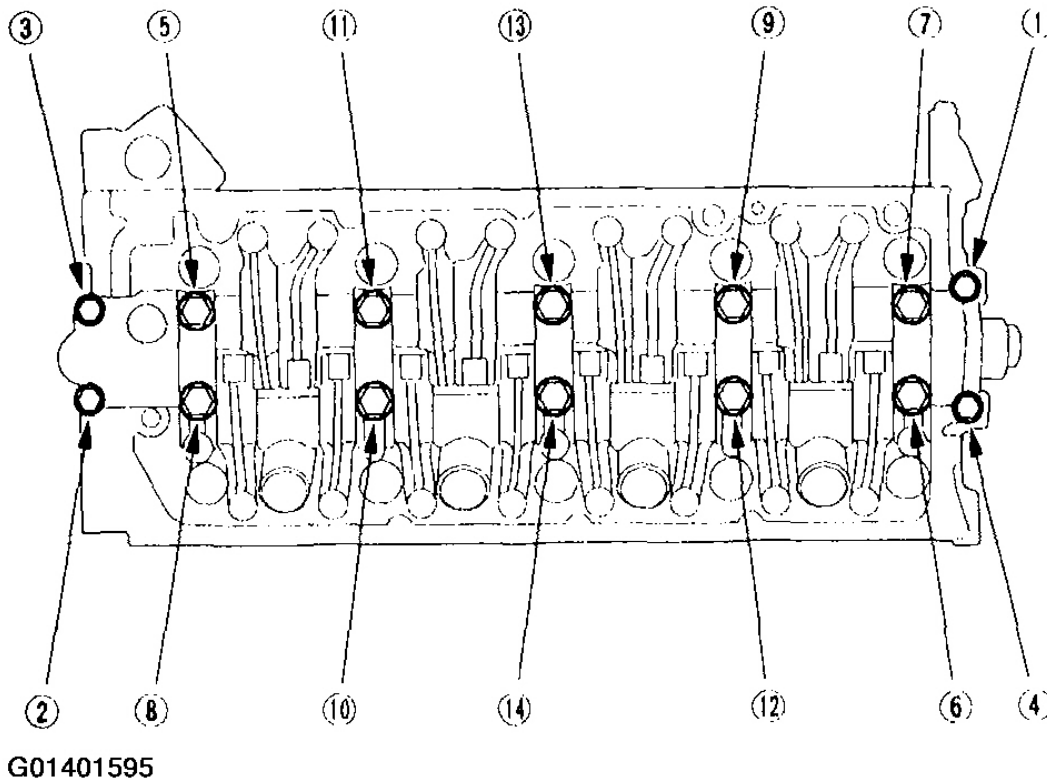


Fig. 159: Camshaft Holder Bolt Loosening Sequence
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

ROCKER ARM AND SHAFT DISASSEMBLY/REASSEMBLY

NOTE:

- Identify parts as they are removed to ensure reinstallation in original location.
- Inspect the rocker shafts and rocker arms (see Rocker Arm and Shaft Inspection).
- The rocker arms must be installed in the same positions if reused.
- When removing or installing the rocker arm assembly, do not remove the camshaft holder bolts. The bolts will keep the holders, springs and rocker arms on the shaft.
- Prior to reassembling, clean all the parts in solvent, dry them, and apply new engine oil to any contact points.
- Bundle the intake rocker arm assemblies with rubber bands to keep them together as a set.

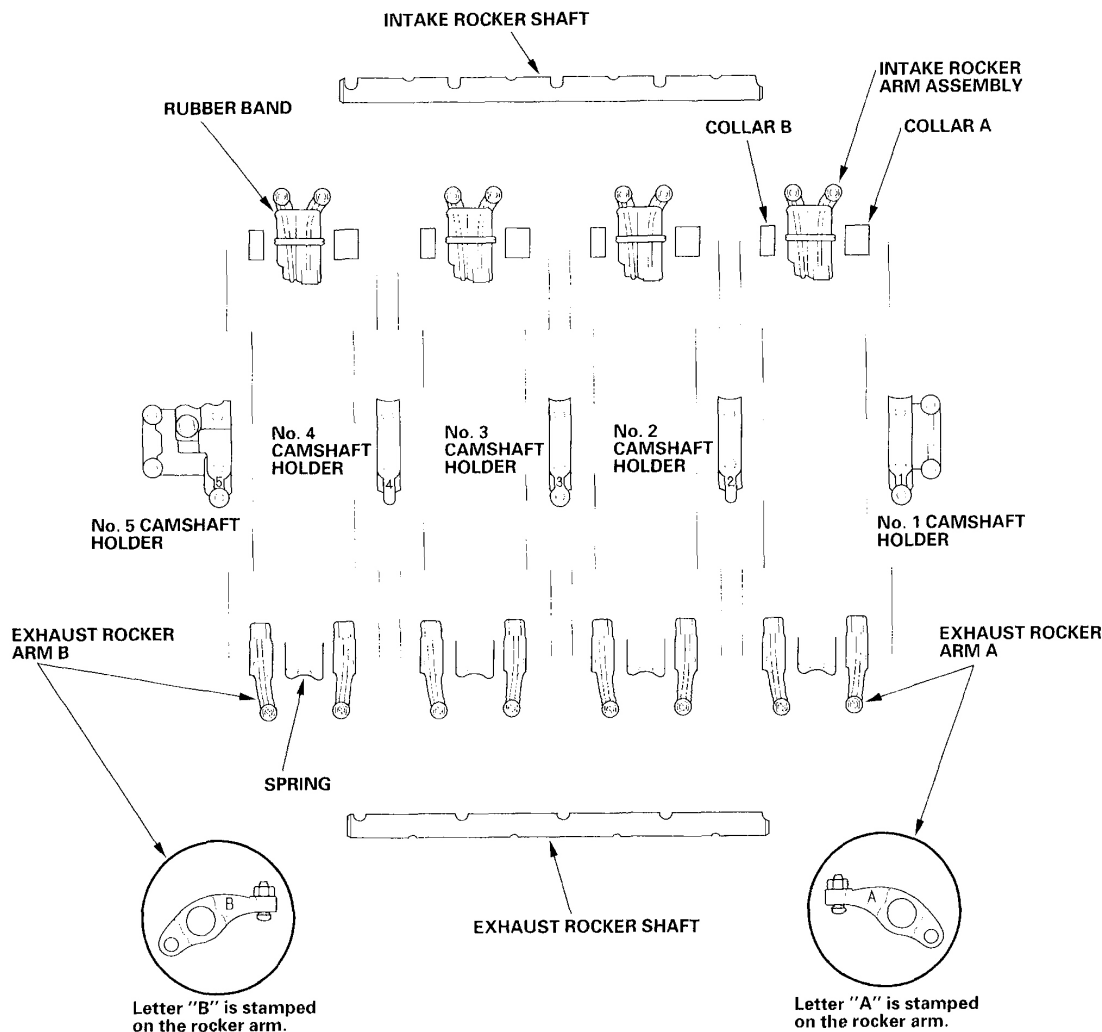
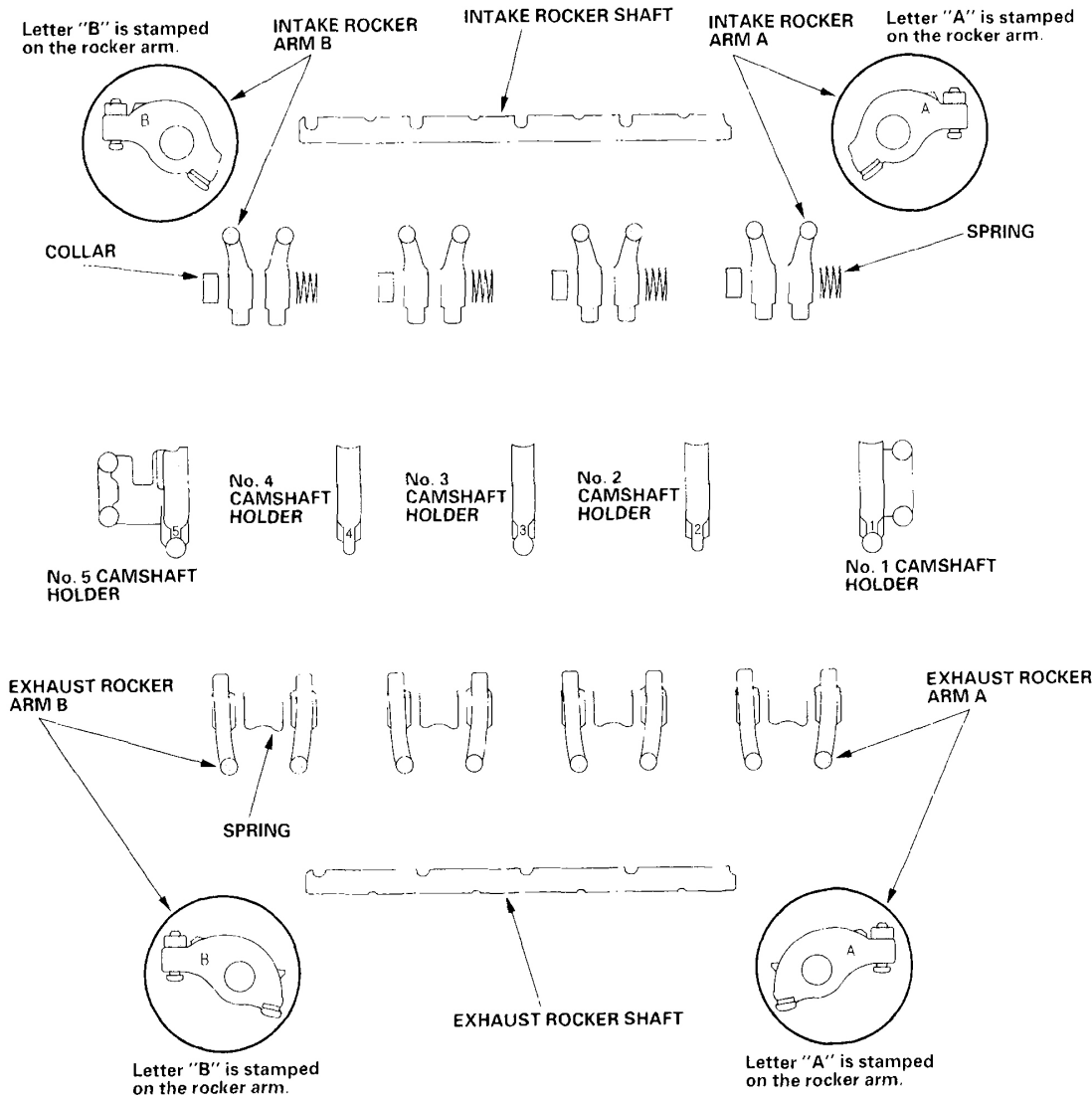


Fig. 160: Rocker Arm & Shaft Disassembly/Reassembly (D17A2, D17A6 Engines)
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

NOTE:

- Identify parts as they are removed to ensure reinstallation in original location.
- Inspect the rocker shafts and rocker arms (see Rocker Arm and Shaft Inspection).
- The rocker arms must be installed in the same positions if reused.
- When removing or installing the rocker arm assembly, do not remove the camshaft holder bolts. The bolts will keep the holders, springs and rocker arms on the shaft.
- Prior to reassembling, clean all the parts in solvent, dry them, and apply new engine oil to any contact points.

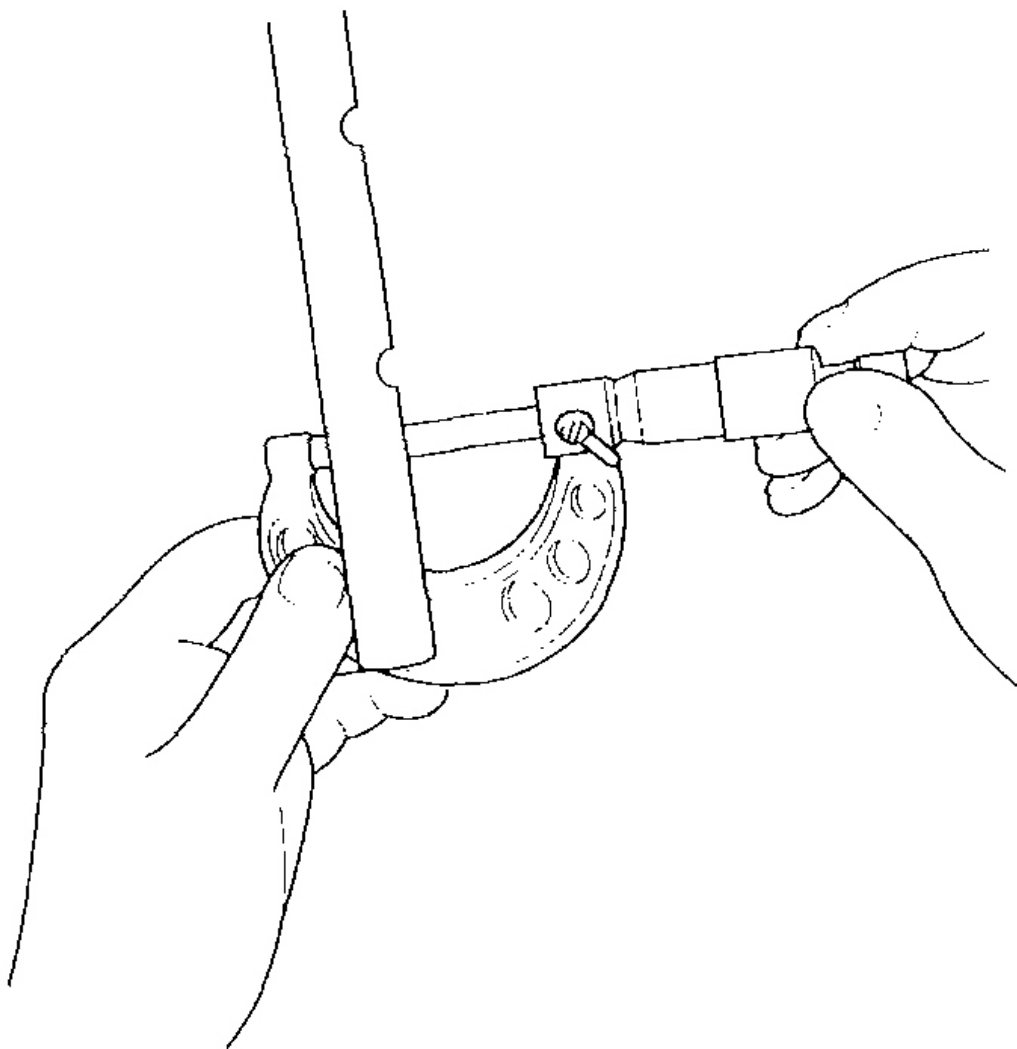


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Fig. 161: Rocker Arm & Shaft Disassembly/Reassembly (D17A1 Engine)
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

ROCKER ARM AND SHAFT INSPECTION

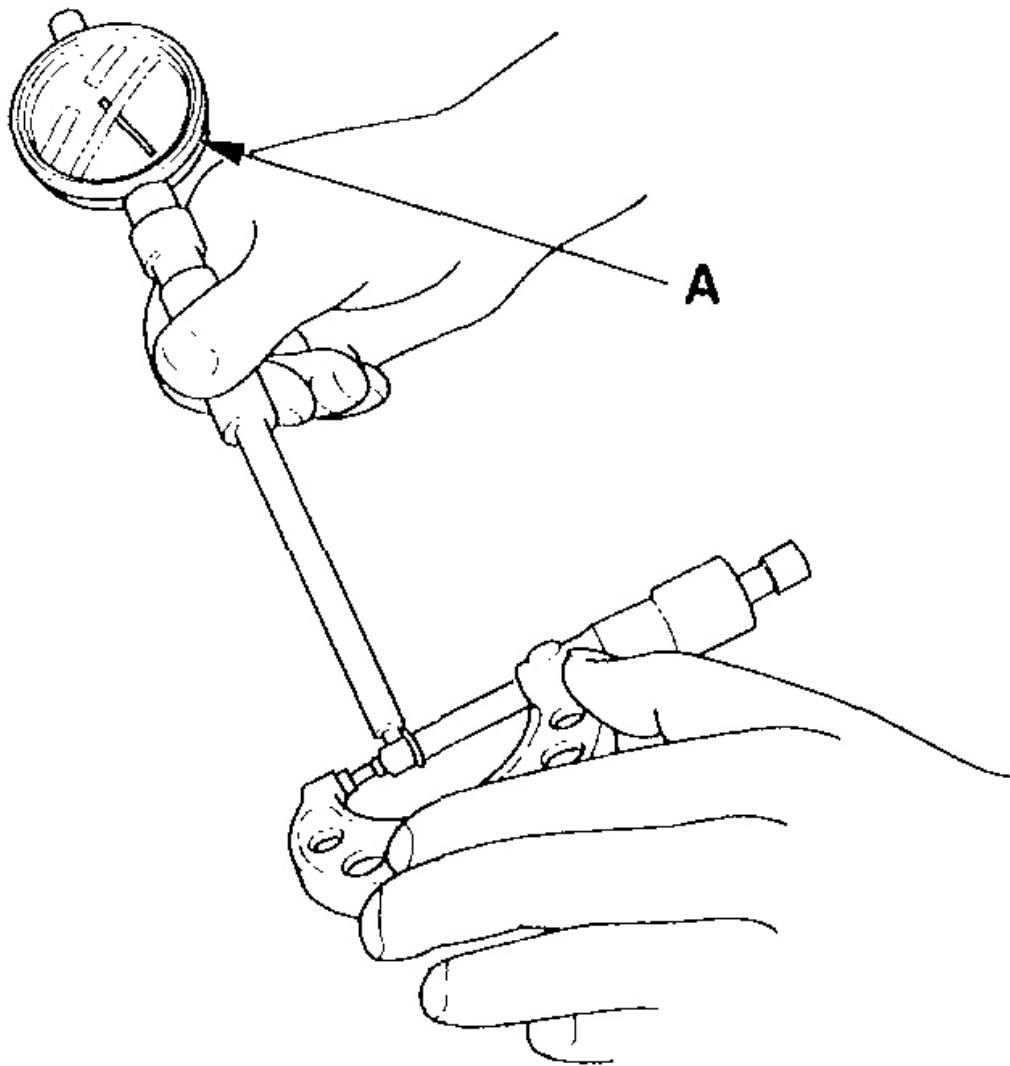
1. Measure the diameter of the shaft at the first rocker location.



G01401598

Fig. 162: Measuring Diameter Of Shaft At First Rocker Location
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Zero the gauge (A) to the shaft diameter.



G01401599

Fig. 163: Zeroing Gauge To Shaft Diameter

Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Measure the inside diameter of the rocker arm, and check it for an out-of-round condition.

Rocker Arm-to-Shaft Clearance

Standard (New):

Intake: 0.017 - 0.050 mm (0.0007 - 0.0020 in.)

Exhaust: 0.018 - 0.054 mm (0.0007 - 0.0021 in.)

Service Limit: 0.08 mm (0.003 in.)

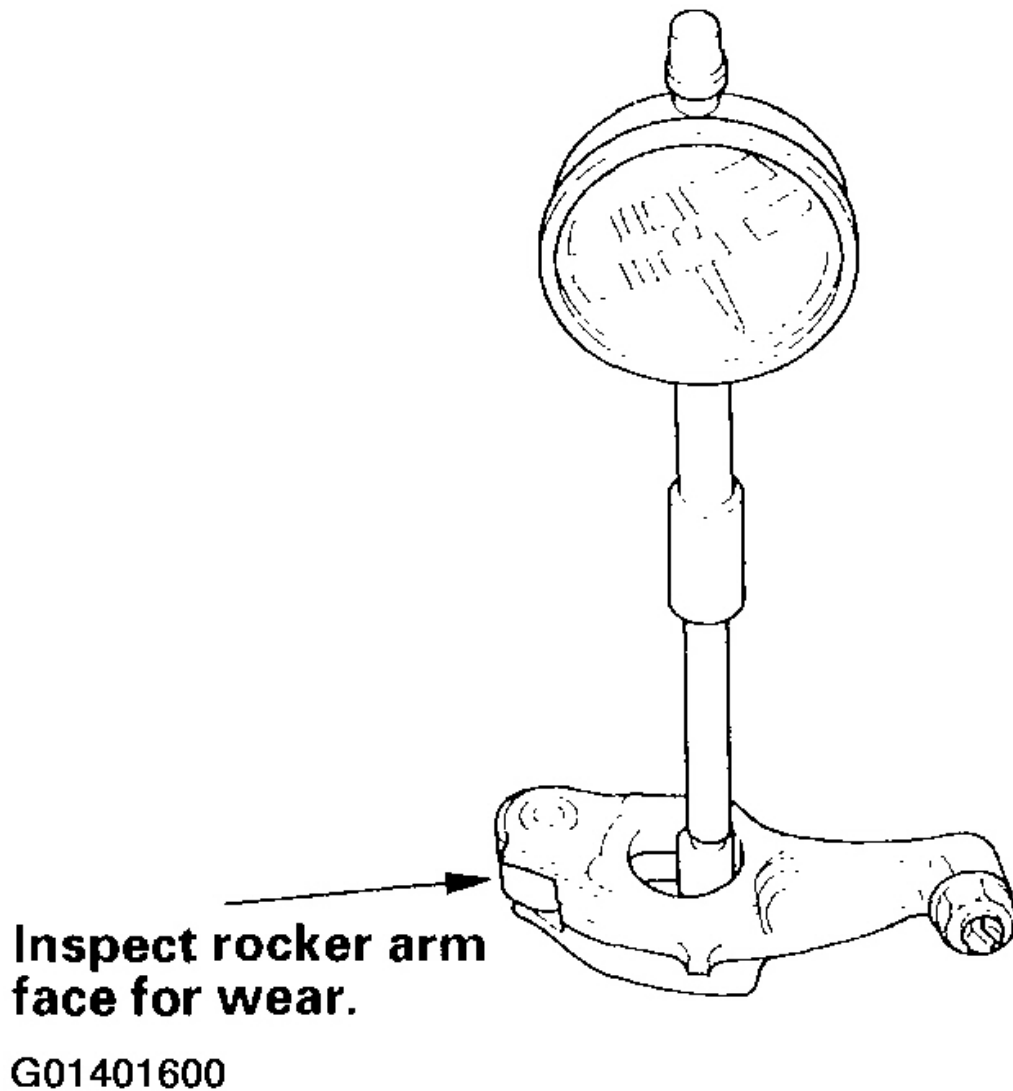


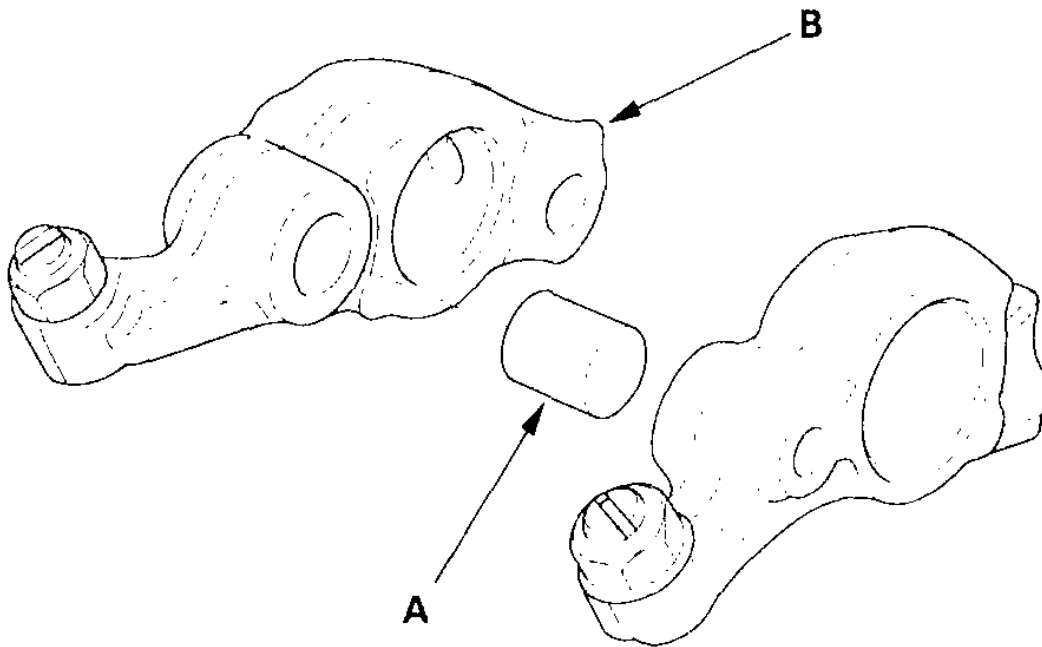
Fig. 164: Measuring Inside Diameter Of Rocker Arm
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Repeat for all rockers and both shafts. If the clearance is over the limit, replace the rocker shaft and all over tolerance rocker arms. If any VTEC intake rocker arm needs replacement, replace both rocker arms in that set (primary and secondary).

5. Inspect the rocker arm piston (A). Push it manually. If it does not move smoothly, replace the rocker arm set.

NOTE:

- When reassembling the primary rocker arm (B), carefully apply air pressure to its oil passage.
- Apply new engine oil to the pistons when reassembling.



G01401601

Fig. 165: Inspecting Rocker Arm Piston

Courtesy of AMERICAN HONDA MOTOR CO., INC.

CAMSHAFT INSPECTION

NOTE:

- Do not rotate the camshaft during inspection.
- Remove the rocker arms and rocker shafts.

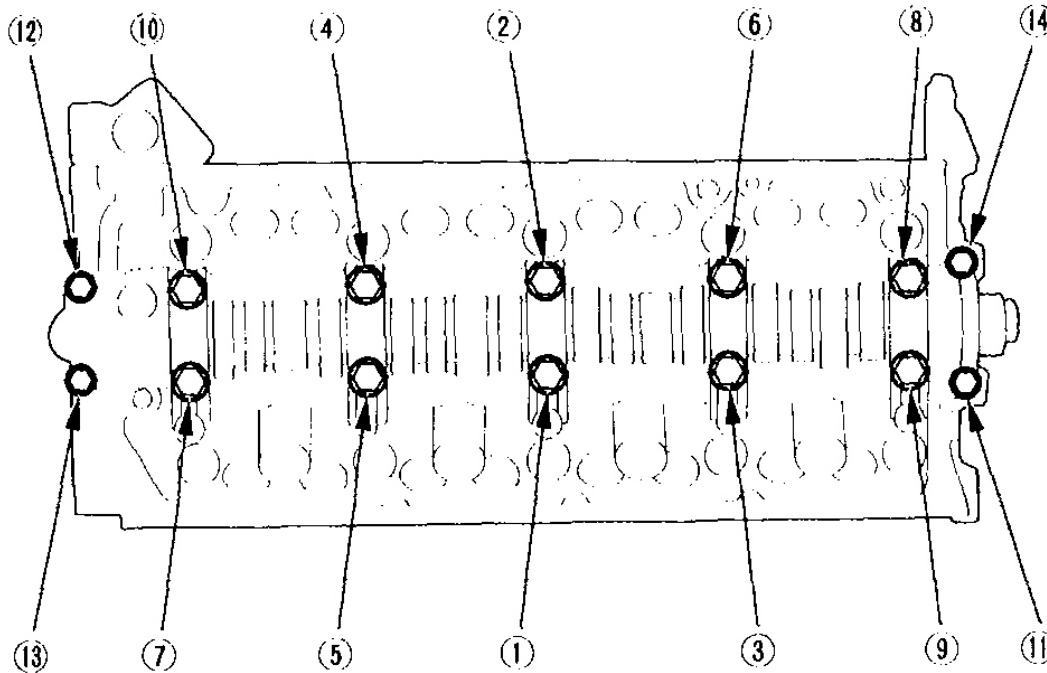
1. Put the camshaft and the camshaft holders on the cylinder head, then tighten the bolts to the specified torque.

NOTE:**Apply new engine oil to the bolt threads.****Specified torque**

8 mm bolts: 20 N.m (2.0 kgf.m, 14 lbf.ft)

6 mm bolts: 12 N.m (1.2 kgf.m, 8.7 lbf.ft)

6 mm bolts: 11, 12, 13, 14



G01401602

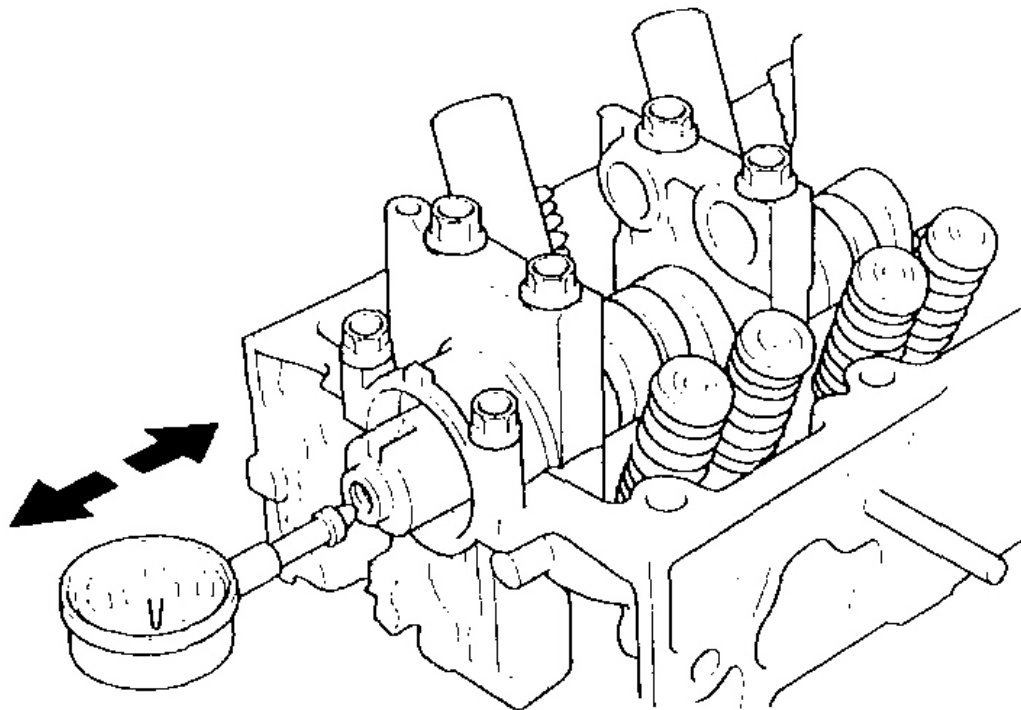
Fig. 166: Putting Camshaft & Camshaft Holders On Cylinder Head
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Seat the camshaft by pushing it away from the camshaft pulley end of the cylinder head.
3. Zero the dial indicator against the end of the camshaft, then push the camshaft back and forth and read the end play.

Camshaft End Play

Standard (New): 0.05 - 0.15 mm (0.002 - 0.006 in.)

Service Limit: 0.5 mm (0.02 in.)



G01401603

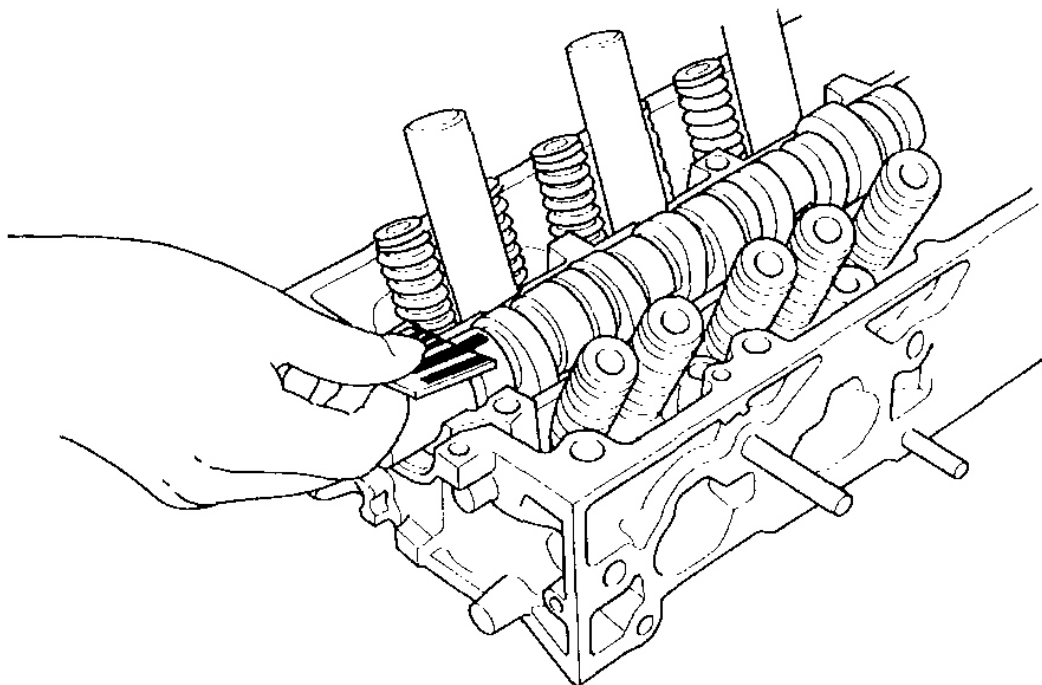
Fig. 167: Zeroing Dial Indicator Against End Of Camshaft
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Unscrew the camshaft holder bolts two turns at a time, in a crisscross pattern. Then remove the camshaft holders from the cylinder head.
5. Lift the camshaft out of the cylinder head, wipe them clean, then inspect the lift ramps. Replace the camshaft if any lobes are pitted, scored, or excessively worn.
6. Clean the camshaft journal surfaces in the cylinder head, then set the camshaft back in place. Place a plastigage strip across each journal.
7. Install the camshaft holders, then tighten the bolts to the specified torque as shown in step 1.
8. Remove the camshaft holders. Measure the widest portion of plastigage on each journal.
 - If the camshaft-to-holder clearance is within limits, go to step 10.
 - If the camshaft-to-holder clearance is beyond the service limit and the camshaft has been replaced, replace the cylinder head.
 - If the camshaft-to-holder clearance is beyond the service limit and the camshaft has not been replaced, go to step 9.

Camshaft-to-Holder Oil Clearance

Standard (New): 0.050 - 0.089 mm (0.0020 - 0.0035 in.)

Service Limit: 0.15 mm (0.006 in.)



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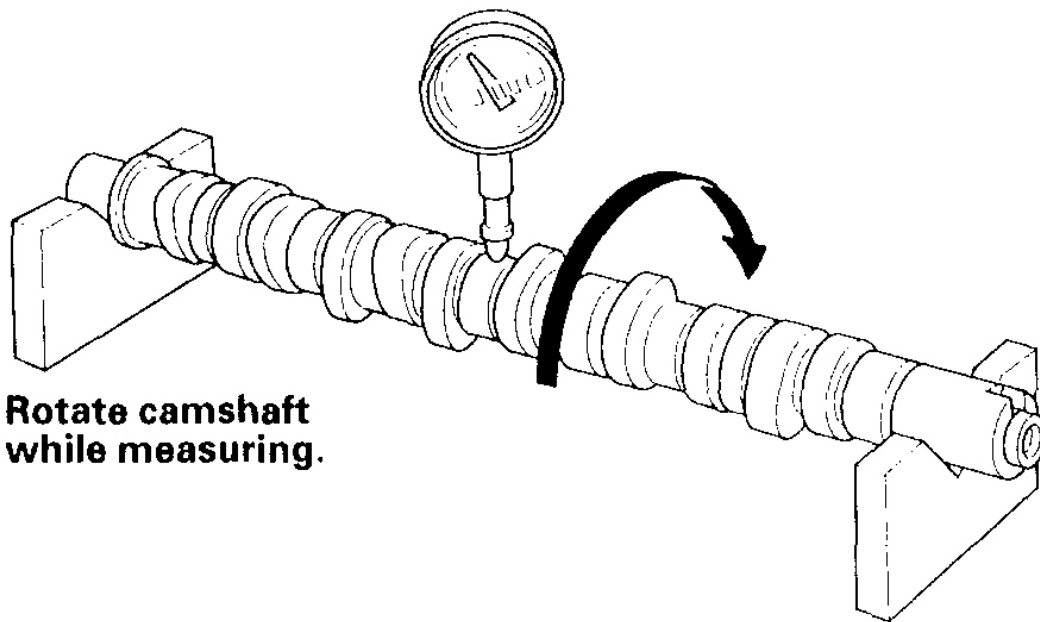
Fig. 168: Measuring Widest Portion Of Plastigage On Each Journal
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Check the total runout with the camshaft supported on V-blocks.
 - If the total runout of the camshaft is within the service limit, replace the cylinder head.
 - If the total runout is beyond the service limit, replace the camshaft and recheck the camshaft-to-holder oil clearance. If the oil clearance is still out of tolerance, replace the cylinder head.

Camshaft Total Runout

Standard (New): 0.03 mm (0.001 in.) max.

Service Limit: 0.04 mm (0.002 in.)



G01401605

Fig. 169: Checking Total Runout With Camshaft Supported On V-Blocks
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Measure cam lobe height.

		INTAKE	EXHAUST
D17A2 engine	PRI	38.604 mm (1.5198 in.)	38.784 mm (1.5269 in.)
	SEC	32.848 mm (1.2932 in.)	
D17A6 engine	PRI	38.427 mm (1.5129 in.)	38.784 mm (1.5269 in.)
	SEC	32.193 mm (1.2674 in.)	
D17A1 engine		35.299 mm (1.3897 in.)	37.281 mm (1.4678 in.)

PRI: Primary

SEC: Secondary

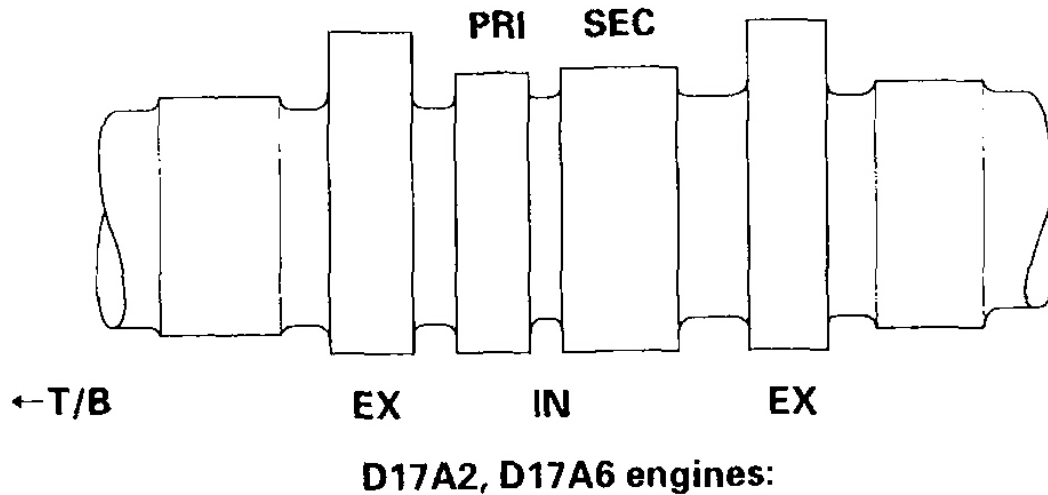
IN: Intake

EX: Exhaust

T/B: Timing Belt

G01401606

Fig. 170: Cam Lobe Height Standard (New) Chart (1 Of 2)
 Courtesy of AMERICAN HONDA MOTOR CO., INC.



G01401607

Fig. 171: Cam Lobe Height Standard (New) Chart (2 Of 2)
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

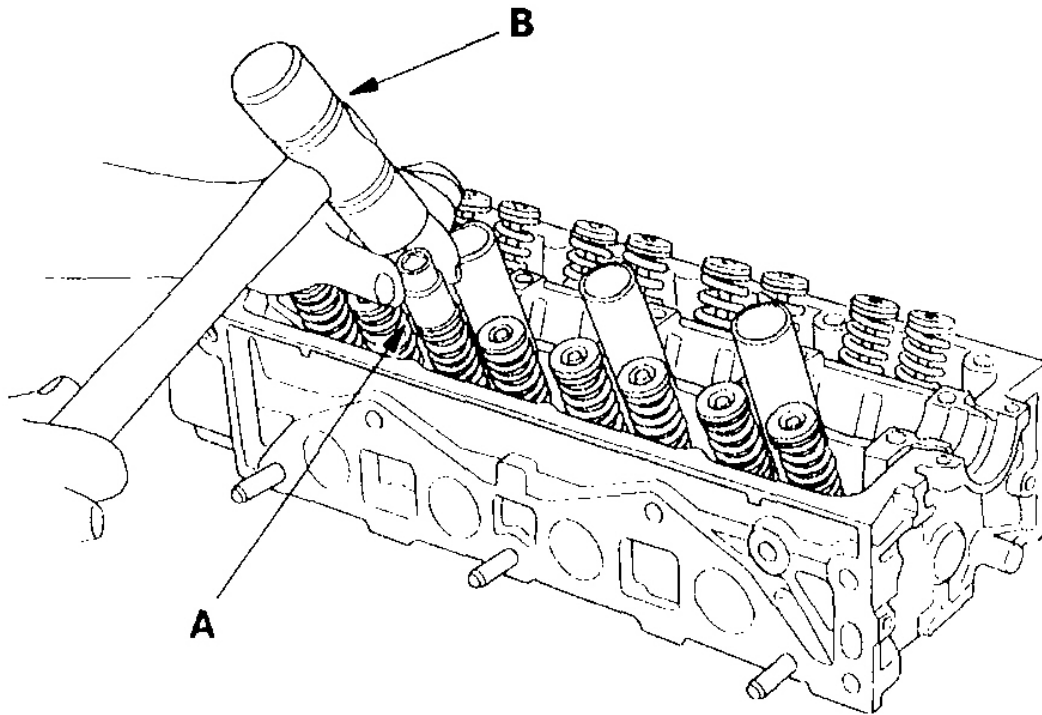
VALVE, SPRING, AND VALVE SEAL REMOVAL

Special Tools Required

Valve spring compressor attachment 07757-PJ1010A

Identify the valves and valve springs as they are removed, so that each item can be reinstalled in its original position.

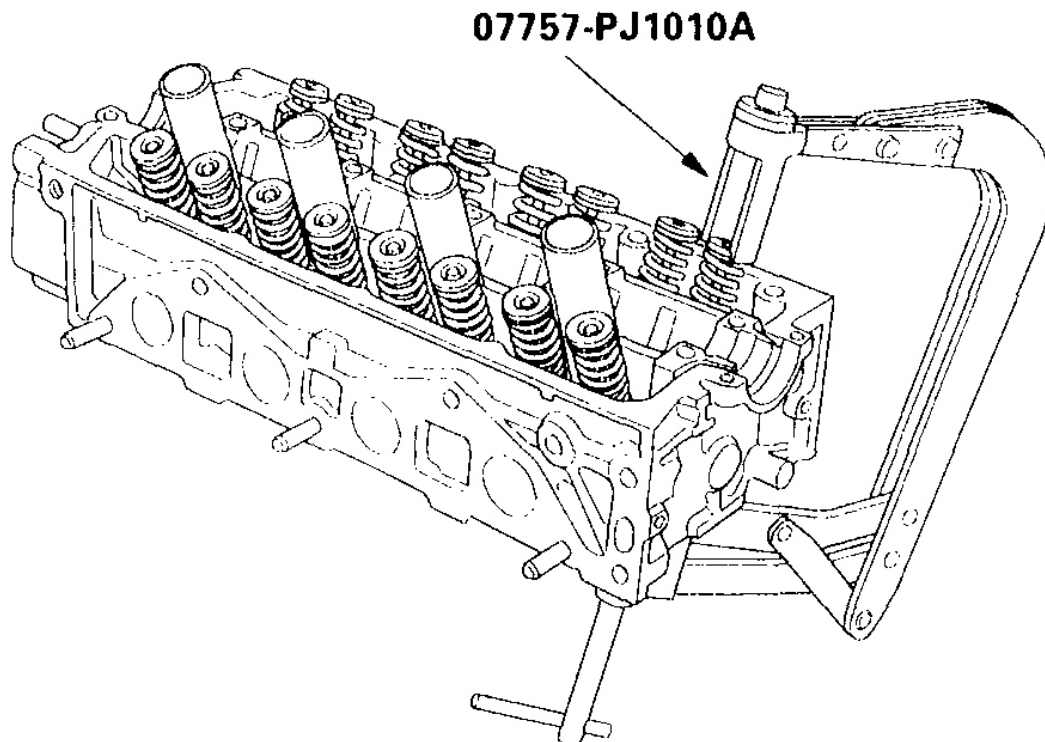
1. Using an appropriate-sized socket (A) and plastic mallet (B), lightly tap the valve retainer to loosen the valve keepers.



G01401608

Fig. 172: Using Appropriate-Sized Socket
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Install the special tool. Compress the spring and remove the valve keepers.

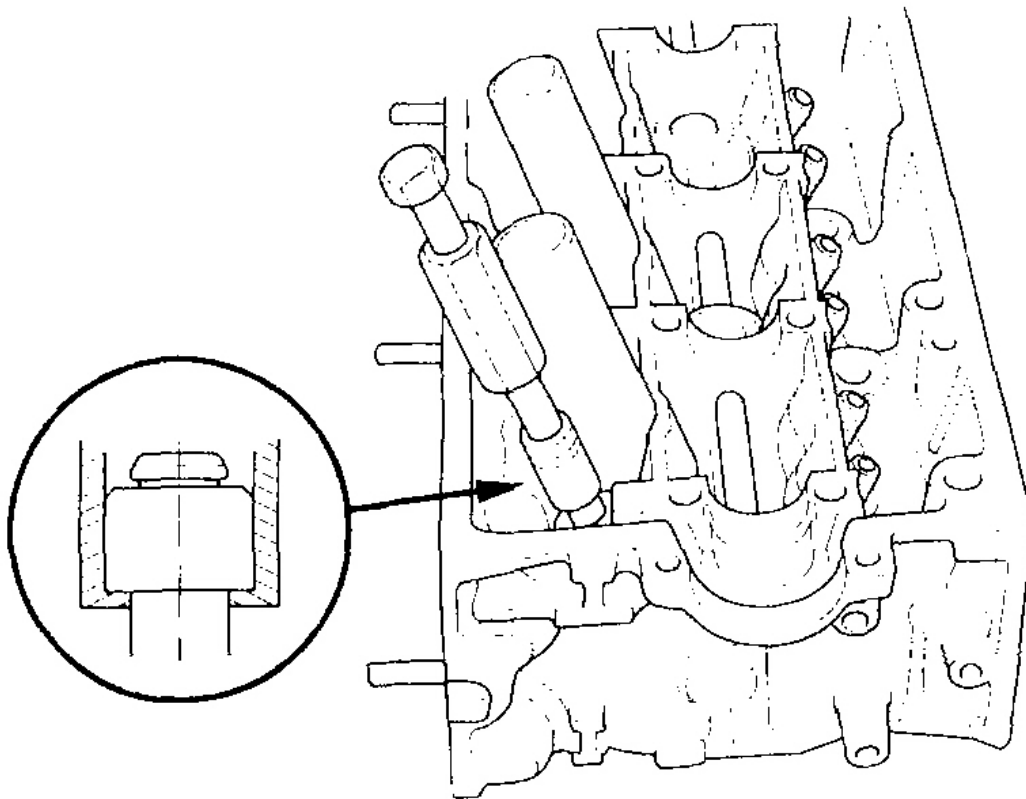


G01401609

Fig. 173: Installing Special Tool

Courtesy of AMERICAN HONDA MOTOR CO., INC.

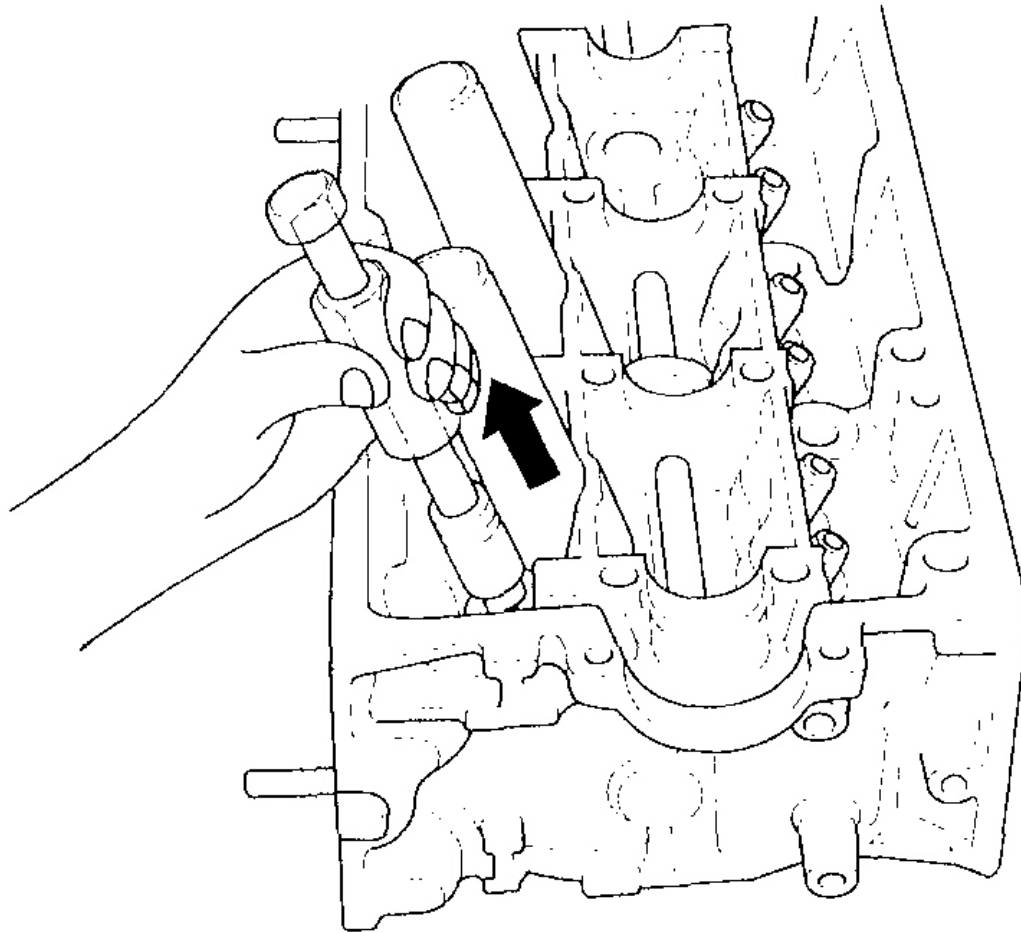
3. Remove the special tool, then remove the valve retainer and valve spring.
4. Install the valve guide seal remover.



G01401610

Fig. 174: Installing Valve Guide Seal Remover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Remove the valve seal.



G01401611

Fig. 175: Removing Valve Seal

Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Remove the valve.
7. Repeat this procedure for the remaining valves.

VALVE INSPECTION

Measure the valve in these areas.

Intake Valve Dimensions

A Standard (New): 29.85 - 30.15 mm (1.175 - 1.187 in.)

B Standard (New): 118.27 - 118.87 mm (4.656 - 4.680 in.)

C Standard (New): 5.480 - 5.490 mm (0.2157 - 0.2161 in.)

C Service Limit: 5.45 mm (0.215 in.)

Exhaust Valve Dimensions

A Standard (New): 25.85 - 26.15 mm (1.018 - 1.030 in.)

B Standard (New): 115.65 - 116.25 mm (4.553 - 4.577 in.)

C Standard (New): 5.450 - 5.460 mm (0.2146 - 0.2150 in.)

C Service Limit: 5.42 mm (0.213 in.)

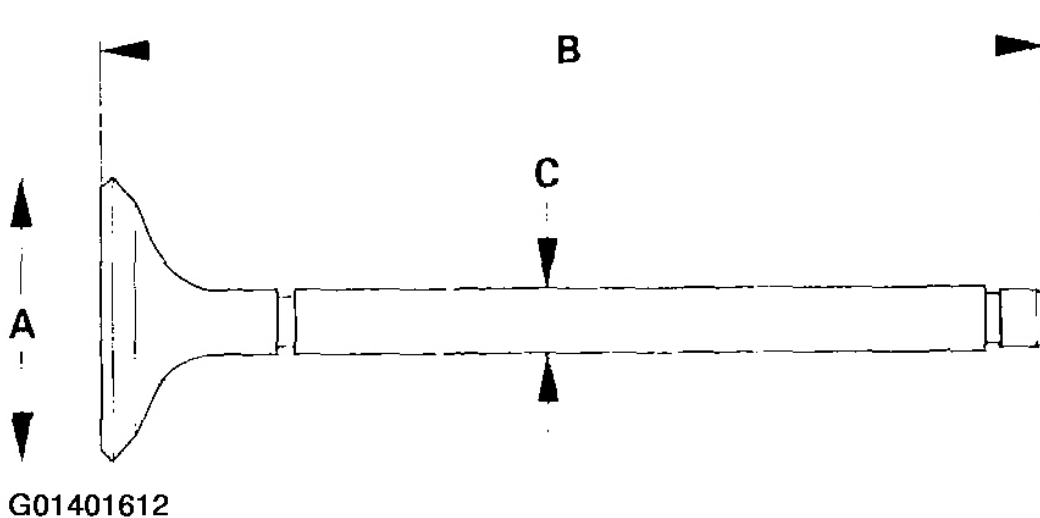


Fig. 176: Measuring Valves

Courtesy of AMERICAN HONDA MOTOR CO., INC.

VALVE STEM-TO-GUIDE CLEARANCE INSPECTION

1. Slide the valve out of its guide about 10mm, then measure the guide-to-stem clearance with a dial indicator while rocking the stem in the direction of normal thrust (wobble method).
 - If the measurement exceeds the service limit, recheck it using a new valve.
 - If the measurement is now within the service limit, reassemble using a new valve.
 - If the measurement with a new valve still exceeds the service limit, go to step 2.

Intake Valve Stem-to-Guide Clearance

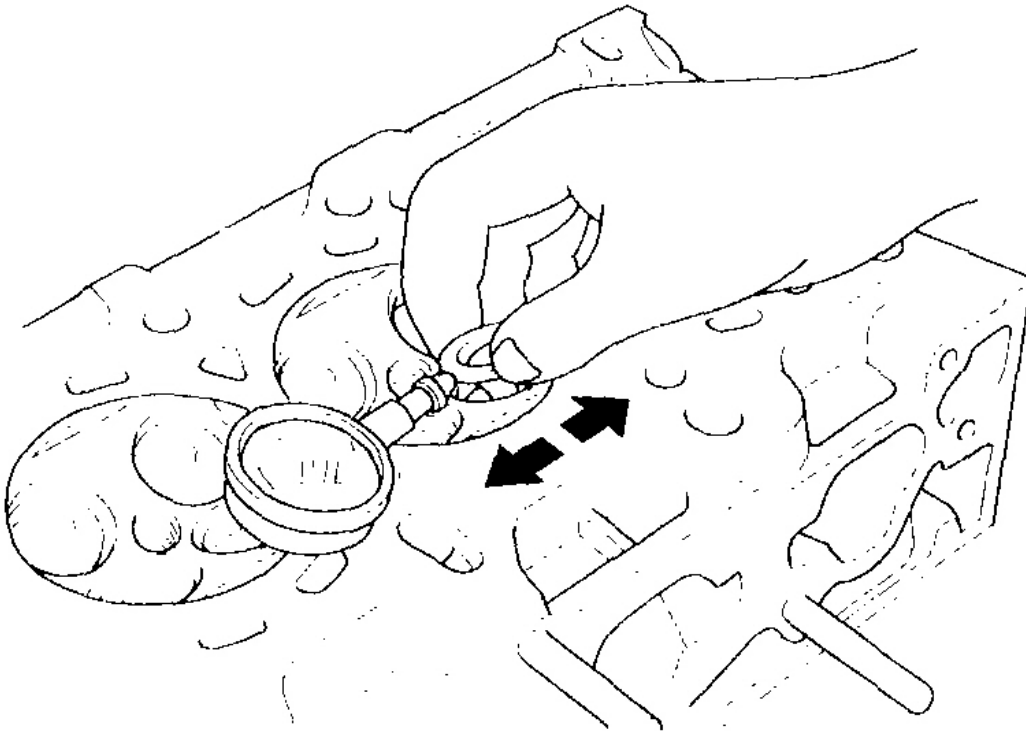
Standard (New): 0.04 - 0.10 mm (0.002 - 0.004 in.)

Service Limit: 0.16 mm (0.006 in.)

Exhaust Valve Stem-to-Guide Clearance

Standard (New): 0.10 - 0.16 mm (0.004 - 0.006 in.)

Service Limit: 0.22 mm (0.009 in.)



G01401613

Fig. 177: Sliding Valve Out Of Its Guide

Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Subtract the O.D. of the valve stem, measured with a micrometer, from the I.D. of the valve guide, measured with an inside micrometer or ball gauge. Take the measurements in three places along the valve stem and three places inside the valve guide. The difference between the largest guide measurement and the smallest stem measurement should not exceed the service limit.

Intake Valve Stem-to-Guide Clearance

Standard (New): 0.02 - 0.05 mm (0.0008 - 0.0020 in.)

Service Limit: 0.08 mm (0.003 in.)

Exhaust Valve Stem-to-Guide Clearance

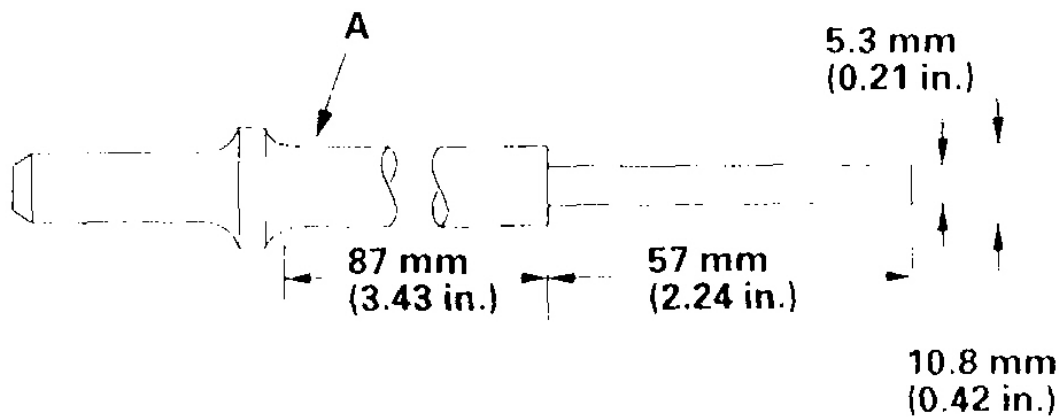
Standard (New): 0.05 - 0.08 mm (0.0020 - 0.0031 in.)

Service Limit: 0.11 mm (0.004 in.)

VALVE GUIDE REPLACEMENT

Special Tools Required

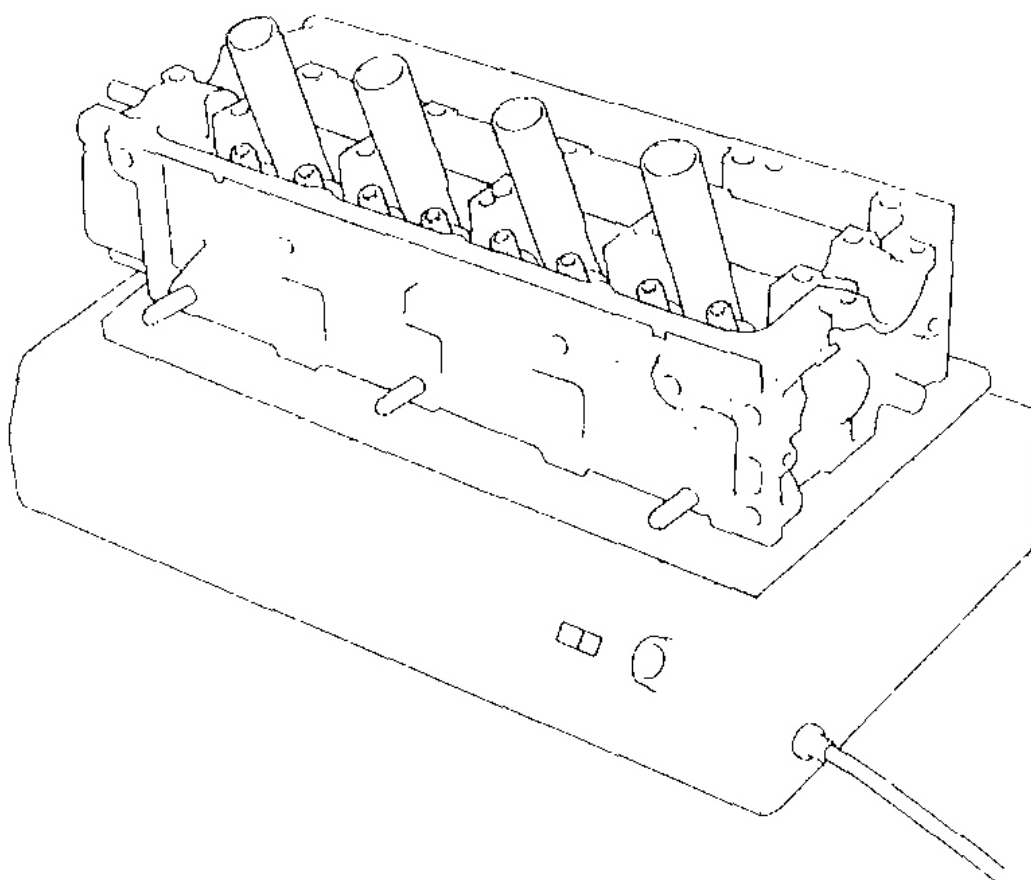
- Valve guide driver, 5.5 mm 07742-0010100
 - Valve guide reamer, 5.5 mm 07HAH-PJ7A100
1. As illustrated, use a commercially available air-impact valve guide driver (A) modified to fit the diameter of the valve guides. In most cases, the same procedure can be done using the special tool and a conventional hammer.



G01401614

Fig. 178: Using Air-Impact Valve Guide Driver Modified To Fit Diameter Of Valve Guides
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Select the proper replacement guides, and chill them in the freezer section of a refrigerator for about an hour.
3. Use a hot plate or oven to evenly heat the cylinder head to 300°F (150°C). Monitor the temperature with a cooking thermometer. Do not get the head hotter than 300°F (150°C); excessive heat may loosen the valve seats.

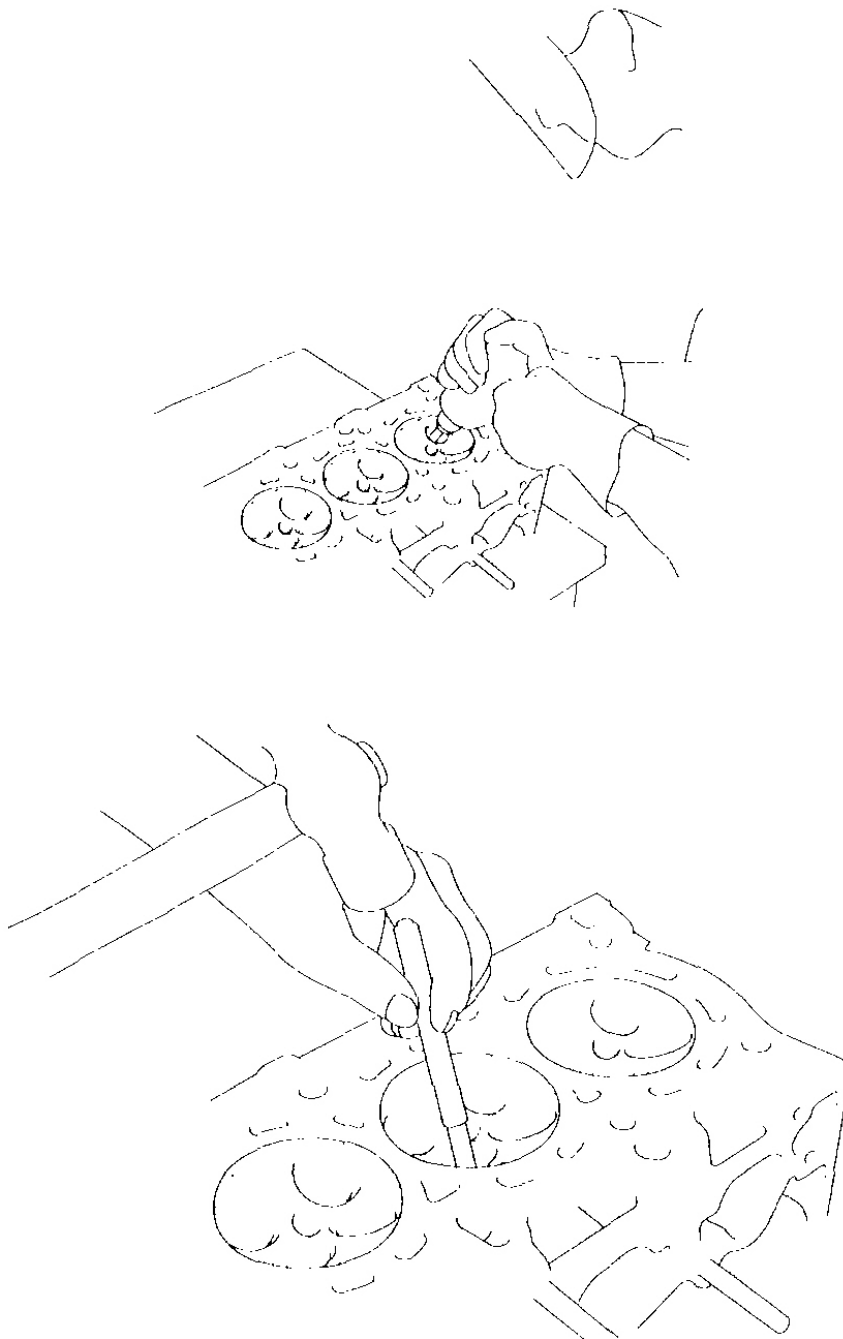


G01401615

Fig. 179: Evenly Heating Cylinder Head

Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Working from the camshaft side, use the driver and an air hammer to drive the guide about 2 mm (0.1 in.) towards the combustion chamber. This will knock off some of the carbon and make removal easier. Hold the air hammer directly in line with the valve guide to prevent damaging the driver.
5. Turn the head over and drive the guide out toward the camshaft side of the head.



G01401616

Fig. 180: Turning Head Over & Driving Guide Out Toward Camshaft Side Of Head
Courtesy of AMERICAN HONDA MOTOR CO., INC.

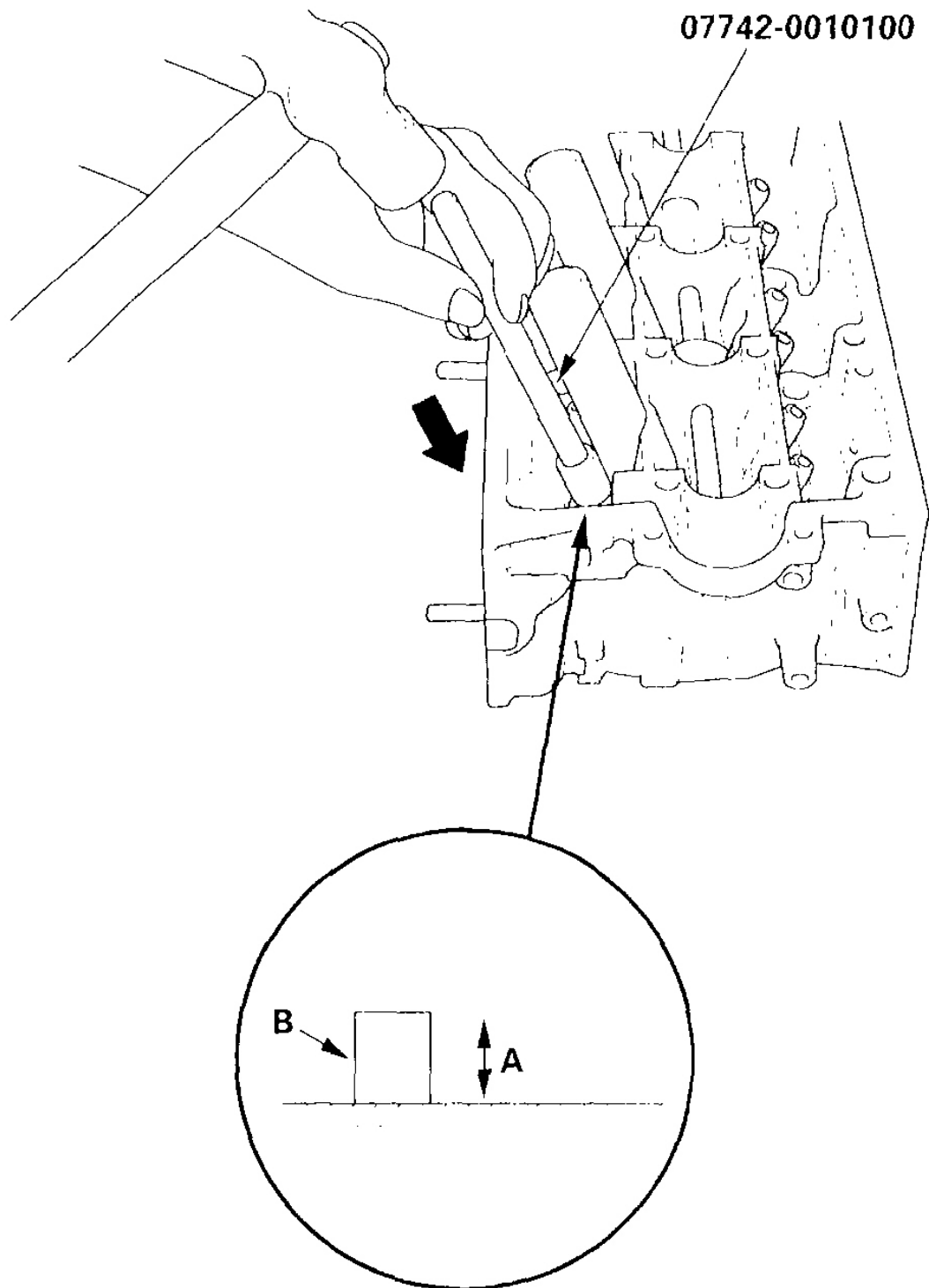
6. If a valve guide won't move, drill it out with a 8 mm (5/16 in.) bit, then try again. Drill out the guides only in extreme cases; you could damage the cylinder head if the guide breaks.

7. Remove the new guide(s) from the freezer, one at a time, as you need them.
8. Apply a thin coat of clean engine oil to the outside of the new valve guide. Install the guide from the camshaft side of the head; use the special tool to drive the guide in to the specified installed height (A) of the guide (B). If you have all 16 guides to do, you may have to reheat the head.

Valve Guide Installed Height

Intake: 17.85 - 18.35 mm (0.703 - 0.722 in.)

Exhaust: 18.65 - 19.15 mm (0.734 - 0.754 in.)

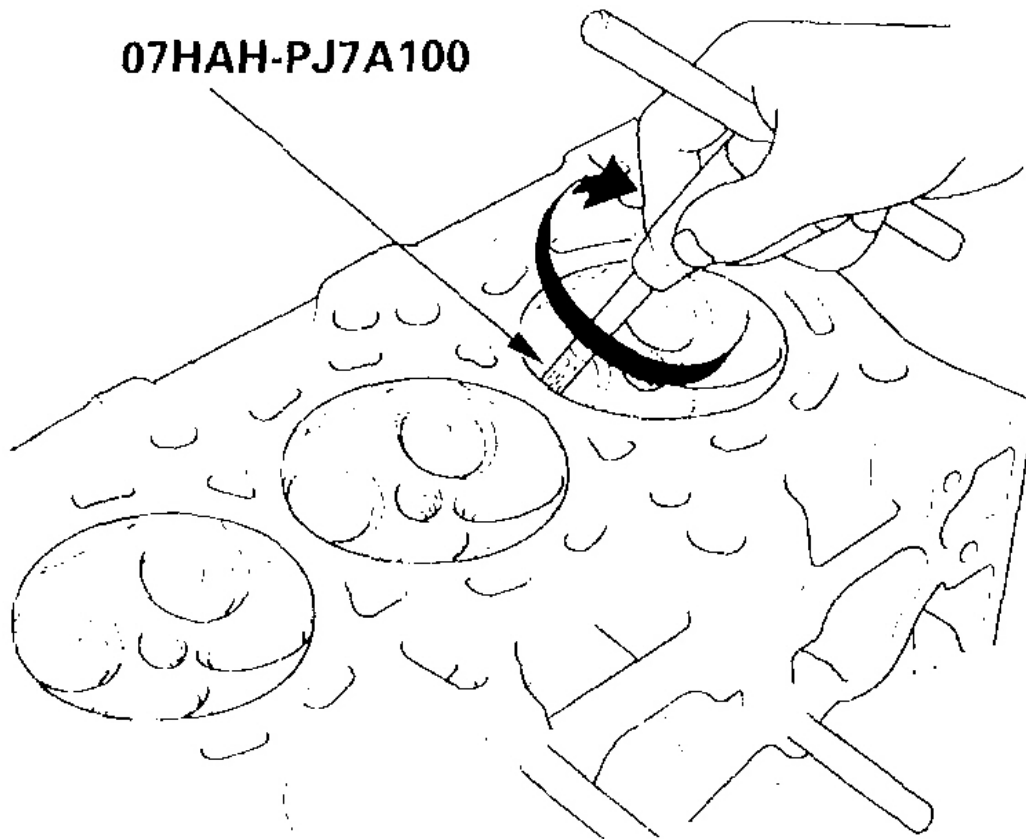


G01401617

Fig. 181: Using Special Tool To Drive Guide In Specified Installed Height Of Guide

Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Coat both reamer and valve guide with cutting oil.
10. Rotate the reamer clockwise the full length of the valve guide bore.



G01401618

Fig. 182: Rotating Reamer Clockwise Full Length Of Valve Guide Bore
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Continue to rotate the reamer clockwise while removing it from the bore.
12. Thoroughly wash the guide in detergent and water to remove any cutting residue.
13. Check the clearance with a valve (see **Valve Inspection**). Verify that the valve slides in the intake and exhaust valve guides without exerting pressure.

VALVE SEAT RECONDITIONING

If the valve guides are worn (see **Valve Inspection**), replace them (see **Valve Guide Replacement**) before

cutting the valve seats.

1. Renew the valve seats in the cylinder head using a valve seat cutter.

- **1** Carefully cut a 45° seat, removing only enough material to ensure a smooth and concentric seat.
- **2** Bevel the upper edge of the seat with the 30° cutter and the lower edge of the seat with the 67.5° cutter (Intake) or 60° cutter (exhaust).

Check the width of the seat and adjust accordingly.

- Make one more very light pass with the 45° cutter to remove any possible burrs caused by the other cutters.

Valve Seat Width

Intake:

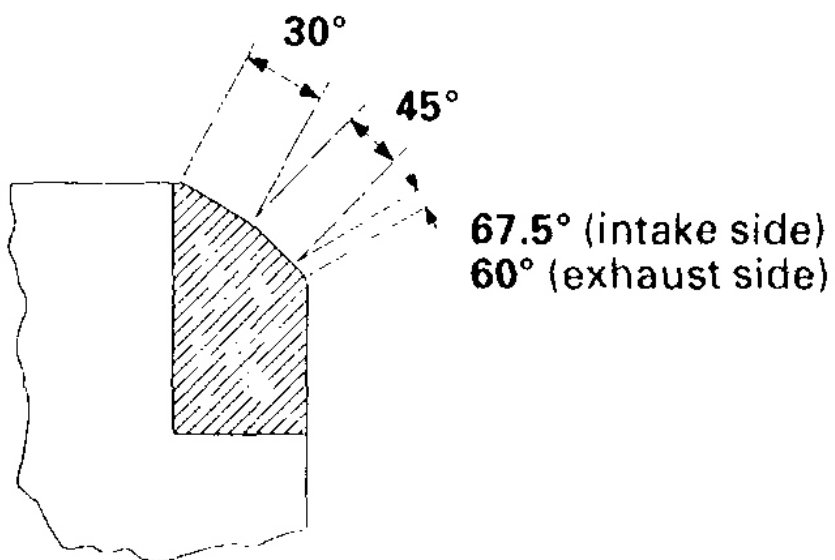
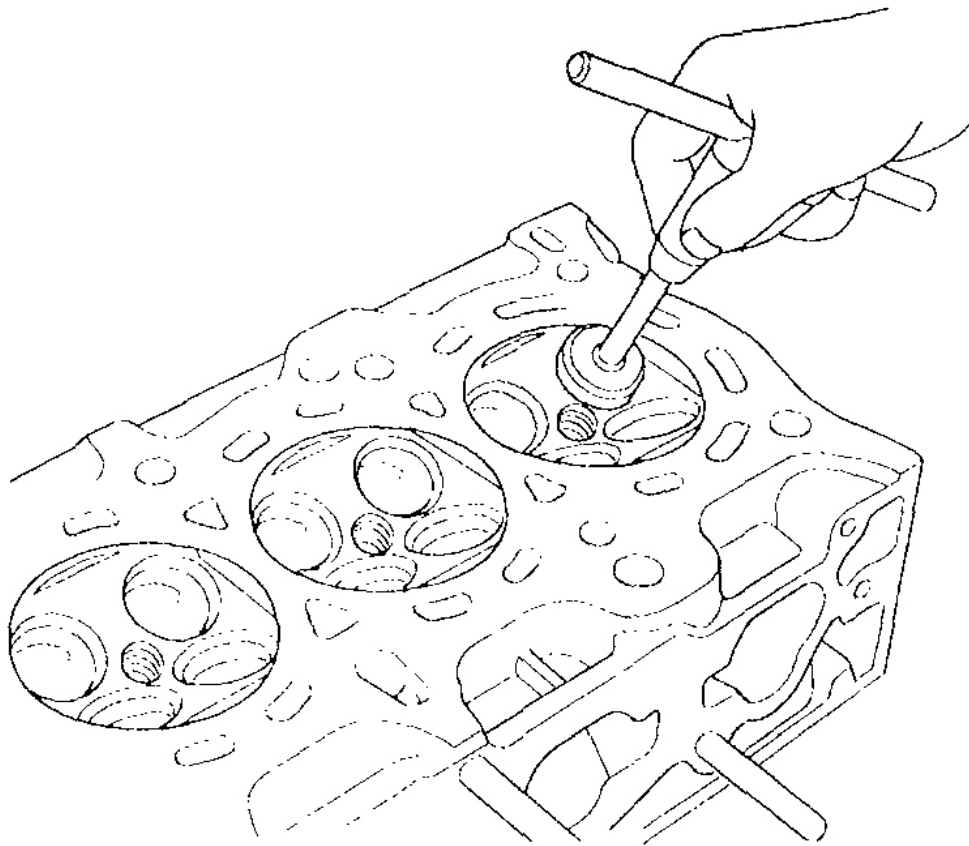
Standard (New): 0.85 - 1.15 mm (0.033 - 0.045 in.)

Service Limit: 1.60 mm (0.063 in.)

Exhaust:

Standard (New): 1.25 - 1.55 mm (0.049 - 0.061 in.)

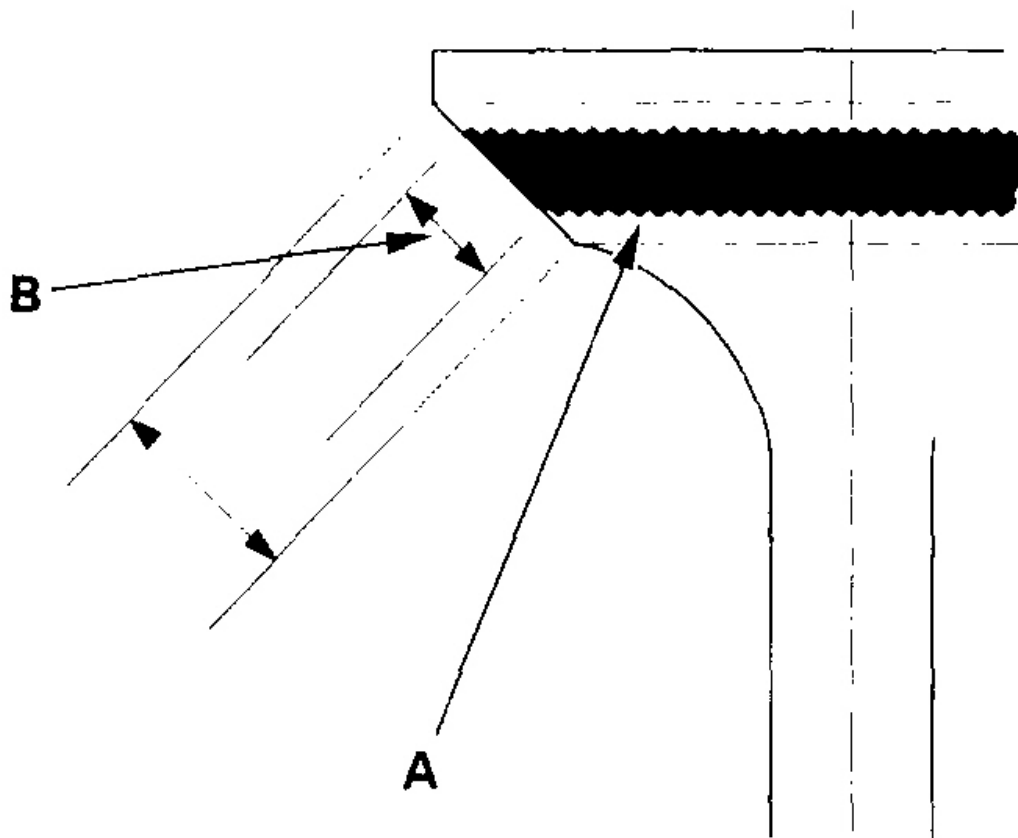
Service Limit: 2.00 mm (0.079 in.)



G01401619

Fig. 183: Renewing Valve Seats In Cylinder Head Using Valve Seat Cutter
Courtesy of AMERICAN HONDA MOTOR CO., INC.

- After resurfacing the seat, inspect it for even valve seating: Apply Prussian Blue compound (A) to the valve face. Insert the valve in its original location in the head, then lift it and snap it closed against the seat several times.



G01401620

Fig. 184: Applying Prussian Blue Compound To Valve Face
Courtesy of AMERICAN HONDA MOTOR CO., INC.

- The actual valve seating surface (B), as shown by the blue compound, should be centered on the seat.
 - If it is too high (closer to the valve stem), you must make a second cut with the 67.5° cutter (Intake) or 60° cutter (exhaust) to move it down, then one more cut with the 45° cutter to restore seat width.

- If it is too low (closer to the valve edge), you must make a second cut with the 30° cutter to move it up, then one more cut with the 45° cutter to restore seat width.

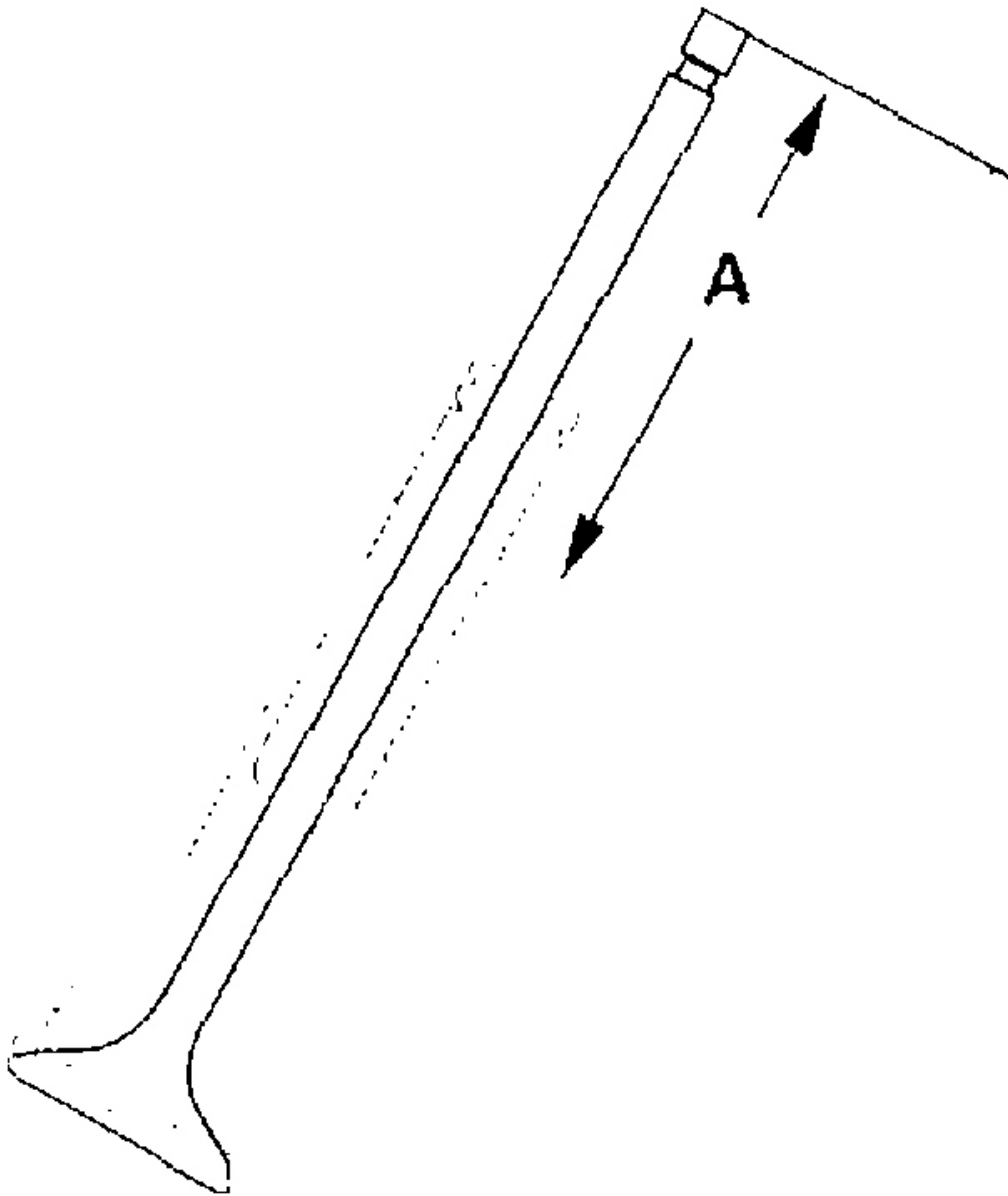
NOTE: **The final cut should always be made with the 45° cutter.**

- Insert the intake and exhaust valves in the head and measure the valve stem installed height (A).

Valve Stem Installed Height

Standard (New): 53.17 - 53.64 mm (2.093 - 2.112 in.)

Service Limit: 53.89 mm (2.122 in.)



G01401621

Fig. 185: Measuring Valve Stem Installed Height
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. If the valve stem installed height is over the service limit, replace the valve and recheck. If it is still over the service limit, replace the cylinder head; the valve seat in the head is too deep.

VALVE, SPRING, AND VALVE SEAL INSTALLATION

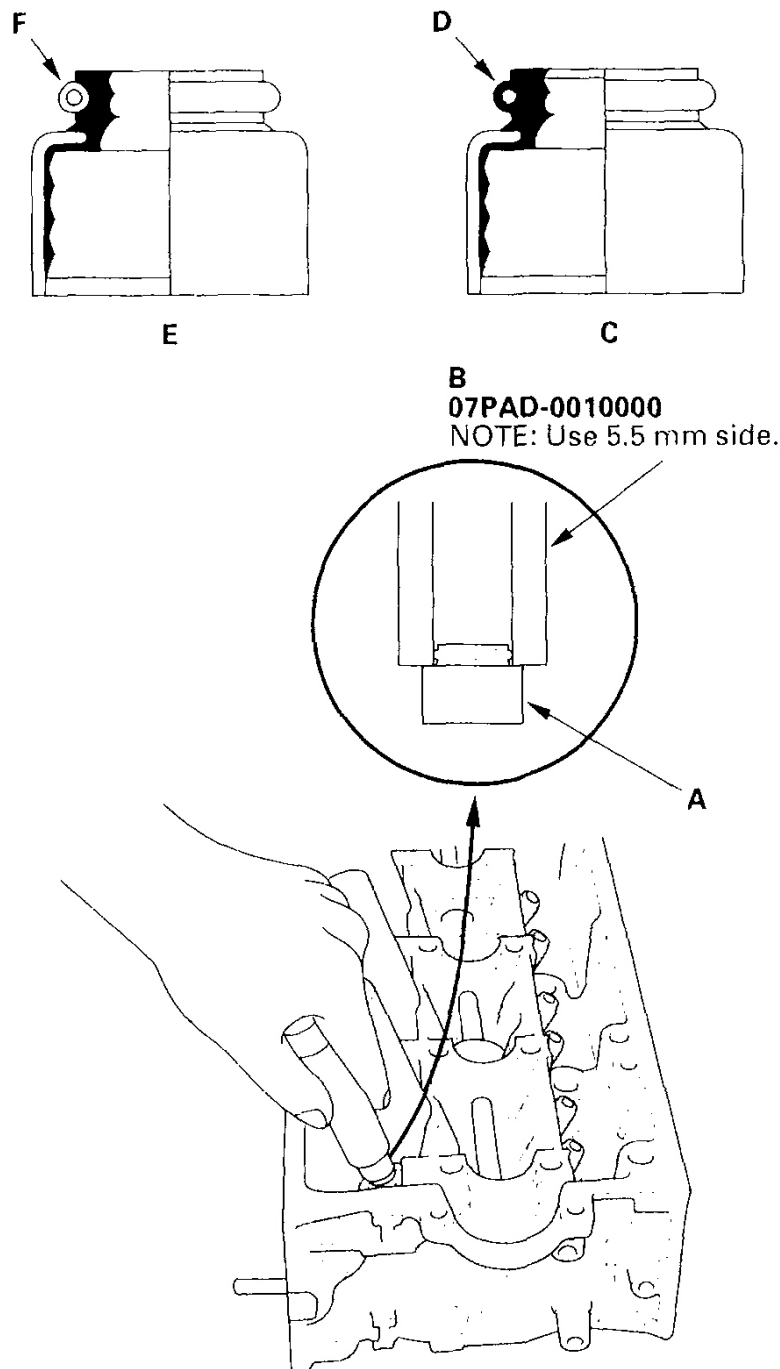
Special Tools Required

- Stem seal driver 07PAD-0010000
- Valve spring compressor attachment 07757-PJ1010A

1. Coat the valve stems with new engine oil. Install the valves in the valve guides.
2. Check that the valves move up and down smoothly.
3. Install the spring seats on the cylinder head.
4. Install the new valve seals (A) using the valve guide seal installer (B).

NOTE: Exhaust valve seal (C) has a black spring (D), and intake valve seal (E) has a white spring (F).

They are not interchangeable.



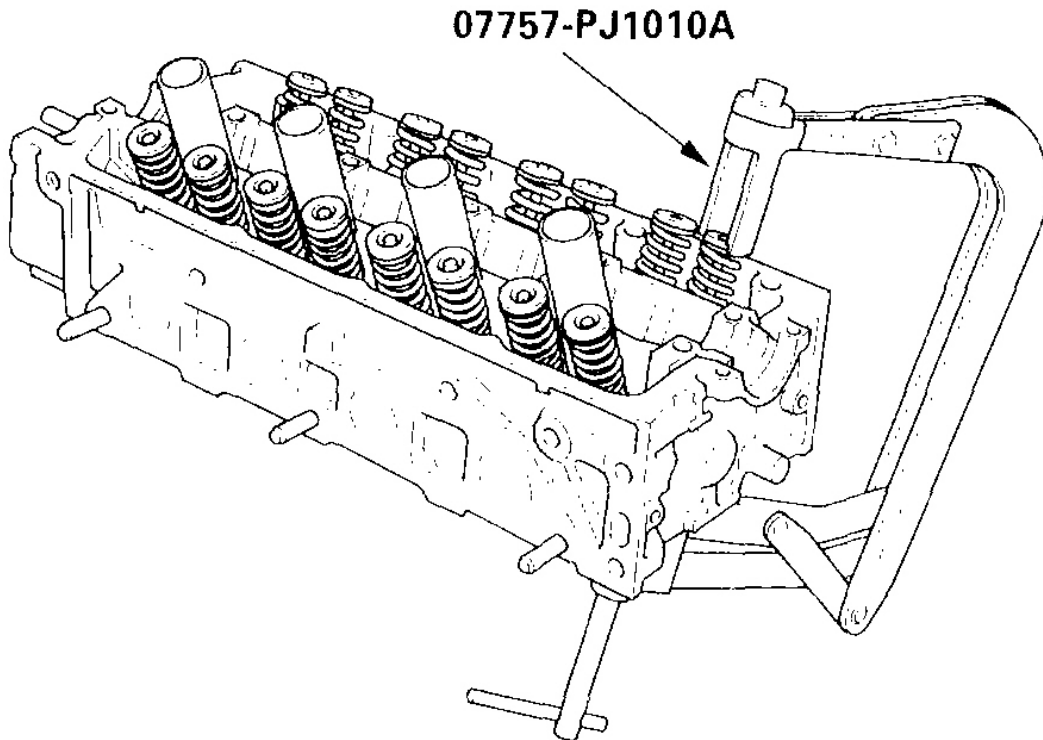
G01401622

Fig. 186: Installing New Valve Seals

Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Install the valve spring and valve retainer. Place the end of the valve spring with closely wound coils toward the cylinder head.

6. Install the special tool. Compress the spring and install the valve keepers.

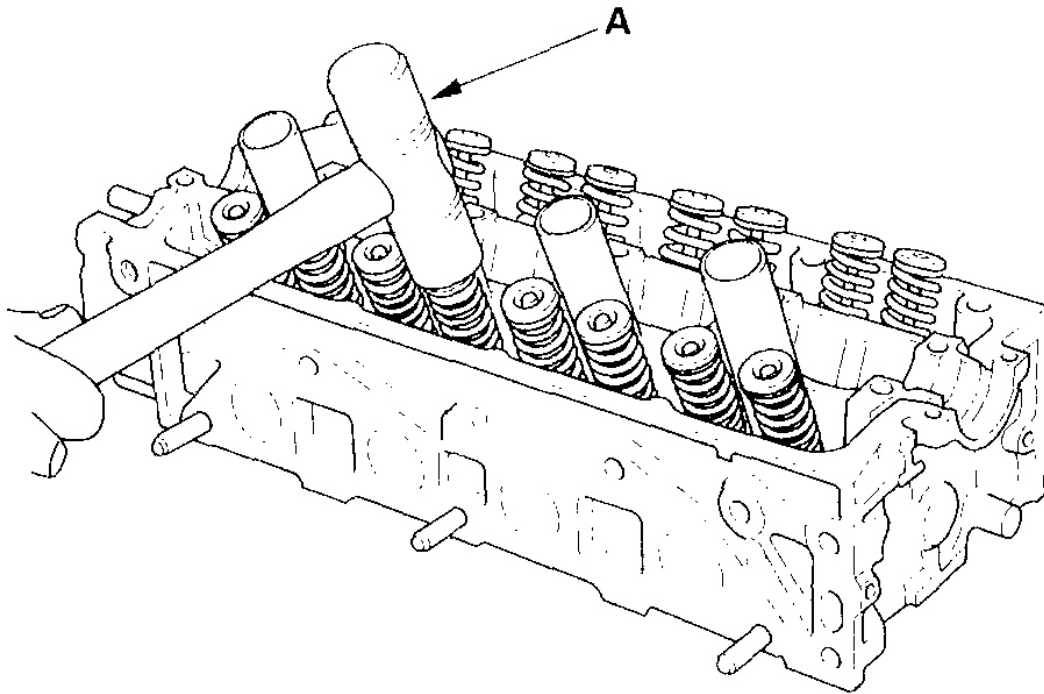


G01401623

Fig. 187: Installing Special Tool

Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Remove the special tool, then remove the valve retainer and valve spring.
8. Lightly tap the end of each valve stem two or three times with a plastic mallet (A) to ensure proper seating of the valve and valve keepers. Tap the valve stem only along its axis so you do not bend the stem.



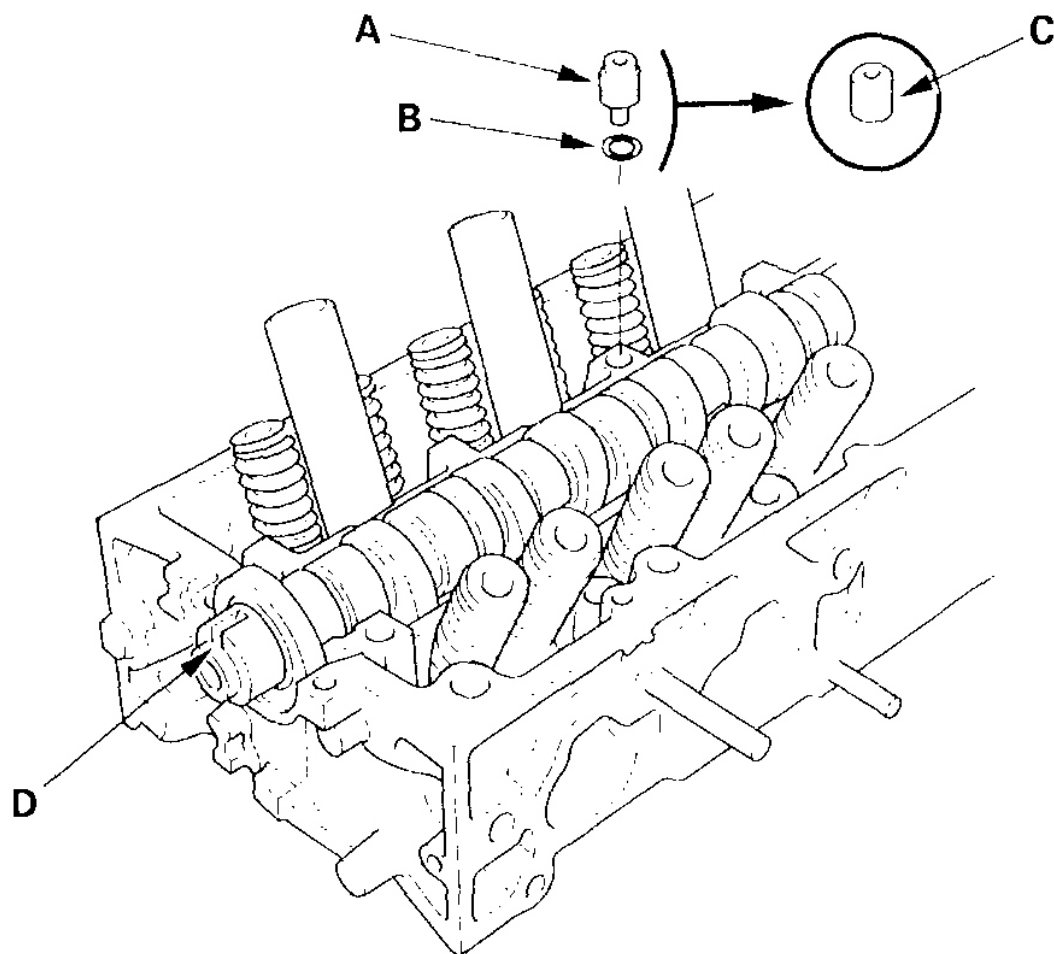
G01401624

Fig. 188: Lightly Tapping End Of Each Valve Stem With Plastic Mallet
Courtesy of AMERICAN HONDA MOTOR CO., INC.

CAMSHAFT, ROCKER ARM, CAMSHAFT SEAL, AND PULLEY INSTALLATION

NOTE: To prevent the rocker arm assembly from coming apart, leave the camshaft holder bolts in the holes.

1. After wiping down the camshaft and the journals in the cylinder head, lubricate both surfaces and install the camshaft.
2. D17A2, D17A6 engines: Clean and install the oil control orifice (A) with a new O-ring (B).



G01401625

Fig. 189: Cleaning & Installing Oil Control Orifice (D17A2, D17A6 Engines)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. D17A1 engine: Clean and install the oil control orifice (C).
4. Turn the camshaft until its keyway (D) is facing up (No.1 piston TDC).
5. Loosen all the valve adjusting screws.
6. Apply liquid gasket to the head mating surface (shaded areas) of the No. 1 and No. 5 camshaft holders.

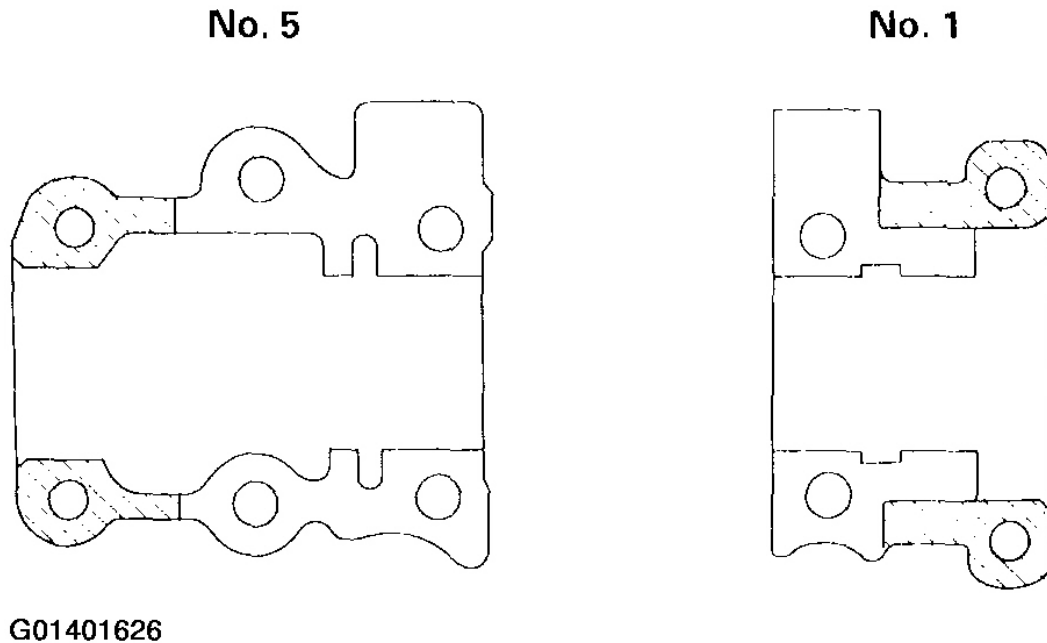


Fig. 190: Applying Liquid Gasket To Head Mating Surface of No. 1 & No. 5 Camshaft Holders
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Set the rocker arm assembly in place and loosely install the bolts. Make sure that the rocker arms are properly positioned on the valve stems.
8. Tighten each bolt two turns at a time, in the sequence shown, to ensure that the rockers do not bind on the valves.

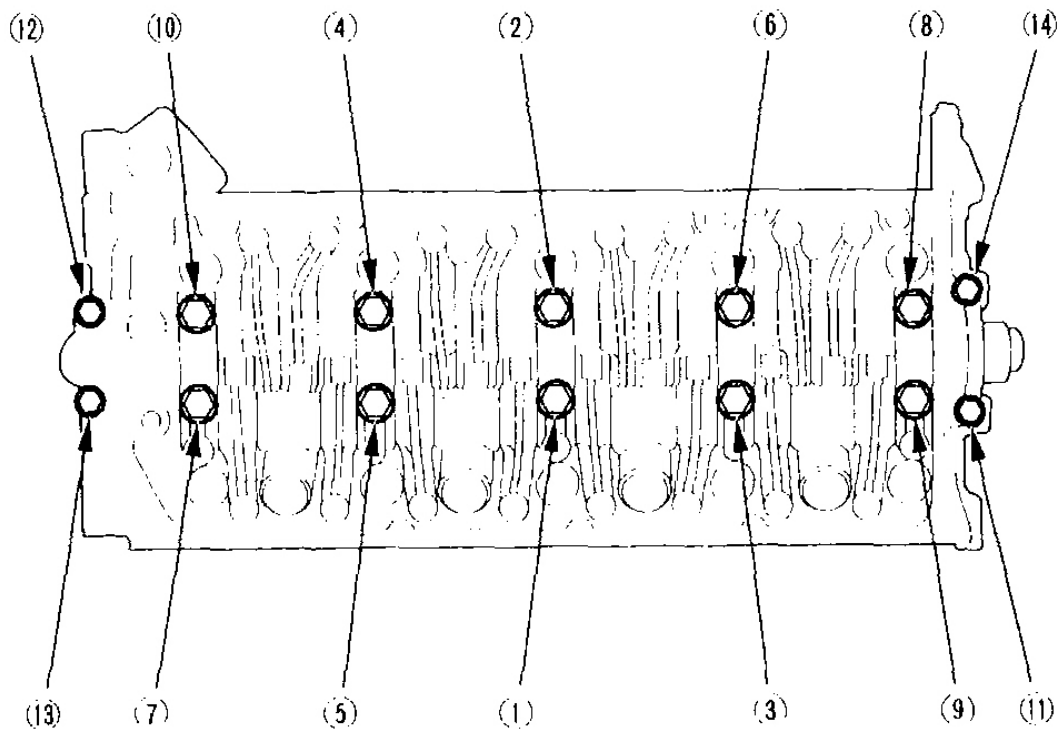
NOTE: Apply new engine oil to the bolt threads.

Specified torque

8 mm bolts: 20 N.m (2.0 kgf.m, 14 lbf.ft)

6 mm bolts: 12 N.m (1.2 kgf.m, 8.7 lbf.ft)

6 mm bolts: 11, 12, 13, 14

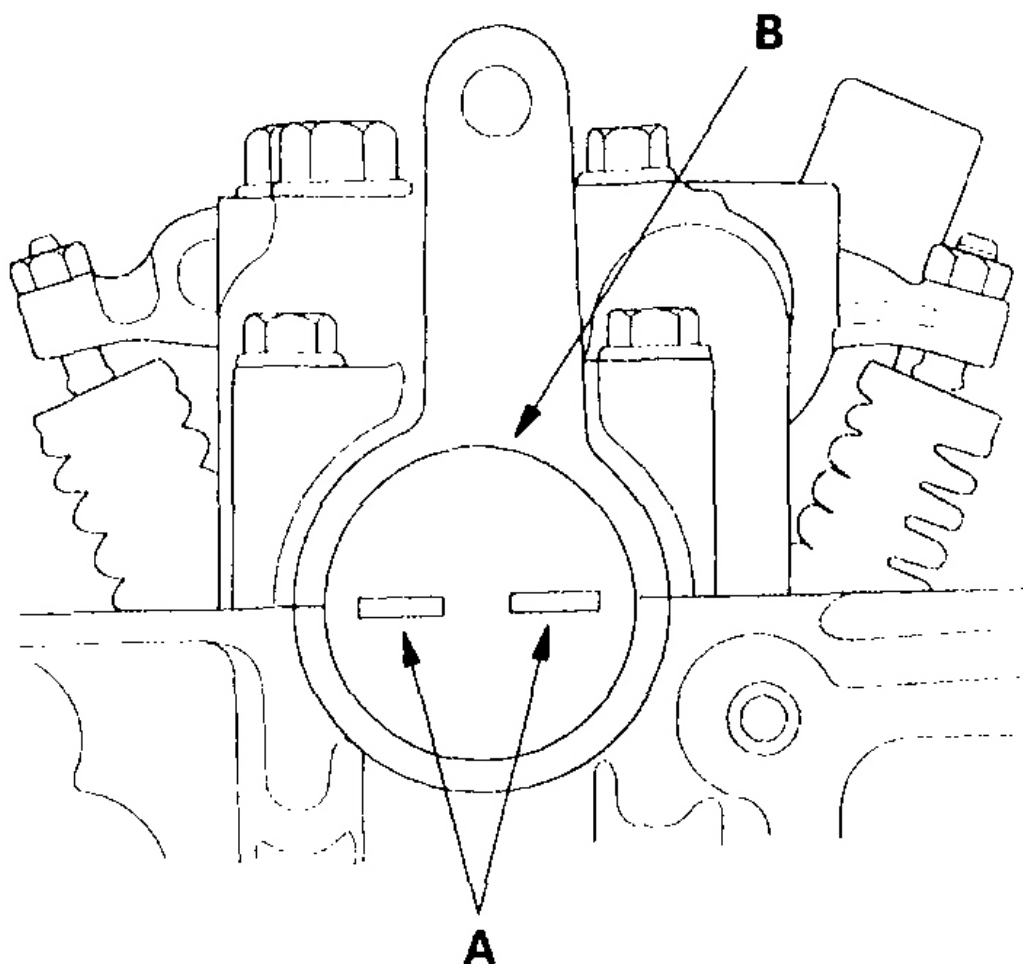


G01401627

Fig. 191: Tightening Bolts In Sequence

Courtesy of AMERICAN HONDA MOTOR CO., INC.

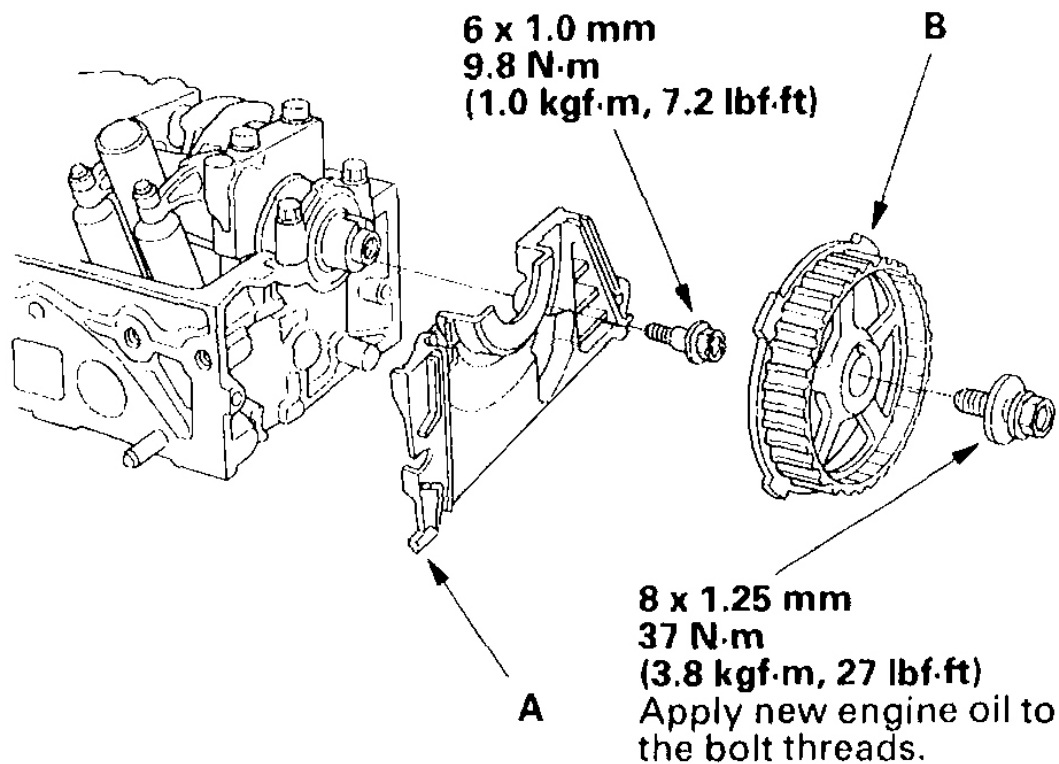
9. Align the marks (A) on the new cylinder head plug (B) with the top edge of the head, then install the cylinder head plug in the cylinder head.



G01401628

Fig. 192: Aligning Marks On New Cylinder Head Plug
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Install the back cover (A), then install the camshaft pulley (B).



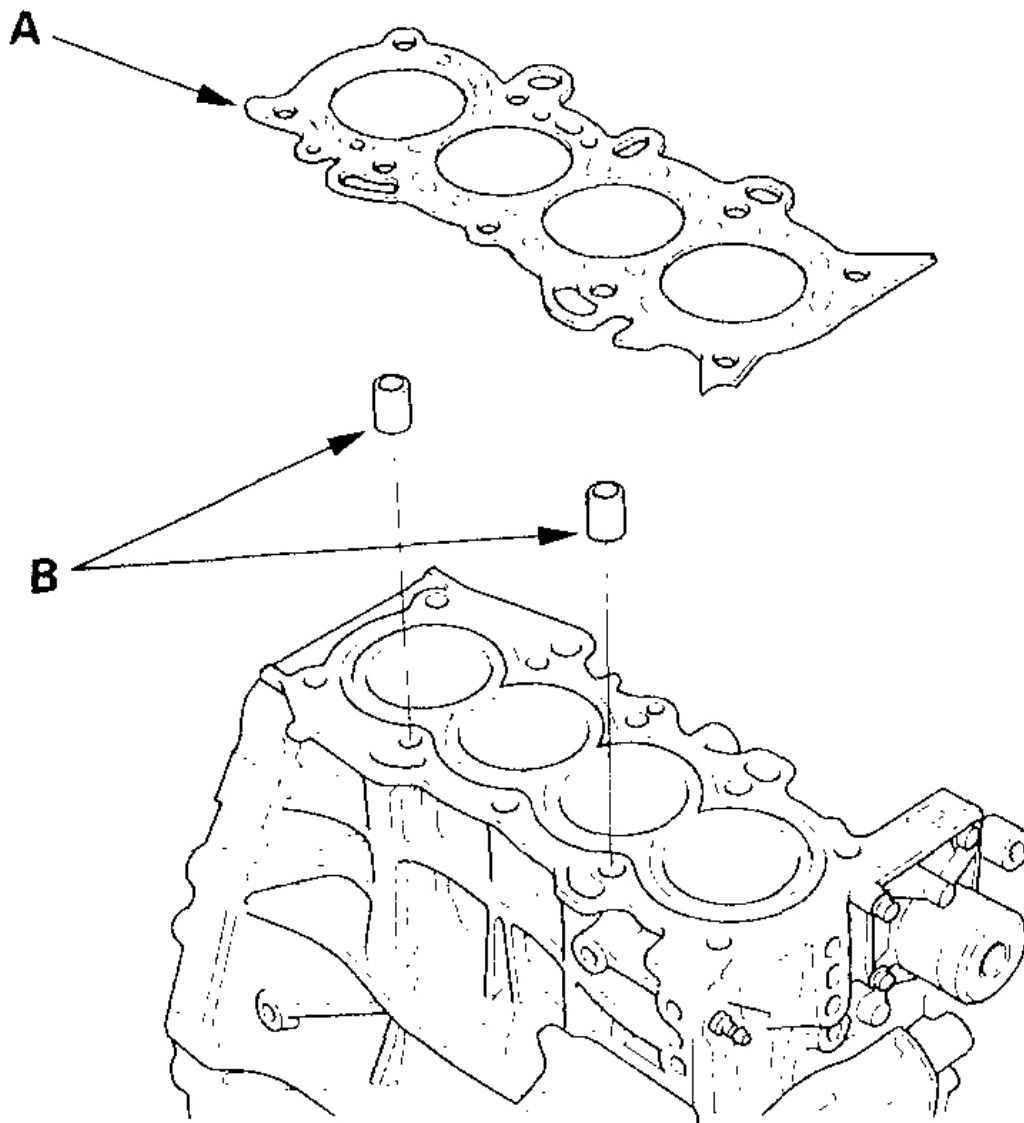
G01401629

Fig. 193: Installing Back Cover & Camshaft Pulley With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

CYLINDER HEAD INSTALLATION

Install the cylinder head in the reverse order of removal:

1. Clean the cylinder head and block surface.
2. Install the cylinder head gasket (A) and dowel pins (B) on the cylinder block. Always use a new cylinder head gasket.

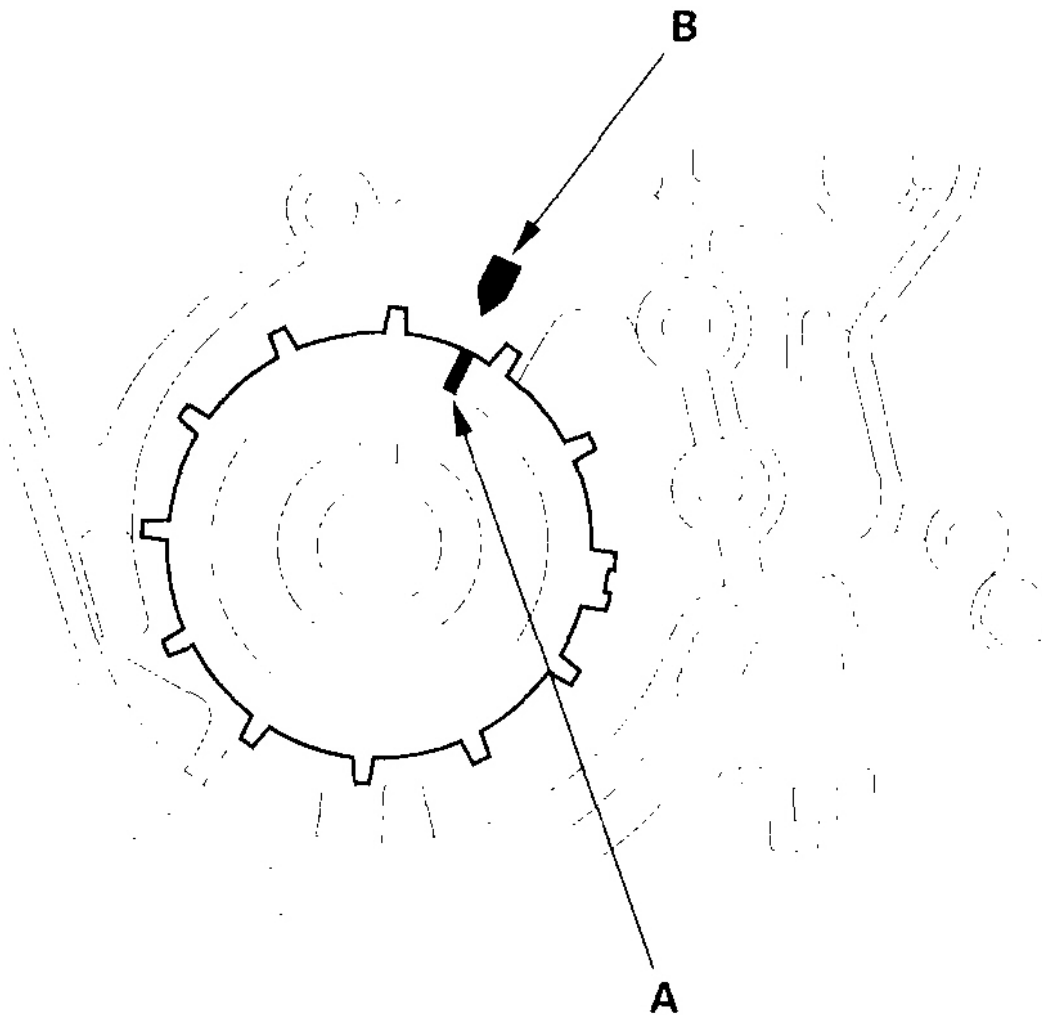


G01401630

Fig. 194: Installing Cylinder Head Gasket

Courtesy of AMERICAN HONDA MOTOR CO., INC.

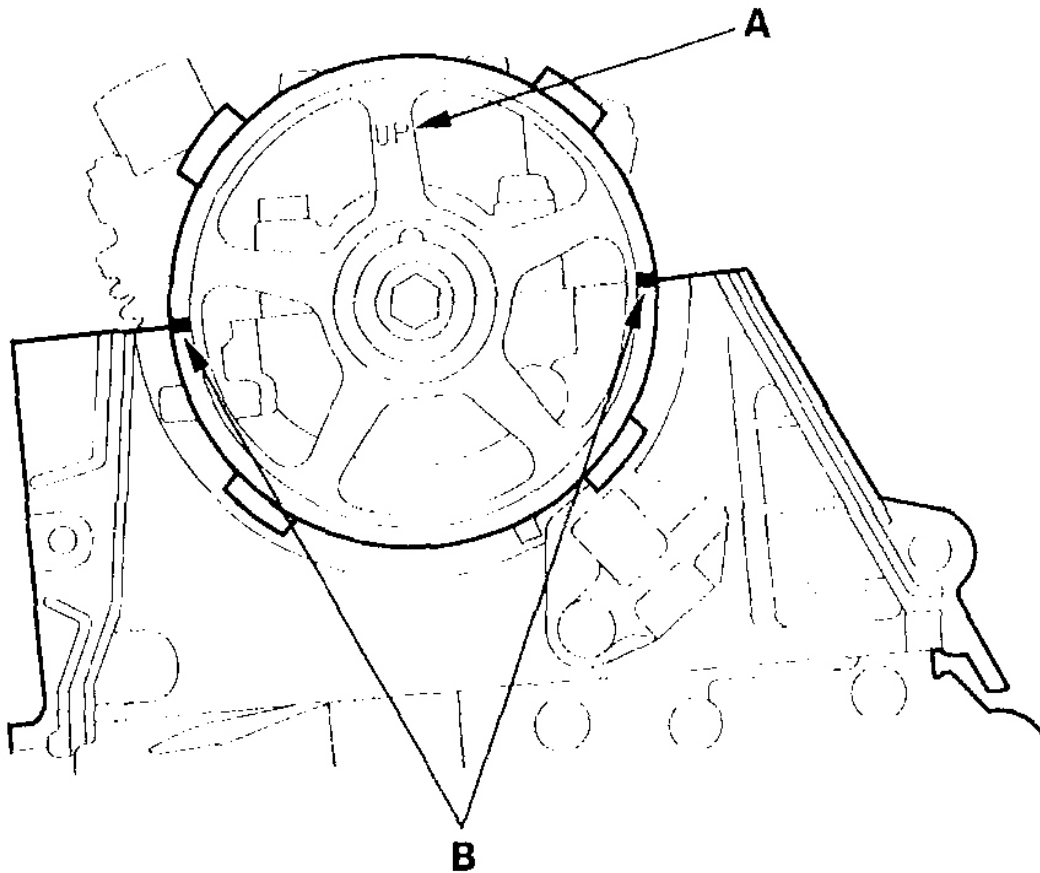
3. Set the crankshaft to top dead center (TDC). Align the TDC mark (A) on the timing belt drive pulley with the pointer (B) on the oil pump.



G01401631

Fig. 195: Aligning TDC Mark On Timing Belt Drive Pulley With Pointer
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Clean the camshaft pulley and set it to TDC.
 - 1 The "UP" mark (A) on the camshaft pulley should be at the top.
 - 2 Align the TDC marks (B) on the camshaft pulley with the top edge of the head.



G01401632

Fig. 196: Marking "UP" On Camshaft Pulley Should Be At Top
Courtesy of AMERICAN HONDA MOTOR CO., INC.

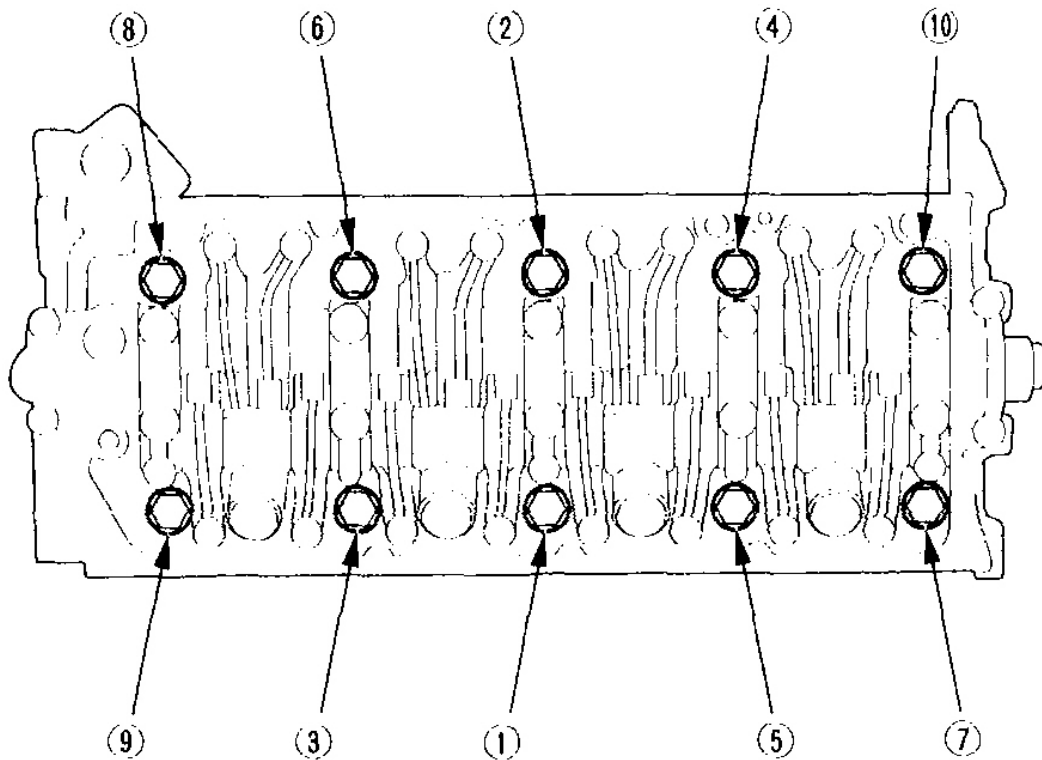
5. Install the cylinder head on the block.
6. Apply new engine oil to the bolt threads and under the bolt heads of all the cylinder head bolts.
7. Tighten the cylinder head bolts sequentially in three steps.

1st step torque: 20 N.m (2.0 kgf.m, 14 lbf.ft)

2nd step torque : 49 N.m (5.0 kgf.m, 36 lbf.ft)

3rd step torque: 67 N.m (6.8 kgf.m, 49 lbf.ft)

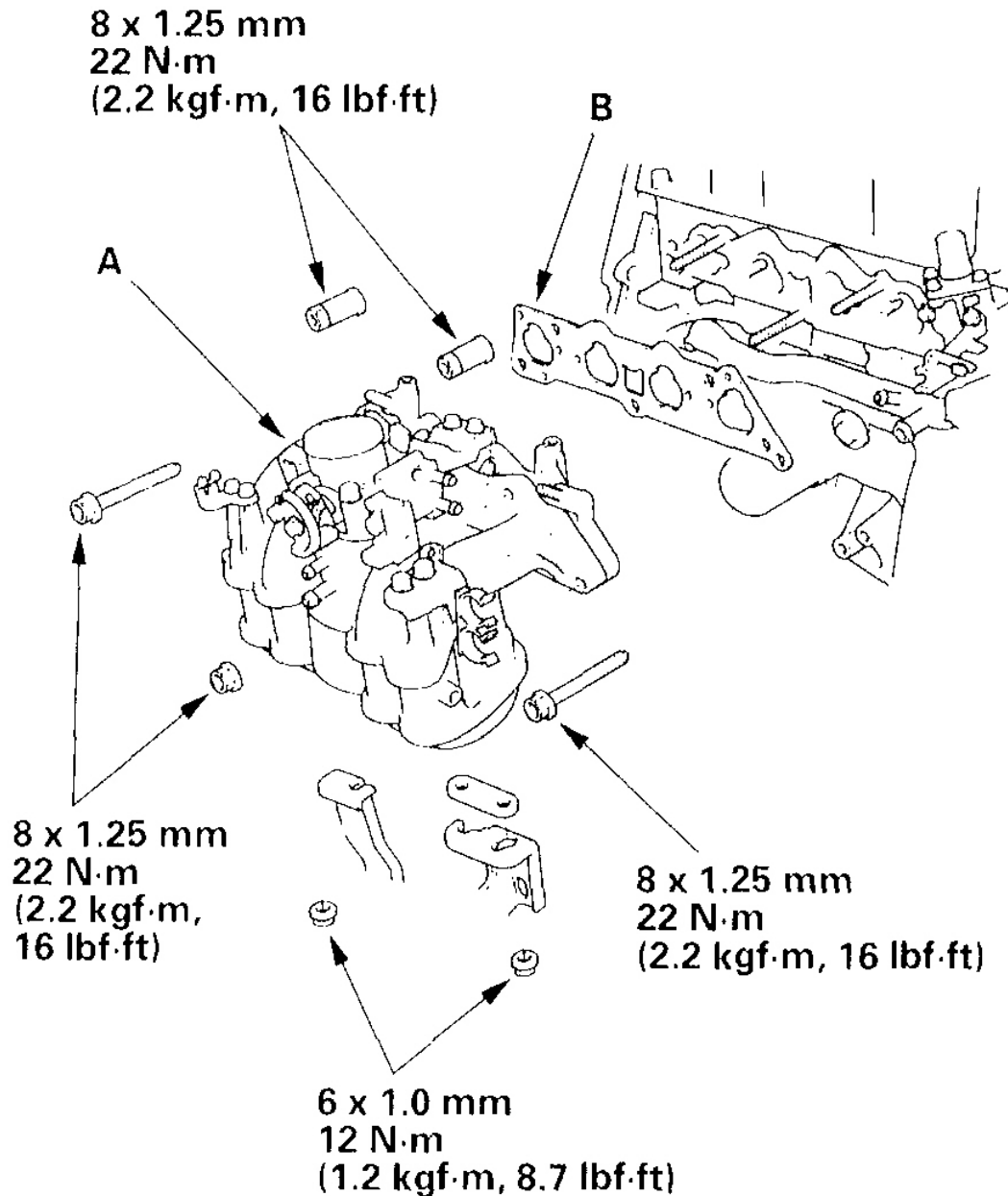
Use a beam-type torque wrench. When using a preset-type torque wrench, be sure to tighten slowly and do not overtighten. If a bolt makes any noise while you are torquing it, loosen the bolt and retighten it from the 1st step.



G01401633

Fig. 197: Cylinder Head Bolts Torque Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

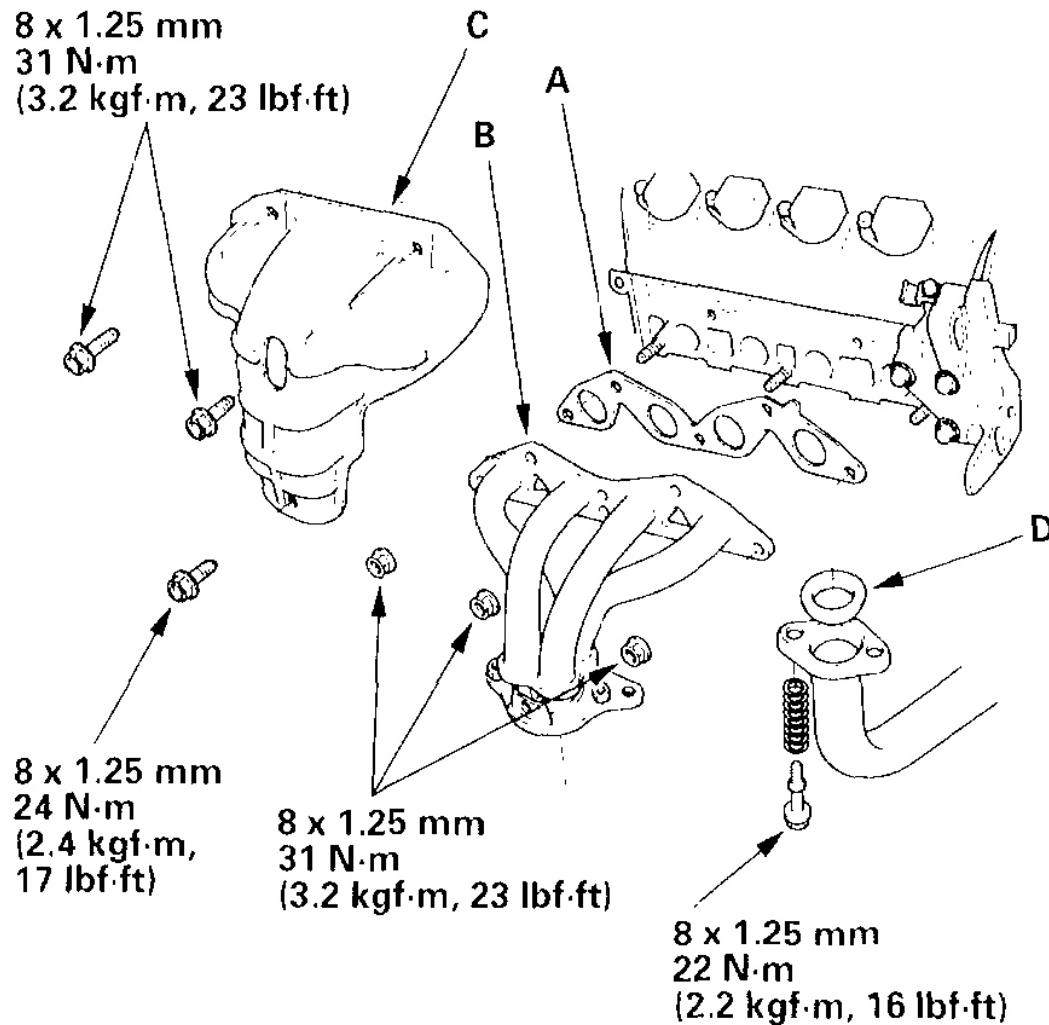
8. Install the timing belt (see **Timing Belt Installation**).
9. Adjust the valve clearance (see **Valve Clearance Adjustment**).
10. Install the cylinder head cover (see **Cylinder Head Cover Installation**).
11. Install the intake manifold (A) and tighten the bolts/nuts in a crisscross pattern in two or three steps, beginning with the inner nut. Always use a new intake manifold gasket (B).



G01401634

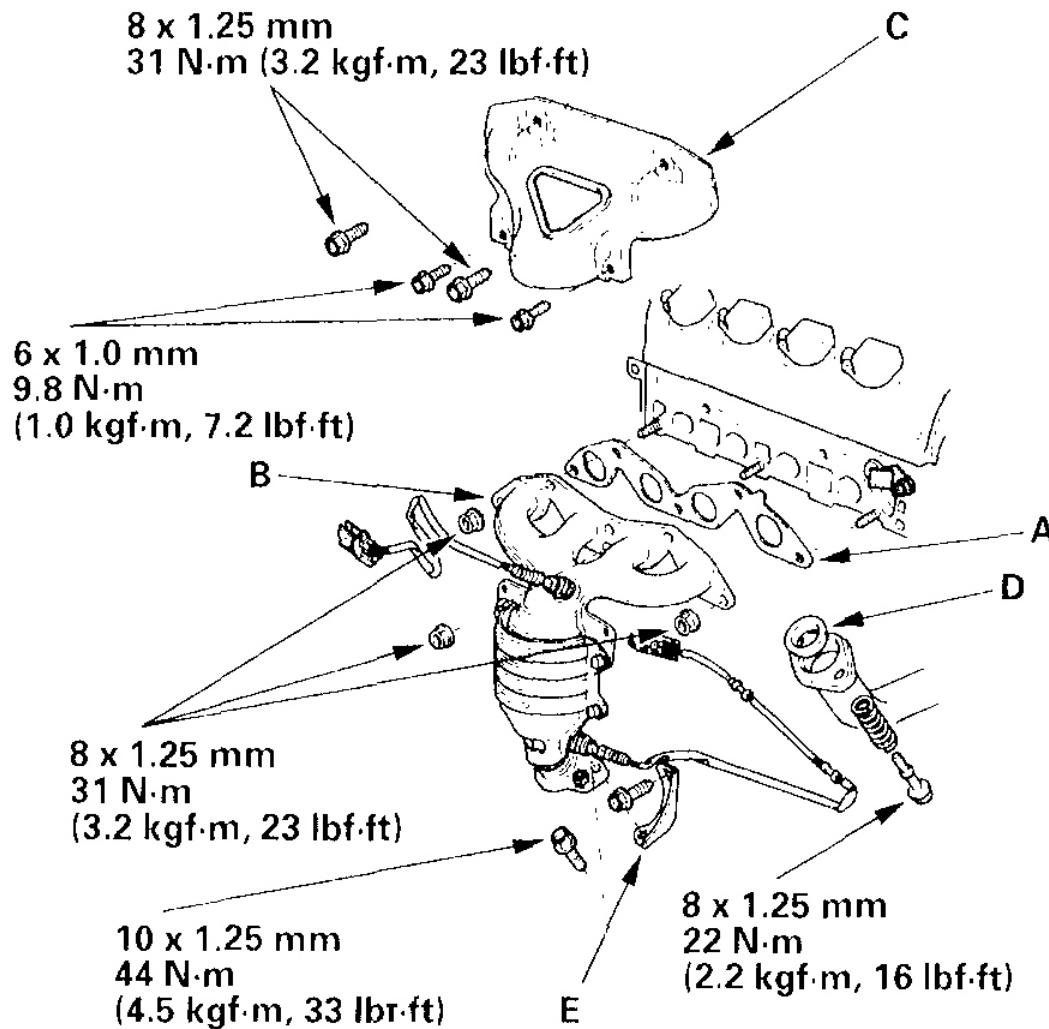
Fig. 198: Installing Intake Manifold With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Tighten the three nuts securing the intake manifold and brackets.
13. Install the new exhaust manifold gasket (A) and exhaust manifold (B). Loosely install the new nuts, then install the cover (C) and loosely install the new bolts.



G01401635

Fig. 199: Installing New Exhaust Manifold Gasket (D17A2 Engine) With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.



G01401636

Fig. 200: Installing New Exhaust Manifold Gasket (D17A1, D17A6 Engines) With Torque Specifications

Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. Tighten the bolts/nuts in a crisscross pattern in two or three steps.
15. Install the exhaust pipe with a new gasket (D).
16. D17A1,D17A6 engines: Install the exhaust manifold bracket (E).
17. Install the A/C hose bracket (A) and power steering (P/S) hose bracket (B).

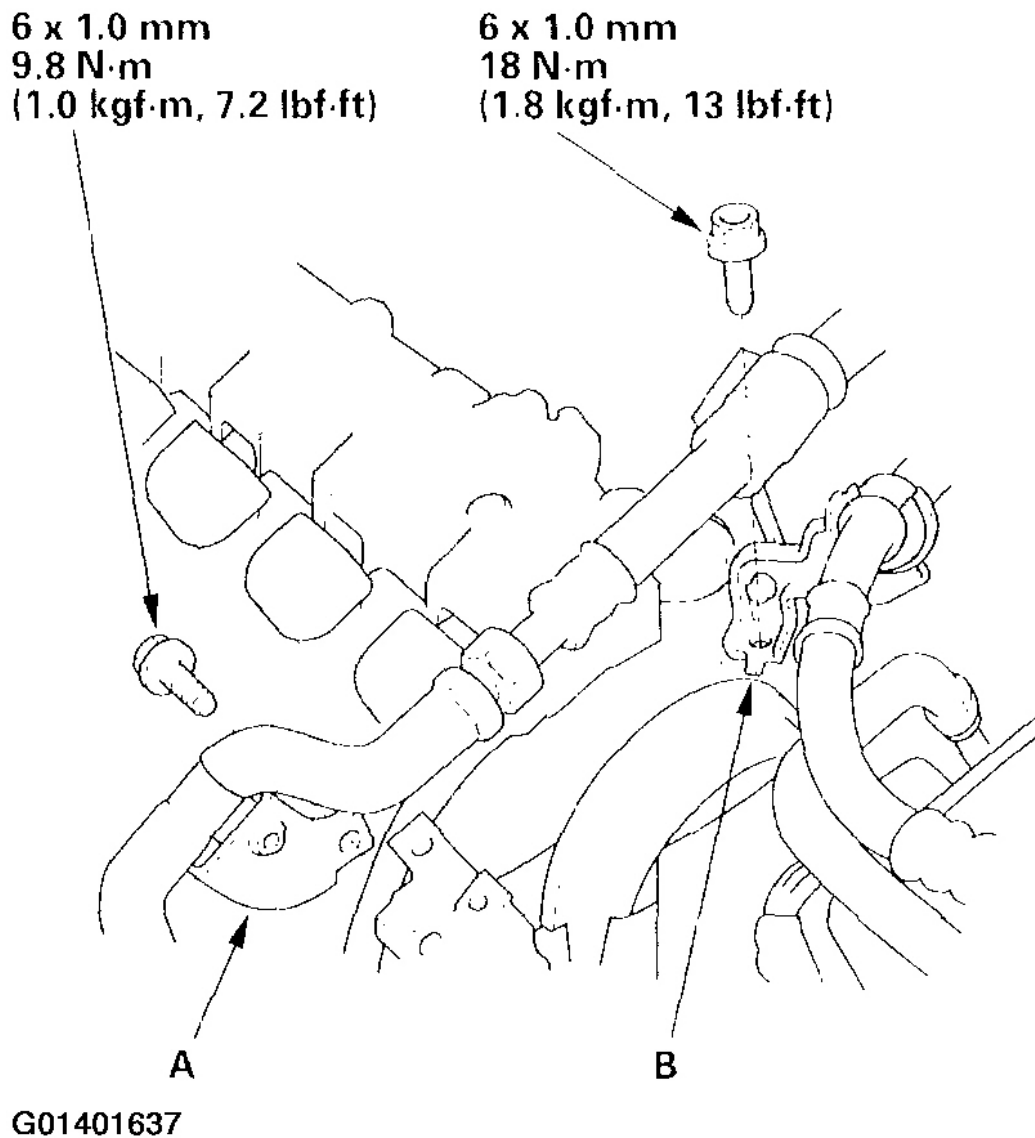
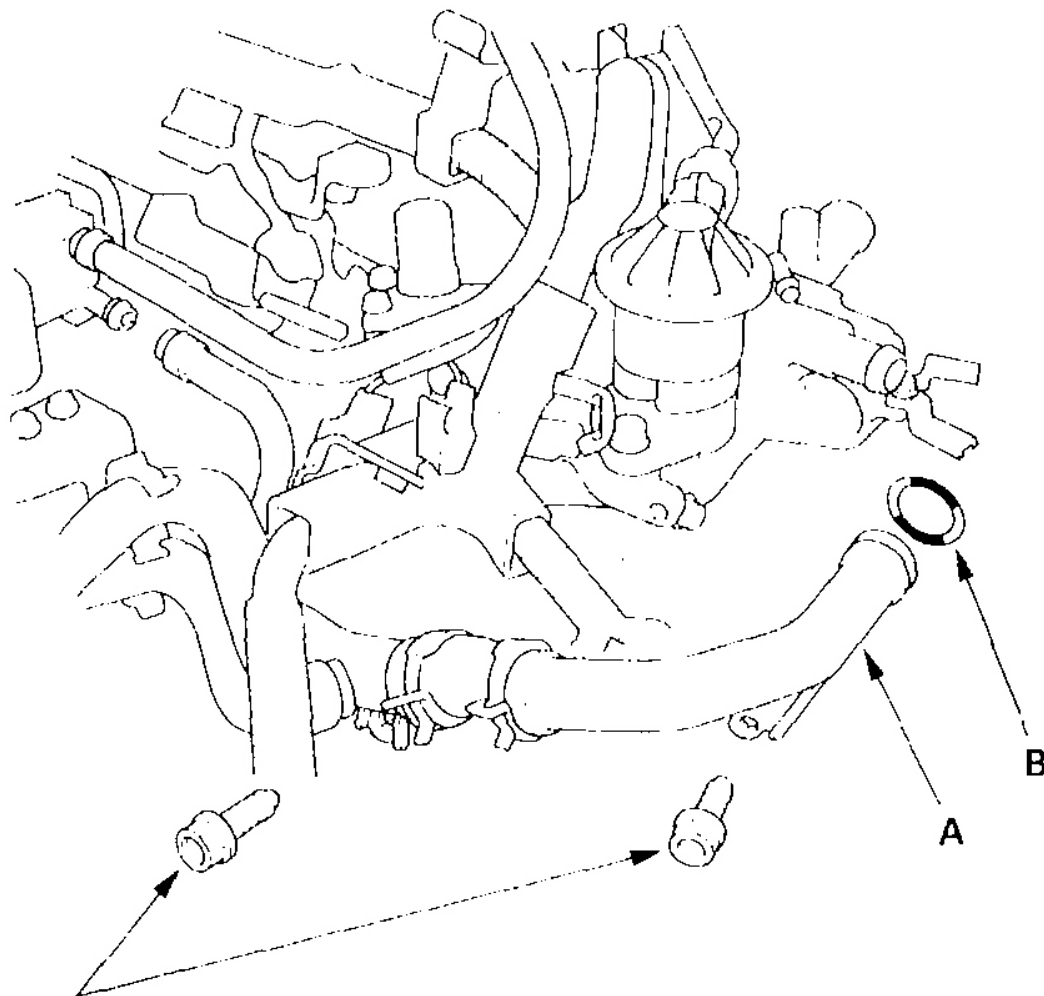


Fig. 201: Installing A/C Hose Bracket With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

18. Loosely install the alternator.
19. Adjust the alternator belt tension or the alternator-A/C compressor belt tension (see **ALTERNATOR BELT**).
20. Loosely install the P/S pump belt and pump.
21. Adjust the P/S pump belt (see **PUMP BELT INSPECTION AND ADJUSTMENT**).
22. Install the connecting pipe (A) with a new O-ring (B).

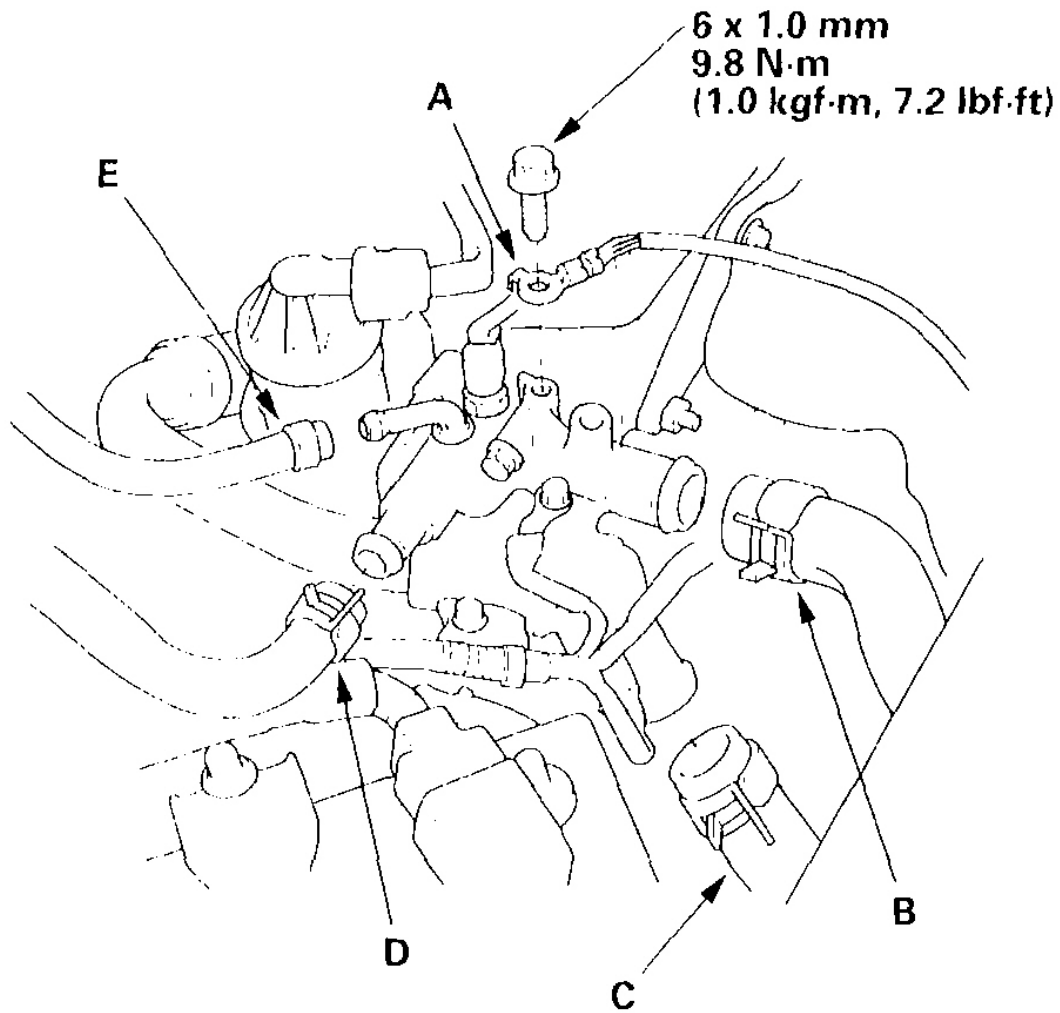


6 x 1.0 mm
12 N·m
(1.2 kgf·m, 8.7 lbf·ft)

G01401638

Fig. 202: Installing Connecting Pipe With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

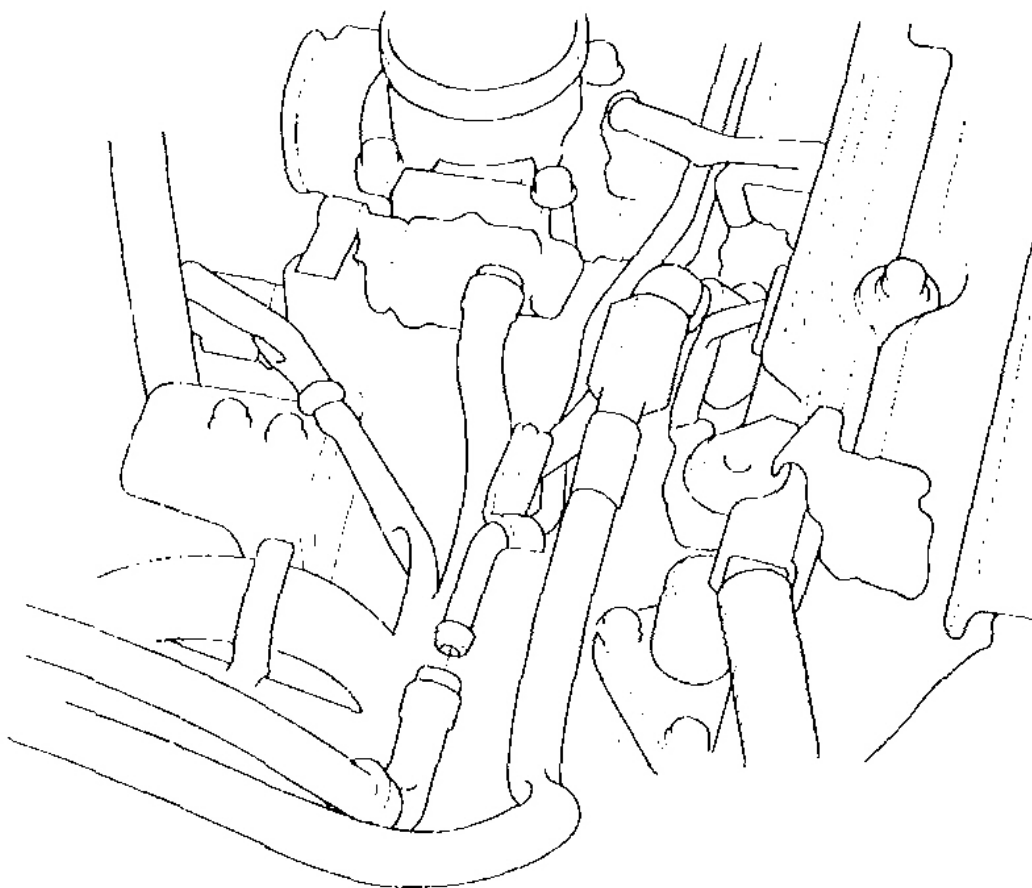
23. Install the ground cable (A), upper radiator hose (B), lower radiator hose (C), heater hose (D) and water bypass hose (E).



G01401639

Fig. 203: Installing Ground Cable With Torque Specifications
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

24. Install the evaporative emission (EVAP) canister hose.



G01401640

Fig. 204: Installing EVAP Canister Hose

Courtesy of AMERICAN HONDA MOTOR CO., INC.

25. Install the brake booster vacuum hose (A) and positive crankcase ventilation (PCV) hose (B).

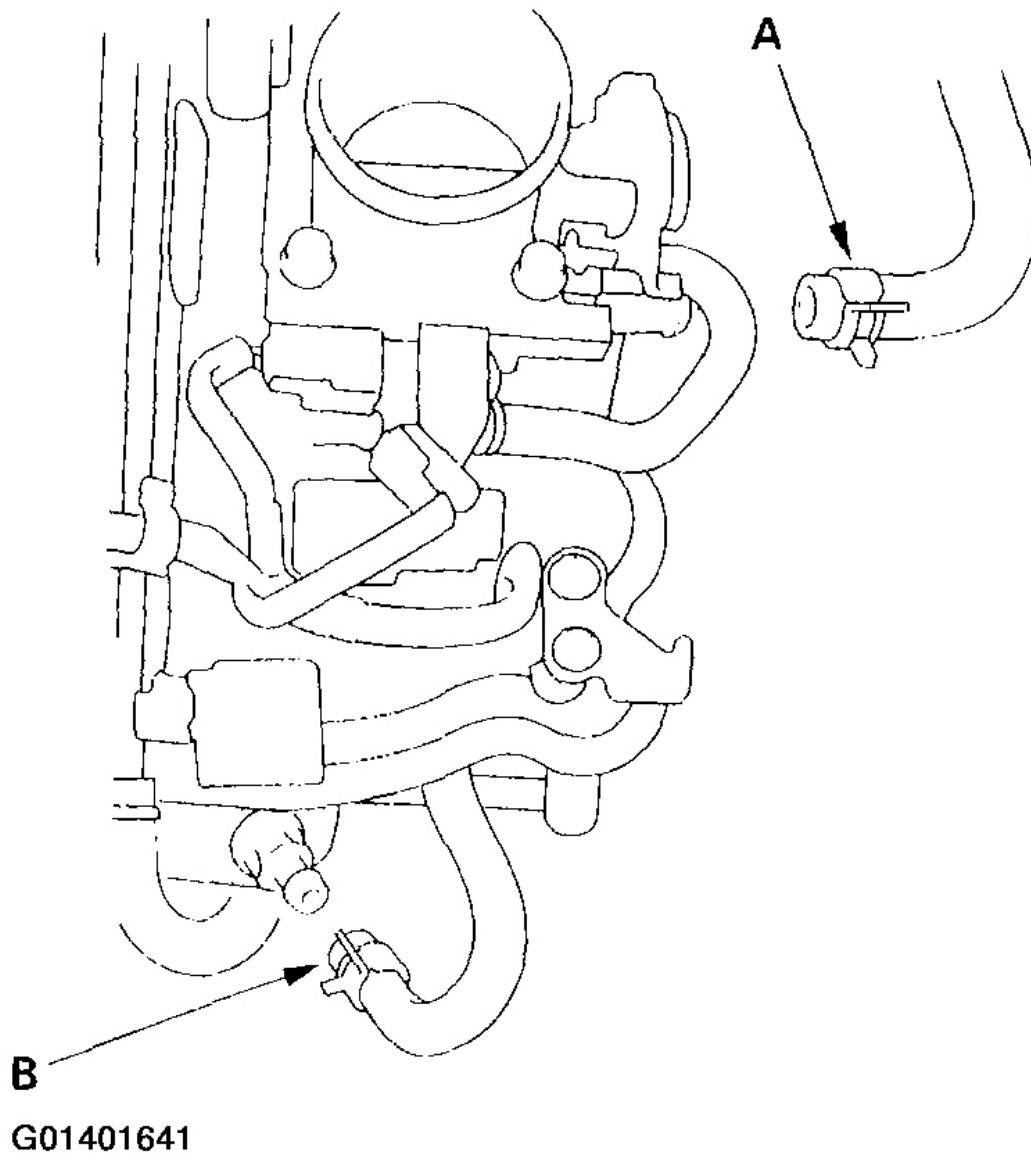
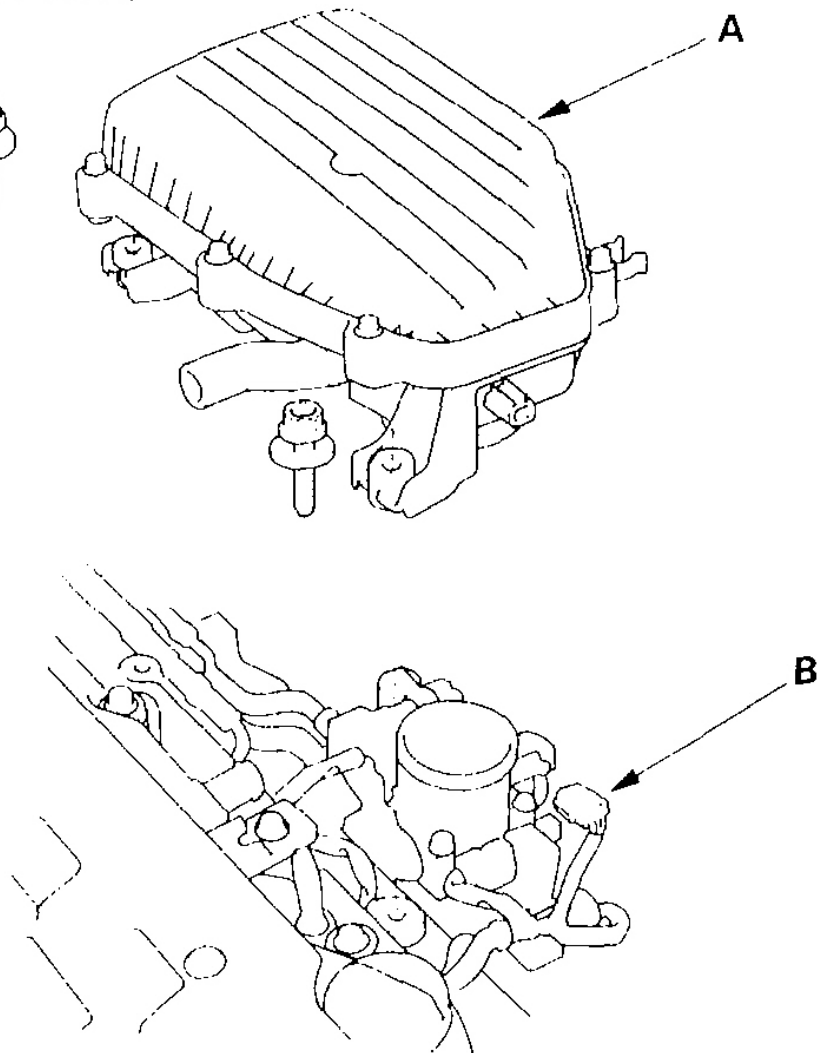


Fig. 205: Installing Brake Booster Vacuum Hose
Courtesy of AMERICAN HONDA MOTOR CO., INC.

26. Install the air cleaner housing (A), then connect the intake air temperature (IAT) sensor connector (B) and breather hose.

6 x 1.0 mm
12 N·m
(1.2 kgf·m, 8.7 lbf·ft)

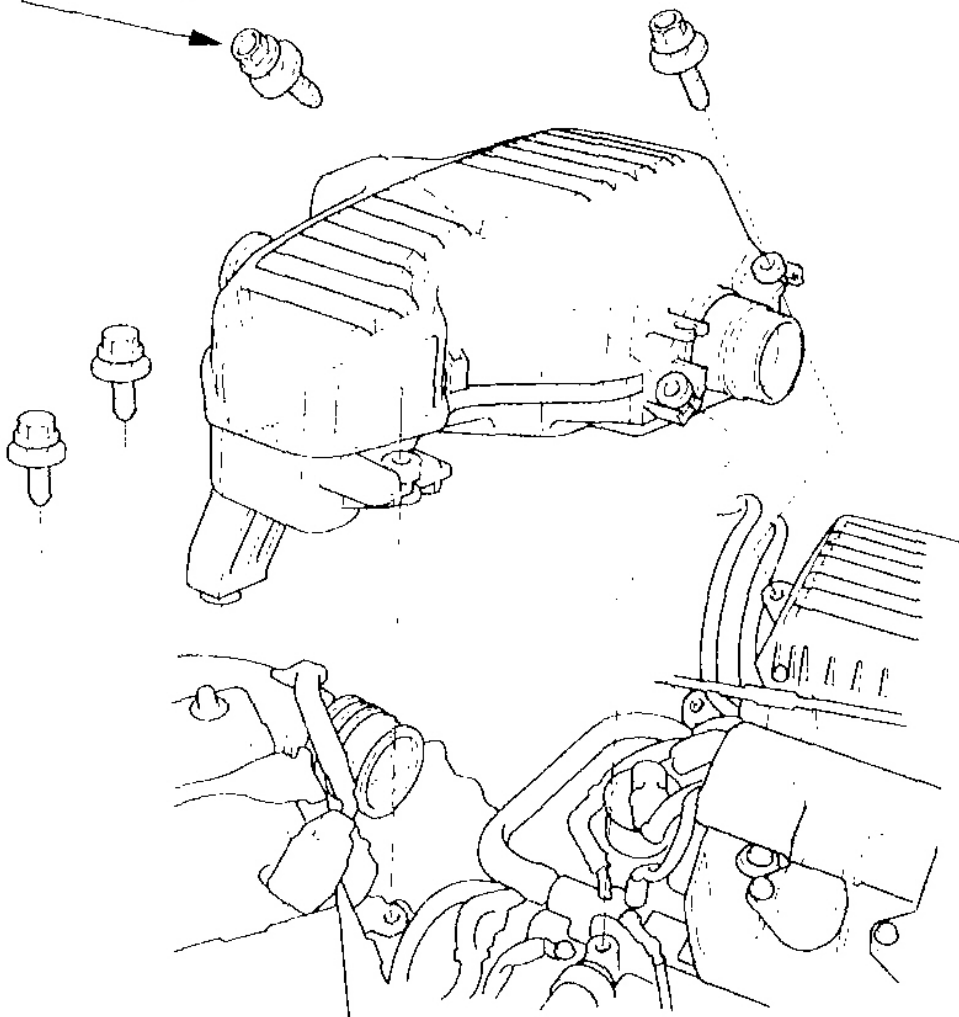


G01401642

Fig. 206: Installing Air Cleaner Housing
Courtesy of AMERICAN HONDA MOTOR CO., INC.

27. Install the intake resonator.

6 x 1.0 mm
12 N·m (1.2 kgf·m, 8.7 lbf·ft)



G01401643

Fig. 207: Installing Intake Resonator

Courtesy of AMERICAN HONDA MOTOR CO., INC.

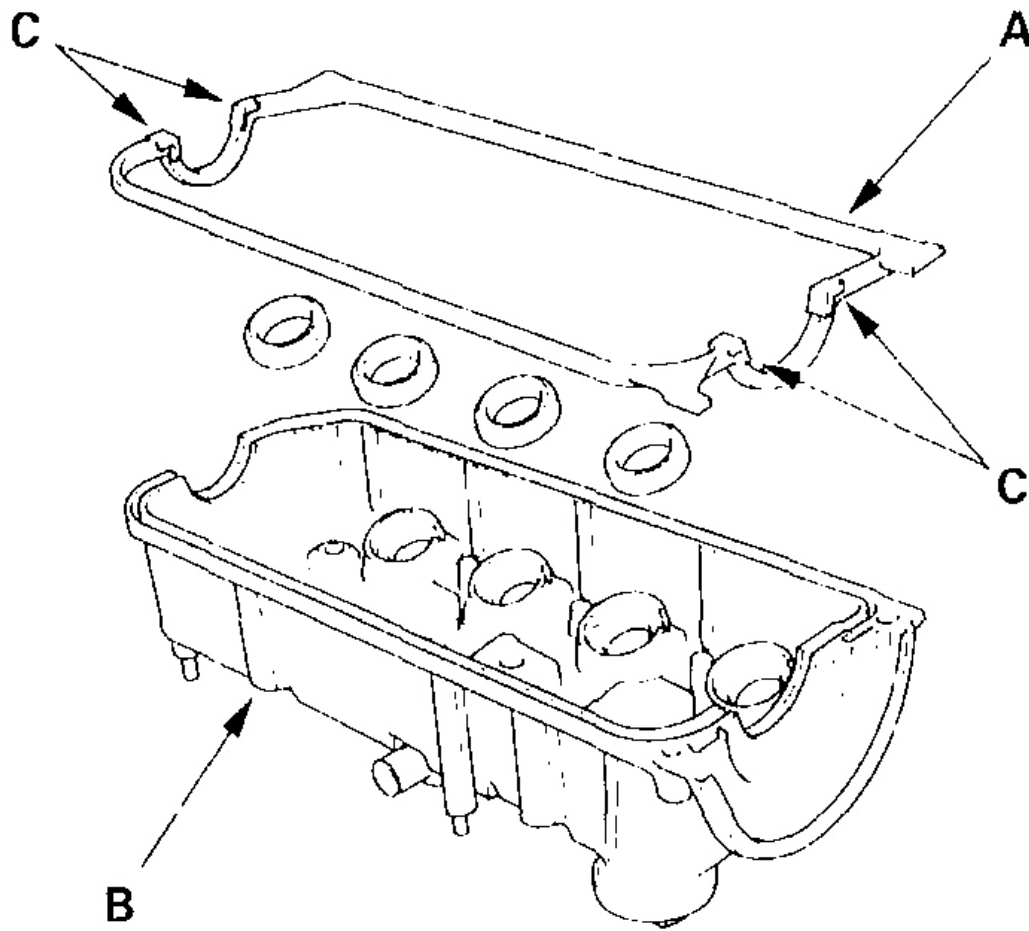
28. Install the cruise control actuator cable (see), then adjust it (see **CRUISE CONTROL ACTUATOR CABLE ADJUSTMENT**).
29. Install the throttle cable (see **THROTTLE CABLE REMOVAL/INSTALLATION**), then adjust it (see **THROTTLE CABLE ADJUSTMENT**).
30. After installation, check that all tubes, hoses and connectors are installed correctly.
31. Clean the battery posts and cable terminals with sandpaper, then assemble them and apply grease to

prevent corrosion.

32. Inspect for fuel leaks. Turn ON (II) the ignition switch (do not operate the starter) so that the fuel pump runs for about 2 seconds and pressurizes the fuel line. Repeat this operation two or three times, then check for fuel leakage at any point in the fuel line.
33. Perform the engine control module (ECM)/powertrain control module (PCM) idle learn procedure (see).
34. Refill the radiator with engine coolant, and bleed air from the cooling system with the heater valve open (see step 10 on **COOLANT REPLACEMENT**).
35. Enter the anti-theft code for the radio, then enter the customer's radio station presets.
36. Set the clock.

CYLINDER HEAD COVER INSTALLATION

1. Thoroughly clean the head cover gasket and the groove.
2. Install the head cover gasket (A) in the groove of the cylinder head cover (B). Seat the head cover gasket in the recesses for the camshaft first, then work it into the groove around the outside edges. Make sure the head cover gasket is seated securely in the corners of the recesses (C) with no gap.



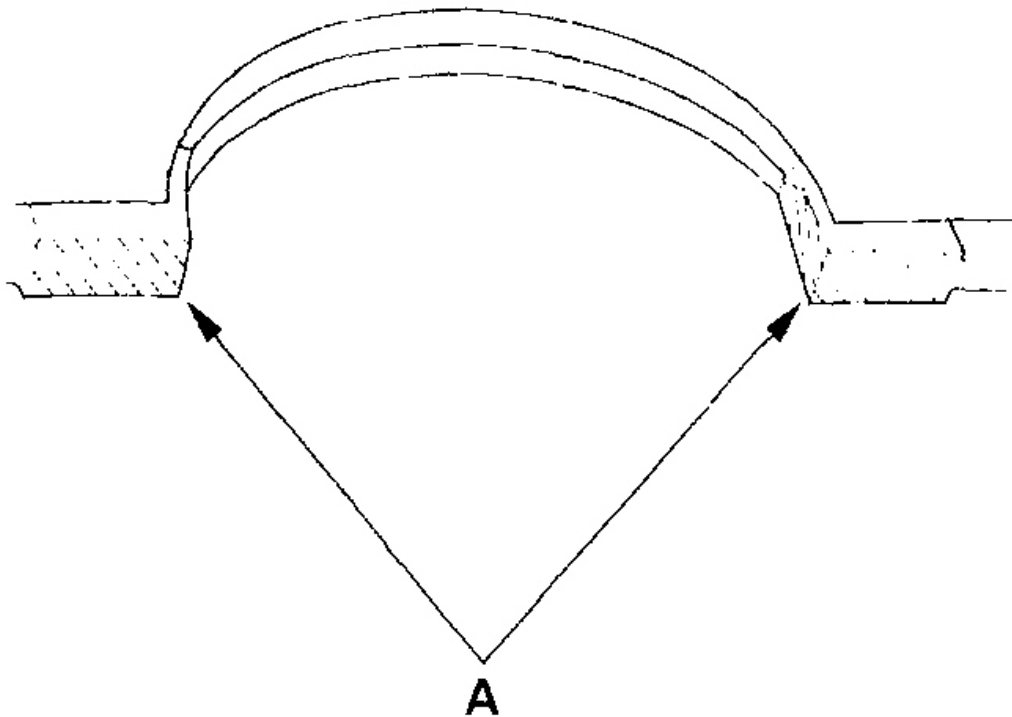
G01401644

Fig. 208: Installing Head Cover Gasket

Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Check that the mating surfaces are clean and dry.
4. Apply liquid gasket, P/N 08718-0001 or 08718-0003, to the head cover gasket at the four corners of the recesses (A).

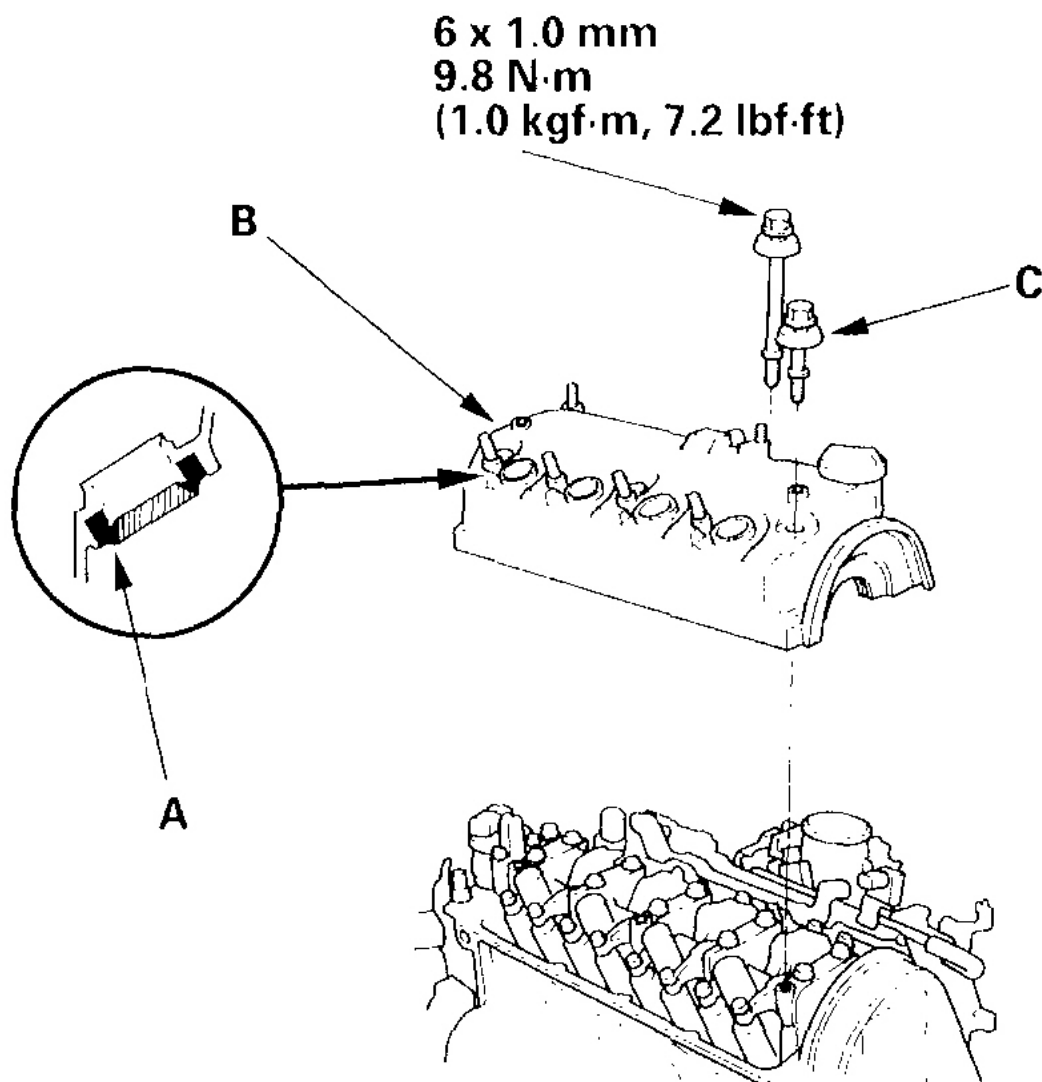
NOTE: Do not install the parts if 4 minutes or more have elapsed since applying liquid gasket. Instead, reapply liquid gasket after removing the old residue.



G01401645

Fig. 209: Applying Liquid Gasket to Head Cover Gasket
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Hold the head cover gasket in the groove by placing your fingers on the camshaft holder contacting surfaces (top of the semicircles). Set the spark plug seal (A) on the spark plug tubes. Once the cylinder head cover (B) is on the cylinder head, slide the cover slightly back and forth to seat the head cover gasket.



G01401646

Fig. 210: Setting Spark Plug Seal On Spark Plug Tubes With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Inspect the cover washers (C). Replace any washer that is damaged or deteriorated.
7. Tighten the bolts in two or three steps. In the final step, tighten all bolts, in sequence, to 9.8 N.m (1.0 kgf.m, 7.2 lbf.ft).

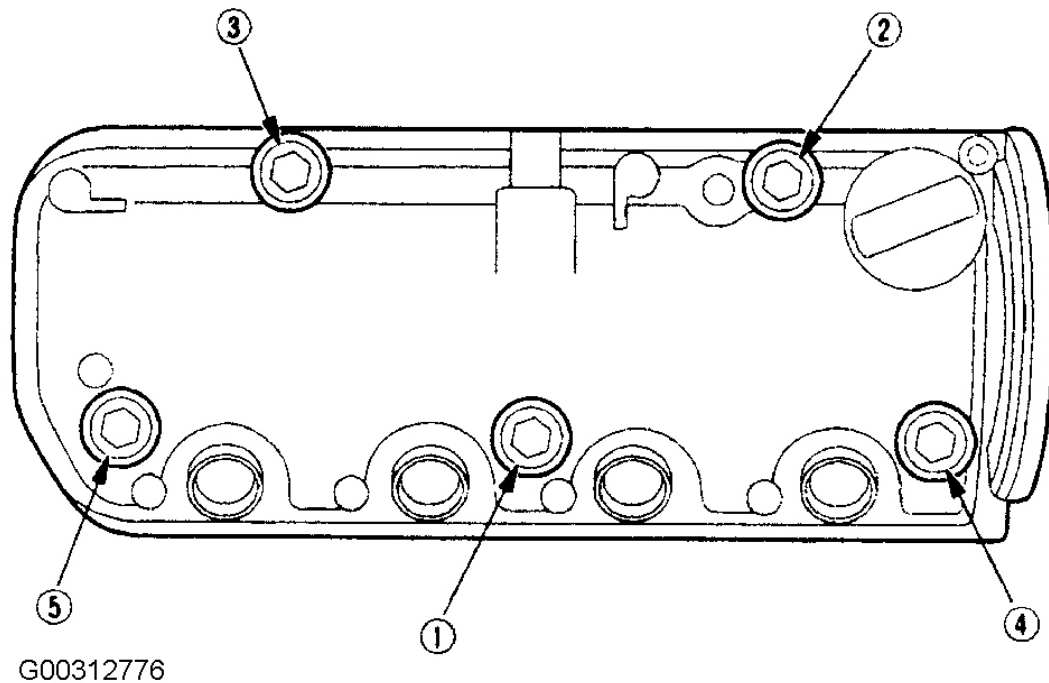
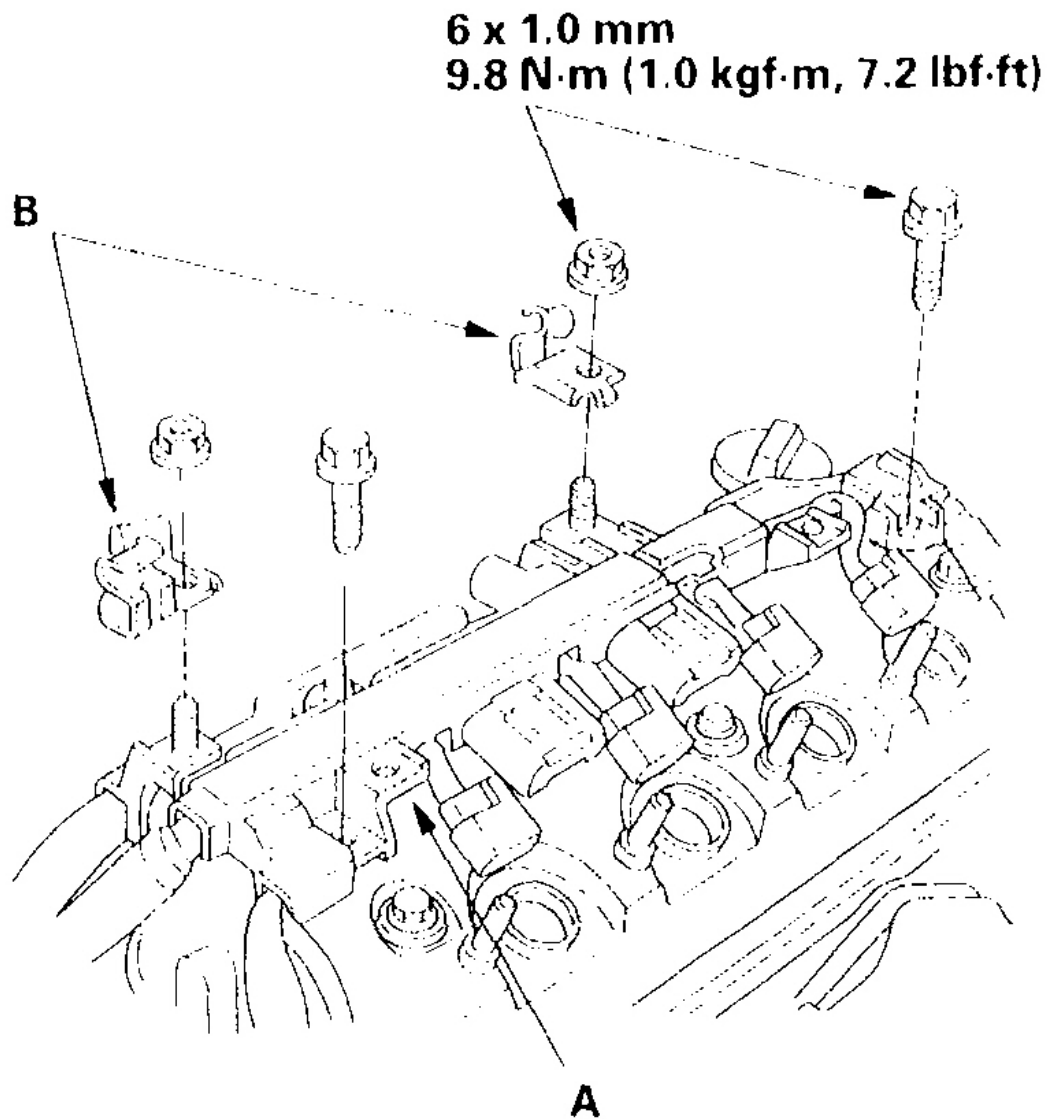


Fig. 211: Tightening Bolts In Two Or Three Steps With Torque Specifications
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Install the harness holder (A) and throttle cable clamps (B).



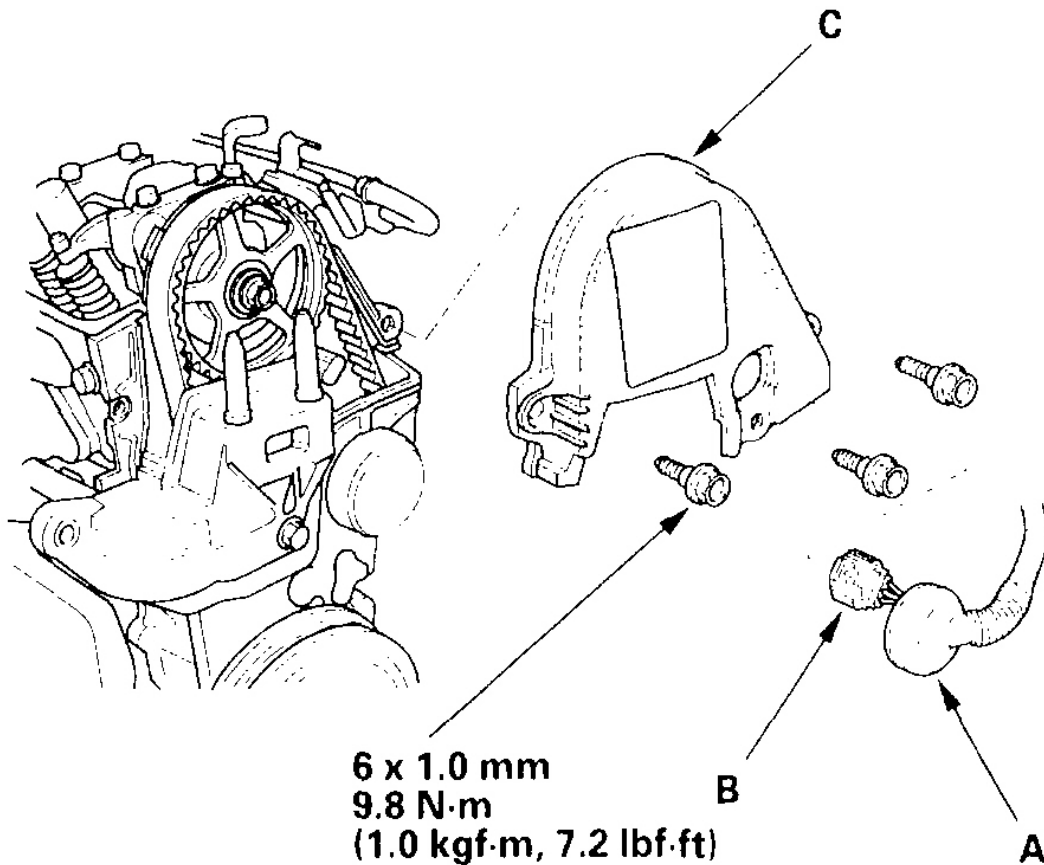
G01401648

Fig. 212: Installing Harness Holder With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Install the ignition coils (see **IGNITION COIL REMOVAL/INSTALLATION**).
10. Check that all tubes, hoses and connectors are installed correctly.
11. After assembly, wait at least 30 minutes before filling the engine with oil.

CMP (TDC) SENSOR REPLACEMENT

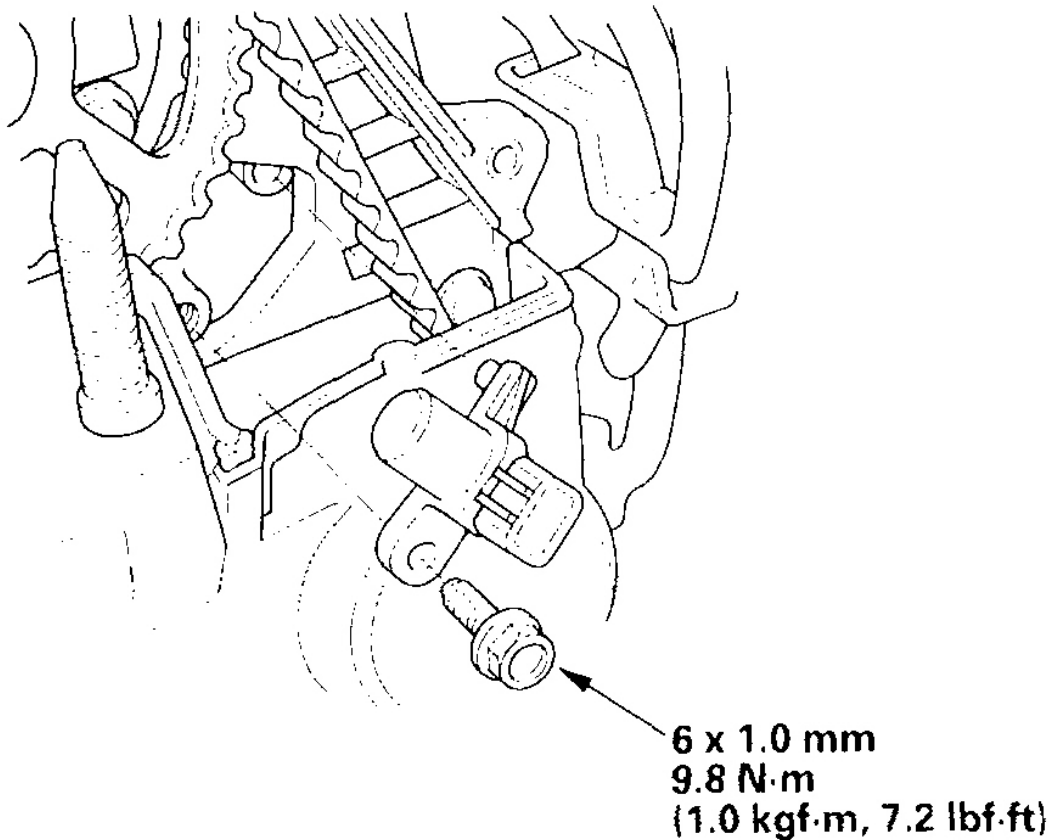
1. Remove the grommet (A) from the upper cover, and disconnect the camshaft position (CMP) (top dead center (TDC)) sensor connector (B).



G01401649

Fig. 213: Removing Grommet From Upper Cover With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Remove the upper cover (C).
3. Remove the CMP (TDC) sensor from the cylinder head.



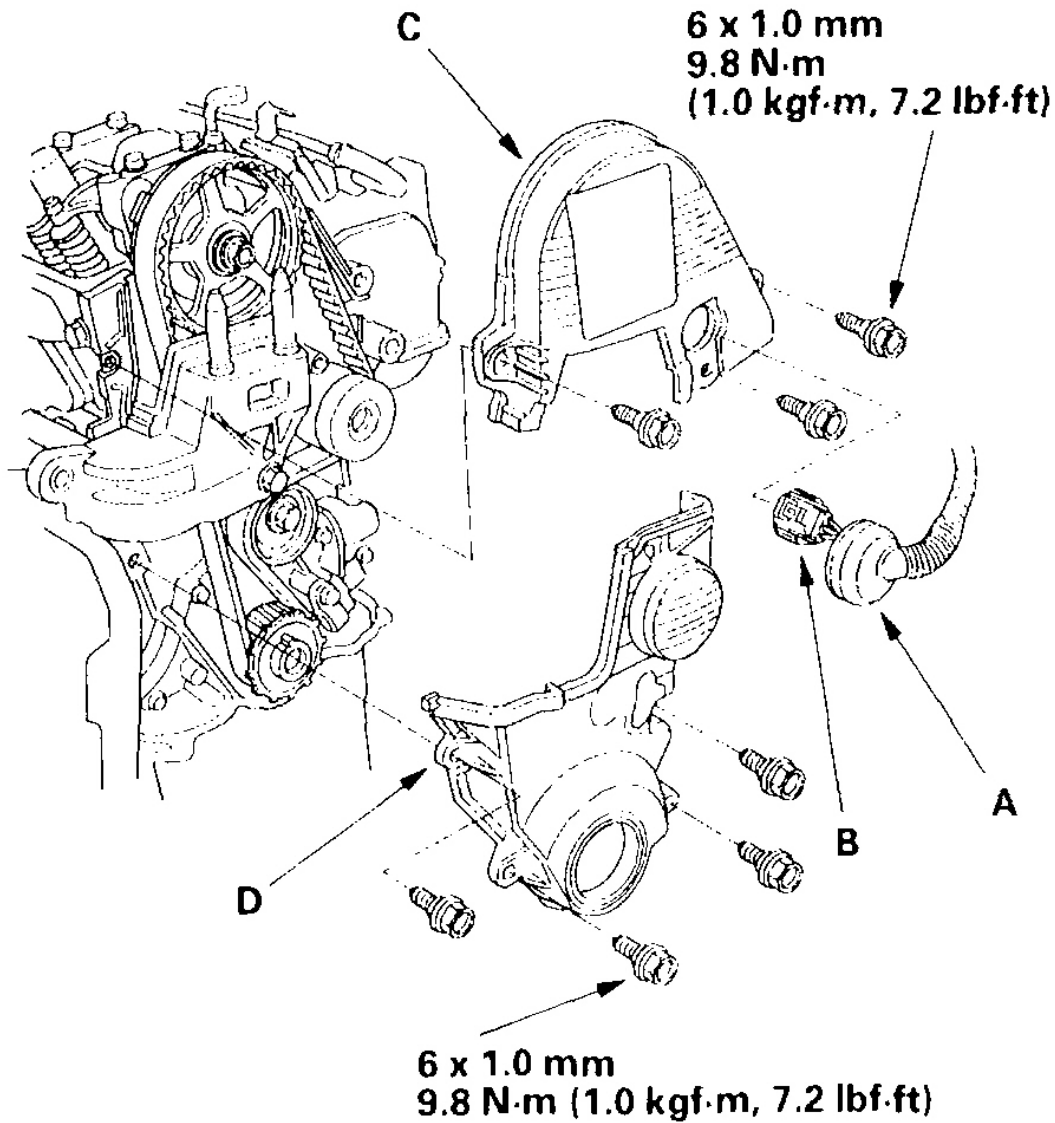
G01401650

Fig. 214: Removing CMP (TDC) Sensor From Cylinder Head With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Install the CMP (TDC) sensor in reverse order of removal.

CKP SENSOR REPLACEMENT

1. Remove the grommet (A) from the upper cover, and disconnect the camshaft position (CMP) (top dead center (TDC)) sensor connector (B).



G01401651

Fig. 215: Removing Grommet From Upper Cover With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Remove the upper cover (C) and lower cover (D).
3. Disconnect the crankshaft position (CKP) sensor connector, then remove the CKP sensor from the oil pump.

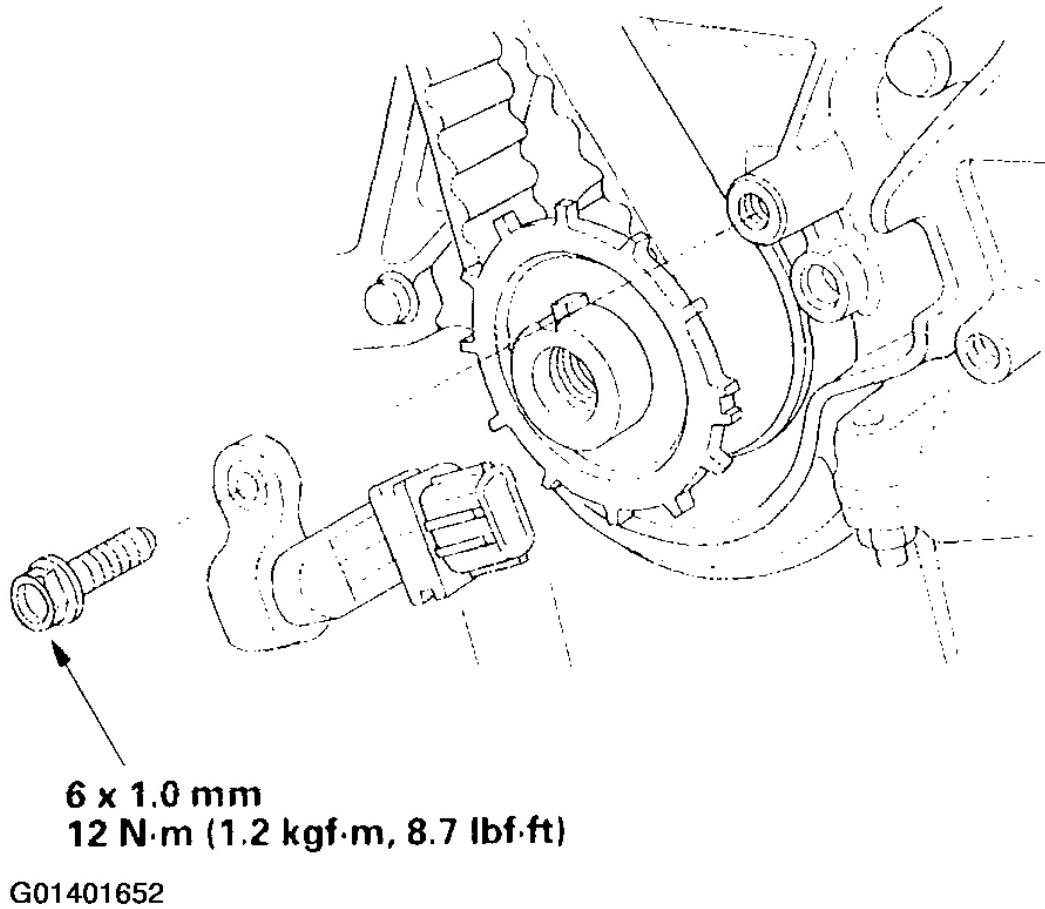


Fig. 216: Disconnecting CKP Sensor Connector With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Install the CKP sensor in reverse order of removal.

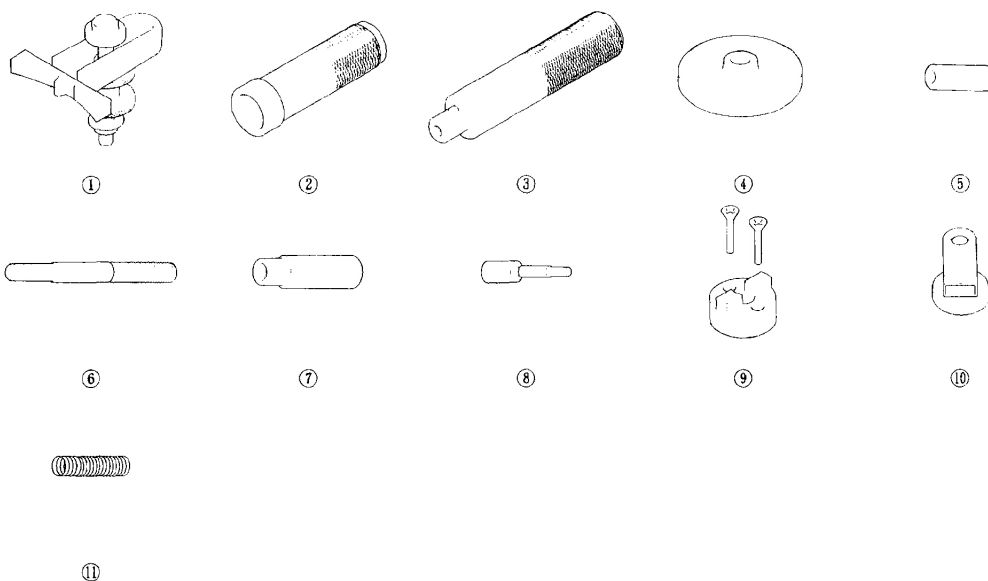
ENGINE BLOCK

SPECIAL TOOLS

2001 Honda Civic EX

2001-05 ENGINE Overhaul - 1.7L

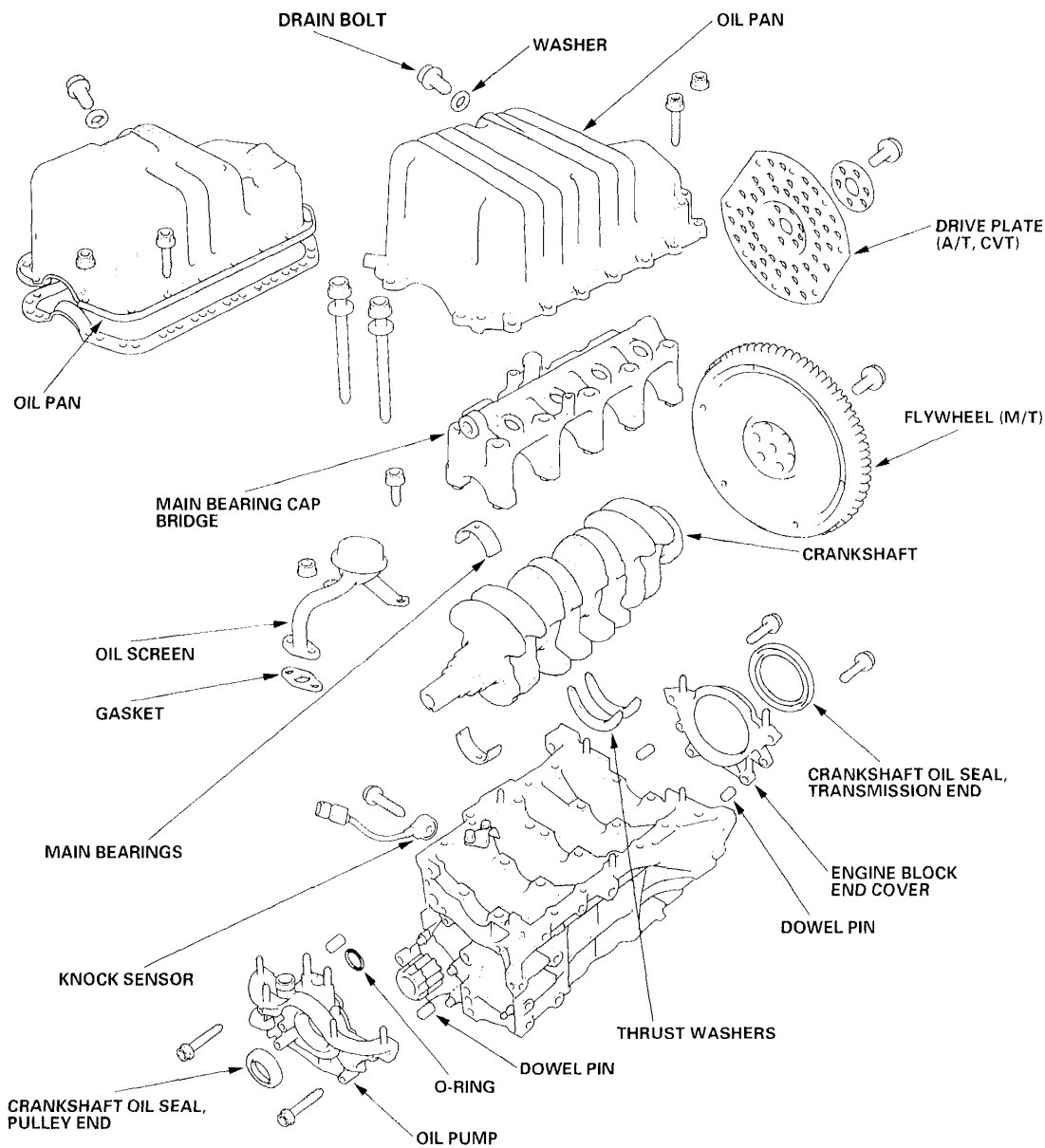
Ref. No.	Tool Number	Description	Qty
①	07LAB-PV00100	Ring Gear Holder	1
②	07746-0030100	Inner Driver Handle	1
③	07749-0010000	Handle Driver	1
④	07948-SB00101 or 07VAD-P8A010A	Driver Attachment, 96 mm	1
⑤	07973-PE00200	Pilot Collar	1
⑥	07973-PE00310	Piston Pin Driver Shaft	1
⑦	07973-PE00320	Piston Pin Driver Head	1
⑧	07973-PE00400	Piston Pin Base Insert	1
⑨	07973-SB00100 or 07TGF-001000A	Piston Base Head	1
⑩	07973-6570500	Piston Base	1
⑪	07973-6570600	Piston Base Spring	1



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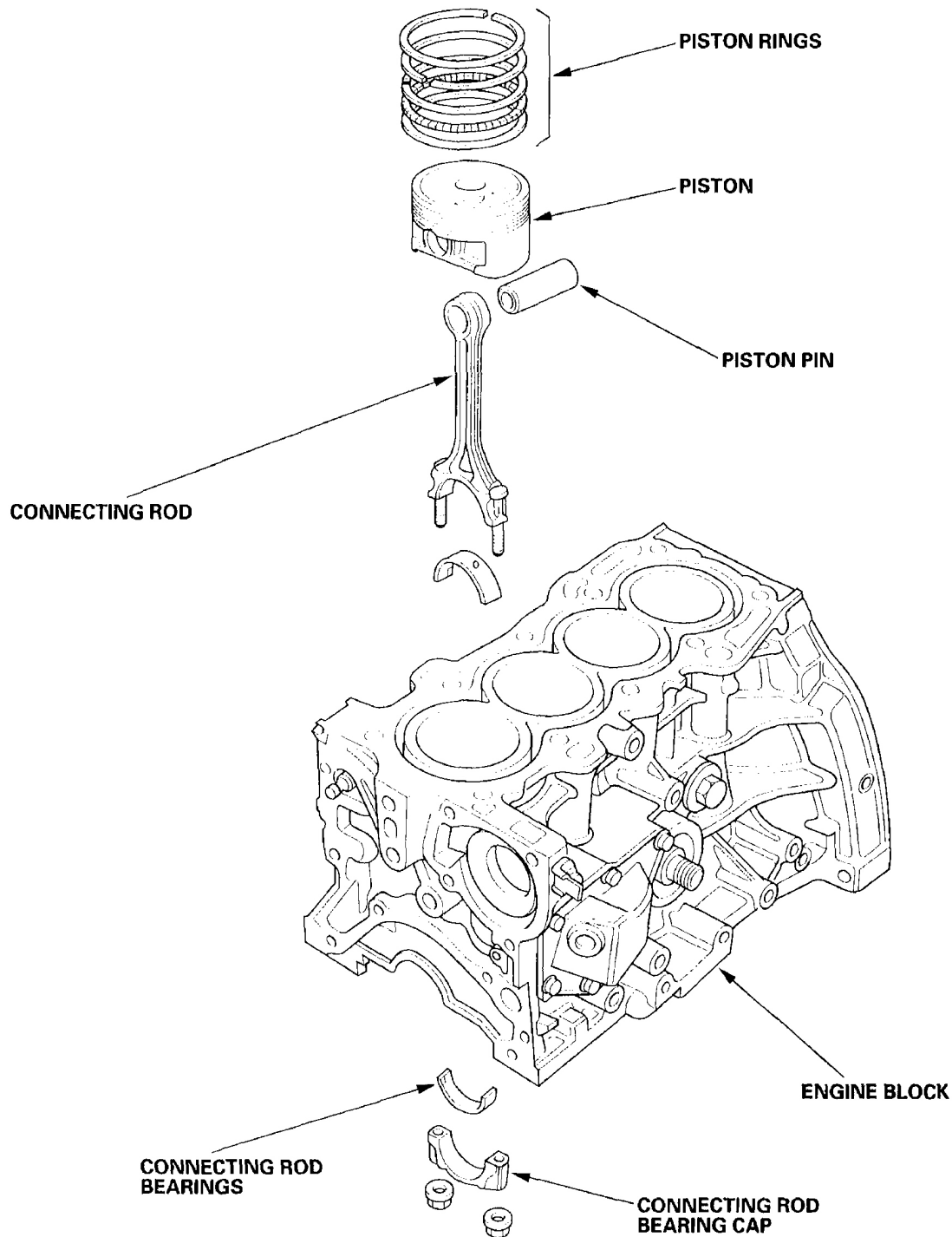
Fig. 217: Engine Block Special Tools
Courtesy of AMERICAN HONDA MOTOR CO., INC.

COMPONENT LOCATION INDEX



G01397475

Fig. 218: Exploded View Of Engine Block Components (1 Of 2)
 Courtesy of AMERICAN HONDA MOTOR CO., INC.



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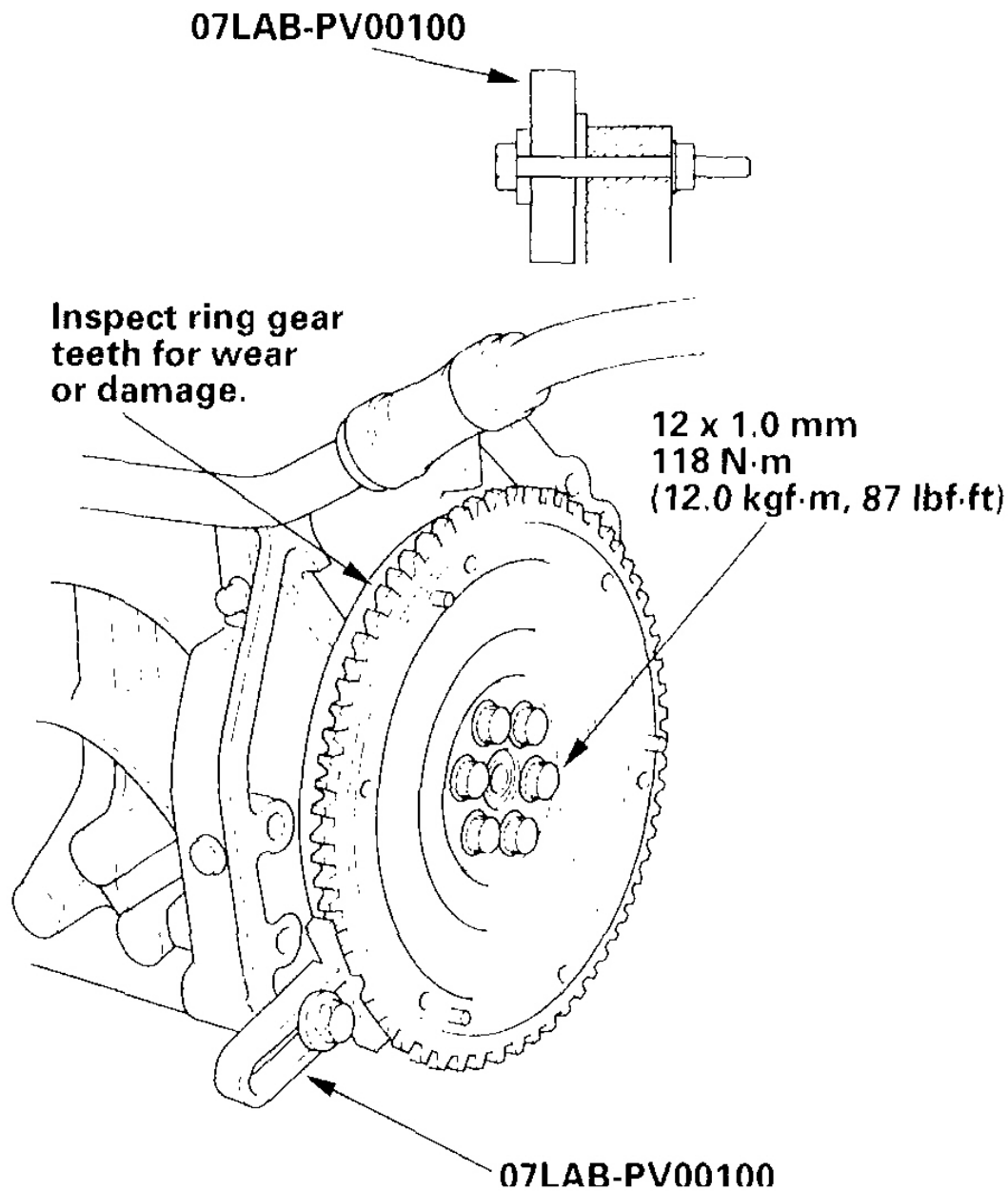
Fig. 219: Exploded View Of Engine Block Components (2 Of 2)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

FLYWHEEL REMOVAL AND INSTALLATION

Special Tools Required

Ring gear holder 07LAB-PV00100

1. Remove the transmission (see **REMOVAL & INSTALLATION**).
2. Remove the pressure plate and clutch disk (see **CLUTCH REPLACEMENT**).
3. Remove the six flywheel bolts, then separate the flywheel from the crankshaft flange. After installation, tighten the bolts in a crisscross pattern.



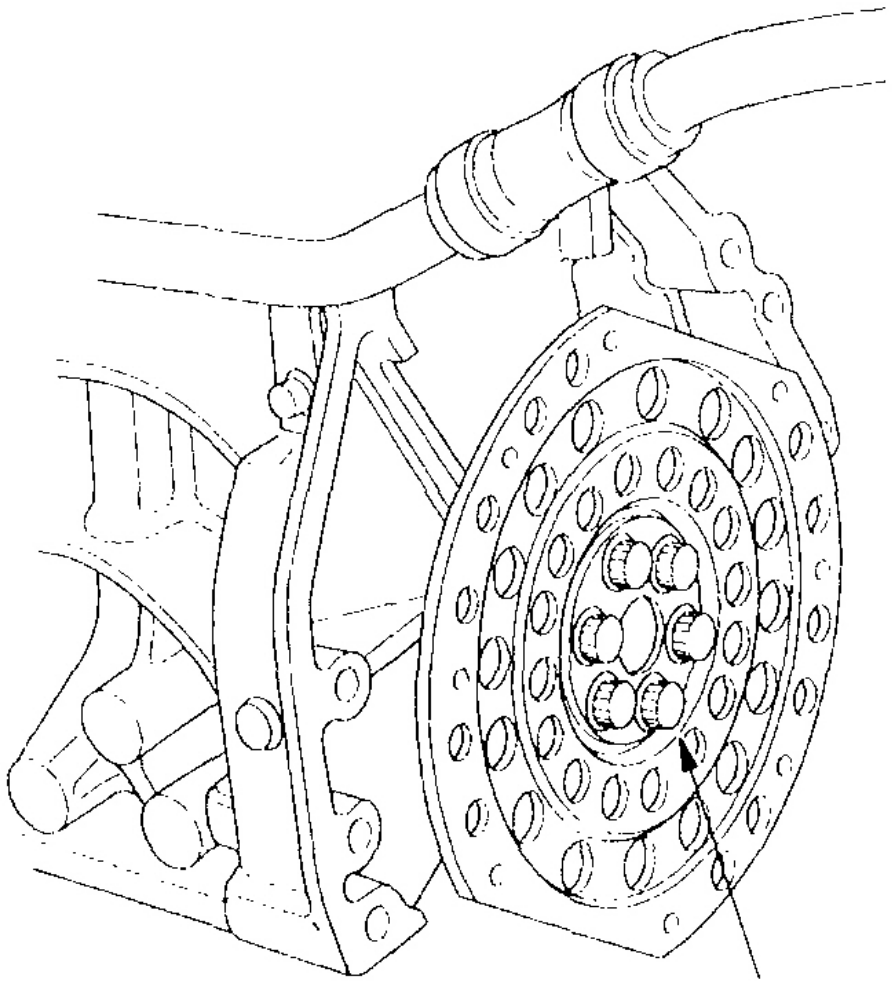
G01397477

Fig. 220: Locating Flywheel With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Install the pressure plate and clutch disc (see **CLUTCH DISC AND PRESSURE PLATE INSTALLATION**).
5. Install the transmission (see **REMOVAL & INSTALLATION**).

DRIVE PLATE REMOVAL AND INSTALLATION

1. Remove the transmission:
 - Automatic transmission (see **REMOVAL & INSTALLATION (EXCEPT HYBRID)**).
 - CVT (see **REMOVAL & INSTALLATION (CVT)**).
2. Remove the six drive plate bolts, then separate the drive plate from the crankshaft flange. After installation, tighten the bolts in a crisscross pattern



12 x 1.0 mm
74 N·m
(7.5 kgf·m, 54 lbf·ft)

G01397478

Fig. 221: Locating Drive Plate With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Install the transmission:
 - Automatic transmission (see **REMOVAL & INSTALLATION (EXCEPT HYBRID)**).
 - CVT (see **REMOVAL & INSTALLATION (CVT)**).

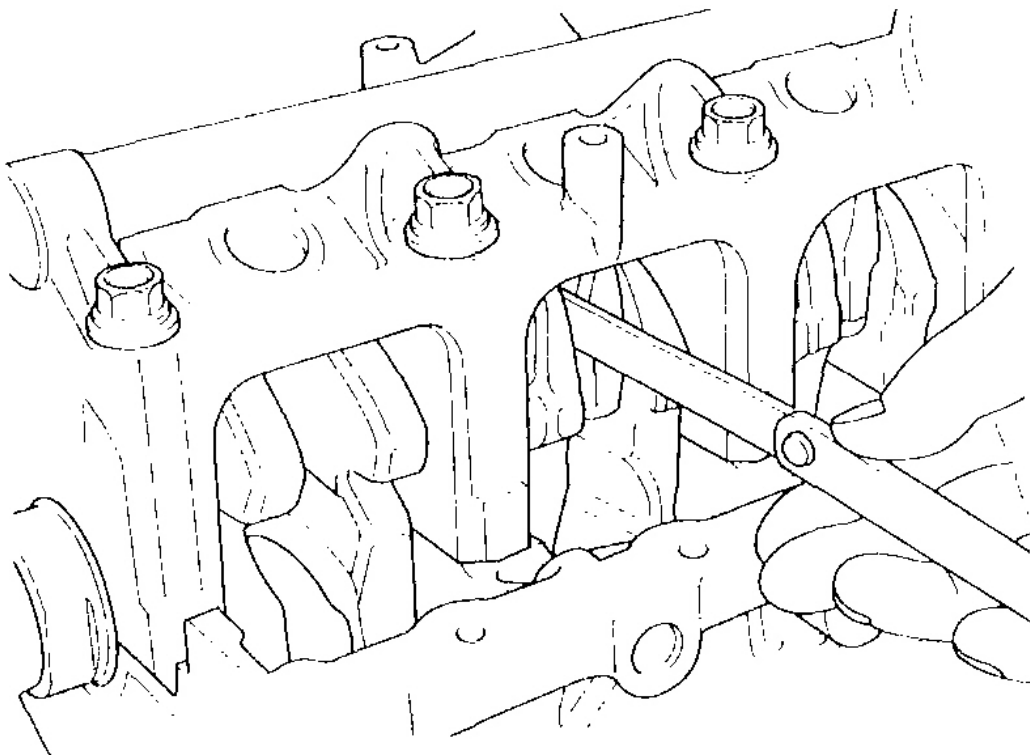
CONNECTING ROD AND CRANKSHAFT END PLAY INSPECTION

1. Remove the oil pump (see **OIL PUMP OVERHAUL**).
2. Measure the connecting rod end play with a feeler gauge between the connecting rod and crankshaft.

Connecting Rod End Play

Standard (New): 0.15-0.30 mm (0.006-0.012 in.)

Service Limit: 0.40 mm (0.016 in.)



G01397479

Fig. 222: Measuring Connecting Rod End Play With Feeler Gauge

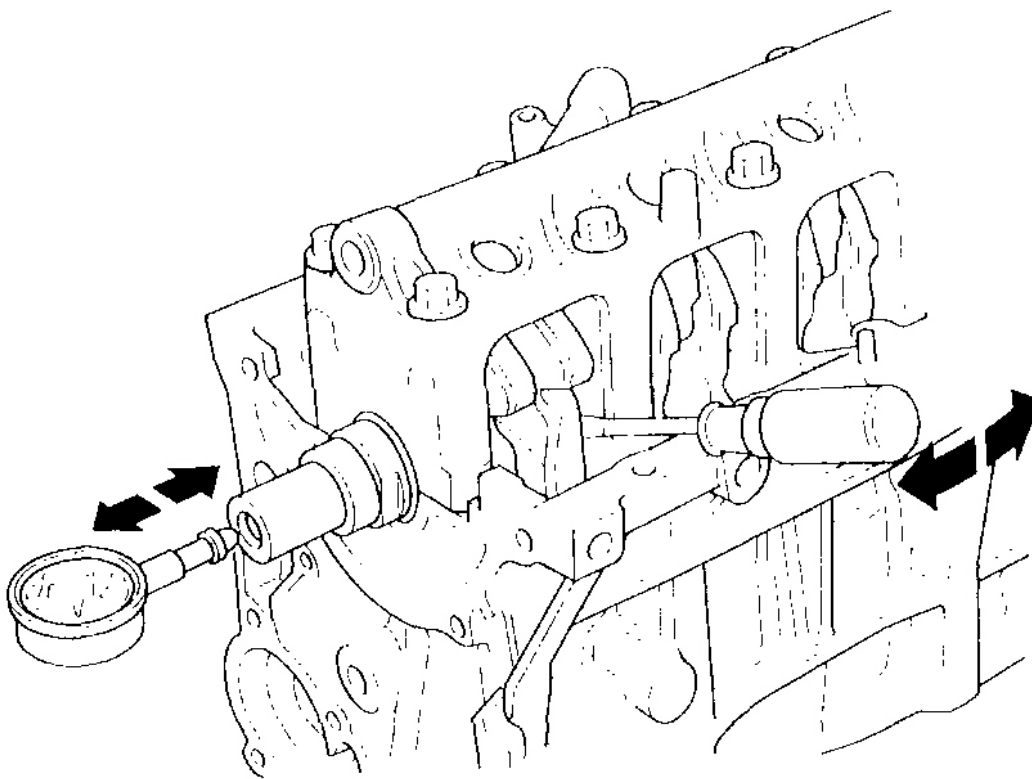
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. If the connecting rod end play is out-of-tolerance, install a new connecting rod, and recheck. If it is still out-of-tolerance; replace the crankshaft (see **Oil Pan Removal**).
4. Mount a dial indicator on the block so that its tip contacts the end of the crankshaft.
5. Push the crankshaft firmly away from the dial indicator, and zero the dial against the end of the crankshaft. Then pull the crankshaft firmly back toward the indicator; the dial reading should not exceed the service limit.

Crankshaft End Play

Standard (New): 0.10-0.35 mm (0.004-0.014 in.)

Service Limit: 0.45 mm (0.018 in.)



G01397480

Fig. 223: Pushing Crankshaft Firmly Away From Dial Indicator
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. If the end play is excessive, replace the thrust washers and recheck. If it is still out-of-tolerance, replace

the crankshaft (see **Oil Pan Removal**).

CRANKSHAFT MAIN BEARING REPLACEMENT

Main Bearing Clearance Inspection

1. Remove the main caps and bearing halves.
2. Clean each main journal and bearing half with a clean shop towel.
3. Place one strip of plastigage across each main journal.

NOTE: If the engine is still in the car when you bolt the main cap down to check the clearance, the weight of the crankshaft and drive plate will flatten the plastigage further than just the torque on the cap bolt and give you an incorrect reading. For an accurate reading, support the crank with a jack under the counterweights, and check only one bearing at a time.

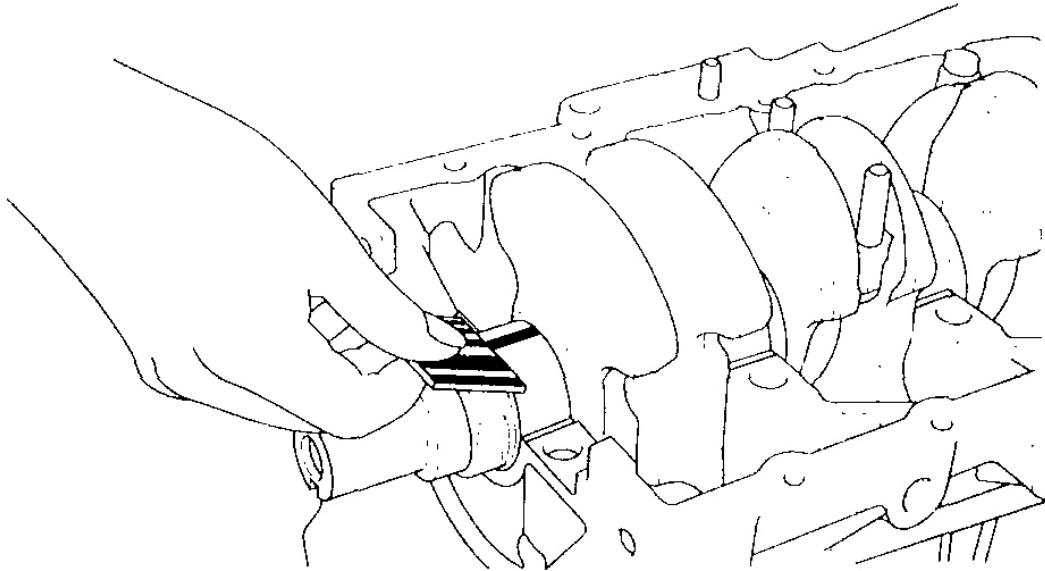
4. Reinstall the bearings and caps, then torque the bolts to 51 N.m (5.2 kgf.m, 38 lbf.ft). Do not rotate the crankshaft.
5. Remove the cap and bearing half, and measure the widest part of the plastigage.

Main Bearing-to-Journal Oil Clearance

Standard (New): No. 1, 5: 0.018-0.036mm (0.0007-0.0014 in.)

No. 2, 3, 4: 0.024-0.042mm (0.0009-0.0017 in.)

Service Limit: 0.05 mm (0.002 in.)



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Fig. 224: Measuring Widest Part Of Plastigage

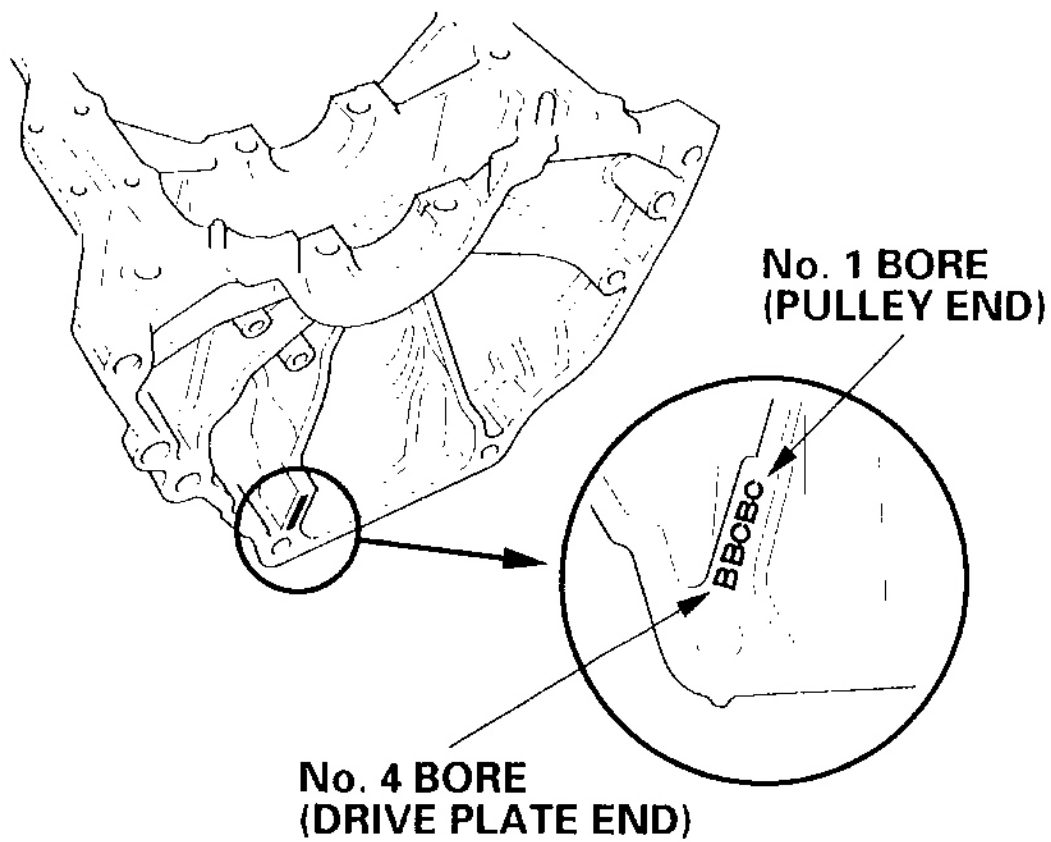
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. If the plastigage measures too wide or too narrow, (remove the engine if it's still in the car), remove the crankshaft, and remove the upper half of the bearing. Install a new, complete bearing with the same color code, and recheck the clearance. Do not file, shim, or scrape the bearings or the caps to adjust clearance.
7. If the plastigage shows the clearance is still incorrect, try the next larger or smaller bearing (the color listed above or below that one), and check again. If the proper clearance cannot be obtained by using the appropriate larger or smaller bearings, replace the crankshaft and start over (see **Oil Pan Removal**).

Main Bearing Selection**Crankshaft Bore Code Location**

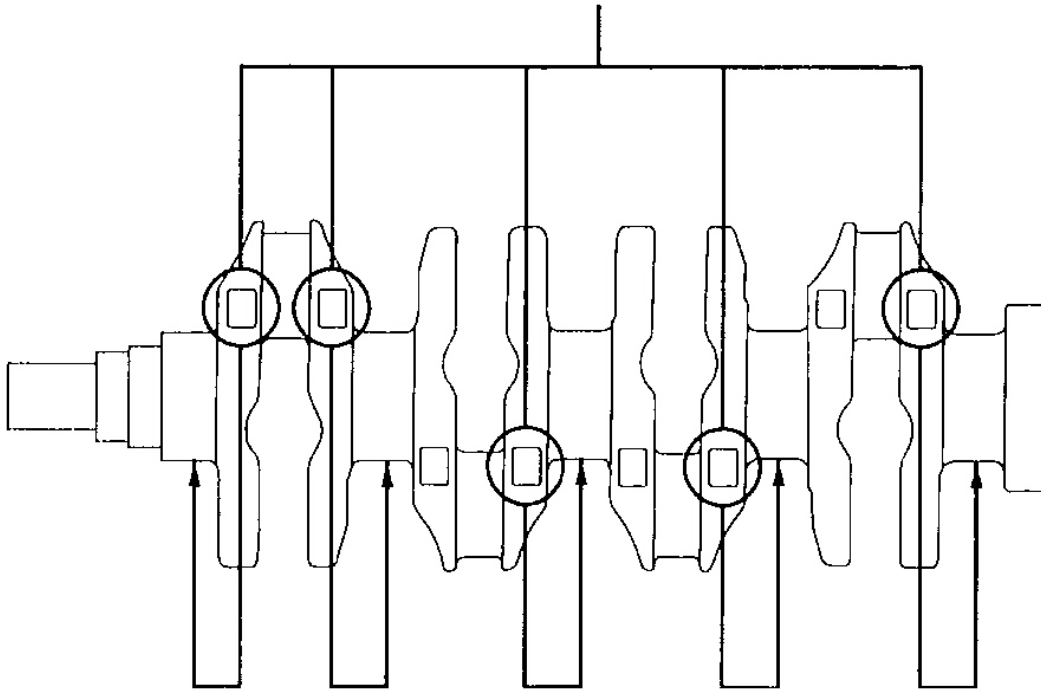
Letters have been stamped on the end of the block as a code for the size of each of the five main journal bores.

Use them, and the numbers stamped on the crankshaft (codes for main journal size), to choose the correct bearings. If the codes are indecipherable because of an accumulation of dirt and dust, do not scrub them with a wire brush or scraper. Clean them only with solvent or detergent.



G01397482

Fig. 225: Locating Main Journal Bore Stamping
Courtesy of AMERICAN HONDA MOTOR CO., INC.



G01397484

Fig. 227: Main Journal Code Locations (Numbers)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

CONNECTING ROD BEARING REPLACEMENT

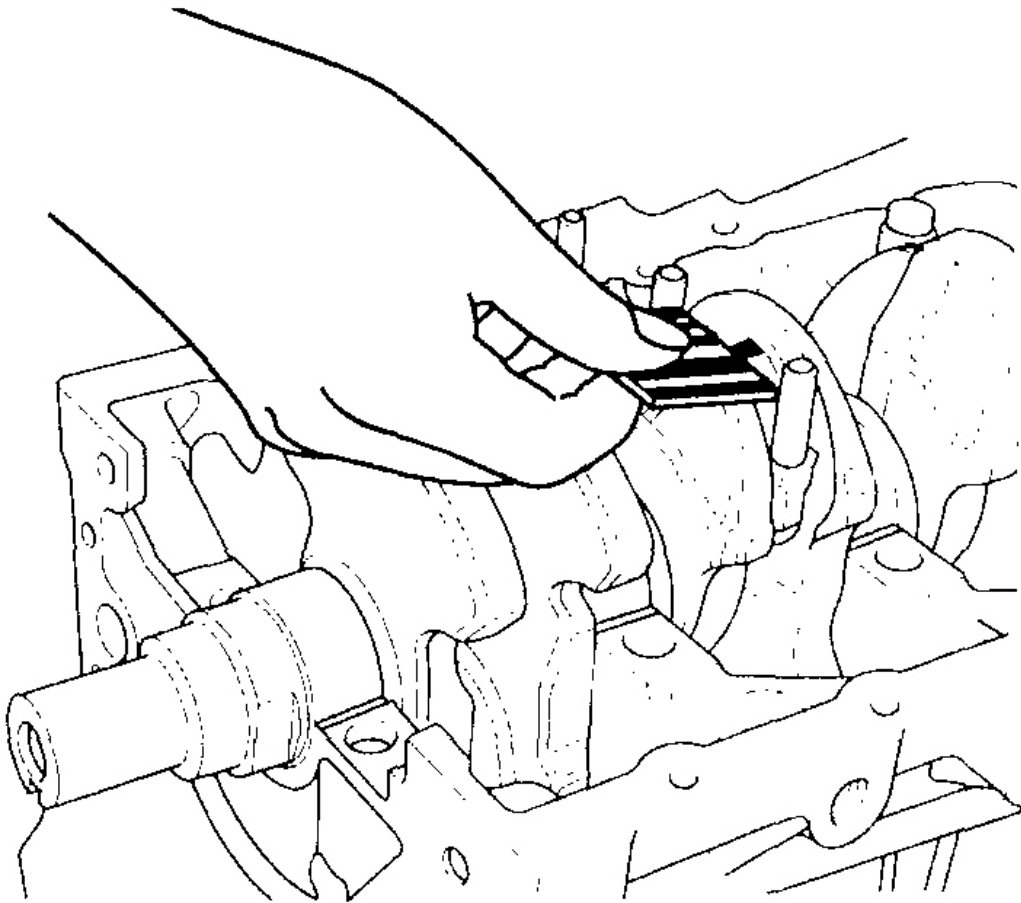
Rod Bearing Clearance Inspection

1. Remove the connecting rod cap and bearing half.
2. Clean the crankshaft rod journal and bearing half with a clean shop towel.
3. Place a strip of plastigage across the rod journal.
4. Reinstall the bearing half and cap, and torque the bolts to 32 N.m (3.3 kgf.m, 24 lbf.ft). Do not rotate the crankshaft.
5. Remove the rod cap and bearing half and measure the widest part of the plastigage.

Connecting Rod Bearing-to-Journal Oil Clearance

Standard (New): 0.024-0.042 mm (0.0009-0.0017 in.)

Service Limit: 0.05 mm (0.002 in.)



G01397485

Fig. 228: Measuring Widest Part Of Plastigage

Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. If the plastigage measures too wide or too narrow, remove the upper half of the bearing, install a new, complete bearing with the same color code, and recheck the clearance. Do not file, shim, or scrape the bearings or the caps to adjust clearance.
7. If the plastigage shows the clearance is still incorrect, try the next larger or smaller bearing (the color listed above or below that one), and check clearance again. If the proper clearance cannot be obtained by using the appropriate larger or smaller bearings, replace the crankshaft and start over (see **Oil Pan Removal**).

Rod Bearing Selection

Each rod falls into one of four tolerance ranges (from 0 to 0.024 mm (0.0009 in.), in 0.006 mm (0.0002 in.) increments) depending on the size of its big-end bore. It's then stamped with a number (1, 2, 3, or 4), indicating

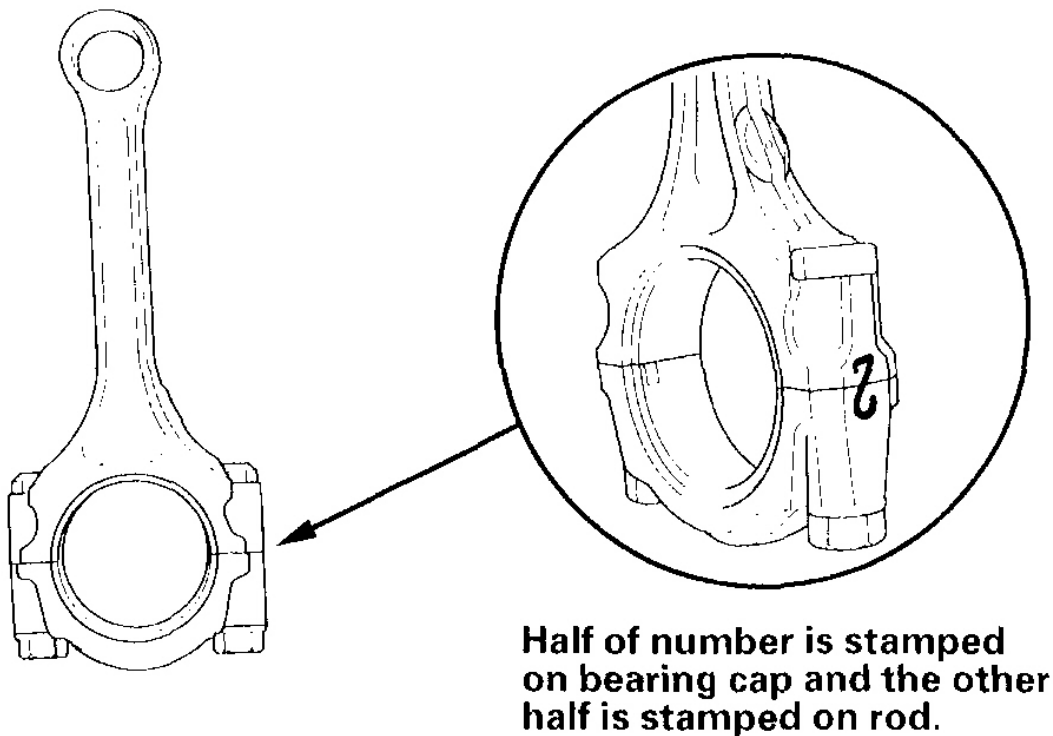
the range. You may find any combination of 1, 2, 3, or 4 in any engine.

Normal Bore Size: 48.0 mm (1.89 in.)

Inspect the connecting rod for cracks and heat damage.

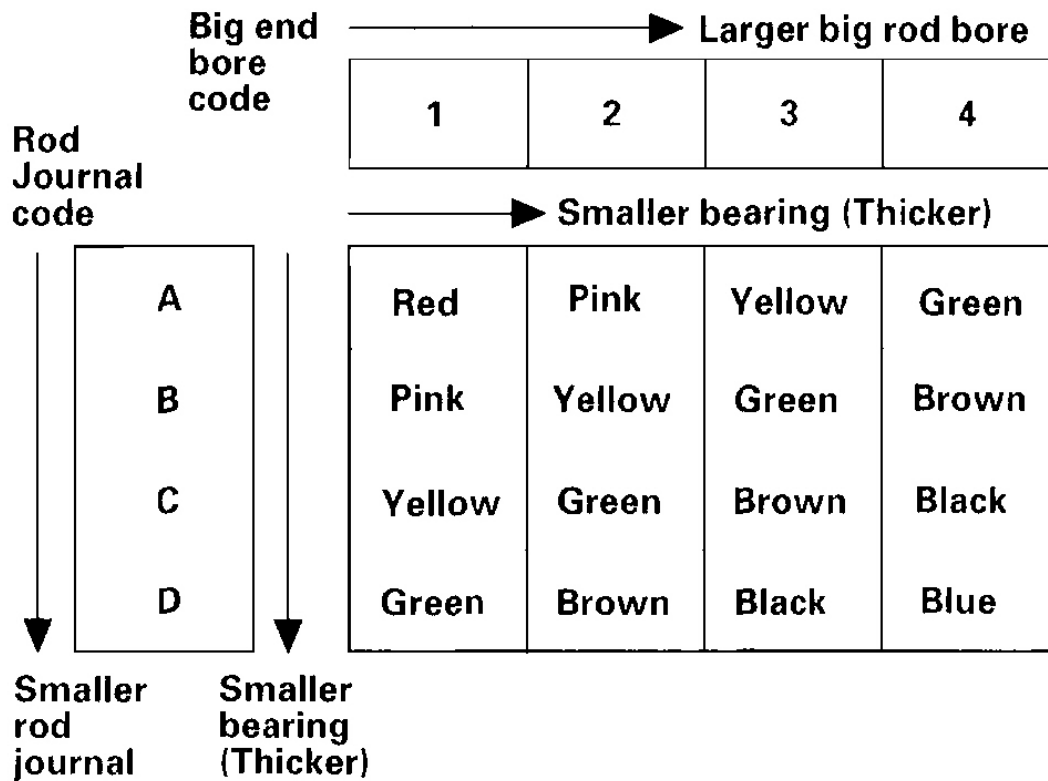
Connecting Rod Journal Code Locations

Numbers have been stamped on the side of each connecting rod as a code for the size of the big end. Use them, and the letters stamped on the crank (codes for rod journal size), to choose the correct bearings. If the codes are indecipherable because of an accumulation of dirt and dust, do not scrub them with a wire brush or scraper. Clean them only with solvent or detergent.



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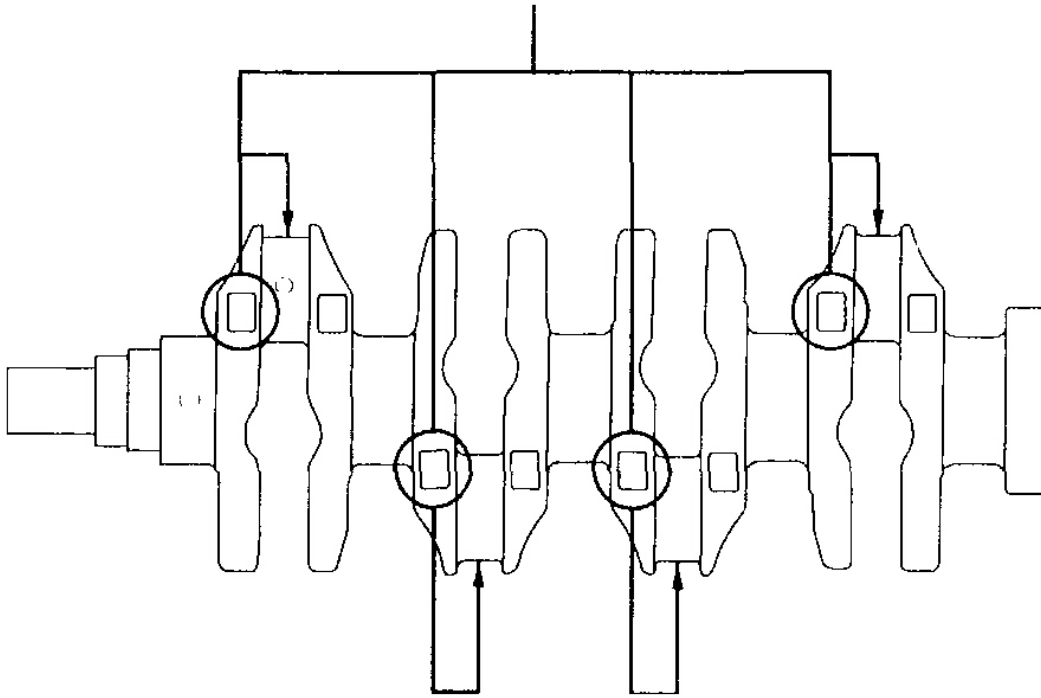
Fig. 229: Connecting Rod Journal Stamping
Courtesy of AMERICAN HONDA MOTOR CO., INC.



G01397487

Fig. 230: Color Code Chart

Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 231: Connecting Rod Journal Code Locations (Letters)
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

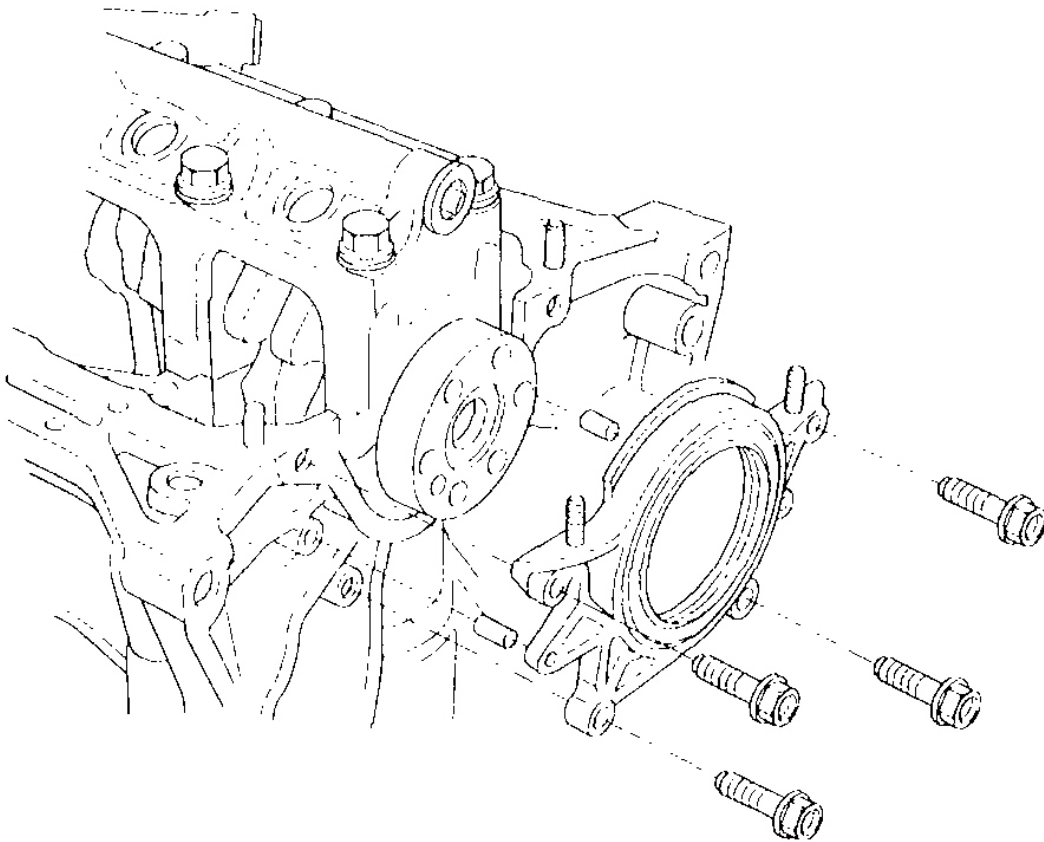
OIL PAN REMOVAL

If the engine is out of the vehicle, go to step 6.

1. Raise the vehicle on the hoist to full height.
2. Drain the engine oil (see **ENGINE OIL REPLACEMENT**).
3. D17A2 engine: Disconnect the primary heated oxygen sensor (primary HO2S) connector and secondary heated oxygen sensor (secondary HO2S) connector, then remove the exhaust pipe A/three way catalytic converter (TWC) (see step 29 on **Engine Removal**).
4. D17A6 engine: Disconnect the third heated oxygen sensor (third HO2S) connector, remove the exhaust pipe A/TWC assembly (see step 30 on **Engine Removal**).
5. D17A1 engine: Remove the exhaust pipe/muffler assembly (see step 31 on **Engine Removal**).
6. Remove the bolts/nuts securing the oil pan.
7. Remove the oil pan.

CRANKSHAFT AND PISTON REMOVAL

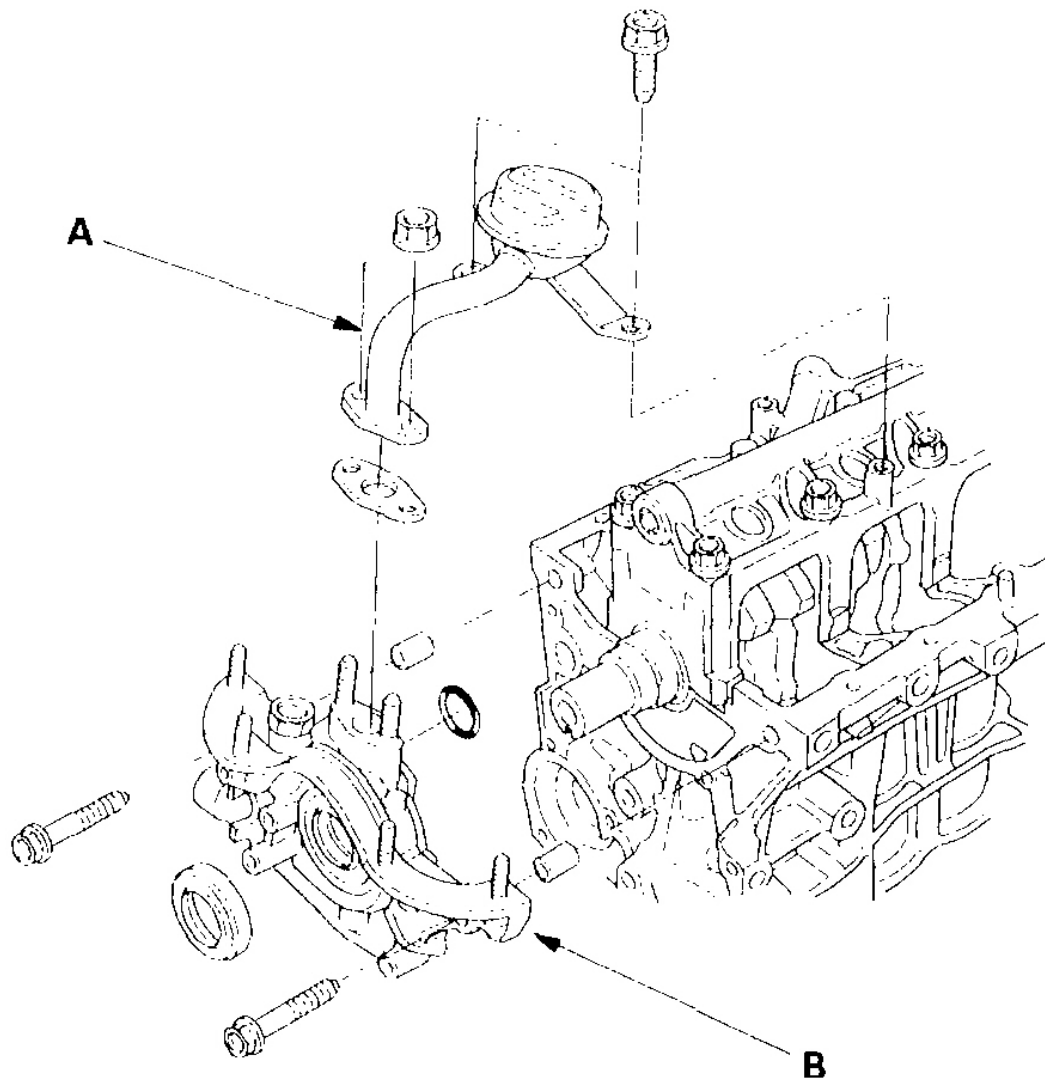
1. Remove the engine assembly (see **Engine Removal**).
2. Remove the transmission:
 - Manual transmission (see **REMOVAL & INSTALLATION**).
 - Automatic transmission (see **REMOVAL & INSTALLATION (EXCEPT HYBRID)**).
 - CVT (see **REMOVAL & INSTALLATION (CVT)**).
3. Remove the cylinder head (see **Cylinder Head Removal**).
4. Remove the oil pan (see **Oil Pan Removal**).
5. Remove the engine block end cover.



G01397489

Fig. 232: Removing Engine Block End Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Remove the oil screen (A), then remove the oil pump (B).

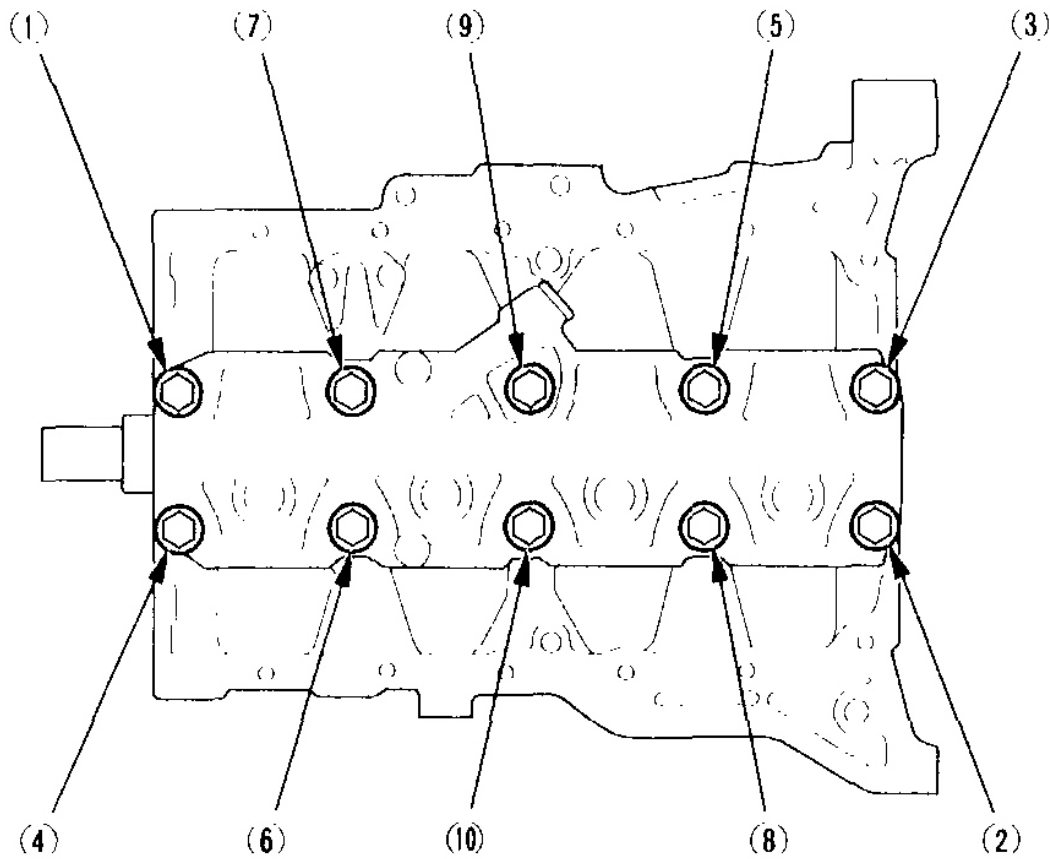


G01397490

Fig. 233: Removing Oil Screen

Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Remove the bearing cap bolts. To prevent warpage, unscrew the bolts in sequence 1/3 turn at a time; repeat the sequence until all bolts are loosened.



G01397491

Fig. 234: Bearing Cap Bolts Loosening Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Remove the bearing cap bridge/bearings. Keep all bearings in order.
9. Turn the crankshaft so No. 2 and No. 3 crankpins are at the top.
10. Remove the rod caps/bearings. Keep all caps/bearings in order.
11. Lift the crankshaft out of the engine, being careful not to damage the journals.

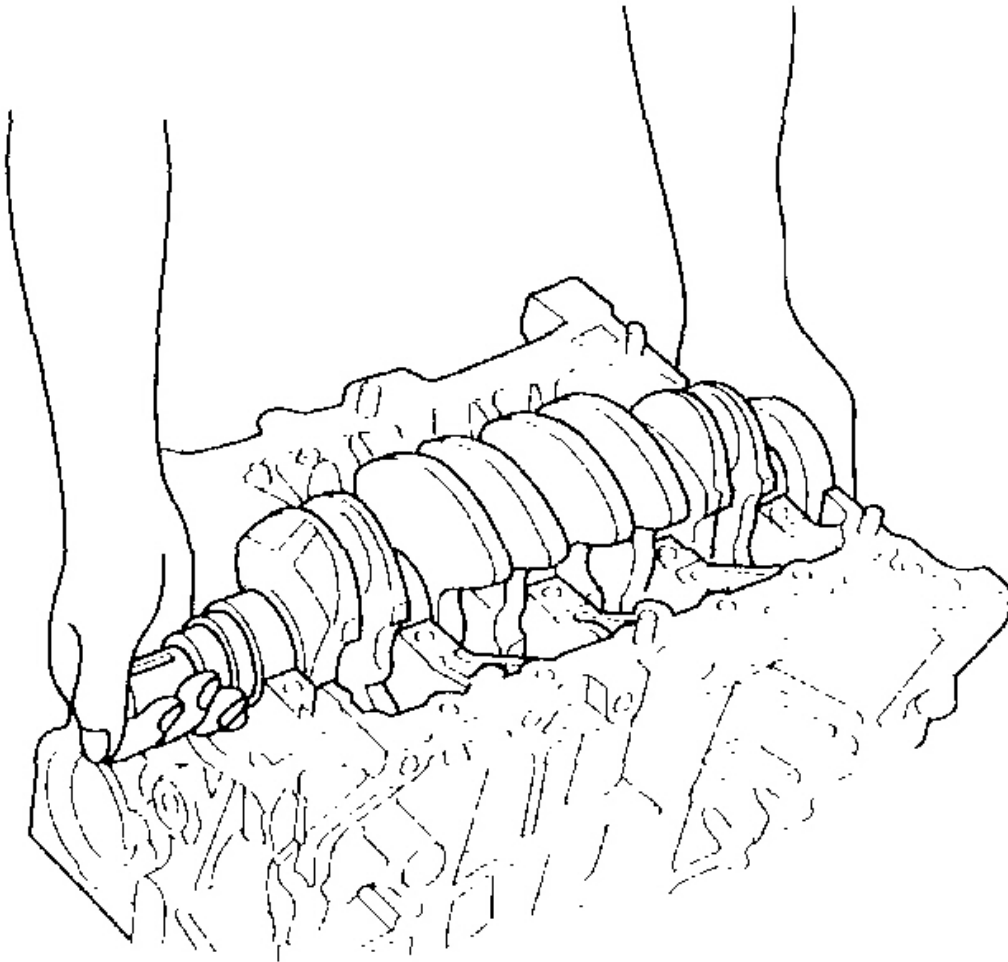
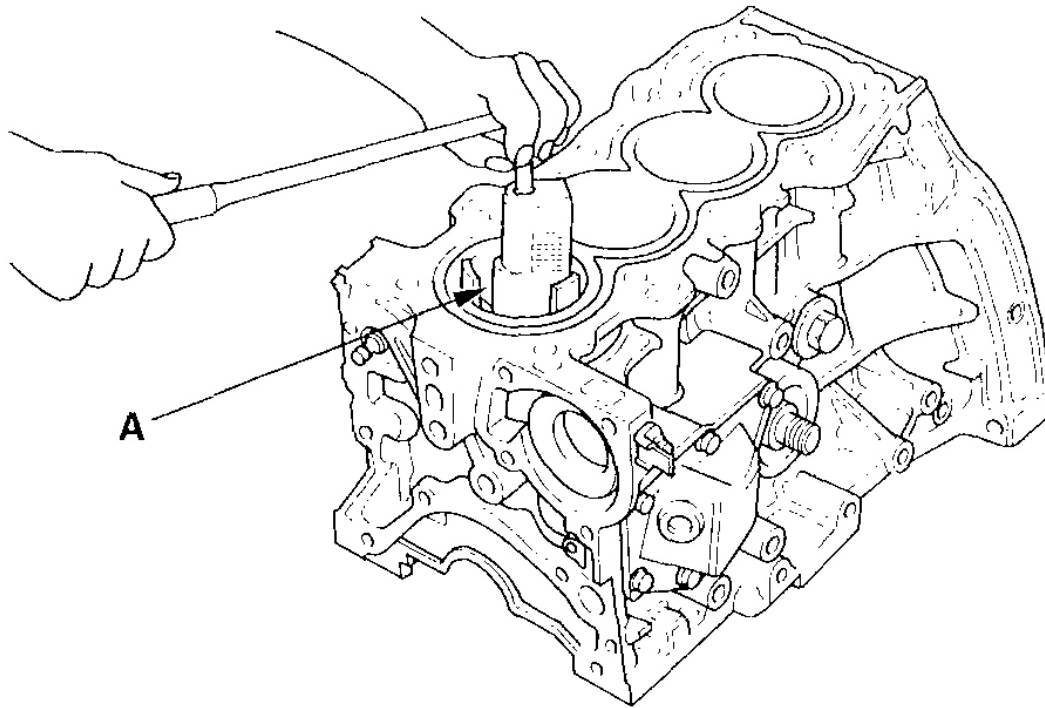
**G01397492**

Fig. 235: Lifting Crankshaft Out Of Engine

Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Remove the upper bearing halves from the connecting rods, and set them aside with their respective caps.
13. Reinstall the bearing cap bridge and bearings on the engine in the proper order.
14. If you can feel a ridge of metal or hard carbon around the top of each cylinder, remove it with a ridge reamer (A). Follow the reamer manufacturer's instructions. If the ridge is not removed, it may damage the pistons as they are pushed out.



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Fig. 236: Removing With Ridge Reamer
Courtesy of AMERICAN HONDA MOTOR CO., INC.

15. Use the wooden handle of a hammer (A) to drive out the pistons (B).

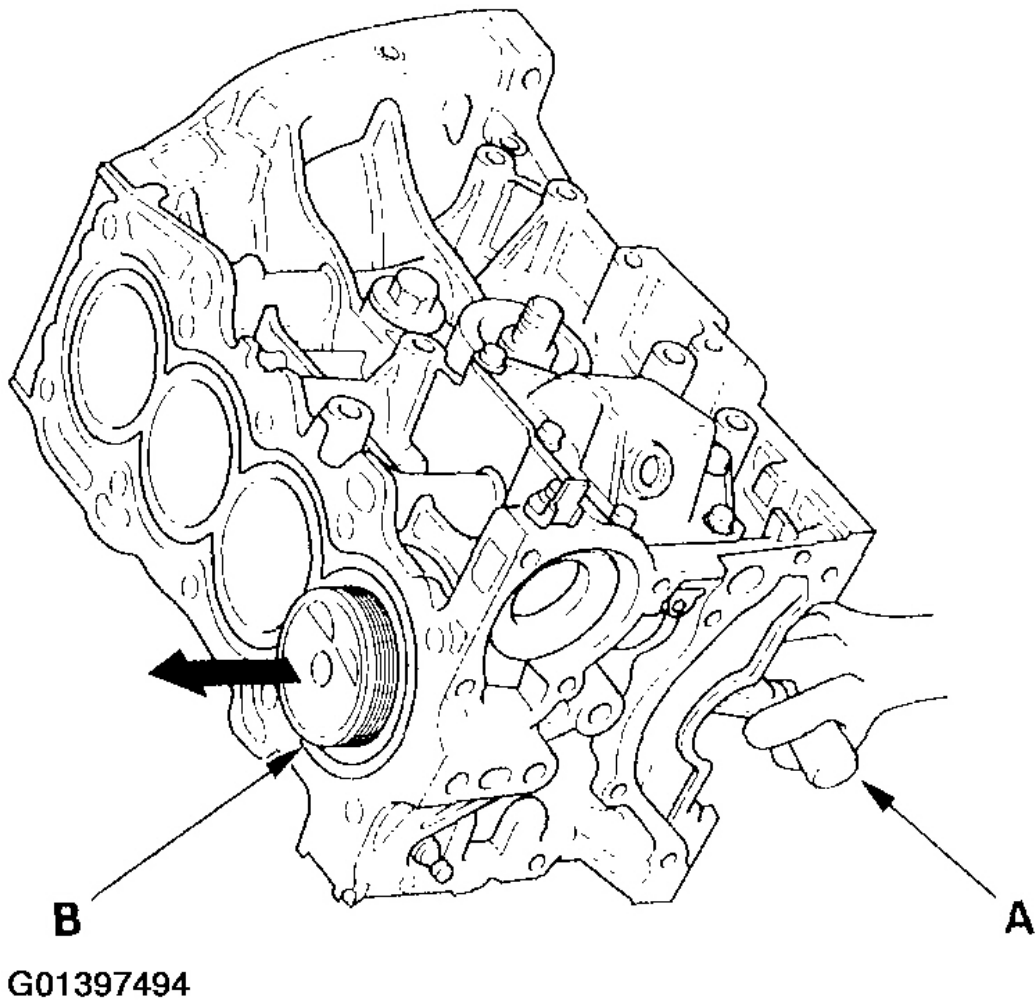


Fig. 237: Using Wooden Handle Of Hammer
Courtesy of AMERICAN HONDA MOTOR CO., INC.

16. Reinstall the connecting rod bearing and caps after removing each piston/connecting rod assembly.
17. To avoid mixup on reassembly, mark each piston/connecting rod assembly with its cylinder number.

NOTE: The existing number on the connecting rod does not indicate its position in the engine, it indicates the rod size.

CRANKSHAFT INSPECTION

Crankshaft Total Indicator Runout

NOTE:

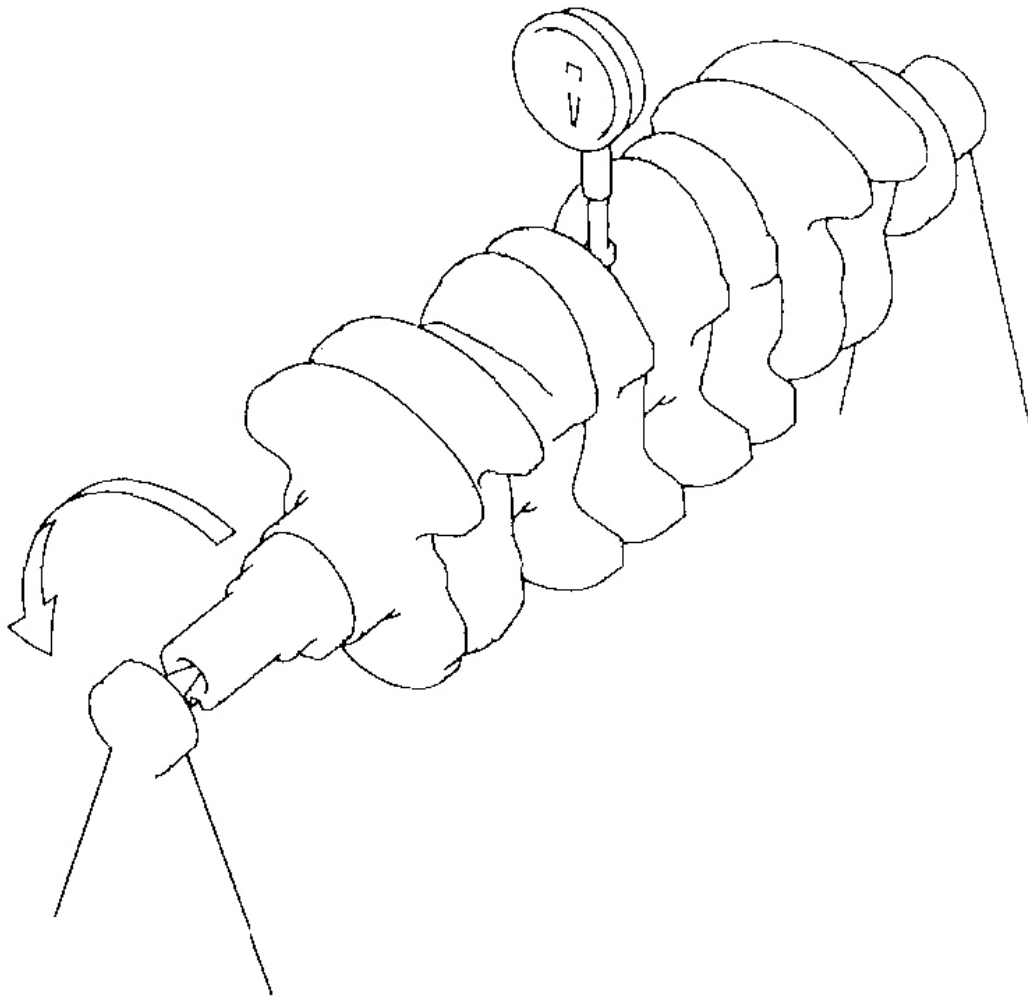
- **Clean the crankshaft oil passages with pipe cleaners or a suitable brush.**
- **Check the keyway and threads.**

1. Remove the crankshaft from the cylinder block (see **Oil Pan Removal**).
2. Clean the crankshaft oil passages with pipe cleaners or a suitable brush.
3. Check the keyway and threads; repair as necessary.
4. Support the crankshaft with V-blocks.
5. Measure the runout on all of the main journals to make sure the crank is not bent. Rotate the crankshaft two complete revolutions. The difference between measurements on each journal must not be more than the service limit.

Out-of-Round and Taper

Standard (New): 0.03 mm (0.001 in.) max.

Service Limit: 0.04 mm (0.002 in.)



G01397495

Fig. 238: Measuring Runout On All Main Journals
Courtesy of AMERICAN HONDA MOTOR CO., INC.

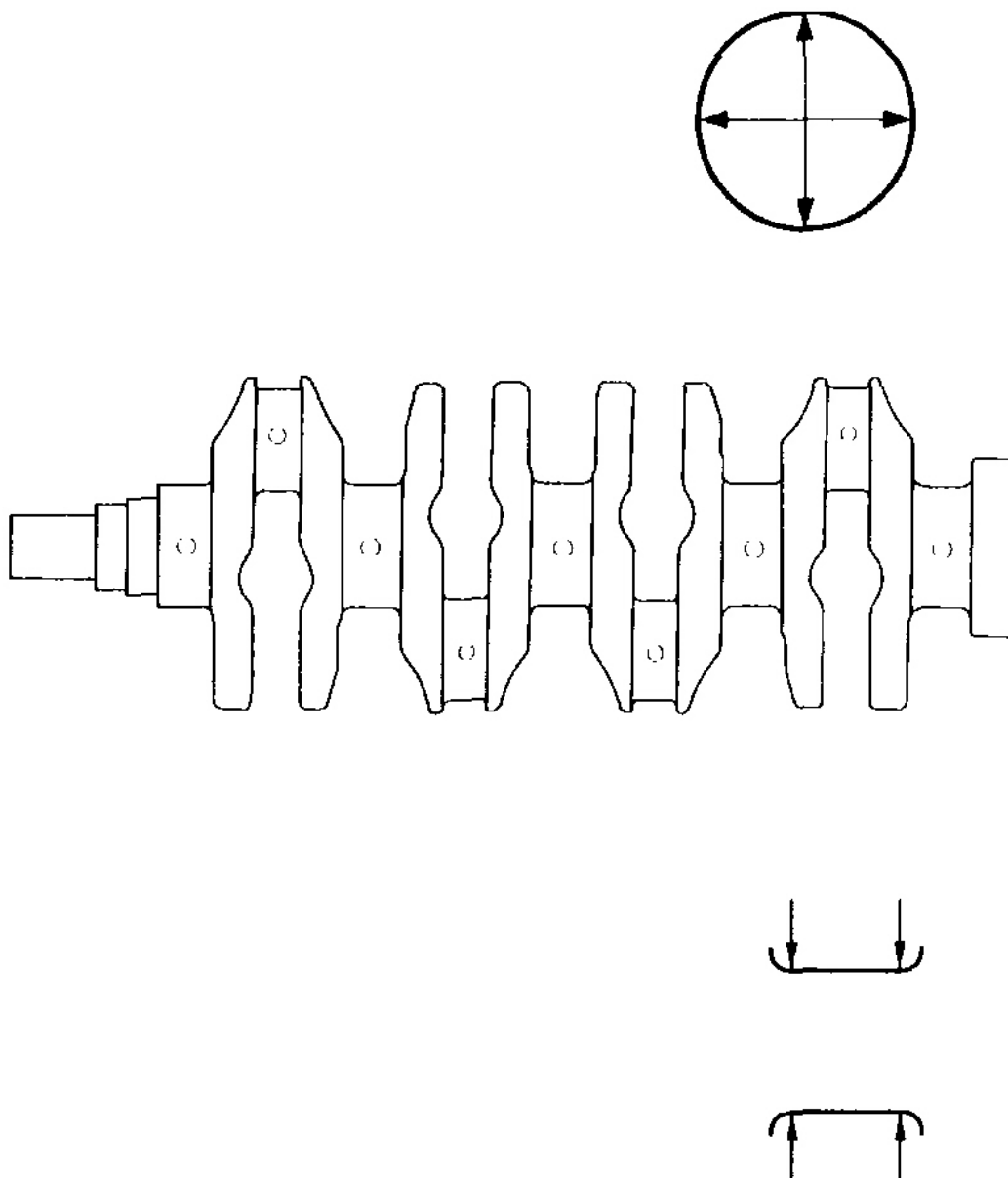
Straightness

6. Measure out-of-round at the middle of each rod and main journal in two places. The difference between measurements on each journal must not be more than the service limit.

Journal Out-of-Round

Standard (New): 0.0025 mm (0.0001 in.) max.

Service Limit: 0.005 mm (0.0002 in.)



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Fig. 239: Measuring Out-Of-Round At Middle Of Each Rod
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Measure taper at the edge of each rod and main journal. The difference between measurements on each journal must not be more than the service limit.

Journal Taper

Standard (New): 0.0025 mm (0.0001 in.) max.

Service Limit: 0.005 mm (0.0002 in.)

BLOCK AND PISTON INSPECTION

1. Remove the crankshaft and pistons (see **Oil Pan Removal**).
2. Check the piston for distortion or cracks.
3. Measure the piston diameter at a point 13 mm (0.5 in) from the bottom of the skirt.

Piston Diameter

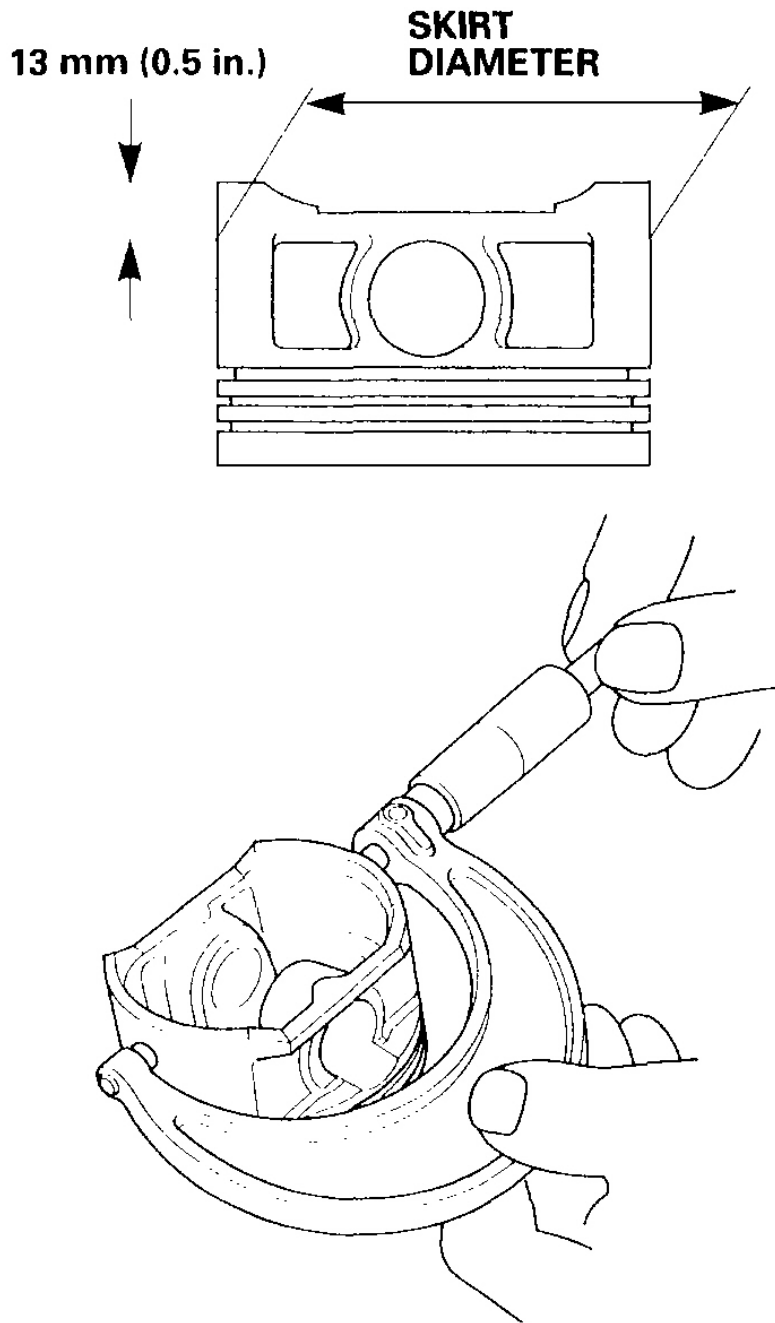
Standard (New): 74.98-74.99 mm (2.9520-2.9524 in.).

Service Limit: 74.97 mm (2.9516 in.)

Oversize Piston Diameter

0.25: 75.23-75.24 mm (2.9618-2.9622 in.)

0.50: 75.48-75.49 mm (2.9716-2.9720 in.)



G01397497

Fig. 240: Measuring Piston Diameter At A Point 13 mm (0.5 in) From Bottom Of Skirt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Measure wear and taper in direction X and Y at three levels in each cylinder as shown. If measurements in any cylinder are beyond the oversize bore service limit, replace the block. If the block is to be rebored,

refer to step 6 after reboring.

Cylinder Bore Size

Standard (New): 75.00-75.02 mm (2.9528-2.9535 in.)

Service Limit: 75.07 mm (2.9555 in.)

Oversize:

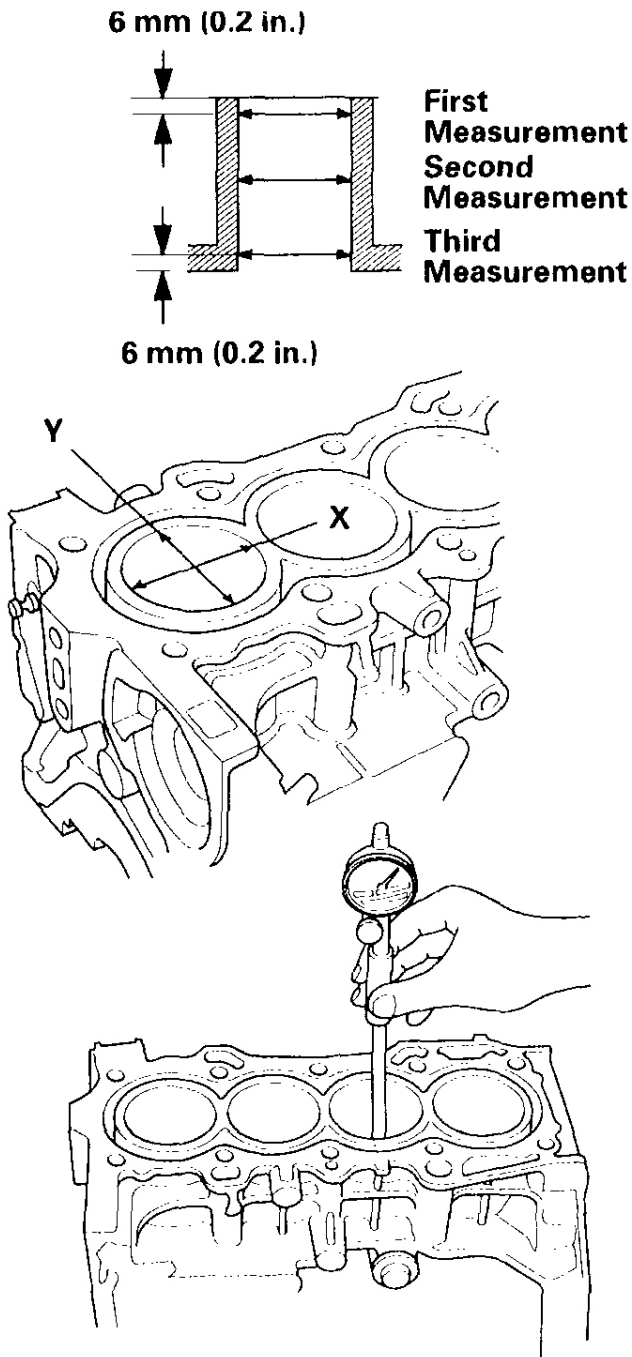
0.25: 75.25-75.27 mm (2.9626-2.9634 in.)

0.50: 75.50-75.52 mm (2.9724-2.9732 in.)

Reboring limit: 0.5 mm (0.02 in.) max.

Bore Taper:

Limit: (Difference between first and third measurement) 0.05 mm (0.002 in.)



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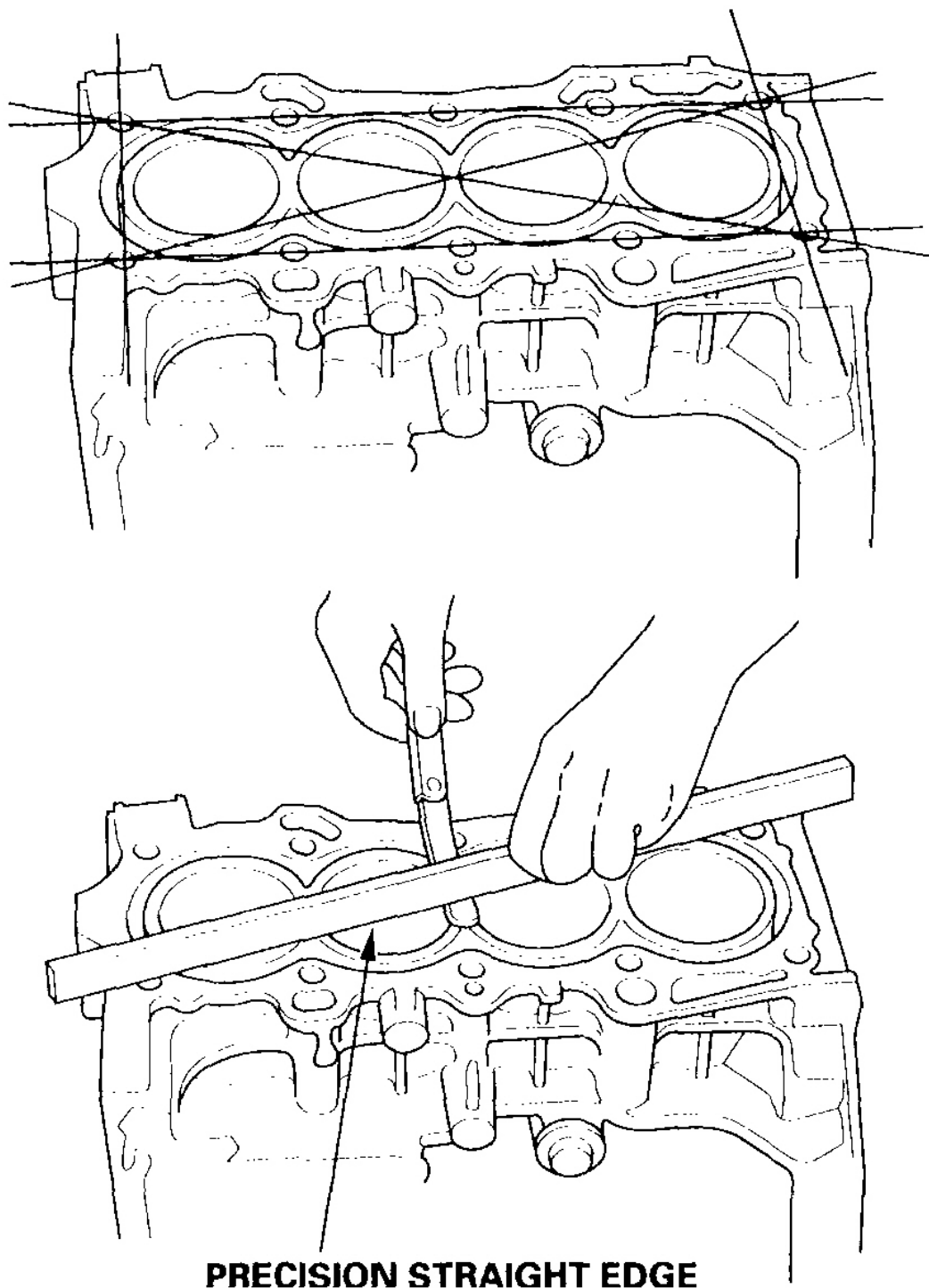
Fig. 241: Measuring Wear & Taper In Direction X & Y At Three Levels In Each Cylinder
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Scored or scratched cylinder bores must be honed.
6. Check the top of the block for warpage. Measure along the edges and across the center as shown.

Engine Block Warpage

Standard (New): 0.07 mm (0.003 in.) max.

Service Limit: 0.10 mm (0.004 in.)



PRECISION STRAIGHT EDGE

G01397499

Fig. 242: Measuring Along Edges & Across Center

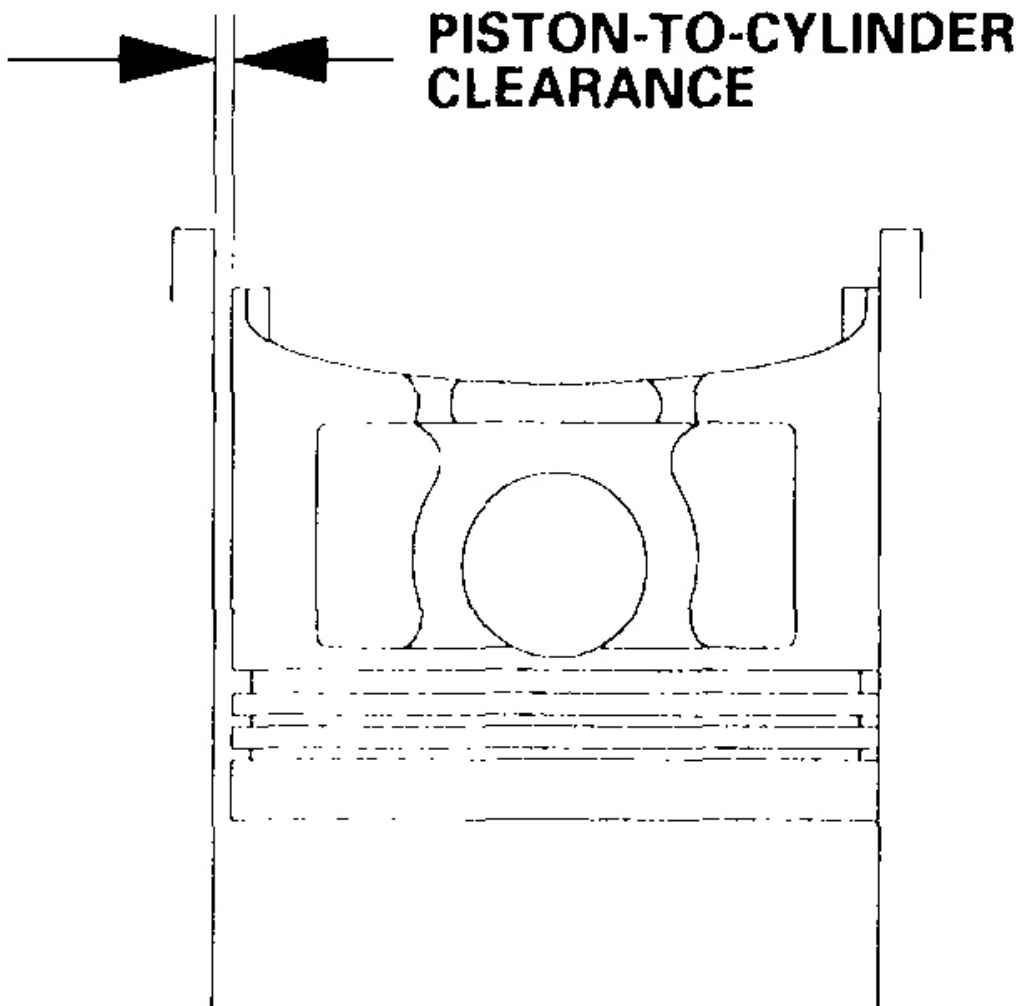
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Calculate the difference between the cylinder bore diameter and the piston diameter. If the clearance is near or exceeds the service limit, inspect the piston and cylinder block for excessive wear.

Piston-to-Cylinder Clearance

Standard (New): 0.010-0.040 mm (0.0004-0.0016 in.)

Service Limit: 0.05 mm (0.002 in.)



G01397500

Fig. 243: Calculating Difference Between Cylinder Bore Diameter & Piston Diameter
Courtesy of AMERICAN HONDA MOTOR CO., INC.

CYLINDER BORE HONING

Only a scored or scratched cylinder bore must be honed.

1. Measure the cylinder bores (see **Block and Piston Inspection**).

If the block is to be reused, hone the cylinders and remeasure the bores.

2. Hone the cylinder bores with honing oil and a fine (400 grit) stone in a 60 degree cross-hatch pattern (A). Use only a rigid hone with 400 grit or finer stone such as Sunnen, Ammco, or equivalent. Do not use stones that are worn or broken.

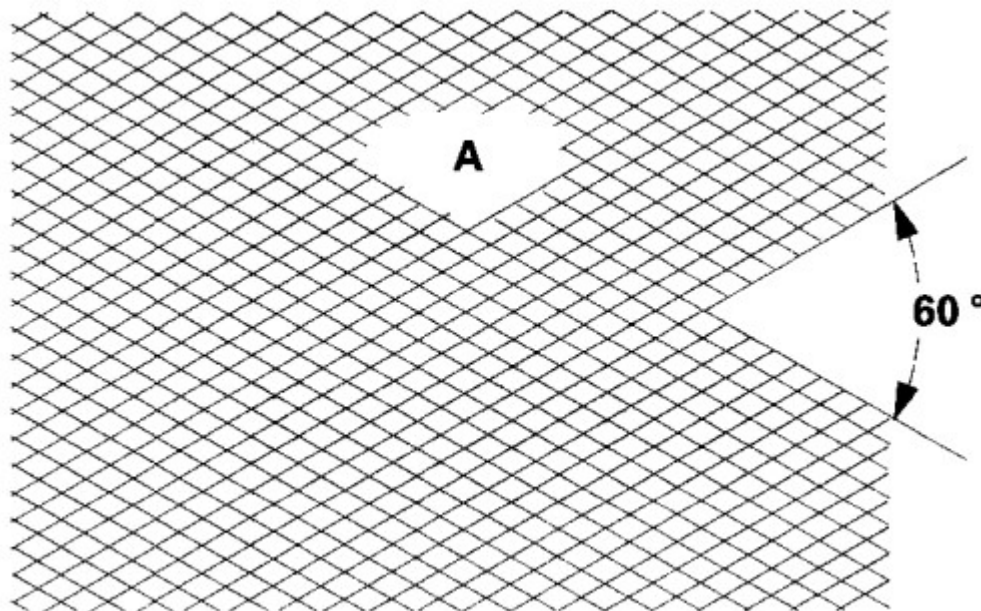


Fig. 244: Honing Cylinder Bores With Honing Oil & Fine Stone
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. When honing is complete, thoroughly clean the engine block of all metal particles. Wash the cylinder bores with hot soapy water, then dry and oil them immediately to prevent rusting. Never use solvent, it will only redistribute the grit on the cylinder walls.
4. If scoring or scratches are still present in the cylinder bores after honing to the service limit, rebore the cylinder block. Some light vertical scoring and scratching is acceptable if it is not deep enough to catch your fingernail and does not run the full length of the bore.

PISTON, PIN, AND CONNECTING ROD REPLACEMENT

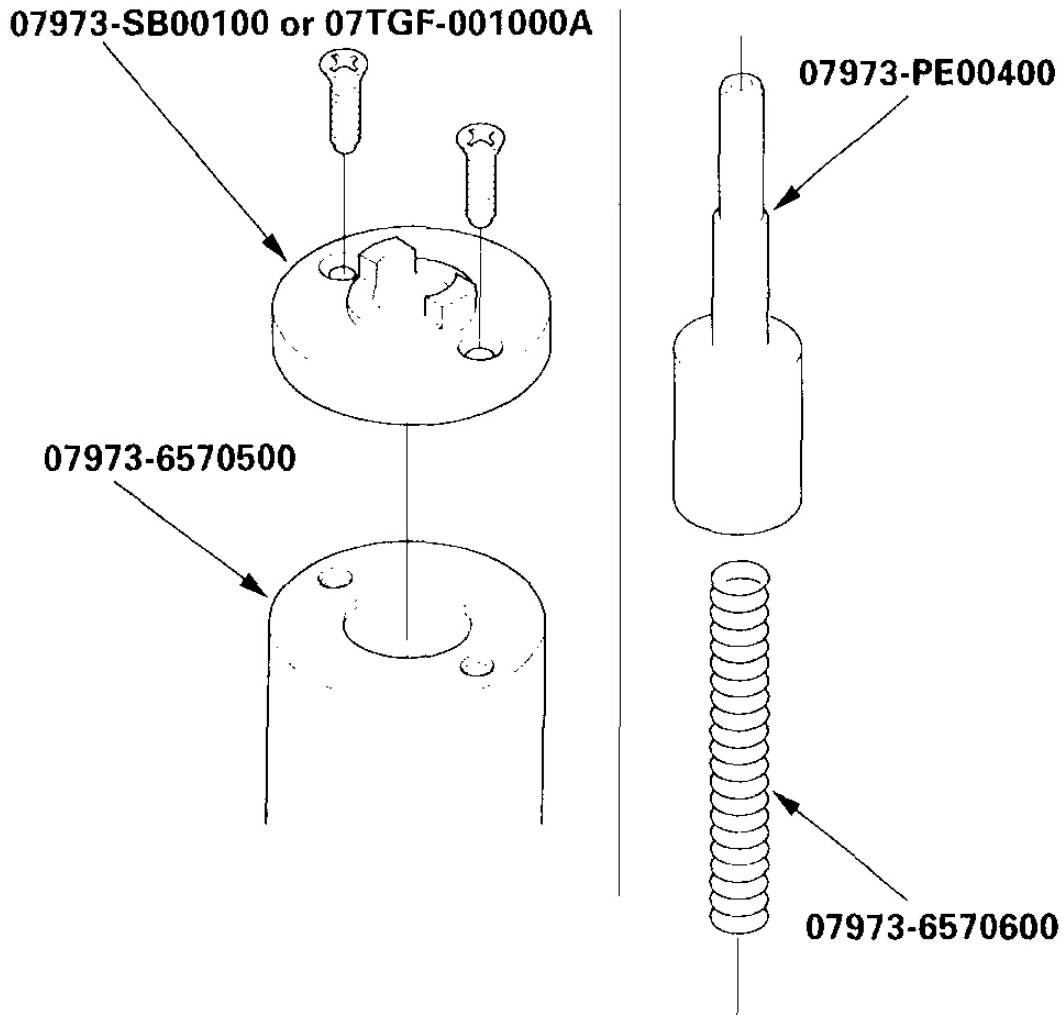
Special Tools Required

- Piston base 07973-6570500

- Piston base spring 07973-6570600
- Piston pin base insert 07973-PE00400
- Piston base head 07973-SB00100 or 07TGF-001000A
- Pilot collar 07973-PE00200
- Piston pin driver shaft 07973-PE00310
- Piston pin driver head 07973-PE00320

Disassembly

1. Remove the piston from the cylinder block (see **Oil Pan Removal**).
2. Assemble the special tool as shown.

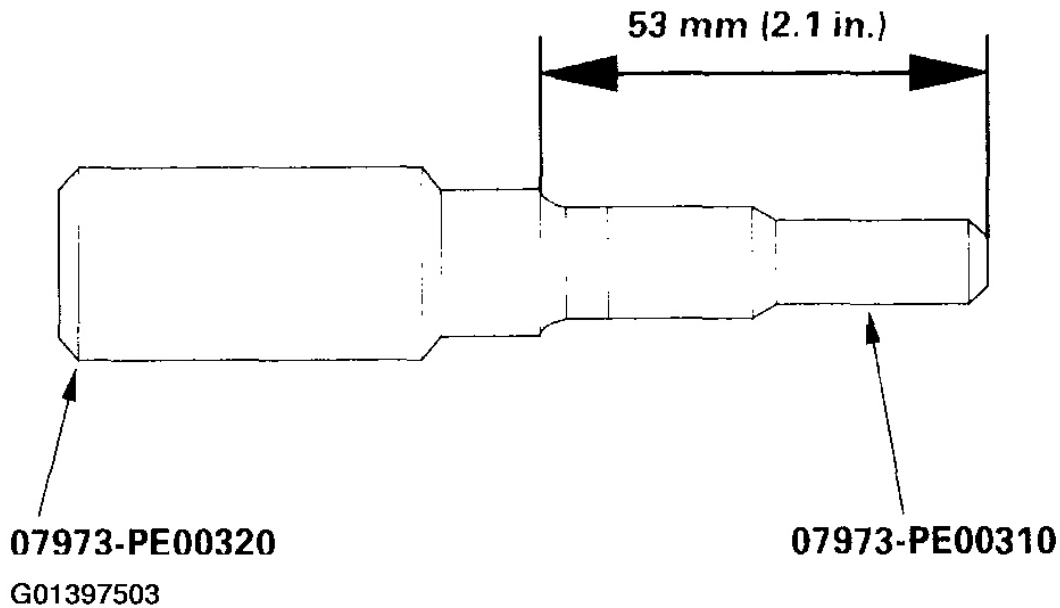


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Fig. 245: Assembling Special Tool

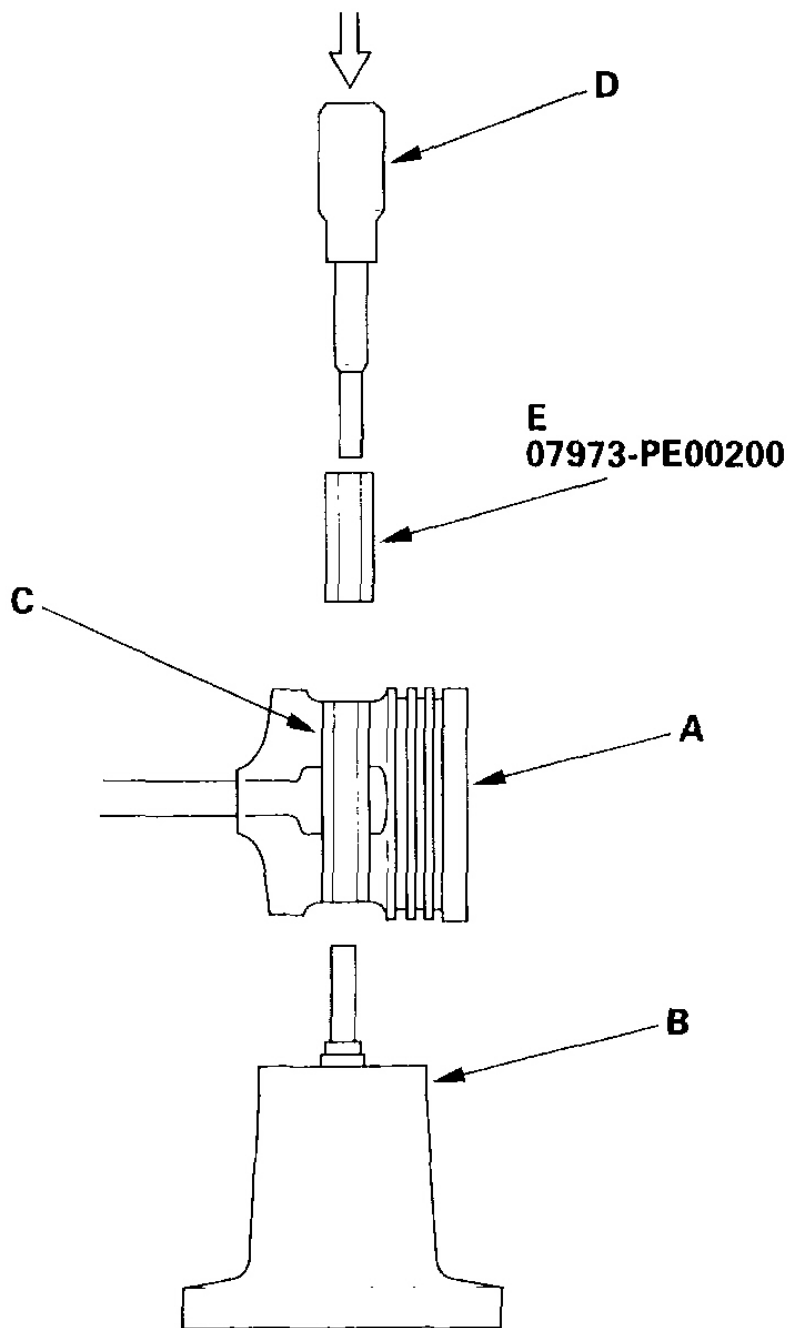
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Assemble and adjust the length of the piston pin driver head and shaft to 53 mm (2.1 in.).

**Fig. 246: Assembling & Adjusting Length Of Piston Pin Drive Head & Shaft**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. With the embossed mark facing up, place the piston assembly (A) on the special tool (B). Be sure you position the recessed flat on the piston against the lugs on the base attachment.



G01397504

Fig. 247: Placing Piston Assembly With Embossed Mark Facing Up
Courtesy of AMERICAN HONDA MOTOR CO., INC.

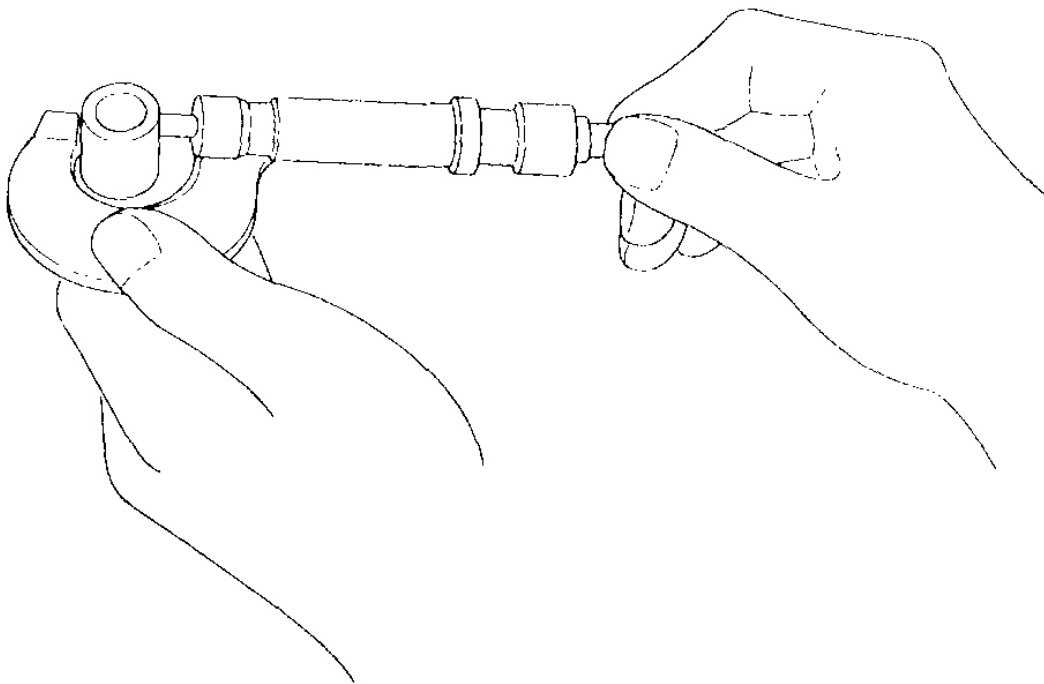
5. Press the pin (C) out with the pin driver (D), pilot collar (E) and a hydraulic press.

Inspection

1. Measure the diameter of the piston pin.

Piston Pin Diameter

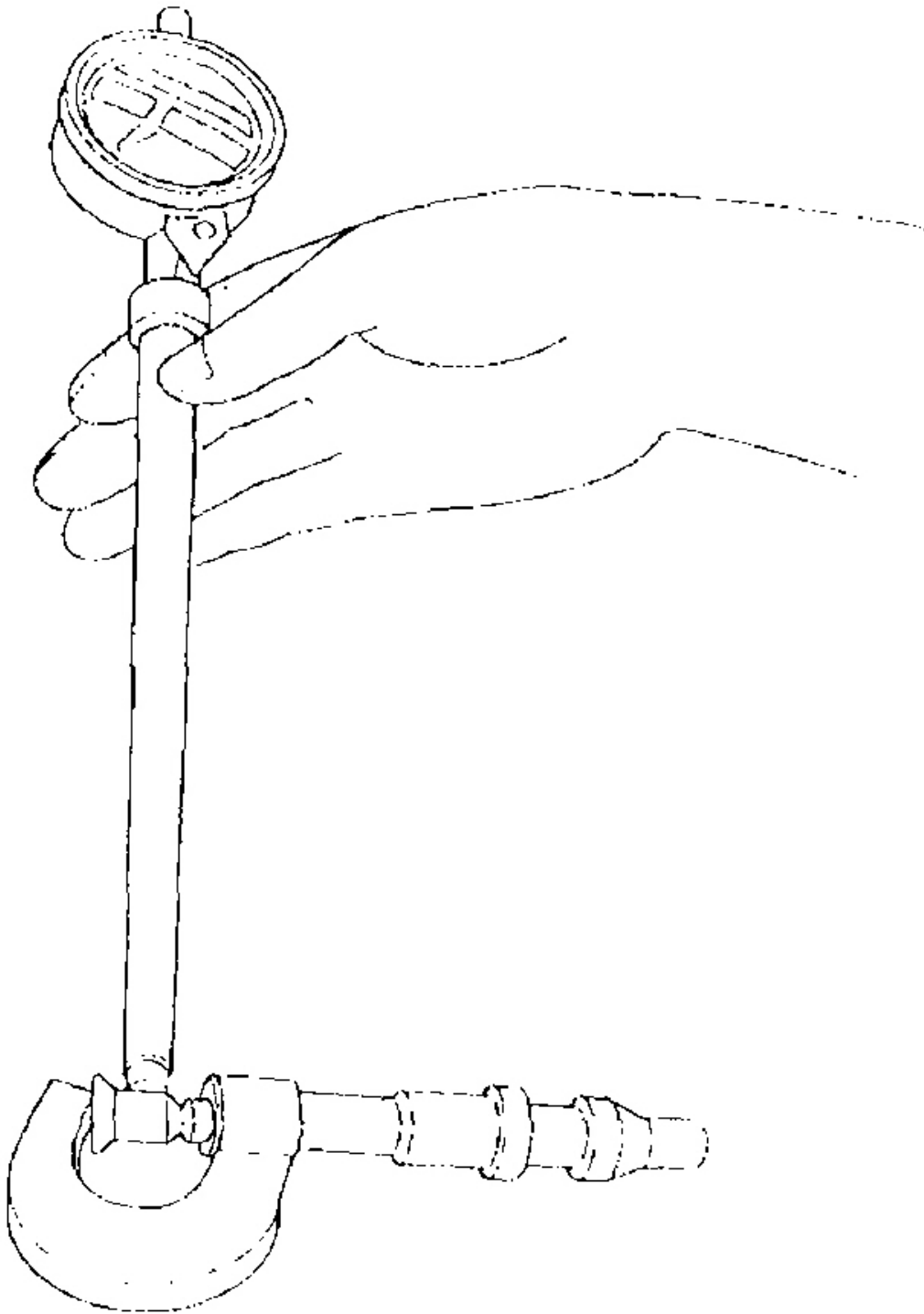
Standard (New): 18.996-19.000 mm (0.7479-0.7480 in.)



G01397505

Fig. 248: Measuring Diameter Of Piston Pin
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Zero the dial indicator to the piston pin diameter.



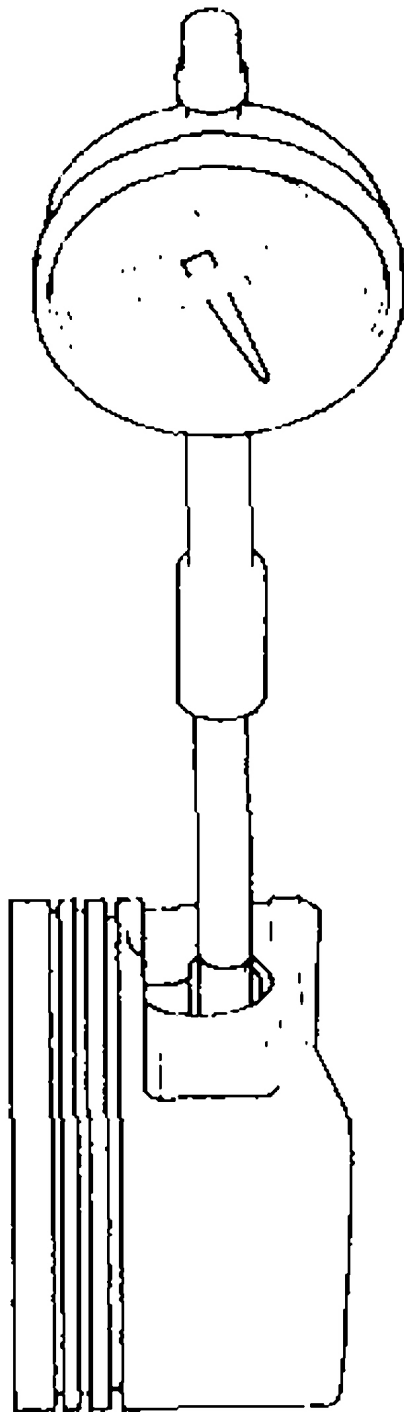
G01397506

Fig. 249: Zeroing Dial Indicator To Piston Pin Diameter
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Measure the piston pin-to-piston clearance.

Piston Pin-to-Piston Clearance

Standard (New): 0.010-0.020 mm (0.0004-0.0008 in.)



G01397507

Fig. 250: Measuring Piston-To-Piston Clearance
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Check the difference between the piston pin diameter and connecting rod small end diameter.

Piston Pin-to-Connecting Rod Interference

Standard (New): 0.016-0.036 mm (0.0006-0.0014 in.)

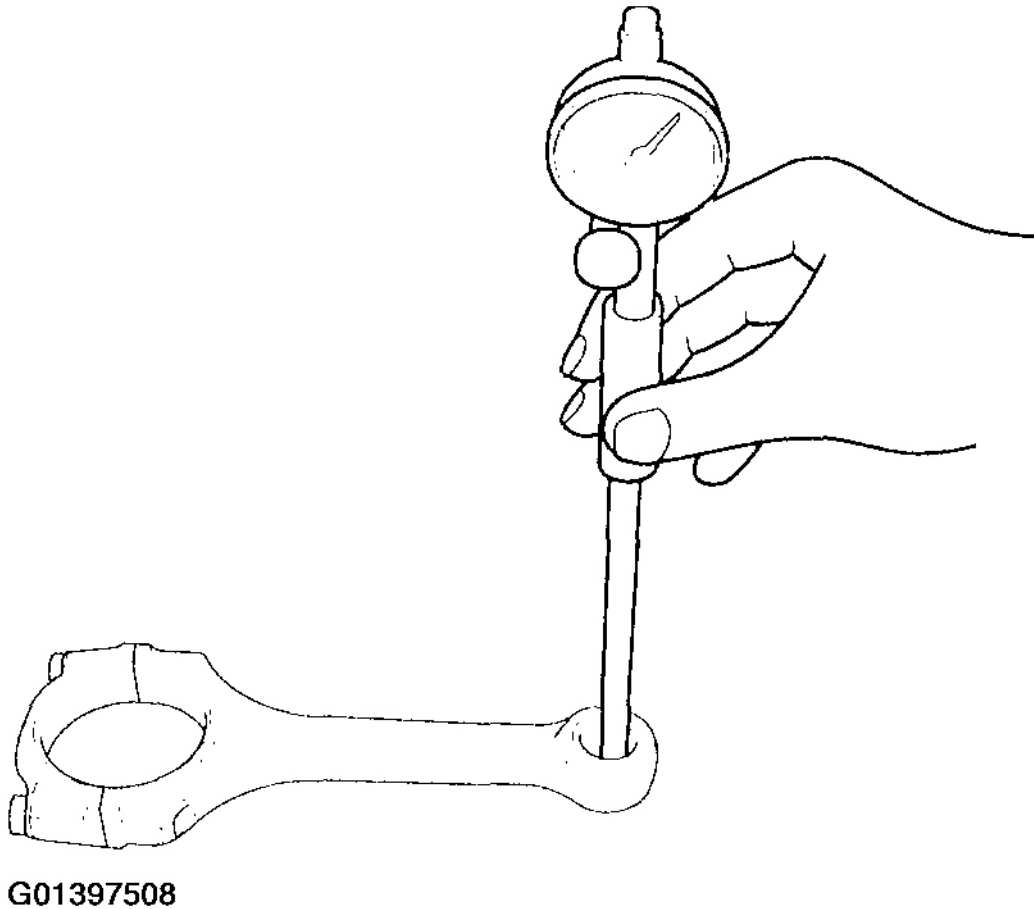
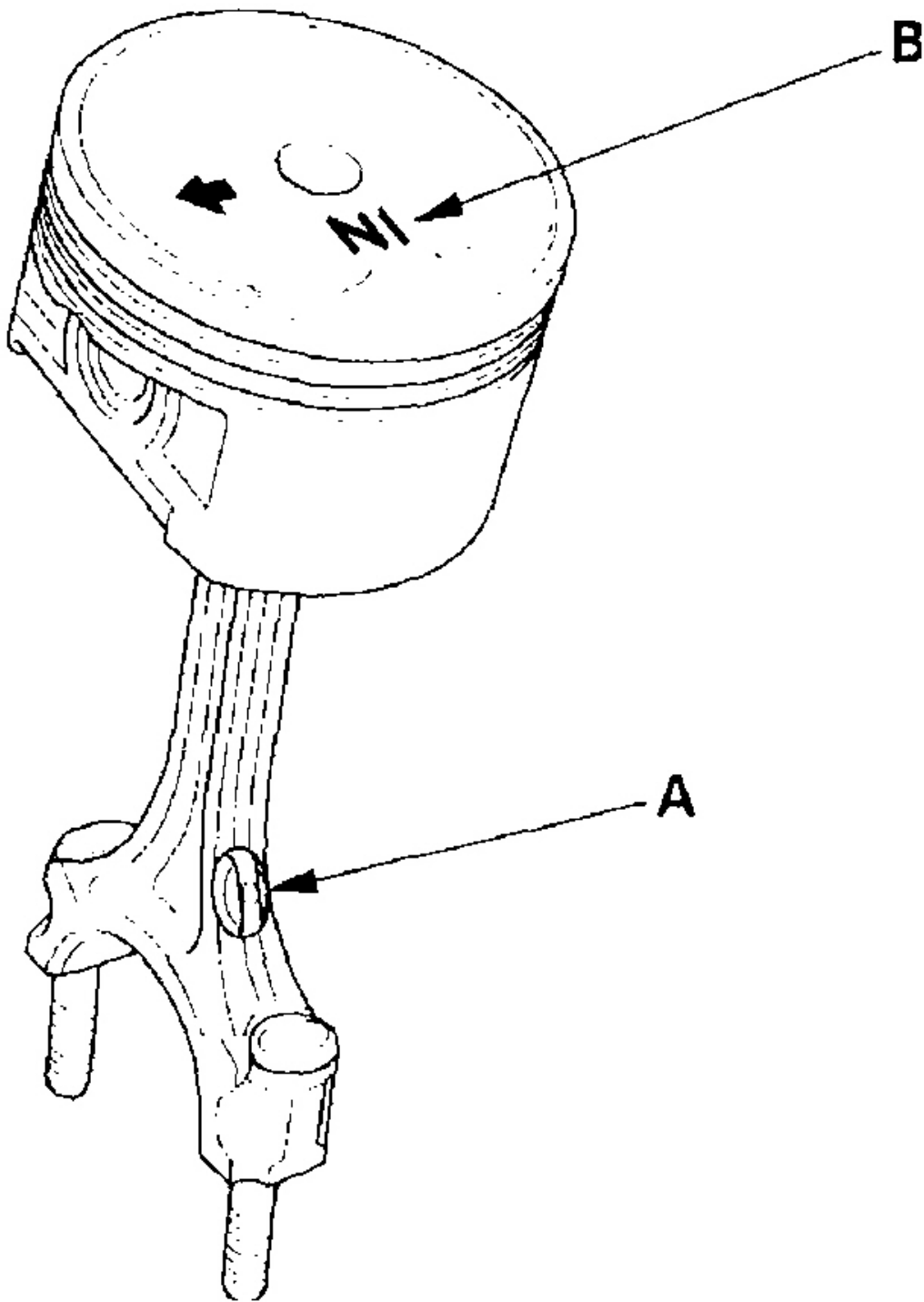


Fig. 251: Checking Difference Between Piston Pin Diameter & Connecting Rod Small End Diameter

Courtesy of AMERICAN HONDA MOTOR CO., INC.

Reassembly

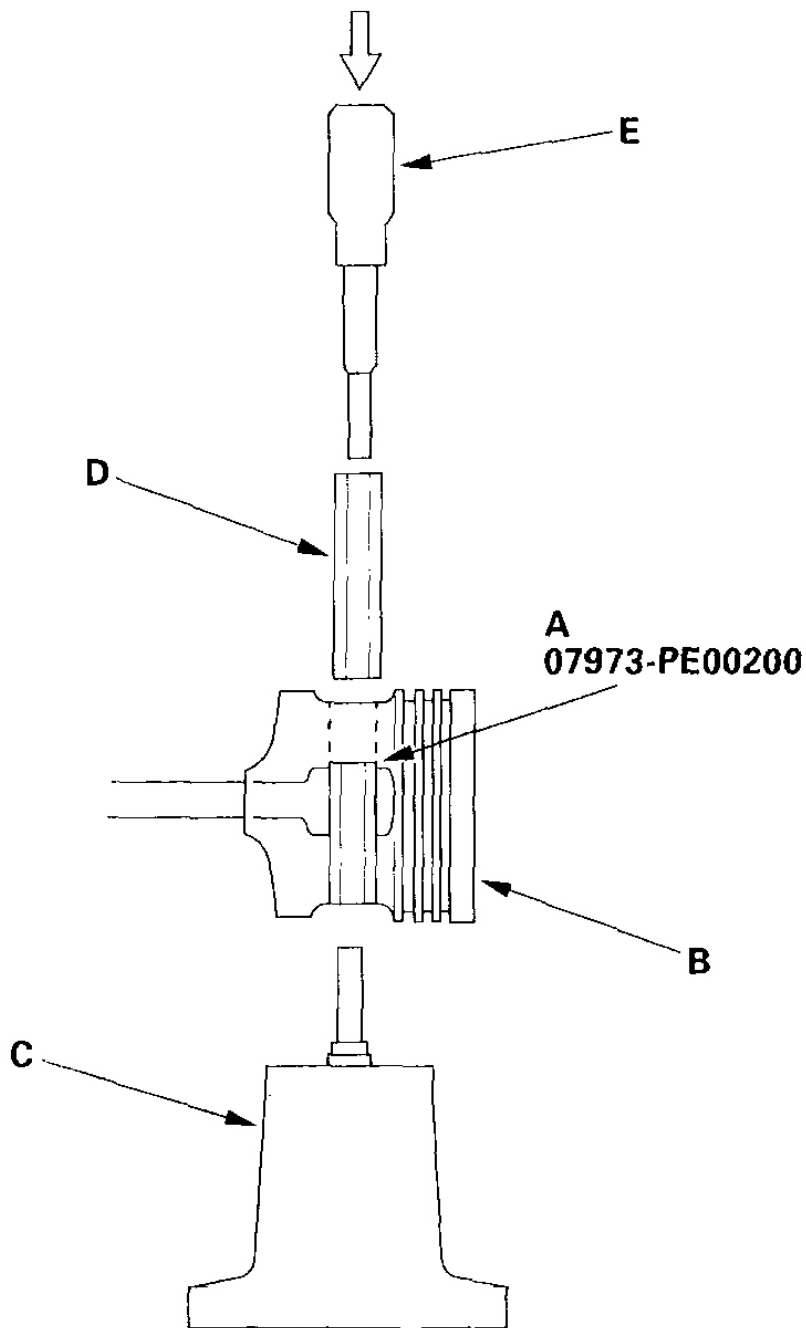
1. Assemble the piston and connecting rod with the connecting rod oil hole (A) facing the "IN" mark (B).



G01397509

Fig. 252: Assembling Piston & Connecting Rod With Connecting Rod Oil Hole
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Insert the pilot collar (A) into the piston and connecting rod.



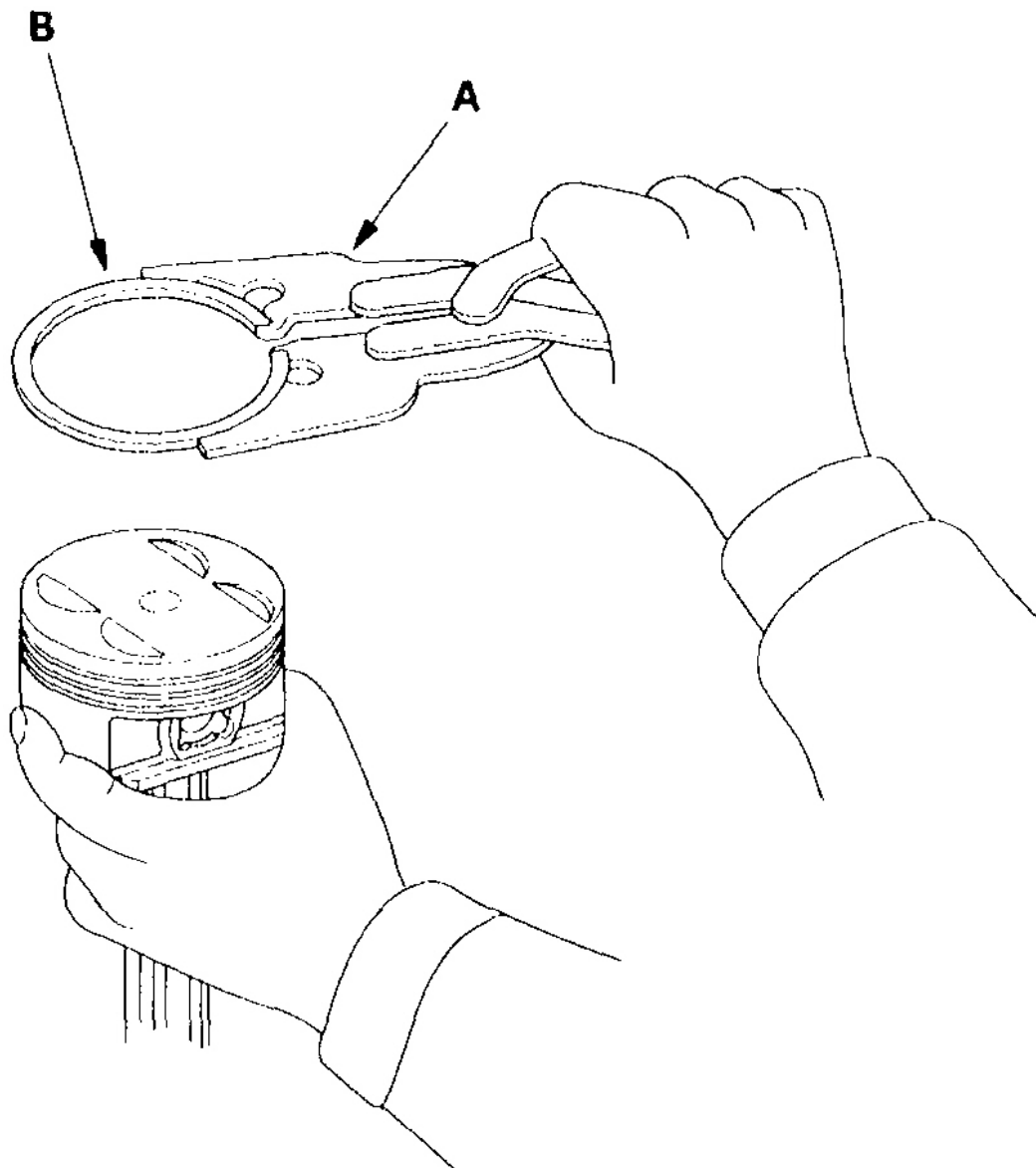
G01397510

Fig. 253: Inserting Pilot Collar**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

3. With the embossed mark facing up, place the piston assembly (B) on the special tool (C). Be sure you position the recessed flat on the piston against the lugs on the base attachment.
4. Press the pin (D) in with the pin driver (E) and a hydraulic press.

PISTON RING REPLACEMENT

1. Remove the piston from the cylinder block (see **Oil Pan Removal**).
2. Using a ring expander (A), remove the old piston rings (B).



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Fig. 254: Using Ring Expander

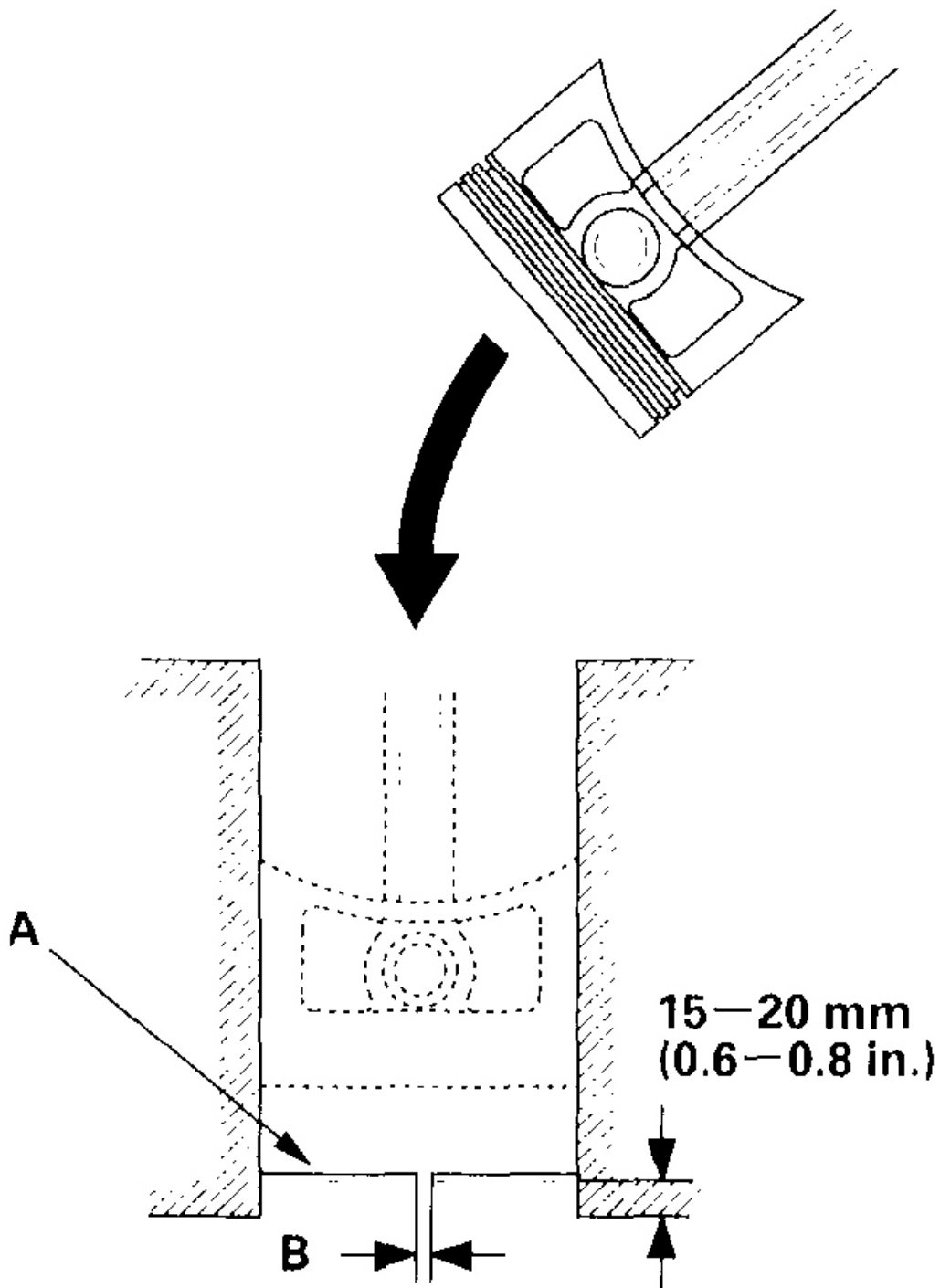
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Clean all ring grooves thoroughly with a squared-off broken ring or ring groove cleaner with a blade to fit the piston grooves.
 - The top ring groove is 1.0 mm (0.04 in.) wide.
 - The second ring groove is 1.2 mm (0.05 in.) wide.

- The oil ring groove is 2.0 mm (0.08 in.) wide.
- File down a blade if necessary.
- Do not use a wire brush to clean the ring grooves, or cut the ring grooves deeper with cleaning tools.

NOTE: **If the piston is to be separated from the connecting rod, do not install new rings yet.**

4. Using a piston, push a new ring (A) into the cylinder bore 15-20 mm (0.6-0.8 in.) from the bottom.



G01397512

Fig. 255: Pushing New Ring Into Cylinder Bore
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Measure the piston ring end-gap (B) with a feeler gauge:
 - If the gap is too small, check to see if you have the proper rings for your engine.
 - If the gap is too large, recheck the cylinder bore diameter against the wear limits (see **Block and Piston Inspection**).
 - If the bore is over the service limit, the cylinder block must be rebored.

Piston Ring End-Gap

Top Ring

Standard (New): 0.15-0.30 mm (0.006-0.012 in.)

Service Limit: 0.60 mm (0.024 in.)

Second Ring

Standard (New): 0.30-0.45 mm (0.0120-0.018 in.)

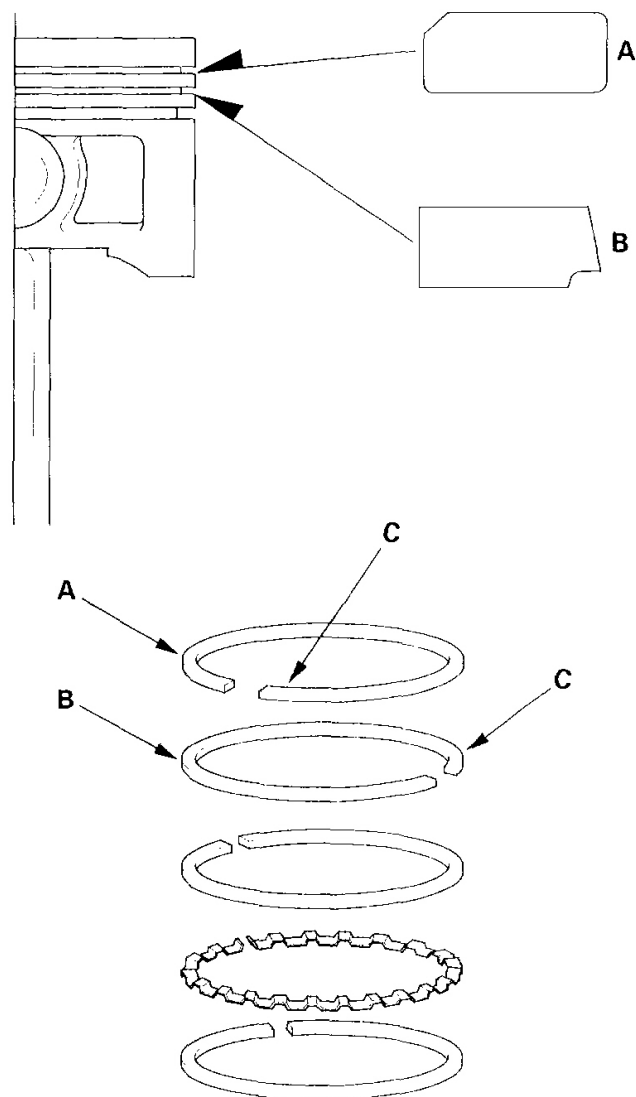
Service Limit: 0.60 mm (0.024 in.)

Oil Ring

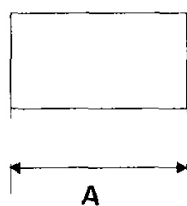
Standard (New): 0.20-0.70 mm (0.008-0.028 in.)

Service Limit: 0.80 mm (0.031 in.)

6. Install the top ring (A) and second ring (B) as shown. The manufacturing marks (C) must be facing upward.



Piston Ring Dimensions:



G01397513

TOP RING (STANDARD):

A: 2.6 mm (0.10 in.)

B: 1.0 mm (0.04 in.)

SECOND RING (STANDARD):

A: 3.0 mm (0.12 in.)

B: 1.2 mm (0.05 in.)

Fig. 256: Installing Top Ring

Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Rotate the rings in their grooves to make sure they do not bind.

8. Position the ring end gaps as shown:

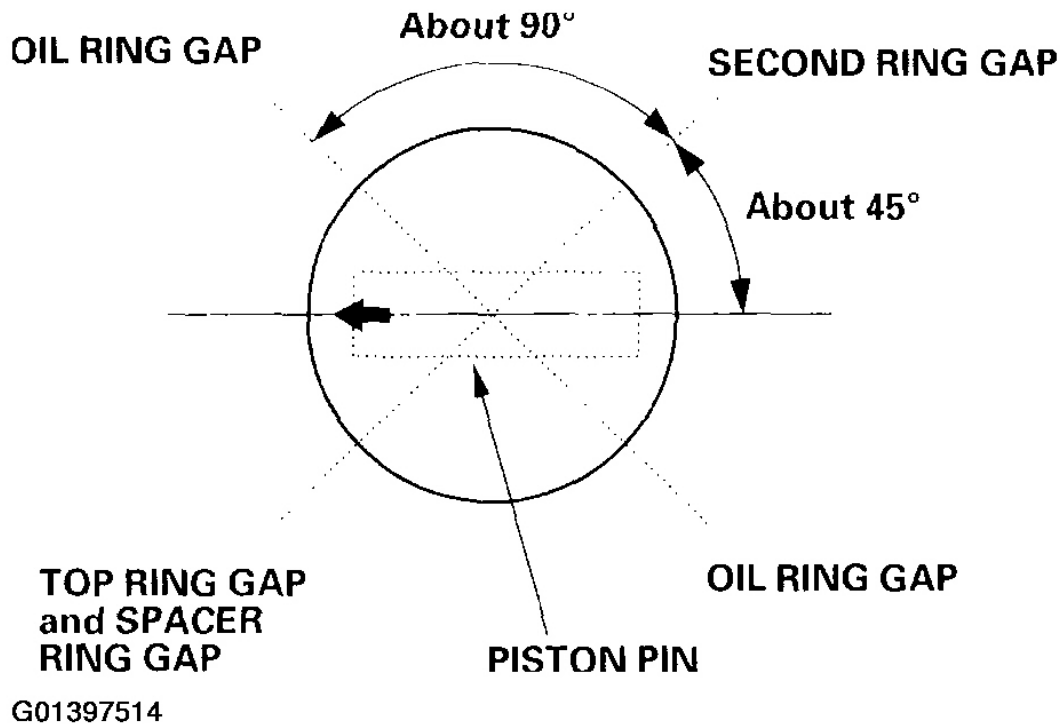


Fig. 257: Positioning Ring End Gaps

Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. After installing a new set of rings, measure the ring-to-groove clearances:

Top Ring Clearance

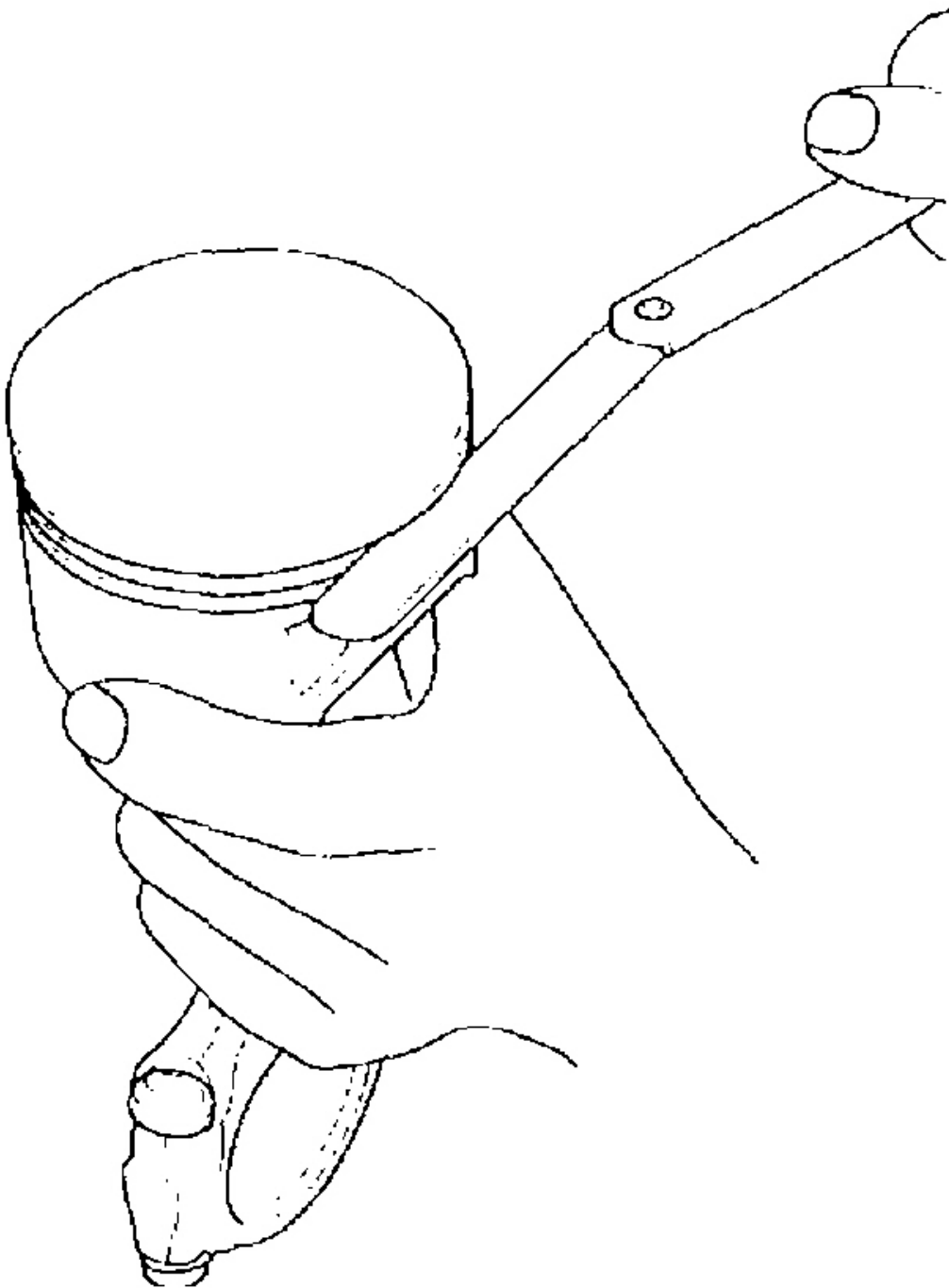
Standard (New): 0.035-0.060 mm (0.0014-0.0024 in.)

Service Limit: 0.13 mm (0.005 in.)

Second Ring Clearance

Standard (New): 0.030-0.055 mm (0.0012-0.0022 in.)

Service Limit: 0.13 mm (0.005 in.)



G01397515

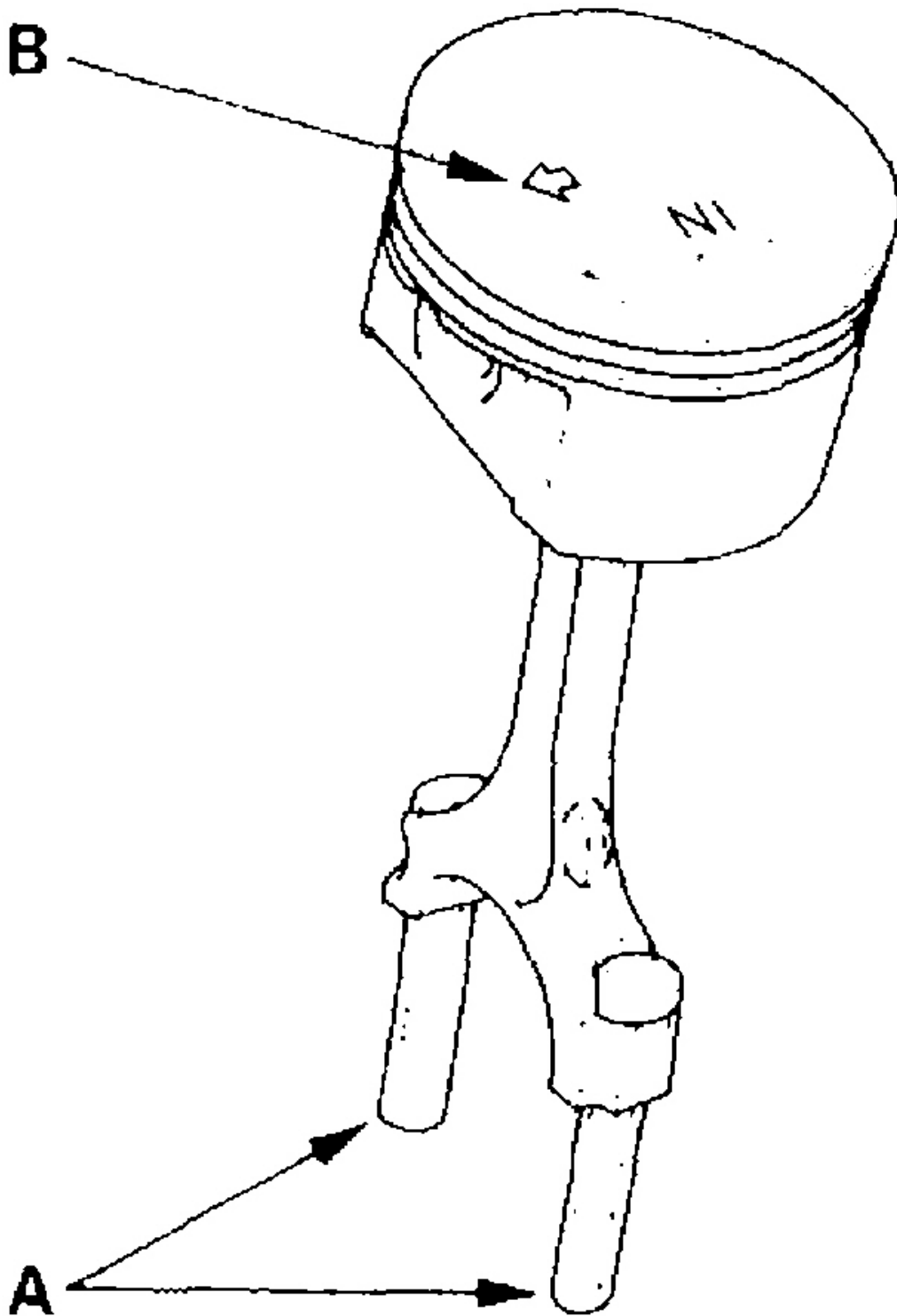
Fig. 258: Measuring Ring-To-Groove Clearances

Courtesy of AMERICAN HONDA MOTOR CO., INC.

PISTON INSTALLATION

If the crankshaft is already installed

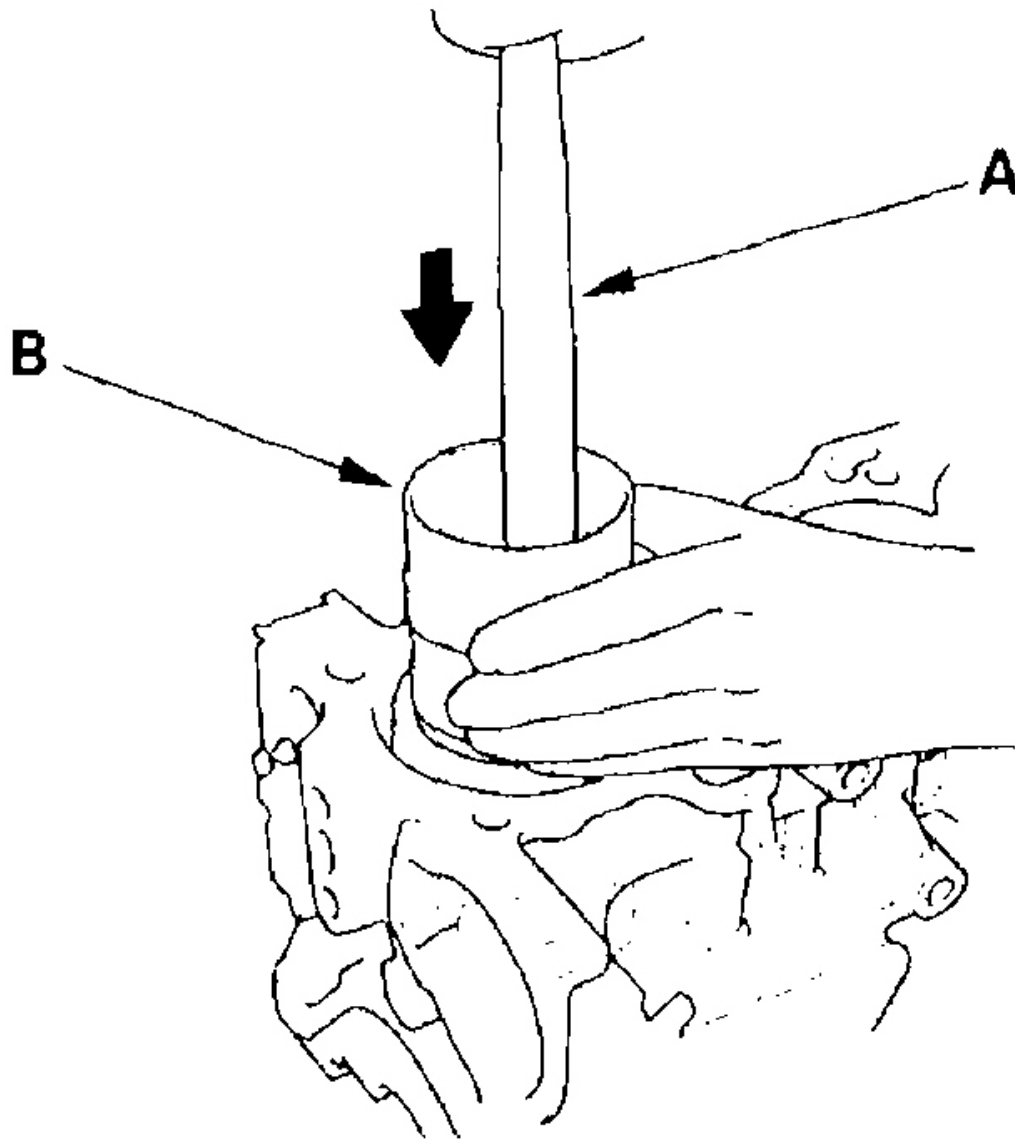
1. Set the crankshaft to BDC for each cylinder.
2. Remove the connecting rod caps, and slip short sections of rubber hoses (A) over the connecting rod bolts. Then install the ring compressor, and check that the bearing is securely in place.



G01397516

Fig. 259: Slipping Short Section Of Rubber Hoses
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Position the arrow (B) facing the timing belt side of the engine.
4. Position the piston in the cylinder, and tap it in using the wooden handle of a hammer (A). Maintain downward force on the ring compressor (B) to prevent the rings from expanding before entering the cylinder bore.



G01397517

Fig. 260: Tapping Piston In Cylinder Using Wooden Handle Of Hammer

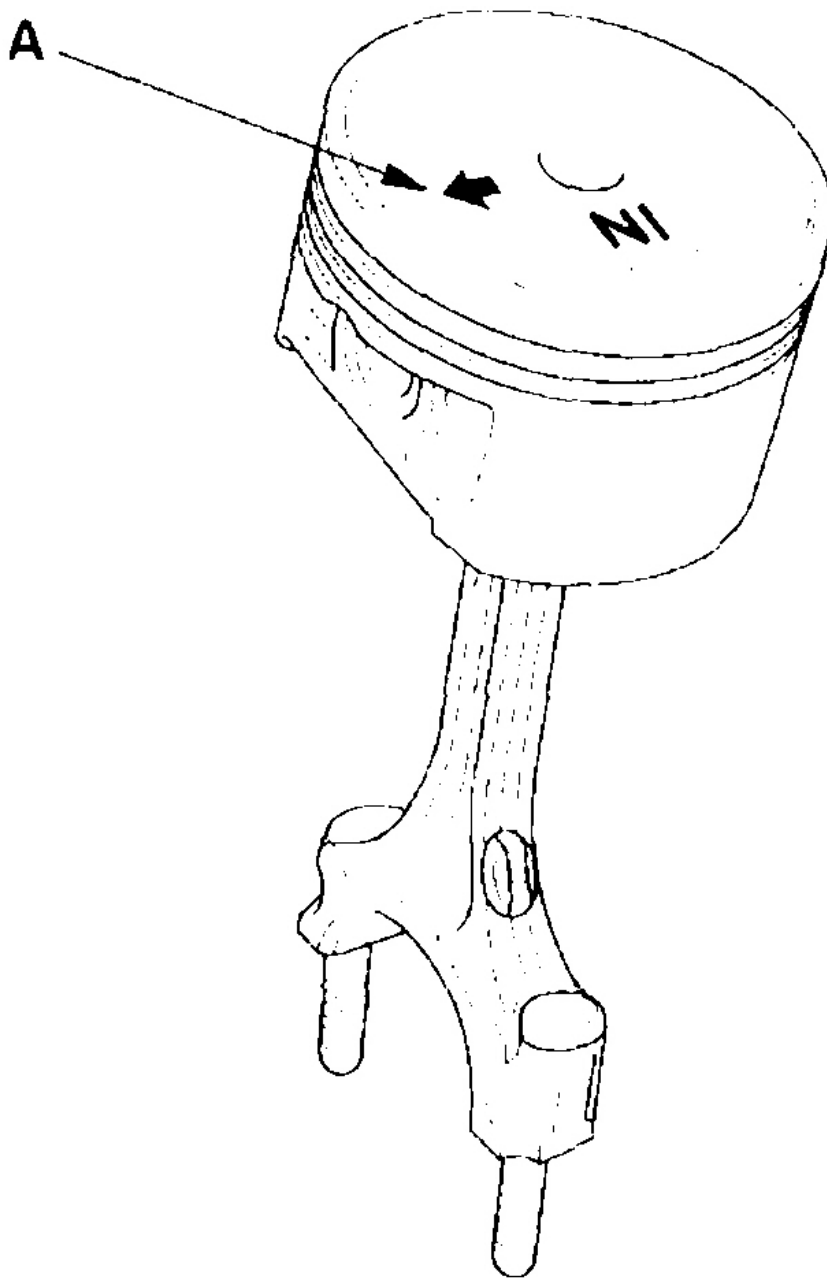
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Stop after the ring compressor pops free, and check the connecting rod-to-crank journal alignment before pushing the piston into place.
6. Check the connecting rod bearing clearance with plastigage (see **Connecting Rod Bearing Replacement**).

7. Apply new engine oil to the bolt threads, then install the rod caps with bearings. Torque the nuts to 32 N.m (3.3 kgf.m, 24 lbf.ft).

If the crankshaft is not installed

1. Remove the connecting rod caps, then install the ring compressor, and check that the bearing is securely in place.
2. Position the arrow (A) facing the timing belt side of the engine.

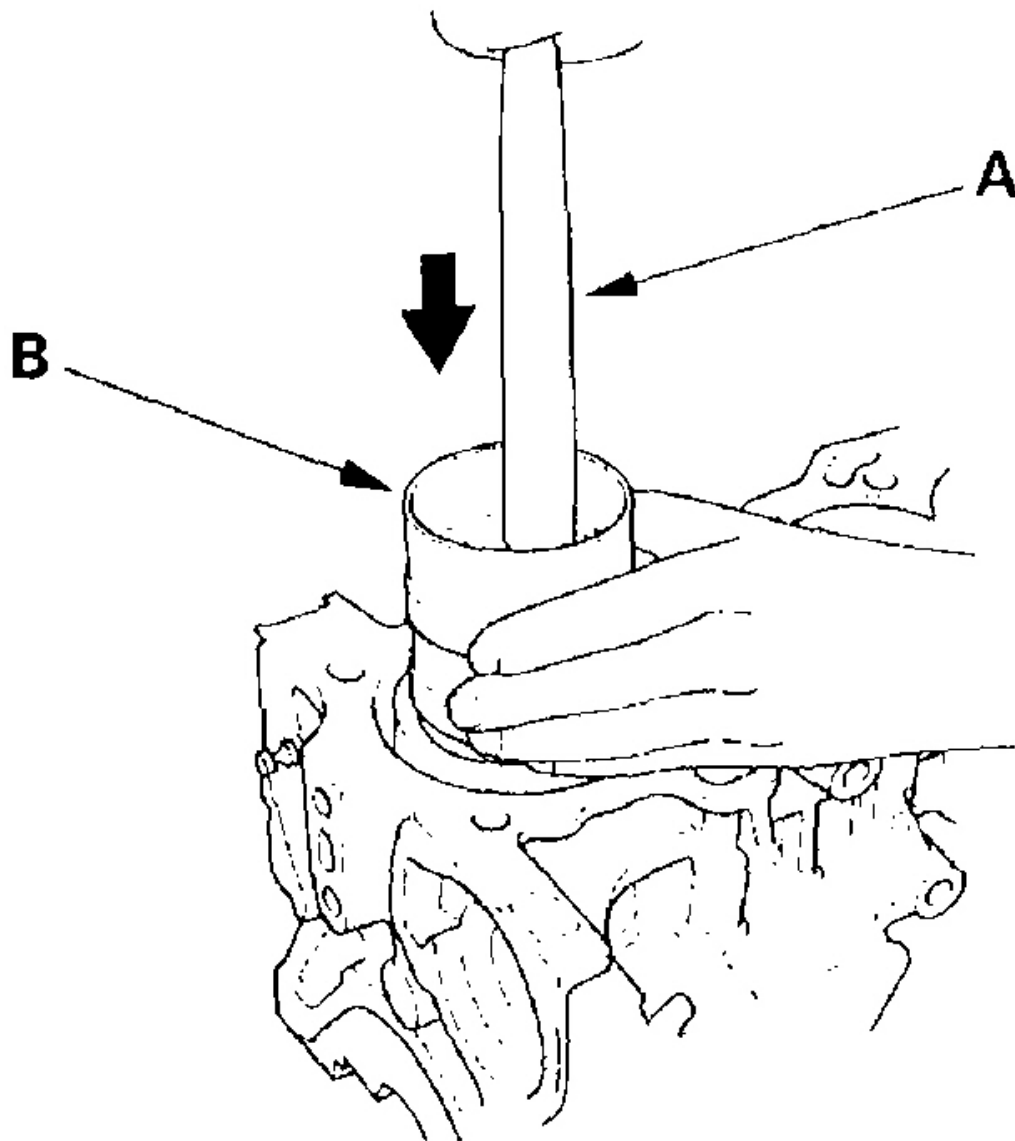


G01397518

Fig. 261: Positioning Arrow Facing Timing Belt Side Of Engine
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Position the piston in the cylinder, and tap it in using the wooden handle of a hammer (A). Maintain downward force on the ring compressor (B) to prevent the rings from expanding before entering the

cylinder bore.



G01397519

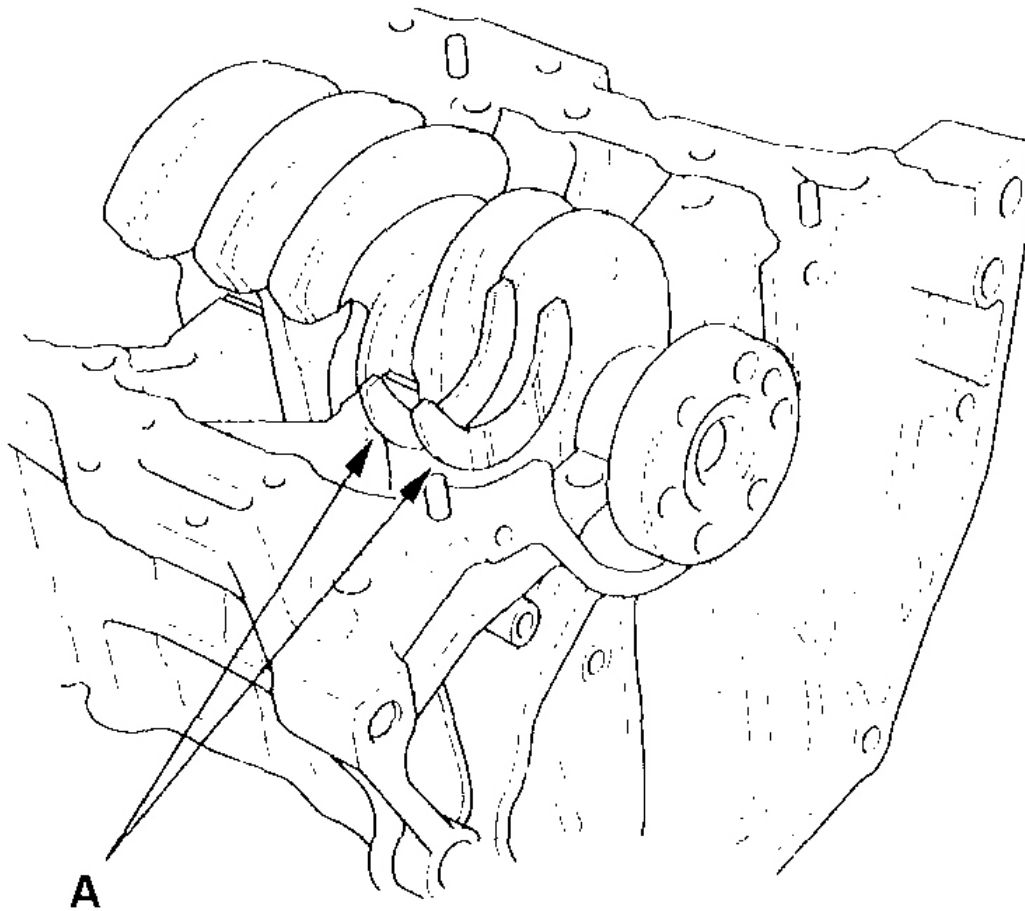
Fig. 262: Tapping Piston In Cylinder Using Wooden Handle Of Hammer
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Position all pistons at top dead center.

CRANKSHAFT INSTALLATION

Special Tools Required

- Handle Driver 07749-0010000
 - Driver Attachment, 96 mm 07948-SB00101 or 07VAD-P8A010A
1. Check the connecting rod bearing clearance with plastigage (see **Connecting Rod Bearing Replacement**).
 2. Check the main bearing clearance with plastigage (see **Crankshaft Main Bearing Replacement**).
 3. Apply new engine oil to the main bearings and rod bearings.
 4. Install the bearing halves in the cylinder block and connecting rods.
 5. Hold the crankshaft so rod journal No. 2 and rod journal No. 3 are straight up, and lower the crankshaft into the block.
 6. Apply new engine oil to the thrust washer surfaces. Install the thrust washers (A) on both edges of the No. 4 main bearing recess.



G01397520

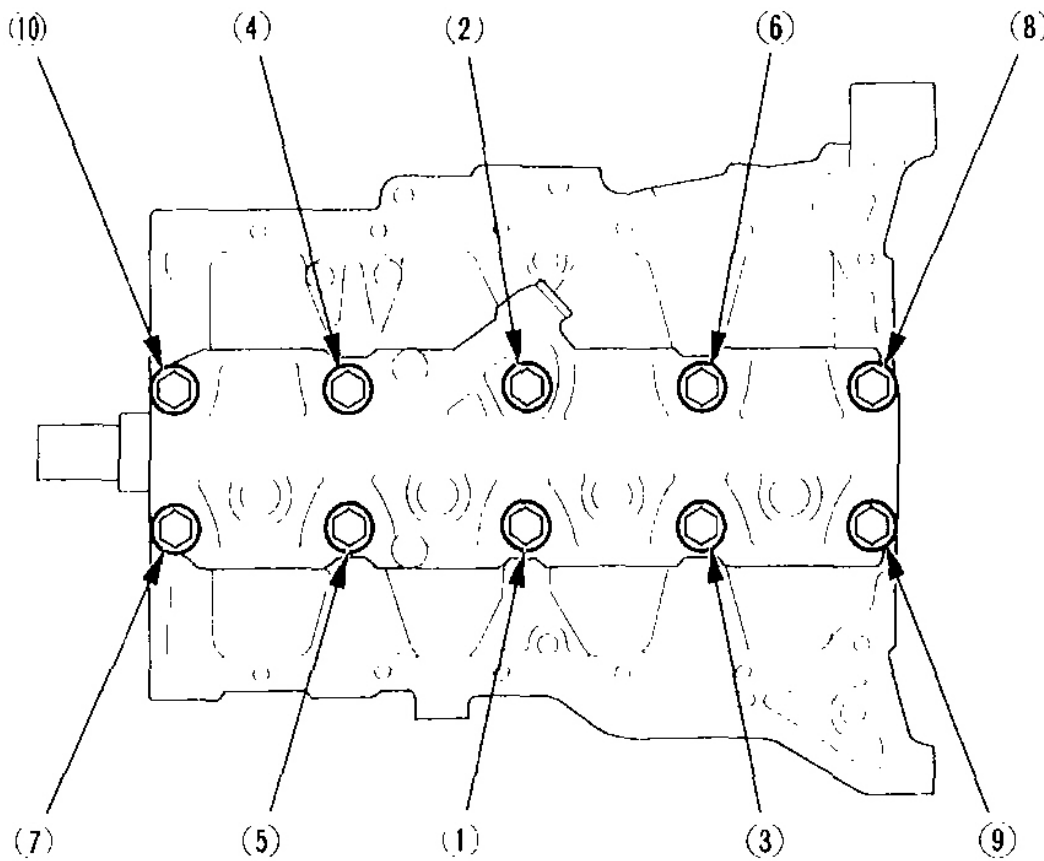
Fig. 263: Installing Thrust Washers

Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Apply new engine oil to the threads of the connecting rod bolts.
8. Seat the rod journals into connecting rod No. 1 and connecting rod No. 4. Install the caps and nuts finger tight. Install the cap so the bearing recess is on the same side as the recess in the rod.
9. Rotate the crankshaft clockwise, and seat the journals into connecting rod No. 2 and connecting rod No. 3. Install the connecting rod cap and bolts finger tight.
10. Tighten the connecting rod bolts to 32 N.m (3.3 kgf.m, 24 lbf.ft).
11. Install the bearing cap bridge. Coat the bolt threads with engine oil.
12. Torque the bearing cap bridge bolts sequentially in two steps.

1st step torque: 25 N.m (2.5 kgf.m, 18 lbf.ft)**2nd step torque:** 51 N.m (5.2 kgf.m, 38 lbf.ft)

NOTE: Whenever any crankshaft or connecting rod bearing is replaced, it is necessary after reassembly to run the engine at idling speed until it reaches normal operating temperature, then continue to run it for about 15 minutes.



G01397521

Fig. 264: Bearing Cap Bolts Tightening Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. The seal mating surface on the engine block end cover should be dry. Apply a light coat of multipurpose grease to the crankshaft and to the lip of the seal.
14. Drive the crankshaft oil seal until the special tool bottoms on the engine block end cover.

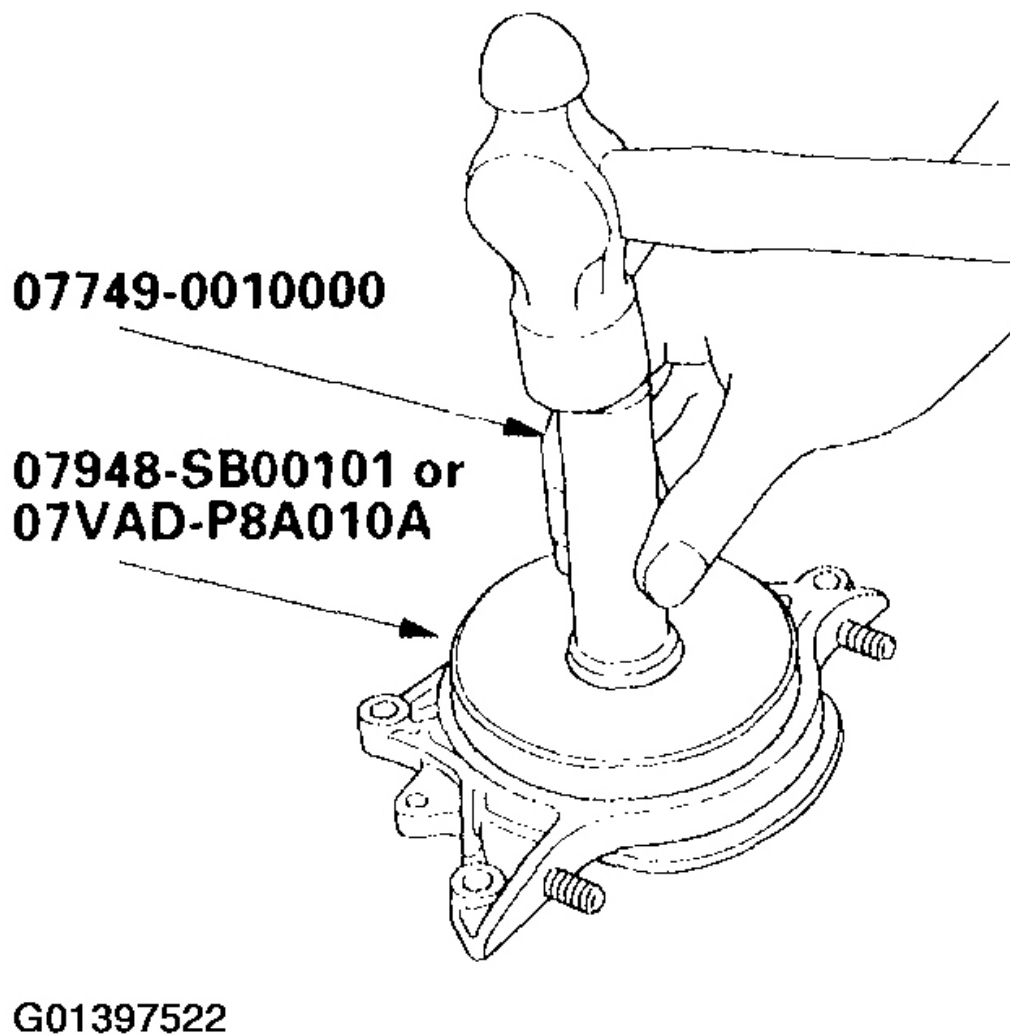


Fig. 265: Driving Crankshaft Oil Seal Until Special Tool Bottoms On Engine Block
Courtesy of AMERICAN HONDA MOTOR CO., INC.

15. Confirm that the clearance is equal all the way around with a feeler gauge.

Clearance: 0.5-0.8 mm (0.02-0.03 in.)

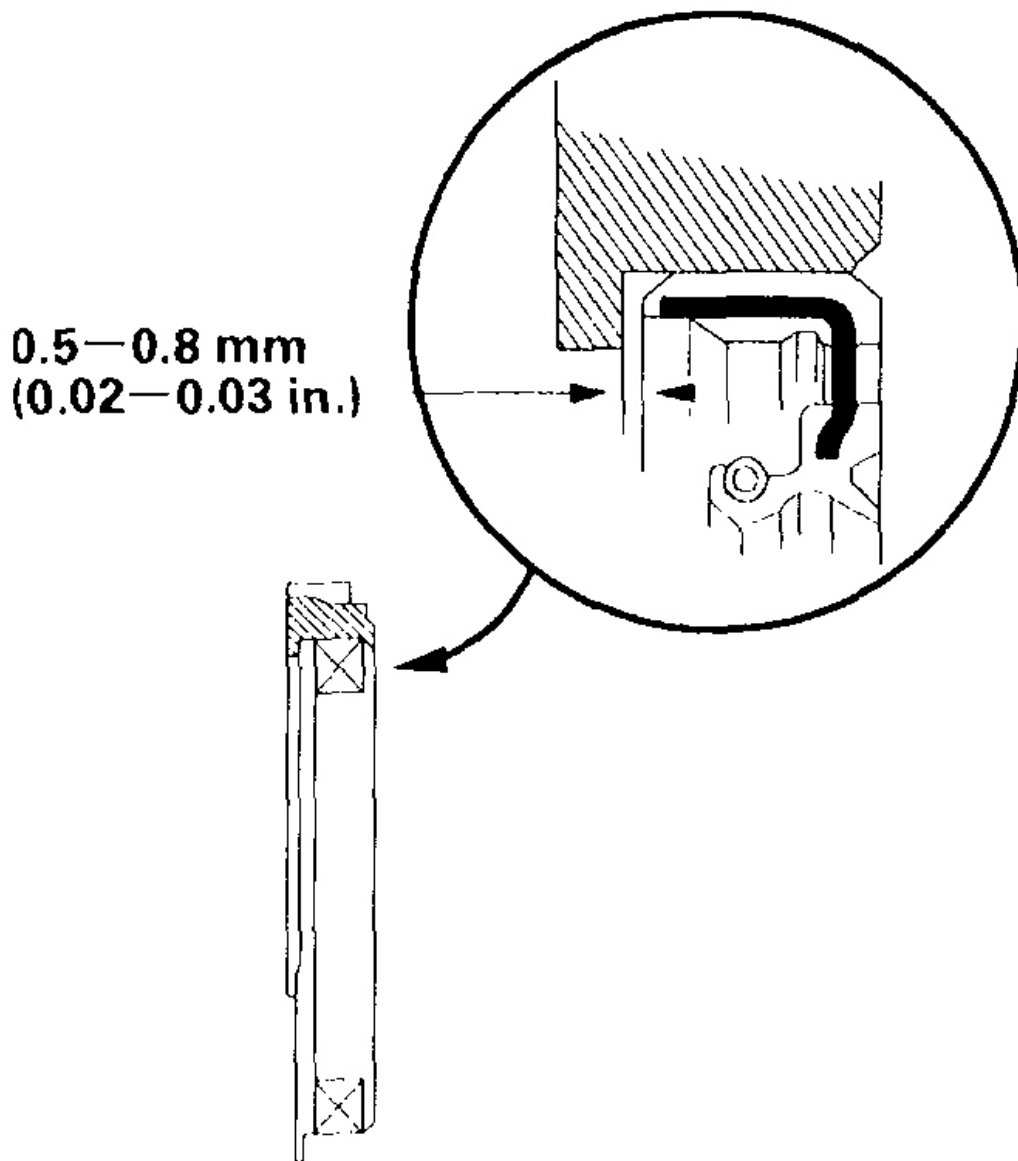
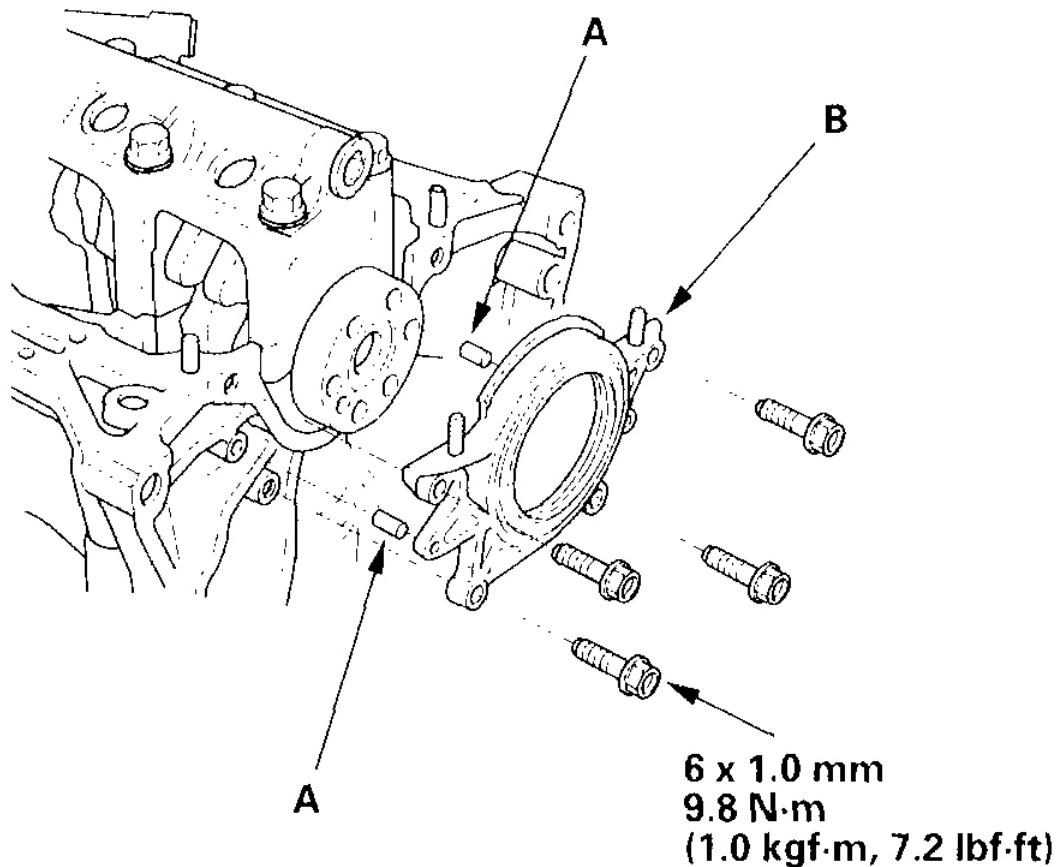
**G01397523**

Fig. 266: Confirming Clearance Is Equal All Around With Feeler Gauge
Courtesy of AMERICAN HONDA MOTOR CO., INC.

16. Remove any old liquid gasket from the engine block end cover mating surfaces, bolts, and bolt holes.
17. Clean and dry the engine block end cover mating surfaces.
18. Apply liquid gasket, P/N 08718-0001 or 08718-0003, evenly to the block mating surface of the engine

block end cover and to the inner threads of the bolt holes. Install the dowel pins (A), and the engine block end cover (B) on the cylinder block.

NOTE: Do not install the parts if 4 minutes or more have elapsed since applying the liquid gasket. Instead, reapply liquid gasket after removing the old residue.



G01397524

Fig. 267: Installing Engine Block End Cover With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

19. After assembly, wait at least 30 minutes before filling the engine with new engine oil.
20. Remove any old liquid gasket from the oil pump mating surfaces, bolts, and bolt holes.
21. Clean and dry the oil pump mating surfaces.
22. Install the oil pump (A).
 - 1 Install a new crankshaft oil seal in the oil pump.

- **2** Apply liquid gasket, P/N 08718-0001 or 08718-0003, evenly to the block mating surface of the oil pump and to the inner threads of the bolt holes.

NOTE: **Do not install the parts if 4 minutes or more have elapsed since applying the liquid gasket. Instead, reapply liquid gasket after removing the old residue.**

- **3** Grease the lip of the oil seal and apply oil to the new O-ring (B).
- **4** Install the dowel pins (C), then align the inner rotor with the crankshaft and install the oil pump.
- **5** Clean the excess grease off the crankshaft and check the seal for distortion.

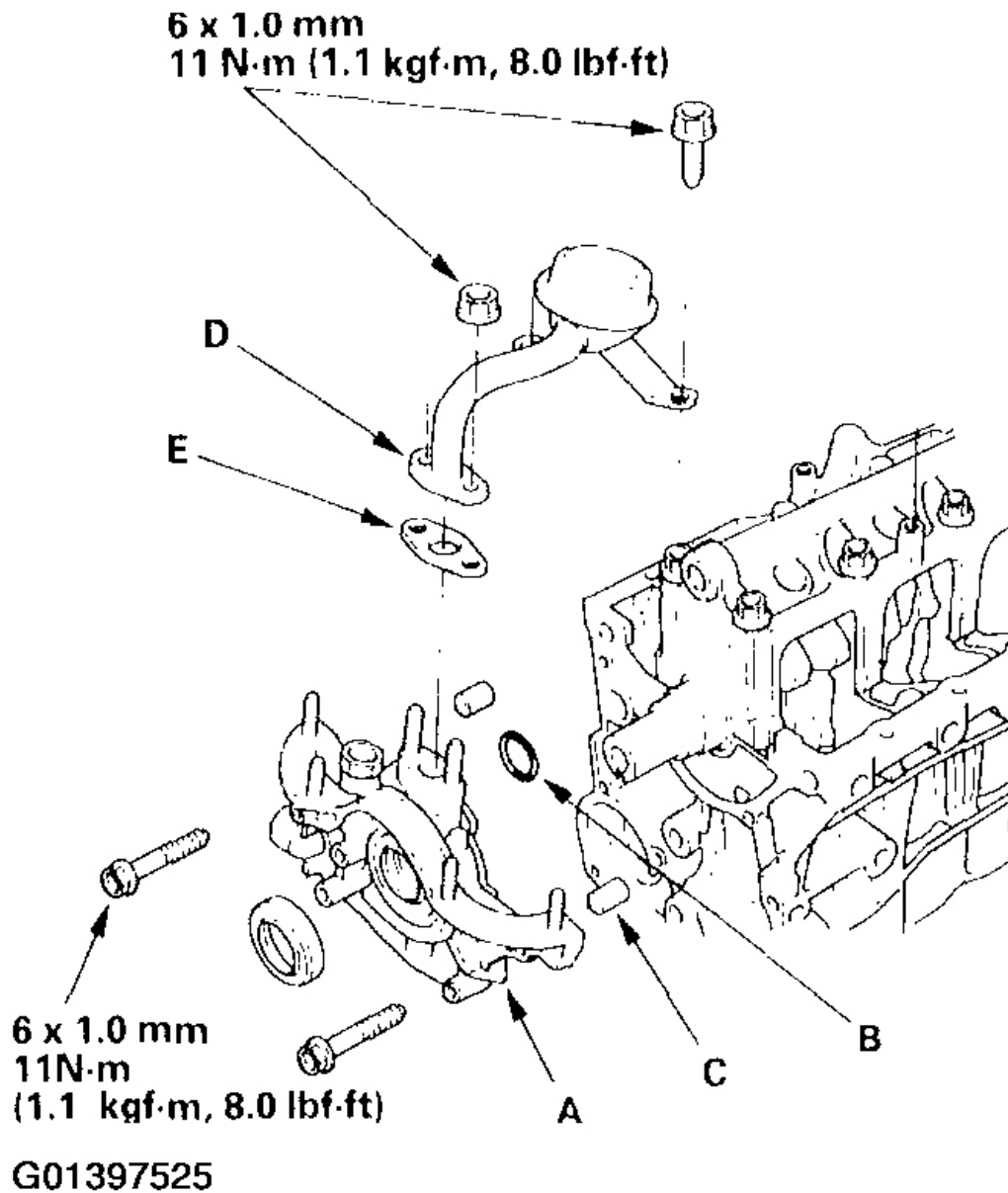


Fig. 268: Installing Oil Pump With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

23. Install the oil screen (D) with a new gasket (E).
24. Install the oil pan:
 - Aluminum Oil Pan (see Aluminum Oil Pan (EX, HX models)).
 - Steel Oil Pan (see Steel Oil Pan (LX, DX models)).

25. Install the cylinder head (see **Cylinder Head Installation**).
26. Install the transmission:
 - Manual transmission (see **TRANSMISSION FLUID INSPECTION AND REPLACEMENT**).
 - Automatic transmission (see **REMOVAL & INSTALLATION (EXCEPT HYBRID)**).
 - CVT (see **REMOVAL & INSTALLATION (CVT)**).
27. Install the engine assembly (see **Engine Installation**).

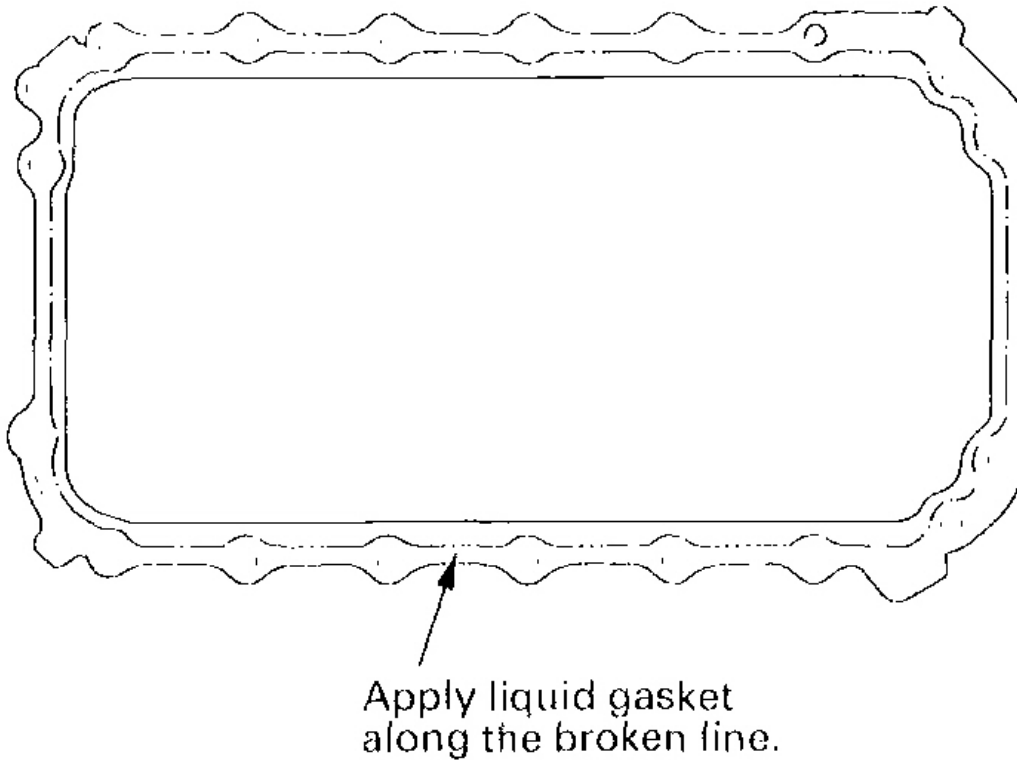
OIL PAN INSTALLATION

Aluminum Oil Pan (EX, HX models)

1. Remove any old liquid gasket from the oil pan mating surfaces, bolts, and bolt holes.
2. Clean and dry the oil pan mating surfaces.
3. Apply liquid gasket, P/N 08718-0001 or 08718-0003, evenly to the oil pan mating surface of the block and to the inner threads of the bolt holes.

NOTE:

- **Apply a 4 mm wide bead of liquid gasket.**
- **Apply a second bead where the two ends of the first bead meet.**
- **Do not install the parts if 4 minutes or more have elapsed since applying liquid gasket. Instead, reapply liquid gasket after removing the old residue.**

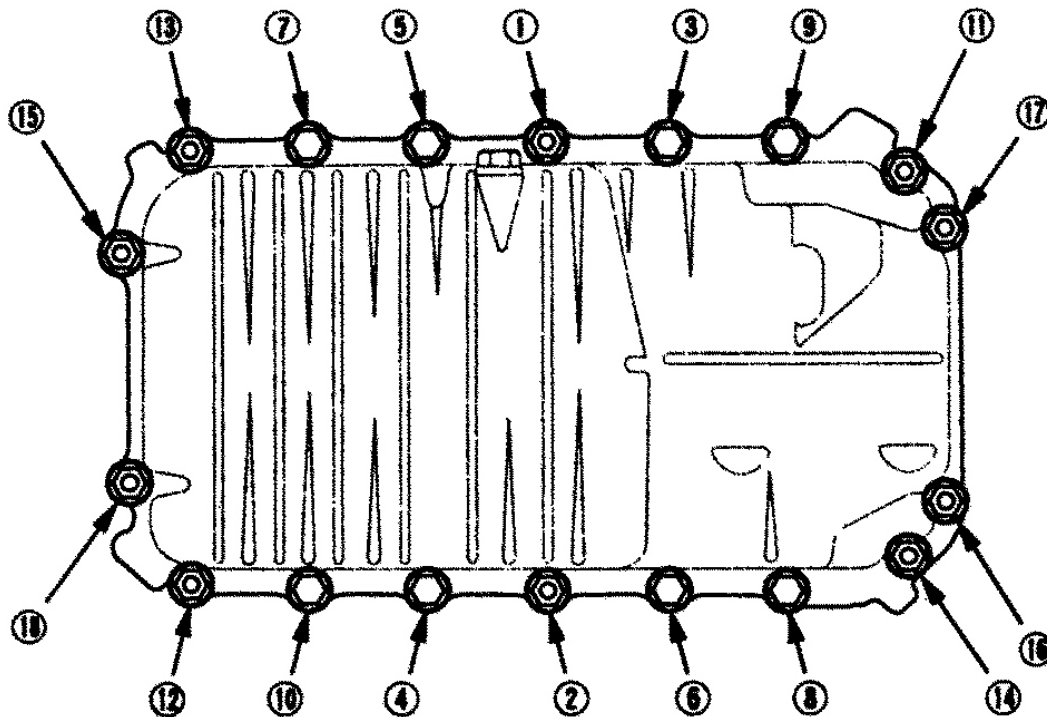


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Fig. 269: Applying Liquid Gasket Evenly To Oil Pan Mating Surface
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Install the oil pan on the cylinder block.
5. Tighten the bolts and nuts in two or three steps. In the final step, tighten all bolts and nuts, in sequence to 12 N.m (1.2 kgf.m, 8.7 lbf.ft).

NOTE: After assembly, wait at least 30 minutes before filling the engine with oil.



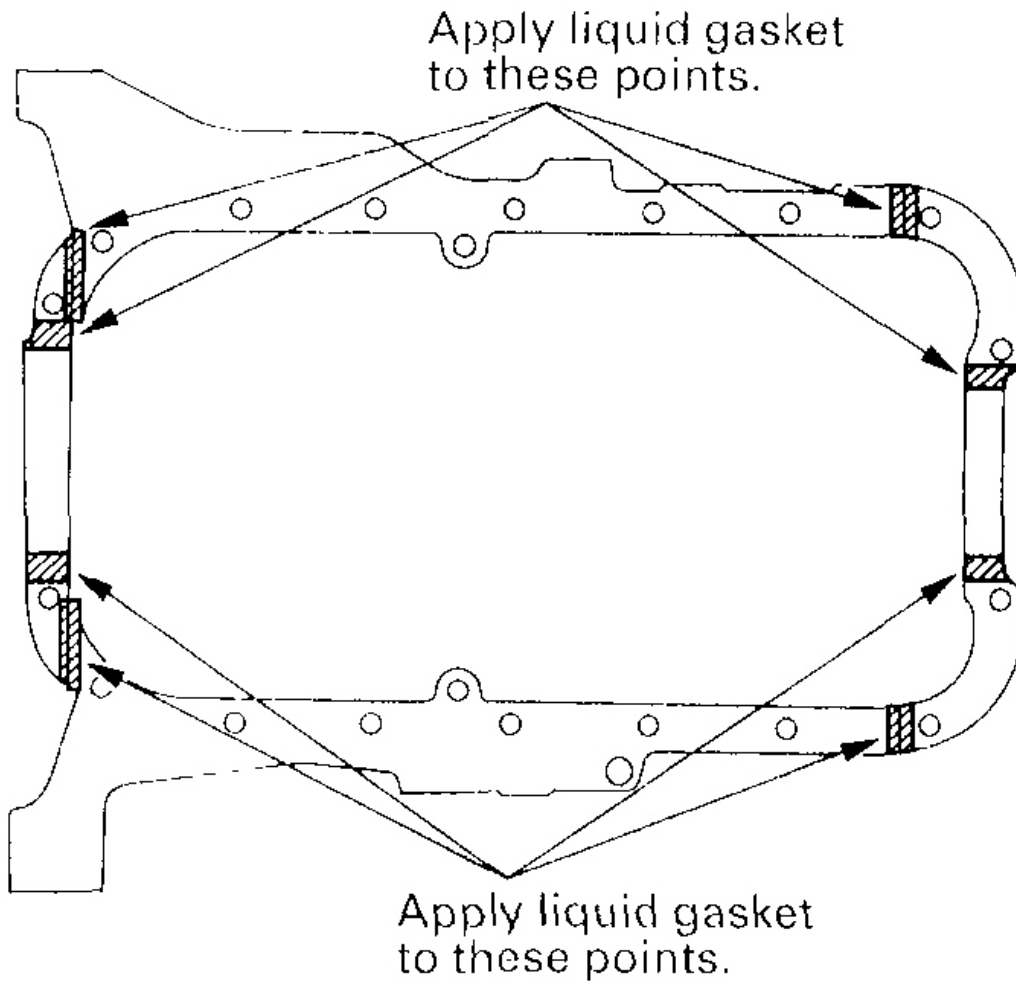
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Fig. 270: Tightening Oil Pan Bolts In Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Steel Oil Pan (LX, DX models)

1. Remove any old liquid gasket from the oil pan mating surfaces, bolts, and bolt holes.
2. Clean and dry the oil pan mating surfaces.
3. Apply liquid gasket, P/N 08718-0001 or 08718-0003, on the oil pump and engine block end cover mating areas.

NOTE: Do not install the parts if 4 minutes or more have elapsed since applying liquid gasket. Instead, reapply liquid gasket after removing the old residue.

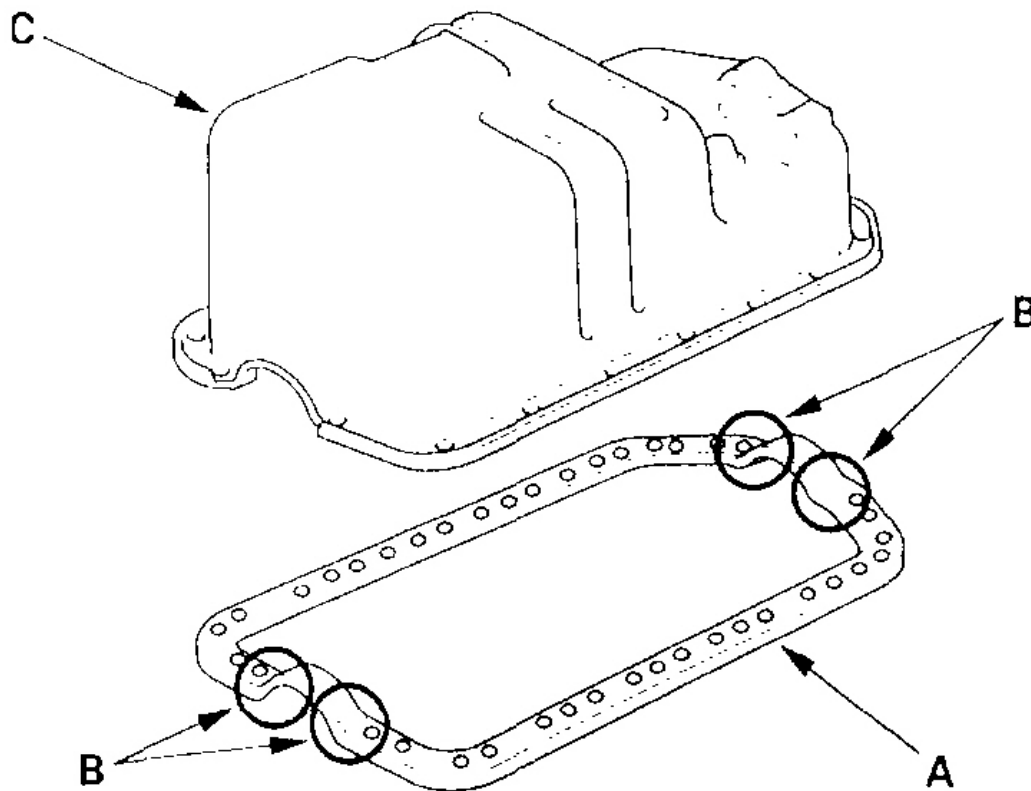


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Fig. 271: Applying Liquid Gasket On Oil Pump & Engine Block
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Apply liquid gasket, P/N 08718-0001 or 08718-0003, to the new oil pan gasket (A) at the four corners of the recesses (B), then install the oil pan (C) on the cylinder block.

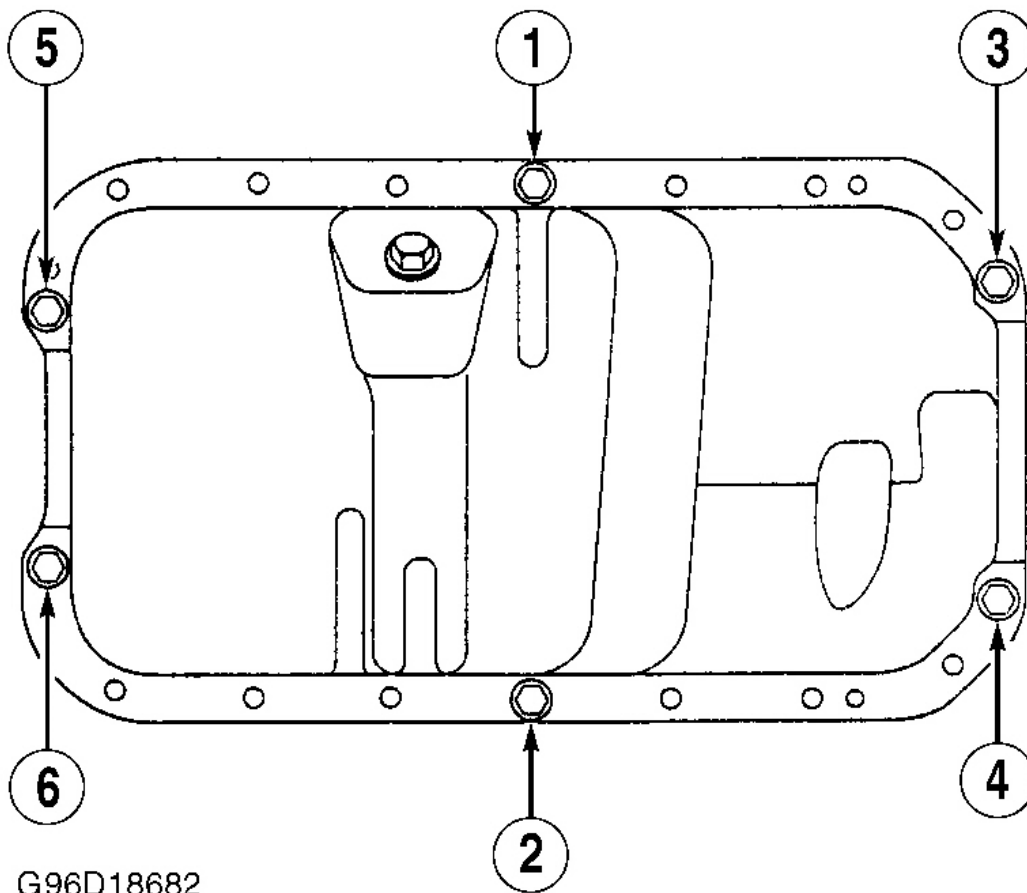
NOTE: Do not install the parts if 4 minutes or more have elapsed since applying liquid gasket. Instead, reapply liquid gasket after removing the old residue.



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Fig. 272: Applying Liquid Gasket To New Oil Pan Gasket
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Tighten the bolts and nuts finger tight at six points as shown.



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Fig. 273: Tightening Bolts & Nuts Finger Tight

Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Tighten all bolts and nuts, clockwise in three steps. In the final step, tighten all bolts, in sequence to 12 N.m (1.2 kgf.m, 8.7 lbf.ft).
7. After assembly, wait at least 30 minutes before filling the engine with new engine oil.

PULLEY END CRANKSHAFT OIL SEAL INSTALLATION - IN CAR**Special Tools Required**

Inner driver handle 07746-0030100

1. Clean and dry the crankshaft oil seal housing.
2. Apply a light coat of multipurpose grease to the crankshaft and to the lip of the seal.
3. Using the special tool, drive in the crankshaft oil seal until the driver bottoms against the oil pump. When

the seal is in place, clean any excess grease off the crankshaft and check that the oil seal lip is not distorted.

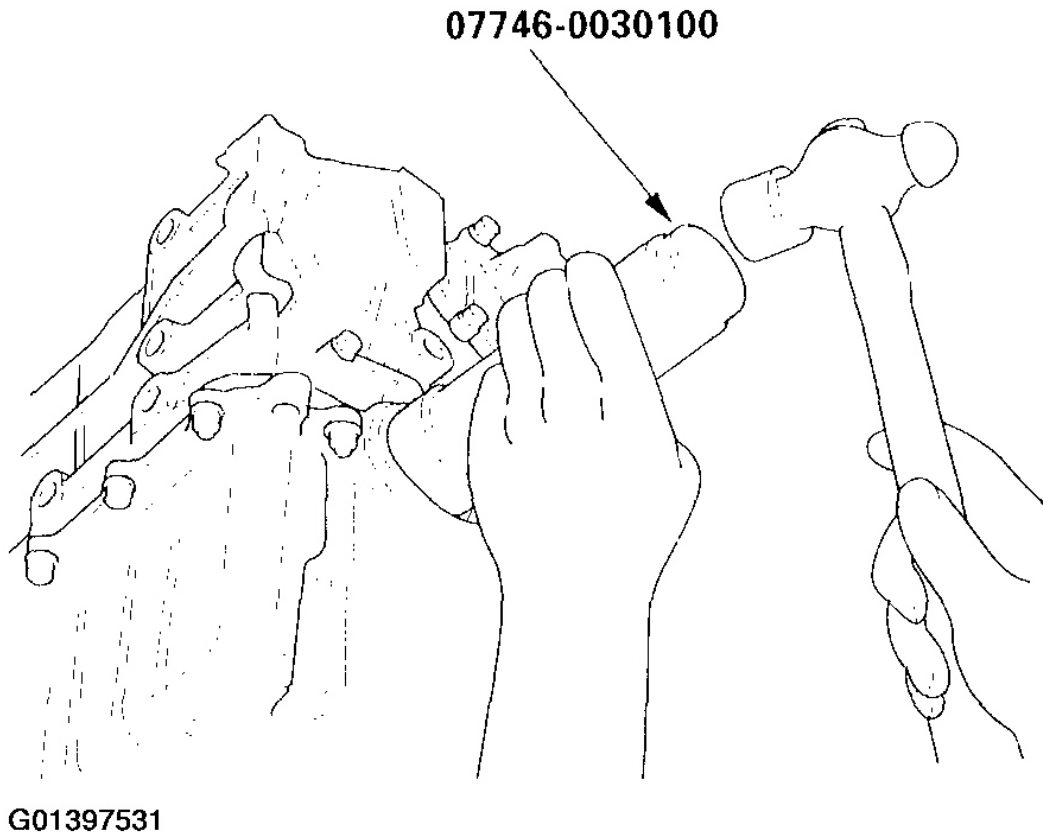


Fig. 274: Driving In Crankshaft Oil Seal With Special Tool
Courtesy of AMERICAN HONDA MOTOR CO., INC.

TRANSMISSION END CRANKSHAFT OIL SEAL INSTALLATION - IN CAR

Special Tools Required

- Driver 07749-0010000
- Driver attachment 07948-SB00101 or 07VAD-P84010A

1. Clean and dry the crankshaft oil seal housing.
2. Apply a light coat of multipurpose grease to the crankshaft and to the lip of the seal.
3. Using the special tools, drive in the crankshaft oil seal until the driver bottoms against the engine block end cover. Align the hole in the driver attachment with the pin on the crankshaft.

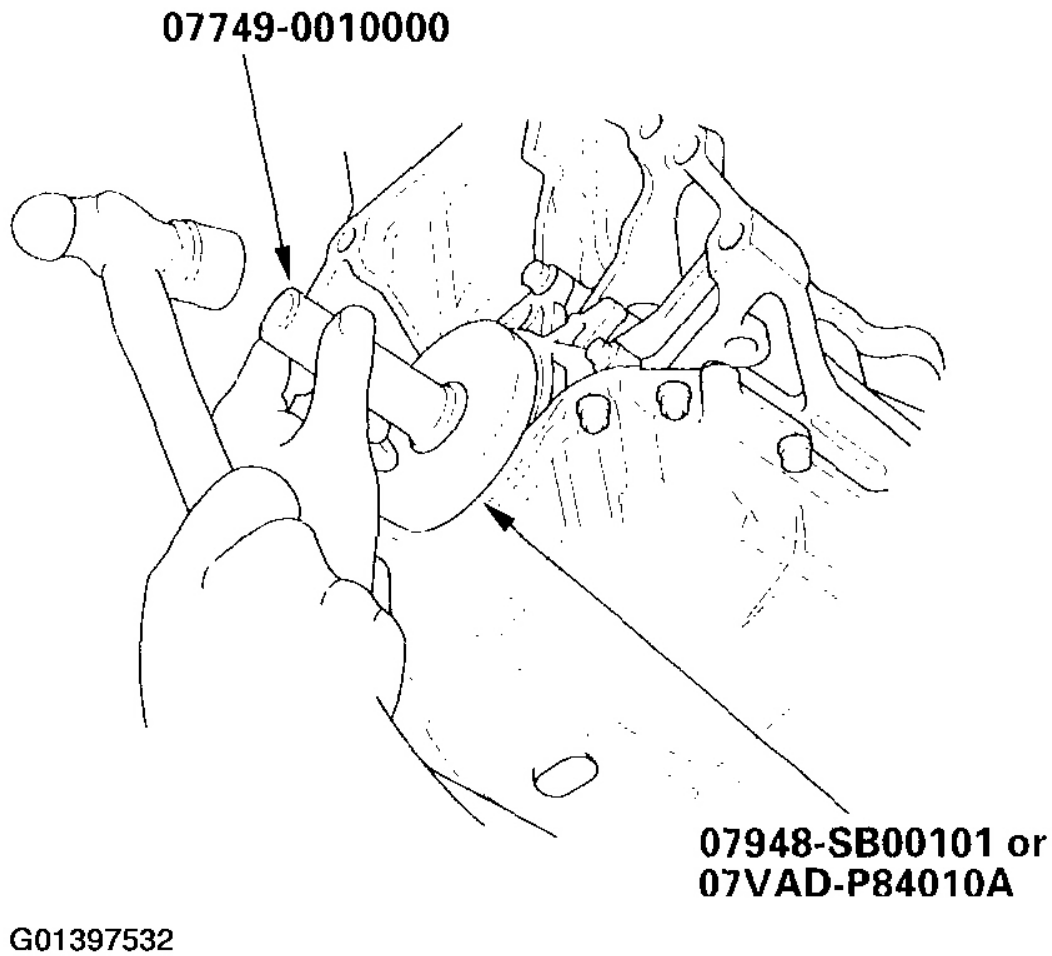
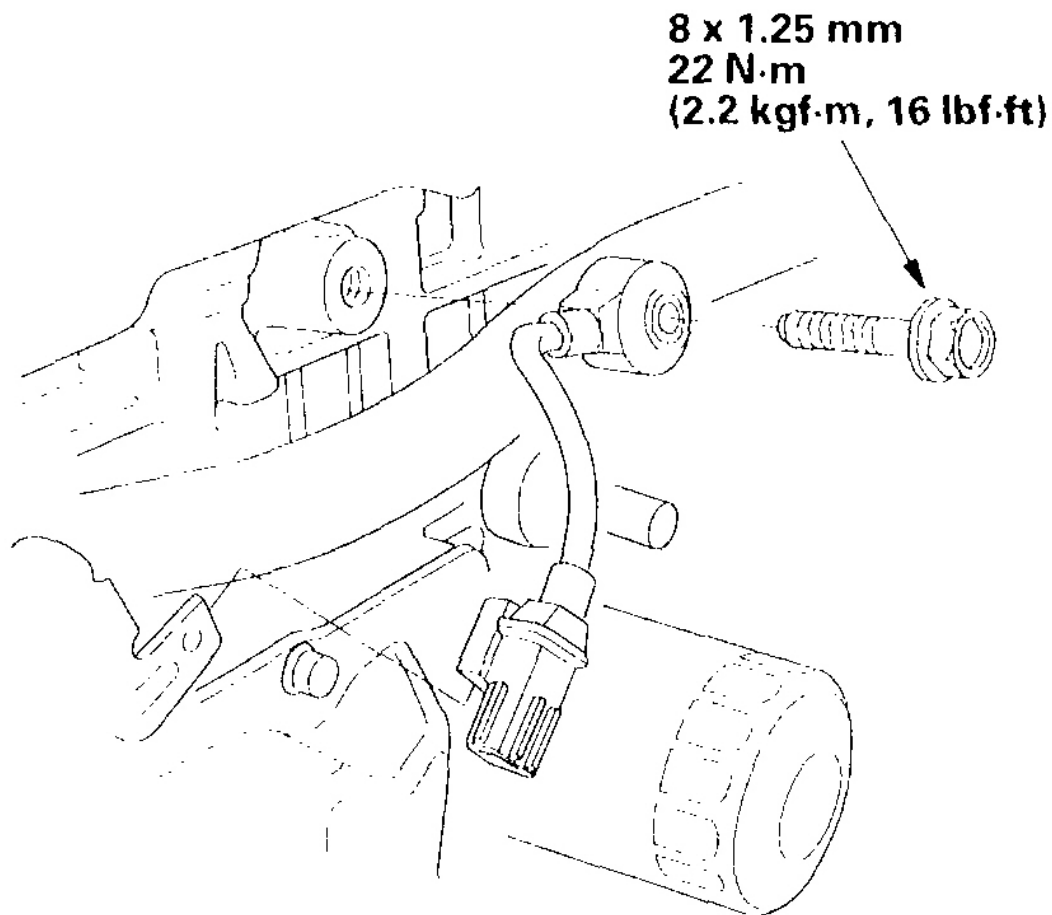


Fig. 275: Driving Crankshaft Oil Seal With Special Tools
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Clean any excess grease off the crankshaft and check that the oil seal lip is not distorted.

KNOCK SENSOR REPLACEMENT

1. Disconnect the knock sensor connector, then remove the knock sensor.



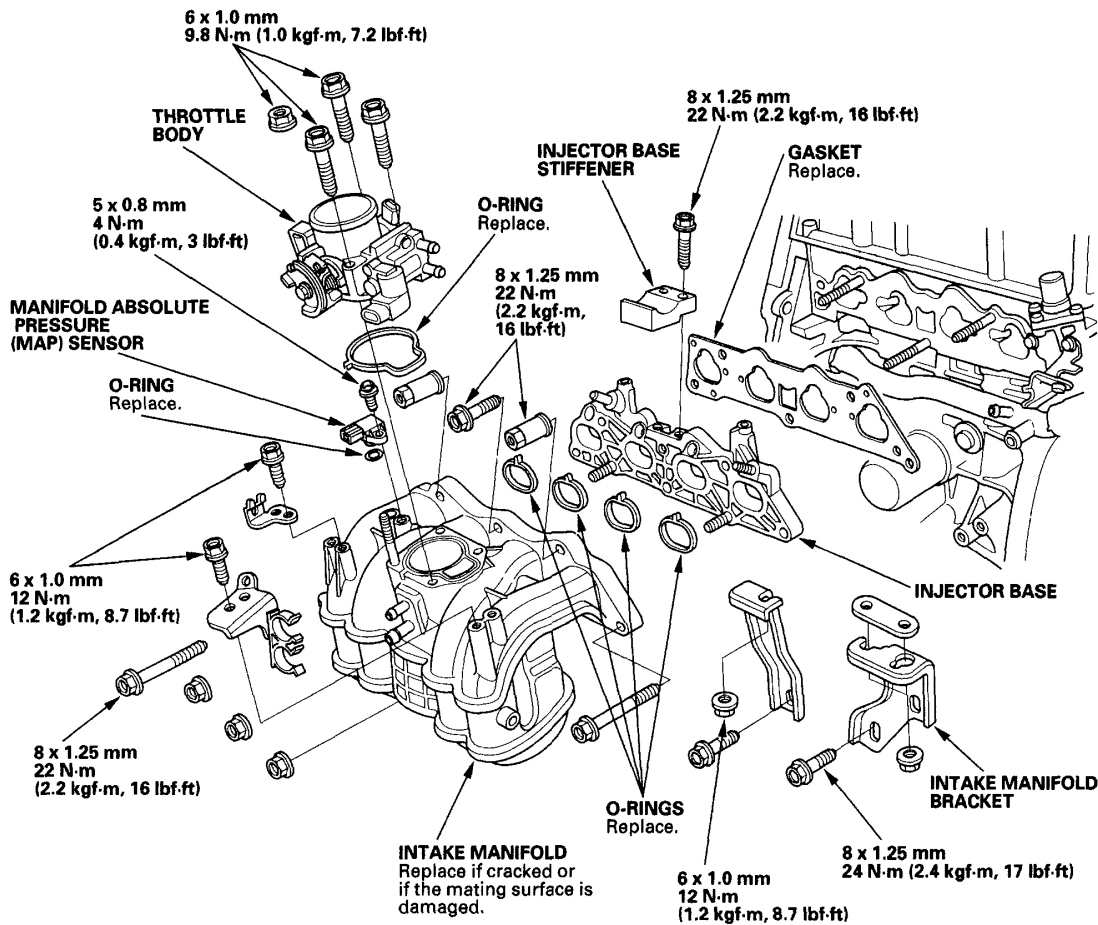
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Fig. 276: Disconnecting Knock Sensor Connector With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Install the knock sensor.

INTAKE MANIFOLD REMOVAL AND INSTALLATION

NOTE: Use new O-rings and gasket when reassembling.

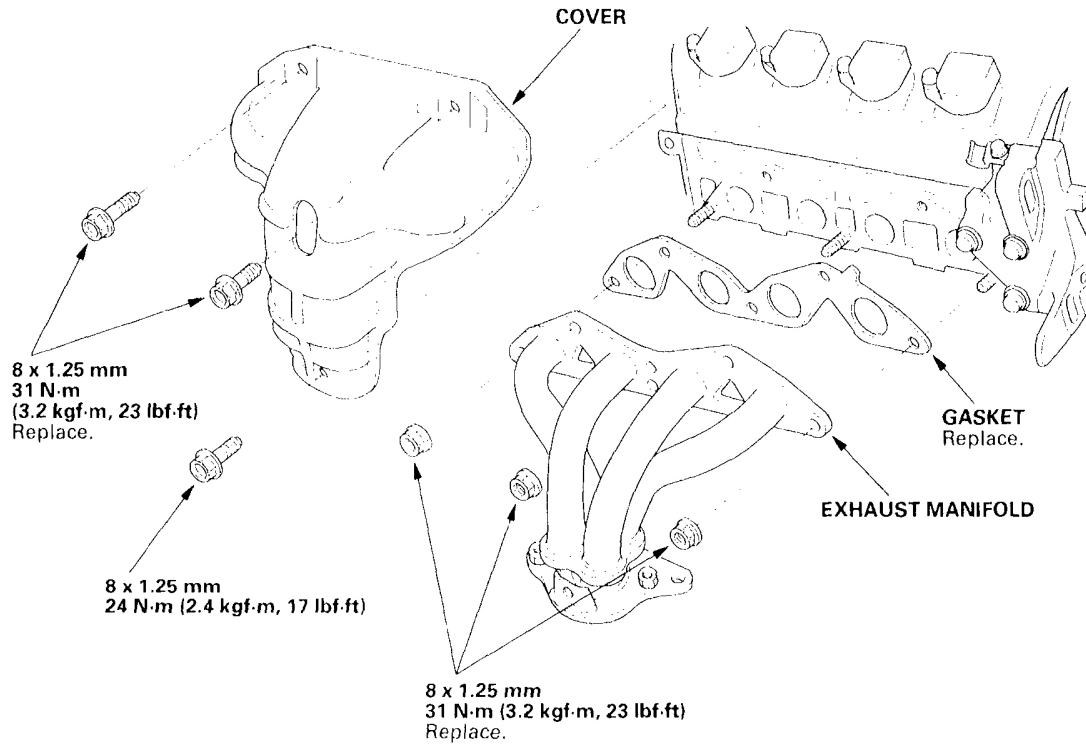


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Fig. 277: Exploded View Of Intake Manifold With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

EXHAUST MANIFOLD REMOVAL AND INSTALLATION

NOTE: Use a new gasket when reassembling.



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Fig. 278: Exploded View Of Exhaust Manifold (D17A2 Engine) With Torque Specifications
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

NOTE: Use a new gaskets and self-locking nuts when reassembling.

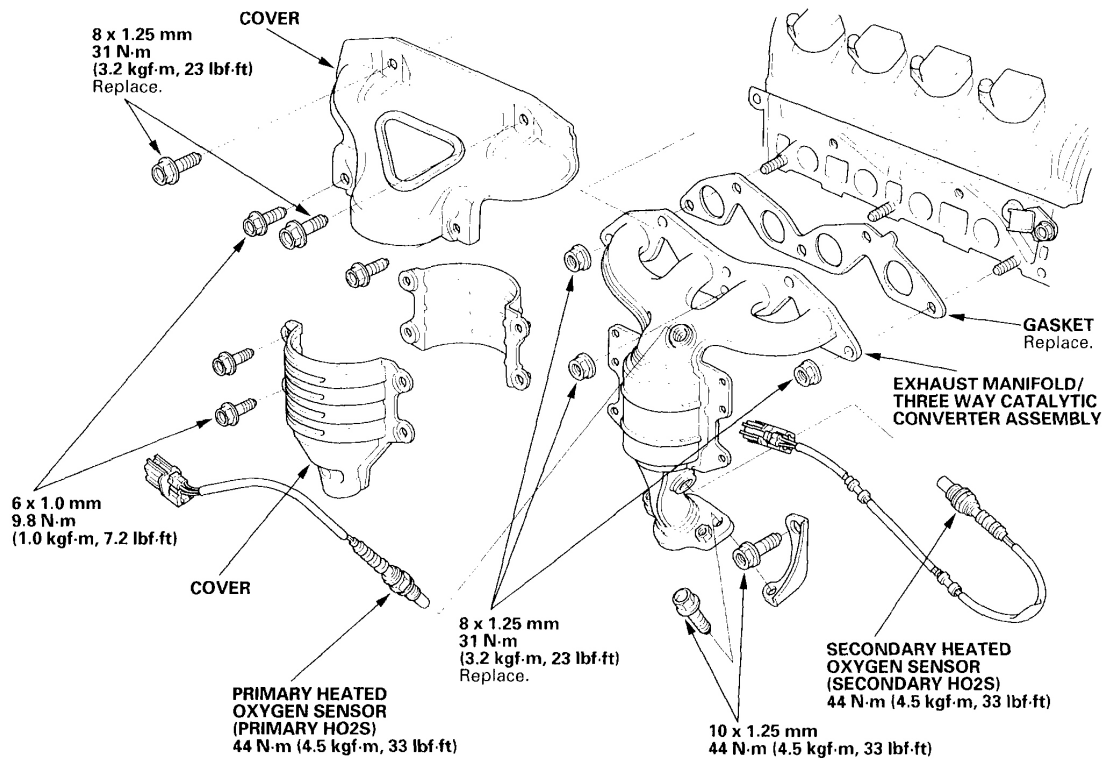


Fig. 279: Exploded View Of Exhaust Manifold (D17A1, D17A6 Engines) With Torque Specifications
 Courtesy of AMERICAN HONDA MOTOR CO., INC.