

2002 ENGINES

2.3L 4-Cylinder - Accord

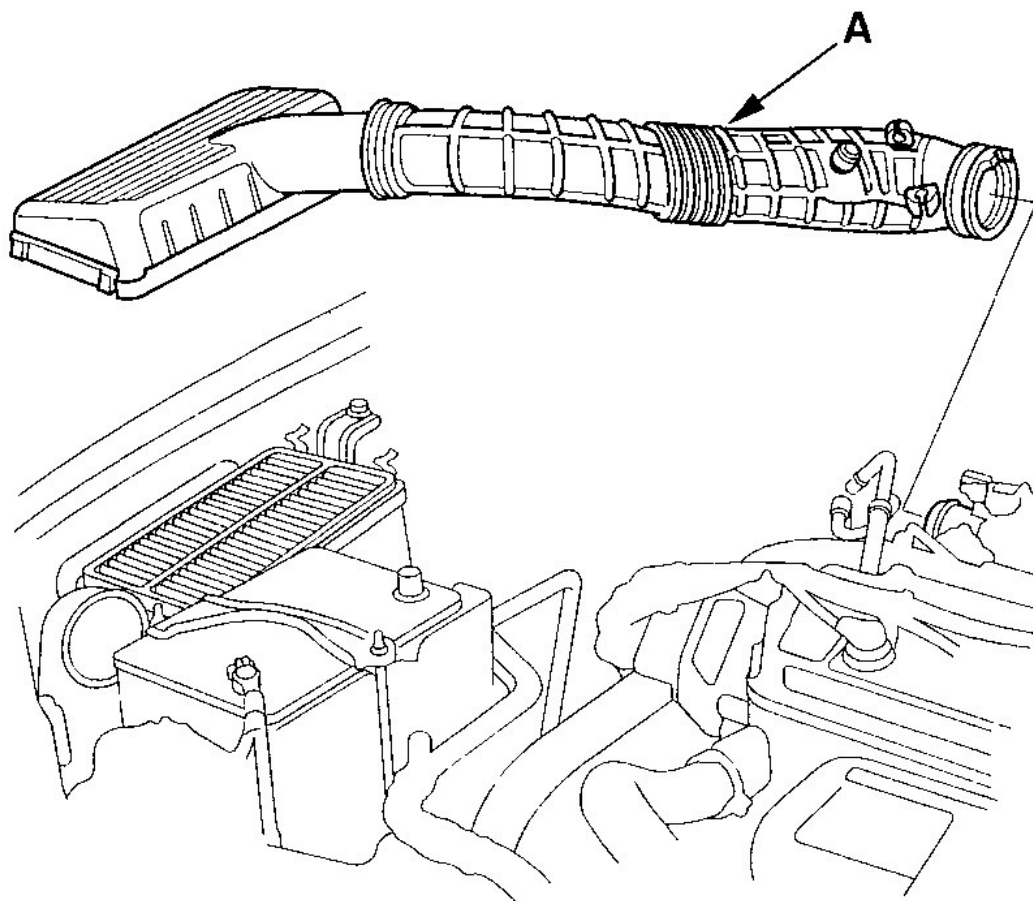
ENGINE ASSEMBLY

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 open position.
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 battery negative terminal first, then the positive terminal.
4. Remove the intake air duct (A).

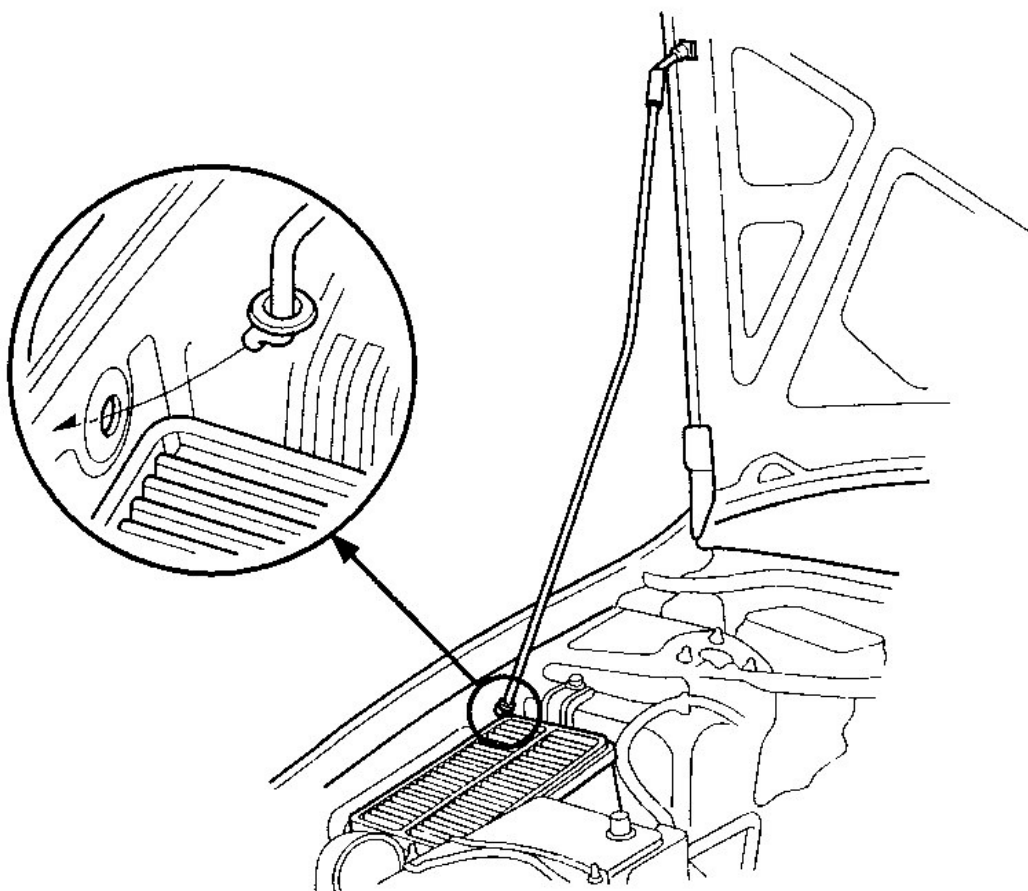


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Fig. 1: Removing Intake Air Duct

Courtesy of AMERICAN HONDA MOTOR CO., INC.

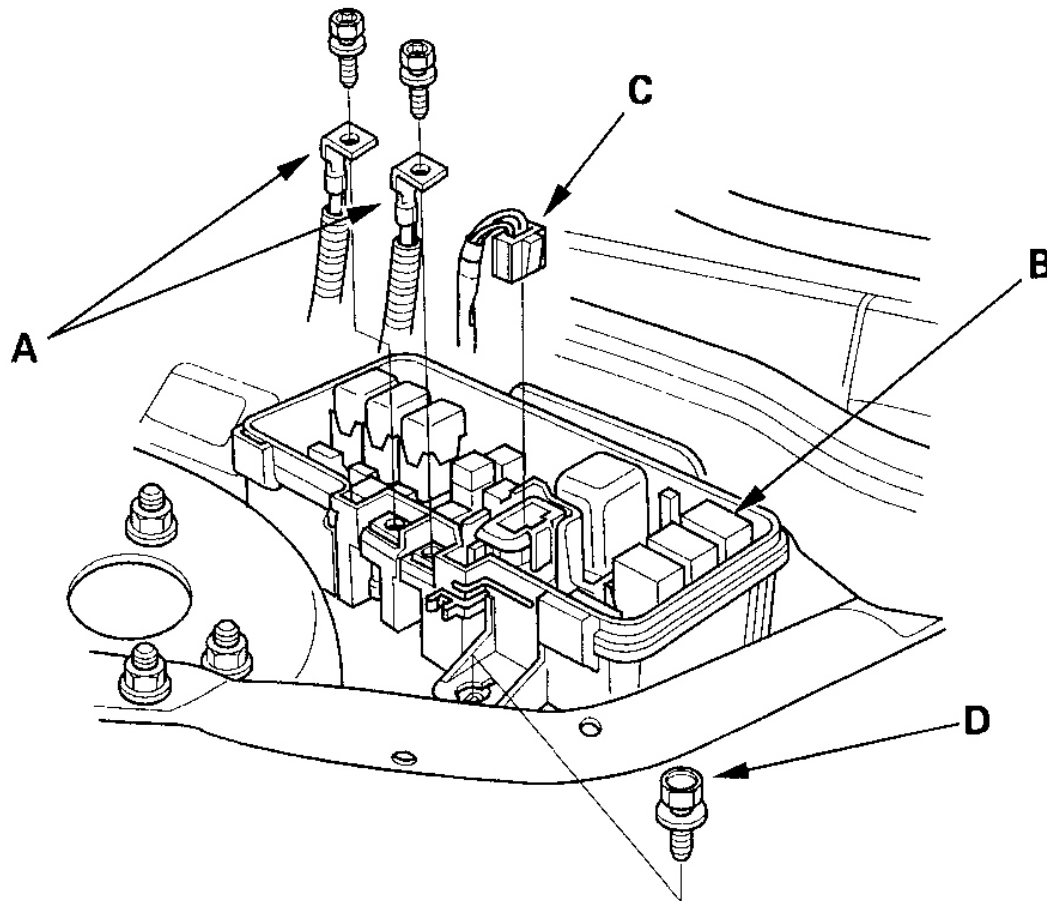
5. Fix the hood in the vertical position by using a support rod (P/N 74145-S84-A00) as shown below.



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Fig. 2: Fixing Hood In Vertical Position Using Support Rod
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Disconnect the battery cables (A) from the under-hood fuse/relay box (B).



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Fig. 3: Disconnecting Battery Cables From Under-Hood Fuse/Relay Box
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Disconnect the connector (C) from the under-hood fuse/relay box (B), and remove the bolt (D).
8. Remove the throttle cable (A) and cruise control cable (B) by loosening the locknuts (C) then slipping the cable ends out of the accelerator linkage. Take care not to bend the cable when removing them. Always replace any kinked cables with a new one.

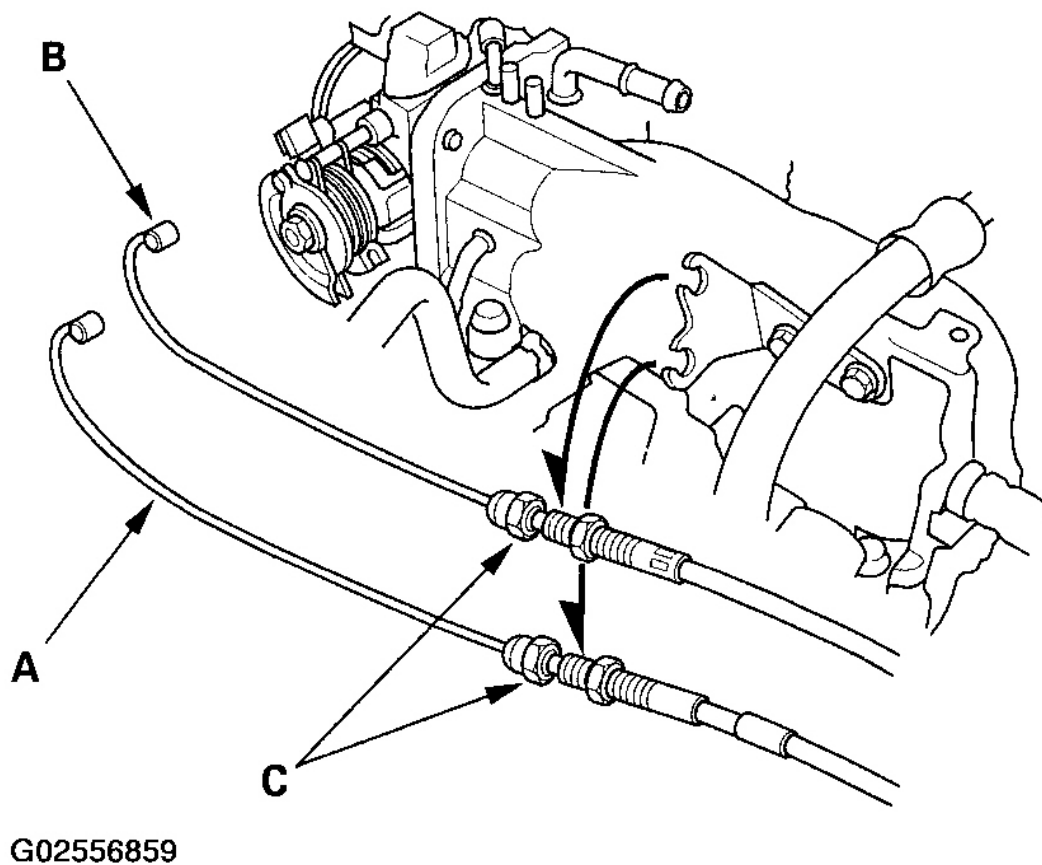
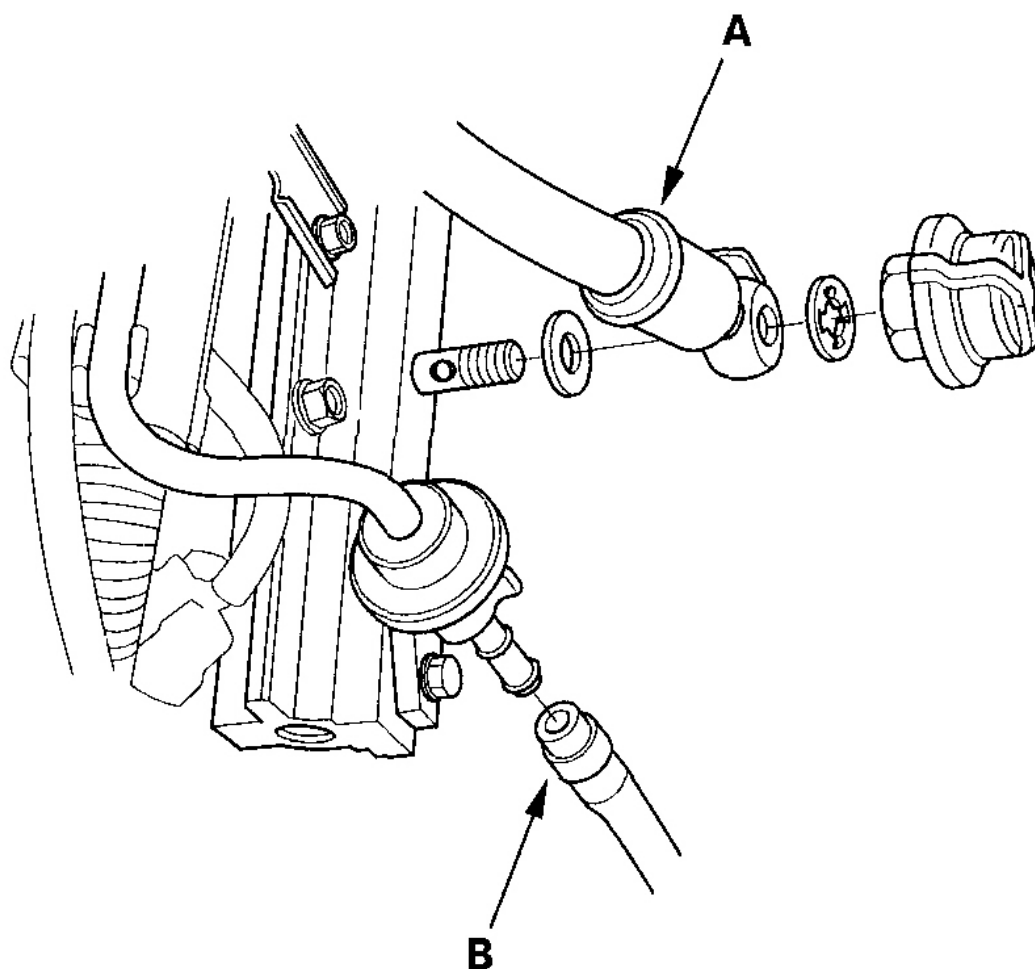


Fig. 4: Removing Throttle Cable & Cruise Control Cable
Courtesy of AMERICAN HONDA MOTOR CO., INC.

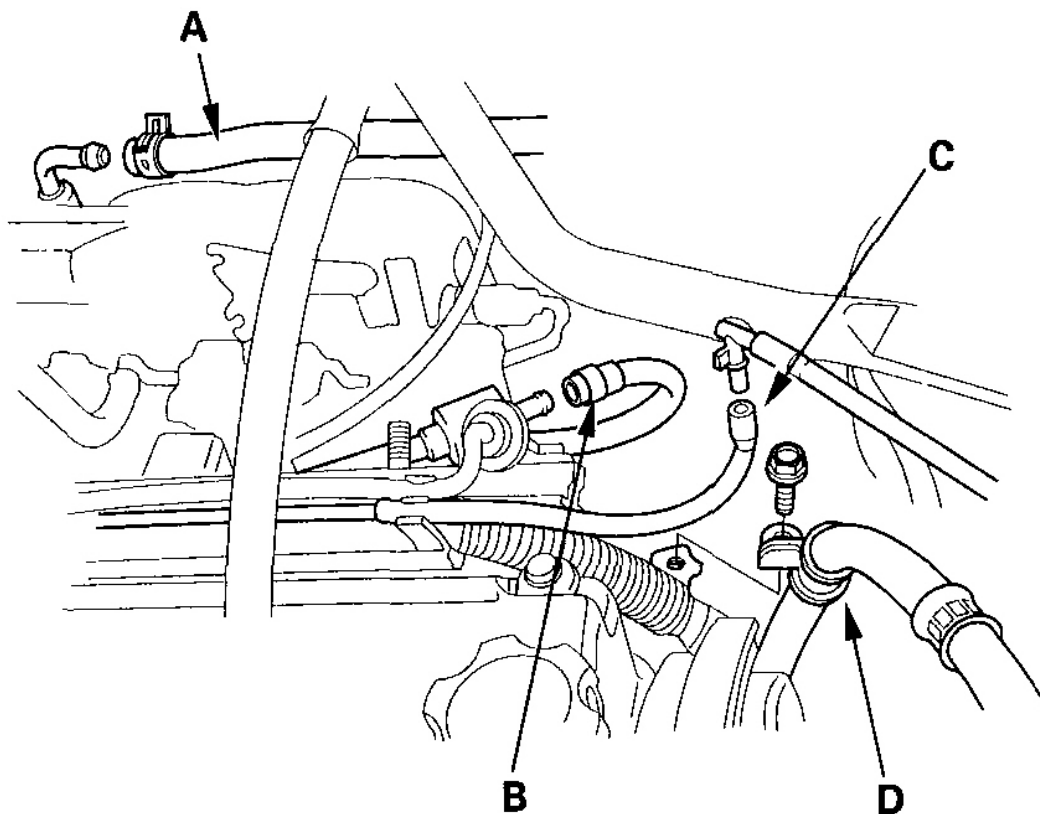
9. Relieve fuel pressure (see **FUEL PRESSURE RELIEVING**).
10. Remove the fuel feed hose (A) and fuel return hose (B).



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Fig. 5: Removing Fuel Feed Hose & Fuel Return Hose
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Remove the brake booster vacuum hose (A), Evaporative Emission (EVAP) canister hose (B), vacuum hose (C) and P/S hose clamp (D).



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Fig. 6: Removing Brake Booster Vacuum Hose

Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Remove the mounting bolts (A), then remove the Power Steering (P/S) pump belt (B) and pump without disconnecting the P/S hoses.

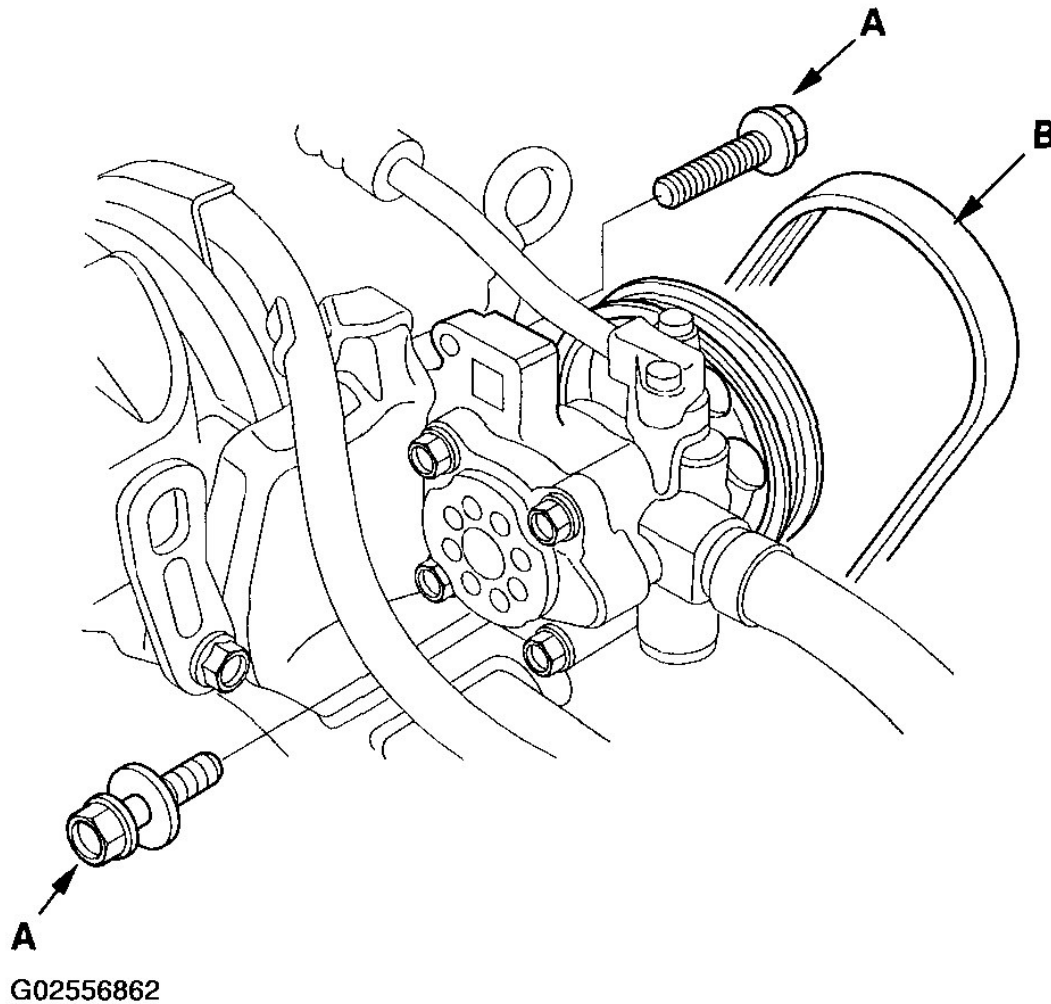
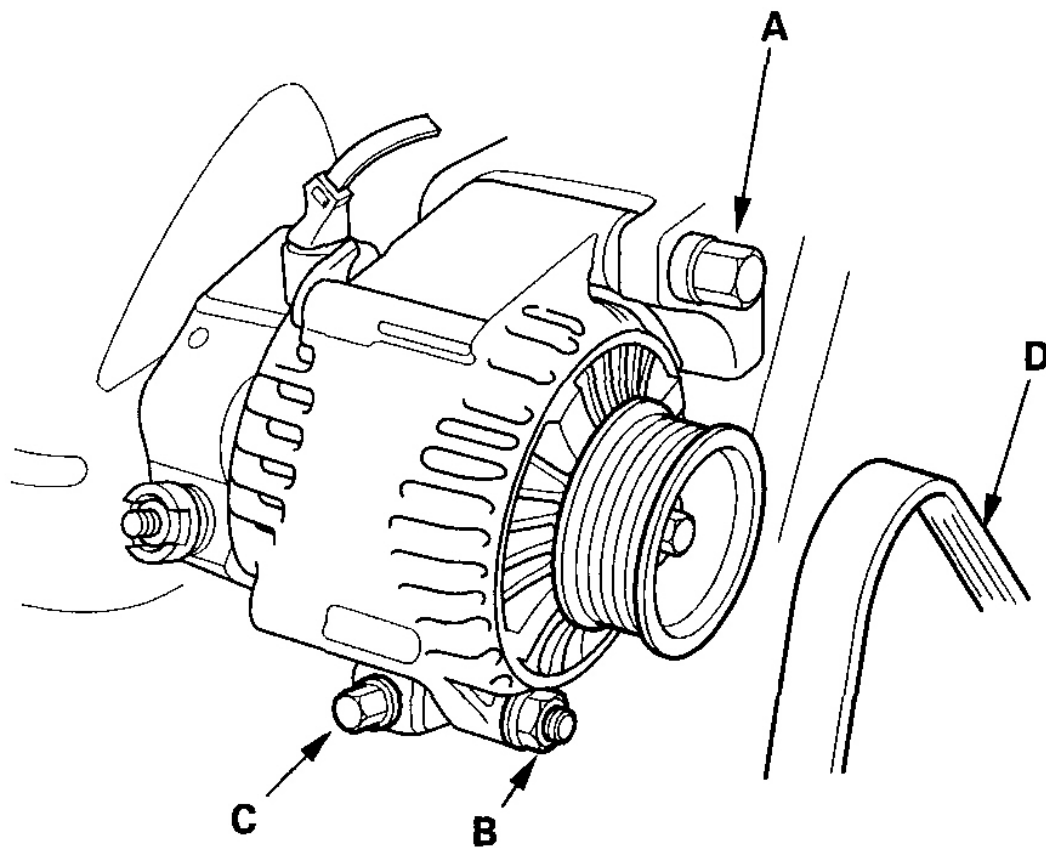


Fig. 7: Removing Mounting Bolts & P/S Pump Belt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Remove the alternator belt.
 - A. Loosen the alternator mounting bolt (A).
 - B. Loosen the alternator locknut (B).
 - C. Loosen the adjusting bolt (C).
 - D. Remove the alternator belt (D).

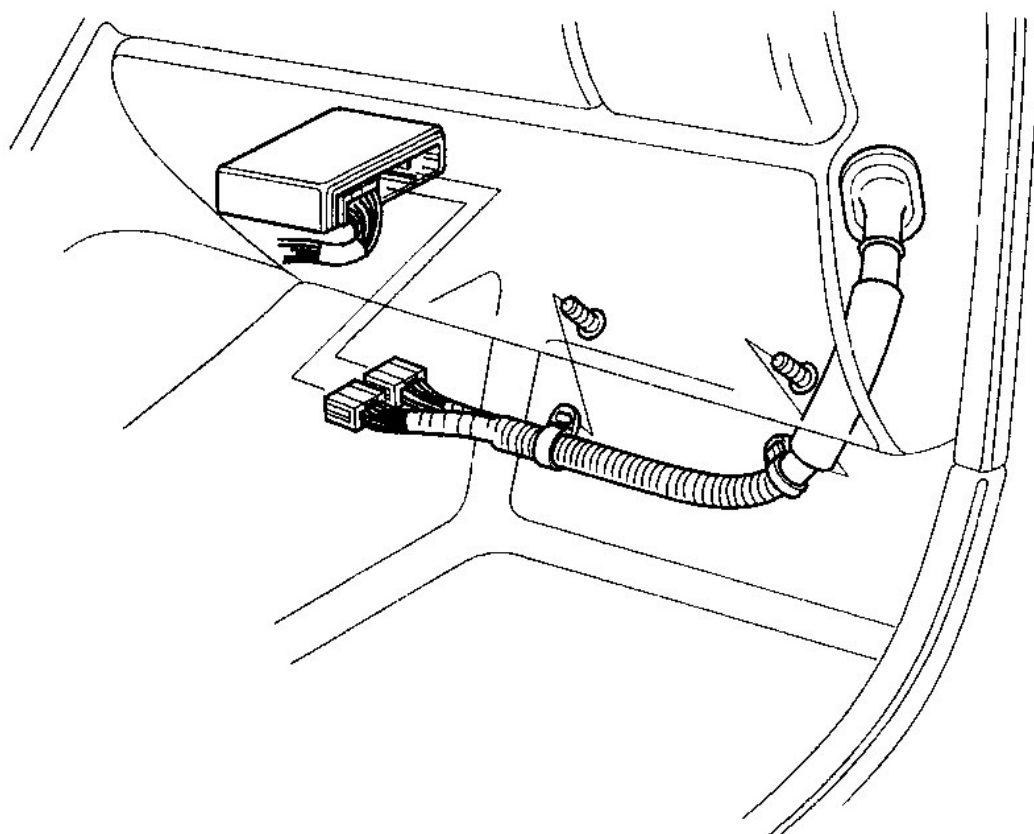


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Fig. 8: Removing Alternator Belt

Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. Disconnect the Engine Control Module (ECM)/Powertrain Control Module (PCM) connectors from the ECM/PCM.



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Fig. 9: Disconnecting ECM/PCM Connectors From ECM/PCM
Courtesy of AMERICAN HONDA MOTOR CO., INC.

15. Remove the grommet (A), then pull out the ECM/PCM connectors.

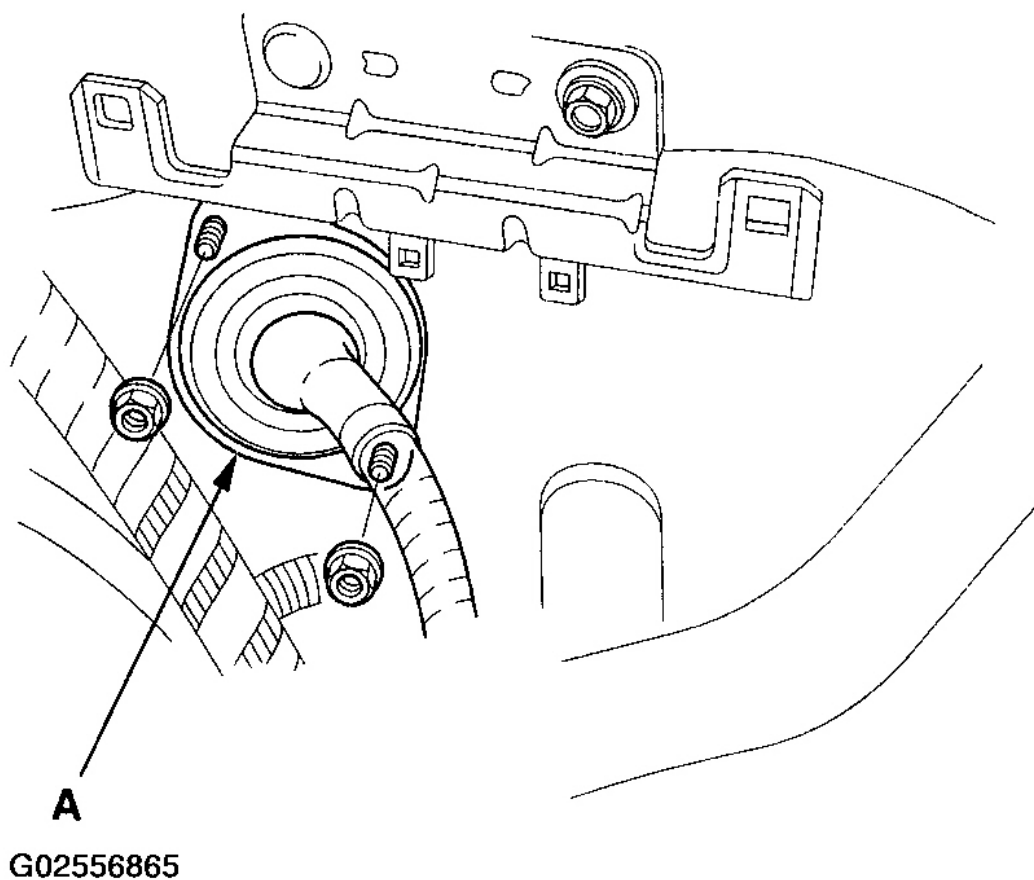
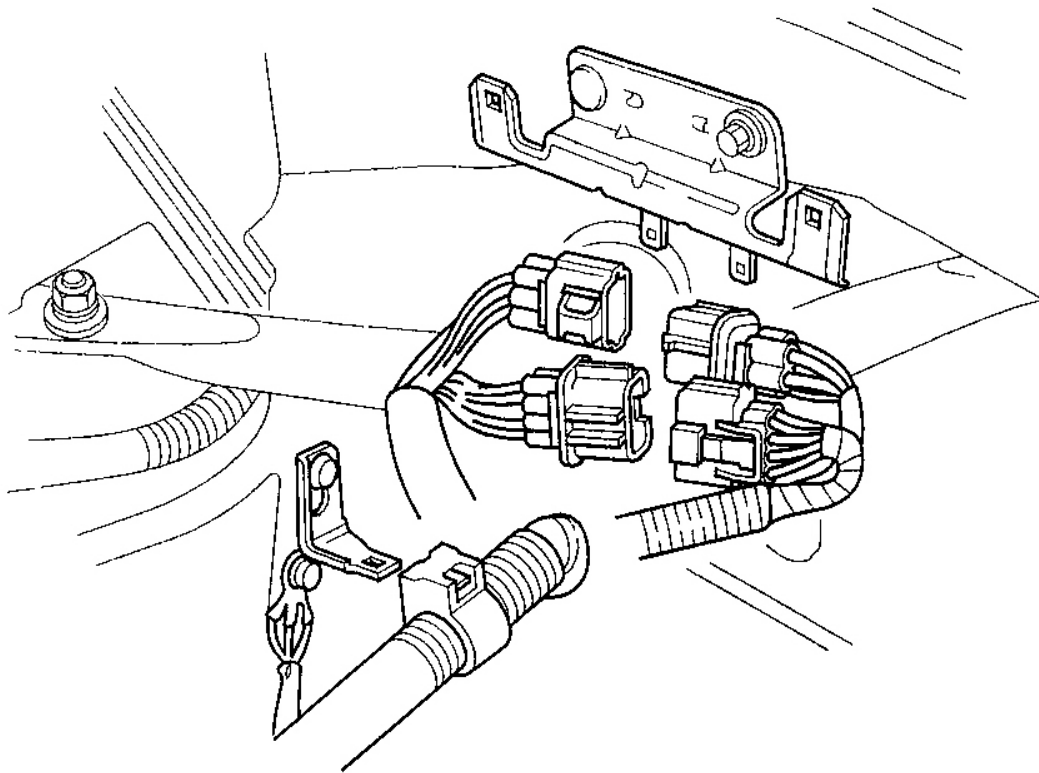


Fig. 10: Removing Grommet & Pulling Out ECM/PCM Connectors
Courtesy of AMERICAN HONDA MOTOR CO., INC.

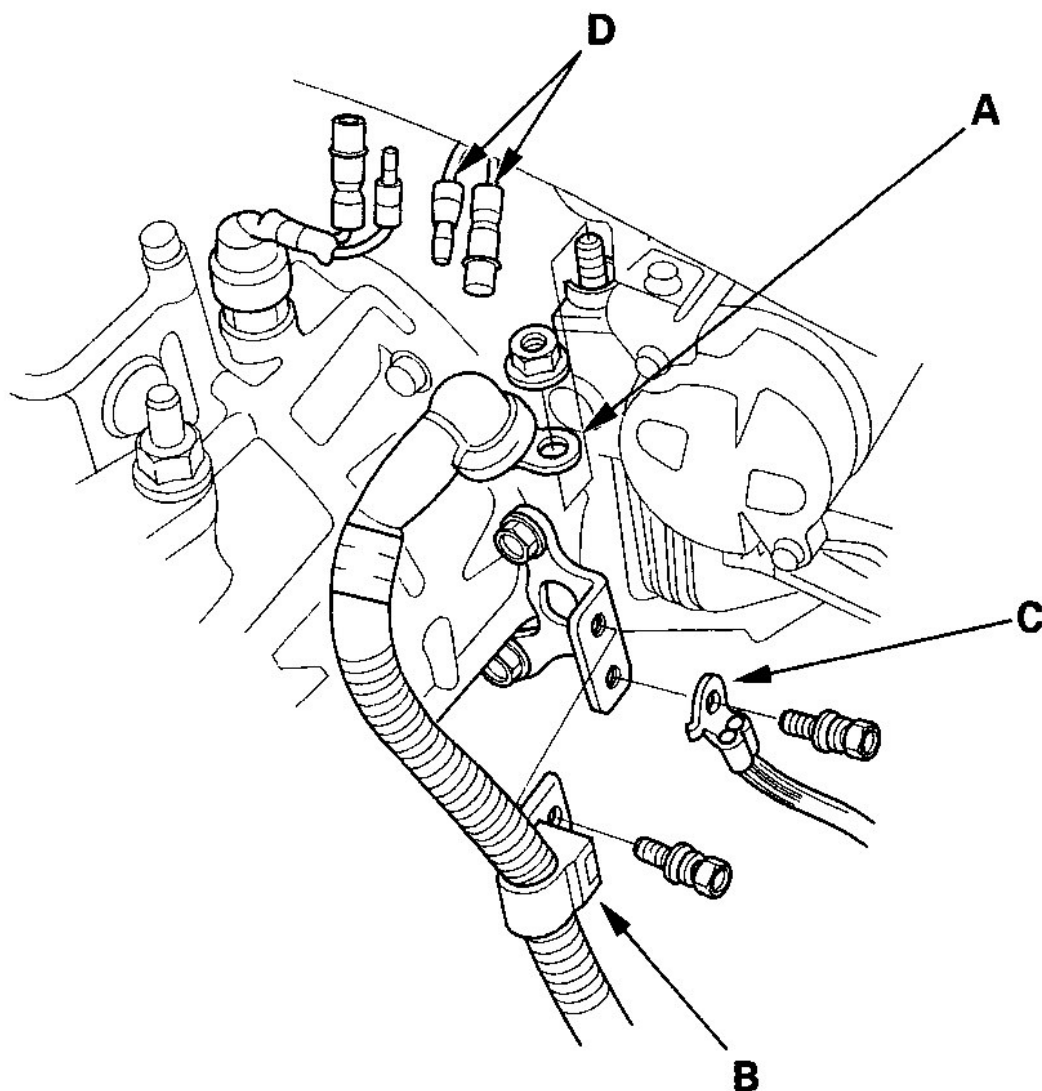
16. Disconnect the engine wire harness connectors on the right side of the engine compartment.



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Fig. 11: Disconnecting Engine Wire Harness Connectors On Right Side Of Engine Compartment
Courtesy of AMERICAN HONDA MOTOR CO., INC.

17. Remove the starter cable (A), wire harness clamp (B), ground cable (C) and back-up light switch connectors (D).

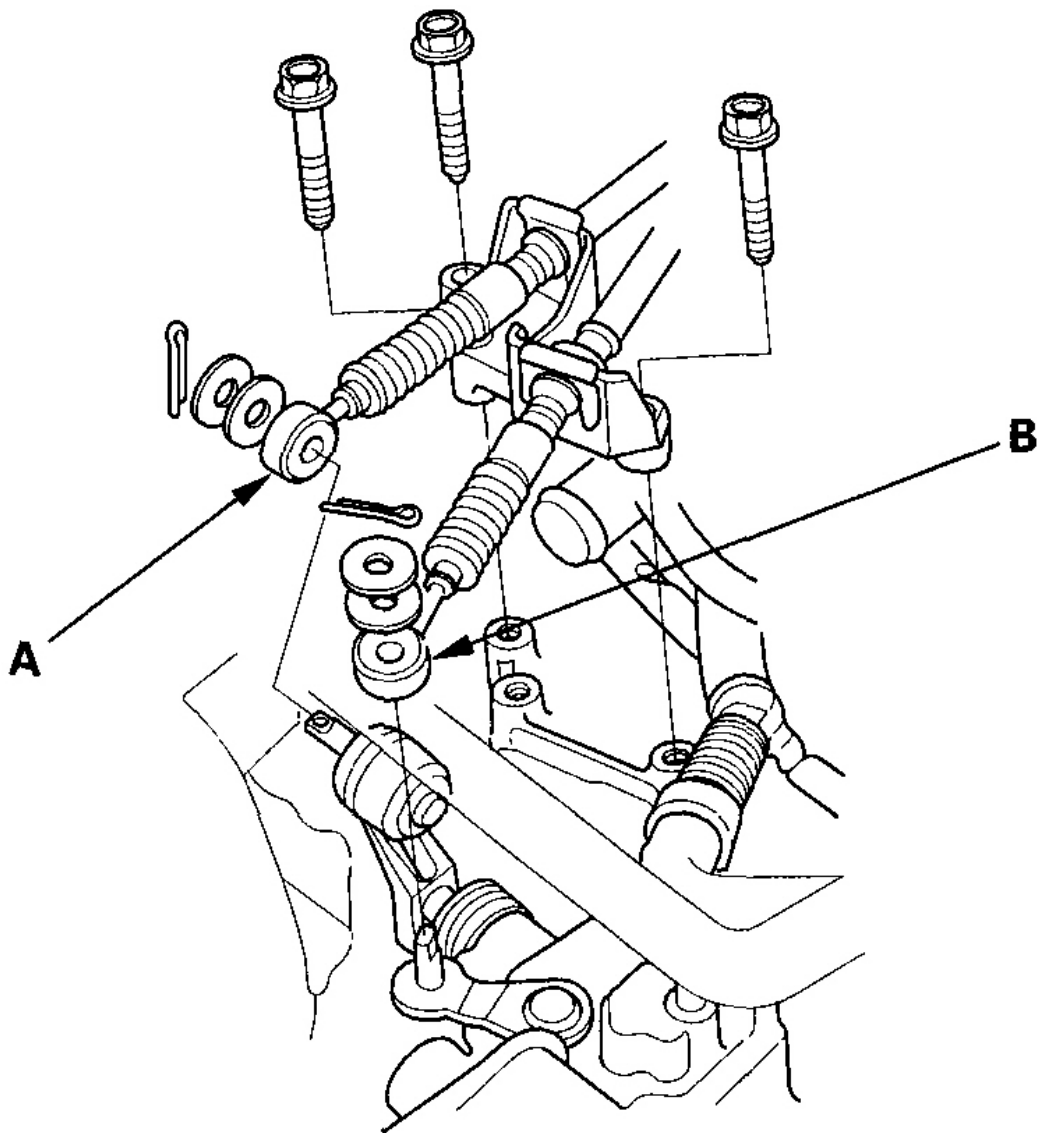


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Fig. 12: Removing Starter Cable

Courtesy of AMERICAN HONDA MOTOR CO., INC.

18. Remove the shift cable (A) and select cable (B). Take care not to bend the cable when removing it. Always replace any kinked cable with a new one (M/T).



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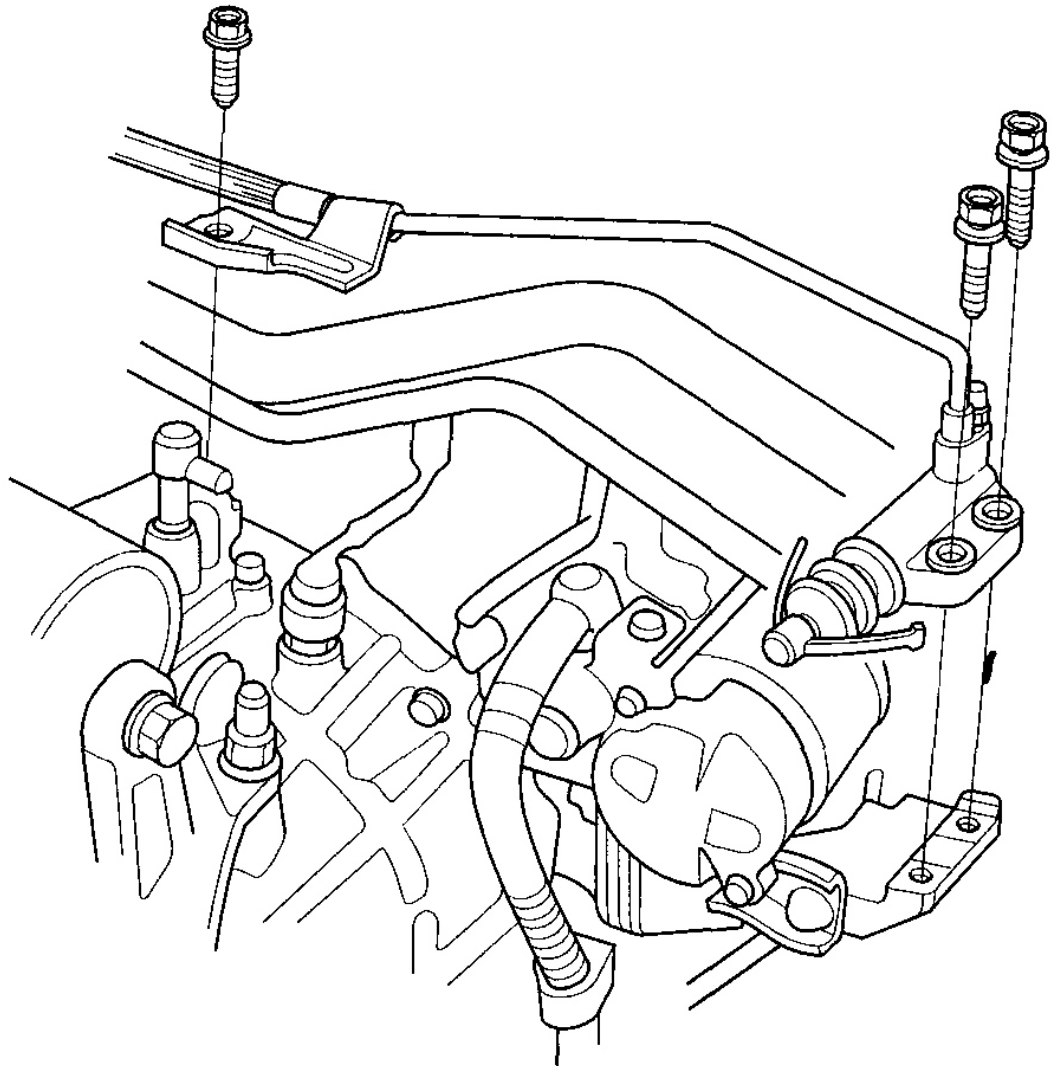
Fig. 13: Removing Shift Cable & Select Cable
Courtesy of AMERICAN HONDA MOTOR CO., INC.

19. Remove the clutch slave cylinder and line/hose assembly (M/T).

NOTE:

- Do not disconnect the line/hose assembly.
- Do not operate the clutch pedal once the slave cylinder has been removed.

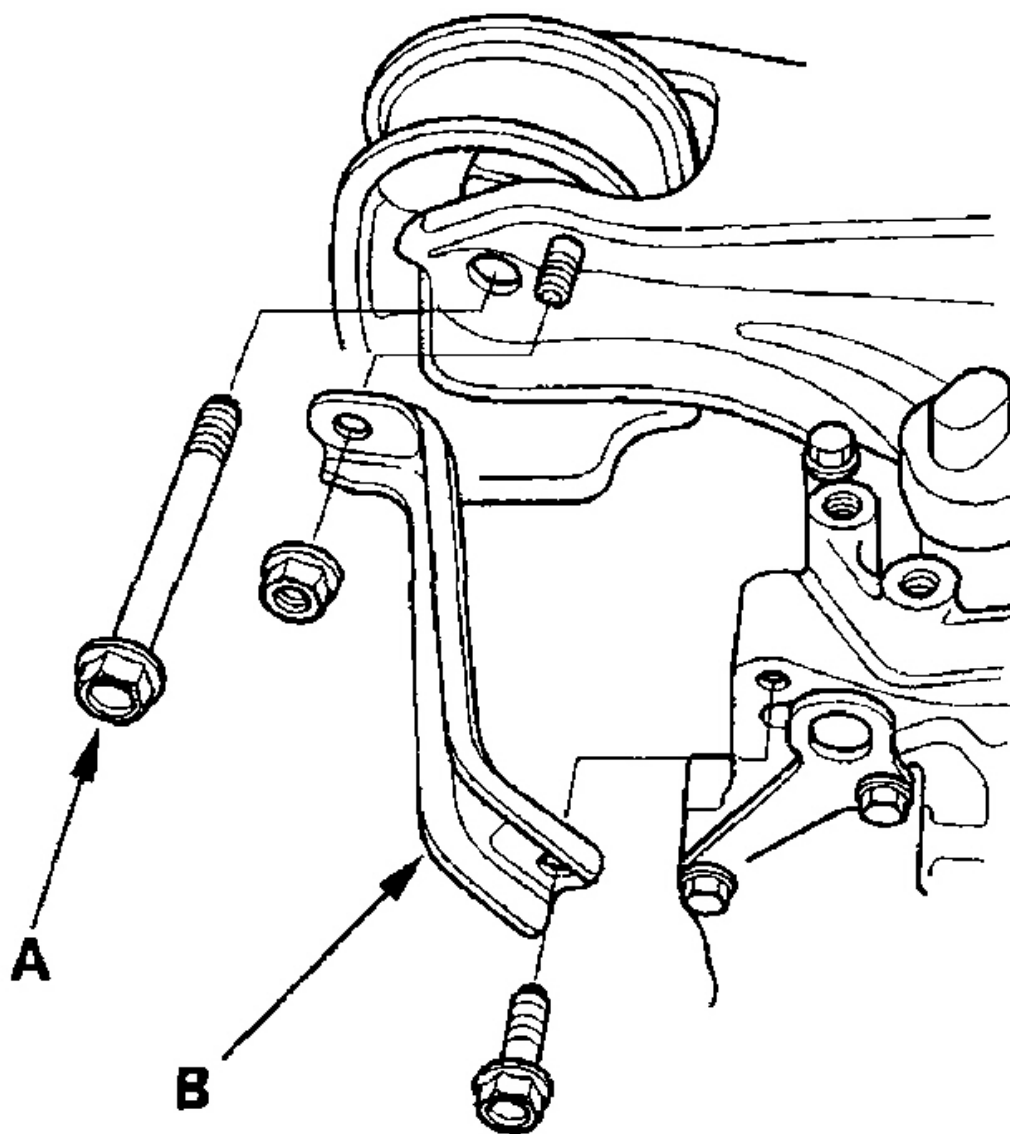
- Take care not to bend the line.



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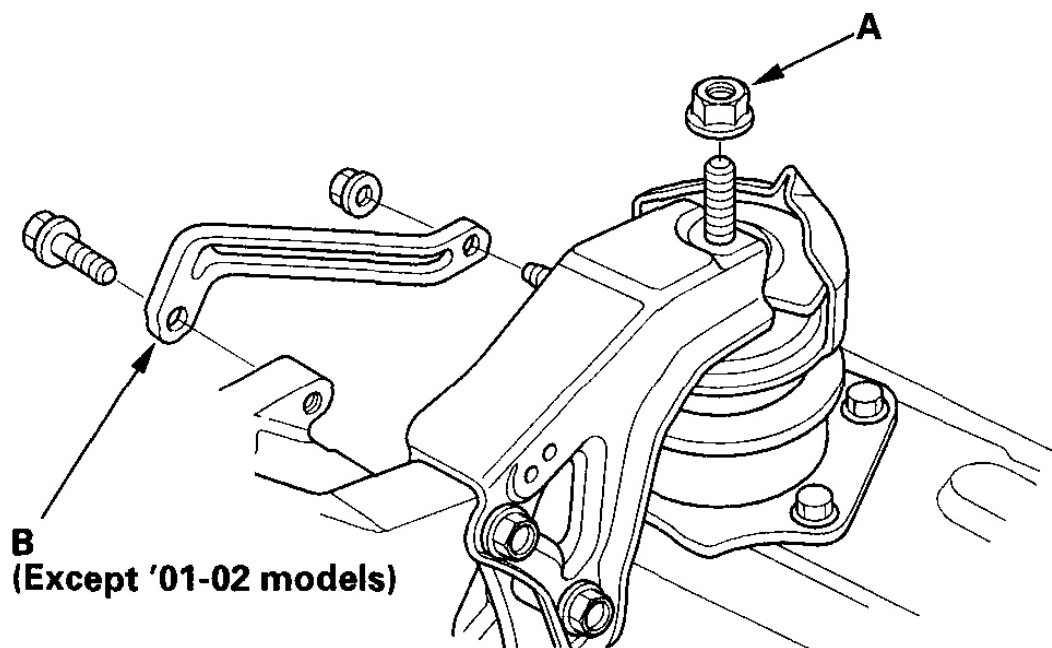
Fig. 14: Removing Clutch Slave Cylinder & Line/Hose Assembly
Courtesy of AMERICAN HONDA MOTOR CO., INC.

20. Remove the rear engine mount bracket mounting bolt/nut (A).



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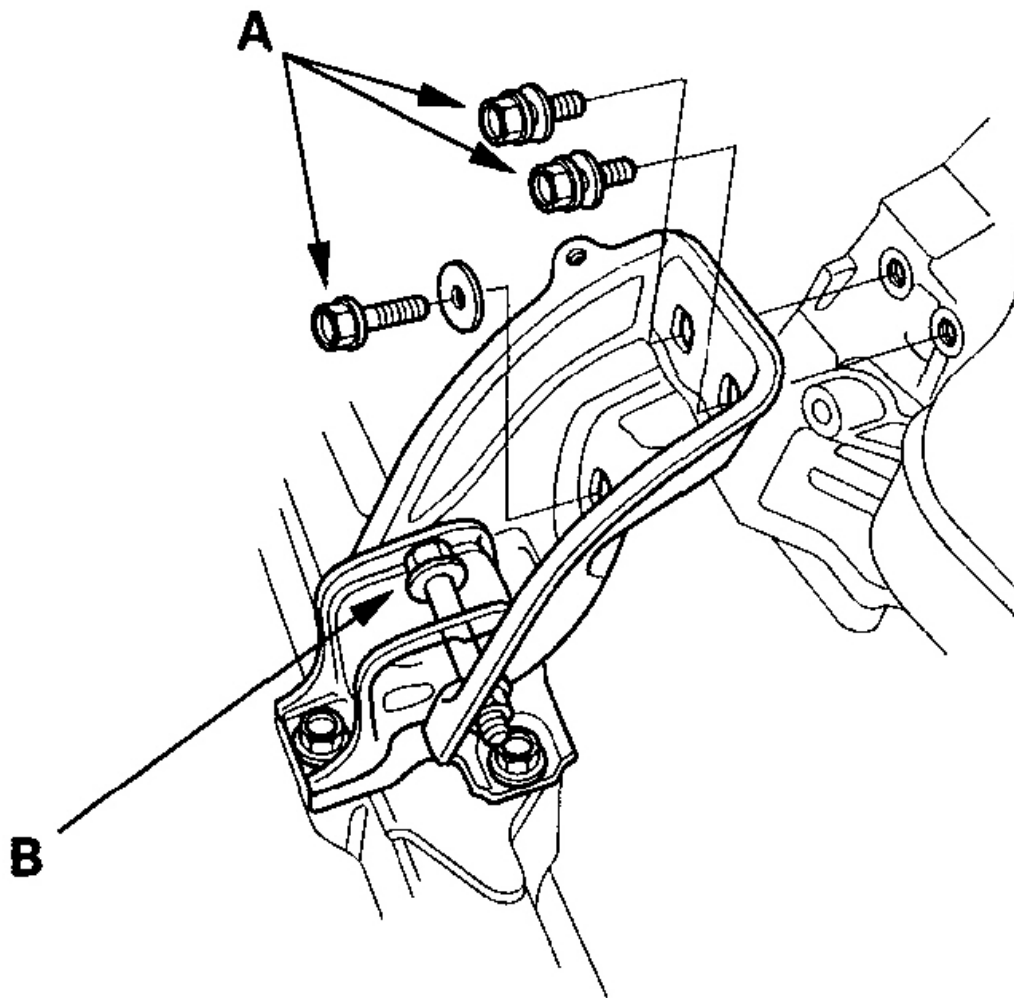
Fig. 15: Removing Rear Engine Mount Bracket Mounting Bolt/Nut (M/T)
Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 16: Removing Rear Engine Mount Bracket Mounting Bolt/Nut (A/T)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

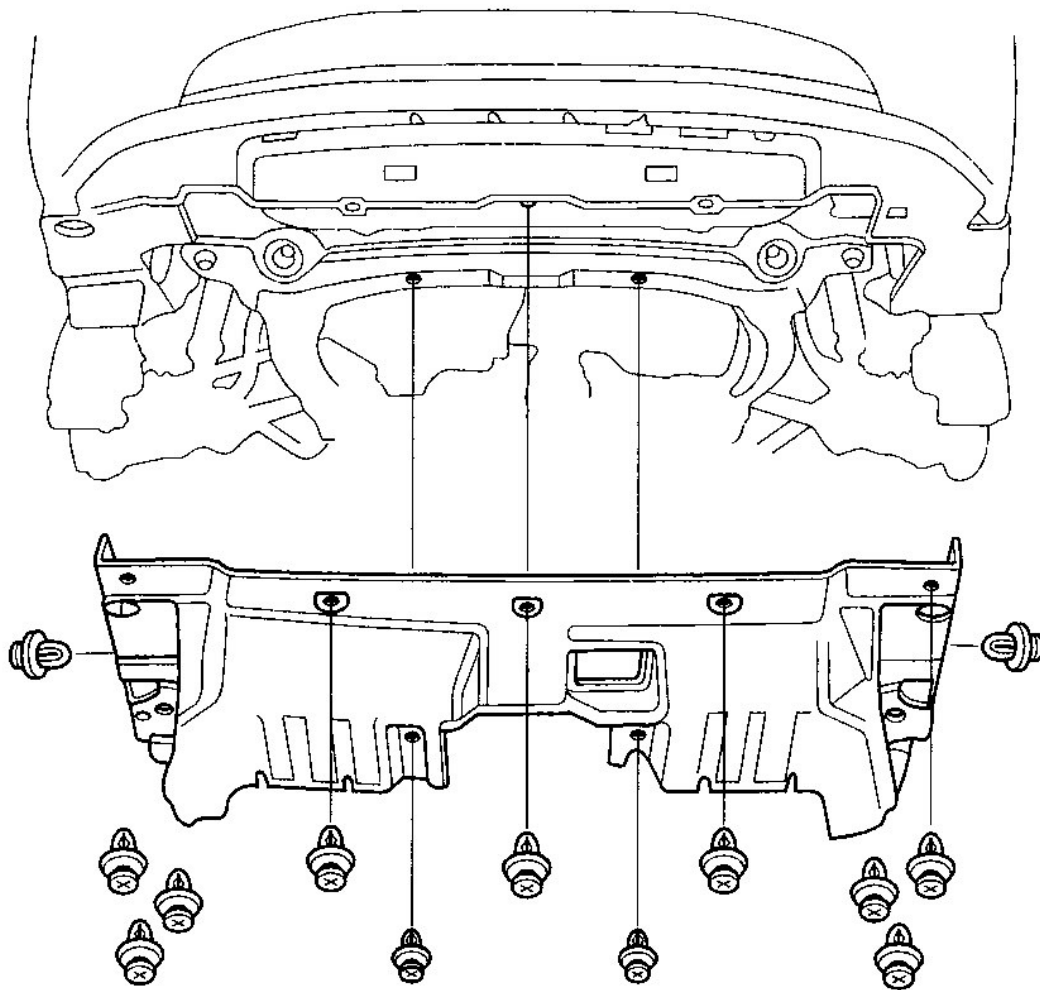
21. Remove the rear stiffener (B) .
22. Remove the front engine mount bracket mounting bolts (A), and loosen the mount bolt (B).



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Fig. 17: Removing Front Engine Mount Bracket Mounting Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

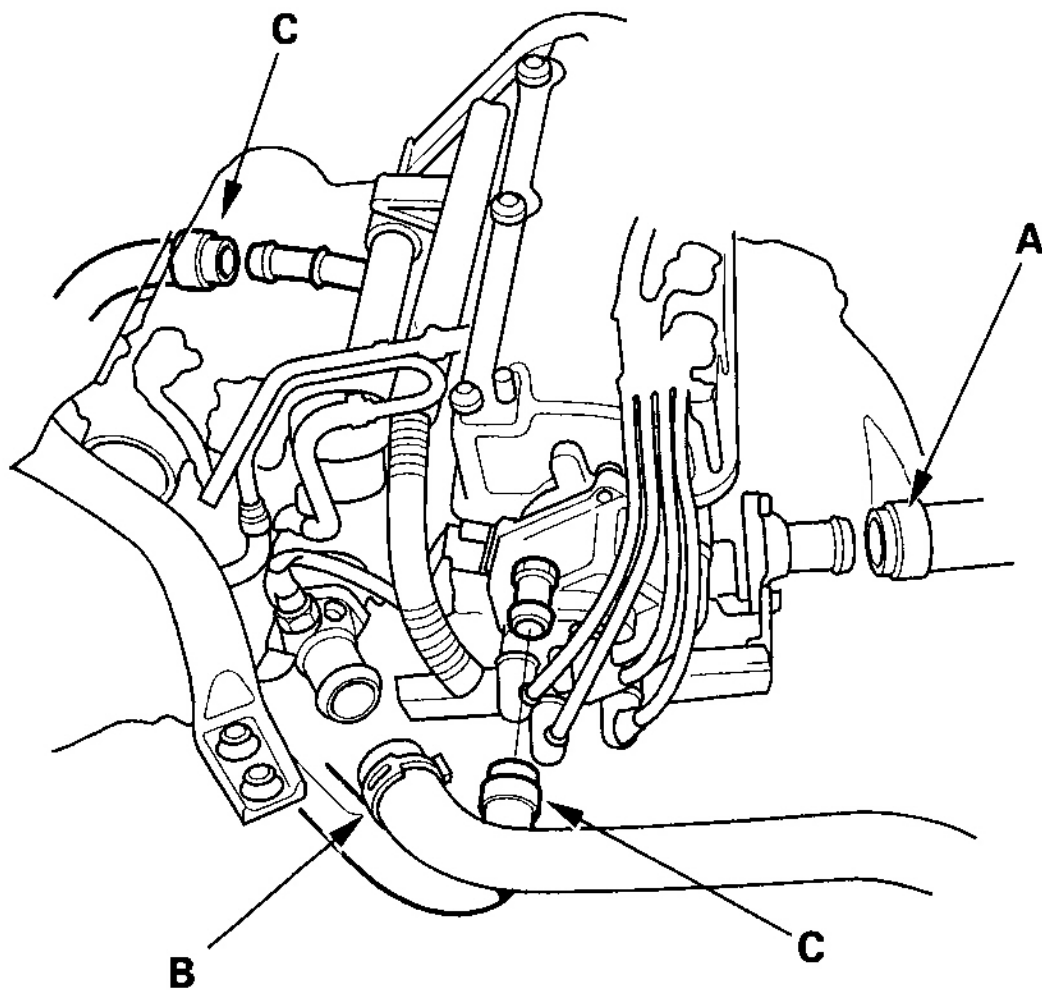


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Fig. 18: Removing Splash Shield

Courtesy of AMERICAN HONDA MOTOR CO., INC.

27. Loosen the drain plug in the radiator to drain the engine coolant (see **COOLANT REPLACEMENT**).
28. Drain the Manual Transmission Fluid (MTF) (see **SERVICING - M/T**) or Automatic Transmission Fluid (ATF) (see page **SERVICING - A/T**). Reinstall the drain plug using a new washer.
29. Drain the engine oil. Reinstall the drain bolt using a new washer (see **ENGINE OIL REPLACEMENT**).
30. Lower the hoist, then remove the upper radiator hose (A), lower radiator hose (B) and the heater hoses (C).

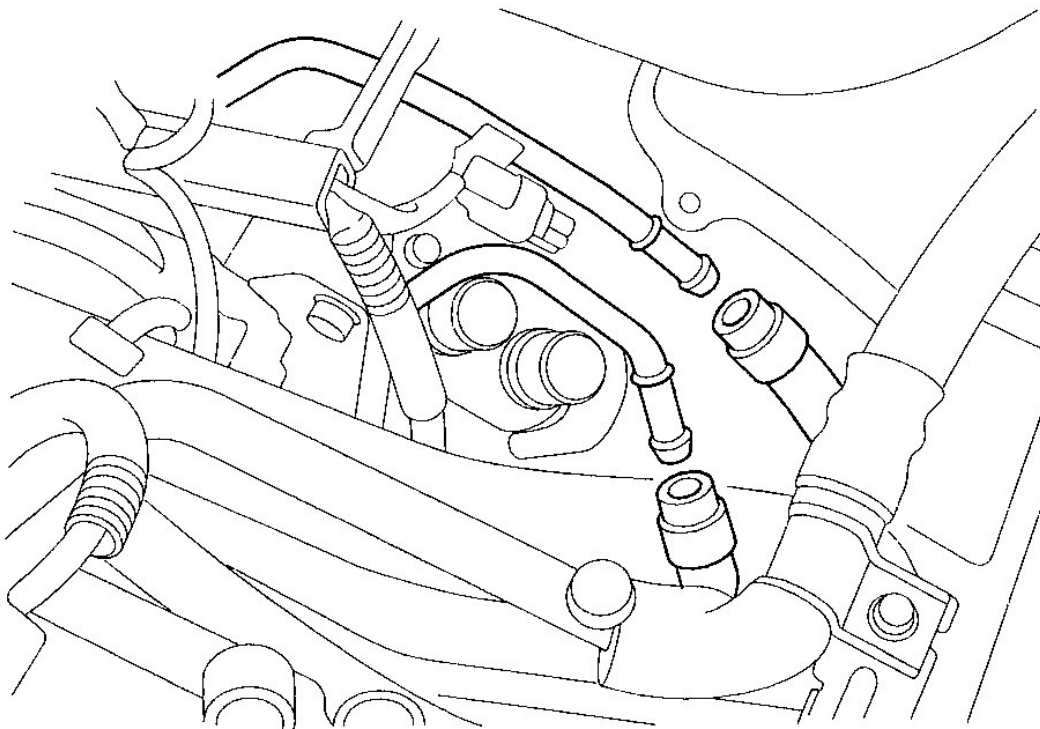


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Fig. 19: Removing Upper Radiator Hose

Courtesy of AMERICAN HONDA MOTOR CO., INC.

31. Remove the ATF cooler hoses, then plug the ATF cooler hoses and lines.

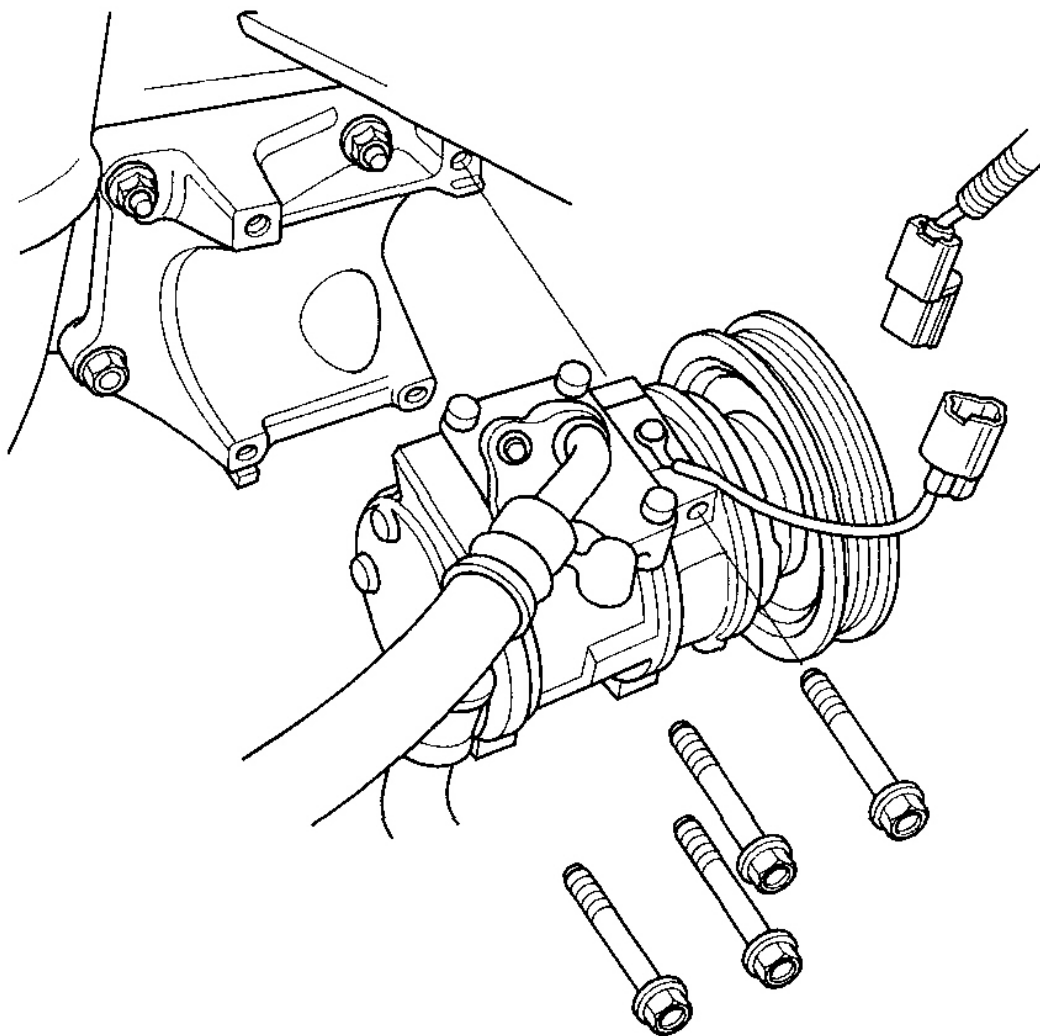


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Fig. 20: Removing ATF Cooler Hoses

Courtesy of AMERICAN HONDA MOTOR CO., INC.

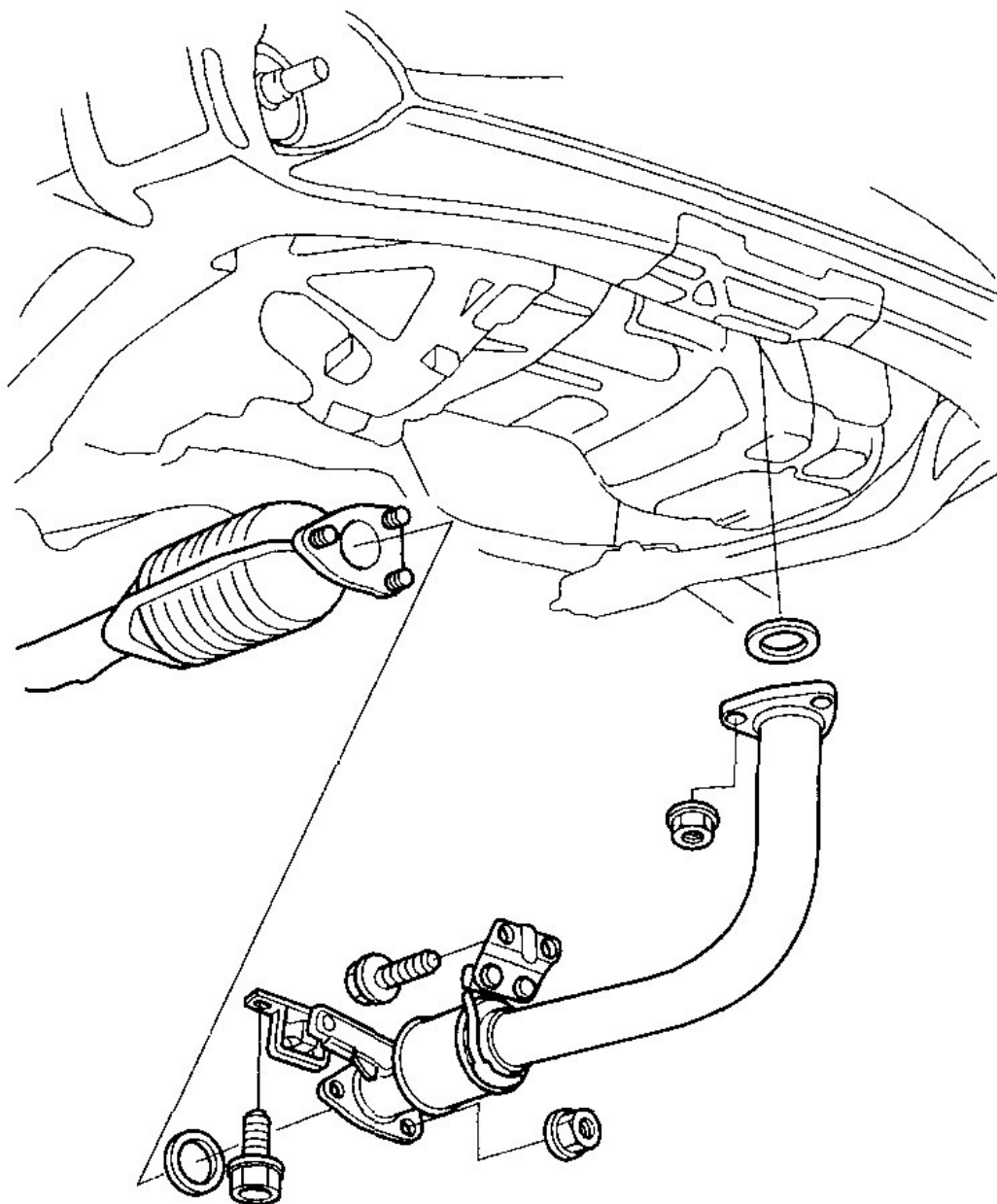
32. Remove the A/C compressor without disconnecting the A/C hoses.



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Fig. 21: Removing A/C Compressor Without Disconnecting A/C Hoses
Courtesy of AMERICAN HONDA MOTOR CO., INC.

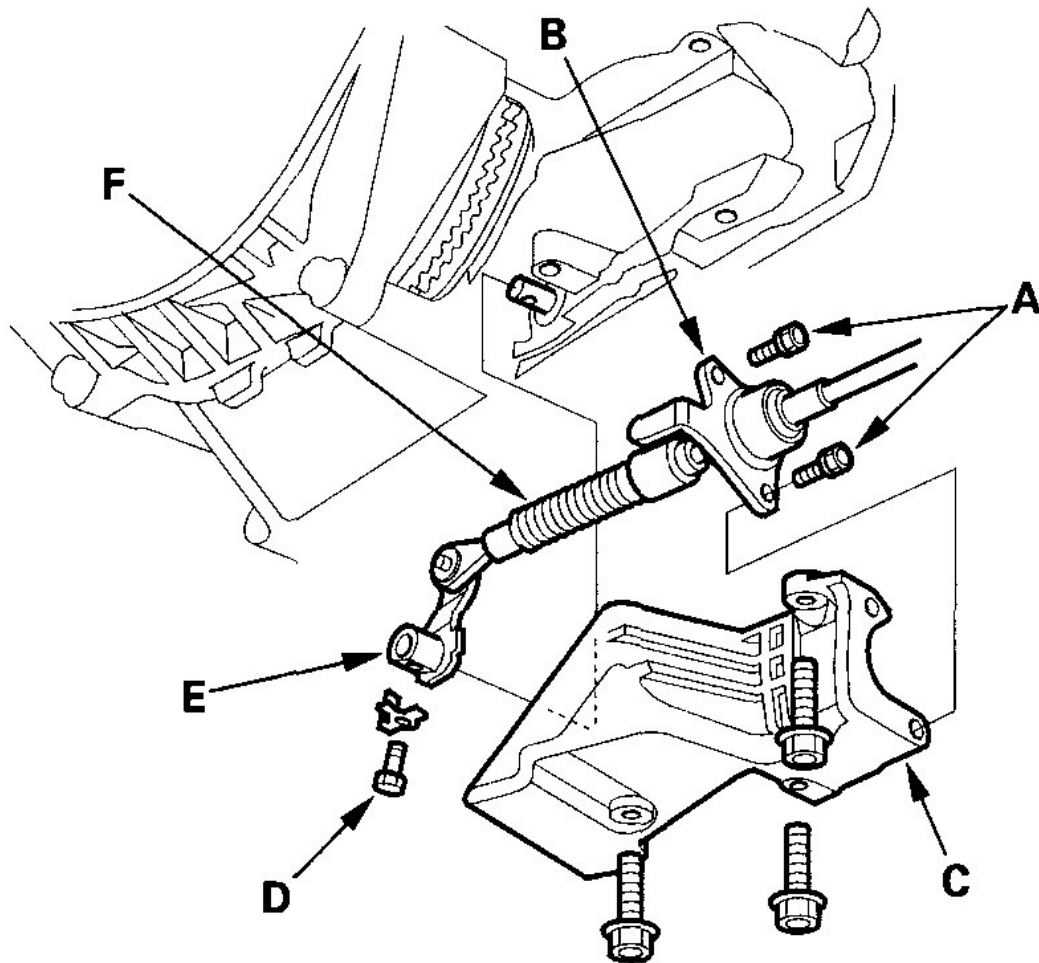
33. Make sure the hoist supports are positioned correctly on the vehicle. Raise the hoist to full height.
34. Remove exhaust pipe A.



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Fig. 22: Removing Exhaust Pipe A
Courtesy of AMERICAN HONDA MOTOR CO., INC.

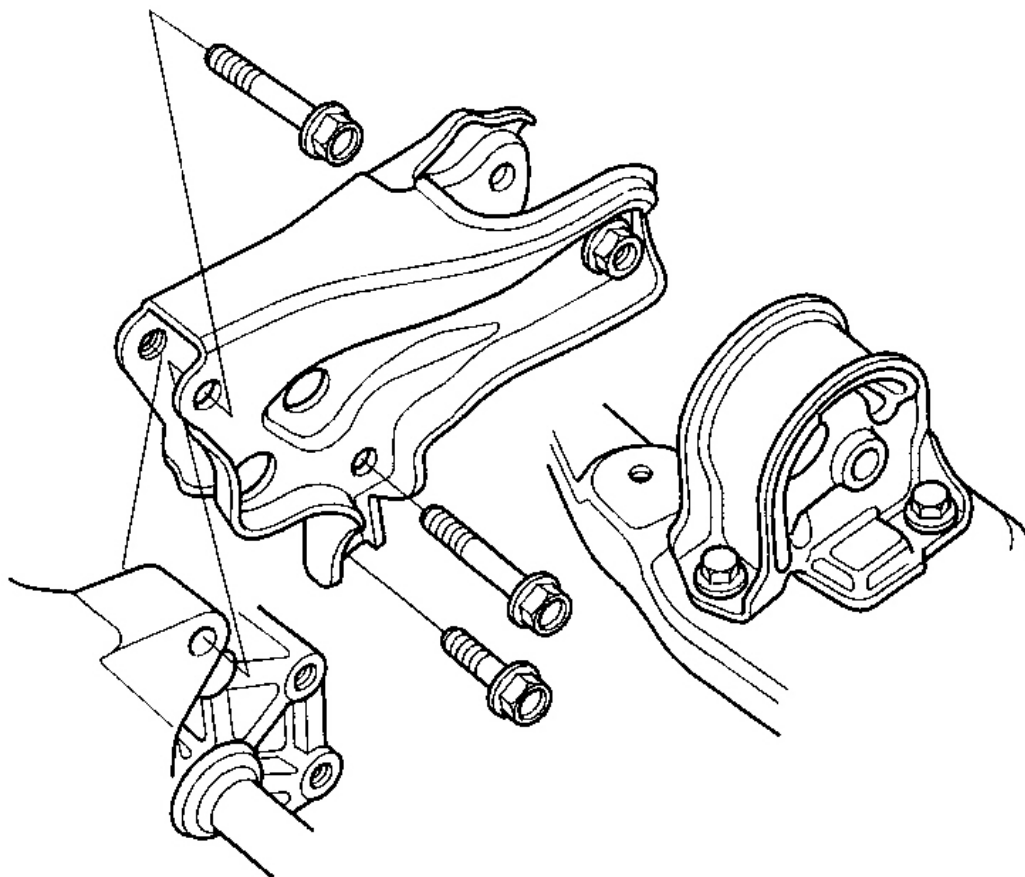
35. Remove the bolts (A) securing the shift cable holder (B), then remove the shift cable cover (C). To prevent damage to the control lever joint, be sure to remove the bolts securing the shift cable holder before removing the bolts securing the shift cable cover (A/T).



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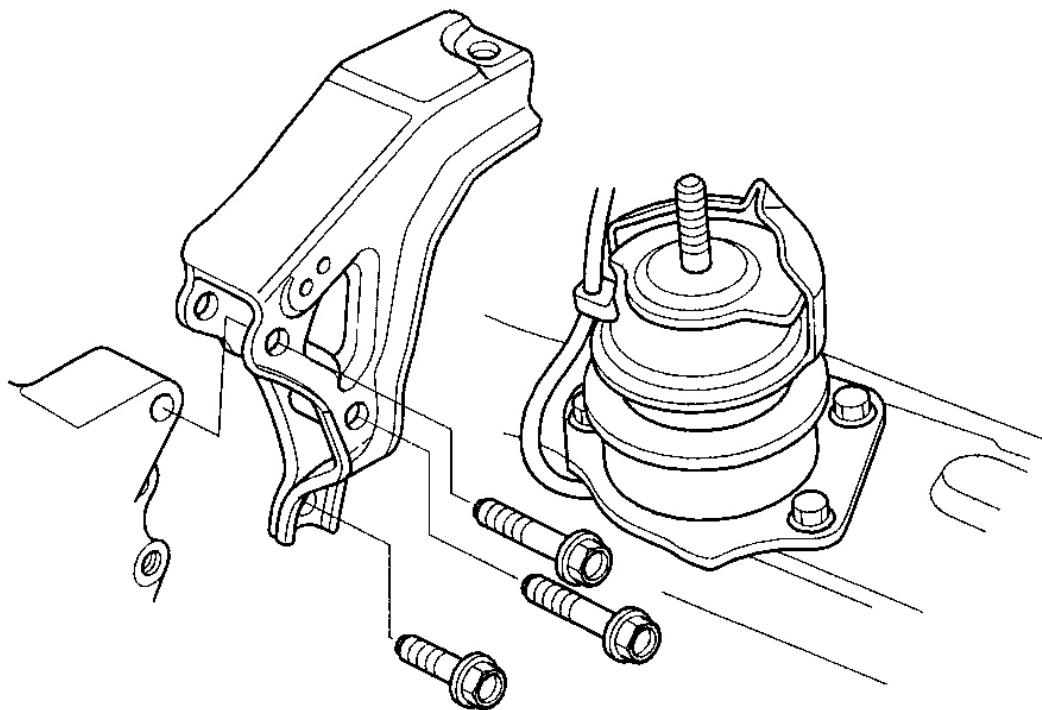
Fig. 23: Removing Bolts Securing Shift Cable Holder
Courtesy of AMERICAN HONDA MOTOR CO., INC.

36. Remove the lock bolt (D) securing the control lever (E), then remove the shift cable (F) with the control lever. Take care not to bend the shift cable while removing it (A/T).
37. Remove the damper fork (see **STRUT ASSEMBLY**).
38. Disconnect the suspension lower arm ball joints (see **BALL JOINT**).
39. Remove the driveshafts (see **AXLE SHAFTS**). Coat all precision finished surfaces with clean engine oil. Tie plastic bags over the driveshaft ends.
40. Remove the rear engine mount bracket.



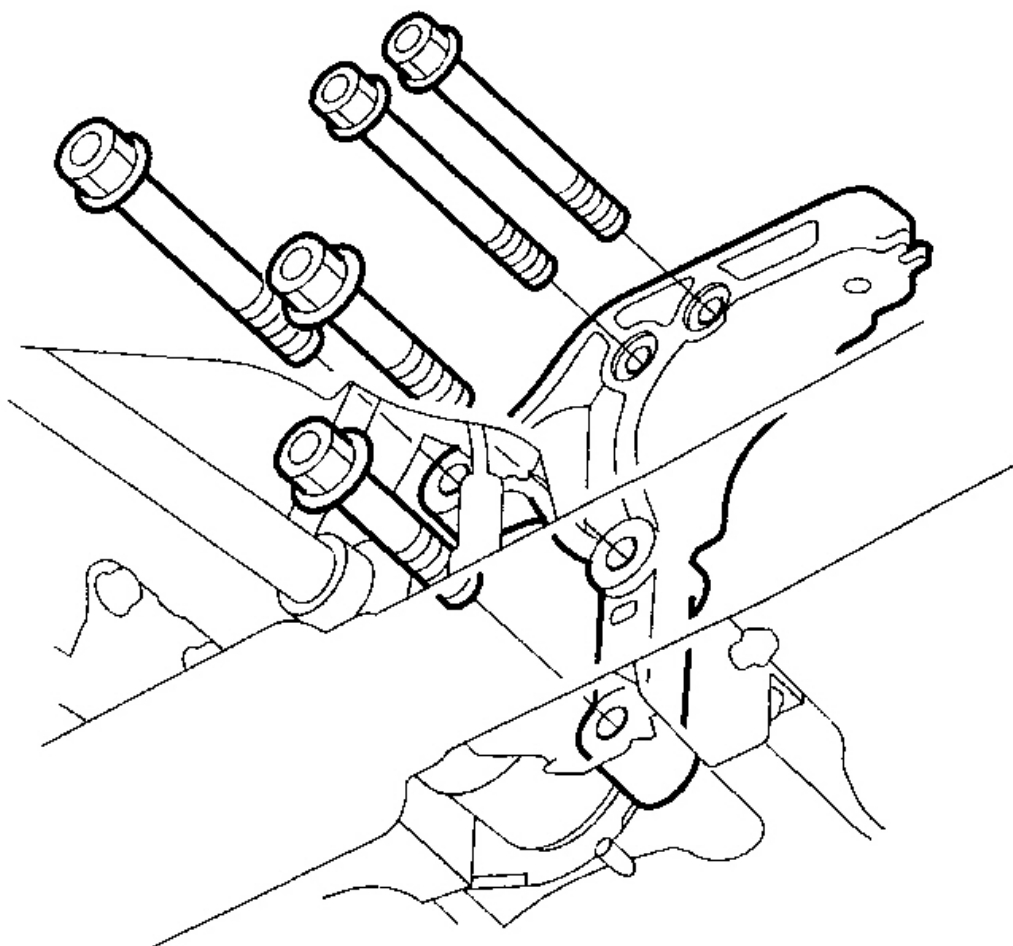
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Fig. 24: Removing Rear Engine Mount Bracket (M/T)
Courtesy of AMERICAN HONDA MOTOR CO., INC.



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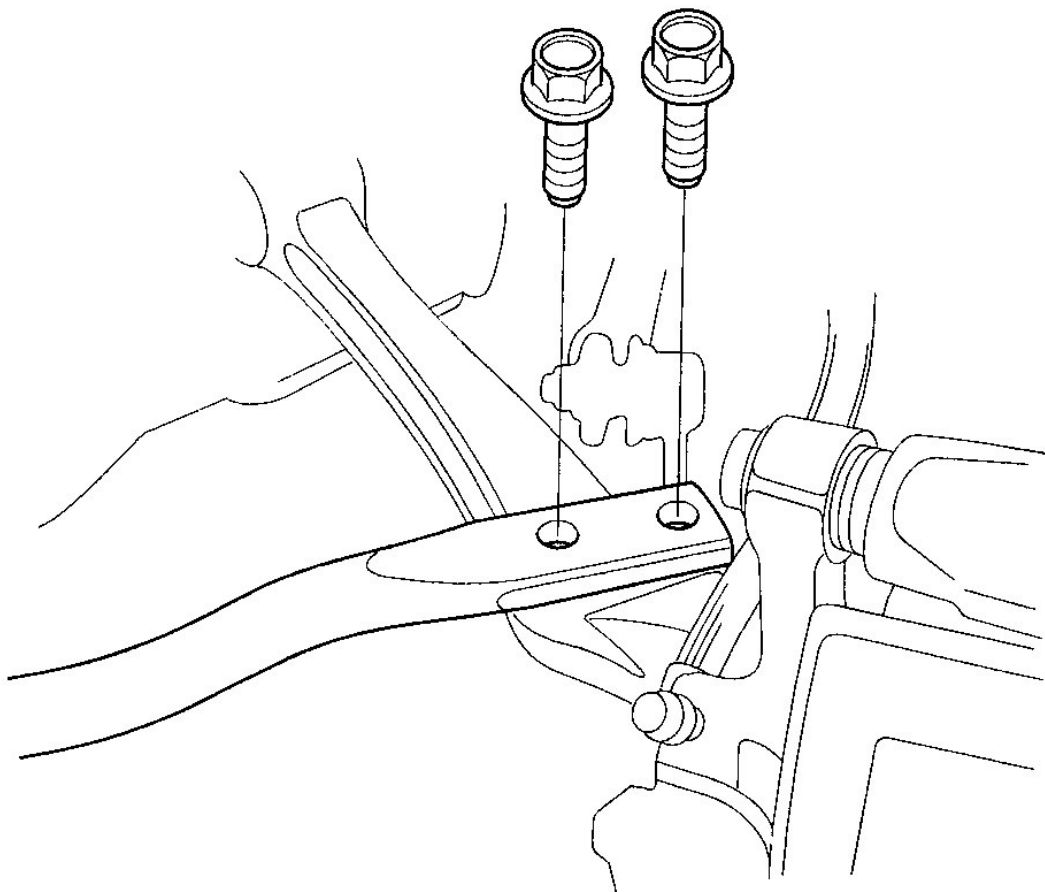
Fig. 25: Removing Rear Engine Mount Bracket (1998-00 Models A/T)
Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 26: Removing Rear Engine Mount Bracket (2001-02 Models A/T)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

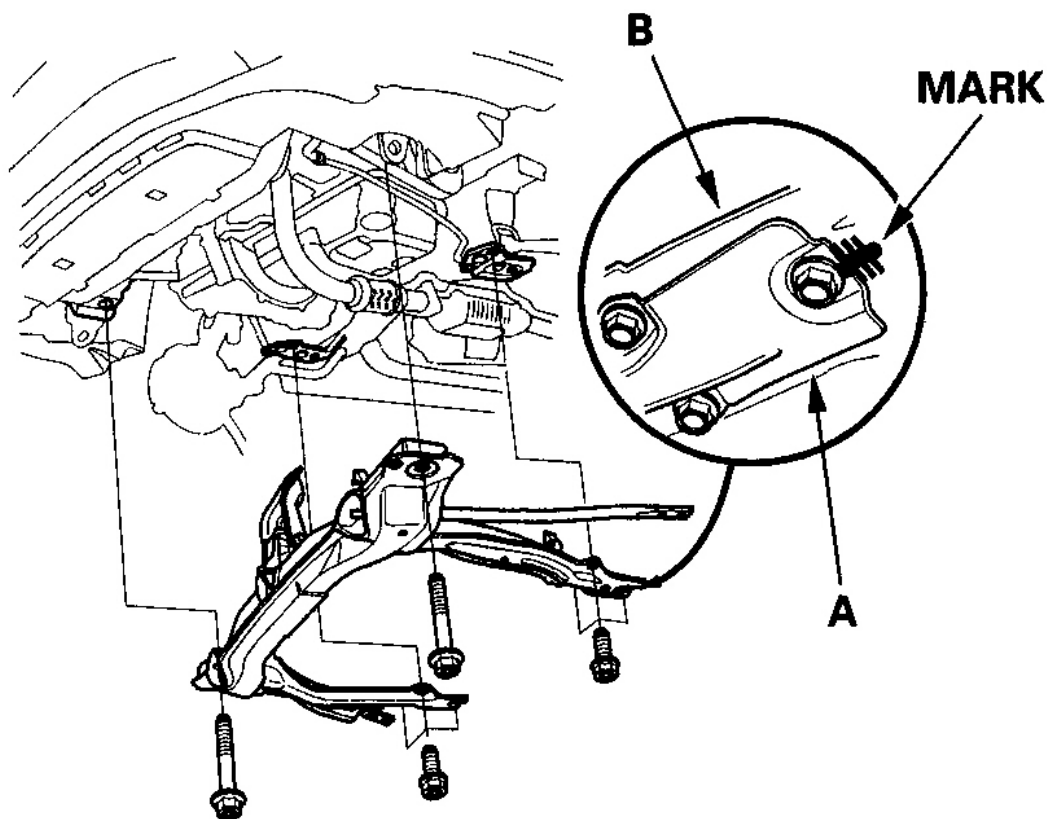
41. Remove the flange bolts securing the radius rods.



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Fig. 27: Removing Flange Bolts Securing Radius Rods
Courtesy of AMERICAN HONDA MOTOR CO., INC.

42. Mark the front beam (A) and rear beam (B), then remove the front beam.

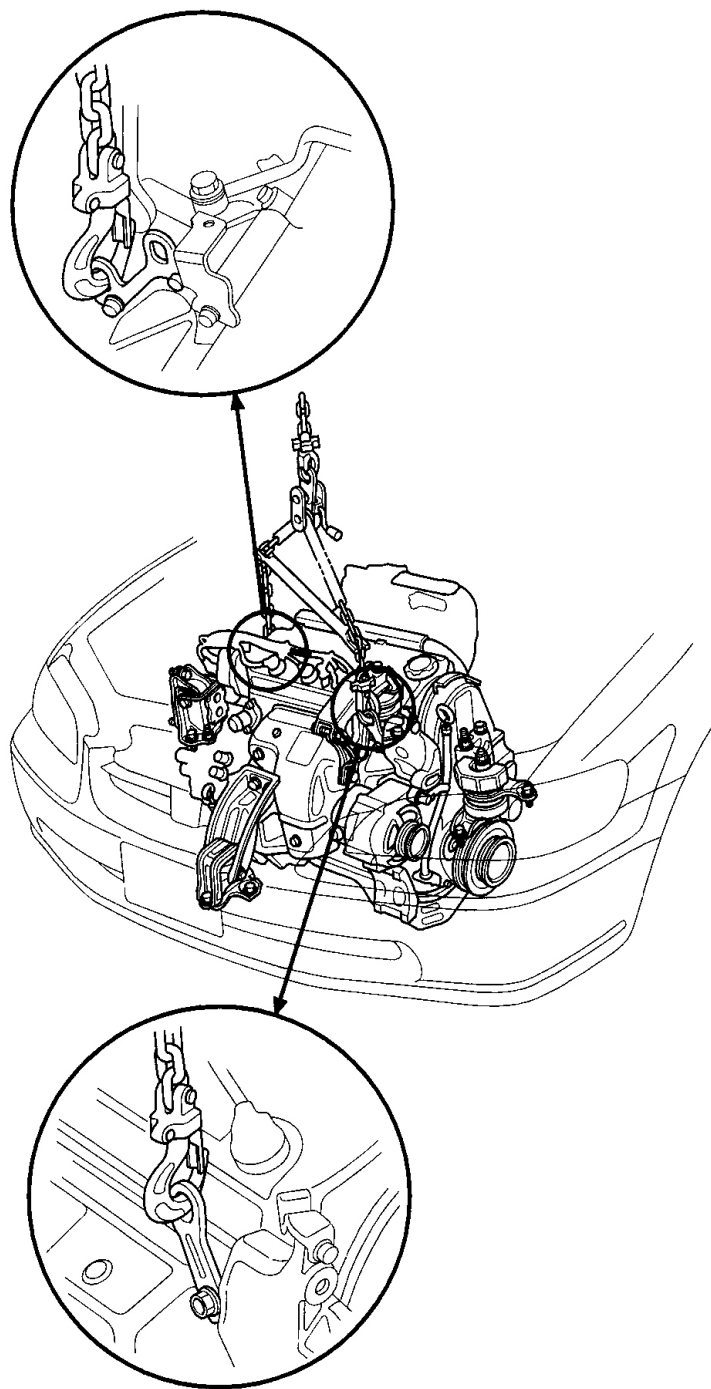


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Fig. 28: Removing Front Beam

Courtesy of AMERICAN HONDA MOTOR CO., INC.

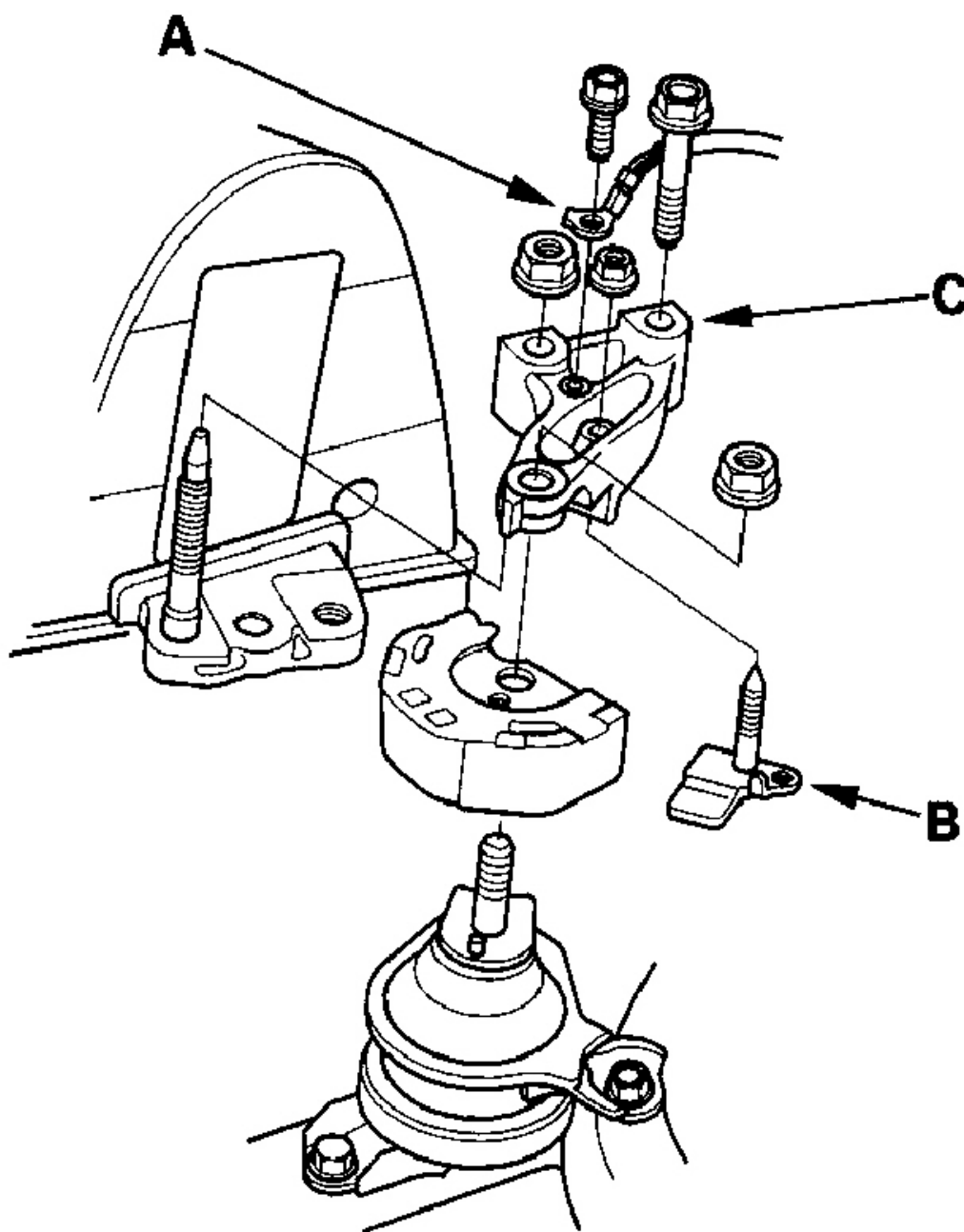
43. Lower the hoist.
44. Attach the chain hoist to the engine as shown.



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Fig. 29: Attaching Chain Hoist To Engine
Courtesy of AMERICAN HONDA MOTOR CO., INC.

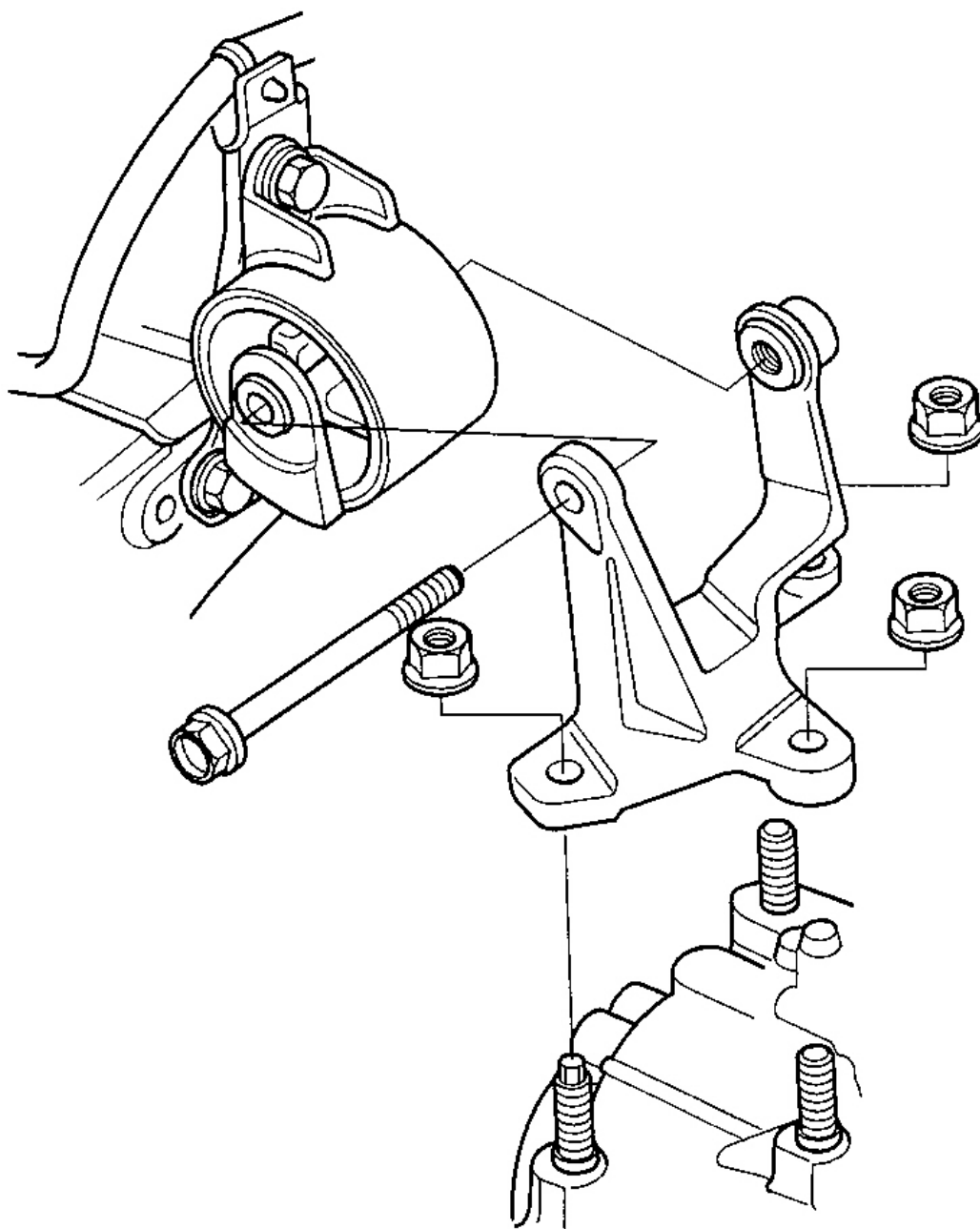
45. Remove the ground cable (A) and the stop (B), then remove the upper bracket (C).



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Fig. 30: Removing Ground Cable & Stop
Courtesy of AMERICAN HONDA MOTOR CO., INC.

46. Remove the transmission mount bracket.



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Fig. 31: Removing Transmission Mount Bracket
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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 all the way. Remove the chain hoist from the engine.
50. Remove the engine from under the vehicle.

ENGINE INSTALLATION

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

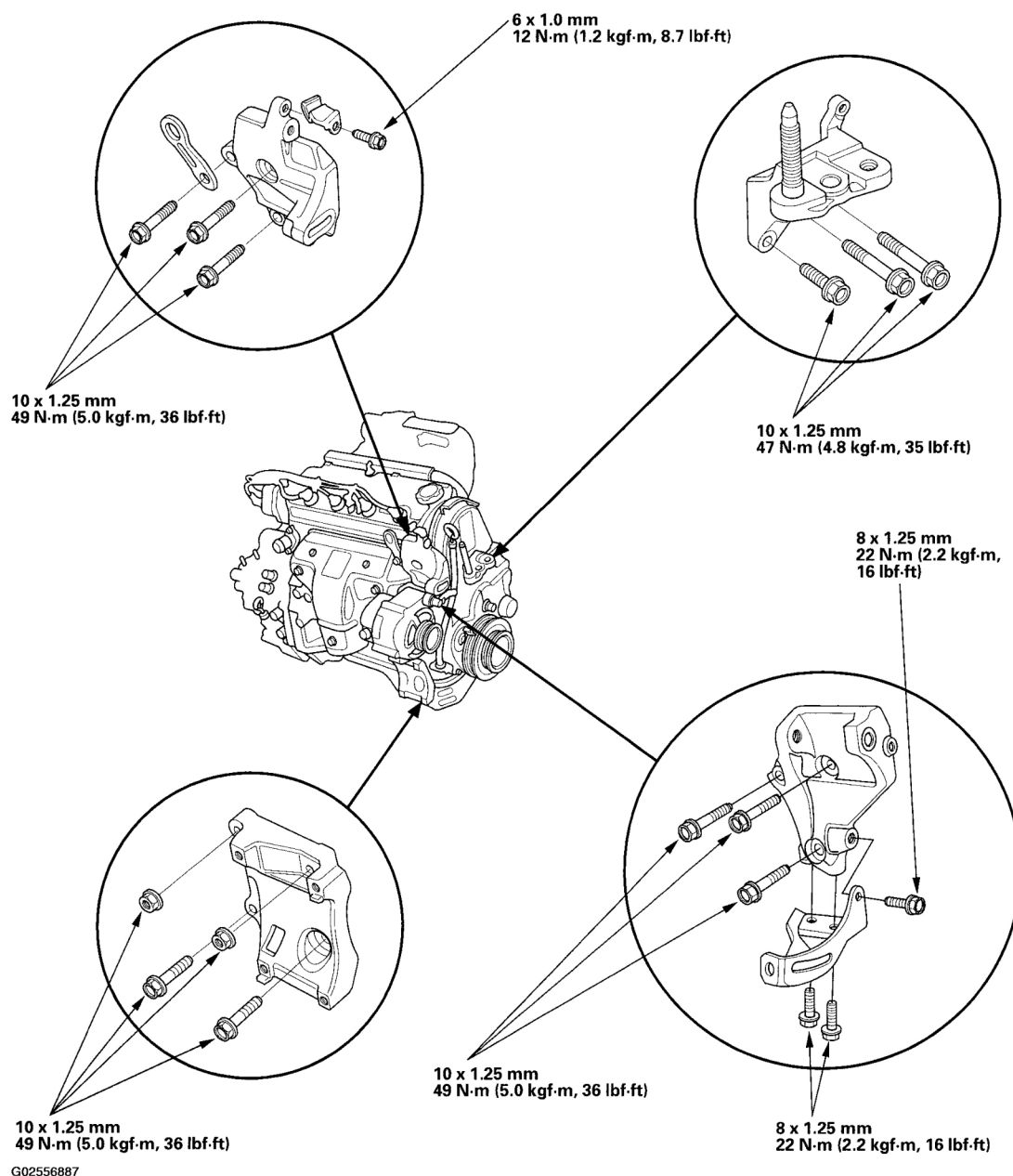
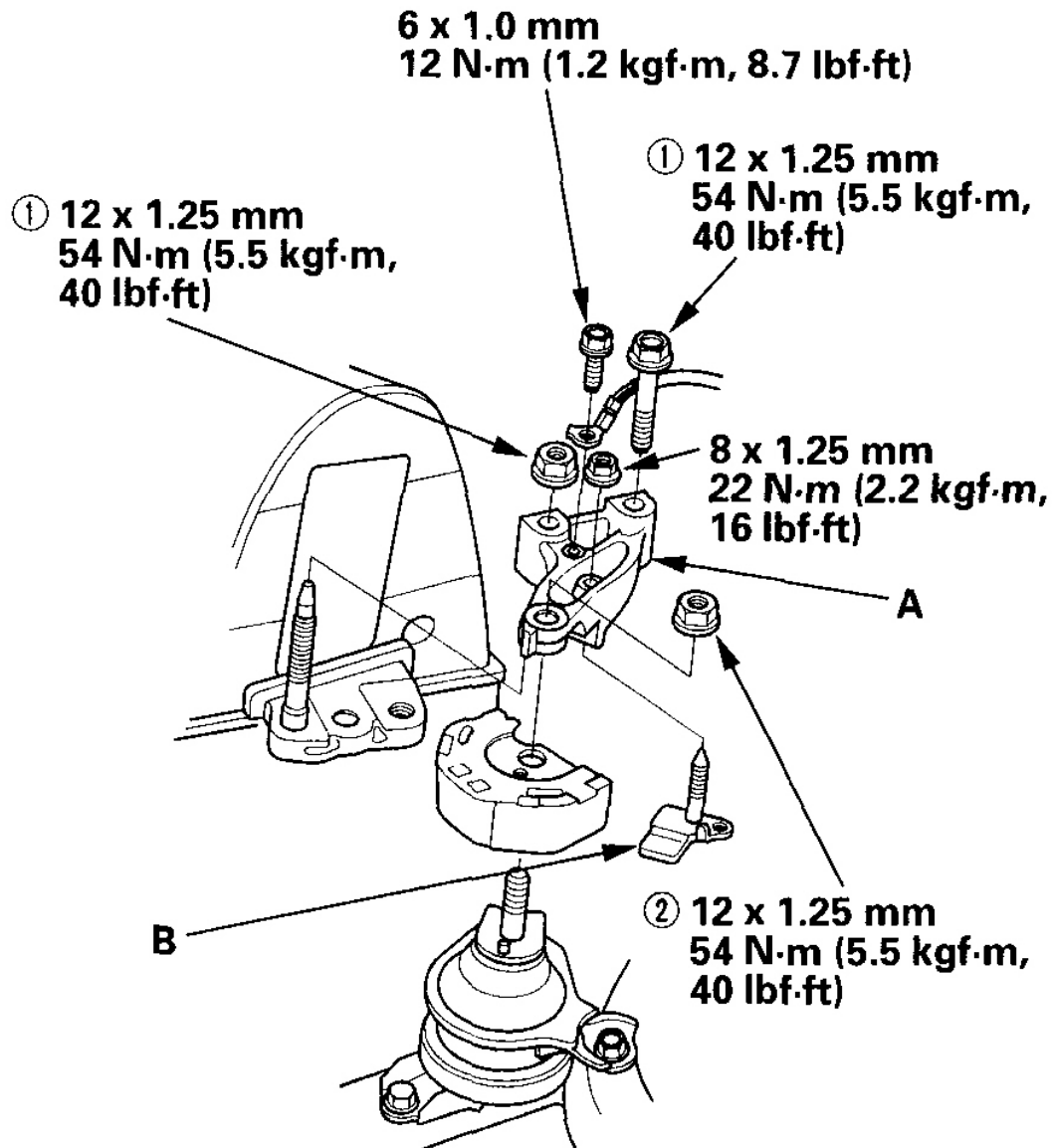


Fig. 32: Installing Accessory Bracket & Tightening Bolts/Nuts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Push the engine under the vehicle. Attach the chain hoist to the engine, then lift the engine into position in the vehicle.

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



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Fig. 33: Installing & Tightening Upper Bracket Bolts/Nuts
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Install the upper bracket (A), then tighten the bolt and nuts in the numbered sequence shown.
4. Install the stop (B).
5. Install the transmission mount bracket. Tighten the bolt and nuts in the numbered sequence shown.

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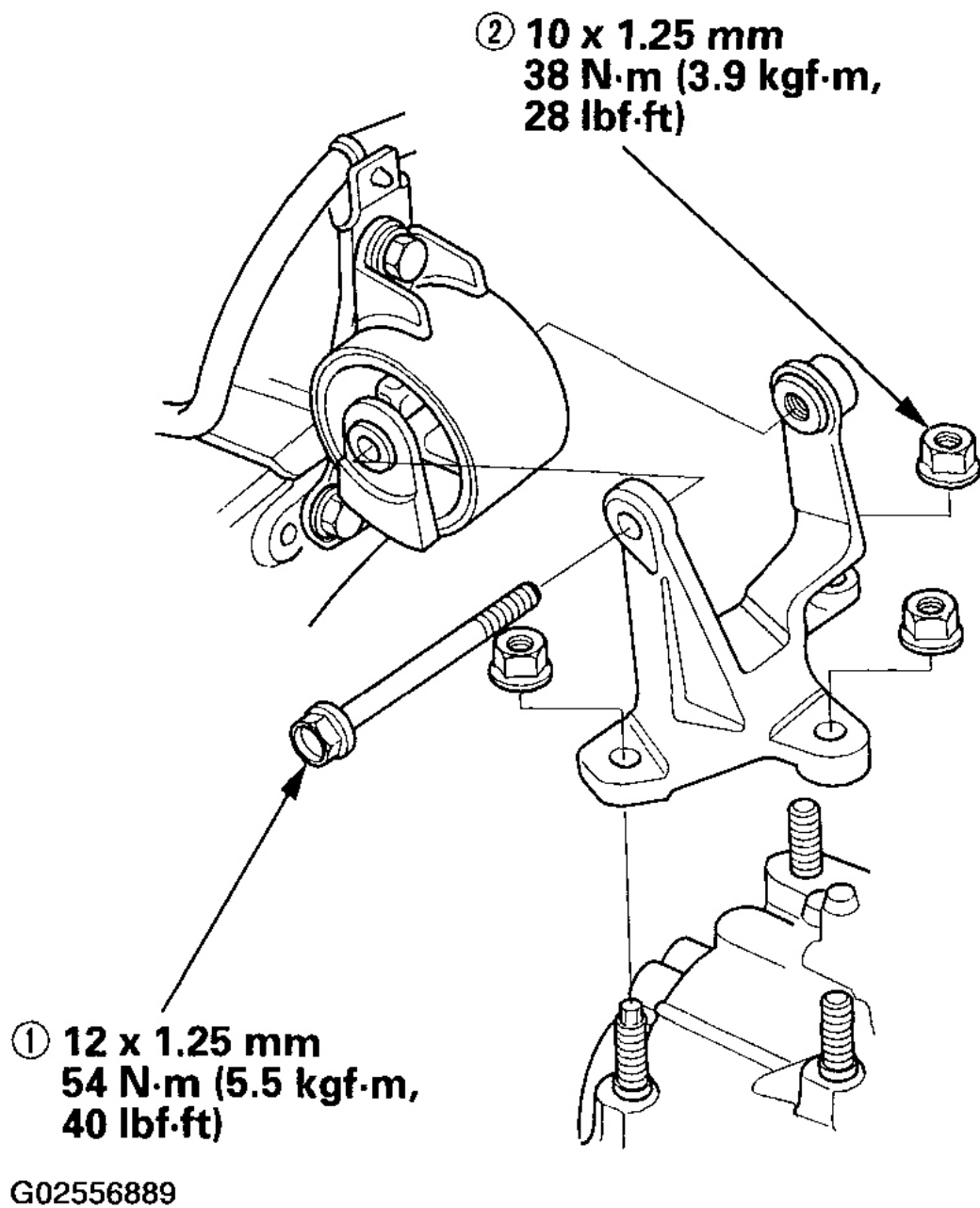
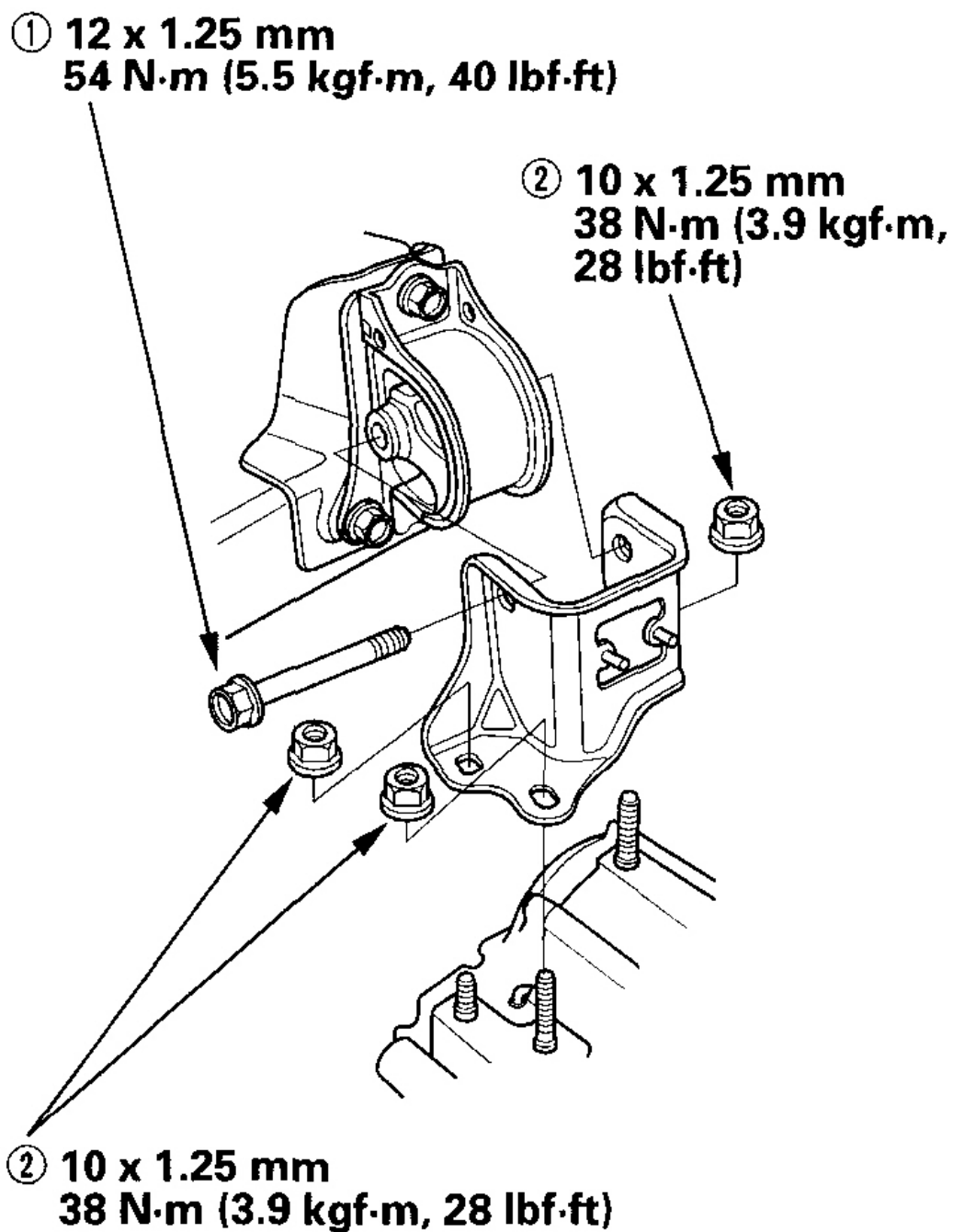


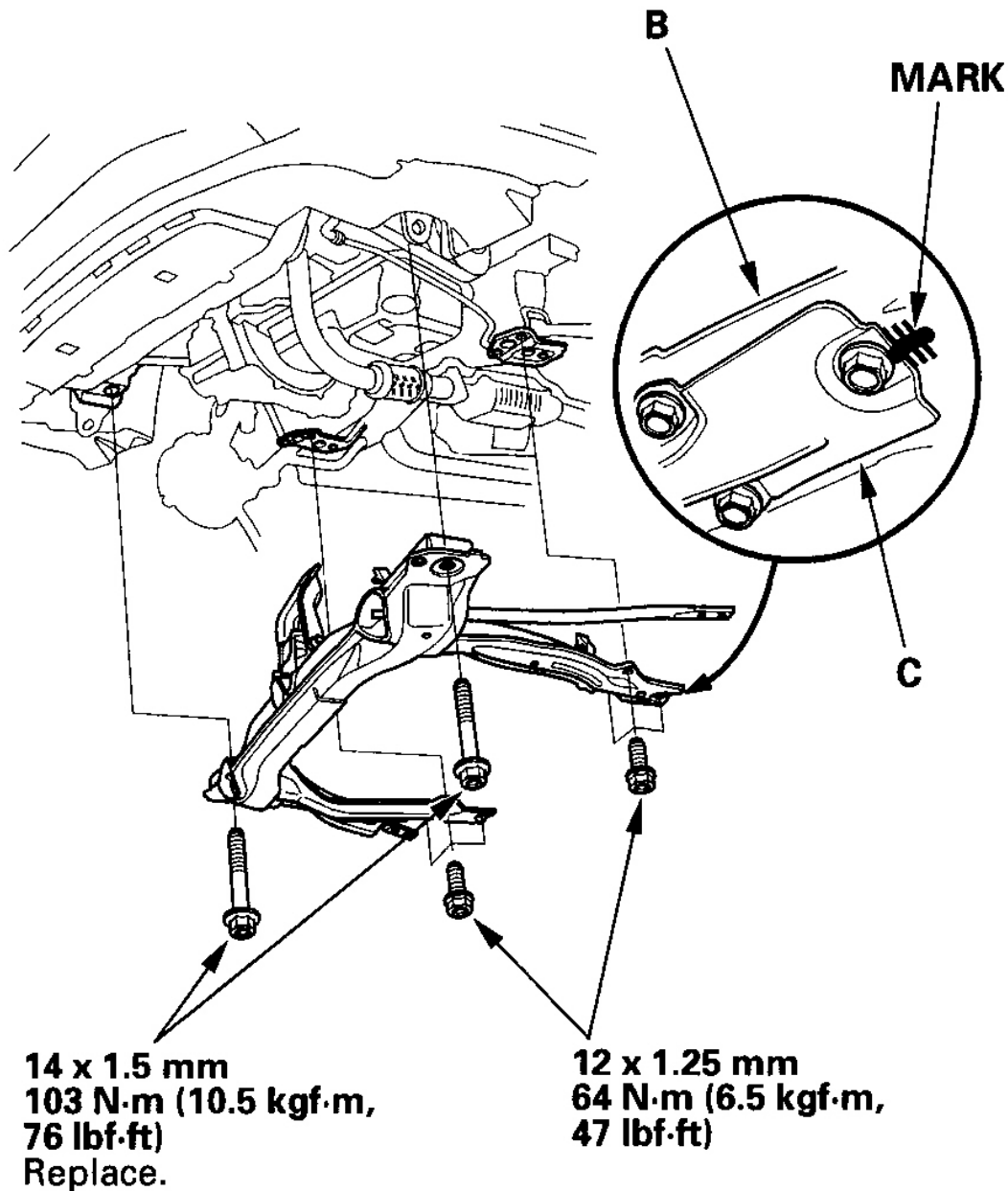
Fig. 34: Tightening Transmission Mount Bracket Bolts & Nuts (M/T)
Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 35: Tightening Transmission Mount Bracket Bolts & Nuts (A/T)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

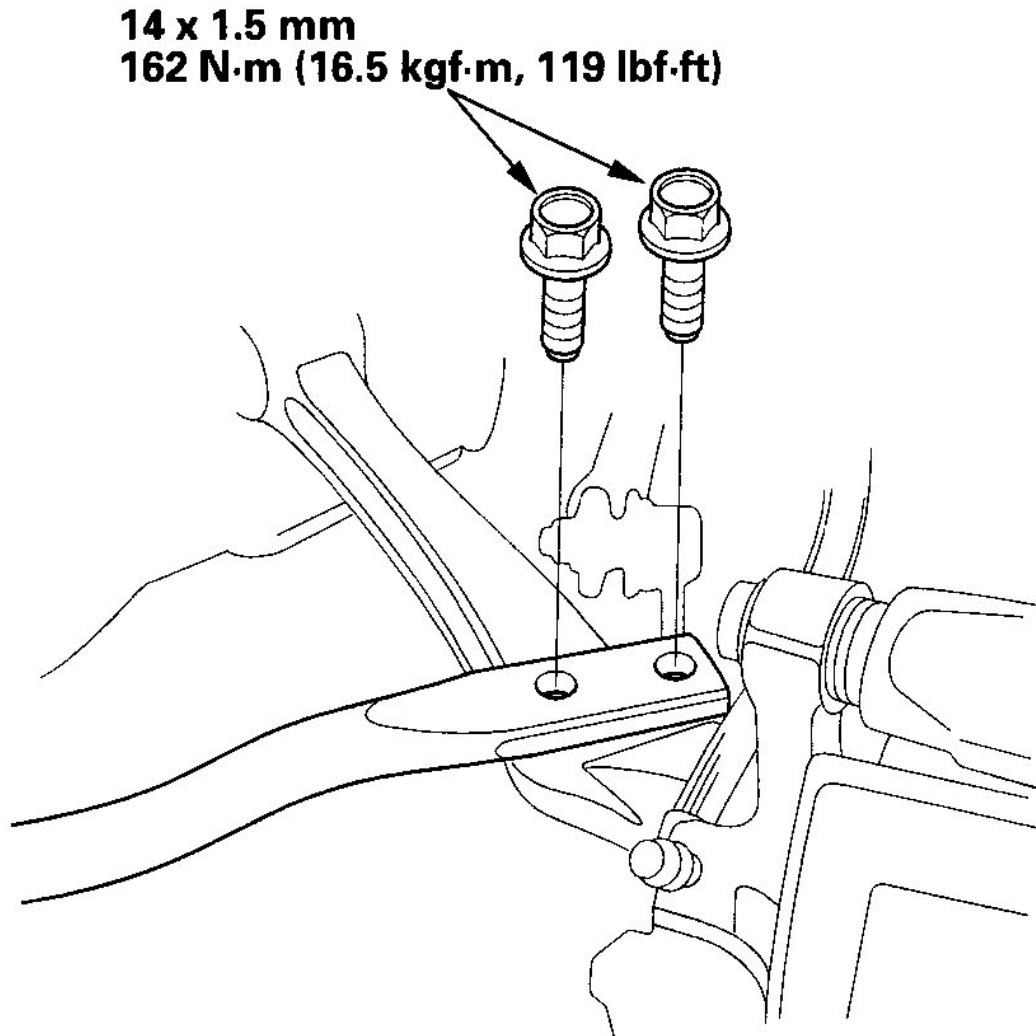
6. Remove the chain hoist from the engine.
7. Raise the hoist to full height.
8. Install the front beam. Align the marks on the rear beam (B) and front beam (C) then tighten the bolts.



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Fig. 36: Aligning Marks On Rear & Front Beam
Courtesy of AMERICAN HONDA MOTOR CO., INC.

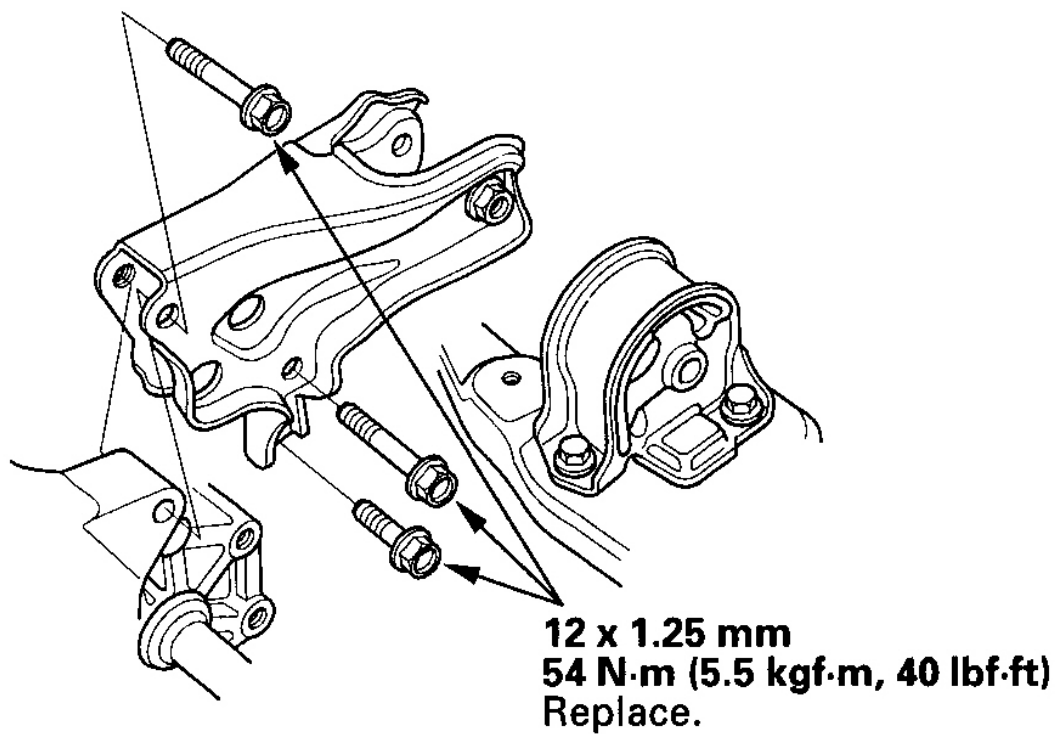
9. Tighten the flange bolts on the radius rods.



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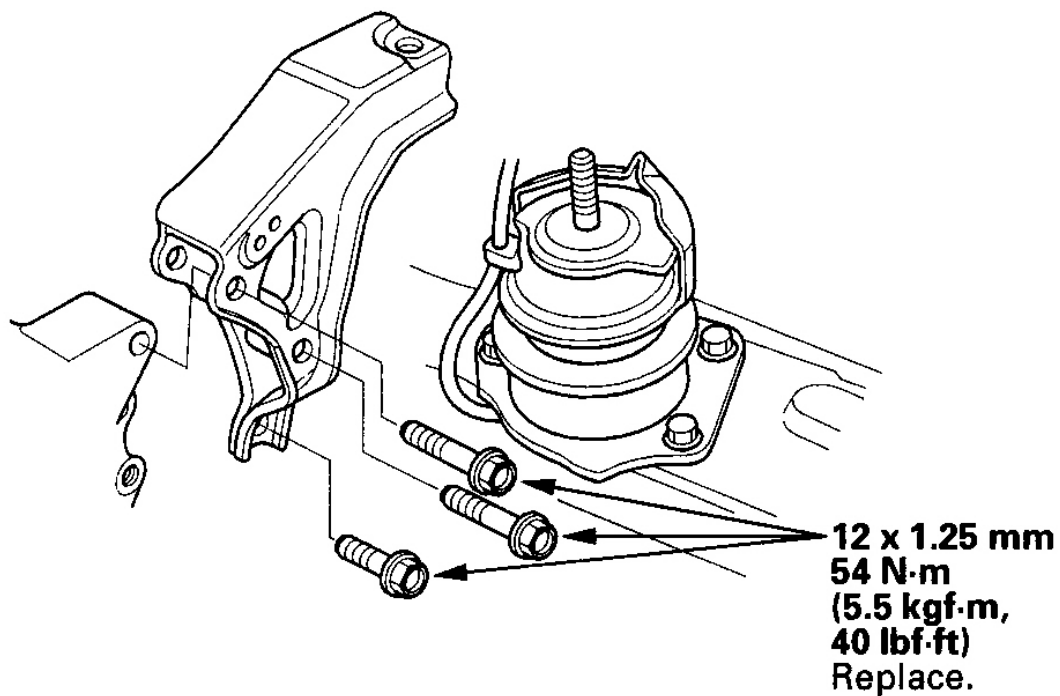
Fig. 37: Tightening Flange Bolts On Radius Rods
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Install the rear mount bracket, then tighten the bolts.



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Fig. 38: Installing Rear Mount Bracket (M/T)
Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 39: Installing Rear Mount Bracket ('98-00 Models A/T)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

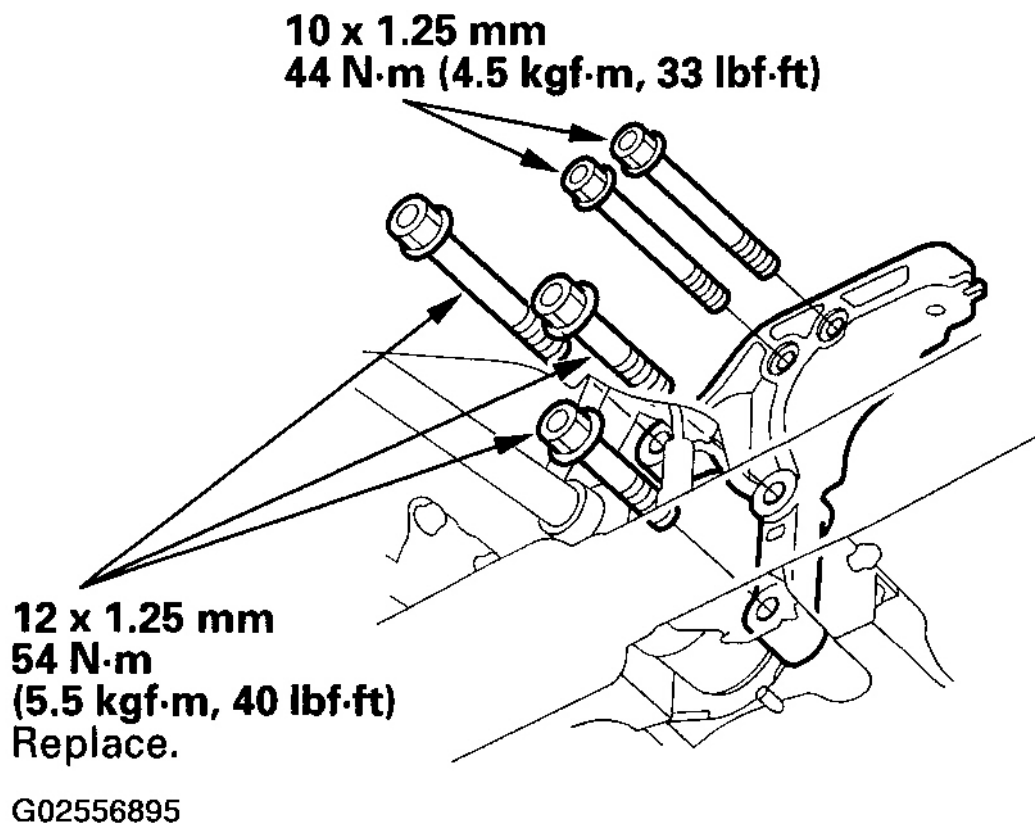
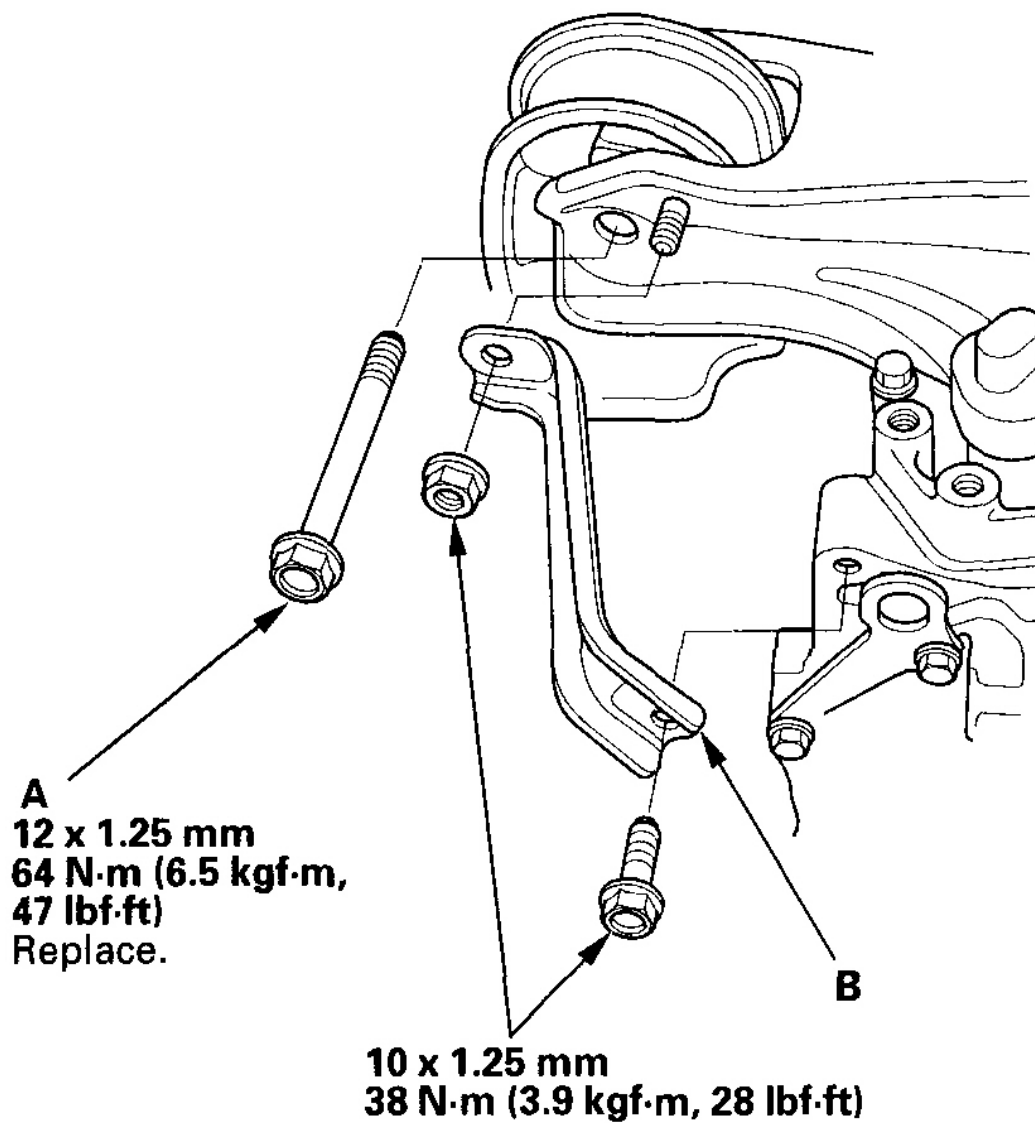


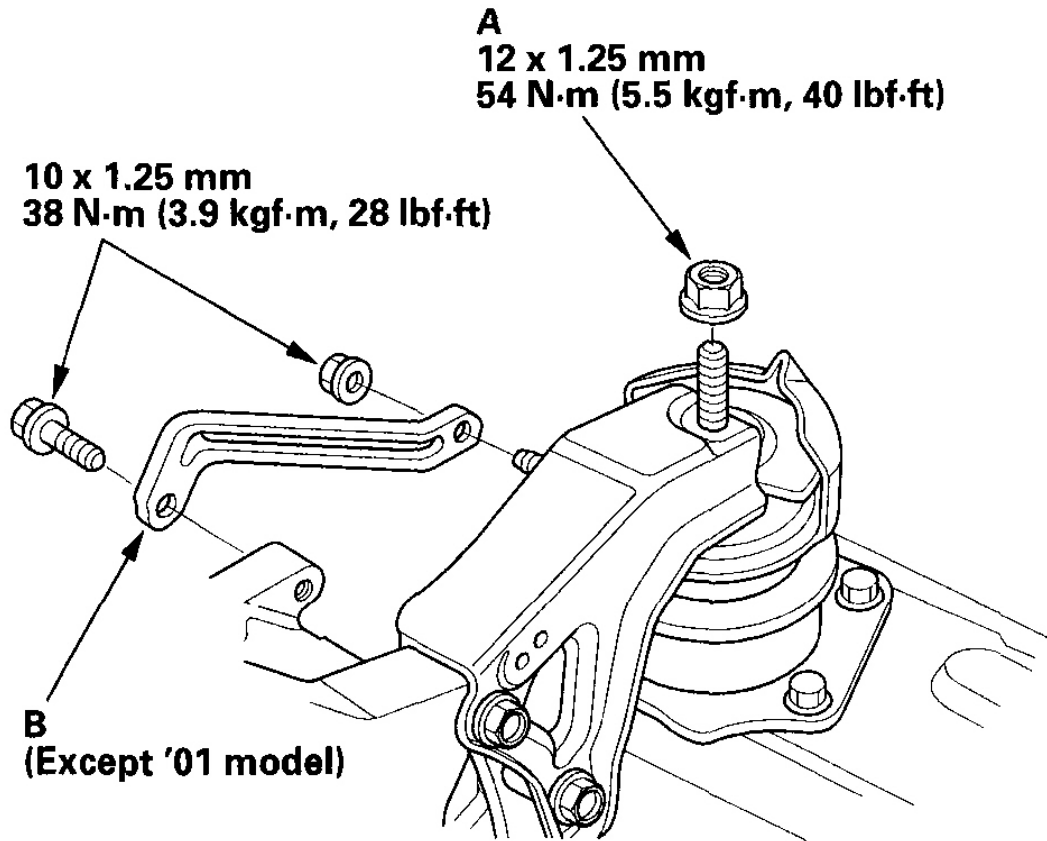
Fig. 40: Installing Rear Mount Bracket ('01-02 Models A/T)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Lower the hoist.
12. Tighten the rear mount mounting bolt/nut (A).



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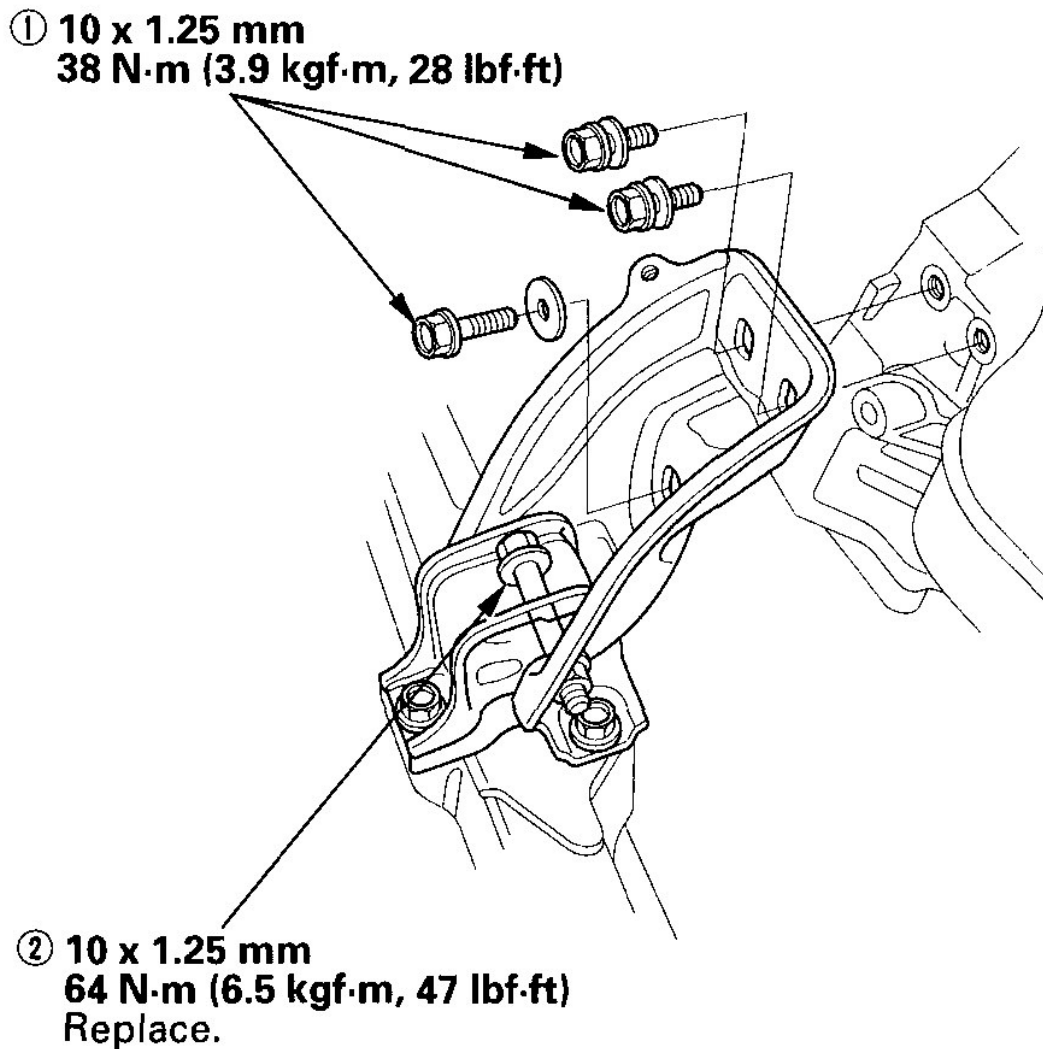
Fig. 41: Tightening Rear Mount Mounting Bolt/Nut (M/T)
Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 42: Tightening Rear Mount Mounting Bolt/Nut (A/T)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

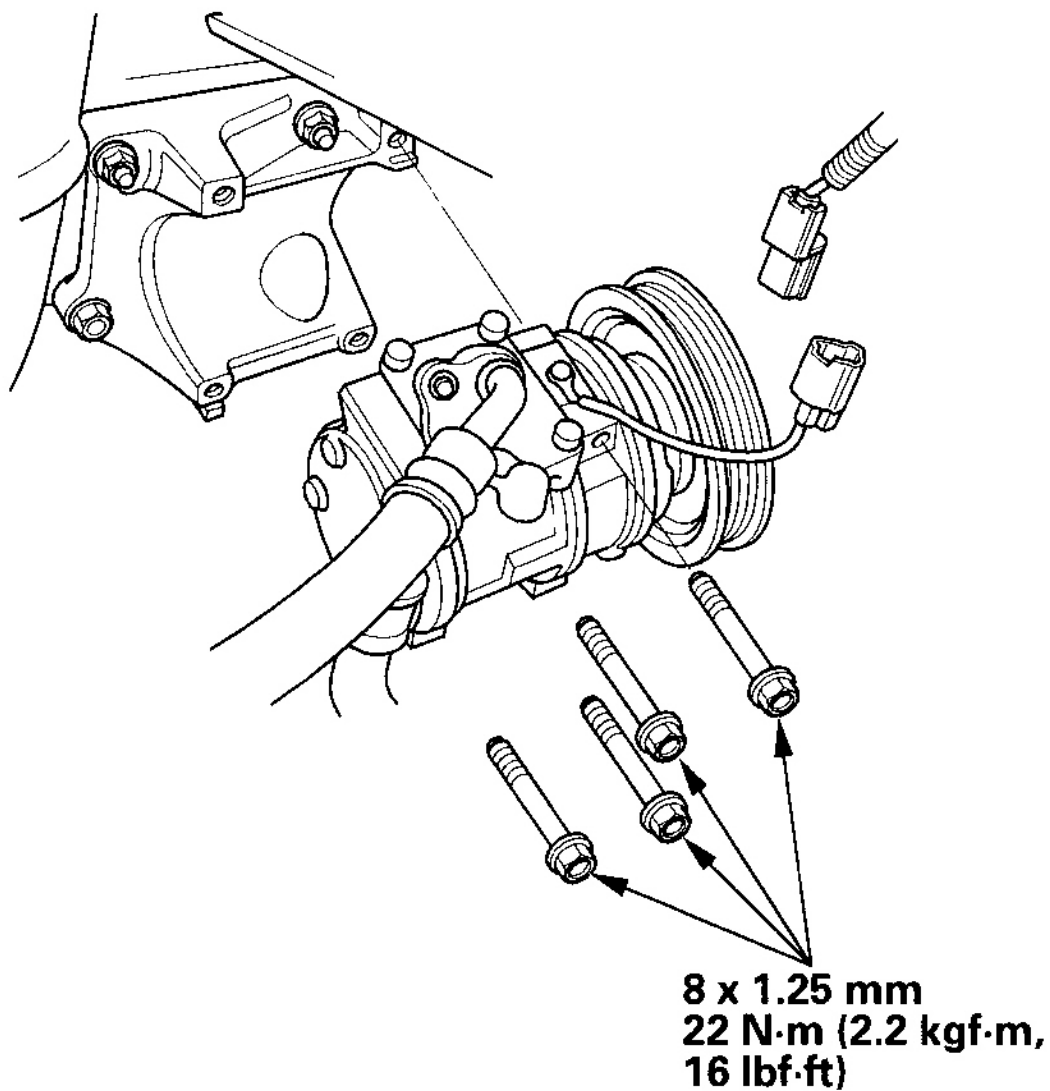
13. Install the rear stiffener (B) (except '01-02 models A/T).
14. Tighten the front mount bracket mounting bolts in the numbered sequence shown.



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Fig. 43: Tightening Front Mount Bracket Mounting Bolts In Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

15. Raise the hoist to full height.
16. Install a new spring clip on the end of each driveshaft, then install the driveshafts. Make sure each clip "clicks" into place in the differential and intermediate shaft.
17. Connect the suspension lower arm ball joints. Use new cotter pins (see **BALL JOINT**).
18. Install the damper fork (see **STRUT ASSEMBLY**).
19. Install the A/C compressor.



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Fig. 44: Installing A/C Compressor

Courtesy of AMERICAN HONDA MOTOR CO., INC.

20. Install the exhaust pipe A (A); use new gaskets (B) and new self-locking nuts (C).

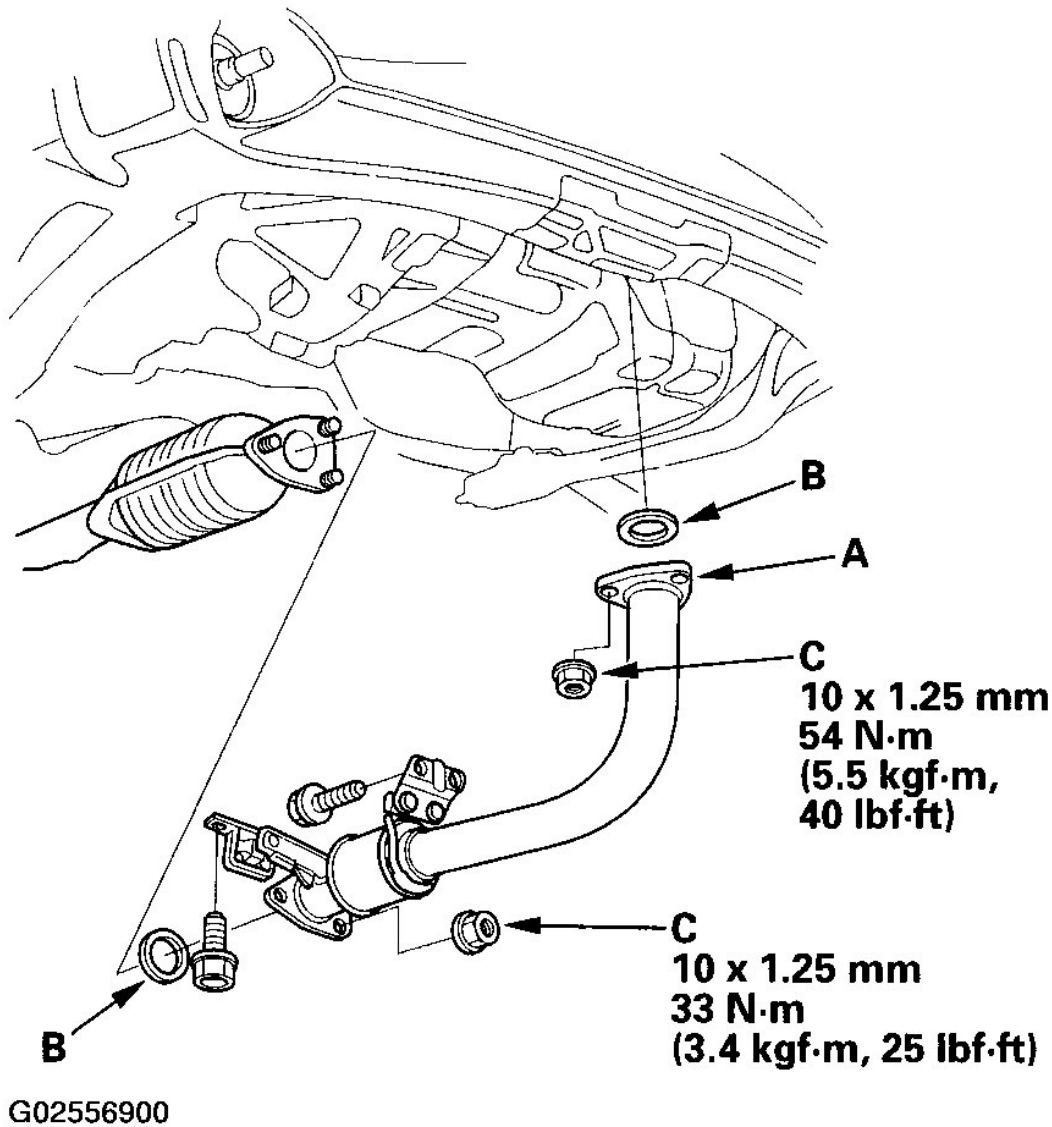
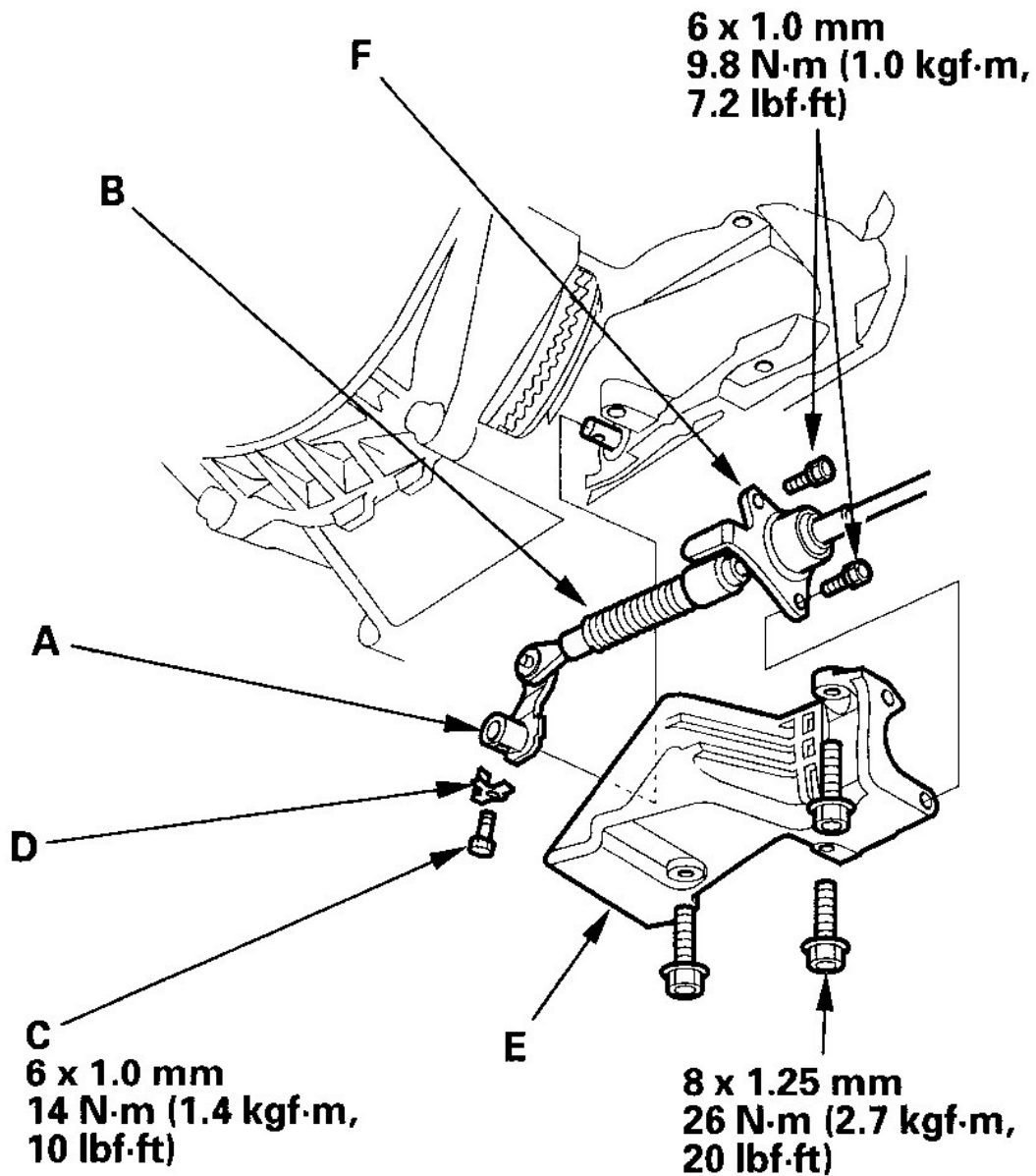


Fig. 45: Installing Exhaust Pipe A

Courtesy of AMERICAN HONDA MOTOR CO., INC.

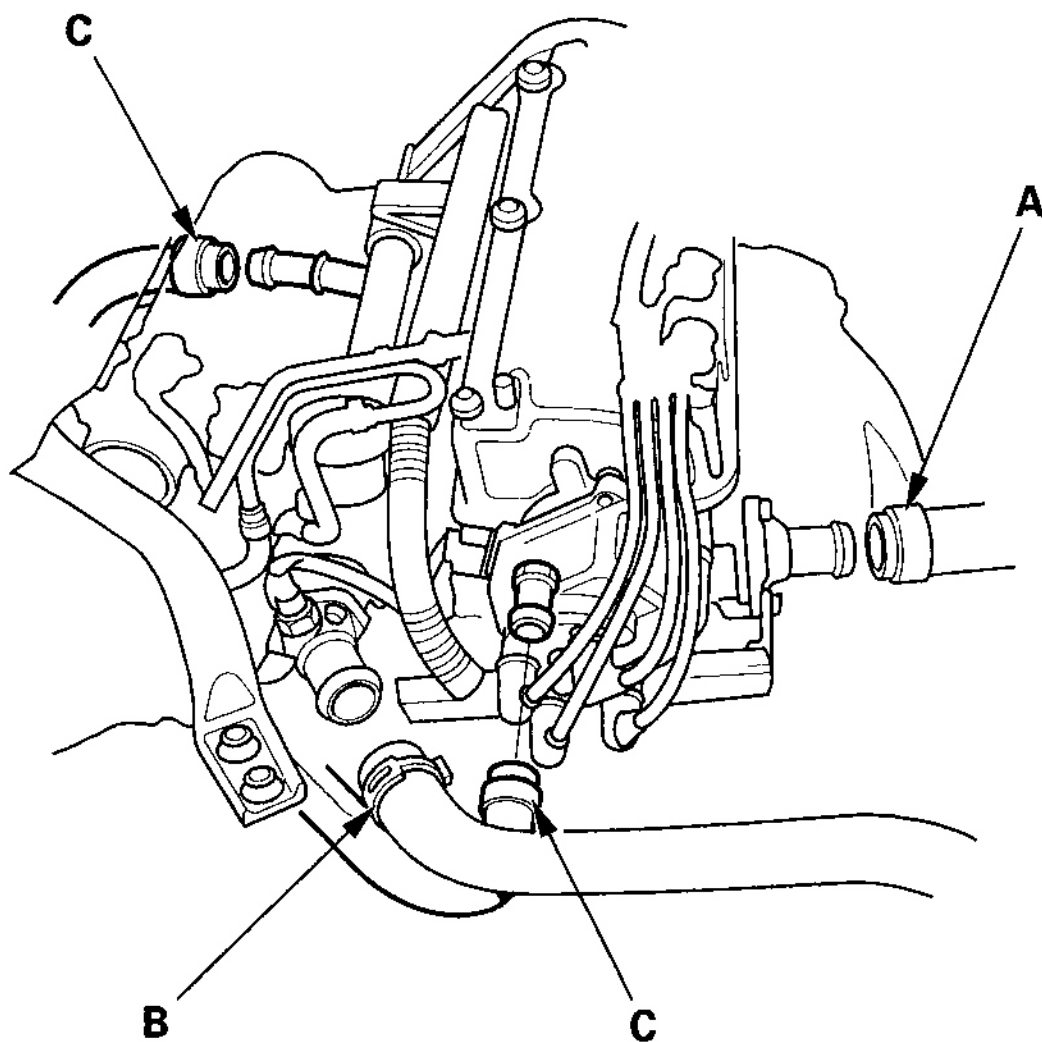
21. Install the control lever (A), with the shift cable (B), on the control shaft. Do not bend the shift cable any more than is necessary to install the control lever (A/T).



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Fig. 46: Installing Control Lever With Shift Cable On Control Shaft
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

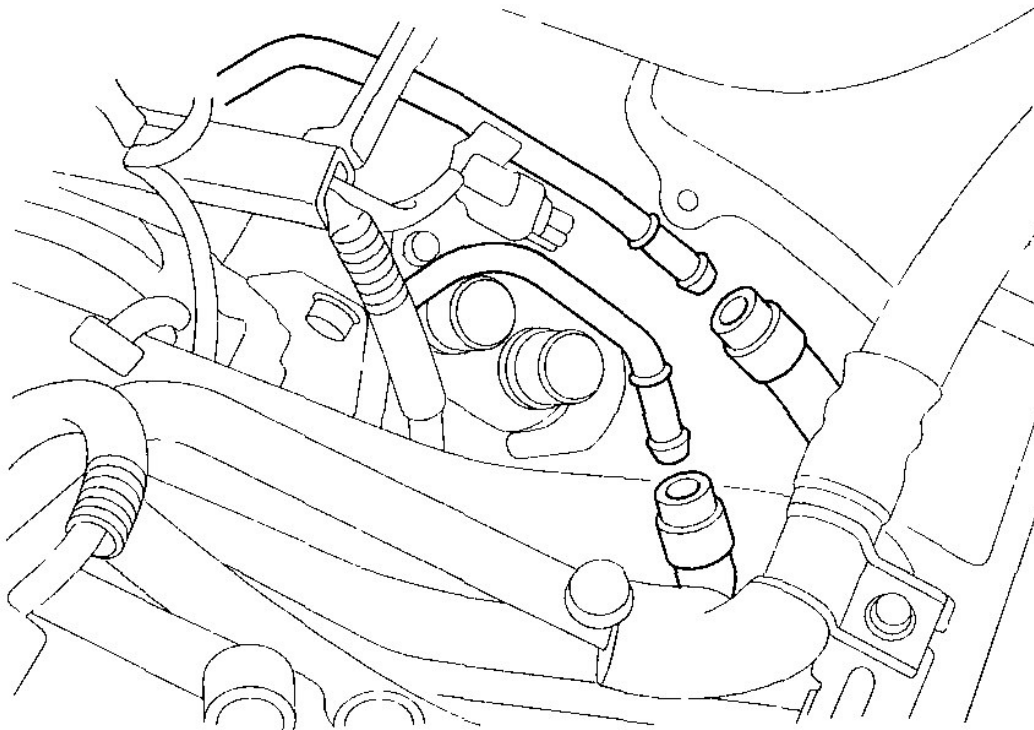
22. Install the lock bolt (C) with a new lock washer (D), then bend the lock tab of the lock washer (A/T).
23. Install the shift cable cover (E), then install the shift cable holder (F) on the shift cable cover (A/T).
24. Connect the upper radiator hose (A), lower radiator hose (B) and heater hoses (C).



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Fig. 47: Connecting Upper Radiator Hose, Lower Radiator Hose & Heater Hoses
Courtesy of AMERICAN HONDA MOTOR CO., INC.

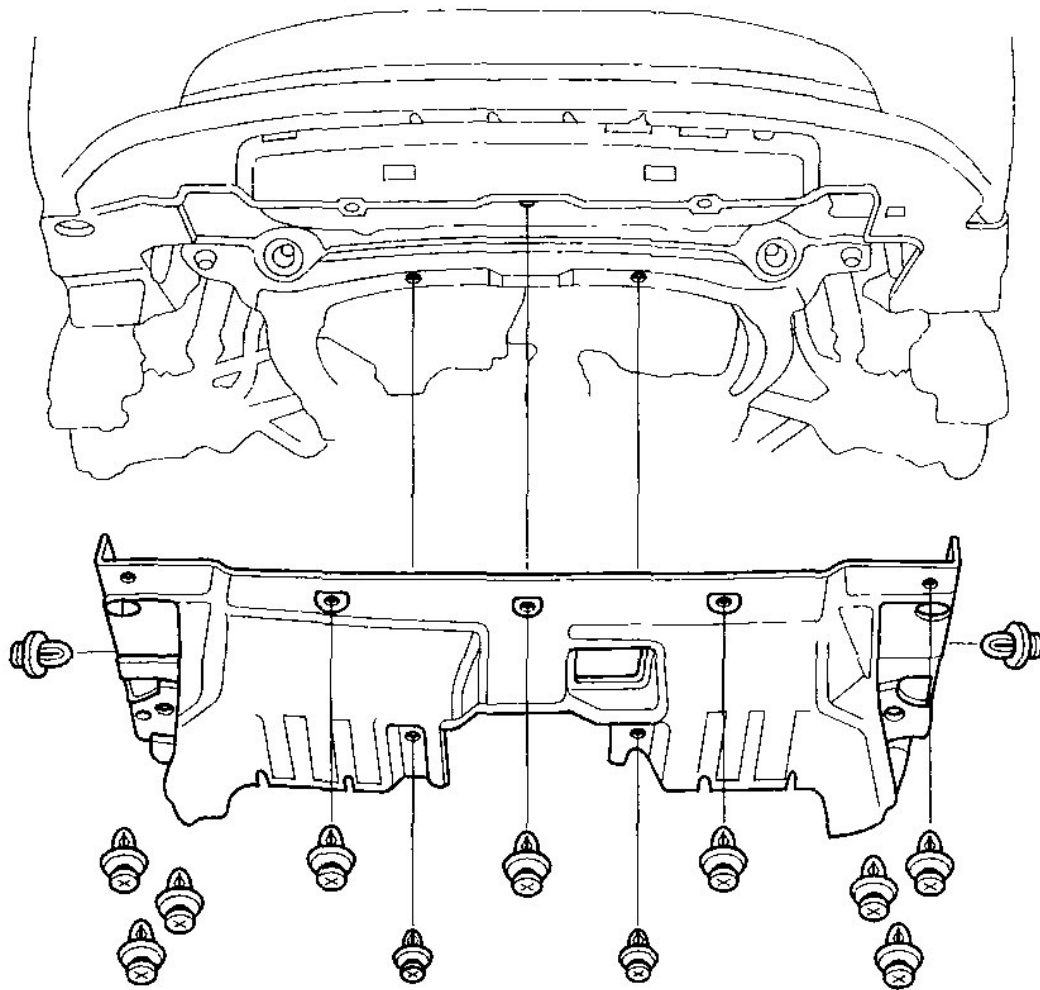
25. Connect the Automatic Transmission Fluid (ATF) cooler hoses (A/T).



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Fig. 48: Connecting ATF Cooler Hoses (A/T)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

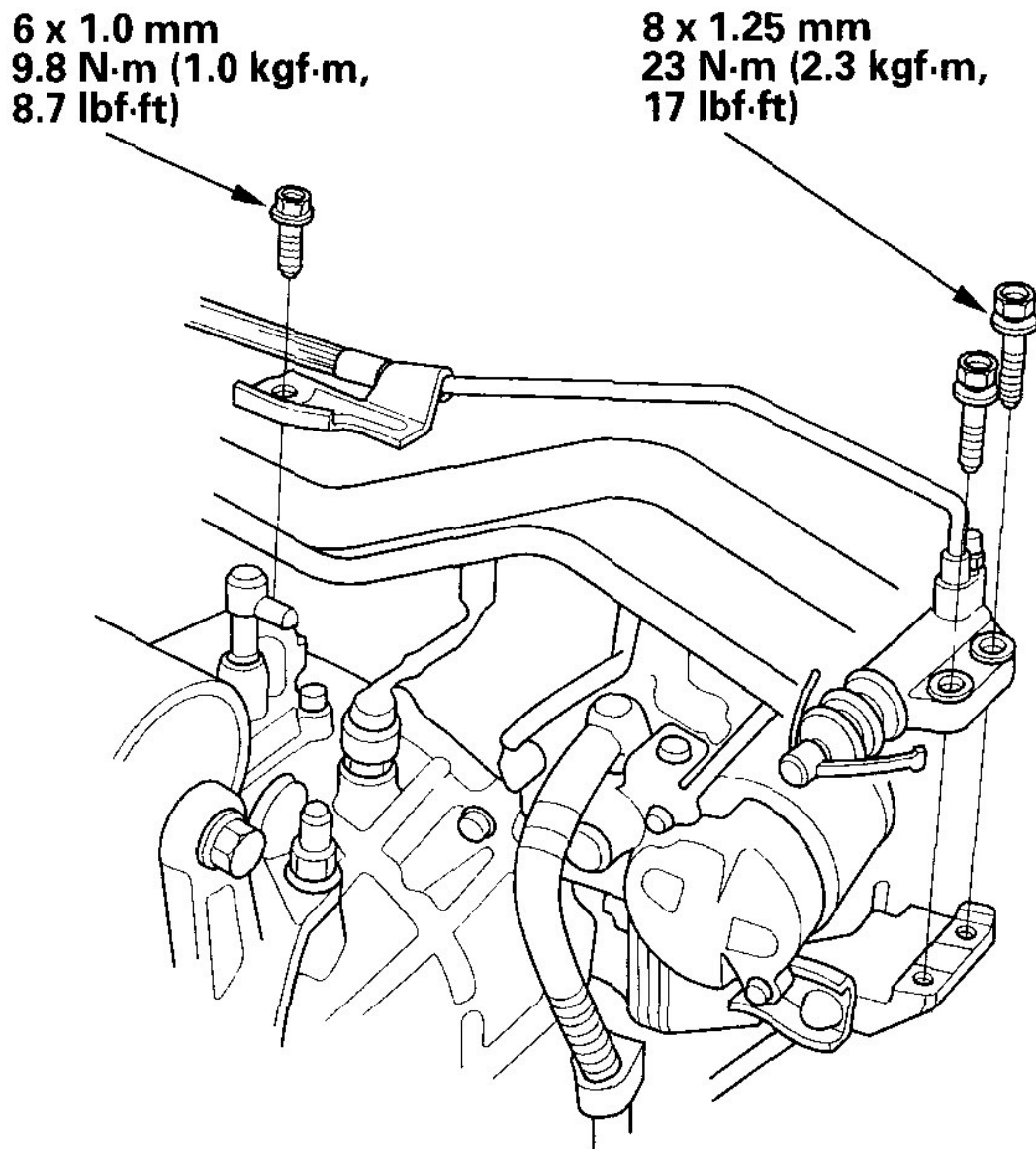
26. Install the splash shield.



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Fig. 49: Installing Splash Shield**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

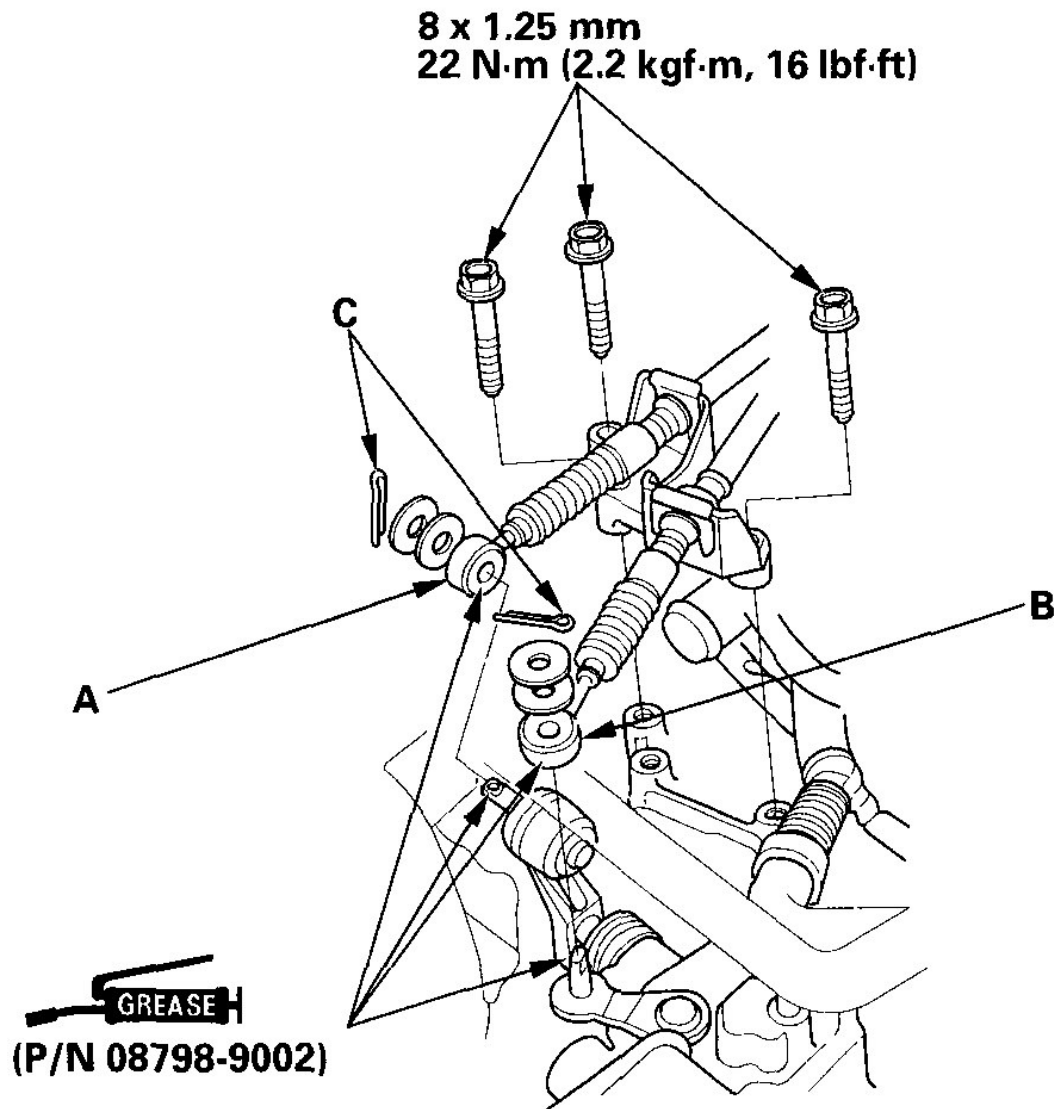
27. Install the front tires/wheels.
28. Lower the hoist.
29. Install the clutch slave cylinder and line/hose assembly. Take care not to bend the line (M/T).



G02556905

Fig. 50: Installing Clutch Slave Cylinder & Line/Hose Assembly (M/T)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

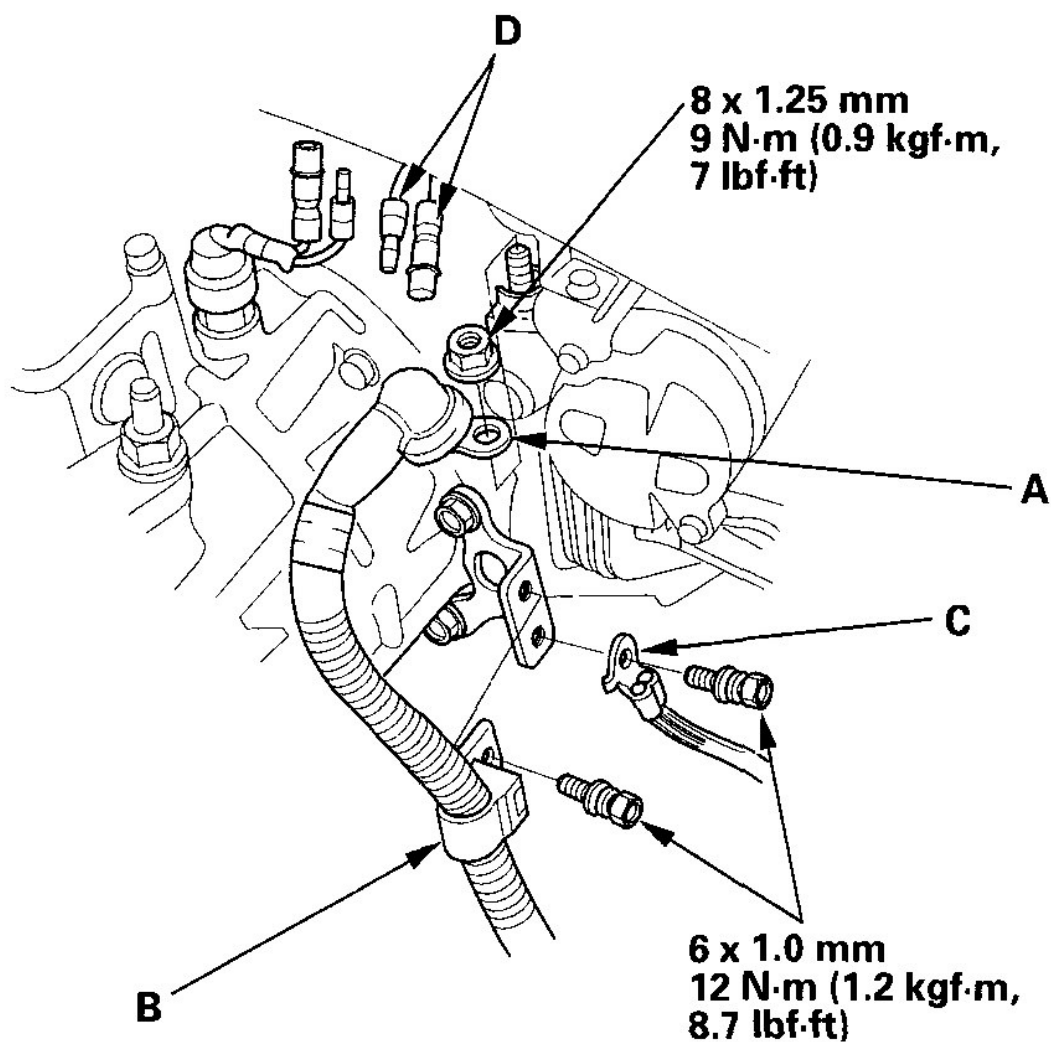
30. Install the shift cable (A) and select cable (B); use new cotter pins (C).



G02556906

Fig. 51: Installing Shift Cable & Select Cable
Courtesy of AMERICAN HONDA MOTOR CO., INC.

31. Loosely install the alternator belt.
32. Loosely install the P/S pump belt and pump.
33. Adjust the alternator belt (see **ADJUSTMENTS**) and the Power Steering (P/S) pump belt (see **PUMP BELTS**).
34. Install the starter cable (A), wire harness clamp (B), ground cable (C) and back-up light switch connectors (D).

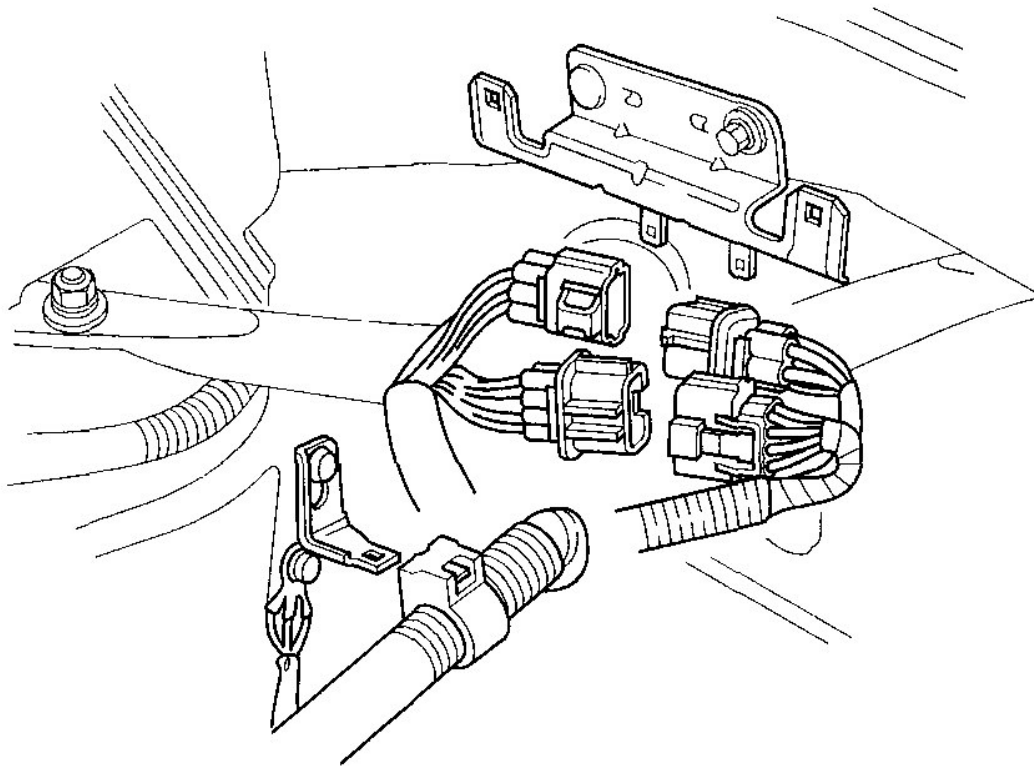


G02556907

Fig. 52: Installing Starter Cable

Courtesy of AMERICAN HONDA MOTOR CO., INC.

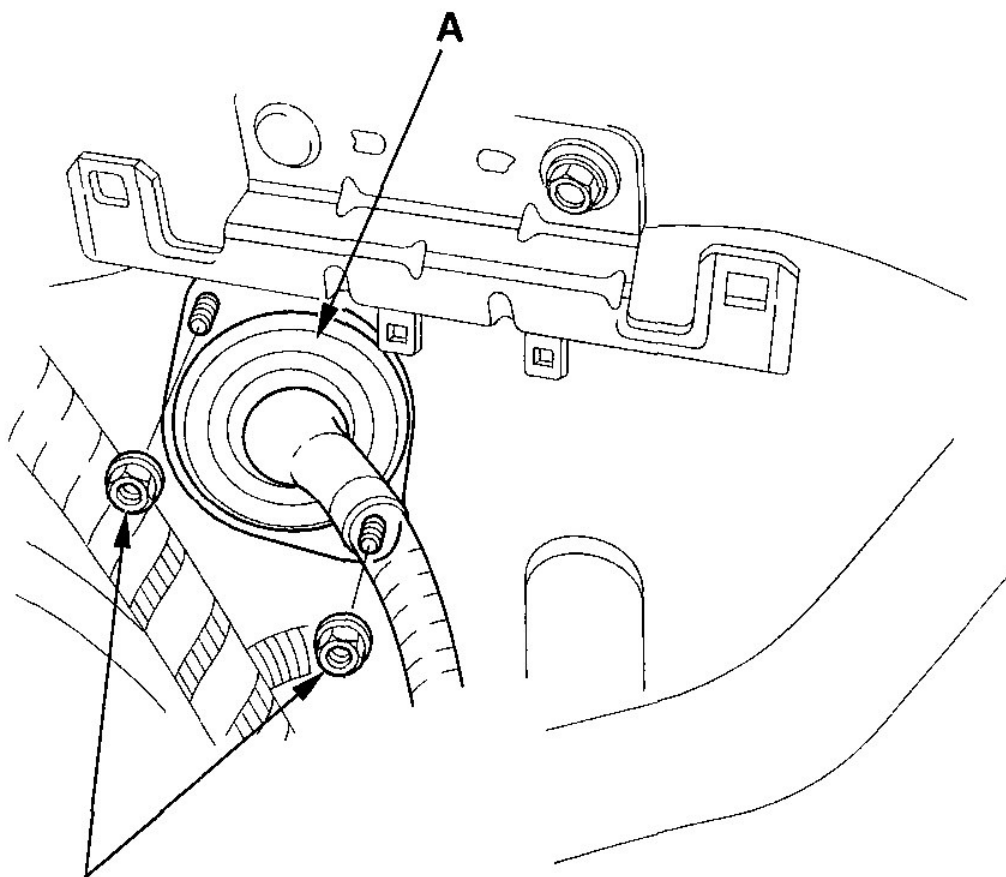
35. Connect the engine wire harness connectors on the right side of the engine compartment.



G02556908

Fig. 53: Connecting Engine Wire Harness Connectors On Right Side Of Engine Compartment
Courtesy of AMERICAN HONDA MOTOR CO., INC.

36. Push the ECM/PCM connectors through the bulkhead, then install the grommet (A).



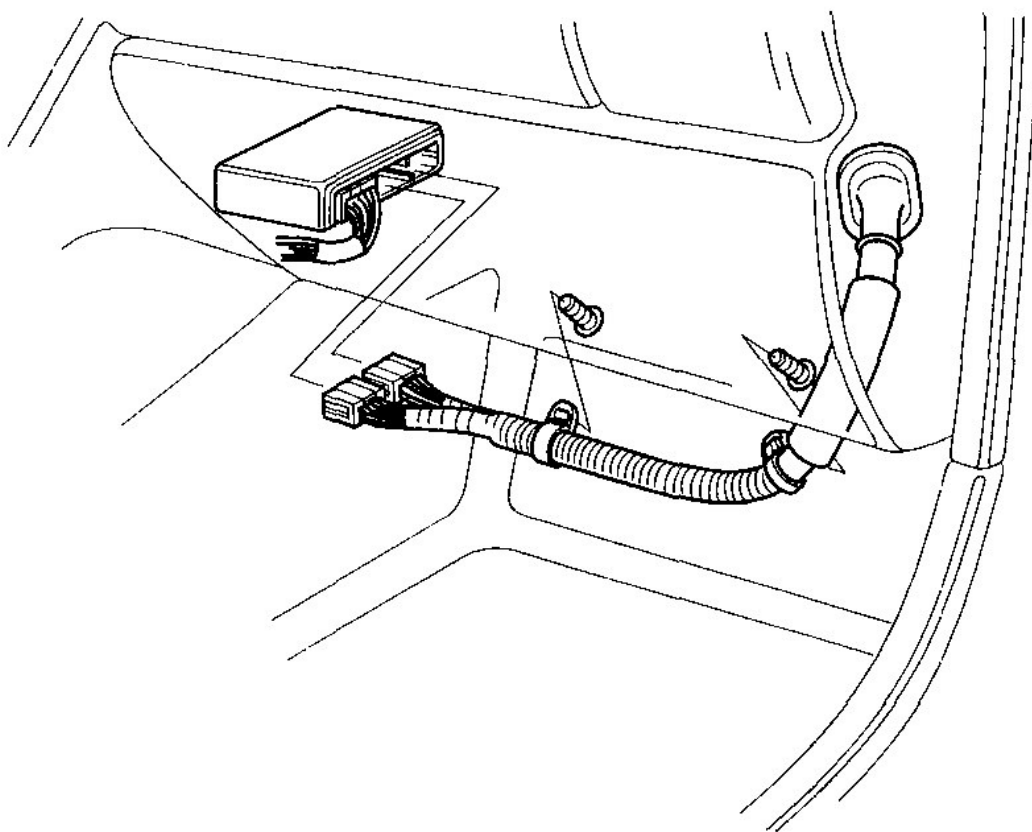
6 x 1.0 mm
12 N·m (1.2 kgf·m, 8.7 lbf·ft)

G02556909

Fig. 54: Installing Grommet

Courtesy of AMERICAN HONDA MOTOR CO., INC.

37. Connect the ECM/PCM connectors.

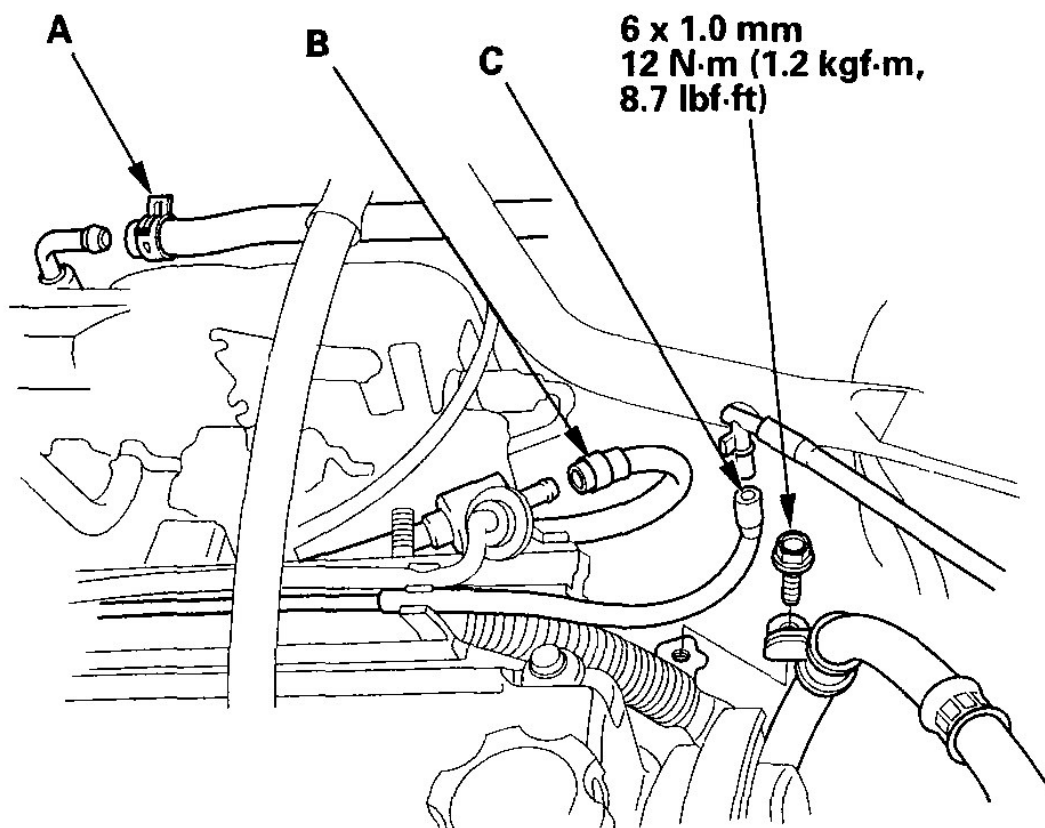


G02556910

Fig. 55: Connecting ECM/PCM Connector

Courtesy of AMERICAN HONDA MOTOR CO., INC.

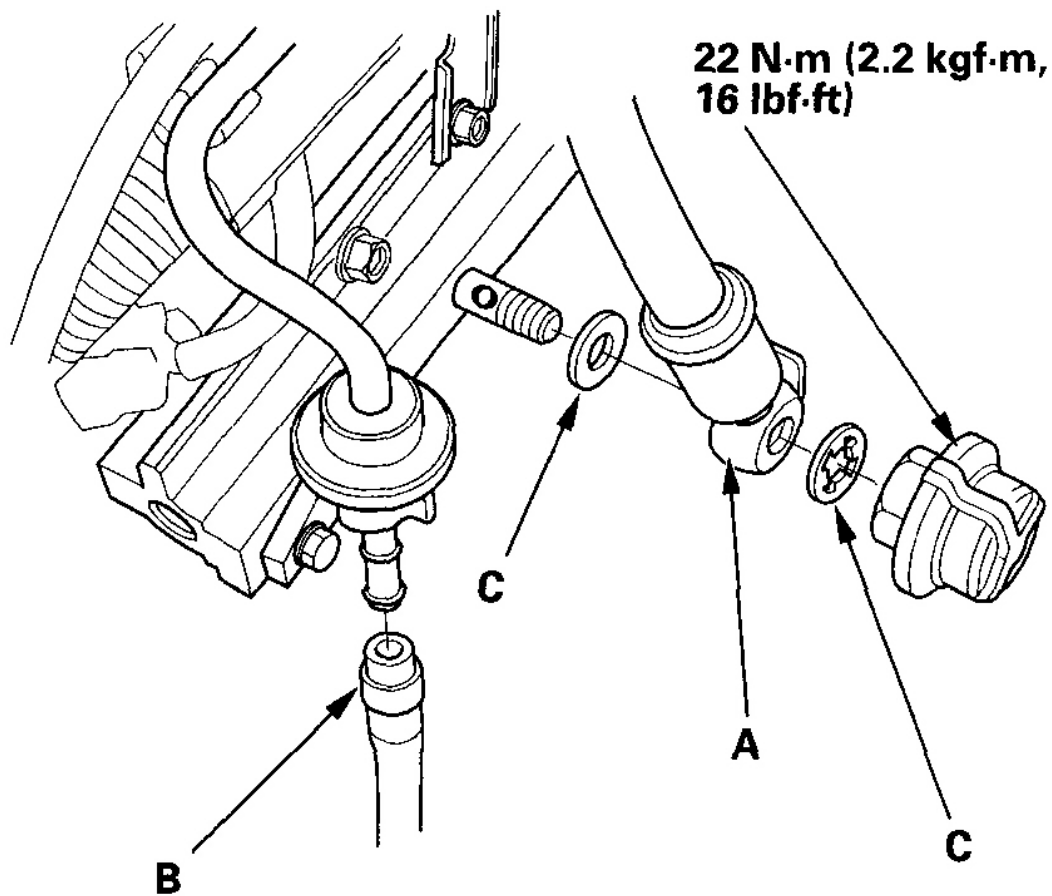
38. Install the brake booster vacuum hose (A), Evaporative Emission (EVAP) canister hose (B) and vacuum hoses (C).



G02556911

Fig. 56: Installing Brake Booster Vacuum Hose
Courtesy of AMERICAN HONDA MOTOR CO., INC.

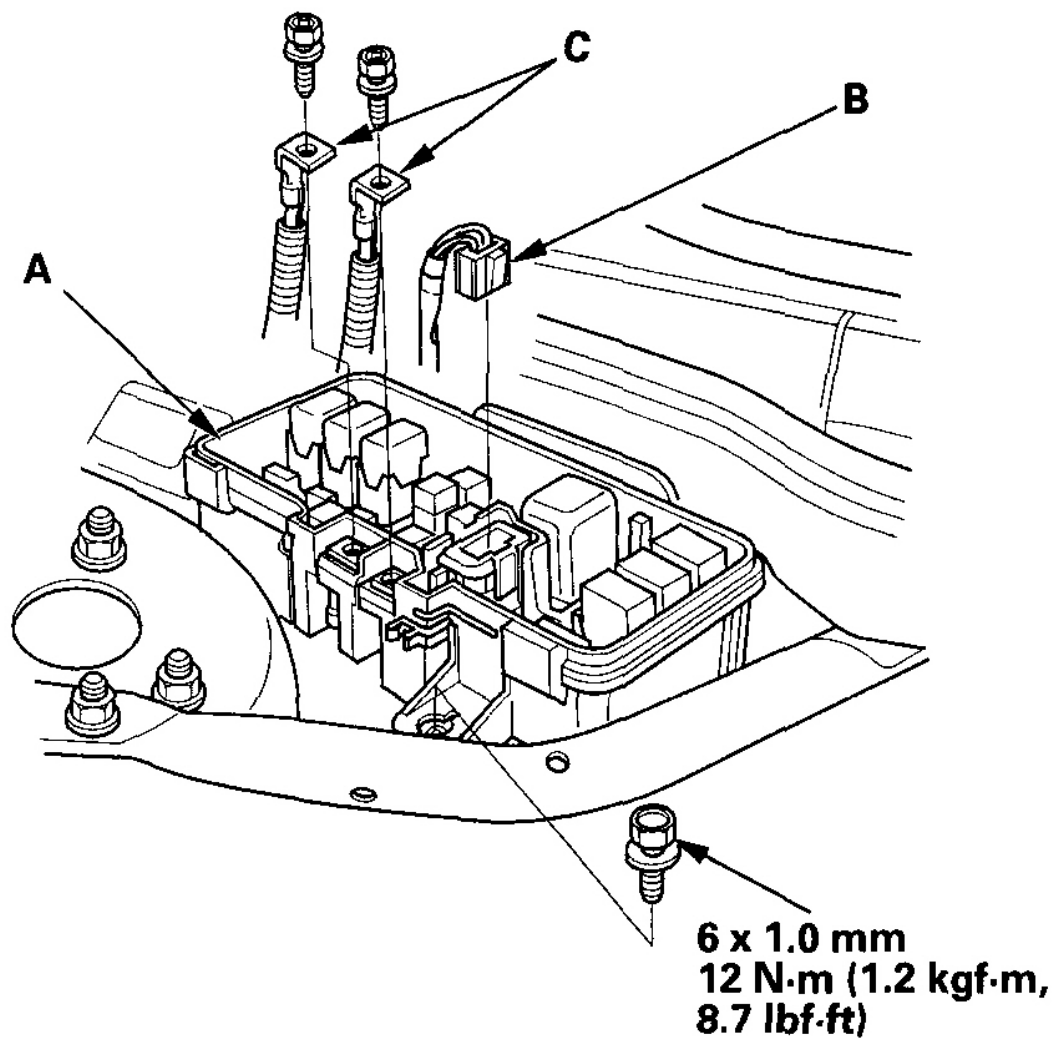
39. Install the fuel feed hose (A) and fuel return hose (B), using new washers (C).



G02556912

Fig. 57: Installing Fuel Feed Hose & Fuel Return Hose
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

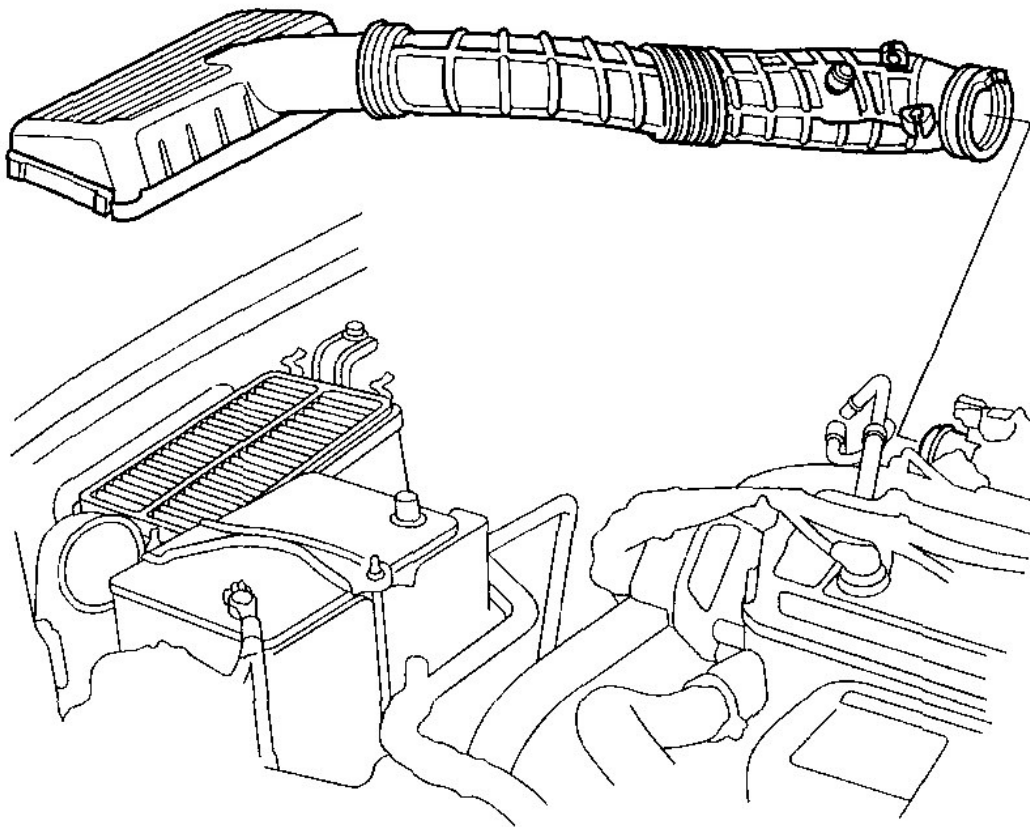
40. Install the cruise control cable, then adjust the cable (see **ACTUATOR CABLE ADJUSTMENT**).
41. Install the throttle cable, then adjust the cable (see **THROTTLE CABLE ADJUSTMENT**).
42. Install the under-hood fuse/relay box (A), then connect the connector (B) and battery cable (C) on the under-hood fuse/relay box.



G02556913

Fig. 58: Installing Under-Hood Fuse/Relay Box & Connecting Connector
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

43. Install the intake air duct.



G02556914

Fig. 59: Installing Intake Air Duct

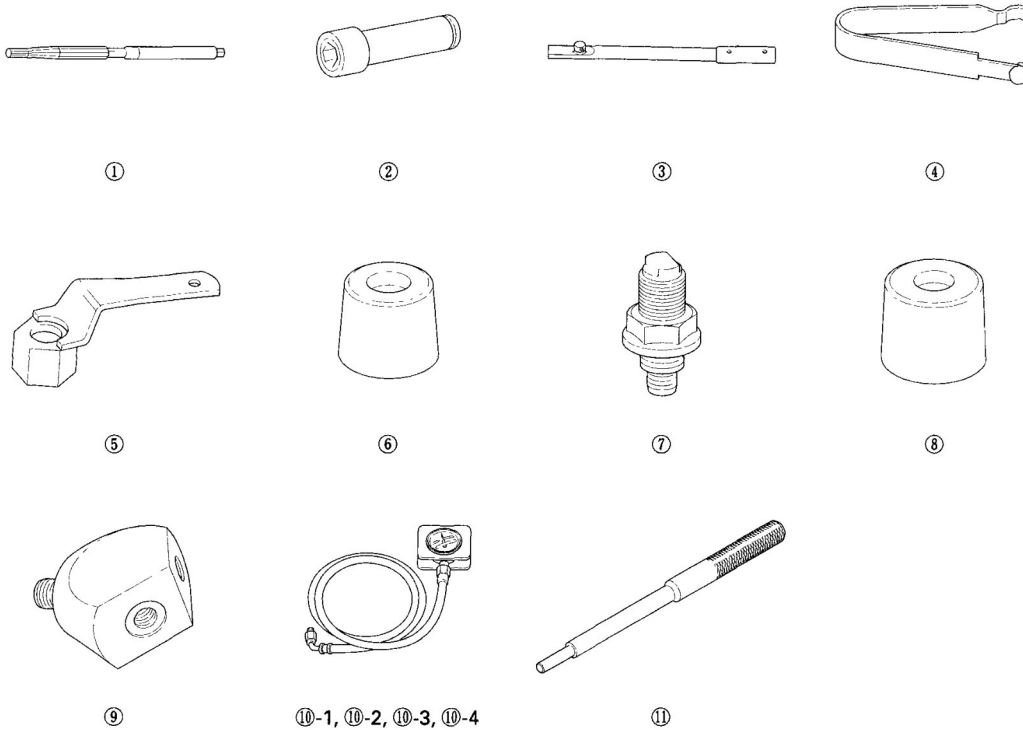
Courtesy of AMERICAN HONDA MOTOR CO., INC.

44. Clean the battery posts and cable terminals with sandpaper, then assemble them and apply grease to prevent corrosion.
45. Refill the engine with engine oil (see **ENGINE OIL REPLACEMENT**).
46. Refill the transmission with MTF (see **SERVICING - M/T**) or ATF (see **SERVICING - A/T**).
47. Refill the radiator with engine coolant, and bleed air from the cooling system with the heater valve open (see **COOLANT REPLACEMENT**).
48. Move the shift lever to each gear, and verify that the A/T gear position indicator follows the transmission range switch (A/T).
49. Check that the transmission shifts into gear smoothly (M/T).
50. Inspect for fuel leaks. Turn ON (II) the ignition switch (do not operate the starter) so that the fuel pump runs for approximately 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.
51. Enter the anti-theft code for the radio, then enter the customer's radio station presets.

CYLINDER HEAD

SPECIAL TOOLS

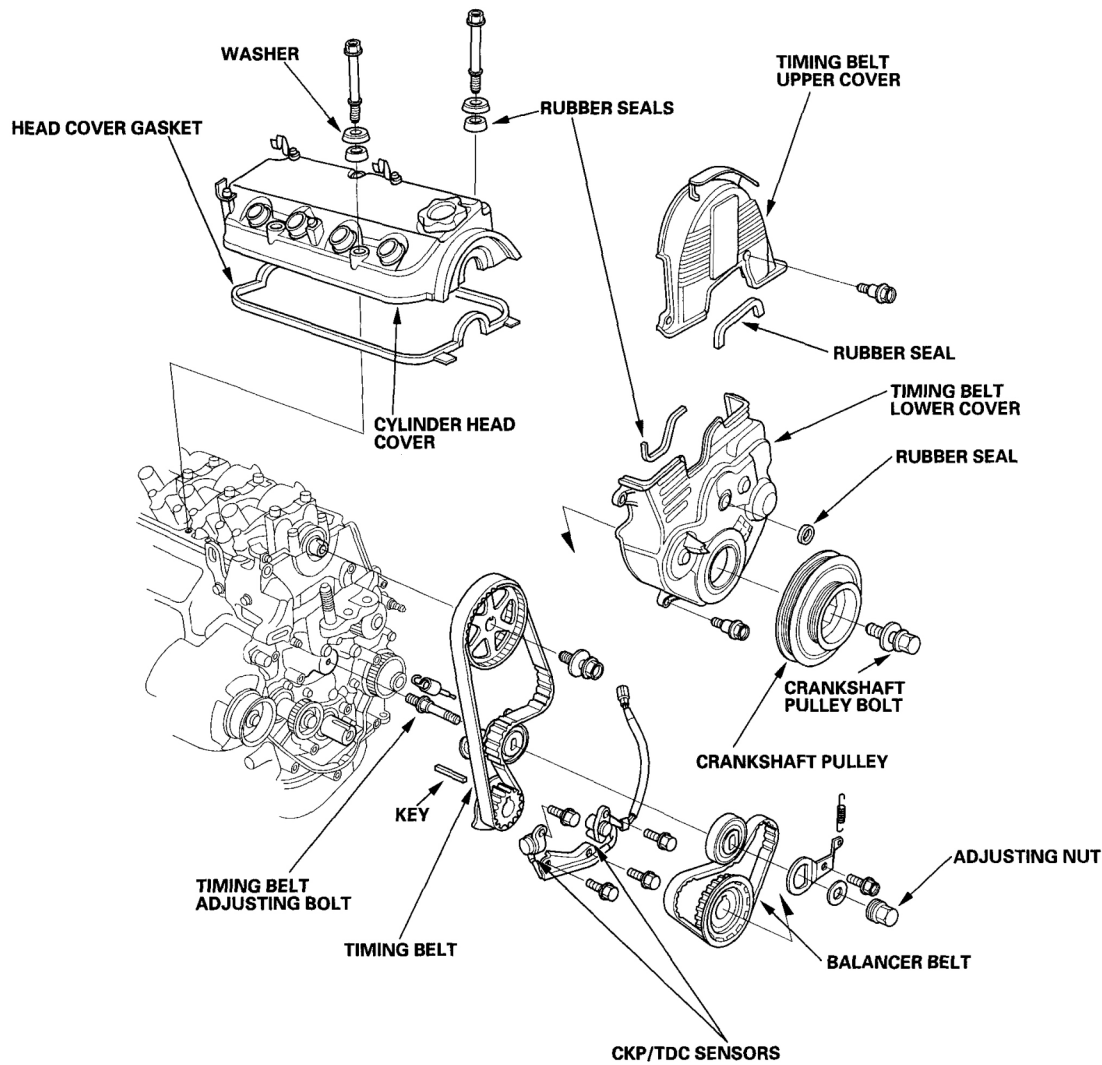
Ref.No.	Tool Number	Description	Qty
①	07HAH-PJ7010B	Valve Guide Reamer, 5.5 mm	1
②	07JAA-001020A	Socket, 19 mm	1
③	07JAB-001020A	Holder Handle	1
④	07LAJ-PR3020B	Air Stopper	1
⑤	07MAB-PY3010A	Holder Attachment, 50 mm, Offset	1
⑥	07NAF-PT0010A	Installer Cup	1
⑦	07NAF-PT0020A	Installer Shaft	1
⑧	07NAG-PT0010A	Seal Guide	1
⑨	07NAJ-P07010A	Pressure Gauge Adaptor	1
⑩-1	07406-0020201	A/T Pressure Hose	1
⑩-2	07406-0070300	A/T Low Pressure Gauge W/Panel	1
⑩-3	07MAJ-PY4011A	A/T Pressure Hose, 2,210 mm	1
⑩-4	07MAJ-PY40120	A/T Pressure Hose Adaptor	1
⑪	07742-0010100	Valve Guide Driver, 5.5 mm	1



G02556915

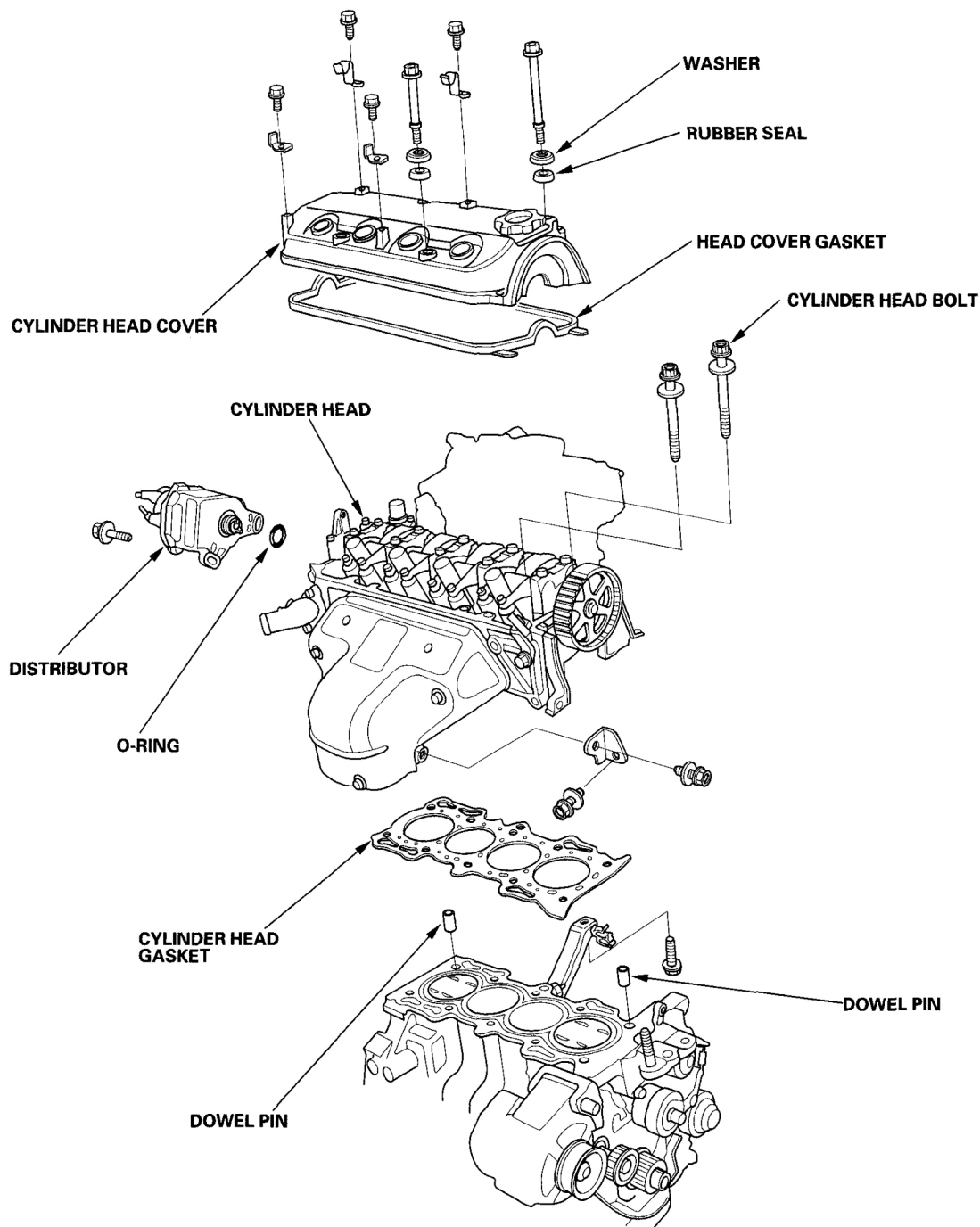
Fig. 60: Identifying Special Tools
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

COMPONENT LOCATION INDEX



G02556916

Fig. 61: Locating Cylinder Head Components (F23A1/F23A4 & F23A5 Engines - 1 Of 2)
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

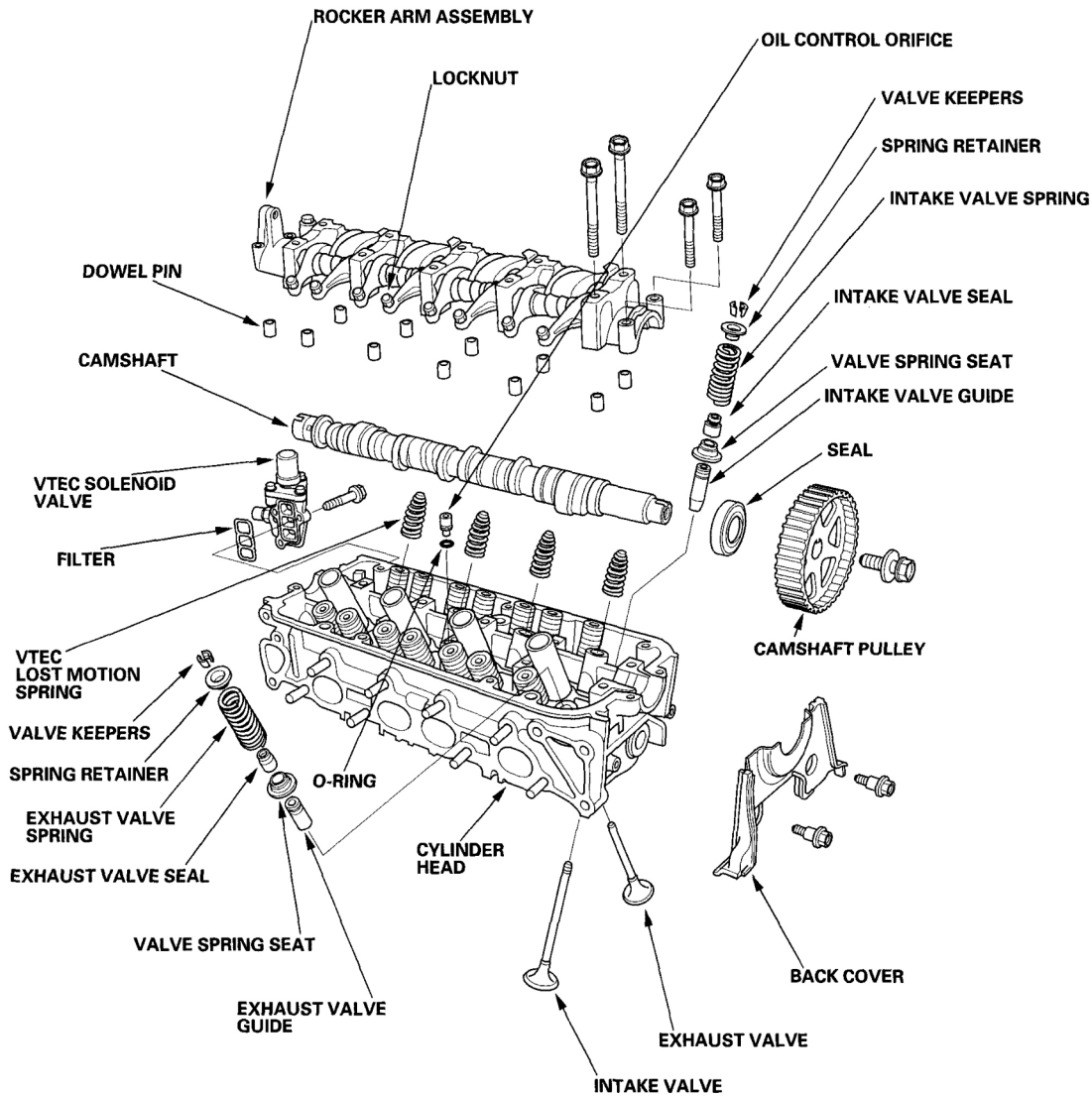


G02556917

Fig. 62: Locating Cylinder Head Components (F23A1/F23A4 & F23A5 Engines - 2 Of 2)
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

2002 Honda Accord SE

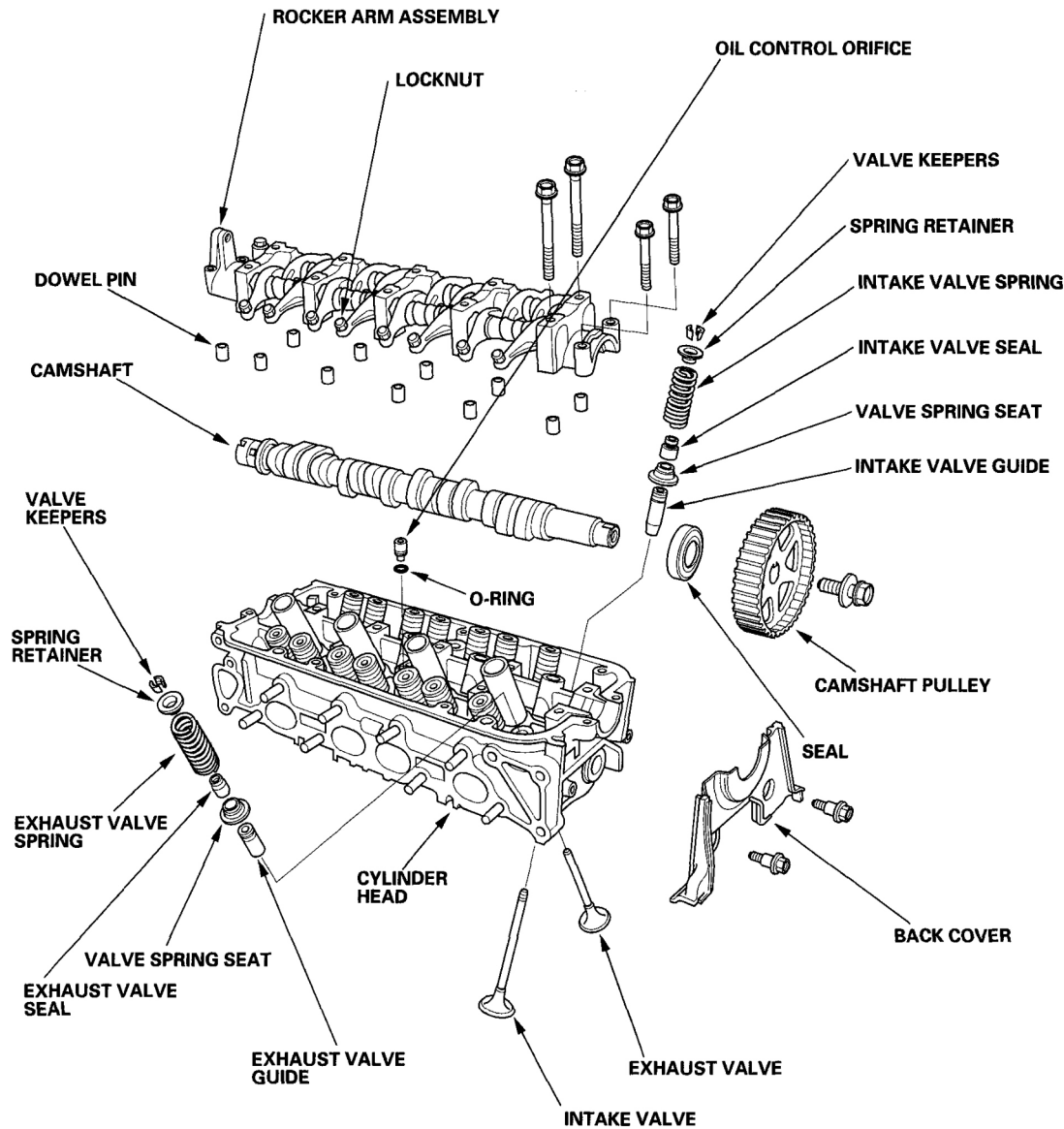
2002 ENGINES 2.3L 4-Cylinder - Accord



G02556918

Fig. 63: Locating Cylinder Head Components (F23A1/F23A4)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

F23A5 engine



G02556919

Fig. 64: Locating Cylinder Head Components (F23A5 Engine)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

DTC TROUBLESHOOTING

DTC Troubleshooting Index

DTC	Description
DTC P1259	A Problem In The VTEC Oil Pressure Switch Circuit Or VTEC Solenoid Valve Circuit.

DTC P1259: A problem in the VTEC Oil Pressure Switch circuit or VTEC Solenoid Valve circuit.

Special Tools Required

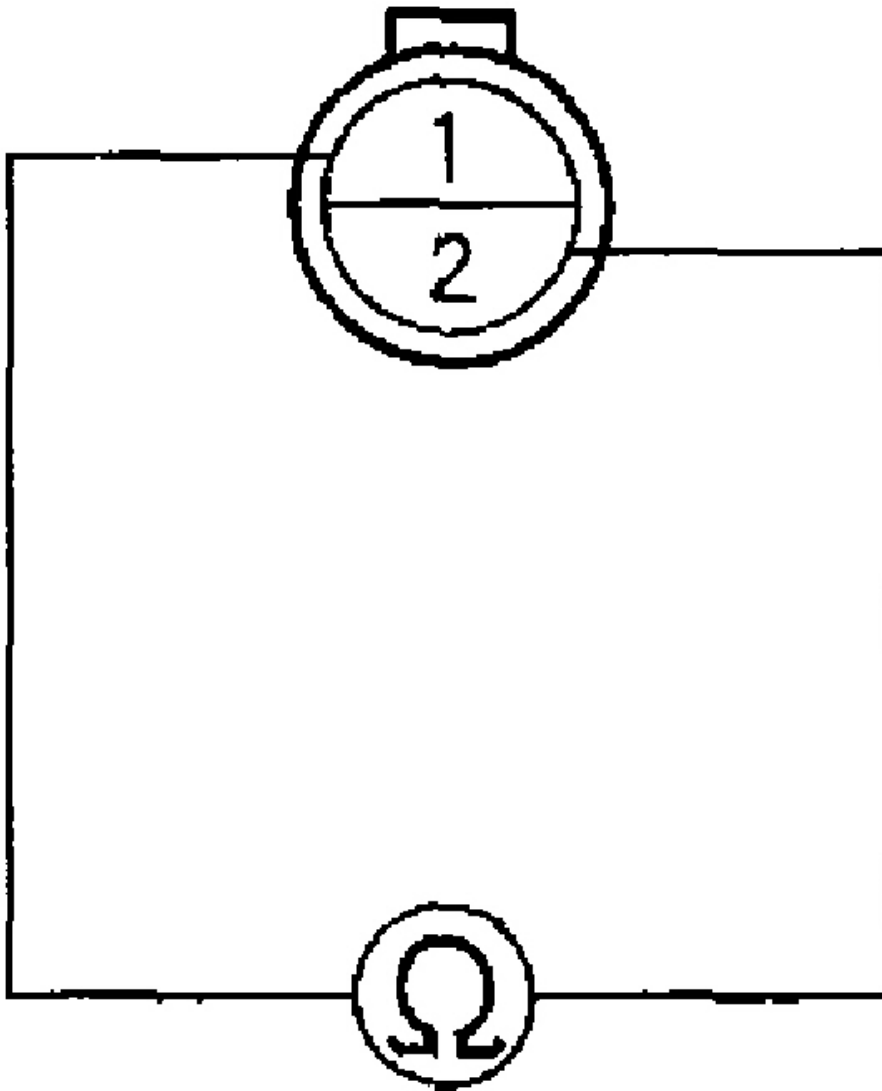
- Pressure Gauge Adaptor 07NAJ-P07010A
 - A/T Low Pressure Gauge W/Panel 07406-0070300
 - A/T Pressure Hose 07406-0020201
 - A/T Pressure Hose, 2,210 mm 07MAJ-PY4011A
 - A/T Pressure Adaptor 07MAJ-PY40120
1. Do the Engine Control Module (ECM)/Powertrain Control Module (PCM) reset procedure (see **HOW TO RESET THE ECM/PCM**).
 2. Start the engine.
 3. Warm up the engine to normal operating temperature (cooling fan comes on).
 4. Road test the vehicle: Accelerate in 1st gear to an engine speed over 4,000 RPM. Hold that engine speed for at least 2 seconds. If DTC P1259 is not repeated during the first road test, repeat this test two more times.

Is DTC P1259 indicated?

YES - Go to step 5.

NO - Intermittent failure, system is OK at this time. Check for poor connections or loose wires at VTEC solenoid valve and ECM/PCM.

5. Turn the ignition switch OFF.
6. Disconnect the VTEC oil pressure switch 2P connector.
7. Check for continuity on the VTEC oil pressure switch between the pressure switch 2P connector terminals No. 1 and No. 2.



**Terminal side of male
terminals**

G02556920

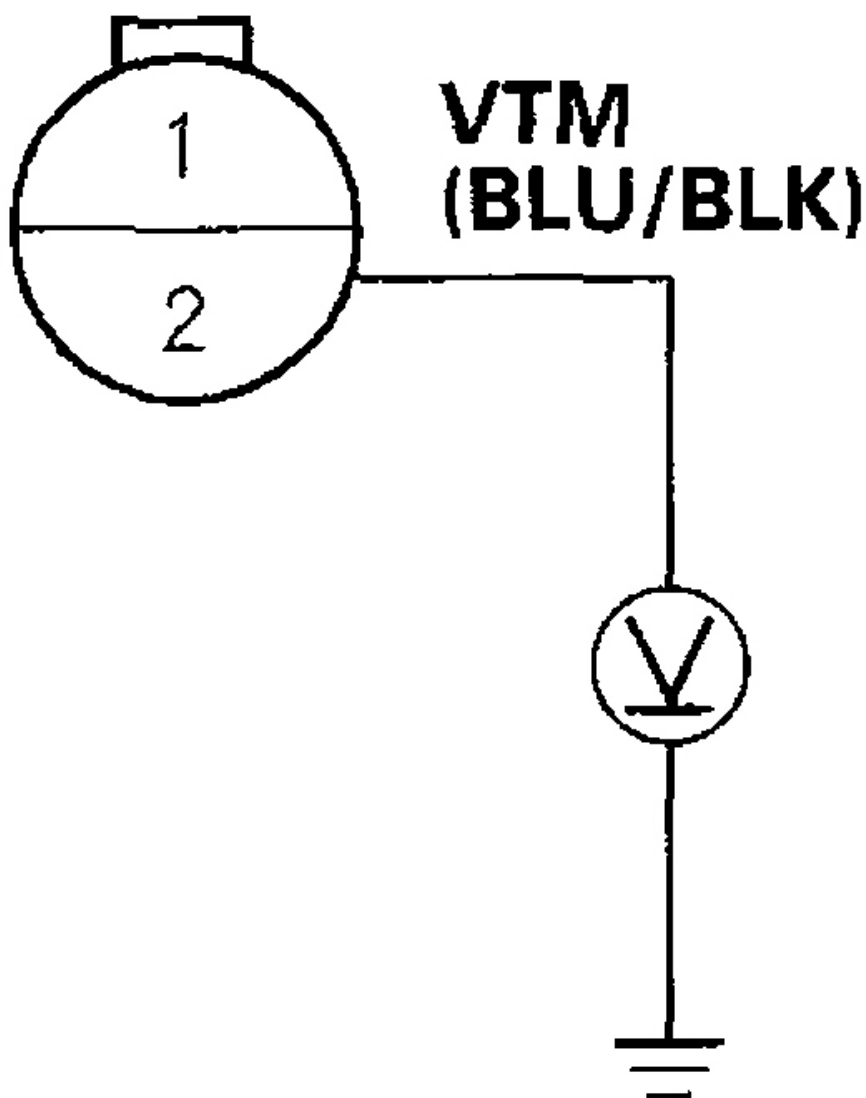
Fig. 65: Checking Continuity On VTEC Oil Pressure Switch Between Pressure Switch 2P Connector Terminals No. 1 & No. 2
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there continuity?

YES - Go to step 8.

NO - Replace the VTEC oil pressure switch.

8. Turn the ignition switch ON (II).
9. Measure the voltage between the VTEC oil pressure switch harness 2P connector terminal No. 2 and body ground.



Wire side of female
terminals

G02556921

Fig. 66: Measuring Voltage Between VTEC Oil Pressure Switch Harness 2P Connector Terminal No. 2 & Body Ground

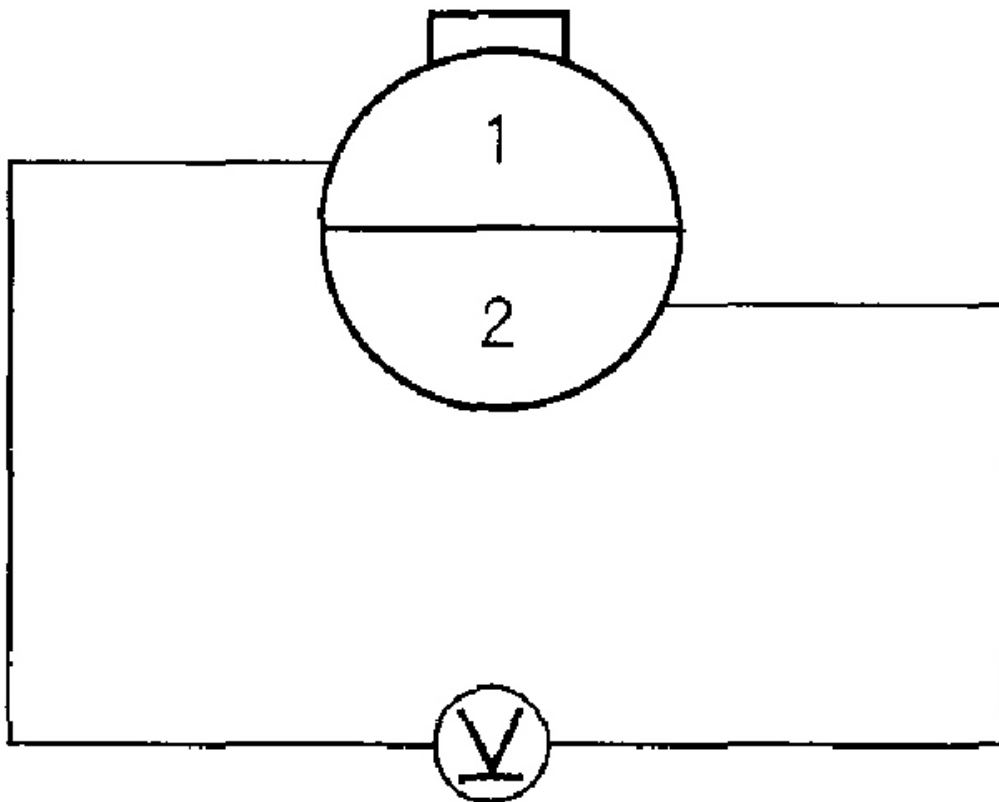
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there battery voltage?

YES - Go to step 10.

NO - Inspect for an open or short to ground in the wire between the VTEC oil pressure switch and the ECM/PCM (C10). If the wire is OK, substitute a known-good ECM/PCM and recheck.

10. Measure voltage across the VTEC oil pressure switch harness 2P connector.



**Wire side of female
terminals**

G02556922

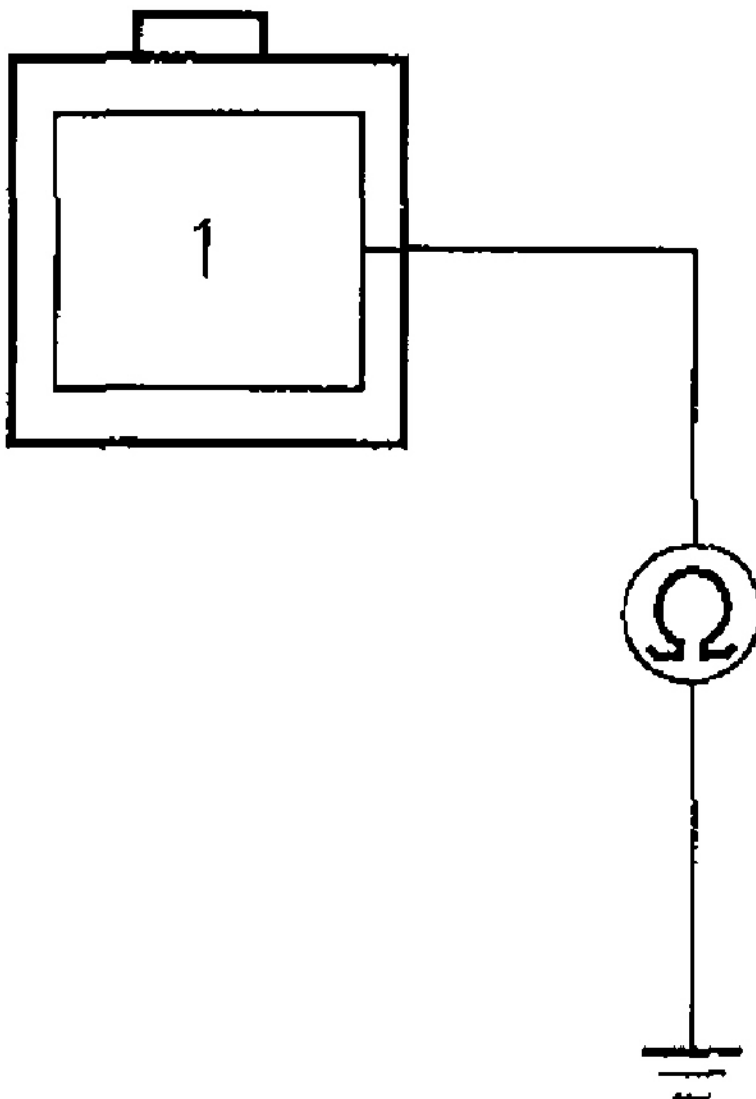
Fig. 67: Measuring Voltage Across VTEC Oil Pressure Switch Harness 2P Connector
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there battery voltage?

YES - Go to step 11.

NO - Repair open in the wire between the VTEC oil pressure switch and G101. If the wire is OK, substitute a known-good ECM/PCM and recheck.

11. Turn the ignition switch OFF.
12. Disconnect the VTEC solenoid valve 1P connector.
13. Check for continuity on the VTEC solenoid valve between the solenoid valve 1P connector terminal and body ground.



Terminal side of
male terminal

G02556923

Fig. 68: Checking Continuity On VTEC Solenoid Valve Between Solenoid Valve 1P Connector Terminal & Body Ground
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there 14-30 ohm ?

YES - Go to step 14.

NO - Replace the VTEC solenoid valve.

14. Remove the VTEC oil pressure switch (A) and install the special tools as shown, then reinstall the VTEC oil pressure switch.

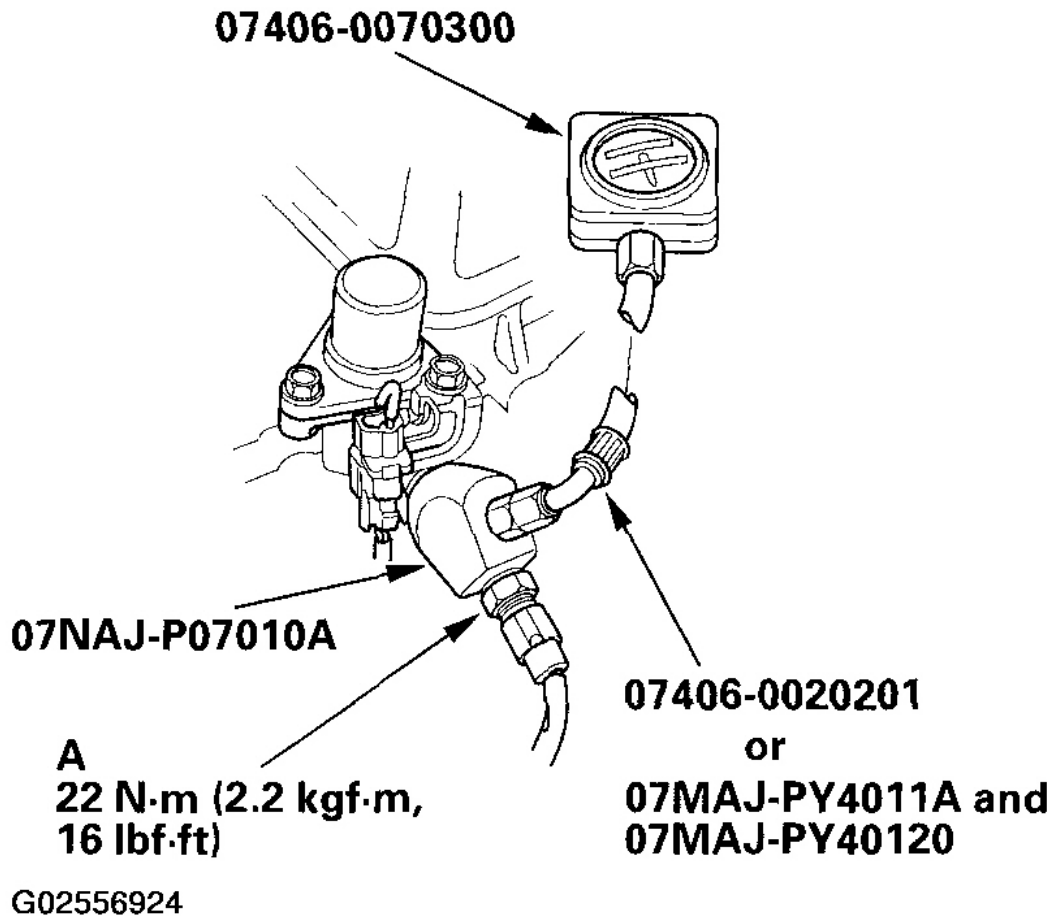


Fig. 69: Removing VTEC Oil Pressure Switch & Installing Special Tools
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

15. Reconnect the VTEC solenoid valve 1P connector and VTEC oil pressure switch 2P connector.
16. Connect a tachometer.
17. Warm up the engine to normal operating temperature (cooling fan comes on).
18. Check oil pressure at engine speeds of 1,000, 2,000 and 4,000 RPM. Keep measuring time as short as possible because the engine is running with no load (less than one minute).

Is pressure below 49 kPa (0.5 kgf/cm² , 7 psi)?

YES - Go to step 19.

NO - Inspect the VTEC solenoid valve (see VTEC Solenoid Valve Test).

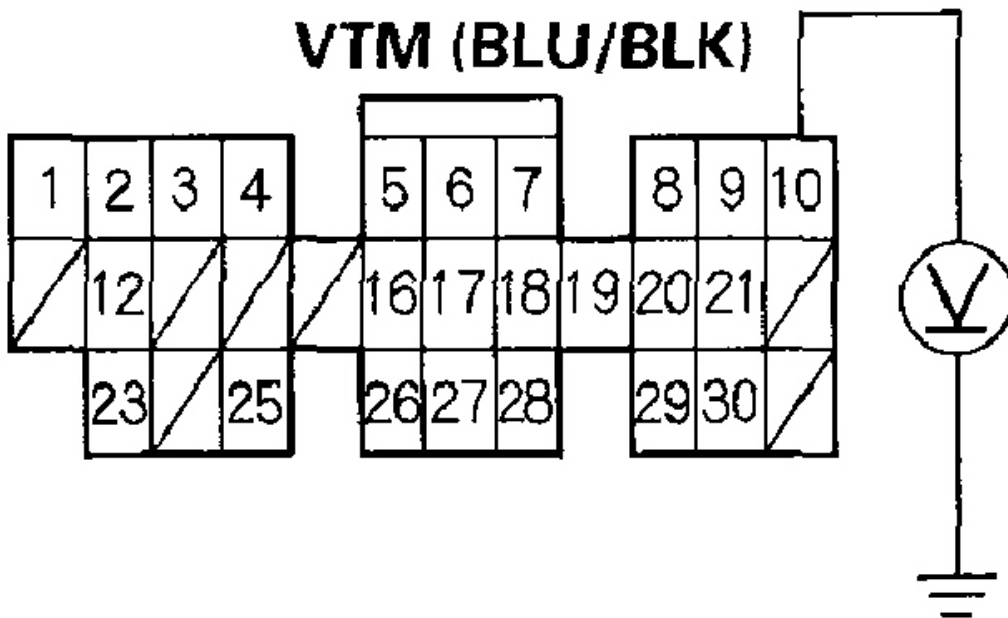
19. Turn the ignition switch OFF.
20. Disconnect the VTEC solenoid valve 1P connector.
21. Attach the battery positive terminal to the VTEC solenoid valve terminal.
22. Start the engine and check oil pressure at an engine speed of 3,000 RPM.

Is pressure above 390 kPa (4.0 kgf/cm² , 57 psi)?

YES - Go to step 23.

NO - Inspect the VTEC solenoid valve (see VTEC Solenoid Valve Test).

23. With the battery positive terminal still connected to the VTEC solenoid valve, measure voltage between C10 and body ground.



Wire side of female terminals

G02556925

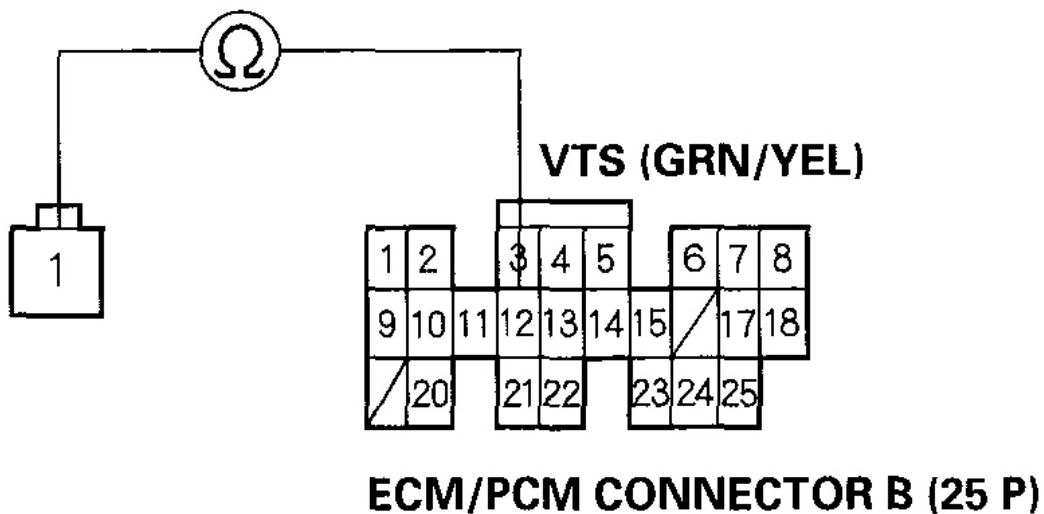
Fig. 70: Measuring Voltage Between C10 & Body Ground
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there battery voltage above 4,000 RPM?

YES - Go to step 24.

NO - Replace the VTEC oil pressure switch.

24. Turn the ignition switch OFF.
25. Disconnect the battery positive terminal from the VTEC solenoid valve terminal.
26. Check for continuity between the VTEC solenoid valve harness 1P connector terminal and the ECM/PCM connector terminal B12.



Wire side of female terminals

G02556926

Fig. 71: Checking Continuity Between VTEC Solenoid Valve Harness 1P Connector Terminal & ECM/PCM Connector Terminal B12

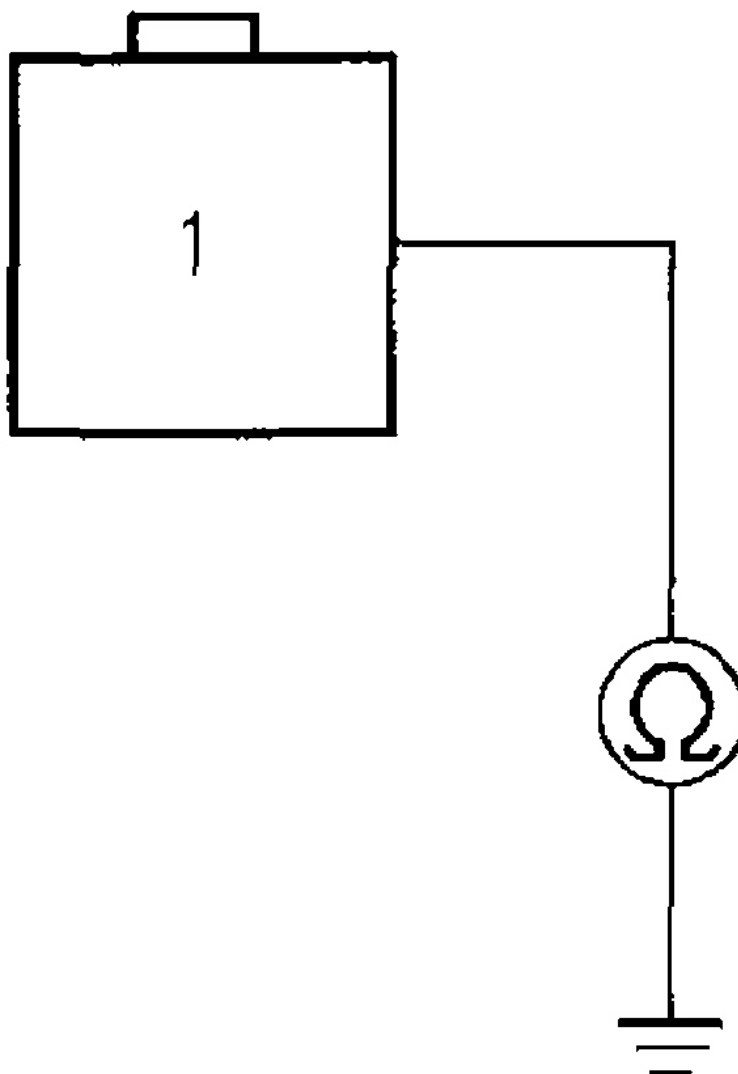
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there continuity?

YES - Go to step 27.

NO - Repair open in the wire between the ECM/PCM (B12) and VTEC solenoid valve connector.

27. Check for continuity between the VTEC solenoid valve 1P connector terminal and body ground.



Wire side of female
terminal

G02556927

Fig. 72: Checking Continuity Between VTEC Solenoid Valve 1P Connector Terminal & Body

Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there continuity?

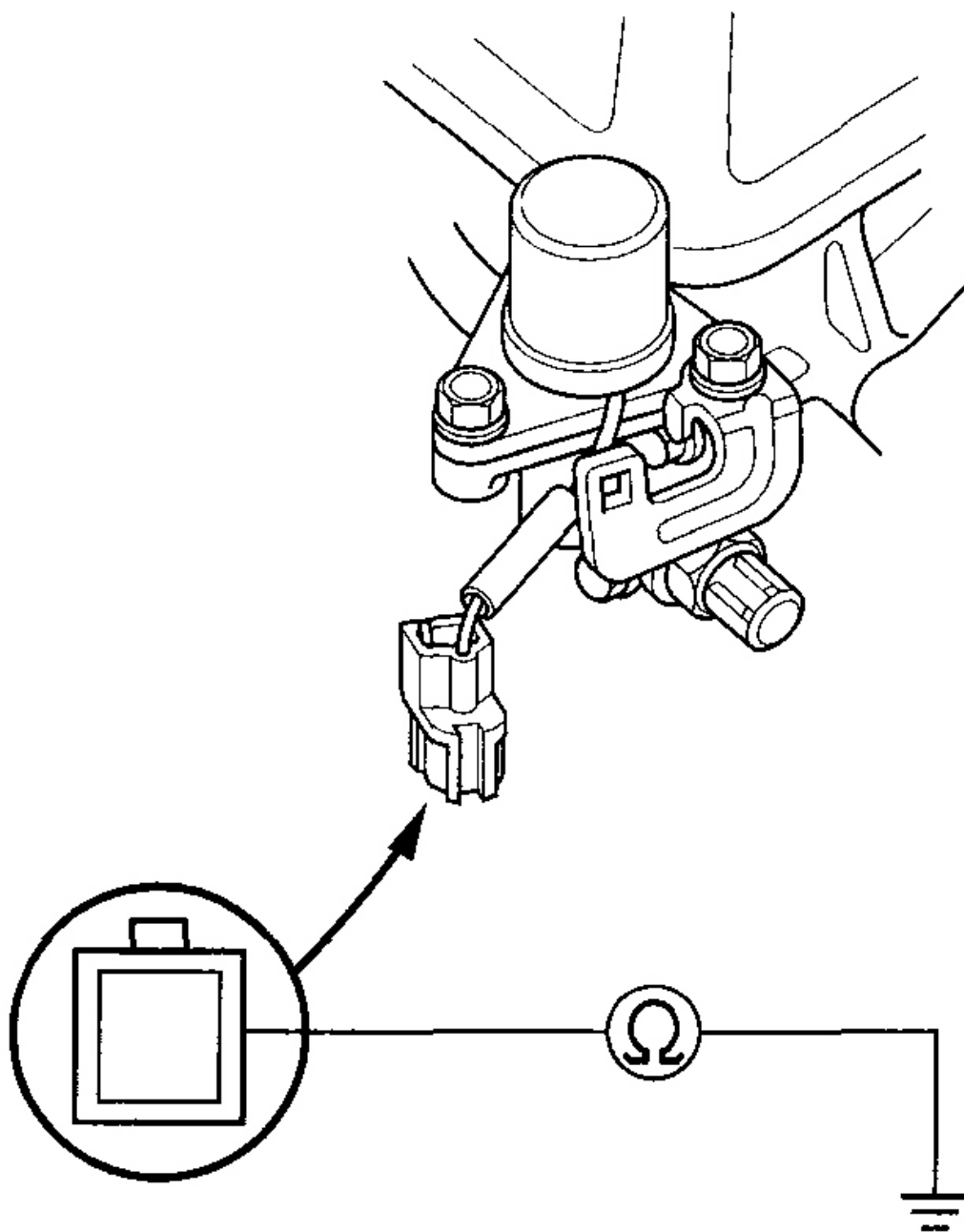
YES - Repair short in the wire between the ECM/PCM (B12) and VTEC solenoid valve connector.

NO - Substitute a known-good ECM/PCM and recheck. If symptom/indication goes away, replace the original ECM/PCM.

VTEC SOLENOID VALVE TEST

1. Disconnect the 1P connector from the VTEC solenoid valve.
2. Measure resistance between the terminal and body ground.

Resistance: 14-30 ohm



G02556928

Fig. 73: Measuring Resistance Between Terminal & Body Ground
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. If the resistance is within specifications, remove the VTEC solenoid valve assembly (A) from the cylinder head, and check the VTEC solenoid valve filter/O-ring (B) for clogging. If there is clogging, replace the engine oil filter and the engine oil.

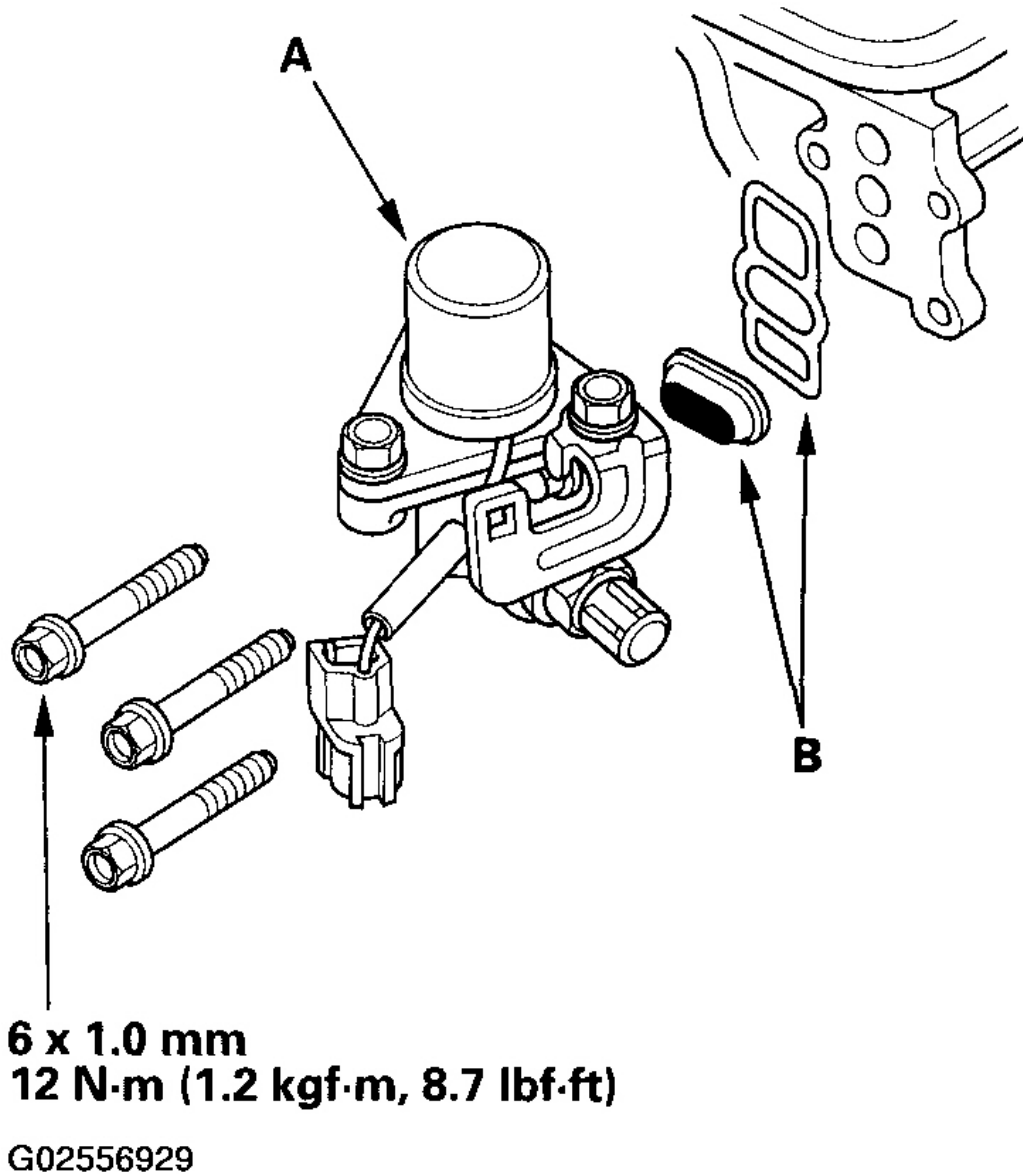
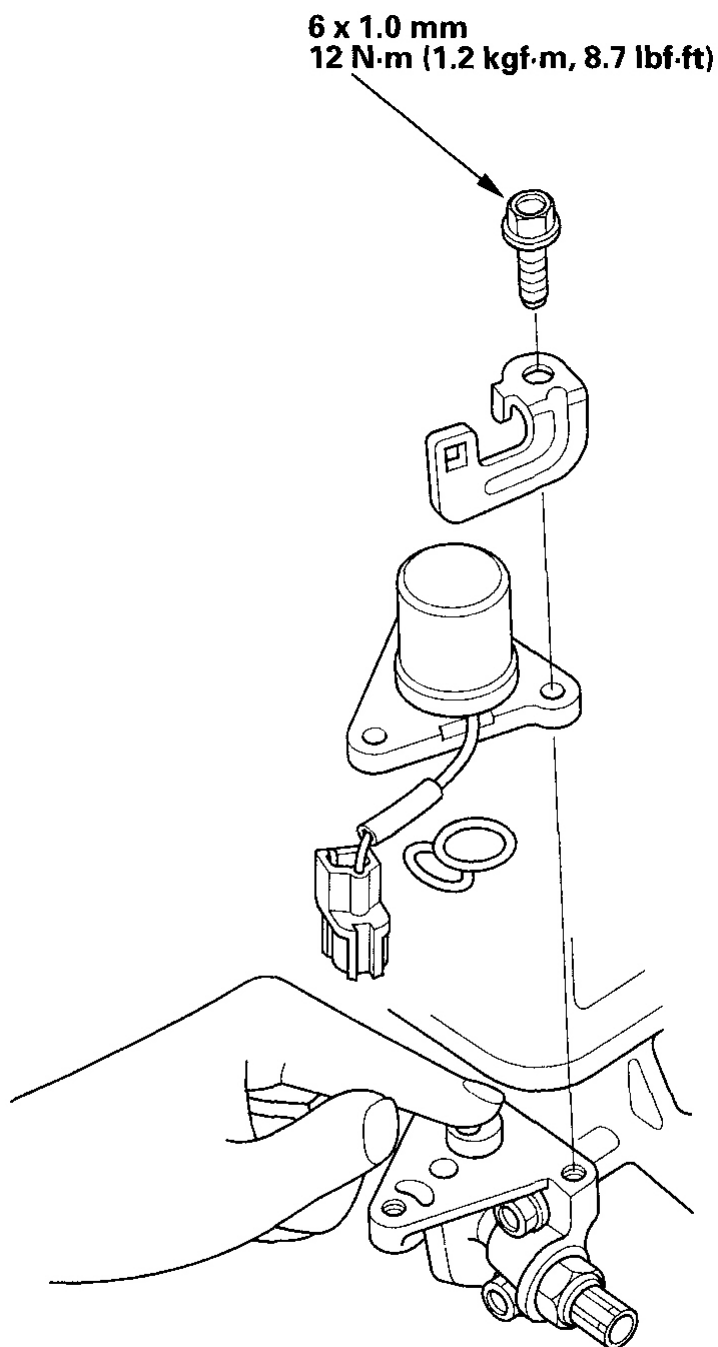


Fig. 74: Removing VTEC Solenoid Valve Assembly From Cylinder Head
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. If the filter is not clogged, push the VTEC solenoid valve with your finger and check its movement. If the VTEC solenoid valve is normal, check the engine oil pressure.



G02556930

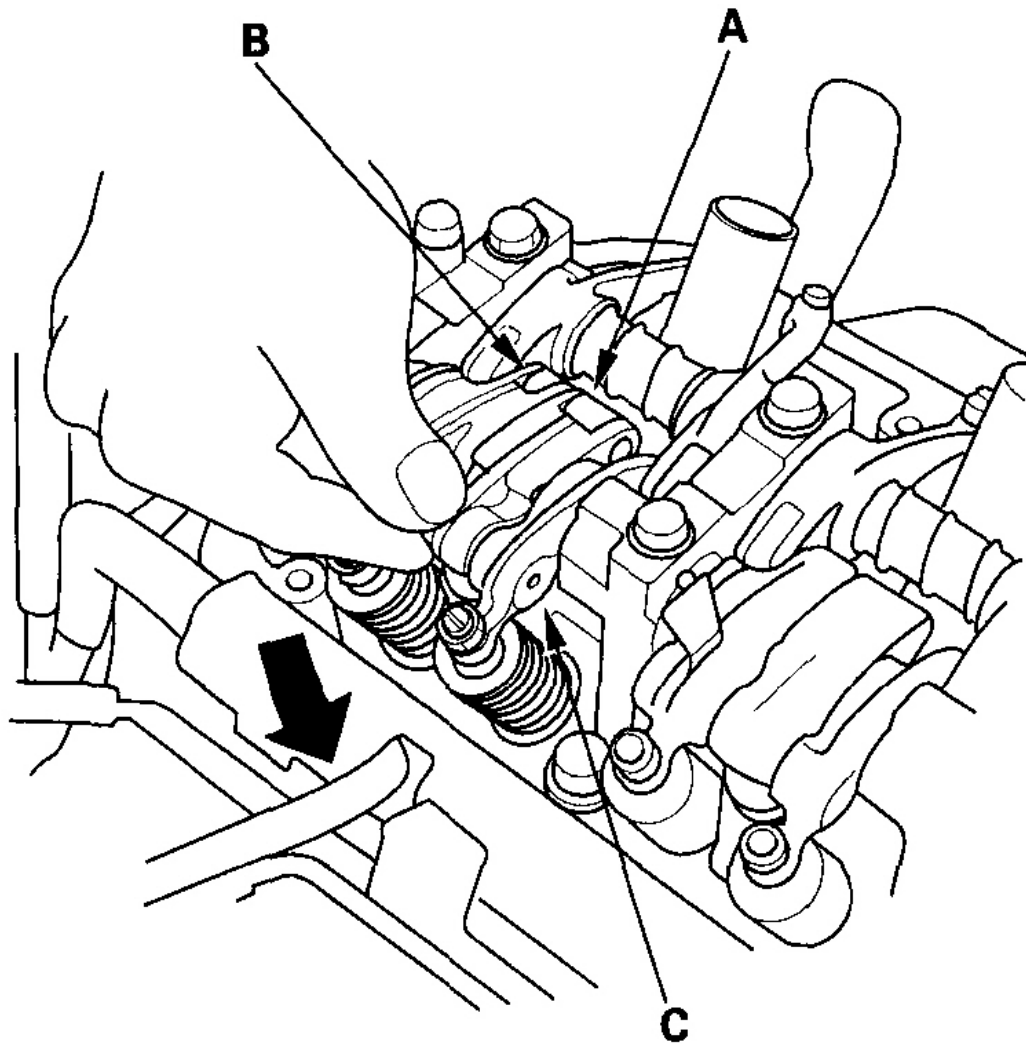
Fig. 75: Pushing VTEC Solenoid Valve With Finger
Courtesy of AMERICAN HONDA MOTOR CO., INC.

VTEC ROCKER ARM TEST

Special Tools Required

Air Stopper 07LAJ-PR3020B

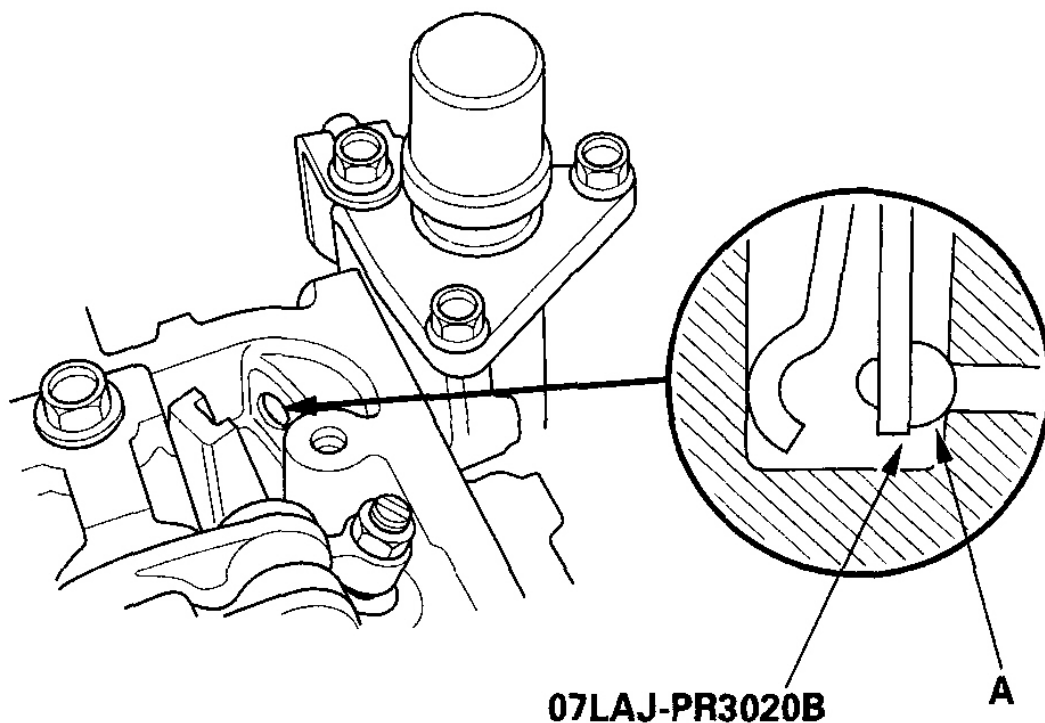
1. Set the No. 1 piston at TDC (see **Timing Belt & Balancer Belt Installation**).
2. Remove the cylinder head cover.
3. Push on the intake mid rocker arm (A) for the No. 1 cylinder. The mid rocker arm should move independently of the intake primary rocker arm (B) and intake secondary rocker arm (C).
 - If the intake mid rocker arm does not move, remove the mid, primary, and secondary rocker arms as an assembly, and check that the pistons in the mid and primary rocker arms move smoothly. If any rocker arm needs replacing, replace the primary, mid, and secondary rocker arms as an assembly, and test.
 - If the intake mid rocker arm moves freely, go to step 4.



G02556931

Fig. 76: Pushing On Intake Mid Rocker Arm For No. 1 Cylinder
Courtesy of AMERICAN HONDA MOTOR CO., INC.

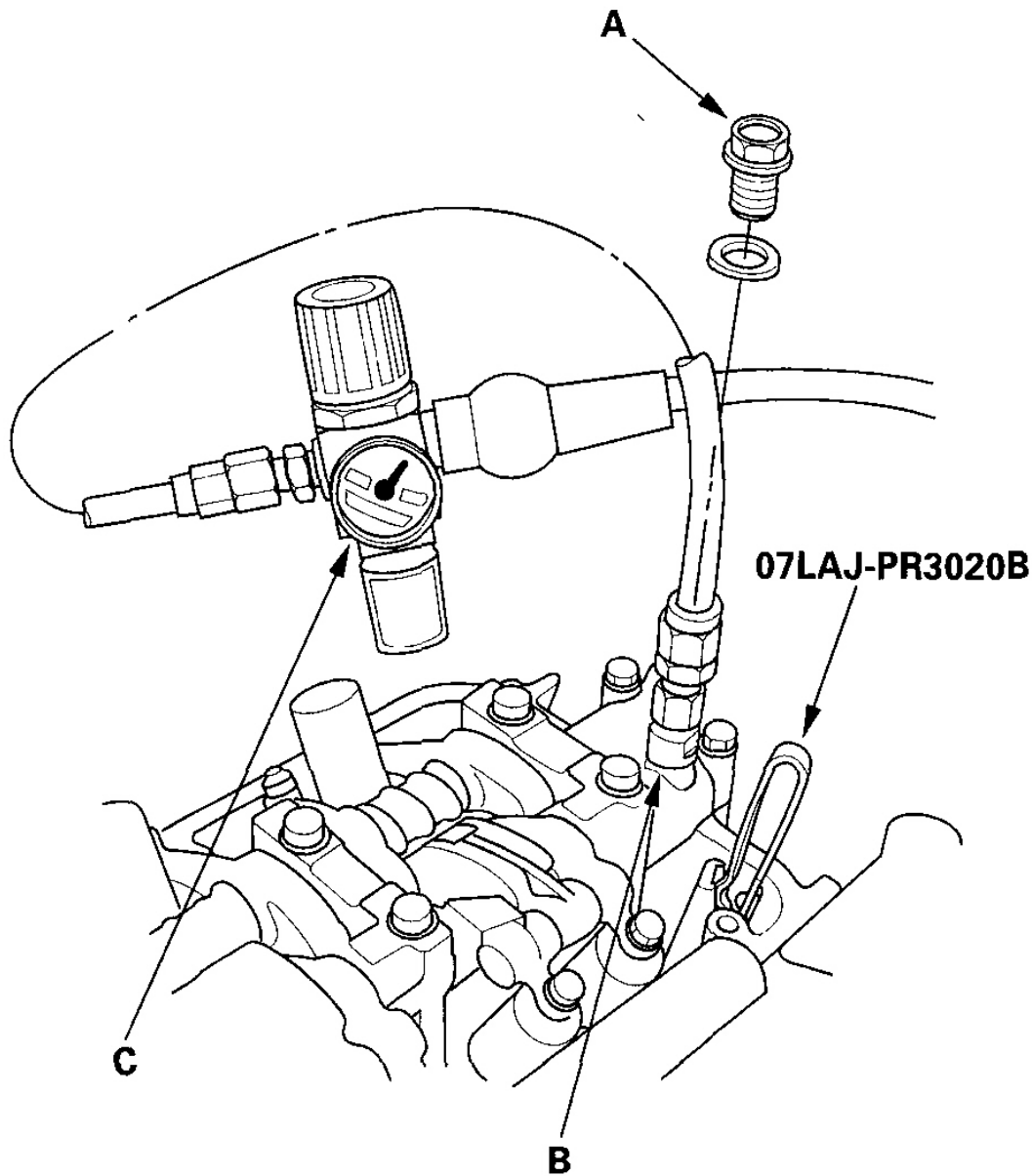
4. Repeat step 3 on the remaining intake mid rocker arms with each piston at TDC. When all the mid rocker arms pass the test, go to step 5.
5. Check that the air pressure on the shop air compressor gauge indicates over 400 kPa (4 kgf/cm² , 57 psi).
6. Inspect the valve clearance (see **Valve Clearance Adjustment**).
7. Cover the timing belt with a shop towel to protect the belt.
8. Plug the relief hole with the air stopper (A).



G02556932

Fig. 77: Plugging Relief Hole With Air Stopper
Courtesy of AMERICAN HONDA MOTOR CO., INC.

NOTE: Remove any oil from the bolt threads and camshaft holder threads before retightening the sealing bolt.



G02556933

Fig. 78: Connecting An Air Pressure Regulator With A 0-100 Psi Gauge
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

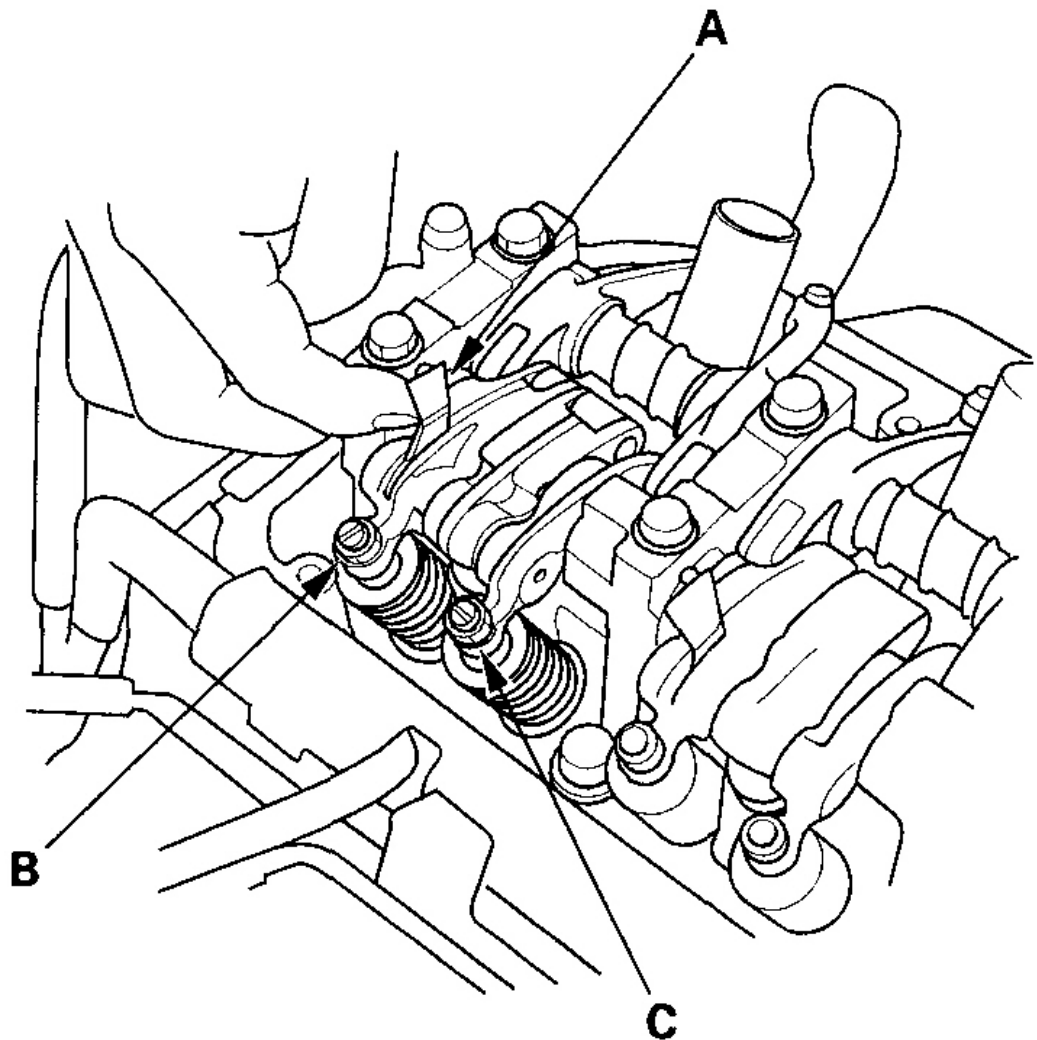
9. Remove the sealing bolt (A) from the inspection hole (B), and connect an air pressure regulator with a 0-100 psi gauge (C).
10. Loosen the valve on the regulator, and apply the specified air pressure.

Specified Air Pressure: 400 kPa (4 kgf/cm², 57 psi)

11. With the specified air pressure applied and the piston at TDC, push up the timing plate (A) 2-3 mm (0.08-0.12 in.) at the plate end then release it. The synchronizing piston will pop out and engage the intake mid, primary (B) and secondary (C) rocker arms. Visually check the engagement of the synchronizing pistons A (D)/B (E). The synchronizing pistons can be seen in the gap between the mid (F), secondary (C) and primary (B) rocker arms.

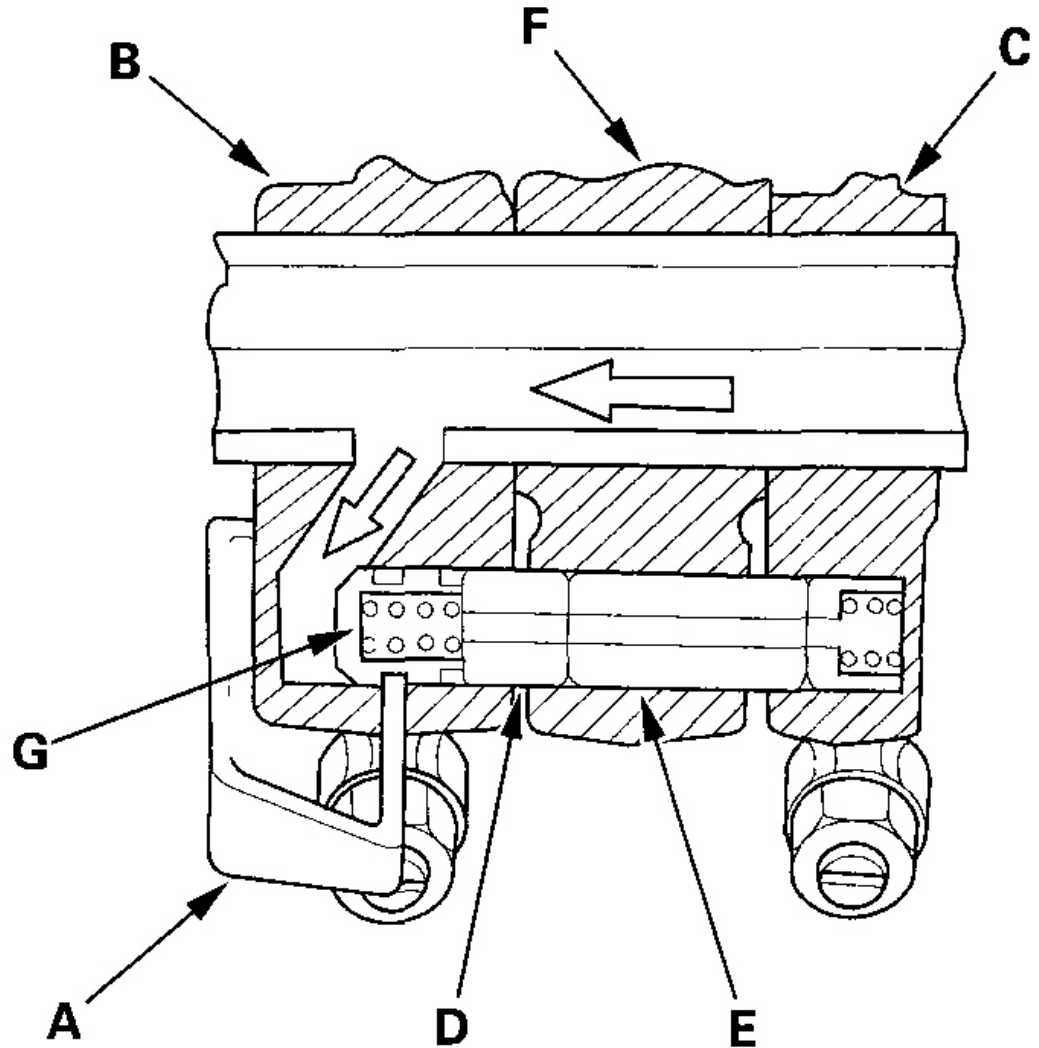
NOTE:

- With the timing plate (A) engaged in the groove on the timing piston (G), the piston is locked in the pushed out position.
- Do not apply too much force when pushing up the timing plate.



G02556934

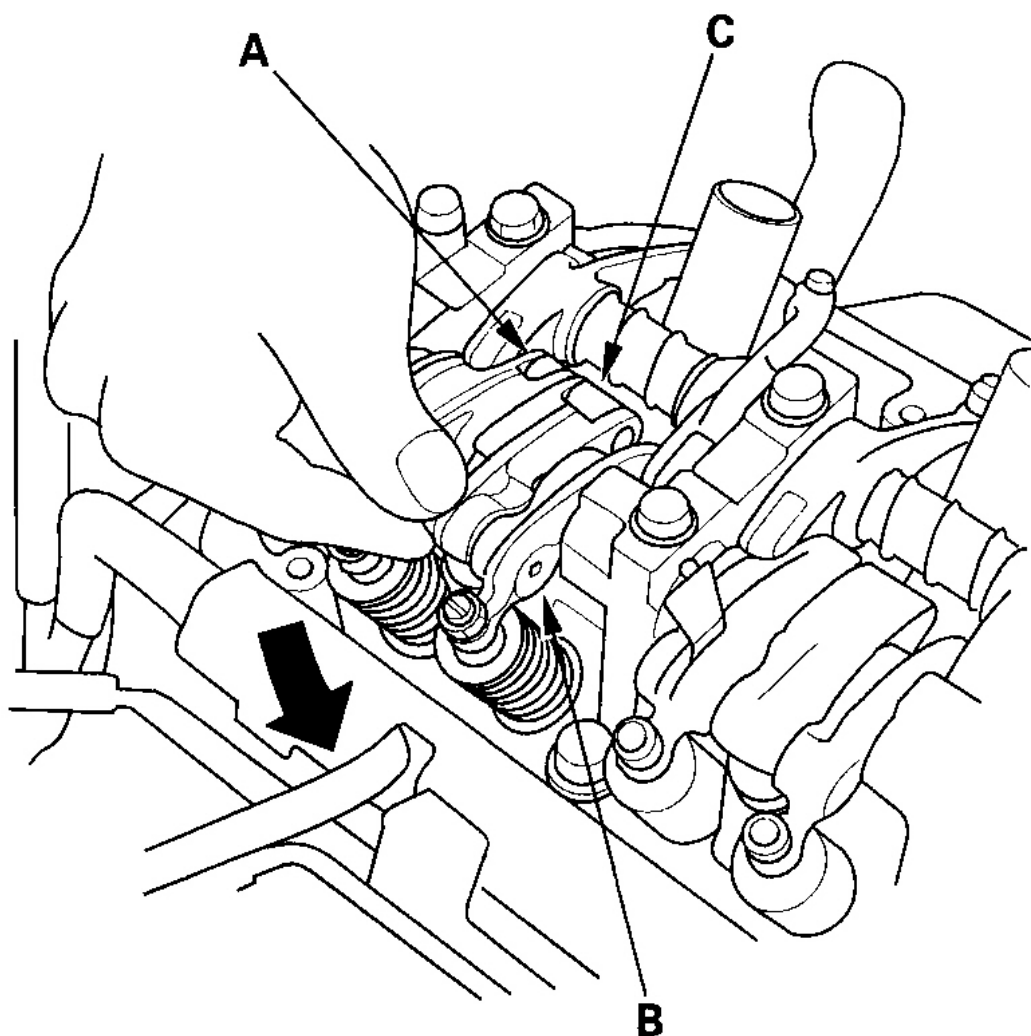
Fig. 79: Pushing Up Timing Plate
Courtesy of AMERICAN HONDA MOTOR CO., INC.



G02556935

Fig. 80: Checking Engagement Of Synchronizing Pistons
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Make sure that the intake primary (A) and secondary (B) rocker arms are mechanically connected by the pistons, and that the mid rocker arm (C) does not move when pushed manually. If any intake mid rocker arm moves independently of the intake primary and secondary rocker arms, replace the rocker arms as a set.



G02556936

Fig. 81: Ensuring Mid Rocker Arm Does Not Move When Pushed Manually
Courtesy of AMERICAN HONDA MOTOR CO., INC.

NOTE: When the timing plate is pushed up, it releases the timing piston (C), letting the return spring move the synchronizing pistons to their original positions.

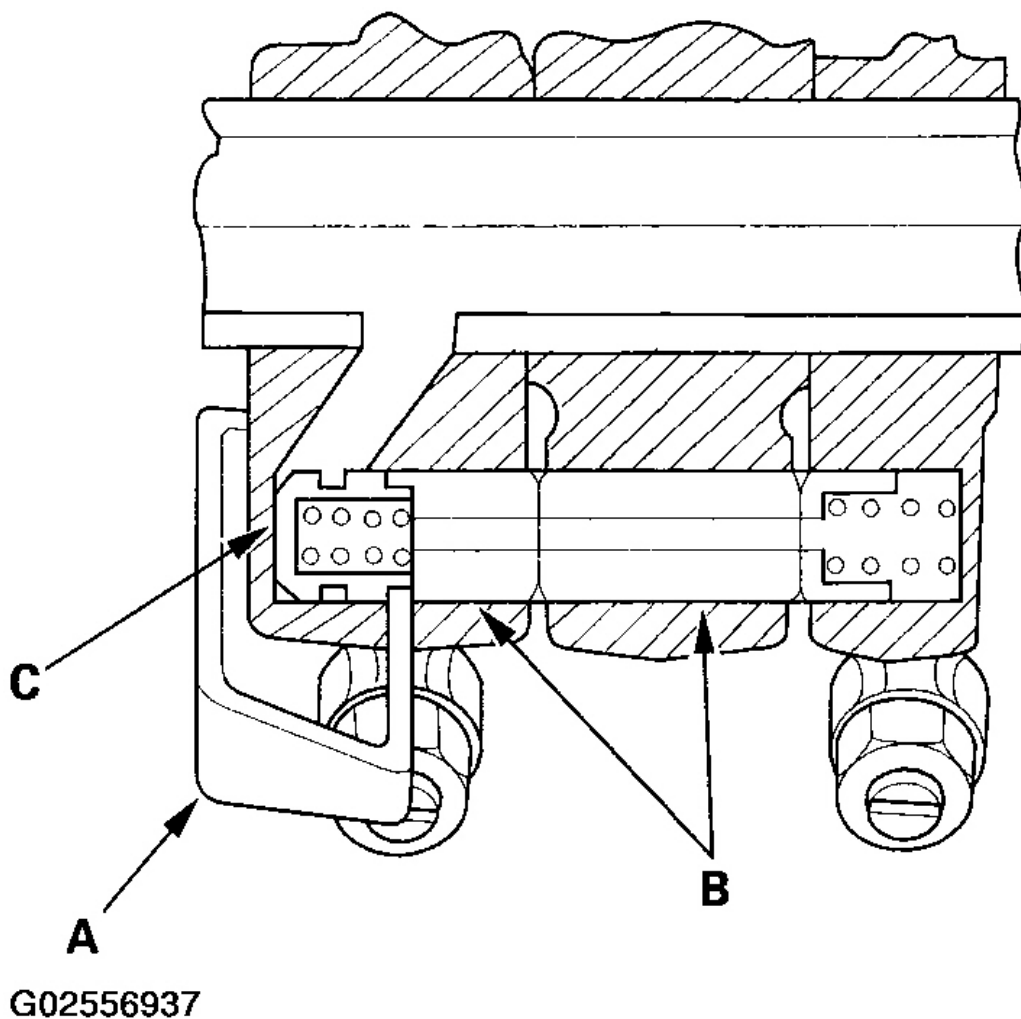


Fig. 82: Pushing Up Timing Plate

Courtesy of AMERICAN HONDA MOTOR CO., INC.

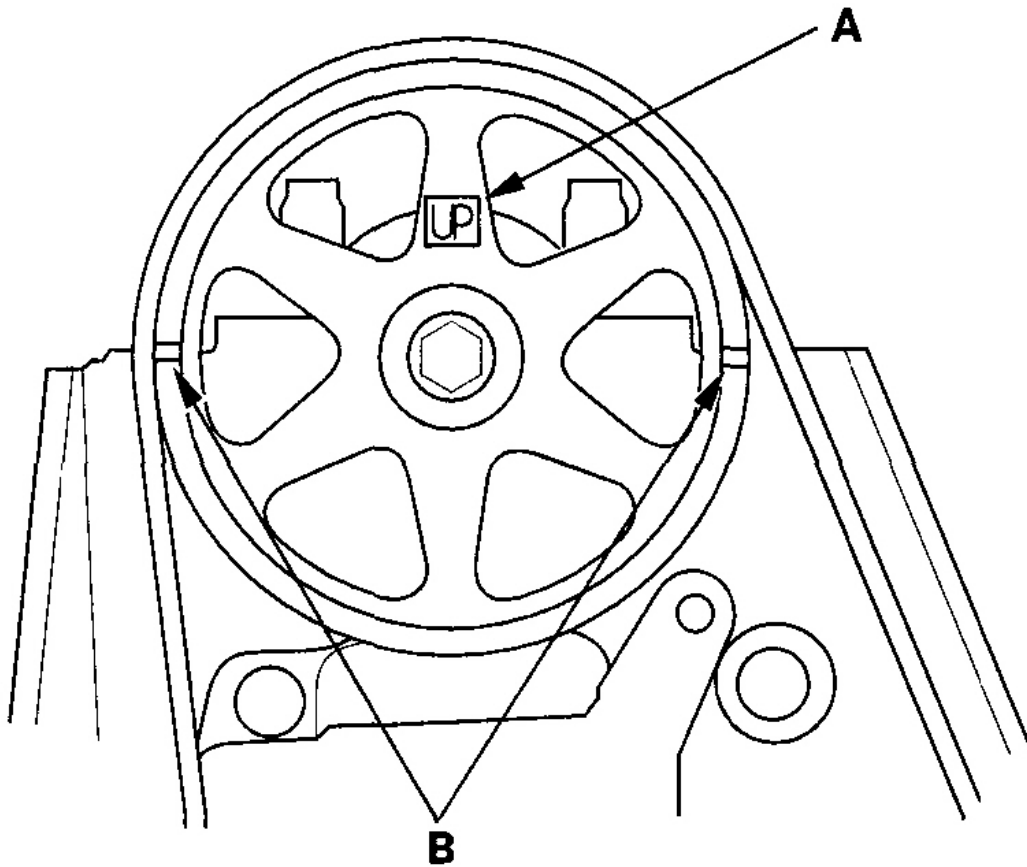
13. Stop applying air pressure. Push up the timing plate (A); the synchronizing pistons (B) will snap back to their original positions. Visually check the disengagement of the synchronizing pistons A/B. Replace the intake rocker arms as an assembly if either piston does not work correctly.
14. Remove the special tools.
15. Check for smooth operation of each lost motion assembly by pushing down on each mid rocker arm. Replace any lost motion assembly that does not move smoothly.

VALVE CLEARANCE ADJUSTMENT

NOTE: Adjust the valves only when the cylinder head temperature is less than 100°F

(38°C).

1. Remove the cylinder head cover.
2. Set the No. 1 piston at TDC. The "UP" mark (A) on the camshaft pulley should be at the top, and the TDC grooves (B) on the pulley should line up with the top edge of the head.



G02556938

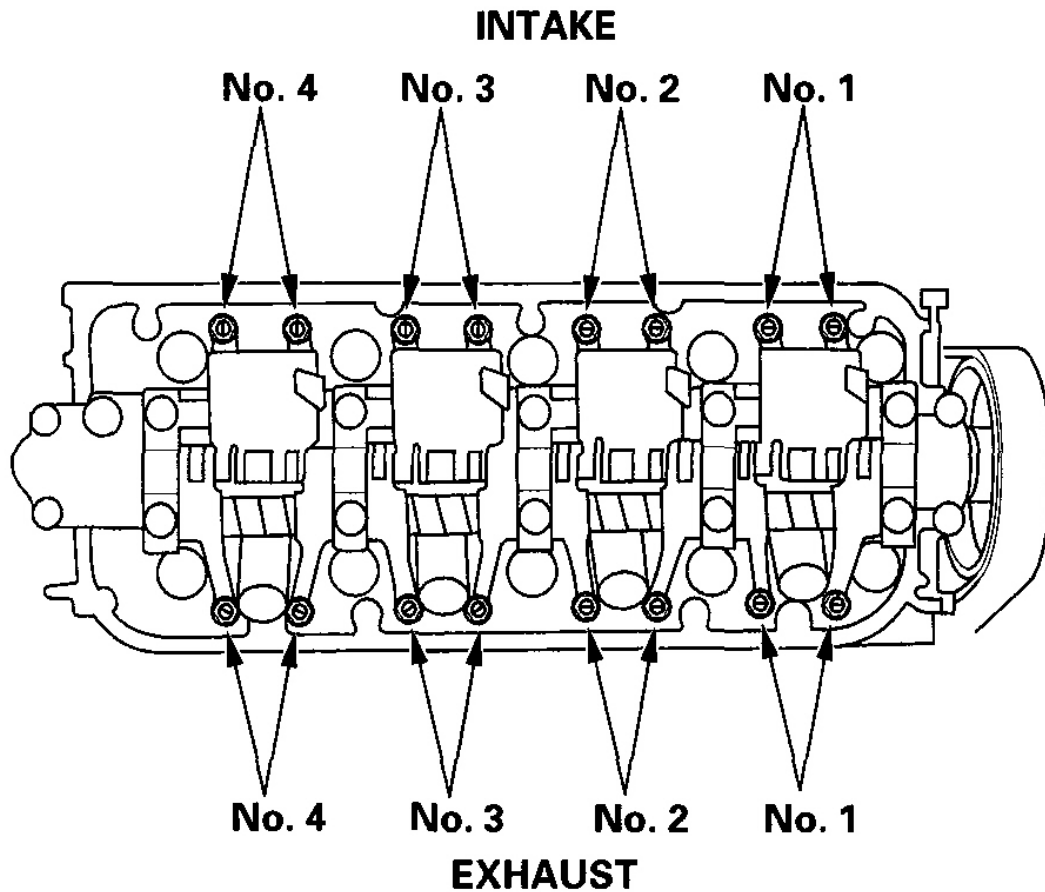
Fig. 83: Setting No. 1 Piston At TDC

Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Select the correct thickness feeler gauge for the valves you're going to check.

Intake: 0.26 mm (0.010 in.) +/- 0.02 mm (0.0008 in.)

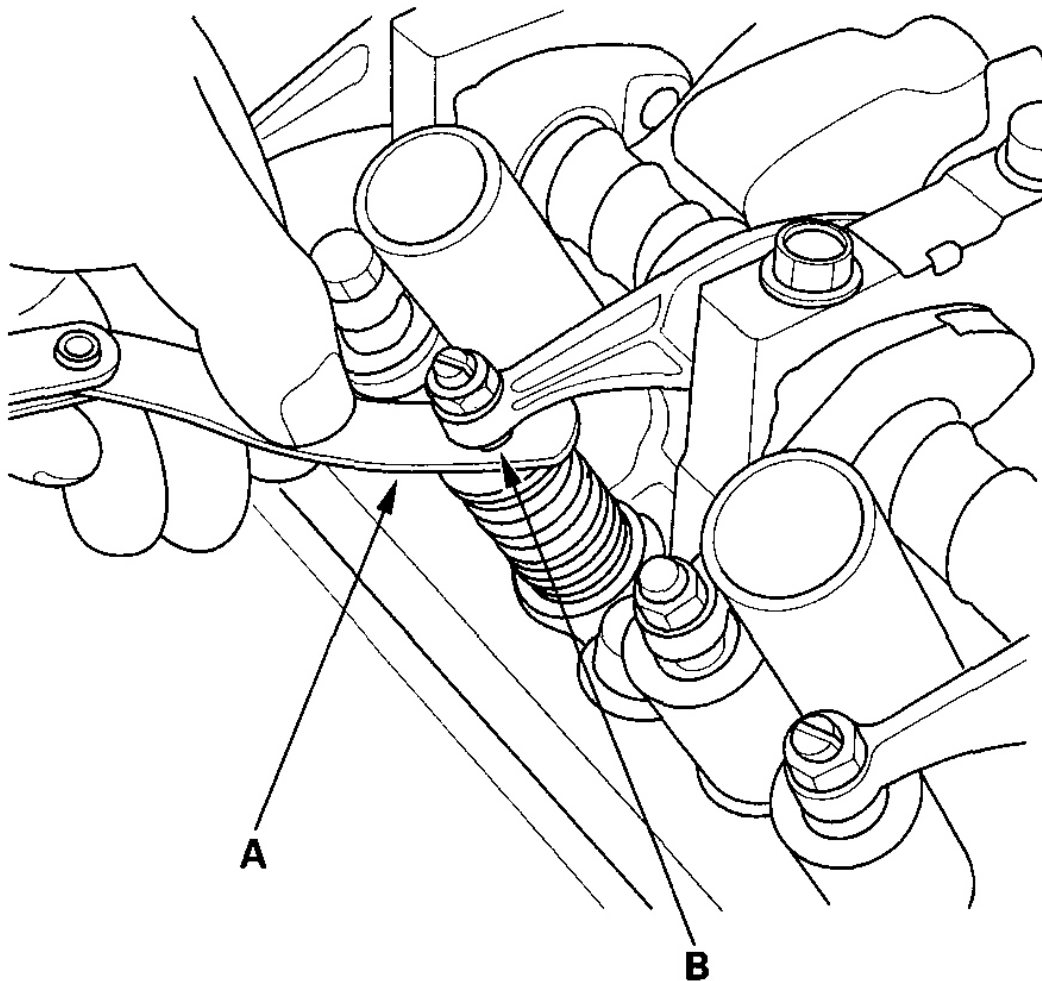
Exhaust: 0.30 mm (0.012 in.) +/- 0.02 mm (0.0008 in.)



G02556939

Fig. 84: Locating Valve Adjusting Screw Locations
Courtesy of AMERICAN HONDA MOTOR CO., INC.

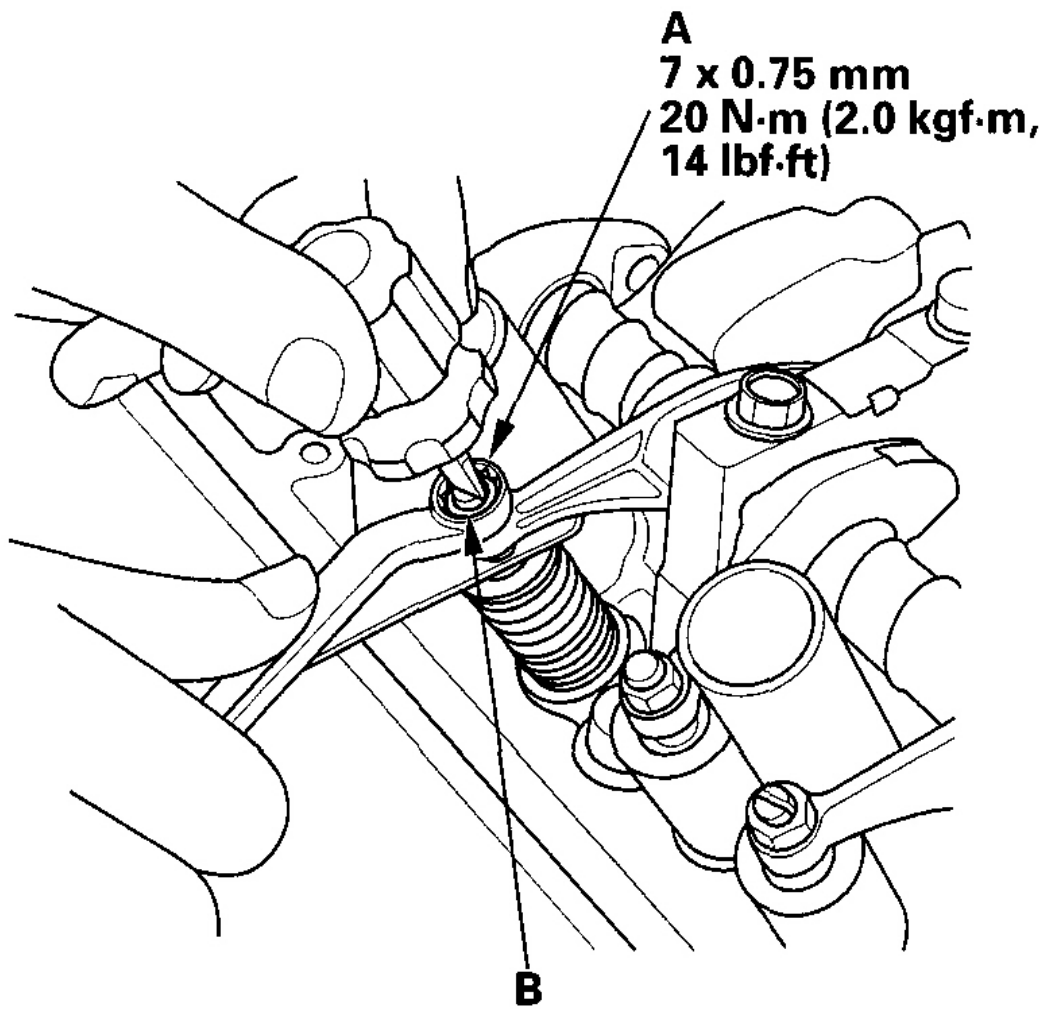
4. Insert the feeler gauge (A) between the adjusting screw (B) and the end of the valve stem and slide it back and forth; you should feel a slight amount of drag.



G02556940

Fig. 85: Inserting Feeler Gauge Between Adjusting Screw & End Of Valve Stem
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. 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.

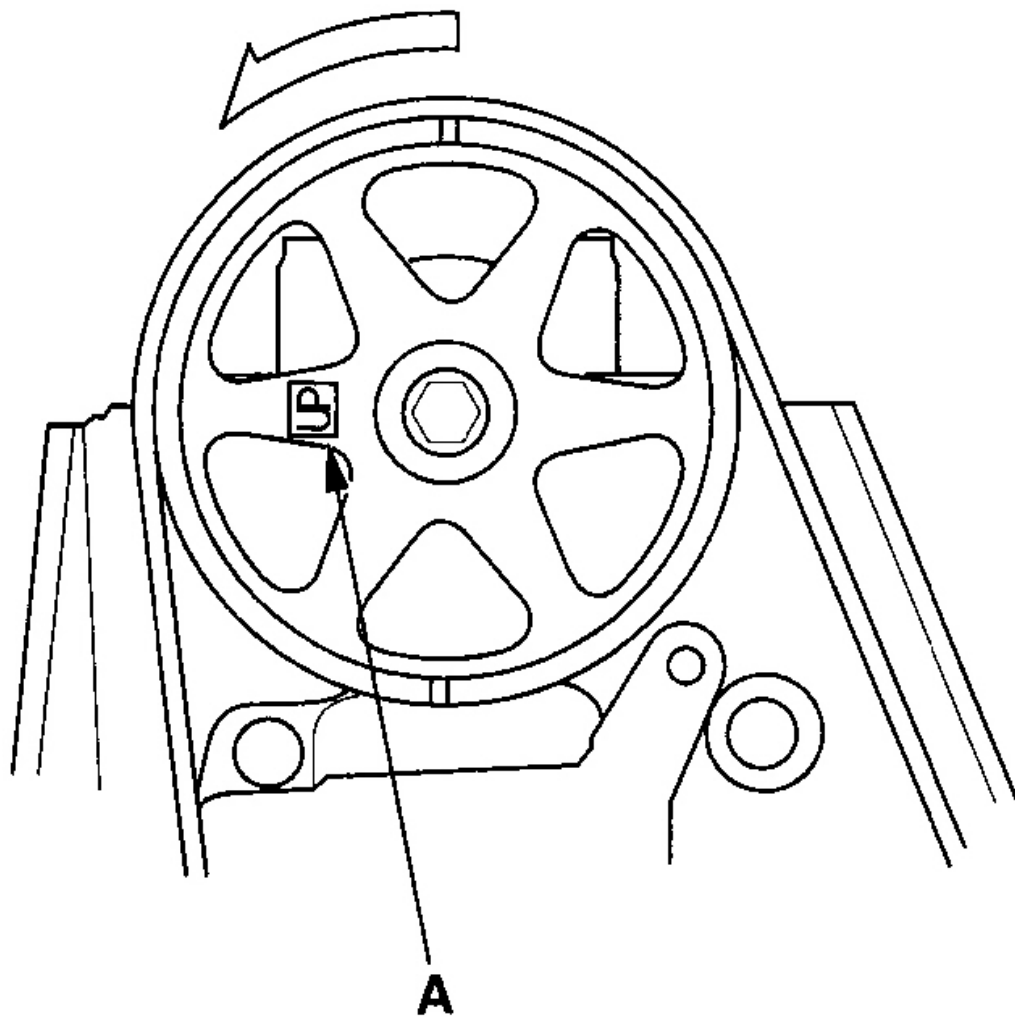


G02556941

Fig. 86: Loosening Locknut

Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

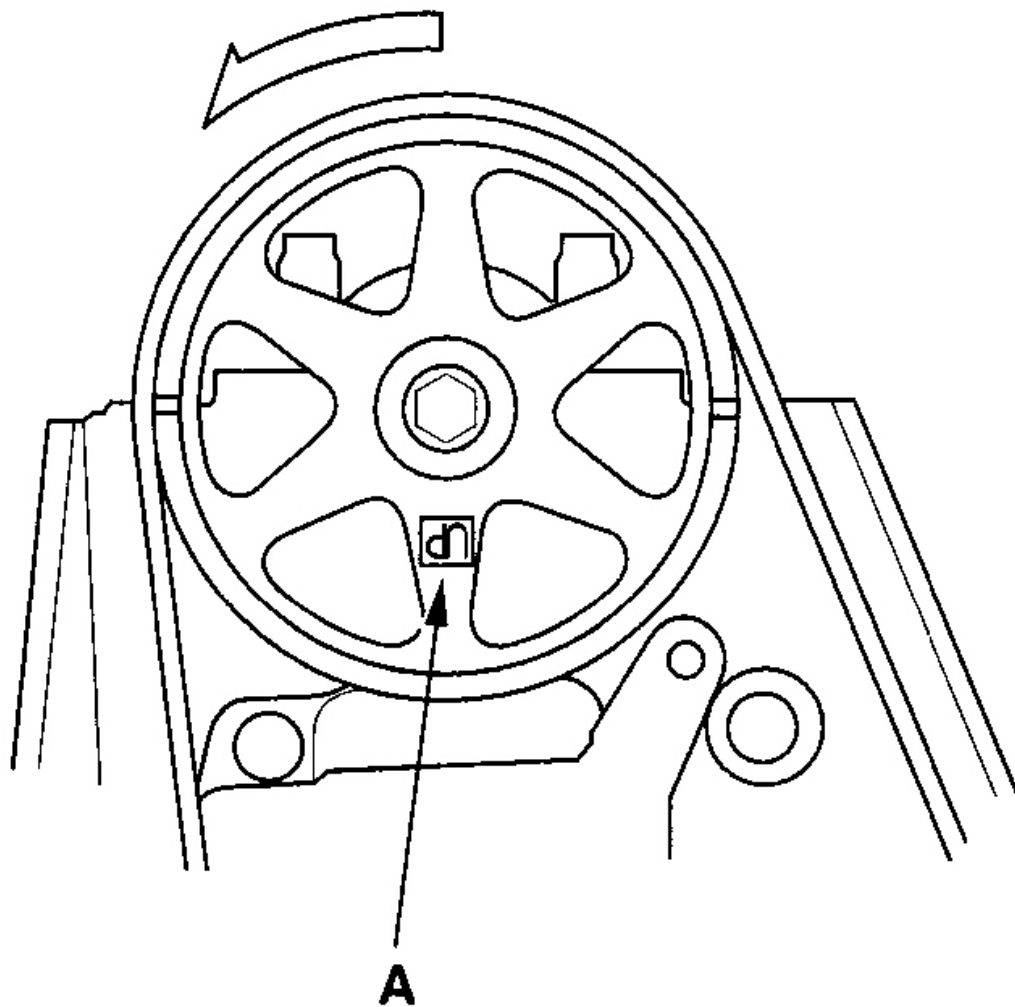


G02556942

Fig. 87: Setting Number 3 Piston At TDC

Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

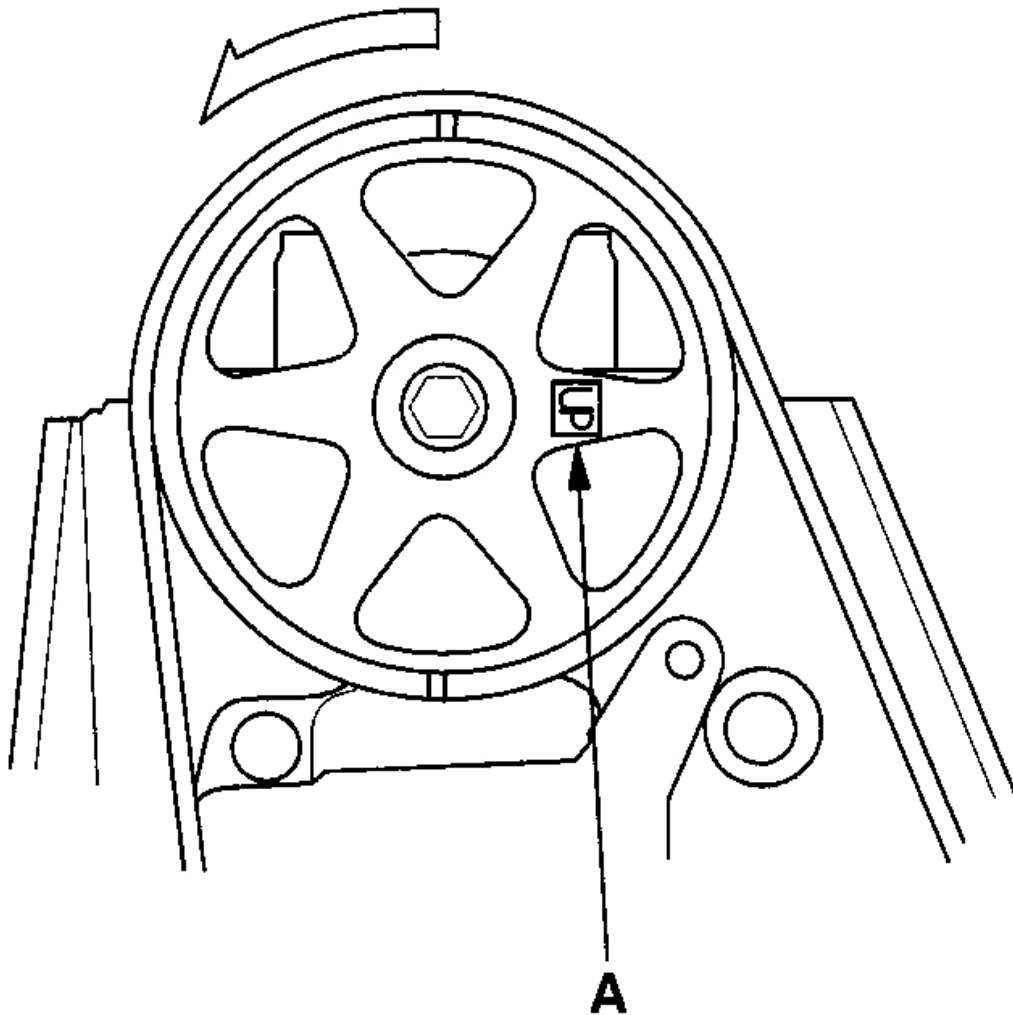


G02556943

Fig. 88: Setting Number 4 Piston At TDC

Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Check and, if necessary, adjust the valve clearance on No. 4 cylinder.
11. 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.



G02556944

Fig. 89: Setting Number 2 Piston At TDC

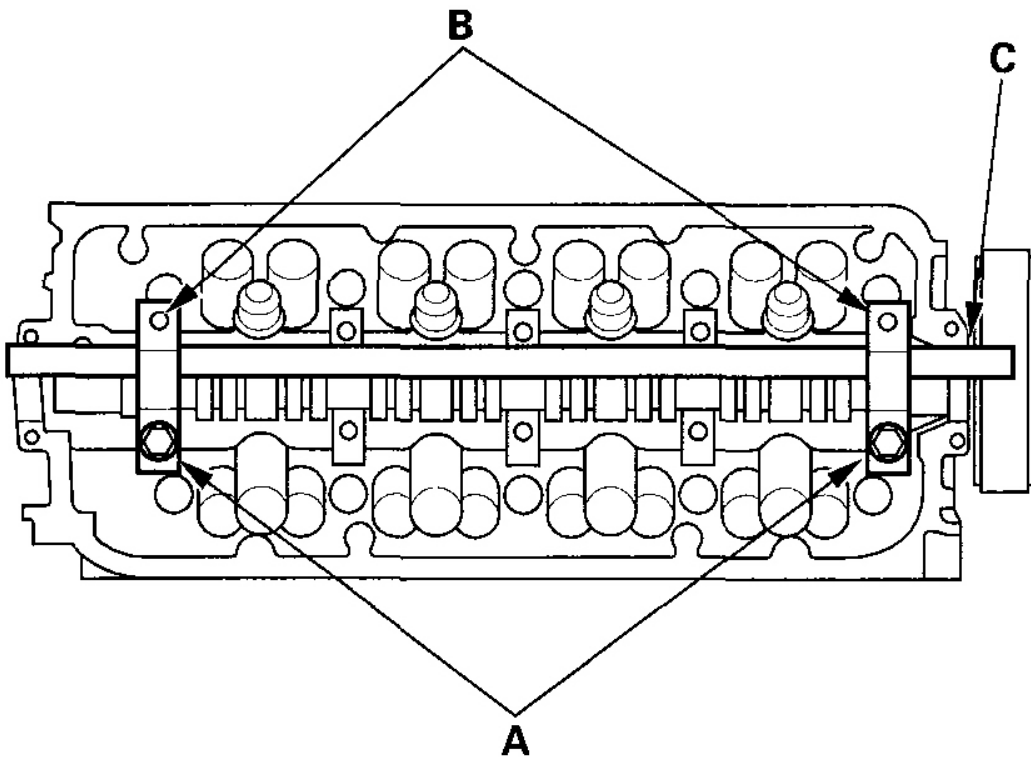
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

VALVE SEAL REPLACEMENT WITH CYLINDER HEAD INSTALLED

The procedure shown below applies when using the in-car valve spring compressor (Snap-on YA8845 with YA8845-2 A 7/8" attachment).

1. Turn the crankshaft so that the No. 1 and No. 4 pistons are at top dead center (TDC).
2. Remove the cylinder head cover.
3. Remove the rocker arm assembly (see **Rocker Arm Assembly Removal**).
4. Remove the injectors and the wire harness.
5. Using the 8 mm bolts (A) supplied with the tool, mount the two uprights (B) to the cylinder head at the end camshaft holders. The uprights fit over the camshaft as shown.



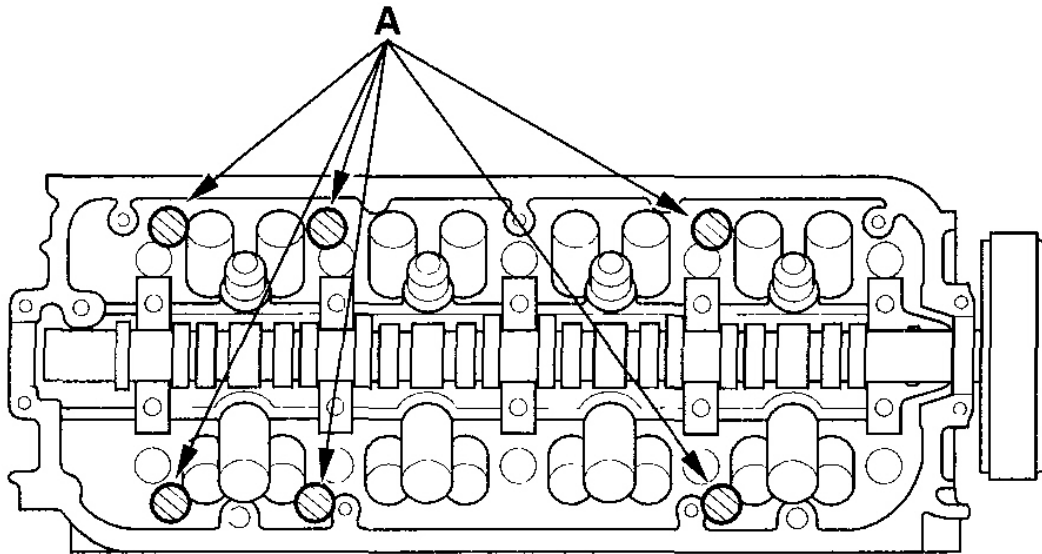
G02556945

Fig. 90: Mounting Two Uprights To Cylinder Head Using 8 MM
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Insert the cross shaft (C) through the top hole of the two uprights.

Intake Valve Seals

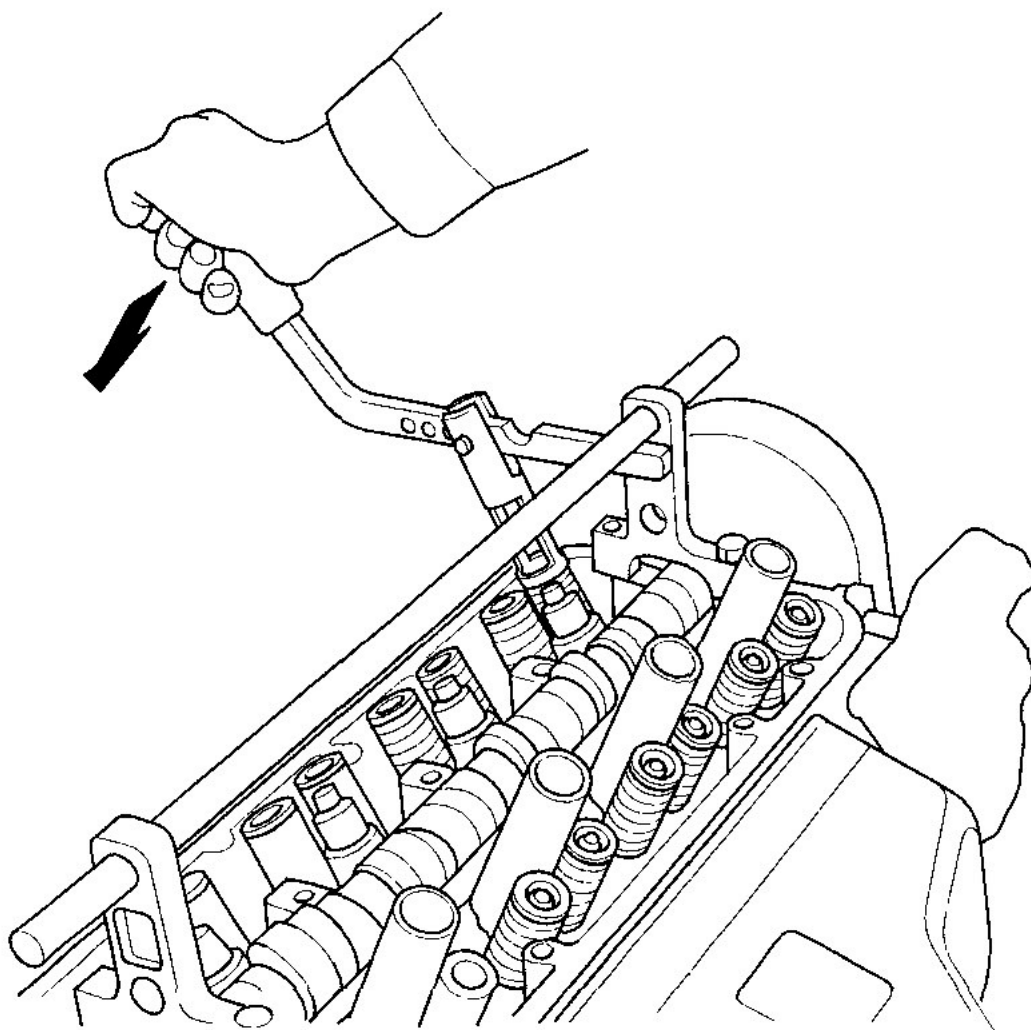
7. Select the 7/8 in. diameter long compressor attachment, and fasten the attachment to the No. 5 hole of the lever arm with the speed pin supplied.
8. Insert an air adaptor into the spark plug hole. Pump air into the cylinder to keep the valve closed while compressing the springs and removing the valve keepers.
9. Put shop towels over the oil passages (A) to prevent the valve keepers from falling into the cylinder head.



G02556946

Fig. 91: Identifying Oil Passages**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

10. Position the lever arm under the cross shaft so the lever is perpendicular to the shaft and the compressor attachment rests on top of the retainer for the spring being compressed. Use the front position slot on the lever as shown.



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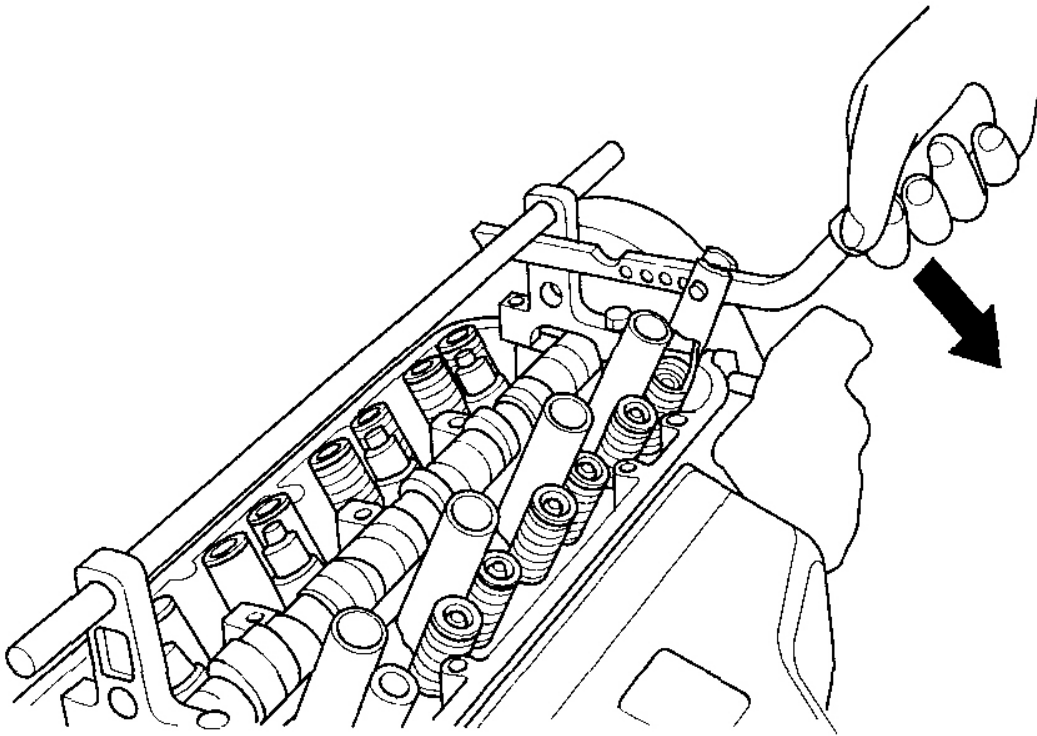
Fig. 92: Positioning Lever Arm Under Cross Shafts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Using a downward motion on the lever arm, compress the valve spring and remove the keepers from the valve stem. Slowly release pressure on the spring.
12. Remove the valve seals (see **Valves, Springs & Valve Seals Removal**).
13. Install the valve seals (see **Valves, Springs & Valve Seals Installation**).
14. Install the springs, the retainers and the keepers in reverse order of removal.

Exhaust Valve Seals

15. Select the 7/8 in. diameter short compressor attachment, and fasten the attachment to the No. 4 hole of the lever arm with the speed pin supplied.

16. Put shop towels over the oil passages to prevent the valve keepers from falling into the cylinder head.
17. Position the lever arm under the cross shaft so the lever is perpendicular to the shaft and the compressor attachment rests on top of the retainer for the spring being compressed. Use the front position slot on the lever as shown.



G02556948

Fig. 93: Position Lever Arm Under Cross Shaft
Courtesy of AMERICAN HONDA MOTOR CO., INC.

18. Using a downward motion on the lever arm, compress the valve spring and remove the keepers from the valve stem. Slowly release pressure on the spring.
19. Remove the valve seals (see **Valves, Springs & Valve Seals Removal**).
20. Install the valve seals (see **Valves, Springs & Valve Seals Installation**).
21. Install the springs, the retainers and the keepers in reverse order of removal.
22. Repeat steps 7 through 21 on the other cylinders.

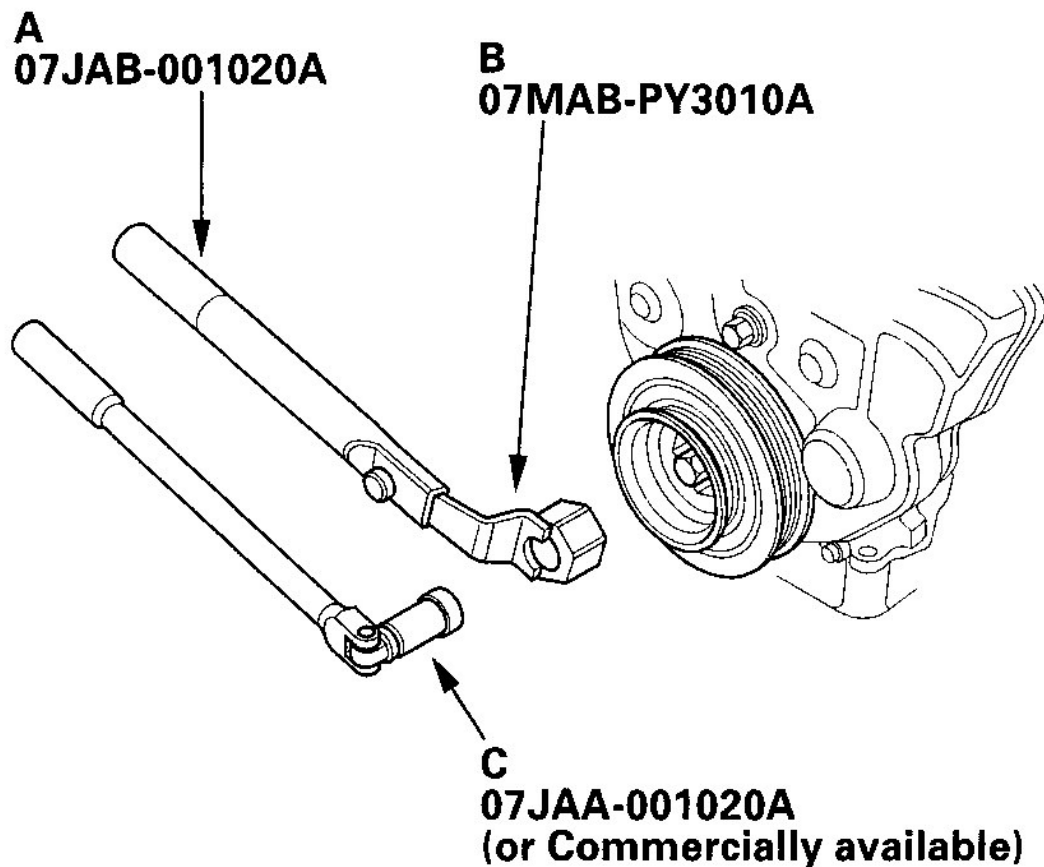
CRANKSHAFT PULLEY REMOVAL & INSTALLATION

Special Tools Required

- Holder Handle 07JAB-001020A
- Holder Attachment, 50 mm, Offset 07MAB-PY3010A
- Socket, 19 mm 07JAA-001020A or a commercially available 19 mm socket

Removal

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



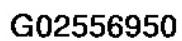
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Fig. 94: Holding Pulley With Holder Handle & Holder Attachment
Courtesy of AMERICAN HONDA MOTOR CO., INC.

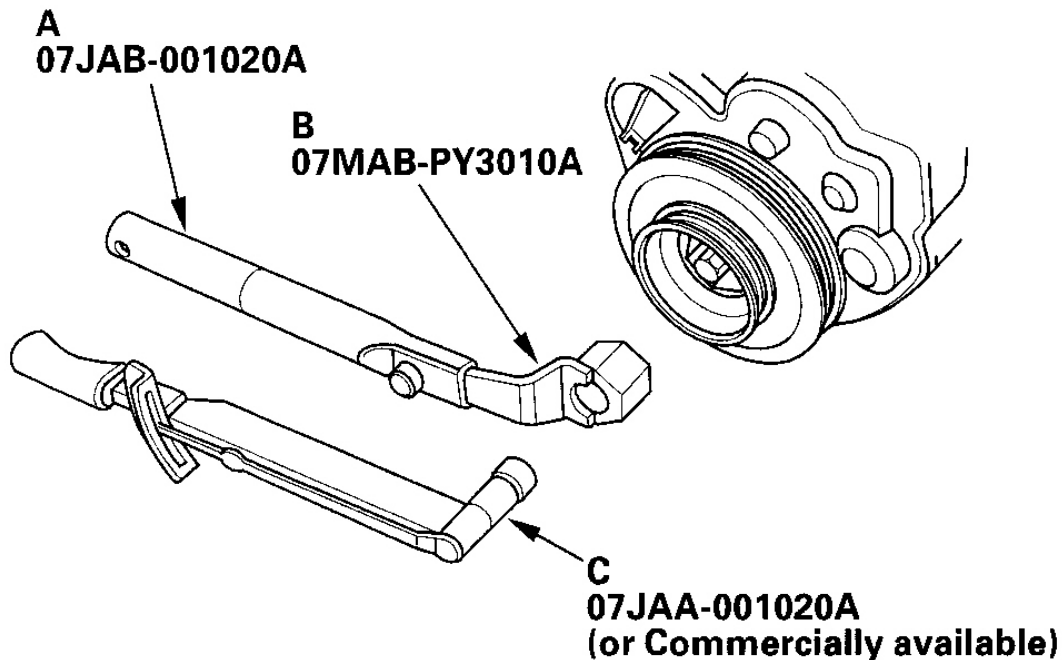
2. Remove the bolt with a heavy duty 19 mm socket (C) and breaker bar.

Installation

1. Clean the pulleys (A), crankshaft (B), bolt (C), and washer (D). Lubricate as shown below.



2. Install the crankshaft pulley, and hold with holder handle (A) and holder attachment (B).



G02556951

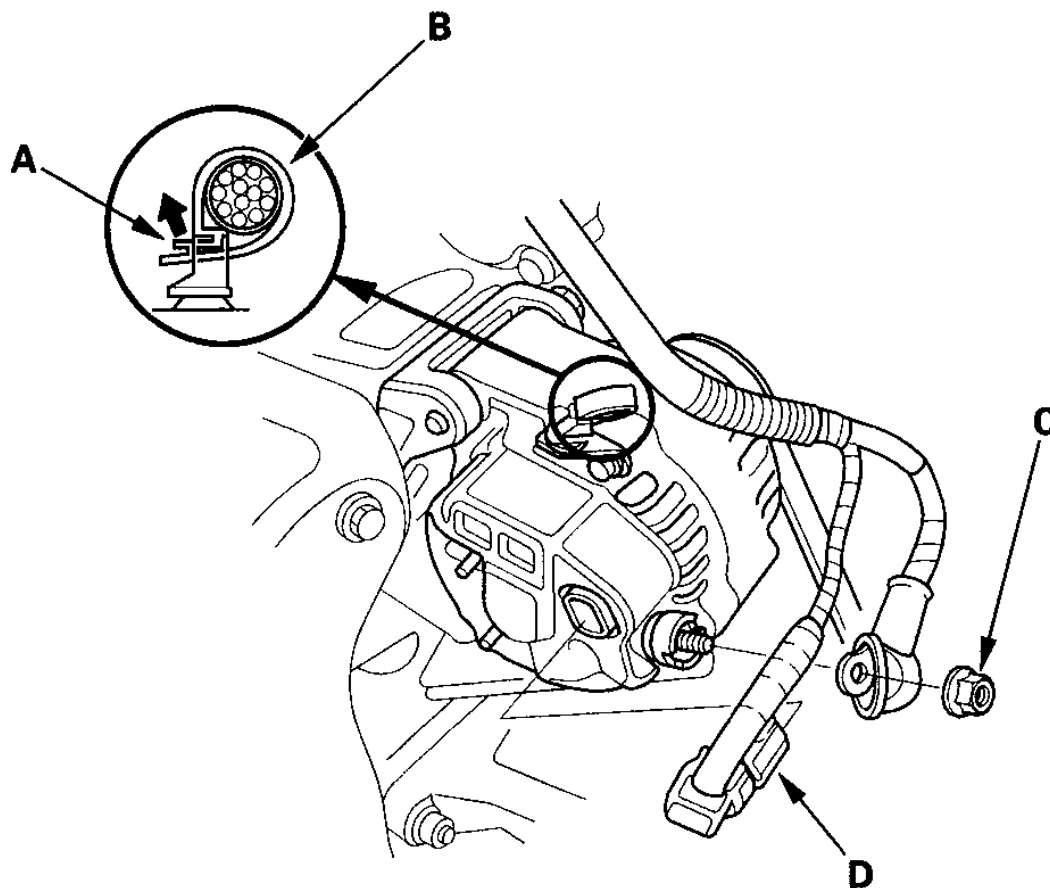
Fig. 96: Installing Crankshaft Pulley

Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Tighten the bolt to 245 N.m (25.0 kgf.m, 181 lb-ft) with a torque wrench and 19 mm socket (C). Do not use an impact wrench.

TIMING BELT INSPECTION

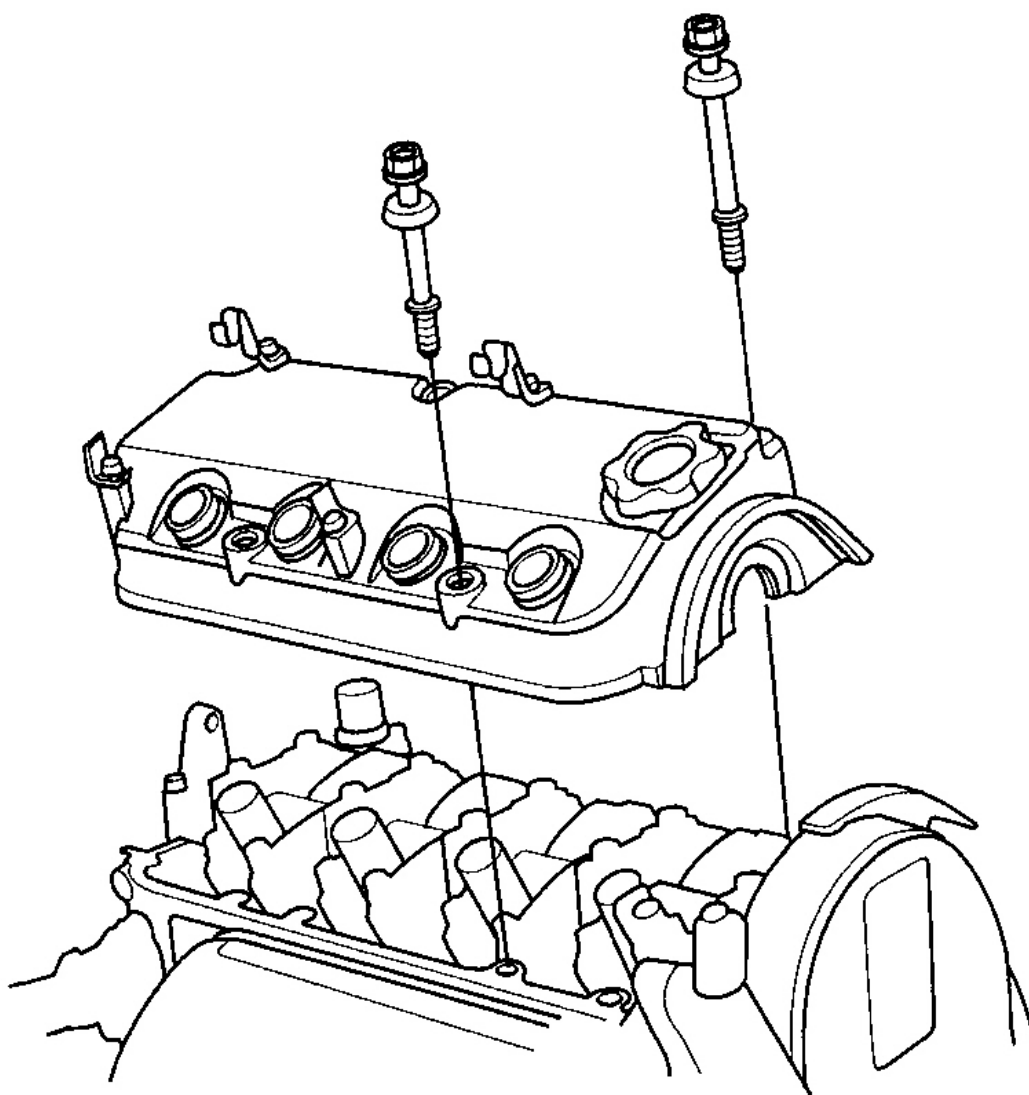
1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset button.
2. Disconnect the battery negative terminal first, then the positive terminal.
3. Disconnect the alternator wire harness.
 - A. Pull up the lock (A), then release the wire harness tie (B).
 - B. Pull back the boot and remove the 6 mm nut (C).
 - C. Disconnect the connector (D) from the alternator.



G02556952

Fig. 97: Pulling Lock & Releasing Wire Harness Tie
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Remove the cylinder head cover.

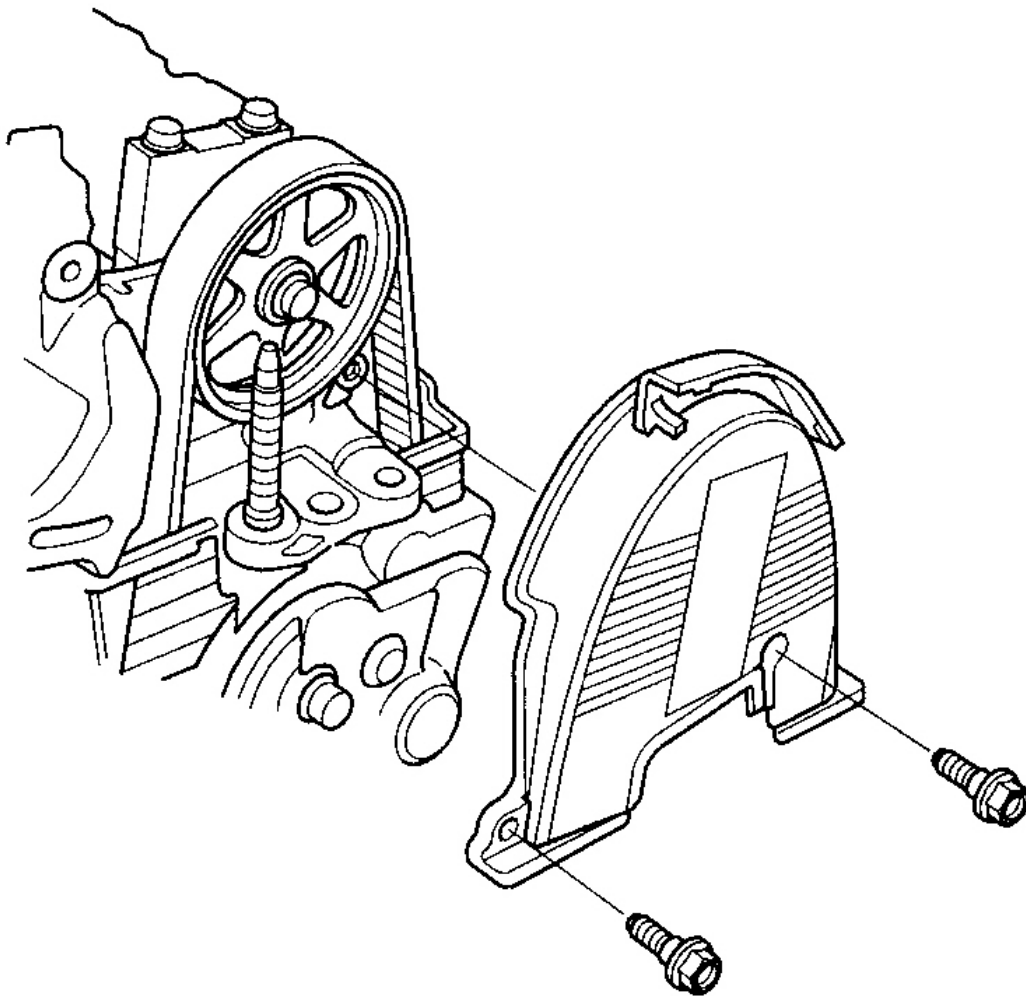


G02556953

Fig. 98: Removing Cylinder Head Cover

Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Remove the upper cover.



G02556954

Fig. 99: Removing Upper Cover

Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Inspect the timing belt for cracks and oil or coolant soaking. Replace the belt if it is oil or coolant soaked. Remove any oil or solvent that gets on the belt.

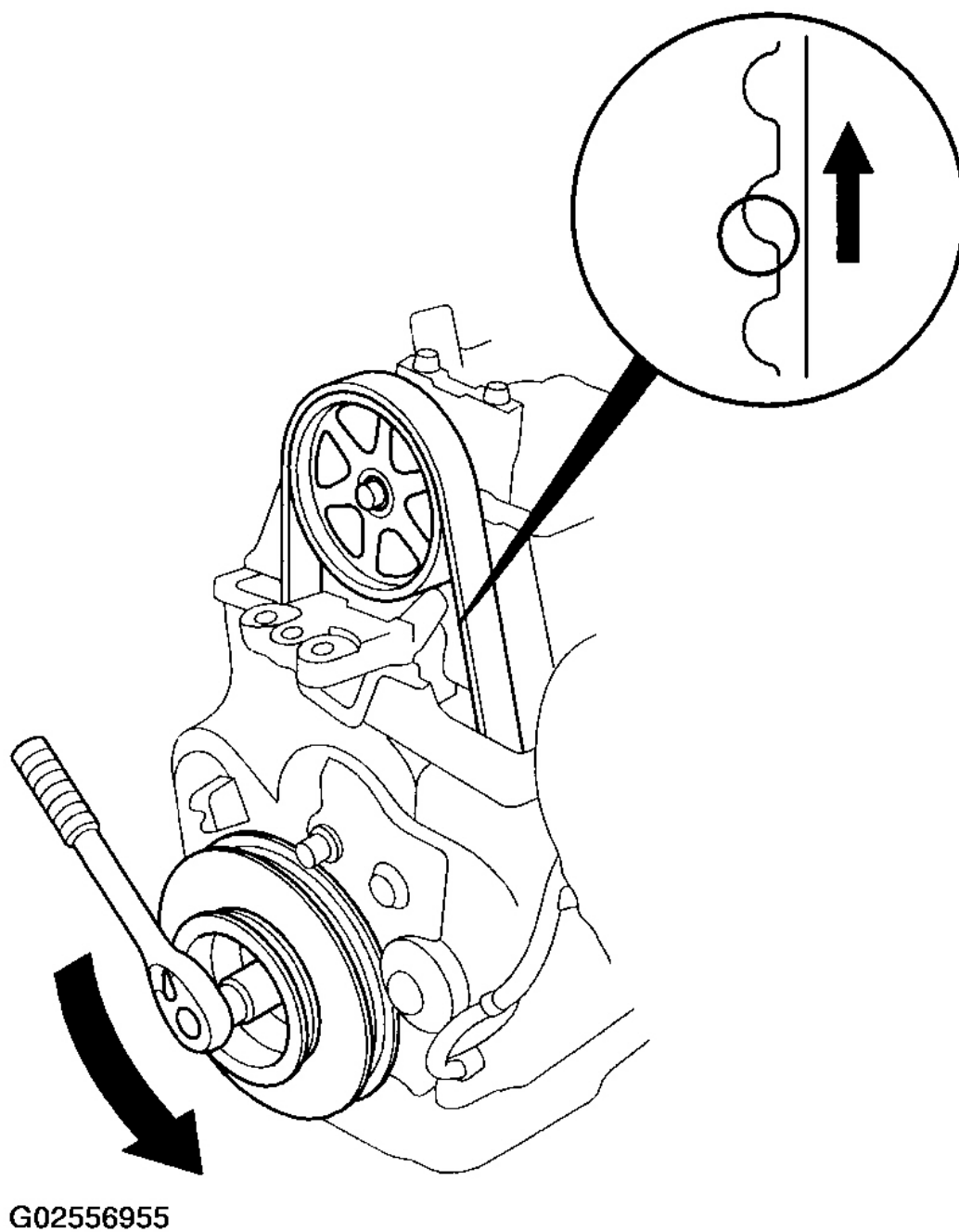


Fig. 100: Inspecting Timing Belt

Courtesy of AMERICAN HONDA MOTOR CO., INC.

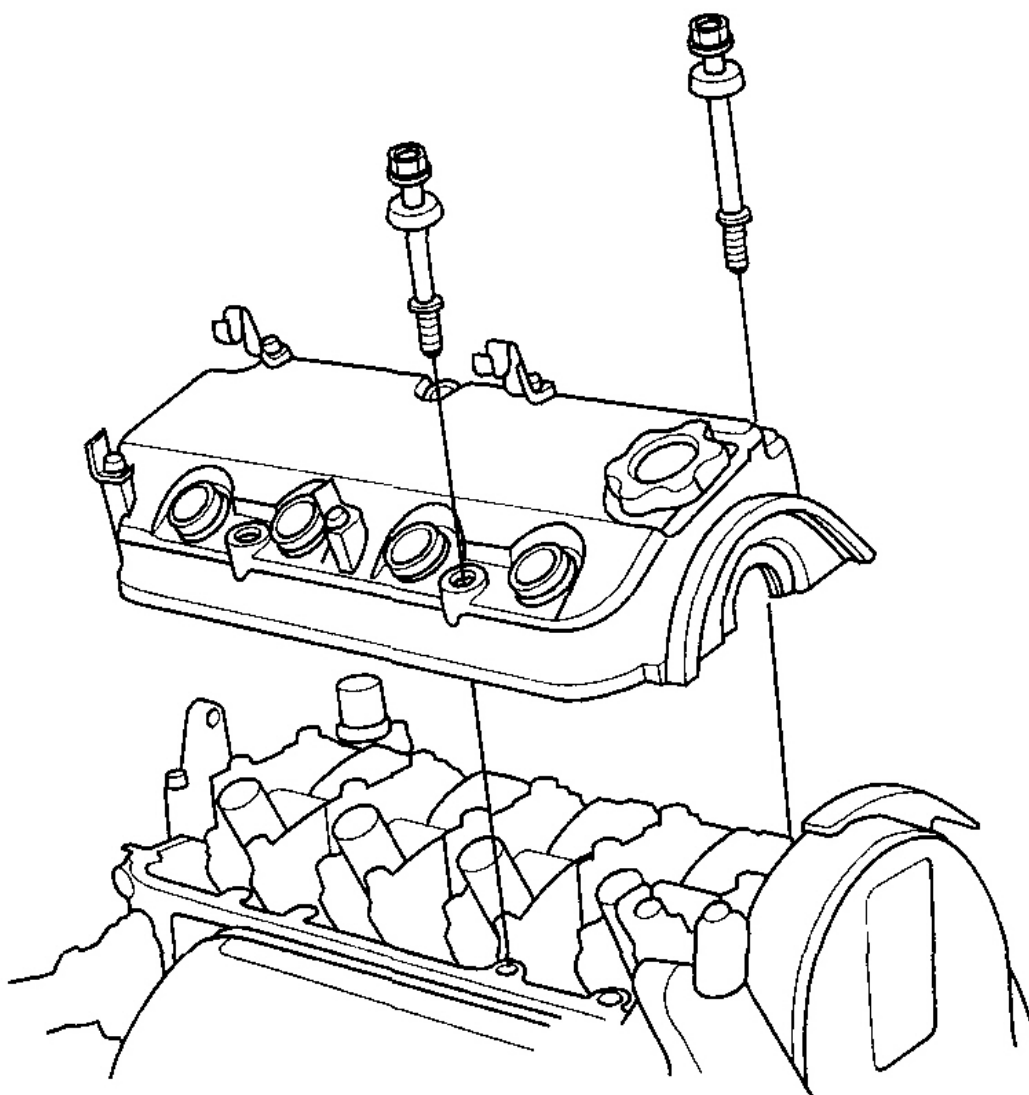
7. After inspecting, retorque the crankshaft pulley bolt to 245 N.m (25.0 kgf.m, 181 lbf-Ft).
8. Reinstall all removed parts.

9. Enter the anti-theft code for the radio, then enter the customer's radio station presets.

BALANCER BELT INSPECTION

Special Tools Required

- Holder Handle 07JAB-001020A
 - 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 battery negative terminal first, then the positive terminal.
 3. Remove the alternator (see **GENERATORS & REGULATORS**).
 4. Remove the alternator bracket. (see **Engine Installation**).
 5. Remove the cylinder head cover.

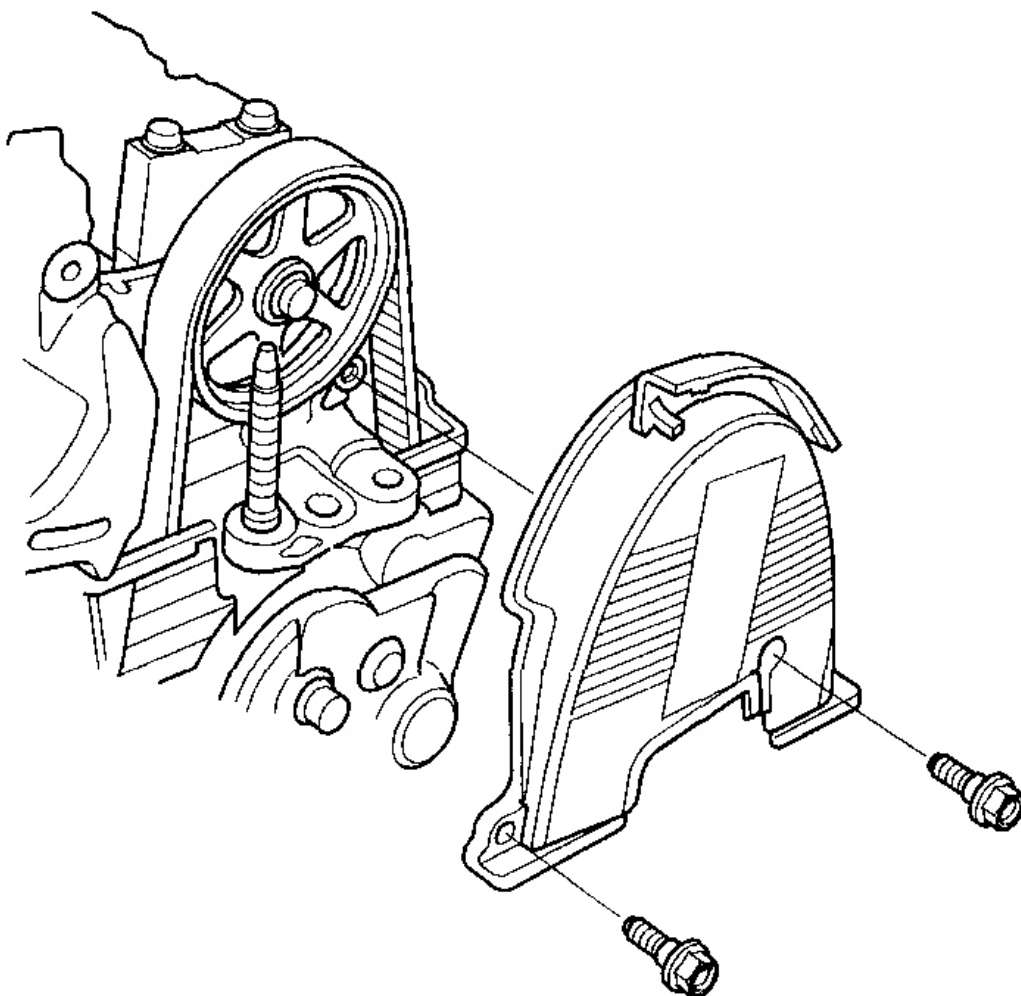


G02556956

Fig. 101: Removing Cylinder Head Cover

Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Remove the upper cover.

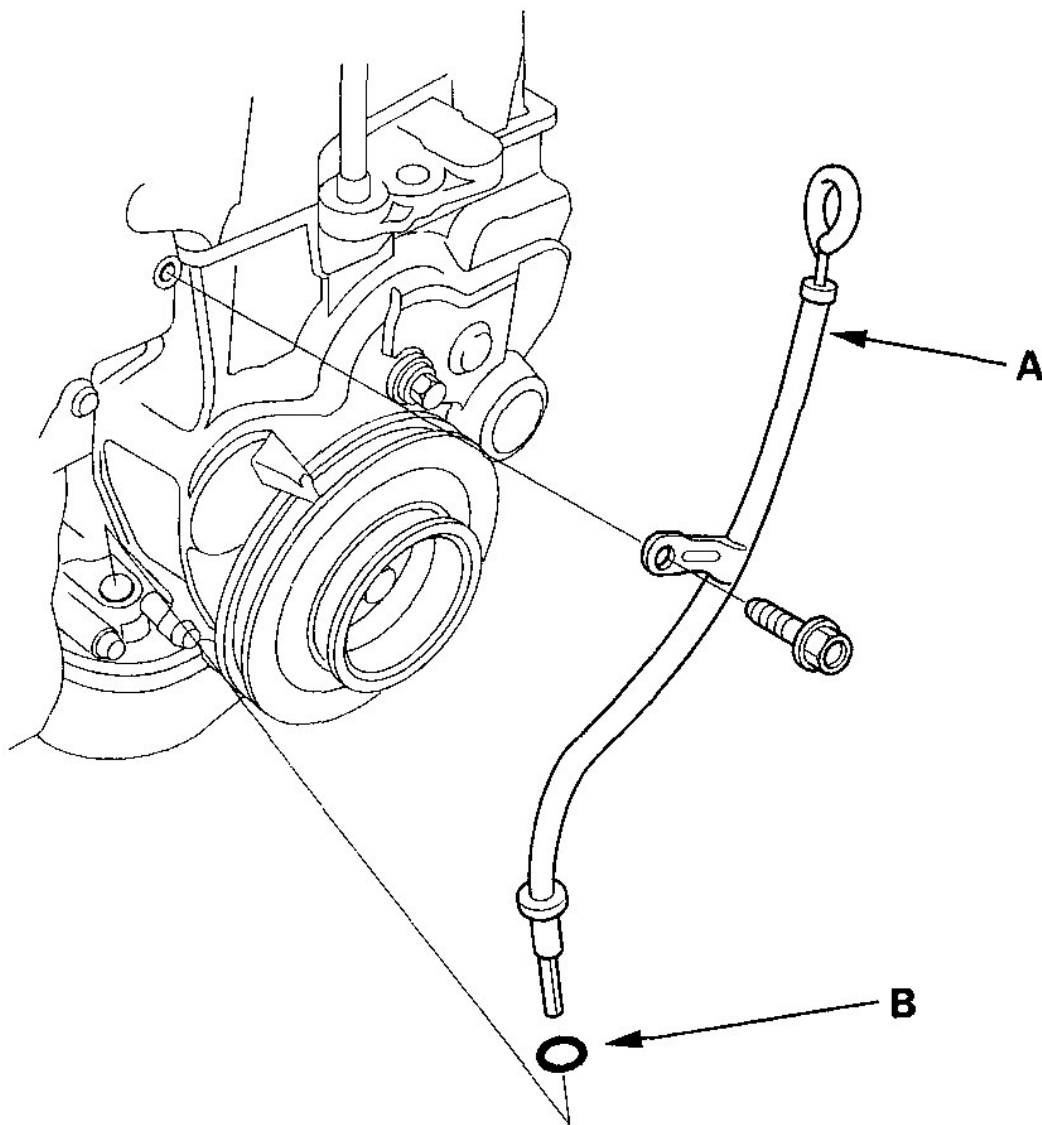


G02556957

Fig. 102: Removing Upper Cover

Courtesy of AMERICAN HONDA MOTOR CO., INC.

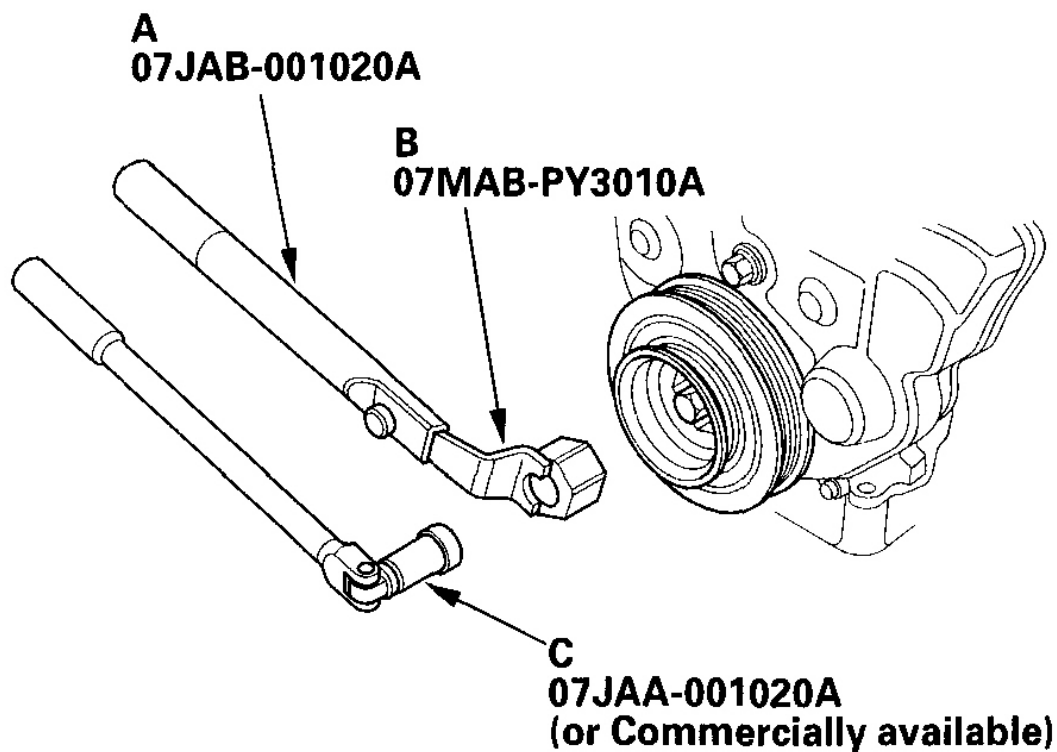
7. Remove the dipstick and tube (A). Discard the O-ring (B).



G02556958

Fig. 103: Removing Dipstick & Tube
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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



G02556959

Fig. 104: Holding Pulley With Holder Handle & Holder Attachment
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Remove the bolt with a heavy duty 19 mm socket (C) and breaker bar.
10. Remove the rubber seal (A) from the adjusting nut, then remove the lower cover.

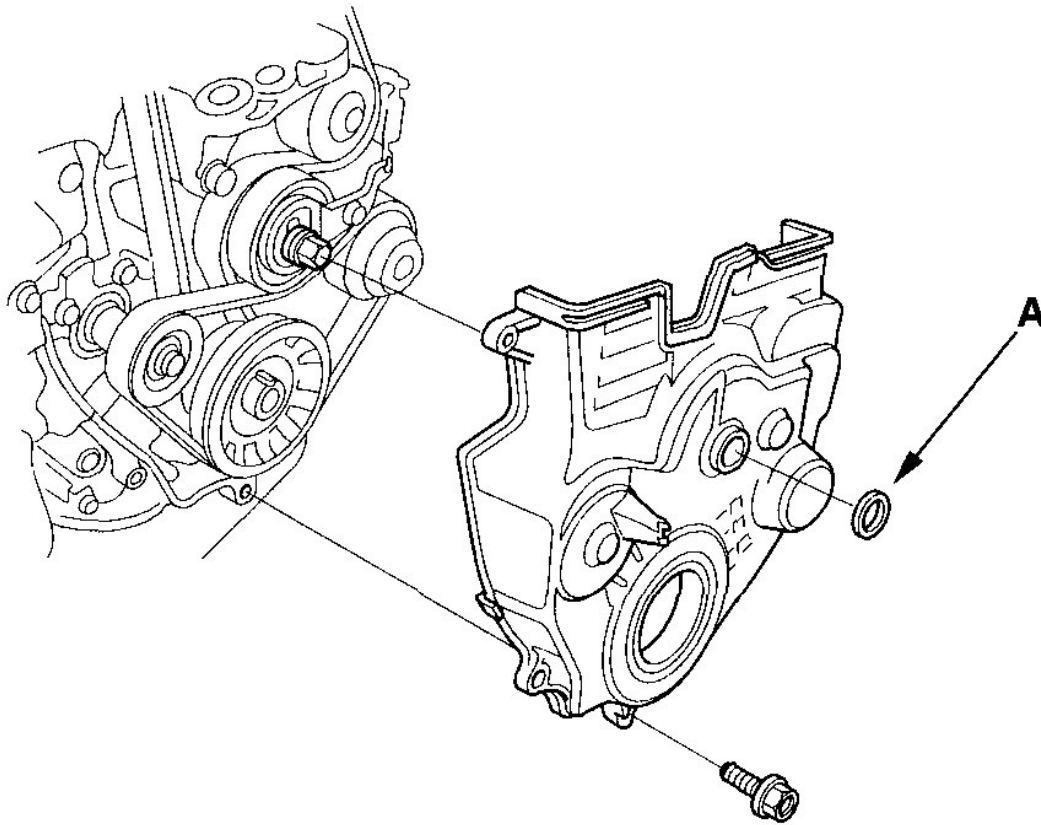
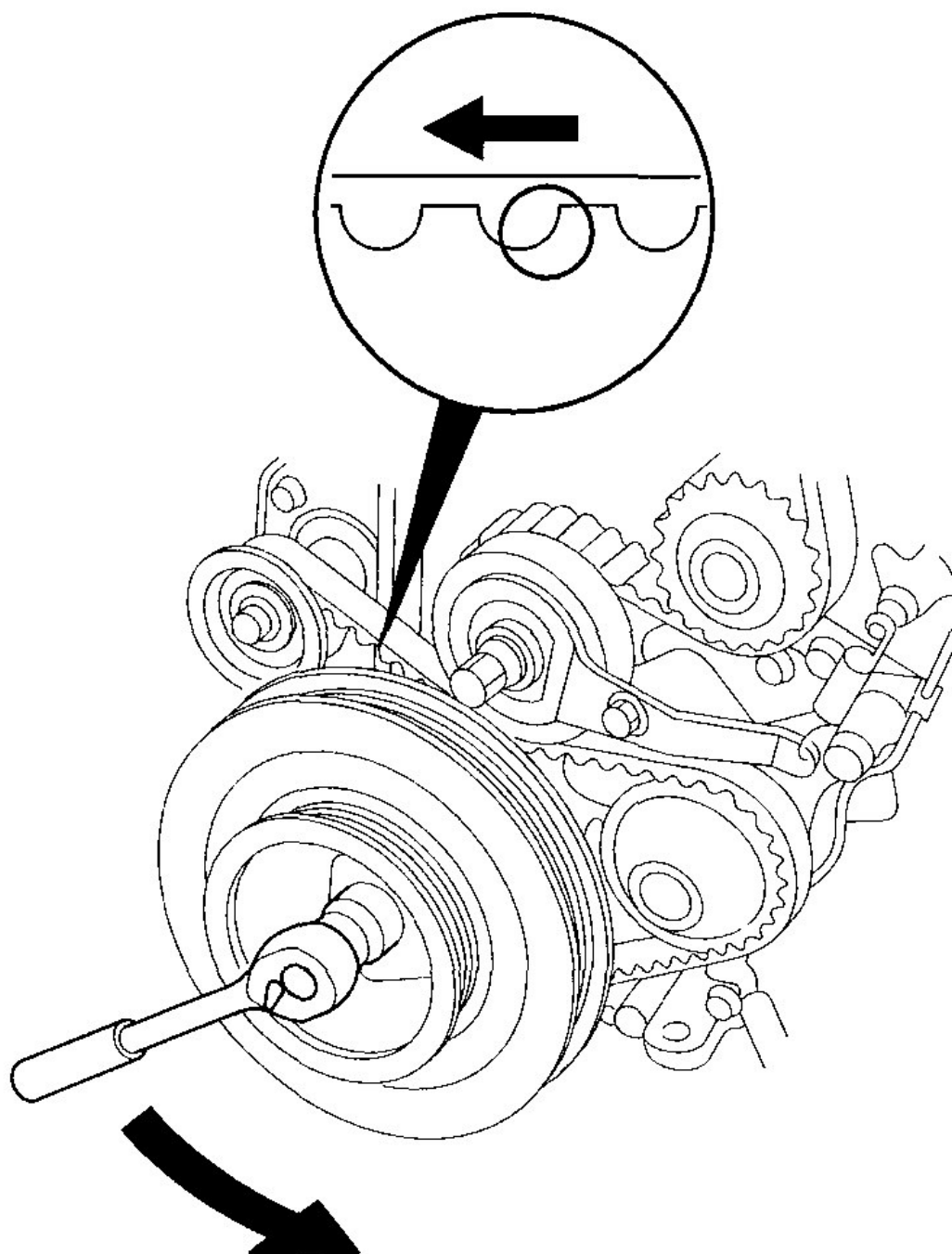
**G02556960**

Fig. 105: Removing Rubber Seal From Adjusting Nut
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Install the crankshaft pulley.
12. Inspect the balancer belt for cracks and oil or coolant soaking. Replace the belt if it is oil or coolant soaked. Remove any oil or solvent that gets on the belt.



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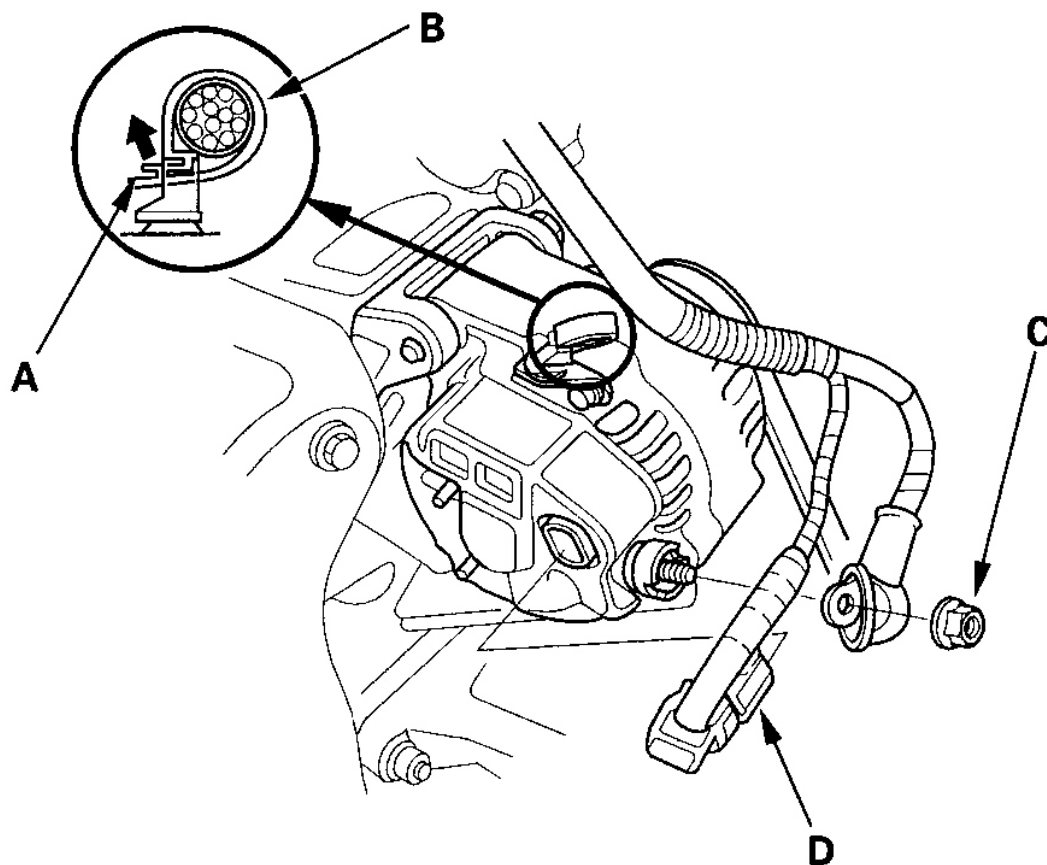
Fig. 106: Replacing Belt If Oil Or Coolant Soaked
Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Reinstall all removed parts.
14. After inspecting, retorque the crankshaft pulley bolt to 245 N.m (25.0 kgf.m, 181 lbf-Ft).
15. Enter the anti-theft code for the radio, then enter the customer's radio station presets.

TIMING BELT & BALANCER BELT ADJUSTMENT**NOTE:**

- **Always adjust timing belt tension when the engine is cold.**
- **Always rotate the crankshaft counterclockwise when viewed from the pulley side. Rotating it clockwise may result in improper adjustment of the belt tension.**

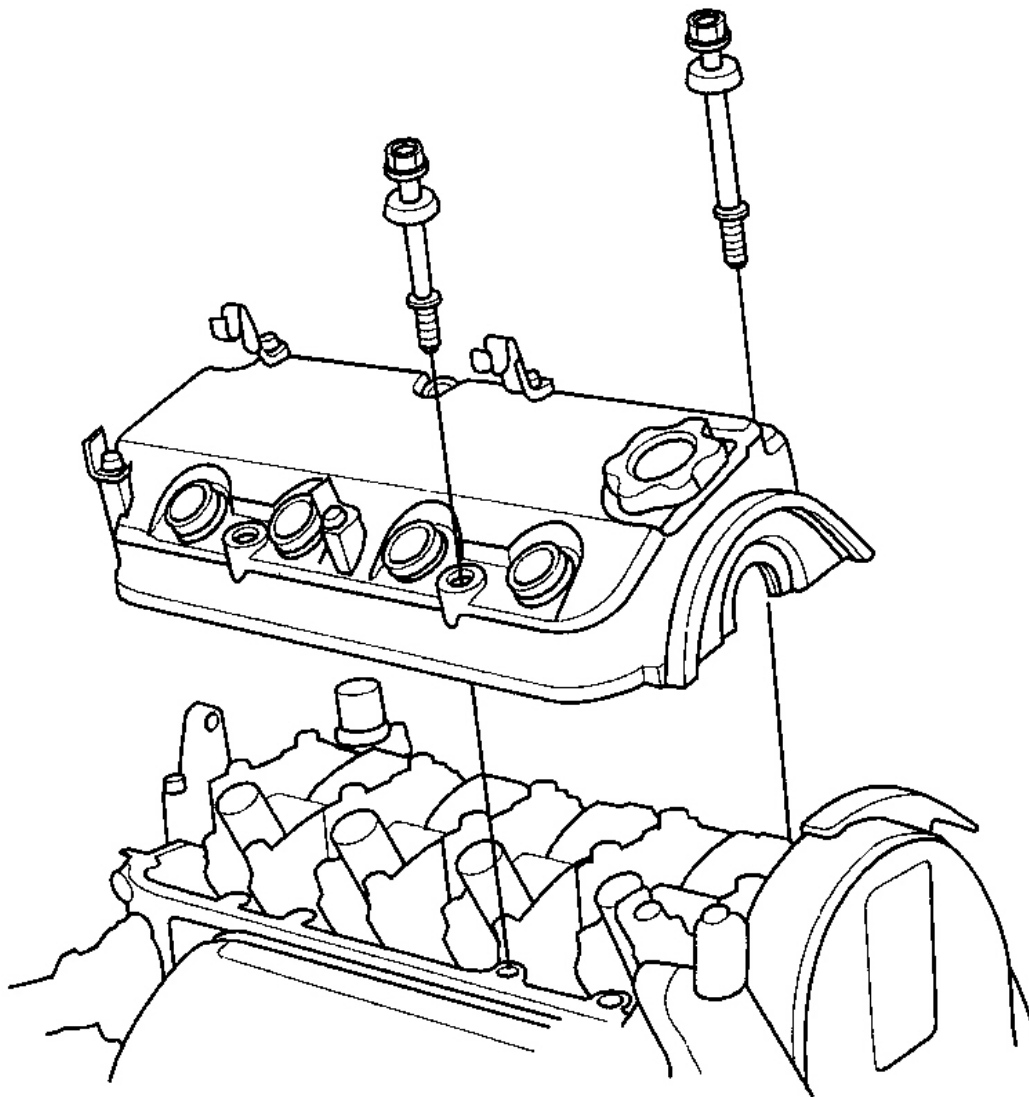
1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.
2. Disconnect the battery negative terminal first, then the positive terminal.
3. Disconnect the alternator wire harness.
 - A. Pull up the lock (A), then release the wire harness tie (B).
 - B. Pull back the boot and remove the 6 mm nut (C).
 - C. Disconnect the connector (D) from the alternator.



G02556962

Fig. 107: Disconnecting Alternator Wire Harness
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Remove the cylinder head cover.

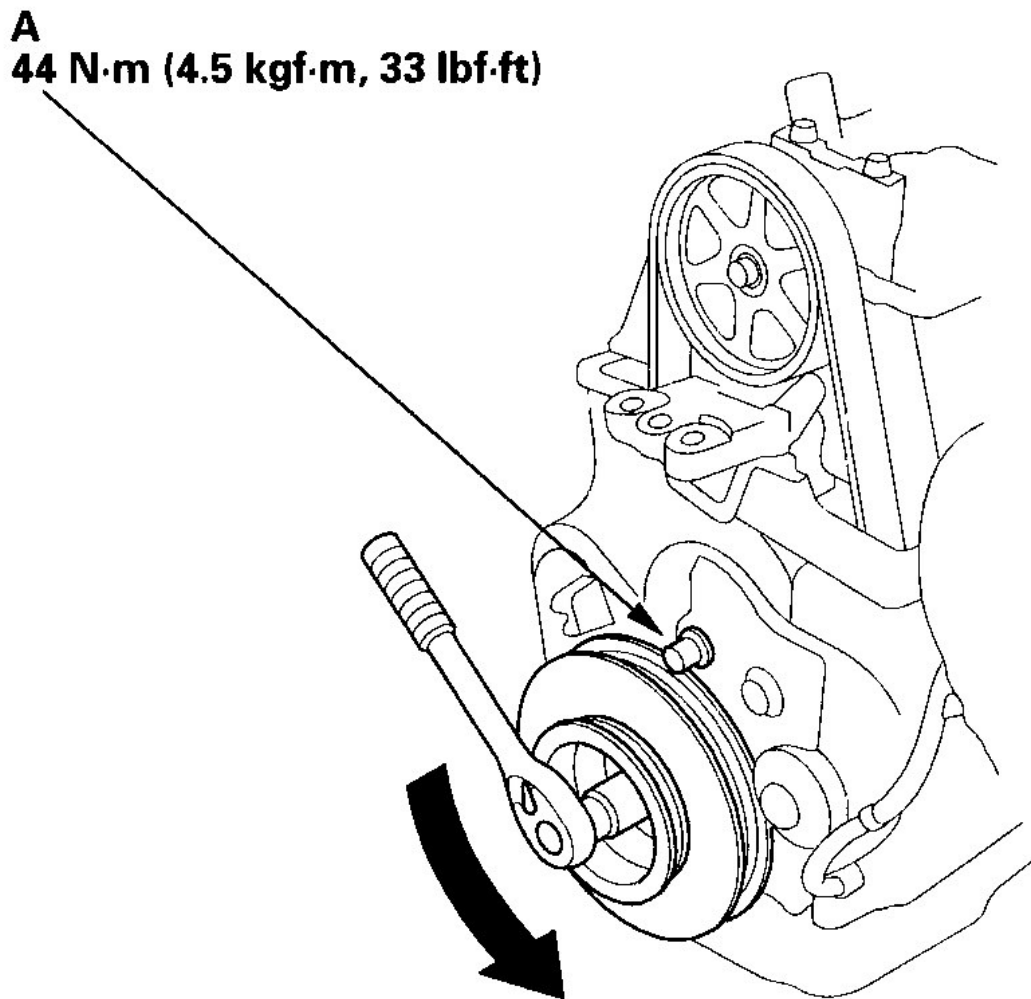


G02556963

Fig. 108: Removing Cylinder Head Cover

Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Rotate the crankshaft five or six revolutions to set the belt.
6. Set the No. 1 piston at TDC.
7. Loosen the adjusting nut (A) 2/3-1 turn.



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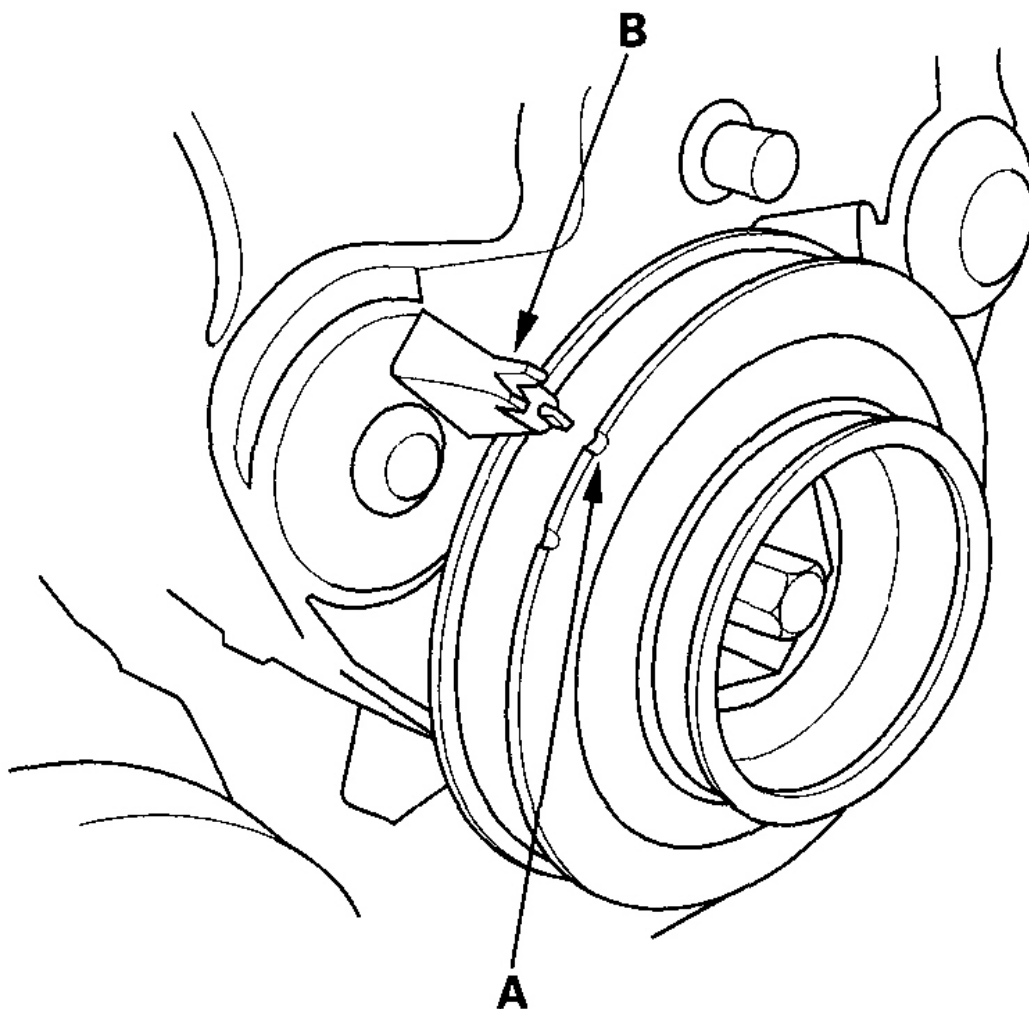
Fig. 109: Loosening Adjusting Nut
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Rotate the crankshaft counterclockwise three teeth on the camshaft pulley.
9. Tighten the adjusting nut (A).
10. After adjusting, retorque the crankshaft pulley bolt to 245 N.m (25.0 kgf.m, 181 lbf-Ft).
11. Enter the anti-theft code for the radio, then enter the customer's radio station presets.

TIMING BELT & BALANCER BELT REMOVAL

Special Tools Required

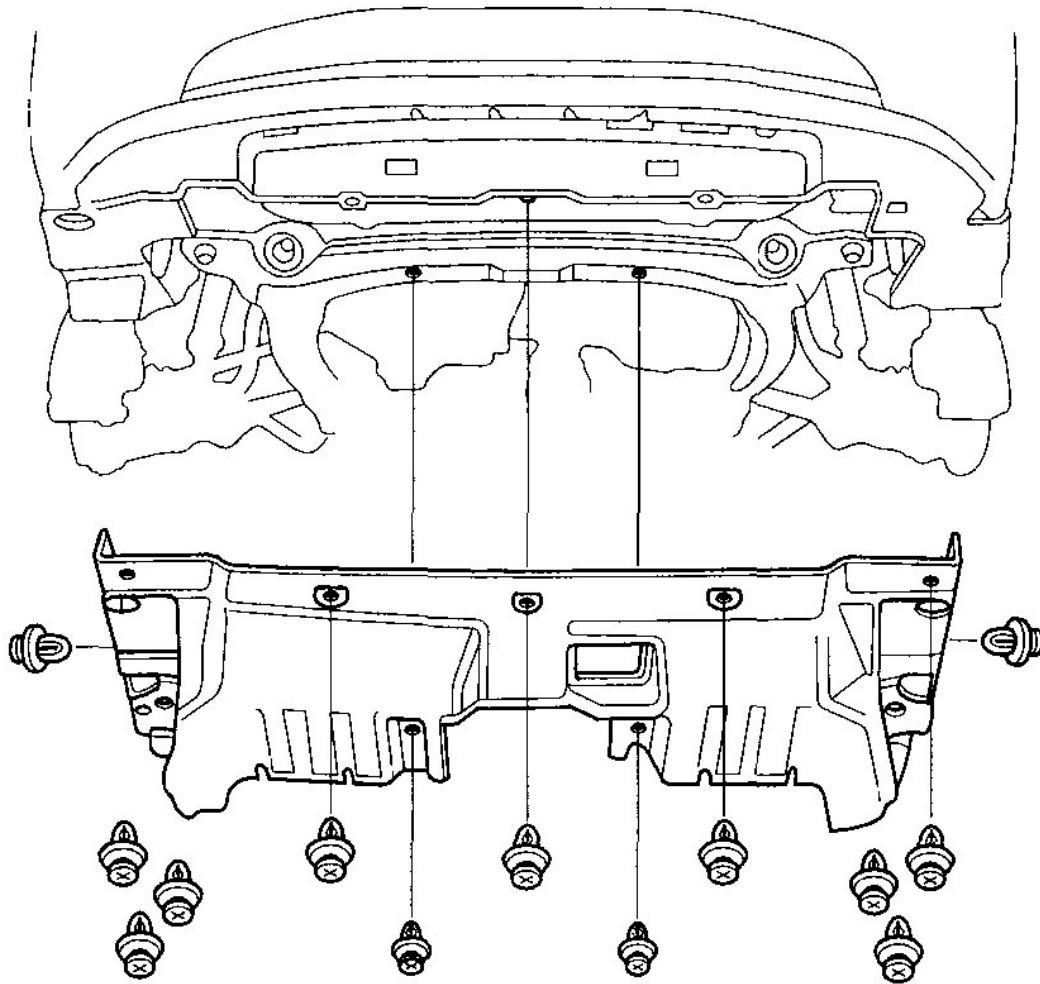
- Holder Handle 07JAB-001020A
 - Holder Attachment, 50 mm, Offset 07MAB-PY3010A
 - Socket, 19 mm 07JAA-001020A or a commercially available 19 mm socket
1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.
 2. Disconnect the battery negative terminal first, then the positive terminal.
 3. Turn the crankshaft pulley so its TDC mark (A) lines up with the pointer (B).



G02556965

Fig. 110: Turning Crankshaft Pulley So TDC Mark Lines Up With Pointer
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Remove the front tires/wheels.
5. Remove the splash shield.

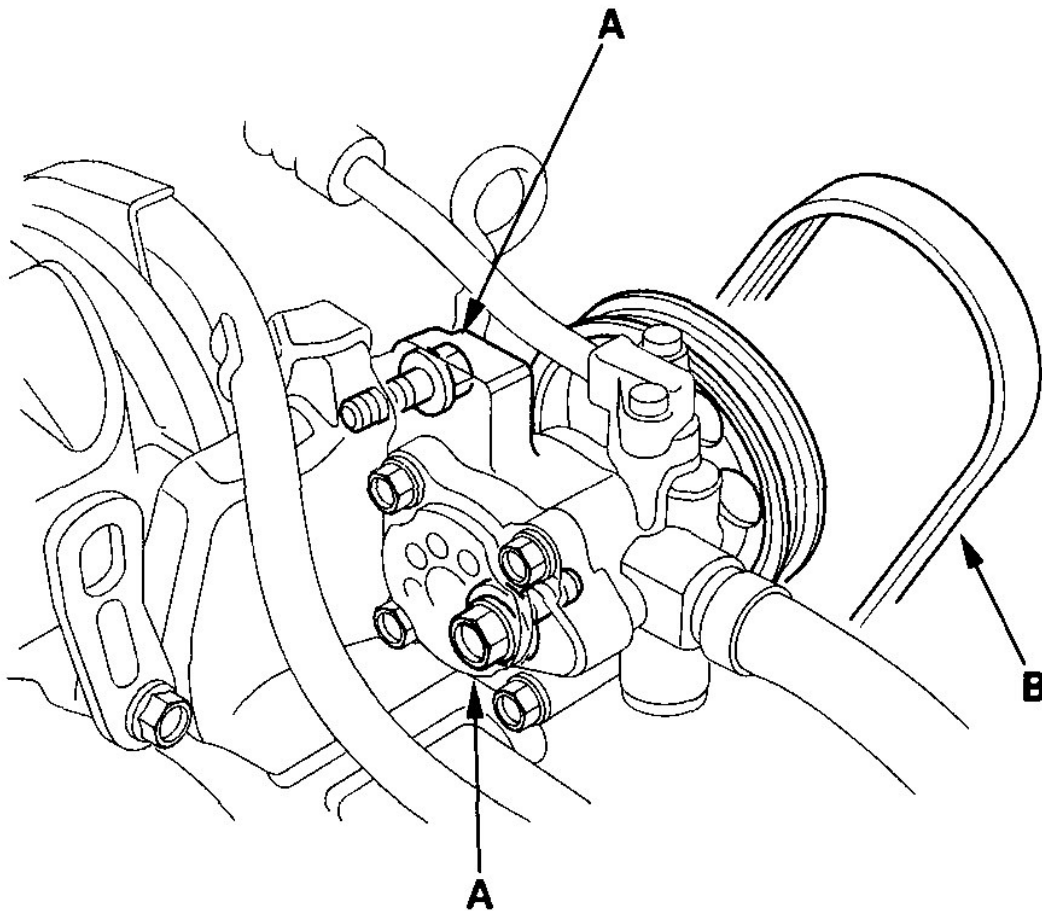


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Fig. 111: Removing Splash Shield

Courtesy of AMERICAN HONDA MOTOR CO., INC.

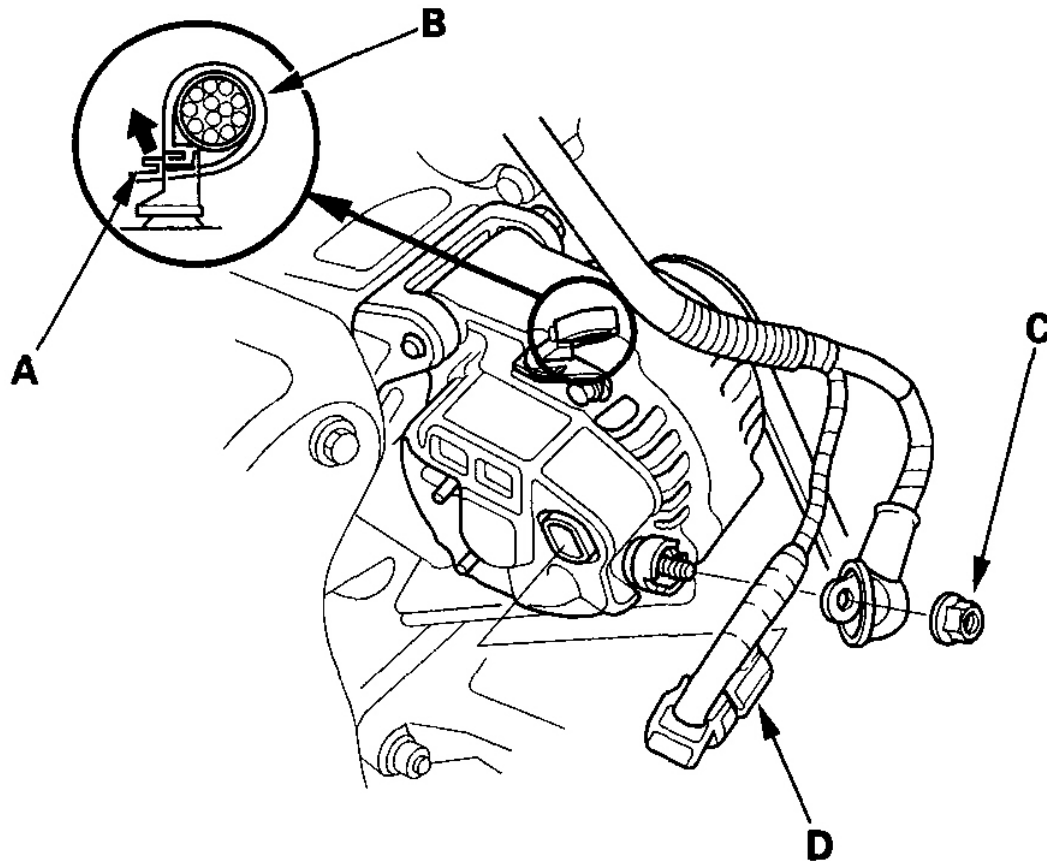
6. Loosen the mounting bolts (A), then remove the P/S belt (B).



G02556967

Fig. 112: Loosening Mounting Bolts & Removing P/S Belt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

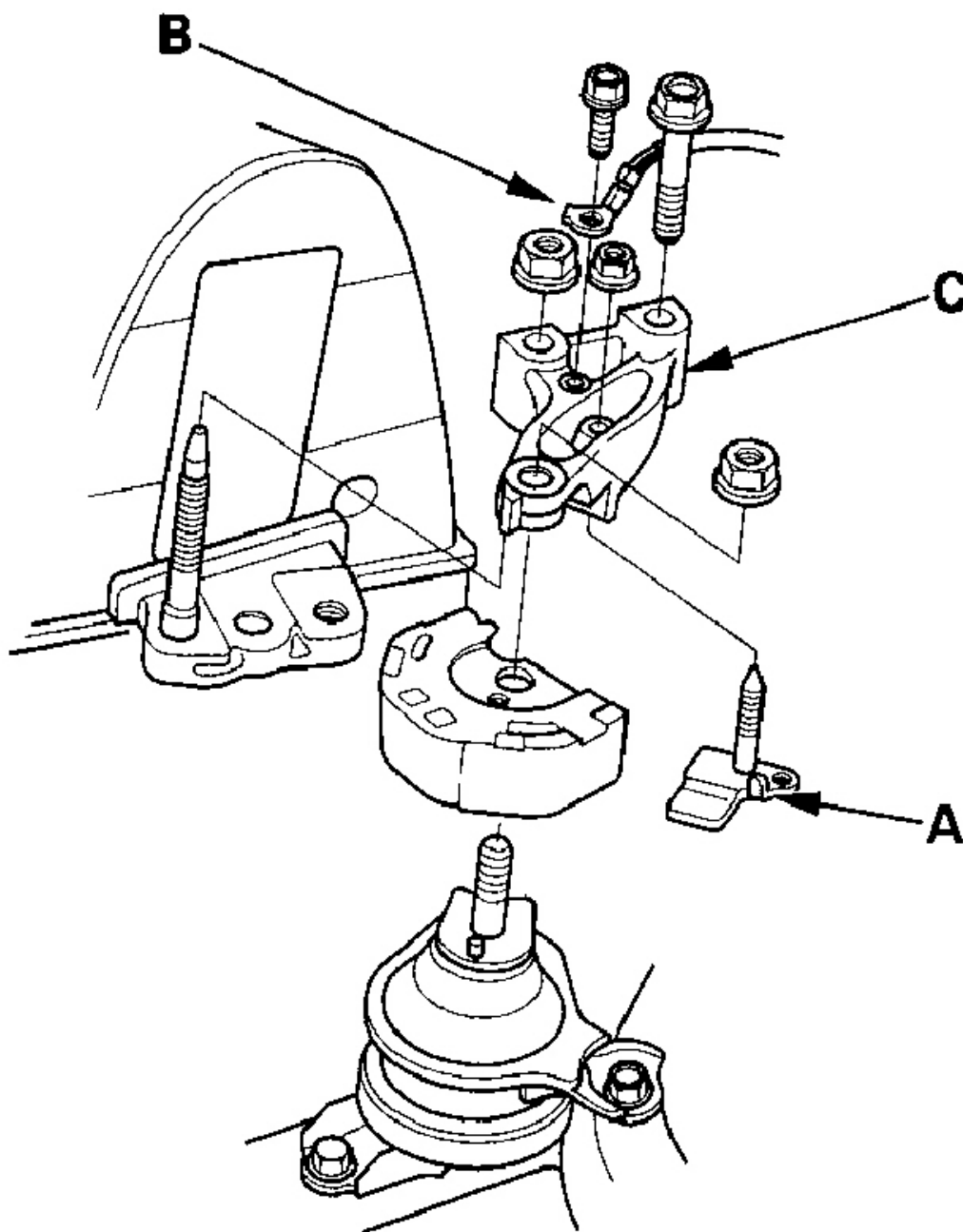
7. Disconnect the alternator wire harness.
 - A. Pull up the lock (A), then release the wire harness tie (B).
 - B. Pull back the boot and remove the 6 mm nut (C).
 - C. Disconnect the connector (D) from the alternator.



G02556968

Fig. 113: Disconnecting Alternator Wire Harness
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Remove the alternator (see **GENERATORS & REGULATORS**).
9. Remove the alternator bracket (see **Engine Installation**).
10. Support the engine with a jack and wood block under the oil pan.
11. Remove the stopper (A) and ground cable (B), then remove the upper bracket (C).

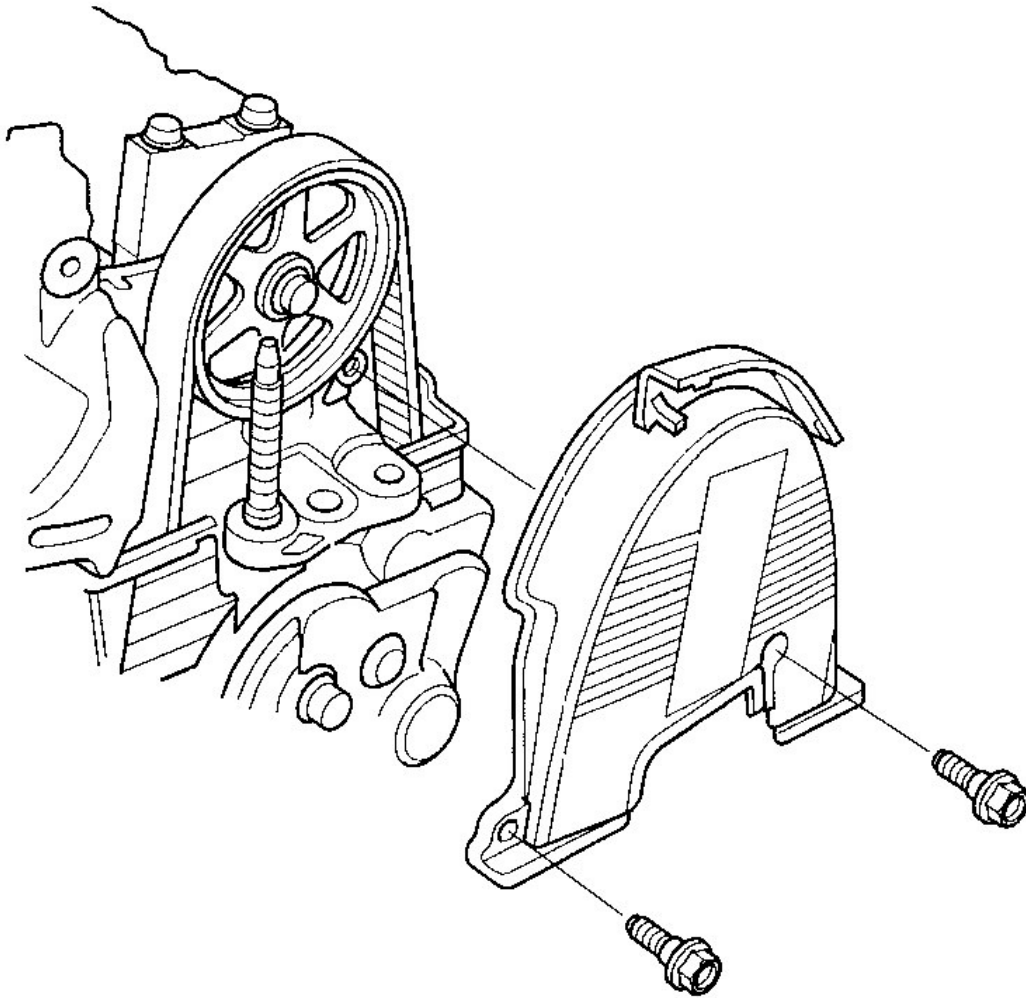


G02556969

Fig. 114: Removing Upper Bracket

Courtesy of AMERICAN HONDA MOTOR CO., INC.

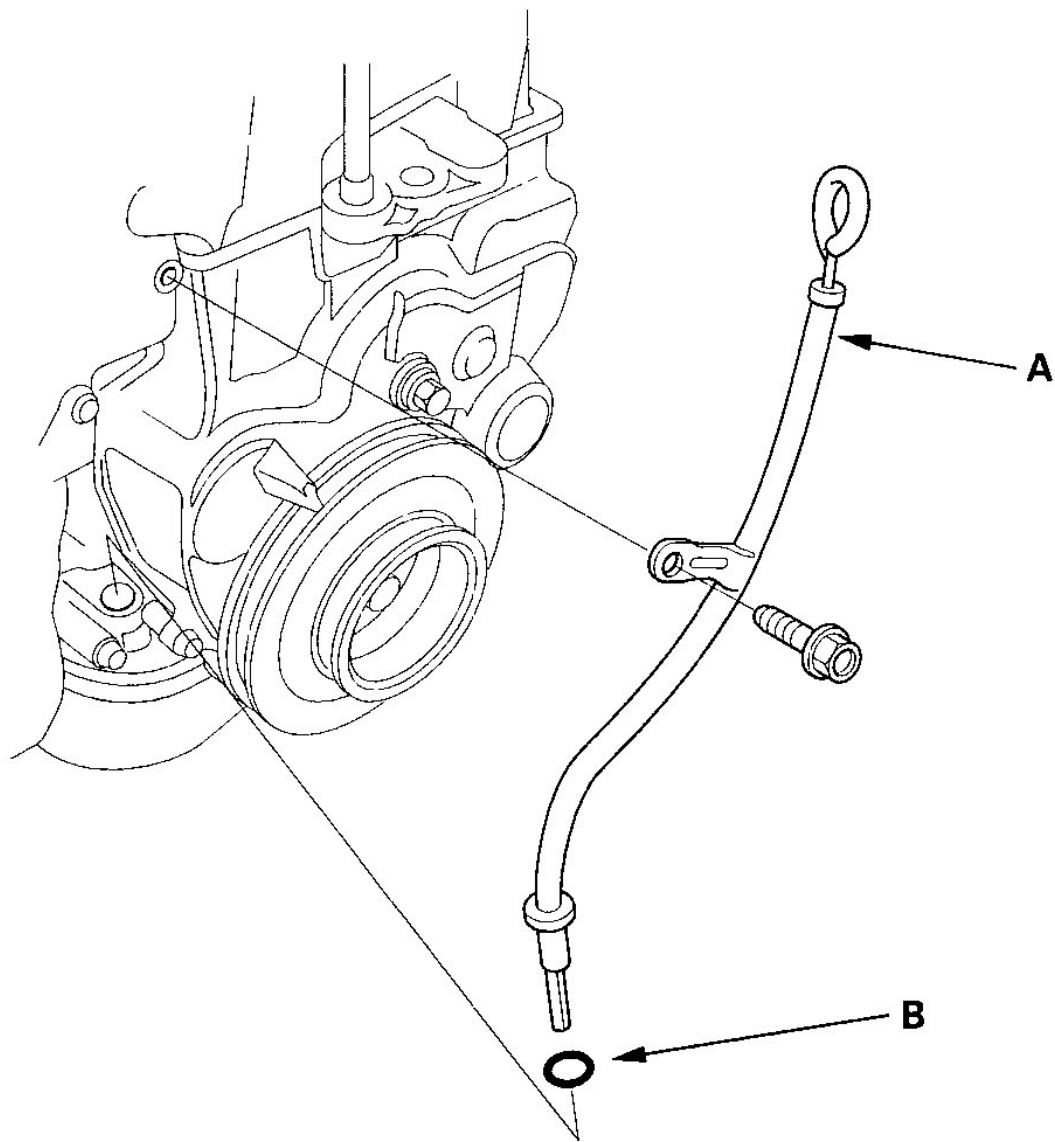
12. Remove the cylinder head cover.
13. Remove the upper cover.



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Fig. 115: Removing Upper Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. Remove the dipstick and tube (A). Discard the O-ring (B).

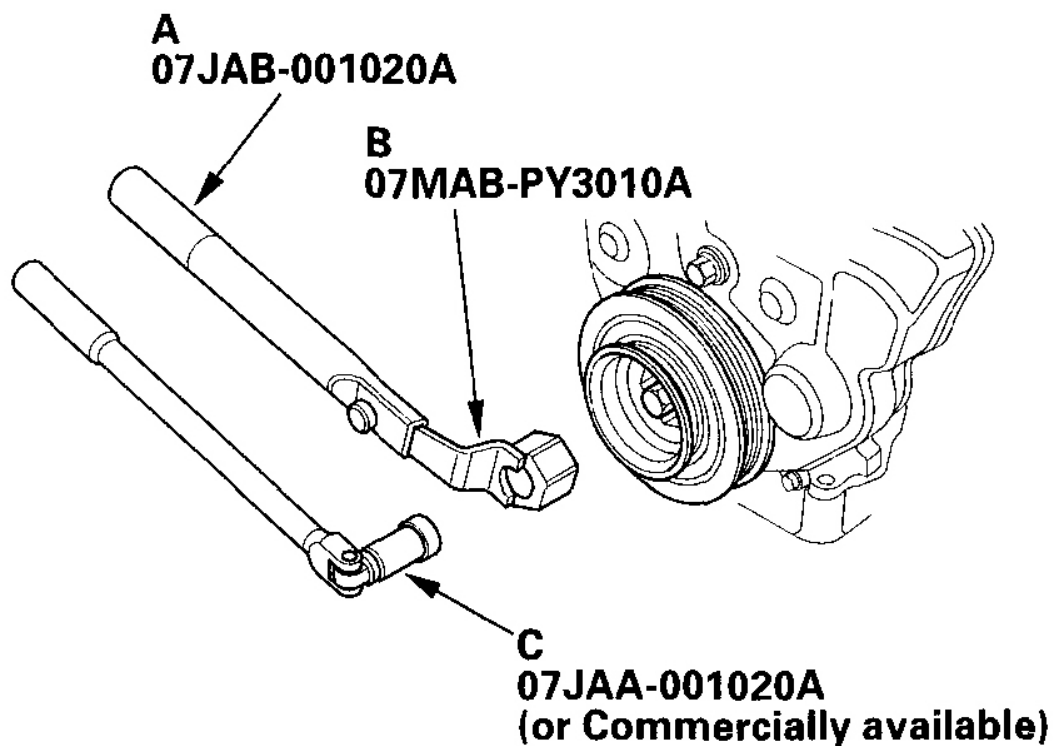


G02556971

Fig. 116: Removing Dipstick & Tube

Courtesy of AMERICAN HONDA MOTOR CO., INC.

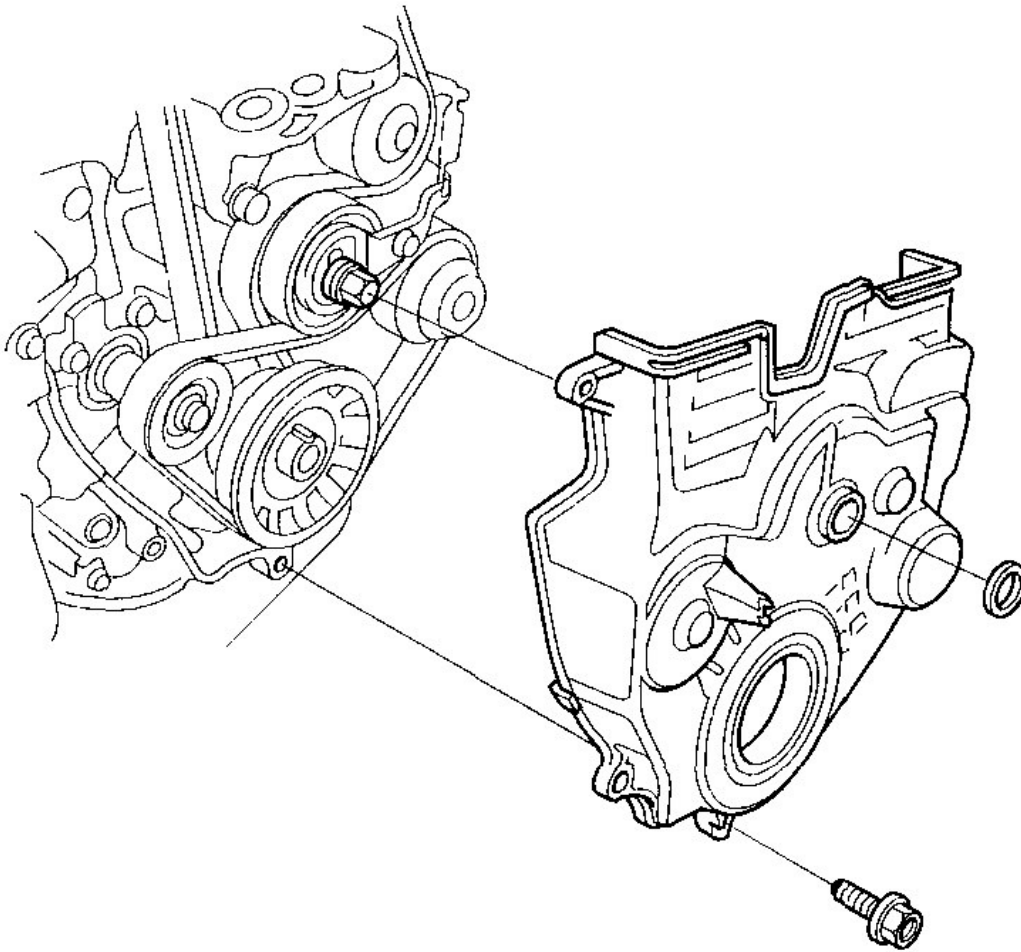
15. Hold the pulley with holder handle (A) and holder attachment (B).



G02556972

Fig. 117: Holding Pulley With Holder Handle & Holder Attachment
Courtesy of AMERICAN HONDA MOTOR CO., INC.

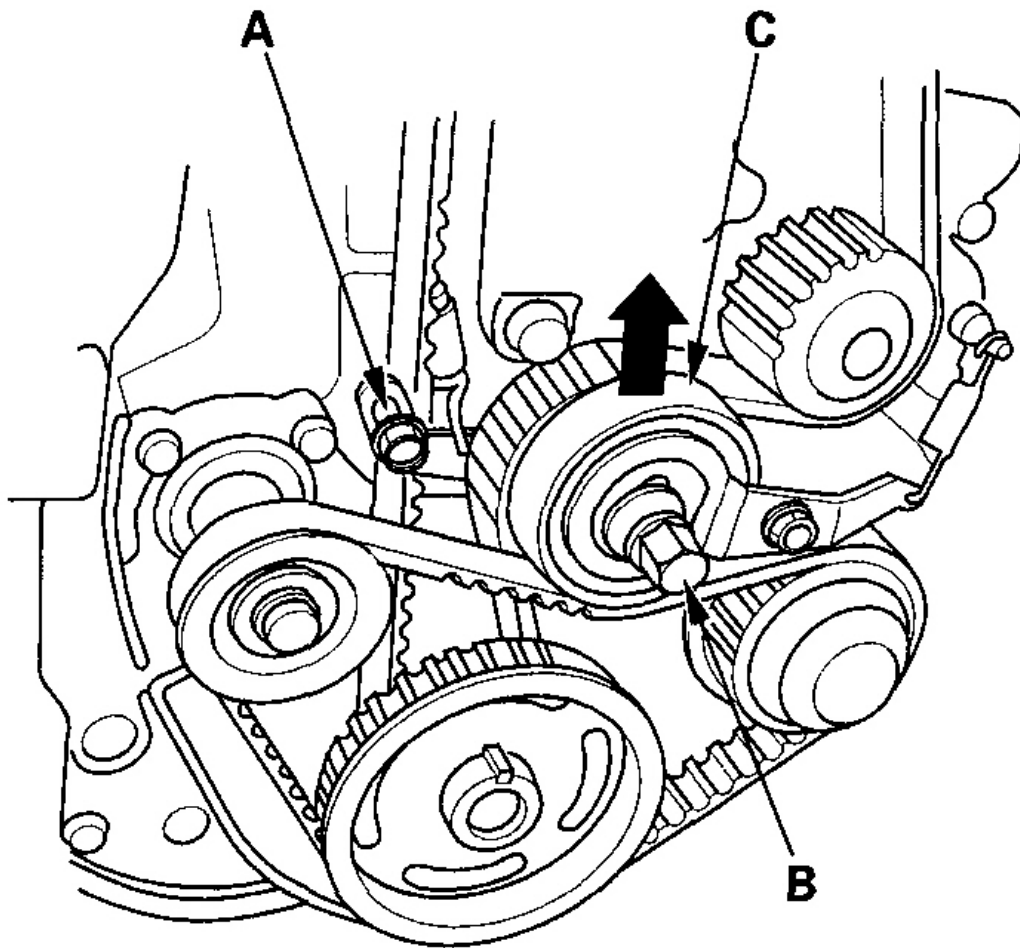
16. Remove the bolt with a heavy duty 19 mm socket (C) and breaker bar.
17. Remove the rubber seal from the adjusting nut, then remove the lower cover.



G02556973

Fig. 118: Removing Rubber Seal From Adjusting Nut & Removing Lower Cover
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

18. If you are removing only the balancer belt, go to step 19. If you are removing both the balancer belt and the timing belt, go to step 20 .
19. Release tension from the balancer belt:
 - A. Install a 6 mm bolt (A) (from the timing cover) through the hole in the end of the timing belt adjuster arm to temporarily lock the arm in place.
 - B. Loosen the adjusting nut (B) 2/3-1 turn.
 - C. Push the tensioner (C) up to take tension off the balancer belt.
 - D. Retighten the adjusting nut (B).



G02556974

Fig. 119: Releasing Tension From Balancer Belt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

20. Release tension from the balancer belt and the timing belt:
- A. Loosen the adjusting nut (A) 2/3-1 turn.
 - B. Push the balancer belt tensioner (B) up to take tension off the balancer belt.
 - C. Push the timing belt tensioner (C) down to take tension off the timing belt.
 - D. Retighten the adjusting nut (A).

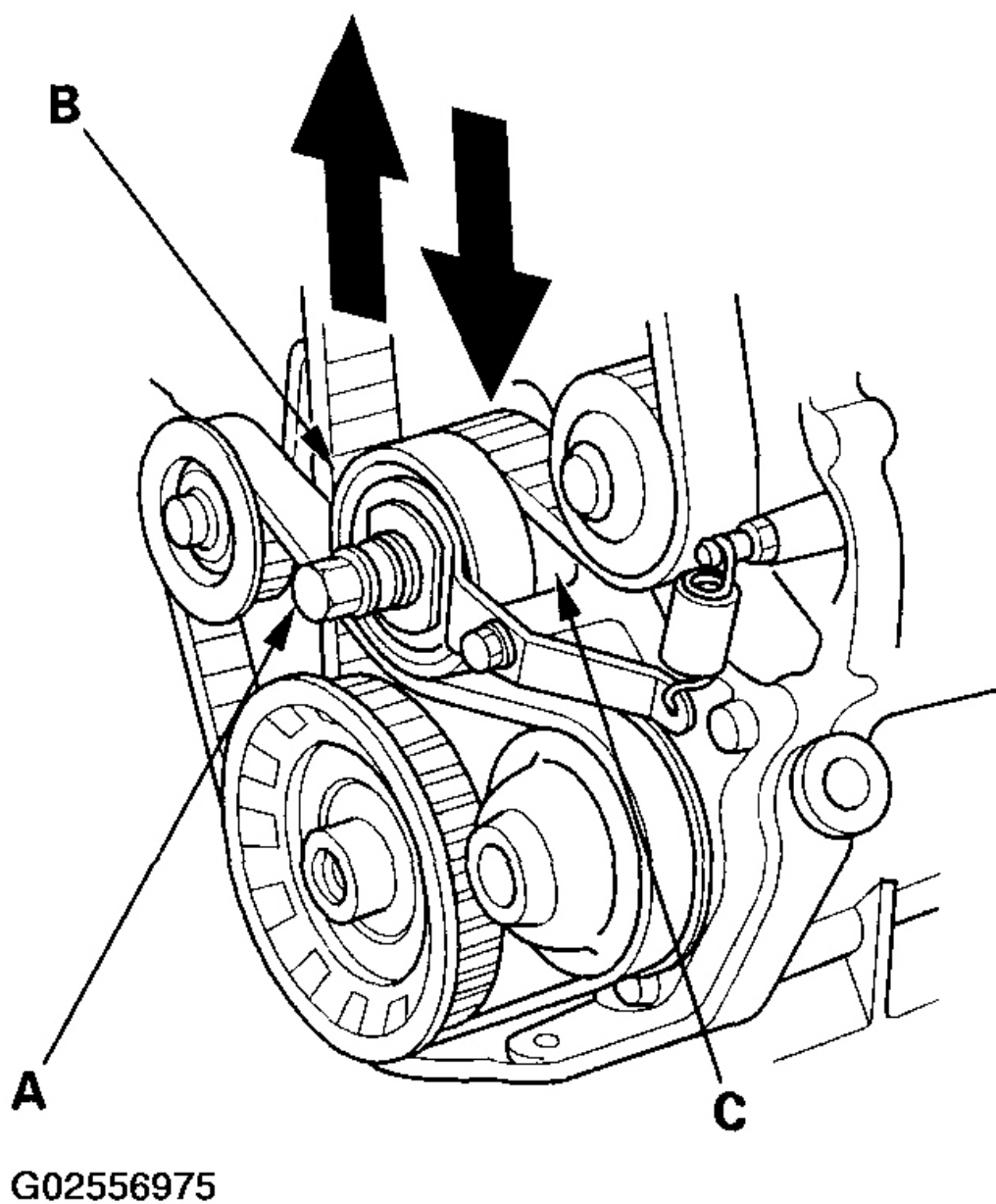


Fig. 120: Releasing Tension From Balancer Belt & Timing Belt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

21. Remove the balancer belt.
22. Remove the timing belt.

TIMING BELT & BALANCER BELT INSTALLATION

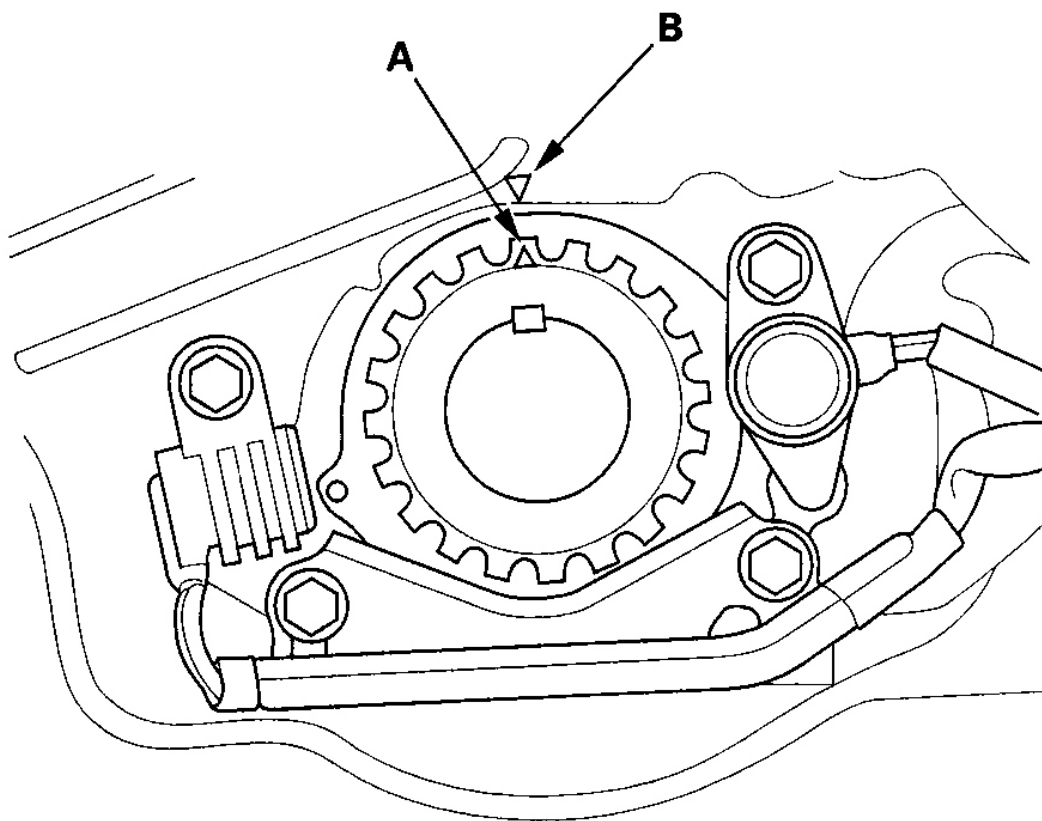
Special Tools Required

- Holder Handle 07JAB-001020A
- 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 timing belt and the balancer belt, go to step 1 .
- If you are installing only the balancer belt, go to step 7 .

1. Remove and clean the balancer belt drive pulley.
2. Clean the timing belt pulleys, and the upper and lower timing cover.
3. Set the crankshaft to TDC. Align the dimple (A) on the tooth of the timing belt drive pulley with the pointer (B) on the oil pump.



G02556976

Fig. 121: Aligning Dimple On Tooth Of Timing Belt Pulley With Pointer
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

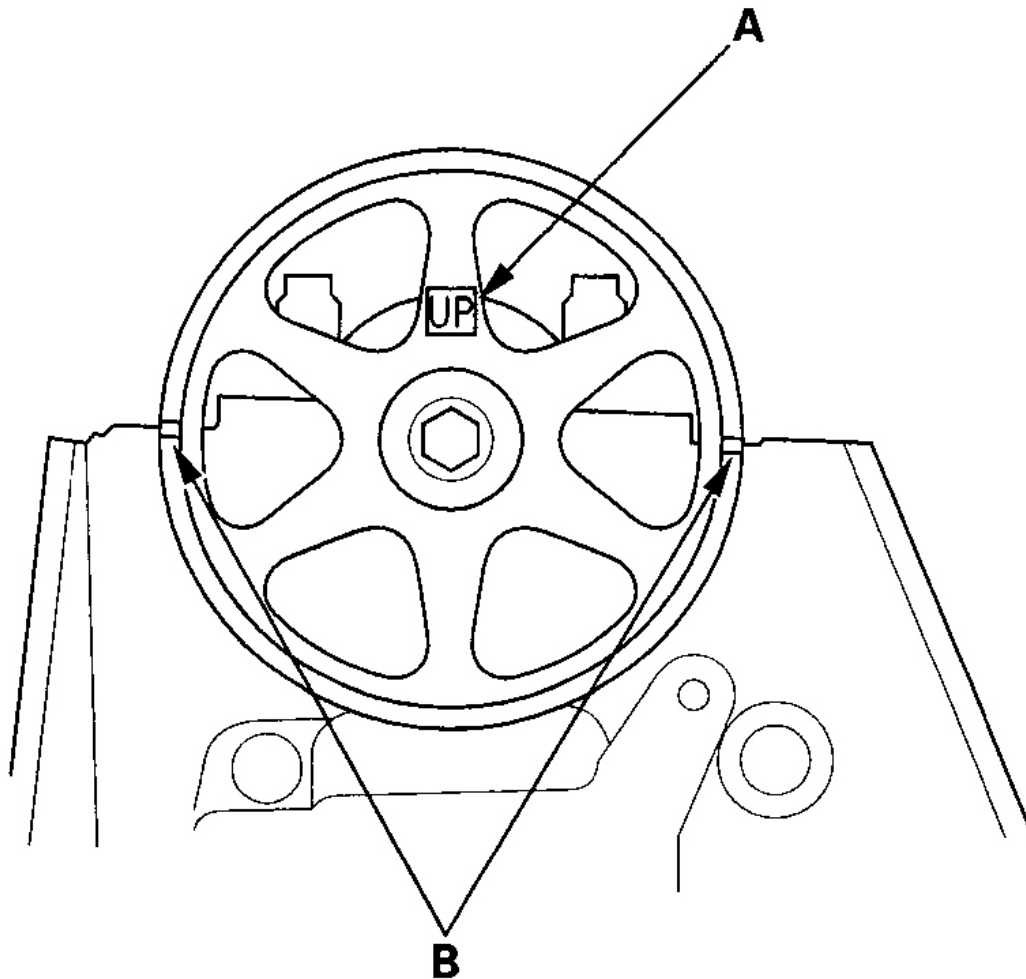
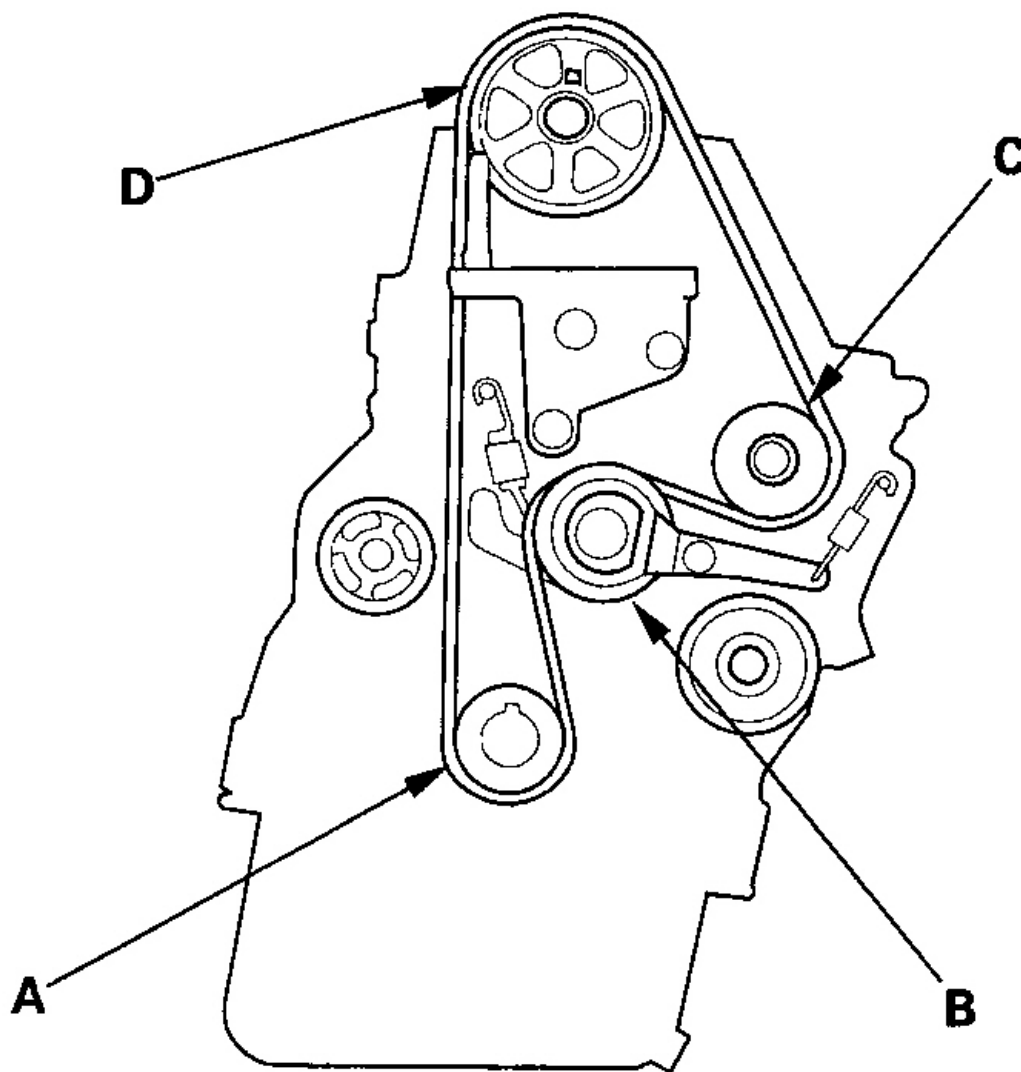
**G02556977**

Fig. 122: Setting Camshaft Pulley To TDC
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Install the timing belt in a counterclockwise sequence, starting with the drive pulley.
 - A. Drive pulley (A).
 - B. Tensioner pulley (B).
 - C. Water pump pulley (C).

D. Camshaft pulley (D).



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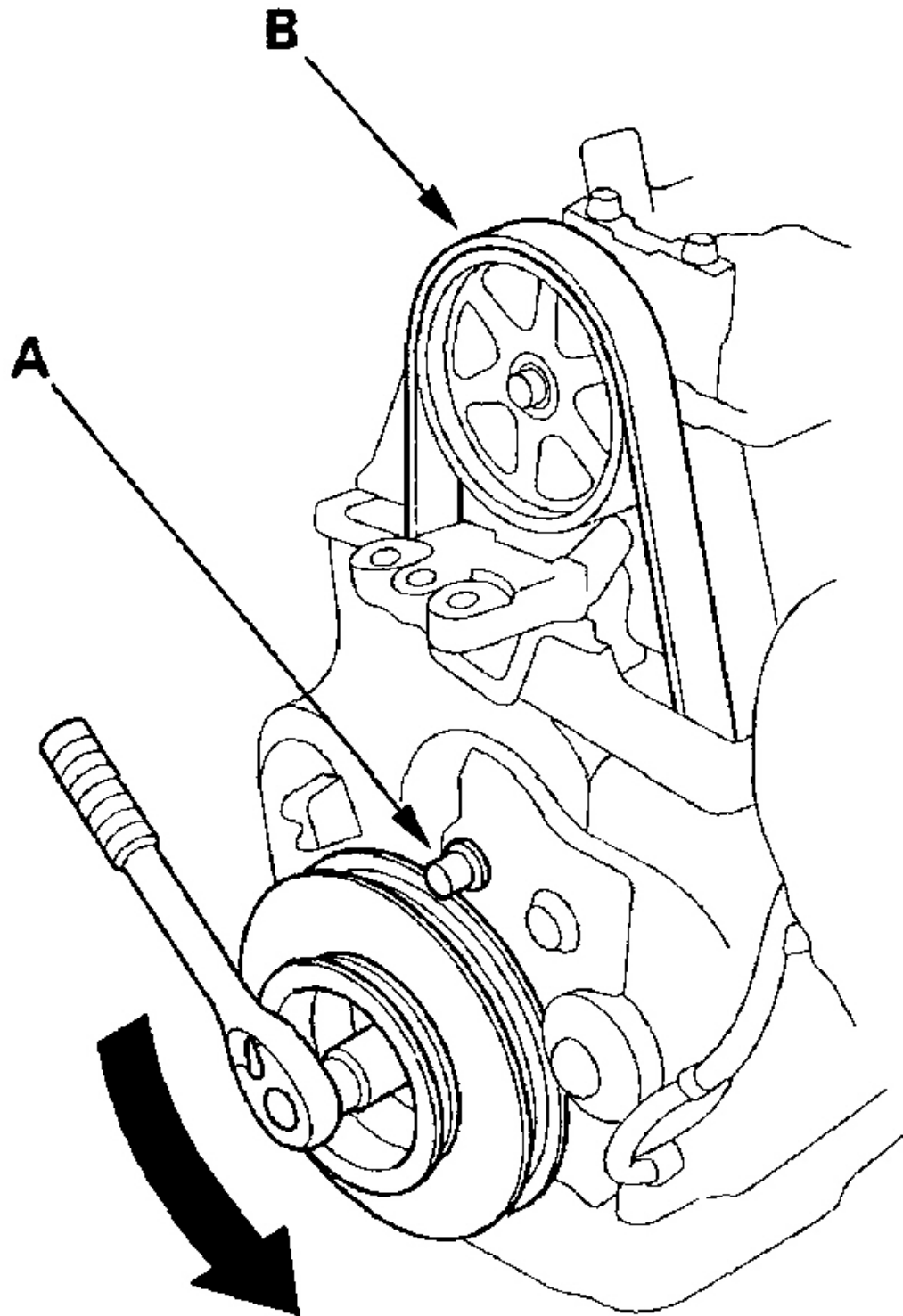
Fig. 123: Installing Timing Belt In Counterclockwise Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Loosen and retighten the adjusting nut to tension the timing belt.
7. Clean any oil off both faces of the balancer belt drive pulley.
8. Check the lower cover rubber seal for cracks and other damage.

NOTE:

- If the rubber seal is coming off, apply liquid gasket to the lower cover and reinstall the rubber seal. Wipe off any liquid gasket that is pressed out.
- When replacing the rubber seal, clean the lower cover groove, cut the repair rubber seal to length, and put the rubber seal into the groove evenly.

9. Install the balancer belt drive pulley and the lower cover.
10. Temporary install the crankshaft pulley and bolt.
11. Rotate the crankshaft pulley five or six turns counterclockwise to seat the timing belt on the pulleys.
12. Adjust the belt tension.
 - A. Loosen the adjusting nut (A) 2/3 1 turn.
 - B. Rotate the crankshaft counterclockwise three teeth on the camshaft pulley (B).
 - C. Tighten the adjusting nut to 44 N.m (4.5 kgf.m, 33 lbf-Ft).

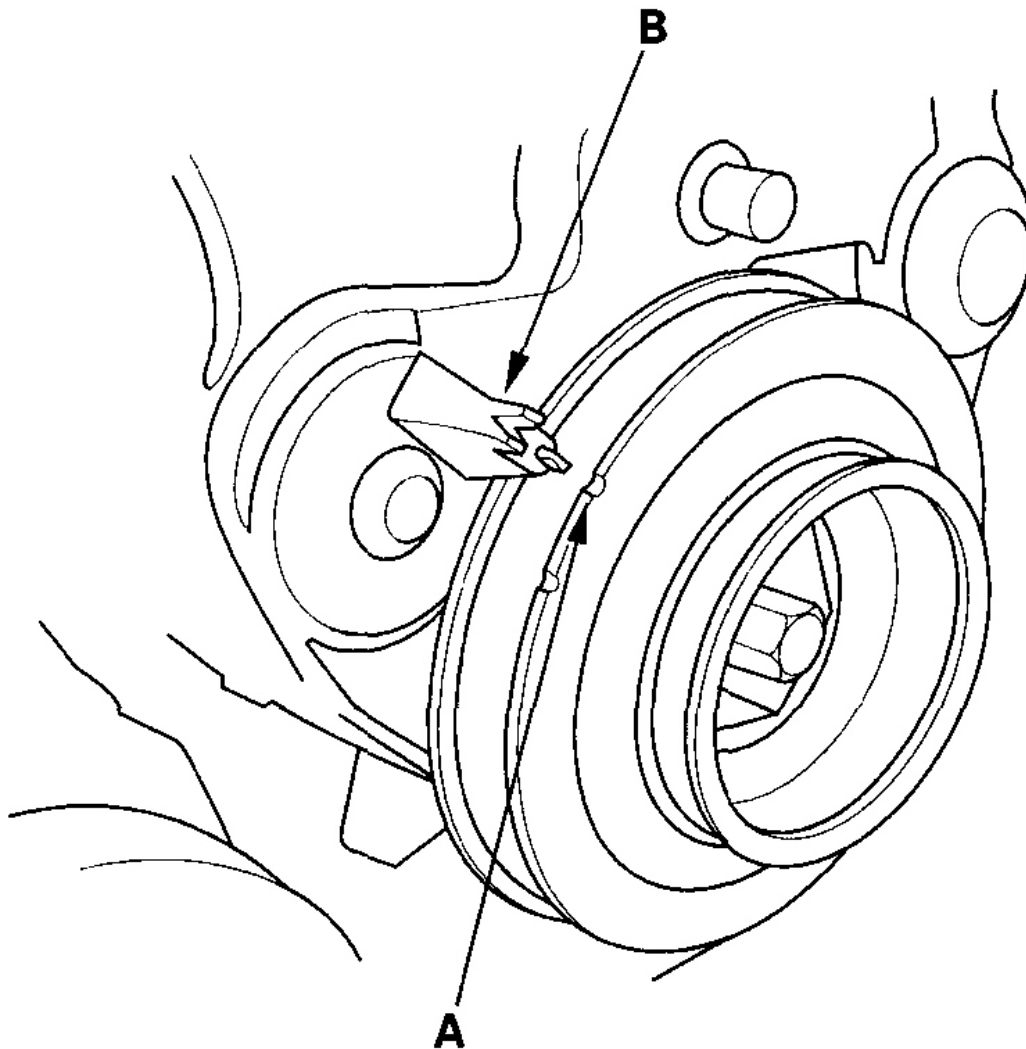


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Fig. 124: Adjusting Belt Tension

Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Turn the crankshaft pulley so its TDC mark (A) lines up with the pointer (B).



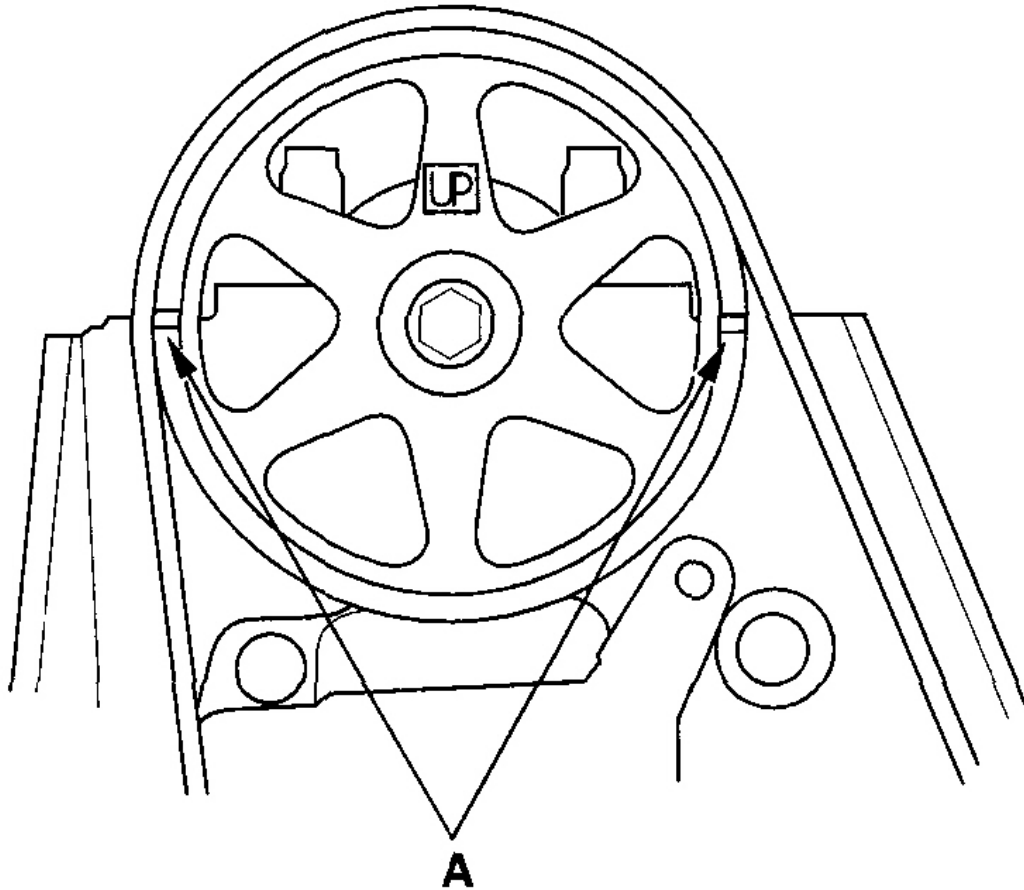
G02556980

Fig. 125: Turning Crankshaft Pulley So TDC Mark Lines Up With Pointer

Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. Check the camshaft pulley marks.
- 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 3 through 5 .



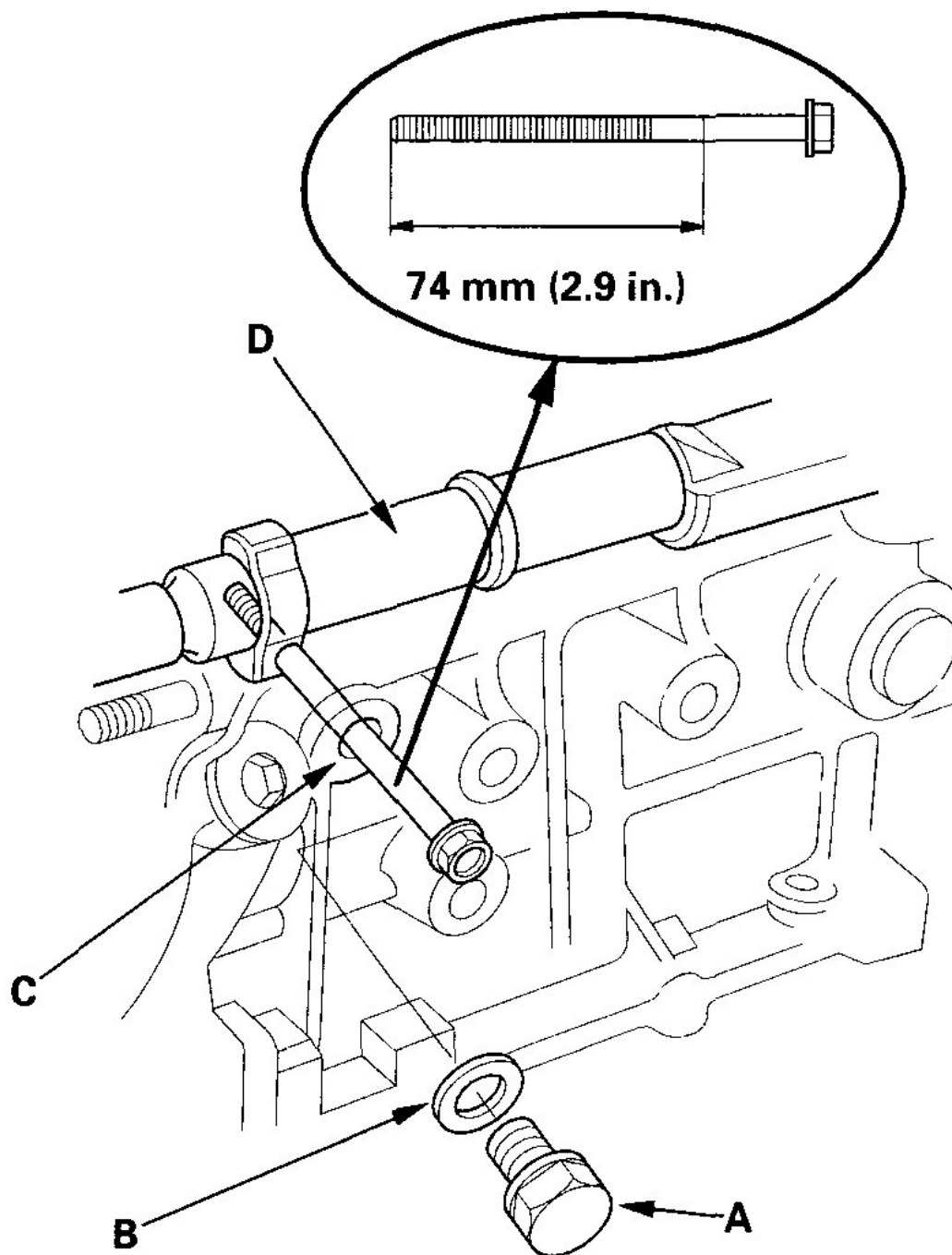
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Fig. 126: Checking Camshaft Pulley Marks

Courtesy of AMERICAN HONDA MOTOR CO., INC.

15. Remove the crankshaft pulley and the lower cover.
16. Turn the crankshaft to TDC again.
17. Lock the timing belt adjuster arm in place with one of the 6 mm timing cover bolts.
18. Loosen the adjusting nut $\frac{2}{3}$ - 1 turn, and make sure the balancer belt tensioner moves freely. Then push the tensioner up and retighten the adjusting nut.
19. Align the rear balancer shaft pulley with a 6 x 100 mm bolt (or equivalent).
 - A. Remove the bolt (A) and washer (B) from the maintenance hole (C).
 - B. Scribe a line on a 6 x 100 mm bolt, 74 mm (2.9 in) from the end.

- C. Insert the bolt in the maintenance hole and into the hole in the balancer shaft (D) up to the line you scribed.

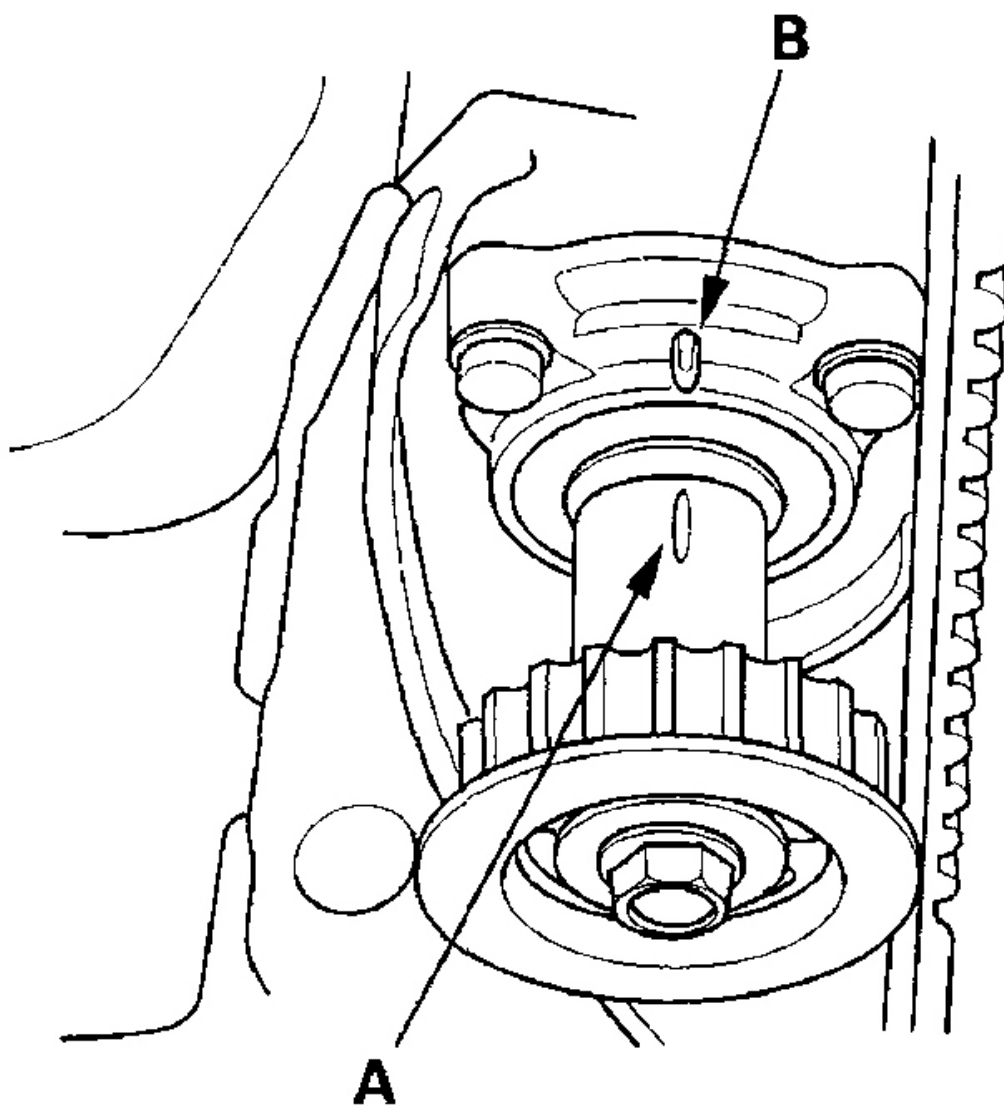


G02556982

Fig. 127: Aligning Rear Balancer Shaft Pulley

Courtesy of AMERICAN HONDA MOTOR CO., INC.

20. Align the groove (A) on the front balancer shaft with the pointer (B) on the oil pump housing as shown.



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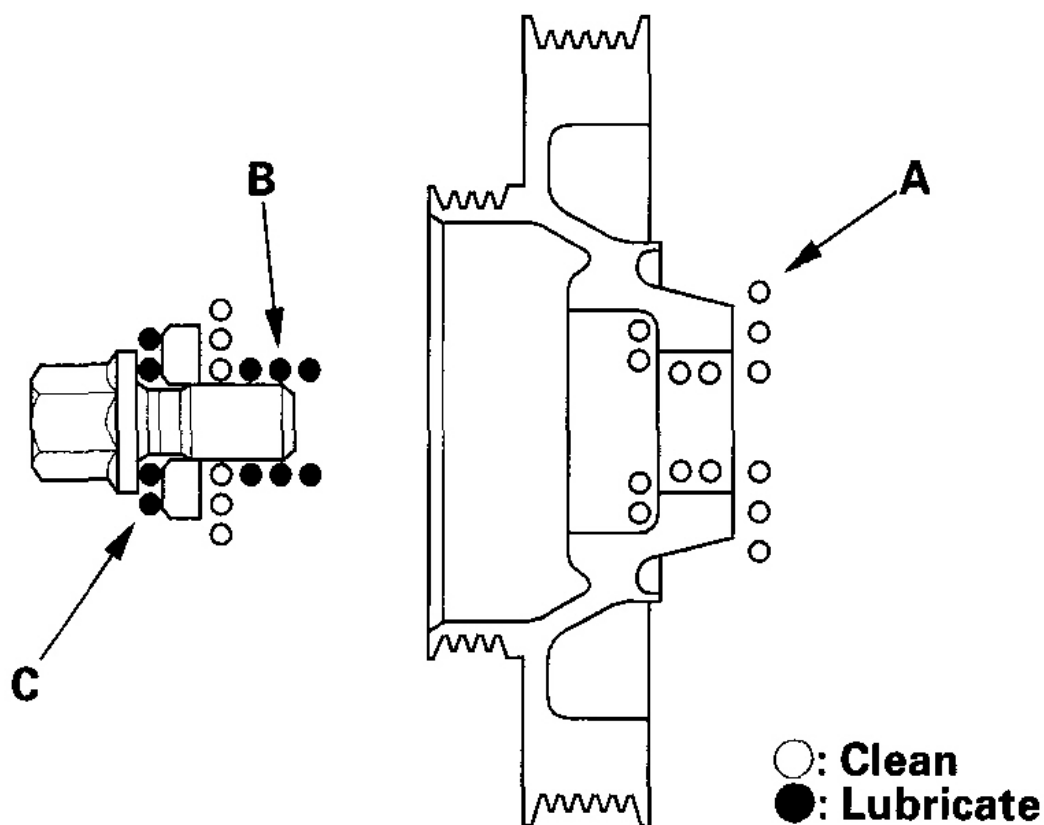
Fig. 128: Aligning Groove On Front Balancer Shaft With Pointer On Oil Pump Housing
Courtesy of AMERICAN HONDA MOTOR CO., INC.

21. Install the balancer belt. Loosen the adjusting nut 2/3-1 turn to tension the balancer belt. Retighten the bolt.
22. Remove the 6 x 100 mm bolt from the maintenance hole and reinstall the sealing bolt. Tighten the bolt to 29 N.m (3.0 kgf.m, 22 lb-Ft).
23. Adjust the balancer belt.
 - A. Temporarily reinstall the crankshaft pulley.
 - B. Loosen the adjusting nut 2/3-1 turn.
 - C. Turn the crankshaft pulley 1 turn counterclockwise, then tighten the adjusting nut.
24. Remove the 6 mm bolt from the timing bolt adjuster arm.
25. Check the lower cover rubber seal for cracks and other damage.

NOTE:

- **If the seal is coming off, reattach it with liquid gasket. Wipe off any excess liquid gasket.**
- **When replacing the seal, clean out the groove in the cover, cut the repair strip to length, and press the new piece into the groove.**

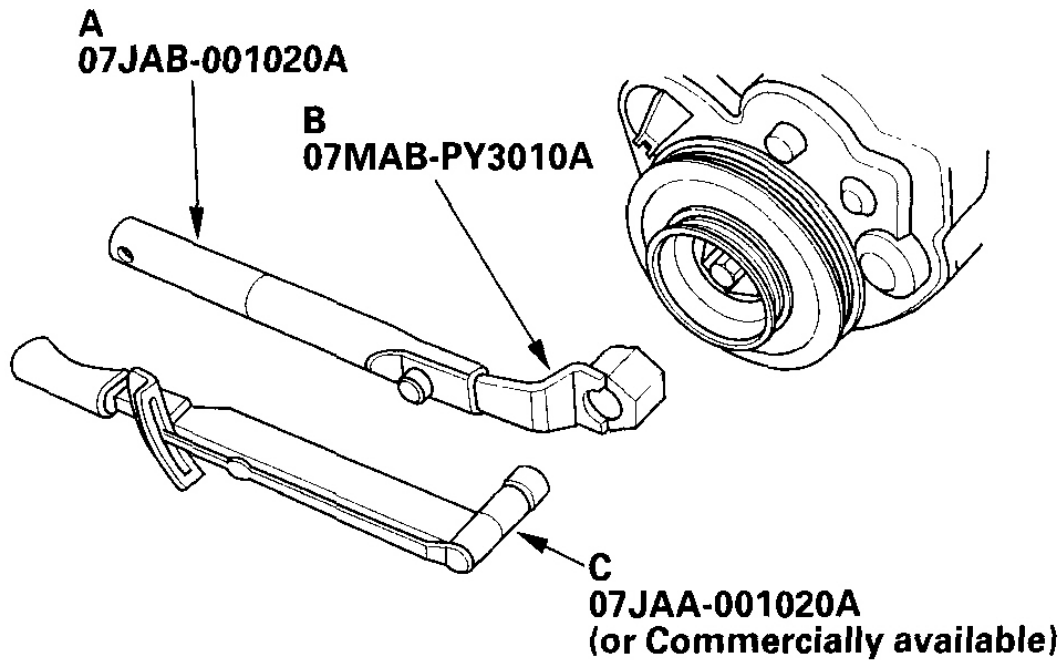
26. Remove the crankshaft pulley and reinstall the lower cover.
27. Install the rubber seal around the adjusting nut.
28. Clean the crankshaft pulley bolt and washer.
29. Clean all oil off the inside face (A) of the crankshaft pulley, and apply lubricant to the pulley bolt (B) and washer (C).



G02556984

Fig. 129: Cleaning & Lubricating Crankshaft Pulley Bolt & Washer
Courtesy of AMERICAN HONDA MOTOR CO., INC.

30. Install the crankshaft pulley, and hold with holder handle (A) and holder attachment (B).



G02556985

Fig. 130: Installing Crankshaft Pulley**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

31. Tighten the bolt to 245 N.m (250 kgf.m, 181 lbf-Ft) with a torque wrench and 19 mm socket (C). Do not use an impact wrench.
32. Install the dipstick and tube (A) with a new O-ring (B).

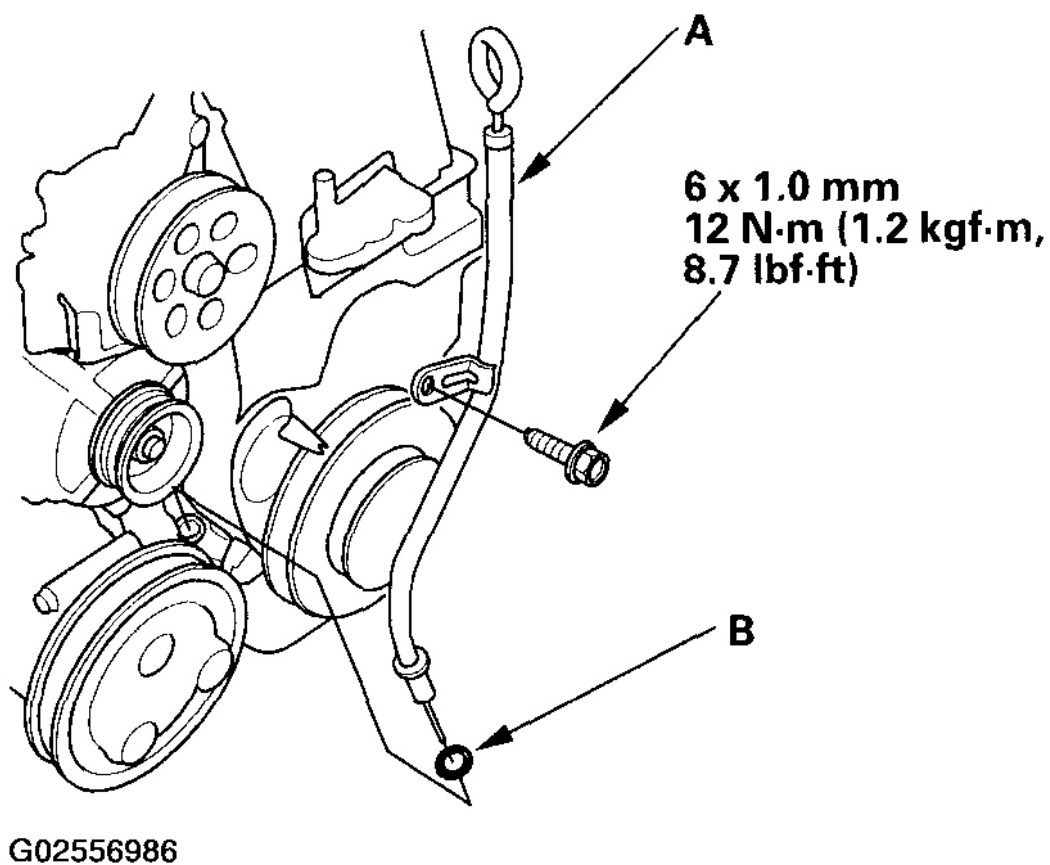
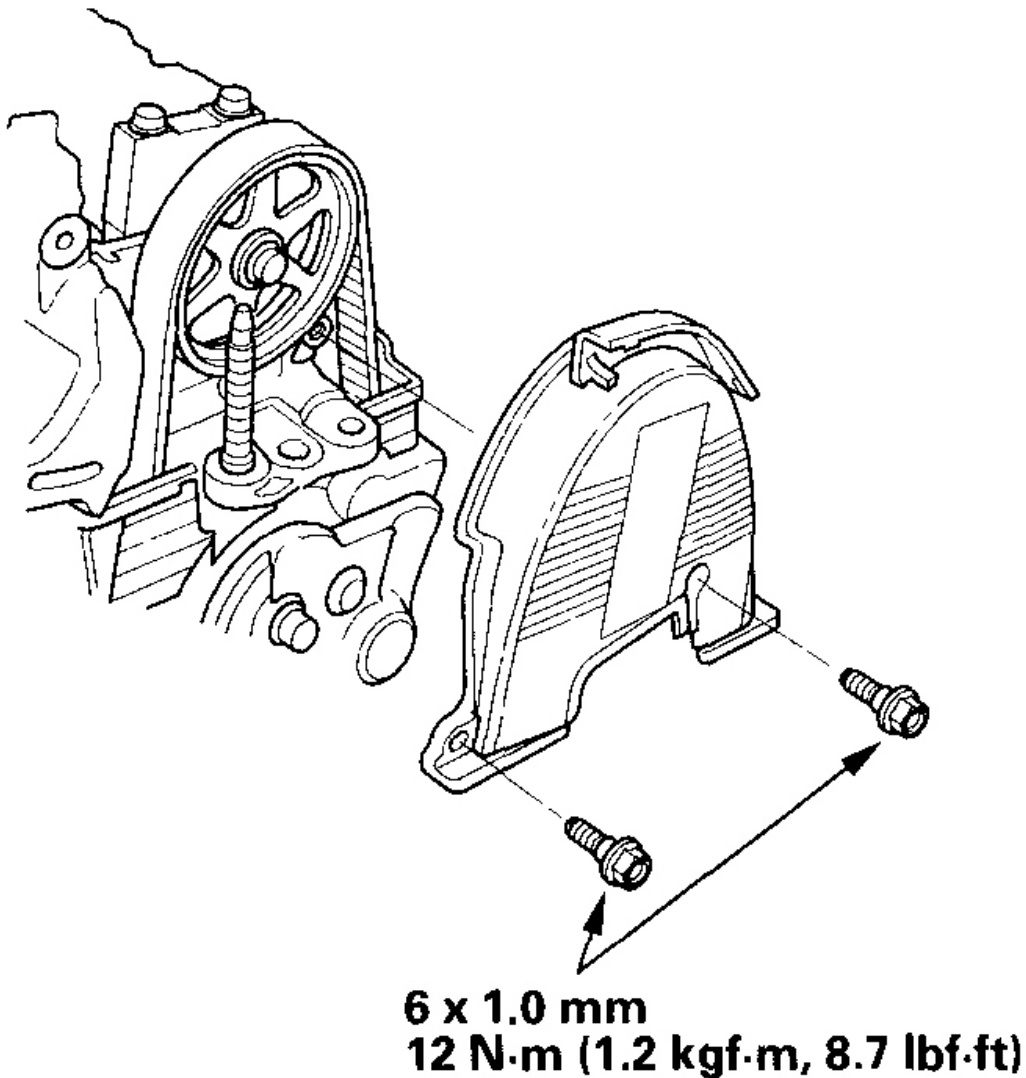


Fig. 131: Installing Dipstick & Tube With New O-Ring
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

33. Install the upper cover.



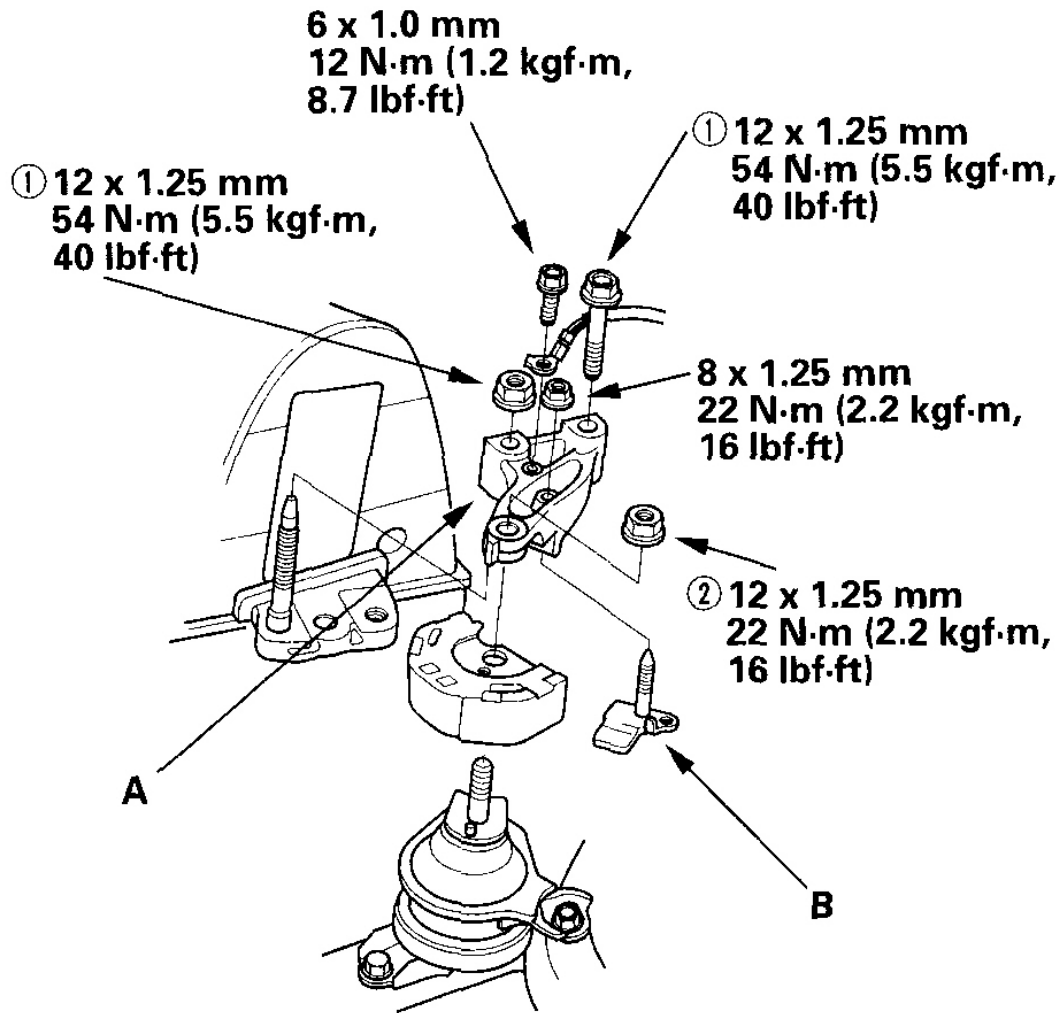
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Fig. 132: Installing Upper Cover

Courtesy of AMERICAN HONDA MOTOR CO., INC.

34. Install the cylinder head cover (see **Cylinder Head Cover Installation**).
35. Install the alternator bracket (see **Engine Installation**).
36. Install the alternator (see **GENERATORS & REGULATORS**).
37. Connect the alternator harness.
38. Install and adjust the power steering pump belt (see **PUMP BELTS**).

39. Install and adjust the alternator belt (see **GENERATORS & REGULATORS**).
40. Install the upper bracket (A), then tighten the bolt and nuts in the numbered sequence shown.



G02556988

Fig. 133: Installing Upper Bracket In Sequence
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

41. Install the stop (B).
42. Install the battery. Clean the battery posts and cable terminals with sandpaper, then assemble them and apply grease to prevent corrosion.
43. Enter the anti-theft code for the radio, then enter the customer's radio station presets.

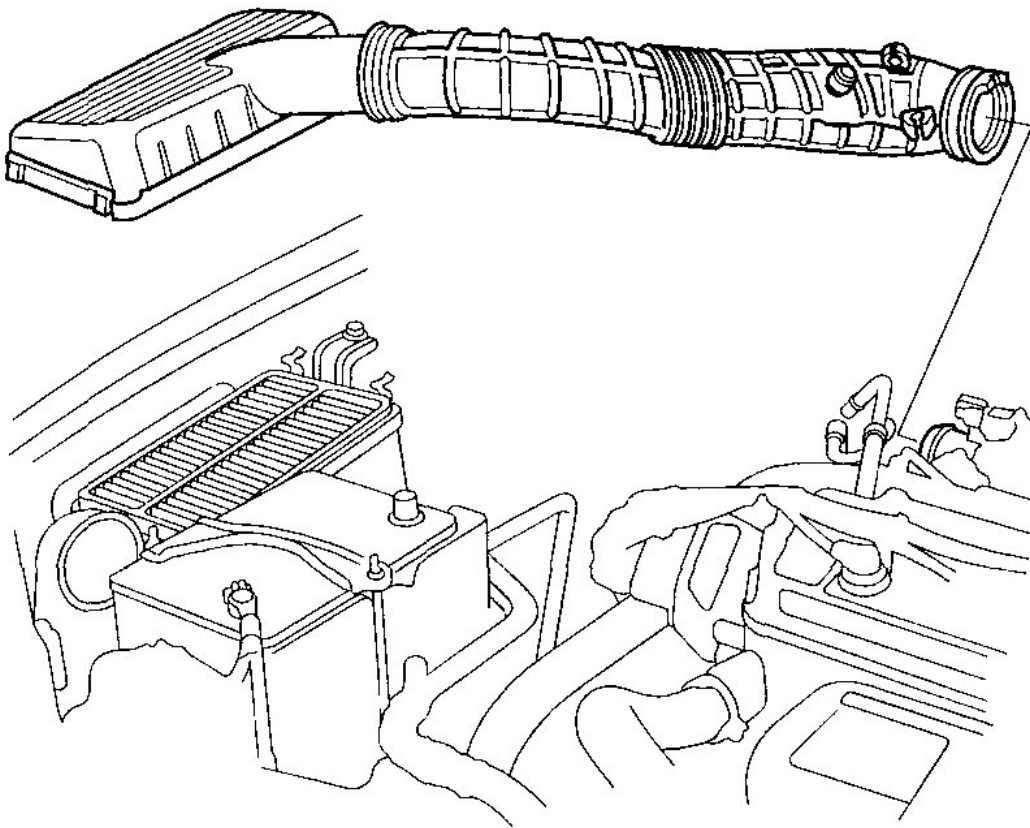
CYLINDER HEAD REMOVAL

Engine removal is not required for this procedure.

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 retaining 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 battery negative terminal.
3. Drain the engine coolant (see **COOLANT REPLACEMENT**).
4. Remove the intake air duct.

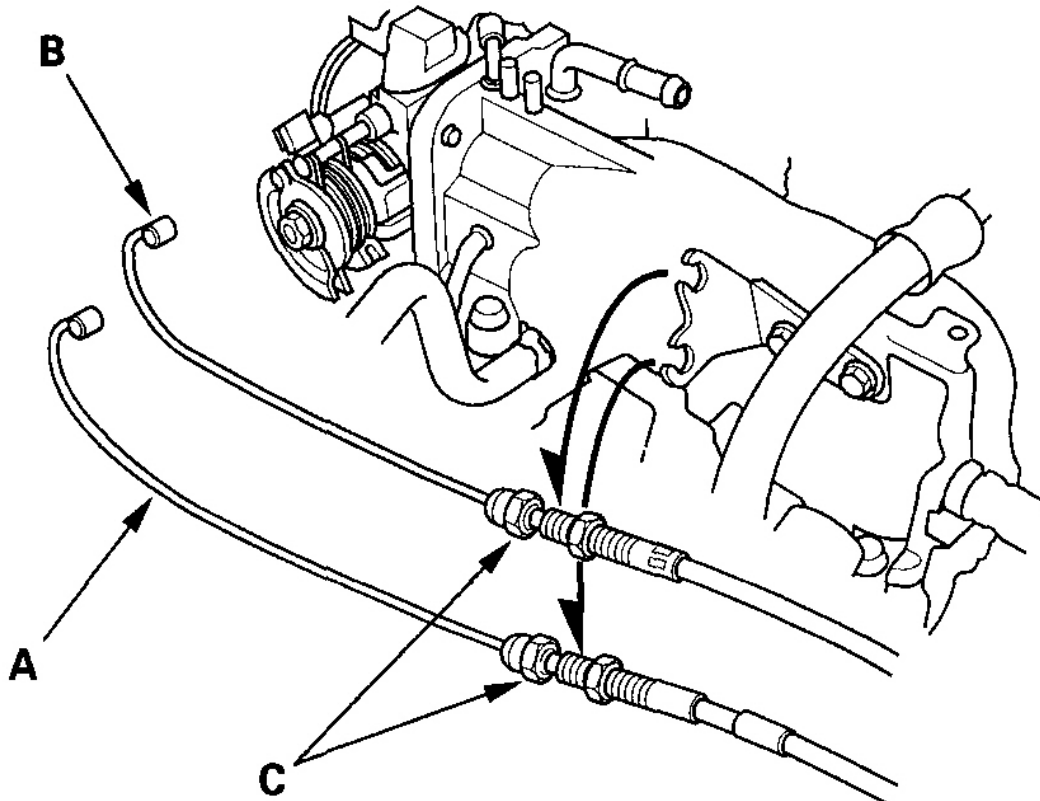


G02556989

Fig. 134: Removing Intake Air Duct

Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

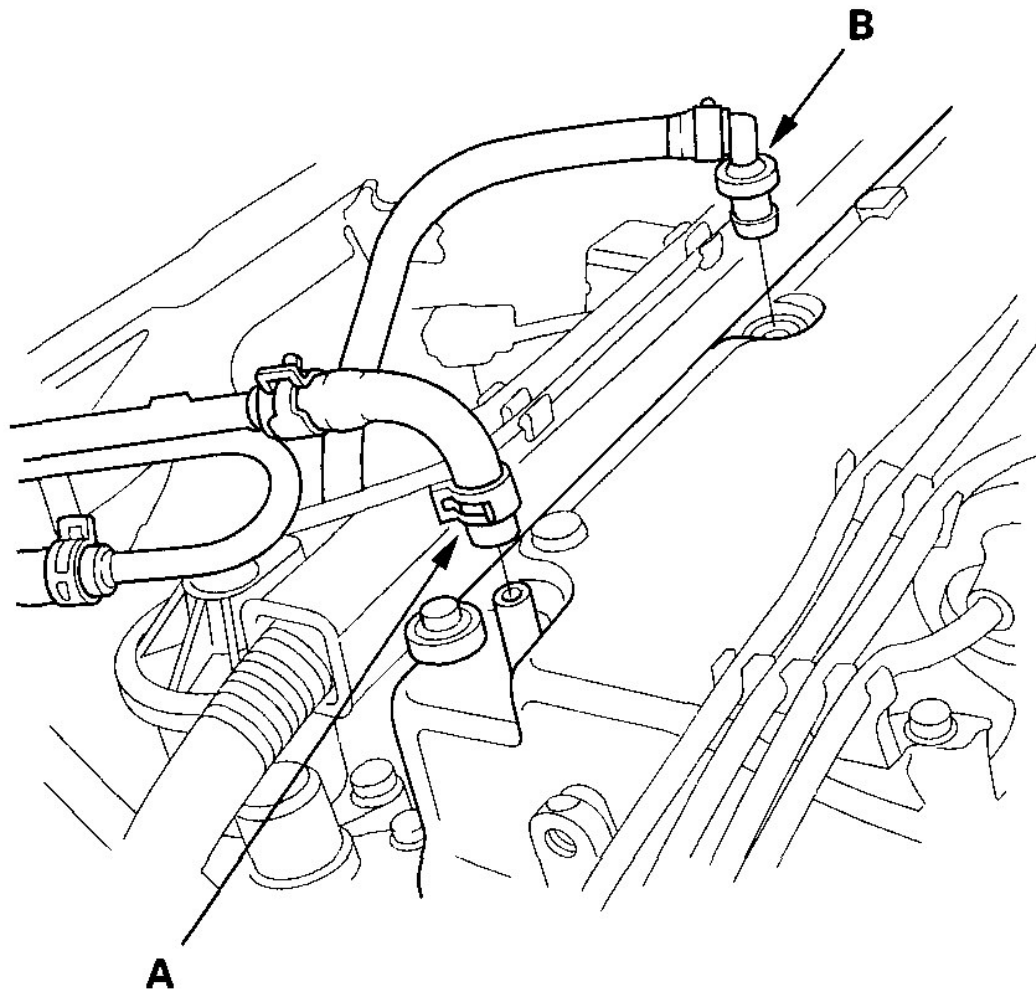


G02556990

Fig. 135: Removing Throttle Cable & Cruise Control Cable

Courtesy of AMERICAN HONDA MOTOR CO., INC.

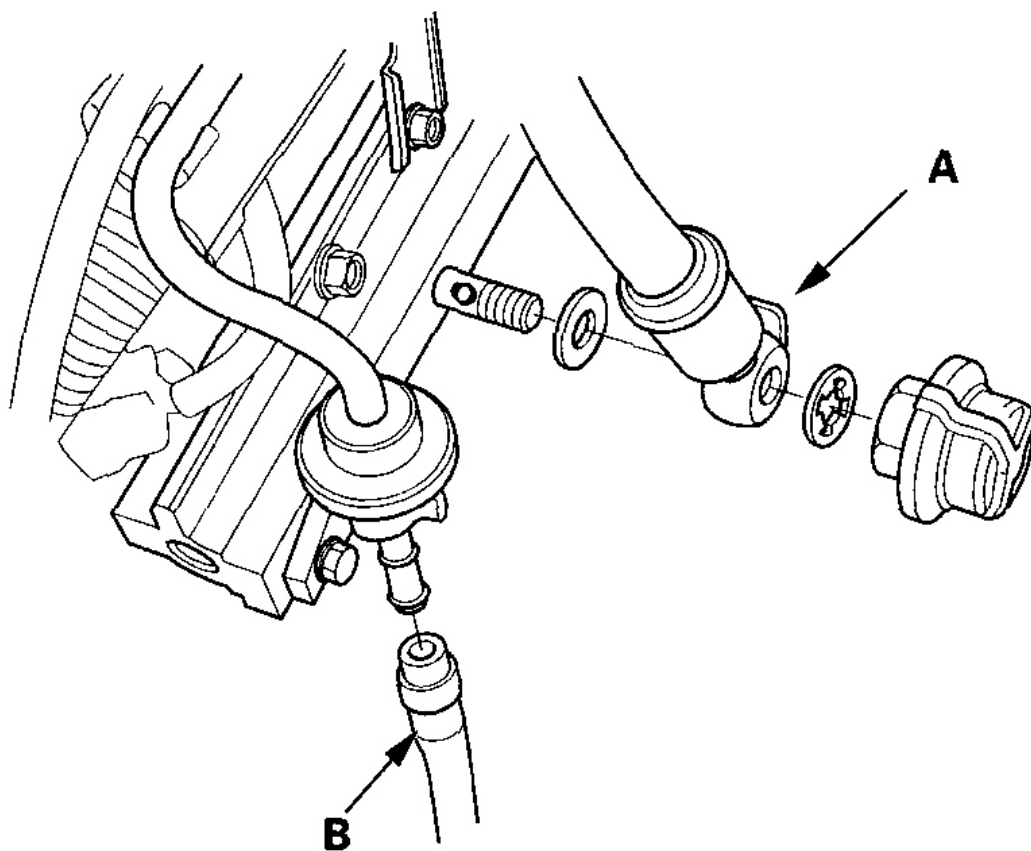
6. Remove the breather hose (A) and Positive Crankcase Ventilation (PCV) hose (B).



G02556991

Fig. 136: Removing Breather Hose & PCV Hose
Courtesy of AMERICAN HONDA MOTOR CO., INC.

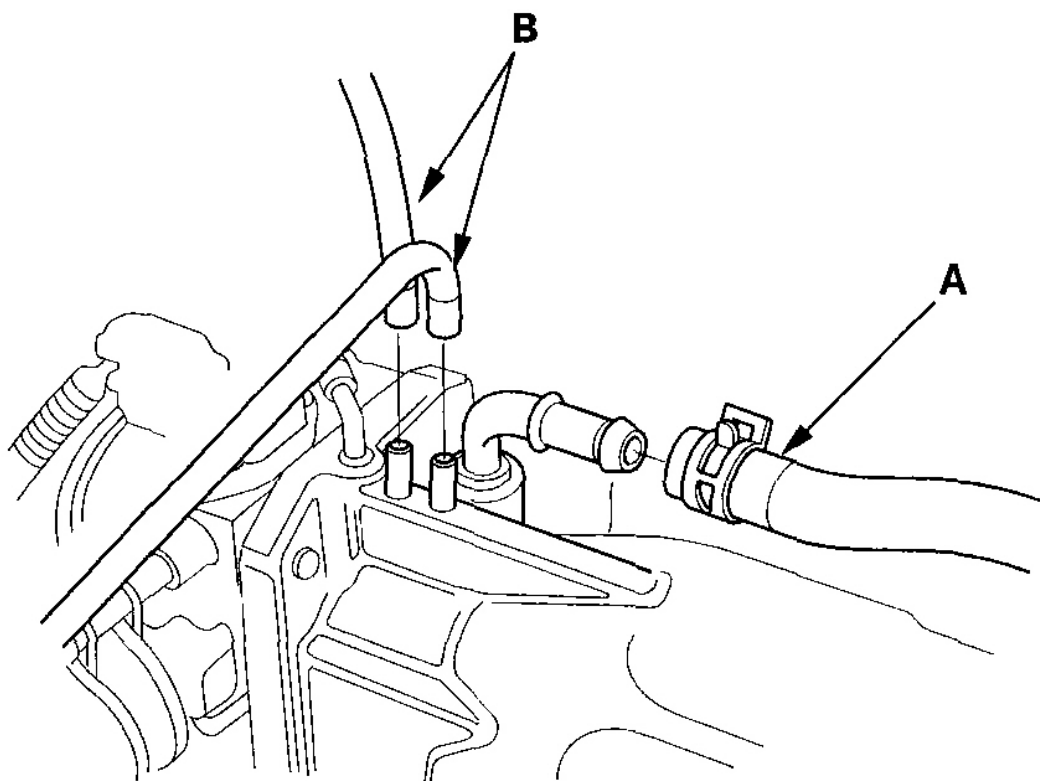
7. Relieve fuel pressure (see **FUEL PRESSURE RELIEVING**).
8. Remove the fuel feed hose (A) and fuel return hose (B).



G02556992

Fig. 137: Removing Fuel Feed Hose & Fuel Return Hose
Courtesy of AMERICAN HONDA MOTOR CO., INC.

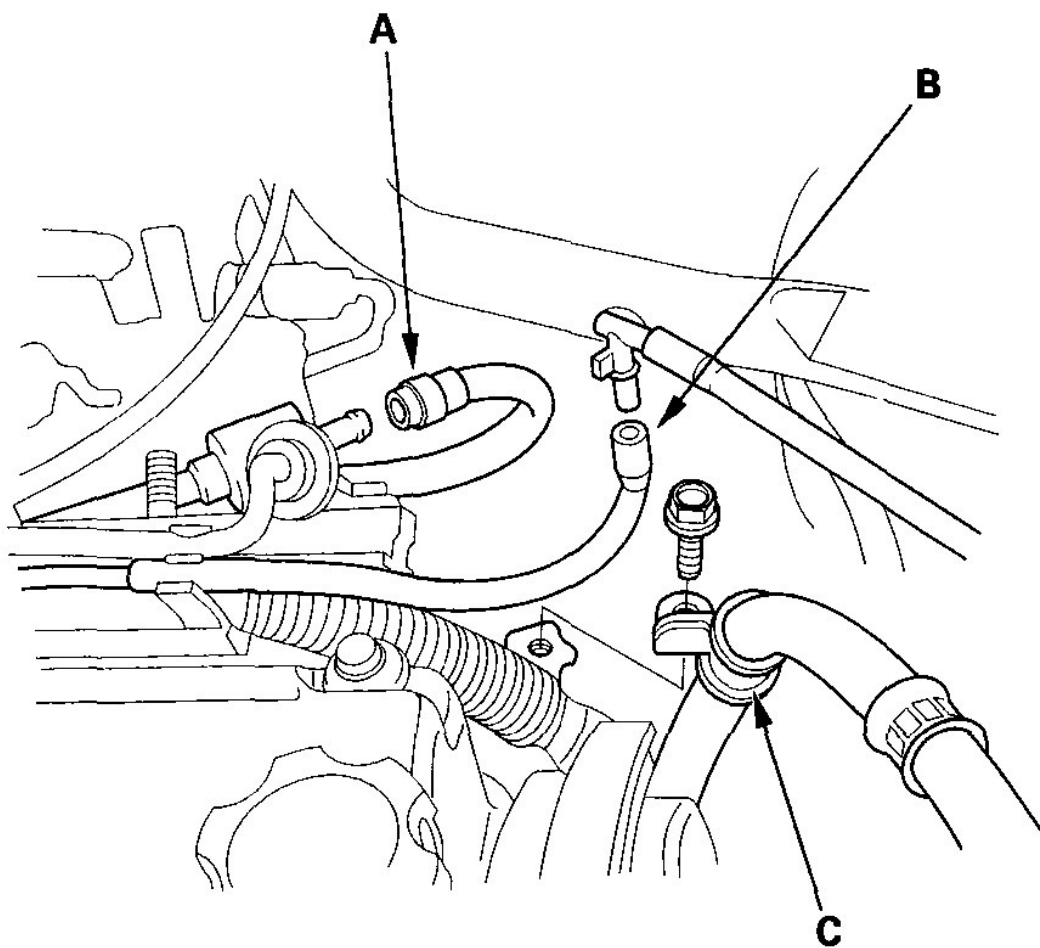
9. Remove the brake booster vacuum hose (A) and vacuum hoses (B).



G02556993

Fig. 138: Removing Brake Booster Vacuum Hose & Vacuum Hoses
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Remove the Evaporative Emission (EVAP) canister hose (A), vacuum hose (B) and P/S hose clamp (C).

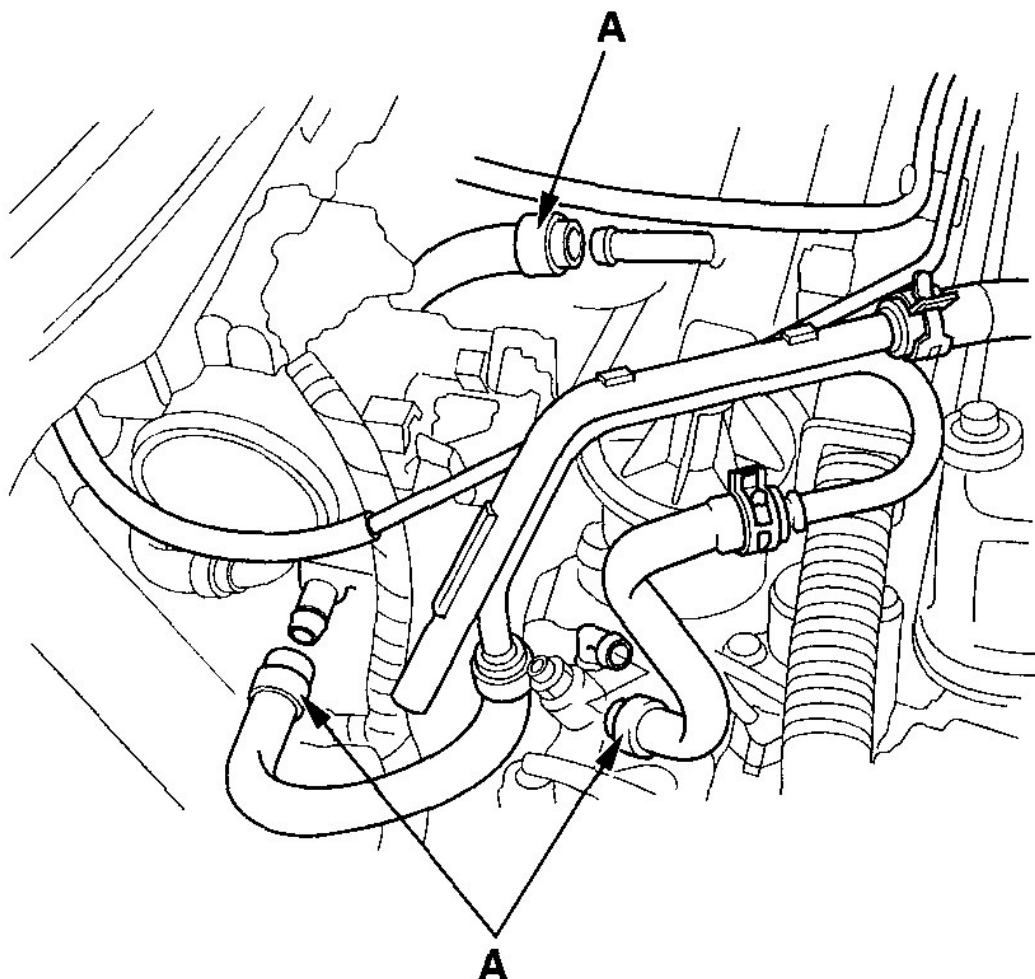


G02556994

Fig. 139: Removing EVAP Canister Hose

Courtesy of AMERICAN HONDA MOTOR CO., INC.

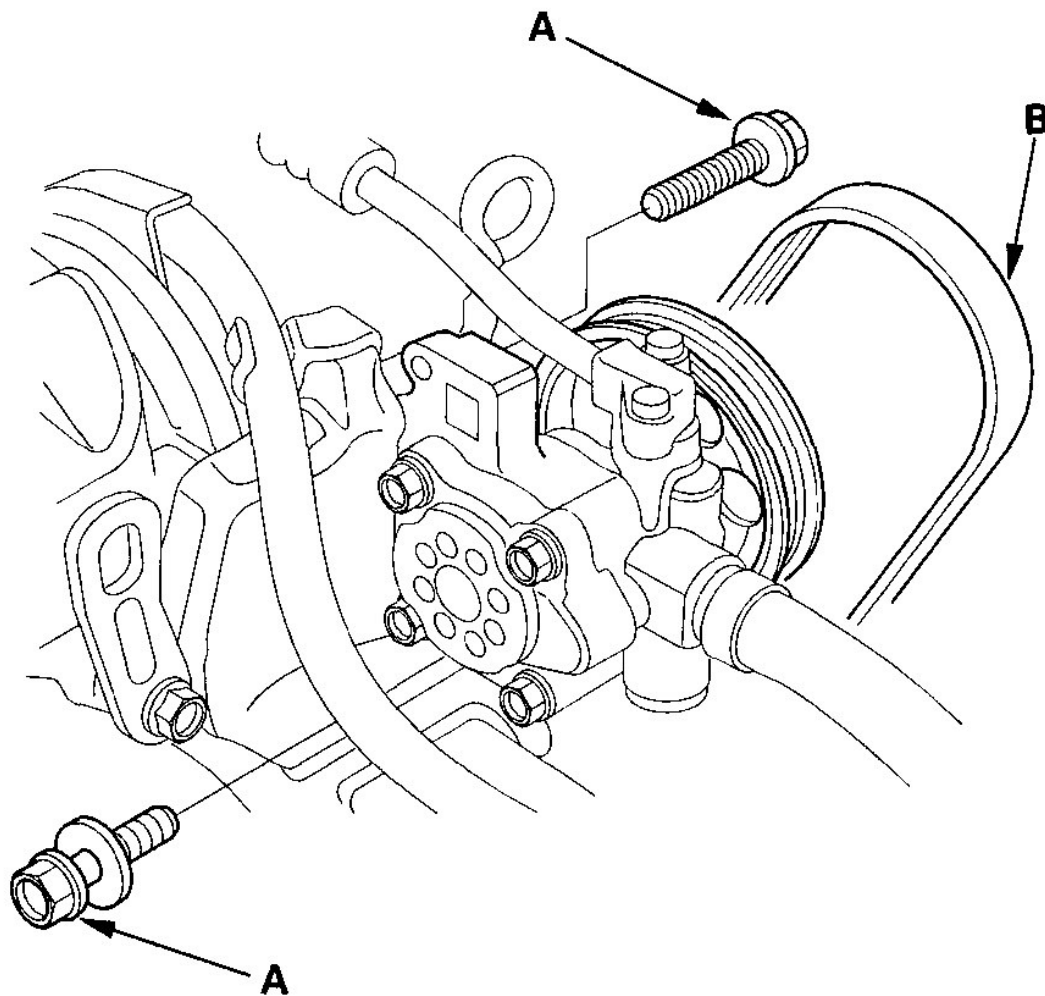
11. Remove the three water bypass hoses (A).



G02556995

Fig. 140: Removing Three Water Bypass Hoses
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Remove the mounting bolts (A), then remove the Power Steering (P/S) pump belt (B) and pump without disconnecting the P/S hoses.



G02556996

Fig. 141: Removing Mounting Bolts & P/S Pump Belt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Remove the alternator belt.
 - A. Loosen the alternator mounting bolt (A).
 - B. Loosen the alternator locknut (B).
 - C. Loosen the adjusting bolt (C).
 - D. Remove the alternator belt (D).

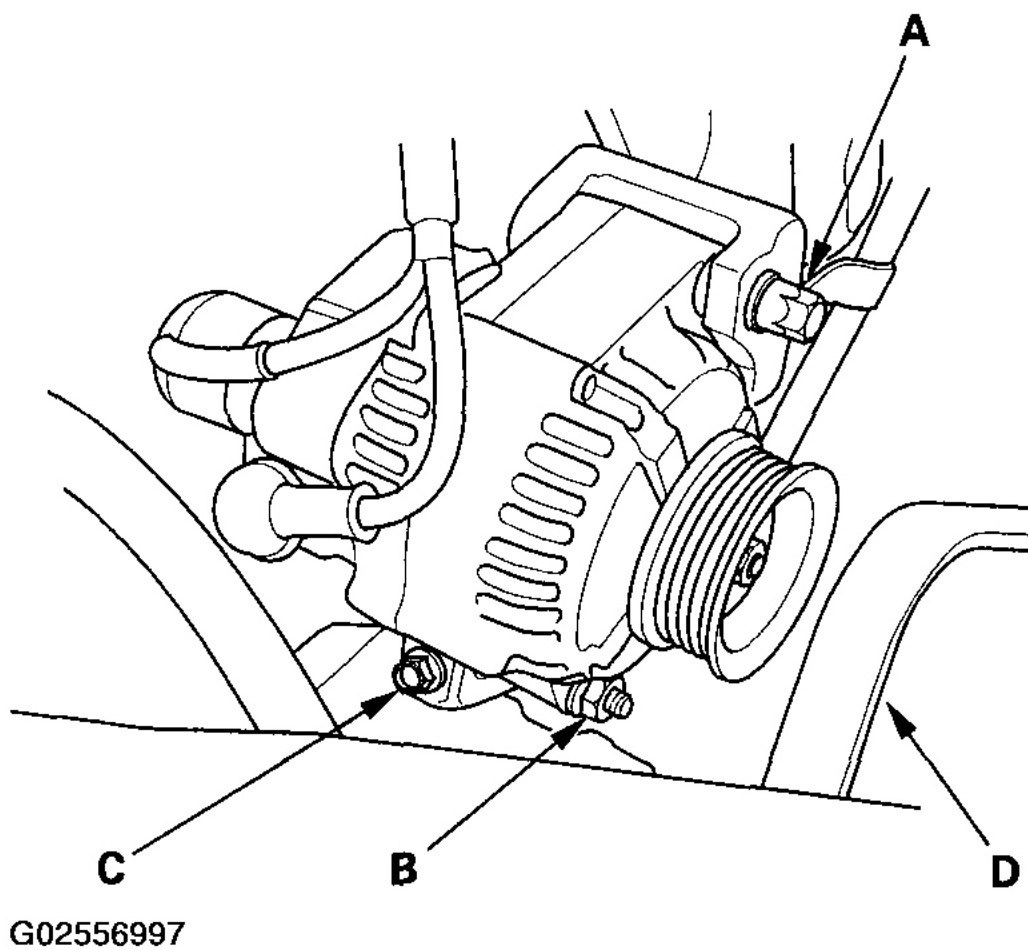
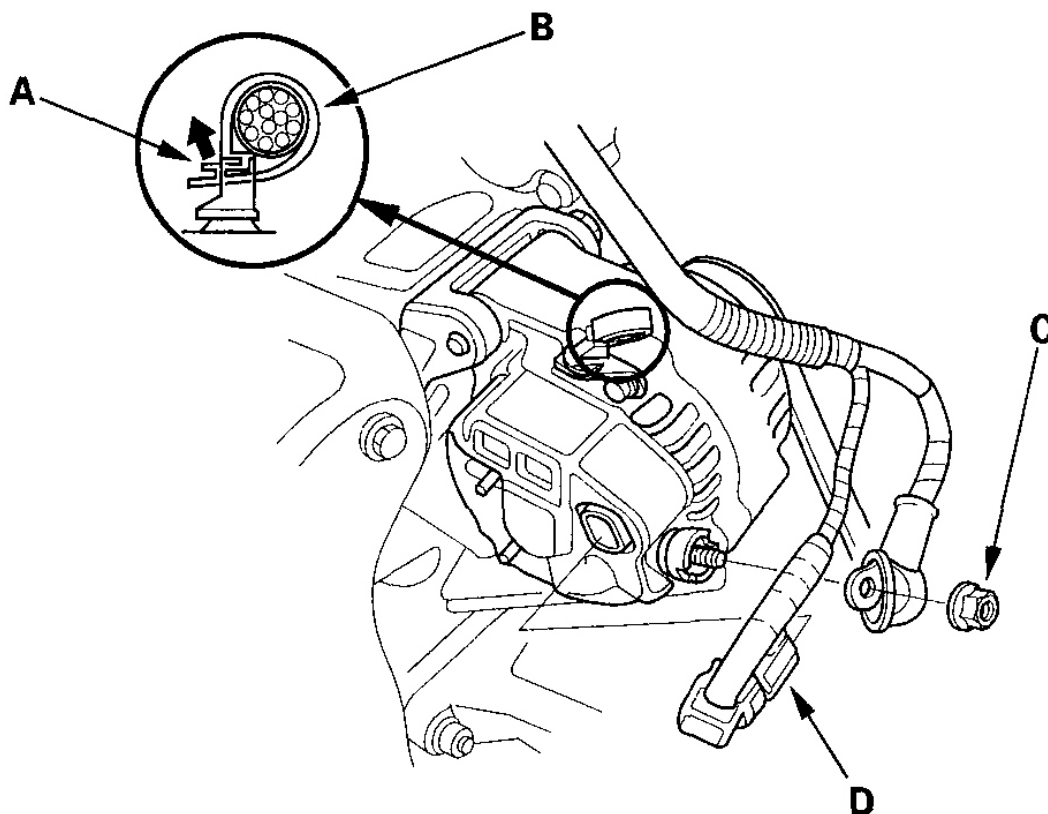


Fig. 142: Removing Alternator Belt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

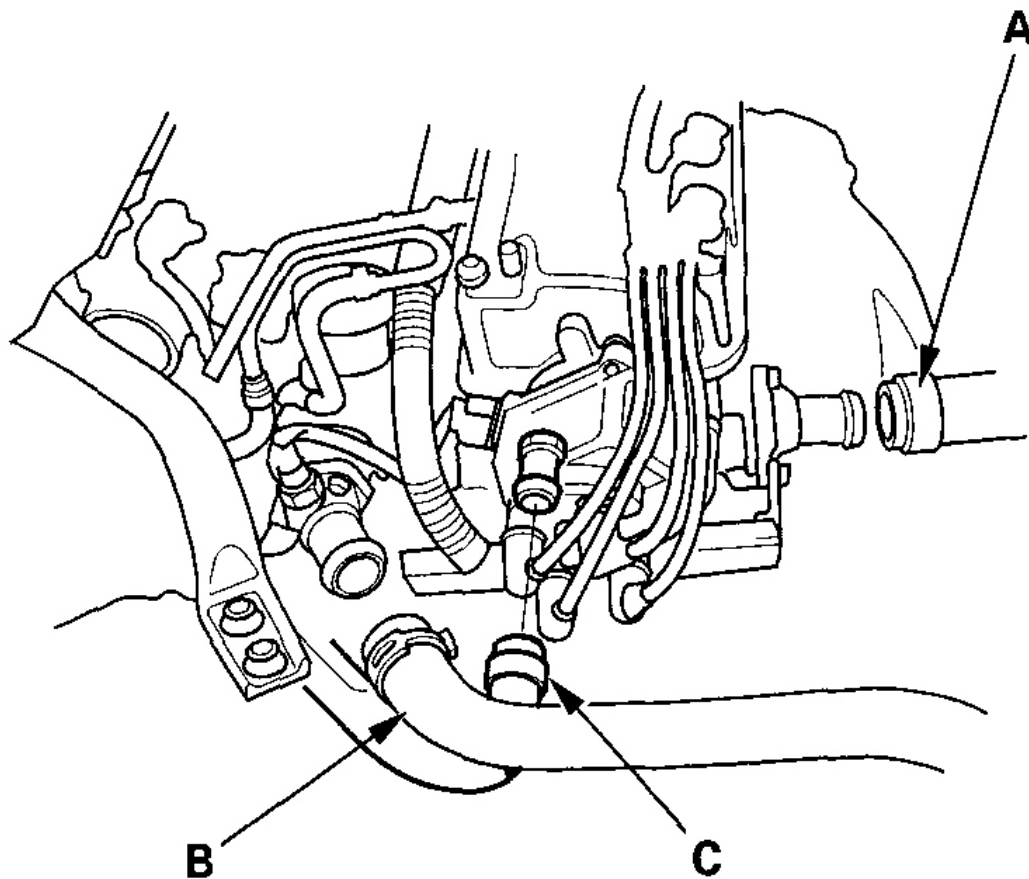
14. Disconnect the alternator wire harness.
 - A. Pull up the lock (A), then release the wire harness tie (B).
 - B. Pull back the boot and remove the 6 mm nut (C).
 - C. Disconnect the connector (D) from the alternator.



G02556998

Fig. 143: Disconnecting Alternator Wire Harness
Courtesy of AMERICAN HONDA MOTOR CO., INC.

15. Remove the upper radiator hose (A), lower radiator hose (B) and heater hose (C).



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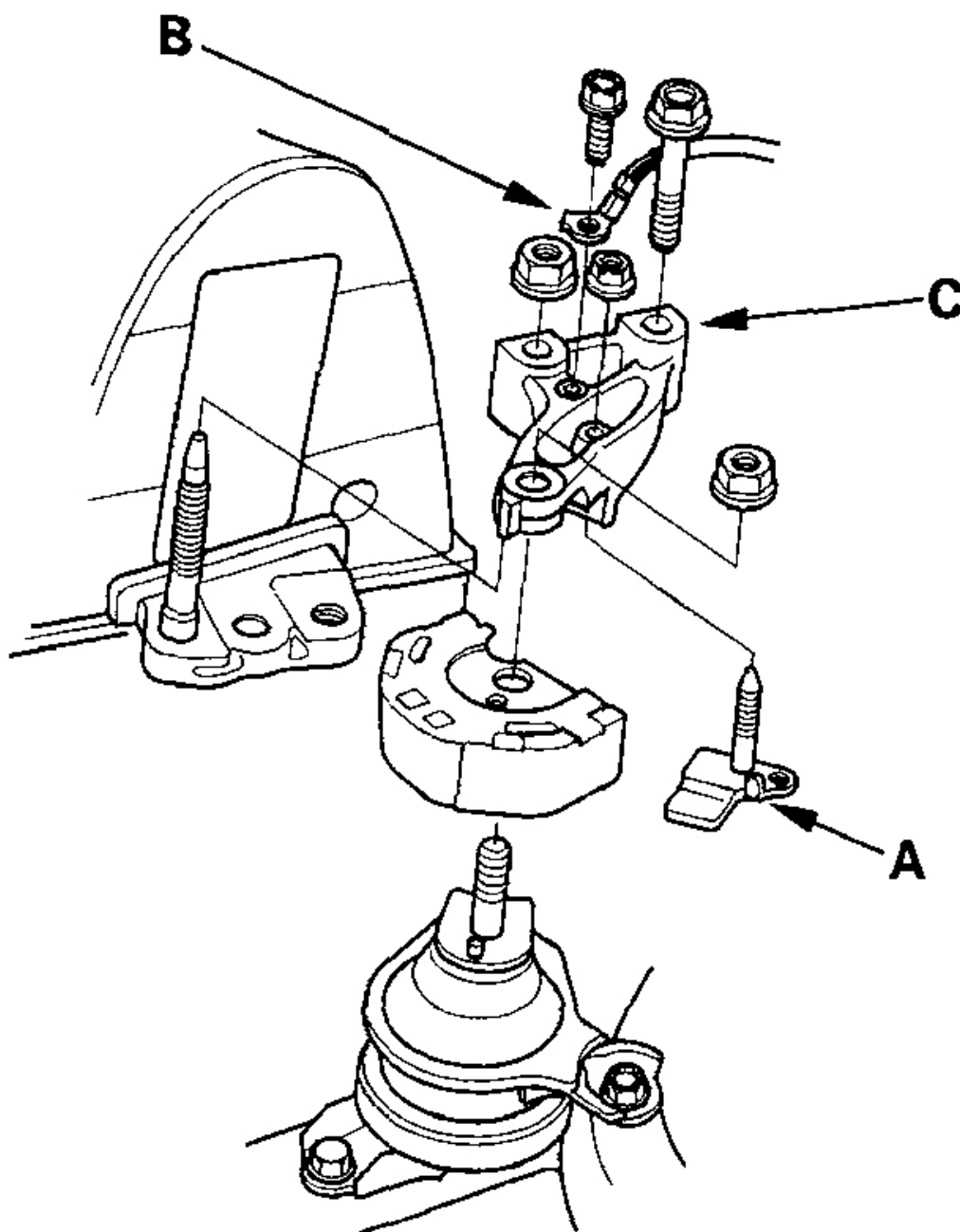
Fig. 144: Removing Upper Radiator Hose

Courtesy of AMERICAN HONDA MOTOR CO., INC.

16. Remove the engine wire harness connectors and wire harness clamps from the cylinder head and the intake manifold.
 - Four injector connectors
 - Intake Air Temperature (IAT) sensor connector
 - Idle Air Control (IAC) valve connector
 - Throttle Position (TP) sensor connector
 - Manifold Absolute Pressure (MAP) sensor connector
 - Primary Heated Oxygen Sensor (primary HO2S) connector (F23A1, F23A5 engine)
 - Air Fuel Ratio (A/F) sensor connector (F23A4 engine)
 - Engine Coolant Temperature (ECT) sensor connector

- Radiator fan switch connector
- Coolant temperature gauge sending unit connector ('98-00 models)
- Exhaust Gas Recirculation (EGR) valve connector
- CKP/TDC sensor connector
- VTEC solenoid valve connector (F23A1/F23A4 engines)
- VTEC oil pressure switch connector (F23A1/F23A4 engines)

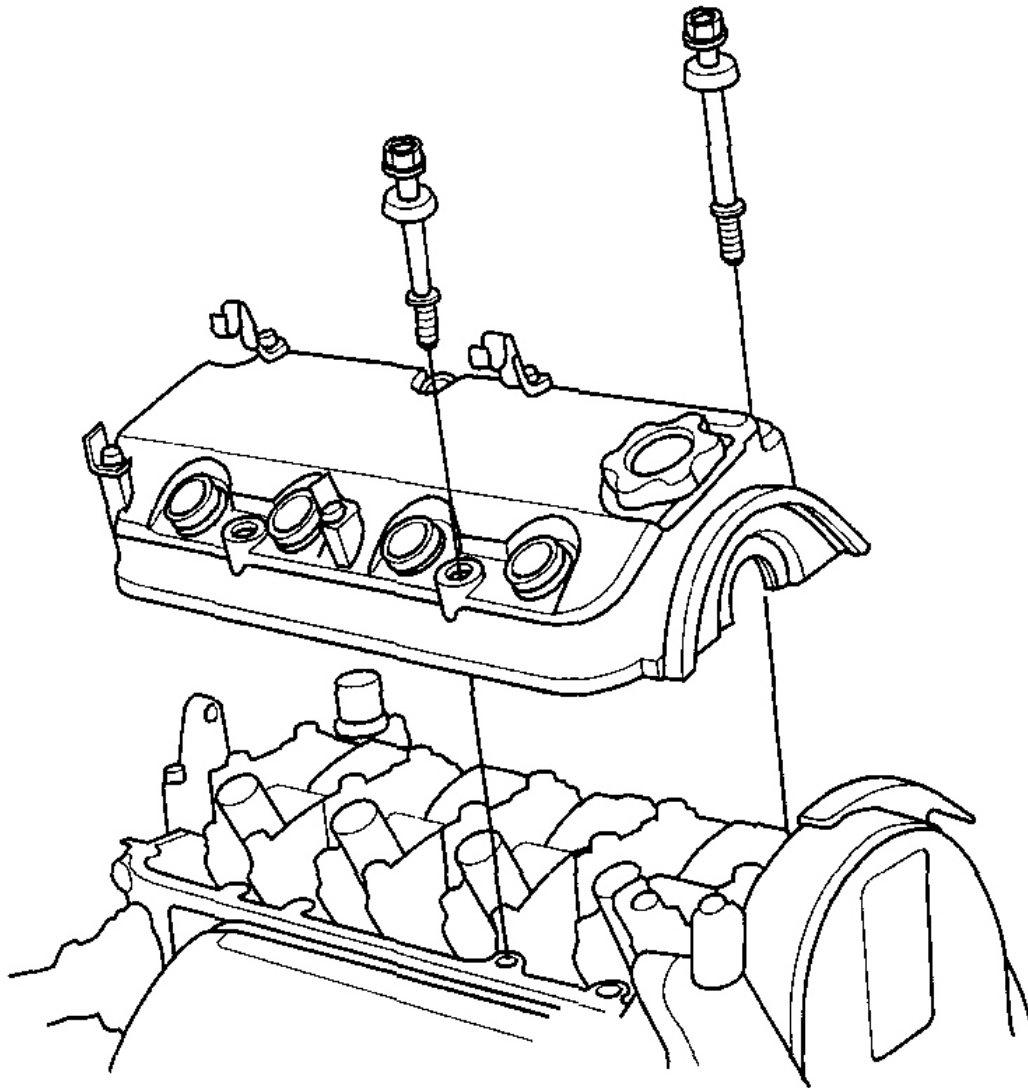
17. Remove the spark plug caps and distributor from the cylinder head.
18. Support the engine with a jack and wood block under the oil pan.
19. Remove the stop (A) and ground cable (B), then remove the upper bracket (C).



G02557000

Fig. 145: Removing Stop & Ground Cable
Courtesy of AMERICAN HONDA MOTOR CO., INC.

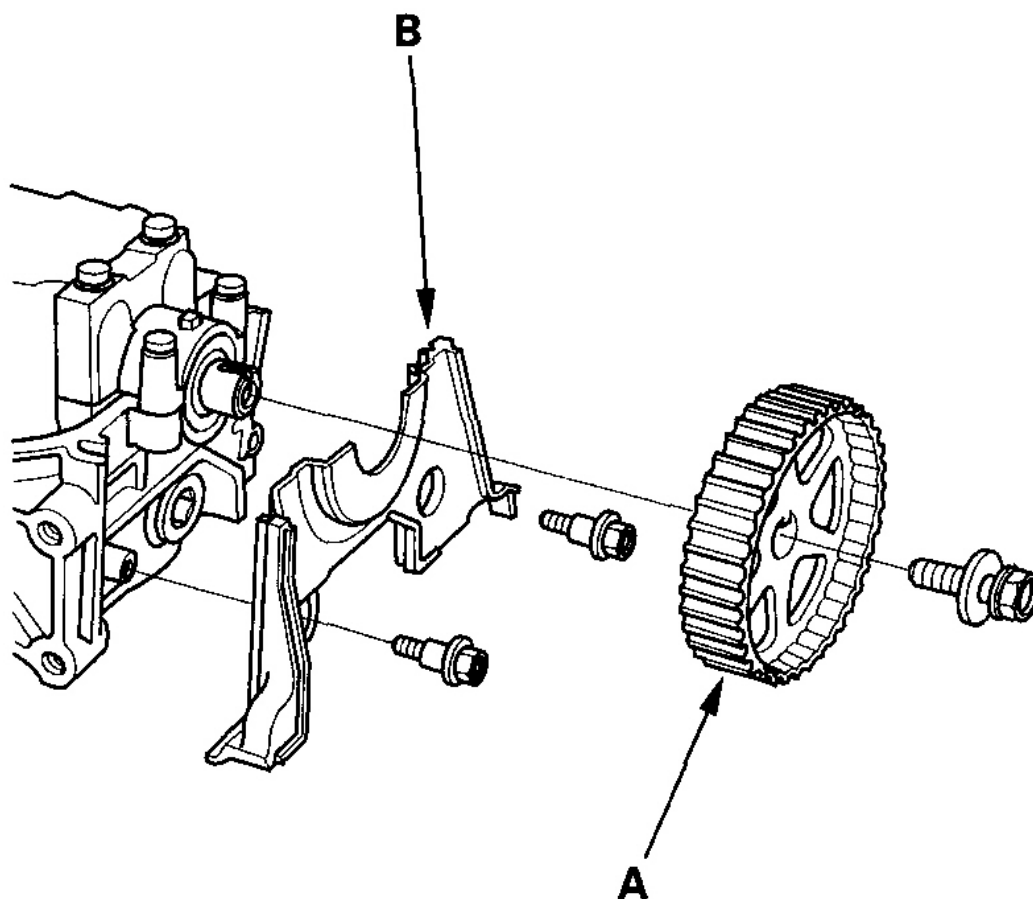
20. Remove the cylinder head cover.



G02557001

Fig. 146: Removing Cylinder Head Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

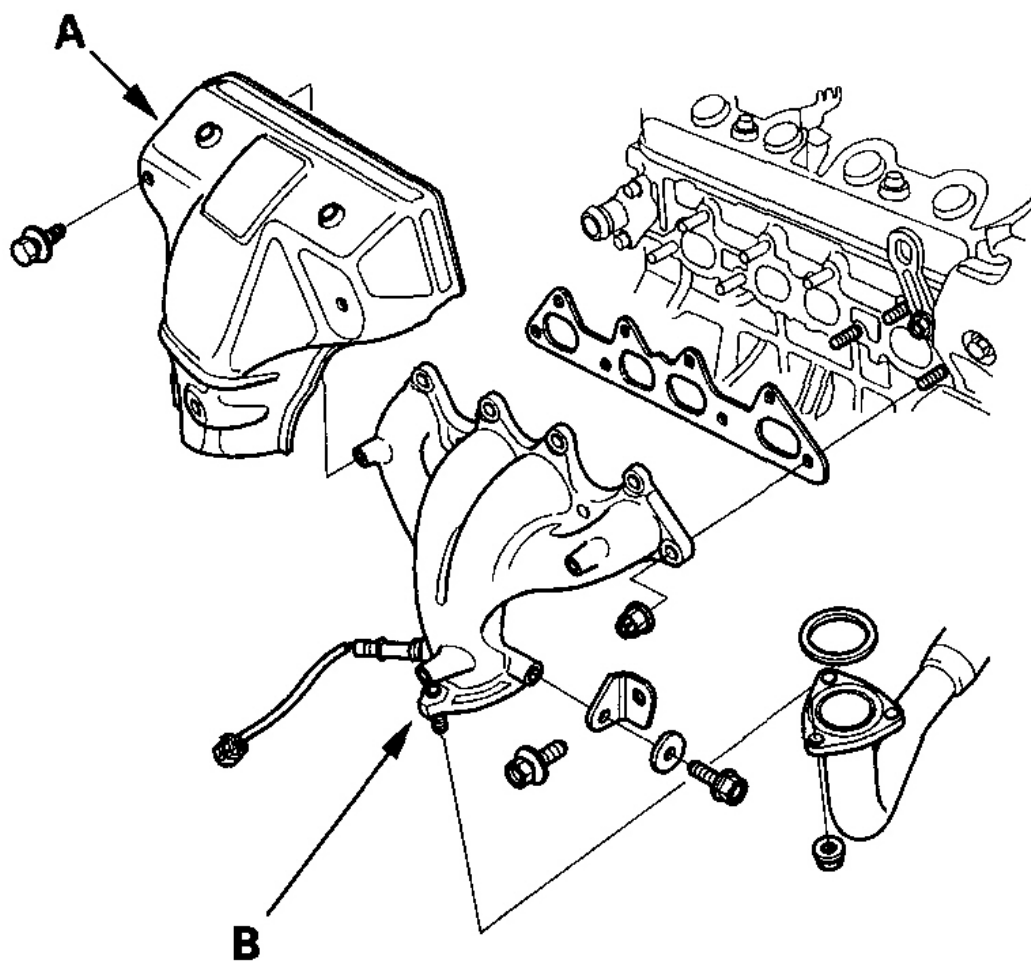
21. Remove the balancer belt and timing belt (see **Timing Belt & Balancer Belt Removal**).
22. Remove the camshaft pulley (A) and back cover (B).



G02557002

Fig. 147: Removing Camshaft Pulley & Back Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

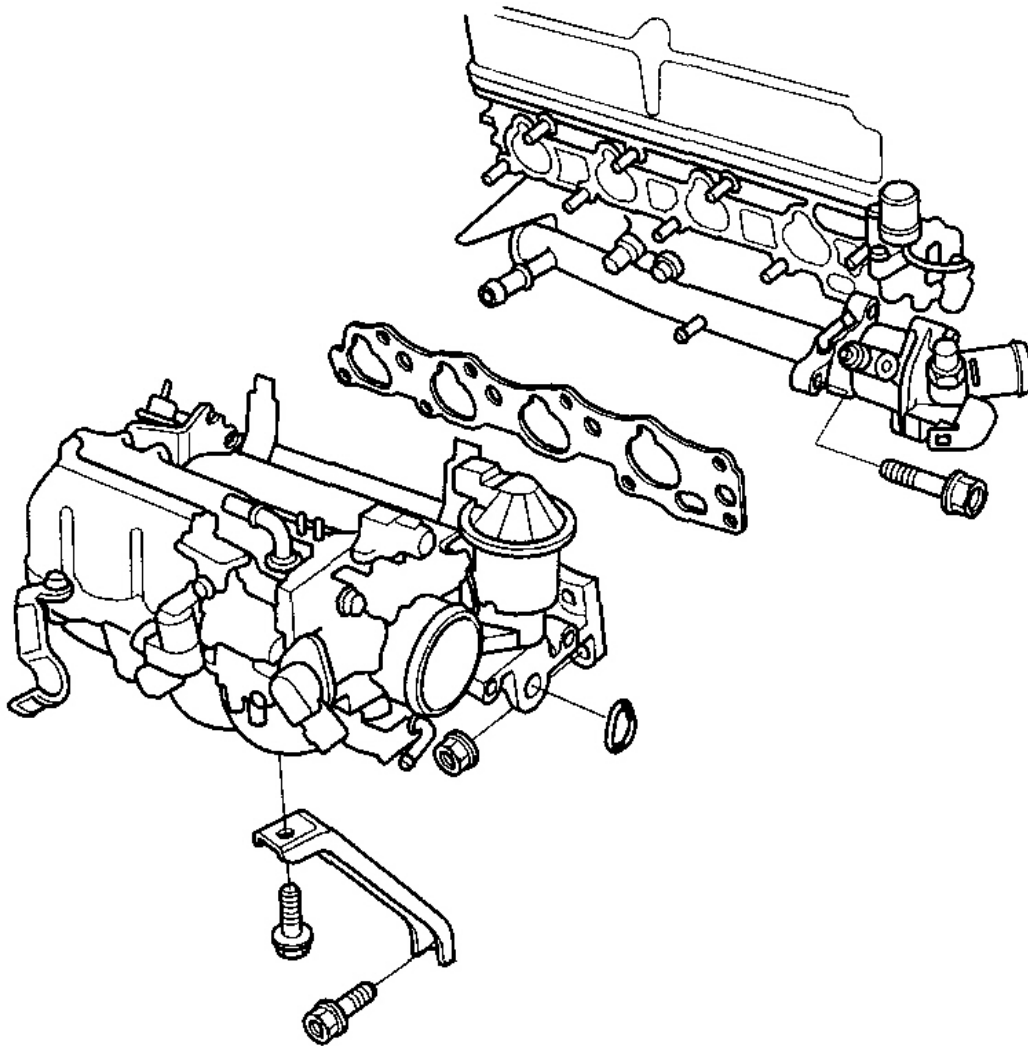
23. Remove the exhaust manifold cover (A), then remove the exhaust manifold (B).



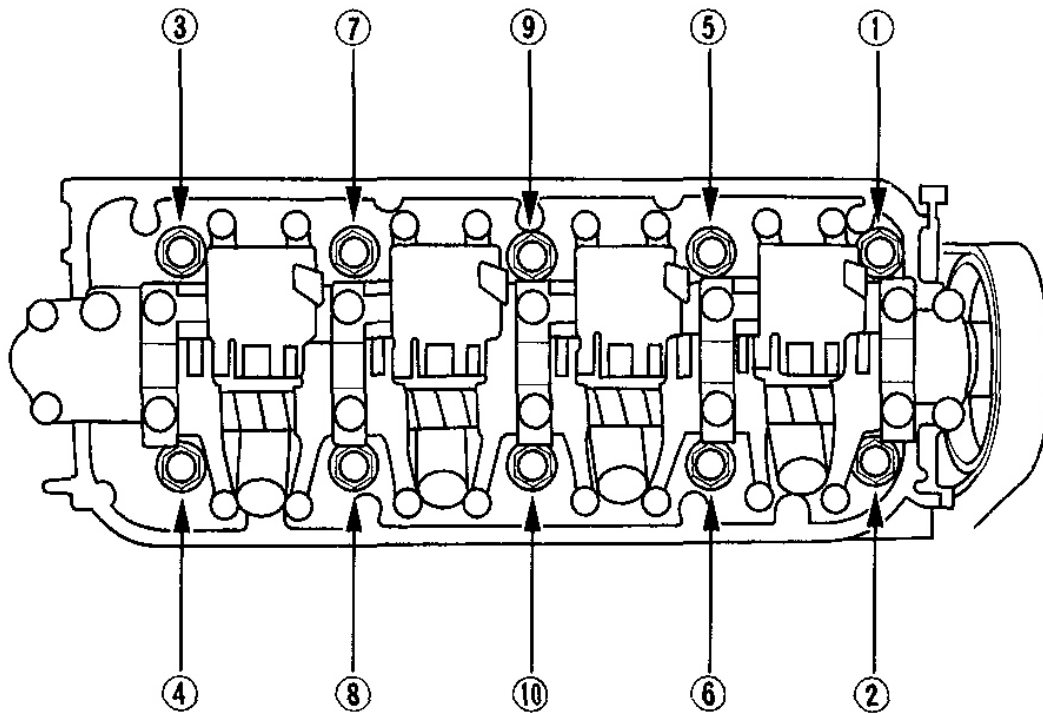
G02557003

Fig. 148: Removing Exhaust Manifold Cover & Exhaust Manifold
Courtesy of AMERICAN HONDA MOTOR CO., INC.

24. Remove the intake manifold.

**G02557004****Fig. 149: Removing Intake Manifold****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.



G02557005

Fig. 150: Identifying Cylinder Head Bolt 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.

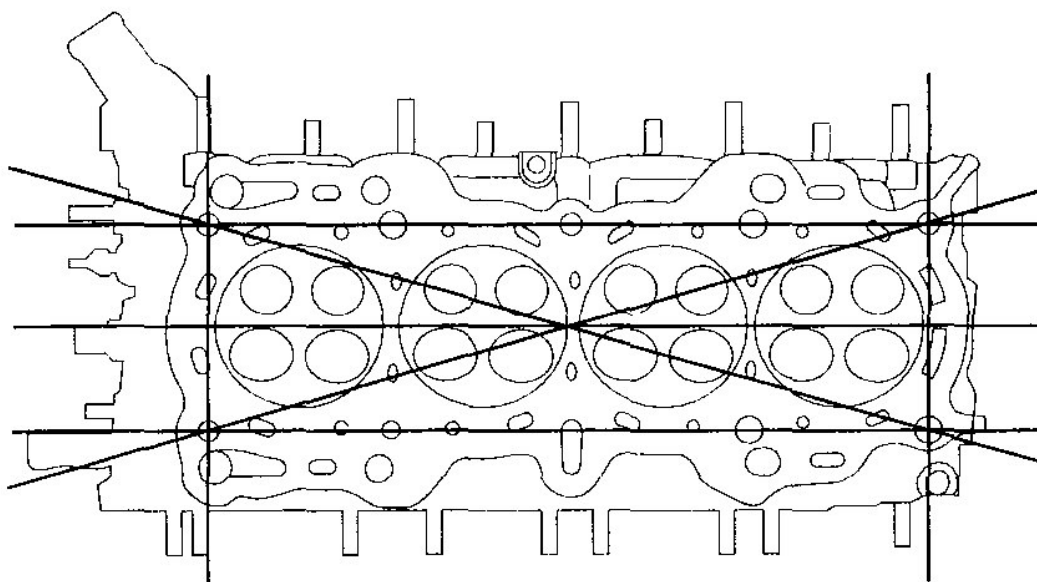
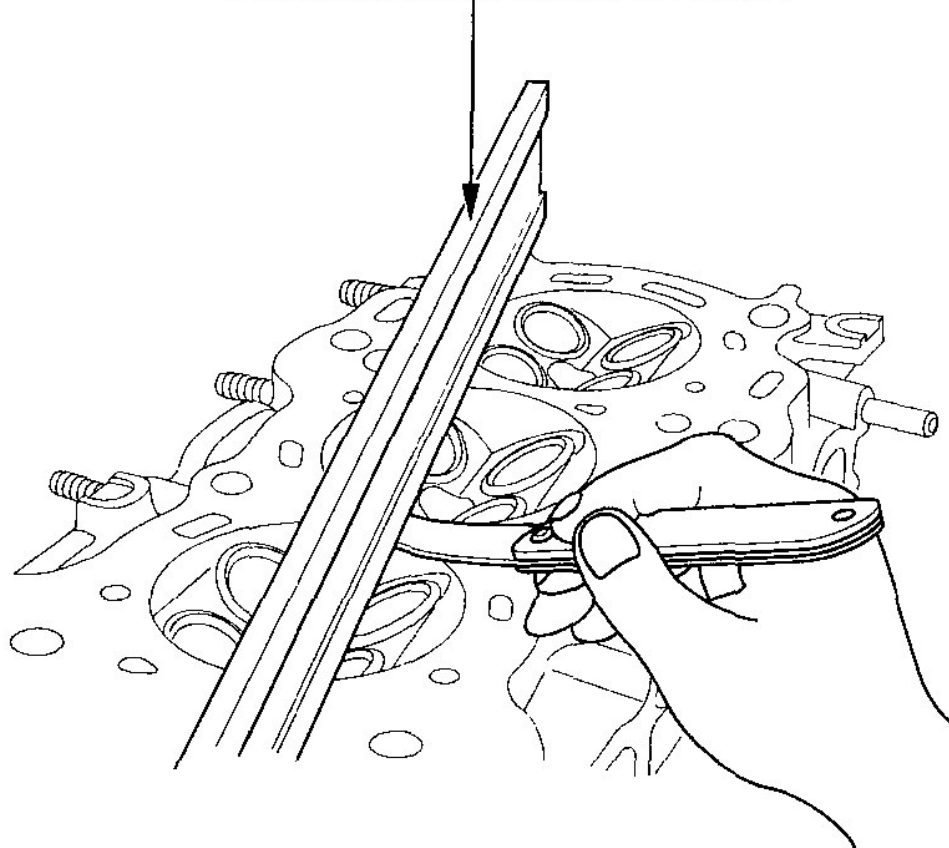
If camshaft-to-holder oil clearances are within specifications, check the cylinder head for warpage. Measure along the edges, and three ways across the center.

- 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 100 mm (3.94 in.).

Cylinder Head Height:

Standard (New): 99.95-100.05 mm (3.935-3.939 in.)

PRECISION STRAIGHT EDGE

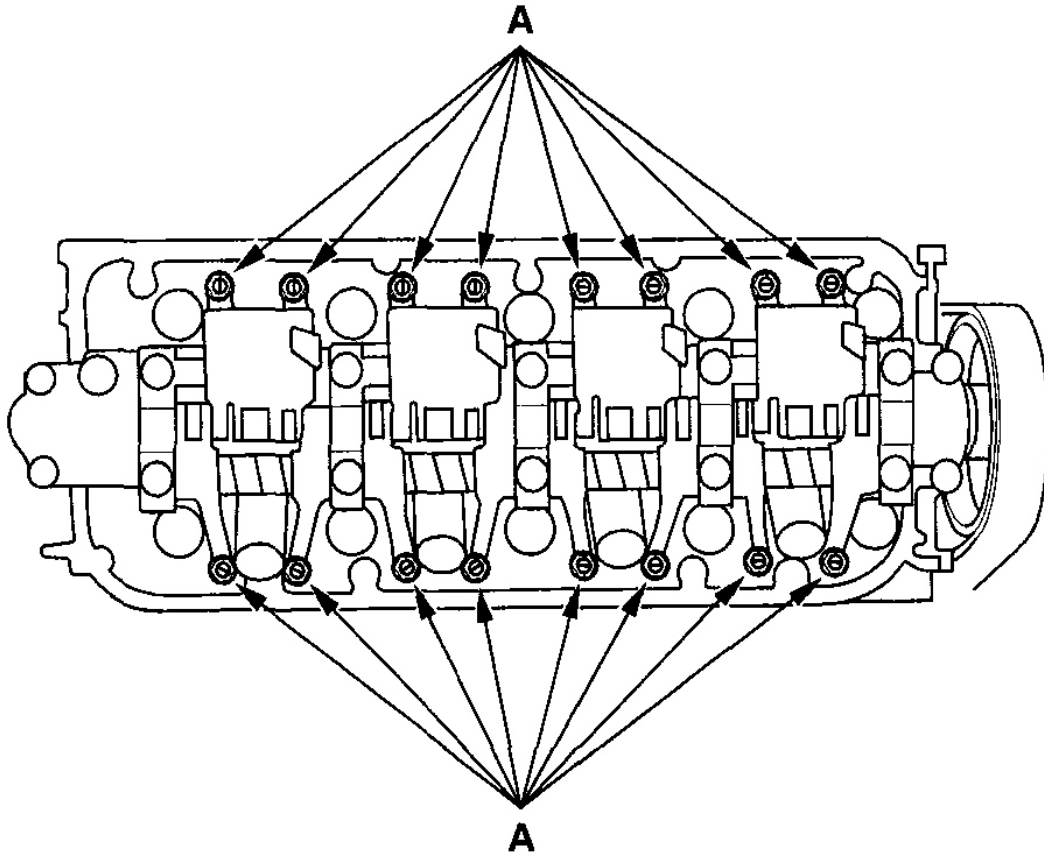


G02557006

Fig. 151: Measuring Along Edges & Three Ways Across Center
Courtesy of AMERICAN HONDA MOTOR CO., INC.

ROCKER ARM ASSEMBLY REMOVAL

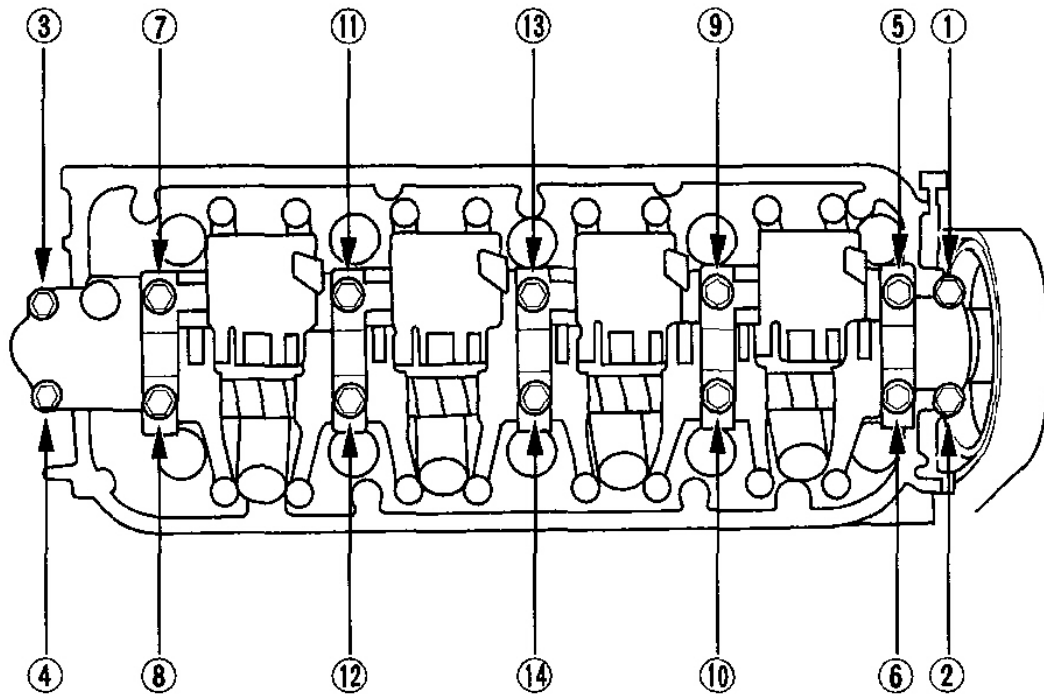
1. Loosen the adjusting screws (A).



G02557007

Fig. 152: Loosening Adjusting Screws
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Remove the bolts and the rocker arm assembly.
 - A. Unscrew the camshaft holder bolts 2 turns at a time, in a crisscross pattern, to prevent damaging the valves or rocker arm assembly.
 - B. 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.



G02557008

Fig. 153: Identifying Camshaft Holder Bolt Loosening Sequence
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

ROCKER ARMS & SHAFTS DISASSEMBLY/REASSEMBLY - F23A1, F23A4 ENGINES

NOTE:

- Identify parts as they are removed to ensure reinstallation in original locations.
- Inspect the rocker shafts and rocker arms (see Rocker Arms & Shafts 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 lubricant to any contact points.
- Bundle the rocker arms with rubber bands to keep them together as a set.

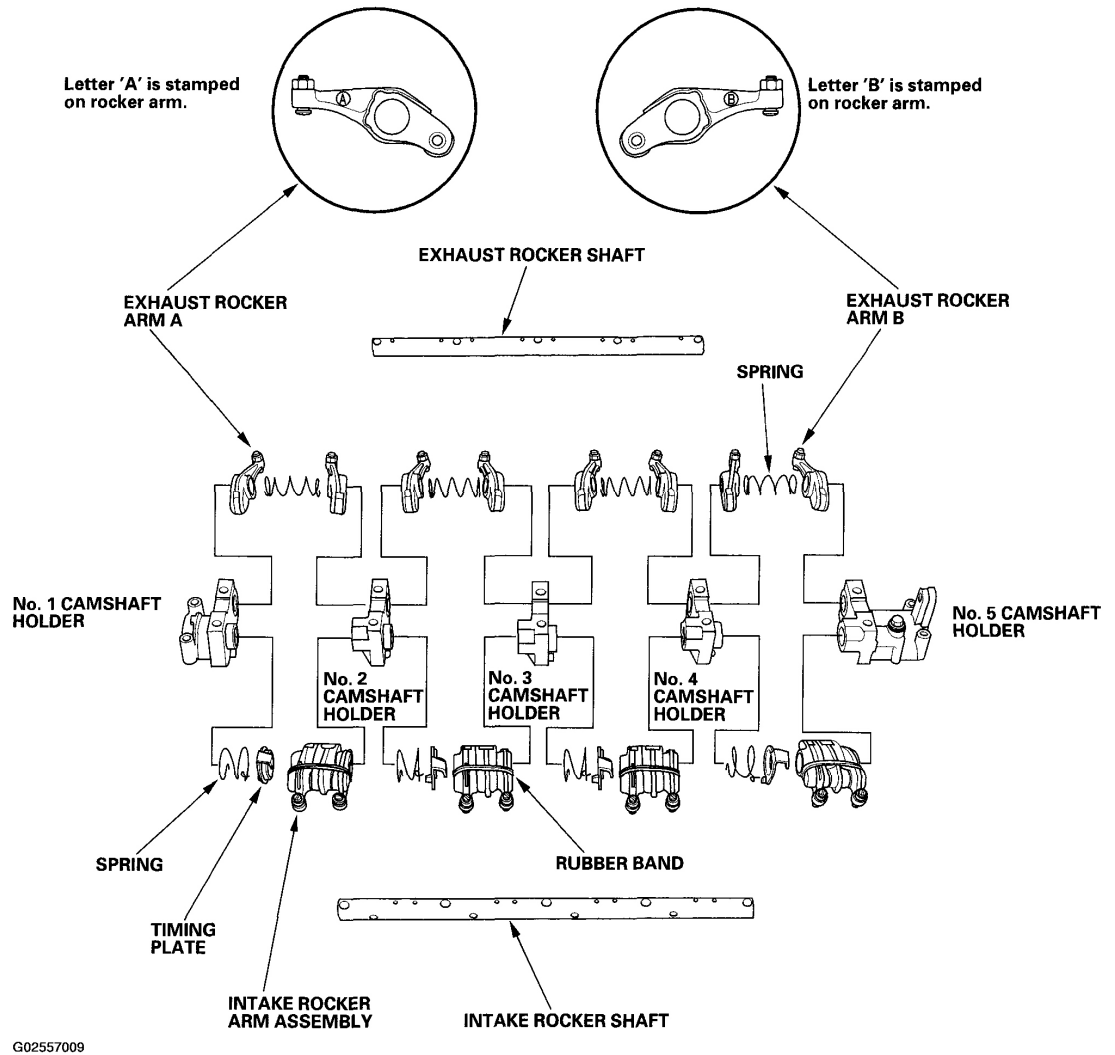


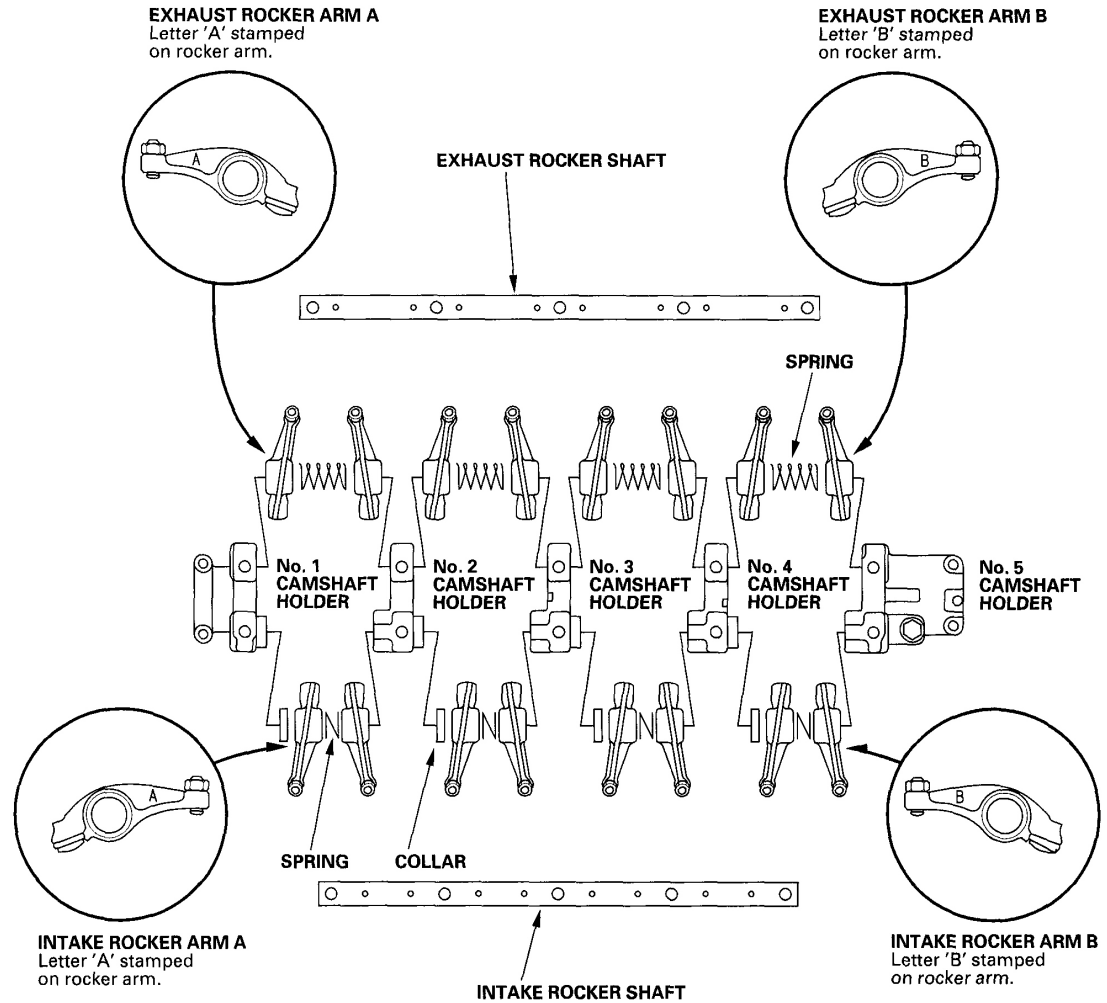
Fig. 154: Exploded View Of Rocker Arms & Shafts Assembly - F23A1 & F23A4 Engines
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

ROCKER ARMS & SHAFTS DISASSEMBLY/REASSEMBLY - F23A5 ENGINE

NOTE:

- Identify parts as they are removed to ensure reinstallation in their original locations.
- Inspect rocker shafts and rocker arms (see Rocker Arms & Shafts 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 lubricant to any contact points.



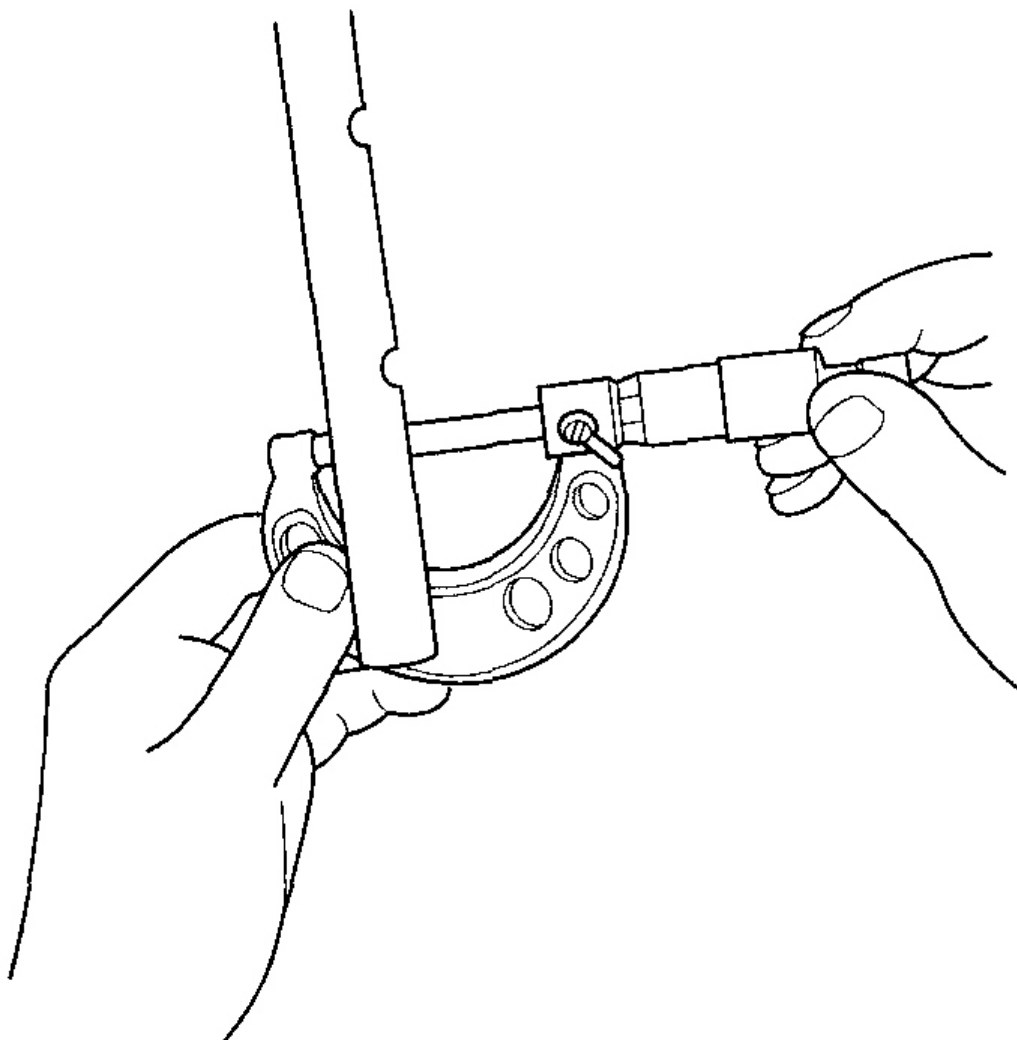
G02557010

Fig. 155: Exploded View Of Rocker Arms & Shafts Assembly - F23A5 Engine

Courtesy of AMERICAN HONDA MOTOR CO., INC.

ROCKER ARMS & SHAFTS INSPECTION

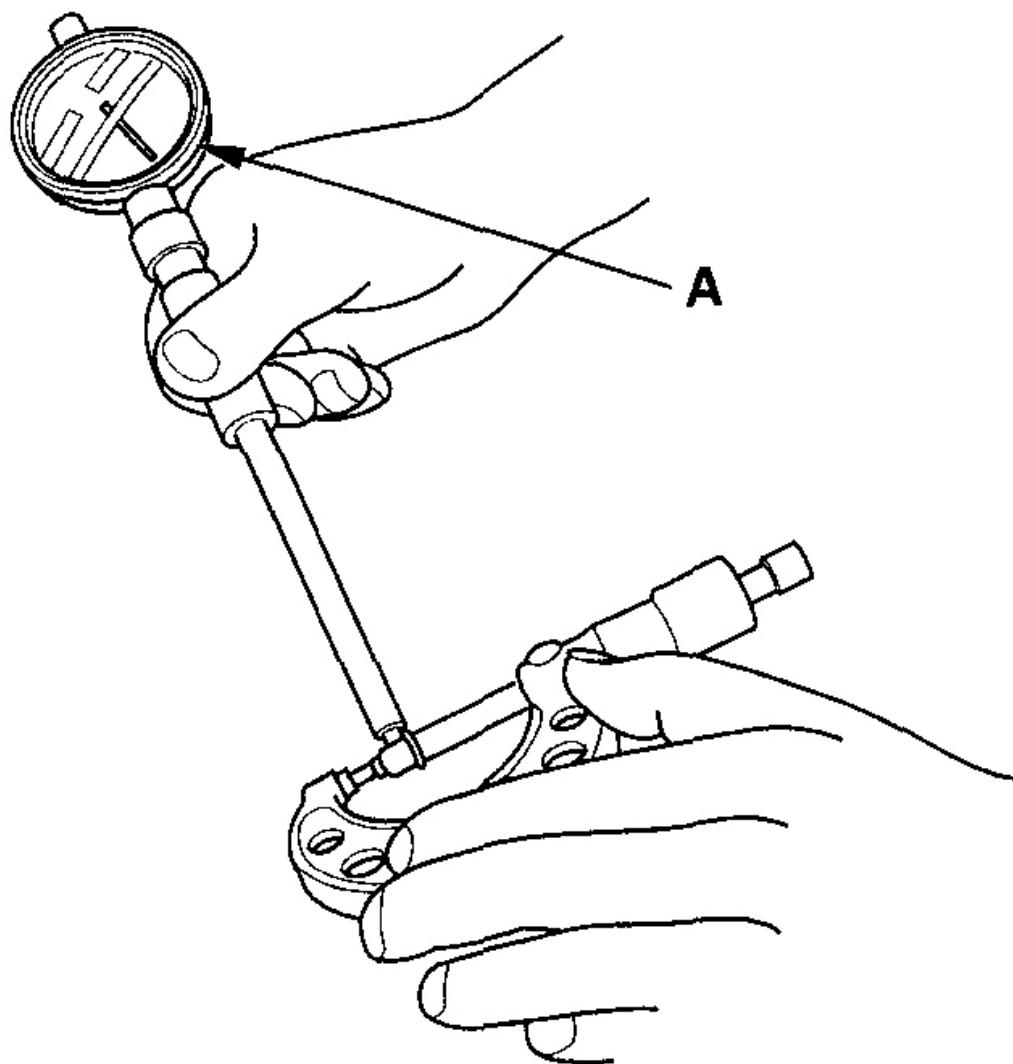
1. Measure the diameter of the shaft at the first rocker location.



G02557011

Fig. 156: Measuring Diameter Of Shaft At First Rocker Location
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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



G02557012

Fig. 157: 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.

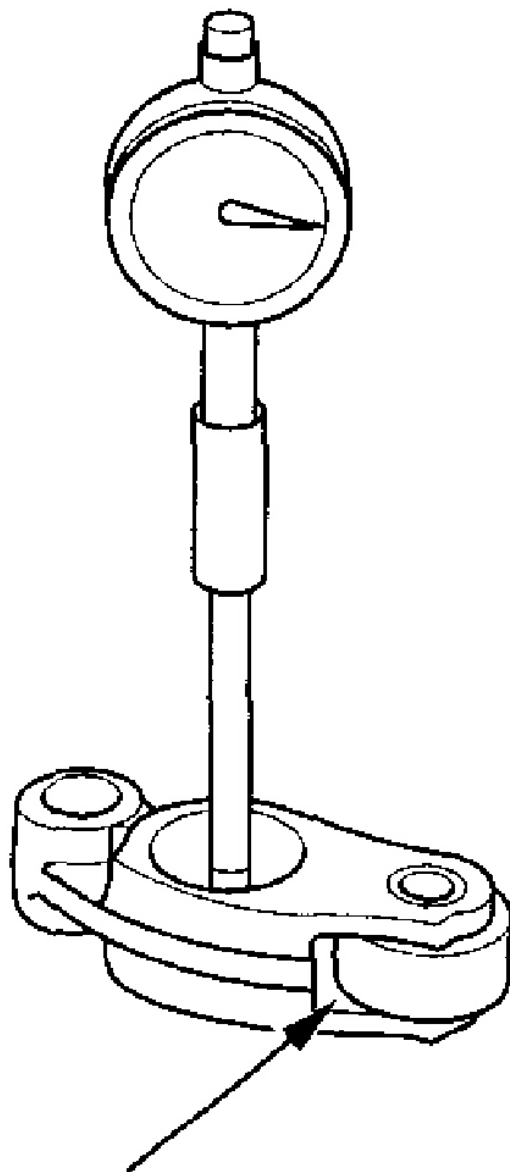
Rocker Arm-to-Shaft Clearance:

Standard (New):

Intake: 0.026-0.067 mm (0.0010-0.0026 in.)

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

Service Limit: 0.08 mm (0.003 in.)



**Inspect rocker arm
face for wear.**

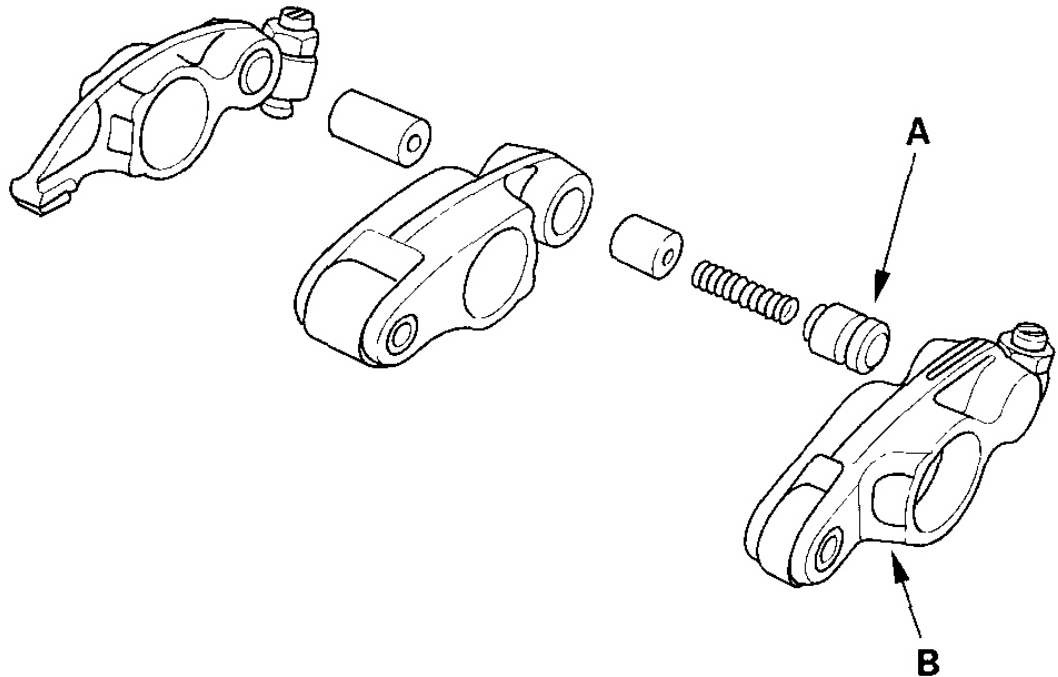
G02557013

Fig. 158: 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 all three rocker arms in that set (primary, mid, and secondary).
5. Inspect the rocker arm piston (A). Push it manually. If it does not move smoothly, replace the rocker arm set.

NOTE:

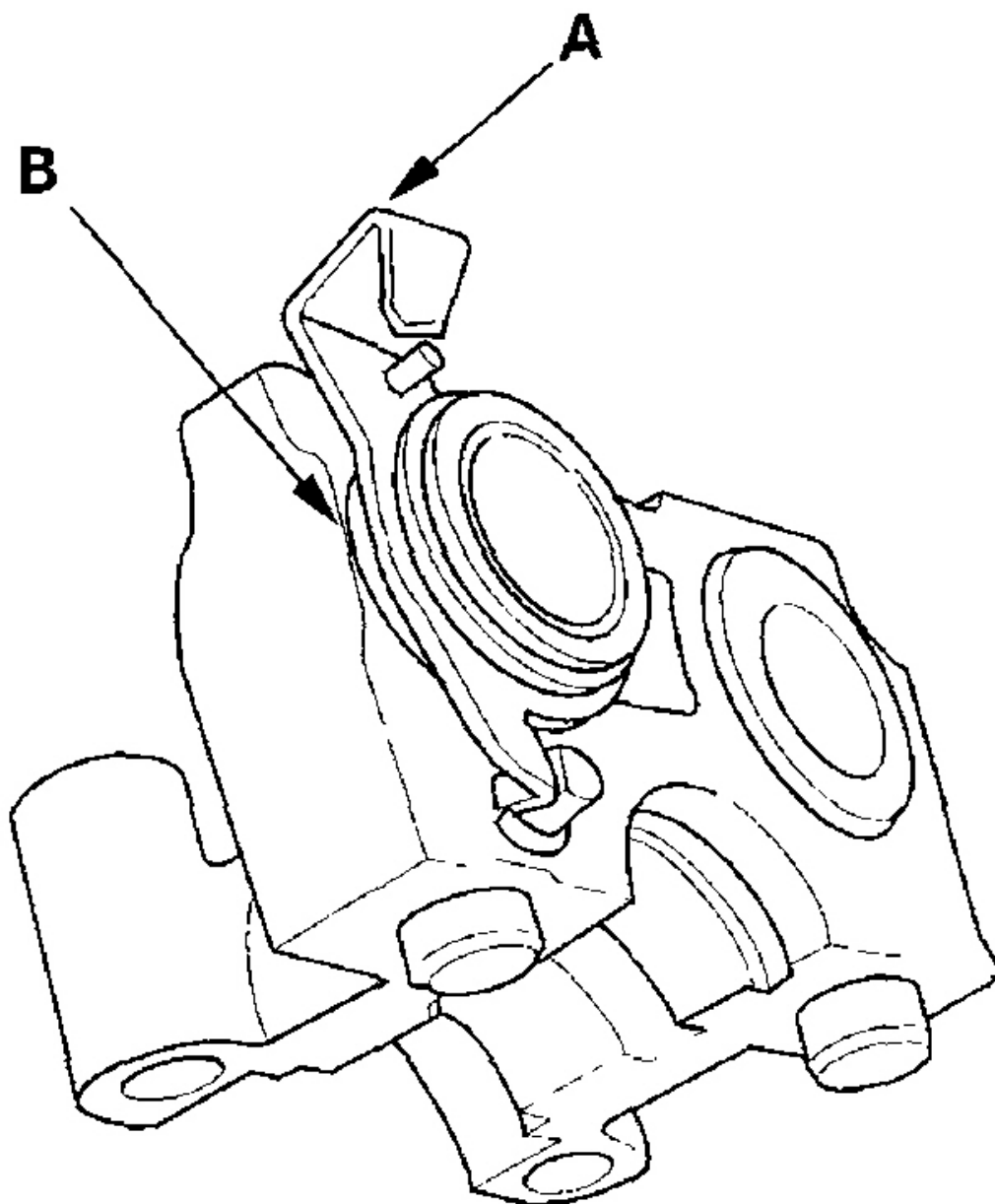
- When reassembling the primary rocker arm (B), carefully apply air pressure to its oil passage.
- Apply oil to the pistons when reassembling.



G02557014

Fig. 159: Inspecting Rocker Arm Piston
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Assemble each timing plate (A) and return spring (B) on its camshaft holder as shown.



G02557015

Fig. 160: Assembling Timing Plate & Return Spring On Its Camshaft Holder
Courtesy of AMERICAN HONDA MOTOR CO., INC.

CAMSHAFT INSPECTION

NOTE:

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

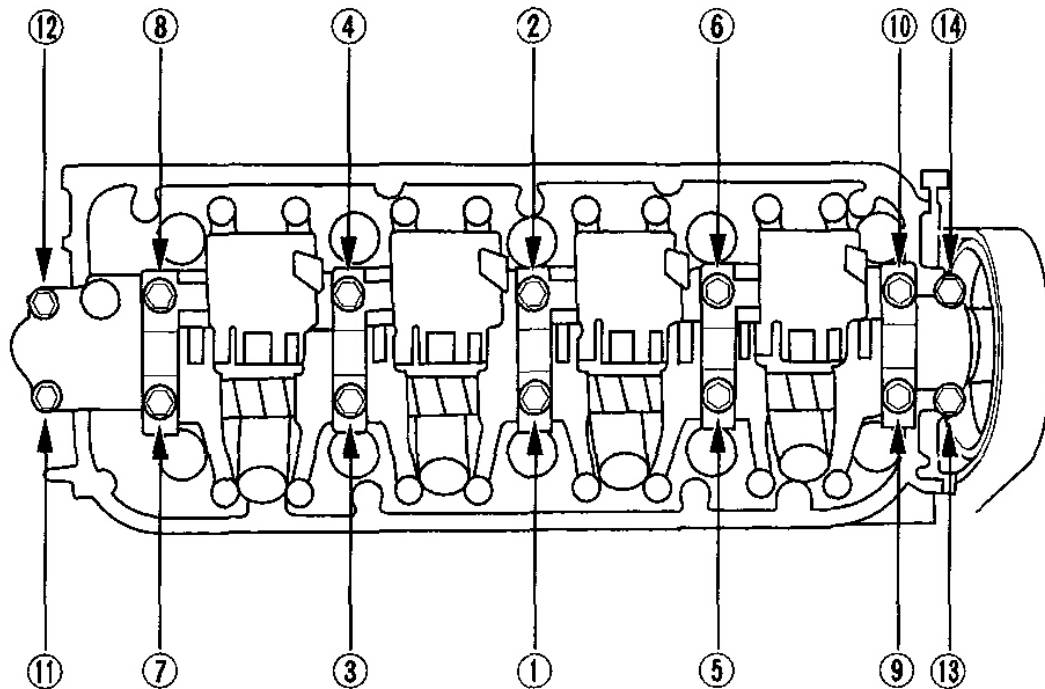
1. Put the camshaft and the camshaft holders on the cylinder head, then tighten the bolts to the specified torque.

Specified torque:

8 mm bolts: 22 N.m (2.2 kgf.m, 16 lbf-Ft)

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

6 mm bolts: (11), (12), (13), (14)



G02557016

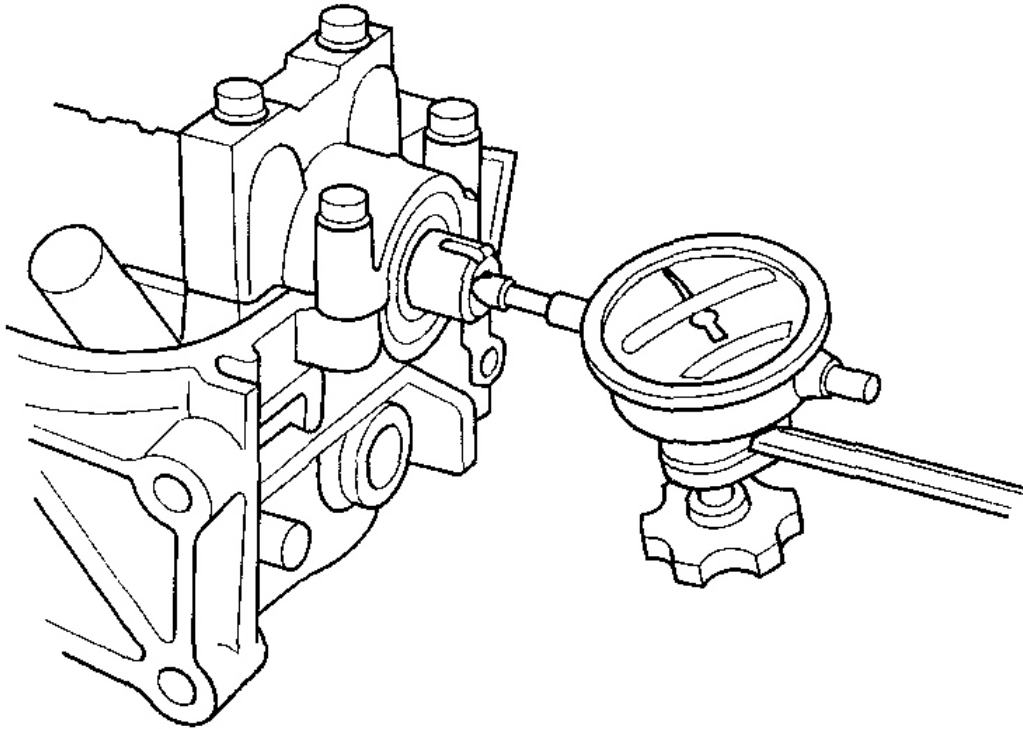
Fig. 161: Identifying Camshaft Tightening Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Seat the camshaft by pushing it toward the distributor end of the cylinder head.
3. Zero the dial indicator against the end of the distributor drive, 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.)



G02557017

Fig. 162: Zeroing Dial Indicator

Courtesy of AMERICAN HONDA MOTOR CO., INC.

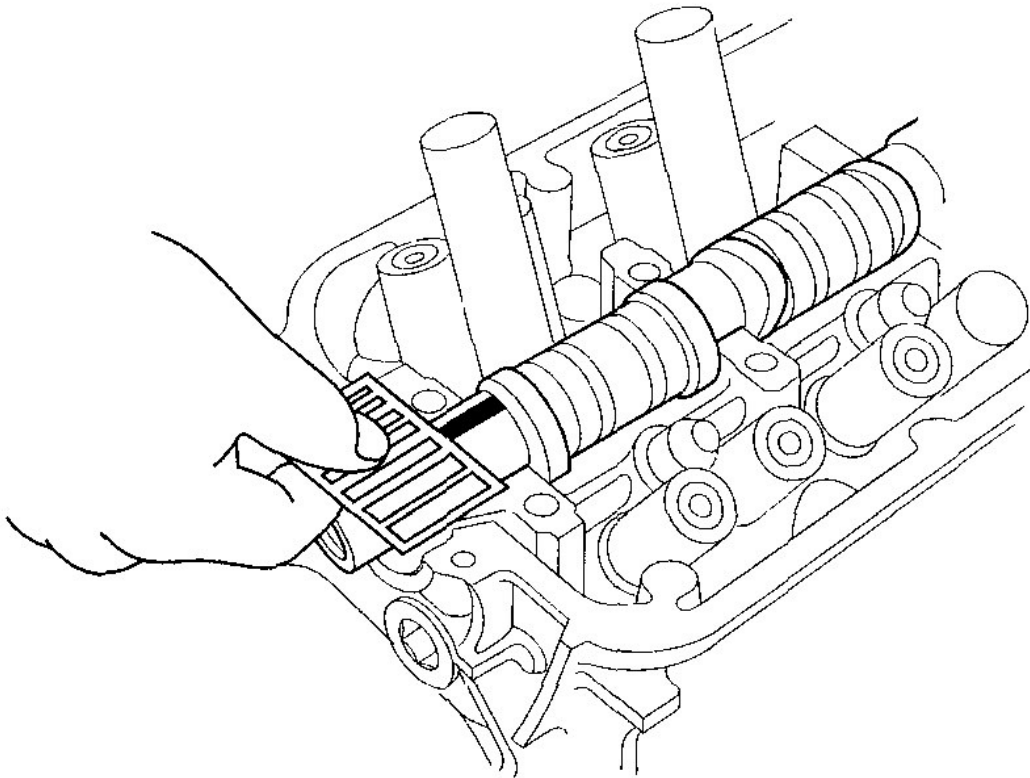
4. Unscrew the camshaft holder bolts two turns at a time, in a crisscross pattern. Then remove the camshaft holders from the cylinder head.
5. Lift the camshaft out of the cylinder head, wipe them clean, then inspect the lift ramps. Replace the camshaft if any lobes are pitted, scored, or excessively 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.)



G02557018

Fig. 163: 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.)

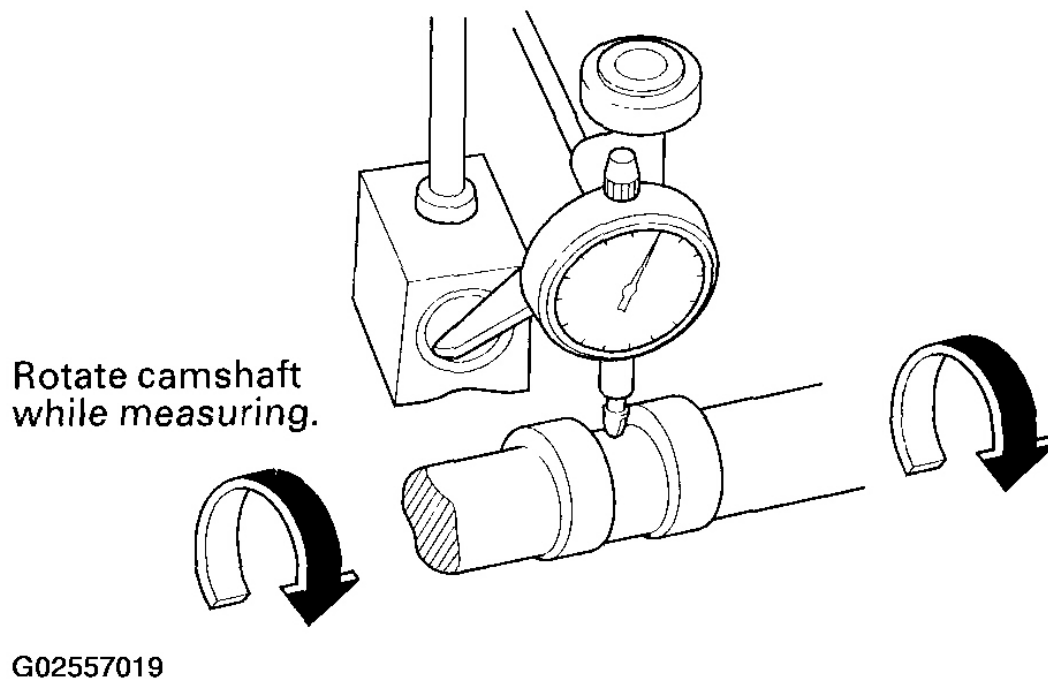


Fig. 164: Measuring Camshaft Runout

Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Measure cam lobe height.

		INTAKE	EXHAUST
F23A1/ F23A4 engines	PRI	37.775 mm (1.4872 in.)	38.366 mm (1.5105 in.)
	MID	39.725 mm (1.5640 in.)	
	SEC	34.481 mm (1.3575 in.)	
F23A5 engine		38.339 mm (1.5094 in.)	37.716 mm (1.4849 in.)

PRI: Primary

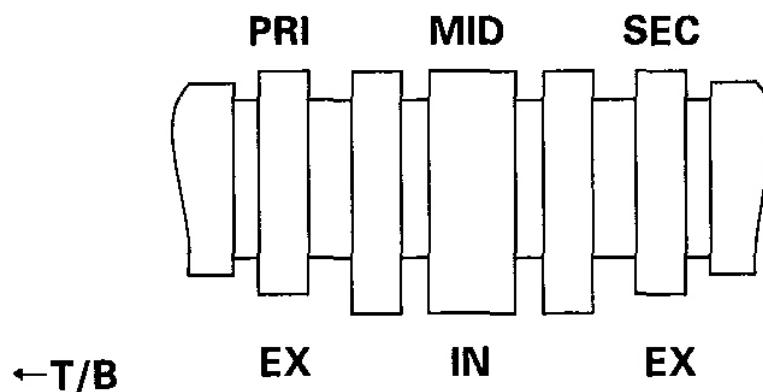
MID: Mid

SEC: Secondary

IN: Intake

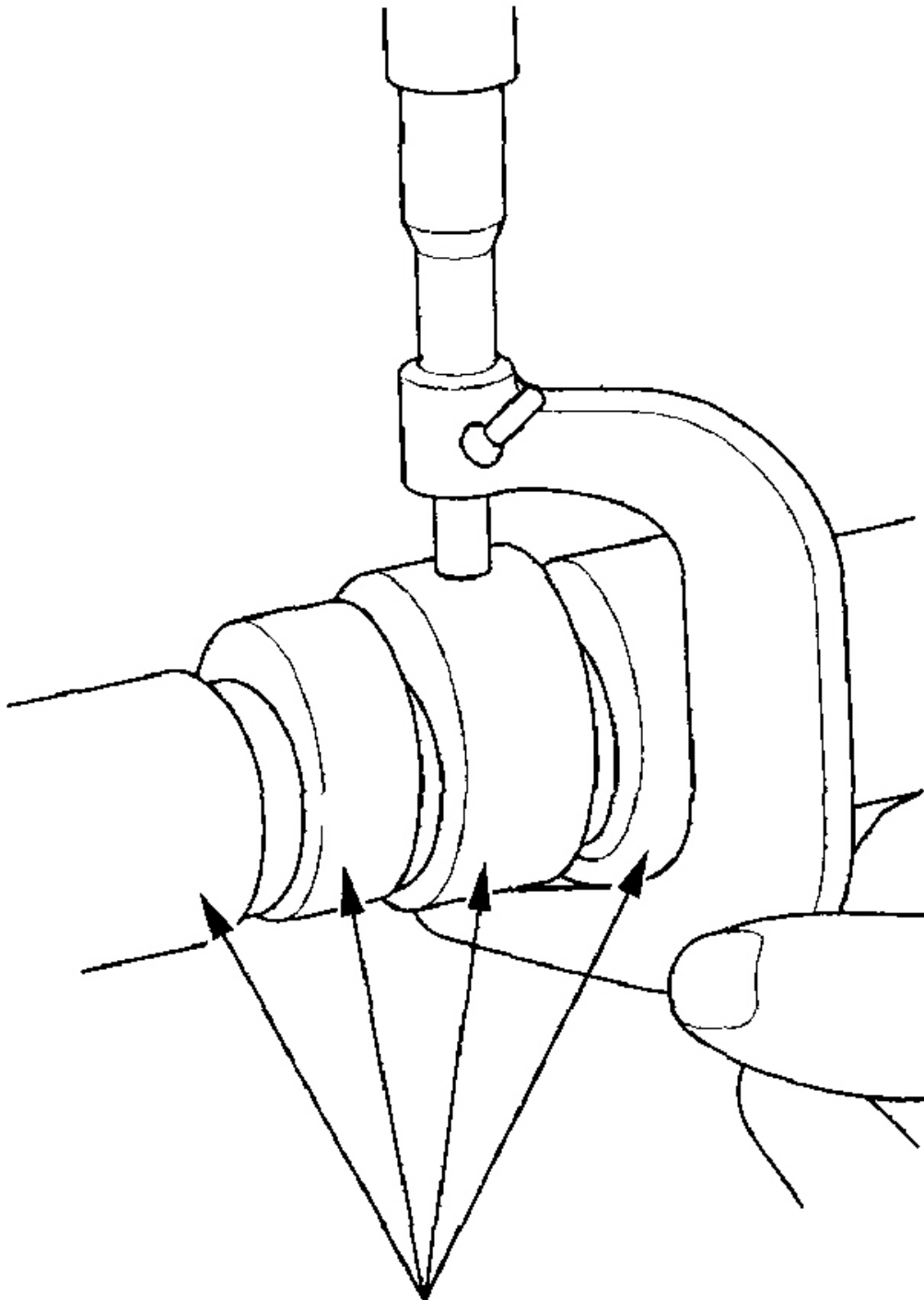
EX: Exhaust

T/B: Timing Belt



G02557020

Fig. 165: Cam Lobe Height Standard Table (New)
 Courtesy of AMERICAN HONDA MOTOR CO., INC.



Inspect this area for wear.

G02557021

Fig. 166: Measuring Cam Lobe Height (F23A1/F23A4 Engines)**Courtesy of AMERICAN HONDA MOTOR CO., INC.****VALVES, SPRINGS & VALVE SEALS REMOVAL**

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.

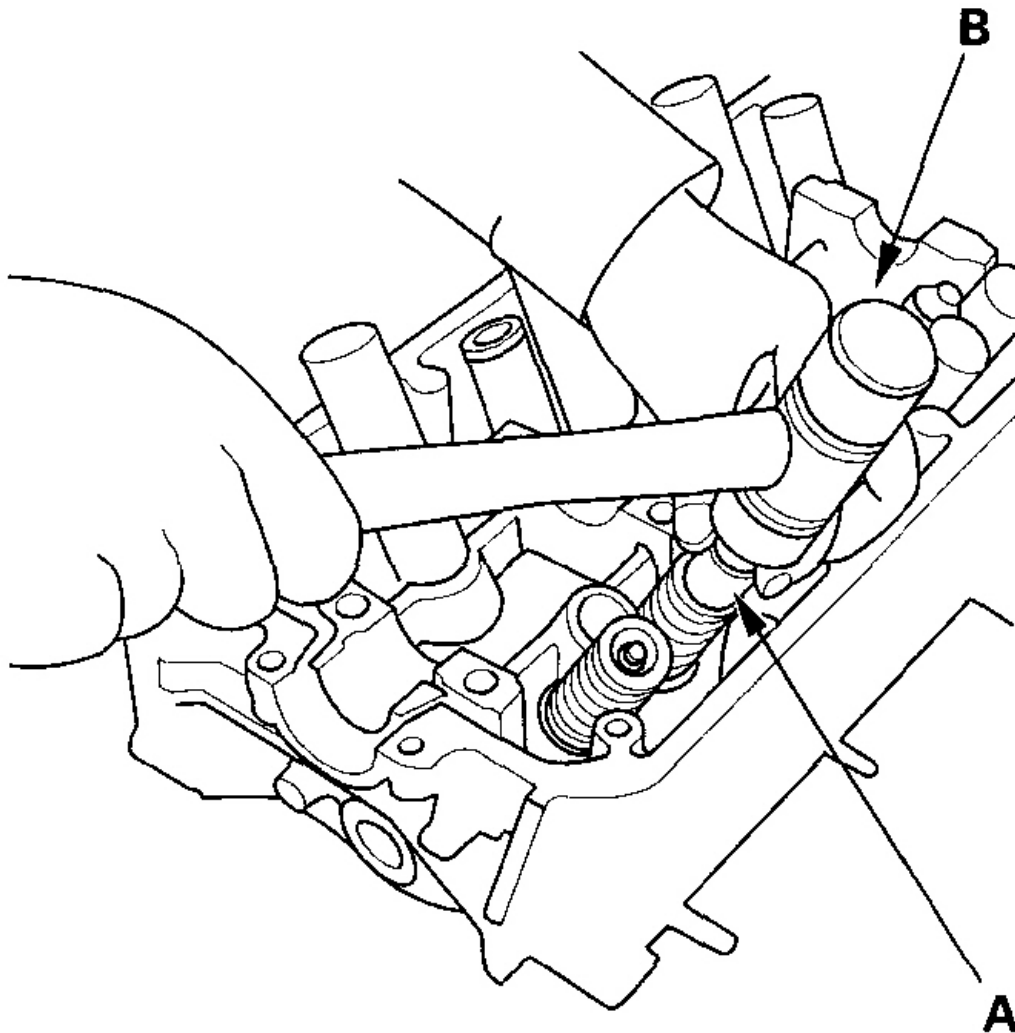
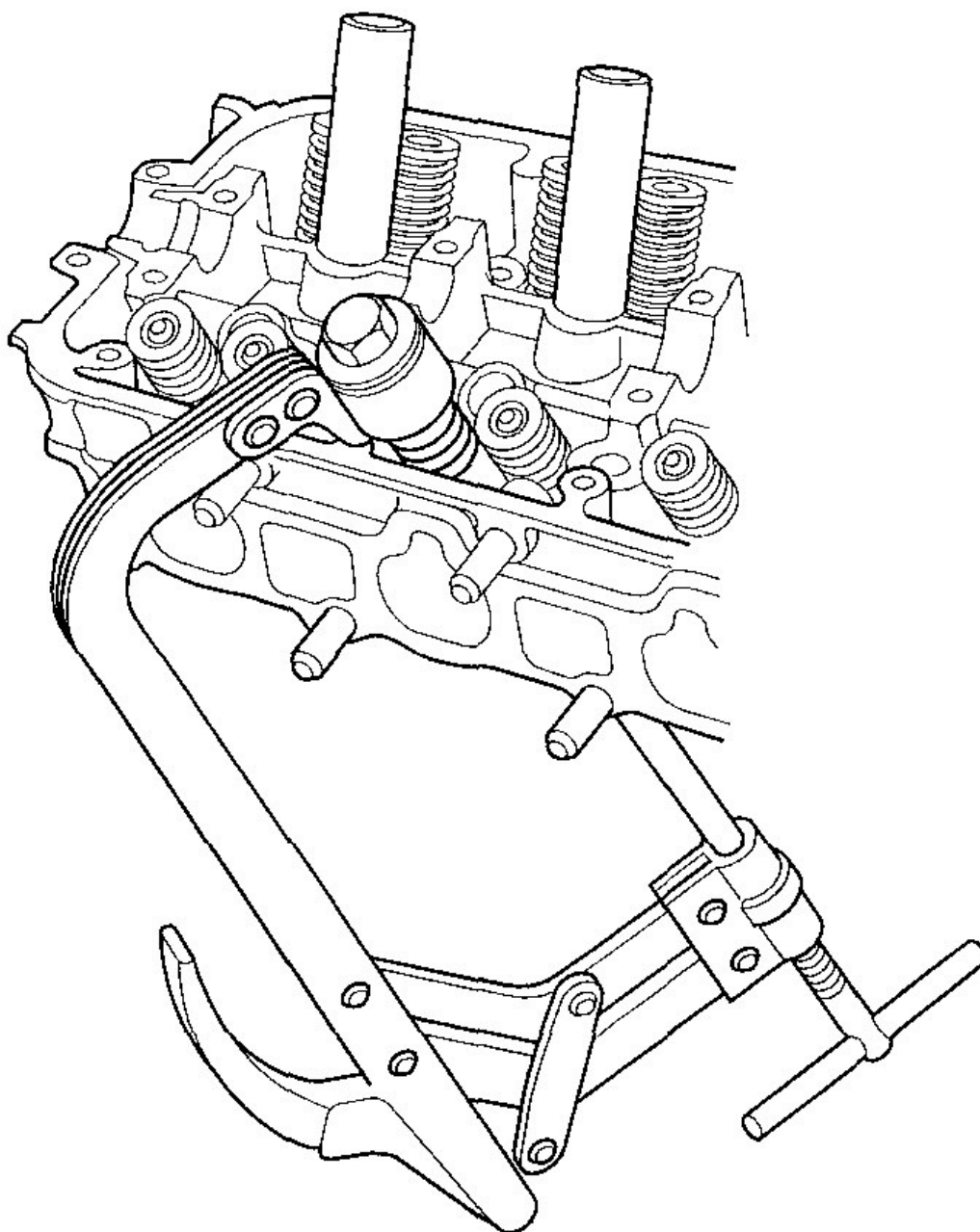
**G02557022**

Fig. 167: Tapping Valve Retainer Using Appropriate-Sized Socket & Plastic Mallet
Courtesy of AMERICAN HONDA MOTOR CO., INC.

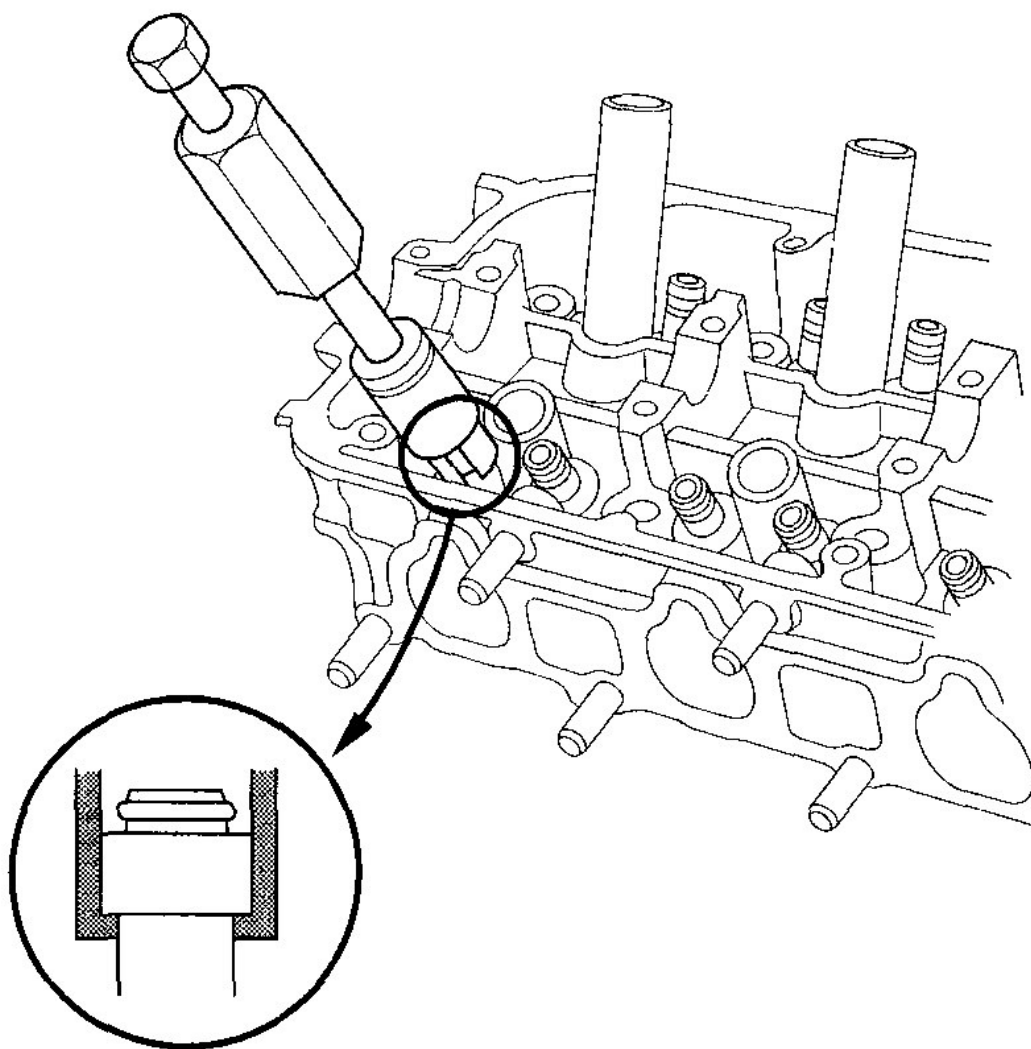
2. Install the spring compressor. Compress the spring and remove the valve keepers.



G02557023

Fig. 168: Compressing Spring & Removing Valve Keepers
Courtesy of AMERICAN HONDA MOTOR CO., INC.

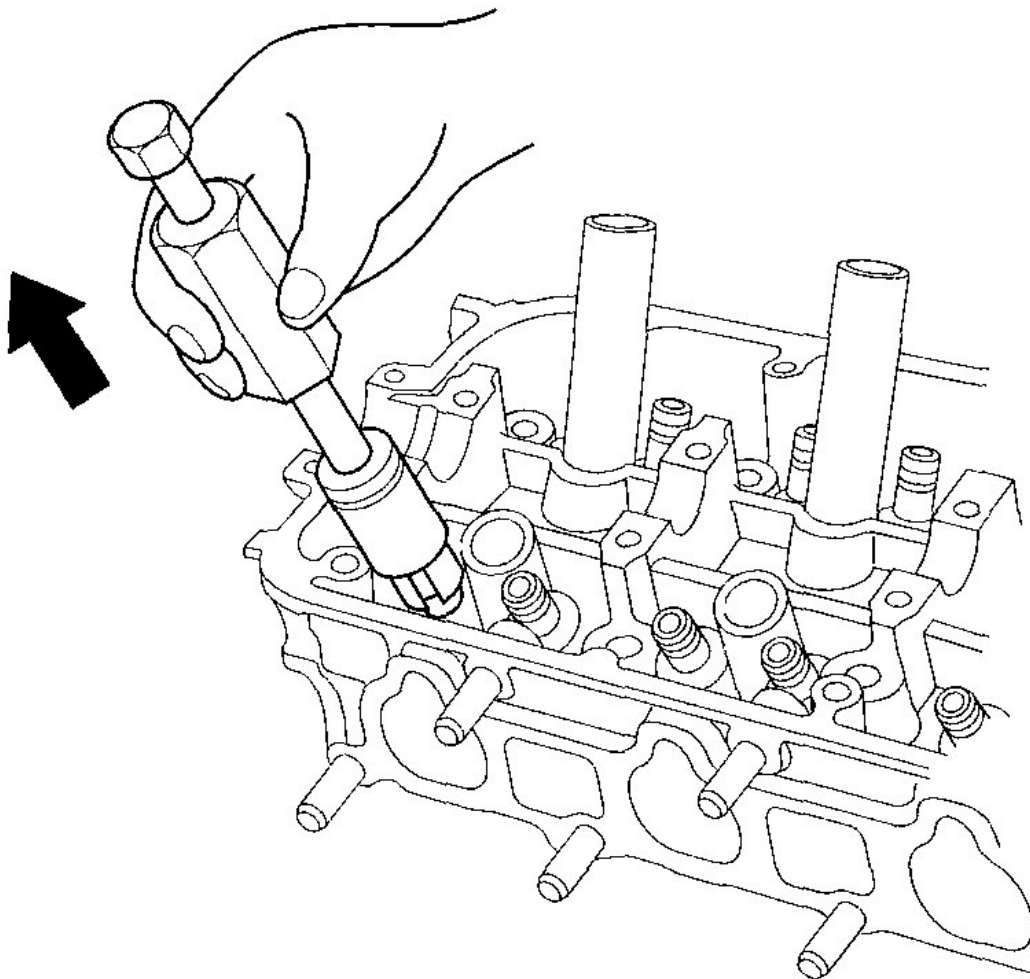
3. Install the valve guide seal remover.



G02557024

Fig. 169: Installing Valve Guide Seal Remover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Remove the valve seal.



G02557025

Fig. 170: Removing Valve Seal

Courtesy of AMERICAN HONDA MOTOR CO., INC.

VALVE INSPECTION

Measure the valve in these areas.

Intake Valve Dimensions

A Standard (New): 33.85-34.15 mm (1.333-1.344 in.)

B Standard (New): 114.85-115.15 mm (4.522-4.533 in.)

C Standard (New): 5.485-5.495 mm (0.2159-0.2163 in.)

C Service Limit: 5.455 mm (0.2148 in.)

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

D Service Limit: 0.65 mm (0.026 in.)

Exhaust Valve Dimensions

A Standard (New): 28.85-29.15 mm (1.136-1.148 in.)

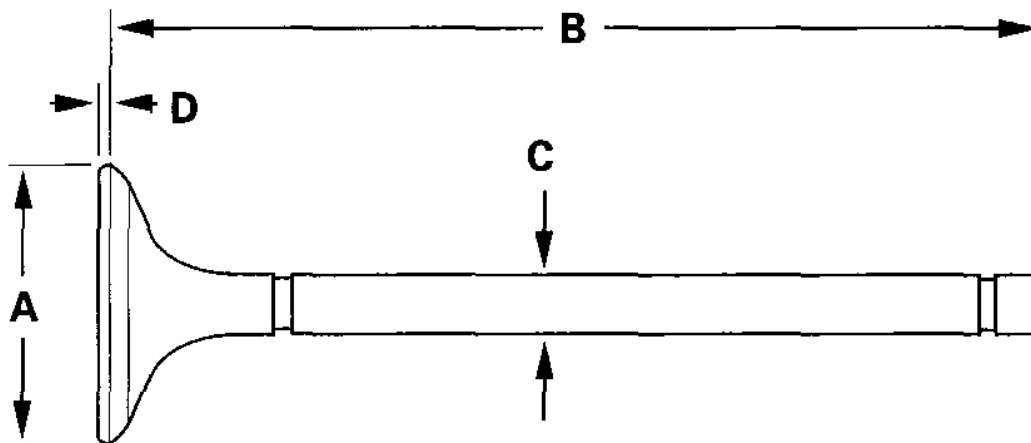
B Standard (New): 112.85-113.15 mm (4.443-4.455 in.)

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

C Service Limit: 5.420 mm (0.2134 in.)

D Standard (New): 1.05-1.35 mm (0.041-0.053 in.)

D Service Limit: 0.95 mm (0.037 in.)



G02557026

Fig. 171: Measuring Valve

Courtesy of AMERICAN HONDA MOTOR CO., INC.

VALVE STEM-TO-GUIDE CLEARANCE INSPECTION

1. Slide the valve out of its guide about 10 mm, 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): 0.04-0.09 mm (0.002-0.004 in.)

Service Limit: 0.16 mm (0.006 in.)

Exhaust Valve Stem-to-Guide Clearance:

Standard (New): 0.11-0.16 mm (0.004-0.006 in.)

Service Limit: 0.24 mm (0.009 in.)



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Fig. 172: Measuring Guide-To-Stem Clearance

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): 0.020-0.045 mm (0.0008-0.0018 in.)

Service Limit: 0.08 mm (0.003 in.)

Exhaust Valve Stem-to-Guide Clearance:

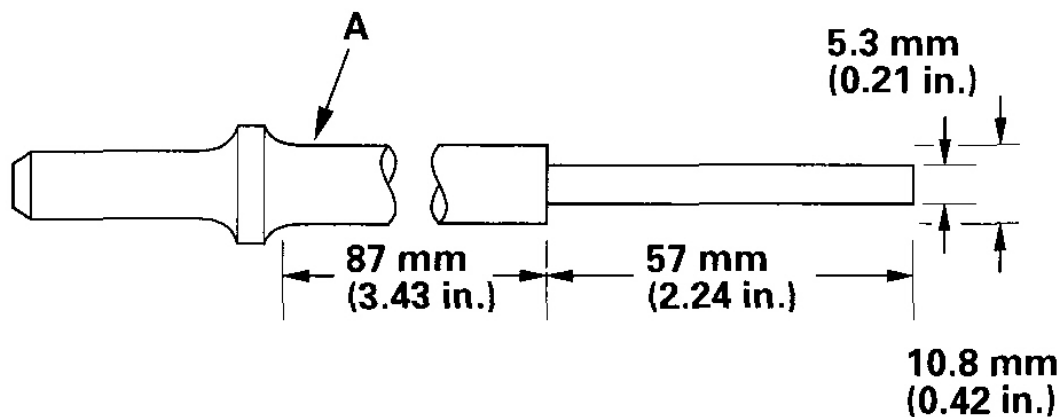
Standard (New): 0.055-0.080 mm (0.0022-0.0031 in.)

Service Limit: 0.12 mm (0.005 in.)

VALVE GUIDE REPLACEMENT

Special Tools Required

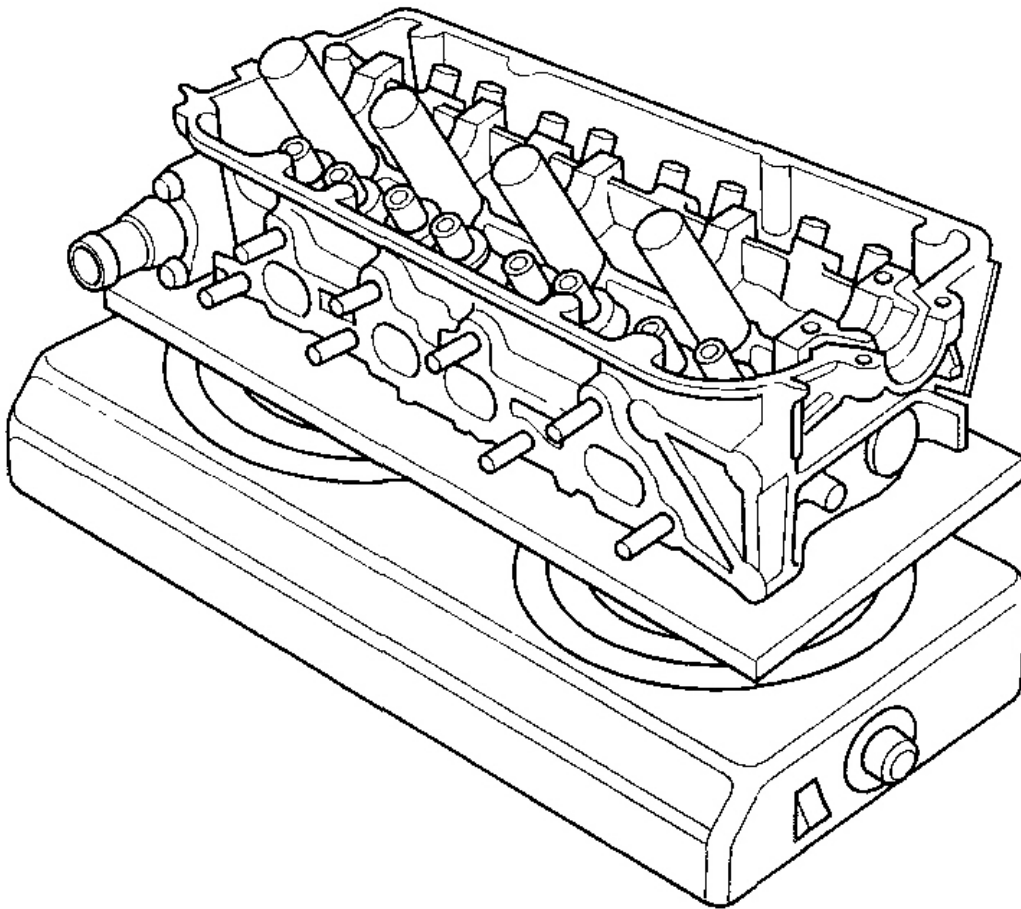
- Valve Guide Driver, 5.5 mm 07742-0010100
 - Valve Guide Reamer, 5.5 mm 07HAH-PJ7010B
1. Modify a commercially-available air-impact valve guide driver (A) to the dimensions shown. In most cases, the same procedure can be done using the special tool and a conventional hammer.



G02557028

Fig. 173: Modifying Commercially-Available Air-Impact Valve Guide Driver
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.

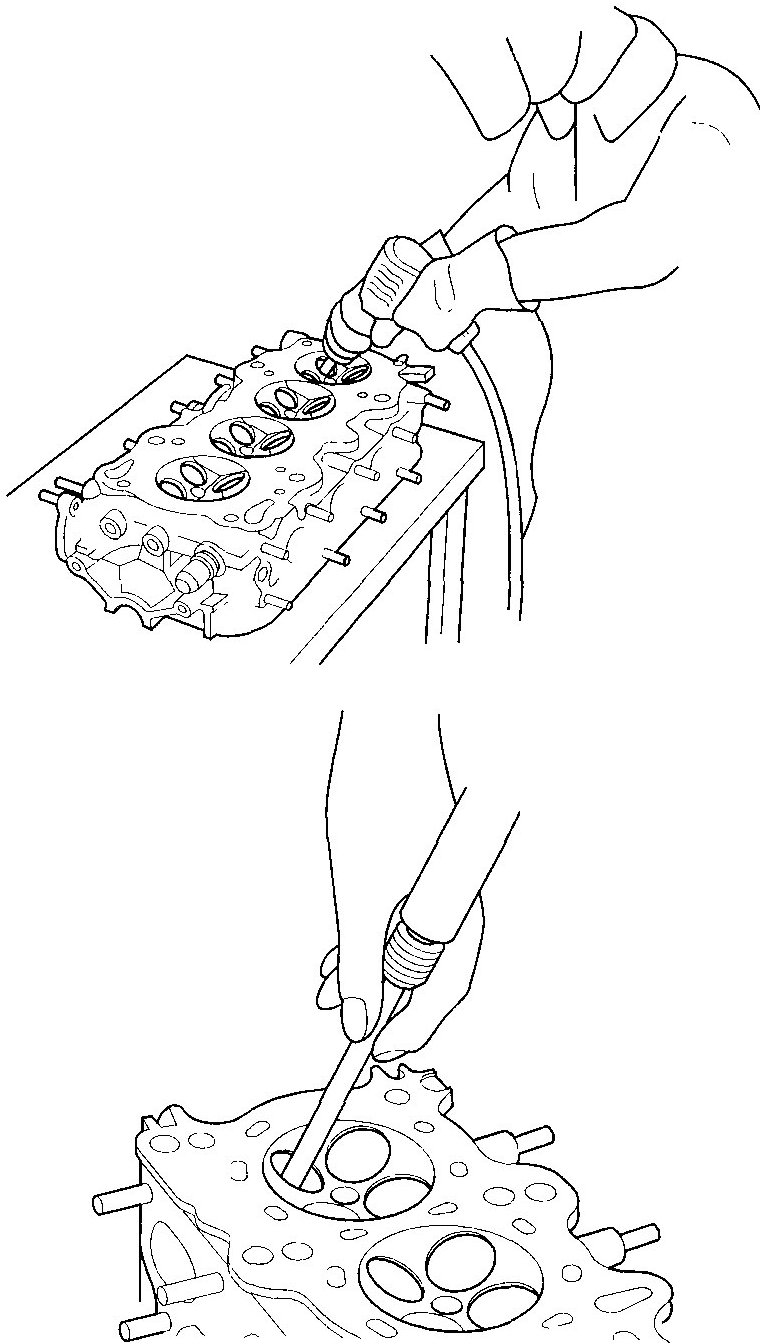


G02557029

Fig. 174: 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.



G02557030

Fig. 175: Driving Guide Out

Courtesy of AMERICAN HONDA MOTOR CO., INC.

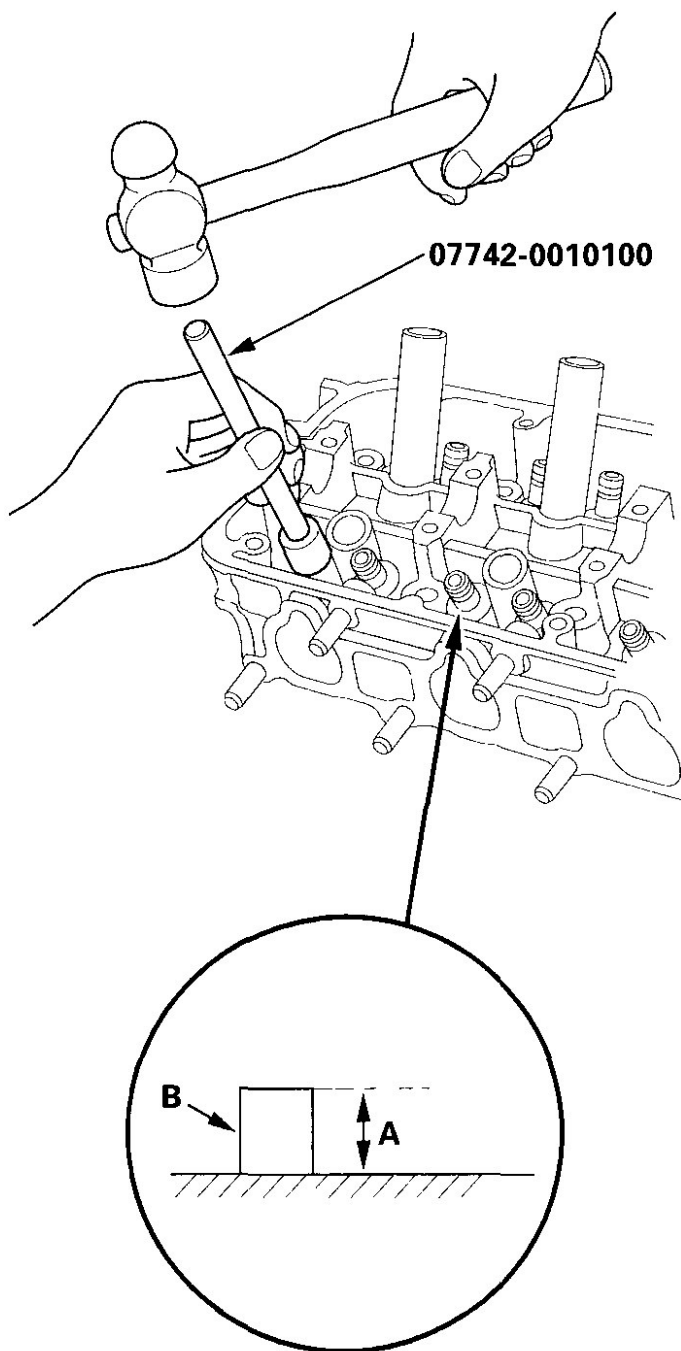
6. If a valve guide won't move, drill it out with a 8 mm (5/16 inch) bit, then try again. Drill guides only in extreme cases; you could damage the cylinder head if the guide breaks.

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: 21.20-22.20 mm (0.835-0.874 in.)

Exhaust: 20.63-21.63 mm (0.812-0.852 in.)



G02557031

Fig. 176: Installing 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.

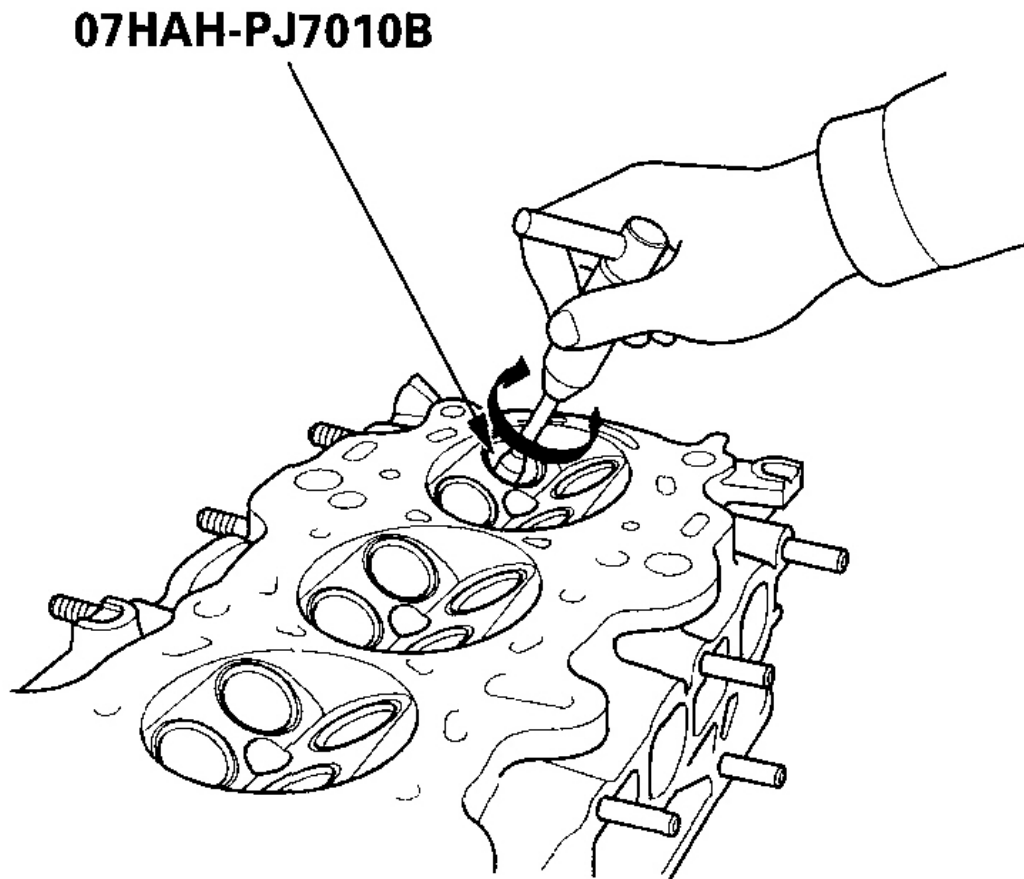


Fig. 177: Rotating Reamer

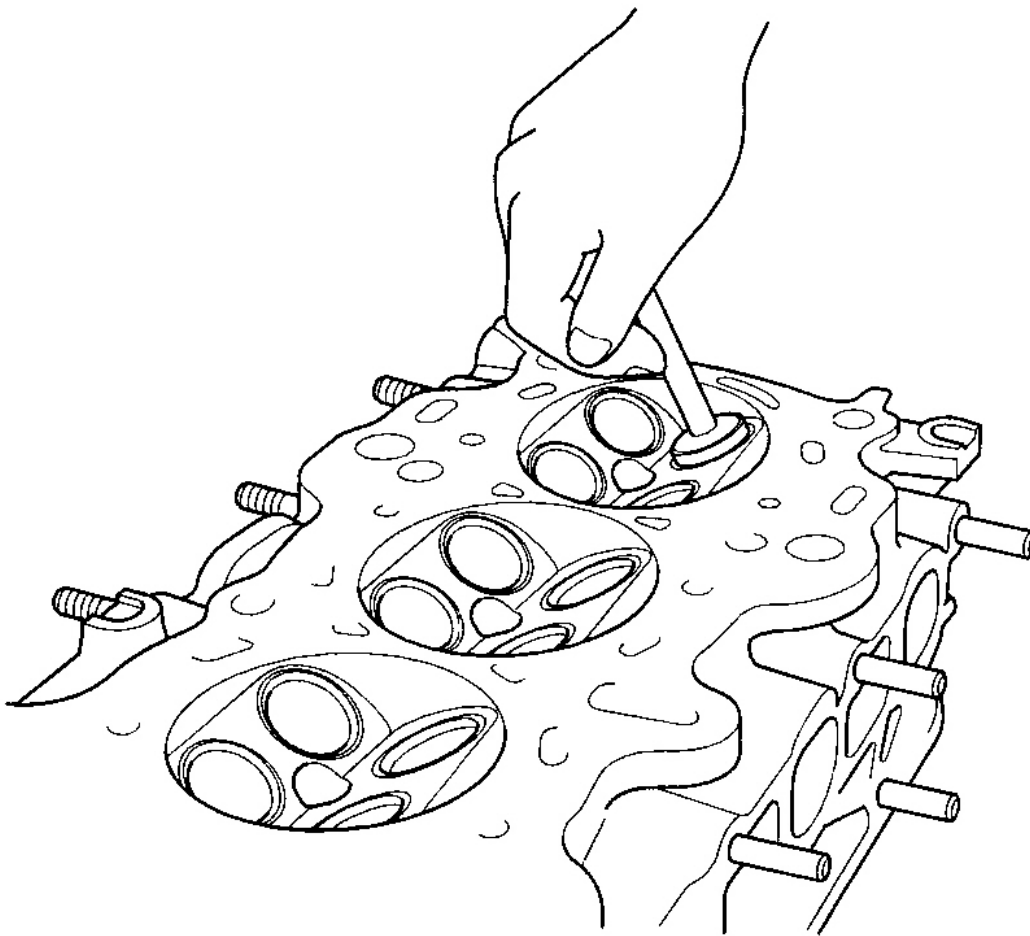
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.

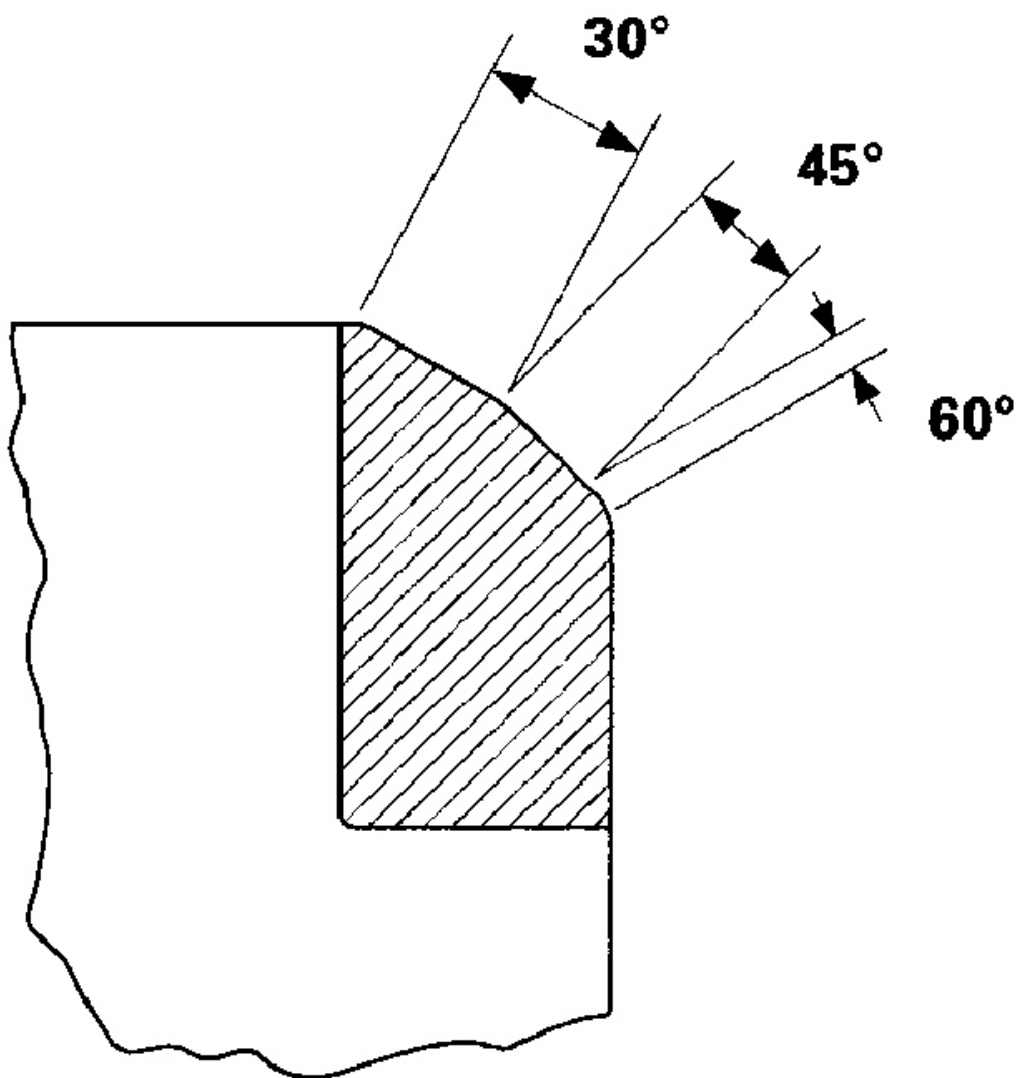
1. Renew the valve seats in the cylinder head using a valve seat cutter.



G02557033

Fig. 178: Renewing Valve Seats In Cylinder Head
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Carefully cut a 45° seat, removing only enough material to ensure a smooth and concentric seat.
3. Bevel the upper edge of the seat with a 30° cutter and the lower edge of the seat with a 60° cutter. Check the width of the seat and adjust accordingly.



G02557034

Fig. 179: Beveling Upper Edge Of Seat

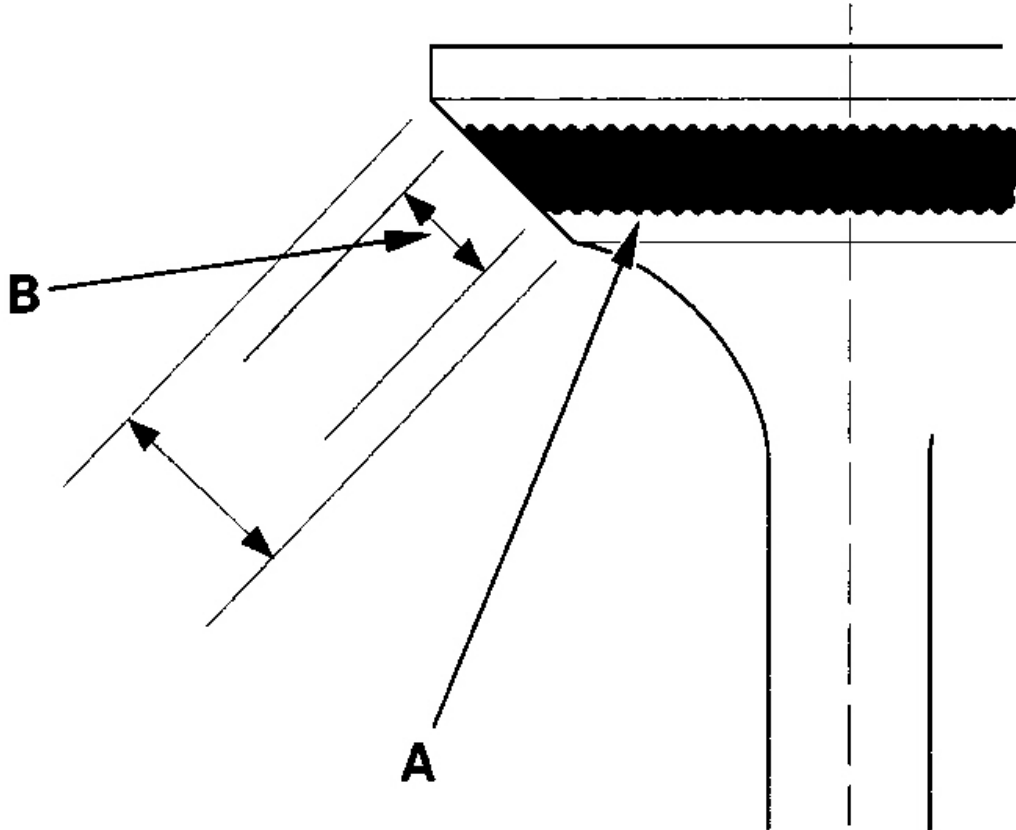
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

Valve Seat Width:**Standard (New):** 1.25-1.55 mm (0.049-0.061 in.)

Service Limit: 2.00 mm (0.079 in.)

5. After resurfacing the seat, inspect 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.



G02557035

Fig. 180: Applying Prussian Blue Compound To Valve Face
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. 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 60° cutter 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.**

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

Intake Valve Stem Installed Height:

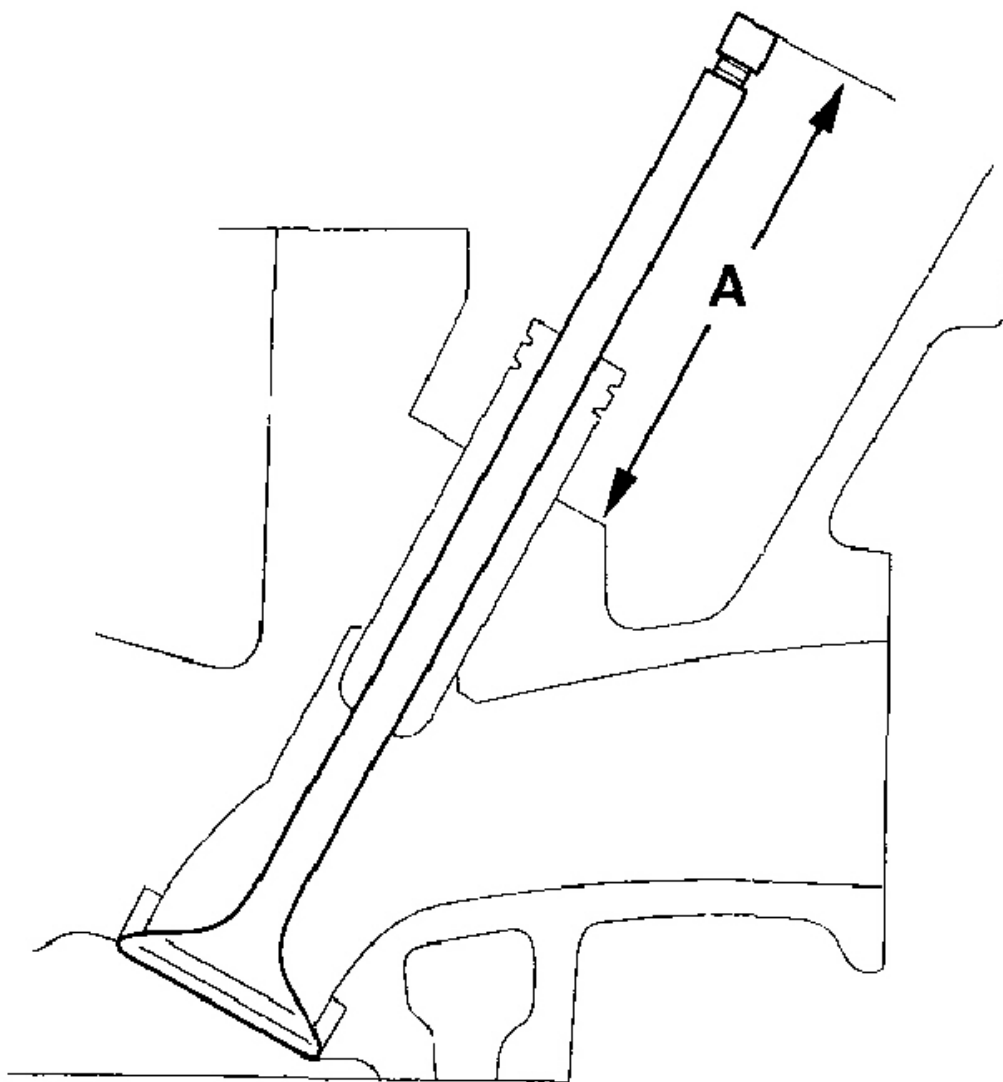
Standard (New): 46.75-47.55 mm (1.841-1.872 in.)

Service Limit: 47.80 mm (1.882 in.)

Exhaust Valve Stem Installed Height:

Standard (New): 46.68-47.48 mm (1.838-1.869 in.)

Service Limit: 47.73 mm (1.879 in.)



G02557036

Fig. 181: Measuring Valve Stem Installed Height
Courtesy of AMERICAN HONDA MOTOR CO., INC.

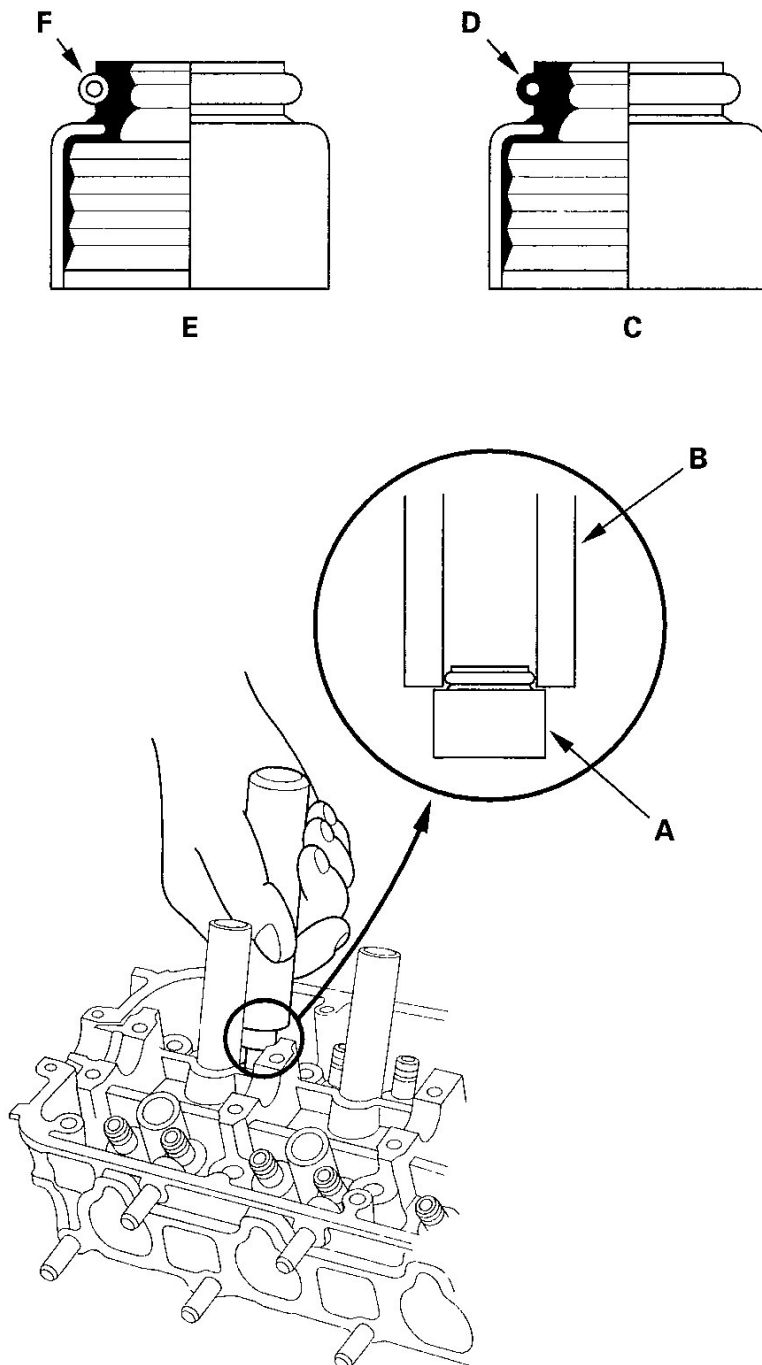
8. If valve stem installed height is over the service limit, replace the valve and recheck. If it is still over the service limit, replace the cylinder head; the valve seat in the head is too deep.

VALVES, SPRINGS & VALVE SEALS INSTALLATION

1. Coat the valve stems with 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.

NOTE: Exhaust valve seal (C) has a black spring (D), and intake valve seal (E) has a white spring (F). They are not interchangeable.



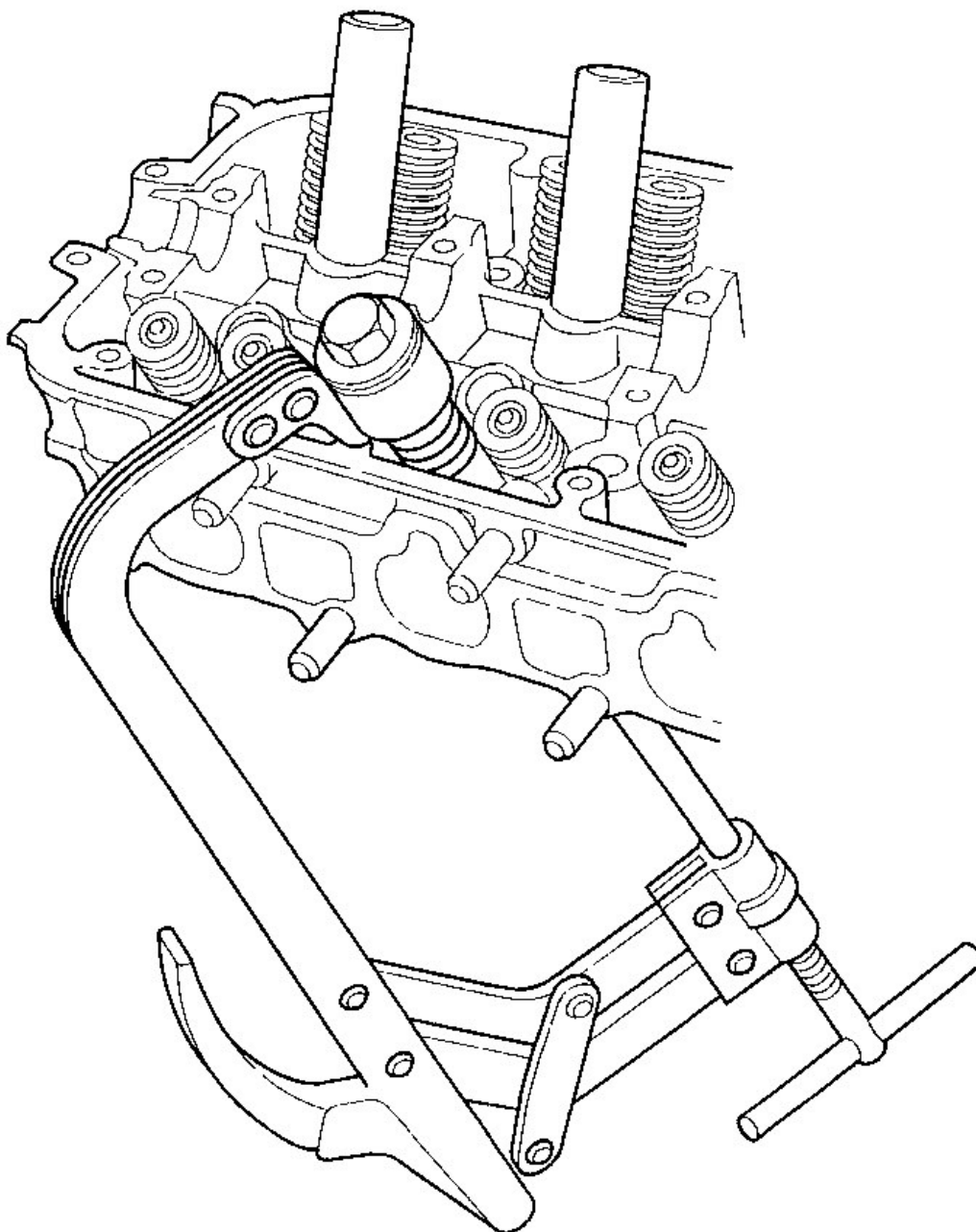
G02557037

Fig. 182: Installing New Valve Seals Using Valve Guide Seal Installer
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Install the new valve seals (A) using the valve guide seal installer (B).
5. Install the valve spring and valve retainer. Place the end of the valve spring with closely wound coils

toward the cylinder head.

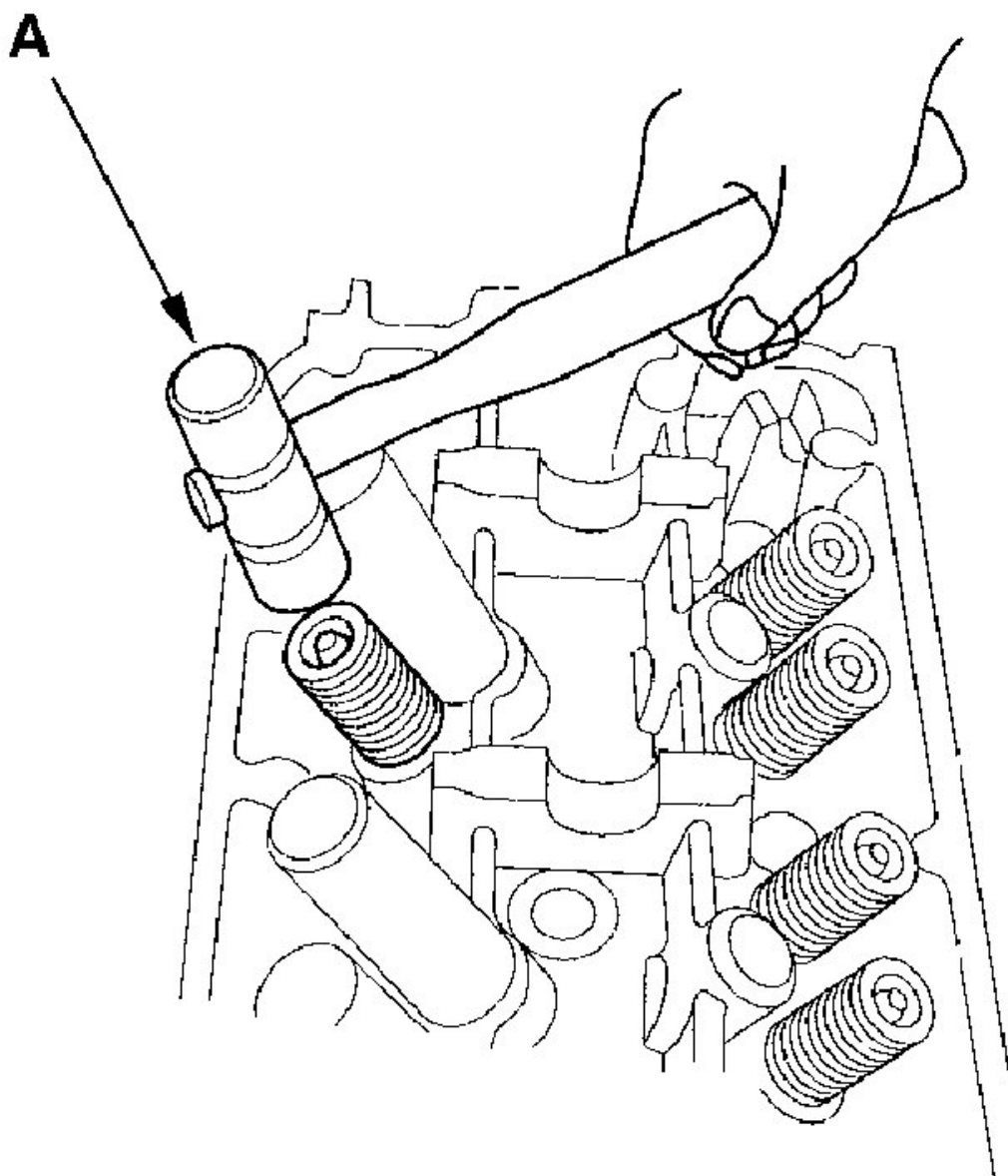
6. Install the valve spring compressor. Compress the spring and install the valve keepers.



G02557038

Fig. 183: Compressing Spring & Installing Valve Keepers**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

7. 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.



G02557039

Fig. 184: Tapping End Of Valve Stem With Plastic Mallet
Courtesy of AMERICAN HONDA MOTOR CO., INC.

CAMSHAFT/ROCKER ARMS, CAMSHAFT SEAL, & PULLEY INSTALLATION

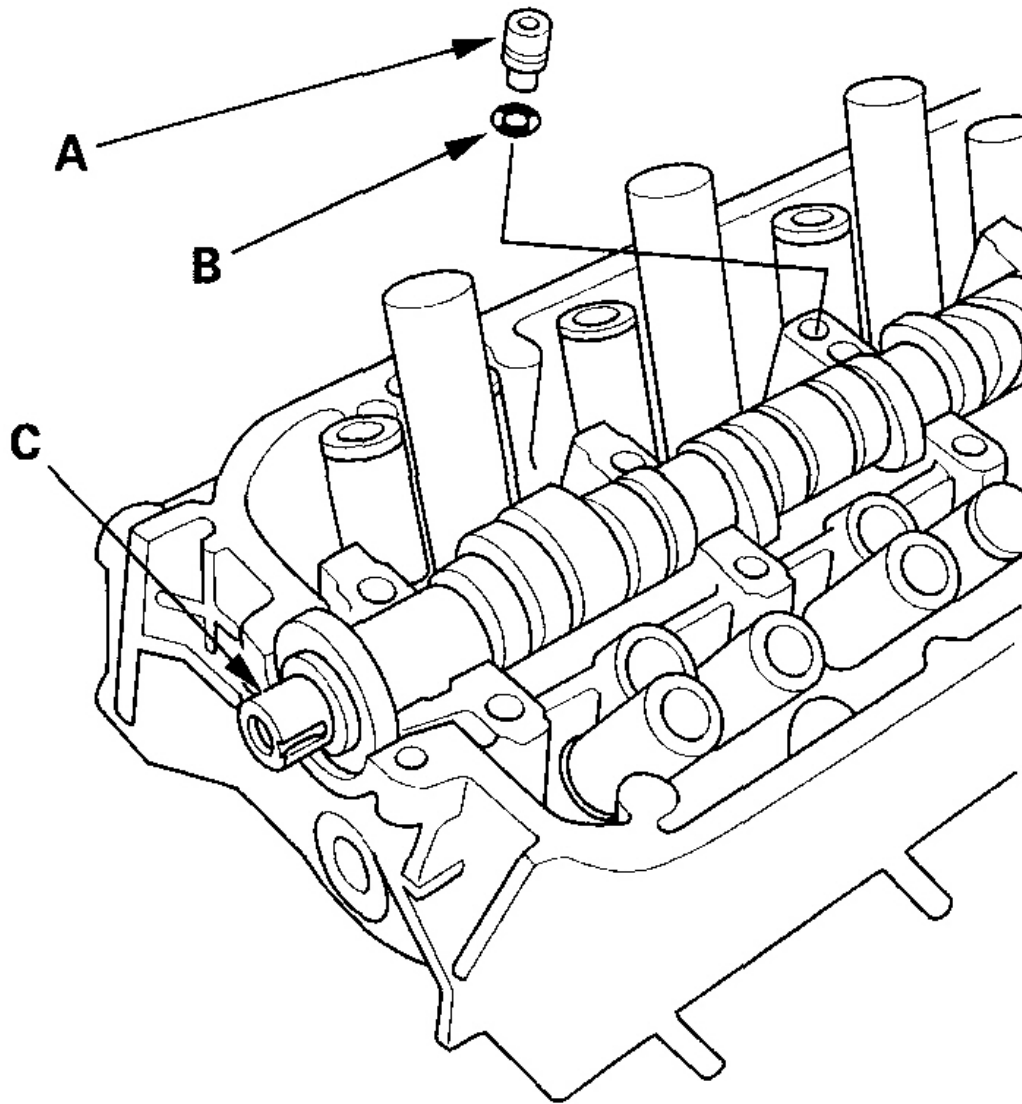
Special Tools Required

- Seal Guide 07NAG-PT0010A
- Installer Cup 07NAF-PT0010A
- Installer Shaft 07NAF-PT0020A

NOTE:

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

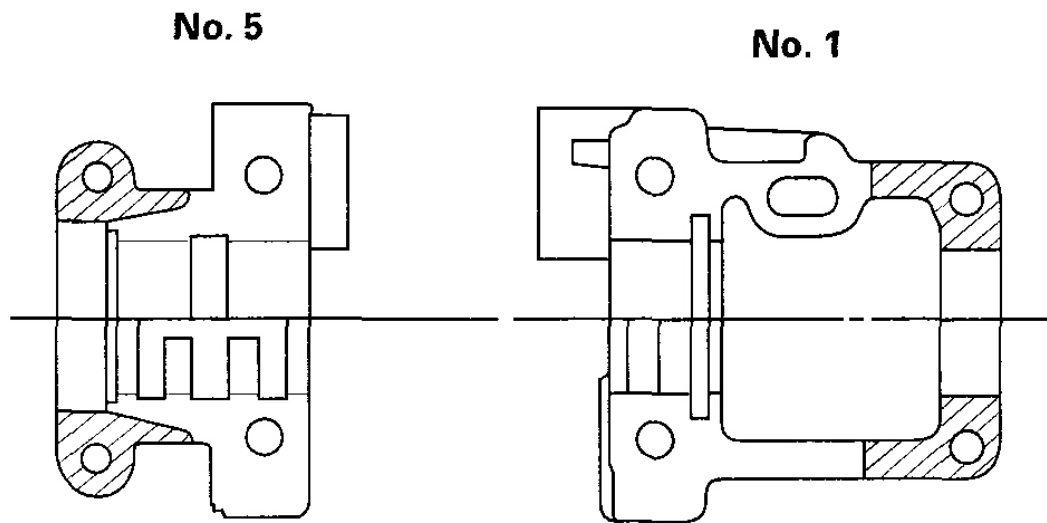
1. After wiping down the camshaft and the journals in the cylinder head, lubricate both surfaces and install the camshaft.
2. Clean and install the oil control orifice (A) with a new O-ring (B).



G02557040

Fig. 185: Installing Oil Control Orifice With New O-Ring
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

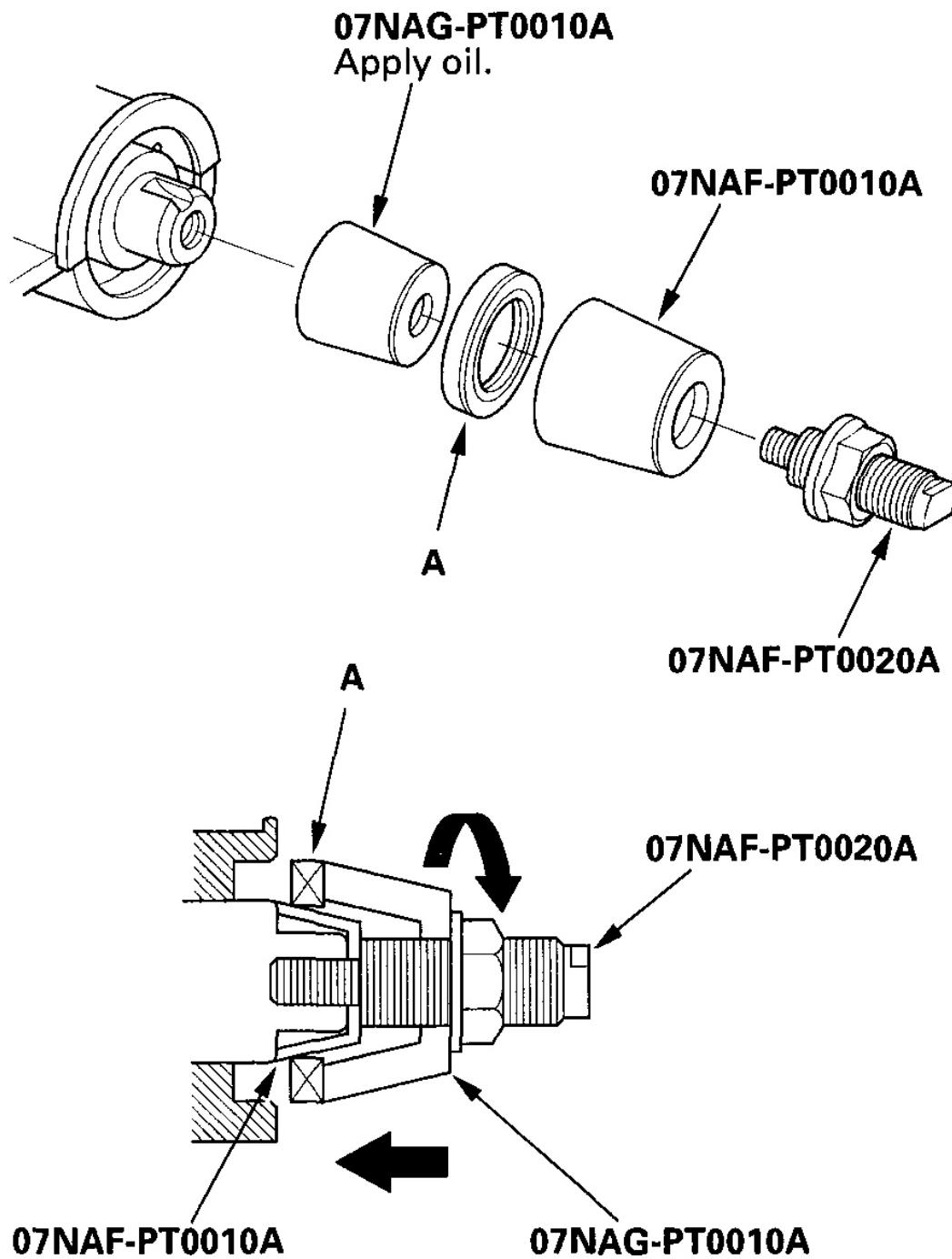
3. Turn the camshaft until its keyway (C) is facing up. (No. 1 piston TDC).
4. Loosen all the valve adjusting screws.
5. Apply liquid gasket to the head mating surfaces (the shaded areas) of the No. 1 and No. 5 camshaft holders.



G02557041

Fig. 186: Applying Liquid Gasket**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

6. 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.
7. Install the camshaft oil seal (A) using the special tools as shown.



G02557042

Fig. 187: Installing Camshaft Oil Seal
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Make sure all the rocker arms are aligned with the valves.
9. Tighten each bolt two turns at a time, in the sequence shown below, to ensure that the rockers do not bind on the valves.

Specified torque:

8 mm bolts: 22 N.m (2.2 kgf.m, 16 lbf.t)

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

6 mm bolts: (11), (12), (13), (14)

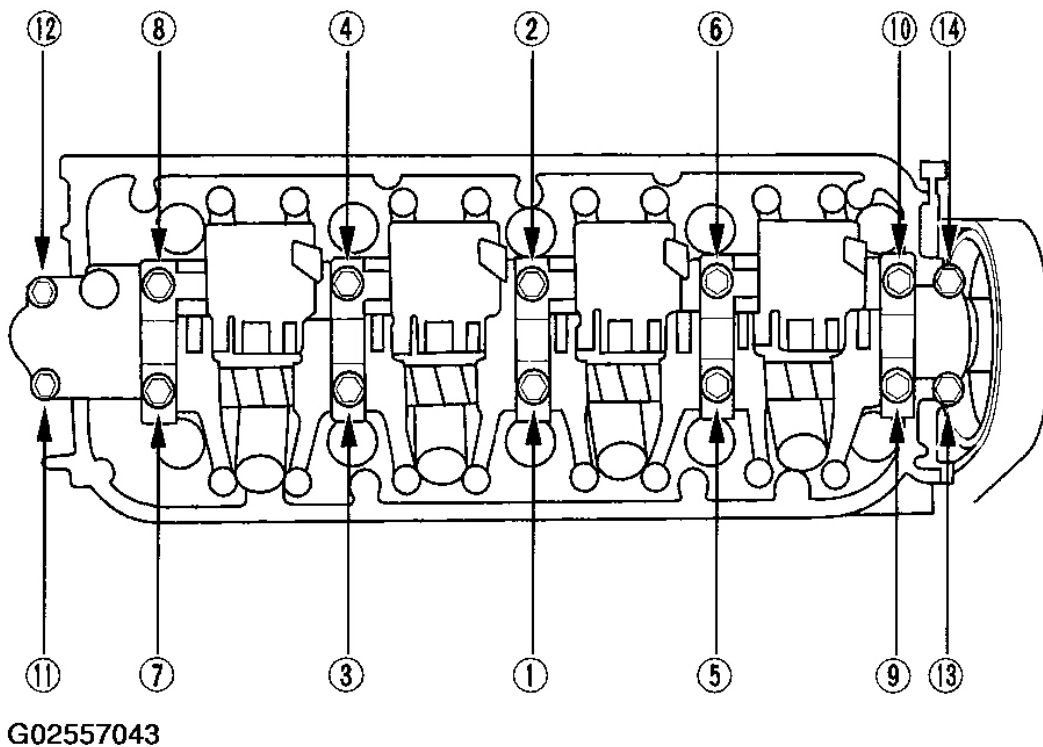


Fig. 188: Identifying Tightening Sequence

Courtesy of AMERICAN HONDA MOTOR CO., INC.

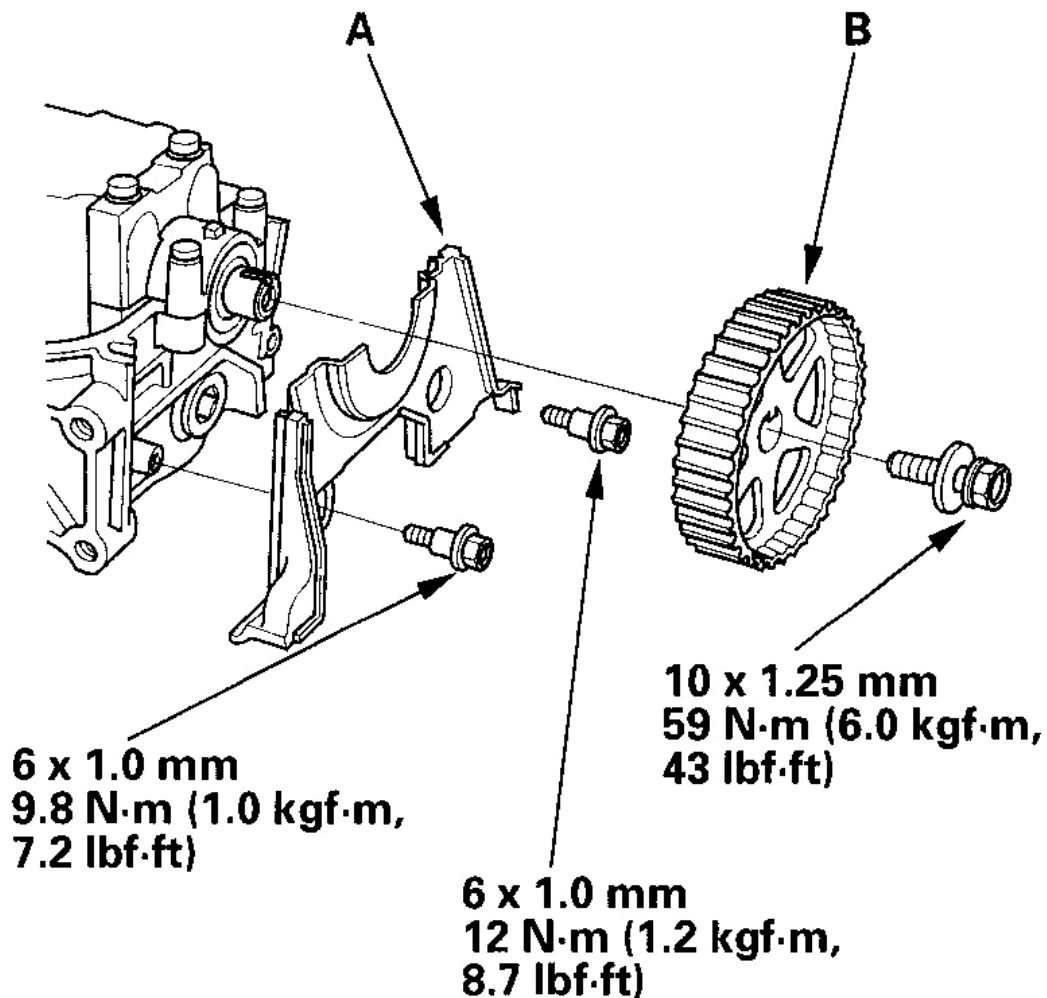
10. Check the back cover rubber seal for cracks and other damage.

NOTE:

- If the rubber seal is coming off, reattach it with liquid gasket. Wipe off any excess liquid gasket.
- When replacing the seal, clean the lower cover groove, cut the repair strip to length, and press the new piece into the groove evenly.
- After installing the rubber seal, check the joints. Apply liquid gasket

if there is any gap or opening.

11. Install the back cover (A).



G02557044

Fig. 189: Installing Back Cover

Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Install the camshaft pulley (B) onto the camshaft, then tighten the retaining bolt to the torque shown.

CYLINDER HEAD INSTALLATION

1. Clean the cylinder head and block surfaces.

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

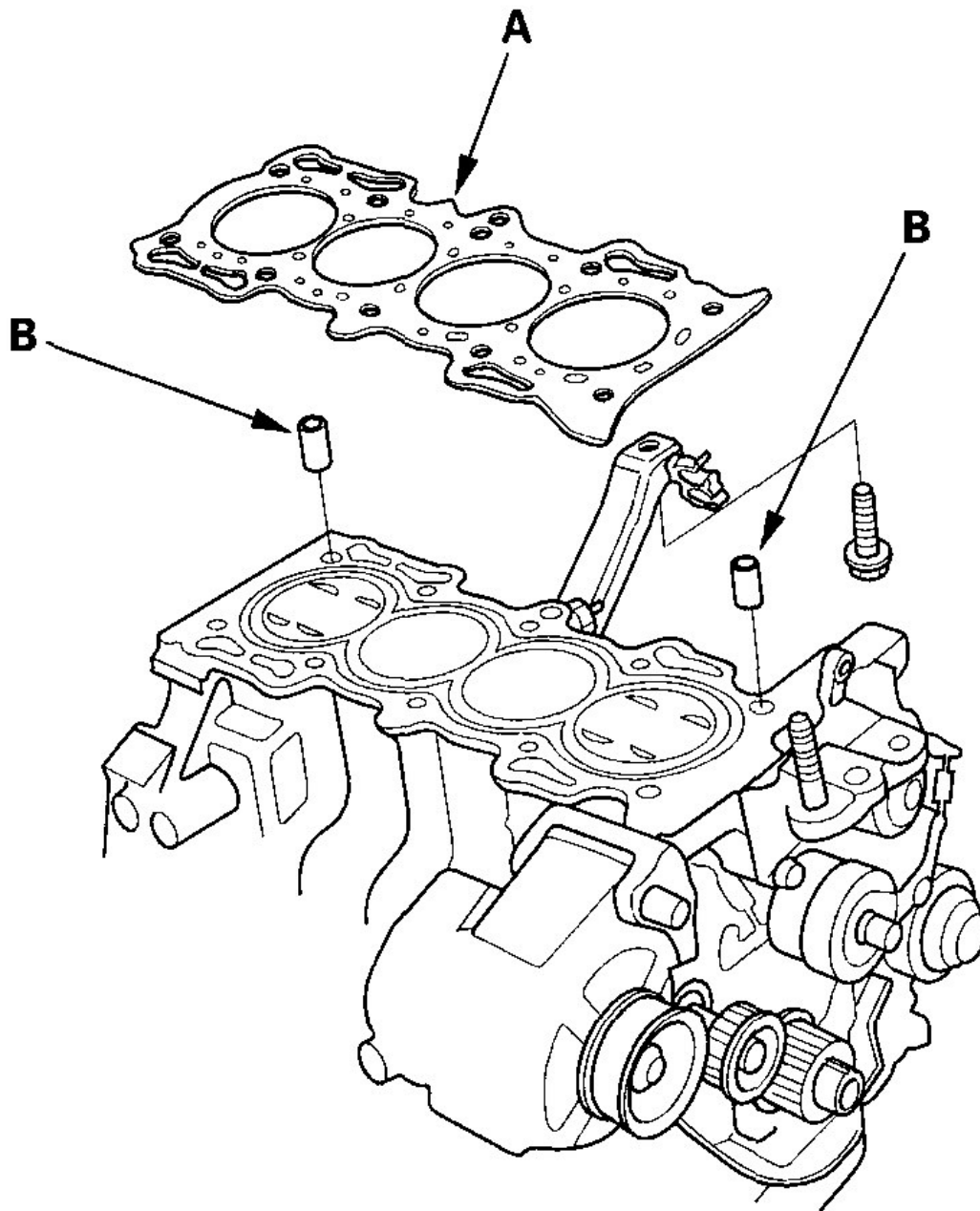
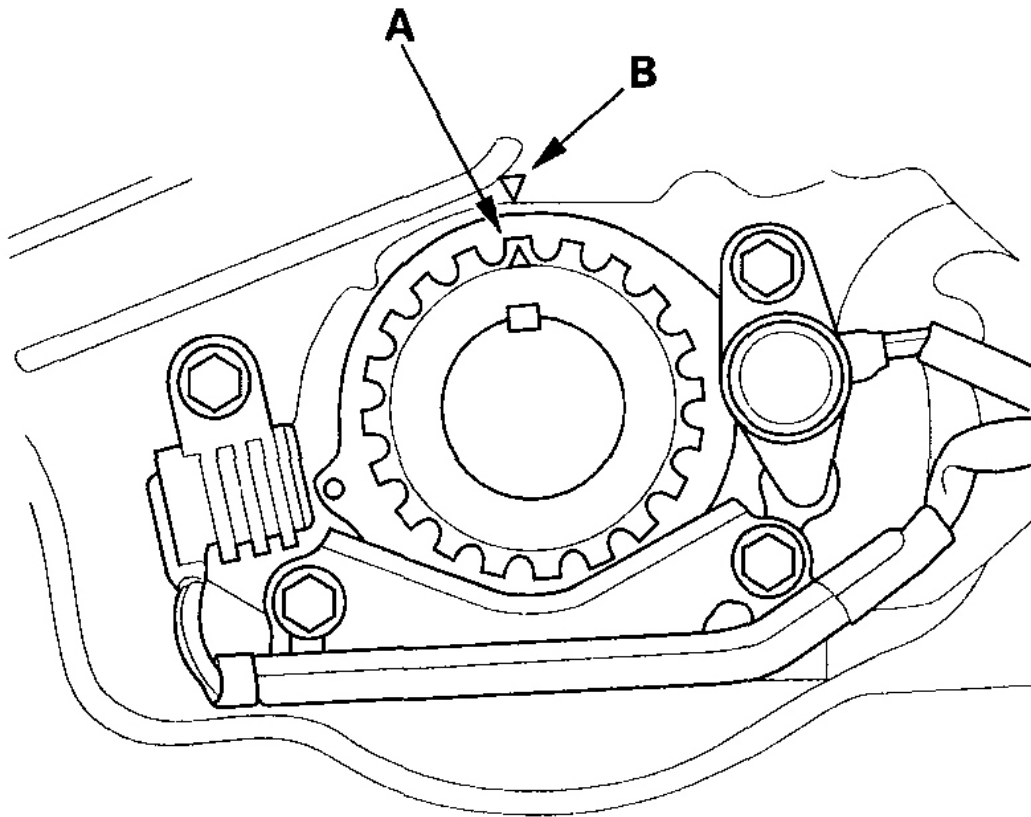
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Fig. 190: Installing Cylinder Head Gasket & Dowel Pins On Cylinder Block

Courtesy of AMERICAN HONDA MOTOR CO., INC.

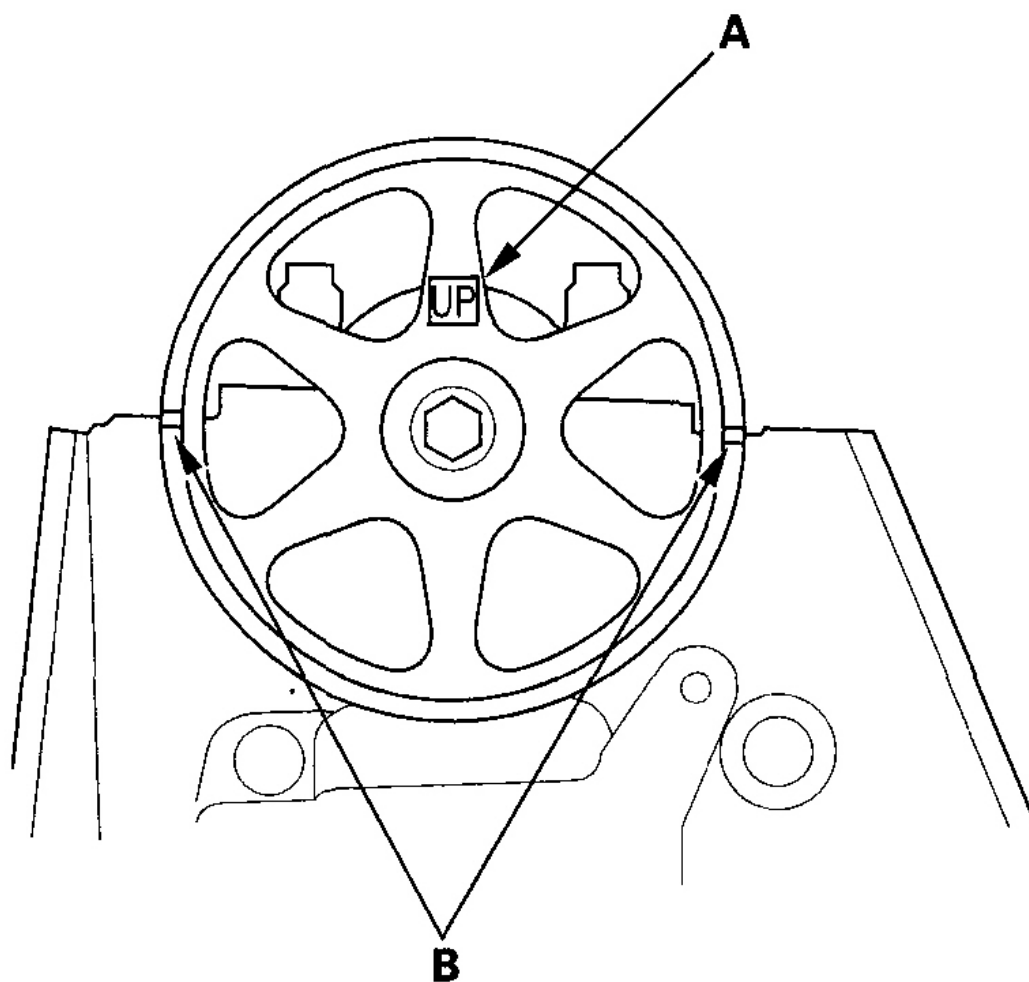
3. Set the timing belt drive pulley to TDC. Align the dimple (A) on the tooth of the timing belt drive pulley with the pointer (B) on the oil pump.



G02557046

Fig. 191: Aligning Dimple On Tooth Of Timing Belt Drive Pulley With Pointer
Courtesy of AMERICAN HONDA MOTOR CO., INC.

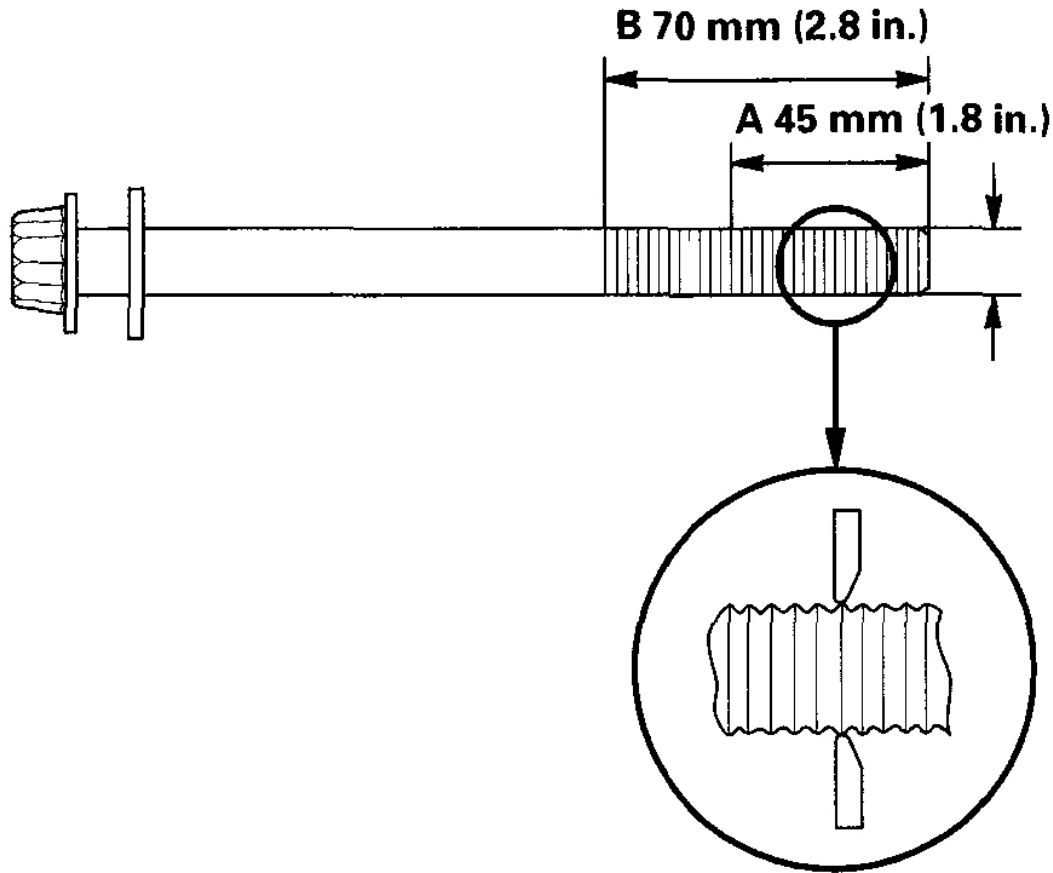
4. Clean the camshaft pulley and set it to TDC.
 - A. The UP mark (A) on the camshaft pulley should be at the top.
 - B. Align the TDC grooves (B) on the pulley with the top edge of the head.



G02557047

Fig. 192: Setting Camshaft Pulley To TDC
Courtesy of AMERICAN HONDA MOTOR CO., INC.

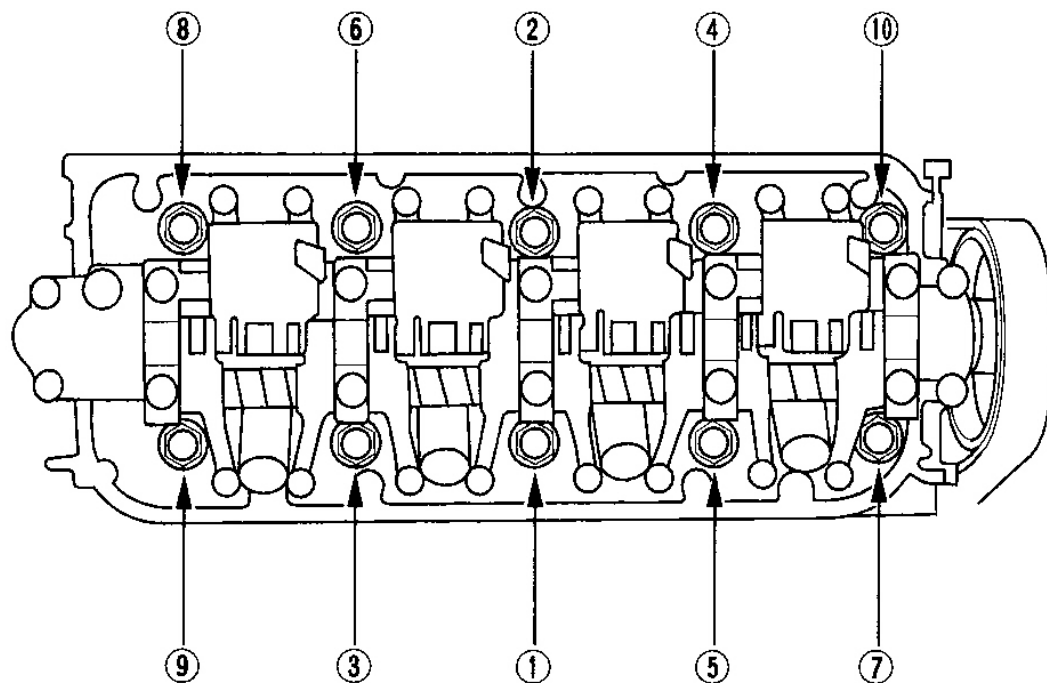
5. Install the cylinder head on the block.
6. Measure the diameter of each cylinder head bolt at point A and point B.



G02557048

Fig. 193: Measuring Diameter Of Each Cylinder Head Bolt
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

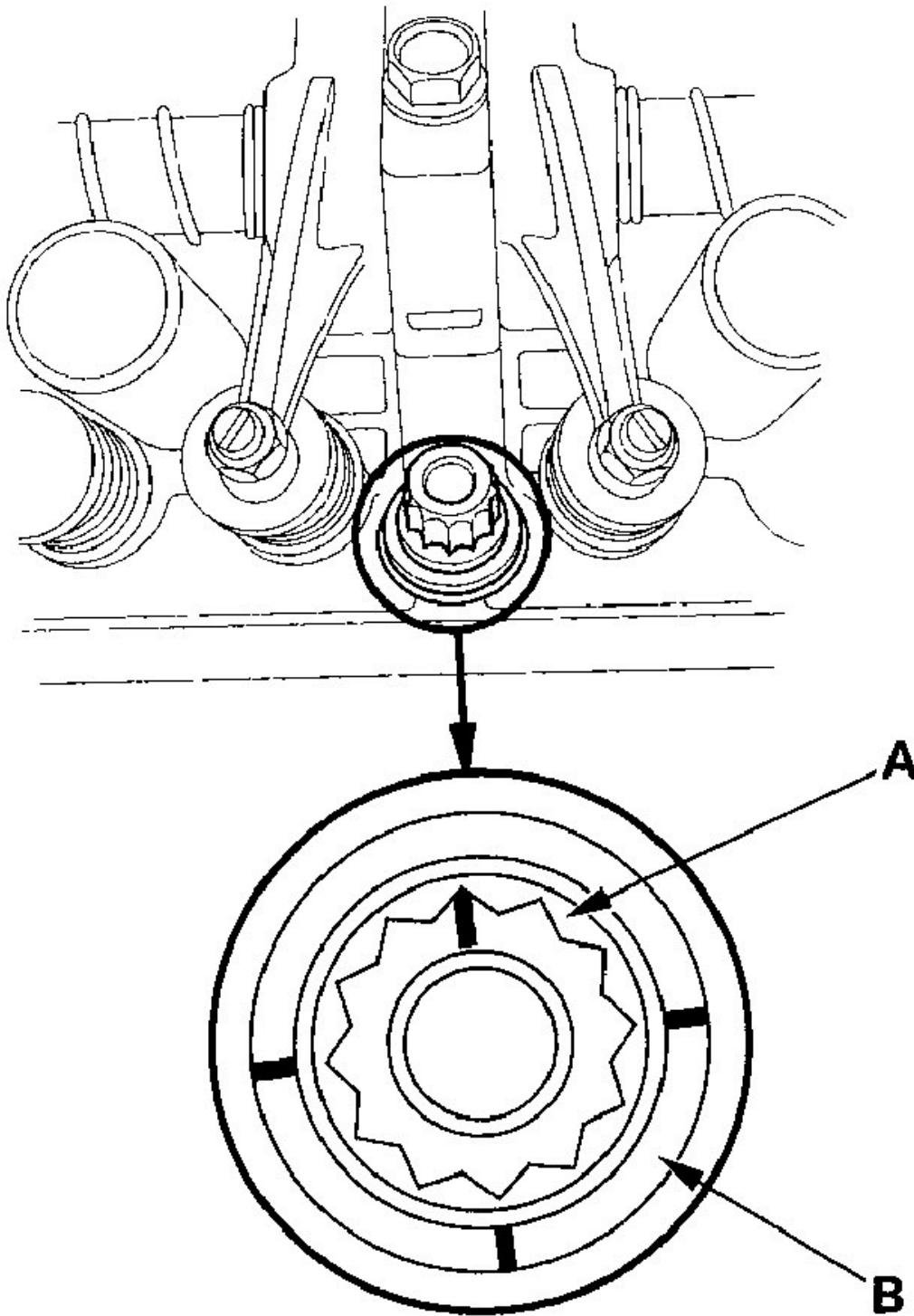
7. If either diameter is less than 11.3 mm (0.44 in.), replace the cylinder head bolt.
8. Apply clean engine oil to the bolt threads and under the bolt heads of all the cylinder head bolts.
9. Tighten the cylinder head bolts. Tighten the cylinder head bolts in sequence to 29 N.m (3.0 kgf.m, 22 lbf-Ft). 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.



G02557049

Fig. 194: Identifying Cylinder Head Bolts Torque Sequence
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Mark the bolt head (A) and the cylinder head (B) as shown.



G02557050

Fig. 195: Marking Bolt Head & Cylinder Head**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

11. Tighten the cylinder head bolts until the mark on the bolt head aligns with the second mark on the cylinder head (turn the bolt 180°).

If you are using a new cylinder head bolt, tighten the bolt to the third mark (270°).

12. Install the intake manifold (A) and then tighten the nuts in a crisscross pattern in two or three steps, beginning with the inner nuts. Always use a new intake manifold gasket (B) and new O-ring (C).

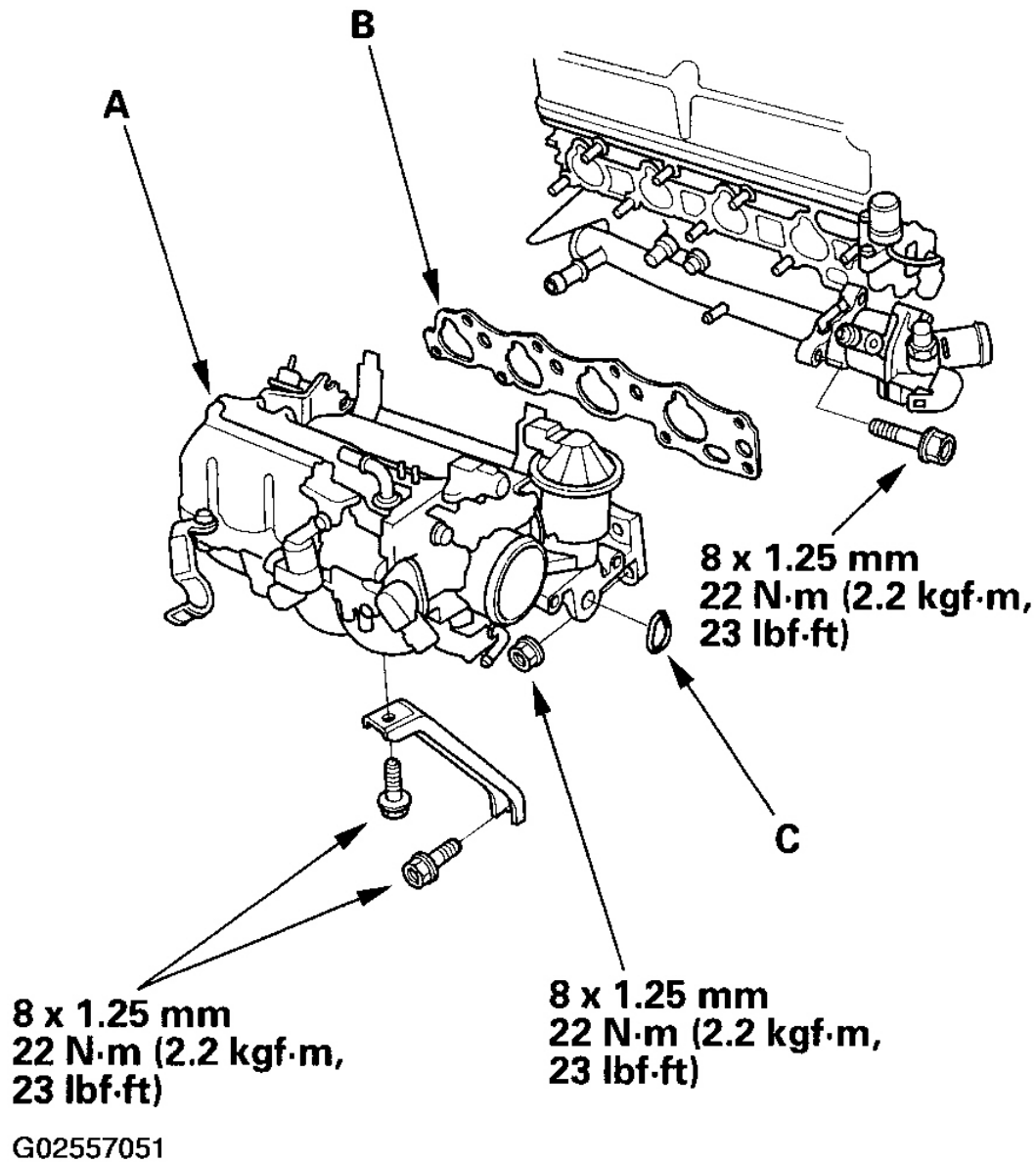
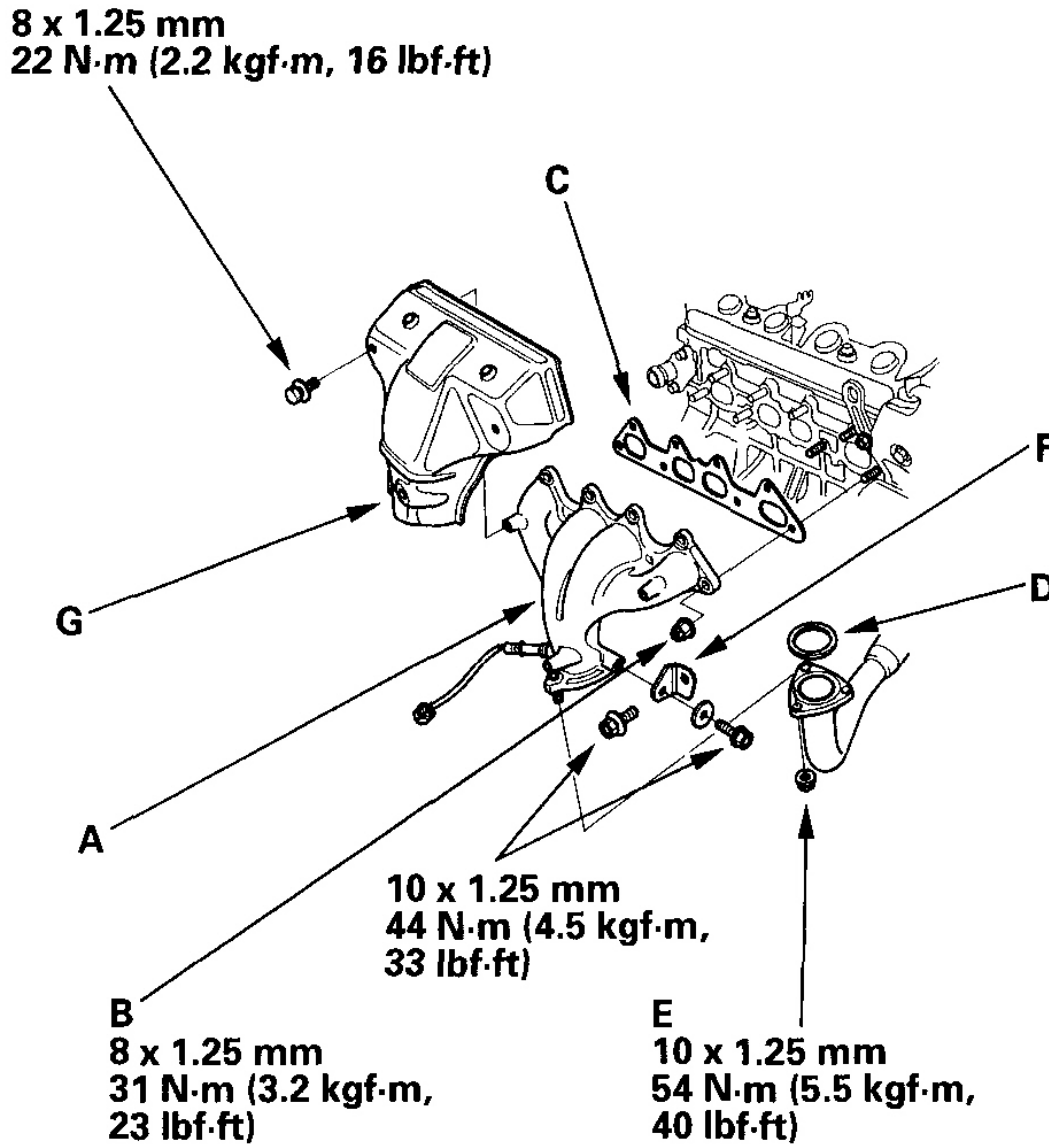


Fig. 196: Installing Intake Manifold

Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Install the exhaust manifold (A) and tighten the new self-locking nuts (B) in a crisscross pattern in two or three steps, beginning with the inner nuts. Always use a new exhaust manifold gasket (C).



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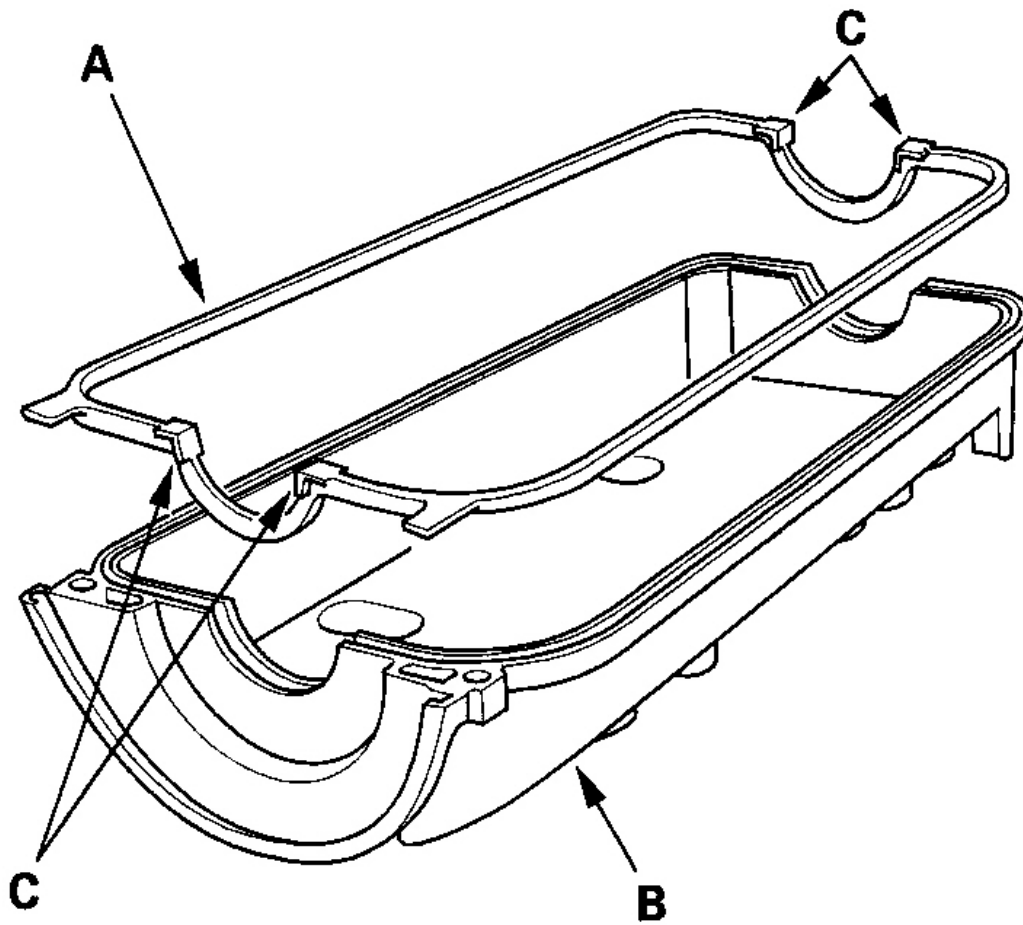
Fig. 197: Installing Exhaust Manifold

Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. Install the exhaust pipe A with a new gasket (D) and new self-locking nuts (E).
15. Install the exhaust manifold bracket (F) and cover (G).
16. Install the timing belt (see **Timing Belt & Balancer Belt Installation**).
17. Adjust the valve clearance (see **Valve Clearance Adjustment**).

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.



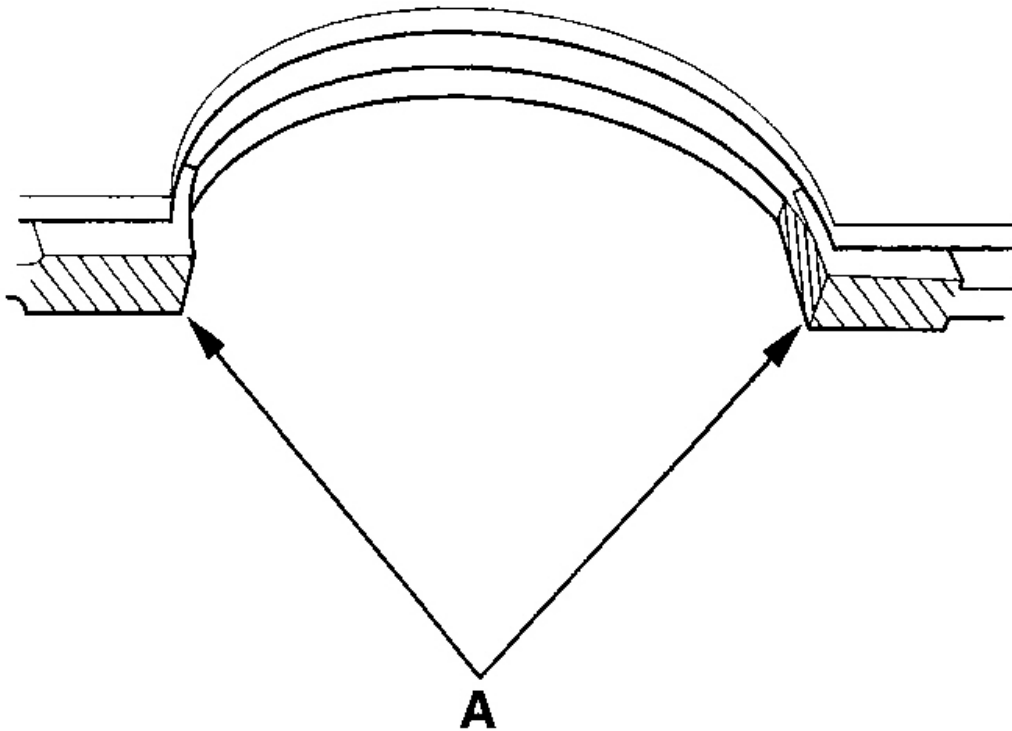
G02557053

Fig. 198: Installing Head Cover Gasket

Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Check that the mating surfaces are clean and dry.

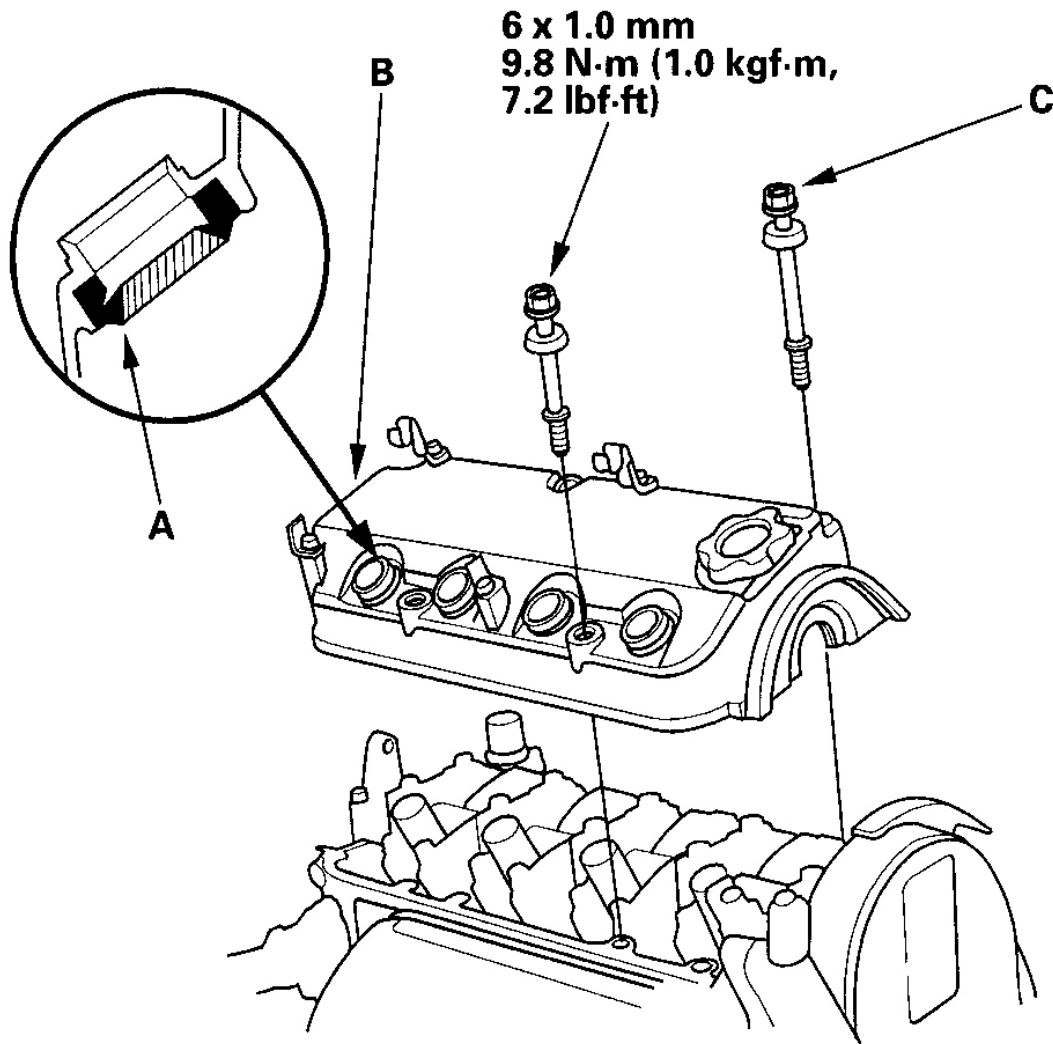
NOTE: Do not install the parts if 5 minutes or more have elapsed since applying liquid gasket. Instead, reapply liquid gasket after removing old residue.



G02557054

Fig. 199: Applying Liquid Gasket**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

4. Apply liquid gasket, part No. 08718-0001 or 08718-0003, to the head cover gasket at the four corners of the recesses (A).
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 tube. Once the cylinder head cover (B) is on the cylinder head, slide the cover slightly back and forth to seat the head cover gasket.

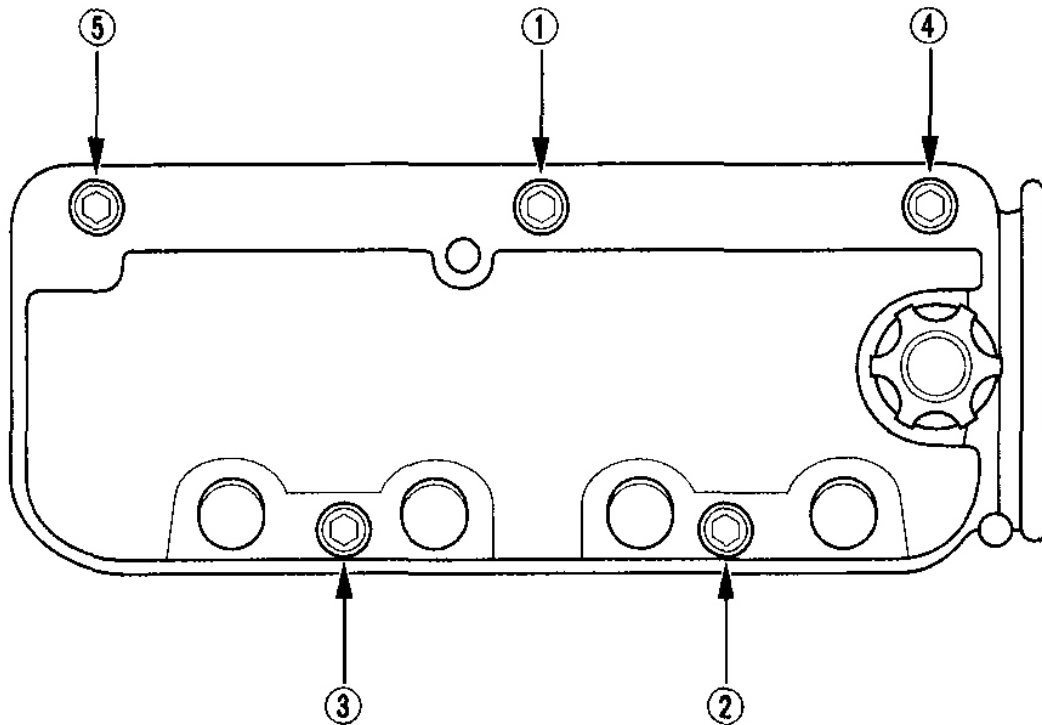


G02557055

Fig. 200: Installing Head Cover

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).



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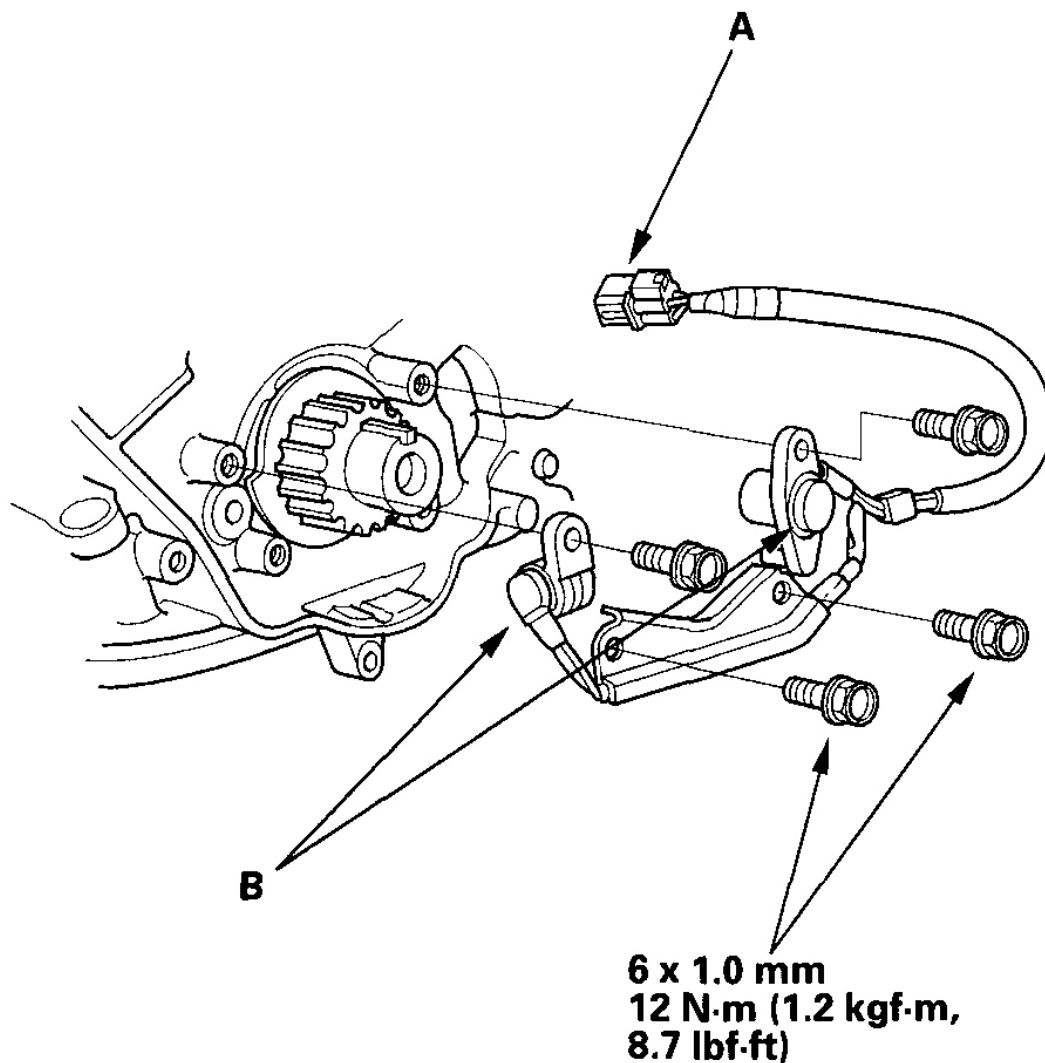
Fig. 201: Identifying Bolt Tightening Sequence

Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Check that all tubes, hoses and connectors are installed correctly.
9. After assembly, wait at least 30 minutes before filling the engine with oil.
10. Enter the anti-theft code for the radio, then enter the customer's radio station presets.

CKP/TDC SENSORS REPLACEMENT

1. Remove the balancer belt (see **Timing Belt & Balancer Belt Removal**).
2. Remove the balancer belt drive pulley.
3. Disconnect the CKP/TDC sensors connector (A), then remove the CKP/TDC sensors (B).



G02557057

Fig. 202: Removing CKP/TDC Sensors

Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Install the CKP/TDC sensors in reverse order of removal.
5. Install the balancer belt (see **Timing Belt & Balancer Belt Installation**).

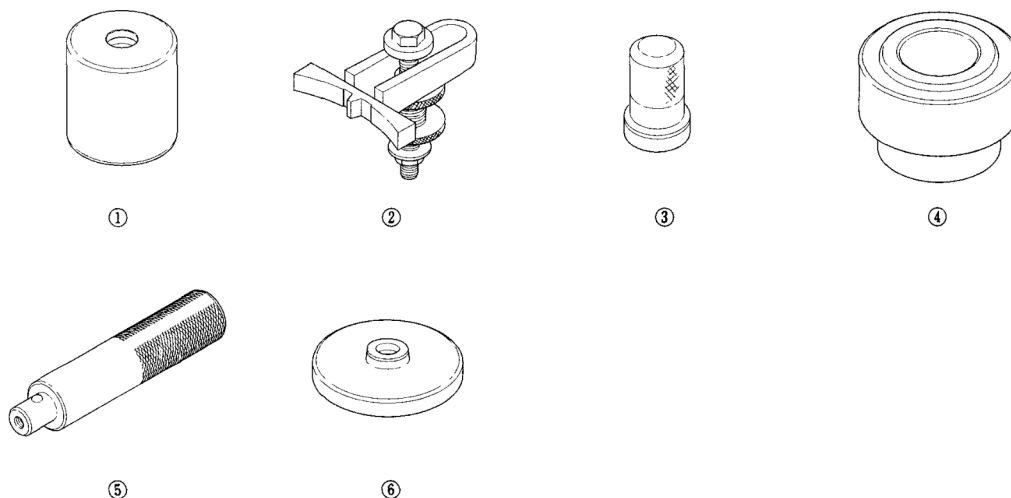
ENGINE BLOCK

SPECIAL TOOLS

2002 Honda Accord SE

2002 ENGINES 2.3L 4-Cylinder - Accord

Ref.No.	Tool Number	Description	Qty
①	07GAF-SE00200	Hub Assembly Guide Attachment	1
②	07LAB-PV00100	Ring Gear Holder	1
③	07LAD-PT3010A	Seal Driver	1
④	07746-0030300	Attachment, 30 mm I.D.	1
⑤	07749-0010000	Driver	1
⑥	07948-SB00101 or 07VAD-P8A010A	Driver Attachment	1

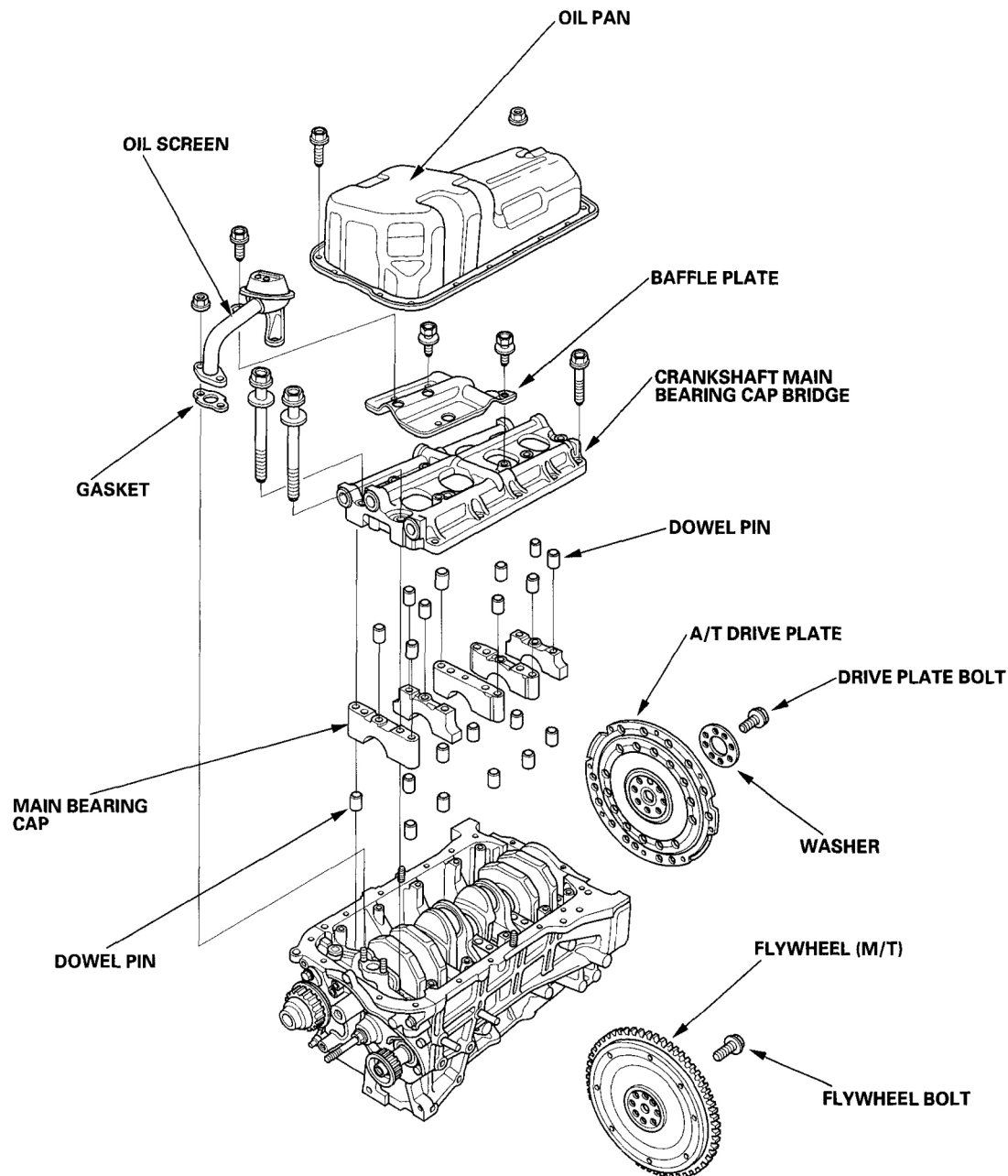


G02557058

Fig. 203: Identifying Special Tools

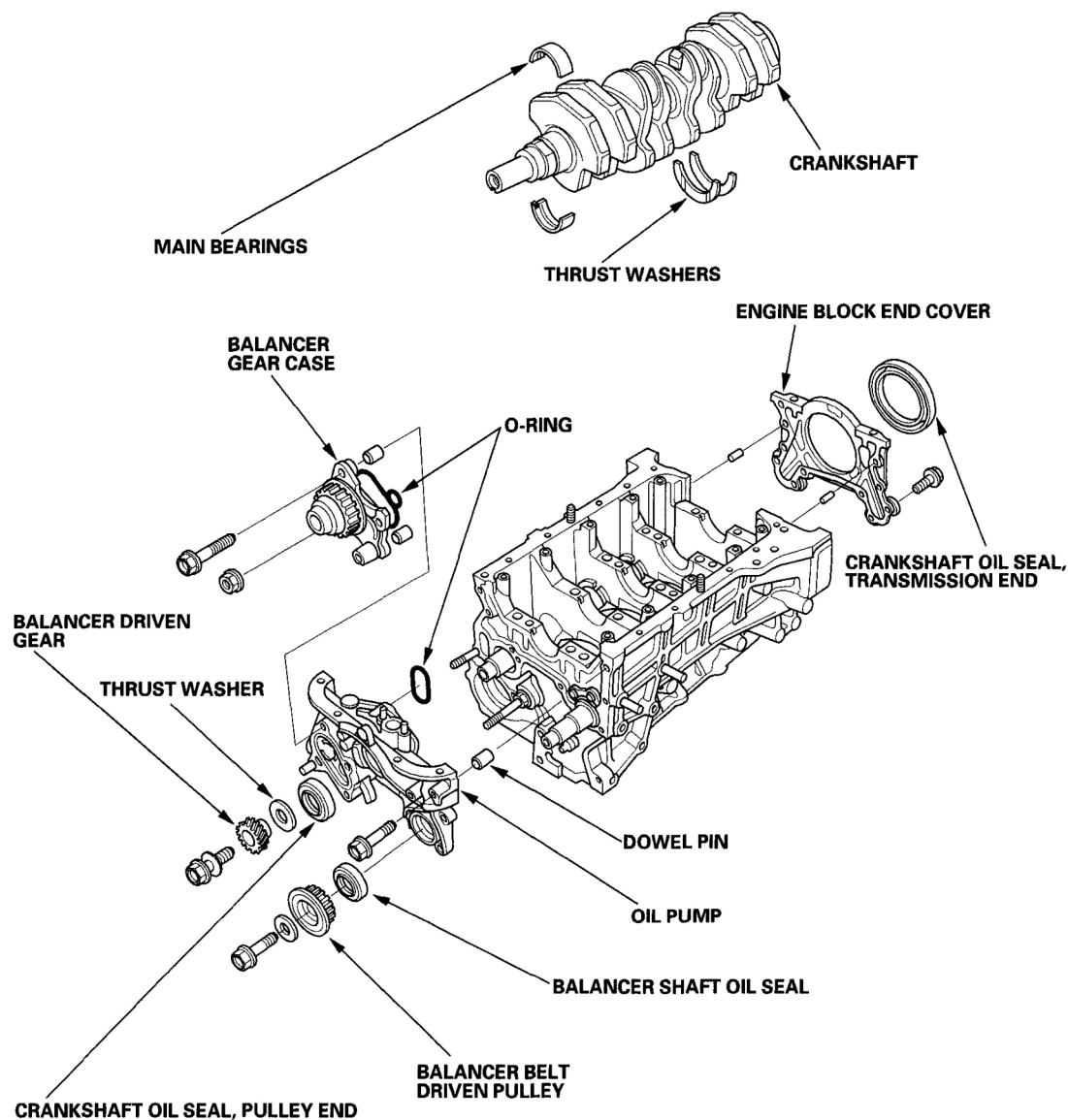
Courtesy of AMERICAN HONDA MOTOR CO., INC.

COMPONENT LOCATION INDEX



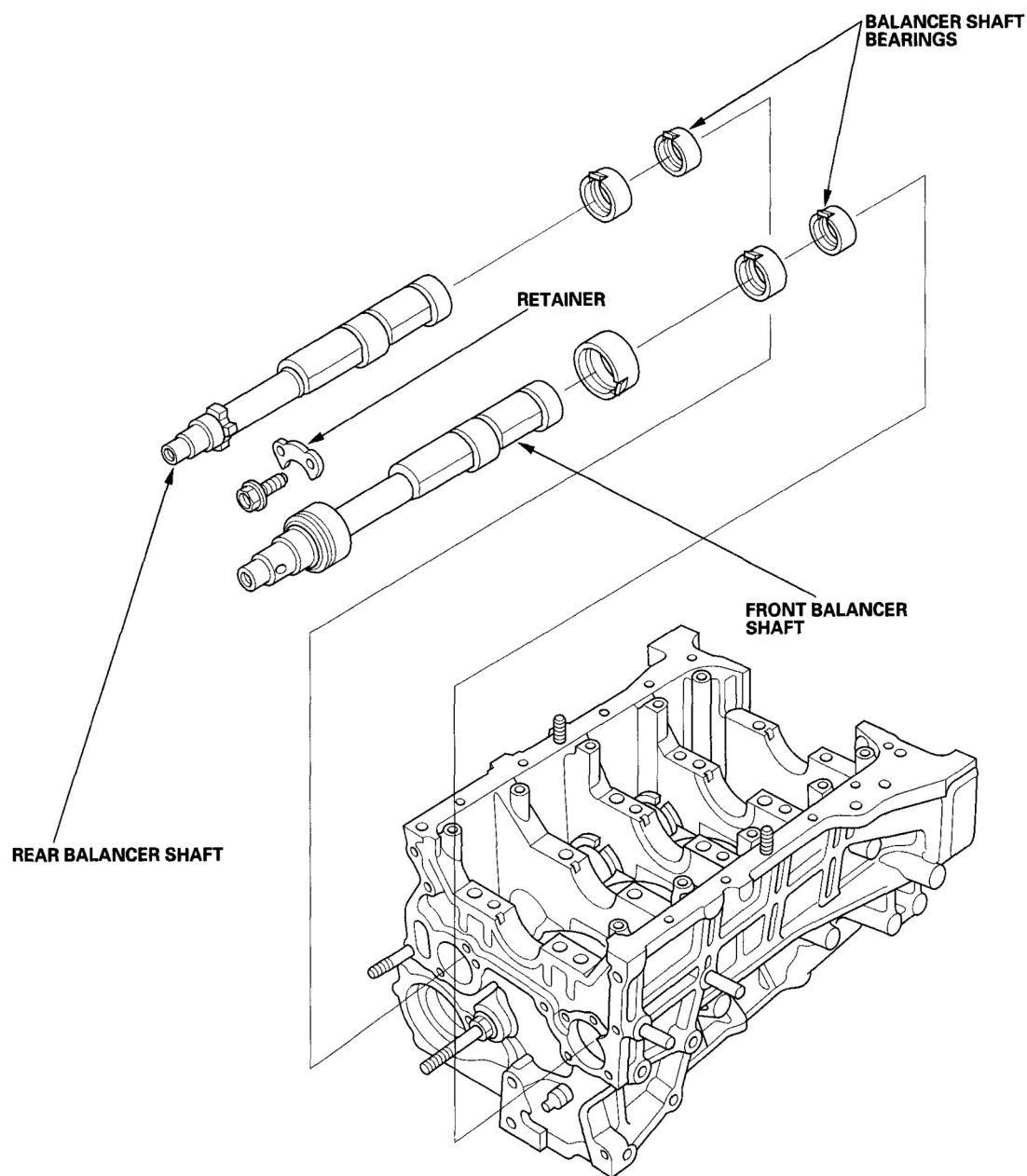
G02557059

Fig. 204: Identifying Engine Block Components (1 Of 4)
 Courtesy of AMERICAN HONDA MOTOR CO., INC.



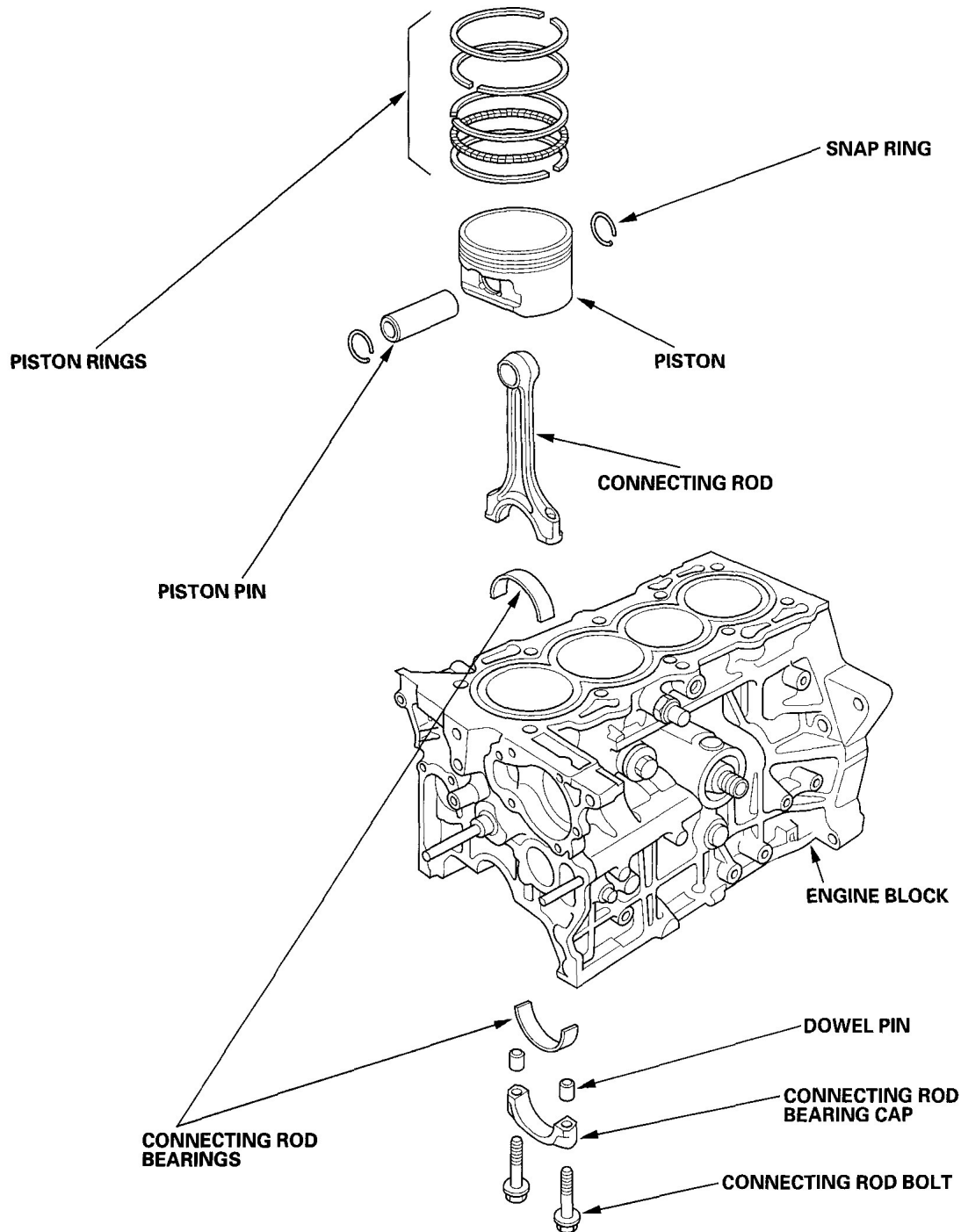
G02557060

Fig. 205: Identifying Engine Block Components (2 Of 4)
 Courtesy of AMERICAN HONDA MOTOR CO., INC.



G02557061

Fig. 206: Identifying Engine Block Components (3 Of 4)
Courtesy of AMERICAN HONDA MOTOR CO., INC.



G02557062

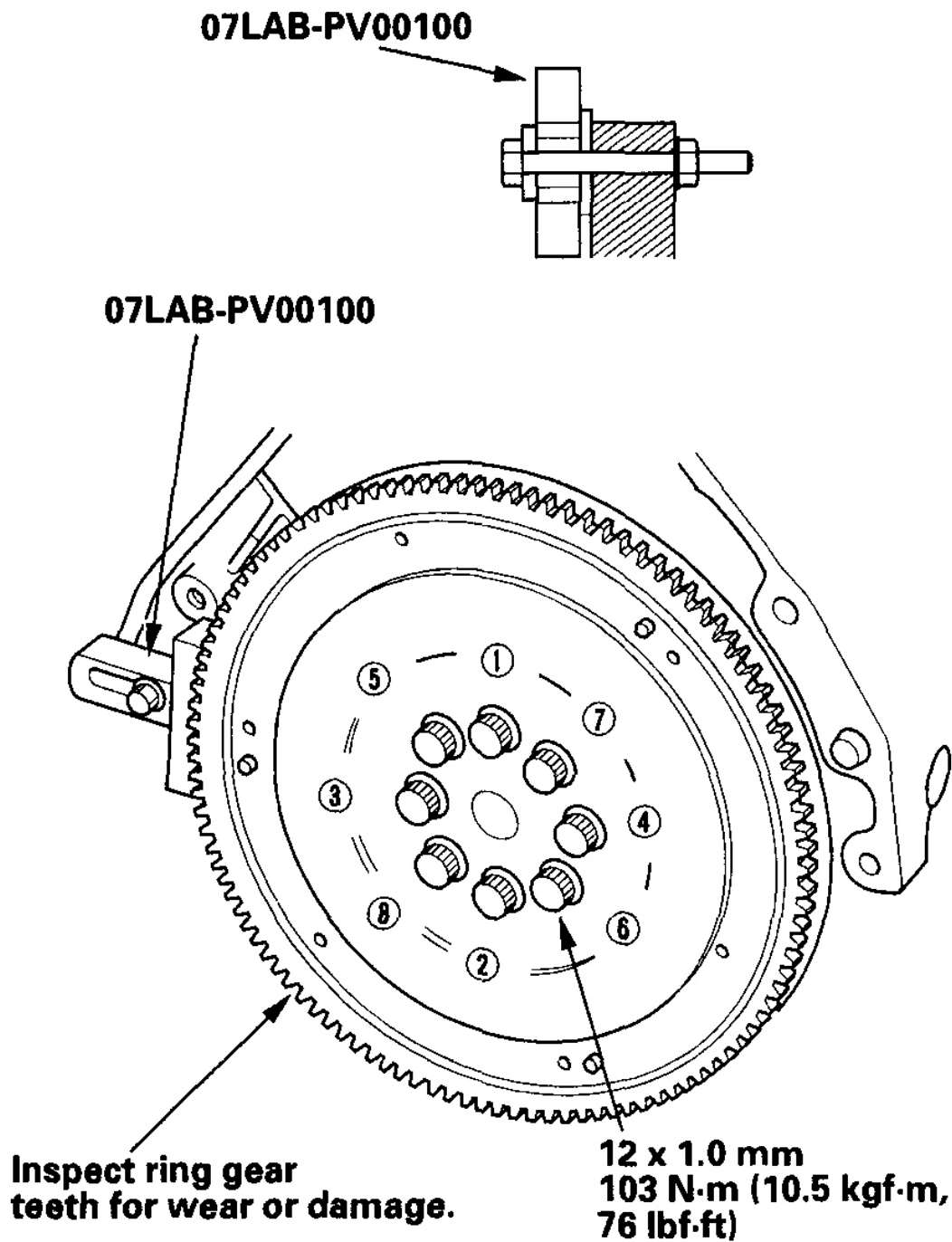
Fig. 207: Identifying Engine Block Components (4 Of 4)
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

FLYWHEEL REMOVAL & INSTALLATION

Special Tools Required

Ring Gear Holder 07LAB-PV00100

1. Remove the transmission (see **TRANSMISSION REMOVAL**).
2. Remove the pressure plate and clutch disk.
3. Remove the 8 flywheel bolts, then separate the flywheel from the crankshaft flange. After installation, tighten the bolts in the sequence shown.



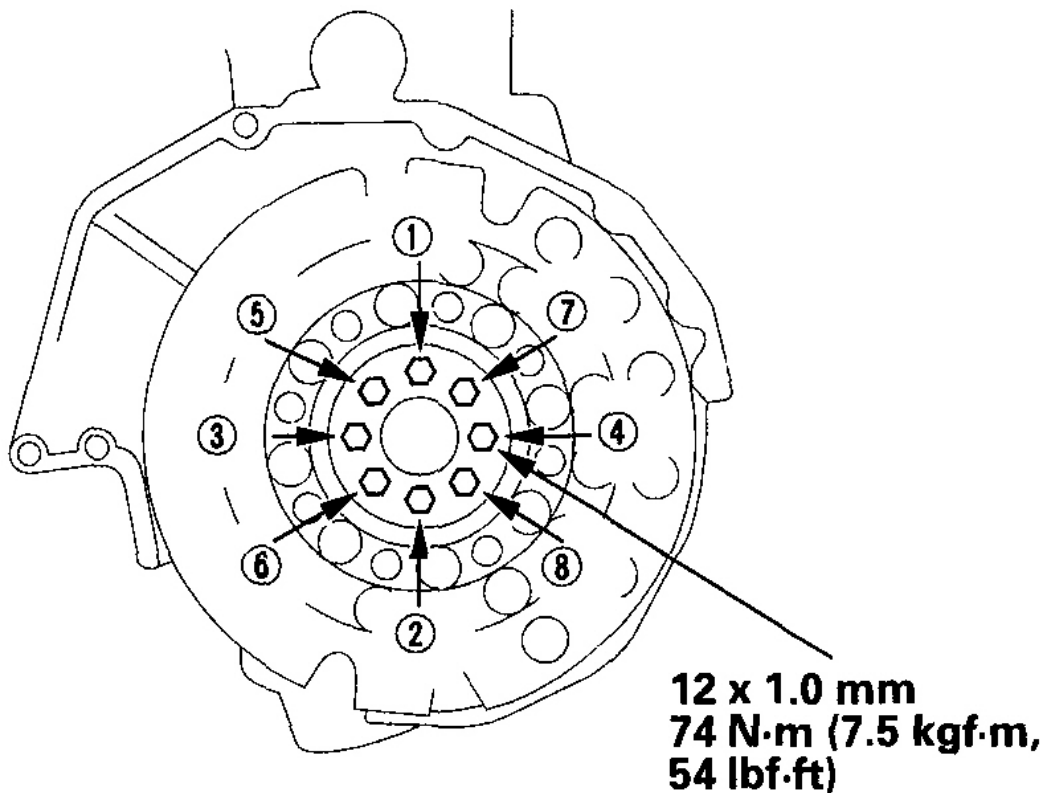
G02557063

Fig. 208: Identifying Bolt Tightening Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Install the transmission (see **TRANSMISSION INSTALLATION**).

DRIVE PLATE REMOVAL & INSTALLATION

1. Remove the transmission (see **REMOVAL & INSTALLATION**).
2. Remove the 8 drive plate bolts, then separate the drive plate from the crankshaft flange. After installation, tighten the bolts in the sequence shown.



G02557064

Fig. 209: Identifying Bolt Tightening Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Install the transmission (see **REMOVAL & INSTALLATION**).

CONNECTING ROD & CRANKSHAFT END PLAY INSPECTION

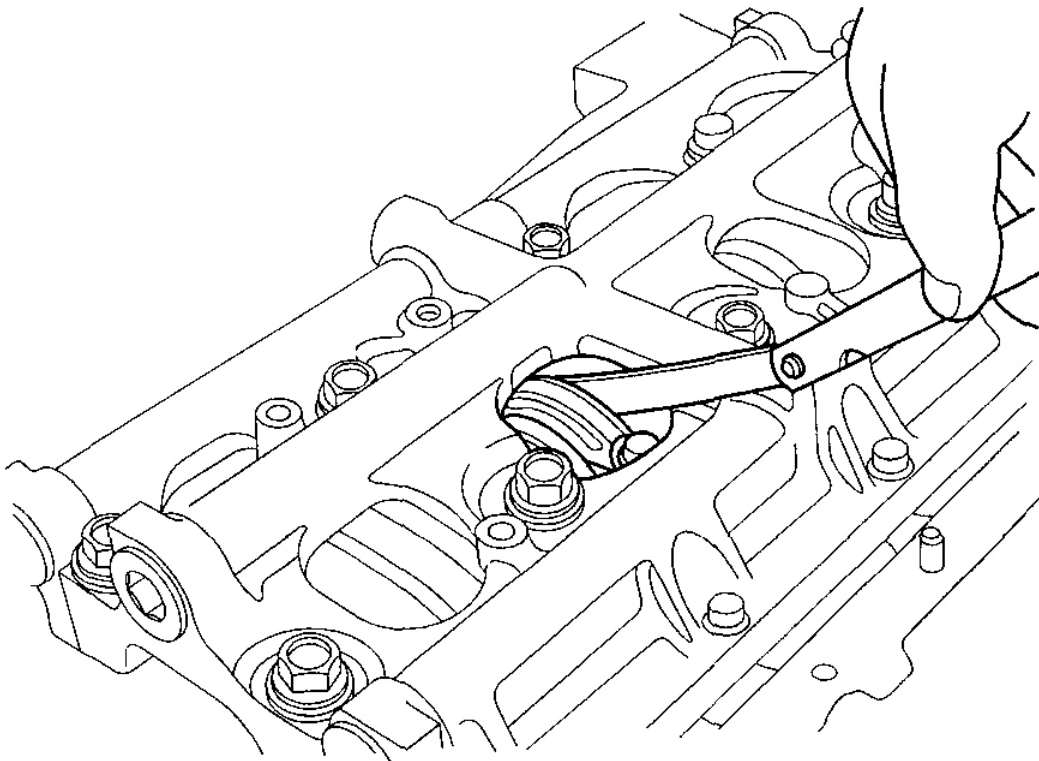
1. Remove the oil pump (see **OIL PUMP OVERHAUL**).
2. Remove the baffle plate (see step 13 on **Crankshaft, Piston & Balancer Shaft Removal**).

3. 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.)



G02557065

Fig. 210: Measuring Connecting Rod End Play

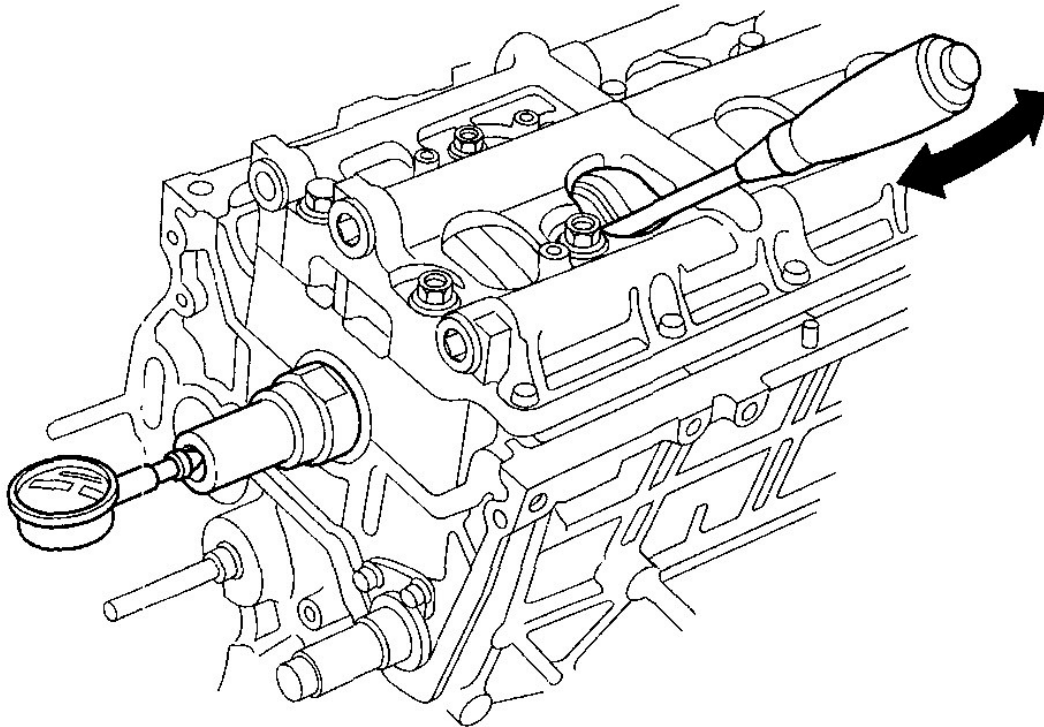
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. 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 **Crankshaft, Piston & Balancer Shaft Removal**).
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.)



G02557066

Fig. 211: Zeroing Dial Against End Of Crankshaft
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.

CRANKSHAFT MAIN BEARING REPLACEMENT

Main Bearing Clearance Inspection

1. To check main bearing-to-journal oil clearance, remove the main caps and bearing halves.
2. Clean each main journal and bearing half with a clean shop towel.

NOTE: If the engine is still in the car when you bolt the main cap down to check clearance, the weight of the crankshaft and flywheel 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.

3. Place one strip of plastigage across each main journal.

NOTE: Do not rotate the crankshaft during inspection.

4. Reinstall the bearings and caps, then torque the bolts to 69 N.m (7.0 kgf.m, 51 lbf-Ft).
5. Remove the caps and bearings again, and measure the widest part of the plastigage.

Main Bearing-to-Journal Oil Clearance:

USA-Produced:

F23A1-1000001 ~, 2000001 ~, 3000001 ~, 4000001 ~

F23A4-1000001 ~, 2000001 ~, 3000001 ~, 4000001 ~

F23A5-1000001 ~, 2000001 ~, 3000001 ~, 4000001 ~

MEXICO-Produced:

F23A1-3400001 ~, 4400001 ~

F23A4-3400001 ~, 4400001 ~

Standard (New):

No. 1, 2, 4: 0.021-0.045 mm (0.0008-0.0018 in.)

No. 3: 0.025-0.049 mm (0.0010-0.0019 in.)

No. 5: 0.009-0.033 mm (0.0004-0.0013 in.)

Service Limit:

No. 1, 2, 4: 0.050 mm (0.0020 in.)

No. 3: 0.055 mm (0.0022 in.)

No. 5: 0.040 mm (0.0016 in.)

JAPAN-Produced:

F23A1-2500001~

F23A4-2500001~

Standard (New):

No. 1, 4: 0.013-0.037 mm (0.0005-0.0015 in.)

No. 2: 0.021-0.045 mm (0.0008-0.0018 in.)

No. 3: 0.025-0.049 mm (0.0010-0.0019 in.)

No. 5: 0.009-0.033 mm (0.0004-0.0013 in.)

Service Limit:

No. 1, 4: 0.045 mm (0.0018 in.)

2002 Honda Accord SE

2002 ENGINES 2.3L 4-Cylinder - Accord

No. 2: 0.050 mm (0.0020 in.)

No. 3: 0.055 mm (0.0022 in.)

No. 5: 0.040 mm (0.0016 in.)

JAPAN-Produced:

F23A1-3500001~, 4500001~

F23A4-3500001~, 4500001~

F23A5-3500001~, 4500001~

Standard (New):

No. 1, 2: 0.025-0.049 mm (0.0010-0.0019 in.)

No. 3: 0.021-0.045 mm (0.0008-0.0018 in.)

No. 4: 0.013-0.037 mm (0.0005-0.0015 in.)

No. 5: 0.009-0.033 mm (0.0004-0.0013 in.)

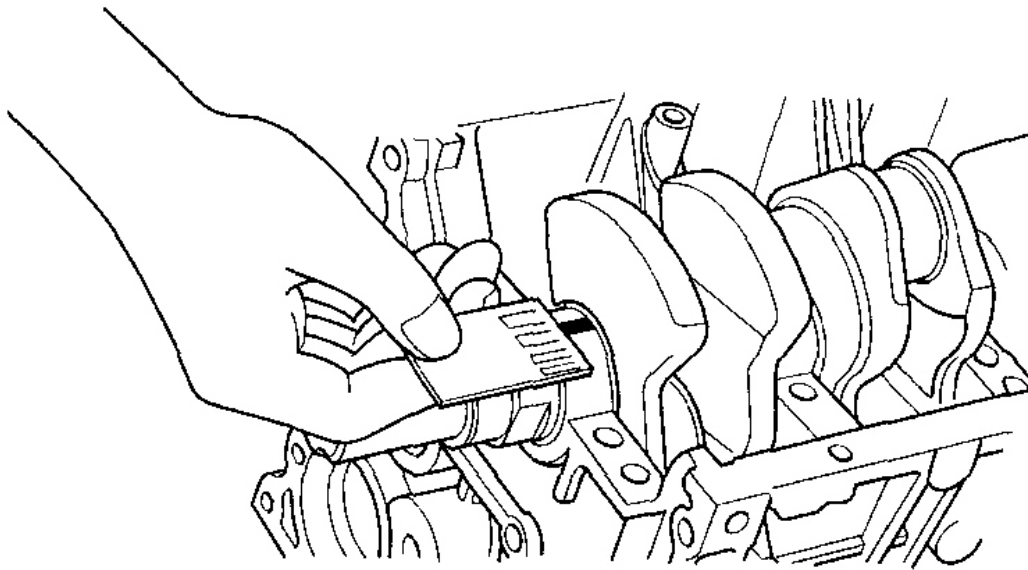
Service Limit:

No. 1, 2: 0.055 mm (0.0022 in.)

No. 3: 0.050 mm (0.0020 in.)

No. 4: 0.045 mm (0.0018 in.)

No. 5: 0.040 mm (0.0016 in.)



G02557067

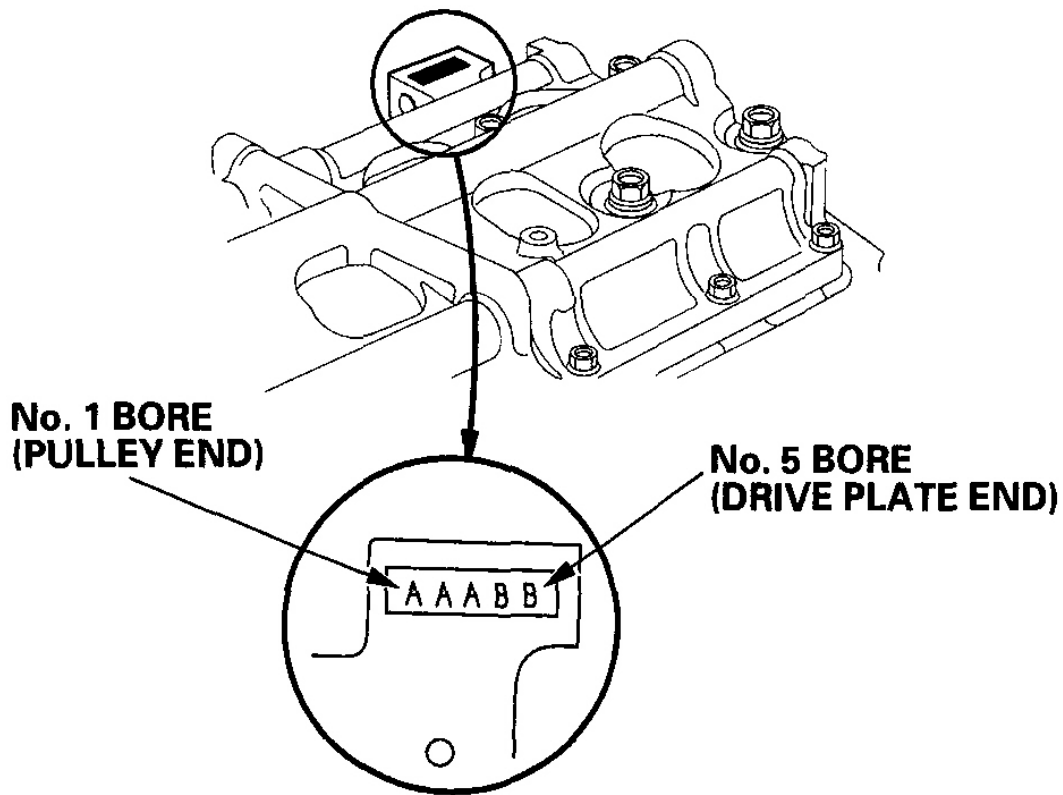
Fig. 212: Measuring Widest Part Of Plastigage
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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(s), 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.

Main Bearing Selection

Crankshaft Bore Code Location

1. Numbers or Letters or Bars have been stamped on the end of the block as a code for the size of each of the 5 main journal bores. Write down the crank bore codes. If you can't read the codes because of accumulated dirt and dust, do not scrub them with a wire brush or scraper. Clean them only with solvent or detergent.

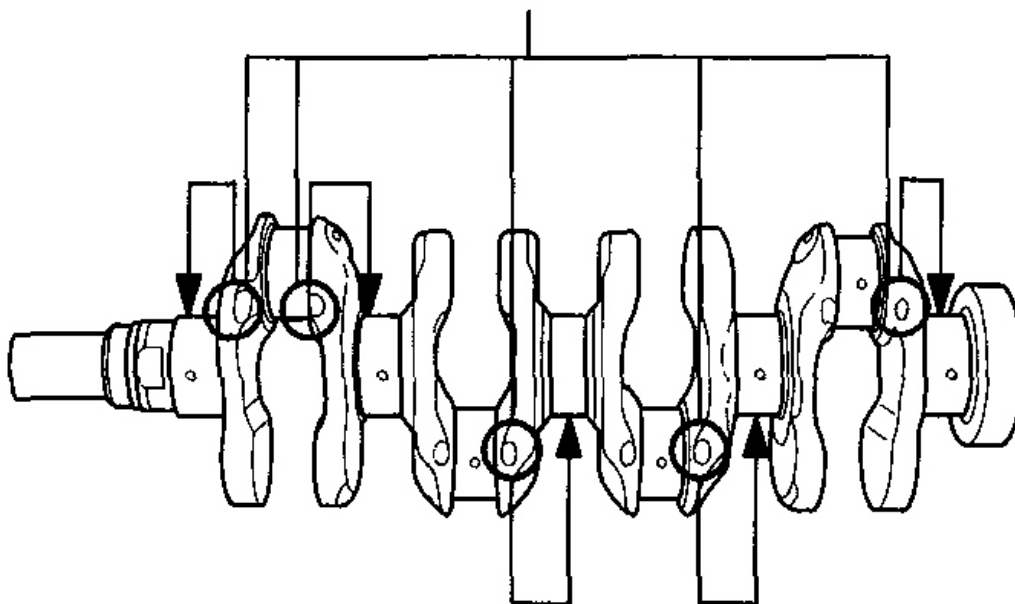


G02557068

Fig. 213: Locating Crankshaft Bore Code

Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. The Main Journal Codes are stamped in 1 of 2 locations: either on the side of the crankshaft next to the main journals, or on the No. 1 web.



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Fig. 214: Locating Main Journal Codes (1 Of 2)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

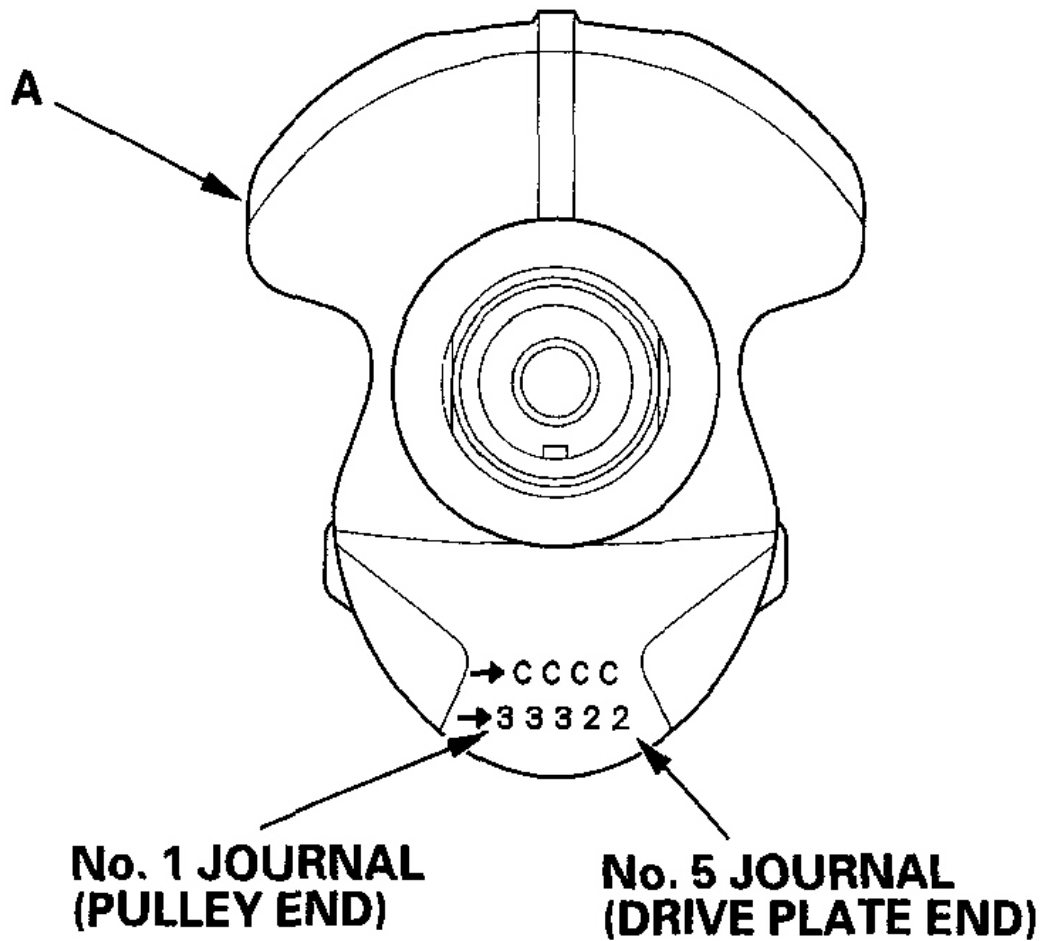


Fig. 215: Locating Main Journal Codes (2 Of 2)

Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Use the crank bore codes and crank journal codes to select the appropriate replacement bearings from the following table.

NOTE:

- Color code is on the edge of the bearing.
- When using bearing halves of different colors, it does not matter which color is used in the top or bottom.

USA-Produced:

F23A1-1000001~ , 2000001~ , 3000001~ , 4000001~

F23A4-1000001~ , 2000001~ , 3000001~ , 4000001~

F23A5-1000001~ , 2000001~ , 3000001~ , 4000001~

MEXICO-Produced:

F23A1-3400001~ , 4400001~

F23A4-3400001~ , 4400001~

		→ Larger crank bore			
Rod Journal code	Crank bore code	1 or A or I	2 or B or II	3 or C or III	4 or D or IIII
		→ Smaller bearing (Thicker)			
	1 or I	Red	Red/ Pink	Pink	Yellow
	2 or II	Red/ Pink	Pink	Yellow	Yellow/ Green
	3 or III	Pink	Yellow	Yellow/ Green	Green
	4 or IIII	Yellow	Yellow/ Green	Green	Brown
	5 or IIIII	Yellow/ Green	Green	Brown	Brown/ Black
	6 or IIIIII	Green	Brown	Brown/ Black	Black
↓	↓				
Smaller main journal	Smaller bearing (Thicker)				

G02557071

Fig. 216: Using Crankshaft Bore Codes & Main Journal Codes To Select Appropriate Main Bearings From Table (1 Of 7)

Courtesy of AMERICAN HONDA MOTOR CO., INC.

JAPAN-Produced:
F23A1-2500001~
F23A4-2500001~

No. 1, 4 Journals:
Bearing Identification

Color code is on the
 edge of the bearing.

→ Larger crank bore

1 or A or I	2 or B or II	3 or C or III	4 or D or IIII
----------------	-----------------	------------------	-------------------

→ Smaller bearing (Thicker)

1 or I	Yellow	Yellow/ Green	Green	Green/ Brown
2 or II	Yellow/ Green	Green	Green/ Brown	Brown
3 or III	Green	Green/ Brown	Brown	Brown/ Black
4 or IIII	Green/ Brown	Brown	Brown/ Black	Black
5 or IIIII	Brown	Brown/ Black	Black	Black/ Blue
6 or IIIIII	Brown/ Black	Black	Black/ Blue	Blue

↓ Smaller main journal ↓ Smaller bearing (Thicker)

G02557072

Fig. 217: Using Crankshaft Bore Codes & Main Journal Codes To Select Appropriate Main Bearings From Table (2 Of 7)
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

**No. 2, 3, 5 Journals:
Bearing Identification**

Color code is on the
edge of the bearing.

→ Larger crank bore

1 or A or I	2 or B or II	3 or C or III	4 or D or IIII
----------------	-----------------	------------------	-------------------

→ Smaller bearing (Thicker)

1 or I	Pink	Pink/ Yellow	Yellow	Yellow/ Green
2 or II	Pink/ Yellow	Yellow	Yellow/ Green	Green
3 or III	Yellow	Yellow/ Green	Green	Green/ Brown
4 or IIII	Yellow/ Green	Green	Green/ Brown	Brown
5 or IIIII	Green	Green/ Brown	Brown	Brown/ Black
6 or IIIIII	Green/ Brown	Brown	Brown/ Black	Black

G02557073

**Fig. 218: Using Crankshaft Bore Codes & Main Journal Codes To Select
Appropriate Main Bearings From Table (3 Of 7)**
Courtesy of AMERICAN HONDA MOTOR CO., INC.

JAPAN-Produced:

F23A1-3500001 ~ ,4500001 ~

F23A4-3500001 ~ ,4500001 ~

F23A5-3500001 ~ ,4500001 ~

No. 1, 2 Journals:**Bearing Identification**

Color code is on the edge of the bearing.

→ Larger crank bore			
1 or A or I	2 or B or II	3 or C or III	4 or D or IIII
→ Smaller bearing (Thicker)			

1 or I	Pink	Pink	Pink/ Yellow	Yellow
2 or II	Pink	Pink/ Yellow	Yellow	Yellow/ Green
3 or III	Pink/ Yellow	Yellow	Yellow/ Green	Green
4 or IIII	Yellow	Yellow/ Green	Green	Green/ Brown
5 or IIIII	Yellow/ Green	Green	Green/ Brown	Brown
6 or IIIIII	Green	Green/ Brown	Brown	Brown/ Black

↓ Smaller main journal ↓ Smaller bearing (Thicker)

G02557074

Fig. 219: Using Crankshaft Bore Codes & Main Journal Codes To Select Appropriate Main Bearings From Table (4 Of 7)
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

**No. 3 Journal:
Bearing Identification**Color code is on the
edge of the bearing.

→ Larger crank bore

1 or A or I	2 or B or II	3 or C or III	4 or D or IIII
----------------	-----------------	------------------	-------------------

→ Smaller bearing (Thicker)

1 or I	Pink/ Yellow	Yellow	Yellow/ Green	Green
2 or II	Yellow	Yellow/ Green	Green	Green/ Brown
3 or III	Yellow/ Green	Green	Green/ Brown	Brown
4 or IIII	Green	Green/ Brown	Brown	Brown/ Black
5 or IIIII	Green/ Brown	Brown	Brown/ Black	Black
6 or IIIIII	Brown	Brown/ Black	Black	Black/ Blue

G02557075

**Fig. 220: Using Crankshaft Bore Codes & Main Journal Codes To Select
Appropriate Main Bearings From Table (5 Of 7)**
Courtesy of AMERICAN HONDA MOTOR CO., INC.

No. 4 Journal: Bearing Identification

Color code is on the
edge of the bearing.

		→ Larger crank bore			
		1 or A or I	2 or B or II	3 or C or III	4 or D or IIII
		→ Smaller bearing (Thicker)			
↓ Smaller main journal	1 or I	Yellow	Yellow/ Green	Green	Green/ Brown
	2 or II	Yellow/ Green	Green	Green/ Brown	Brown
	3 or III	Green	Green/ Brown	Brown	Brown/ Black
	4 or IIII	Green/ Brown	Brown	Brown/ Black	Black
	5 or IIIII	Brown	Brown/ Black	Black	Black/ Blue
	6 or IIIIII	Brown/ Black	Black	Black/ Blue	Blue
		↓ Smaller bearing (Thicker)			

G02557076

**Fig. 221: Using Crankshaft Bore Codes & Main Journal Codes To Select
Appropriate Main Bearings From Table (6 Of 7)**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

**No. 5 Journal:
Bearing Identification****Color code is on the
edge of the bearing.**

		→ Larger crank bore			
		1 or A or I	2 or B or II	3 or C or III	4 or D or IIII
		→ Smaller bearing (Thicker)			
↓ Smaller main journal	1 or I	Pink	Pink/ Yellow	Yellow	Yellow/ Green
	2 or II	Pink/ Yellow	Yellow	Yellow/ Green	Green
	3 or III	Yellow	Yellow/ Green	Green	Green/ Brown
	4 or IIII	Yellow/ Green	Green	Green/ Brown	Brown
	5 or IIIII	Green	Green/ Brown	Brown	Brown/ Black
	6 or IIIIII	Green/ Brown	Brown	Brown/ Black	Black
		↓ Smaller bearing (Thicker)			

G02557077

**Fig. 222: Using Crankshaft Bore Codes & Main Journal Codes To Select
Appropriate Main Bearings From Table (7 Of 7)**
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 plastigage across the rod journal.

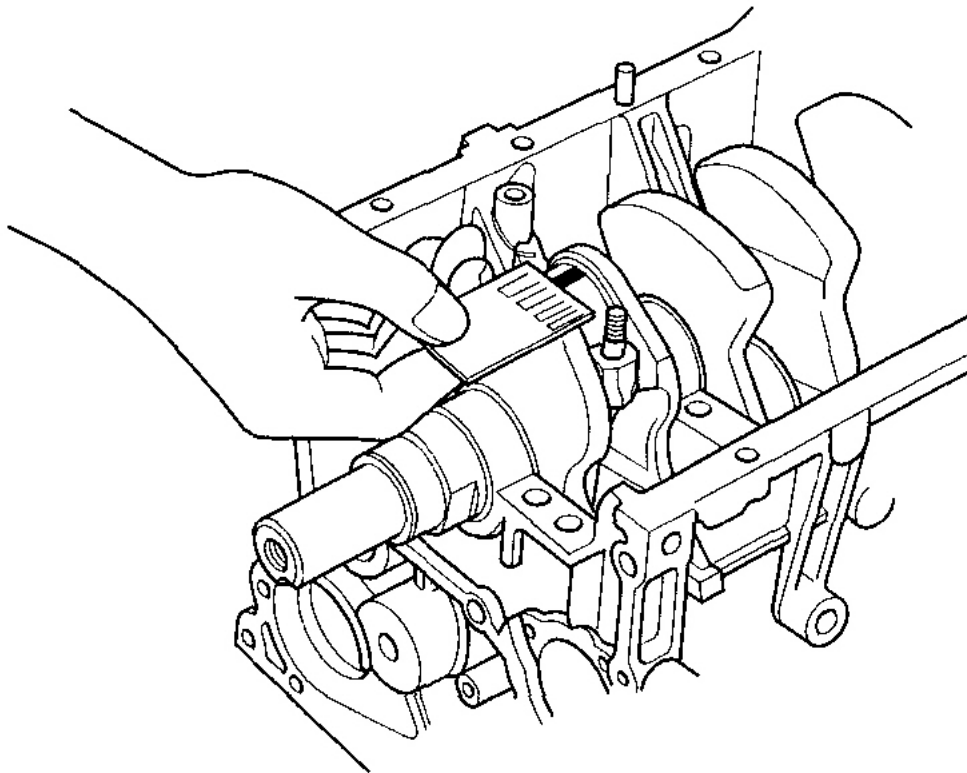
NOTE: Do not rotate the crankshaft during inspection.

4. Reinstall the bearing half and cap, and torque the bolt (see Crankshaft & Balancer Shafts Installation).
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): 0.021-0.049 mm
(0.0008-0.0019 in.)

Service Limit: 0.060 mm (0.0024 in.)



G02557078

Fig. 223: Measuring Connecting Rod Bearing-To-Journal Oil Clearance
Courtesy of AMERICAN HONDA MOTOR CO., INC.

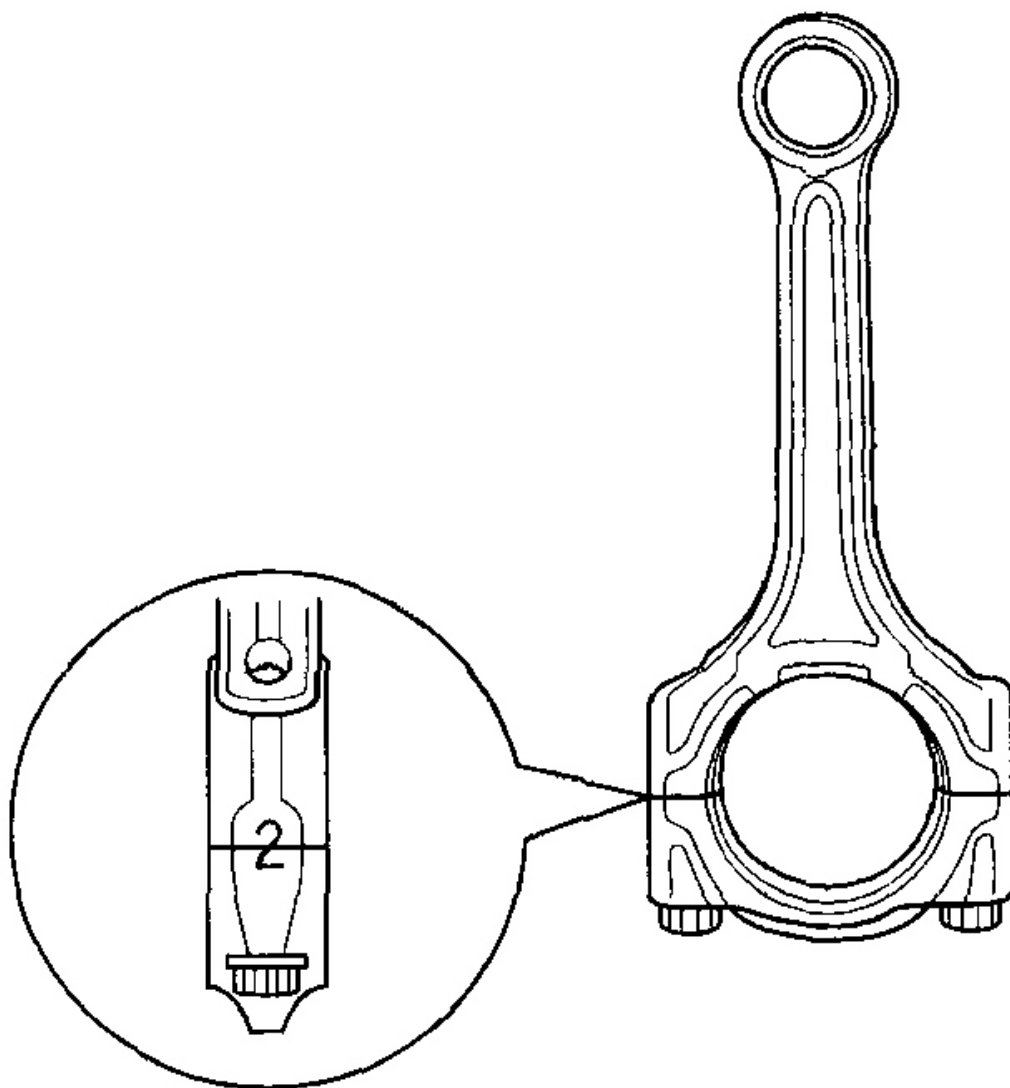
6. If the plastigage measures too wide or too narrow, remove the upper half of the bearing, install a new,

complete bearing with the same color code(s), 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 bearing, replace the crankshaft and start over.

Rod Bearing Selection

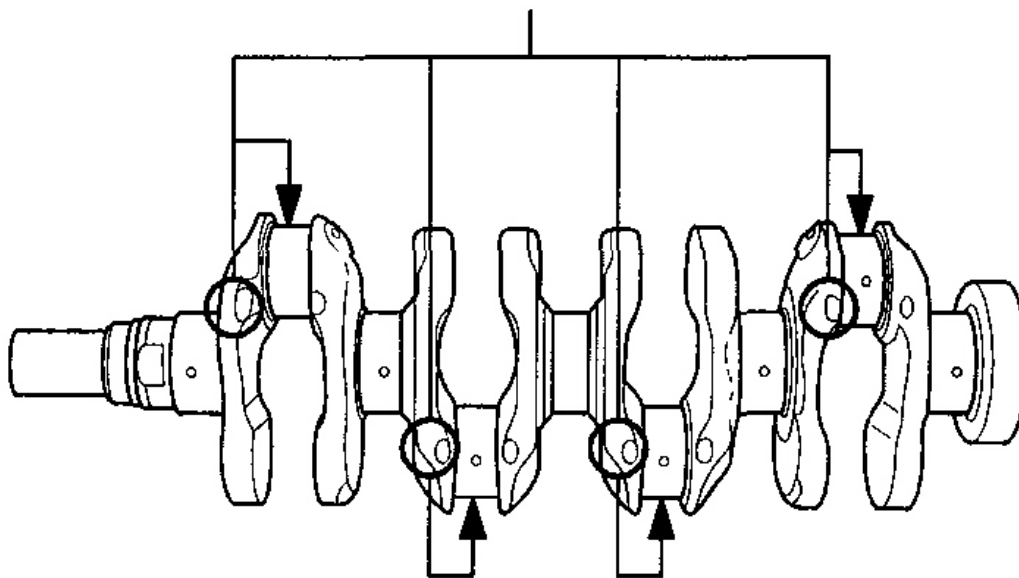
1. Inspect each connecting rod for cracks and heat damage.
2. Each rod has a tolerance range from 0 to 0.024 mm (0.0009 in), in 0.0006 mm (0.0002 in) increments, depending on the size of its big end bore. It's then stamped with a number or bar (1, 2, 3 or 4/I, II, III, or IIII) indicating the range. You may find any combination of numbers and bars in any engine, (Half the number or bar is stamped on the bearing cap, the other half on the rod). If you can't read the code because of an accumulation of oil and varnish, do not scrub them with a wire brush or scraper. Clean them only with solvent or detergent.



G02557079

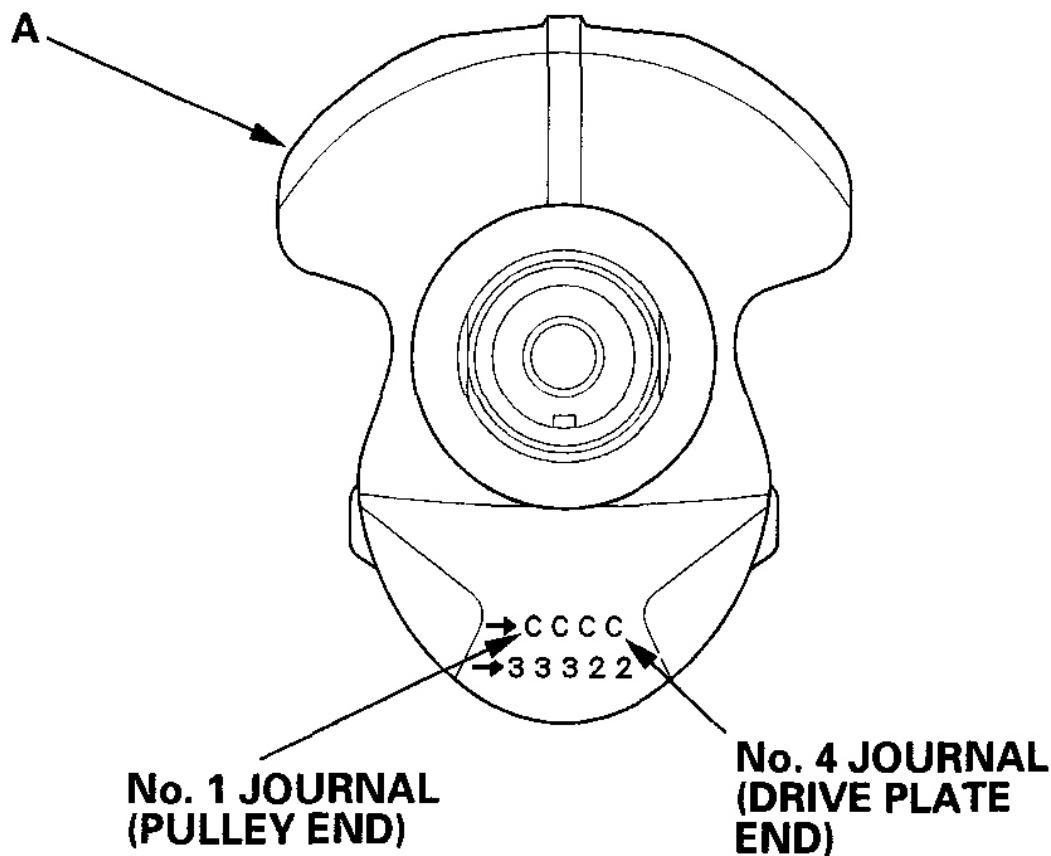
Fig. 224: Locating Connecting Rod Big End Bore Code
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. The Connecting Rod Journal Codes are stamped in 2 locations: either on the side of the crankshaft next to the rod journals, or on the No. 1 web.



G02557080

Fig. 225: Locating Connecting Rod Journal Codes (1 Of 2)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

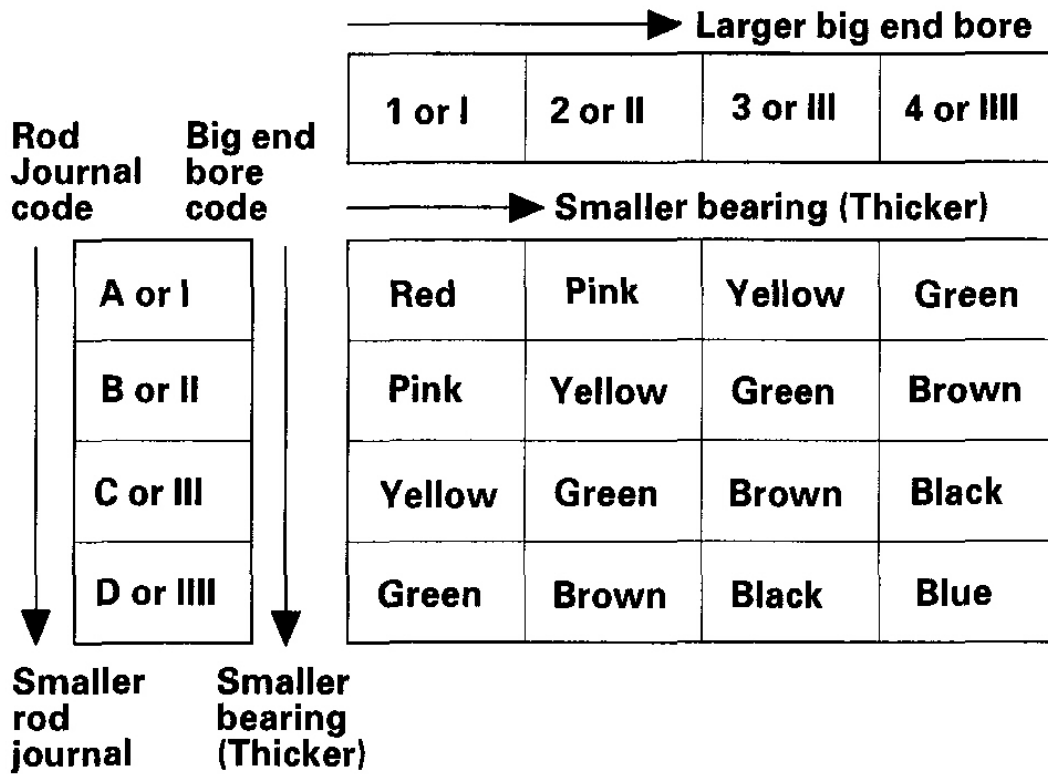


G02557081

Fig. 226: Locating Connecting Rod Journal Codes (2 Of 2)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Use the big end bore codes and rod journal codes to select appropriate replacement bearings from the following table.

NOTE: Color code is on the edge of the bearing.



G02557082

Fig. 227: Using Connecting Rod Bore Codes & Journal Codes To Select Appropriate Rod Bearings From Table

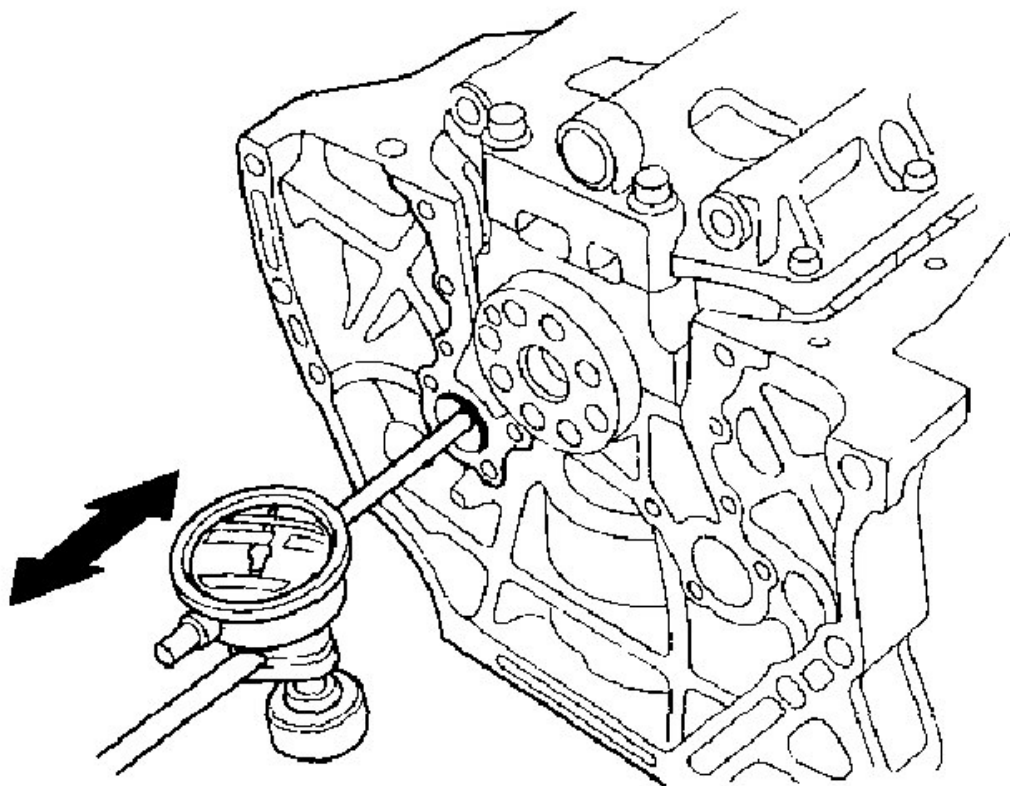
Courtesy of AMERICAN HONDA MOTOR CO., INC.

BALANCER SHAFTS INSPECTION

NOTE: Inspect the balancer shaft end play before removing the right side cover and the balancer gear case (see Crankshaft, Piston & Balancer Shaft Removal).

1. Remove the oil pan and the right side cover (see Crankshaft, Piston & Balancer Shaft Removal).

NOTE: The thickness of the retainer must not be changed either by grinding or shimming.



G02557083

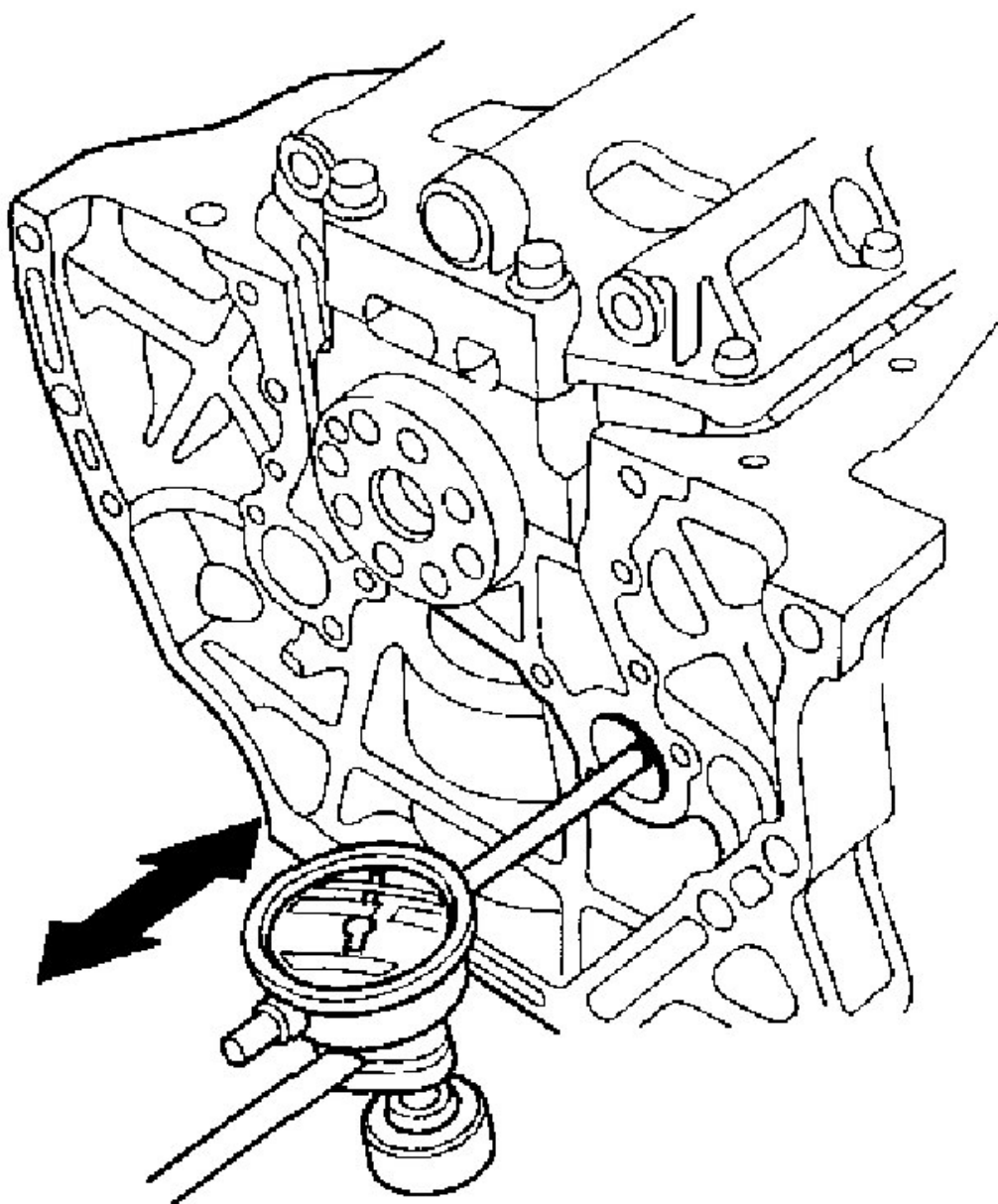
Fig. 228: Zeroing Dial Against End Of Balancer Shaft
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Push the front balancer shaft firmly away from the dial indicator. Zero the dial against the end of the balancer shaft, then pull the shaft firmly back toward the indicator. If end play is excessive, inspect the retainer and thrust surfaces on the shaft.

Front Balancer Shaft End Play

Standard (New): 0.10-0.40 mm (0.004-0.016 in.)

NOTE: The thickness of the thrust washer must not be changed either by grinding or shimming.



G02557084

Fig. 229: Zeroing Dial Against End Of Balancer Shaft
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Push the rear balancer shaft firmly away from the dial indicator. Zero the dial against the end of the balancer shaft, then pull the shaft firmly back toward the indicator. If end play is excessive, inspect the

thrust washer and the thrust surfaces on the driven gear and the oil pump body.

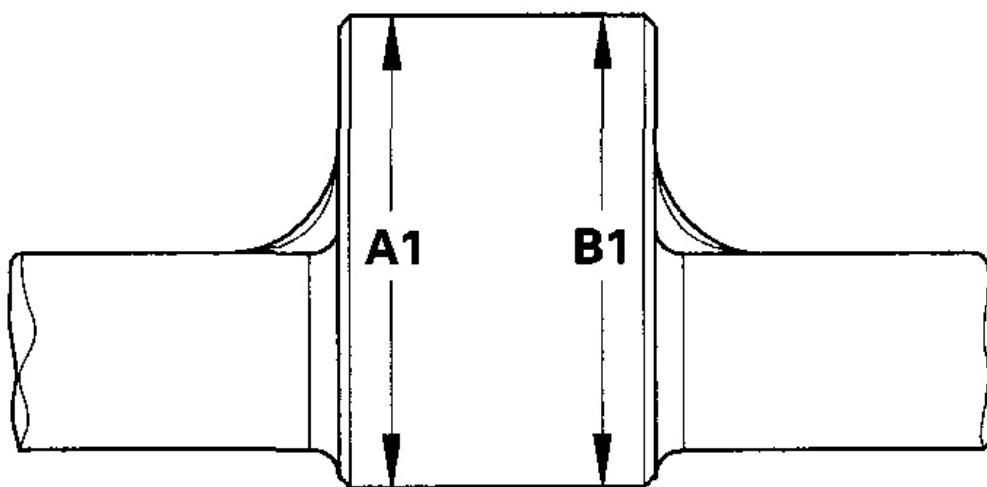
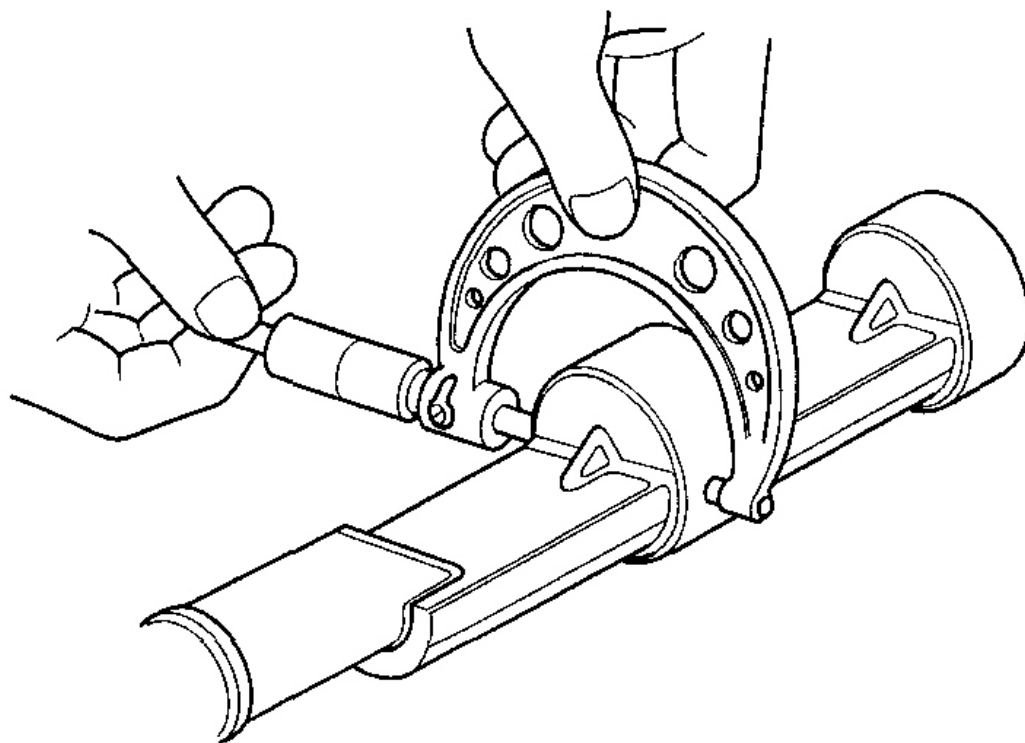
Rear Balancer Shaft End Play

Standard (New): 0.04-0.15 mm (0.002-0.006 in.)

4. Remove the balancer shafts (see **Crankshaft, Piston & Balancer Shaft Removal**).
5. Clean the balancer shafts, and Inspect the surface of each balancer shaft journal and bearing.
6. Replace the bearing or balancer shaft if there is wear, damage or discoloration on the surface of the bearing or the balancer shaft journal. A mirror-like surface is normal. When replacing the rear No. 1 bearing, be sure to replace the oil pump housing with a new one.
7. Measure taper at the edges of each journal. The difference between measurements on each journal must not exceed the standard.

Journal Taper

Standard (New): 0.005 mm (0.0002 in.)



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Fig. 230: Measuring Taper At Edges Of Each Journal

Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Measure runout on the No. 2 journal (A) of each balancer shaft to make sure the balancer shafts are not bent.

Balancer Shaft Total Indicated Runout

Standard (New): 0.02 mm (0.001 in.)

Service Limit: 0.03 mm (0.001 in.)

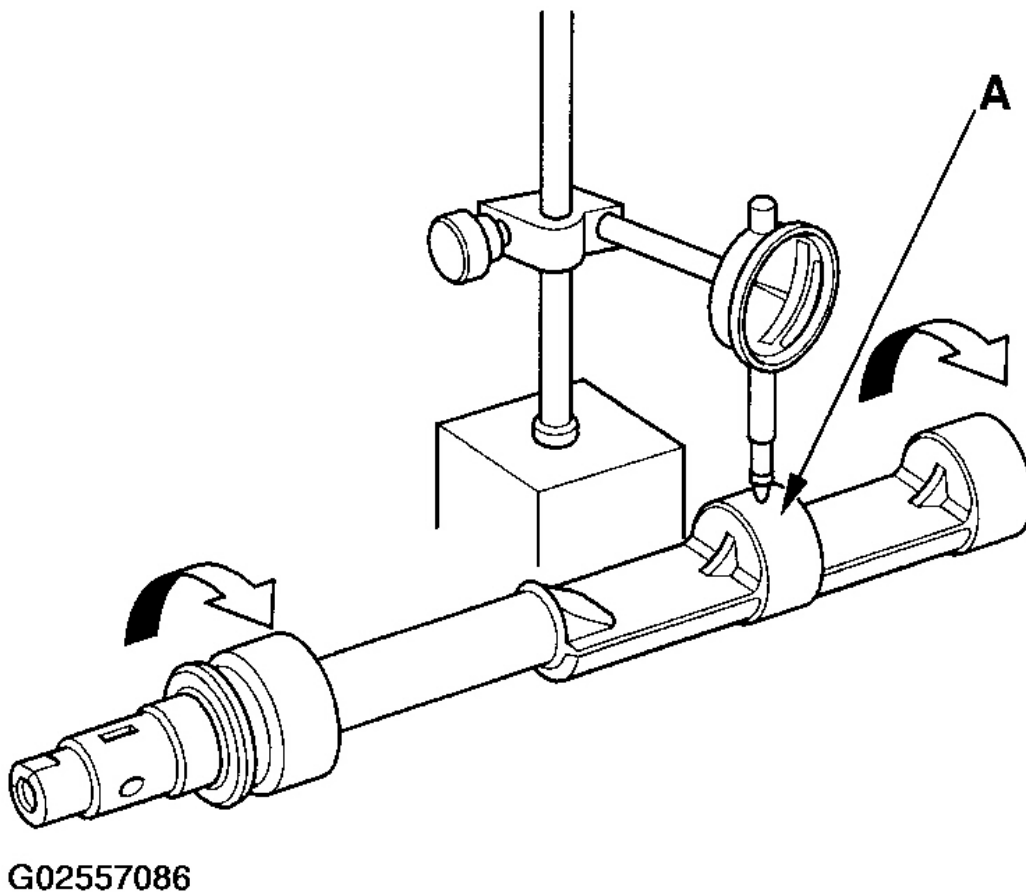


Fig. 231: Measuring Runout On No. 2 Journal Of Balancer Shaft
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Measure the diameters of the journals on the front balancer shaft (A) and the rear balancer shaft (B).

Journal Diameter Standard (New):

2002 Honda Accord SE

2002 ENGINES 2.3L 4-Cylinder - Accord

No. 1 journal:

Front (C): 42.722-42.734 mm (1.6820-1.6824 in.)

Rear (D): 20.938-20.950 mm (0.8243-0.8248 in.)

No. 2 journals:

Front (E) and Rear (F): 38.712-38.724 mm (1.5241-1.5246 in.)

No. 3 journals:

Front (G) and Rear (H): 34.722-34.734 mm (1.3670-1.3675 in.)

Service Limit:

No. 1 journal:

Front (C): 42.71 mm (1.681 in.)

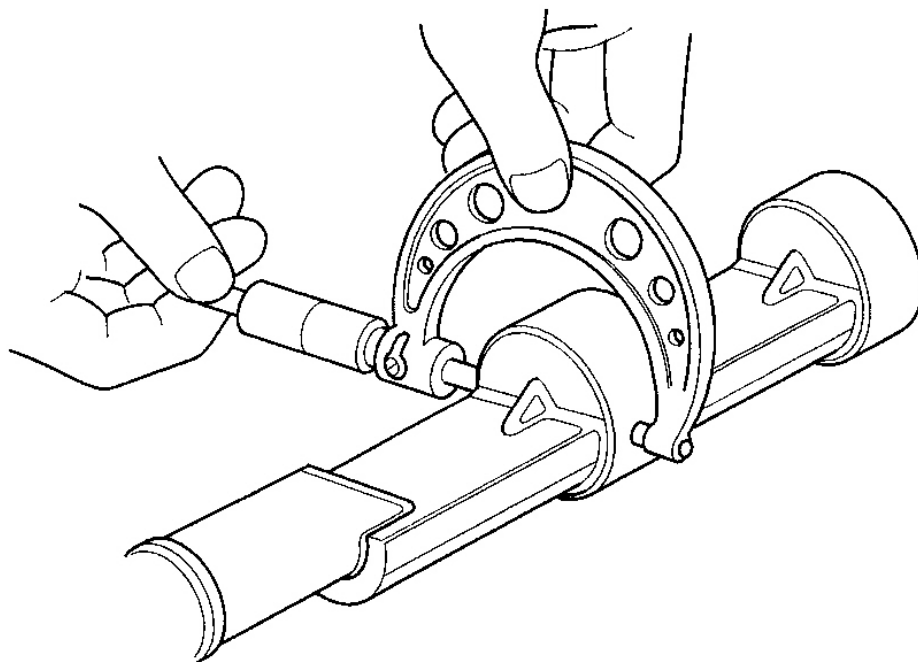
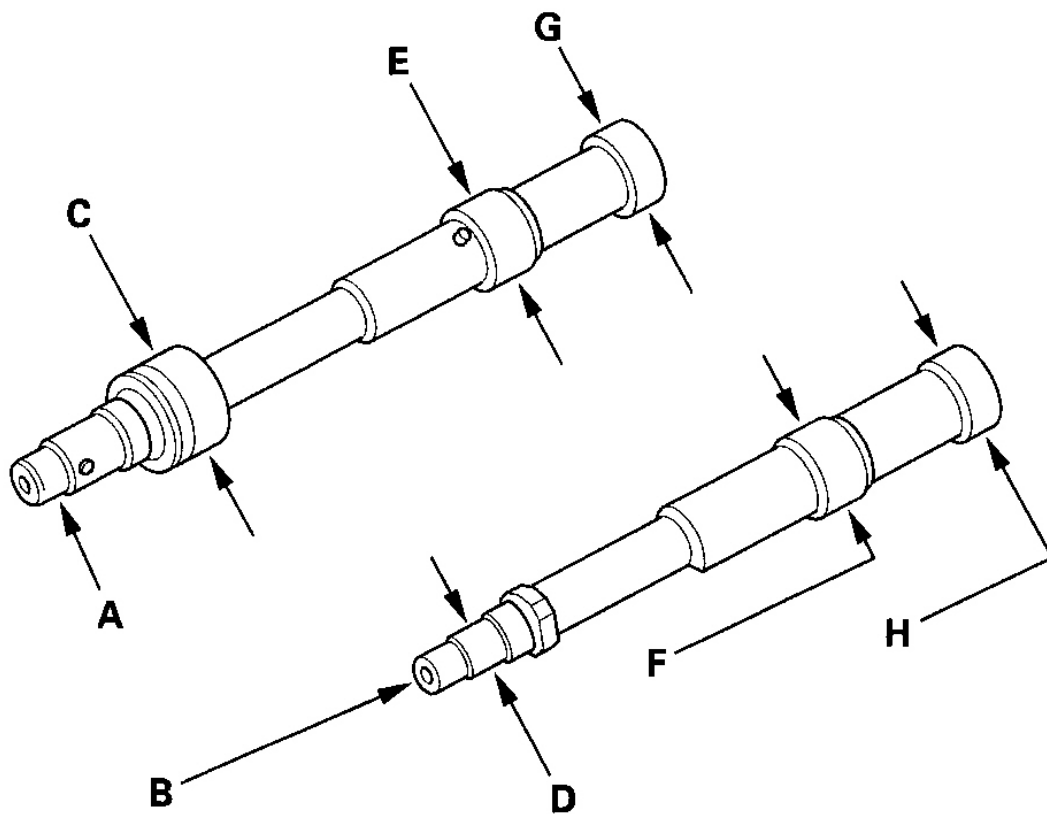
Rear (D): 20.92 mm (0.824 in.)

No. 2 journals:

Front (E) and Rear (F): 38.70 mm (1.524 in.)

No. 3 journals:

Front (G) and Rear (H): 34.71 mm (1.367 in.)



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Fig. 232: Measuring Diameters Of Journals On Front Balancer Shaft & Rear Balancer Shaft
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Remove the crankshaft, the pistons and the other parts from the block, then clean the balancer shaft journal bearings in the block and the oil pump housing with a clean shop towel.
11. Check the surface of the bearings; if there is wear, damage or discoloration, replace the bearings or the oil pump housing.
12. Measure the inner diameters of the bearings for the front balancer shaft (A) and the rear balancer shaft (B).

Bearing Inner Diameter

Standard (New):

No. 1 journal:

Front (C): 42.800-42.820 mm (1.6850-1.6858 in.)

Rear (D): 21.000-21.013 mm (0.8268-0.8273 in.)

No. 2 journals

Front (E) and Rear (F): 38.800-38.820 mm (1.5276-1.5283 in.)

No. 3 journals

Front (G) and Rear (H): 34.800-34.820 mm (1.3701-1.3709 in.)

Service Limit:

No. 1 journal:

Front (C): 42.83 mm (1.686 in.)

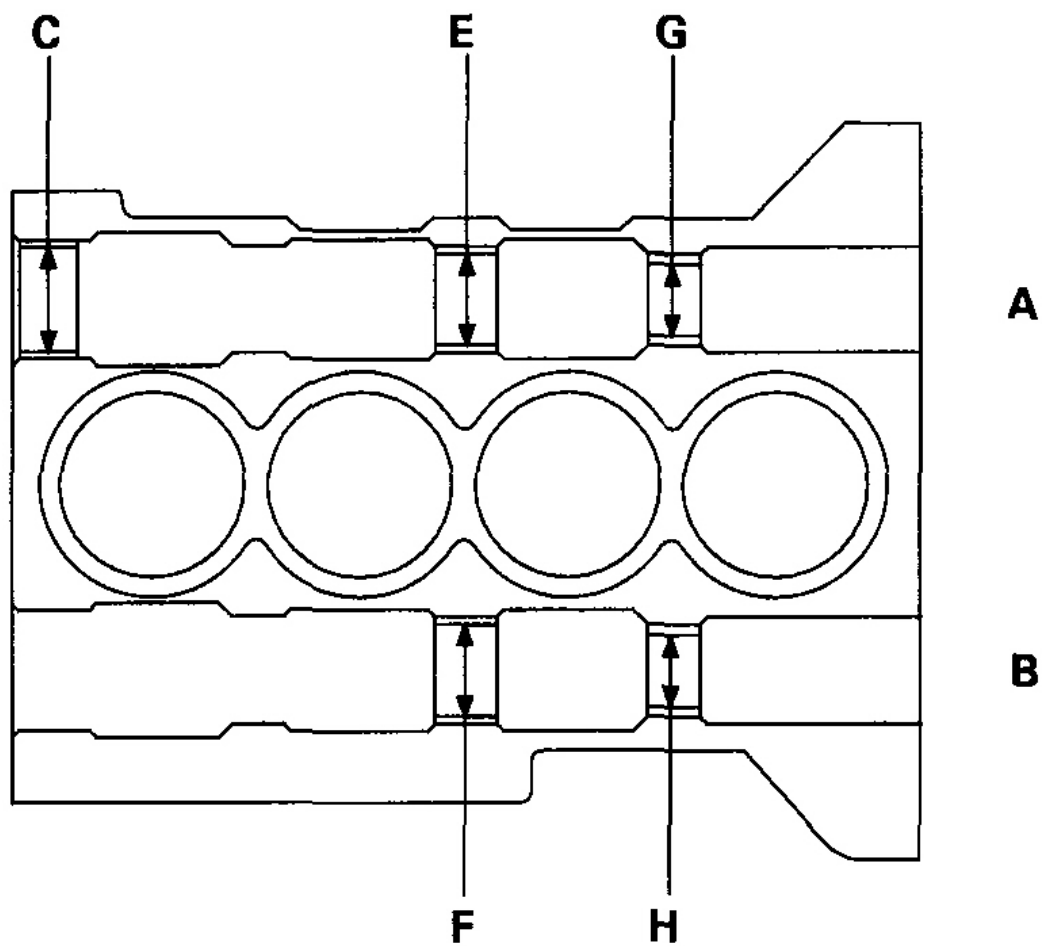
Rear (D): 21.02 mm (0.828 in.)

No. 2 journals

Front (E) and Rear (F): 38.83 mm (1.529 in.)

No. 3 journals:

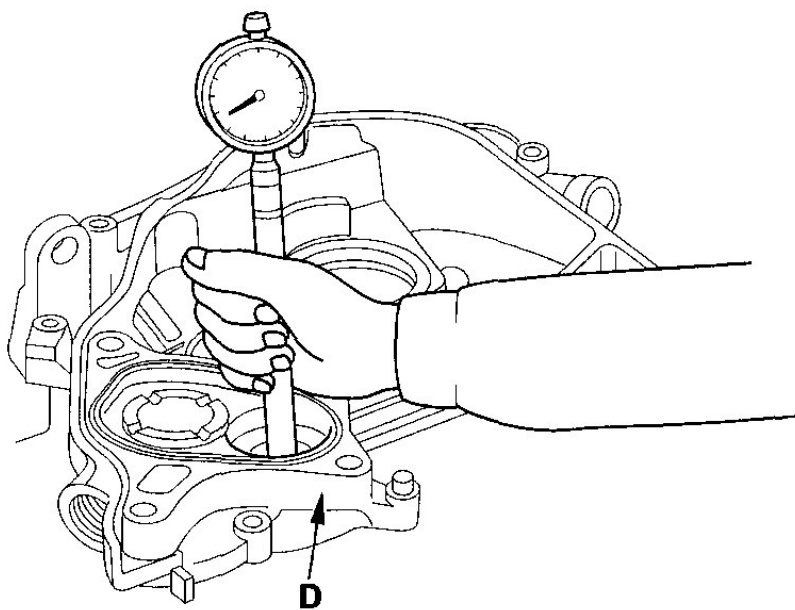
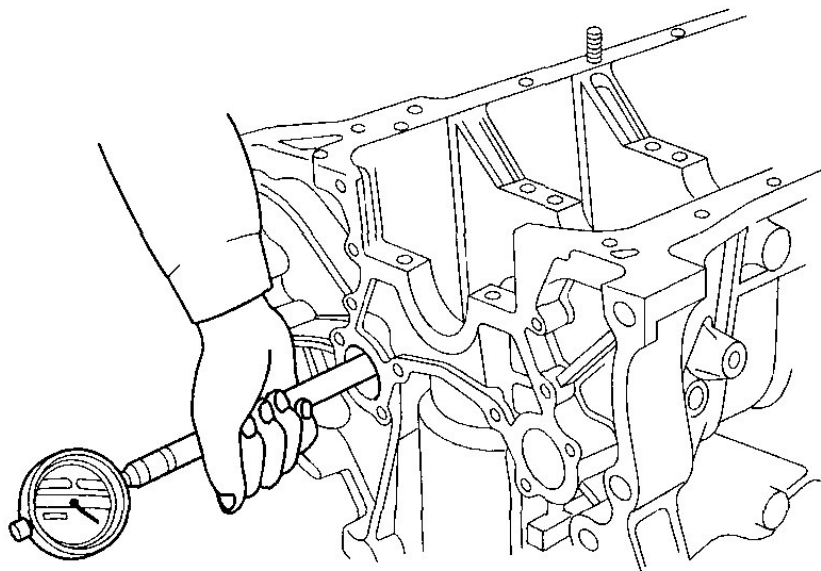
Front (G) and Rear (H): 34.83 mm (1.371 in.)



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Fig. 233: Measuring Inner Diameters Of Bearings For Front Balancer Shaft & Rear Balancer Shaft (1 Of 2)

Courtesy of AMERICAN HONDA MOTOR CO., INC.



G02557089

Fig. 234: Measuring Inner Diameters Of Bearings For Front Balancer Shaft & Rear Balancer Shaft
(2 Of 2)

Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Calculate the shaft-to-bearings oil clearances.

BEARING I.D. - JOURNAL O.D. = OIL CLEARANCE**Shaft-to-Bearings Oil Clearances Standard (New):**

No. 1 Front journal, No. 3 Front and Rear journals: 0.066-0.098 mm (0.0026-0.0039 in.)

No. 2 Front and Rear journals: 0.076-0.108 mm (0.0030-0.0043 in.)

No. 1 Rear journal: 0.050-0.075 mm (0.0020-0.0030 in.)

Service Limit:

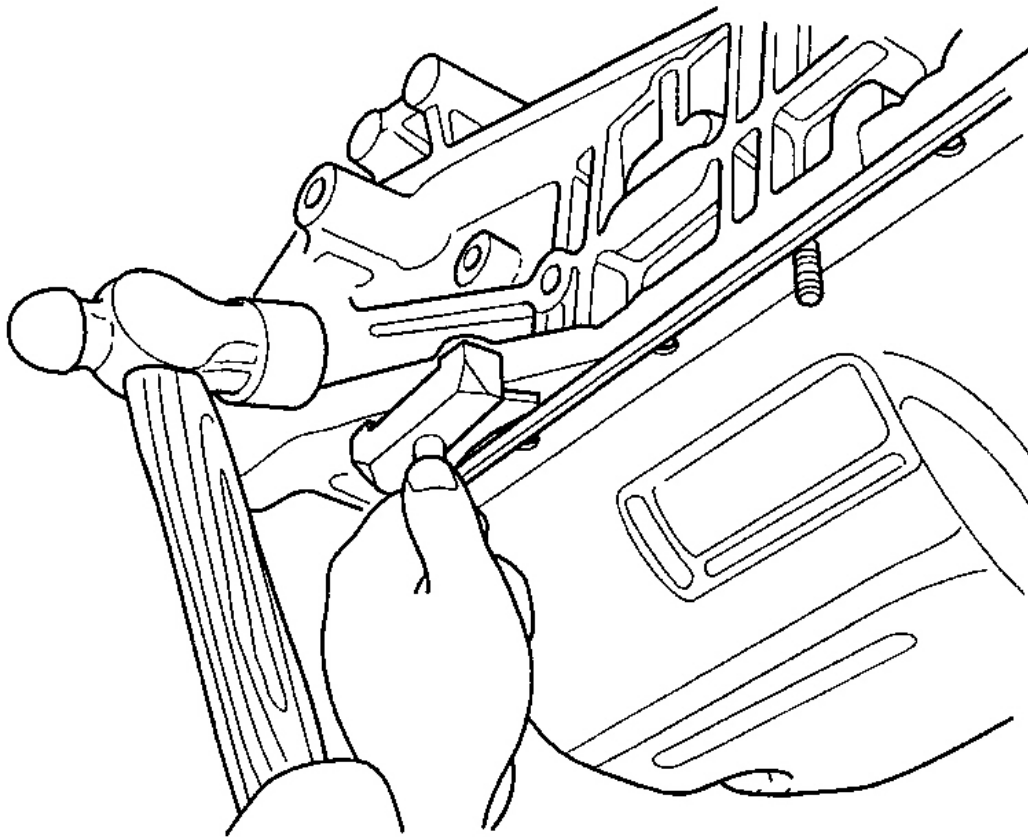
No. 1 Front journal, No. 3 Front and Rear journals: 0.12 mm (0.005 in.)

No. 2 Front and Rear journals: 0.13 mm (0.005 in.)

No. 1 Rear journal: 0.09 mm (0.004 in.)

CRANKSHAFT, PISTON & BALANCER SHAFT REMOVAL

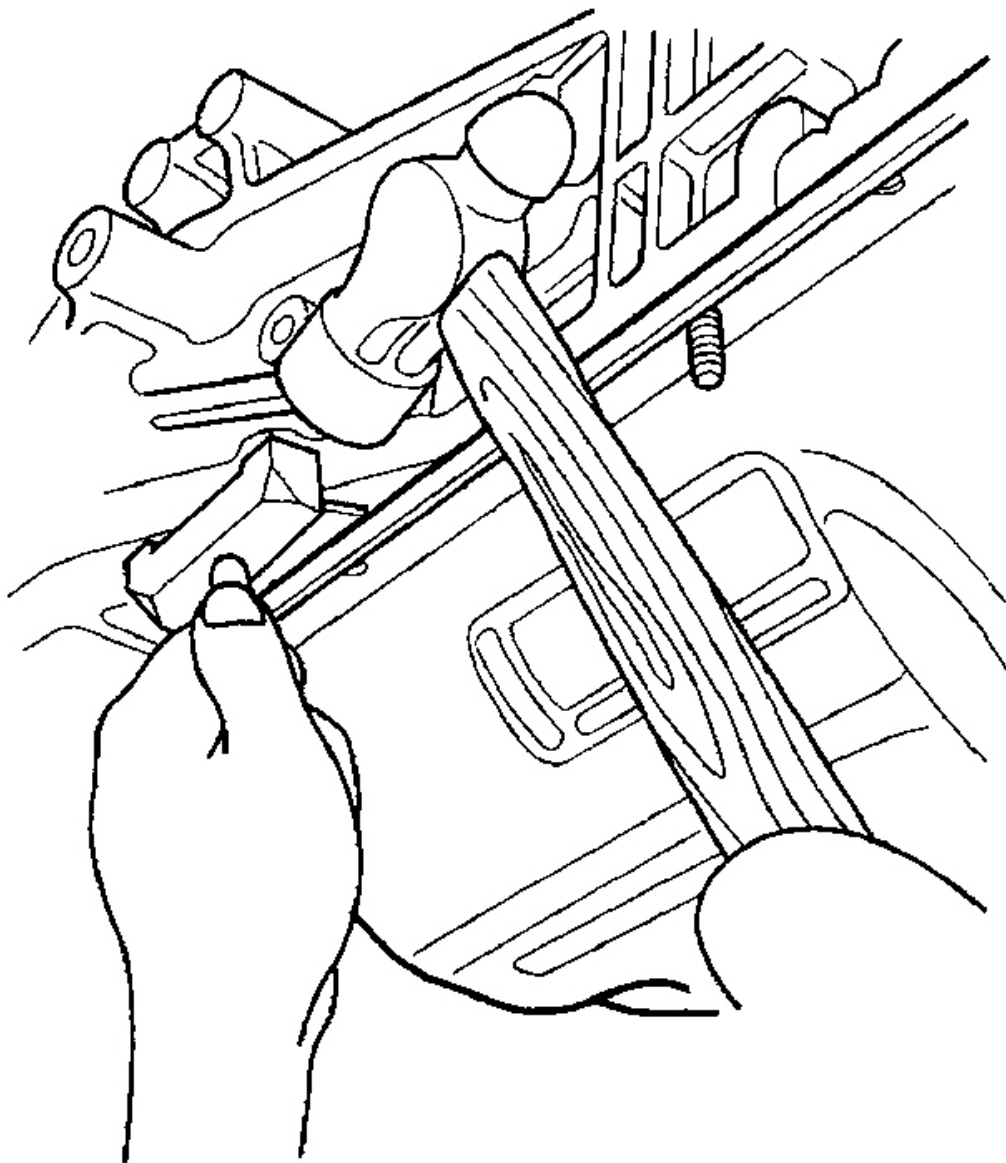
1. Remove the engine assembly (see **Engine Removal**).
2. Remove the transmission:
 - Manual transmission (see **TRANSMISSION REMOVAL**).
 - Automatic transmission (see **REMOVAL & INSTALLATION - A/T**).
3. Remove the bolts securing the oil pan.
4. Drive an oil pan seal cutter between the oil pan and cylinder block.



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Fig. 235: Driving Oil Pan Seal Cutter Between Oil Pan & Cylinder Block
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Cut the oil pan seal by striking the side of the cutter to slide the cutter along the oil pan. Remove the oil pan.

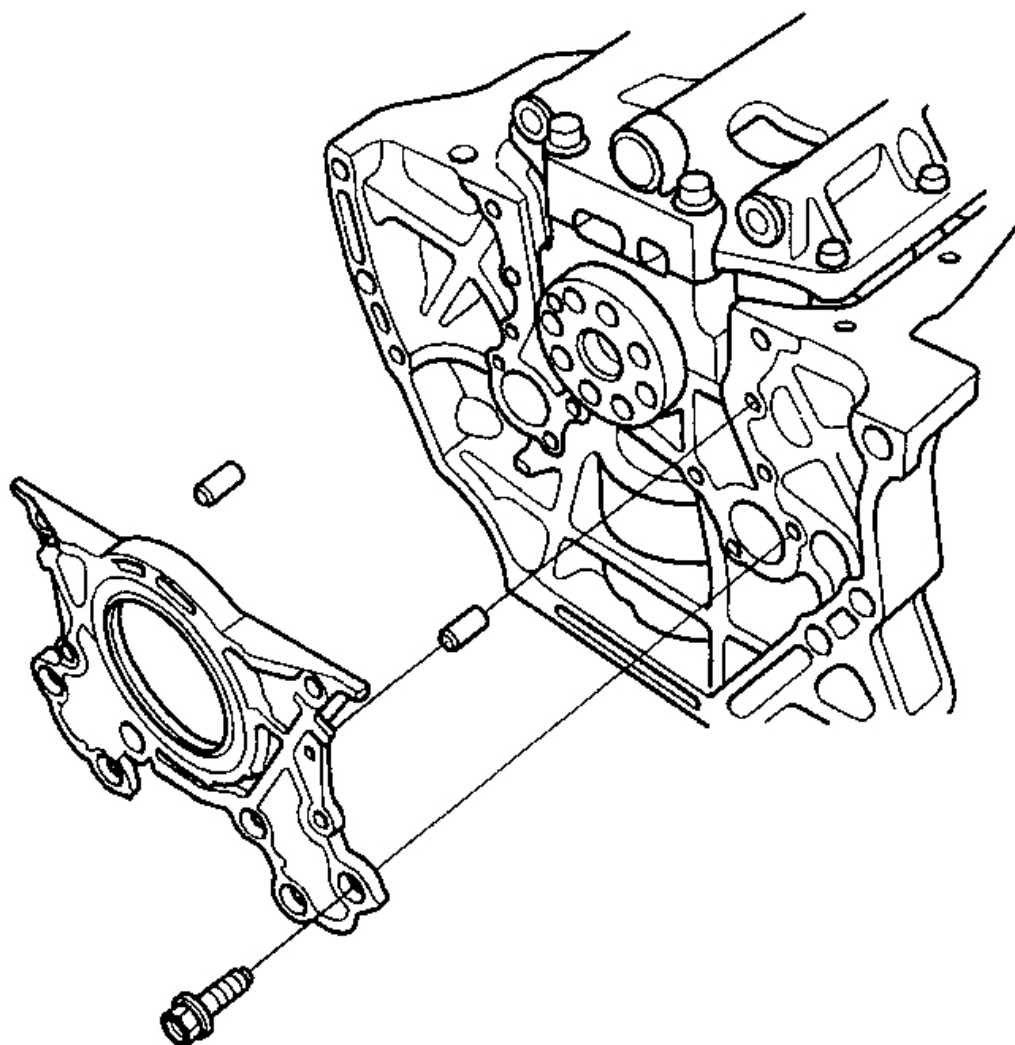


G02557091

Fig. 236: Striking Side Of Cutter

Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Remove the right side cover.



G02557092

Fig. 237: Removing Right Side Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Remove the CKP/TDC sensors.
8. Remove the timing belt drive pulley.
9. Remove the balancer gear case.

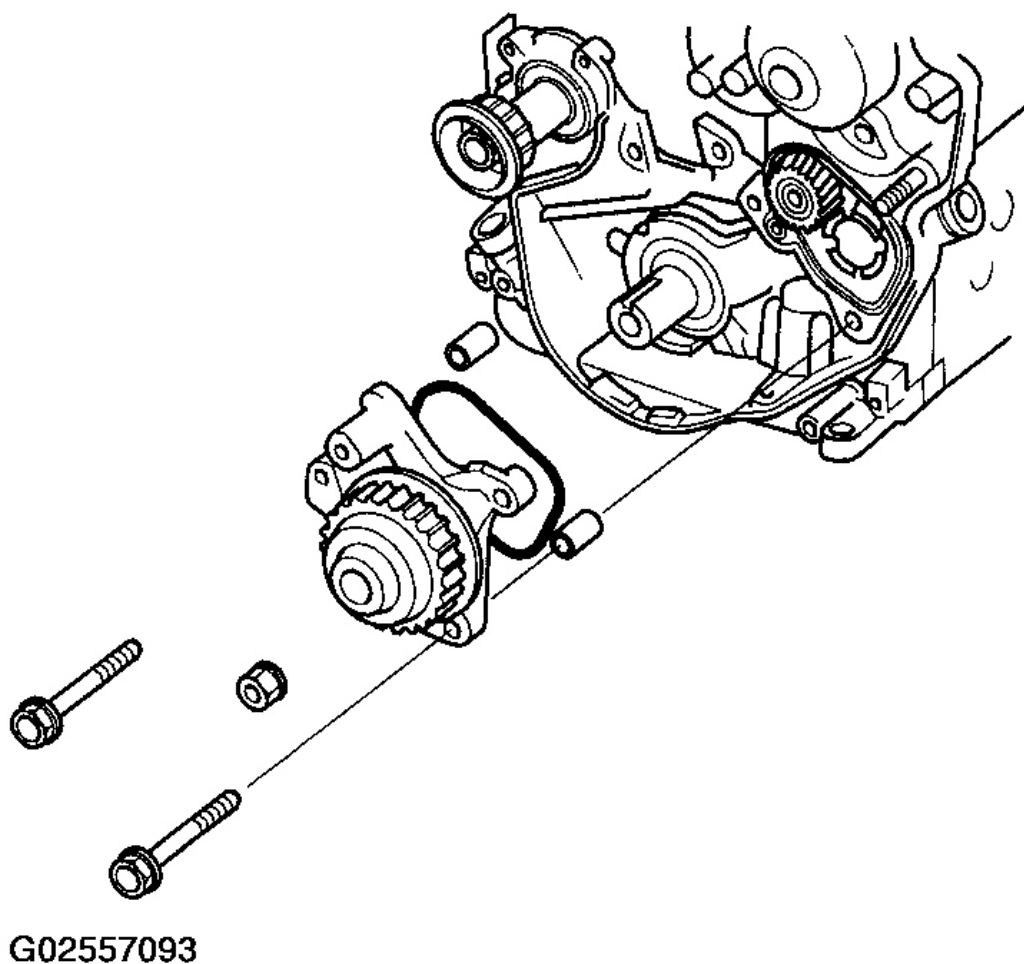
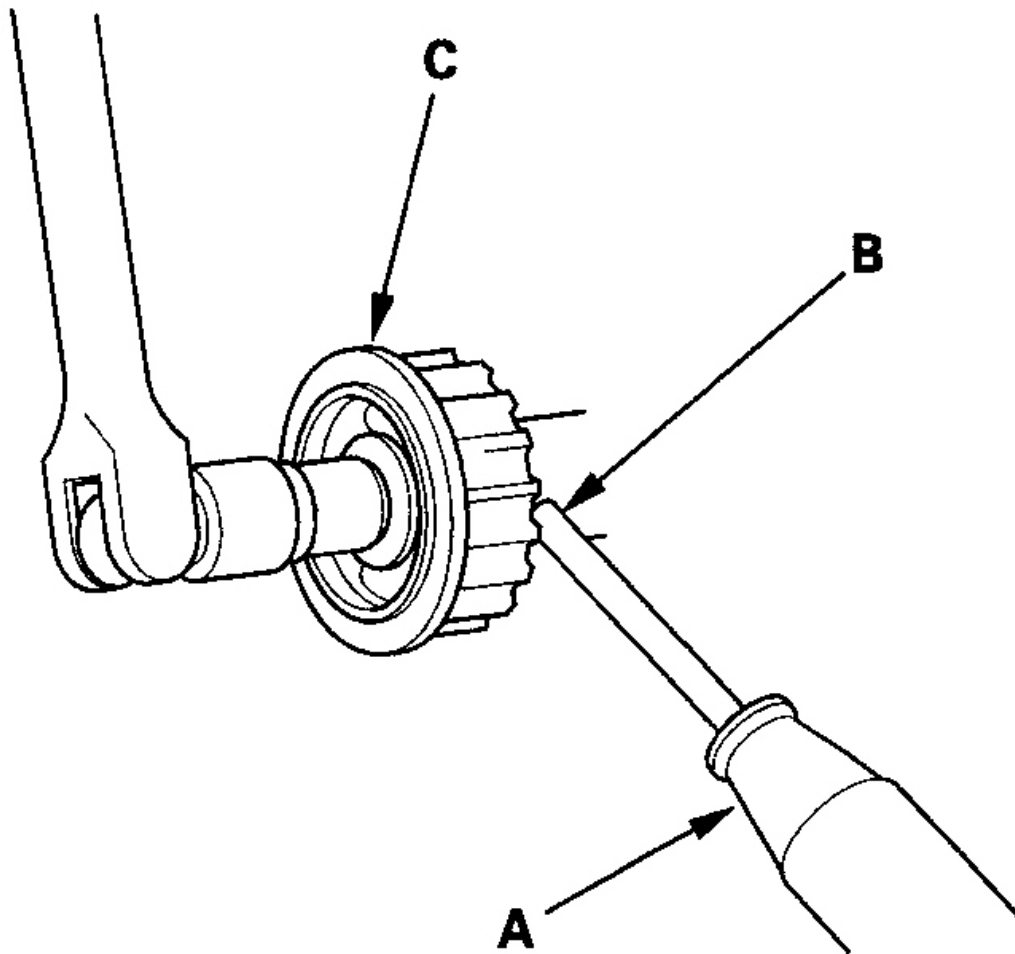


Fig. 238: Removing Balancer Gear Case

Courtesy of AMERICAN HONDA MOTOR CO., INC.

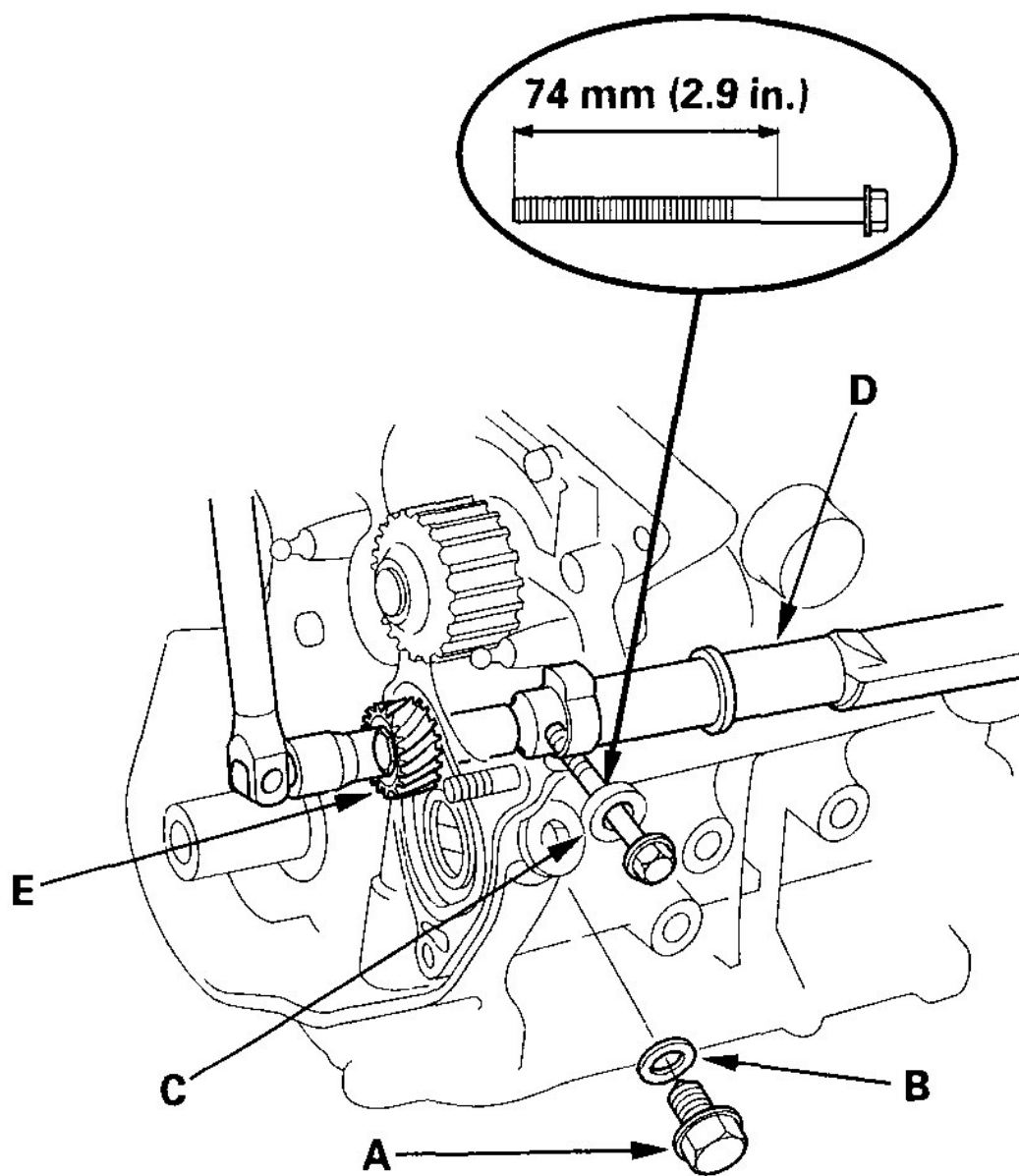
10. Insert a screwdriver (A) in the front balancer shaft maintenance hole (B), and remove the front balancer driven pulley (C).



G02557094

Fig. 239: Removing Front Balancer Driven Pulley
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Remove the balancer driven gear.
 - A. Remove the bolt (A) and washer (B) from the maintenance hole (C).
 - B. Scribe a line on a 6 X 100 mm bolt, 74 mm (2.9 in.) from the end.
 - C. Insert the bolt in the maintenance hole and into the hole in the rear balancer shaft (D) up to the line you scribed.
 - D. Remove the bolt and balancer driven gear (E).



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Fig. 240: Removing Bolt & Balancer Driven Gear
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Remove the oil screen (A) and the oil pump (B).

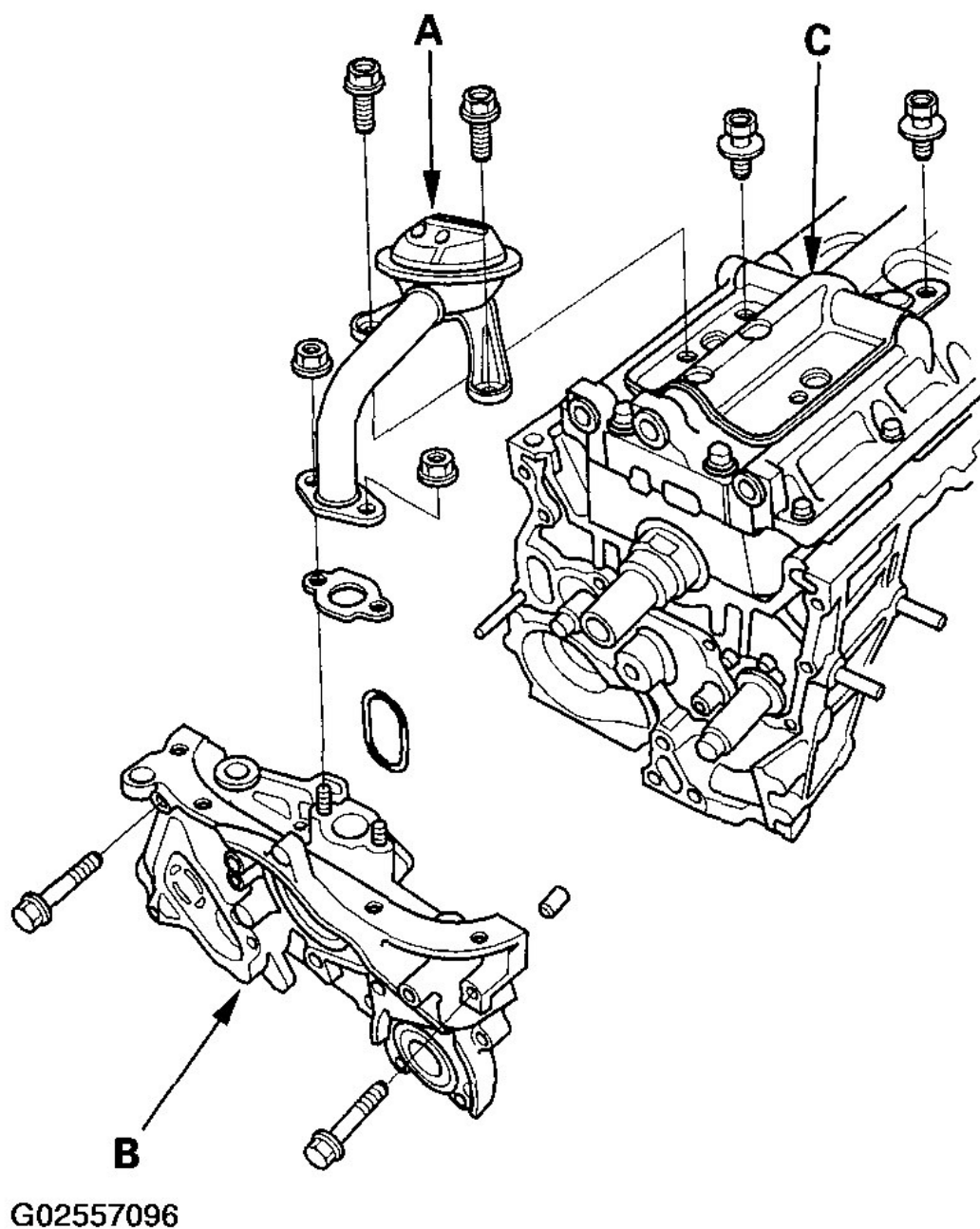
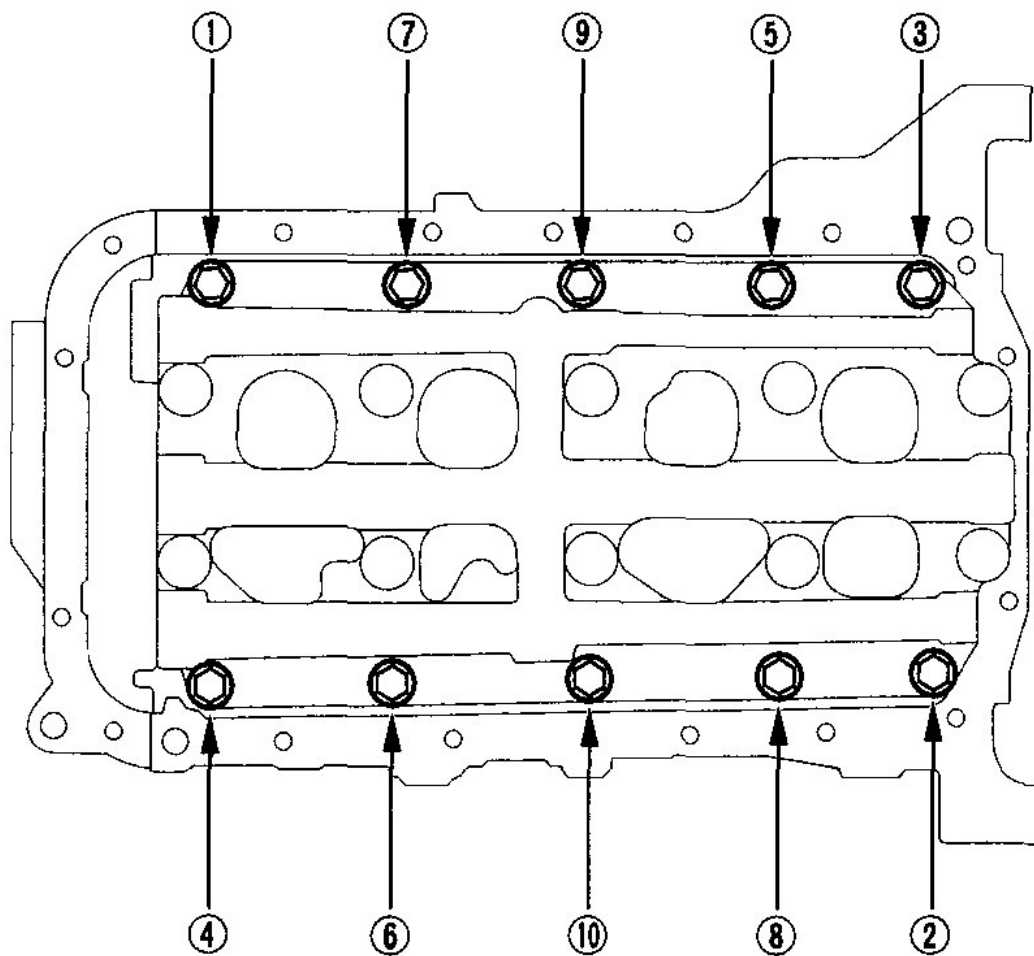


Fig. 241: Removing Oil Screen & Oil Pump

Courtesy of AMERICAN HONDA MOTOR CO., INC.

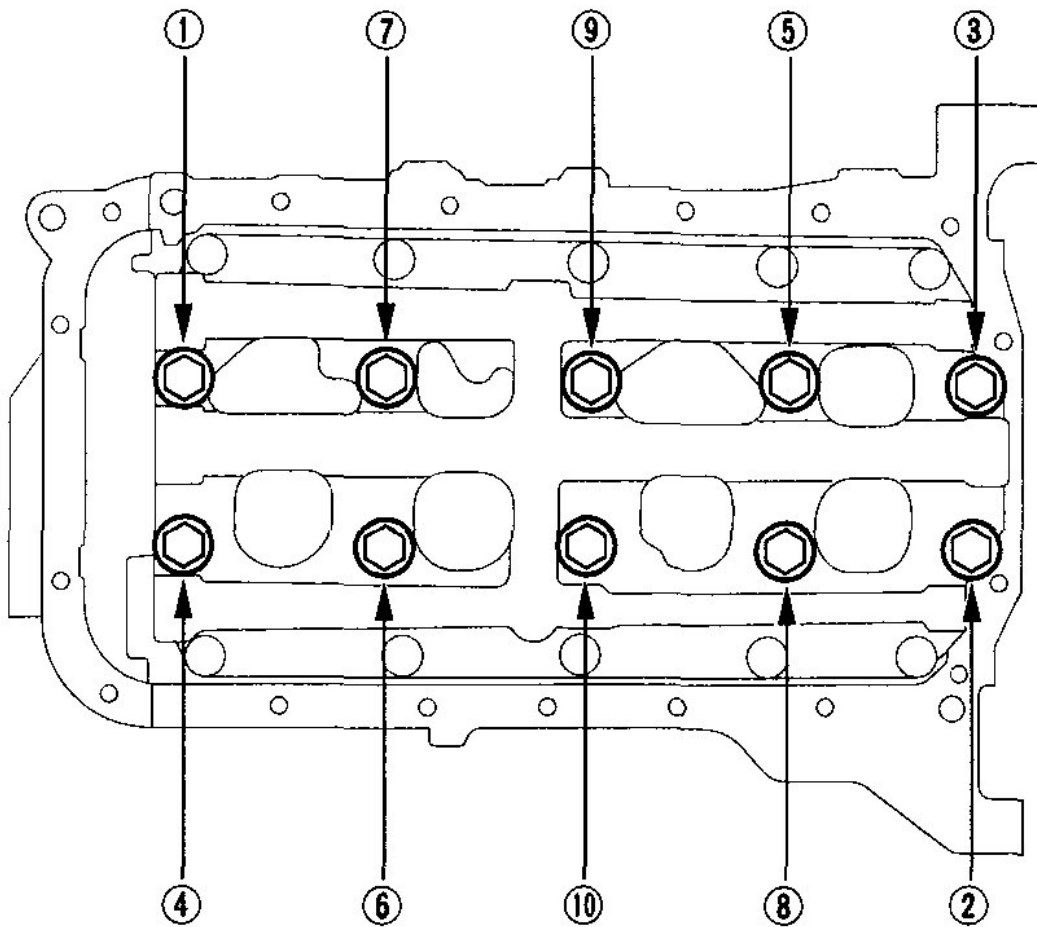
13. Remove the baffle plate (C).
14. Remove the 6 mm bolts. To prevent warpage, unscrew the bolts in sequence 1/3 turn at a time; repeat the sequence until all bolts are loosened.



G02557097

Fig. 242: Identifying 6 MM Bolt Unscrewing Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

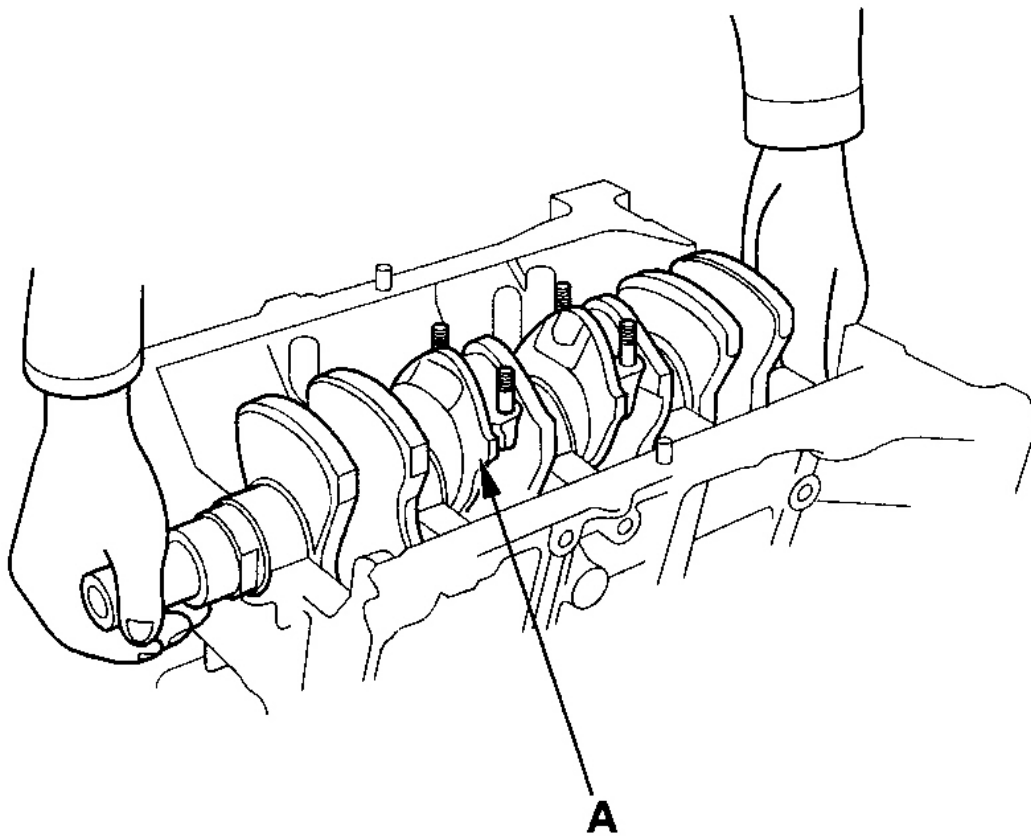
15. Remove the 11 mm bolts. To prevent warpage, unscrew the bolts in sequence 1/3 turn at a time; repeat the sequence until all bolts are loosened.



G02557098

Fig. 243: Identifying 11 MM Bolt Unscrewing Sequence
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

16. Remove the bearing cap bridge.
17. Turn the crankshaft so No. 2 and 3 crank pins are at the top.
18. Remove the rod caps/bearings and main caps/bearings. Keep all caps/bearings in order.
19. Lift the crankshaft (A) out of the engine, being careful not to damage the journals.



G02557099

Fig. 244: Lifting Crankshaft Out Of Engine
Courtesy of AMERICAN HONDA MOTOR CO., INC.

20. Remove the front balancer shaft and the rear balancer shaft.
 - A. Remove the bolt and the retainer (A).
 - B. Pull out the front balancer shaft (B).
 - C. Pull out the rear balancer shaft (C).

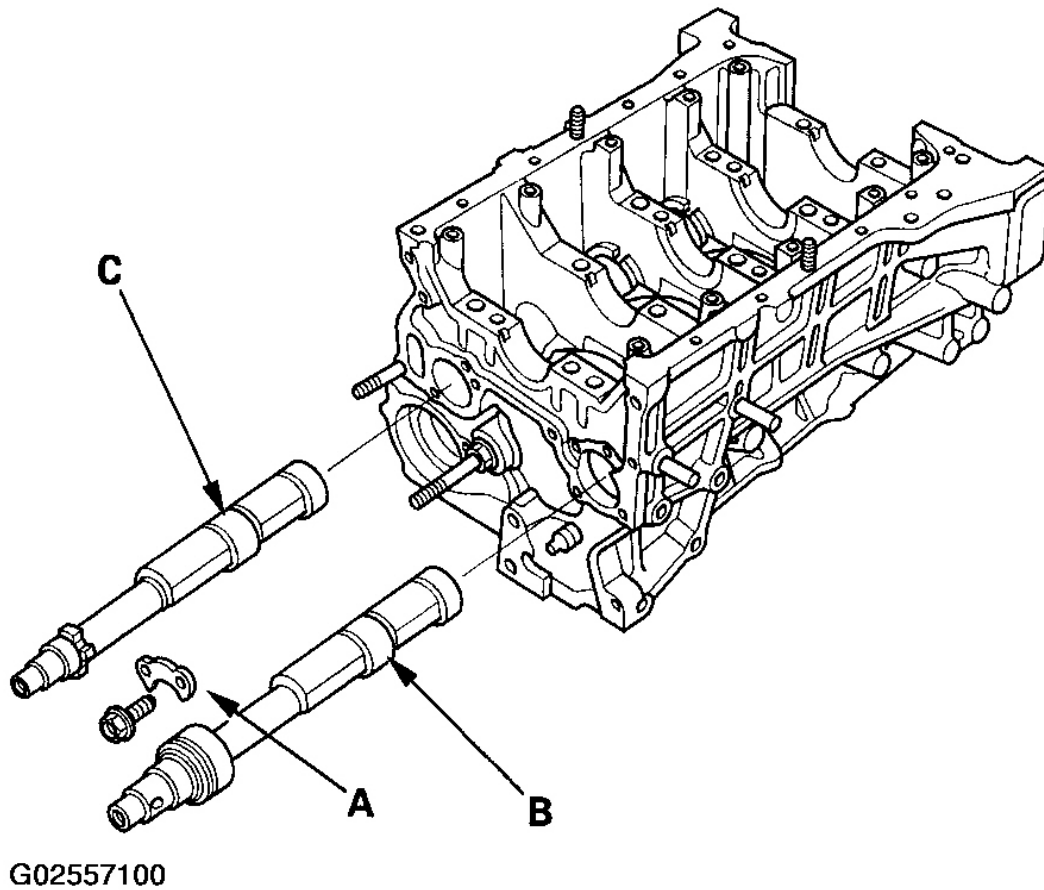
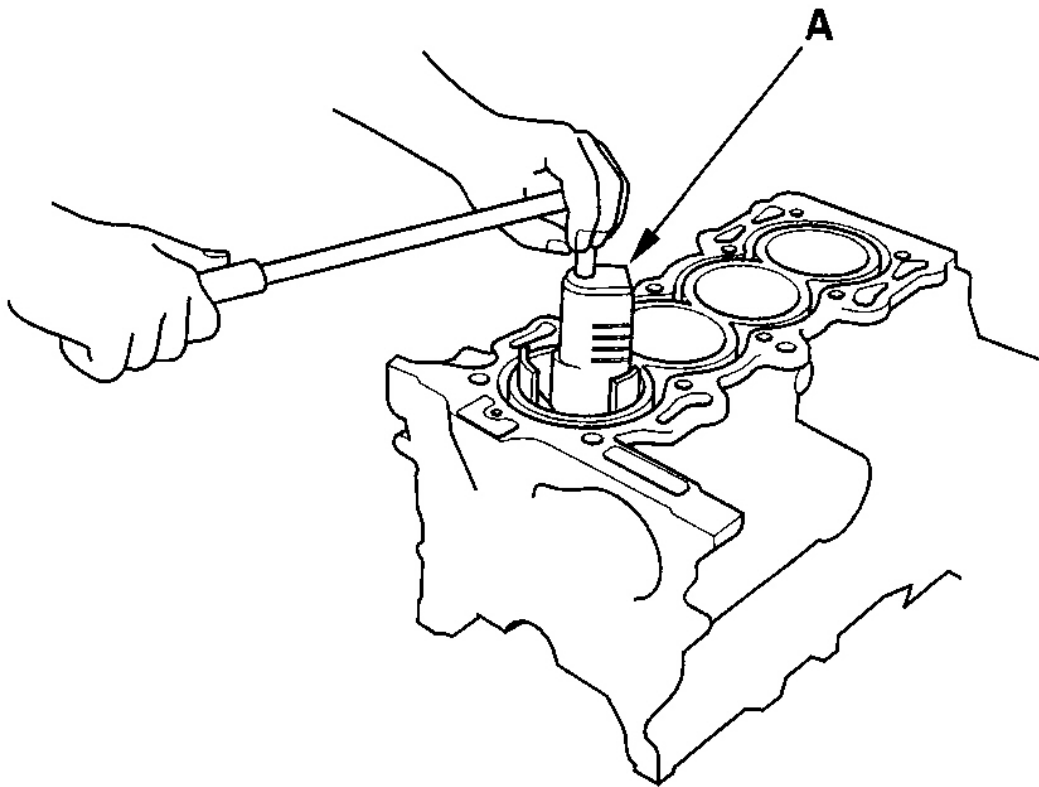


Fig. 245: Removing Front Balancer Shaft & Rear Balancer Shaft
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

21. Remove the upper bearing halves from the connecting rods, and set them aside with their respective caps.
22. Reinstall the main caps and bearings on the engine in the proper order.
23. 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.



G02557101

Fig. 246: Removing Metal Or Hard Carbon Around Top Of Each Cylinder Using Ridge Reamer
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

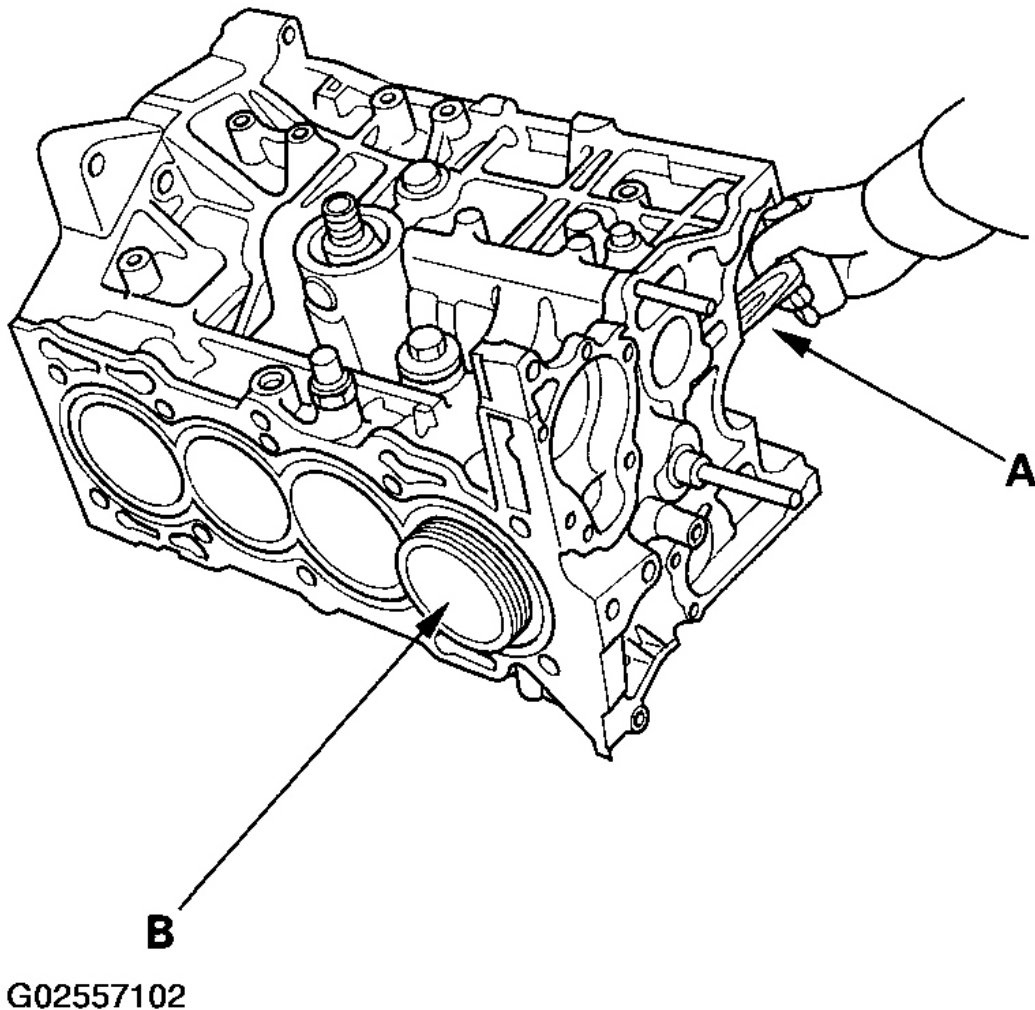


Fig. 247: Driving Out The Pistons

Courtesy of AMERICAN HONDA MOTOR CO., INC.

25. Reinstall the connecting rod bearings and caps after removing each piston/connecting rod assembly.

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

26. To avoid mix-up on reassembly, mark each piston/connecting rod assembly with its cylinder number.

CRANKSHAFT INSPECTION

Straightness

NOTE:

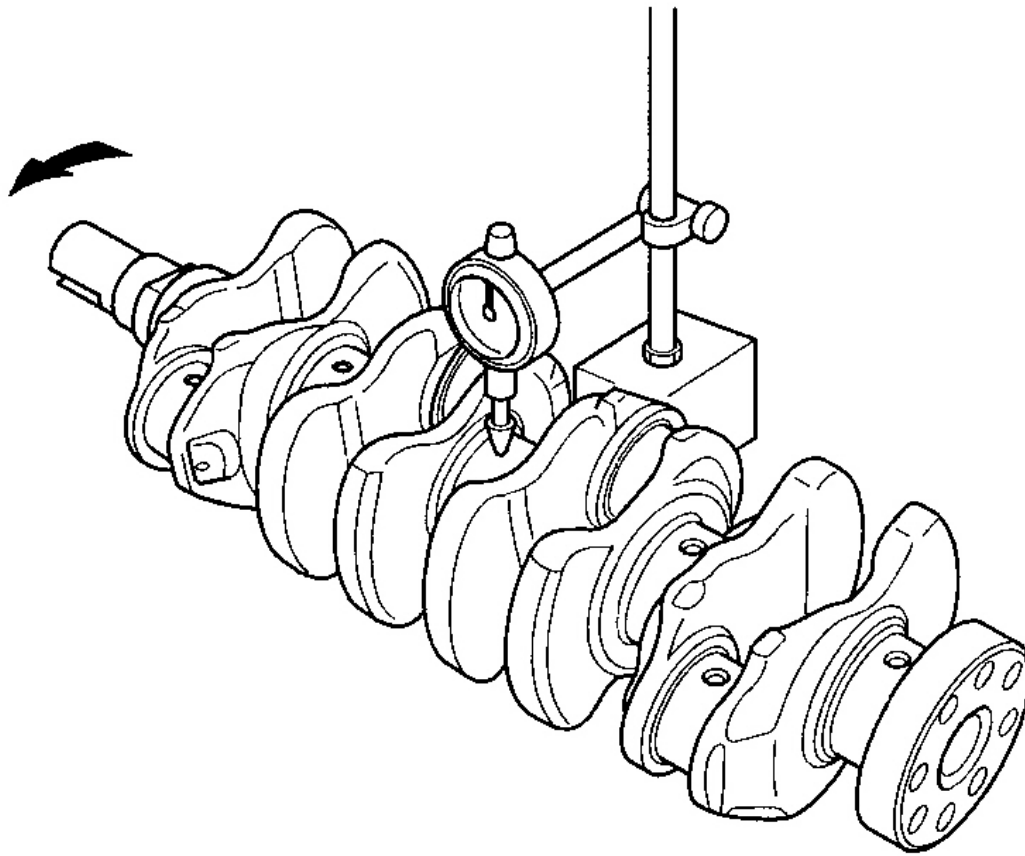
- **Clean the crankshaft oil passages with pipe cleaners or a suitable brush.**
- **Check the keyway and threads.**

1. Remove the crankshaft from the engine block (see **Crankshaft, Piston & Balancer Shaft Removal**).
2. Clean the crankshaft oil passages with pipe cleaners or a suitable brush.
3. Clean the keyway and thread; repair or replace it if necessary.
4. Support the crankshaft with a V-blocks.
5. Measure runout on all 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.

Crankshaft Total Indicator Runout:

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

Service Limit: 0.04 mm (0.002 in.)



G02557103

Fig. 248: Measuring Runout On Main Journals
Courtesy of AMERICAN HONDA MOTOR CO., INC.

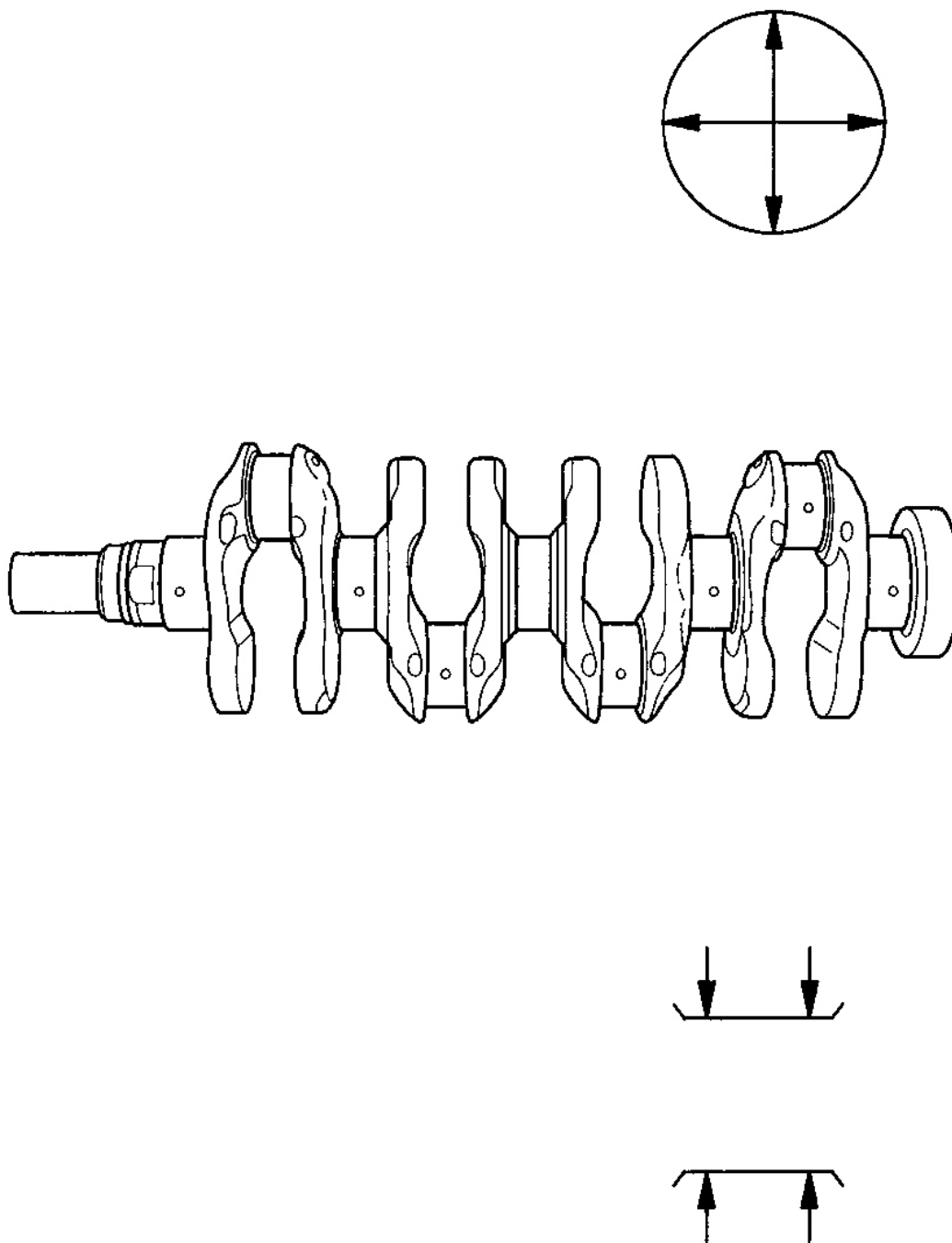
Out-of-Round & Taper

1. 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): 0.005 mm (0.0002 in.) Max.

Service Limit: 0.006 mm (0.0002 in.)



G02557104

Fig. 249: Measuring Out-Of-Round At Middle Of Each Rod & Main Journal In Two Places
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. 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): 0.005 mm (0.0002 in.) Max.

Service Limit: 0.006 mm (0.0002 in.)

BLOCK & PISTON INSPECTION

1. Remove the piston from the engine block (see **Crankshaft, Piston & Balancer Shaft Removal**).
2. Check the piston for distortion or cracks.
3. Measure the piston diameter at a point 16 mm (0.6 in) from the bottom of the skirt. There are two standard-size pistons (No Letter or A, and B). The letter is stamped on the top of the piston. Letters are also stamped on the block as cylinder bore sizes.

Piston Diameter:**Standard (New):**

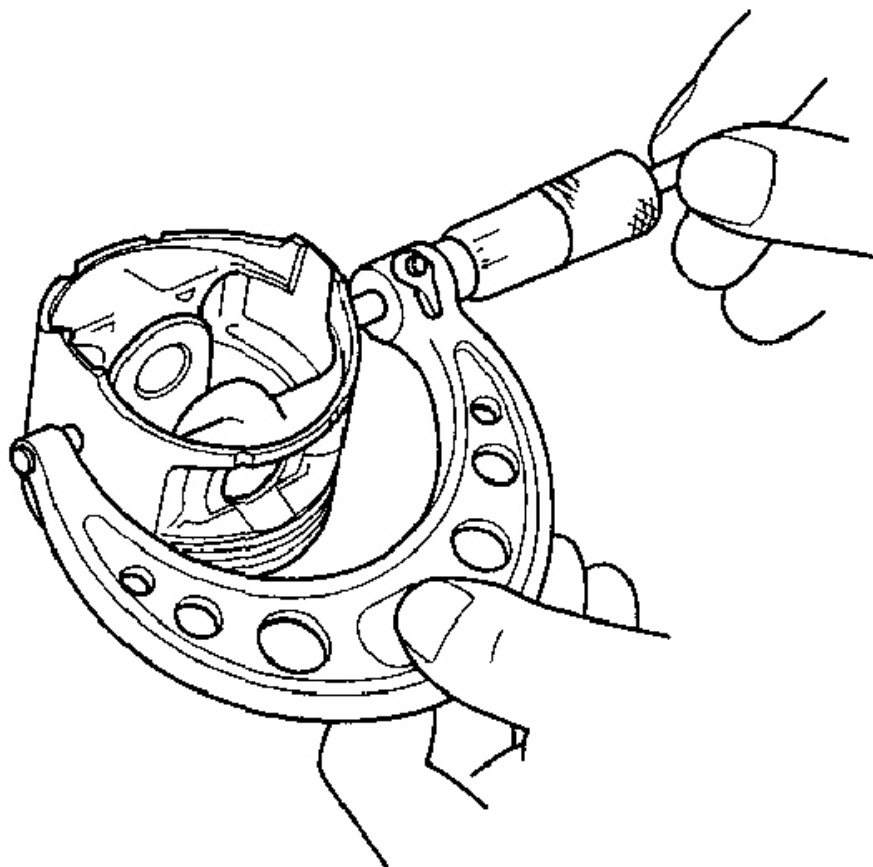
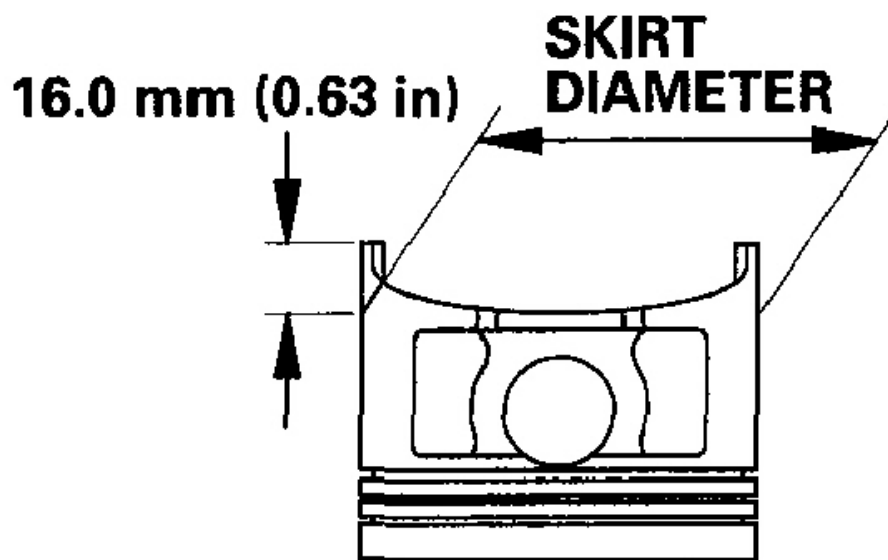
No Letter (or A): 85.980-85.990 mm (3.3850-3.3854 in.)

B: 85.970-85.980 mm (3.3846-3.3850 in.)

Service Limit:

No Letter (or A): 85.970 mm (3.3846 in.)

B: 85.960 mm (3.3842 in.)

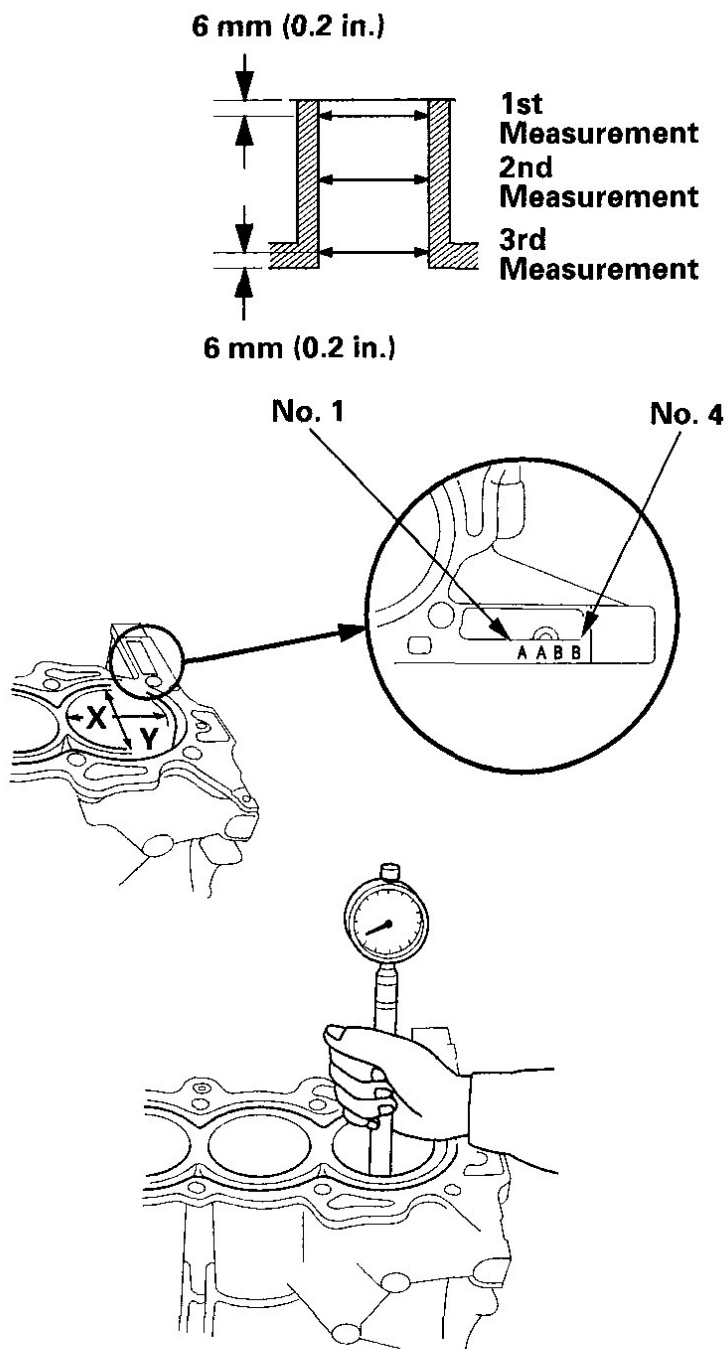


G02557105

Fig. 250: Measuring Piston Diameter**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

4. Measure wear and taper in direction X and Y at 3 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):****A or I:** 86.010-86.020 mm (3.3862-3.3866 in.)**B or II:** 86.000-86.010 mm (3.3858-3.3862 in.)**Service Limit:** 86.070 mm (3.3886 in.)**Oversize: 0.25:** 86.250-86.260 mm (3.3957-3.3960 in.)**Reboring limit: 0.25 mm (0.01 in.) Max.****Bore Taper:****Limit:** (Difference between 1st and 3rd measurement) 0.05 mm (0.002 in.)



G02557106

Fig. 251: Measuring Wear & Taper

Courtesy of AMERICAN HONDA MOTOR CO., INC.

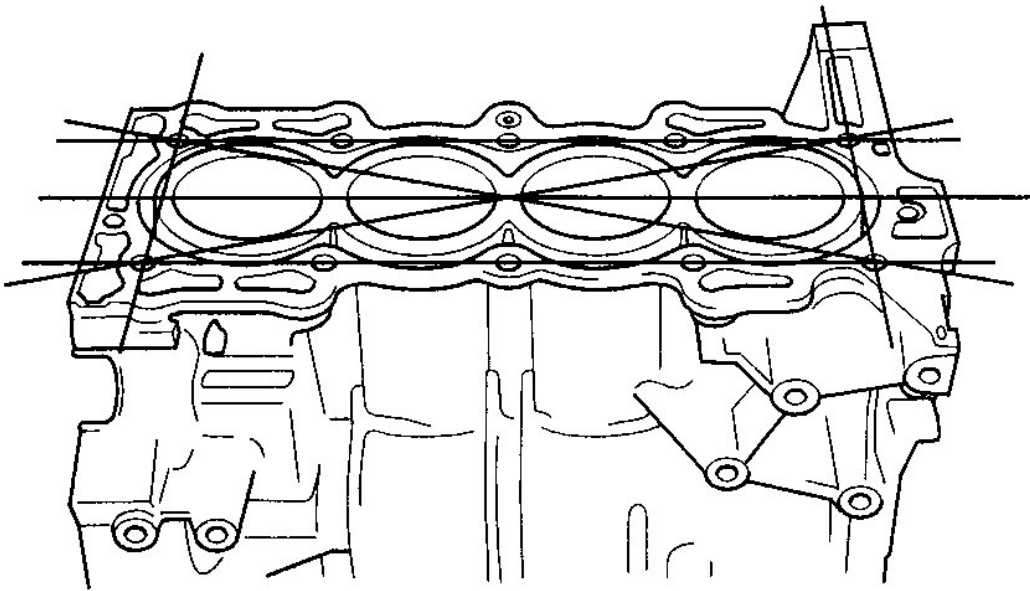
5. Scored or scratched cylinder bores must be honed.

6. Check the top of the block for warpage. Measure along the edges and across the center as shown.

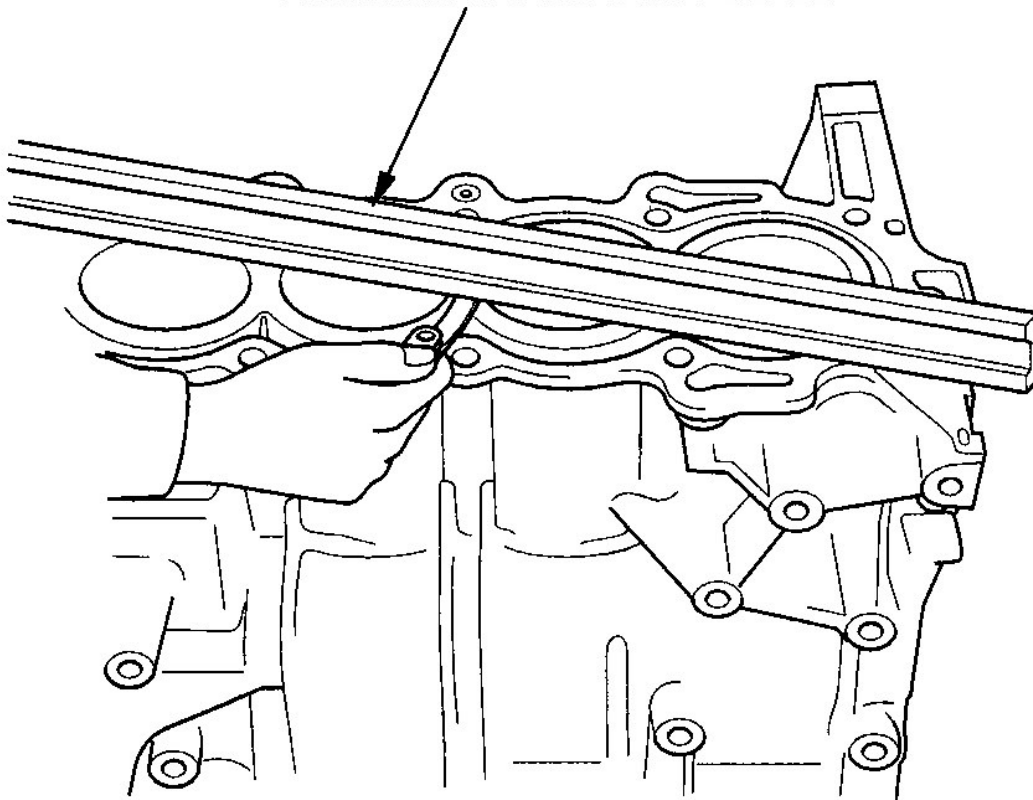
Engine Block Warpage:

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

Service Limit: 0.10 mm (0.004 in.)



PRECISION STRAIGHT EDGE

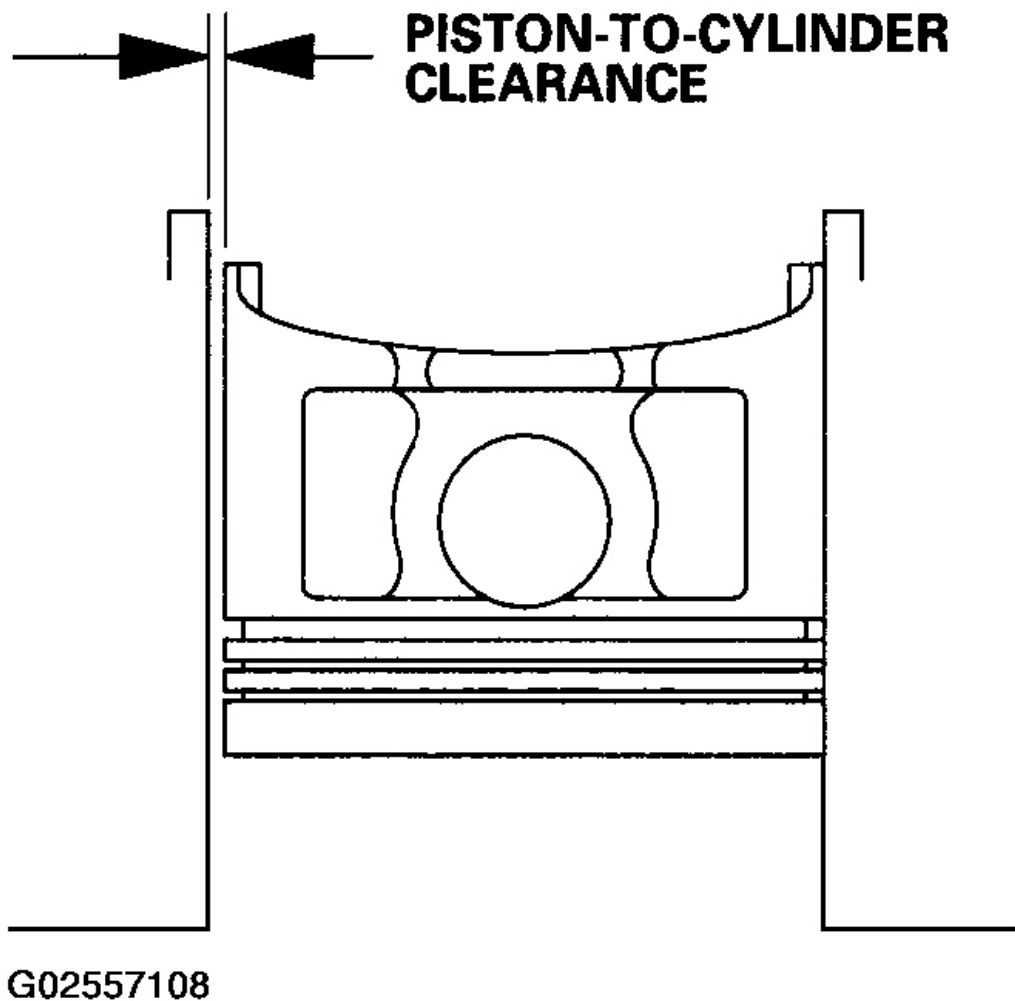


G02557107

Fig. 252: Checking Top Of Block For Warpage

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.

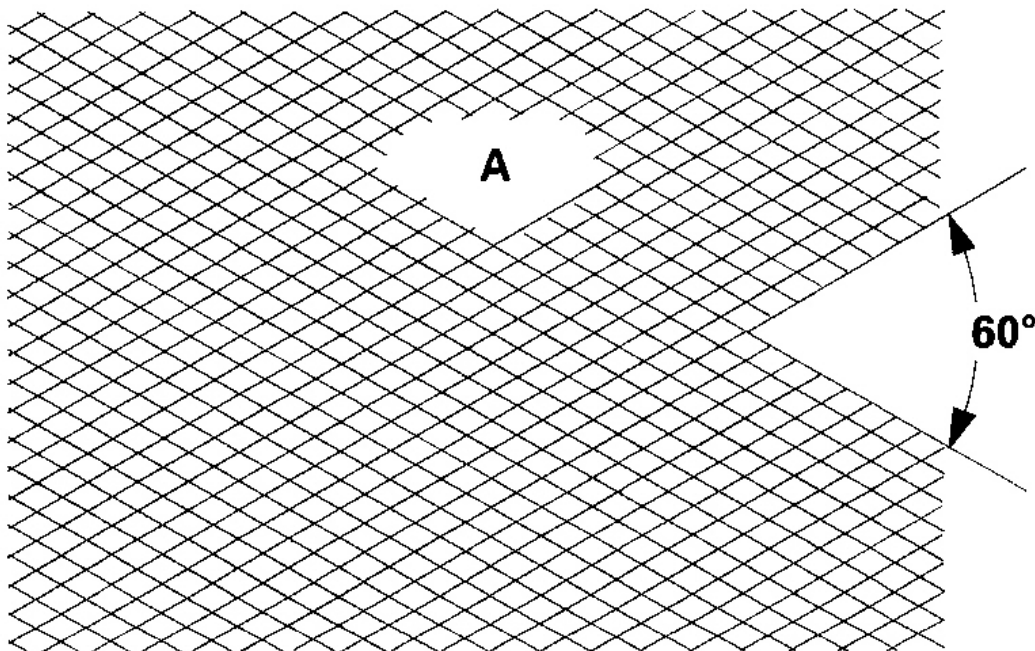
Piston-to-Cylinder Clearance:**Standard (New):** 0.020-0.040 mm (0.0008-0.0016 in.)**Service Limit:** 0.05 mm (0.002 in.)**Oversize Piston Diameter: 0.25:** 86.230-86.240 mm (3.3949-3.3953 in.)**Fig. 253: Measuring Piston-To-Cylinder Clearance**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

CYLINDER HONING

Only a scored or scratched cylinder bore must be honed.

1. Measure the cylinder bores (see **Block & 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.



G02557109

Fig. 254: Honing Cylinder Bores In A 60 Degree Cross-Hatch Pattern

Courtesy of AMERICAN HONDA MOTOR CO., INC.

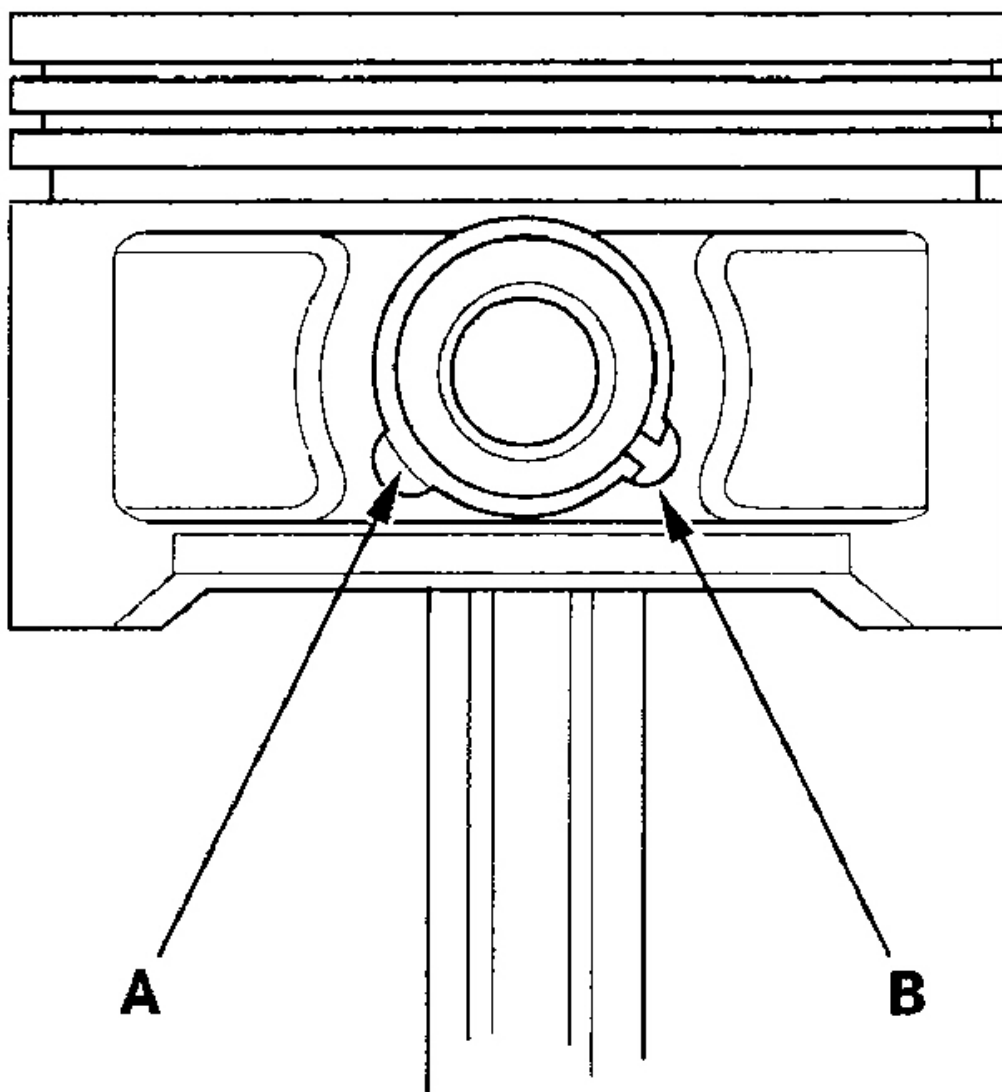
3. When honing is complete, thoroughly clean the engine block of all metal particles. Wash the cylinder bores with hot soapy water, then dry and oil them immediately to prevent rusting. Never use solvent, it will only redistribute the grit on the cylinder walls.
4. If scoring or scratches are still present 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 & CONNECTING ROD REPLACEMENT

Disassembly

NOTE: **Take care not to damage the ring grooves.**

1. Apply engine oil to the piston pin snap rings (A) and turn them in the ring grooves until the end gaps are lined up with the cutouts in the piston pin bores (B).

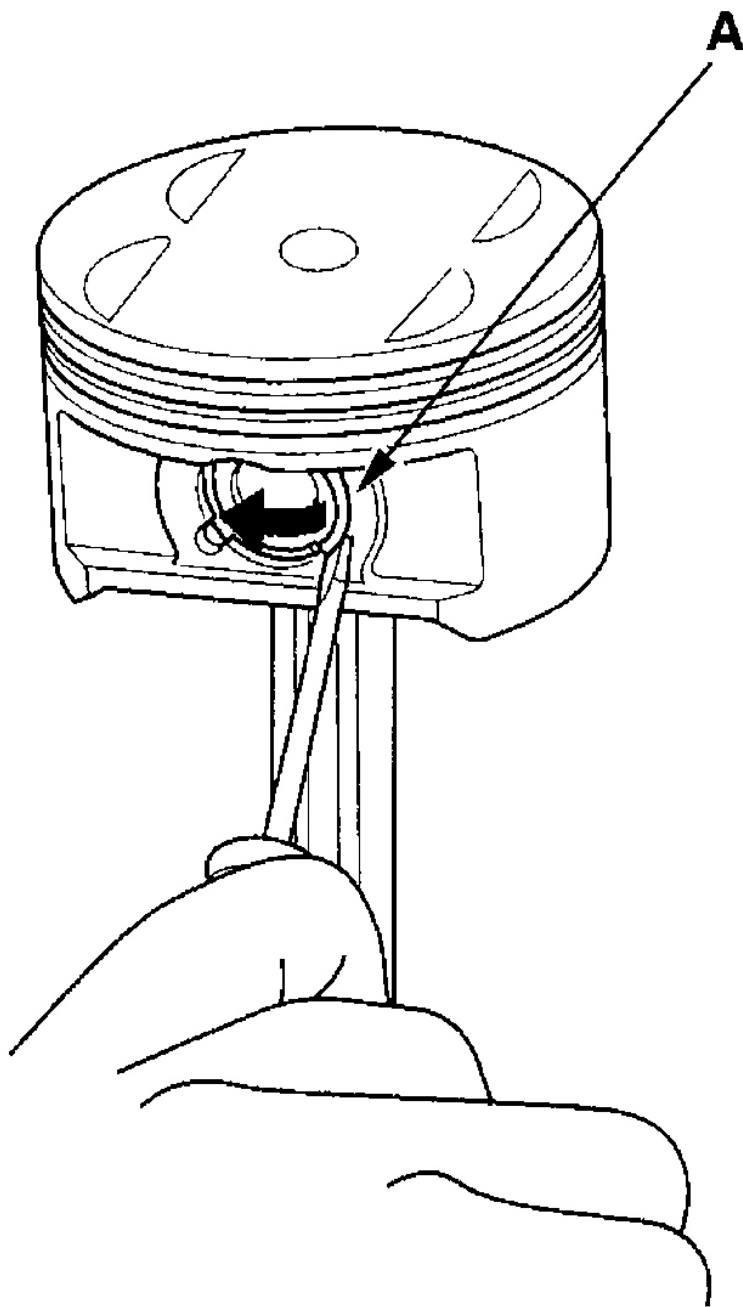


G02557110

Fig. 255: Turning Piston Pin Snap Rings In Ring Grooves Until End Gaps Are Lined Up With Cutouts In Piston Pin Bores

Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Remove both snap rings (A). Start at the cutout in the piston pin bore. Remove the snap rings carefully so they do not go flying or get lost. Wear eye protection.

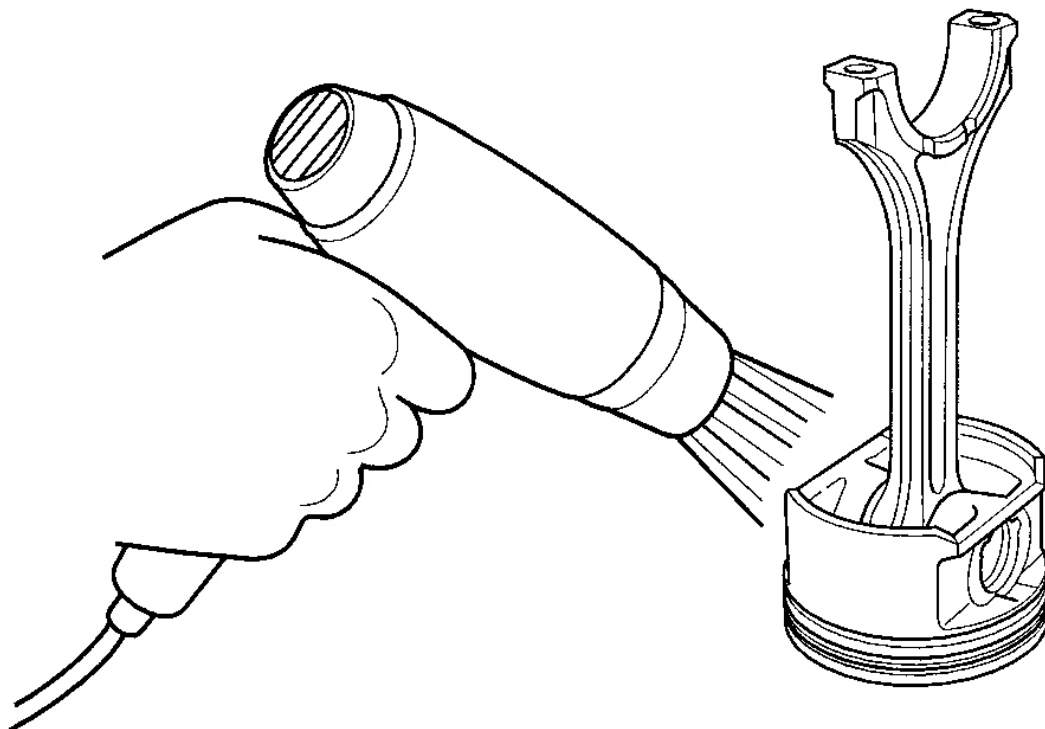


G02557111

Fig. 256: Removing Snap Rings

Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Heat the piston and connecting rod assembly to about 158°F (70°C), then remove the piston pin.



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Fig. 257: Heating Piston & Connecting Rod Assembly
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Inspection

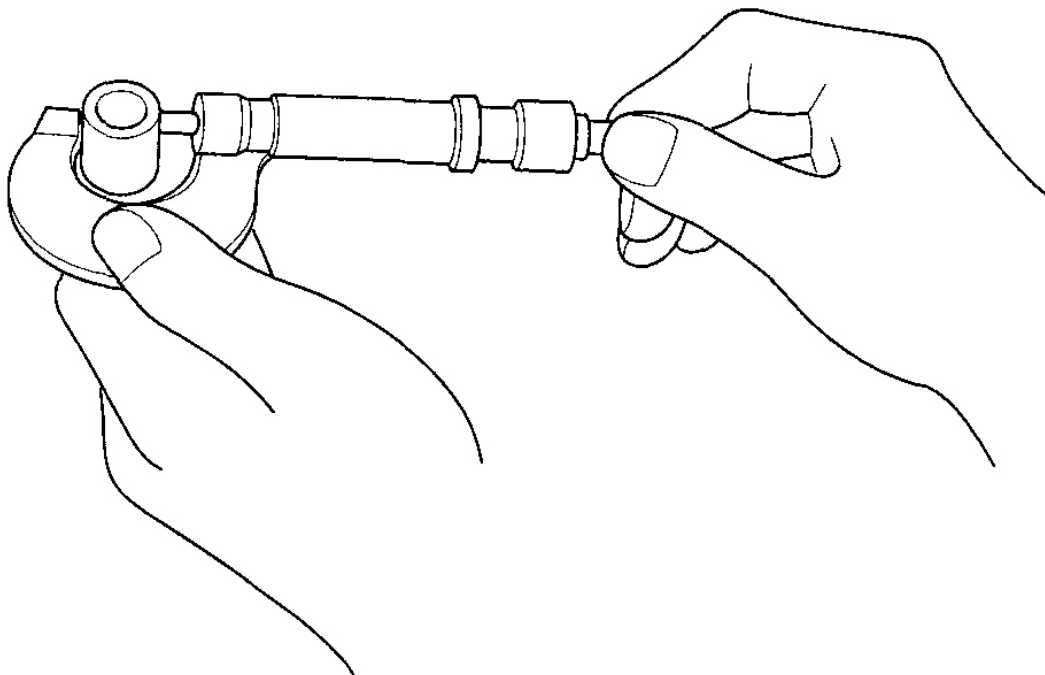
NOTE: **Inspect the piston, piston pin and connecting rod when they are at room temperature.**

1. Measure the diameter of the piston pin.

Piston Pin Diameter:

Standard (New): 21.962-21.965 mm (0.8646-0.8648 in.)

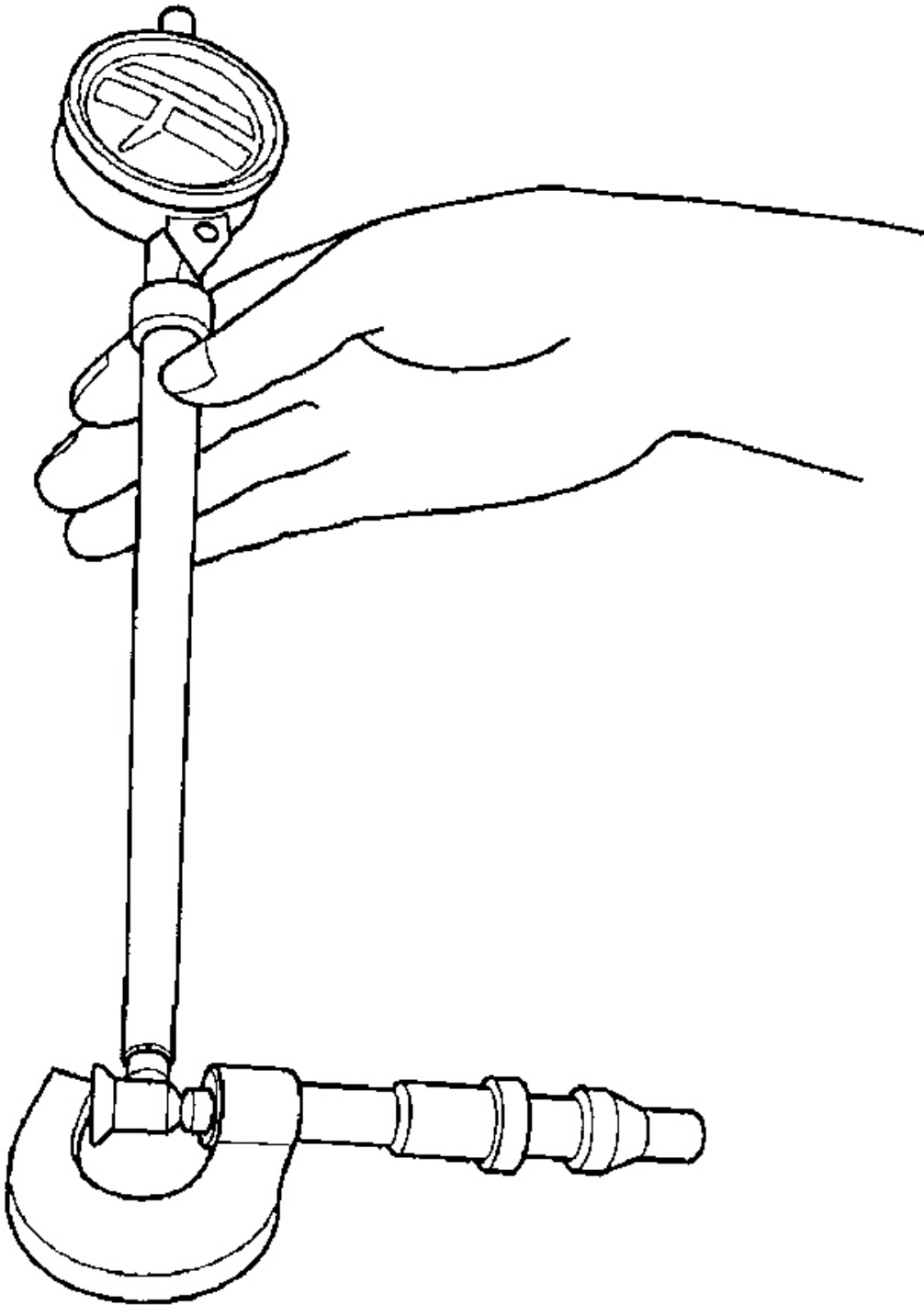
Service Limit: 21.954 mm (0.8643 in.)



G02557113

Fig. 258: Measuring Diameter Of Piston Pin
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

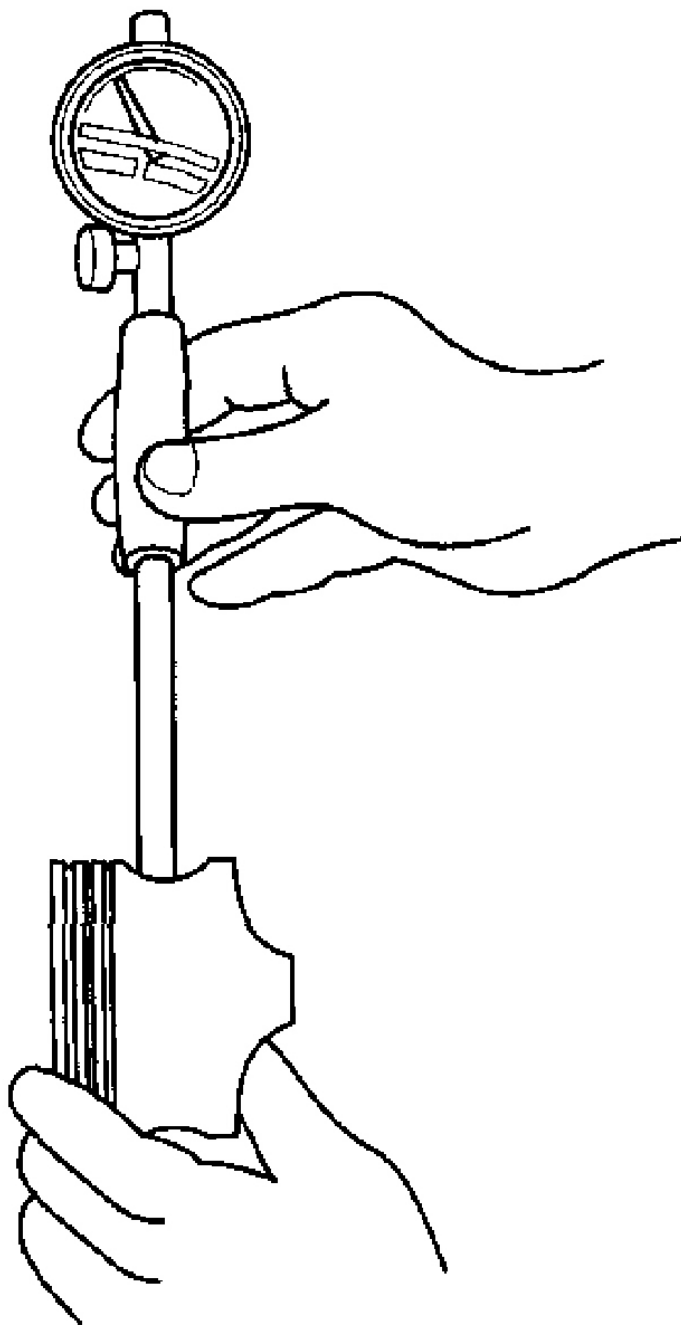


G02557114

Fig. 259: Zeroing Dial Indicator**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

3. Check the difference between the piston pin diameter and piston pin hole diameter in the piston.

Piston Pin-to-Piston Clearance:**Standard (New):** -0.0050 to +0.0010 mm (-0.00020 to +0.00004 in.)**Service Limit:** 0.004 mm (0.0002 in.)



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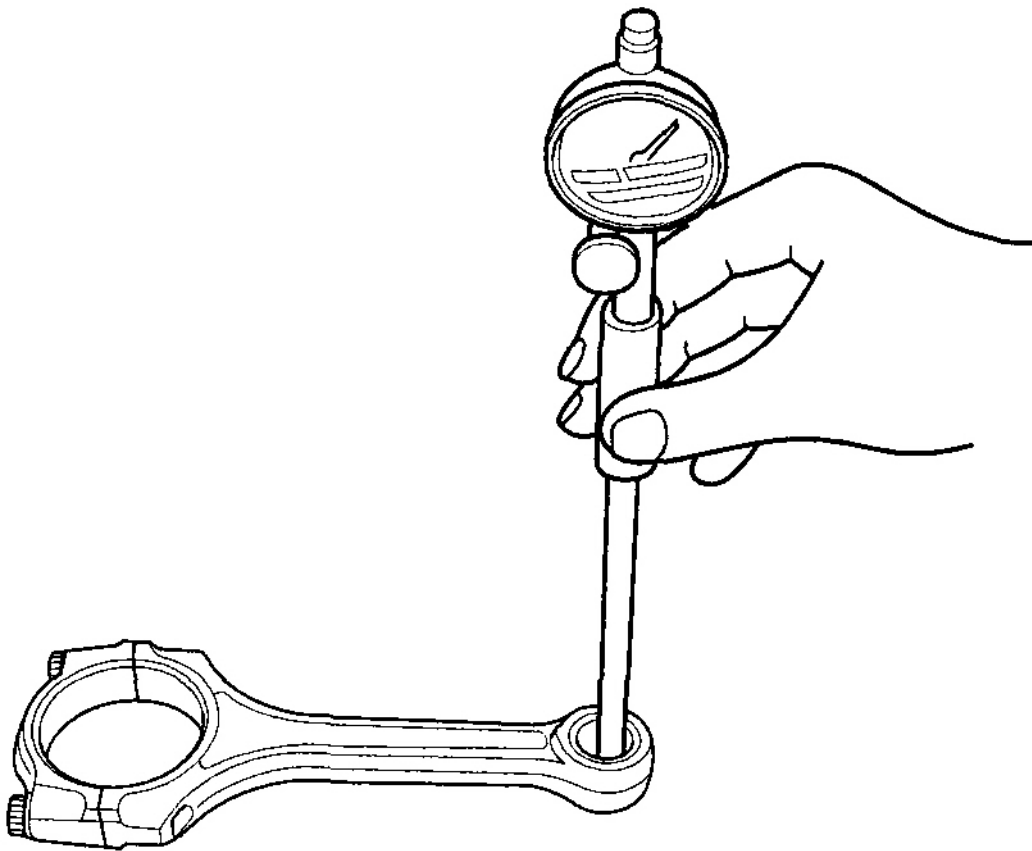
Fig. 260: Measuring Piston-To-Pin Clearance
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Measure the piston pin-to-connecting rod clearance.

Piston Pin-to-Connecting Rod Clearance:

Standard (New): 0.005-0.014 mm (0.0002-0.0006 in.)

Service Limit: 0.019 mm (0.0007 in.)

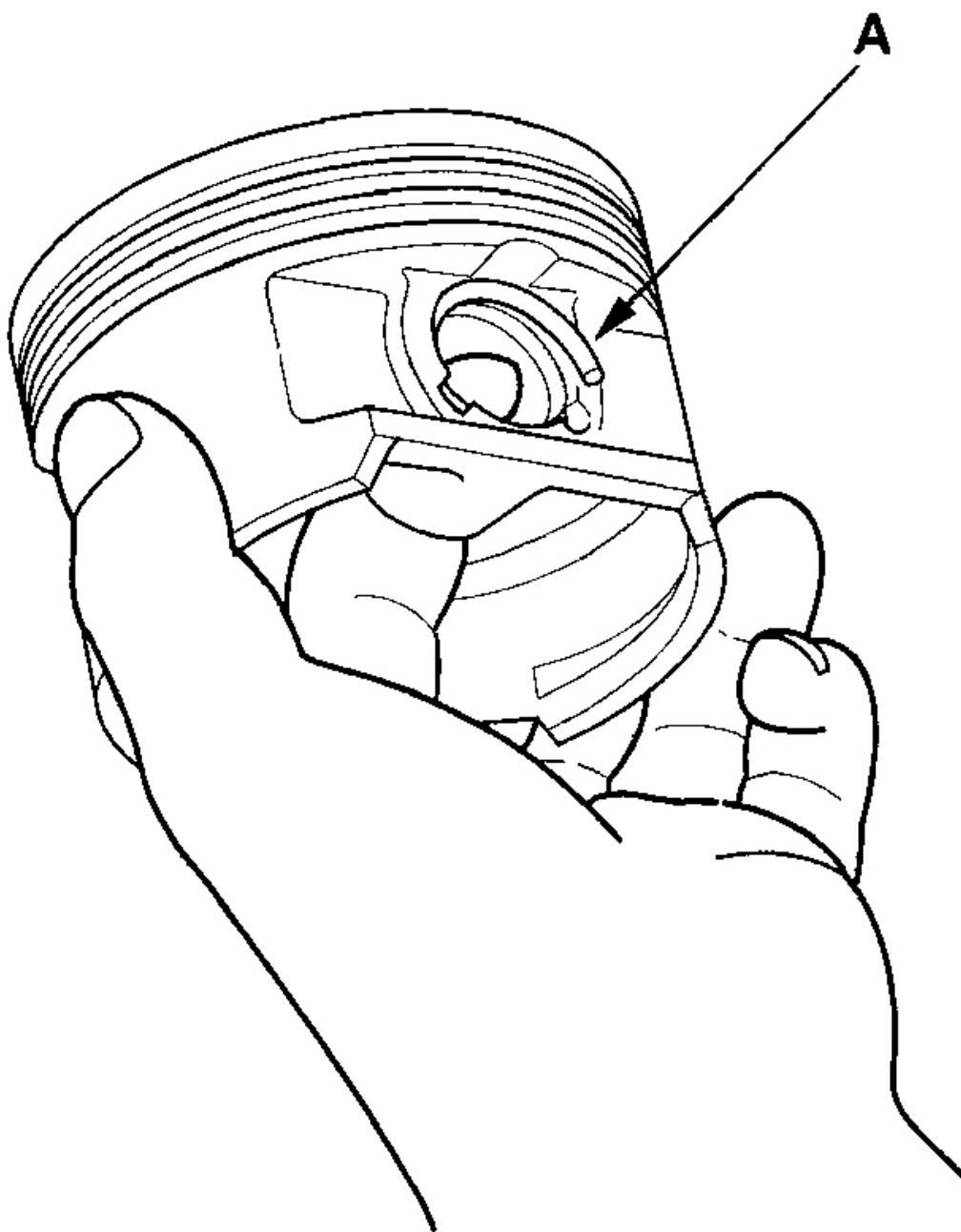


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Fig. 261: Measuring Piston Pin-To-Connecting Rod Clearance
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Reassembly

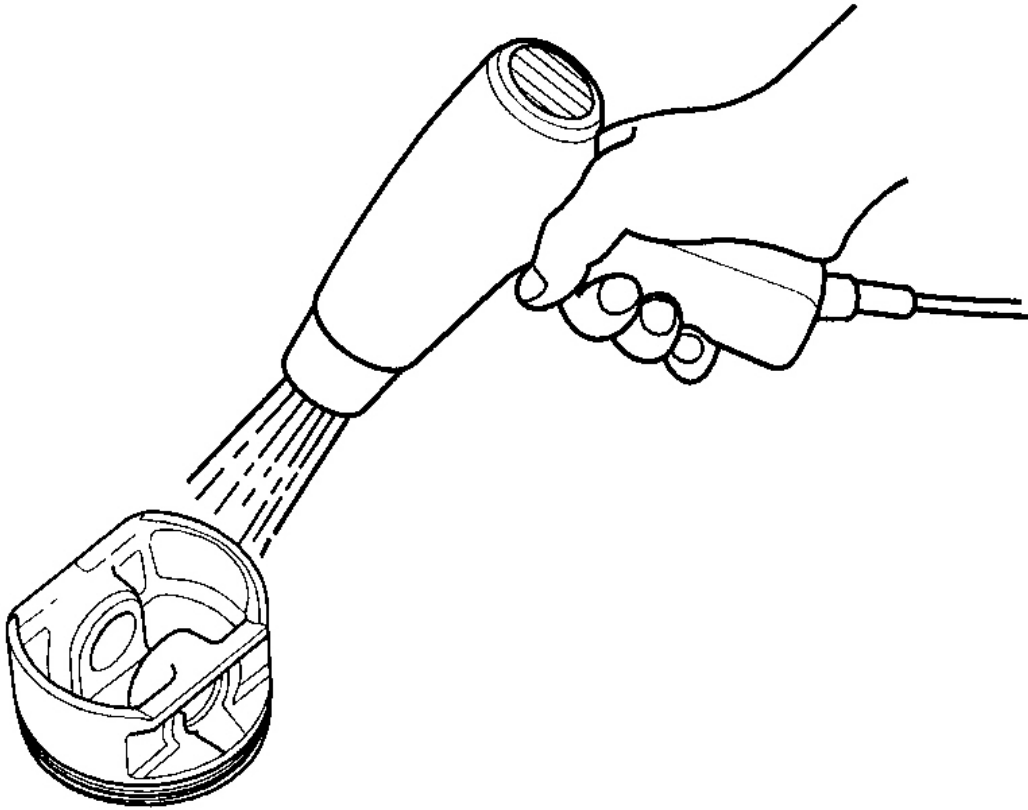
1. Install a piston pin snap ring (A).



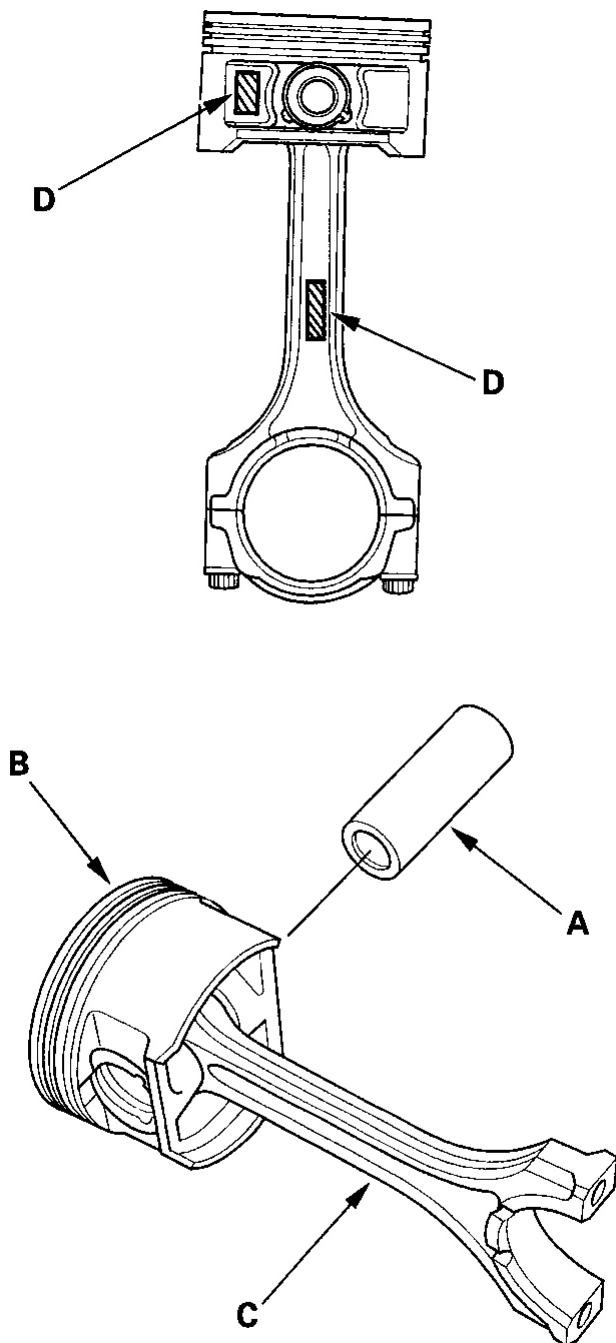
G02557117

Fig. 262: Installing Piston Pin Snap Ring
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Coat the piston pin bore in the piston, the bore in the connecting rod, and the piston pin with engine oil.
3. Heat the piston to about 158°F (70°C).

**G02557118****Fig. 263: Heating Piston****Courtesy of AMERICAN HONDA MOTOR CO., INC.**

4. Install the piston pin (A). Assemble the piston (B) and connecting rod (C) with the embossed marks (D) on the same side.



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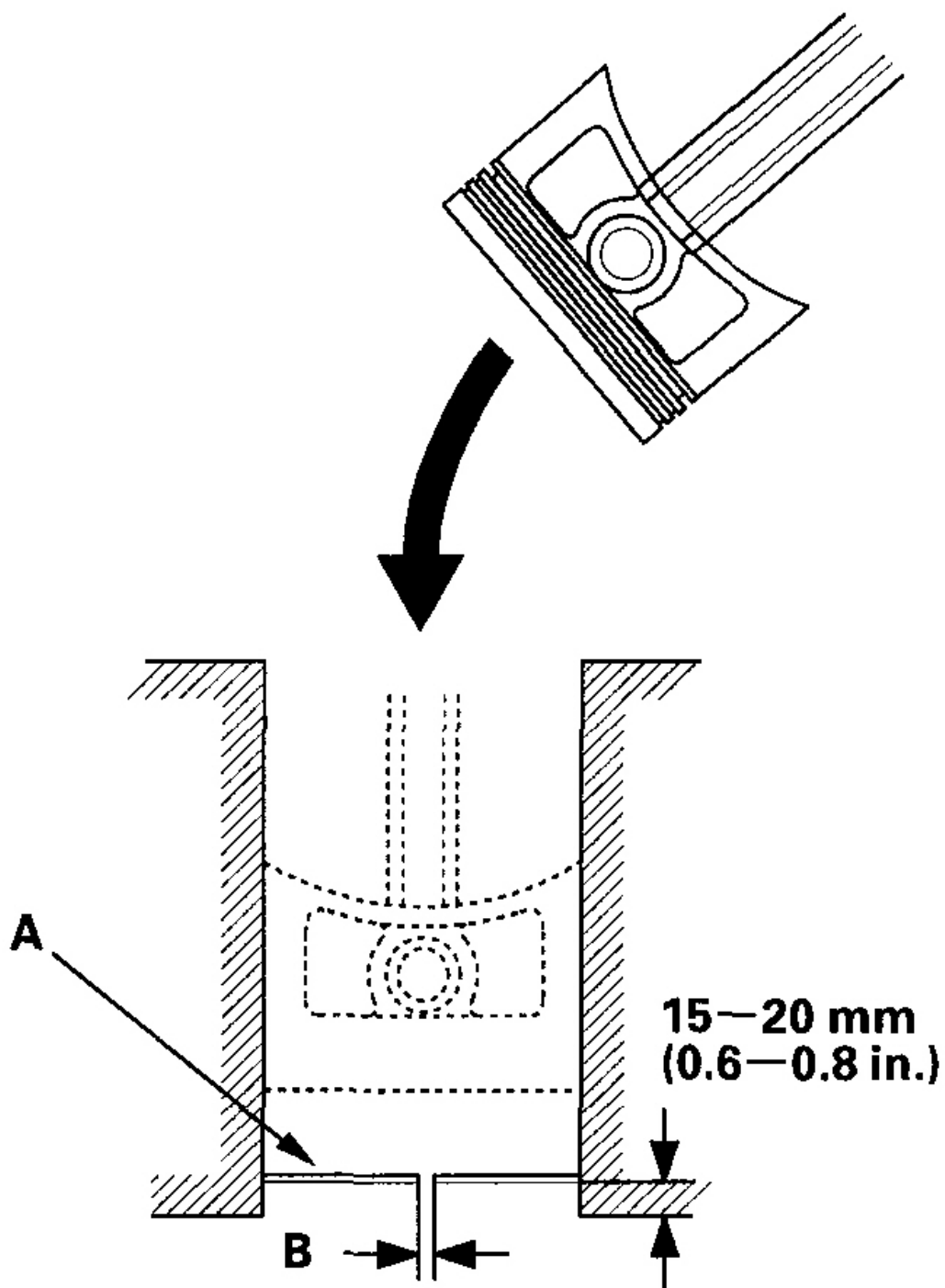
Fig. 264: Installing Piston Pin

Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Install the remaining snap ring.

PISTON RING REPLACEMENT

1. Remove the piston from the cylinder block (see **Crankshaft, Piston & Balancer Shaft Removal**).
2. Using a piston, push a new ring (A) into the cylinder bore 15-20 mm (0.6-0.8 in.) from the bottom.



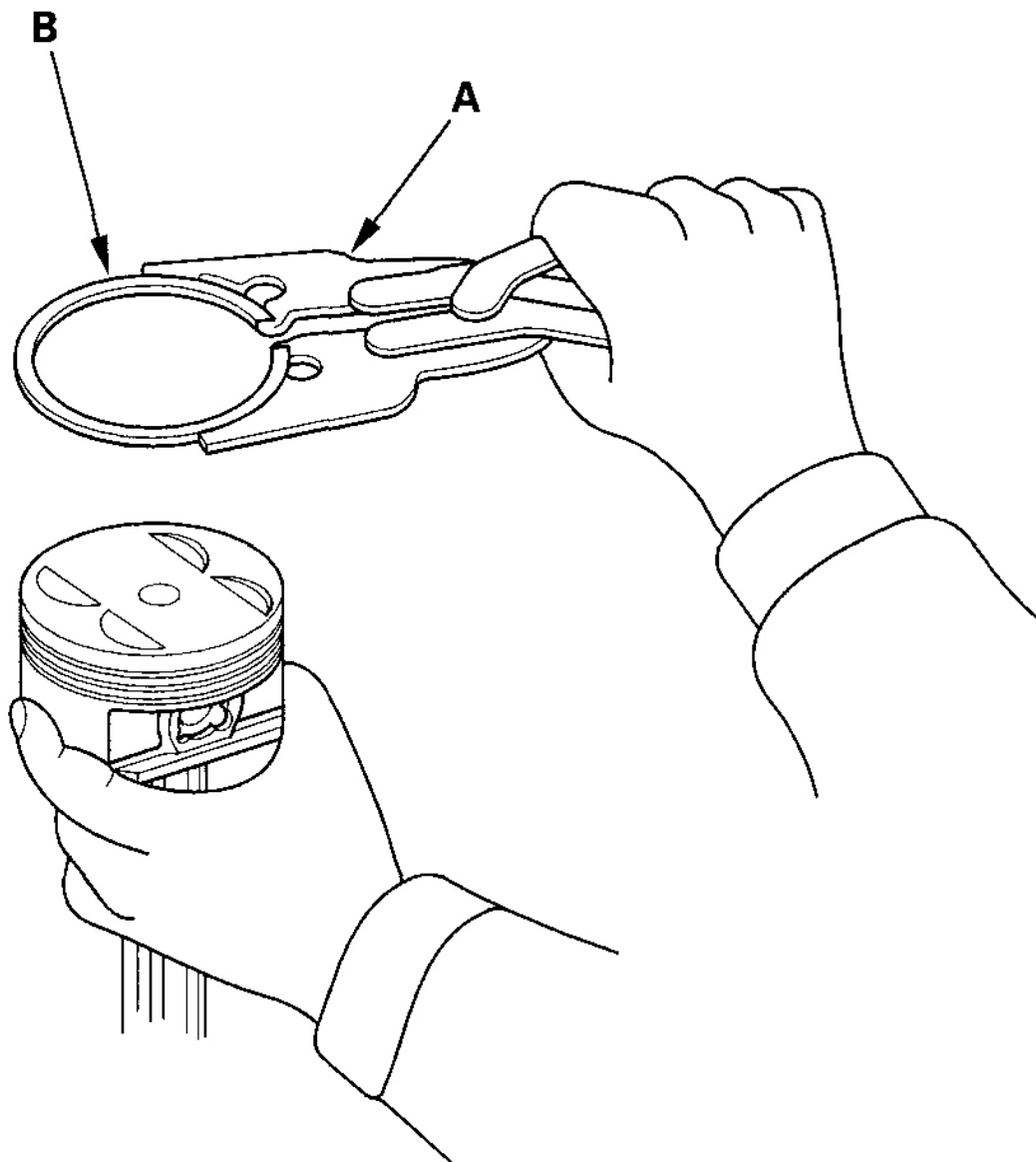
G02557120

Fig. 265: Pushing Ring Into Cylinder Bore**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

3. 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 & Piston Inspection**). If the bore is over the service limit, the cylinder block must be rebored.

Piston Ring End-Gap:**Top Ring****Standard (New):** 0.20-0.35 mm (0.008-0.014 in.)**Service Limit:** 0.60 mm (0.024 in.)**Second Ring****Standard (New):** 0.40-0.55 mm (0.016-0.022 in.)**Service Limit:** 0.70 mm (0.028 in.)**Oil Ring****Standard (New):** 0.20-0.70 mm (0.008-0.028 in.)**Service Limit:** 0.80 mm (0.031 in.)

4. Using a ring expander (A), remove the old piston rings (B).



G02557121

Fig. 266: Removing Old Piston Rings

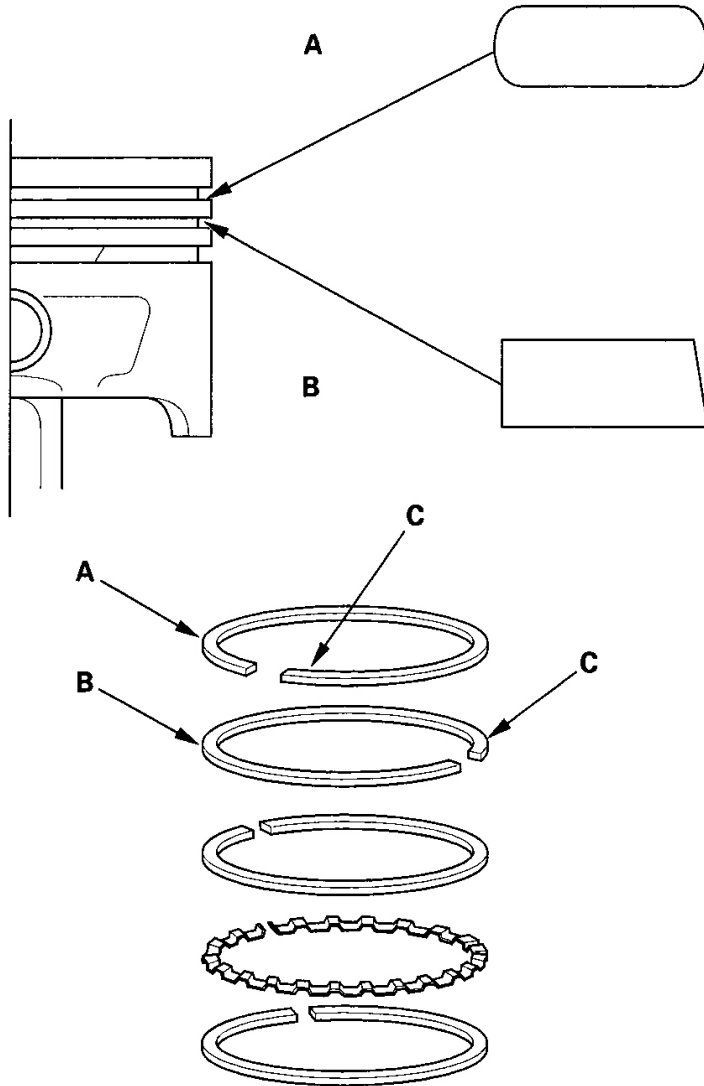
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

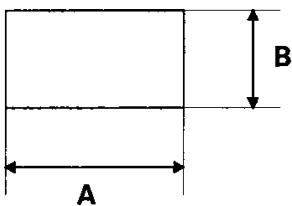
5. Clean all ring grooves thoroughly with a squared-off broken ring or ring groove cleaner with a blade to fit the piston grooves. The top and second ring grooves are 1.2 mm (0.05 in.) wide. The oil ring groove is 2.8

mm (0.11 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.

6. Install the rings as shown. The top ring (A) has a 1B mark and the second ring (B) has a 2B mark. The manufacturing marks (C) must be facing upward.



Piston Ring Dimensions:



G02557122

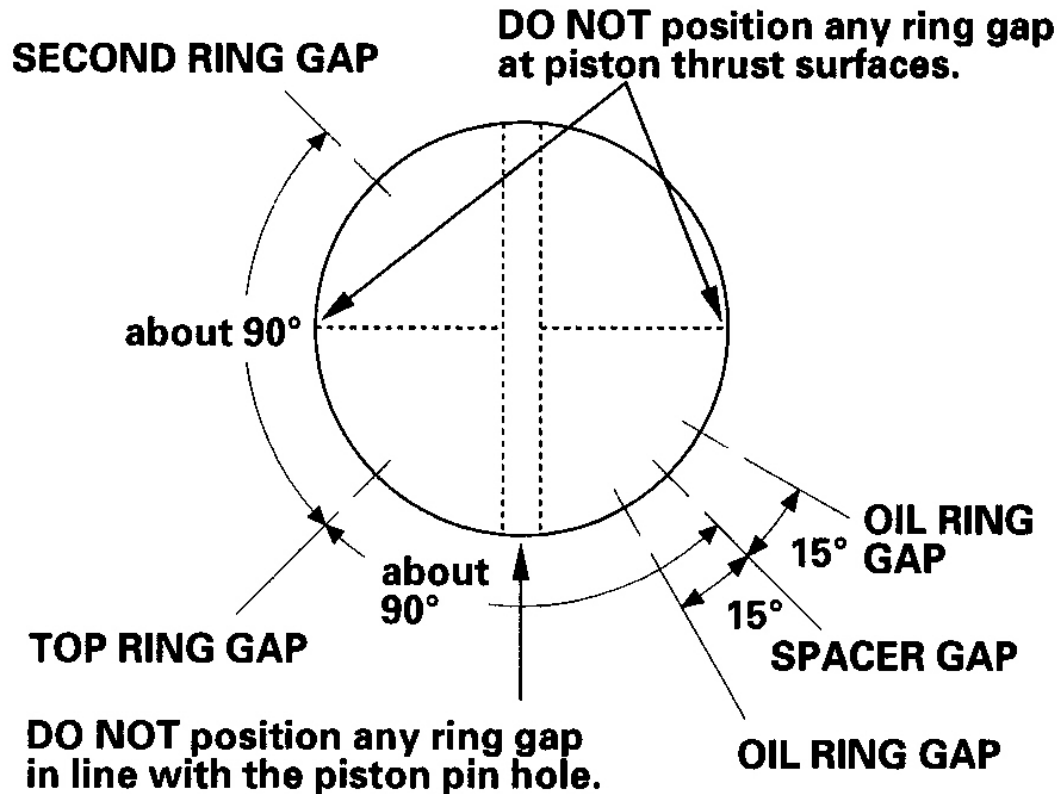
Top Ring (Standard):
A: 3.1 mm (0.12 in.)
B: 1.2 mm (0.05 in.)

Second Ring (Standard):
A: 3.4 mm (0.13 in.)
B: 1.2 mm (0.05 in.)

Fig. 267: Installing Rings

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:



G02557123

Fig. 268: Positioning Ring End Gaps

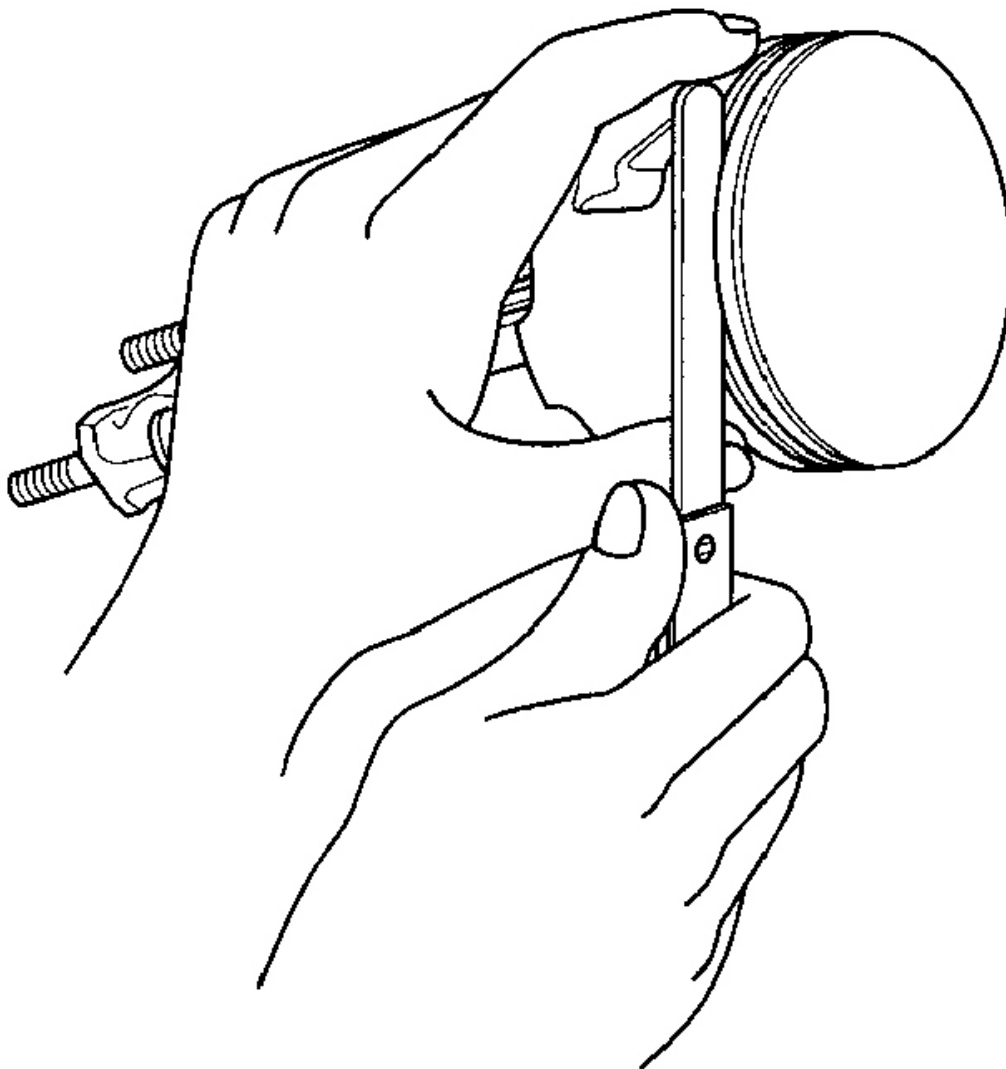
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.)



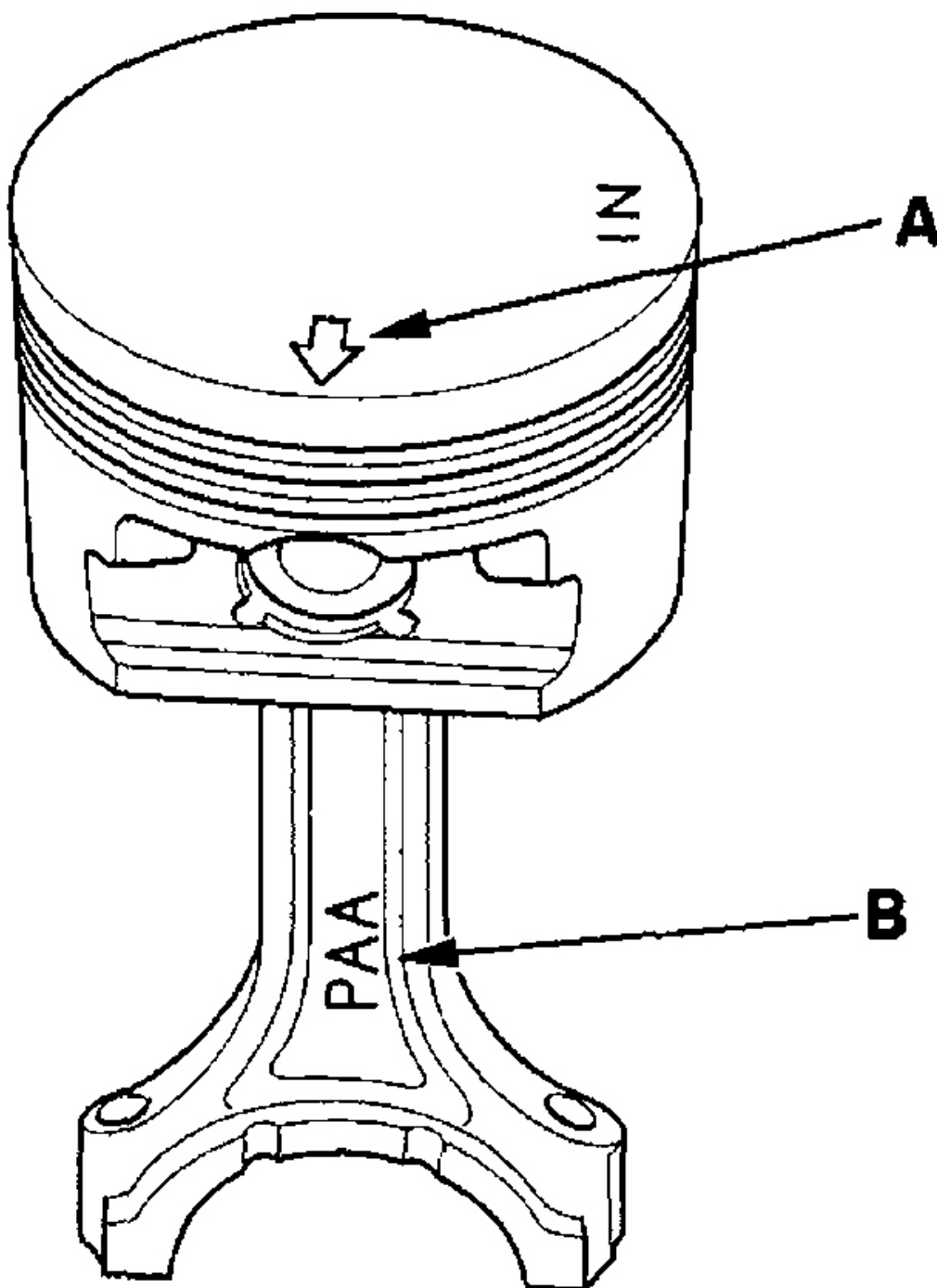
G02557124

Fig. 269: Measuring Ring-To-Groove Clearances
Courtesy of AMERICAN HONDA MOTOR CO., INC.

PISTON INSTALLATION

If the crankshaft is already installed

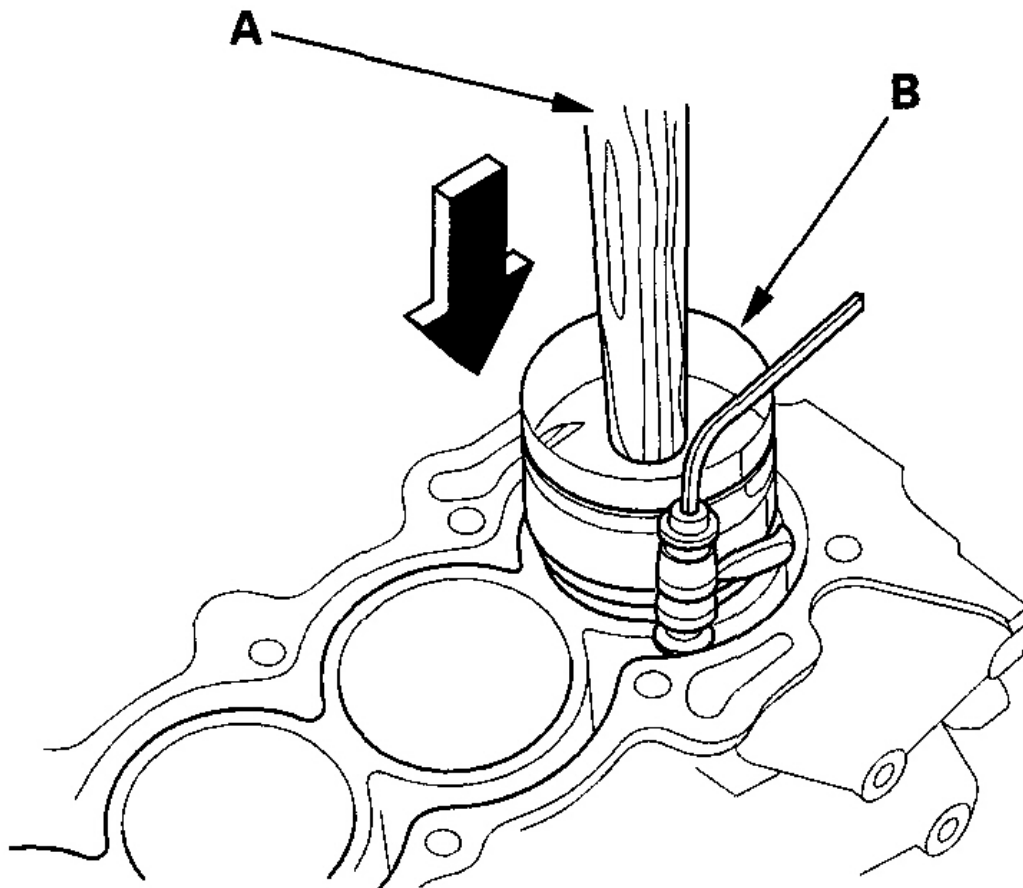
1. Set the crankshaft to BDC for each cylinder.
2. Remove the connecting rod caps, then install the ring compressor, and check that the bearing is securely in place.
3. Position the arrow (A) and the mark (B) facing the timing belt side of the engine.



G02557125

Fig. 270: Positioning Arrow & Mark Facing Timing Belt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.

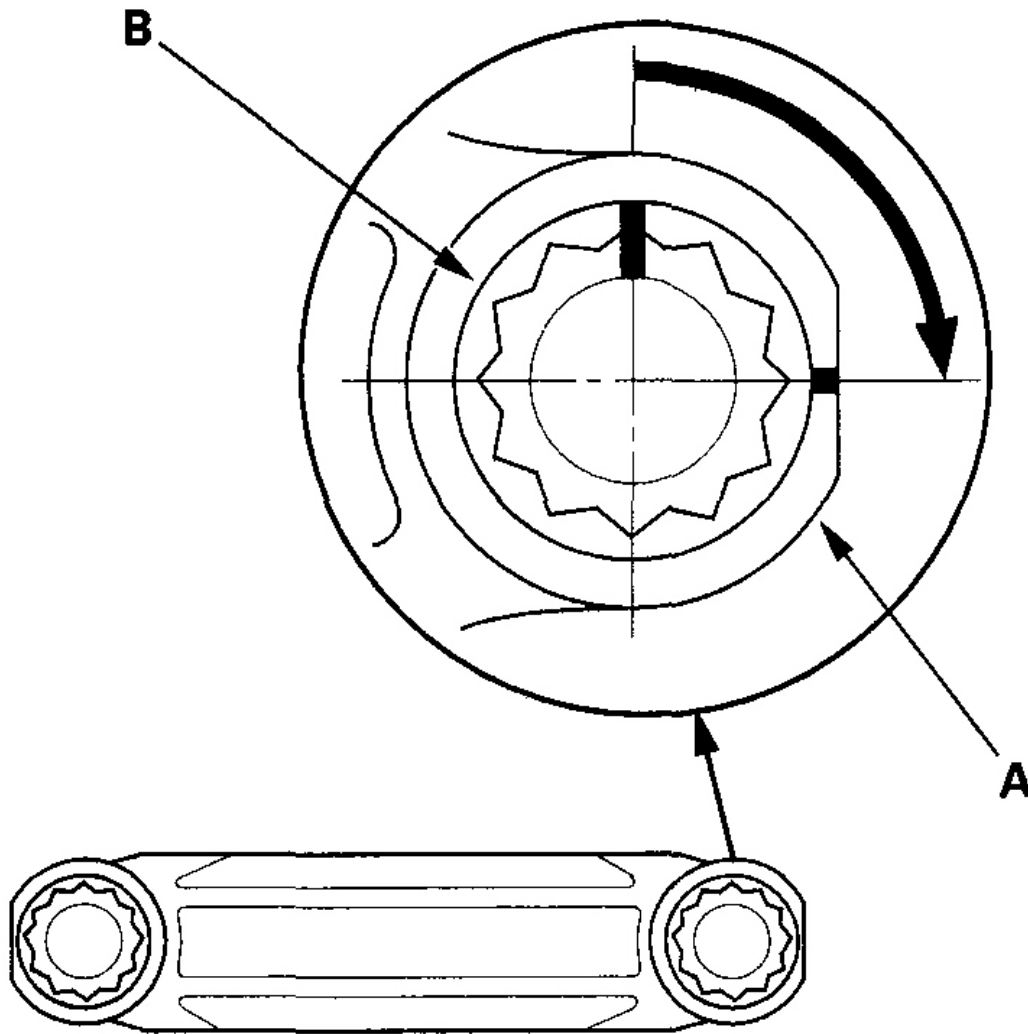


G02557126

Fig. 271: Positioning Piston In Cylinder By Tapping With 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 **Rod Bearing Clearance Inspection**).
7. Apply engine oil to the bolt threads, then install the rod caps with bearings. Torque the bolts to 20 N.m (2.0 kgf.m, 14 lbf-Ft).

8. Mark the connecting rod (A) and bolt head (B) as shown.



G02557127

Fig. 272: Marking Connecting Rod & Bolt Head
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Tighten the bolt until the mark on the bolt head lines up with the mark on the connecting rod (turn the bolt 90°).

If the crankshaft is not installed

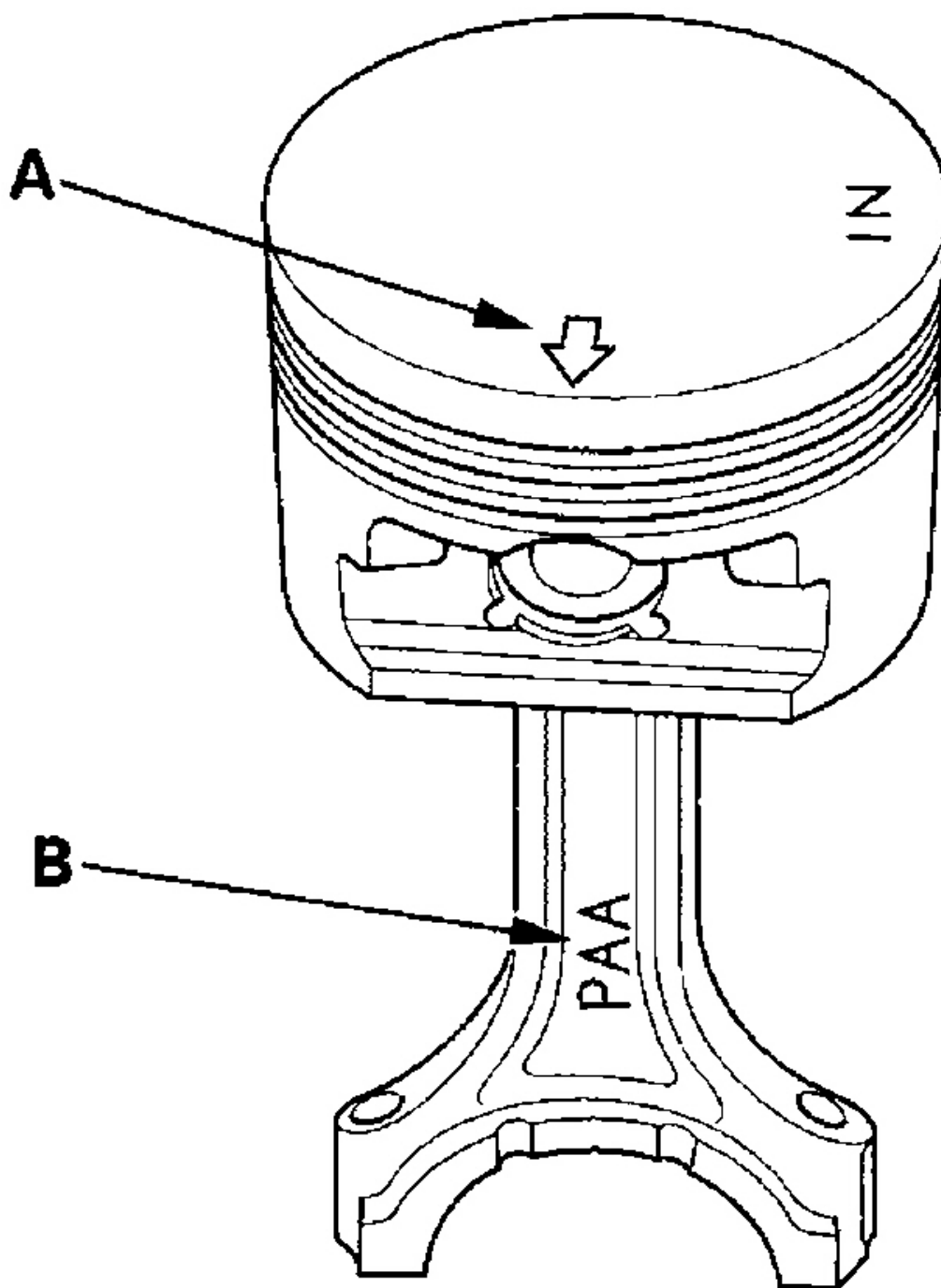
1. Remove the connecting rod caps, then install the ring compressor, and check that the bearing is securely

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in place.

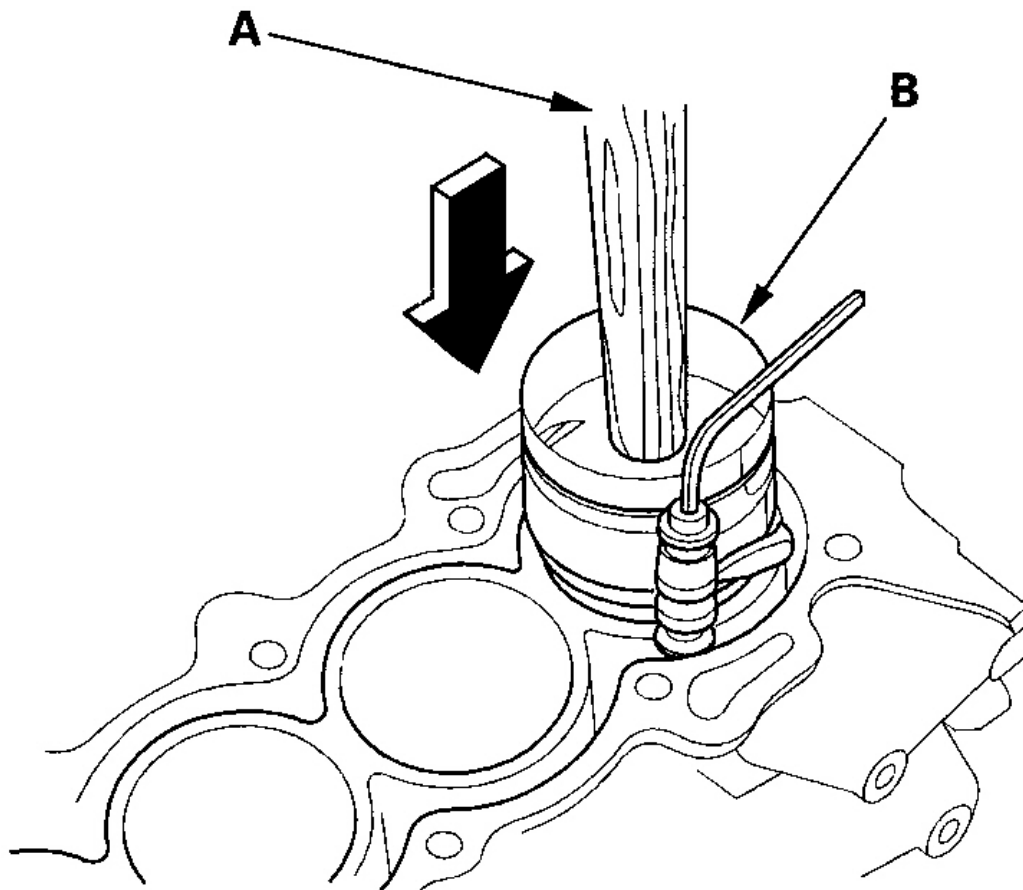
2. Position the arrow (A) and the mark (B) facing the timing belt side of the engine.



G02557128

Fig. 273: Positioning Arrow & Mark Facing Timing Belt
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.



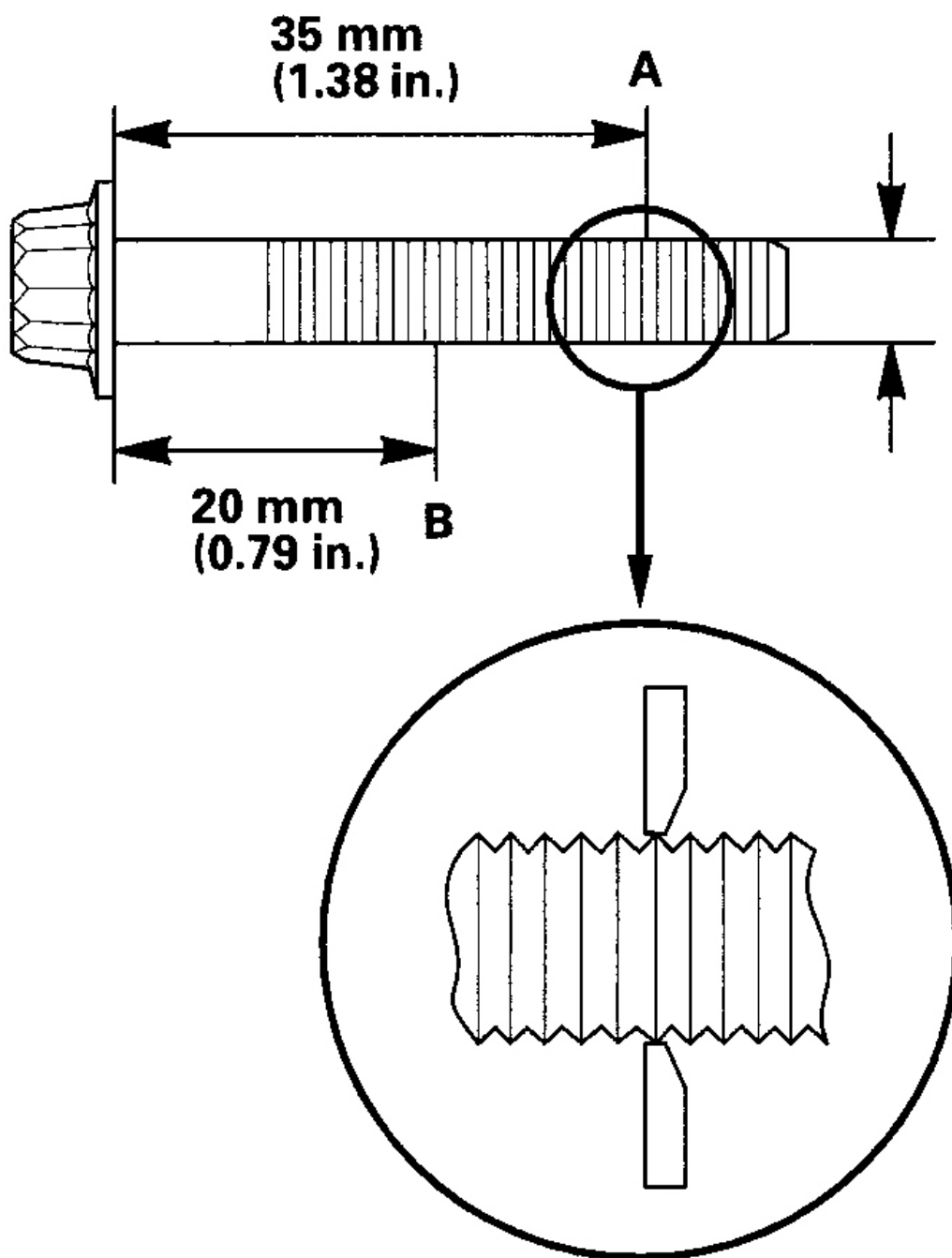
G02557129

Fig. 274: Positioning Piston In Cylinder Tapping With Wooden Handle Of Hammer
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Position all pistons at top dead center.

CONNECTING ROD BOLT INSPECTION

1. Measure the diameter of each connecting rod bolt at point A and point B.



G02557130

Fig. 275: Measuring Diameter Of Connecting Rod Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Calculate the difference in diameter between point A and point B.

Point A - Point B = Difference in Diameter

Difference in Diameter:

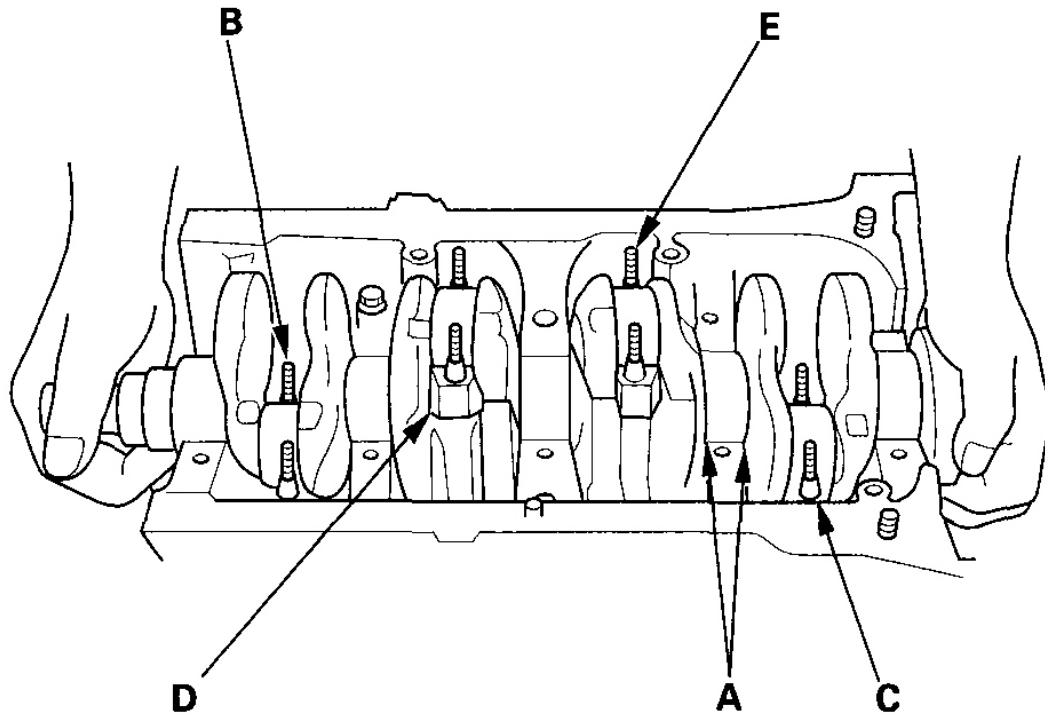
Specification: 0-0.1 mm (0-0.004 in.)

3. If the difference in diameter is out of tolerance, replace the connecting rod bolt.

CRANKSHAFT & BALANCER SHAFTS INSTALLATION

Special Tools Required

- Driver 07749-0010000
 - Driver Attachment 07948-SB00101
1. Check the connecting rod bearing clearance with plastigage (see **Main Bearing Clearance Inspection**).
 2. Check the main bearing clearance with plastigage (see **Main Bearing Clearance Inspection**).
 3. Inspect the connecting rod bolts (see **Connecting Rod Bolt Inspection**).
 4. Apply a coat of engine oil to the main bearings and rod bearings.
 5. Install the bearing halves in the cylinder block and connecting rods.
 6. Hold the crankshaft so rod journal No. 2 and rod journal No. 3 are straight up.
 7. Install the thrust washers (A) in the No. 4 journal of the cylinder block.



G02557131

Fig. 276: Installing Thrust Washers In No. 4 Journal Of Cylinder Block
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Lower the crankshaft into the block, seating the rod journals into connecting rod No. 1 (B) and connecting rod No. 4 (C). Install the connecting rod caps and bolts finger tight.
9. Rotate the crankshaft clockwise, seat the journals into connecting rod No. 2 (D) and connecting rod No. 3 (E). Install the connecting rod caps and bolts finger tight. Install caps so the bearing recess is on the same side as the recess in the rod.
10. Apply engine oil to the bolt threads, then install the rod caps with bearings, and torque the bolts to 20 N.m (2.0 kgf.m, 14 lbf-Ft).
11. Mark the connecting rod (A) and bolt head (B) as shown.

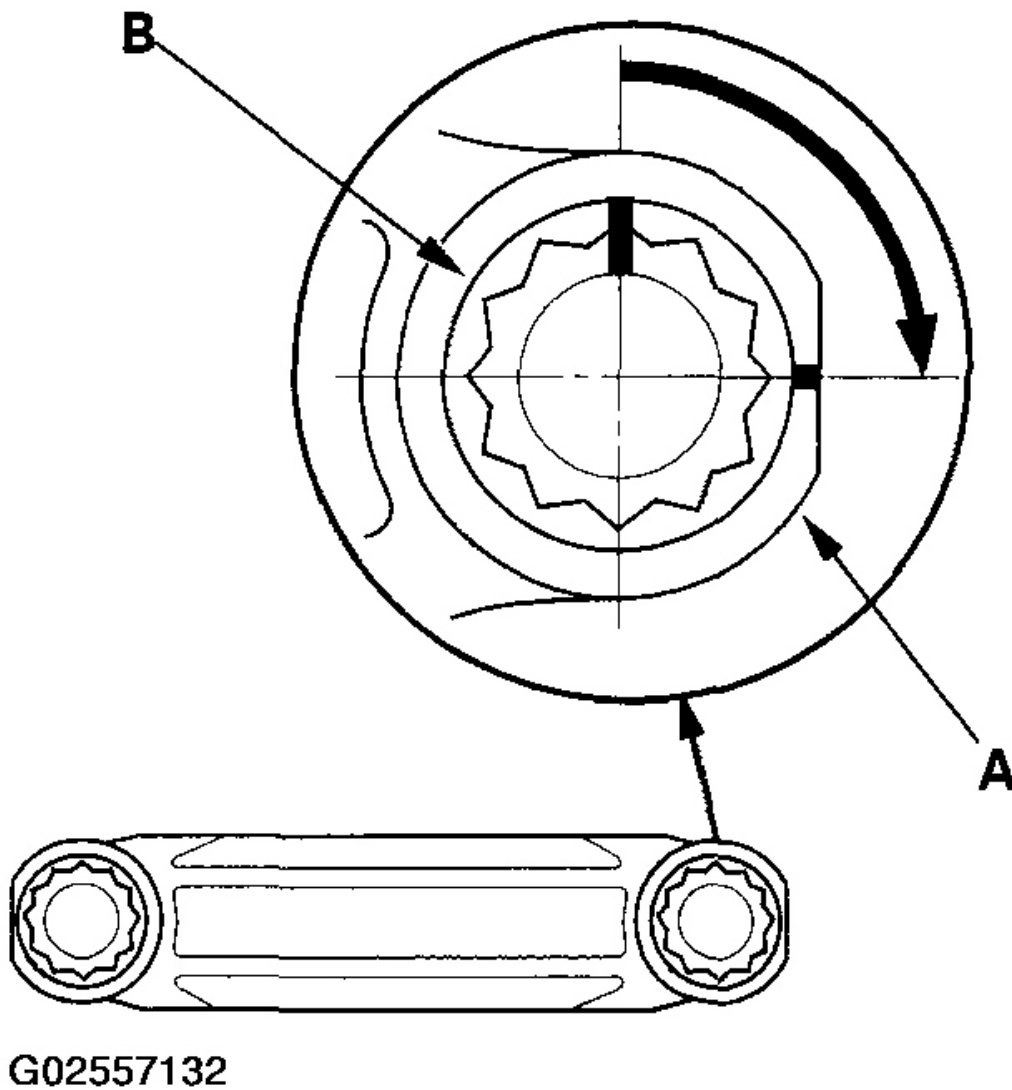
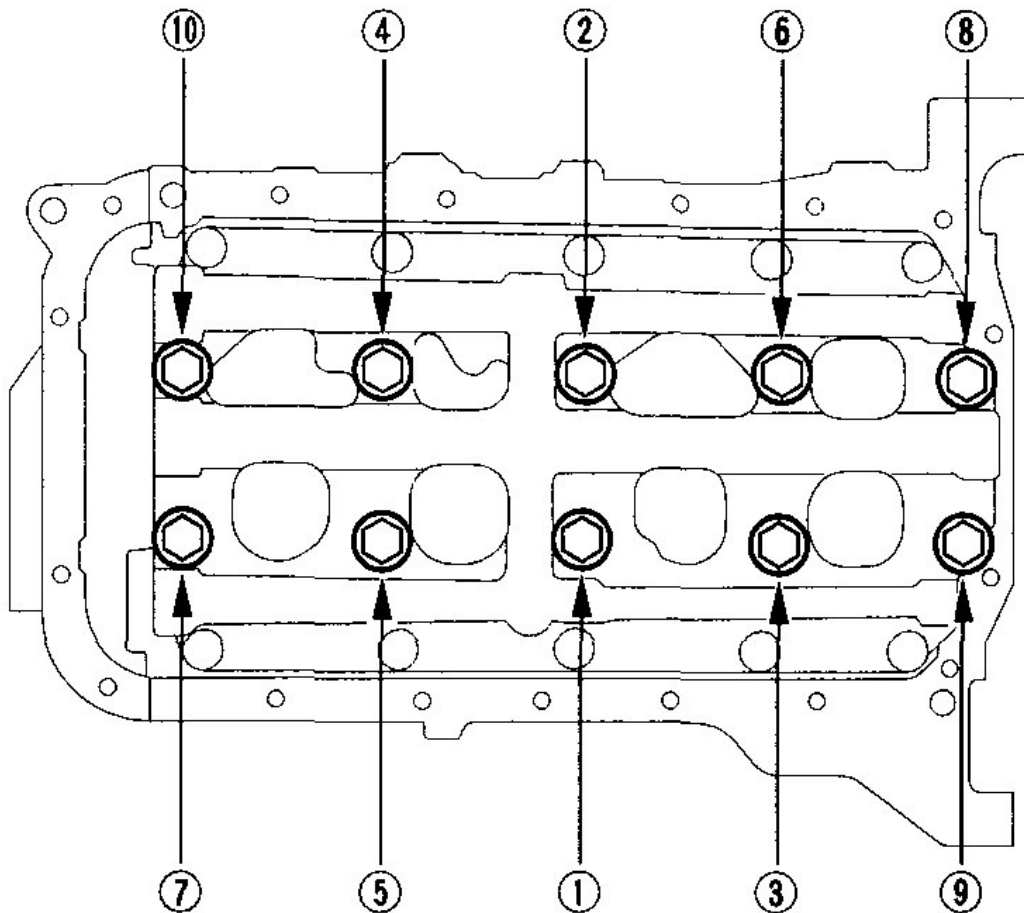


Fig. 277: Marking Connecting Rod & Bolt Head
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Tighten the bolt until the mark on the bolt head lines up with the mark on the connecting rod (turn the bolt 90°).
13. Check main bearing clearance with plastigage (see **Main Bearing Clearance Inspection**).
14. Install the main bearing caps and bearing cap bridge. Coat the bolt threads with engine oil.
15. Tighten the 11 mm bolts in two steps. In the first step, tighten all bolts in sequence to about 29 N.m (3.0 kgf.m, 22 lbf-Ft); in the final step, tighten in the same sequence to 78 N.m (8.0 kgf.m, 58 lbf-Ft).

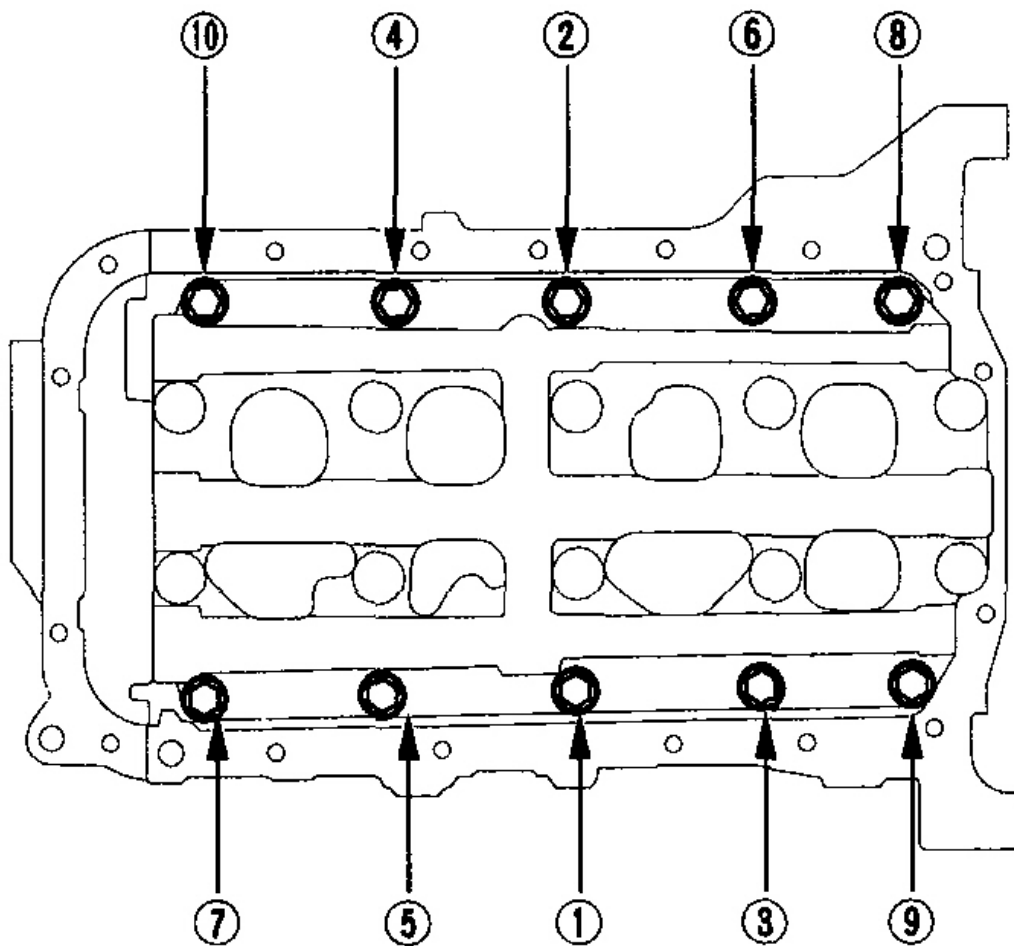


G02557133

Fig. 278: Identifying 11 MM Bolt Tightening Sequence

Courtesy of AMERICAN HONDA MOTOR CO., INC.

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 approximately 15 minutes.



G02557134

Fig. 279: Identifying 6 MM Bolt Tightening Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

16. Tighten the 6 mm bolts in sequence to 12 N.m (1.2 kgf.m, 8.7 lbf-Ft).
17. Drive the crankshaft oil seal squarely into the right side cover.

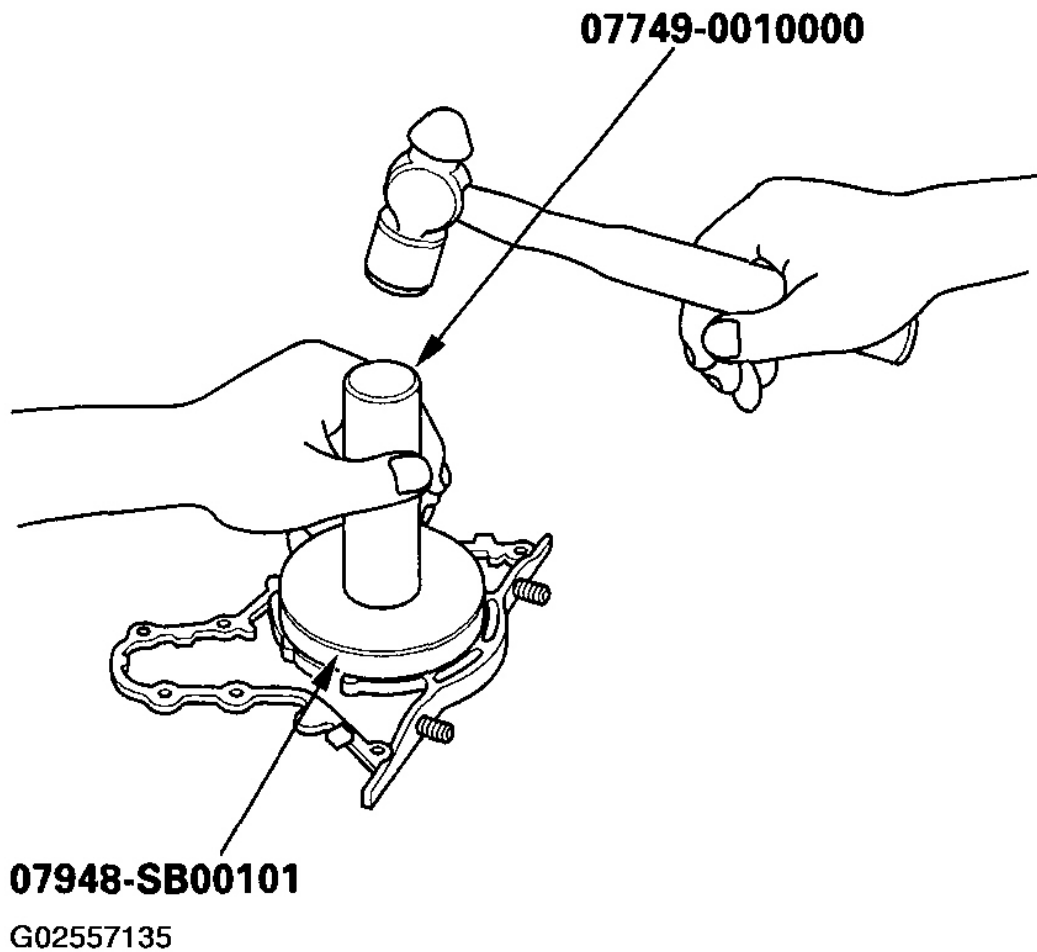
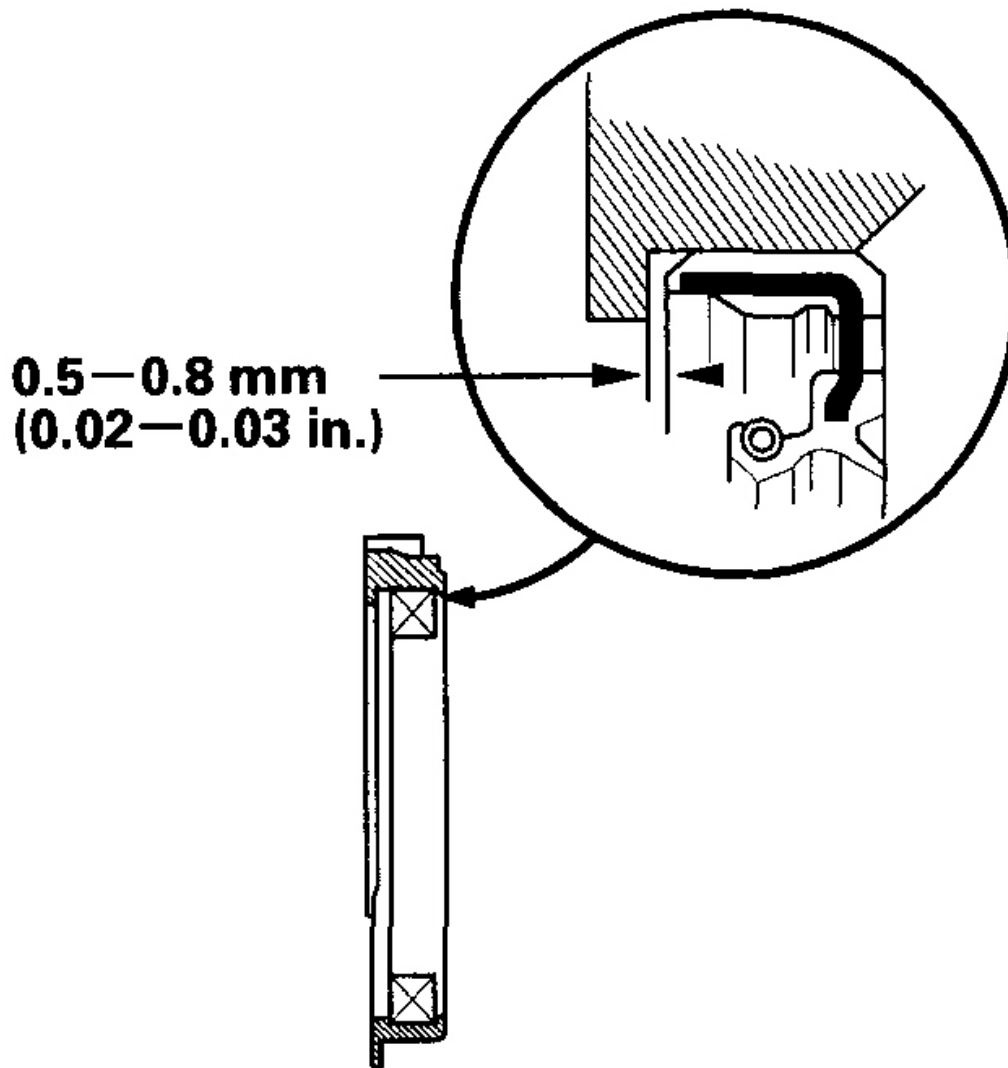


Fig. 280: Driving Crankshaft Oil Seal Squarely Into Side Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

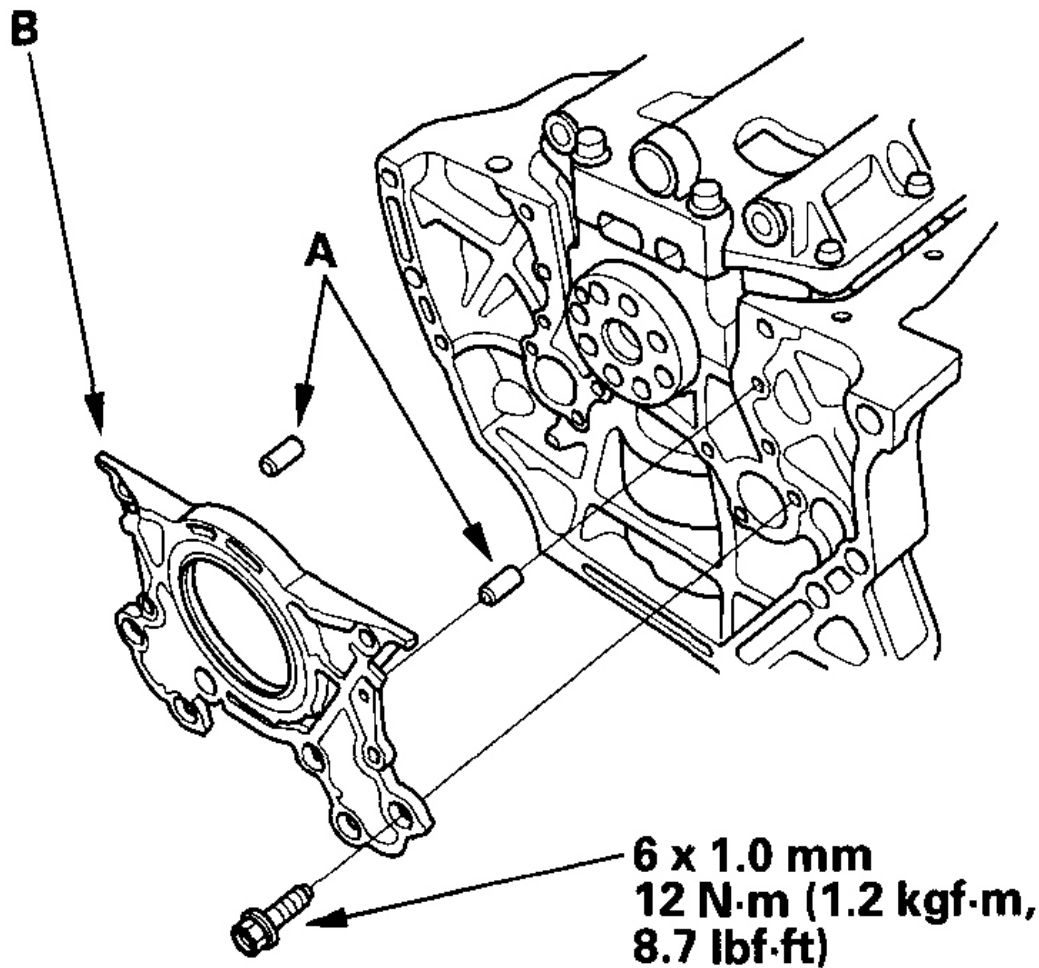


G02557136

Fig. 281: Confirming Clearance Is Equal Around Feeler Gauge
Courtesy of AMERICAN HONDA MOTOR CO., INC.

19. Clean and dry the right side cover mating surfaces. Apply a light coat of oil to the crankshaft and to the lip of the seal.

NOTE: Do not install the parts if 5 minutes or more have elapsed since applying the liquid gasket. Instead, reapply liquid gasket after removing the old residue.



G02557137

Fig. 282: Installing The Dowel Pins & The Right Side Cover
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

20. Apply liquid gasket, part No. 08718-0001 or 08718-0003, evenly to the block mating surface of the right side cover and to the inner threads of the bolt holes. Install the dowel pins (A) and the right side cover (B) on the cylinder block.
21. After assembly, wait at least 30 minutes before filling the engine with oil.
22. Install the rear balancer shaft (A) and the front balancer shaft (B) into the block, then install the retainer (C).

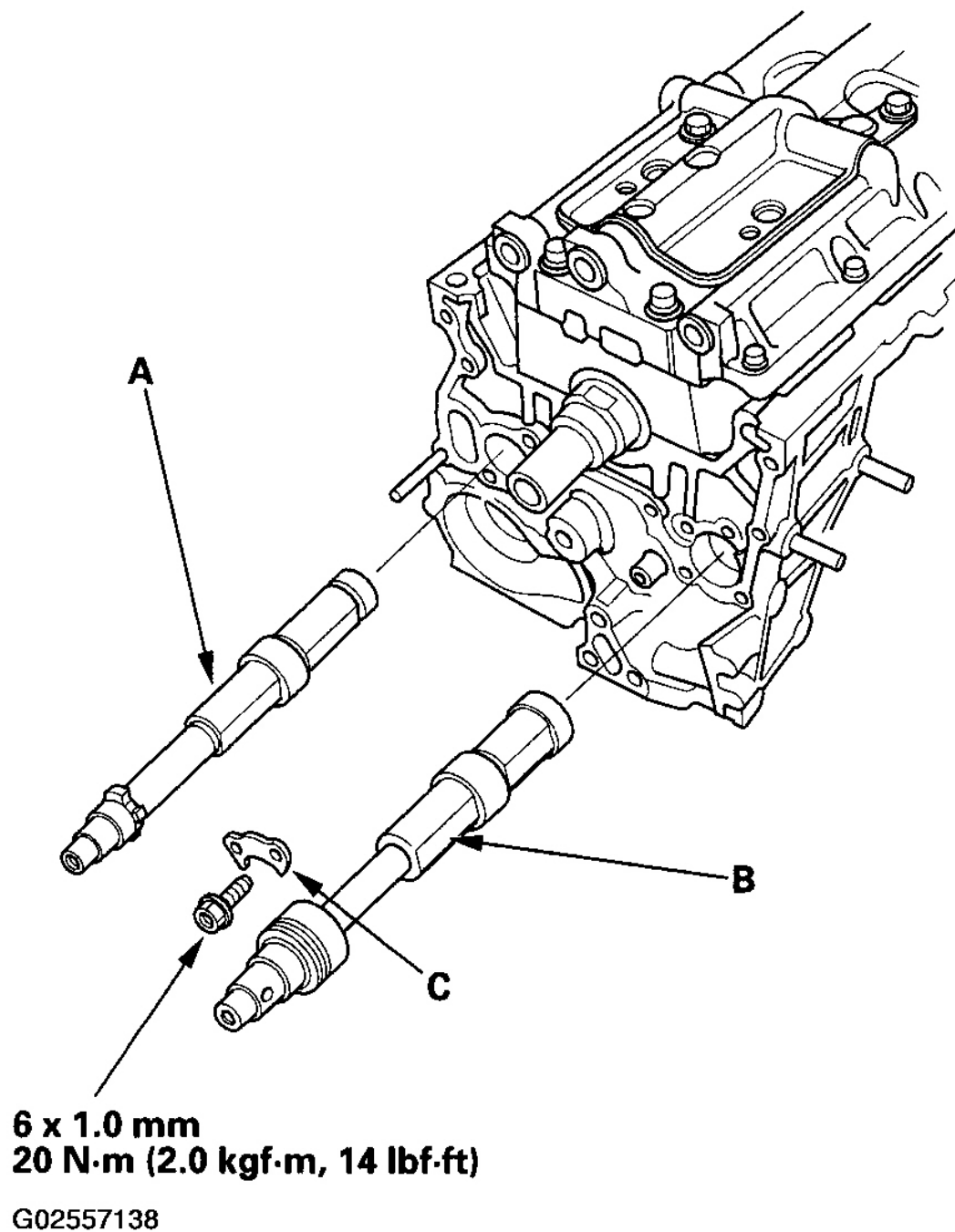
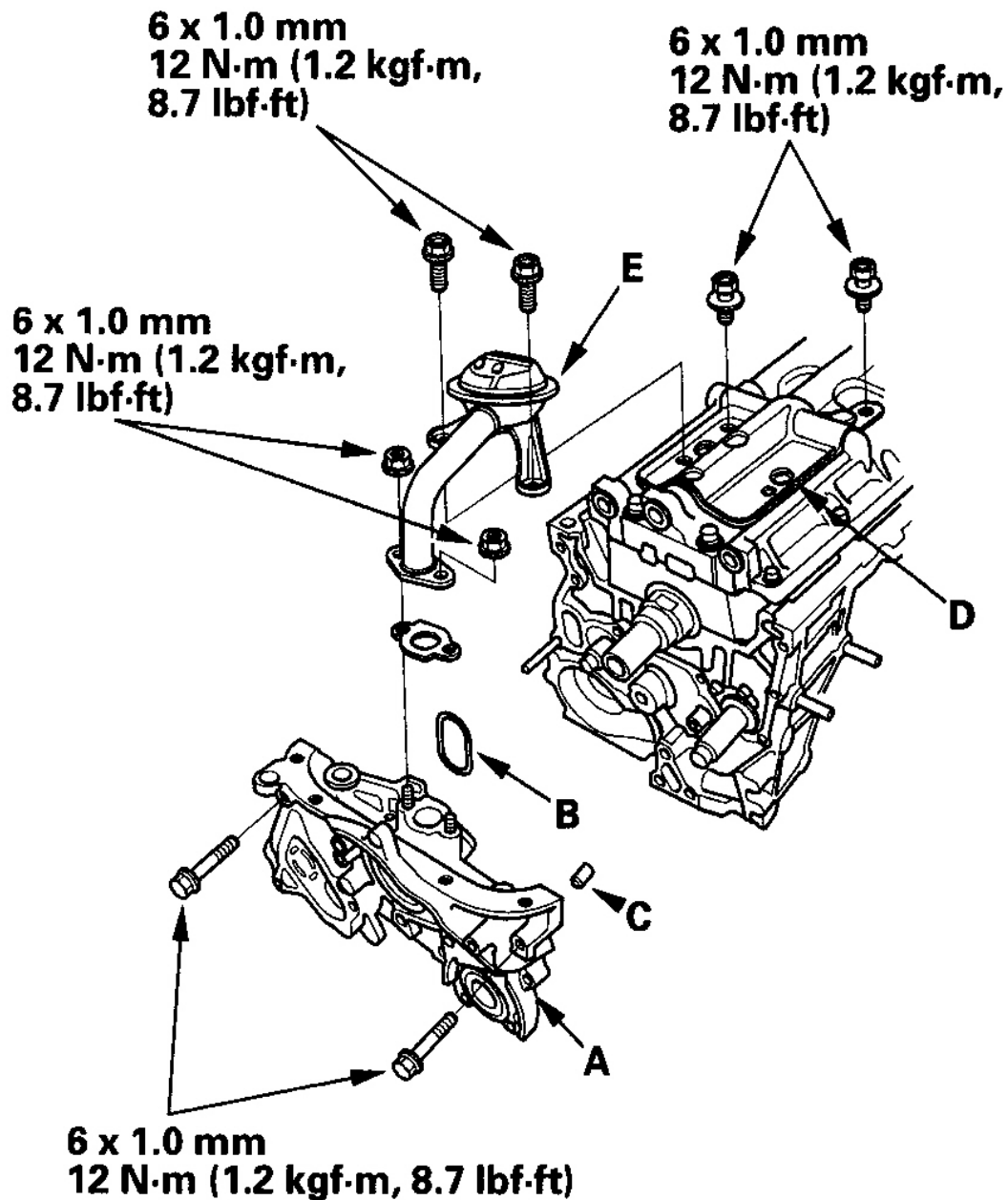


Fig. 283: Installing Rear Balancer Shaft & Front Balancer Shaft Into Block
Courtesy of AMERICAN HONDA MOTOR CO., INC.

23. Clean and dry the oil pump mating surfaces.
24. Install the oil pump (A).

- A. Install a new crankshaft oil seal in the oil pump (see step 17 on **OIL PUMP OVERHAUL**).
- B. Apply liquid gasket part, No. 08718-0001 or 08718-0003, evenly to the block mating surface of the oil pump and to the inner threads of the bolt holes.
- C. Grease the lips of the oil seals and apply oil to the new O-ring (B).
- D. Install the dowel pins (C), then align the inner rotor with the crankshaft and install the oil pump.
- E. Clean the excess grease off the crankshaft and balancer shaft and check the seals for distortion.



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Fig. 284: Installing Oil Pump

Courtesy of AMERICAN HONDA MOTOR CO., INC.

25. Install the baffle plate (D), then install the oil screen (E).
26. Hold the front balancer shaft with a screwdriver (A), then install the timing balancer belt driven pulley (B).

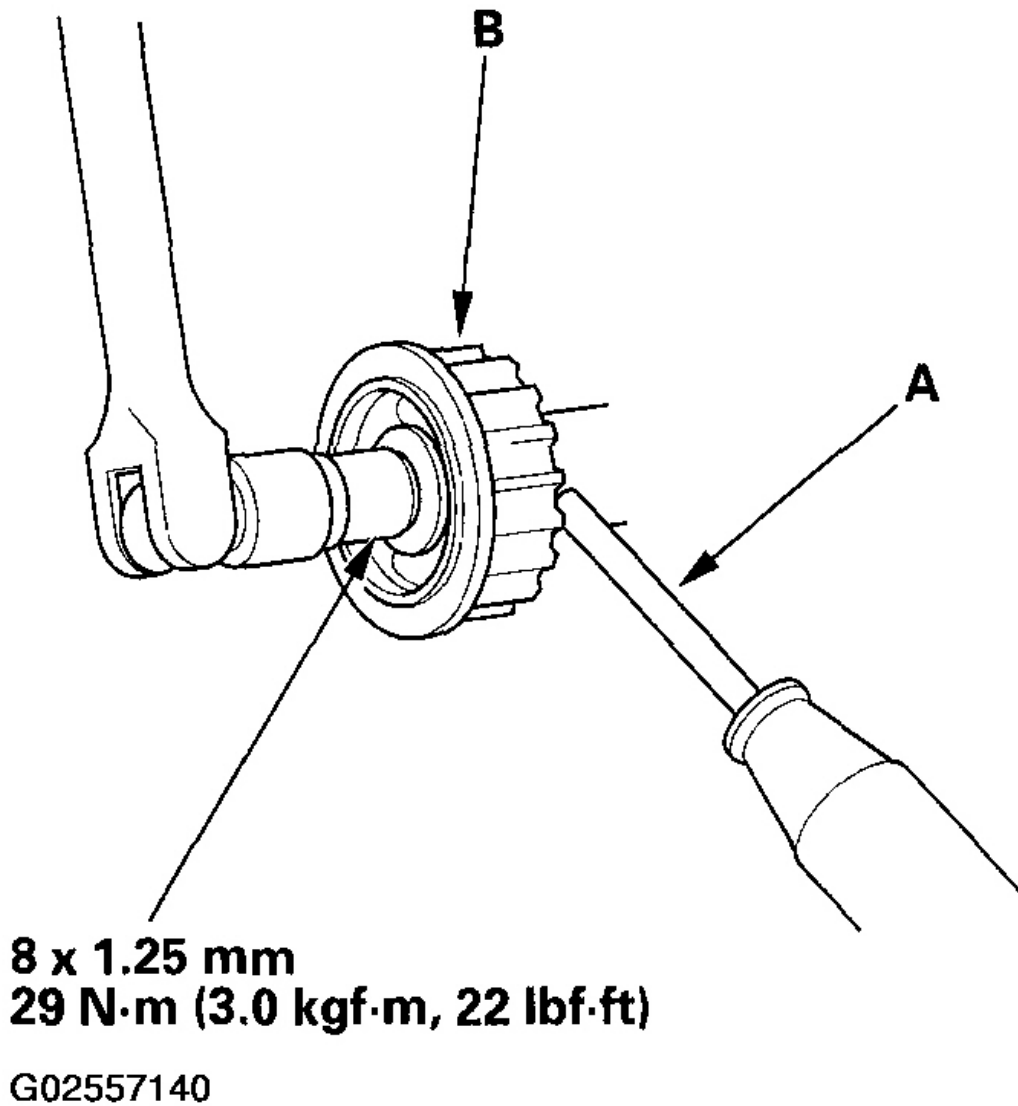
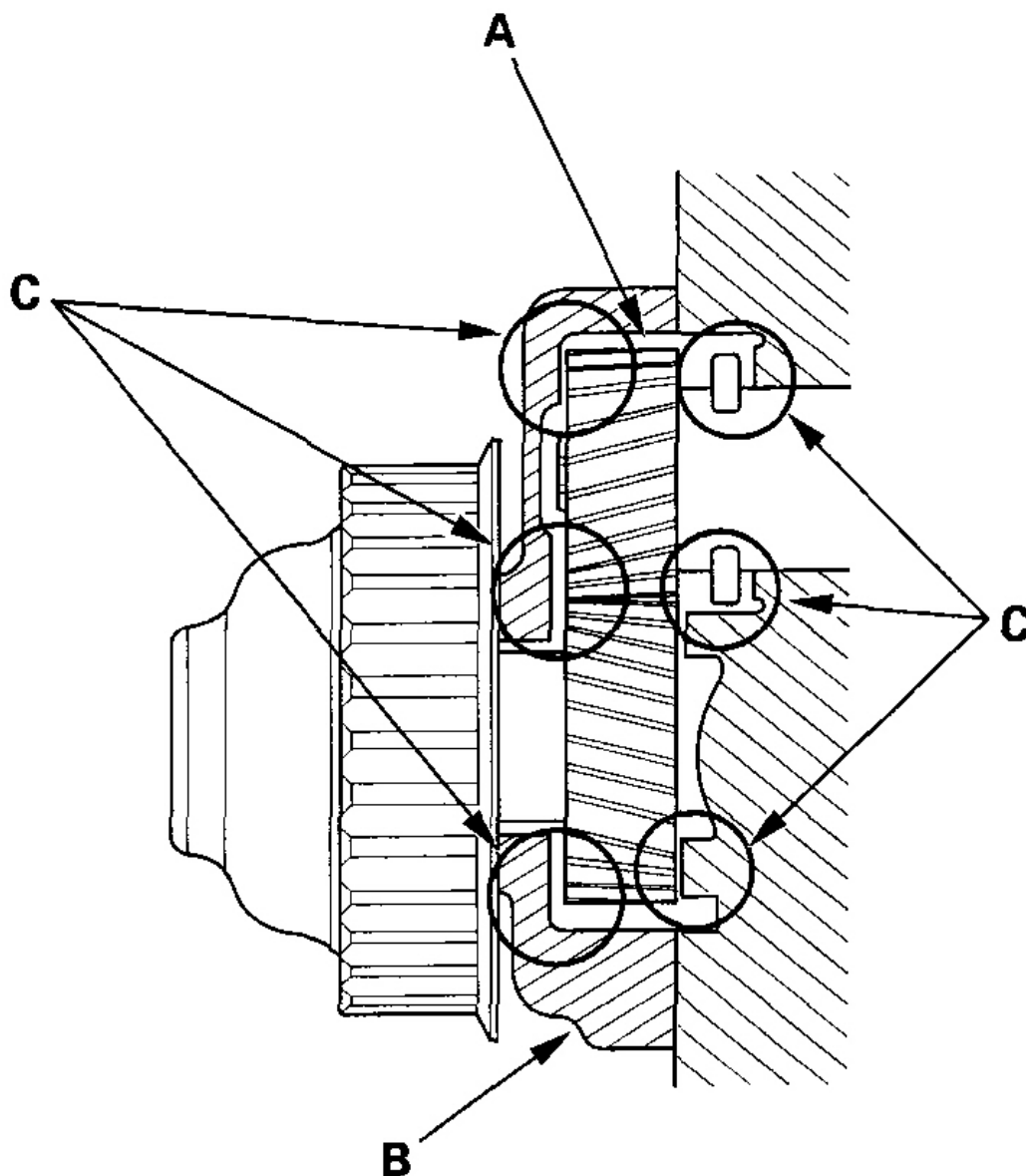


Fig. 285: Holding Front Balancer Shaft & Installing Timing Balancer Belt Driven Pulley
Courtesy of AMERICAN HONDA MOTOR CO., INC.

27. Before installing the balancer driven gear (A) and the balancer gear case (B) apply molybdenum disulfide (C) to the thrust surfaces of the balancer gears as shown.



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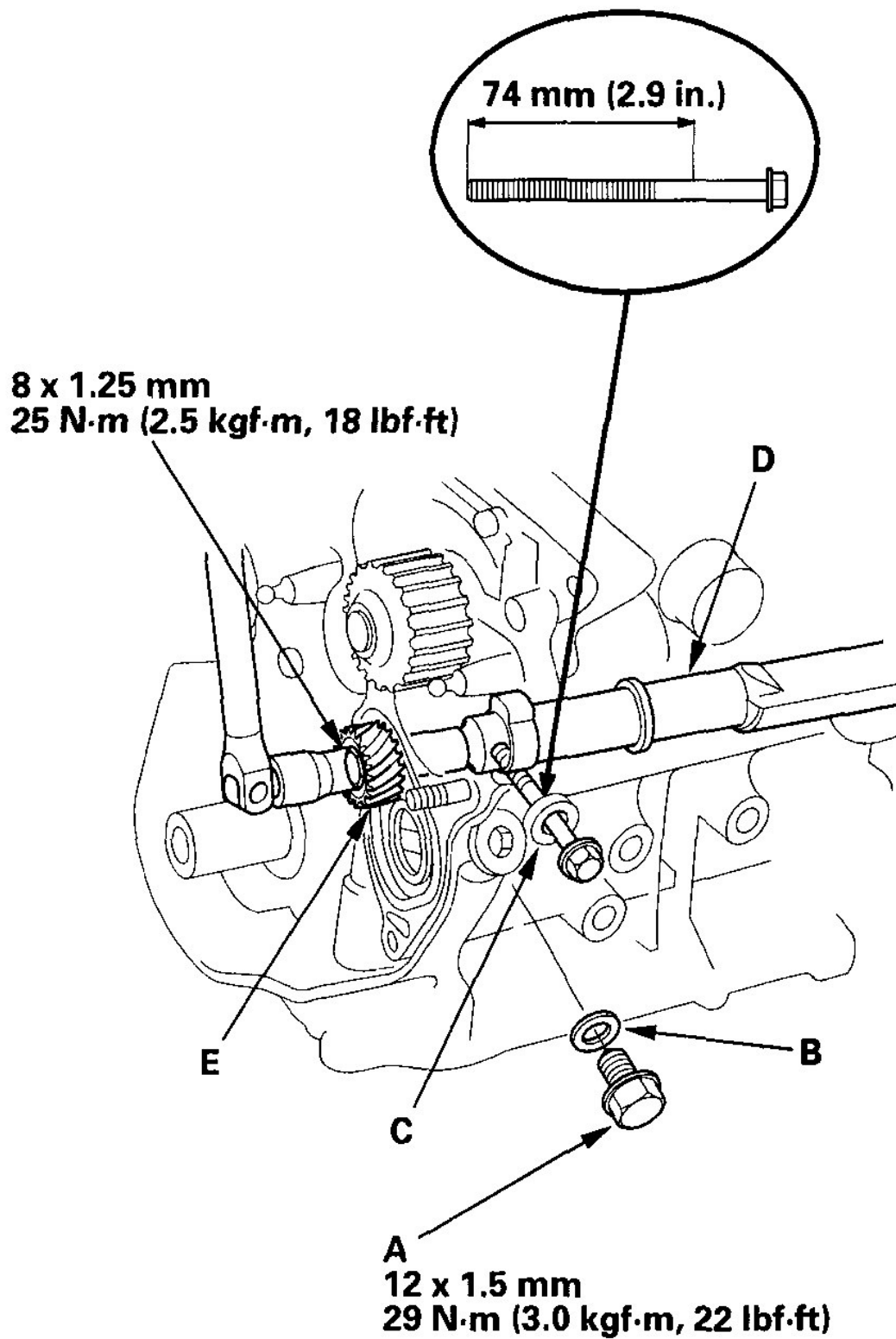
Fig. 286: Applying Molybdenum Disulfide To Thrust Surfaces Of Balancer Gears
Courtesy of AMERICAN HONDA MOTOR CO., INC.

28. Install the balancer driven gear.
 - A. Remove the bolt (A) and washer (B) from the maintenance hole (C).
 - B. Scribe a line on a 6 x 100 mm bolt, 74 mm from the end.

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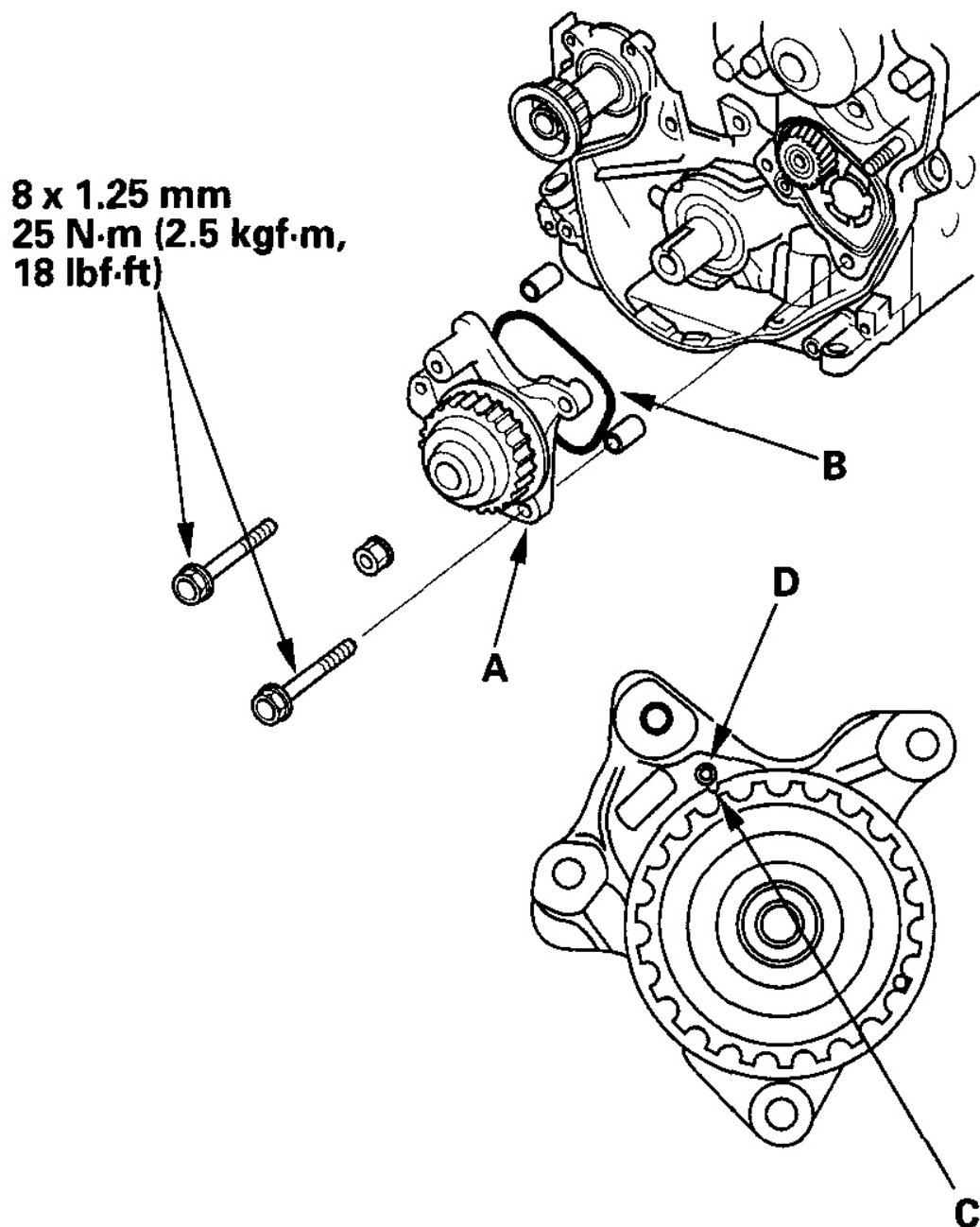
- C. Insert the bolt in the maintenance hole and into the hole in the rear balancer shaft (D) up to the line you scribed.
- D. Install the balancer driven gear (E).



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Fig. 287: Installing Balancer Driven Gear**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

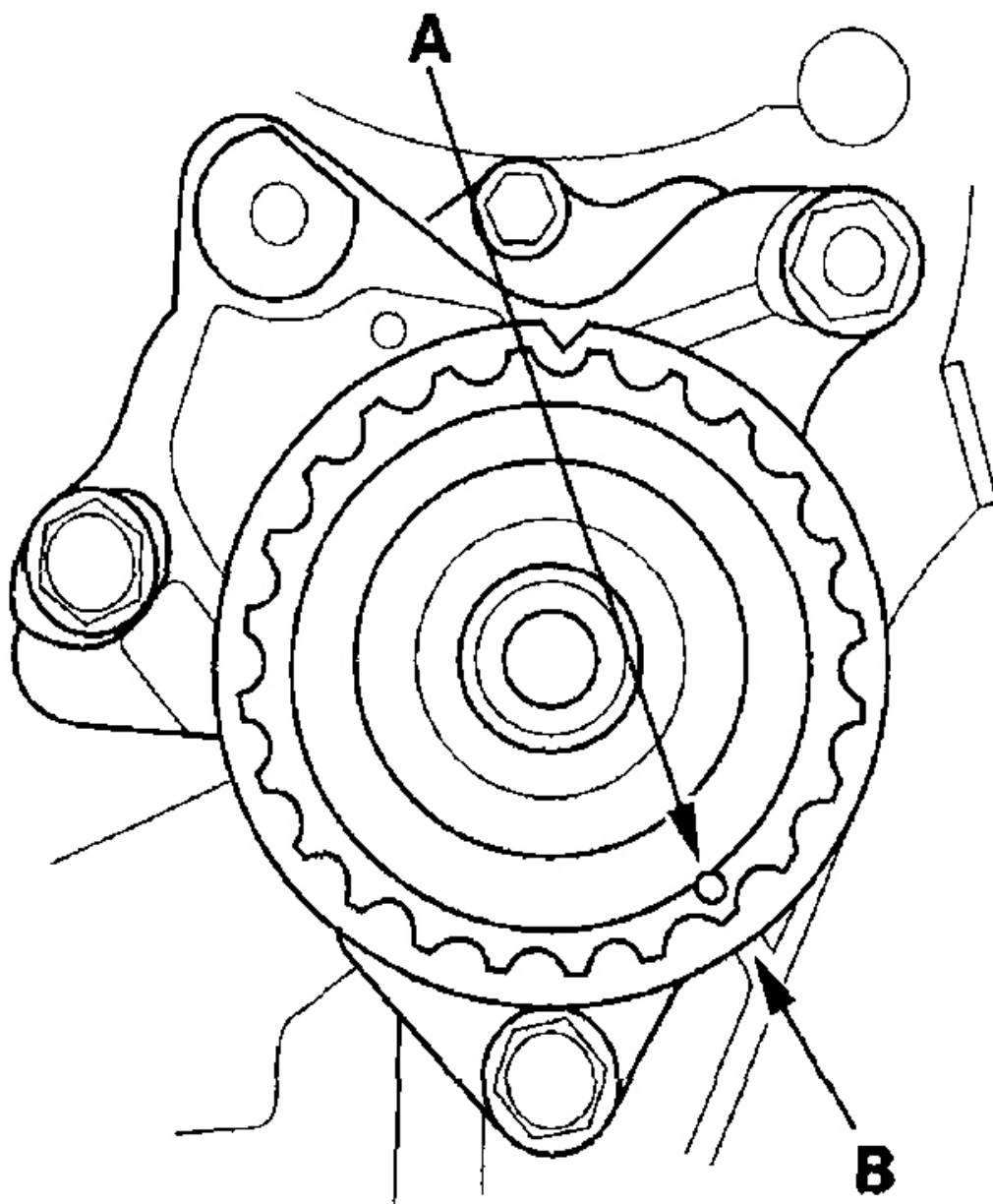
29. Install the balancer gear case (A).
 - A. Apply clean engine oil to the new O-ring (B).
 - B. Hold the rear balancer shaft with the 6 x 100 mm bolt.
 - C. Align the notch (C) on the pulley edge with the pointer (D) on the gear case.
 - D. Install the gear case (A).



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Fig. 288: Installing Balancer Gear Case
Courtesy of AMERICAN HONDA MOTOR CO., INC.

30. After installation, make sure the pulley pointer (A) aligns with the oil pump pointer (B).



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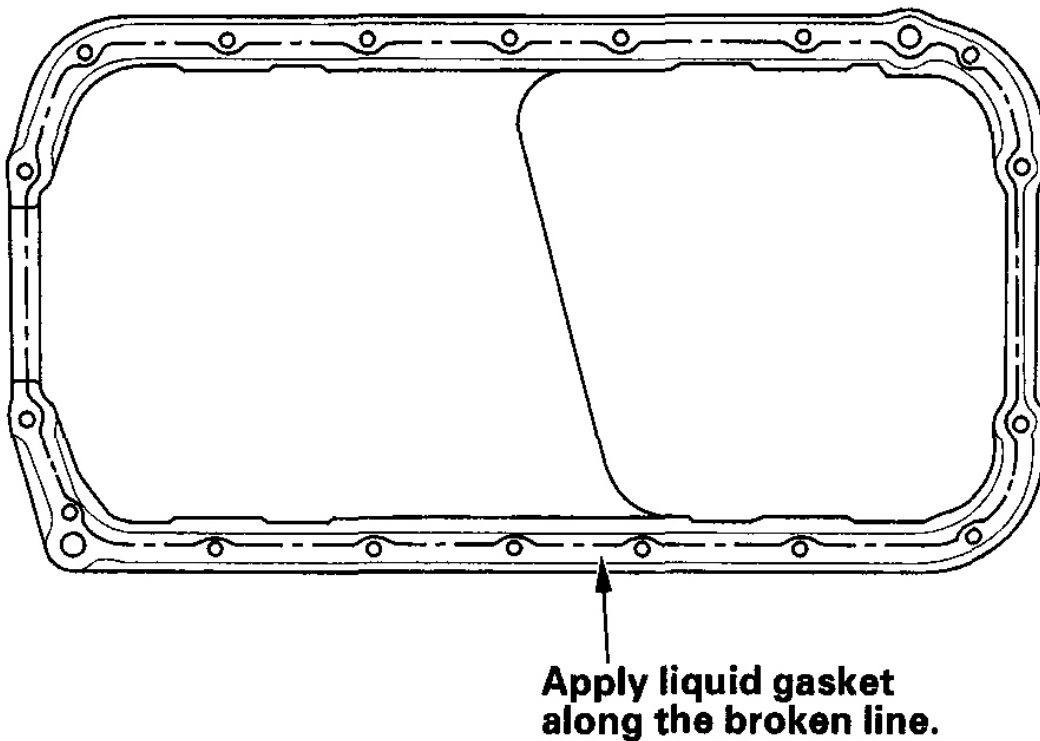
Fig. 289: Ensuring Pulley Pointer Aligns With Oil Pump Pointer
Courtesy of AMERICAN HONDA MOTOR CO., INC.

31. Clean and dry the cylinder block mating surfaces.

32. Apply liquid gasket part No. 08718-0009 evenly to the cylinder block mating surface of the oil pan and to the inner threads of the bolt holes, then install the oil pan.

NOTE:

- Apply liquid gasket in a 4 mm wide bead.
- Apply a second bead where the two ends of the first bead meet.
- Do not install the parts if 5 minutes or more have elapsed since applying liquid gasket. Instead, reapply liquid gasket after removing old residue.

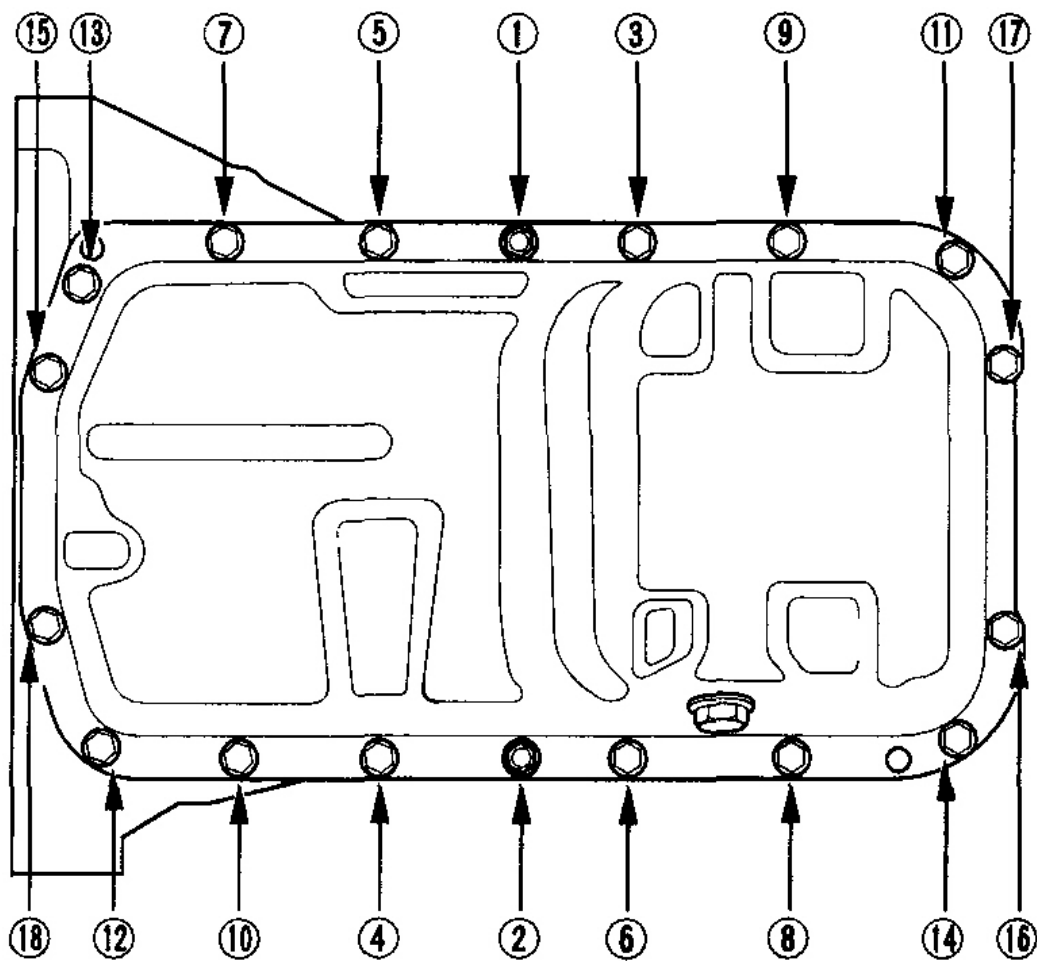


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Fig. 290: Applying Liquid Gasket

Courtesy of AMERICAN HONDA MOTOR CO., INC.

33. Tighten the bolts/nuts in two or three steps. In the final step, tighten all bolts/nuts, in sequence, to 12 N.m (1.2 kgf.m, 8.7 lbf-Ft).



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Fig. 291: Identifying Bolt Tightening Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

PULLEY END CRANKSHAFT SEAL INSTALLATION - IN-CAR

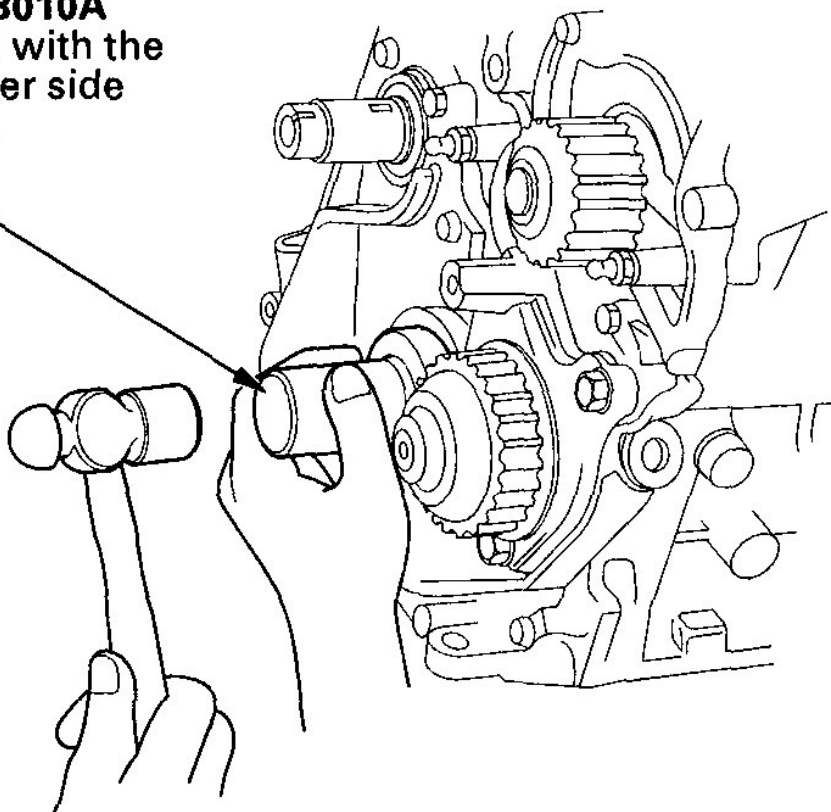
Special Tools Required

Seal Driver 07LAD-PT3010A

1. Dry the crankshaft oil seal housing.
2. Apply a light coat of grease to the crankshaft and to the lip of the seal.
3. Using the seal driver, 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.

07LAD-PT3010A
Install seal with the
part number side
facing out.



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Fig. 292: Driving In Crankshaft Oil Seal
Courtesy of AMERICAN HONDA MOTOR CO., INC.

BALANCER SHAFT SEALS INSTALLATION - IN-CAR

Special Tools Required

- Hub Assembly Guide Attachment 07GAF-SE00200
- Attachment, 30 mm I.D. 07746-0030300

1. Dry the crankshaft oil seal housing.
2. Apply a light coat of grease to the balancer shaft and to the lip of the seal.
3. Using the special tools, drive in the front balancer shaft oil seal until the driver bottoms against the oil pump. When the seal is in place, clean any excess grease off the balancer shaft, and check that the oil seal lip is not distorted.

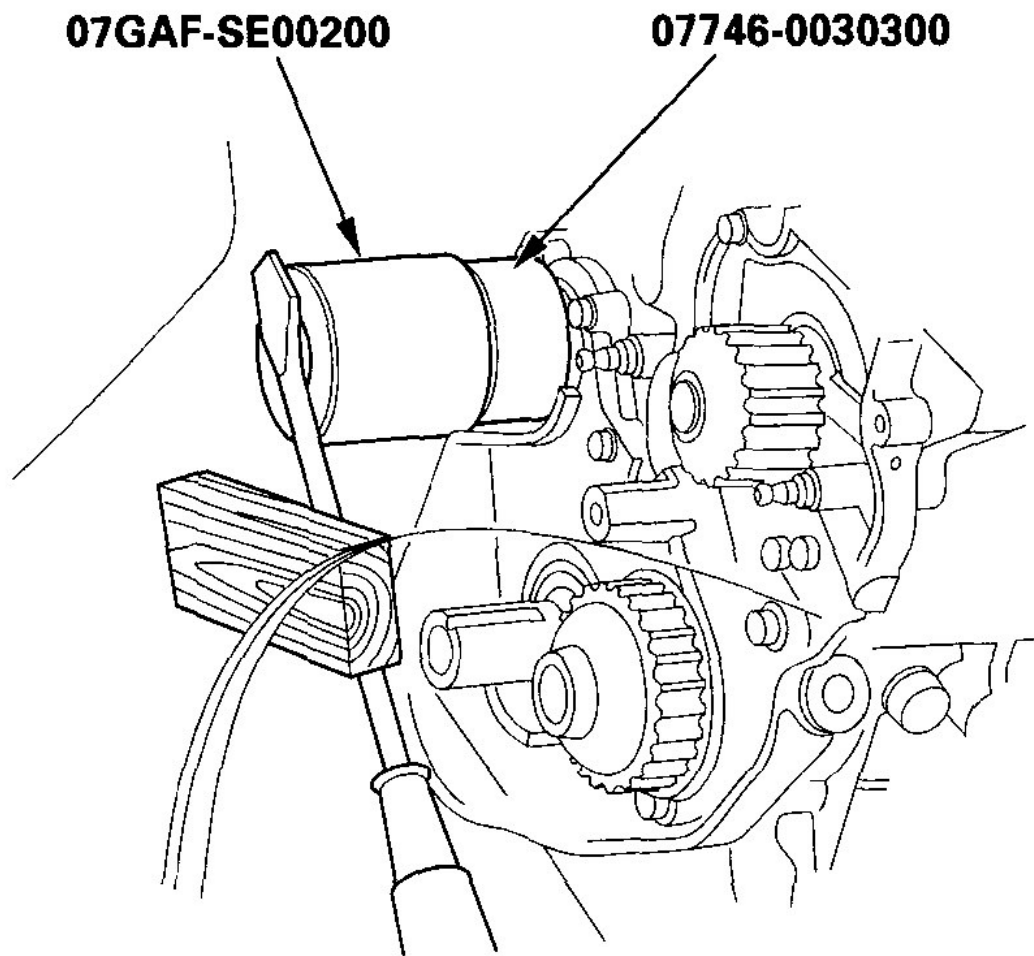


Fig. 293: Driving In Front Balancer Shaft Oil Seal
Courtesy of AMERICAN HONDA MOTOR CO., INC.

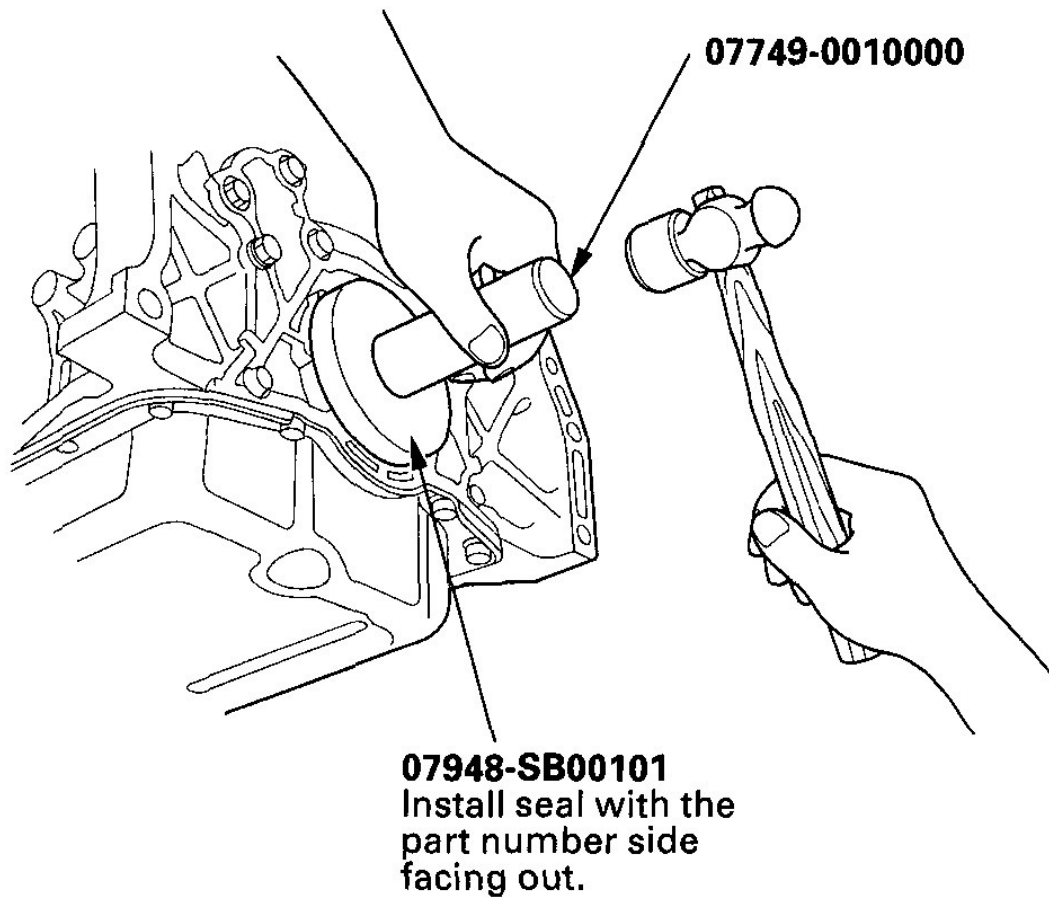
TRANSMISSION END CRANKSHAFT SEAL INSTALLATION - IN-CAR

Special Tools Required

- Driver 07749-0010000
- Driver Attachment 07948-SB00101 or 07VAD-P8A010A

1. Dry the crankshaft oil seal housing.
2. Apply a light coat of grease to the crankshaft and to the lip of the seal.
3. Using the special tools, drive the crankshaft oil seal into the right side cover to the point where the

clearance between the bottom of the crankshaft oil seal and right side cover is 0.5-0.8 mm (0.02-0.03 in.) (see **Crankshaft & Balancer Shafts Installation**). Align the hole in the driver attachment with the pin on the crankshaft.



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Fig. 294: Driving In Crankshaft Oil Seal
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.

INTAKE MANIFOLD REMOVAL & INSTALLATION

NOTE:

- Use new O-rings and gaskets when reassembling.
- Check for folds or scratches on the surface of the gasket.
- Replace with a new gasket if damaged.

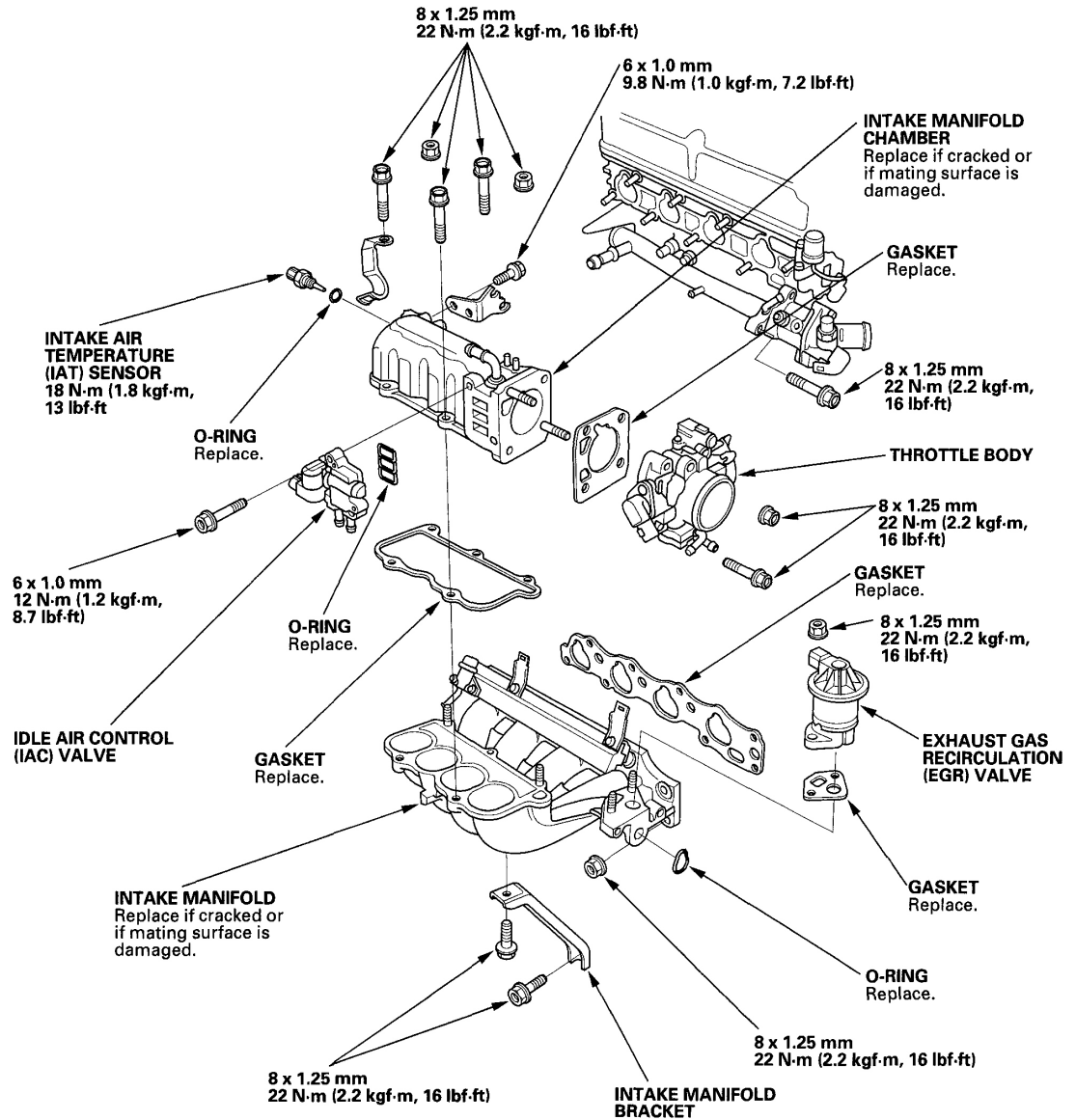


Fig. 295: Exploded View Of Intake Manifold
Courtesy of AMERICAN HONDA MOTOR CO., INC.

EXHAUST MANIFOLD REMOVAL & INSTALLATION

F23A1, F23A5 ENGINES:

NOTE:

- Use new gaskets and self-locking nuts when reassembling.
- Check for folds or scratches on the surface of the gasket.
- Replace with a new gasket if damaged.

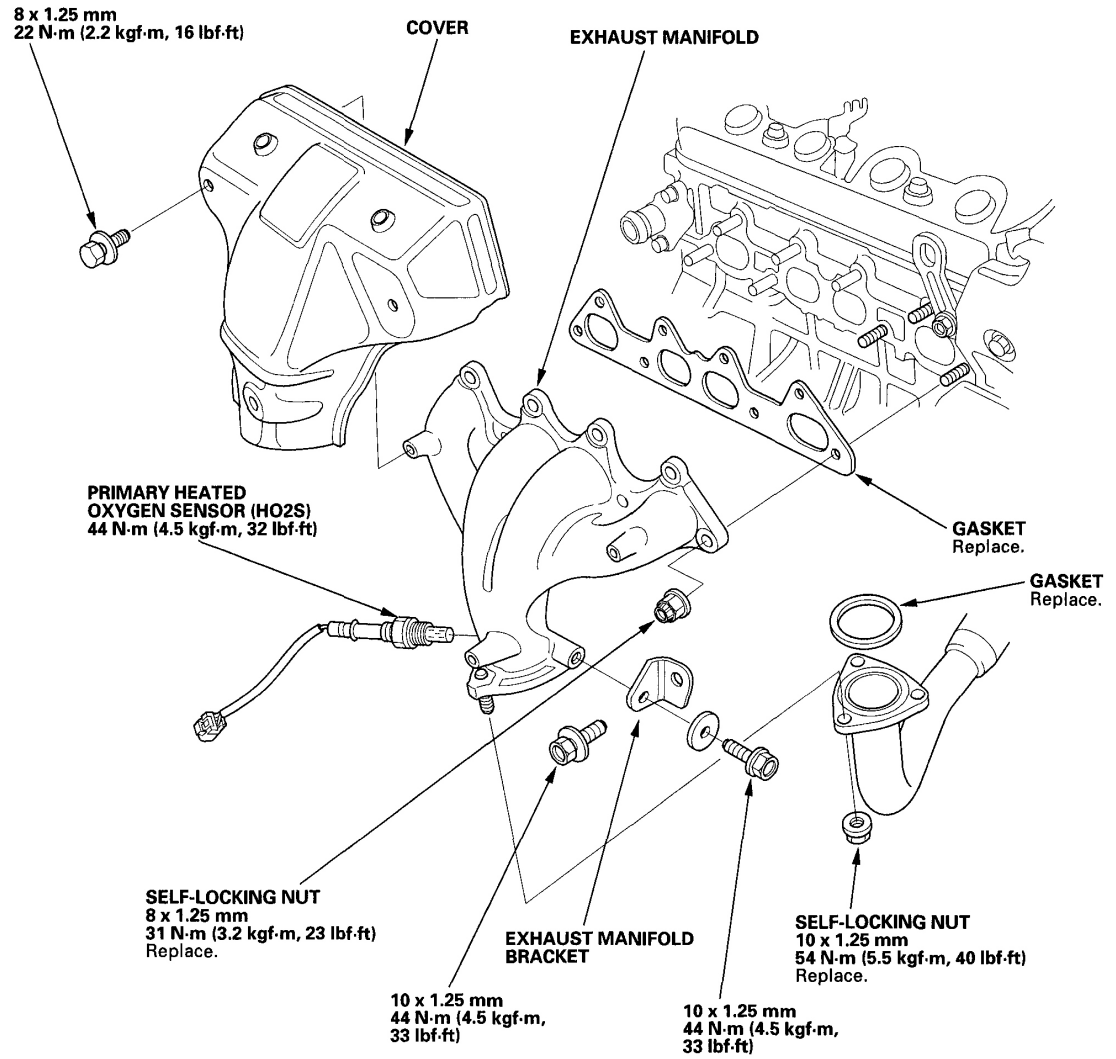
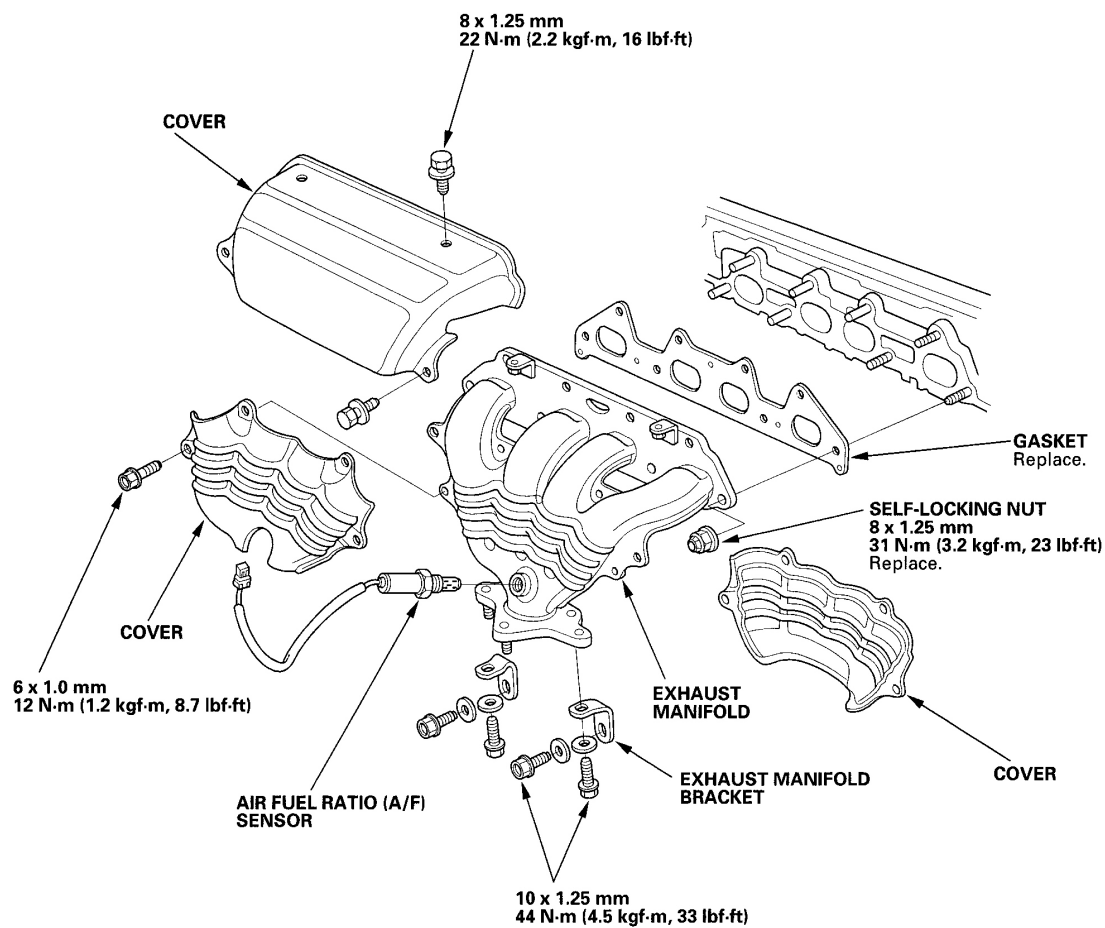


Fig. 296: Exploded View Of Exhaust Manifold (F23A1 & F23A5 Engines)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

F23A4 ENGINE:

NOTE:

- Use new gaskets and self-locking nuts when reassembling.
- Check for folds or scratches on the surface of the gasket.
- Replace with a new gasket if damaged.



G02557175

Fig. 297: Exploded View Of Exhaust Manifold (F23A4 Engine)
Courtesy of AMERICAN HONDA MOTOR CO., INC.