2000-06 ENGINE

Cylinder Head - Insight

SPECIAL TOOLS

Ref. No.	Tool Number	Description	Qty
①	07AAJ-PNAA100	Air Pressure Regulator	1
②	07HAH-PJ70100	Valve Guide Reamer, 5.5 mm	1
③	07JAA-001010A	Socket, 17 mm	1
④	07JAB-001020B	Holder Handle	1
⑤	07MAB-PY3010A	Holder Attachment, 50 mm Offset	1
⑥	07NAJ-P07010A	Pressure Gauge Adapter	1
⑦	07VAJ-P8A010A	VTEC Air Adapter	1
⑧-1	07406-0070300	A/T Low Pressure Gauge w/Panel	1
⑧-2	07MAJ-PY4011A	A/T Pressure Hose, 2,210 mm	1
⑧-3	07MAJ-PY40120	A/T Pressure Hose Adapter	1
⑨	07742-0010100	Valve Guide Driver, 5.5 mm	1
⑩	07757-PJ1010A	Valve Spring Compressor Attachment	1

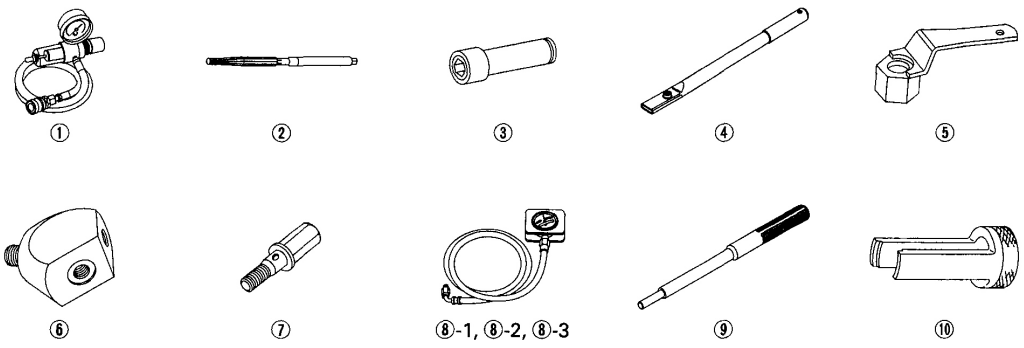

Fig. 1: Identifying Special Service Tool
Courtesy of AMERICAN HONDA MOTOR CO., INC.

COMPONENT LOCATION INDEX

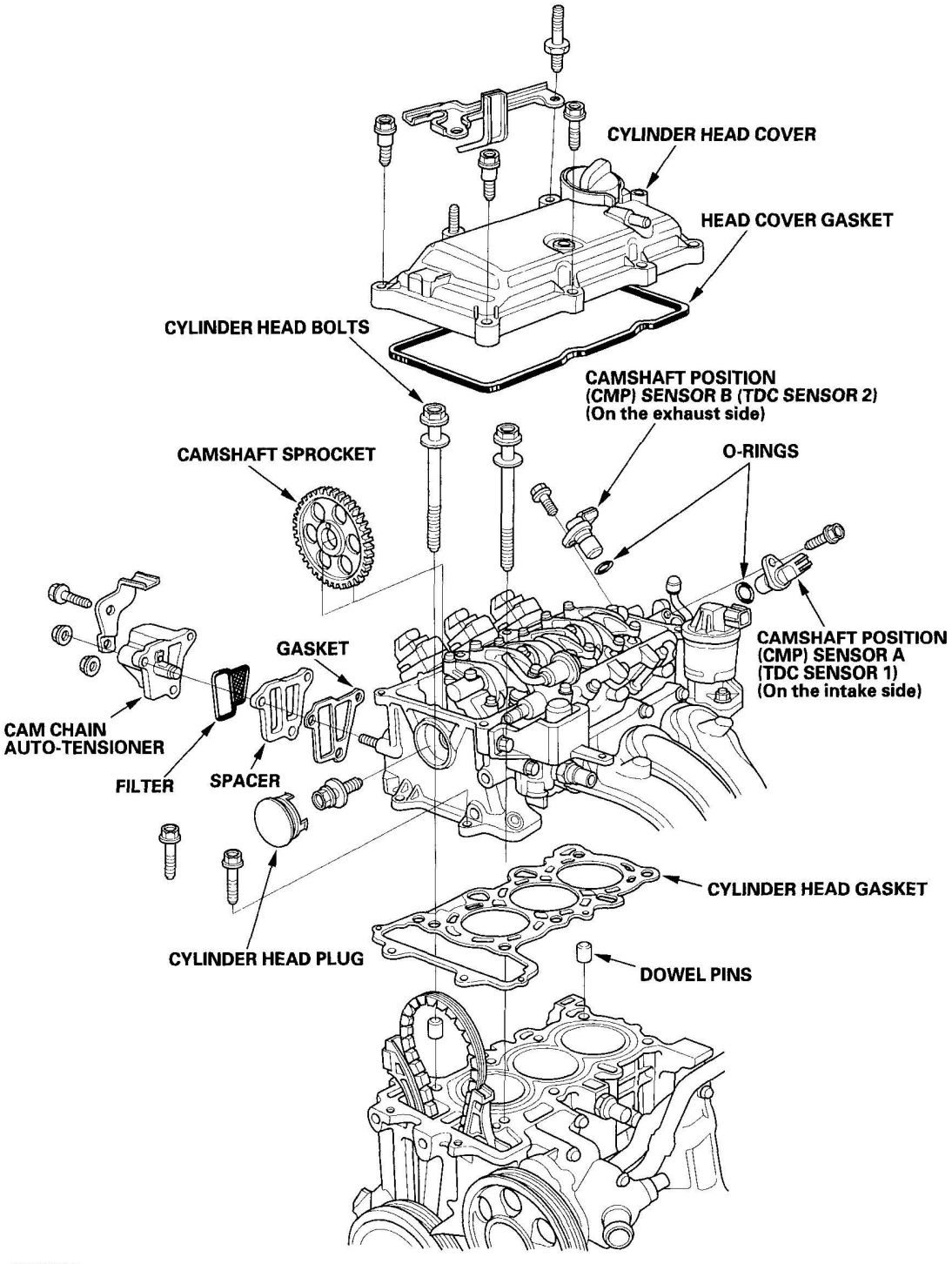

Fig. 2: Identifying Cylinder Head Components (1 Of 3)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

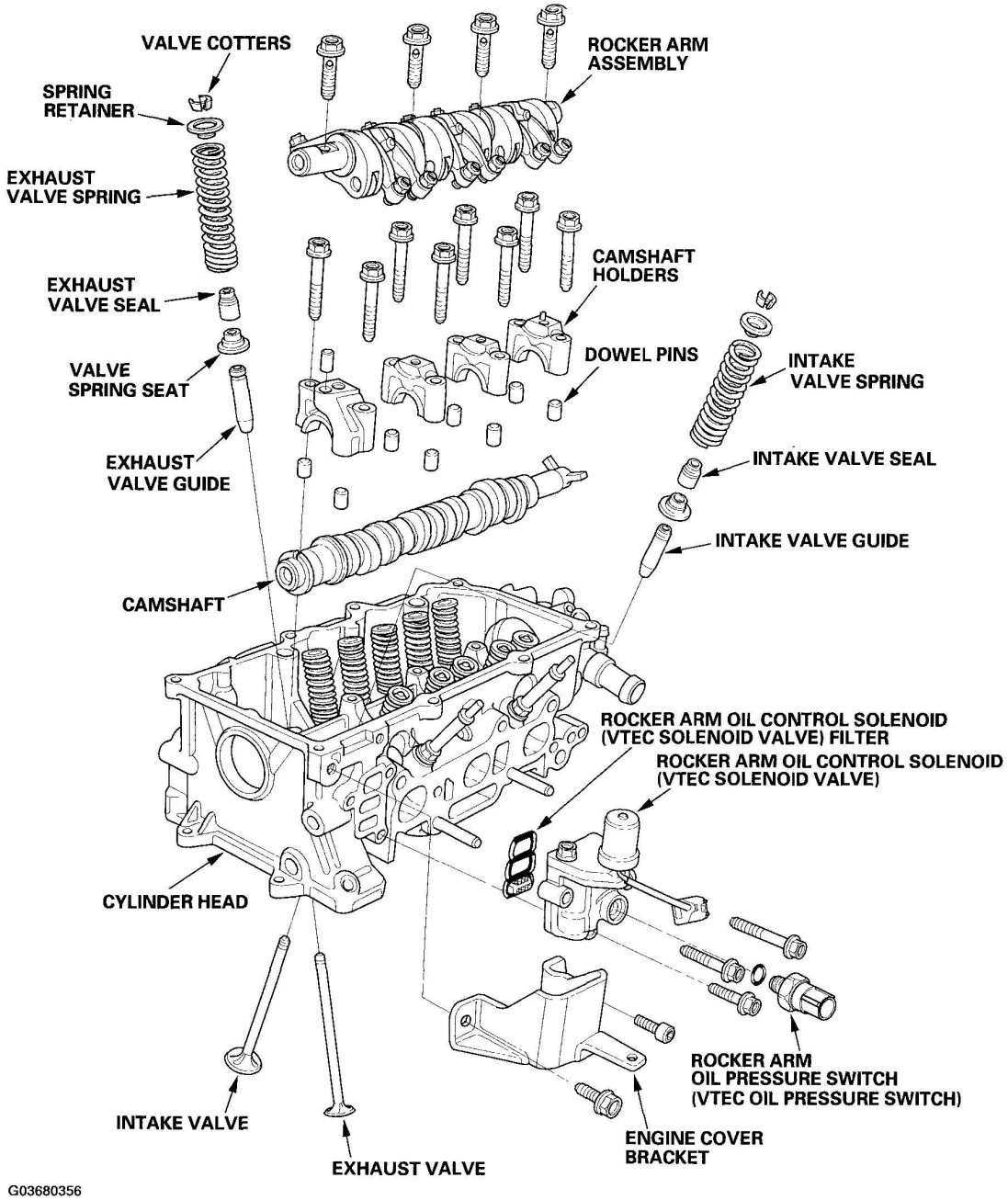

Fig. 3: Identifying Cylinder Head Components (2 Of 3)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

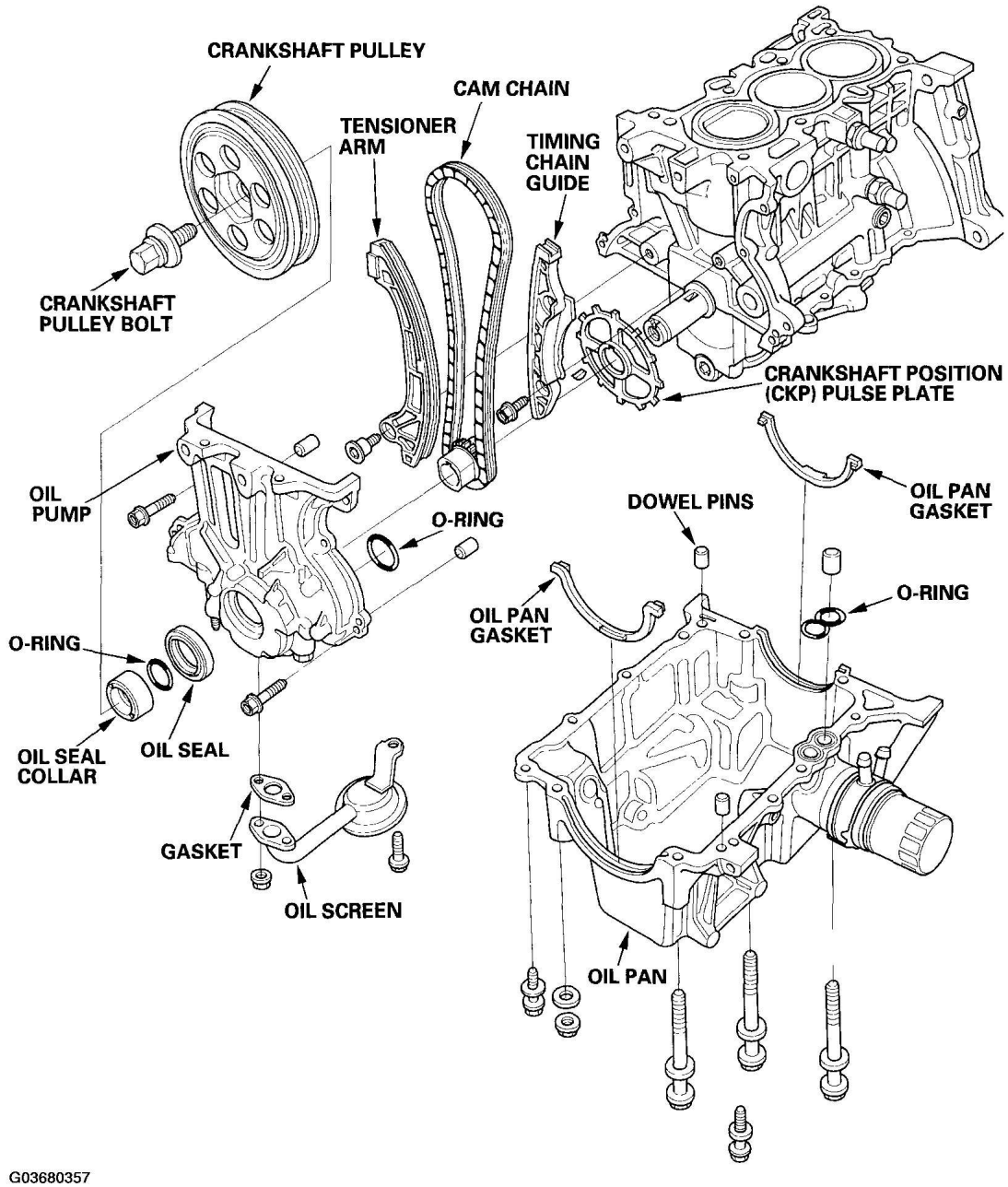

Fig. 4: Identifying Cylinder Head Components (3 Of 3)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

DTC TROUBLESHOOTING

DTC INDEX

DTC	Description

DTC P1259	VTEC System Malfunction- 2000-2003 models
DTC P2646	VTEC System Malfunction- 2004 model
DTC P2646	Rocker Arm Oil Pressure Switch (VTEC Oil Pressure Switch) Circuit Low Voltage; - 2005-2006 models
DTC P2647	Rocker Arm Oil Pressure Switch (VTEC Oil Pressure Switch) Circuit High Voltage; - 2005-2006 models

DTC P1259: VTEC SYSTEM MALFUNCTION- 2000-2003 MODELS; DTC P2646: VTEC SYSTEM MALFUNCTION- 2004 MODEL

Special Tools Required

- Pressure gauge adapter 07NAJ-P07010A
- A/T low pressure gauge w/panel 07406-0070300
- A/T pressure hose, 2,210 mm 07MAJ-PY4011A
- A/T pressure hose adapter 07MAJ-PY40120

NOTE:

- **Information marked with an asterisk (* 1) applies to 2000-2003 models.**
- **Information marked with an asterisk (* 2) applies to 2004 model.**

1. Do the engine control module (ECM) reset procedure (see **HDS CLEAR COMMAND**).
2. Start the engine.
3. Warm up the engine to normal operating temperature (cooling fan comes on).
4. Test-drive 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"or P2646*[2] is not repeated during the first test, repeat this test two more times.

Is DTC P1259 [1] or P2646* [2] indicated?*

YES -Go to step 5.

NO -Intermittent failure, system is OK at this time. Check for poor connections or loose wires at the rocker arm oil control solenoid (VTEC solenoid valve) and the ECM.

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

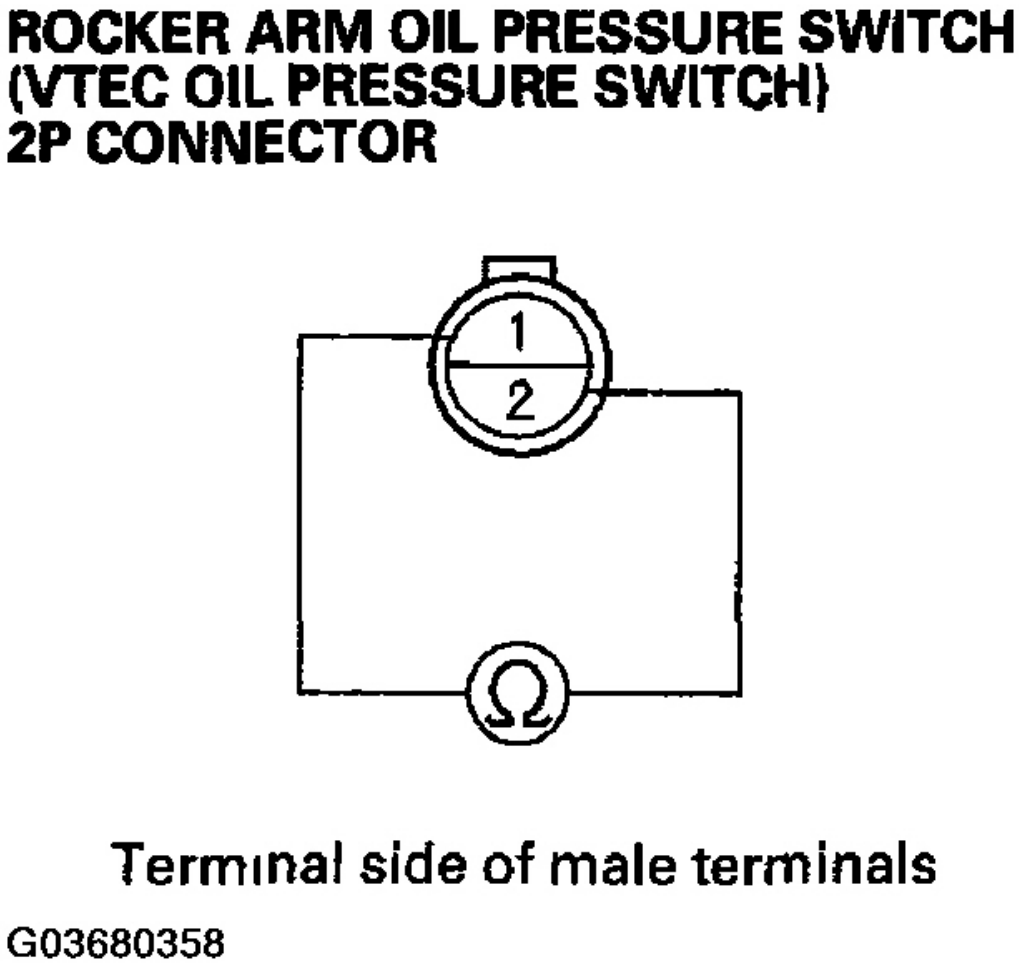

Fig. 5: Checking Continuity On Rocker Arm Oil Pressure Switch
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there continuity?

YES -Go to step 8.

NO -Replace the rocker arm oil pressure switch (VTEC oil pressure switch) (see **ROCKER ARM OIL PRESSURE SWITCH (VTEC OIL PRESSURE SWITCH) REPLACEMENT**).

8. Turn the ignition switch ON (II).

9. Measure the voltage between the rocker arm oil pressure switch (VTEC oil pressure switch) harness 2P connector terminal No. 1 and body ground.

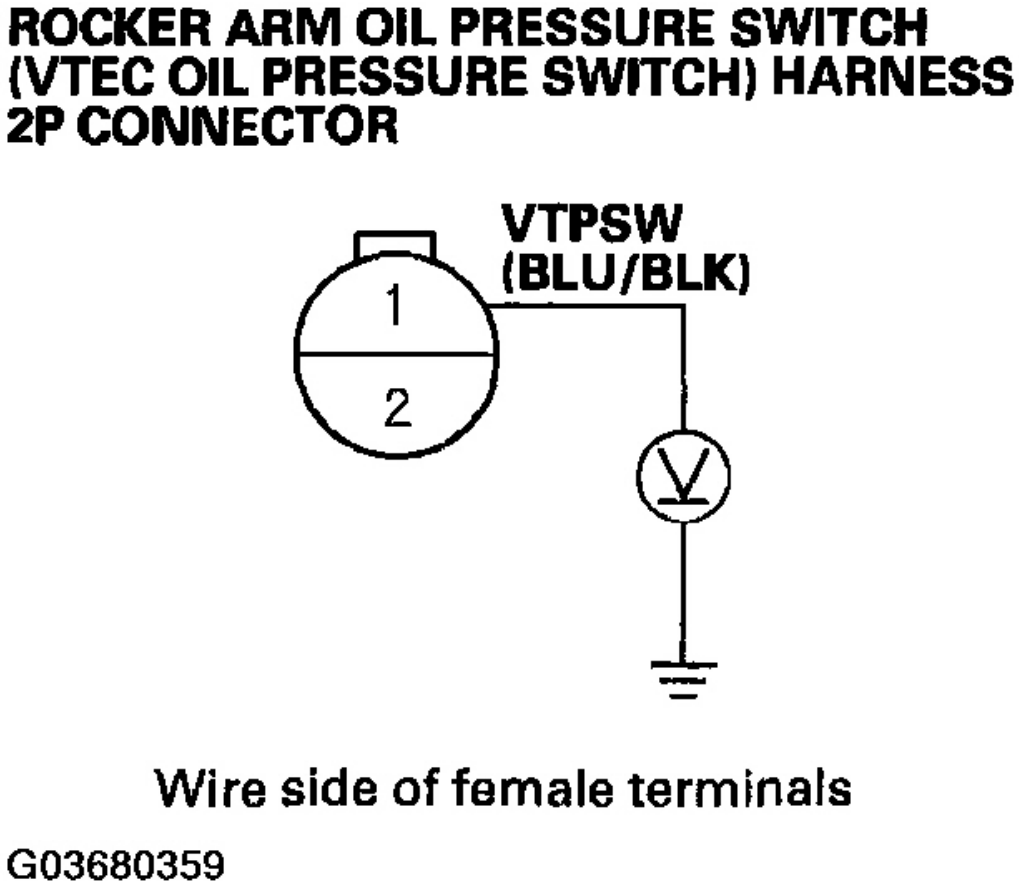

Fig. 6: Measuring Voltage Between Rocker Arm Oil Pressure Switch
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there battery voltage?

YES -Go to step 10.

NO -Inspect for an open or a short to ground in the wire between the rocker arm oil pressure switch (VTEC oil pressure switch) and the ECM (C10). If the wire is OK, substitute a known-good ECM and recheck 2000-

2001 M/T models (see **HOW TO TROUBLESHOOT CIRCUITS AT THE ECM**), 2002-2006 M/T models and CVT model (see **ECM UPDATING AND SUBSTITUTION FOR TESTING-2006 M/T MODELS AND CVT MODEL**).

10. Measure voltage across the rocker arm oil pressure switch (VTEC oil pressure switch) harness 2P connector.

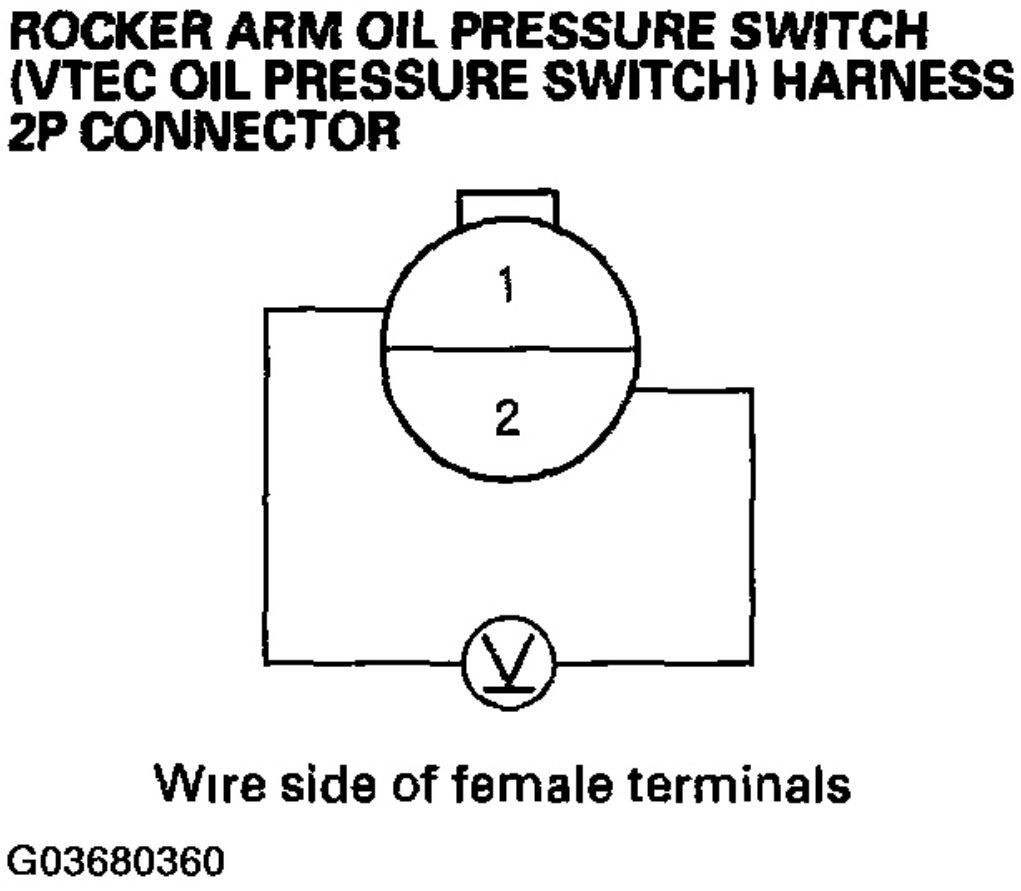

Fig. 7: Measuring Voltage Across Rocker Arm Oil Pressure Switch
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there battery voltage?

YES -Go to step 11.

NO -Repair an open in the wire between the rocker arm oil pressure switch (VTEC oil pressure switch) and G101. If the wire is OK, substitute a known-good ECM and recheck 2000-2001 M/T models (see **HOW TO TROUBLESHOOT CIRCUITS AT THE ECM**), 2002-2006 M/T models and CVT model (see **ECM UPDATING AND SUBSTITUTION FOR TESTING-2006 M/T MODELS AND CVT MODEL**).

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

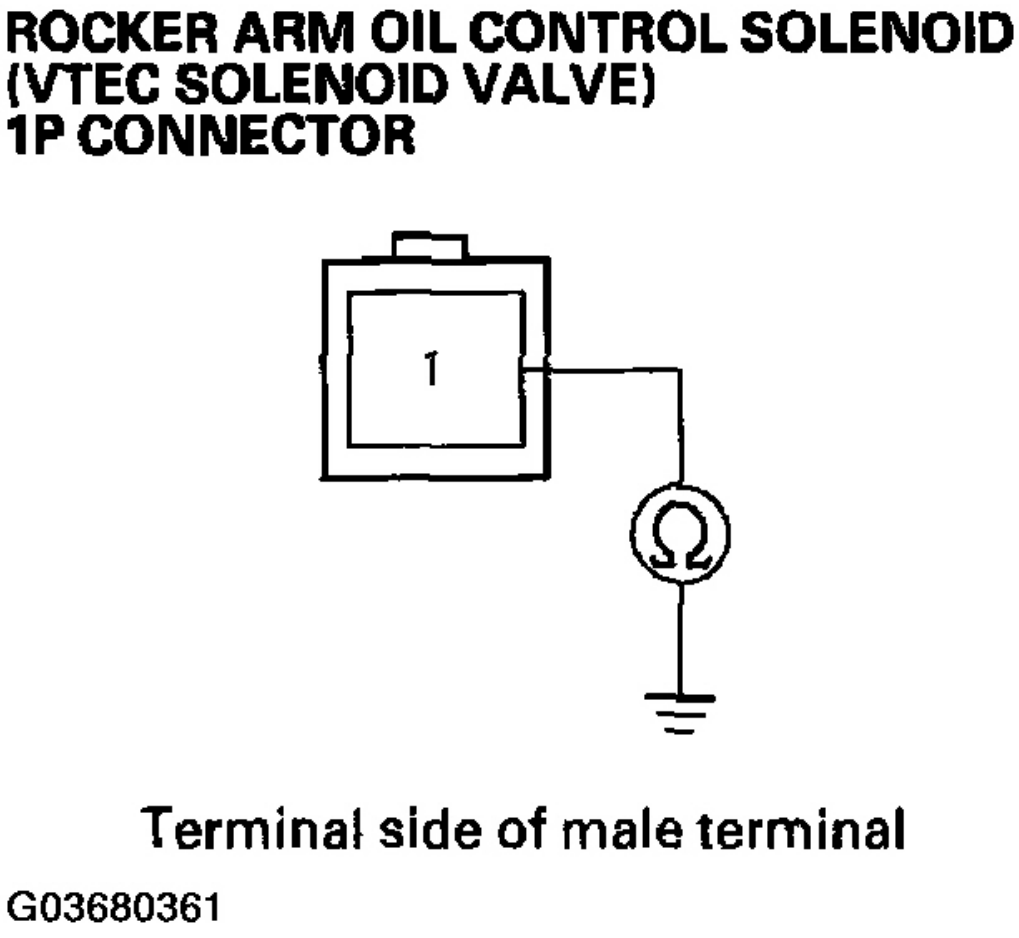

Fig. 8: Checking Continuity On Rocker Arm Oil Control Solenoid
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there 14-30 ohm?

YES -Go to step 14.

NO -Replace the rocker arm oil control solenoid (VTEC solenoid valve).

14. Remove the engine cover and engine cover bracket.
15. Remove the rocker arm oil pressure switch (VTEC oil pressure switch) (A) and install the special tools as shown, then reinstall the rocker arm oil pressure switch (VTEC oil pressure switch).

NOTE: Install the part in the reverse order of removal with a new O-ring.

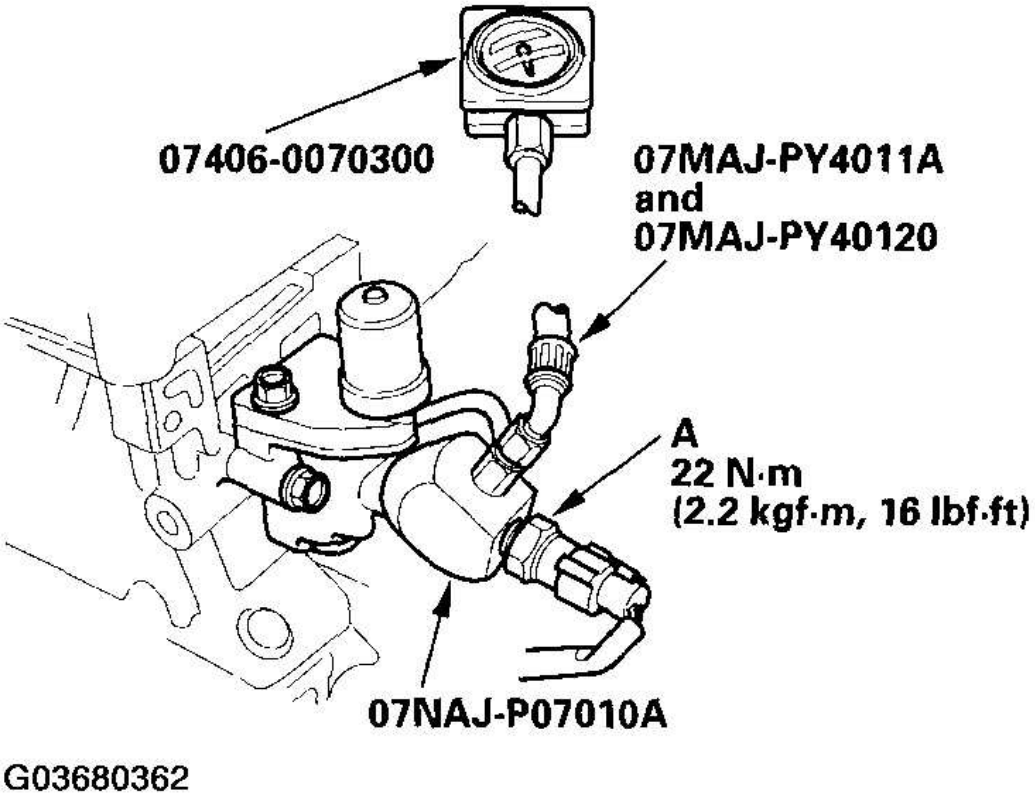

Fig. 9: Removing Engine Cover And Engine Cover Bracket With Torque Specificatons
Courtesy of AMERICAN HONDA MOTOR CO., INC.

16. Reconnect the rocker arm oil control solenoid (VTEC solenoid valve) 1P connector and the rocker arm oil pressure switch (VTEC oil pressure switch) 2P connector.
17. Connect the HDS or a tachometer.
18. Warm up the engine to normal operating temperature (cooling fan comes on).
19. 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/cnf^2 , 7 psi)?

YES -Go to step 20.

NO -Inspect the rocker arm oil control solenoid (VTEC solenoid valve) (see **ROCKER ARM OIL CONTROL SOLENOID (VTEC SOLENOID VALVE) REMOVAL/ INSPECTION**).

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

Is pressure above 200 kPa (2.0 kgf/cm^2 , 28 psi)?

YES -Go to step 24.

NO -Inspect the rocker arm oil control solenoid (VTEC solenoid valve) (see **ROCKER ARM OIL CONTROL SOLENOID (VTEC SOLENOID VALVE) REMOVAL/ INSPECTION**).

24. With the battery positive cable still connected to the rocker arm oil control solenoid (VTEC solenoid valve), measure voltage between ECM connector terminal C10 and body ground.

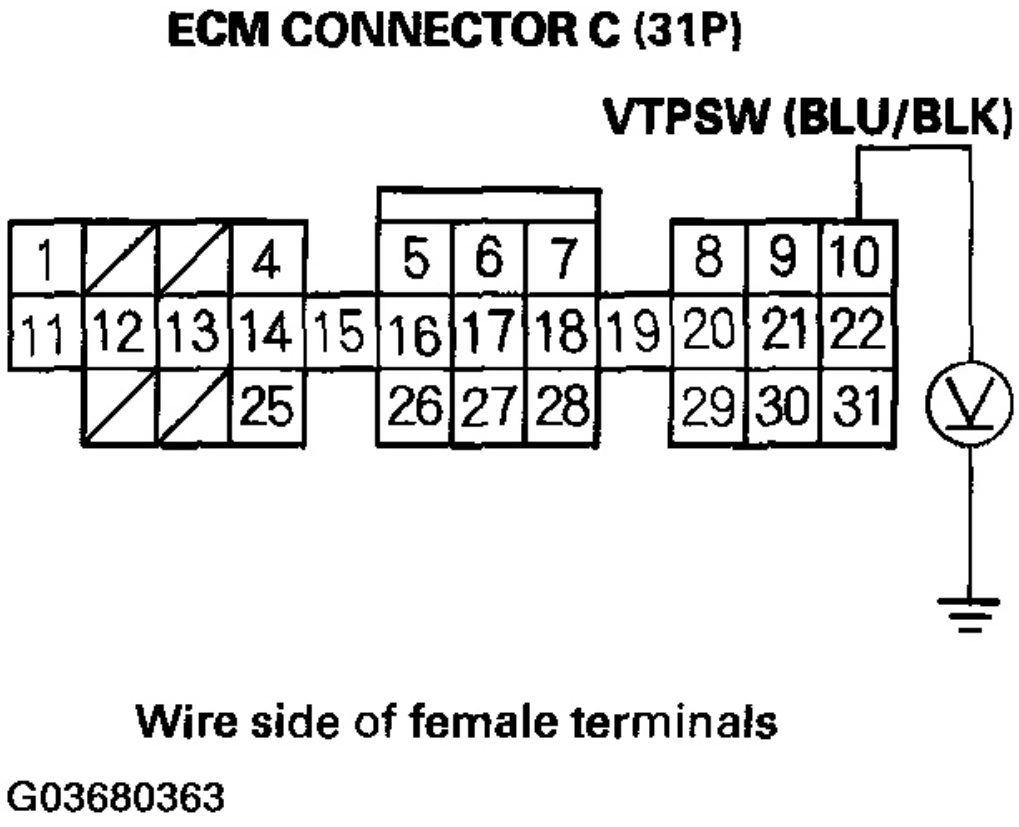

Fig. 10: Measuring Voltage Between ECM Connector Terminal C10 And Body Ground
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there battery voltage above 4,000 RPM?

YES -Go to step 25.

NO -Replace the rocker arm oil pressure switch (VTEC oil pressure switch) (see **ROCKER ARM OIL PRESSURE SWITCH (VTEC OIL PRESSURE SWITCH) REPLACEMENT**).

25. Turn the ignition switch OFF.
26. Disconnect the battery positive cable from the rocker arm oil control solenoid (VTEC solenoid valve) terminal.

27. Disconnect the ECM connector B (25P).
28. Check for continuity between the rocker arm oil control solenoid (VTEC solenoid valve) harness IP connector terminal and ECM connector terminal B12.

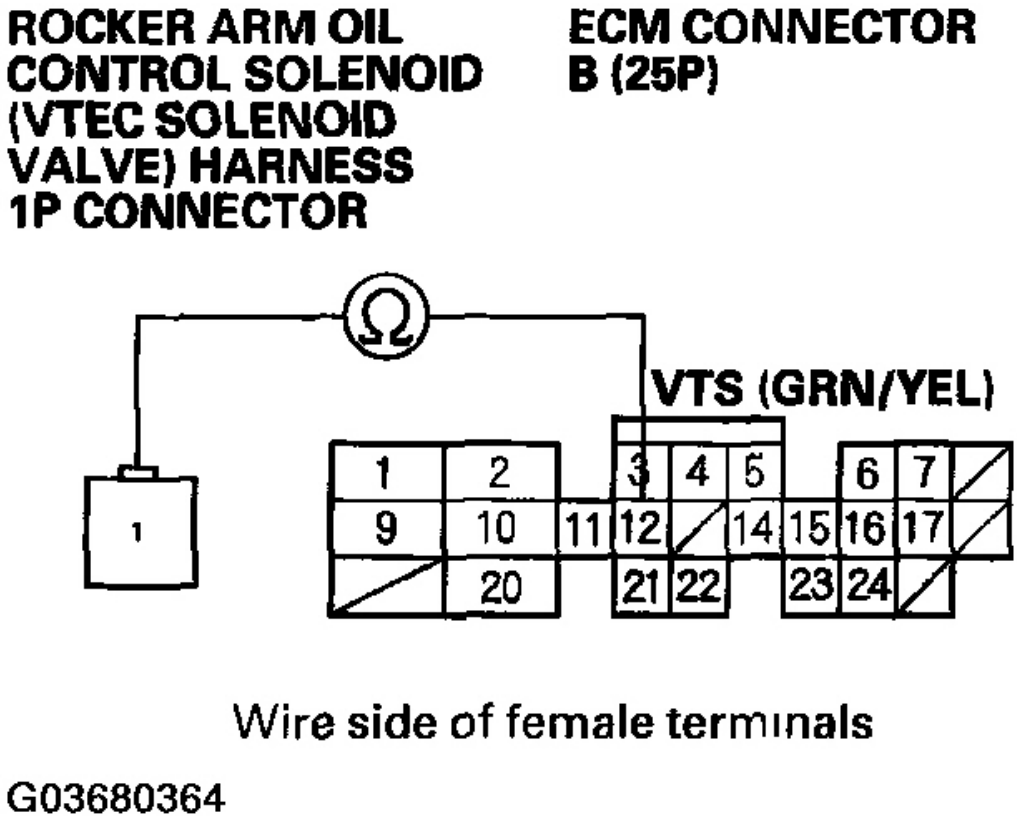

Fig. 11: Checking Continuity Between Rocker Arm Oil Control Solenoid Harness IP Connector Terminal And ECM Connector Terminal B12
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there continuity?

YES -Go to step 29.

NO -Repair an open in the wire between ECM connector terminal B12

and rocker arm oil control solenoid (VTEC solenoid valve) connector.

29. Check for continuity between the rocker arm oil control solenoid (VTEC solenoid valve) harness IP connector terminal and body ground.

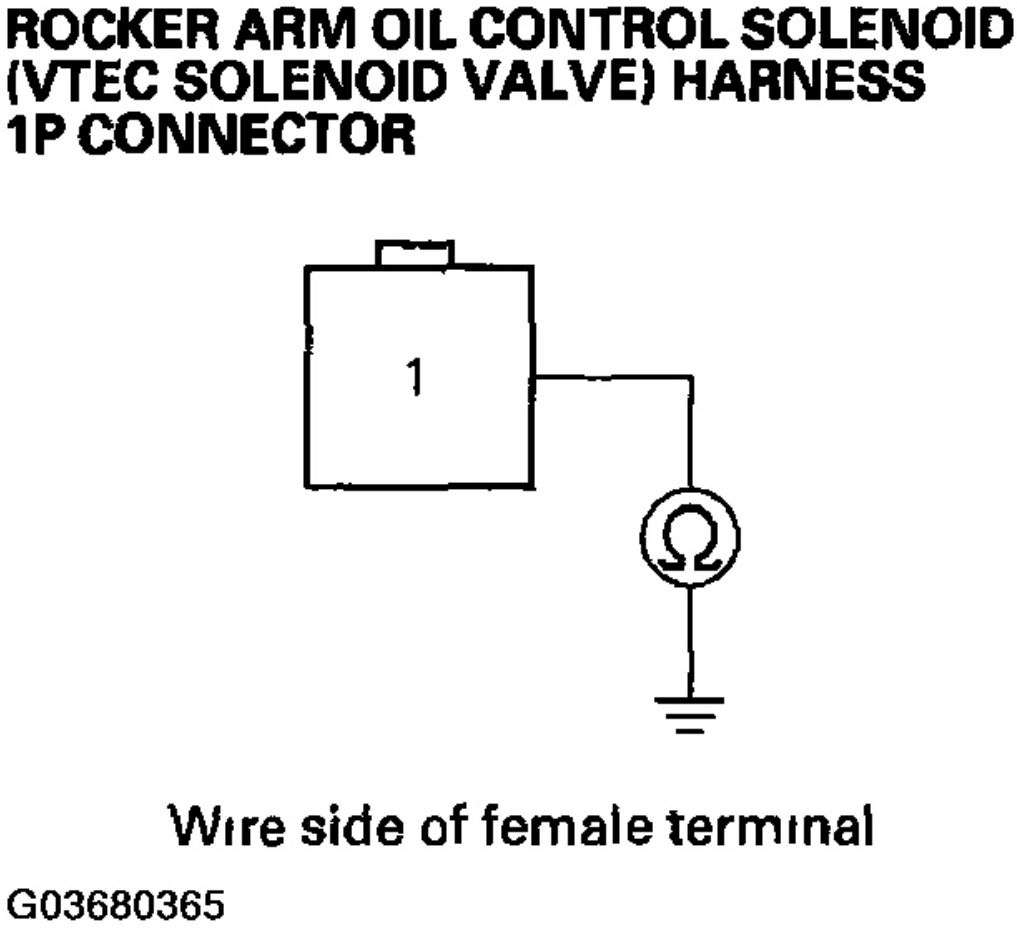

Fig. 12: Checking For Continuity Between Rocker Arm Oil Control Solenoid Harness IP Connector Terminal And Body Ground
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there continuity?

YES -Repair a short in the wire between the ECM (B12) and the rocker

arm oil control solenoid (VTEC solenoid valve) connector.

NO -Substitute a known-good ECM and recheck 2000-2001 M/T models (see **HOW TO TROUBLESHOOT CIRCUITS AT THE ECM**), 2002-2006 M/T models and CVT model (see **ECM UPDATING AND SUBSTITUTION FOR TESTING-2006 M/T MODELS AND CVT MODEL**). If symptom/indication goes away, replace the original ECM (see **ECM REPLACEMENT**).

DTC P2646: ROCKER ARM OIL PRESSURE SWITCH (VTEC OIL PRESSURE SWITCH) CIRCUIT LOW VOLTAGE; - 2005-2006 MODELS

Special Tools Required

- Pressure gauge adapter 07NAJ-P07010A
- A/T low pressure gauge w/panel 07406-0070300
- A/T pressure hose, 2,210 mm 07MAJ-PY4011A
- A/T pressure hose adapter 07MAJ-PY40120

1. Do the engine control module (ECM) reset procedure (see **HDS CLEAR COMMAND**).
2. Start the engine.
3. Warm up the engine to normal operating temperature (cooling fan comes on).
4. Test-drive 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 P2646 is not repeated during the first test, repeat this test two more times.

   Is DTC P2646 indicated?

   YES -Go to step 5.

   NO -Intermittent failure, system is OK at this time. Check for poor connections or loose wires at the rocker arm oil control solenoid (VTEC solenoid valve) and the ECM.
5. Turn the ignition switch OFF.
6. Remove the rocker arm oil pressure switch (VTEC oil pressure switch) (A) and install the special tools as shown, then install the rocker arm oil

pressure switch (VTEC oil pressure switch) (A) to the oil pressure gauge adapter (B).

NOTE: Install the part in the reverse order of removal with a new O-ring.

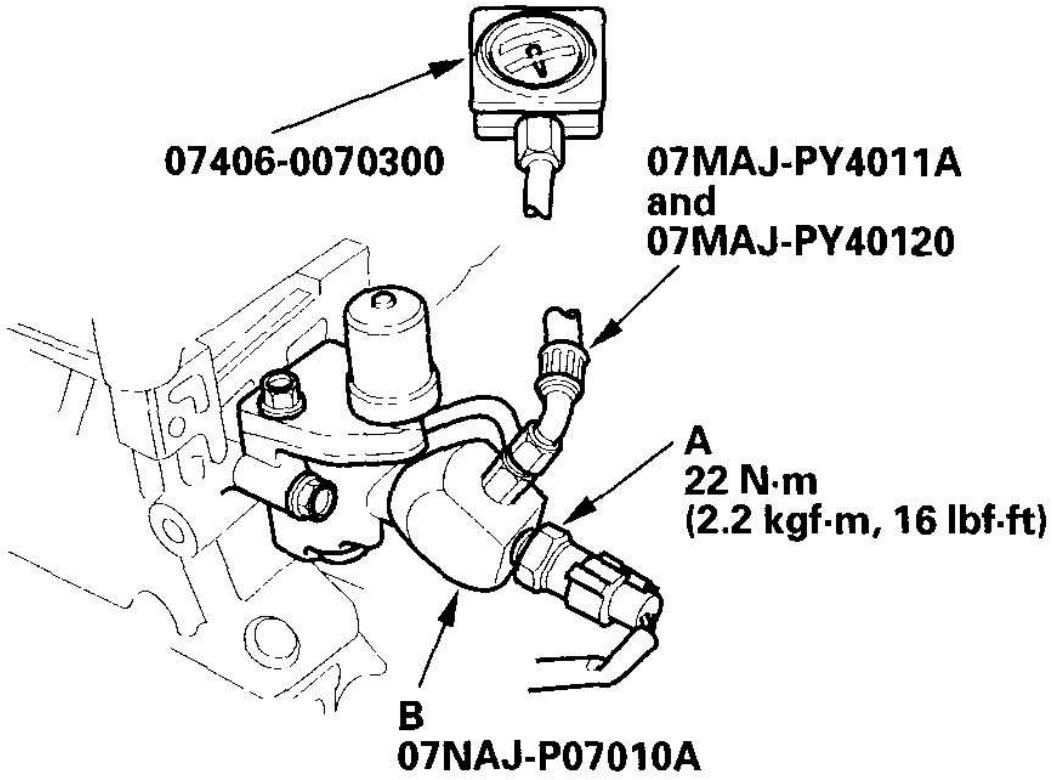

Fig. 13: Removing Rocker Arm Oil Pressure Switch And Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Disconnect the rocker arm oil control solenoid (VTEC solenoid valve) 1P connector.
8. Warm up the engine to normal operating temperature (cooling fan comes on).

9. Attach the battery positive cable to the rocker arm oil control solenoid (VTEC solenoid valve) terminal.
10. Start the engine and check oil pressure at an engine speed of 3,000 RPM.

    Is pressure above 200 kPa (2.0 kgf/cm^2 , 28 psi)?

    YES -Go to step 11.

    NO -Inspect the rocker arm oil control solenoid (VTEC solenoid valve) (see **ROCKER ARM OIL CONTROL SOLENOID (VTEC SOLENOID VALVE) REMOVAL/ INSPECTION**).
11. Disconnect the rocker arm oil pressure switch (VTEC oil pressure switch) 2P connector.
12. At the rocker arm oil pressure switch (VTEC oil pressure switch) side, check for continuity between the rocker arm oil pressure switch (VTEC oil pressure switch) 2P connector terminals No. 1 and No. 2 in the condition of step 10 .

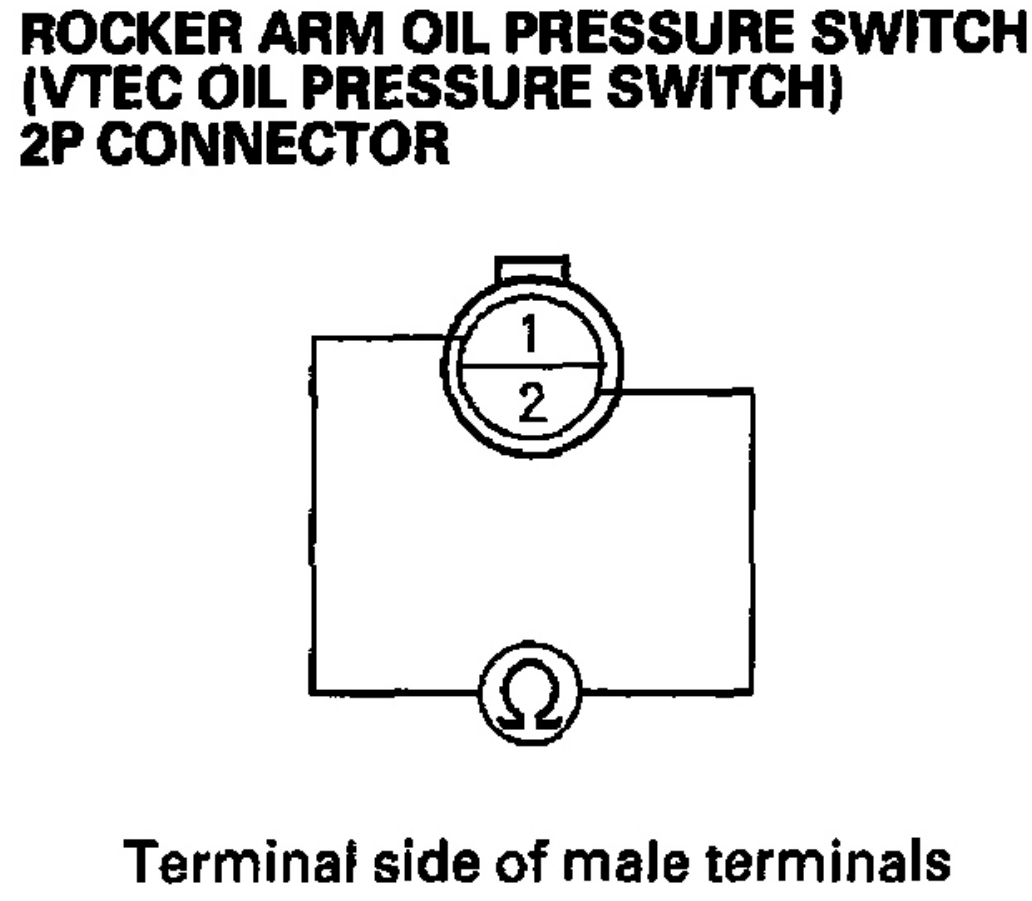

Fig. 14: Checking Continuity On Rocker Arm Oil Pressure Switch
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there continuity?

YES -Replace the rocker arm oil pressure switch (VTEC oil pressure switch) (see **ROCKER ARM OIL PRESSURE SWITCH (VTEC OIL PRESSURE SWITCH) REPLACEMENT**).

NO -Go to step 13.

13. Turn the ignition switch OFF.

14. Disconnect the battery terminals from the rocker arm oil control solenoid (VTEC solenoid valve) terminal connector.
15. Disconnect ECM connector C (31P).
16. Check for continuity between ECM connector terminal C10 and body ground.

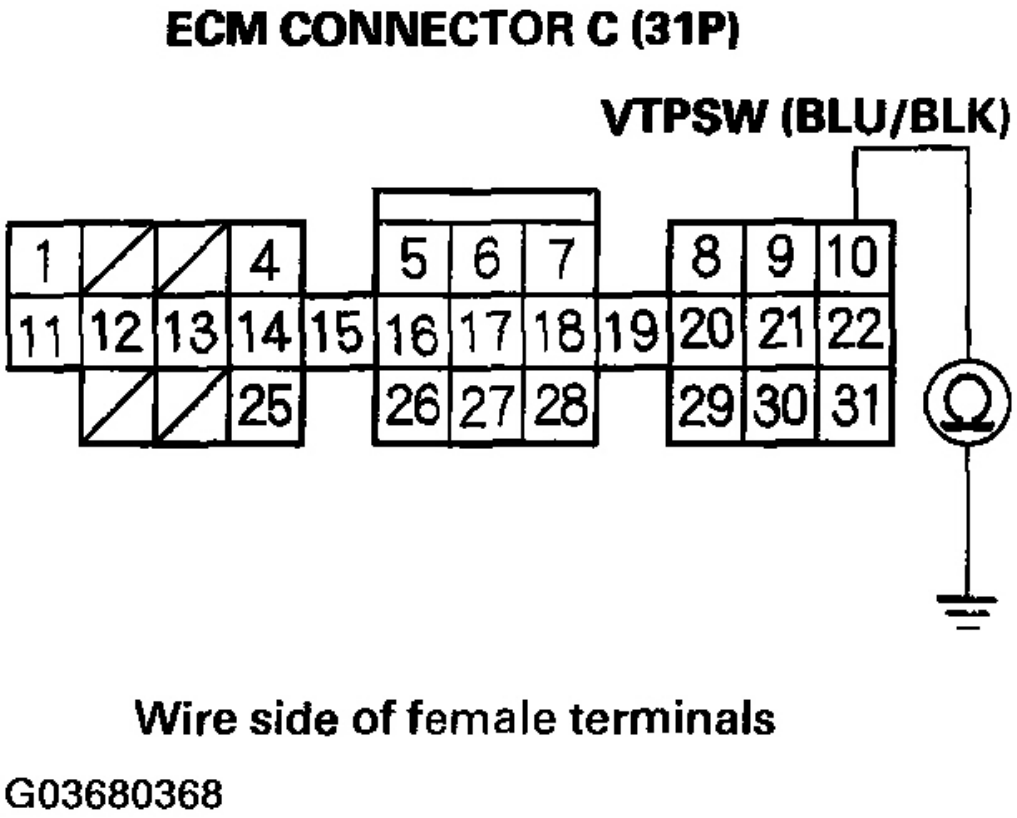

Fig. 15: Checking For Continuity Between ECM Connector Terminal C10 And Body Ground
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there continuity?

YES -Repair a short in the wire between the ECM (C10) and the

rocker arm oil pressure switch (VTEC oil pressure switch).

NO -Go to step 17.

17. Disconnect the ECM connector B (25P).
18. Check for continuity between ECM connector terminal B12 and body ground.

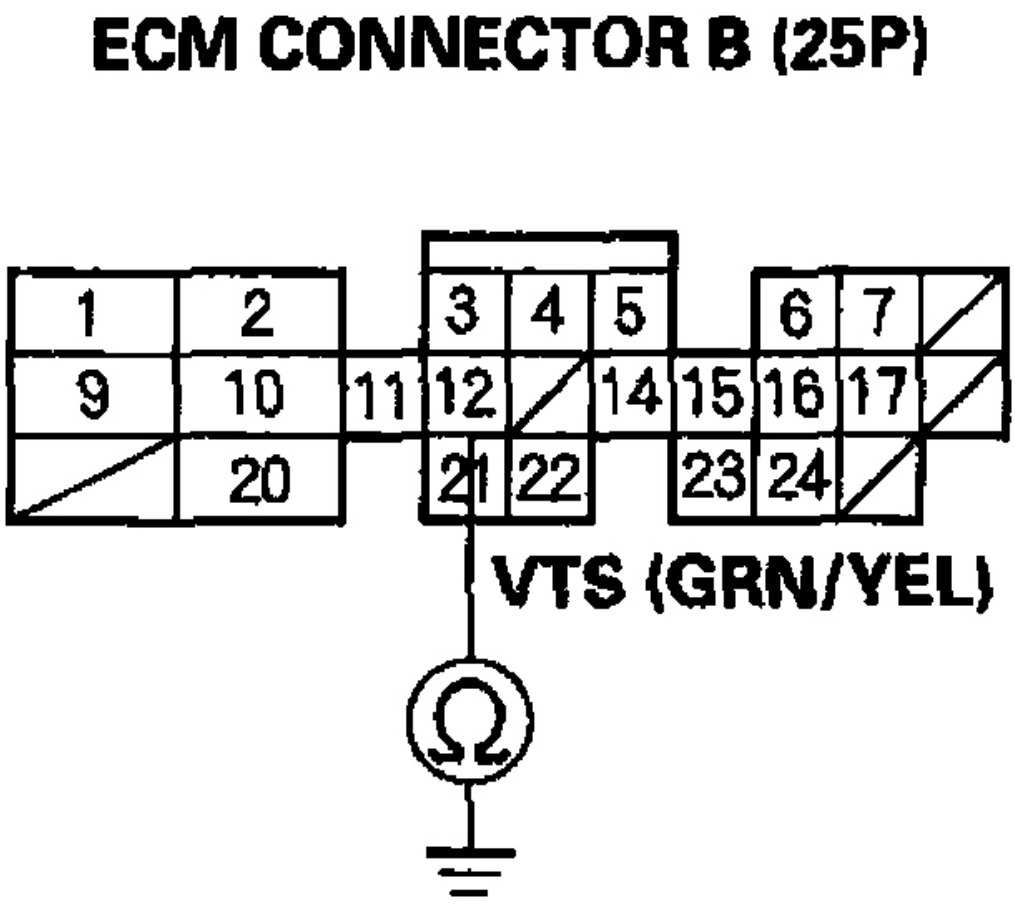

Fig. 16: Checking For Continuity Between ECM Connector Terminal B12 And Body Ground
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there continuity?

YES -Repair a short in the wire between the ECM (B12) and the rocker arm oil control solenoid (VTEC solenoid valve).

NO -Go to step 19.

19. Check for continuity between the rocker arm oil control solenoid (VTEC solenoid valve) harness 1P connector terminal and the ECM connector terminal B12.

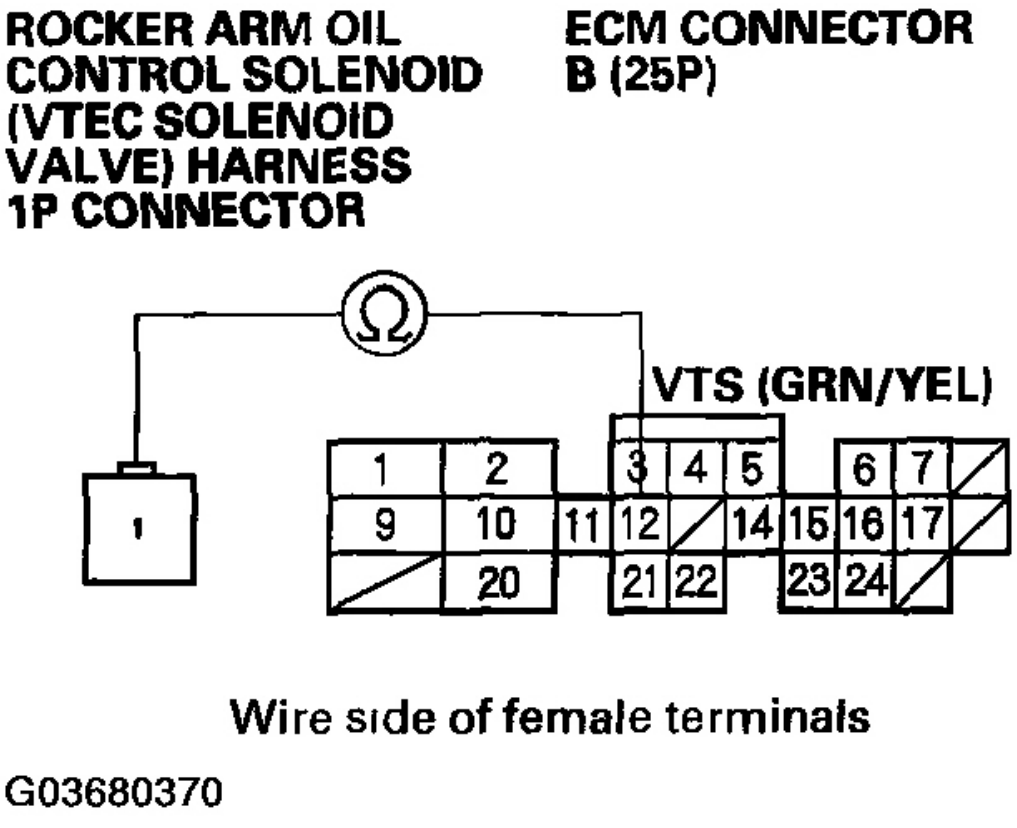

Fig. 17: Checking For Continuity Between Rocker Arm Oil Control Solenoid
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there continuity?

YES -Substitute a known-good ECM, then recheck 2000-2001 M/T models (see **HOW TO TROUBLESHOOT CIRCUITS AT THE ECM**), 2002-2006 M/T models and CVT model (see **ECM UPDATING AND SUBSTITUTION FOR TESTING-2006 M/T MODELS AND CVT MODEL**). If the symptom/indication goes away with a known-good ECM, replace the original ECM (see **ECM REPLACEMENT**).

NO -Repair an open in the wire between the ECM (B12) and the rocker arm oil control solenoid (VTEC solenoid valve).

DTC P2647: ROCKER ARM OIL PRESSURE SWITCH (VTEC OIL PRESSURE SWITCH) CIRCUIT HIGH VOLTAGE; - 2005-2006 MODELS

Special Tools Required

- Pressure gauge adapter 07NAJ-P07010A
- A/T low pressure gauge w/panel 07406-0070300
- A/T pressure hose, 2,210 mm 07MAJ-PY4011A
- A/T pressure hose adapter 07MAJ-PY40120

1. Do the engine control module (ECM) reset procedure (see **HDS CLEAR COMMAND**).
2. Start the engine.
3. Warm up the engine to normal operating temperature (cooling fan comes on).

Is DTC P2647 indicated?

YES -Go to step 4.

NO -Intermittent failure, system is OK at this time. Check for poor connections or loose wires at the rocker arm oil control solenoid

(VTEC solenoid valve) and the ECM.

4. Turn the ignition switch OFF.
5. Remove the rocker arm oil pressure switch (VTEC oil pressure switch) (A) and install the special tools as shown, then install the rocker arm oil pressure switch (VTEC oil pressure switch) (A) to the oil pressure gauge adapter (B).

NOTE: Install the part in the reverse order of removal with a new O-ring.

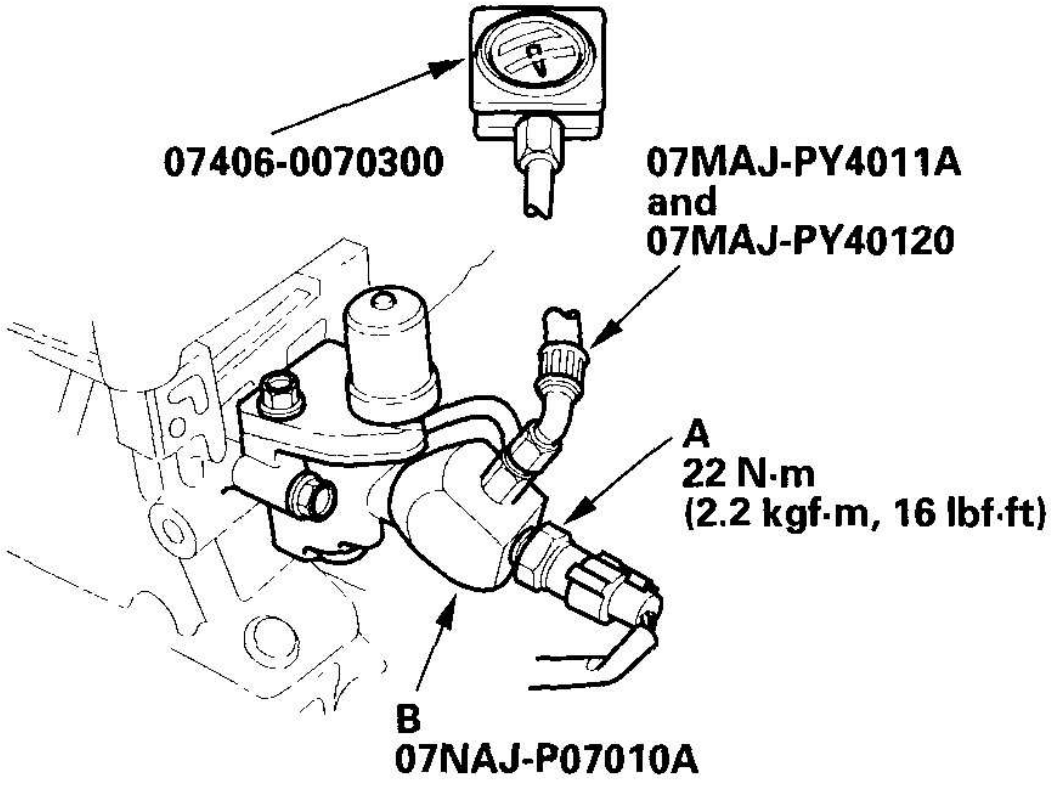

Fig. 18: Installing Rocker Arm Oil Pressure Switch And Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Warm up the engine to normal operating temperature (cooling fan comes on).
7. 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/cm^2 , 7 psi)?

   YES -Go to step 8.

   NO -Inspect the rocker arm oil control solenoid (VTEC solenoid valve) (see **ROCKER ARM OIL CONTROL SOLENOID (VTEC SOLENOID VALVE) REMOVAL/ INSPECTION**).
8. Disconnect the rocker arm oil pressure switch (VTEC oil pressure switch) 2P connector.
9. At the rocker arm oil pressure switch (VTEC oil pressure switch) side, check for continuity between the rocker arm oil pressure switch (VTEC oil pressure switch) 2P connector terminals No. 1 and No. 2.

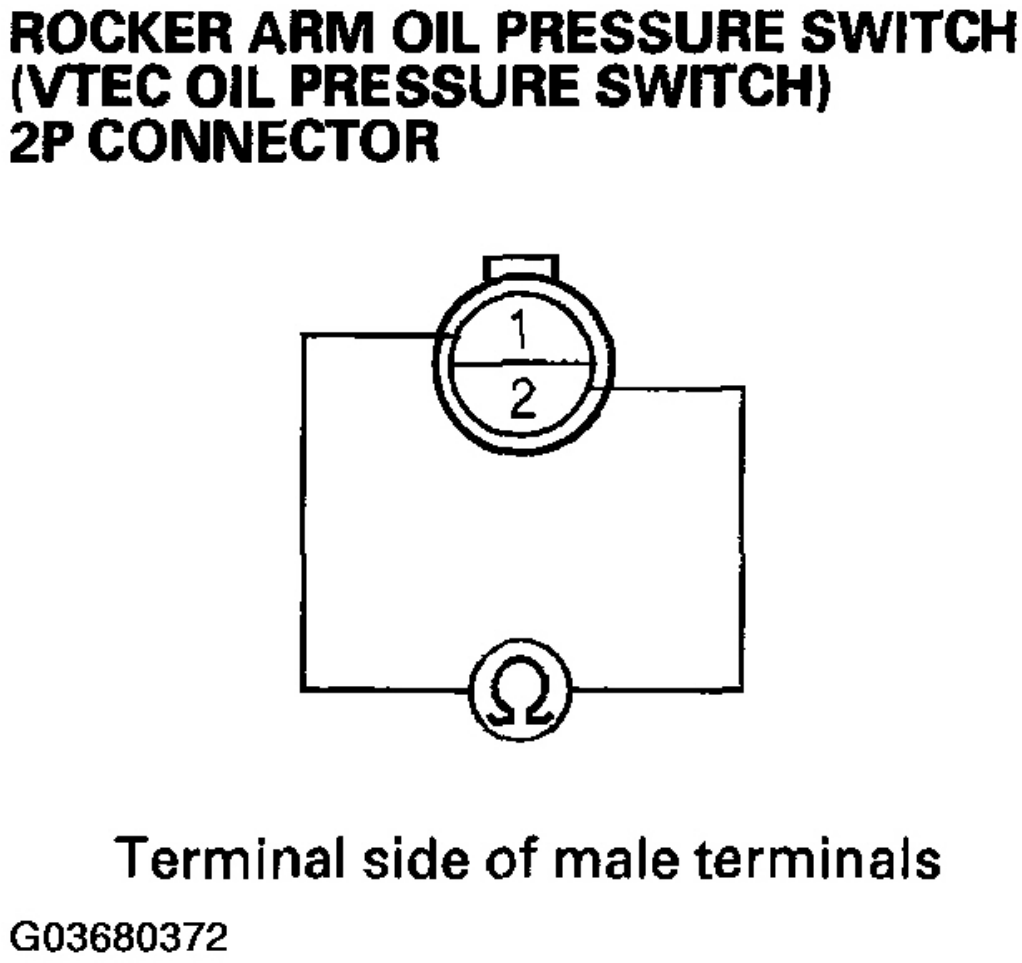

Fig. 19: Checking Continuity On Rocker Arm Oil Pressure Switch
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there continuity?

YES -Go to step 10.

NO -Replace the rocker arm oil pressure switch (VTEC oil pressure switch) (see **ROCKER ARM OIL PRESSURE SWITCH (VTEC OIL PRESSURE SWITCH) REPLACEMENT**).

10. Measure voltage between rocker arm oil pressure switch (VTEC oil

pressure switch) 2P connector terminal No. 1 and body ground.

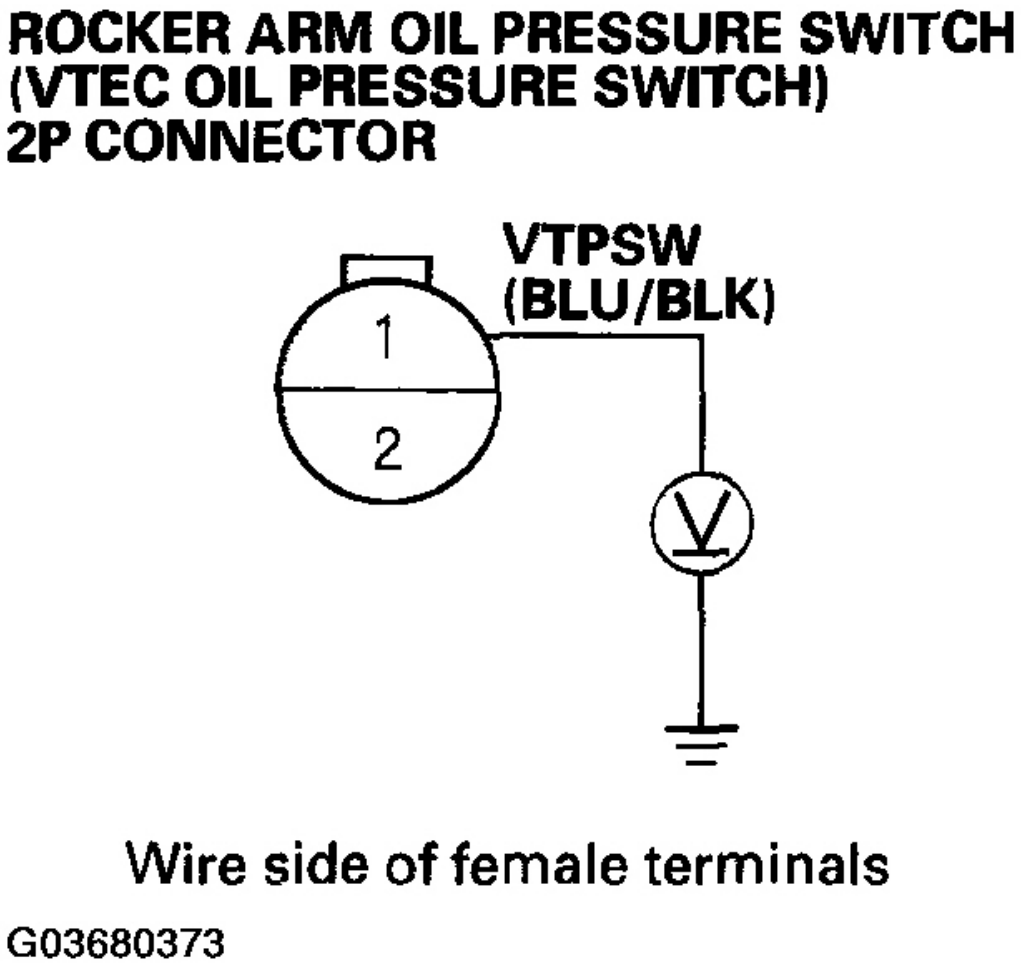

Fig. 20: Measuring Voltage Between Rocker Arm Oil Pressure Switch
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there battery voltage?

YES -Repair an open in the wire between the rocker arm oil pressure switch (VTEC oil pressure switch) and G101.

NO -Go to step 11.

11. Measure voltage between ECM connector terminal C10 and body ground.

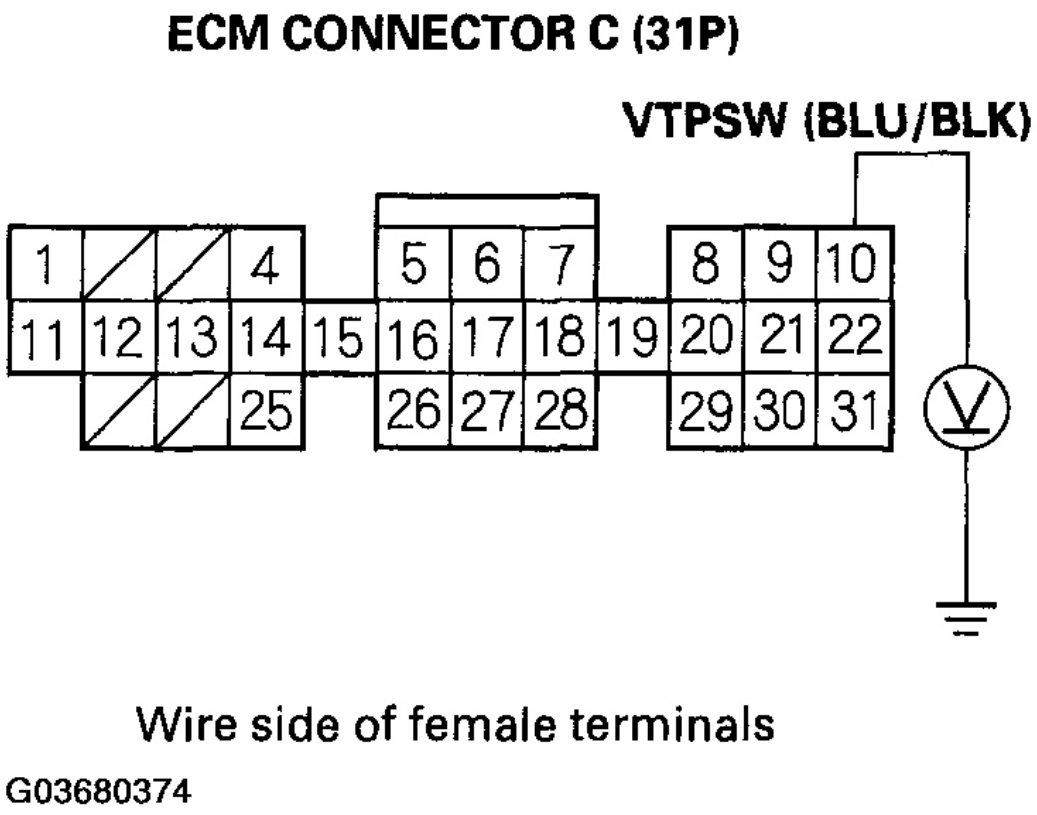

Fig. 21: Measuring Voltage Between ECM Connector Terminal C10 And Body Ground
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there battery voltage?

YES -Repair an open in the wire between the ECM (C10) and the rocker arm oil pressure switch (VTEC oil pressure switch).

NO -Substitute a known-good ECM, then recheck 2000-2001 M/T models (see **HOW TO TROUBLESHOOT CIRCUITS AT THE ECM**), 2002-2006 M/T models and CVT model (see **ECM UPDATING AND SUBSTITUTION FOR TESTING-2006 M/T**

MODELS AND CVT MODEL). If the symptom/indication goes away with a known-good ECM, replace the original ECM (see **ECM REPLACEMENT**).

ROCKER ARM OIL CONTROL SOLENOID (VTEC SOLENOID VALVE) REMOVAL/ INSPECTION

1. Remove the engine cover.
2. Disconnect the 1P connector from the rocker arm oil control solenoid (VTEC solenoid valve).
3. Measure resistance between the terminal and body ground.

   Resistance: 14-30 ohm.

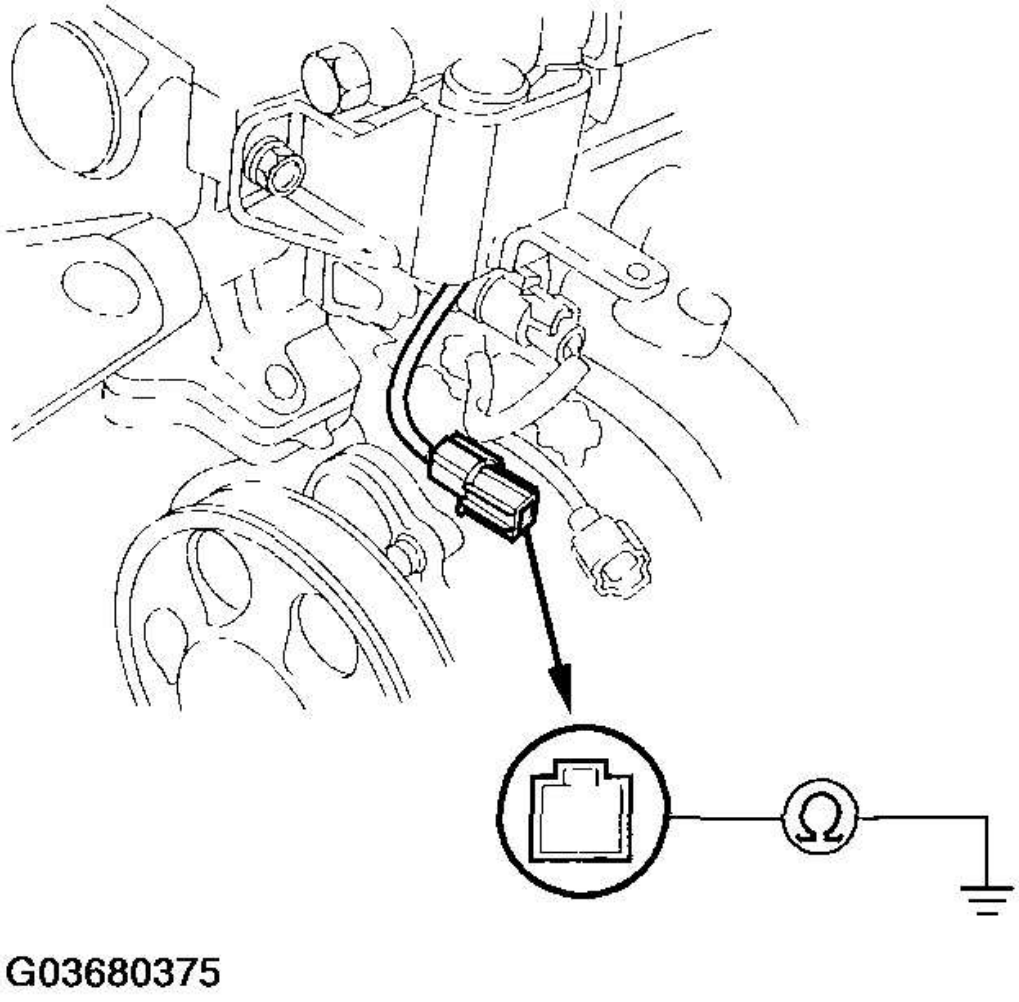

Fig. 22: Measuring Resistance Between Terminal And Body Ground
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

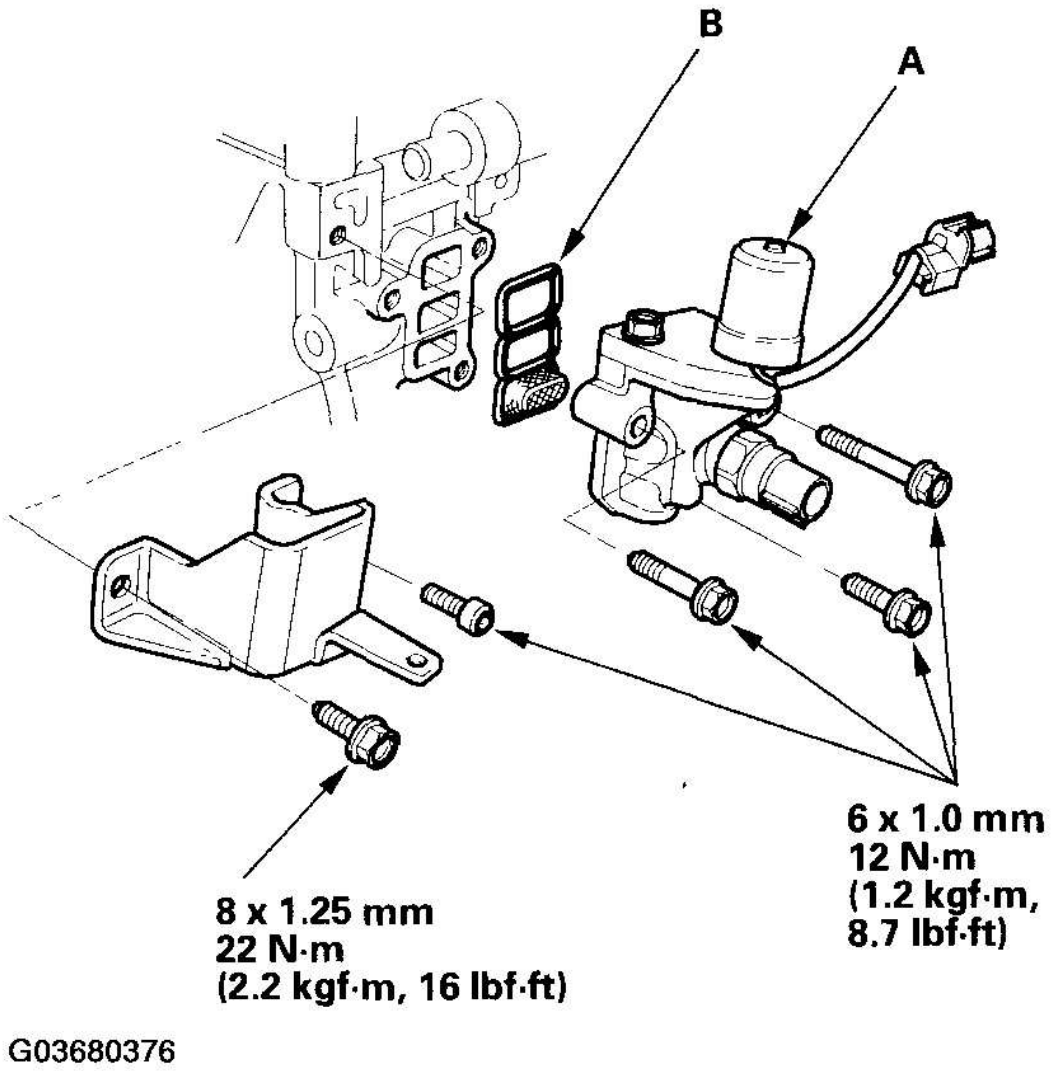

Fig. 23: Replacing Engine Oil Filter/O-Ring And Engine Oil With Torque Specificatons
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Install the rocker arm oil control solenoid (VTEC solenoid valve) in the reverse order of removal.

ENGINE COMPRESSION INSPECTION

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

2. Turn the ignition switch OFF.
3. Turn the battery module switch OFF.
4. Remove the engine cover.
5. Disconnect the three injector connector.
6. Remove the three ignition coils (see **IGNITION COIL REMOVAL/INSTALLATION**).
7. Remove the three spark plugs.
8. Attach the compression gauge to a spark plug hole.

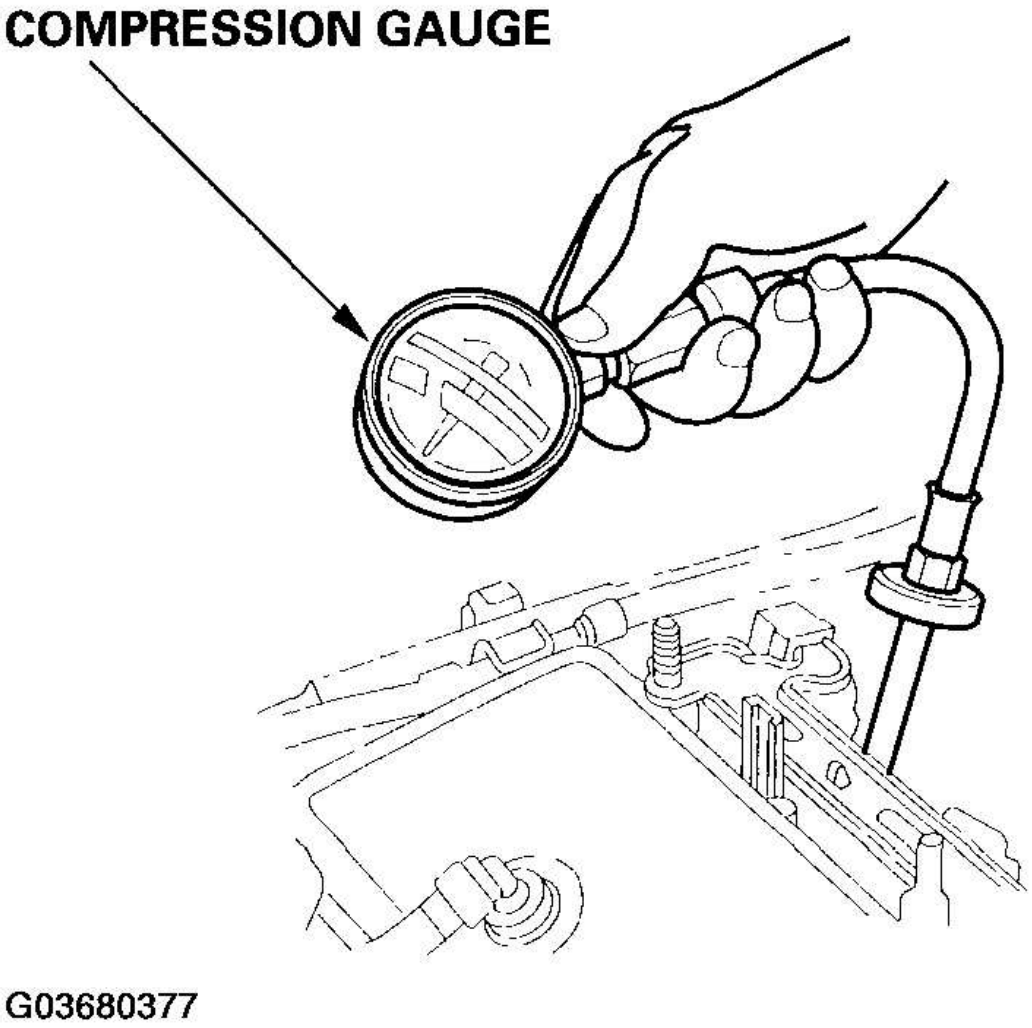

Fig. 24: Attaching Compression Gauge To Spark Plug Hole
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Open the throttle fully, crank the engine with the starter motor and measure the compression.

   Compression Pressure:

   Above 880 kPa (9.0kgf/cm^2 ,128 psi)

10. Measure the compression on the remaining cylinders.

    Maximum Variation:

    Within 200 kPa (2.0kgf/cm^2 ,28 psi)

11. If the compression is not within specifications, check the following items, then remeasure the compression.
    - Damaged or worn valves and seals
    - Damaged cylinder head gasket
    - Damaged or worn piston rings
    - Damaged or worn piston and cylinder bore
12. Remove the compression gauge from the spark plug hole.
13. Install the three spark plugs.
14. Install the three ignition coils (see **IGNITION COIL REMOVAL/INSTALLATION**).
15. Connect the three injector connectors.
16. Turn the battery module switch ON.
17. Reset the ECM using the HDS (see **HDS CLEAR COMMAND**).
18. Do the ECM idle learn procedure (see **ECM IDLE LEARN PROCEDURE**).

ROCKER ARM OIL PRESSURE SWITCH (VTEC OIL PRESSURE SWITCH) REPLACEMENT

1. Disconnect the rocker arm oil pressure switch (VTEC oil pressure switch) connector, then remove the rocker arm oil pressure switch (VTEC oil pressure) switch (A).

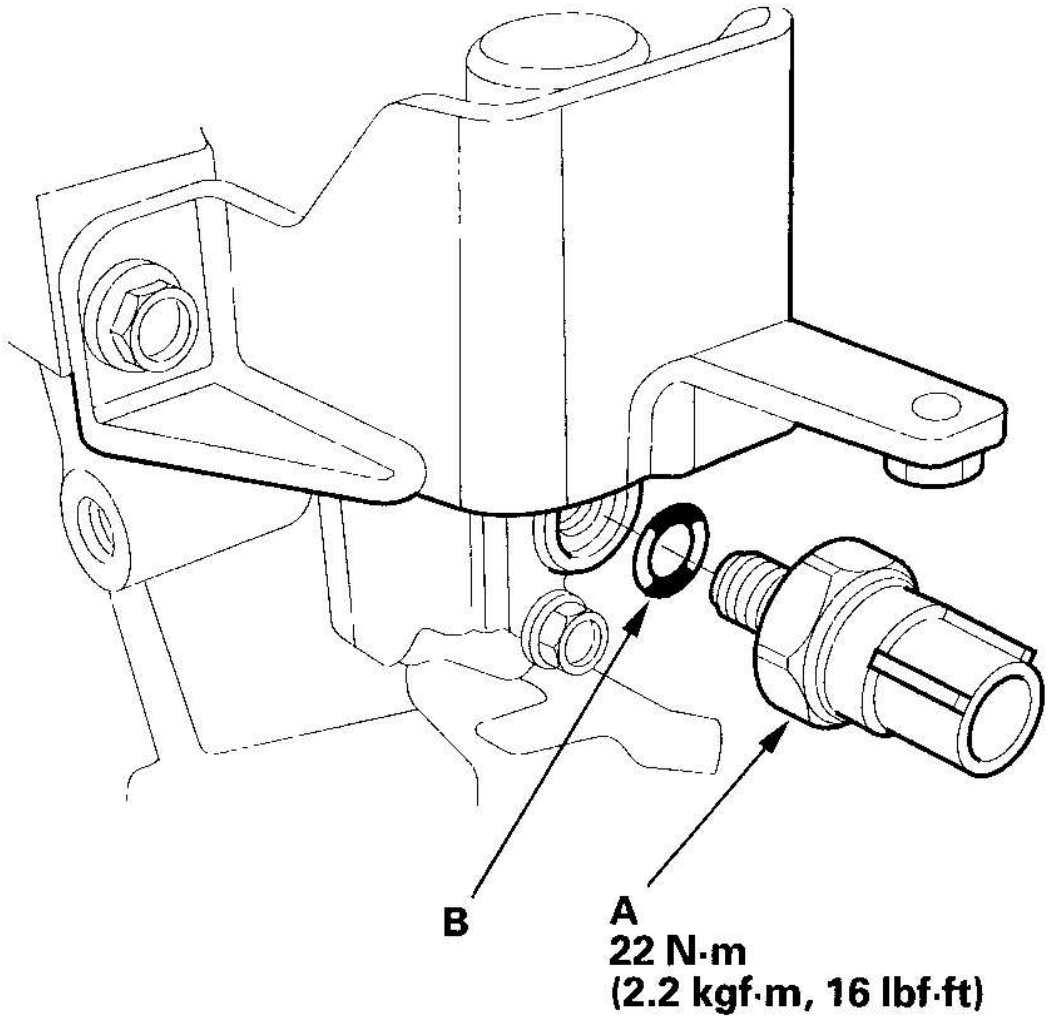

Fig. 25: Disconnecting Rocker Arm Oil Pressure Switch And Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Install the rocker arm oil pressure switch (VTEC oil pressure switch) with a new O-ring (B).

VTEC ROCKER ARM TEST

Special Tools Required

- Air pressure regulator 07AAJ-PNAA100
- VTEC air adapter 07VAJ-P8A010A

1. Start the engine and let it run for 5 minutes, then turn the ignition switch OFF.
2. Remove the cylinder head cover (see **CYLINDER HEAD COVER REMOVAL**).
3. Set the No. 1 piston at top dead center (TDC) (see **VALVE CLEARANCE ADJUSTMENT**).
4. Move the primary rocker arm (A) for No. 1 cylinder. The primary rocker arm should move independently of the secondary rocker arm (B).
   - If the primary rocker arm does not move, remove the primary and secondary rocker arms as an assembly, and check that the piston in the secondary rocker arm moves smoothly.
   - If any rocker arm needs replacing, replace the primary and secondary rocker arms as an assembly.

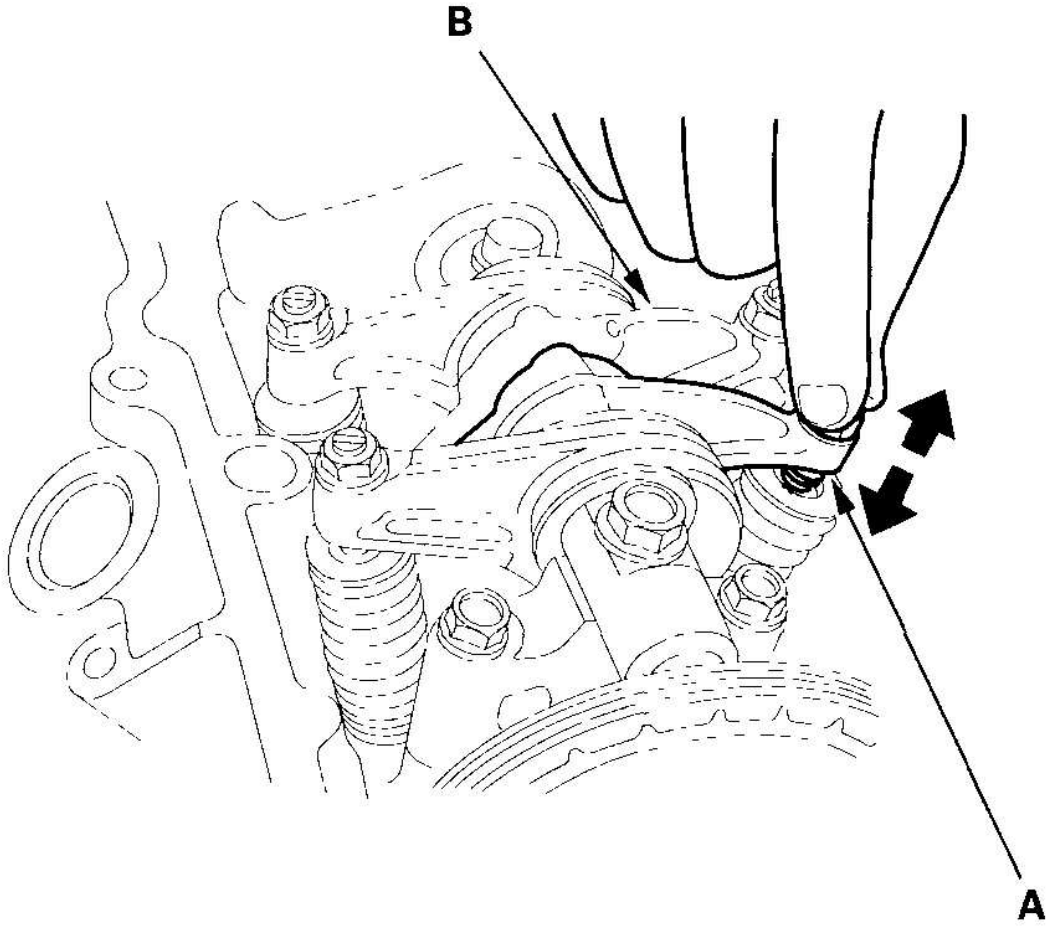

Fig. 26: Replacing Primary And Secondary Rocker Arms Assembly
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Repeat step 4 on the remaining primary rocker arms with each piston at TDC. When all the primary rocker arms pass the test, go to step 6.
6. Check that the air pressure on the shop air compressor gauge indicates over 400 kPa (4 kgf/cm^2 , 57 psi).
7. Inspect the valve clearance (see **VALVE CLEARANCE ADJUSTMENT**).
8. Remove a rocker shaft mounting bolt (A), then connect the VTEC air

adapter (B) and the VTEC air pressure regulator (C) to the bolt hole.

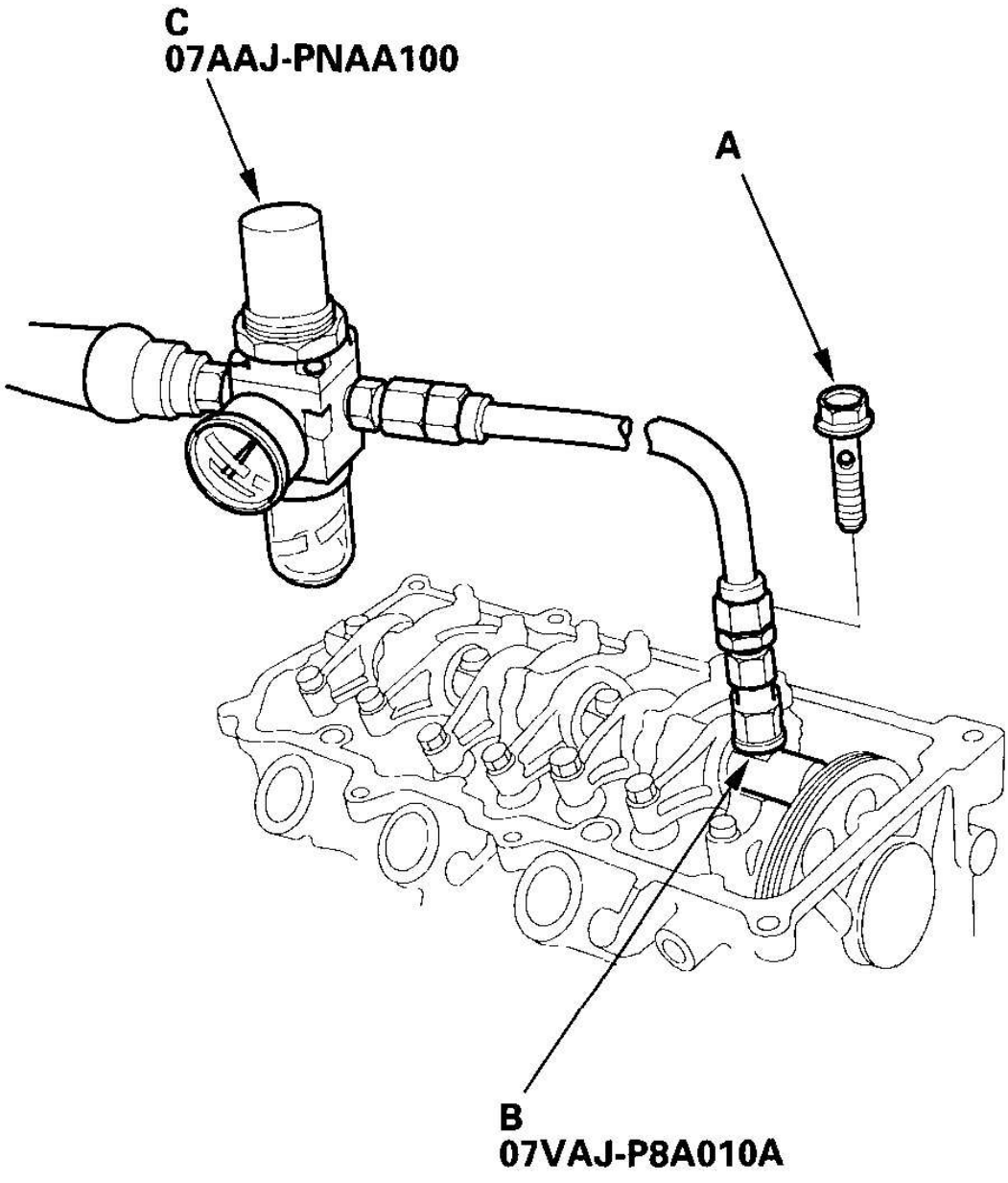

Fig. 27: Removing Rocker Shaft Mounting Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

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

Specified Air Pressure:

250 kPa (2.5 kgf/cm^2 ,36 psi)

10. With the specified air pressure applied and the piston at TDC, move the primary rocker arm (A). The primary rocker arm and secondary rocker arm (B) should move together. If the primary and secondary rocker arms do not move together, replace the rocker arms as a set.

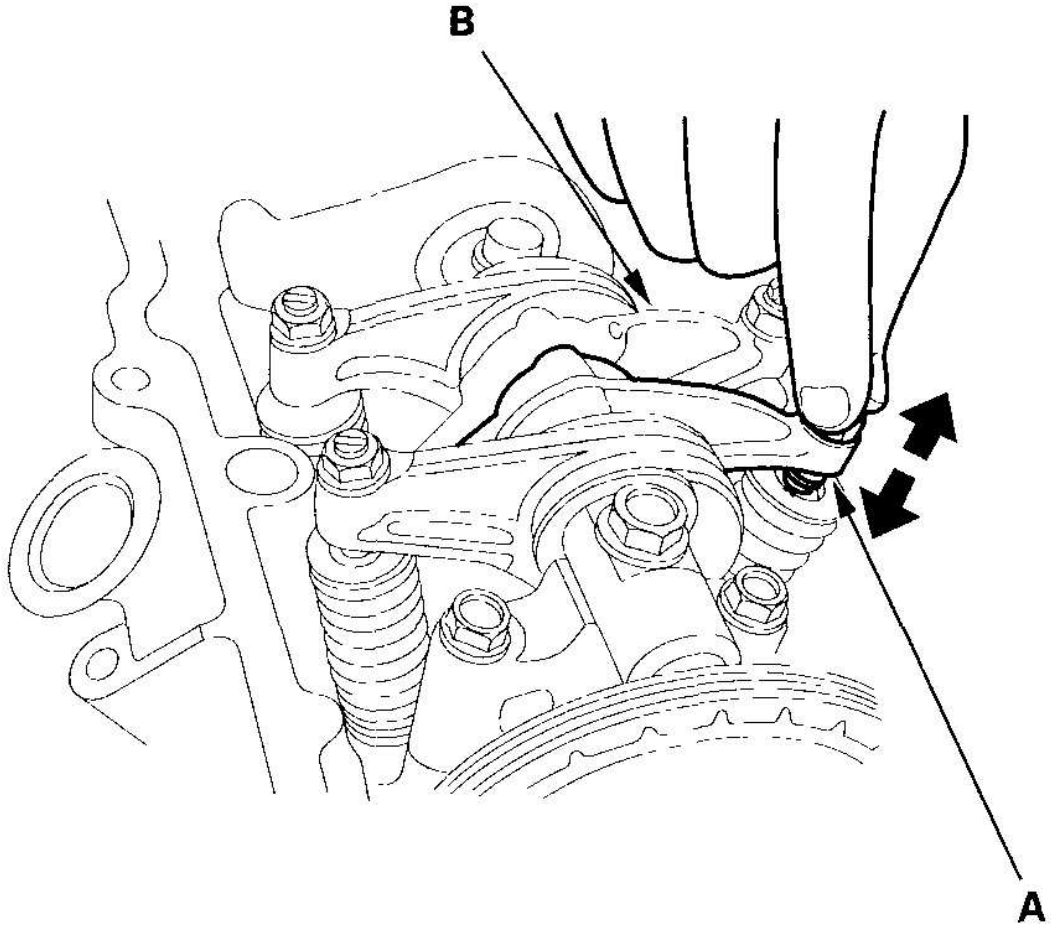

Fig. 28: Identifying Rocker Arm
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Repeat step 9 and 10 for the remaining cylinders. Be sure to set the cylinder's piston at TDC before beginning work.
12. Remove the special tools.
13. Tighten the rocker shaft mounting bolt to 22 N.m (2.2 kgf.m, 16 lbf.ft)
14. Install the cylinder head cover (see **CYLINDER HEAD COVER INSTALLATION**).

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 (see **CYLINDER HEAD COVER REMOVAL**).
2. Set the No. 1 piston at top dead center (TDC). No. 1 piston TDC mark (A) on the camshaft sprocket should align with the cylinder head surface.

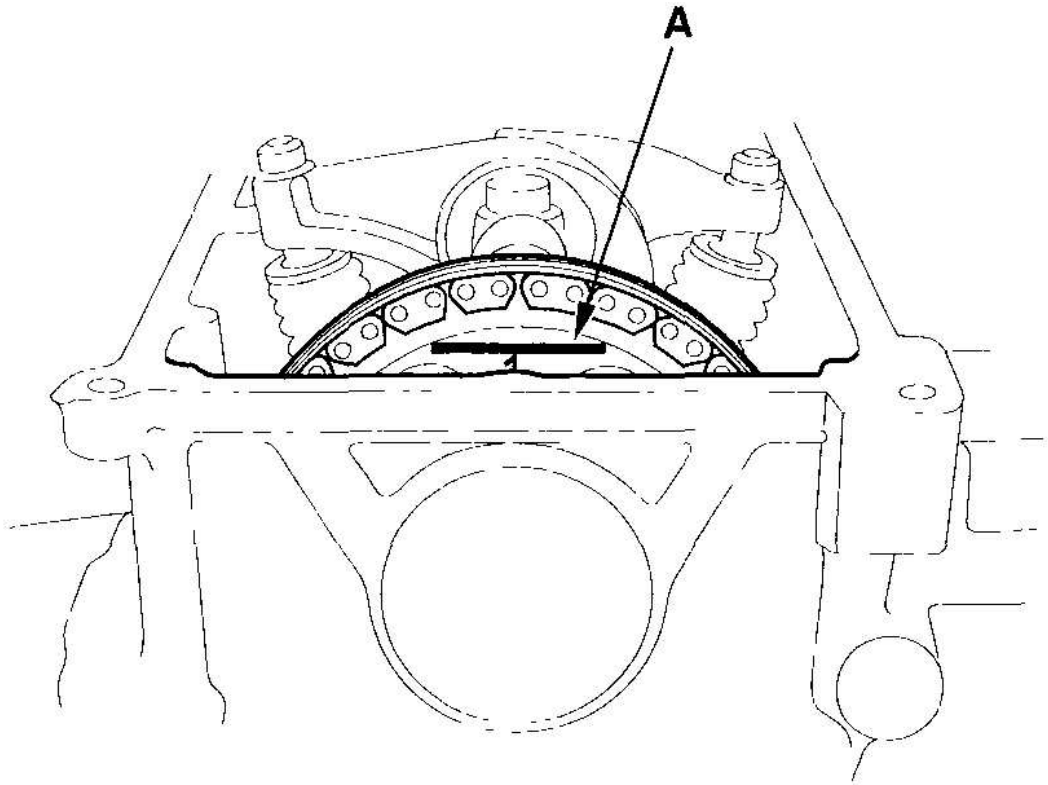

Fig. 29: Aligning TDC Mark (A) On The Camshaft Sprocket
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

Intake: 0.18-0.22 mm (0.007-0.009 in.)

Exhaust: 0.21-0.25 mm (0.008-0.010 in.)

Adjusting screw location:

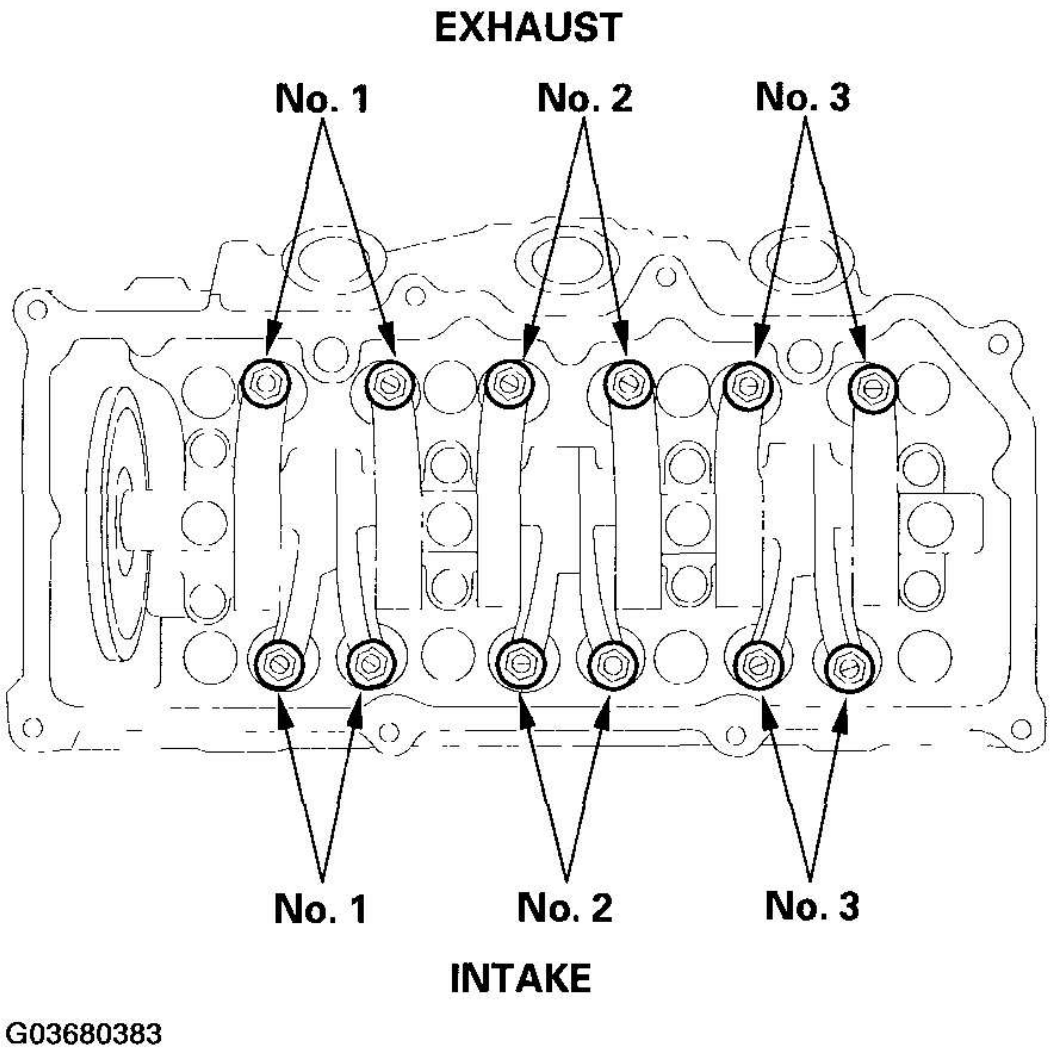

Fig. 30: Identifying Valve Adustments
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

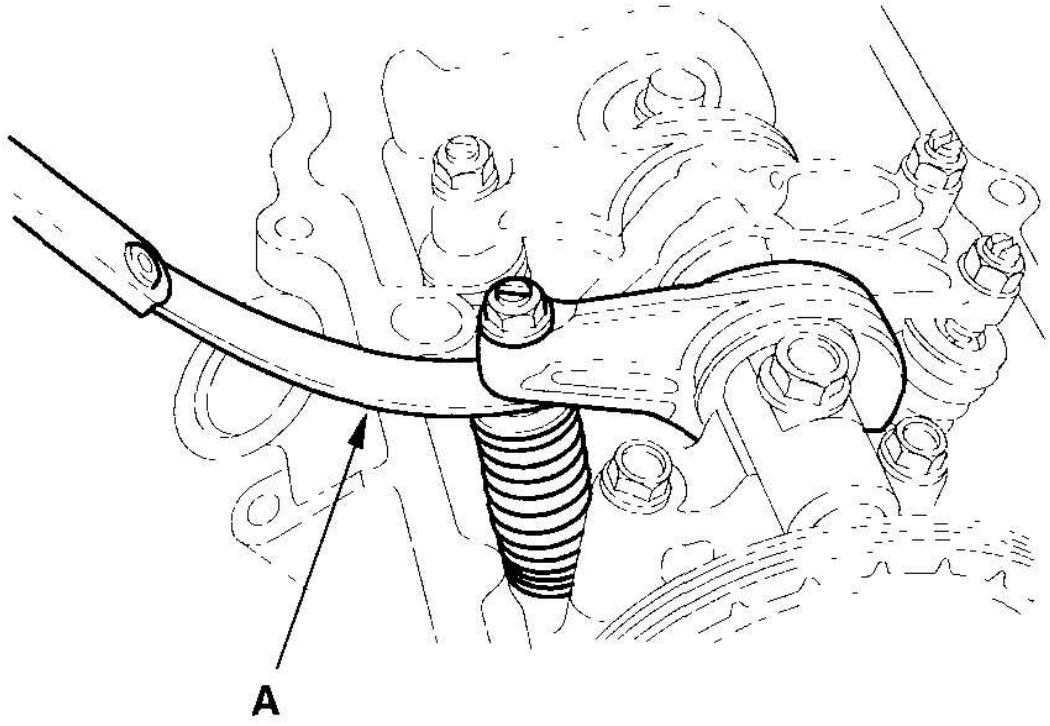

Fig. 31: Installing Feeler Gauge Between Adjusting Screw And End Of Valve Stem
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.

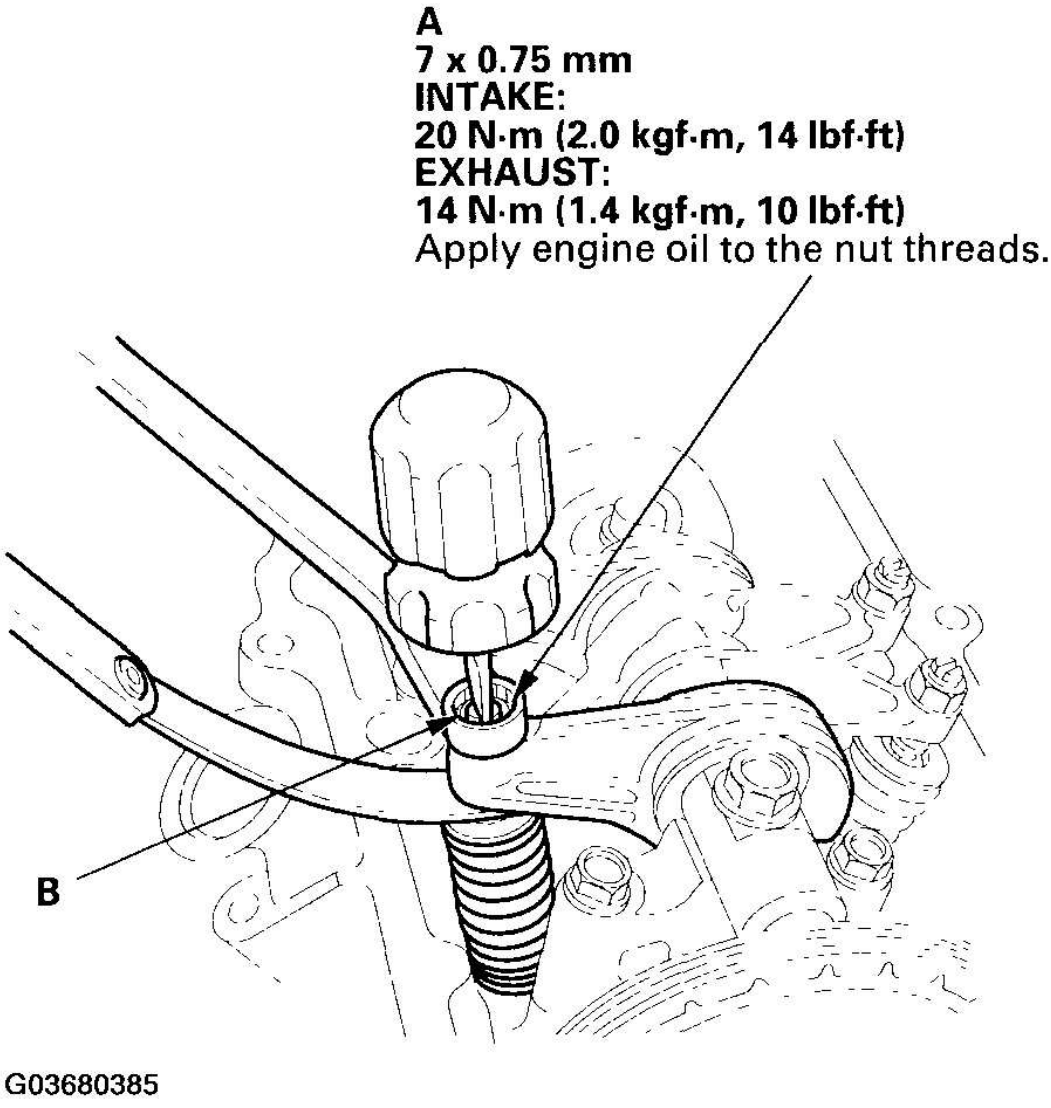

Fig. 32: Tightening Adjusting Screw And Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Tighten the locknut and recheck the clearance. Repeat the adjustment, if necessary.
7. Rotate the crankshaft 240° clockwise (camshaft sprocket turn 120°). The second TDC mark (A) should be aligned with the cylinder head surface.

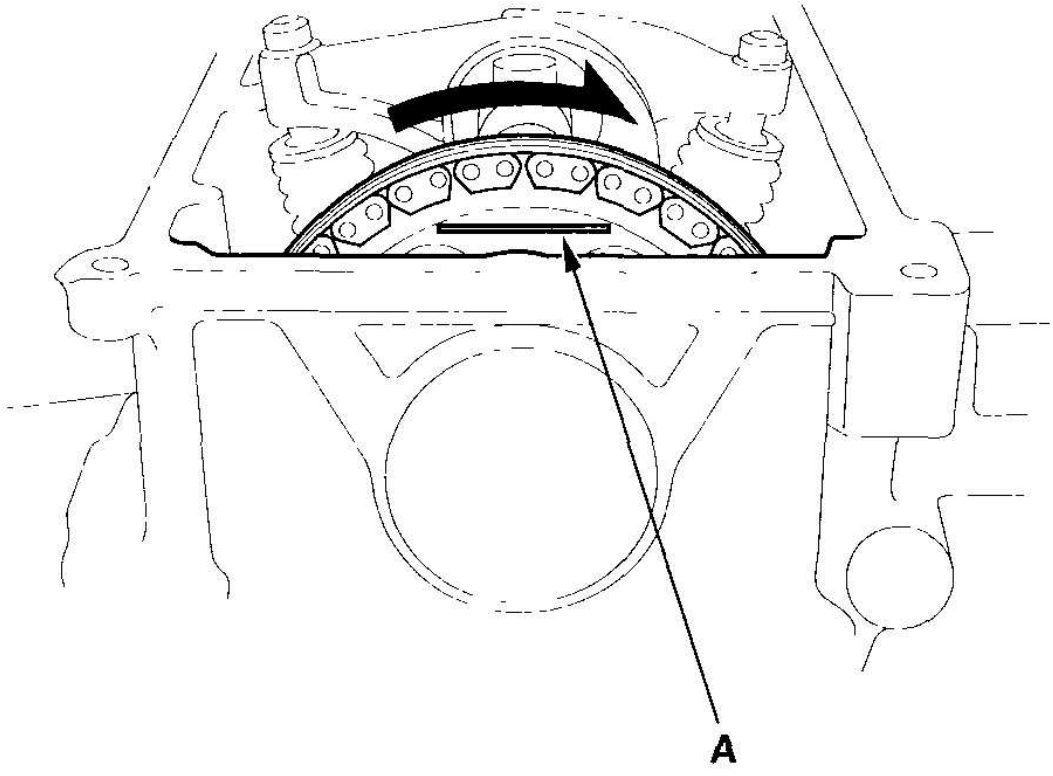

Fig. 33: Identifying TDC Mark On Camshaft Sprocket
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Check and, if necessary, adjust the valve clearance on No. 3 cylinder.
9. Rotate the crankshaft 240° clockwise (camshaft sprocket turn 120°). The third TDC mark should be aligned with the cylinder head surface.
10. Check and, if necessary, adjust the valve clearance on No. 2 cylinder.
11. Install the cylinder head cover (see **CYLINDER HEAD COVER INSTALLATION**).

CRANKSHAFT PULLEY REMOVAL AND INSTALLATION

Special Tools Required

- Holder handle 07JAB-001020B

- Holder attachment, HEX 50 mm, offset 07MAB-PY3010A
- Socket, 17 mm 07JAA-001010A or a commercially available 17 mm socket

REMOVAL

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

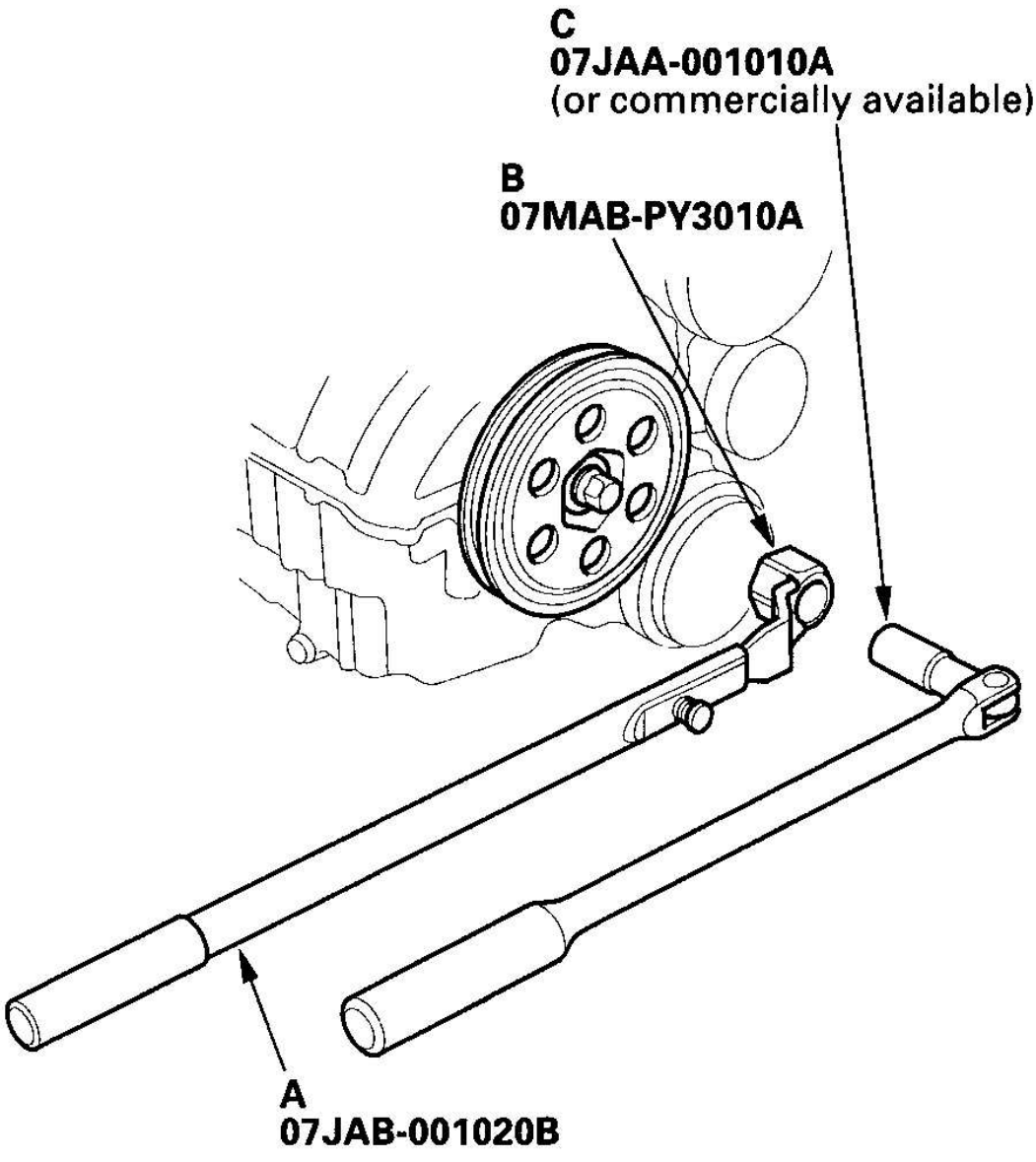

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Fig. 34: Removing Pulley With Holder Handle
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Remove the bolt with a heavy-duty 17 mm socket (C) and breaker bar, then remove the crankshaft pulley.

INSTALLATION

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

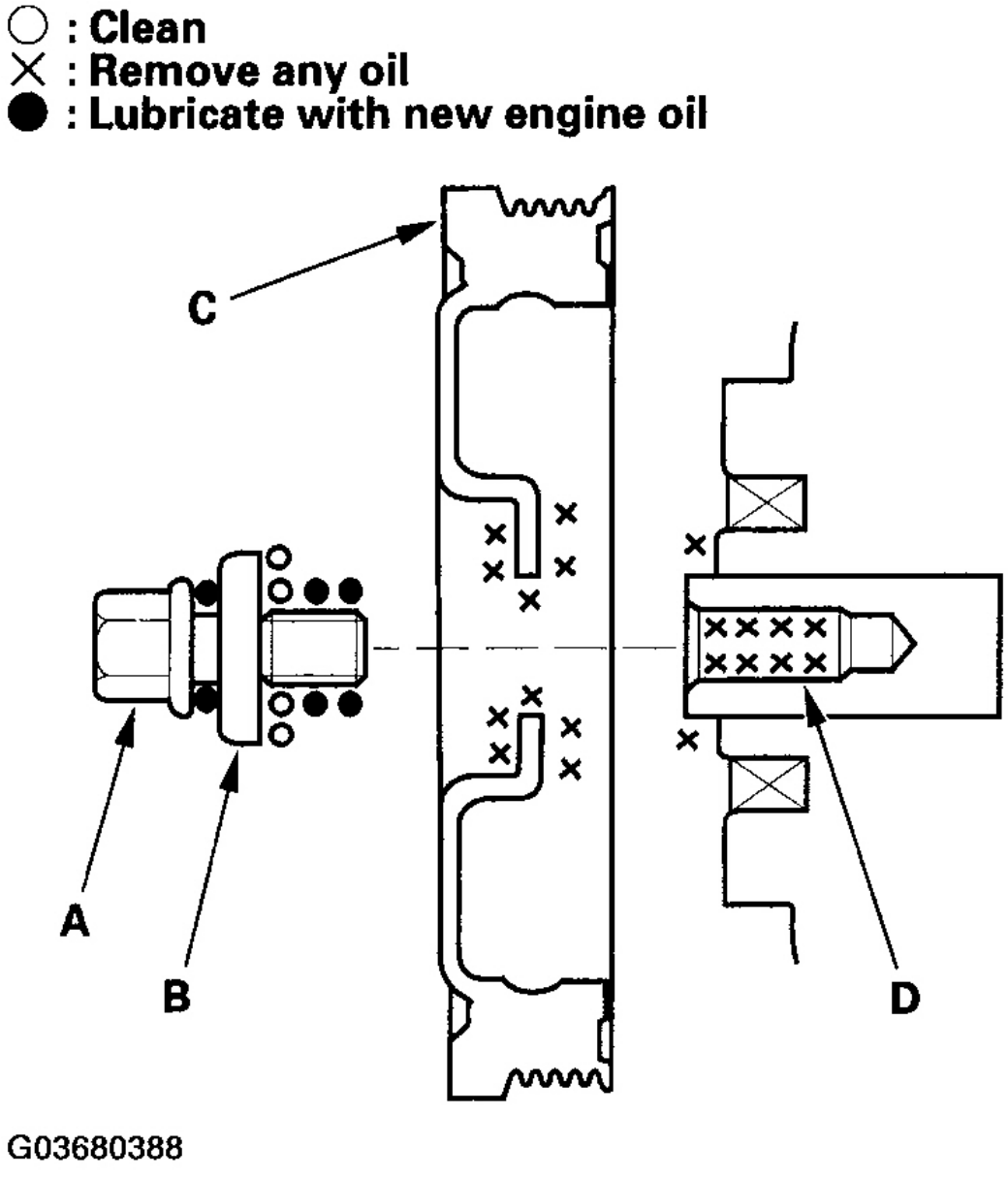

Fig. 35: Identifying Lubrication Points
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Install the crankshaft pulley, and tighten the bolt to 20 N.m (2.0 kgf.m, 14 lbf.ft).
3. Tighten the pulley bolt an additional 90°.

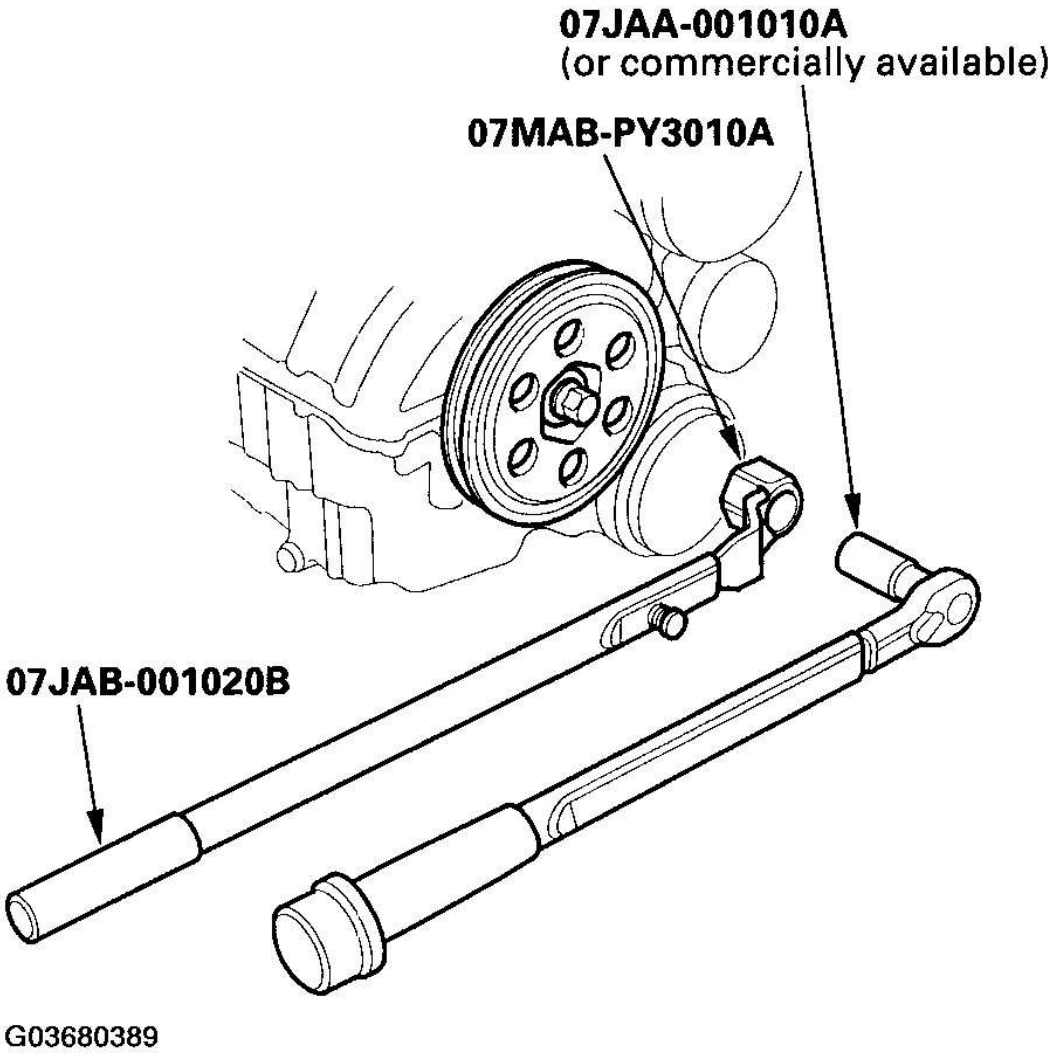

Fig. 36: Installing Crankshaft Pulley
Courtesy of AMERICAN HONDA MOTOR CO., INC.

CAM CHAIN REMOVAL

Special Tools Required

- Holder handle 07JAB-001020B
- Holder attachment, HEX 50 mm offset 07MAB-PY3010A
- Socket, 17 mm 07JAA-001010A or a commercially available 17 mm socket

Engine removal is required before removing the cam chain.

NOTE:

- **To avoid damaging the wires and terminals, unplug the wiring connectors carefully while holding the connector portion.**
- **Mark all wiring and hoses to avoid mis-connection. Also, be sure that they do not contact other wiring or hoses, or interfere with other parts.**

1. Remove the engine (see **ENGINE REMOVAL**).
2. Remove the cylinder head (see **CYLINDER HEAD COVER REMOVAL**).
3. Remove the idler pulley bracket mounting bolt.

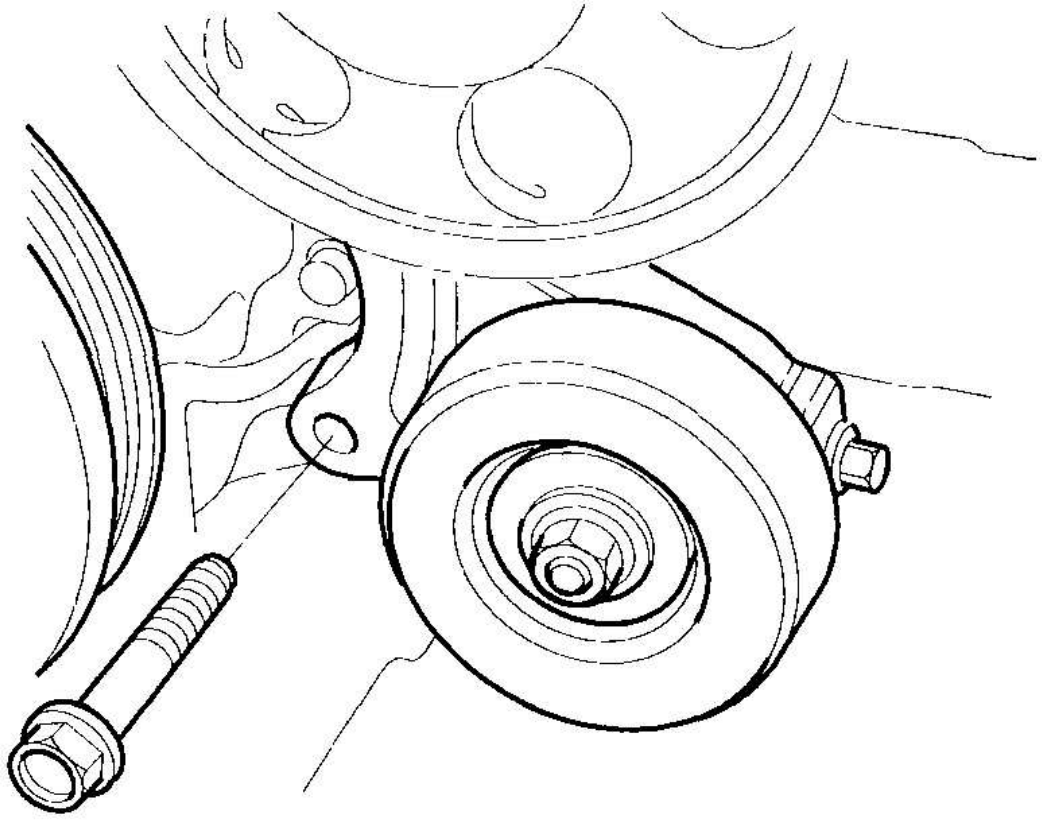

Fig. 37: Removing Idler Pulley Bracket Mounting Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Remove the water pump (see **WATER PUMP INSPECTION**).
5. Hold the pulley with holder handle (A) and holder attachment (B).

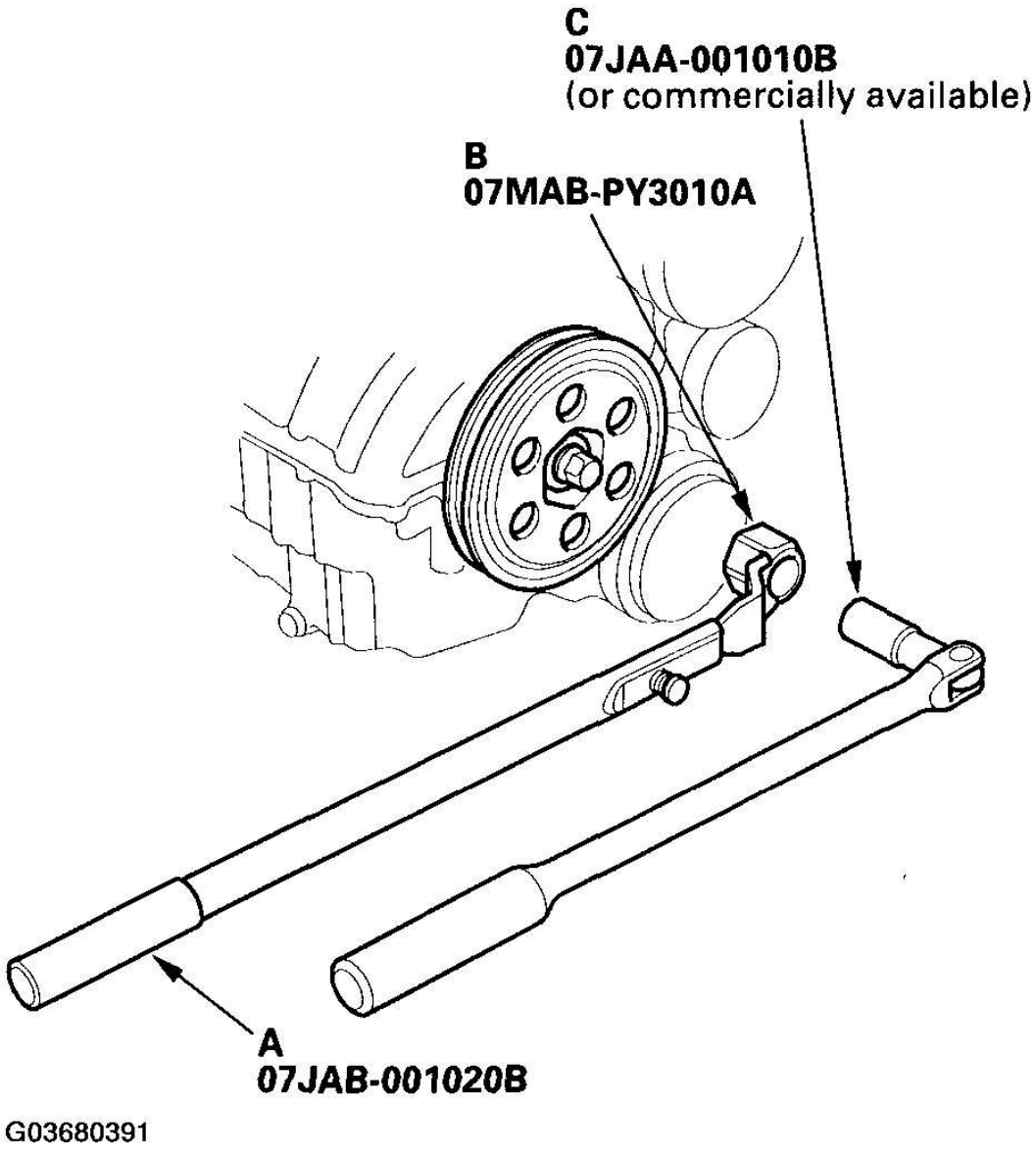

Fig. 38: Holding Pulley With Holder Handle
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Remove the bolt with a heavy-duty 17 mm socket (C) and breaker bar, then remove the crankshaft pulley.
7. 2000-2003 models: Remove the engine oil cooler bypass hoses.

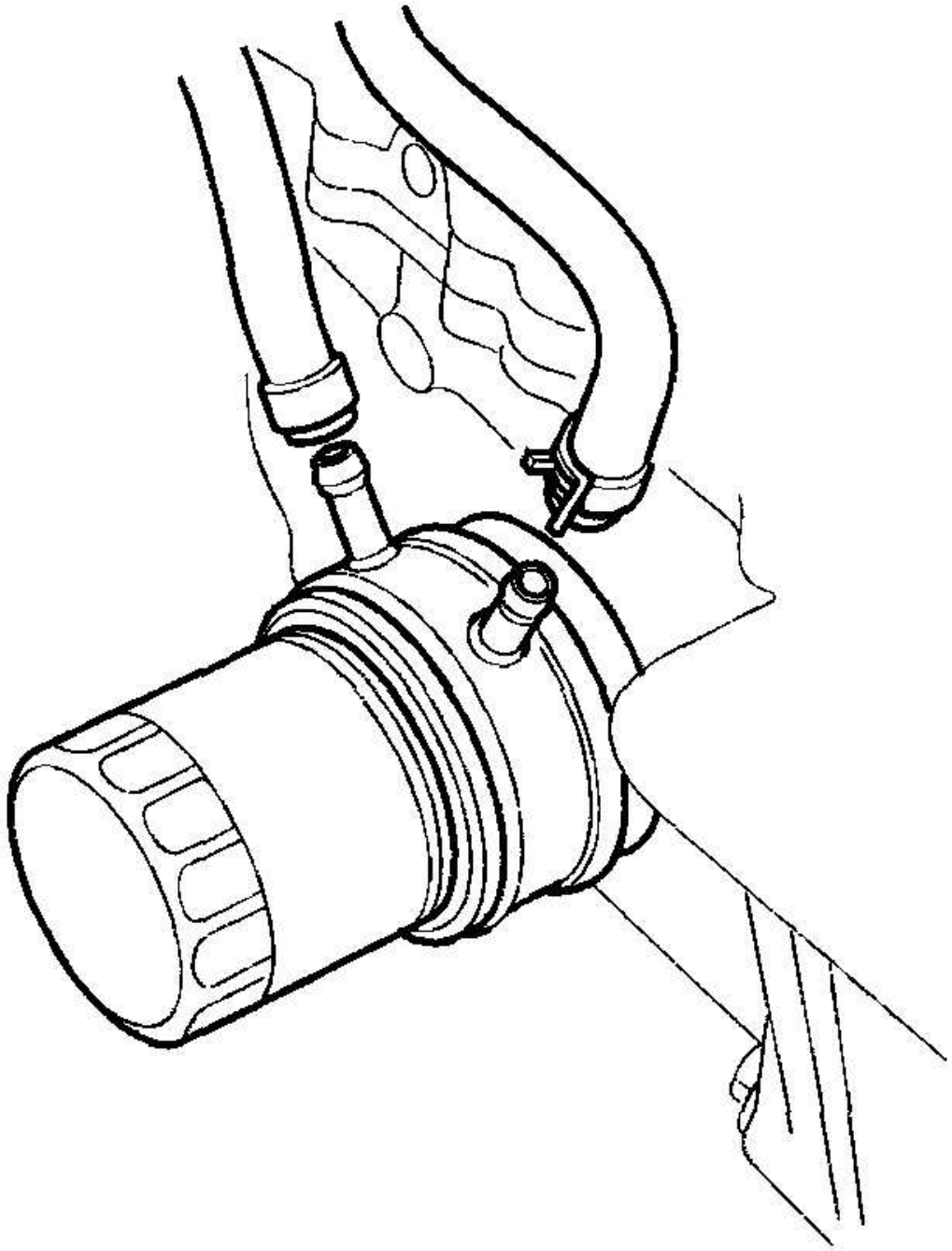

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Fig. 39: Removing Engine Oil Cooler Bypass Hoses

Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Remove the oil pan.

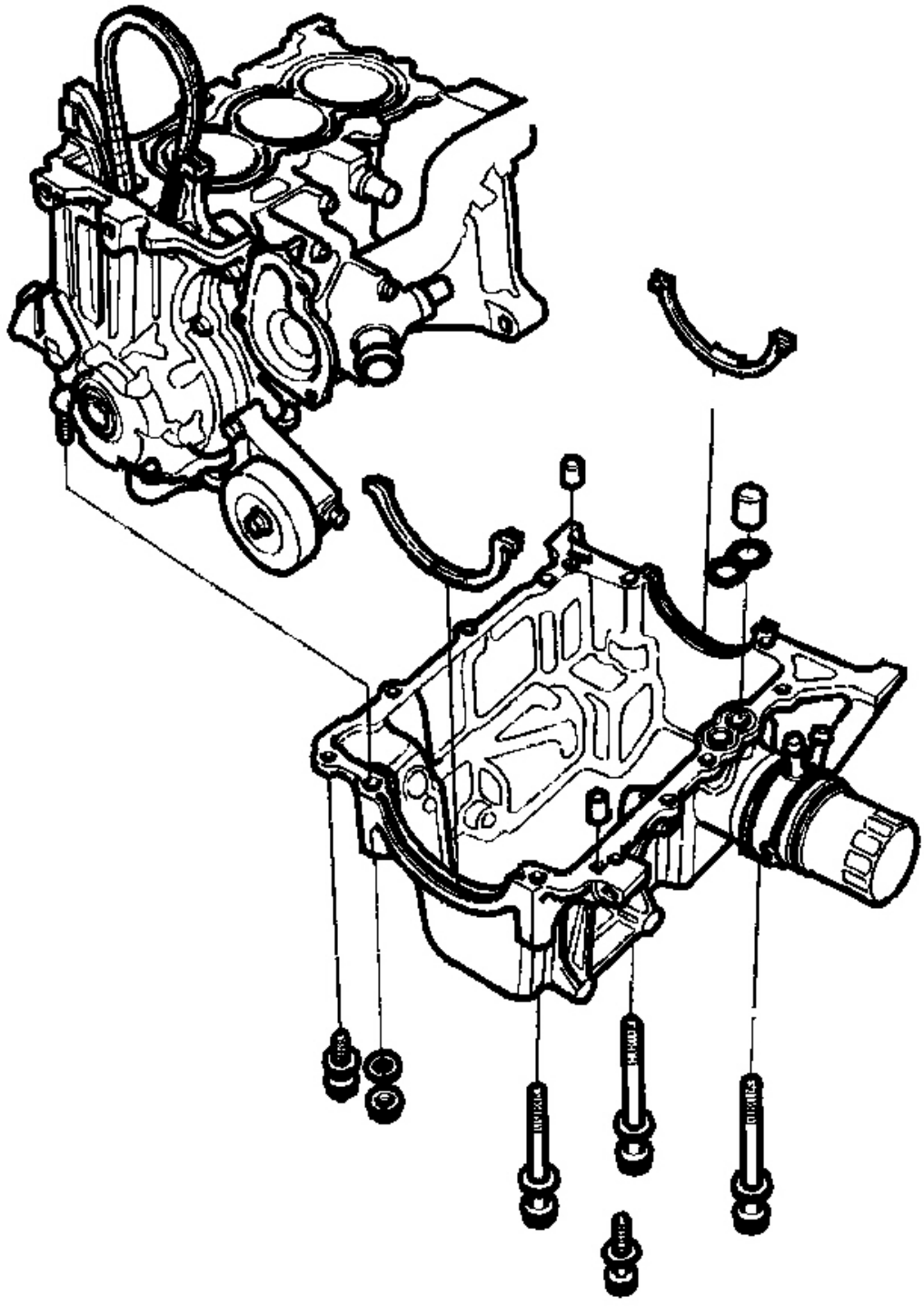

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Fig. 40: Removing Oil Pan
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Remove the oil screen, then remove the oil pump assembly.

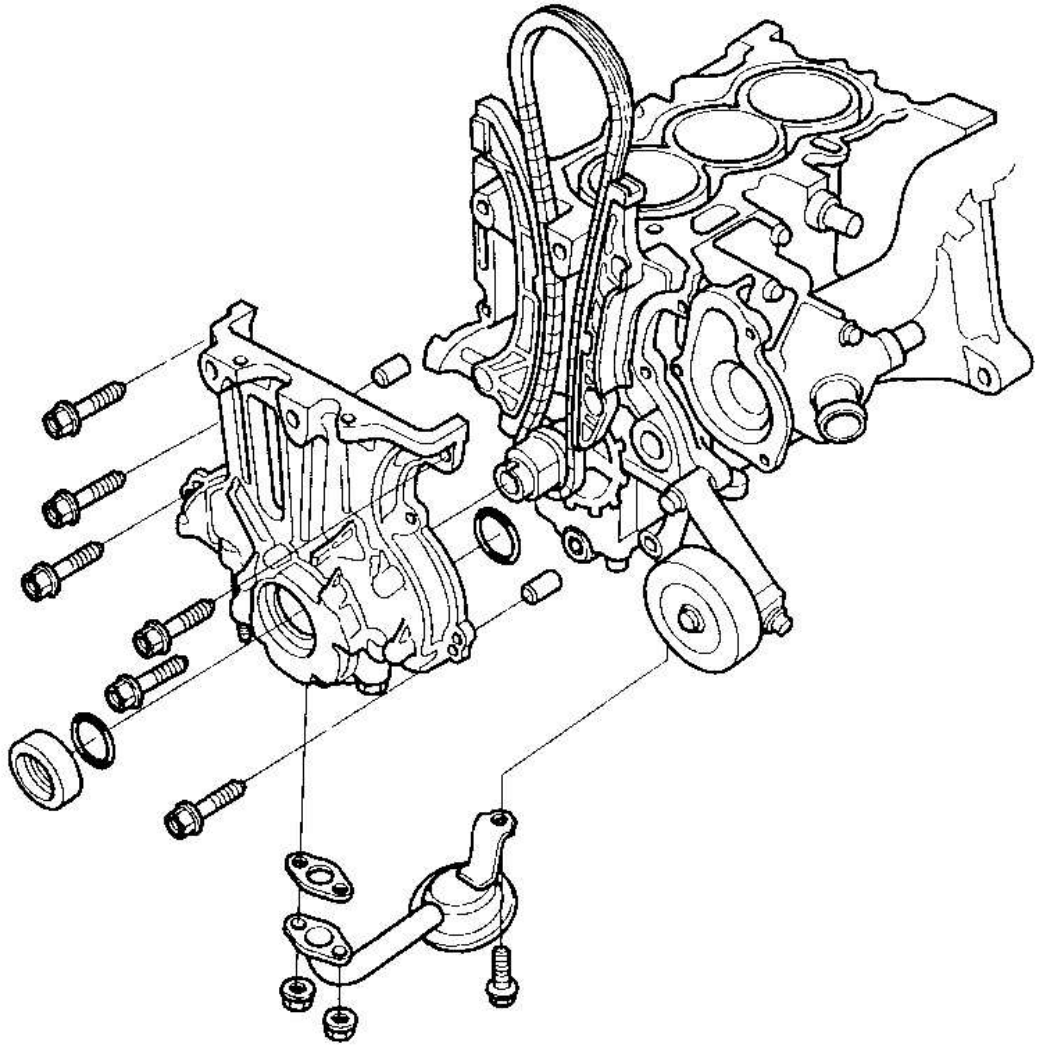

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Fig. 41: Removing Oil Pump Assembly
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Remove the cam chain.

CAM CHAIN INSTALLATION

Special Tools Required

- Holder handle 07JAB-001020B
- Holder attachment, HEX 50 mm, offset 07MAB-PY3010A
- Socket, 17 mm 07JAA-001010Aor a commercially available 17 mm socket

1. Set the crankshaft sprocket so that the No. 1 piston is at top dead center (TDC). Align the TDC mark (A) on the crankshaft pulse plate with the pointer (B) on the engine block.

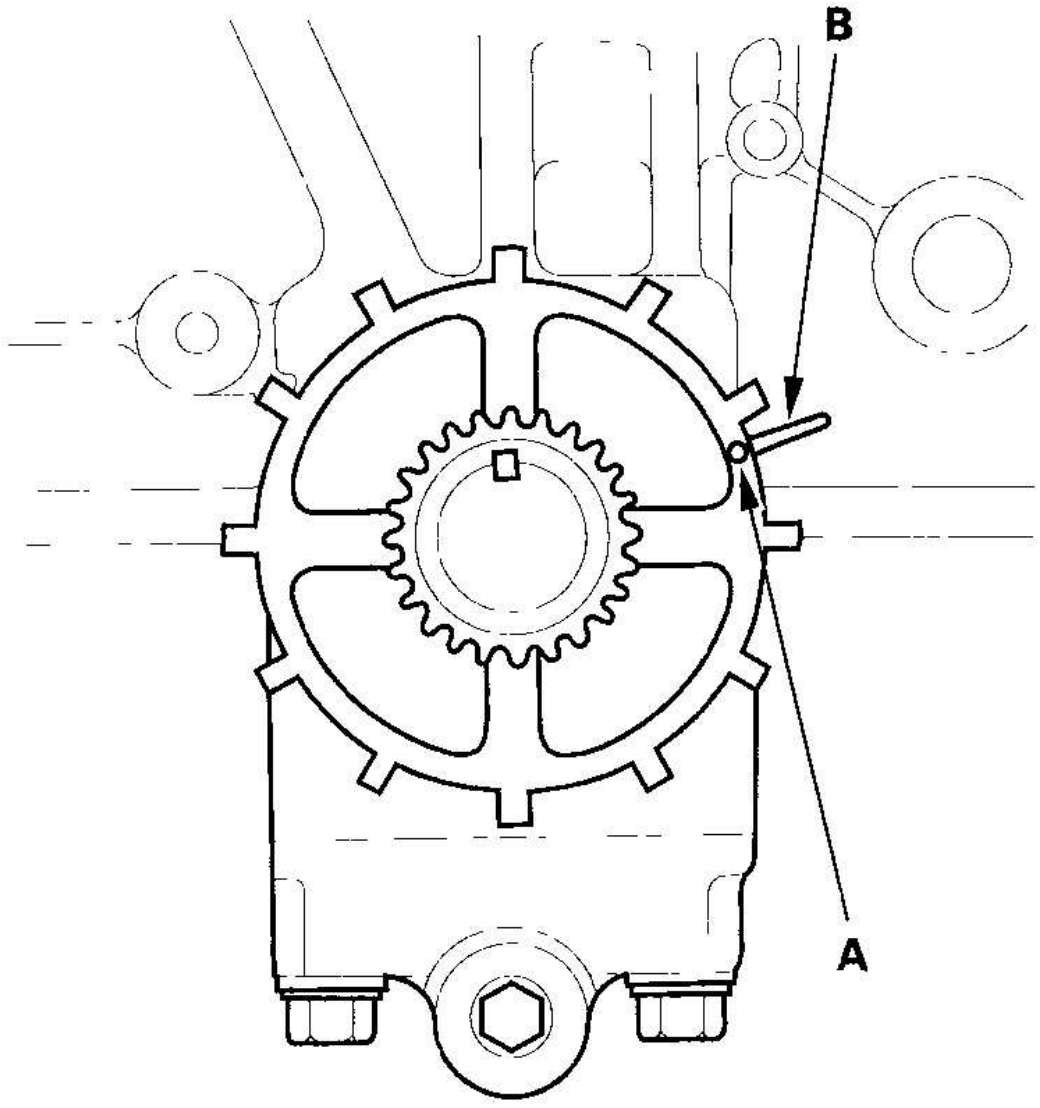

Fig. 42: Aligning TDC Mark
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Install the cam chain with the colored piece (A) aligned with the punch mark (B) on the crankshaft sprocket.

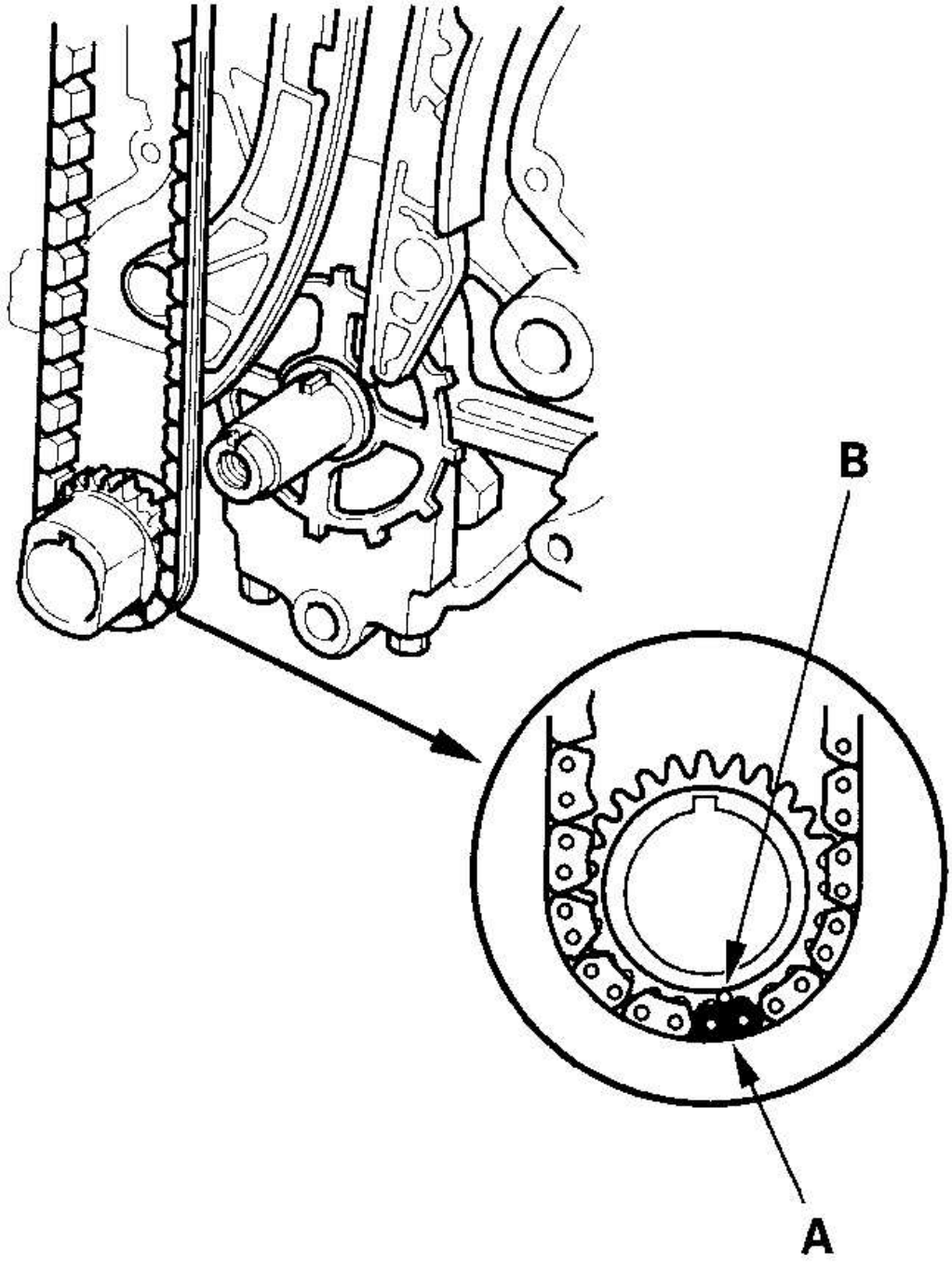

Fig. 43: Installing Cam Chain With Colored Piece

Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Clean and dry the oil pump mating surfaces.
4. Apply liquid gaskets, P/N 08717-0004 or 08718-0001, to the engine block mating surface of the oil pump.

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

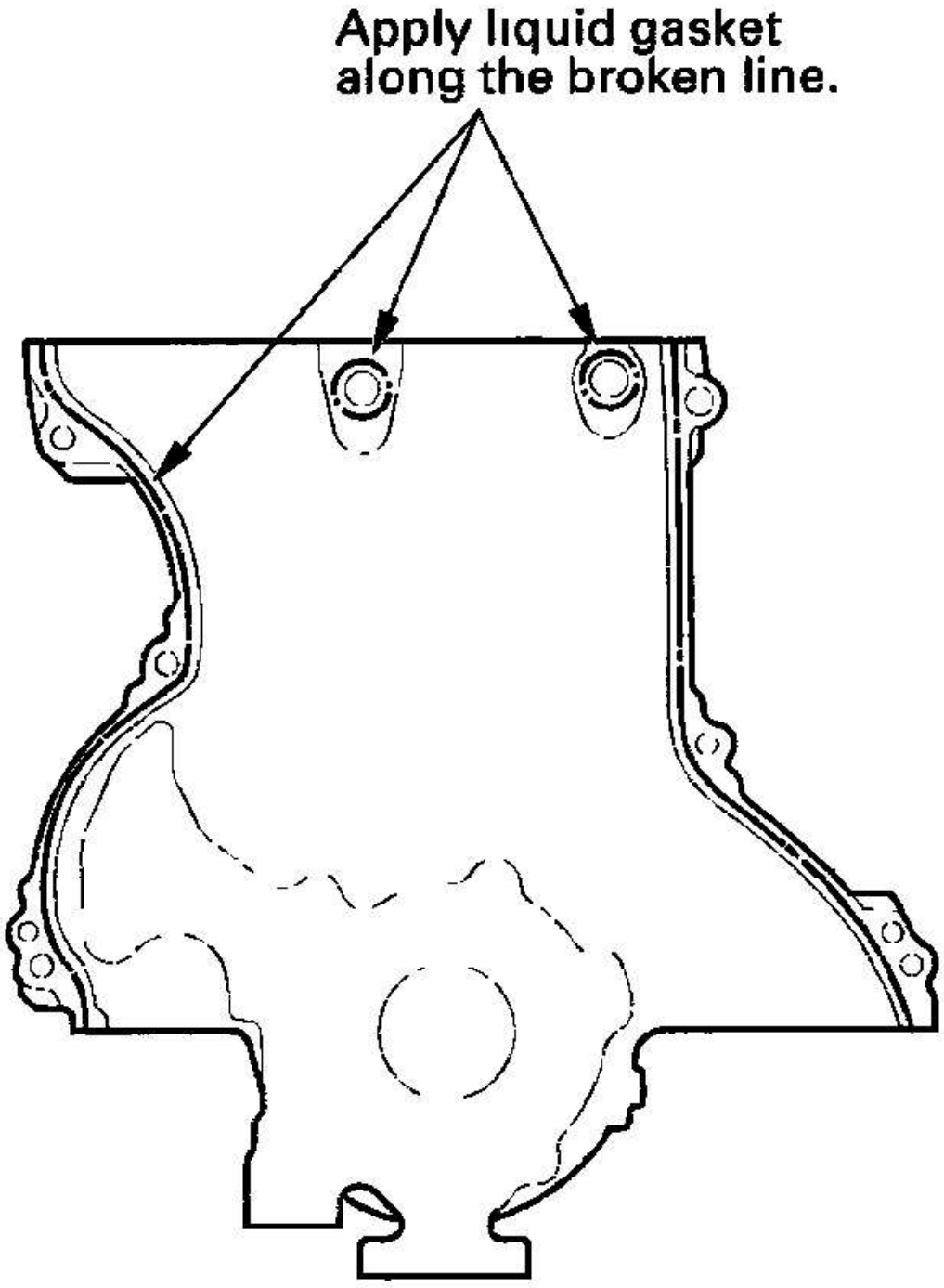

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Fig. 44: Applying Liquid Gaskets
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Install the dowel pins (A), then align the oil pump inner rotor with the crankshaft and install the oil pump (B) with new O-rings (C).

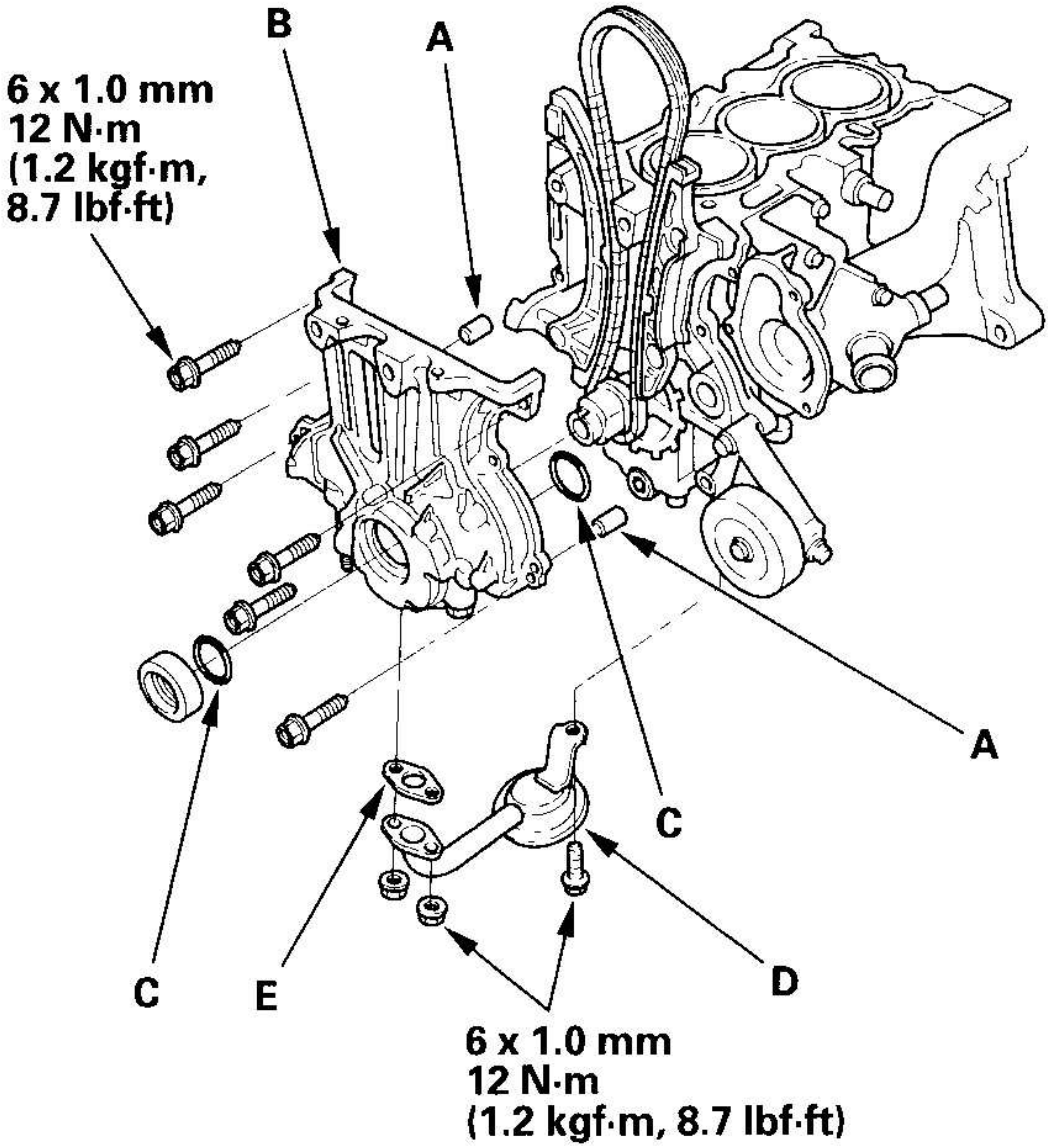

Fig. 45: Installing Dowel Pins And Torque Specifications

Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Install the oil screen (D) with a new gasket (E).
7. Clean and dry the oil pan mating surfaces.
8. Apply liquid gasket P/N 08718-0001 to the engine block mating surface of the oil pan.

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

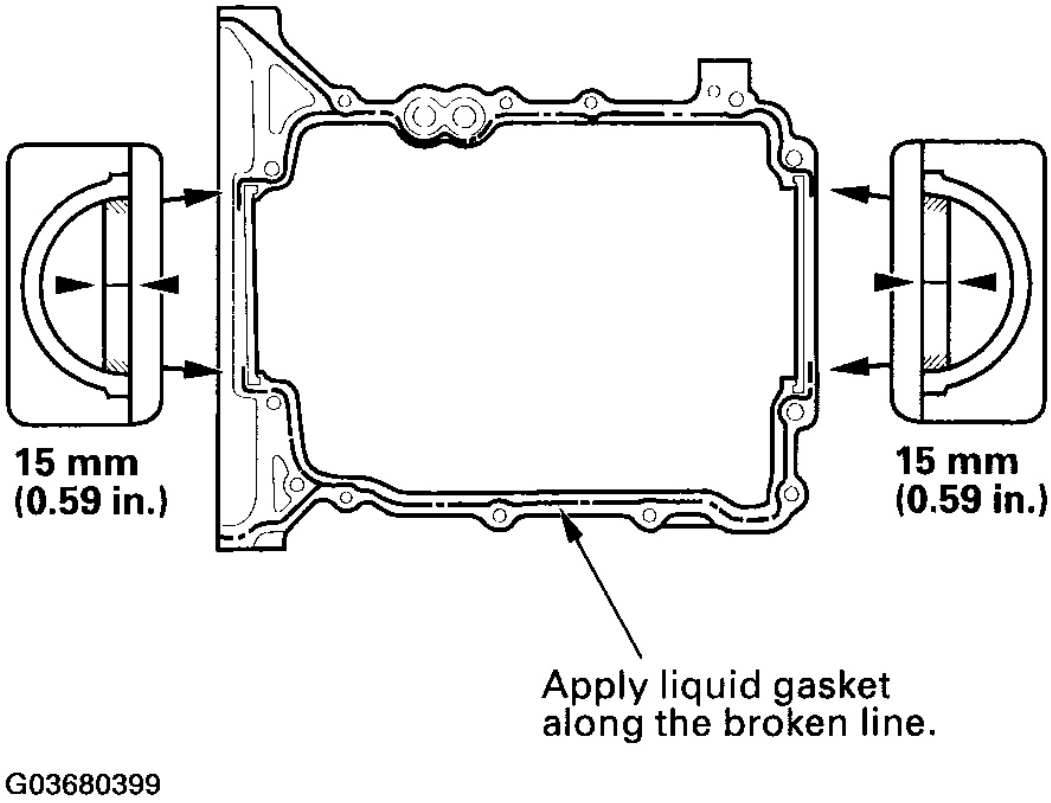

Fig. 46: Applying Liquid Gaskets
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Install the new oil pan gaskets (A) and a new O-ring (B) on the oil pan,

then install the oil pan (C).

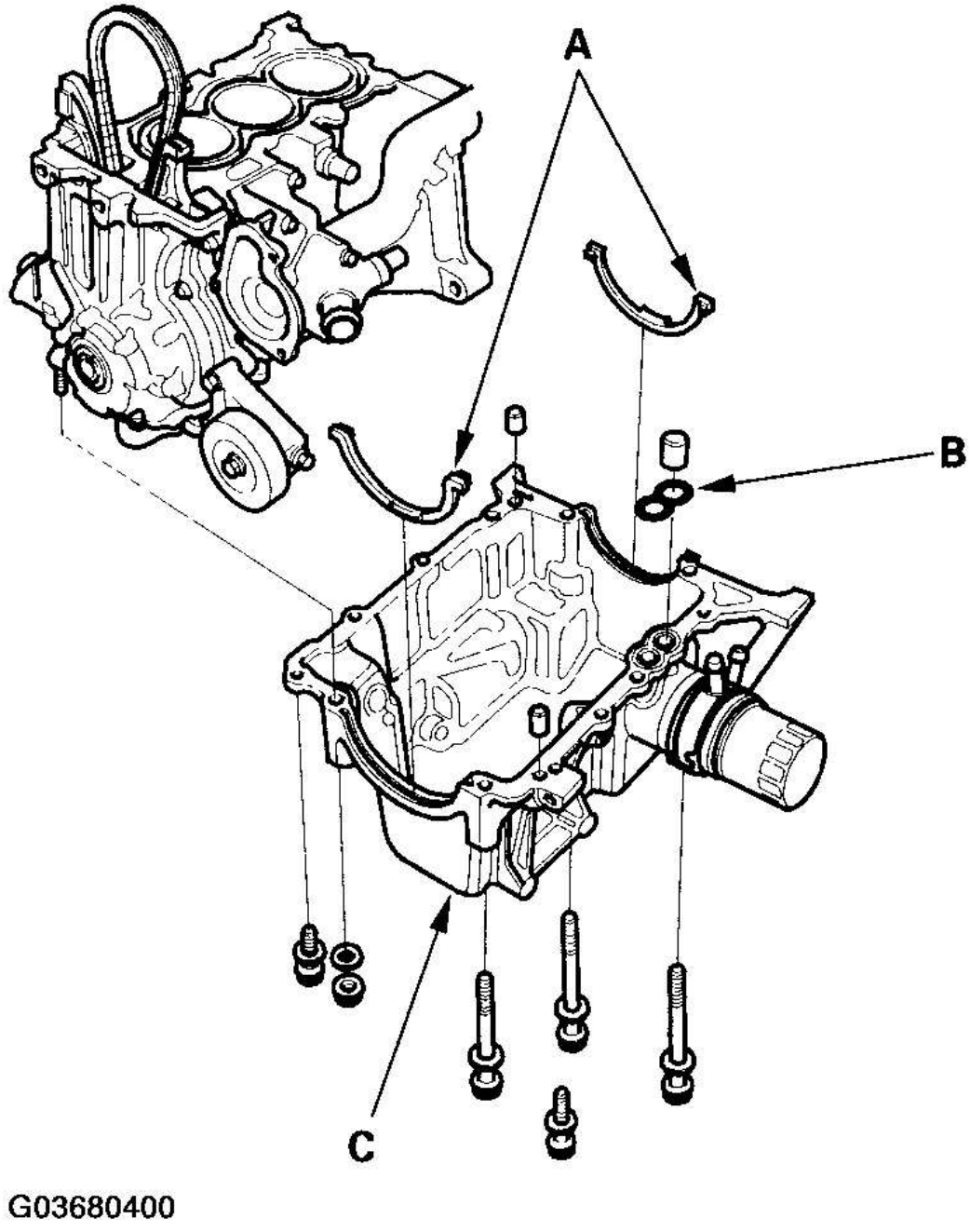

Fig. 47: Installing New Oil Pan Gaskets And New O-Ring
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Tighten the bolts and nuts to the specified torque.

    Specified Torque:

    8 x 1.25 mm

    22 N.m (2.2 kgf.m, 16lbf.ft)

    6 x 1.0 mm

    12 N.m (1.2 kgf.m, 8.7 lbf.ft)

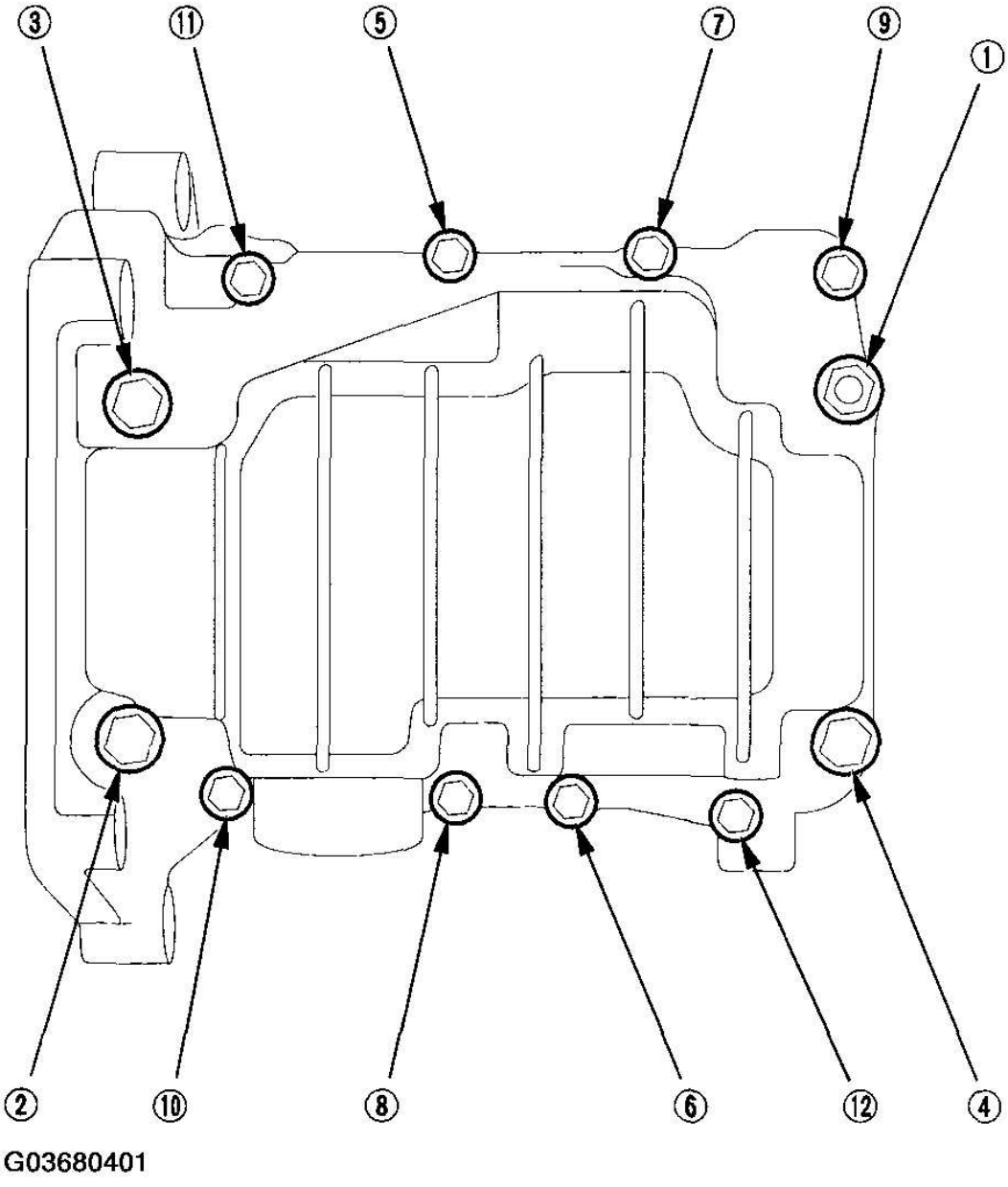

Fig. 48: Tightening Bolts And Nuts To Specified Torque
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Clean the bolt (A), washer (B), crankshaft pulley (C) and crankshaft (D). Lubricate with new engine oil as shown.

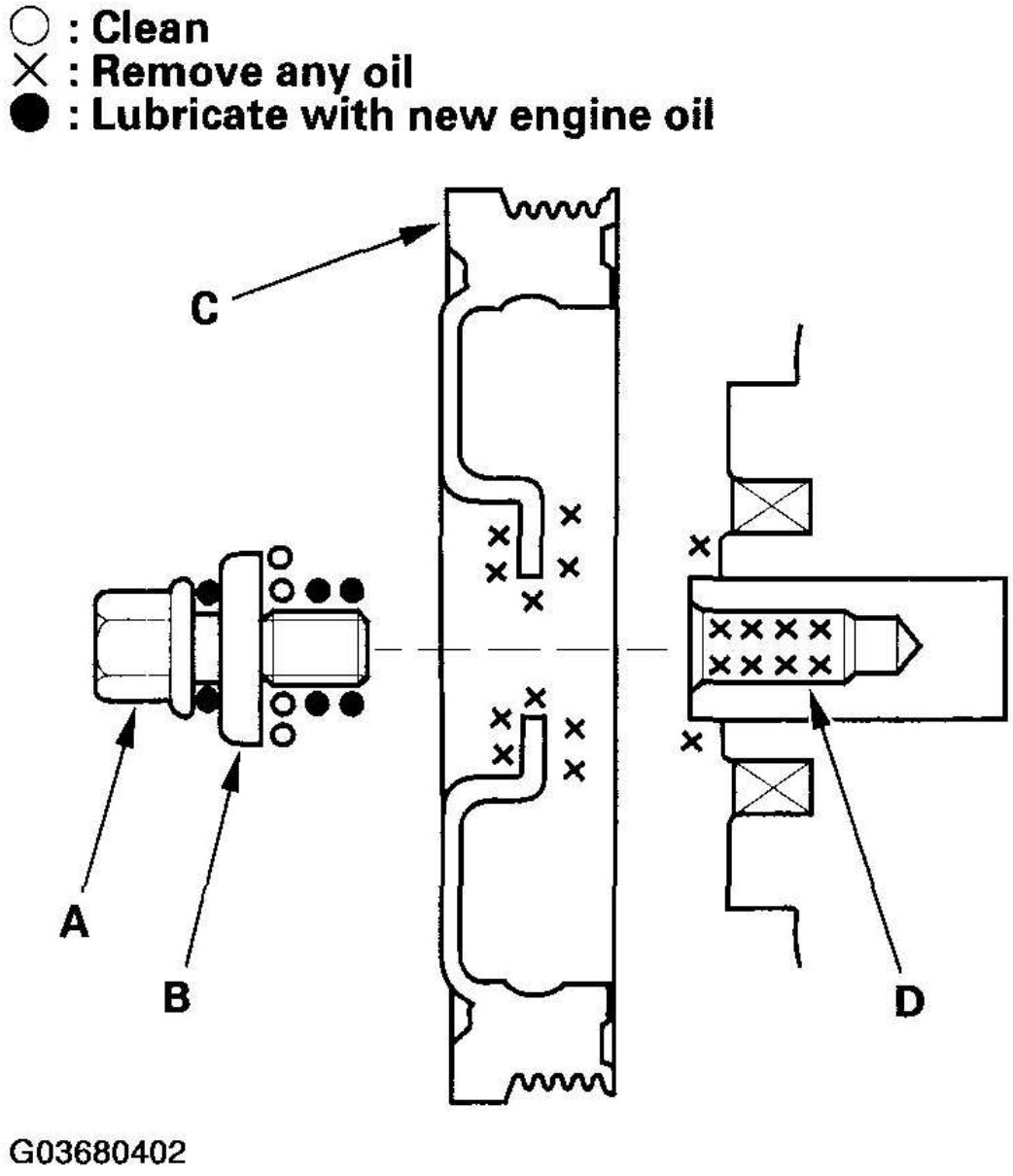

Fig. 49: Identifying Bolt, Washer, Crankshaft Pulley And Crankshaft
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Install the crankshaft pulley, and tighten the bolt to 20 N.m (2.0 kgf.m, 14 lbf.ft).
13. Tighten the pulley bolt an additional 90°.

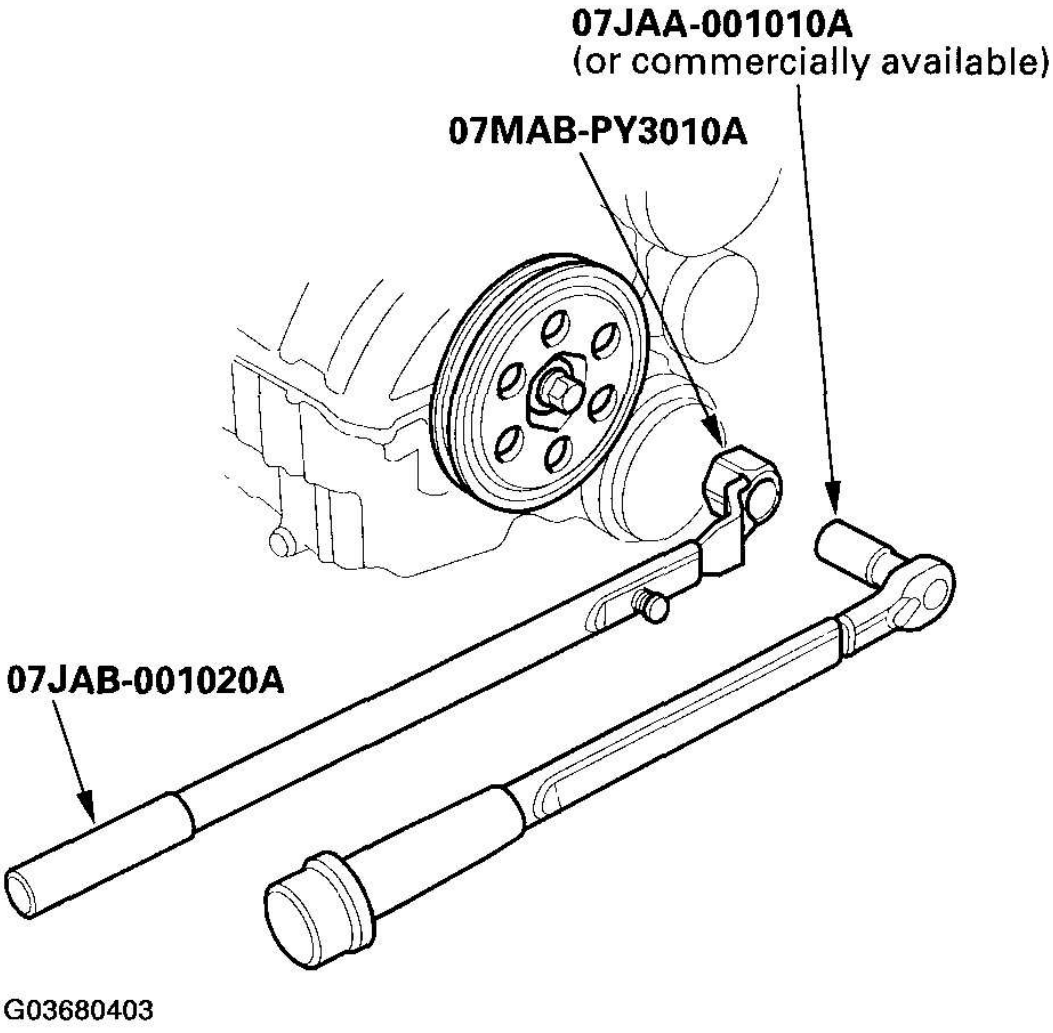

Fig. 50: Tightening Pulley Bolt An Additional 90°
Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. Clean the cylinder head and engine block surfaces.
15. Apply liquid gasket, P/N 08717-0004 or 08718-0001, to the shaded areas of the cylinder head gasket mating surface of the block and oil pump (see step 3).
16. Install the dowel pins and new cylinder head gasket (see step 4).
17. Apply liquid gasket, P/N 08717-0004 or 08718-0001, to the cylinder head mating surface of the block and oil pump along the broken line (see step

5).

18. Install the cylinder head on the engine block.
19. Apply engine oil to the threads and under the heads of all the cylinder head bolts.
20. Tighten the cylinder head bolts in sequence to 39 N.m (4.0 kgf.m, 29 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 (see step 8).
21. Turn the cylinder head bolts 90°.
22. Tighten the 6 mm bolts to 12 N.m (1.2 kgf.m, 8.7 lbf.ft).
23. Make sure the crankshaft pulley is at TDC (see **CAMSHAFT AND ROCKER ARM INSTALLATION**).
24. Place the camshaft sprocket into the cylinder head (see step 11).
25. Install the cam chain on the camshaft sprocket with the punch mark (A) aligned with the colored piece (B).

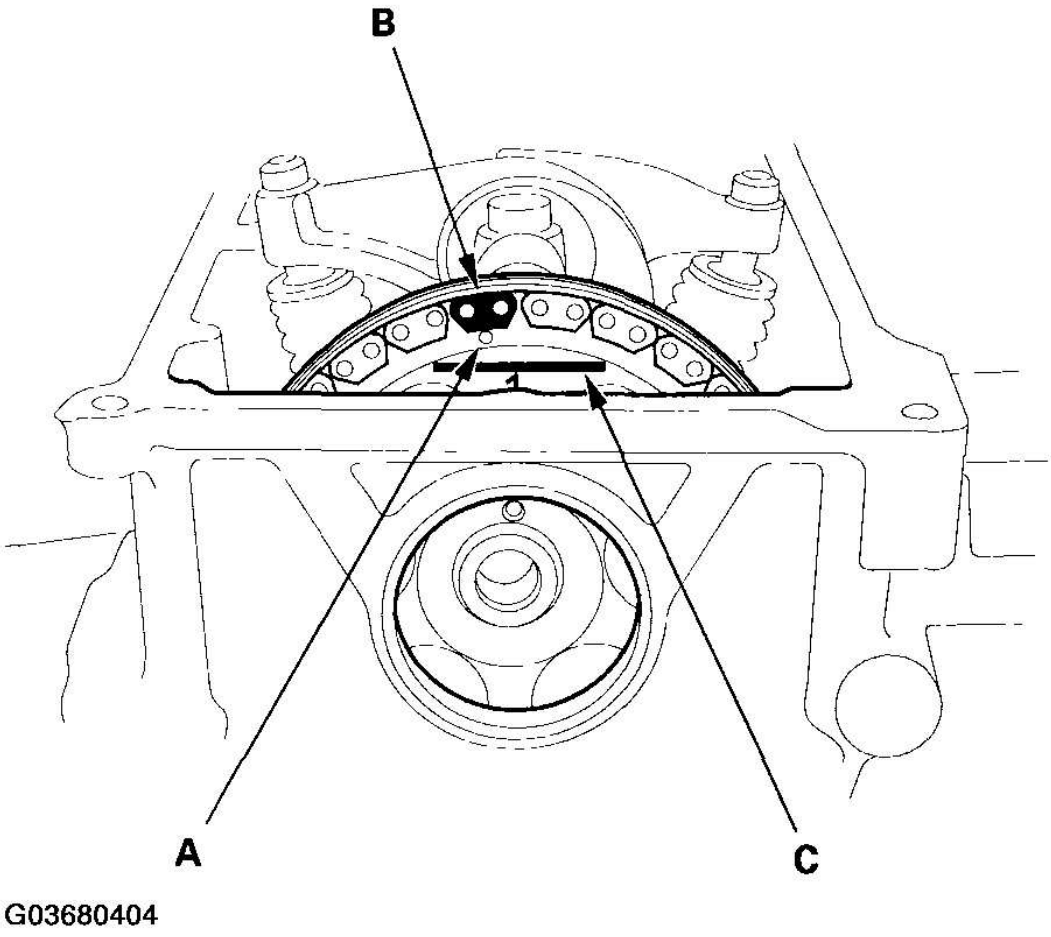

Fig. 51: Installing Cam Chain On Camshaft Sprocket With Punch Mark
Courtesy of AMERICAN HONDA MOTOR CO., INC.

26. Fit the camshaft sprocket on the camshaft.
27. Turn the camshaft sprocket counterclockwise to relieve cam chain free play, and check the alignment of the TDC mark (C) on the camshaft sprocket with the cylinder head surface.

    If the camshaft sprocket is not positioned at TDC, remove the camshaft sprocket from the camshaft, and reposition the cam chain to bring the camshaft sprocket to TDC.

28. Hold the camshaft with an open-end wrench, then tighten the camshaft sprocket mounting bolt (see step 14).
29. Put the new cylinder head plug into the cylinder head (see step 15).
30. Press the rod to pump the oil out of the cam chain auto-tensioner (see step 16).
31. Install the new O-ring into the spacer. Set the spacer and new gasket on the cam chain auto-tensioner, then tighten the bolt and nuts equally while pressing the cam chain auto-tensioner against the cylinder head (see step 17).
32. Adjust the valve clearance (see **VALVE CLEARANCE ADJUSTMENT**).
33. Install the cylinder head cover (see **CYLINDER HEAD COVER INSTALLATION**).
34. 2000-2003 models: Install the engine oil cooler bypass hoses.

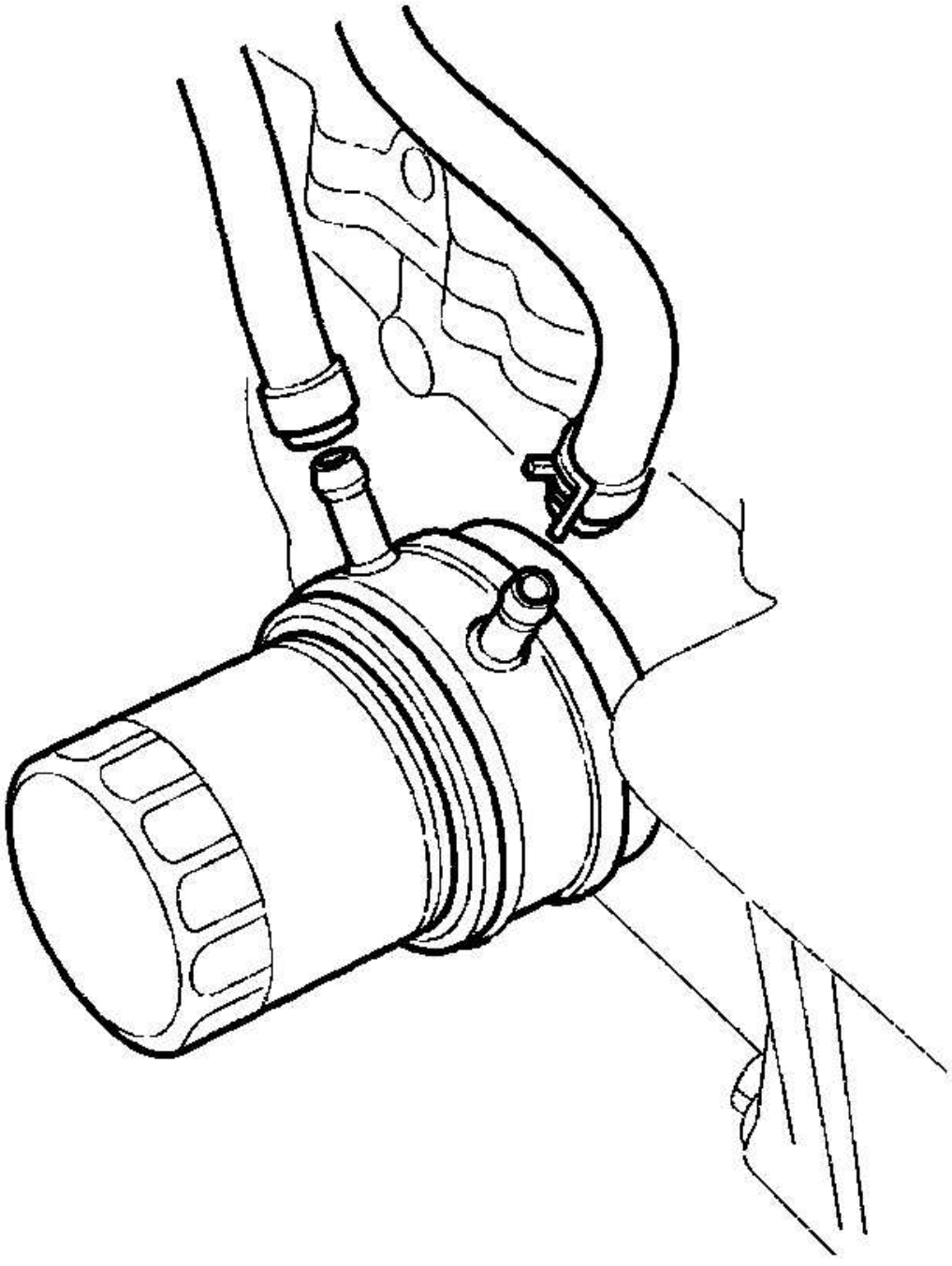

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Fig. 52: Installing Engine Oil Cooler Bypass Hoses (2000-2003 Models)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

35. Tighten the idler pulley bracket mounting bolt.

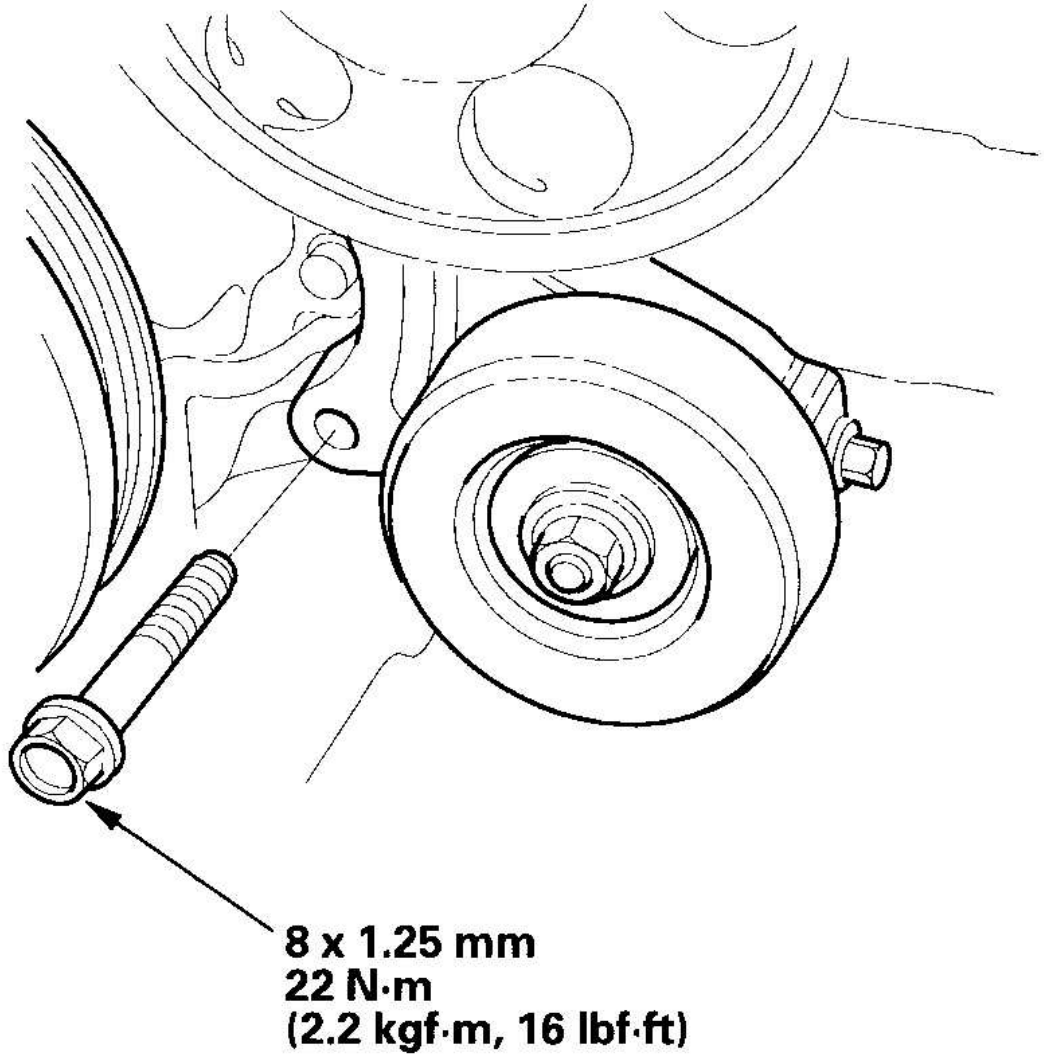


Fig. 53: Tightening Idler Pulley Bracket Mounting Bolt And Torque Specifications

Courtesy of AMERICAN HONDA MOTOR CO., INC.

36. Install the water pump (see **WATER PUMP INSPECTION**).
37. Install the engine (see **ENGINE INSTALLATION**).

CKP PULSE PLATE REPLACEMENT

1. Remove the cam chain (see **CAM CHAIN REMOVAL**).
2. Remove the crankshaft sprocket.
3. Remove the tensioner arm (A) and timing chain guide (B).
4. Remove the crankshaft pulse plate (C).

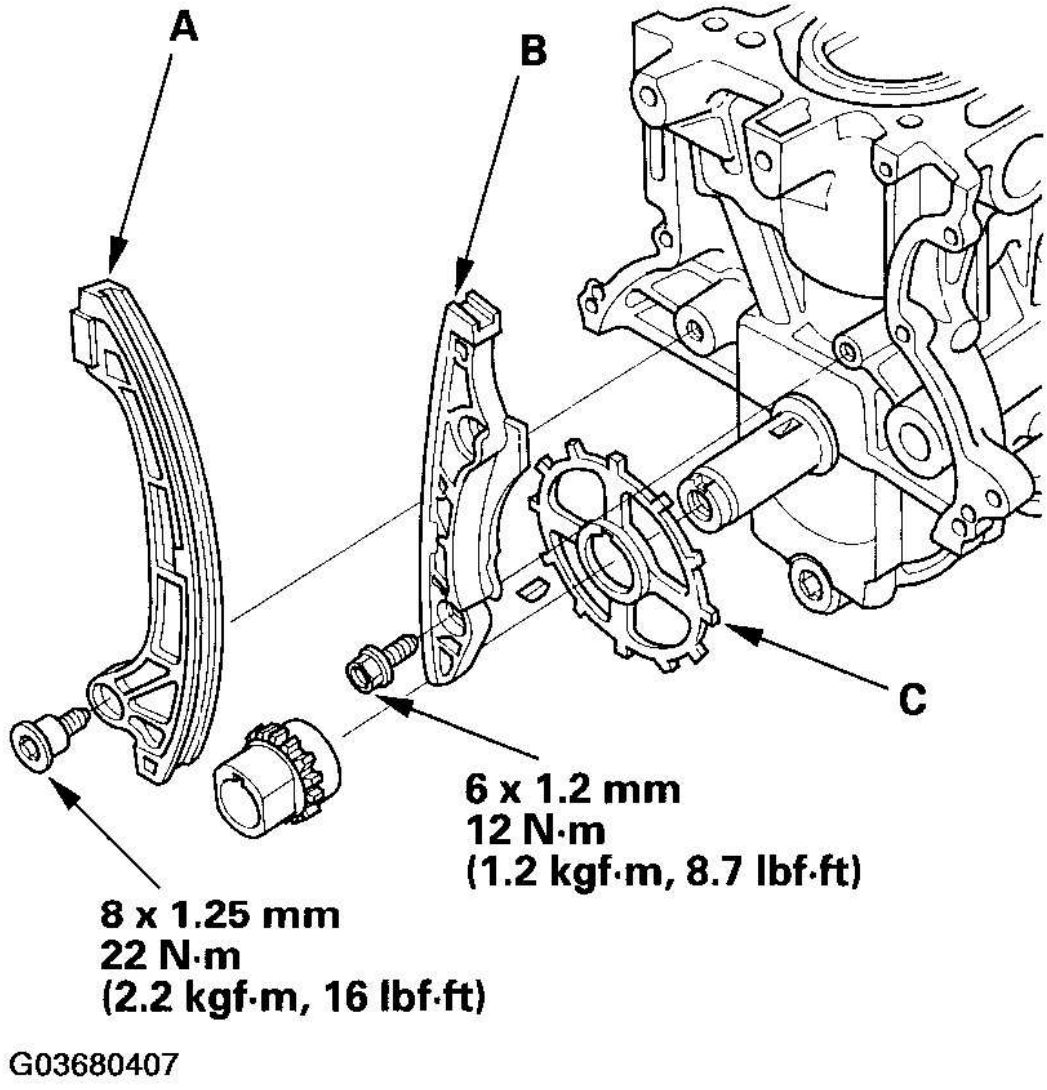


Fig. 54: Removing Crankshaft Pulse Plate And Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Install the crankshaft pulse plate (C).
6. Install the tensioner arm (A) and timing chain guide (B).
7. Install the cam chain (see **CAM CHAIN INSTALLATION**).

CYLINDER HEAD COVER REMOVAL

1. Remove the engine cover.
2. Relieve fuel pressure:
   - 2000-2003 models (see **2000-2003 MODELS**)
   - 2004-2005 models (see **2004-2005 MODELS**)
   - 2006 model (see **2006 MODEL**)
3. 2000-2004 models: Remove the positive crankcase ventilation (PCV) valve (A).

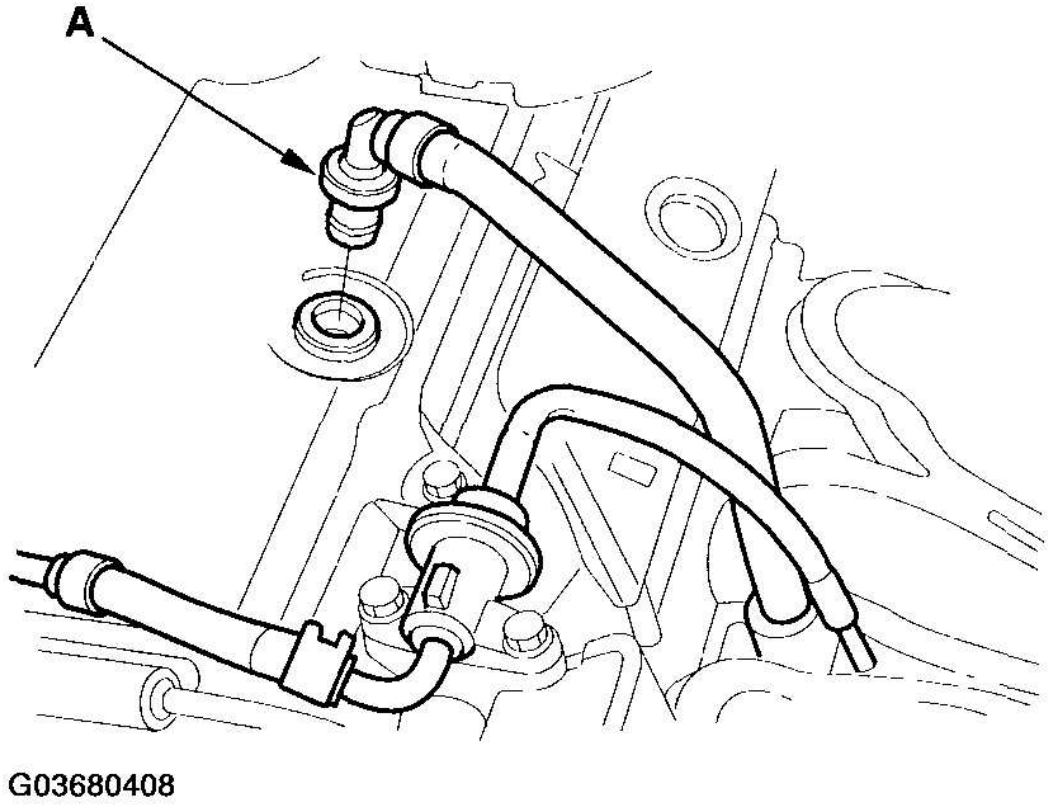


Fig. 55: Removing Positive Crankcase Ventilation (PCV) Valve (2000-2004 Models)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. 2005-2006 models: Remove the PCV hose (A).

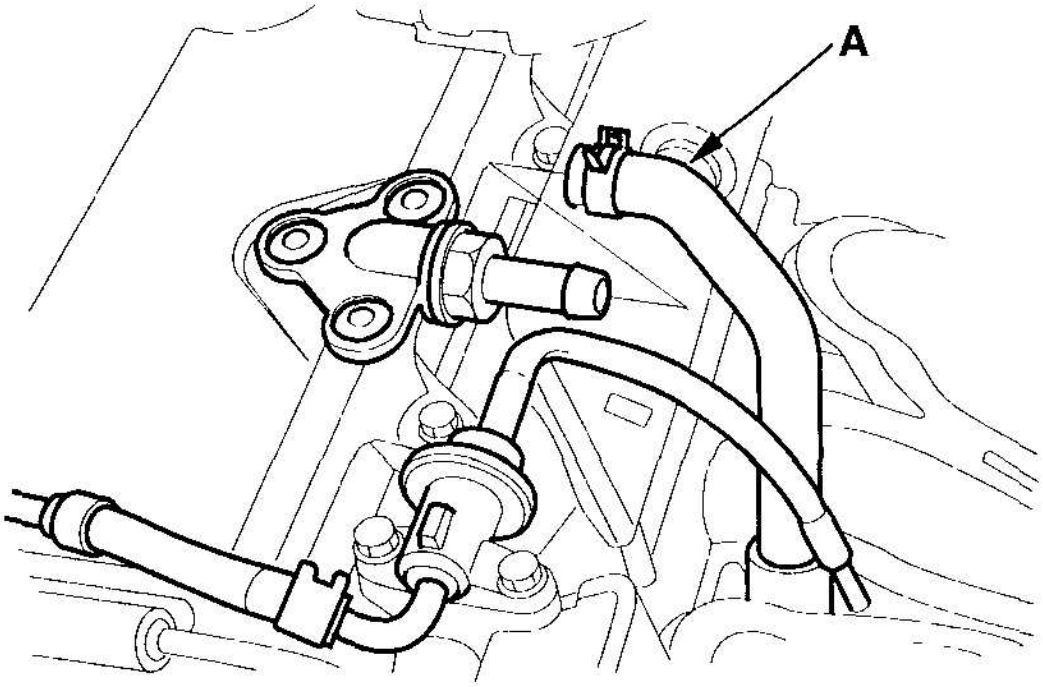


Fig. 56: Removing PCV Hose (2005-2006 Models)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. 2005-2006 models: Remove the fuel feed hose (A) and the fuel return hose (B). 2006 model: Remove the fuel feed hose (A).

2000-2003 models:

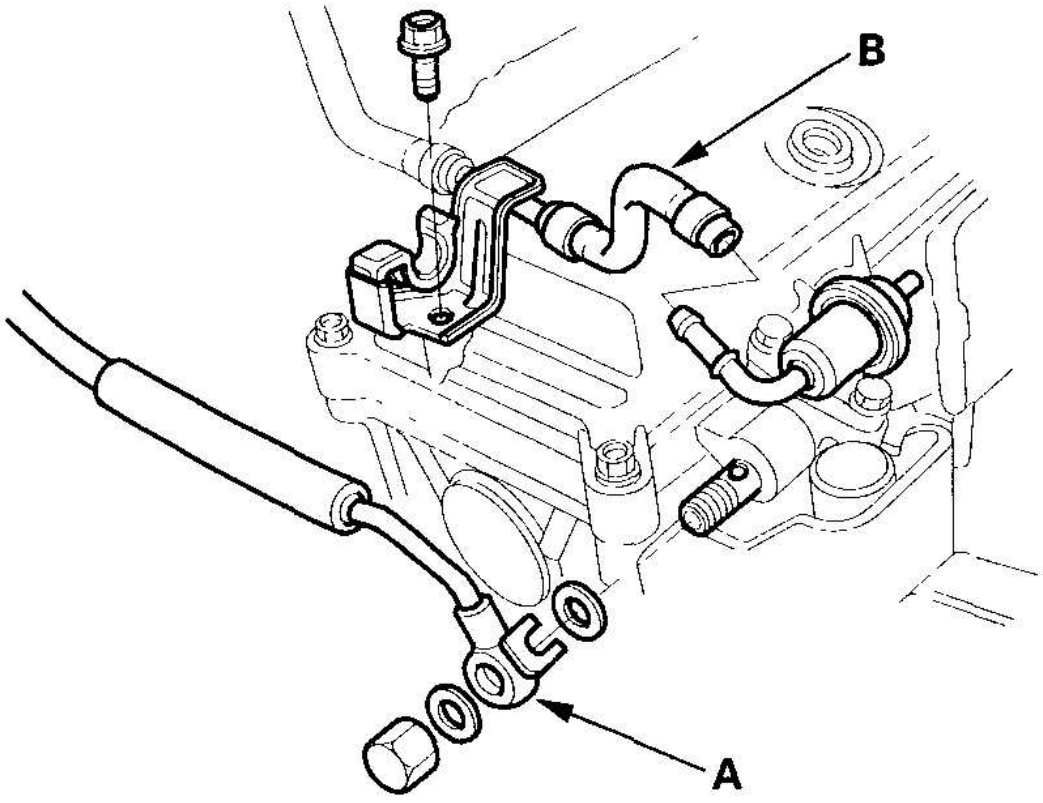


Fig. 57: Removing Fuel Feed Hose (2000-2003 Models)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

This illustration shows the M/T model.

2004-2005 models:

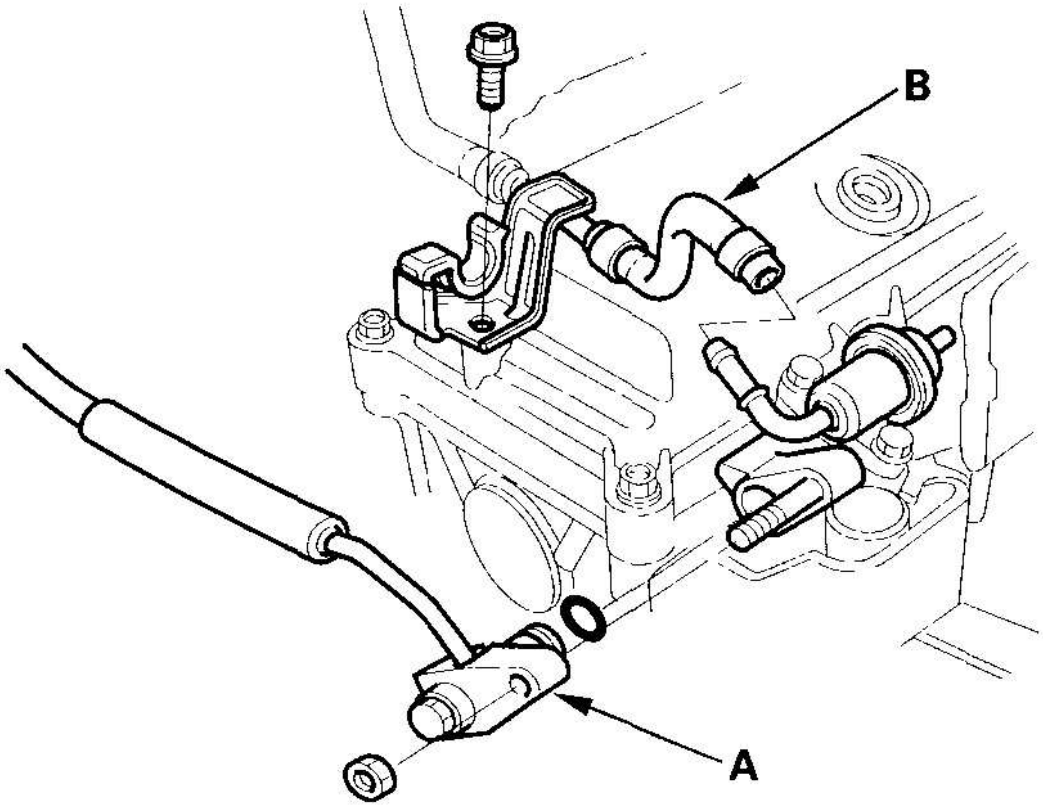


Fig. 58: Removing Fuel Feed Hose (2004-2005 Models)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

This illustration shows the M/T model.

2006 model:

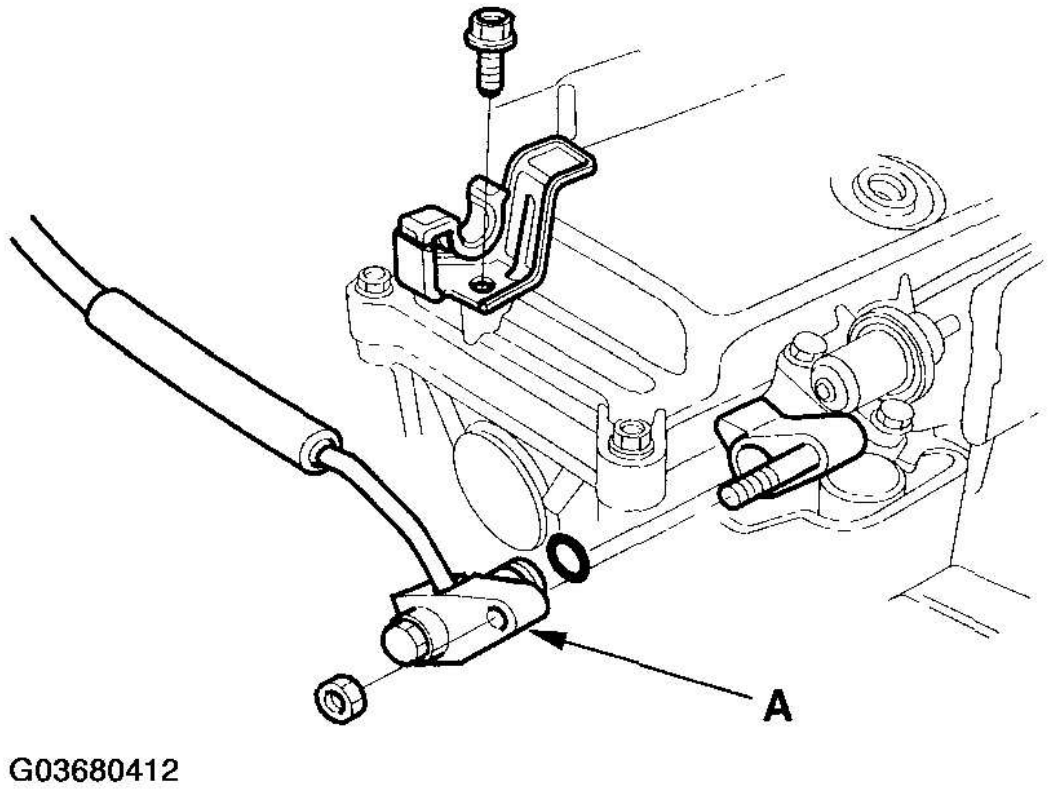
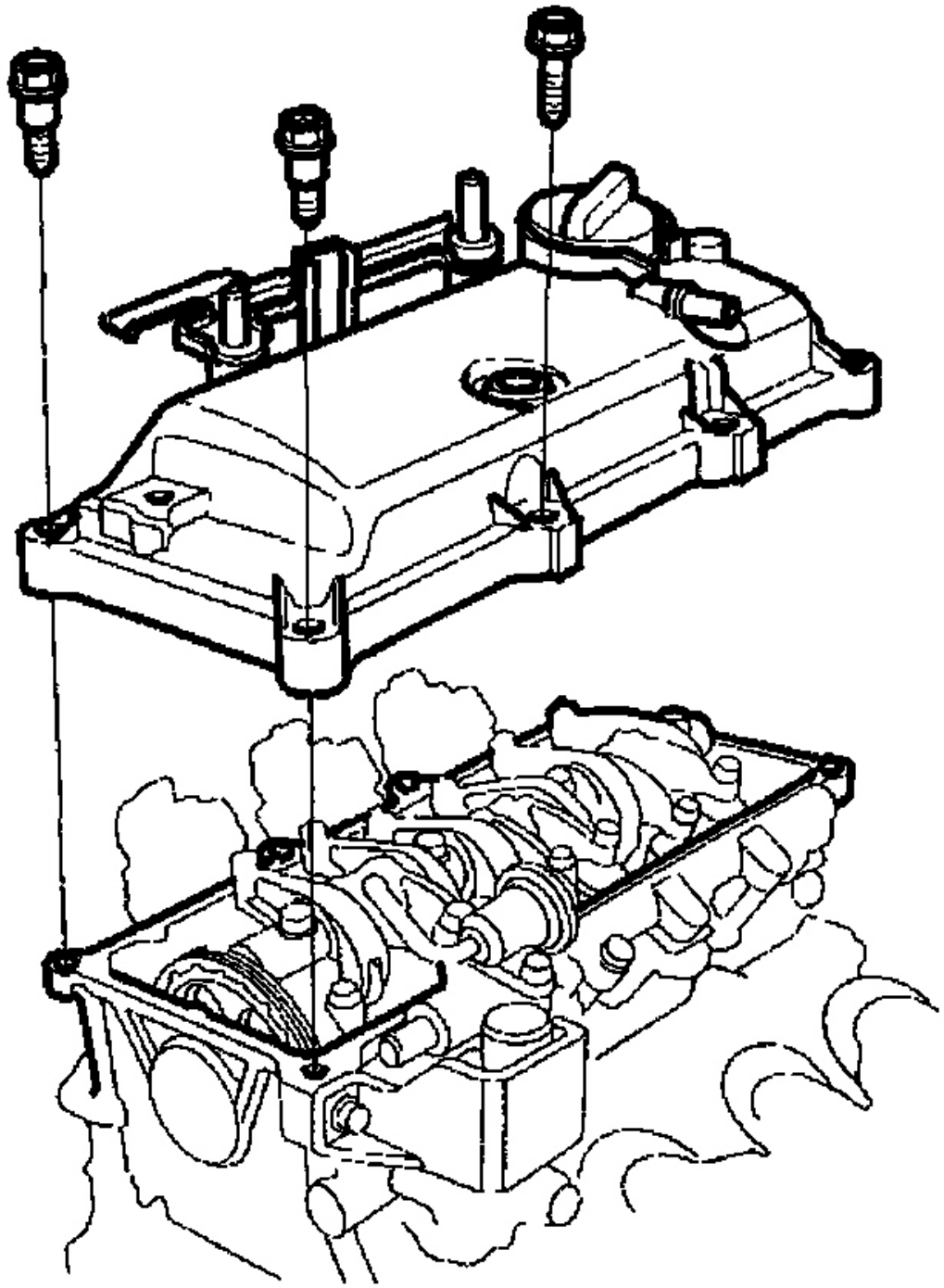


Fig. 59: Removing Fuel Feed Hose (2006 Models)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Remove the cylinder head cover.



G03680413

Fig. 60: Removing Cylinder Head Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

CYLINDER HEAD COVER INSTALLATION

1. Install the head cover gasket in the groove of the cylinder head cover.
2. Install the cylinder head cover on the cylinder head.
3. Tighten the bolts in two or three steps. In the final step, tighten all bolts, in sequence, to 12 N.m (1.2 kgf.m,8.7 lbf.ft).

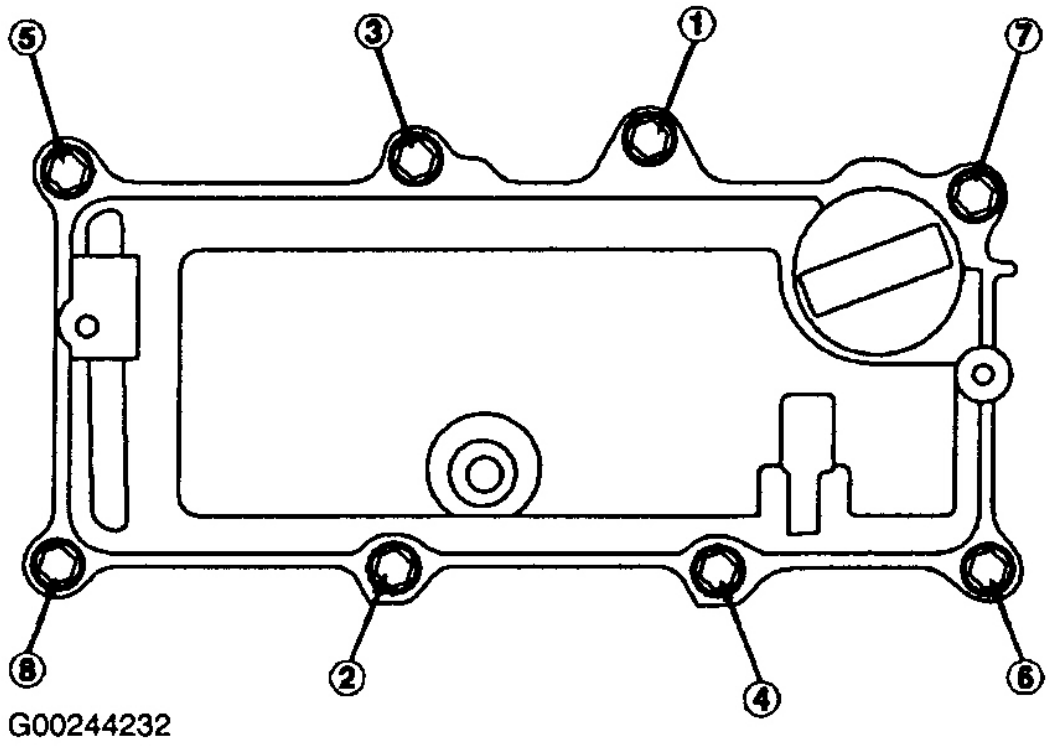


Fig. 61: Cylinder Head Cover Bolt Tightening Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Install the fuel return hose (A), and install the fuel feed hose (B) with new washers (C) (2000-2003 models) or with a new O-ring (2004-2006 models).

2000-2003 models:

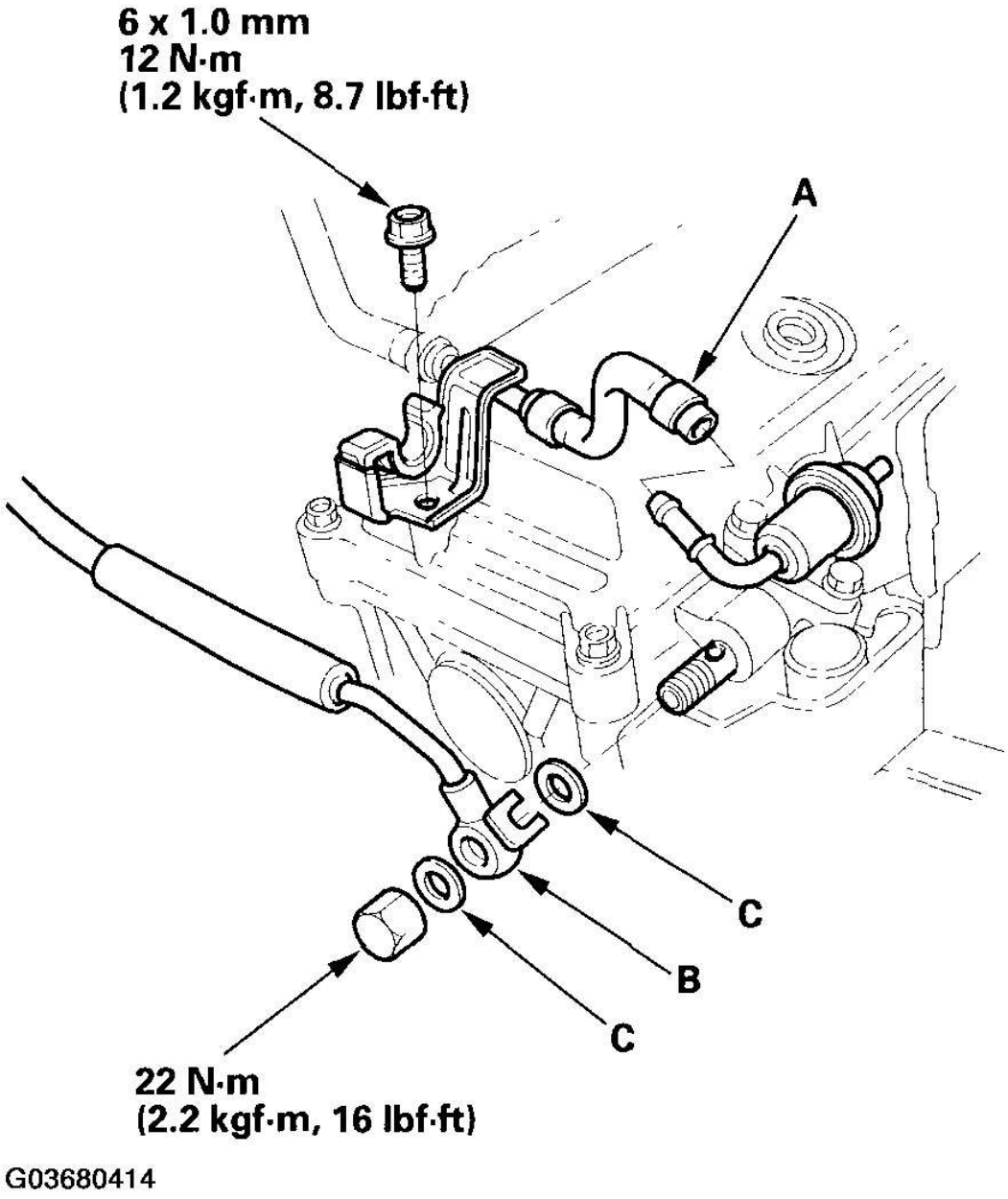


Fig. 62: Installing Fuel Return Hose (2000-2003 Models)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

This illustration shows the M/T model

2004-2005 models:

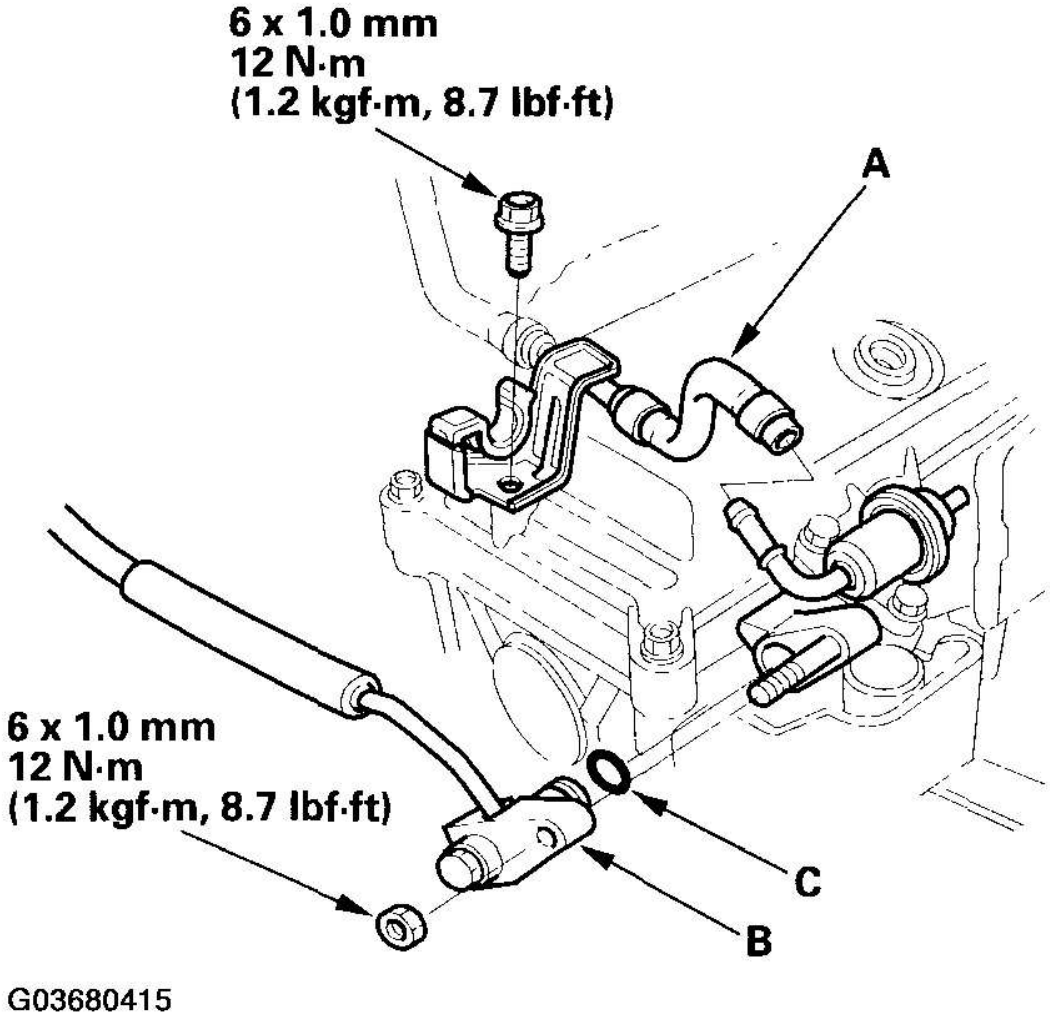


Fig. 63: Installing Fuel Return Hose And Torque Specifications (2004-2005 Models)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

This illustration shows the M/T model.

2006 model:

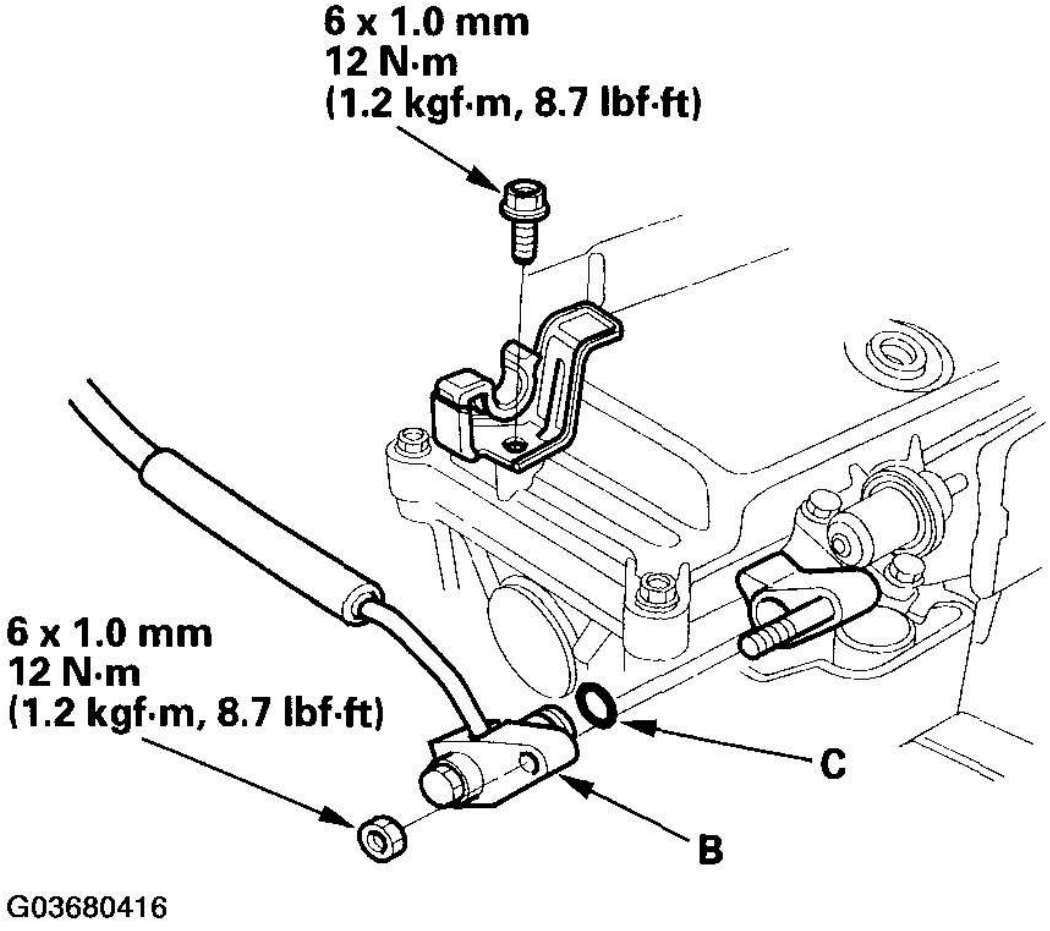
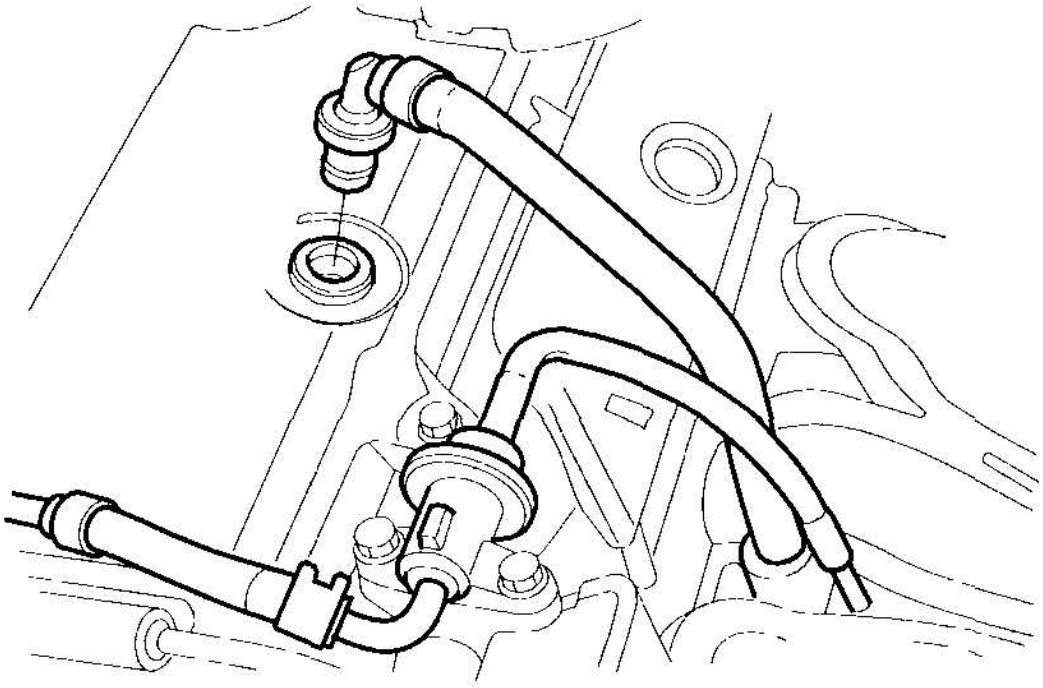


Fig. 64: Installing Fuel Return Hose (2006 Models)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. 2000-2004 models: Install the positive crankcase ventilation (PCV) valve.



G03680417

Fig. 65: Installing Positive Crankcase Ventilation (PCV) Valve (2000-2004 Models)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. 2005-2006 models: Install the PCV hose.

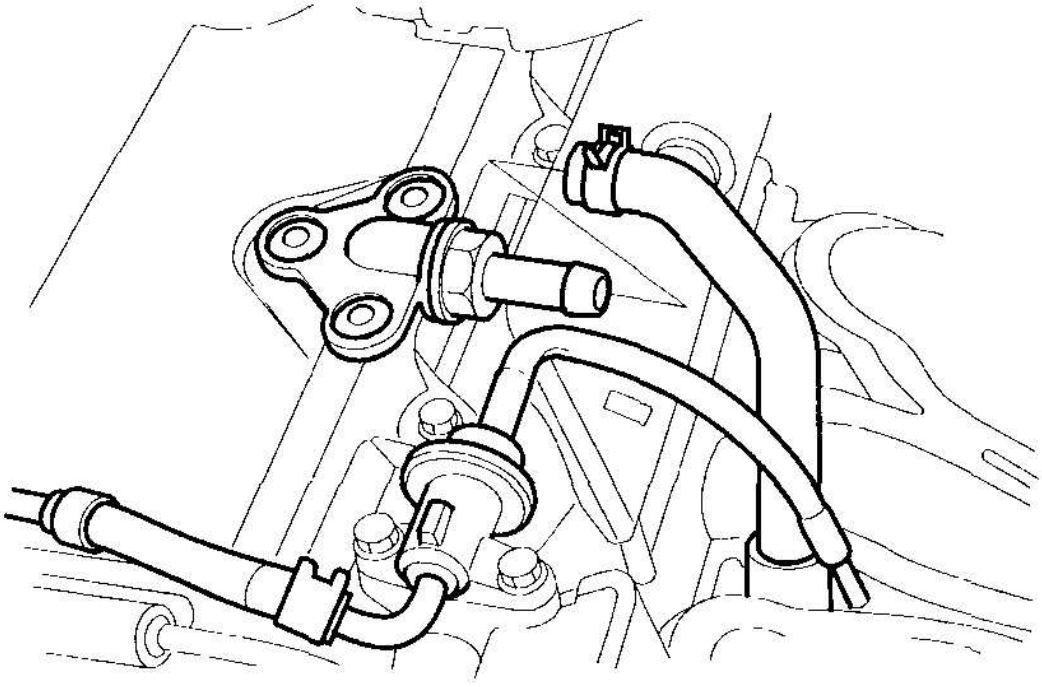


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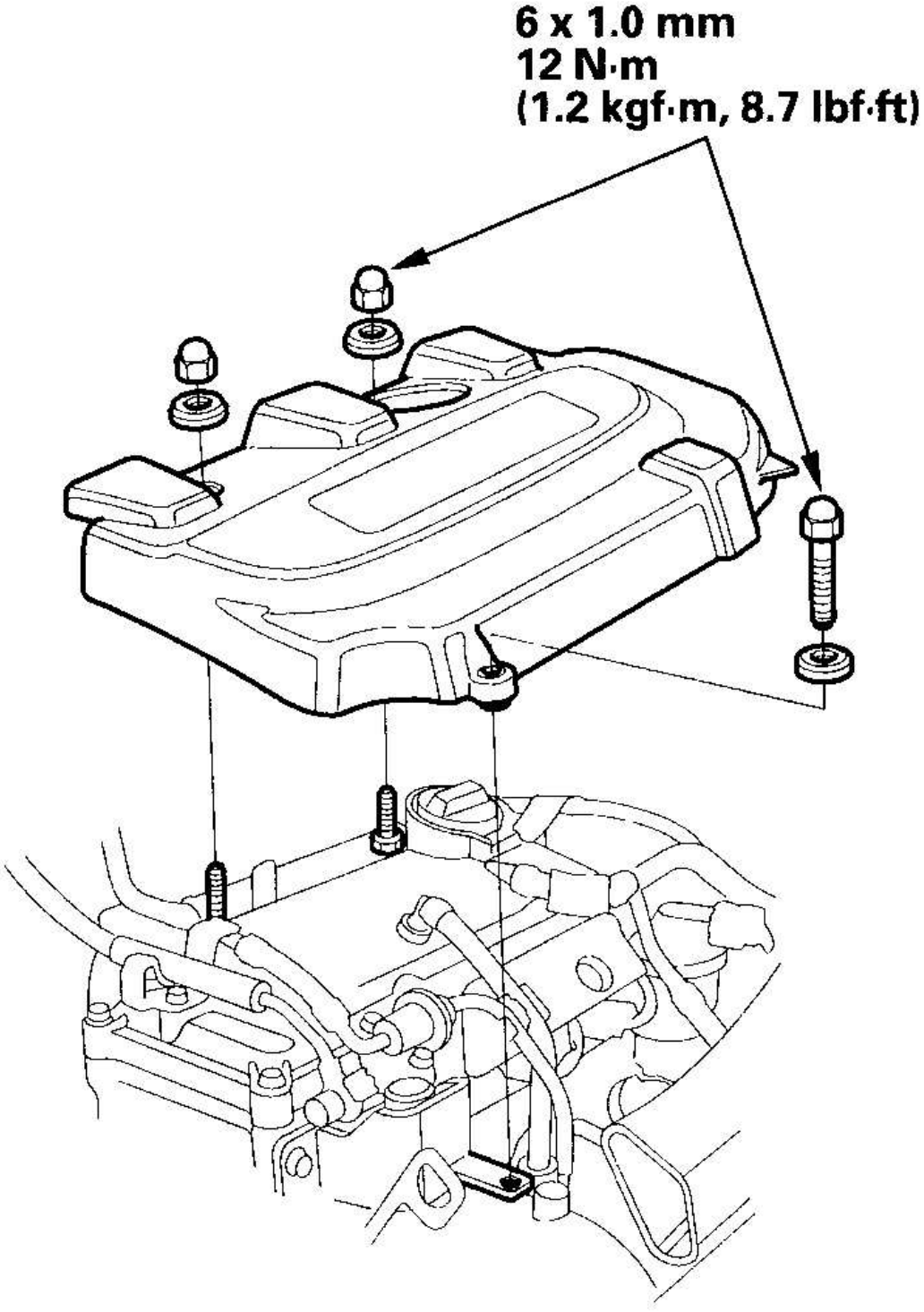
Fig. 66: Installing PCV Hose And Torque Specifications(2005-2006 Models)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Install the engine cover.



G03680419

Fig. 67: Installing Engine Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

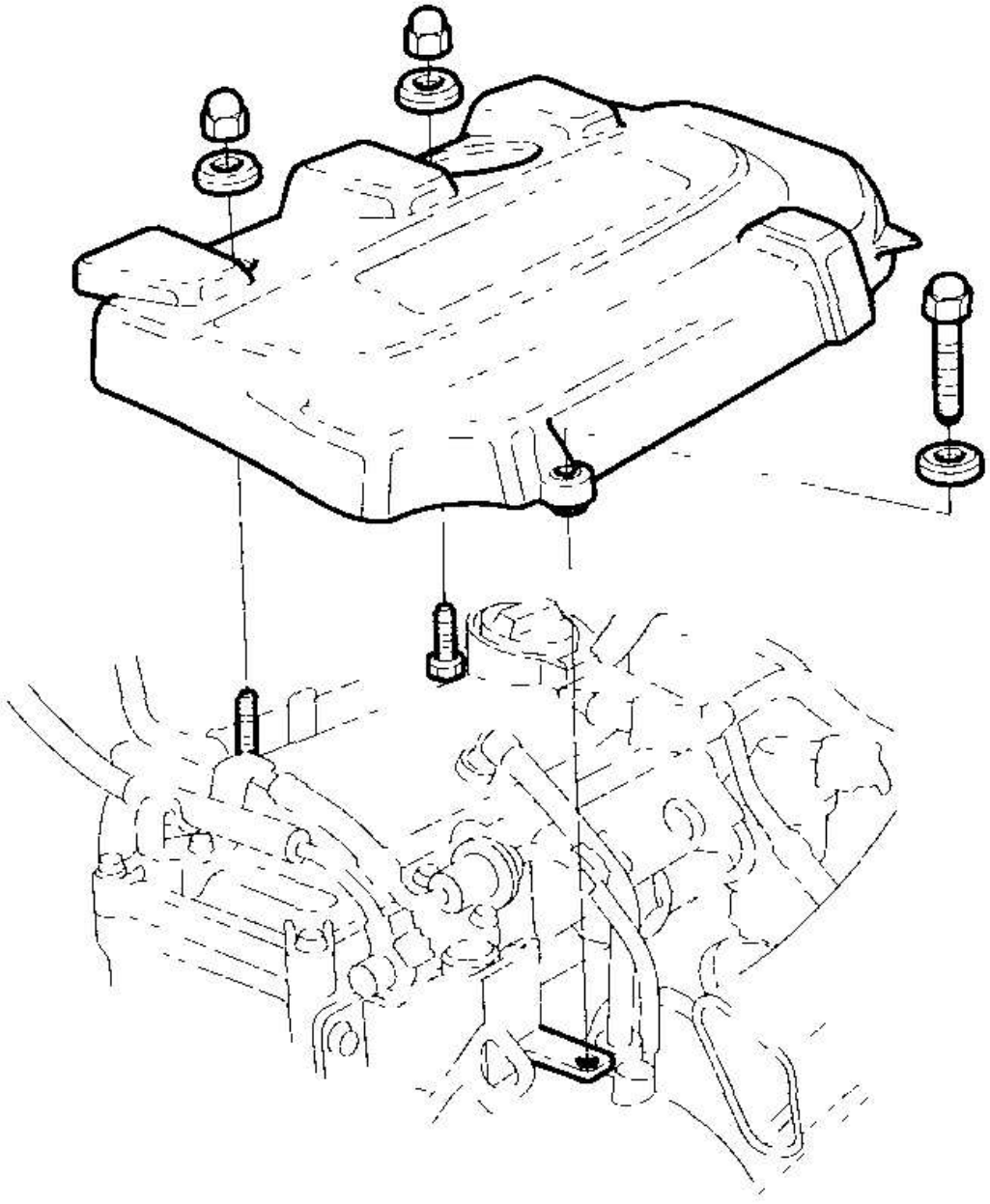
8. Inspect for fuel leaks. Turn the ignition switch ON (II) (do not operate the starter) so that the fuel pump runs for about 2 seconds and pressurizes the fuel line. Repeat this operation two or three times, then check for fuel leakage at any point in the fuel line.

CYLINDER HEAD REMOVAL

NOTE:

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

1. Make sure you have the anti-theft codes for the radio, then write down the audio presets.
2. Disconnect the negative cable from the battery first, then disconnect the positive cable.
3. Drain the engine coolant (see **COOLANT REPLACEMENT**).
4. Drain the engine oil (see **ENGINE OIL REPLACEMENT**).
5. Remove the engine cover.



G03680420

Fig. 68: Removing Engine Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Remove the breather pipe (A) and brake booster vacuum hose bracket (B) from the air cleaner housing, then remove the air cleaner housing/intake air duct assembly (C).

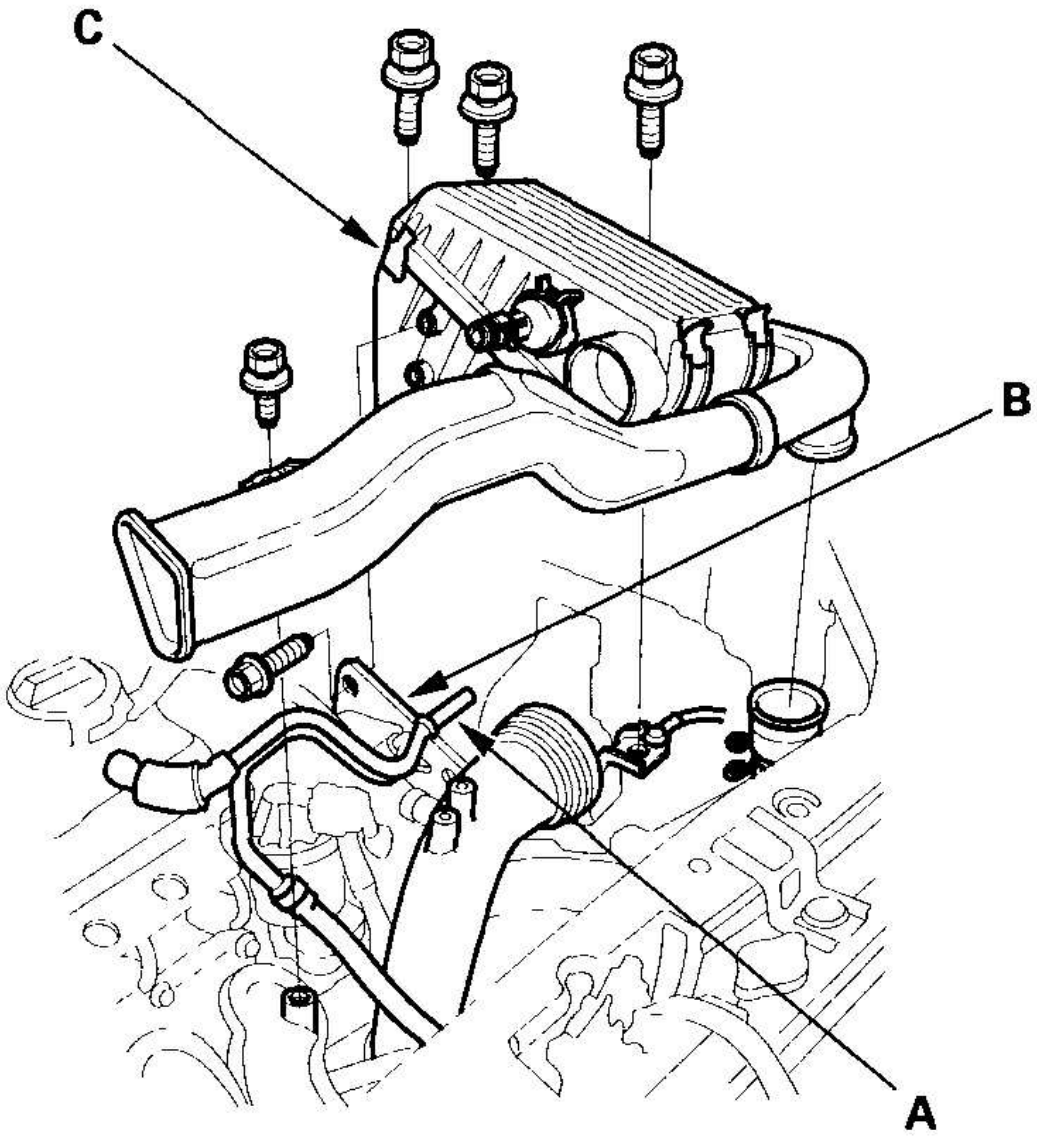
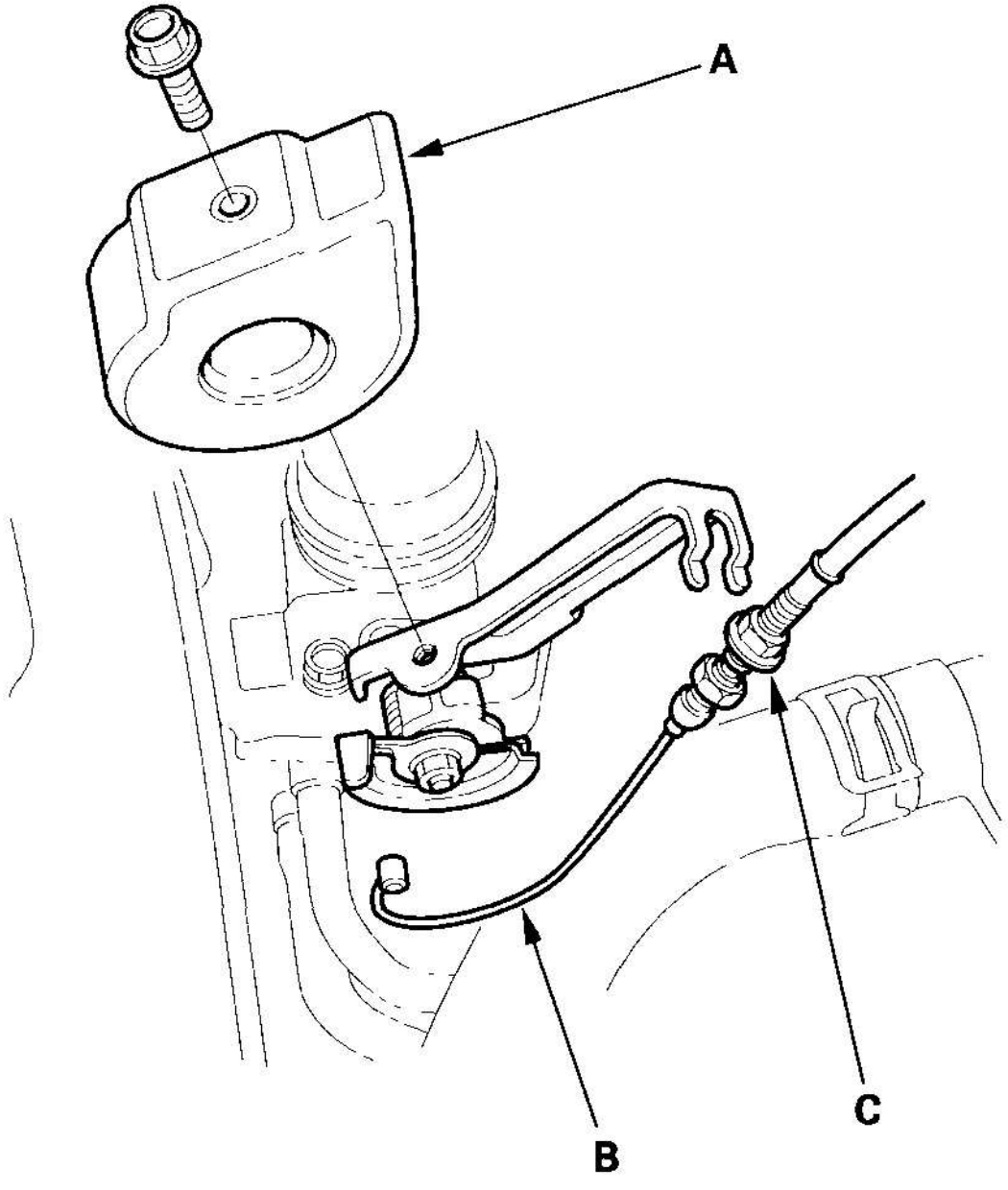


Fig. 69: Removing Air Cleaner Housing/Intake Air Duct Assembly
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Remove the throttle cover (A). Remove the throttle cable (B) by loosening the locknut (C), then slip the cable end out of the accelerator linkage. Take care not to bend the cable when removing it. Always replace any kinked cable with a new one.



G03680422

Fig. 70: Removing Throttle Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Remove the brake booster vacuum hose (A), evaporative emission (EVAP) canister hose (B), water bypass hoses (C), and vacuum hose (D).

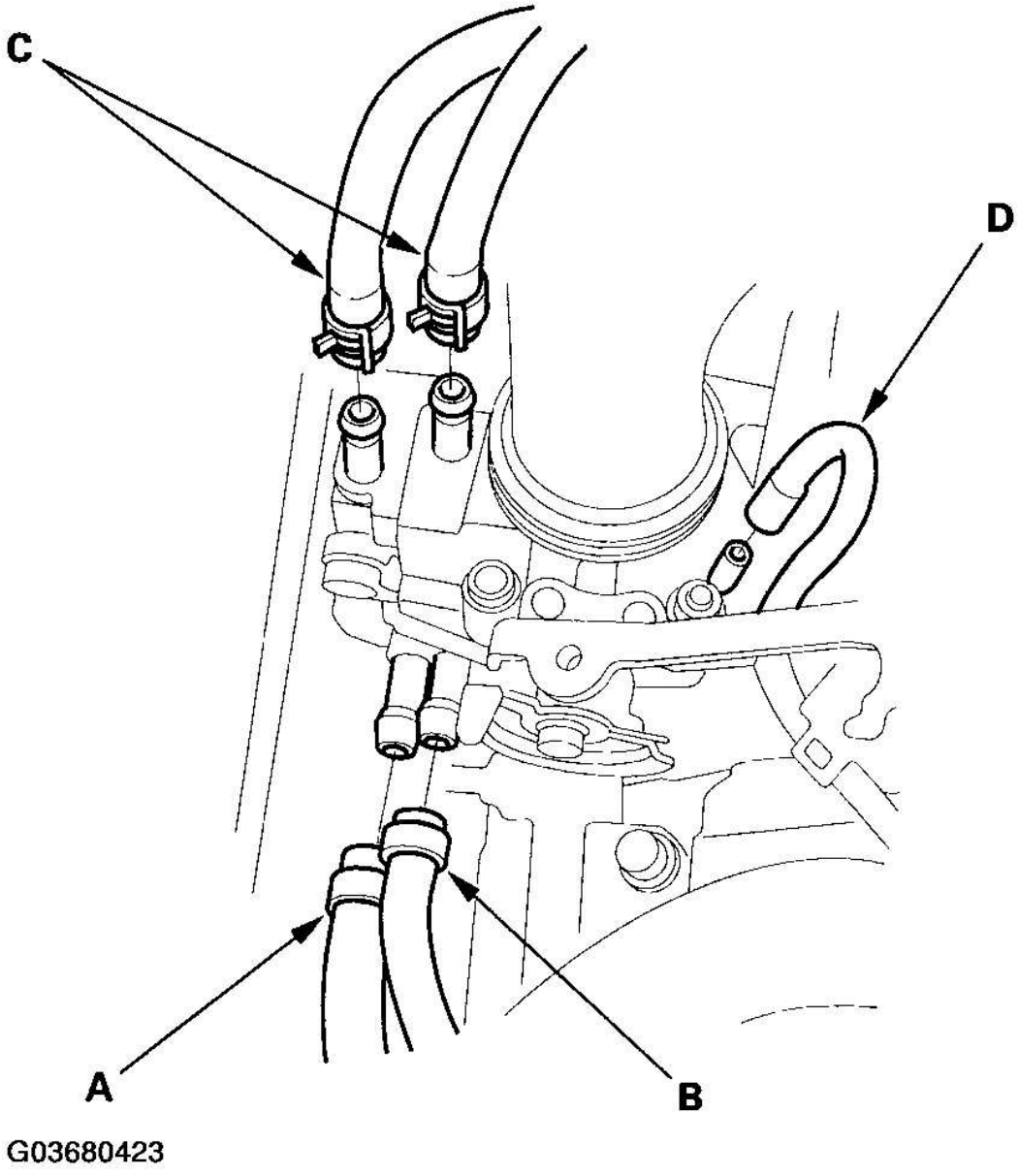


Fig. 71: Removing Brake Booster Vacuum Hose

Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Relieve fuel pressure:
    - 2000-2003 models (see **2000-2003 MODELS**)
    - 2004-2005 models (see **2004-2005 MODELS**)
    - 2006 model (see **2006 MODEL**)
10. Remove the heater hoses.

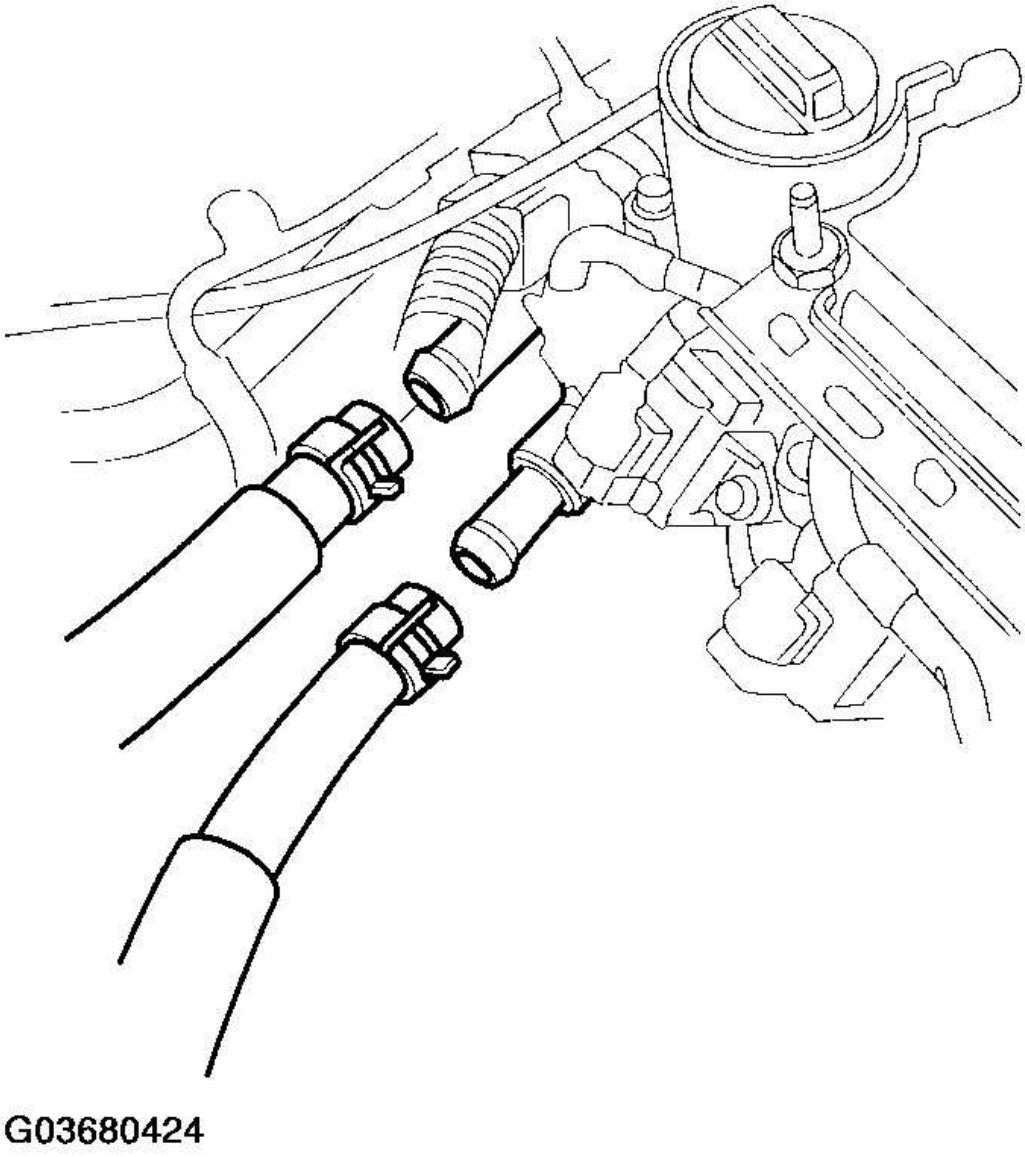


Fig. 72: Removing Heater Hoses
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Remove the engine wire harness connectors and wire harness clamps from the cylinder head and intake manifold.
    - Three fuel injector connectors

- Three ignition coil connectors
- Intake air temperature (IAT) sensor connector
- Idle air control (IAC) valve connector
- Throttle position (TP) sensor connector
- Manifold absolute pressure (MAP) sensor connector
- Engine coolant temperature (ECT) sensor connector
- Exhaust gas recirculation (EGR) valve connector
- Air fuel ratio (A/F) sensor connector
- Secondary heated oxygen sensor (secondary HO2S) connector
- 2002-2006 M/T models: Third heated oxygen sensor (third HO2S) connector
- Rocker arm oil control solenoid (VTEC solenoid valve) connector
- Rocker arm oil pressure switch (VTEC oil pressure switch) connector
- Camshaft position (CMP) sensor A/B connectors

12. Remove the cylinder head cover (see step 3).
13. Remove the intake manifold (A) and EGR plate (B).

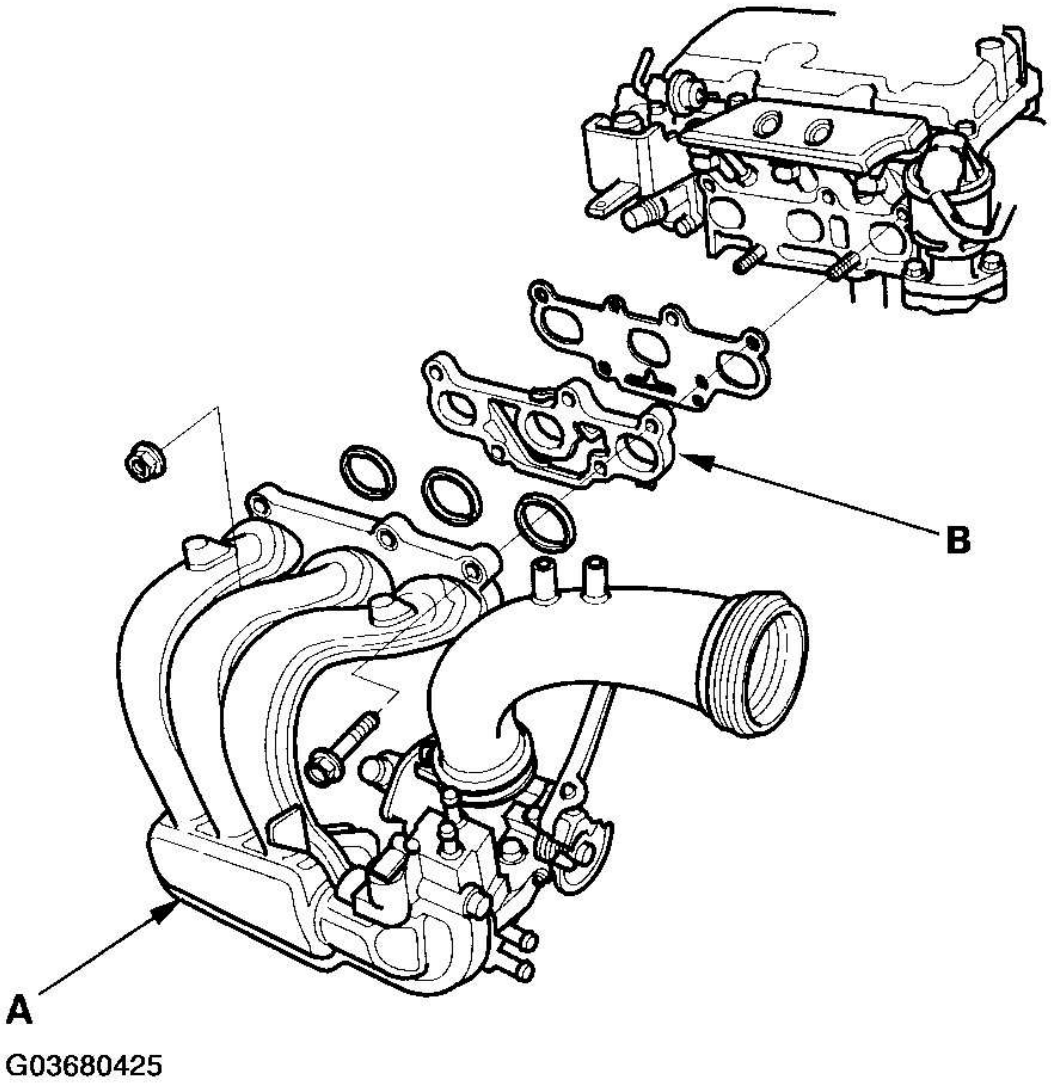


Fig. 73: Removing Intake Manifold And EGR Plate
Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. Remove the upper radiator hose (A) and connecting pipes (B).

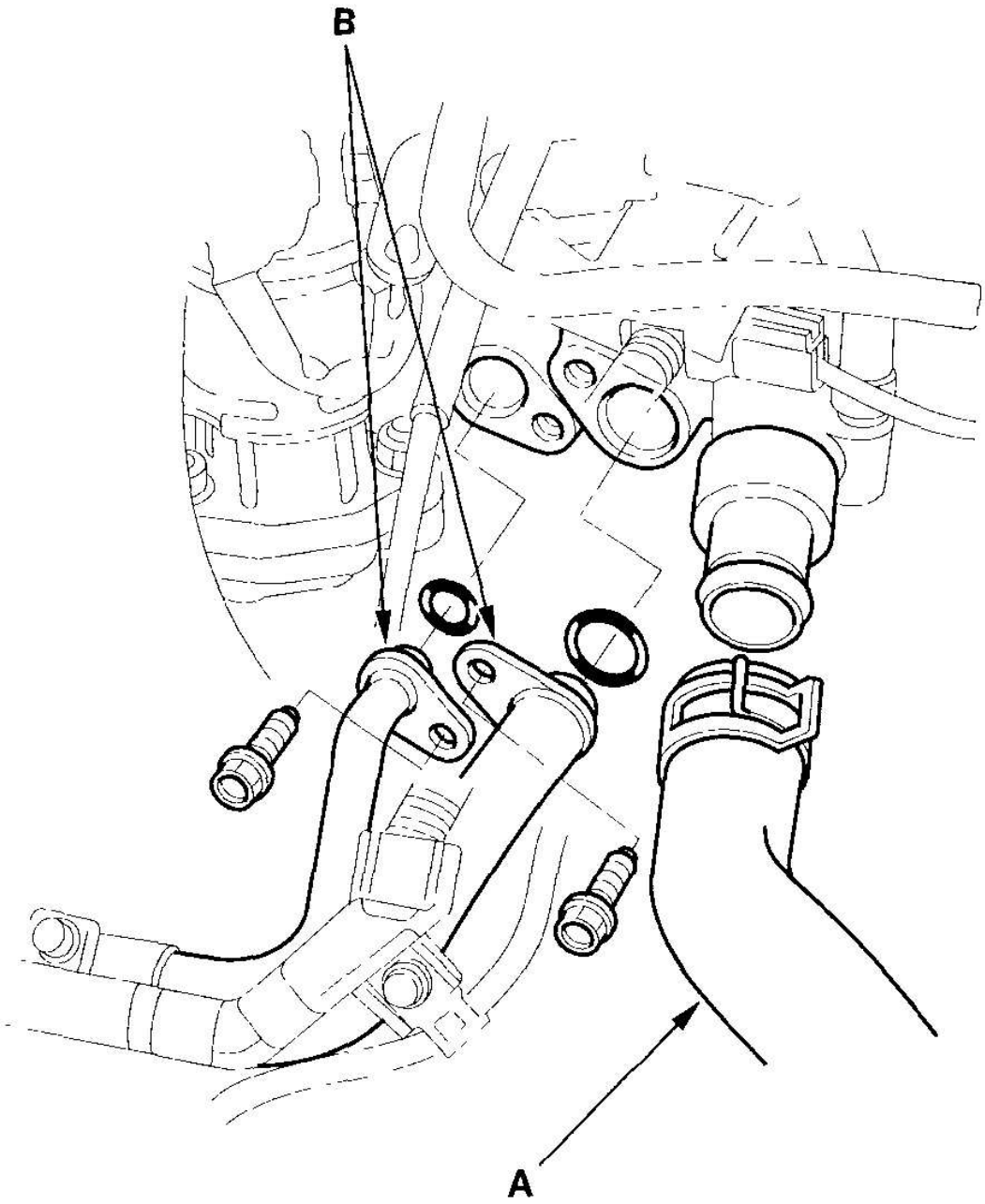


Fig. 74: Removing Upper Radiator Hose And Connecting Pipes
Courtesy of AMERICAN HONDA MOTOR CO., INC.

15. Remove the three way catalytic converter (TWC).

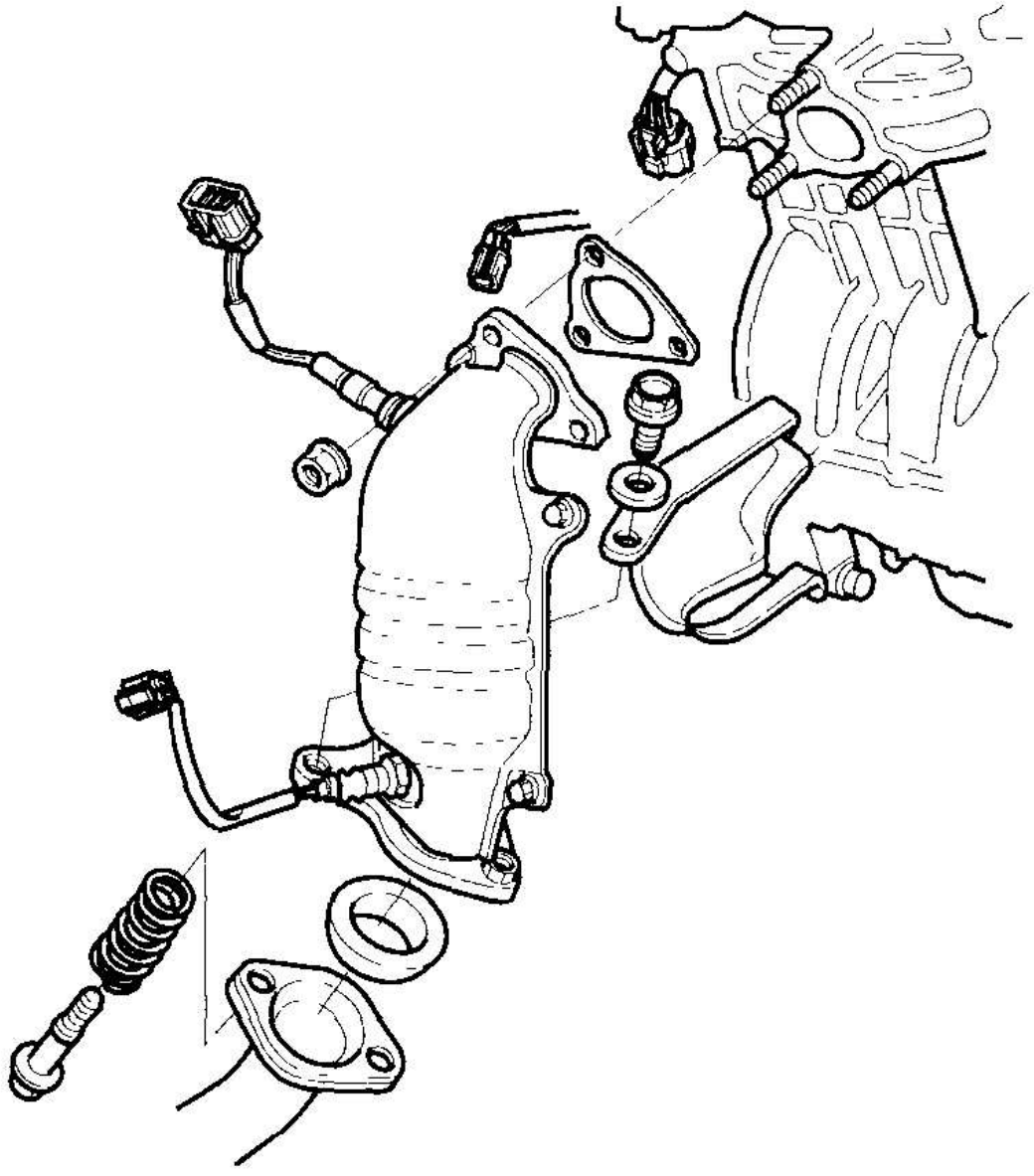


Fig. 75: Removing Three Way Catalytic Converter
Courtesy of AMERICAN HONDA MOTOR CO., INC.

16. Remove the dipstick.
17. Remove the cam chain auto-tensioner. When removing the bolt and nuts, make

sure to loosen them in sequence, one turn at a time.

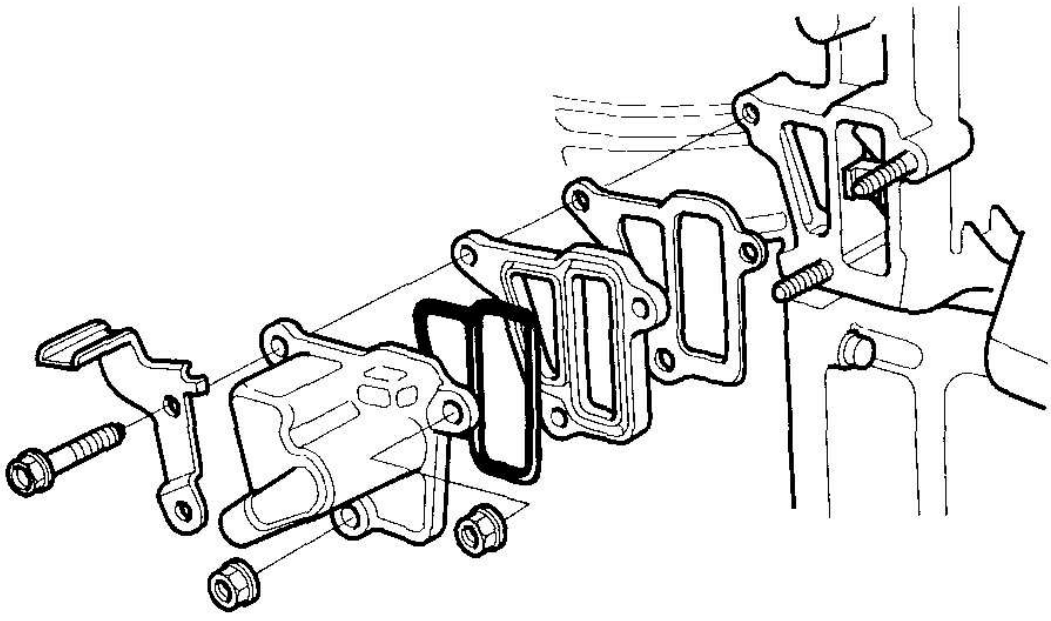


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Fig. 76: Removing Cam Chain Auto-Tensioner
Courtesy of AMERICAN HONDA MOTOR CO., INC.

18. Remove the cylinder head plug.

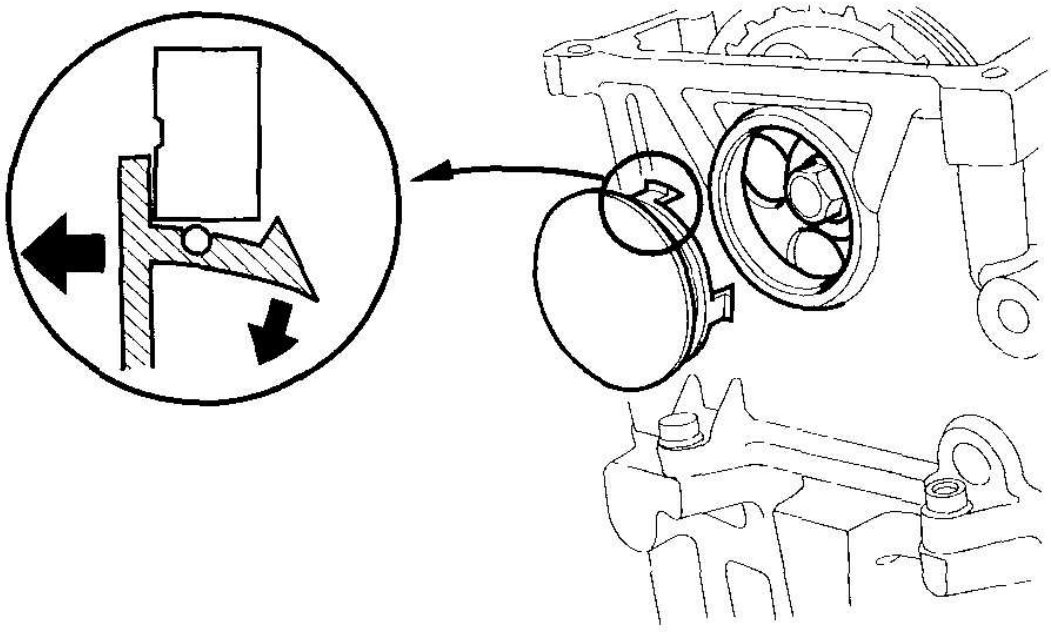

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Fig. 77: Removing Cylinder Head Plug
Courtesy of AMERICAN HONDA MOTOR CO., INC.

19. Hold the camshaft with an open-end wrench, then loosen the camshaft sprocket mounting bolt.

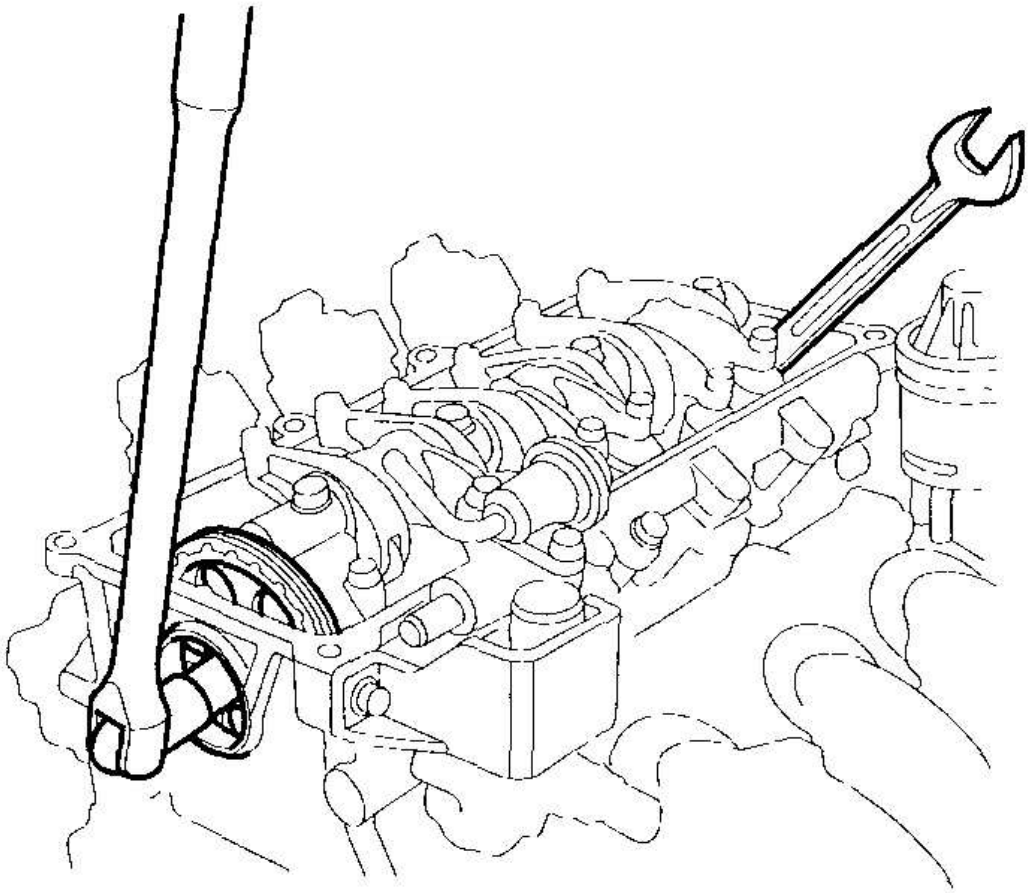

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Fig. 78: Loosening Camshaft Sprocket Mounting Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

20. Remove the camshaft sprocket from the cylinder head.

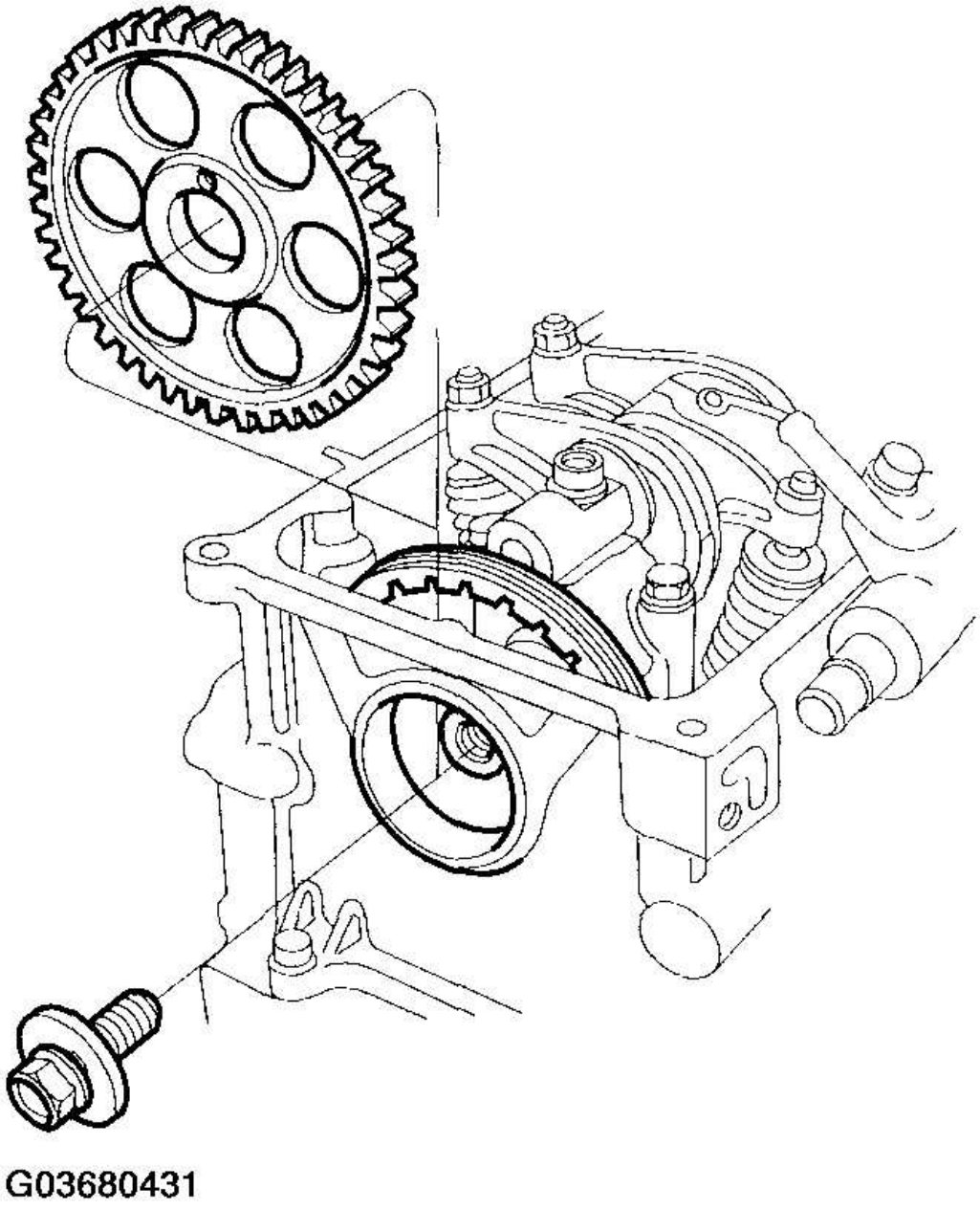

Fig. 79: Removing Camshaft Sprocket From Cylinder Head
Courtesy of AMERICAN HONDA MOTOR CO., INC.

21. Remove the engine mount bracket mounting bolt on the cylinder head side.

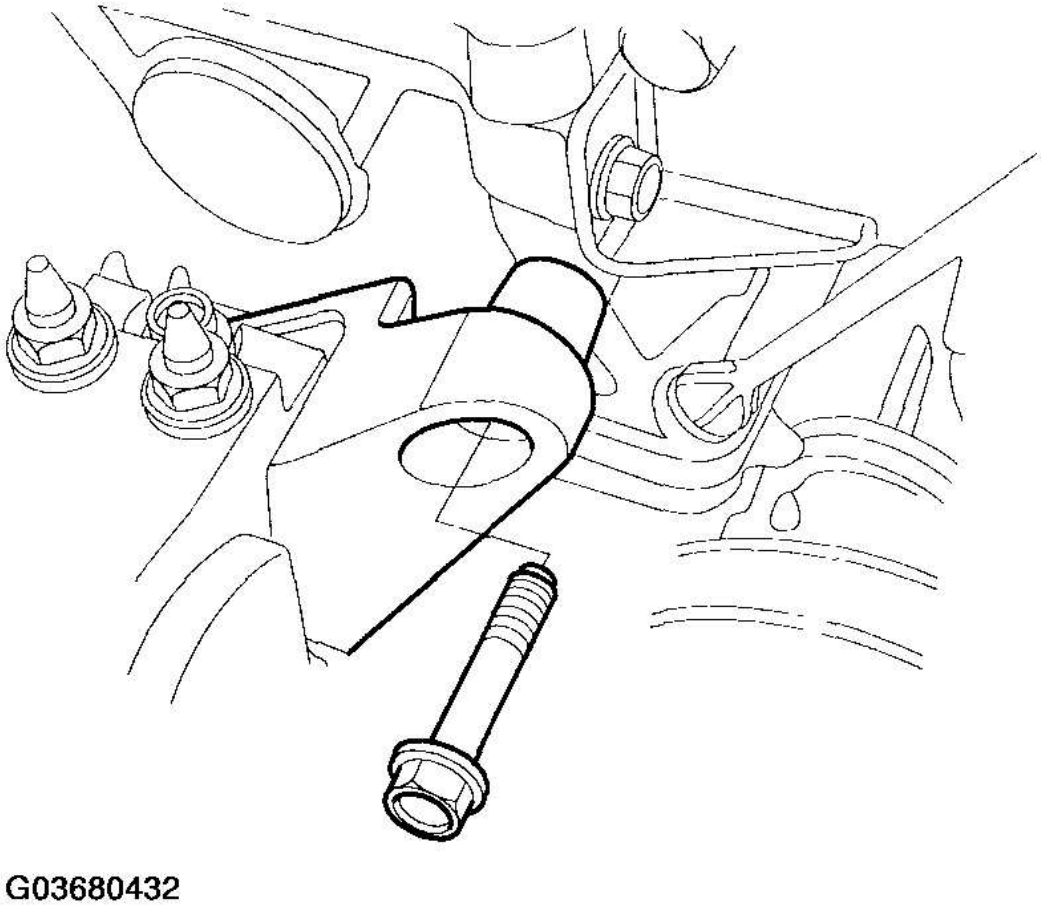

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Fig. 80: Removing Engine Mount Bracket Mounting Bolt On Cylinder Head Side
Courtesy of AMERICAN HONDA MOTOR CO., INC.

22. Remove the cylinder head bolts. To prevent warpage, unscrew the bolts in sequence 1/3 turn at a time; repeat the sequence until all the bolts are loose.

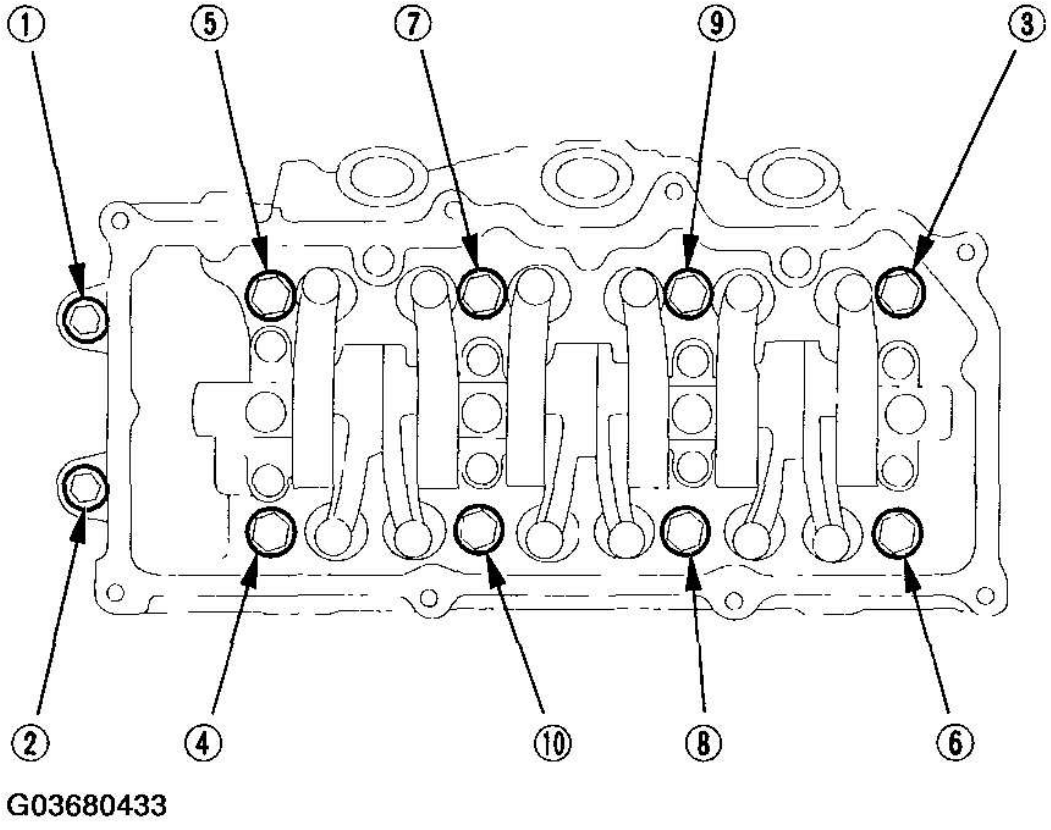

Fig. 81: Removing Cylinder Head Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

23. 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 the cylinder head.
- Maximum resurface limit is 0.2 mm (0.008 in.) based on a height of 120 mm (4.72 in.).

Cylinder Head Height

Standard (New): 119.95-120.05 mm (4.722-4.726 in.)

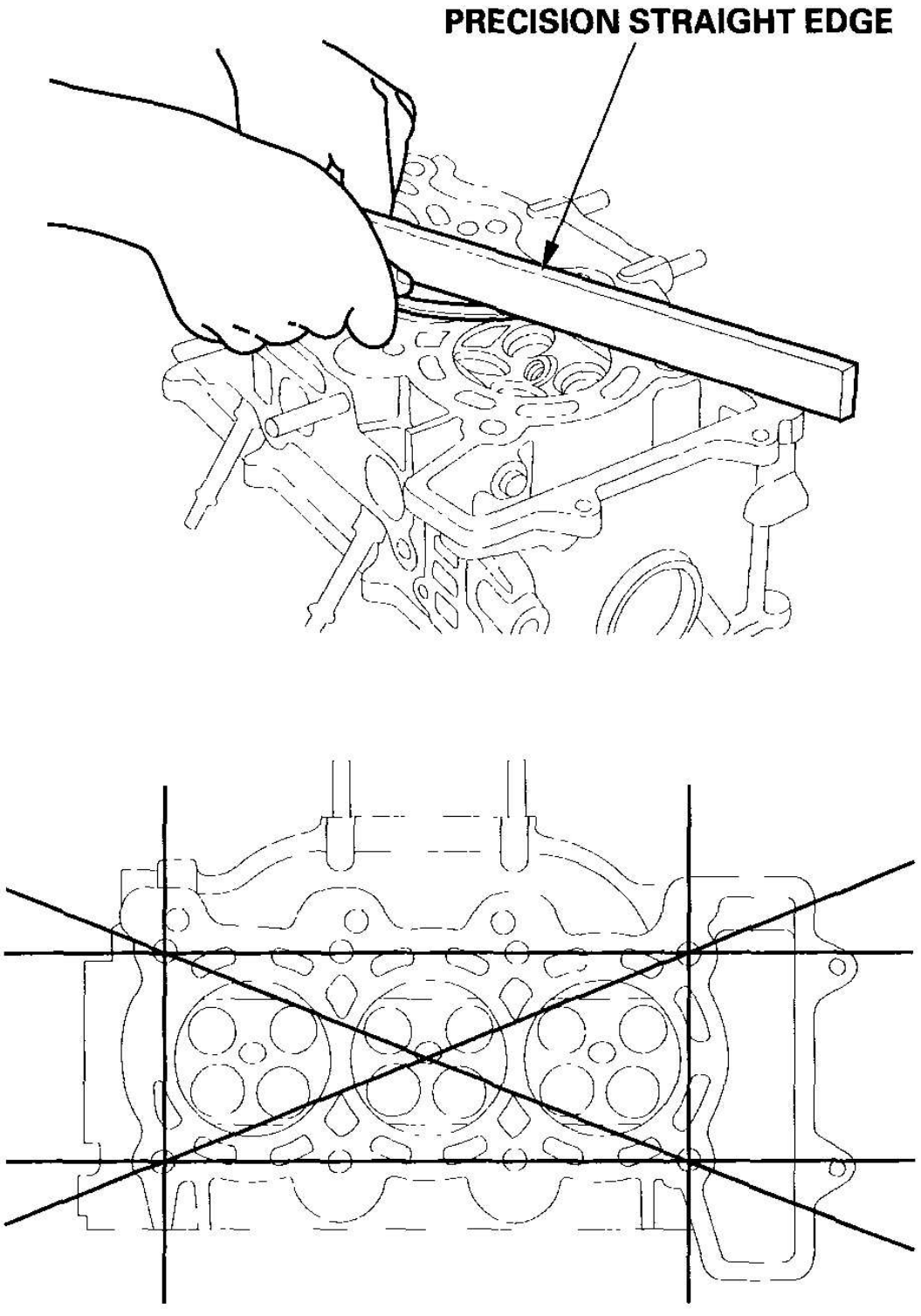

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Fig. 82: Identifying Cylinder Head Height
Courtesy of AMERICAN HONDA MOTOR CO., INC.

ROCKER ARM ASSEMBLY REMOVAL

1. Loosen the adjusting screws (A).

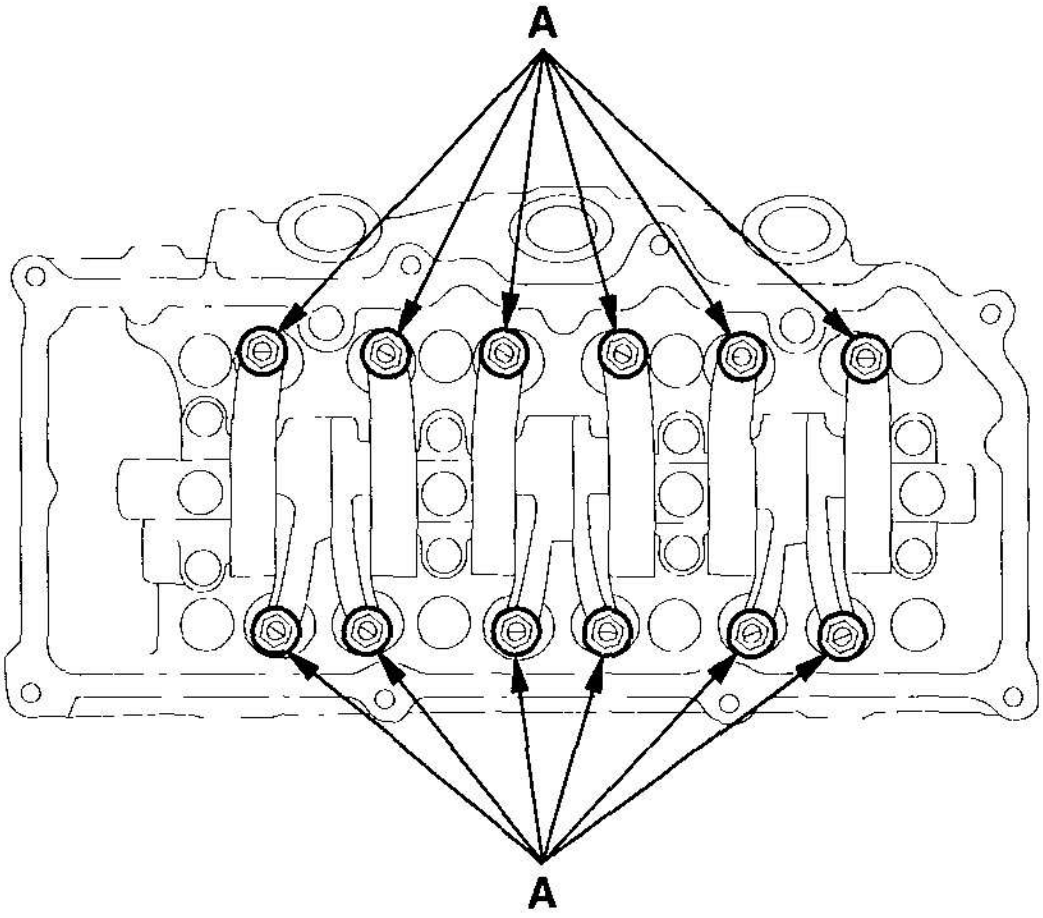

Fig. 83: Removing Rocker Arm Assembly
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Remove the bolts and the rocker arm assembly.
    - 1 To prevent damaging the valves or rocker arm assembly, unscrew the

rocker shaft mounting bolts in sequence as shown two turns at a time.

- 2 When removing the rocker arm assembly, do not remove the rocker shaft mounting bolts. The bolts will keep the rocker arms on the shaft.

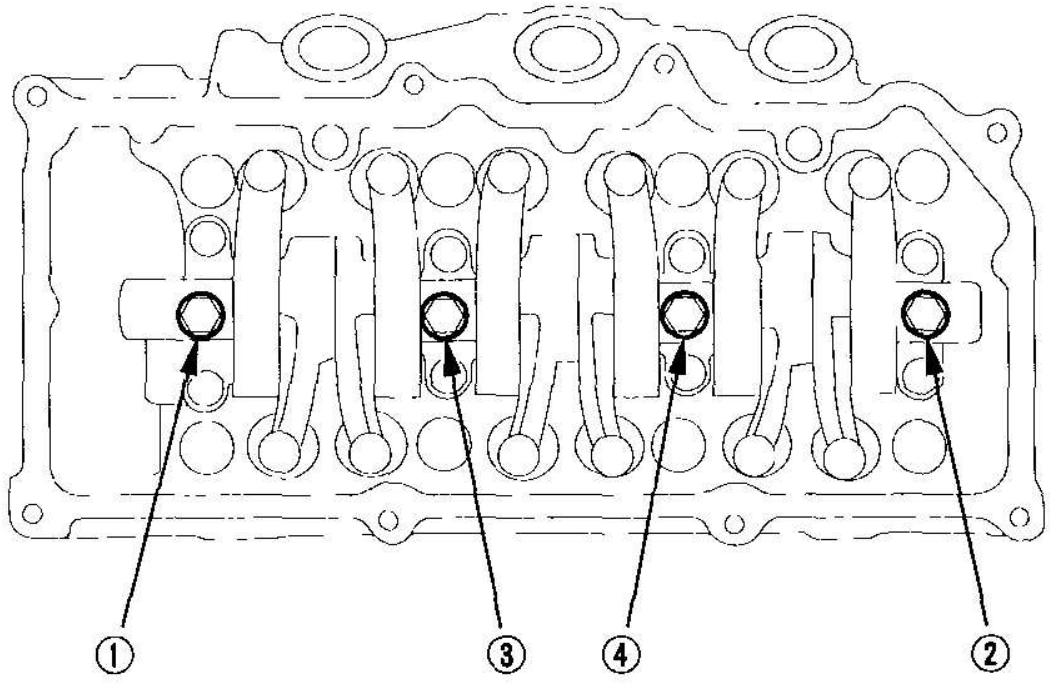

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Fig. 84: Removing Rocker Shaft Mounting Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

ROCKER ARM AND SHAFT DISASSEMBLY/REASSEMBLY

NOTE:

- **Identify parts as they are removed to ensure reinstallation in original locations.**
- **Inspect the rocker shafts and rocker arms (see ROCKER ARM AND SHAFT INSPECTION).**
- **The rocker arms must be installed in the same positions if reused.**

- **When removing or installing the rocker arm assembly, do not remove the rocker shaft mounting bolts. The bolts will keep the rocker arms on the shaft.**
- **Prior to reassembling, clean all the parts in solvent, dry them, and apply new engine oil to any contact points.**
- **When replacing the intake rocker arm assembly, remove the fastening hardware from the new intake rocker arm assembly.**

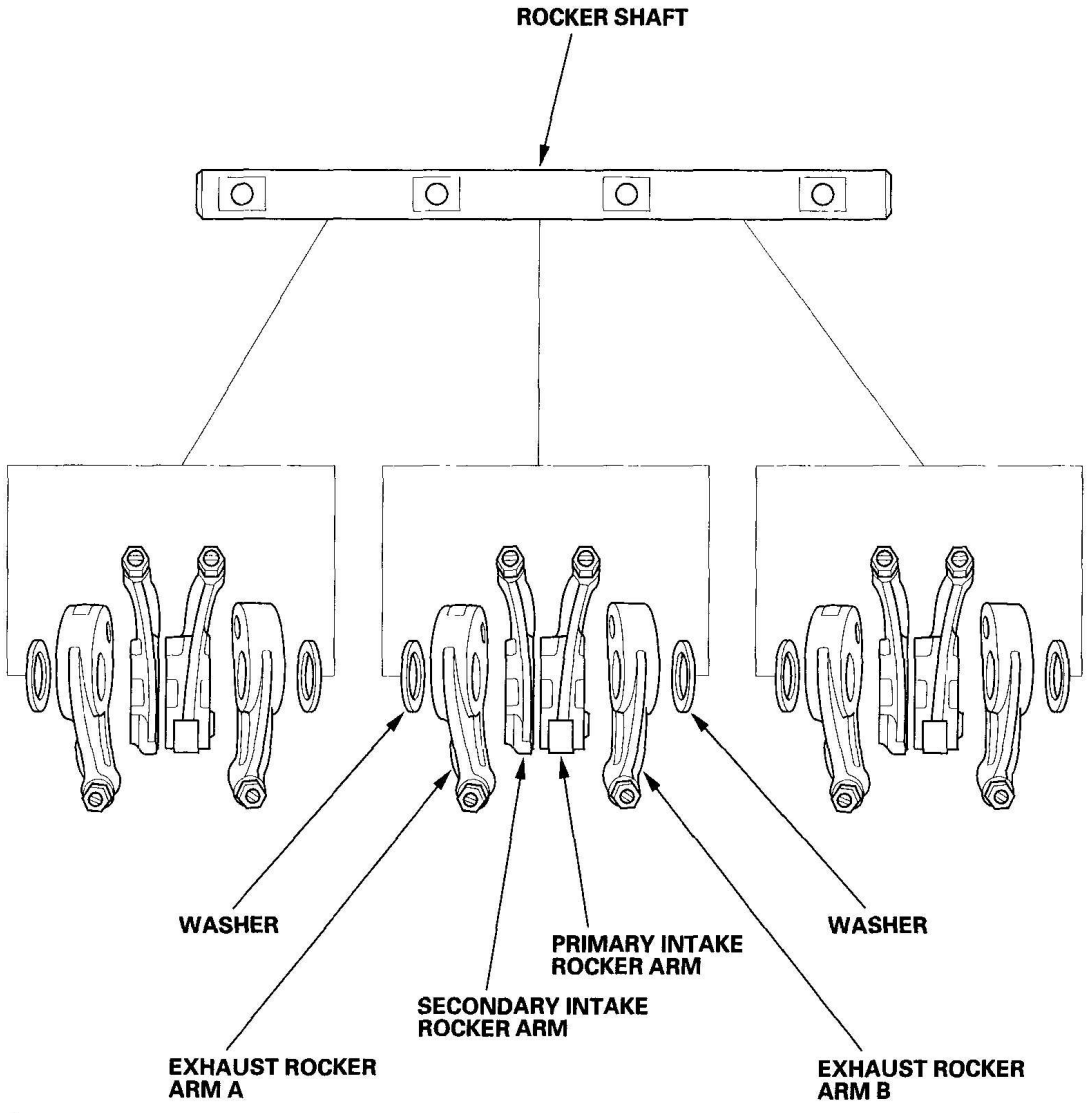

Fig. 85: Identifying Rocker Shafts And Rocker Arms
Courtesy of AMERICAN HONDA MOTOR CO., INC.

ROCKER ARM AND SHAFT INSPECTION

1. Remove the rocker arm assembly (see **ROCKER ARM ASSEMBLY REMOVAL**), then disassemble the rocker arm assembly (see **ROCKER ARM AND SHAFT DISASSEMBLY/REASSEMBLY**).
2. Measure the diameter of the shaft at the first rocker location.

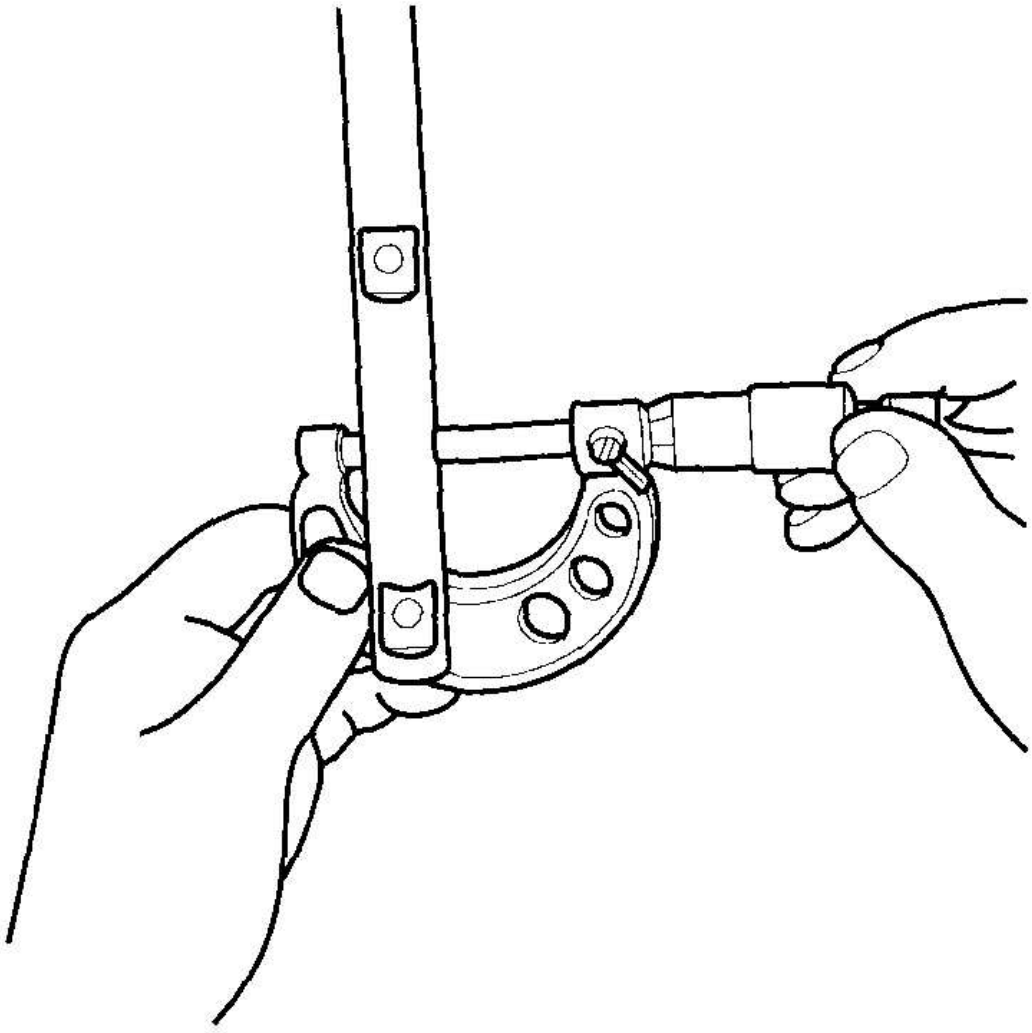

Fig. 86: Measuring Diameter Of Shaft At First Rocker Location
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

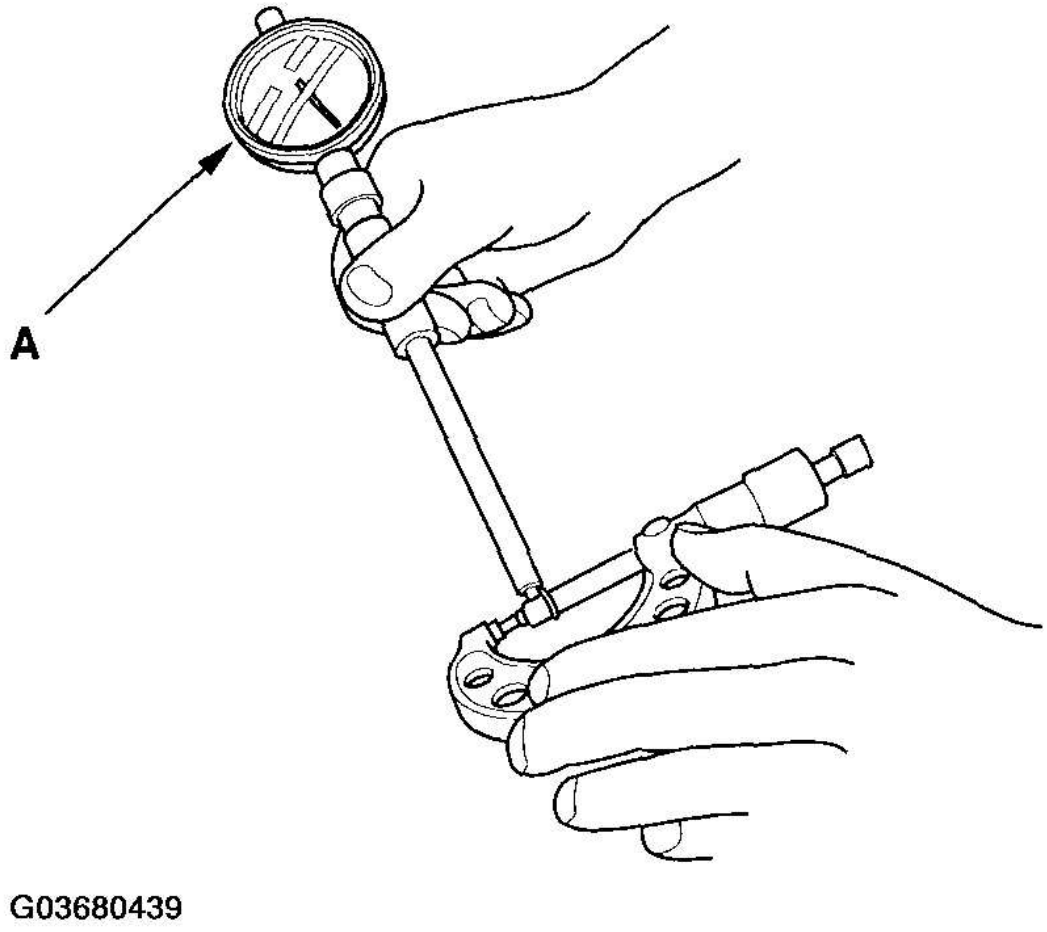

Fig. 87: Zeroing Gauge
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. 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: 0.019-0.058 mm

(0.0007-0.0023 in.)

Service Limit: 0.08 mm (0.003 in.)

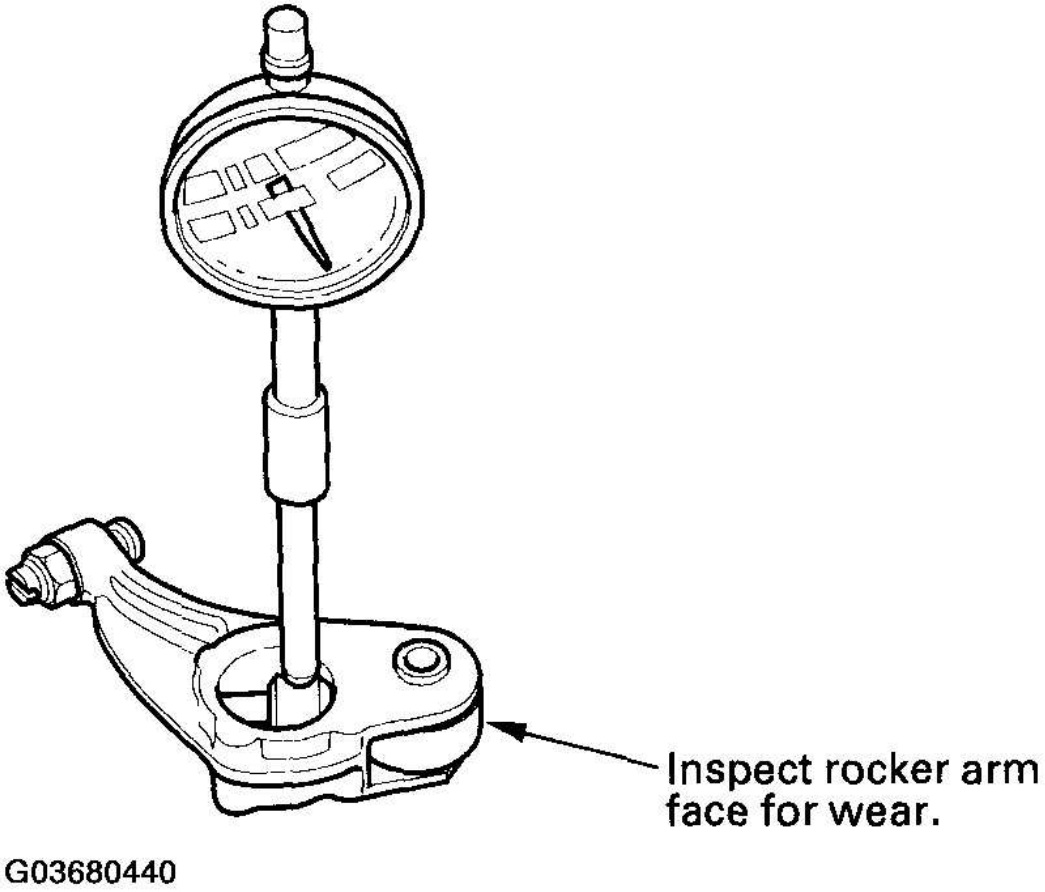

Fig. 88: Identifying Rocker Arm-To-Shaft Clearance
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

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

NOTE:

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

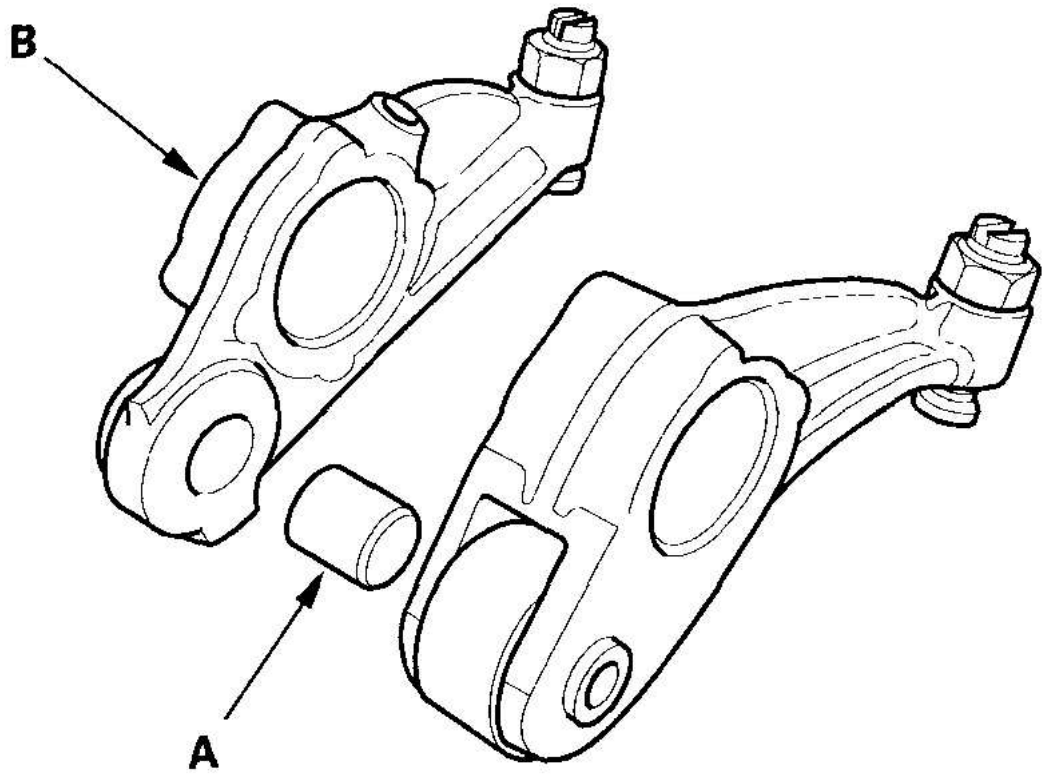

Fig. 89: Applying New Engine Oil To Pistons
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Reassemble the rocker arm assembly (see **ROCKER ARM AND SHAFT DISASSEMBLY/REASSEMBLY**), then install the rocker arm assembly (see **ROCKER ARM AND SHAFT DISASSEMBLY/REASSEMBLY**).

CAMSHAFT INSPECTION

NOTE: Do not rotate the camshaft during inspection.

1. Remove the rocker arms and rocker shaft.
2. Put the camshaft and the camshaft holders on the cylinder head, then tighten the bolts to the specified torque.

   Specified Torque:

   12 N.m (1.2 kgf.m, 8.7 lbf.ft)

   Apply new engine oil to the bolt threads.

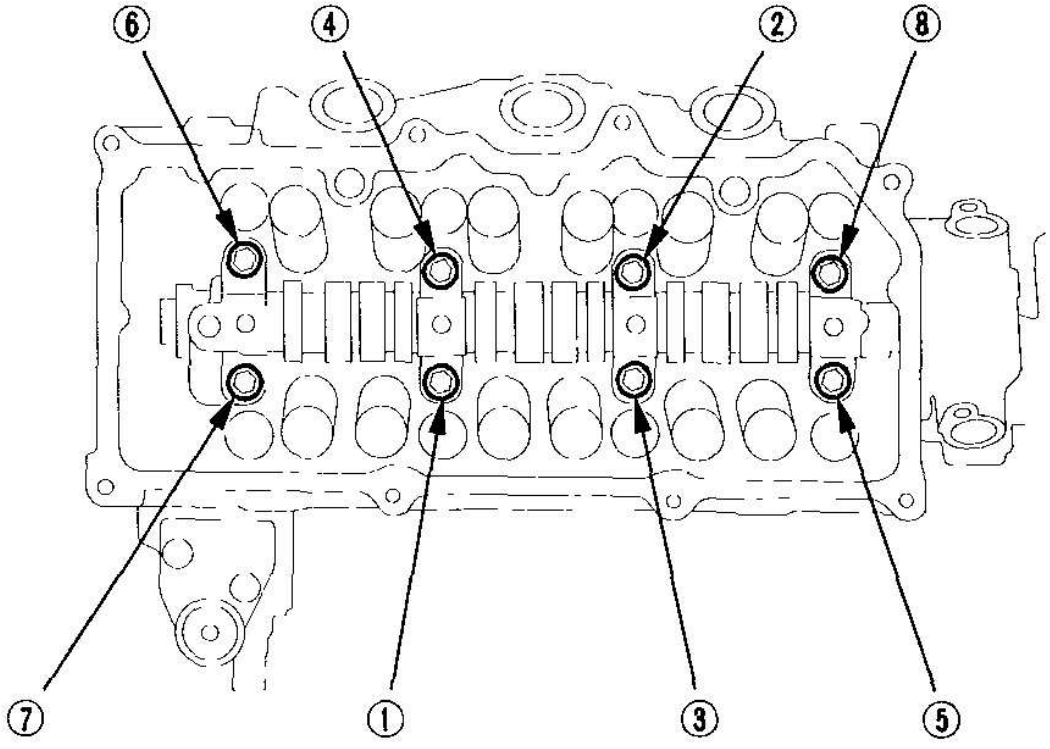

Fig. 90: Removing Rocker Arms And Rocker Shaft
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Seat the camshaft by pushing it toward the rear of the cylinder head.
4. Zero the dial indicator against the end of the camshaft. 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.)

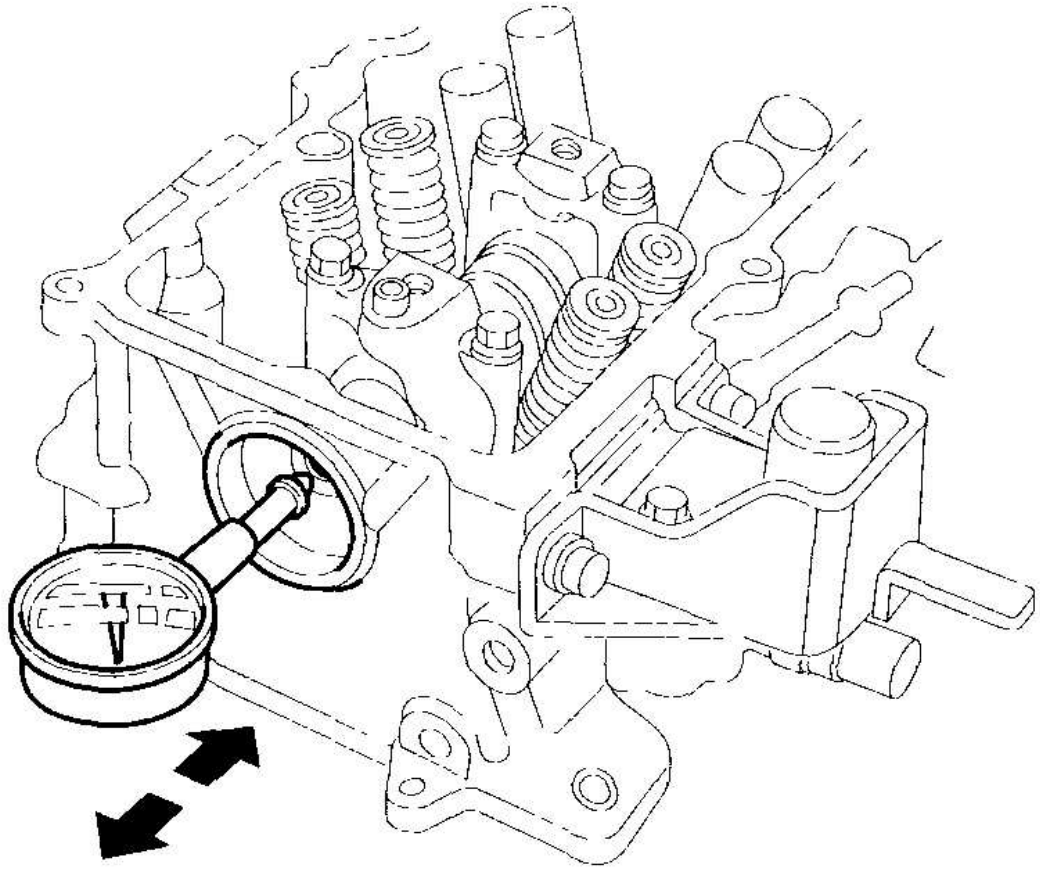

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Fig. 91: Identifying Camshaft End Play
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Unscrew the camshaft holder bolts two turns at a time, in a crisscross pattern. Then remove the camshaft holders from the cylinder head.
6. Lift the camshaft out of the cylinder head, wipe it clean, then inspect the lift ramps. Replace the camshaft if any lobes are pitted, scored, or excessively worn.
7. Clean the camshaft journal surfaces in the cylinder head, then set the camshaft back in place. Place a plastigage strip across each journal.
8. Install the camshaft holders, then tighten the bolts to the specified torque as shown in step 2 .
9. Remove the camshaft holders. Measure the widest part of plastigage on each journal.
   - If the camshaft-to-holder clearance is within limits, go to step 11 .
   - 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 10.

Camshaft-to-Holder Oil Clearance

Standard (New): 0.050-0.089 mm

(0.0020-0.0035 in.)

Service Limit: 0.15 mm (0.006 in.)

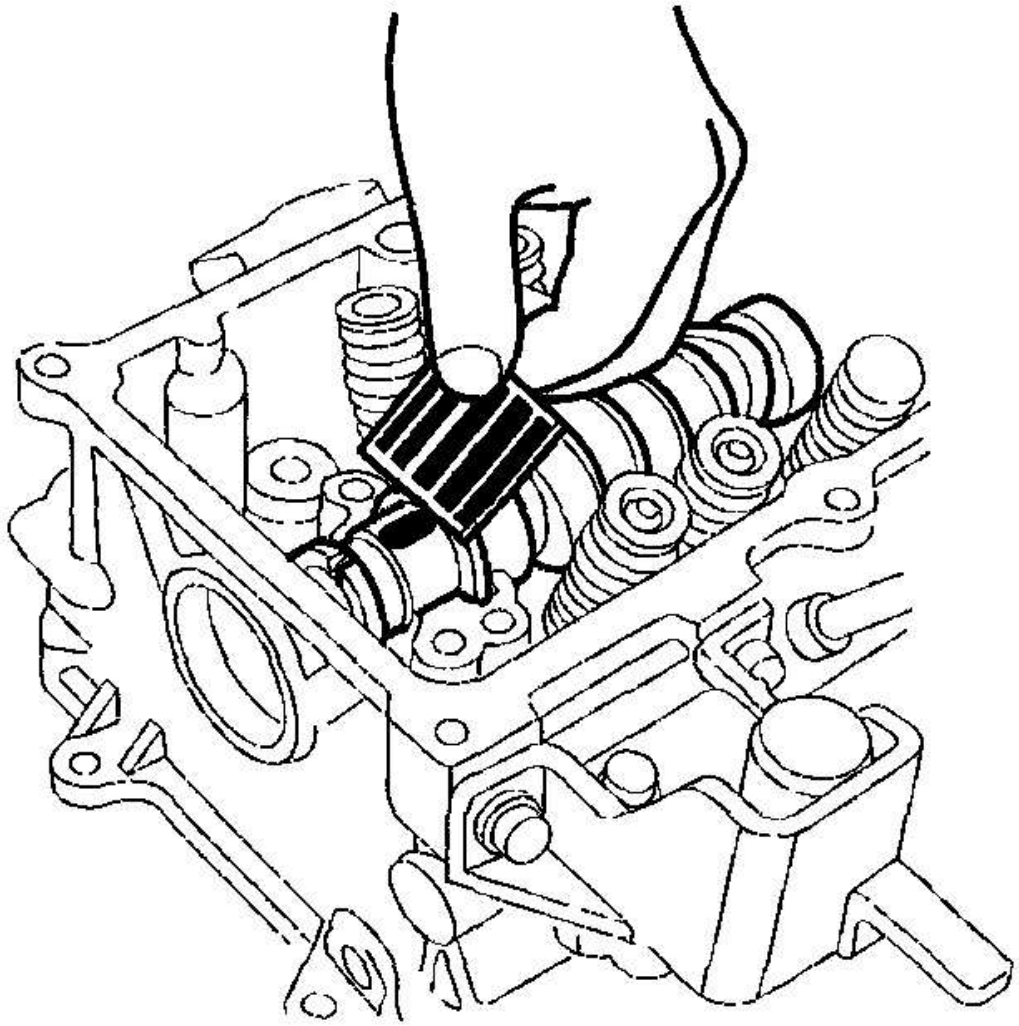

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Fig. 92: Identifying Camshaft-To-Holder Oil Clearance
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. 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.)

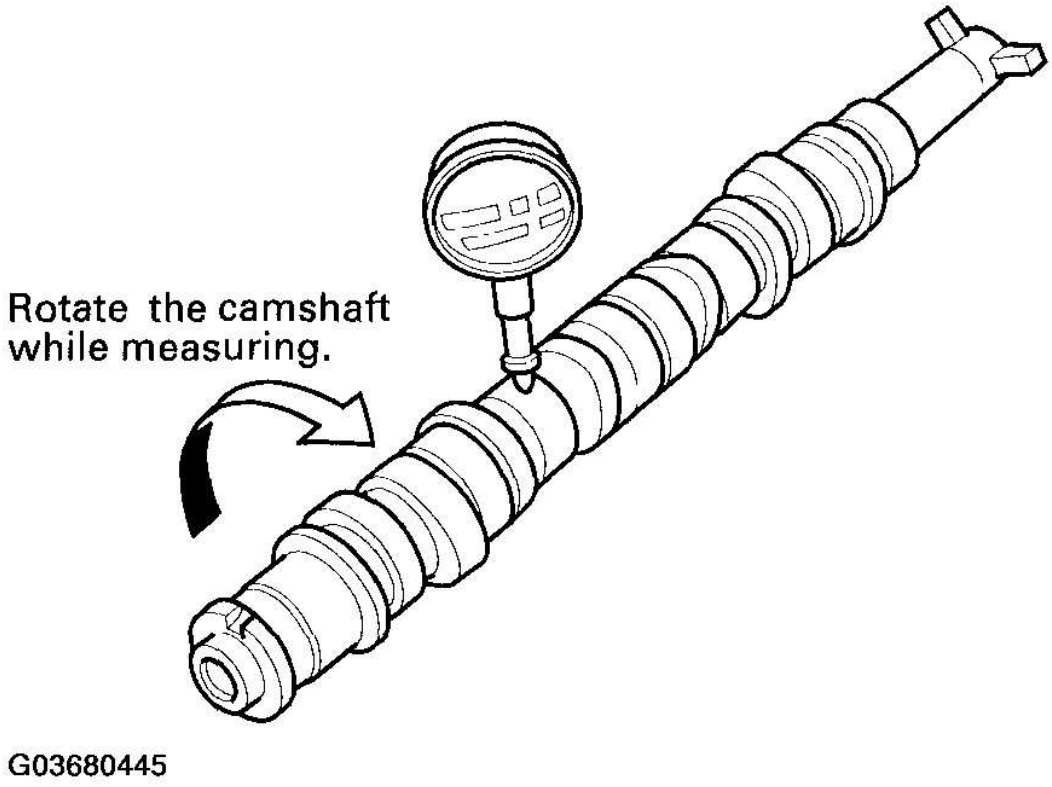


Fig. 93: Identifying Camshaft Total Runout
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Measure cam lobe height.

Cam Lobe Height Standard (New):

CAM LOBE HEIGHT STANDARD

	INTAKE	EXHAUST
PRI	36.332 mm(1.4304 in.)	36.246 mm (1.4270 in.)
SEC	32.263 mm (1.2702 in.)	

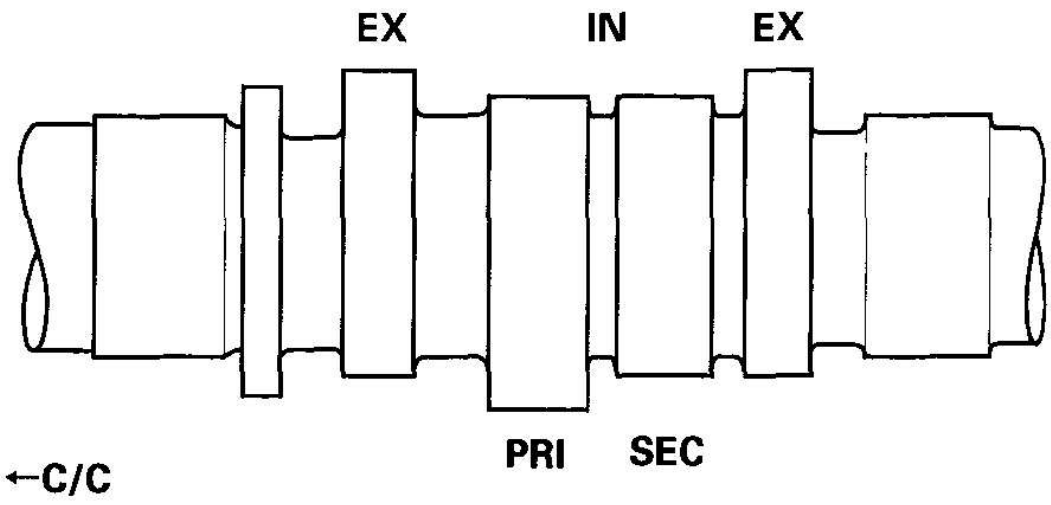
PRI: Primary

SEC: Secondary

IN: Intake

EX: Exhaust

C/C: Cam Chain



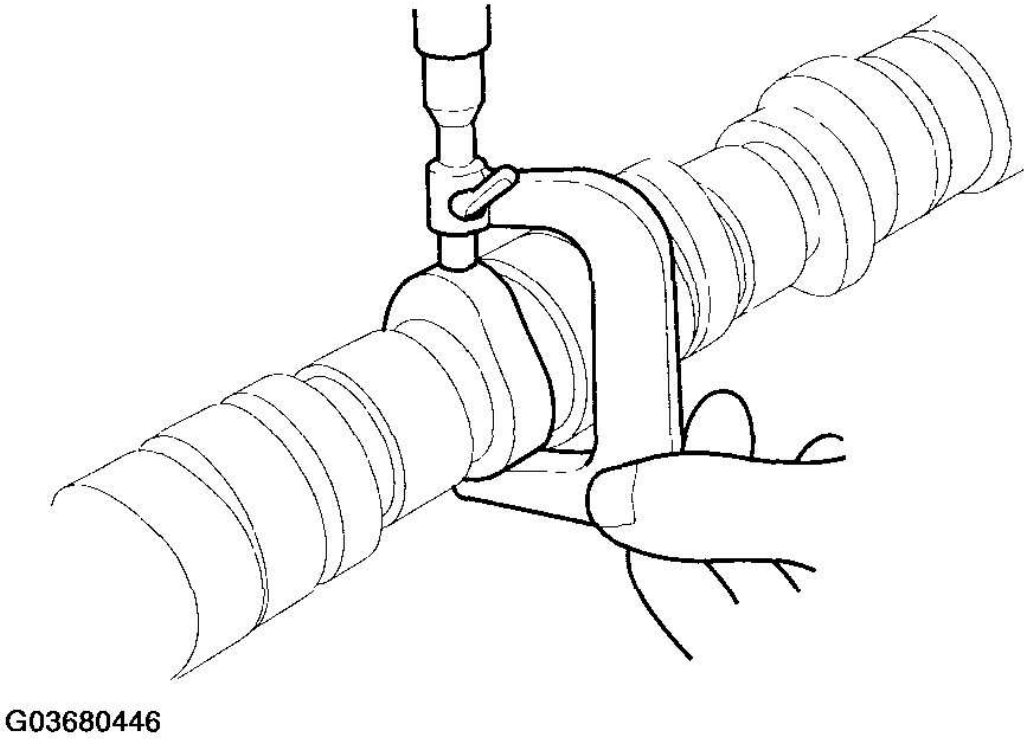


Fig. 94: Measuring Cam Lobe Height
Courtesy of AMERICAN HONDA MOTOR CO., INC.

VALVE, SPRING, AND VALVE SEAL REMOVAL

Special Tools Required

Valve spring compressor attachment 07757-PJ1010A

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

1. Remove the cylinder head (see **CYLINDER HEAD REMOVAL**).
2. Remove the rocker arm assembly (see **ROCKER ARM ASSEMBLY REMOVAL**).
3. Remove the camshaft.
4. Using an appropriate-sized socket (A) and plastic mallet (B), lightly tap the valve retainer to loosen the valve cotters.

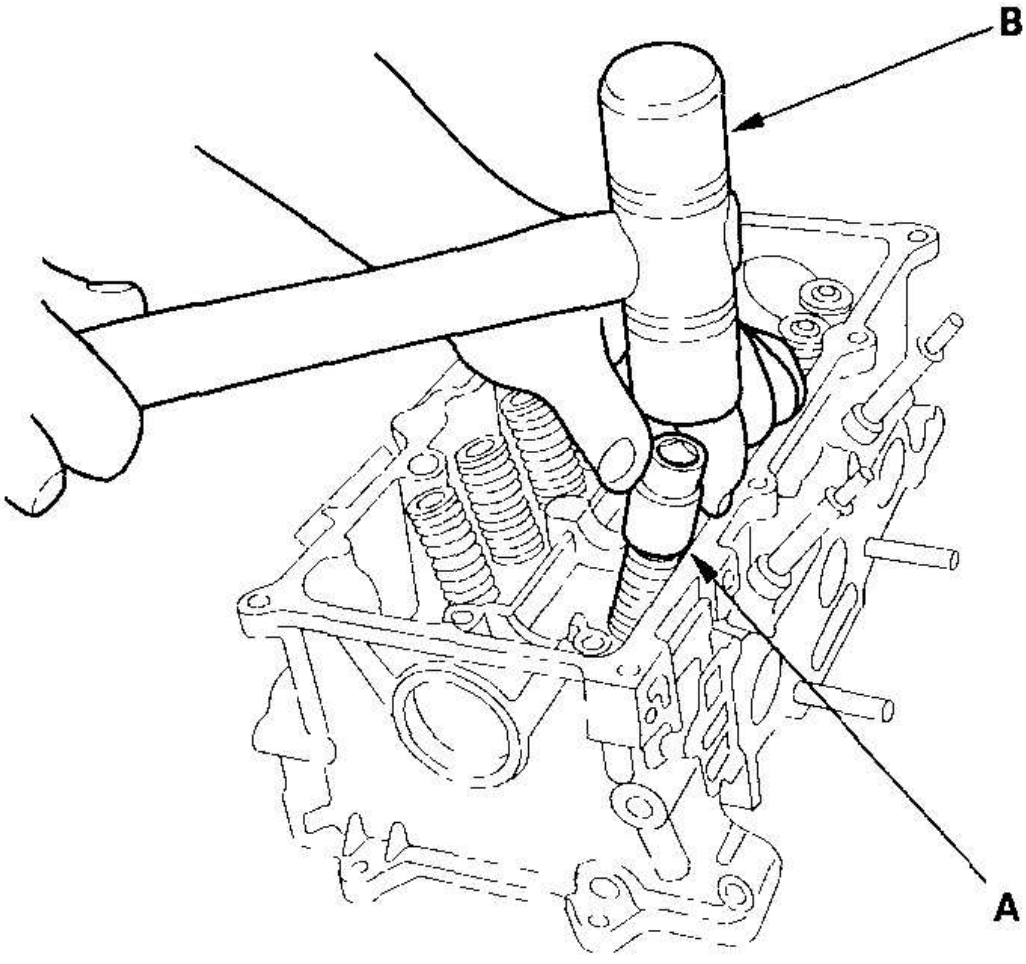


Fig. 95: Lightly Tapping The Valve Retainer
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Install the valve spring compressor attachment and valve spring compressor. Compress the spring and remove the valve cotters.

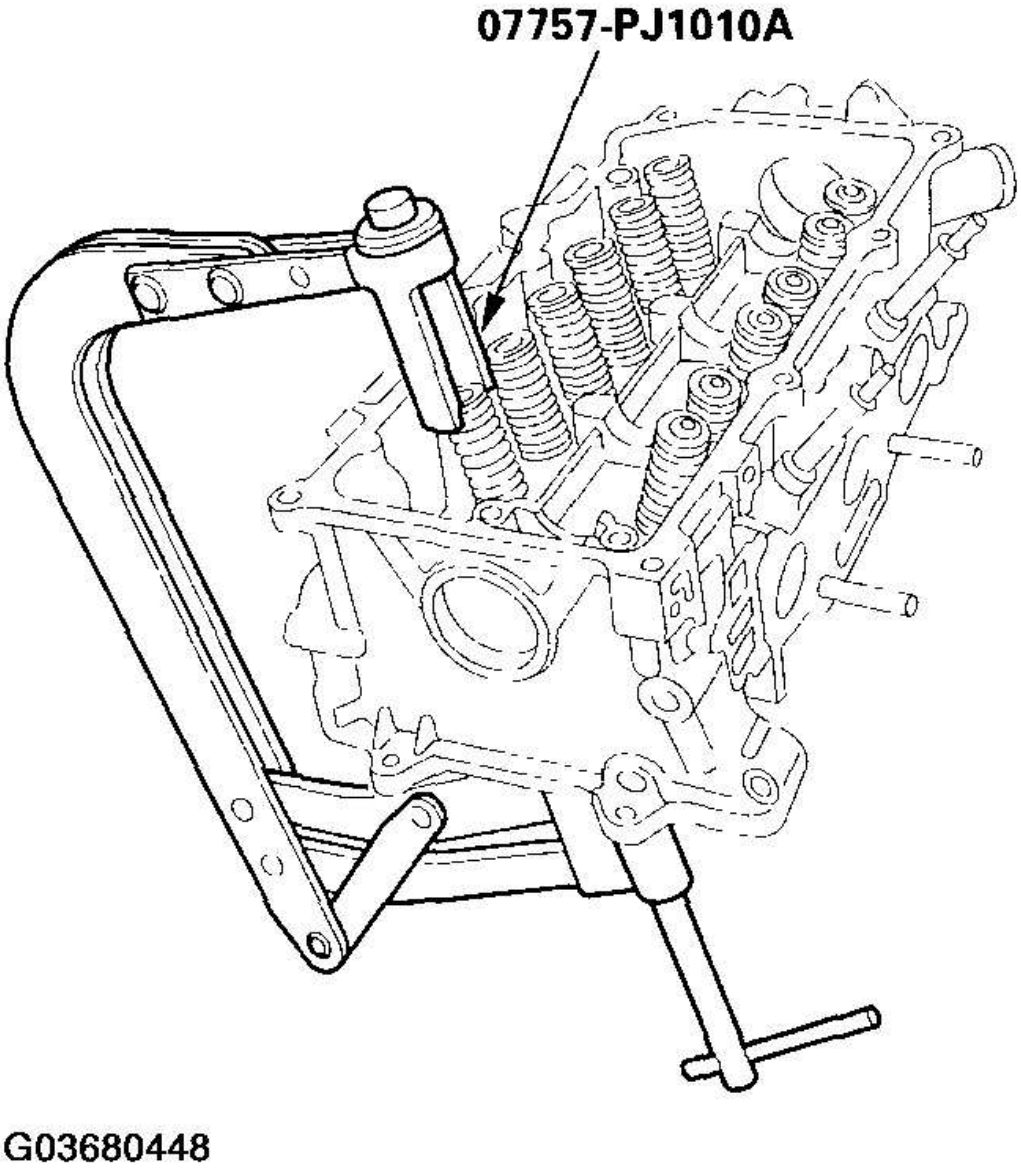


Fig. 96: Installing Valve Spring Compressor Attachment And Valve Spring Compressor
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Remove the valve spring compressor, valve spring compressor attachment, spring retainer, and spring.

7. Install the valve guide seal remover.

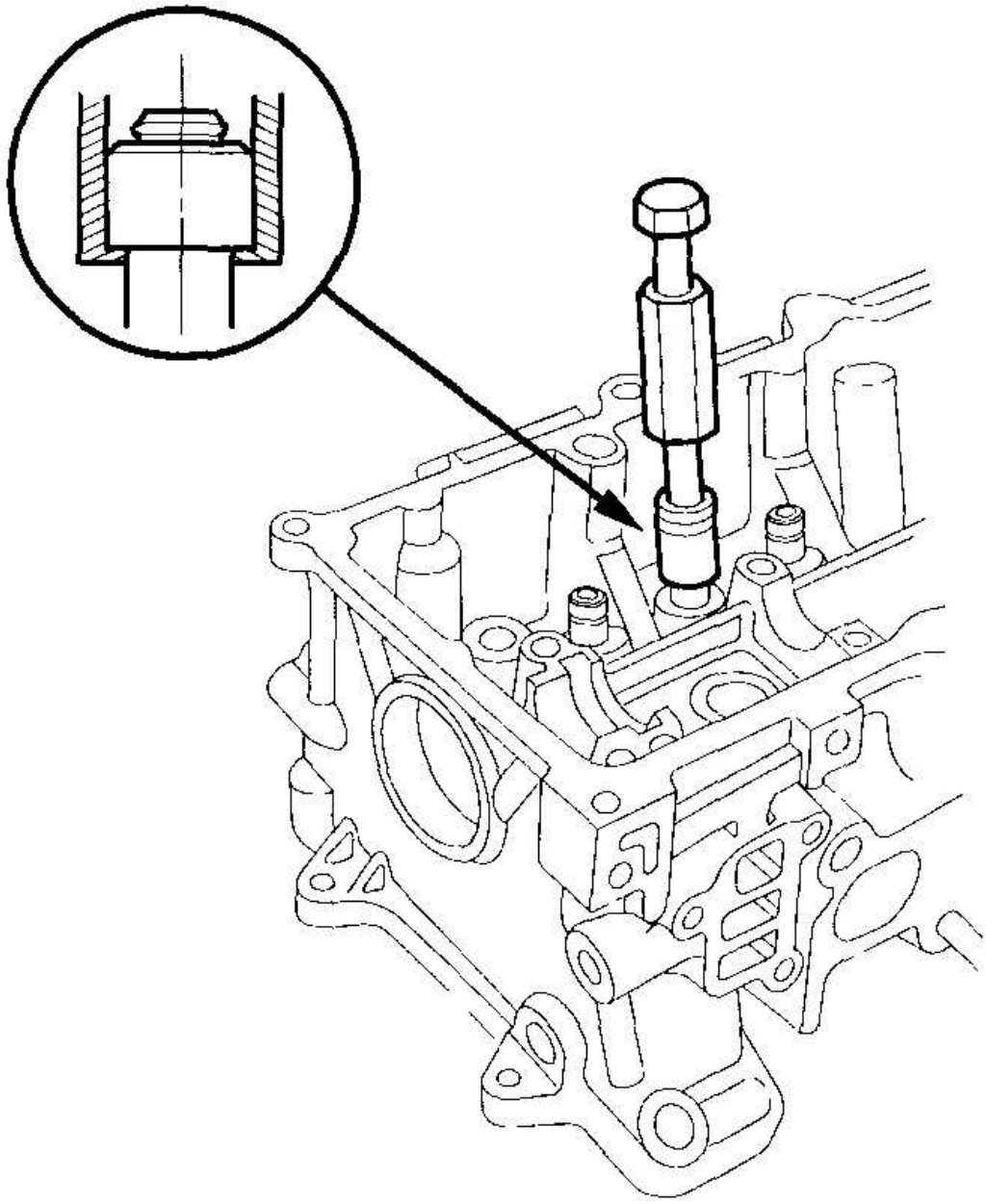


Fig. 97: Installing Valve Guide Seal Remover

Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Remove the valve seal.

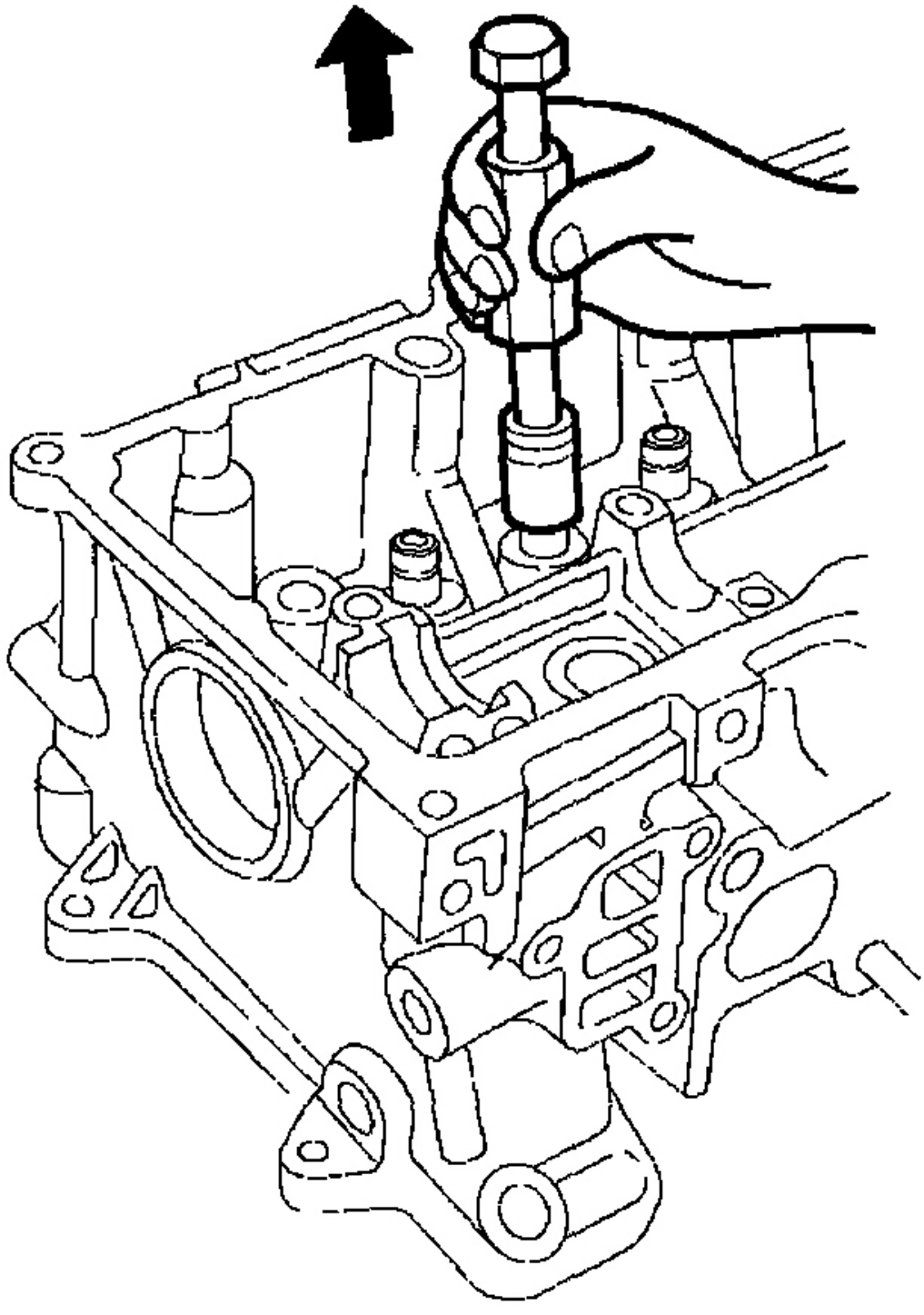


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Fig. 98: Removing Valve Seal
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Remove the valve spring seat and valve.

VALVE INSPECTION

1. Remove the valves (see **VALVE, SPRING, AND VALVE SEAL REMOVAL**).
2. Measure the valve in these areas.

Intake Valve Dimensions

A Standard (New): 26.9-27.1 mm (1.06-1.07 in.)

B Standard (New): 117.20-117.50 mm (4.614-4.626 in.)

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

C Service Limit: 5.44 mm (0.214 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): 22.9-23.1 mm (0.90-0.91 in.)

B Standard (New): 116.71-117.01 mm (4.595-4.607 in.)

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

C Service Limit: 5.41 mm (0.213 in.)

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

D Service Limit: 0.95 mm (0.037 in.)

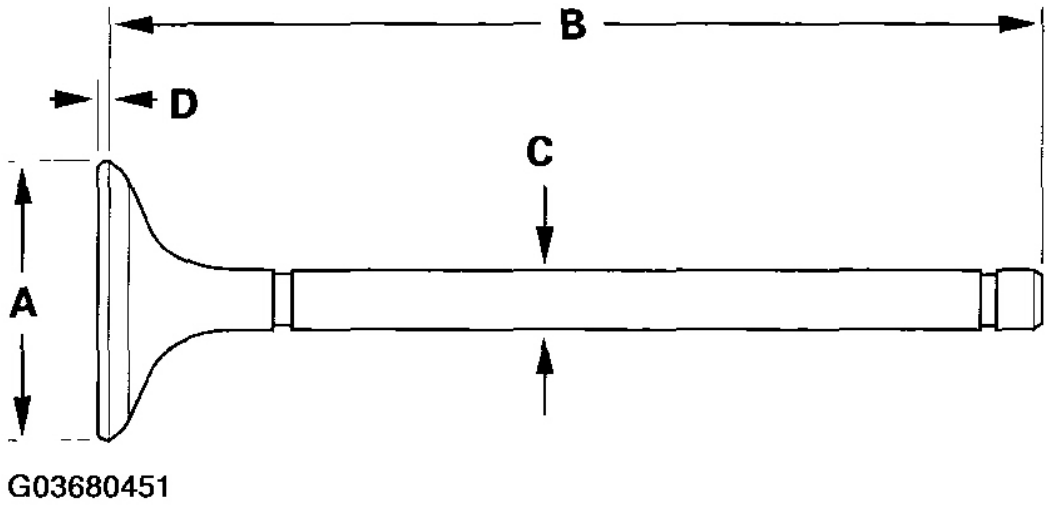

Fig. 99: Identifying Intake Valve Dimensions
Courtesy of AMERICAN HONDA MOTOR CO., INC.

VALVE STEM-TO-GUIDE CLEARANCE INSPECTION

1. Remove the valve (see **VALVE, SPRING, AND VALVE SEAL REMOVAL**).
2. Slide the valve out of its guide about 10 mm (0.4 in.), 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 3.

Intake Valve Stem-to-Guide Clearance

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

Service Limit: 0.18 mm (0.007 in.)

Exhaust Valve Stem-to-Guide Clearance Standard (New): 0.10-0.16 mm (0.004-0.006 in.)

Service Limit: 0.26 mm (0.010 in.)

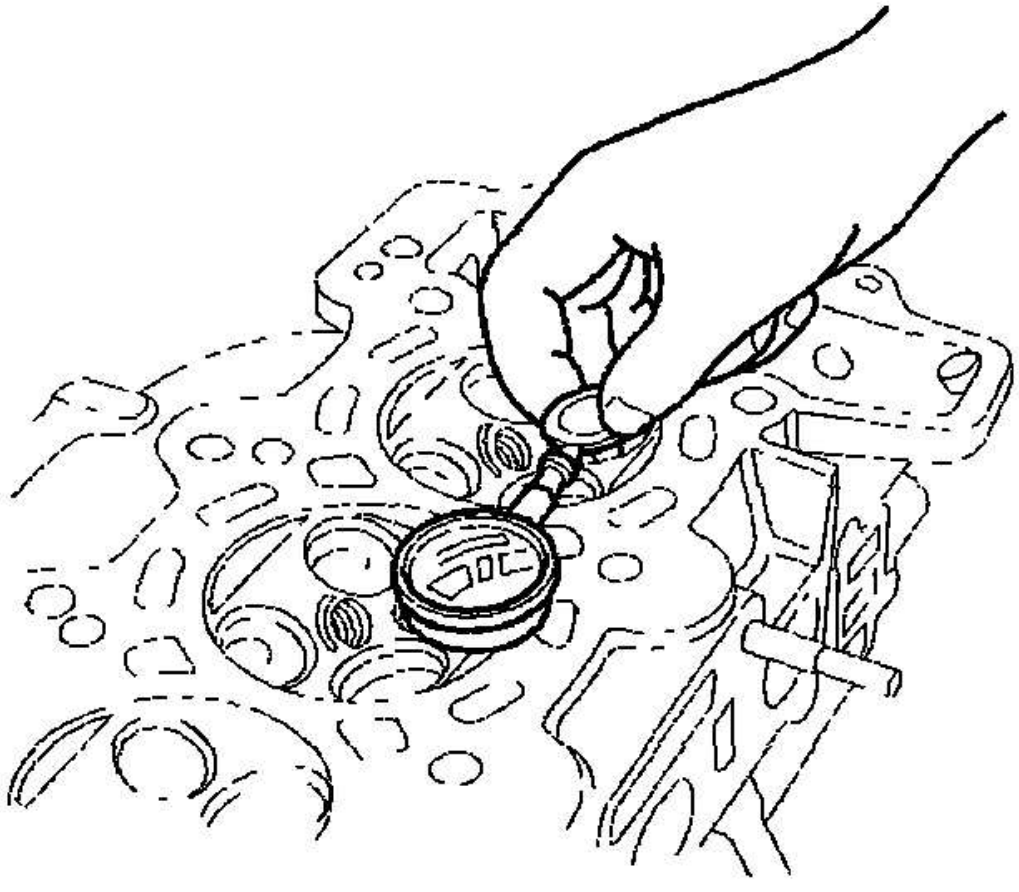

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Fig. 100: Identifying Intake Valve Stem-To-Guide Clearance
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Subtract the O.D. of the valve stem, measured with a micrometer, from the I.D. of the valve guide, measured with an inside micrometer or ball gauge. Take the measurements in three places along the valve stem and three places inside the

valve guide. The difference between the largest guide measurement and the smallest stem measurement should not exceed the service limit.

Intake Valve Stem-to-Guide Clearance

Standard (New): 0.02-0.05 mm (0.001-0.002 in.)

Service Limit: 0.09 mm (0.004 in.)

Exhaust Valve Stem-to-Guide Clearance

Standard (New): 0.05-0.08 mm (0.002-0.003 in.)

Service Limit: 0.13 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-PJ70100

1. Inspect valve stem-to-guide clearance (see **VALVE STEM-TO-GUIDE CLEARANCE INSPECTION**).
2. As illustrated, use a commercially available air-impact valve guide driver (A) modified to fit the diameter of the valve guides. In most cases, the same procedure can be done using the special tool and a conventional hammer.

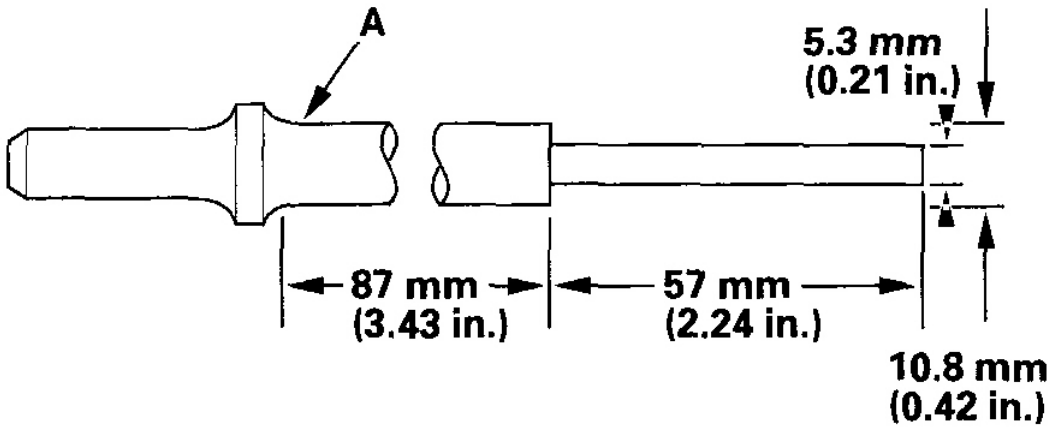

Fig. 101: Identifying Valve Stem-To-Guide Clearance
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Select the proper replacement guides, and chill them in the freezer section of a refrigerator for about an hour.
4. 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.

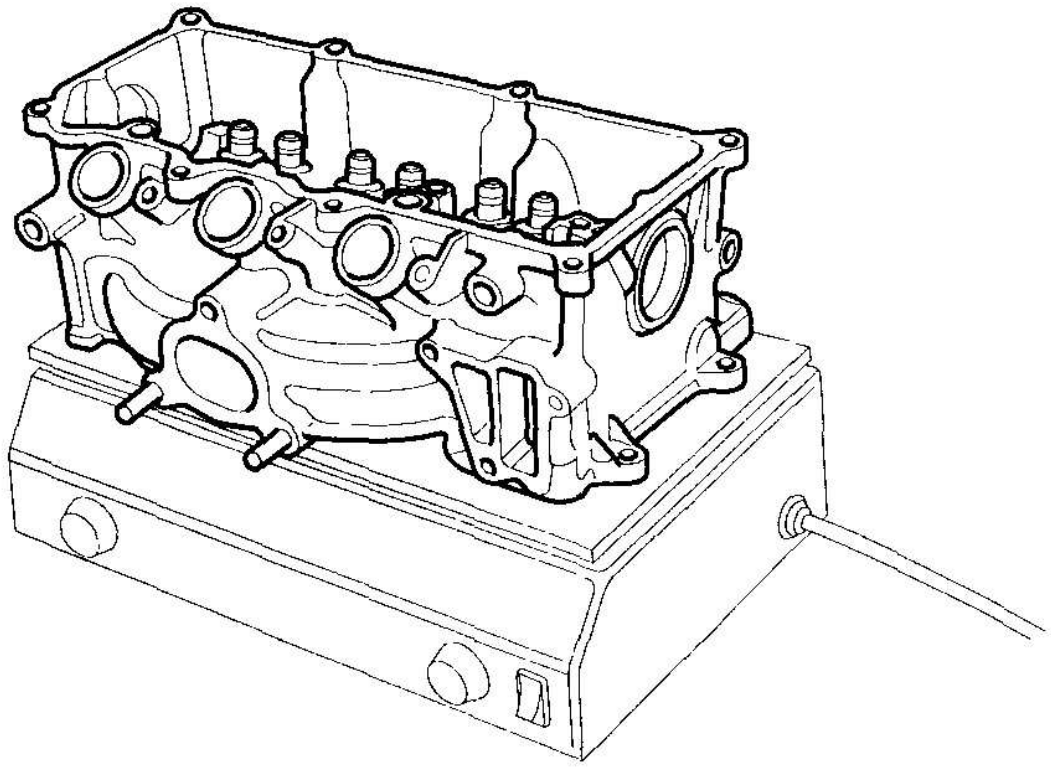

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Fig. 102: Heating Cylinder Head
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. 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. Wear safety goggles or a face shield.
6. Turn the head over, and drive the guide out toward the camshaft side of the head.

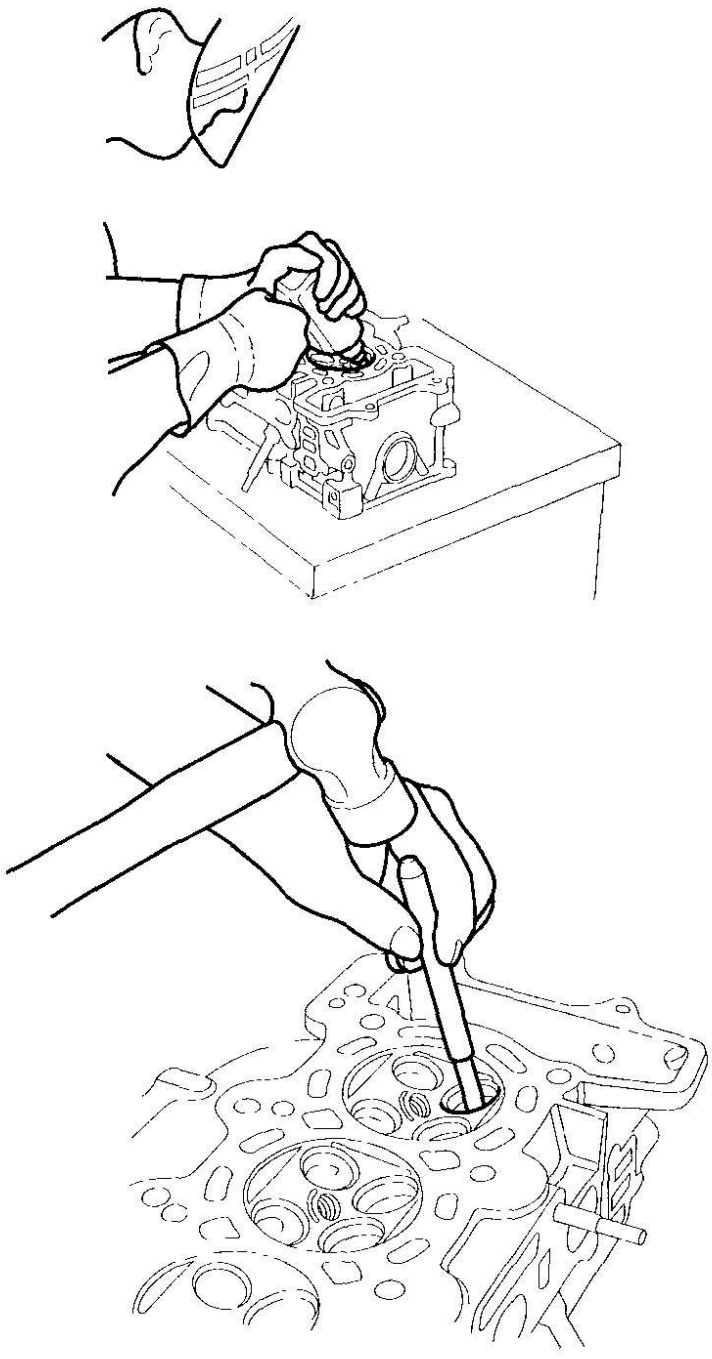

Fig. 103: Guiding Out Toward Camshaft Side Of Head
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. If a valve guide won't move, drill it out with an 8 mm (5/16 in.) bit, then try again. Drill guides only in extreme cases; you could damage the cylinder head if the guide breaks.
8. Take out the new guide(s) from the freezer, one at a time, as you need them.
9. 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 12 guides to do, you may have to reheat the head.

   Valve Guide Installed Height: 17.85-18.35 mm (0.703-0.722 in.)

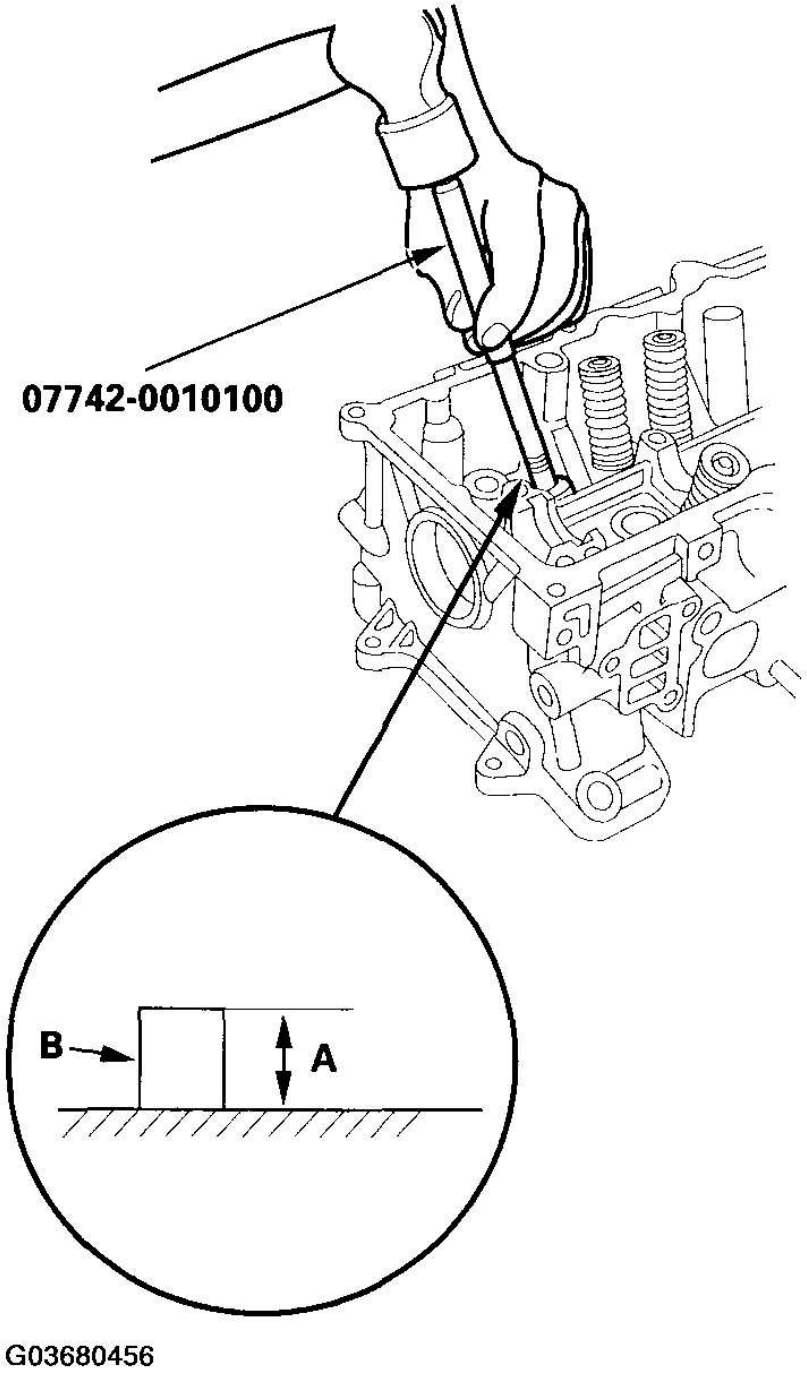

Fig. 104: Identifying Valve Guide Installed Height
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

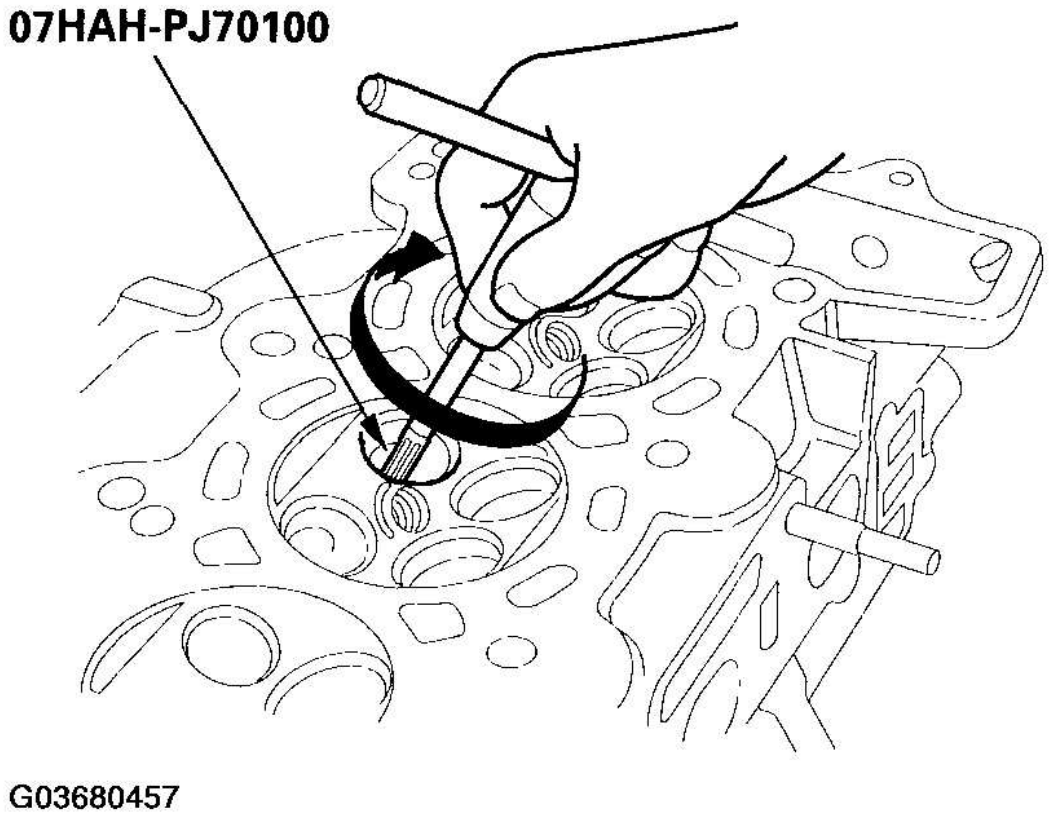

Fig. 105: Rotating Reamer Clockwise Full Length Of Valve Guide Bore
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Continue to rotate the reamer clockwise while drawing it from the bore.
13. Thoroughly wash the guide in detergent and water to remove any cutting residue.
14. Check the clearance with a valve (see **VALVE INSPECTION**). Verify that the valve slides in the intake and exhaust valve guides without being stuck.
15. Inspect the value seating, if necessary, renew the valve seat using a valve

seat cutter (see **VALVE SEAT RECONDITIONING**).

VALVE SEAT RECONDITIONING

1. Inspect valve stem-to-guide clearance (see **VALVE STEM-TO-GUIDE CLEARANCE INSPECTION**), If the valve guides are worn, replace them (see **VALVE GUIDE REPLACEMENT**) before cutting the valve seats.
2. Renew the valve seats in the cylinder head using a valve seat cutter.

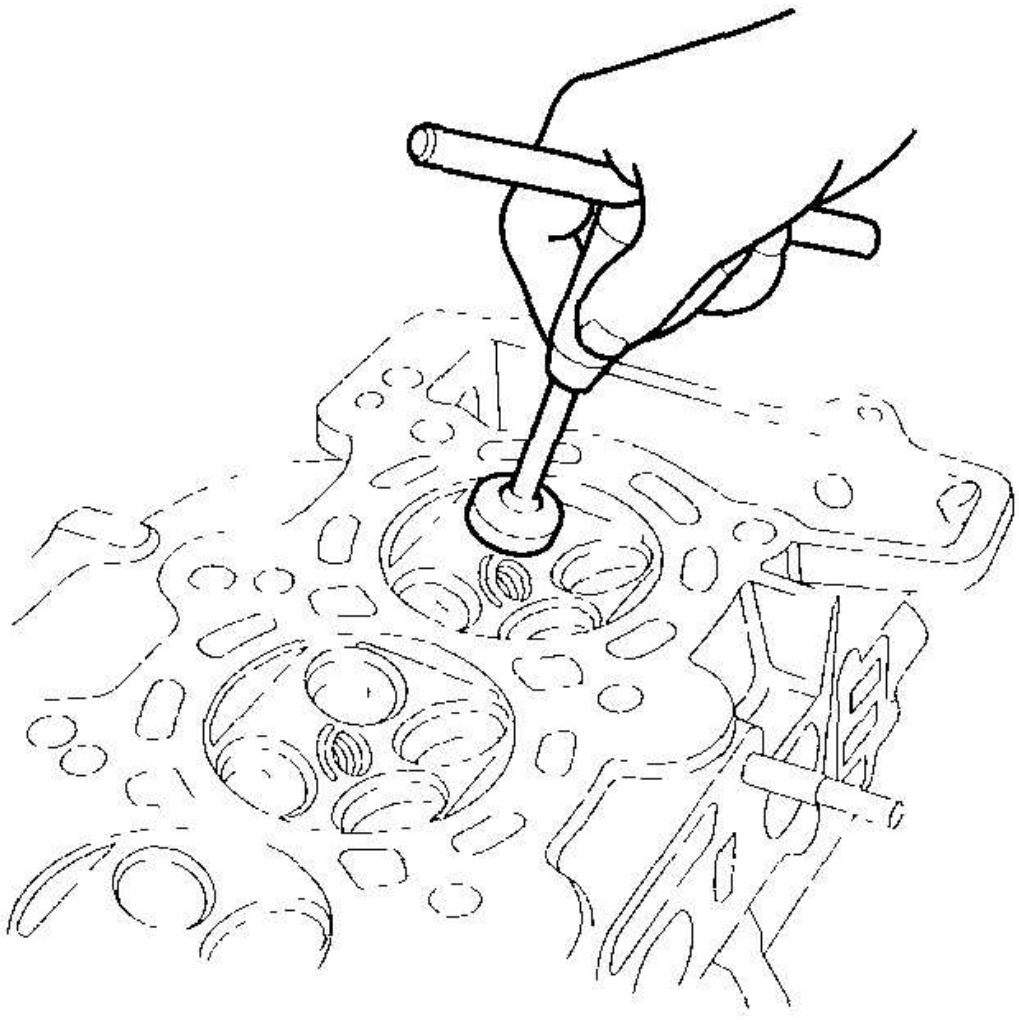

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Fig. 106: Identifying Valve Stem-To-Guide Clearance
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Carefully cut a 45° seat, removing only enough material to ensure a smooth and concentric seat.
4. 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.

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

   Valve Seat Width Intake:

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

   Service Limit: 1.60 mm (0.063 in.)

   Exhaust:

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

   Service Limit: 2.00 mm (0.079 in.)

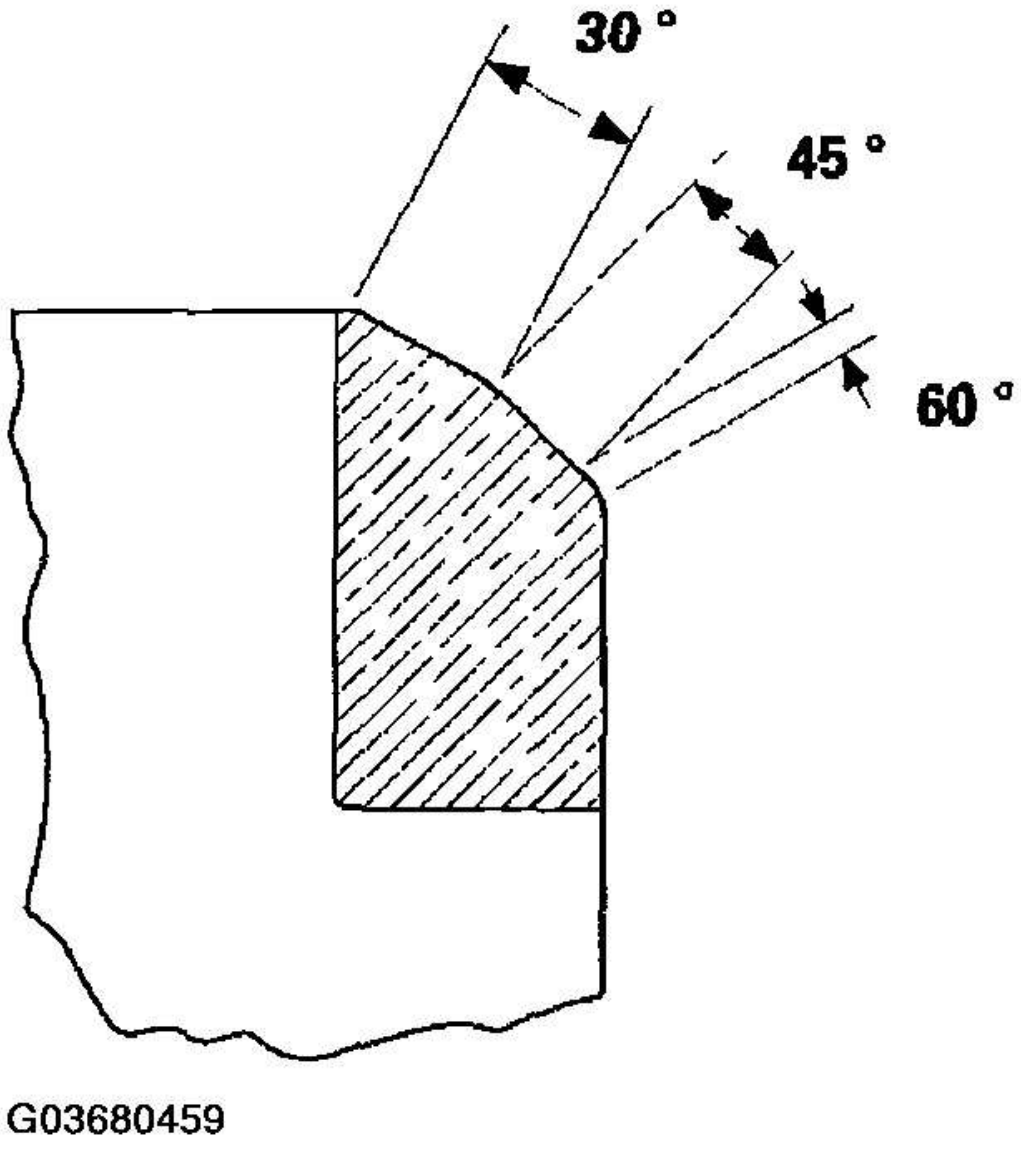

Fig. 107: Identifying Valve Seat Width Intake
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. 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.

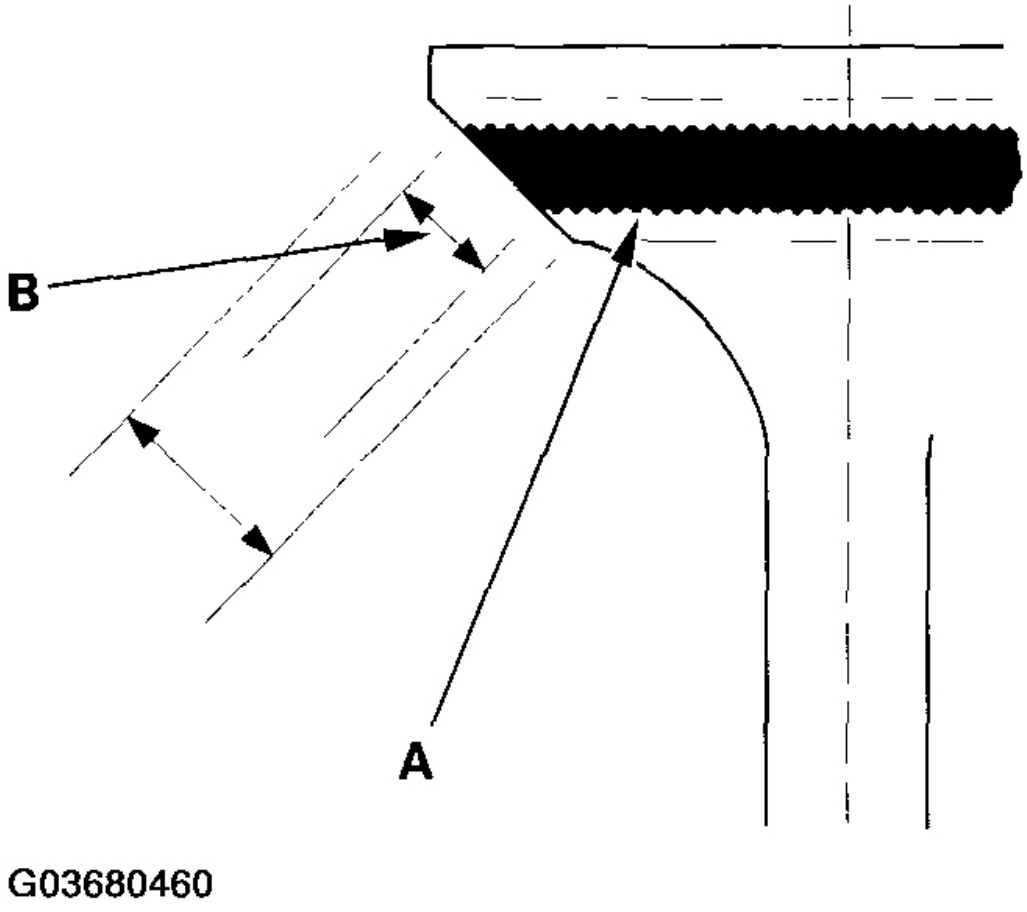

Fig. 108: Applying Prussian Blue Compound To Valve Face
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. 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.

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

   Intake Valve Stem Installed Height

   Standard (New): 53.00-53.80 mm (2.087-2.118 in.)

   Service Limit: 54.14 mm (2.131 in.)

   Exhaust Valve Stem Installed Height

   Standard (New): 52.91-53.71 mm (2.083-2.115 in.)

   Service Limit: 54.05 mm (2.128 in.)

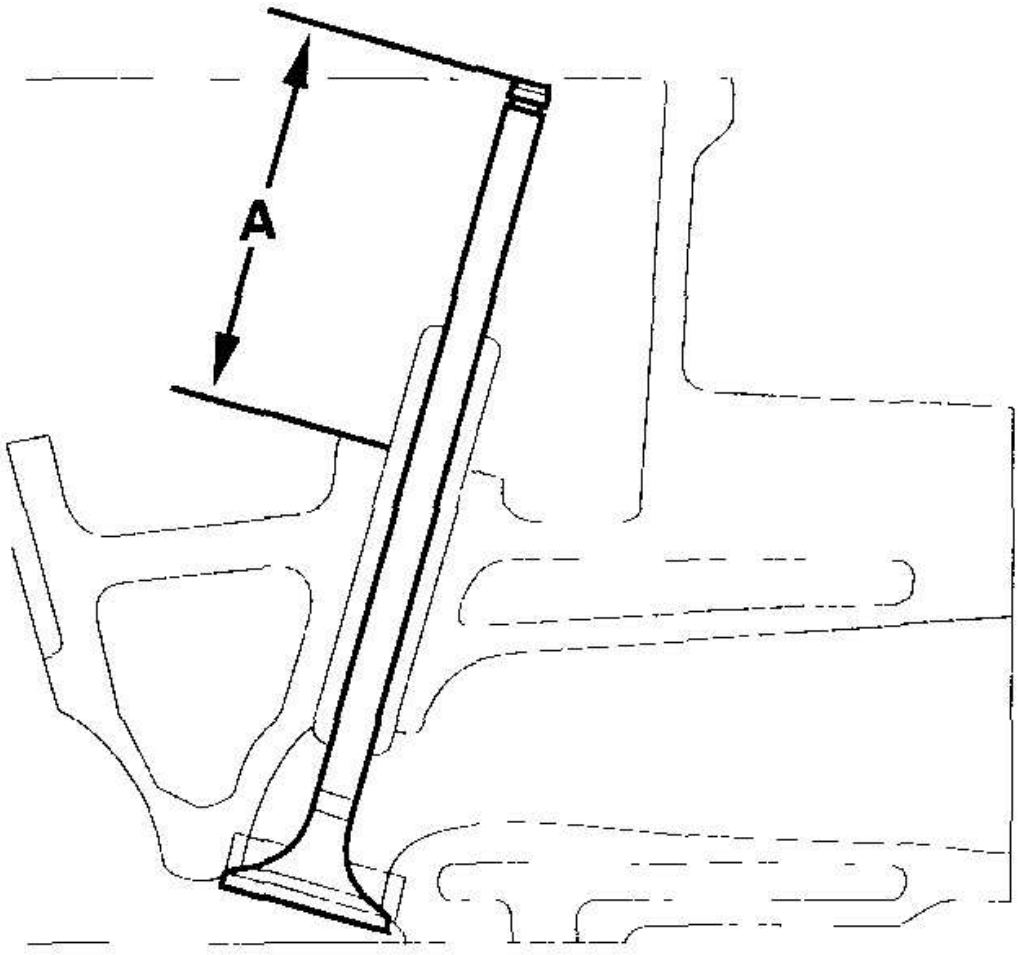

Fig. 109: Identifying Intake Valve Stem Installed Height
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. 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.

VALVE, SPRING, AND VALVE SEAL INSTALLATION

Special Tools Required

Valve spring compressor attachment 07757-PJ1010A

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

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

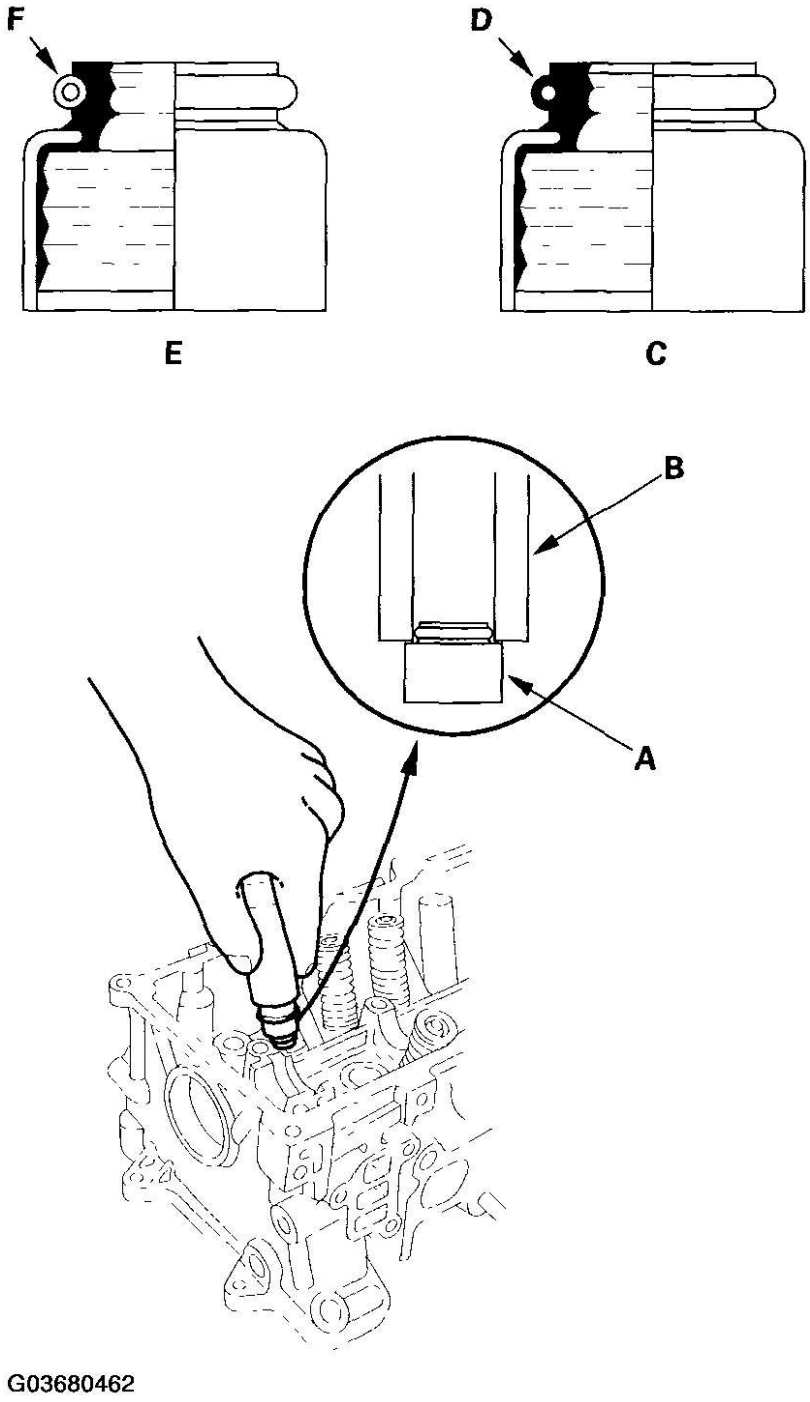

Fig. 110: Installing Valve Seals Using Stem Seal Driver
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Install the valve spring and valve retainer. Place the end of the valve spring with closely wound coils toward the cylinder head.
6. Install the valve spring compressor. Compress the spring, and install the valve cotters.

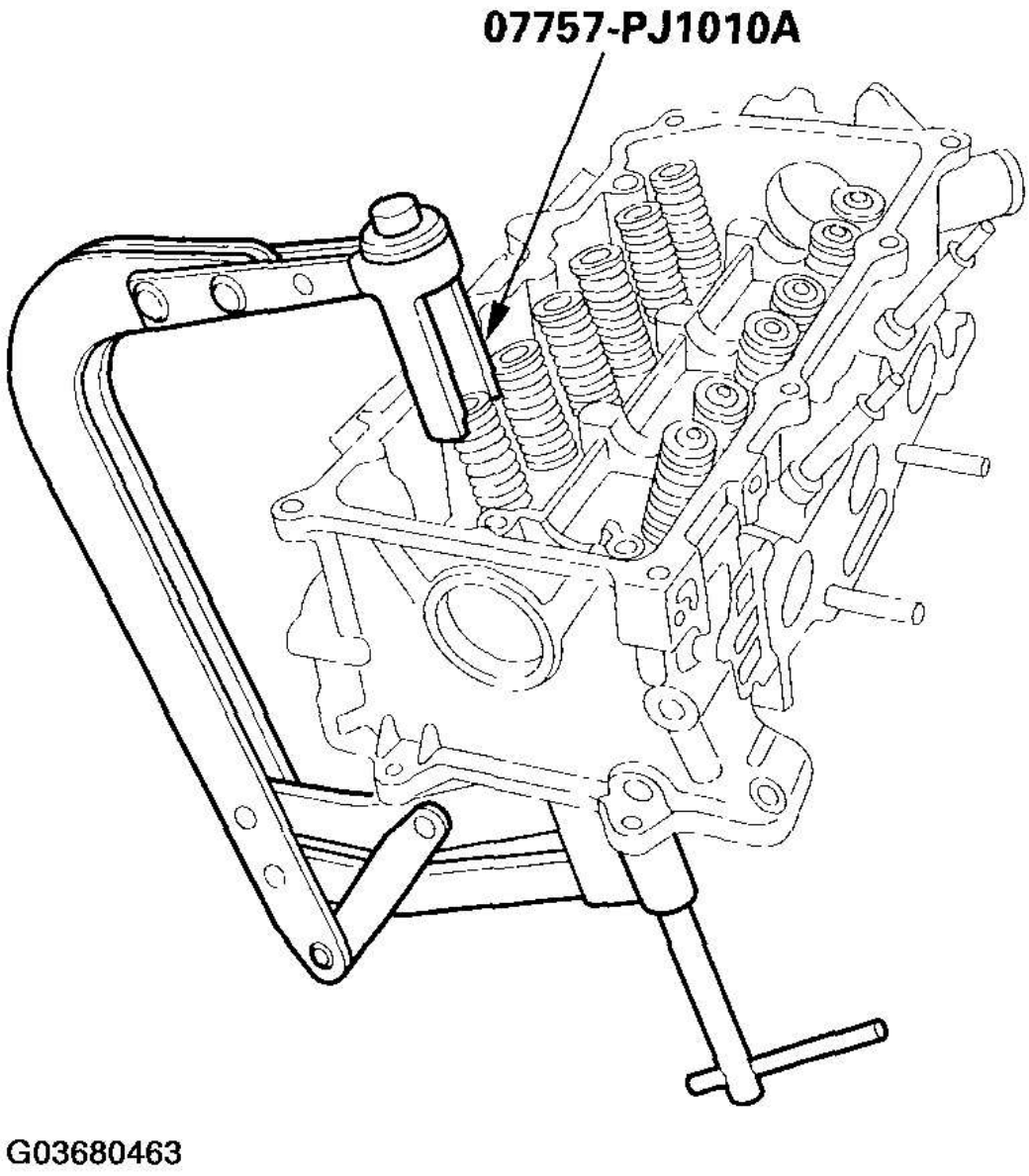

Fig. 111: Installing Valve Spring Compressor

Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Lightly tap the end of each valve stem two or three times with the wooden handle of a hammer (A) to ensure proper seating of the valve and valve cotters. Tap the valve stem only along its axis so you do not bend the stem.

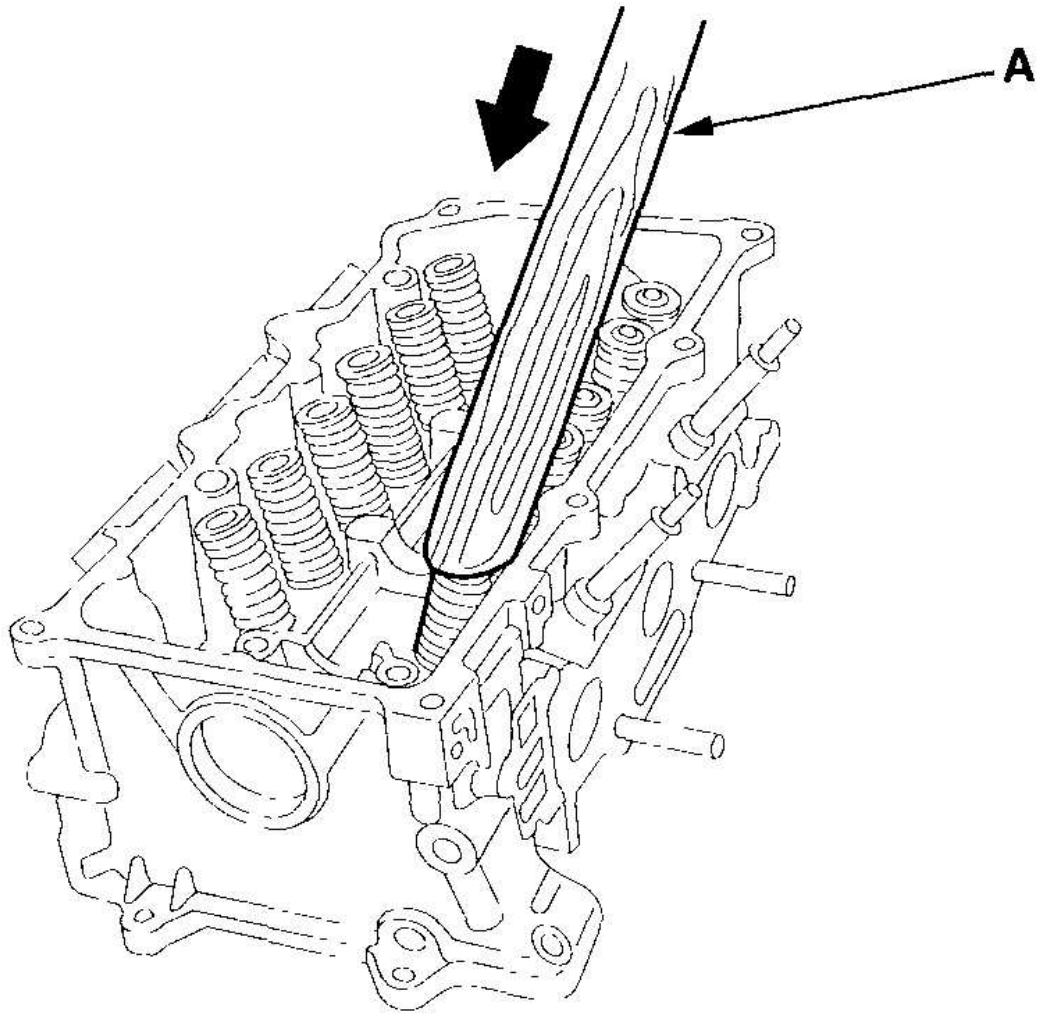

Fig. 112: Taping End Of Valve Stem
Courtesy of AMERICAN HONDA MOTOR CO., INC.

CAMSHAFT AND ROCKER ARM INSTALLATION

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

1. Apply new engine oil to the bolt threads of all camshaft holder bolts.
2. Put the camshaft and the camshaft holders on the cylinder head, then tighten the bolts, in sequence, to 12 N.m (1.2kgf.m, 8.7 lbf.ft).

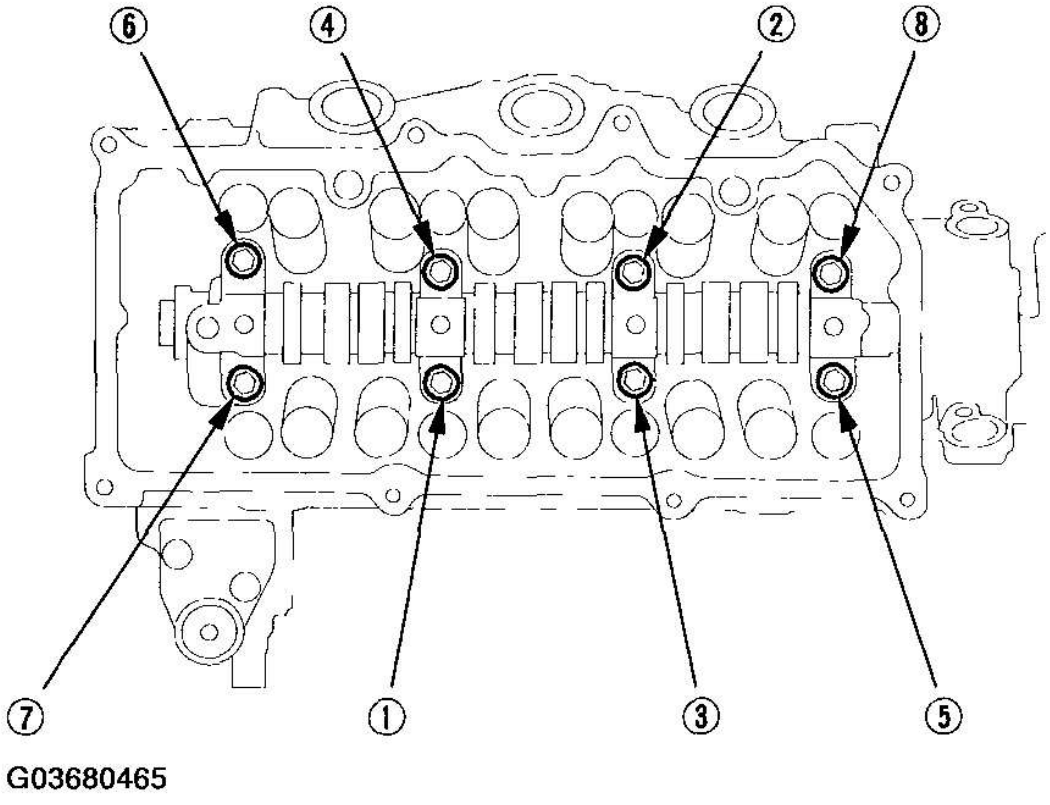

Fig. 113: Installing Camshaft And Camshaft Holders On Cylinder Head
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Install the rocker arm assembly on the camshaft holders, then tighten the rocker shaft mounting bolts, in sequence, to 22 N.m (2.2 kgf.m, 16 lbf.ft).

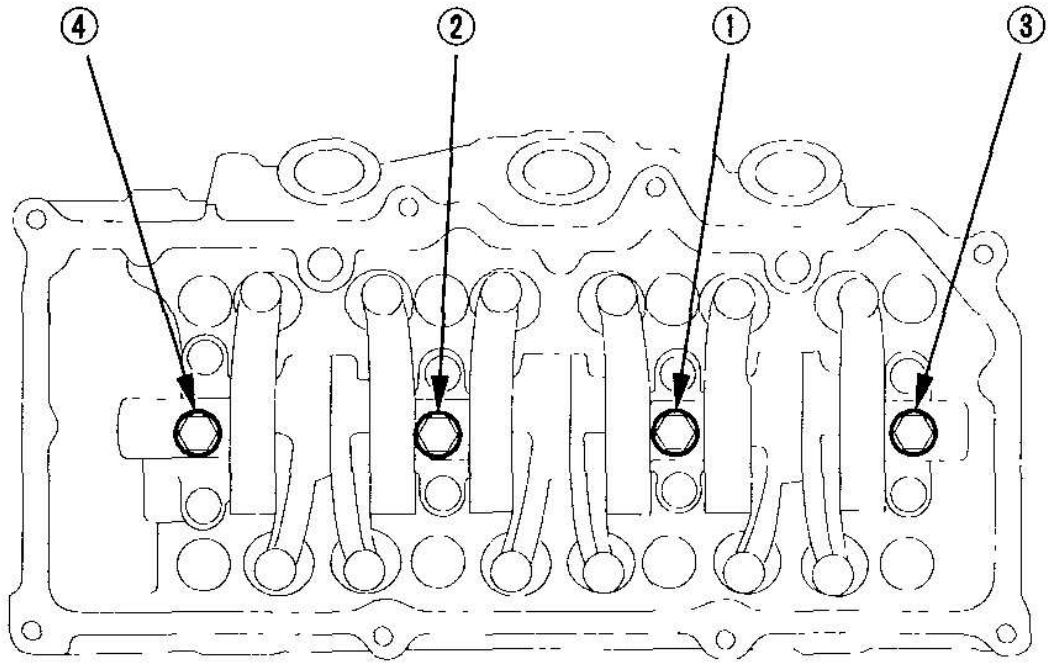

Fig. 114: Installing Rocker Arm Shaft Mounting Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

CYLINDER HEAD INSTALLATION

1. Make sure the crankshaft pulley is at top dead center (TDC).

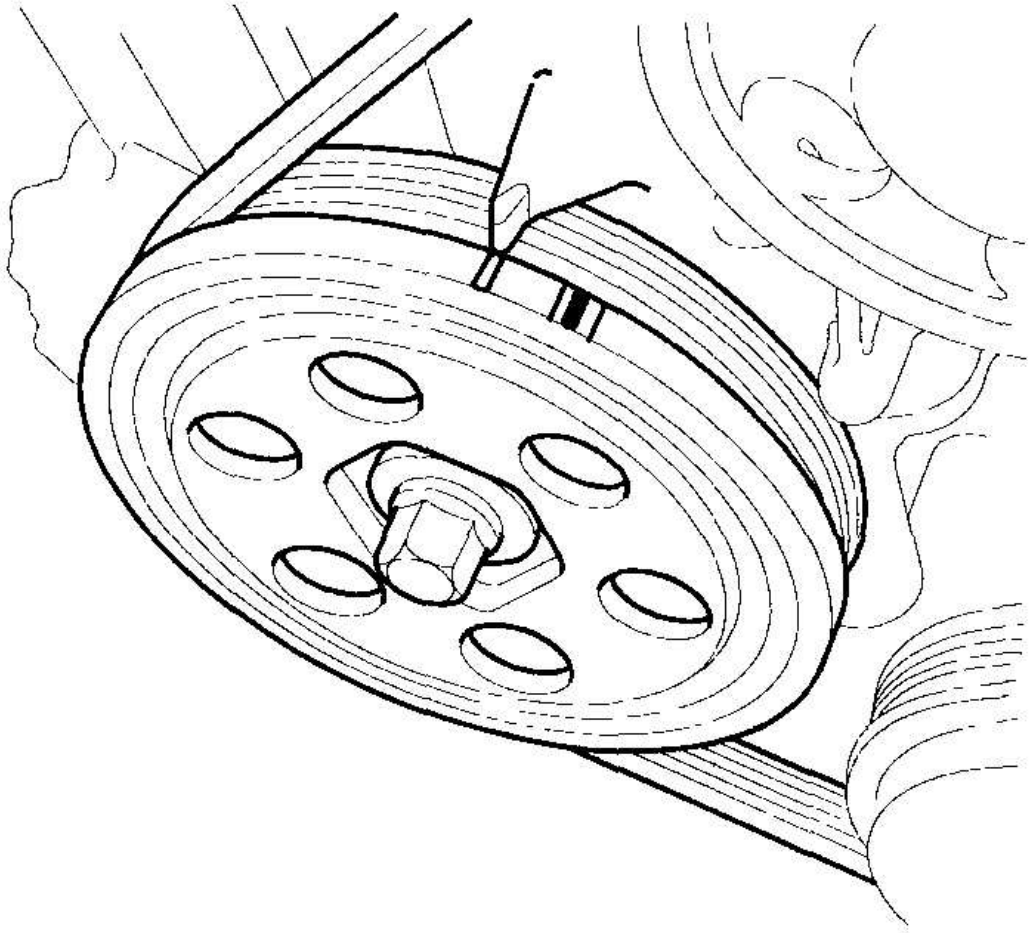

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Fig. 115: Identifying Crankshaft Pulley At Top Dead Center
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Clean the cylinder head and engine block surfaces.
3. Apply liquid gasket, P/N 08717-0004 or 08718-0001, to the shaded areas (A) of the cylinder head gasket mating surface of the engine block and oil pump.

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

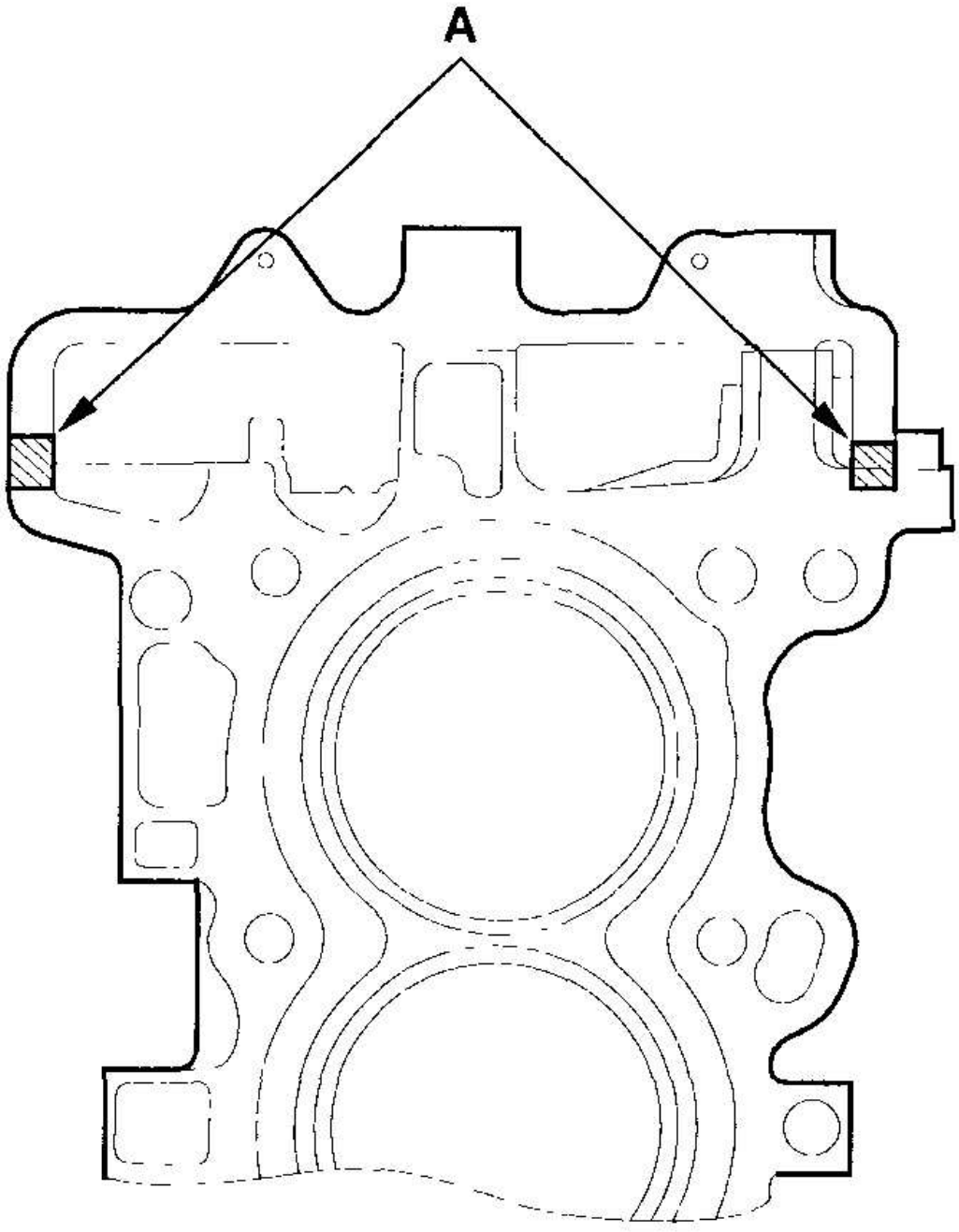

Fig. 116: Applying Liquid Gasket
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Install the dowel pins (A) and new cylinder head gasket (B).

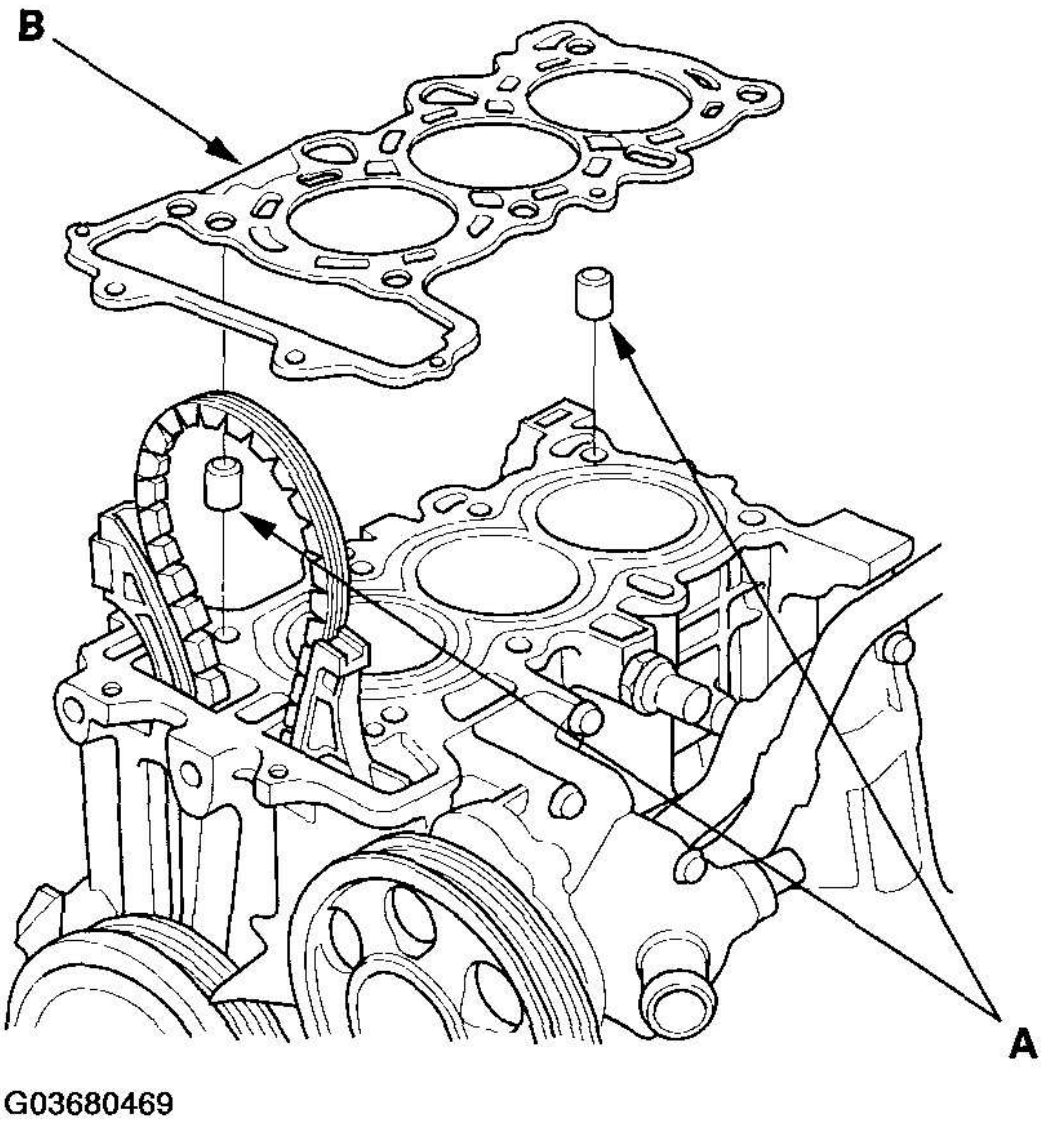

Fig. 117: Installing Dowel Pins And Cylinder Head Gasket
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Apply liquid gasket, P/N 08717-0004 or 08718-0001, to the cylinder head mating surface of the engine block and oil pump along the broken line.

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

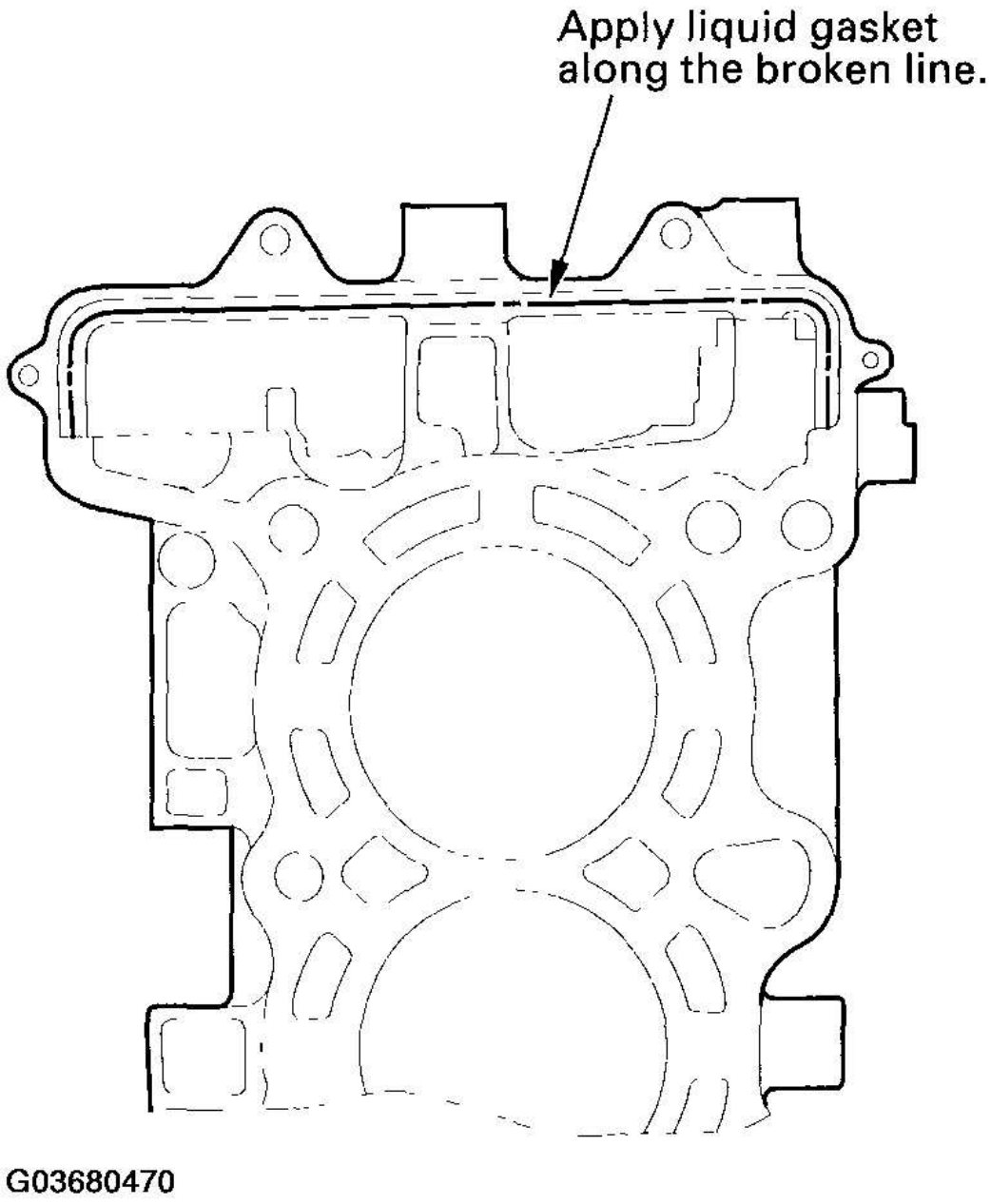

Fig. 118: Applying Liquid Gasket

Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Install the cylinder head on the engine block.
7. Apply new engine oil to the threads and flange the cylinder head bolts.
8. Tighten the cylinder head bolts in sequence to 39 N.m (4.0 kgf.m, 29 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.

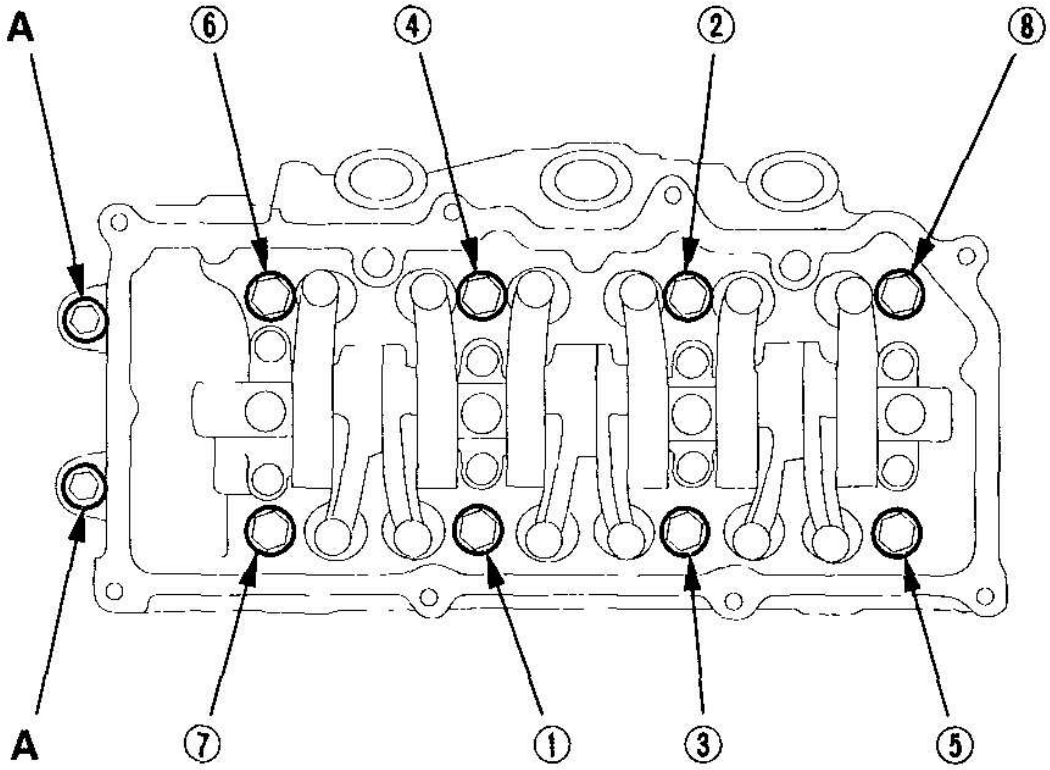

Fig. 119: Installing Cylinder Head On Engine Block
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Turn the cylinder head bolts 90°.
10. Tighten the 6 mm bolts (A) to 12 N.m (1.2 kgf.m, 8.7 lbf.ft).

11. Place the camshaft sprocket into the cylinder head.

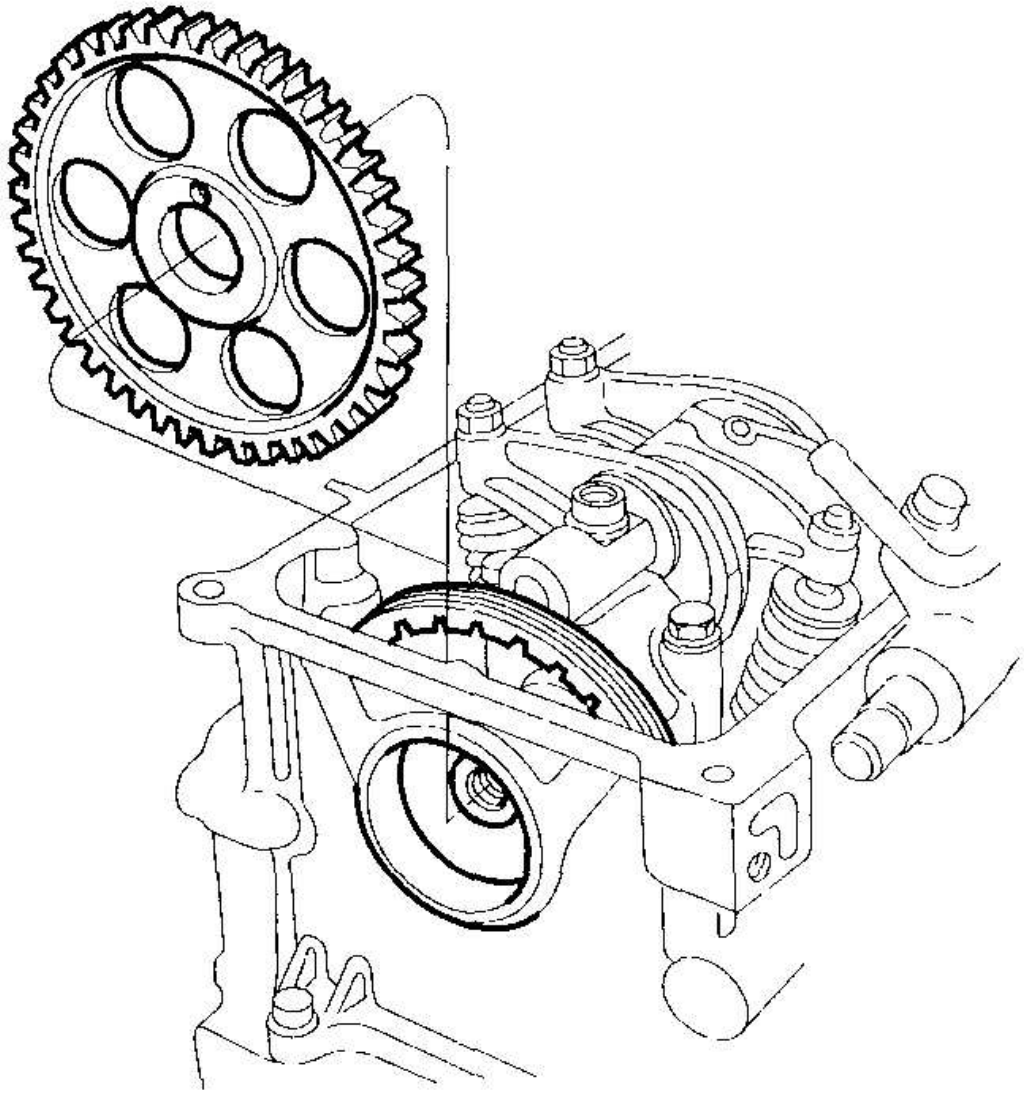

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Fig. 120: Placing Camshaft Sprocket Into Cylinder Head
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Install the cam chain on the camshaft sprocket, then fit the camshaft sprocket

on the camshaft.

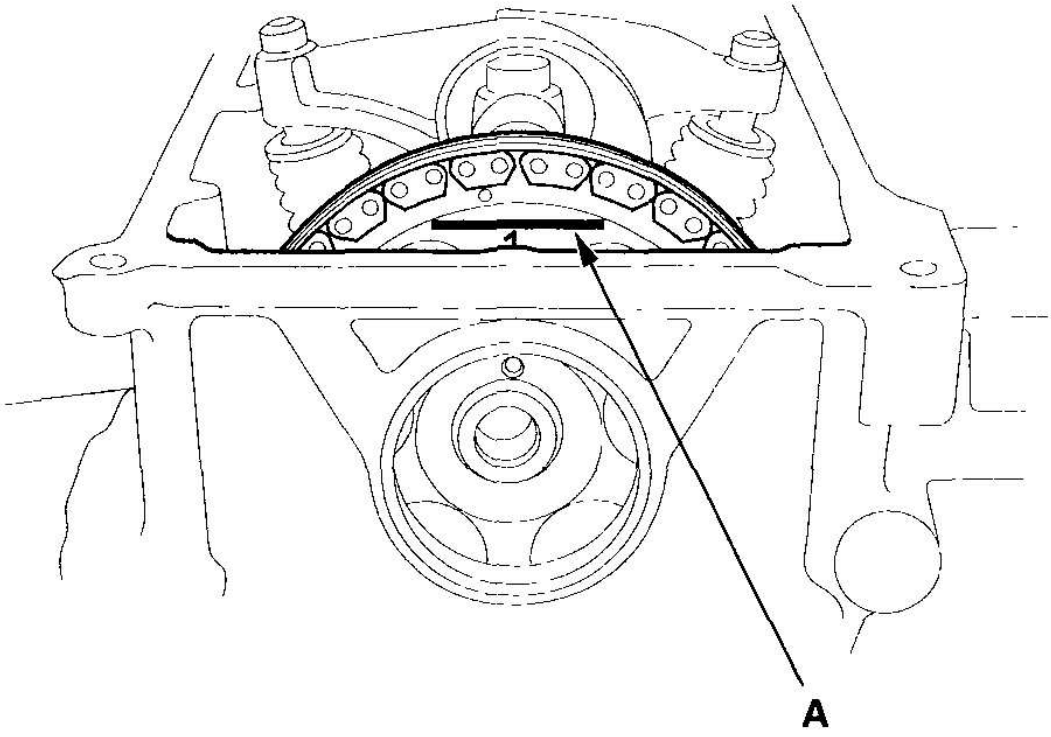

Fig. 121: Installing Cam Chain On Camshaft Sprocket
Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Turn the camshaft sprocket counterclockwise to relieve cam chain free play, and check the alignment of the TDC mark (A) on the camshaft sprocket with the cylinder head surface. If the camshaft sprocket is not positioned at TDC, remove the camshaft sprocket from the camshaft and reposition the cam chain to bring the camshaft sprocket to TDC.
14. Hold the camshaft with an open-end wrench, then tighten the camshaft sprocket mounting bolt.

Specified Torque:

56 N.m (5.7 kgf.m, 41 lbf.ft)

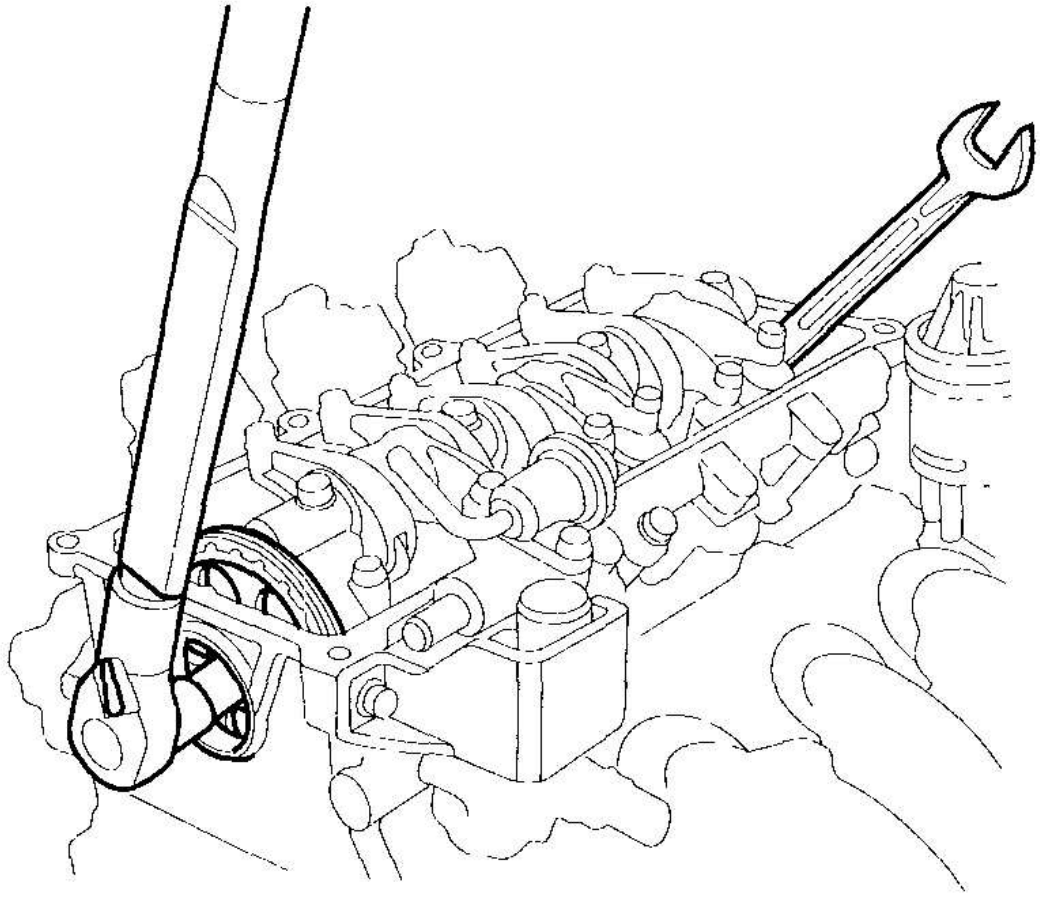

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Fig. 122: Tightening The Camshaft Sprocket Mounting Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

15. Put the new cylinder head plug into the cylinder head.

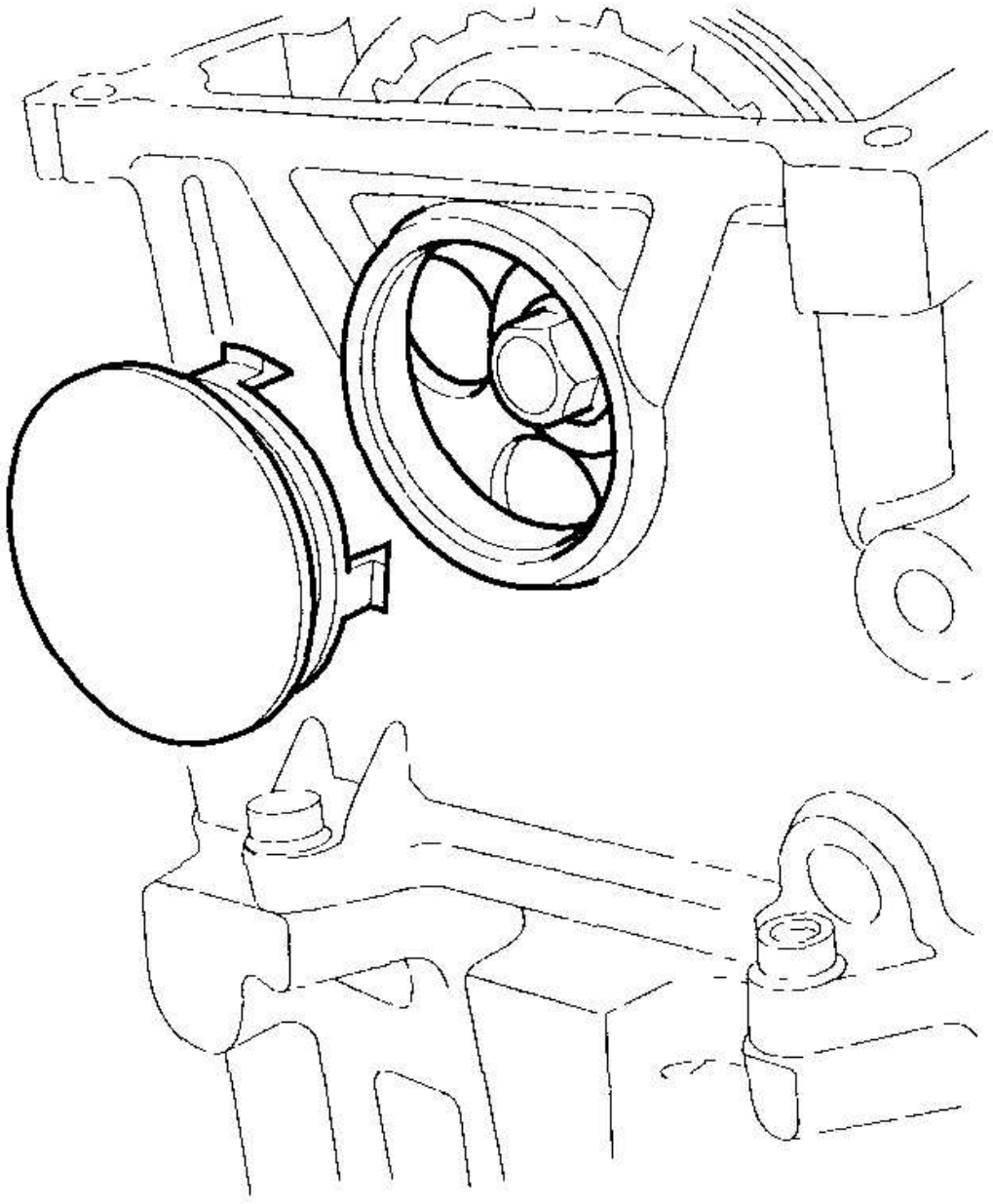

Fig. 123: Installing Cylinder Head Plug Into Cylinder Head
Courtesy of AMERICAN HONDA MOTOR CO., INC.

16. Press the rod to pump the oil out of the cam chain auto-tensioner.

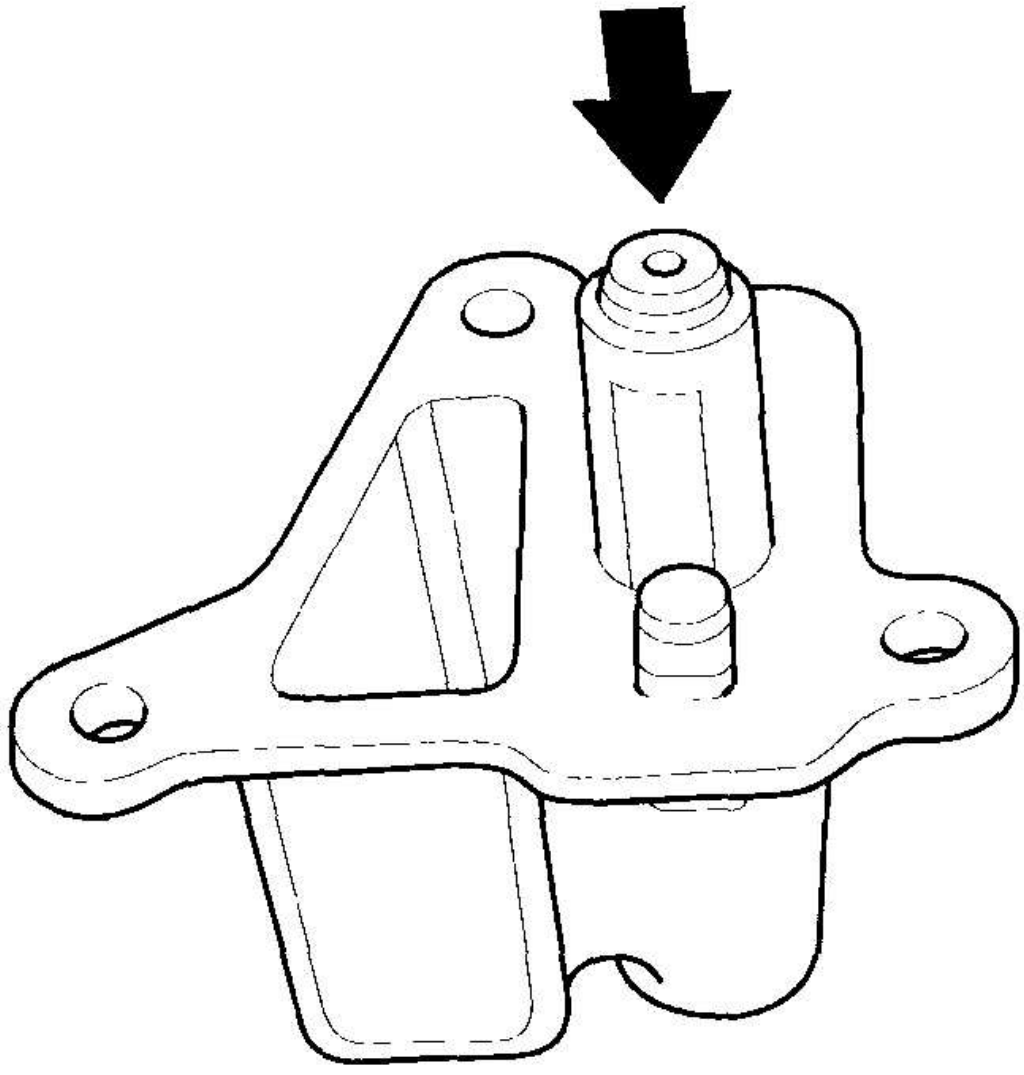

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Fig. 124: Pressing Rod To Pump Oil Out Of Cam Chain Auto-Tensioner And Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

17. Install the new O-ring (A) into the spacer (B). Set the spacer and new gasket

(C) on the cam chain auto-tensioner (D), then tighten the bolt and nuts equally while pressing the cam chain auto-tensioner against the cylinder head.

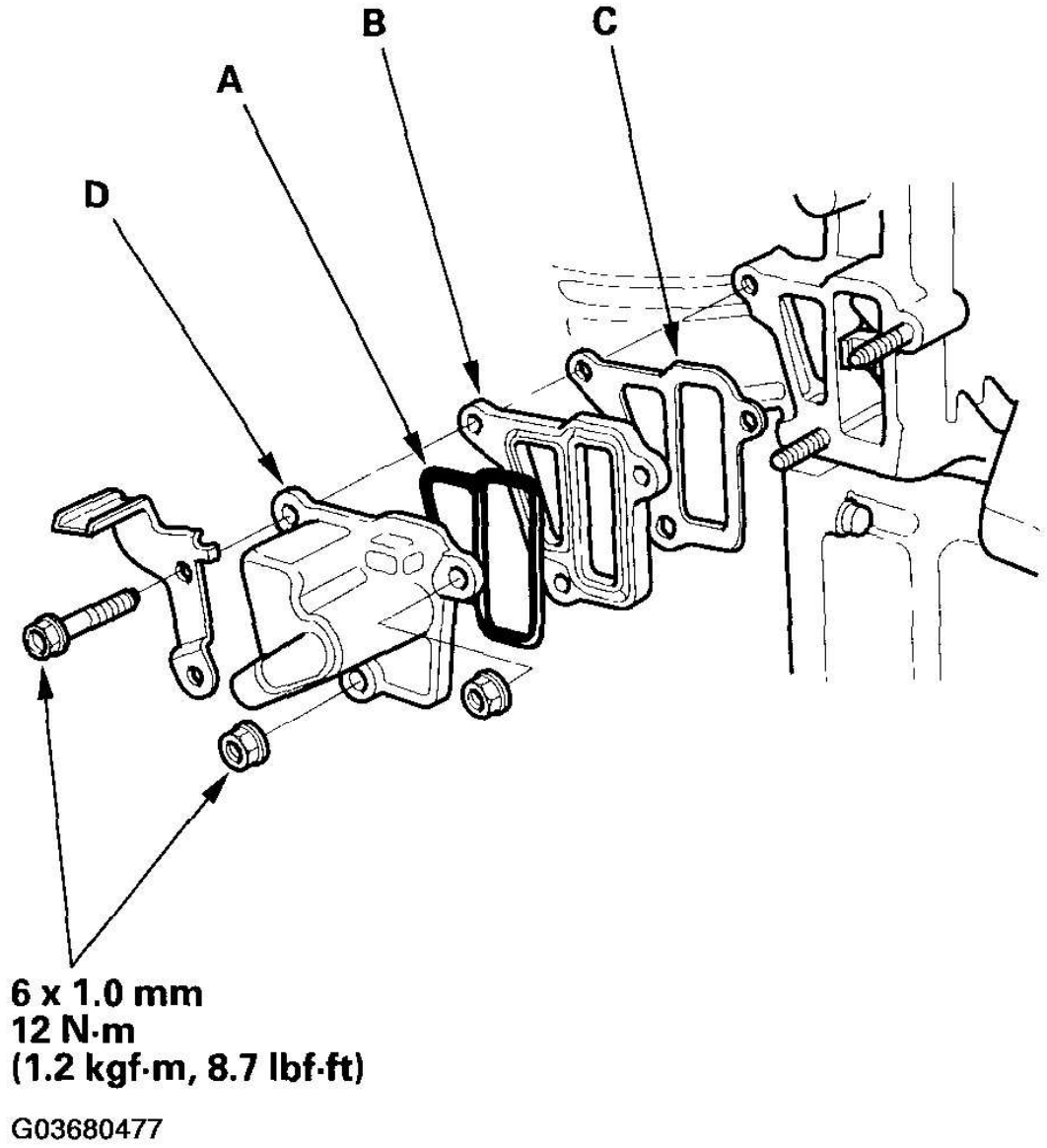

Fig. 125: Installing Cam Chain Auto-Tensioner And Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

18. Adjust the valve clearance (see **VALVE CLEARANCE ADJUSTMENT**).
19. Install the dipstick.

20. Install the three way catalytic converter (A) with new gaskets (B) and new nuts (C).

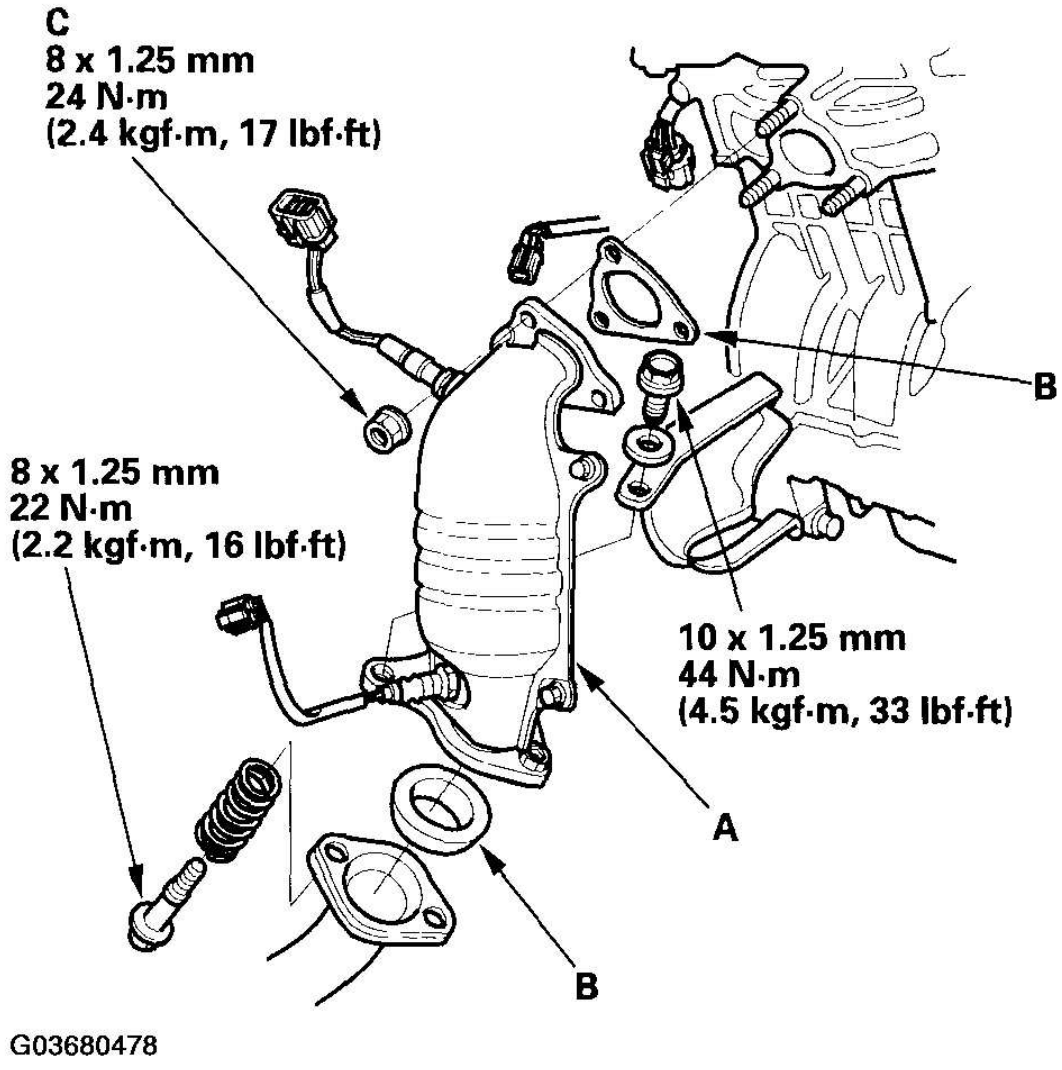

Fig. 126: Installing Three Way Catalytic Converter With Gaskets And Nuts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

21. Install the heater hoses.

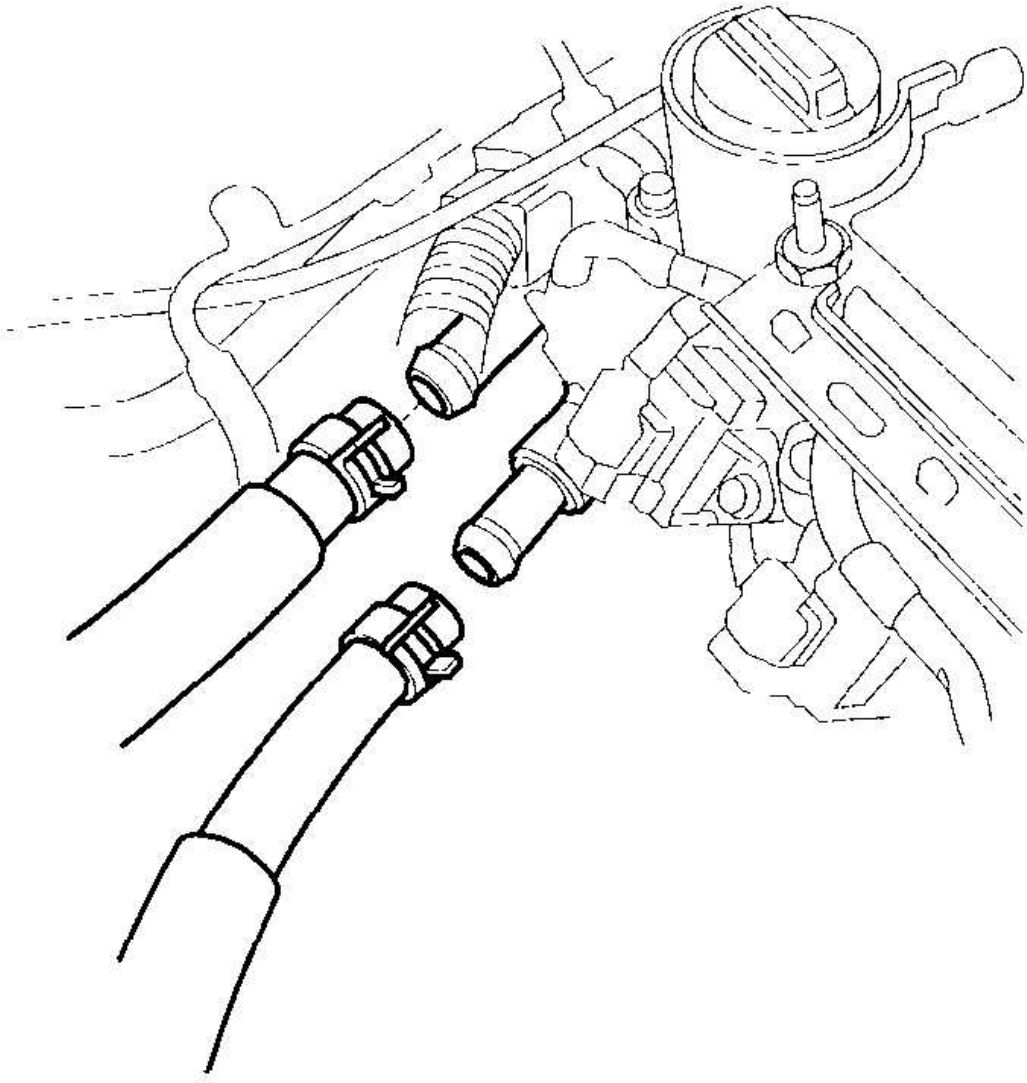

Fig. 127: Installing Heater Hoses And Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

22. Install the connecting pipes (A) with new O-rings (B).

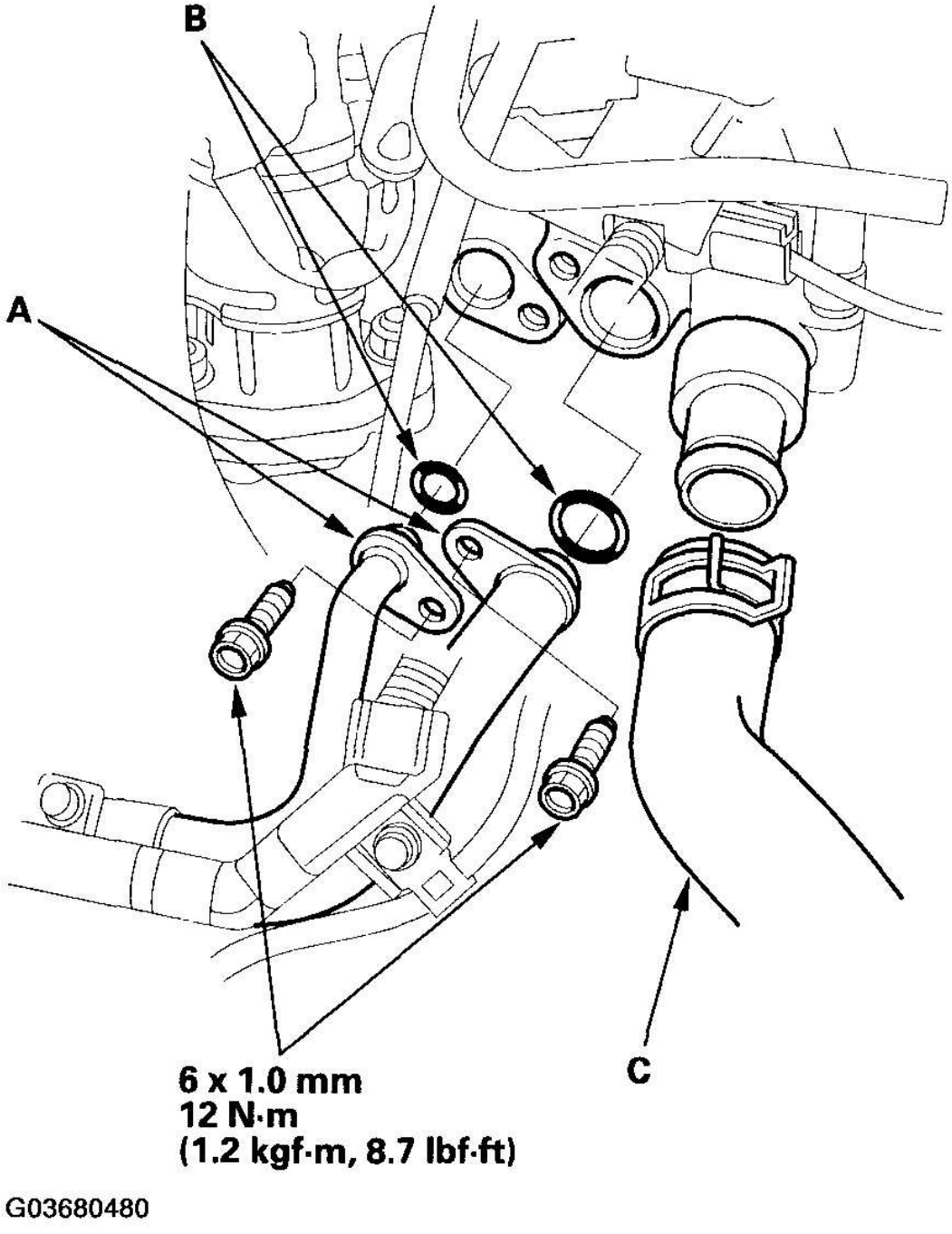

Fig. 128: Installing Connecting Pipes With O-Rings And Torque Specifications

Courtesy of AMERICAN HONDA MOTOR CO., INC.

23. Install the upper radiator hose (C).
24. Install the exhaust gas recirculation (EGR) plate (A) and intake manifold (B) with a new gasket (C) and new O-rings (D).

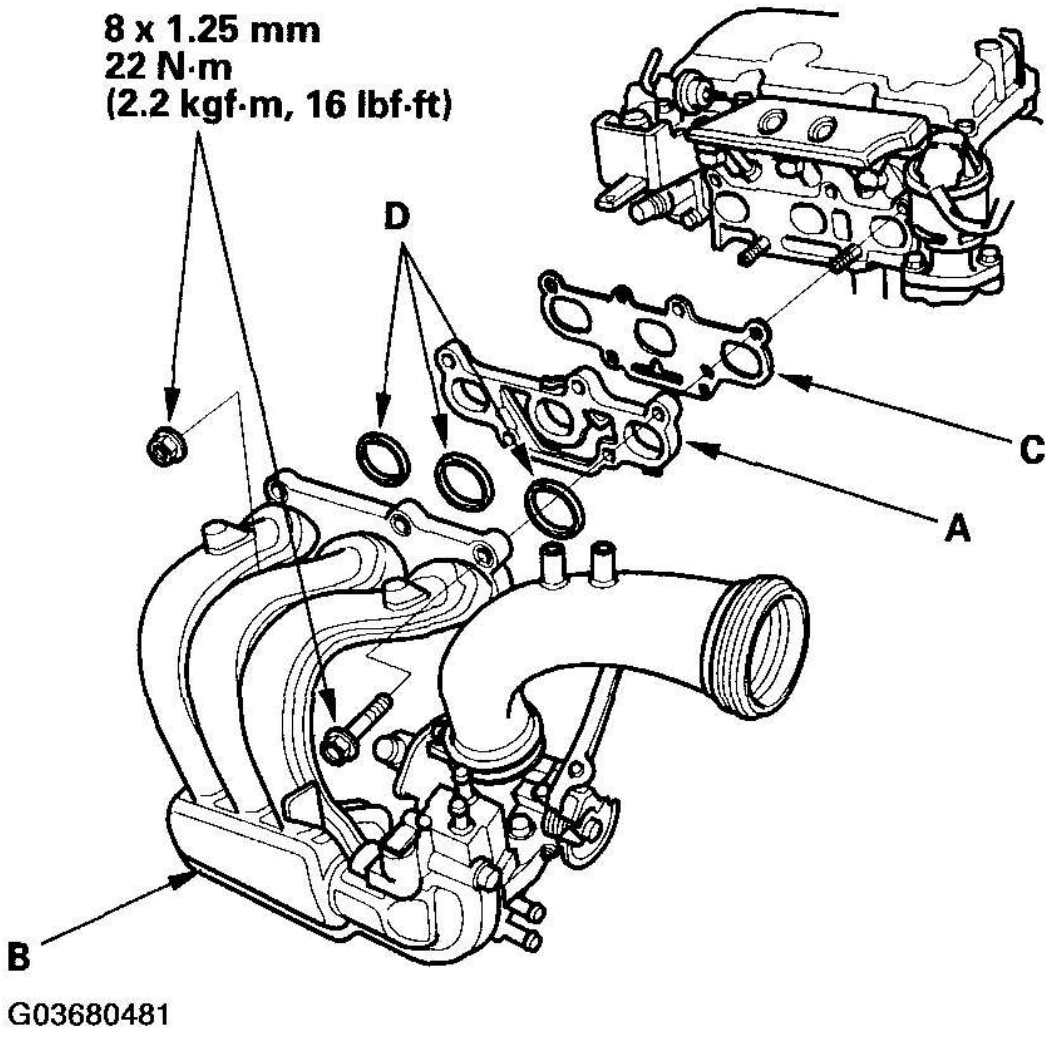

Fig. 129: Installing Exhaust Gas Recirculation Plate And Intake Manifold
Courtesy of AMERICAN HONDA MOTOR CO., INC.

25. Install the cylinder head cover (see **CYLINDER HEAD COVER INSTALLATION**).
26. Install the brake booster vacuum hose (A), evaporative emission (EVAP)

canister hose (B), water bypass hoses (C), and vacuum hose (D).

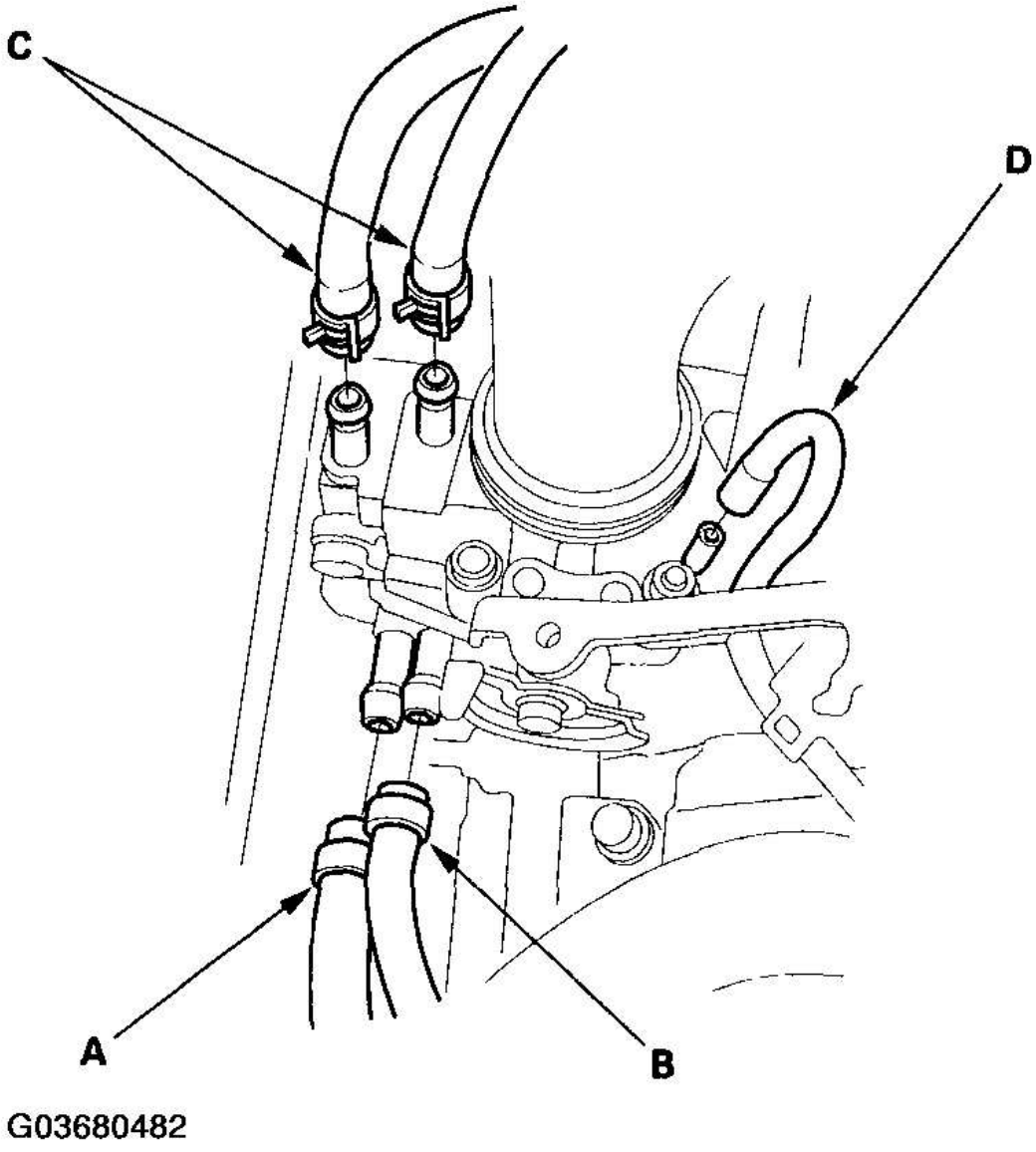

Fig. 130: Installing The Brake Booster Vacuum Hose
Courtesy of AMERICAN HONDA MOTOR CO., INC.

27. Install the air cleaner housing/intake air duct assembly (A), then install the brake booster vacuum hose bracket (B) and breather pipe (C).

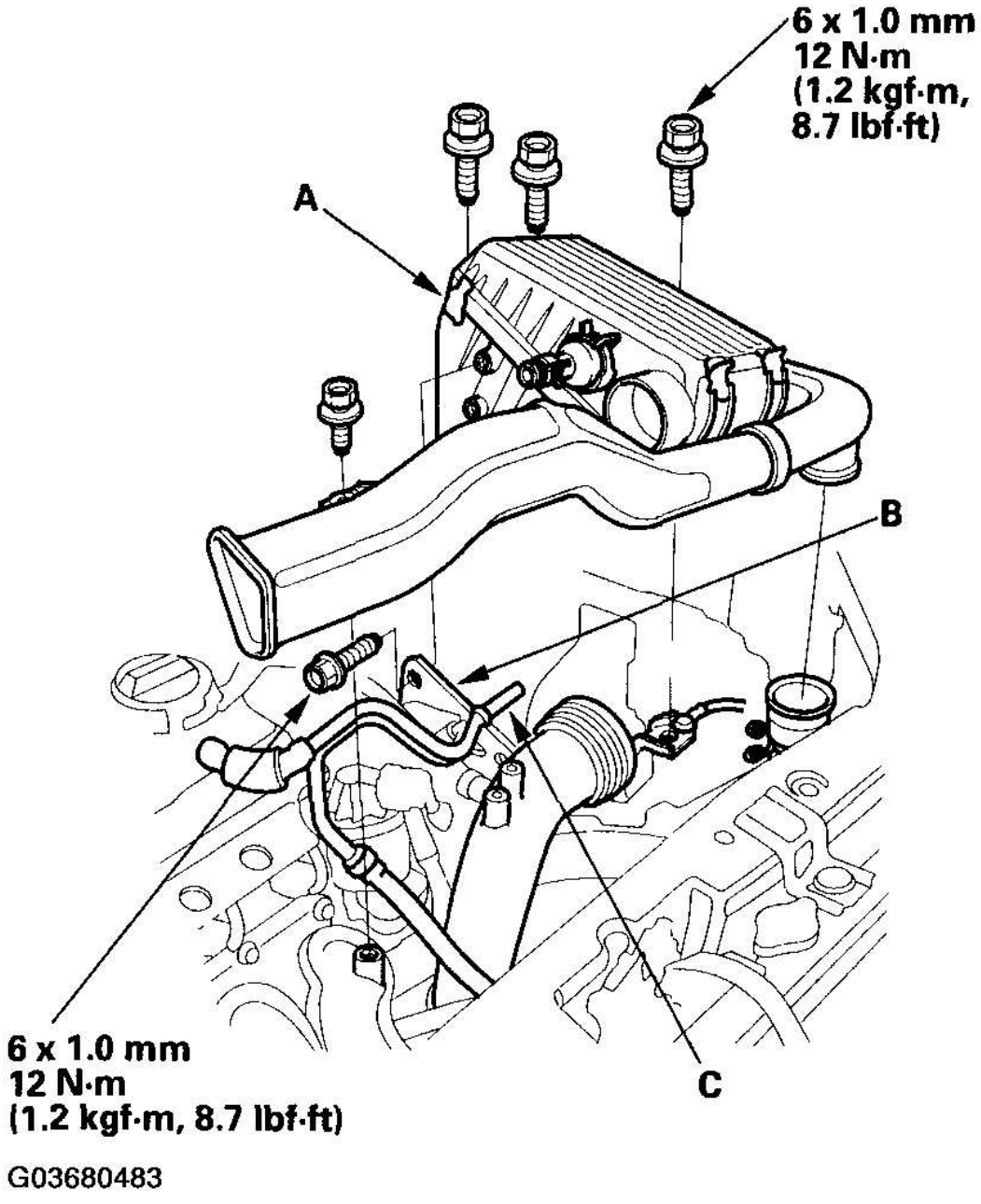

Fig. 131: Installing Air Cleaner Housing/Intake Air Duct Assembly And Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

28. Install the throttle cable (see **THROTTLE BODY**

REMOVAL/INSTALLATION), then adjust it (see **THROTTLE CABLE ADJUSTMENT**).

29. After installation, check that all tubes, hoses and connectors are installed correctly.
30. Install the engine cover.

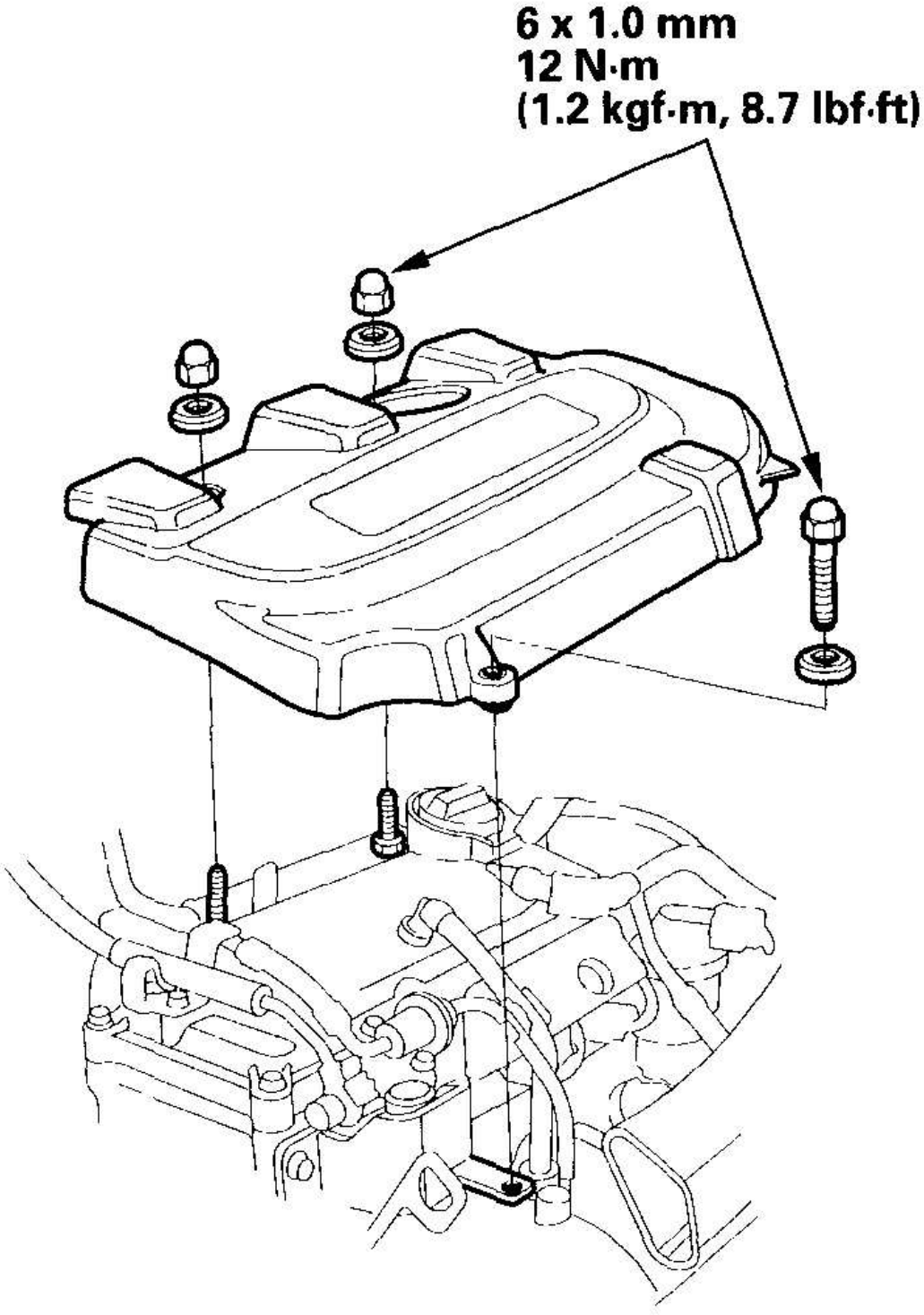

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Fig. 132: Installing Engine Cover And Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

31. After assembly, wait at least 30 minutes before filling the engine with oil (see **ENGINE OIL REPLACEMENT**).
32. Connect the positive cable to the battery first, then connect the negative cable.
33. Remove the No. 15 (40 A) fuse from the under-hood fuse/relay box.
34. Inspect for fuel leaks. Turn ON (II) the ignition switch (do not operate the starter) so that the fuel pump runs for approximately two 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.
35. Refill the radiator with engine coolant, and bleed air from the cooling system with the heater valve open (see step 9 on **COOLANT REPLACEMENT**).
36. If the IMA battery level gauge (BAT) displays no segments, start the engine, and hold it between 3,500 RPM and 4,000 RPM with no load (in Park or neutral) until the BAT displays at least three segments.
37. Reinstall the No. 15 (40 A) fuse to the under-hood fuse/relay box.
38. Reset the ECM with the HDS (see **HDS CLEAR COMMAND**).
39. Do the engine control module (ECM) idle learn procedure (see **ECM IDLE LEARN PROCEDURE**).
40. Enter the anti-theft code for the radio, then enter the audio presets.
41. Set the clock.

CMP SENSOR A/B (TDC SENSOR 1/2) REPLACEMENT

1. Disconnect connectors from the camshaft position (CMP) sensor A (on the intake side) and CMP sensor B (on the exhaust side). Remove the CMP sensor A and the CMP sensor B.

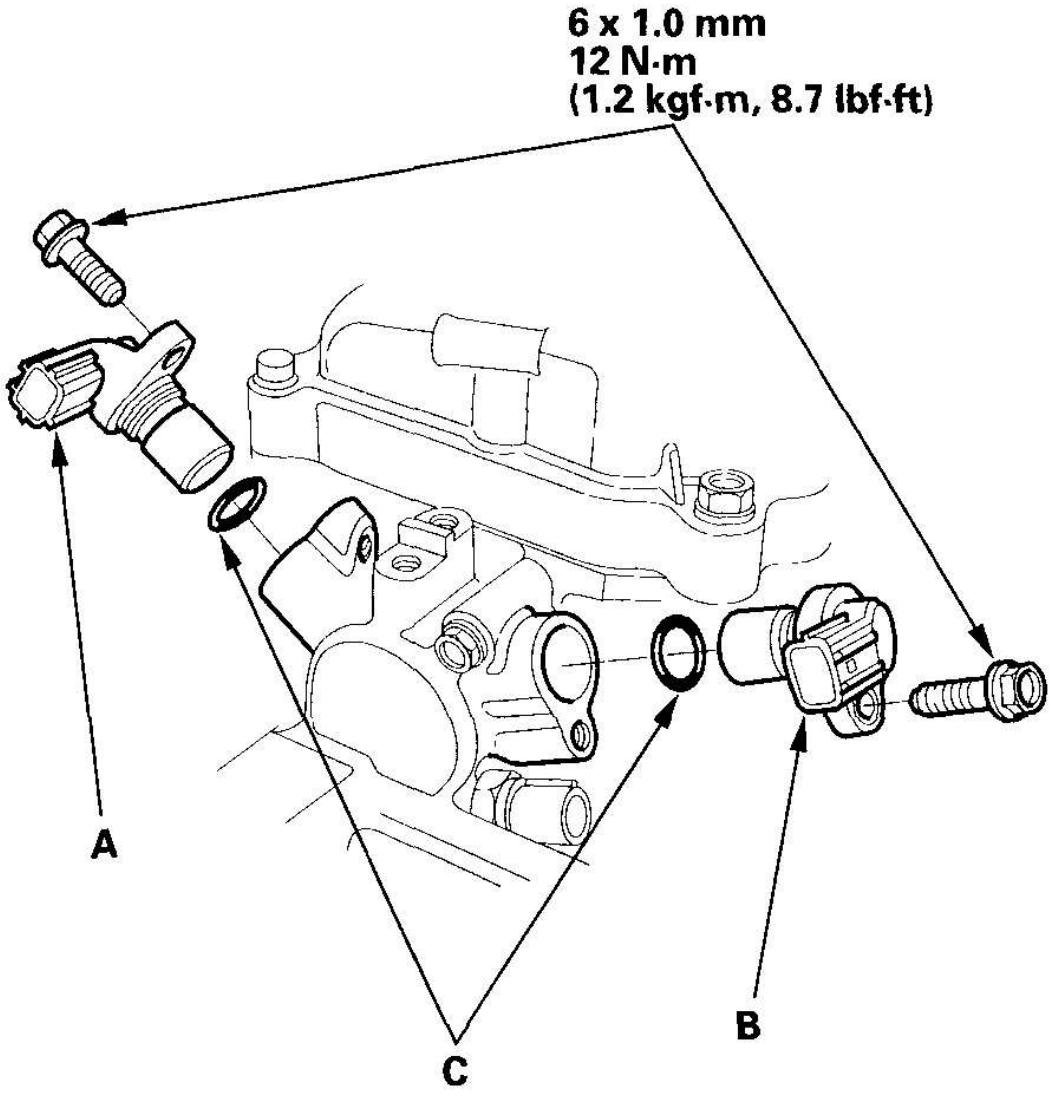

Fig. 133: Disconnecting Connectors From Camshaft Position (CMP) Sensor
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Install the CMP sensor A and the CMP sensor B with new O-rings (C).