

2012 ENGINE

Cylinder Head (J37A4) - TL

SPECIAL TOOLS

Ref.No.	Tool Number	Description	Qty
①	070AJ-001A101	VCM Air Adapter	1
②	07742-0010100	Valve Guide Driver, 5.35 x 9.7 mm	1
③	07757-PJ1010A	Valve Spring Compressor Attachment	1
④	07AAJ-PNAA101	Air Pressure Regulator	1
⑤	07AAJ-R70A100	VTEC Air Stop Tool A	1
⑥	07AAJ-R70A200	VTEC Air Stop Tool B	1
⑦	07GAF-SD40330	Ball Joint Remover/Installer	1
⑧	07HAH-PJ7A100	Valve Guide Reamer, 5.5 mm	1
⑨	07JAA-001020A	Socket, 19 mm	1
⑩	07JAB-001020B	Holder Handle	1
⑪	07MAB-PY3010A	Holder Attachment, 50 mm, Offset	1
⑫	07PAD-0010000	Stem Seal Driver	1

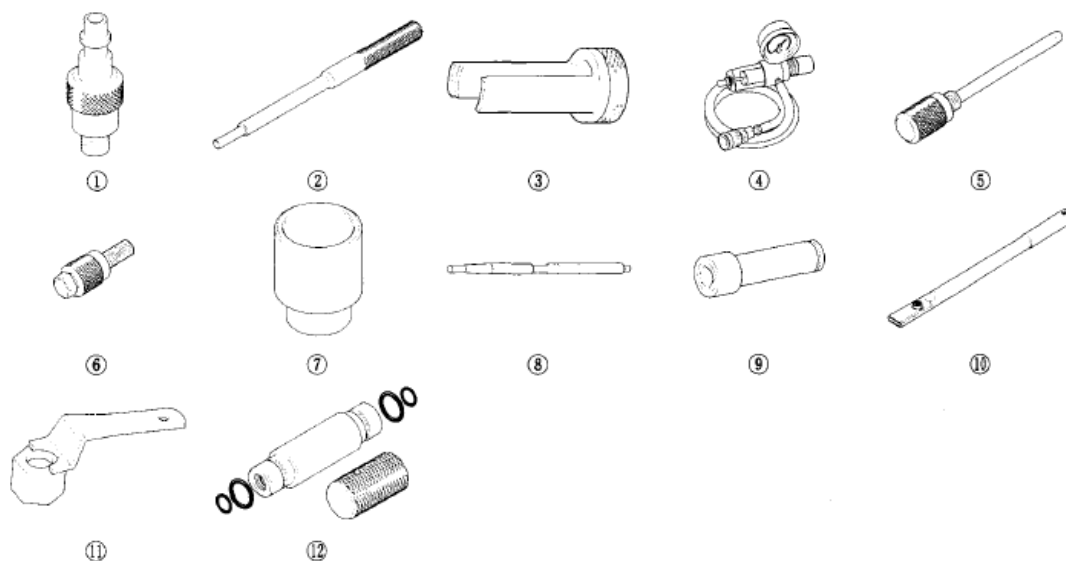


Fig. 1: Identifying Cylinder Head Special Tools

Courtesy of AMERICAN HONDA MOTOR CO., INC.

COMPONENT LOCATION INDEX

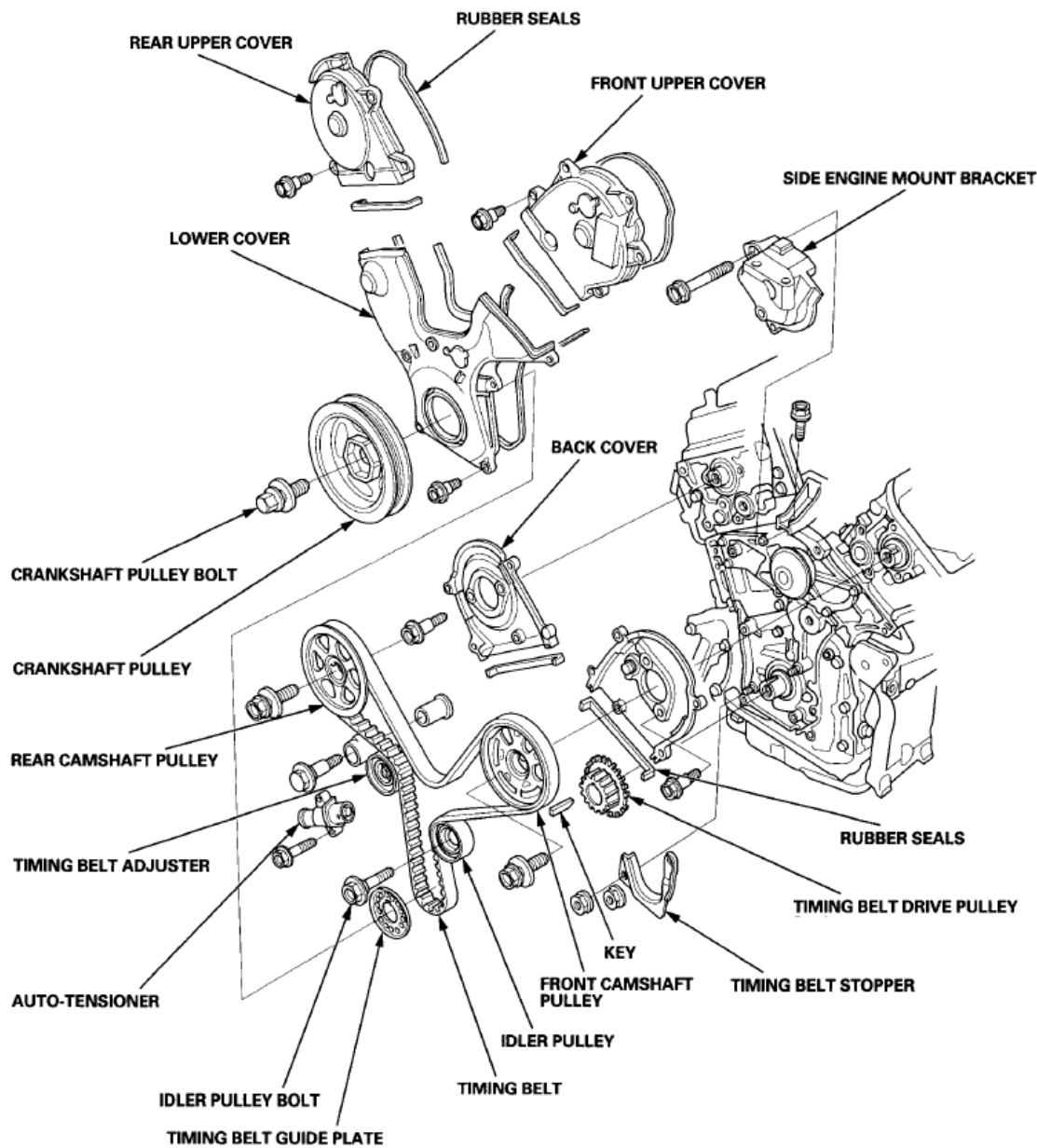


Fig. 2: Cylinder Head Components Location (1 Of 2)
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

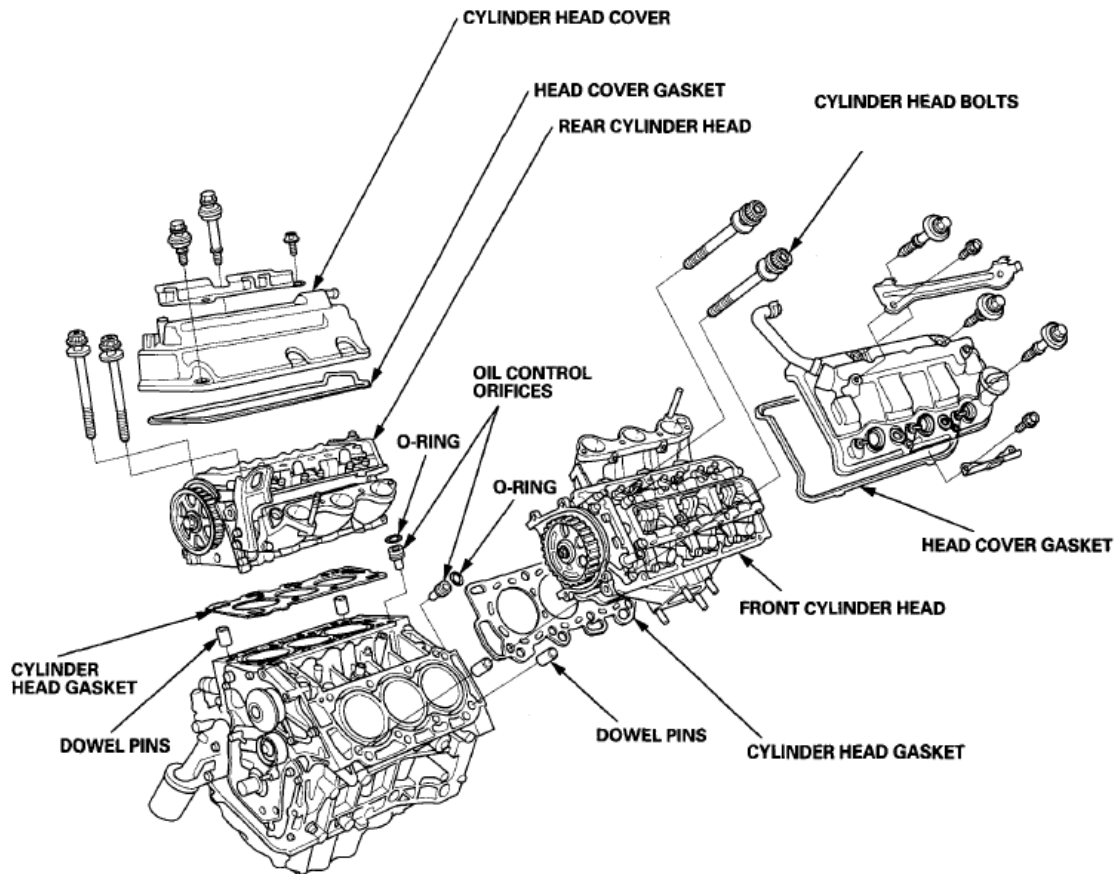


Fig. 3: Cylinder Head Components Location (2 Of 2)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

FRONT

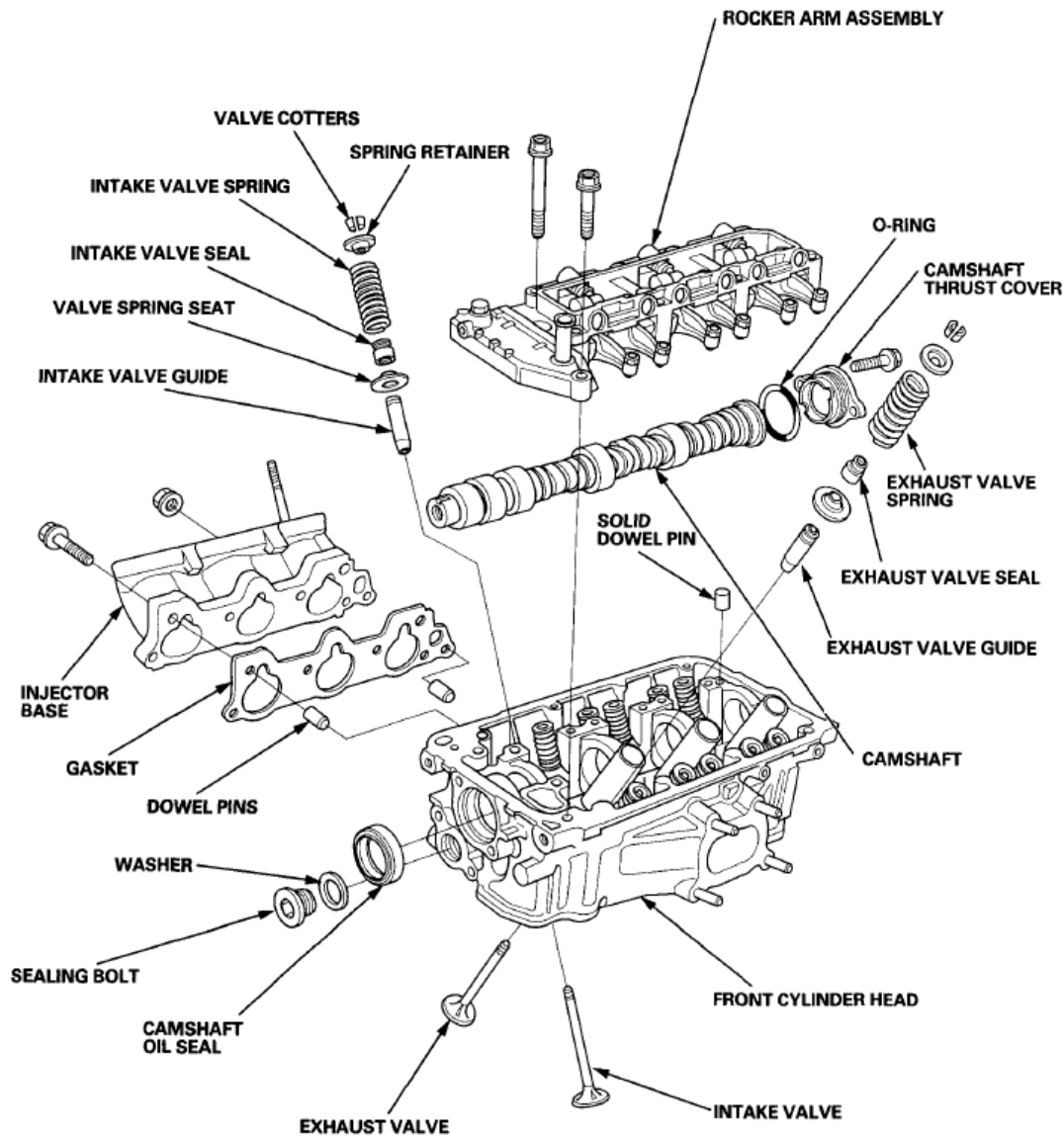


Fig. 4: Cylinder Head Components Location (Front)
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

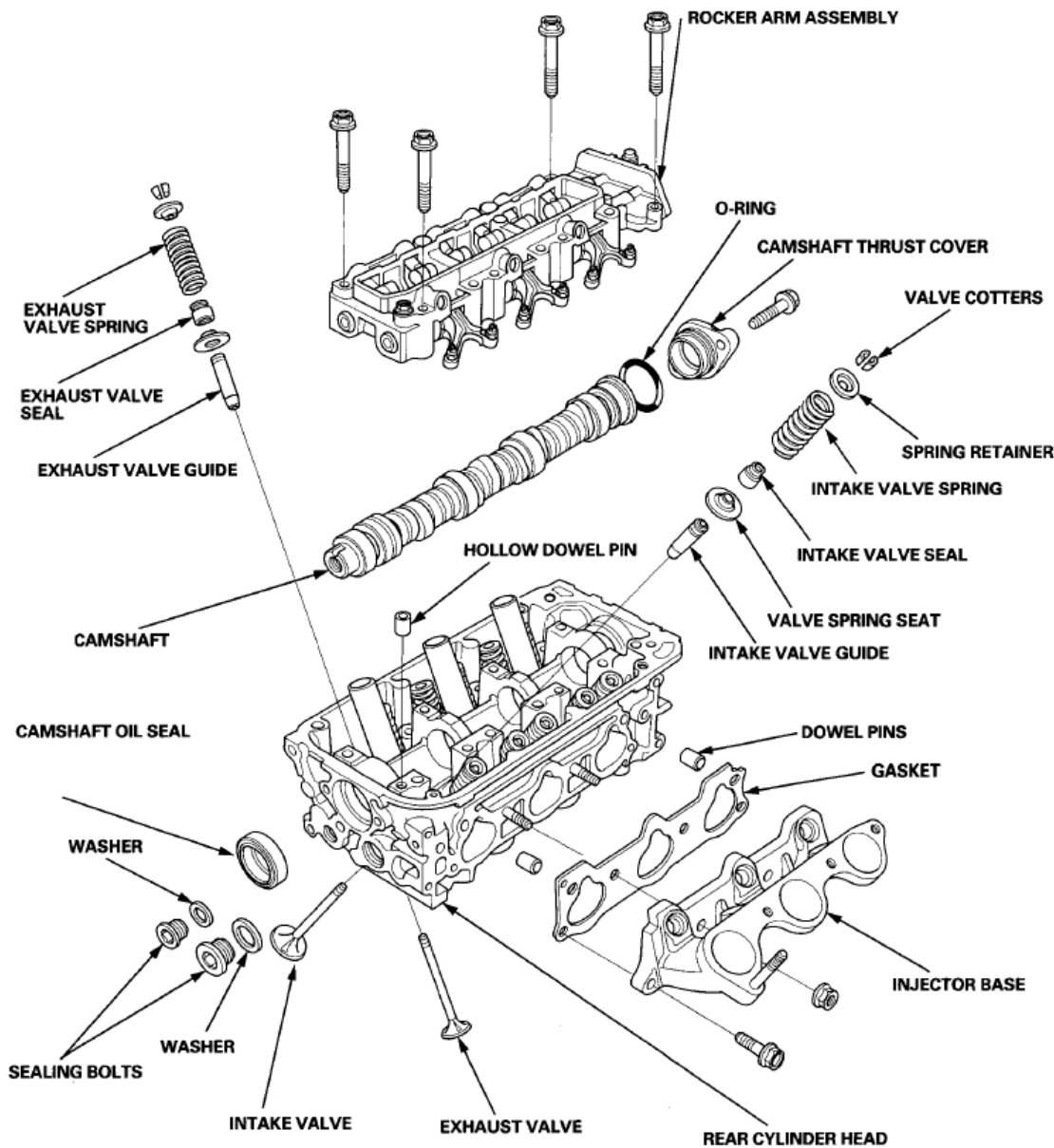


Fig. 5: Cylinder Head Components Location (Rear)
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

ENGINE COMPRESSION INSPECTION

NOTE: After the inspection, you must reset the ECM/PCM. Otherwise, the ECM/PCM will continue to stop the fuel injectors from operating.

1. Turn the ignition switch to LOCK (0), or press the engine start/stop button to select the OFF mode.
2. Connect the HDS to the DLC (see **HOW TO USE THE HDS (HONDA DIAGNOSTIC SYSTEM)**).

3. Turn the ignition switch to ON (II), or press the engine start/stop button to select the ON mode.
4. Make sure the HDS communicates with the vehicle and the ECM/PCM. If it does not communicate, troubleshoot the DLC circuit (see **DLC CIRCUIT TROUBLESHOOTING**).
5. Select ALL INJECTORS STOP in the PGM-FI INSPECTION menu with the HDS.
6. Turn the ignition switch to LOCK (0), or press the engine start/stop button to select the OFF mode.
7. Remove the six ignition coils and the six spark plugs (see **IGNITION COIL AND SPARK PLUG REMOVAL/INSTALLATION**).
8. Attach the compression gauge to a spark plug hole.

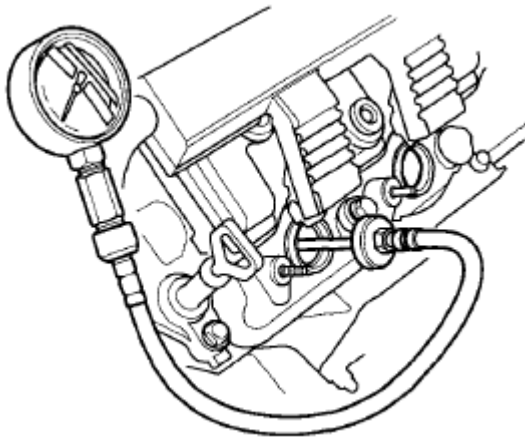


Fig. 6: Measuring Engine Compression Using Compression Gauge
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Step on the accelerator pedal to open the throttle fully, then crank the engine with the starter motor, and measure the compression.

Compression Pressure:

Above 930 kPa (9.48 kgf/cm² , 134.8 psi)

10. Measure the compression on the remaining cylinders.

Maximum Variation:

Within 200 kPa (2.04 kgf/cm² , 29.0 psi)

11. If the compression is not within the specifications, perform a cylinder leak down test to determine the problem area. Then check the following items, and remeasure the compression:
 - Incorrect valve clearance
 - Confirmation of cam timing
 - Damaged or worn cam lobes

- Damaged or worn valves and seats
 - Damaged cylinder head gaskets
 - 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 six spark plugs and the six ignition coils (see **IGNITION COIL AND SPARK PLUG REMOVAL/INSTALLATION**).
 14. Select ECM/PCM reset (see **HDS CLEAR COMMAND**) in the PGM-FI INSPECTION menu to cancel ALL INJECTORS STOP with the HDS.

VTEC ROCKER ARM TEST

Special Tools Required

- VTEC Air Stop Tool B 07AAJ-R70A200
 - VCM Air Adapter 070AJ-001A101
 - Air Pressure Regulator 07AAJ-PNAA101
 - VTEC Air Stop Tool A 07AAJ-R70A100
1. Remove the six ignition coils and the six spark plugs, (see **IGNITION COIL AND SPARK PLUG REMOVAL/INSTALLATION**)
 2. Remove the **cylinder head covers**.
 3. Rotate the crankshaft pulley clockwise. Make sure that the intake primary rocker arm (A) and the intake secondary rocker arm (B) are separated and that the intake primary rocker arm should move independently:
 - If the intake primary rocker arm and the intake secondary rocker arm move together, remove the intake primary rocker arm and the intake secondary rocker arm as an assembly, and check that the pistons in the rocker arms move smoothly. If any intake rocker arm needs replacing, replace the primary and secondary rocker arms as an assembly, then retest.
 - If the intake primary rocker arm and the intake secondary rocker arm move independently, go to step 4.

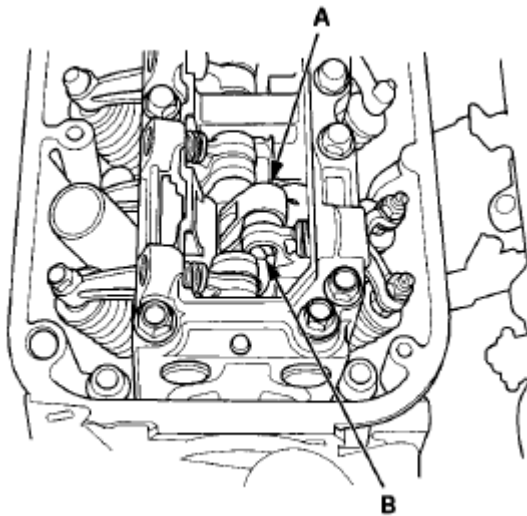


Fig. 7: Identifying Intake Primary And Secondary Rocker Arm
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Rotate the crankshaft pulley clockwise, and visually check all the exhaust primary rocker arms (A) and the exhaust secondary rocker arms (B) move independently:
 - If the exhaust primary rocker arm and the exhaust primary rocker arm move together, remove the exhaust primary rocker arm and the exhaust secondary rocker arm as an assembly, and check that the pistons in the rocker arms move smoothly. If any exhaust rocker arm needs replacing, replace the primary and secondary rocker arms as an assembly, then retest.
 - If the exhaust primary rocker arm and the exhaust secondary rocker arm move independently, go to step 5.

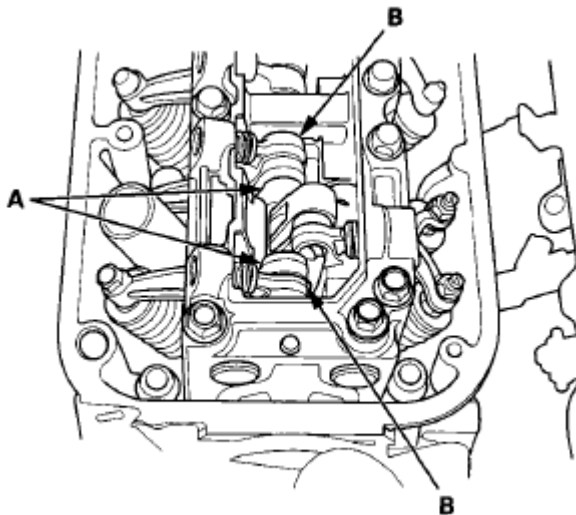


Fig. 8: Identifying Exhaust Primary And Secondary Rocker Arm
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Check that the air pressure on the shop air compressor gauge indicates over 981 kPa (10.00 kgf/cm²).

142.3 psi).

6. Inspect the **valve clearance**.
7. Remove the sealing bolts, then install VTEC air stop tool B (A) and the VCM air adapter (B) to the inspection hole, then connect the air pressure regulator (C) as shown.

FRONT

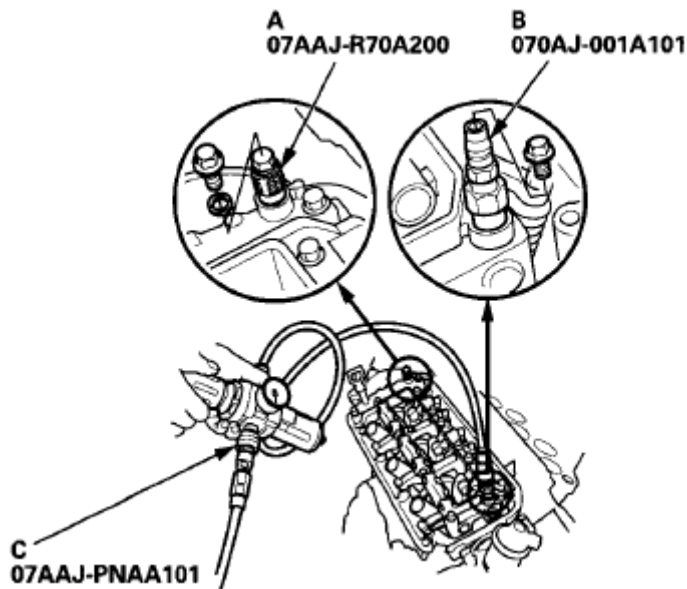


Fig. 9: Identifying Air Pressure Regulator Connection With VCM Air Adapter (Front)
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Remove the sealing bolts, then install VTEC air stop tool A (A) and the VCM air adapter (B) to the inspection hole, then connect the air pressure regulator (C) as shown.

REAR

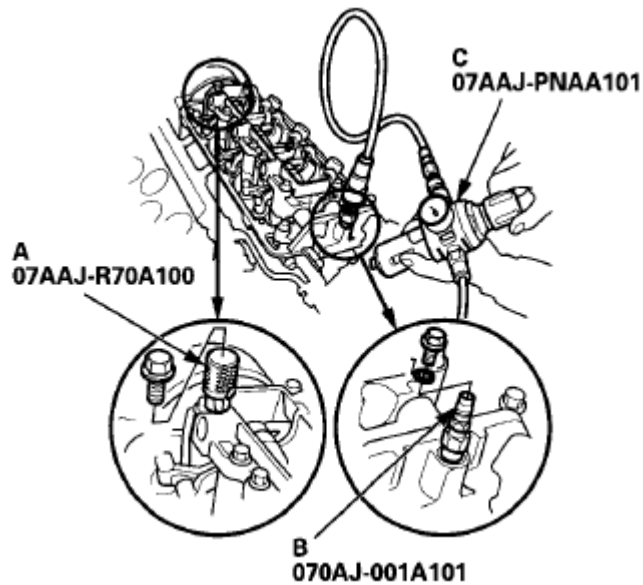


Fig. 10: Identifying Air Pressure Regulator Connection With VCM Air Adapter (Rear)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

Specified Air Pressure:

550-690 kPa (5.61-7.04 kgf/cm² , 79.8-100.1 psi)

10. With the specified air pressure applied, rotate the crankshaft pulley clockwise. The intake primary rocker arm (A) should move together with the intake secondary rocker arm (B):
 - If the intake primary rocker arm and the intake secondary rocker arm move independently, remove the intake primary rocker arm and the intake secondary rocker arm as an assembly, and check that the pistons in the rocker arms move smoothly. If any intake rocker arm needs replacing, replace the primary and secondary rocker arms as an assembly, then retest.
 - If the intake primary rocker arm and the intake secondary rocker arm move together, go to step 11.

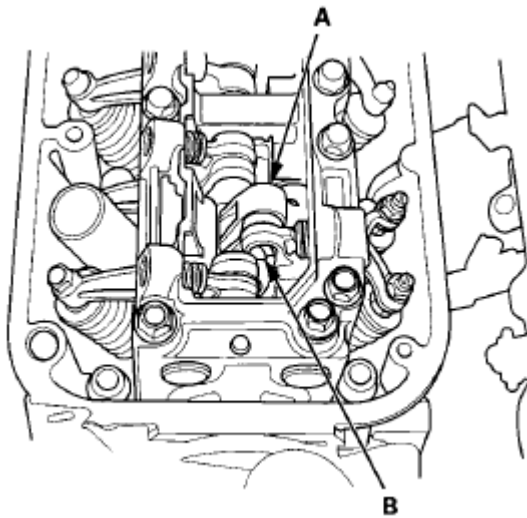


Fig. 11: Identifying Intake Primary And Secondary Rocker Arm
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. With the specified air pressure applied, rotate the crankshaft pulley clockwise. The exhaust primary rocker arm (A) should move together with the exhaust secondary rocker arm (B):
- If the exhaust primary rocker arm and the exhaust secondary rocker arm move independently, remove the exhaust primary rocker arm and the exhaust secondary rocker arm as an assembly, and check that the pistons in the rocker arms move smoothly. If any exhaust rocker arm needs replacing, replace the primary and secondary rocker arms as an assembly, then retest.
 - If the exhaust primary rocker arm and the exhaust secondary rocker arm move together, go to step 12.

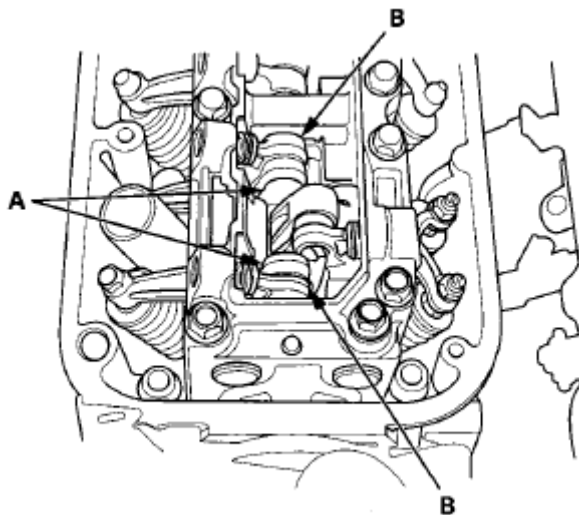


Fig. 12: Identifying Exhaust Primary And Secondary Rocker Arm
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Remove the air pressure regulator, the VCM air adapter, VTEC air stop tool A, and VTEC air stop tool B.

13. Torque the sealing bolts to 22 N.m (2.2 kgf.m, 16 lbf.ft).
14. Install the **cylinder head covers**.
15. Install the six spark plugs.

VALVE CLEARANCE ADJUSTMENT

NOTE: Connect the HDS to the DLC, and monitor ECT SENSOR 1. Adjust the valve clearance only when the engine coolant temperature is less than 100°F (38°C).

1. Remove the **cylinder head covers**.
2. Set the No. 1 piston at top dead center (TDC). Align the pointer (A) on the front upper cover with the No. 1 piston TDC mark (B) on the front camshaft pulley.

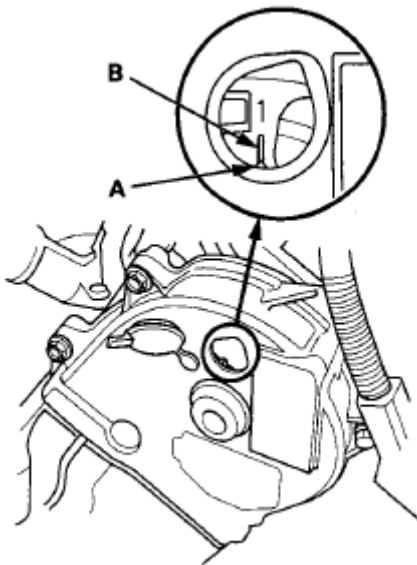


Fig. 13: Identifying Pointer And No. 1 Piston TDC Mark
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Select the correct feeler gauge for the valve clearance you are going to check.

Valve Clearance

Intake: 0.20-0.24 mm (0.008-0.009 in)

Exhaust: 0.28-0.32 mm (0.011-0.012 in)

REAR

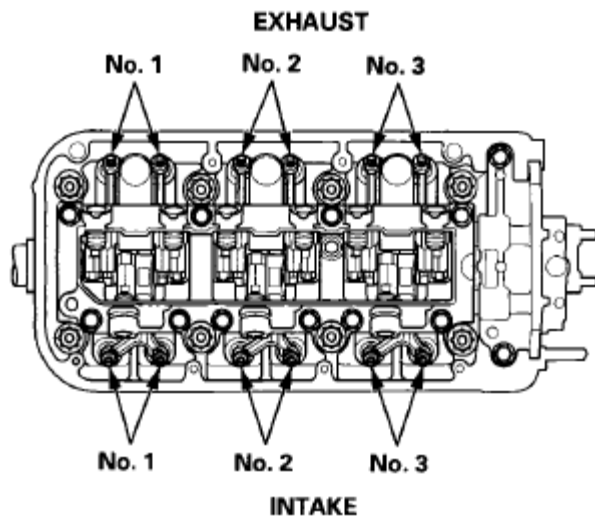


Fig. 14: Identifying Valves (Rear)

Courtesy of AMERICAN HONDA MOTOR CO., INC.

FRONT

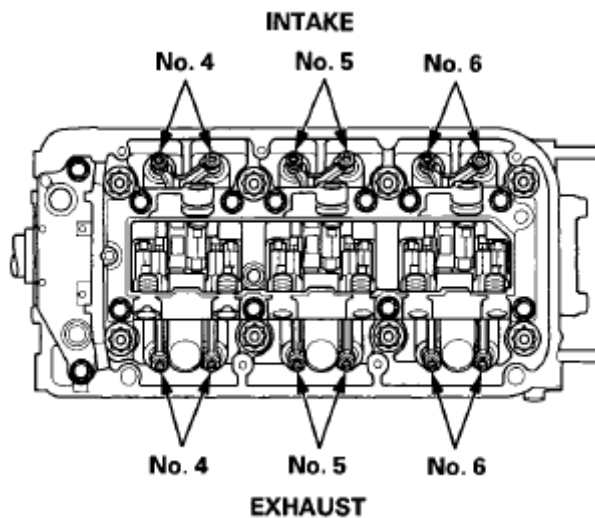


Fig. 15: Identifying Valves (Front)

Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Insert the feeler gauge (A) between the adjusting screw and the end of the valve stem on the No. 1 cylinder, and slide it back and forth; you should feel a slight amount of drag.

INTAKE

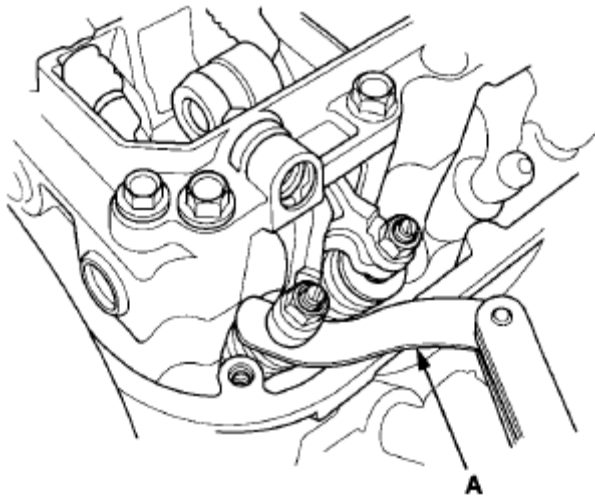


Fig. 16: Checking Valve Clearance Using Feeler Gauge (Intake)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

EXHAUST

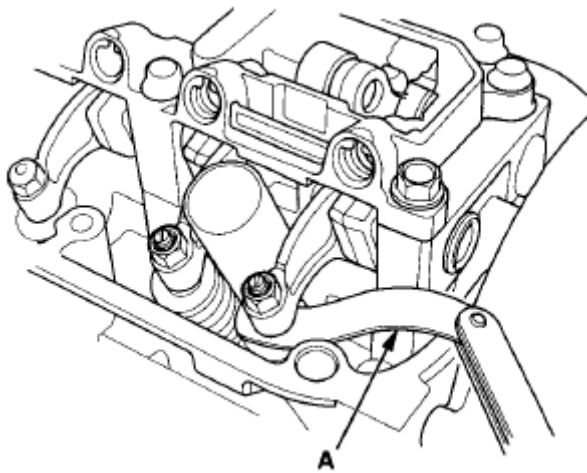


Fig. 17: Checking Valve Clearance Using Feeler Gauge (Exhaust)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. If you feel too much or too little drag, loosen the locknut, and turn the adjusting screw until the drag on the feeler gauge is correct.

INTAKE

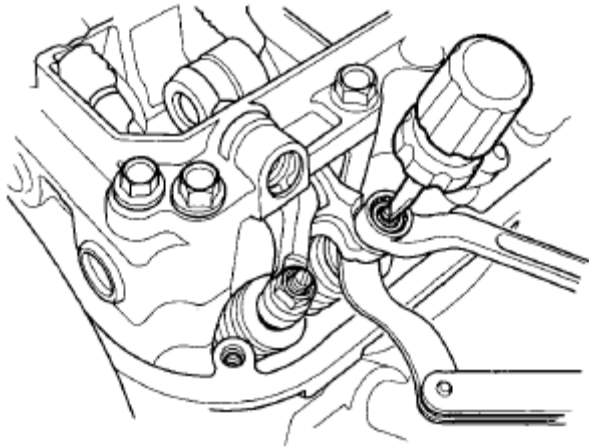


Fig. 18: Adjusting Valve Clearance Using Feeler Gauge (Intake)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

EXHAUST

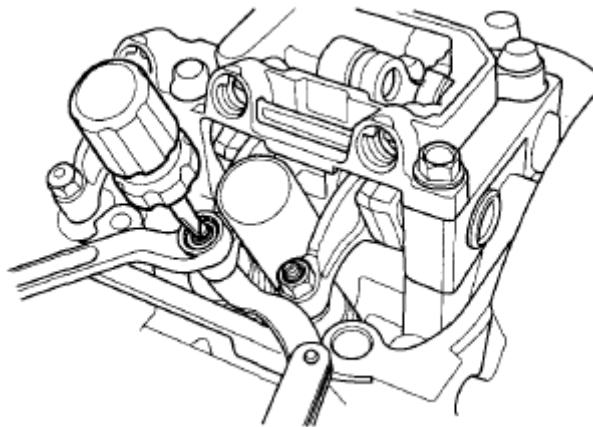


Fig. 19: Adjusting Valve Clearance Using Feeler Gauge (Exhaust)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. While holding the adjusting screw with the screw driver, tighten the locknut, then recheck the clearance. Repeat the adjustment, if necessary.

Specified Torque

20 N.m (2.0 kgf.m, 14 lbf.ft)

Apply new engine oil to the nut threads.

7. Rotate the crankshaft clockwise. Align the pointer (A) on the front upper cover with the No. 4 piston TDC mark (B) on the front camshaft pulley.

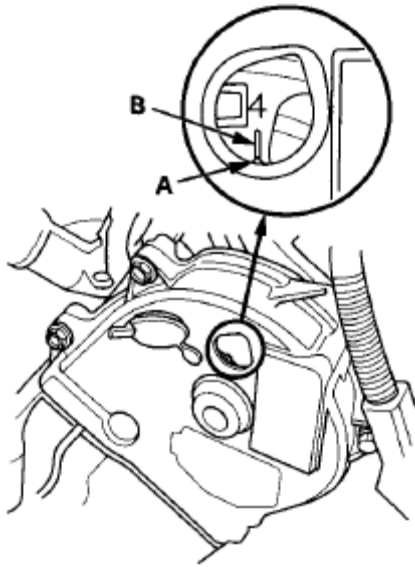


Fig. 20: Identifying Front Upper Cover Pointer And No. 4 Piston TDC Mark
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Check and, if necessary, adjust the valve clearance on the No. 4 cylinder.
9. Rotate the crankshaft clockwise. Align the pointer (A) on the front upper cover with the No. 2 piston TDC mark (B) on the front camshaft pulley.

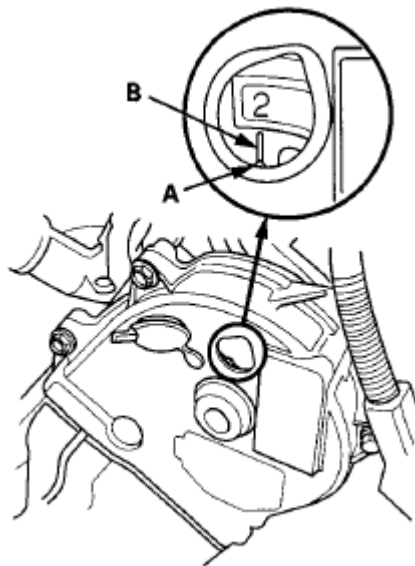


Fig. 21: Identifying Front Upper Cover Pointer And No. 2 Piston TDC Mark
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Check and, if necessary, adjust the valve clearance on the No. 2 cylinder.
11. Rotate the crankshaft clockwise. Align the pointer (A) on the front upper cover with the No. 5 piston TDC mark (B) on the front camshaft pulley.

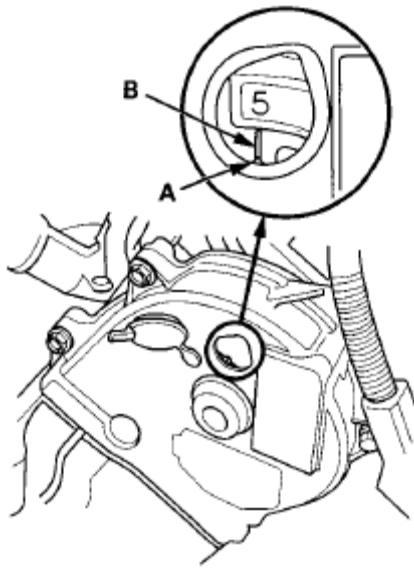


Fig. 22: Identifying Front Upper Cover Pointer And No. 5 Piston TDC Mark
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Check and, if necessary, adjust the valve clearance on the No. 5 cylinder.
13. Rotate the crankshaft clockwise. Align the pointer (A) on the front upper cover with the No. 3 piston TDC mark (B) on the front camshaft pulley.

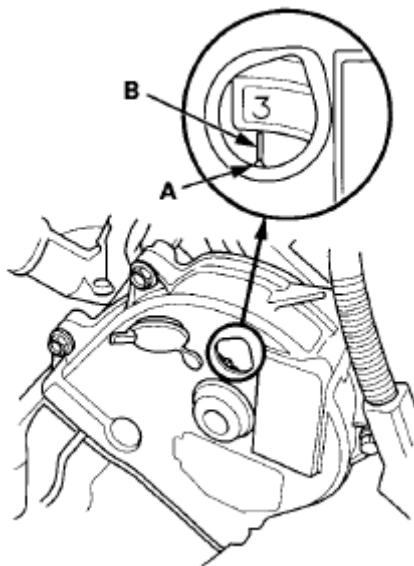


Fig. 23: Identifying Front Upper Cover Pointer And No. 3 Piston TDC Mark
Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. Check and, if necessary, adjust the valve clearance on the No. 3 cylinder.
15. Rotate the crankshaft clockwise. Align the pointer (A) on the front upper cover with the No. 6 piston TDC mark (B) on the front camshaft pulley.

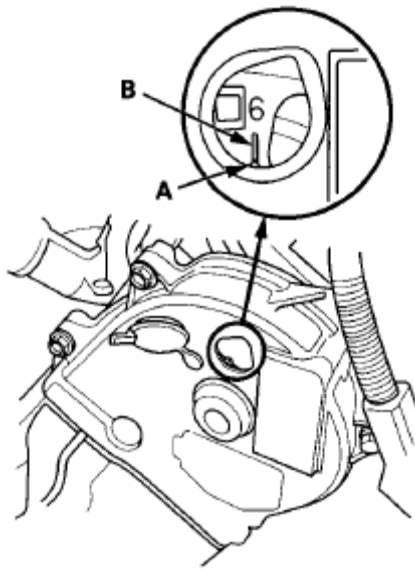


Fig. 24: Identifying Front Upper Cover Pointer And No. 6 Piston TDC Mark
Courtesy of AMERICAN HONDA MOTOR CO., INC.

16. Check and, if necessary, adjust the valve clearance on the No. 6 cylinder.
17. Install the cylinder head covers.

CRANKSHAFT PULLEY REMOVAL AND INSTALLATION

Special Tools Required

- Holder Handle 07JAB-001020B
- Holder Attachment, 50 mm, Offset 07MAB-PY3010A
- Socket, 19 mm 07JAA-001020A or equivalent

REMOVAL

1. Raise the vehicle on the lift.
2. Remove the right front wheel.
3. Remove the front splash shield (see **FRONT SPLASH SHIELD REPLACEMENT**).
4. Remove the drive belt (see **DRIVE BELT REPLACEMENT**).
5. Hold the pulley with the holder handle (A) and the holder attachment, 50 mm, offset (B).

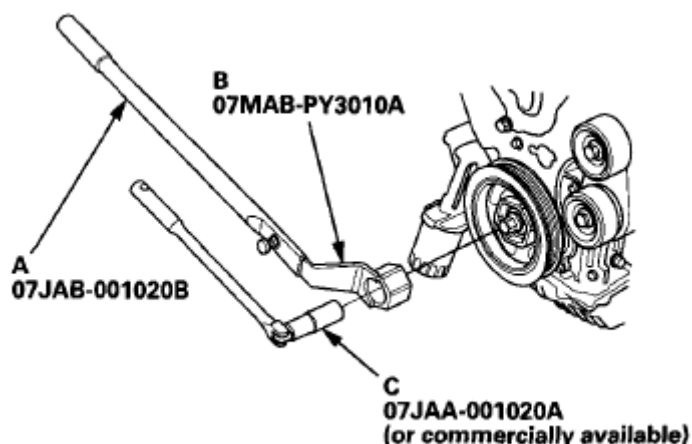


Fig. 25: Identifying Holder Handle And Holder Attachment Offset Of Crankshaft Pulley
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

INSTALLATION

1. Remove any oil and clean the pulleys (A), the crankshaft (B), the bolt (C), and the washer (D). Lubricate with new engine oil as shown.

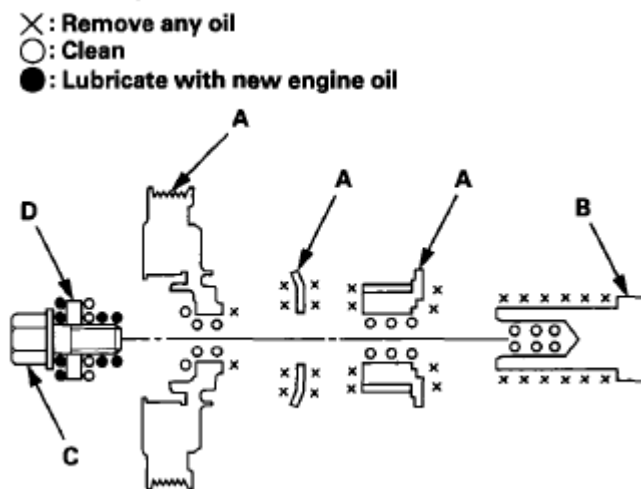


Fig. 26: Positions For Installing Crankshaft Pulley
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Install the crankshaft pulley, and tighten the bolt. Do not use an impact wrench.
 1. Hold the pulley with the holder handle (A) and the holder attachment (B). Torque the bolt to 64 N.m (6.5 kgf.m, 47 lbf.ft) with a torque wrench and the heavy duty socket, 19 mm (C).
 2. Tighten the bolt an additional 60 °.

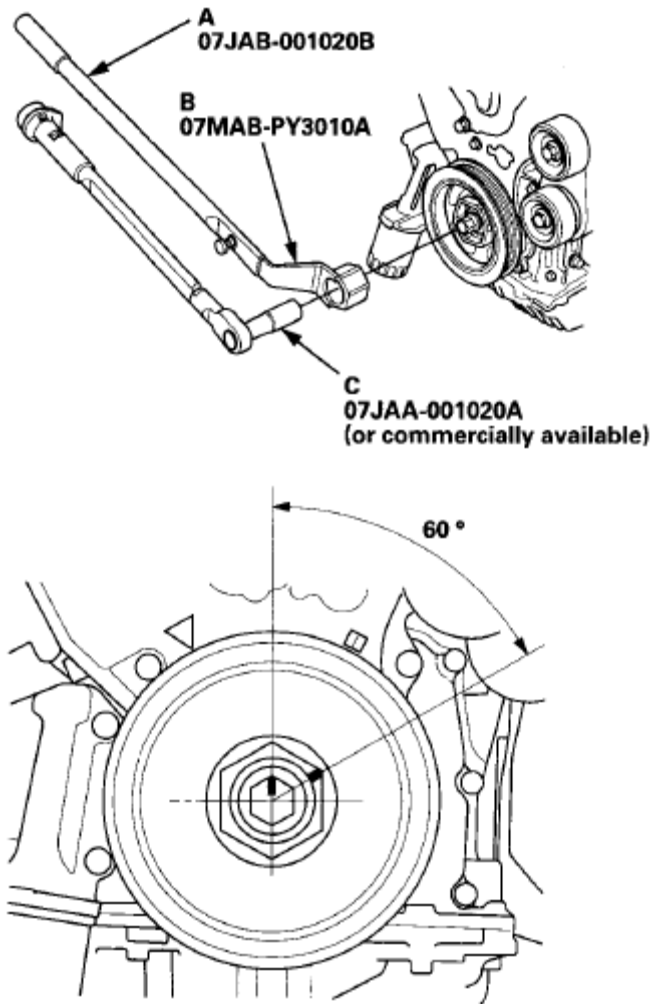


Fig. 27: Position For Installing Crankshaft Pulley Bolt
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Install the drive belt (see **DRIVE BELT REPLACEMENT**).
4. Install the front splash shield (see **FRONT SPLASH SHIELD REPLACEMENT**).
5. Install the right front wheel.

TIMING BELT INSPECTION

1. Remove the drive belt (see **DRIVE BELT REPLACEMENT**).
2. Remove the front upper cover.

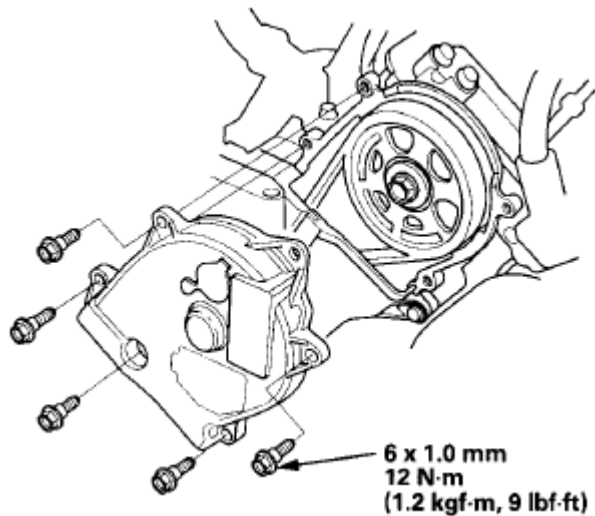


Fig. 28: Identifying Front Upper Cover Bolt With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Inspect the timing belt for cracks and oil or coolant contamination. Replace the belt if it is cracked, or contaminated with oil or coolant. Wipe off any oil or solvent that gets on the belt pulleys.

NOTE: If there is any leakage, repair them before replacing the timing belt.

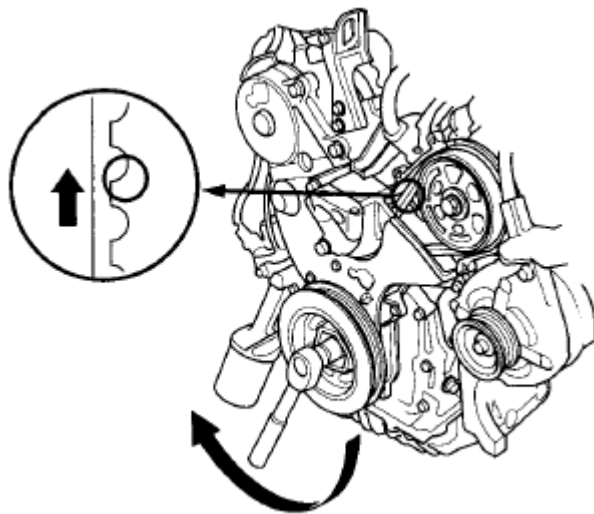


Fig. 29: Inspecting Timing Belt For Cracks And Oil Or Coolant Contamination
Courtesy of AMERICAN HONDA MOTOR CO., INC.

TIMING BELT REMOVAL

1. Remove the engine compartment covers (see **ENGINE COMPARTMENT COVER REPLACEMENT**).

2. Turn the crankshaft so its white mark (A) on the crankshaft pulley lines up with the pointer (B).

NOTE: The other pointer (C) is not used.

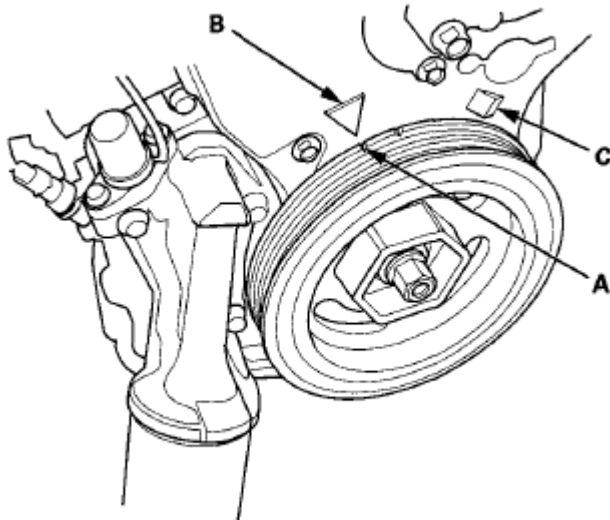


Fig. 30: Identifying White Mark On Crankshaft Pulley And Pointer
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Check that the No. 1 piston top dead center (TDC) mark (A) on the front camshaft pulley and the pointer (B) on the front upper cover are aligned.

NOTE: If the marks are not aligned, rotate the crankshaft 360 degrees, and recheck the camshaft pulley mark.

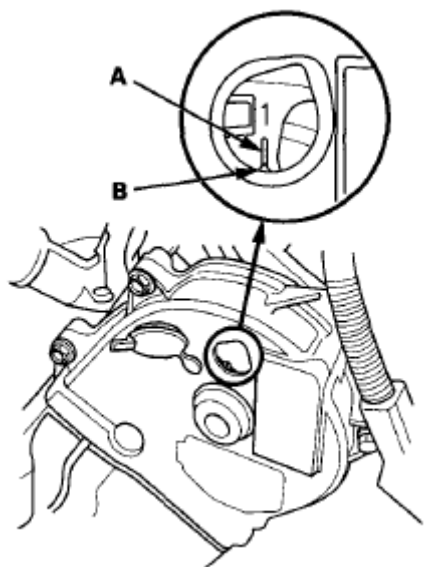


Fig. 31: Identifying No. 1 Piston Top Dead Center (TDC) Mark And Pointer

Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Raise the vehicle on the lift, then remove the right front wheel.
5. Remove the front splash shield (see **FRONT SPLASH SHIELD REPLACEMENT**).
6. Remove the drive belt auto-tensioner (see **DRIVE BELT AUTO-TENSIONER REPLACEMENT**).
7. Support the engine with a jack and a wood block under the oil pan.
8. Remove the ground cable (A), then remove the upper half of the side engine mount bracket (B).

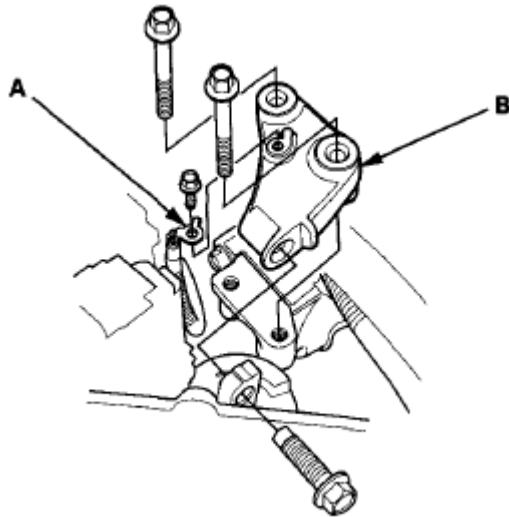


Fig. 32: Identifying Engine Mount Bracket And Ground Cable
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Remove the **crankshaft pulley**.
10. Remove the front upper cover (A) and the rear upper cover (B).

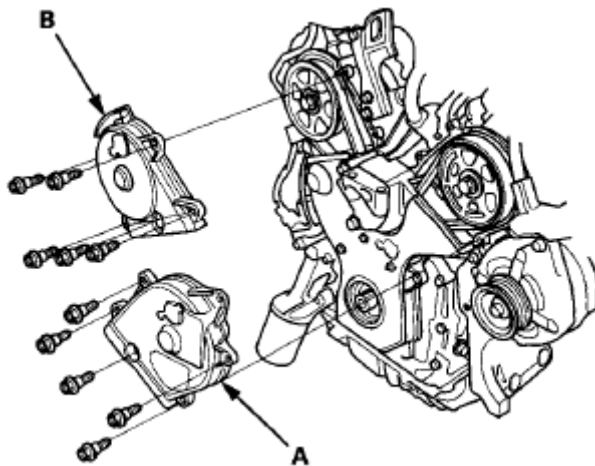


Fig. 33: Identifying Front And Rear Upper Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Remove the lower cover.

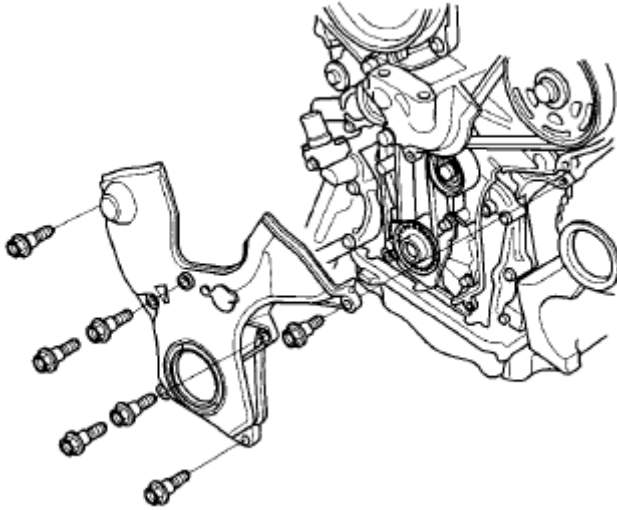


Fig. 34: Identifying Lower Cover

Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Remove one of the battery clamp bolts from the battery tray, and grind the end of it as shown.

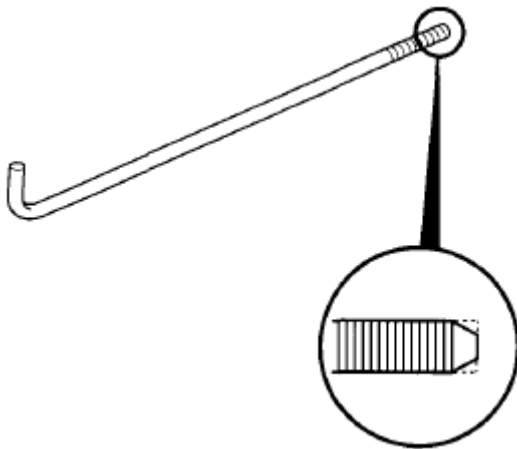


Fig. 35: Identifying Grind At End Of Battery Clamp Bolt

Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Thread the battery clamp bolt in as shown to hold the timing belt adjuster in its current position. Tighten it by hand, do not use a wrench.

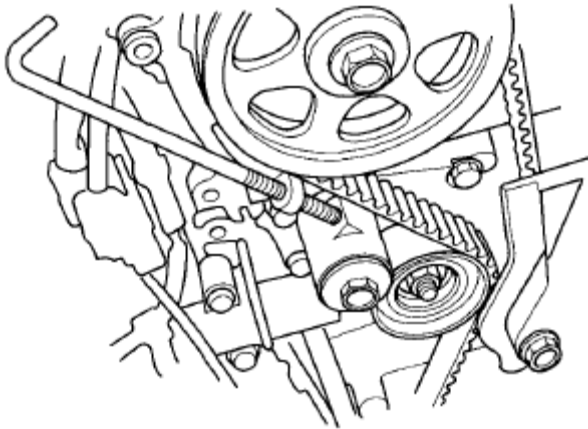


Fig. 36: Identifying Battery Clamp Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. Remove the timing belt guide plate (A).

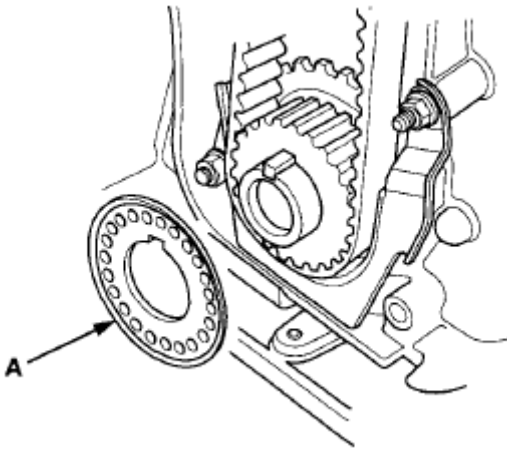


Fig. 37: Identifying Timing Belt Guide Plate
Courtesy of AMERICAN HONDA MOTOR CO., INC.

15. Remove the lower half of the side engine mount bracket.

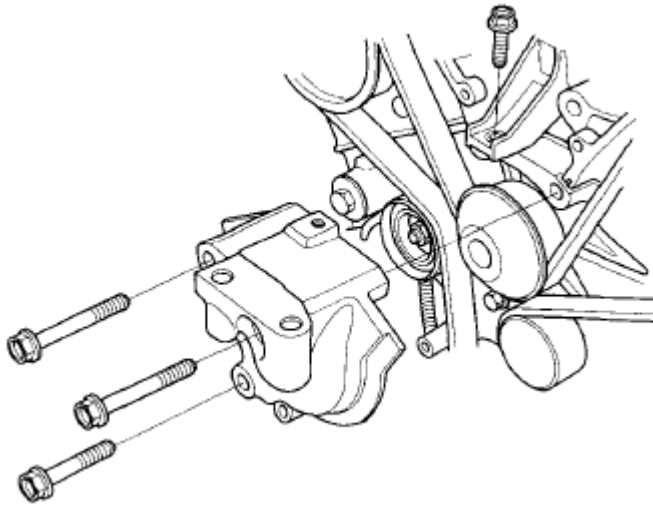


Fig. 38: Identifying Lower Half Of Side Engine Mount Bracket
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

16. Remove the idler pulley bolt (A) and the idler pulley (B), then remove the timing belt. Discard the idler pulley bolt.

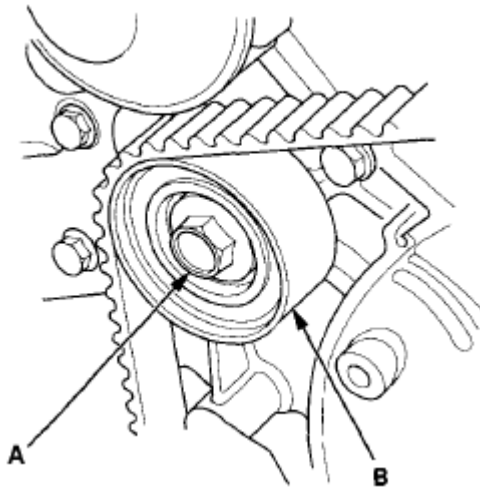


Fig. 39: Identifying Idler Pulley And Idler Pulley Bolt
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

TIMING BELT INSTALLATION

NOTE: The following procedure is for installation of a used timing belt. If you are installing a new belt, refer to the timing belt replacement procedure.

1. Clean the timing belt pulleys, the timing belt guide plate, and the upper and lower covers.
2. Set the timing belt drive pulley to top dead center (TDC) by aligning the TDC mark (A) on the tooth of

the timing belt drive pulley with the pointer (B) on the oil pump.

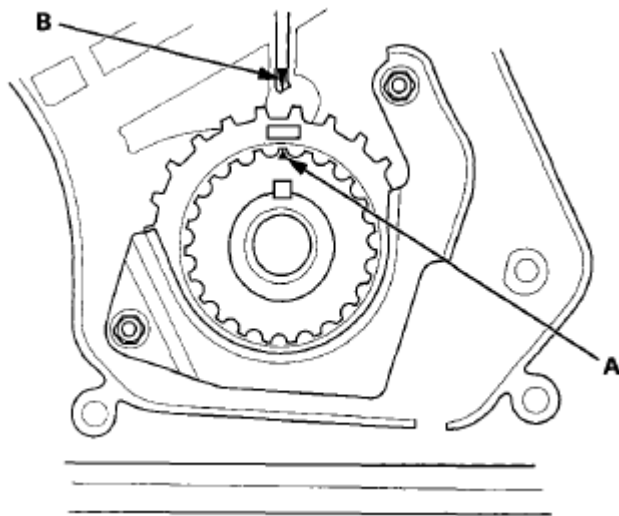


Fig. 40: Identifying TDC Mark On Tooth Of Timing Belt Drive Pulley And Pointer On Oil Pump
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Set the camshaft pulleys to TDC by aligning the TDC marks (A) on the camshaft pulleys with the pointers (B) on the back covers.

FRONT

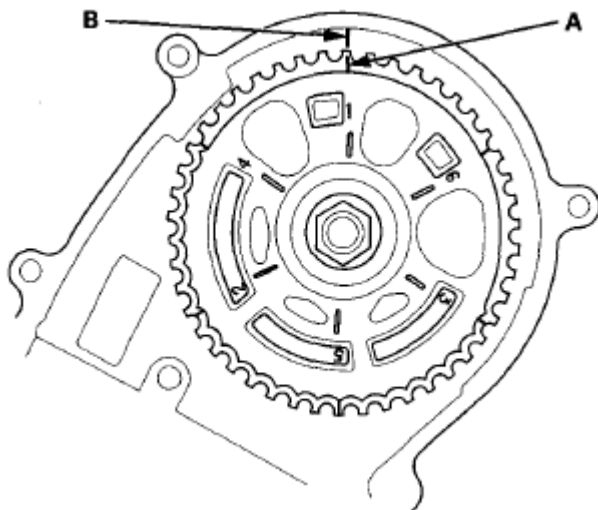


Fig. 41: Identifying TDC Mark On Camshaft Pulleys And Pointer On Back Covers - Front
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

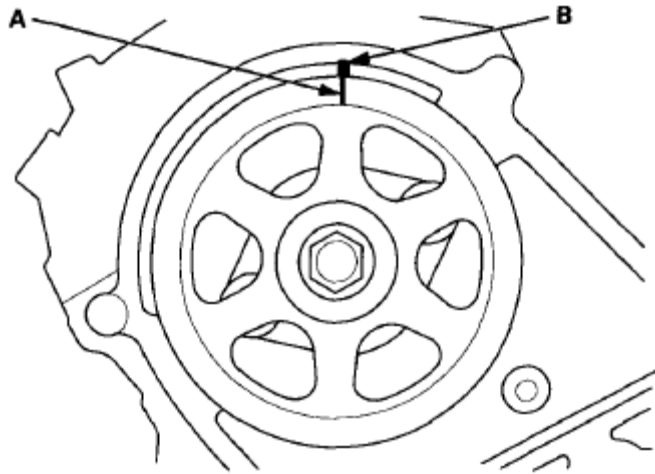


Fig. 42: Identifying TDC Mark On Camshaft Pulleys And Pointer On Back Covers - Rear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Loosely install the idler pulley with a new idler pulley bolt so the pulley can move but does not come off.
5. If the auto-tensioner has extended and the timing belt cannot be installed, do the **timing belt replacement** procedure.
6. Install the timing belt in a counterclockwise sequence starting with the drive pulley. Take care not to damage the timing belt during installation:
 1. Drive pulley (A)
 2. Idler pulley (B)
 3. Front camshaft pulley (C)
 4. Water pump pulley (D)
 5. Rear camshaft pulley (E)
 6. Adjusting pulley (F)

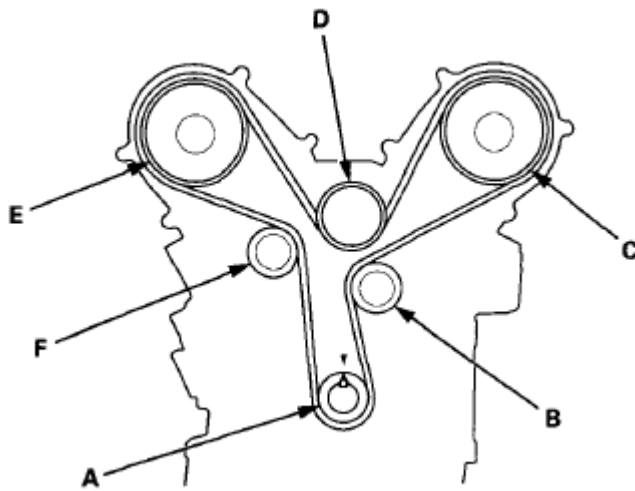


Fig. 43: Identifying Various Types Of Pulley

Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Tighten the idler pulley bolt.

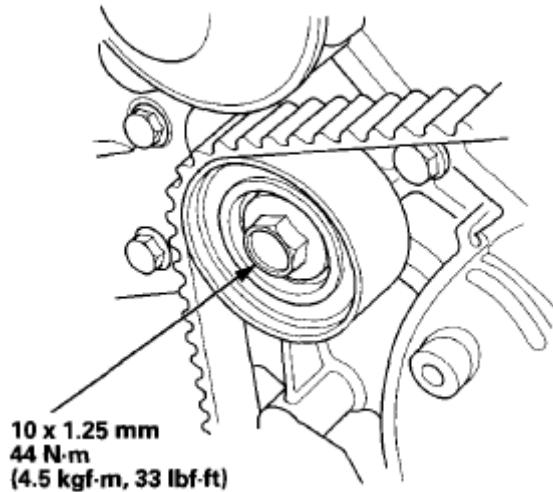


Fig. 44: Identifying Idler Pulley Bolt With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Remove the battery clamp bolt from the back cover.

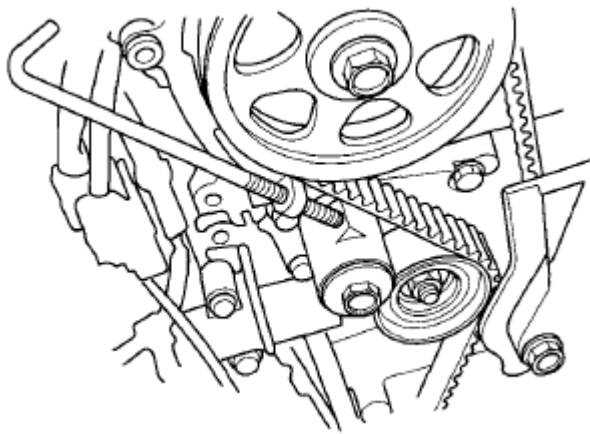


Fig. 45: Identifying Battery Clamp Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Install the lower half of the side engine mount bracket using new bolts (A) and the bolt (B).

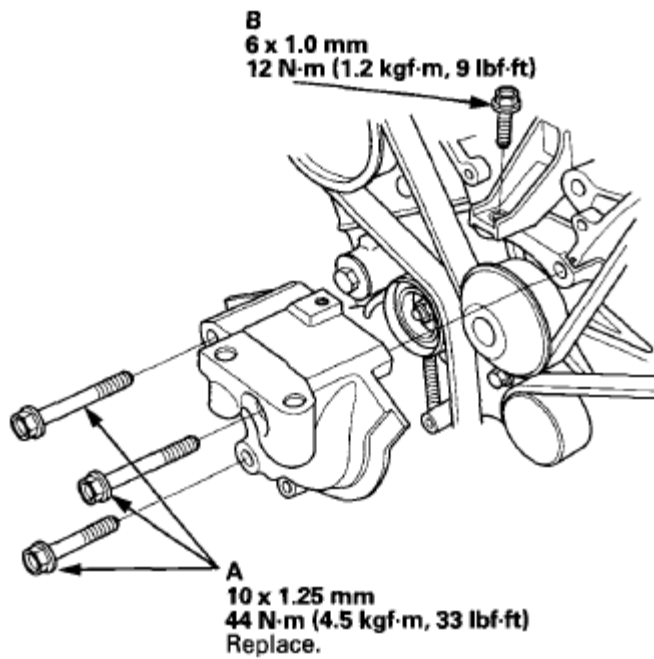


Fig. 46: Identifying Bolts With Torque Specifications
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Install the timing belt guide plate (A) as shown

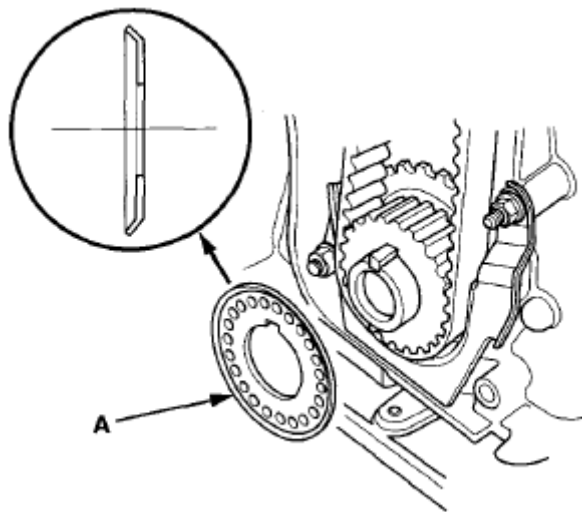


Fig. 47: Identifying Timing Belt Guide Plate
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Install the lower cover.

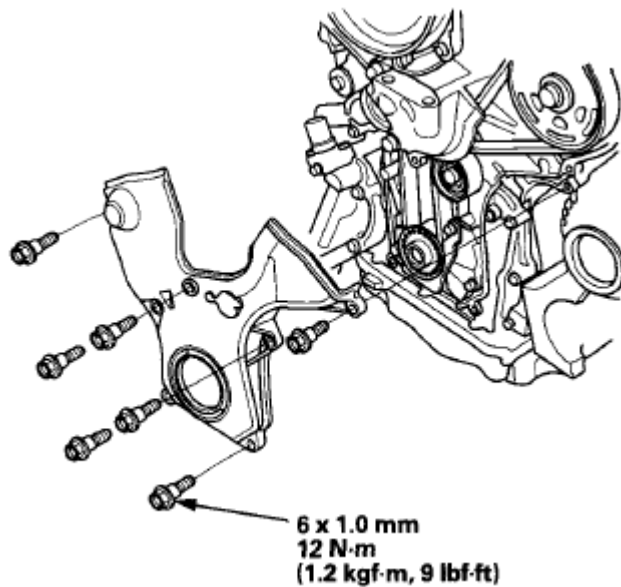


Fig. 48: Identifying Lower Cover Bolts With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Install the front upper cover (A) and the rear upper cover (B).

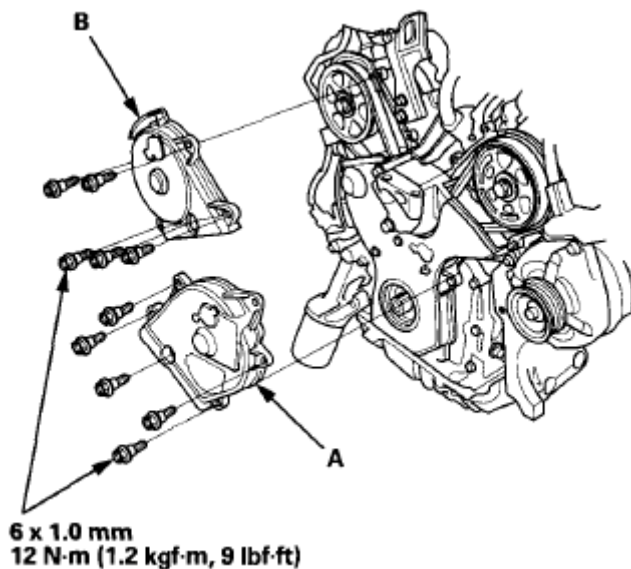


Fig. 49: Identifying Front Upper Cover And Rear Upper Cover With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Install the **crankshaft pulley**.
14. Rotate the crankshaft pulley about six turns clockwise so the timing belt positions itself on the pulleys.
15. Turn the crankshaft pulley so its white mark (A) lines up with the pointer (B).

NOTE: The other pointer (C) is not used.

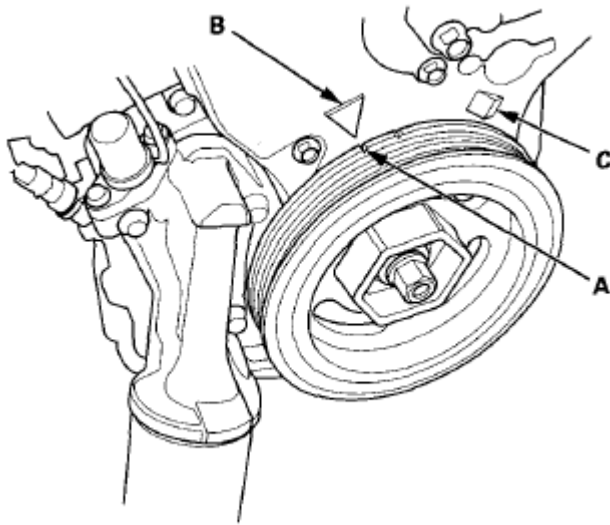


Fig. 50: Identifying Crankshaft Pulley White Mark And Pointer
Courtesy of AMERICAN HONDA MOTOR CO., INC.

16. Check the camshaft pulley marks.

NOTE: If the marks are not aligned, rotate the crankshaft 360 degrees, and recheck the camshaft pulley mark:

- If the camshaft pulley marks are at TDC, go to step 17.
- If the camshaft pulley marks are not at TDC, remove the timing belt and repeat steps 2 through 16.

FRONT

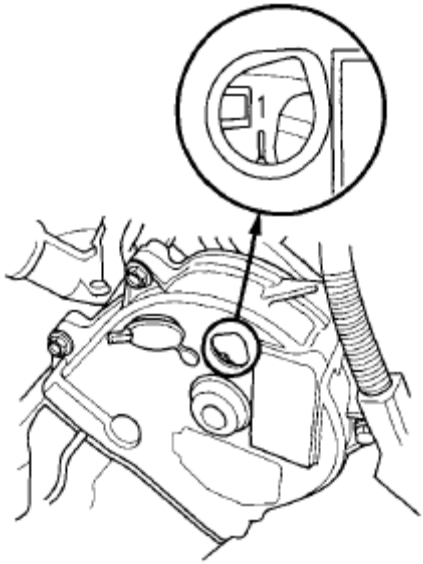


Fig. 51: Identifying Camshaft Pulley Mark - Front
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

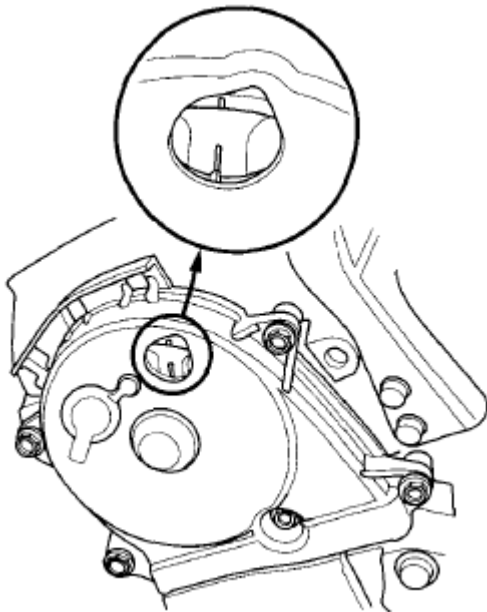


Fig. 52: Identifying Camshaft Pulley Mark - Rear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

17. Loosely install the upper half of the side engine mount bracket (A) using new bolts, then install the ground cable (B).

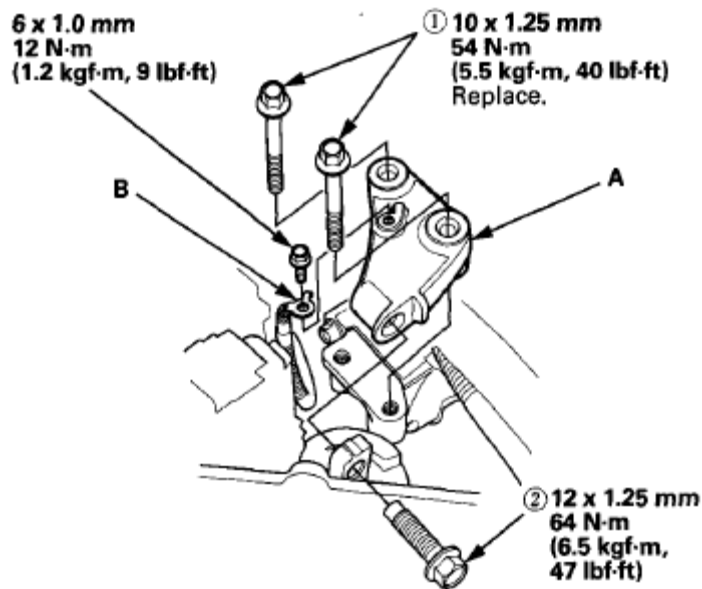


Fig. 53: Identifying Side Engine Mount Bracket And Ground Cable With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

18. Remove the jack and the wood block.
19. Tighten the mounting bolts in the numbered sequence shown.
20. Install the drive belt auto-tensioner (see **DRIVE BELT AUTO-TENSIONER REPLACEMENT**).
21. Install the front splash shield (see **FRONT SPLASH SHIELD REPLACEMENT**).
22. Install the right front wheel.
23. Install the engine compartment covers (see **ENGINE COMPARTMENT COVER REPLACEMENT**).
24. Do the CKP pattern clear/CKP pattern learn procedure (see **CKP PATTERN CLEAR/CKP PATTERN LEARN**).

TIMING BELT REPLACEMENT

NOTE: The following procedure is for installation of a new timing belt. If you are installing a used belt, refer to the **timing belt installation** procedure.

1. Remove the **timing belt**.
2. Clean the timing belt pulleys, the timing belt guide plate, and the upper and lower covers.
3. Set the timing belt drive pulley to top dead center (TDC) by aligning the TDC mark (A) on the tooth of the timing belt drive pulley with the pointer (B) on the oil pump.

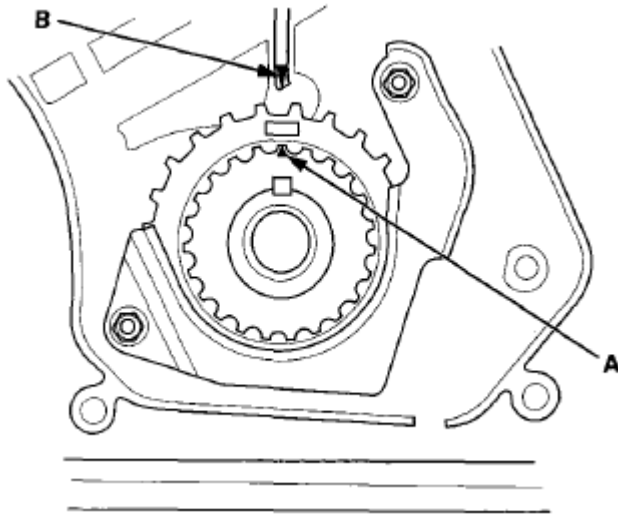


Fig. 54: Identifying TDC Mark On Tooth Of Timing Belt Drive Pulley And Pointer On Oil Pump
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Set the camshaft pulleys to TDC by aligning the TDC marks (A) on the camshaft pulleys with the pointers (B) on the back covers.

FRONT

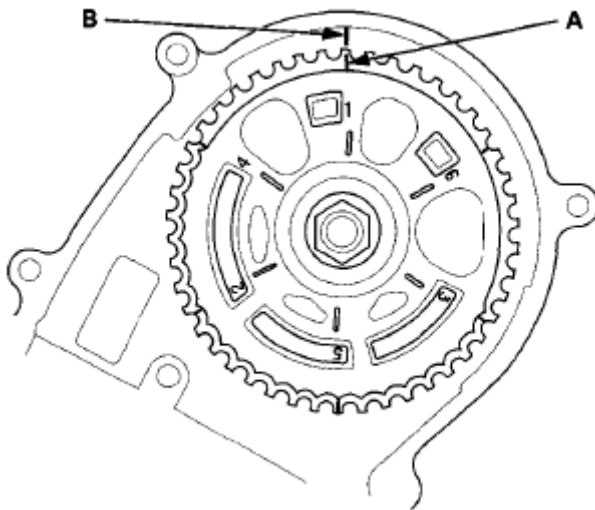


Fig. 55: Identifying TDC Marks On Camshaft Pulleys And Pointers On Back Covers - Front
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

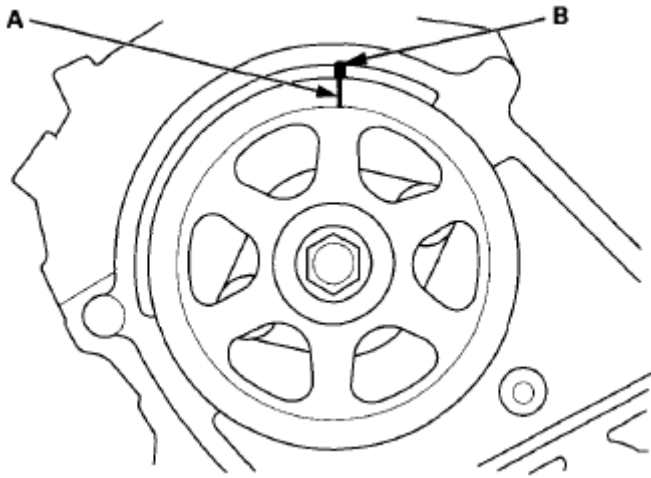


Fig. 56: Identifying TDC Marks On Camshaft Pulleys And Pointers On Back Covers - Rear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Remove the battery clamp bolt from the back cover.
6. Remove the auto-tensioner.

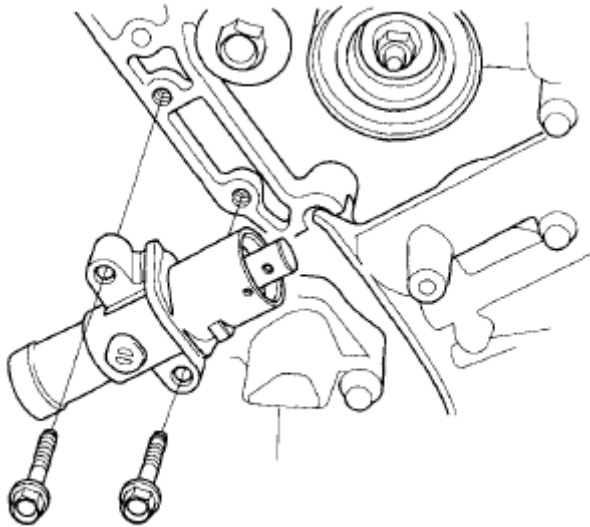


Fig. 57: Identifying Auto-Tensioner
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Align the holes on the rod and the housing of the auto-tensioner.

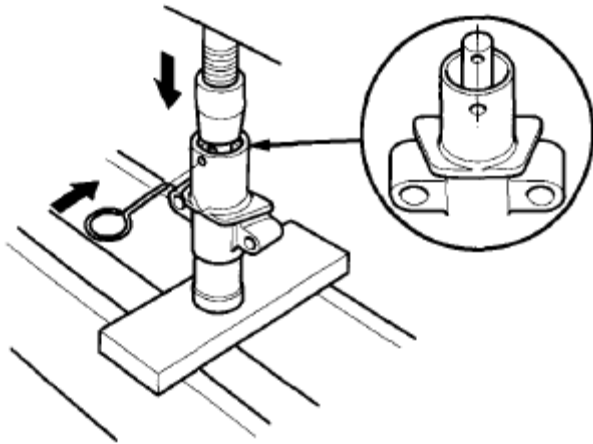


Fig. 58: Aligning Holes On Rod And Housing Of Auto-Tensioner
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Use a hydraulic press to slowly compress the auto-tensioner. Insert a 2.0 mm (5/64 in) pin through the housing and the rod.

NOTE: The compression pressure should not exceed 9, 800 N (999.3 kgf, 2, 203.1 lbf).

9. Install the auto-tensioner.

NOTE: Make sure the pin stays in place.

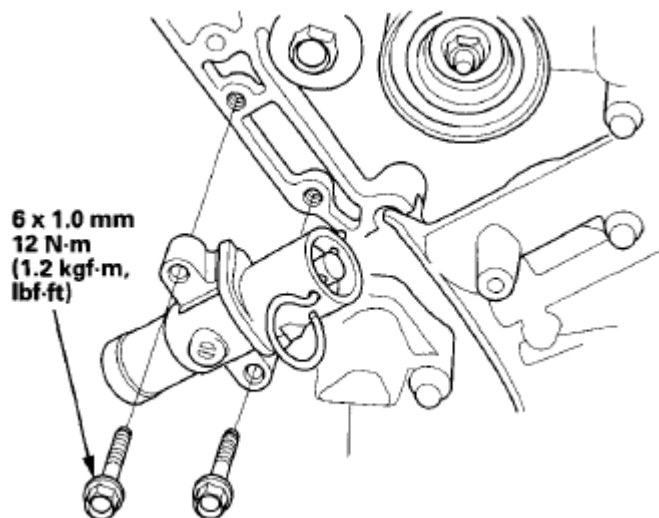


Fig. 59: Identifying Auto-Tensioner With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Thread the battery clamp bolt in as shown to hold the timing belt adjuster. Tighten it by hand, do not use

a wrench.

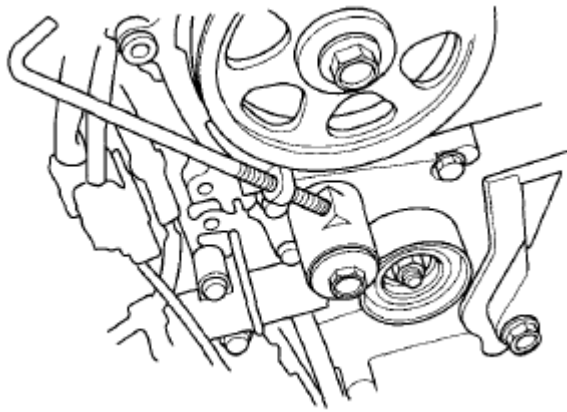


Fig. 60: Identifying Battery Clamp Bolt To Hold Timing Belt Adjuster
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Loosely install the idler pulley with a new idler pulley bolt so the pulley can move but does not come off.
12. Install the timing belt in a counterclockwise sequence starting with the drive pulley:
 1. Drive pulley (A)
 2. Idler pulley (B)
 3. Front camshaft pulley (C)
 4. Water pump pulley (D)
 5. Rear camshaft pulley (E)
 6. Adjusting pulley (F)

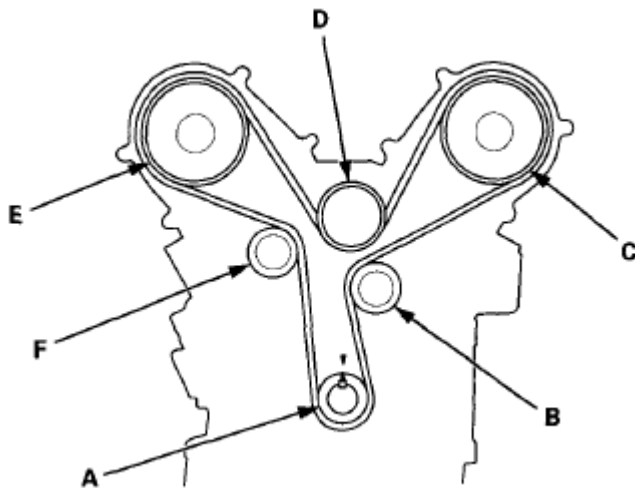


Fig. 61: Identifying Timing Belt & Related Components
Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Tighten the idler pulley bolt.

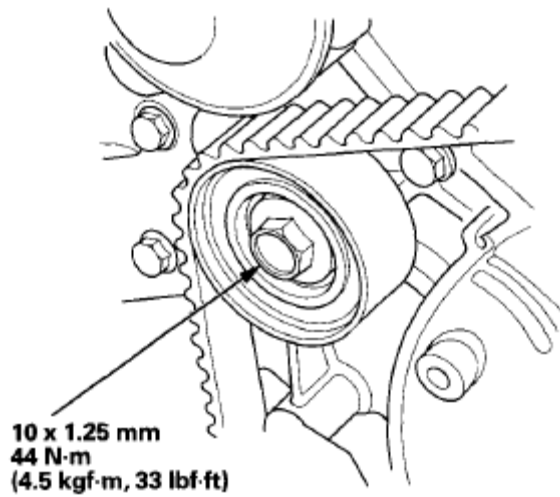


Fig. 62: Identifying Idler Pulley Bolt With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. Remove the pin from the auto-tensioner.

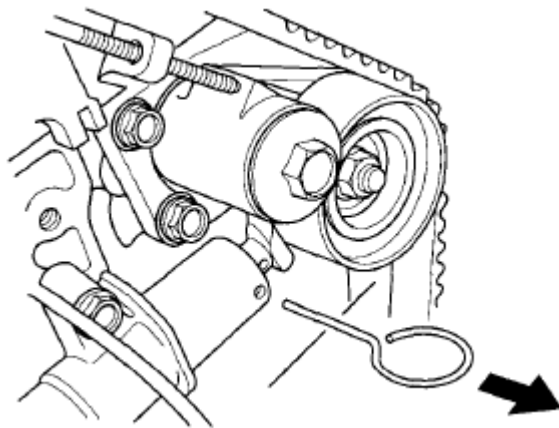


Fig. 63: Removing Pin From Auto-Tensioner
Courtesy of AMERICAN HONDA MOTOR CO., INC.

15. Remove the battery clamp bolt from the back cover.
16. Install the lower half of the side engine mount bracket using new bolts (A) and the bolt (B).

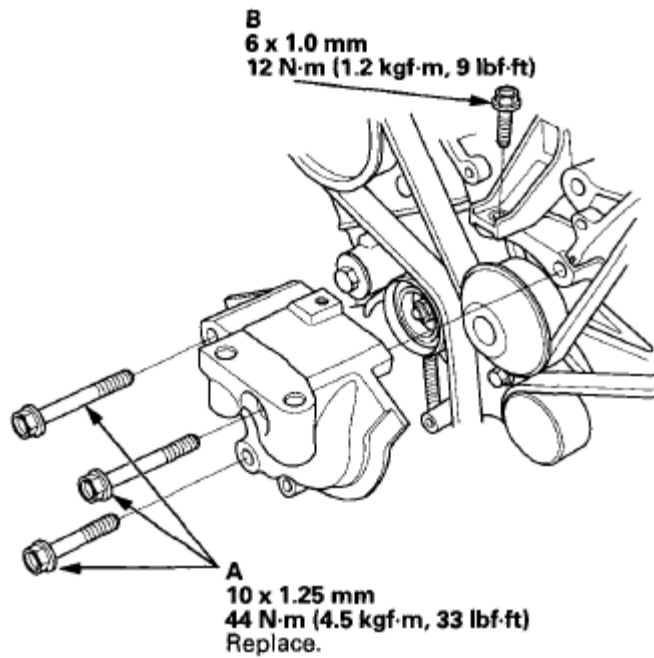


Fig. 64: Identifying Lower Half Of The Side Engine Mount Bracket & Fasteners With Torque Specifications

Courtesy of AMERICAN HONDA MOTOR CO., INC.

17. Install the timing belt guide plate (A) as shown.

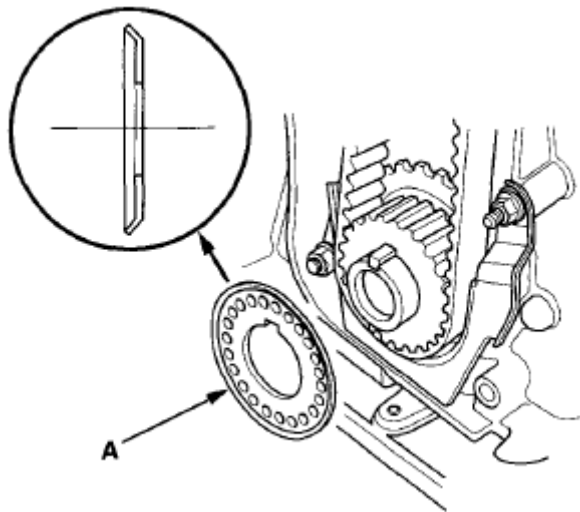


Fig. 65: Identifying Timing Belt Guide Plate

Courtesy of AMERICAN HONDA MOTOR CO., INC.

18. Install the lower cover.

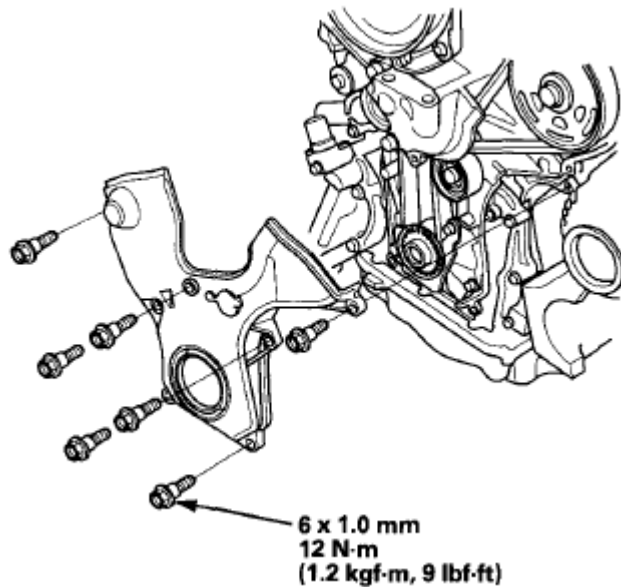


Fig. 66: Identifying Lower Cover Bolts With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

19. Install the front upper cover (A) and the rear upper cover (B).

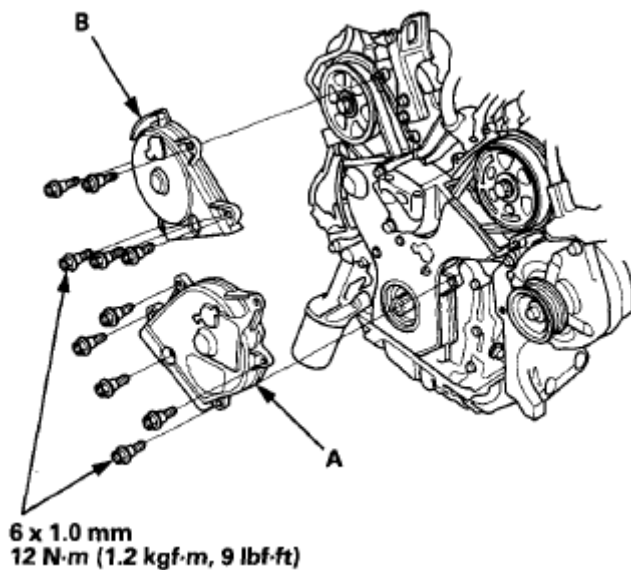


Fig. 67: Identifying Front And Rear Upper Cover With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

20. Install the **crankshaft pulley**.
21. Rotate the crankshaft pulley about six turns clockwise so the timing belt positions itself on the pulleys.
22. Turn the crankshaft pulley so its white mark (A) lines up with the pointer (B).

NOTE: The other pointer (C) is not used.

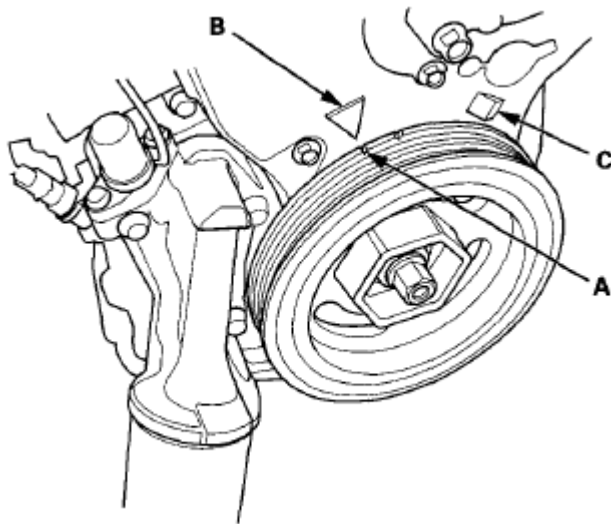


Fig. 68: Identifying Crankshaft Pulley White Mark And Pointer
Courtesy of AMERICAN HONDA MOTOR CO., INC.

23. Check the camshaft pulley marks.

NOTE: If the marks are not aligned, rotate the crankshaft 360 degrees, and recheck the camshaft pulley mark:

- If the camshaft pulley marks are at TDC, go to step 24.
- If the camshaft pulley marks are not at TDC, remove the timing belt and repeat steps 3 through 23.

FRONT

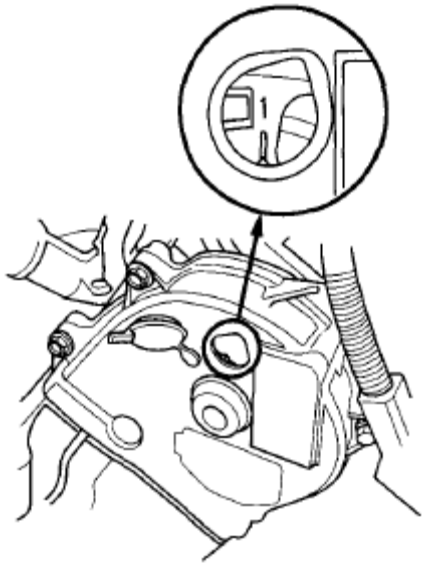


Fig. 69: Identifying Camshaft Pulley Mark - Front
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

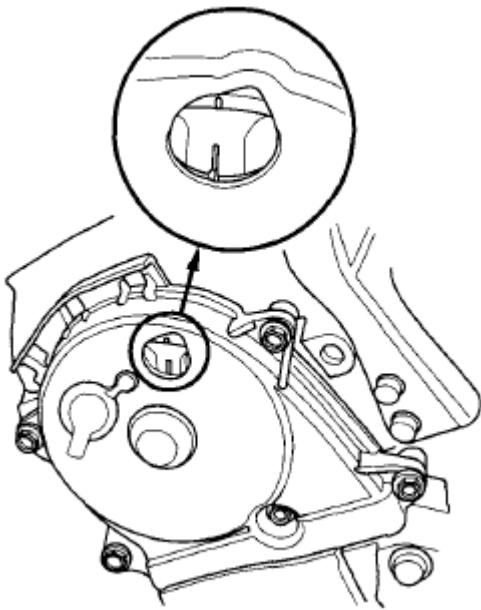


Fig. 70: Identifying Camshaft Pulley Mark - Rear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

24. Loosely install the upper half of the side engine mount bracket (A) using new bolts, then install the ground cable (B).

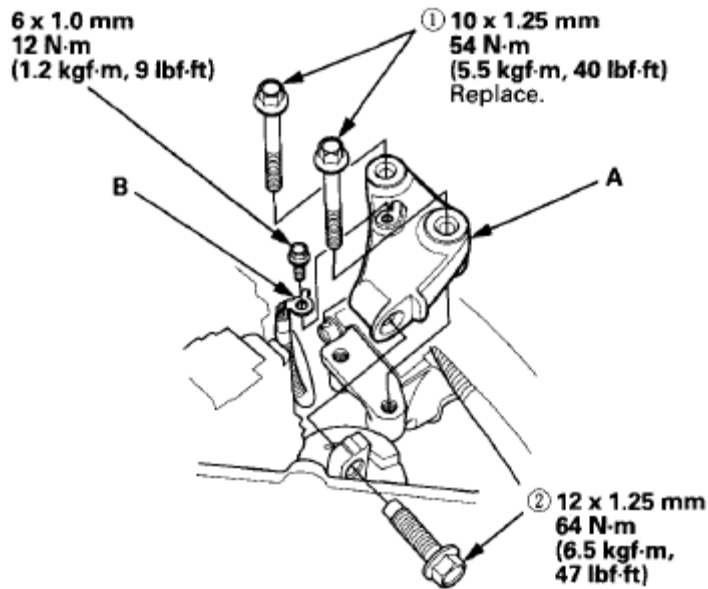


Fig. 71: Identifying Side Engine Mount Bracket And Ground Cable With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

25. Remove the jack and the wood block.
26. Tighten the mounting bolts in the numbered sequence shown.
27. Install the drive belt auto-tensioner (see **DRIVE BELT AUTO-TENSIONER REPLACEMENT**).
28. Install the front splash shield (see **FRONT SPLASH SHIELD REPLACEMENT**).
29. Install the right front wheel.
30. Install the engine compartment covers (see **ENGINE COMPARTMENT COVER REPLACEMENT**).
31. Do the CKP pattern clear/CKP pattern learn procedure (see **CKP PATTERN CLEAR/CKP PATTERN LEARN**).

TIMING BELT ADJUSTER REPLACEMENT

1. Remove the **timing belt**.
2. Remove the battery clamp bolt from the back cover.
3. Remove the auto-tensioner (see step 6).
4. Remove the bolt (A), then remove the timing belt adjuster (B) and the collar (C).

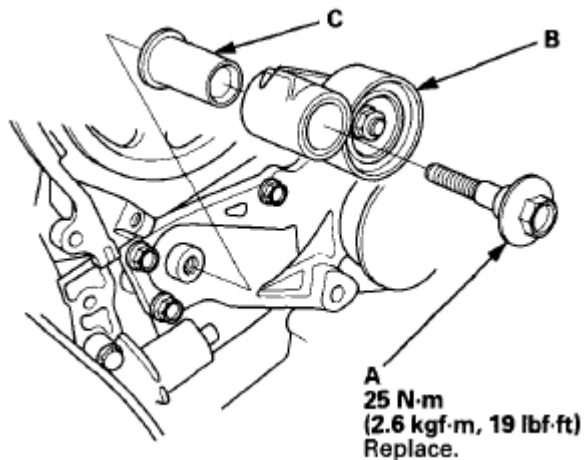


Fig. 72: Identifying Timing Belt Adjuster, Collar And Bolt With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Install the timing belt adjuster using new bolt in the reverse order of removal.
6. Install the timing belt.

TIMING BELT DRIVE PULLEY REPLACEMENT

1. Remove the timing belt.
2. Remove the timing belt stopper (A), then remove the timing belt drive pulley (B) and the key (C).

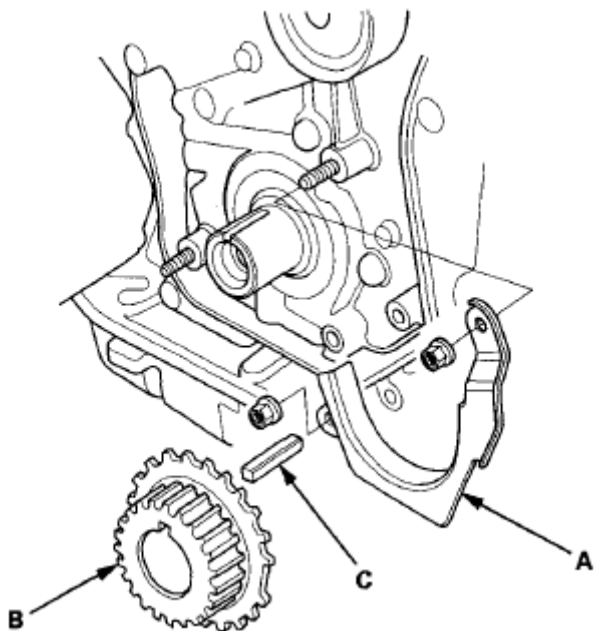


Fig. 73: Identifying Timing Belt Stopper, Timing Belt Drive Pulley And Key
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Inspect the timing belt drive pulley and the key for damage. If it is cracked or damaged, replace the timing belt drive pulley.
4. Install the new timing belt drive pulley and the key, then install the timing belt stopper.
5. Install the **timing belt**.
6. Do the CKP pattern clear/CKP pattern learn procedure (see **CKP PATTERN CLEAR/CKP PATTERN LEARN**).

CYLINDER HEAD COVER REMOVAL

FRONT

1. Remove the intake manifold (see **REMOVAL**).
2. Remove the three ignition coils from the front cylinder head (see **IGNITION COIL AND SPARK PLUG REMOVAL/INSTALLATION**).
3. Disconnect the EGR valve connector (A) and remove the harness holder mounting bolt (B) and the harness clamp (C).

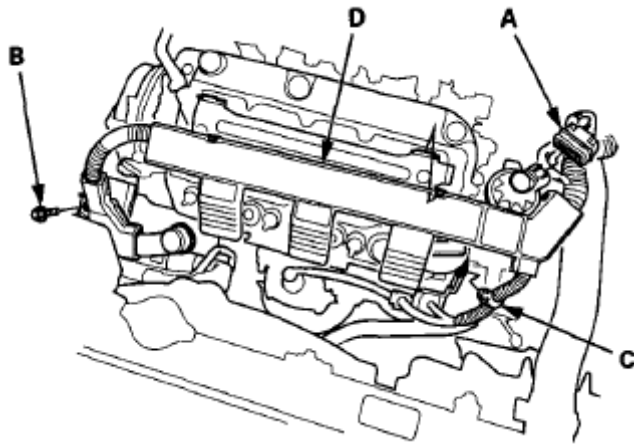


Fig. 74: Identifying EGR Valve Connector, Harness Clamp, Harness Holder And Mounting Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Remove the harness holder (D) from the bracket.
5. Remove the front cylinder head cover.

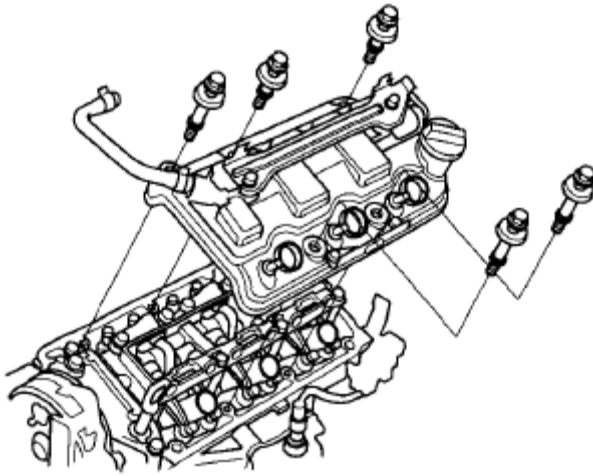


Fig. 75: Identifying Front Cylinder Head Cover
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

1. Remove the strut brace (see **FRAME BRACE REPLACEMENT**).
2. Remove the intake manifold (see **REMOVAL**).
3. Remove the three ignition coils from the rear cylinder head (see **IGNITION COIL AND SPARK PLUG REMOVAL/INSTALLATION**).
4. Remove the harness holder mounting bolts (A) and the engine ground cable (B).

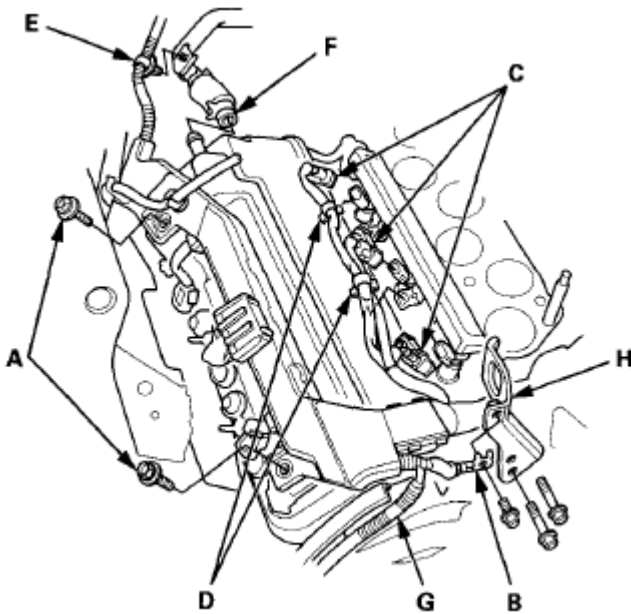


Fig. 76: Identifying Injector Connectors, Breather Hose, Hanger Bracket, Harness Clamps, Engine Ground Cable And Mounting Bolts
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Disconnect the three injector connectors (C) and the two harness clamps (D).
6. Remove the harness clamp (E) and disconnect the breather hose (F).
7. Remove the harness (G) from the upper cover.
8. Remove the engine hanger bracket (H).
9. Remove the harness holder mounting bolts (A) and disconnect the knock sensor connector (B) and the CMP sensor connector (C).

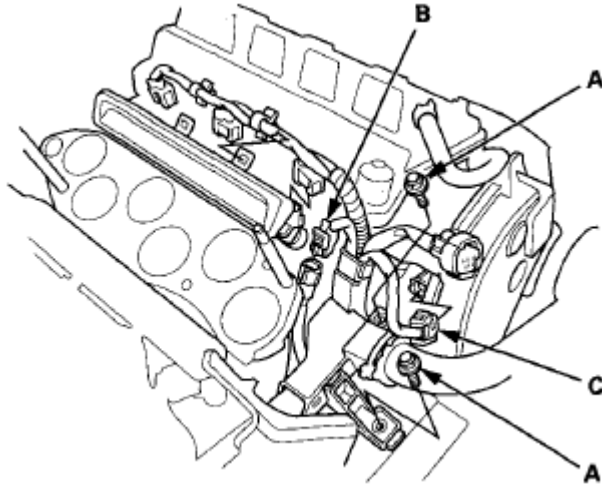


Fig. 77: Identifying Knock Sensor Connector, CMP Sensor Connector And Harness Holder Mounting Bolts

Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Remove the rear cylinder head cover.

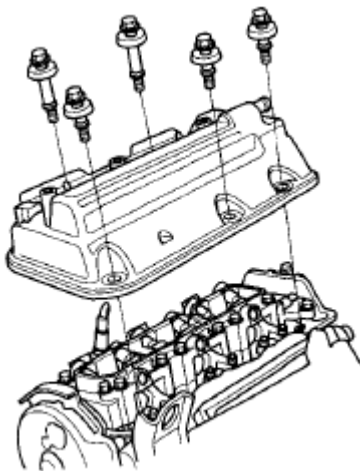


Fig. 78: Identifying Rear Cylinder Head Cover

Courtesy of AMERICAN HONDA MOTOR CO., INC.

CYLINDER HEAD COVER INSTALLATION

FRONT

1. Check the spark plug seals for damage. If any seals are damaged, replace it.
2. Thoroughly clean the head cover gasket and the groove.
3. Install the head cover gasket (A) in the groove of the cylinder head cover (B). Make sure the head cover gasket is seated securely.

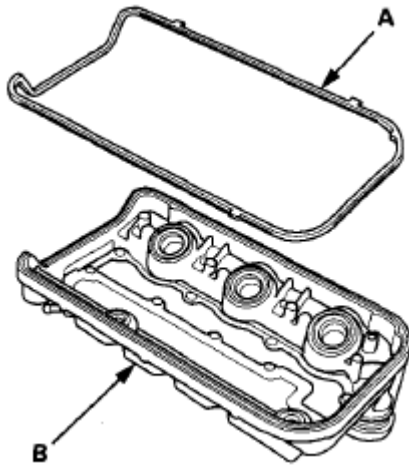


Fig. 79: Identifying Head Cover Gasket And Cylinder Head Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Remove all of the old liquid gasket from the rocker shaft holder and the cylinder head.
5. Clean the head cover contacting surfaces with a shop towel.
6. Apply liquid gasket, P/N 08717-0004, 08718-0003, 08718-0004, or 08718-0009 to the rocker shaft holder mating areas (A). Install the component within 5 minutes of applying the liquid gasket.

NOTE:

- If you apply liquid gasket P/N 08718-0012, the component must be installed within 4 minutes.
- If too much time has passed after applying the liquid gasket, remove the old liquid gasket and residue, then reapply the new liquid gasket.

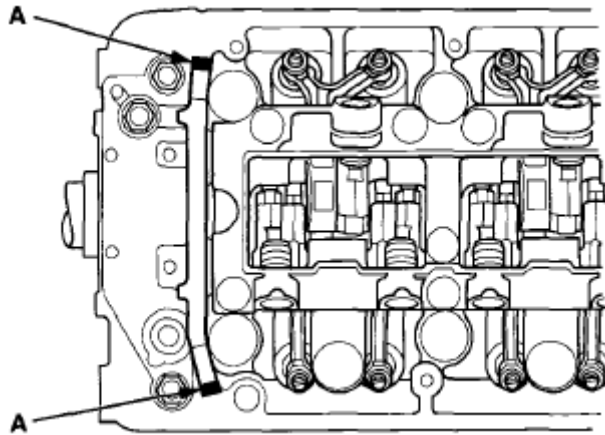


Fig. 80: Identifying Rocker Shaft Holder Mating Areas
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Set the spark plug seals (A) on the spark plug tubes, and install the front cylinder head cover (B).

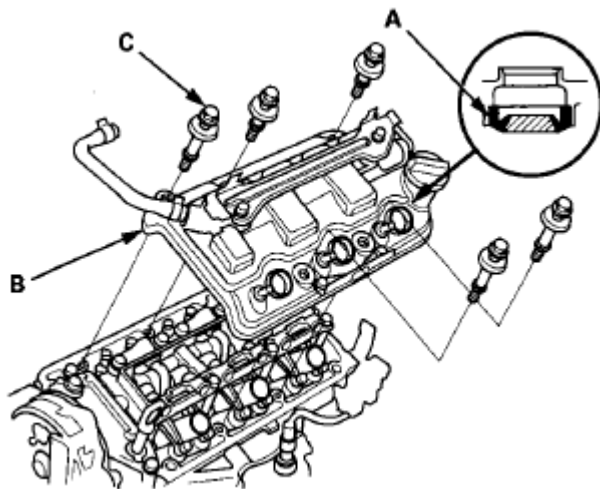


Fig. 81: Identifying Spark Plug Seals And Front Cylinder Head Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Inspect the spark plug seals for damage.
9. Inspect the cover washers (C). Replace any washer that is damaged or deteriorated.
10. Tighten the bolts in three steps. In the final step torque all bolts, in sequence, 12 N.m (1.2 kgf.m, 9 lbf.ft).

NOTE:

- Wait at least 30 minutes before filling the engine with oil.
- Do not run the engine for at least 3 hours after installing the cylinder head cover.

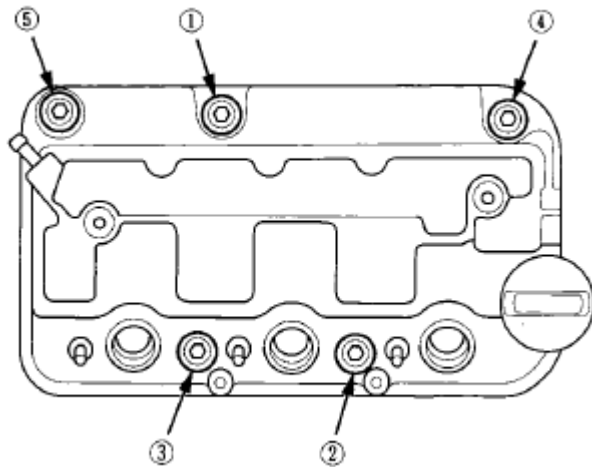


Fig. 82: Identifying Front Cylinder Head Cover Bolts With Tightening Sequence
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Install the harness holder (A) to the bracket.

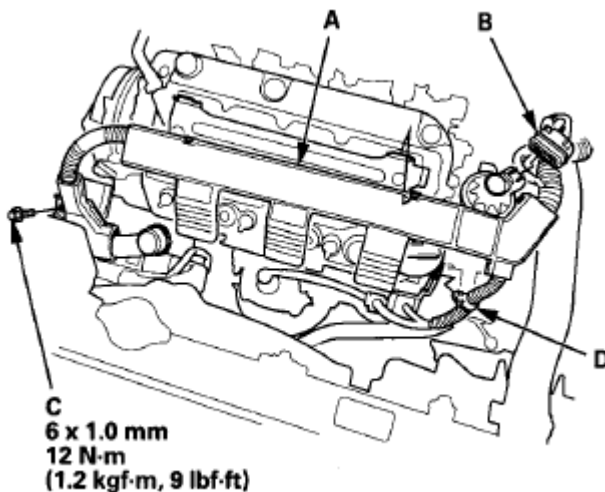


Fig. 83: Identifying EGR Valve Connector, Harness Holder, Clamp And Mounting Bolt With Torque Specifications
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Connect the EGR valve connector (B) and tighten the harness holder mounting bolt (C) and the harness clamp (D).
13. Install the three ignition coils to the front cylinder head (see **IGNITION COIL AND SPARK PLUG REMOVAL/INSTALLATION**).
14. Install the intake manifold (see **INSTALLATION**).

REAR

1. Check the spark plug seals for damage. If any seals are damaged, replace it.

2. Thoroughly clean the head cover gasket and the groove.
3. Install the head cover gasket (A) in the groove of the cylinder head cover (B). Make sure the head cover gasket is seated securely.

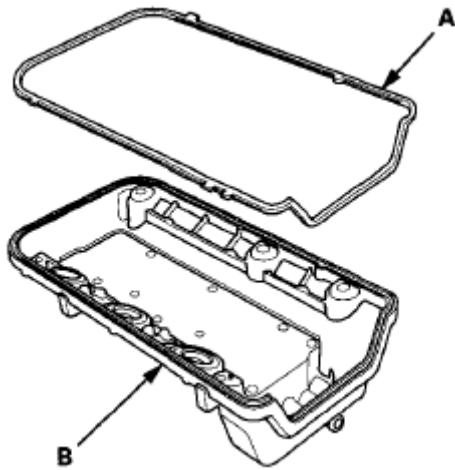


Fig. 84: Identifying Head Cover Gasket And Cylinder Head Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Remove all of the old liquid gasket from the rocker shaft holder and the cylinder head.
5. Clean the head cover contacting surfaces with a shop towel.
6. Apply liquid gasket, P/N 08717-0004, 08718-0003, 08718-0004, or 08718-0009 to the rocker shaft holder mating areas (A). Install the component within 5 minutes of applying the liquid gasket.

NOTE:

- If you apply liquid gasket P/N 08718-0012, the component must be installed within 4 minutes.
- If too much time has passed after applying the liquid gasket, remove the old liquid gasket and residue, then reapply the new liquid gasket.

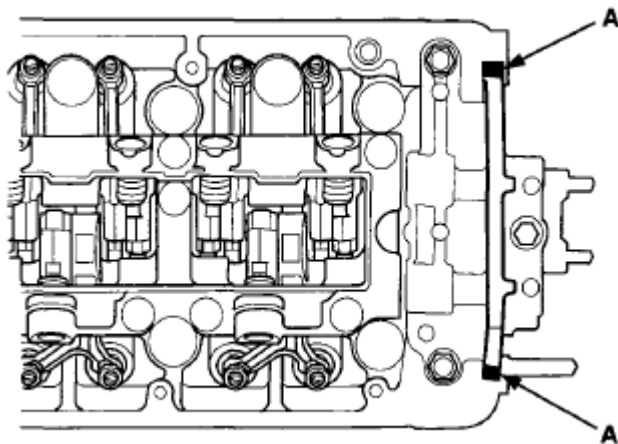


Fig. 85: Identifying Rocker Shaft Holder Mating Areas

Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Set the spark plug seals (A) on the spark plug tubes, and install the rear cylinder head cover (B).

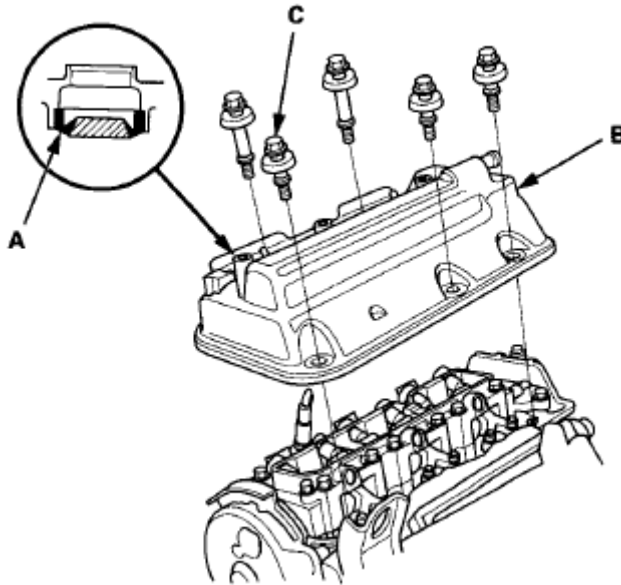


Fig. 86: Identifying Spark Plug Seals, Rear Cylinder Head Cover And Cover Washers
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Inspect the spark plug seals for damage.
9. Inspect the cover washers (C). Replace any washer that is damaged or deteriorated.
10. Tighten the bolts in three steps. In the final step torque all bolts, in sequence, 12 N.m (1.2 kgf.m, 9 lbf.ft).

NOTE:

- Wait at least 30 minutes before filling the engine with oil.
- Do not run the engine for at least 3 hours after installing the cylinder head cover.

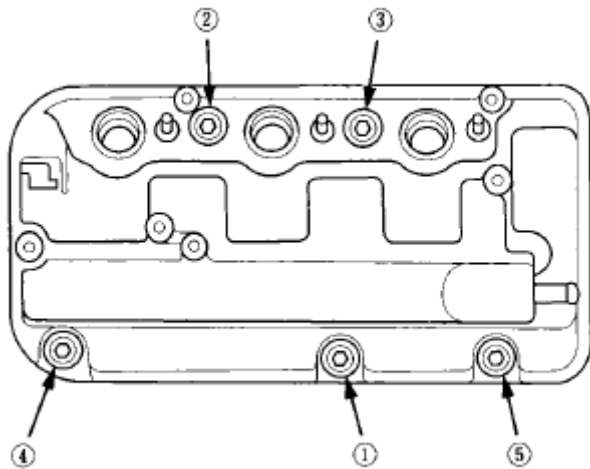


Fig. 87: Identifying Rear Cylinder Head Cover Bolts With Tightening Sequence
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Connect the knock sensor connector (A) and the CMP sensor connector (B) and install the harness holder mounting bolts (C).

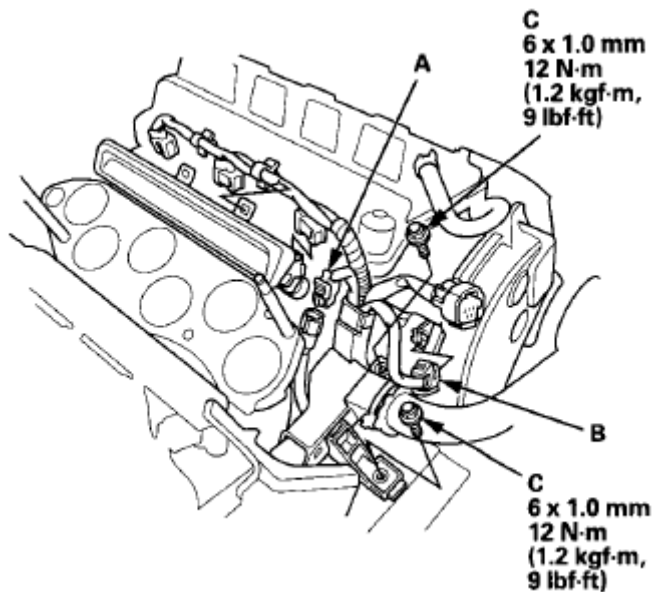


Fig. 88: Identifying Knock Sensor Connector, CMP Sensor Connector And Mounting Bolts With Torque Specifications
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Install the engine hanger bracket (A).

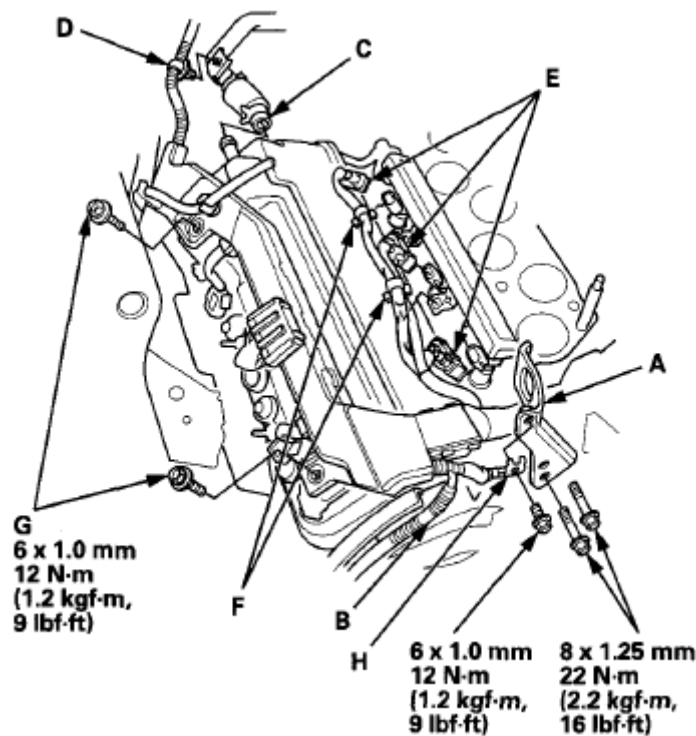


Fig. 89: Identifying Engine Hanger Bracket, Breather Hose, Injector Connectors, Harness Clamps, Engine Ground Cable And Harness Holder Mounting Bolts With Torque Specifications
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Install the harness (B) to the upper cover.
14. Connect the breather hose (C) and install the harness clamp (D).
15. Reconnect the three injector connectors (E) and the two harness clamps (F).
16. Install the harness holder mounting bolts (G) and engine ground cable (H).
17. Install the three ignition coils to the rear cylinder head (see **IGNITION COIL AND SPARK PLUG REMOVAL/INSTALLATION**).
18. Install the intake manifold (see **INSTALLATION**).
19. Install the strut brace (see **FRAME BRACE REPLACEMENT**).

CYLINDER HEAD REMOVAL

NOTE:

- Use fender covers to avoid damaging painted surfaces.
- To avoid damaging the wiring and terminals, unplug the wiring connectors carefully while holding the connector portion.
- Connect the HDS to the DLC (see **HOW TO USE THE HDS (HONDA DIAGNOSTIC SYSTEM)**), and monitor ECT SENSOR 1. 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 any other wiring or hoses, or interfere with any other parts.**

1. Remove the engine compartment covers (see **ENGINE COMPARTMENT COVER REPLACEMENT**).
2. Relieve the fuel pressure (see **FUEL PRESSURE RELIEVING**).
3. Do the battery terminal disconnection procedure (see **BATTERY TERMINAL DISCONNECTION AND RECONNECTION**).
4. Drain the engine coolant (see **COOLANT CHECK**).
5. Remove the six ignition coils (see **IGNITION COIL AND SPARK PLUG REMOVAL/INSTALLATION**).
6. Remove the alternator (see **ALTERNATOR REMOVAL AND INSTALLATION**).
7. Remove the intake manifold (see **REMOVAL**).
8. Remove the **timing belt**.
9. Disconnect the following engine wire harness connectors, and remove the wire harness clamps from the cylinder head:
 - Six injector connectors
 - Knock sensor connector
 - ECT sensor 1 connector
 - Engine mount control solenoid valve connector
 - EGR valve connector
 - CMP sensor connector
 - Rocker arm oil control solenoid connector
 - Rocker arm oil pressure switch connector
 - Two A/F sensor connectors
 - Two secondary HO2S connectors
10. Remove the front warm up TWC (see **WARM UP TWC REMOVAL/INSTALLATION**) and the rear warm up TWC (see **REAR (BANK 1)**).
11. Remove the quick-connect fitting cover (A), then disconnect the fuel feed hose (B) (see **FUEL LINE/QUICK-CONNECT FITTING REMOVAL**).

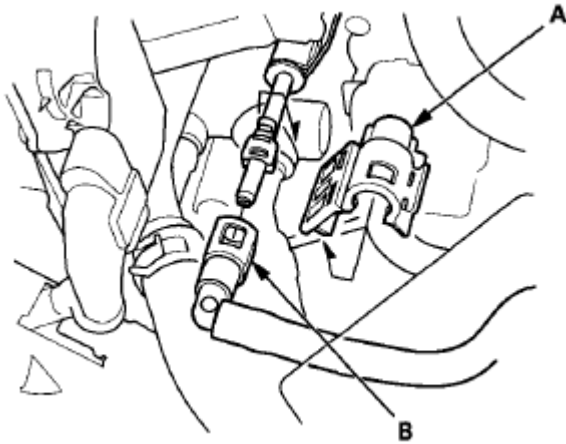


Fig. 90: Identifying Quick-Connect Fitting Cover And Fuel Feed Hose
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Remove the connector bracket (A) from the front cylinder head.

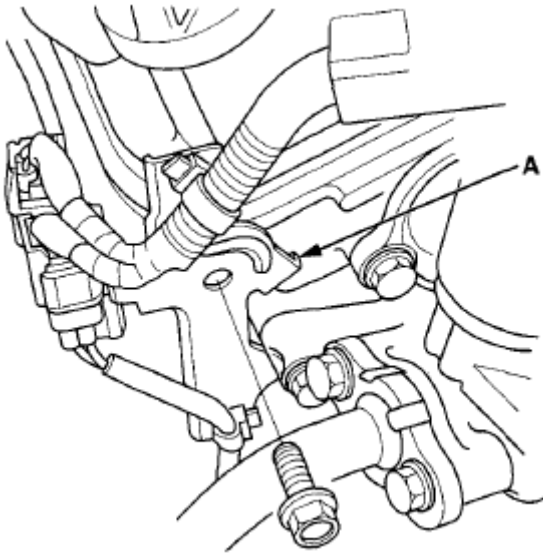


Fig. 91: Identifying Connector Bracket
Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Remove the engine mount control solenoid valve bracket (A) from the rear cylinder head.

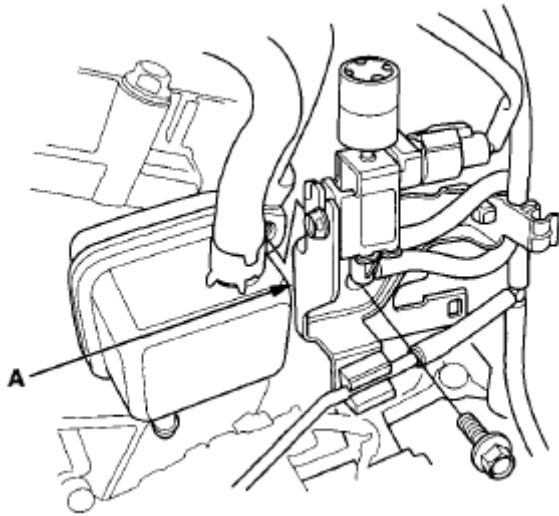


Fig. 92: Identifying Engine Mount Control Solenoid Valve Bracket
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. Remove the EVAP canister joint with the bracket (see step 9).
15. Remove the injector bases (see **INJECTOR BASE REMOVAL AND INSTALLATION**).
16. Remove the water passage (see **WATER PASSAGE REPLACEMENT**).
17. Remove the **timing belt**.
18. Remove the camshaft pulleys (A) and the back covers (B).

FRONT

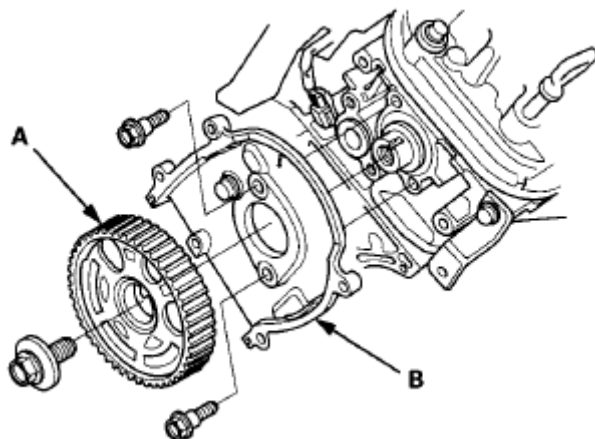


Fig. 93: Identifying Camshaft Pulleys And Back Covers - Front
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

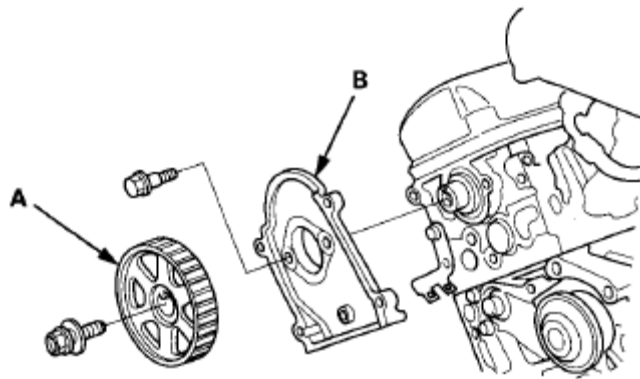


Fig. 94: Identifying Camshaft Pulleys And Back Covers - Rear
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

19. Remove the **cylinder head covers**.
20. Remove the cylinder head bolts. To prevent warpage, loosen the bolts in sequence 1/3 turn at a time; repeat the sequence until all bolts are loosened.

FRONT

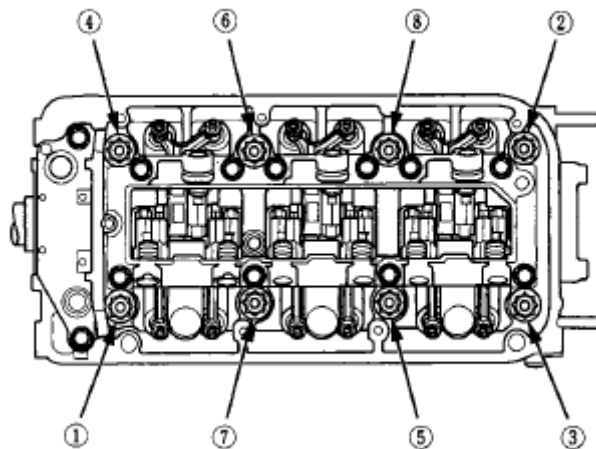


Fig. 95: Identifying Cylinder Head Bolts With Loosening Sequence (Front)
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

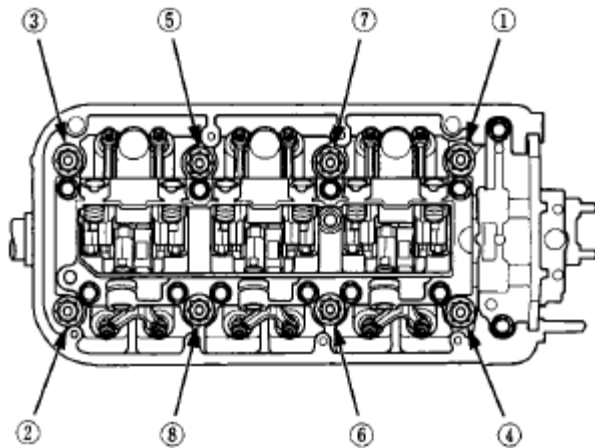


Fig. 96: Identifying Cylinder Head Bolts With Loosening Sequence (Rear)
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

21. Remove the cylinder heads.

CAMSHAFT REPLACEMENT

FRONT

1. Remove the engine compartment covers (see ENGINE COMPARTMENT COVER REPLACEMENT).
2. Do the battery removal procedure (see BATTERY REMOVAL AND INSTALLATION).
3. Drain the engine coolant (see COOLANT CHECK).
4. Disconnect the radiator hoses (A).

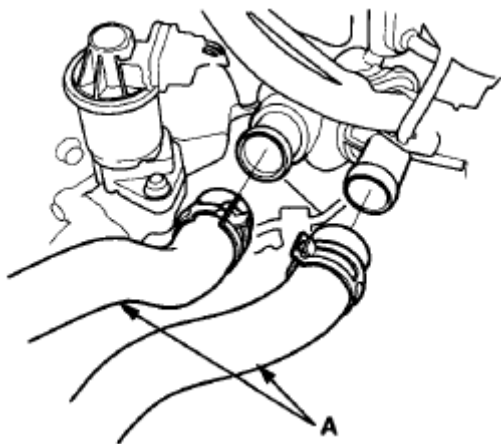


Fig. 97: Identifying Radiator Hoses
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Remove the EGR valve (see EGR VALVE REPLACEMENT).

6. Remove the EGR valve stud bolts (A).

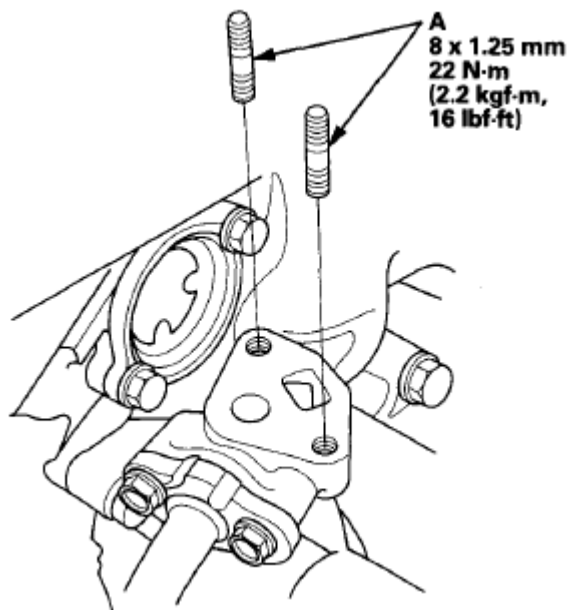


Fig. 98: Identifying EGR Valve Stud Bolts With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Remove the **timing belt**.
8. Remove the front **rocker arm assembly**.
9. Remove the front camshaft pulley (see step 18).
10. Remove the thrust cover (A), then remove the front camshaft (B).

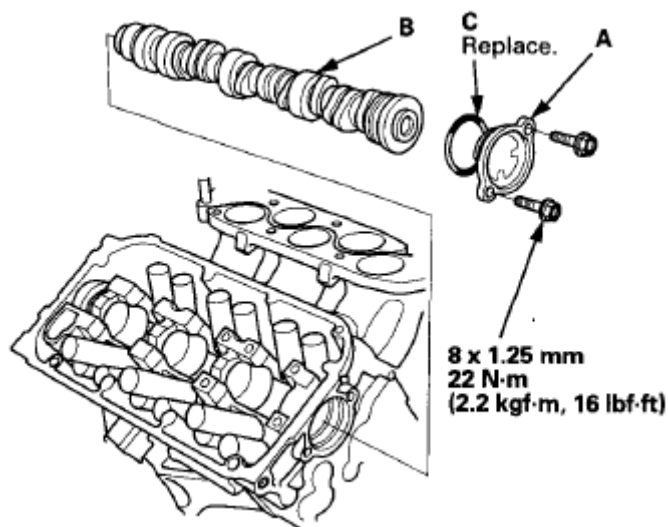


Fig. 99: Identifying Thrust Cover, Camshaft And O-Ring With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Install the front camshaft in the reverse order of removal. Always use a new O-ring (C). Apply new engine oil to the journals and the cam lobes.
12. Apply new engine oil to the threads of the camshaft pulley mounting bolt, then install the front camshaft pulley (see step 15).
13. Install the front rocker arm assembly, then tighten the mounting bolts (see step 13).
14. Install the **timing belt**.
15. Adjust the **valve clearance**.
16. Install the EGR valve stud bolts, then install the EGR valve (see **EGR VALVE REPLACEMENT**).
17. Connect the radiator hoses.
18. Do the battery installation procedure (see **BATTERY REMOVAL AND INSTALLATION**).
19. Fill the radiator with engine coolant, and bleed the air from the cooling system (see **COOLANT CHECK**).
20. Install the engine compartment covers (see **ENGINE COMPARTMENT COVER REPLACEMENT**).
21. Do the CKP pattern clear/CKP pattern learn procedure (see **CKP PATTERN CLEAR/CKP PATTERN LEARN**).

REAR

1. Remove the engine compartment covers (see **ENGINE COMPARTMENT COVER REPLACEMENT**).
2. Relieve the fuel pressure (see **FUEL PRESSURE RELIEVING**).
3. Do the battery removal procedure (see **BATTERY REMOVAL AND INSTALLATION**).
4. Drain the engine coolant (see **COOLANT CHECK**).
5. Remove the under-hood fuse/relay box from the bracket.
6. Remove the air cleaner (see **THROTTLE BODY CLEANING**).
7. Remove the quick-connect fitting cover, then disconnect the fuel feed hose (see step 11).
8. Disconnect the heater hoses (A).

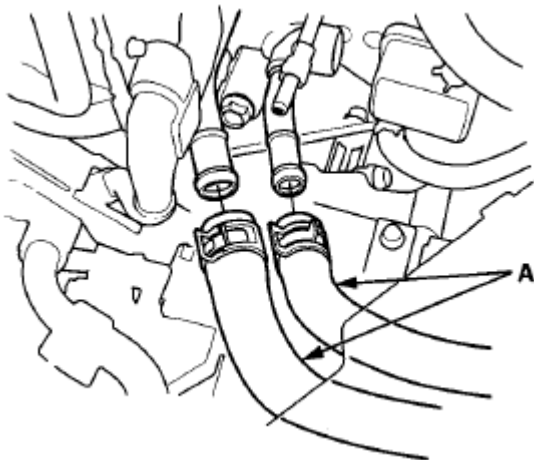
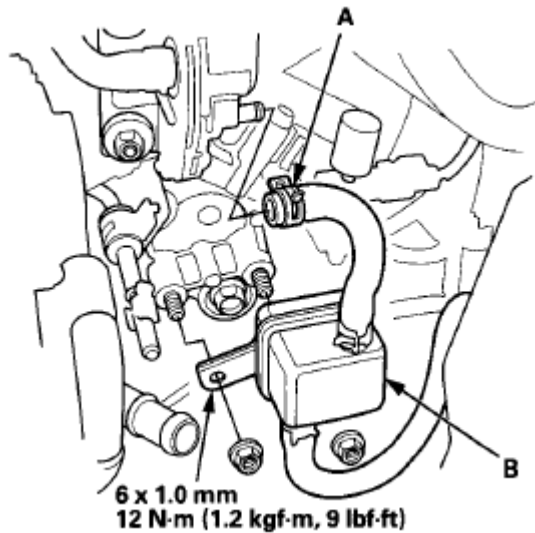


Fig. 100: Identifying Heater Hoses

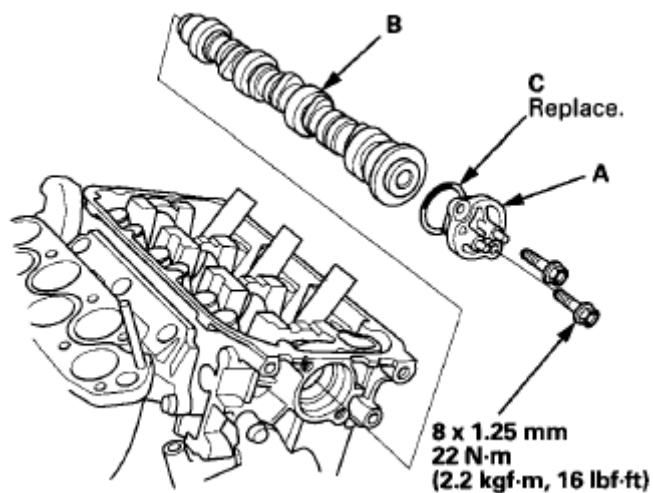
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Disconnect the EVAP canister hose (A), then remove the EVAP canister joint (B) with the bracket.

**Fig. 101: Identifying EVAP Canister Hose And EVAP Canister Joint With Torque Specifications**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Remove the timing belt.
11. Remove the rear rocker arm assembly.
12. Remove the rear camshaft pulley (see step 18).
13. Remove the thrust cover (A), then remove the rear camshaft (B).

**Fig. 102: Identifying Thrust Cover, Rear Camshaft And O-Ring With Torque Specifications**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. Install the rear camshaft in the reverse order of removal. Always use a new O-ring (C). Apply new engine oil to the journals and cam lobes.
15. Apply new engine oil to the threads of the camshaft pulley mounting bolt, then install the rear camshaft pulley (see step 15).
16. Install the rear rocker arm assembly, then tighten the mounting bolts (see step 13).
17. Install the **timing belt**.
18. Adjust the **valve clearance**.
19. Install the EVAP canister joint with the bracket, then connect the EVAP canister hose.
20. Connect the heater hoses.
21. Connect the fuel feed hose, then install the quick-connect fitting cover (see step 21).
22. Install the air cleaner (see **THROTTLE BODY CLEANING**).
23. Install the under-hood fuse/relay box to the bracket.
24. Do the battery installation procedure (see **BATTERY REMOVAL AND INSTALLATION**).
25. Inspect for fuel leaks. Turn the ignition switch to ON (II), or press the engine start/stop button to select the ON mode (do not operate the starter) so the fuel pump runs for about 2 seconds and pressurizes the fuel line. Repeat this operation three times, then check for fuel leakage at any point in the fuel line.
26. Fill the radiator with engine coolant, and bleed the air from the cooling system (see **COOLANT CHECK**).
27. Install the engine compartment covers (see **ENGINE COMPARTMENT COVER REPLACEMENT**).
28. Do the CKP pattern clear/CKP pattern learn procedure (see **CKP PATTERN CLEAR/CKP PATTERN LEARN**).

CYLINDER HEAD INSPECTION FOR WARPAGE

1. Remove the **cylinder head**.
2. Inspect the **camshaft**.
3. 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 121 mm (4.76 in).

Cylinder Head Warpage

Standard (New): 0.05 mm (0.002 in) max.

Cylinder Head Height

Standard (New): 120.95-121.05 mm (4.762-4.765 in)

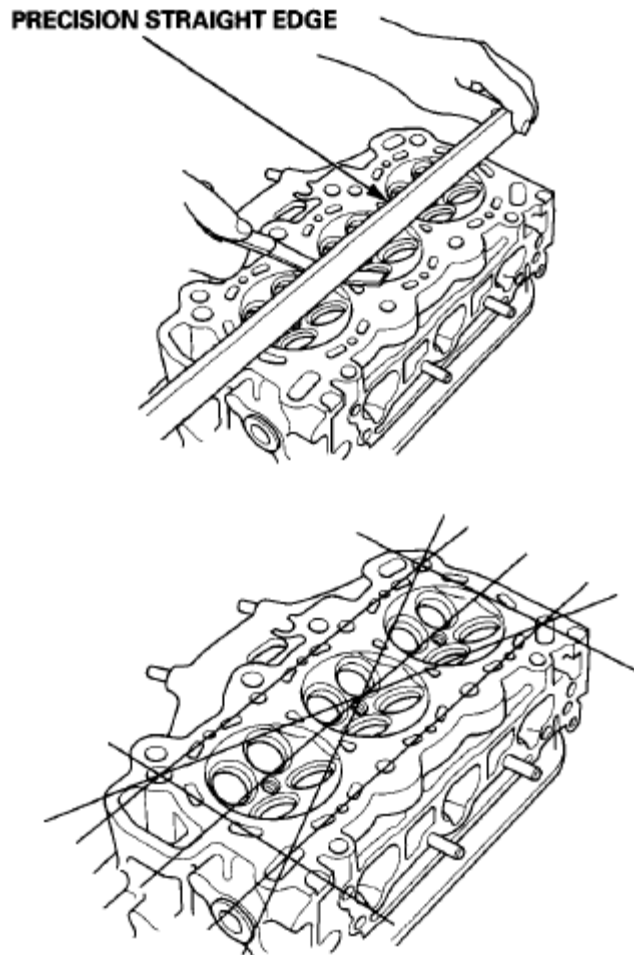


Fig. 103: Checking Cylinder Head For Warpage Along Edges And Three Ways Across Center
Courtesy of AMERICAN HONDA MOTOR CO., INC.

ROCKER ARM ASSEMBLY REMOVAL

Front

1. Remove the **cylinder head cover**.
2. Loosen the locknuts and the adjusting screws (A).

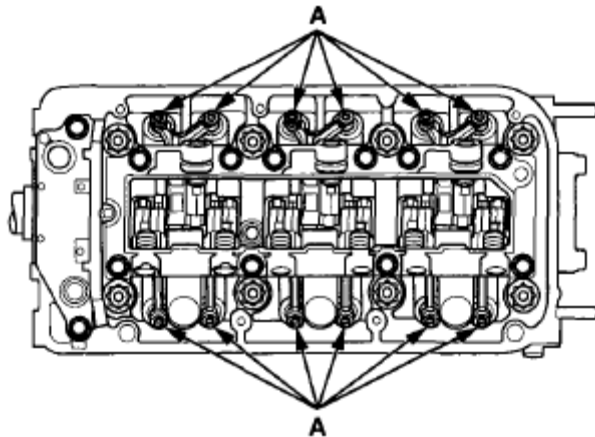


Fig. 104: Identifying Adjusting Screws (Front)
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Remove the rocker shaft bridge mounting bolts, the rocker shaft holder mounting bolts, and the rocker arm assembly.
 1. Loosen the rocker shaft bridge mounting bolts and the rocker shaft holder mounting bolts in sequence two turns at a time, to prevent damaging the valves or the rocker arm assembly.
 2. When removing the rocker arm assembly, do not remove the rocker shaft bridge mounting bolts and the rocker shaft holder mounting bolts. The bolts will keep the rocker arms on the shafts.

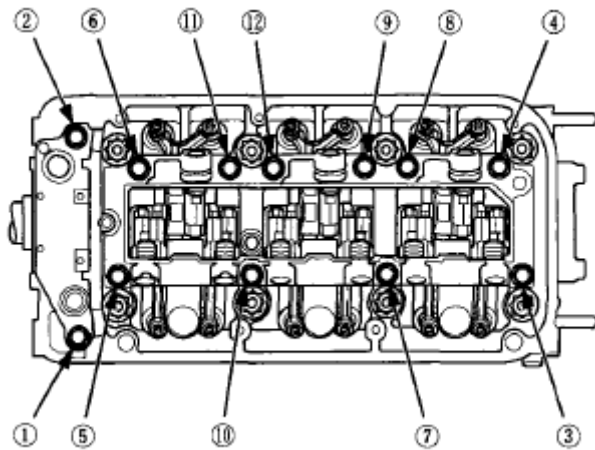


Fig. 105: Identifying Rocker Bolts With Loosening Sequence (Front)
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

Rear

4. Remove the **cylinder head cover**.
5. Loosen the locknuts and the adjusting screws (A).

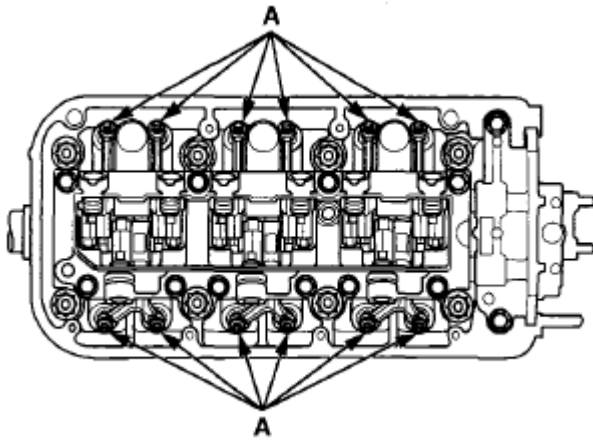


Fig. 106: Identifying Adjusting Screws - Rear
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Remove the rocker shaft bridge mounting bolts, the rocker shaft holder mounting bolts, and the rocker arm assembly.
 1. Loosen the rocker shaft bridge mounting bolts and the rocker shaft holder mounting bolts in sequence two turns at a time, to prevent damaging the valves or the rocker arm assembly.
 2. When removing the rocker arm assembly, do not remove the rocker shaft bridge mounting bolts and the rocker shaft holder mounting bolts. The bolts will keep the rocker arms on the shafts.

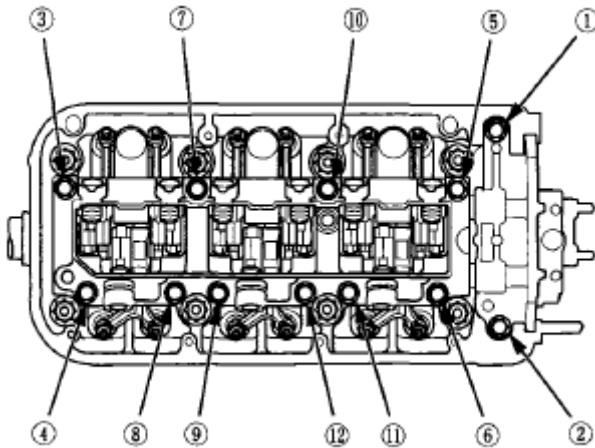


Fig. 107: Identifying Rocker Bolts With Loosening Sequence (Rear)
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

ROCKER ARM AND SHAFT DISASSEMBLY/REASSEMBLY

FRONT

NOTE:

- Identify parts as they are removed so they can be reinstalled in their original locations.

- Inspect the **rocker shafts and the rocker arms**.
- If reused, the rocker arms must be installed in their original locations.
- When removing or installing the rocker arm assembly, do not remove the mounting bolts. The bolts will keep the rocker arms, the rocker shaft bridge, and the rocker shaft holder on the shaft.
- If the rocker shaft cannot be removed or installed by hand, remove or install the rocker shaft by heating the rocker shaft bridge.
- Bundle the rocker arms with rubber bands to keep them together as a set, and remove the bands after the rocker arms have been installed.
- Prior to reassembling, clean all the parts in solvent, dry them, and apply new engine oil to all contact points and bearing surfaces, and the lost motion assembly.
- When replacing the rocker arm assembly, remove the fastening hardware from the new rocker arm assembly.
- Never remove any of the circlips that retain the lost motion assemblies in the rocker shaft bridge. The circlips are not available separately, and are factory installed in the rocker shaft bridge. To remove the lost motion assemblies, first remove the rocker shafts and the rocker arms.

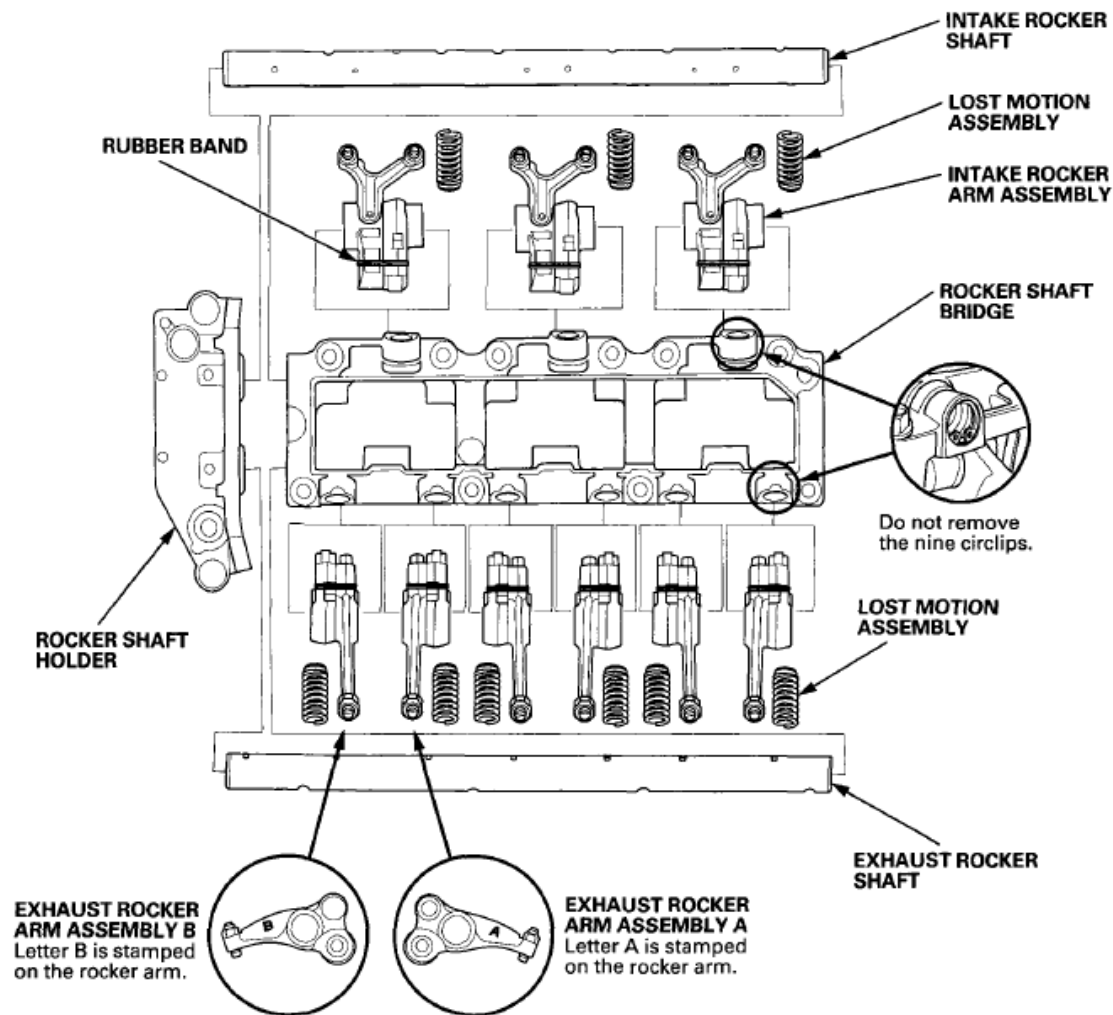


Fig. 108: Identifying Rocker Arm And Shaft Components Location (Front)
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

NOTE:

- Identify parts as they are removed so they can be reinstalled in their original locations.
- Inspect the rocker shafts and the rocker arms.
- If reused, the rocker arms must be installed in their original locations.
- When removing or installing the rocker arm assembly, do not remove the mounting bolts. The bolts will keep the rocker arms, the rocker shaft bridge, and the rocker shaft holder on the shaft.
- If the rocker shaft cannot be removed or installed by hand, remove or install the rocker shaft by heating the rocker shaft bridge.
- Bundle the rocker arms with rubber bands to keep them together as a set, and remove the bands after the rocker arms have been installed.

- Prior to reassembling, clean all the parts in solvent, dry them, and apply new engine oil to all contact points and bearing surfaces, and the lost motion assembly.
- When replacing the rocker arm assembly, remove the fastening hardware from the new rocker arm assembly.
- Never remove any of the circlips that retain the lost motion assemblies in the rocker shaft bridge. The circlips are not available separately, and are factory installed in the rocker shaft bridge. To remove the lost motion assemblies, first remove the rocker shafts and the rocker arms.

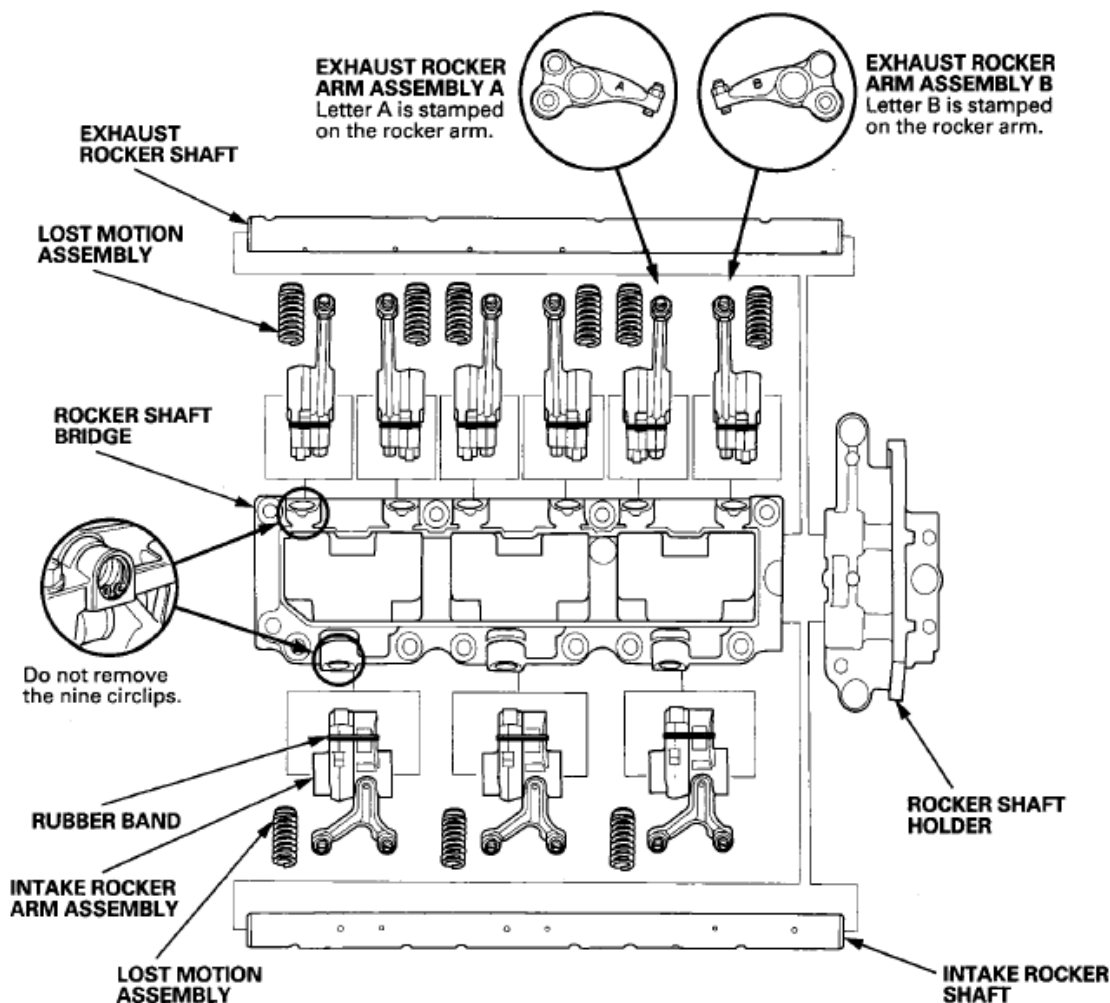


Fig. 109: Identifying Rocker Arm And Shaft Components Location (Rear)
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

ROCKER ARM AND SHAFT INSPECTION

1. Remove the rocker arm assembly.
2. Disassemble the rocker arm assembly.

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

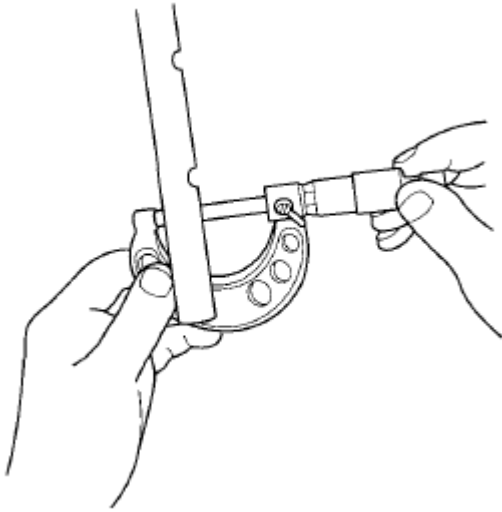


Fig. 110: Measuring Diameter Of Shaft At First Rocker Location
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Zero the dial gauge (A) to the shaft diameter.

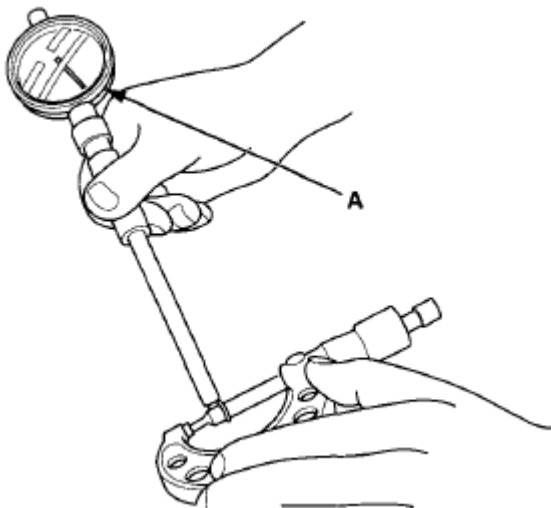


Fig. 111: Setting Dial Gauge To Zero Corresponding To Shaft Diameter
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

Intake Rocker Arm-to-Shaft Clearance:

Standard (New): 0.015-0.046 mm (0.00059-0.00181 in)

Service Limit: 0.046 mm (0.00181 in)

Exhaust Rocker Arm-to-Shaft Clearance:

Standard (New): 0.015-0.046 mm (0.00059-0.00181 in)

Service Limit: 0.046 mm (0.00181 in)

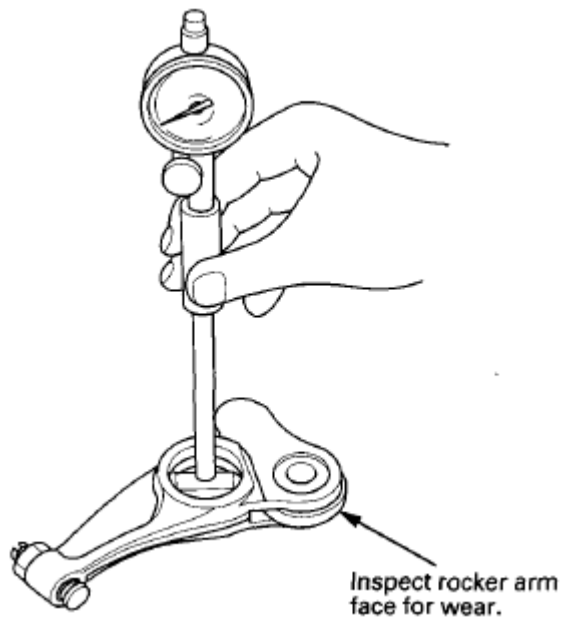


Fig. 112: Measuring Intake Rocker Arm-To-Shaft Clearance Using Dial Gauge
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

VTEC Rocker Arms

7. Inspect the rocker arm piston (A). Slide them into the rocker arms. If they do not move smoothly, replace the rocker arm set.

NOTE:

- Apply new engine oil to the rocker arm piston when reassembling.
- When removing the rocker arm piston from the intake secondary (B), and or the exhaust primary rocker arm (C), carefully apply air pressure to the oil passage of the rocker arm.

INTAKE

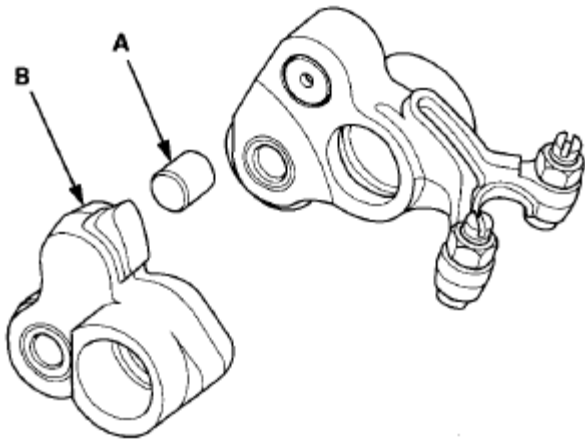


Fig. 113: Identifying Rocker Arm Piston And Intake Secondary
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

EXHAUST

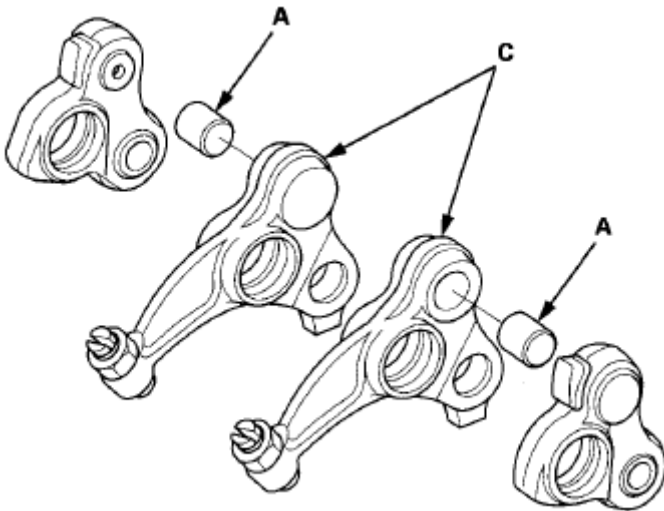


Fig. 114: Identifying Rocker Arm Piston And Exhaust Primary Rocker Arm
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Reassemble the rocker arm assembly.
9. Install the rocker arm assembly.

CAMSHAFT INSPECTION

1. Remove the cylinder head.
2. Remove the rocker arm assembly.
3. Disassemble the rocker arm assembly.
4. Front: Put the rocker shafts bridge and the rocker shaft holder on the front cylinder head, then tighten the

bolts to the specified torque.

Specified Torque

8 x 1.25 mm: 22 N.m (2.2 kgf.m, 16 lbf.ft)

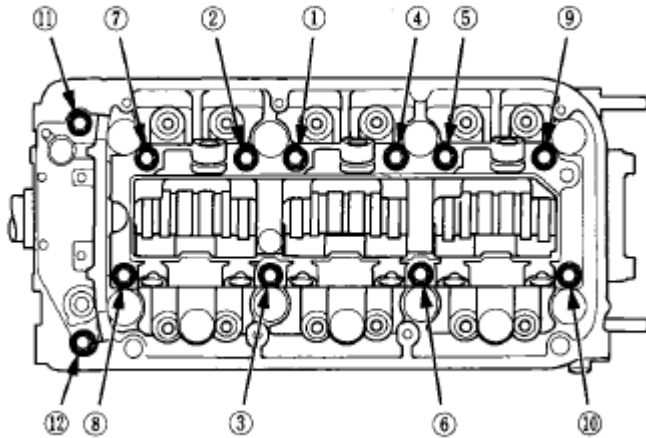


Fig. 115: Identifying Rocker Bolts With Tightening Sequence (Front)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Rear: Put the rocker shaft bridge and the rocker shaft holder on the rear cylinder head, then tighten the bolts to the specified torque.

Specified Torque

8 x 1.25 mm: 22 N.m (2.2 kgf.m, 16 lbf.ft)

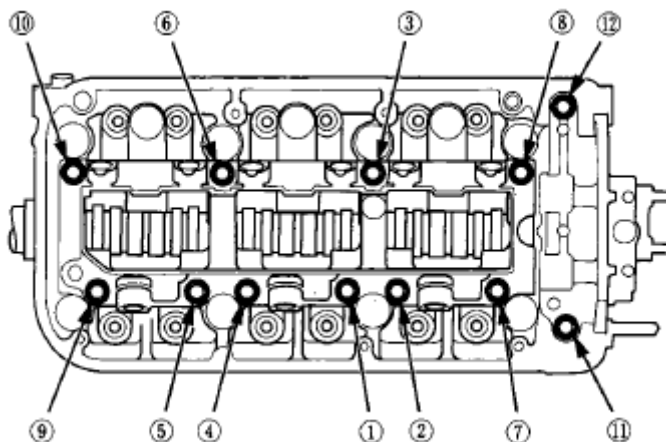


Fig. 116: Identifying Rocker Bolts With Tightening Sequence (Rear)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Seat the camshaft by pushing it toward the rear of the cylinder head.

7. Zero the dial gauge against the end of the camshaft. Push the camshaft back and forth and read the end play. If the end play is beyond the service limit, replace the thrust cover and recheck. If it is still beyond the service limit, replace the cylinder head. If it is still beyond the service limit, replace the camshaft.

Camshaft End Play

Standard (New): 0.05-0.20 mm (0.0020-0.0079 in)

Service Limit: 0.20 mm (0.0079 in)

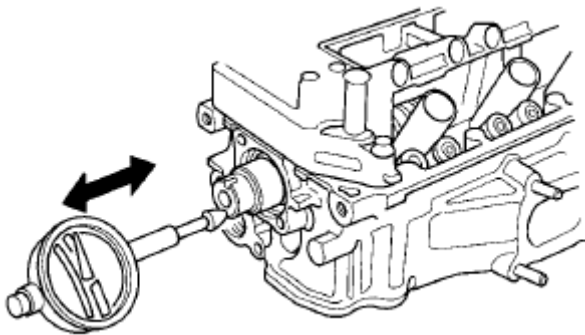


Fig. 117: Measuring Camshaft End Play Using Dial Gauge
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Remove the camshaft thrust cover (A), then pull out the camshaft (B).

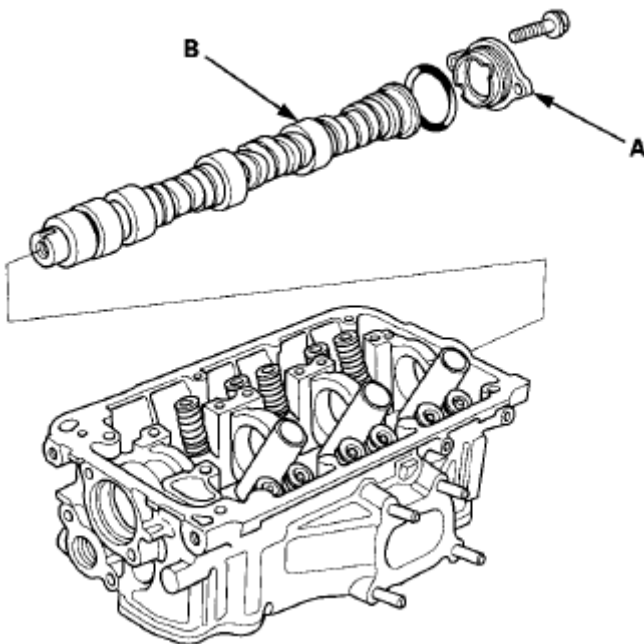


Fig. 118: Identifying Camshaft Thrust Cover And Camshaft
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Wipe the camshaft clean, then inspect the lift ramps. Replace the camshaft if any lobes are pitted, scored, or excessively worn.
10. Measure the diameter of each camshaft journal.

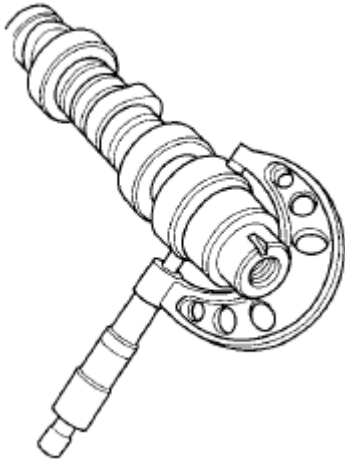


Fig. 119: Measuring Diameter Of Camshaft Journal
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Zero the dial gauge (A) to the journal diameter.

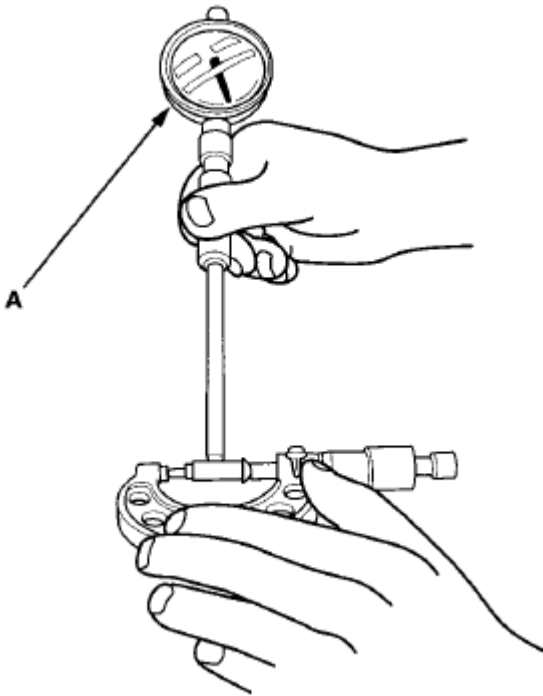


Fig. 120: Setting Dial Gauge To Zero Corresponding To Journal Diameter
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Clean the camshaft bearing surfaces in the cylinder head. Measure the inside diameter of each camshaft bearing surface, and check for an out-of-round condition:
- If the camshaft-to-holder clearance is within limits, go to step 14.
 - 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 13.

Camshaft-to-Holder Oil Clearance

Standard (New): 0.050-0.089 mm (0.00197-0.00350 in)

Service Limit: 0.15 mm (0.0059 in)

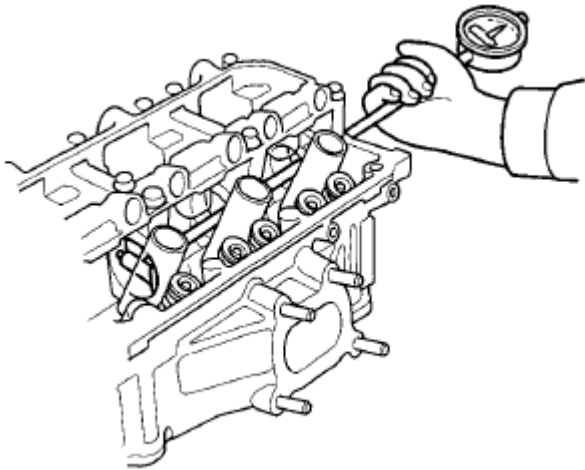


Fig. 121: Measuring Camshaft-To-Holder Oil Clearance Using Dial Gauge
Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Check 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 oil clearance. If the oil clearance is still out of tolerance, replace the cylinder head.

Camshaft Total Runout

Standard (New): 0.03 mm (0.0012 in) max.

Service Limit: 0.04 mm (0.0016 in)

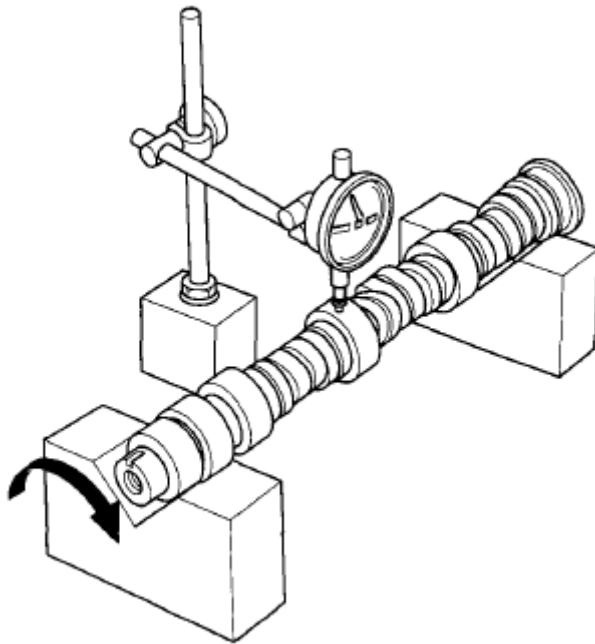


Fig. 122: Checking Camshaft Total Runout Using Dial Gauge
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. Measure the cam lobe height.

CAM LOBE HEIGHT STANDARD (NEW)

	INTAKE	EXHAUST
PRI	34.299 mm (1.35035 in)	36.734 mm (1.44622 in)
SEC	35.932 mm (1.41464 in)	37.370 mm (1.47126 in)

FRONT

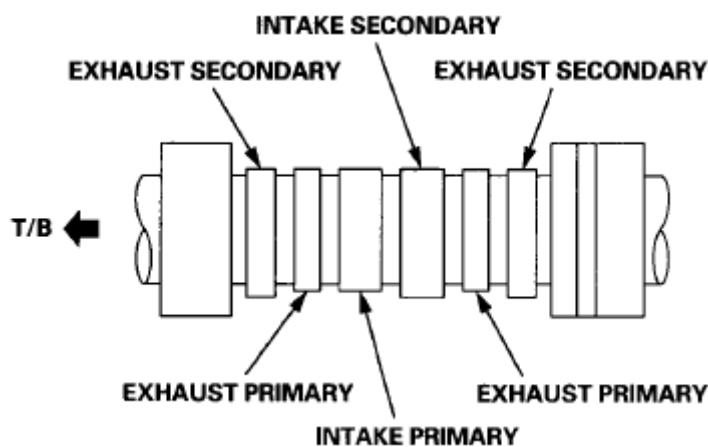


Fig. 123: Measuring Cam Lobe Height For Intake And Secondary Exhaust - Front
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

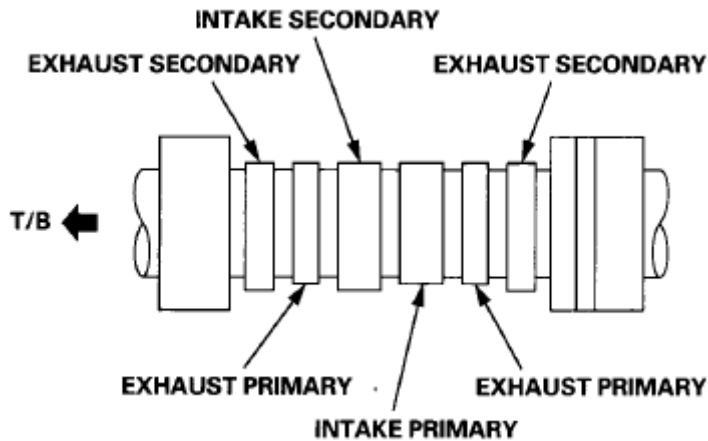
REAR

Fig. 124: Measuring Cam Lobe Height For Intake And Secondary Exhaust - Rear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

VALVE, SPRING, AND VALVE SEAL REMOVAL**Special Tools Required**

Valve Spring Compressor Attachment 07757-PJ1010A

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

1. Remove the **cylinder head**.
2. Remove the **rocker arm assembly**.
3. Using an appropriate-sized socket (A) and a plastic mallet (B), lightly tap the spring retainer to loosen the valve cotters.

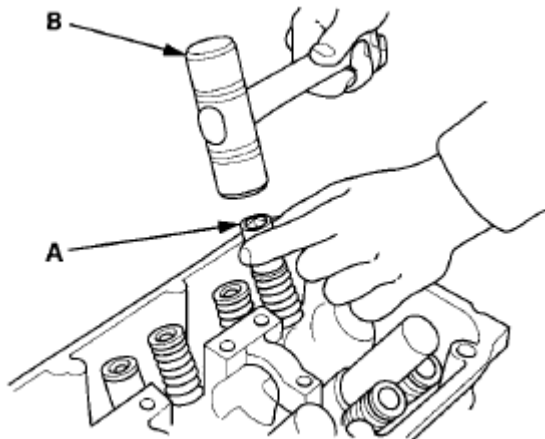


Fig. 125: Tapping Spring Retainer To Loosen Valve Cotters Using Socket And Plastic Mallet
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

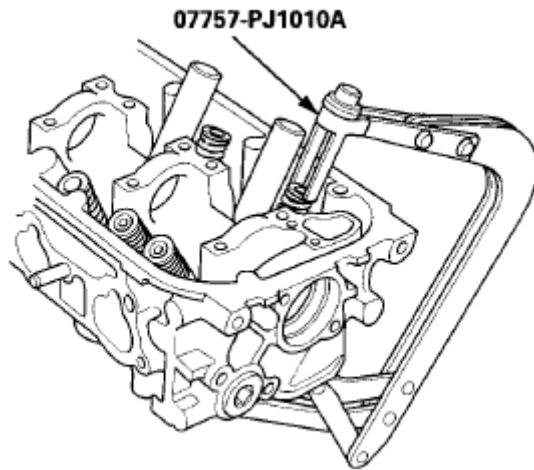


Fig. 126: Installing Valve Spring Compressor Attachment And Valve Spring Compressor
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Remove the valve spring compressor and the valve spring compressor attachment, then remove the spring retainer, the valve spring, and the valve.
6. Install the valve guide seal remover (A).

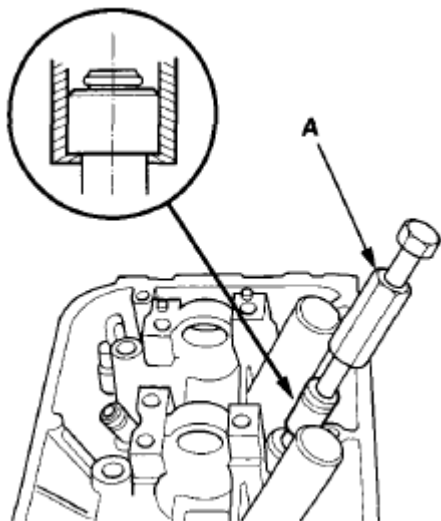


Fig. 127: Identifying Valve Guide Seal Remover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Remove the valve seal.

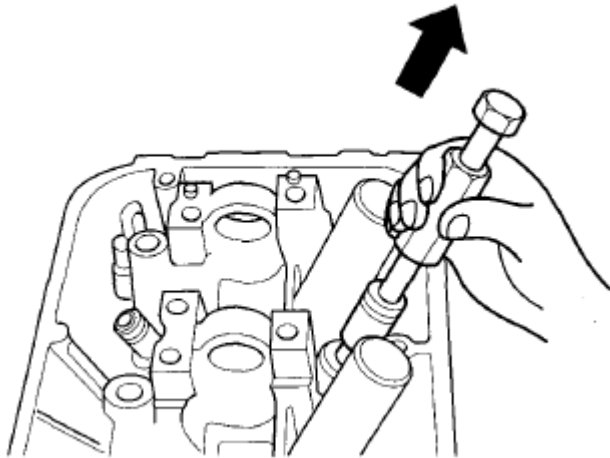


Fig. 128: Removing Valve Seal

Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Remove the valve spring seat.

VALVE INSPECTION

1. Remove the valves.
2. Measure the valve in these areas.

Intake Valve Dimensions

A Standard (New): 35.90-36.01 mm (1.413-1.421 in)

B Standard (New): 116.55-117.15 mm (4.589-4.612 in)

C Standard (New): 5.485-5.495 mm (0.21594-0.21634 in)

C Service Limit: 5.455 mm (0.21476 in)

Exhaust Valve Dimensions

A Standard (New): 29.90-30.10 mm (1.177-1.185 in)

B Standard (New): 113.90-114.50 mm (4.484-4.508 in)

C Standard (New): 5.450-5.460 mm (0.21457-0.21496 in)

C Service Limit: 5.420 mm (0.21339 in)

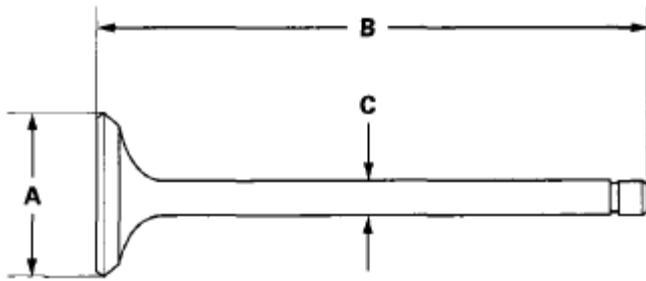


Fig. 129: Measuring Intake And Exhaust Valve Dimensions
Courtesy of AMERICAN HONDA MOTOR CO., INC.

VALVE STEM-TO-GUIDE CLEARANCE INSPECTION

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

Intake Valve Stem-to-Guide Clearance

Standard (New): 0.020-0.045 mm (0.00079-0.00177 in)

Service Limit: 0.08 mm (0.0031 in)

Exhaust Valve Stem-to-Guide Clearance Standard (New): 0.055-0.080 mm (0.00217-0.00315 in)

Service Limit: 0.11 mm (0.0043 in)

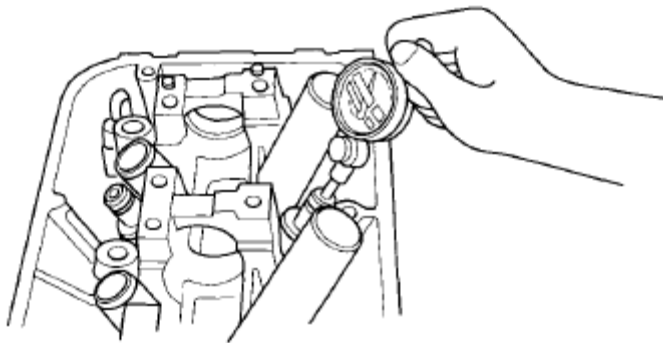


Fig. 130: Measuring Valve Stem-To-Guide Clearance Using Micrometer
Courtesy of AMERICAN HONDA MOTOR CO., INC.

VALVE GUIDE REPLACEMENT

Special Tools Required

- Valve Guide Driver, 5.35 x 9.7 mm 07742-0010100
- Valve Guide Reamer, 5.5 mm 07HAH-PJ7A100

1. Inspect the **valve stem-to-guide clearance**.
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 valve guide driver, 5.35 x 9.7 mm and a conventional hammer.

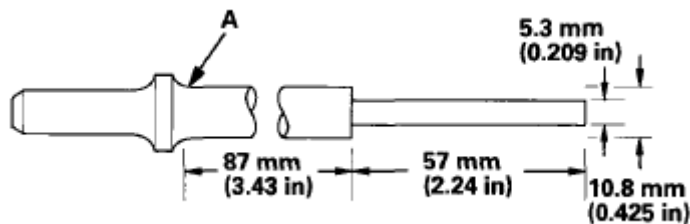


Fig. 131: Identifying Air-Impact Valve Guide Driver
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Select the proper replacement guides, and chill them in the freezer section of a refrigerator for at least 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.

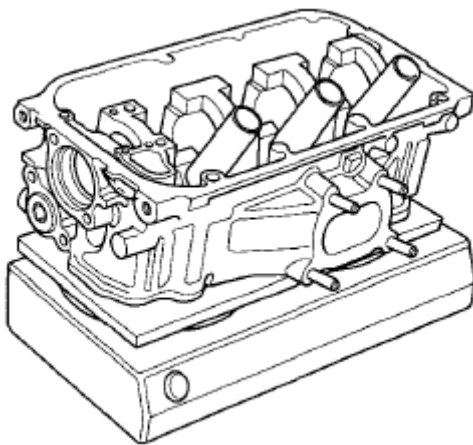


Fig. 132: Using Hot Plate Or Oven To Evenly Heat Cylinder Head
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Working from the camshaft side, use the driver and an air hammer to drive the guide about 2 mm (0.08 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.

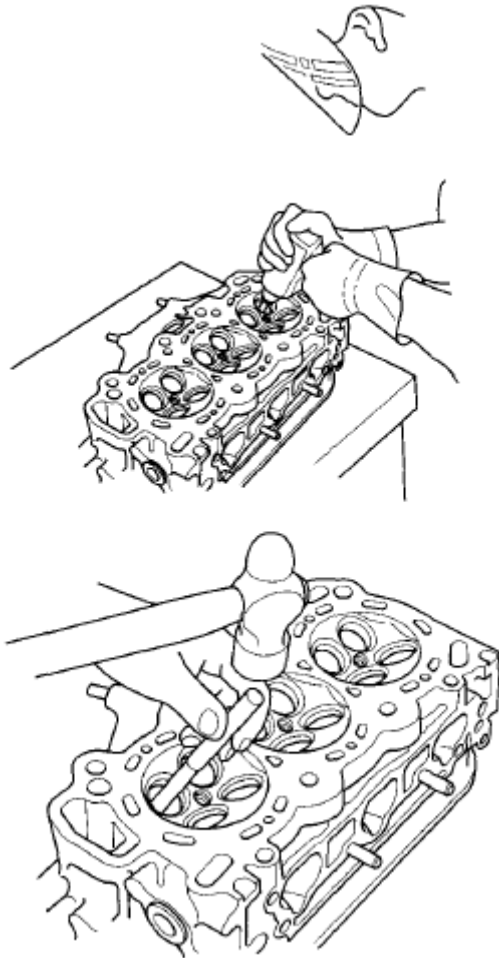


Fig. 133: Turning Head Over And Driving Guide Out Toward Camshaft Side Of Head
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. If a valve guide still will not move, drill it out with an 8 mm (5/16 in) drill bit, then try again.

NOTE: **Drill guides only in extreme cases; you could damage the cylinder head if the guide breaks.**

8. Remove the new guide(s) from the freezer, one at a time, as you need them.
9. Apply a thin coat of new engine oil to the outside of the new valve guide. Install the guide from the camshaft side of the head; use the valve guide driver to drive the guide 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

Intake: 21.20-22.20 mm (0.8346-0.8740 in)

Exhaust: 20.60-21.60 mm (0.8110-0.8504 in)

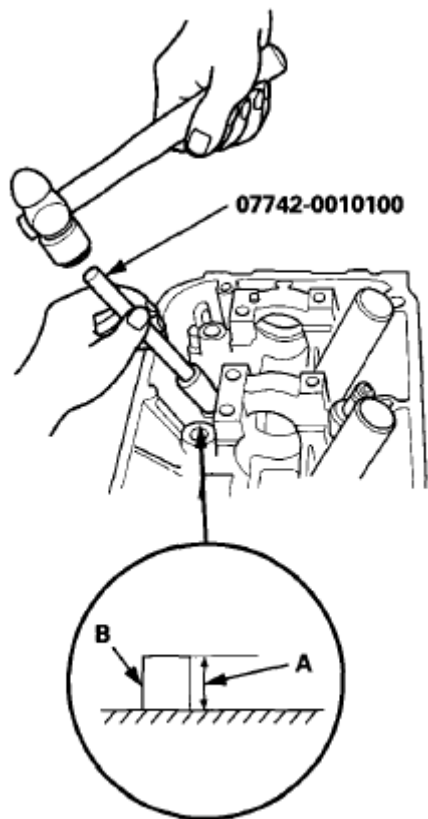


Fig. 134: Installing Guide To Specified Height From Camshaft Side Of Head Using Valve Guide Driver

Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Coat both the valve guide reamer, 5.5 mm and the valve guide with cutting oil.
11. Rotate the reamer clockwise the full length of the valve guide bore.

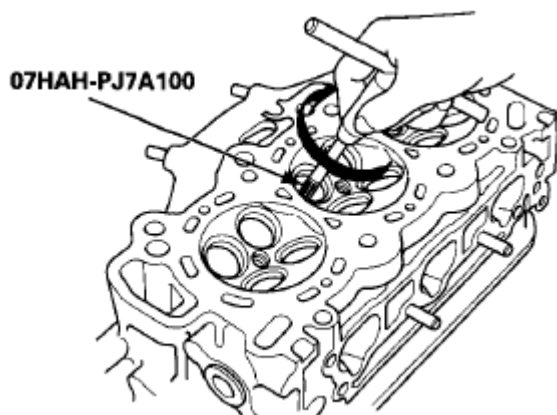


Fig. 135: Rotating Reamer Clockwise Full Length Of Valve Guide Bore

Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Continue to rotate the reamer clockwise while removing 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**. Verify that a valve slides into the intake and exhaust valve guides without sticking.
15. Inspect the **valve seating**. If necessary renew the valve seat using a valve seat cutter.

VALVE SEAT RECONDITIONING

1. Inspect **valve stem-to-guide clearance**. If the valve guides are worn, replace them before cutting the valve seats.
2. Renew the valve seats in the cylinder head using a valve seat cutter.

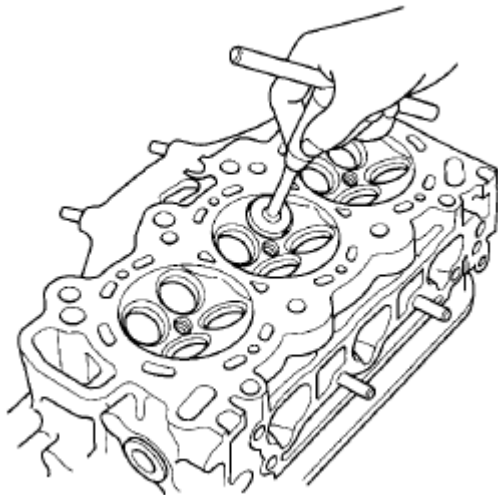


Fig. 136: Renewing Valve Seats In Cylinder Head Using Valve Seat Cutter
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Carefully cut a 45 ° seat, removing only enough material to ensure a smooth and concentric seat.
4. Bevel the upper and lower edges at the angles shown in the illustration. Check the width of the seat and adjust accordingly.

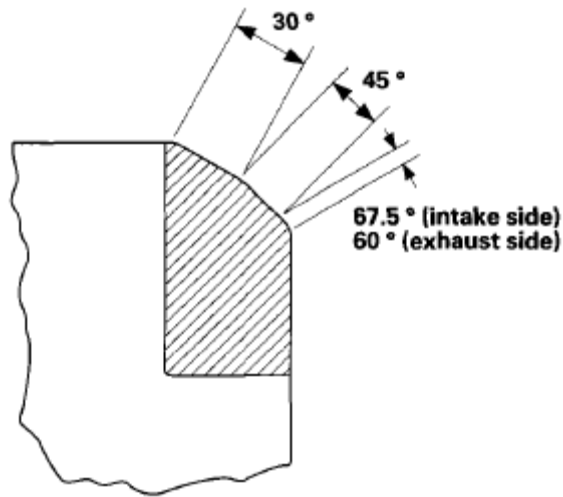


Fig. 137: Beveling Upper And Lower Edges At Specified Angles
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

Valve Seat Width

Standard (New): 1.25-1.55 mm (0.0492-0.0610 in)

Service Limit: 2.00 mm (0.0787 in)

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

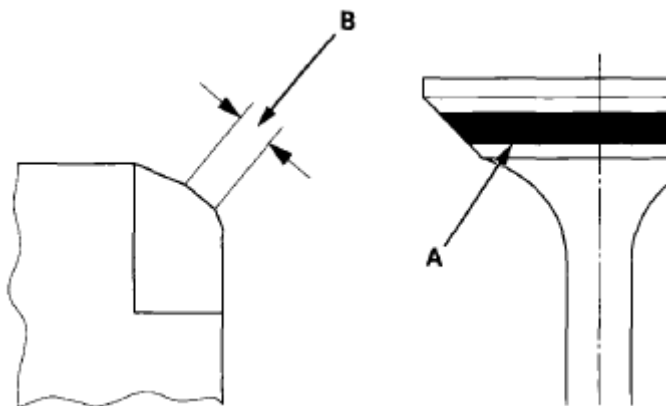


Fig. 138: Identifying Valve Seating Surface And Prussian Blue Compound
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

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 67.5 ° cutter (intake seat) or the 60 ° cutter (exhaust seat) 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 the valve stem installed height (A).

Intake Valve Stem Installed Height Standard (New): 46.75-47.55 mm (1.8405-1.8720 in)

Service Limit: 47.80 mm (1.8819 in)

Exhaust Valve Stem Installed Height Standard (New): 46.68-47.48 mm (1.8378-1.8693 in)

Service Limit: 47.73 mm (1.8791 in)

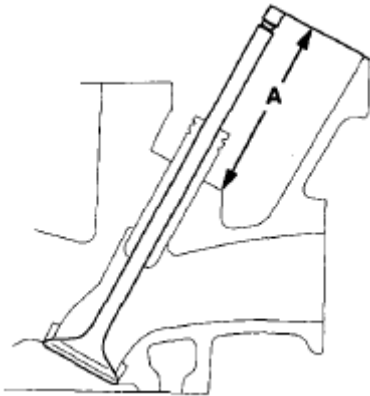


Fig. 139: Measuring Intake Valve Stem Installed Height
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

VALVE, SPRING, AND VALVE SEAL INSTALLATION

Special Tools Required

- Stem Seal Driver 07PAD-0010000
- Valve Spring Compressor Attachment 07757-PJ1010A

1. Coat the valve stems with new engine oil. Install the valves in the valve guides.
2. Check that the valves move up and down smoothly.

3. Install the spring seats on the cylinder head.
4. Install the new valve seals (A) using the 5.5 mm side of the stem seal driver (B).

NOTE: The exhaust valve seal (C) have a black spring (D) and intake valve seal (E) have a white or silver spring (F); they are not interchangeable.

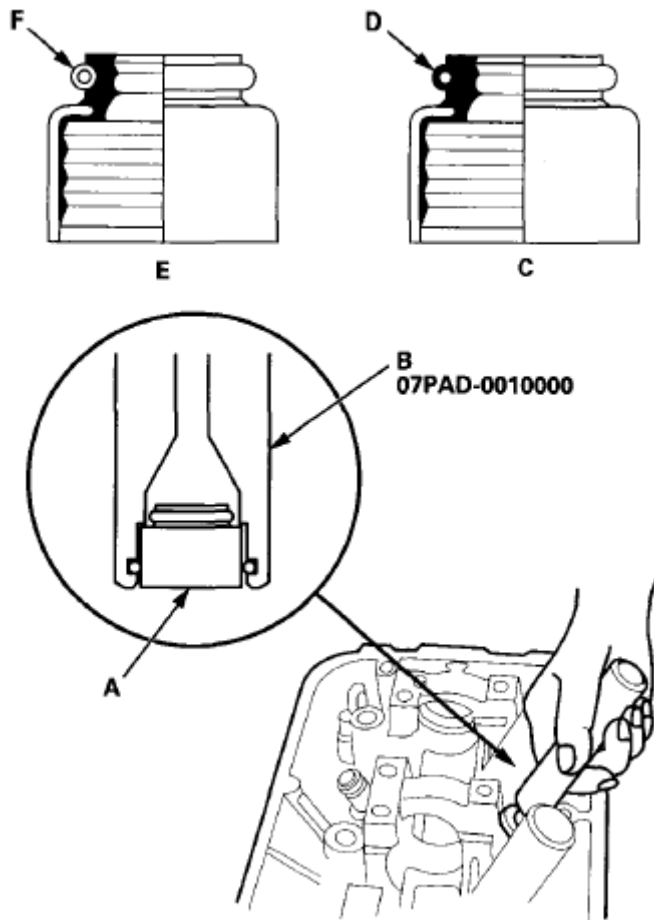


Fig. 140: Installing Valve Seals Using Side Of Stem Seal Driver
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

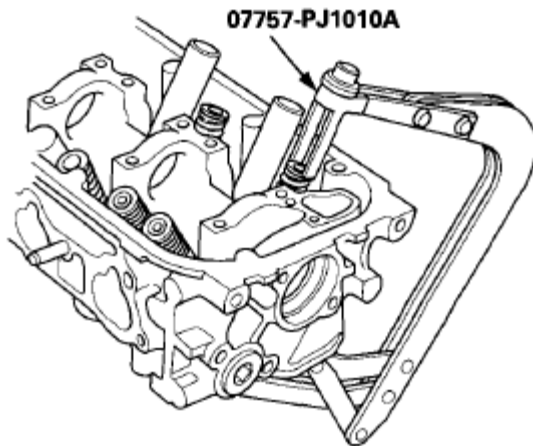


Fig. 141: Installing Valve Spring Compressor Attachment And Valve Spring Compressor
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Remove the valve spring compressor and the valve spring compressor attachment.
8. Lightly tap the end of each valve stem two or three times with a plastic mallet (A) to ensure proper seating of the valve and valve cotters. Tap the valve stem only along its axis so you do not bend the stem.

NOTE: Be sure to raise the head off the work bench so the valve is not possibly damaged.

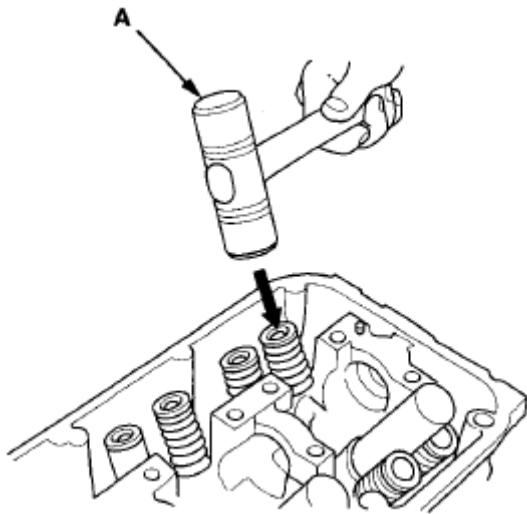


Fig. 142: Tapping End Of Valve Stem With Plastic Mallet
Courtesy of AMERICAN HONDA MOTOR CO., INC.

CAMSHAFT, ROCKER ARM ASSEMBLY, CAMSHAFT SEAL, AND PULLEY INSTALLATION

FRONT

1. Loosen the locknuts and the adjusting screws.
2. Dry the camshaft oil seal housing.
3. Apply a light coat of new engine oil to the lip of the camshaft oil seal.
4. Gently tap the new camshaft oil seal (A) squarely into the cylinder head to the specified installed height.

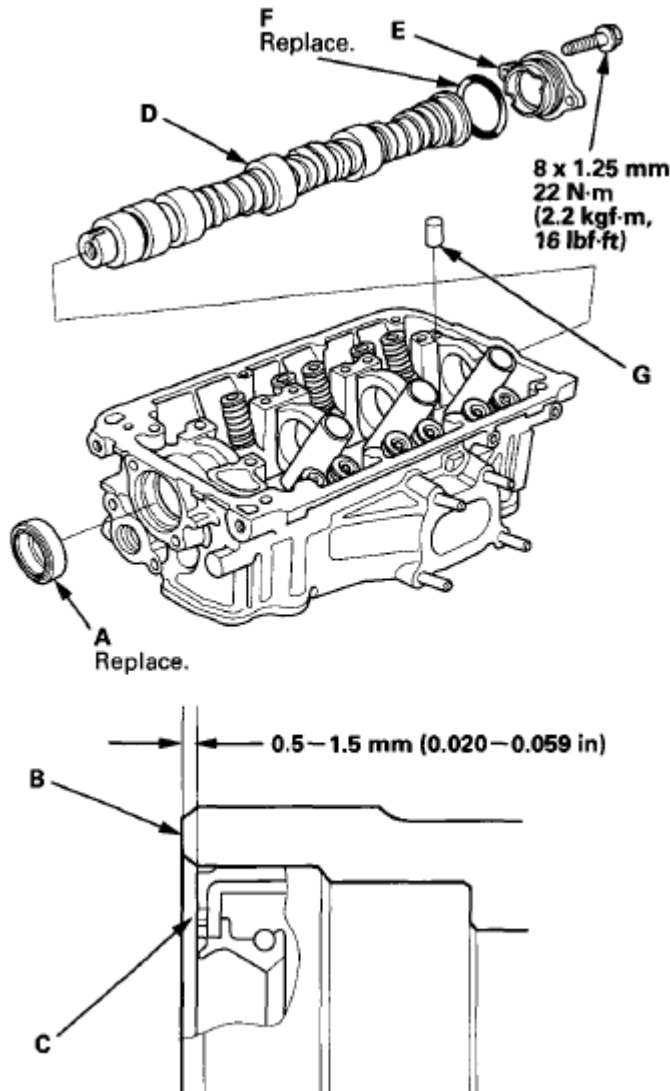


Fig. 143: Identifying Camshaft Oil Seal And Distance Between Cylinder Head Surface And Oil Seal With Torque Specifications
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Measure the distance between the cylinder head surface (B) and the oil seal (C).

Oil Seal Installed Height 0.5-1.5 mm (0.020-0.059 in)

6. Insert the camshaft (D) into the cylinder head, then install the camshaft thrust cover (E). Always use a

new O-ring (F). Apply new engine oil to the journals and the cam lobes.

7. Clean the excess oil off the camshaft, and check that the oil seal lip is not distorted.
8. Install the solid dowel pin (G).
9. If the rocker arm assembly is disassembled, reassemble the **rocker arm assembly**.
10. Remove all of the old liquid gasket from the rocker shaft holder and the cylinder head.
11. Apply liquid gasket, P/N 08717-0004, 08718-0003, 08718-0004, or 08718-0009 to the rocker shaft holder mating surface of the cylinder head. Install the component within 5 minutes of applying the liquid gasket.

NOTE:

- Apply a 2.5 mm (0.098 in) diameter bead of liquid gasket along the broken line (A).
- If you apply liquid gasket P/N 08718-0012, the component must be installed within 4 minutes.
- If too much time has passed after applying the liquid gasket, remove the old liquid gasket and residue, then reapply the new liquid gasket.

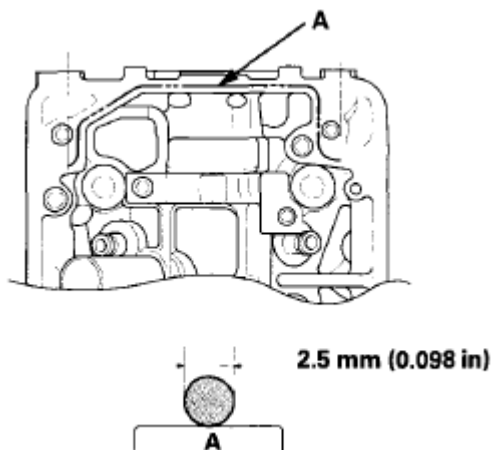


Fig. 144: Identifying Broken Line

Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Set the rocker arm assembly in place, and loosely install the bolts. Make sure that the rocker arms are properly positioned on the valve stems.

NOTE:

- Wait at least 30 minutes before filling the engine with oil.
- Do not run the engine for at least 3 hours after installing the rocker arm assembly.

13. Tighten each bolt two turns at a time in the sequence shown to ensure that the rockers do not bind on the valves.

Specified Torque

8 x 1.25 mm: 22 N.m (2.2 kgf.m, 16 lbf.ft)

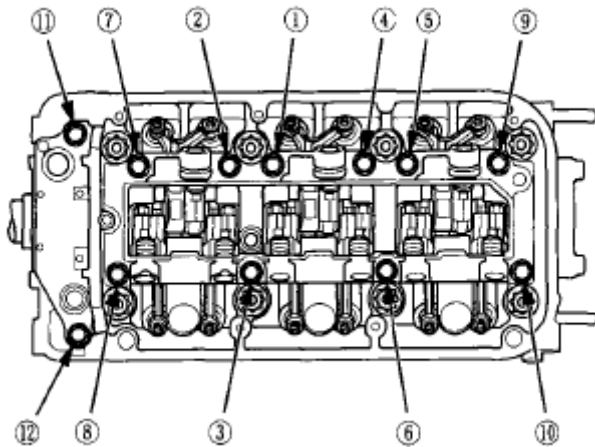


Fig. 145: Identifying Rocker Bolts With Tightening Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. Install the injector base (A). Always use a new gasket (B).

NOTE: The front injector base gasket is different from the rear one. Do the mix injector base gasket types.

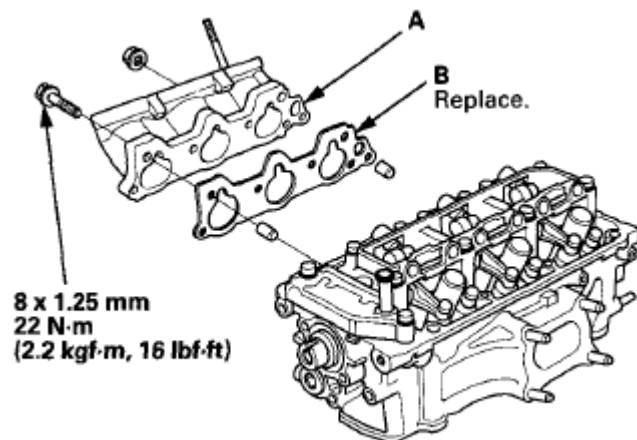


Fig. 146: Identifying Injector Base And Gasket With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

15. Apply new engine oil to the threads of the camshaft pulley mounting bolt (A). Install the back cover (B), then install the camshaft pulley (C).

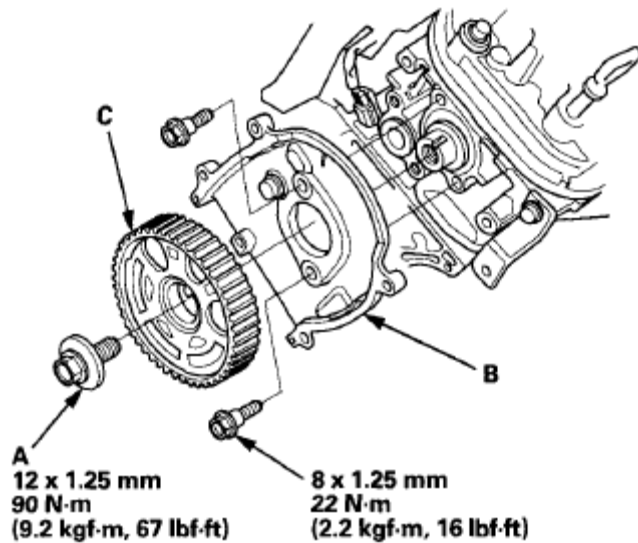


Fig. 147: Identifying Camshaft Pulley, Back Cover And Mounting Bolt With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

16. Set the camshaft pulleys to top dead center (TDC) before bolting them onto the engine block (see step 6).

REAR

1. Loosen the locknuts and the adjusting screws.
2. Dry the camshaft oil seal housing.
3. Apply a light coat of new engine oil to the lip of the camshaft oil seal.
4. Gently tap the new camshaft oil seal (A) squarely into the cylinder head to the specified installed height.

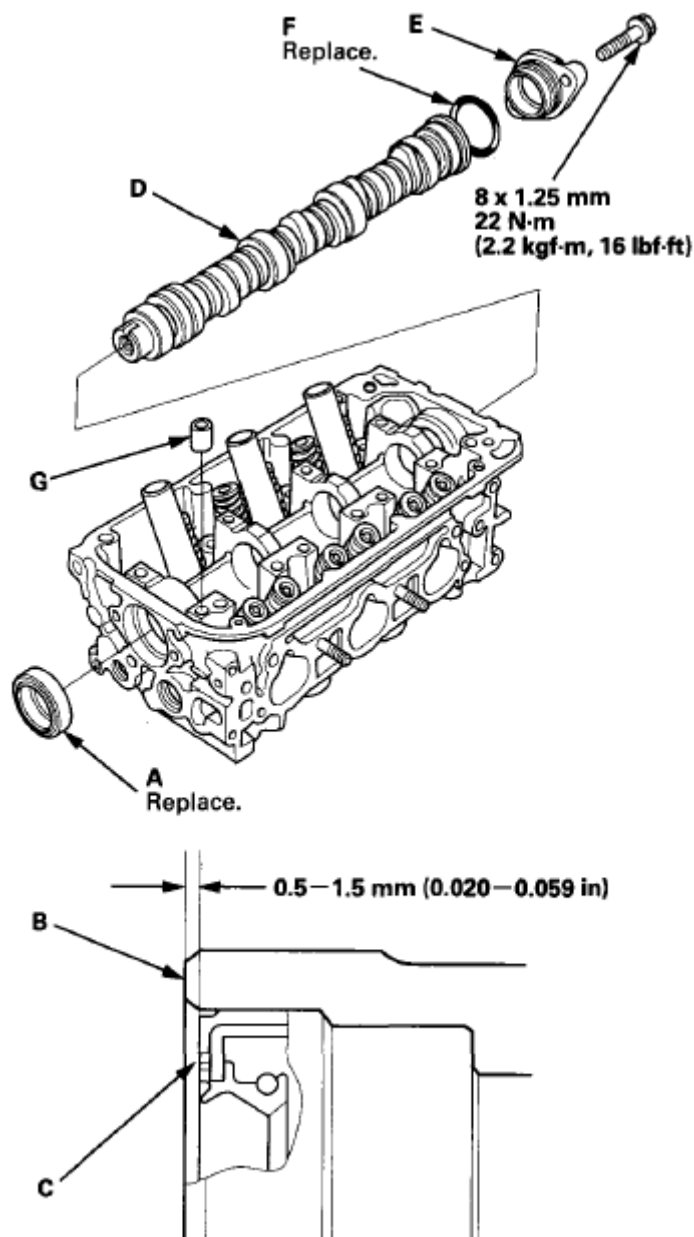


Fig. 148: Identifying Camshaft Oil Seal And Distance Between Cylinder Head Surface And Oil Seal With Torque Specifications

Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Measure the distance between the cylinder head surface (B) and the oil seal (C).

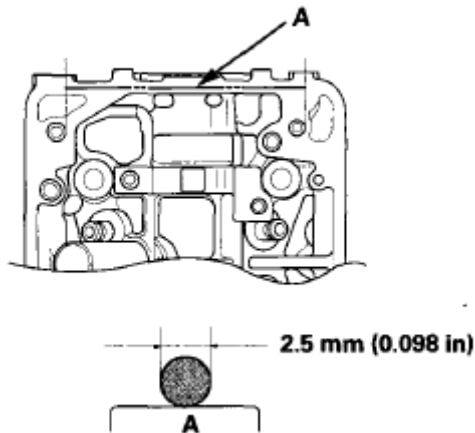
Oil Seal Installed Height 0.5-1.5 mm (0.020-0.059 in)

6. Insert the camshaft (D) into the cylinder head, then install the camshaft thrust cover (E). Always use a new O-ring (F). Apply new engine oil to the journals and the cam lobes.
7. Clean the excess oil off the camshaft, and check that the oil seal lip is not distorted.

8. Install the hollow dowel pin (G).
9. If the rocker arm assembly is disassembled, reassemble the **rocker arm assembly**.
10. Remove all of the old liquid gasket from the rocker shaft holder and the cylinder head.
11. Apply liquid gasket, P/N 08717-0004, 08718-0003, 08718-0004, or 08718-0009 to the rocker shaft holder mating surface of the cylinder head. Install the component within 5 minutes of applying the liquid gasket.

NOTE:

- Apply a 2.5 mm (0.098 in) diameter bead of liquid gasket along the broken line (A).
- If you apply liquid gasket P/N 08718-0012, the component must be installed within 4 minutes.
- If too much time has passed after applying the liquid gasket, remove the old liquid gasket and residue, then reapply the new liquid gasket.

**Fig. 149: Identifying Broken Line**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Set the rocker arm assembly in place, and loosely install the bolts. Make sure that the rocker arms are properly positioned on the valve stems.

NOTE:

- Wait at least 30 minutes before filling the engine with oil.
- Do not run the engine for at least 3 hours after installing the rocker arm assembly.

13. Tighten each bolt two turns at a time in the sequence shown to ensure that the rockers do not bind on the valves.

Specified Torque

8 x 1.25 mm: 22 N.m (2.2 kgf.m, 16 lbf.ft)

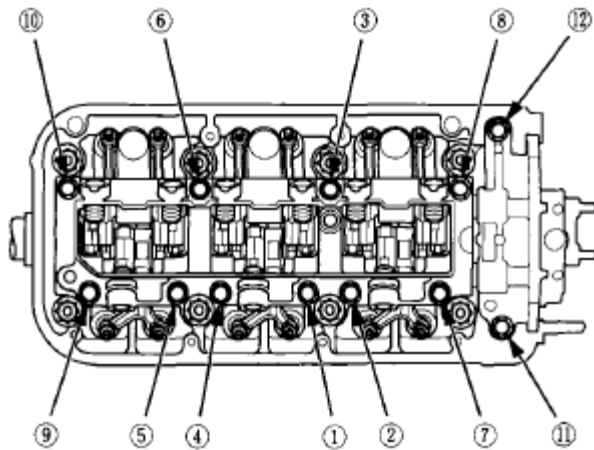


Fig. 150: Identifying Rocker Bolts With Tightening Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. Install the injector base (A). Always use a new gasket (B).

NOTE: The rear injector base gasket is different from the front one. Do the mix injector base gasket types.

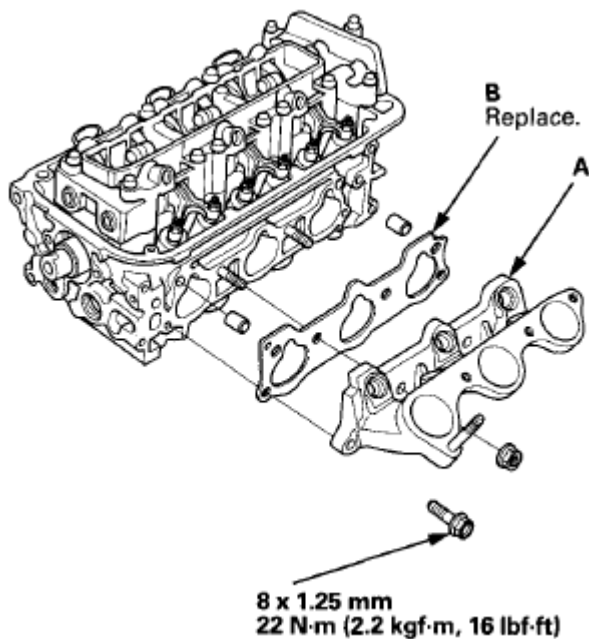


Fig. 151: Identifying Injector Base And Gasket With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

15. Apply new engine oil to the threads of the camshaft pulley mounting bolt (A). Install the back cover (B), then install the camshaft pulley (C).

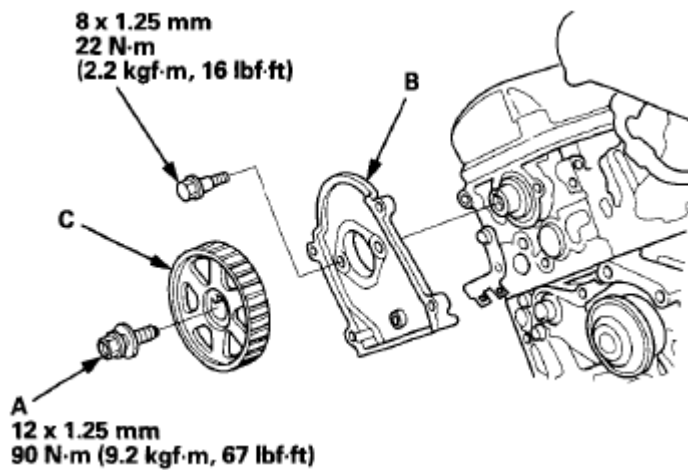


Fig. 152: Identifying Camshaft Pulley, Back Cover And Bolt With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

16. Set the camshaft pulleys to TDC before bolting them onto the engine block (see step 6).

CYLINDER HEAD INSTALLATION

1. Clean the cylinder head and the engine block surface.
2. Clean and install the oil control orifices (A) with new O-rings (B).

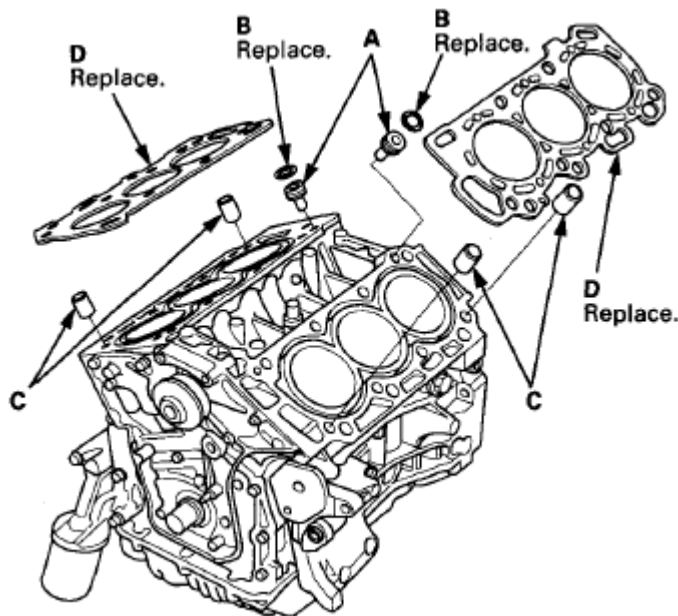


Fig. 153: Identifying Cylinder Head Gaskets, Oil Control Orifices, O-Rings And Dowel Pins
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Install the dowel pins (C) and the new cylinder head gaskets (D).

4. Clean the timing belt pulleys, the timing belt guide plate, and the upper and lower covers.
5. Set the timing belt drive pulley to top dead center (TDC) by aligning the TDC mark (A) on the tooth of the timing belt drive pulley with the pointer (B) on the oil pump.

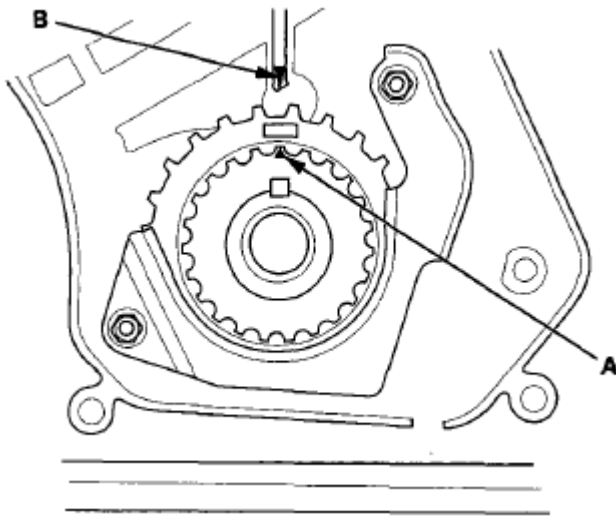


Fig. 154: Identifying TDC Mark And Pointer
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Set the camshaft pulleys to TDC by aligning the TDC marks (A) on the camshaft pulleys with the pointers (B) on the back covers.

FRONT

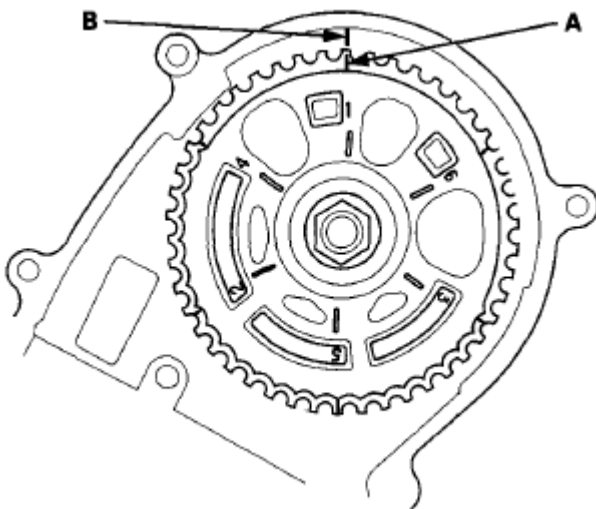


Fig. 155: Identifying TDC Marks On Camshaft Pulleys And Pointers On Back Covers - Front
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

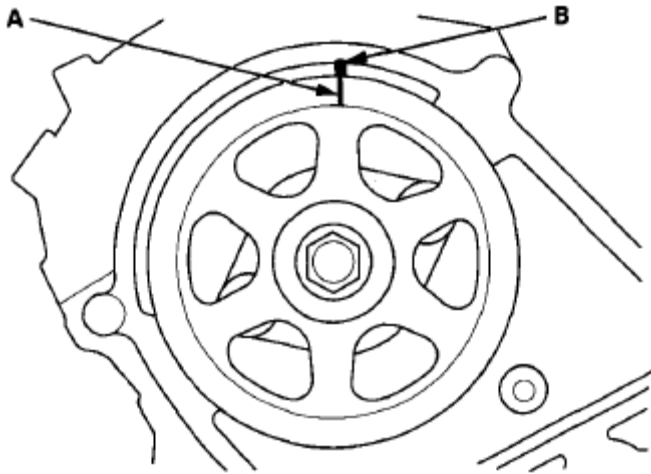


Fig. 156: Identifying TDC Marks On Camshaft Pulleys And Pointers On Back Covers - Rear
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Install the cylinder heads on the engine block.
8. Measure the diameter of each cylinder head bolt at point A and point B.

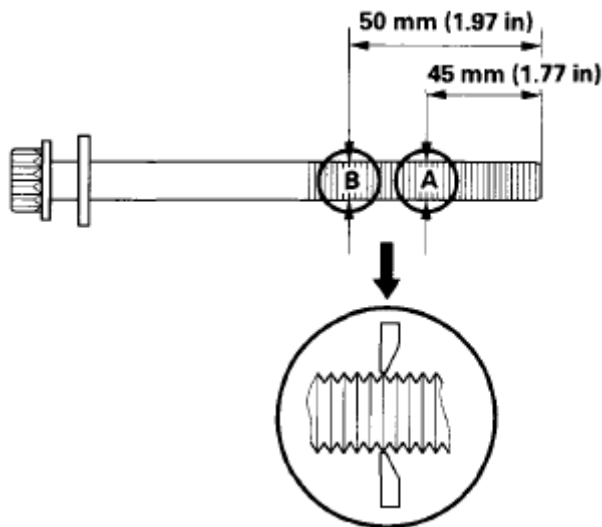


Fig. 157: Identifying Cylinder Head Bolt Diameter At Point A And B
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. If either diameter is less than 11.3 mm (0.445 in), replace the cylinder head bolt.
10. Apply new engine oil to the threads and under the bolt heads of all cylinder head bolts.
11. Torque the cylinder head bolts in sequence to 29 N.m (3.0 kgf.m, 22 lbf.ft) using a beam-type torque wrench. When using a preset click-type torque wrench, be sure to tighten slowly and do not overtighten. If a bolt makes any noise while you are torquing it, loosen the bolt and retighten it from the first step.

FRONT

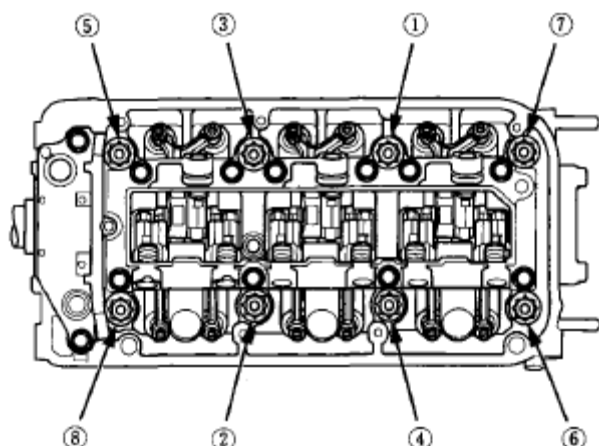


Fig. 158: Identifying Cylinder Head Bolts With Tightening Sequence (Front)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

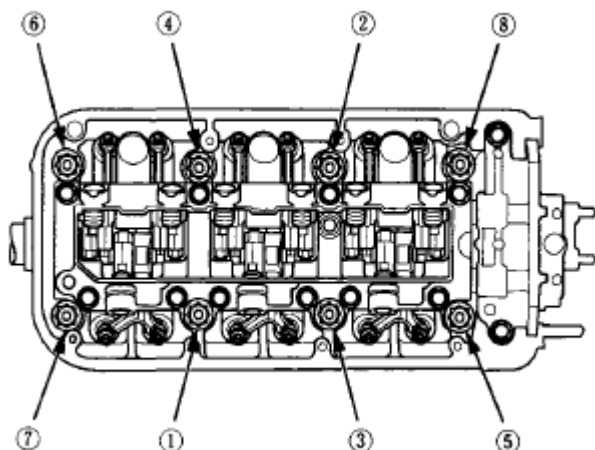


Fig. 159: Identifying Cylinder Head Bolts With Tightening Sequence (Rear)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. After torquing, tighten all cylinder head bolts in two steps (90 ° per step) using the sequence shown in step 11. If you are using a new cylinder head bolt, tighten the bolt an extra 90 °.

NOTE: Remove the cylinder head bolt if you tightened it beyond the specified angle, and go back to step 8 of the procedure. Do not loosen it back to the specified angle.

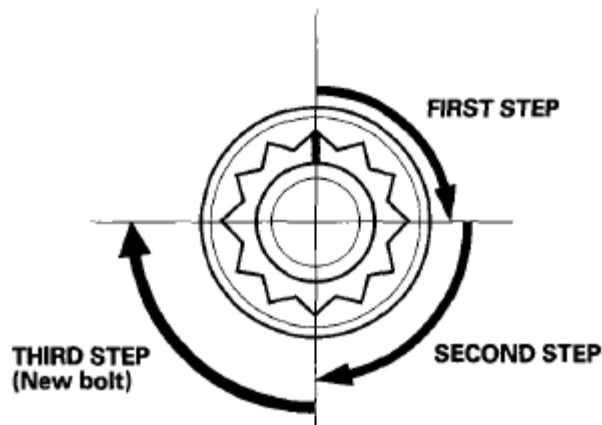


Fig. 160: Identifying Cylinder Head Bolts Tightening Steps
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Install the **timing belt**.
14. Adjust the **valve clearance**.
15. Install the **cylinder head covers**.
16. Install the water passage (see **WATER PASSAGE REPLACEMENT**).
17. Install the injector bases (see **INJECTOR BASE REMOVAL AND INSTALLATION**).
18. Install the connector bracket (A) to the front cylinder head.

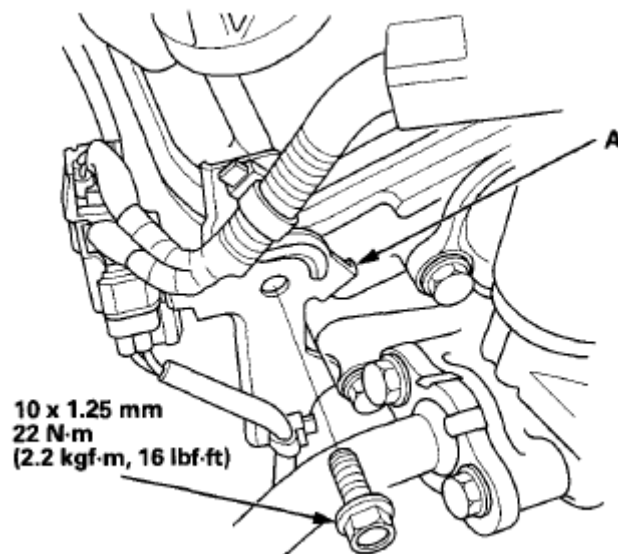


Fig. 161: Identifying Connector Bracket With Torque Specifications
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

19. Install the EVAP canister joint with the bracket (see step 9).
20. Install the engine mount control solenoid valve bracket (A) to the rear cylinder head.

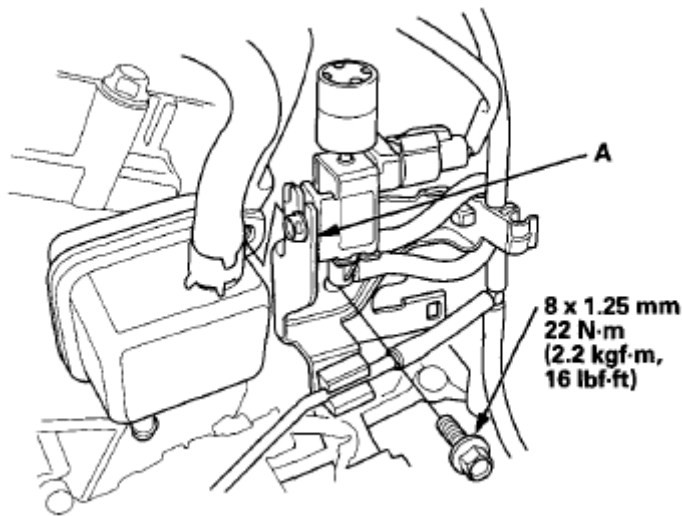


Fig. 162: Identifying Control Solenoid Valve Bracket With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

21. Connect the fuel feed hose (A), then install the quick-connect fitting cover (B) (see **FUEL LINE/QUICK-CONNECT FITTING INSTALLATION**).

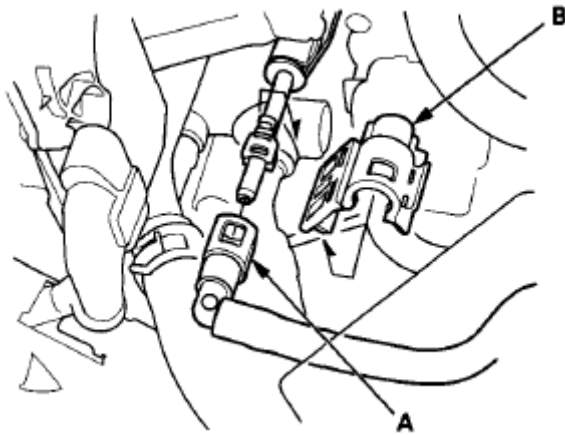


Fig. 163: Identifying Fuel Feed Hose And Quick-Connect Fitting Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

22. Install the front warm up TWC (see **WARM UP TWC REMOVAL/INSTALLATION**) and the rear warm up TWC (see **REAR (BANK 1)**).
23. Connect the following engine wire harness connectors, and install the wire harness clamps to the cylinder head:
- Six injector connectors
 - Knock sensor connector
 - ECT sensor 1 connector
 - Engine mount control solenoid valve connector

- EGR valve connector
 - CMP sensor connector
 - Rocker arm oil control solenoid connector
 - Rocker arm oil pressure switch connector
 - Two A/F sensor connectors
 - Two secondary HO2S connectors
24. Install the intake manifold (see **INSTALLATION**).
 25. Install the alternator (see **INSTALLATION**).
 26. Install the six ignition coils (see **IGNITION COIL AND SPARK PLUG REMOVAL/INSTALLATION**).
 27. Do the battery terminal reconnection procedure (see **BATTERY TERMINAL DISCONNECTION AND RECONNECTION**).
 28. After installation, check that all tubes, hoses, and connectors are installed correctly.
 29. Inspect for fuel leaks. Turn the ignition switch to ON (II), or press the engine start/stop button to select the ON mode (do not operate the starter) so the fuel pump runs for about 2 seconds and pressurizes the fuel line. Repeat this operation three times, then check for fuel leakage at any point in the fuel line.
 30. Refill the radiator with engine coolant, and bleed the air from the cooling system (see **COOLANT CHECK**).
 31. Check for fluid leaks.
 32. Do the ECM/PCM idle learn procedure (see **ECM/PCM IDLE LEARN PROCEDURE**).
 33. Do the CKP pattern clear/CKP pattern learn procedure (see **CKP PATTERN CLEAR/CKP PATTERN LEARN**).
 34. Inspect the idle speed (see **IDLE SPEED INSPECTION**).
 35. Inspect the ignition timing (see **IGNITION TIMING INSPECTION**).
 36. Install the engine compartment covers (see **ENGINE COMPARTMENT COVER REPLACEMENT**).

CAMSHAFT OIL SEAL INSTALLATION - IN CAR

Special Tools Required

Ball Joint Remover/Installer 07GAF-SD40330

1. Remove the **timing belt**.
2. Remove the camshaft pulley and the back cover (see step 18).
3. Remove the camshaft oil seal.
4. Clean and dry the camshaft oil seal housing.
5. Apply a light coat of new engine oil to the lip of the camshaft oil seal.
6. Using the ball joint remover/installer (A), a washer (B), and a 12 x 75 x 1.25 mm bolt (C), press in the new camshaft oil seal (D) squarely into the cylinder head to the specified installed height.

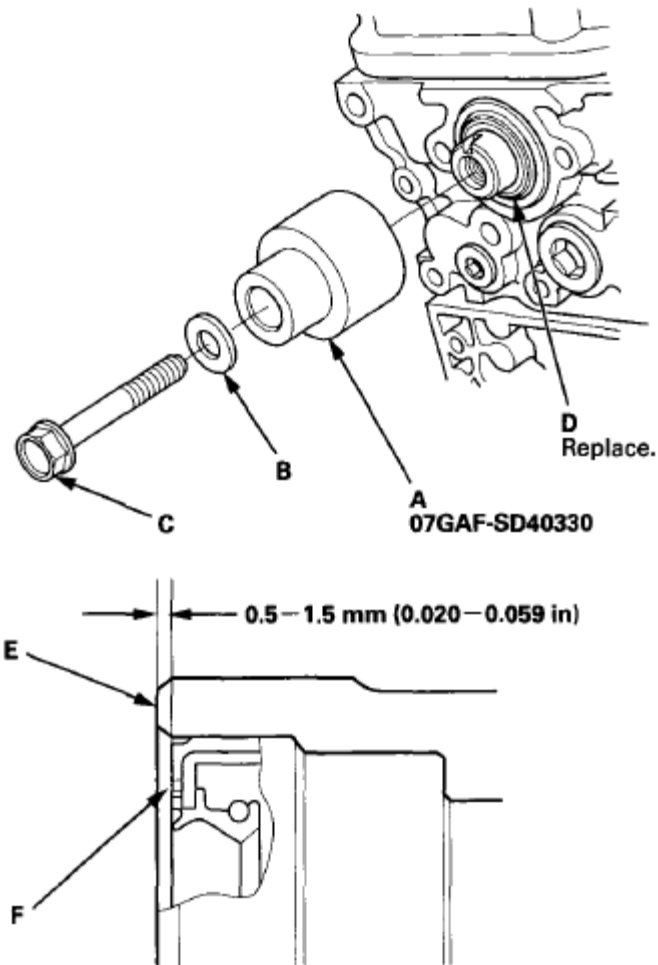


Fig. 164: Identifying Ball Joint Remover/Installer, Camshaft Oil Seal And Distance Between Cylinder Head Surface And Oil Seal

Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Measure the distance between the cylinder head surface (E) and the oil seal (F).

Oil Seal Installed Height 0.5-1.5 mm (0.020-0.059 in)

8. Clean the excess oil off the camshaft, and check that the oil seal is not distorted.
9. Apply new engine oil to the threads of the camshaft pulley mounting bolt. Install the back cover, then install the camshaft pulley:
 - Front (see step 15)
 - Rear (see step 15)
10. Install the **timing belt**.

SEALING BOLT INSTALLATION

NOTE: When installing the sealing bolts (A), always use a new washers (B).

FRONT

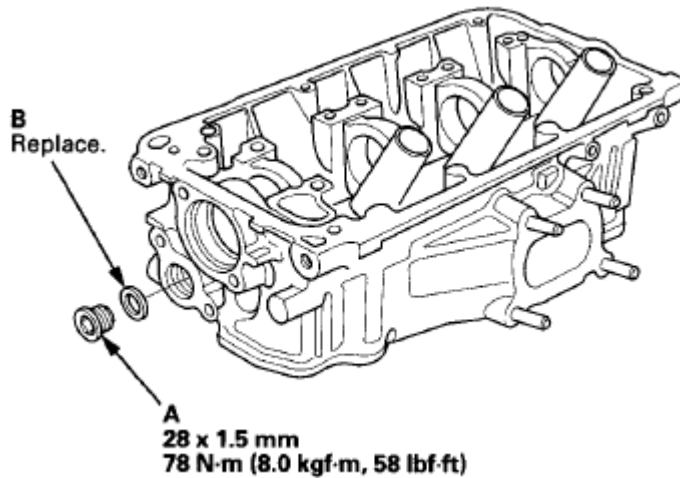


Fig. 165: Identifying Washers And Sealing Bolts With Torque Specification (Front)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

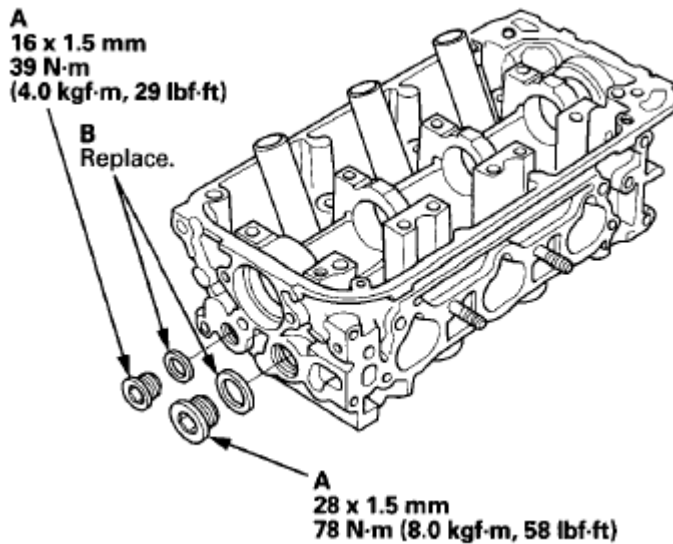


Fig. 166: Identifying Washers And Sealing Bolts With Torque Specification (Rear)
Courtesy of AMERICAN HONDA MOTOR CO., INC.