2012 ENGINE

Cylinder Head (J35Z6) - 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

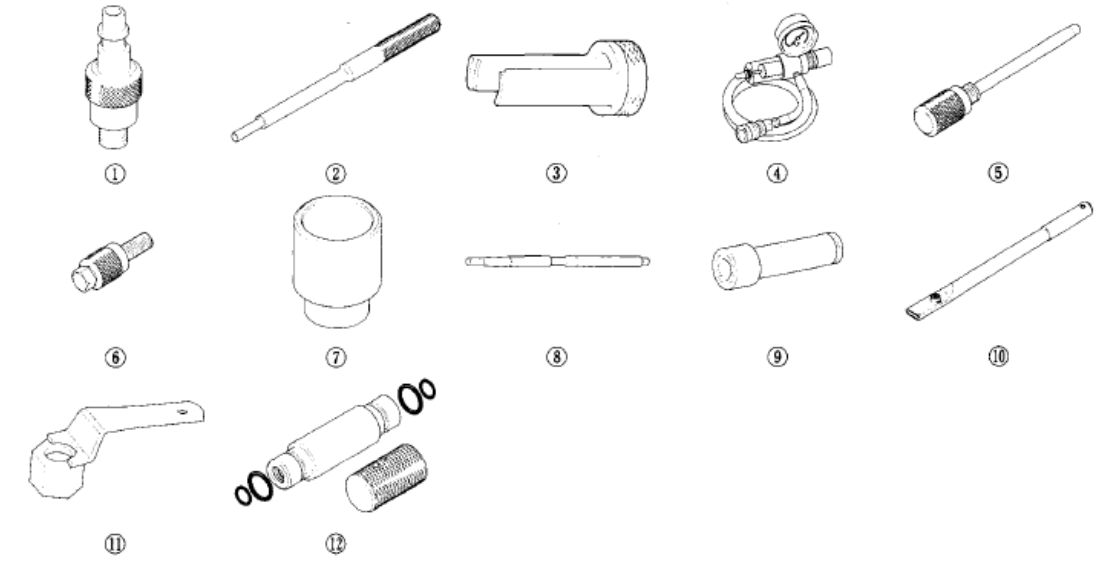


Fig. 1: Identifying Cylinder Head Special Tools
Courtesy of AMERICAN HONDA MOTOR CO., INC.

COMPONENT LOCATION INDEX

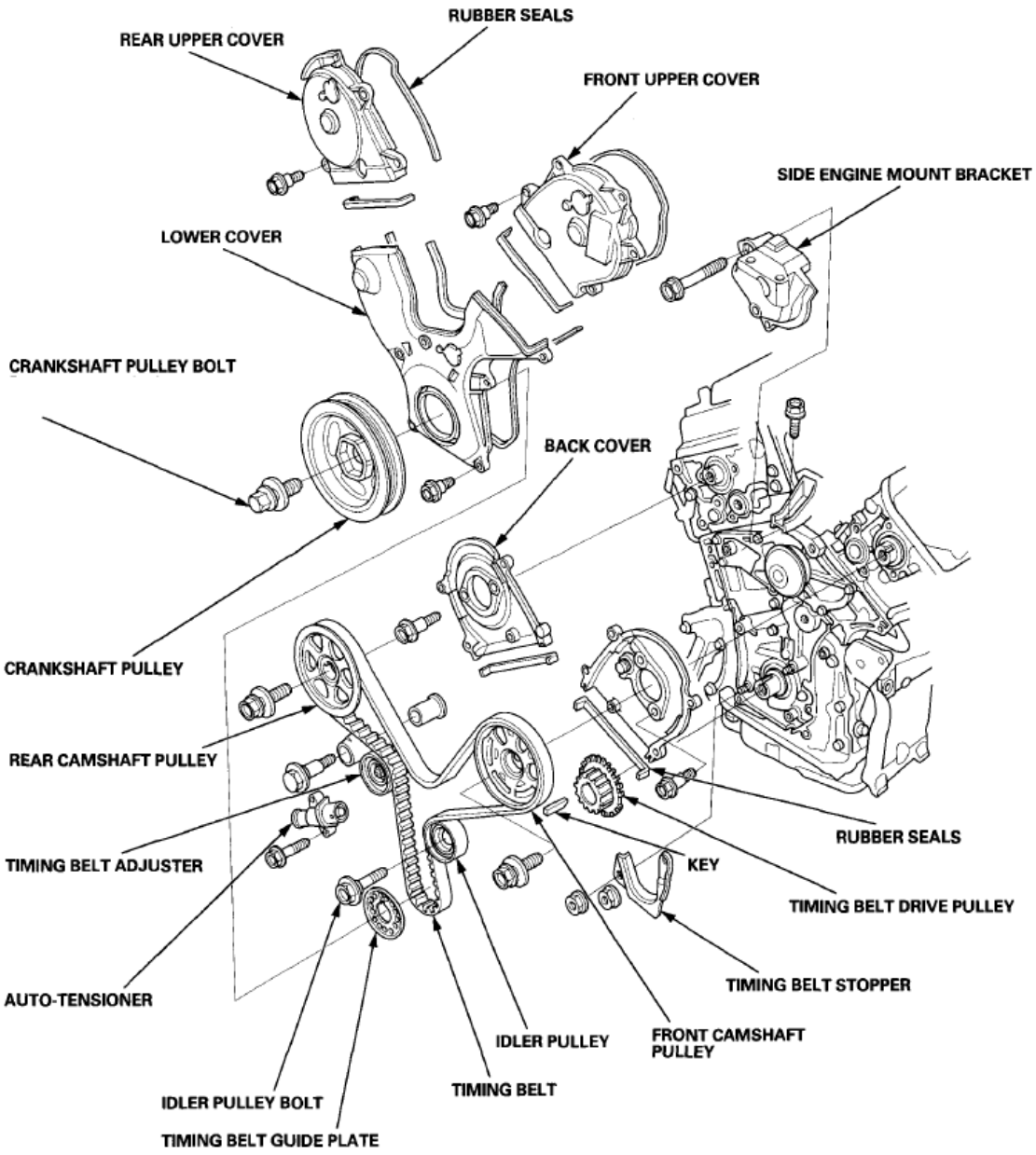


Fig. 2: Cylinder Head Components Location (1 Of 2)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

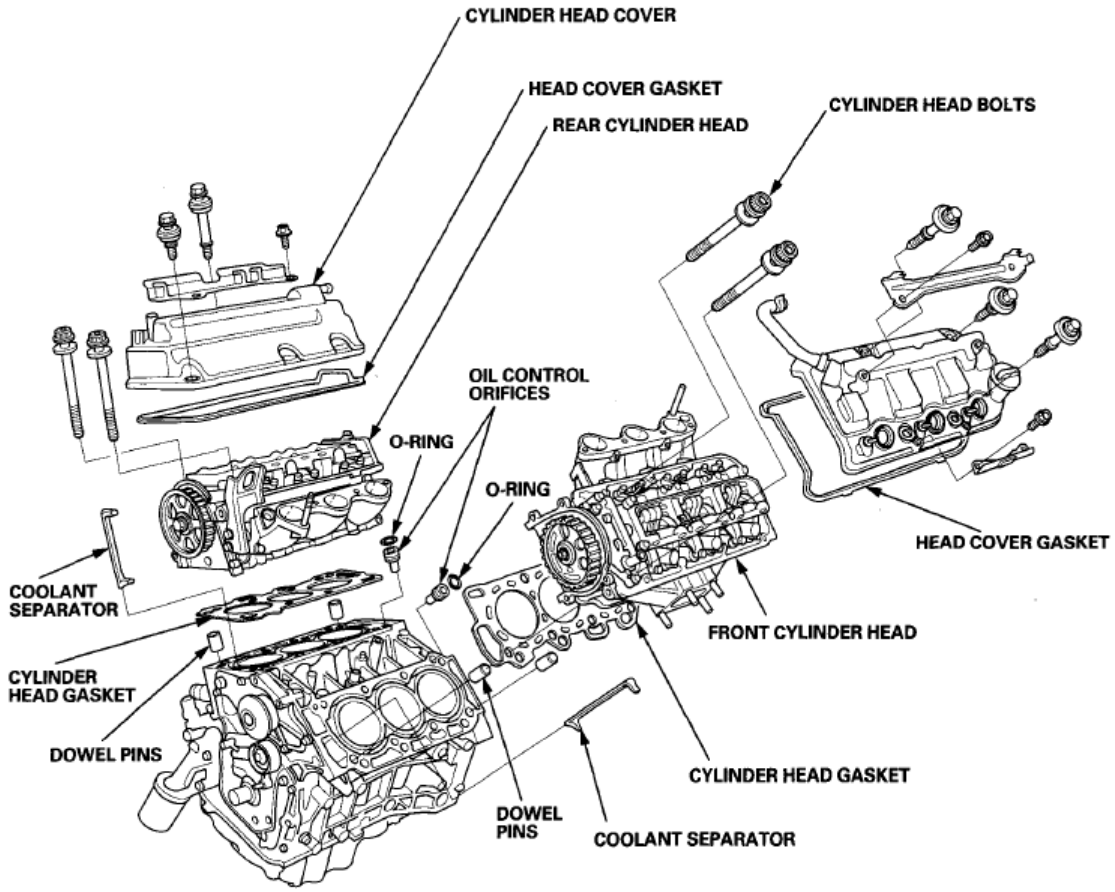


Fig. 3: Cylinder Head Components Location (2 Of 2)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

FRONT

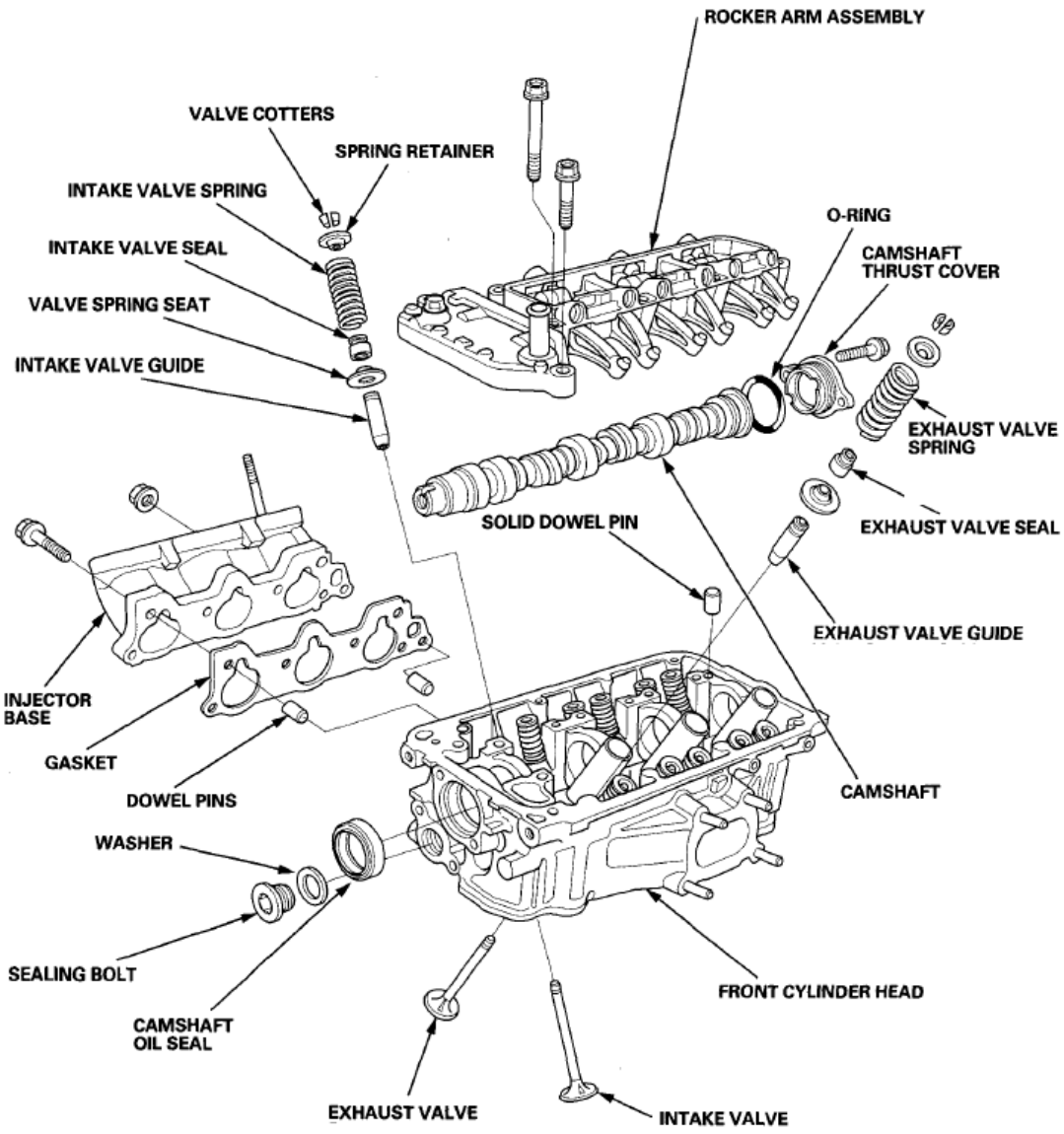


Fig. 4: Exploded View Of Cylinder Head - Front
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

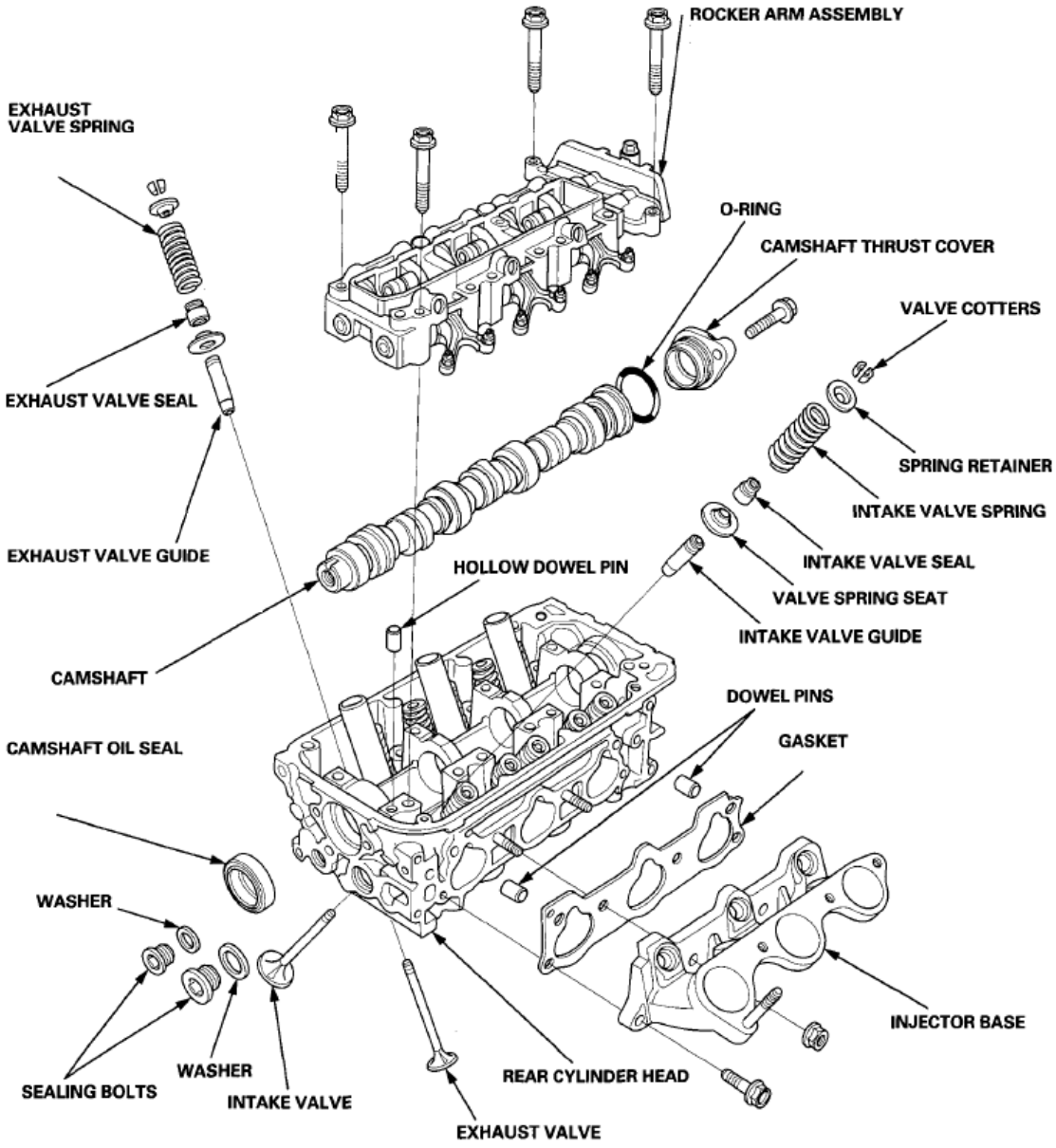


Fig. 5: Exploded View Of Cylinder Head - Rear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

ENGINE COMPRESSION INSPECTION

NOTE: After the inspection, you must reset the PCM. Otherwise, the 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 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.

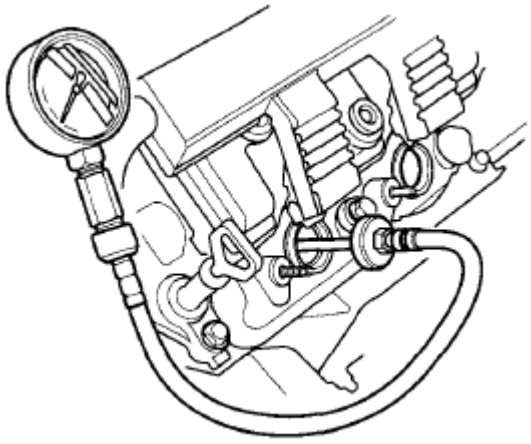


Fig. 6: Identifying Compression Gauge And Spark Plug Hole
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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/cm^2 , 134.8 psi)

10. Measure the compression on the remaining cylinders.

    Maximum Variation:

    Within 200 kPa (2.04 kgf/cm^2 , 29.0 psi)

11. If the compression is not within 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.
14. Install the six spark plugs and the six ignition coils (see **IGNITION COIL AND SPARK PLUG REMOVAL/INSTALLATION**).
15. Select 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 (see **TIMING BELT DRIVE PULLEY REPLACEMENT**).
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.

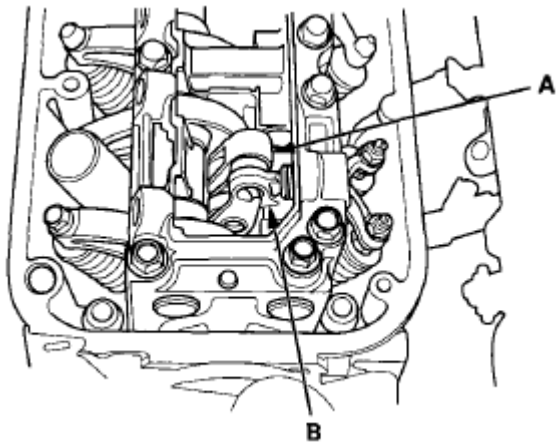


Fig. 7: Identifying Primary And Secondary Rocker Arm
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Check that the air pressure on the shop air compressor gauge indicates over 981 kPa (10.00 kgf/cm^2 , 142.3 psi).
5. Inspect the valve clearance (see **VALVE CLEARANCE ADJUSTMENT**).
6. Remove the sealing bolts, then install VTEC air stop tool B and the VCM air adapter (A) to the inspection hole, then connect the air pressure regulator (C) as shown.

FRONT

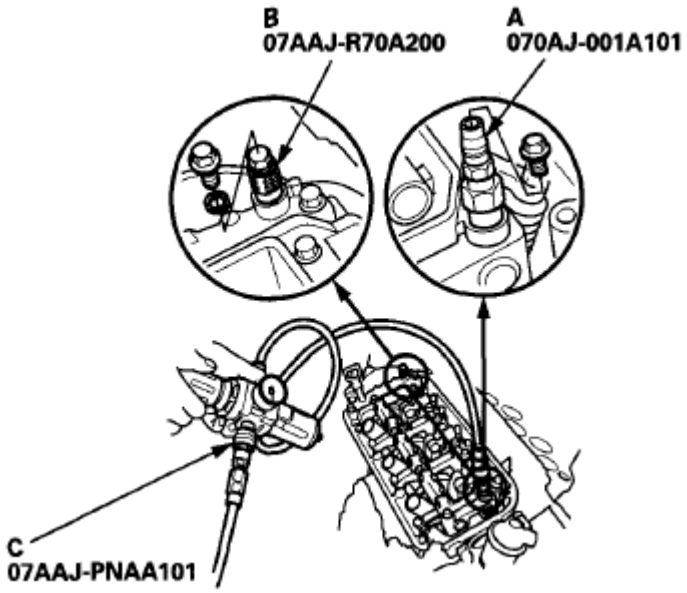


Fig. 8: Identifying VCM Air Adapter And Air Pressure Adapter - Front
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

REAR

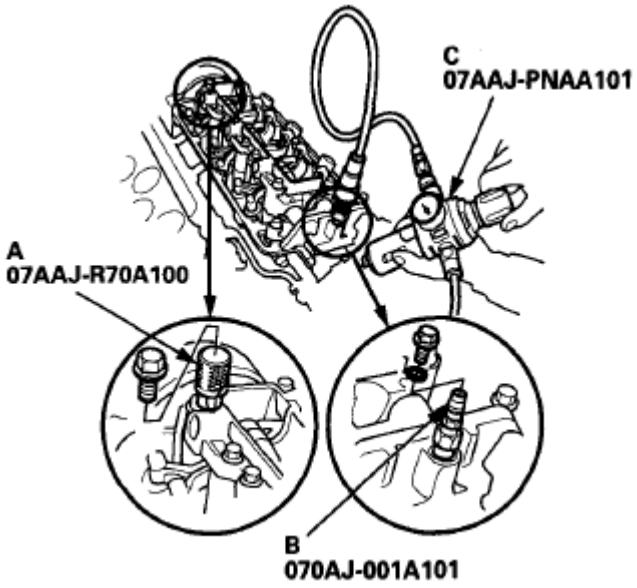


Fig. 9: Identifying VCM Air Adapter And Air Pressure Adapter - Rear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

   Specified Air Pressure:

   550 - 690 kPa (5.61-7.04 kgf/cm^2 , 79.8-100.1 psi)

9. 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 10.

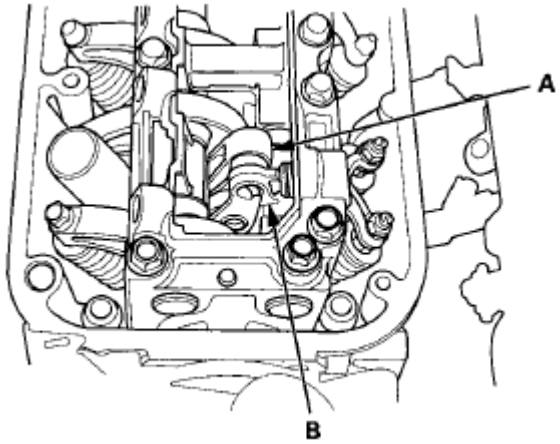


Fig. 10: Identifying Primary And Secondary Rocker Arm
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Remove the air pressure regulator, the VCM air adapter, VTEC air stop tool A, and VTEC air stop tool B.
11. Torque the sealing bolts to 22 N.m (2.2 kgf.m, 16 lbf.ft).
12. Install the cylinder head covers (see **CYLINDER HEAD COVER INSTALLATION**).
13. Install the six spark plugs.

VALVE CLEARANCE ADJUSTMENT

NOTE: Connect the HDS to the DLC (see HOW TO USE THE HDS (HONDA DIAGNOSTIC SYSTEM)), 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 (see **TIMING BELT DRIVE PULLEY REPLACEMENT**).
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.

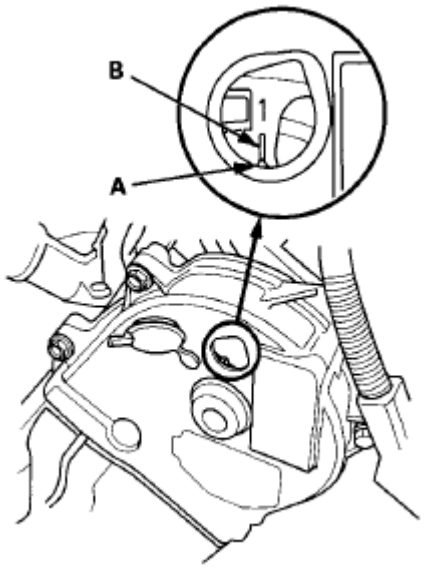


Fig. 11: Identifying Pointer And TDC Mark
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

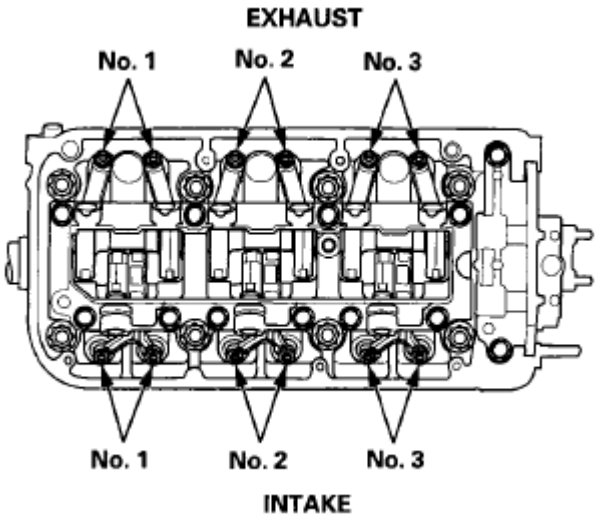


Fig. 12: Adjusting Rear Valve Clearance
Courtesy of AMERICAN HONDA MOTOR CO., INC.

FRONT

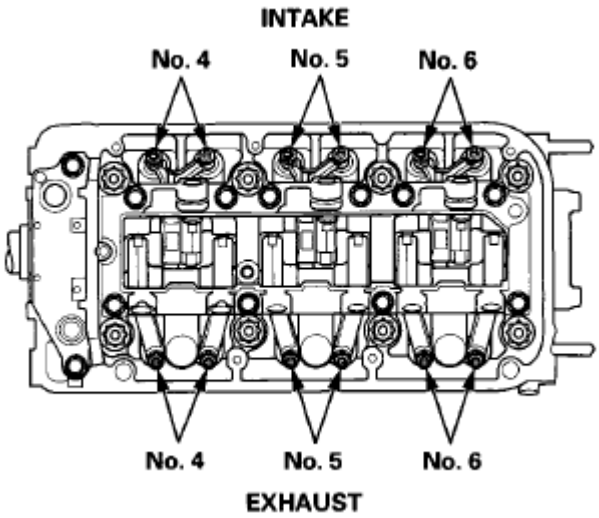


Fig. 13: Adjusting Front Valve Clearance
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

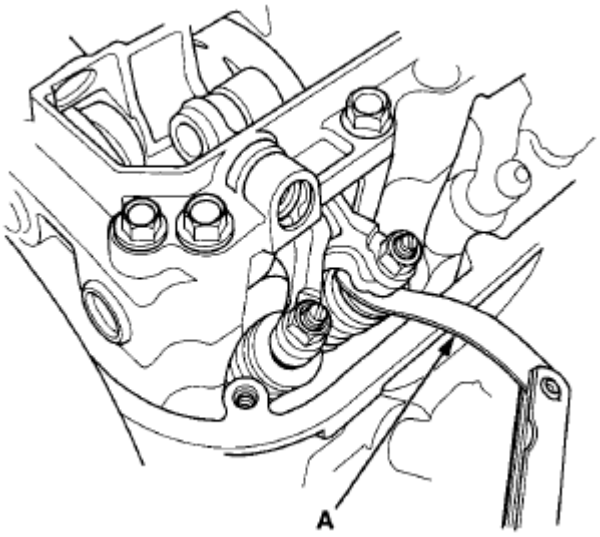


Fig. 14: Inserting Feeler Gauge In Intake Valve
Courtesy of AMERICAN HONDA MOTOR CO., INC.

EXHAUST

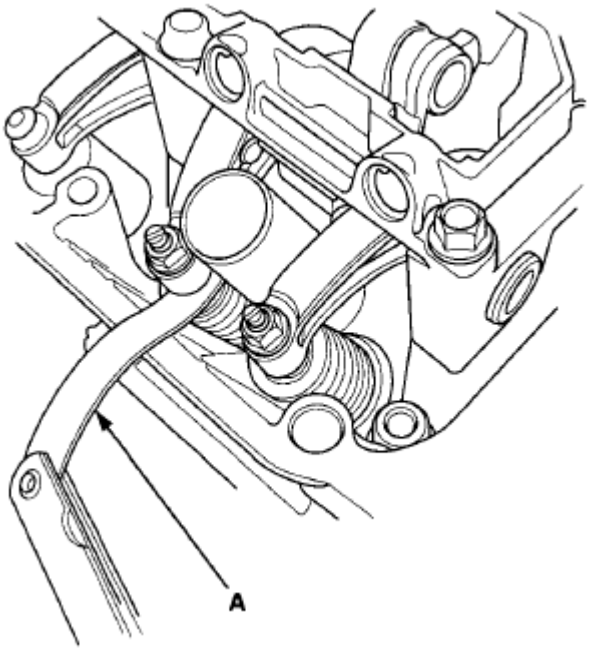


Fig. 15: Inserting Feeler Gauge In Exhaust Valve
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

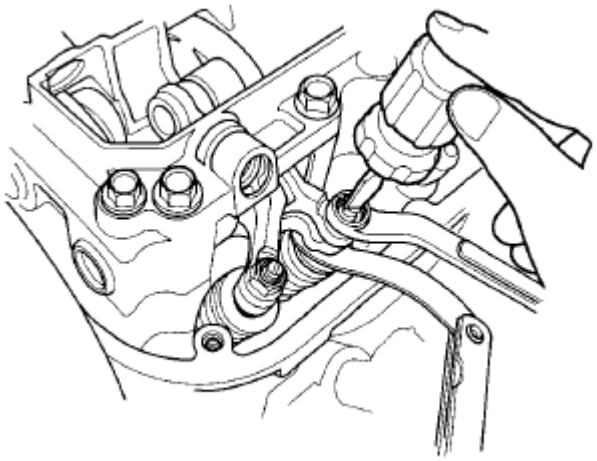


Fig. 16: Turning Adjusting Screw (Intake Valve)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

EXHAUST

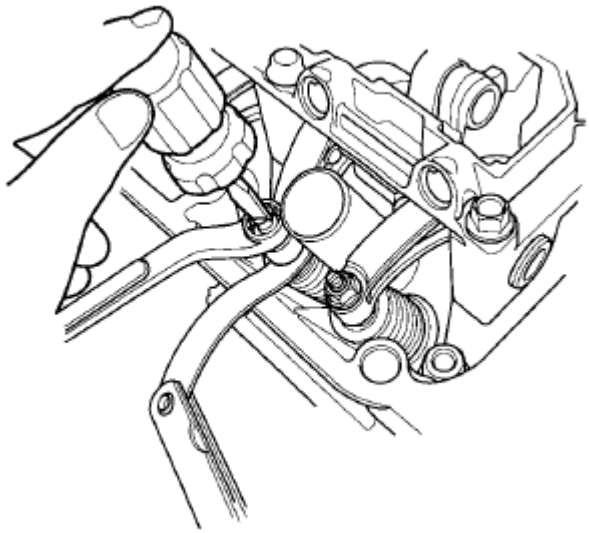


Fig. 17: Turning Adjusting Screw (Exhaust Valve)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

   Specified Torque

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

   Apply new engine oil to the nut threads.

   Exhaust: 14 N.m (1.4 kgf.m, 10 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.

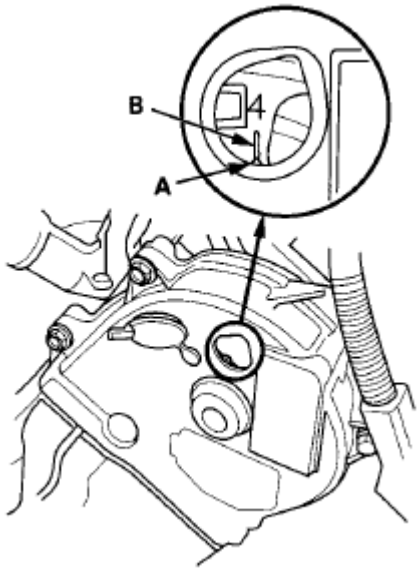


Fig. 18: Identifying Pointer And TDC Mark On Piston No. 4
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.

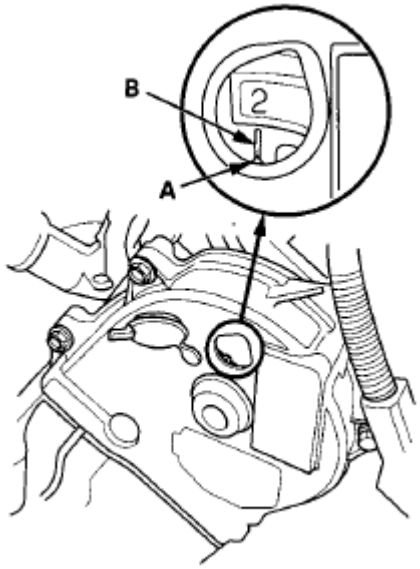


Fig. 19: Identifying Pointer And TDC Mark On Piston No. 2
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.

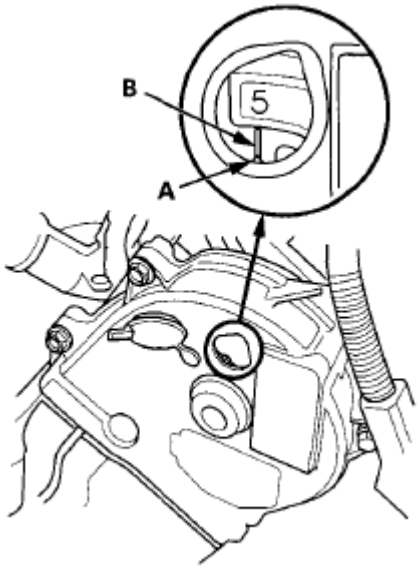


Fig. 20: Identifying Pointer And TDC Mark On Piston No. 5
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.

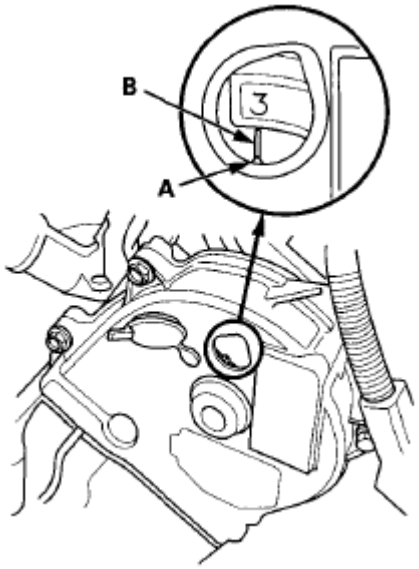


Fig. 21: Identifying Pointer And TDC Mark On Piston No. 3
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.

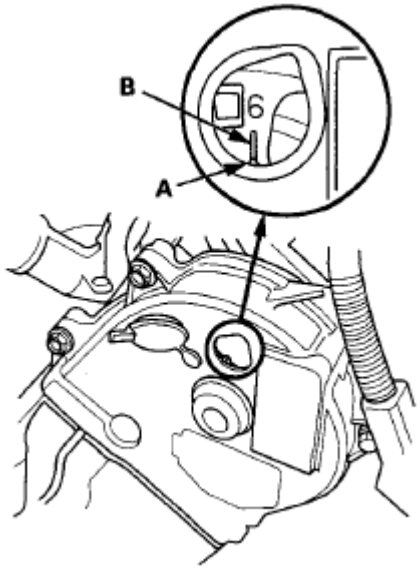


Fig. 22: Identifying Pointer And TDC Mark On Piston No. 6
Courtesy of AMERICAN HONDA MOTOR CO., INC.

16. Check and, if necessary, adjust the valve clearance on the No. 6 cylinder.
17. Install the cylinder head covers (see **CYLINDER HEAD COVER INSTALLATION**).

CRANKSHAFT PULLEY REMOVAL AND INSTALLATION

Special Tools Required

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

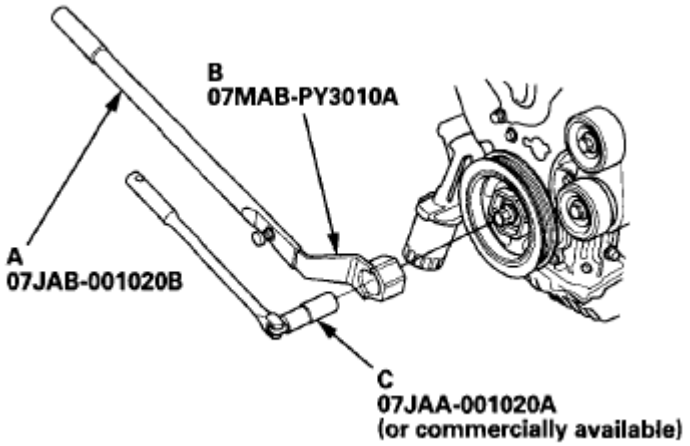


Fig. 23: Identifying Holder Handle, Holder Attachment And Offset Of Pulley
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.

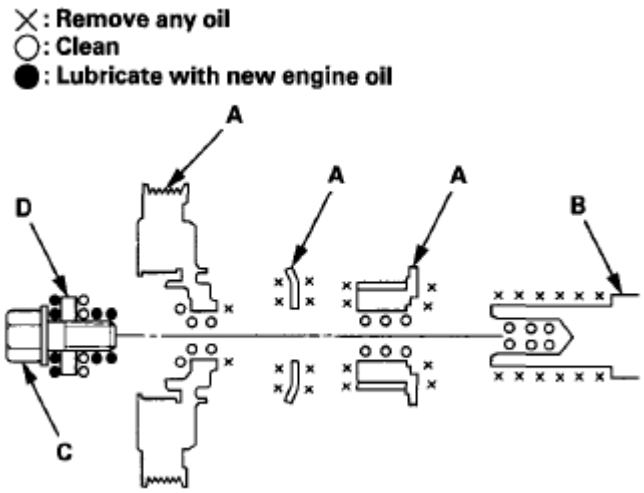


Fig. 24: Identifying Pulleys, Crankshaft, Washer And Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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 19 mm (C).
    2. Tighten the bolt an additional 60 °.

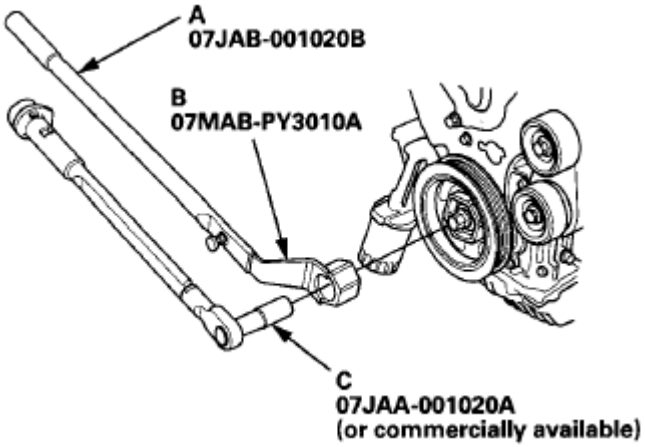


Fig. 25: Identifying Holder Handle, Holder Attachment And Offset Of Pulley
Courtesy of AMERICAN HONDA MOTOR CO., INC.

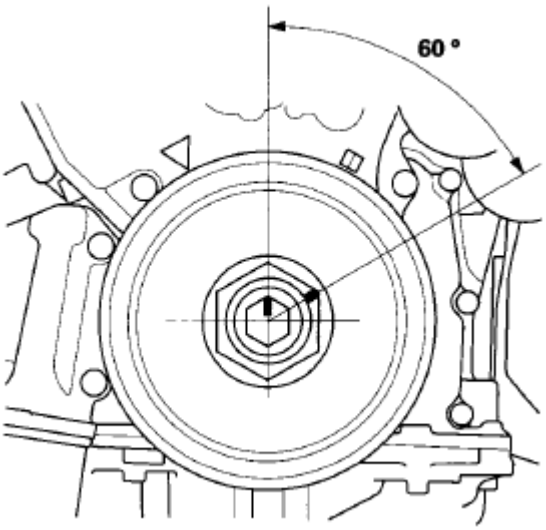


Fig. 26: Identifying Tightening Bolt An Additional 60°
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.

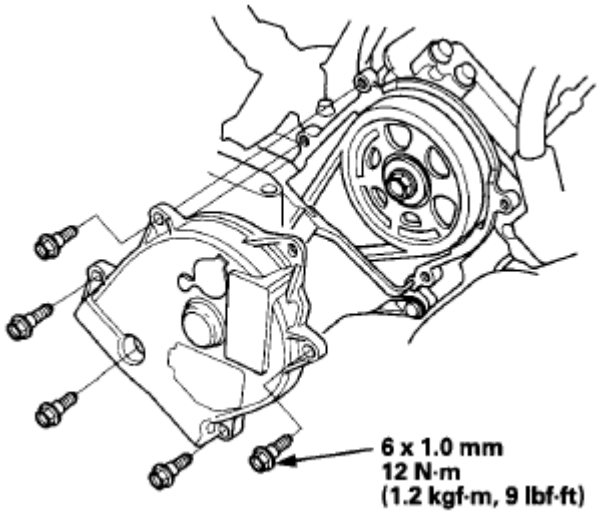


Fig. 27: Identifying Front Upper Cover And Bolts With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.

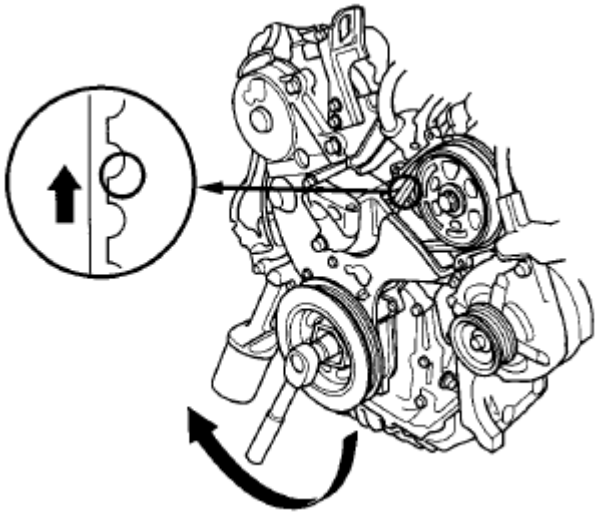


Fig. 28: Inspecting Timing Belt For Cracks And Oil Or Coolant Contamination
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.

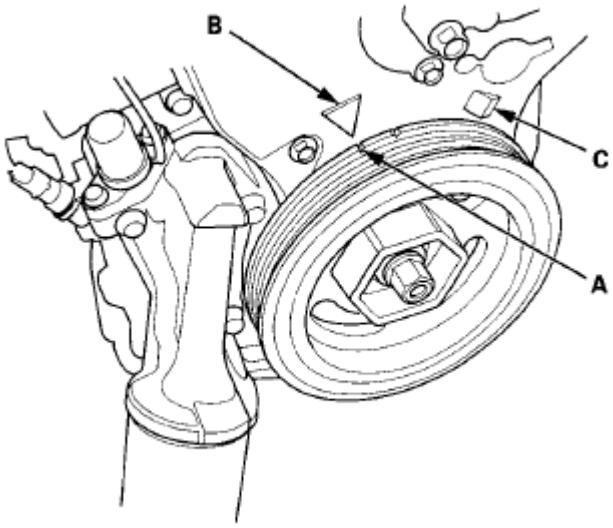


Fig. 29: Identifying White Mark And Pointers On Crankshaft Pulley
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.

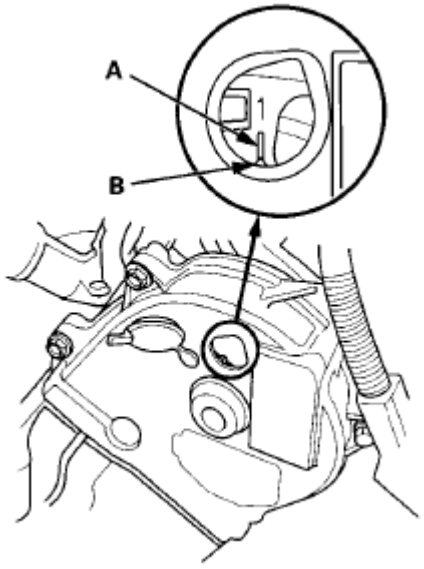


Fig. 30: Identifying TDC Mark And Pointer On Camshaft
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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).

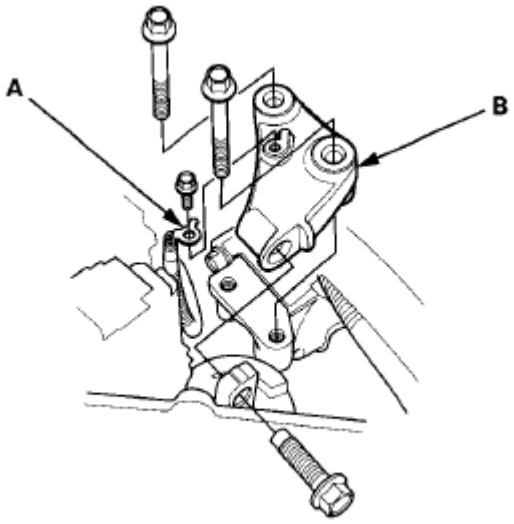


Fig. 31: Identifying Ground Cable And Engine Mount Bracket
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Remove the crankshaft pulley (see **CRANKSHAFT PULLEY REMOVAL AND INSTALLATION**).
10. Remove the front upper cover (A) and the rear upper cover (B).

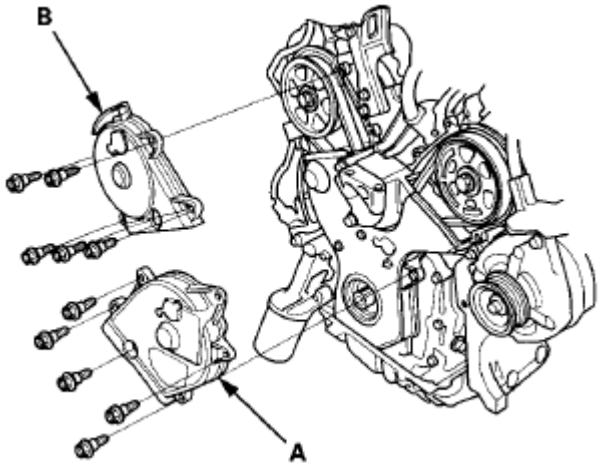


Fig. 32: Identifying Front And Rear Upper Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Remove the lower cover.

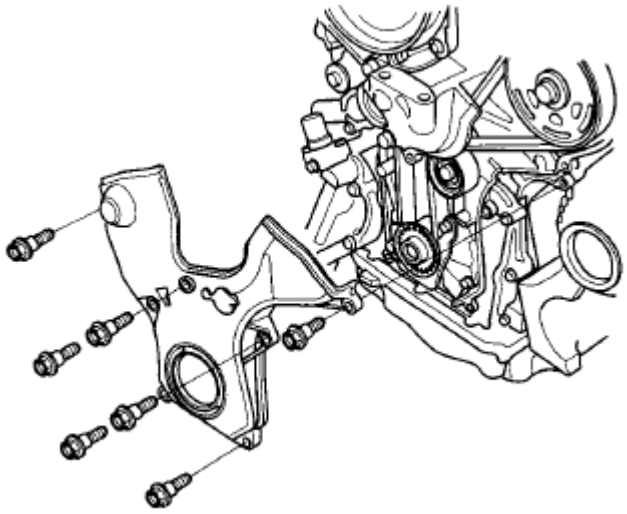


Fig. 33: Identifying Lower Cover And Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

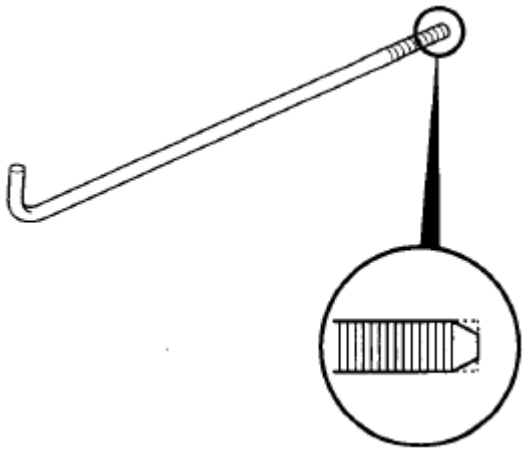


Fig. 34: Identifying Grind End Of Battery Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.

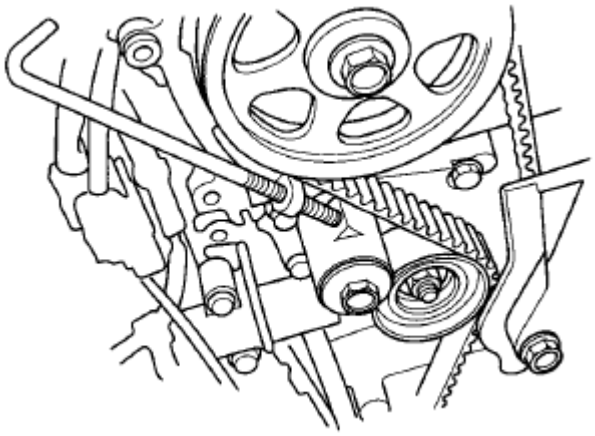


Fig. 35: Holding Timing Belt Adjuster In Current Position
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

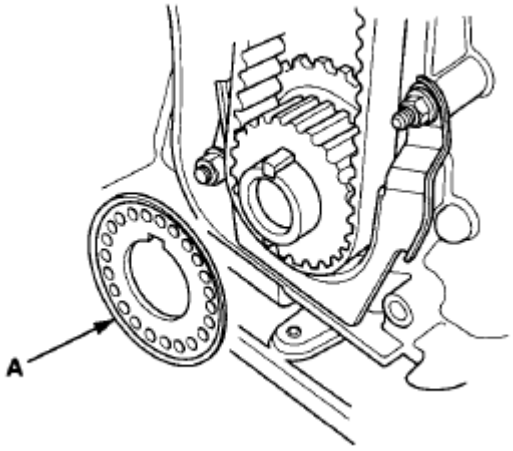


Fig. 36: Identifying Timing Belt Guide Plate
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

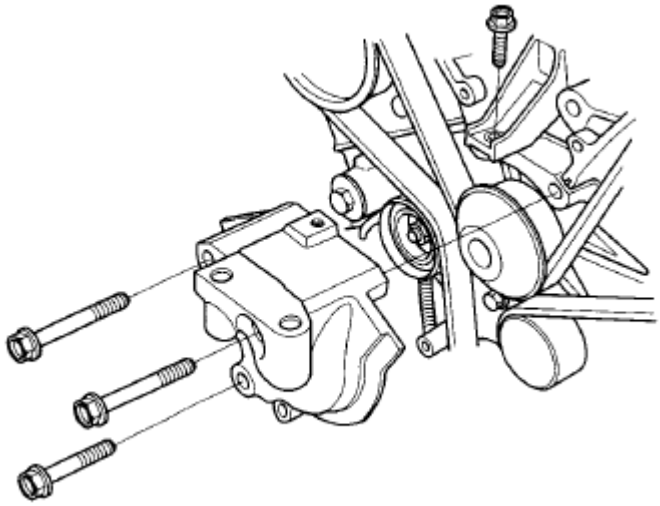


Fig. 37: Identifying Engine Mount Bracket
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

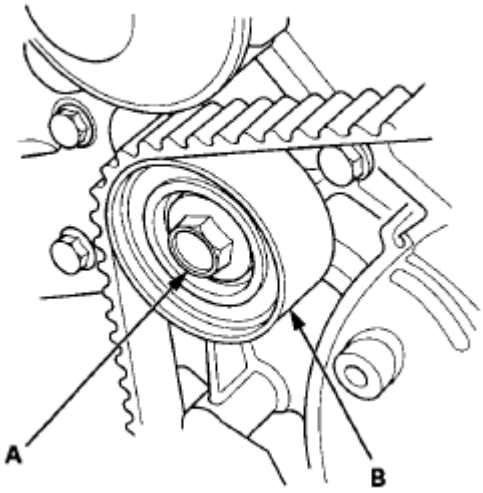


Fig. 38: Identifying Idler Pulley And Idler Pulley Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.

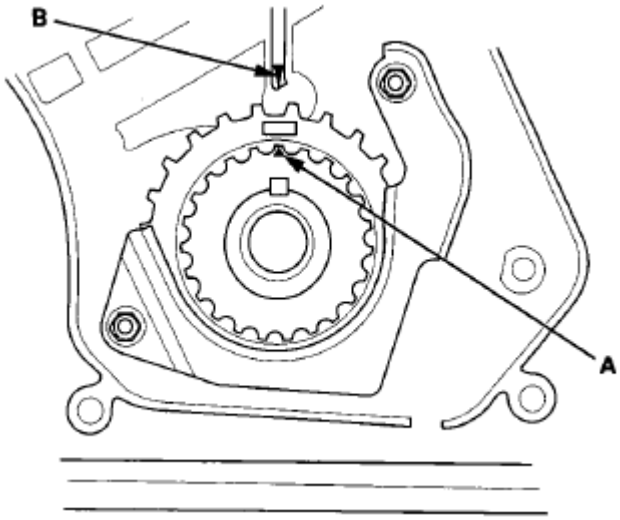


Fig. 39: Identifying TDC Mark And Pointer On Oil Pump
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

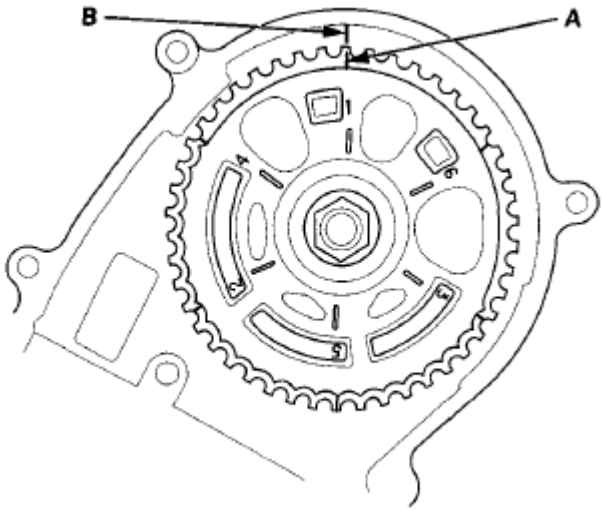


Fig. 40: Identifying TDC Marks And Pointers On Camshaft Pulley - Front
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

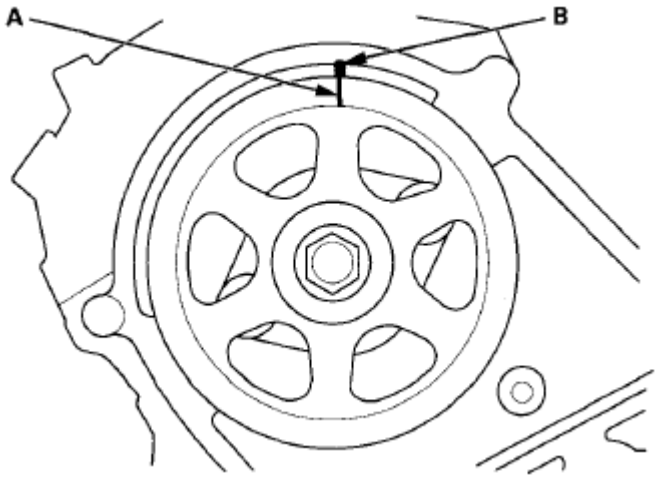


Fig. 41: Identifying TDC Marks And Pointers On Camshaft Pulley - Rear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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 (see **TIMING BELT REPLACEMENT**).
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)

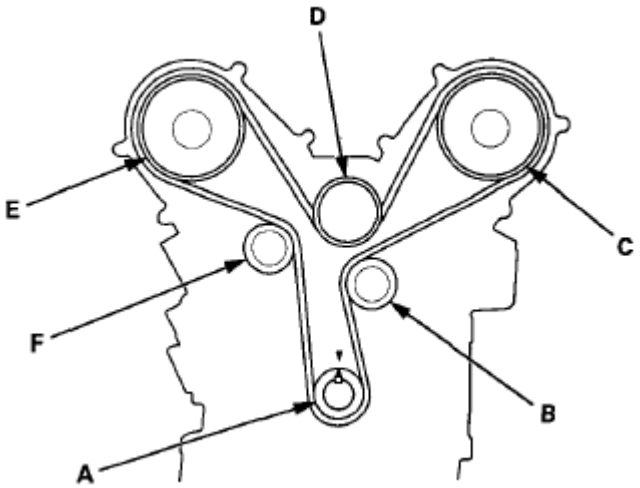


Fig. 42: Identifying Timing Belt And Related Components
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Tighten the idler pulley bolt.

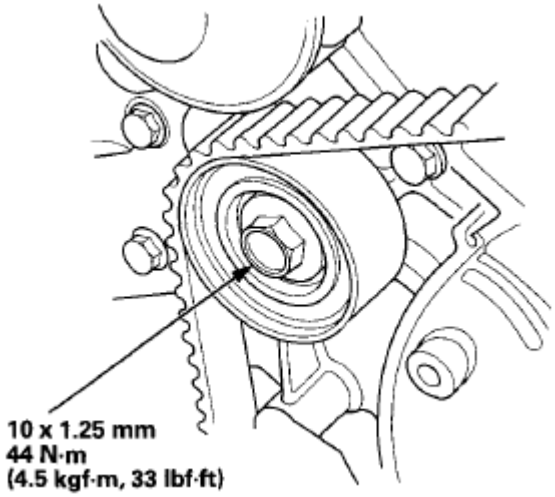


Fig. 43: Identifying Idler Pulley Bolt With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

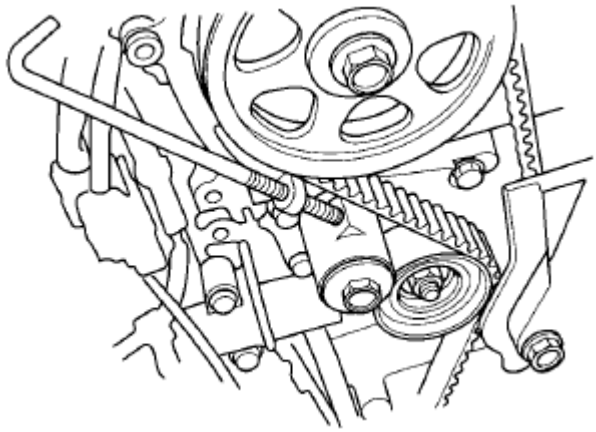


Fig. 44: Identifying Battery Clamp Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

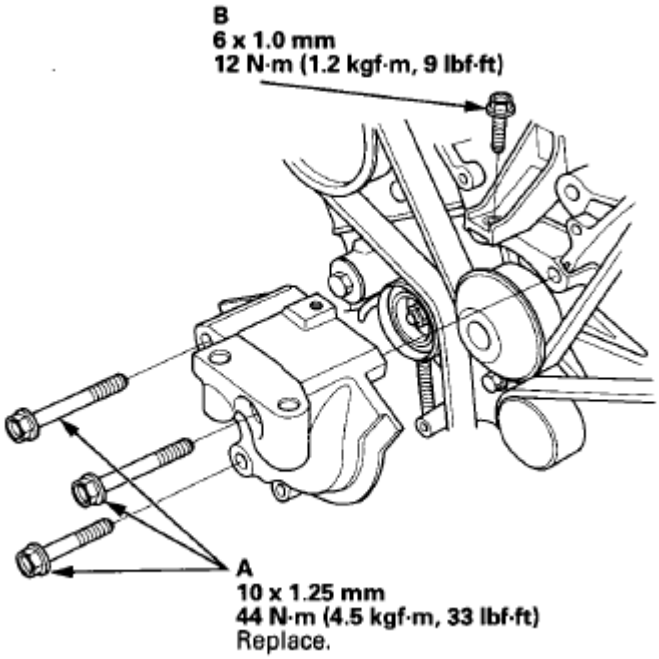


Fig. 45: Identifying Engine Mount Bracket Bolts With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

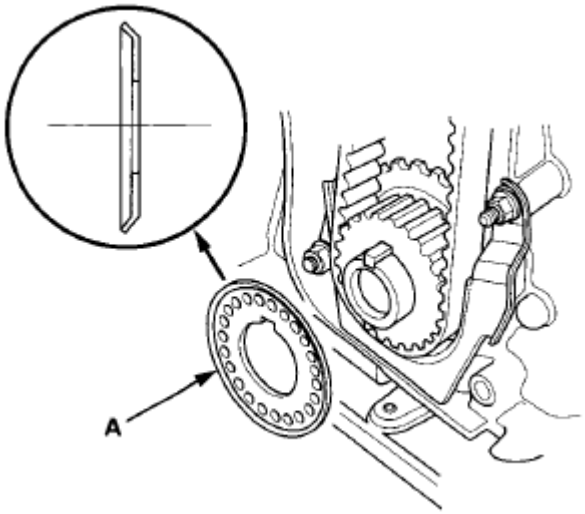


Fig. 46: Identifying Timing Belt Guide Plate
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Install the lower cover.

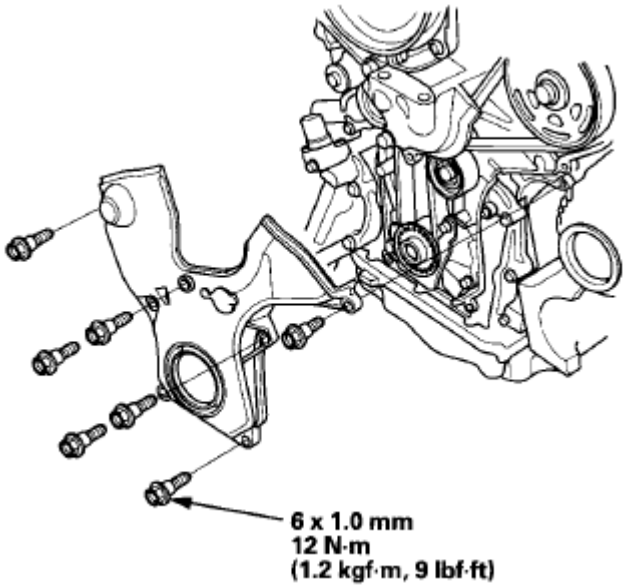


Fig. 47: Identifying Lower Cover And Bolts With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

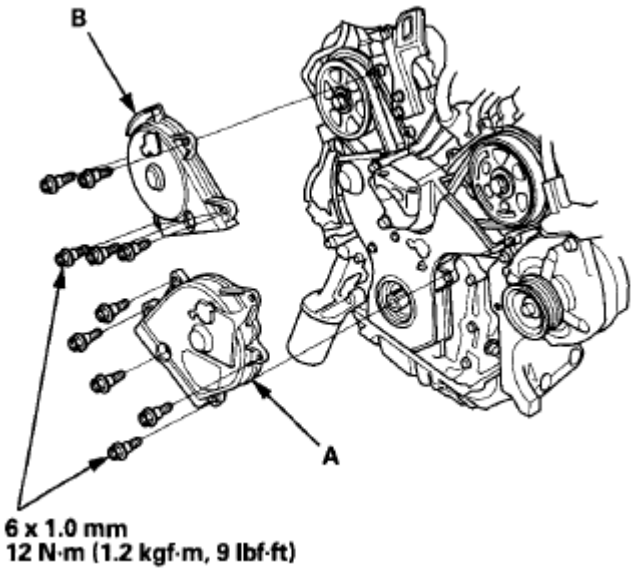


Fig. 48: Identifying Front And Rear Upper Cover With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Install the crankshaft pulley (see **CRANKSHAFT PULLEY REMOVAL AND INSTALLATION**).
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.

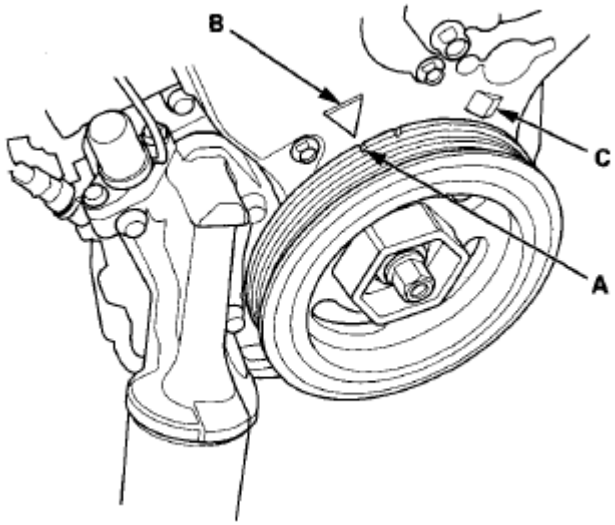


Fig. 49: Identifying White Marks And Pointers On Crankshaft Pulley
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

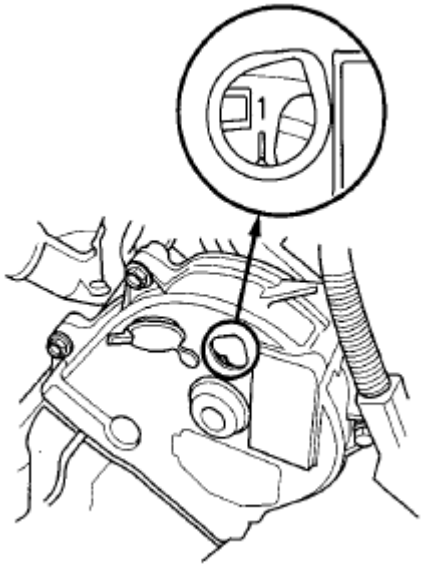


Fig. 50: Identifying Camshaft Pulley Marks - Front

Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

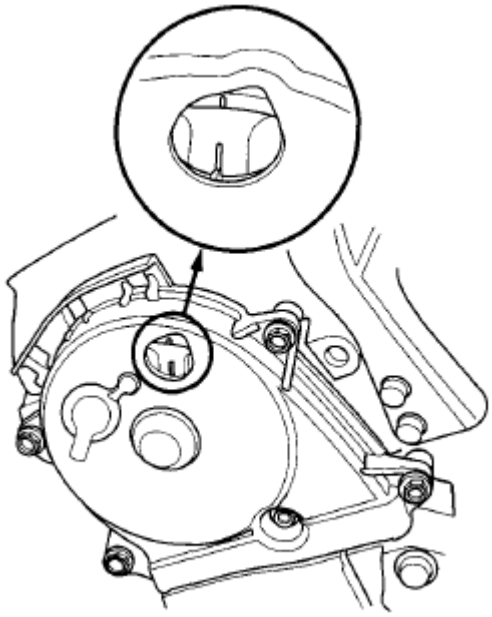


Fig. 51: Identifying Camshaft Pulley Marks - Rear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

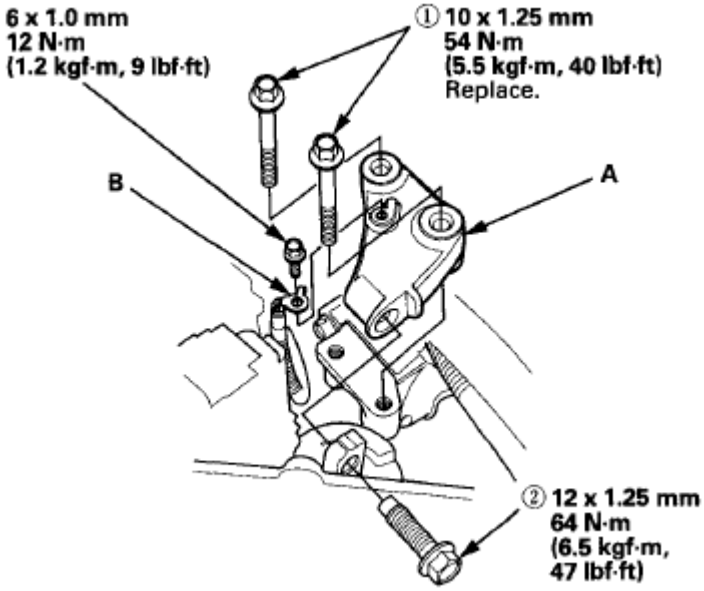


Fig. 52: Identifying Engine Mount Bracket, Bolts And Cable With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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 (see **TIMING BELT REMOVAL**).
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.

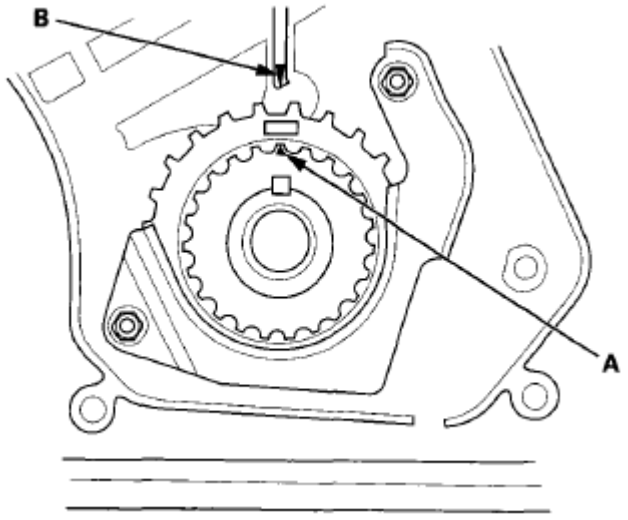


Fig. 53: Identifying TDC Mark And Pointer On Oil Pump
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

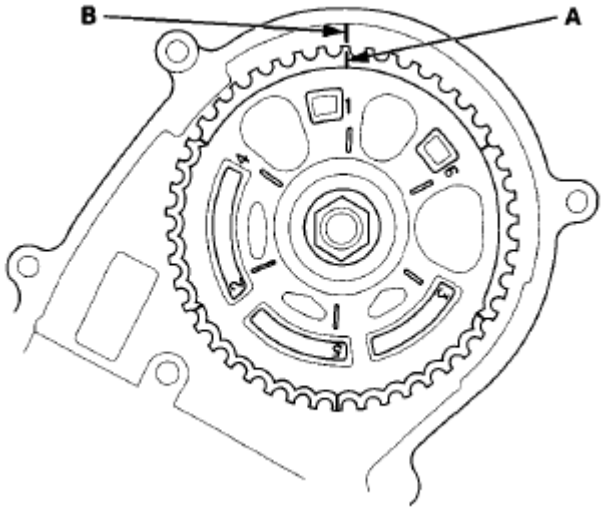


Fig. 54: Identifying TDC Marks On Crankshaft Pulley And Pointers On Back Cover - Front
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

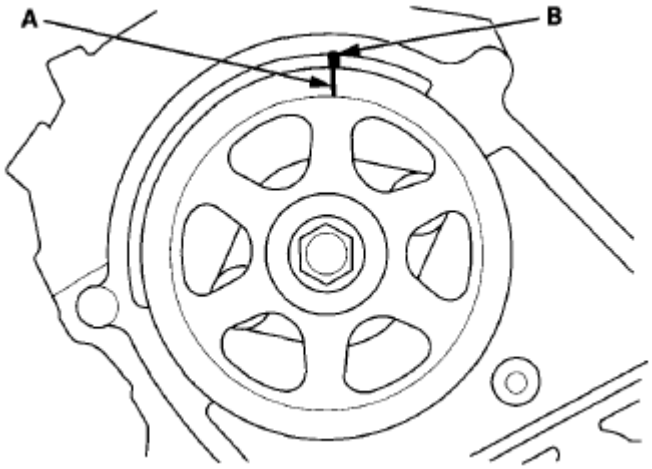


Fig. 55: Identifying TDC Marks On Crankshaft Pulley And Pointers On Back Cover - Rear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

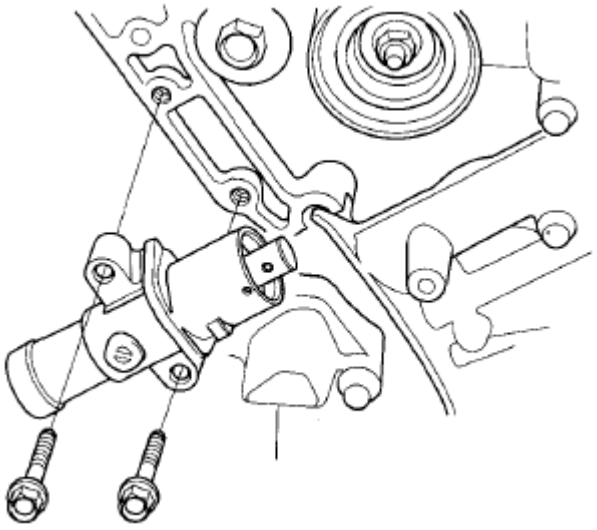


Fig. 56: Identifying Auto-Tensioner
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

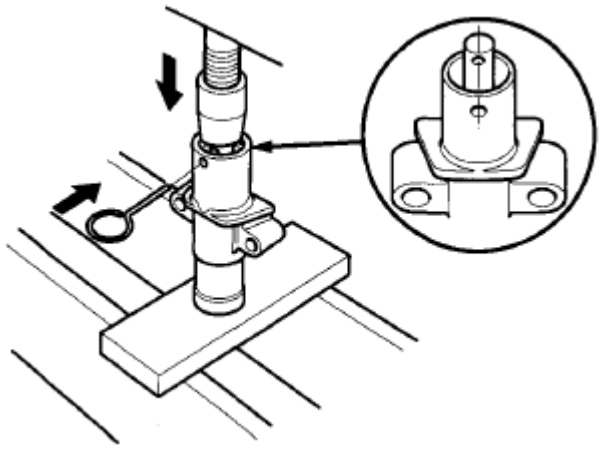


Fig. 57: Aligning Holes On Rod And Housing Of Auto-Tensioner
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.

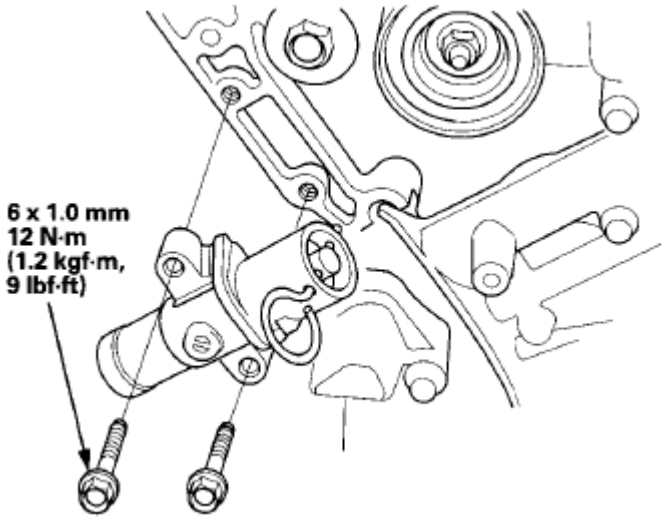


Fig. 58: Identifying Bolts Of Auto-Tensioner With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

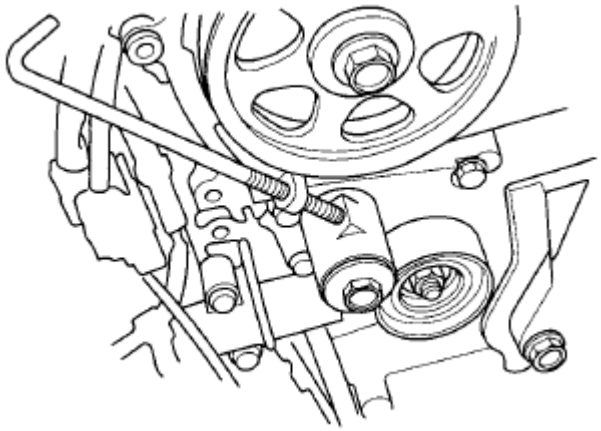


Fig. 59: Identifying Battery Clamp Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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)

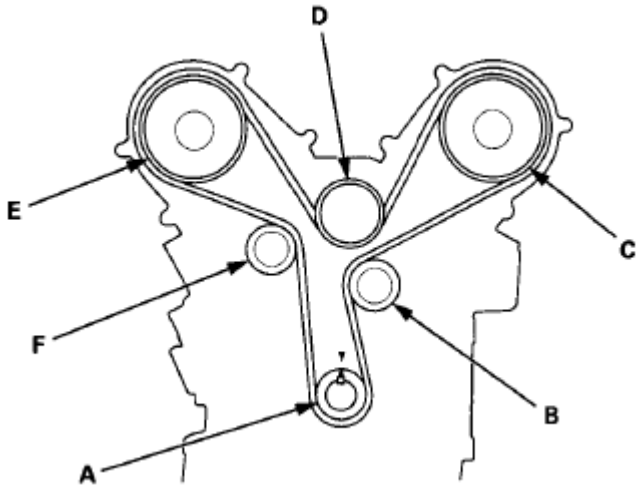


Fig. 60: Identifying Timing Belt And Related Parts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Tighten the idler pulley bolt.

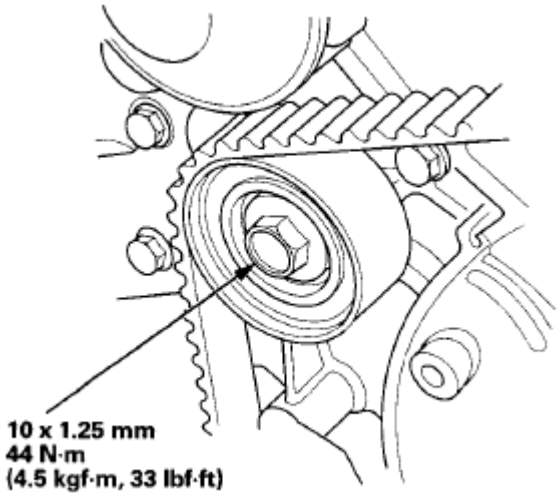


Fig. 61: Identifying Idler Pulley Bolt With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. Remove the pin from the auto-tensioner.

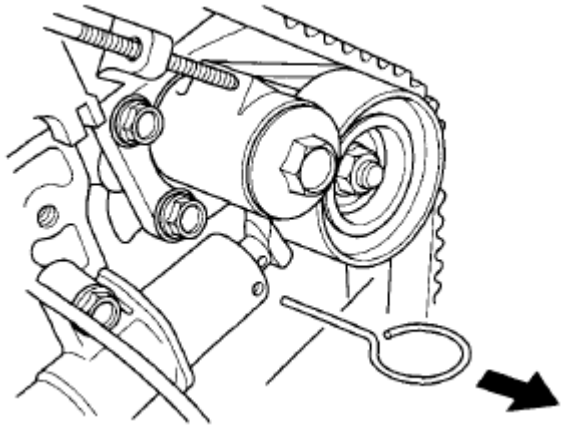


Fig. 62: Removing Pin From Auto-Tensioner
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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).

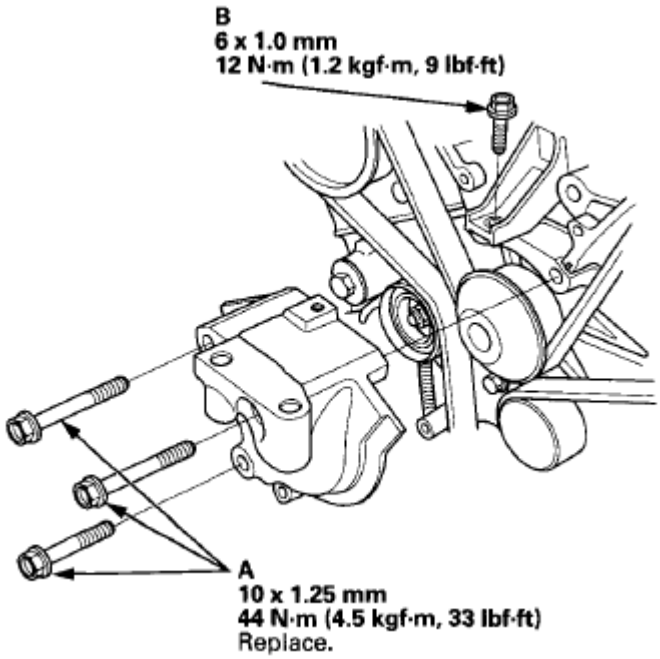


Fig. 63: Identifying Engine Mount Bracket Bolts With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

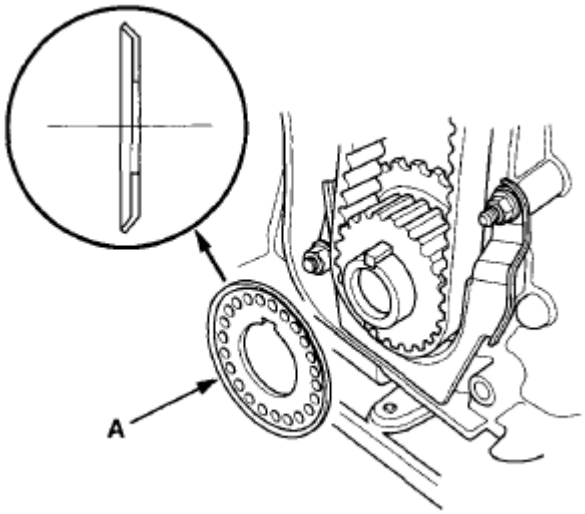


Fig. 64: Identifying Timing Belt Guide Plate
Courtesy of AMERICAN HONDA MOTOR CO., INC.

18. Install the lower cover.

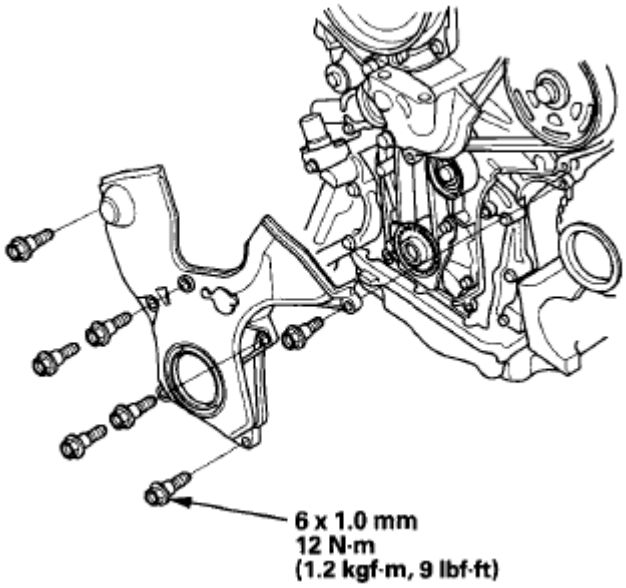


Fig. 65: Identifying Lower Cover And Bolts With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

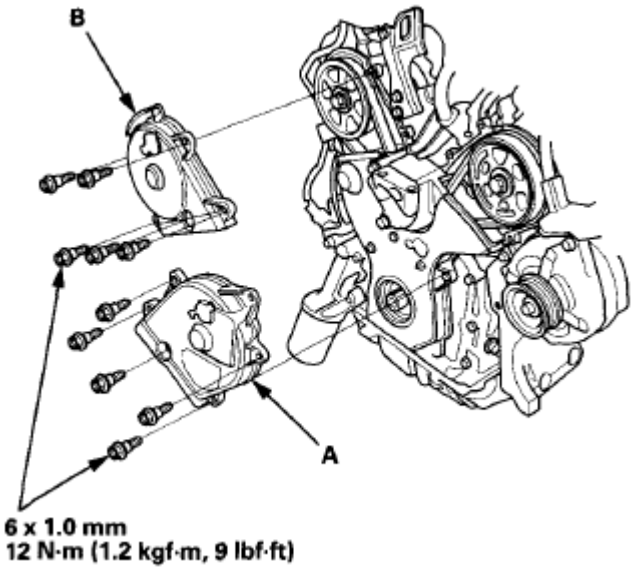


Fig. 66: Identifying Front And Rear Upper Cover With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

20. Install the crankshaft pulley (see **CRANKSHAFT PULLEY REMOVAL AND INSTALLATION**).
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.

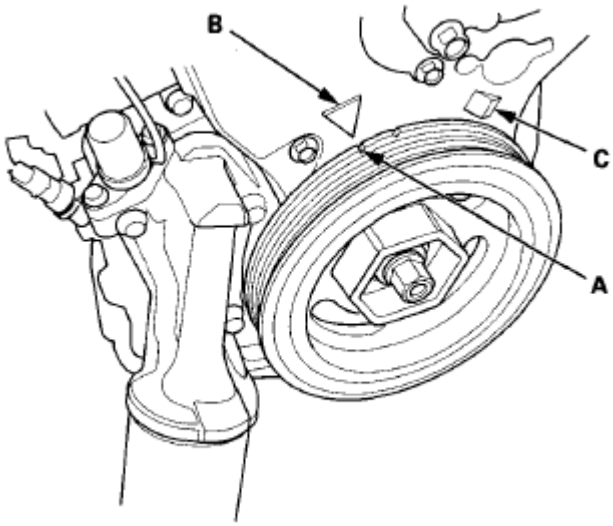


Fig. 67: Identifying White Mark And Pointer On Crankshaft Pulley
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

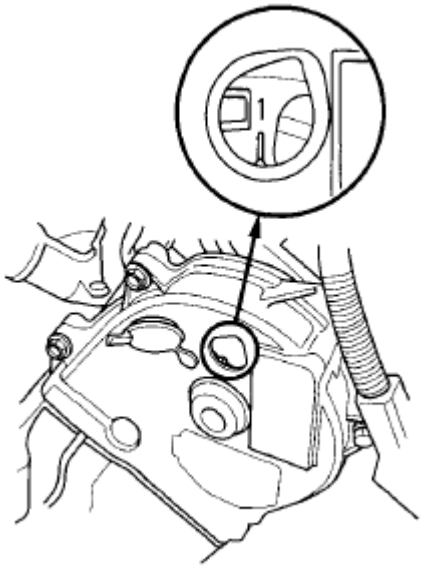


Fig. 68: Identifying Camshaft Pulley Marks - Front
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

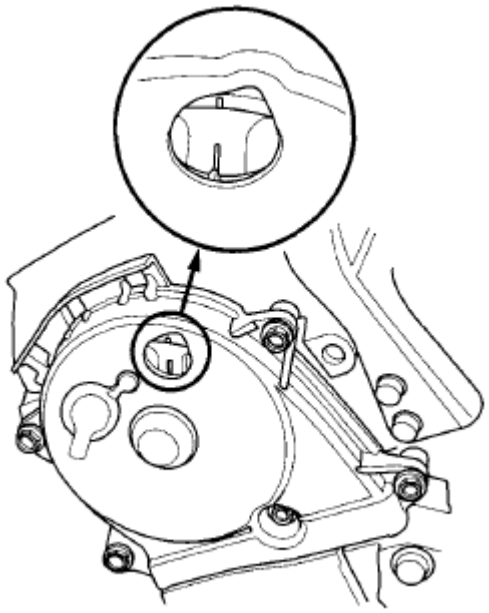


Fig. 69: Identifying Camshaft Pulley Marks - Rear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

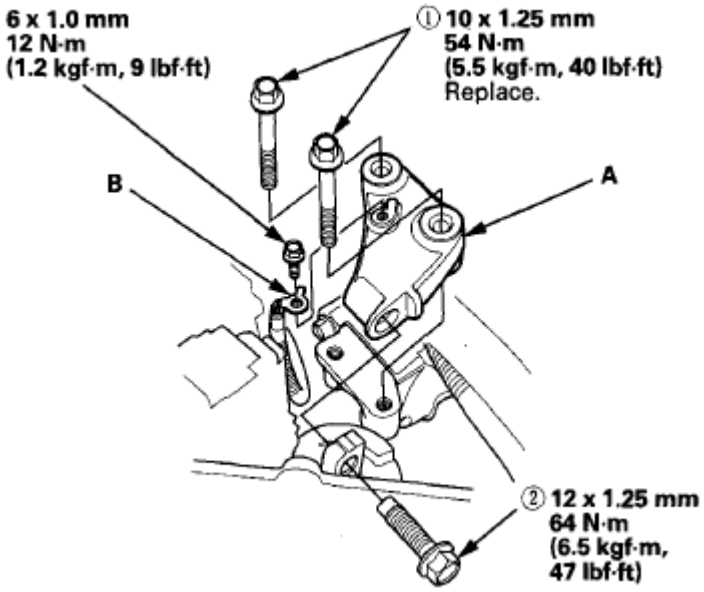


Fig. 70: Identifying Engine Mount Bracket And Ground Cable With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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 (see **TIMING BELT REMOVAL**).
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).

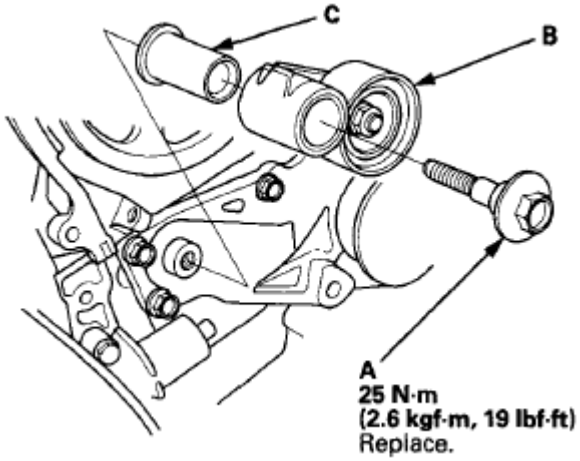


Fig. 71: Identifying Timing Belt Adjuster, Collar And Bolt With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Install the timing belt adjuster using new bolt in the reverse order of removal.
6. Install the timing belt (see **TIMING BELT INSTALLATION**).

TIMING BELT DRIVE PULLEY REPLACEMENT

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

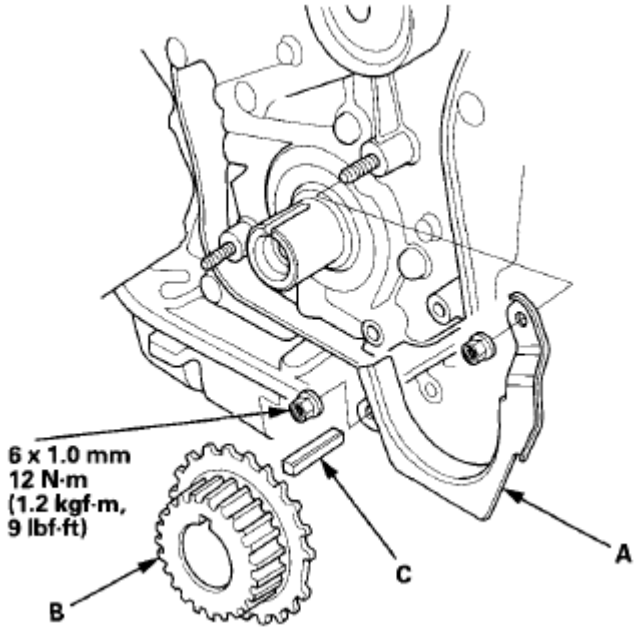


Fig. 72: Identifying Timing Belt Stopper, Driver Pulley And Key With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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 (see **TIMING BELT INSTALLATION**).
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).

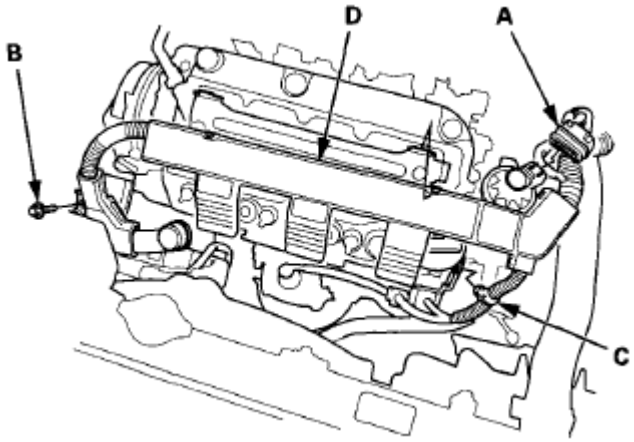


Fig. 73: Identifying EGR Valve Connector, Mounting Bolt And Harness Clamp
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

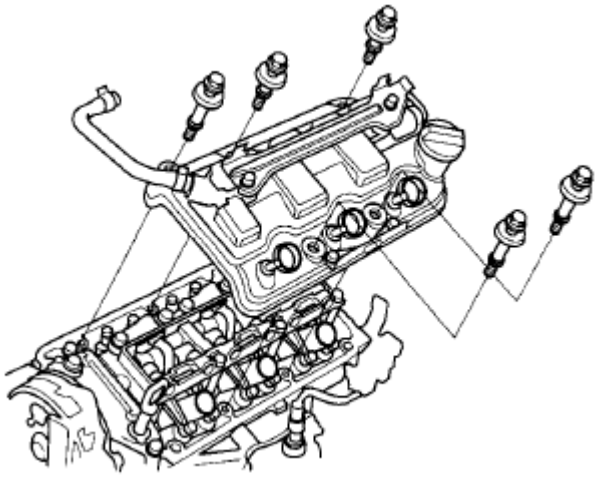


Fig. 74: Removing Front Cylinder Head Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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).

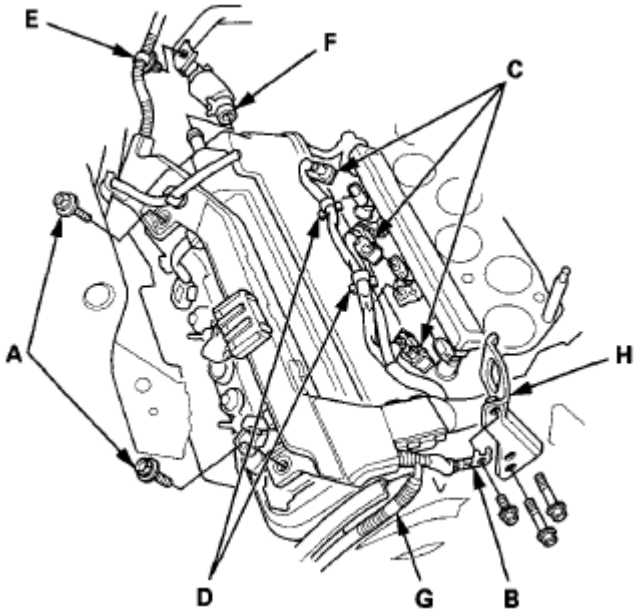


Fig. 75: Identifying Cylinder Head Cover And Related Components
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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).

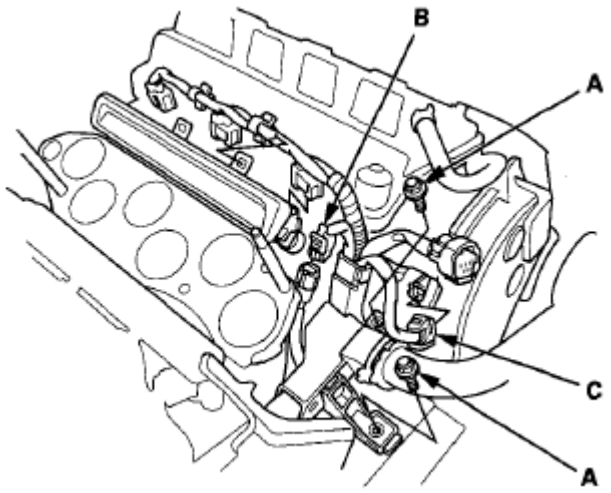


Fig. 76: Identifying Mounting Bolts, Knock Sensor Connector And CMP Sensor Connector
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Remove the rear cylinder head cover.

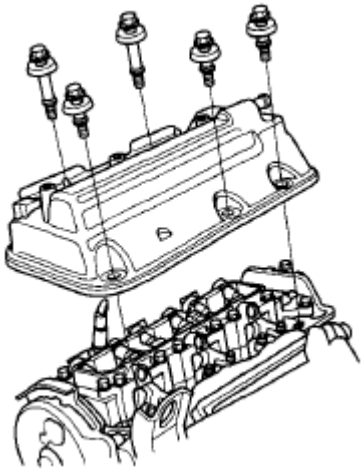


Fig. 77: Identifying Rear Cylinder Head Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.

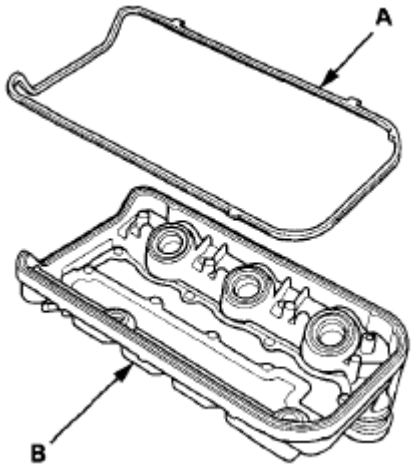


Fig. 78: Identifying Head Cover Gasket And Cylinder Head Cover (Front)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.**

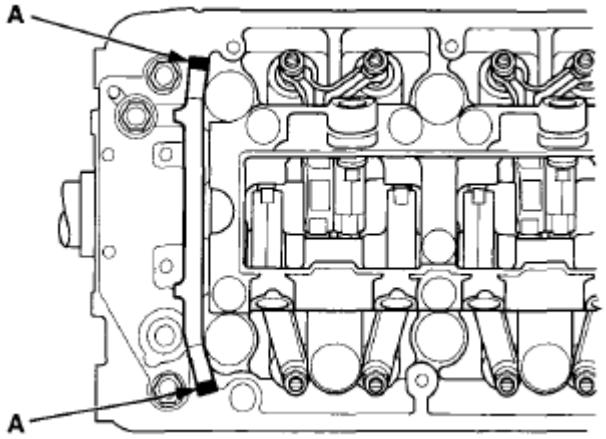


Fig. 79: Locating Shaft Holder Mating Areas
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

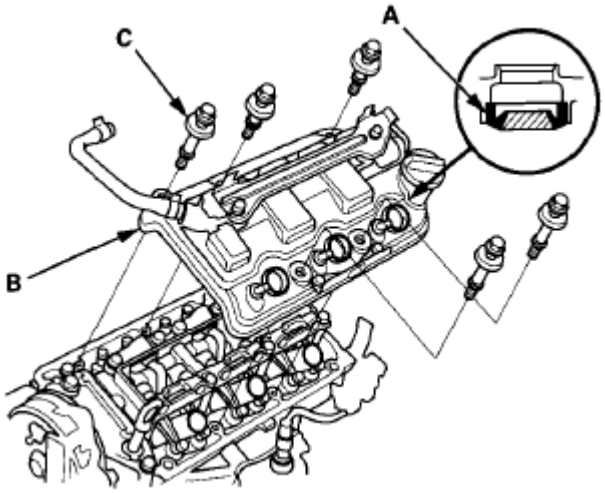


Fig. 80: Identifying Spark Plug Seal, Head Cover And Cover Washers
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.**

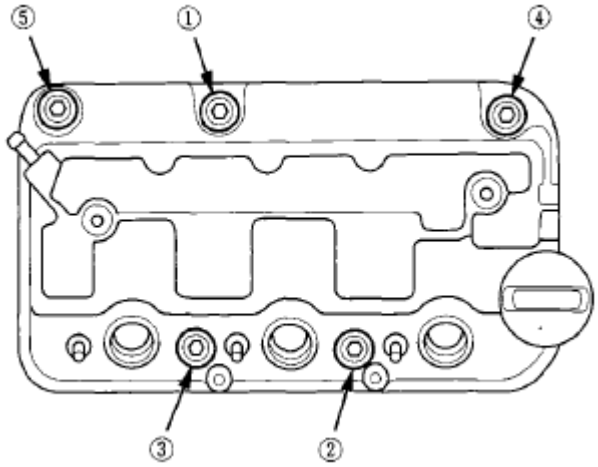


Fig. 81: Identifying Bolts On Cylinder Head Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

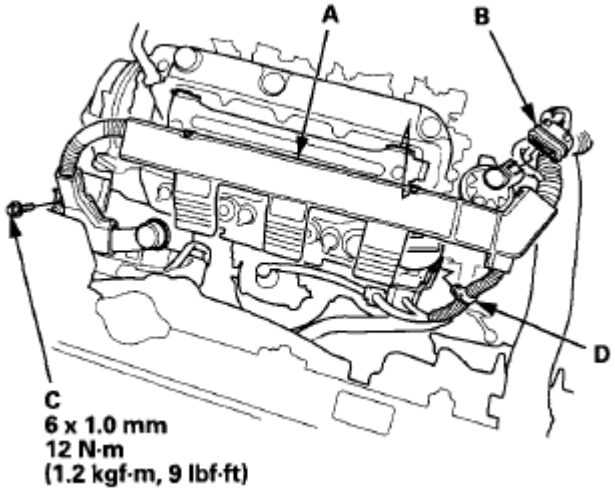


Fig. 82: Identifying Harness Holder, Mounting Bolt, EGR Valve Connector And Clamp With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.

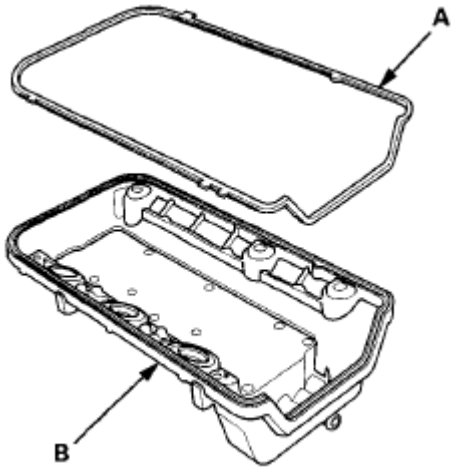


Fig. 83: Identifying Head Cover Gasket And Cylinder Head Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.**

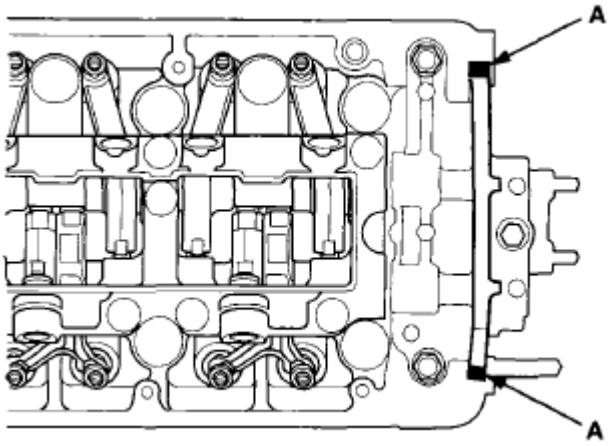


Fig. 84: Locating Shaft Holder Mating Areas
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

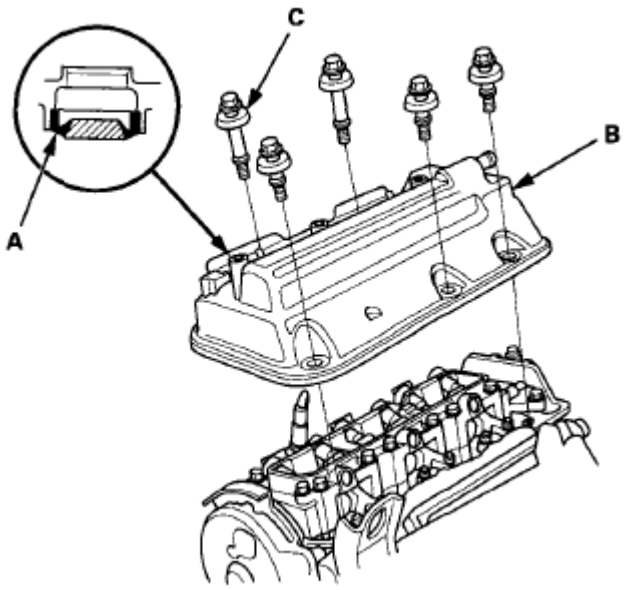


Fig. 85: Identifying Spark Plug Seals, Cylinder Head Cover And Cover Washers
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.**

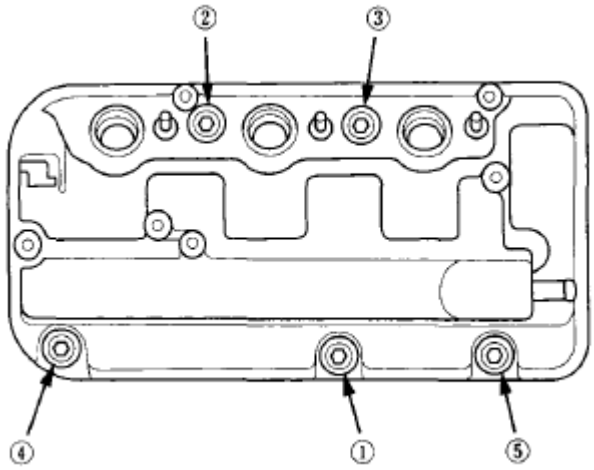


Fig. 86: Identifying Bolts On Cylinder Head Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

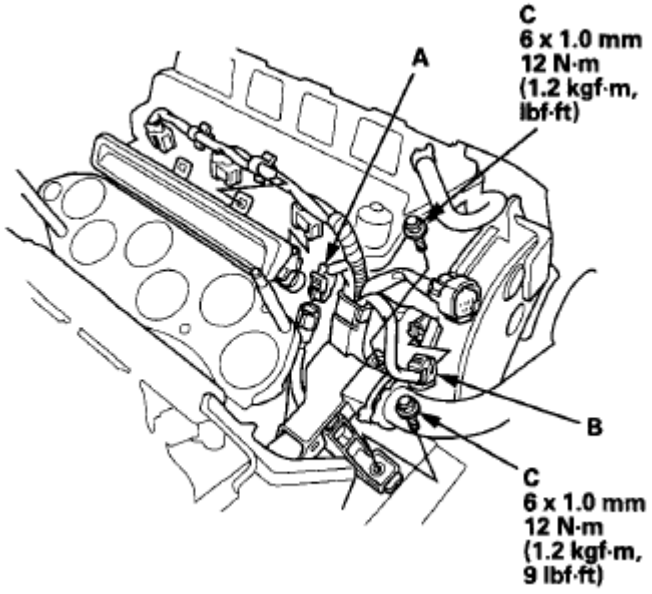


Fig. 87: Identifying Knock Sensor Connector, CMP Sensor Connector And Mounting Bolts With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Install the engine hanger bracket (A). D-

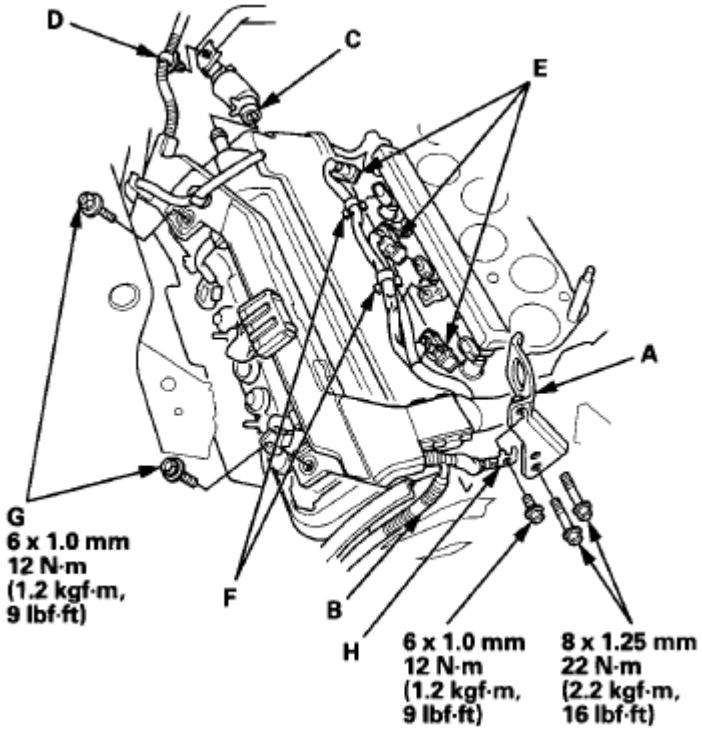


Fig. 88: Identifying Hanger Brackets, Upper Cover, Breather Hose, Connectors, Harness Clamps, Ground Cable & Fasteners With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Install the harness (B) to the upper cover.
14. Connect the breather hose (C) and install the harness clamp (D).
15. Connect the three injector connectors (E) and the two harness clamps (F).
16. Install the harness holder mounting bolts (G) and the 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 **INTAKE MANIFOLD REMOVAL AND INSTALLATION**).
8. 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
9. Remove the front warm up TWC (see **WARM UP TWC REMOVAL/INSTALLATION**) and the rear warm up TWC (see **REAR (BANK 1)**).
10. Remove the quick-connect fitting cover (A), then disconnect the fuel feed hose (B) (see **FUEL LINE/QUICK-CONNECT FITTING REMOVAL**).

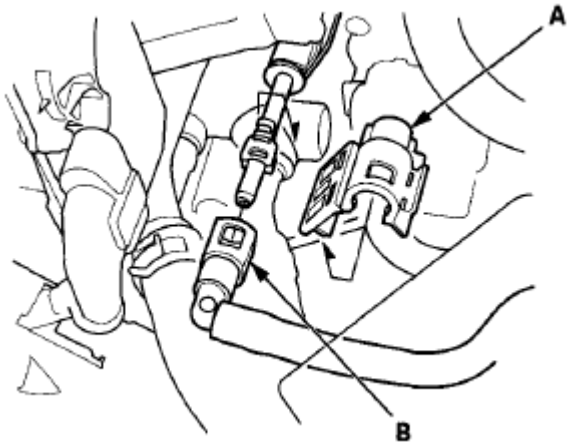


Fig. 89: Identifying Quick Connect Fitting Cover And Fuel Feed Hose
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

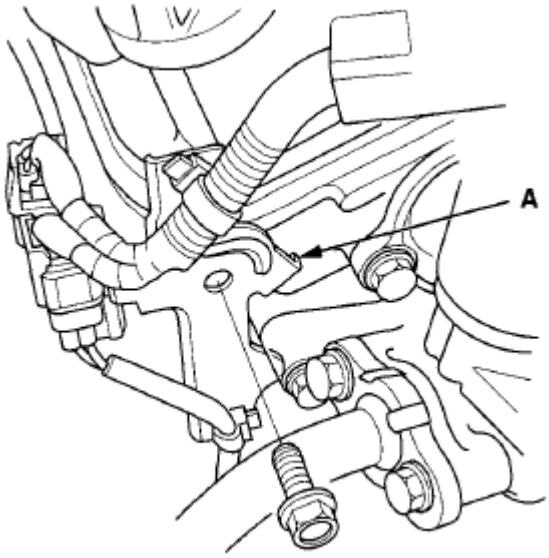


Fig. 90: Identifying Connector Bracket
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

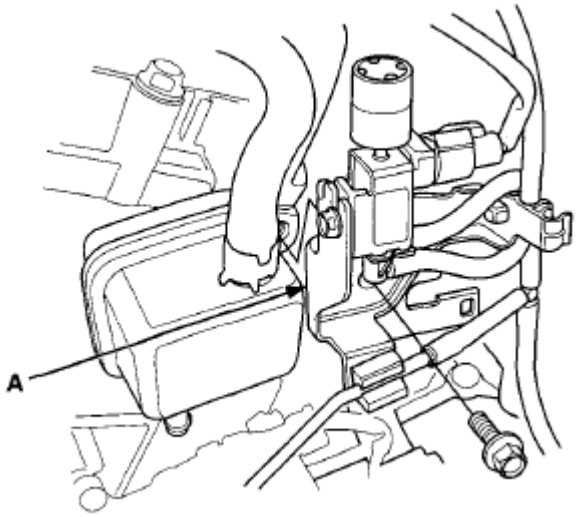


Fig. 91: Identifying Engine Mount Control Solenoid Valve Bracket
Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Remove the EVAP canister joint with the bracket (see step 9).
14. Remove the injector bases (see **INJECTOR BASE REMOVAL AND INSTALLATION**).

15. Remove the water passage (see **WATER PASSAGE REPLACEMENT**).
16. Remove the timing belt (see **TIMING BELT REMOVAL**).
17. Remove the camshaft pulleys (A) and the back covers (B).

FRONT

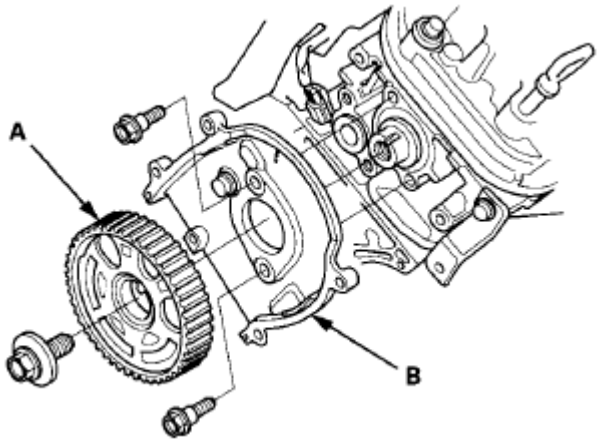


Fig. 92: Identifying Camshaft Pulleys And Back Covers (Front)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

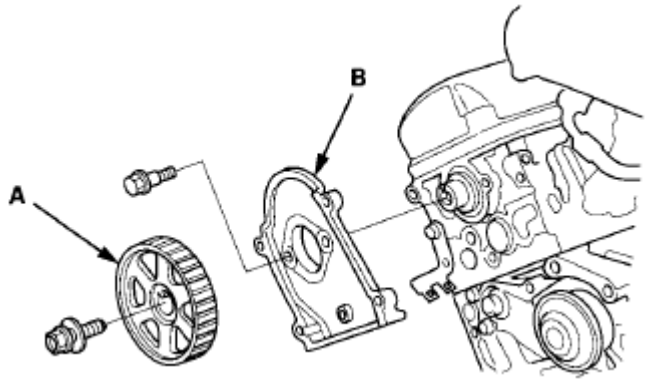


Fig. 93: Identifying Camshaft Pulleys And Back Covers (Rear)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

18. Remove the cylinder head covers (see **TIMING BELT DRIVE PULLEY REPLACEMENT**).
19. 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

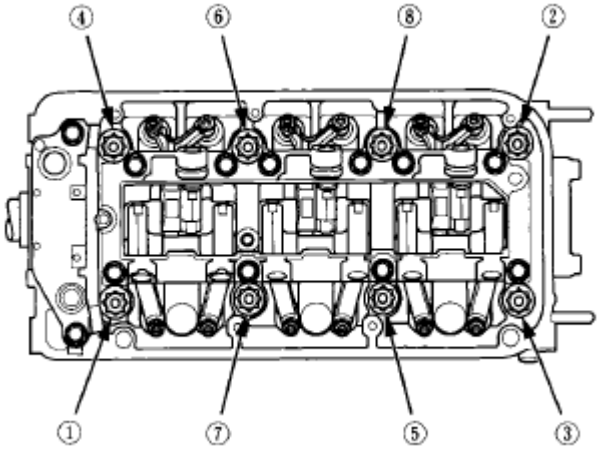


Fig. 94: Identifying Cylinder Head Bolts (Front)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

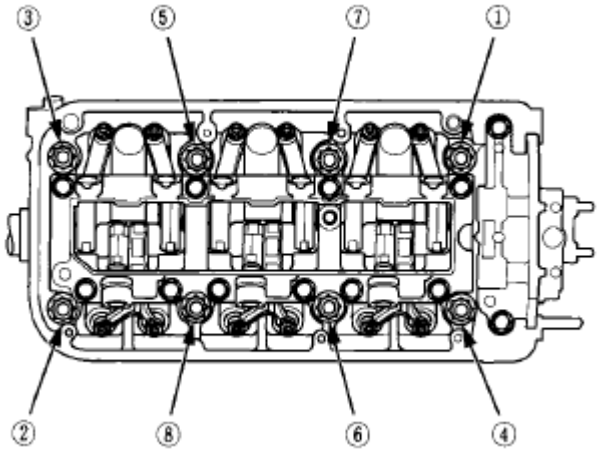


Fig. 95: Identifying Cylinder Head Bolts (Rear)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

20. 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).

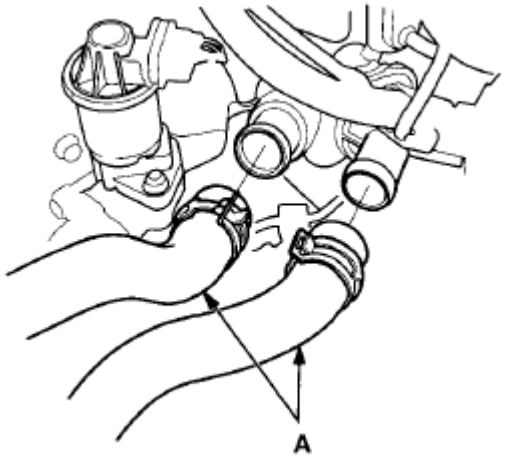


Fig. 96: Identifying Radiator Hoses
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Remove the EGR valve (see **EGR VALVE REPLACEMENT**).
6. Remove the EGR valve stud bolts (A).

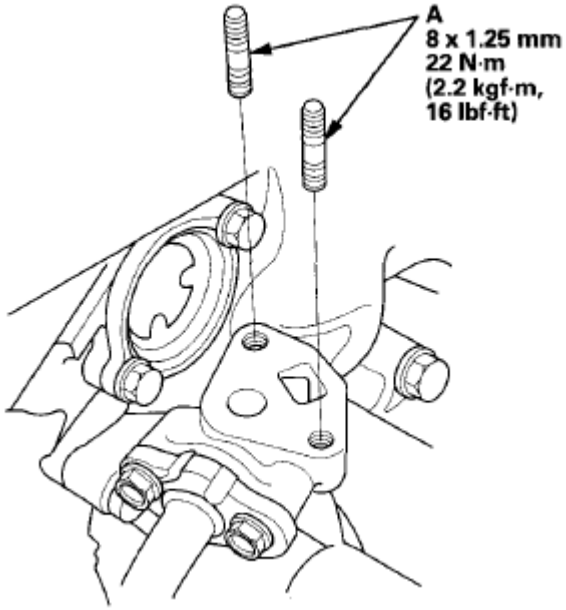


Fig. 97: Identifying EGR Valve Stud Bolts With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Remove the timing belt (see **TIMING BELT REMOVAL**).
8. Remove the front rocker arm assembly (see **ROCKER ARM ASSEMBLY REMOVAL**).
9. Remove the front camshaft pulley (see step 17).
10. Remove the thrust cover (A), then remove the front camshaft (B).

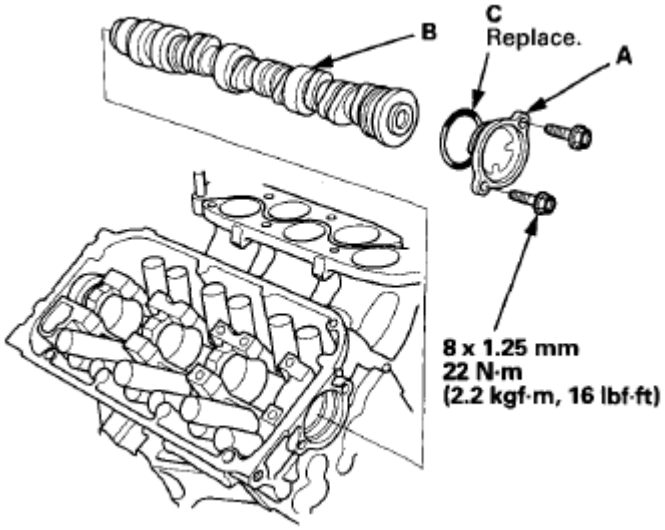


Fig. 98: Identifying Thrust Cover, Front Camshaft And O-Ring With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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 (see **TIMING BELT INSTALLATION**).
15. Adjust the valve clearance (see **VALVE CLEARANCE ADJUSTMENT**).
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 10).
8. Disconnect the heater hoses (A).

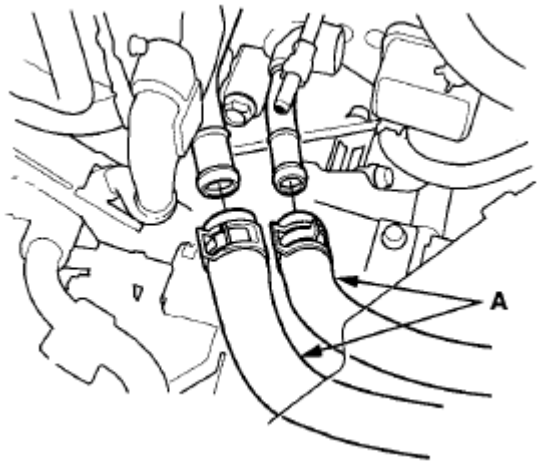


Fig. 99: Identifying Heater Hoses
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

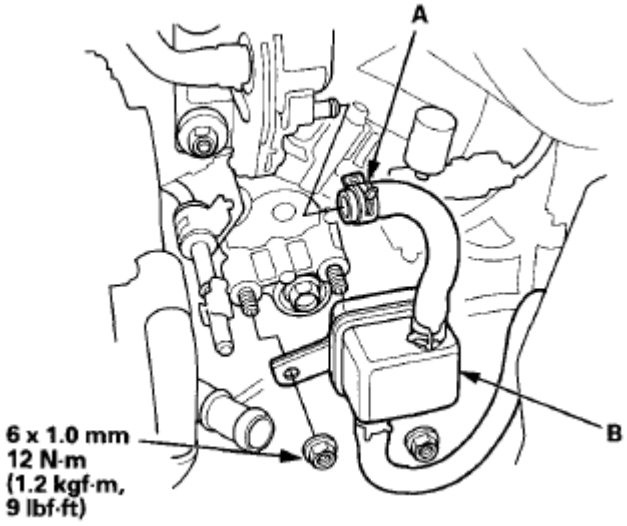


Fig. 100: Identifying EVAP Canister Hose And Joint With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Remove the timing belt (see **TIMING BELT REMOVAL**).
11. Remove the rear rocker arm assembly (see **ROCKER ARM ASSEMBLY REMOVAL**).
12. Remove the rear camshaft pulley.
13. Remove the thrust cover (A), then remove the rear camshaft (B).

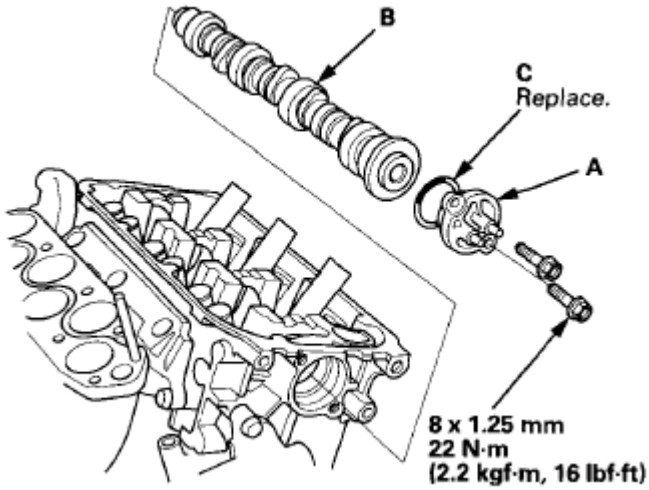


Fig. 101: Identifying Thrust Cover, Rear Camshaft And O-Ring With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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 (see **TIMING BELT INSTALLATION**).
18. Adjust the valve clearance (see **VALVE CLEARANCE ADJUSTMENT**).
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 (see **CYLINDER HEAD REMOVAL**).
2. Inspect the camshaft (see **CAMSHAFT INSPECTION**).

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)

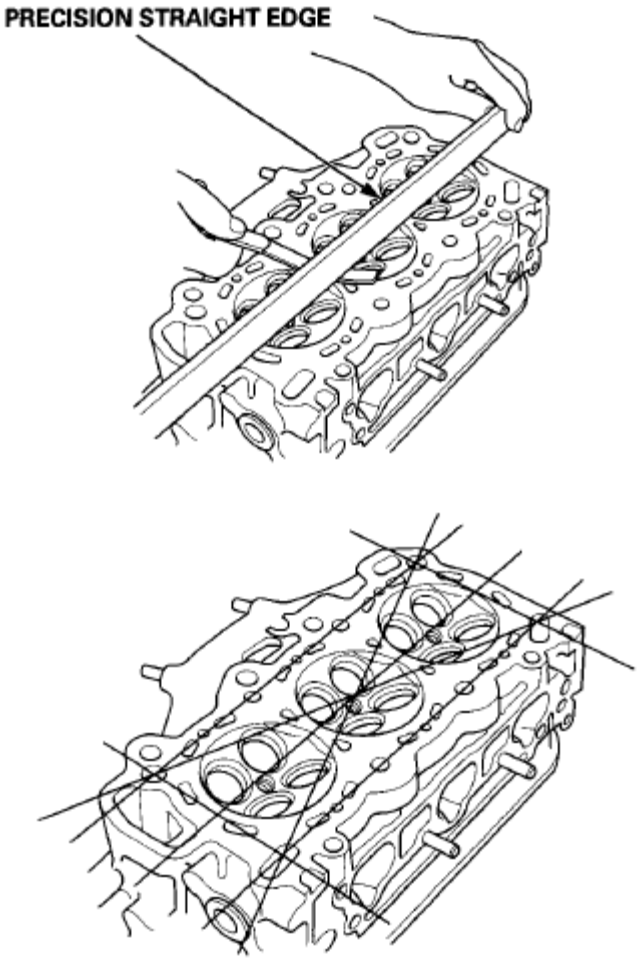


Fig. 102: Inspecting Cylinder Head Warpage
Courtesy of AMERICAN HONDA MOTOR CO., INC.

ROCKER ARM ASSEMBLY REMOVAL

Front

1. Remove the cylinder head cover (see **TIMING BELT DRIVE PULLEY REPLACEMENT**).
2. Loosen the locknuts and the adjusting screws (A).

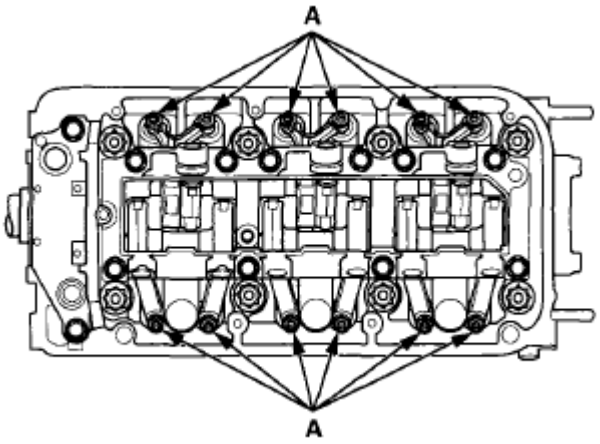


Fig. 103: Identifying Locknuts And Adjusting Screws (Front)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.

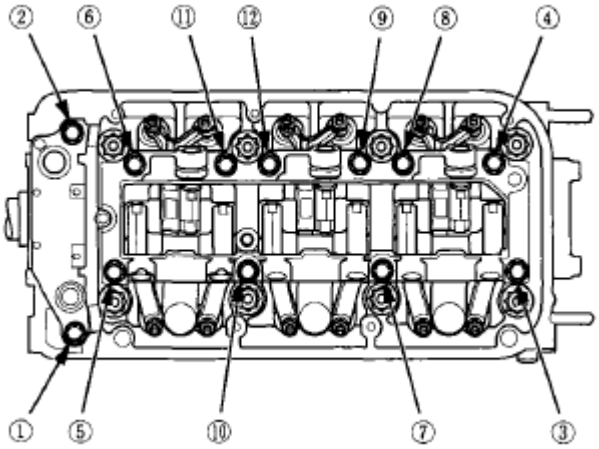


Fig. 104: Identifying Bolts On Rocker Arm Assembly (Front) With Loosening Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Rear

4. Remove the cylinder head cover (see **TIMING BELT DRIVE PULLEY REPLACEMENT**).
5. Loosen the locknuts and the adjusting screws (A).

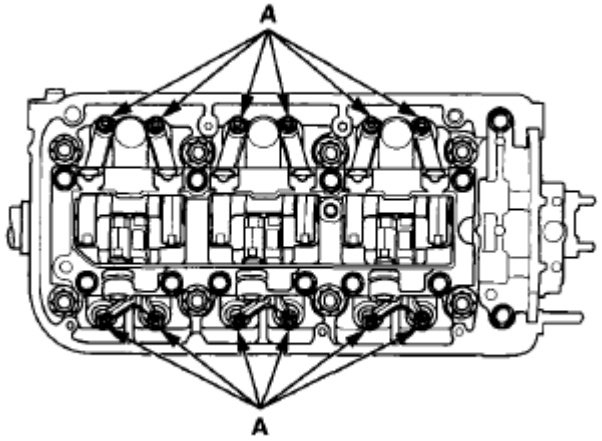


Fig. 105: Identifying Locknuts And Adjusting Screws (Rear)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.

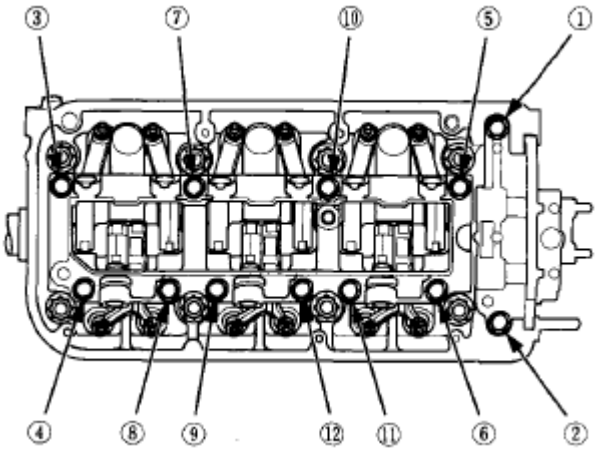


Fig. 106: Identifying Bolts On Rocker Arm Assembly (Rear) With Loosening Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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 (see ROCKER ARM AND SHAFT INSPECTION).**
- **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.**

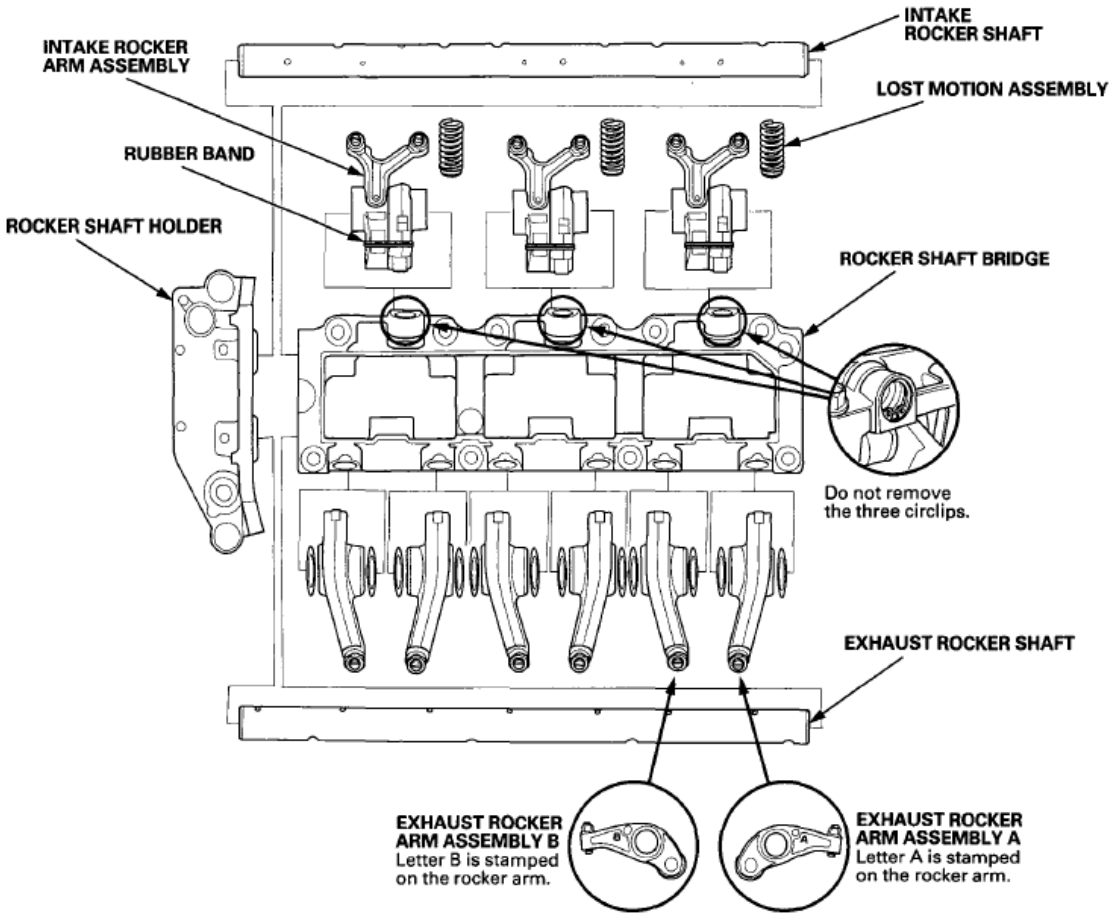


Fig. 107: Identifying Rocker Arm And Shaft And Related Components (Front)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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 (see ROCKER ARM AND SHAFT INSPECTION).**
- **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.**

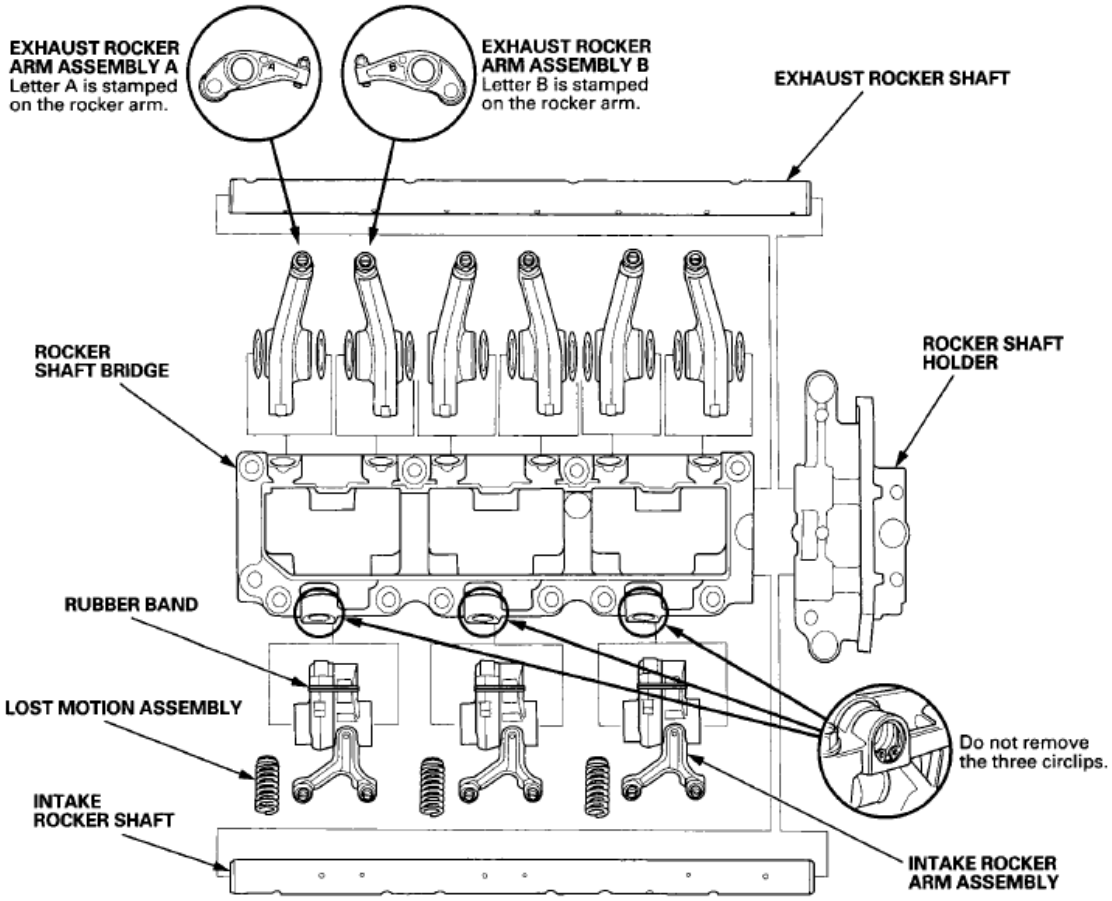


Fig. 108: Identifying Rocker Arm And Shaft And Related Components (Rear)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

ROCKER ARM AND SHAFT INSPECTION

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

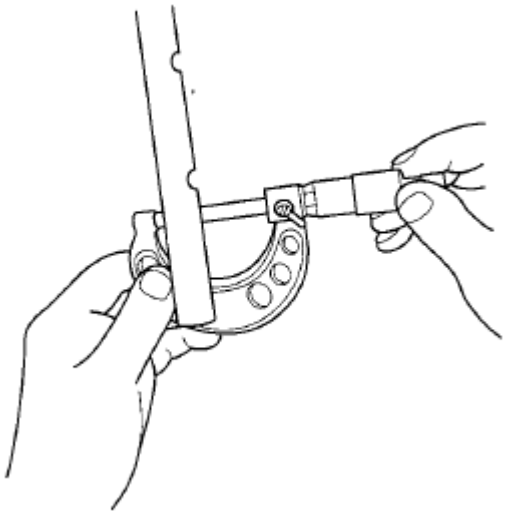


Fig. 109: Measuring Diameter Of Shaft At First Rocker Location
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

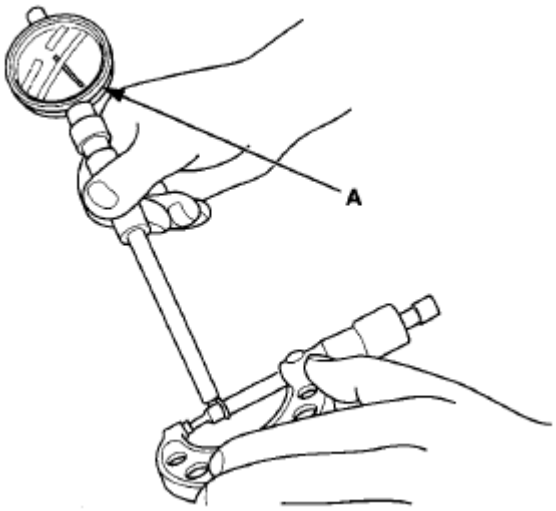


Fig. 110: Identifying Dial Gauge
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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): 0.018-0.047 mm (0.00071-0.00185 in)

Service Limit: 0.047 mm (0.00185 in)

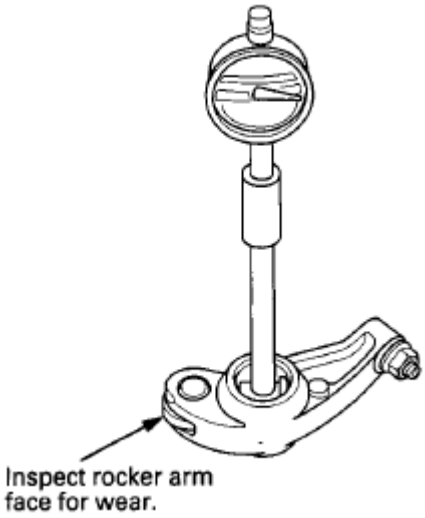


Fig. 111: Measuring Inside Diameter Of Rocker Arm And Check For Out-Of-Round Condition
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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 intake 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 rocker arm (B), carefully apply air pressure to the oil passage of the rocker arm.**

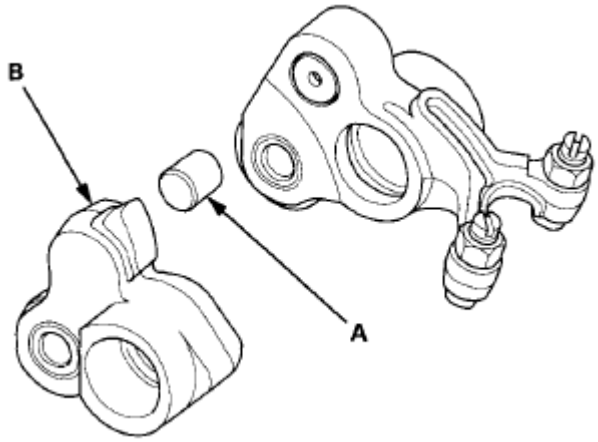


Fig. 112: Identifying Rocker Arm Piston And Intake Secondary Rocker Arm
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Reassemble the rocker arm assembly (see **ROCKER ARM AND SHAFT DISASSEMBLY/REASSEMBLY**).
9. Install the rocker arm assembly (see **CAMSHAFT, ROCKER ARM ASSEMBLY, CAMSHAFT SEAL, AND PULLEY INSTALLATION**).

CAMSHAFT INSPECTION

1. Remove the cylinder head (see **CYLINDER HEAD REMOVAL**).
2. Remove the rocker arm assembly (see **ROCKER ARM ASSEMBLY REMOVAL**).
3. Disassemble the rocker arm assembly (see **ROCKER ARM AND SHAFT DISASSEMBLY/REASSEMBLY**).
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)

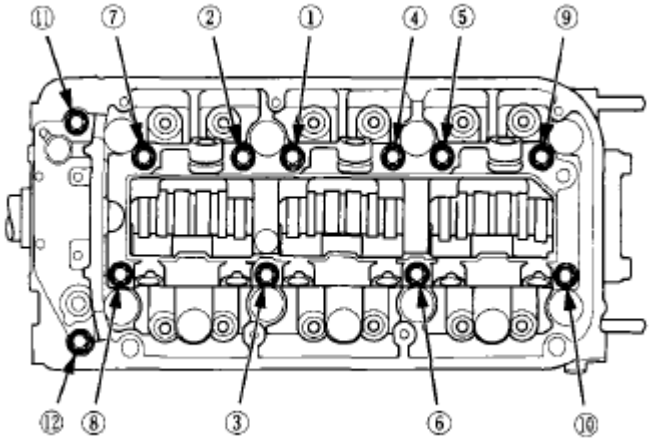


Fig. 113: Identifying Rocker Shaft Holder-To-Front Cylinder Head Bolts With Tightening Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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)

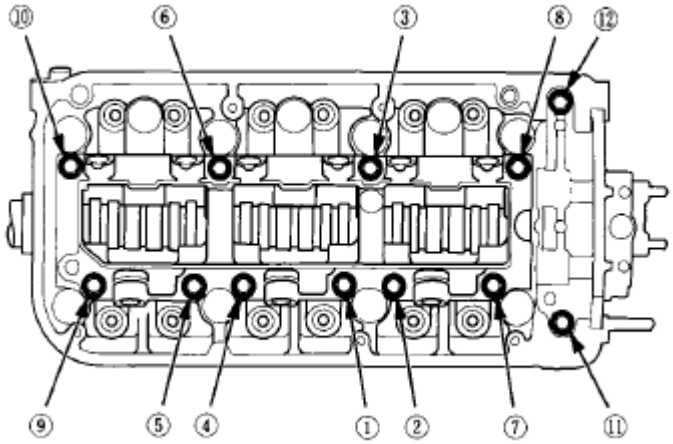


Fig. 114: Identifying Rocker Shaft Holder-To-Rear Cylinder Head Bolts With Tightening Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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)

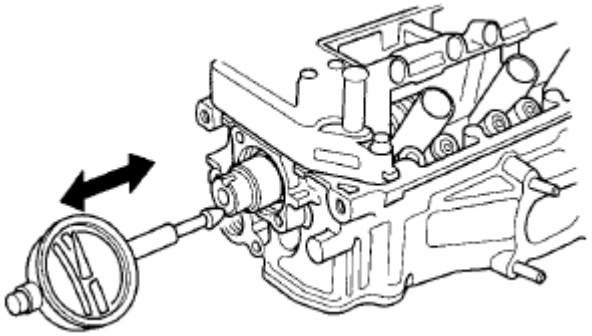


Fig. 115: Inspecting Camshaft Using Dial Gauge
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

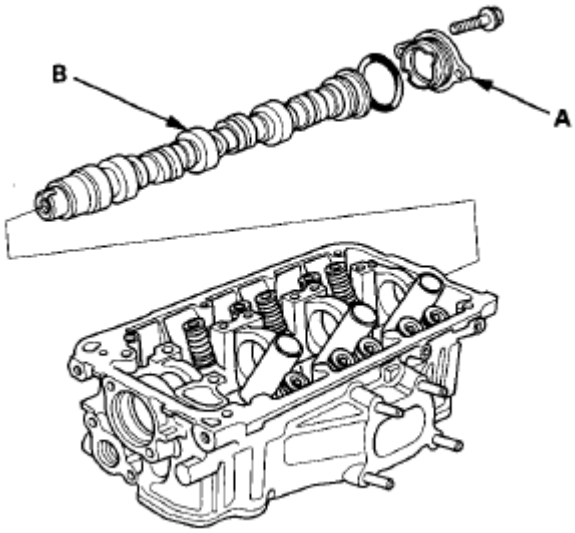


Fig. 116: Identifying Camshaft Thrust Cover And Camshaft
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.

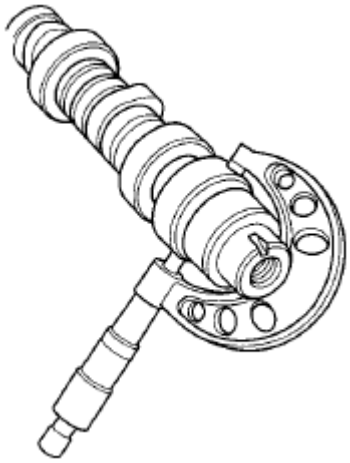


Fig. 117: Measuring Diameter Of Each Camshaft Journal
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

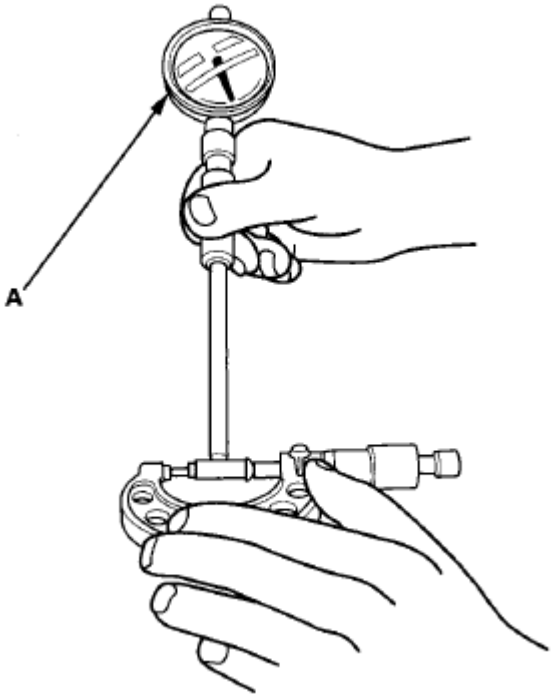


Fig. 118: Identifying Dial Gauge
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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)

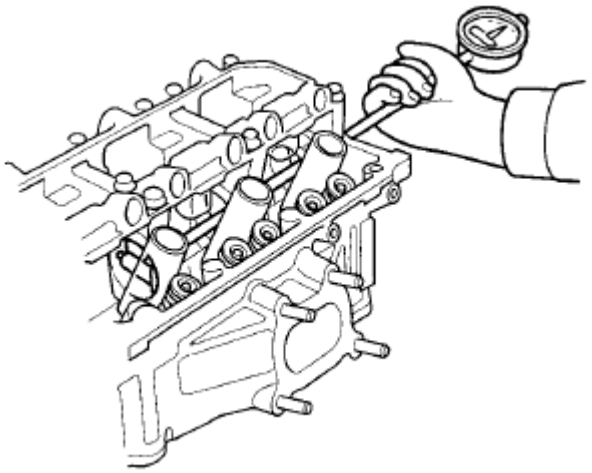


Fig. 119: Measuring Inside Diameter Of Each Camshaft Bearing Surface
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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)

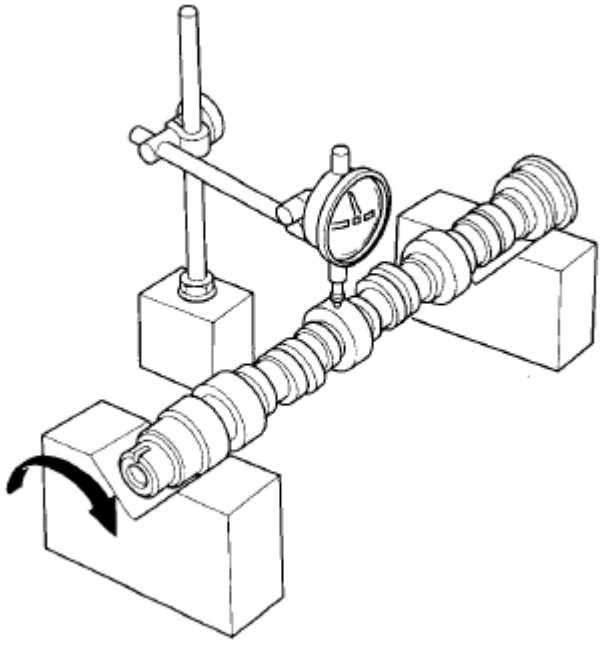


Fig. 120: Turning Camshaft For Inspection Using Dial Gauge
Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. Measure the cam lobe height.

CAM LOBE HEIGHT STANDARD (NEW)

	INTAKE	EXHAUST
PRI	34.299 mm (1.35035 in)	36.760 mm (1.44724 in)
SEC	35.621 mm (1.40240 in)	

FRONT

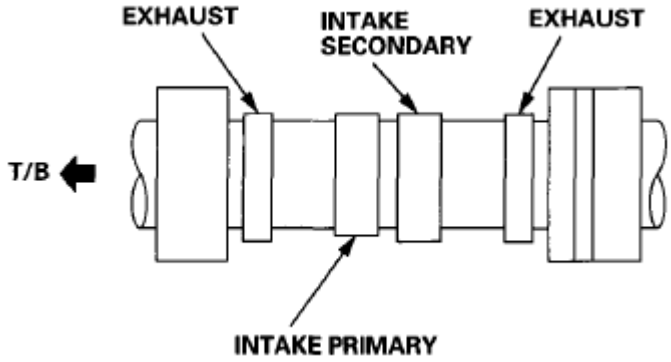


Fig. 121: Identifying Front Of Camshaft
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

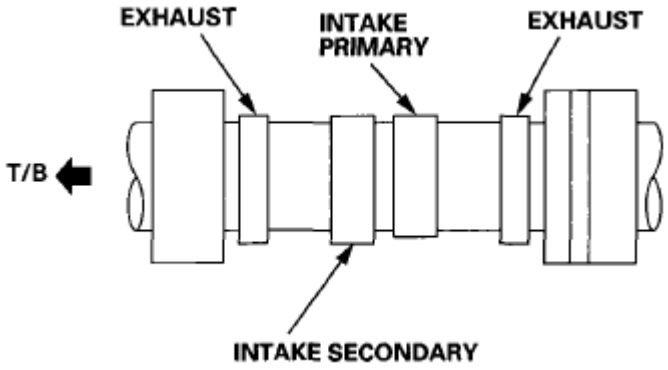


Fig. 122: Identifying Rear Of Camshaft
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

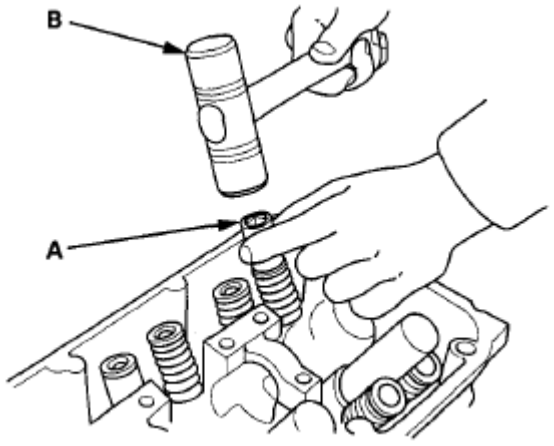


Fig. 123: Identifying Socket And Plastic Mallet
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

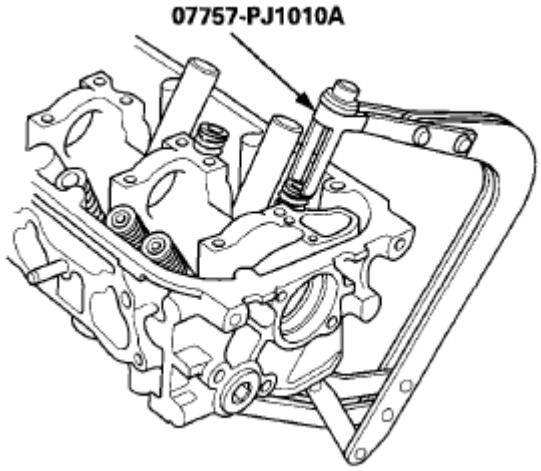


Fig. 124: Compressing Spring To Release Valve Cotters
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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).

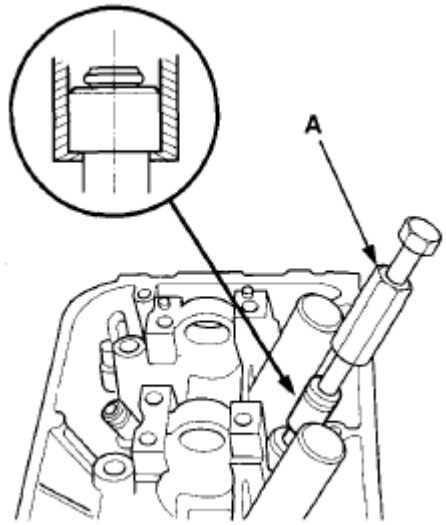


Fig. 125: Identifying Valve Guide Seal Remover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Remove the valve seal.

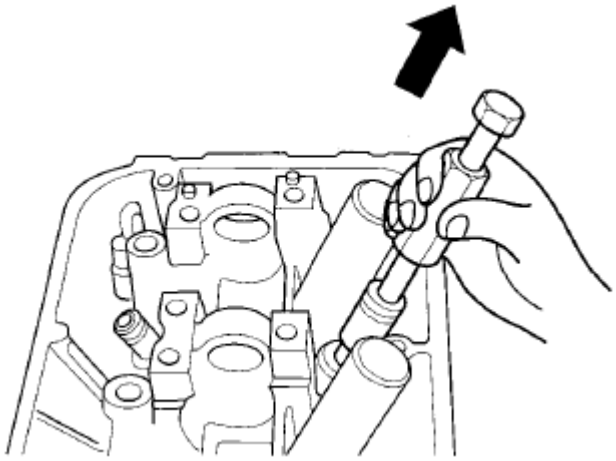


Fig. 126: Removing Seal
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Remove the valve spring seat.

VALVE INSPECTION

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

Intake Valve Dimensions

A Standard (New): 35.90-36.01 mm (1.4134-1.4177 in)

B Standard (New): 116.55-117.15 mm (4.5886-4.6122 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 (1.1772-1.1850 in)

B Standard (New): 113.90-114.50 mm (4.4842-4.5079 in)

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

C Service Limit: 5.420 mm (0.21339 in)

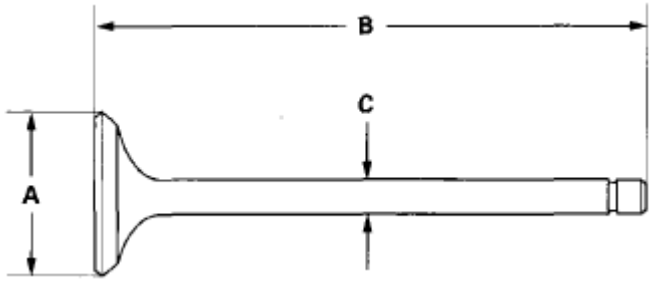


Fig. 127: Measuring Intake Valve Dimensions
Courtesy of AMERICAN HONDA MOTOR CO., INC.

VALVE STEM-TO-GUIDE CLEARANCE INSPECTION

1. Remove the valves (see **VALVE, SPRING, AND VALVE SEAL REMOVAL**).
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)

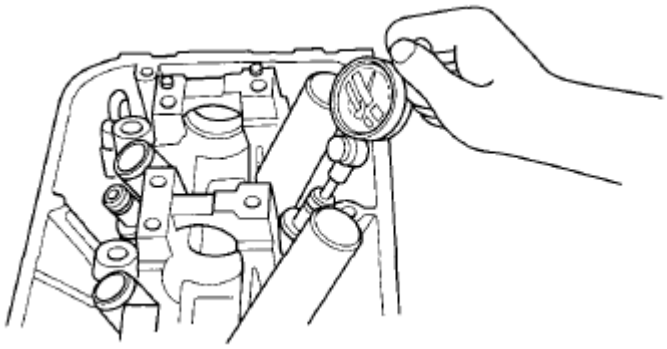


Fig. 128: Identifying Valve Stem To Guide Clearances
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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 (see **VALVE STEM-TO-GUIDE CLEARANCE INSPECTION**).
2. As illustrated, use a commercially available air-impact valve guide driver (A) modified to fit the diameter of the valve guides. In most cases, the same procedure can be done using the valve guide driver, 5.35 x 9.7 mm and a conventional hammer.

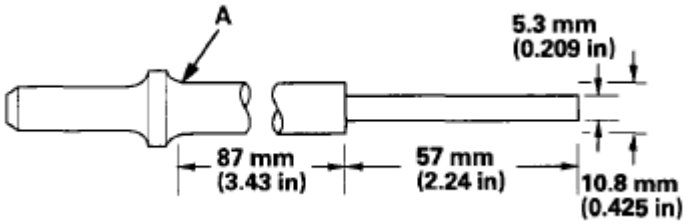


Fig. 129: Identifying Air-Impact Valve Guide Driver
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.

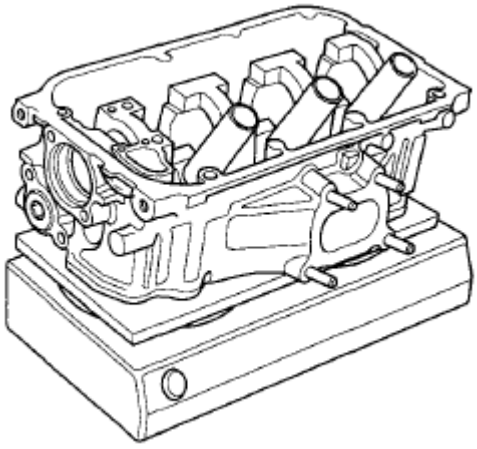


Fig. 130: Monitoring Temperature Of Cylinder Head With Cooking Thermometer
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.

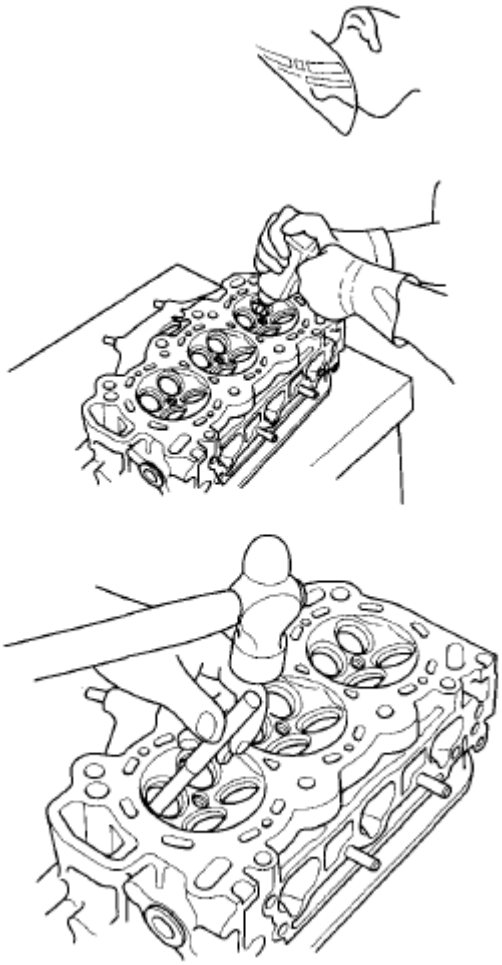


Fig. 131: Turning Head Over And Drive Guide Out Toward Camshaft Side Of Head
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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)

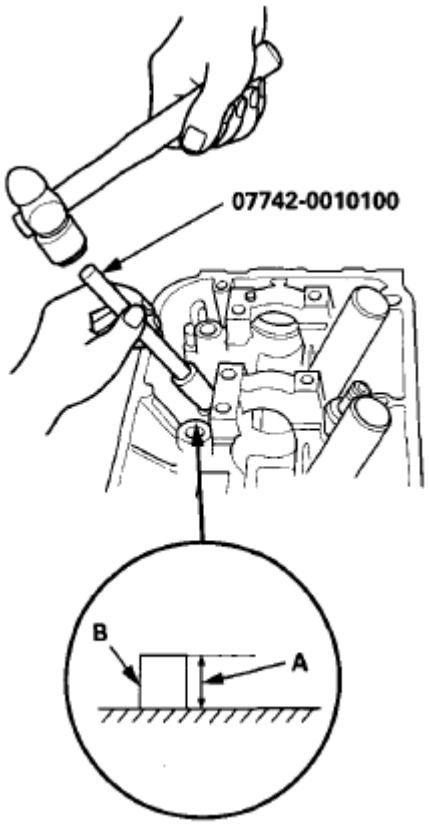


Fig. 132: Identifying Dimensions Of Valve Driver Guide
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.

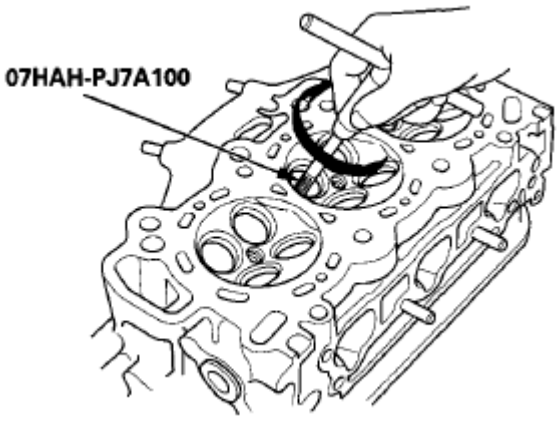


Fig. 133: Rotating Reamer Clockwise Full Length Of Valve Guide Bore
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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 (see **VALVE STEM-TO-GUIDE CLEARANCE INSPECTION**). Verify that a valve slides into the intake and exhaust valve guides without sticking.
15. Inspect the valve seating (see **VALVE SEAT RECONDITIONING**). If necessary renew the valve seat using a valve seat cutter.

VALVE SEAT RECONDITIONING

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

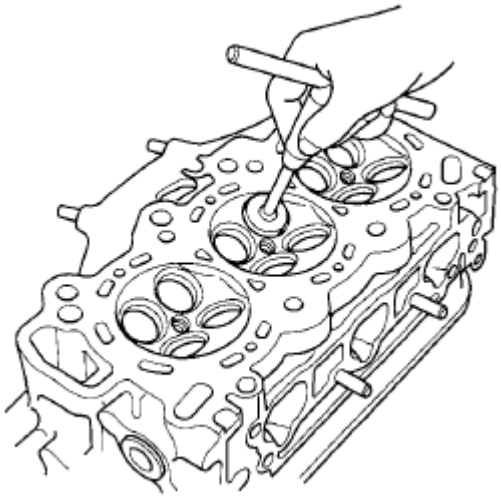


Fig. 134: Renewing Valve Seats In Cylinder Head Using Valve Seat Cutter
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.

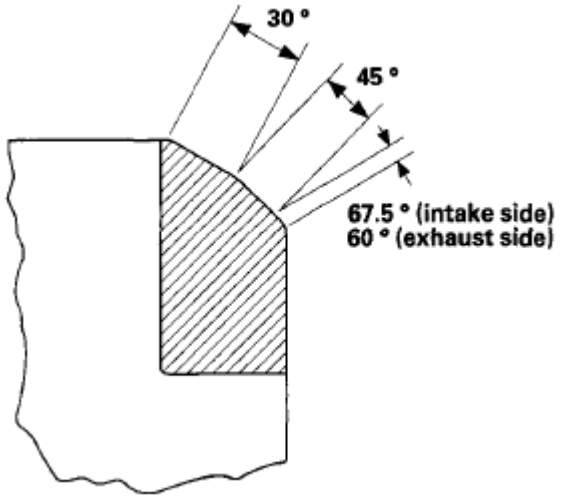


Fig. 135: Identifying Width Of Seat And Adjust Accordingly
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Make one more very light passes 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.

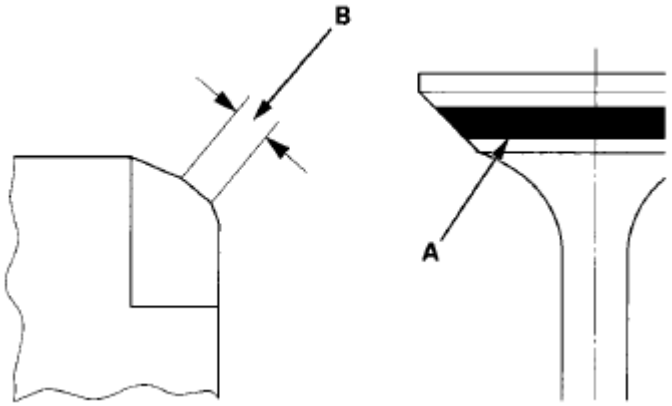


Fig. 136: Identifying Prussian Blue Compound And Actual Valve Seating Surface
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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)

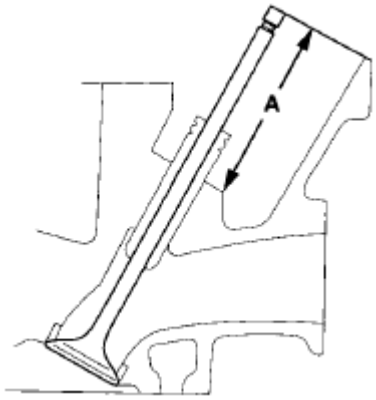


Fig. 137: Identifying Valve Stem Installed Height
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.

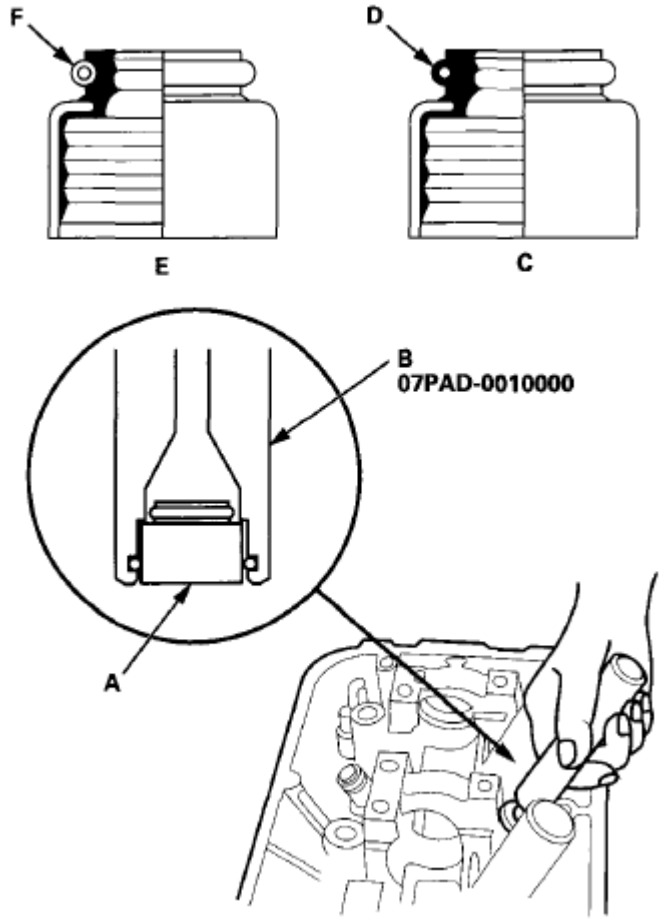


Fig. 138: Identifying Valve, Spring And Valve Seal
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.

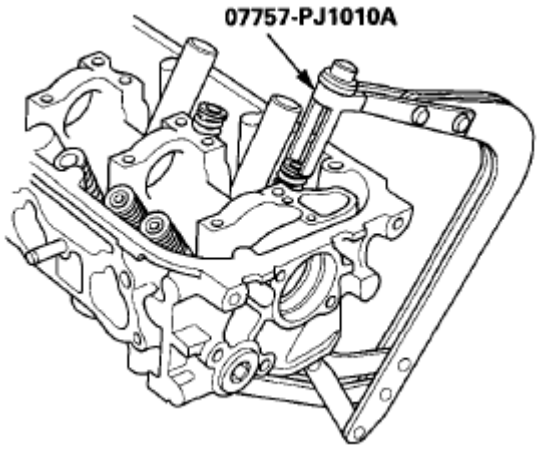


Fig. 139: Identifying Valve Spring Compressor Attachment
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.

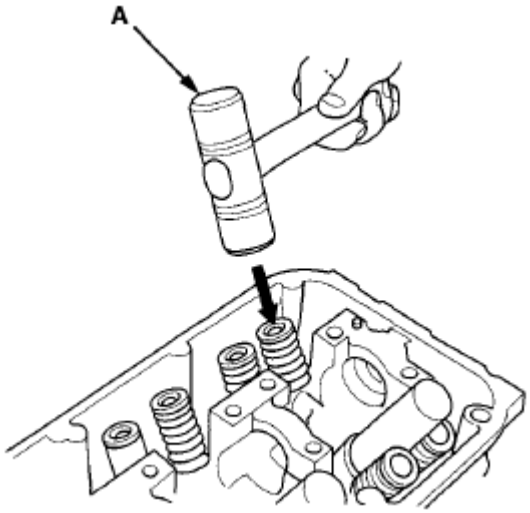


Fig. 140: Tapping Valve Stem With Plastic Mallet To Ensure Proper Seating Of Valve And Valve Cotters
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.

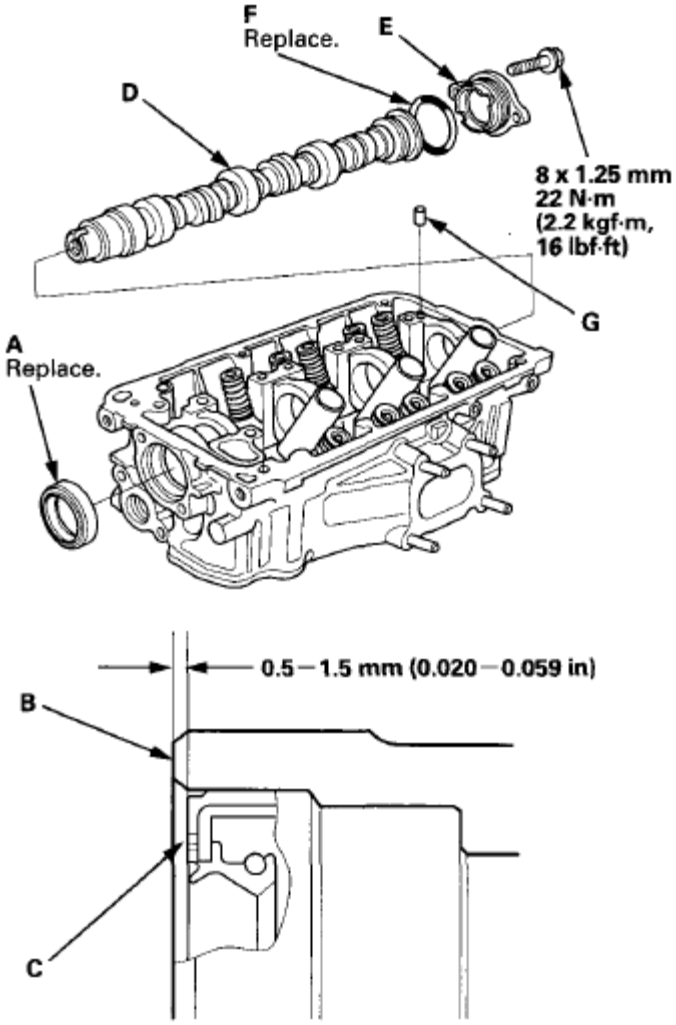


Fig. 141: Identifying Camshaft Oil Seal, Cylinder Head Surface, Oil Seal, Camshaft, Thrust Cover And O-Ring With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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, check that the oil seal lip is distorted.
8. Install the solid dowel pin (G).
9. If the rocker arm assembly is disassembled, reassemble the rocker arm assembly (see **ROCKER ARM AND SHAFT DISASSEMBLY/REASSEMBLY**).
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.**

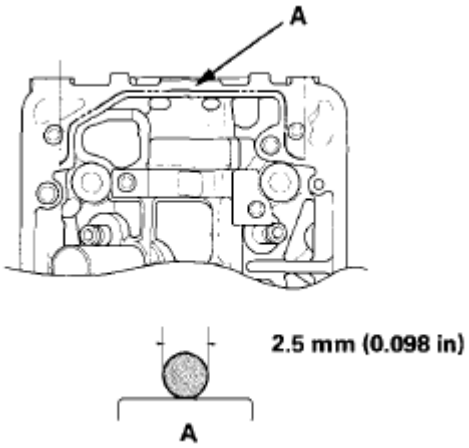


Fig. 142: Identifying Broken Line Of Liquid Gasket
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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)

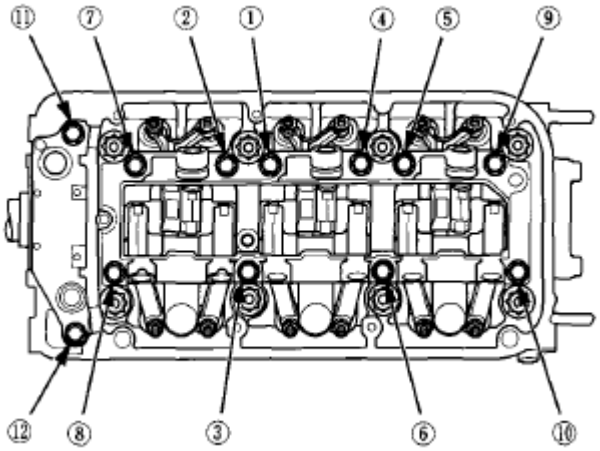


Fig. 143: Identifying Rocker Bolts With Tightening Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.

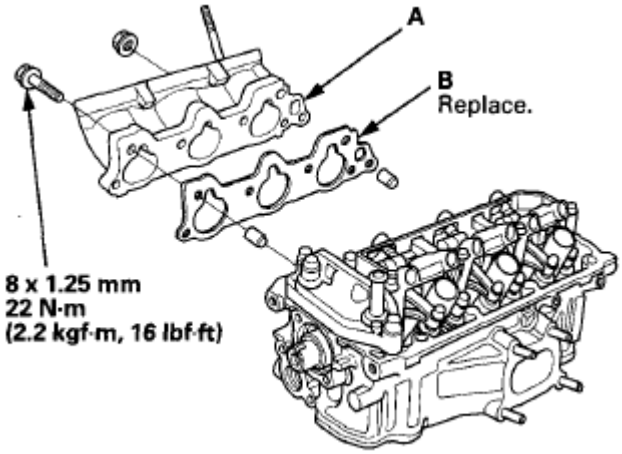


Fig. 144: Identifying Injector Base And Gasket With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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).

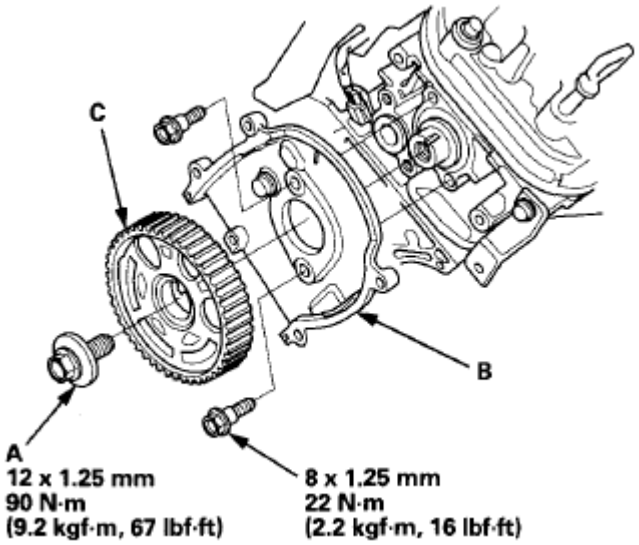


Fig. 145: Identifying Camshaft Pulley, Back Cover And Mounting Bolt With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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) into the cylinder head.
    1. Tap the camshaft oil seal in squarely.
    2. Install the oil seal about 0.5-1.5 mm (0.020-0.059 in) below the surface of the cylinder head.

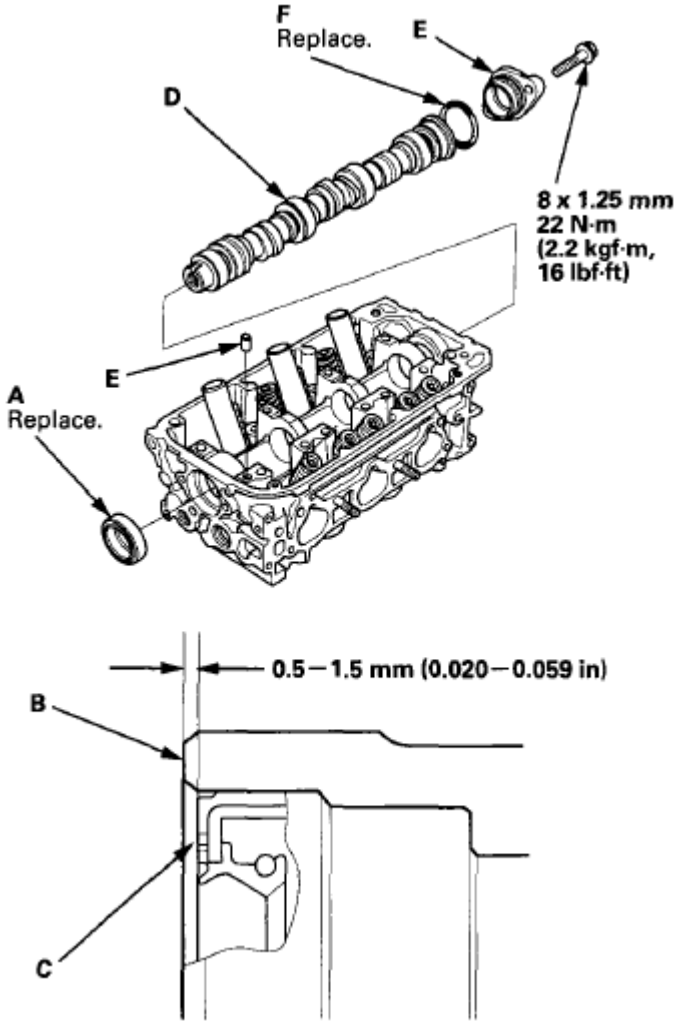


Fig. 146: Identifying Camshaft Oil Seal, Cylinder Head Surface, Camshaft Thrust Cover And O-Ring With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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, check that the oil seal lip is distorted.
8. Install the hollow dowel pin (G).
9. If the rocker arm assembly is disassembled, reassemble the rocker arm assembly (see **ROCKER ARM AND SHAFT DISASSEMBLY/REASSEMBLY**).
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.**

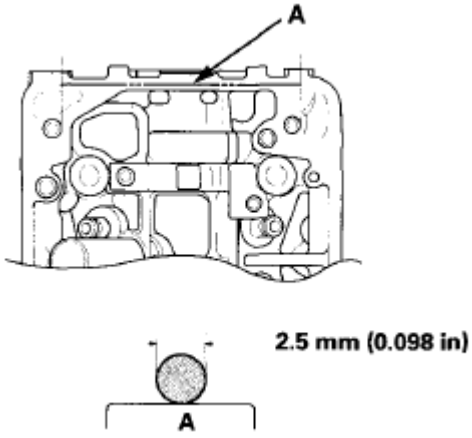


Fig. 147: Identifying Broken Line Of Liquid Gasket
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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)

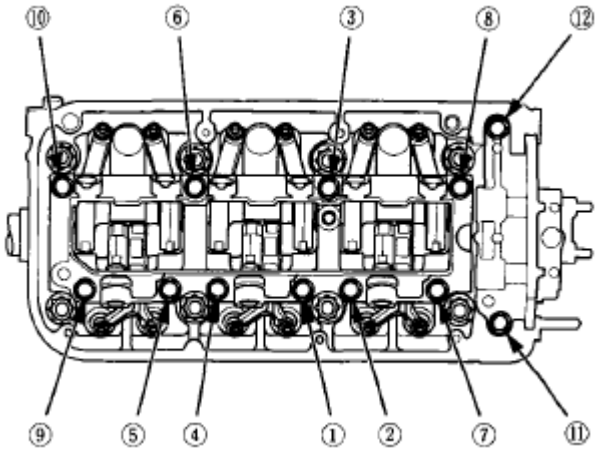


Fig. 148: Identifying Rocker Bolts With Tightening Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.

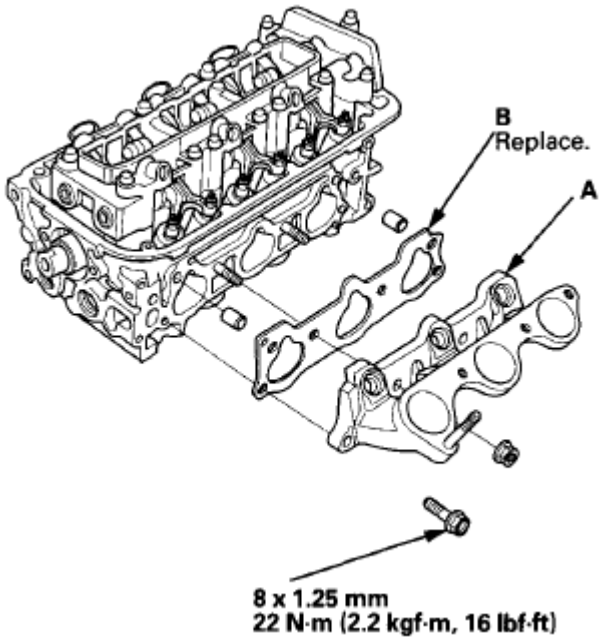


Fig. 149: Identifying Injector Base And Gasket With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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).

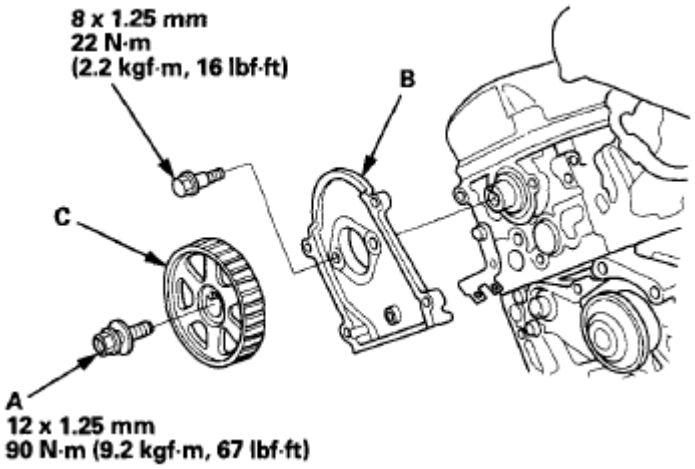


Fig. 150: Identifying Mounting Bolt, Back Cover And Camshaft Pulley With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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).

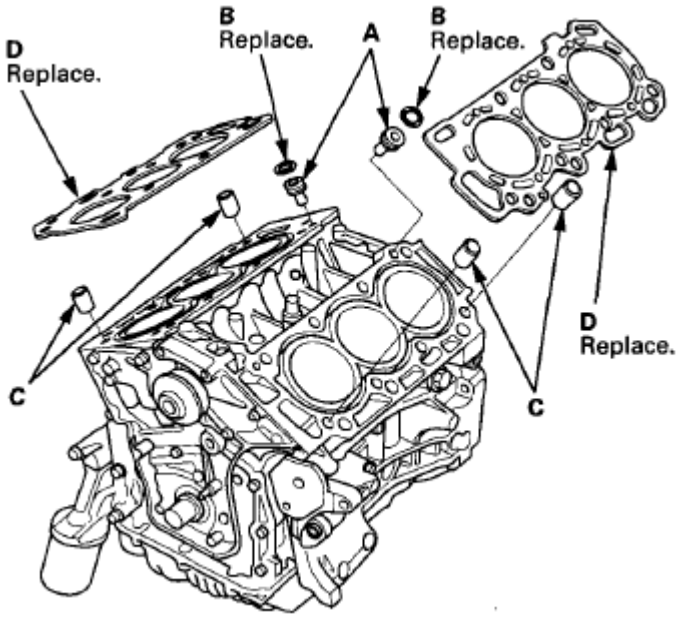


Fig. 151: Identifying Oil Control Orifices, O-Rings, Dowel Pins And Head Gasket
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.

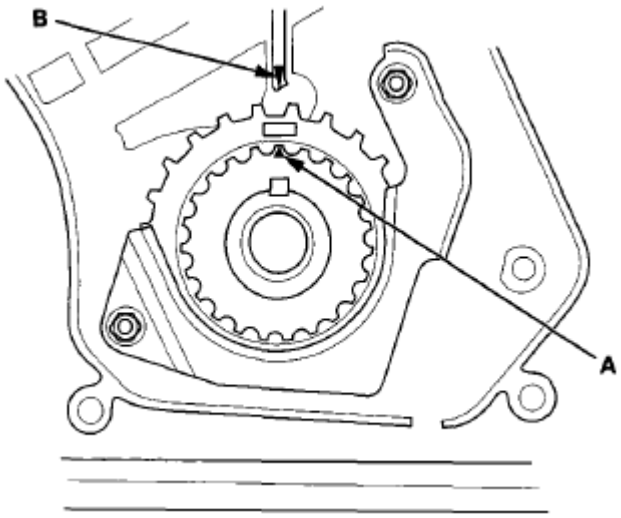


Fig. 152: Identifying TDC Mark And Pointer On Oil Pump
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

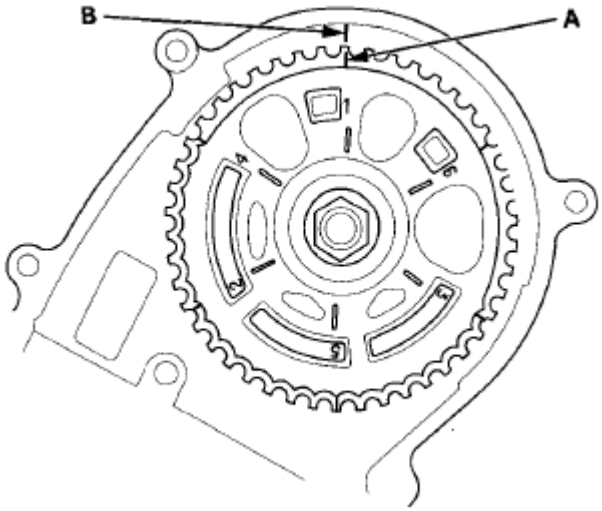


Fig. 153: Identifying TDC Marks And Pointers On Camshaft Pulley (Front)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

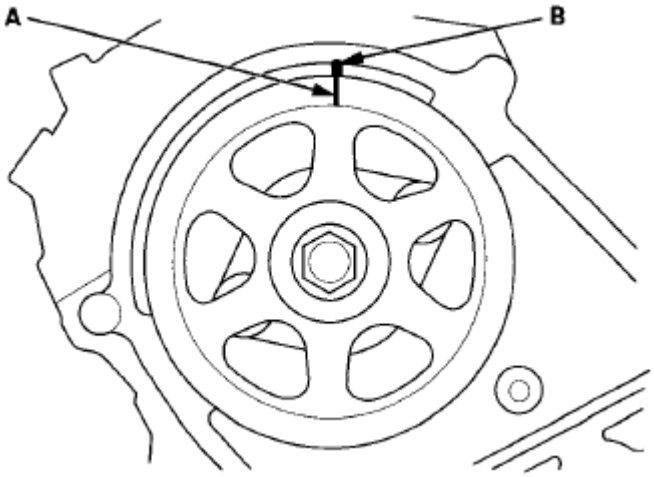


Fig. 154: Identifying TDC Marks And Pointers On Camshaft Pulley (Rear)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

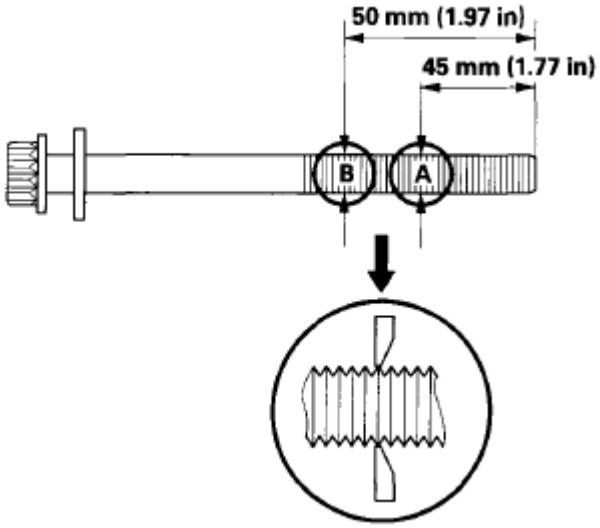


Fig. 155: Measuring Diameter Of Each Cylinder Head Bolt At Point A And Point B
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

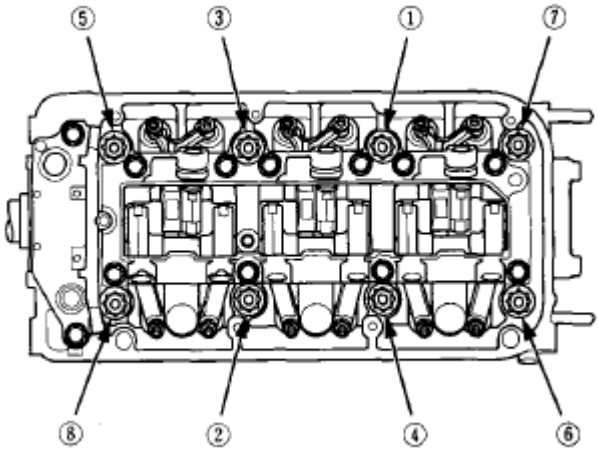


Fig. 156: Identifying Cylinder Head Bolts With Tightening Sequence (Front)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

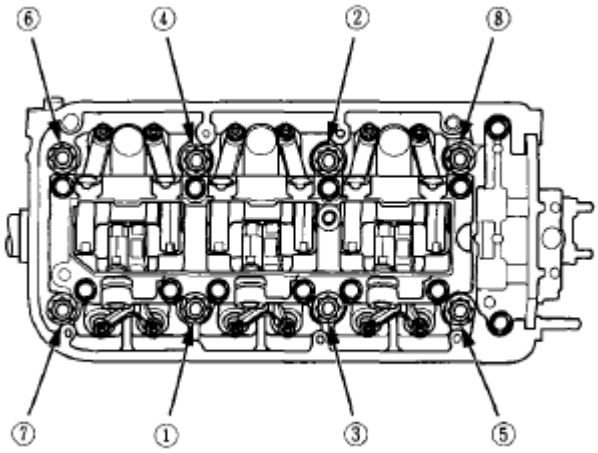


Fig. 157: Identifying Cylinder Head Bolts With Tightening Sequence (Rear)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.

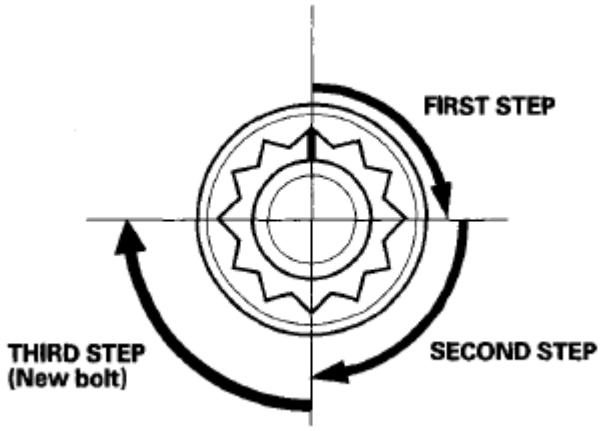


Fig. 158: Identifying Cylinder Head Bolt Tightening Graph
Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Install the timing belt (see **TIMING BELT INSTALLATION**).
14. Adjust the valve clearance (see **VALVE CLEARANCE ADJUSTMENT**).
15. Install the cylinder head covers (see **CYLINDER HEAD COVER INSTALLATION**).
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.

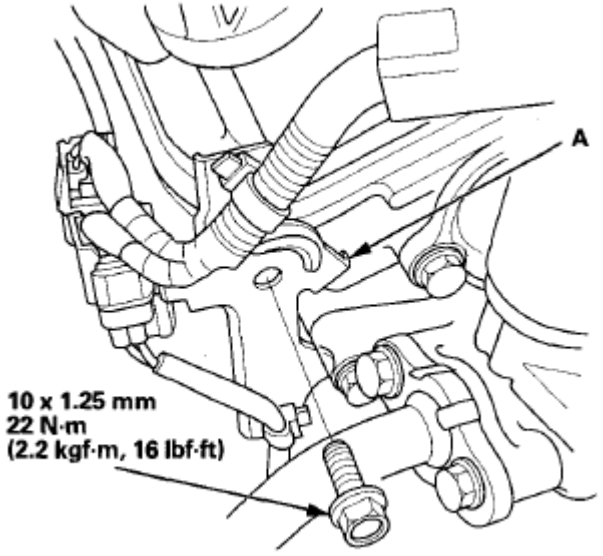


Fig. 159: Identifying Connector Bracket With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.

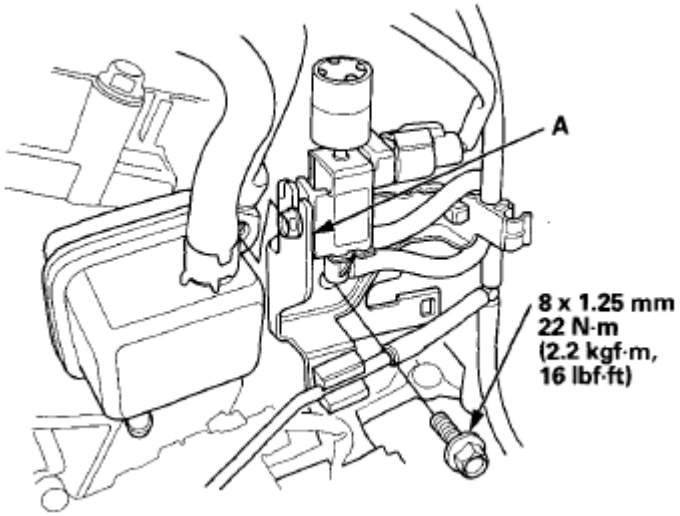


Fig. 160: Identifying Engine Mount Control Solenoid Valve Bracket With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

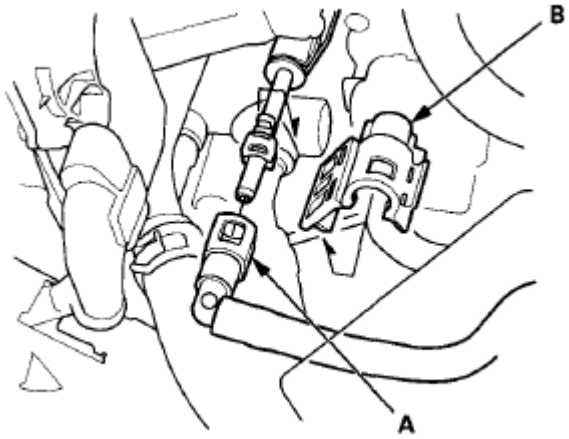


Fig. 161: Identifying Fuel Feed Hose And Fitting Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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 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 (see **TIMING BELT REMOVAL**).
2. Remove the camshaft pulley and the back cover (see step 17).
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 12x75 x 1.25 mm bolt (C), press in the new camshaft oil seal (D) squarely into the cylinder head to the specified installed height.

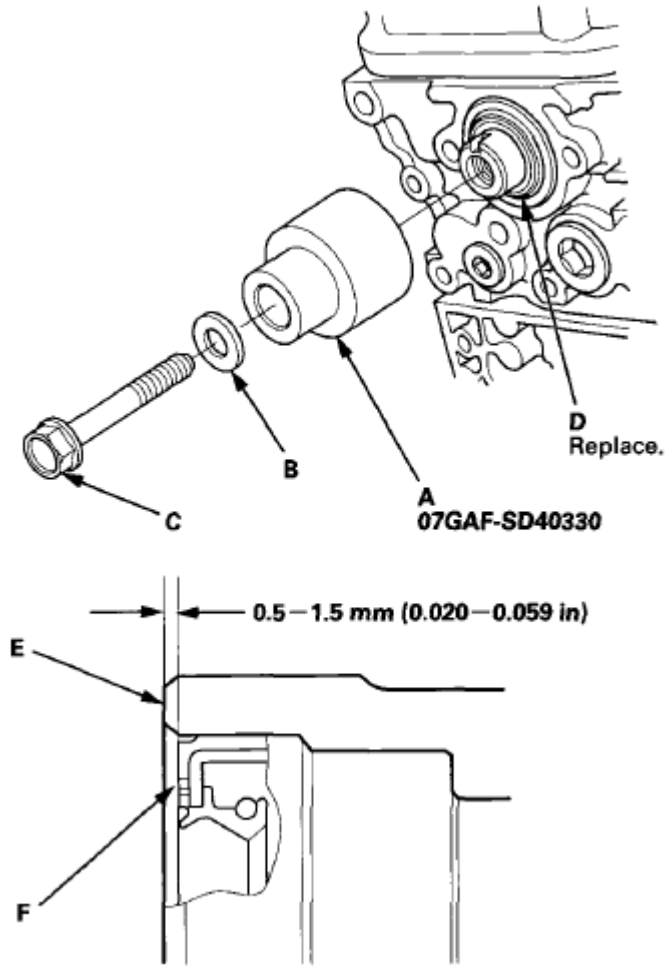


Fig. 162: Identifying Camshaft Oil Seal And Related Components
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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 (see **TIMING BELT INSTALLATION**).

SEALING BOLT INSTALLATION

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

FRONT

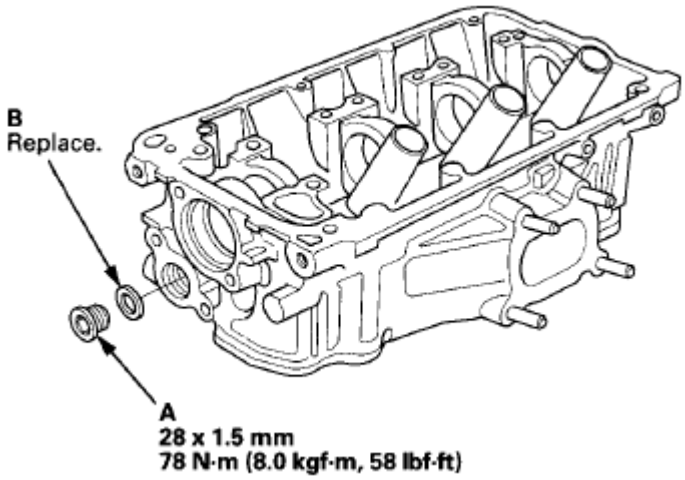


Fig. 163: Identifying Sealing Bolt And Washer (Front) With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

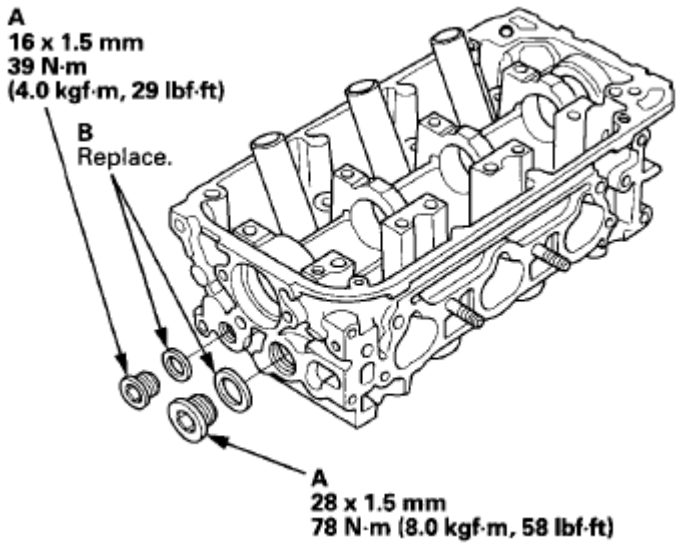


Fig. 164: Identifying Sealing Bolt And Washer (Rear) With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2012 ENGINE

Engine Block - TL

SPECIAL TOOLS

Ref.No.	Tool Number	Description	Qty
①	070AD-RCA0200	Oil Seal Driver Attachment, 106 mm	1
②	07749-0010000	Driver Handle, 15 x 135L	1
③	07OAD-RCAA100	Oil Seal Driver, 64 mm	1

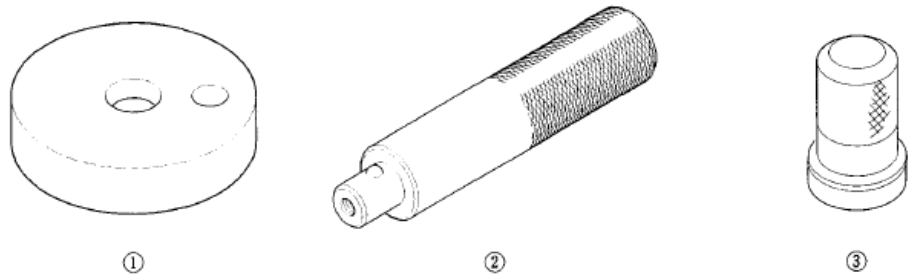


Fig. 1: Identifying Driver Handle, Oil Seal Driver And Attachment
Courtesy of AMERICAN HONDA MOTOR CO., INC.

COMPONENT LOCATION INDEX

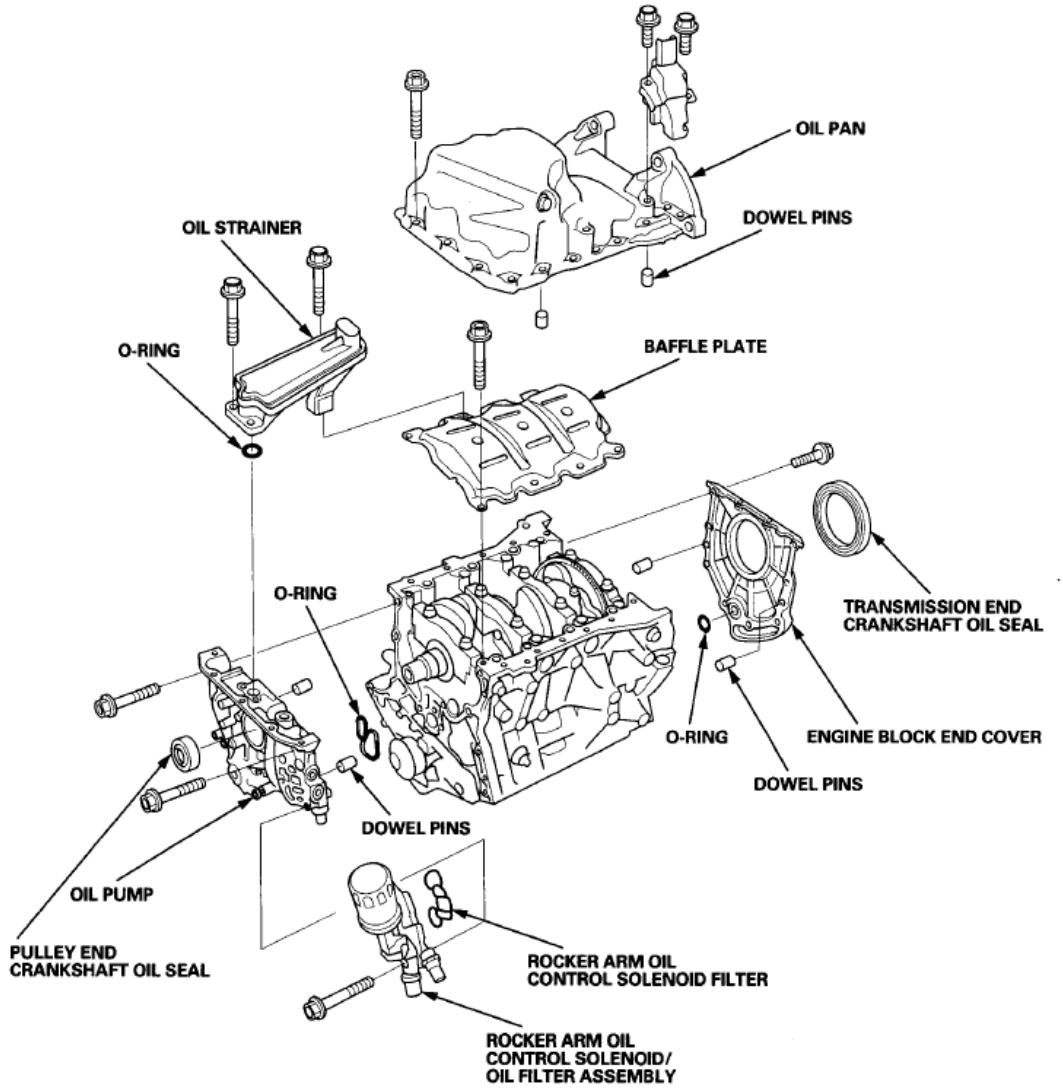


Fig. 2: Identifying Engine Block Components (1 Of 3)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

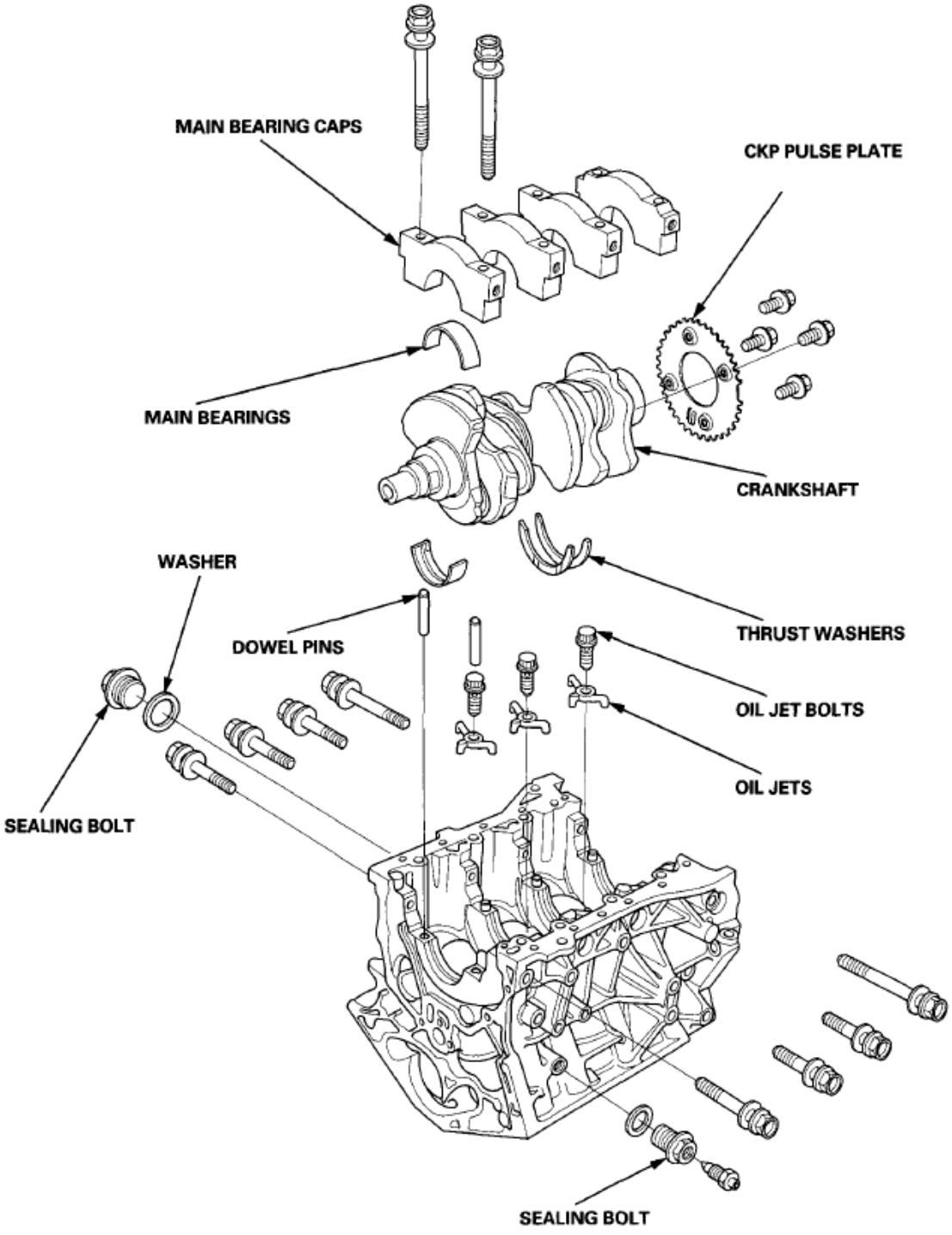


Fig. 3: Identifying Engine Block Components (2 Of 3)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

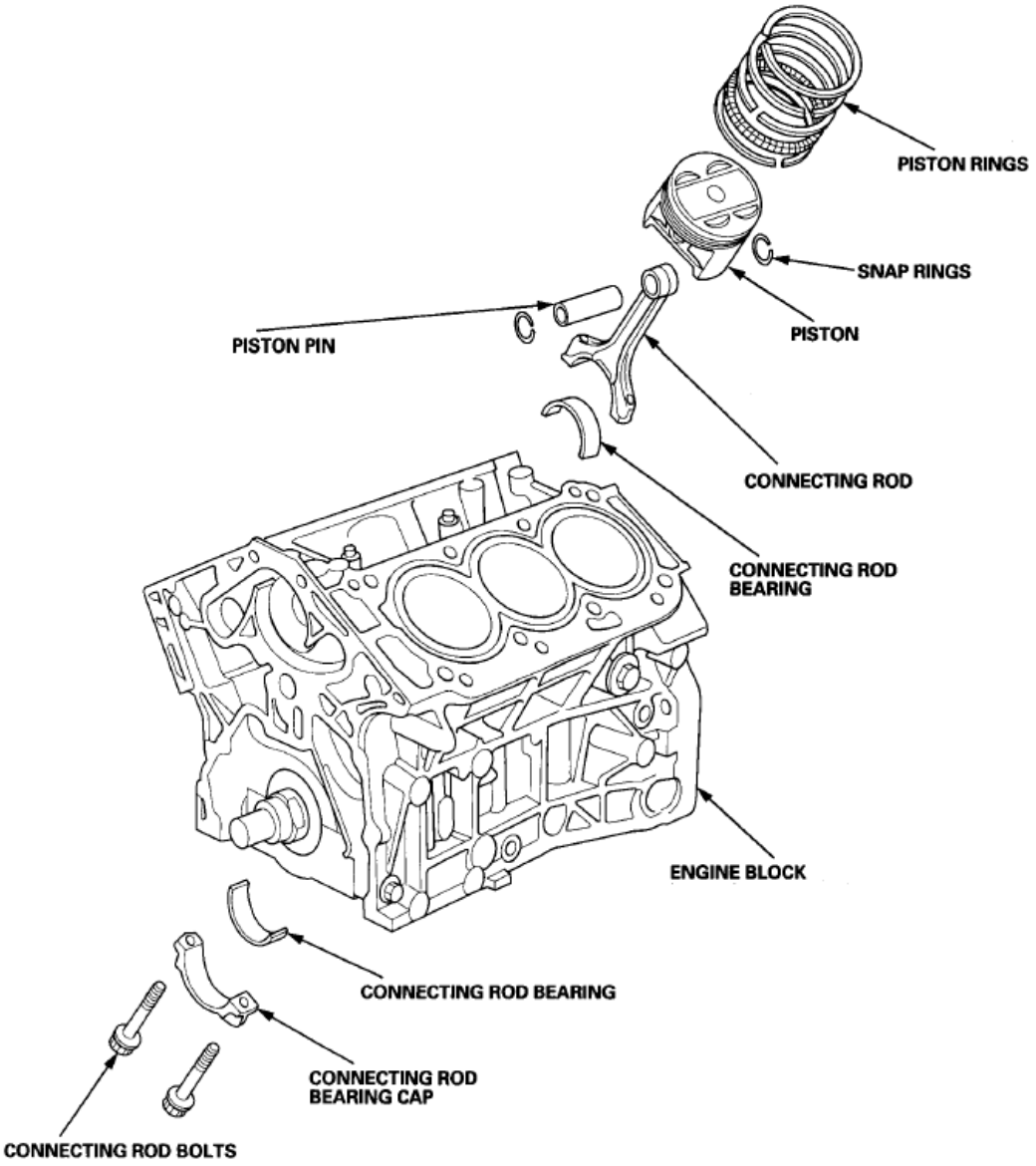


Fig. 4: Identifying Engine Block Components (3 Of 3)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

CONNECTING ROD AND CRANKSHAFT END PLAY INSPECTION

1. Remove the oil pump (see **REMOVAL**).
2. Remove the baffle plate (see step 10).
3. Measure the connecting rod end play with a feeler gauge (A) between the connecting rod (B) and the crankshaft (C).

   Connecting Rod End Play

   Standard (New): 0.15- 0.35 mm (0.006- 0.013 in)

Service Limit: 0.45 mm (0.017 in)

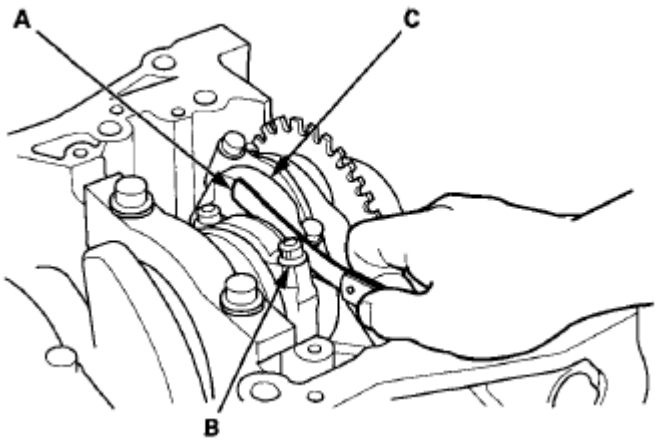


Fig. 5: Measuring Connecting Rod End Play Using Feeler Gauge Between Connecting Rod And Crankshaft
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. If the connecting rod end play is beyond the service limit, install a new connecting rod and recheck. If it is still beyond the service limit, replace the **crankshaft**.
5. Push the crankshaft firmly away from the dial indicator by prying, and zero the dial against the end of the crankshaft. Then pull the crankshaft firmly back toward the indicator by prying; the dial reading should not exceed the service limit.

Crankshaft End Play

Standard (New): 0.10- 0.35 mm (0.0039- 0.0138 in)

Service Limit: 0.45 mm (0.0177 in)

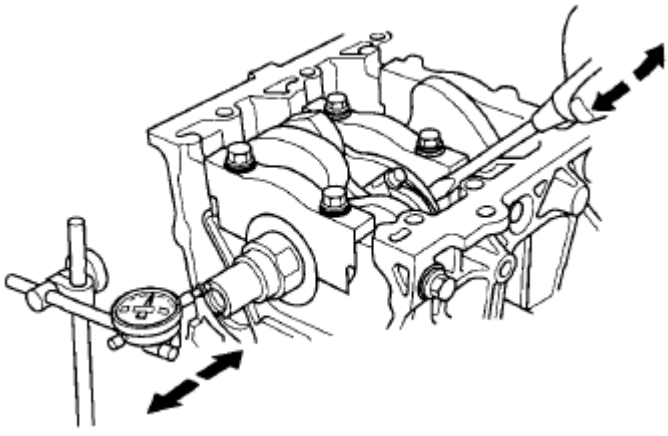


Fig. 6: Measuring Crankshaft End Play
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. If the crankshaft end play is beyond the service limit, replace the thrust washers and recheck. If it is still beyond the service limit, replace the **crankshaft**.

CRANKSHAFT MAIN BEARING REPLACEMENT

MAIN BEARING CLEARANCE INSPECTION

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

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

4. Reinstall the bearings and the bearing caps, then torque the bearing cap bolts to 74 N.m (7.5 kgf.m, 54 lbf.ft), and the bearing cap side bolts to 49 N.m (5.0 kgf.m, 36 lbf.ft) in the proper sequence (see step 22).

NOTE:
- **Apply new engine oil to the bolt threads and flanges.**
- **Do not rotate the crankshaft during inspection.**

5. Remove the bearing cap and the bearing half, and measure the widest part of the plastigage.

Main Bearing-to-Journal Oil Clearance

Standard (New): 0.019- 0.045 mm (0.00075- 0.00177 in)

Service Limit: 0.050 mm (0.00197 in)

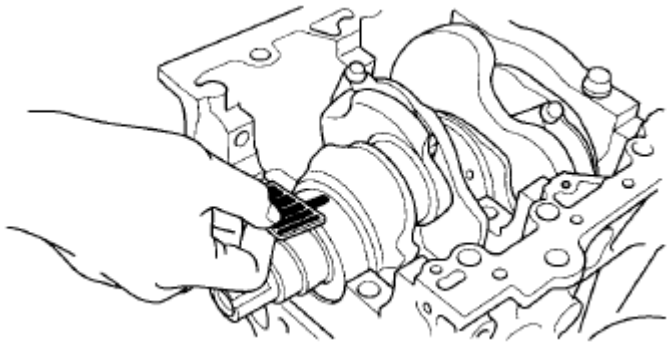


Fig. 7: Measuring Widest Part Of Plastigage
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. If the plastigage measures too wide or too narrow, remove the crankshaft, and remove the upper half of

the bearing. Install a new, complete bearing with the same color code, and recheck the clearance. Do not file, shim, or scrape the bearings or the caps to adjust clearance.

7. If the plastigage shows the clearance is still incorrect, try the next larger or smaller bearing (the color listed above or below that one), and check the clearance again. If the proper clearance cannot be obtained by using the appropriate larger or smaller bearings, replace the **crankshaft and start over**.

MAIN BEARING SELECTION

Block Bore Code Location

Letters or bars have been stamped on the end of the engine block as a code for the size of each of the four main journal bores.

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

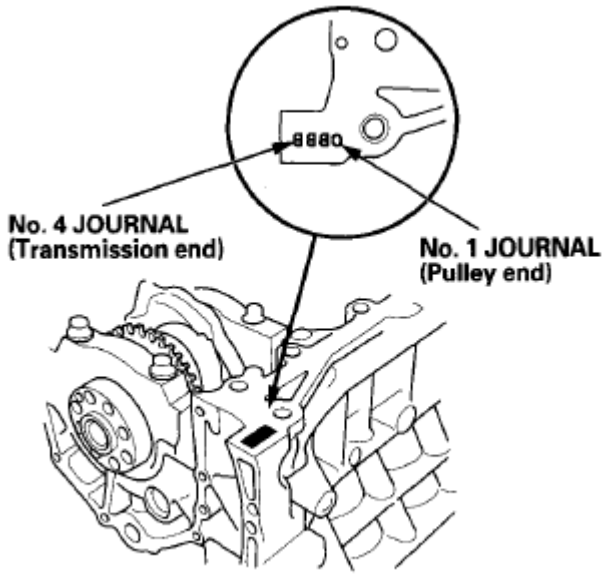


Fig. 8: Identifying Block Bore Code Location
Courtesy of AMERICAN HONDA MOTOR CO., INC.

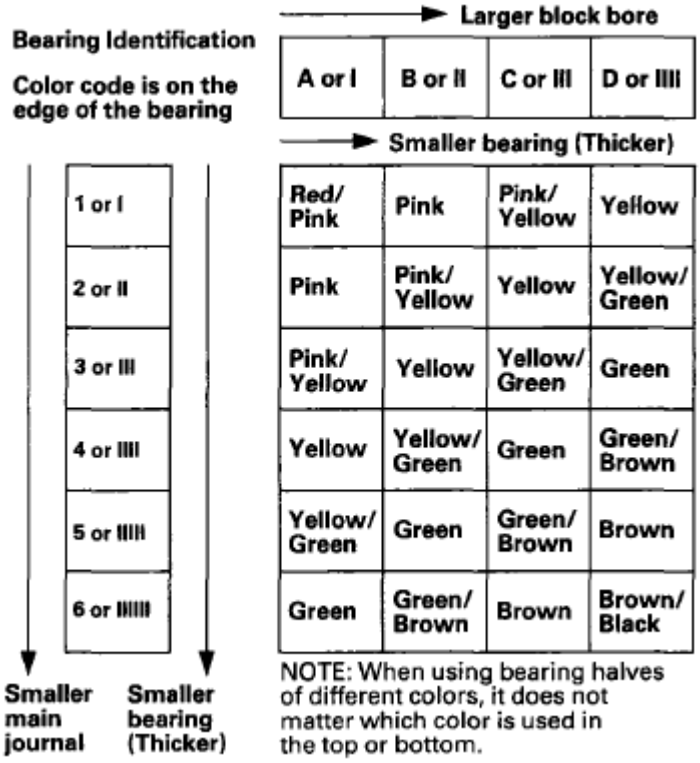


Fig. 9: Color Coded Bearing Identification Table
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Main Journal Code Locations (Numbers or Bars)

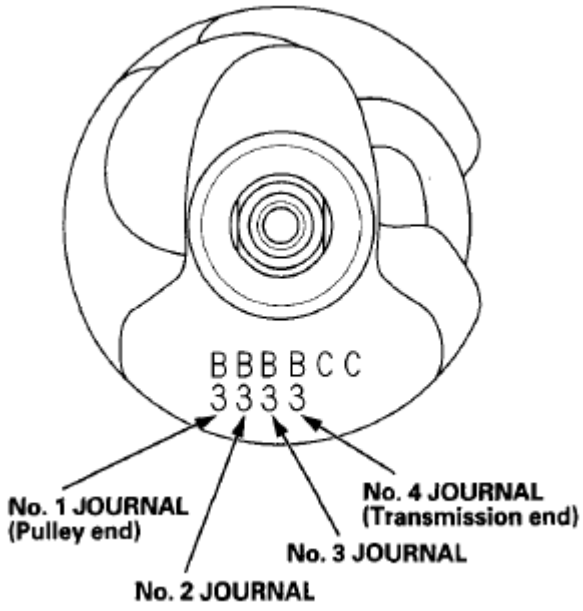


Fig. 10: Identifying Main Journal Code Locations (Numbers Or Bars)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

CONNECTING ROD BEARING REPLACEMENT

CONNECTING ROD BEARING CLEARANCE INSPECTION

1. Remove the connecting rod cap and the **bearing half**.
2. Clean the connecting rod journal and the bearing half with a clean shop towel.
3. Place a strip of plastigage across the rod journal.
4. Reinstall the bearing half and the rod cap, and tighten the bolts.

NOTE:

- **Apply new engine oil to the bolt threads and flanges.**
- **Do not rotate the crankshaft during inspection.**

Tightening Torque:

20 N.m (2.0 kgf.m, 14 lbf.ft) + 90 °

5. Remove the rod cap and the bearing half and measure the widest part of the plastigage.

Connecting Rod Bearing-to-Journal Oil

Clearance

Standard (New): 0.020- 0.044 mm (0.00079- 0.00173 in)

Service Limit: 0.050 mm (0.00197 in)

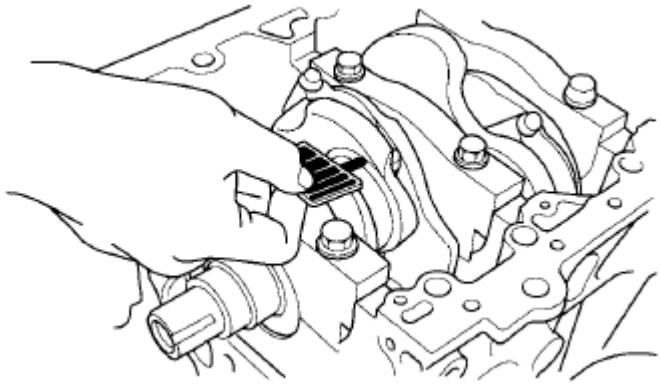


Fig. 11: Measuring Widest Part Of Plastigage
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. If the plastigage measures too wide or too narrow, remove the upper half of the bearing, then install a new, complete bearing with the same color code, and recheck the clearance. Do not file, shim, or scrape the bearings or the caps to adjust clearance.
7. If the plastigage shows the clearance is still incorrect, try the next larger or smaller bearing (the color

listed above or below that one), and check the clearance again. If the proper clearance cannot be obtained by using the appropriate larger or smaller bearings, replace the **crankshaft and start over**.

CONNECTING ROD BEARING SELECTION

Each connecting rod falls into one of four tolerance ranges (from 0 to 0.024 mm (0.0009 in), in 0.006 mm (0.0002 in) increments) depending on the size of its big end bore.

It is then stamped with a number or bar (1, 2, 3, or 4/I, II, III, or IIII) indicating the range. You may find any combination of 1, 2, 3, or 4/I, II, III, or IIII in any engine.

Big End Bore Size

J35Z6 engine: 58.0 mm (2.283 in)

J37A4 engine: 60.0 mm (2.362 in)

Inspect the connecting rod for cracks and heat damage.

Big End Bore Code Locations

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

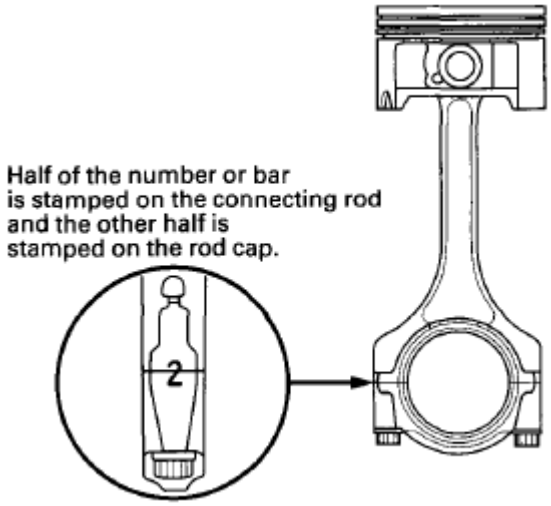


Fig. 12: Identifying Big End Bore Code Locations
Courtesy of AMERICAN HONDA MOTOR CO., INC.

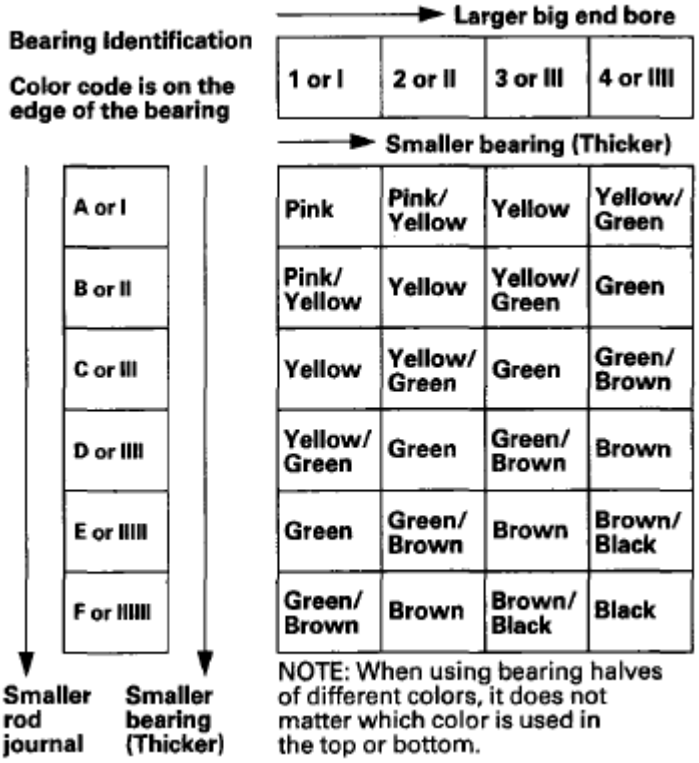


Fig. 13: Color Coded Bearing Identification Table
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Connecting Rod Journal Code Locations (Letters or Bars)

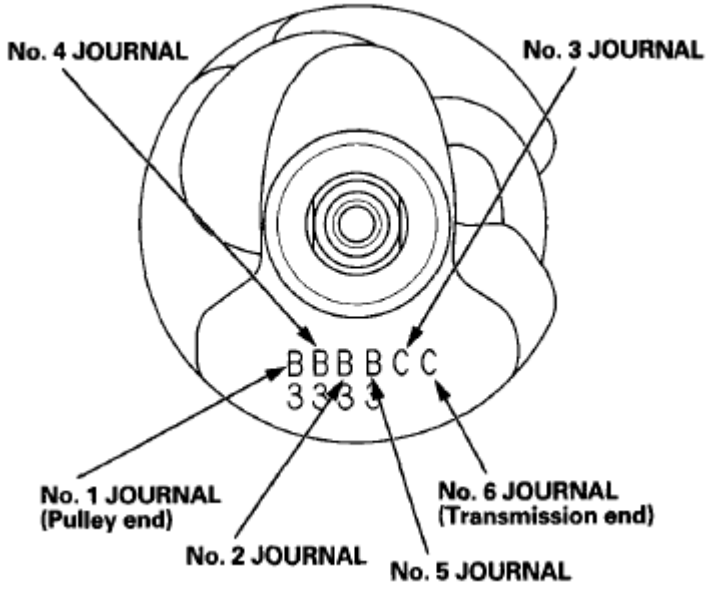


Fig. 14: Identifying Connecting Rod Journal Code Locations (Letters Or Bars)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

OIL PAN REMOVAL

1. If the engine is already out of the vehicle, go to step 6.
2. Raise the vehicle on the lift.
3. Drain the engine oil (see **ENGINE OIL LEVEL CHECK**).
4. Remove the front splash shield (see **FRONT SPLASH SHIELD REPLACEMENT**).
5. Remove exhaust pipe A (see step 42 **ENGINE REMOVAL**).
6. Remove the rear warm up TWC bracket.

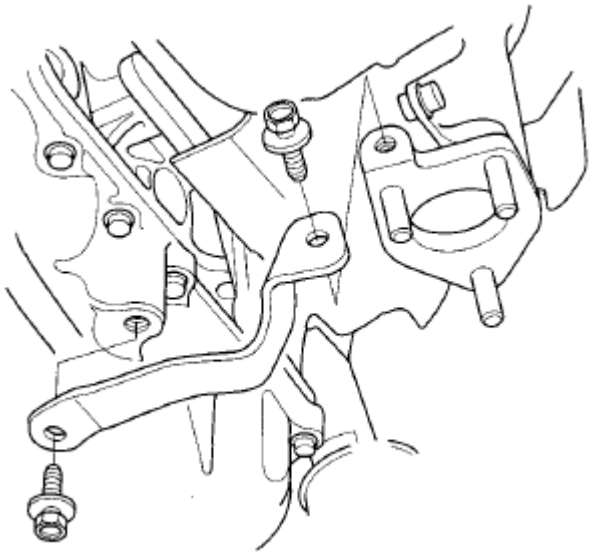


Fig. 15: Identifying Rear Warm Up TWC Bracket
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Remove the CKP sensor cover (A) and the bolt (B), then disconnect the CKP sensor connector (C).

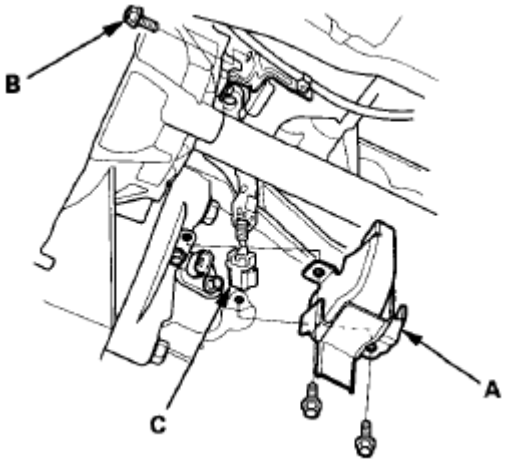


Fig. 16: Identifying CKP Sensor Cover, Connector And Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Remove the torque converter case cover (A) and the four bolts (B) securing the transmission.

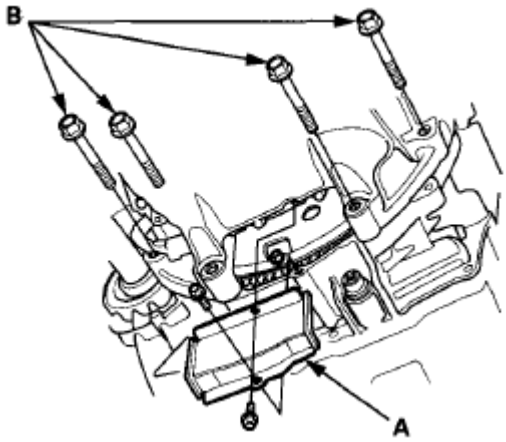


Fig. 17: Identifying Torque Converter Case Cover And Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Remove the bolts securing the oil pan.
10. Using a flat blade screwdriver, separate the oil pan from the engine block in the places shown in illustration below.

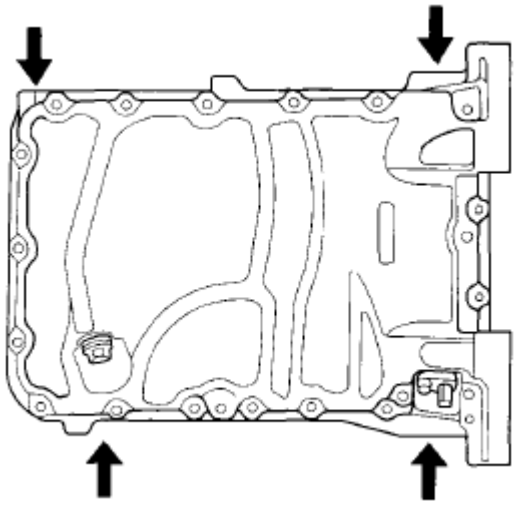


Fig. 18: Identifying Oil Pan & Screwdriver Pry Points
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Remove the oil pan.

CRANKSHAFT AND PISTON REMOVAL

1. Remove the engine/transmission (see **ENGINE REMOVAL**).
2. Remove the transmission:

- Manual transmission (see **TRANSMISSION REMOVAL**)
- Automatic transmission (see **TRANSMISSION REMOVAL**)

3. M/T model: Remove the flywheel (see **TRANSMISSION SIDE**).
4. A/T model: Remove the drive plate (see **DRIVE PLATE REMOVAL AND INSTALLATION**).
5. Remove the cylinder heads:
   - J35Z6 engine (see **CYLINDER HEAD REMOVAL**)
   - J37A4 engine (see **CYLINDER HEAD REMOVAL**)
6. Remove the timing belt drive pulley from the crankshaft:
   - J35Z6 engine (see **TIMING BELT DRIVE PULLEY REPLACEMENT**)
   - J37A4 engine (see **TIMING BELT DRIVE PULLEY REPLACEMENT**)
7. Remove the **oil pan**.
8. Remove the engine block end cover.

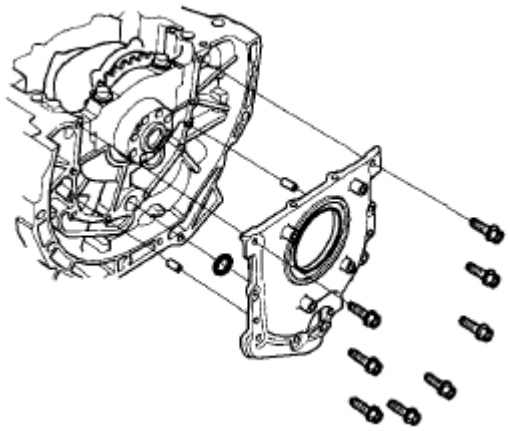


Fig. 19: Identifying Engine Block End Cover With Mounting Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Remove the rocker arm oil control solenoid/oil filter assembly.

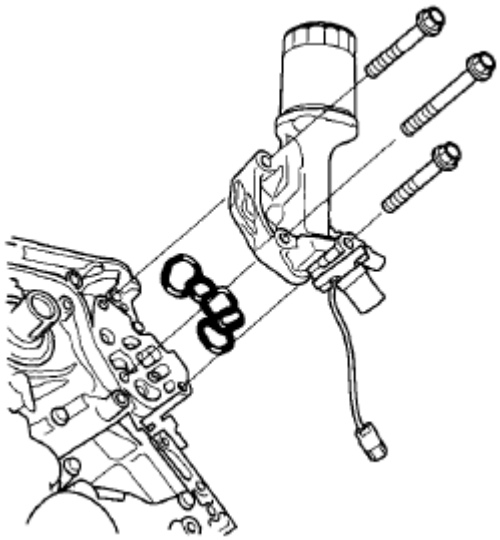


Fig. 20: Identifying Rocker Arm Oil Control Solenoid/Oil Filter Assembly
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Remove the oil strainer (A), the baffle plate (B), and the oil pump (C).

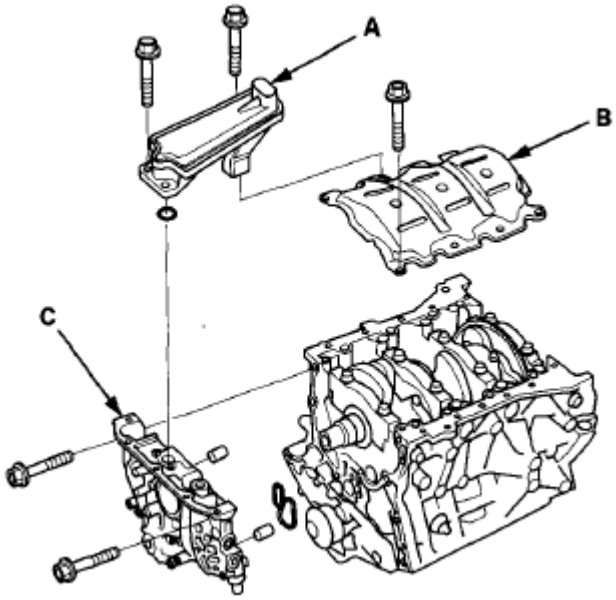


Fig. 21: Identifying Oil Strainer, Baffle Plate, And Oil Pump
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. J35Z6 engine: If you can feel a ridge of metal or hard carbon around the top of any cylinder, remove it with a ridge reamer (A). Follow the reamer manufacturer's instructions. If the ridge is not removed, it may damage the piston as it's pushed out.

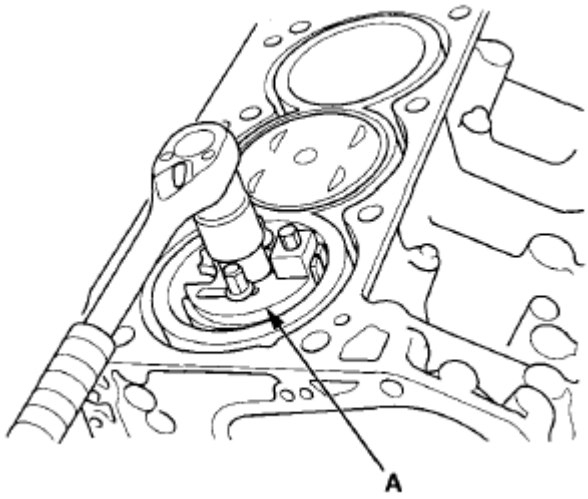


Fig. 22: Removing Ridge Of Metal Or Hard Carbon Around Top Of Cylinder By Using Ridge Reamer
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Remove the connecting rod caps after setting the connecting rod journal at bottom dead center (BDC) for each cylinder. Remove the piston/connecting rod assembly by pushing on the connecting rod. Take care not to damage the oil jets, the connecting rod journal, or the cylinder with the connecting rod.

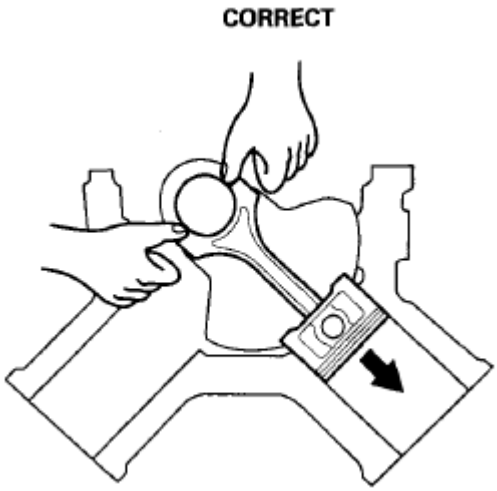


Fig. 23: Pushing Connecting Rod In Correct Direction
Courtesy of AMERICAN HONDA MOTOR CO., INC.

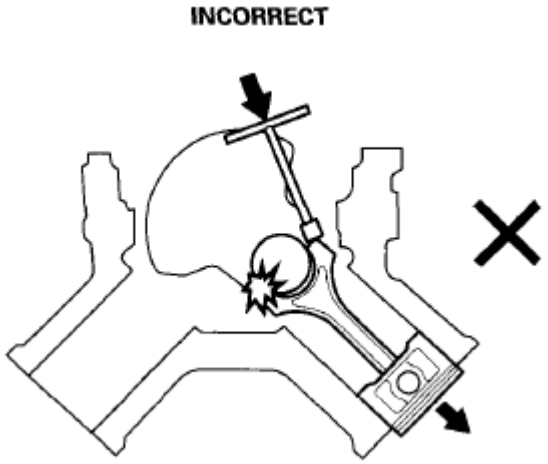


Fig. 24: Pushing Connecting Rod In Incorrect Direction
Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Remove the bearing from the rod cap. Keep all caps/bearings in order.
14. Remove the upper bearing halves from the connecting rods, and set them aside with their respective caps.
15. After removing a piston/connecting rod assembly, reinstall the rod cap on the rod.
16. To avoid confusion during reassembly, mark each piston/connecting rod assembly with its cylinder number.
17. Loosen the bearing cap bolts and the bearing cap side bolts in sequence 1/3 turn at a time; repeat the sequence until all bolts are loosened.

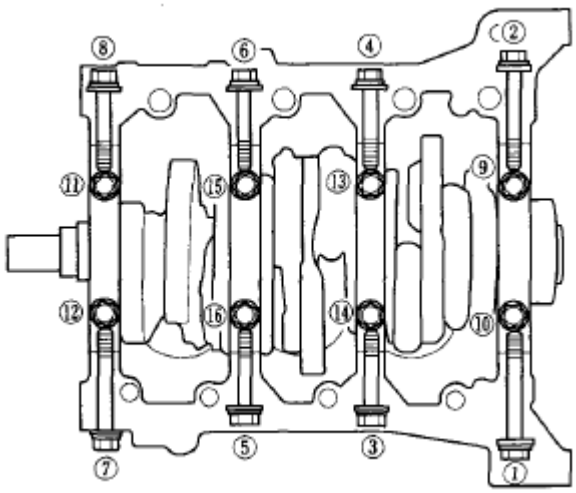


Fig. 25: Identifying Bearing Cap Bolts And Side Bolts With Loosening Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

18. Remove the bearing cap bolts (A) and the bearing cap side bolts (B), then remove the main bearing caps (C).

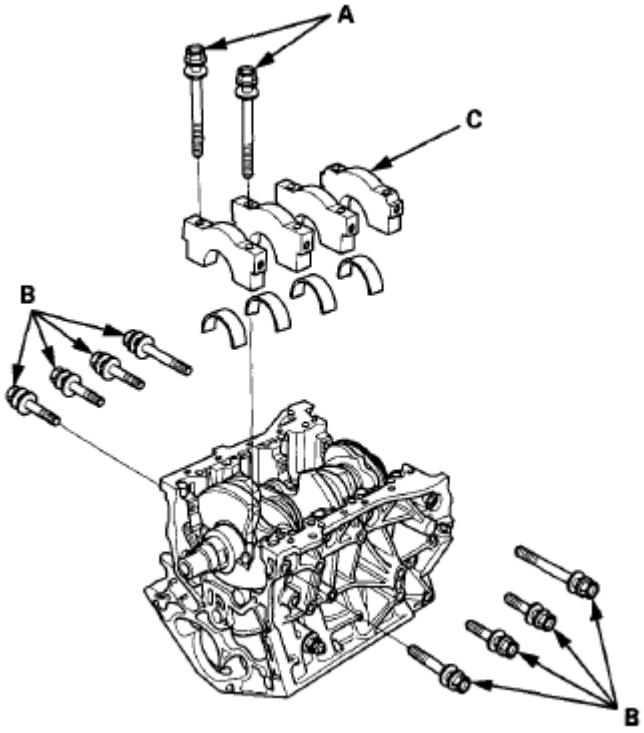


Fig. 26: Identifying Main Bearing Caps, Bearing Cap Bolts And Side Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

19. Lift the crankshaft (A) out of the engine block, being careful not to damage the journals and the CKP pulse plate (B).

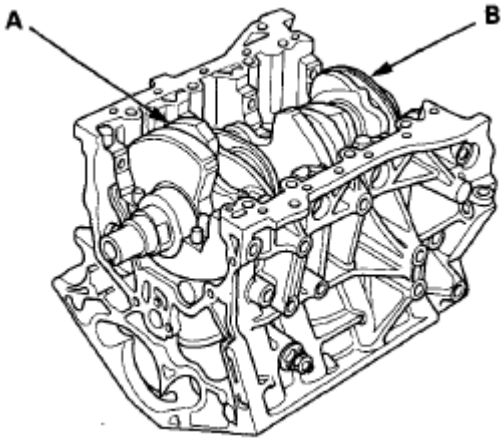


Fig. 27: Identifying Crankshaft And CKP Pulse Plate
Courtesy of AMERICAN HONDA MOTOR CO., INC.

20. Remove the CKP pulse plate from the **crankshaft**.
21. Reinstall the main caps and the bearings on the engine block in the proper order.

CRANKSHAFT INSPECTION

Out-of-Round and Taper

1. Remove the **crankshaft from the engine block**.
2. Remove the **CKP pulse plate from the crankshaft**.
3. Clean the crankshaft oil passages with pipe cleaners or a suitable brush.
4. Check the keyway slot and the threaded holes for damage.
5. Measure the out-of-round at the middle of each rod and the main journal in two places. The difference between measurements on each journal must not be more than the service limit.

   Journal Out-of-Round

   Standard (New): 0.005 mm (0.00020 in) max.

   Service Limit: 0.010 mm (0.00039 in)

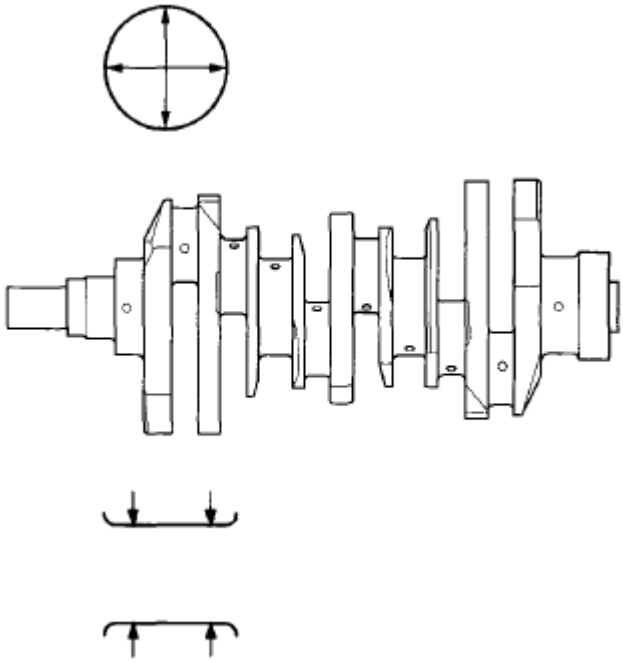


Fig. 28: Identifying Journal Out-Of-Round At Middle Of Each Rod
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

   Journal Taper

   Standard (New): 0.005 mm (0.00020 in) max.

   Service Limit: 0.010 mm (0.00039 in)

Straightness

7. Place the V-blocks on a flat surface.
8. Check the total runout with the crankshaft supported on V-blocks.
9. Measure the runout on all of the main journals. Rotate the crankshaft two complete revolutions. The difference between measurements on each journal must not be more than the service limit.

Crankshaft Total Runout

Standard (New): 0.025 mm (0.00098 in) max.

Service Limit: 0.030 mm (0.00118 in)

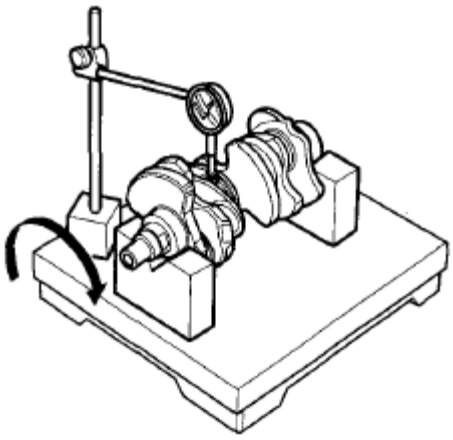


Fig. 29: Measuring Runout On All Of Main Journals
Courtesy of AMERICAN HONDA MOTOR CO., INC.

BLOCK AND PISTON INSPECTION

1. Remove the pistons from the **engine block**.
2. Check the pistons for distortion or cracks.
3. Measure the piston skirt diameter at a point 16 mm (0.63 in) from the bottom of the skirt.

J35Z6 engine

Piston Skirt Diameter

Standard (New): 88.975- 88.985 mm (3.50295- 3.50334 in)

Service Limit: 88.965 mm (3.50255 in)

Oversize Piston Skirt Diameter

0.25: 89.225- 89.235 mm (3.51279- 3.51318 in)

J37A4 engine

Piston Skirt Diameter

Standard (New): 89.983- 89.996 mm (3.54263- 3.54314 in)

Service Limit: 89.975 mm (3.54232 in)

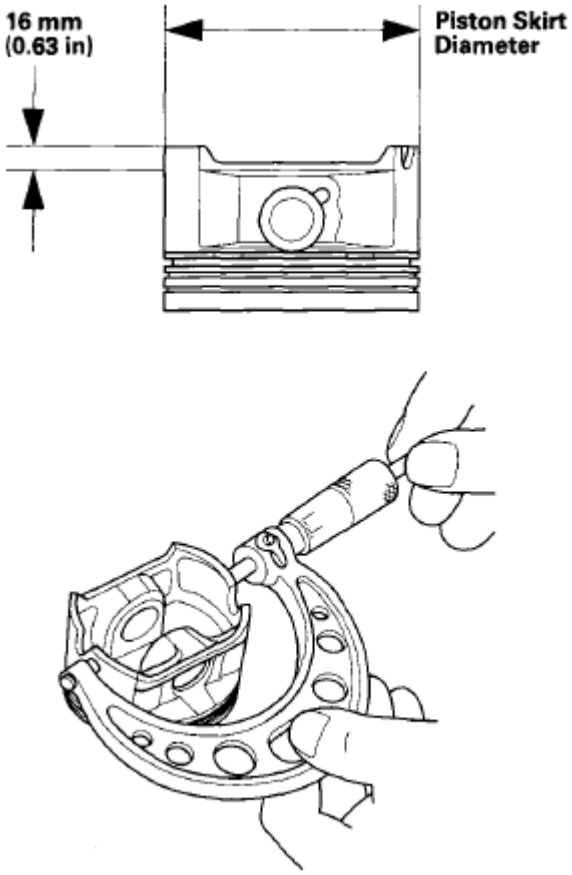


Fig. 30: Measuring Piston Skirt Diameter From Bottom Of Skirt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Measure the wear and taper in direction X and Y at three levels in each cylinder as shown in illustration above.
5. J35Z6 engine: If the measurements in any cylinder are beyond the oversize bore service limit, replace the engine block. If the engine block has to be rebored, refer to step 8 after reboring.

   J37A4 engine: If the measurements in any cylinder are beyond the service limit, replace the engine block. The J37A4 engine block can not be rebored.

J35Z6 engine

Cylinder Bore Size

Standard (New): 89.000- 89.015 mm (3.50393- 3.50452 in)

Service Limit: 89.065 mm (3.50649 in)

Oversize

0.25: 89.250- 89.265 mm (3.51377- 3.51436 in)

Reboring Limit: 0.25 mm (0.0098 in)

Bore Taper

Limit: (Difference between first and third measurement) 0.05 mm (0.0020 in)

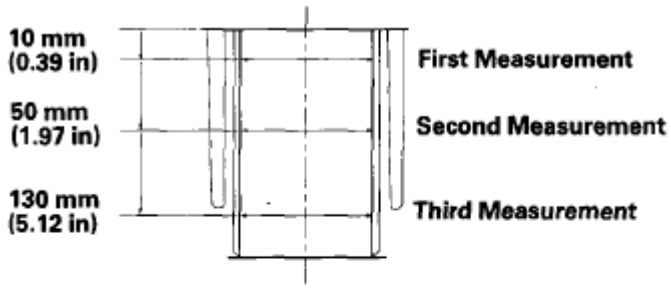
J37A4 engine Cylinder Bore Size

Standard (New): 90.000- 90.015 mm (3.54330- 3.54389 in)

Service Limit: 90.065 mm (3.54586 in)

Bore Taper

Limit: (Difference between first and third measurement) 0.05 mm (0.0020 in)



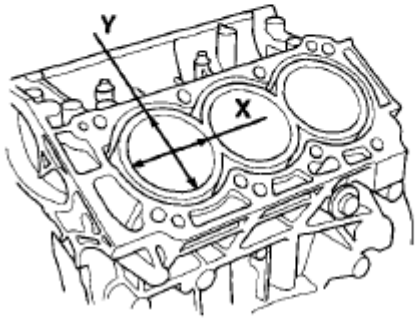


Fig. 31: Measuring Wear And Taper In Direction X And Y At Three Levels In Each Cylinder
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. **J35Z6 engine**: Hone any scored or scratched cylinder bores.

   NOTE: The J37A4 engine can not be honed. If the cylinders are damaged, the engine block must be replaced.

7. Check the top of the engine block for warpage. Measure along the edges and across the center as shown in illustration below.

   Engine Block Warpage

   Standard (New): 0.07 mm (0.002 in) max.

   Service Limit: 0.10 mm (0.003 in)

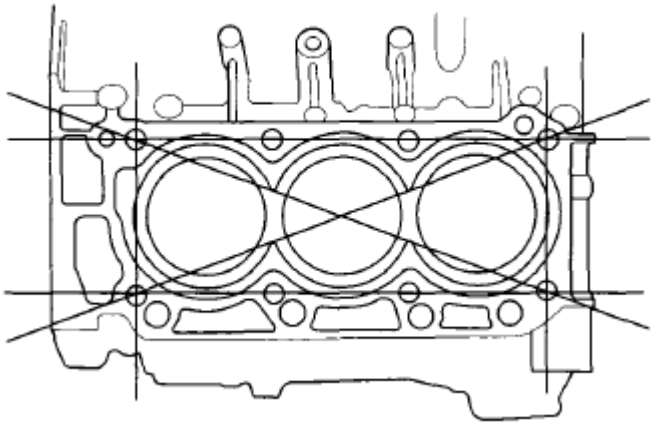


Fig. 32: Identifying Top Of Engine Block For Warpage
Courtesy of AMERICAN HONDA MOTOR CO., INC.

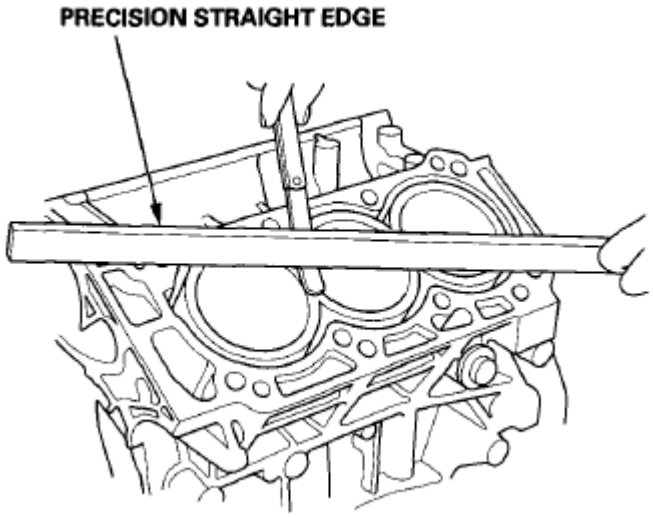


Fig. 33: Checking Top Of Engine Block For Warpage Using Precision Straight Edge

Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

J35Z6 engine

Piston-to-Cylinder Bore Clearance

Standard (New): 0.015- 0.040 mm (0.001- 0.001 in)

Service Limit: 0.08 mm (0.003 in)

J37A4 engine

Piston-to-Cylinder Bore Clearance

Standard (New): 0.004- 0.032 mm (0.001- 0.001 in)

Service Limit: 0.07 mm (0.002 in)

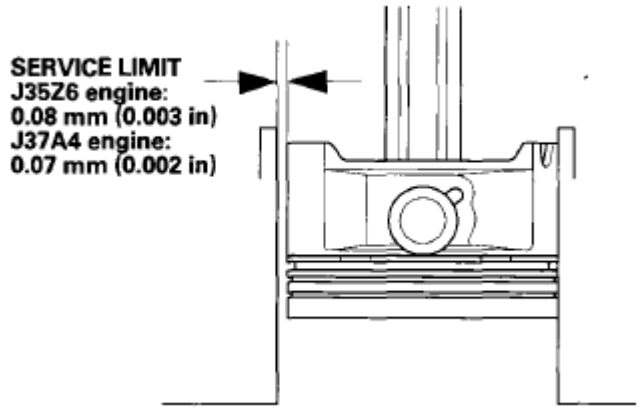


Fig. 34: Identifying Difference Between Cylinder Bore Diameter And Piston Diameter
Courtesy of AMERICAN HONDA MOTOR CO., INC.

CYLINDER BORE HONING

J35Z6 ENGINE

NOTE: The J37A4 engine can not be honed. If the cylinders are damaged, the engine block must be replaced.

1. Measure the cylinder bores (see step 4). If the engine block is to be reused, hone the cylinders and remeasure the bores. Only scored or scratched cylinder bores must be honed.
2. Remove the oil jets (see **OIL JET REPLACEMENT**).

3. Hone the cylinder bores with honing oil and a fine (400 grit) stone in a 60 degree Crosshatch pattern.

NOTE:
- **Use only a rigid hone with 400 grit or finer stone, such as Sunnen, Ammco, or equivalent.**
- **Do not use stones that are worn or broken.**

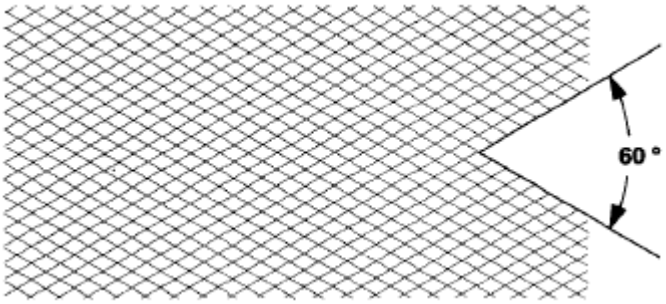


Fig. 35: Identifying 60° Crosshatch Pattern Of Cylinder Bores
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. When honing is complete, thoroughly clean the engine block of all metal particles. Wash the cylinder bores with hot soapy water, then dry and oil them immediately to prevent rusting.

NOTE: Never use solvent, it will only redistribute the grit on the cylinder walls.

5. If scoring or scratches are still present in the cylinder bores after honing to the service limit, rebore the engine block. Some light vertical scoring and scratching is acceptable if it is not deep enough to catch your fingernail and does not run the full length of the bore.
6. Install the oil jets (see **OIL JET REPLACEMENT**).

PISTON, PIN, AND CONNECTING ROD REPLACEMENT

DISASSEMBLY

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

NOTE: Take care not to damage the ring grooves.

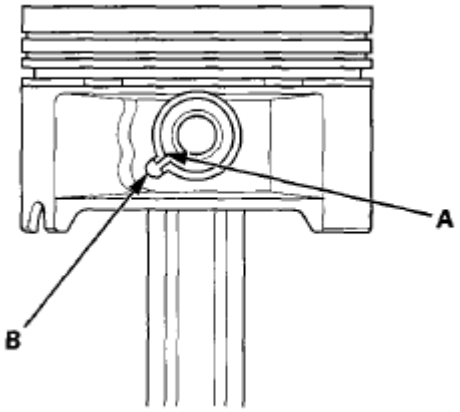


Fig. 36: Identifying Piston Pin Snap Rings And Piston Pin Bores
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

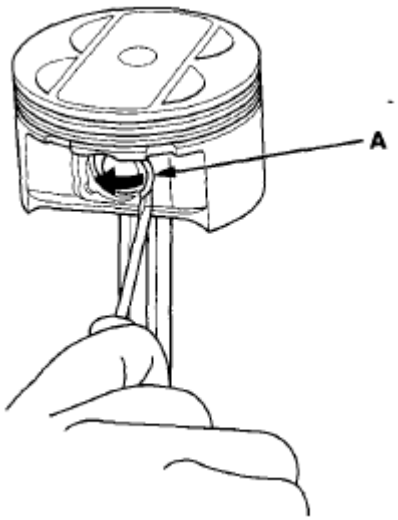


Fig. 37: Identifying Snap Rings From Both Sides Of Each Piston
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Separately heat each piston and connecting rod assembly to about 158 CF (70 °C), then remove the piston pin.

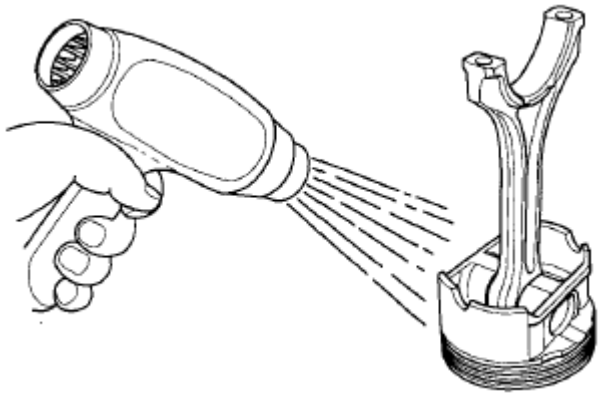


Fig. 38: Removing Piston Pin To Separate Heat On Each Piston And Connecting Rod Assembly
Courtesy of AMERICAN HONDA MOTOR CO., INC.

INSPECTION

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

1. Measure the diameter of the piston pin.

   Piston Pin Diameter

   Standard (New): 21.962- 21.965 mm (0.86464- 0.86476 in)

   Service Limit: 21.954 mm (0.86433 in)

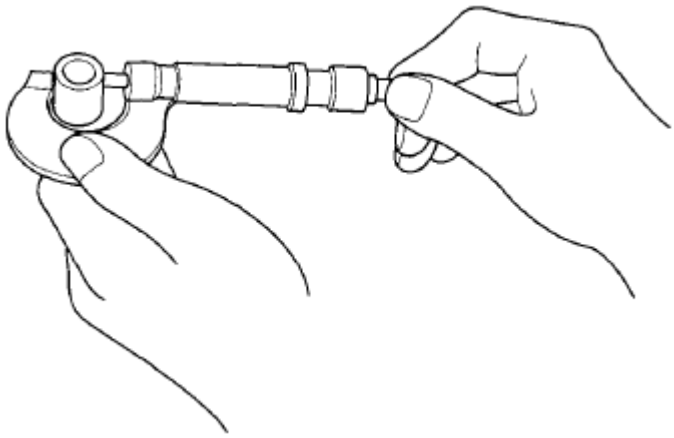


Fig. 39: Measuring Piston Pin Diameter
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Zero the dial gauge (A) to the piston pin diameter.

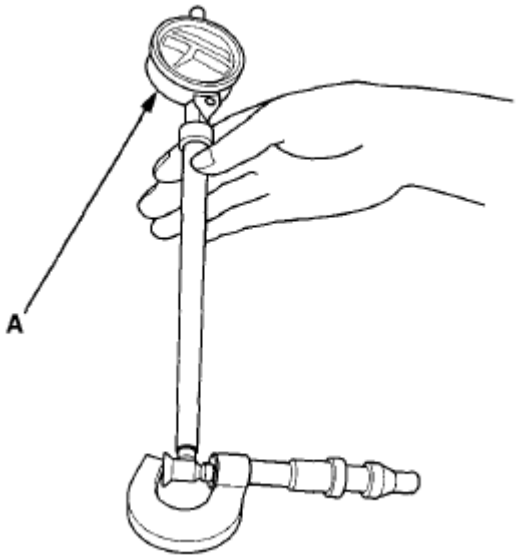


Fig. 40: Measuring Piston Pin Diameter
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

   J35Z6 engine

   Piston Pin-to-Piston Clearance

   Standard (New): -0.005- 0.001 mm (-0.00020- 0.00004 in)

   Service Limit: 0.004 mm (0.00016 in)

   J37A4 engine

   Piston Pin-to-Piston Clearance

   Standard (New): -0.005- 0.003 mm (-0.00020- 0.00012 in)

   Service Limit: 0.004 mm (0.00016 in)

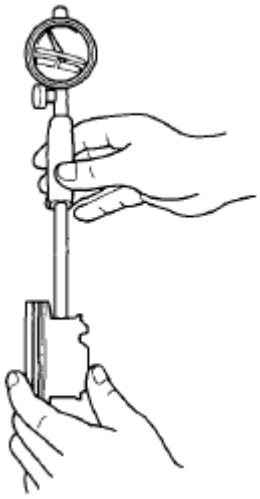


Fig. 41: Checking Piston Pin-To-Piston Clearance
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

   Piston Pin-to-Connecting Rod Clearance

   Standard (New): 0.005- 0.014 mm (0.00020- 0.00055 in)

   Service Limit: 0.019 mm (0.00075 in)

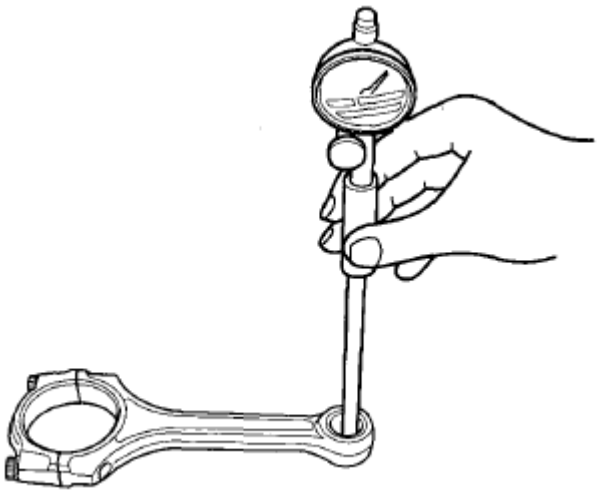


Fig. 42: Measuring Piston Pin-To-Connecting Rod Clearance
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REASSEMBLY

1. Install a piston pin snap ring (A) only on one side.

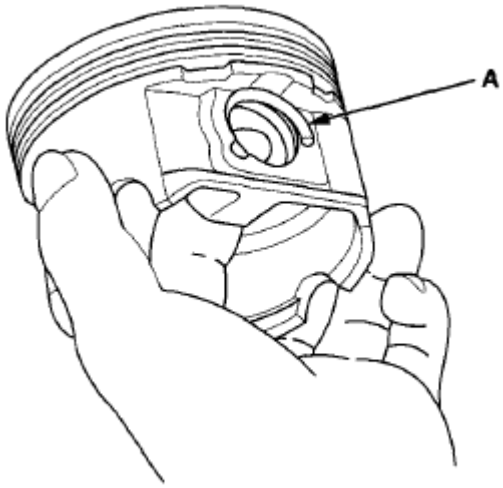


Fig. 43: Installing Piston Pin Snap Ring
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

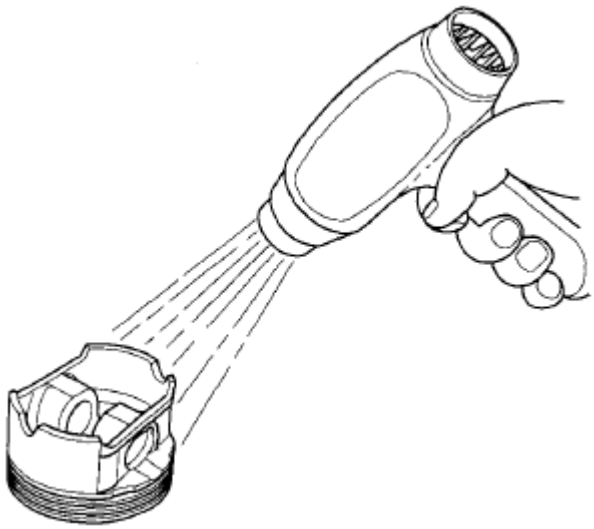


Fig. 44: Heating Piston
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

NOTE: Apply new engine oil to the piston pin.

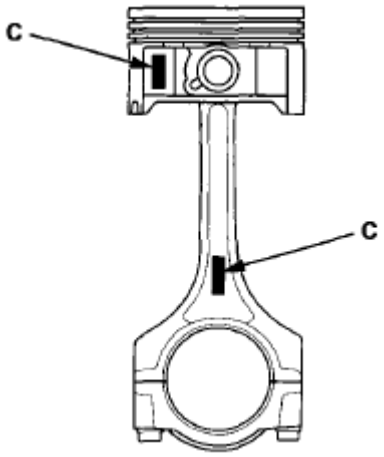


Fig. 45: Identifying Embossed Marks On Piston And Connecting Rod
Courtesy of AMERICAN HONDA MOTOR CO., INC.

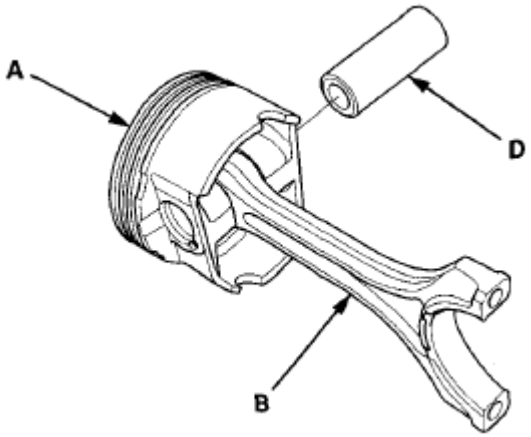


Fig. 46: Identifying Piston, Connecting Rod And Piston Pin
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Install the remaining snap ring.
6. Reassemble the other pistons the same way.

PISTON RING REPLACEMENT

1. Remove the pistons from the **engine block**.
2. Using a ring expander (A), remove the old piston rings (B).

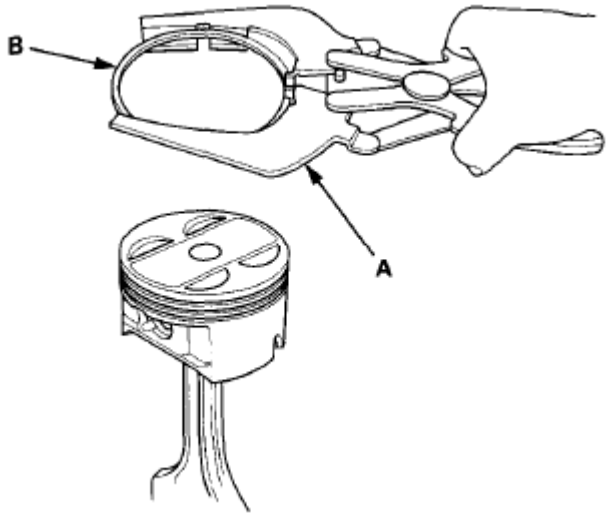


Fig. 47: Removing Piston Rings Using Ring Expander
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Clean all the ring grooves thoroughly with a squared-off broken ring, or a ring groove cleaner with a blade to fit the piston grooves. File down the blade, if necessary. The top ring and second ring grooves are 1.2 mm (0.047 in) wide, and the oil ring groove is 2.8 mm (0.110 in) (J35Z6 engine) or 2.0 mm (0.079 in) (J37A4 engine) wide. Do not use a wire brush to clean the ring grooves, or cut the ring grooves deeper with the cleaning tool.

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

4. Using a piston, push a new ring (A) into the cylinder bore 15- 20 mm (0.59- 0.79 in) from the bottom.

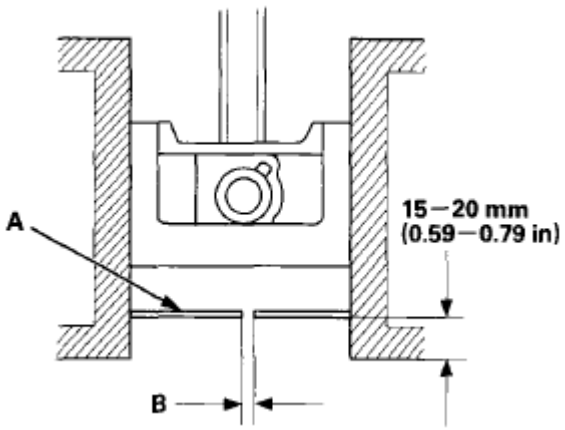


Fig. 48: Identifying Piston Ring Position
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Measure the piston ring end-gap (B) with a feeler gauge:
   - If the gap is too small, check to see if you have the proper rings for your engine.

- If the gap is too large, recheck the cylinder bore diameter against the wear limits (see step 4).

6. J35Z6 engine: If the bore is over the service limit, the engine block must be rebored.

J35Z6 engine

Piston Ring End-Gap

Top Ring:

Standard (New): 0.20- 0.35 mm (0.008- 0.013 in)

Service Limit: 0.60 mm (0.023 in)

Second Ring:

Standard (New): 0.40- 0.S5 mm (0.016- 0.021 in)

Service Limit: 0.70 mm (0.027 in)

Oil Ring:

Standard (New): 0.20- 0.70 mm (0.008- 0.027 in)

Service Limit: 0.80 mm (0.031 in)

J37A4 engine

Piston Ring End-Gap

Top Ring:

Standard (New): 0.30- 0.40 mm (0.012- 0.015 in)

Service Limit: 0.60 mm (0.023 in)

Second Ring:

Standard (New): 0.40- 0.55 mm (0.016- 0.021 in)

Service Limit: 0.70 mm (0.027 in)

Oil Ring:

Standard (New): 0.20- 0.35 mm (0.008- 0.013 in)

Service Limit: 0.45 mm (0.017 in)

7. Install the rings as shown in illustration below. The top ring (A) has a 1D or 1R mark (J35Z6 engine) or 1E mark (J37A4 engine) and the second ring (B) has a 2X or 2R mark (J35Z6 engine) or 2E mark (J37A4 engine). The manufacturing marks (C) must be facing upward.

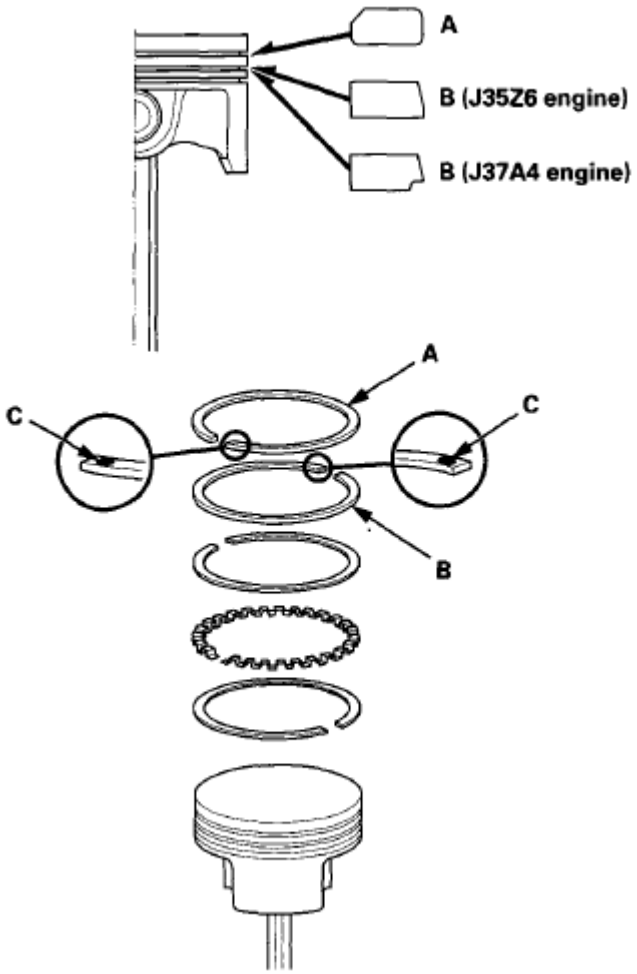


Fig. 49: Identifying Top Ring, Second Ring With Manufacturing Marks
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Piston Ring Dimensions:

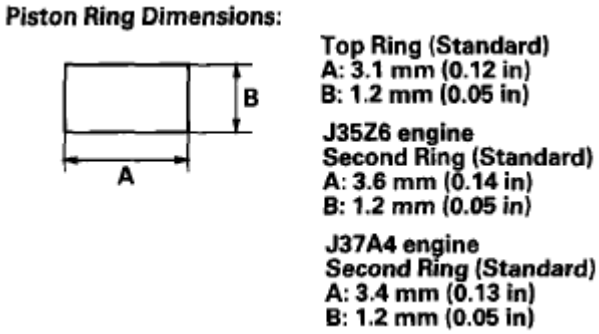


Fig. 50: Identifying Piston Ring Dimensions
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

J35Z6 engine

Top Ring Clearance

Standard (New): 0.055- 0.080 mm (0.003- 0.003 in)

Service Limit: 0.15 mm (0.005 in)

Second Ring Clearance

Standard (New): 0.030- 0.055 mm (0.002- 0.002 in)

Service Limit: 0.13 mm (0.005 in)

J37A4 engine

Top Ring Clearance

Standard (New): 0.055- 0.085 mm (0.003- 0.003 in)

Service Limit: 0.15 mm (0.005 in)

Second Ring Clearance

Standard (New): 0.030- 0.060 mm (0.002- 0.002 in)

Service Limit: 0.13 mm (0.005 in)

Fig. 51: Measuring Ring-To-Groove Clearance

Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Rotate the rings in their grooves to make sure they do not bind.
10. Position the ring end gaps as shown in illustration below.

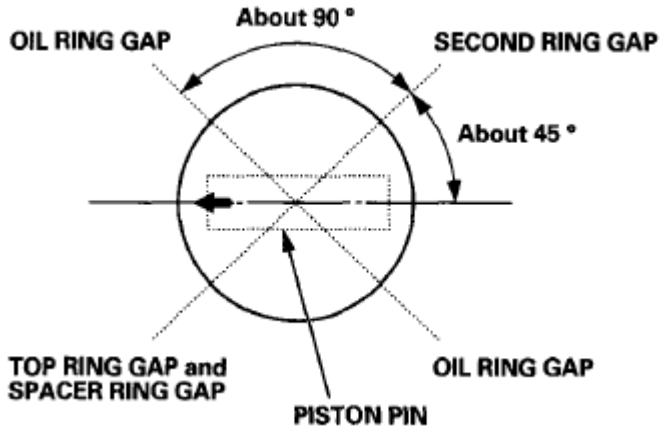


Fig. 52: Positioning Ring End Gaps
Courtesy of AMERICAN HONDA MOTOR CO., INC.

CRANKSHAFT AND PISTON INSTALLATION

Special Tools Required

- Driver Handle, 15 x 135L 07749-0010000
- Oil Seal Driver Attachment, 106 mm 070AD-RCA0200

1. Check the **main bearing clearance** with plastigage.
2. Check the **connecting rod bearing clearance** with plastigage.
3. Install the bearing halves in the engine block and the connecting rods.
4. Apply new engine oil to the inside of the main bearings and the rod bearings.
5. Install the **CKP pulse plate to the crankshaft**.
6. Lower the crankshaft (A) into the engine block, being careful not to damage the journals and the CKP pulse plate (B).

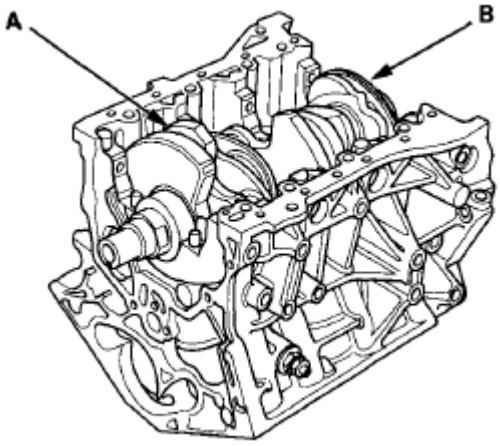


Fig. 53: Identifying Crankshaft And CKP Pulse Plate
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Apply new engine oil to the side with the thrust washer groove. Install the thrust washers (A) in the No. 3 journal.

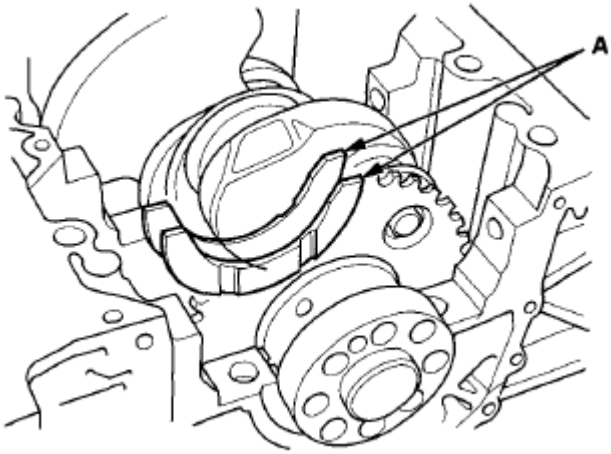


Fig. 54: Identifying Thrust Washers
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Install the bearings (A) and the main bearing caps (B) with the arrow (C) facing the timing belt side of the engine block.

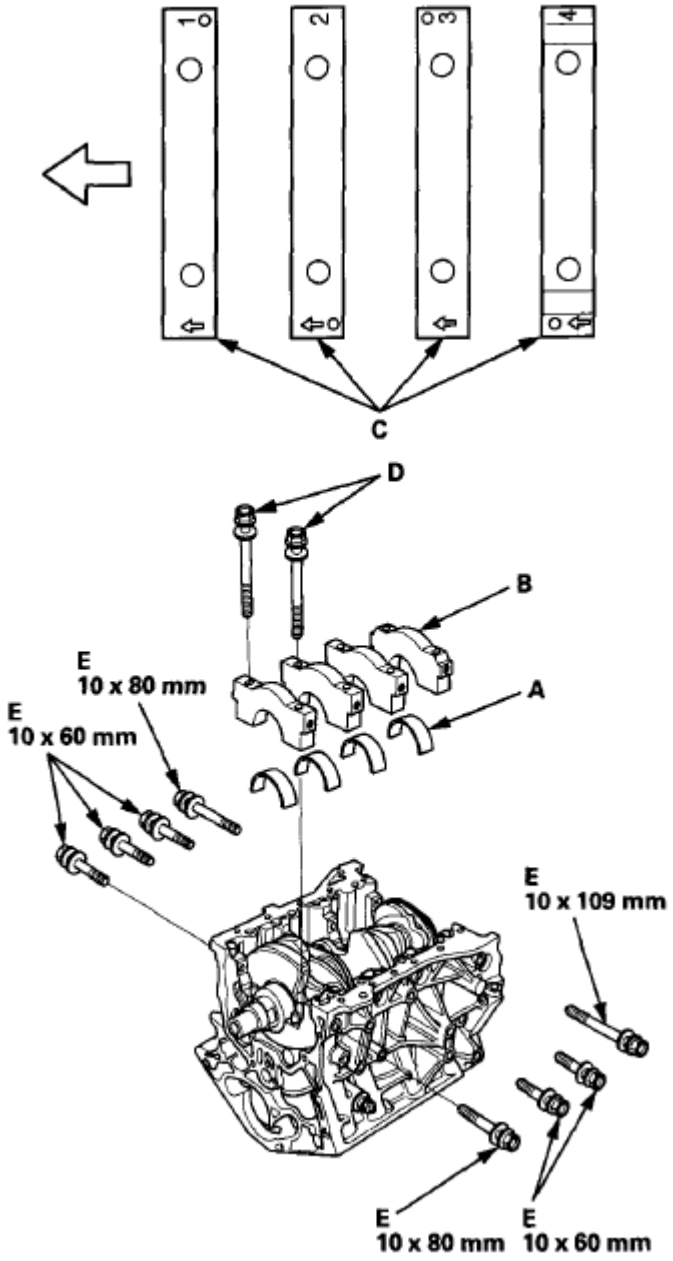


Fig. 55: Identifying Bearings And Main Bearing Caps Installation Position
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Apply new engine oil to the bolt threads and flanges, then loosely install the bearing cap bolts (D) and the bearing cap side bolts (E).
10. Set the crankshaft to bottom dead center (BDC) for the cylinder you are installing the piston in.
11. Apply new engine oil to the piston, the inside of the ring compressor, and the cylinder bore.
12. Attach the ring compressor to the piston/connecting rod assembly, and check that the bearing is securely in place.
13. Position the piston/connecting rod assembly with the arrow (A) facing the timing belt side of the engine block.

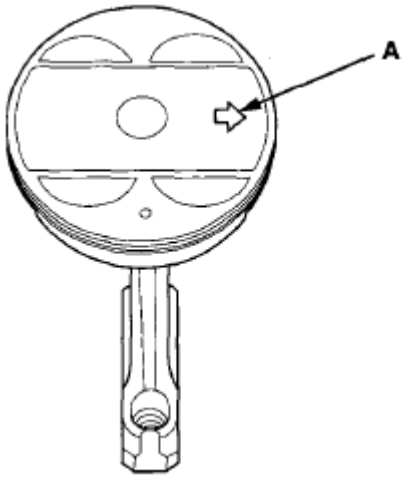


Fig. 56: Positioning Piston/Connecting Rod Assembly With Arrow
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

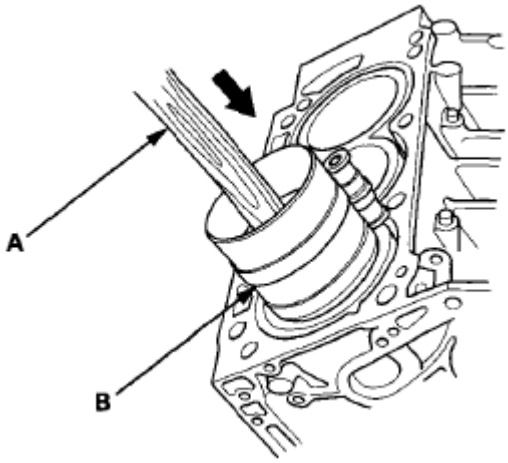


Fig. 57: Pushing Downward Force On Ring Compressor By Using Wooden Handle Of Hammer
Courtesy of AMERICAN HONDA MOTOR CO., INC.

15. Stop after the ring compressor pops free, and check the connecting rod-to-rod journal alignment before pushing the piston into place.
16. Measure the diameter of each connecting rod bolt at point A and point B.

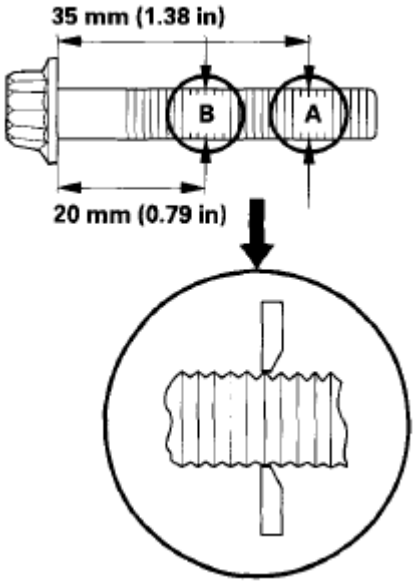


Fig. 58: Identifying Connecting Rod Bolt Diameter At Point A And B
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

    Point A- Point B = Difference in Diameter

    Difference in Diameter

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

18. If the difference in diameter is out of tolerance, replace the connecting rod bolt.
19. Install the bearing (A), then line up the mark (B) on the connecting rod (C) and the rod cap (D).

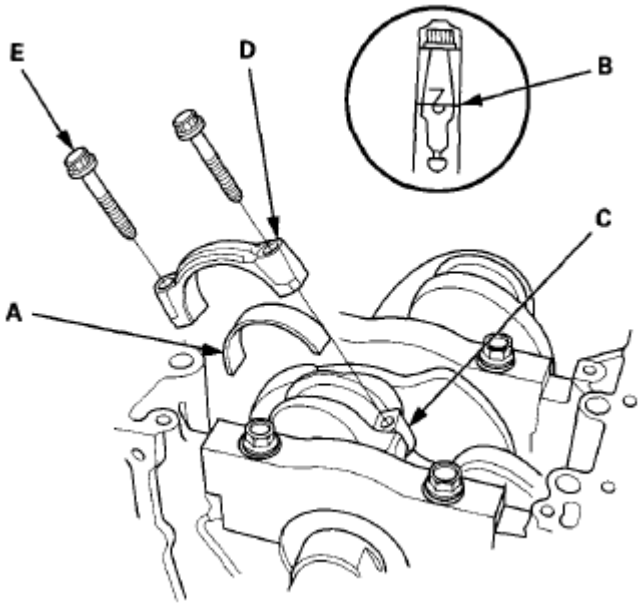


Fig. 59: Identifying Bearing, Connecting Rod, Rod Cap, Bearing Mark And Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

20. Apply new engine oil to the bolt threads and flanges. Torque the bolts (E) to 20 N.m (2.0 kgf.m, 15 lbf.ft).
21. Tighten the connecting rod bolt an additional 90 °.

NOTE: Remove the connecting rod bolt if you tightened it beyond the specified angle, and go back to step 16 of the procedure. Do not loosen it back to the specified angle. Repeat steps 10 to 21 for the remaining cylinders.

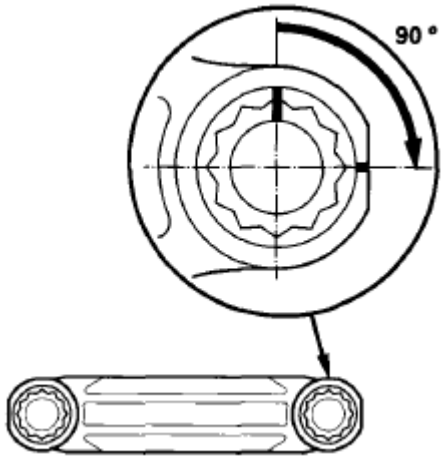


Fig. 60: Identifying Specified Angle For Tightening Connecting Rod Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

22. Tighten the main bearing cap bolts, then tighten the main bearing cap side bolts to the specified torque in

the sequence as shown in illustration below. Repeat the torque sequence again to ensure the bolts are properly torqued.

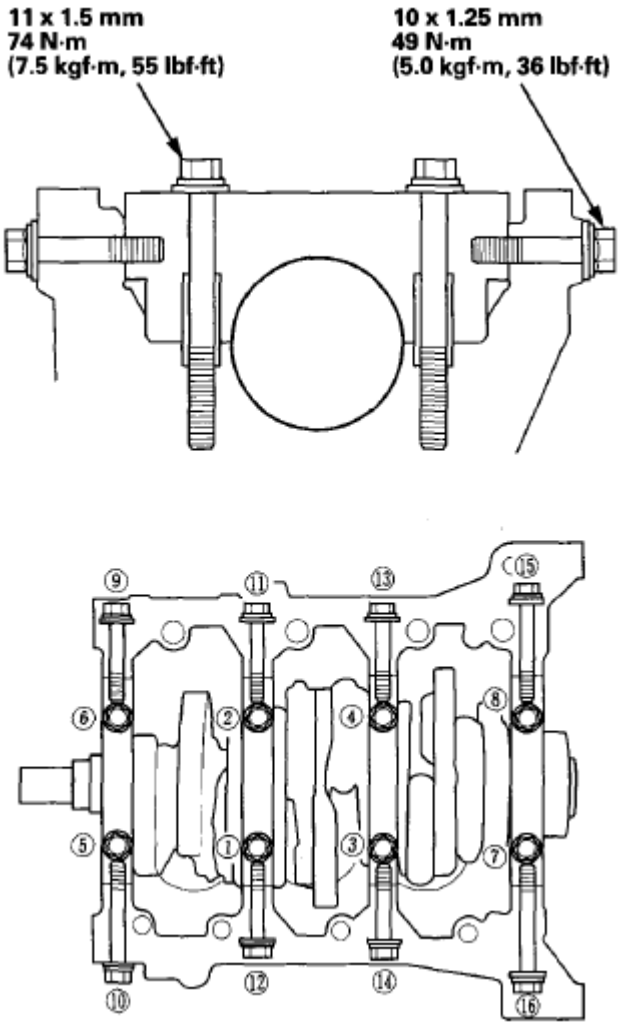


Fig. 61: Identifying Main Bearing Cap Side Bolts With Tightening Sequence With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

23. Remove ail of the old liquid gasket from the engine block end cover mating surfaces, the bolts, and the bolt holes.
24. Clean and dry the engine block end cover mating surfaces.
25. Apply a light coat of new engine oil to the lip of the crankshaft oil seal.
26. Using the driver handle, 15 x135 L and the oil seal driver attachment, 106 mm, drive in the new crankshaft oil seal (A) until the oil seal driver attachment bottoms on the engine block end cover.

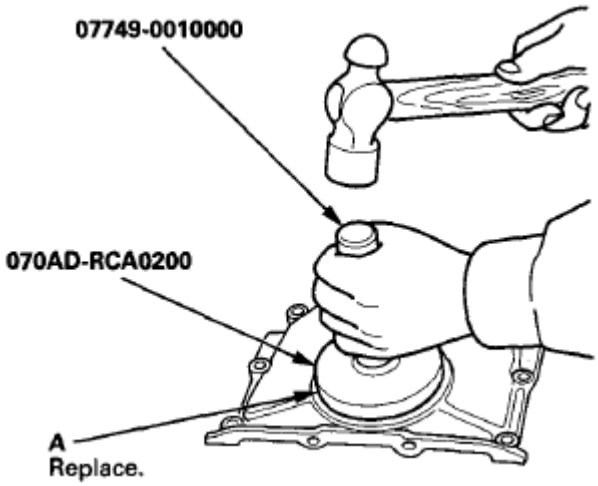


Fig. 62: Installing Crankshaft Oil Seal Using Driver Handle And Attachment
Courtesy of AMERICAN HONDA MOTOR CO., INC.

27. Apply liquid gasket, P/N 08717-0004, 08718-0003, 08718-0004, or 08718-0009 to the engine block mating surface of the engine block end cover and to the inside edge of the threaded bolt holes. 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.**

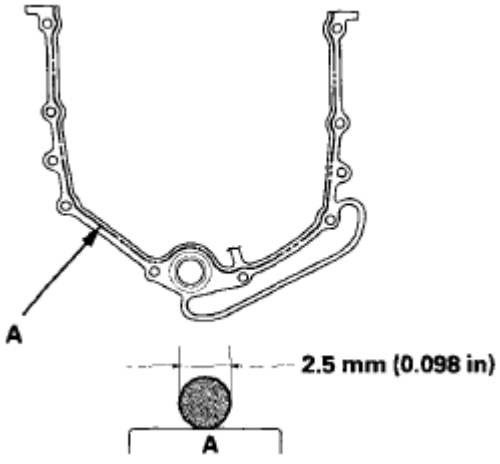


Fig. 63: Identifying Diameter Bead Of Liquid Gasket
Courtesy of AMERICAN HONDA MOTOR CO., INC.

28. Install the dowel pins (A), a new O-ring (B), and the engine block end cover (C) on the engine block.

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 engine block end cover.**

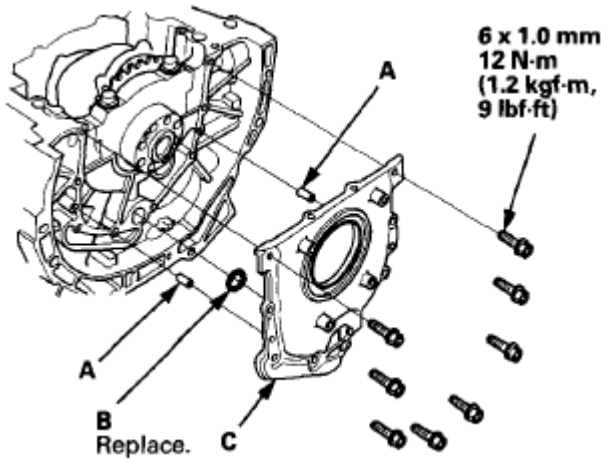


Fig. 64: Identifying Dowel Pins, O-Rings And Engine Block End Cover On Engine Block With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

29. Clean the excess oil off the crankshaft, and check that the oil seal lip is not distorted.
30. Install a new crankshaft oil seal in the oil pump (see **OIL PUMP OVERHAUL**).
31. Remove all of the old liquid gasket from the oil pump mating surfaces, the bolts, and the bolt holes.
32. Clean and dry the oil pump mating surfaces.
33. Apply liquid gasket, P/N 08717-0004, 08718-0003, 08718-0004, or 08718-0009 to the engine block mating surface of the oil pump and to the inside edge of the threaded bolt holes. 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.**

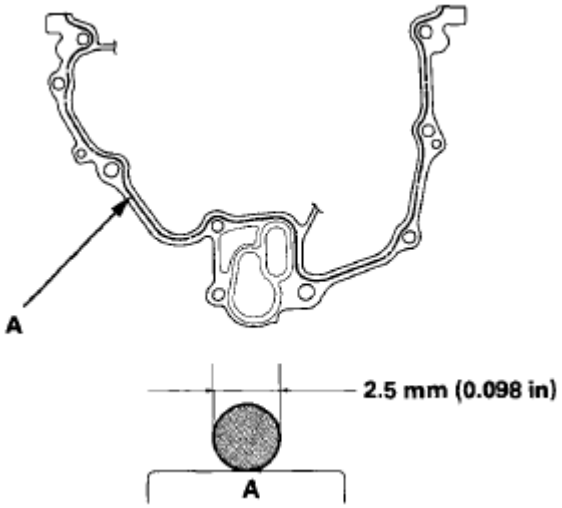


Fig. 65: Identifying Diameter Bead Of Liquid Gasket
Courtesy of AMERICAN HONDA MOTOR CO., INC.

34. Apply a light coat of new engine oil to the lip of the crankshaft oil seal, and apply new engine oil to the new O-ring (A).

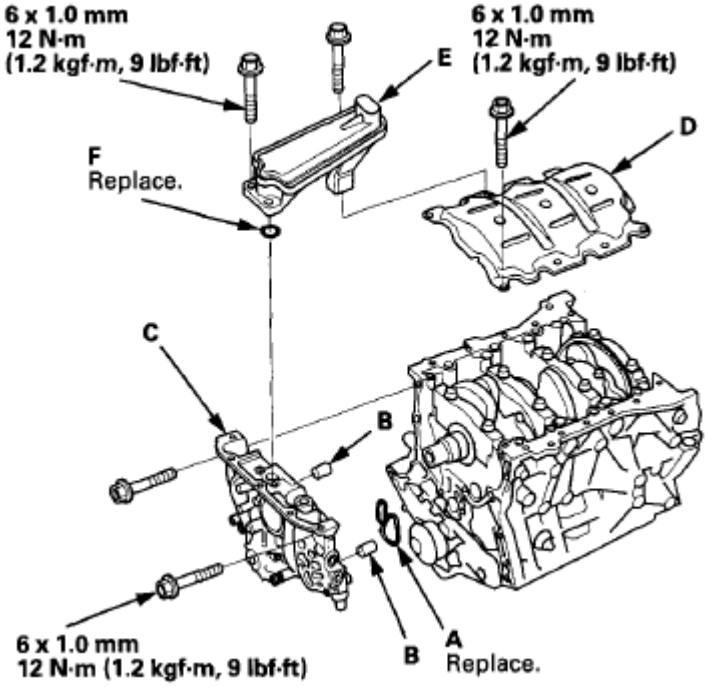


Fig. 66: Identifying O-Rings, Dowel Pins, Oil Pump, Baffle Plate, Oil Retainer With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

35. Install the dowel pins (B), then align the inner rotor with the crankshaft, and install the oil pump (C).
36. Clean the excess oil off the crankshaft, and check that the oil seal is not distorted.

37. Install the baffle plate (0), then install the oil strainer (E) with a new O-ring (F).

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 oil pump.**

38. Install the rocker arm oil control solenoid/oil filter assembly (A), with a new rocker arm oil control solenoid filter (B).

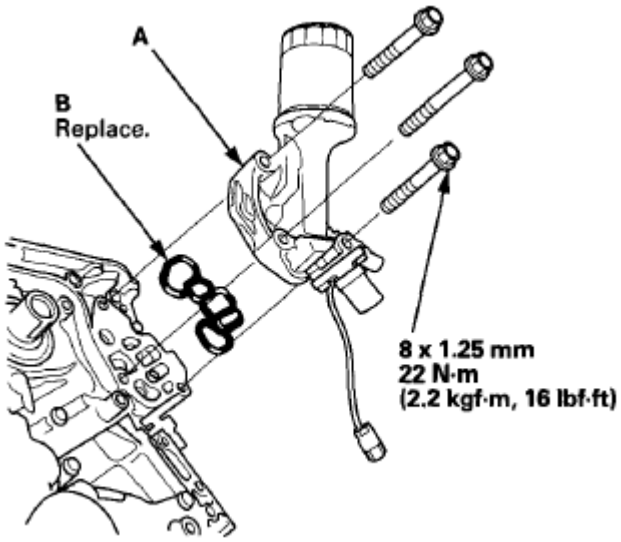


Fig. 67: Identifying Rocker Arm Oil Control Solenoid/Oil Filter Assembly And Solenoid Filter With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

39. Install the **oil pan**.
40. Install the timing belt drive pulley to the crankshaft:
    - J35Z6 engine (see **TIMING BELT DRIVE PULLEY REPLACEMENT**)
    - J37A4 engine (see **TIMING BELT DRIVE PULLEY REPLACEMENT**)
41. Install the cylinder heads:
    - J35Z6 engine (see **CYLINDER HEAD INSTALLATION**)
    - J37A4 engine (see **CYLINDER HEAD INSTALLATION**)
42. M/T model: Install the flywheel (see **TRANSMISSION SIDE**).
43. A/T model: Install drive plate (see **DRIVE PLATE REMOVAL AND INSTALLATION**).
44. Install the transmission:
    - Manual transmission (see **TRANSMISSION INSTALLATION**)
    - Automatic transmission (see **DRIVE PLATE REMOVAL AND INSTALLATION**)
45. Install the engine/transmission (see **ENGINE INSTALLATION**).

NOTE: When any crankshaft main or connecting rod bearing is replaced, run the engine at idle until it reaches normal operating temperature, then continue to run it for about 15 minutes.

CKP PULSE PLATE REPLACEMENT

1. Remove the **crankshaft** from the engine block.
2. Remove the CKP pulse plate (A) from the crankshaft.

NOTE: Be careful not to damage the journals and the CKP pulse plate.

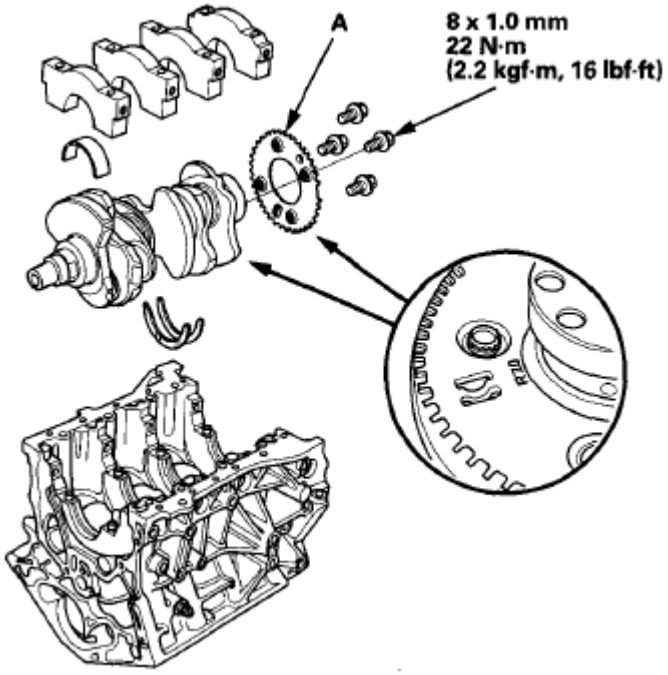


Fig. 68: Identifying CKP Pulse Plate With Mounting Bolts With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Install the CKP pulse plate in the reverse order of removal.

NOTE: When installing the crankshaft, refer to the crankshaft and piston installation procedure.

OIL PAN INSTALLATION

1. Remove all of the old liquid gasket from the oil pan mating surfaces, the bolts, and the bolt holes.
2. Clean and dry the oil pan mating surfaces.
3. Apply liquid gasket, P/N 08717-0004, 08718-0003, 08718-0004, or 08718-0009 to the oil pan mating surface of the engine block and to the inside edge of the threaded bolt holes. 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.**

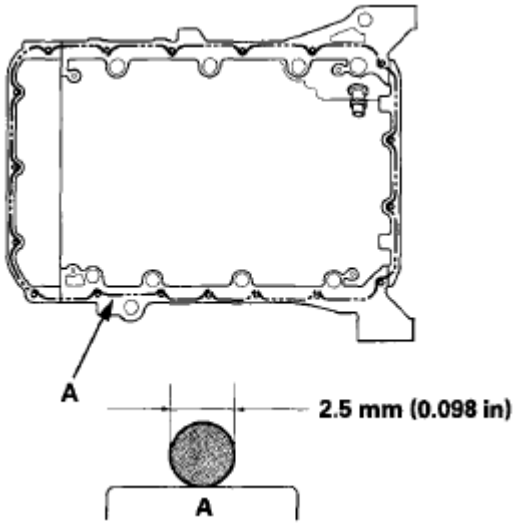


Fig. 69: Identifying Diameter Bead Of Liquid Gasket Along Broken Line
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Install the oil pan on the engine block.
5. Tighten the bolts in three steps. In the final step, torque all bolts, in sequence, to 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 oil pan.**

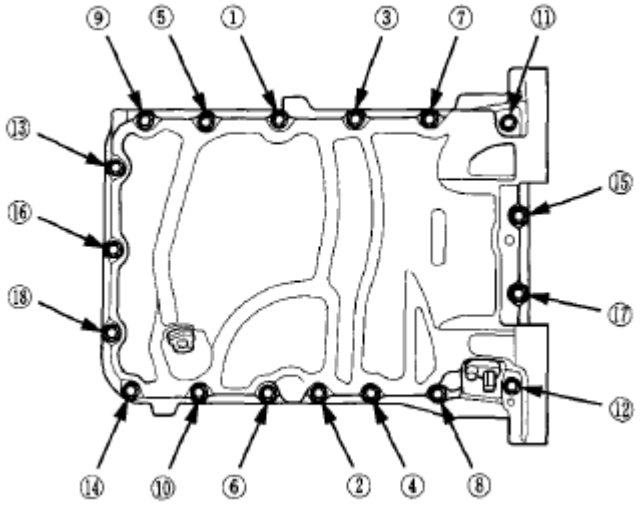


Fig. 70: Identifying Oil Pan Bolts With Tightening Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Tighten the four bolts (A) securing the transmission, then install the torque converter case cover (B).

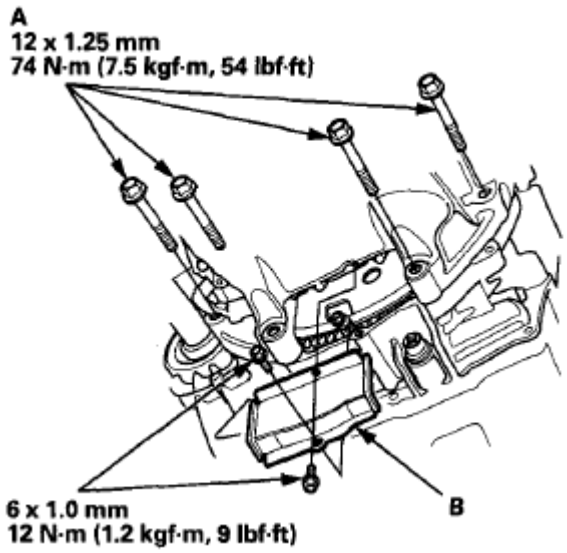


Fig. 71: Identifying Transmission Bolts With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Connect the CKP sensor connector (A), then install the CKP sensor cover (B) and the bolt (C).

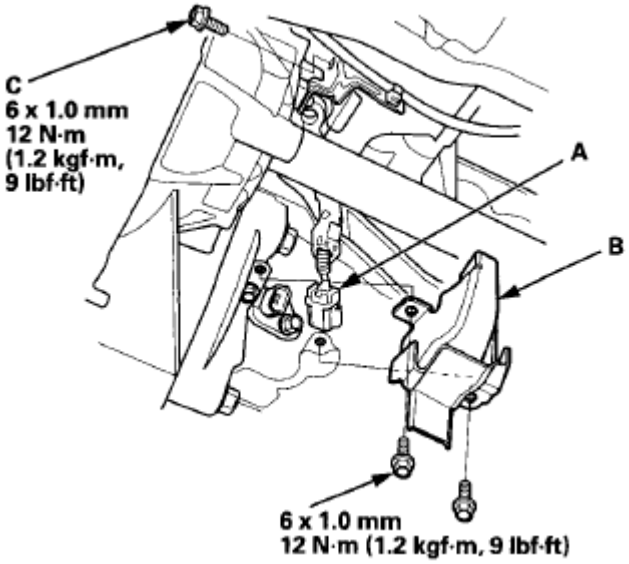


Fig. 72: Identifying CKP Sensor Connector, CKP Sensor Cover & Mounting Bolt With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Install the rear warm up TWC bracket.

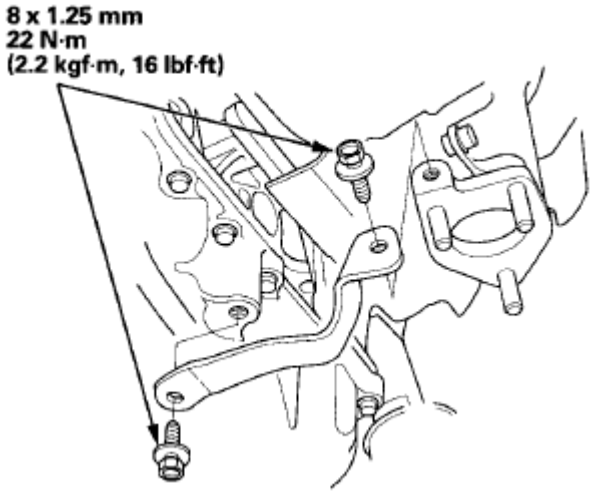


Fig. 73: Identifying Rear Warm Up TWC Bracket With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. If the engine is still in the vehicle, do the following steps.
10. Install exhaust pipe A using new gaskets and new self-locking nuts (see step 35 **ENGINE INSTALLATION**).
11. Install the front splash shield (see **FRONT SPLASH SHIELD REPLACEMENT**).
12. Refill the engine with engine oil (see **ENGINE OIL LEVEL CHECK**).

PULLEY END CRANKSHAFT OIL SEAL INSTALLATION - IN CAR

Special Tools Required

Oil Seal Driver, 64 mm 07OAD-RCAA100

1. Remove the timing belt drive pulley:
   - J35Z6 engine (see **TIMING BELT DRIVE PULLEY REPLACEMENT**)
   - J37A4 engine (see **TIMING BELT DRIVE PULLEY REPLACEMENT**)
2. Remove the pulley end crankshaft oil seal.
3. Clean and dry the crankshaft oil seal housing.
4. Apply a light coat of new engine oil to the lip of the crankshaft oil seal.
5. Using the oil seal driver, 64 mm, drive in the new crankshaft oil seal (A) until the oil seal driver bottoms on the oil pump.

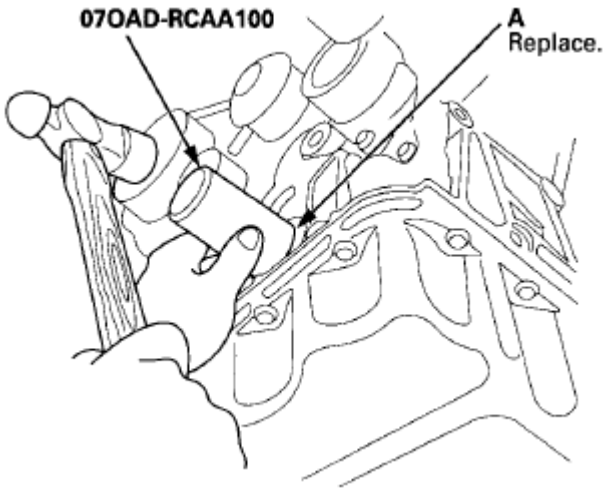


Fig. 74: Installing End Crankshaft Oil Seal Using Oil Seal Driver
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Clean the excess oil off the crankshaft, and check that the oil seal lip is not distorted.
7. Install the timing belt drive pulley:
   - J35Z6 engine (see **TIMING BELT DRIVE PULLEY REPLACEMENT**)
   - J37A4 engine (see **TIMING BELT DRIVE PULLEY REPLACEMENT**)

TRANSMISSION END CRANKSHAFT OIL SEAL INSTALLATION - IN CAR

Special Tools Required

- Driver Handle, 15 x 135L 07749-0010000
- Oil Seal Driver Attachment, 106 mm 070AD-RCA0200

1. M/T model: Remove the transmission (see **TRANSMISSION REMOVAL**), and the flywheel (see **TRANSMISSION SIDE**).
2. A/T model: Remove the transmission (see **TRANSMISSION REMOVAL**), and the drive plate (see **DRIVE PLATE REMOVAL AND INSTALLATION**).
3. Remove the transmission end crankshaft oil seal.
4. Clean and dry the crankshaft oil seal housing.
5. Apply a light coat of new engine oil to the lip of the crankshaft oil seal.
6. Using the driver handle, 15x 135 Land the oil seal driver attachment, 106 mm, drive in the new crankshaft oil seal (A) until the oil seal driver attachment bottoms on the engine block end cover. Align the hole in the oil seal driver attachment with the pin on the crankshaft.

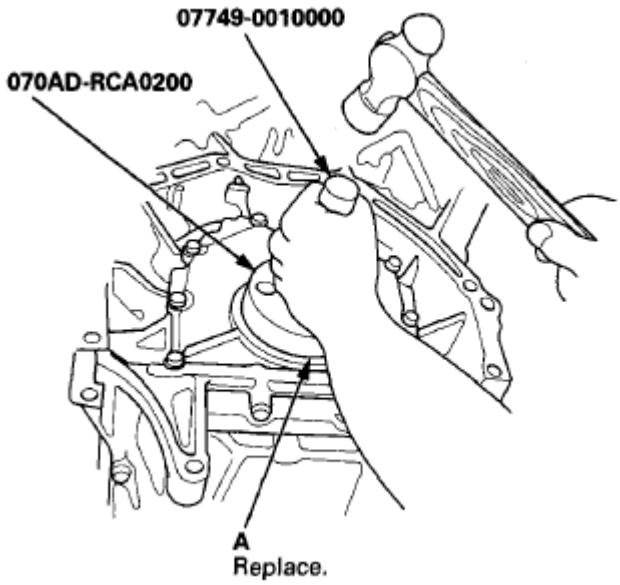


Fig. 75: Installing Transmission End Crankshaft Oil Seal Using Driver Handle
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Clean the excess oil off the crankshaft, and check that the oil seal lip is not distorted.
8. M/T model: Install the flywheel (see **TRANSMISSION SIDE**), and the transmission (see **TRANSMISSION INSTALLATION**).
9. A/T model: Install the drive plate (see **DRIVE PLATE REMOVAL AND INSTALLATION**), and the transmission (see **DRIVE PLATE REMOVAL AND INSTALLATION**).

SEALING BOLT INSTALLATION

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

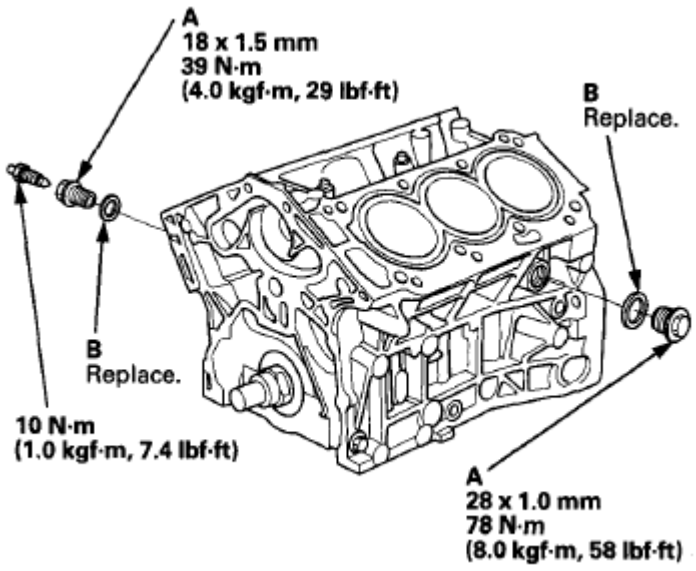


Fig. 76: Identifying Sealing Bolts And Washers With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

