

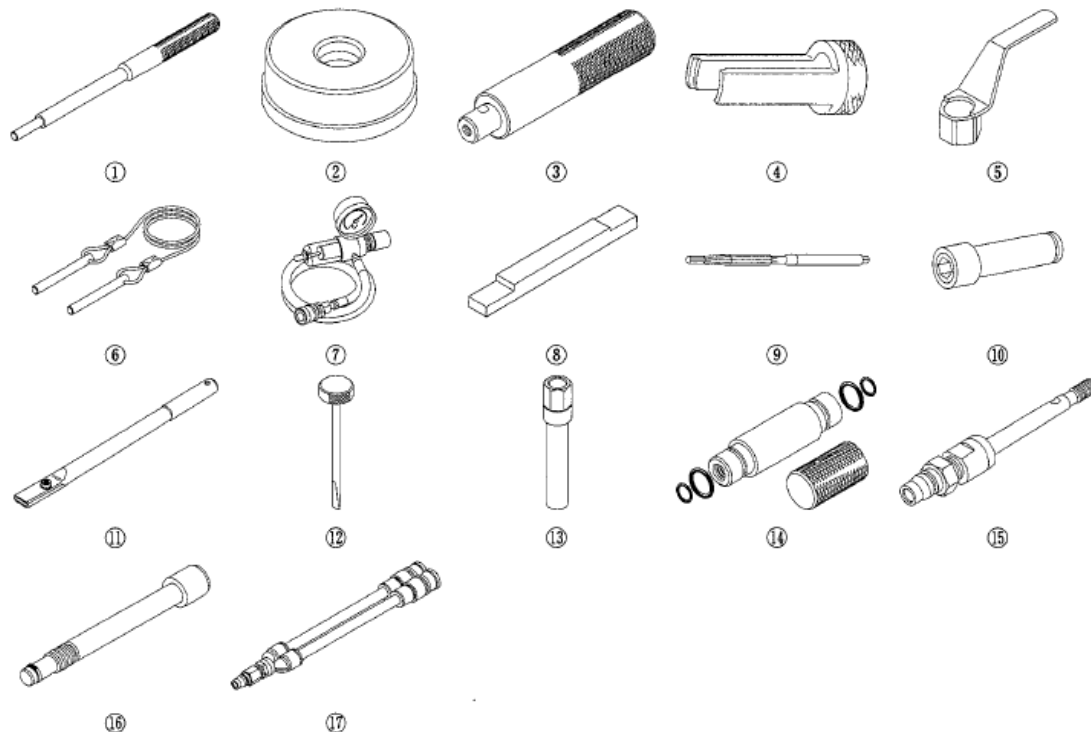
## 2008-12 ENGINE

## Cylinder Head (PZEV) - Accord

## CYLINDER HEAD

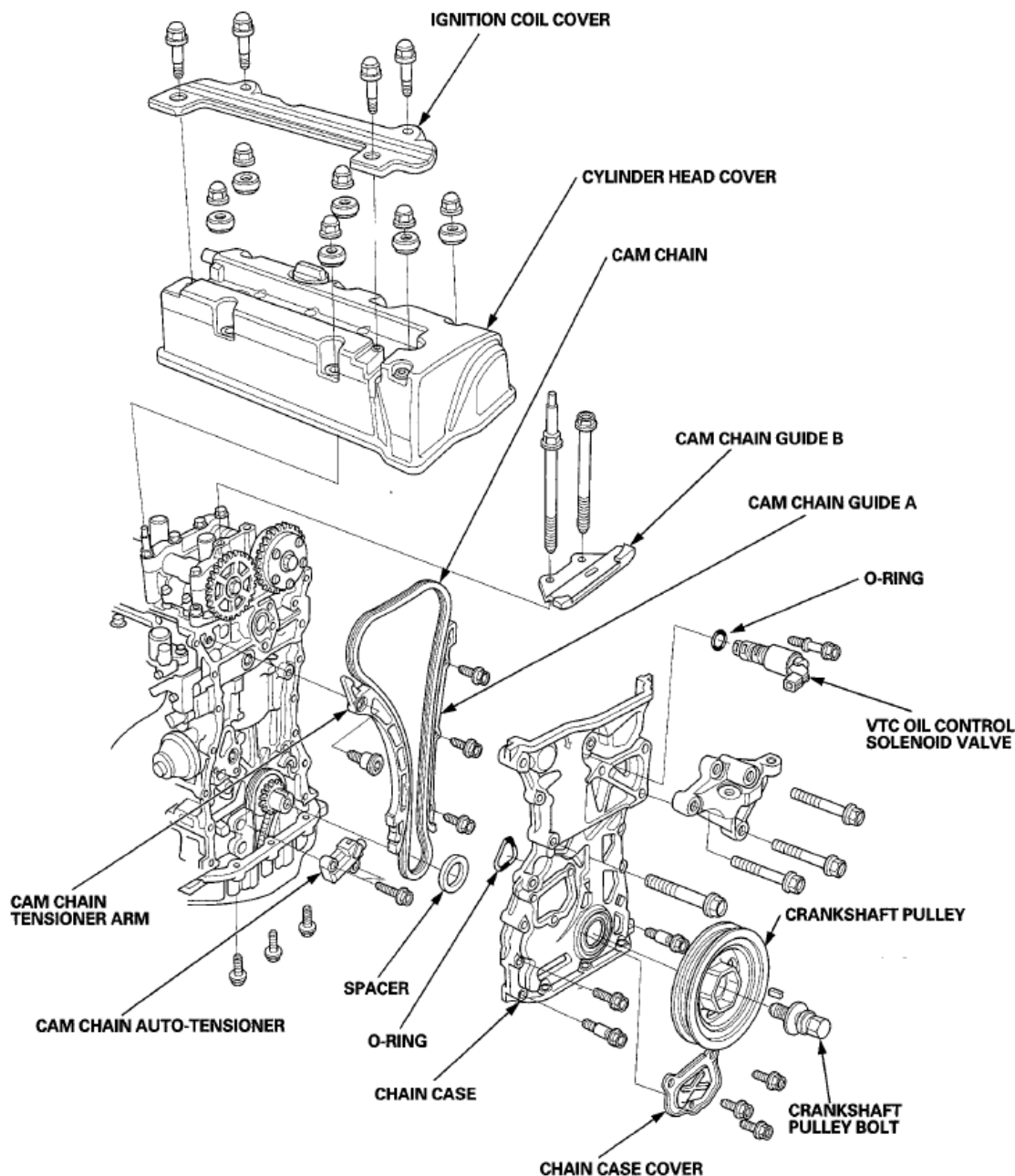
## SPECIAL TOOLS

Ref.No.	Tool Number	Description	Qty
①	07742-0010100	Valve Guide Driver, 5.35 x 9.7 mm	1
②	07746-0010400	Attachment, 52 x 55 mm	1
③	07749-0010000	Driver Handle, 15 x 135L	1
④	07757-PJ1010A	Valve Spring Compressor Attachment	1
⑤	07AAB-RJAA100	Crankshaft Pulley Holder	1
⑥	07AAB-RWCA120	Camshaft Lock Pin Set	1
⑦	07AAJ-PNAA101	Air Pressure Regulator	1
⑧	07AAJ-RWCA100	Cam Chain Inspection Gauge	1
⑨	07HAH-PJ7A100	Valve Guide Reamer, 5.5 mm	1
⑩	07JAA-001020A	Socket, 19 mm	1
⑪	07JAB-001020B	Handle, 6-25-660L	1
⑫	07MAA-PR70110	Adjuster	1
⑬	07MAA-PR70120	Locknut Wrench	1
⑭	07PAD-0010000	Stem Seal Driver	1
⑮	07ZAJ-PNAA101	VTEC Air Adapter	2
⑯	07ZAJ-PNAA200	VTEC Air Stopper	1
⑰	07ZAJ-PNAA300	Air Joint Adapter	1

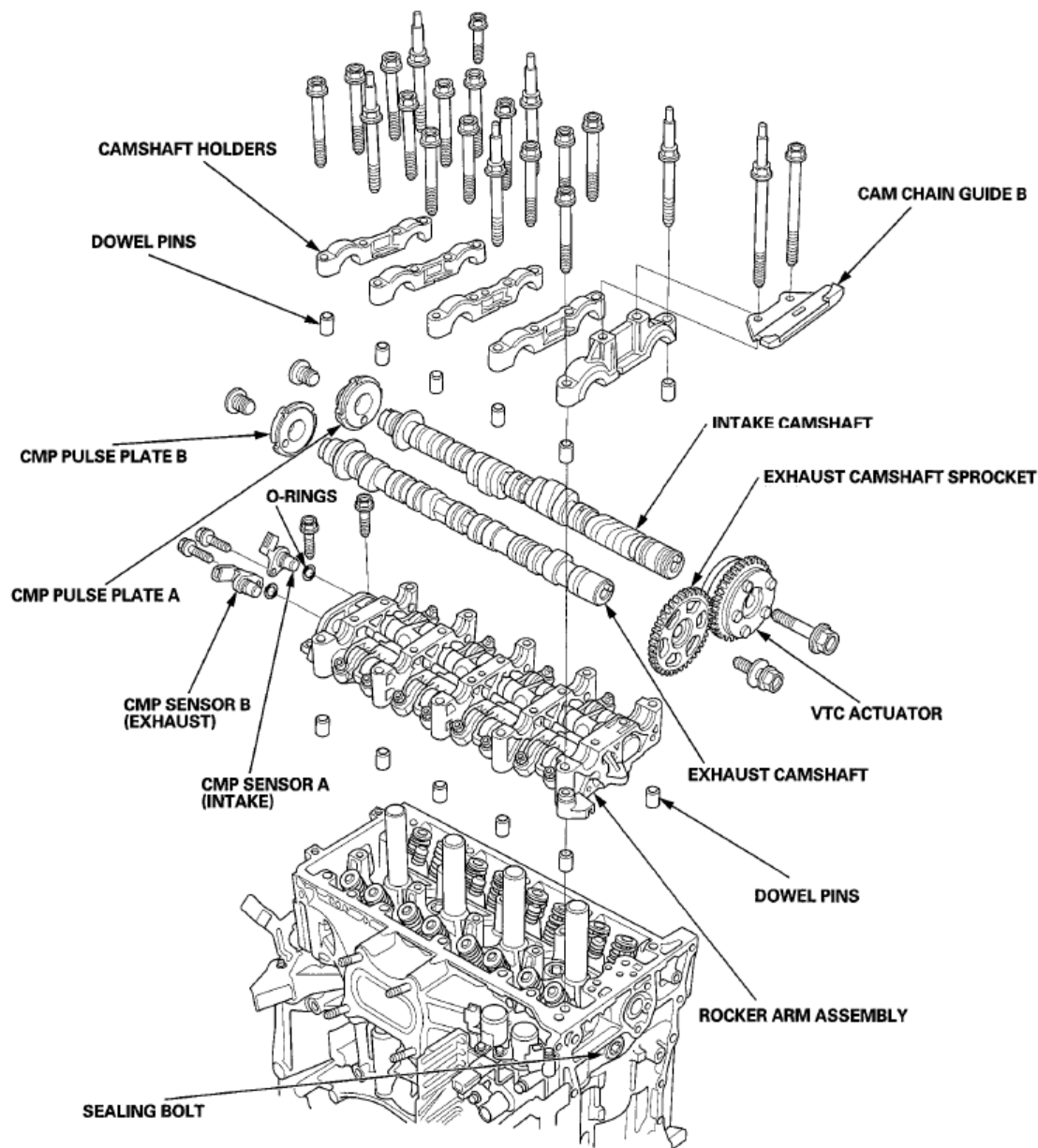

**Fig. 1: Identifying Special Tools**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

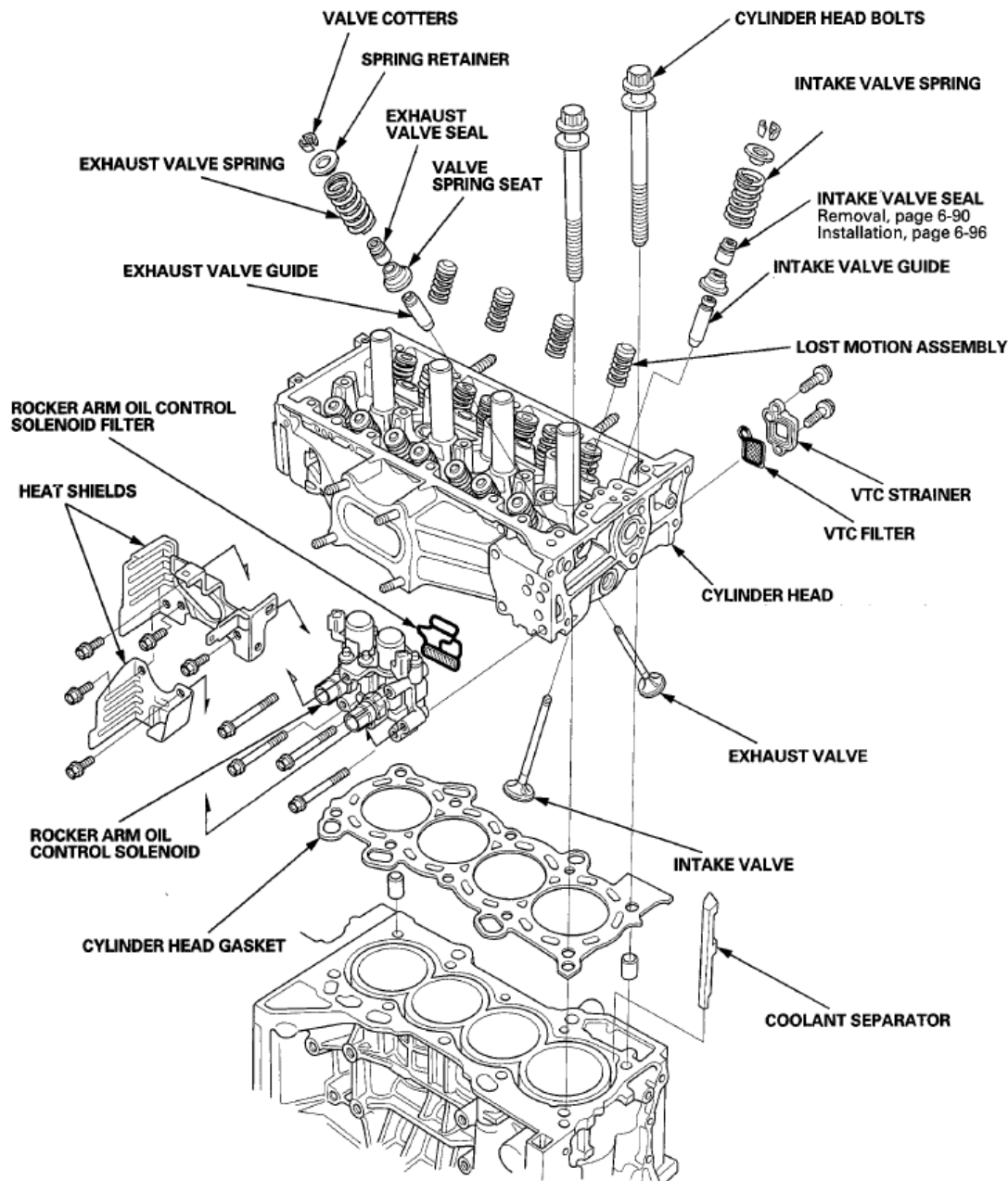
## COMPONENT LOCATION INDEX



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



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



**Fig. 4: Identifying Cylinder Head Component Location (3 Of 3)**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

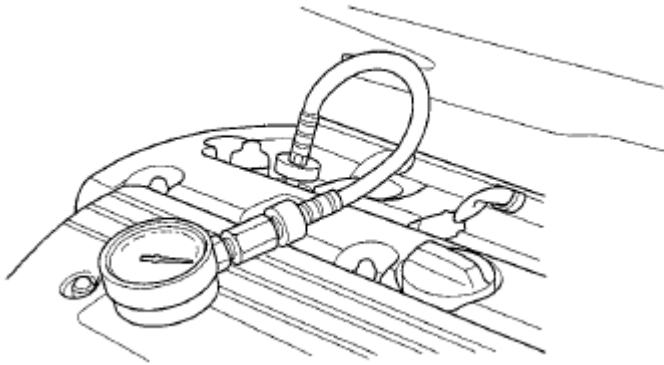
## ENGINE COMPRESSION INSPECTION

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

1. Warm up the engine to normal operating temperature (cooling fan comes on).
2. Turn the ignition switch to LOCK (0).
3. Connect the HDS to the DLC (see step 2 under **HOW TO USE THE HDS (HONDA DIAGNOSTIC**

**SYSTEM) ).**

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



**Fig. 5: Identifying Compression Gauge Connection With Spark Plug Hole**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. 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<sup>2</sup> , 134.8 psi)**

11. Measure the compression on the remaining cylinders.

**Maximum Variation**

**Within 200 kPa (2.04 kgf/cm<sup>2</sup> ,29.0 psi)**

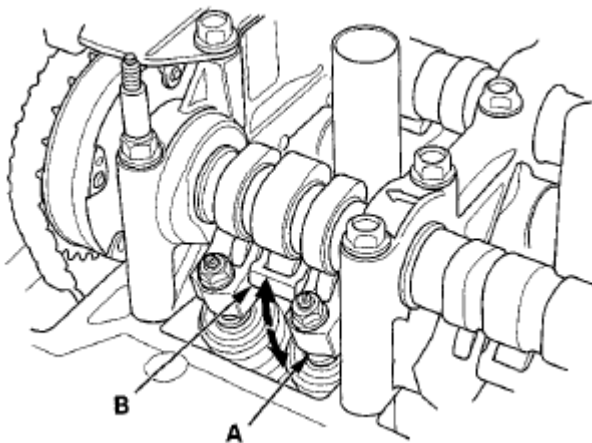
12. If the compression is not within specifications, perform a cylinder leak down test to determine the problem area. Then check the following items, then remeasure the compression.
  - Incorrect valve clearance
  - Confirmation of cam timing
  - Damaged or worn cam lobes
  - Damaged or worn valves and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

- Damaged or worn piston rings
  - Damaged or worn piston and cylinder bore
13. Remove the compression gauge from the spark plug hole.
  14. Install the four spark plugs and the four ignition coils.
  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

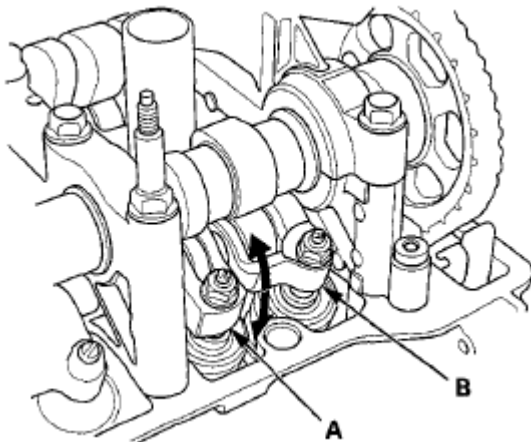
### Special Tools Required

- VTEC Air Stopper 07ZAJ-PNAA200
  - VTEC Air Adapter 07ZAJ-PNAA101 (2)
  - Air Joint Adapter 07ZAJ-PNAA300
  - Air Pressure Regulator 07AAJ-PNAA101
1. Remove the four ignition coils and the four spark plugs (see **IGNITION COIL AND SPARK PLUG REMOVAL/INSTALLATION** ).
  2. Remove the cylinder head cover (see **CYLINDER HEAD COVER REMOVAL** ).
  3. Intake side: Rotate the crankshaft pulley clockwise. Make sure that the intake secondary rocker arm (A) and the intake mid rocker arm (B) are separated that the intake secondary rocker arm and the intake mid rocker arm should move independently:
    - If the mid and secondary rocker arms move together, remove the mid, primary, and secondary rocker arms as an assembly, and check that the pistons in the rocker arms move smoothly. If any rocker arm needs replacing, replace the mid, primary, and secondary rocker arms as an assembly, then retest.
    - If the secondary rocker arm move independently, go to step 4.



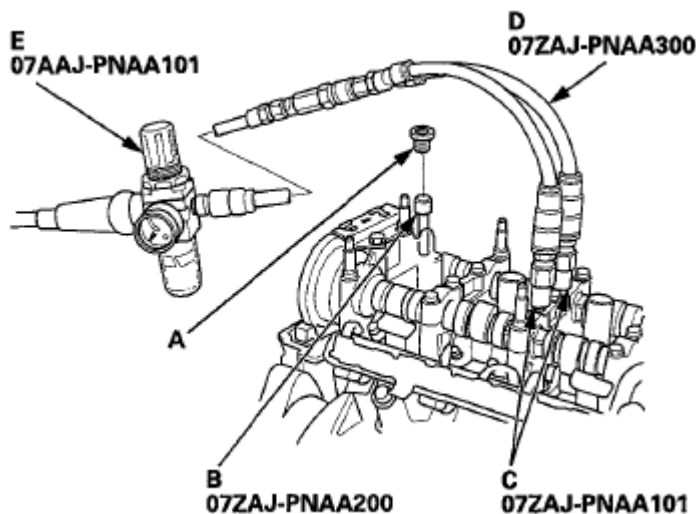
**Fig. 6: Identifying Secondary Rocker Arm And Intake Mid Rocker Arm**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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



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

5. Check that the air pressure on the shop air compressor gauge indicates over 400 kPa (4.08 kgf/cm<sup>2</sup> , 58.0 psi),
6. Inspect the valve clearance (see **VALVE CLEARANCE ADJUSTMENT** ).
7. Remove the sealing bolt (A) from the relief hole, and install the VTEC air stopper (B).



**Fig. 8: Identifying Sealing Bolt And VTEC Air Stopper**

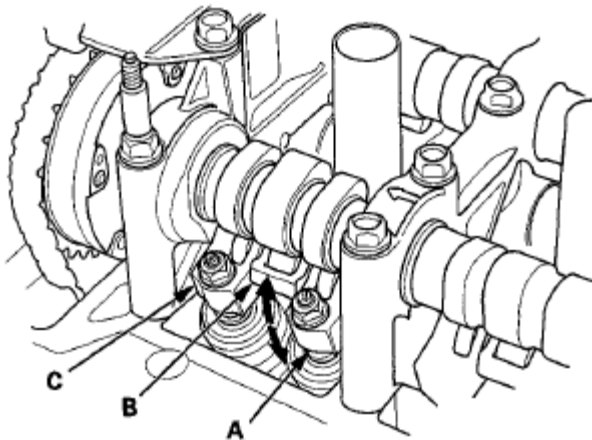
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Remove the No. 3 camshaft holder bolts, and install the VTEC air adapters (C) finger-tight.
9. Connect the air joint adapter (D) and the air pressure regulator (E).
10. Loosen the valve on the air pressure regulator, and apply the specified air pressure.

### **Specified Air Pressure**

**290 kPa (2.96 kgf/cm<sup>2</sup> ,42.1 psi)**

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

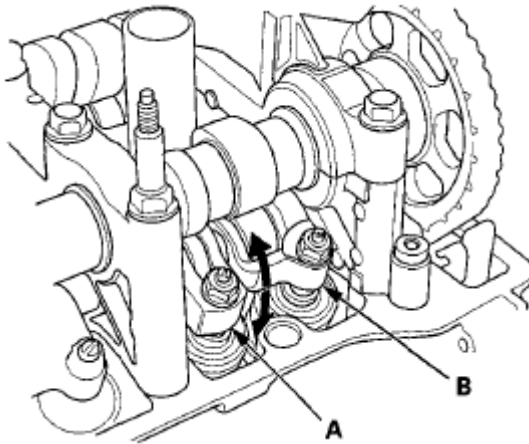


**Fig. 9: Identifying Intake Secondary Rocker Arm Intake Mid Rocker Arm And Intake Primary Rocker Arm**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Exhaust side: With the specified air pressure applied, rotate the crankshaft pulley clockwise. The exhaust secondary rocker arm (A) should move together of the exhaust primary rocker arm (B):
  - If the primary and secondary rocker arms move independently, remove the primary and secondary rocker arms as an assembly, and check that the pistons in the rocker arms move smoothly. If any rocker arm needs replacing, replace the primary and secondary rocker arms as an assembly, then retest.
  - If the primary and secondary rocker arms move together, go to step 13.



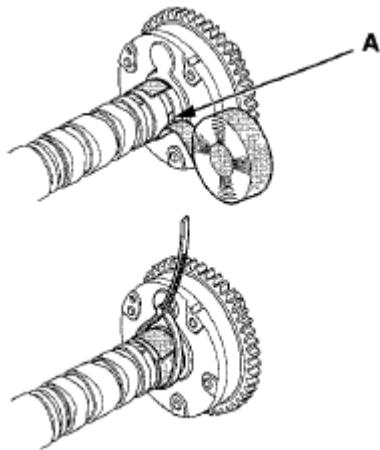


**Fig. 10: Identifying Exhaust Secondary Rocker Arm And Exhaust Primary Rocker Arm**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Remove the air pressure regulator, the air joint adapter, the VTEC air adapter, and the VTEC air stopper.
14. Torque the camshaft holder mounting bolts to 22 N.m (2.2 kgf.m, 16 lbf.ft).
15. Torque the sealing bolt to 10 N.m (1.0 kgf.m, 7.4 lbf.ft).
16. Install the cylinder head cover (see **CYLINDER HEAD COVER INSTALLATION** ).
17. Install the four spark plugs and the four ignition coils (see **IGNITION COIL AND SPARK PLUG REMOVAL/INSTALLATION** ).

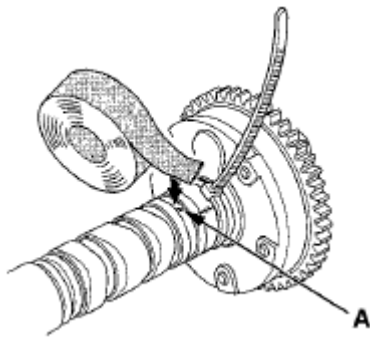
## VTC ACTUATOR INSPECTION

1. Remove the cam chain (see **CAM CHAIN REMOVAL** ).
2. Loosen the rocker arm adjusting screws (see step 2 .
3. Remove the camshaft holder (see step 3 .
4. Remove the intake camshaft.
5. Check that the VTC actuator is locked by turning the VTC actuator counterclockwise. If it is not locked, turn the VTC actuator clockwise until it stops, then recheck it. If it is still not locked, replace the VTC actuator.
6. Seal the retard holes (A) in the No. 1 camshaft journal with tape and a wire tie.



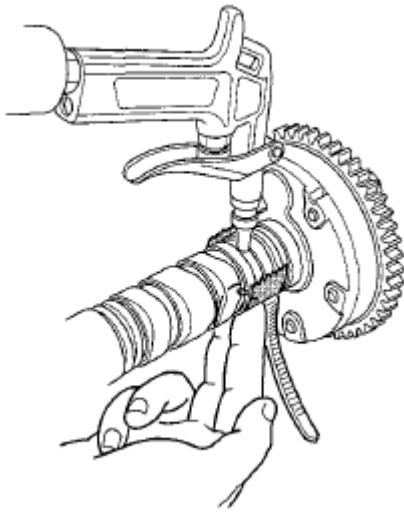
**Fig. 11: Identifying Retard Holes In Intake Camshaft**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Seal one of the advance holes (A) with tape.



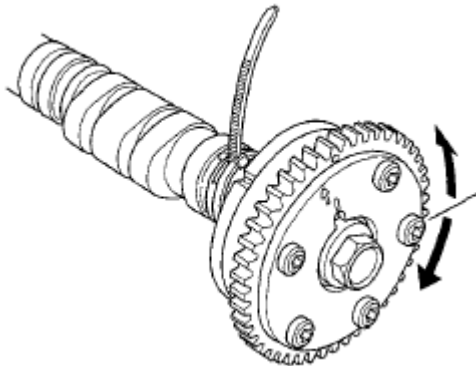
**Fig. 12: Identifying Advance Holes**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Apply air to the unsealed advance hole to release the lock.



**Fig. 13: Applying Air To The Unsealed Advance Hole To Release The Lock.**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Check that the VTC actuator moves smoothly. If the VTC actuator does not move smoothly, replace the VTC actuator.



**Fig. 14: Identifying VTC Actuator In Cylinder Head**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Remove the wire tie, the tape, and the adhesive residue from the No. 1 camshaft journal.
11. Make sure the punch marks on the VTC actuator and the exhaust camshaft sprocket are facing up, then set the camshafts in the cylinder head (see step 7).
12. Set the camshaft holders and cam chain guide B in place (see step 8).
13. Tighten the camshaft holder bolts to the specified torque (see step 9).
14. Hold the camshaft, and turn the VTC actuator clockwise until you hear it click. Make sure to lock the VTC actuator by turning it.
15. Install the cam chain (see **CAM CHAIN INSTALLATION**).
16. Adjust the valve clearance (see **VALVE CLEARANCE ADJUSTMENT**).

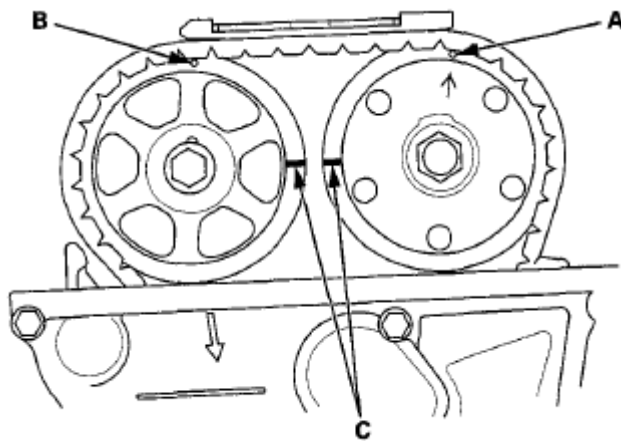
## VALVE CLEARANCE ADJUSTMENT

### Special Tools Required

- Locknut Wrench 07MAA-PR70120
- Adjuster 07MAA-PR70110

**NOTE:** Connect the HDS to the DLC (see step 2 under HOW TO USE THE HDS (HONDA DIAGNOSTIC SYSTEM) ) and monitor the ECT SENSOR 1 with the HDS. Adjust the valve clearance only when the engine coolant temperature is less than 100° F (38°C).

1. Remove the cylinder head cover (see CYLINDER HEAD COVER REMOVAL ).
2. Set the No. 1 piston at top dead center (TDC). The punch mark (A) on the VTC actuator and the punch mark (B) on the exhaust camshaft sprocket should be at the top. Align the TDC marks (C) on the VTC actuator and the exhaust camshaft sprocket.



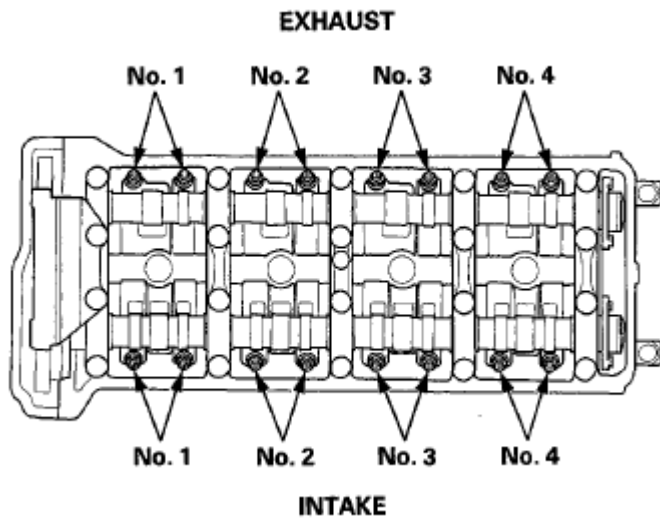
**Fig. 15: Identifying TDC Punch Mark, VTC Actuator Punch Mark And TDC Marks**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

### Valve Clearance

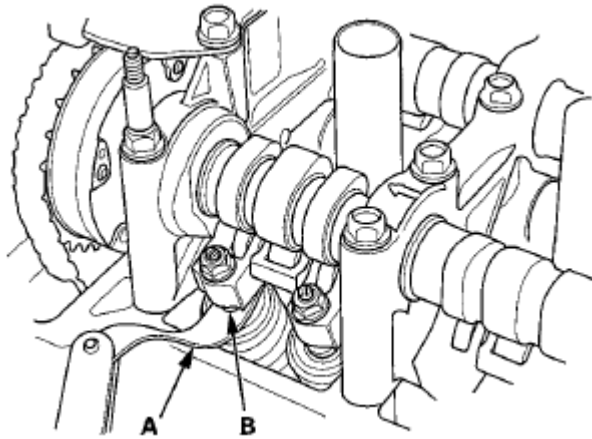
**Intake: 0.21-0.25 mm (0.008-0.010 in)**

**Exhaust: 0.25-0.29 mm (0.010-0.011 in)**



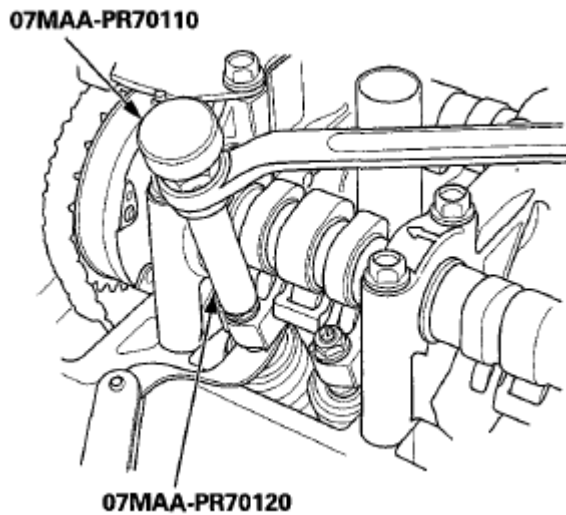
**Fig. 16: Identifying Feeler Gauge Valve Sequence**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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



**Fig. 17: Identifying Feeler Gauge And Adjusting Screw**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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



**Fig. 18: Identifying Feeler Gauge With Adjusting Screw**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Tighten the locknut to the specified torque, and recheck the clearance. Repeat the adjustment if necessary.

**Specified Torque**

**Intake:**

**7 x 0.75 mm**

**14 N.m (1.4 kgf.m, 10 lbf.ft)**

**Apply new engine oil to the nut threads.**

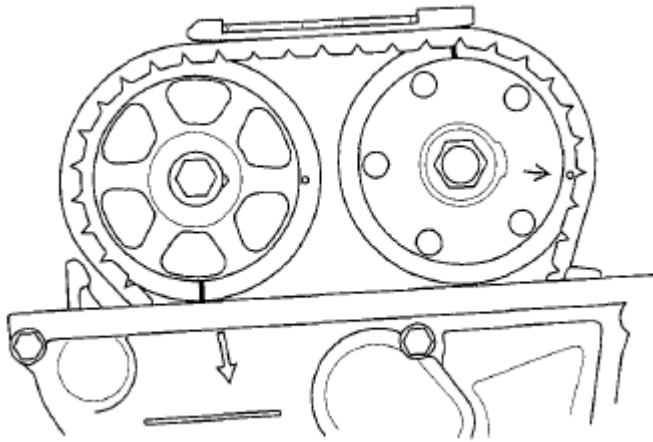
**Exhaust:**

**7 x 0.75 mm**

**14 N.m (1.4 kgf.m, 10 lbf.ft)**

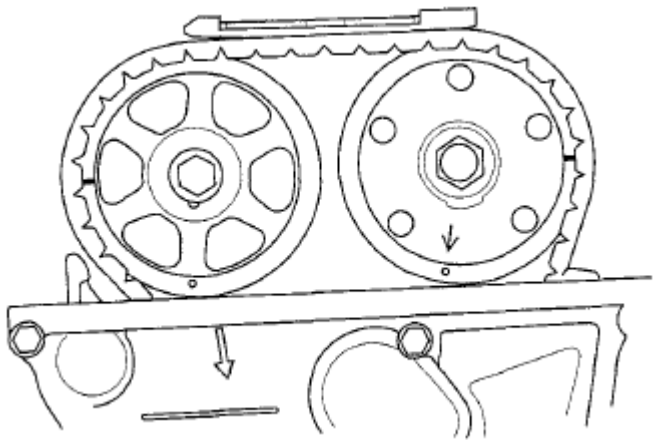
**Apply new engine oil to the nut threads.**

7. Rotate the crankshaft 180° clockwise (camshaft pulley turns 90°).



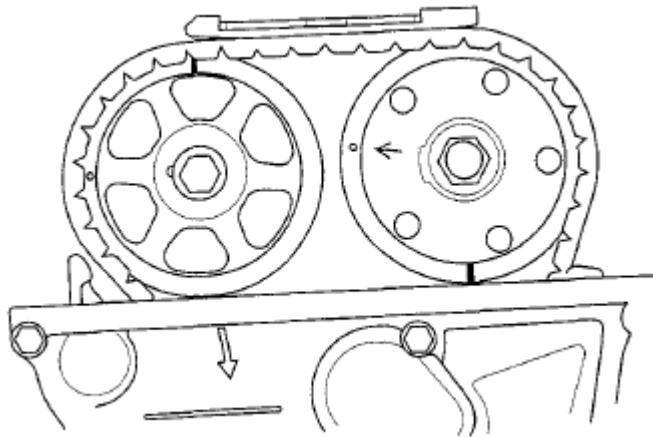
**Fig. 19: Identifying Valve Clearance With Camshaft Pulley**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Check and, if necessary, adjust the valve clearance on the No. 3 cylinder.
9. Rotate the crankshaft 180° clockwise (camshaft pulley turns 90°).



**Fig. 20: Identifying Valve Clearance With Camshaft Pulley**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Check and, if necessary, adjust the valve clearance on the No. 4 cylinder.
11. Rotate the crankshaft 180° clockwise (camshaft pulley turns 90°).



**Fig. 21: Identifying Valve Clearance With Camshaft Pulley**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Check and, if necessary, adjust the valve clearance on the No. 2 cylinder.
13. Install the cylinder head cover (see **CYLINDER HEAD COVER INSTALLATION** ).

## **CRANKSHAFT PULLEY REMOVAL AND INSTALLATION**

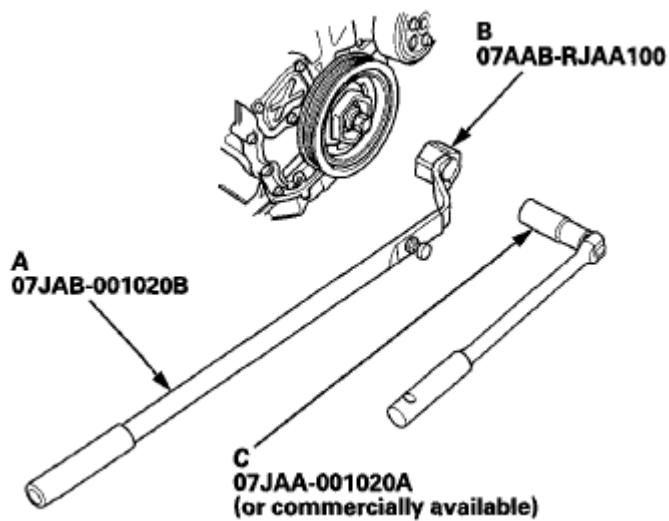
### **Special Tools Required**

- Holder Handle, 07JAB-001020B
- Crankshaft Pulley Holder 07AAB-RJAA100
- Socket, 19 mm 07JAA-001020A or equivalent

### **Removal**

1. Remove the right front wheel.
2. Remove the splash shield (see step 25 under **ENGINE REMOVAL** ).
3. Remove the drive belt (see **DRIVE BELT REMOVAL/INSTALLATION** ).
4. Hold the pulley with the handle, 6-25-660L (A) and the crankshaft pulley holder (B).





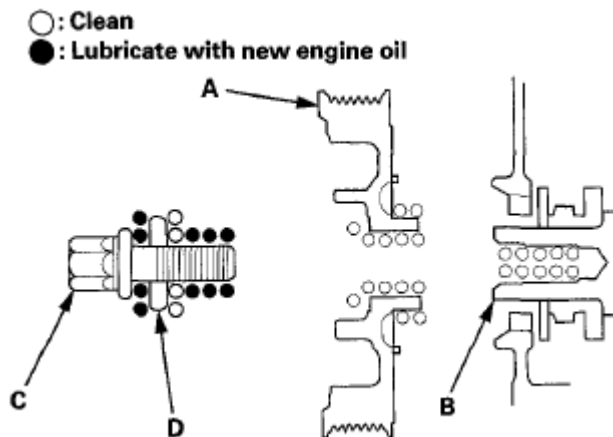
**Fig. 22: Identifying SST's**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

#### Installation

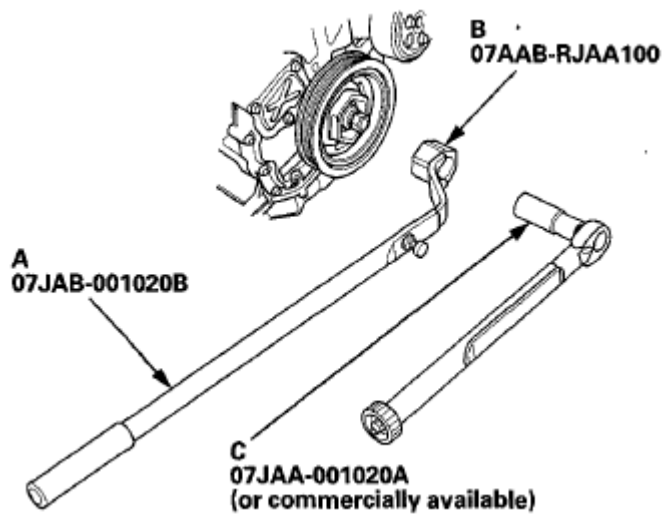
1. Clean the crankshaft pulley (A), the crankshaft (B), the bolt (C), and the washer (D). Lubricate with new engine oil as shown.



**Fig. 23: Identifying Crankshaft Pulley, Crankshaft, Bolt And Washer**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

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



**Fig. 24: Identifying SST's**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

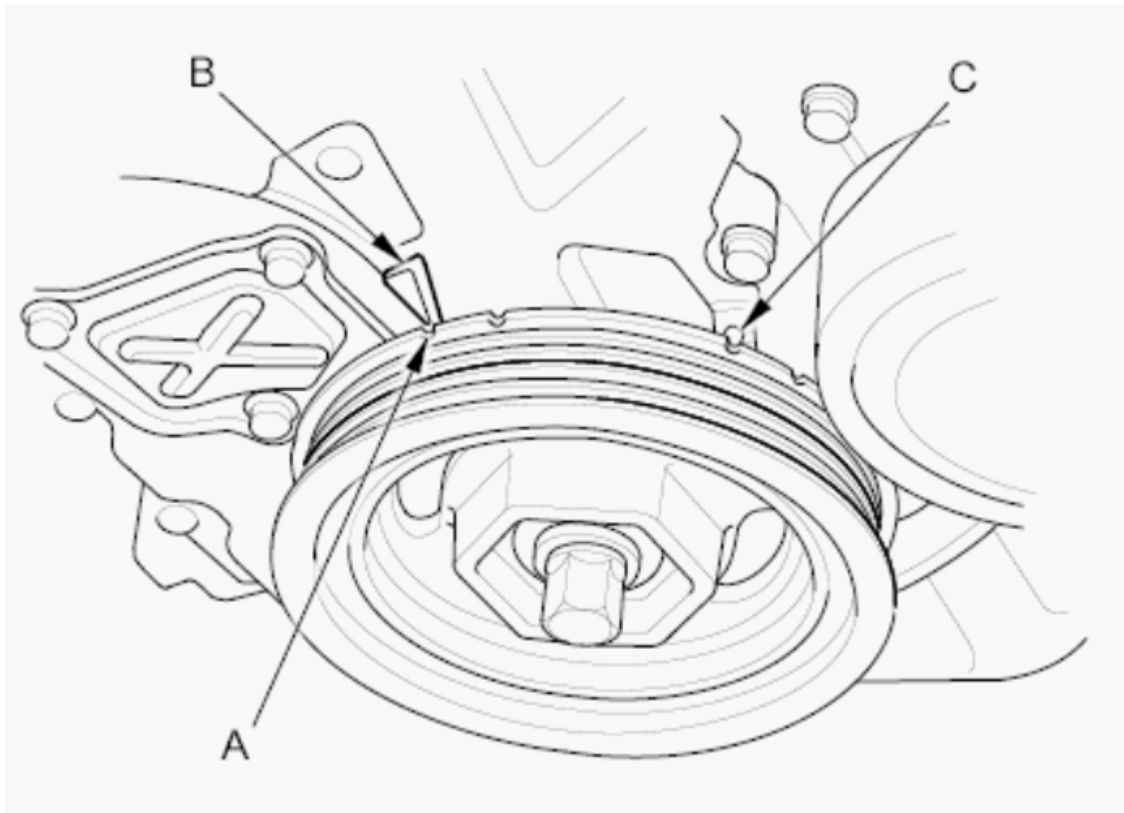
3. Torque the bolt to 49 N.m (5.0 kgf.m, 36 lbf.ft) with a torque wrench and socket, 19 mm (C). Do not use an impact wrench. If the pulley bolt or crankshaft are new, torque the bolt to 177 N.m (18.0 kgf.m, 130 lbf.ft), then remove the bolt and torque it to 49 N.m (5.0 kgf.m, 36 lbf.ft).
4. Tighten the pulley bolt an additional 90°.
5. Install the drive belt (see **DRIVE BELT REMOVAL/INSTALLATION** ).
6. Install the splash shield (see step 49 under **ENGINE INSTALLATION** ).
7. Install the right front wheel.

## CAM CHAIN REMOVAL

**NOTE:** Keep the cam chain away from magnetic fields.

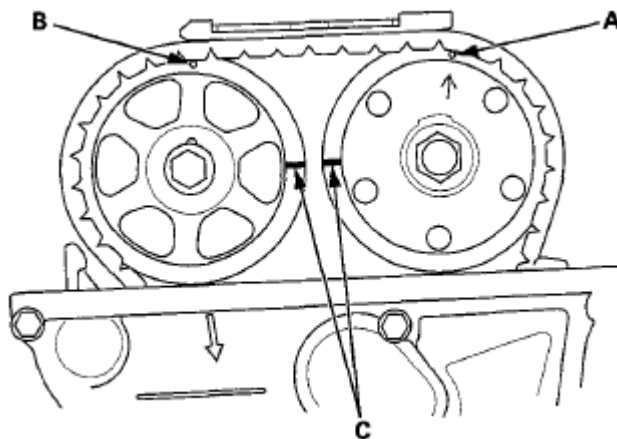
1. Remove the right front wheel.
2. Remove the front splash shield (see step 25 under **ENGINE REMOVAL** ).
3. Remove the drive belt (see **DRIVE BELT REMOVAL/INSTALLATION** ).
4. Turn the crankshaft so its white mark (A) lines up with the pointer (B).

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



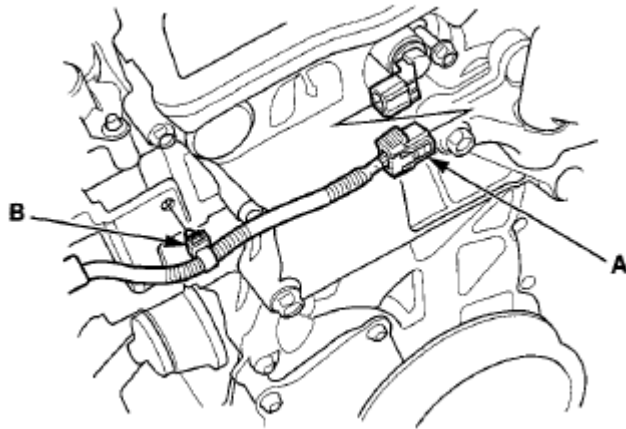
**Fig. 25: Turning Crankshaft So White Mark (A) Lines Up With Pointer (B)**

5. Remove the cylinder head cover (see **CYLINDER HEAD COVER REMOVAL** ).
6. Set the No. 1 piston at top dead center (TDC). The punch mark (A) on the VTC actuator and the punch mark (B) on the exhaust camshaft sprocket should be at the top. Align the TDC marks (C) on the VTC actuator and the exhaust camshaft sprocket.



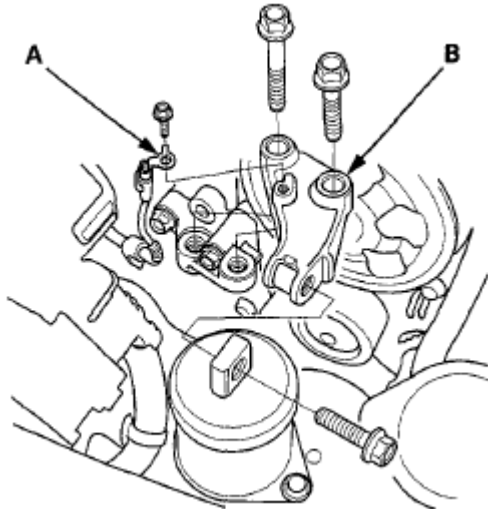
**Fig. 26: Identifying TDC Punch Mark, VTC Actuator And Exhaust Camshaft Sprocket**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Disconnect the VTC oil control solenoid valve connector (A) and remove the harness clamp (B).



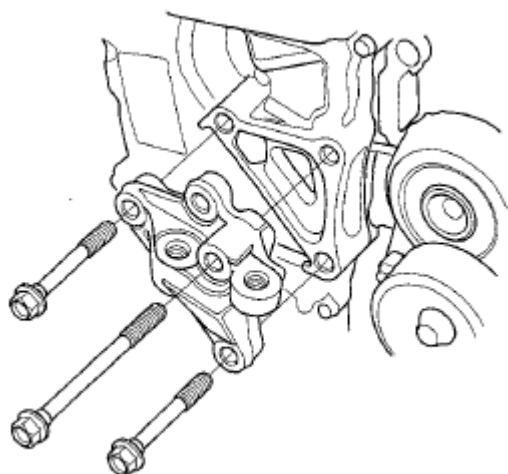
**Fig. 27: Identifying VTC Oil Control Solenoid Valve Connector And Harness Clamp**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Remove the VTC oil control solenoid valve (see **VTC OIL CONTROL SOLENOID VALVE REMOVAL/TEST/INSTALLATION** ).
9. Remove the crankshaft pulley (see **CRANKSHAFT PULLEY REMOVAL AND INSTALLATION** ).
10. Lift and support the engine with a jack and a wood block under the oil pan.
11. Remove the ground cable (A), then remove the side engine mount bracket (B).



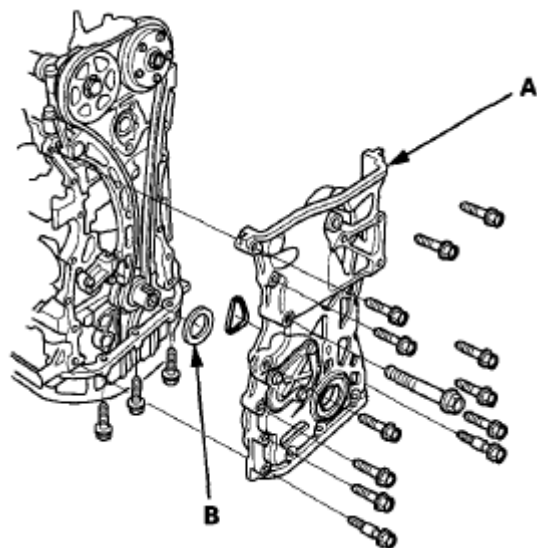
**Fig. 28: Identifying Ground Cable And Engine Mount Bracket**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Remove the side engine mount bracket mounting bolts.



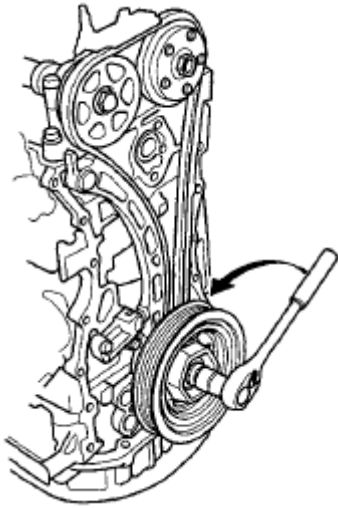
**Fig. 29: Identifying Engine Mount Bracket Mounting Bolts**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Remove the cam chain case (A) and the spacer (B).



**Fig. 30: Identifying Cam Chain Case And Spacer**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

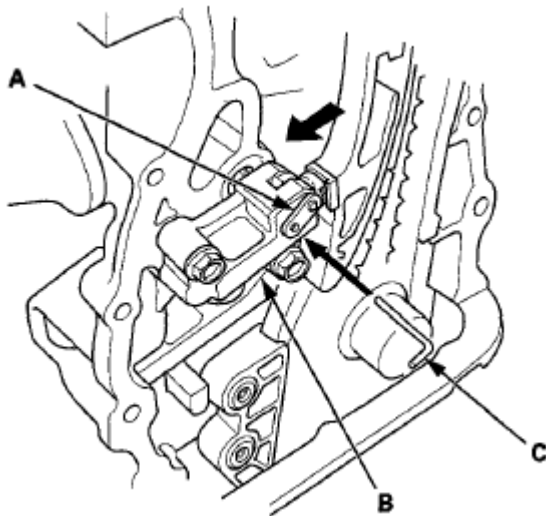
14. Loosely install the crankshaft pulley.
15. Turn the crankshaft counterclockwise to compress the auto-tensioner.



**Fig. 31: Turning Crankshaft Counterclockwise**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

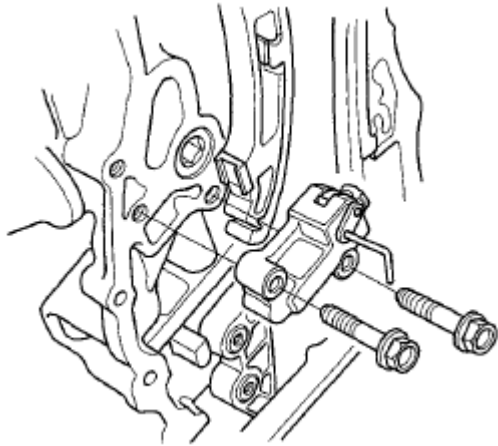
16. Rotate the crankshaft counterclockwise to align the holes on the lock (A) and the auto-tensioner (B), then insert a 1.2 mm (3/64 in) diameter pin (C) into the holes. Turn the crankshaft clockwise to secure the pin.

**NOTE:** If the holes in the lock and the auto-tensioner do not align, continue to rotating the crankshaft counterclockwise until the holes align, then install the pin.



**Fig. 32: Identifying Hole Alignment And Pin**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

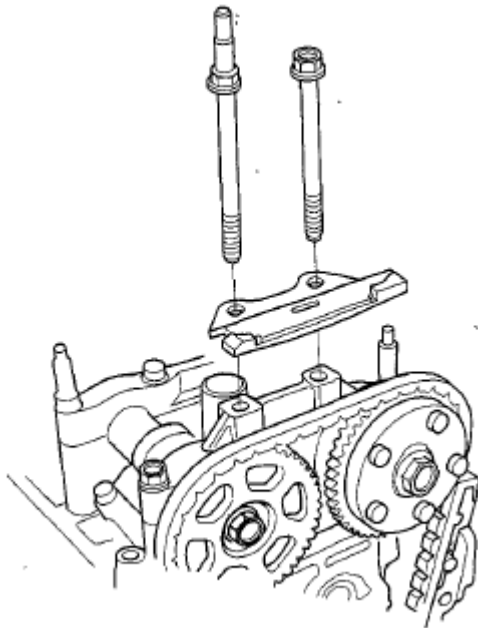
17. Remove the auto-tensioner.



**Fig. 33: Identifying Auto-Tensioner**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

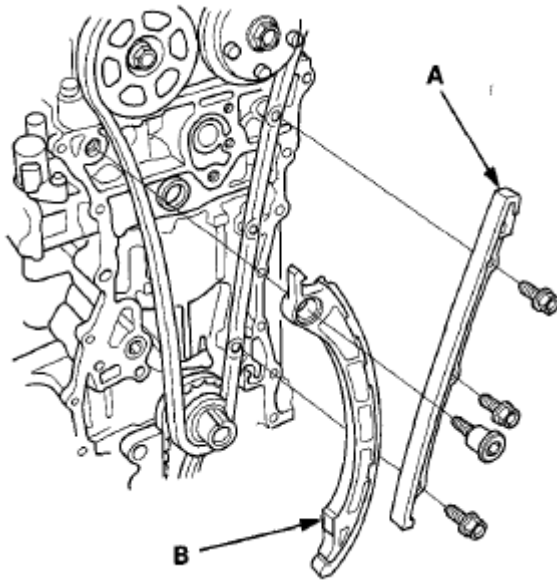
18. Remove cam chain guide B.



**Fig. 34: Identifying Cam Chain Guide**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

19. Remove cam chain guide A and the tensioner arm (B).



**Fig. 35: Identifying Cam Chain Guide And Tensioner Arm**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

20. Remove the cam chain.

## CAM CHAIN INSTALLATION

### Special Tools Required

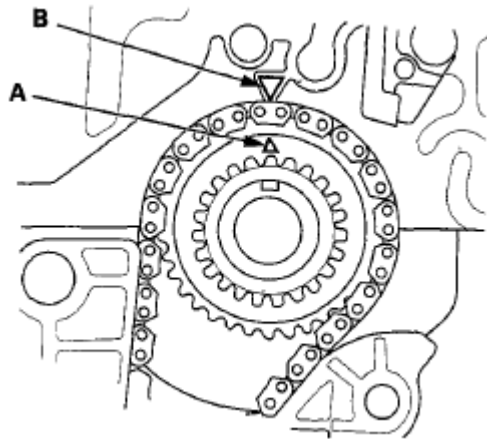
Camshaft Lock Pin Set 07AAB-RWCA120

### NOTE:

- Keep the cam chain away from magnetic fields.
- Before doing this procedure, check that the VTC actuator is locked by turning the VTC actuator counterclockwise. If not locked, turn the VTC actuator clockwise until it stops, then recheck it. If it is still not locked, replace the VTC actuator.

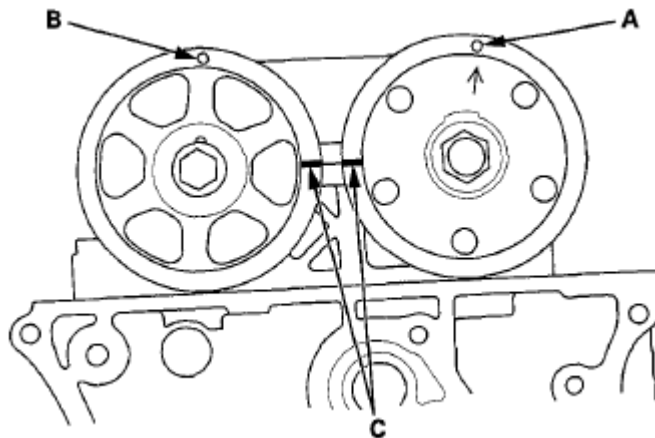
1. Set the crankshaft to top dead center (TDC). Align the TDC mark (A) on the crankshaft sprocket with the pointer (B) on the engine block.





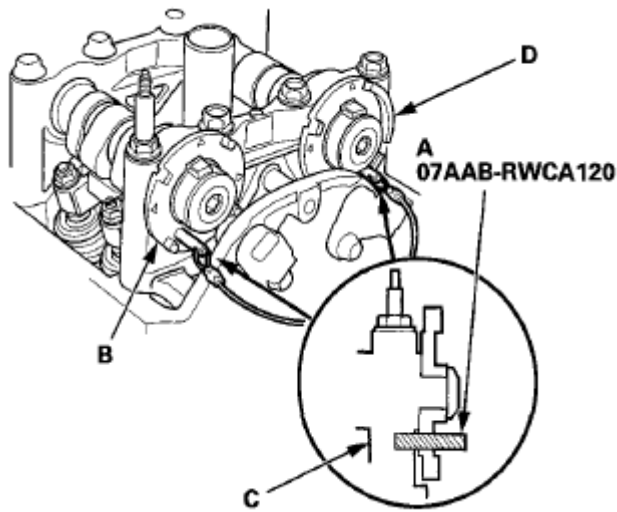
**Fig. 36: Identifying TDC Mark And Crankshaft Sprocket With Pointer**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Set the camshafts to TDC. The punch mark (A) on the VTC actuator and the punch mark (B) on the exhaust camshaft sprocket should be at the top. Align the TDC marks (C) on the VTC actuator and the exhaust camshaft sprocket.



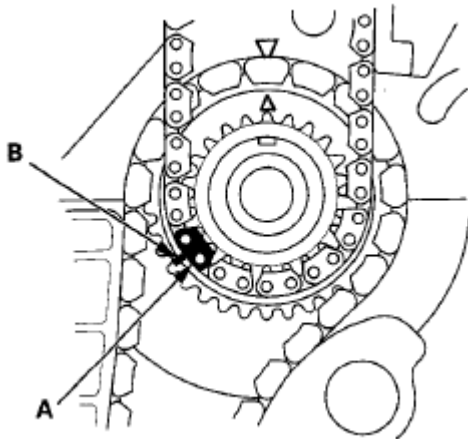
**Fig. 37: Identifying TDC Punch Mark And VTC Actuator Punch Mark**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. To hold the intake camshaft, insert a camshaft lock pin set (07AAB-RWCA120) (A) into the maintenance hole in CMP pulse plate A (B) and through the No. 5 rocker shaft holder (C).



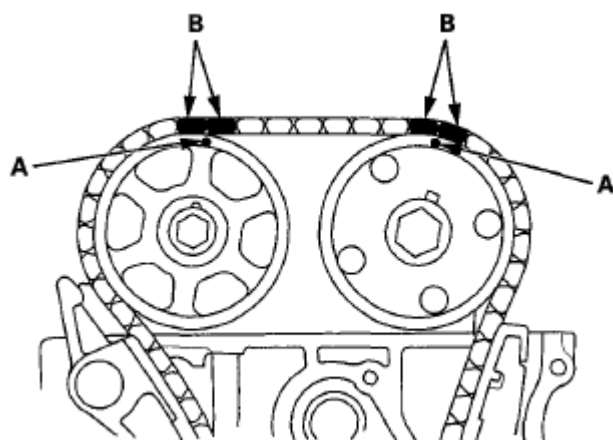
**Fig. 38: Identifying Camshaft Lock Pin And CMP Pulse Plate**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. To hold the exhaust camshaft, insert a camshaft lock pin set (A) into the maintenance hole in CMP pulse plate B (D) and through the No. 5 rocker shaft holder (C).
5. Install the cam chain on the crankshaft sprocket with the colored link plate (A) aligned with the mark (B) on the crankshaft sprocket.



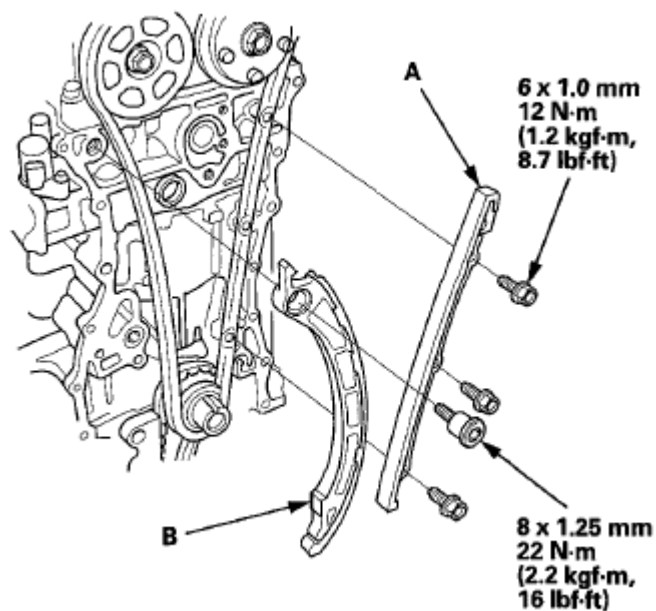
**Fig. 39: Identifying Colored Link Plate And Timing Mark**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Install the cam chain on the VTC actuator and the exhaust camshaft sprocket with the punch marks (A) aligned with the center of the two colored link plates (B).



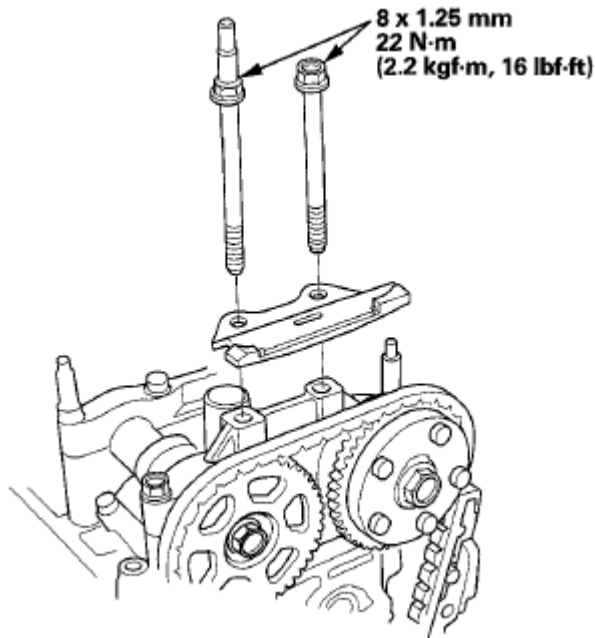
**Fig. 40: Identifying Cam Sprocket Punch Marks And Colored Link Plates**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Install cam chain guide A and the tensioner arm (B).



**Fig. 41: Identifying Cam Chain Guide And Tensioner Arm With Torque Specifications**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

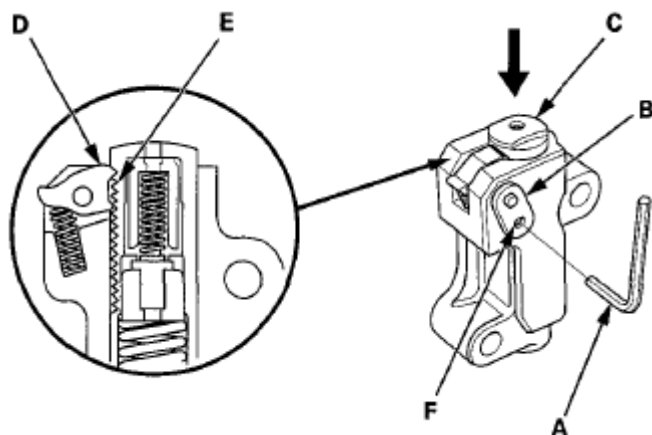
8. Install cam chain guide B.



**Fig. 42: Identifying Cam Chain Guide With Torque Specifications**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

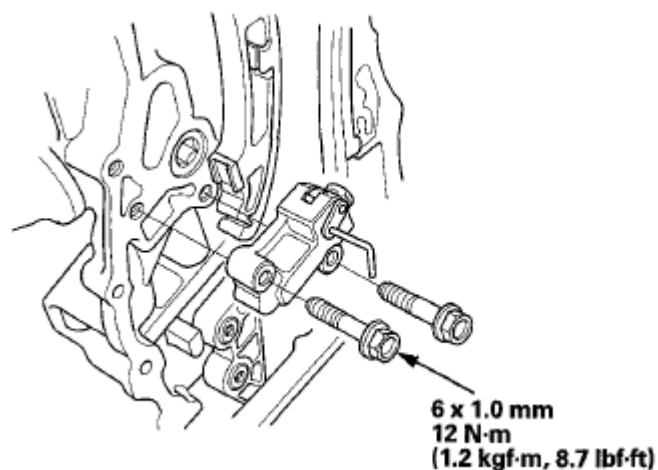
9. Compress the auto-tensioner when replacing the cam chain. Remove the diameter pin (A) from the auto-tensioner that was installed during removal. Turn the plate (B) counterclockwise, to release the lock, then press the rod (C), and set the first cam (D) to the first edge of the rack (E). Insert the 1.2 mm (3/64 in) diameter pin or lock pin into the holes (F).

**NOTE:** If the chain tensioner is not set up as described, the tensioner will become damaged.



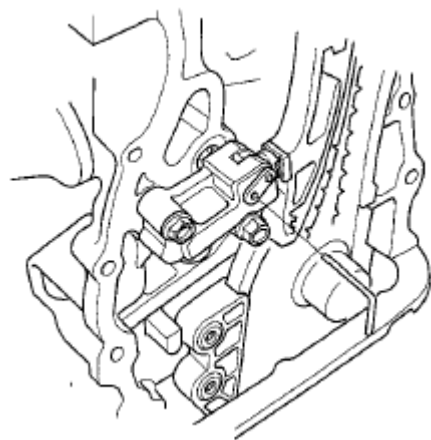
**Fig. 43: Identifying Auto-Tensioner Cam Chain, Rod Plate And Holes**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Install the auto-tensioner.



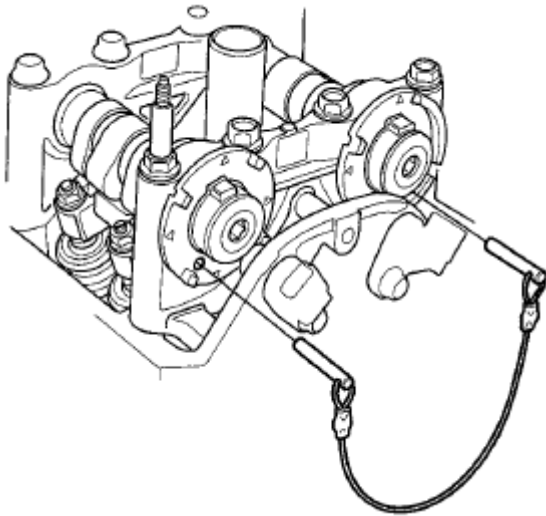
**Fig. 44: Identifying Auto-Tensioner With Torque Specifications**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Remove the diameter pin from the auto-tensioner.



**Fig. 45: Identifying Diameter Pin**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Remove the camshaft lock pin set.



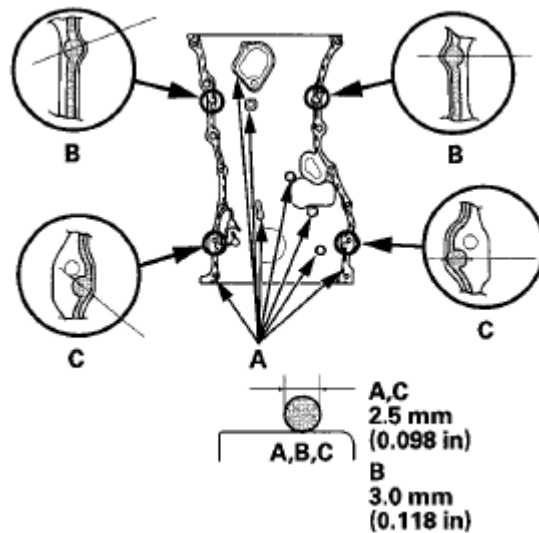
**Fig. 46: Identifying Camshaft Lock Pin**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Check the chain case oil seal for damage. If the oil seal is damaged, replace the chain case oil seal (see **CAM CHAIN CASE OIL SEAL INSTALLATION** ).
14. Remove the old liquid gasket from the chain case mating surfaces, the bolts, and the bolt holes.
15. Clean and dry the chain case mating surfaces.
16. Apply liquid gasket, P/N 08717-0004, 08718-0003, or 08718-0009 to the engine block mating surface of the chain case, 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).
- Apply a 3.0 mm (0.118 in) diameter bead of liquid gasket along the broken line (B).
- If too much time has passed after applying the liquid gasket, remove the old liquid gasket and residue, then reapply new liquid gasket.

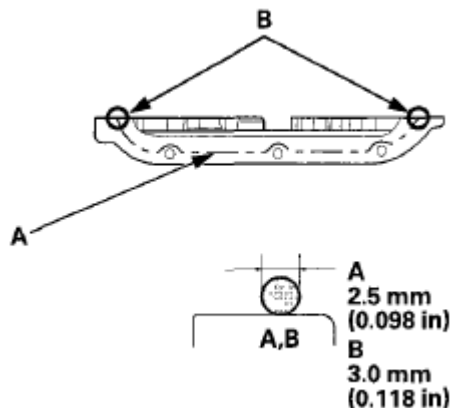


**Fig. 47: Identifying Liquid Gasket Along Broken Line**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

17. Apply liquid gasket, P/N 08717-0004, 08718-0003, or 08718-0009 to the oil pan mating surface of the chain case, 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).
- Apply a 3.0 mm (0.118 in) diameter bead of liquid gasket along the broken line (B).
- If too much time has passed after applying the liquid gasket, remove the old liquid gasket and residue, then reapply new liquid gasket.

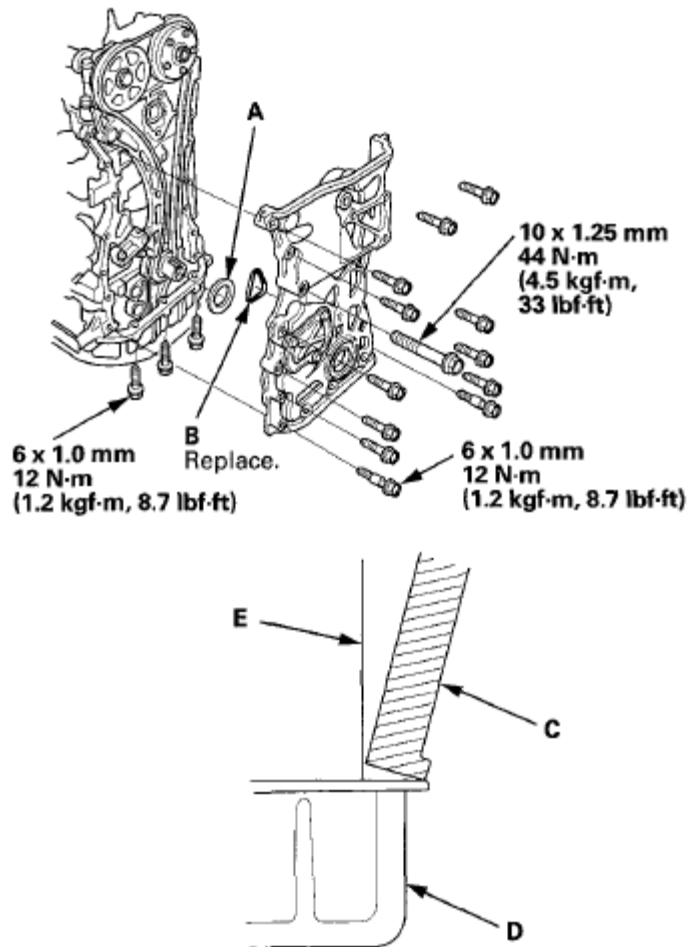


**Fig. 48: Identifying Diameter Bead Of Liquid Gasket Along Broken Line**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

18. Install the spacer (A), then install the new O-ring (B) on the chain case. Set the edge of the chain case (C) to the edge of the oil pan (D), then install the chain case on the engine block (E). Wipe off the excess liquid gasket on the oil pan and chain case mating surface.

**NOTE:**

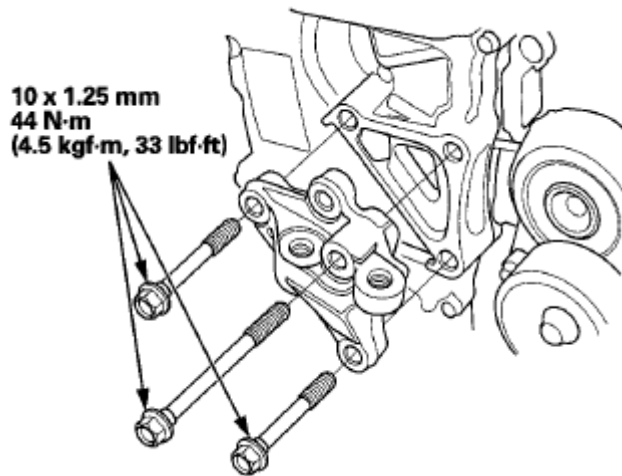
- When installing the chain case, do not slide the bottom surface onto the oil pan mounting surface.
- Wait at least 30 minutes before filling the engine with oil.
- Do not run the engine for at least 3 hours after installing the chain case.



**Fig. 49: Identifying Spacer, O-Ring, Chain Case And Oil Pan With Torque Specifications**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

19. Install the side engine mount bracket, then tighten the side engine mount bracket mounting bolts.

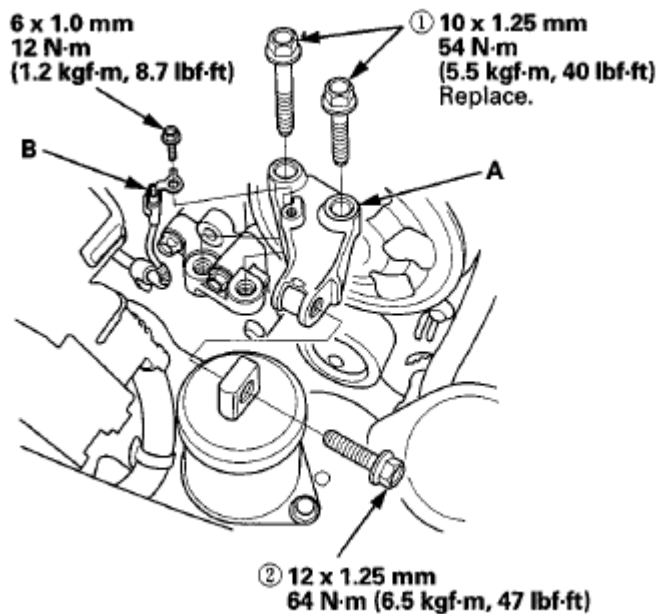




**Fig. 50: Identifying Engine Mount Bracket And Engine Mount Bracket Mounting Bolts With Torque Specifications**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

20. Install the side engine mount bracket (A), then loosely install the new side engine mount bracket mounting bolts.

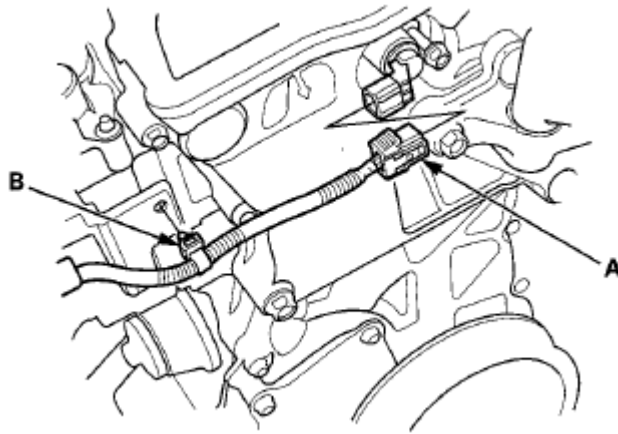


**Fig. 51: Identifying Engine Mount Bracket And Ground Cable With Torque Specifications**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

21. Install the ground cable (B).
22. Remove the jack and the wood block.
23. Tighten the side engine mount bracket mounting bolts in the numbered sequence shown.
24. Install the crankshaft pulley (see **CRANKSHAFT PULLEY REMOVAL AND INSTALLATION** ).

25. Install the VTC oil control solenoid valve (see **VTC OIL CONTROL SOLENOID VALVE REMOVAL/TEST/INSTALLATION** ).
26. Connect the VTC oil control solenoid valve connector (A) and install the harness clamp (B).



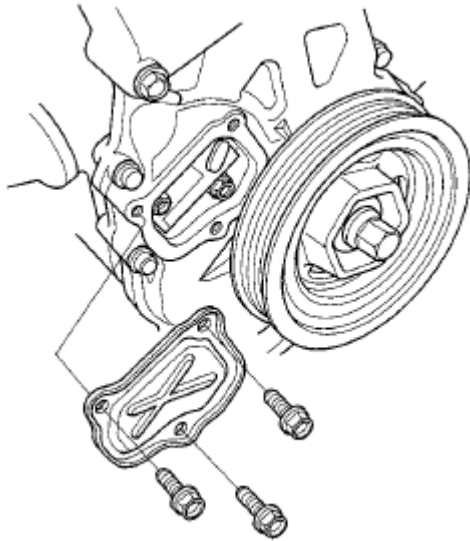
**Fig. 52: Identifying VTC Oil Control Solenoid Valve Connector And Harness Clamp**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

27. Install the cylinder head cover (see **CYLINDER HEAD COVER INSTALLATION** ).
28. Install the drive belt (see **DRIVE BELT REMOVAL/INSTALLATION** ).
29. Install the splash shield (see step 49 under **ENGINE INSTALLATION** ).
30. Install the right front wheel.
31. Do the CKP pattern clear/CKP pattern learn procedure (see **CKP PATTERN CLEAR/CKP PATTERN LEARN** ).

## **CAM CHAIN AUTO-TENSIONER REMOVAL AND INSTALLATION**

### **Removal**

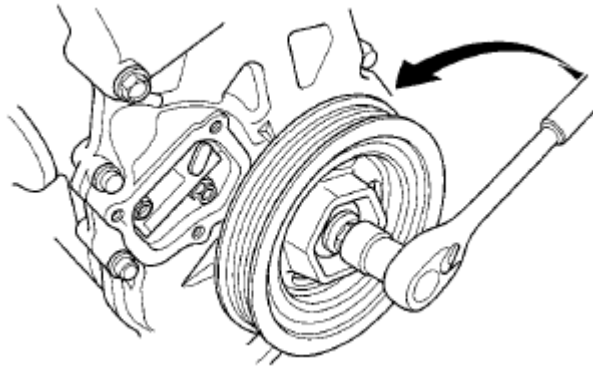
1. Remove the chain case cover.



**Fig. 53: Identifying Chain Case Cover**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Turn the crankshaft counterclockwise to compress the auto-tensioner.

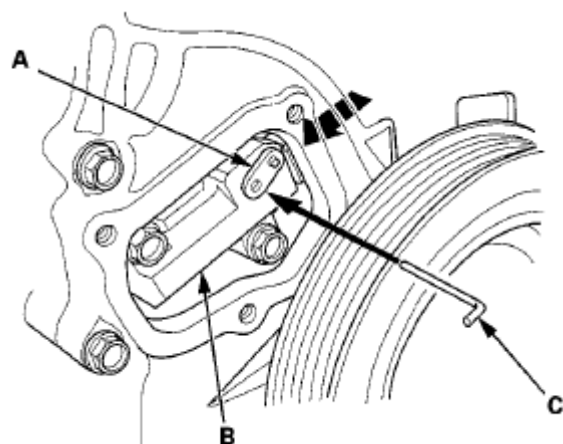


**Fig. 54: Identifying Crankshaft Counterclockwise Auto-Tensioner**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

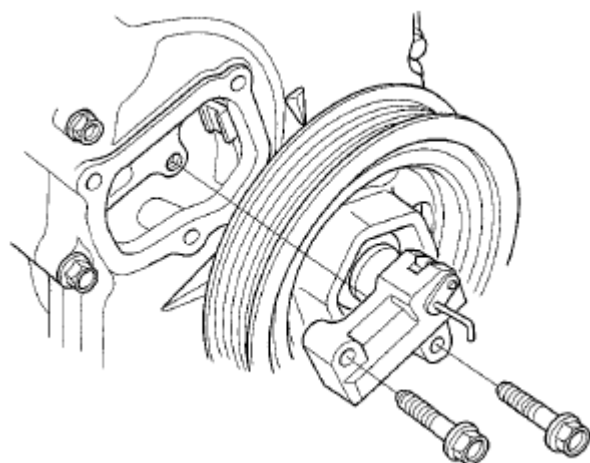
3. Rotate the crankshaft counterclockwise to align the holes on the lock (A) and the auto-tensioner (B), then insert a 1.2 mm (3/64 in) diameter pin (C) into the holes. Turn the crankshaft clockwise to secure the pin.

**NOTE:** If the holes in the lock and the auto-tensioner do not align, continue to rotating the crankshaft counterclockwise until the holes align, then install the pin.



**Fig. 55: Identifying Crankshaft Lock, Auto-Tensioner And Diameter Pin**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Remove the auto-tensioner.

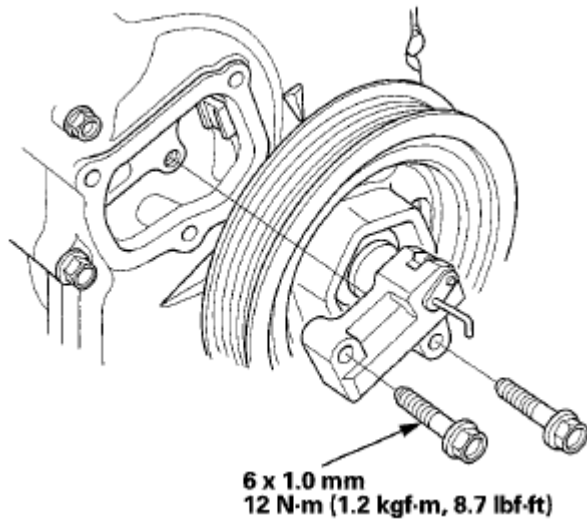


**Fig. 56: Identifying Auto-Tensioner**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

#### Installation

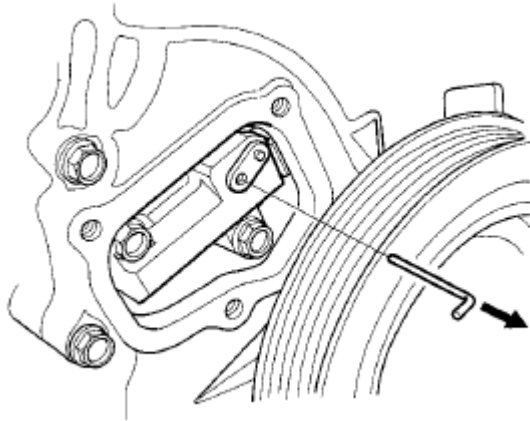
1. Install the auto-tensioner.

**NOTE:** Check the auto-tensioner cam position. If the position is not aligned, set the first cam to the first edge of the rack (see step 9).



**Fig. 57: Identifying Auto-Tensioner Cam Position With Torque Specifications**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Remove the 1.2 mm (3/64 in) diameter pin from the auto-tensioner.



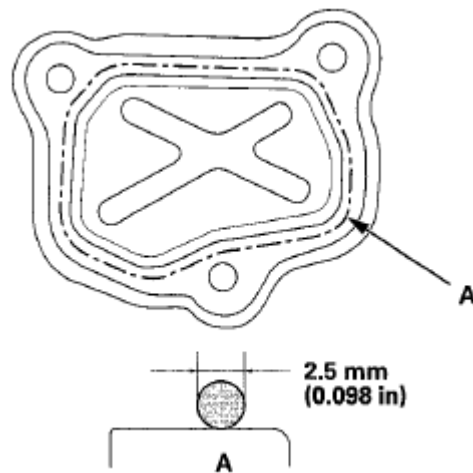
**Fig. 58: Identifying Diameter Pin**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Remove all of the old liquid gasket from the chain case cover mating surfaces, the bolts, and the bolt holes.
4. Clean and dry the chain case cover mating surfaces.
5. Apply liquid gasket, P/N 08717-0004, 08718-0003, or 08718-0009 to the chain case mating surface of the chain case 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 too much time has passed after applying the liquid gasket, remove

the old liquid gasket and residue, then reapply new liquid gasket.

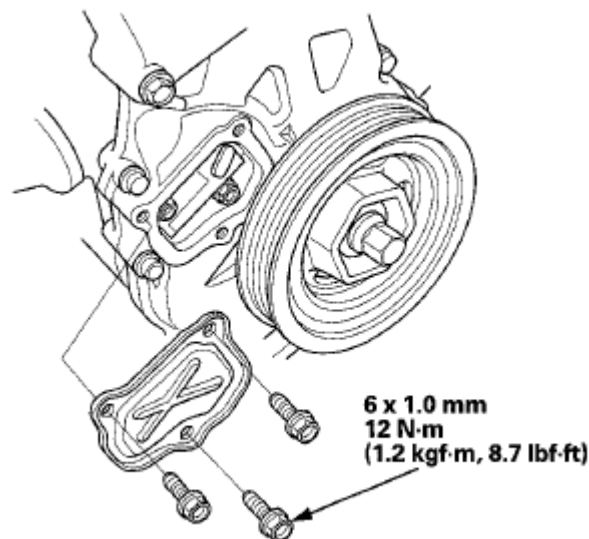


**Fig. 59: Identifying Diameter Bead Of Liquid Gasket Along Broken Line**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Install the chain case cover.

**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 chain case cover.



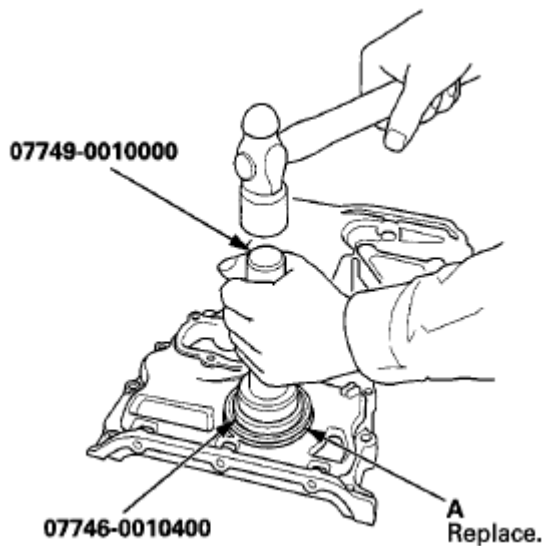
**Fig. 60: Identifying Chain Case Cover With Torque Specifications**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

**CAM CHAIN CASE OIL SEAL INSTALLATION**

**Special Tools Required**

- Driver Handle, 15 x 135L 07749-0010000
- Attachment, 52 x 55 mm 07746-0010400

1. Clean and dry the crankshaft oil seal.
2. Apply a light coat of new engine oil to the lip of the chain case oil seal.
3. Use the driver handle, 15 x 135L and the attachment, 52 x 55 mm to drive a new oil seal (A) squarely into the chain case to the specified installed height.

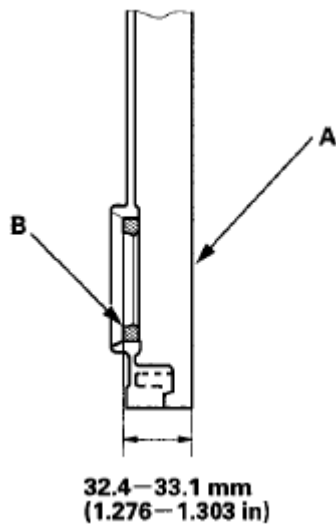


**Fig. 61: Installing Chain Case Oil Seal Using SST**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Measure the distance between the chain case surface (A) and the oil seal (B).

**Oil Seal Installed Height**

**32.4-33.1 mm (1.276-1.303 in)**



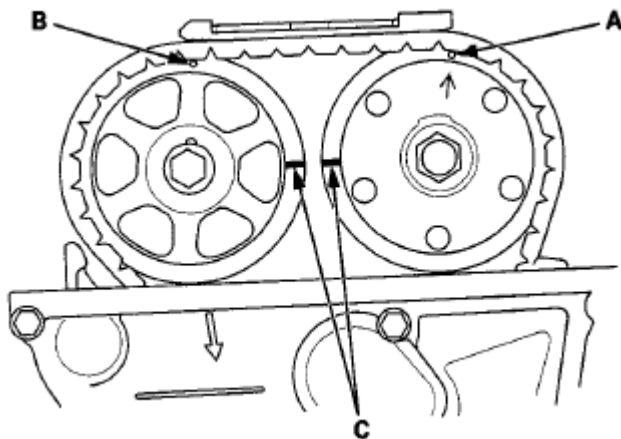
**Fig. 62: Identifying Distance Between Chain Case Surface And Oil Seal**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

## CAM CHAIN INSPECTION

### Special Tools Required

Cam Chain Inspection Gauge 07AAJ-RWCA100

1. Remove the right front wheel.
2. Remove the splash shield (see step 25 under **ENGINE REMOVAL** ).
3. Remove the cylinder head cover (see **CYLINDER HEAD COVER REMOVAL** ).
4. Rotate the crankshaft pulley two turns clockwise.
5. Set the No. 1 piston at top dead center (TDC). The punch mark (A) on the VTC actuator and the punch mark (B) on the exhaust camshaft sprocket should be at the top. Align the TDC marks (C) on the VTC actuator and the exhaust camshaft sprocket.



**Fig. 63: Identifying TDC Punch Mark And VTC Actuator And Punch Mark**



Courtesy of AMERICAN HONDA MOTOR CO., INC.

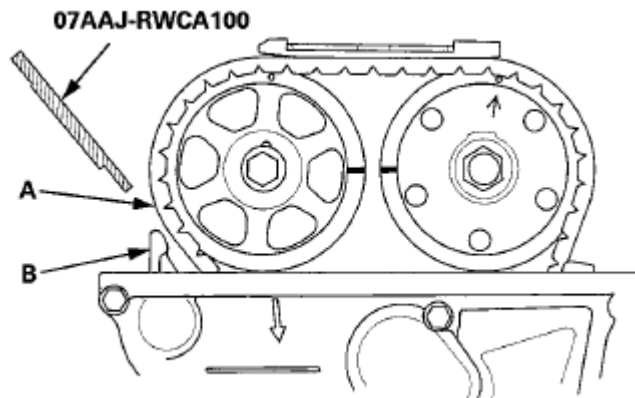
6. Measure the clearance between the cam chain (A) and the tensioner arm (B) with the cam chain inspection gauge (07AAJ-RWCA100).
  - If the clearance is OK, go to step 17.
  - If the clearance is more than the service limit, go to step 7.

### Chain-to-Arm Clearance

#### Service Limit

MIL on with P0341: 4.3 mm (0.169 in)

Without MIL: 5.5 mm (0.217 in)



**Fig. 64: Identifying Cam Chain And Tensioner Arm**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

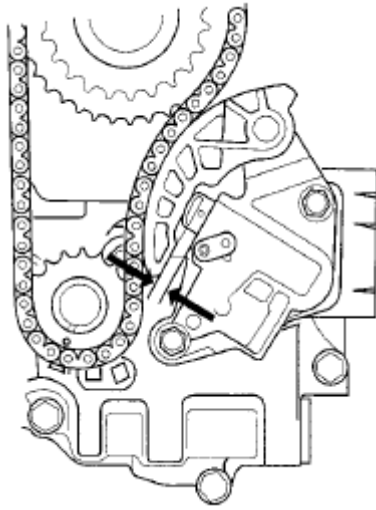
7. Remove the oil pan (see **OIL PAN REMOVAL**).
8. Lift and support the engine with a jack and a wood block under the engine block.

**NOTE:** Do not hit the oil pump and the baffle plate when placing the jack on the edge of the engine block.

9. Remove the cam chain (see **CAM CHAIN REMOVAL**), and check the teeth on the crankshaft sprocket, the VTC actuator, and the exhaust camshaft sprocket for wear and damage. If any of them are worn or damaged, replace if necessary.
10. Check the oil passage on the auto-tensioner for clogs. If the auto-tensioner is clogged, replace it.
11. Measure the length of the oil pump chain auto-tensioner rod.

### Oil Pump Chain Auto-Tensioner Rod Length

**Service Limit: 13 mm (0.51 in)**

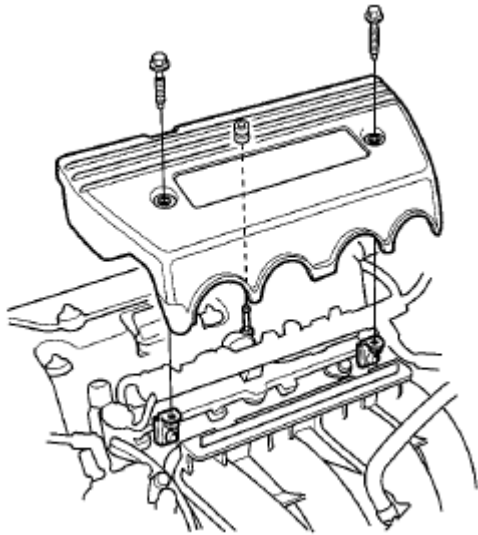


**Fig. 65: Identifying Length Of Oil Pump Chain Auto-Tensioner Rod**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. If the length is over the service limit, replace the oil pump chain (see **OIL PUMP CHAIN REPLACEMENT** ). When replacing, check the teeth on the crankshaft sprocket and the oil pump sprocket for wear and damage. If any of them are worn or damaged, replace if necessary.
13. Check the oil passage on the oil pump chain auto-tensioner for clogs. If the auto-tensioner is clogged, replace it.
14. Install the new cam chain (see **CAM CHAIN INSTALLATION** ).
15. Remove the jack and the wood block.
16. Install the oil pan (see **OIL PAN INSTALLATION** ).
17. Install the cylinder head cover (see **CYLINDER HEAD COVER INSTALLATION** ).
18. Install the splash shield (see step 49 under **ENGINE INSTALLATION** ).
19. Install the right front wheel.

## CYLINDER HEAD COVER REMOVAL

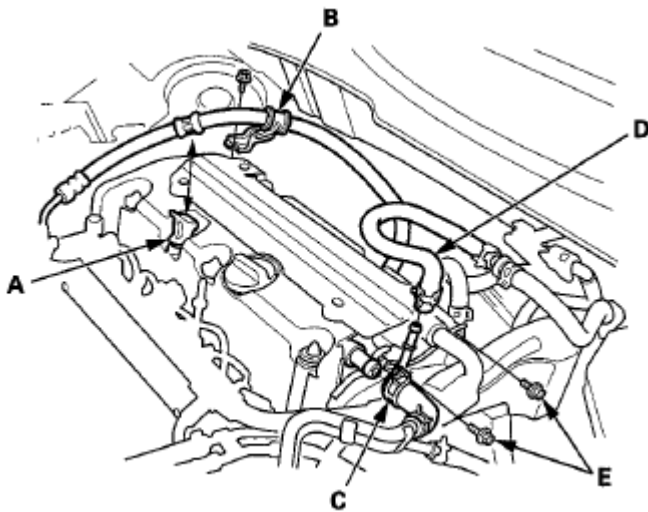
1. Remove the strut brace (if equipped) (see **FRAME BRACE REPLACEMENT** ).
2. '08-10 models: Remove the engine cover.



**Fig. 66: Identifying Engine Cover**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

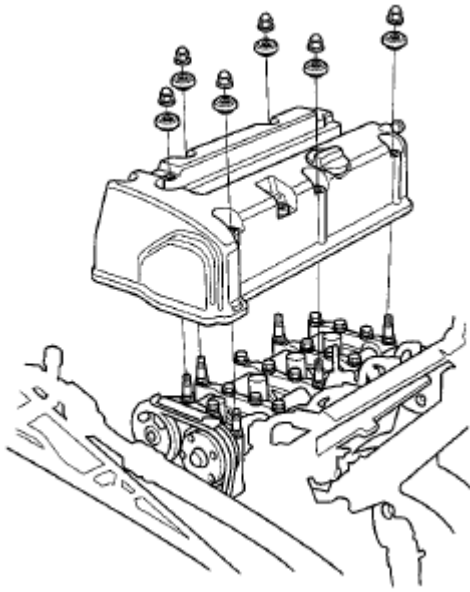
3. Remove the dipstick (A), and the power steering hose bracket (B) and disconnect the breather hose (C) and the brake booster vacuum hose (D).



**Fig. 67: Identifying Dipstick, Power Steering Hose Bracket, Breather Hose And Brake Booster Vacuum Hose**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Remove the two bolts (E) securing the EVAP canister purge valve bracket.
5. Remove the four ignition coils (see **IGNITION COIL AND SPARK PLUG REMOVAL/INSTALLATION** ).
6. Remove the cylinder head cover.



**Fig. 68: Identifying Cylinder Head Cover**

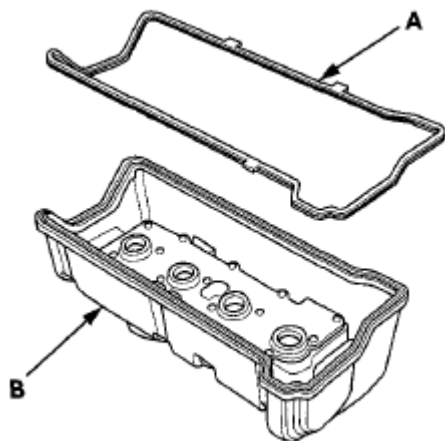
Courtesy of AMERICAN HONDA MOTOR CO., INC.

### CYLINDER HEAD COVER INSTALLATION

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.

**NOTE:** Check and if necessary, replace the head cover gasket.

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.

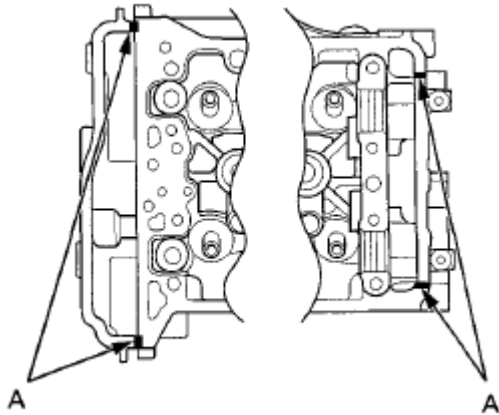


**Fig. 69: Identifying Head Cover Gasket And Groove Of Cylinder Head Cover**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

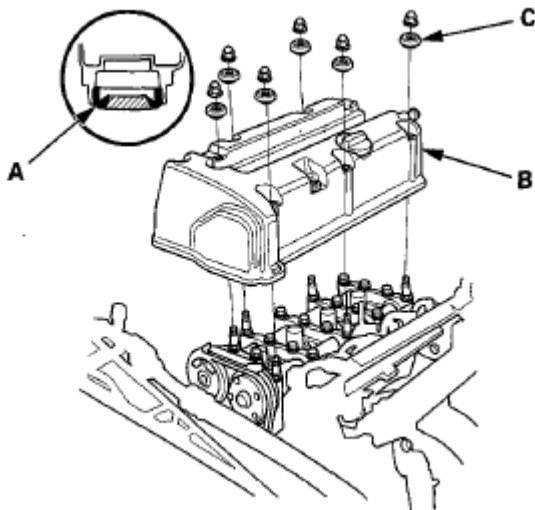
4. Remove all of the liquid gasket from the chain case and the No. 5 rocker shaft holder.
5. Clean the head cover contacting surfaces with a shop towel.
6. Apply liquid gasket, P/N 08717-0004, 08718-0003, or 08718-0009, on the chain case and the No. 5 rocker shaft holder mating areas (A). Install the component within 5 minutes of applying the liquid gasket.

**NOTE:** If too much time has passed after applying the liquid gasket, remove the old liquid gasket and residue, then reapply new liquid gasket.



**Fig. 70: Identifying Rocker Shaft Holder Mating Areas**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Set the spark plug seals (A) on the spark plug tubes. Place the cylinder head cover (B).



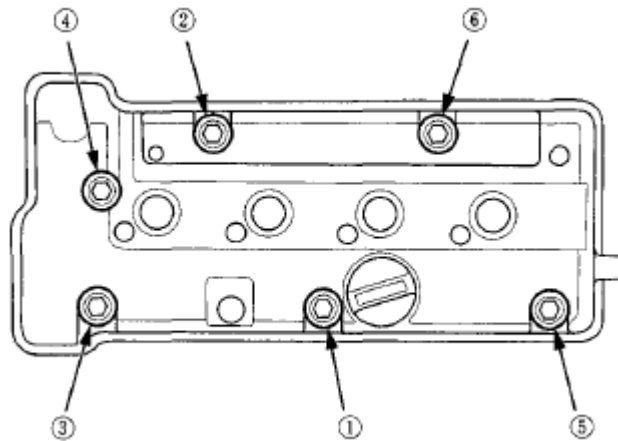
**Fig. 71: Identifying Spark Plug Seals And Cylinder Head Cover**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Inspect the spark plug seals for damage.
9. Inspect the cover washers (C). Replace any washer that is damaged or deteriorated.

10. Tighten the bolts in three steps. In the final step torque bolts, in sequence, to 12 N.m (1.2 kgf.m, 8.7 lbf.ft).

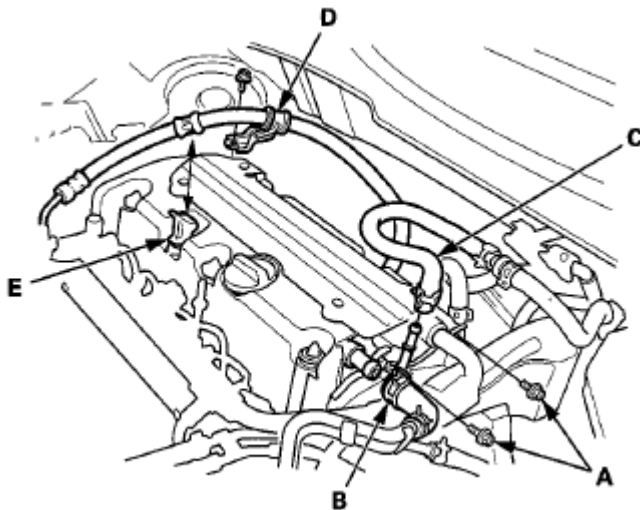
**NOTE:**

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



**Fig. 72: Identifying Cylinder Head Cover Bolts Tightening Sequence**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Install the two bolts (A) securing the EVAP canister purge valve bracket.

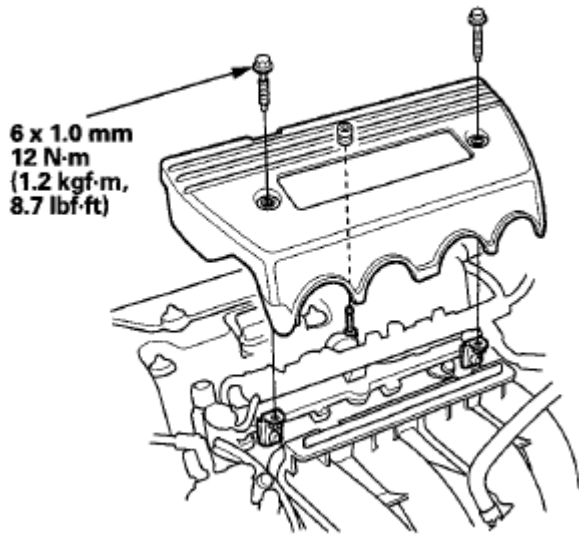


**Fig. 73: Identifying Bolts And EVAP Canister Purge Valve Bracket**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Connect the breather hose (B) and the brake booster vacuum hose (C) and install the power steering (P/S) hose bracket (D), and the dipstick (E).
13. Install the four ignition coils (see **IGNITION COIL AND SPARK PLUG**

**REMOVAL/INSTALLATION** ).

14. '08-10 models: Install the engine cover.



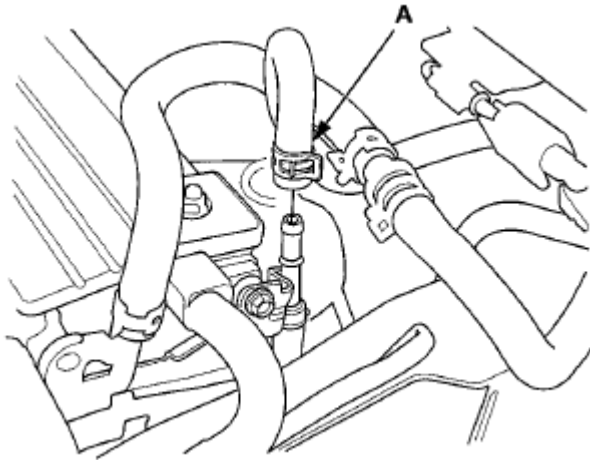
**Fig. 74: Identifying Engine Cover With Torque Specifications**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

15. Install the strut brace (if equipped) (see **FRAME BRACE REPLACEMENT** ).

**CYLINDER HEAD REMOVAL****NOTE:**

- Use fender covers to avoid damaging painted surfaces.
- To avoid damaging the wires and terminals, unplug the wiring connectors carefully while holding the connector portion.
- Connect the HDS to the DLC (see step 2 under **HOW TO USE THE HDS (HONDA DIAGNOSTIC SYSTEM)** ), and monitor the ECT sensor 1. To avoid damaging the cylinder head, wait until the ECT SENSOR 1 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.

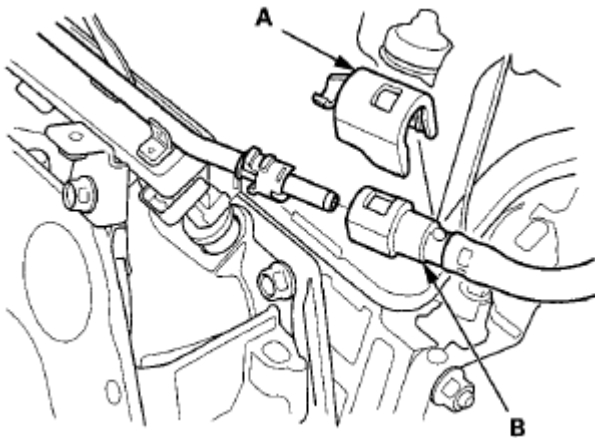
1. Remove the strut brace (if equipped) (see **FRAME BRACE REPLACEMENT** ).
2. Relieve the fuel pressure (see **FUEL PRESSURE RELIEVING** ).
3. Drain the engine coolant (see **COOLANT CHECK** ).
4. Remove the drive belt (see **DRIVE BELT REMOVAL/INSTALLATION** ).
5. Remove the intake manifold (see **REMOVAL** ).
6. Remove the warm up TWC (see **WARM UP TWC REMOVAL/INSTALLATION** ).
7. Disconnect the EVAP canister hose (A).



**Fig. 75: Identifying EVAP Canister Hose**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Remove the quick-connect fitting cover (A), then disconnect the fuel feed hose (B) (see **FUEL LINE/QUICK-CONNECT FITTING REMOVAL** ).

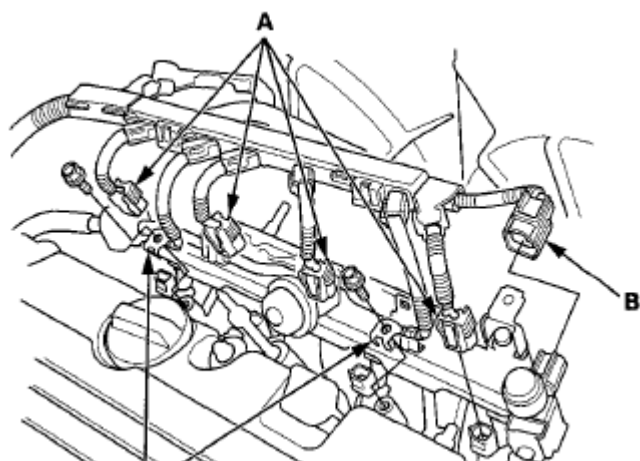


**Fig. 76: Identifying Quick-Connect Fitting Cover And Fuel Feed Hose**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Disconnect the four fuel injector connectors (A), the engine mount control solenoid valve connector (B), and remove the ground cables (C).

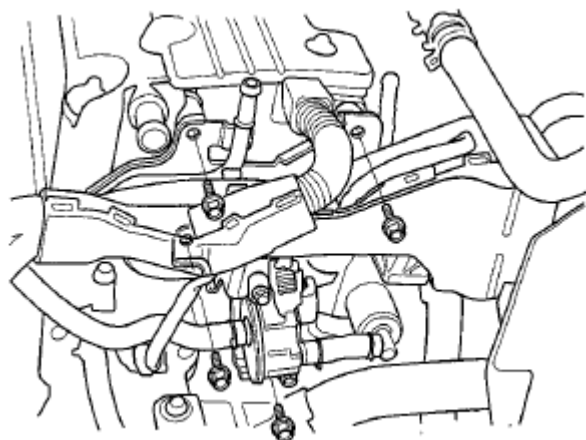




**Fig. 77: Identifying Fuel Injector Connectors And Engine Mount Control Solenoid Valve Connector**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

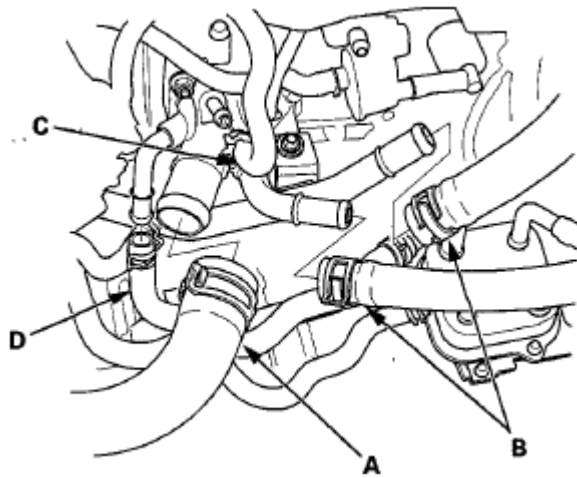
10. Remove the four bolts securing the EVAP canister purge valve bracket.



**Fig. 78: Identifying EVAP Canister Purge Valve Bracket**

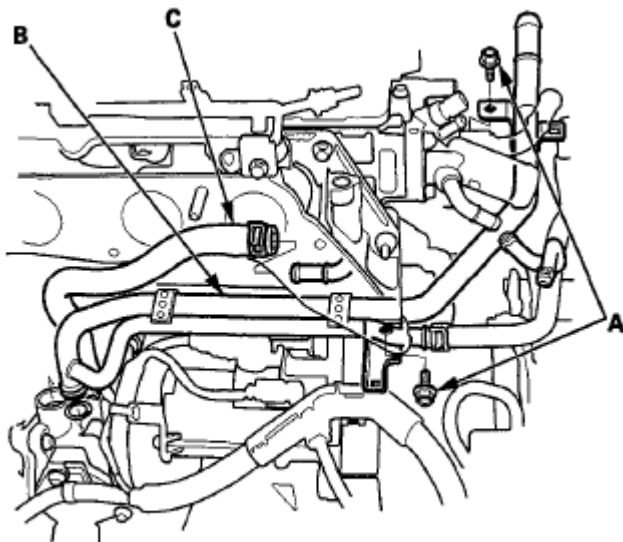
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Disconnect the upper radiator hose (A), the heater hoses (B), and the water bypass hose (C).



**Fig. 79: Identifying Upper Radiator Hose, Heater Hoses And Water Bypass Hose**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. With ATF warmer: Disconnect the water bypass hose (D).
13. Remove the connecting pipe mounting bolts (A) securing the connecting pipe (B).



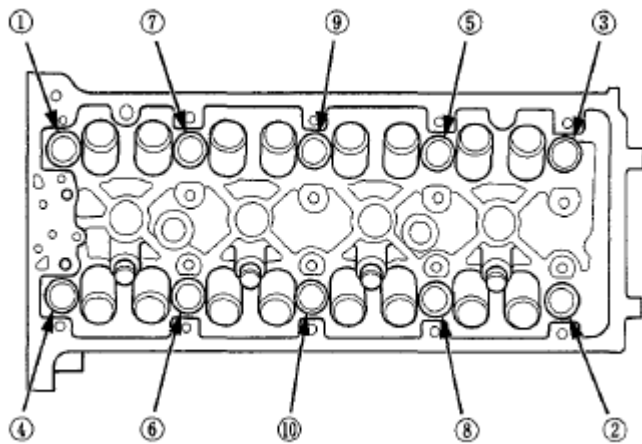
\* : This illustration shows the ATF warmer.

**Fig. 80: Identifying Pipe Mounting Bolts, Connecting Pipe And Connecting Pipe**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

\*: This illustration shows the ATF warmer.

14. Disconnect the water bypass hose (C).
15. Disconnect the following engine wire harness connectors, and remove the wire harness clamps from the cylinder head:
  - ECT sensor 1 connector

- CMP sensor A (Intake) connector
  - CMP sensor B (Exhaust) connector
  - Two rocker arm oil control solenoid connectors
  - Two rocker arm oil pressure switch connectors
  - EVAP canister purge valve connector
  - VTC oil control solenoid valve connector
  - Engine oil pressure switch connector
16. Remove the cam chain (see **CAM CHAIN REMOVAL** ).
  17. Remove the rocker arm assembly (see **ROCKER ARM ASSEMBLY REMOVAL** ).
  18. 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.

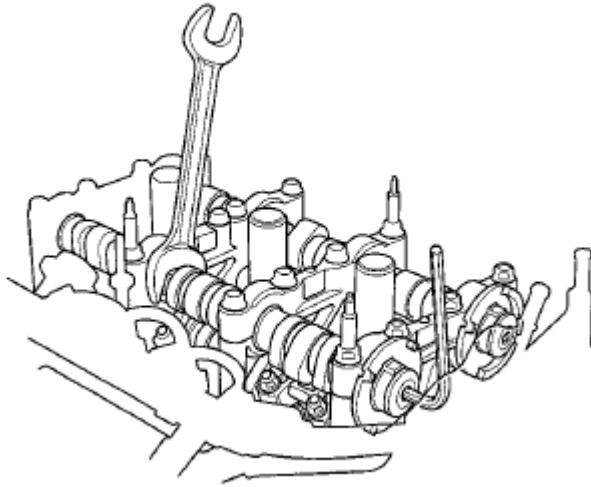


**Fig. 81: Identifying Cylinder Head Bolt Loosening Sequence**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

19. Remove the cylinder head.

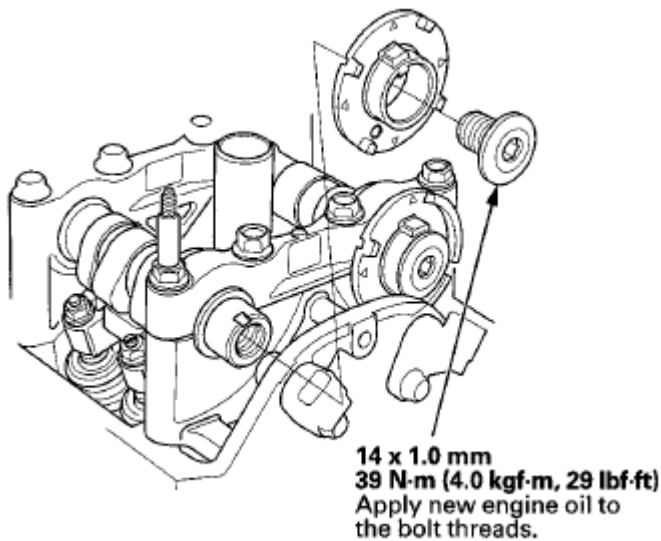
#### **CMP PULSE PLATE A REPLACEMENT**

1. Remove the cylinder head cover (see **CYLINDER HEAD COVER REMOVAL** ).
2. Remove CMP sensor A (see **CMP SENSOR A REPLACEMENT** ).
3. Hold the camshaft with an open-end wrench, then loosen the bolt.



**Fig. 82: Holding Camshaft With Wrench To Loosen Bolt**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Remove CMP pulse plate A.

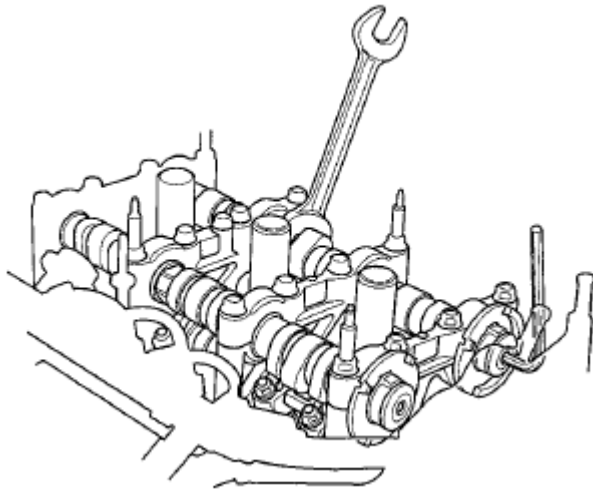


**Fig. 83: Identifying CMP Pulse Plate With Torque Specifications**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Install CMP pulse plate A in the reverse order of removal.

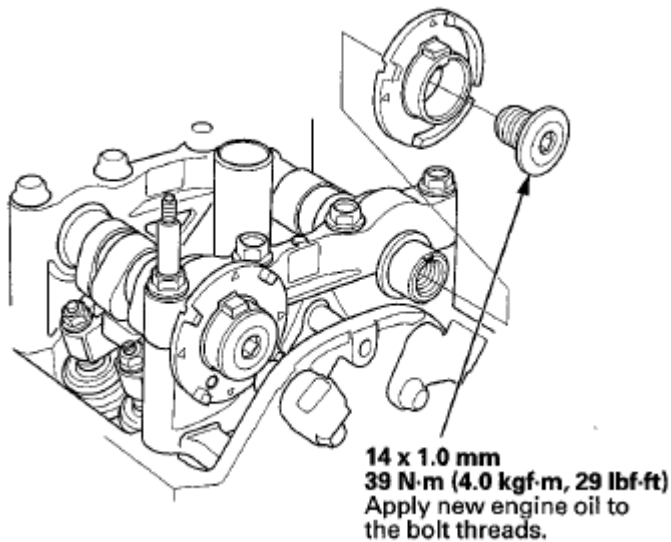
#### **CMP PULSE PLATE B REPLACEMENT**

1. Remove the cylinder head cover (see **CYLINDER HEAD COVER REMOVAL** ).
2. Remove CMP sensor B (see **CMP SENSOR B REPLACEMENT** ).
3. Hold the camshaft with an open-end wrench, then loosen the bolt.



**Fig. 84: Holding Camshaft With Wrench To Loosen Bolt**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Remove CMP pulse plate B.



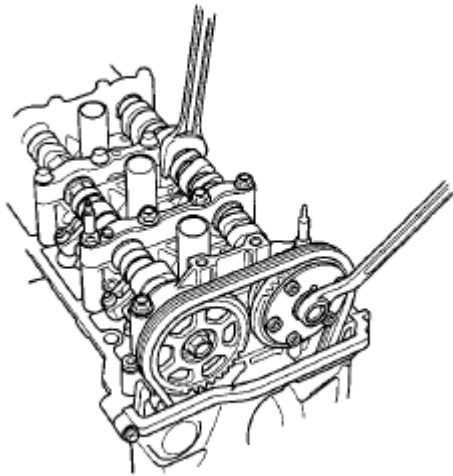
**Fig. 85: Identifying CMP Pulse Plate With Torque Specifications**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Install CMP pulse plate B in the reverse order of removal.

## **VTC ACTUATOR, EXHAUST CAMSHAFT SPROCKET REPLACEMENT**

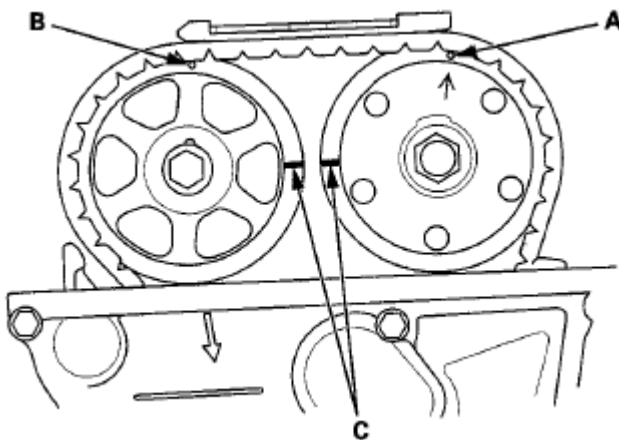
1. Remove the cylinder head cover (see **CYLINDER HEAD COVER REMOVAL** ).
2. Hold the camshaft with an open-end wrench, then loosen the VTC actuator mounting bolt and the exhaust camshaft sprocket mounting bolt.

**NOTE:** Do not remove the VTC actuator and exhaust camshaft sprocket mounting bolts.



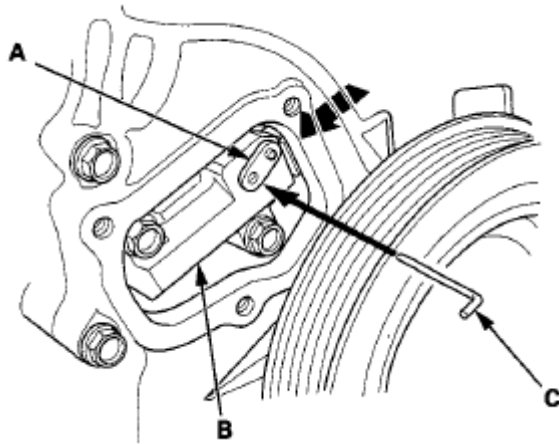
**Fig. 86: Identifying VTC Actuator Mounting Bolt And Exhaust Camshaft Sprocket Mounting Bolt**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Set the No. 1 piston at top dead center (TDC). The punch mark (A) on the VTC actuator and the punch mark (B) on the exhaust camshaft sprocket should be at the top. Align the TDC marks (C) on the VTC actuator and the exhaust camshaft sprocket.



**Fig. 87: Identifying TDC Punch Mark, VTC Actuator And Punch Mark And TDC Marks**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Remove the chain case cover (see step 1).
5. Rotate the crankshaft counterclockwise and align the holes on the lock (A) and the auto-tensioner (B), then insert a 1.2 mm (3/64 in) diameter pin or lock pin (C) into the holes.

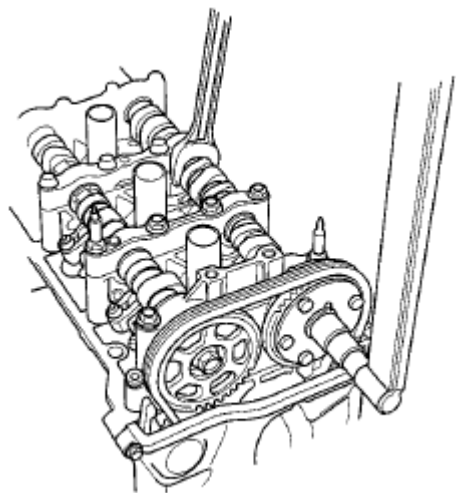


**Fig. 88: Identifying Crankshaft Hole Alignment And Lock Pin**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

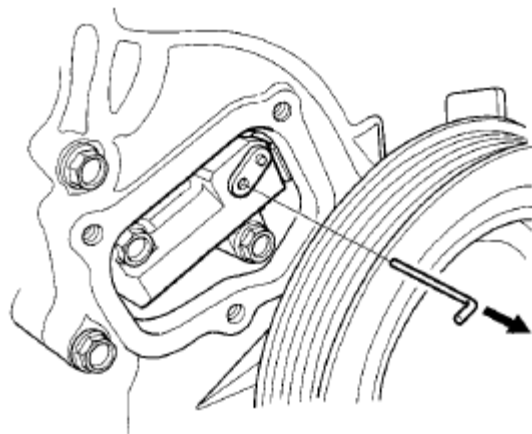
6. Turn the crankshaft clockwise to secure the pin and the TDC on the No. 1 cylinder.
7. Loosen the rocker arm adjusting screws (see step 2
8. Remove the camshaft holder bolts (see step 3 .
9. Remove the five camshaft holders and cam chain guide B.
10. Carefully tip up the intake camshaft on the transmission side of the engine until there is enough slack in the chain to lift the chain off of the VTC actuator's teeth.
11. Remove the intake and exhaust camshafts while keeping some tension on the cam chain.
12. Secure the cam chain to the A/C compressor suction hose or the power steering hose with a wire tie to prevent the chain from falling down into the chain case.
13. Remove the VTC actuator and the exhaust camshaft sprocket.
14. Install the VTC actuator and the exhaust camshaft sprocket.

**NOTE: Install the VTC actuator while in the unlocked position.**

15. Apply new engine oil to the threads of the VTC actuator and exhaust camshaft sprocket mounting bolts, then loosely install them.
16. Turn the VTC actuator clockwise until you hear it click. Make sure to lock the VTC actuator by turning it.
17. Remove the wire tie while keeping light tension on the cam chain.
18. Slide the intake and exhaust camshafts in at an angle to allow the cam chain to slip over the VTC actuator's teeth and the exhaust sprocket's teeth.
19. Line up the marks made in step 3 for each cam.
20. Apply new engine oil to the camshaft journals and lobes on both cams, and reinstall the five camshaft holders and cam chain guide B in place.
21. Tighten the camshaft holder bolts to the specified torque (see step 9 .
22. Hold the camshaft with an open-end wrench, then tighten the bolts.

**Specified Torque****VTC Actuator Mounting Bolt:****12 x 1.25 mm****113 N.m (11.5 kgf.m, 83 lbf.ft)****Exhaust Camshaft Sprocket Mounting Bolt:****10 x 1.25 mm****72 N.m (7.3 kgf.m, 53 lbf.ft)****Fig. 89: Tightening Cam Shaft Bolts****Courtesy of AMERICAN HONDA MOTOR CO., INC.**

23. Remove the 1.2 mm (3/64 in) diameter pin from the auto-tensioner.

**Fig. 90: Identifying Diameter Pin**



**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

24. Remove all of the old liquid gasket from the chain case cover mating surfaces, the bolts, and the bolt holes.
25. Clean and dry the chain case cover mating surfaces.
26. Apply liquid gasket, P/N 08717-0004, 08718-0003, or 08718-0009 to the chain case mating surface of the chain case cover, and to the inside edge of the threaded bolt holes. Install the component within 5 minutes of applying the liquid gasket (see **CAM CHAIN AUTO-TENSIONER REMOVAL AND INSTALLATION** ).
27. Install the chain case cover (see step 6 .
28. Adjust the valve clearance (see **VALVE CLEARANCE ADJUSTMENT** ).
29. Install the cylinder head cover (see **CYLINDER HEAD COVER INSTALLATION** ).

### **CYLINDER HEAD INSPECTION FOR WARPAGE**

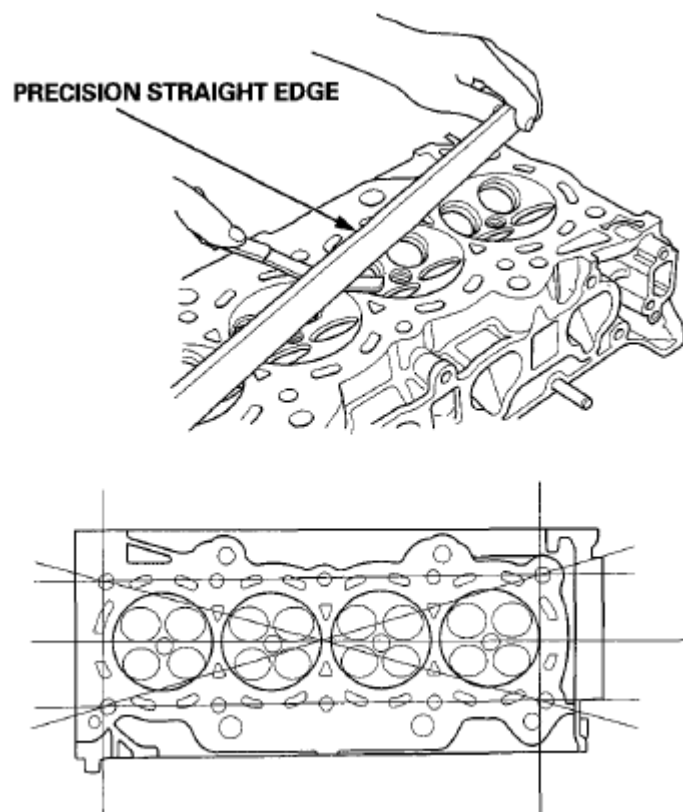
1. Remove the cylinder head (see **CYLINDER HEAD REMOVAL** ).
2. Inspect the camshaft (see **CAMSHAFT INSPECTION** ).
3. Check the cylinder head for warpage. Measure along the edges, and three ways across the center.
  - If warpage is less than 0.05 mm (0.0020 in) cylinder head resurfacing is not required.
  - Maximum resurface limited to the cylinder head height standard as shown.

#### **Cylinder Head Warpage**

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

#### **Cylinder Head Height**

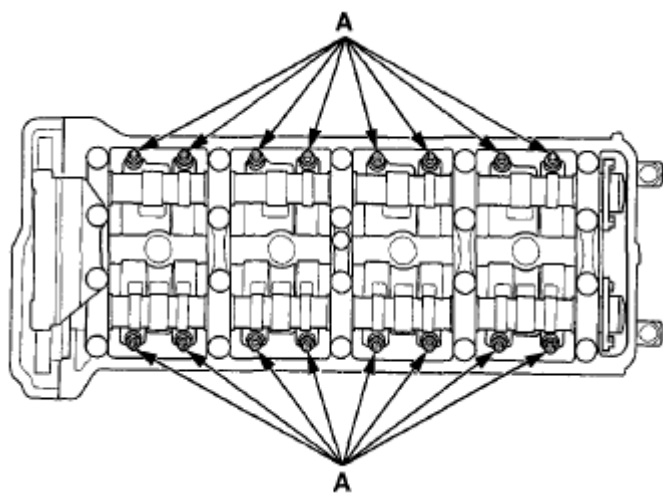
**Standard (New): 103.95-104.05 mm (4.093-4.096 in)**



**Fig. 91: Measuring Cylinder Head Warpage And Edges**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

### ROCKER ARM ASSEMBLY REMOVAL

1. Remove the cam chain (see CAM CHAIN REMOVAL ).
2. Loosen the locknuts and the rocker arm adjusting screws (A).

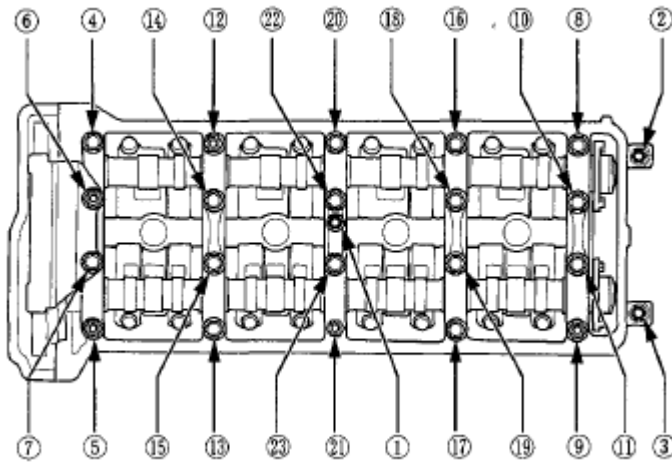


**Fig. 92: Identifying Locknuts With Arm Adjusting Screws**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Remove the camshaft holder bolts. To prevent damaging the camshafts, loosen the bolts, in sequence, two turns at a time.

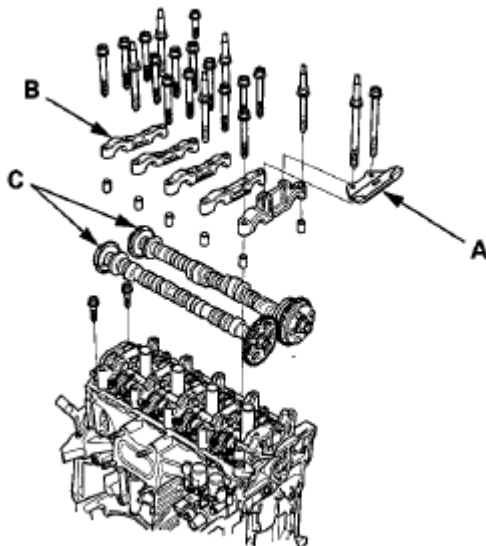
**NOTE:** Bolt (1) is not on all engines.



**Fig. 93: Identifying Camshaft Holder Bolts With Loosening Sequence**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

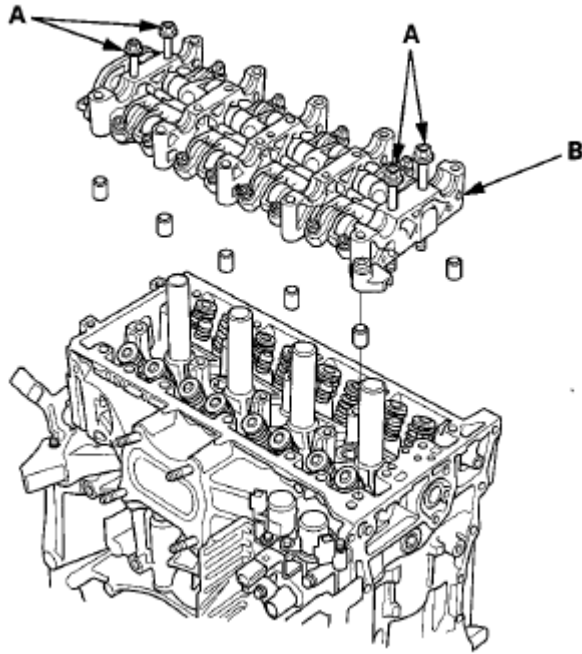
4. Remove cam chain guide B (A), the camshaft holders (B), and the camshafts (C).



**Fig. 94: Identifying Cam Chain Guide, Camshaft Holders And Camshafts**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Insert the bolts (A) into the rocker shaft holder, then remove the rocker arm assembly (B).

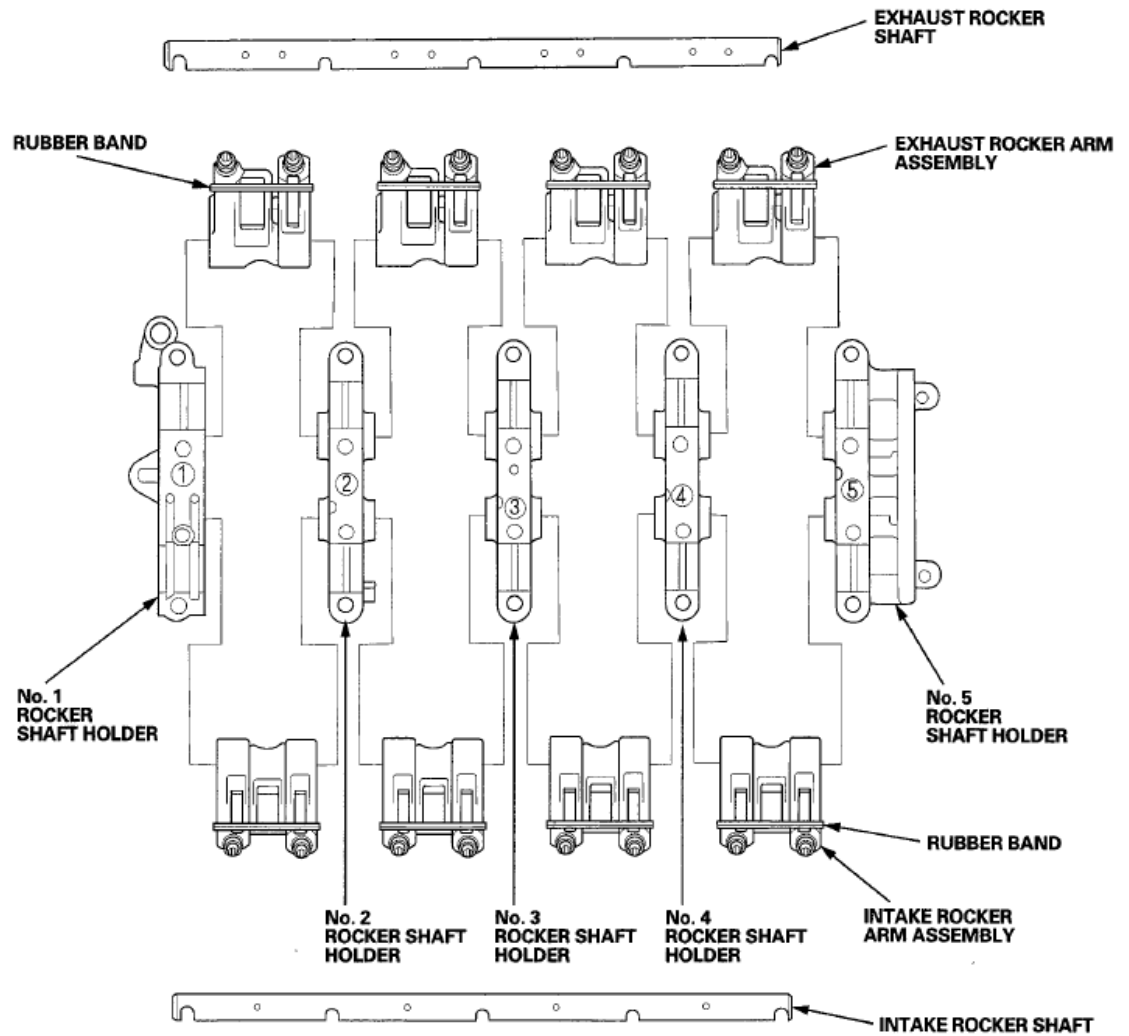


**Fig. 95: Identifying Bolts In Rocker Arm Assembly**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

## ROCKER ARM AND SHAFT DISASSEMBLY/REASSEMBLY

### NOTE:

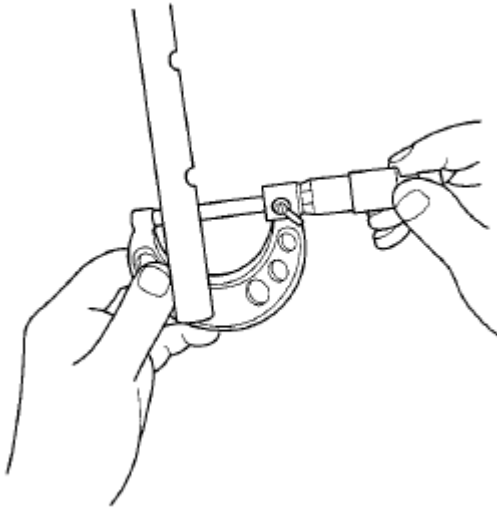
- Identify parts as they are removed so they can be reinstalled in their original locations.
- Inspect the rocker arm shaft and rocker arms (see ROCKER ARM AND SHAFT INSPECTION ).
- If reused, the rocker arms must be installed in the original locations.
- When removing, or installing the rocker arm assembly, do not remove the camshaft holder bolts. The bolts will keep the holders and the rocker arms on the shaft.
- Bundle the rocker arms with rubber bands to keep them together as a set, and remove the bands after the intake and the exhaust 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.
- When replacing the VTEC rocker arm assembly, remove the fastening hardware from the new VTEC rocker arm assembly.



**Fig. 96: Identifying Rocker Arm And Shaft Disassembly /Reassembly**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

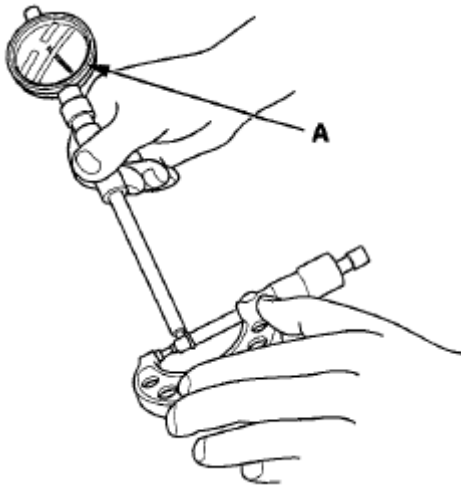
## ROCKER ARM AND SHAFT INSPECTION

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. 97: Measuring Diameter Of Shaft In Rocker Arm**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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



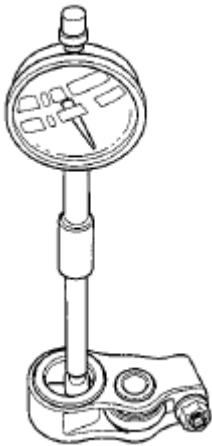
**Fig. 98: Measuring Zero Gauge Shaft Diameter**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

#### **Rocker Arm-to-Shaft Clearance**

**Standard (New): 0.018-0.059 mm (0.00071 - 0.00232 in)**

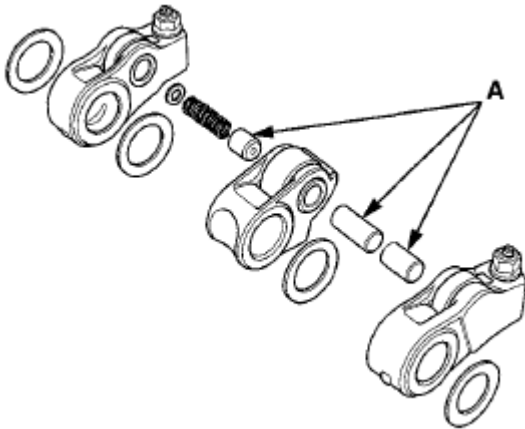
**Service Limit: 0.08 mm (0.0031 in)**



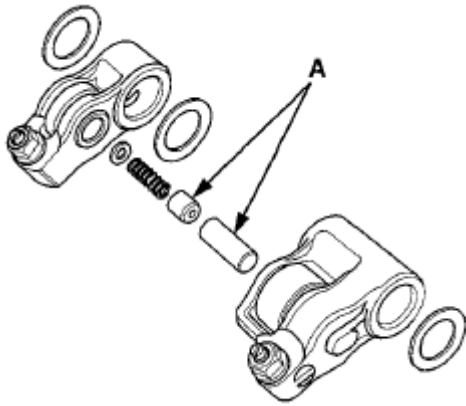
**Fig. 99: Identifying Inside Diameter Of Rocker Arm**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Repeat for all intake rocker arms and intake shaft. If the clearance is beyond the service limit, replace the rocker shaft and all out of service limit rocker arms. If any VTEC rocker arm needs replacement, replace the intake rocker arms (primary, mid, and secondary), as a set.
7. Repeat for all exhaust rocker arms and exhaust shaft. If the clearance is beyond the service limit, replace the rocker shaft and all out of service limit rocker arms. If any VTEC rocker arm needs replacement, replace the exhaust rocker arms (primary and secondary), as a set.
8. Inspect the rocker arm pistons (A). Push on each piston manually. If it does not move smoothly, replace the rocker arm set.

**NOTE:** Apply new engine oil to the rocker arm pistons when reassembling.



**Fig. 100: Identifying Rocker Arm Pistons (Intake Side)**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.



**Fig. 101: Identifying Rocker Arm Pistons (Exhaust Side)**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Reassemble the rocker arm assembly (see **ROCKER ARM AND SHAFT DISASSEMBLY/REASSEMBLY** ).
10. Install the rocker arm assembly (see **ROCKER ARM ASSEMBLY INSTALLATION** ).

## CAMSHAFT INSPECTION

**NOTE:** Do not rotate the camshaft during 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. Put the rocker shaft holders, the camshaft, and the camshaft holders on the cylinder head, then tighten the bolts, in sequence, to the specified torque.

**NOTE:** If the engine does not have bolt (21), skip it and continue the torque sequence.

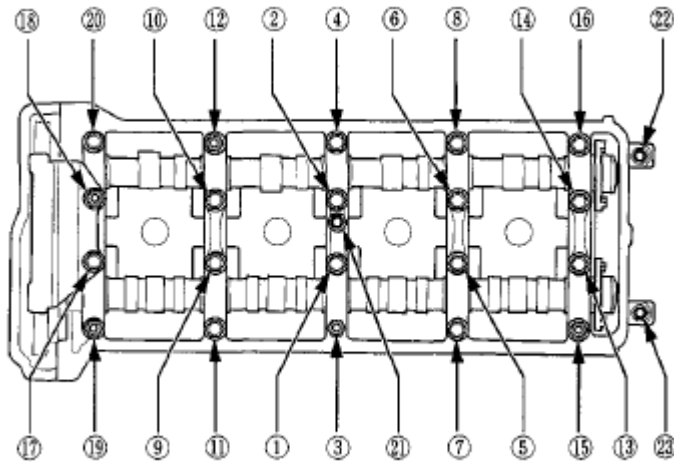
### Specified Torque

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

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

6 x 1.0 mm Bolts: (21), (22), (23)





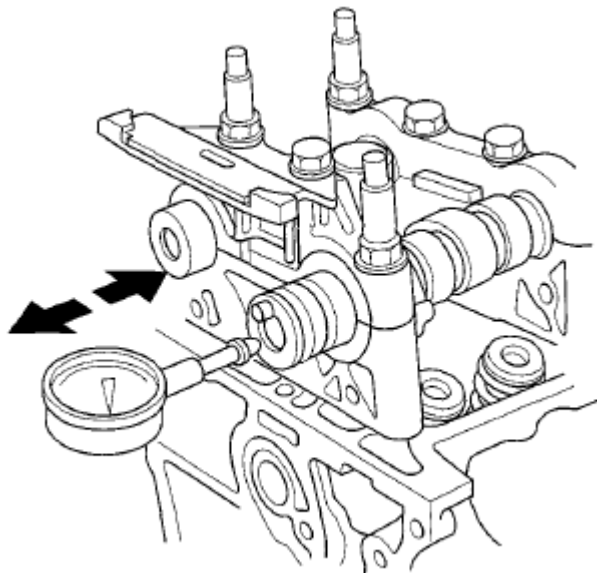
**Fig. 102: Identifying Rocker Shaft Holders With Tightening Sequence**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Seat the camshaft by pushing it away from the camshaft pulley end of the cylinder head.
6. Zero the dial indicator against the end of the camshaft, then push the camshaft back and forth, and read the end play. If the end play is beyond the service limit, replace the cylinder head and recheck. 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: 0.40 mm (0.0157 in)**



**Fig. 103: Identifying Zero Dial Indicator In Cylinder Head**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Loosen the camshaft holder bolts two turns at a time, in a crisscross pattern. Then remove the camshaft holders from the cylinder head.
8. Lift the camshafts out of the cylinder head, and wipe them clean, then inspect the lift ramps. Replace the camshaft if any lobes are pitted, scored, or excessively worn.
9. Clean the camshaft journal surfaces in the cylinder head, then set the camshafts back in place. Place a plastigage strip across each journal.
10. Install the camshaft holders, then tighten the bolts to the specified torque as shown in step 4.
11. Remove the camshaft holders. Measure the widest portion of plastigage on each journal:
  - If the camshaft-to-holder clearance is within the service limits, go to step 13.
  - 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 12.

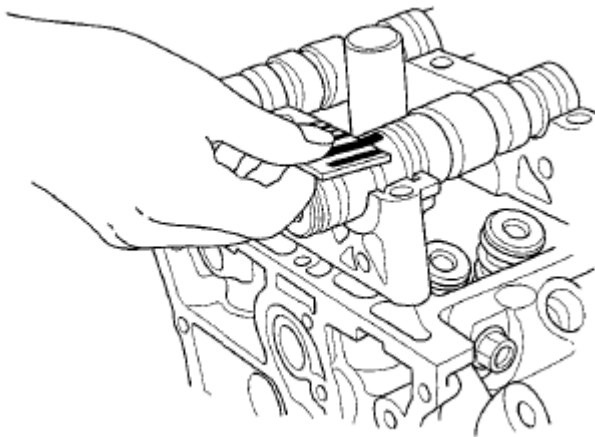
### **Camshaft-to-Holder Oil Clearance**

#### **Standard (New):**

**No. 1 Journal: 0.030-0.069 mm (0.00118-0.00272 in)**

**No. 2, 3, 4, 5 Journals: 0.060-0.099 mm (0.00236-0.00390 in)**

**Service Limit: 0.15 mm (0.0059 in)**

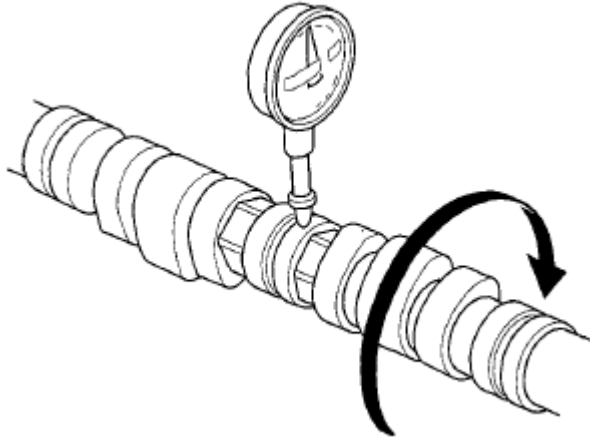


**Fig. 104: Measuring Widest Portion Of Plastic Gauge**  
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

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

**Camshaft Total Runout**

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



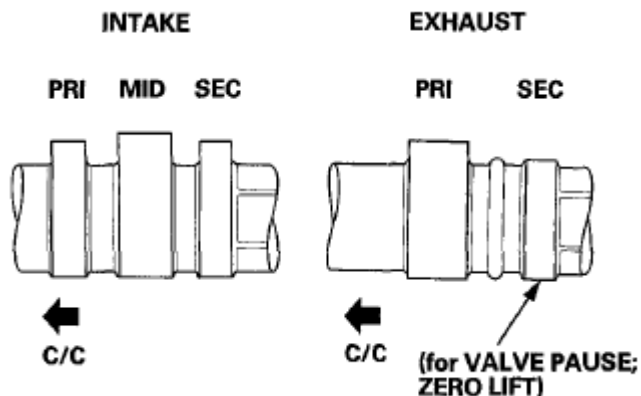
**Fig. 105: Identifying Total Runout With Camshaft**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Measure the cam lobe height.

**Cam Lobe Height Standard (New):**

**CAM LOBE HEIGHT SPECIFICATION**

	INTAKE	EXHAUST
PRI	33.744 mm (1.32850 in)	34.232 mm (1.34771 in)
MID	35.456 mm (1.39590 in)	--
SEC	33.744 mm (1.32850 in)	ZERO LIFT
PRI: Primary MID: Mid SEC: Secondary C/C: Cam Chain		



**Fig. 106: Identifying Valves**

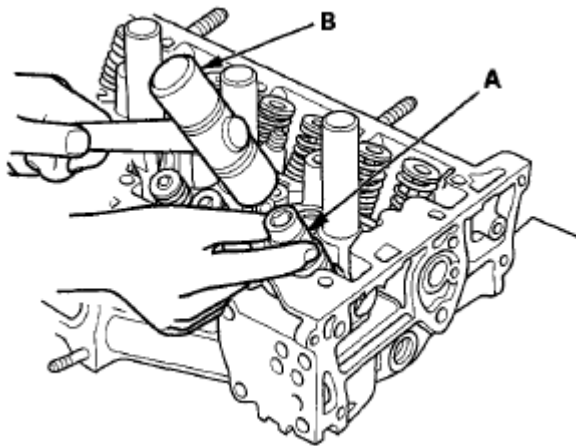
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

Valve Spring Compressor Attachment 07757-PJ1010A

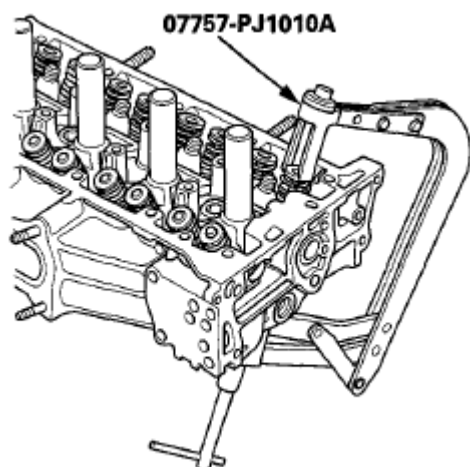
**NOTE:** Identify the valves and the valve springs as they are removed so that each item can be reinstalled in its original position.

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. 107: Identifying Socket And Plastic Mallet**

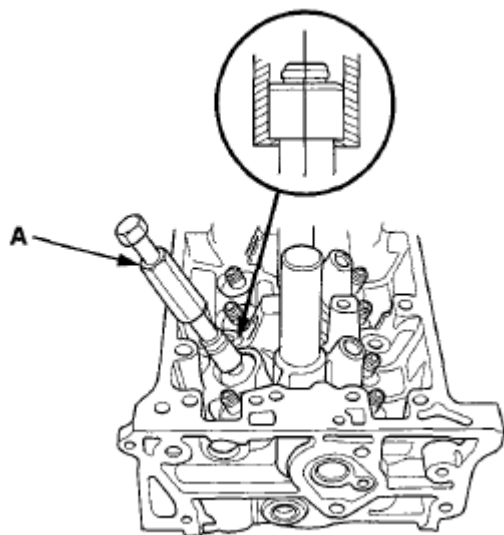
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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



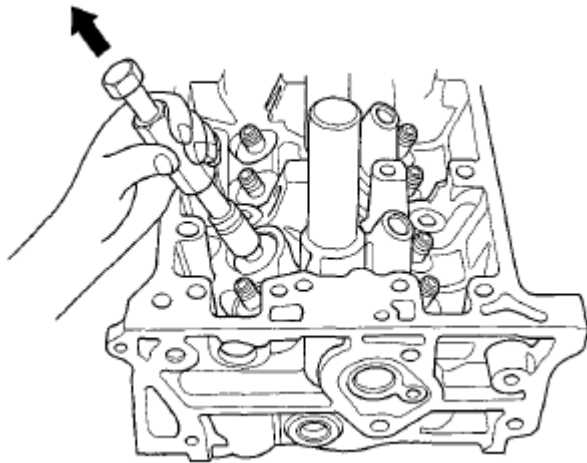
**Fig. 108: Identifying Valve Spring Compressor**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

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



**Fig. 109: Installing Valve Guide Seal Remover**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Remove the valve seal.



**Fig. 110: Removing Valve 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): 35.85-36.15 mm (1.4114-1.4232 in)**

**B Standard (New): 108.5-109.1 mm (4.272-4.295 in)**

**C Standard (New): 5.475-5.485 mm (0.21555-0.21594 in)**

**C Service Limit: 5.445 mm (0.21437 in)**

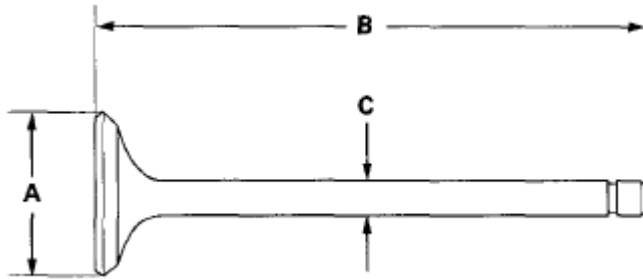
### Exhaust Valve Dimensions

**A Standard (New): 30.85-31.15 mm (1.2146-1.2264 in)**

**B Standard (New): 108.4-109.0 mm (4.268-4.291 in)**

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

**C Service Limit: 5.42 mm (0.2134 in)**



**Fig. 111: Measuring Intake/Exhaust Valve Stem Guide**  
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): 0.030-0.055 mm (0.00118-0.00217 in)**

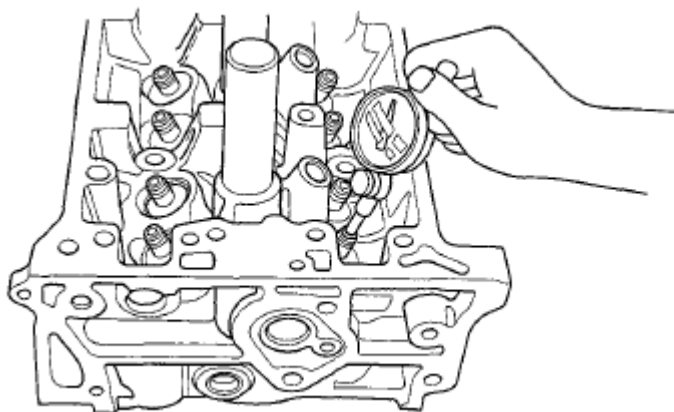
**Service Limit: 0.08 mm (0.0031 in)**

### 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)**



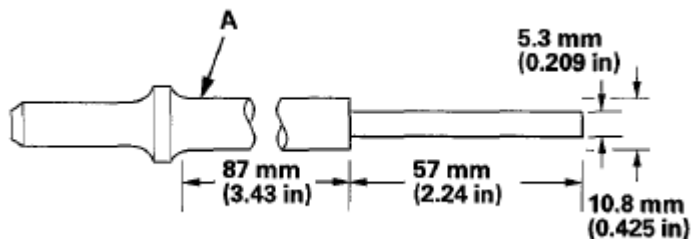
**Fig. 112: Identifying Valve Stem-To-Guide Clearance**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

## VALVE GUIDE REPLACEMENT

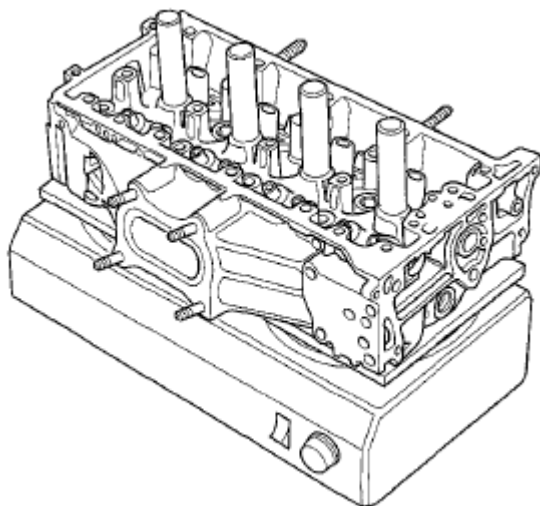
### Special Tools Required

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

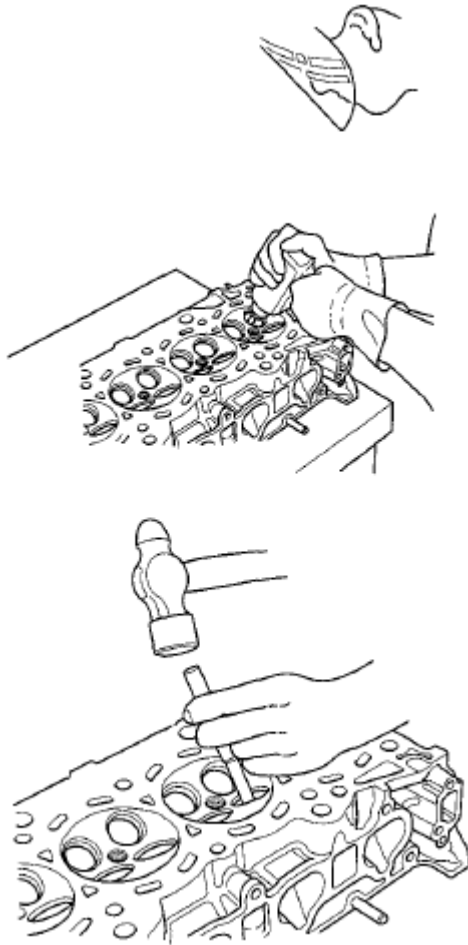
3. Select the proper replacement guides, and chill them in the freezer section of a refrigerator for at least an hour.
4. Use a hot plate or oven to evenly heat the cylinder head to 300°F (150°C). Monitor the temperature with a cooking thermometer. Do not get the head hotter than 300°F (150°C); excessive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





**Fig. 114: Identifying Cylinder Head And Hot Plate**  
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. 115: Removing Guide 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.**

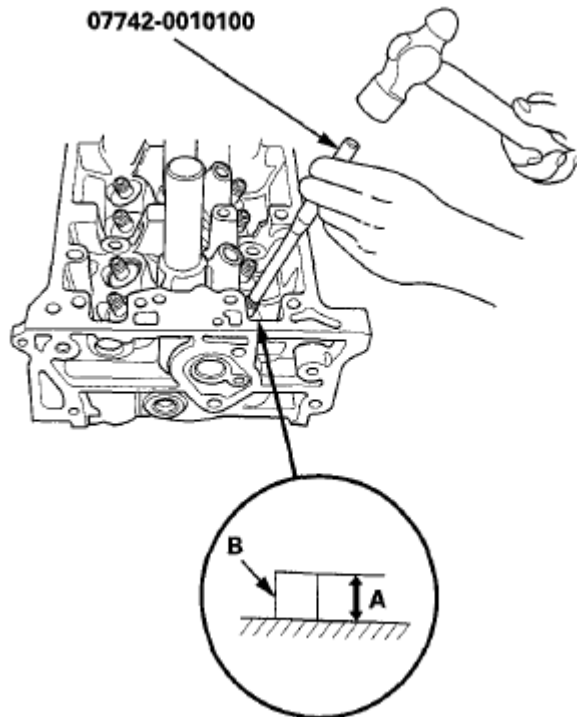
8. Remove the new guide(s) from the freezer, one at a time, as you need them.
9. Apply a thin coat of new engine oil to the outside of the new valve guide. Install the guide from the

camshaft side of the head; use the valve guide driver to drive the guide in to the specified installed height (A) of the guide (B). If you have all 16 guides to do, you may have to reheat the head.

### Valve Guide Installed Height

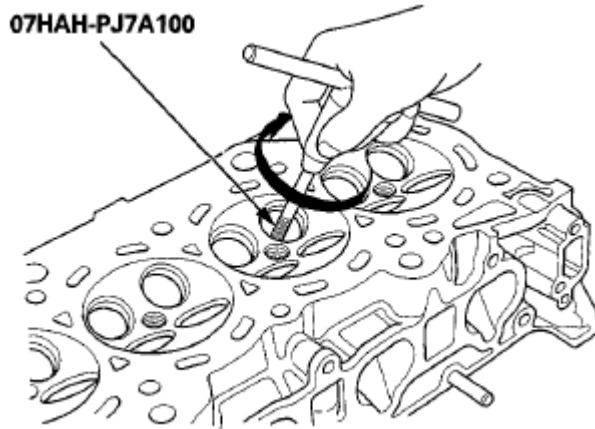
**Intake: 15.2 - 16.2 mm (0.598 - 0.638 in)**

**Exhaust: 15.5 - 16.5 mm (0.610 - 0.650 in)**



**Fig. 116: Identifying Valve Guide Installed Height**  
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 valve guide reamer clockwise to the full length of the valve guide bore.

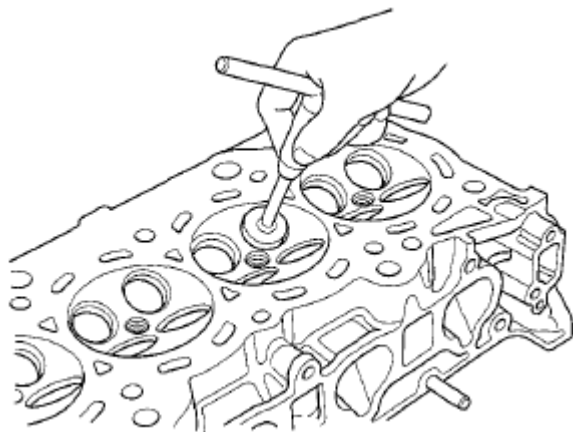


**Fig. 117: Rotating Valve Guide Reamer Clockwise**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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 clearances 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, if necessary renew the valve seat using a valve seat cutter (see VALVE SEAT RECONDITIONING ).

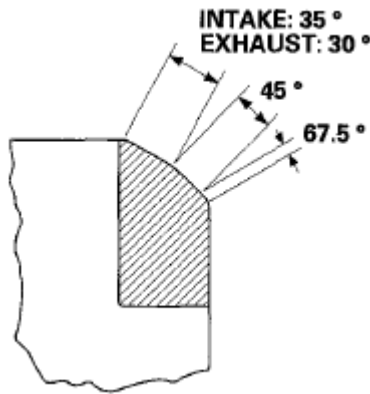
## VALVE SEAT RECONDITIONING

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



**Fig. 118: Identifying Valve Seats In Cylinder Head And 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. 119: Identifying Width And Edge Of Seat**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

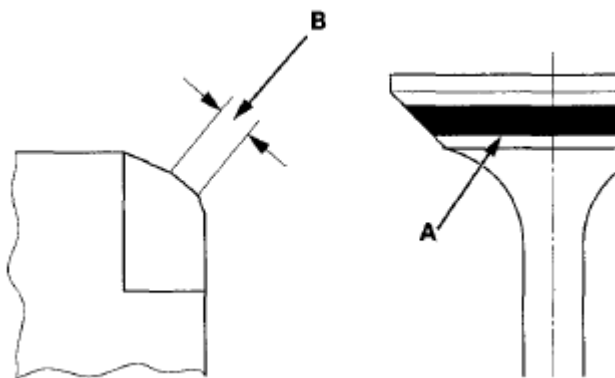
5. Make one more very light pass with the 45° cutter to remove any possible burrs caused by the other cutters.

#### Valve Seat Width

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

**Service Limit: 2.00 mm (0.0787 in)**

6. After resurfacing the seat, inspect 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. 120: Identifying Blue Compound And 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 to move it down, then one more cut with the 45° cutter to restore seat width.
- If it is too low (close to the valve edge), you must make a second cut with the 35° cutter (intake side) or the 30° cutter (exhaust side) to move it up, then make 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

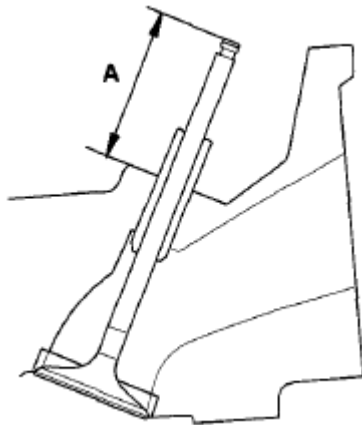
**Standard (New): 44.0-44.5 mm (1.732-1.752 in)**

**Service Limit: 44.7 mm (1.760 in)**

#### Exhaust Valve Stem Installed Height

**Standard (New): 44.0-44.5 mm (1.732-1.752 in)**

**Service Limit: 44.7 mm (1.760 in)**



**Fig. 121: Identifying Intake/Exhaust Valve Stem Height**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

## VALVE, SPRING, AND VALVE SEAL INSTALLATION

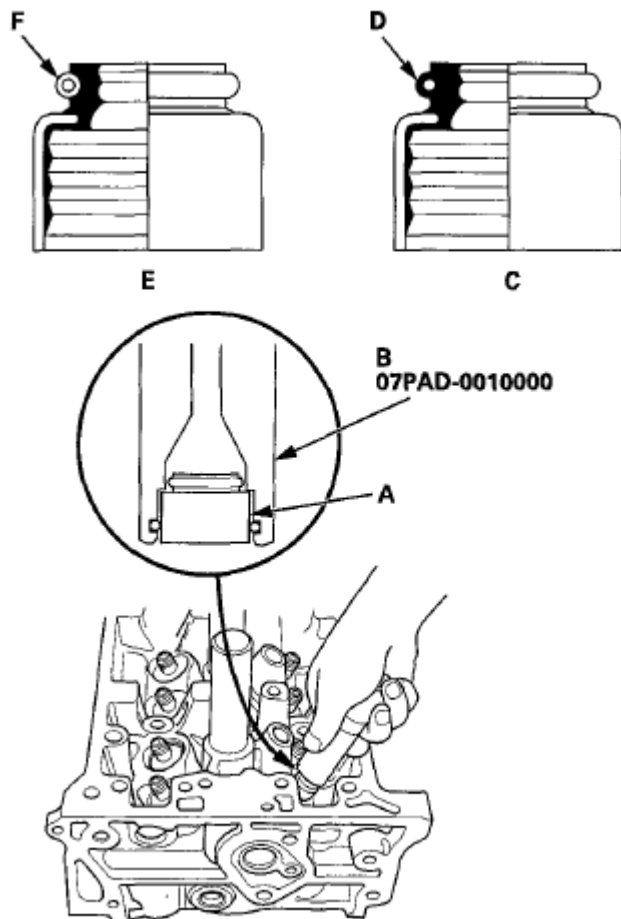
### Special Tools Required

- Stem Seal Driver 07PAD-0010000

- Valve Spring Compressor Attachment 07757-PJ101OA

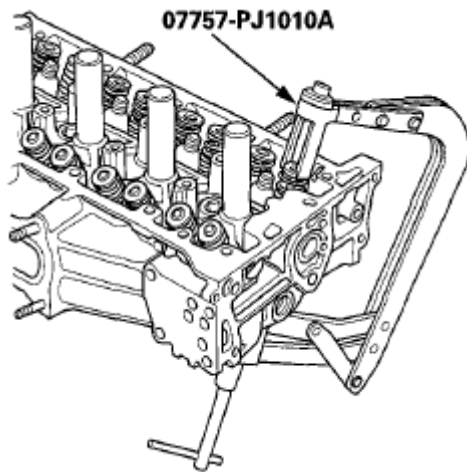
1. Coat the valve stems with new engine oil. Install the valves in the valve guides.
2. Check that the valves move up and down smoothly.
3. Install the spring seats on the cylinder head.
4. Install the new valve seals (A) using the 5.5 mm side of the stem seal driver (B).

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



**Fig. 122: Installing Exhaust Valve Seal, Valve Seals, Stem Seal Driver And White Or Silver Spring**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

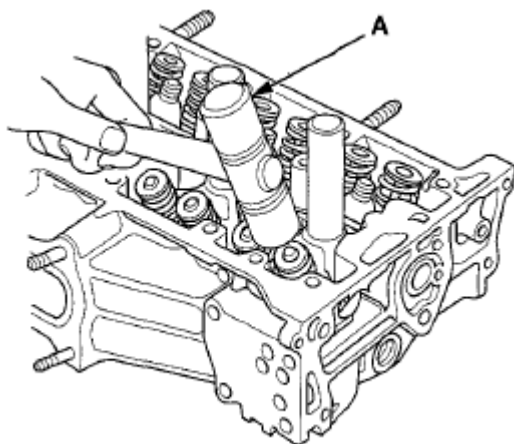
5. Install the valve spring and the spring retainer. Place the end of the valve spring with the closely wound coils toward the cylinder head.
6. Install the valve spring compressor attachment and the valve spring compressor. Compress the valve spring, and install the valve cotters.



**Fig. 123: Identifying Valve Spring Compressor**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

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



**Fig. 124: Identifying Plastic Mallet And Valve Stem**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

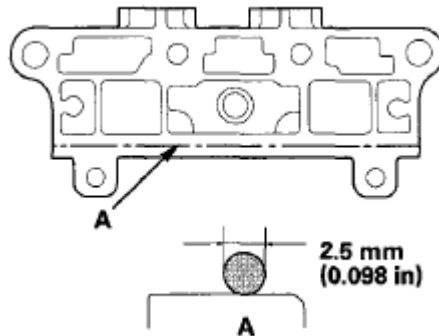
## ROCKER ARM ASSEMBLY INSTALLATION

1. Reassemble the rocker arm assembly (see **ROCKER ARM AND SHAFT DISASSEMBLY/REASSEMBLY** ).
2. Clean and dry the No. 5 rocker shaft holder mating surface.
3. Apply liquid gasket, P/N 08717-0004, 08718-0003, or 08718-0009 to the cylinder head mating surface of

the No. 5 rocker shaft holder, 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 too much time has passed after applying the liquid gasket, remove the old liquid gasket and residue, then reapply new liquid gasket.



**Fig. 125: Identifying Diameter Bead Of Liquid Gasket Broken Line**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

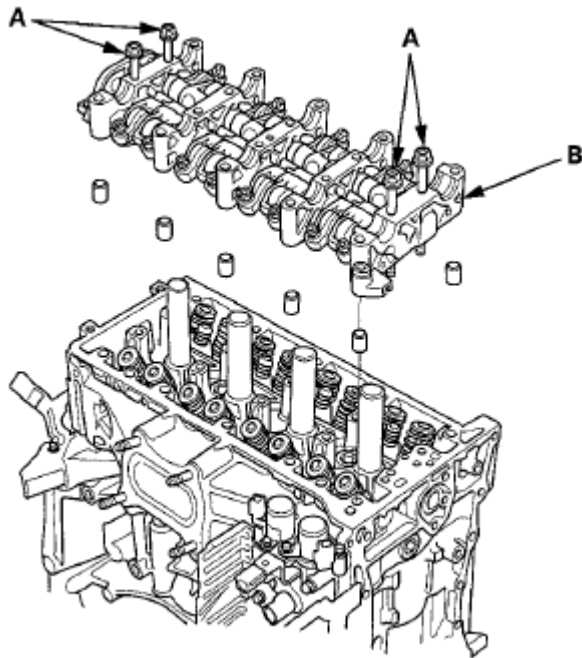
4. Install the lost motion assembly in the cylinder head.

**NOTE:**

**Apply new engine oil to the lost motion assembly.**

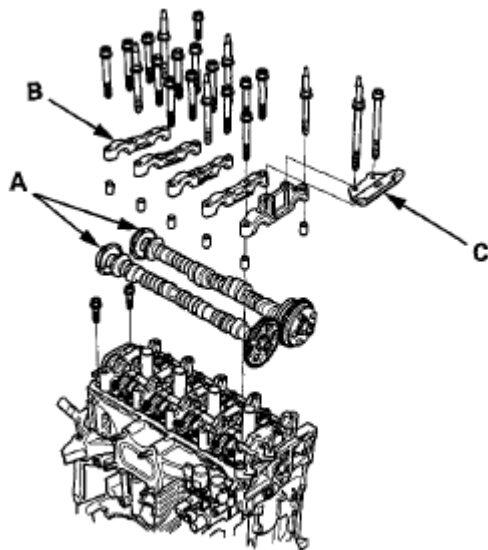
5. Insert the bolts (A) into the rocker shaft holder, then install the rocker arm assembly (B) on the cylinder head.





**Fig. 126: Identifying Bolts, Rocker Arm Assembly And Cylinder Head**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Remove the bolts from the rocker shaft holder.
7. Make sure the punch marks on the VTC actuator and the exhaust camshaft sprocket are facing up, then set the camshafts (A) in the holder. Apply new engine oil to the camshaft journals and lobes.



**Fig. 127: Identifying Camshafts, Camshaft Holders And Cam Chain Guide**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Set the camshaft holders (B) and cam chain guide B (C) in place.

9. Tighten the bolts to the specified torque.

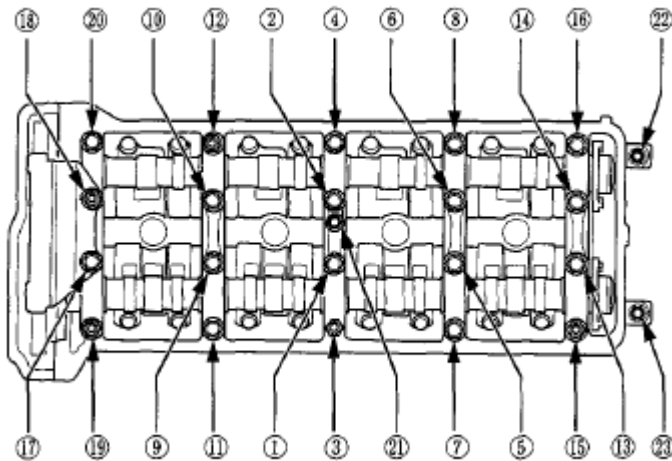
**NOTE:** If the engine does not have bolt (21), skip it and continue the torque sequence.

#### Specified Torque

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

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

6 x 1.0 mm Bolts: (21), (22), (23)

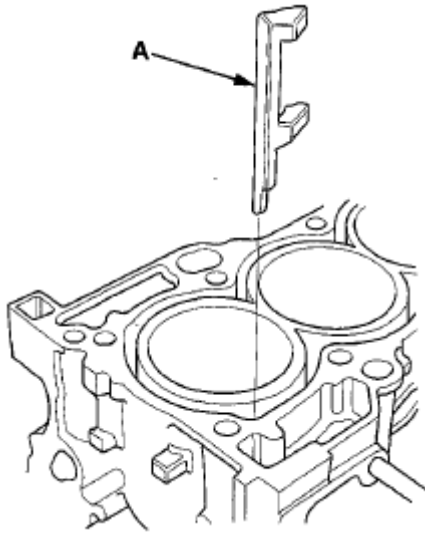


**Fig. 128: Identifying Rocker Arm Bolts With Tightening Sequence**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Install the cam chain (see CAM CHAIN INSTALLATION ), then adjust the valve clearance (see VALVE CLEARANCE ADJUSTMENT ).

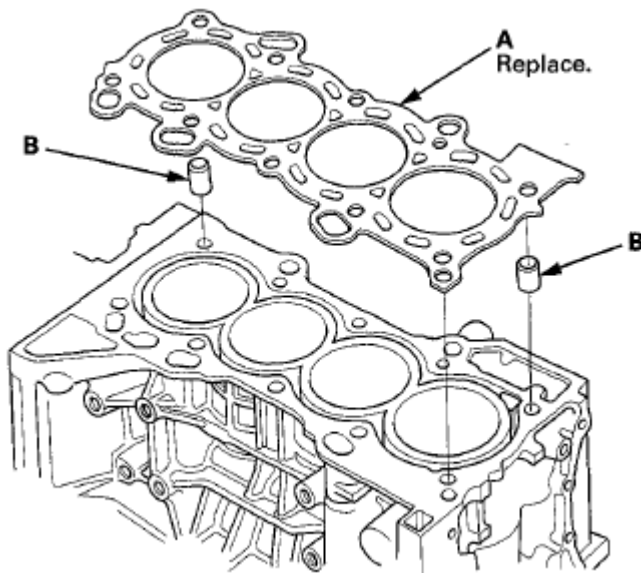
#### CYLINDER HEAD INSTALLATION

1. Install a new coolant separator (A) in the engine block whenever the engine block is replaced.



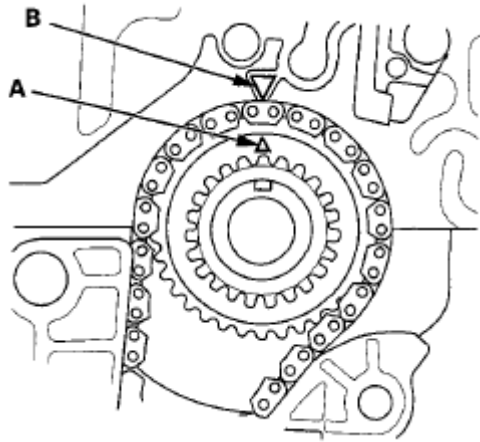
**Fig. 129: Identifying Coolant Separator On Cylinder Head**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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



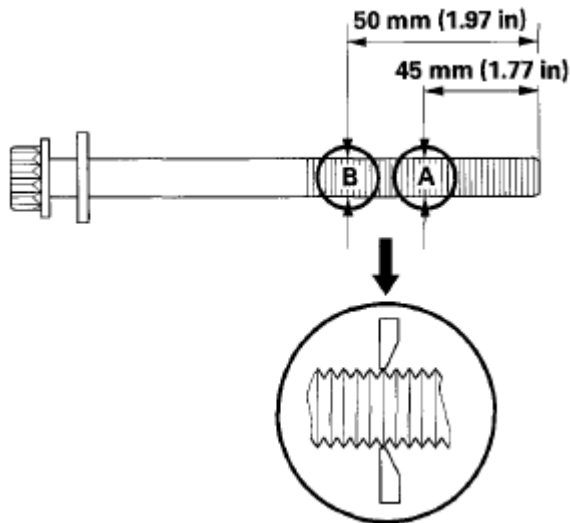
**Fig. 130: Identifying Cylinder Head Gasket And Dowel Pins**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Set the crankshaft to top dead center (TDC). Align the TDC mark (A) on the crankshaft sprocket with the pointer (B) on the engine block.



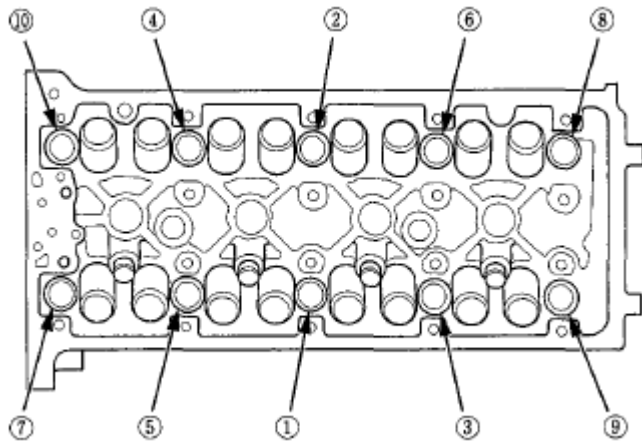
**Fig. 131: Identifying TDC Mark And Crankshaft Sprocket With Pointer**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

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



**Fig. 132: Identifying Diameter Of Head Bolt**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

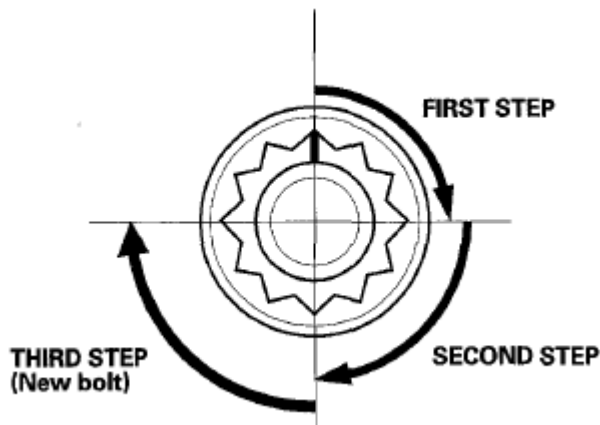
7. If either diameter is less than 10.6 mm (0.417 in), replace the cylinder head bolt.
8. Apply new engine oil to the threads and under the bolt heads of all cylinder head bolts.
9. Torque the cylinder head bolts in sequence to 39 N.m (4.0 kgf.m, 29 lbf.ft). Use a beam-type torque wrench. When using a preset 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.



**Fig. 133: Identifying Cylinder Head Bolts Tightening Sequence**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. After torquing, tighten all cylinder head bolts in two steps (90° per step) using the sequence shown in step 9. 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 6 of the procedure. Do not loosen it back to the specified angle.

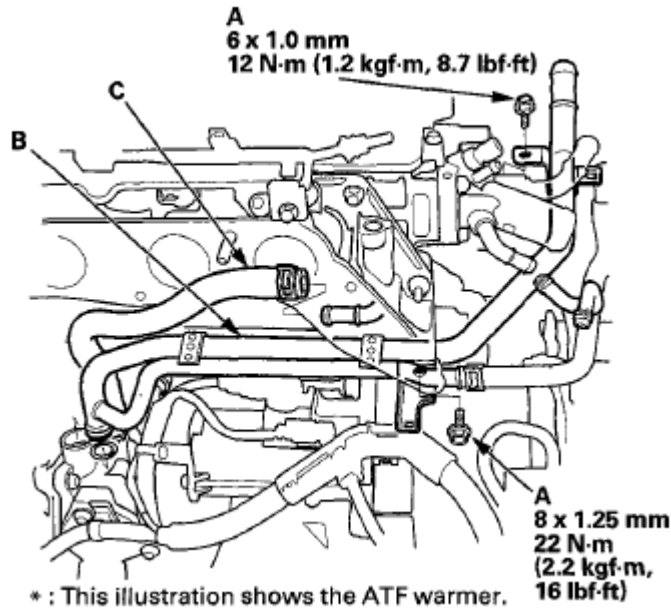


**Fig. 134: Tightening Cylinder Head Bolts**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Install the rocker arm assembly (see **ROCKER ARM ASSEMBLY INSTALLATION** ).
12. Install the cam chain (see **CAM CHAIN INSTALLATION** ).
13. Connect the following engine wire harness connectors, and install the wire harness clamps to the cylinder head:
  - ECT sensor 1 connector
  - CMP sensor A (Intake) connector
  - CMP sensor B (Exhaust) connector

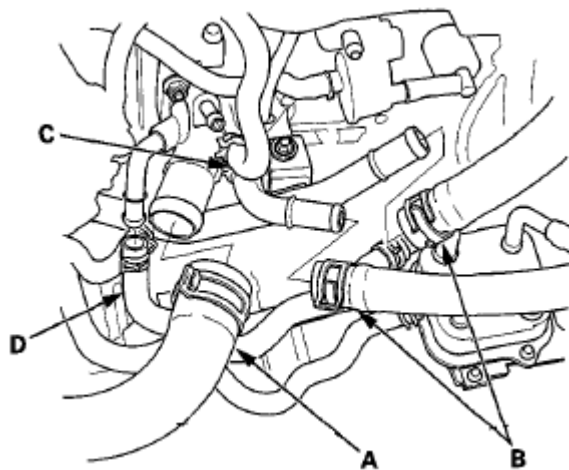
- Two rocker arm oil control solenoid connectors
- Two rocker arm oil pressure switch connectors
- EVAP canister purge valve connector
- VTC oil control solenoid valve connector
- Engine oil pressure switch connector

14. Install the connecting pipe mounting bolts (A) securing the connecting pipe.



**Fig. 135: Identifying Pipe Mounting Bolts And Water Bypass Hose With Torque Specifications**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

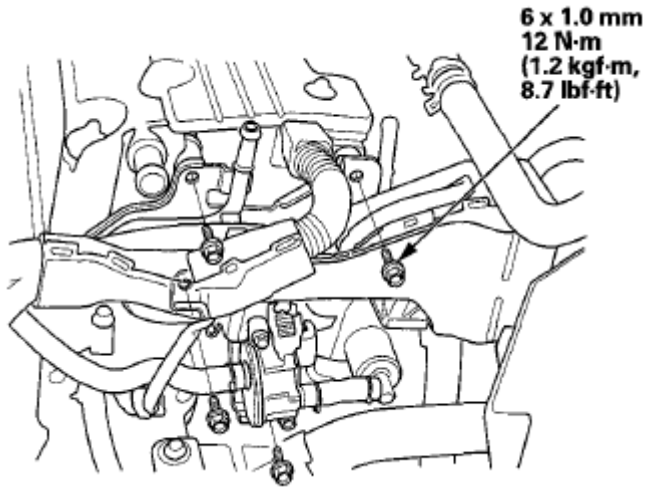
15. Connect the water bypass hose (C).
16. Connect the upper radiator hose (A), the heater hoses (B), and the water bypass hose (C).



**Fig. 136: Identifying Upper Radiator Hose, Heater Hoses And Water Bypass Hose**

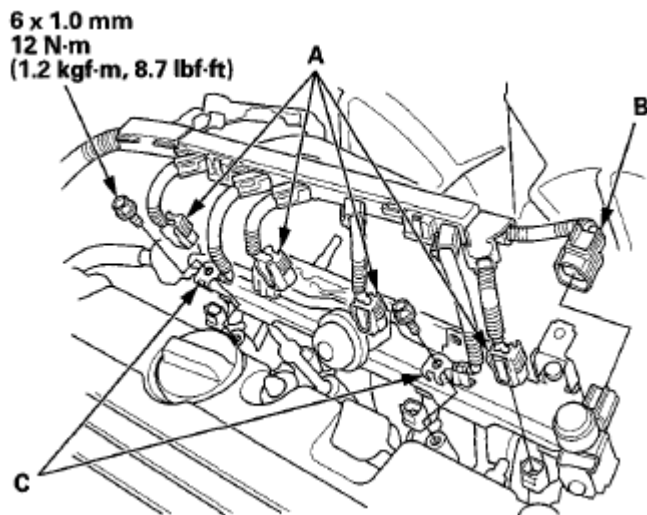
Courtesy of AMERICAN HONDA MOTOR CO., INC.

17. With ATF warmer: Connect the water bypass hose (D).
18. Install the four bolts securing the EVAP canister purge valve bracket.



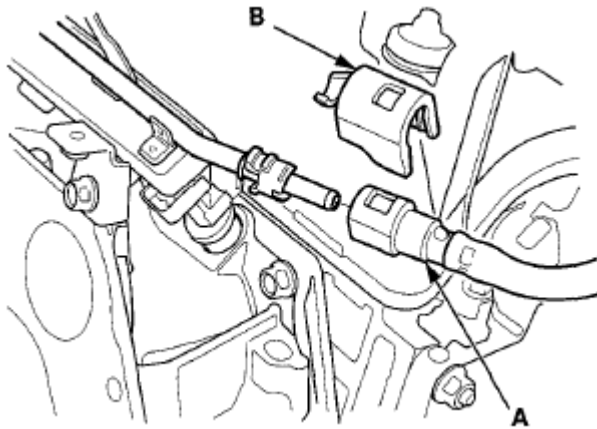
**Fig. 137: Identifying EVAP Canister Purge Valve Bracket With Torque Specifications**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

19. Connect the four fuel injector connectors (A), the engine mount control solenoid valve connector (B), and install the ground cables (C).



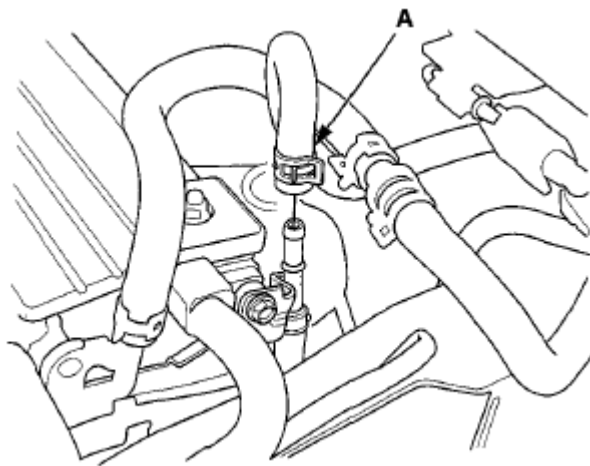
**Fig. 138: Identifying Fuel Injector Connectors, Engine Mount Control Solenoid Valve Connector And Ground Cables With Torque Specifications**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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



**Fig. 139: Identifying Fuel Feed Hose And Connecting Covers**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

21. Connect the EVAP canister hose (A).



**Fig. 140: Identifying EVAP Canister Hose**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

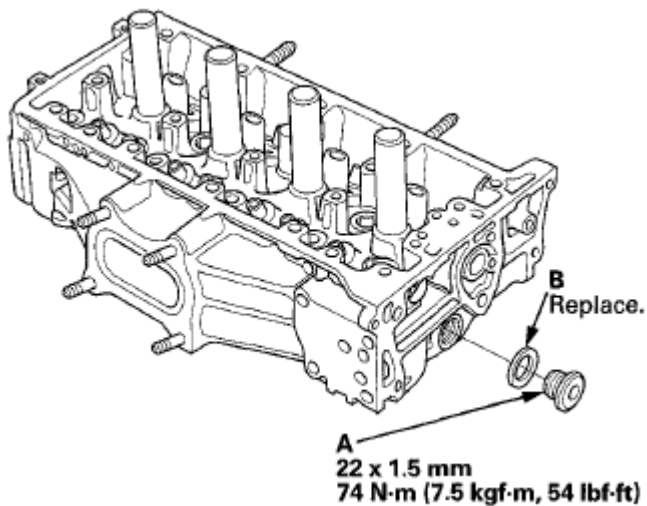
22. Install the warm up TWC (see **WARM UP TWC REMOVAL/INSTALLATION** ).
23. Install the intake manifold (see **INSTALLATION** ).
24. Install the drive belt (see **DRIVE BELT REMOVAL/INSTALLATION** ).
25. Install the strut brace (if equipped) (see **FRAME BRACE REPLACEMENT** ).
26. After installation, check that all tubes, hoses, and connectors are installed correctly.
27. Inspect for fuel leaks. Turn the ignition switch to ON (II) (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.
28. Refill the radiator with engine coolant, and bleed the air from the cooling system (see **COOLANT CHECK** ).
29. Do the PCM idle learn procedure (see **ECM/PCM IDLE LEARN PROCEDURE** ).



30. Do the CKP pattern clear/CKP pattern learn procedure (see **CKP PATTERN CLEAR/CKP PATTERN LEARN** ).
31. Inspect the idle speed (see **IDLE SPEED INSPECTION** ).
32. Inspect the ignition timing (see **IGNITION TIMING INSPECTION** ).

## SEALING BOLT INSTALLATION

**NOTE:** When installing the sealing bolt (A), always use a new washer (B).



**Fig. 141: Identifying Sealing Bolt And Washer With Torque Specifications**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

## 2010 Honda Accord EX

2008-12 ENGINE Engine Block - Accord

### 2008-12 ENGINE

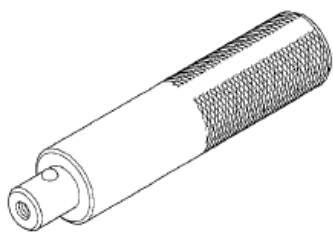
#### Engine Block - Accord

## SPECIAL TOOLS

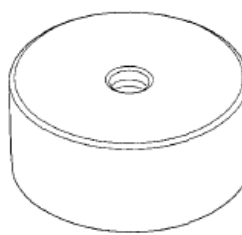
Ref.No.	Tool Number	Description	Qty
①	07746-0010700	Attachment, 24 x 26 mm	1
②	07749-0010000	Driver Handle, 15 x 135L	1
③	07ZAD-PNAA100	Oil Seal Driver Attachment, 96 mm	1



①



②

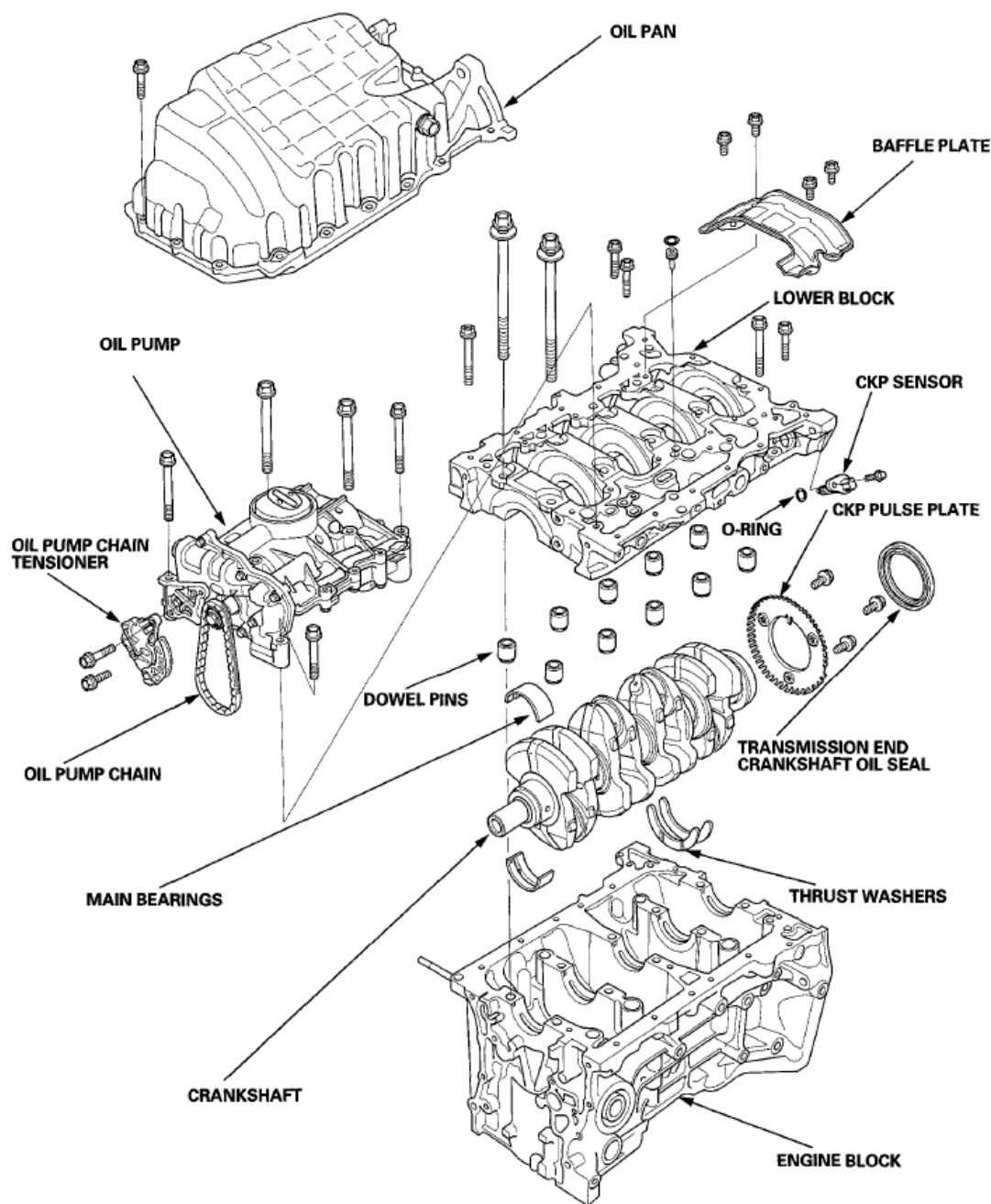


③

**Fig. 1: Identifying Special Tools**

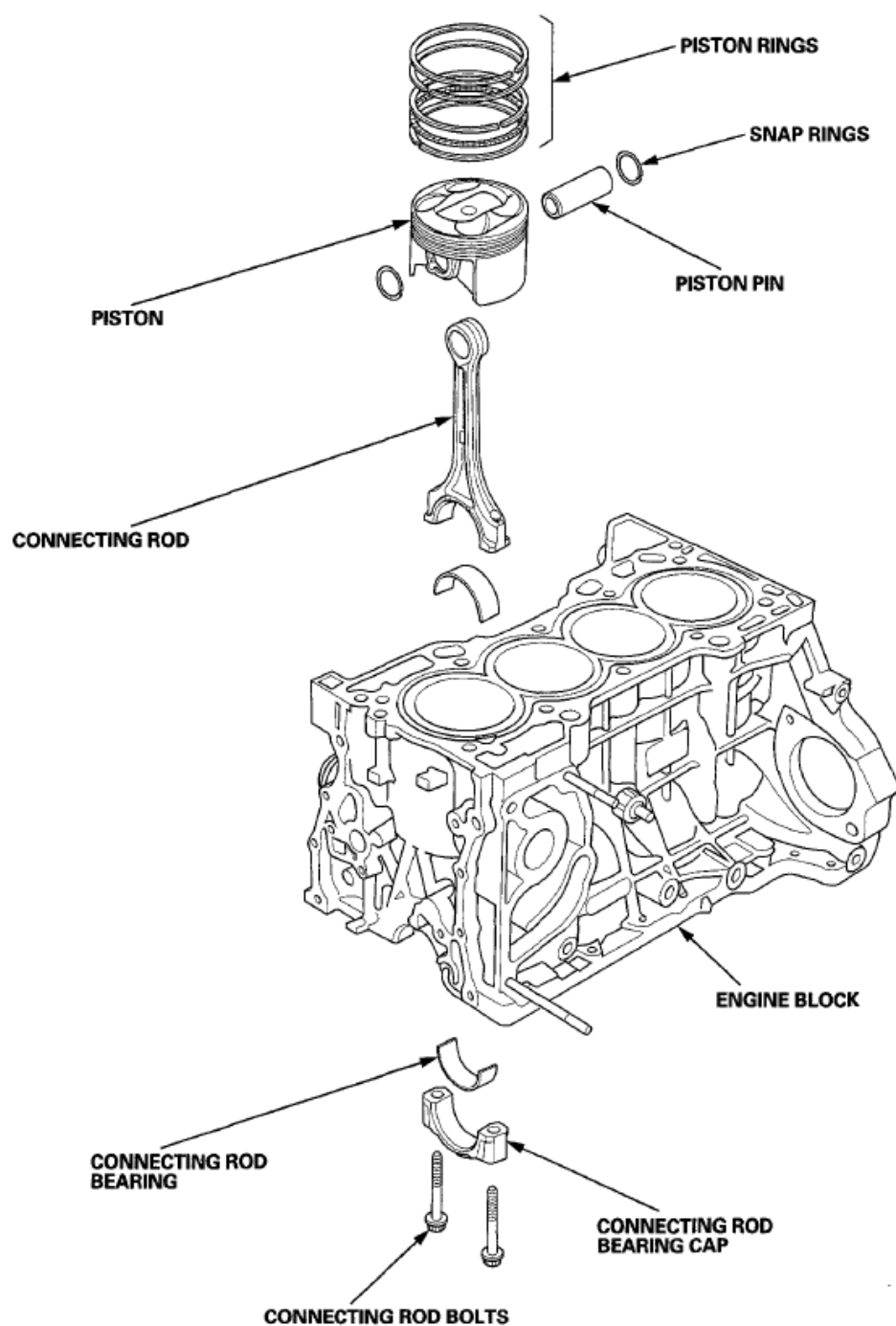
Courtesy of AMERICAN HONDA MOTOR CO., INC.

## COMPONENT LOCATION INDEX



**Fig. 2: Identifying Engine Block Component Location (1 Of 2)**

Courtesy of AMERICAN HONDA MOTOR CO., INC.



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

## CONNECTING ROD AND CRANKSHAFT END PLAY INSPECTION

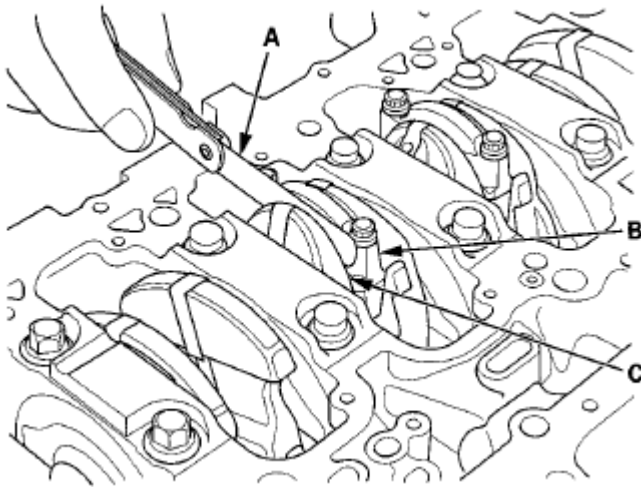
1. Remove the oil pump (see [OIL PUMP OVERHAUL](#) ).
2. Remove the baffle plate (see step 10).

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 (0.0059-0.0138 in)**

**Service Limit: 0.40 mm (0.0157 in)**



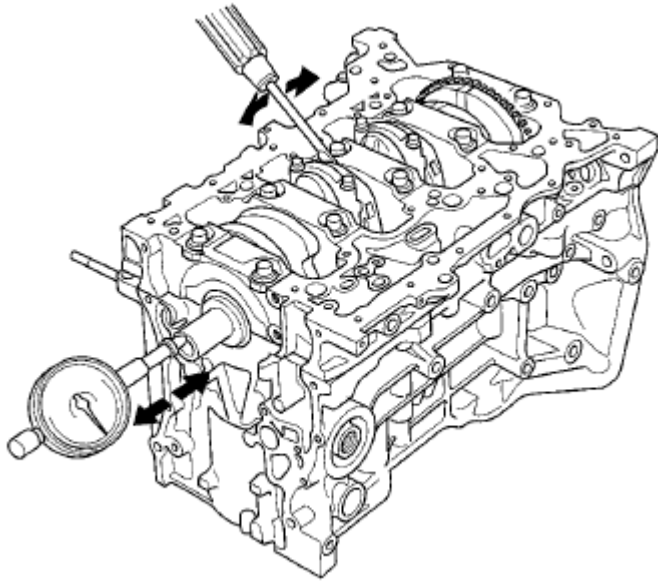
**Fig. 4: Measuring Feeler Gauge, Connecting Rod And Crankshaft**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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 (see **CRANKSHAFT AND PISTON REMOVAL** ).
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. 5: Checking 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 (see CRANKSHAFT AND PISTON REMOVAL ).

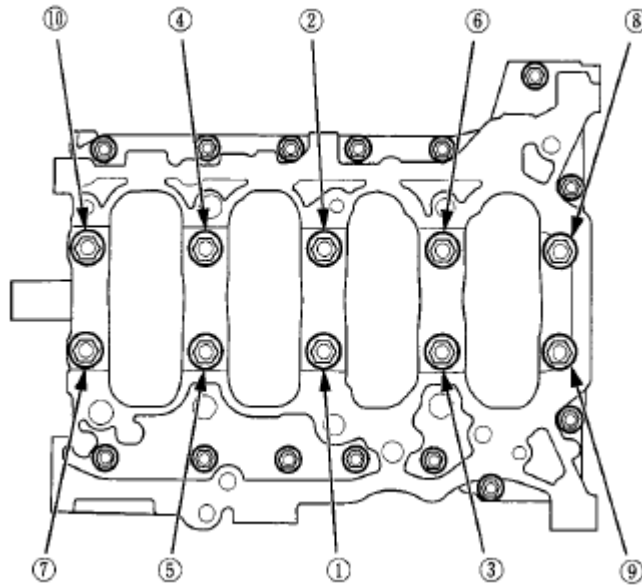
## CRANKSHAFT MAIN BEARING REPLACEMENT

### MAIN BEARING CLEARANCE INSPECTION

1. To check the main bearing-to-journal oil clearance, remove the lower block and the bearing halves (see CRANKSHAFT AND PISTON REMOVAL ).
2. Clean each main journal and the bearing half with a clean shop towel.
3. Place one strip of plastigage across each main journal.
4. Reinstall the bearings and the lower block, then torque the bolts to 29 N.m (3.0 kgf.m, 22 lbf.ft).

**NOTE:**

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



**Fig. 6: Identifying Bolts And Tightening Sequence**  
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

5. Tighten the bearing cap bolts an additional 48°.
6. Remove the lower block and the bearings again, and measure the widest part of the plastigage.

#### **Main Bearing-to-Journal Oil Clearance**

##### **No. 1, 2, 4, 5 Journals:**

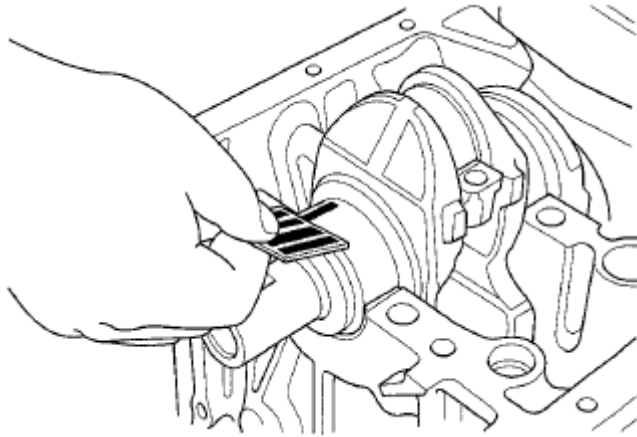
**Standard (New): 0.017-0.041 mm (0.00067-0.00161 in)**

**Service Limit: 0.050 mm (0.00197 in)**

##### **No. 3 Journal:**

**Standard (New): 0.025-0.049 mm (0.00098-0.00193 in)**

**Service Limit: 0.055 mm (0.00217 in)**



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

7. 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 appropriate color code(s), and recheck the clearance. Do not file, shim, or scrape the bearings or the caps to adjust clearance.
8. If the plastigage shows the clearance is still incorrect, try the next larger or smaller bearing (the color listed above or below the current one), and check again. If the proper clearance cannot be obtained by using the appropriate larger or smaller bearings, replace the crankshaft and start over (see **CRANKSHAFT AND PISTON REMOVAL** ).

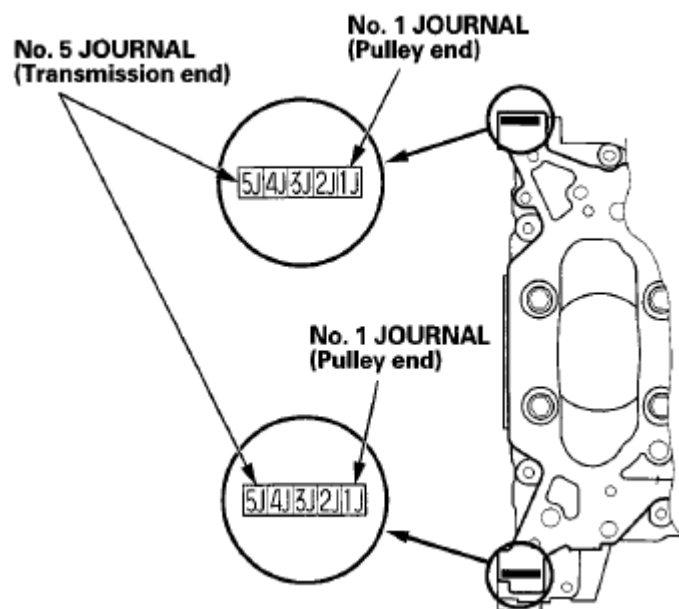
## MAIN BEARING SELECTION

### Block Bore Code Location

1. Numbers, letters, or bars have been stamped on either side of the lower block end as a code for the size of each of the five main journal bores. Write down the block bore codes.

If you cannot read the codes because of accumulated dirt and dust, do not scrub them with a wire brush or scraper. Clean them only with solvent or detergent.

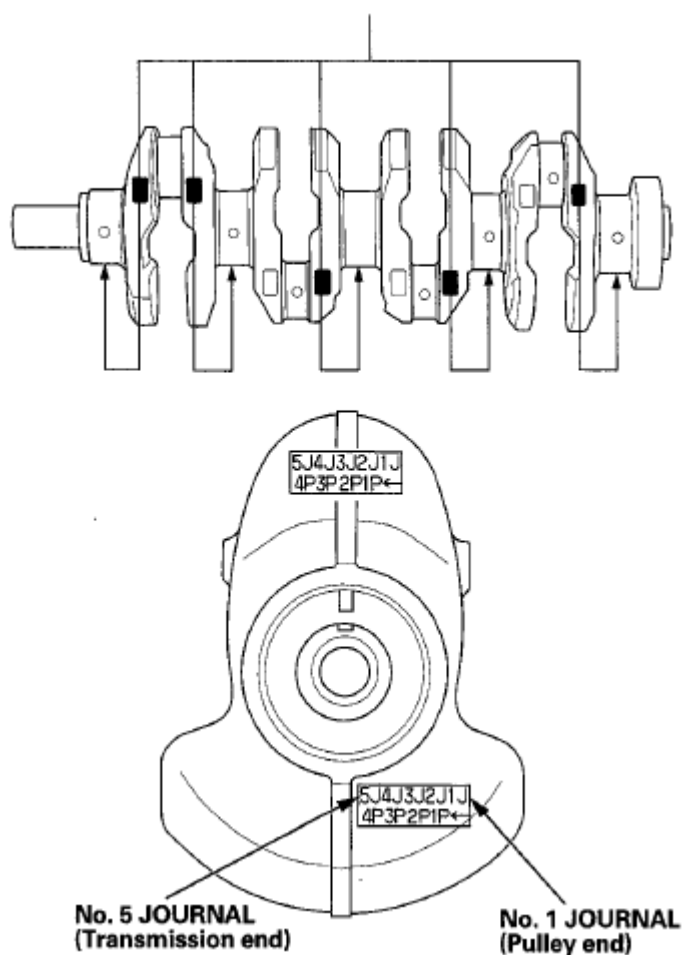




**Fig. 8: Identifying Black Bore Code Location**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

**Main Journal Code Location**

2. The main journal codes are stamped on the crankshaft in either location.



**Fig. 9: Identifying Main Journal Code Location**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

**NOTE:**

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

**K24Z2 engine**

Main journal code	Block bore code	Larger block bore			
		1 or A or I	2 or B or II	3 or C or III	4 or D or IIII
		Smaller bearing (Thicker)			
1		Pink	Pink/ Yellow	Yellow	Green
2		Pink/ Yellow	Yellow	Green	Green/ Brown
3		Yellow	Green	Green/ Brown	Brown
4		Green	Green/ Brown	Brown	Black
5		Green/ Brown	Brown	Black	Black/ Blue
6		Brown	Black	Black/ Blue	Blue

Smaller main journal      Smaller bearing (Thicker)

Fig. 10: Identifying K24Z2 Engine

Courtesy of AMERICAN HONDA MOTOR CO., INC.

## K24Z3 engine

Main journal code	Block bore code	Larger block bore			
		1 or A or I	2 or B or II	3 or C or III	4 or D or IIII
		Smaller bearing (Thicker)			
1		Red	Red/ Pink	Pink	Yellow
2		Red/ Pink	Pink	Yellow	Yellow/ Green
3		Pink	Yellow	Yellow/ Green	Green
4		Yellow	Yellow/ Green	Green	Brown
5		Yellow/ Green	Green	Brown	Brown/ Black
6		Green	Brown	Brown/ Black	Black

Smaller main journal      Smaller bearing (Thicker)

Fig. 11: Identifying K24Z3 Engine

Courtesy of AMERICAN HONDA MOTOR CO., INC.

## CONNECTING ROD BEARING REPLACEMENT

### CONNECTING ROD BEARING CLEARANCE INSPECTION

1. Remove the oil pump (see **OIL PUMP REMOVAL** ).
2. Remove the baffle plate (see step 10 on ).
3. Remove the connecting rod cap and the bearing half (see **CRANKSHAFT AND PISTON REMOVAL** ).
4. Clean the crankshaft rod journal and the bearing half with a clean shop towel.
5. Place plastigage across the rod journal.
6. Reinstall the bearing half and the cap, then torque the bolts to 41 N.m (4.2 kgf.m, 30 lbf.ft) +120°.

**NOTE:**

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

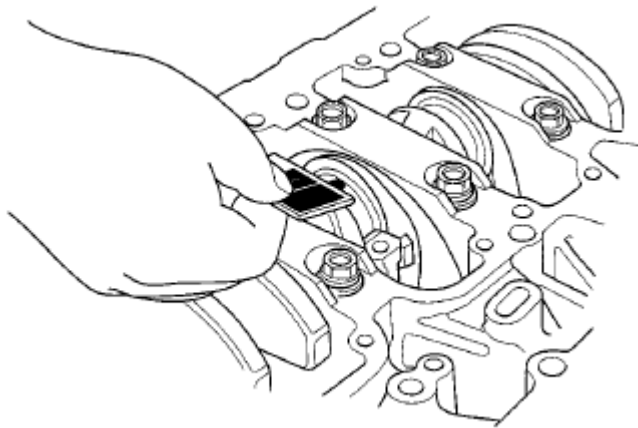
7. Remove the rod cap and the bearing half and measure the widest part of the plastigage.

#### Connecting Rod Bearing-to-Journal Oil

##### Clearance

**Standard (New): 0.032-0.066 mm (0.00126-0.00260 in)**

**Service Limit: 0.077 mm (0.00303 in)**



**Fig. 12: Measuring Widest Part Of Plastigage**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. If the plastigage measures too wide or too narrow, remove the cap, and the upper half of the bearing. Install a new, complete bearing with the appropriate color code(s), and recheck the clearance. Do not file, shim, or scrape the bearings or the caps to adjust clearance.
9. If the plastigage shows the clearance is still incorrect, try the next larger or smaller bearing (the color

listed above or below the current 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 (see **CRANKSHAFT AND PISTON REMOVAL** ).

## CONNECTING ROD BEARING SELECTION

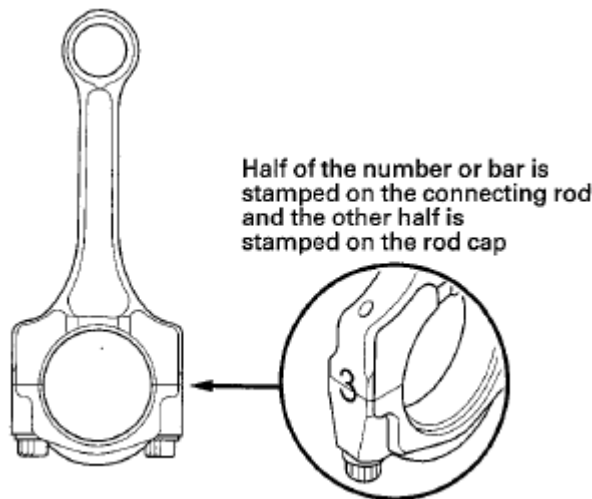
1. Inspect each connecting rod for cracks and heat damage.

### Big End Bore Code Locations

2. Each connecting rod has a tolerance range from 0 to 0.024 mm (0.00094 in), in 0.006 mm (0.00024 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 Nil) indicating the range. You may find any combination of numbers and bars in any engine. (Half the number or bar is stamped on the rod cap, the other half is on the rod.)

If you cannot read the code because of an accumulation of oil and varnish, do not scrub it with a wire brush or scraper. Clean it only with solvent or detergent.

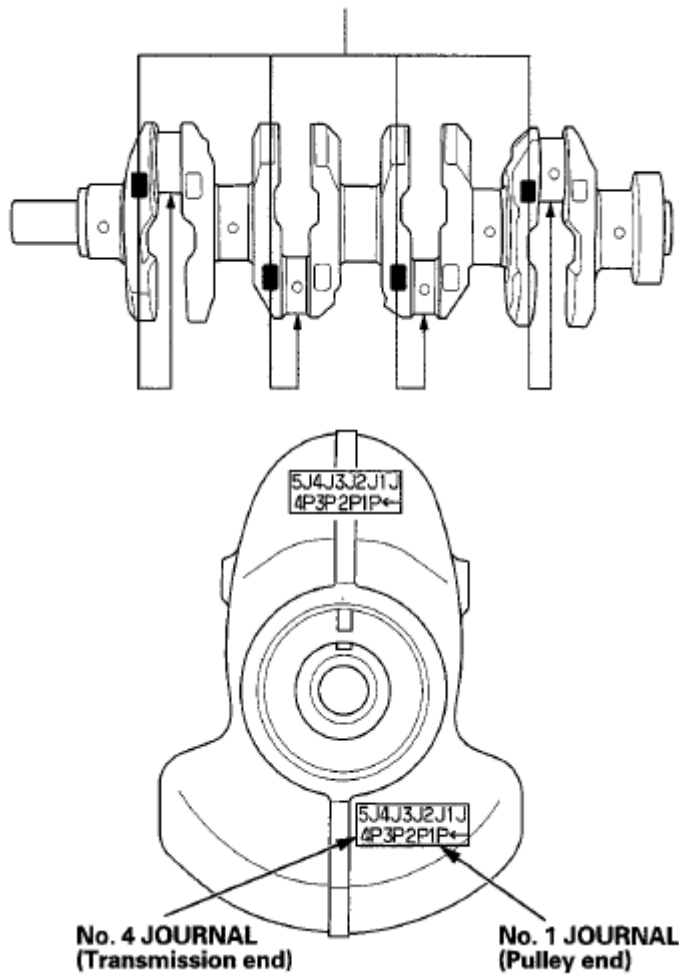
**Big End Bore Size: 51.0 mm (2.008 in)**



**Fig. 13: Identifying Big End Bore Code Locations In Engine**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

### Connecting Rod Journal Code Location

3. The connecting rod journal codes are stamped on the crankshaft in either location.



**Fig. 14: Identifying Journal Code Location On Crankshaft**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

**NOTE:**

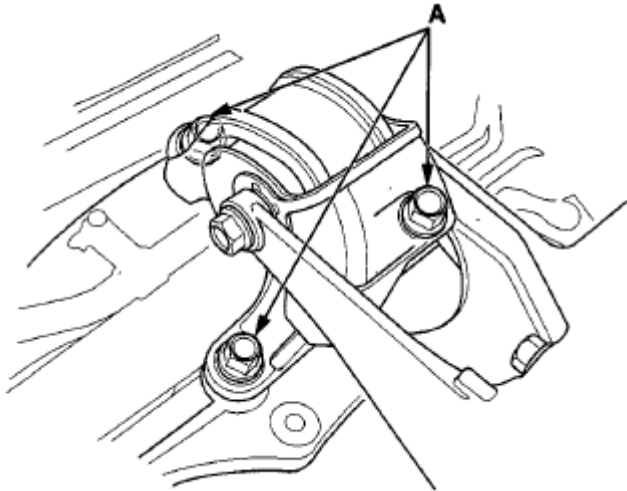
- Color code is on the edge of the bearing.
- When using bearing halves of different colors, it does not matter which color is used in the top or bottom.

		Big end bore code		→ Larger big end bore			
				1 or I	2 or II	3 or III	4 or IIII
				→ Smaller bearing (Thicker)			
Rod journal code	A			Red	Pink	Pink/ Yellow	Yellow
	B			Pink	Yellow	Yellow/ Green	Green
	C			Yellow	Green	Green/ Brown	Brown
	D			Green	Brown	Brown/ Black	Black
</							

Courtesy of AMERICAN HONDA MOTOR CO., INC.

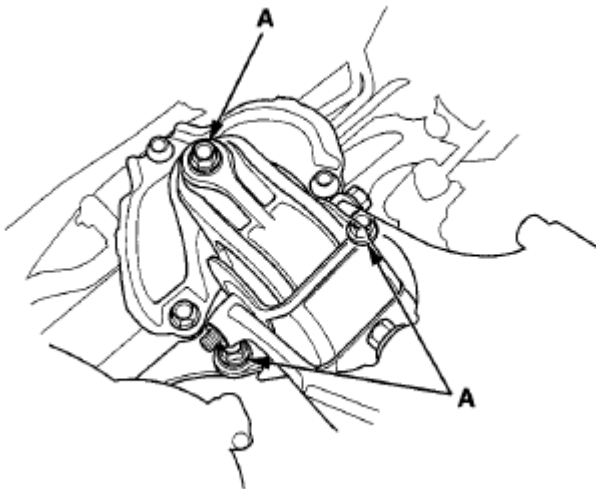
7. Loosen the rear engine mount mounting bolts (A).

**M/T model**



**Fig. 17: Identifying Rear Engine Mount Mounting Bolts In M/T Model**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

**A/T model**

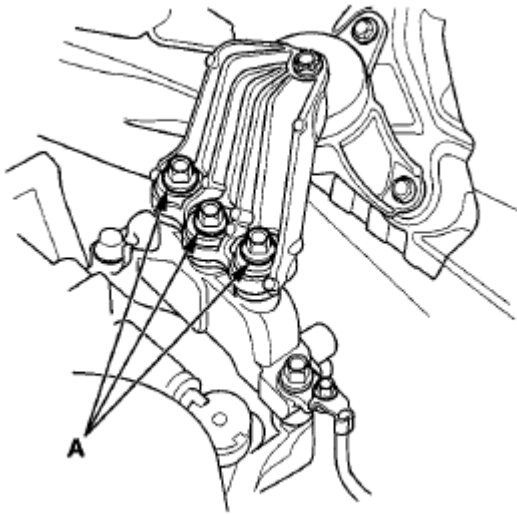


**Fig. 18: Identifying Rear Engine Mount Mounting Bolts In A/T Model**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Loosen the upper transmission mount bracket mounting bolts (A).

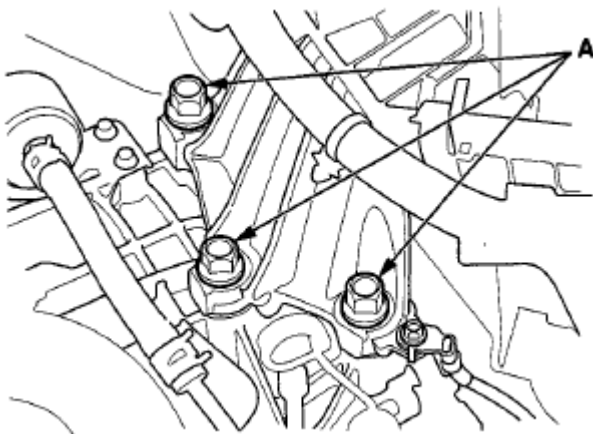
**M/T model**





**Fig. 19: Identifying Upper Transmission Mount Bracket Mounting Bolts In M/T Model**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

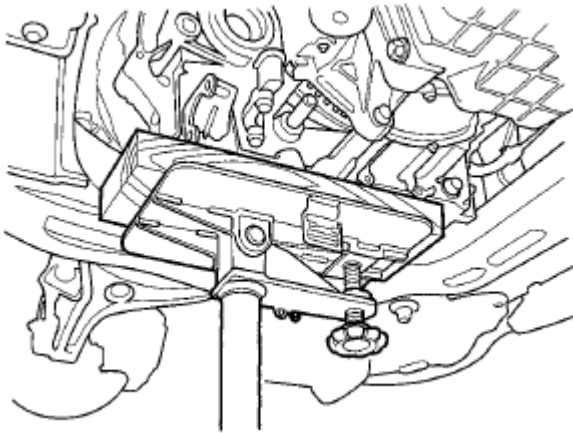
**A/T model**



**Fig. 20: Identifying Upper Transmission Mount Bracket Mounting Bolts In A/T Model**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

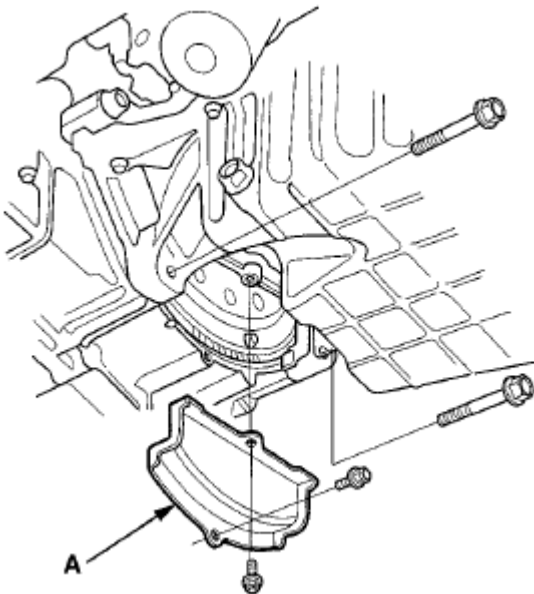
9. Raise the vehicle on the lift.
10. Remove the left front wheel.
11. Remove the splash shield (see step 25 under **ENGINE REMOVAL** ).
12. Drain the engine oil (see step 5 under **ENGINE OIL REPLACEMENT** ).
13. Separate the left side knuckle from the lower arm (see step 5 under **LOWER ARM REMOVAL/INSTALLATION** ).
14. Remove the left side damper fork (see step 3 under **LOWER ARM REMOVAL/INSTALLATION** ).
15. Remove the left side driveshaft (see **DRIVESHAFT INSPECTION** ). Coat all precision-finished surface with new engine oil. Tie a plastic bag over the driveshaft end.

16. Remove the nuts securing the lower transmission mount (see step 50 under **ENGINE REMOVAL** ).
17. A/T model: Remove the shift cable bracket.
  - Vehicles with JHM VINs (see step 53 under **TRANSMISSION REMOVAL** ).
  - Vehicles with 1HG VINs (see step 55 under **TRANSMISSION REMOVAL** ).
18. Use a transmission jack to lift the transmission 30-40 mm (1.18-1.57 in).



**Fig. 21: Lifting Transmission Using Transmission Jack**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

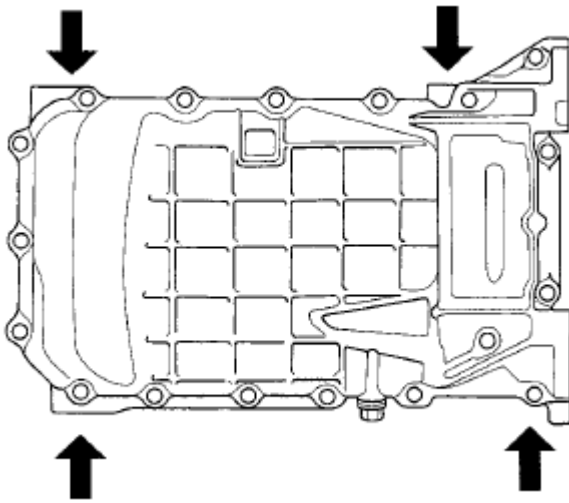
19. Remove the clutch case cover (A), and remove the two bolts securing the transmission.



**Fig. 22: Identifying Clutch Case Cover**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

20. Remove the bolts securing the oil pan.

21. Using a flat blade screwdriver, separate the oil pan from the engine block in the places shown.

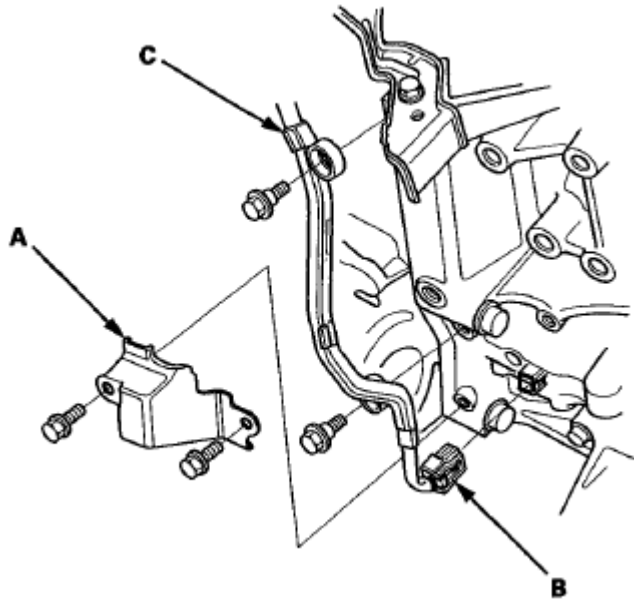


**Fig. 23: Identifying Engine Block And Oil Pan Pry Points**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

22. Remove the oil pan.

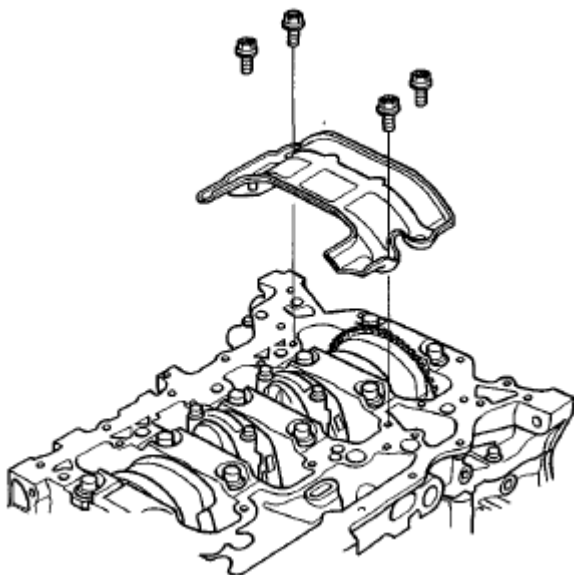
## CRANKSHAFT AND PISTON REMOVAL

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 step 17 under **CLUTCH REPLACEMENT** ).
4. A/T model: Remove the drive plate (see **DRIVE PLATE REMOVAL AND INSTALLATION** ).
5. Remove the CKP sensor cover (A), then disconnect the CKP sensor connector (B).



**Fig. 24: Identifying CKP Sensor Cover, CKP Sensor Connector And Harness Holder**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

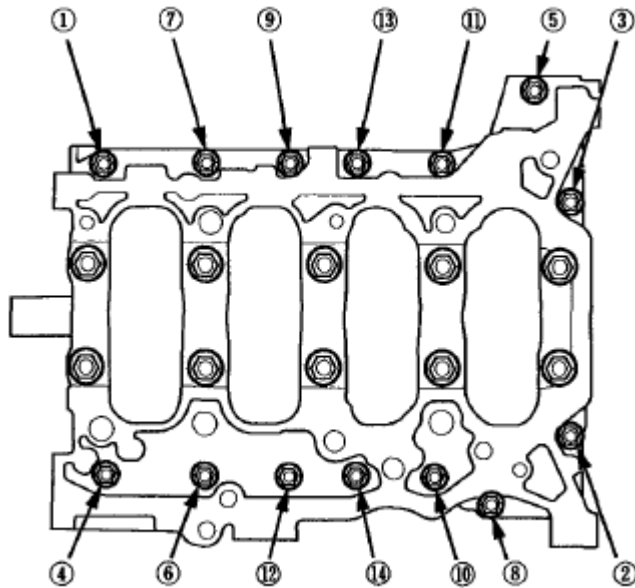
6. Remove the harness holder (C).
7. Remove the oil pan (see **OIL PAN REMOVAL** ).
8. Remove the oil pump (see **OIL PUMP REMOVAL** ).
9. Remove the cylinder head:
  - All models except PZEV (see **CYLINDER HEAD REMOVAL** )
  - PZEV model (see **CYLINDER HEAD REMOVAL** )
10. Remove the baffle plate.



**Fig. 25: Identifying Baffle Plate**

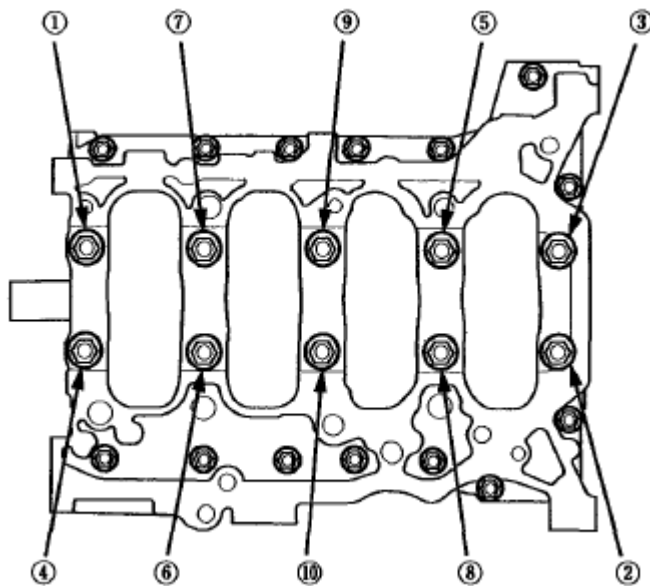
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Remove the 8 mm bolts.

**Fig. 26: Identifying Cylinder Head Cover Bolts Loosening Sequence**

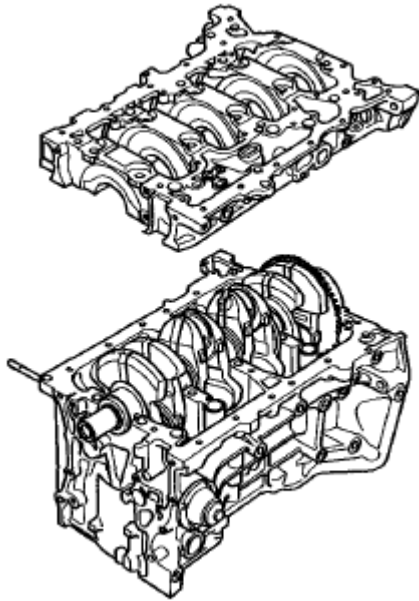
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

**Fig. 27: Identifying Bearing Cap Bolts Loosening Sequence**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

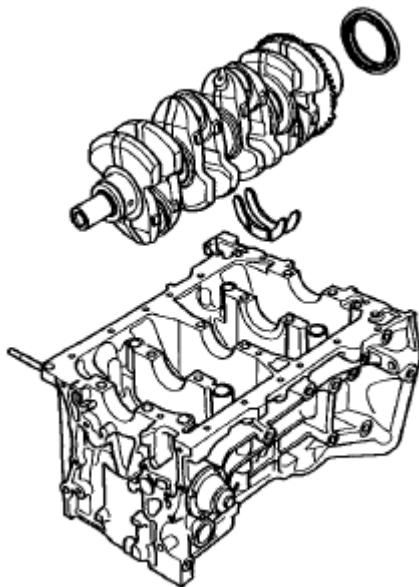
13. Remove the lower block and the bearings. Keep all the bearings in order.



**Fig. 28: Identifying Block And Bearings**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. Remove the rod caps/bearings. Keep all the caps/bearings in order.
15. Lift the crankshaft out of the engine. Be careful not to damage the journals and the CKP pulse plate.

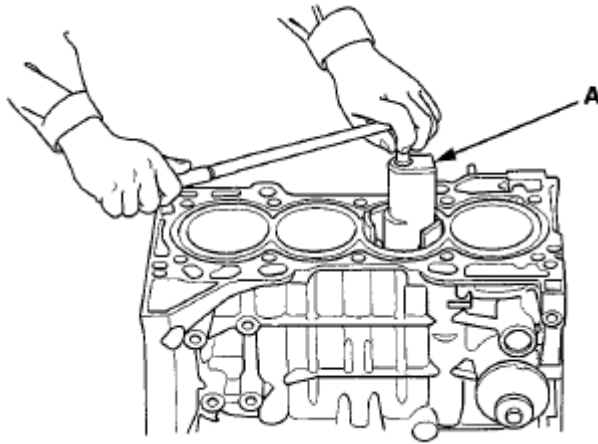


**Fig. 29: Identifying Journals And CKP Pulse Plate**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

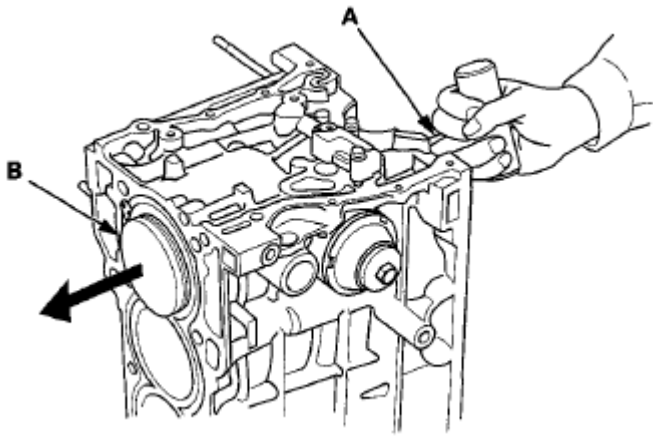
16. Remove the CKP pulse plate from the crankshaft (see **CKP PULSE PLATE REPLACEMENT** ).

17. Remove the upper bearing halves from the connecting rods, and set them aside with their respective caps.
18. If you can feel a ridge of metal or hard carbon around the top of each cylinder, remove it with a ridge reamer (A). Follow the reamer manufacturer's instructions. If the ridge is not removed, it may damage the piston as it is pushed out.



**Fig. 30: Installing Ridge Reamer On Cylinder**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

19. Use the wooden handle of a hammer (A) to drive out the piston/connecting rod assembly (B).



**Fig. 31: Installing Piston/Connecting Rod Assembly With Tools**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

20. Reinstall the lower block and the bearings on the engine block in the proper order.
21. Reinstall the connecting rod bearings and the caps after removing each piston/connecting rod assembly.
22. Mark each piston/connecting rod assembly with its cylinder number to make sure they are reinstalled in the original order.

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

## CRANKSHAFT INSPECTION

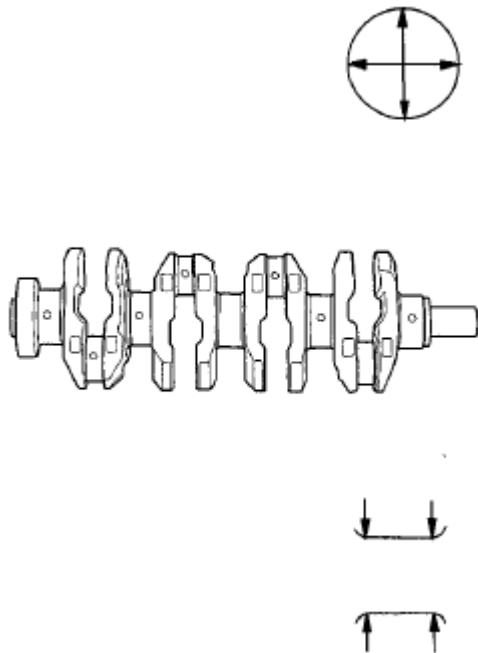
### Out-of-Round and Taper

1. Remove the crankshaft from the engine block (see CRANKSHAFT AND PISTON REMOVAL ).
2. Remove the CKP pulse plate from the crankshaft (see CKP PULSE PLATE REPLACEMENT ).
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 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): 0.004 mm (0.00016 in) max.**

**Service Limit: 0.010 mm (0.00039 in)**



**Fig. 32: Identifying Edges Of Rod And Main Journal**  
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)**

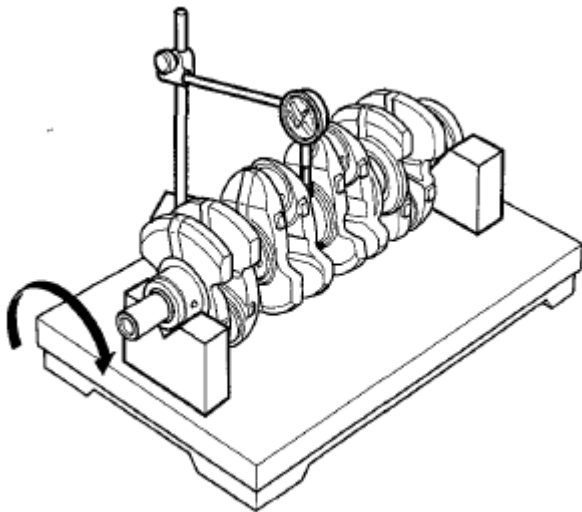
### **Straightness**

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): 0.03 mm (0.0012 in) max.**

**Service Limit: 0.04 mm (0.0016 in)**



**Fig. 33: Identifying Crankshaft Supported On V-Blocks**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

## **BLOCK AND PISTON INSPECTION**

1. Remove the pistons from the engine block (see **CRANKSHAFT AND PISTON REMOVAL** ).
2. Check the pistons for distortion or cracks.
3. Measure the piston diameter at a point 13 mm (0.51 in) from the bottom of the skirt. There are two standard-size pistons (No Letter or A, and B). The letter is stamped on the top of the piston. Letters are also stamped on the engine block as the cylinder bore sizes.

### **Piston Skirt Diameter**

**Standard (New):**

**No Letter (or A): 86.980-86.990 mm (3.42440-3.42480 in)**

**B: 86.970-86.980 mm (3.42401-3.42440 in)**

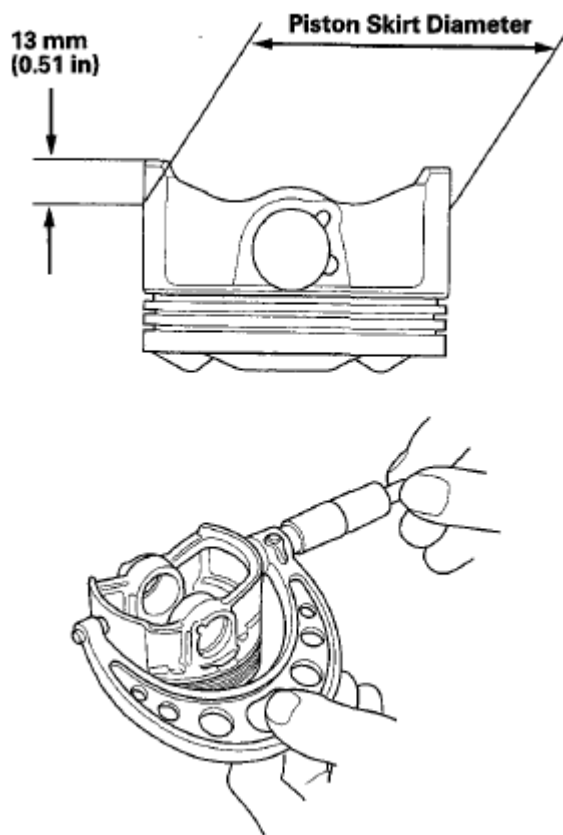
**Service Limit:**

**No Letter (or A): 86.930 mm (3.42243 in)**

**B: 86.920 mm (3.42204 in)**

**Oversize Piston Skirt Diameter**

**0.25: 87.230-87.240 mm (3.43425-3.43464 in)**



**Fig. 34: Identifying Piston Skirt Diameter**

**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

4. Measure the wear and taper in direction X and Y at three levels inside each cylinder as shown. If measurements in any cylinder are beyond the oversize bore service limit, replace the engine block. If the engine block is being rebored, refer to step 7 after reboring.

**Cylinder Bore Size**

**Standard (New):**

**A or I: 87.010-87.020 mm (3.42558-3.42598 in)**

**B or II: 87.000-87.010 mm (3.42519-3.42558 in)**

**Service Limit: 87.070 mm (3.42795 in)**

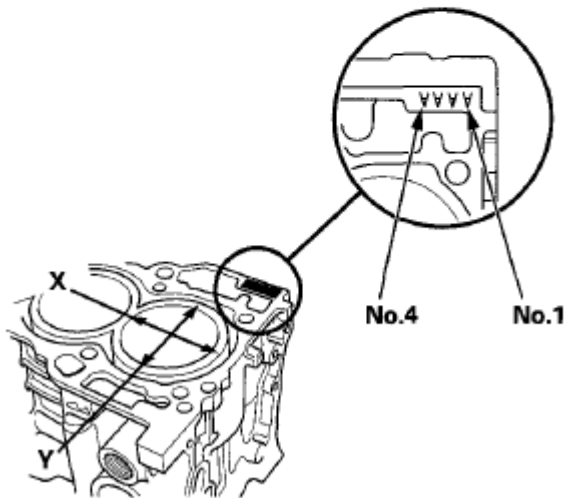
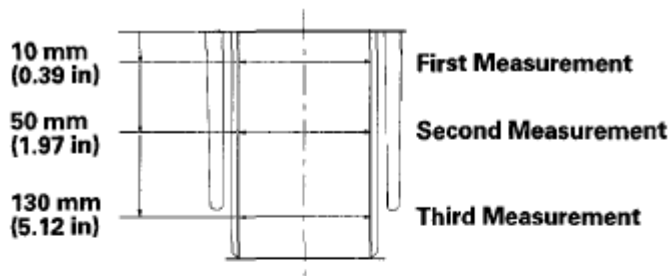
#### Oversize Bore

**0.25: 87.250-87.260 mm (3.43503-3.43543 in)**

**Reboring Limit: 0.25 mm (0.0098 in) max.**

#### Bore Taper

**Limit (Difference between first 0.02 mm (0.0008 in) and third measurement):**



**Fig. 35: Identifying Block And Piston**

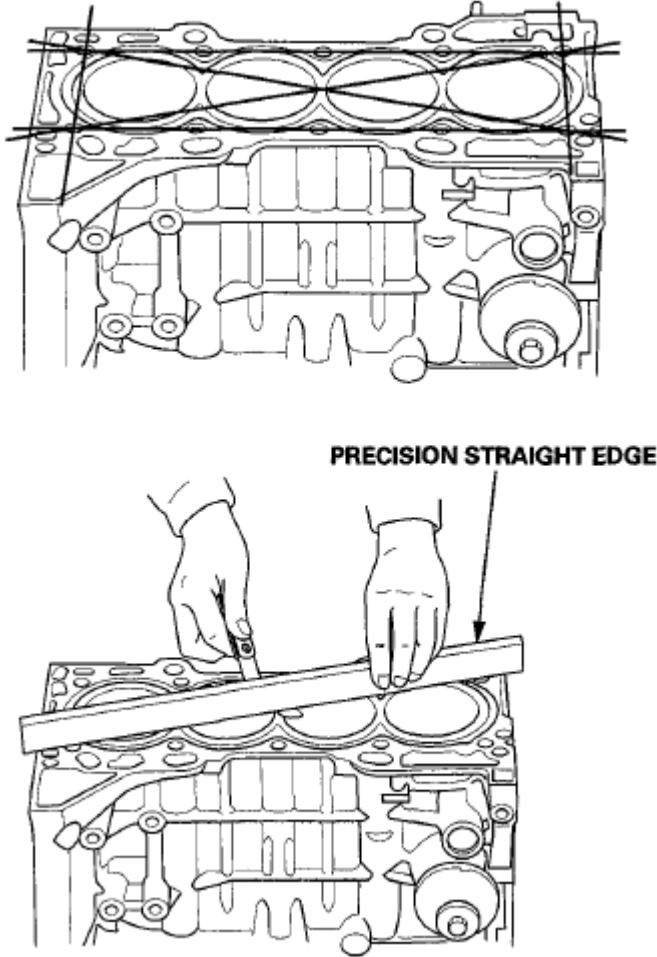
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Hone any scored or scratched cylinder bores (see **CYLINDER BORE HONING** ).
6. Check the top of the engine block for warpage. Measure along the edges and across the center as shown.

#### Engine Block Warpage

**Standard (New): 0.07 mm (0.0028 in) max.**

**Service Limit: 0.10 mm (0.0039 in)**



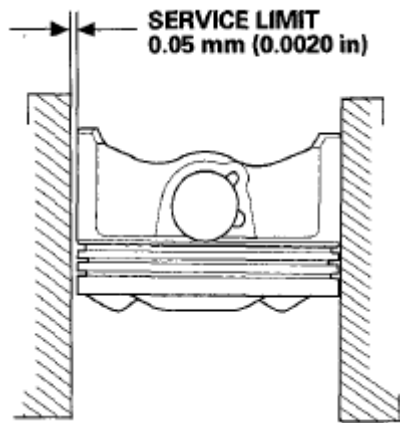
**Fig. 36: Measuring Engine Block Warpage**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

#### **Piston-to-Cylinder Bore Clearance**

**Standard (New): 0.020-0.040 mm (0.00079-0.00157 in)**

**Service Limit: 0.05 mm (0.0020 in)**



**Fig. 37: Identifying Piston To Cylinder Bore Clearance**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

## CYLINDER BORE HONING

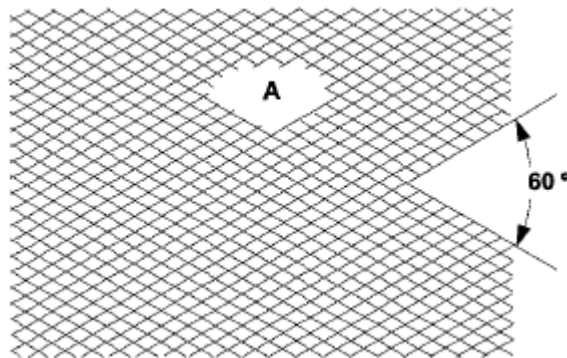
1. Measure the cylinder bores (see CYLINDER BORE HONING ).

If the engine block is to be reused, hone the cylinders, and remeasure the bores. Only a scored or scratched cylinder bore must be honed.

2. Remove the oil jets (see ENGINE OIL GALLERY CAP REPLACEMENT ).
3. Hone the cylinder bores with honing oil and a fine (400 grit) stone in a 60 degree cross-hatch pattern (A).

**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. 38: Identifying Cylinder Bores In Cross Hatch Pattern**  
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.

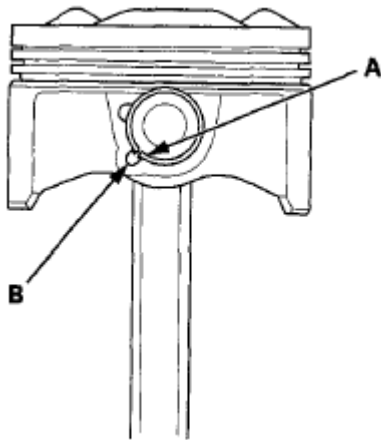
5. If scoring or scratches are still present in the cylinder bores after honing to the service limit, rebore the engine block. Some light vertical scoring and scratching is acceptable if it is not deep enough to catch your fingernail, and does not run the full length of the bore.
6. Install the oil jets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

## PISTON, PIN, AND CONNECTING ROD REPLACEMENT

### DISASSEMBLY

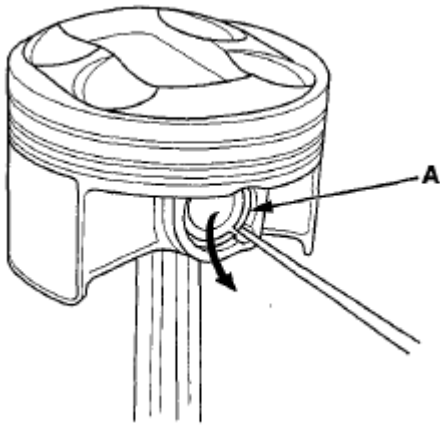
1. Remove the piston from the engine block (see CRANKSHAFT AND PISTON REMOVAL ).
2. Apply new engine oil to the piston pin snap rings (A), and turn them in the ring grooves until the end gaps are lined up with the cutouts in the piston pin bores (B).

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



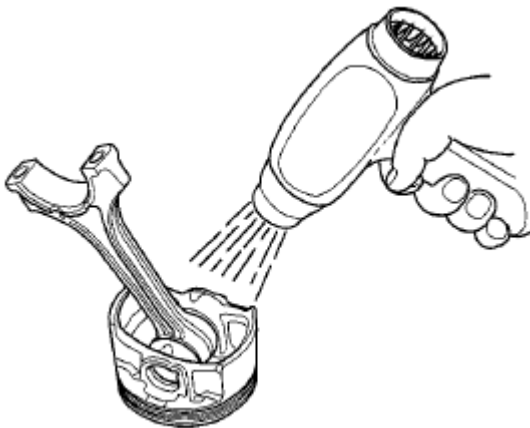
**Fig. 39: Identifying Piston Pin Snap Rings And Piston Pin Bores**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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. 40: Identifying Snap Rings In Piston Pin Bore**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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



**Fig. 41: Heating The Piston And Connecting Rod Assembly**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

## INSPECTION

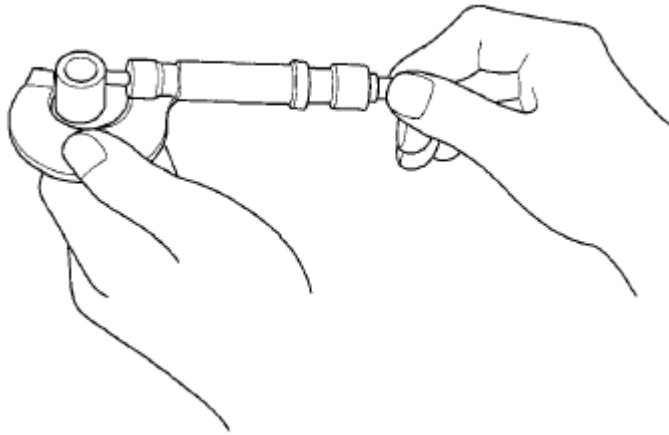
**NOTE:** Inspect the piston, the piston pin, and the connecting rod when they are at room temperature.

1. Measure the diameter of the piston pin.

### Piston Pin Diameter

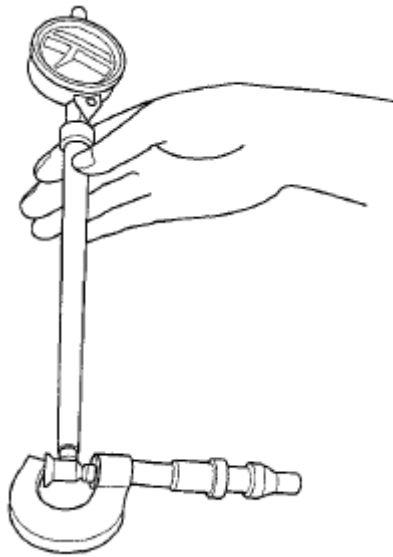
**Standard (New): 21.961-21.965 mm (0.86460-0.86476 in)**

**Service Limit: 21.953 mm (0.86429 in)**



**Fig. 42: Measuring Diameter Of Piston Pin**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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



**Fig. 43: Measuring Zero Dial Indicator To Piston Pin Diameter**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

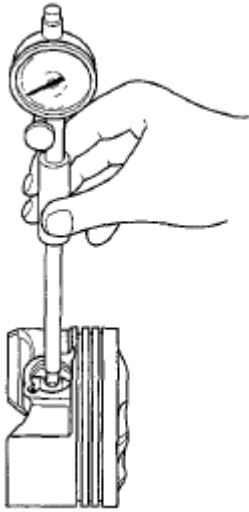
3. Check the difference between the piston pin diameter and the piston pin hole diameter in the piston.

**Piston Pin-to-Piston Clearance**

**Standard (New): -0.005-0.002 mm (-0.00020-0.00008 in)**

**Service Limit: 0.005 mm (0.00020 in)**





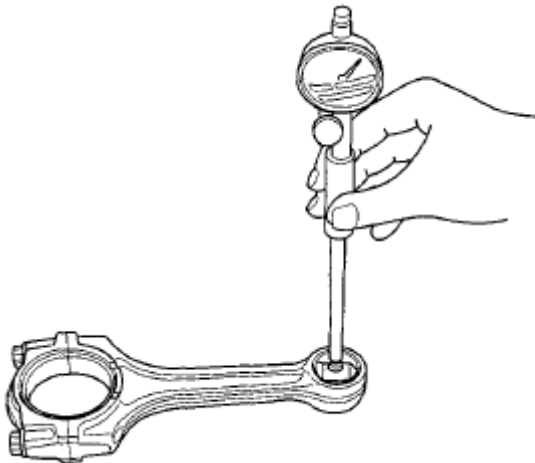
**Fig. 44: Checking Between Piston Pin Diameter And Piston Pin Hole Diameter**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

**Piston Pin-to-Connecting Rod Clearance**

**Standard (New): 0.005-0.015 mm (0.00020-0.00059 in)**

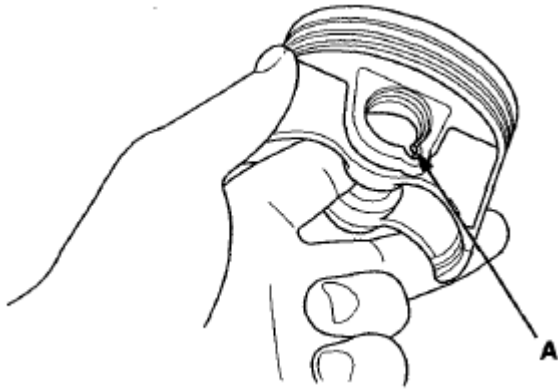
**Service Limit: 0.02 mm (0.0008 in)**



**Fig. 45: Measuring Piston Pin-To-Connecting Rod Clearance**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

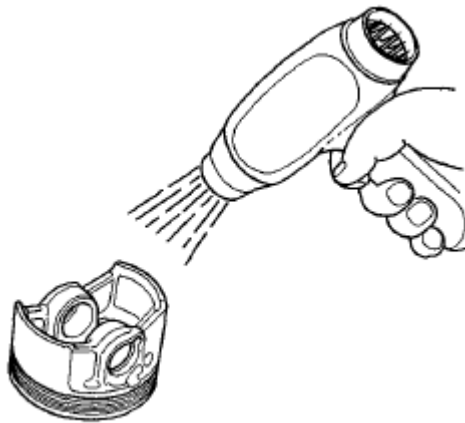
**REASSEMBLY**

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

**Fig. 46: Installing Piston Pin Snap Ring**

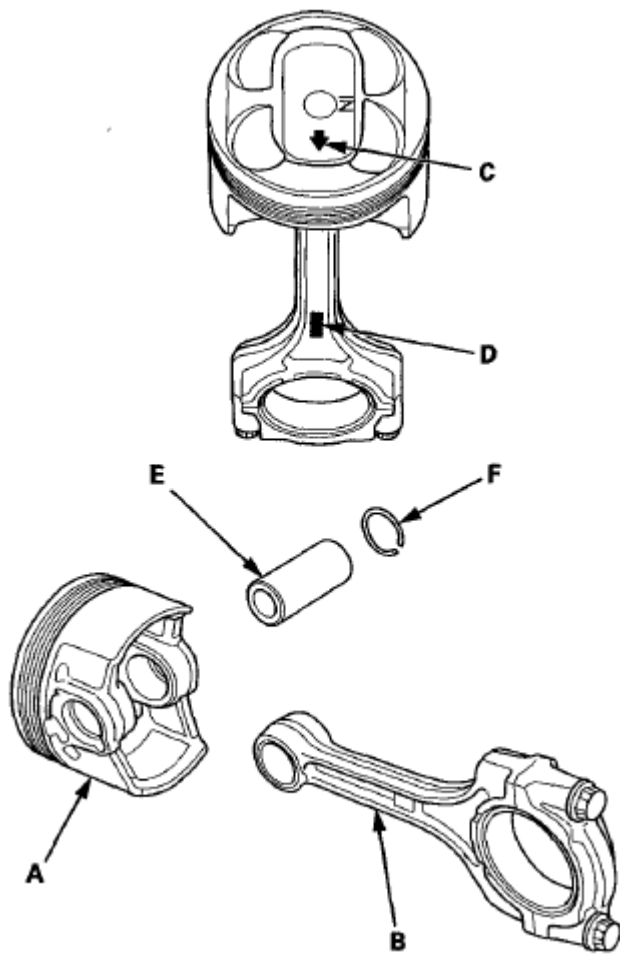
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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. 47: Heating Piston**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

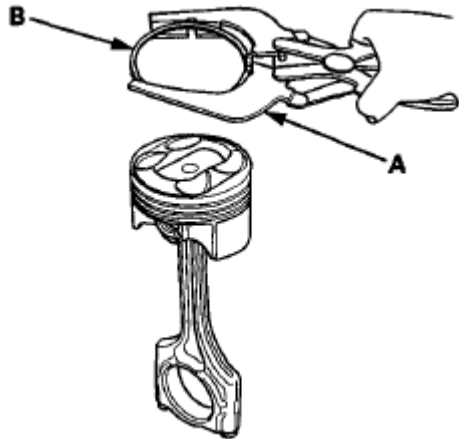


**Fig. 48: Identifying Piston, Connecting Rod And Embossed Mark**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Install the remaining snap ring (F).
6. Turn the snap rings in the ring grooves until the end gaps are positioned at the bottom of the piston.

## PISTON RING REPLACEMENT

1. Remove the piston from the engine block (see **CRANKSHAFT AND PISTON REMOVAL** ).
2. Using a ring expander (A), remove the old piston rings (B).



**Fig. 49: Installing Ring Expander And Piston Rings**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Clean all ring grooves thoroughly with a squared-off broken ring or a ring groove cleaner with a blade to fit the piston grooves.

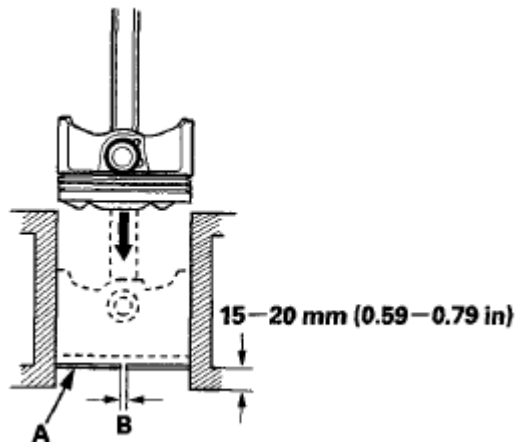
The top and second ring grooves are 1.2 mm (0.047 in) wide. The oil ring groove is 2.0 mm (0.079 in) wide ('08-10 models).

The top ring groove is 1.2 mm (0.047 in) wide. The second ring groove is 1.0 mm (0.039 in) wide. The oil ring groove is 2.0 mm (0.079 in) wide ('11-12 models). File down a blade if necessary.

Do not use a wire brush to clean the ring grooves, or cut the ring grooves deeper with the cleaning tools.

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

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



**Fig. 50: Identifying Ring And Piston Ring End-Gap In Cylinder Bore**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Measure the piston ring end-gap (B) with a feeler gauge:

- If the gap is too small, check to see if you have the proper rings for your engine.
- If the gap is too large, recheck the cylinder bore diameter against the wear limits (see **CYLINDER BORE HONING** ). If the bore is beyond the service limit, the engine block must be rebored.

**Piston Ring End-Gap ('08-10 models)**

**Top Ring:**

**Standard (New): 0.20-0.35 mm (0.0079-0.0138 in)**

**Service Limit: 0.60 mm (0.0236 in)**

**Second Ring:**

**Standard (New): 0.50-0.65 mm (0.0197-0.0256 in)**

**Service Limit: 0.70 mm (0.0276 in)**

**Oil Ring:**

**Standard (New): 0.20-0.70 mm (0.0079-0.0276 in)**

**Service Limit: 0.75 mm (0.0295 in)**

**Piston Ring End-Gap ('11-12 models)**

**Top Ring:**

**Standard (New): 0.20-0.30 mm (0.0079-0.0118 in)**

**Service Limit: 0.55 mm (0.0217 in)**

**Second Ring:**

**Standard (New): 0.20-0.32 mm (0.0079-0.0126 in)**

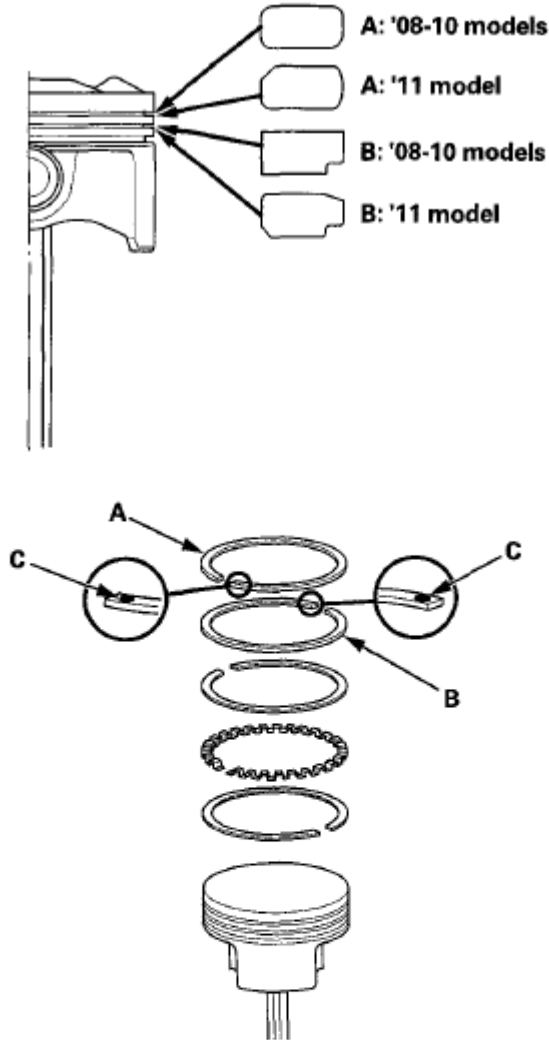
**Service Limit: 0.42 mm (0.0165 in)**

**Oil Ring:**

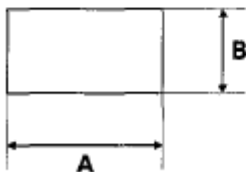
**Standard (New): 0.20-0.50 mm (0.0079-0.0197 in)**

**Service Limit: 0.55 mm (0.0217 in)**

- Install the top ring and the second ring as shown. The top ring (A) has a 1R mark, and the second ring (B) has a 2RN mark ('08-10 models) or 2R mark ('11-12 models). The manufacturing marks (C) must face upward.



### Piston Ring Dimensions:



#### '08-10 models

##### Top Ring (Standard):

A: 2.7 mm (0.106 in)

B: 1.2 mm (0.047 in)

##### Second Ring (Standard):

A: 3.4 mm (0.134 in)

B: 1.2 mm (0.047 in)

#### '11 model

##### Top Ring (Standard):

A: 2.7 mm (0.106 in)

B: 1.2 mm (0.047 in)

##### Second Ring (Standard):

A: 2.5 mm (0.098 in)

B: 1.0 mm (0.039 in)

**Fig. 51: Installing Top Ring And Second Ring**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

**Top Ring Clearance**

**Standard (New): 0.060-0.085 mm (0.00236-0.00335 in)**

**Service Limit: 0.13 mm (0.0051 in)**

**Second Ring Clearance ('08-10 models)**

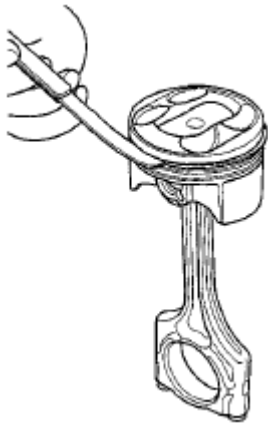
**Standard (New): 0.040-0.065 mm (0.00157-0.00256 in)**

**Service Limit: 0.13(0.0051)**

**Second Ring Clearance ('11-12 models)**

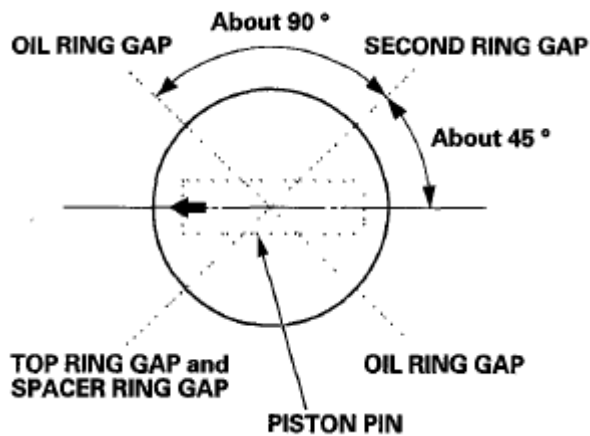
**Standard (New): 0.020-0.045 mm (0.00079-0.00177 in)**

**Service Limit: 0.13 mm (0.0051 in)**



**Fig. 52: Measuring Top Ring Clearance**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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



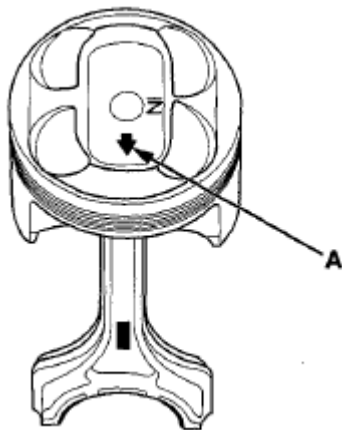
**Fig. 53: Positioning Ring End Gaps**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

## PISTON INSTALLATION

### IF THE CRANKSHAFT IS ALREADY INSTALLED

1. Set the crankshaft to bottom dead center (BDC) for each cylinder as its piston is installed.
2. Remove the connecting rod caps, then install the ring compressor, and check that the bearing is securely in place.
3. Apply new engine oil to the piston, the inside of the ring compressor, and the cylinder bore, then attach the ring compressor to the piston/connecting rod assembly.
4. Position the mark (A) to face the cam chain side of the engine block.



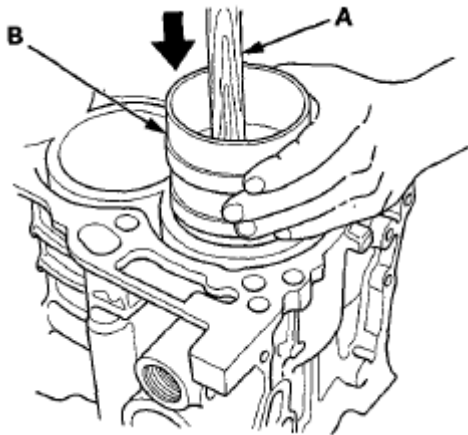
**Fig. 54: Positioning Mark Of CAM Chain Engine Block**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Position the piston in the cylinder, and tap it in using the wooden handle of a hammer (A).

Push down on the ring compressor (B) to prevent the rings from expanding before entering the cylinder bore.

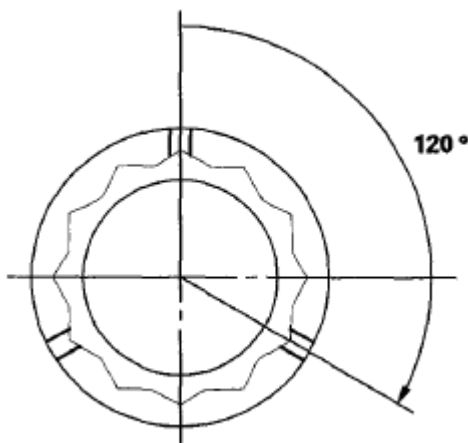




**Fig. 55: Installing Ring Compressor In Cylinder Bore With Tool**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Stop after the ring compressor pops free, and check the connecting rod-to-rod journal alignment before pushing the piston into place.
7. Check the connecting rod bearing clearance with plastigage (see **CONNECTING ROD BEARING REPLACEMENT** ).
8. Inspect the connecting rod bolts (see **CONNECTING ROD BOLT INSPECTION** ).
9. Apply new engine oil to the bolt threads, then install the connecting rod caps with bearings. Torque the bolts to 41 N.m (4.2 kgf.m, 30 lbf.ft).
10. Tighten the connecting rod bolts an additional 120°.

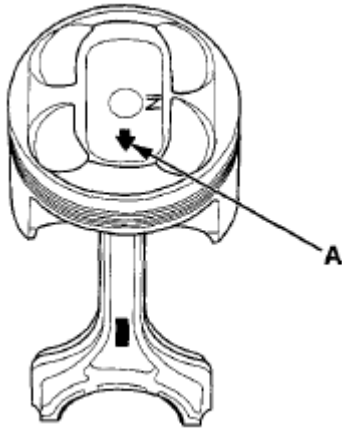
**NOTE:** Remove the connecting rod bolt if you tightened it beyond the specified angle, and go back to step 8 of the procedure. Do not loosen it back to the specified angle. Repeat steps 1 to 10 for the remaining cylinders.



**Fig. 56: Tightening Connecting Rod Bolts**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

**IF THE CRANKSHAFT IS NOT INSTALLED**

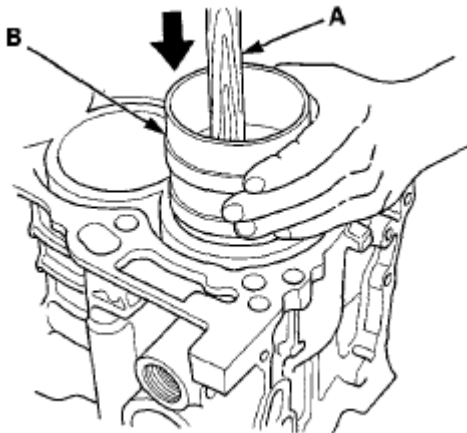
1. Remove the connecting rod caps, then install the ring compressor, and check that the bearing is securely in place.
2. Apply new engine oil to the piston, the inside of the ring compressor, and the cylinder bore, then attach the ring compressor to the piston/connecting rod assembly.
3. Position the mark (A) to face the cam chain side of the engine block.



**Fig. 57: Identifying Position Mark In Engine Block**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Position the piston in the cylinder, and tap it in using the wooden handle of a hammer (A).

Push down on the ring compressor (B) to prevent the rings from expanding before entering the cylinder bore.

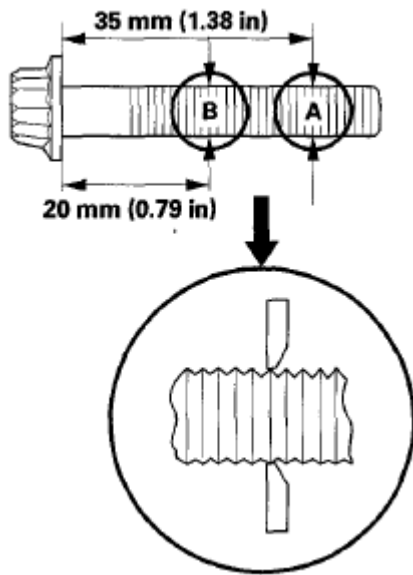


**Fig. 58: Installing Ring Compressor In Cylinder Bore With Tool**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Position all pistons at top dead center (TDC).

## CONNECTING ROD BOLT INSPECTION

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



**Fig. 59: Identifying Connecting Rod Bolt**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

**Point A-Point B = Difference in Diameter**

**Difference in Diameter**

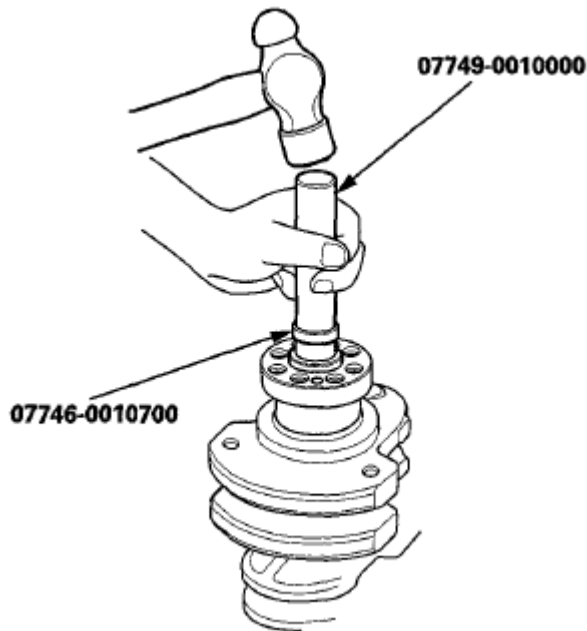
**Specification: 0-0.1 mm (0-0.004 in)**

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

## CRANKSHAFT INSTALLATION

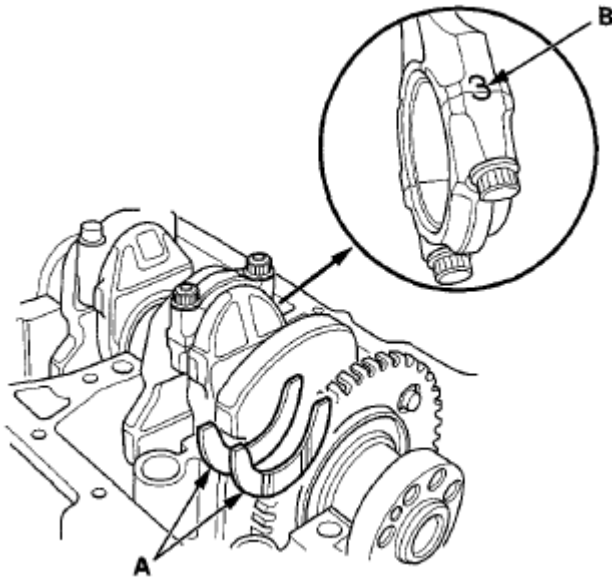
### Special Tools Required

- Driver Handle, 15 x 135L 07749-0010000
  - Bearing Driver Attachment, 24 x 26 mm 07746-0010700
  - Oil Seal Driver Attachment, 96 mm 07ZAD-PNAA100
1. M/T model: Install the crankshaft end bushing when replacing the crankshaft. Using the driver, handle, 15 x 135L and the bearing driver attachment, 24 x 26 mm, drive in the crankshaft end bushing until the driver handle and the bearing driver attachment bottom against the crankshaft.



**Fig. 60: Installing Crankshaft End Bushing In Crankshaft**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

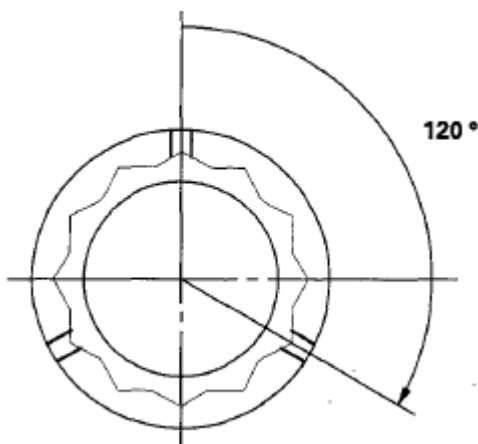
2. Check the main bearing clearance with plastigage (see **MAIN BEARING CLEARANCE INSPECTION** ).
3. Check the connecting rod bearing clearance with plastigage (see **CONNECTING ROD BEARING REPLACEMENT** ).
4. Install the bearing halves in the engine block and the connecting rods.
5. Apply a coat of new engine oil to the main bearings and the rod bearings.
6. Install the CKP pulse plate to the crankshaft (see **CKP PULSE PLATE REPLACEMENT** ).
7. Hold the crankshaft so rod journal No. 2 and rod journal No. 3 are straight up, and lower the crankshaft into the engine block. Be careful not to damage the journals and the CKP pulse plate.
8. Apply new engine oil to the thrust washer surfaces. Install the thrust washers (A) in the No. 4 journal of the engine block.



**Fig. 61: Identifying Thrust Washers And Mark Of Line In Engine**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Inspect the connecting rod bolts (see CONNECTING ROD BOLT INSPECTION ).
10. Apply new engine oil to the threads of the connecting rod bolts.
11. Seat the rod journals into connecting rod No. 1 and connecting rod No. 4. Line up the mark (B) on the connecting rod and the cap, then install the caps and bolts finger-tight.
12. Rotate the crankshaft clockwise, and seat the journals into connecting rod No. 2 and connecting rod No. 3. Line up the mark on the connecting rod and the cap, then install the caps and bolts finger-tight.
13. Torque the connecting rod bolts to 41 N.m (4.2 kgf.m, 30 lbf.ft).
14. Tighten the connecting rod bolts an additional 120°.

**NOTE:** Remove the connecting rod bolt if you tightened it beyond the specified angle, and go back to step 9 of the procedure. Do not loosen it back to the specified angle.

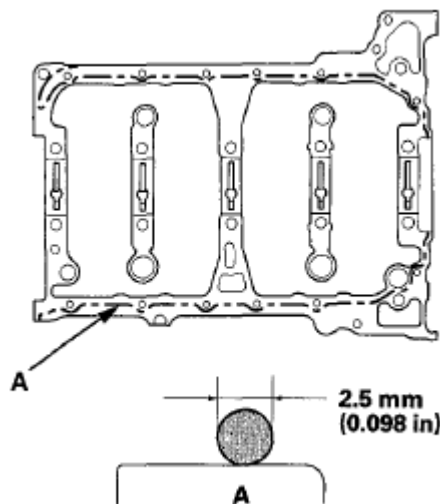


**Fig. 62: Tightening Connecting Bolts****Courtesy of AMERICAN HONDA MOTOR CO., INC.**

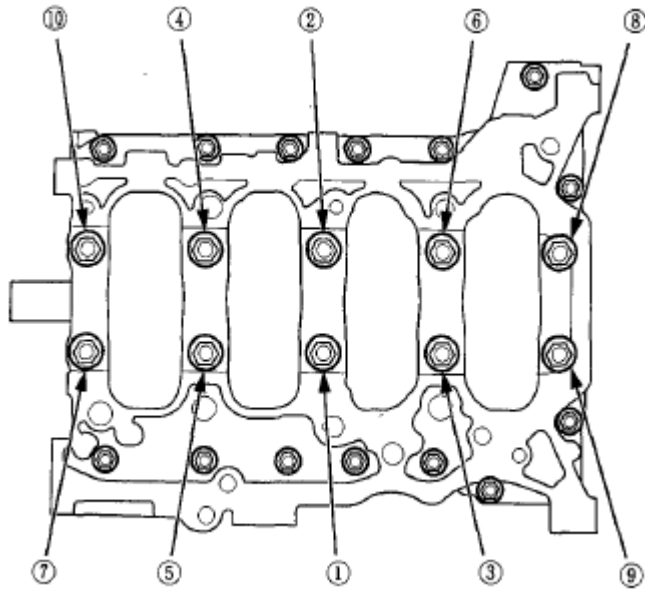
15. Remove all of the old liquid gasket from the lower block mating surfaces, the bolts, and the bolt holes.
16. Clean and dry the lower block mating surfaces.
17. Apply liquid gasket, P/N 08717-0004, 08718-0003, or 08718-0009 to the engine block mating surface of the lower block, and to the inside edge 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 too much time has passed after applying the liquid gasket, remove the old liquid gasket and residue, then reapply new liquid gasket.**

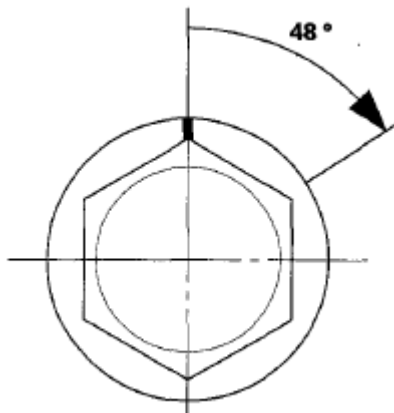
**Fig. 63: Identifying Diameter Bead Of Liquid Gasket Along Broken Line****Courtesy of AMERICAN HONDA MOTOR CO., INC.**

18. Put the lower block on the engine block.
19. Apply new engine oil to the threads of the bearing cap bolts. Torque the bearing cap bolts in sequence, to 29 N.m (3.0 kgf.m, 22 lbf.ft).



**Fig. 64: Identifying Bearing Cap Bolts Tightening Sequence**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

20. Tighten the bearing cap bolts an additional 48°.

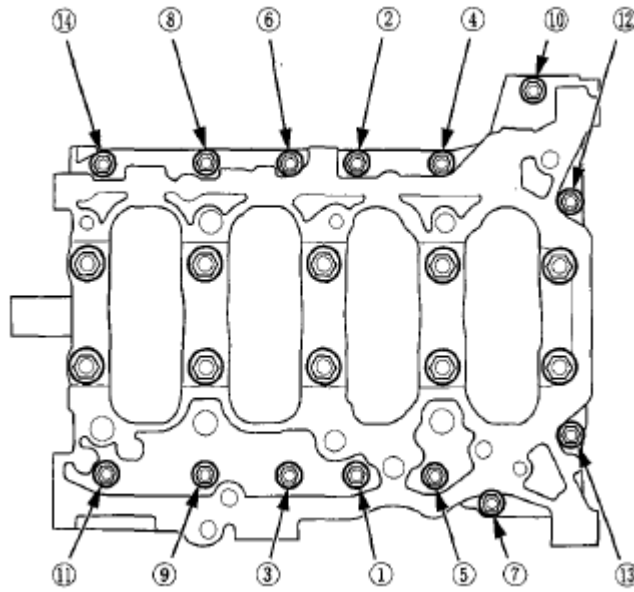


**Fig. 65: Tightening Bearing Cap Bolts**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

21. Torque the 8 mm bolts in sequence to 22 N.m (2.2 kgf.m, 16 lbf.ft).

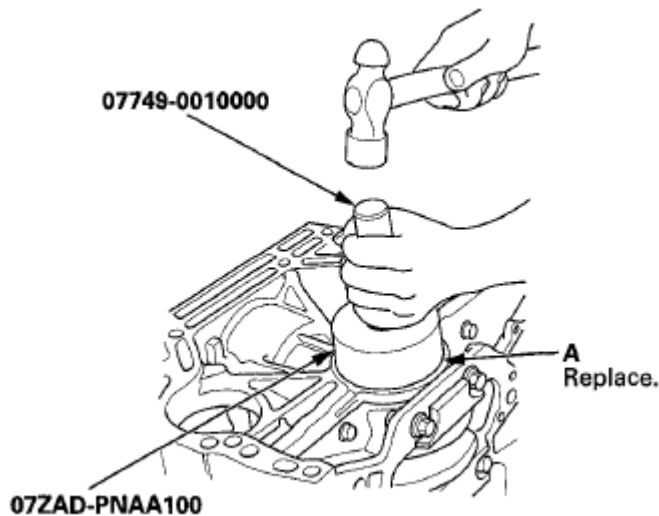
**NOTE:**

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



**Fig. 66: Identifying Bolts And Tightening Sequence**  
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

22. Apply a light coat of new engine oil to the lip of the crankshaft oil seal.
23. Use the driver handle and the oil seal driver attachment, 96 mm to drive a new crankshaft oil seal (A) squarely into the engine block to the specified installed height.



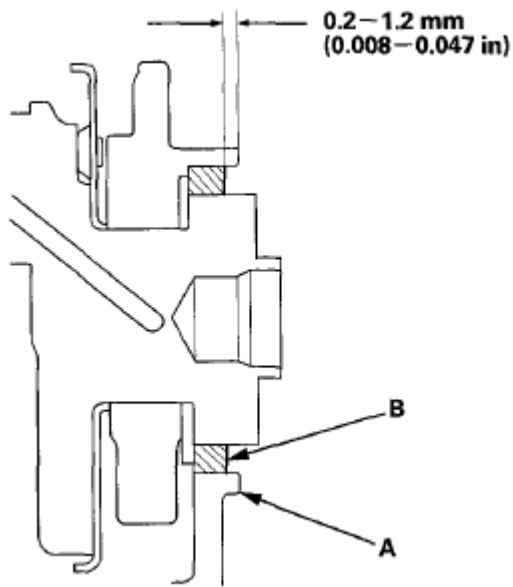
**Fig. 67: Installing Oil Seal Driver With SST**  
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

24. Clean the excess grease off the crankshaft, and check that the oil seal lip is not distorted.
25. Measure the distance between the engine block (A) and the crankshaft oil seal (B).

### Crankshaft Oil Seal Installed Height

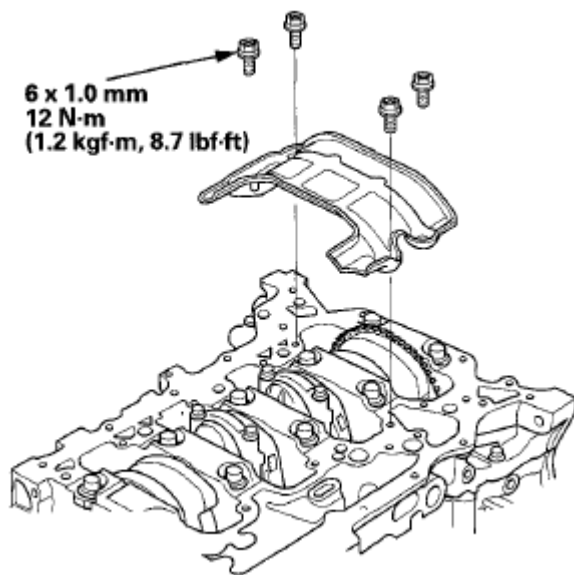


0.2-1.2 mm (0.008-0.047 in)



**Fig. 68: Identifying Engine Block And Crankshaft Oil Seal**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

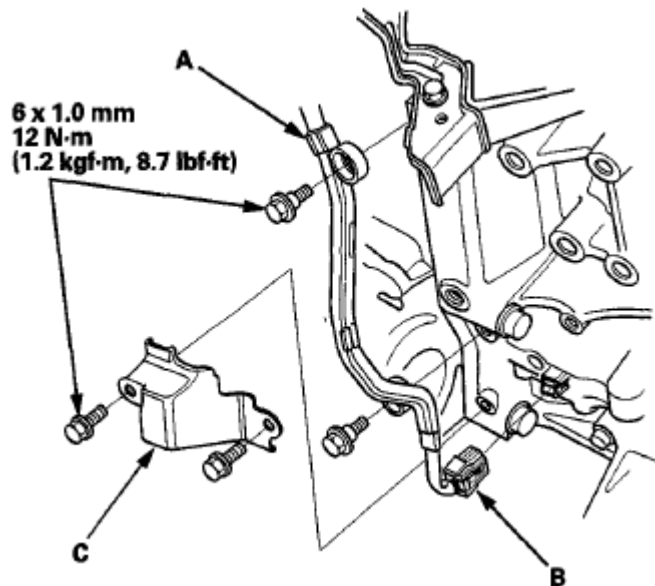
26. Install the baffle plate.



**Fig. 69: Identifying Baffle Plate With Torque Specifications**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

27. Install the oil pump (see **OIL PUMP INSTALLATION** ).
28. Install the oil pan (see **OIL PAN INSTALLATION** ).
29. Install the cylinder head:

- All models except PZEV (see CYLINDER HEAD INSTALLATION )
  - PZEV model (see CYLINDER HEAD INSTALLATION )
30. M/T model: Install the flywheel (see step 18 under CLUTCH REPLACEMENT ), the clutch disc (see step 26 under CLUTCH REPLACEMENT ), and the pressure plate (see step 27 under CLUTCH REPLACEMENT ).
  31. A/T model: Install the drive plate (see DRIVE PLATE REMOVAL AND INSTALLATION ).
  32. Install the harness holder (A).



**Fig. 70: Identifying Harness Holder, CKP Sensor Connector And CKP Sensor Cover With Torque Specifications**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

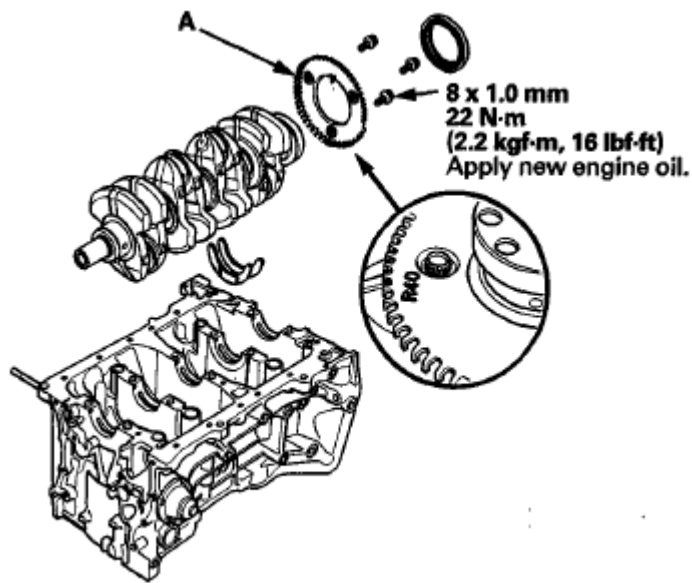
33. Connect the CKP sensor connector (B), then install the CKP sensor cover (C).
34. Install the transmission:
  - Manual transmission (see TRANSMISSION INSTALLATION )
  - Automatic transmission (see DRIVE PLATE REMOVAL AND INSTALLATION )
35. Install the engine/transmission (see ENGINE INSTALLATION ).

**NOTE:** Whenever any crankshaft 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 (see CRANKSHAFT AND PISTON REMOVAL ).
2. Remove the CKP pulse plate (A) from the crankshaft.

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



**Fig. 71: Identifying CKP Pulse Plate In Crankshaft With Torque Specifications**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

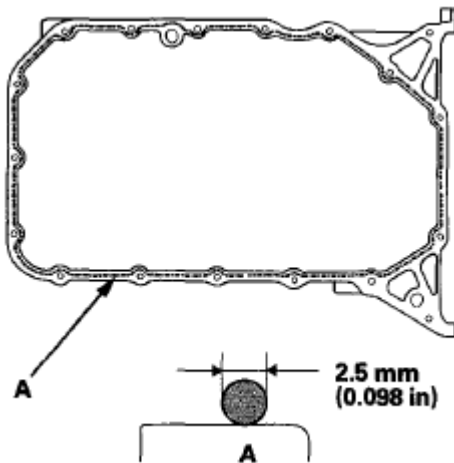
**NOTE:** When installing the crankshaft, refer to the crankshaft installation procedure (see CRANKSHAFT INSTALLATION ).

## 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, or 08718-0009 to the engine block mating surface of the oil pan, 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 too much time has passed after applying the liquid gasket, remove the old liquid gasket and residue, then reapply new liquid gasket.

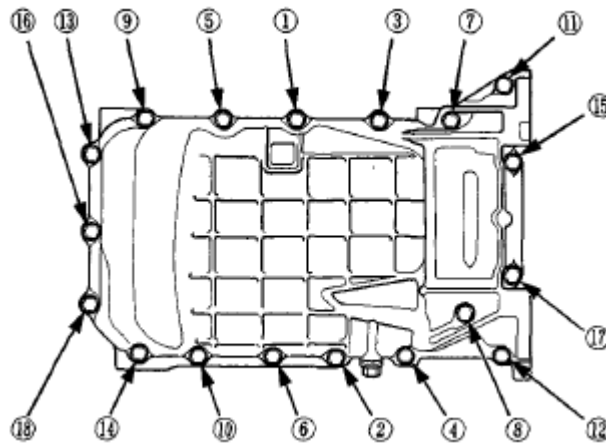


**Fig. 72: Identifying Diameter Bead Of Liquid Gasket Broken Line**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

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, 8.7 lbf.ft). Wipe off the excess liquid gasket on the each side of crankshaft pulley and the flywheel/drive plate.

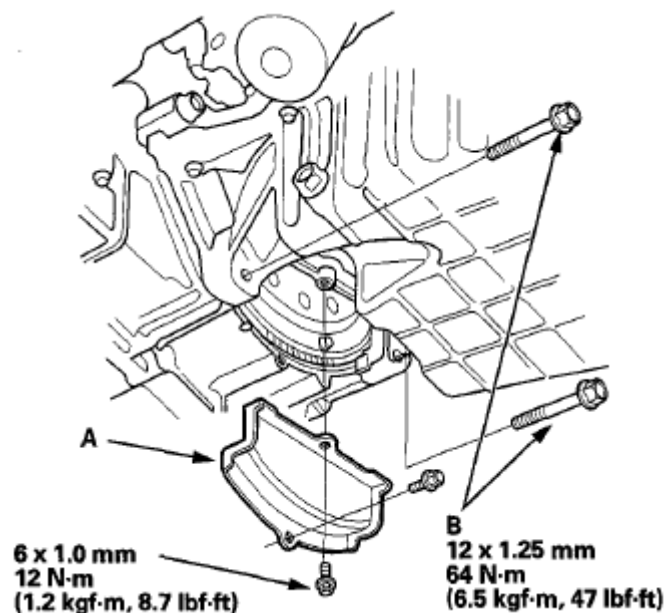
**NOTE:**

- 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. 73: Identifying Oil Pan Bolts Tightening Sequence**  
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

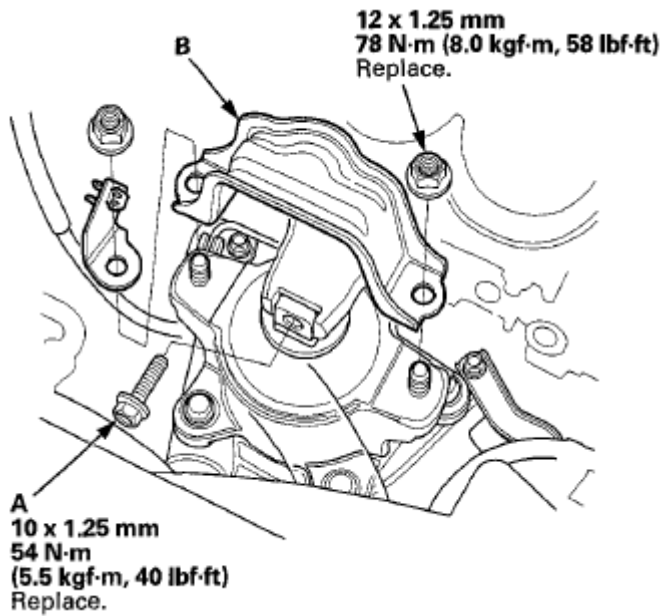
6. Install the clutch case cover (A) and the transmission mounting bolts (B).



**Fig. 74: Identifying Clutch Case Cover And Transmission Mounting Bolts With Torque Specifications**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

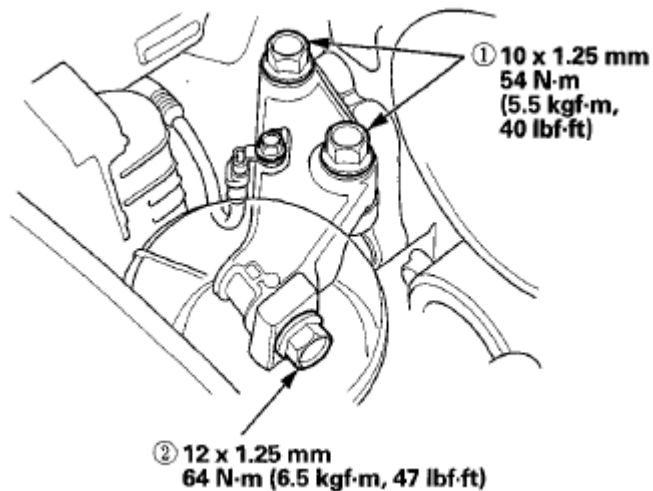
7. If the engine is still in the vehicle, do steps 8 through 25.
8. Remove the transmission jack from the transmission.
9. A/T model: Install the shift cable bracket.
  - Vehicles with JHM VINs (see step 33 under **TRANSMISSION INSTALLATION** ).
  - Vehicles with 1HG VINs (see step 36 under **TRANSMISSION INSTALLATION** ).
10. Tighten the lower transmission mount mounting nuts (see step 24 under **ENGINE INSTALLATION** ).
11. Install a new set ring on the end of driveshaft, then install the driveshaft (see **DRIVESHAFT INSTALLATION** ). Make sure the ring "clicks" into place in the differential.
12. Connect the lower arm to the left side knuckle (see step 5 under **KNUCKLE/HUB/WHEEL BEARING REPLACEMENT** ).
13. Install the left side damper fork (see step 3 under **KNUCKLE/HUB/WHEEL BEARING REPLACEMENT** ).
14. Install the splash shield (see step 49 under **ENGINE INSTALLATION** ).
15. Install the left front wheel.
16. Lower the vehicle on the lift.
17. Tighten the front engine mount mounting bolt (A), then install the front engine mount stop (B).



**Fig. 75: Identifying Front Engine Mount Mounting Bolt And Front Engine Mount Stop With Torque Specifications**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

18. Loosen the side engine mount bracket mounting bolts, then retighten the bolts in the numbered sequence shown.

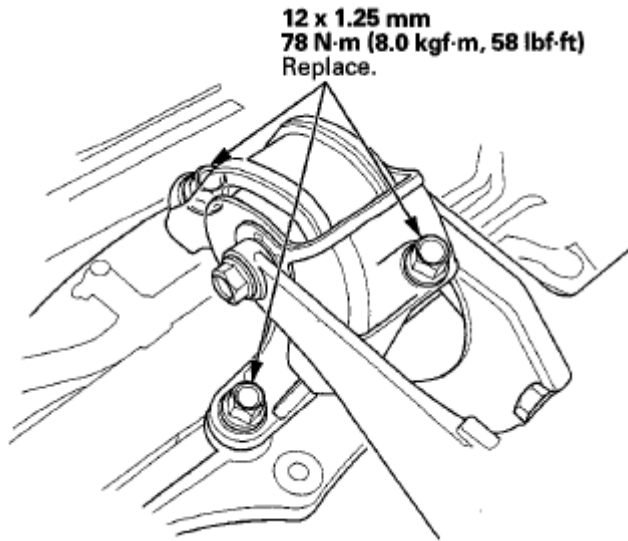


**Fig. 76: Identifying Side Engine Mount Bracket Mounting Bolts And Bolts With Torque Specifications**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

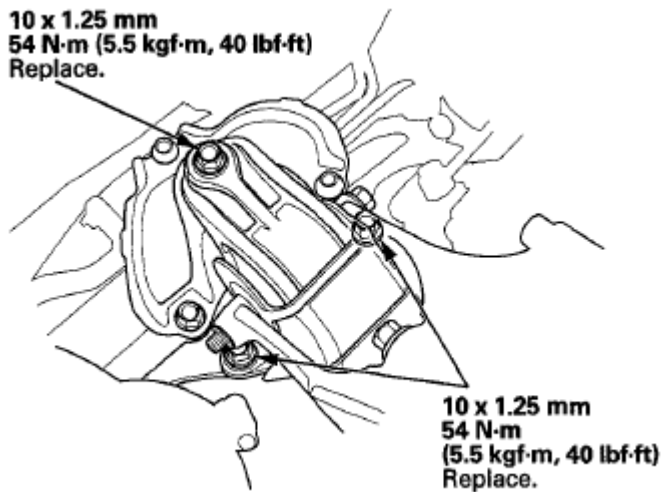
19. Tighten the rear engine mount mounting bolts to the specified torque.

**M/T model**



**Fig. 77: Tightening Rear Engine Mount Mounting Bolts In M/T Model With Torque Specifications**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

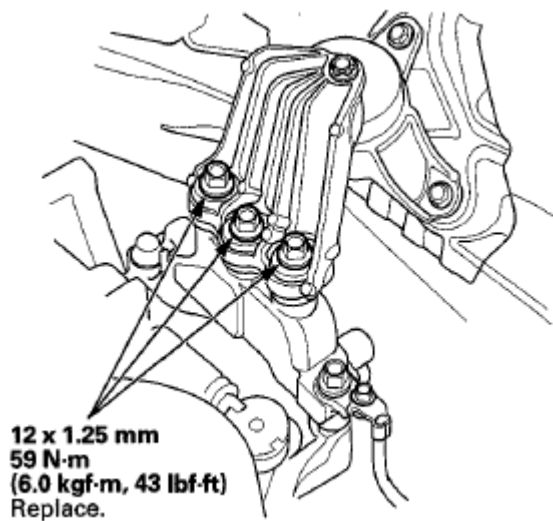
A/T model



**Fig. 78: Tightening Rear Engine Mount Mounting Bolts In M/T Model With Torque Specifications**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

20. Tighten the upper transmission mount bracket mounting bolts to the specified torque.

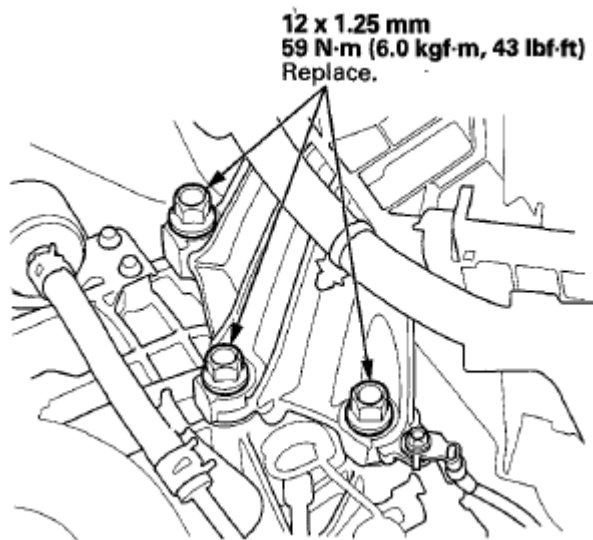
M/T model



**Fig. 79: Tightening Upper Transmission Mount Bracket Mounting Bolts In M/T Model With Torque Specifications**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

A/T model



**Fig. 80: Tightening Upper Transmission Mount Bracket Mounting Bolts In A/T Model With Torque Specifications**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

21. Install the battery base, then install the harness clamps (see step 65 under **ENGINE INSTALLATION** ).
22. Install the air cleaner (see **THROTTLE BODY CLEANING** ).
23. Do the battery installation procedure (see **BATTERY REMOVAL AND INSTALLATION** ).
24. Install the strut brace (if equipped) (see **FRAME BRACE REPLACEMENT** ).
25. Refill the engine with engine oil (see **OIL PRESSURE TEST** ).

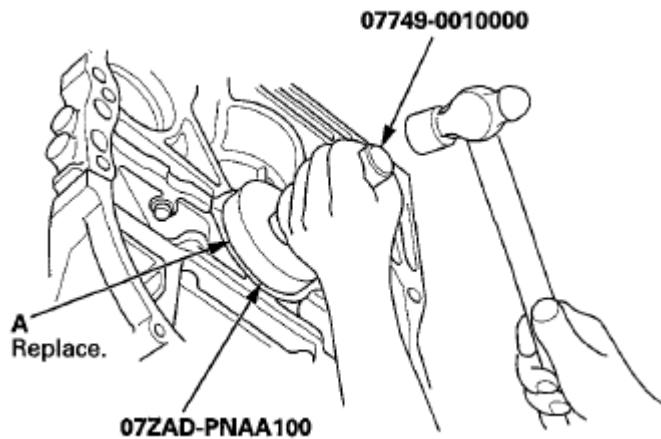


## TRANSMISSION END CRANKSHAFT OIL SEAL INSTALLATION - IN CAR

### Special Tools Required

- Driver Handle, 15 x 135L 07749-0010000
- Oil Seal Driver Attachment, 96 mm 07ZAD-PNAA100

1. Remove the transmission:
  - Manual transmission (see **TRANSMISSION REMOVAL** )
  - Automatic transmission (see **TRANSMISSION REMOVAL** )
2. M/T model: Remove the flywheel (see step 17 under **CLUTCH REPLACEMENT** ), the clutch disc (see step 8 under **CLUTCH REPLACEMENT** ), and the pressure plate (see step 3 under **CLUTCH REPLACEMENT** ).
3. A/T model: Remove the drive plate (see **DRIVE PLATE REMOVAL AND INSTALLATION** ).
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. Use the driver handle, 15 x 135L and the oil seal driver attachment, 96 mm to drive a new crankshaft oil seal (A) squarely into the engine block to the specified installed height.

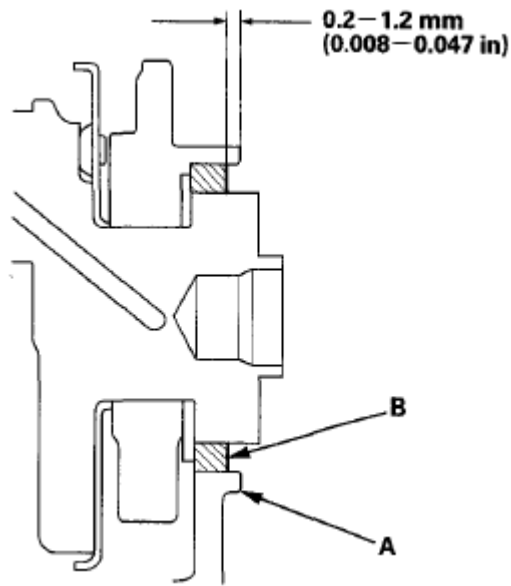


**Fig. 81: Installing Crankshaft Oil Seal**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Clean the excess grease off the crankshaft, and check that the oil seal lip is not distorted.
8. Measure the distance between the engine block (A) and the crankshaft oil seal (B).

**Oil Seal Installed Height: 0.2-1.2 mm (0.008-0.047 in)**

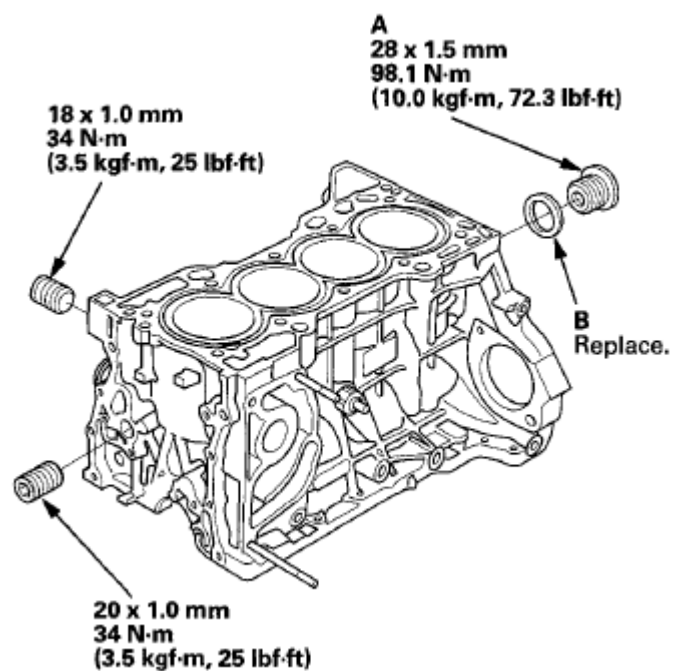


**Fig. 82: Identifying Distance Between Engine Block And Crankshaft Oil Seal**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. M/T model: Install the flywheel (see step 18 under **CLUTCH REPLACEMENT** ), the clutch disc (see step 26 under **CLUTCH REPLACEMENT** ), and the pressure plate (see step 27 under **CLUTCH REPLACEMENT** ).
10. A/T model: Install the drive plate (see **DRIVE PLATE REMOVAL AND INSTALLATION** ).
11. Install the transmission:
  - Manual transmission (see **TRANSMISSION INSTALLATION** )
  - Automatic transmission (see **DRIVE PLATE REMOVAL AND INSTALLATION** )

## SEALING BOLT INSTALLATION

**NOTE:** When installing the sealing bolt (A), always use a new washer (B).



**Fig. 83: Identifying Sealing Bolt And Washer With Torque Specifications**  
Courtesy of AMERICAN HONDA MOTOR CO., INC.