2009-11 ENGINE

Cylinder Head (J35Z6) - TL

SPECIAL TOOLS

Ref.No.	Tool Number	Description	Qty
①	070AJ-001A101	VCM Air Adapter	1
②	07742-0010100	Valve Guide Driver, 5.35 x 9.7 mm	1
③	07757-PJ1010A	Valve Spring Compressor Attachment	1
④	07AAJ-PNAA101	Air Pressure Regulator	1
⑤	07AAJ-R70A100	VTEC Air Stop Tool A	1
⑥	07AAJ-R70A200	VTEC Air Stop Tool B	1
⑦	07GAF-SD40330	Ball Joint Remover/Installer	1
⑧	07HAH-PJ7A100	Valve Guide Reamer, 5.5 mm	1
⑨	07JAA-001020A	Socket, 19 mm	1
⑩	07JAB-001020B	Handle, 6-25-660L	1
⑪	07MAB-PY3010A	Holder Attachment, 50 mm, Offset	1
⑫	07PAD-0010000	Stem Seal Driver, 30 mm	1

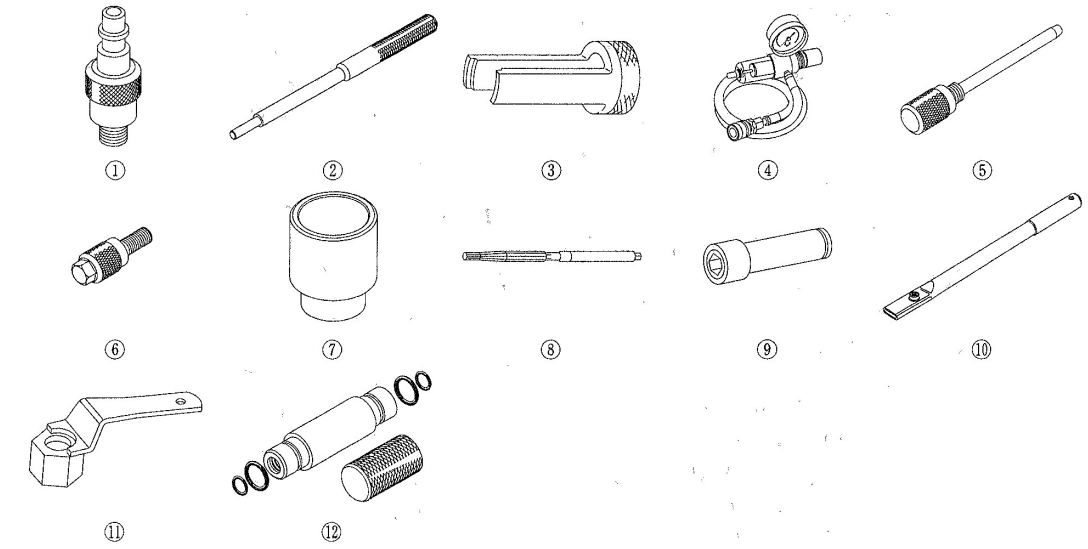


Fig. 1: Identifying Special Tools
Courtesy of AMERICAN HONDA MOTOR CO., INC.

COMPONENT LOCATION INDEX

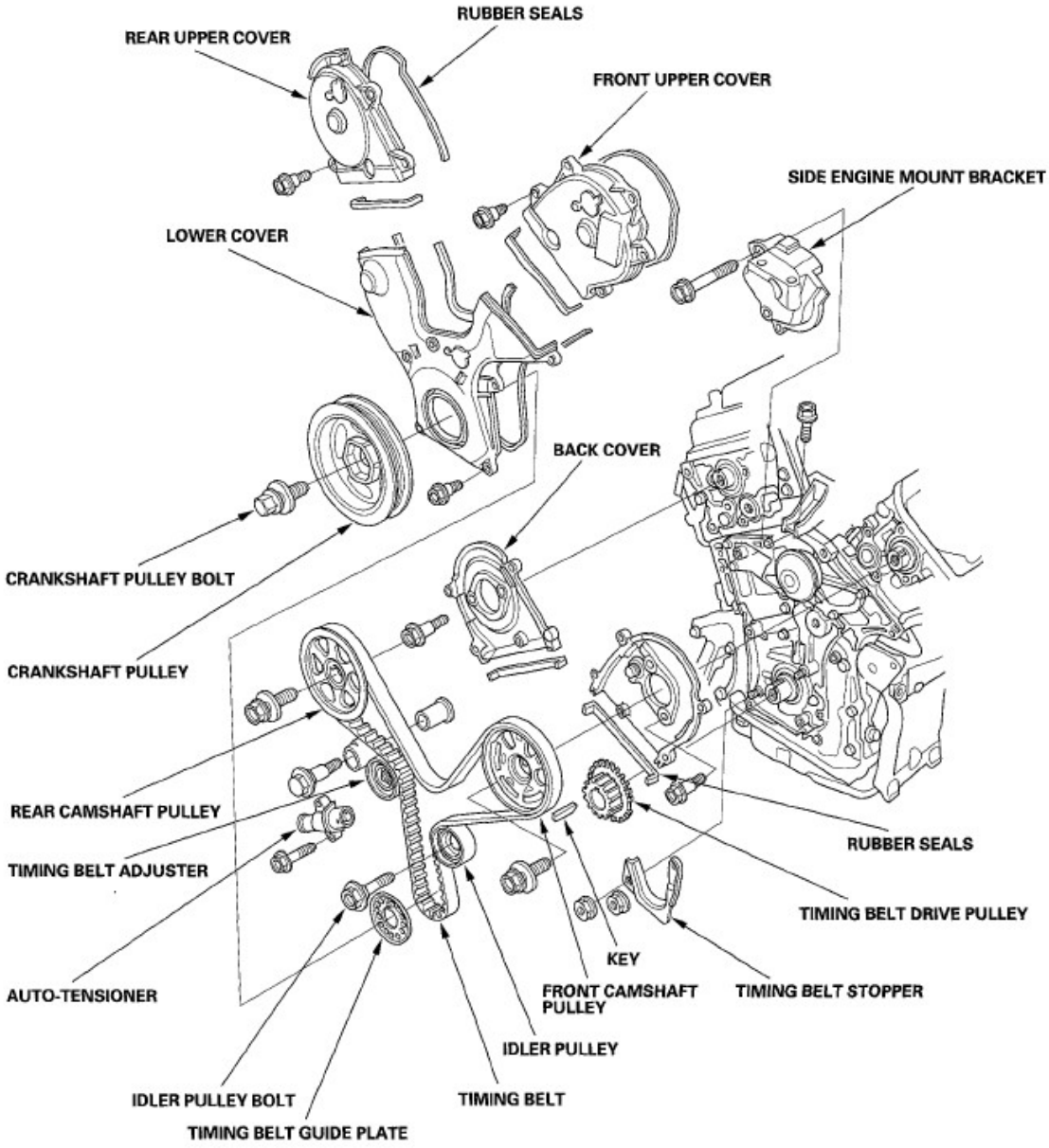


Fig. 2: Identifying Cylinder Head Component Locations (1 Of 2)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

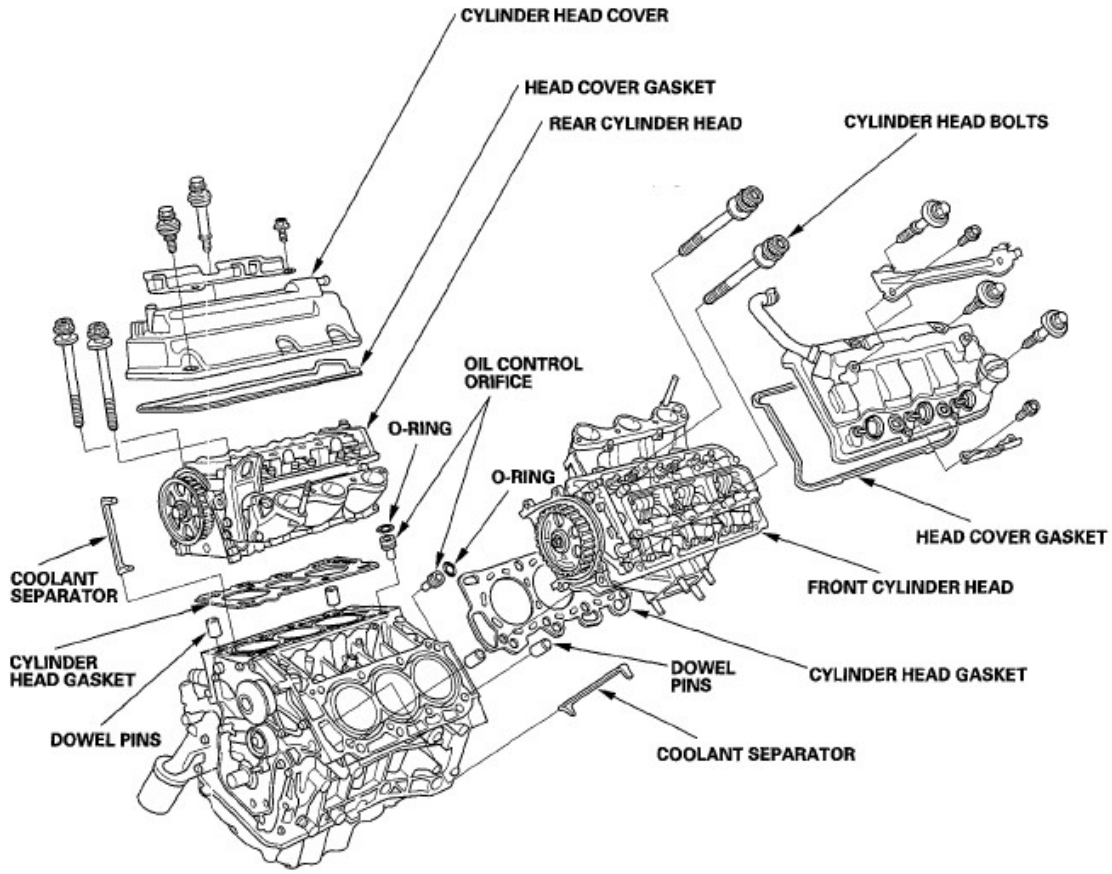


Fig. 3: Identifying Cylinder Head Component Locations (2 Of 2)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

FRONT

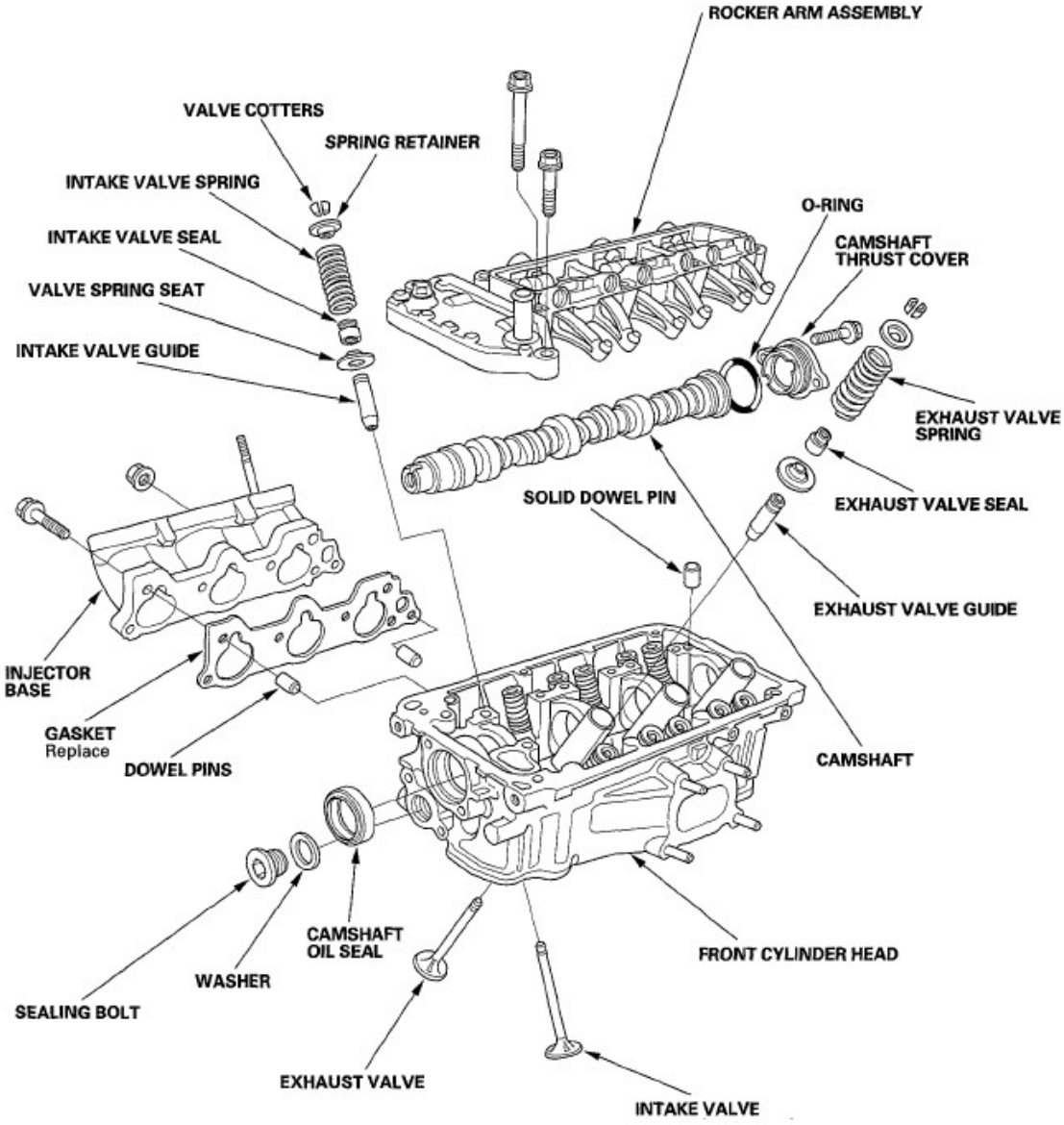


Fig. 4: Identifying Cylinder Head Component Locations - Front
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

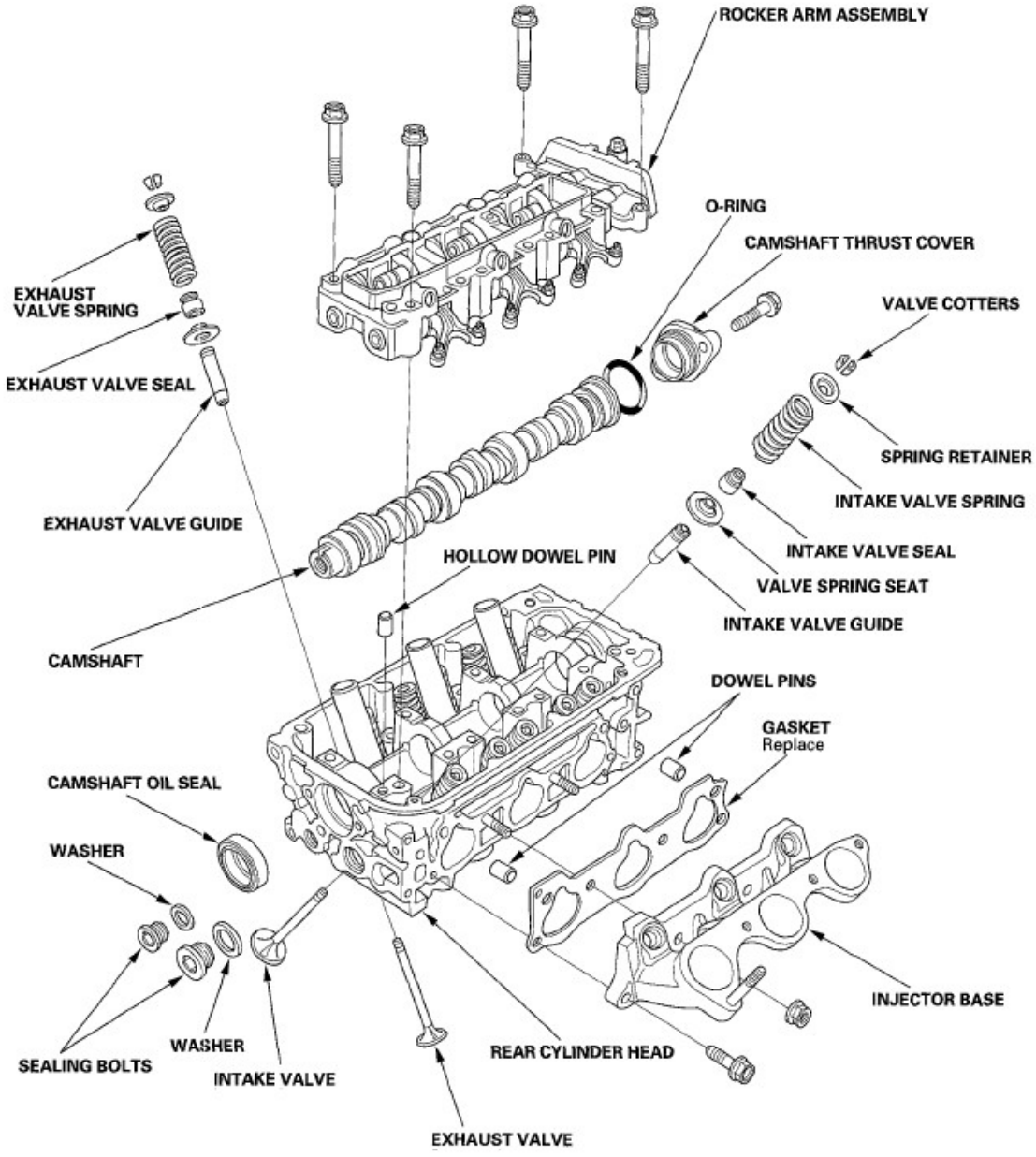


Fig. 5: Identifying Cylinder Head Component Locations - Rear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

ENGINE COMPRESSION INSPECTION

NOTE: After the inspection, you must reset the powertrain control module (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), or press the engine start/stop button to select the OFF mode

3. Connect the Honda Diagnostic System (HDS) to the data link connector (DLC) (see step 2 on **GENERAL TROUBLESHOOTING INFORMATION**)
4. Turn the ignition switch to ON (II), or press the engine start/stop button to select the ON mode
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), or press the engine start/stop button to select the OFF mode
8. Remove the six ignition coils (see **IGNITION COIL REMOVAL/INSTALLATION**)
9. Remove the six spark plugs
10. Attach the compression gauge to a spark plug hole

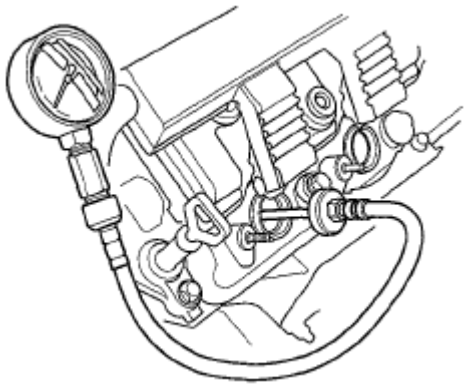


Fig. 6: Attaching Compression Gauge To Spark Plug Hole
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. 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 932 kPa (9.5 kgf/cm^2 , 135 psi)

12. Measure the compression on the remaining cylinders

    Maximum Variation.

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

13. If the compression is not within specifications, 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 gaskets
- Damaged or worn piston rings
- Damaged or worn piston and cylinder bore

14. Remove the compression gauge from the spark plug hole
15. Install the six spark plugs
16. Install the six ignition coils (see **IGNITION COIL REMOVAL/INSTALLATION**)
17. Select PCM reset (see **ECM/PCM RESET**) in the PGM-FI INSPECTION menu to cancel ALL INJECTORS STOP with the HDS

VTEC ROCKER ARM TEST

Special Tools Required

- VTEC air stop tool B 07AAJ-R70A200
- VTEC air adapter 070AJ-001A101
- Air pressure regulator 07AAJ-PNAA101
- VTEC air stop tool A 07AAJ-R70A100

1. Start the engine and let it run for 5 minutes, then turn the ignition switch to LOCK (0), or press the engine start/stop button to select the OFF mode
2. Remove the six spark plugs
3. Remove the cylinder head covers (see **TIMING BELT DRIVE PULLEY REPLACEMENT**)
4. Rotate the crankshaft pulley clockwise, and visually check all the intake primary rocker arms (A) and the intake secondary rocker arms (B) moves independently
    - If the intake primary rocker arm and the intake secondary rocker arm move together, remove the intake primary rocker arm and the intake secondary rocker arm as an assembly, and check that the pistons in the rocker arms move smoothly If any intake rocker arm needs replacing, replace the primary and secondary rocker arms as an assembly, then retest
    - If the intake primary rocker arm and the intake secondary rocker arm move independently, go to step 5

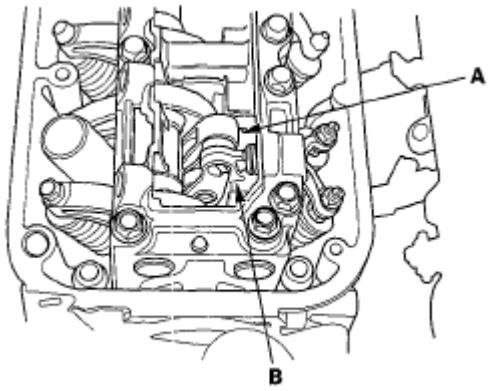


Fig. 7: Identifying Intake Primary Rocker And Intake Secondary Rocker Arms
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Check that the air pressure on the shop air compressor gauge indicates over 981 kPa (10.0 kgf/cm^2 , 142 psi)
6. Inspect the valve clearance (see **VALVE CLEARANCE ADJUSTMENT**)
7. Remove the sealing bolts, then install the VTEC air stop tool B (A) and the VTEC air adapter (B) to the inspection hole, then connect the air pressure regulator (C) as shown

FRONT

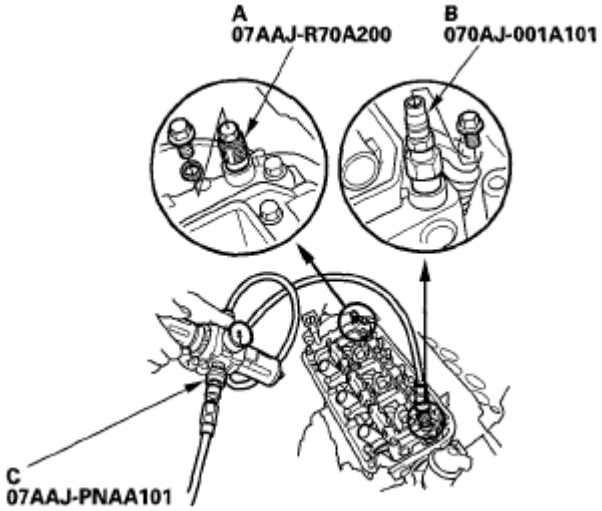


Fig. 8: Connecting Air Pressure Regulator - Front
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

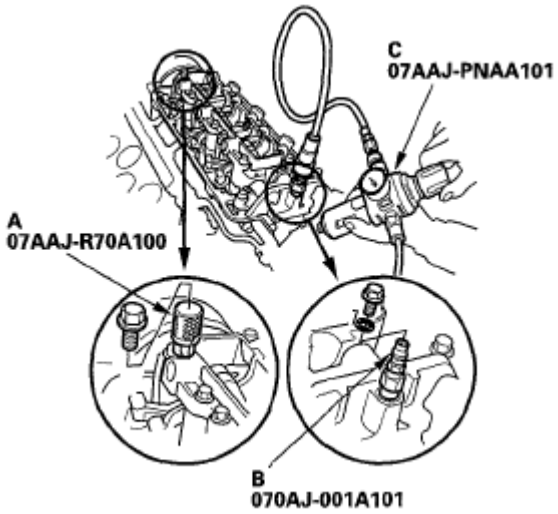


Fig. 9: Connecting Air Pressure Regulator - Rear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

   Specified Air Pressure

   550-690 kPa (5.6-7.0 kgf/cm^2 , 80-100 psi)

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

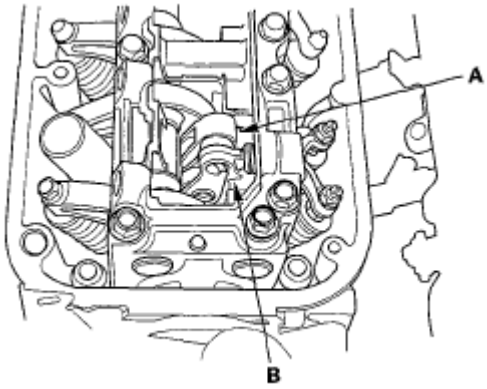


Fig. 10: Identifying Intake Primary Rocker And Intake Secondary Rocker Arms
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Remove the air pressure regulator, the VTEC air adapter, the VTEC air stop tool A, and the VTEC air stop tool B
12. Tighten the sealing bolts to 22 N m (2 2 kgf m, 16 lbf ft)
13. Install the cylinder head covers (see **CYLINDER HEAD COVER INSTALLATION**)
14. Install the six spark plugs

VALVE CLEARANCE ADJUSTMENT

NOTE: Connect the Honda Diagnostic System (HDS) to the data link connector (DLC), and monitor the engine coolant temperature (ECT) sensor 1 Adjust the valve clearance only when the ECT sensor 1 temperature is less than 100°F (38°C)

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

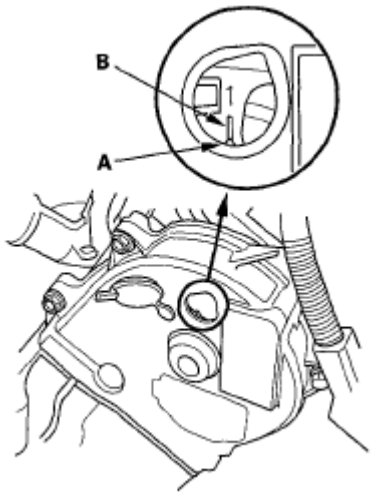


Fig. 11: Aligning Pointer On Front Upper Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

Valve Clearance

Intake 0.20-0.24 mm (0.008-0.009 in)

Exhaust 0.28-0.32 mm (0.011-0.013 in)

REAR

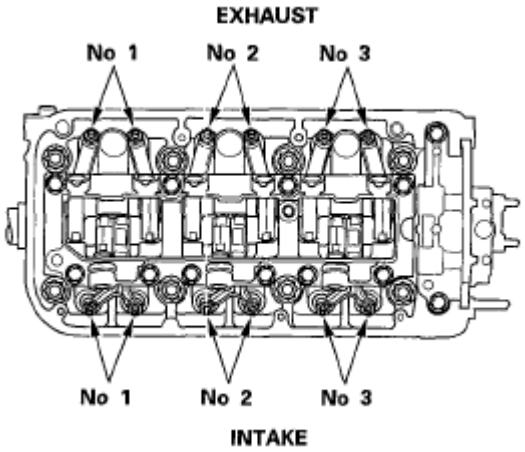


Fig. 12: Identifying Intake And Exhaust Valve Clearance - Rear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

FRONT

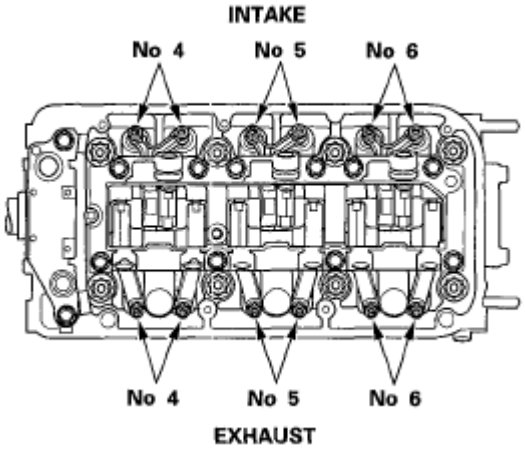


Fig. 13: Identifying Intake And Exhaust Valve Clearance - Front
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

INTAKE

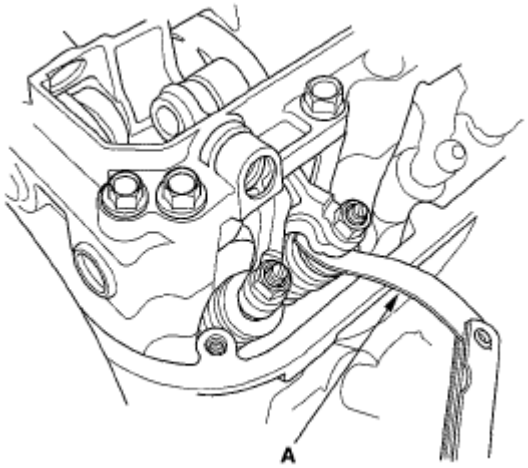


Fig. 14: Checking Intake Valve Clearance
Courtesy of AMERICAN HONDA MOTOR CO., INC.

EXHAUST

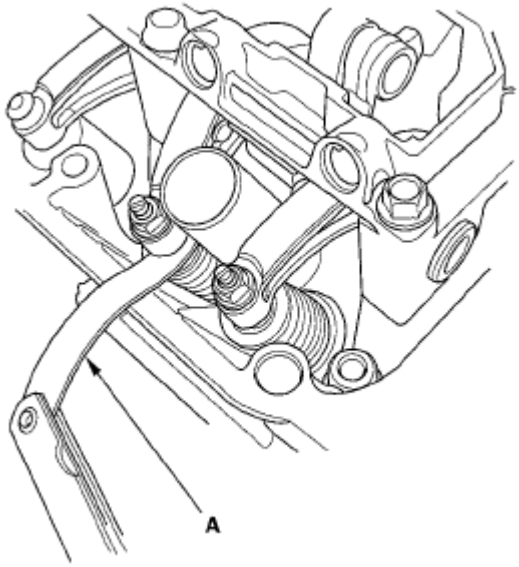


Fig. 15: Checking Exhaust Valve Clearance
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

INTAKE

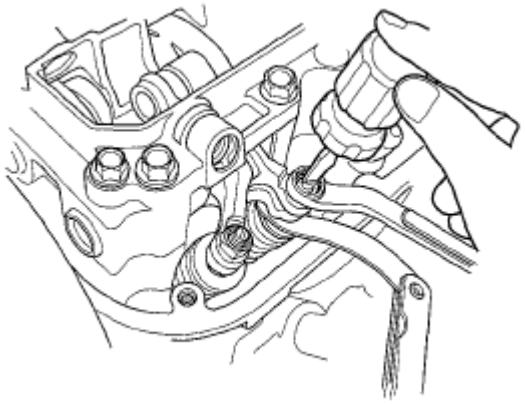


Fig. 16: Adjusting Intake Valve Screw
Courtesy of AMERICAN HONDA MOTOR CO., INC.

EXHAUST

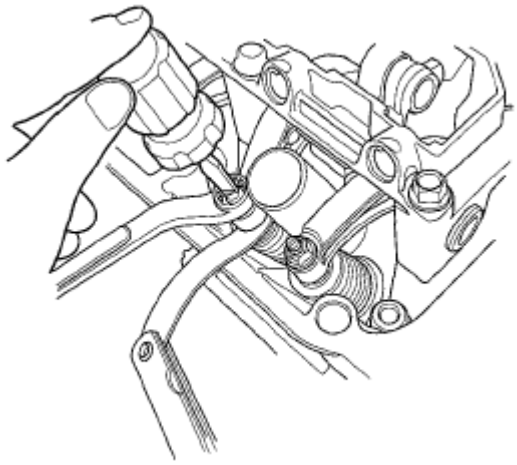


Fig. 17: Adjusting Exhaust Valve Screw
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

Specified Torque

Intake 20 N m (2 0 kgf m, 14 lbf ft)

Apply new engine oil to the nut threads

Exhaust 14 N m (1 4 kgf m, 10 lbf ft)

Apply new engine oil to the nut threads

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

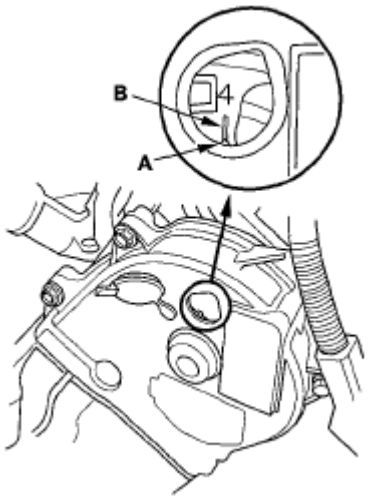


Fig. 18: Identifying Pointer On Front Upper Cover With No 4 Piston TDC Mark On Front Camshaft Pulley
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

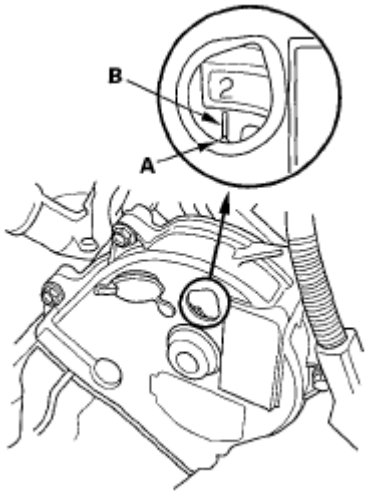


Fig. 19: Identifying Pointer On Front Upper Cover With No 2 Piston TDC Mark On Front Camshaft Pulley
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

mark (B) on the front camshaft pulley

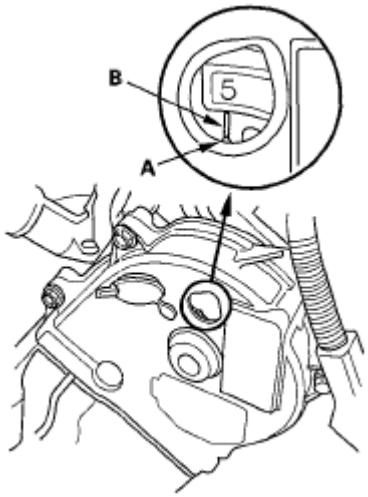


Fig. 20: Identifying Pointer On Front Upper Cover With No 5 Piston TDC Mark On Front Camshaft Pulley
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

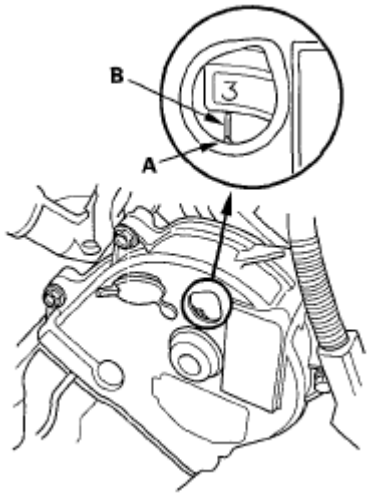


Fig. 21: Identifying Pointer On Front Upper Cover With No 3 Piston TDC Mark On Front Camshaft Pulley
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

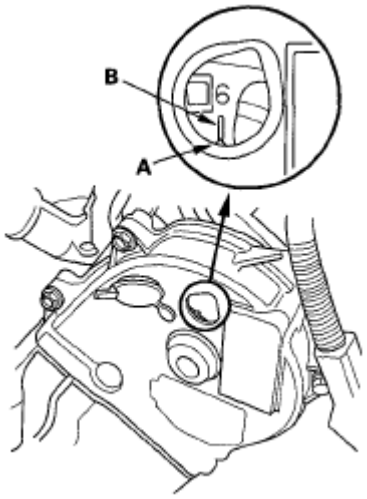


Fig. 22: Identifying Pointer On Front Upper Cover With No 6 Piston TDC Mark On Front Camshaft Pulley
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

CRANKSHAFT PULLEY REMOVAL AND INSTALLATION

Special Tools Required

- Handle, 6-25-660L 07JAB-001020B
- Holder attachment, 50 mm, offset 07MAB-PY3010A
- Socket, 19 mm 07JAA-001020A, or equivalent

REMOVAL

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

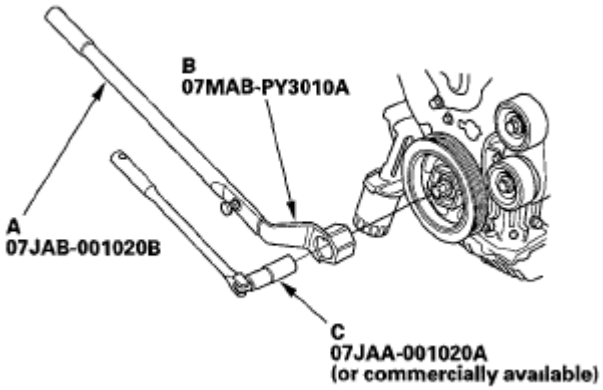


Fig. 23: Identifying Holder Handle And Holder Attachment
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

INSTALLATION

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

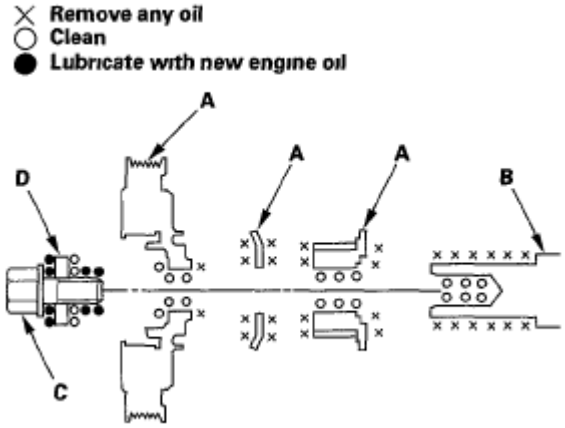


Fig. 24: Identifying Lubricate Applying Area
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Install the crankshaft pulley, and tighten the bolt Do not use an impact wrench
    1. Hold the pulley with the holder handle (A) and the holder attachment (B) Tighten the bolt to 64 N m (6 5 kgf m, 47 lbf ft) with a torque wrench and a 19 mm socket (C)
    2. Mark the bolt head (D) and the crankshaft pulley (E) as shown, then tighten the bolt an additional 60° (The mark on the bolt head lines up with the mark on the crankshaft pulley)

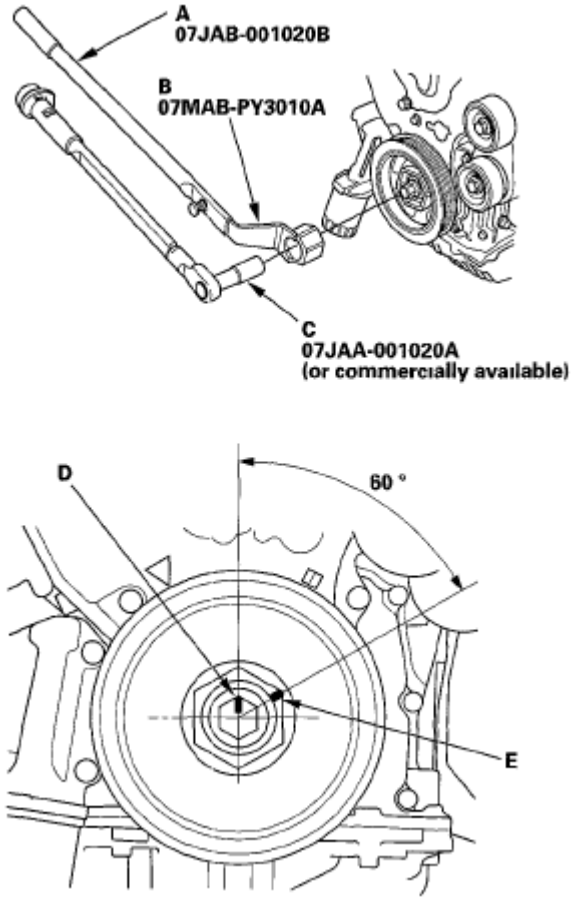


Fig. 25: Identifying Holder Handle And Holder Attachment
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

TIMING BELT INSPECTION

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

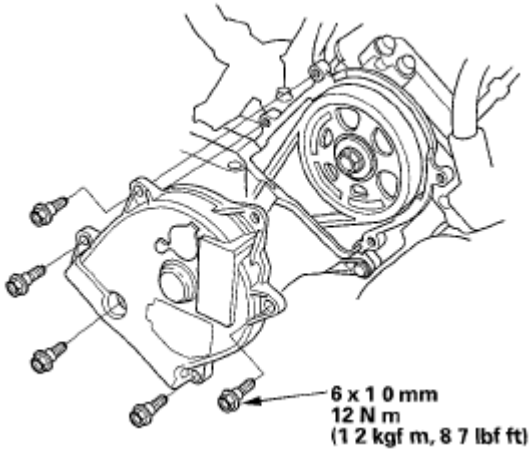


Fig. 26: Identifying Front Upper Cover Bolts With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

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

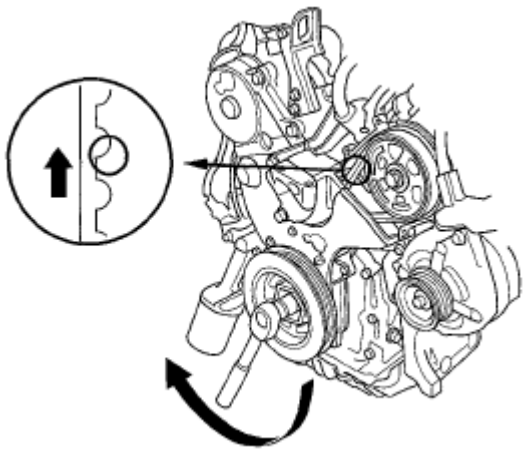


Fig. 27: Inspecting Timing Belt For Cracks
Courtesy of AMERICAN HONDA MOTOR CO., INC.

TIMING BELT REMOVAL

1. Remove the engine compartment covers (see **ENGINE COMPARTMENT COVER REPLACEMENT**)
2. Turn the crankshaft so its white mark (A) lines up with the pointer (B)

NOTE: The other pointer (C) is not used

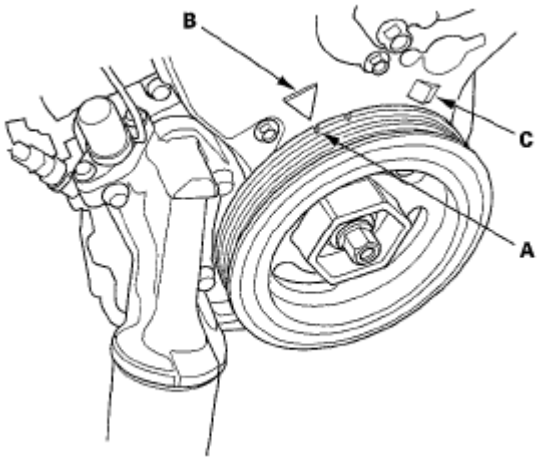


Fig. 28: Identifying Crankshaft Pulley Timing Mark Location
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

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

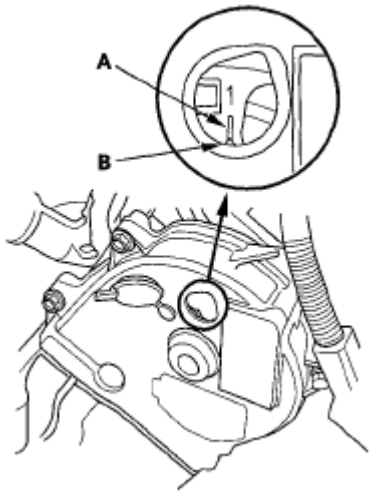


Fig. 29: Identifying No 1 Piston (TDC) Mark On Front Camshaft Pulley And Pointer On Front Upper Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

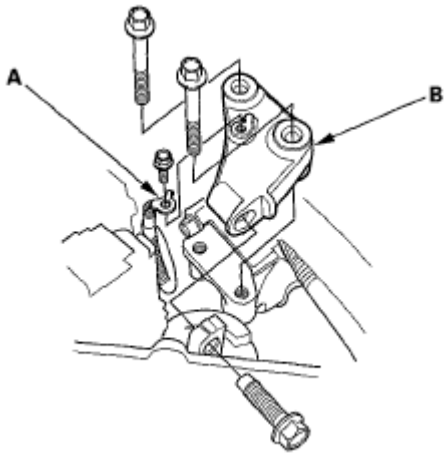


Fig. 30: Identifying Engine Mount Bracket And Ground Cable
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

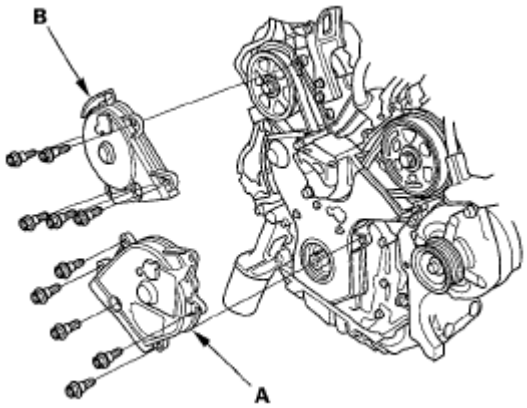


Fig. 31: Identifying Front And Rear Timing Belt Upper Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Remove the lower cover

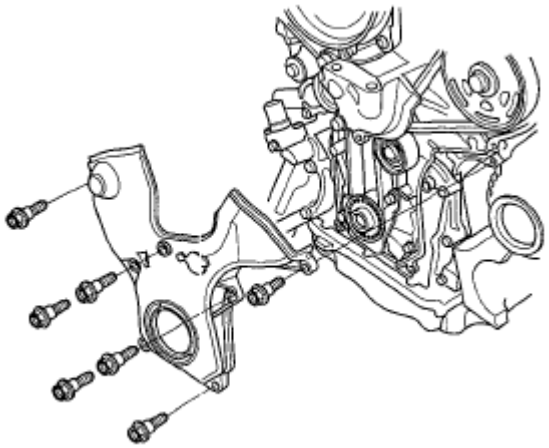


Fig. 32: Identifying Timing Belt Lower Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

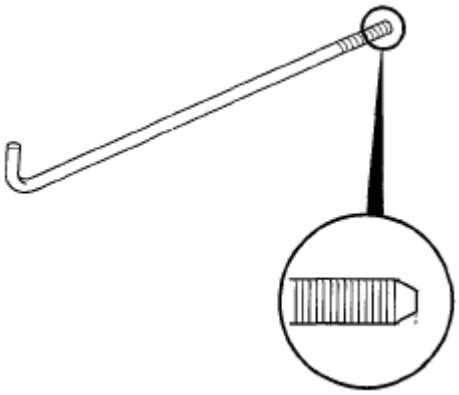


Fig. 33: Identifying Battery Clamp Bolts Grind Area
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

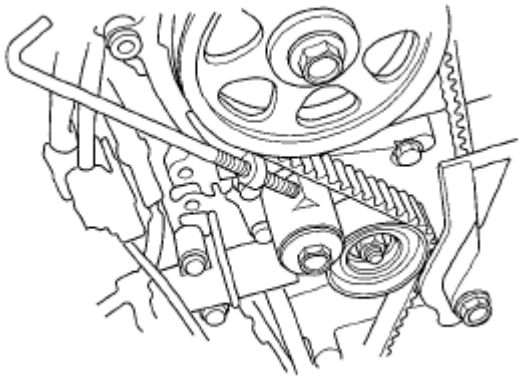


Fig. 34: Identifying Battery Clamp Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. Remove the timing belt guide plate (A)

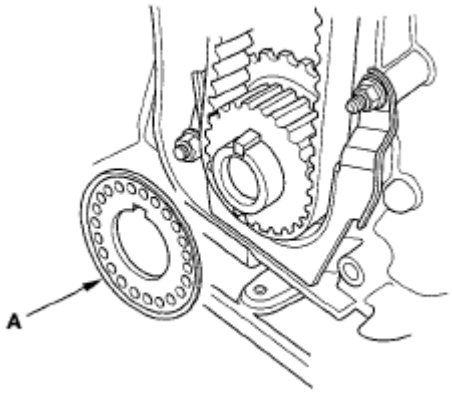


Fig. 35: Identifying Timing Belt Guide Plate
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

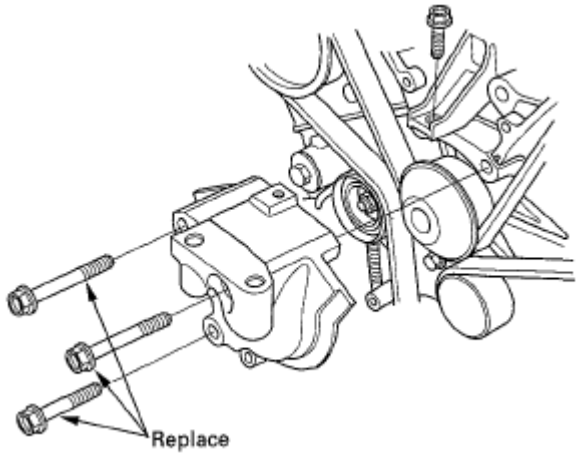


Fig. 36: Identifying Engine Mount Bracket With Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

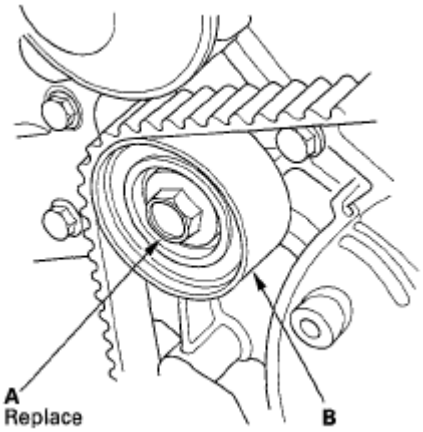


Fig. 37: Identifying Idler Pulley With Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

TIMING BELT INSTALLATION

NOTE: The following procedure is for installing a used timing belt If you are installing a new belt, refer to the timing belt replacement procedure (see TIMING BELT REPLACEMENT)

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

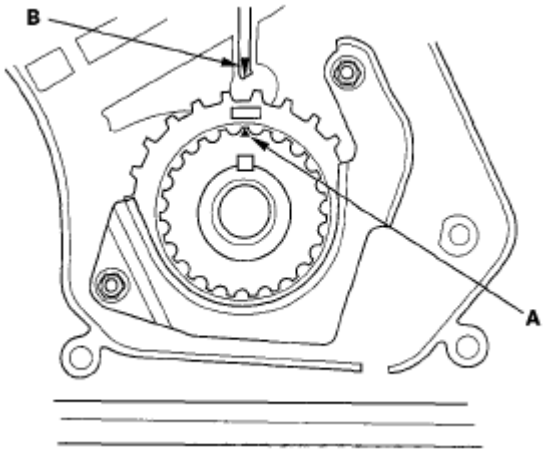


Fig. 38: Identifying TDC Mark On Tooth Of Timing Belt Drive Pulley With Pointer On Oil Pump
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

FRONT

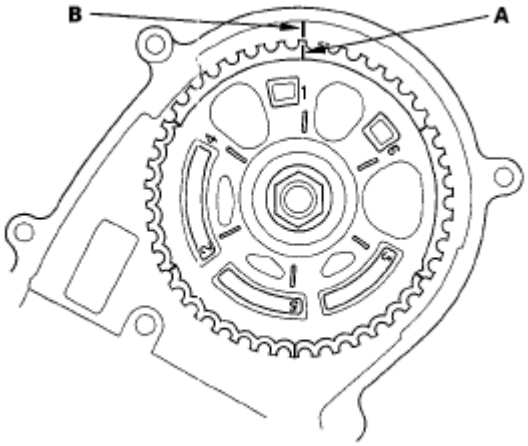


Fig. 39: Identifying TDC Marks On Camshaft Pulleys With Pointers On Back Covers - Front
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

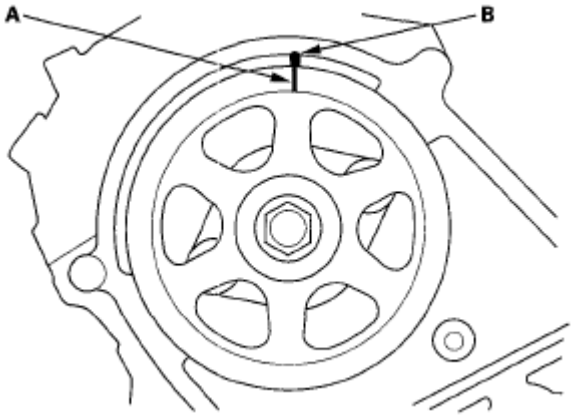


Fig. 40: Identifying TDC Marks On Camshaft Pulleys With Pointers On Back Covers - Rear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

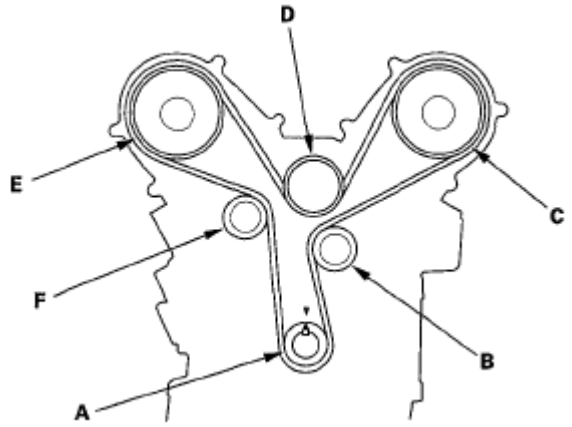


Fig. 41: Identifying Timing Belt Installation Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Tighten the idler pulley bolt

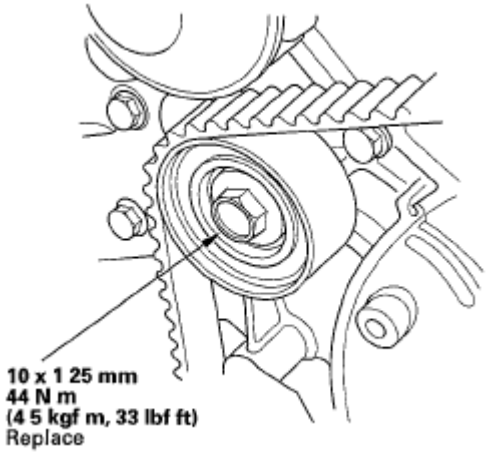


Fig. 42: Identifying Idler Pulley Bolt With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Remove the battery clamp bolt from the back cover

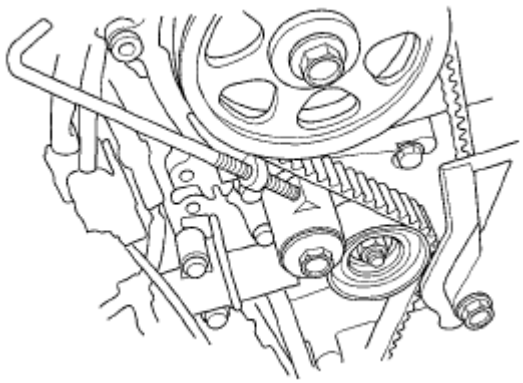


Fig. 43: Identifying Battery Clamp Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Install the lower half of the side engine mount bracket

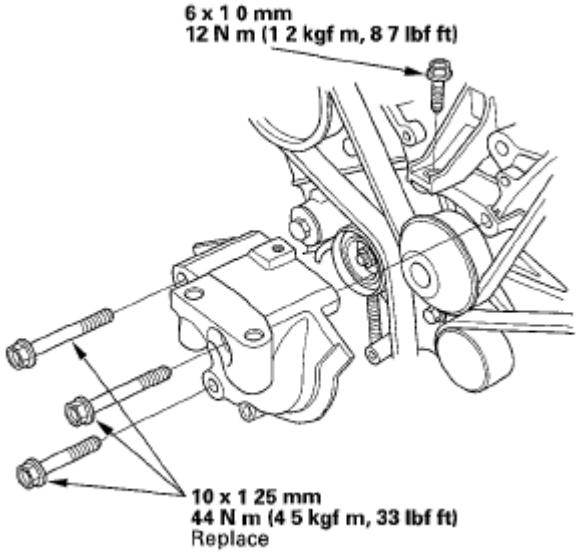


Fig. 44: Identifying Engine Mount Bracket Bolts With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Install the timing belt guide plate as shown

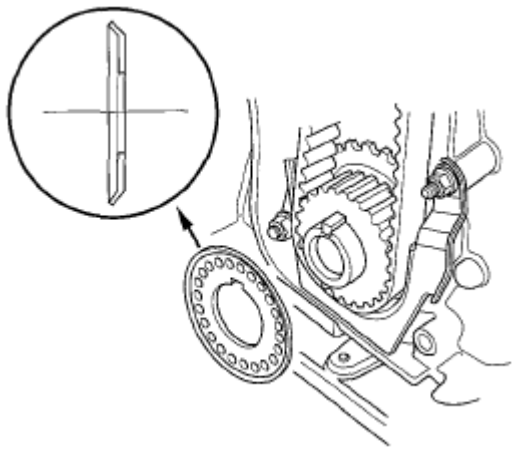


Fig. 45: Identifying Timing Belt Guide Plate
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Install the lower cover

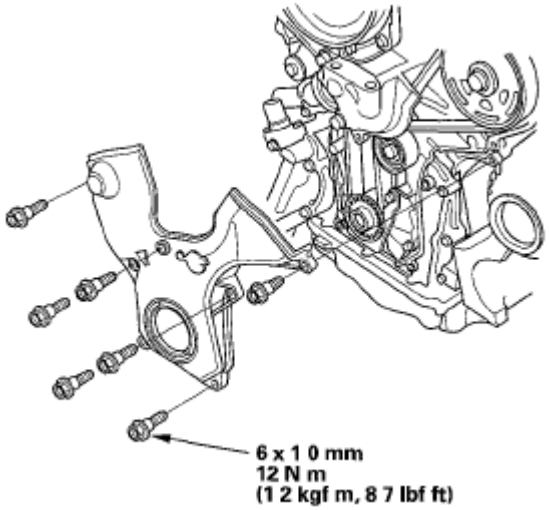


Fig. 46: Identifying Lower Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

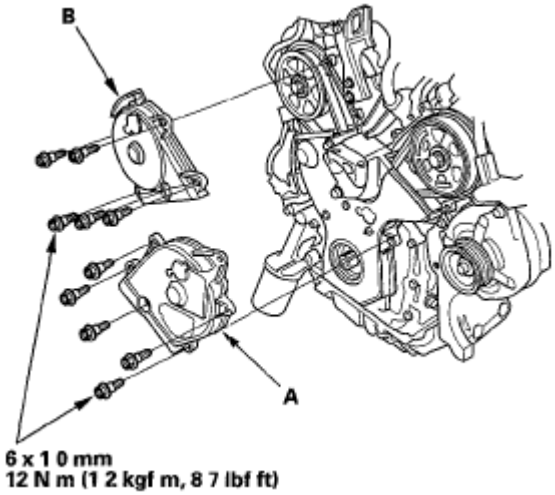


Fig. 47: Identifying Front And Rear Upper Cover Bolts With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

NOTE: The other pointer (C) is not used

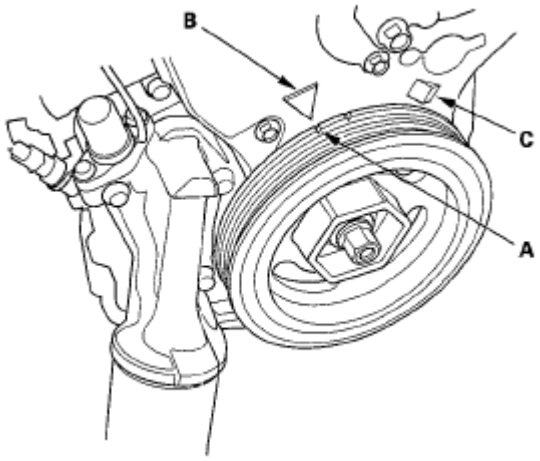


Fig. 48: Identifying Timing Mark Location
Courtesy of AMERICAN HONDA MOTOR CO., INC.

16. Check the camshaft pulley marks

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

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

FRONT

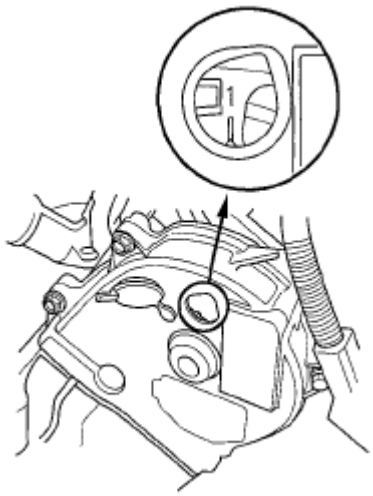


Fig. 49: Identifying Camshaft Pulley Marks Location - Front
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

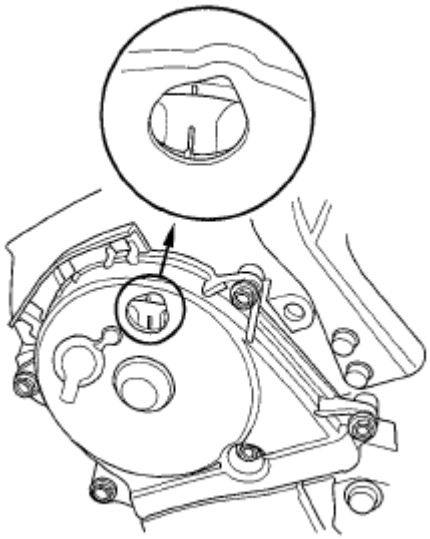


Fig. 50: Identifying Camshaft Pulley Marks Location - Rear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

17. Install the upper half of the side engine mount bracket (A), then tighten the mounting bolts in the numbered sequence shown

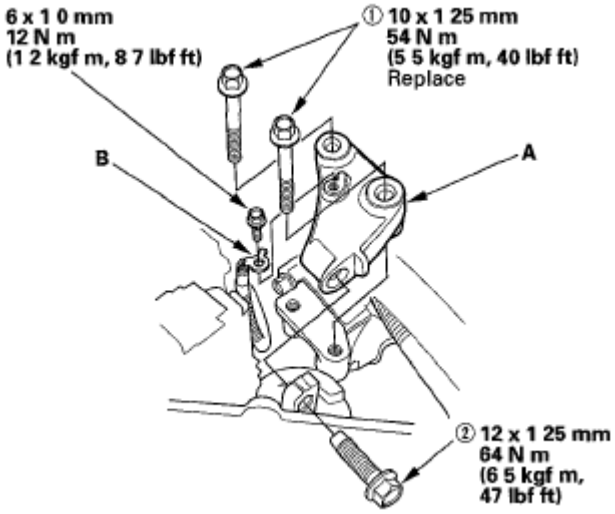


Fig. 51: Identifying Engine Mount Bracket Bolts Tightening Sequence With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

18. Install the ground cable (B)
19. Install the drive belt auto-tensioner (see **DRIVE BELT AUTO-TENSIONER REPLACEMENT**)
20. Install the splash shield (see **FRONT SPLASH SHIELD REPLACEMENT**)
21. Install the right front wheel
22. Install the engine compartment covers (see **ENGINE COMPARTMENT COVER REPLACEMENT**)
23. Do the crankshaft position (CKP) pattern clear/CKP pattern learn procedure (see **CKP PATTERN**

CLEAR/CKP PATTERN LEARN)

TIMING BELT REPLACEMENT

NOTE: The following procedure is for installing a new timing belt If you are installing a used belt, refer to the timing belt installation procedure (see TIMING BELT INSTALLATION)

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

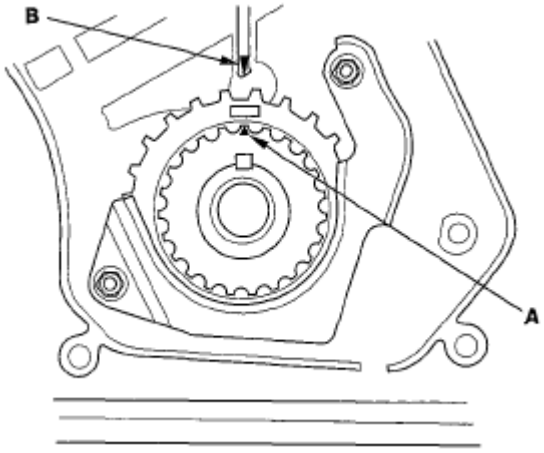


Fig. 52: Identifying TDC Mark On Tooth Of Timing Belt Drive Pulley With Pointer On Oil Pump
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

FRONT

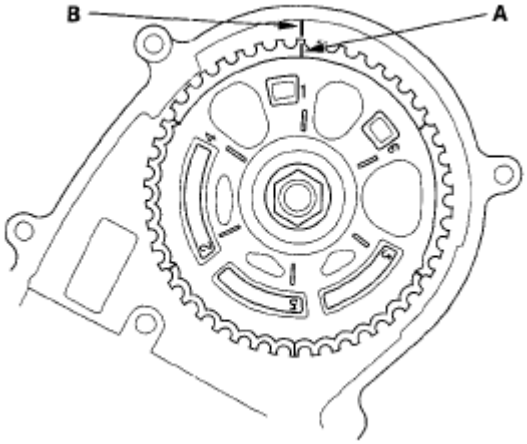


Fig. 53: Identifying TDC Marks On Camshaft Pulleys With Pointers On Back Covers - Front
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

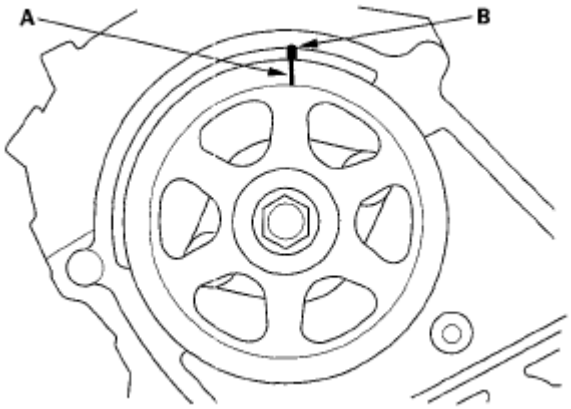


Fig. 54: Identifying TDC Marks On Camshaft Pulleys With Pointers On Back Covers - Rear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

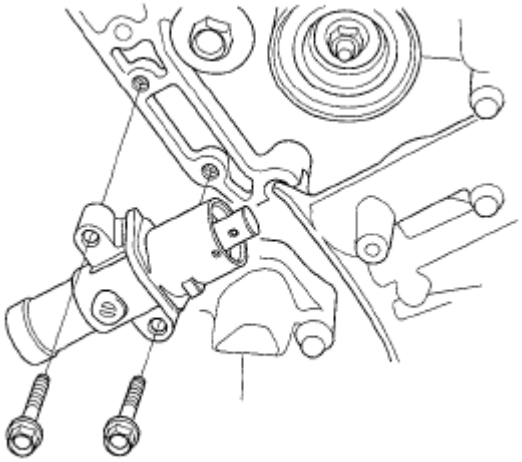


Fig. 55: Identifying Auto-Tensioner Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

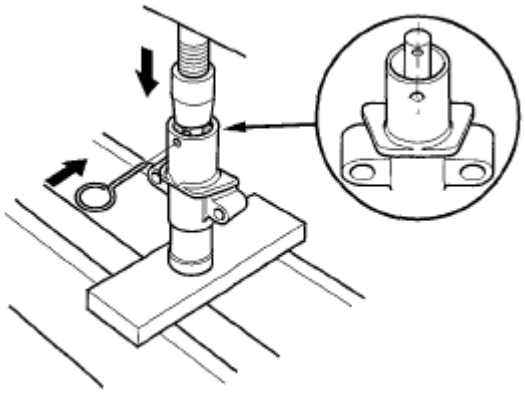


Fig. 56: Aligning Holes On Rod And Housing Of Auto-Tensioner
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Use a hydraulic press to slowly compress the auto-tensioner Insert a 2.0 mm (0.08 in) pin through the housing and the rod

NOTE: The compression pressure should not exceed 9,800 N (1,000 kgf, 2,200 lbf)

9. Install the auto-tensioner

NOTE: Make sure the pin stays in place

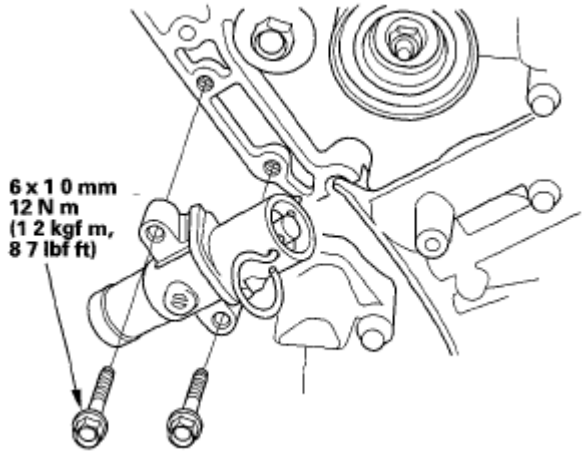


Fig. 57: Identifying Auto-Tensioner With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

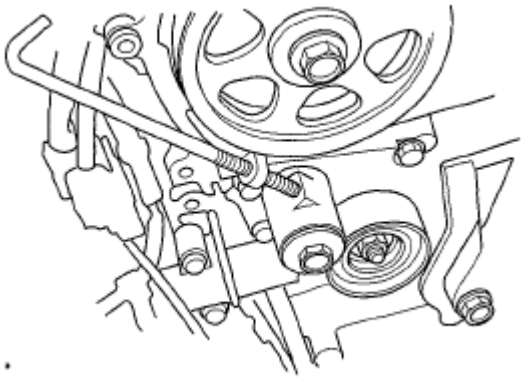


Fig. 58: Identifying Battery Clamp Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

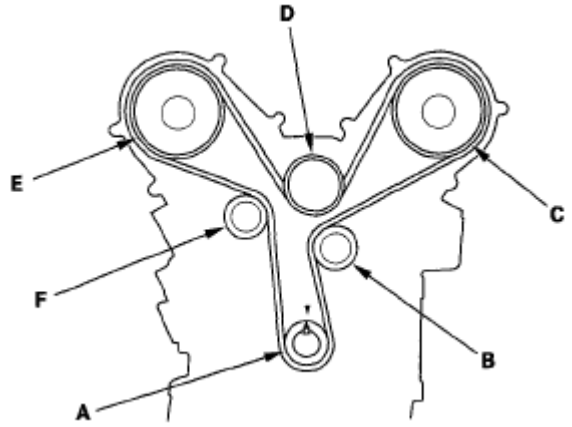


Fig. 59: Identifying Timing Belt Installation Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Tighten the idler pulley bolt

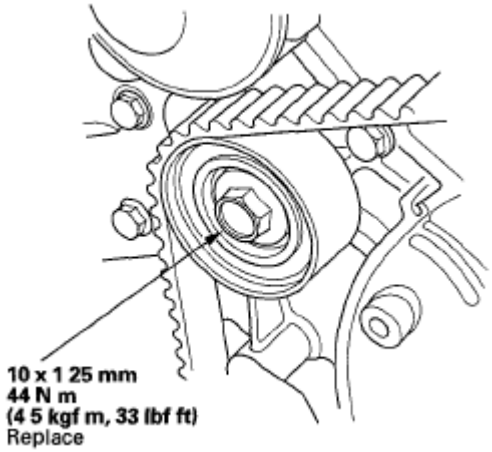


Fig. 60: Identifying Idler Pulley Bolt With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. Remove the pin from the auto-tensioner

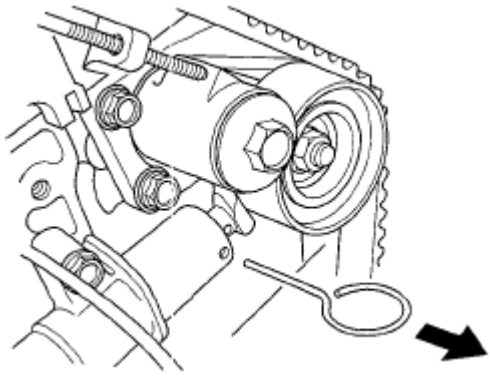


Fig. 61: Removing Pin From Auto-Tensioner
Courtesy of AMERICAN HONDA MOTOR CO., INC.

15. Remove the battery clamp bolt from the back cover
16. Install the lower half of the side engine mount bracket

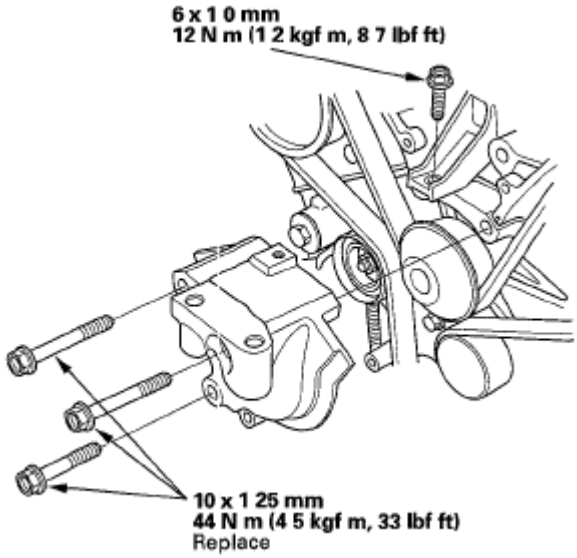


Fig. 62: Identifying Engine Mount Bracket Bolts With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

17. Install the timing belt guide plate as shown

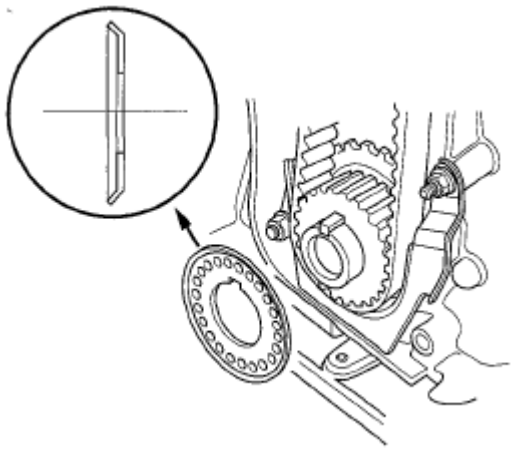


Fig. 63: Identifying Timing Belt Guide Plate
Courtesy of AMERICAN HONDA MOTOR CO., INC.

18. Install the lower cover

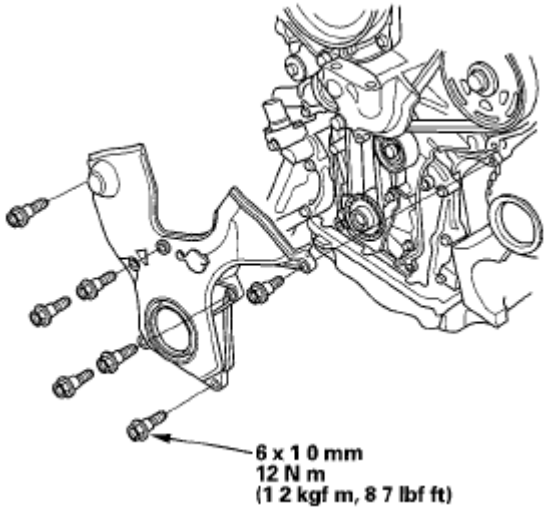


Fig. 64: Identifying Lower Cover With Bolts With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

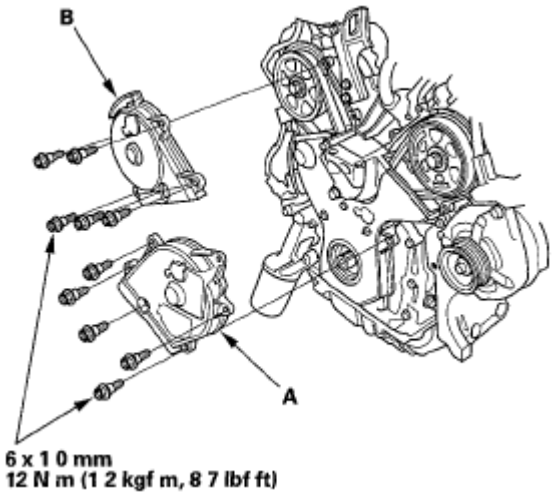


Fig. 65: Identifying Front And Rear Upper Cover With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

NOTE: The other pointer (C) is not used

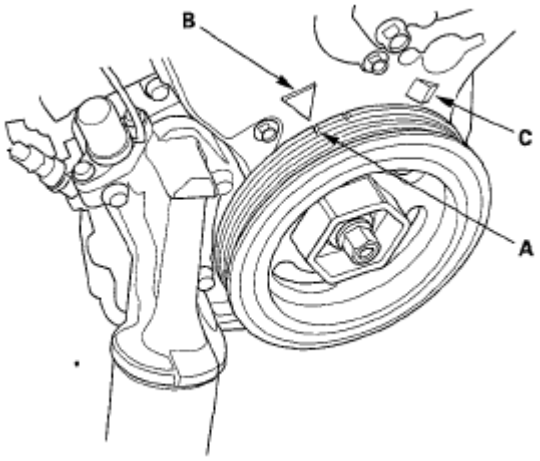


Fig. 66: Identifying Crankshaft Pulley Mark Location
Courtesy of AMERICAN HONDA MOTOR CO., INC.

23. Check the camshaft pulley marks

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

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

FRONT

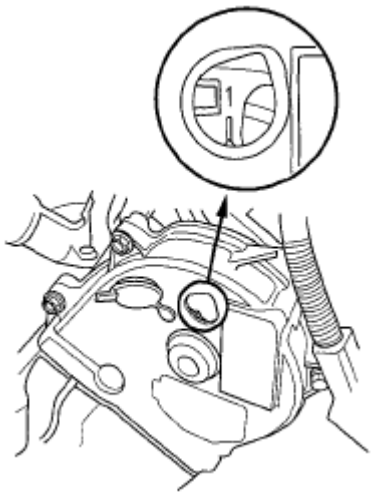


Fig. 67: Aligning Camshaft Pulley Marks - Front
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

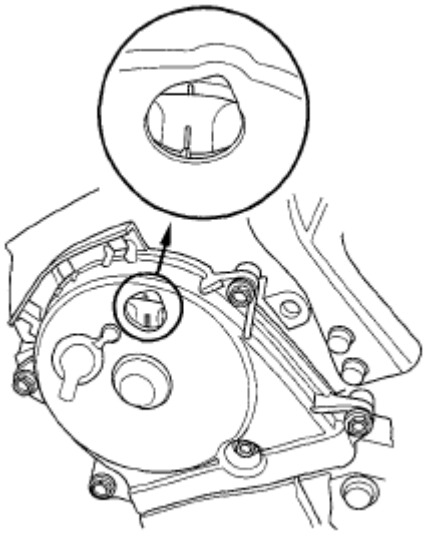


Fig. 68: Aligning Camshaft Pulley Marks - Rear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

24. Install the upper half of the side engine mount bracket (A), then tighten the mounting bolts in the numbered sequence shown

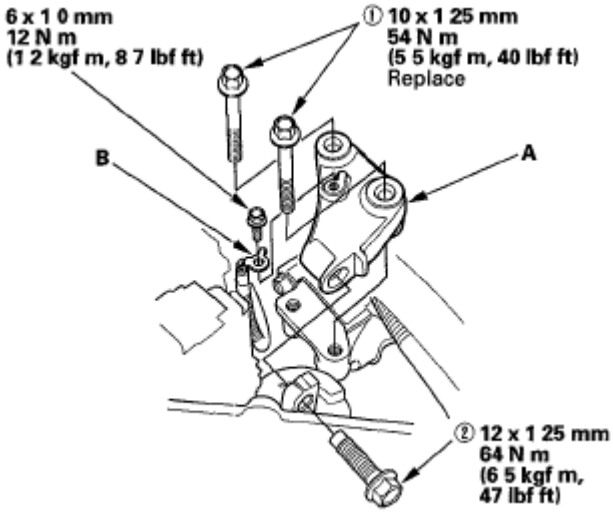


Fig. 69: Identifying Engine Mount Bracket Bolts With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

25. Install the ground cable (B)
26. Install the drive belt auto-tensioner (see **DRIVE BELT AUTO-TENSIONER REPLACEMENT**)
27. Install the splash shield (see **FRONT SPLASH SHIELD REPLACEMENT**)
28. Install the right front wheel
29. Install the engine compartment covers (see **ENGINE COMPARTMENT COVER REPLACEMENT**)
30. Do the crankshaft position (CKP) pattern clear/CKP pattern learn procedure (see **CKP PATTERN**

CLEAR/CKP PATTERN LEARN)

TIMING BELT ADJUSTER REPLACEMENT

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

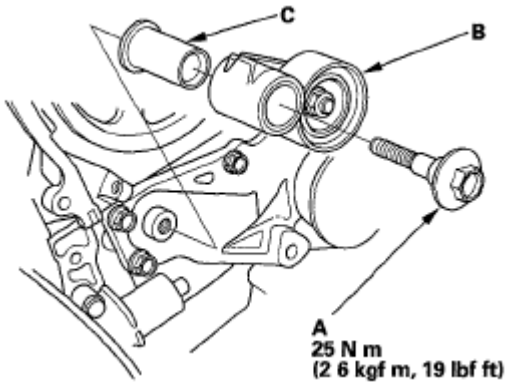


Fig. 70: Identifying Timing Belt Adjuster And Collar With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

TIMING BELT DRIVE PULLEY REPLACEMENT

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

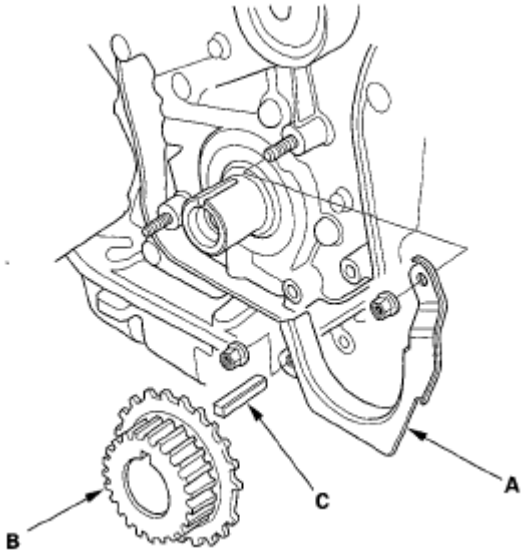


Fig. 71: Identifying Timing Belt Drive Pulley And Key
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

CYLINDER HEAD COVER REMOVAL

FRONT

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

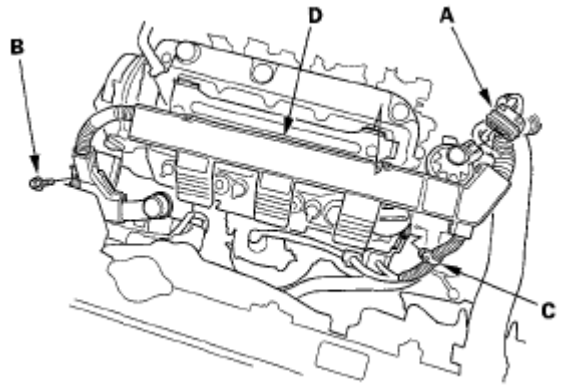


Fig. 72: Identifying Harness Holder Mounting Bolt And Harness Clamp
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

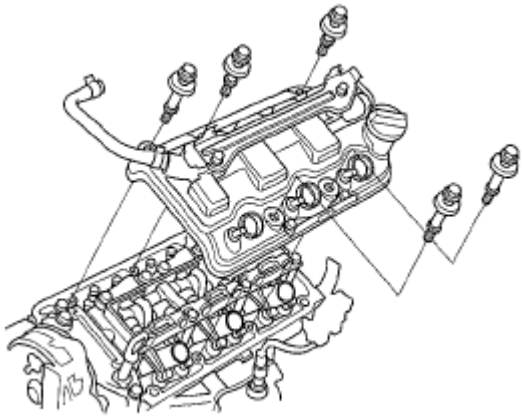


Fig. 73: Identifying Front Cylinder Head Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

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

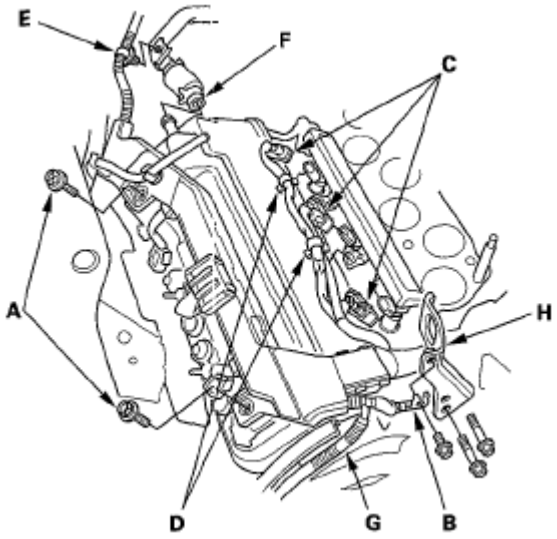


Fig. 74: Identifying Harness Holder Mounting Bolts And Engine Ground Cable
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

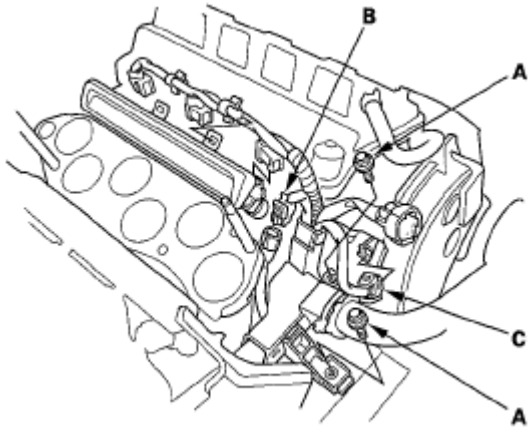


Fig. 75: Identifying Knock Sensor And Camshaft Position Sensor Connectors
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Remove the rear cylinder head cover

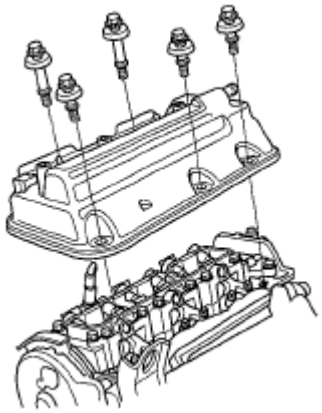


Fig. 76: Identifying Rear Cylinder Head Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

CYLINDER HEAD COVER INSTALLATION

FRONT

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

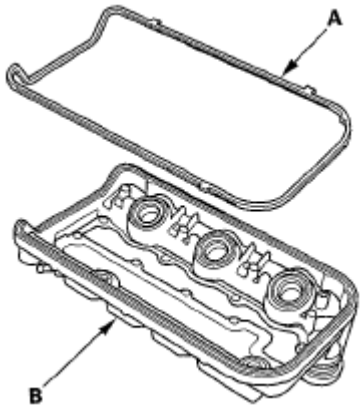


Fig. 77: Identifying Head Cover Gasket
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

NOTE:

- **If you apply liquid gasket P/N 08718-0012, the component must be**

installed within 4 minutes

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

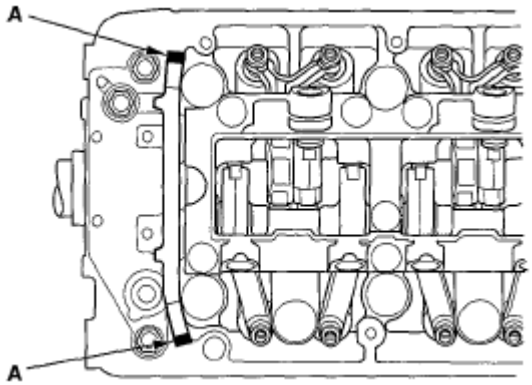


Fig. 78: Identifying Liquid Gasket Applying Area
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

NOTE:

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

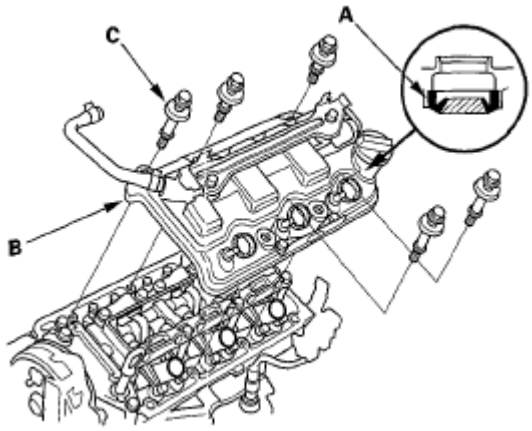


Fig. 79: Identifying Spark Plug Seals Applying Area
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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 tighten all bolts, in sequence, 12 N m (1 2 kgf m, 8 7 lbf ft)

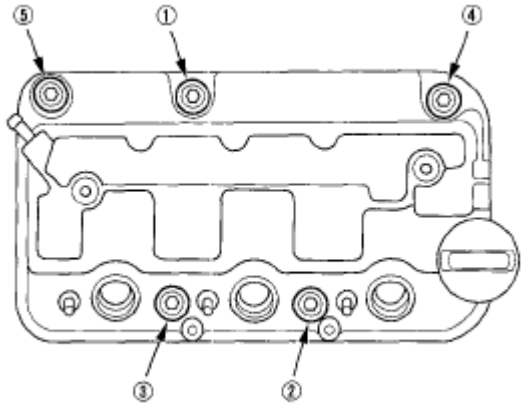


Fig. 80: Identifying Bolts Tightening Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

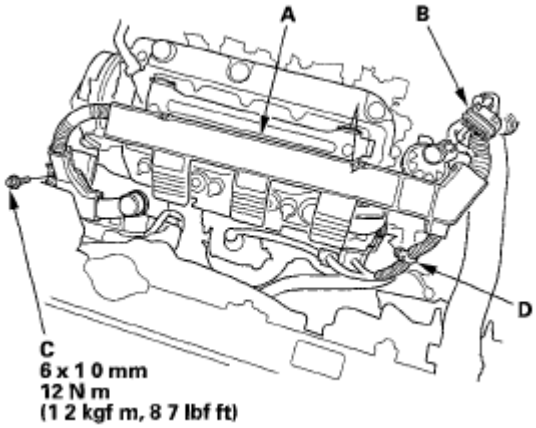


Fig. 81: Identifying Harness Holder And Harness Holder Mounting Bolt With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

REAR

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

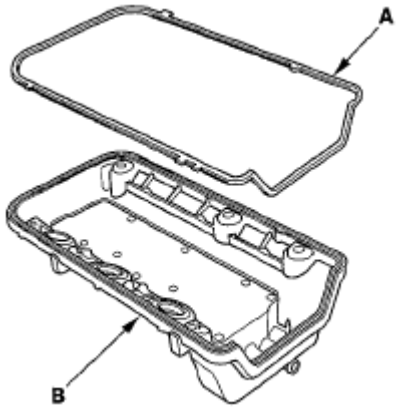


Fig. 82: Identifying Head Cover Gasket
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

NOTE:

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

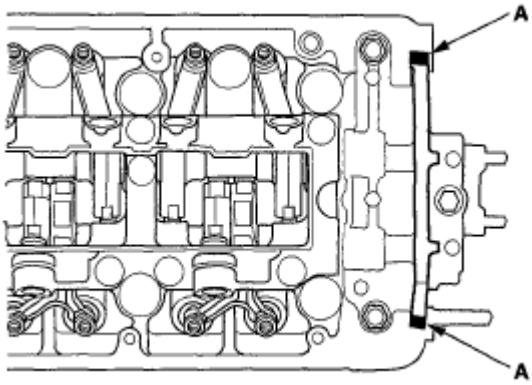


Fig. 83: Identifying Liquid Gasket Applying Area
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

NOTE:

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

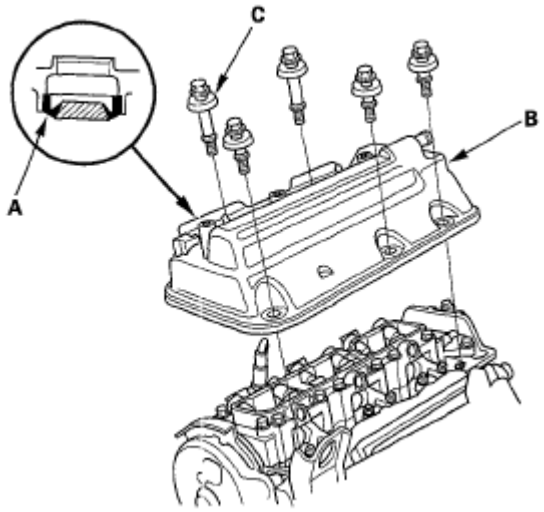


Fig. 84: Identifying Rear Cylinder Head Cover And Spark Plug Seals
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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 tighten all bolts, in sequence, 12 N m (1 2 kgf m, 8 7 lbf ft)

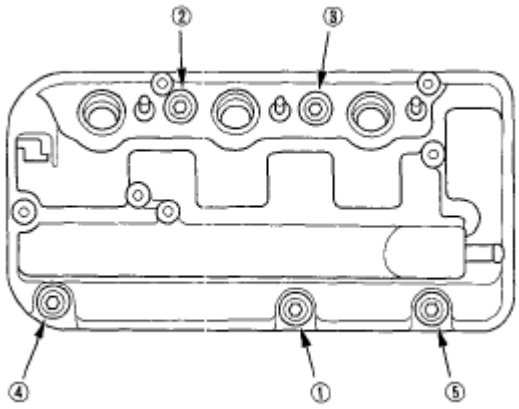


Fig. 85: Identifying Cylinder Head Cover Bolts Tightening Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

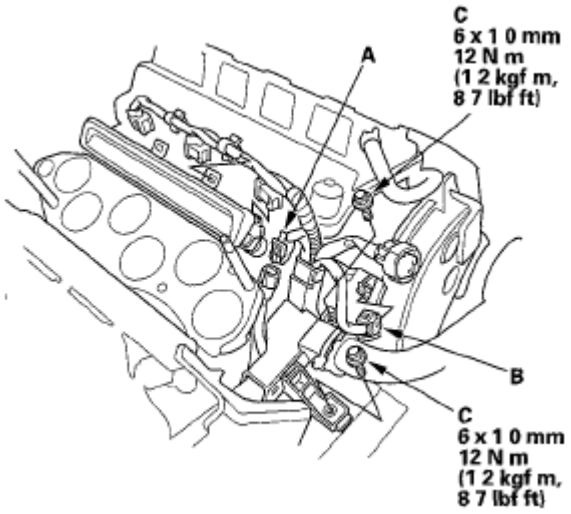


Fig. 86: Identifying Knock Sensor Connector With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Install the engine hanger bracket (A)

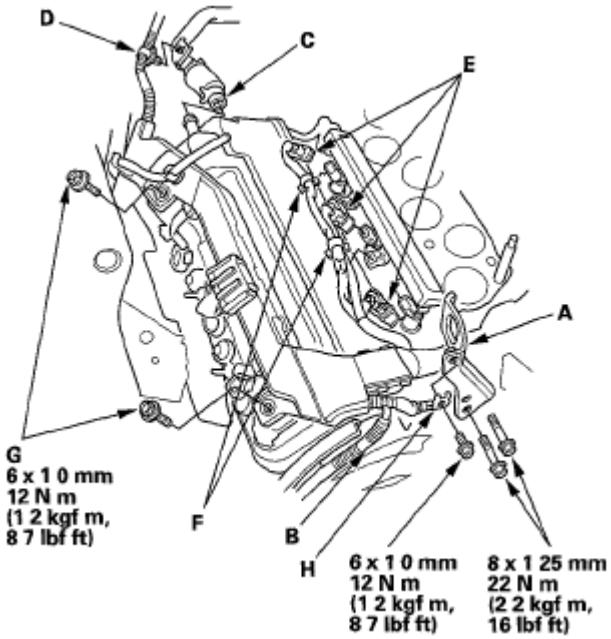


Fig. 87: Identifying Engine Hanger Bracket And Breather Hose With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Install the harness (B) to the upper cover
14. Connect the breather hose (C) and install the harness clamp (D)
15. Reconnect the three injector connectors (E) and the two harness clamps (F)
16. Install the harness holder mounting bolts (G) and the engine ground cable (H)
17. Install the three ignition coils to the rear cylinder head (see **IGNITION COIL**

REMOVAL/INSTALLATION)

18. Install the intake manifold (see **INSTALLATION**)
19. Install the strut brace (see **FRAME BRACE REPLACEMENT**)

CYLINDER HEAD REMOVAL

NOTE:

- **Use fender covers to avoid damaging painted surfaces**
- **To avoid damaging the wiring and terminals, unplug the wiring connectors carefully while holding the connector portion**
- **Connect the Honda Diagnostic System (HDS) to the data link connector (DLC), and monitor the engine coolant temperature (ECT) sensor 1 To avoid damaging the cylinder head, wait until the ECT sensor 1 temperature drops below 100°F (38°C) before loosening the cylinder head bolts**
- **Mark all wiring and hoses to avoid misconnection Also, be sure that they do not contact any other wiring or hoses, or interfere with any other parts**

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

LINE/QUICK-CONNECT FITTING REMOVAL)

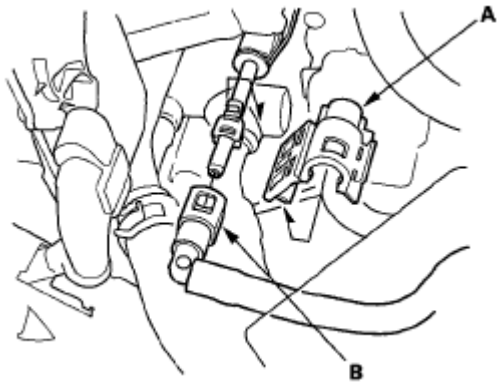


Fig. 88: Identifying Quick-Connect Fitting Cover And Fuel Feed Hose
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Remove the connector bracket from the front cylinder head

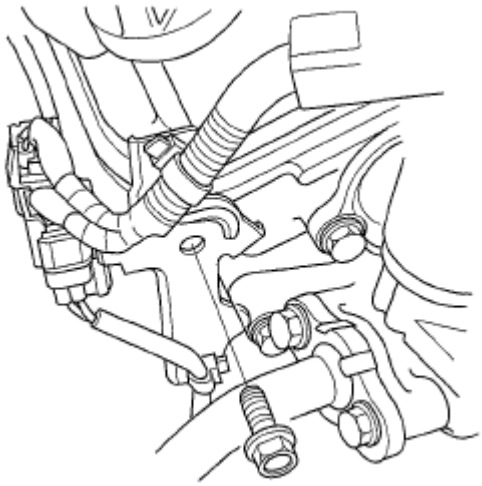


Fig. 89: Identifying Connector Bracket
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

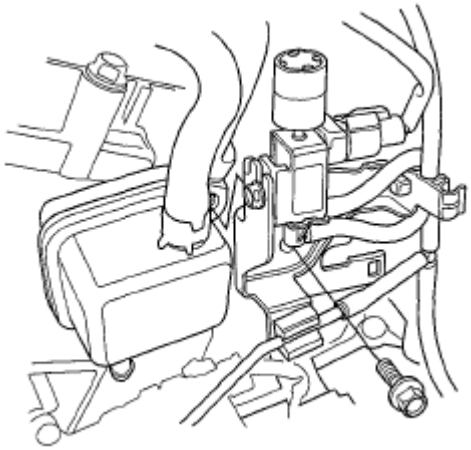


Fig. 90: Identifying Engine Mount Control Solenoid Valve Bracket
Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. Remove the evaporative emission (EVAP) canister joint with the bracket (see 9 under Rear Camshaft Replacement
15. Remove the injector bases (see **INJECTOR BASE REMOVAL AND INSTALLATION**)
16. Remove the water passage (see **WATER PASSAGE REPLACEMENT**)
17. Remove the camshaft pulleys (A) and the back covers (B)

FRONT

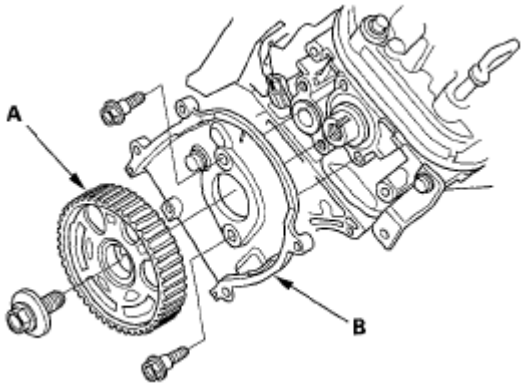


Fig. 91: Identifying Camshaft Pulleys And Back Covers - Front
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

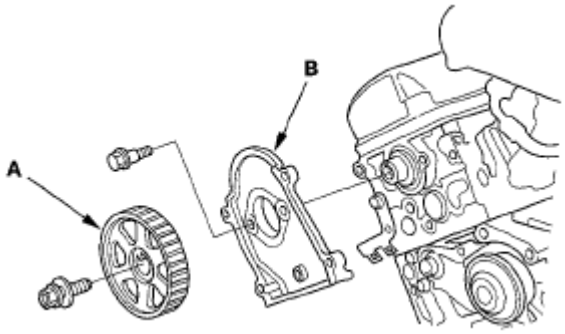


Fig. 92: Identifying Camshaft Pulleys And Back Covers - Rear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

18. Remove the cylinder head covers (see **TIMING BELT DRIVE PULLEY REPLACEMENT**)
19. Remove the cylinder head bolts To prevent warpage, loosen the bolts in sequence 1/3 turn at a time, repeat the sequence until all bolts are loosened

FRONT

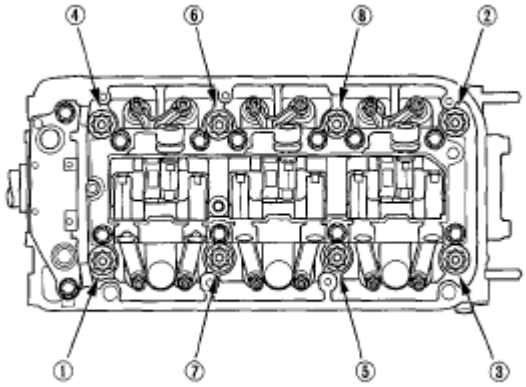


Fig. 93: Identifying Cylinder Head Bolts - Front
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

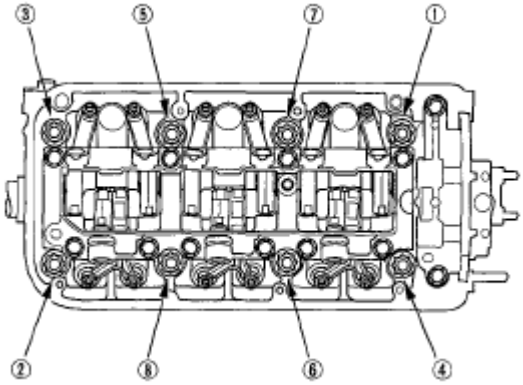


Fig. 94: Identifying Cylinder Head Bolts - Rear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

20. Remove the cylinder heads

CAMSHAFT REPLACEMENT

FRONT

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

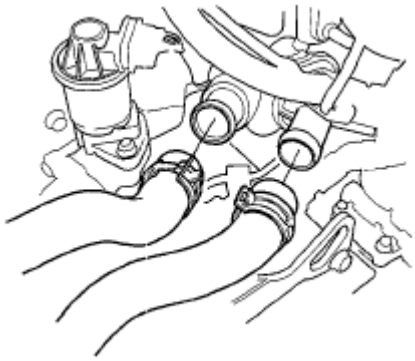


Fig. 95: Identifying Radiator Hoses
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

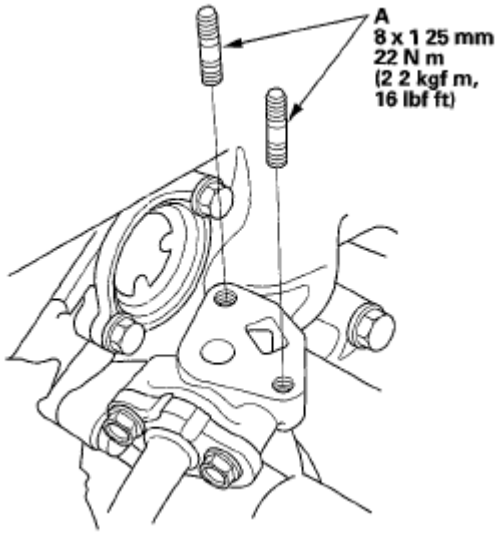


Fig. 96: Identifying EGR Valve Stud Bolts With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

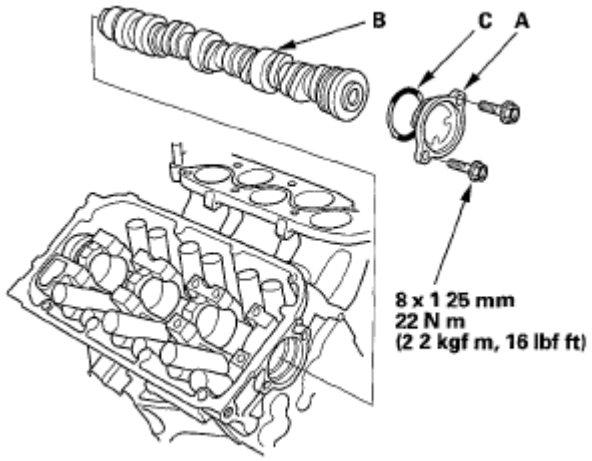


Fig. 97: Identifying Front Camshaft And Thrust Cover With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Install the front camshaft in the reverse order of removal Always use a new O-ring (C) Apply new engine oil to the journals and the cam lobes
12. Apply new engine oil to the threads of the camshaft pulley mounting bolt, then install the front camshaft pulley (see step 14 on **REAR**)
13. Install the front rocker arm assembly, then tighten the mounting bolts (see step 12 on **FRONT**)

14. Install the timing belt (see **TIMING BELT INSTALLATION**)
15. Adjust the valve clearance (see **VALVE CLEARANCE ADJUSTMENT**)
16. Install the EGR valve stud bolts, then install the EGR valve (see **EGR VALVE REPLACEMENT**)
17. Connect the radiator hoses
18. Do the battery installation procedure (see **BATTERY REMOVAL AND INSTALLATION**)
19. Fill the radiator with engine coolant, and bleed the air from the cooling system with the heater valve open (see step 9 on **COOLANT REPLACEMENT**)
20. Install the engine compartment covers (see **ENGINE COMPARTMENT COVER REPLACEMENT**)
21. Do the crankshaft position (CKP) pattern clear/CKP pattern learn procedure (see **CKP PATTERN CLEAR/CKP PATTERN LEARN**)

REAR

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

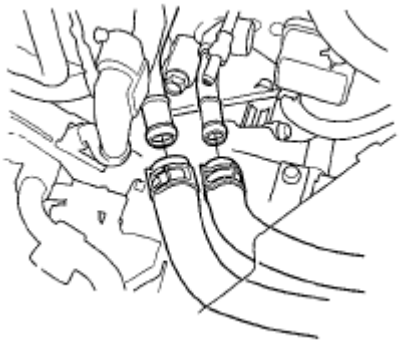


Fig. 98: Identifying Heater Hoses
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Disconnect the evaporative emission (EVAP) canister hose (A), then remove the EVAP canister joint (B)

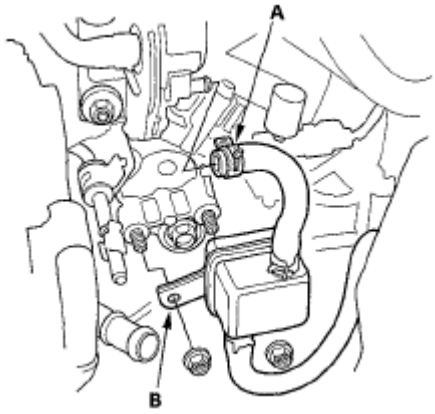


Fig. 99: Identifying Evaporative Emission Canister Hose
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

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

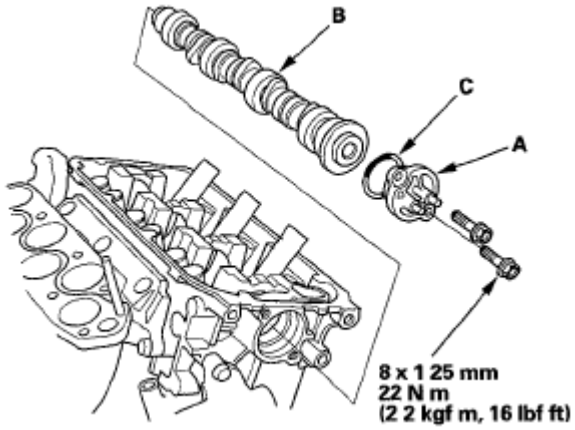


Fig. 100: Identifying Rear Camshaft And Thrust Cover With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. Install the rear camshaft in the reverse order of removal Always use a new O-ring (C) Apply new engine oil to the journals and cam lobes
15. Apply new engine oil to the threads of the camshaft pulley mounting bolt, then install the rear camshaft pulley (see step 14 on **CYLINDER HEAD INSTALLATION**)
16. Install the rear rocker arm assembly, then tighten the mounting bolts (see step 12 on **REAR**)
17. Install the timing belt (see **TIMING BELT INSTALLATION**)
18. Adjust the valve clearance (see **VALVE CLEARANCE ADJUSTMENT**)

19. Install the EVAP canister joint, then connect the EVAP canister hose
20. Connect the heater hoses
21. Connect the fuel feed hose, then install the quick-connect fitting cover (see step 20 on **CYLINDER HEAD INSTALLATION**)
22. Install the air cleaner assembly (see **THROTTLE BODY CLEANING**)
23. Install the under-hood fuse/relay box to the bracket
24. Do the battery installation procedure (see **BATTERY REMOVAL AND INSTALLATION**)
25. Inspect for fuel leaks Turn the ignition switch to ON (II), or press the engine start/stop button to select the ON mode (do not operate the starter) so the fuel pump runs for about 2 seconds and pressurizes the fuel line Repeat this operation three times, then check for fuel leakage at any point in the fuel line
26. Fill the radiator with engine coolant, and bleed the air from the cooling system with the heater valve open (see step 9 on **COOLANT REPLACEMENT**)
27. Install the engine compartment covers (see **ENGINE COMPARTMENT COVER REPLACEMENT**)
28. Do the crankshaft position (CKP) pattern clear/CKP pattern learn procedure (see **CKP PATTERN CLEAR/CKP PATTERN LEARN**)

CYLINDER HEAD INSPECTION FOR WARPAGE

1. Remove the cylinder head (see **CYLINDER HEAD REMOVAL**)
2. Inspect the camshaft (see **CAMSHAFT INSPECTION**)
3. Check the cylinder head for warpage Measure along the edges, and three ways across the center
    - If warpage is less than 0.05 mm (0.002 in), cylinder head resurfacing is not required
    - If warpage is between 0.05 mm (0.002 in) and 0.2 mm (0.008 in), resurface the cylinder head
    - Maximum resurface limit is 0.2 mm (0.008 in) based on a height of 121 mm (4.76 in)

    Cylinder Head Height

    Standard (New) 120.95-121.05 mm

    (4.762-4.766 in)

    Service Limit 120.8 mm (4.756 in)

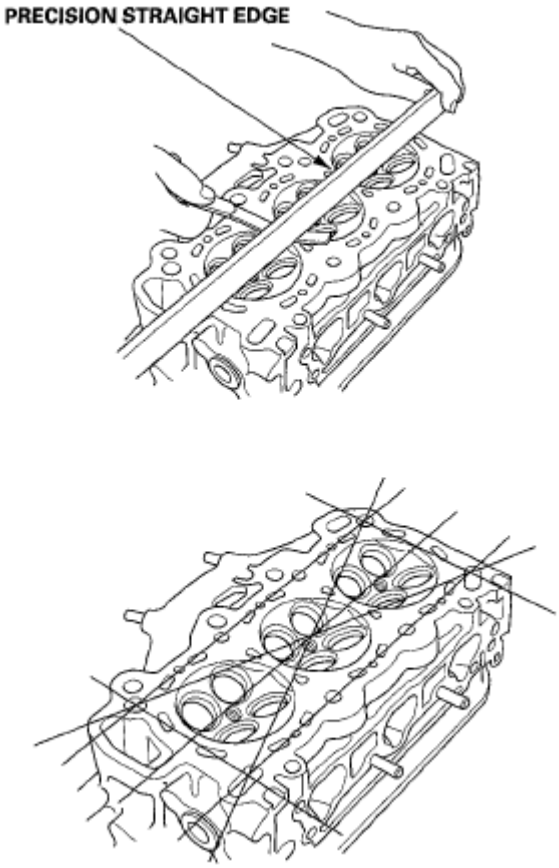


Fig. 101: Checking Cylinder Head Surface
Courtesy of AMERICAN HONDA MOTOR CO., INC.

ROCKER ARM ASSEMBLY REMOVAL

Front

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

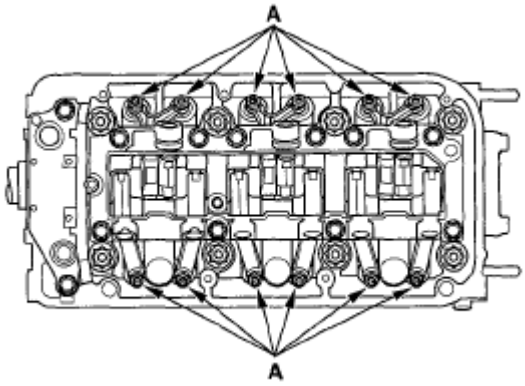


Fig. 102: Identifying Rocker Arm Adjusting Screws - Front
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

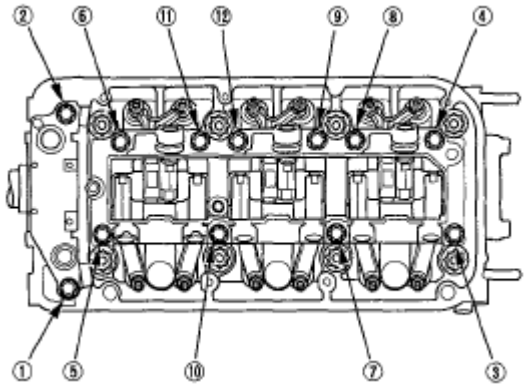


Fig. 103: Identifying Rocker Shaft Bridge Mounting Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Rear

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

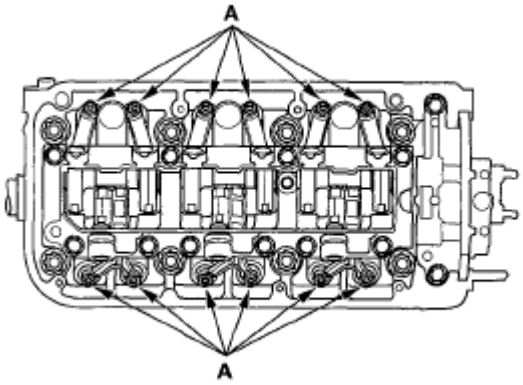


Fig. 104: Identifying Rocker Arm Adjusting Screws - Rear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Remove the rocker shaft bridge mounting bolts, the rocker shaft holder mounting bolts, and the rocker arm assembly

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

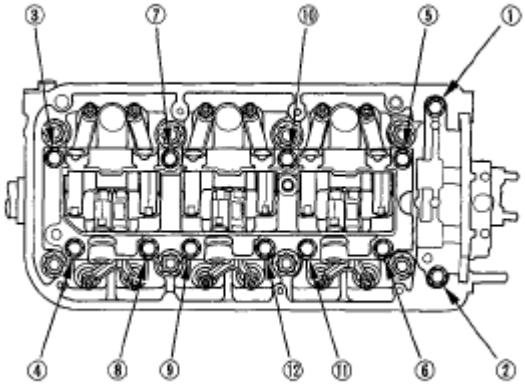


Fig. 105: Identifying Rocker Shaft Bridge Mounting Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

ROCKER ARM AND SHAFT DISASSEMBLY/REASSEMBLY

FRONT

NOTE:

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

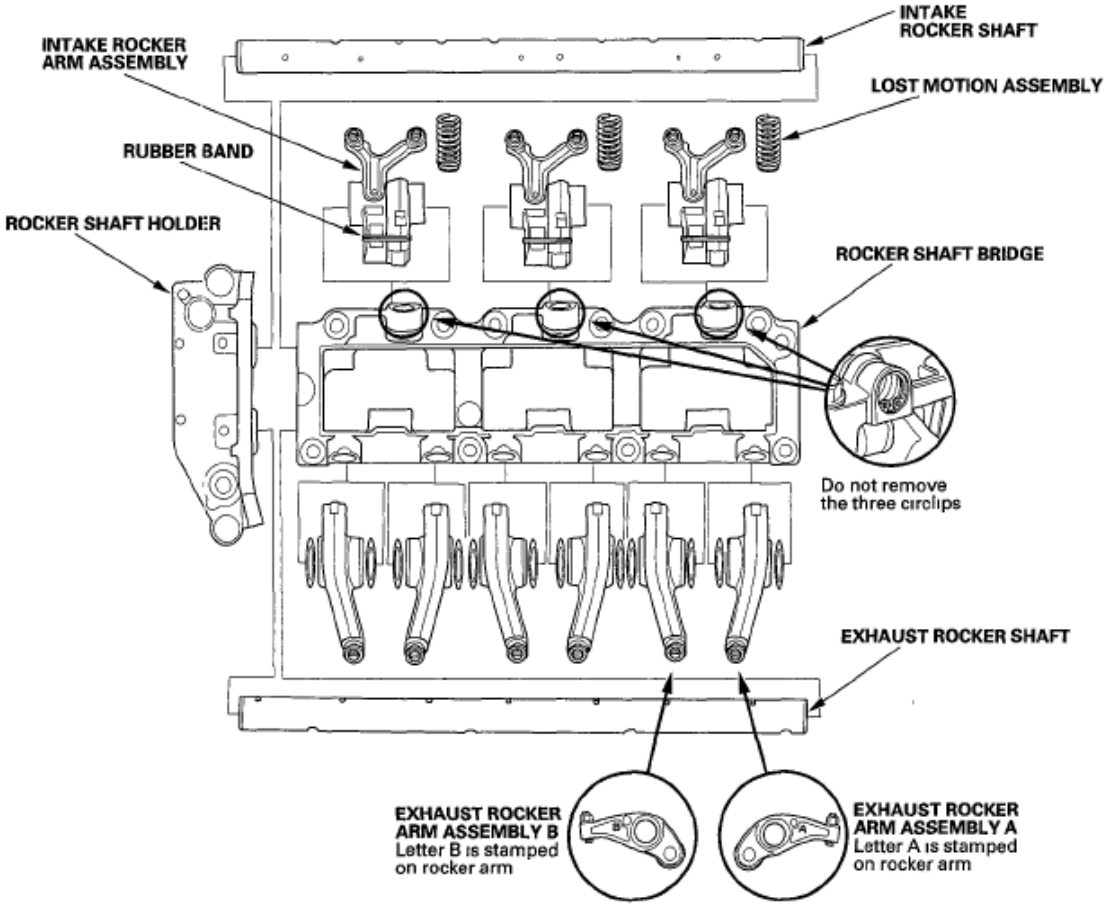


Fig. 106: Identifying Rocker Arm Components - Front
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

NOTE:

- **Identify parts as they are removed so they can be reinstalled in their original locations**
- **Inspect the rocker shafts and the rocker arms (see ROCKER ARM AND SHAFT INSPECTION)**
- **If reused, the rocker arms must be installed in their original locations**
- **When removing or installing the rocker arm assembly, do not remove the mounting bolts The bolts will keep the rocker arms, the rocker shaft bridge, and the rocker shaft holder on the shaft**
- **If the rocker shaft cannot be removed or installed by hand, remove or install the rocker shaft by heating the rocker shaft bridge**
- **Bundle the rocker arms with rubber bands to keep them together as a set, and remove the bands after the rocker arms have been installed**
- **Prior to reassembling, clean all the parts in solvent, dry them, and apply new engine oil to all contact points and bearing surfaces**

- **When replacing the rocker arm assembly, remove the fastening hardware from the new rocker arm assembly**
- **Never remove any of the circlips that retain the lost motion assemblies in the rocker shaft bridge The circlips are not available separately, and are factory installed in the rocker shaft bridge To remove the lost motion assemblies, first remove the rocker shafts and the rocker arms**

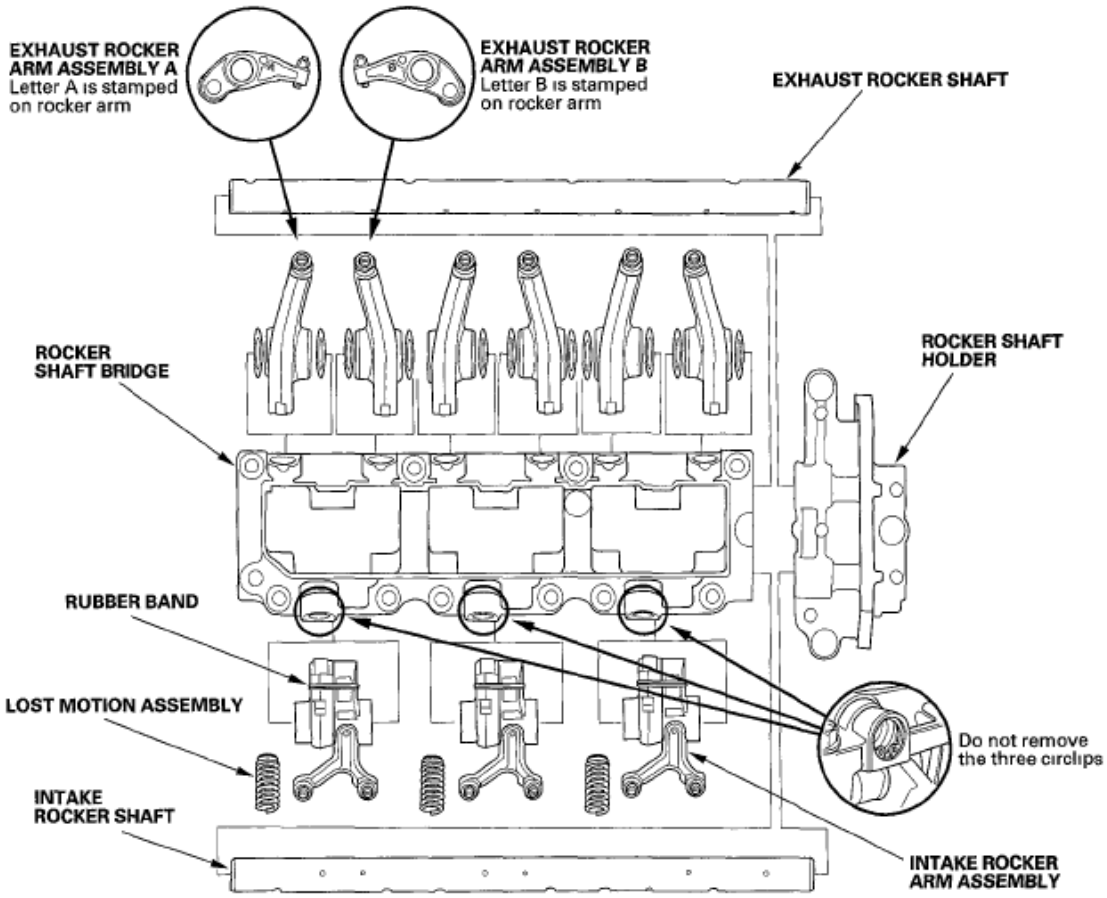


Fig. 107: Identifying Rocker Arm Components - Rear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

ROCKER ARM AND SHAFT INSPECTION

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

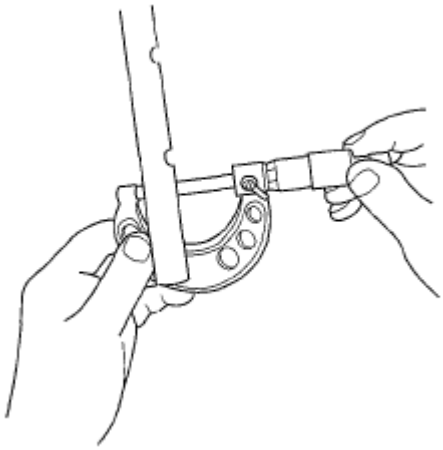


Fig. 108: Measuring Diameter Of Shaft First Rocker Location
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

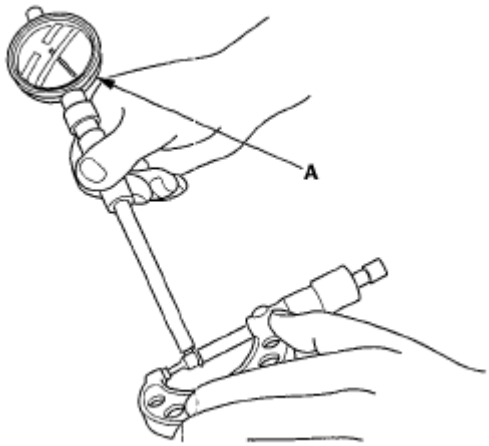


Fig. 109: Identifying Shaft Diameter
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

   Intake Rocker Arm-to-Shaft Clearance

   Standard (New). 0.015-0.046 mm

   (0.0006-0.0018 in)

   Service Limit 0.046 mm (0.0018 in.)

   Exhaust Rocker Arm-to-Shaft Clearance

   Standard (New) 0.018-0.047 mm

(0.0007-0.0019 in.)

Service Limit. 0.047 mm (0.0019 in.)

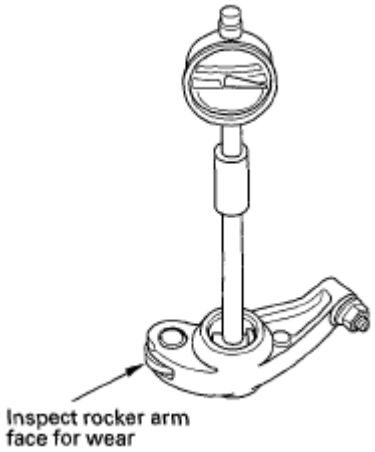


Fig. 110: Measuring Inside Diameter Of Rocker Arm
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

VTEC Rocker Arms

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

NOTE:

- **Apply new engine oil to the rocker arm piston when reassembling**
- **When removing the rocker arm piston from the intake secondary rocker arm (B), carefully apply air pressure to the oil passage of the rocker arm**

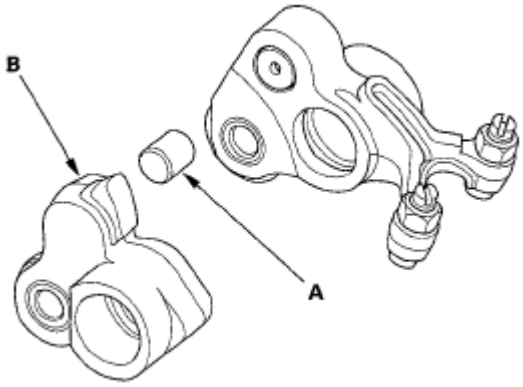


Fig. 111: Identifying Rocker Arm Piston And Intake Secondary Rocker Arm
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

CAMSHAFT INSPECTION

1. Remove the cylinder head (see **CYLINDER HEAD REMOVAL**)
2. Remove the rocker arm assembly (see **ROCKER ARM ASSEMBLY REMOVAL**)
3. Disassemble the rocker arm assembly (see **Rocker Arm and Shaft Disassembly/Reassembly**)
4. Front Put the rocker shafts bridge and the rocker shaft holder on the front cylinder head, then tighten the bolts to the specified torque

   Specified Torque

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

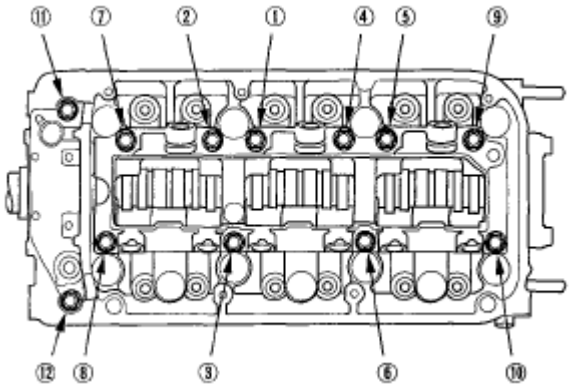


Fig. 112: Identifying Front Cylinder Head Bolts Tightening Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

   Specified Torque

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

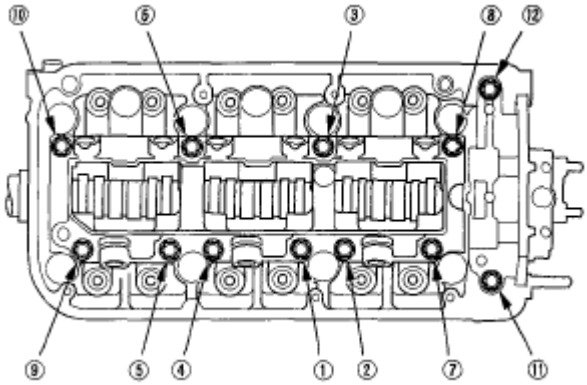


Fig. 113: Identifying Rear Cylinder Head Bolts Tightening Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Seat the camshaft by pushing it toward the rear of the cylinder head
7. Zero the dial indicator against the end of the camshaft Push the camshaft back and forth and read the end play If the end play is beyond the service limit, replace the thrust cover and recheck If it is still beyond the service limit, replace the camshaft

   Camshaft End Play

   Standard (New) 0.05-0.20 mm

   (0.002-0.008 in)

   Service Limit 0.20 mm (0.008 in)

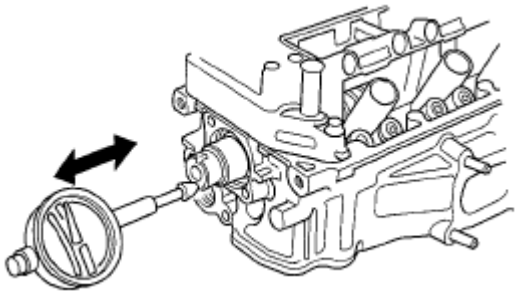


Fig. 114: Checking Camshaft End Play
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

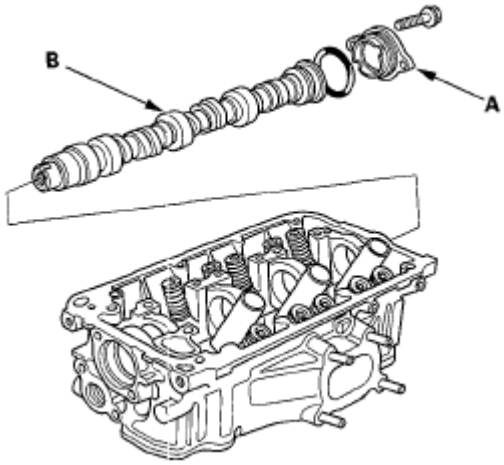


Fig. 115: Identifying Camshaft Thrust Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

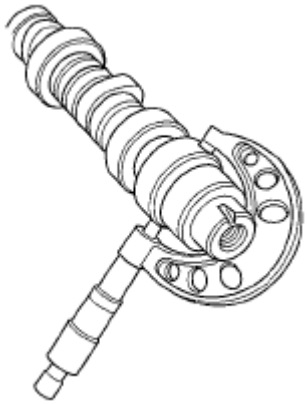


Fig. 116: Measuring Diameter Of Camshaft Journal
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Zero the gauge to the journal diameter

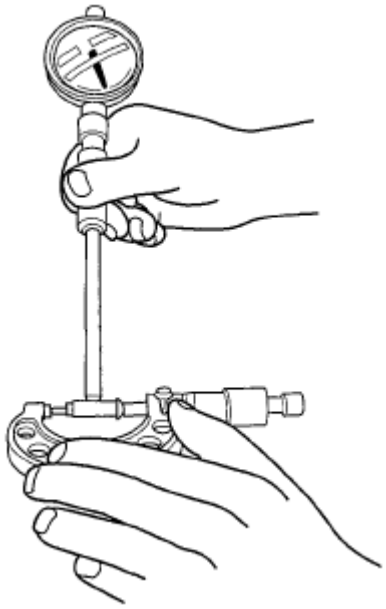


Fig. 117: Checking Journal Diameter
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Clean the camshaft bearing surfaces in the cylinder head Measure the inside diameter of each camshaft bearing surface, and check for an out-of-round condition
    - If the camshaft-to-holder clearance is within limits, go to step 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). 0.050-0.089 mm

    (0.0020-0.0035 in)

    Service Limit 0.15 mm (0.0060 in.)

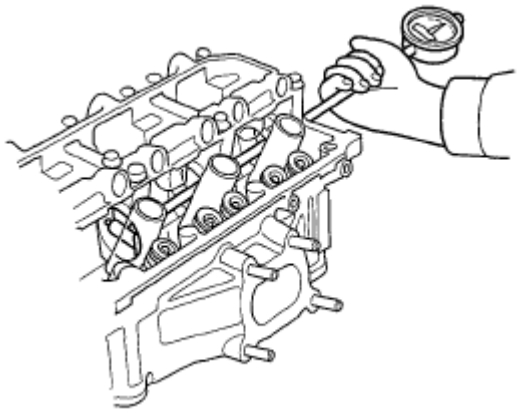


Fig. 118: Measuring Inside Diameter Of Camshaft Bearing Surface
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

    Camshaft Total Runout

    Standard (New) 0.03 mm (0.0012 in) max

    Service Limit. 0.04 mm (0.002 in)

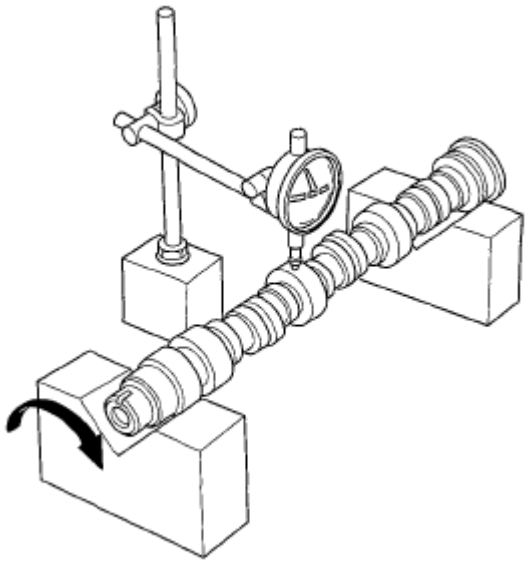


Fig. 119: Checking Camshaft Total Runout
Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. Measure the cam lobe height

Cam Lobe Height Standard (New).

CAM LOBE HEIGHT SPECIFICATION

	INTAKE	EXHAUST
PRI	34 299 mm (1 3504 in)	36 760 mm (1 4472 in)
SEC	35 621 mm (1 4024 m)	

FRONT

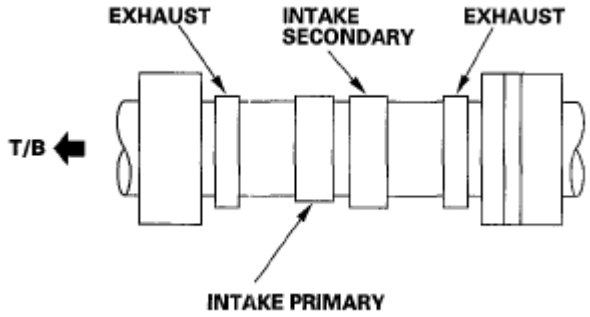


Fig. 120: Identifying Cam Lobe Height - Front
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

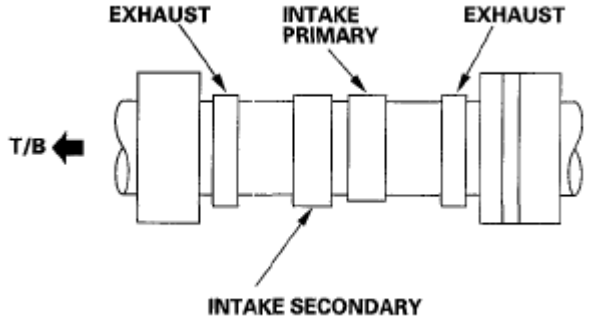


Fig. 121: Identifying Cam Lobe Height - Rear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

VALVE, SPRING, AND VALVE SEAL REMOVAL

Special Tools Required

Valve spring compressor attachment 07757-PJ1010A

Identify the valves and 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

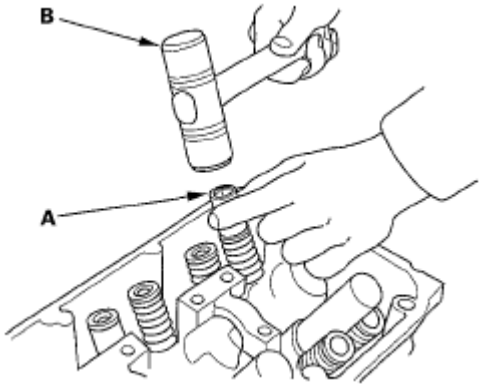


Fig. 122: Tapping Spring Retainer
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

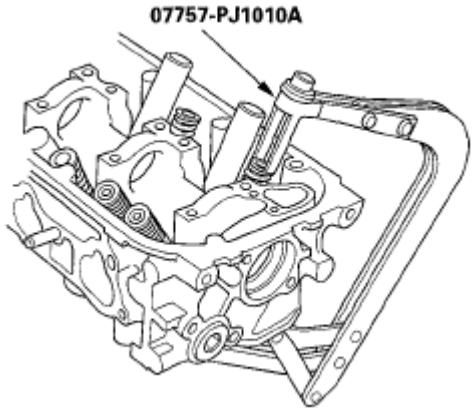


Fig. 123: Compressing Spring
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

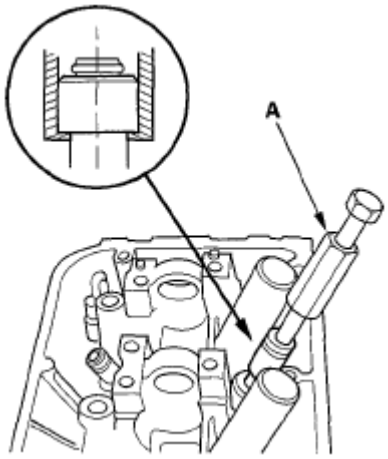


Fig. 124: Identifying Valve Guide Seal Remover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Remove the valve seal

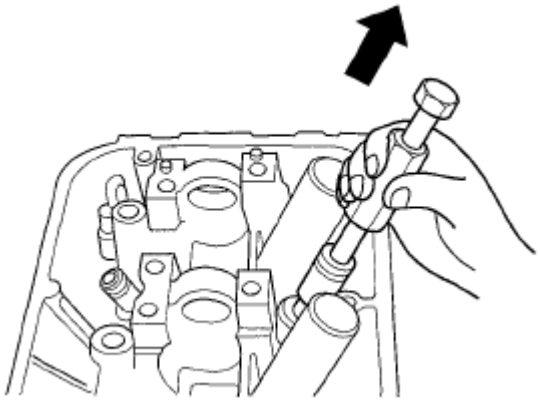


Fig. 125: Removing Valve Seal
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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): 35.90-36.01 mm (1.413-1.421 in)

B Standard (New). 116.55-117.15 mm (4 589-4.612 in.)

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

C Service Limit 5.455 mm (0.2148 in)

Exhaust Valve Dimensions

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

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

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

C Service Limit 5.420 mm (0.2134 in)

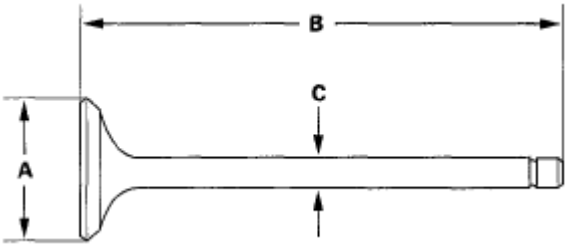


Fig. 126: Identifying Valve Dimensions
Courtesy of AMERICAN HONDA MOTOR CO., INC.

VALVE STEM-TO-GUIDE CLEARANCE INSPECTION

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

Intake Valve Stem-to-Guide Clearance

Standard (New) 0.020-0.045 mm (0.0008-0.0018 in)

Service Limit 0.08 mm (0.003 in.)

Exhaust Valve Stem-to-Guide Clearance

Standard (New). 0.055-0 080 mm (0.0022-0.0031 in)

Service Limit. 0.11 mm (0.004 in)

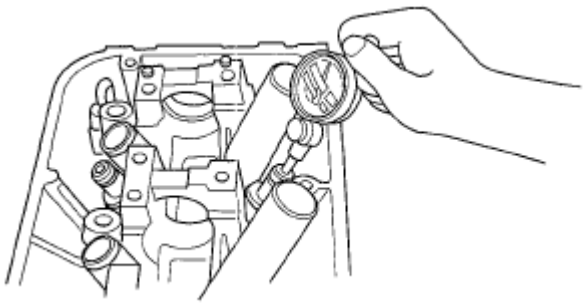


Fig. 127: Identifying Valve Stem-To-Guide Clearance
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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 and a conventional hammer

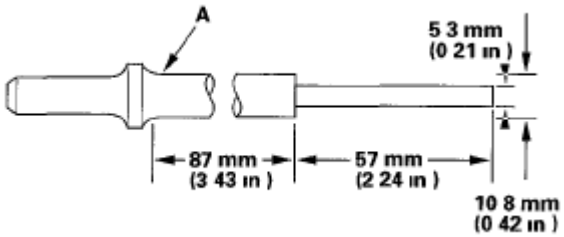


Fig. 128: Inspecting Valve Stem-To-Guide Clearance
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

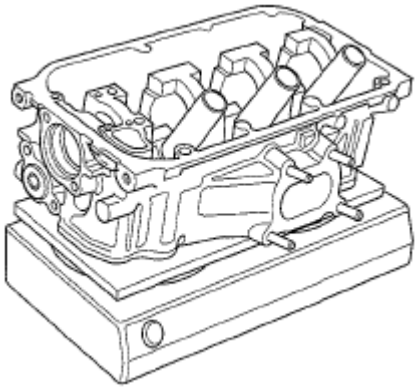


Fig. 129: Heating Cylinder Head
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Working from the camshaft side, use the driver and an air hammer to drive the guide about 2 mm (0.1 in) towards the combustion chamber This will knock off some of the carbon and make removal easier Hold the air hammer directly in line with the valve guide to prevent damaging the driver Wear safety goggles or a face shield
6. Turn the head over, and drive the guide out toward the camshaft side of the head

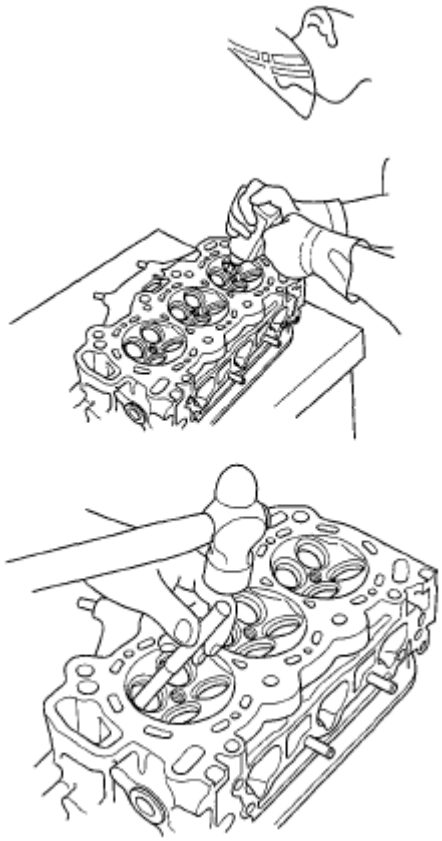


Fig. 130: Tapping Valve Guide Seat
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

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

8. Remove the new guide(s) from the freezer, one at a time, as you need them
9. Apply a thin coat of new engine oil to the outside of the new valve guide Install the guide from the camshaft side of the head, use the valve guide driver to drive the guide to the specified installed height (A) of the guide (B) If you have all 12 guides to do, you may have to reheat the head

Valve Guide Installed Height

Intake 21.20-22.20 mm (0.835-0.874 in)

Exhaust 20.60-21.60 mm (0.811-0.850 in)

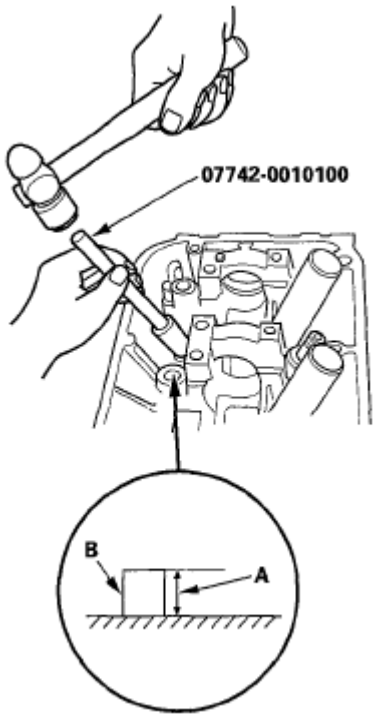


Fig. 131: Identifying Valve Guide Installation Height
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

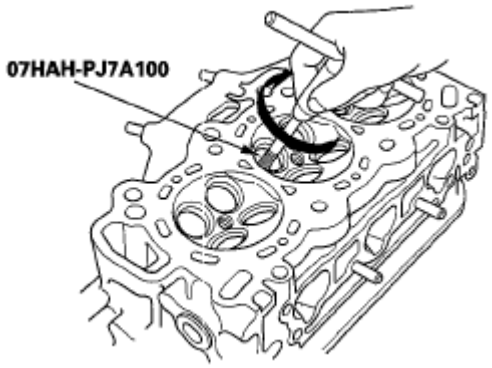


Fig. 132: Identifying Valve Guide Seat With Reamer
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Continue to rotate the reamer clockwise while removing it from the bore
13. Thoroughly wash the guide in detergent and water to remove any cutting residue
14. Check the clearance with a valve (see **VALVE STEM-TO-GUIDE CLEARANCE INSPECTION**) Verify that a valve slides in 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 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

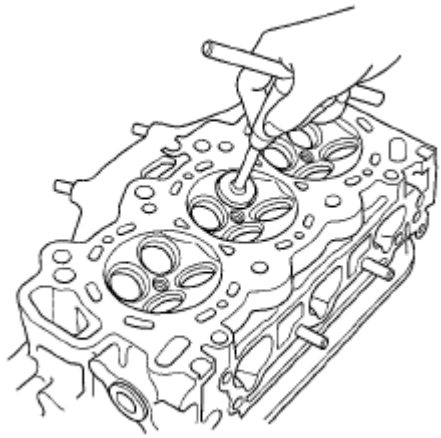


Fig. 133: Cutting Valve Seats
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

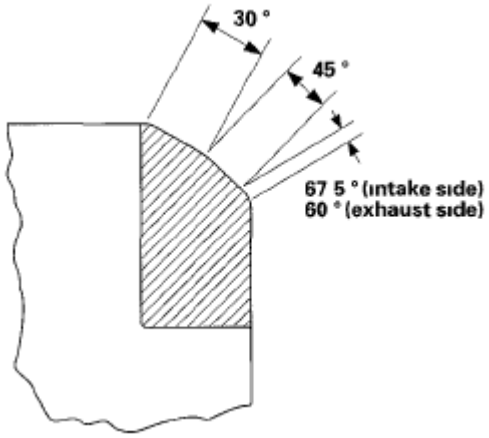


Fig. 134: Identifying Valve Seats Cutting Angle
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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 (0.049-0.061 in)

   Service Limit 2.00 mm (0.079 in)

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

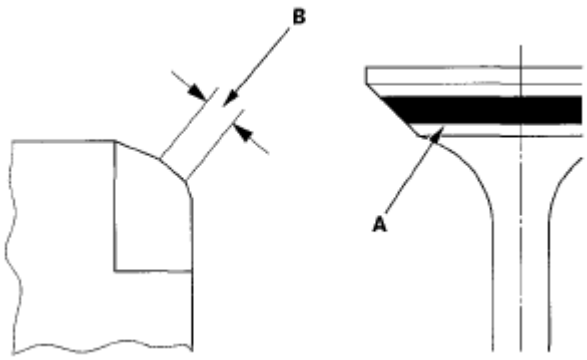


Fig. 135: Checking Valve Seating Surface
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. The actual valve seating surface (B), as shown by the blue compound, should be centered on the seat
   - If it is too high (closer to the valve stem), you must make a second cut with the 67 5° cutter (intake

seat) or the 60° cutter (exhaust seat) to move it down, then one more cut with the 45° cutter to restore seat width
- If it is too low (closer to the valve edge), you must make a second cut with the 30° cutter to move it up, then one more cut with the 45° cutter to restore seat width

NOTE: The final cut should always be made with the 45° cutter

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

   Intake Valve Stem Installed Height

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

   Service Limit. 47.80 mm (1.882 in)

   Exhaust Valve Stem Installed Height

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

   Service Limit 47.73 mm (1.879 in)

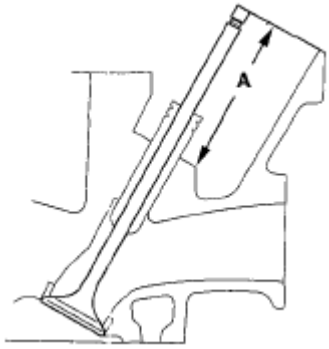


Fig. 136: Measuring Valve Stem Installed Height
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

VALVE, SPRING, AND VALVE SEAL INSTALLATION

Special Tools Required

- Stem seal driver 07PAD-0010000
- Valve spring compressor attachment 07757-PJ1010A

1. Coat the valve stems with new engine oil Install the valves in the valve guides

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

NOTE: Exhaust valve seals (C) have a black spring (D) and intake valve seals (E) have a white or silver spring (F) They are not interchangeable

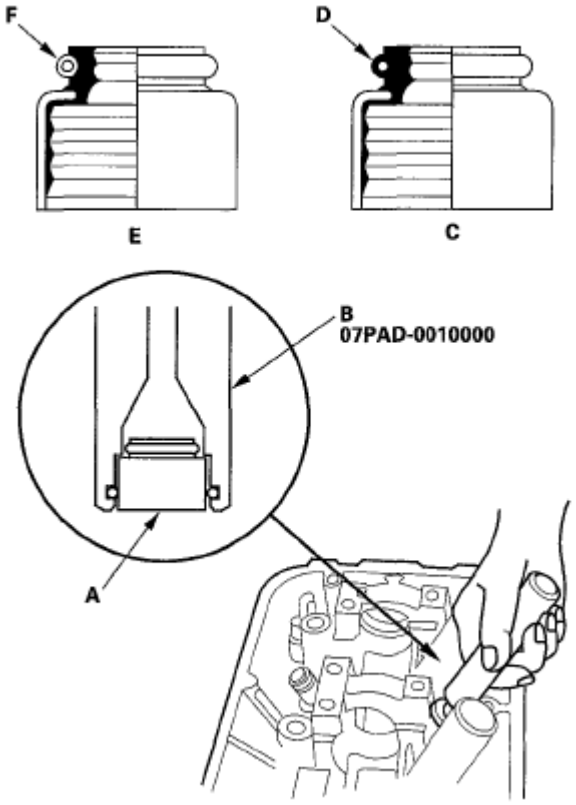


Fig. 137: Installing Valve Seals
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

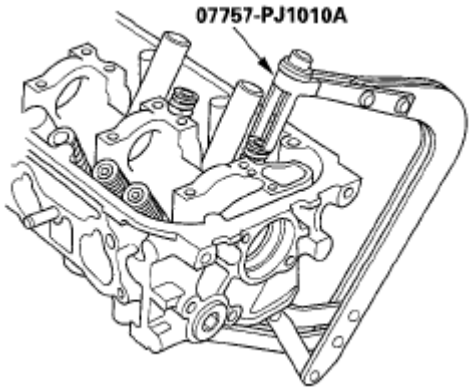


Fig. 138: Installing Valve Cotters With Compressor Attachment
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

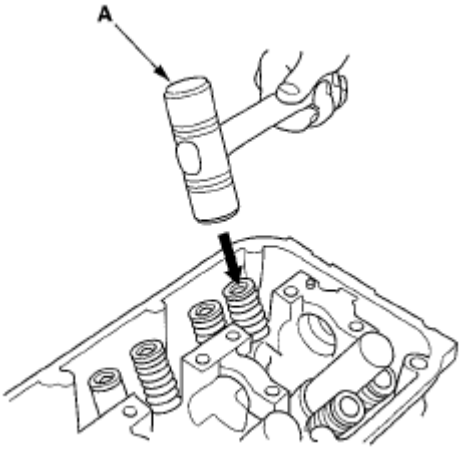


Fig. 139: Tapping Valve Stem
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

FRONT

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

2. Install the oil seal about 0 5-15 mm (0 02-0 06 in) below the surface of the cylinder head

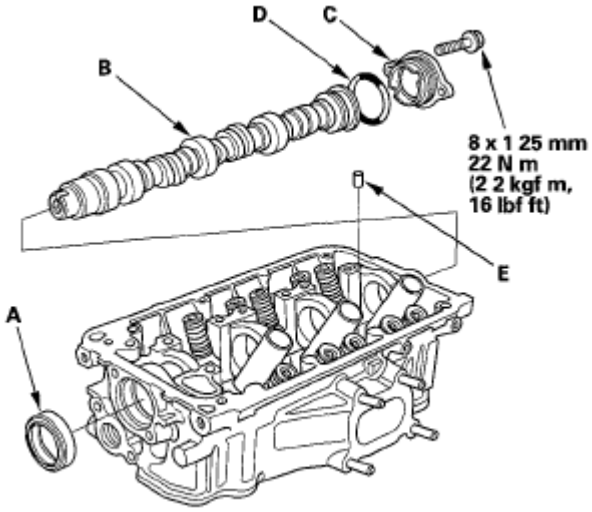


Fig. 140: Identifying Camshaft And Cylinder Head With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Insert the camshaft (B) into the cylinder head, then install the camshaft thrust cover (C) Always use a new O-ring (D) Apply new engine oil to the journals and the cam lobes
6. Check that the oil seal lips are not distorted
7. Install the solid dowel pin (E)
8. If the rocker arm assembly is disassembled, reassemble the rocker arm assembly (see **ROCKER ARM AND SHAFT DISASSEMBLY/REASSEMBLY**)
9. Remove all of the old liquid gasket from the rocker shaft holder and the cylinder head
10. Apply liquid gasket, P/N 08717-0004, 08718-0003, or 08718-0009, evenly to the rocker shaft holder mating surface of the cylinder head Install the component within 5 minutes of applying the liquid gasket

NOTE:

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

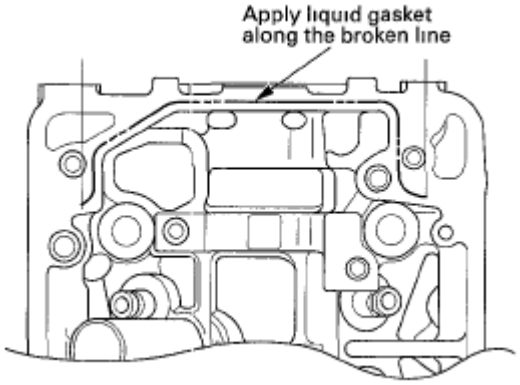


Fig. 141: Identifying Liquid Gasket Applying Area
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

NOTE:

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

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

Specified Torque

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

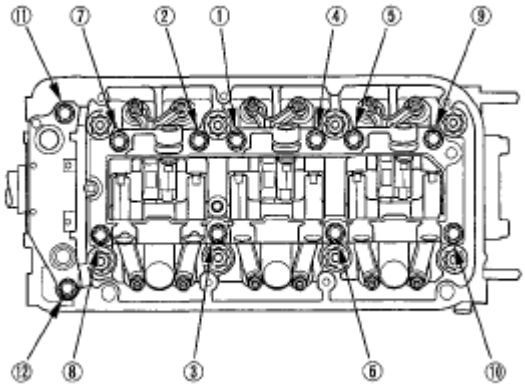


Fig. 142: Identifying Rocker Arm Assembly Bolts Tightening Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

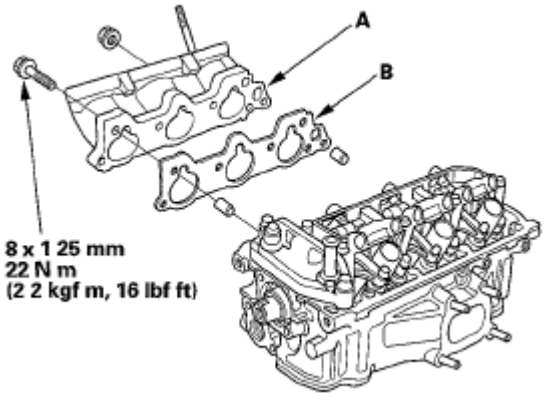


Fig. 143: Identifying Injector Base And Gasket With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

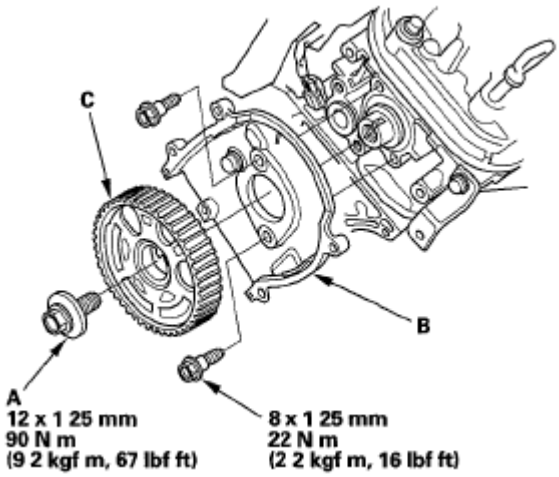


Fig. 144: Identifying Camshaft Pulley Mounting Bolt With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

15. Set the camshaft pulleys to top dead center (TDC) before bolting them onto the engine block (see step 6 on **CYLINDER HEAD INSTALLATION**)

REAR

1. Loosen the locknuts and the adjusting screws
2. Dry the camshaft oil seal housing
3. Apply a light coat of new engine oil to the lip of the camshaft oil seal
4. Gently tap the new camshaft oil seal (A) into the cylinder head
    1. Tap the camshaft oil seal in squarely
    2. Install the oil seal about 0.5-15 mm (0.02-0.06 in) below the surface of the cylinder head

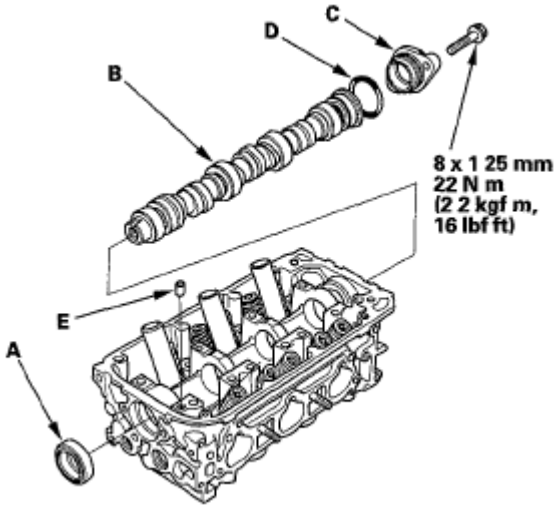


Fig. 145: Inserting Camshaft Into Cylinder Head With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Insert the camshaft (B) into the cylinder head, then install the camshaft thrust cover (C) Always use a new O-ring (D) Apply new engine oil to the journals and the cam lobes
6. Check that the oil seal lips are not distorted
7. Install the hollow dowel pin (E)
8. If the rocker arm assembly is disassembled, reassemble the rocker arm assembly (see **REAR**)
9. Remove all of the old liquid gasket from the rocker shaft holder and the cylinder head
10. Apply liquid gasket, P/N 08717-0004, 08718-0003, or 08718-0009, evenly to the rocker shaft holder mating surface of the cylinder head Install the component within 5 minutes of applying the liquid gasket

NOTE:

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

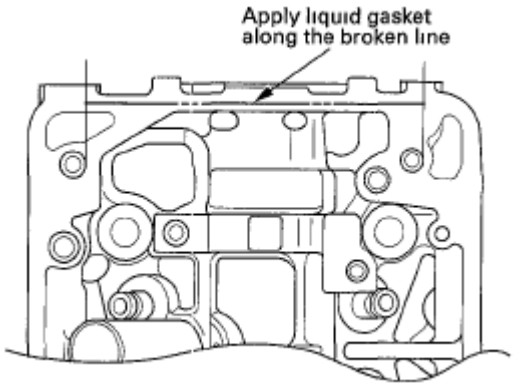


Fig. 146: Identifying Liquid Gasket Applying Area
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

NOTE:

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

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

Specified Torque

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

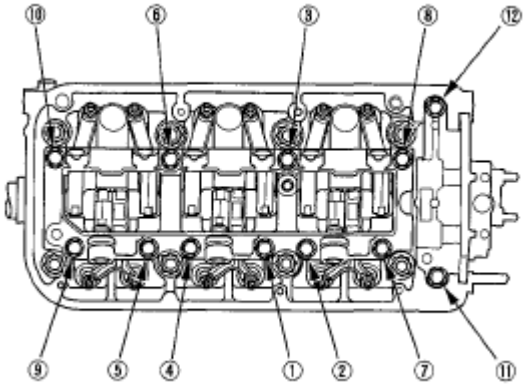


Fig. 147: Identifying Rocker Arm Assembly Bolts Tightening Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

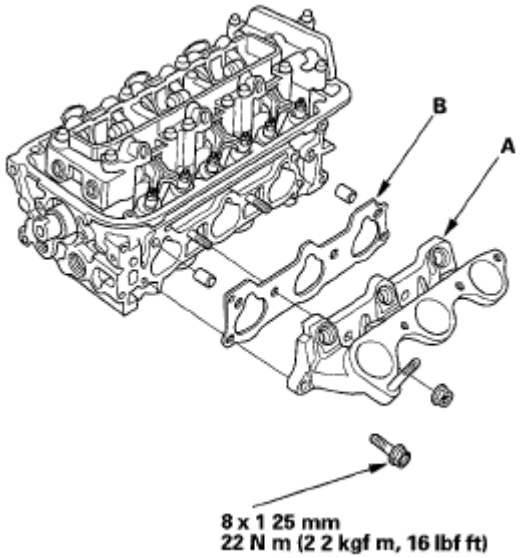


Fig. 148: Identifying Injector Base With Gasket With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

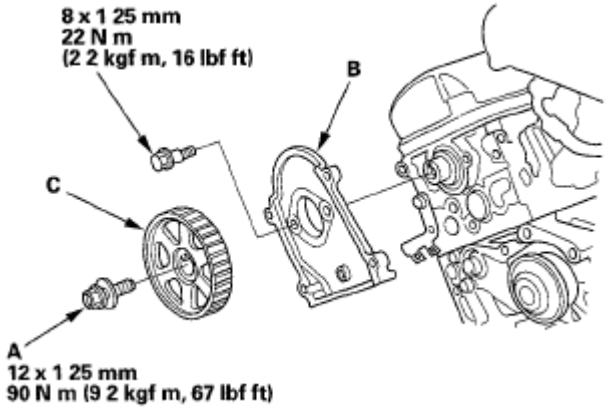


Fig. 149: Identifying Camshaft Pulley Mounting Bolt With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

15. Set the camshaft pulleys to TDC before bolting them onto the engine block (see step 6 on **CYLINDER HEAD INSTALLATION**)

CYLINDER HEAD INSTALLATION

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

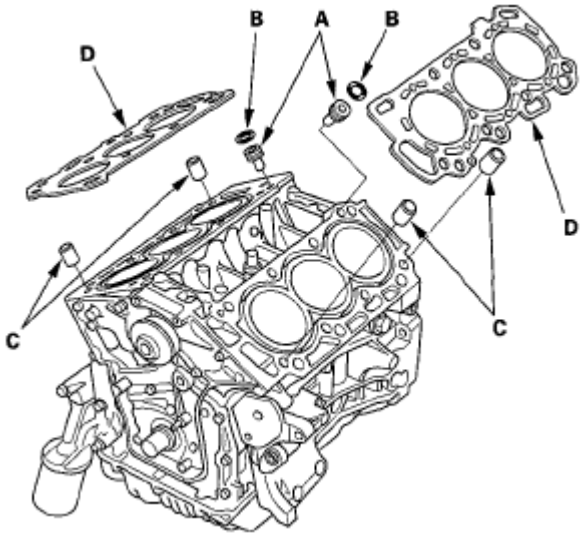


Fig. 150: Identifying Dowel Pins And Cylinder Head Gaskets
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Install the dowel pins (C) and the new cylinder head gaskets (D)
4. Clean the timing belt pulleys, the timing belt guide plate, and the upper and lower covers
5. Set the timing belt drive pulley to top dead center (TDC) by aligning the TDC mark (A) on the tooth of the timing belt drive pulley with the pointer (B) on the oil pump

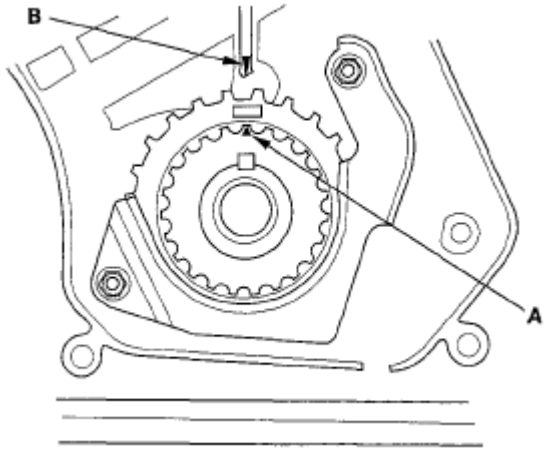


Fig. 151: Identifying TDC Mark On Tooth Of Timing Belt Drive Pulley With Pointer On Oil Pump
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

FRONT

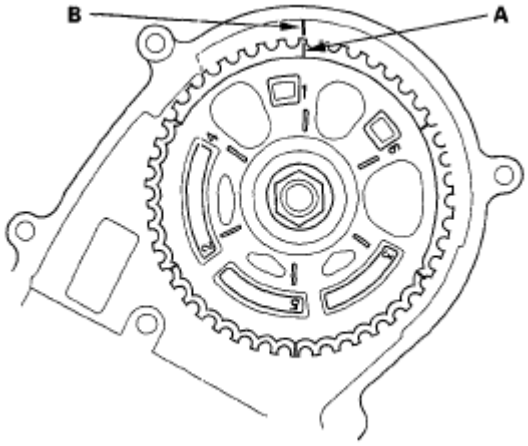


Fig. 152: Identifying TDC Marks On Camshaft Pulleys With Pointers On Back Covers - Front
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

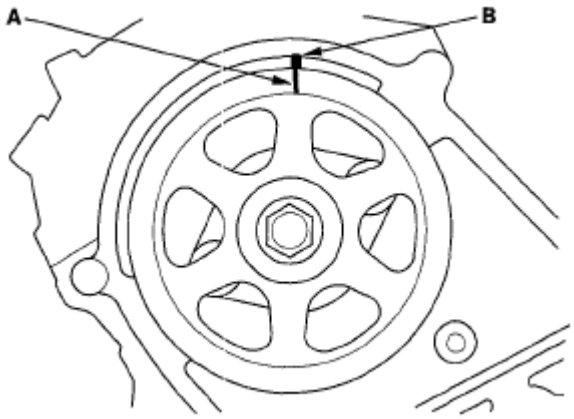


Fig. 153: Identifying TDC Marks On Camshaft Pulleys With Pointers On Back Covers - Rear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

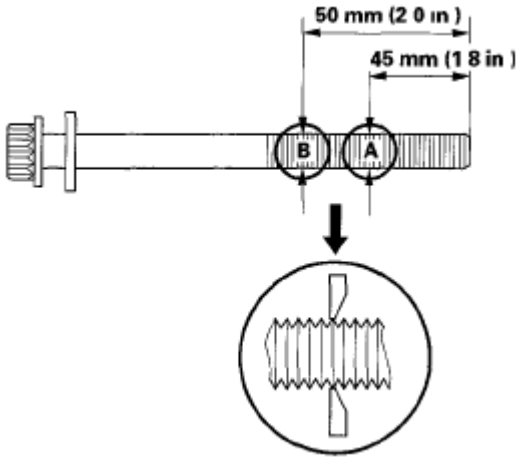


Fig. 154: Measuring Diameter Of Cylinder Head Bolt Point A And B
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

FRONT

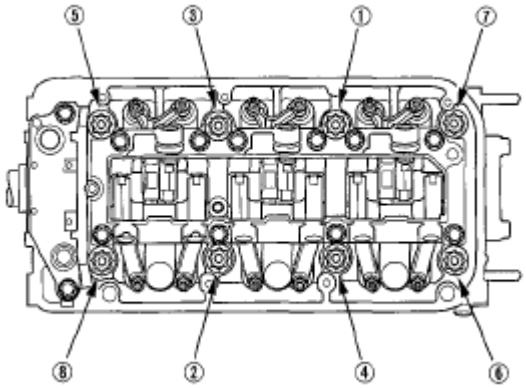


Fig. 155: Identifying Cylinder Head Bolts Tightening Sequence - Front
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

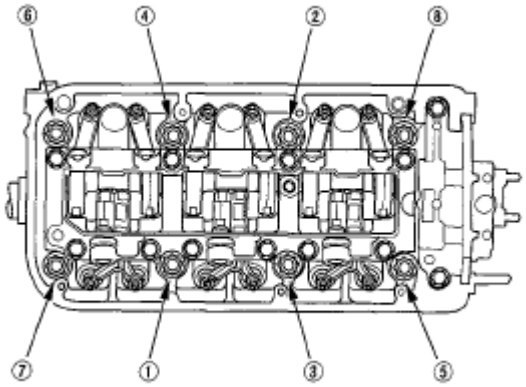


Fig. 156: Identifying Cylinder Head Bolts Tightening Sequence - Rear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

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

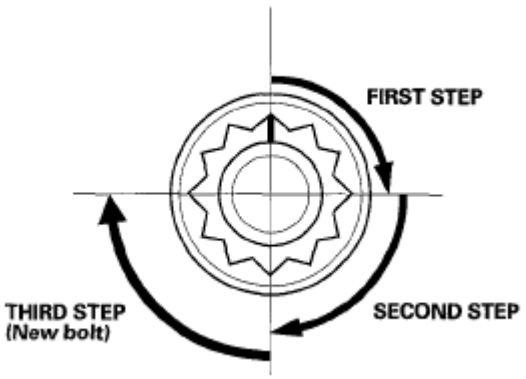


Fig. 157: Identifying Cylinder Head Bolts Tightening Angle
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

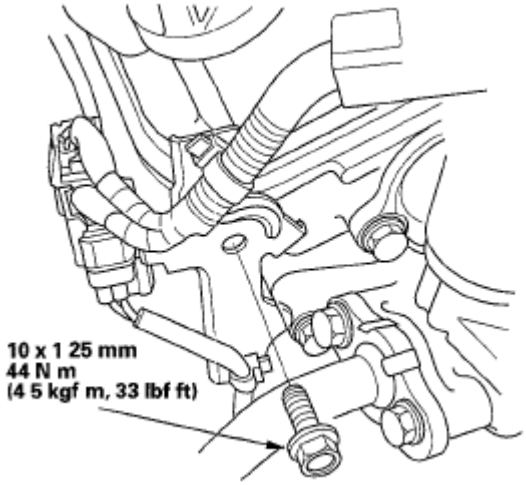


Fig. 158: Identifying Connector Bracket With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

19. Install the evaporative emission (EVAP) canister joint with the bracket (see 9 under Rear Camshaft Replacement)
20. Install the engine mount control solenoid valve bracket to the rear cylinder head

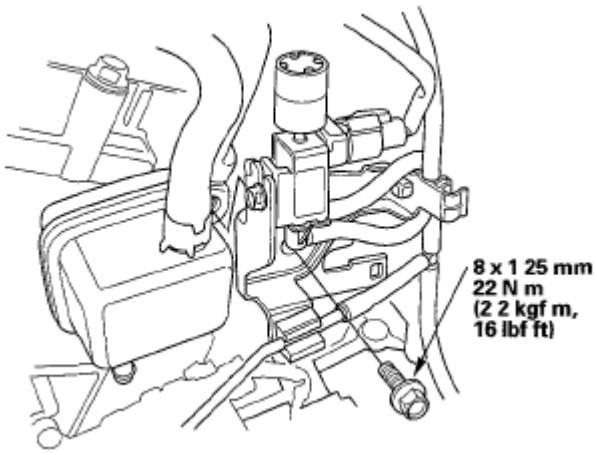


Fig. 159: Identifying Engine Mount Control Solenoid Valve Bracket With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

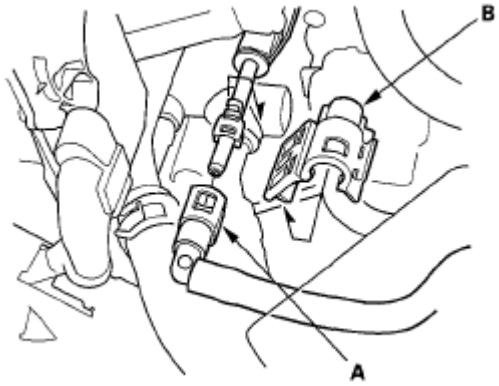


Fig. 160: Identifying Fuel Feed Hose And Quick-Connect Fitting Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

22. Install the front warm up three way catalytic converter (front WU-TWC) (see **WARM UP TWC REMOVAL/INSTALLATION**) and the rear warm up three way catalytic converter (rear WU-TWC) (see **REAR (BANK 1)**)
23. Connect the following engine wire harness connectors, and install the wire harness clamps to the cylinder head
    - Six injector connectors
    - Knock sensor connector
    - Engine coolant temperature (ECT) sensor 1 connector
    - Engine mount control solenoid valve connector
    - Camshaft position (CMP) sensor connector
    - Rocker arm oil control solenoid connector
    - Rocker arm oil pressure switch connector
    - Two air fuel ratio (A/F) sensor connectors
    - Two secondary heated oxygen sensor (secondary HO2S) connectors
24. Install the six ignition coils (see **IGNITION COIL REMOVAL/INSTALLATION**)
25. Install the intake manifold (see **INSTALLATION**)
26. Install the alternator (see **INSTALLATION**)
27. Do the battery terminal reconnection procedure (see **BATTERY TERMINAL DISCONNECTION AND RECONNECTION**)
28. After installation, check that all tubes, hoses, and connectors are installed correctly
29. Inspect for fuel leaks Turn the ignition switch to ON (II), or press the engine start/stop button to select the ON mode (do not operate the starter) so the fuel pump runs for about 2 seconds and pressurizes the fuel line Repeat this operation three times, then check for fuel leakage at any point in the fuel line
30. Refill the radiator with engine coolant, and bleed the air from the cooling system with the heater valve open (see step 9 on **COOLANT REPLACEMENT**)
31. Check for fluid leaks
32. Do the powertrain control module (PCM) idle learn procedure (see **PCM IDLE LEARN PROCEDURE**)

33. Do the crankshaft position (CKP) pattern clear/CKP pattern learn procedure (see **CKP PATTERN CLEAR/CKP PATTERN LEARN**)
34. Inspect the idle speed (see **IDLE SPEED INSPECTION**)
35. Inspect the ignition timing (see **IGNITION TIMING INSPECTION**)
36. Install the engine compartment covers (see **ENGINE COMPARTMENT COVER REPLACEMENT**)

CAMSHAFT OIL SEAL INSTALLATION - IN CAR

Special Tools Required

Ball joint remover/installer 07GAF-SD40330

1. Remove the timing belt (see **Timing Belt Removal**)
2. Remove the camshaft pulley and the back cover (see step 17 under Cylinder Head Removal)
3. Remove the camshaft oil seal
4. Clean and dry the camshaft oil seal housing
5. Apply a light coat of new engine oil to the lip of the camshaft oil seal
6. Using the ball joint remover/installer (A), a washer (B), and a 12 x 75 x 1.25 mm bolt (C), press in the new camshaft oil seal (D) about 0.5-1.5 mm (0.02-0.06 in) below the surface of the cylinder head

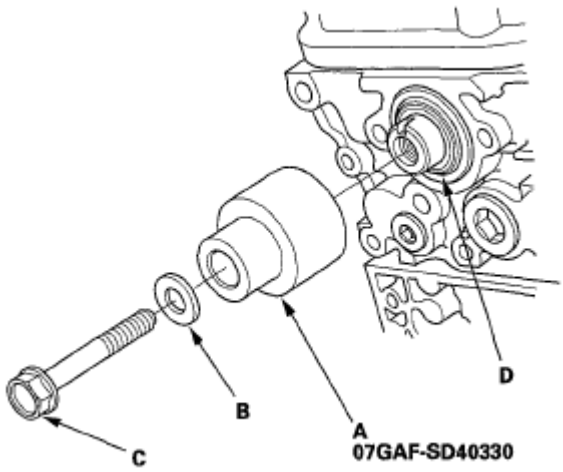


Fig. 161: Installing Camshaft Oil Seal
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Apply new engine oil to the threads of the camshaft pulley mounting bolt. Install the back cover, then install the camshaft pulley.
    - Front (see step 14 under Front Camshaft, Rocker Arm Assembly, Camshaft Seal, and Pulley Installation)
    - Rear (see step 14 under Rear Camshaft, Rocker Arm Assembly, Camshaft Seal, and Pulley Installation)

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

FRONT

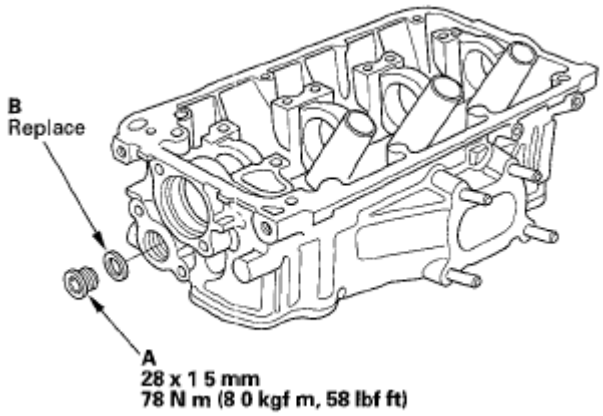


Fig. 162: Identifying Sealing Bolts With Torque Specification - Front
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

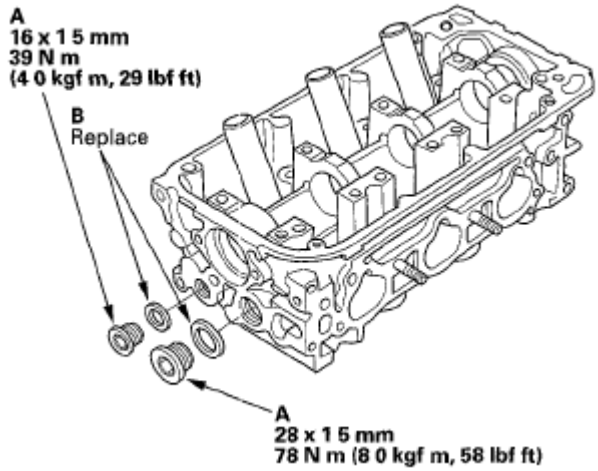


Fig. 163: Identifying Sealing Bolts With Torque Specifications - Rear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2009-11 ENGINE

Engine Block - TL

SPECIAL TOOLS

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

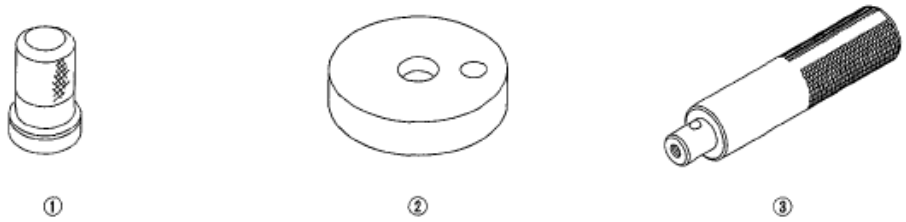


Fig. 1: Identifying Special Tools
Courtesy of AMERICAN HONDA MOTOR CO., INC.

COMPONENT LOCATION INDEX

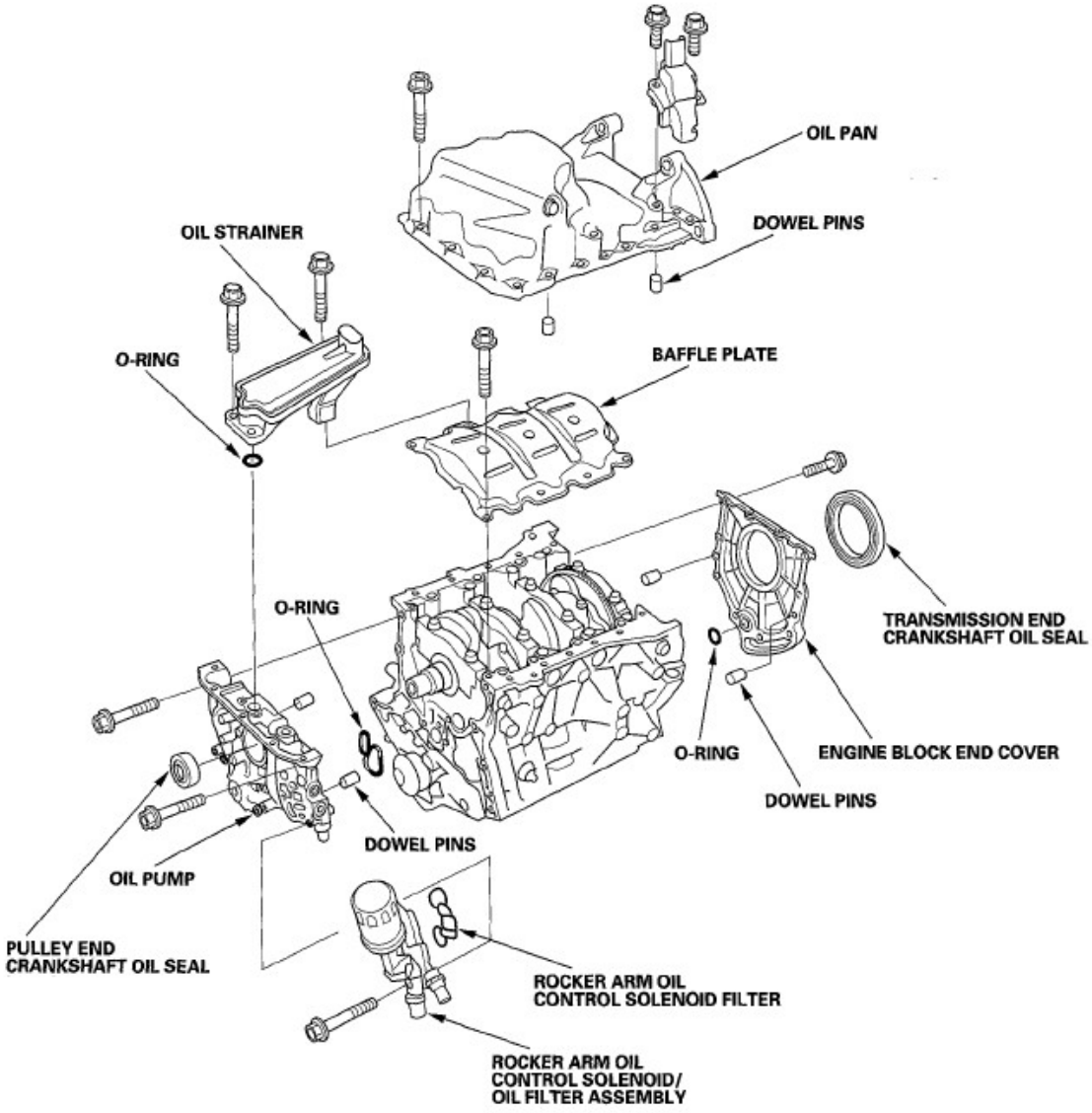


Fig. 2: Identifying Engine Component Locations (1 Of 3)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

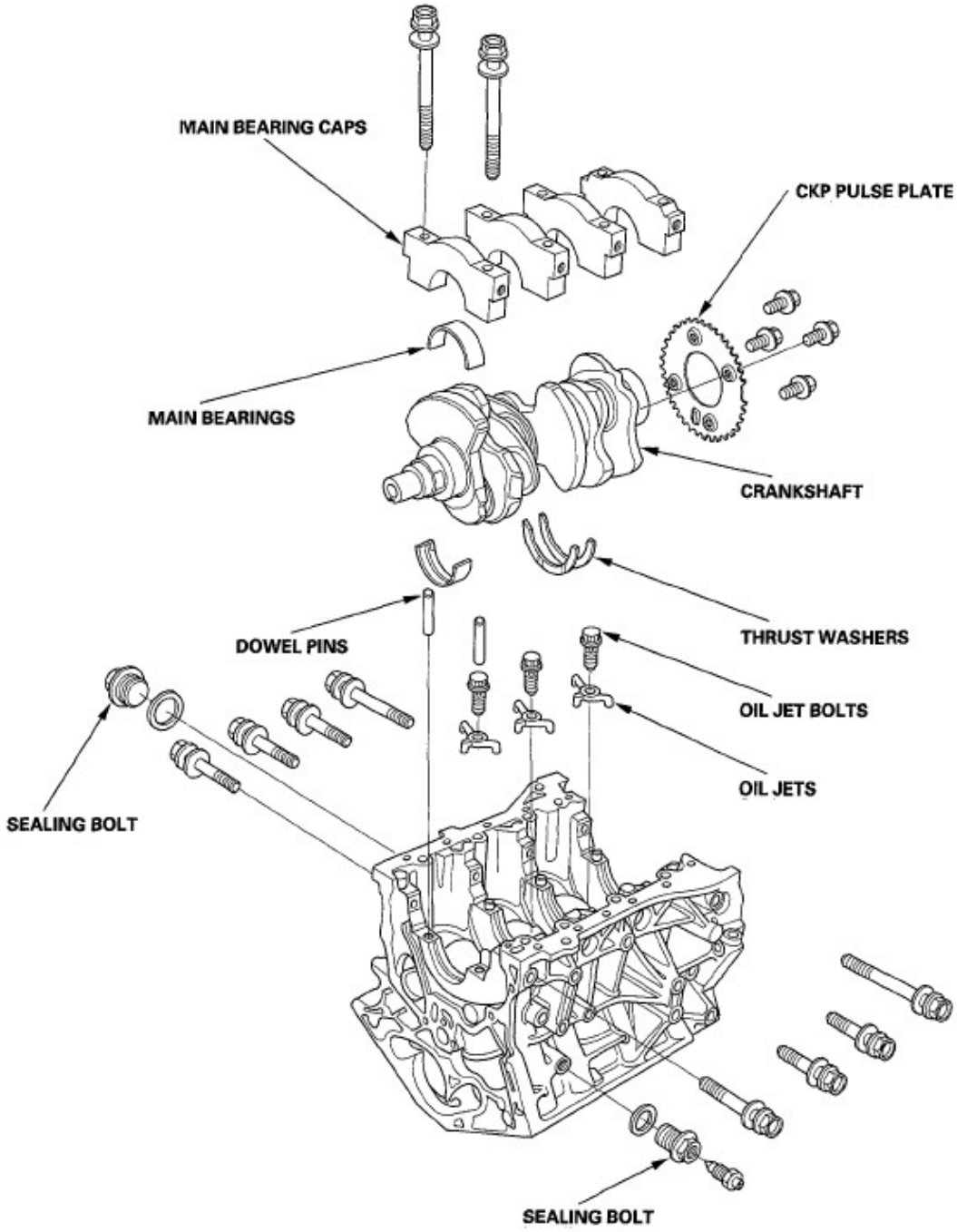


Fig. 3: Identifying Engine Component Locations (2 Of 3)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

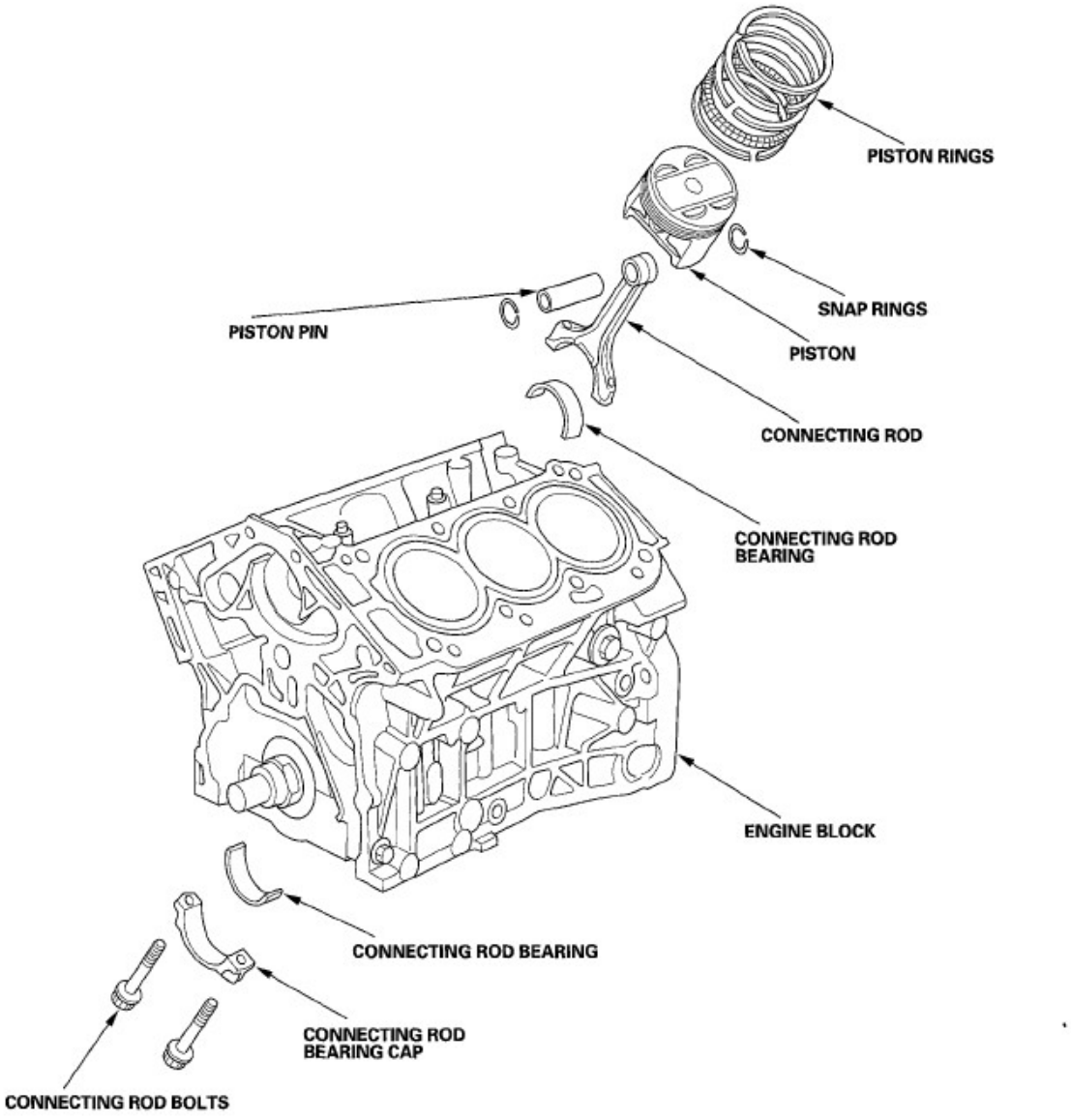


Fig. 4: Identifying Engine Component Locations (3 Of 3)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

CONNECTING ROD AND CRANKSHAFT END PLAY INSPECTION

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

   Connecting Rod End Play

   Standard (New): 0.15-0.35 mm (0.006-0.014 in)

Service Limit: 0.45 mm (0.018 in)

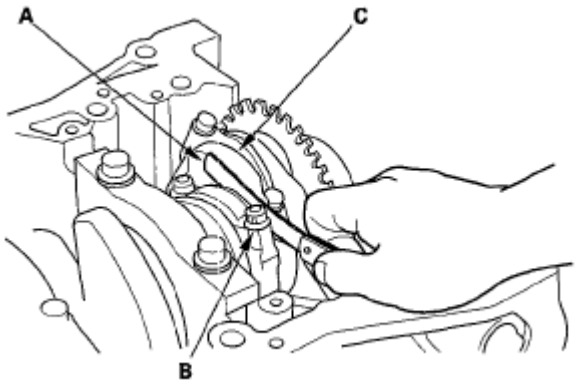


Fig. 5: Measuring Connecting Rod End Play
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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, and zero the dial against the end of the crankshaft Then pull the crankshaft firmly back toward the indicator, the dial reading should not exceed the service limit

Crankshaft End Play

Standard (New): 0.10-0.35 mm (0.004-0.014 in)

Service Limit: 0.45 mm (0.018 in)

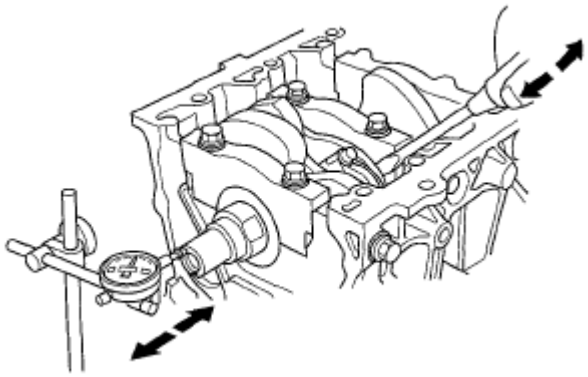


Fig. 6: Checking Crankshaft End Play
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. If the end play is excessive, 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. Remove the main bearing caps and the bearing halves (see **CRANKSHAFT AND PISTON REMOVAL**)
2. Clean each main journal and bearing half with a clean shop towel
3. Place one strip of plastigage across each main journal

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

4. Reinstall the bearings and the caps, then tighten the bearing cap bolts to 74 N m (7.5 kgf m, 54 lbf ft), and the bearing cap side bolts to 49 N m (5.0 kgf m, 36 lbf ft) in the proper sequence (see step 23)

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

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

   Main Bearing-to-Journal Oil Clearance

   Standard (New): 0.019-0.045 mm (0.0007-0.0018 in)

   Service Limit: 0.050 mm (0.0020 in)

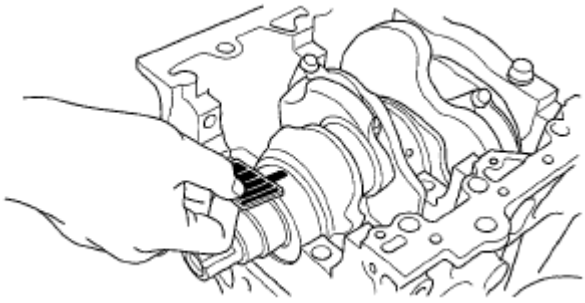


Fig. 7: Measuring Widest Part Of Plastigage
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

MAIN BEARING SELECTION

Block Bore Code Location

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

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

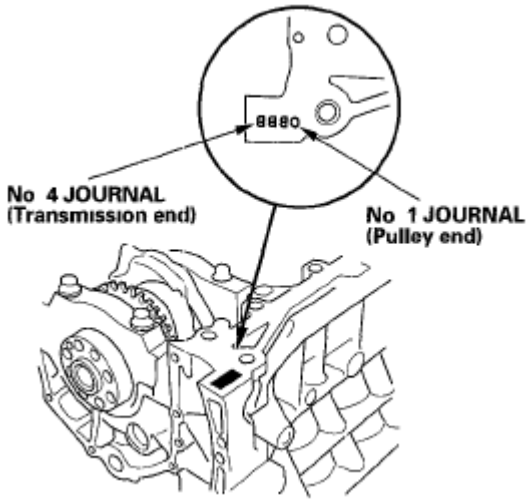


Fig. 8: Identifying Crankshaft Bore Code Location
Courtesy of AMERICAN HONDA MOTOR CO., INC.

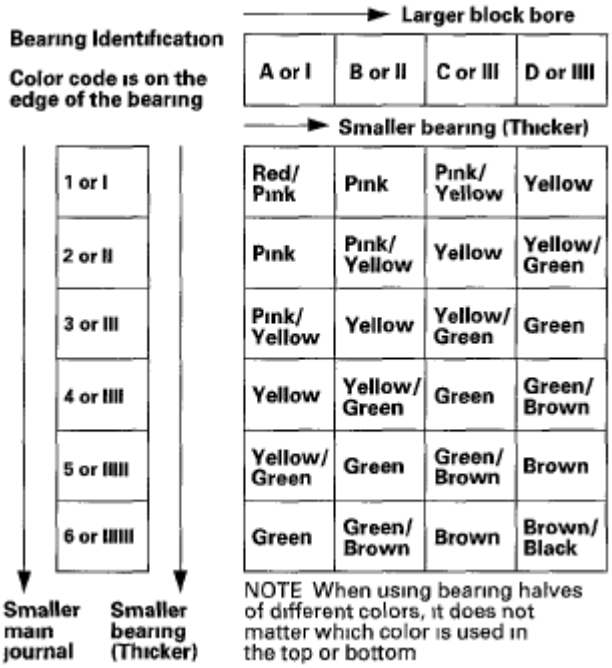


Fig. 9: Bearing Color Code Chart
Courtesy of AMERICAN HONDA MOTOR CO., INC.

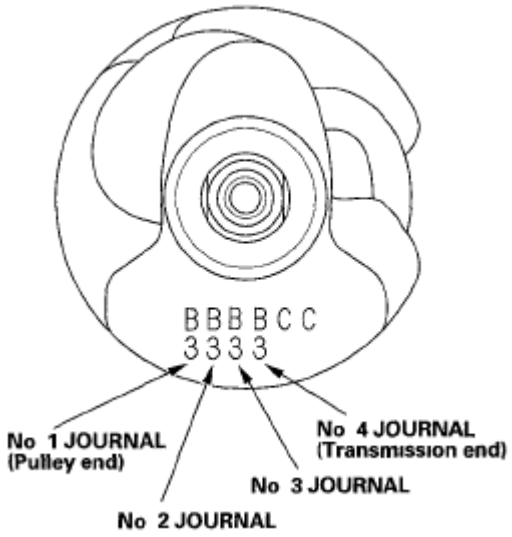


Fig. 10: Identifying Main Journal Code Locations (Numbers or Bars)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

CONNECTING ROD BEARING REPLACEMENT

CONNECTING ROD BEARING CLEARANCE INSPECTION

1. Remove the connecting rod cap and the bearing half (see **CRANKSHAFT AND PISTON REMOVAL**)
2. Clean the crankshaft rod journal and bearing half with a clean shop towel

3. Place a strip of plastigage across the rod journal
4. Reinstall the bearing half and the cap, and tighten the bolts

NOTE:

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

Tightening Torque.

20 N.m (2.0 kgf m, 14 lbf ft) + 90 °

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

Connecting Rod Bearing-to-Journal Oil Clearance

Standard (New): 0.020-0.044 mm (0.0008-0.0017 in)

Service Limit: 0.050 mm (0.0020 in)

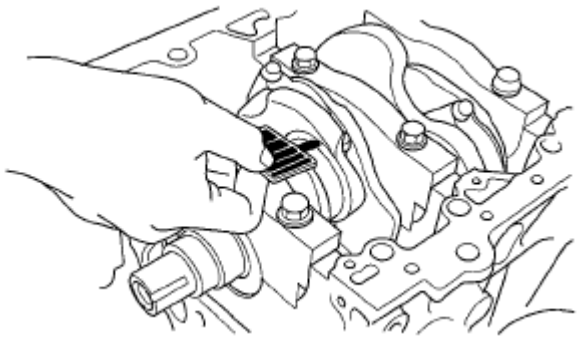


Fig. 11: Measuring Widest Part Of Plastigage
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

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

It's then stamped with a number or bar (1,2,3, or 4/I, II, III, or Mil) indicating the range You may find any

combination of 1,2,3, or 4/I, II, III, or IIII in any engine

Big End Bore Size

J35Z6 engine 58.0 mm (2.28 in)

J37A4 engine. 60.0 mm (2.36 in)

Inspect the connecting rod for cracks and heat damage

Big End Bore Code Locations

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

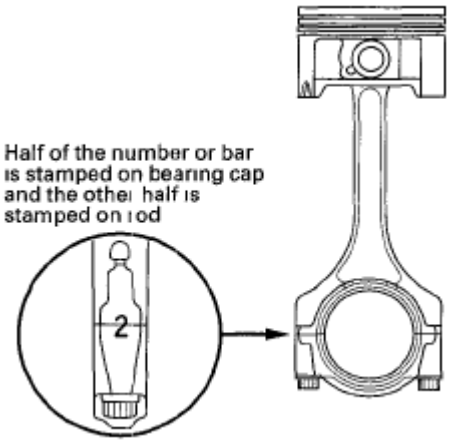


Fig. 12: Identifying Connecting Rod Journal Code Locations
Courtesy of AMERICAN HONDA MOTOR CO., INC.

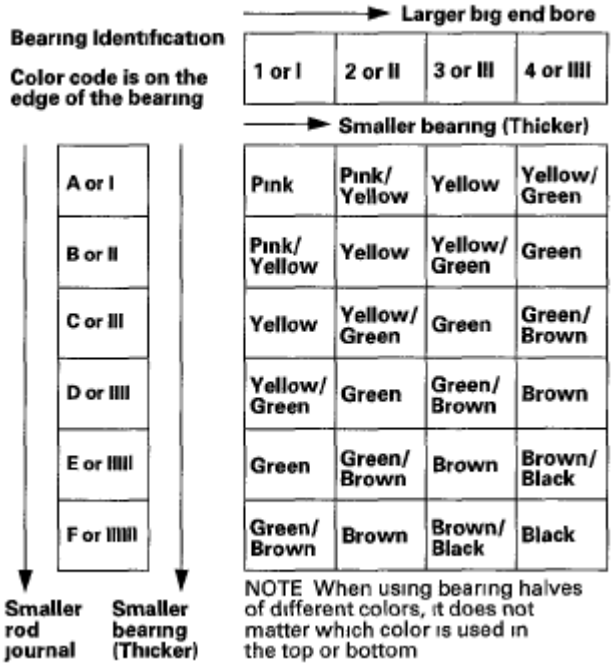


Fig. 13: Bearing Color Code Chart
Courtesy of AMERICAN HONDA MOTOR CO., INC.

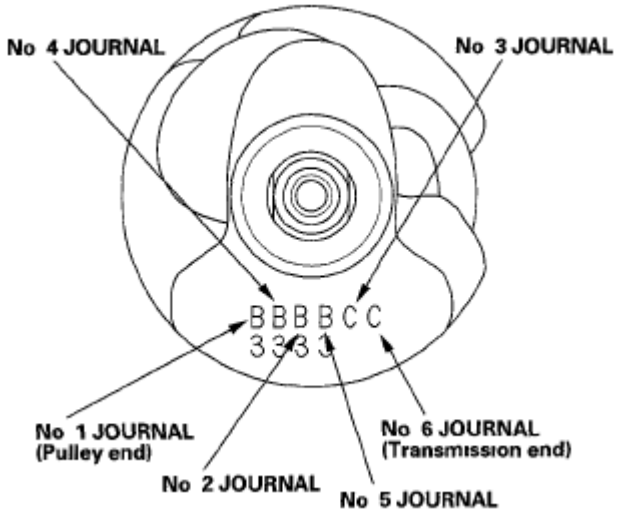


Fig. 14: Identifying Connecting Rod Journal Code Locations (Letters or Bars)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

OIL PAN REMOVAL

1. If the engine is already out of the vehicle, go to step 6
2. Raise the vehicle on the lift
3. Drain the engine oil (see **ENGINE OIL REPLACEMENT**)
4. Remove the splash shield (see **FRONT SPLASH SHIELD REPLACEMENT**)

5. Remove exhaust pipe A (see step 35 on **ENGINE REMOVAL**)
6. Remove the rear warm up three way catalytic converter (rear WU-TWC) bracket

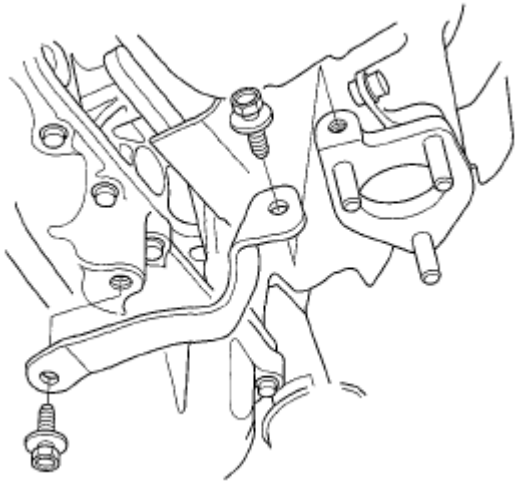


Fig. 15: Identifying Rear Warm Up Three Way Catalytic Converter (Rear WU-TWC) Bracket
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

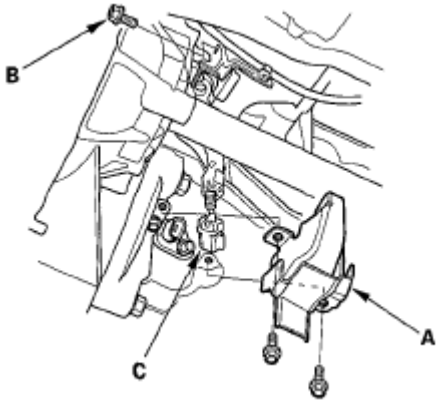


Fig. 16: Identifying Crankshaft Position Sensor Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

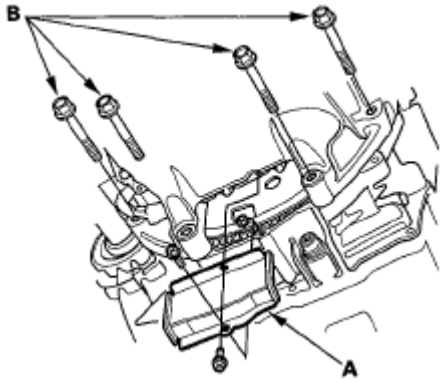


Fig. 17: Identifying Torque Converter Cover With Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

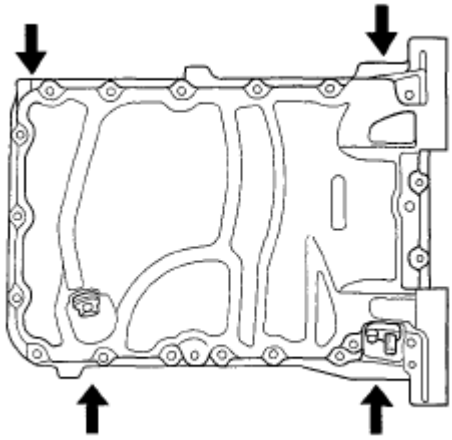


Fig. 18: Identifying Oil Pan Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Remove the oil pan

CRANKSHAFT AND PISTON REMOVAL

1. Remove the engine/transmission (see **ENGINE REMOVAL**)
2. Remove the transmission:
   - Manual transmission (see **TRANSMISSION REMOVAL**)
   - Automatic transmission (see **TRANSMISSION REMOVAL**)
3. M/T model: Remove the flywheel (see **ENGINE SIDE** step 16.)
4. A/T model: Remove the drive plate (see **DRIVE PLATE REMOVAL AND INSTALLATION**)
5. Remove the cylinder heads

- J35Z6 engines (see **CYLINDER HEAD REMOVAL**)
- J37A4 engine (see **CYLINDER HEAD REMOVAL**)

6. Remove the timing belt drive pulley from the crankshaft
   - J35Z6 engine (see **TIMING BELT DRIVE PULLEY REPLACEMENT**)
   - J37A4 engine (see **TIMING BELT DRIVE PULLEY REPLACEMENT**)
7. Remove the oil pan (see **OIL PAN REMOVAL**)
8. Remove the engine block end cover

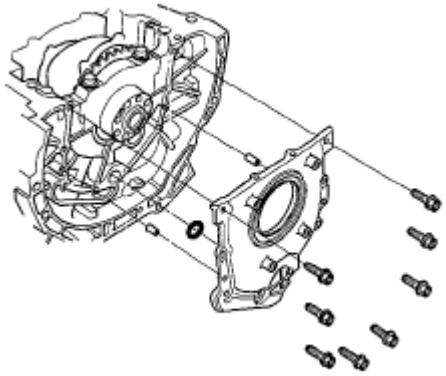


Fig. 19: Identifying Engine Block End Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

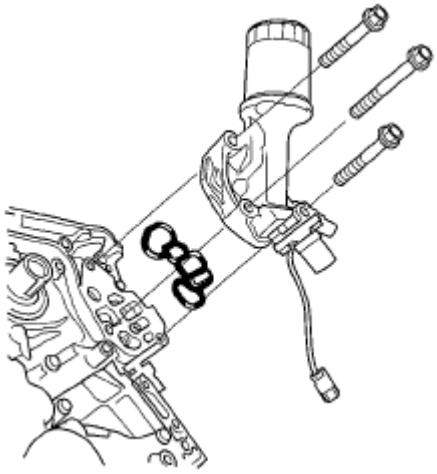


Fig. 20: Identifying Rocker Arm Oil Control Solenoid/Oil Filter Assembly
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

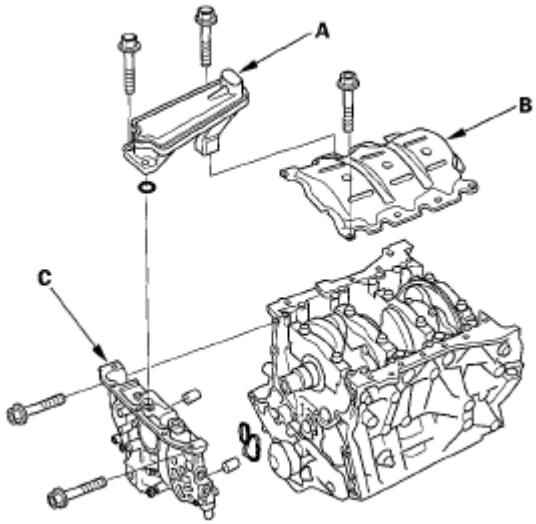


Fig. 21: Identifying Oil Strainer, Baffle Plate And Oil Pump
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

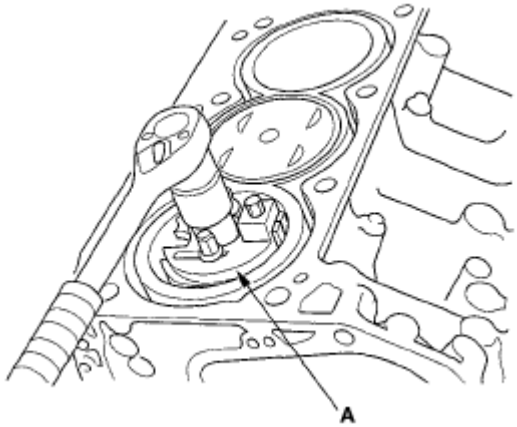


Fig. 22: Removing Hard Carbon Of Cylinder
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

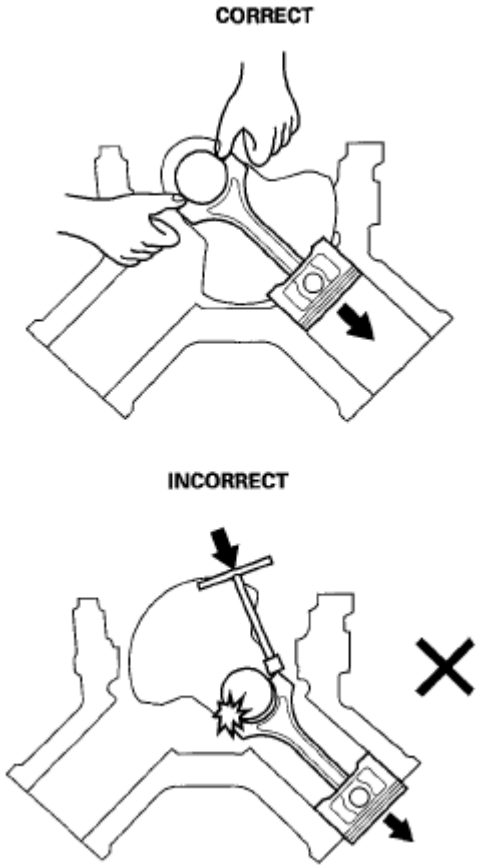


Fig. 23: Pushing Connecting Rod
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

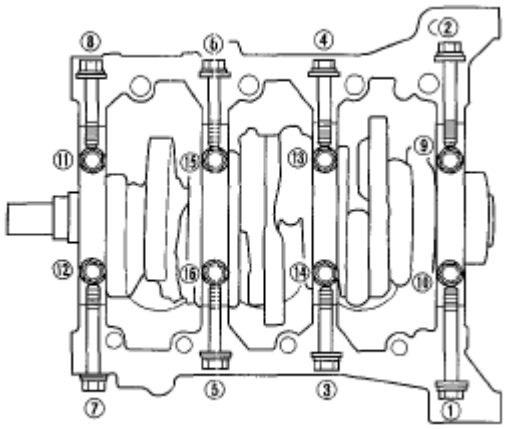


Fig. 24: Identifying Bearing Cap Bolts Loosening Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

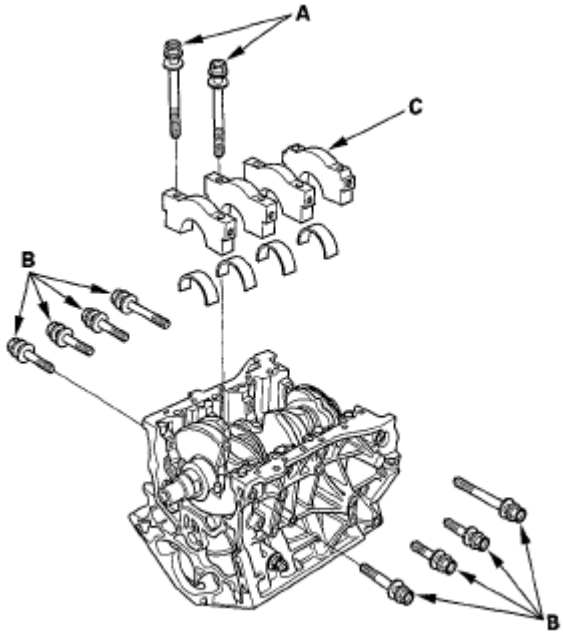


Fig. 25: Identifying Bearing Cap Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

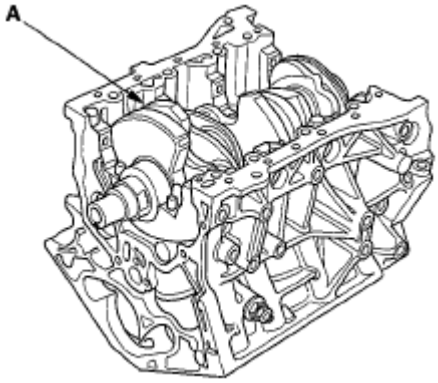


Fig. 26: Lifting Crankshaft
Courtesy of AMERICAN HONDA MOTOR CO., INC.

20. Remove the CKP pulse plate from the crankshaft (see **CKP PULSE PLATE REPLACEMENT**)
21. Reinstall the main caps and the bearings on the engine block in the proper order

CRANKSHAFT INSPECTION

Out-of-Round and Taper

1. Remove the crankshaft from the engine block (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 the main journal in two places The difference between measurements on each journal must not be more than the service limit

   Journal Out-of-Round

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

   Service Limit: 0.010 mm (0.0004 in)

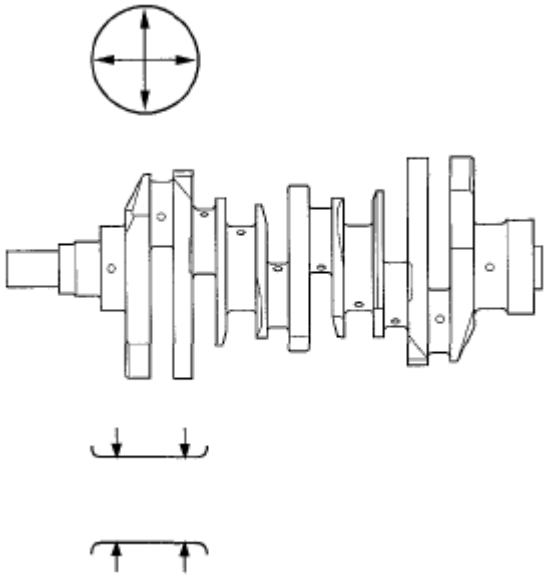


Fig. 27: Measuring Taper Edges Of Each Rod And Main Journal
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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 (0.0002 in) max

   Service Limit: 0.010 mm (0.0004 in)

   Straightness

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

   Crankshaft Total Runout

   Standard (New): 0.025 mm (0.0010 in.) max

   Service Limit: 0.030 mm (0.0012 in)

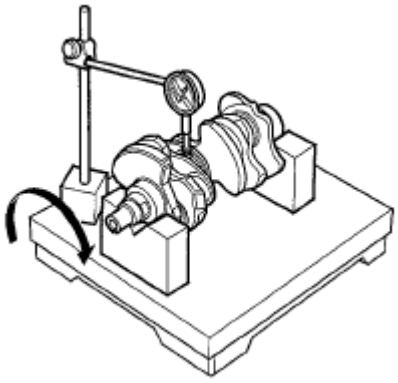


Fig. 28: Measuring Crankshaft Total Runout
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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 skirt diameter at a point 16.0 mm (0.63 m) from the bottom of the skirt

J35Z6 engine

Piston Skirt Diameter

Standard (New): 88 975-88 985 mm (3.5029-3.5033 in)

Service Limit: 88.965 mm (3.5026 in)

Oversize Piston Skirt Diameter

0.25: 89.225 - 89.235 mm (3.5128 - 3.5132 in)

J37A4 engine

Piston Skirt Diameter

Standard (New): 89 983-89 996 mm (3 5426-3 5431 in)

Service Limit: 89 975 mm (3 5423 in)

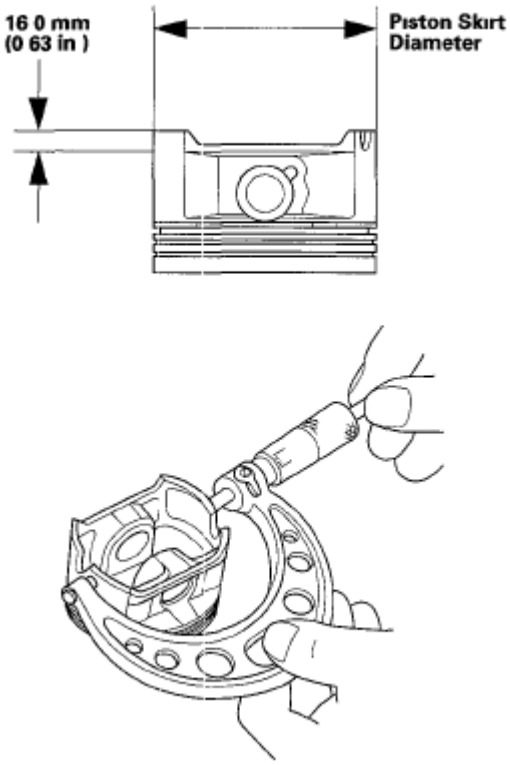


Fig. 29: Measuring Piston Skirt Diameter
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

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

   J35Z6 engine

   Cylinder Bore Size

   Standard (New): 89.000-89.015 mm (3.5039-3.5045 in)

   Service Limit: 89.065 mm (3.5065 in)

   Oversize

   0.25: 89.250-89.265 mm (3.5138-3.5144 in)

   Reboring Limit 0.25 mm (0.01 in)

   Bore Taper

Limit (Difference between first and third measurement) 0.015 mm (0.00059 in)

J37A4 engine

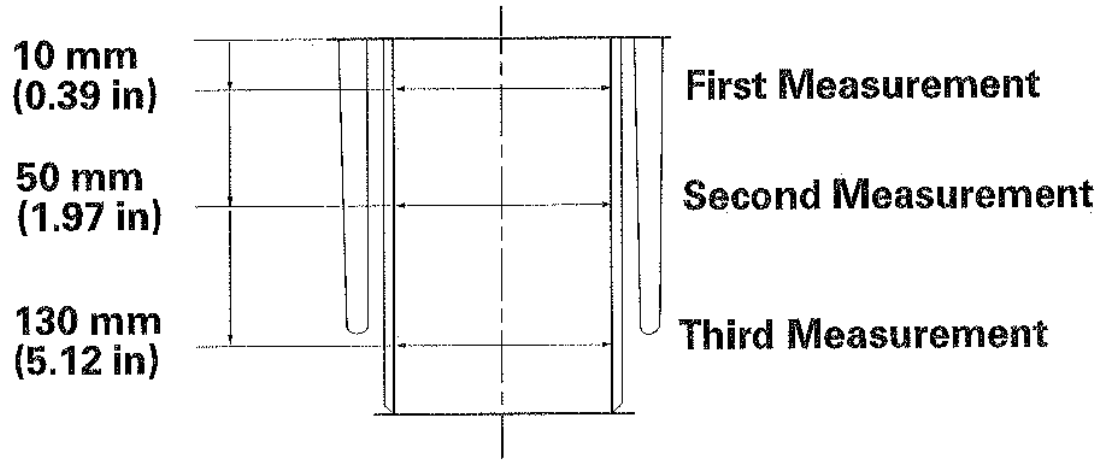
Cylinder Bore Size

Standard (New): 90.000-90.015 mm (3.5433-3.5439 in)

Service Limit: 90.065 mm (3.5459 in)

Bore Taper

Limit (Difference between first and third measurement) 0.015 mm (0.00059 in)



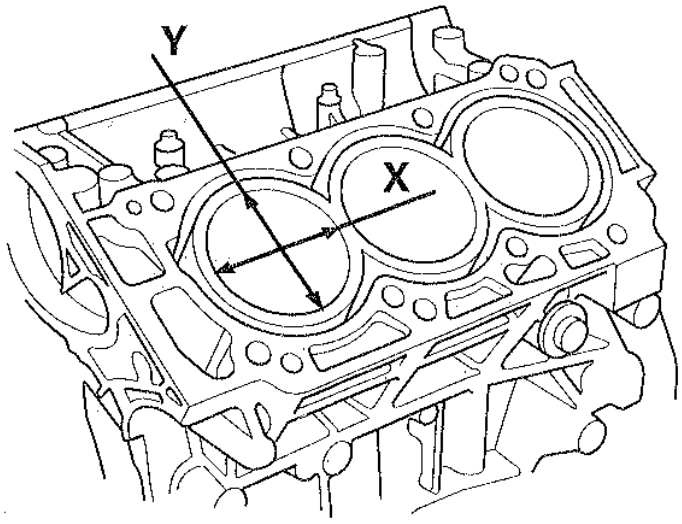


Fig. 30: Measuring Cylinder Bore Size

Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. J35Z6 engine Hone any scored or scratched cylinder bores (see **CYLINDER BORE HONING**)

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

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

Engine Block Warpage

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

Service Limit: 0.10 mm (0.004 in)

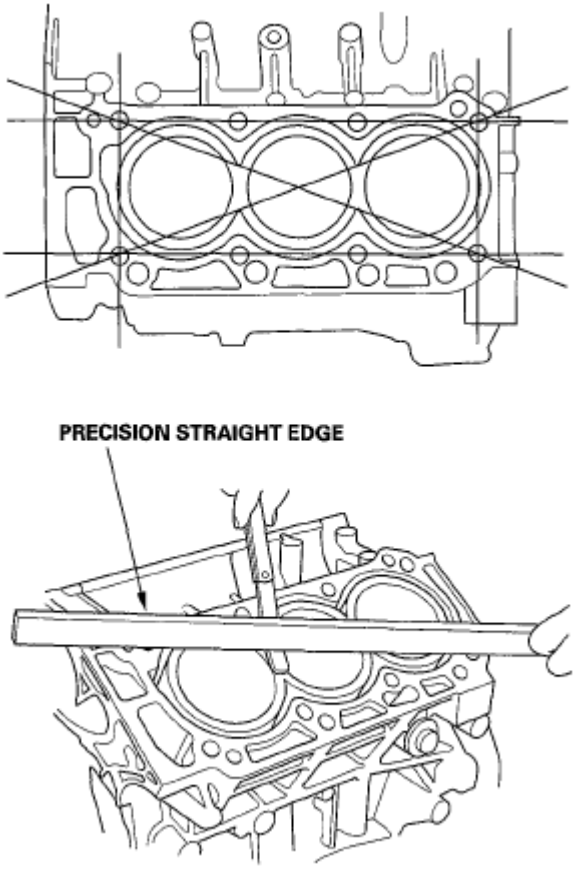


Fig. 31: Checking Top Of Engine Block For Warpage
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

J35Z6 engine

Piston-to-Cylinder Bore Clearance

Standard (New): 0 015-0 040.mm (0.0006-0.0016 in.)

Service Limit: 0 08 mm (0.003 in)

J37A4 engine

Piston-to-Cylinder Bore Clearance

Standard (New): 0.004-0.032 mm (0.00016-0.0013 in)

Service Limit: 0.070 mm (0.0027 in)

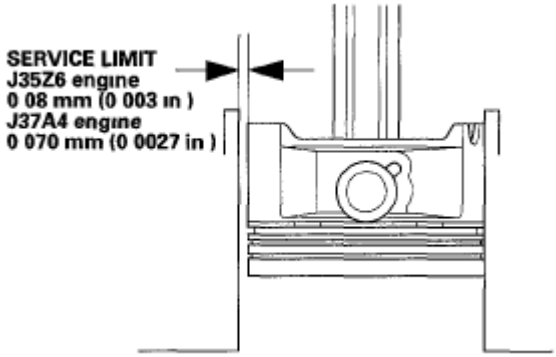


Fig. 32: Inspecting Piston And Cylinder Bore For Excessive Wear
Courtesy of AMERICAN HONDA MOTOR CO., INC.

CYLINDER BORE HONING

J35Z6 ENGINE

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

1. Measure the cylinder bores (see step 4) If the engine block is to be reused, hone the cylinders and remeasure the bores Only scored or scratched cylinder bores must be honed
2. Remove the oil jets (see **OIL FILTER FEED PIPE REPLACEMENT**)
3. Hone the cylinder bores with honing oil and a fine (400 grit) stone in a 60 degree Crosshatch pattern

NOTE:

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

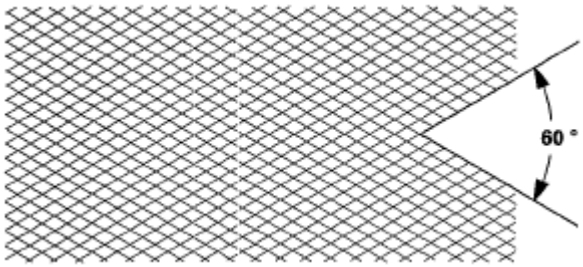


Fig. 33: Honing Cylinder Bores
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

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

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

PISTON, PIN, AND CONNECTING ROD REPLACEMENT

DISASSEMBLY

1. Remove the pistons 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

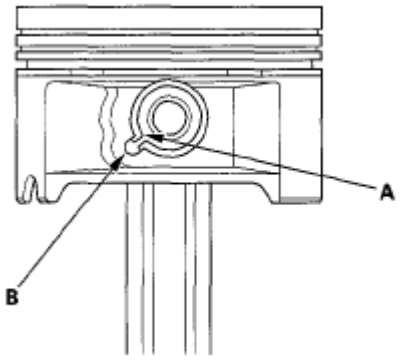


Fig. 34: Identifying Piston Snap Rings
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

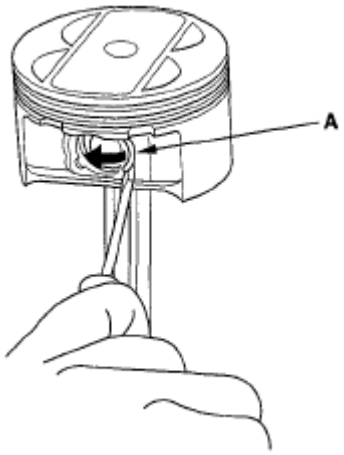


Fig. 35: Removing Snap Rings
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

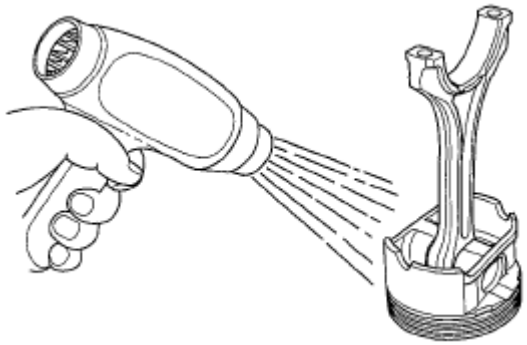


Fig. 36: Removing Piston Pin
Courtesy of AMERICAN HONDA MOTOR CO., INC.

INSPECTION

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

1. Measure the diameter of the piston pin

   Piston Pin Diameter

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

Service Limit: 21.954 mm (0.8643 in)

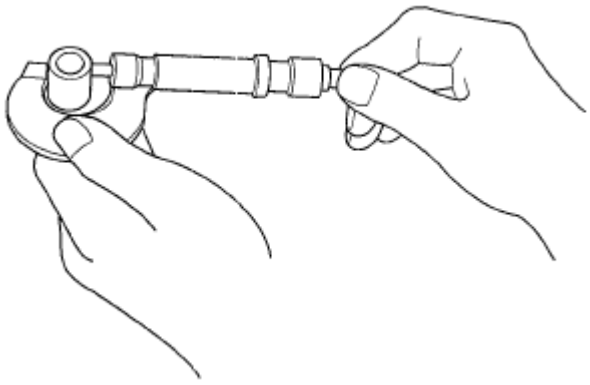


Fig. 37: Measuring Diameter Of Piston Pin
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Zero the dial indicator to the piston pin diameter

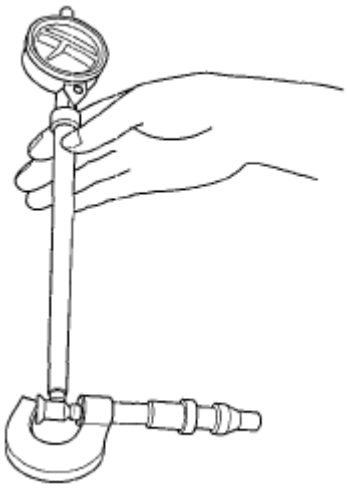


Fig. 38: Identifying Zero Dial Indicator To Piston Pin Diameter
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

J35Z6 engine

Piston Pin-to-Piston Clearance

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

Service Limit: 0.004 mm (0.00016 in)

J37A4 engine

Piston Pin-to-Piston Clearance

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

Service Limit: 0.004 mm (0.00016 in.)

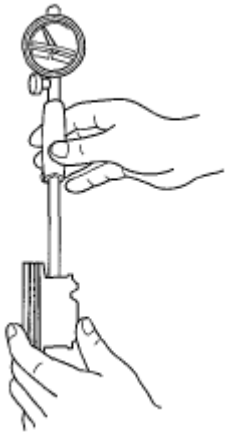


Fig. 39: Identifying Piston Pin-To-Piston Clearance
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

Piston Pin-to-Connecting Rod Clearance

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

Service Limit: 0.019 mm (0.00075 in)

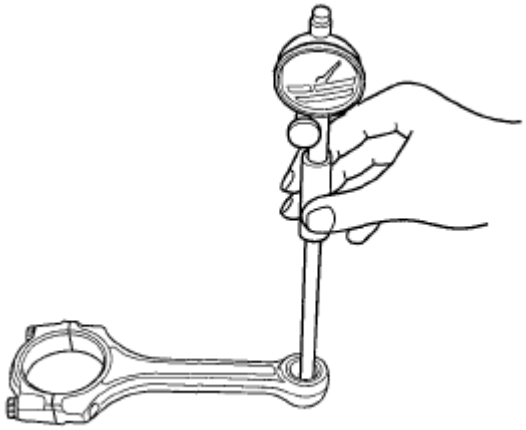


Fig. 40: Measuring Piston Pin-To-Connecting Rod Clearance
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REASSEMBLY

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

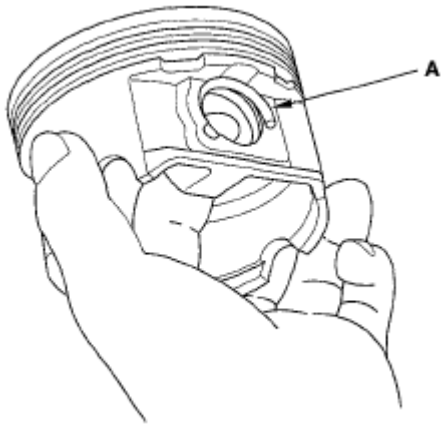


Fig. 41: Installing Piston Pin Snap Ring
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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)

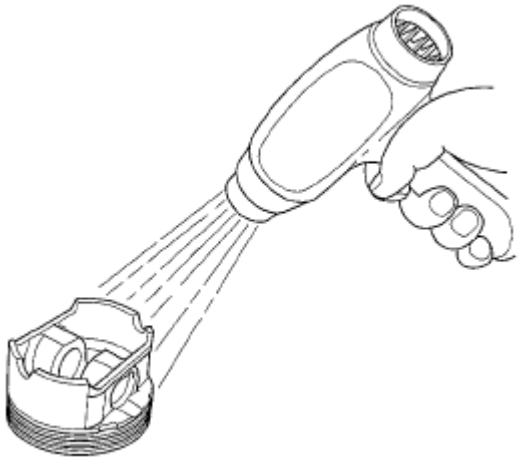


Fig. 42: Heating Piston
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

NOTE: Apply new engine oil to the piston pin

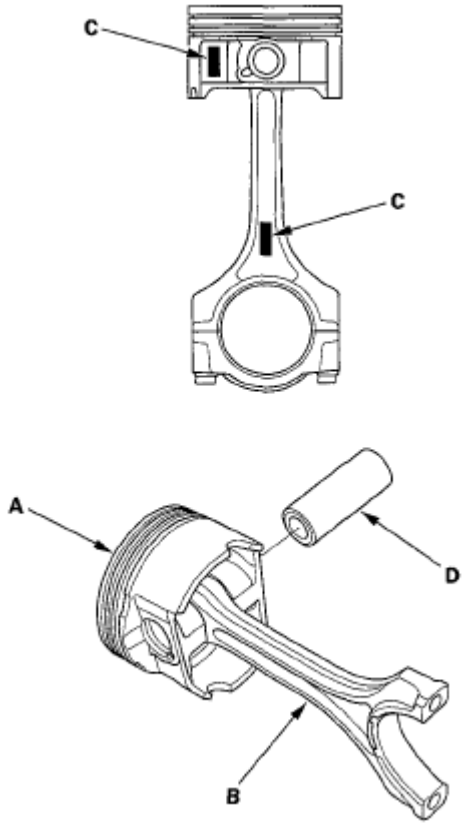


Fig. 43: Identifying Piston And Connecting Rod Installation Position
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

PISTON RING REPLACEMENT

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

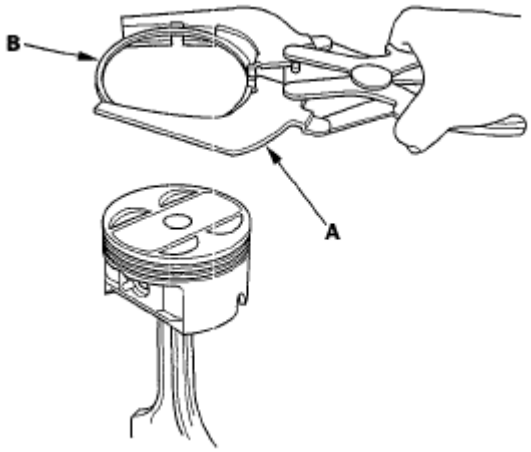


Fig. 44: Removing Old Piston Rings
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Clean all the ring grooves thoroughly with a squared-off broken ring, or a ring groove cleaner with a blade to fit the piston grooves File down the blade, if necessary The top ring and second ring grooves are 1.2 mm (0.05 in) wide, and the oil ring groove is 2.0 mm (0.08 in) wide Do not use a wire brush to clean the ring grooves, or cut the ring grooves deeper with the cleaning tool

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

4. Using a piston, push a new ring (A) into the cylinder bore 15-20 mm (0.6-0.8 in) from the bottom

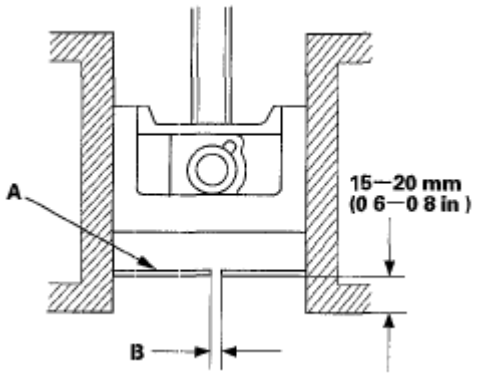


Fig. 45: Identifying Piston Ring Gap
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Measure the piston ring end-gap (B) with a feeler gauge
   - If the gap is too small, check to see if you have the proper rings for your engine
   - If the gap is too large, recheck the cylinder bore diameter against the wear limits (see step 4)
6. J35Z6 engine If the bore is over the service limit, the engine block must be rebored

J35Z6 engine

Piston Ring End-Gap

Top Ring

Standard (New): 0.20-0.35 mm (0.008-0.014 in)

Service Limit: 0.60 mm (0.024 in)

Second Ring

Standard (New): 0.40-0.55 mm (0.016-0.022 in)

Service Limit: 0.70 mm (0.028 in)

Oil Ring

Standard (New): 0.20-0.70 mm (0.008-0.028 in)

Service Limit: 0.80 mm (0.031 in)

J37A4 engine

Piston Ring End-Gap

Top Ring

Standard (New): 0.30-0.40 mm (0.012-0.016 in)

Service Limit: 0.60 mm (0.024 in)

Second Ring

Standard (New): 0.40-0.55 mm (0.016-0.022 in)

Service Limit: 0.70 mm (0.028 in)

Oil Ring

Standard (New): 0.20-0.35 mm (0.008-0.014 in)

Service Limit: 0.45 mm (0.018 in)

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

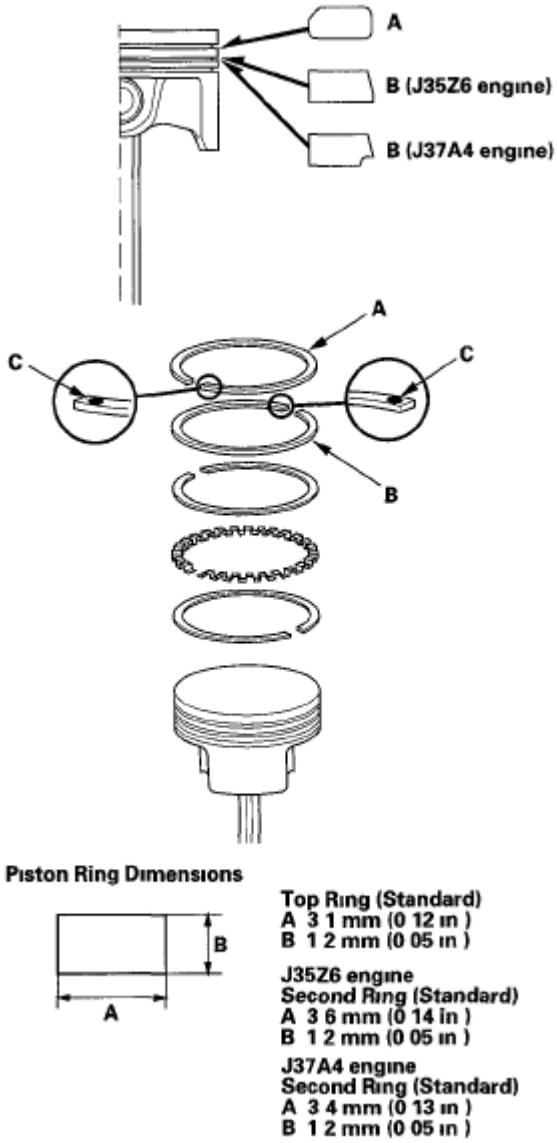


Fig. 46: Identifying Piston Ring Installation Position
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

   J35Z6 engine

   Top Ring Clearance

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

   Service Limit: 0.15 mm (0.006 in)

   Second Ring Clearance

Standard (New): 0.030-0.055 mm (0.0012-0.0022 in)

Service Limit: 0.13 mm (0.005 in)

J37A4 engine

Top Ring Clearance

Standard (New): 0.055-0.085 mm (0.0022-0.0033 in)

Service Limit: 0.15 mm (0.006 in)

Second Ring Clearance

Standard (New): 0.030-0.060 mm (0.0012-0.0024 in)

Service Limit: 0.13 mm (0.005 in.)

Fig. 47: Measuring Ring-To-Groove Clearance
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

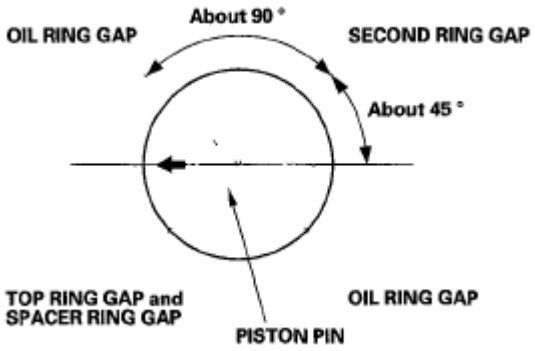


Fig. 48: Identifying Ring End Gaps
Courtesy of AMERICAN HONDA MOTOR CO., INC.

CRANKSHAFT AND PISTON INSTALLATION

Special Tools Required

- Driver handle, 15 x 135L 07749-0010000
- Oil seal driver attachment, 106 mm 070AD-RCA0200

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

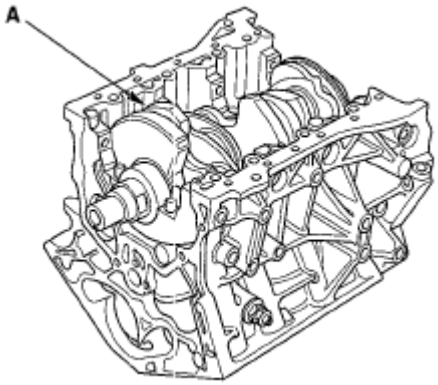


Fig. 49: Identifying Crankshaft
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

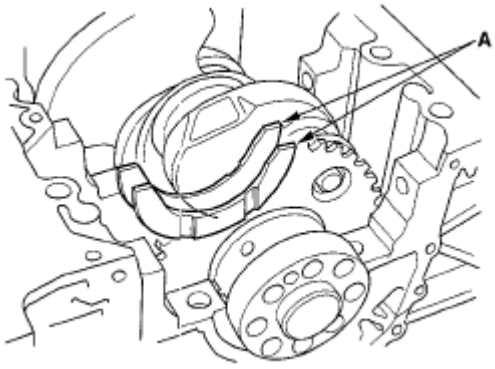


Fig. 50: Identifying Thrust Washers
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

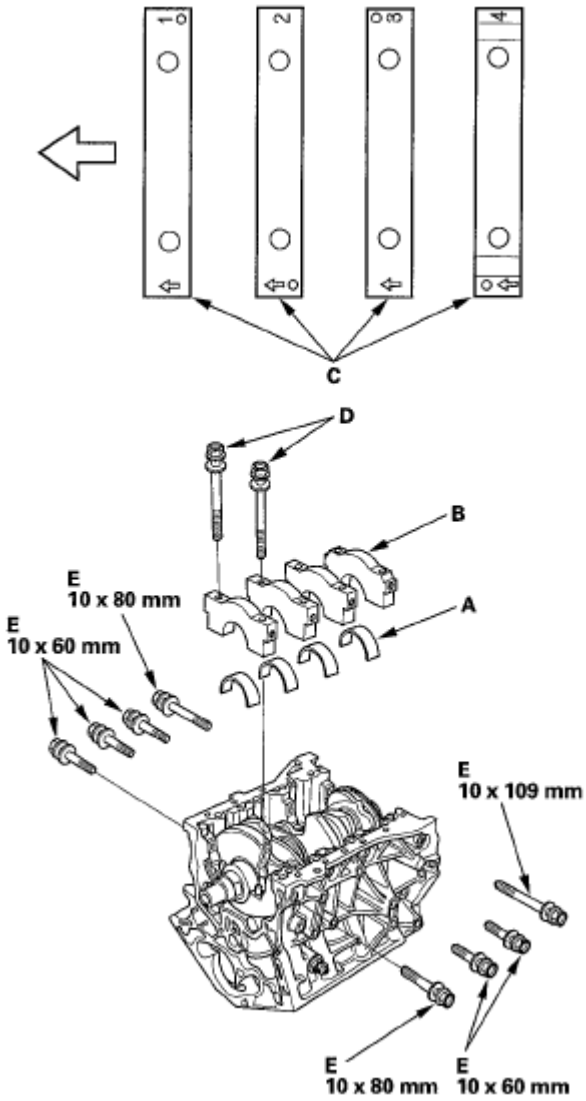


Fig. 51: Identifying Bearing Caps Installation Position
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

13. Position the piston/connecting rod assembly with the arrow (A) facing the timing belt side of the engine block

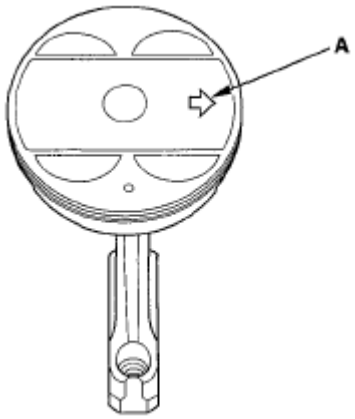


Fig. 52: Positioning Piston/Connecting Rod Assembly
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

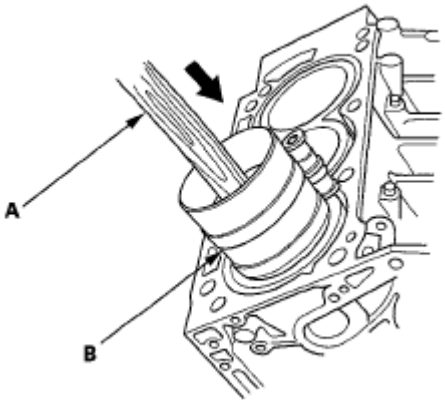


Fig. 53: Tapping Piston/Connecting Rod Assembly In Cylinder Bore
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

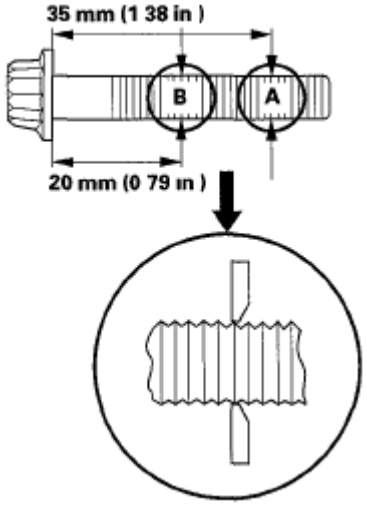


Fig. 54: Measuring Diameter Of Connecting Rod Bolt Point A And B
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

    Point A-Point B = Difference in Diameter

    Difference in Diameter

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

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

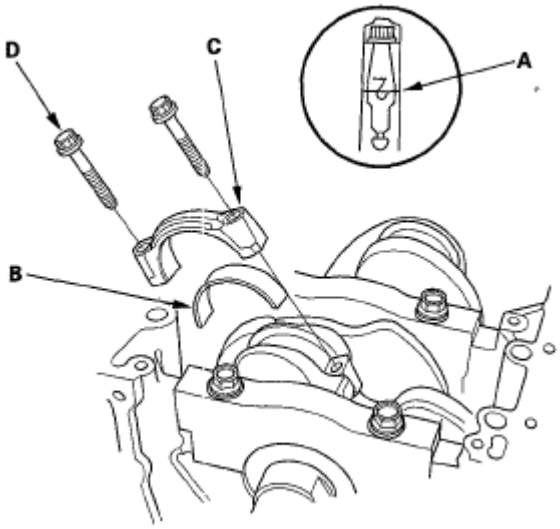


Fig. 55: Identifying Connecting Rod Bearing And Cap
Courtesy of AMERICAN HONDA MOTOR CO., INC.

20. Apply new engine oil to the bolt threads and flanges Tighten the bolts (D) to 20 N m (2.0 kgf m, 14 lbf ft)
21. Mark the connecting rod (A) and the bolt head (B) as shown

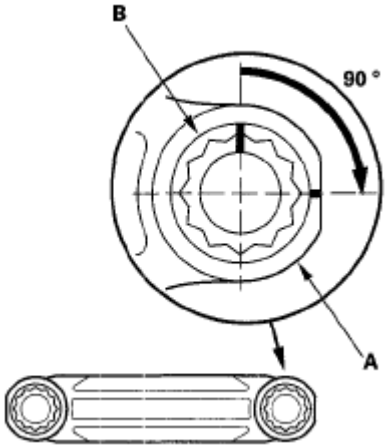


Fig. 56: Identifying Connecting Rod Bolts Tightening Angle
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

NOTE: Remove the connecting rod bolt if you tightened it beyond the specified angle, and go back to step 16 of the procedure Do not loosen it back to the specified angle. Repeat step 10 to 22 for the remaining cylinders

23. Tighten the bearing cap bolts, and then the bearing cap side bolts to the specified torque in the sequence as shown Repeat the torque sequence again to ensure the bolts are properly torqued

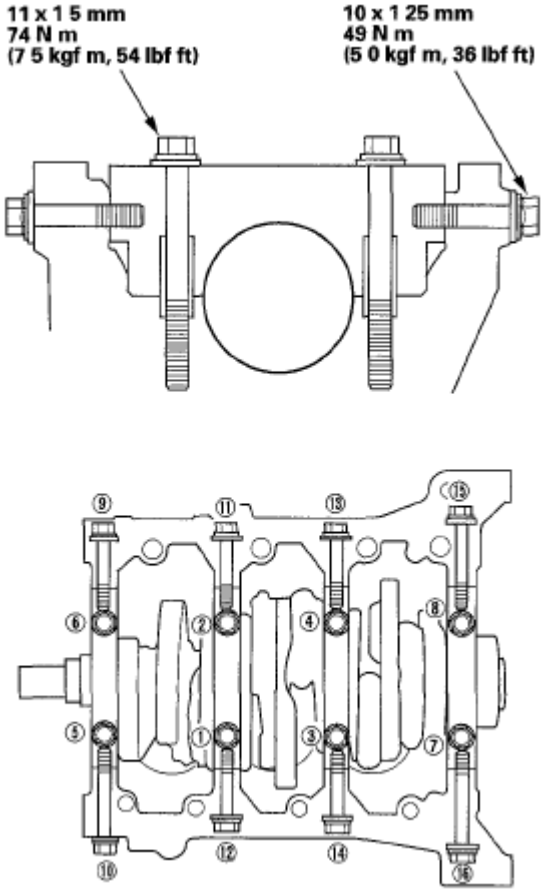


Fig. 57: Tightening Bearing Cap Bolts With Specification Torque
Courtesy of AMERICAN HONDA MOTOR CO., INC.

24. Remove all of the old liquid gasket from the engine block end cover mating surfaces, the bolts, and the bolt holes
25. Clean and dry the engine block end cover mating surfaces
26. Apply a light coat of new engine oil to the lip of the crankshaft oil seal
27. Using the driver handle, 15 x 135 L and the oil seal driver attachment, 106 mm, drive in the new crankshaft oil seal until the oil seal driver attachment bottoms on the engine block end cover

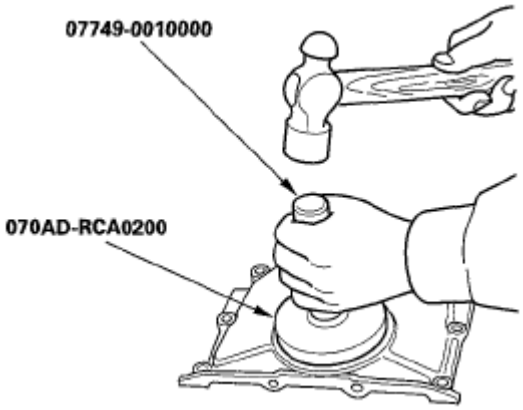


Fig. 58: Tapping Crankshaft Oil Seal
Courtesy of AMERICAN HONDA MOTOR CO., INC.

28. Apply liquid gasket, P/N 08717-0004, 08718-0003, or 08718-0009, evenly to the engine block mating surface of the engine block end cover and to the inside edge of the threaded bolt holes Install the component within 5 minutes of applying the liquid gasket

NOTE:

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

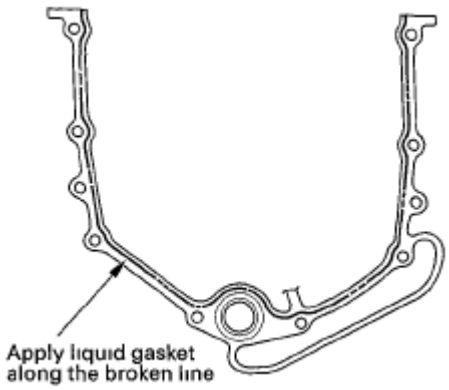


Fig. 59: Identifying Liquid Gasket Applying Area
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

NOTE:

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

block end cover

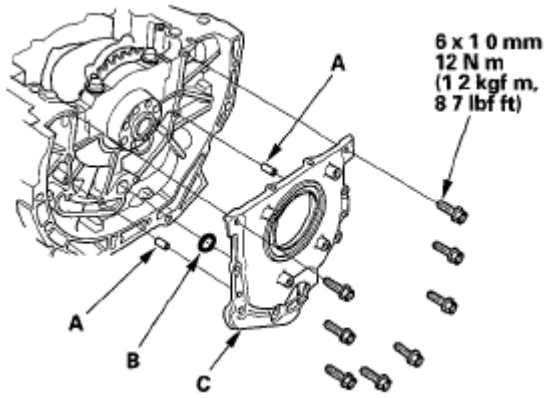


Fig. 60: Identifying Dowel Pins, O-Ring And Engine Block End Cover With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

30. Clean the excess grease off the crankshaft, and check the seal for distortion
31. Install a new crankshaft oil seal in the oil pump (see step 3 on **INSTALLATION**)
32. Remove all of the old liquid gasket from the oil pump mating surfaces, the bolts, and the bolt holes
33. Clean and dry the oil pump mating surfaces
34. Apply liquid gasket, P/N 08717-0004, 08718-0003, or 08718-0009, evenly to the engine block mating surface of the oil pump and to the inside edge of the threaded bolt holes Install the component within 5 minutes of applying the liquid gasket

NOTE:

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

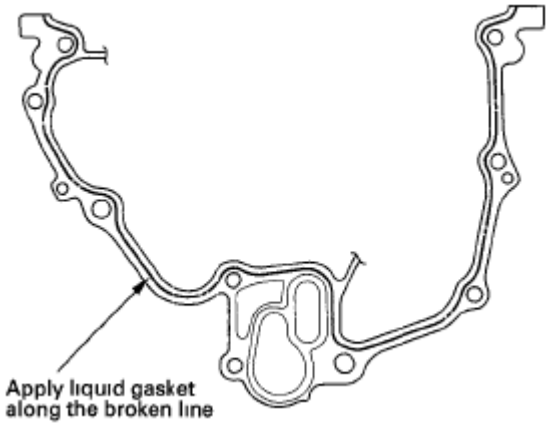


Fig. 61: Identifying Liquid Gasket Applying Area
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

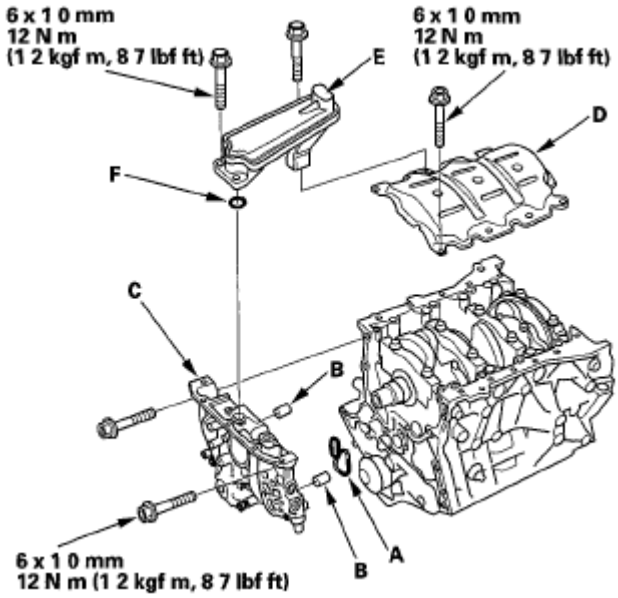


Fig. 62: Identifying Baffle Plate, Oil Pump And Dowel Pins With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

36. Install the dowel pins (B), then align the inner rotor with the crankshaft, and install the oil pump (C)
37. Clean the excess grease off the crankshaft, and check the seal for distortion
38. Install the baffle plate (D), then install the oil strainer (E) with a new O-ring (F)

NOTE:

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

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

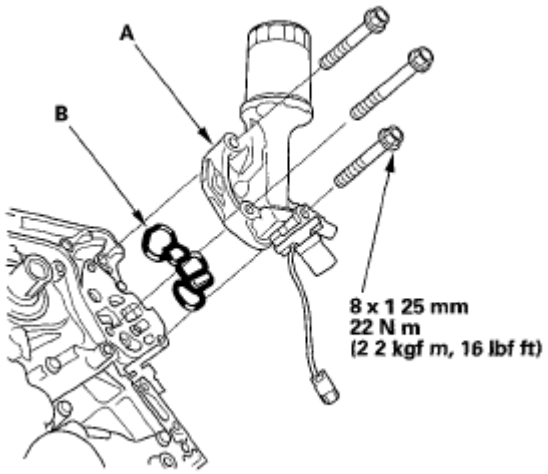


Fig. 63: Identifying Rocker Arm Oil Control Solenoid And Oil Filter Assembly With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

40. Install the oil pan (see **OIL PAN INSTALLATION**)
41. Install the timing belt drive pulley to the crankshaft
    - J35Z6 engine (see **TIMING BELT DRIVE PULLEY REPLACEMENT**)
    - J37A4 engine (see **TIMING BELT DRIVE PULLEY REPLACEMENT**)
42. Install the cylinder heads
    - J35Z6 engine (see **CYLINDER HEAD INSTALLATION**)
    - J37A4 engine (see **CYLINDER HEAD INSTALLATION**)
43. M/T model: Install the flywheel (see **ENGINE SIDE** step 18.)
44. A/T model: Install drive plate (see **DRIVE PLATE REMOVAL AND INSTALLATION**)
45. Install the transmission:
    - Manual transmission (see **TRANSMISSION INSTALLATION**)
    - Automatic transmission (see **TRANSMISSION INSTALLATION**)
46. Install the engine/transmission (see **ENGINE INSTALLATION**)

NOTE: When 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 journals and the CKP pulse plate

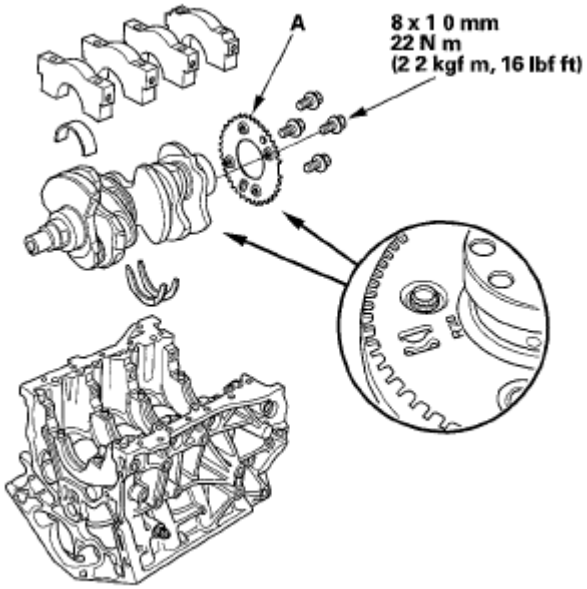


Fig. 64: Identifying CKP Pulse Plate With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

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, evenly to the oil pan mating surface of the engine block and to the inside edge of the threaded bolt holes Install the component within 5 minutes of applying the liquid gasket

NOTE:

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

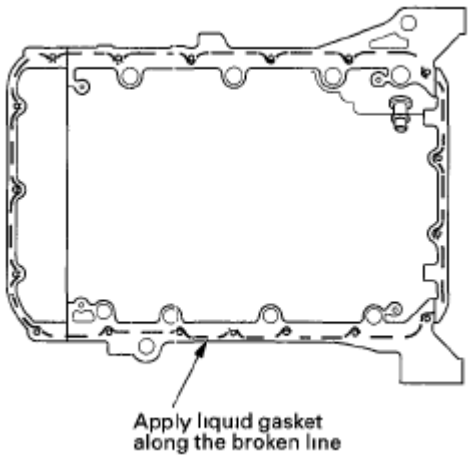


Fig. 65: Identifying Liquid Gasket Applying Area
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

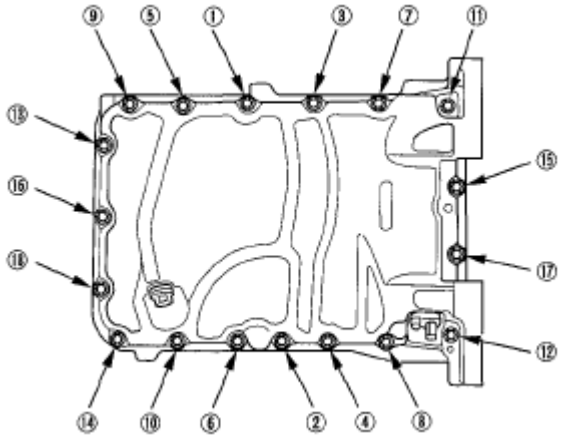


Fig. 66: Identifying Oil Pan Bolts Tightening Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

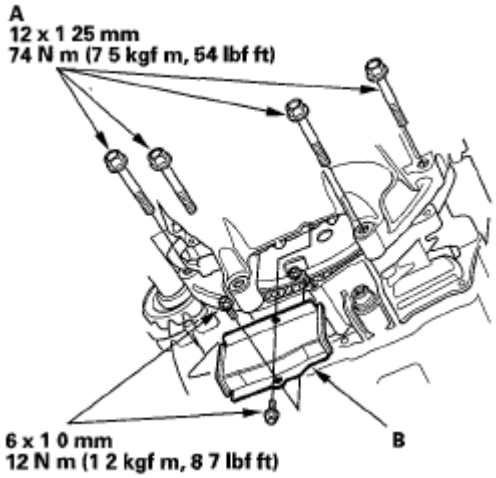


Fig. 67: Tightening Torque Converter Cover Bolts With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

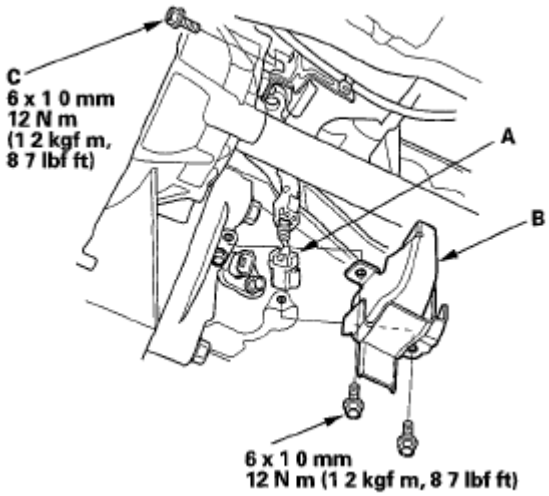


Fig. 68: Identifying Crankshaft Position Sensor Connector With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Install the rear warm up three way catalytic converter (rear WU-TWC) bracket

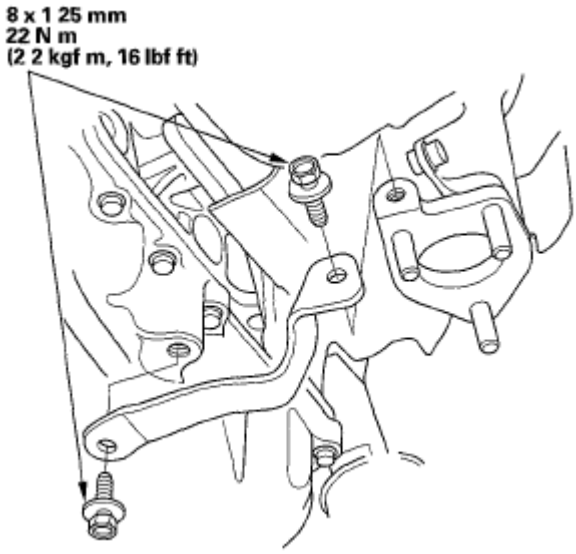


Fig. 69: Identifying Rear Warm Up Three Way Catalytic Converter (Rear WU-TWC) Bracket With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. If the engine is still in the vehicle, do the following steps
10. Install exhaust pipe A using new gaskets and new self-locking nuts (see step 37 on **ENGINE INSTALLATION**)
11. Install the splash shield (see **FRONT SPLASH SHIELD REPLACEMENT**)
12. Refill the engine with the recommended engine oil (see step 4 on **ENGINE OIL REPLACEMENT**)

PULLEY END CRANKSHAFT OIL SEAL INSTALLATION - IN CAR

Special Tools Required

Oil seal driver, 64 mm 070AD-RCAA100

1. Remove the timing belt drive pulley:
   - J35Z6 engine (see **TIMING BELT DRIVE PULLEY REPLACEMENT**)
   - J37A4 engine (see **TIMING BELT DRIVE PULLEY REPLACEMENT**)
2. Remove the pulley end crankshaft oil seal
3. Clean and dry the crankshaft oil seal housing
4. Apply a light coat of new engine oil to the lip of the crankshaft oil seal
5. Using the oil seal driver, 64 mm, drive in the new crankshaft oil seal until the oil seal driver bottoms against the oil pump When the seal is in place, clean any excess grease off the crankshaft, and check that the oil seal lip is not distorted

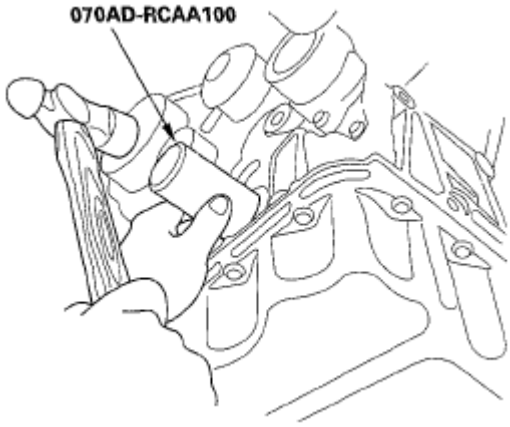


Fig. 70: Tapping Crankshaft Oil Seal
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Install the timing belt drive pulley:

- J35Z6 engine (see **TIMING BELT DRIVE PULLEY REPLACEMENT**)
- J37A4 engine (see **TIMING BELT DRIVE PULLEY REPLACEMENT**)

TRANSMISSION END CRANKSHAFT OIL SEAL INSTALLATION - IN CAR

Special Tools Required

- Driver handle, 15 x 135L 07749-0010000
- Oil seal driver attachment, 106 mm 070AD-RCA0200

1. M/T model: Remove the transmision (see **TRANSMISSION REMOVAL**), and the flywheel (see **ENGINE SIDE** step 16).
2. A/T model: Remove the transmission (see **TRANSMISSION REMOVAL**) and the drive plate (see **DRIVE PLATE REMOVAL AND INSTALLATION**)
3. Remove the transmission end crankshaft oil seal
4. Clean and dry the crankshaft oil seal housing
5. Apply a light coat of new engine oil to the lip of the crankshaft oil seal
6. Using the driver handle, 15 x 135L, and the oil seal driver attachment, 106 mm, drive in the new crankshaft oil seal until the oil seal driver attachment bottoms against the engine block end cover Align the hole in the oil seal driver attachment with the pin on the crankshaft.

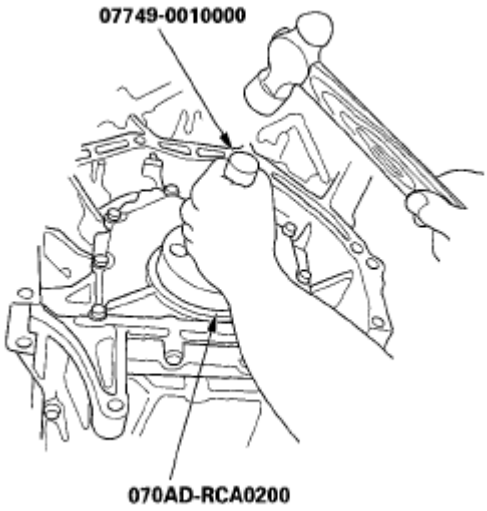


Fig. 71: Tapping Crankshaft Oil Seal
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Clean any excess grease off the crankshaft, and check that the oil seal lip is not distorted
8. M/T model: Install the flywheel (see **ENGINE SIDE** step 18). Install the transmission (see **TRANSMISSION INSTALLATION**).
9. A/T model: Install the drive plate (see **DRIVE PLATE REMOVAL AND INSTALLATION**), and the transmission (see **TRANSMISSION INSTALLATION**)

SEALING BOLT INSTALLATION

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

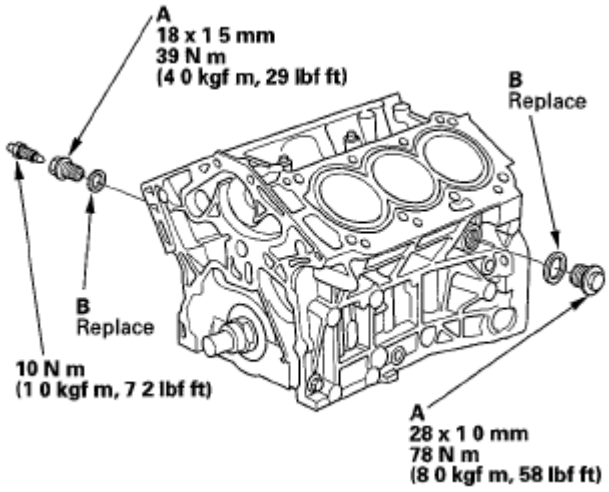


Fig. 72: Identifying Sealing Bolt And Washer With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

