2011-12 ENGINE

Cylinder Head - Odyssey

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-R70A200	VTEC Air Stop Tool B	1
⑥	07GAF-SD40330	Ball Joint Remover/Installer	1
⑦	07HAH-PJ7A100	Valve Guide Reamer, 5.5 mm	1
⑧	07JAA-001020A	Socket, 19 mm	1
⑨	07JAB-001020B	Holder Handle	1
⑩	07MAB-PY3010A	Holder Attachment, 50 mm, Offset	1
⑪	07PAD-0010000	Stem Seal Driver	1

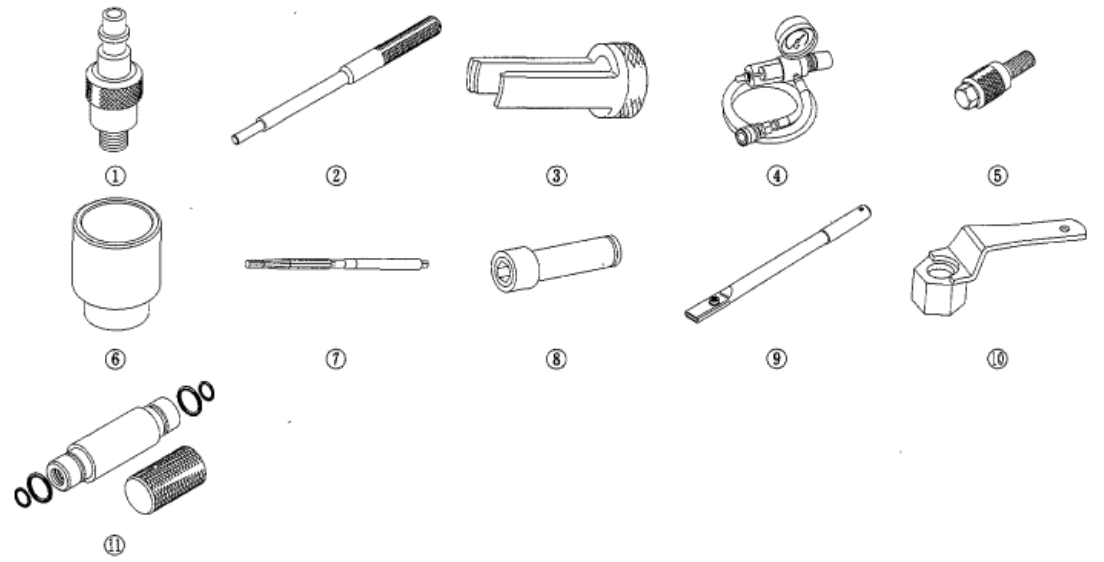


Fig. 1: Identifying Special Tools
Courtesy of AMERICAN HONDA MOTOR CO., INC.

COMPONENT LOCATION INDEX

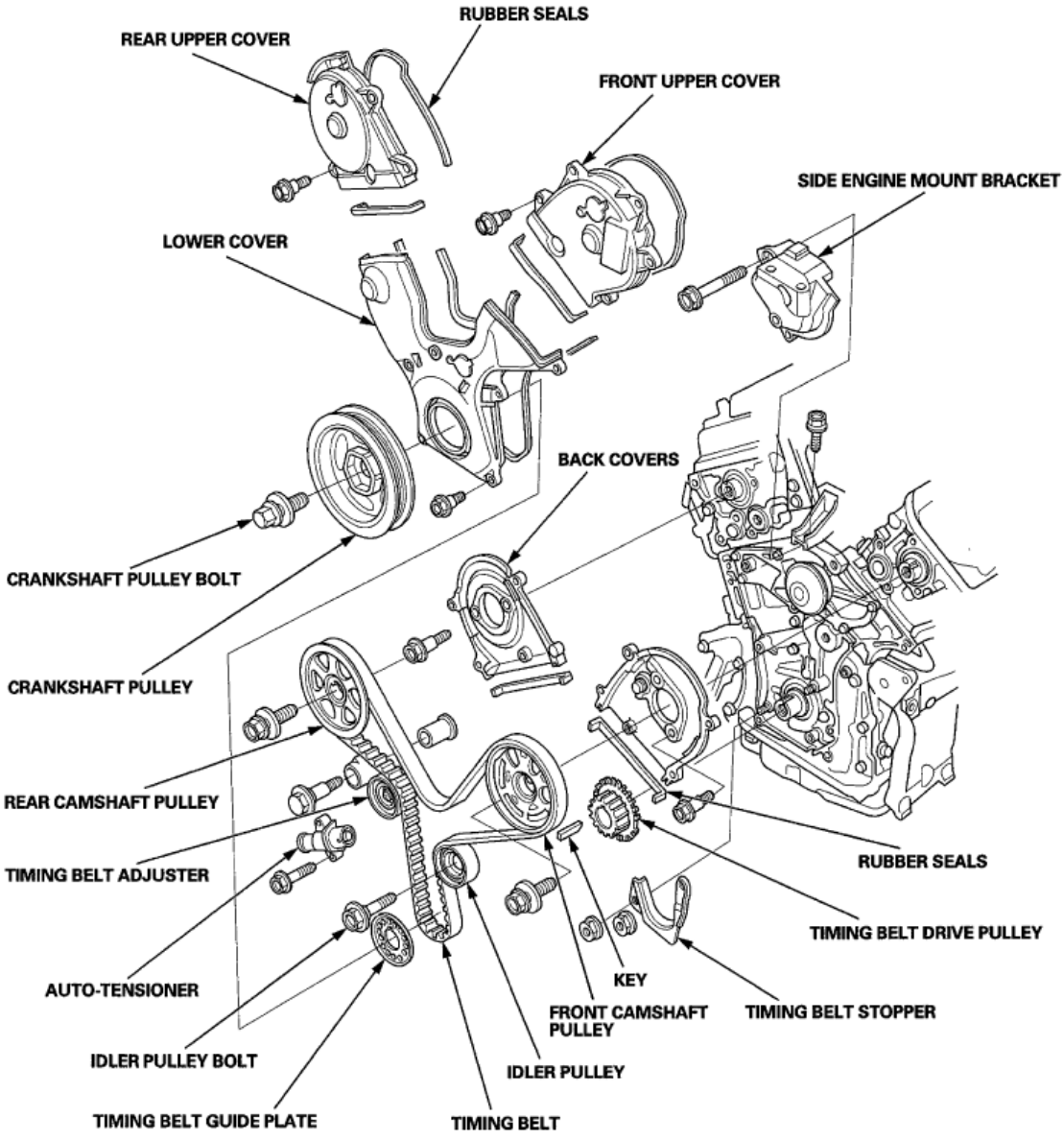


Fig. 2: Exploded View Of Crankshaft And Timing Belt Drive Pulley Replacement Components Locations
Courtesy of AMERICAN HONDA MOTOR CO., INC.

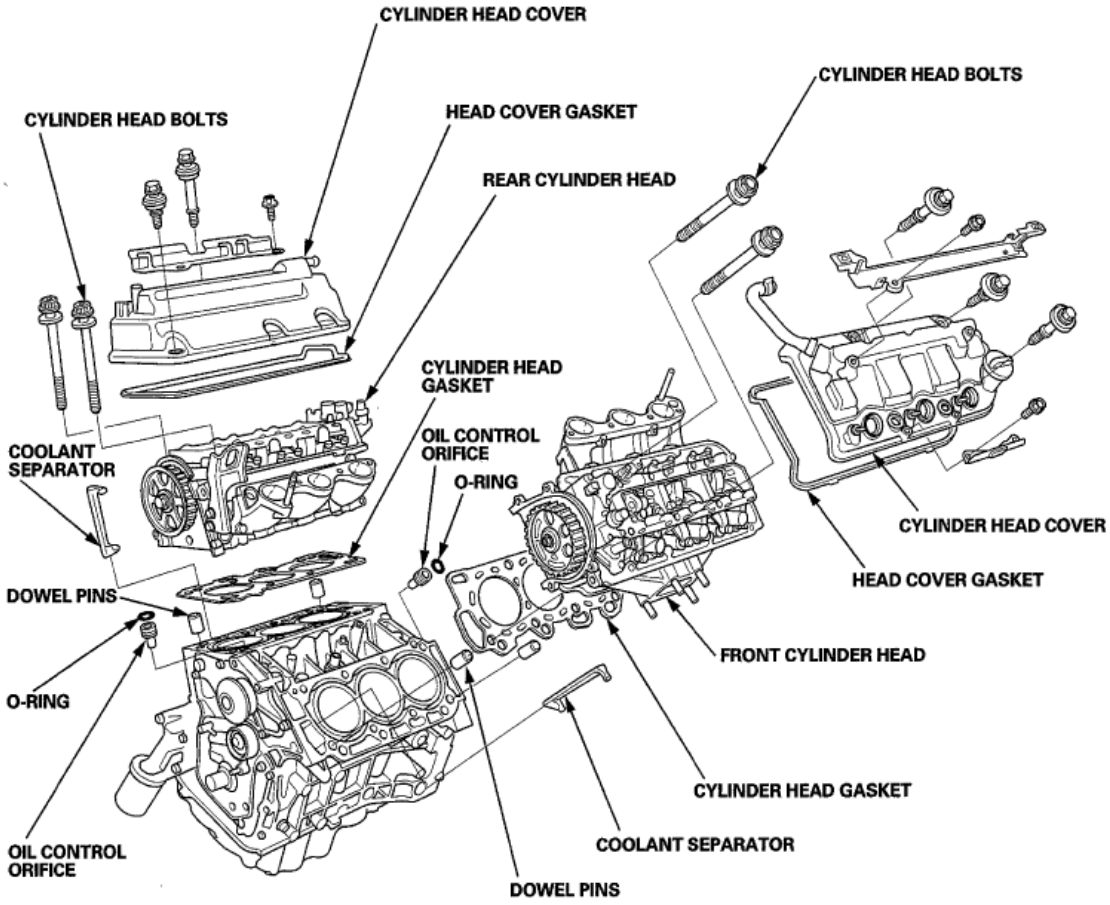


Fig. 3: Identifying Cylinder Head Replacement Components Locations
Courtesy of AMERICAN HONDA MOTOR CO., INC.

FRONT

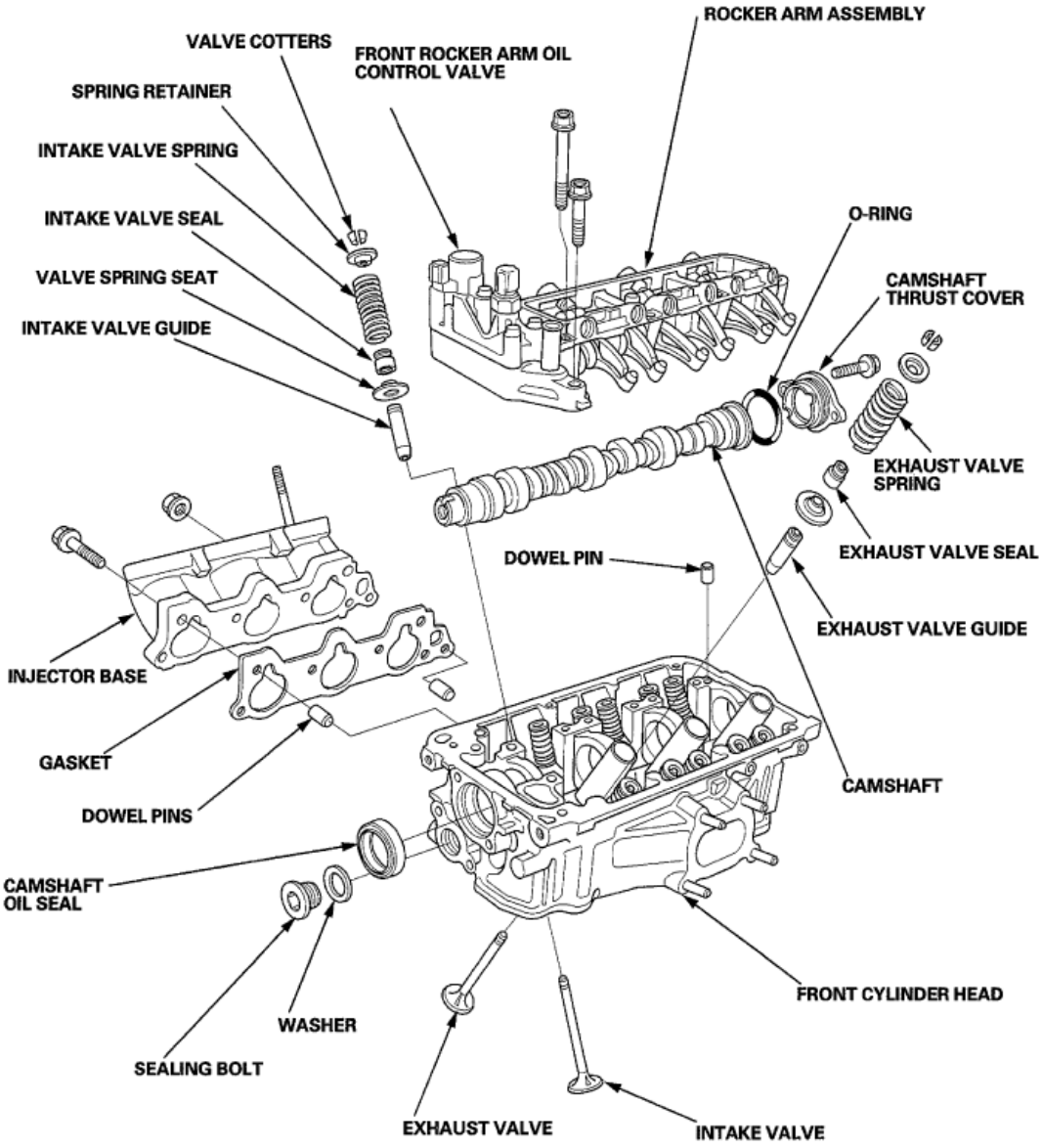


Fig. 4: Identifying Cylinder Head Replacement Components Locations (FRONT)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

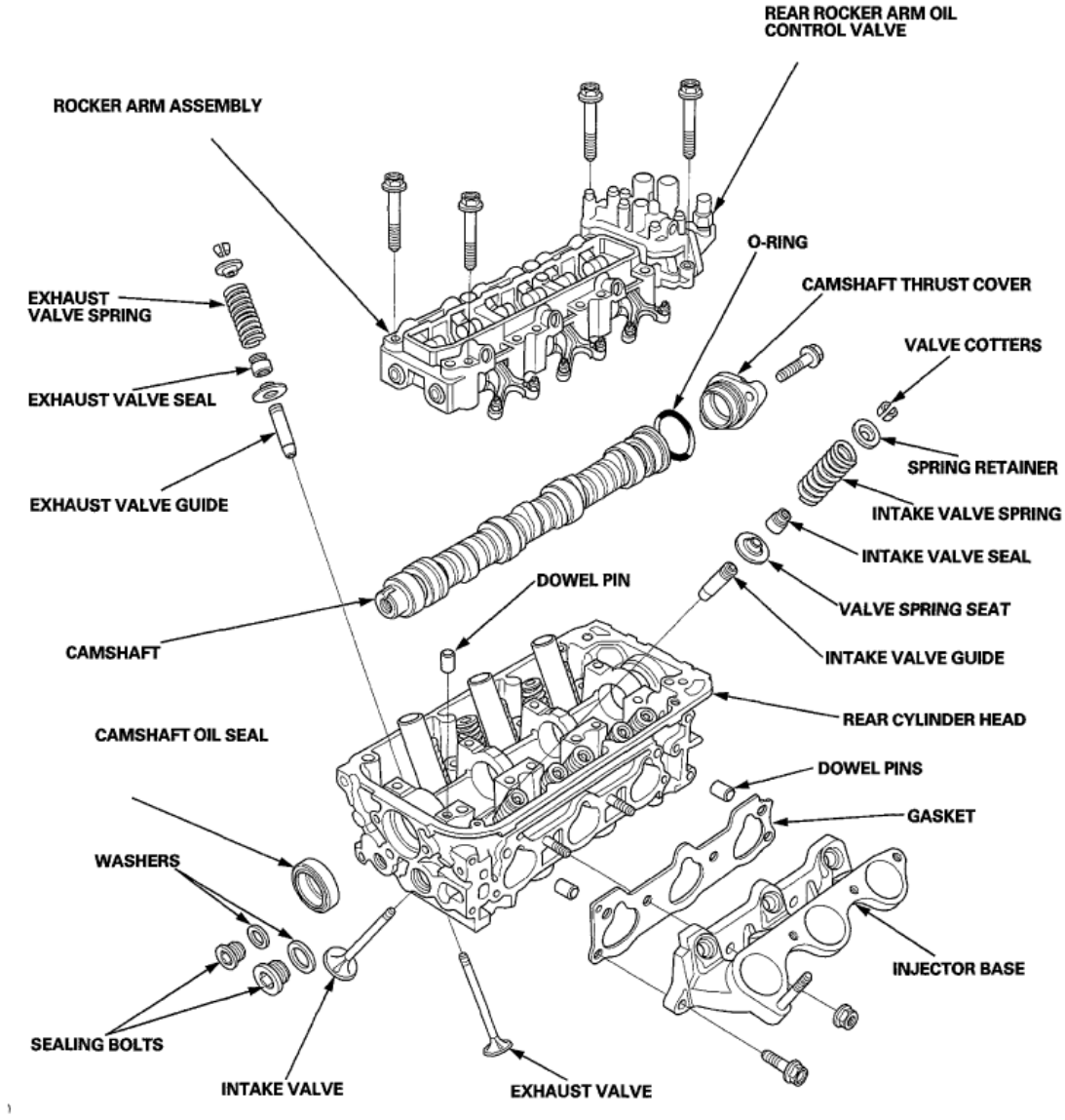


Fig. 5: Identifying Cylinder Head Replacement Components Locations (REAR)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

ENGINE COMPRESSION INSPECTION

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

1. Turn the ignition switch to LOCK (0).
2. Connect the HDS to the DLC (see step 2 on **GENERAL TROUBLESHOOTING INFORMATION**).
3. Turn the ignition switch to ON (II).
4. Make sure the HDS communicates with the vehicle and the PCM. If it does not communicate,

troubleshoot the DLC circuit (see **DLC CIRCUIT TROUBLESHOOTING**).

5. Select ALL INJECTORS STOP in the PGM-FI INSPECTION menu with the HDS.
6. Turn the ignition switch to LOCK (0).
7. Remove the six ignition coils and the six spark plugs (see **IGNITION COIL AND SPARK PLUG REMOVAL/INSTALLATION**).
8. Attach the compression gauge to a spark plug hole.

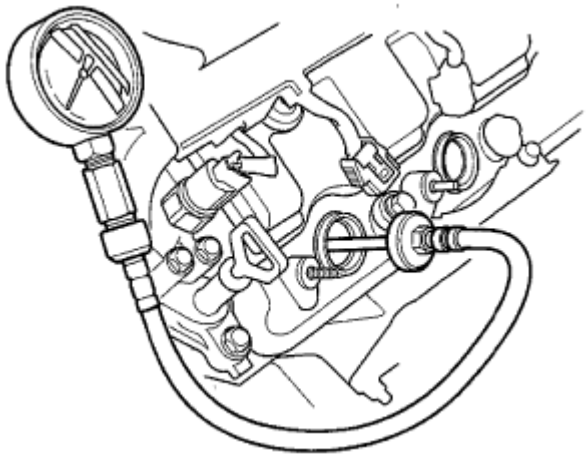


Fig. 6: Identifying Compression Gauge Connection With Spark Plug Hole
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

   Compression Pressure:

   Above 930 kPa (9.48 kgf/cm^2 , 134.8 psi)

10. Measure the compression on the remaining cylinders.

    Maximum Variation:

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

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

- Damaged or worn piston and cylinder bore

12. Remove the compression gauge from the spark plug hole.
13. Install the six spark plugs and the six ignition coils (see **IGNITION COIL AND SPARK PLUG REMOVAL/INSTALLATION**).
14. Select PCM reset (see **IF THE MIL DID NOT STAY ON**) in the PGM-FI INSPECTION menu to cancel ALL INJECTORS STOP with the HDS.

VARIABLE CYLINDER MANAGEMENT ROCKER ARM TEST

Special Tools Required

- VCM Air Adapter 070AJ-001A101
- VTEC Air Stop Tool B 07AAJ-R70A200
- Air Pressure Regulator 07AAJ-PNAA101

1. Remove the six ignition coils and the six spark plugs (see **IGNITION COIL AND SPARK PLUG REMOVAL/INSTALLATION**).
2. Remove the cylinder head covers (see **CYLINDER HEAD COVER REMOVAL**).
3. Rotate the crankshaft pulley clockwise. Make sure that the intake primary rocker arm (A) and the intake secondary rocker arm (B) are mechanically connected by the pistons and that the intake primary rocker arm and the intake secondary rocker arm should move together:
   - If the intake secondary rocker arm moves 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 4.

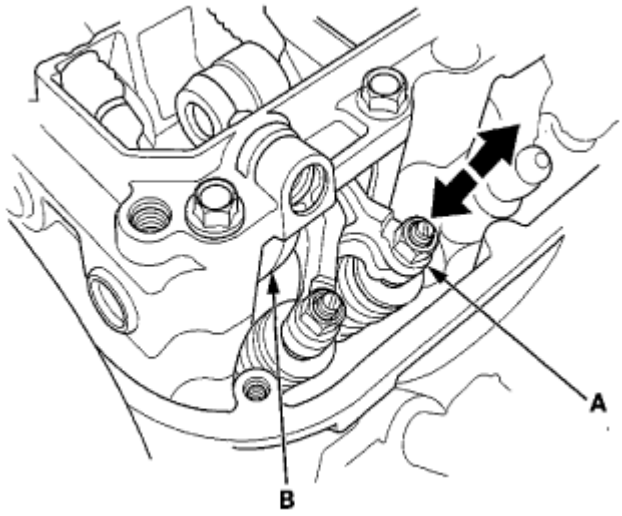


Fig. 7: Moving Intake Primary Rocker Arm With Intake Secondary Rocker Arm
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

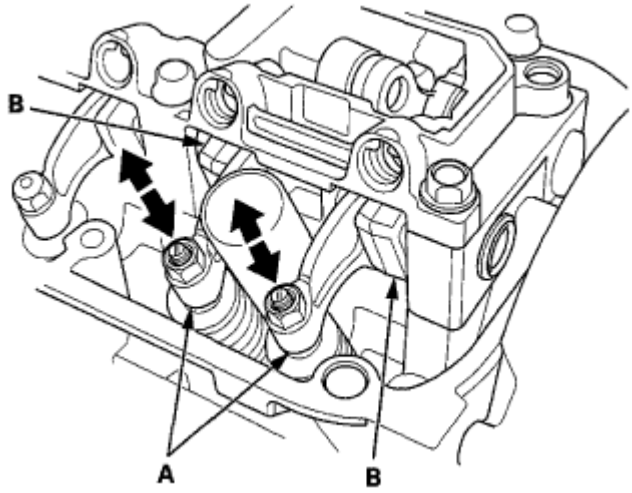


Fig. 8: Moving Exhaust Primary Rocker Arm With Exhaust Secondary Rocker Arm
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Check that the air pressure on the shop air compressor gauge indicates over 690 kPa (7.04 kgf/cm^2 , 100.1 psi).
6. Inspect the valve clearance (see **VALVE CLEARANCE ADJUSTMENT**).
7. Remove the sealing bolt, then install the VCM air adapter (A) to the inspection hole and install VTEC air stop tool B, then connect the air pressure regulator (C) as shown.

FRONT

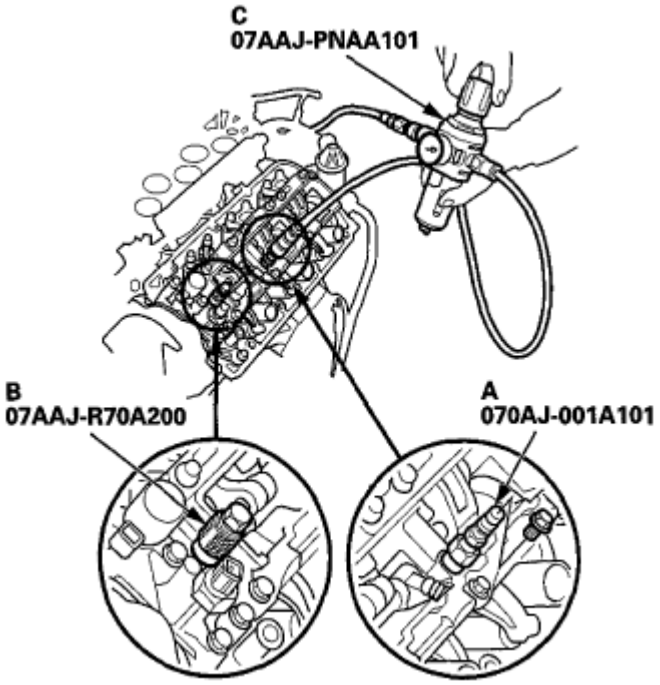


Fig. 9: Identifying Air Pressure Regulator Connection With VCM Air Adapter (FRONT)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

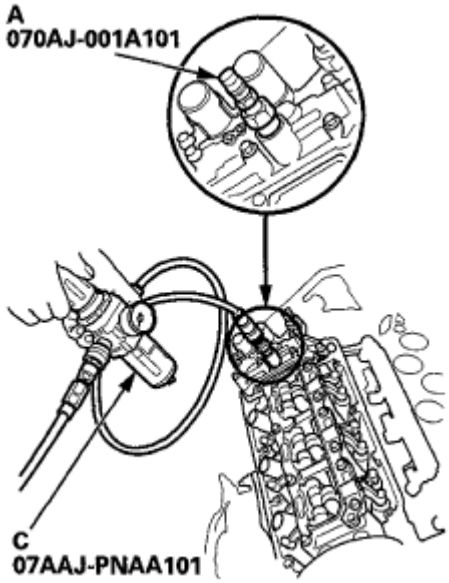


Fig. 10: Identifying Air Pressure Regulator Connection With VCM Air Adapter (FRONT)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

Specified Air Pressure:

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

9. With the specified air pressure applied, rotate the crankshaft pulley clockwise. The intake secondary rocker arm (A) should move independently with the intake primary rocker arm (B):
   - If the intake secondary rocker arm does not 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 secondary rocker arm move independently, go to step 10.

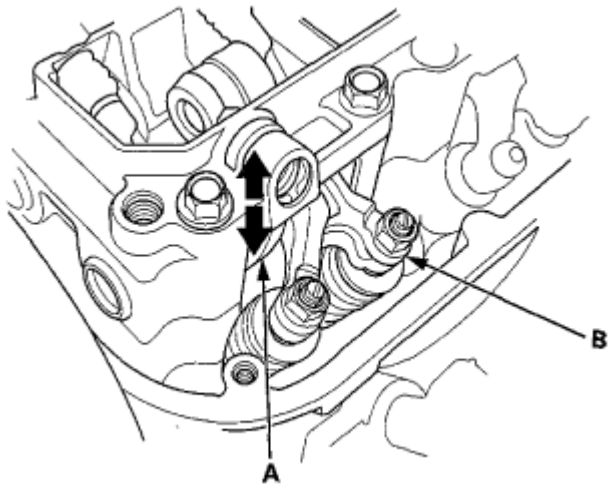


Fig. 11: Moving Intake Secondary Rocker Arm With Intake Primary Rocker Arm
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. With the specified air pressure applied, rotate the crankshaft pulley clockwise. The exhaust secondary rocker arm (A) should move independently with the exhaust primary rocker arm (B):
    - If the exhaust secondary rocker arm does not move independently, remove the exhaust primary rocker arm and the exhaust secondary rocker arm as an assembly, and check that the pistons in the rocker arms move smoothly. If any exhaust rocker arm needs replacing, replace the primary and secondary rocker arms as an assembly, then retest.
    - If the exhaust secondary rocker arm moves independently, go to step 11.

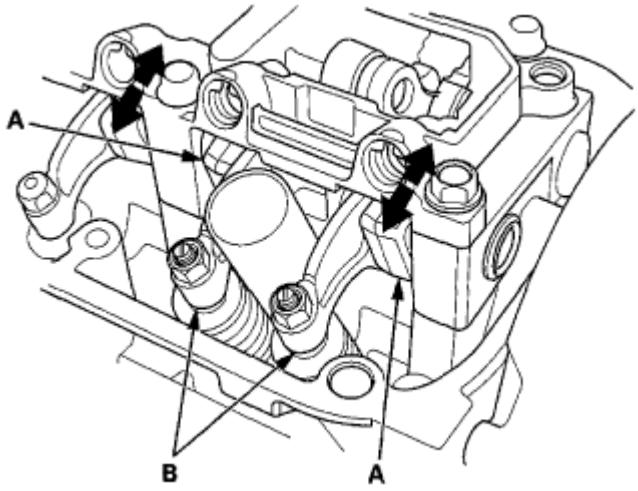


Fig. 12: Moving Exhaust Secondary Rocker Arm With Exhaust Primary Rocker Arm
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Remove the air pressure regulator, VTEC air stop tool B, and the VCM air adapter.
12. Torque 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 and the six ignition coils (see **IGNITION COIL AND SPARK PLUG REMOVAL/INSTALLATION**).

VALVE CLEARANCE ADJUSTMENT

NOTE: Connect the HDS to the DLC (see step 2 on GENERAL TROUBLESHOOTING INFORMATION), and monitor the ECT SENSOR 1. Adjust the valve clearance only when the engine coolant temperature is less than 100°F(38°C).

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

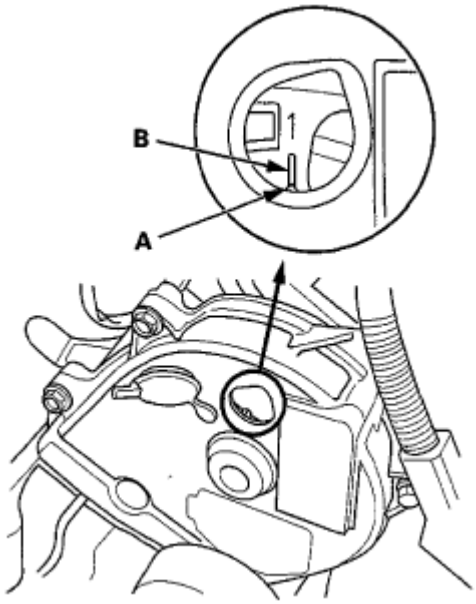


Fig. 13: Identifying Pointer On Front Upper Cover With No. 1 Piston TDC Mark On Front Camshaft Pulley
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

   Valve Clearance

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

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

   REAR

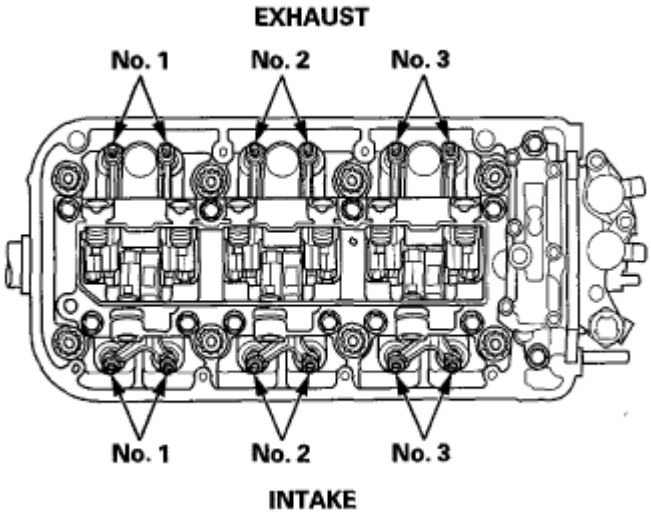


Fig. 14: Identifying Valve Clearance Position (REAR)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

FRONT

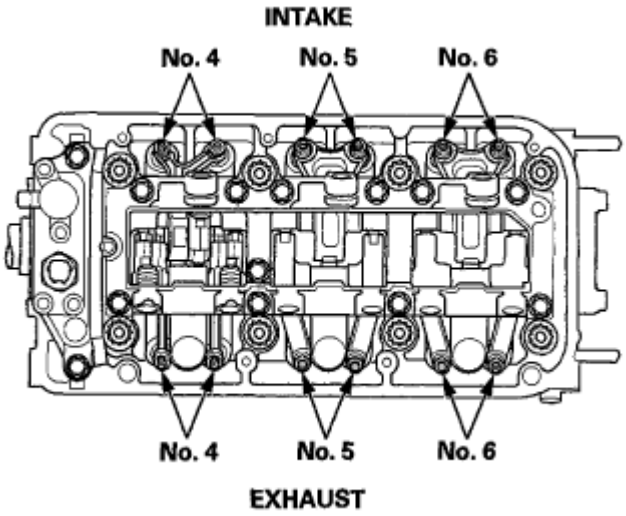


Fig. 15: Identifying Valve Clearance Position (FRONT)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

INTAKE

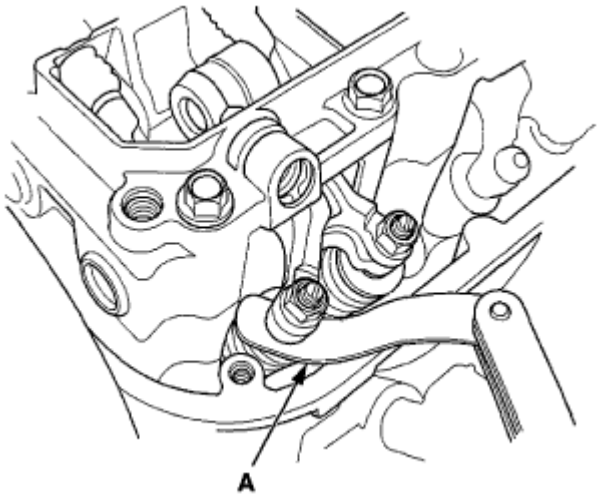


Fig. 16: Inserting Feeler Gauge Between Adjusting Screw And End Of Valve Stem On No. 1 Cylinder (INTAKE)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

EXHAUST

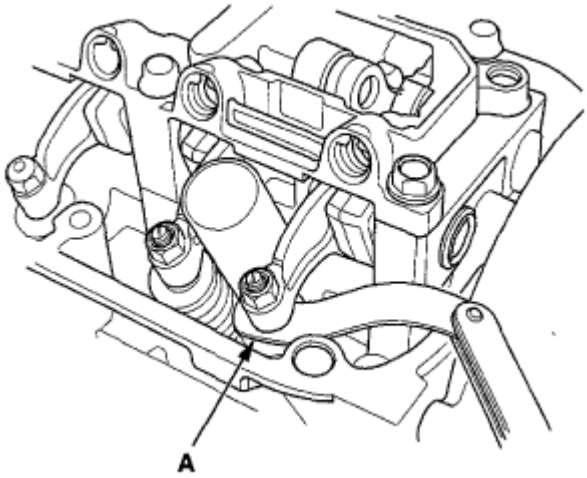


Fig. 17: Inserting Feeler Gauge Between Adjusting Screw And End Of Valve Stem On No. 1 Cylinder (EXHAUST)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

INTAKE

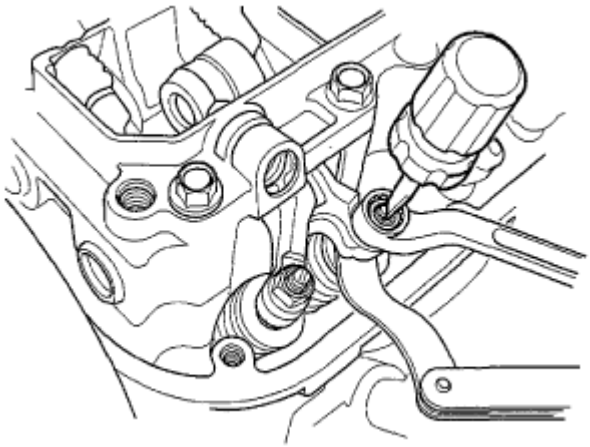


Fig. 18: Loosening Locknut (INTAKE)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

EXHAUST

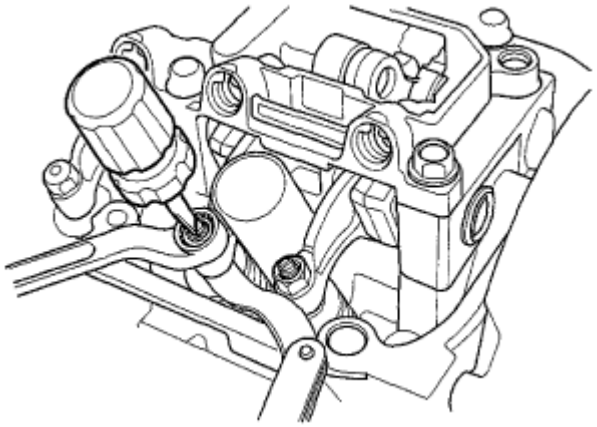


Fig. 19: Loosening Locknut (EXHAUST)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

   Specified Torque

   No. 1, No. 2, No. 3, and No. 4 cylinders:

   20 N.m (2.0 kgf.m, 15 lbf.ft)

   Apply new engine oil to the nut threads.

   No. 5 and No. 6 cylinders:

   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.

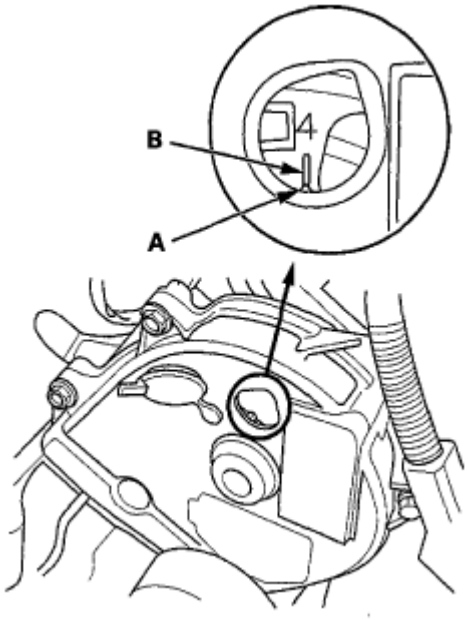


Fig. 20: Identifying Pointer On Front Upper Cover With No. 4 Piston TDC Mark On Front Camshaft Pulley
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.

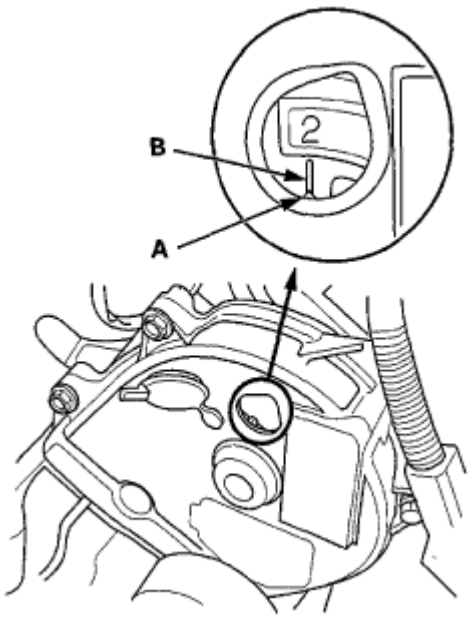


Fig. 21: Identifying Pointer On Front Upper Cover With No. 2 Piston TDC Mark On Front Camshaft Pulley
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.

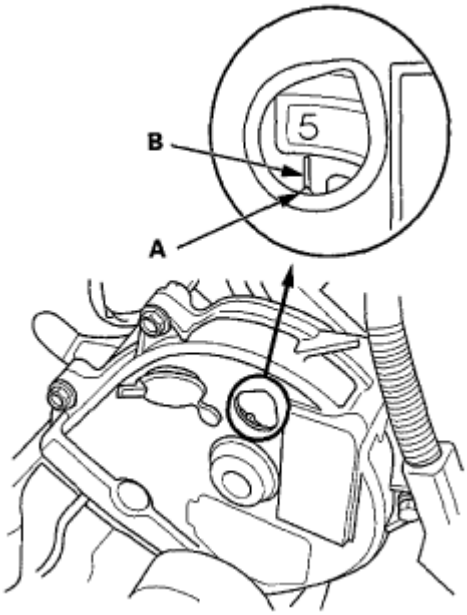


Fig. 22: Identifying Pointer On Front Upper Cover With No. 5 Piston TDC Mark On Front Camshaft Pulley
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.

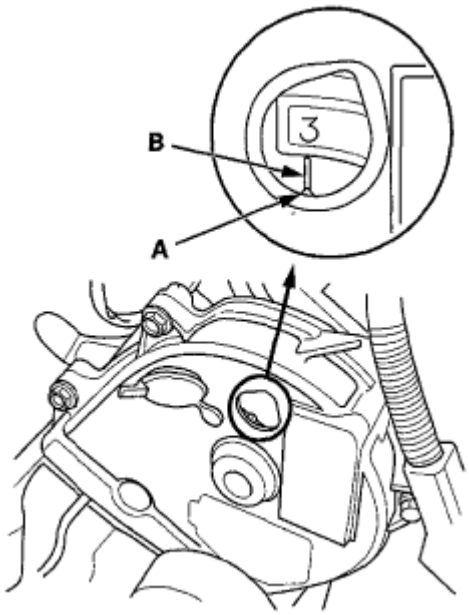


Fig. 23: Identifying Pointer On Front Upper Cover With No. 3 Piston TDC Mark On Front Camshaft Pulley
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.

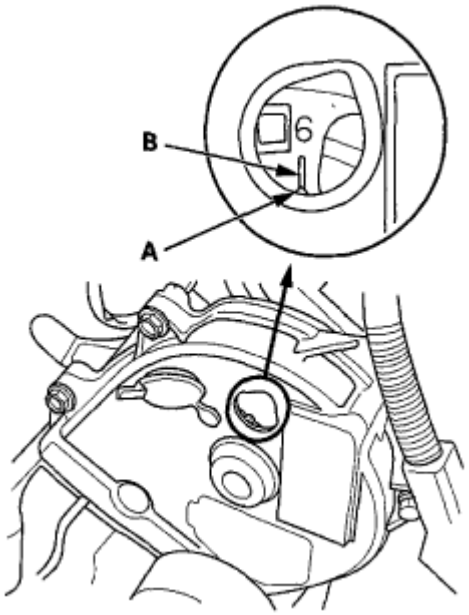


Fig. 24: Identifying Pointer On Front Upper Cover With No. 6 Piston TDC Mark On Front Camshaft Pulley
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

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

REMOVAL

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

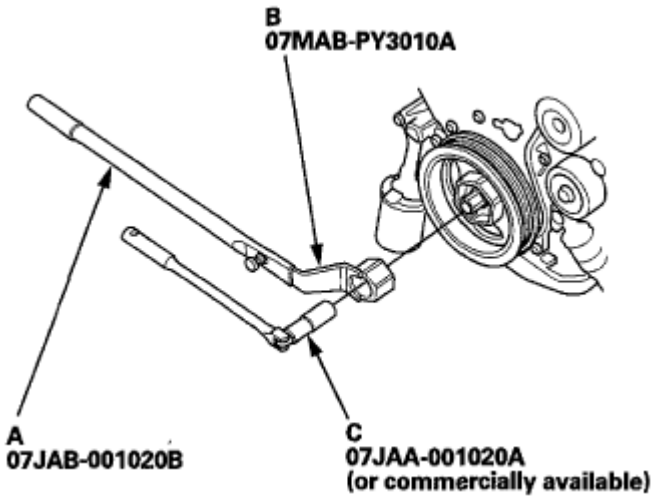


Fig. 25: Installing Pulley Using Holder Handle And Holder Attachment
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

INSTALLATION

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

X: Remove any oil

o: Clean

•: Lubricate with new engine oil

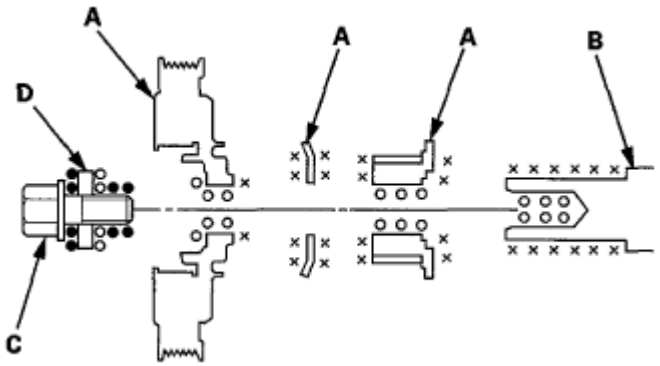


Fig. 26: Identifying Pulleys, Crankshaft And Washer With Mounting Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Install the crankshaft pulley, then tighten the bolt. Do not use an impact wrench.
    1. Hold the pulley with the holder handle (A) and the holder attachment (B). Torque the bolt to 65 N.m (6.6 kgf.m, 48 lbf.ft) with a torque wrench and the heavy duty 19 mm socket (C).
    2. Tighten the bolt an additional 60°.

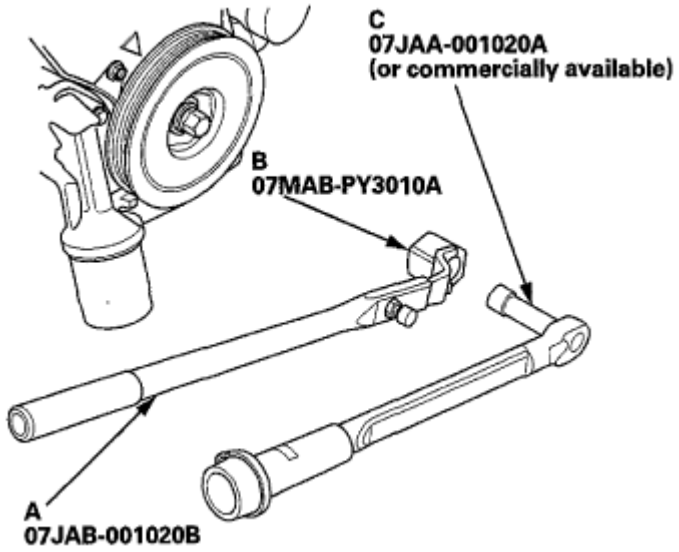


Fig. 27: Tightening Pulley Bolt Using Heavy Duty Socket
Courtesy of AMERICAN HONDA MOTOR CO., INC.

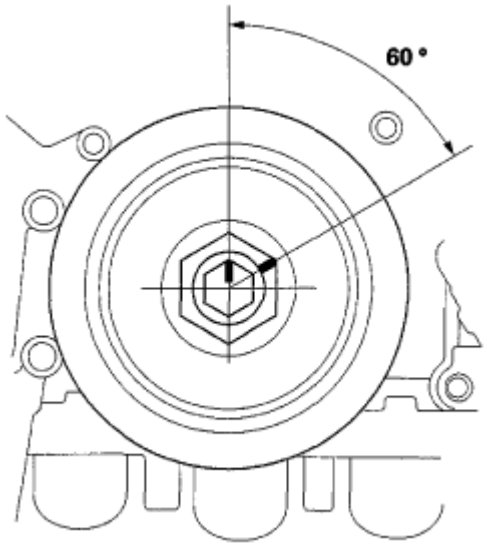


Fig. 28: Identifying Pulley Bolt Angle Position
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.

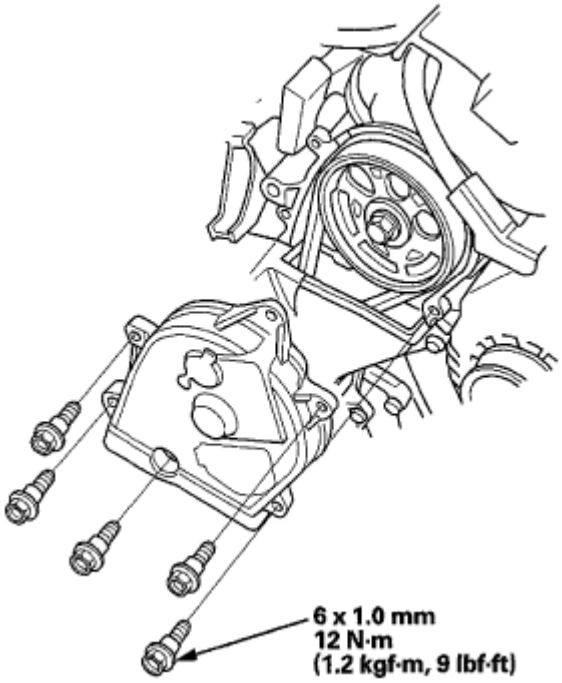


Fig. 29: Identifying Front Upper Cover With Bolts And Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

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

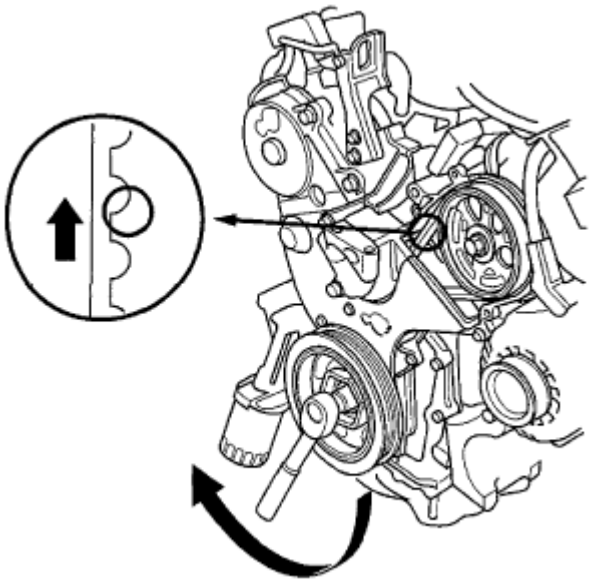


Fig. 30: Identifying Timing Belt For Cracks And Oil Or Coolant Contamination
Courtesy of AMERICAN HONDA MOTOR CO., INC.

TIMING BELT REMOVAL

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

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

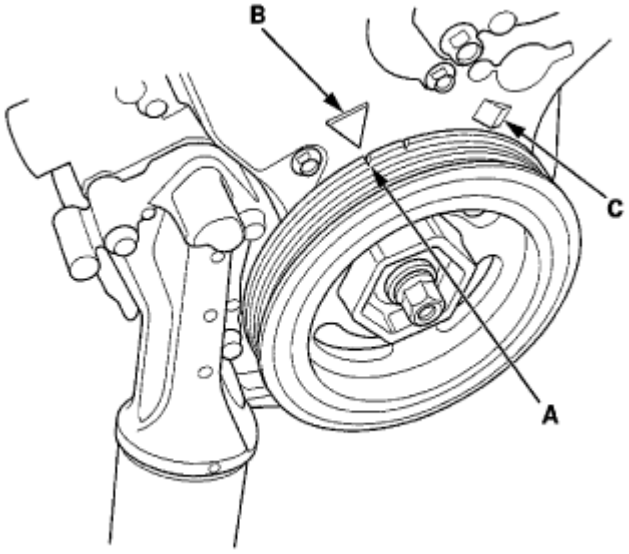


Fig. 31: Identifying Crankshaft Pulley Mark Alignment With Pointers
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. 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.

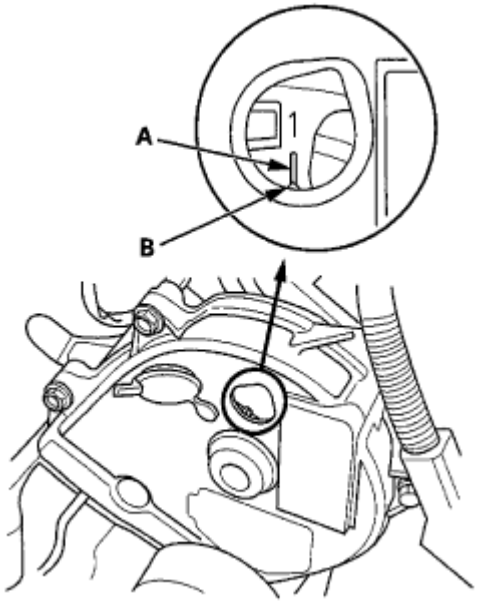


Fig. 32: Identifying Pointer On Front Upper Cover With No. 1 Piston Top Dead Center TDC Mark On Front Camshaft Pulley
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

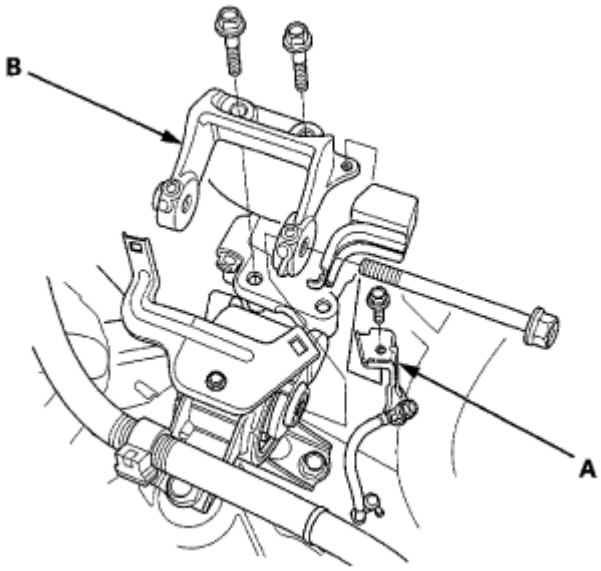


Fig. 33: Identifying Ground Cable Bracket And Side Engine Mount Bracket
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

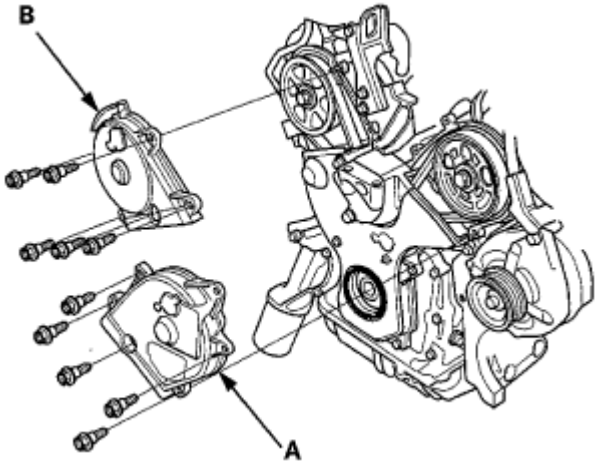


Fig. 34: Identifying Front Upper Cover And Rear Upper Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Remove the lower cover.

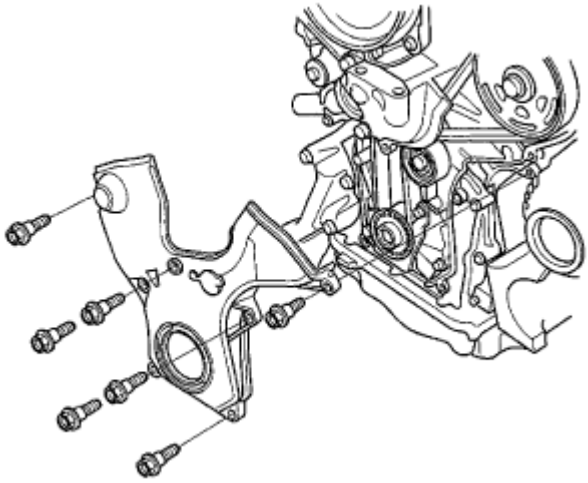


Fig. 35: Identifying Lower Cover With Mounting Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

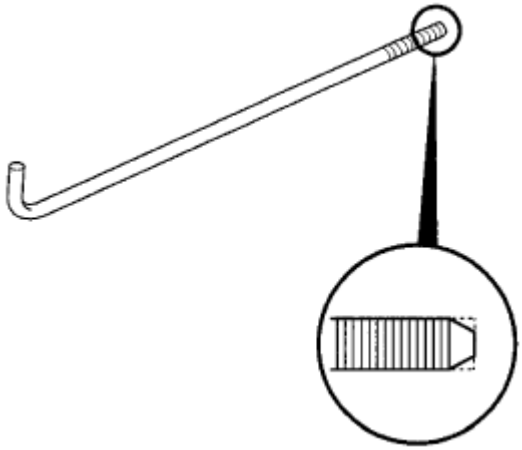


Fig. 36: Identifying Battery Clamp Bolts With Grounded End
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. 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.

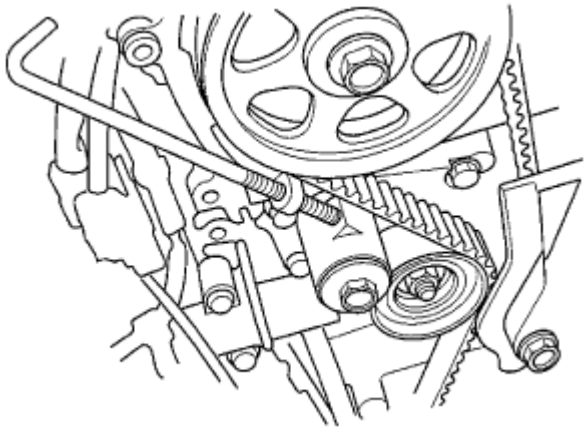


Fig. 37: Identifying Battery Clamp Bolt On Back Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

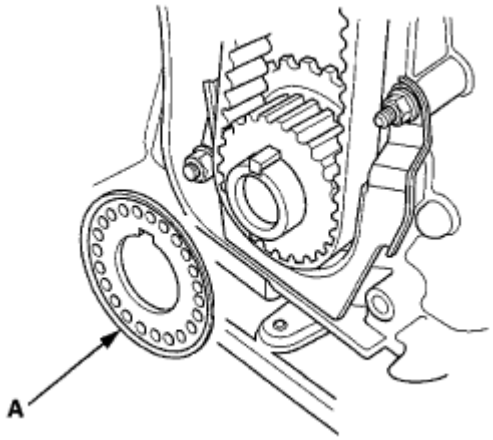


Fig. 38: Identifying Timing Belt Guide Plate
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

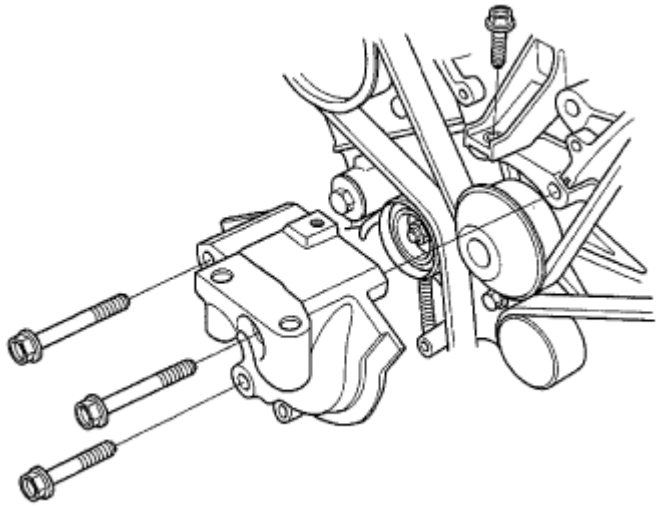


Fig. 39: Identifying Side Engine Mount Bracket
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

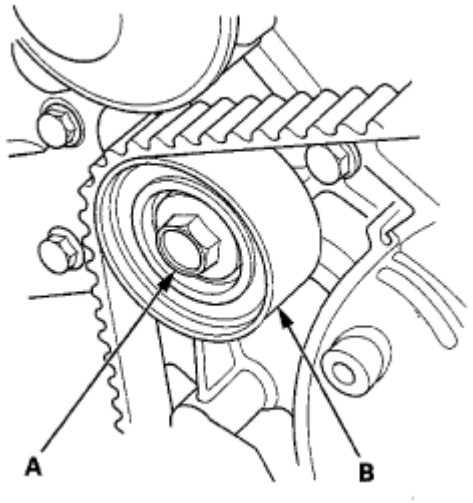


Fig. 40: Identifying Idler Pulley With Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

TIMING BELT INSTALLATION

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

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

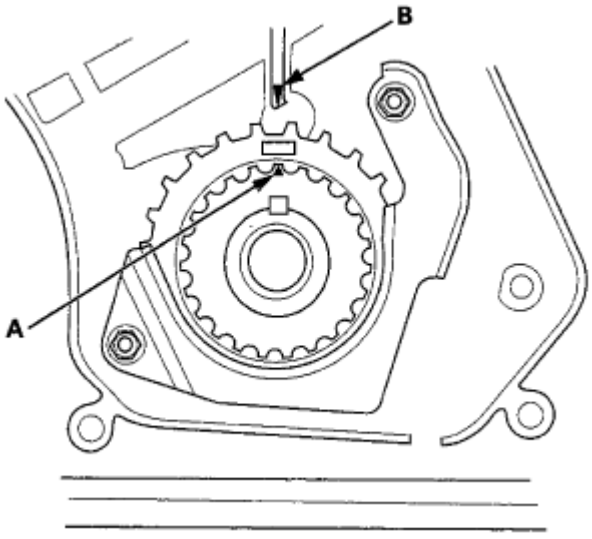


Fig. 41: Identifying TDC Mark Alignment Position On Tooth Of Timing Belt Drive Pulley With Pointer On Oil Pump
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

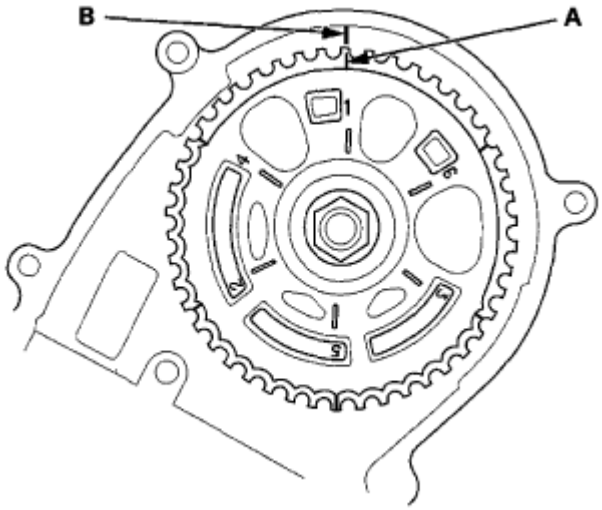


Fig. 42: Identifying TDC Marks Alignment Position On Camshaft Pulleys With Pointers On Back Covers (FRONT)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

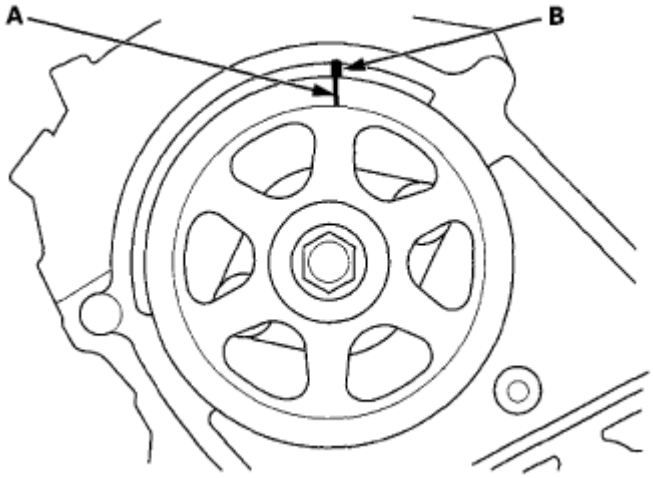


Fig. 43: Identifying TDC Marks Alignment Position On Camshaft Pulleys With Pointers On Back Covers (REAR)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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)

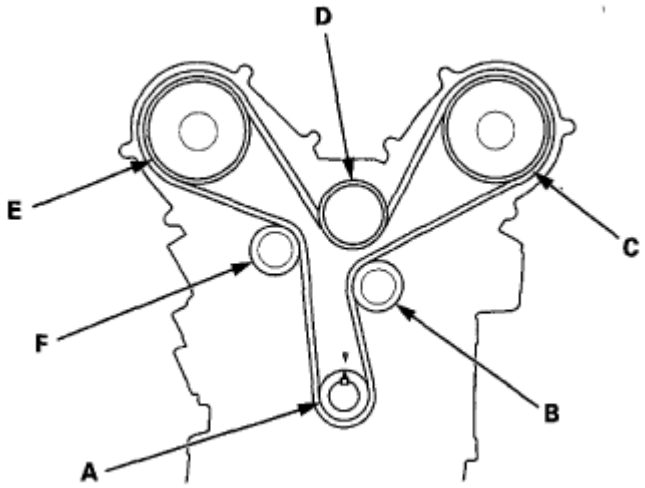


Fig. 44: Identifying Drive Pulley, Idler Pulley, Front Camshaft Pulley, Water Pump Pulley, Rear Camshaft Pulley And Adjusting Pulley
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Tighten the idler pulley bolt.

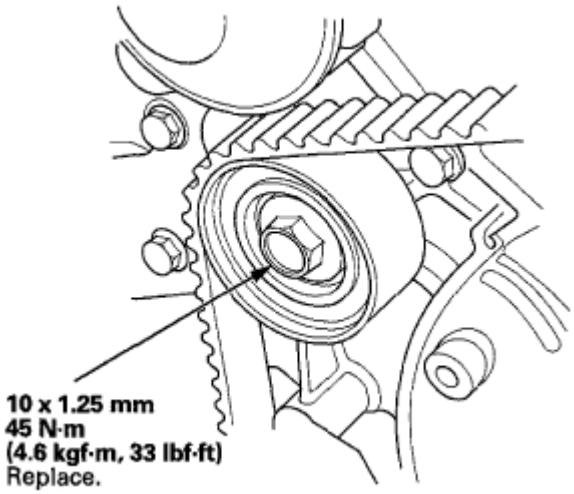


Fig. 45: Identifying Idler Pulley Bolt With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

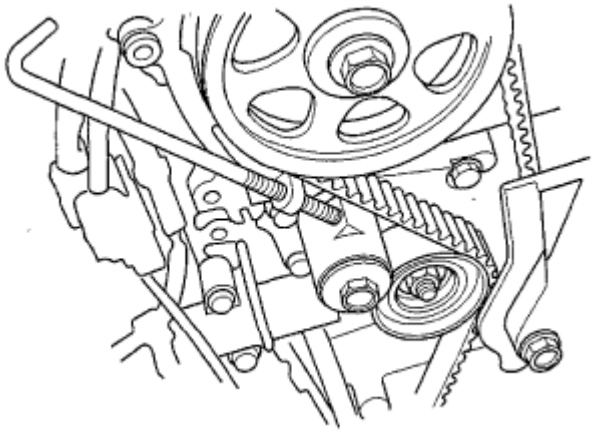


Fig. 46: Identifying Battery Clamp Bolt On Back Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

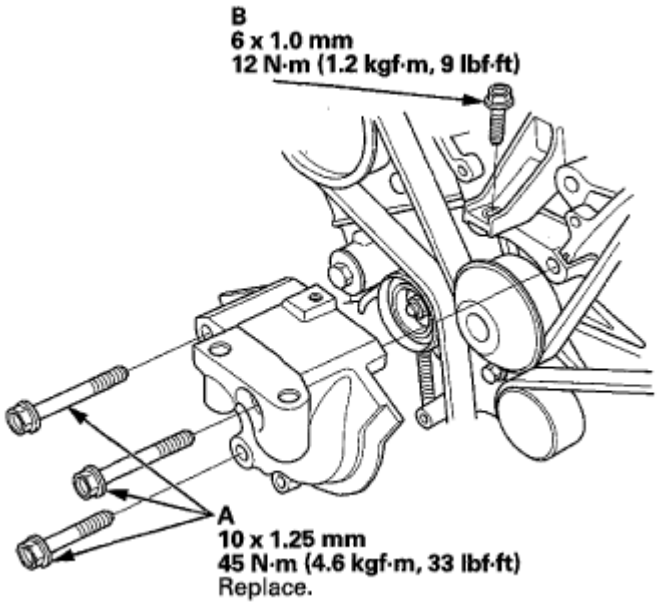


Fig. 47: Identifying Side Engine Mount Bracket With Mounting Bolts And Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

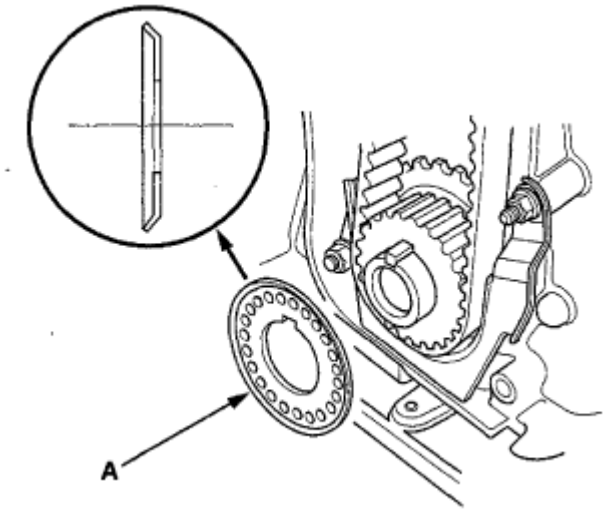


Fig. 48: Identifying Timing Belt Guide Plate
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Install the lower cover.

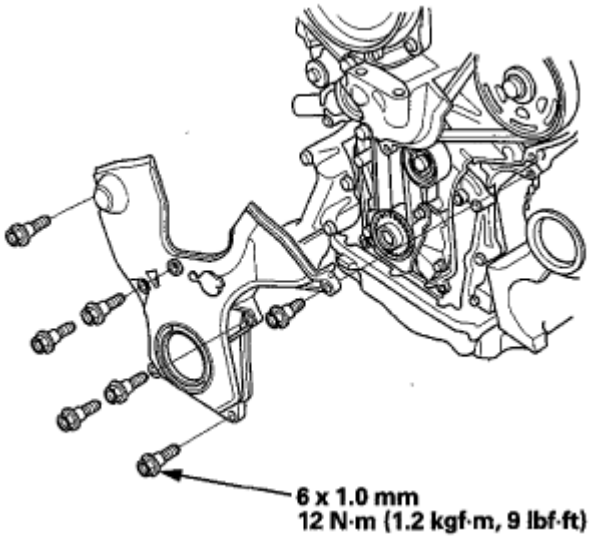


Fig. 49: Identifying Lower Cover With Mounting Bolts And Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

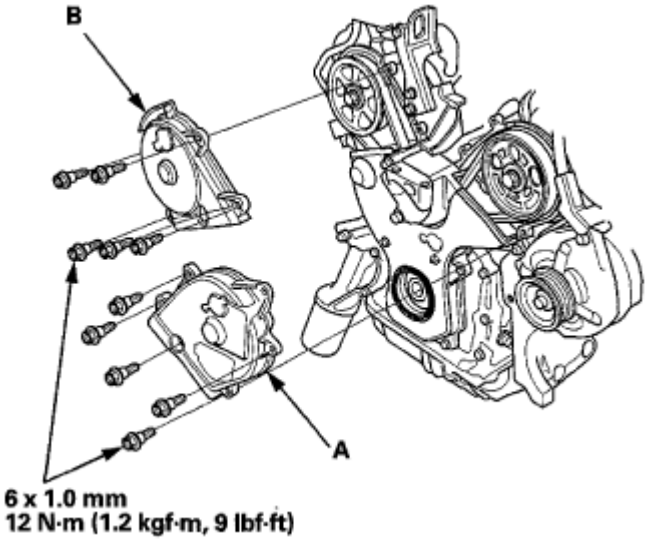


Fig. 50: Identifying Front Upper Cover And Rear Upper Cover With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Install the crankshaft pulley (see **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.

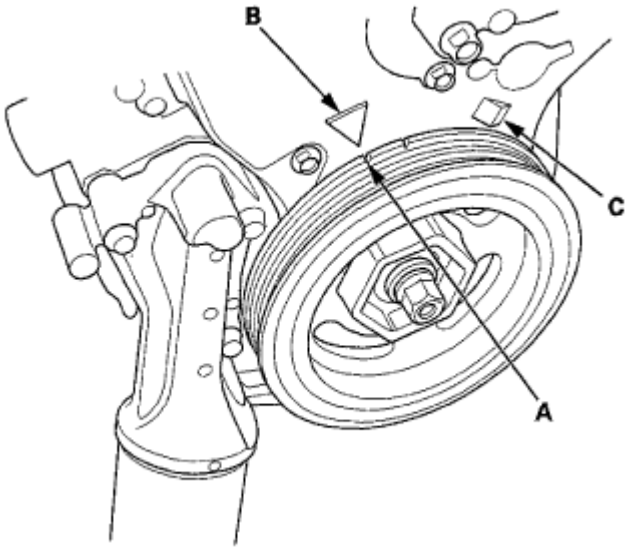


Fig. 51: Identifying Crankshaft Pulley Mark Alignment With Pointers
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

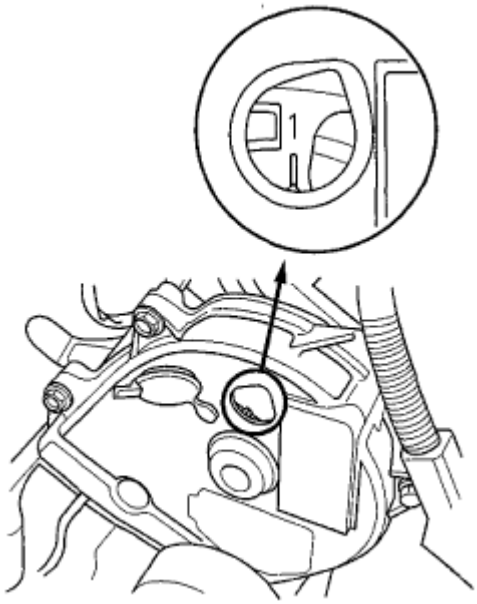


Fig. 52: Identifying Pointer On Front Upper Cover With No. 1 Piston TDC Mark On Front Camshaft Pulley (FRONT)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

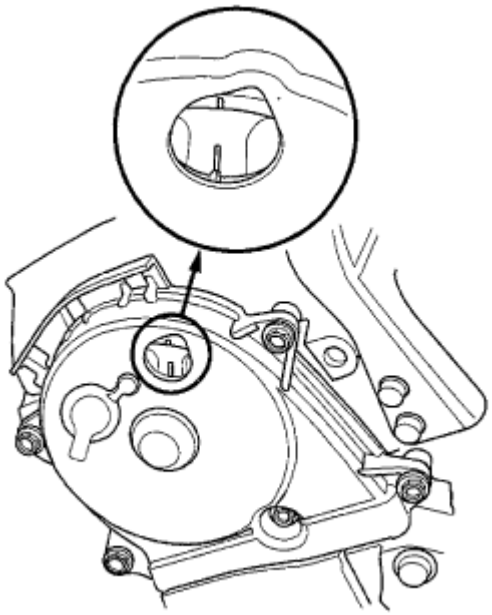


Fig. 53: Identifying Pointer On Front Upper Cover With No. 1 Piston TDC Mark On Front Camshaft Pulley (REAR)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

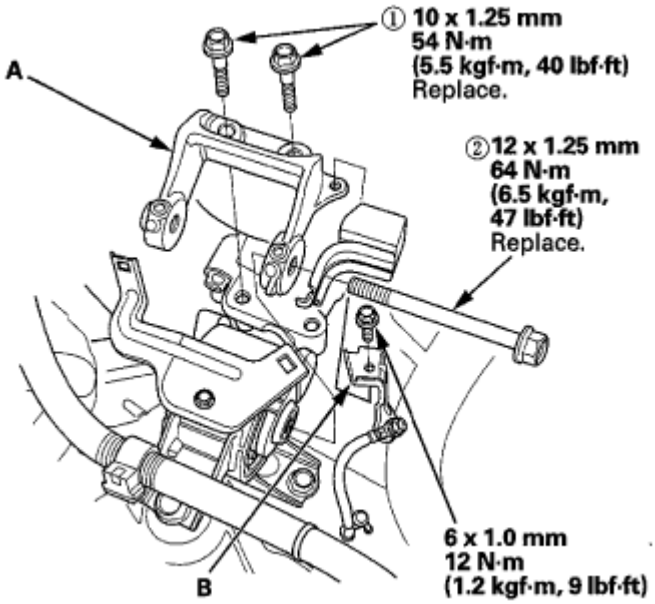


Fig. 54: Identifying Side Engine Mount Bracket And Ground Cable Bracket With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

18. Remove the jack and the wood block.

19. Tighten the mounting bolts in the numbered sequence shown.
20. Install the drive belt auto-tensioner (see **DRIVE BELT AUTO-TENSIONER REPLACEMENT**).
21. Install the splash shield (see **FRONT SPLASH SHIELD REPLACEMENT**).
22. Install the right front wheel.
23. Do the CKP pattern clear/CKP pattern learn procedure (see **CKP PATTERN CLEAR/CKP PATTERN LEARN**).

TIMING BELT REPLACEMENT

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

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

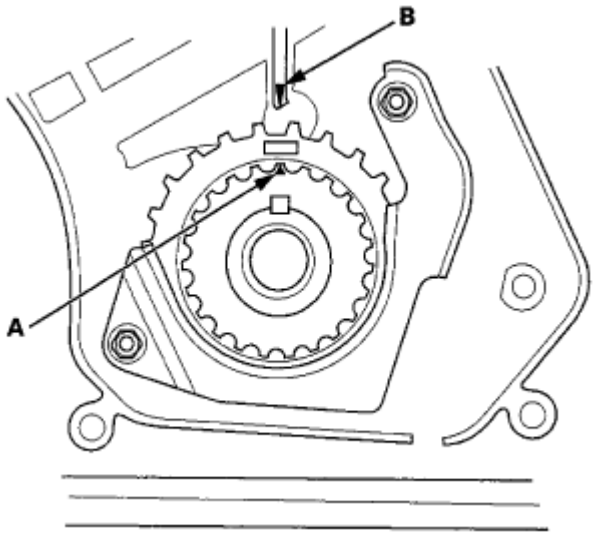


Fig. 55: Identifying TDC Mark On Tooth Of Timing Belt Drive Pulley And Pointer On Oil Pump
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

FRONT

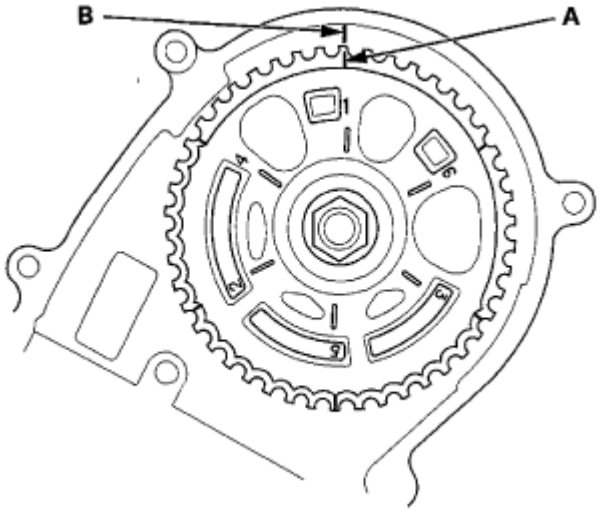


Fig. 56: Identifying TDC Marks On Camshaft Pulley And Pointers On Back Covers (Front)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

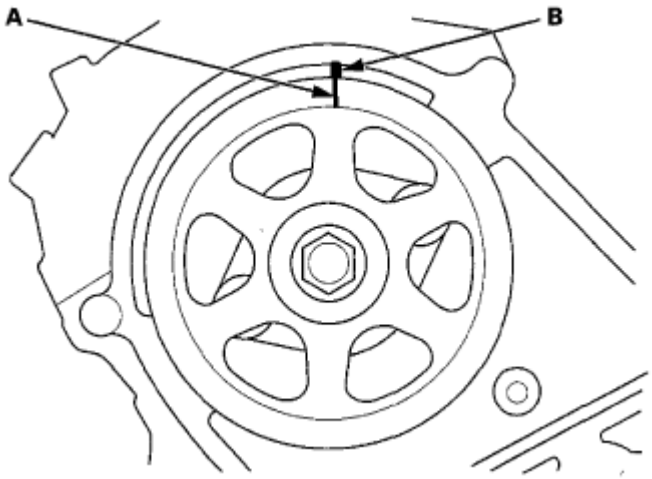


Fig. 57: Identifying TDC Marks On Camshaft Pulley And Pointers On Back Covers (Front)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

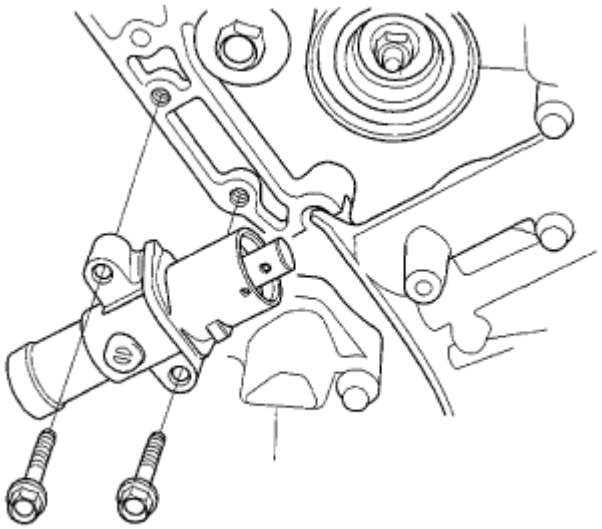


Fig. 58: Identifying TDC Marks On Camshaft Pulley And Pointers On Back Covers (Rear)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

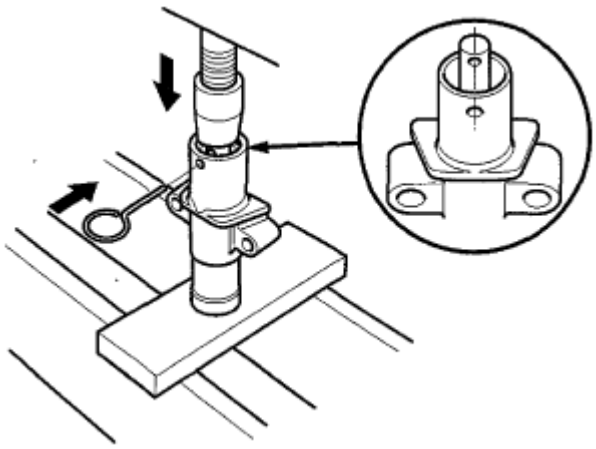


Fig. 59: Compressing Auto-Tensioner Using Press
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

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

9. Install the auto-tensioner.

NOTE: Make sure the pin stays in place.

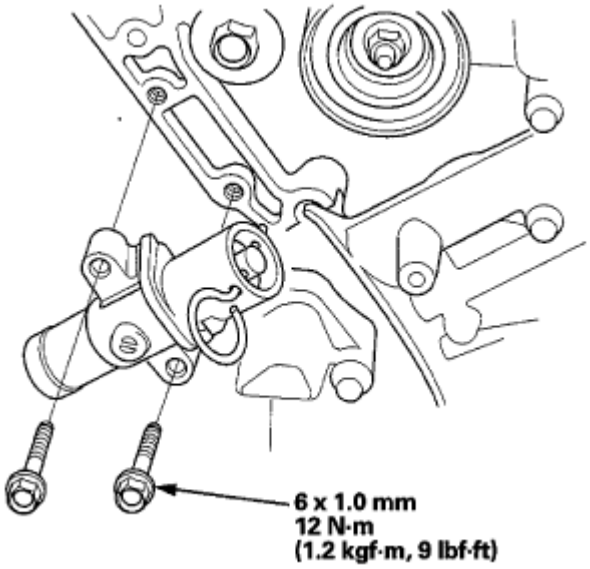


Fig. 60: Identifying Auto-Tensioner Mounting Bolts With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

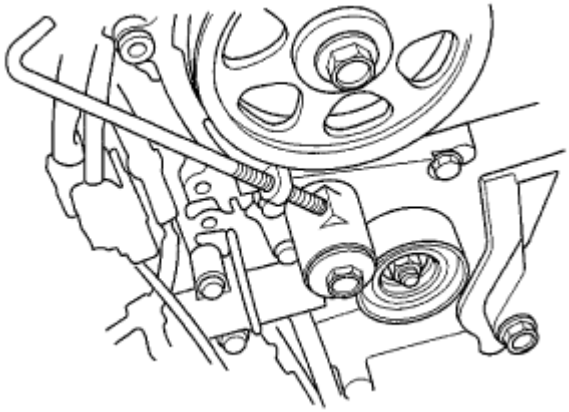


Fig. 61: Inserting Battery Clamp Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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)

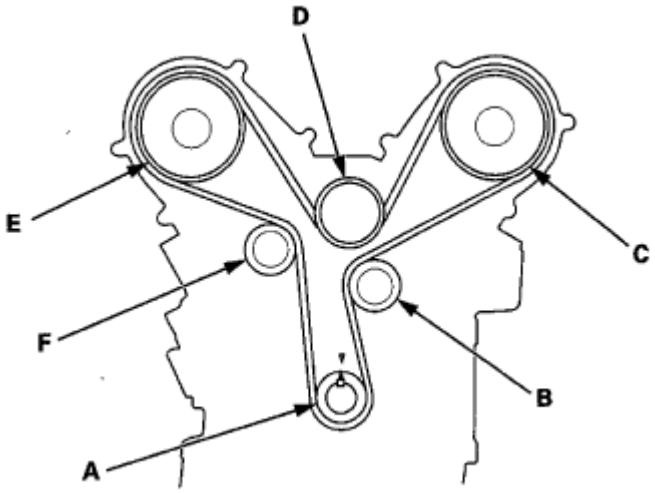


Fig. 62: Identifying Drive Pulley, Idler Pulley, Front Camshaft Pulley, Water Pump Pulley, Rear Camshaft Pulley And Adjusting Pulley
Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Tighten the idler pulley bolt.

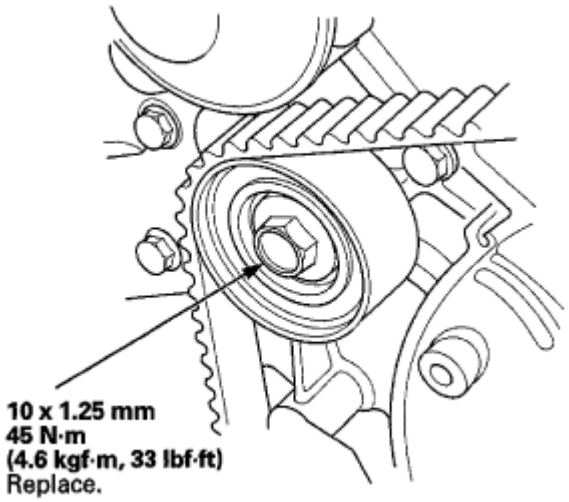


Fig. 63: Identifying Idler Pulley Bolt With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. Remove the pin from the auto-tensioner.

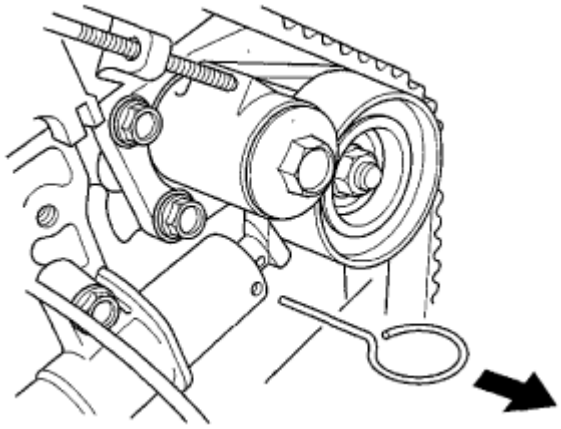


Fig. 64: Removing Pin From Auto-Tensioner
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

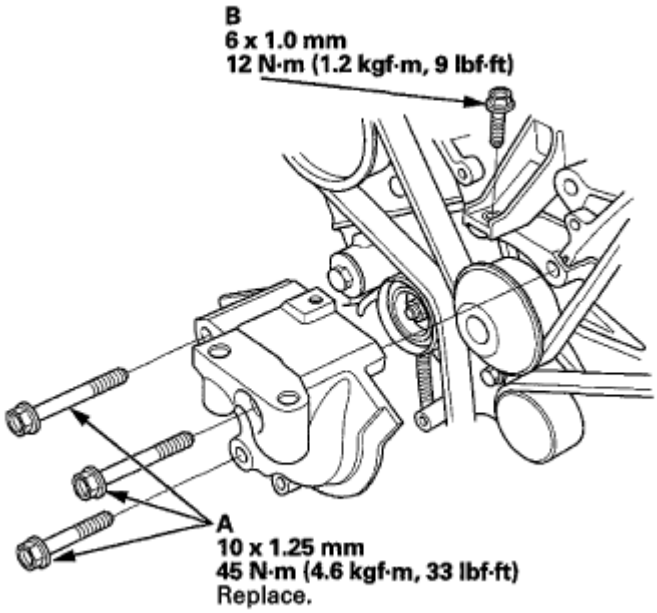


Fig. 65: Identifying Side Engine Mount Bracket Bolts With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

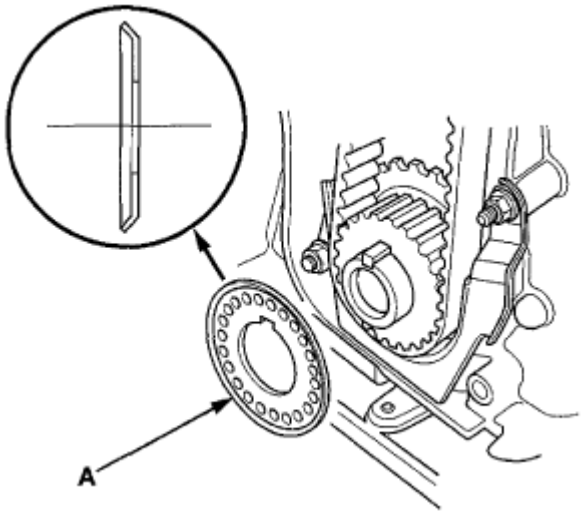


Fig. 66: Identifying Timing Belt Guide Plate
Courtesy of AMERICAN HONDA MOTOR CO., INC.

18. Install the lower cover.

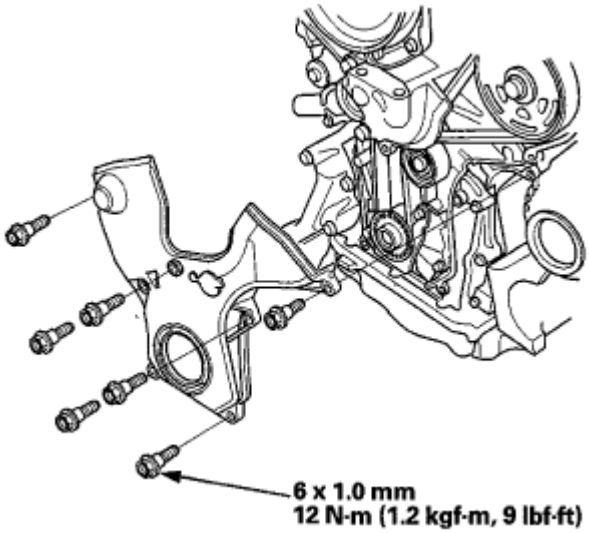


Fig. 67: Identifying Lower Cover Mounting Bolts With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

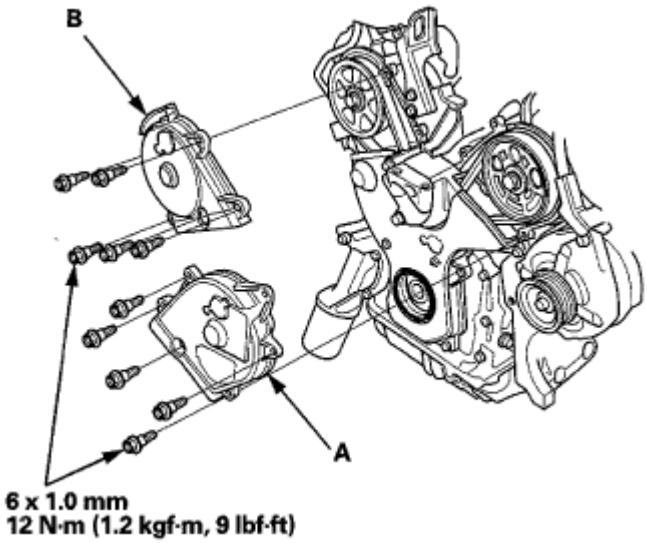


Fig. 68: Identifying Front Upper Cover And Rear Upper Cover With Mounting Bolts Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

20. Install the crankshaft pulley (see **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.

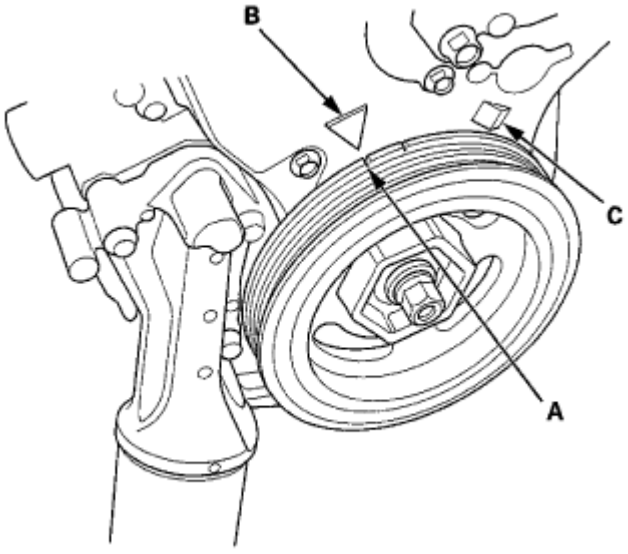


Fig. 69: Identifying Marks On Crankshaft Pulley With Pointer
Courtesy of AMERICAN HONDA MOTOR CO., INC.

23. Check the camshaft pulley marks.

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

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

FRONT

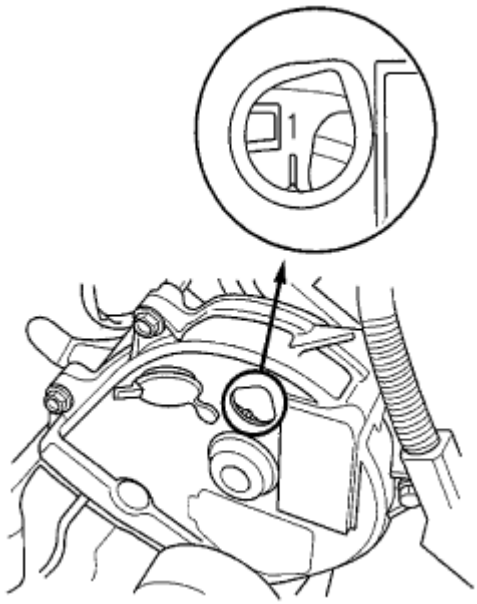


Fig. 70: Identifying Crankshaft Pulley Mark (Front)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

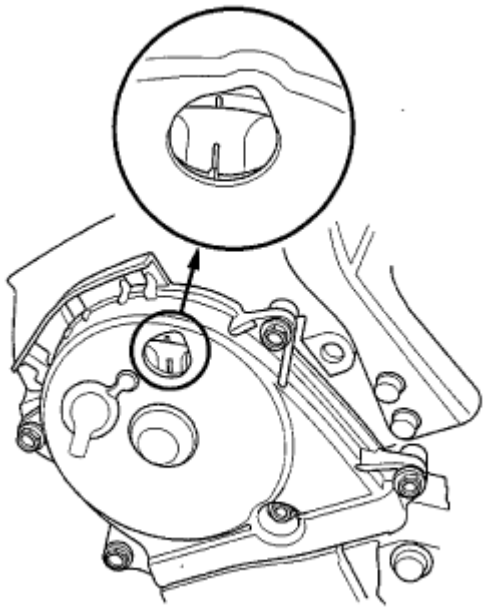


Fig. 71: Identifying Crankshaft Pulley Mark (Rear)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

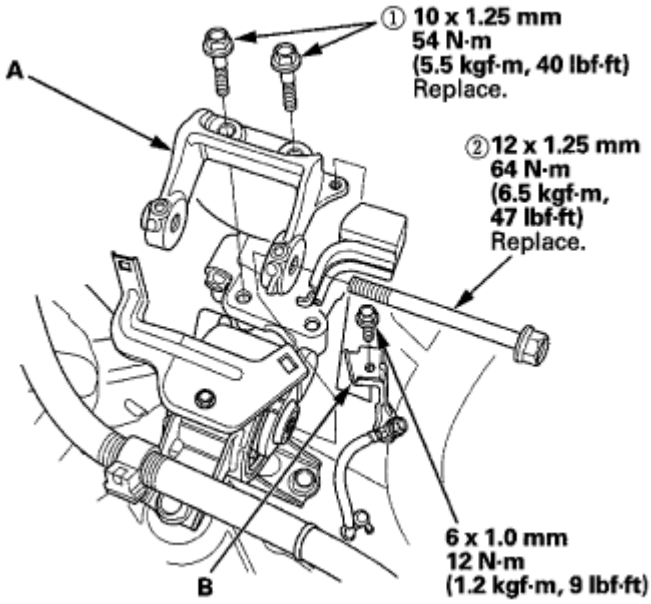


Fig. 72: Identifying Side Engine Mount Bracket Upper Half And Ground Cable Bracket With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

25. Remove the jack and the wood block.
26. Tighten the mounting bolts in the numbered sequence shown.

27. Install the drive belt auto-tensioner (see **DRIVE BELT AUTO-TENSIONER REPLACEMENT**).
28. Install the splash shield (see **FRONT SPLASH SHIELD REPLACEMENT**).
29. Install the right front wheel.
30. Do the CKP pattern clear/CKP pattern learn procedure (see **CKP PATTERN CLEAR/CKP PATTERN LEARN**).

TIMING BELT ADJUSTER REPLACEMENT

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

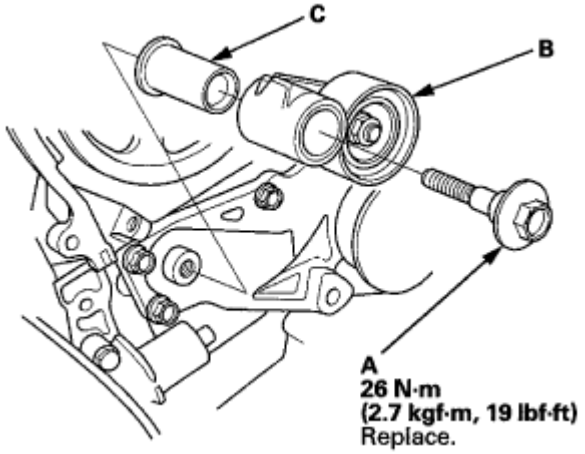


Fig. 73: Identifying Timing Belt Adjuster, Collar And Bolt With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

TIMING BELT DRIVE PULLEY REPLACEMENT

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

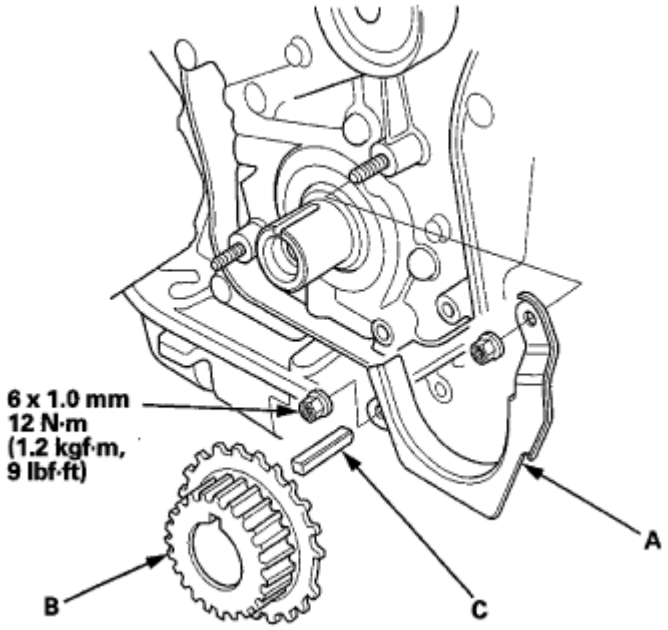


Fig. 74: Identifying Timing Belt Stopper, Timing Belt Drive Pulley And Key With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

CYLINDER HEAD COVER REMOVAL

FRONT

1. Remove the intake manifold (see **REMOVAL**).
2. Remove the three ignition coils from the front cylinder head (see **IGNITION COIL AND SPARK PLUG REMOVAL/INSTALLATION**).
3. Disconnect the EGR valve connector (A), the front secondary HO2S connector (B), the front A/F sensor connector (C), the rocker arm oil control solenoid A (Bank 2) connector (D), the front rocker arm oil pressure switch connector (E) and the harness clamp (F) securing the harness holder, and remove the dipstick (G).

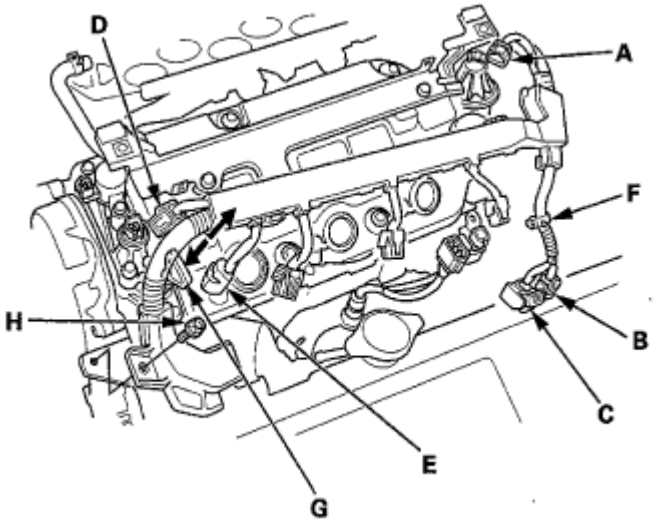


Fig. 75: Removing Dipstick
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Remove the bolt (H) securing the harness holder.
5. Remove the front cylinder head cover.

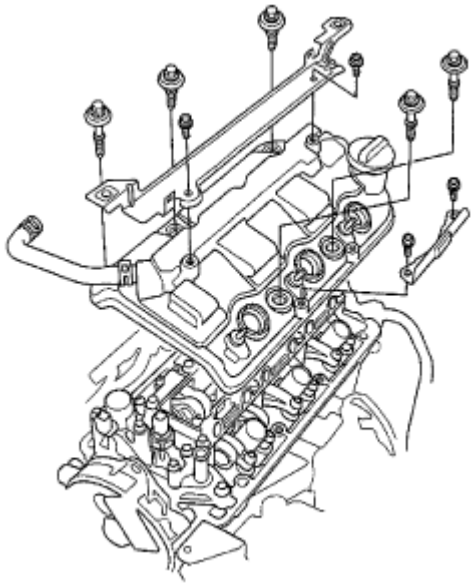


Fig. 76: Identifying Front Cylinder Head Cover Mounting Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

1. Remove the intake manifold (see **REMOVAL**).
2. Remove the three ignition coils from the rear cylinder head (see **IGNITION COIL AND SPARK PLUG REMOVAL/INSTALLATION**).

3. Remove the drive belt (see **DRIVE BELT REPLACEMENT**).
4. Remove the power steering pump and the power steering hose bracket (see step 6) with its hoses connected.
5. Remove the harness holder mounting bolts (A).

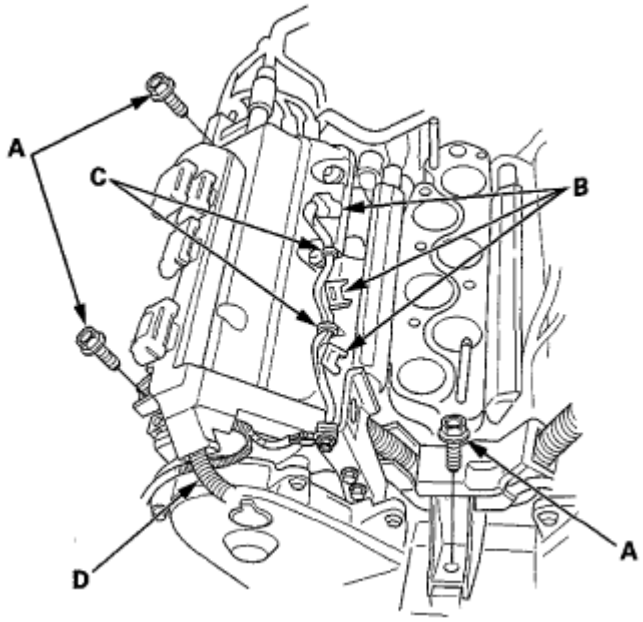


Fig. 77: Identifying Injector Connectors, Harness Clamps, Harness And Harness Holder Mounting Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Disconnect the three injector connectors (B) and the two harness clamps (C).
7. Remove the harness (D) from the upper cover.
8. Disconnect the rear rocker arm oil pressure switch connector (A), the rocker arm oil control solenoid B (Bank 1) connector (B), the rocker arm oil control solenoid A (Bank 1) connector (C), the rear A/F sensor connector (D), the rear secondary HO2S connector (E), and the harness clamps (F), then remove the harness holder (G).

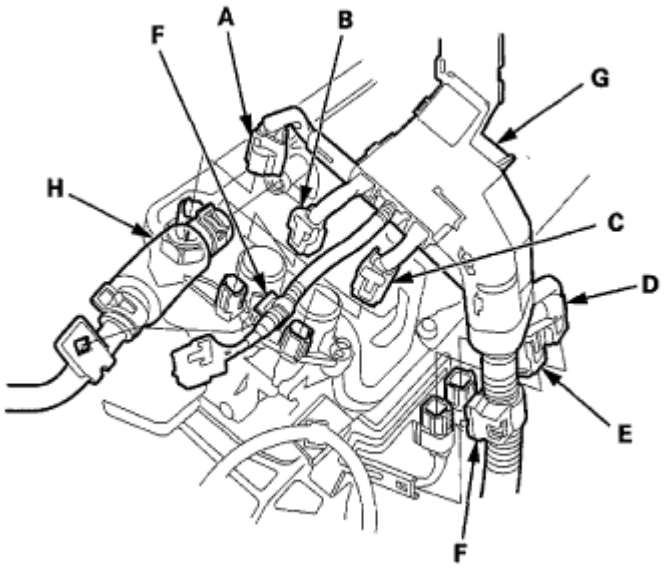


Fig. 78: Identifying (Rear Rocker Arm Oil Pressure Switch, Rocker Arm Oil Control Solenoid, Rear A/F Sensor Connector And Rear Secondary HO2S) Connectors
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Disconnect the breather hose (H).
10. Remove the rear cylinder head cover.

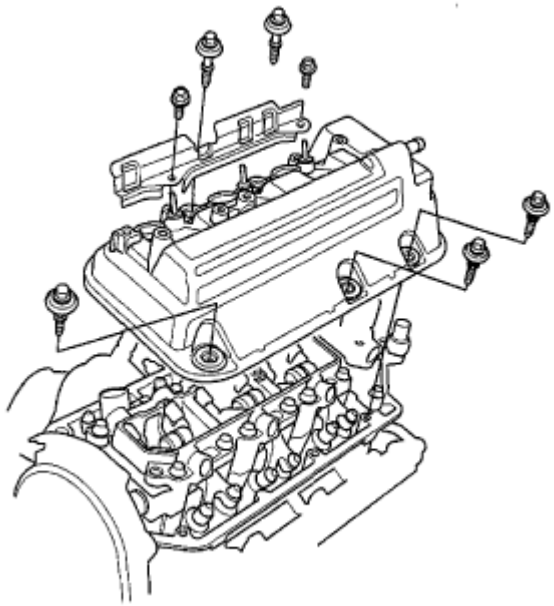


Fig. 79: Identifying Cylinder Head Cover Mounting Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

CYLINDER HEAD COVER INSTALLATION

FRONT

1. Check the spark plug seals for damage. If any seals are damaged, replace it.
2. Thoroughly clean the head cover gasket and the groove of the cylinder head cover.

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

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

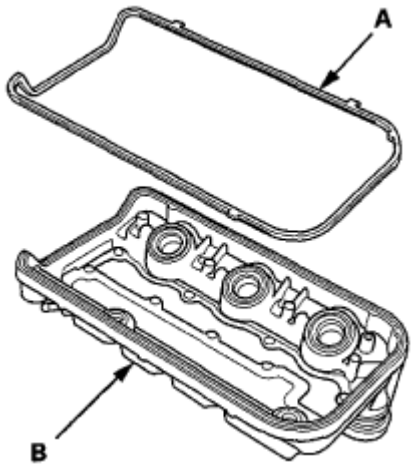


Fig. 80: Identifying Head Cover Gasket And Cylinder Head Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Remove all of the old liquid gasket from the front rocker arm oil control valve and the cylinder head.
5. Clean the head cover contacting surfaces with a shop towel.
6. Apply liquid gasket (P/N 08717-0004, 08718-0003, 08718-0004, or 08718-0009) to the rocker arm oil control valve mating surfaces (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.**

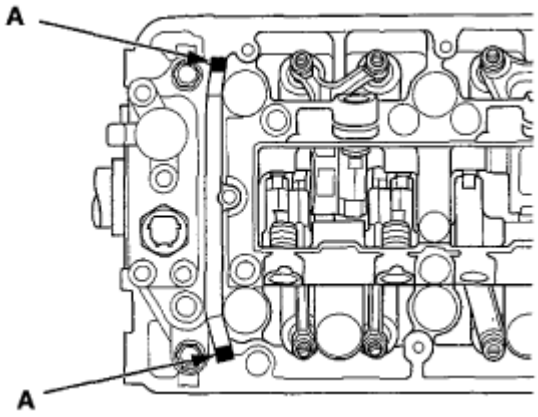


Fig. 81: Identifying Rocker Arm Oil Control Valve Mating Surfaces Liquid Gasket Applying Area
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

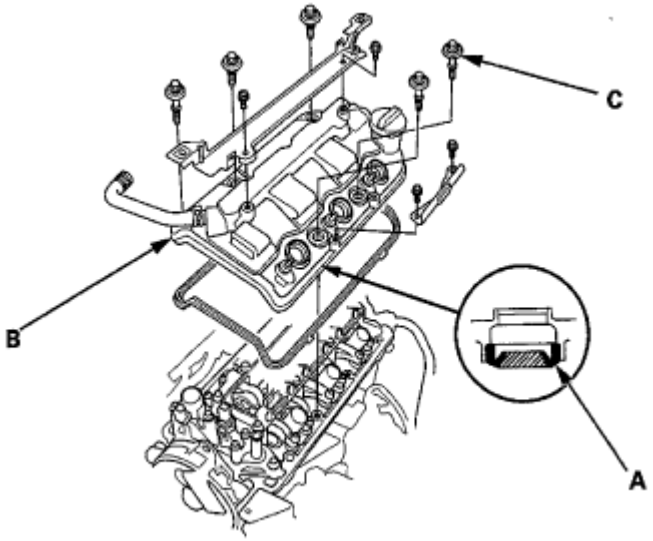


Fig. 82: Identifying Spark Plug Seals, Front Cylinder Head Cover And Cover Washers
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

NOTE:

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

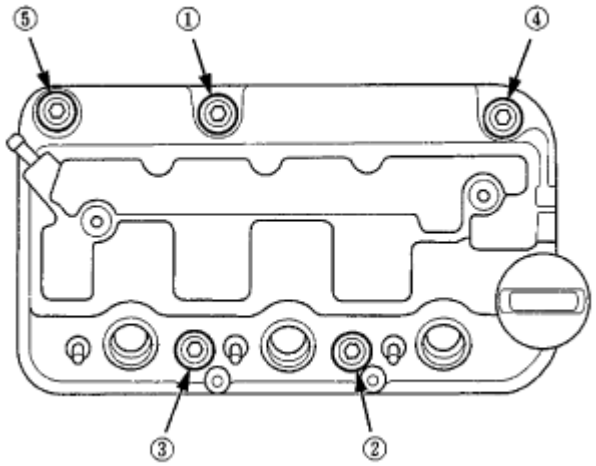


Fig. 83: Identifying Cylinder Head Cover Mounting Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Tighten the bolt (A) securing the harness holder.

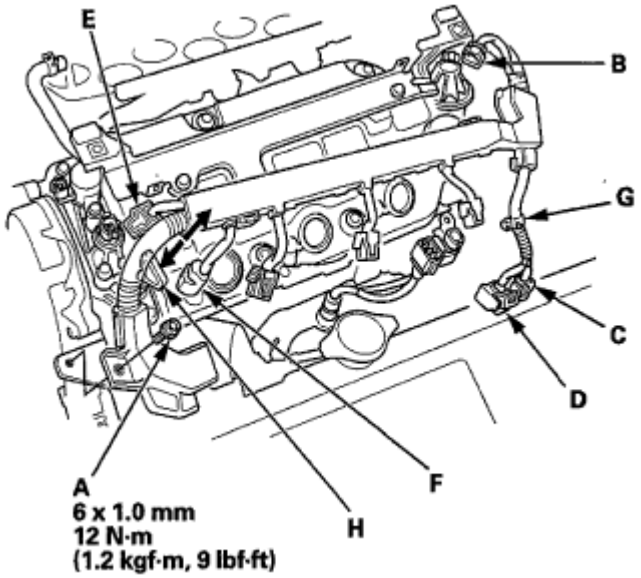


Fig. 84: Identifying (Rear Rocker Arm Oil Pressure Switch, Rocker Arm Oil Control Solenoid, Rear A/F Sensor Connector And Rear Secondary HO2S) Connectors With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Connect the EGR valve connector (B), the front secondary HO2S connector (C), the front A/F sensor connector (D), the rocker arm oil control solenoid A (Bank 2) connector (E), the front rocker arm oil pressure switch connector (F) and the harness clamp (G) securing the harness holder, and install the dipstick (H).
13. Install the three ignition coils to the front cylinder head (see **IGNITION COIL AND SPARK PLUG REMOVAL/INSTALLATION**).
14. Install the intake manifold (see **INSTALLATION**).

REAR

1. Check the spark plug seals for damage. If any seals are damaged, replace it.
2. Thoroughly clean the head cover gasket and the groove of the cylinder head cover.

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

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

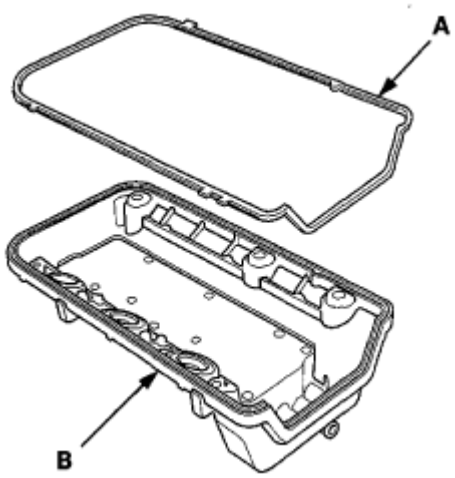


Fig. 85: Identifying Head Cover Gasket And Cylinder Head Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Remove all of the old liquid gasket from the rear rocker arm oil control valve and the cylinder head.
5. Clean the head cover contacting surfaces with a shop towel.
6. Apply liquid gasket (P/N 08717-0004, 08718-0003, 08718-0004, or 08718-0009) to the rocker arm oil control valve mating surfaces (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.**

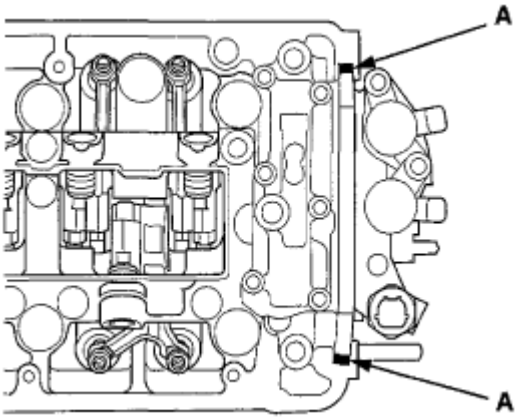


Fig. 86: Identifying Rocker Arm Oil Control Valve Mating Surface Liquid Gasket Applying Area
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

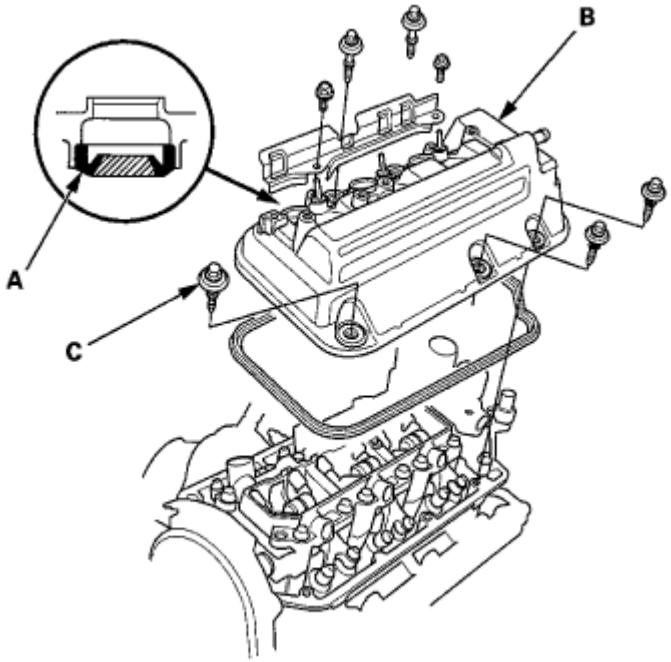


Fig. 87: Identifying Spark Plug Seals, Rear Cylinder Head Cover And Cover Washers
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

NOTE:

- **Wait at least 30 minutes before filling the engine with oil.**

- **Do not run the engine for at least 3 hours after installing the cylinder head cover.**

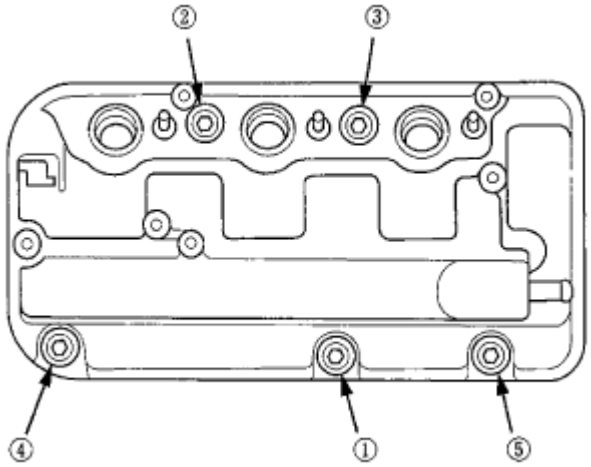


Fig. 88: Identifying Cylinder Head Cover Mounting Bolts Tightening Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Connect the rear rocker arm oil pressure switch connector (A), the rocker arm oil control solenoid B (Bank 1) connector (B), the rocker arm oil control solenoid A (Bank 1) connector (C), the rear A/F sensor connector (D), the rear secondary HO2S connector (E), and the harness clamps (F), then install the harness holder (G).

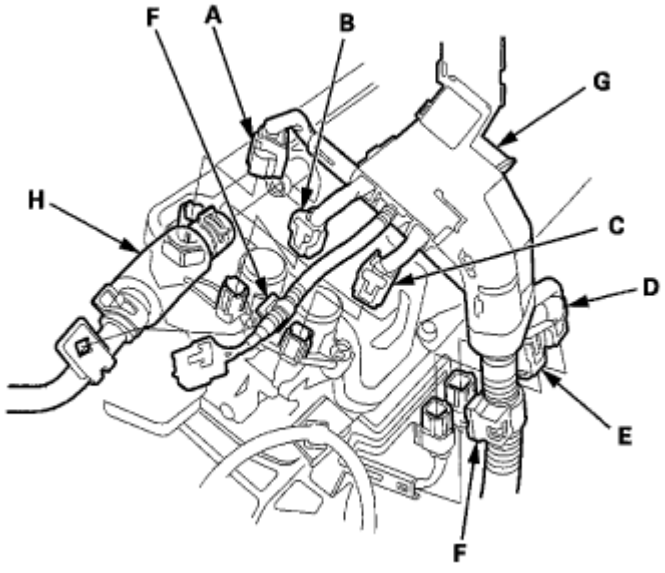


Fig. 89: Identifying (Rear Rocker Arm Oil Pressure Switch, Rocker Arm Oil Control Solenoid, Rear A/F Sensor Connector And Rear Secondary HO2S) Connectors
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Connect the breather hose (H).
13. Tighten the harness holder mounting bolts (A).

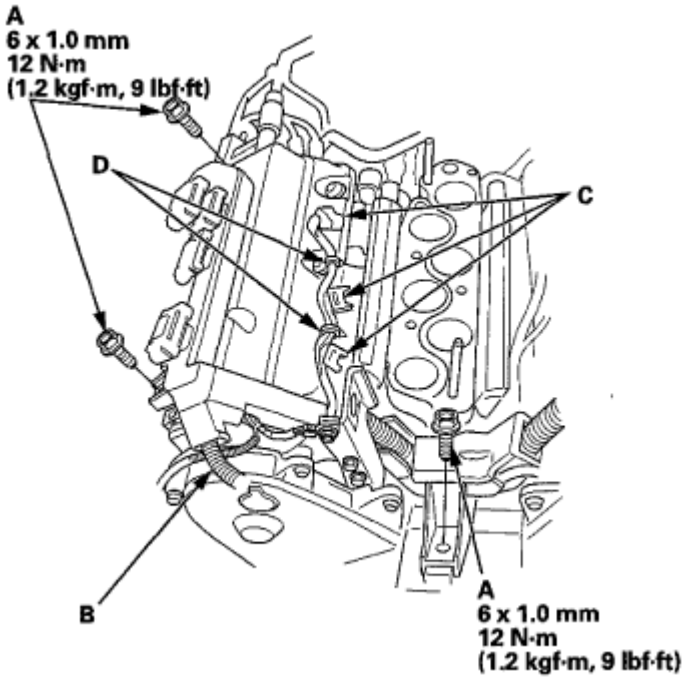


Fig. 90: Identifying Injector Connectors, Harness Clamps, Harness And Harness Holder Mounting Bolts With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. Install the harness (B) to the upper cover.
15. Reconnect the three injector connectors (C) and the two harness clamps (D).
16. Install the power steering pump and the power steering hose bracket (see step 25).
17. Install the drive belt (see **DRIVE BELT REPLACEMENT**).
18. Install the three ignition coils to the rear cylinder head (see **IGNITION COIL AND SPARK PLUG REMOVAL/INSTALLATION**).
19. Install the intake manifold (see **INSTALLATION**).

CYLINDER HEAD REMOVAL

NOTE:

- **Use fender covers to avoid damaging painted surfaces.**
- **To avoid damaging the wires and terminals, unplug the wiring connectors carefully while holding the connector portion.**
- **Connect the HDS to the DLC (see step 2 on GENERAL TROUBLESHOOTING INFORMATION), and monitor ECT SENSOR 1. To avoid damaging the cylinder head, wait until the engine coolant temperature drops below 100°F (38°C) before loosening the cylinder head**

bolts.

- **Mark all wirings and hoses to avoid misconnection. Also, be sure that they do not contact any other wirings or hoses, or interfere with any other parts.**

1. Relieve the fuel pressure (see **FUEL PRESSURE RELIEVING**).
2. Do the battery terminal disconnection procedure (see **BATTERY TERMINAL DISCONNECTION AND RECONNECTION**).
3. Drain the engine coolant (see **COOLANT CHECK**).
4. Remove the six ignition coils (see **IGNITION COIL AND SPARK PLUG REMOVAL/INSTALLATION**).
5. Remove the alternator (see **ALTERNATOR REMOVAL AND INSTALLATION**).
6. Remove the power steering pump (A) and the power steering hose bracket (B) with its hose connected.

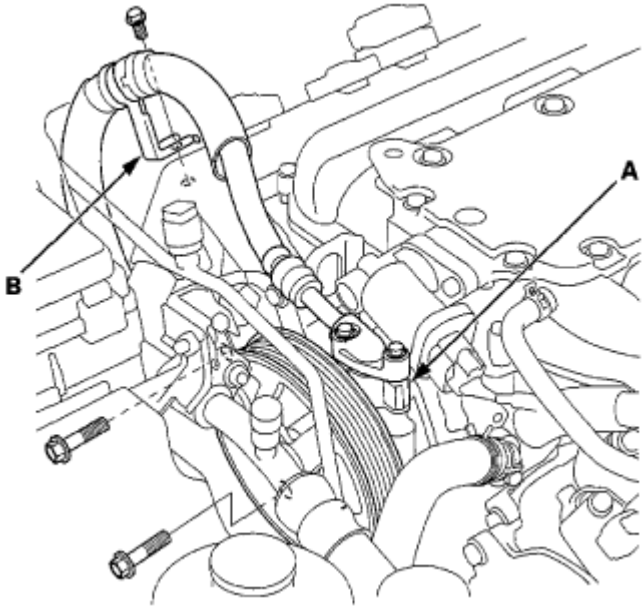


Fig. 91: Identifying Power Steering Pump And Power Steering Hose Bracket
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Remove the intake manifold (see **REMOVAL**).
8. Disconnect the following engine wire harness connectors, and remove the wire harness clamps from the cylinder head:
   - Six injector connectors
   - Knock sensor connector
   - ECT sensor 1 connector
   - EGR valve connector
   - Rocker arm oil pressure sensor connector
   - Rocker arm oil control solenoid A (Bank 1) connector

- Rocker arm oil control solenoid A (Bank 2) connector
- Rocker arm oil control solenoid B (Bank 1) connector
- Front rocker arm oil pressure switch connector
- Rear rocker arm oil pressure switch connector
- CMP sensor connector
- Two A/F sensor connectors
- Two secondary HO2S connectors

9. Remove the front warm up TWC (see **WARM UP TWC REMOVAL/INSTALLATION**) and the rear warm up TWC (see **REAR WU-TWC (BANK 1)**).
10. Remove the quick-connect fitting cover (A), then disconnect the fuel feed hose (B) (see **FUEL LINE/QUICK-CONNECT FITTING REMOVAL**).

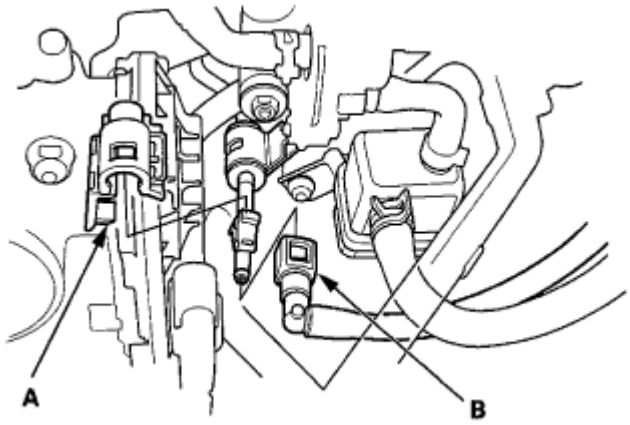


Fig. 92: Identifying Quick-Connect Fitting Cover And Fuel Feed Hose
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Remove the EVAP canister purge joint (A) with the bracket.

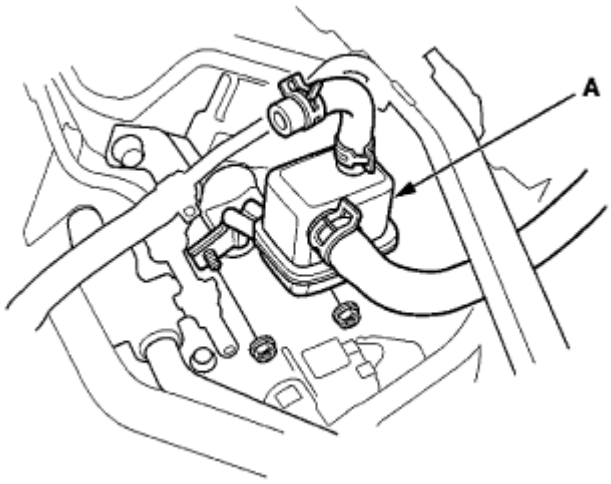


Fig. 93: Identifying EVAP Canister Purge Joint

Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

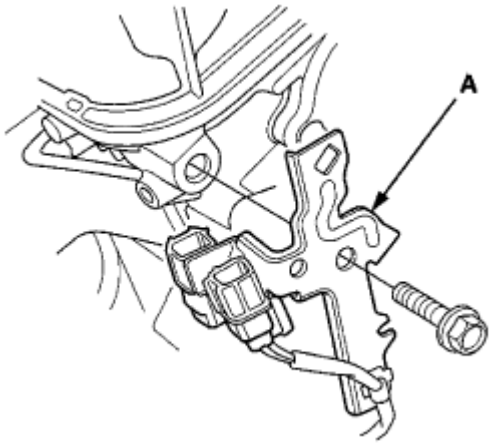


Fig. 94: Identifying Connector Bracket
Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Remove the harness bracket (A) from the rear cylinder head.

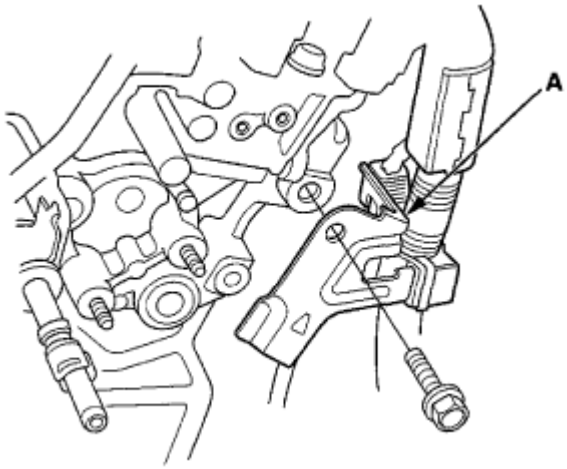


Fig. 95: Identifying Rear Cylinder Head Harness Bracket
Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. Remove the injector bases (see **INJECTOR BASE REMOVAL AND INSTALLATION**).
15. Remove the water passage (see **WATER PASSAGE REPLACEMENT**).
16. Remove the timing belt (see **TIMING BELT REMOVAL**).
17. Remove the camshaft pulleys (A) and the back covers (B).

FRONT

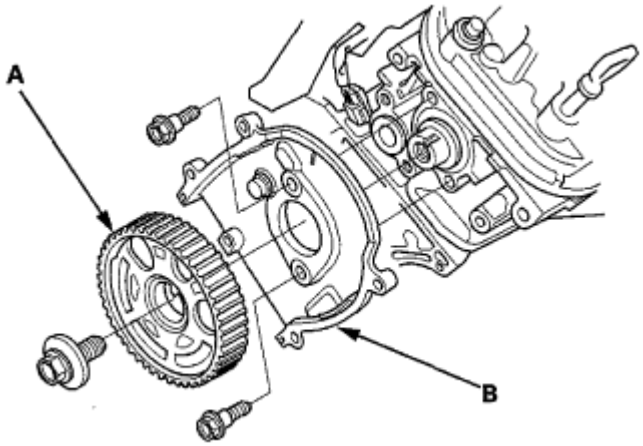


Fig. 96: Identifying Camshaft Pulleys And Back Covers (Front)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

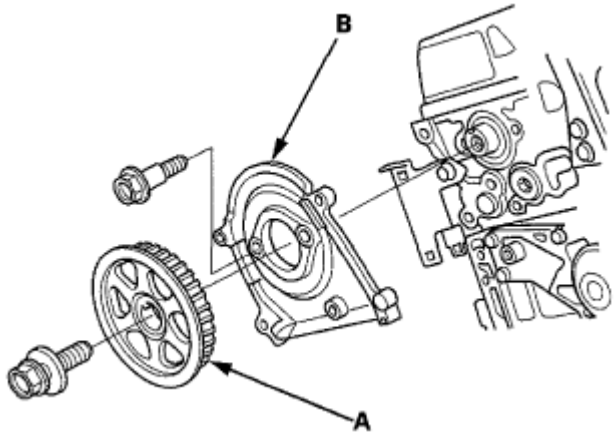


Fig. 97: Identifying Camshaft Pulleys And Back Covers (Rear)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

18. Remove the cylinder head covers (see **CYLINDER HEAD COVER REMOVAL**).
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

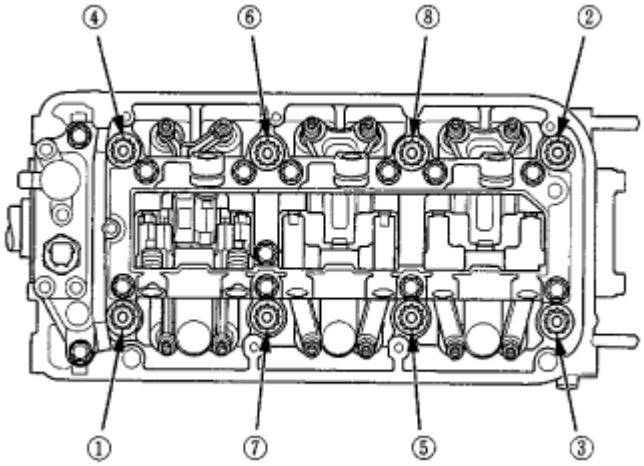


Fig. 98: Identifying Cylinder Head Bolts Tightening Sequence (Front)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

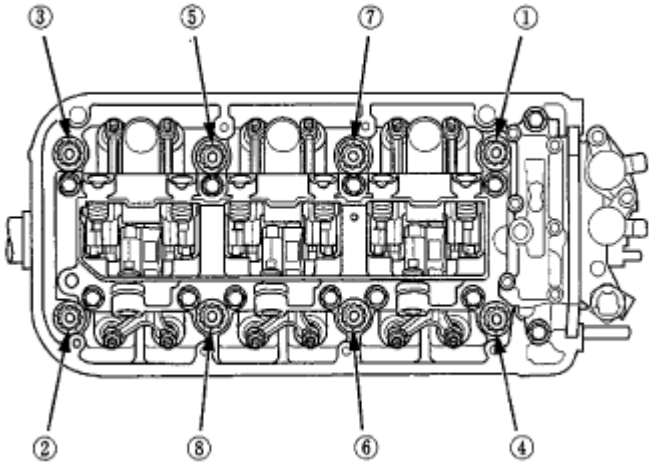


Fig. 99: Identifying Cylinder Head Bolts Tightening Sequence (Rear)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

20. Remove the cylinder heads.

CAMSHAFT REPLACEMENT

FRONT

1. Do the battery removal procedure (see **BATTERY REMOVAL AND INSTALLATION**).
2. Remove the battery base (see step 10 on **ENGINE REMOVAL**).
3. Remove the EGR valve (see **EGR VALVE REPLACEMENT**).
4. Remove the EGR valve stud bolts (A).

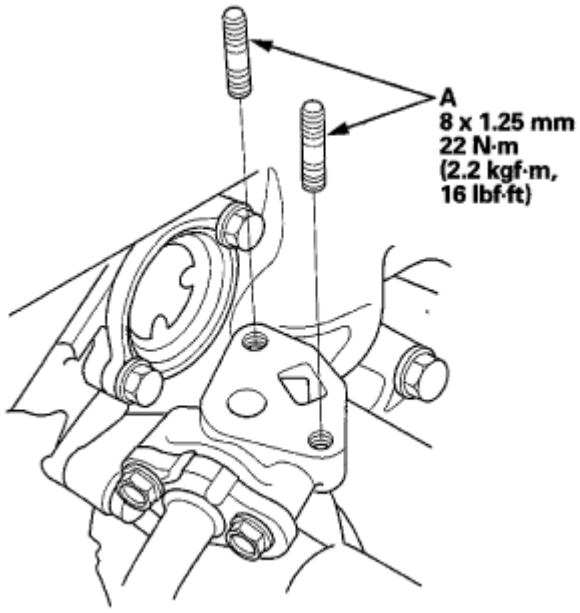


Fig. 100: Identifying EGR Valve Stud Bolts With Tightening Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

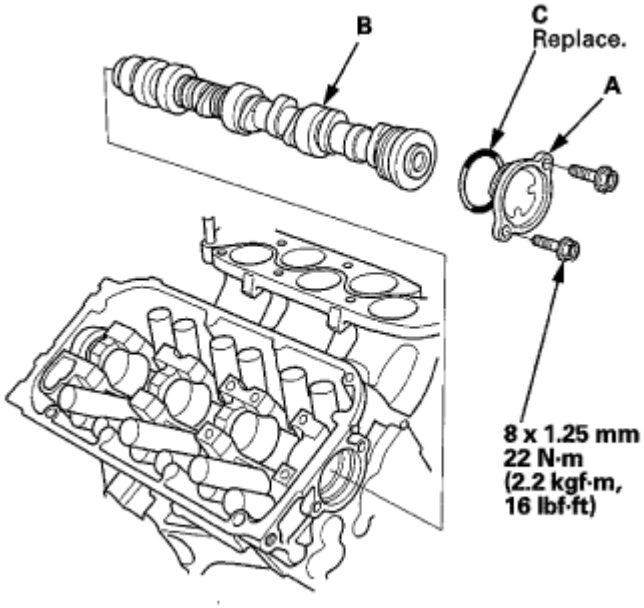


Fig. 101: Identifying Thrust Cover, Front Camshaft, O-Ring And Mounting Bolts Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. 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.
10. Apply new engine oil to the threads of the camshaft pulley mounting bolt, then install the front camshaft pulley (see step 15).
11. Install the front rocker arm assembly, then tighten the mounting bolts (see **CAMSHAFT, ROCKER ARM ASSEMBLY, CAMSHAFT SEAL, AND PULLEY INSTALLATION**).
12. Install the timing belt (see **TIMING BELT INSTALLATION**).
13. Adjust the valve clearance (see **VALVE CLEARANCE ADJUSTMENT**).
14. Install the EGR valve stud bolts, then install the EGR valve (see **EGR VALVE REPLACEMENT**).
15. Install the battery base (see step 47 on **ENGINE INSTALLATION**).
16. Do the battery installation procedure (see **BATTERY REMOVAL AND INSTALLATION**).
17. Do the CKP pattern clear/CKP pattern learn procedure (see **CKP PATTERN CLEAR/CKP PATTERN LEARN**).

REAR

1. Relieve the fuel pressure (see **FUEL PRESSURE RELIEVING**).
2. Drain the engine coolant (see **COOLANT CHECK**).
3. Remove the intake air duct (see step 2 on **REMOVAL**).
4. Remove the quick-connector fitting cover (A), then disconnect the fuel feed hose(B) (see **FUEL LINE/QUICK-CONNECT FITTING REMOVAL**).

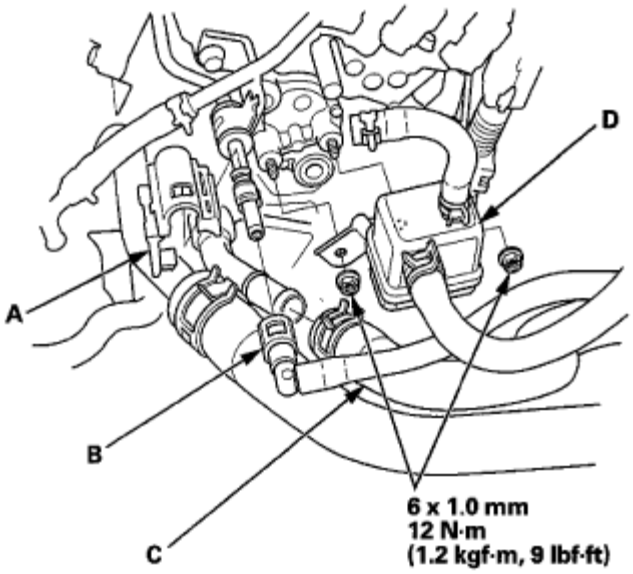


Fig. 102: Identifying Quick-Connector Fitting Cover, Fuel Feed Hose, Heater Hose, EVAP Canister Purge Joint With Mounting Bolts Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Disconnect the heater hose (C) and remove the EVAP canister purge joint (D) with the bracket.

6. Remove the timing belt (see **TIMING BELT REMOVAL**).
7. Remove the rear rocker arm assembly (see **REAR**).
8. Remove the rear camshaft pulley (see step 17).
9. Remove the thrust cover (A), then remove the rear camshaft (B).

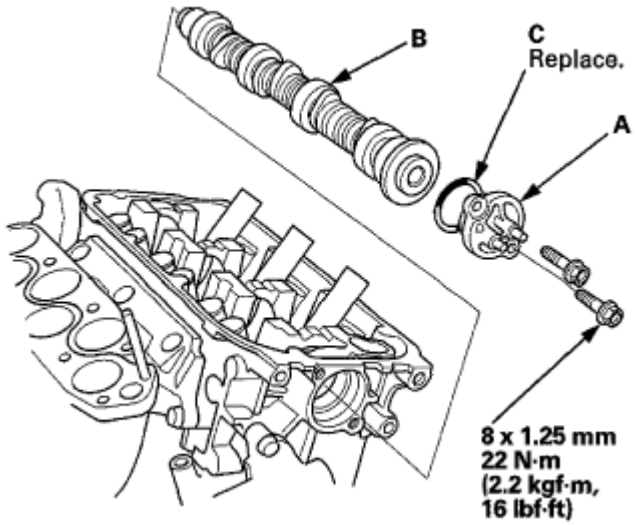


Fig. 103: Identifying Thrust Cover, Rear Camshaft, O-Ring And Mounting Bolts Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Install the rear camshaft in the reverse order of removal. Always use a hew O-ring (C). Apply new engine oil to the journals and the cam lobes.
11. Apply new engine oil to the threads of the camshaft pulley mounting bolt, then install the rear camshaft pulley (see step 15).
12. Install the rear rocker arm assembly, then tighten the mounting bolts (see **REAR**).
13. Install the timing belt (see **TIMING BELT INSTALLATION**).
14. Adjust the valve clearance (see **VALVE CLEARANCE ADJUSTMENT**).
15. Connect the heater hoses and install the EVAP canister purge joint with the bracket.
16. Connect the fuel feed hose, then install the quick-connect fitting cover (see **FUEL LINE/QUICK-CONNECT FITTING INSTALLATION**).
17. Inspect for fuel leaks. Turn the ignition switch to ON (II) (do not operate the starter) so the fuel pump runs for about 2 seconds and pressurizes the fuel line. Repeat this operation three times, then check for fuel leakage at any point in the fuel line.
18. Fill the radiator with engine coolant, and bleed the air from the cooling system (see **COOLANT CHECK**).
19. Do the CKP pattern clear/CKP pattern learn procedure (see **CKP PATTERN CLEAR/CKP PATTERN LEARN**).

CYLINDER HEAD INSPECTION FOR WARPAGE

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

Cylinder Head Warpage

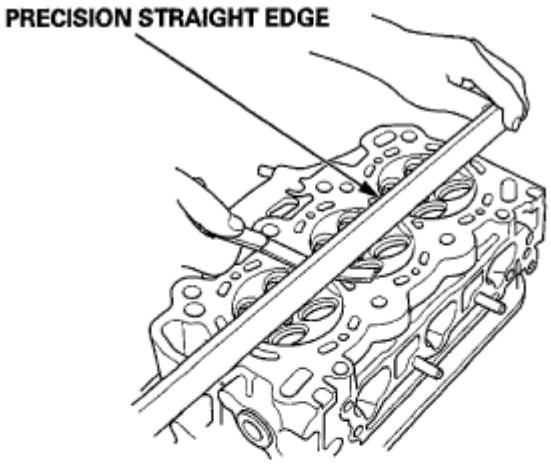
Standard (New): 0.05 mm (0.002 in) max.

Service Limit: 0.20 mm (0.007 in)

Cylinder Head Height

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

Service Limit: 120.8 mm (4.756 in)



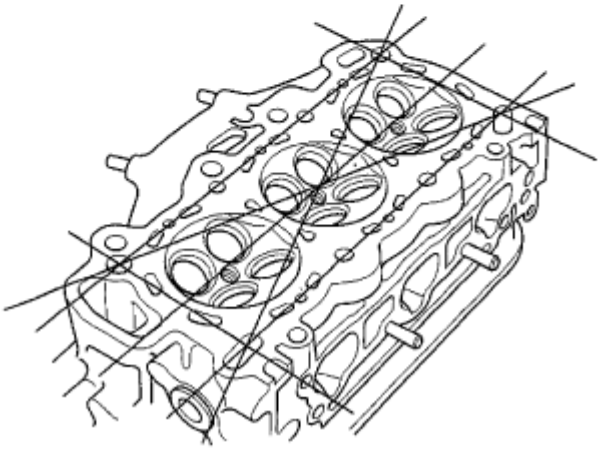


Fig. 104: Checking Cylinder For Warpage Using Precision Straight Edge
Courtesy of AMERICAN HONDA MOTOR CO., INC.

ROCKER ARM ASSEMBLY REMOVAL

FRONT

1. Remove the cylinder head cover (see **CYLINDER HEAD COVER REMOVAL**).
2. Loosen the locknuts and the adjusting screws (A).

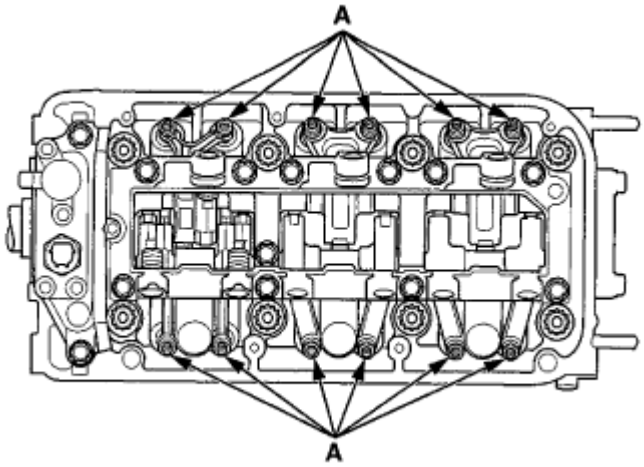


Fig. 105: Identifying Locknuts And Adjusting Screws
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Remove the rocker shaft bridge mounting bolts, the front rocker arm oil control valve mounting bolts, and the rocker arm assembly.
    1. Loosen the rocker shaft bridge mounting bolts and the front rocker arm oil control valve 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 front rocker arm oil control valve mounting bolts. The bolts will keep the rocker arms on the shafts.

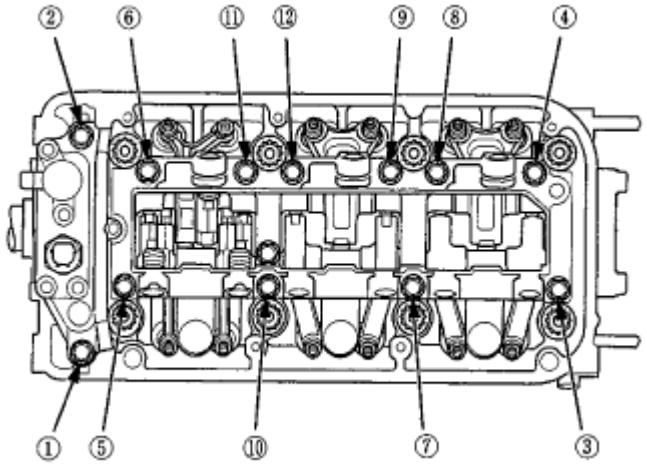


Fig. 106: Identifying Rocker Shaft Bridge Mounting Bolts Tightening Sequence (Front)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

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

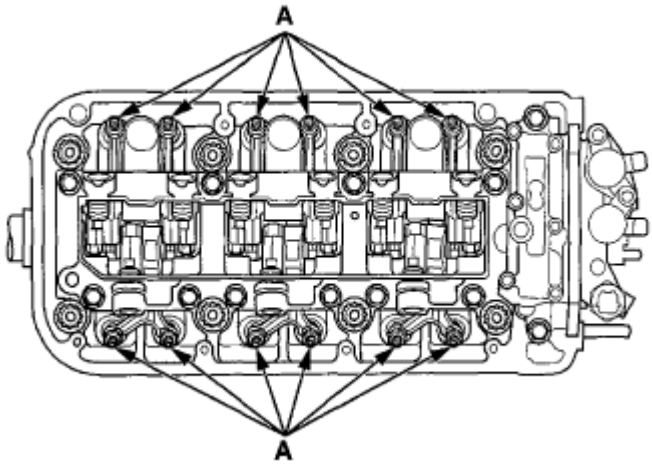


Fig. 107: Identifying Locknuts And Adjusting Screws
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Remove the rocker shaft bridge mounting bolts, the rear rocker arm oil control valve mounting bolts, and the rocker arm assembly.
    1. Loosen the rocker shaft bridge mounting bolts and the rear rocker arm oil control valve 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 rear rocker arm oil control valve mounting bolts. The bolts will keep the rocker arms on the shafts.

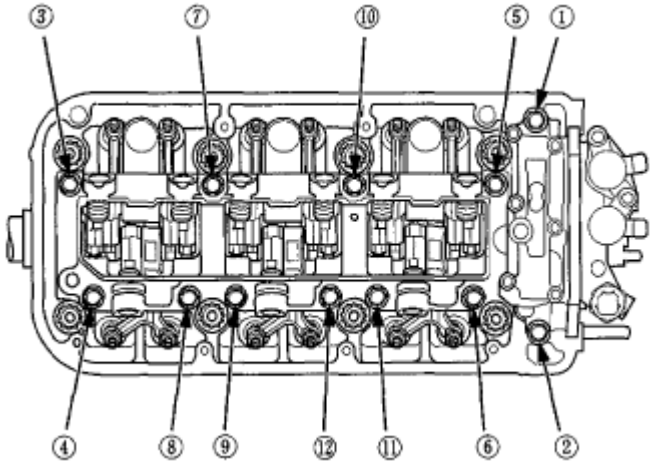


Fig. 108: Identifying Rocker Shaft Bridge Mounting Bolts Tightening Sequence (Rear)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

ROCKER ARM AND SHAFT DISASSEMBLY/REASSEMBLY

FRONT

NOTE:

- **Identify parts as they are removed so they can be reinstalled in their original locations.**
- **Inspect the rocker shafts and 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 front rocker arm oil control valve on the shaft.**
- **If the rocker shaft does not remove or does not install 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 the contact points, the bearing surfaces, and the lost motion assembly.**
- **When replacing the rocker arm assembly, remove the fastening hardware from the new rocker arm assembly.**
- **Never remove any of the circlips that retain the lost motion assemblies in the rocker shaft bridge. The circlips are not available separately, and are factory installed in the rocker shaft bridge. To remove the lost motion assemblies, first remove the rocker shafts and the rocker arms.**

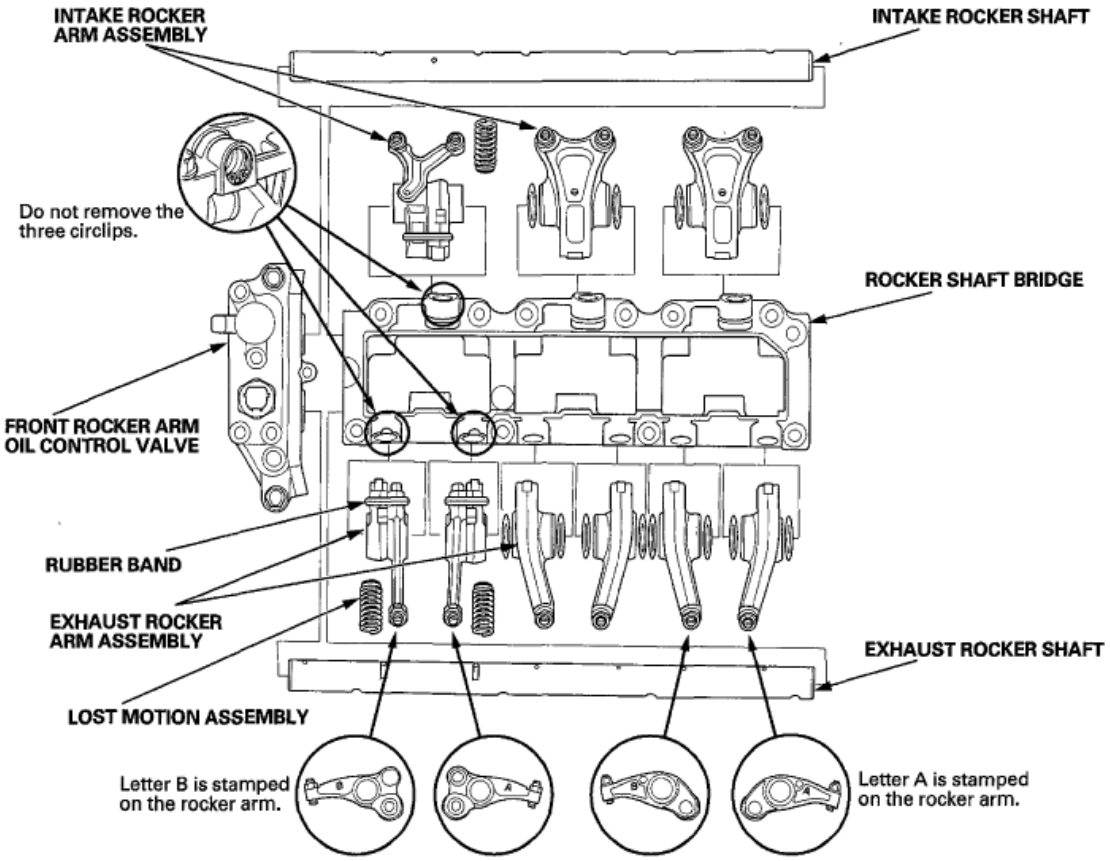


Fig. 109: Identifying Rocker Assembly Components (Front)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

NOTE:

- **Identify parts as they are removed so they can be reinstalled in their original locations.**
- **Inspect the rocker shafts and 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 rear rocker arm oil control valve on the shaft.**
- **If the rocker shaft does not remove or does not install 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 the contact points, the bearing surfaces, and the lost motion assembly.**

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

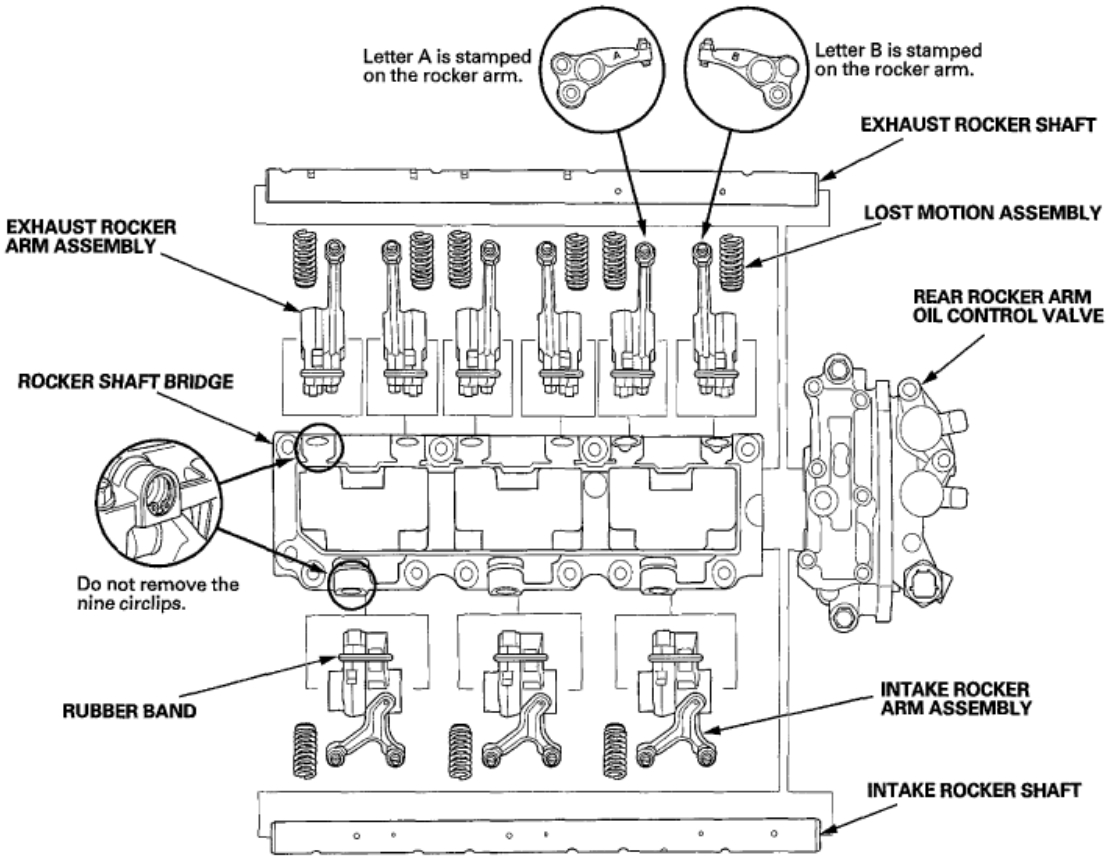


Fig. 110: Identifying Rocker Assembly Components (Rear)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.

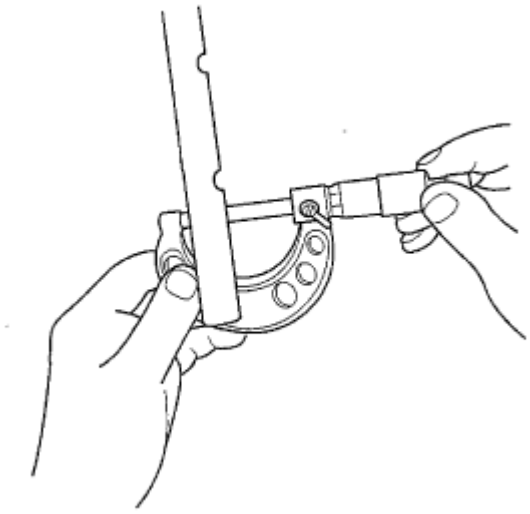


Fig. 111: Measuring Diameter Of Shaft At First Rocker Location
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

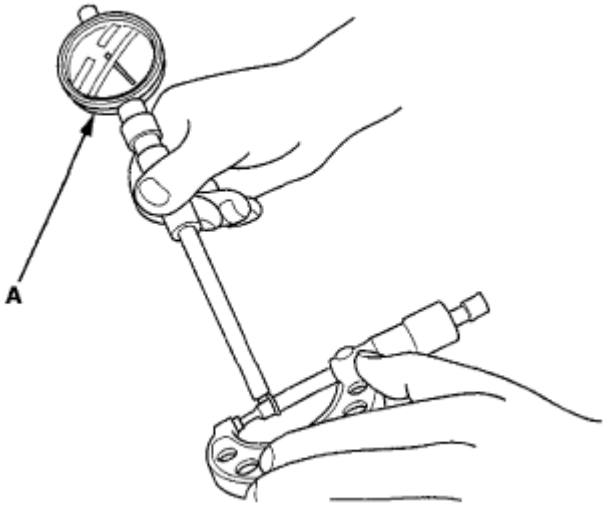


Fig. 112: Setting Gauge To Zero At Shaft Diameter
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

   NO. 1, No. 2, No. 3, and No. 4 CYLINDERS

   Intake Rocker Arm-to-Shaft Clearance

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

   Service Limit: 0.046 mm (0.00181 in)

NO. 1, No. 2, No. 3, and No. 4 CYLINDERS

Exhaust Rocker Arm-to-Shaft Clearance

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

Service Limit: 0.046 mm (0.00181 in)

No. 5 and No. 6 CYLINDERS

Intake Rocker Arm-to-Shaft Clearance

Standard (New): 0.018-0.056 mm (0.00071-0.00220 in)

Service Limit: 0.056 mm (0.00220 in)

No. 5 and No. 6 CYLINDERS

Exhaust Rocker Arm-to-Shaft Clearance

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

Service Limit: 0.047 mm (0.00185 in)

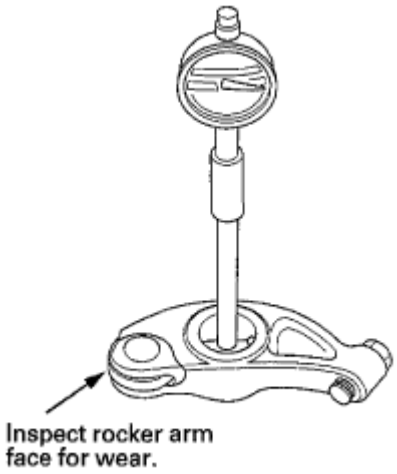


Fig. 113: Measuring Inside Diameter Of Rocker Arm
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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 variable cylinder management rocker arm needs replacement, replace all rocker arms in that set (primary and secondary).

Variable Cylinder Management Rocker Arms

7. Inspect the rocker arm pistons (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 pistons when reassembling.**
- **When removing the rocker arm pistons from the intake primary rocker arm (B) and the exhaust secondary rocker arms (C), carefully apply air pressure to the oil passage of the rocker arm.**

INTAKE

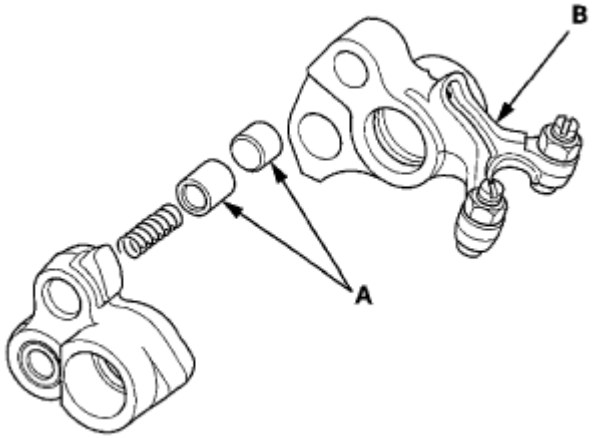


Fig. 114: Identifying Primary Rocker Arm, Secondary Rocker Arm And Rocker Arm Piston (Intake)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

EXHAUST

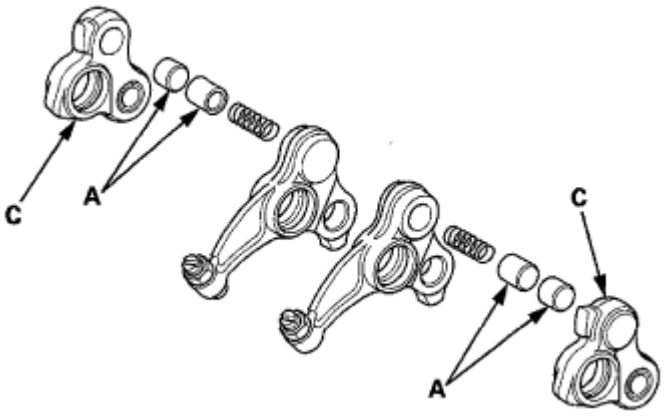


Fig. 115: Identifying Primary Rocker Arm, Secondary Rocker Arm And Rocker Arm Piston (Front)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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 front rocker arm oil control valve on the front cylinder head, then tighten the bolts to the specified torque.

   Specified Torque

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

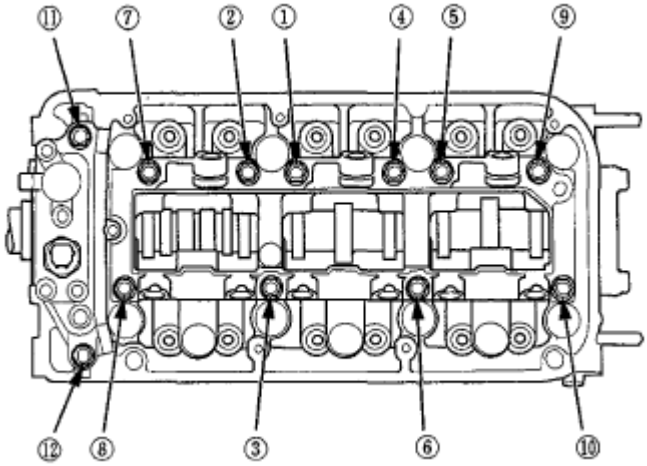


Fig. 116: Identifying Front Cylinder Head Mounting Bolts Tightening Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

   Specified Torque

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

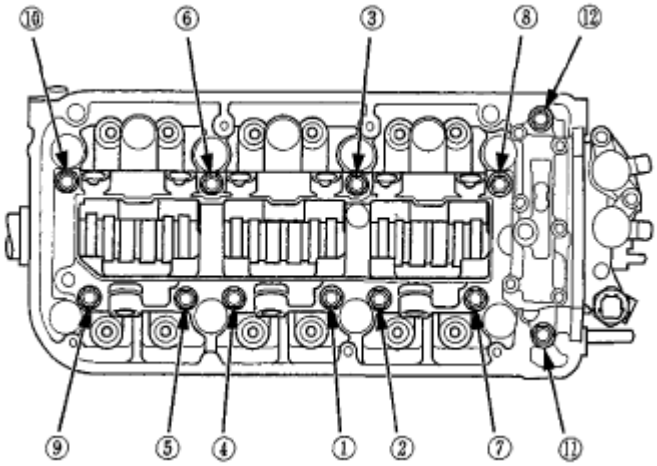


Fig. 117: Identifying Rear Cylinder Head Mounting Bolts Tightening Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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 cylinder head. If it is still beyond the service limit, replace the camshaft.

   Camshaft End Play

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

   Service Limit: 0.20 mm (0.0079 in)

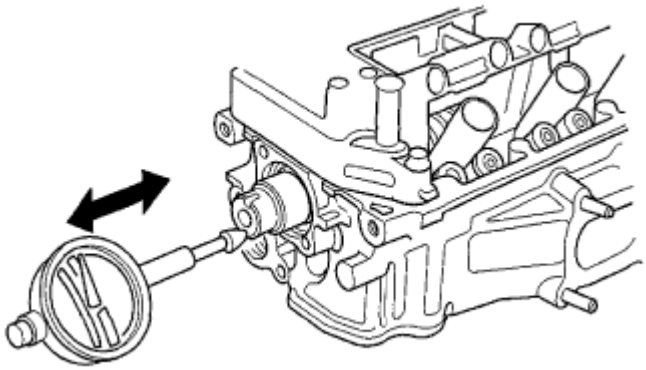


Fig. 118: Checking Camshaft Endplay
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

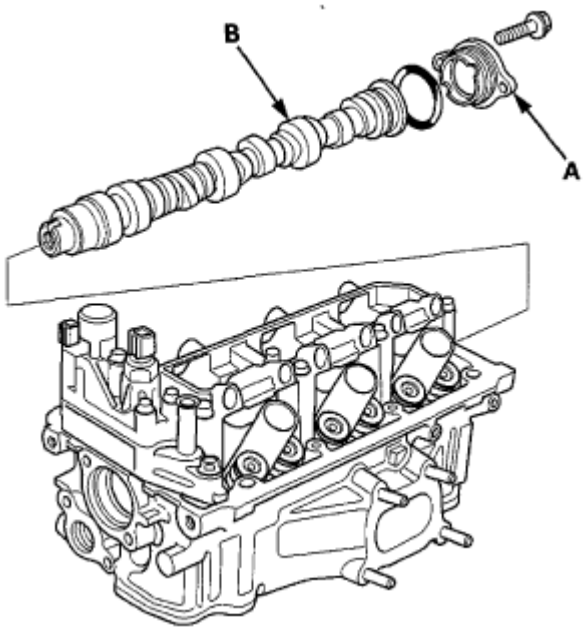


Fig. 119: Identifying Camshaft Thrust Cover And Camshaft
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

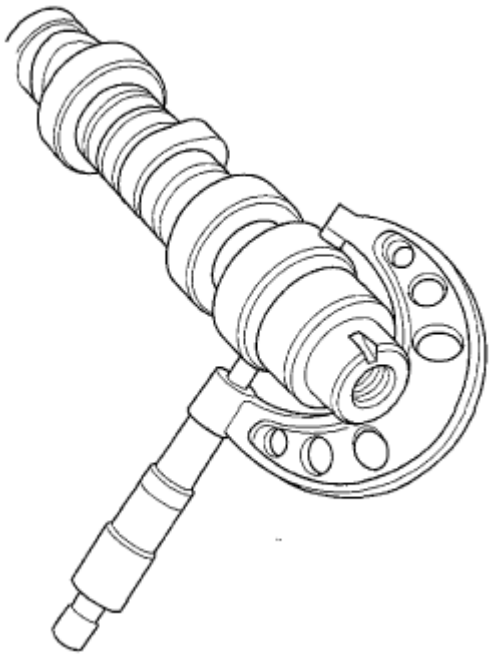


Fig. 120: Measuring Diameter Of Camshaft Journal
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

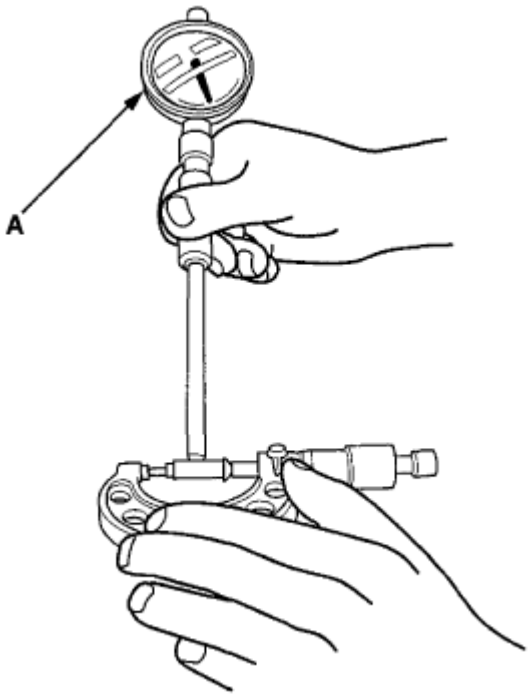


Fig. 121: Setting Gauge To Zero On Journal Diameter
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Clean the camshaft bearing surfaces in the cylinder head. Measure the inside diameter of each camshaft bearing surface, and check for an out-of-round condition.
    - If the camshaft-to-holder clearance is within limits, go to step 14.
    - If the camshaft-to-holder clearance is beyond the service limit and the camshaft has been replaced, replace the cylinder head.
    - If the camshaft-to-holder clearance is beyond the service limit and the camshaft has not been replaced, go to step 13.

    Camshaft-to-Holder Oil Clearance

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

    Service Limit: 0.15 mm (0.0059 in)

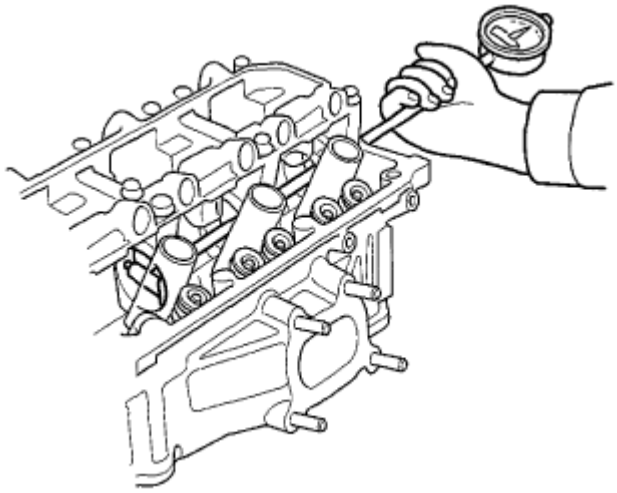


Fig. 122: Measuring Inside Diameter Of Camshaft Bearing Surface
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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 (0.0016 in)

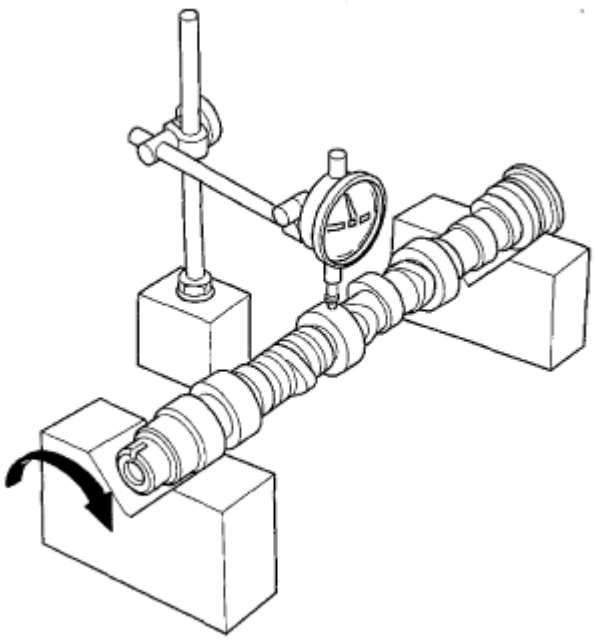


Fig. 123: Checking Total Runout With Camshaft Supported On V-Blocks
Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. Measure the cam lobe height.

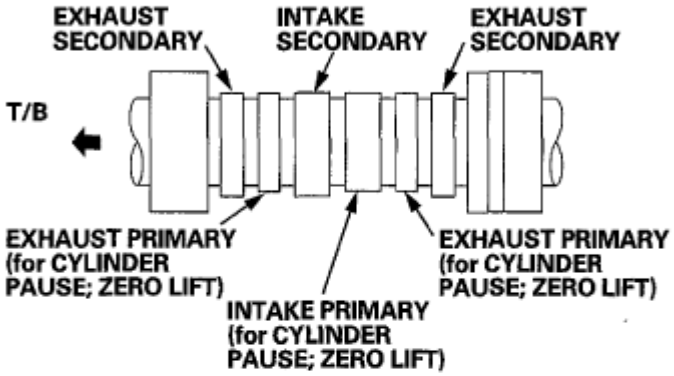
NOTE:

- **When measuring the No. 1, No. 2, No. 3, and No. 4 cylinders intake cam lobe height of the camshaft, measure the secondary cam lobes.**
- **When measuring the No. 1, No. 2, No. 3, and No. 4 cylinders exhaust cam lobe height of the camshaft, measure the secondary cam lobes.**

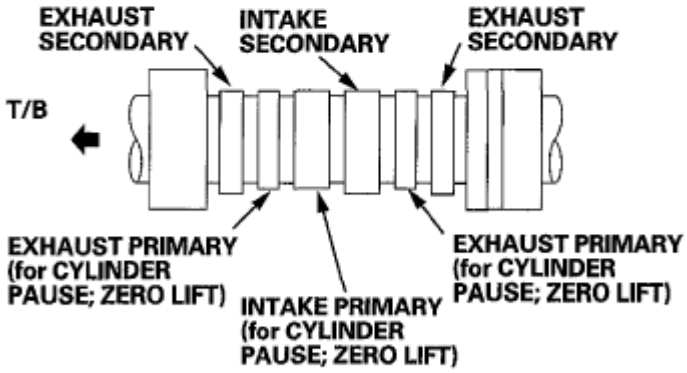
Cam Lobe Height Standard (New)
No. 1, No. 2, No. 3, and No. 4 CYLINDERS:
Intake: 35.162 mm (1.38433 in)
Exhaust: 36.537 mm (1.43846 in)

No. 5 and No. 6 CYLINDERS:
Intake: 35.155 mm (1.38405 in)
Exhaust: 36.512 mm (1.43748 in)

No. 1, No. 2, and No. 3 CYLINDERS



No. 4 CYLINDER



No. 5 and No. 6 CYLINDERS

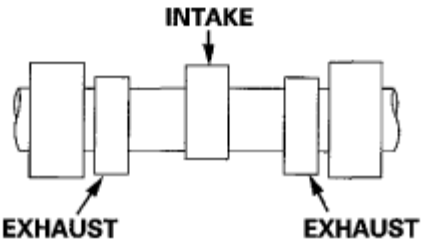


Fig. 124: Identifying Intake And Exhaust Camshaft Lobes
Courtesy of AMERICAN HONDA MOTOR CO., INC.

VALVE, SPRING, AND VALVE SEAL REMOVAL

Special Tools Required

Valve Spring Compressor Attachment 07757-PJ1010A

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

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

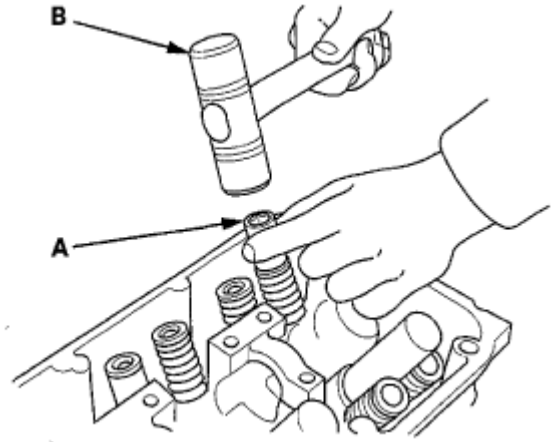


Fig. 125: Tapping Spring Retainer Using Socket And Plastic Mallet
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

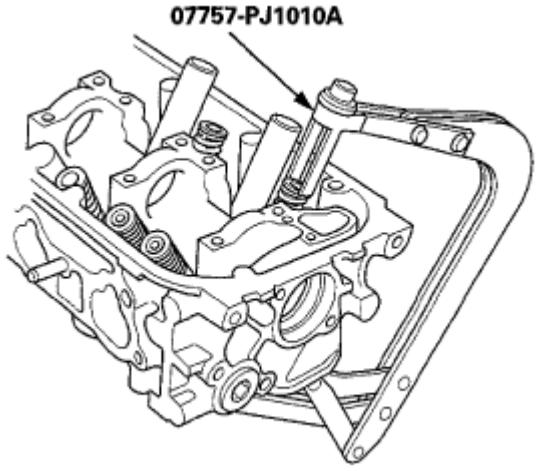


Fig. 126: Removing Valve Cotters
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

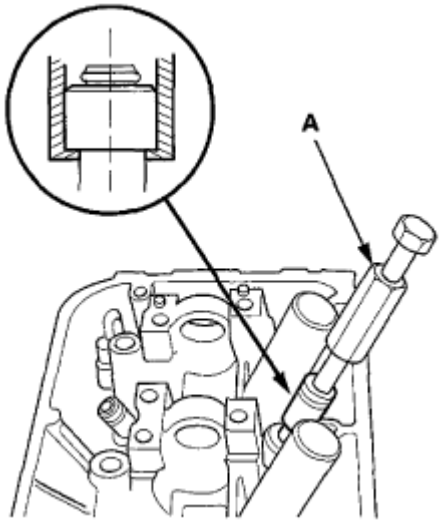


Fig. 127: Identifying Valve Guide Seal Remover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Remove the valve seal.

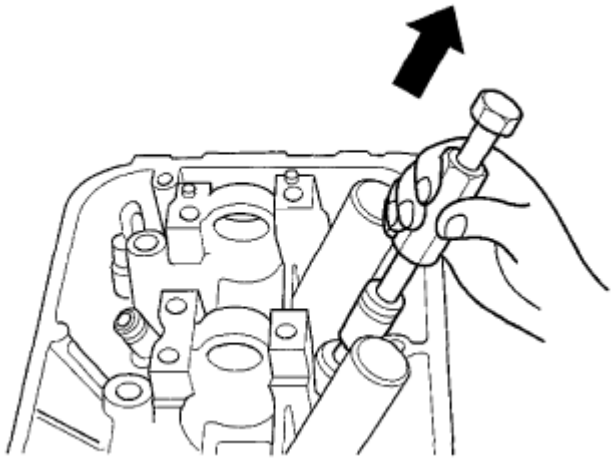


Fig. 128: Removing Valve Seal
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Remove the valve spring seat.

VALVE INSPECTION

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

2. Measure the valve in these areas.

Intake Valve Dimensions

A Standard (New): 35.90-36.10 mm (1.4134-1.4213 in)

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

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

C Service Limit: 5.455 mm (0.21476 in)

Exhaust Valve Dimensions

A Standard (New): 29.90-30.10 mm (1.1772-1.1850 in)

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

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

C Service Limit: 5.420 mm (0.21339 in)

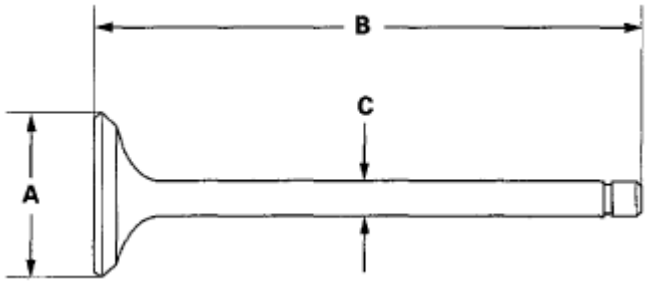


Fig. 129: Identifying Valve Measurement Areas
Courtesy of AMERICAN HONDA MOTOR CO., INC.

VALVE STEM-TO-GUIDE CLEARANCE INSPECTION

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

Intake Valve Stem-to-Guide Clearance

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

Service Limit: 0.08 mm (0.0031 in)

Exhaust Valve Stem-to-Guide Clearance

Standard (New): 0.055-0.080 mm (0.00217-0.00315 in)

Service Limit: 0.11 mm (0.0043 in)

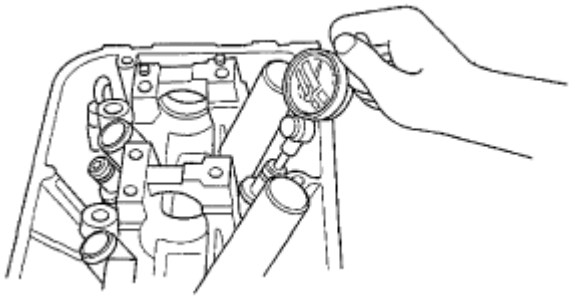


Fig. 130: Measuring Inside Diameter Of Valve Gauge Using Micrometer
Courtesy of AMERICAN HONDA MOTOR CO., INC.

VALVE GUIDE REPLACEMENT

Special Tools Required

- Valve Guide Driver, 5.35x9.7 mm 07742-0010100
- Valve Guide Reamer, 5.5 mm 07HAH-PJ7A100

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

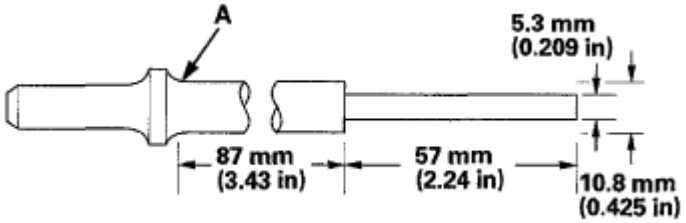


Fig. 131: Identifying Valve Guide Driver With Dimensions
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

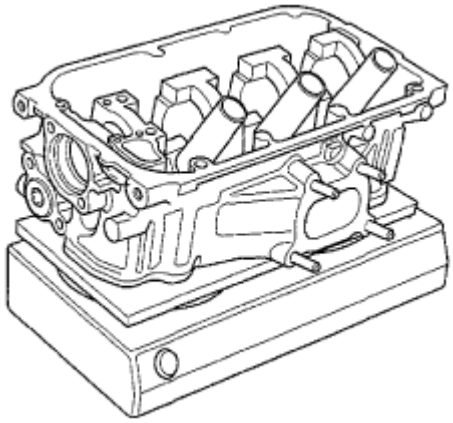


Fig. 132: Heating Cylinder Head
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Working from the camshaft side, use the driver and an air hammer to drive the guide about 2 mm (0.08 in) towards the combustion chamber. This will knock off some of the carbon and make removal easier. Hold the air hammer directly in line with the valve guide to prevent damaging the driver. Wear safety goggles or a face shield.
6. Turn the head over, and drive the guide out toward the camshaft side of the head.

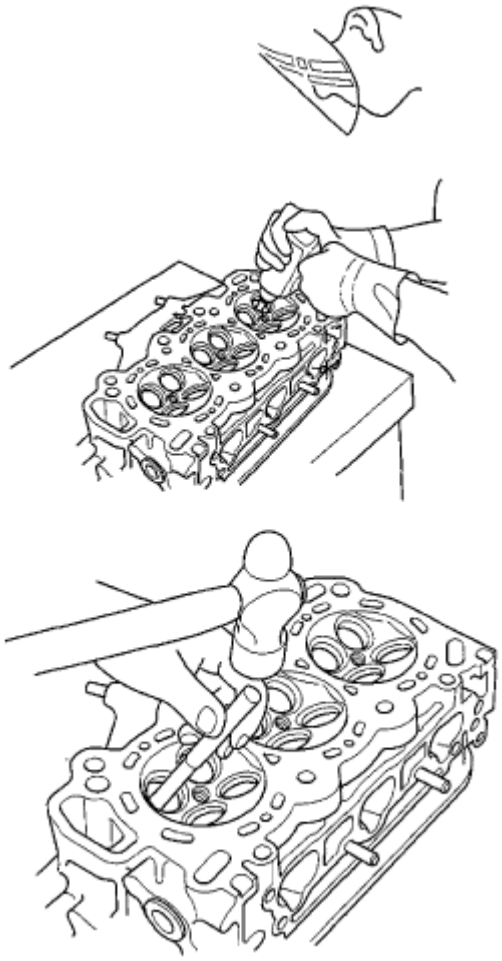


Fig. 133: Driving Guide Towards Combustion Chamber Using Driver And Air Hammer
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

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

8. Remove the new guide(s) from the freezer, one at a time, as you need them.
9. Apply a thin coat of new engine oil to the outside of the new valve guide. Install the guide from the camshaft side of the head; use the valve guide driver, 5.35 x 9.7 mm to drive the guide to the specified installed height (A) of the guide (B). If you have all 12 guides to do, you may have to reheat the head.

Valve Guide Installed Height

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

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

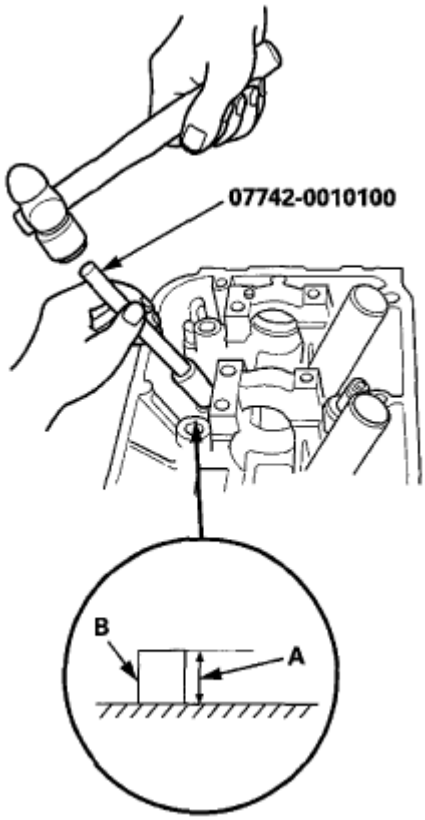


Fig. 134: Installing Guide From Camshaft Side Of Head
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

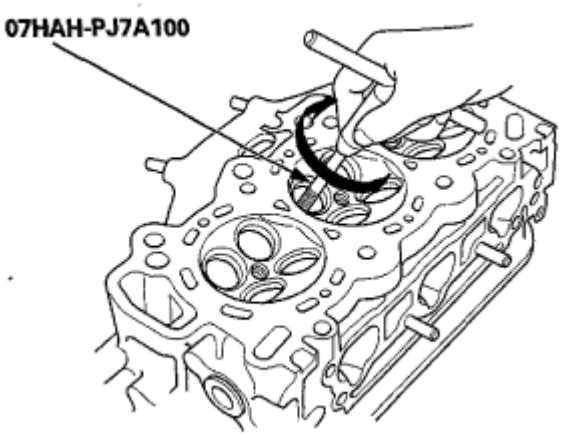


Fig. 135: Rotating Reamer Clockwise
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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 GUIDE REPLACEMENT**). Verify that a valve slides in the intake and exhaust valve guides without sticking.
15. Inspect the valve seating (see **VALVE SEAT RECONDITIONING**). If necessary renew the valve seat using a valve seat cutter.

VALVE SEAT RECONDITIONING

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

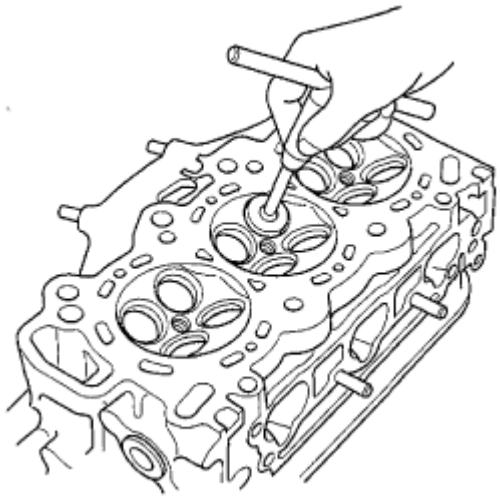


Fig. 136: Cutting Valve Seats In Cylinder Head Using Valve Seat Cutter
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

   Check the width of the seat and adjust accordingly.

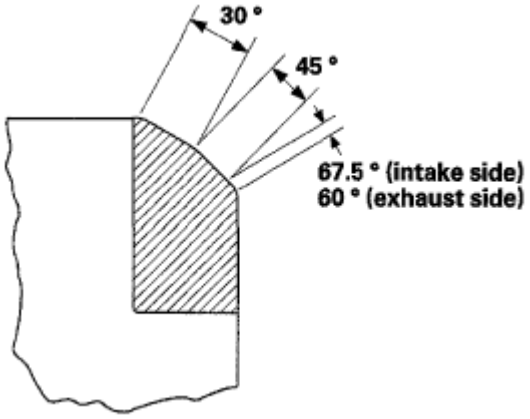


Fig. 137: Identifying Valve Upper And Lower Edges Angles
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

   Valve Seat Width

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

   Service Limit: 2.00 mm (0.0787 in)

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

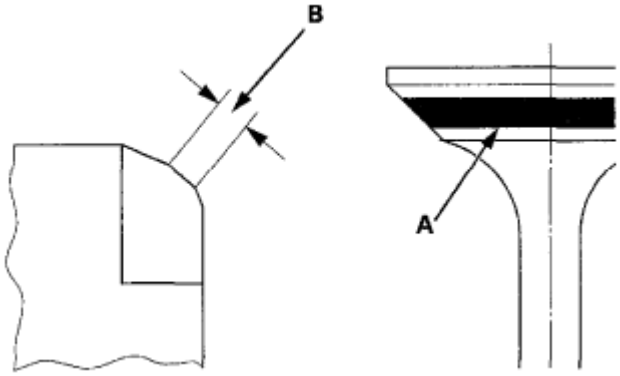


Fig. 138: Identifying Actual Valve Seating Surface And Prussian Blue Compound Applying Area
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. The actual valve seating surface (B), as shown by the blue compound, should be centered on the seat:
   - If it is too high (closer to the valve stem), you must make a second cut with the 67.5° cutter (intake seat) or the 60° cutter (exhaust seat) to move it down, then one more cut with the 45° cutter to restore seat width.

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

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

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

   Intake Valve Stem Installed Height

   Standard (New): 46.75-47.55 mm (1.8405-1.8720 in)

   Service Limit: 47.80 mm (1.8819 in)

   Exhaust Valve Stem Installed Height

   Standard (New): 46.68-47.48 mm (1.8378-1.8693 in)

   Service Limit: 47.73 mm (1.8791 in)

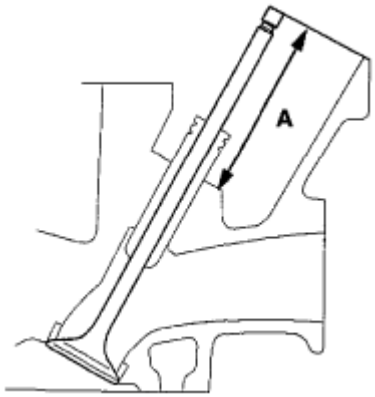


Fig. 139: Identifying Valve Stem Installed Height
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

VALVE, SPRING, AND VALVE SEAL INSTALLATION

Special Tools Required

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

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

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

NOTE: 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.

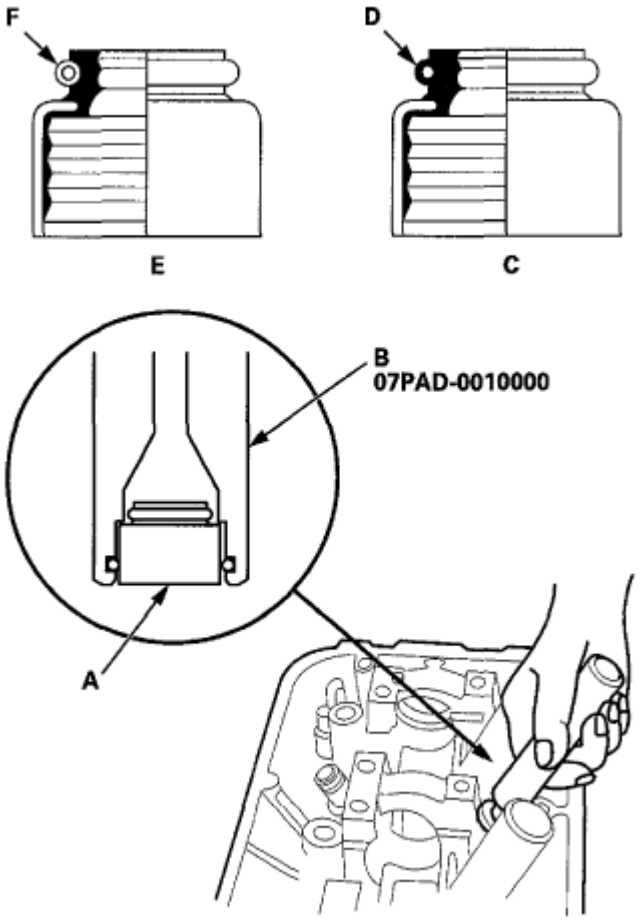


Fig. 140: Installing Valve Seals Using Stem Seal Driver
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

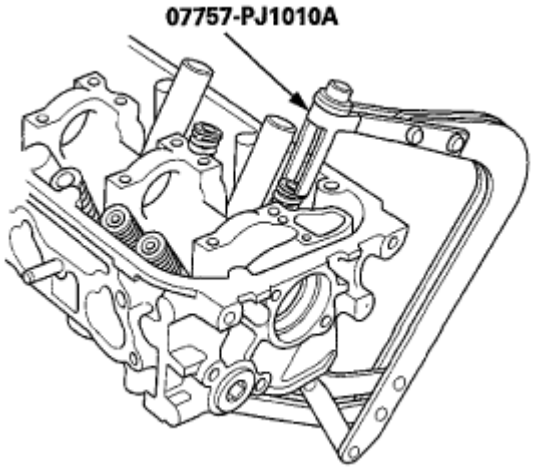


Fig. 141: Installing Valve Cotters Using Valve Spring Compressor
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

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

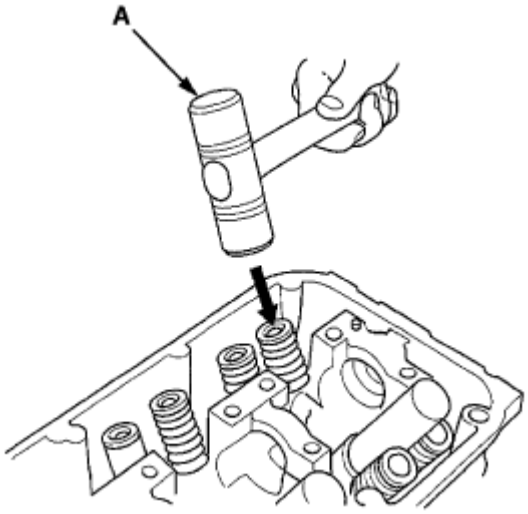


Fig. 142: Tapping Valve Stem Using Plastic Mallet
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

FRONT

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

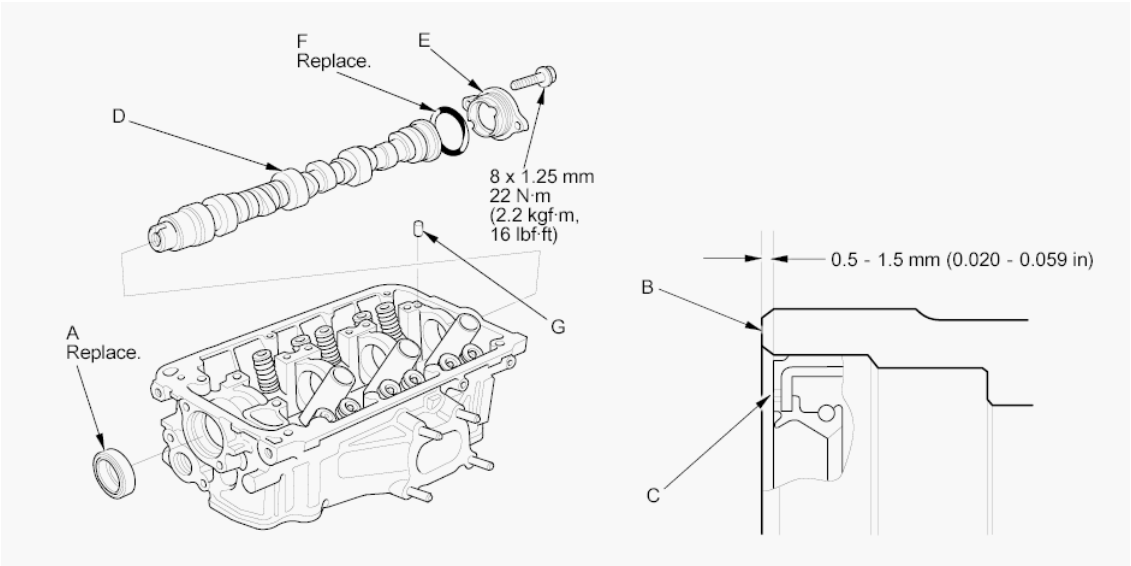


Fig. 143: Identifying Camshaft, Oil Seal, Thrust Cover And O-Ring With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

   Oil Seal Installed Height

   0.5-1.5 mm (0.020-0.059 in)

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

NOTE:

- **Apply a 2.5 mm (0.098 in) diameter bead of liquid gasket along the broken line (A).**
- **If you apply liquid gasket P/N 08718-0012, the component must be**

installed within 4 minutes.

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

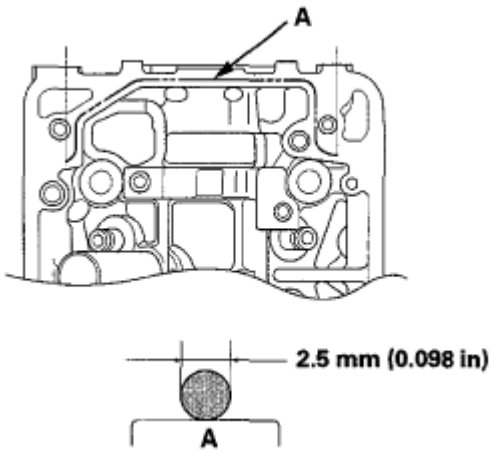


Fig. 144: Identifying Liquid Gasket Applying Area
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

NOTE:

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

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

Specified Torque

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

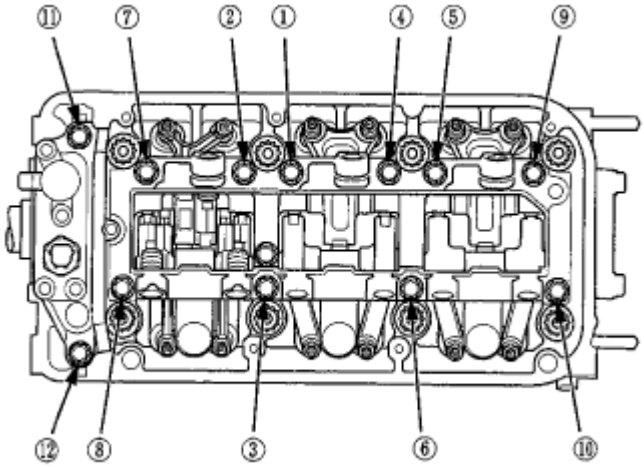


Fig. 145: Identifying Mounting Bolts Tightening Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

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

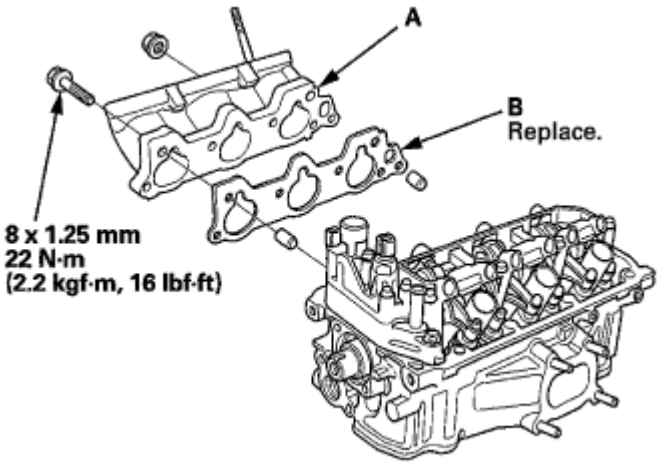


Fig. 146: Identifying Injector Base, Gasket With Mounting Bolts Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

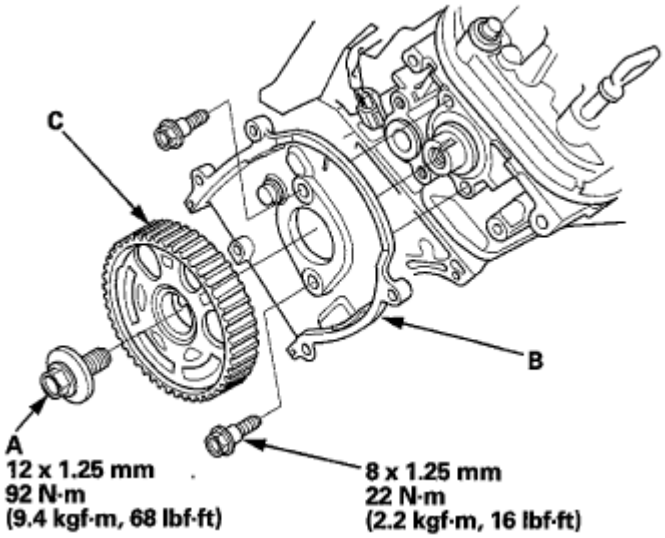


Fig. 147: Identifying Back Cover, Camshaft Pulley And Camshaft Pulley Mounting Bolts Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

REAR

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

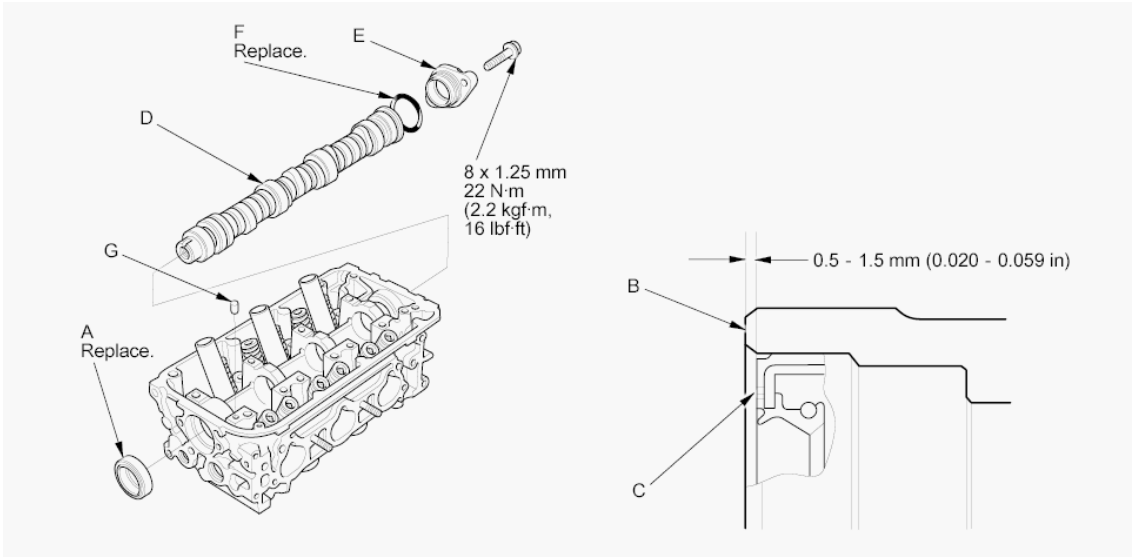


Fig. 148: Identifying Camshaft, Thrust Cover, Oil Seal And O-Ring With Mounting Bolt Torque Specification

Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

   Oil Seal Installed Height

   0.5-1.5 mm (0.020-0.059 in)

6. Insert the camshaft (D) into the cylinder head, then install the camshaft thrust cover (E). Always use a new O-ring (F). Apply new engine oil to the journals and the cam lobes.
7. Clean the excess oil off the camshaft, and check that the oil seal lip is not distorted.
8. Install the dowel pin (G).
9. If the rocker arm assembly is disassembled, reassemble the rocker arm assembly (see **REAR**).
10. Remove all of the old liquid gasket from the rear rocker arm oil control valve and the cylinder head.
11. Apply liquid gasket (P/N 08717-0004, 08718-0003, 08718-0004, or 08718-0009) to the rocker arm oil control valve mating surface of the cylinder head. Install the component within 5 minutes of applying the liquid gasket.

NOTE:

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

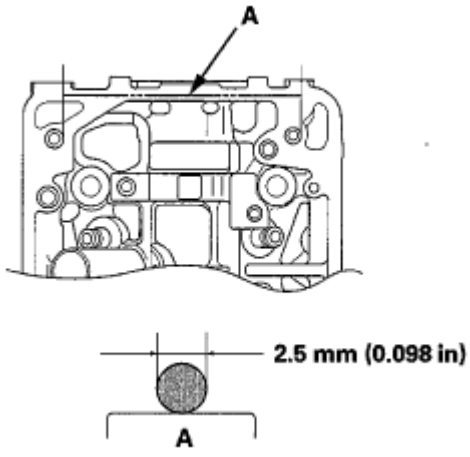


Fig. 149: Identifying Liquid Gasket Applying Area
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

NOTE:

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

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

    Specified Torque

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

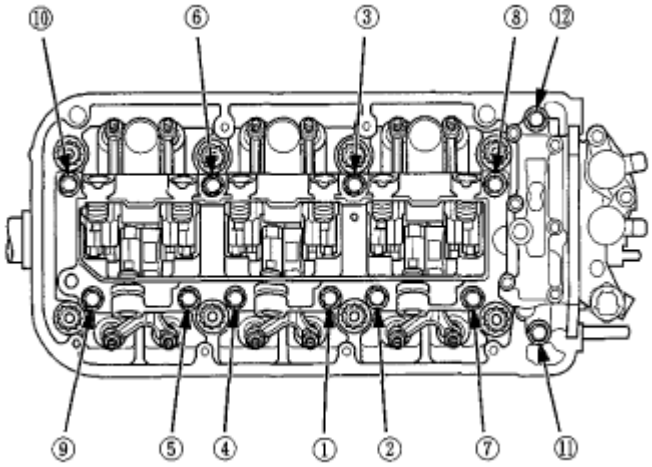


Fig. 150: Identifying Mounting Bolts Tightening Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

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

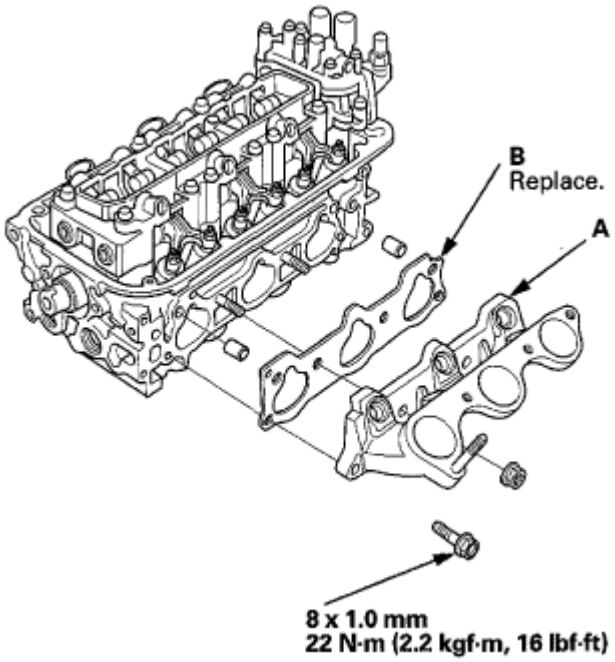


Fig. 151: Identifying Injector Base And Gasket With Mounting Bolts Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

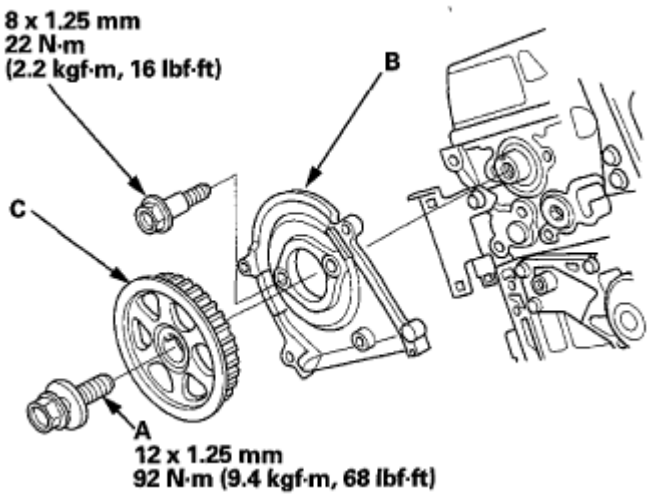


Fig. 152: Identifying Camshaft Pulley, Back Cover, O-Ring And Dowel Pins With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

CYLINDER HEAD INSTALLATION

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

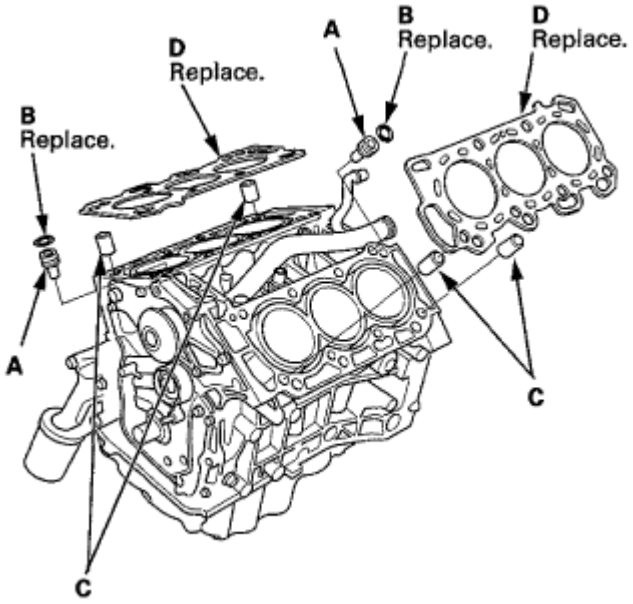


Fig. 153: Identifying Oil Control Orifices, Dowel Pins, Gaskets And O-Rings
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

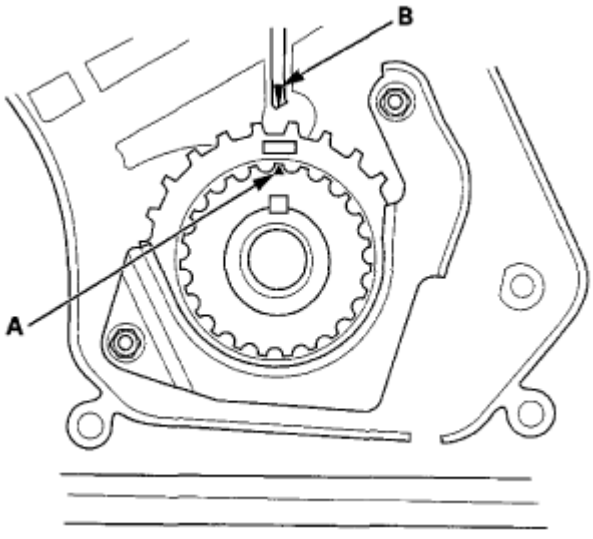


Fig. 154: Identifying Alignment Of TDC Mark On Tooth Of Timing Belt Drive Pulley With Pointer On Oil Pump

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

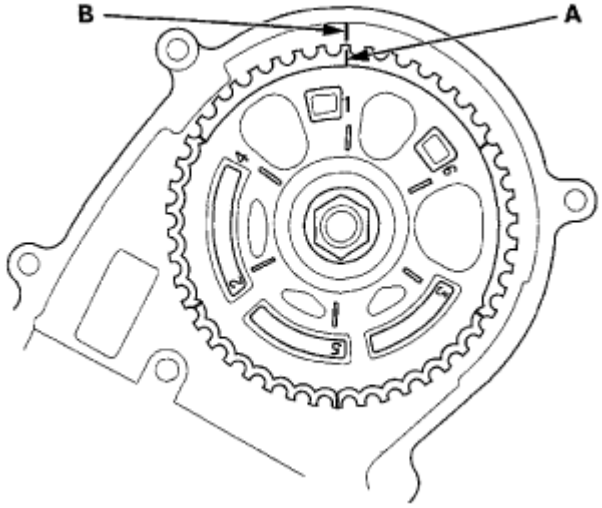


Fig. 155: Identifying Alignment Of TDC Mark On Camshaft Pulley With Pointer On Back Cover (Front)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

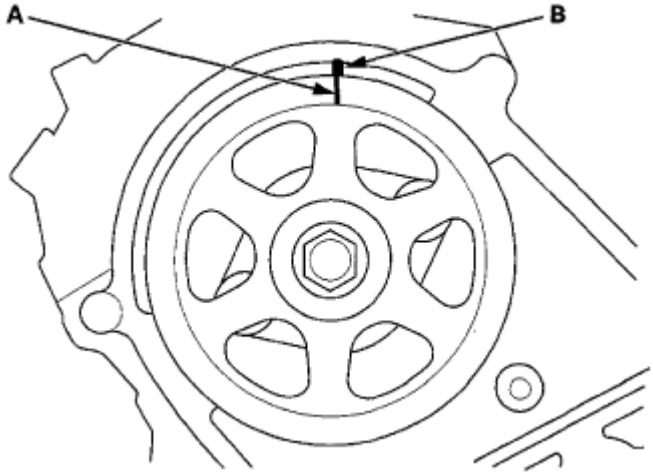


Fig. 156: Identifying Alignment Of TDC Mark On Camshaft Pulley With Pointer On Back Cover (Rear)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Install the cylinder heads on the engine block.

8. Measure the diameter of each cylinder head bolt at point A and point B.

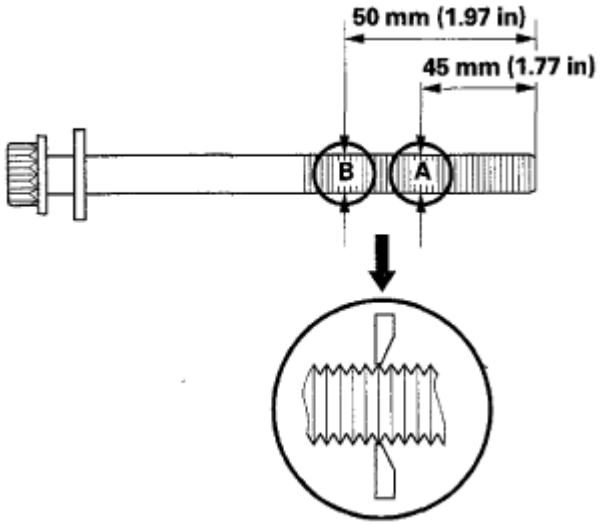


Fig. 157: Measuring Diameter Cylinder Head Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. If either diameter is less than 11.3 mm (0.445 in), replace the cylinder head bolt.
10. Apply new engine oil to the threads and under the bolt heads of all cylinder head bolts.
11. Torque the cylinder head bolts in sequence to 30 N.m (3.1 kgf.m, 22 lbf.ft), using a beam-type torque wrench. When using a preset click-type torque wrench, be sure to tighten slowly and do not overtighten. If a bolt makes any noise while you are torquing it, loosen the bolt and retighten it from the first step.

FRONT

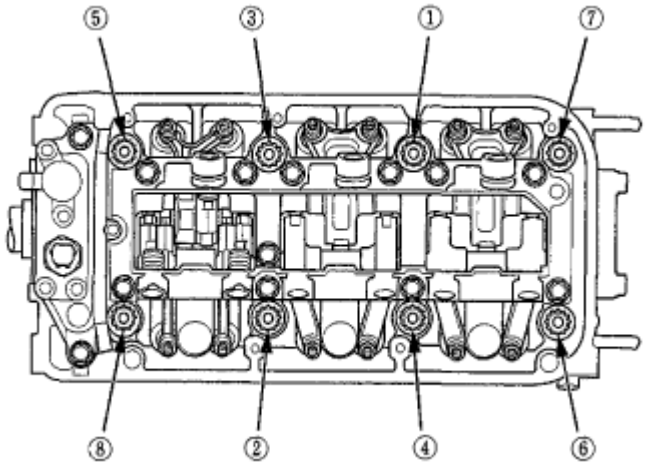


Fig. 158: Identifying Cylinder Head Bolts Tightening Sequence (Front)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

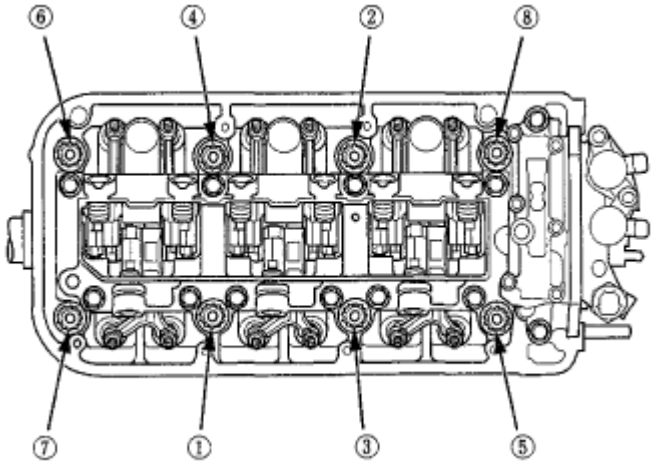


Fig. 159: Identifying Cylinder Head Bolts Tightening Sequence (Rear)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.

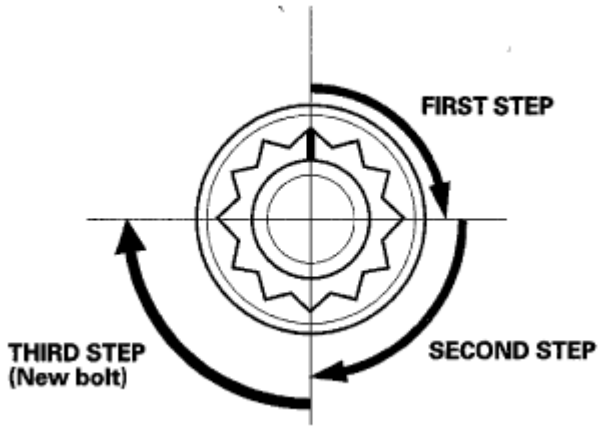


Fig. 160: Tightening Cylinder Head Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

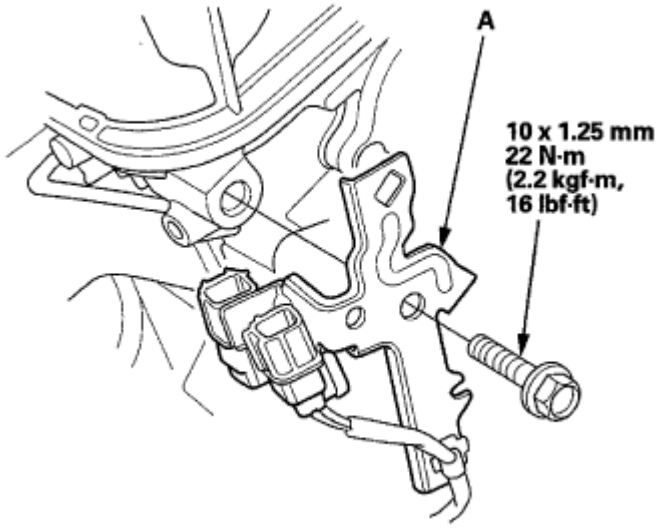


Fig. 161: Identifying Connector Bracket With Mounting Bolts Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

19. Install the harness bracket (A) to the rear cylinder head.

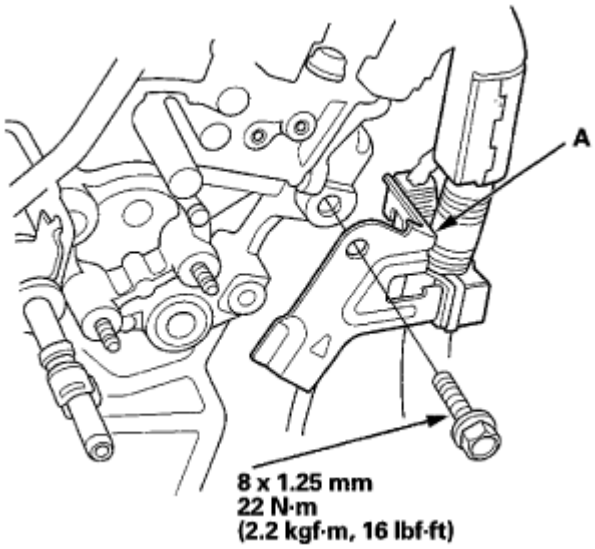


Fig. 162: Identifying Rear Cylinder Head Harness Bracket With Mounting Bolt Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

20. Install the EVAP canister purge joint (A) with the bracket.

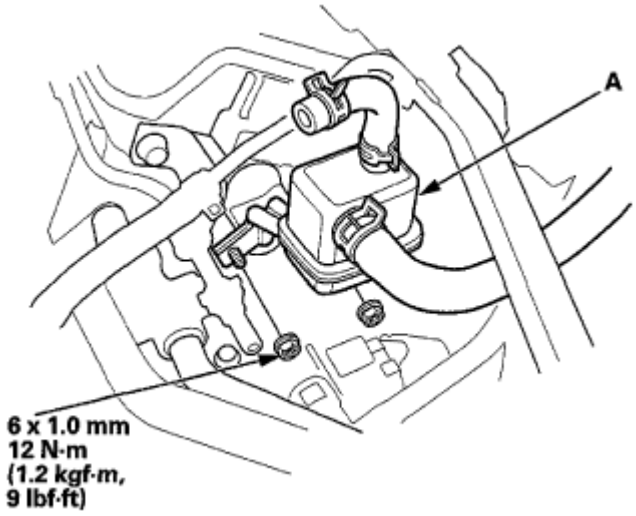


Fig. 163: Identifying EVAP Canister Purge Joint With Mounting Bolts Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

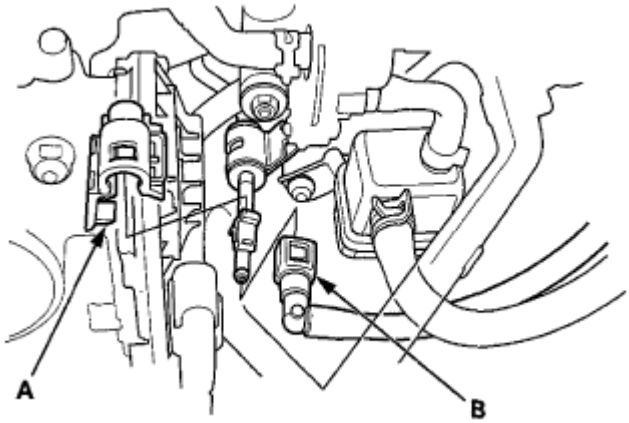


Fig. 164: Identifying Fuel Feed Hose And Quick-Connect Fitting Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

- Rocker arm oil control solenoid A (Bank 1) connector
- Rocker arm oil control solenoid A (Bank 2) connector
- Rocker arm oil control solenoid B (Bank 1) connector
- Front rocker arm oil pressure switch connector
- Rear rocker arm oil pressure switch connector
- CMP sensor connector
- Two A/F sensor connectors
- Two secondary HO2S connectors

24. Install the intake manifold (see **INSTALLATION**).
25. Install the power steering pump (A) and the power steering hose bracket (B).

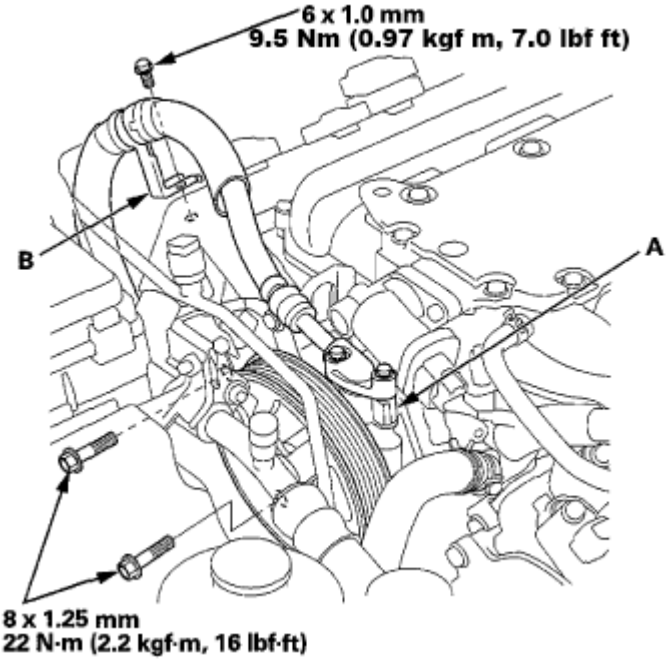


Fig. 165: Identifying Power Steering Pump And Power Steering Hose Bracket With Mounting Bolts Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

26. Install the alternator (see **INSTALLATION**).
27. Install the six ignition coils (see **IGNITION COIL AND SPARK PLUG REMOVAL/INSTALLATION**).
28. Do the battery terminal reconnection procedure (see **BATTERY TERMINAL DISCONNECTION AND RECONNECTION**).
29. After installation, check that all tubes, hoses and connectors are installed correctly.
30. Inspect for fuel leaks. Turn the ignition switch to ON (II) (do not operate the starter) so the fuel pump runs for about 2 seconds and pressurizes the fuel line. Repeat this operation three times, then check for fuel leakage at any point in the fuel line.

31. Refill the radiator with engine coolant, and bleed the air from the cooling system (see **COOLANT CHECK**).
32. Do the PCM idle learn procedure (see **PCM IDLE LEARN PROCEDURE**).
33. Do the CKP pattern clear/CKP pattern learn procedure (see **CKP PATTERN CLEAR/CKP PATTERN LEARN**).
34. Inspect the idle speed (see **IDLE SPEED INSPECTION**).
35. Inspect the ignition timing (see **IGNITION TIMING INSPECTION**).

CAMSHAFT OIL SEAL INSTALLATION - IN CAR

Special Tools Required

Ball Joint Remover/Installer 07GAF-SD40330

1. Remove the timing belt (see **TIMING BELT REMOVAL**).
2. Remove the camshaft pulley and the back cover (see step 17).
3. Remove the camshaft oil seal.
4. Clean and dry the camshaft oil seal housing.
5. Apply a light coat of new engine oil to the lip of the camshaft oil seal.
6. Using the remover/installer, 22 x 37/46 x 52 mm (A), a washer (B), and a 12x75 x 1.25 mm bolt (C), press in the new camshaft oil seal (D) squarely into the cylinder head to the specified installed height.

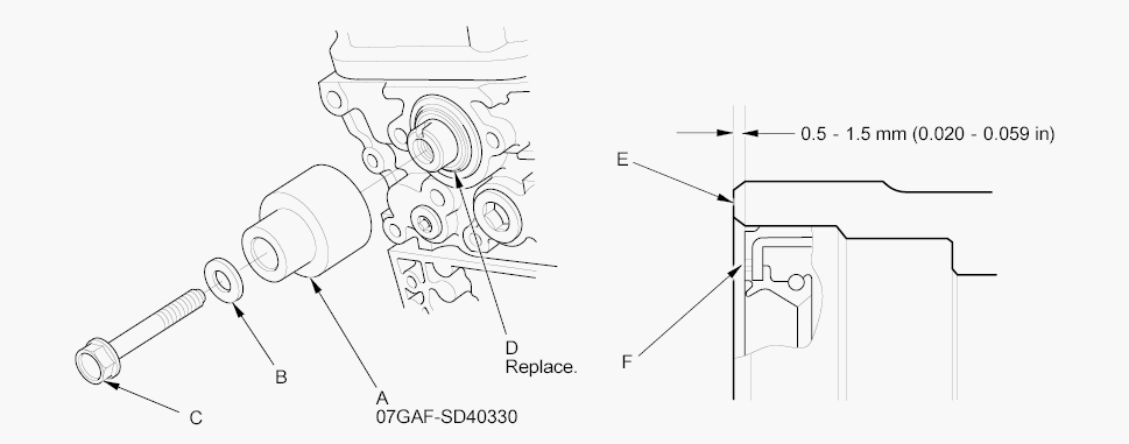


Fig. 166: Installing Camshaft Oil Seal Using Ball Joint Remover/Installer
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

   Oil Seal Installed Height

   0.5-1.5 mm (0.020-0.059 in)

8. Clean the excess oil off the camshaft, and check that the oil seal lip is not distorted.

9. Apply new engine oil to the threads of the camshaft pulley mounting bolt. Install the back cover, then install the camshaft pulley:
   - Front (see step 15).
   - Rear (see step 15).
10. Install the timing belt (see **TIMING BELT INSTALLATION**).

SEALING BOLT INSTALLATION

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

FRONT

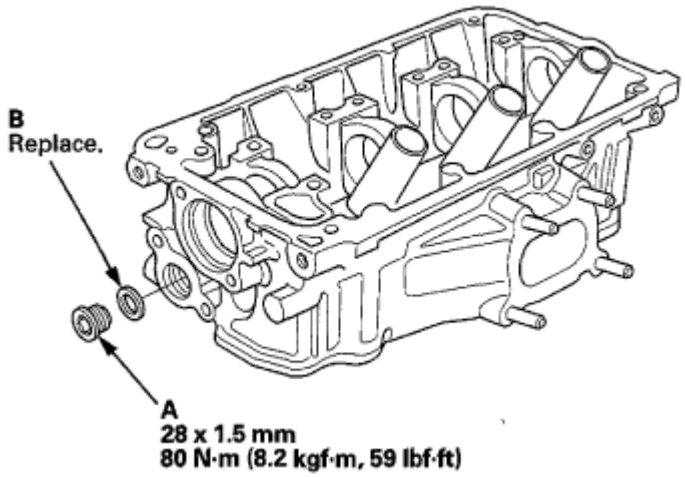


Fig. 167: Identifying Cylinder Head Sealing Bolt And Washer With Torque Specification (Front)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR

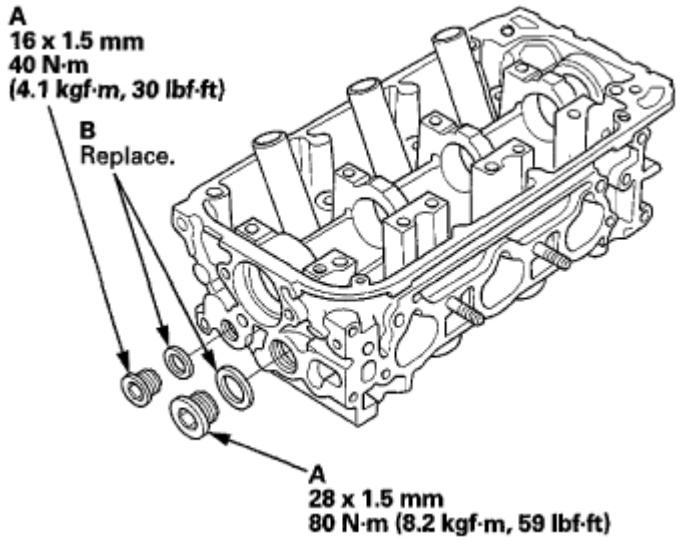


Fig. 168: Identifying Cylinder Head Sealing Bolt And Washer With Torque Specification (Rear)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

FRONT ROCKER ARM OIL CONTROL VALVE REPLACEMENT

1. Remove the front rocker arm assembly (see **FRONT**).
2. Remove the front rocker arm oil control valve (A).

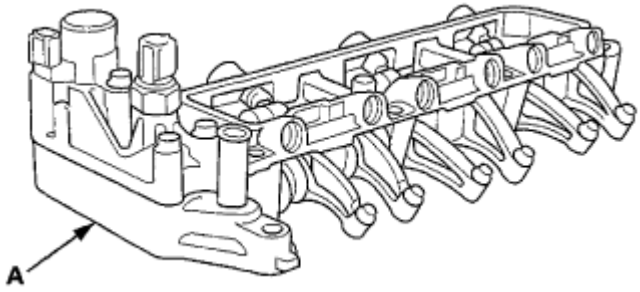


Fig. 169: Identifying Front Rocker Arm Oil Control Valve
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Install the front rocker arm oil control valve in the reverse order of removal.

NOTE: When installing the front rocker arm assembly, refer to the CAMSHAFT, ROCKER ARM ASSEMBLY, CAMSHAFT SEAL, AND PULLEY INSTALLATION PROCEDURE .

REAR ROCKER ARM OIL CONTROL VALVE REPLACEMENT

1. Remove the rear rocker arm assembly (see **REAR**).
2. Remove the rear rocker arm oil control valve (A).

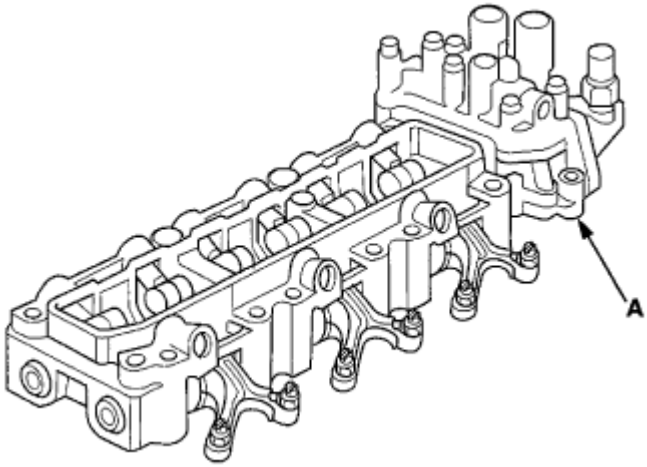


Fig. 170: Identifying Rear Rocker Arm Oil Control Valve
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Install the rear rocker arm oil control valve in the reverse order of removal.

NOTE: When installing the rear rocker arm assembly, refer to the CAMSHAFT, ROCKER ARM ASSEMBLY, CAMSHAFT SEAL, AND PULLEY INSTALLATION PROCEDURE.

2011-12 ENGINE

Engine Assembly - Odyssey

ENGINE REMOVAL

SPECIAL TOOLS REQUIRED

- Engine Hanger Balance Bar VSB02C000019*
- Engine Support Hanger, A and Reds AAR-T1256*
- 2008 V6 Attachment Arm SIL02C000033*
- Subframe Adapter VSB02C000016*

*: Available through the Honda Tool and Equipment Program, 888-424-6857.

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.**
- **Mark all wiring and hoses to avoid misconnection. Also, be sure that they do not contact other wiring or hoses, or interfere with other parts.**
- **Check the label on the PCM to see if it was made by Keihin or Continental. Refer to the Fuel and Emissions Systems' General Troubleshooting Information for more details (see GENERAL TROUBLESHOOTING INFORMATION).**

1. Open the hood, and secure it with the hood support rod (A) in the wide-open position (B).

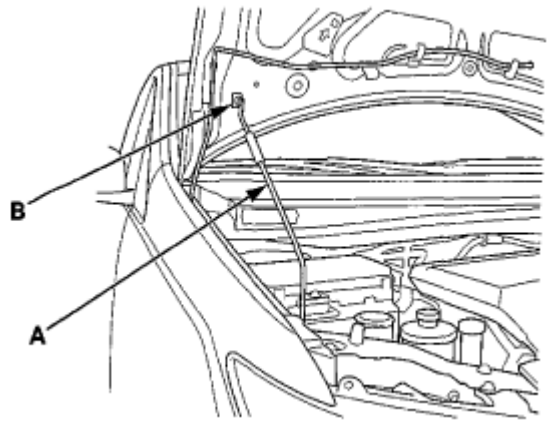


Fig. 1: Identifying Hood Support Rod On Wide-Open Position
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Relieve the fuel pressure (see **FUEL PRESSURE RELIEVING**).
3. Drain the power steering fluid (see **FLUID CHECK/REPLACEMENT**).

4. Remove the bulkhead cover (see **FRONT BULKHEAD COVER REPLACEMENT**).
5. Remove the cowl cover (see **COWL COVER REPLACEMENT**).
6. Do the battery removal procedure (see **BATTERY REMOVAL AND INSTALLATION**).
7. Remove the engine cover.

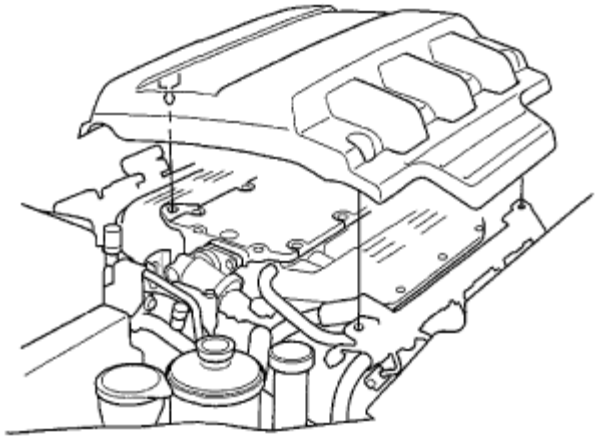


Fig. 2: Identifying Engine Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Remove the air cleaner (see **AIR CLEANER ELEMENT INSPECTION/REPLACEMENT**).
9. Disconnect the engine wire harness (A) and starter cable (B) from the main under-hood fuse box (C), then remove the main under-hood fuse box and the harness clamps (D).

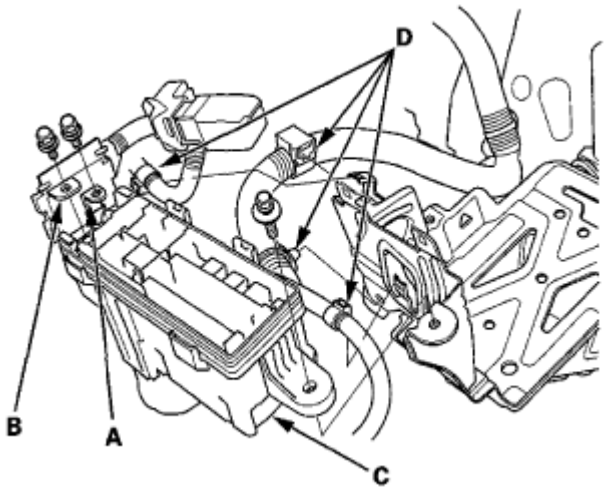


Fig. 3: Identifying Engine Wire Harness, Starter Cable Of Main Under-Hood Fuse Box And Harness Clamps
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Remove the harness clamps (A) and the bolts (B) and loosen the bolt (C), then remove the battery base (D).

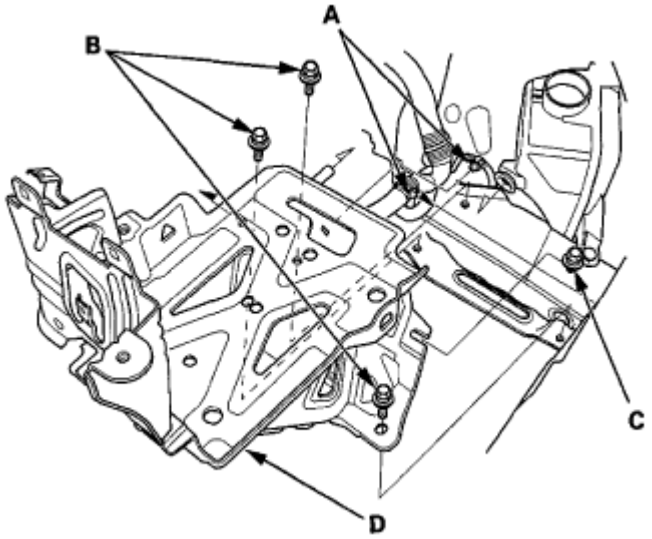


Fig. 4: Identifying Harness Clamps And Battery Base With Mounting Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Remove the shift cable. Do not bend the shift cable excessively:
    - 5-speed A/T model (see step 22 on **TRANSMISSION REMOVAL**).
    - 6-speed A/T model (see step 21 on **TRANSMISSION REMOVAL**).
12. Remove the quick connect fitting cover (A), then disconnect the fuel feed hose (B) (see **FUEL LINE/QUICK-CONNECT FITTING REMOVAL**).

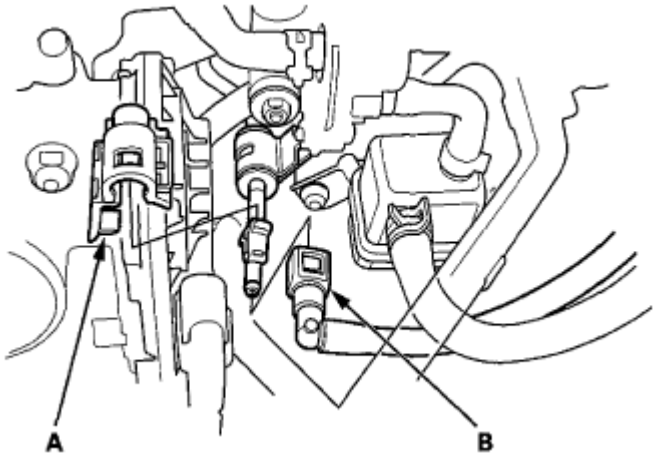


Fig. 5: Identifying Quick Connect Fitting Cover And Fuel Feed Hose
Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Disconnect the brake booster vacuum hose (A), the EVAP canister hose (B), and the breather hose (C).

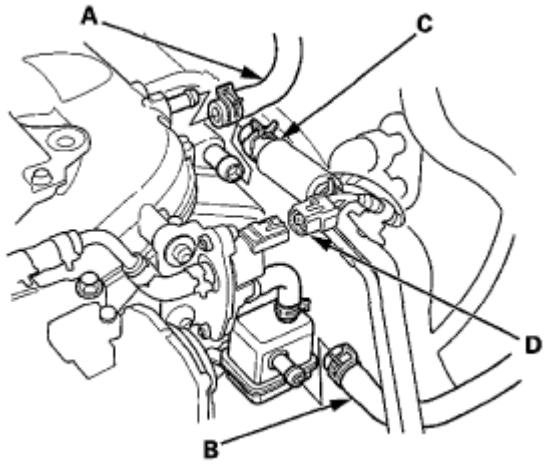


Fig. 6: Identifying Brake Booster Vacuum Hose, EVAP Canister Hose And Breather Hose
Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. Disconnect the EVAP canister purge valve connector (D).
15. Remove the steering joint cover (A).

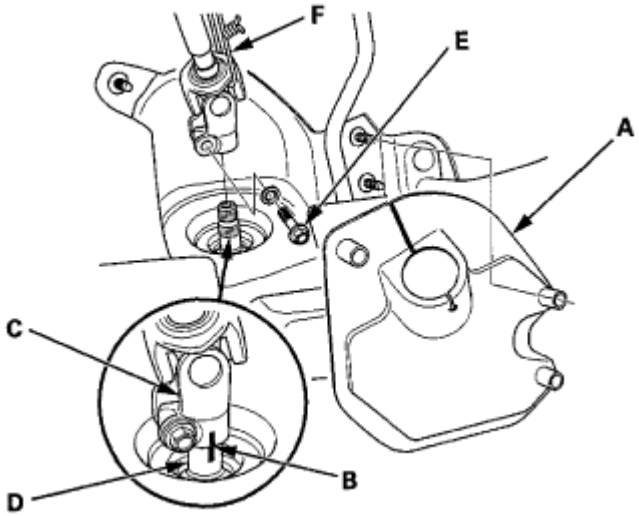


Fig. 7: Identifying Steering Joint Cover, Mark On Steering Joint, Steering Gearbox Pinion Shaft And Steering Joint Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

16. Make a reference mark (B) across the steering joint (C) and the steering gearbox pinion shaft (D). Loosen the steering joint bolt (E), then install the steering wheel holder tool (see step 15 on **REMOVAL**).
17. Remove the steering joint bolt, then disconnect the steering joint from the steering gearbox pinion shaft.

NOTE: Hold the lower slide shaft on the column with a piece of wire (F) between the joint yoke of the lower slide shaft and the joint yoke of the upper shaft to prevent the slider shaft from pulling out.

18. Remove the PCM cover (A).

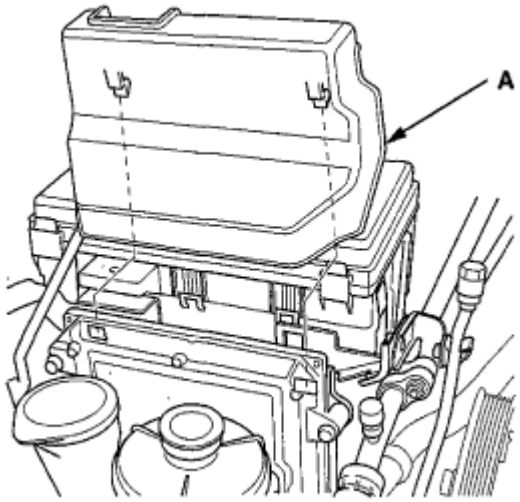


Fig. 8: Identifying PCM Cover (Keihin PCM)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Continental PCM

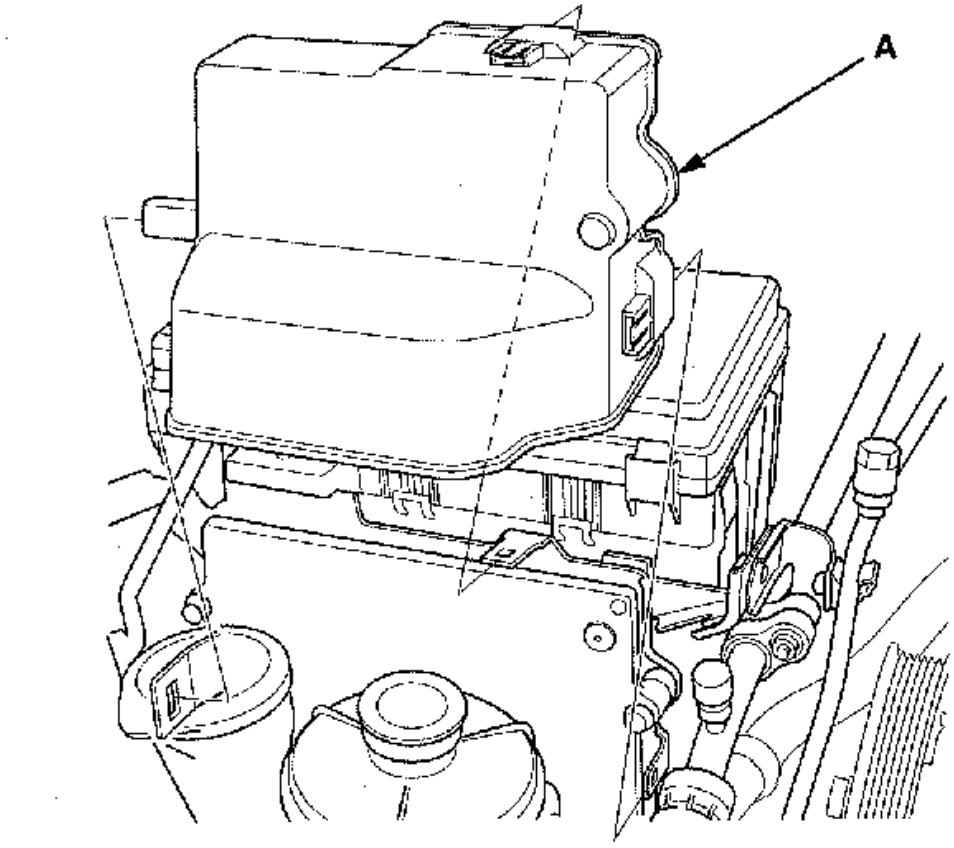


Fig. 9: Identifying PCM Cover (Continental PCM)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

19. Remove the harness clamps (A), then disconnect the PCM connectors (B) and the engine wire harness connector (C).

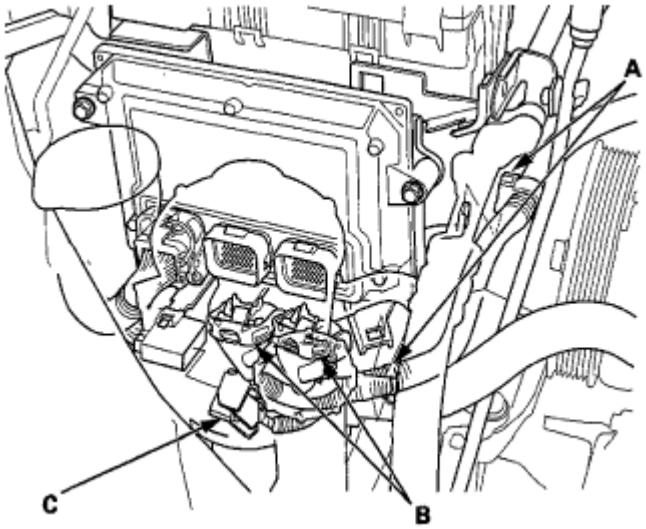


Fig. 10: Identifying Harness Clamps, PCM Connectors And Engine Wire Harness Connector
Courtesy of AMERICAN HONDA MOTOR CO., INC.

*: This illustration shows the Keihin PCM.

20. Remove the drive belt (see **DRIVE BELT REPLACEMENT**).
21. Disconnect the power steering pump inlet hose (A) and the power steering pump outlet hose (B) from the power steering pump, then plug the power steering hoses and the power steering pump.

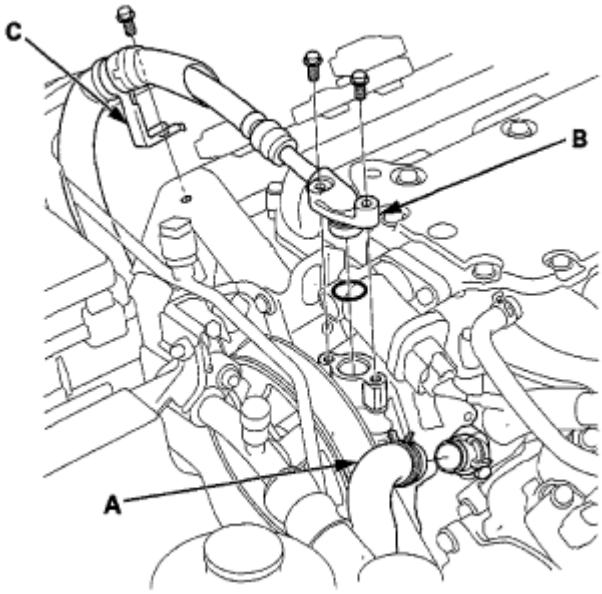


Fig. 11: Identifying Power Steering Pump Inlet Hose, Power Steering Pump Outlet Hose And Power Steering Hose Bracket
Courtesy of AMERICAN HONDA MOTOR CO., INC.

22. Remove the power steering hose bracket (C)
23. Wait until the engine is cool, then carefully remove the radiator cap.
24. Raise the vehicle on the lift.
25. Remove the front wheels.
26. Remove the splash shield (see **FRONT SPLASH SHIELD REPLACEMENT**).
27. Remove the front inner fender (see **FRONT INNER FENDER REPLACEMENT**).
28. Loosen the drain plug in the radiator, and drain the engine coolant (see **COOLANT CHECK**).
29. Drain the engine oil (see **ENGINE OIL REPLACEMENT**).
30. Drain the ATF:
    - 5-speed A/T model (see **ATF REPLACEMENT**).
    - 6-speed A/T model (see **ATF REPLACEMENT**).
31. Remove exhaust pipe A.

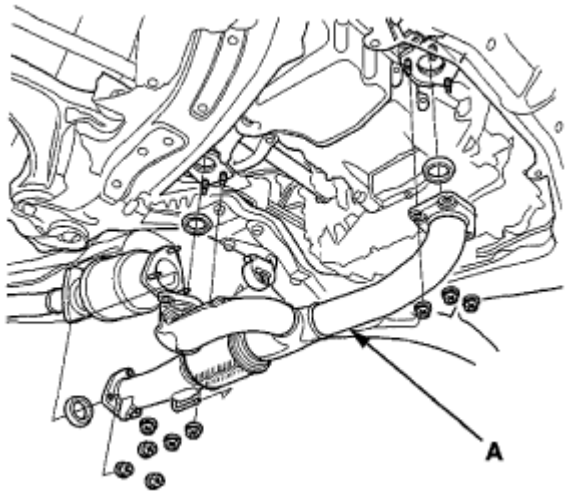


Fig. 12: Identifying Exhaust Pipe
Courtesy of AMERICAN HONDA MOTOR CO., INC.

32. Remove the suspension stroke sensor (see **SUSPENSION STROKE SENSOR REPLACEMENT**).
33. Separate the stabilizer links from the dampers (see **STABILIZER LINK REMOVAL/INSTALLATION**).
34. Separate the tie-rod end ball joints from the knuckles (see step 3 on **KNUCKLE REPLACEMENT**).
35. Separate the lower arms from the knuckles (see step 5 on **KNUCKLE REPLACEMENT**).
36. Remove the driveshafts (see **DRIVESHAFT REMOVAL**). Coat all precision-finished surfaces with new engine oil. Tie plastic bags over the driveshaft ends.
37. Disconnect the power steering hose (A) and the A/T cooler hoses (B), then plug the lines and the hoses.

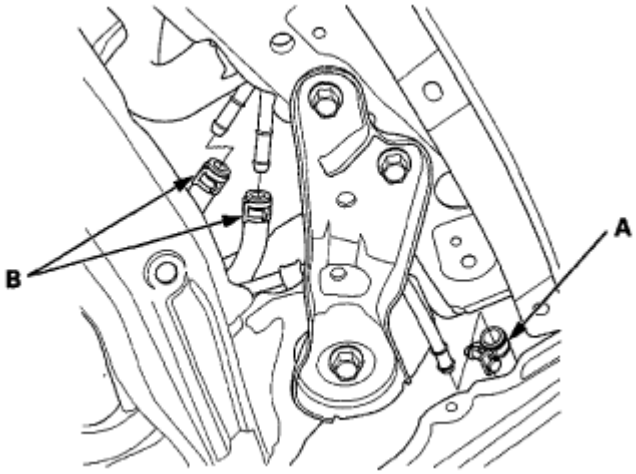


Fig. 13: Identifying Power Steering Hose And A/T Cooler Hoses
Courtesy of AMERICAN HONDA MOTOR CO., INC.

38. Disconnect the PSP switch connector (A) and remove the heat shield bolt (B).

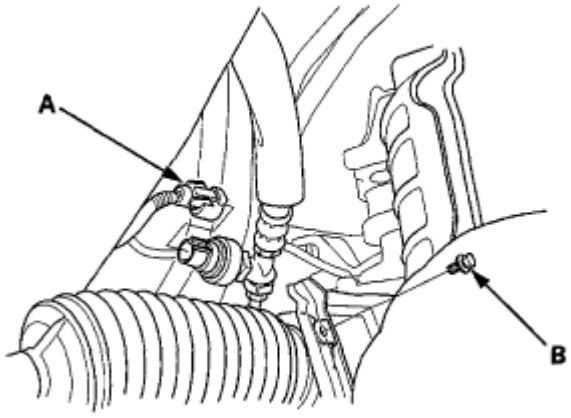


Fig. 14: Identifying PSP Switch Connector And Heat Shield Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

39. Lower the vehicle on the lift.
40. Remove the radiator (see **RADIATOR REPLACEMENT**).
41. Disconnect the A/C compressor clutch connector (A), then remove the A/C compressor (B) without disconnecting the A/C hoses. Do not bend the A/C hoses excessively.

NOTE: Hang the A/C compressor with a wire tie.

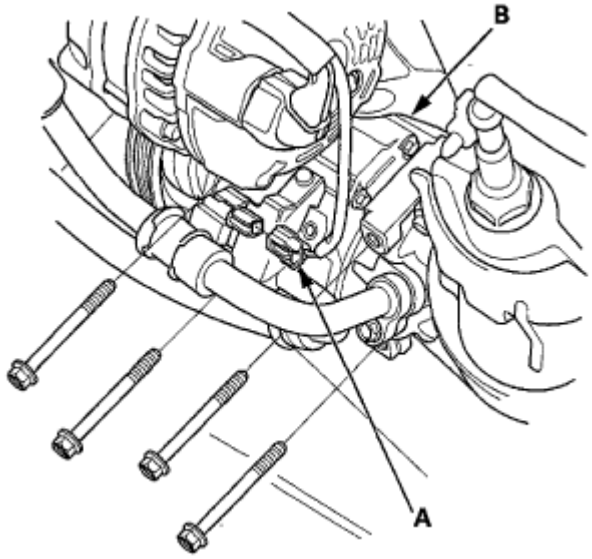


Fig. 15: Identifying A/C Compressor Clutch Connector And A/C Compressor
Courtesy of AMERICAN HONDA MOTOR CO., INC.

42. Disconnect the heater hoses (A).

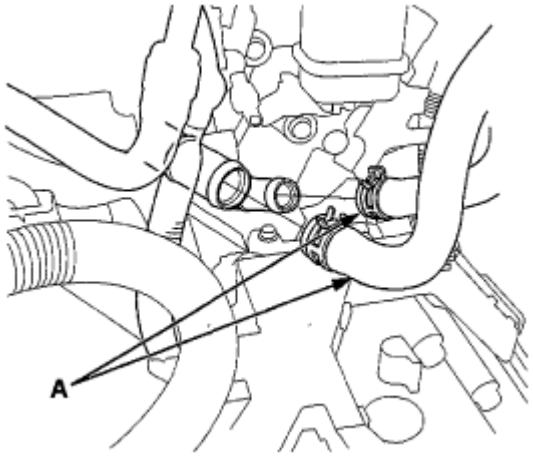


Fig. 16: Identifying Heater Hoses
Courtesy of AMERICAN HONDA MOTOR CO., INC.

43. Remove the bolt (A) securing the connector bracket (B) from the front cylinder head; use the bracket bolt hole (C) to attach the engine hanger balance bar front arm.

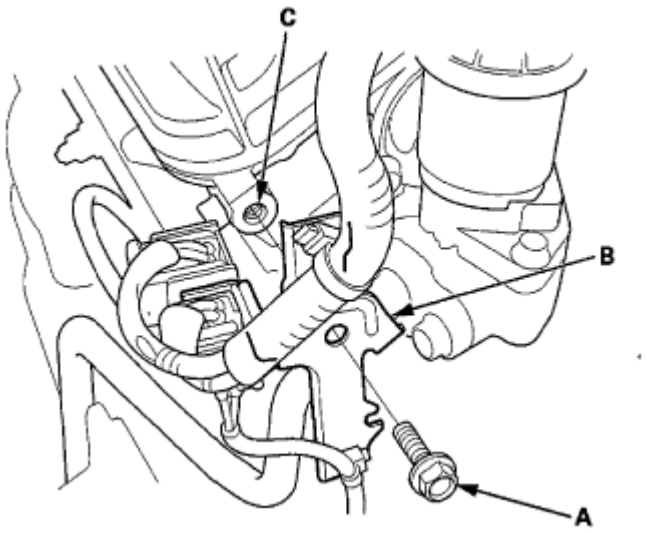


Fig. 17: Identifying Bracket Bolt Hole And Connector Bracket Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

44. Remove the bolt (A) securing the harness bracket (B) from the rear cylinder head; use the bracket bolt hole (C) to attach the 2008 V6 attachment arm.

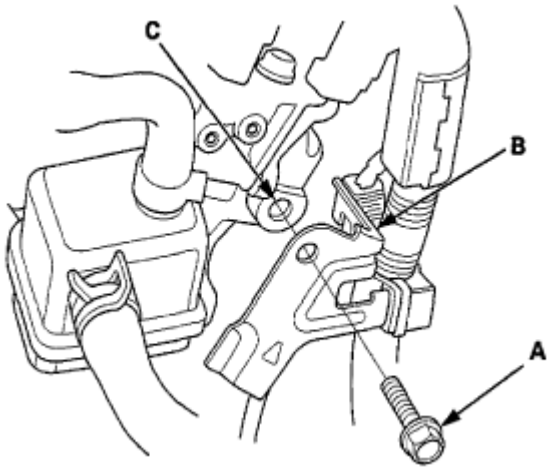


Fig. 18: Identifying Bracket Bolt Hole And Harness Bracket Bolt Of Rear Cylinder Head
Courtesy of AMERICAN HONDA MOTOR CO., INC.

45. Install the engine hanger balance bar (VSB02C000019). Attach the front arm (A) to the front cylinder head with a 10 mm (0.39 in) spacer (B) and a 10 x 1.25 mm bolt (C). Remove the rear arm from the engine hanger balance bar, then install the 2008 V6 attachment arm (SIL02C000033). Attach the 2008 V6 attachment arm to the rear cylinder head with a 10 mm (0.39 in) spacer (D) and an 8 x 1.25 mm bolt (E).

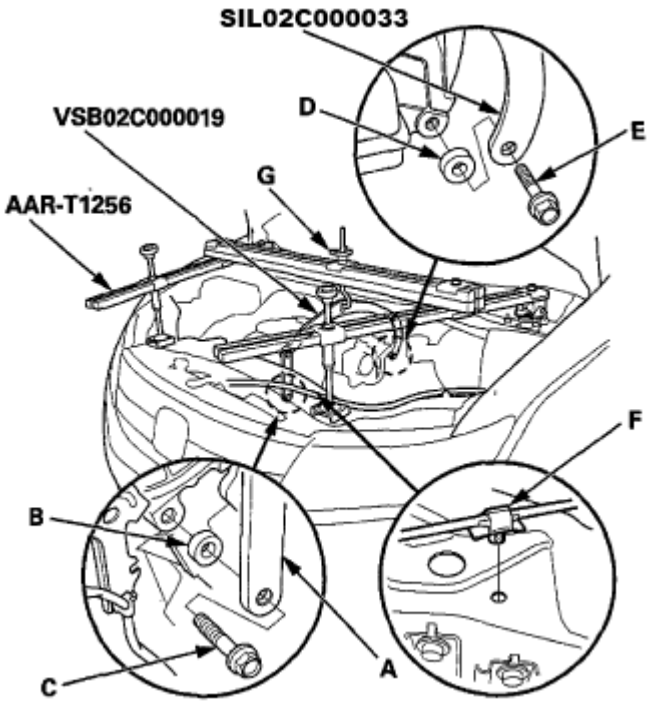


Fig. 19: Identifying Supporting Engine With Brace
Courtesy of AMERICAN HONDA MOTOR CO., INC.

46. Remove the hood opener cable clip (F). Install the engine support hanger (AAR-T1256) onto the vehicle as shown, and attach the hook to the slotted hole in the engine hanger balance bar. Tighten the wing nut

(G) by hand, and lift and support the engine/transmission.

NOTE:

- **Be careful when working around the windshield.**
- **Be careful not to damage the hood opener cable when installing the engine support hanger at the front bulkhead.**
- **AAR-T1256 two sets required for stacking two cross section bars.**

47. Remove the front engine mount stop (A), then remove the front engine mount mounting bolt (B).

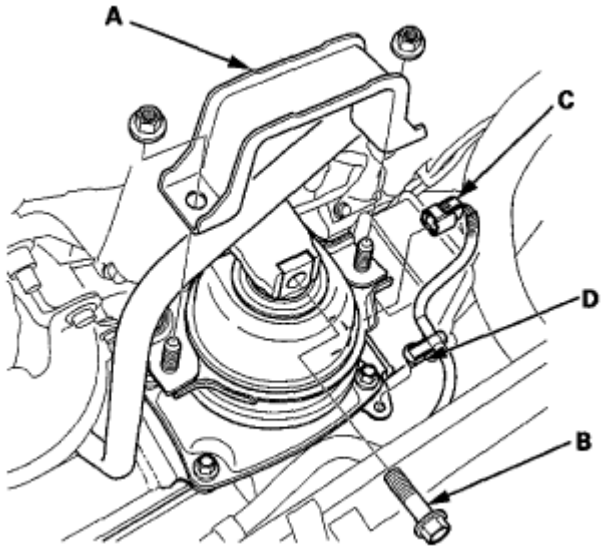


Fig. 20: Identifying Front Engine Mount Stop And Front Engine Mount With Mounting Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

48. Disconnect the front engine mount actuator connector (C) and remove the clamp (D) from the front subframe.
49. Raise the vehicle on the lift.
50. With headlight leveling system: Disconnect the front suspension stroke sensor connector (A), and remove the harness clamps (B).

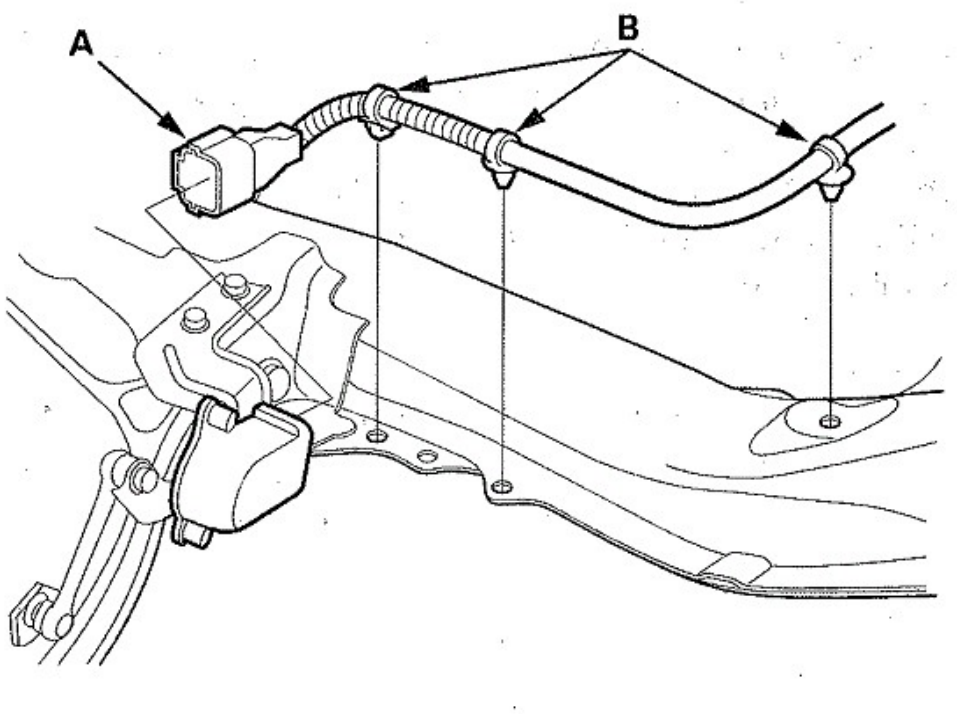


Fig. 21: Identifying Front Suspension Stroke Sensor Connector And Harness Clamps
Courtesy of AMERICAN HONDA MOTOR CO., INC.

51. Remove the lower transmission mount mounting bolts (A) and the ground cable (B).

5-speed A/T model

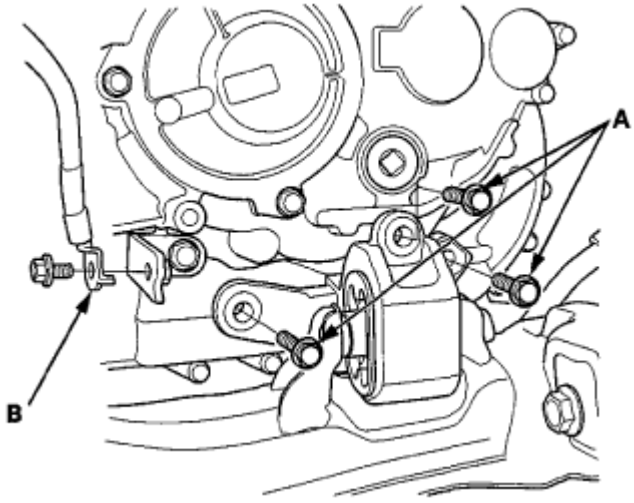


Fig. 22: Identifying Ground Cable And Transmission Mount With Mounting Bolts (5-Speed A/T Model)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6-speed A/T model

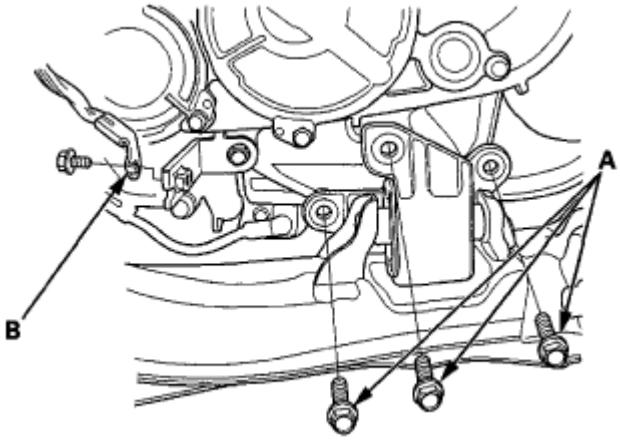


Fig. 23: Identifying Ground Cable And Transmission Mount With Mounting Bolts (6-Speed A/T Model)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

52. Remove the rear engine mount base mounting bolts (A) and disconnect the rear engine mount actuator connector (B).

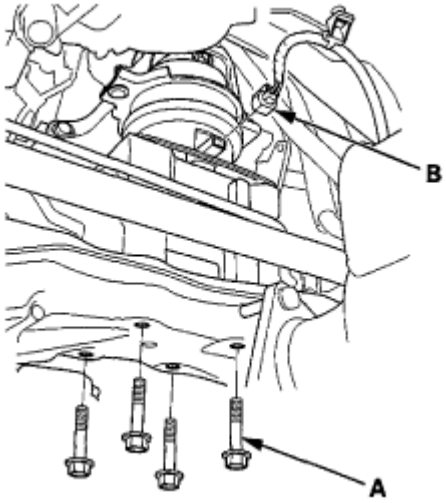


Fig. 24: Identifying Rear Engine Mount Actuator Connector And Rear Engine Mount Base With Mounting Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

53. Attach the subframe adapter (VSB02C000016) to the front subframe by looping the belt (A) over the front of the front subframe (B), then secure the belt with its stop (C).

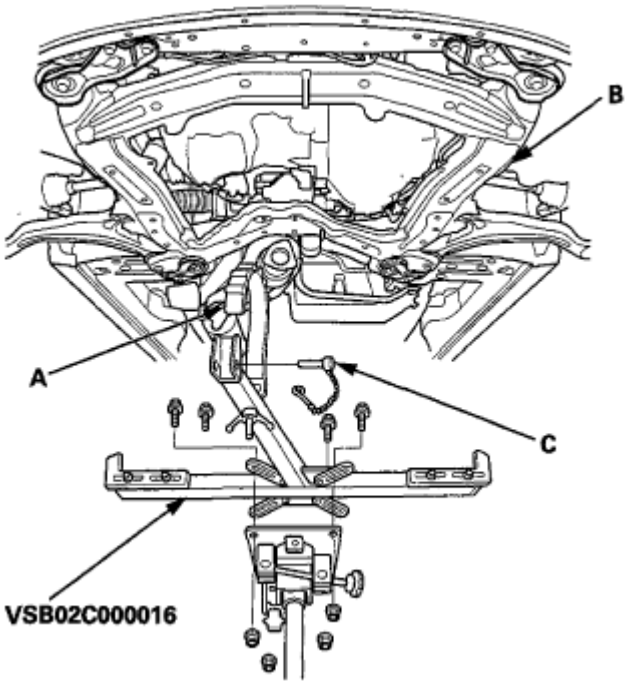


Fig. 25: Identifying Subframe Adapter (VSB02C000016) Connection With Front Subframe By Looping Belt Onto Front Of Front Subframe
Courtesy of AMERICAN HONDA MOTOR CO., INC.

54. Raise the transmission jack and line up the slots in the subframe adapter arms with the bolt holes on the jack base, then securely attach them with four bolts.
55. Remove the six 12 x 1.25 mm bolts (A) securing the subframe stiffeners (B), the four subframe mounting bolts (C), and the stiffeners, then lower the front subframe (D).

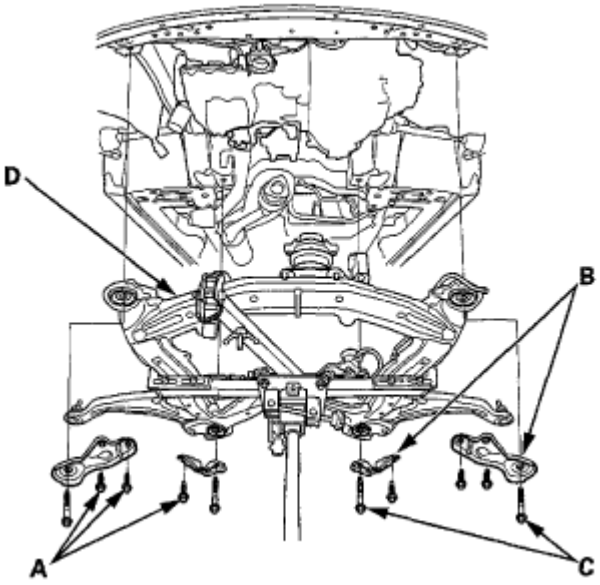


Fig. 26: Identifying Front Subframe And Subframe Stiffeners With Mounting Bolts

Courtesy of AMERICAN HONDA MOTOR CO., INC.

56. Lower the vehicle on the lift.
57. Attach a chain hoist (A) to the engine hanger (B) and the transmission hanger (C), then lift the engine/transmission until it's securely supported by the chain hoist and remove the engine support hanger, the engine hanger balance bar, and the engine hanger adapter set.

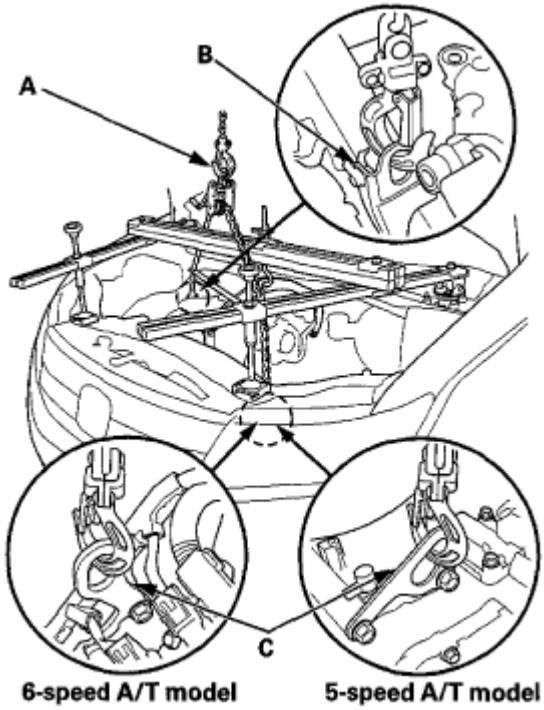


Fig. 27: Lifting Engine/Transmission Using Chain Hoist
Courtesy of AMERICAN HONDA MOTOR CO., INC.

58. Remove the mounting bolts from the upper half of the side engine mount bracket.

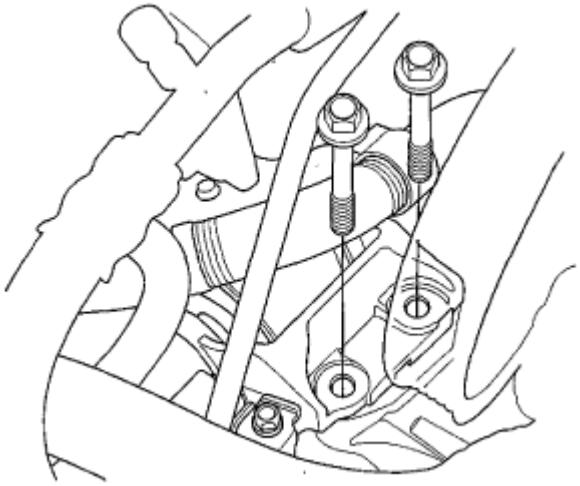


Fig. 28: Identifying Side Engine Mount Bracket With Mounting Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

59. Check that the engine/transmission is completely free of the vacuum hoses, the fuel hoses, the coolant hoses, and the electrical wiring.
60. Slowly lower the engine/transmission about 150 mm (5.91 in). Check once again that all the hoses and the electrical wiring are disconnected and free from the engine/transmission, then lower it all the way and support it.
61. Disconnect the chain hoist from the engine/transmission.
62. Raise the vehicle, and remove the engine/transmission from under the vehicle.

ENGINE INSTALLATION

SPECIAL TOOLS REQUIRED

- Engine Hanger Balance Bar VSB02C000019*
- Engine Support Hanger, A and Reds AAR-T1256*
- 2008 V6 Attachment Arm SIL02C000033*
- Subframe Adapter VSB02C000016*

*: Available through the Honda Tool and Equipment Program, 888-424-6857.

1. Install the engine mount brackets and the accessory brackets, then tighten their bolts to the specified torque.

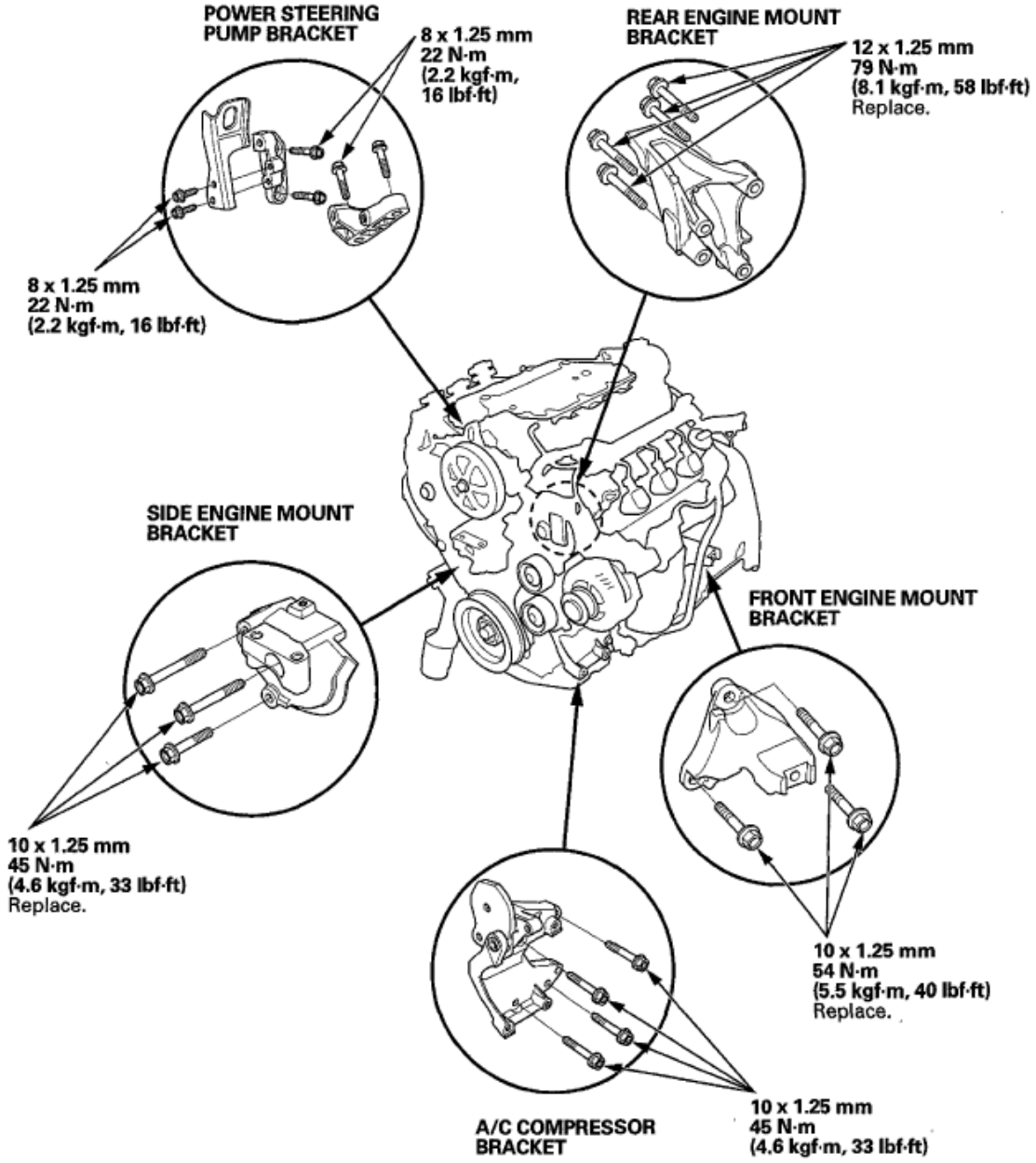


Fig. 29: Identifying Engine Mount Brackets And Accessory Brackets With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Position the engine/transmission under the vehicle. Be sure that they are properly aligned. Carefully lower the vehicle until the engine/transmission are properly positioned in the engine compartment. Make sure the vehicle is not resting on any part of the engine/transmission. Support the engine/transmission with a chain hoist (A) and carefully raise the engine/transmission into place.

NOTE: Reinstall the mounting bolts/support nuts in the sequence given in the following steps. Failure to follow this sequence may cause excessive noise and vibration, and reduce engine mount life.

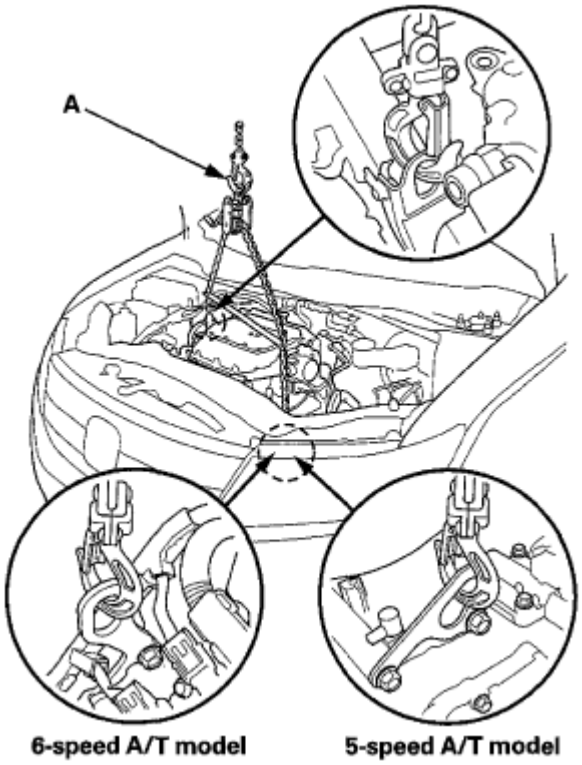


Fig. 30: Supporting Engine/Transmission Using Chain Hoist
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Install the engine hanger balance bar (VSB02C000019). Attach the front arm (A) to the front cylinder head with a 10 mm (0.39 in) spacer (B) and a 10 x 1.25 mm bolt (C). Remove the rear arm from the engine hanger balance bar, then install the 2008 V6 attachment arm (SIL02C000033). Attach the 2008 V6 attachment arm to the rear cylinder head with a 10 mm (0.39 in) spacer (D) and an 8 x 1.25 mm bolt (E).

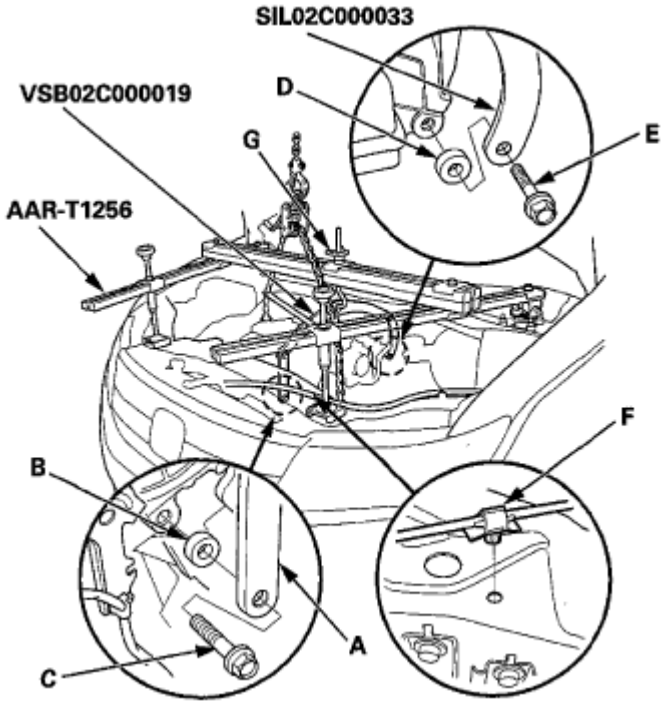


Fig. 31: Identifying Engine Hanger Balance Bar (VSB02C000019)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Remove the hood opener cable clip (F). Install the engine support hanger (AAR-T1256) onto the vehicle as shown, and attach the hook to the slotted hole in the engine hanger balance bar. Tighten the wing nut (G) by hand, and lift and support the engine/transmission.

NOTE:

- **Be careful when working around the windshield.**
- **Be careful not to damage the hood opener cable when installing the engine support hanger at the front bulkhead.**
- **AAR-T1256 two sets required for stacking two cross section bars.**

5. Install the new mounting bolts into the upper half of the side engine mount bracket. Tighten the bolts to the specified torque.

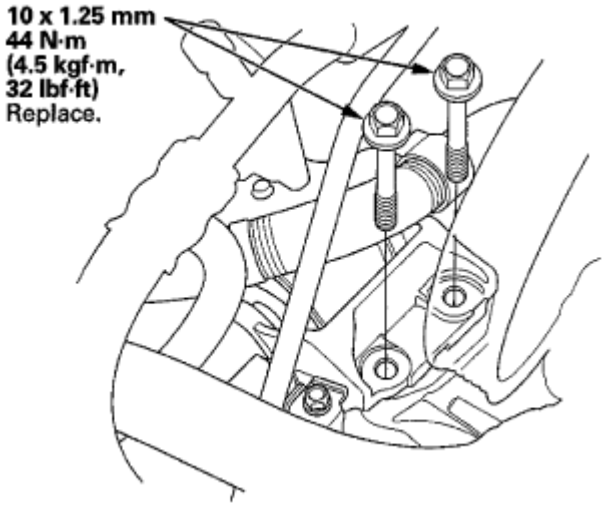


Fig. 32: Identifying Side Engine Mount Bracket Mounting Bolts With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Remove the chain hoist, then raise the vehicle on the lift.
7. Using the subframe adapter (VSB02C000016) and a transmission jack, raise the front subframe up to the body.

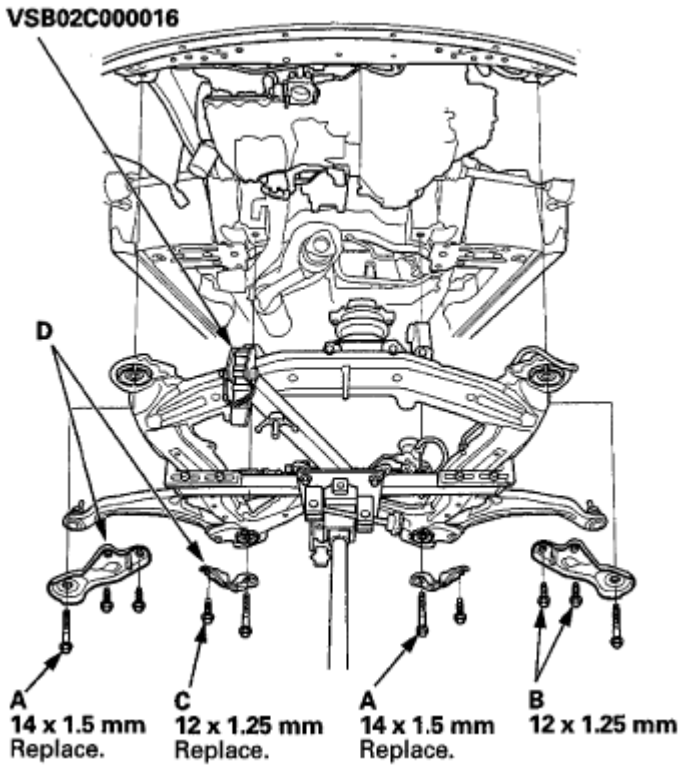


Fig. 33: Raising Front Subframe Of Body Using Subframe Adapter (VSB02C000016)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Loosely install the new front subframe mounting bolts (four) (A), the 12 x 1.25 mm bolts (four) (B), new bolts (two) (C), and the stiffeners (D).
9. Align the front subframe with the subframe alignment pin (see **FRONT SUBFRAME ALIGNMENT**).
10. Remove the transmission jack and the subframe adapter.
11. Tighten the lower transmission mount mounting bolts (A) and the ground cable (B).

6-speed A/T model

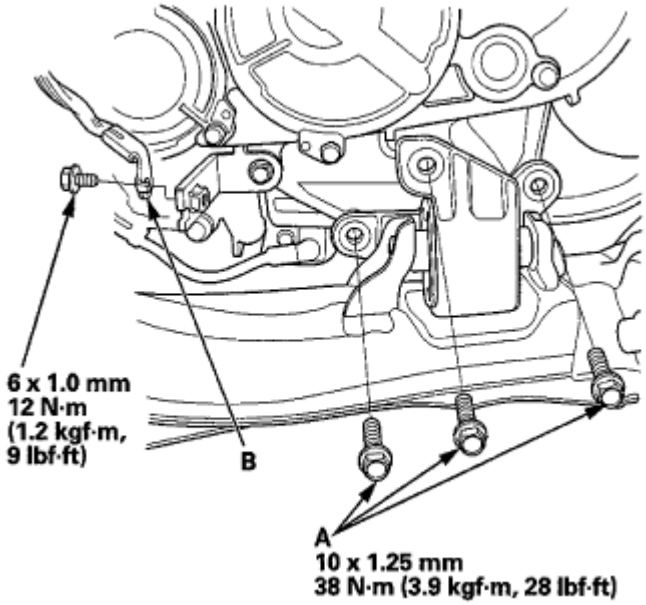


Fig. 34: Identifying Ground Cable And Transmission Mount Mounting Bolts With Torque Specifications (6-Speed A/T Model)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5-speed A/T model

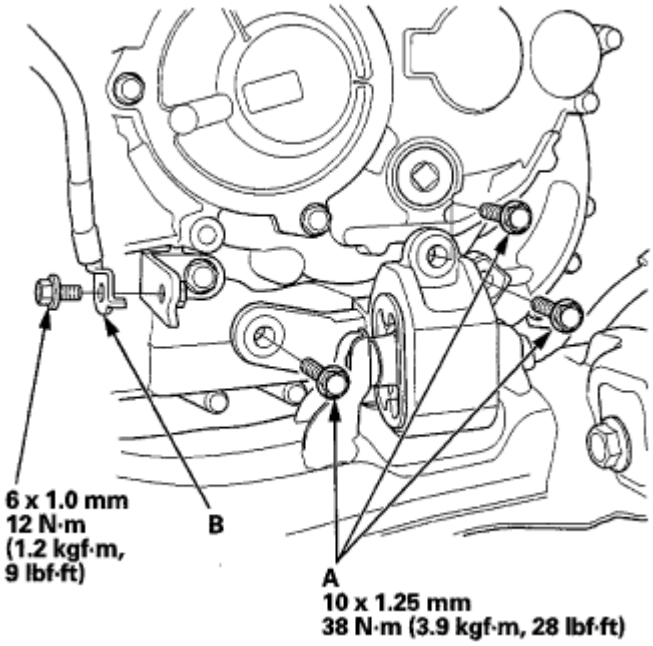


Fig. 35: Identifying Ground Cable And Transmission Mount & Mounting Bolts With Torque Specifications (5-Speed A/T Model)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. With headlight leveling system: Connect the front suspension stroke sensor connector (A), and install the harness clamps (B).

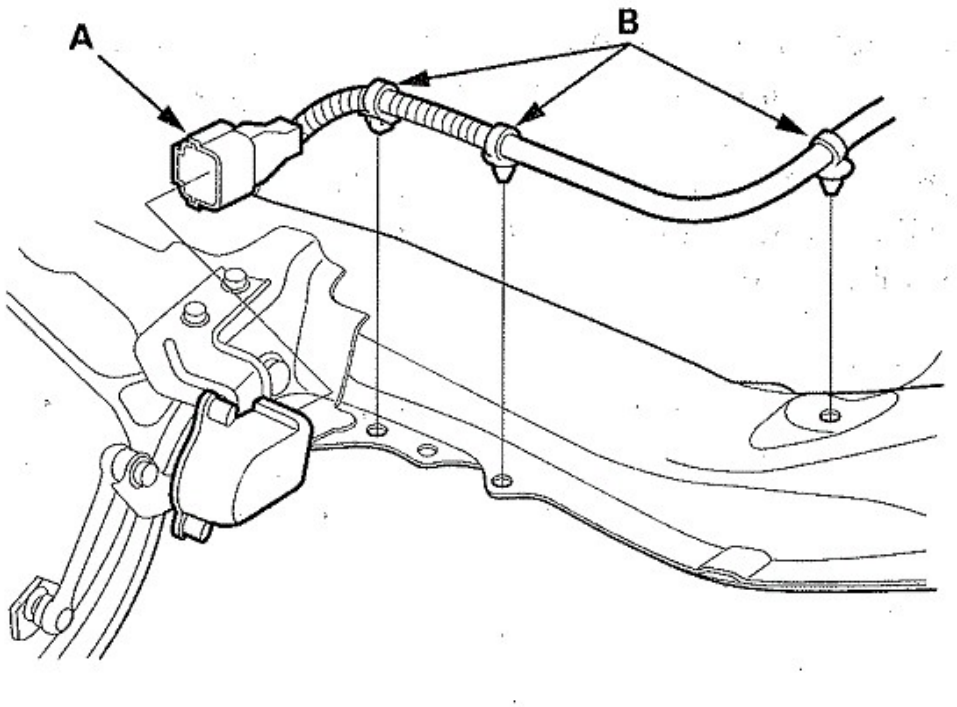


Fig. 36: Identifying Front Suspension Stroke Sensor Connector And Harness Clamps

Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Tighten the rear engine mount base mounting bolts (A), then connect the rear engine mount actuator connector (B).

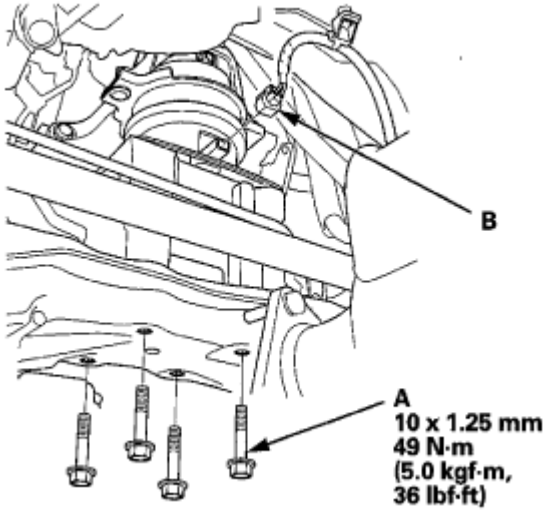


Fig. 37: Identifying Rear Engine Mount Actuator Connector And Rear Engine Mount Base Mounting Bolts With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. Lower the vehicle on the lift.
15. Remove the engine support hanger, the engine hanger balance bar, and the 2008 V6 attachment arm.
16. Tighten the new front engine mount bolt (A), then install the front engine mount stop (B) using new nuts, and connect the front engine mount actuator connector (C), and install the harness clamp (D) to the front subframe.

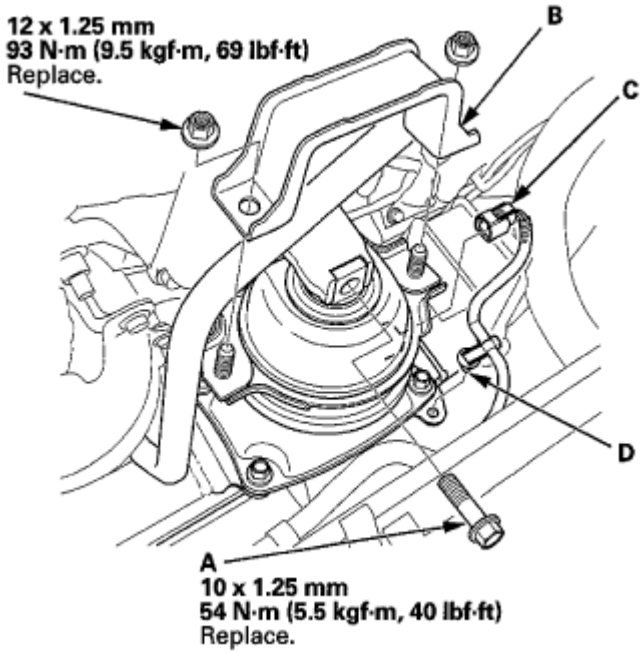


Fig. 38: Identifying Front Engine Mount Stop, Front Engine Mount Actuator Connector, Harness Clamp And Front Engine Mount Bolt With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

17. Loosen the mounting bolts (A) for the upper half of the side engine mount bracket, then retighten them to the specified torque.

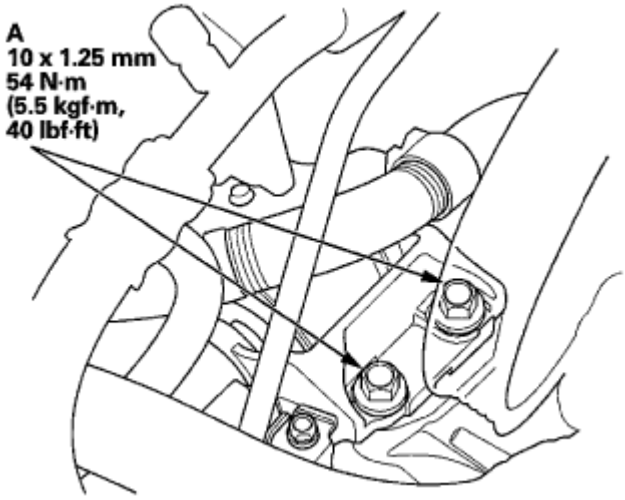


Fig. 39: Identifying Side Engine Mount Bracket Mounting Bolts With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

18. Install the connector bracket to the front cylinder head.

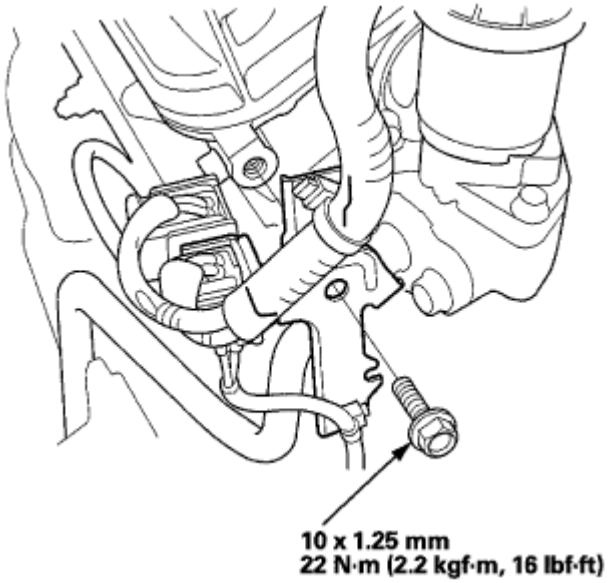


Fig. 40: Identifying Connector Bracket Mounting Bolt With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

19. Install the harness bracket to the rear cylinder head.

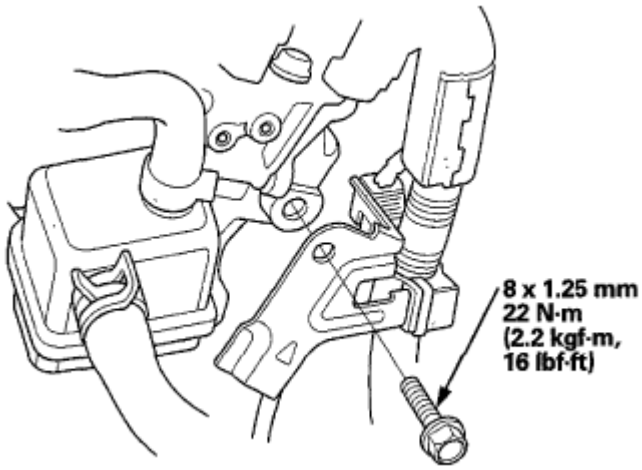


Fig. 41: Identifying Harness Bracket Mounting Bolt With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

20. Connect the heater hoses (A).

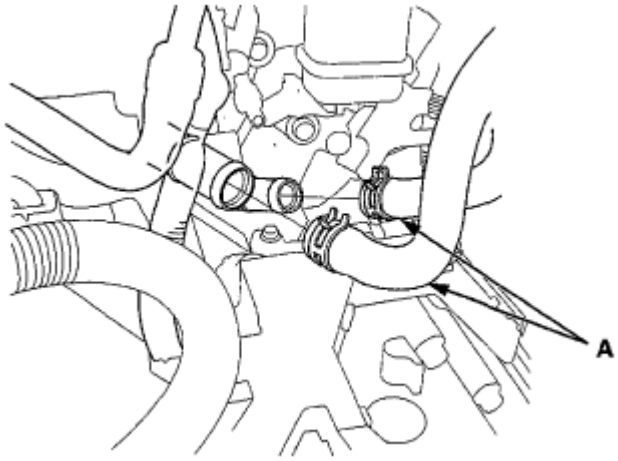


Fig. 42: Identifying Heater Hoses
Courtesy of AMERICAN HONDA MOTOR CO., INC.

21. Install the A/C compressor (A), then connect the A/C compressor clutch connector (B).

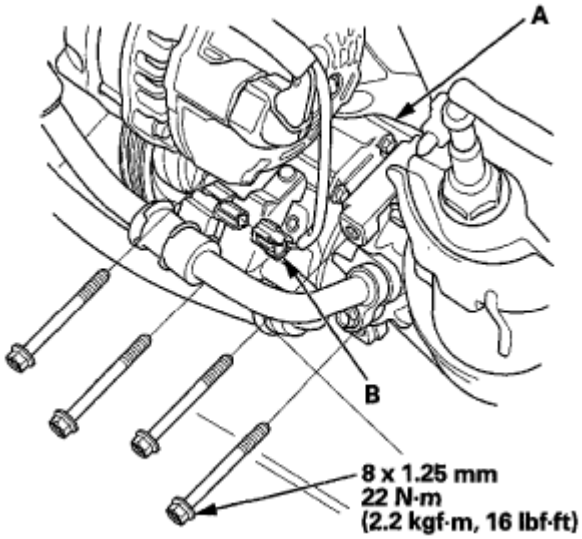


Fig. 43: Identifying A/C Compressor And A/C Compressor Clutch Connector With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

22. Install the radiator (see **RADIATOR REPLACEMENT**).
23. Raise the vehicle on the lift.
24. Connect the PSP switch connector (A) and the heat shield bolt (B).

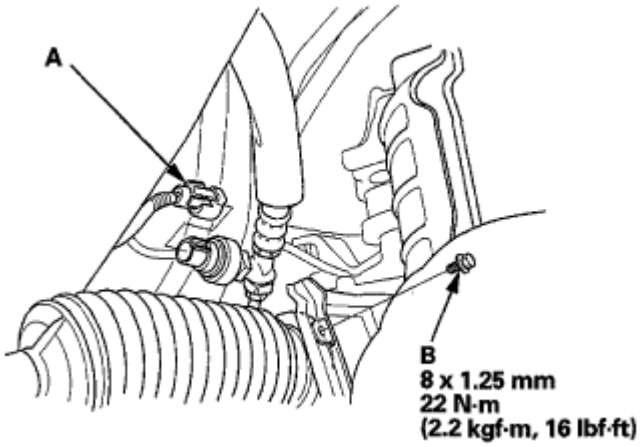


Fig. 44: Identifying PSP Switch Connector And Heat Shield Bolt With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

25. Connect the power steering fluid hose (A), then sucure the hose with the clamp (B).

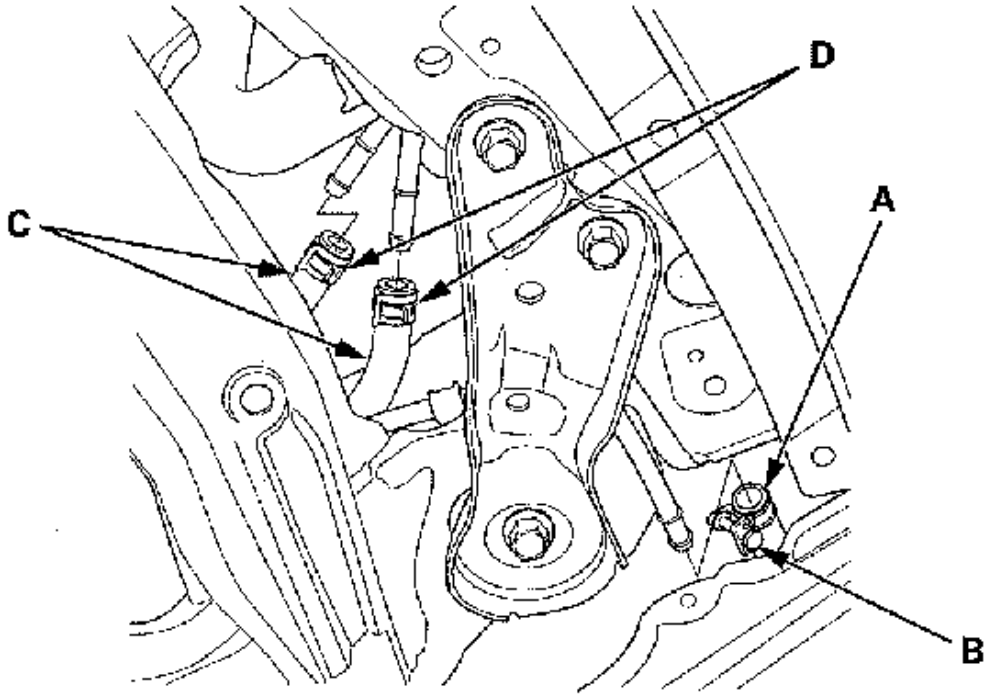


Fig. 45: Identifying Power Steering Hose And A/T Cooler Hoses
Courtesy of AMERICAN HONDA MOTOR CO., INC.

26. Connect the A/T cooler hoses (C), then secure the hose with the clamp (D):
    - 5-Speed A/T model (see **ATF COOLER HOSE REPLACEMENT**).
    - 6-Speed A/T model (see **ATF COOLER HOSE REPLACEMENT**).
27. Install a new set ring on the end of each driveshaft, then install the driveshafts (see **DRIVESHAFT INSTALLATION**).

28. Connect the suspension lower arms to the knuckles (see step 5 on **KNUCKLE REPLACEMENT**).
29. Connect the tie-rod end ball joints to the knuckles (see step 3 on **KNUCKLE REPLACEMENT**).
30. Connect the stabilizer links to the dampers (see **STABILIZER LINK REMOVAL/INSTALLATION**).
31. Install the suspension stroke sensor (see **SUSPENSION STROKE SENSOR REPLACEMENT**).
32. Install exhaust pipe A using new gaskets (B) and new self locking nuts (C).

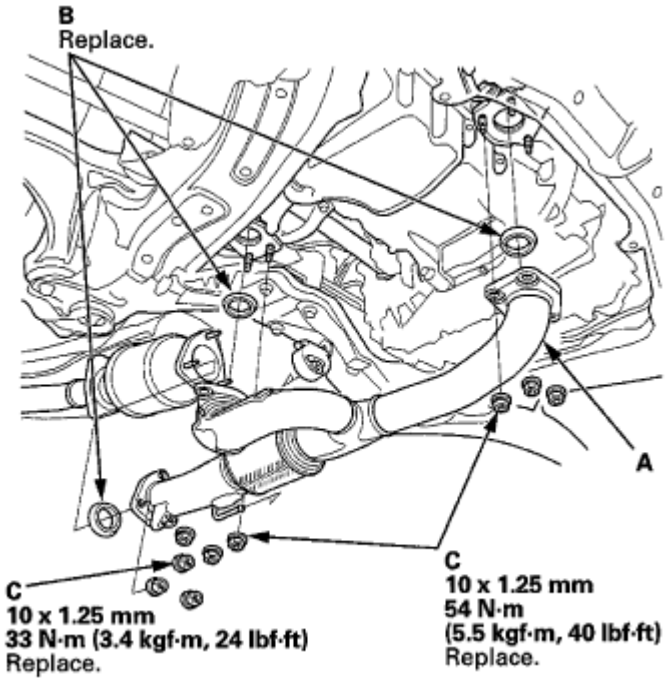


Fig. 46: Identifying Exhaust Pipe, Gaskets With Self Locking Nuts With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

33. Install the front inner fender (see **FRONT INNER FENDER REPLACEMENT**).
34. Remove the splash shield (see **FRONT SPLASH SHIELD REPLACEMENT**).
35. Install the front wheels.
36. Lower the vehicle on the lift.
37. Connect the power steering pump outlet hose (A) with a new O-ring (B), and connect the power steering pump inlet hose (C).

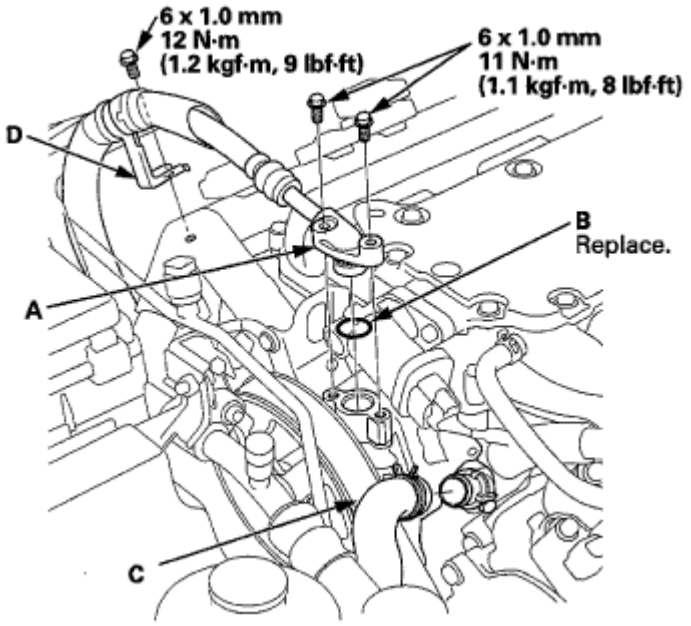


Fig. 47: Identifying Power Steering Pump Outlet Hose, O-Ring And Power Steering Pump Inlet Hose With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

38. Install the power steering hose bracket (D) to the rear cylinder head cover.
39. Install the drive belt (see **DRIVE BELT REPLACEMENT**).
40. Connect the engine wire harness connector (A) and the PCM connectors (B), then install the harness clamps (C).

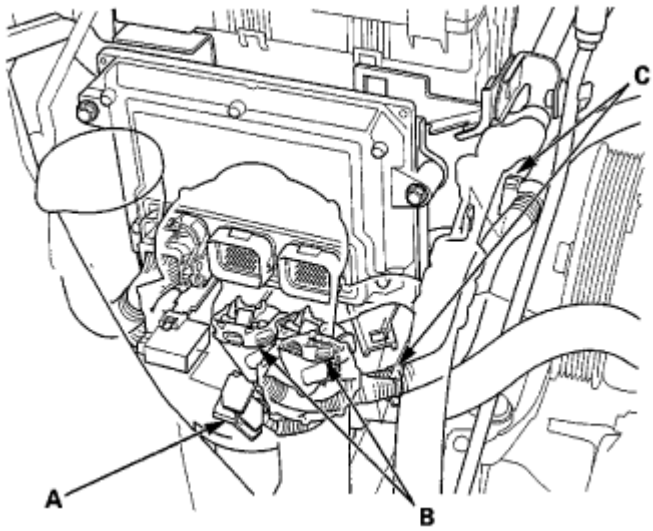


Fig. 48: Identifying Engine Wire Harness Connector, PCM Connectors And Harness Clamps
Courtesy of AMERICAN HONDA MOTOR CO., INC.

*: This illustration shows the Keihin PCM.

41. Install the PCM cover (A).

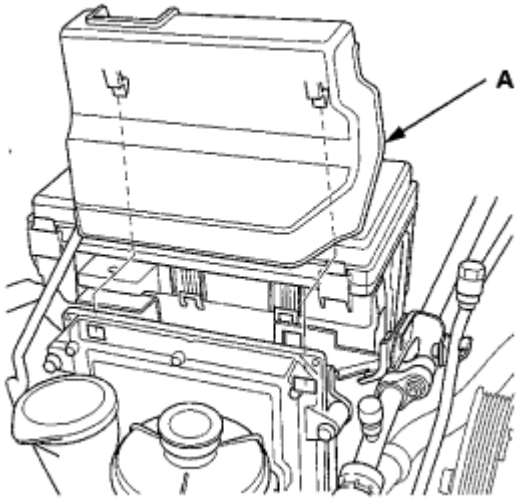


Fig. 49: Identifying PCM Cover (Keihin PCM)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Continental PCM

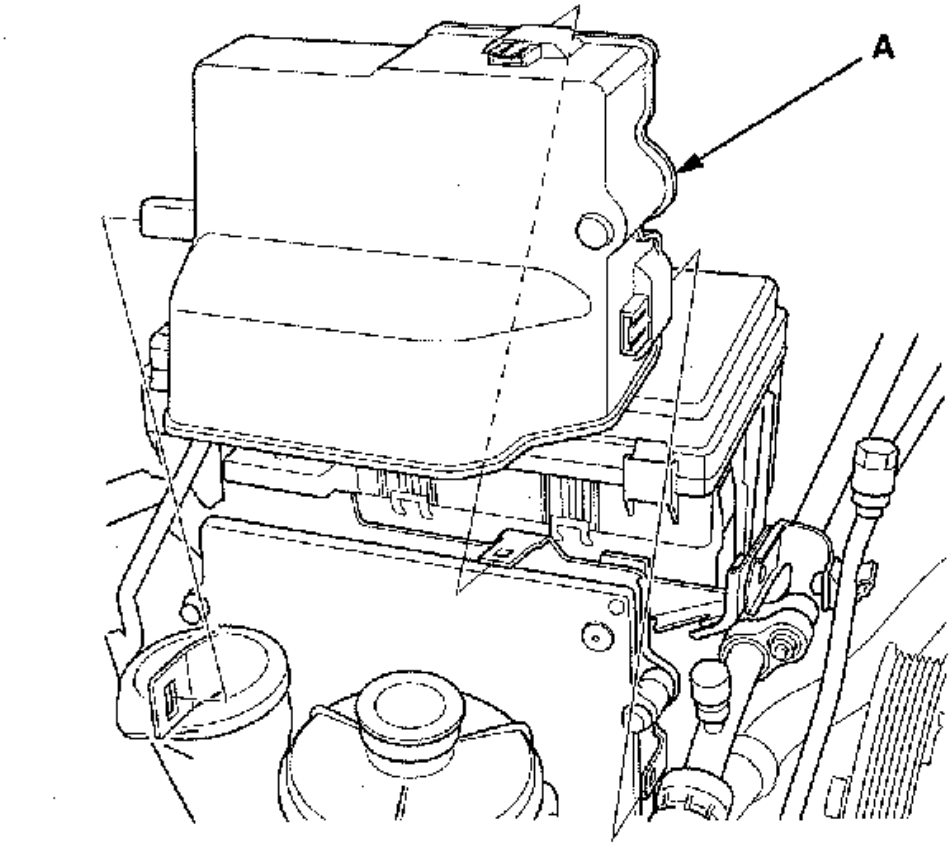


Fig. 50: Identifying PCM Cover (Continental PCM)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

42. Connect the brake booster vacuum hose (A), the EVAP canister hose (B), and the breather hose (C).

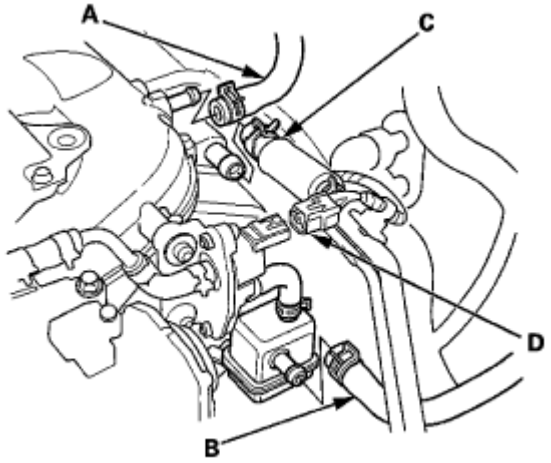


Fig. 51: Identifying Brake Booster Vacuum Hose, EVAP Canister Hose And Breather Hose
Courtesy of AMERICAN HONDA MOTOR CO., INC.

43. Connect the EVAP canister purge valve connector (D).
44. Connect the fuel feed hose (A), then install the quick-connect fitting cover (B) (see **FUEL LINE/QUICK-CONNECT FITTING INSTALLATION**).

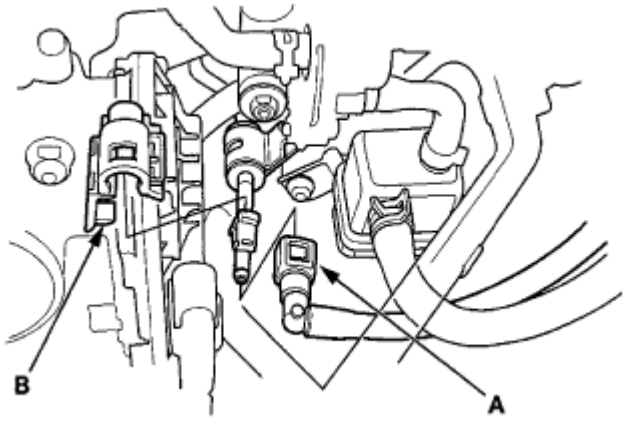


Fig. 52: Identifying Fuel Feed Hose And Quick-Connect Fitting Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

45. Cut the wire (A), then align the reference mark (B) on the steering joint (C) and the steering gearbox pinion shaft (D). Connect the steering joint to the steering gearbox pinion shaft. Loosely install the steering joint bolt (E).

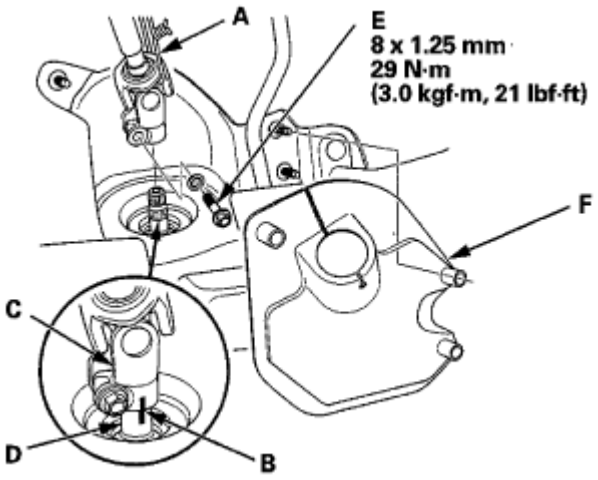


Fig. 53: Identifying Wire, Mark On Steering Joint, Steering Gearbox Pinion Shaft And Steering Joint Bolt With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

46. Remove the steering wheel holder tool (see step 36 on **INSTALLATION**), then tighten the steering joint bolt.
47. Install the steering joint cover (F).
48. Install the shift cable:
    - 5-speed A/T model (see step 59 on **TRANSMISSION INSTALLATION**).
    - 6-speed A/T model (see step 48 on **TRANSMISSION INSTALLATION**).
49. Install the battery base (A), and the harness clamps (B), then tighten the bolts (C).

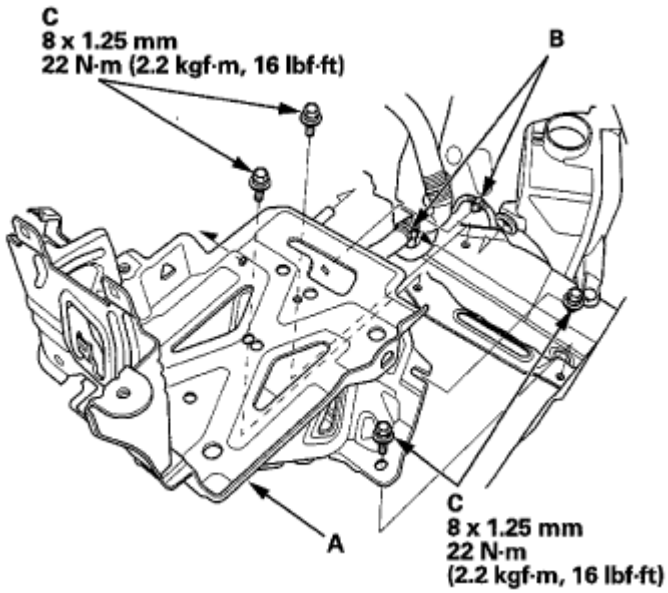


Fig. 54: Identifying Harness Clamps, Battery Base & Bolts With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

50. Install the main under-hood fuse box (A) and the harness clamps (B), then connect the engine wire harness (C) and starter cables (D) to the main under-hood fuse box.

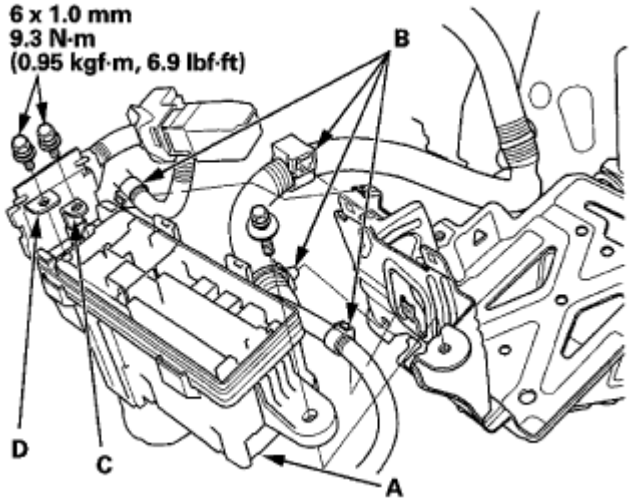


Fig. 55: Identifying Under-Hood Fuse Box And Harness Clamps, Engine Wire Harness And Starter Cables With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

51. Install the air cleaner (see **AIR CLEANER ELEMENT INSPECTION/REPLACEMENT**).
52. Install the engine cover.

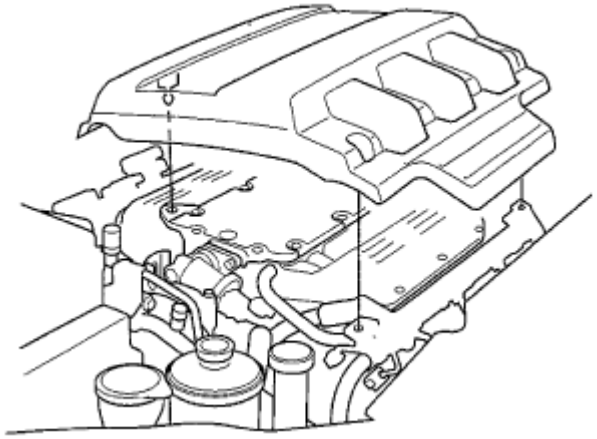


Fig. 56: Identifying Engine Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

53. Do the battery installation procedure (see **BATTERY REMOVAL AND INSTALLATION**).
54. Install the cowl cover (see **COWL COVER REPLACEMENT**).
55. Install the bulkhead cover (see **FRONT BULKHEAD COVER REPLACEMENT**).
56. Inspect for fuel leaks. Turn the ignition switch to ON (II) (do not operate the starter) so the fuel pump runs for about 2 seconds and pressurizes the fuel line. Repeat this operation three times, then check for

fuel leakage at any point in the fuel line.

57. Refill the engine with engine oil (see **ENGINE OIL REPLACEMENT**).
58. Refill the transmission with ATF:
    - 5-speed A/T model (see **ATF REPLACEMENT**).
    - 6-speed A/T model (see **ATF REPLACEMENT**).
59. Move the shift lever to each gear, and verify that the A/T gear position indicator follows the transmission range switch.
60. Refill the reservoir with power steering fluid (see step 6 on **FLUID CHECK/REPLACEMENT**).
61. Refill the radiator with engine coolant (see step 9 on **COOLANT REPLACEMENT**).
62. Do the power steering system bleeding procedure (see **FLUID CHECK/REPLACEMENT**).
63. Do the cooling system bleeding procedure (see **COOLANT CHECK**).
64. Check for fluid leaks.
65. Do the PCM reset procedure (see **IF THE MIL DID NOT STAY ON**).
66. Do the CKP pattern clear/CKP pattern learn procedure (see **CKP PATTERN CLEAR/CKP PATTERN LEARN**).
67. Inspect the idle speed (see **IDLE SPEED INSPECTION**).
68. Inspect the ignition timing (see **IGNITION TIMING INSPECTION**).
69. Check the wheel alignment (see **WHEEL ALIGNMENT**).

SIDE ENGINE MOUNT REMOVAL AND INSTALLATION

REMOVAL

NOTE: Check the label on the PCM to see if it was made by Keihin or Continental. Refer to the Fuel and Emissions Systems' General Troubleshooting Information for more details (see GENERAL TROUBLESHOOTING INFORMATION).

1. Remove the bolt (A) and the clamps (B) from the under-hood fuse/relay box (C).

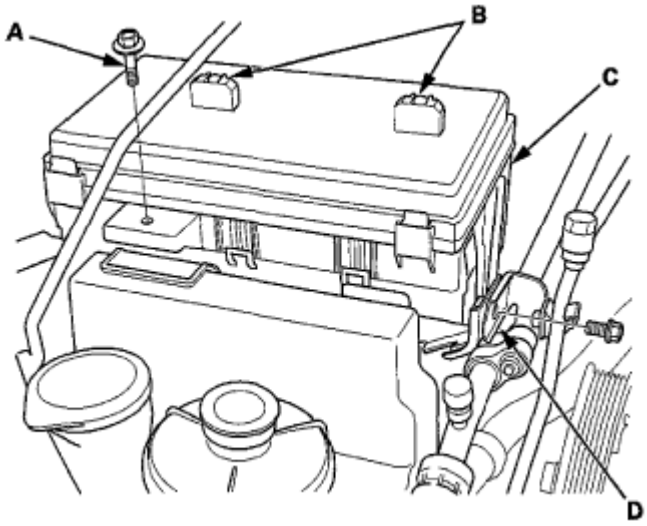


Fig. 57: Identifying Under-Hood Fuse/Relay Box Bolt And Clamps
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Remove the A/C line bracket (D).
3. Remove the PCM cover (A).

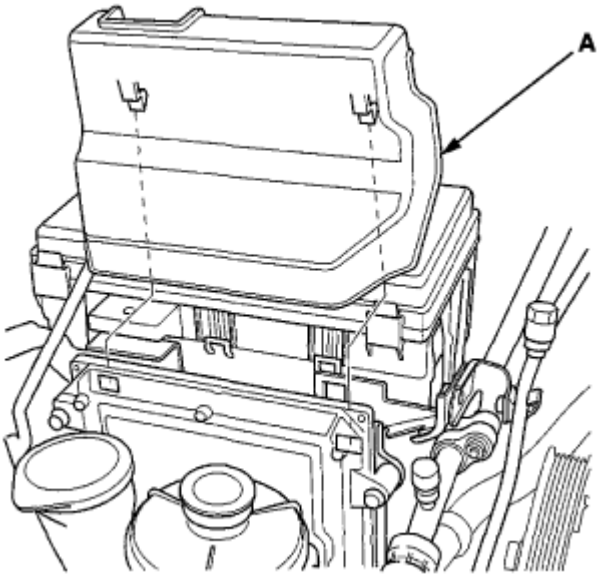


Fig. 58: Identifying PCM Cover (Keihin PCM)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Continental PCM

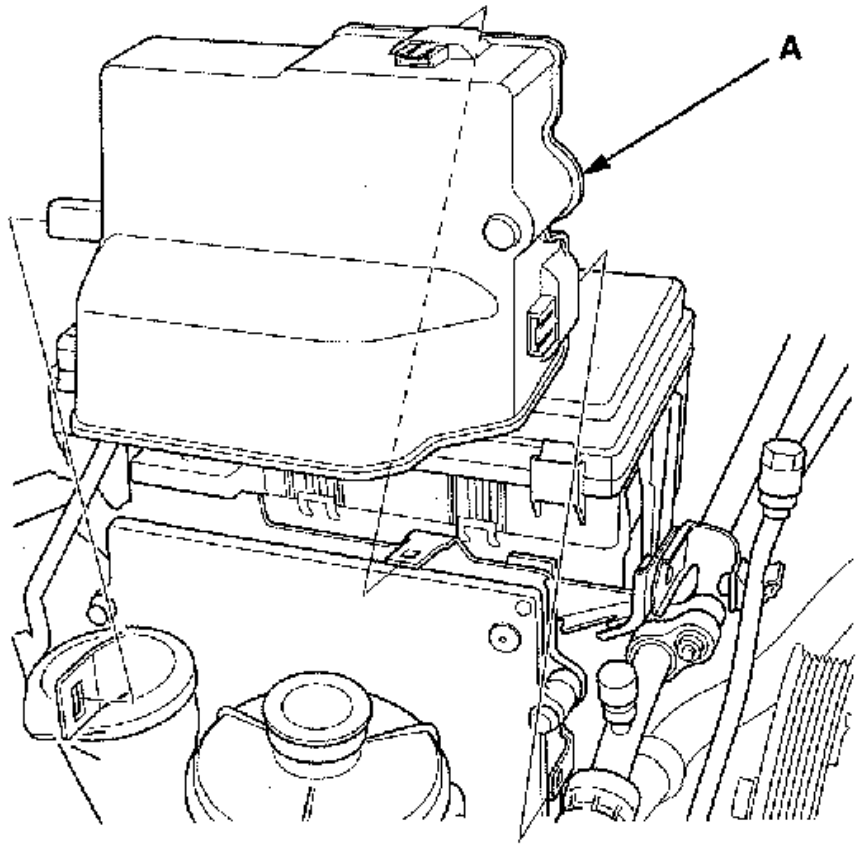


Fig. 59: Identifying PCM Cover (Continental PCM)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Remove the power steering reservoir (A) from the clamp.

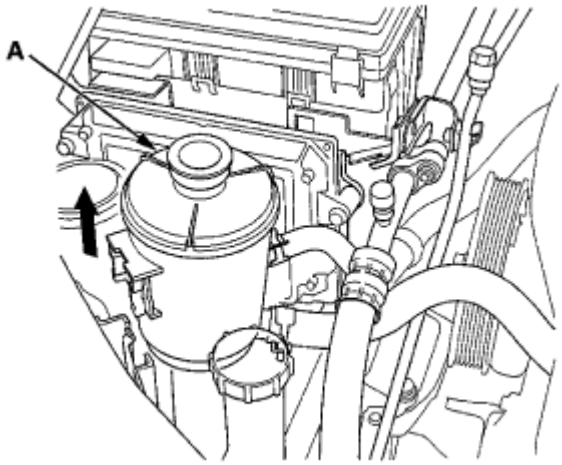


Fig. 60: Identifying Power Steering Reservoir
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Keihin PCM: Remove the harness clamps (A) and the bolts (B), then loosen the bolt (C).

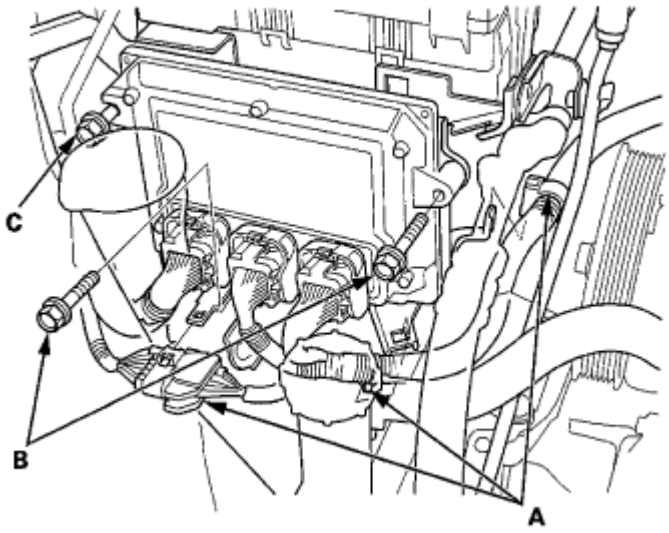


Fig. 61: Identifying Harness Clamps Mounting Bolts (Keihin PCM)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Continental PCM: Remove the harnes clamps (A) and the nuts (B).

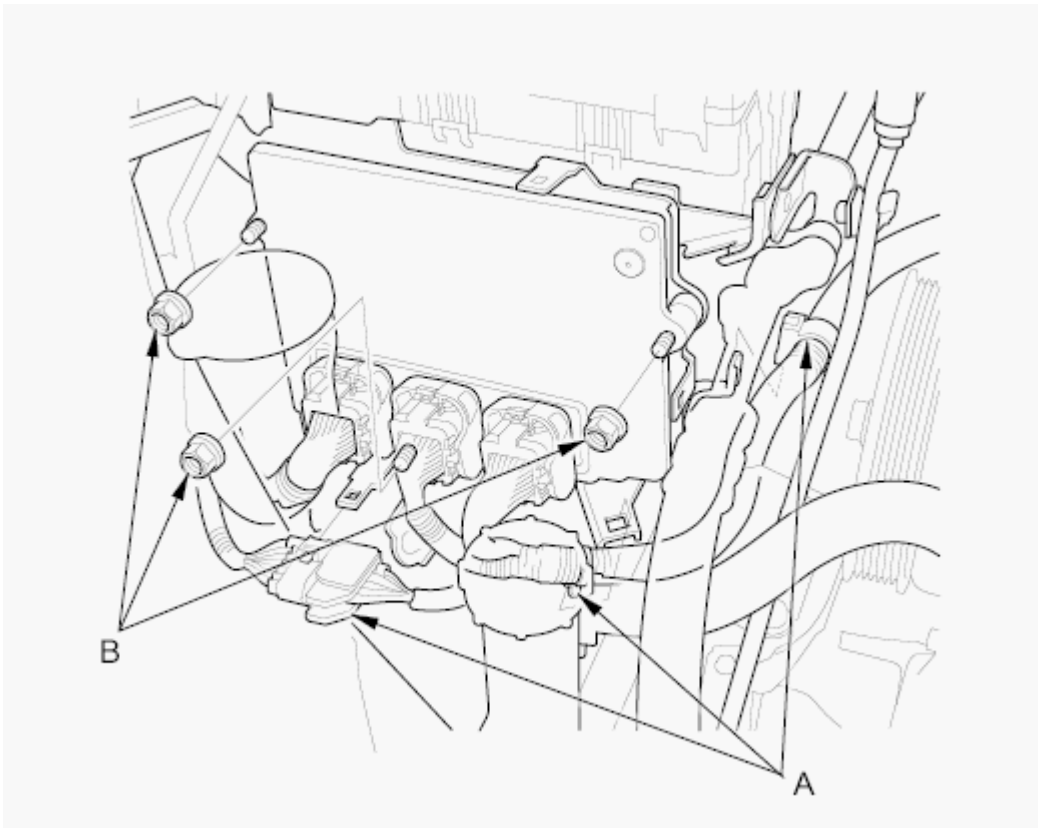


Fig. 62: Identifying Harness Clamps Mounting Bolts (Continental PCM)

Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Keihin PCM: Remove the bolts (A) and loosen the bolt (B), then remove the PCM bracket (C).

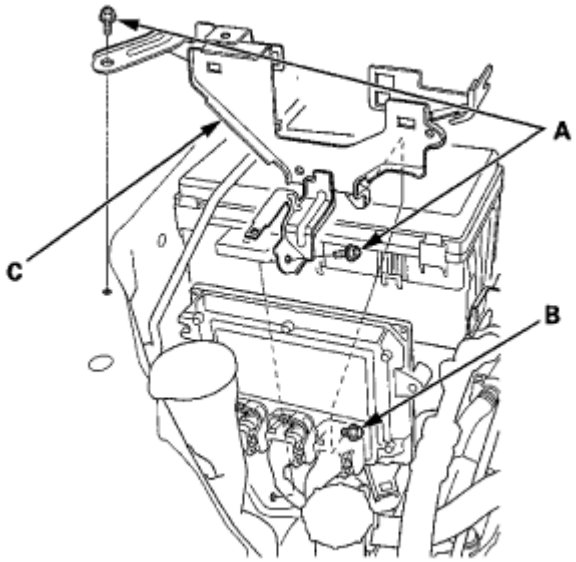


Fig. 63: Identifying PCM Bracket With Bolts (Keihin PCM)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Continental PCM: Remove the bolts (A) and loosen the bolt (B), then remove the spacer (C) and the PCM bracket (D).

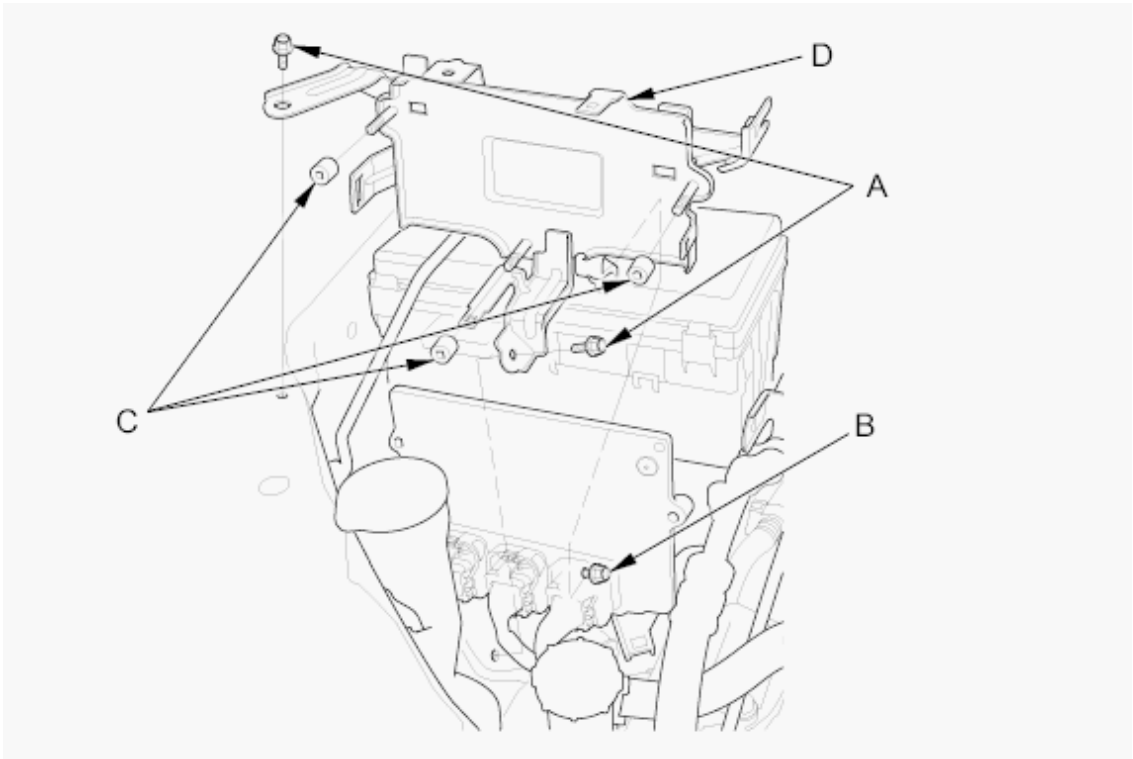


Fig. 64: Identifying PCM Bracket With Bolts (Continental PCM)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Lift and support the engine with a jack and a wood block under the oil pan.
10. Remove the ground cable bracket (A), then remove the upper half of the side engine mount bracket (B).

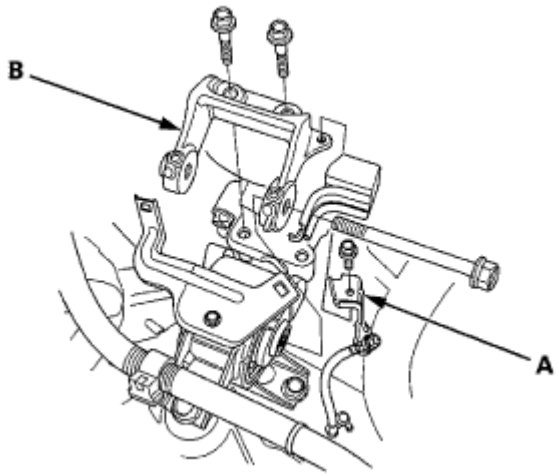


Fig. 65: Identifying Ground Cable Bracket And Side Engine Mount Bracket
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Remove the wire harness bracket (A) and the side engine mount (B).

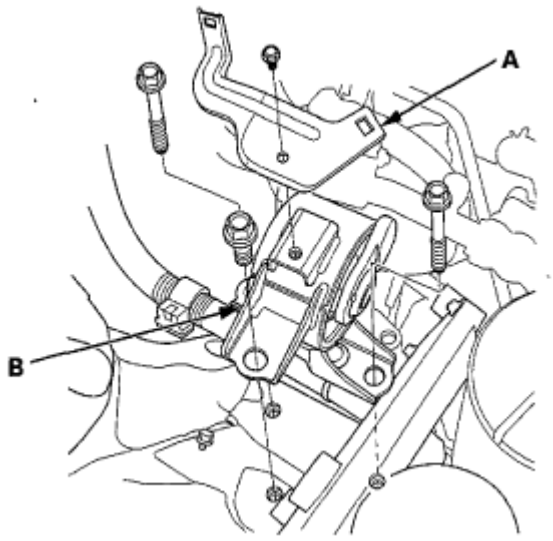


Fig. 66: Identifying Wire Harness Bracket And Side Engine Mount
Courtesy of AMERICAN HONDA MOTOR CO., INC.

INSTALLATION

NOTE: Check the label on the PCM to see if it was made by Keihin or Continental. Refer

to the Fuel and Emissions Systems' General Troubleshooting Information for more details (see GENERAL TROUBLESHOOTING INFORMATION).

1. Install the side engine mount (A) and the wire harness bracket (B).

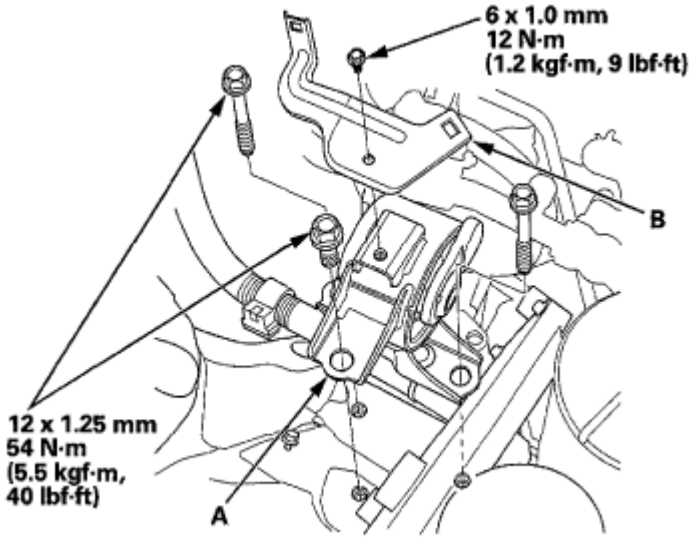


Fig. 67: Identifying Side Engine Mount And Wire Harness Bracket With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

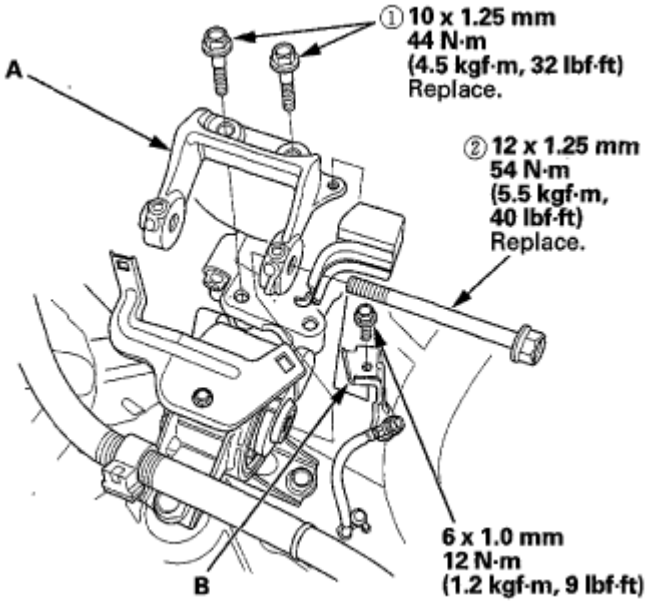


Fig. 68: Identifying Ground Cable Bracket And Side Engine Mount Bracket Bolts With Torque Specifications

Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Remove the jack and the wood block.
4. Tighten the mounting bolts in the numbered sequence shown.
5. Keihin PCM: Install the PCM bracket (A), then tighten the bolts (B).

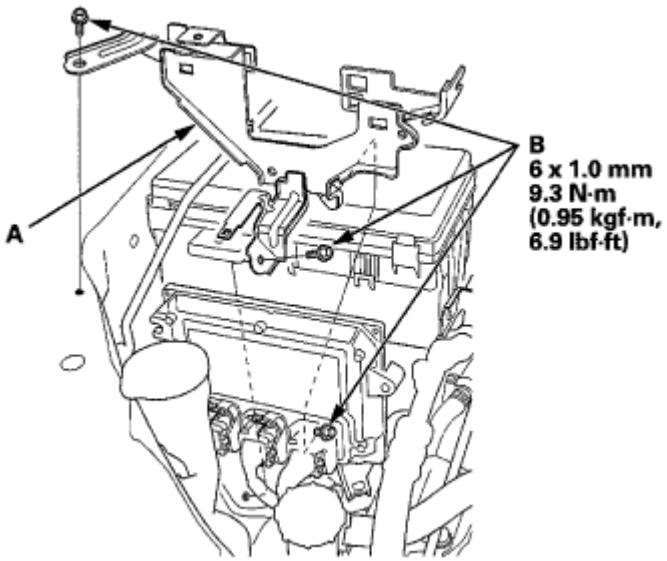


Fig. 69: Identifying PCM Bracket Bolts With Torque Specifications (Keihin PCM)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Continental PCM: Install the PCM bracket (A) and the spacer (B), then tighten the bolts (C).

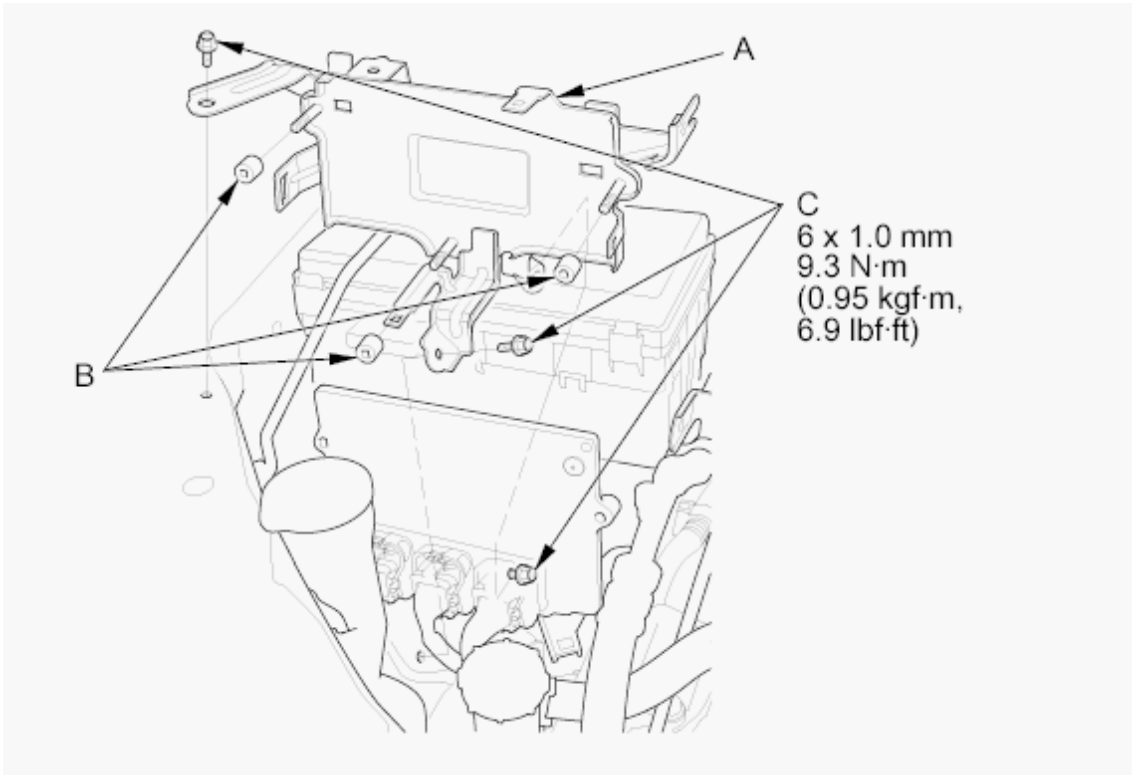


Fig. 70: Identifying PCM Bracket Bolts With Torque Specifications (Continental PCM)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Install the PCM (A) and the harness clamp (B).

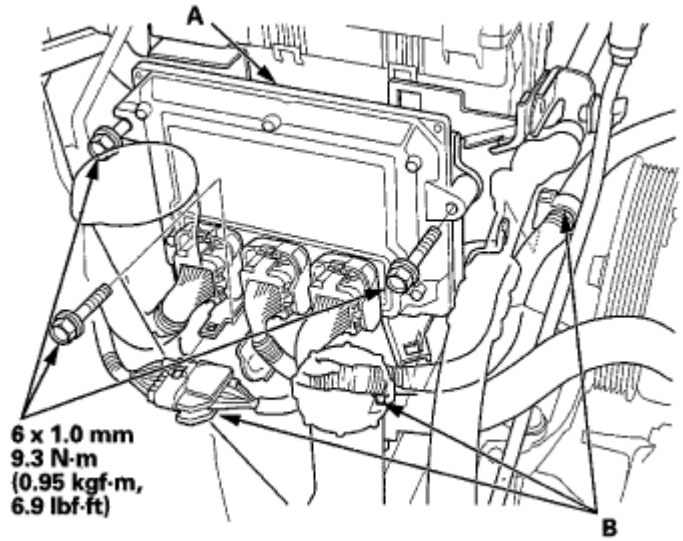


Fig. 71: Identifying PCM And Harness Clamp With Torque Specifications (Keihin PCM)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

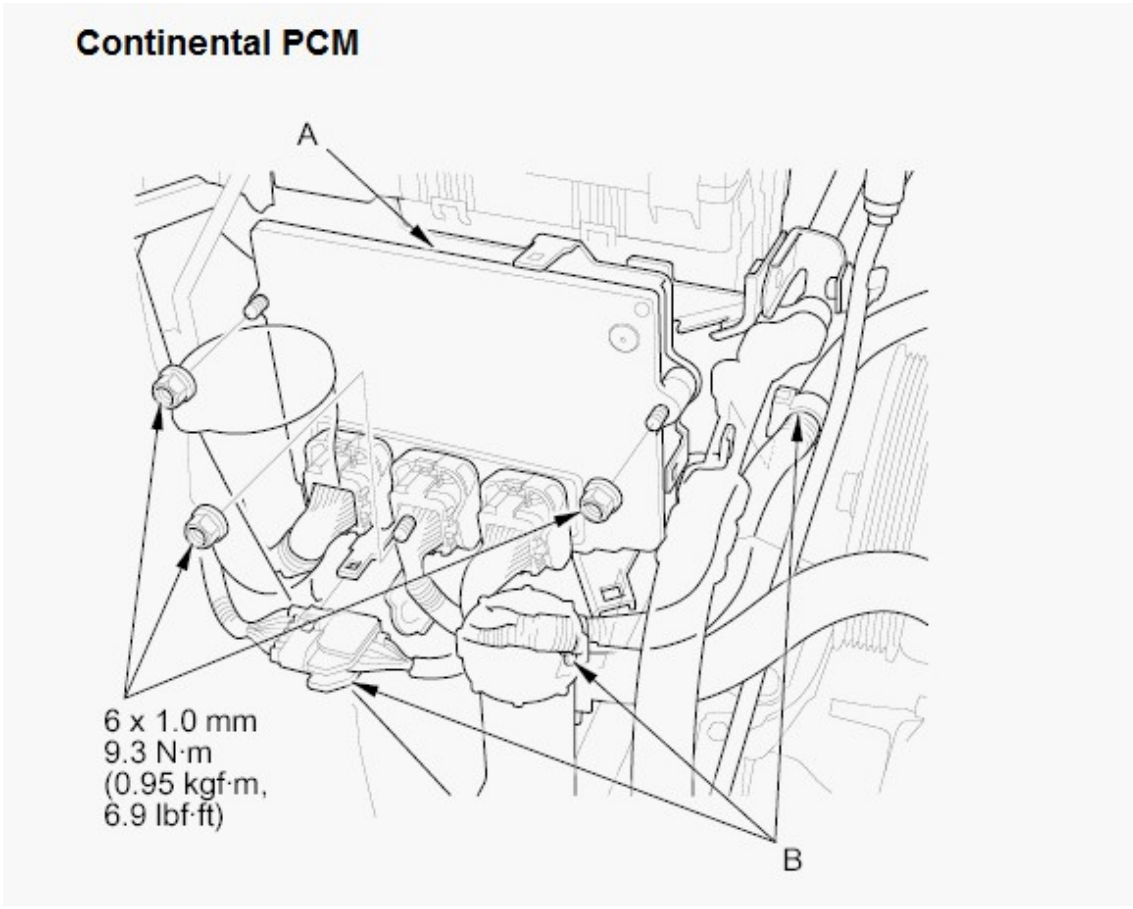


Fig. 72: Identifying PCM And Harness Clamp With Torque Specifications (Continental PCM)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Install the power steering reservoir (A) to the clamp.

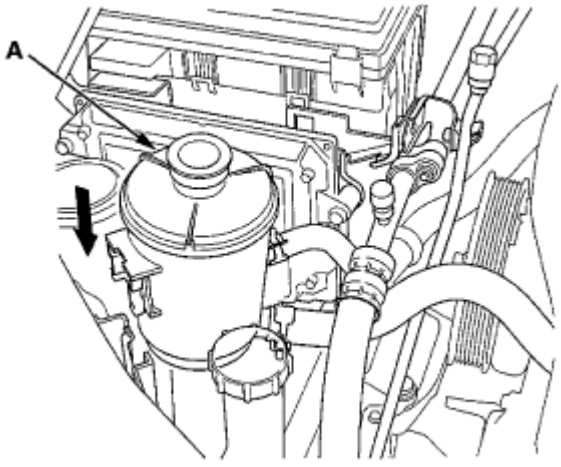


Fig. 73: Identifying Power Steering Reservoir
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Install the PCM cover (A).

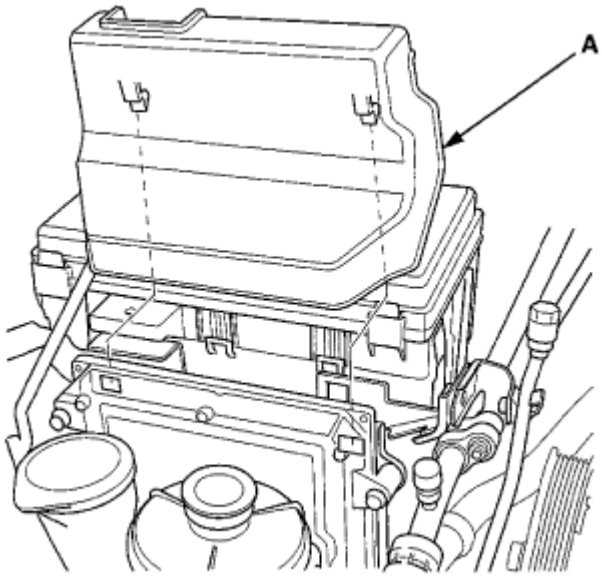


Fig. 74: Identifying PCM Cover (Keihin PCM)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Continental PCM

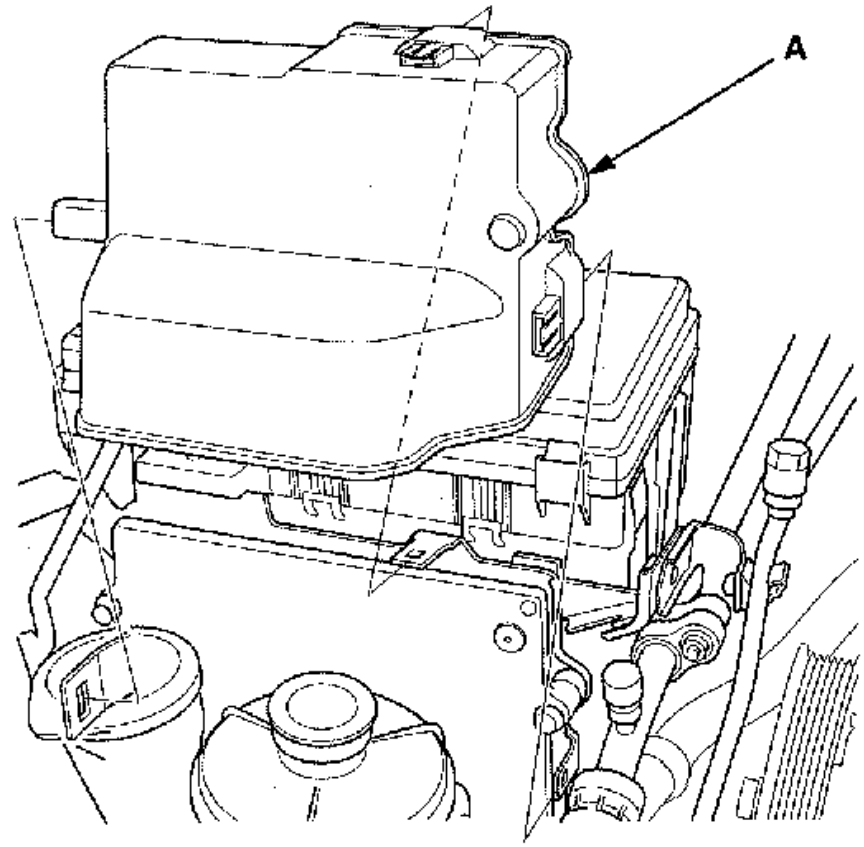


Fig. 75: Identifying PCM Cover (Continental PCM)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Install the under-hood fuse/relay box (A) and the AC line bracket (B).

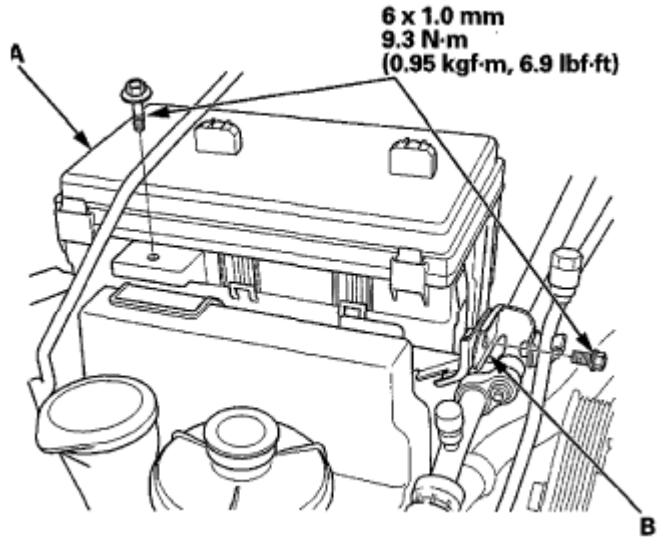


Fig. 76: Identifying Under-Hood Fuse/Relay Box And AC Line Bracket With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

FRONT ENGINE MOUNT REMOVAL AND INSTALLATION

REMOVAL

1. Remove the air intake scoop (see step 1 on **INTAKE AIR RESONATOR REMOVAL/INSTALLATION**).
2. Remove the A/C condenser fan shroud assembly, then remove the radiator fan shroud assembly (see **FAN, FAN MOTOR, AND SHROUD REMOVAL AND INSTALLATION**).
3. Do the battery removal procedure (see **BATTERY REMOVAL AND INSTALLATION**).
4. Remove the front engine mount stop (A), then remove the front engine mount mounting bolt (B).

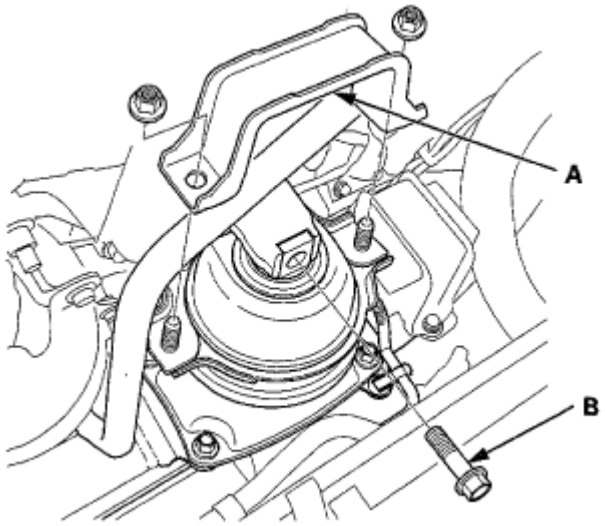


Fig. 77: Identifying Front Engine Mount Stop And Front Engine Mount With Mounting Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Lift and support the engine with a jack and a wood block under the engine/transmission.
6. Disconnect the front engine mount actuator connector (A), then remove the front engine mount bracket (B) and the front engine mount (C) as shown.

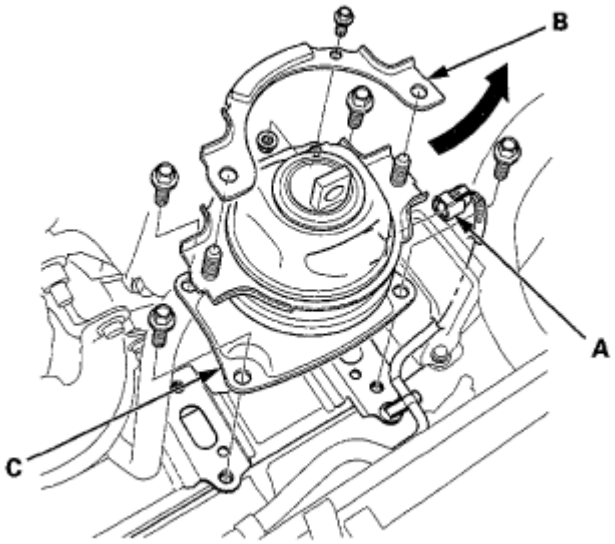


Fig. 78: Removing Front Engine Mount Actuator Connector
Courtesy of AMERICAN HONDA MOTOR CO., INC.

INSTALLATION

1. Install the front engine mount (A) using new bolts (B) and the front engine mount bracket (C), then connect the front engine mount actuator connector (D).

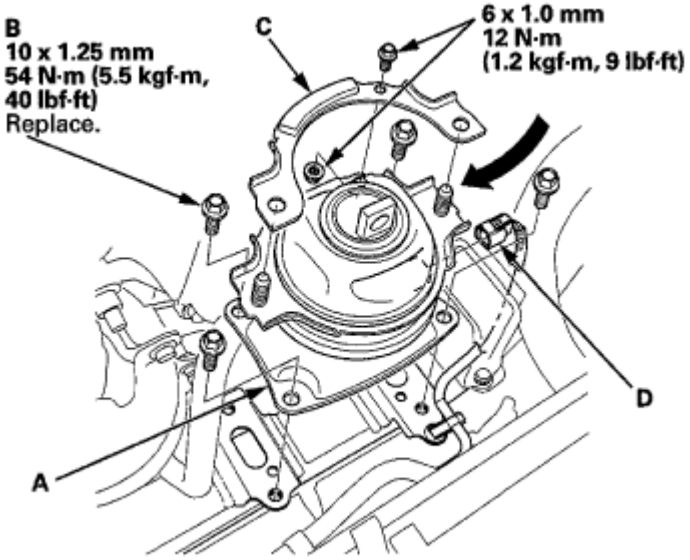


Fig. 79: Installing Front Engine Mount Using Bolts With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Remove the jack and the wood block.
3. Install the new front engine mount mounting bolt (A), then install the front engine mount stop (B) using new nuts.

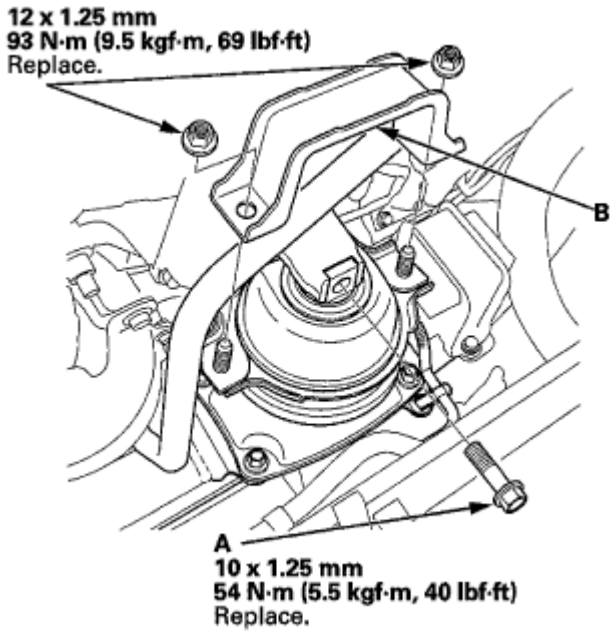


Fig. 80: Identifying Front Engine Mount Stop Nuts And Front Engine Mount & Mounting Bolt With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Do the battery installation procedure (see **BATTERY REMOVAL AND INSTALLATION**).
5. Install the radiator fan shroud assembly, then install the A/C condenser fan shroud assembly (see **INSTALLATION**).
6. Install the air intake scoop (see step 1 on **INTAKE AIR RESONATOR REMOVAL/INSTALLATION**).

REAR ENGINE MOUNT REMOVAL AND INSTALLATION

REMOVAL

1. Loosen the rear engine mount stop nuts (A).

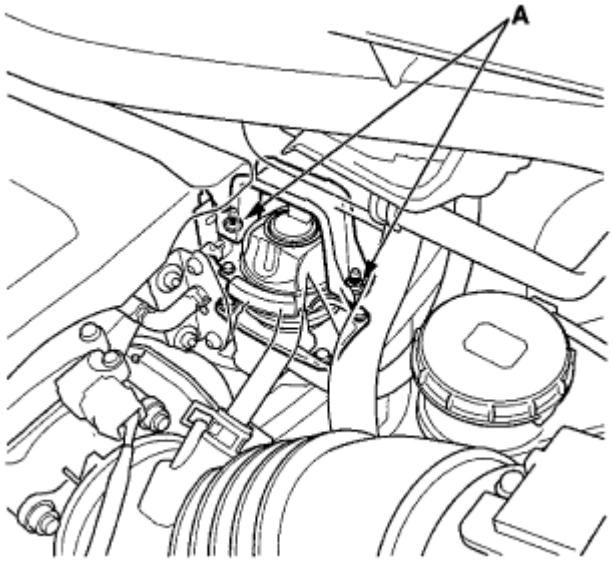


Fig. 81: Identifying Rear Engine Mount Stop Nuts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Raise the vehicle on the lift.
3. Support the engine/transmission with a transmission jack.
4. Disconnect the rear engine mount actuator connector (A), then remove the heat shield (B) and the rear engine mount stop (C).

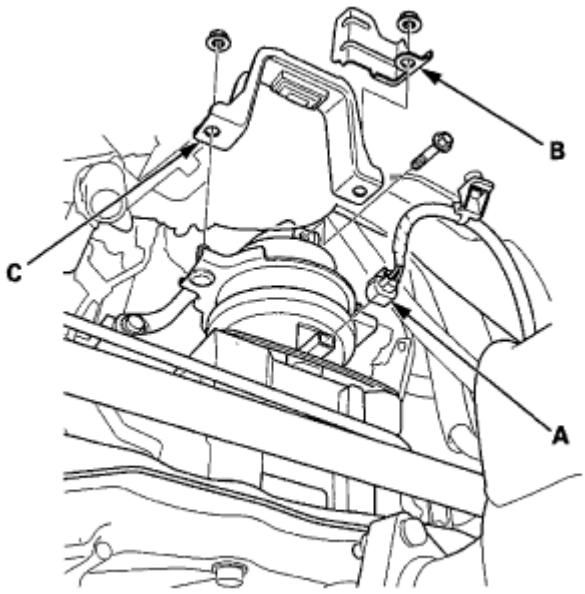


Fig. 82: Identifying Rear Engine Mount Actuator Connector, Heat Shield And Rear Engine Mount Stop
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Remove the rear engine mount bracket (A) and the rear engine mount (B).

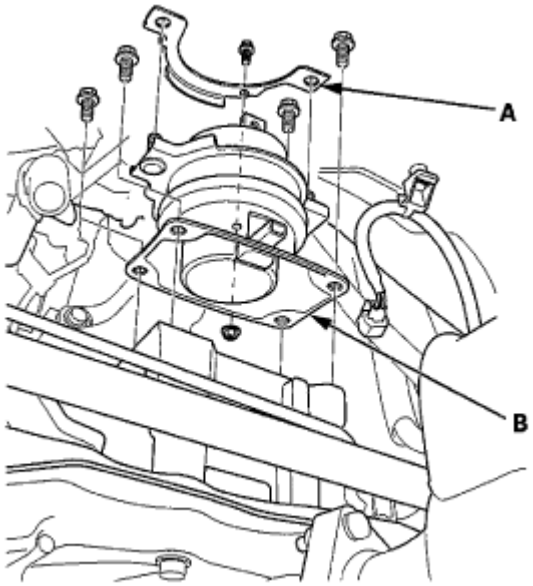


Fig. 83: Identifying Rear Engine Mount Bracket And Rear Engine Mount
Courtesy of AMERICAN HONDA MOTOR CO., INC.

INSTALLATION

1. Install the rear engine mount (A) using new bolts (B) and install the rear engine mount bracket (C).

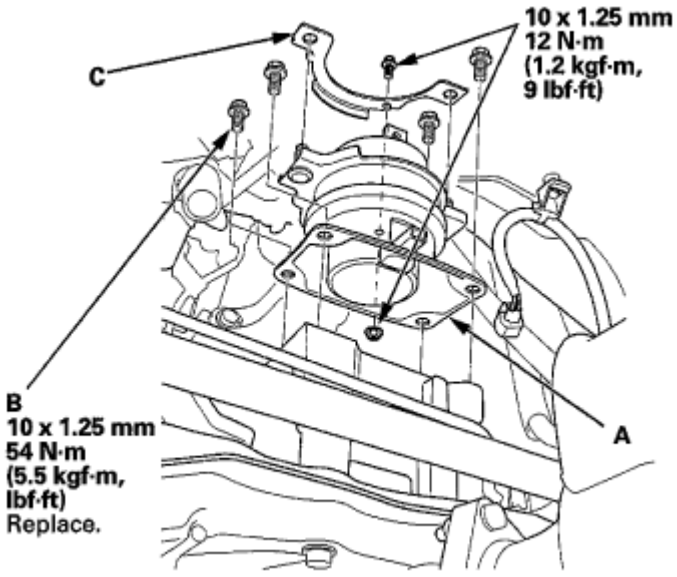


Fig. 84: Identifying Rear Engine Mount Bracket And Rear Engine Mount Bolts With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Remove the transmission jack.
3. Install the new rear engine mount mounting bolt (A), then loosely install the rear engine mount stop (B)

using new nuts (C), then connect the rear engine mount actuator connector (D).

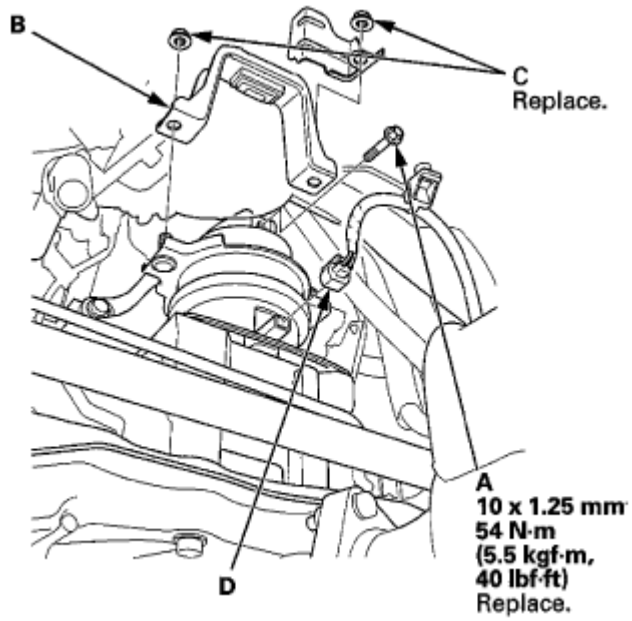


Fig. 85: Identifying Rear Engine Mount Stop, Rear Engine Mount Actuator Connector And Rear Engine Mount Mounting Bolt With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Lower the vehicle on the lift.
5. Tighten the rear mount stop nuts.

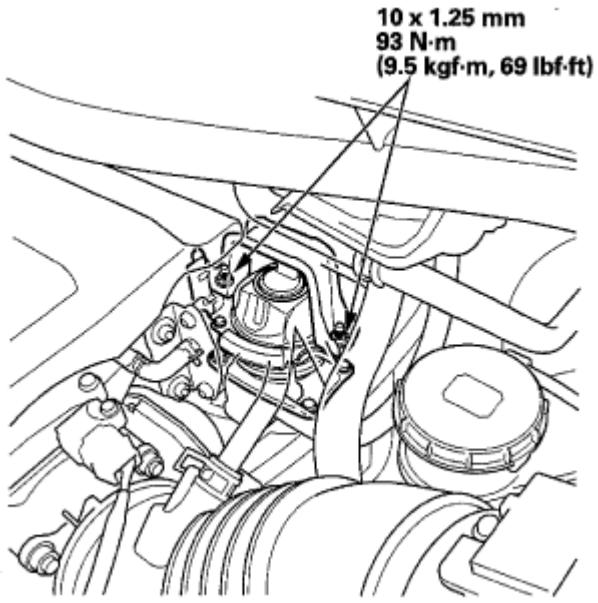


Fig. 86: Identifying Rear Mount Stop Nuts With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

LOWER TRANSMISSION MOUNT REMOVAL AND INSTALLATION

REMOVAL

1. Remove the splash shield (see **FRONT SPLASH SHIELD REPLACEMENT**).
2. Remove the left side front inner fender (see **FRONT INNER FENDER REPLACEMENT**).
3. Support the engine/transmission with a transmission jack.
4. Remove the lower transmission mount (A).

5-speed A/T model

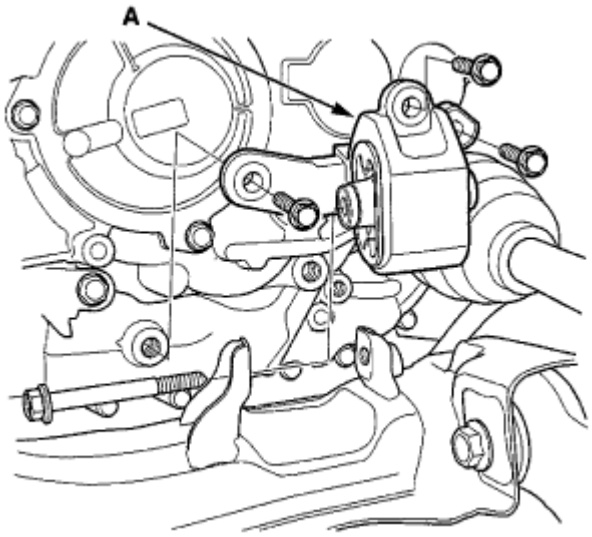


Fig. 87: Identifying Transmission Mount (5-Speed A/T Model)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6-speed A/T model

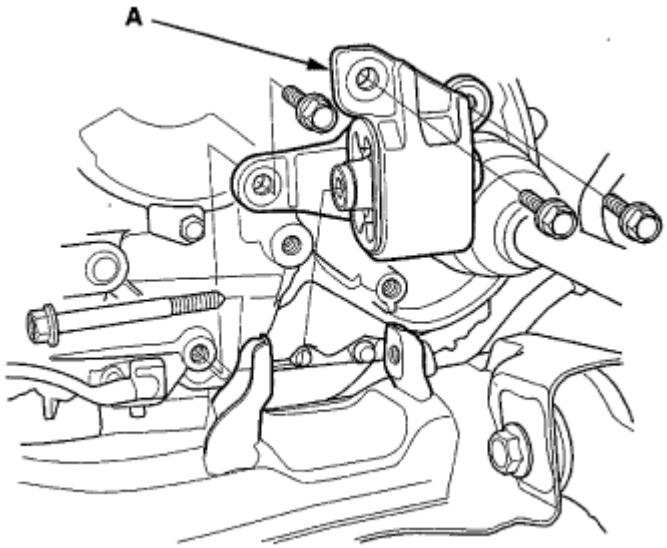


Fig. 88: Identifying Transmission Mount (6-Speed A/T Model)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

INSTALLATION

1. Install the lower transmission mount (A), then loosely install the new lower transmission mount mounting bolt (B) and tighten the lower transmission mount mounting bolts (C).

5-speed A/T model

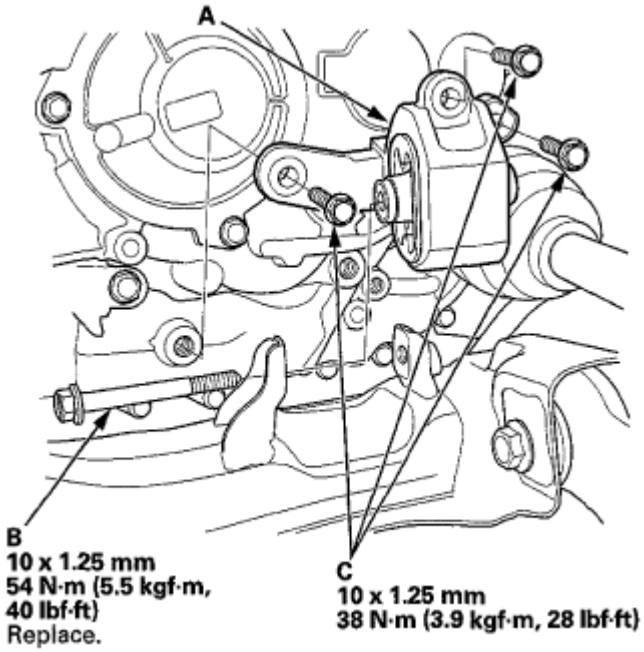


Fig. 89: Identifying Transmission Mount Mounting Bolts With Torque Specifications (5-Speed A/T Model)

Courtesy of AMERICAN HONDA MOTOR CO., INC.

6-speed A/T model

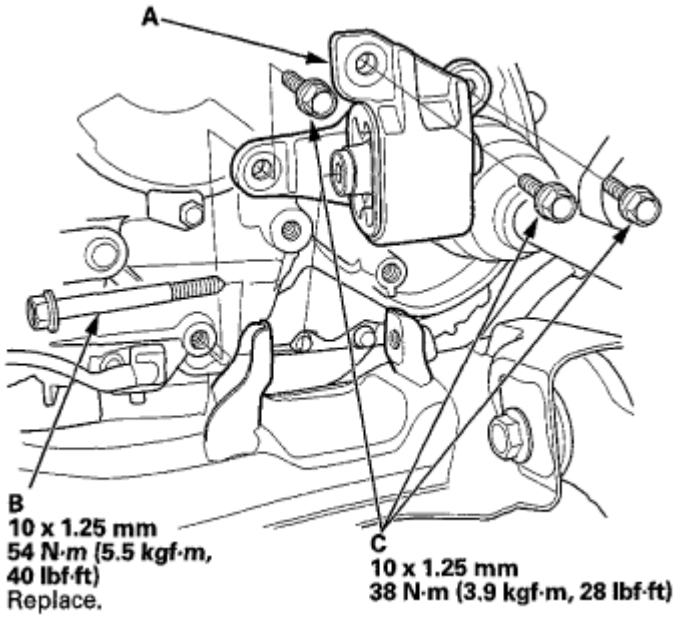


Fig. 90: Identifying Transmission Mount Mounting Bolts With Torque Specifications (6-Speed A/T Model)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Remove the transmission jack.
3. Tighten the lower transmission mount mounting bolts.
4. Install the front inner fender (see **FRONT INNER FENDER REPLACEMENT**).
5. Install the splash shield (see **FRONT SPLASH SHIELD REPLACEMENT**).

2011-12 ENGINE

Mechanical - Odyssey

SPECIAL TOOLS

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

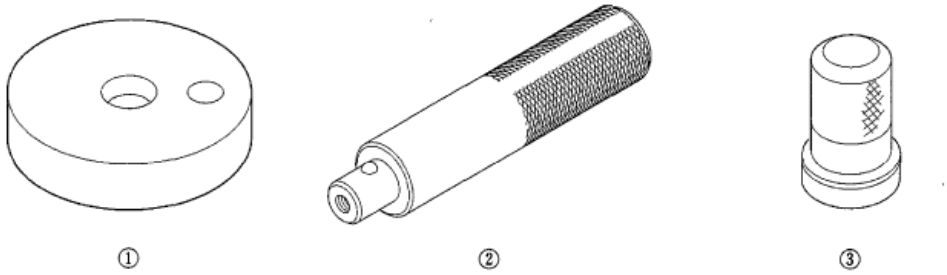


Fig. 1: Identifying Special Tools
Courtesy of AMERICAN HONDA MOTOR CO., INC.

COMPONENT LOCATION INDEX

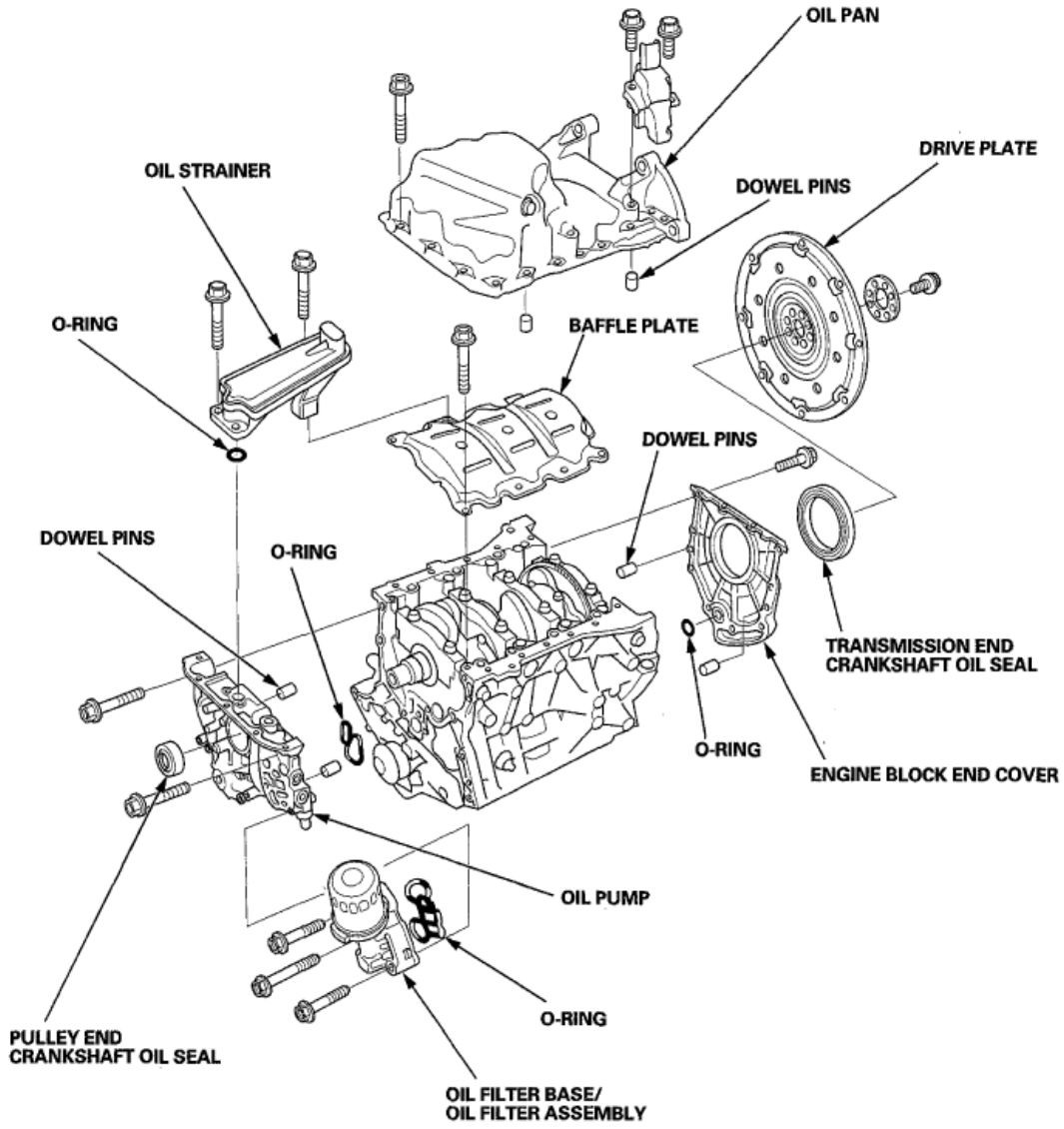


Fig. 2: Identifying Engine Block Assembly Replacement Components (1 Of 3)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

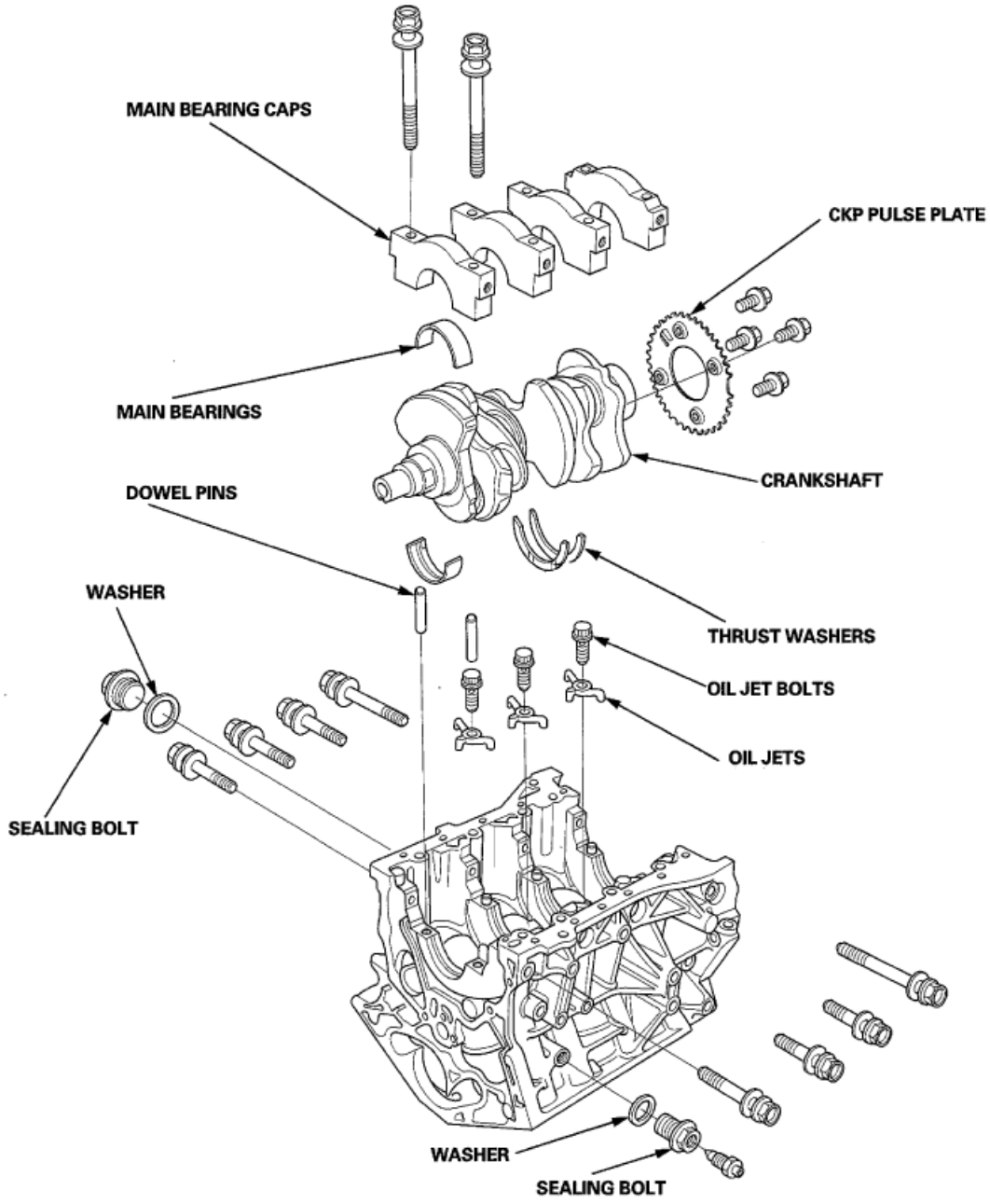


Fig. 3: Identifying Engine Block Assembly Replacement Components (2 Of 3)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

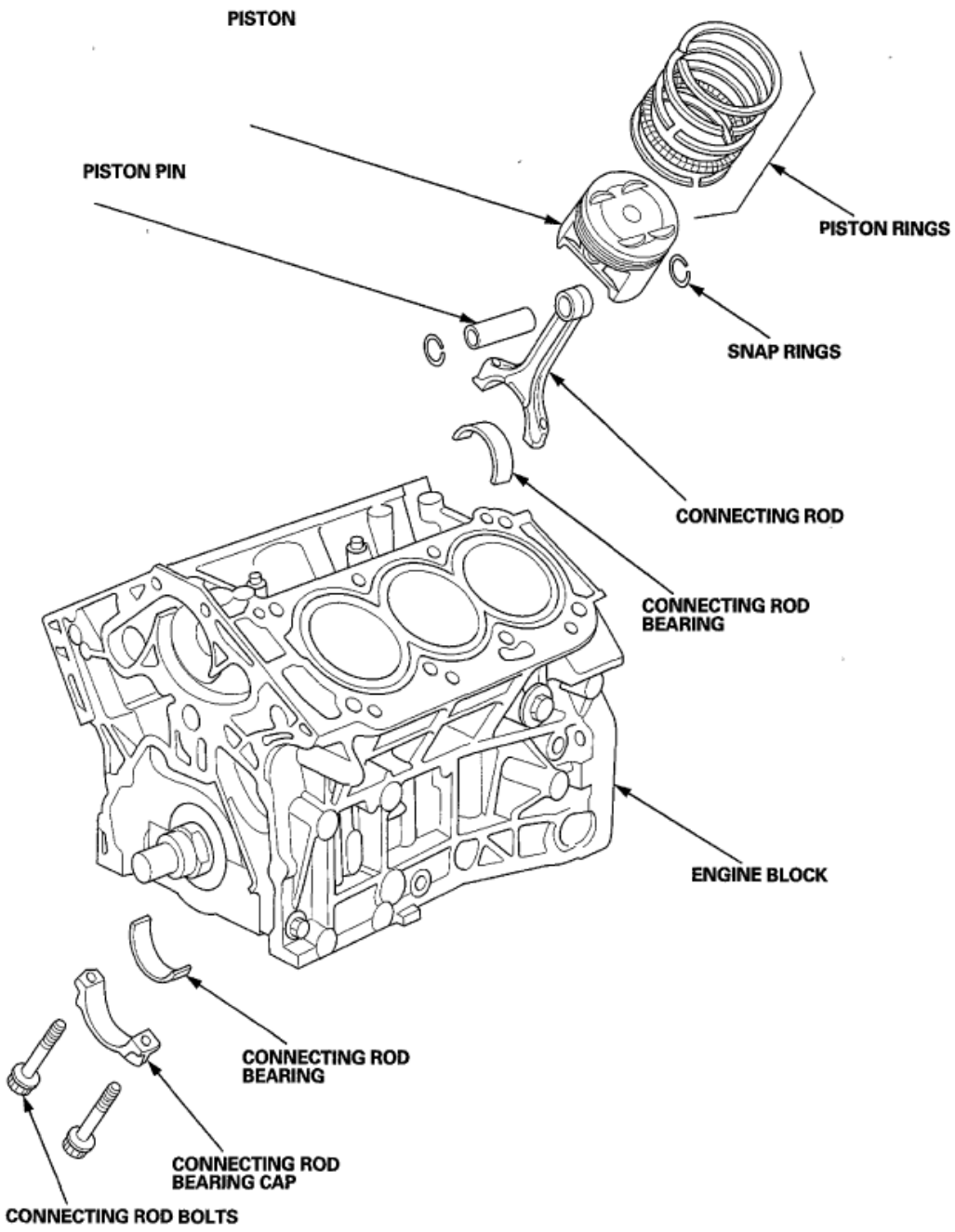


Fig. 4: Identifying Engine Block Assembly Replacement Components (3 Of 3)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

CONNECTING ROD AND CRANKSHAFT END PLAY INSPECTION

1. Remove the oil pump (see **REMOVAL**).
2. Remove the baffle plate (see step 9).
3. Measure the connecting rod end play with a feeler gauge (A) between the connecting rod (B) and the crankshaft (C).

Connecting Rod End Play

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

Service Limit: 0.45 mm (0.017 in)

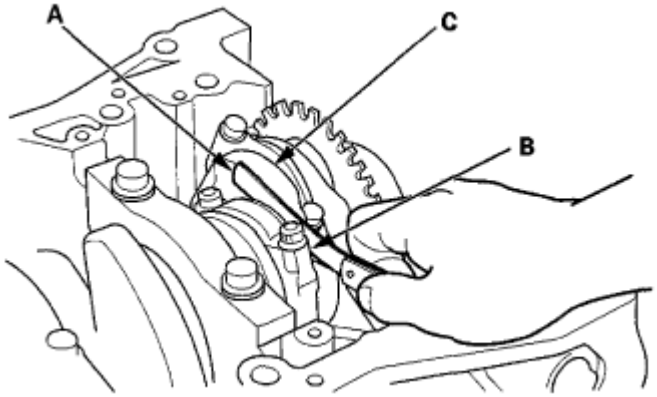


Fig. 5: Measuring Connecting Rod End Play Between Connecting Rod And Crankshaft Using Feeler Gauge
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

Crankshaft End Play

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

Service Limit: 0.45 mm (0.0177 in)

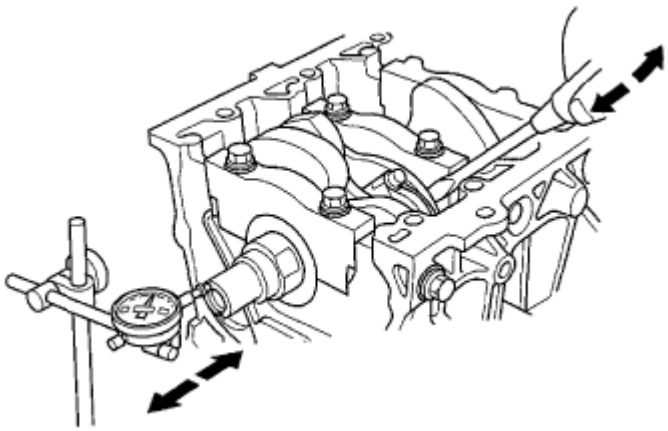


Fig. 6: Pushing Crankshaft Firmly Away From Dial Indicator By Prying
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. If the crankshaft end play is beyond the service limit, replace the thrust washers and recheck. If it is still beyond the service limit, replace the crankshaft (see **CRANKSHAFT AND PISTON REMOVAL**).

CRANKSHAFT MAIN BEARING REPLACEMENT

MAIN BEARING CLEARANCE INSPECTION

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

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 main bearings and the main bearing caps, then torque the bearing cap bolts to 74 N.m (7.5 kgf.m, 55 lbf.ft), and the bearing cap side bolts to 49 N.m(5.0 kgf.m, 36 lbf.ft) in the proper sequence (see step 22).

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

5. Remove the main bearing caps and the bearing halves, and measure the widest part of the plastigage.

Main Bearing-to-Journal Oil Clearance

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

Service Limit: 0.050 mm (0.00197 in)

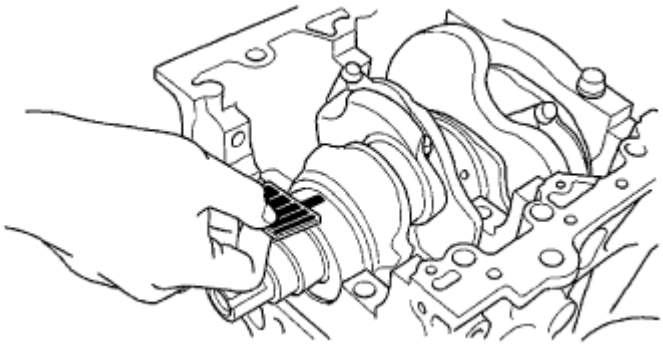


Fig. 7: Measuring Main Bearing-To-Journal Oil Clearance
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. If the plastigage measures too wide or too narrow, remove the crankshaft, and remove the upper half of the bearing. Install a new, complete bearing with the same color code, and recheck the clearance. Do not file, shim, or scrape the bearings or the caps to adjust clearance.
7. If the plastigage shows the clearance is still incorrect, try the next larger or smaller bearing (the color listed above or below that one), and check the clearance again. If the proper clearance cannot be obtained by using the appropriate larger or smaller bearings, replace the crankshaft and start over (see **CRANKSHAFT AND PISTON REMOVAL**).

MAIN BEARING SELECTION

Block Bore Code Locations

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

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

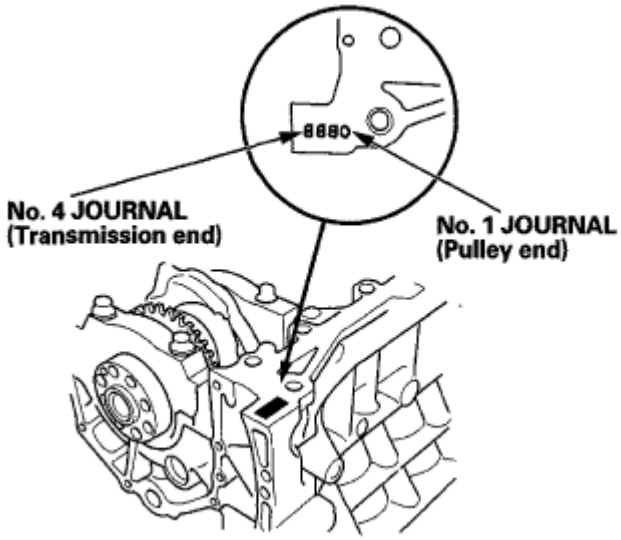


Fig. 8: Identifying Block Bore Code
Courtesy of AMERICAN HONDA MOTOR CO., INC.

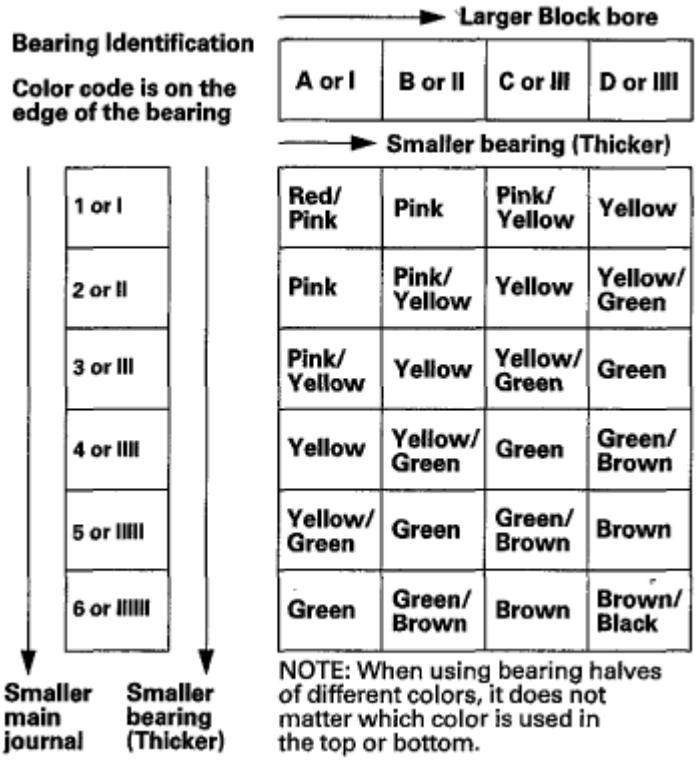


Fig. 9: Bearing Identification Chart
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Main Journal Code Locations (Numbers or Bars)

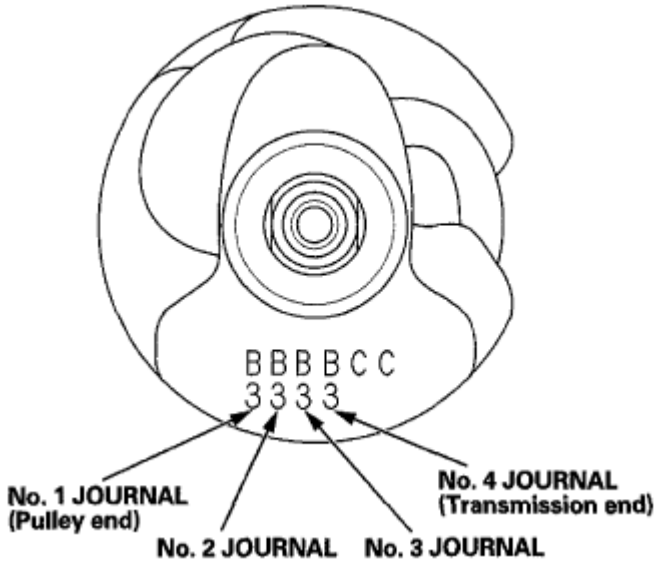


Fig. 10: Identifying Main Journal Code
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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 connecting rod journal and the bearing half with a clean shop towel.
3. Place one strip of plastigage across the connecting rod journal.
4. Reinstall the bearing half and the connecting rod cap, then torque the connecting rod bolt to 20 N.m (2.0 kgf.m, 15 lbf.ft) + 90°.

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

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

Connecting Rod Bearing-to-Journal Oil

Clearance

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

Service Limit: 0.050 mm (0.00197 in)

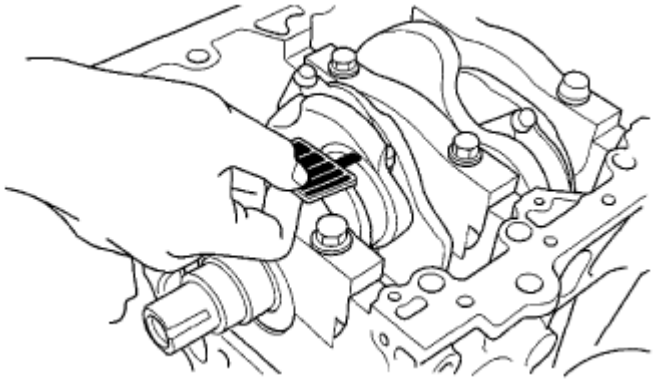


Fig. 11: Measuring Connecting Rod Bearing-To-Journal Oil Clearance
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. If the plastigage measures too wide or too narrow, remove the upper half of the bearing. Install a new, complete bearing with the same color code, and recheck the clearance. Do not file, shim, or scrape the bearings or the caps to adjust clearance.
7. If the plastigage shows the clearance is still incorrect, try the next larger or smaller bearing (the color listed above or below that one), and check the clearance again. If the proper clearance cannot be obtained by using the appropriate larger or smaller bearings, replace the crankshaft and start over (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 (0.00095 in), in 0.006 mm (0.00024 in) increments) depending on the size of its big end bore.

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

Big End Bore Size: 58.0 mm (2.283 in)

Inspect the connecting rod for cracks and heat damage.

Big End Bore Code Locations

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

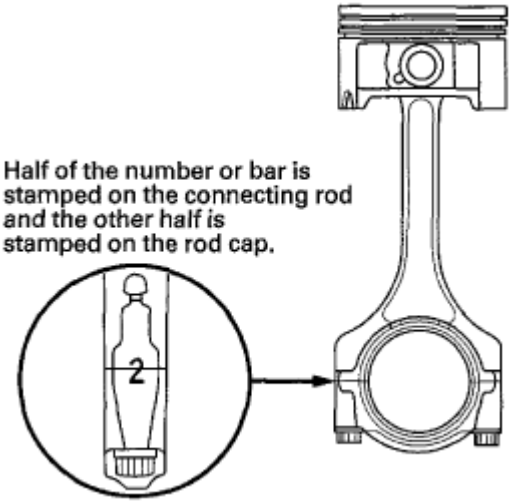


Fig. 12: Identifying Big End Bore Code
Courtesy of AMERICAN HONDA MOTOR CO., INC.

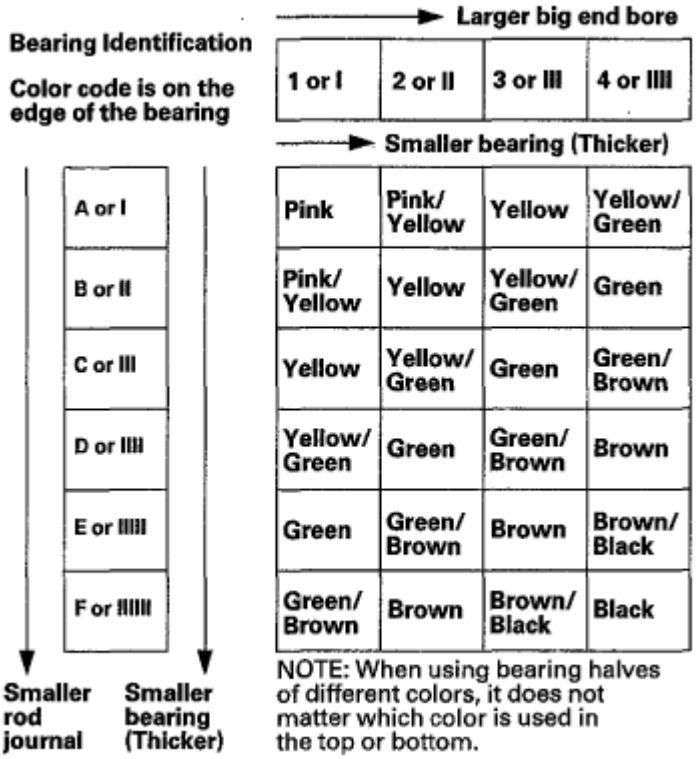


Fig. 13: Bearing Identification Reference Chart
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Connecting Rod Journal Code Locations (Letters or Bars)

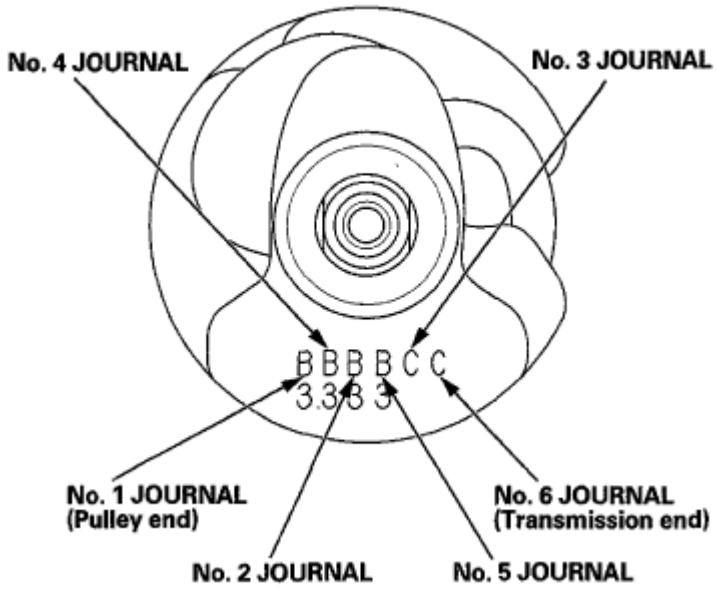


Fig. 14: Connecting Rod Journal Code
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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 inner fender (see **FRONT INNER FENDER REPLACEMENT**).
5. Remove exhaust pipe A (see step 31 in **ENGINE REMOVAL**).
6. Remove the rear warm up TWC bracket.

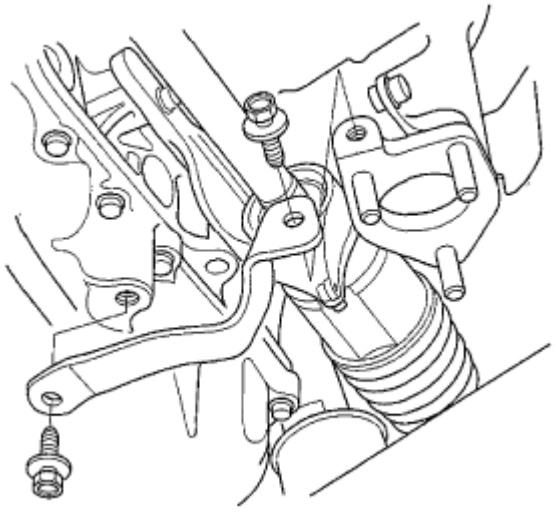


Fig. 15: Identifying Rear Warm Up TWC Bracket And Exhaust Pipe

Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

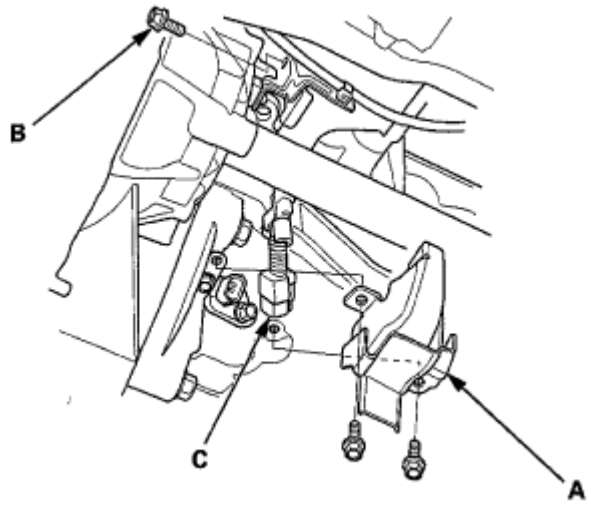


Fig. 16: Identifying CKP Sensor Connector, CKP Sensor Cover And Mounting Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

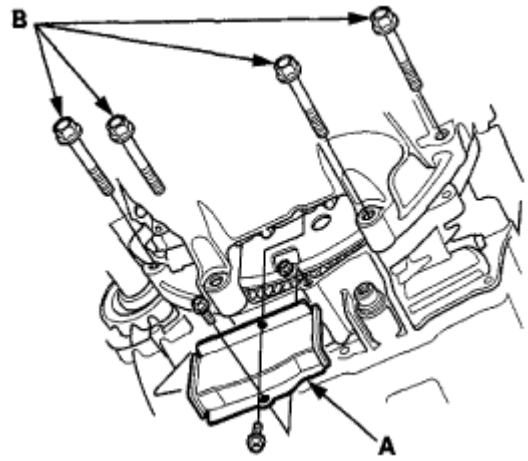


Fig. 17: Identifying Torque Converter Case Cover With Mounting Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.

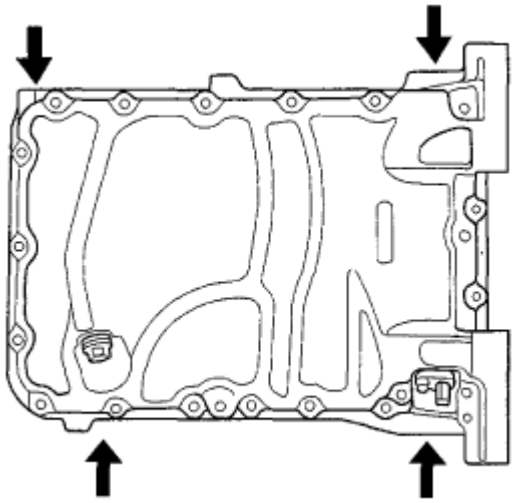


Fig. 18: Identifying Oil Pan Separating Position
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Remove the oil pan.

CRANKSHAFT AND PISTON REMOVAL

1. Remove the engine/transmission (see **ENGINE REMOVAL**).
2. Remove the transmission:
   - 5-speed A/T model (see **TRANSMISSION REMOVAL**).
   - 6-speed A/T model (see **TRANSMISSION REMOVAL**).
3. Remove the drive plate:
   - 5-speed A/T model (see **DRIVE PLATE REMOVAL AND INSTALLATION**).
   - 6-speed A/T model (see **DRIVE PLATE REMOVAL AND INSTALLATION**).
4. Remove the cylinder heads (see **CYLINDER HEAD REMOVAL**).
5. Remove the timing belt drive pulley from the crankshaft (see **TIMING BELT DRIVE PULLEY REPLACEMENT**).
6. Remove the oil pan (see **OIL PAN REMOVAL**).
7. Remove the engine block end cover.

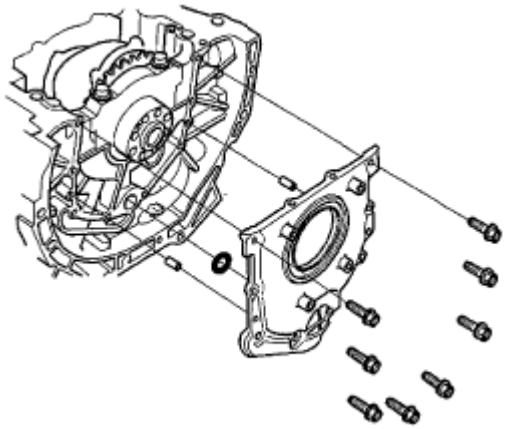


Fig. 19: Identifying Engine Block End Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Remove the oil filter base/oil filter assembly.

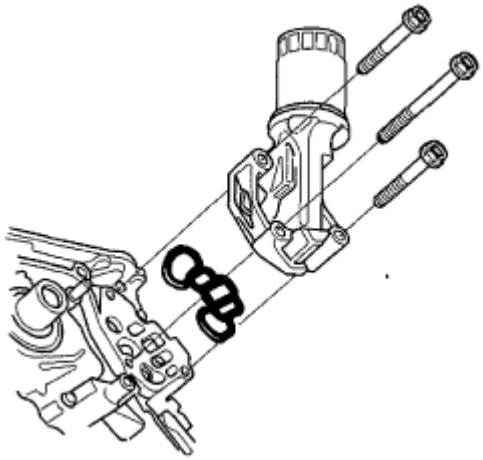


Fig. 20: Identifying Oil Filter Base/Oil Filter Assembly
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

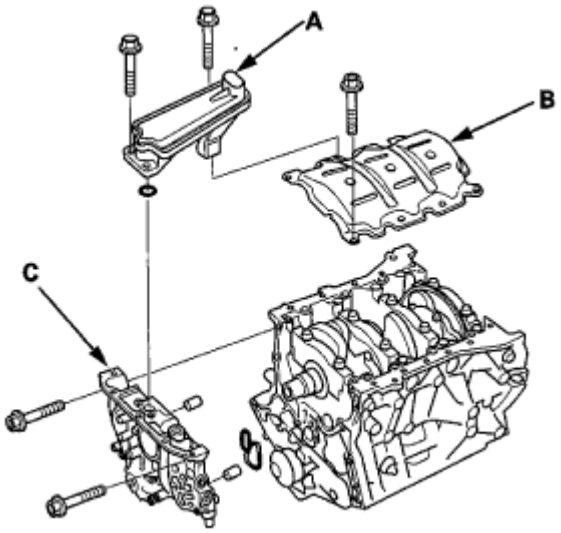


Fig. 21: Identifying Oil Strainer, Baffle Plate And Oil Pump
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. 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.

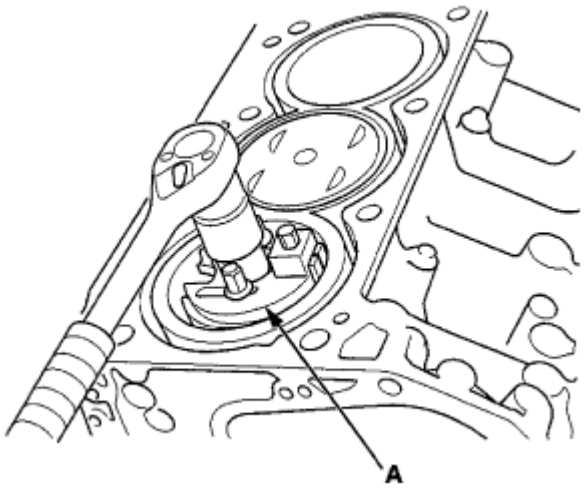


Fig. 22: Removing Cylinder Using Ridge Reamer
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

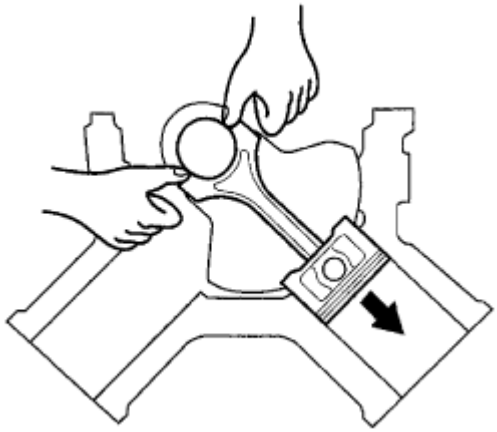


Fig. 23: Identifying Correct Way Of Piston/Connecting Rod Removal
Courtesy of AMERICAN HONDA MOTOR CO., INC.

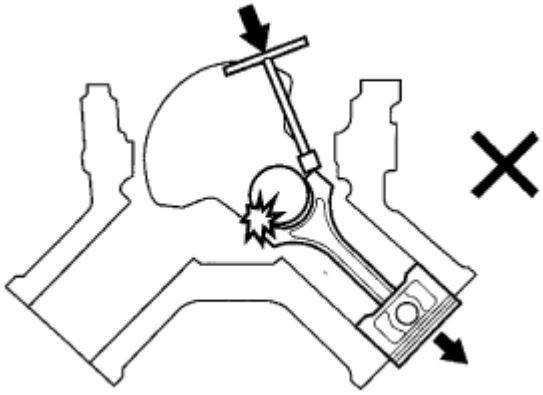


Fig. 24: Identifying Incorrect Way Of Piston/Connecting Rod Removal
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

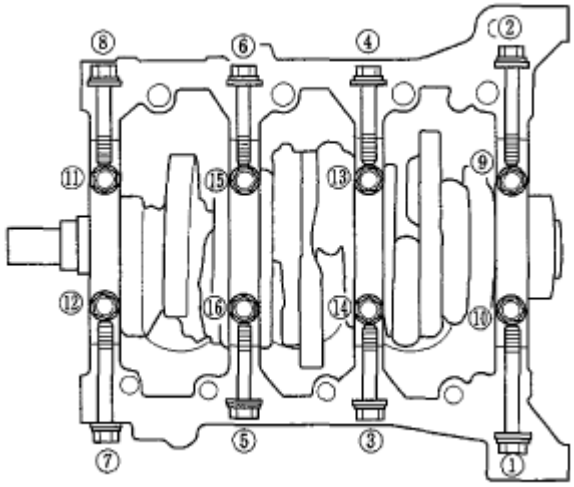


Fig. 25: Identifying Bearing Cap Bolts And Bearing Cap Side Bolts Removal Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

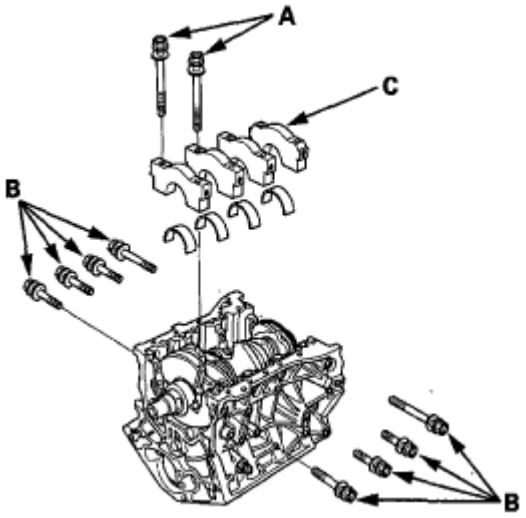


Fig. 26: Identifying Bearing Cap Bolts, Bearing Cap Side Bolts And Main Bearing Caps
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

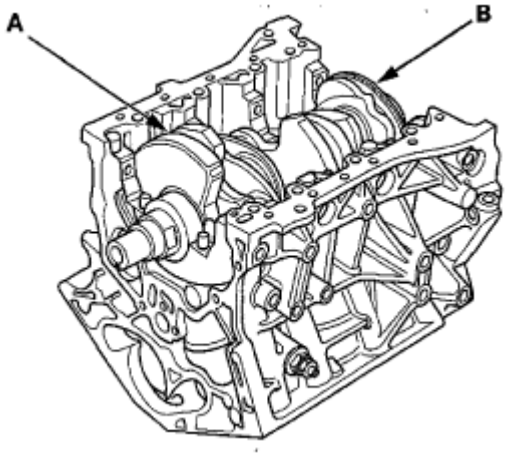


Fig. 27: Identifying Crankshaft And CKP Pulse Plate
Courtesy of AMERICAN HONDA MOTOR CO., INC.

19. Remove the CKP pulse plate from the crankshaft (see **CKP PULSE PLATE REPLACEMENT**).
20. Reinstall the main bearing caps and 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 (0.00020 in) max.

   Service Limit: 0.010 mm (0.00039 in)

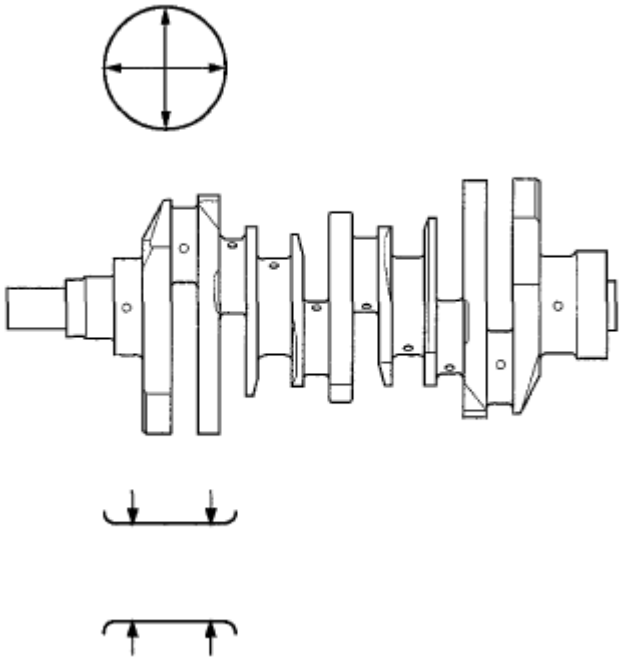


Fig. 28: Identifying Journal Dimension
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

   Journal Taper

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

   Service Limit: 0.010 mm (0.00039 in)

   Straightness

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

   Crankshaft Total Runout

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

   Service Limit: 0.030 mm (0.00118 in)

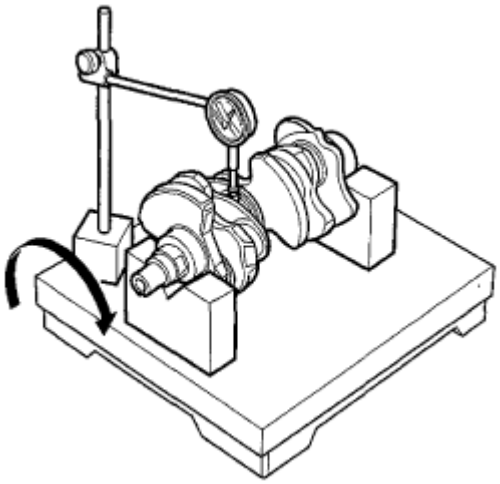


Fig. 29: Check Main Journal Runout With Crankshaft Supported On V-Blocks
Courtesy of AMERICAN HONDA MOTOR CO., INC.

BLOCK AND PISTON INSPECTION

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

Piston Skirt Diameter

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

Service Limit: 88.965 mm (3.50255 in)

Oversize Piston Skirt Diameter

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

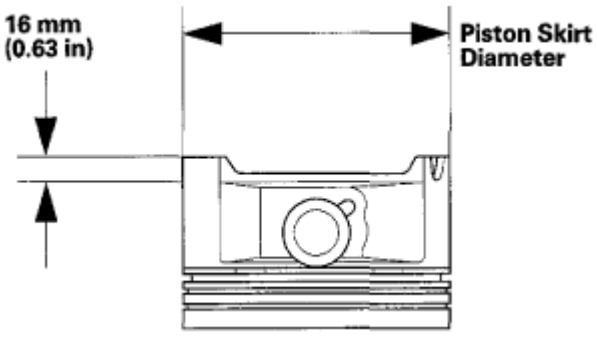


Fig. 30: Identifying Piston Skirt Diameter At Point 16 mm (0.63 in) From Bottom Of Skirt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

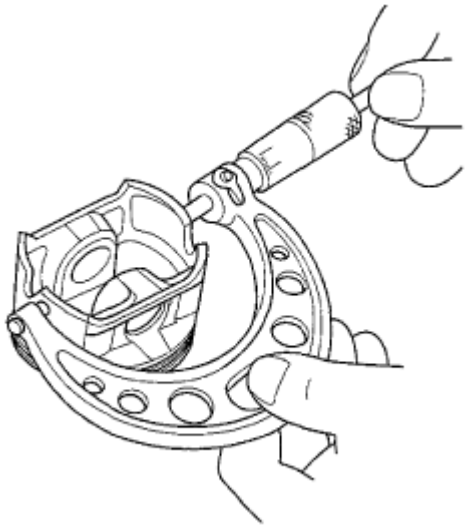


Fig. 31: Measuring Piston Skirt Diameter At Point 16 mm (0.63 in) From Bottom Of Skirt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

   Cylinder Bore Size

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

   Service Limit: 89.065 mm (3.50649 in)

   Oversize

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

   Reboring Limit: 0.25 mm (0.0098 in)

   Bore Taper

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

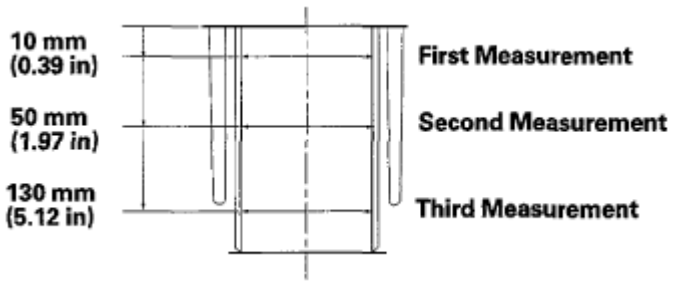


Fig. 32: Identifying Bore Taper Measurement
Courtesy of AMERICAN HONDA MOTOR CO., INC.

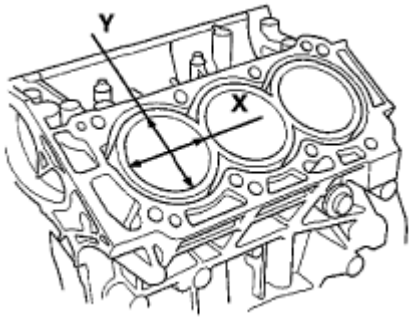


Fig. 33: Identifying Cylinder Wear And Taper Measuring Direction
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

Engine Block Warpage

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

Service Limit: 0.10 mm (0.003 in)

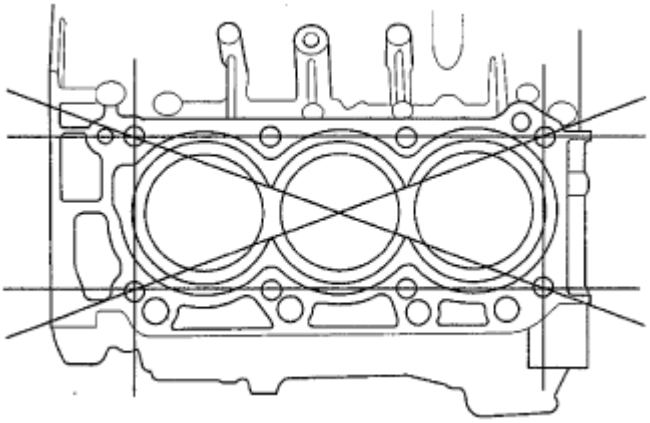


Fig. 34: Identifying Engine Block Warpage Measuring Positions
Courtesy of AMERICAN HONDA MOTOR CO., INC.

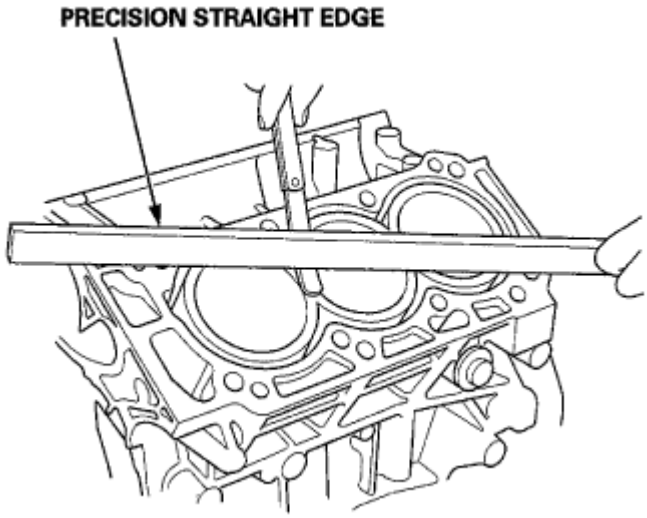


Fig. 35: Checking Top Of Engine Block For Warpage
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

   Piston-to-Cylinder Bore Clearance

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

   Service Limit: 0.08 mm (0.003 in)

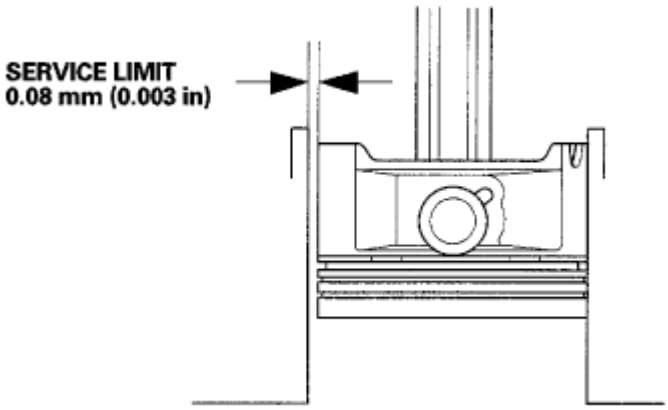


Fig. 36: Identifying Difference Between Cylinder Bore Diameter And Piston Diameter
Courtesy of AMERICAN HONDA MOTOR CO., INC.

CYLINDER BORE HONING

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.**

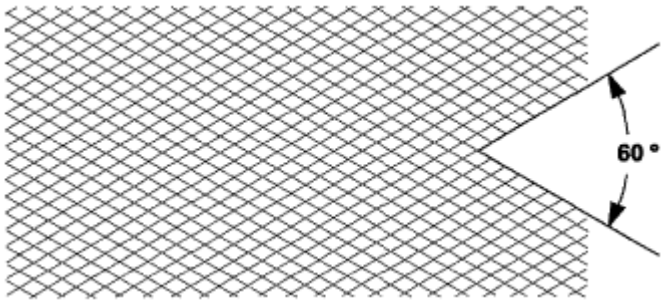


Fig. 37: Identifying Cylinder Bore Honing Angle
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.

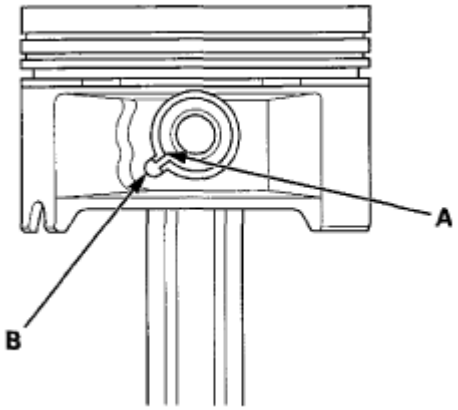


Fig. 38: Identifying Piston Pin Snap Rings And Piston Pin Bores
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

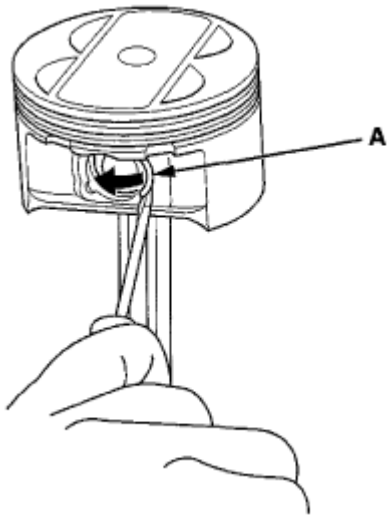


Fig. 39: Removing Snap Rings
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

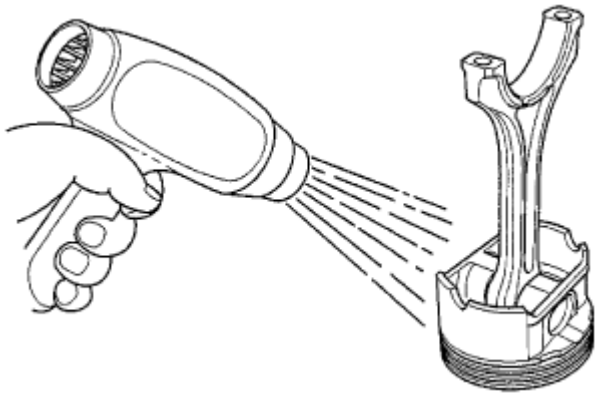


Fig. 40: Heating Piston And Connecting Rod Assembly
Courtesy of AMERICAN HONDA MOTOR CO., INC.

INSPECTION

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

1. Measure the diameter of the piston pin.

   Piston Pin Diameter

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

   Service Limit: 21.954 mm (0.86433 in)

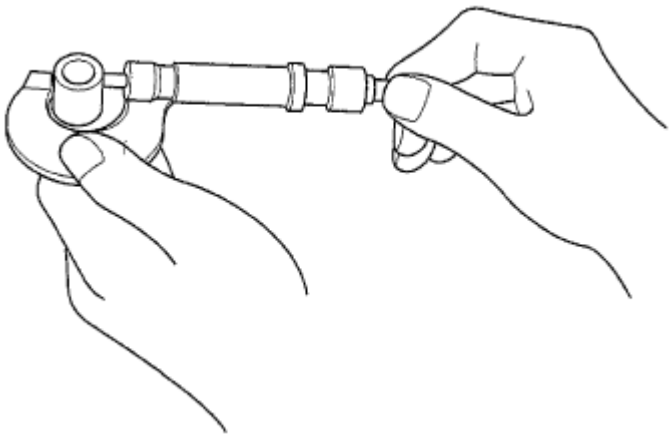


Fig. 41: Measuring Diameter Of Piston Pin
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

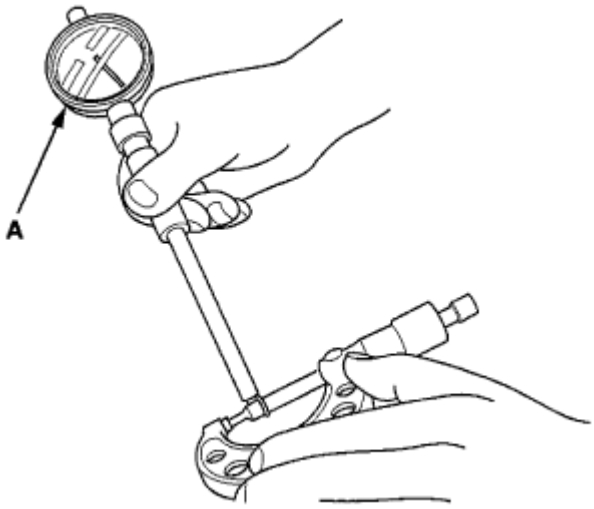


Fig. 42: Making Gauge Reading To Zero On Piston Pin Diameter
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

   Piston Pin-to-Piston Clearance

   Standard (New): -0.0050-0.0010 mm (-0.000197-0.000039 in)

   Service Limit: 0.004 mm (0.00016 in)

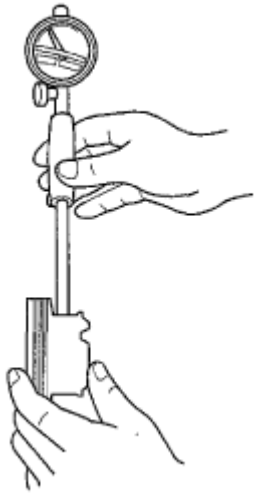


Fig. 43: Checking Difference Between Piston Pin Diameter And Piston Pin Hole Diameter On Piston
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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)

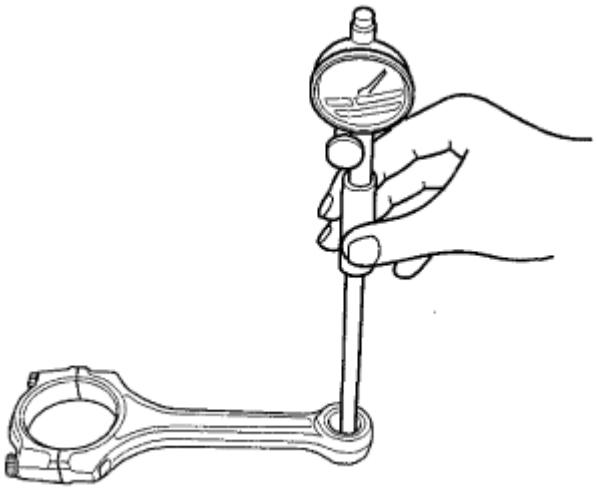


Fig. 44: Measuring Piston Pin-To-Connecting Rod Clearance
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REASSEMBLY

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

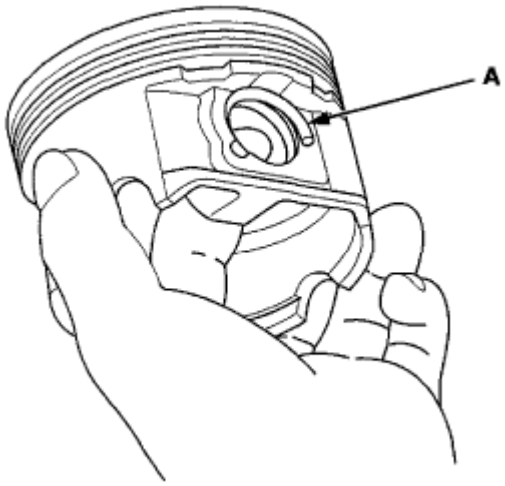


Fig. 45: Installing Piston Pin Snap Ring
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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).

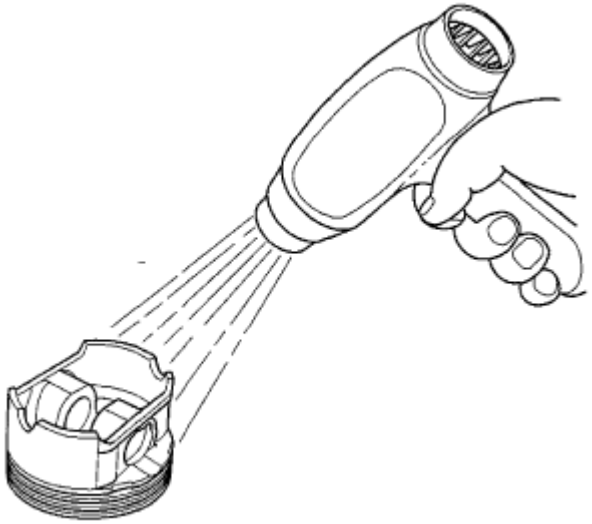


Fig. 46: Heating Piston To About 158°
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.

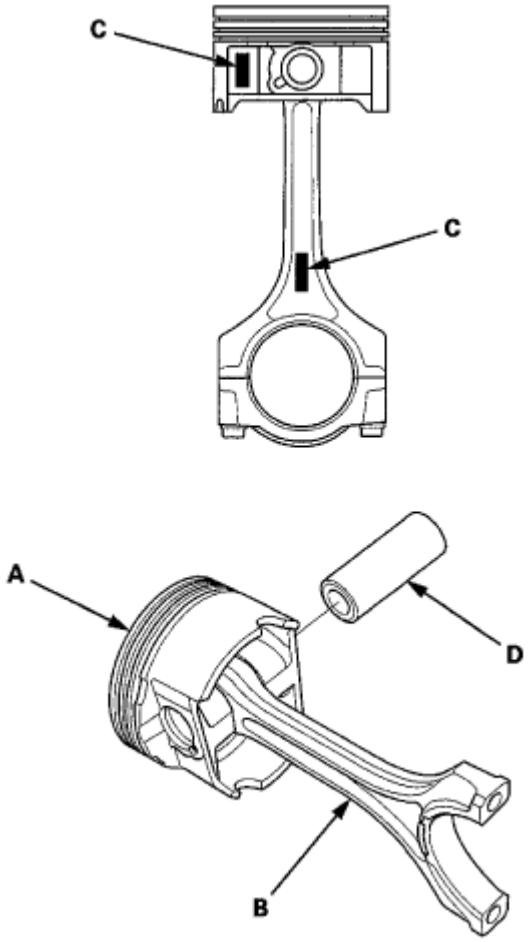


Fig. 47: Identifying Embossed Marks On Piston And Connecting Rod
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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).

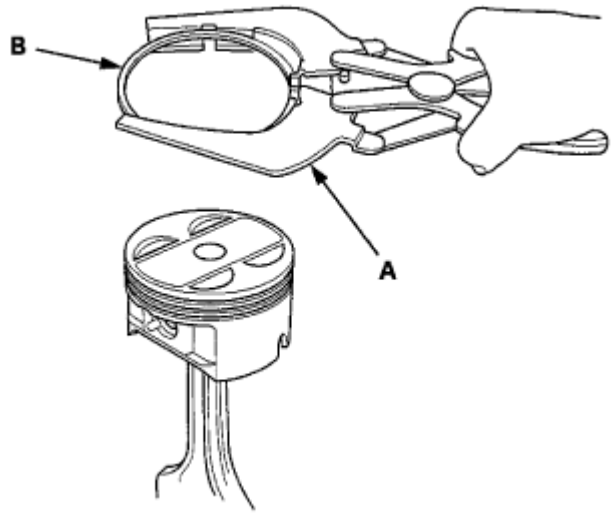


Fig. 48: Removing Piston Rings Using Ring Expander
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

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

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

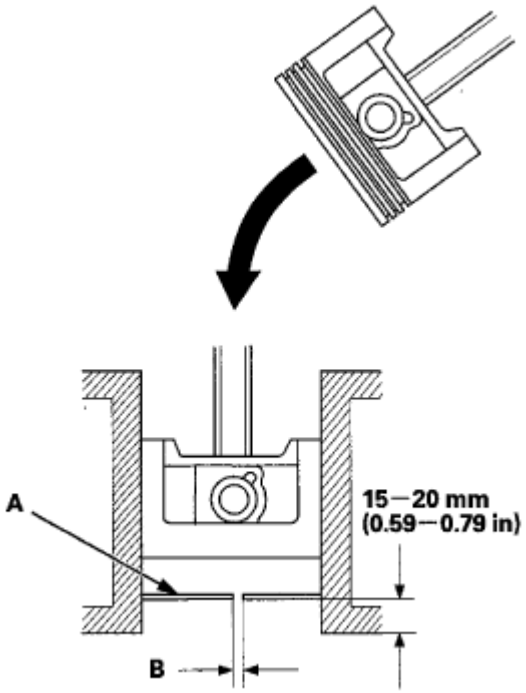


Fig. 49: Pushing Ring Into Cylinder Bore Using Piston
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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). If the bore is over the service limit, the engine block must be rebored.

Piston Ring End-Gap

Top Ring:

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

Service Limit: 0.60 mm (0.023 in)

Second Ring:

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

Service Limit: 0.70 mm (0.027 in)

Oil Ring:

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

Service Limit: 0.80 mm (0.031 in)

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

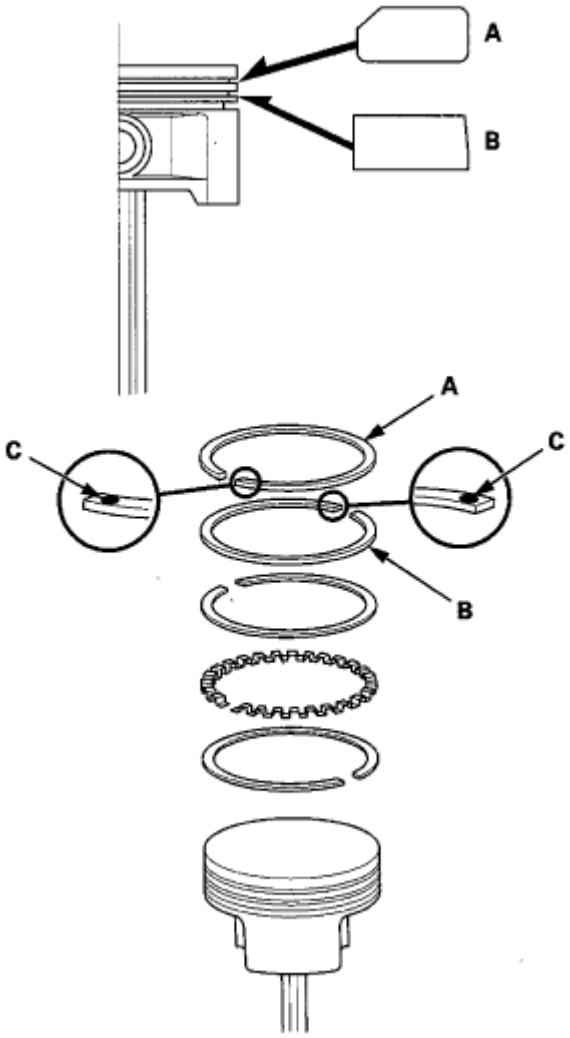
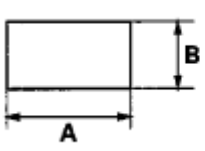


Fig. 50: Identifying Piston Rings
Courtesy of AMERICAN HONDA MOTOR CO., INC.



Top Ring (Standard)
A: 3.1 mm (0.122 in)
B: 1.2 mm (0.047 in)

Second Ring (Standard)
A: 3.6 mm (0.142 in)
B: 1.2 mm (0.047 in)

Fig. 51: Identifying Piston Rings With Manufacturing Marks
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Piston Ring Dimensions:

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

Top Ring Clearance

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

Service Limit: 0.15 mm (0.005 in)

Second Ring Clearance

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

Service Limit: 0.13 mm (0.005 in)

Fig. 52: Measuring Ring-To-Groove Clearance
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

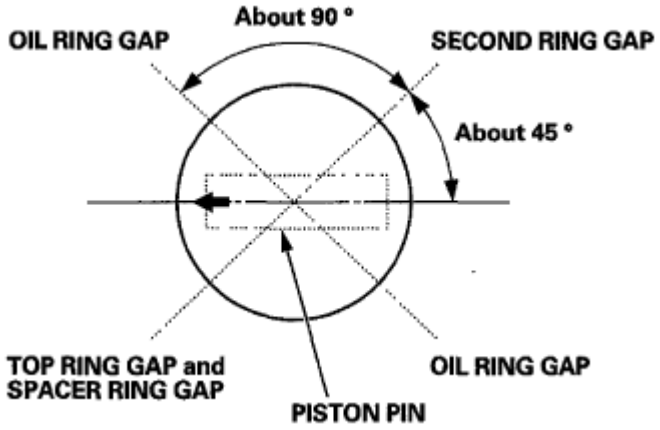


Fig. 53: Identifying Ring End Gap Position
Courtesy of AMERICAN HONDA MOTOR CO., INC.

CRANKSHAFT AND PISTON INSTALLATION

Special Tools Required

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

1. Check the main bearing clearance with plastigage (see **MAIN BEARING CLEARANCE INSPECTION**).
2. Check the connecting rod bearing clearance with plastigage (see **CONNECTING ROD BEARING CLEARANCE INSPECTION**).
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 connecting 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 (B).

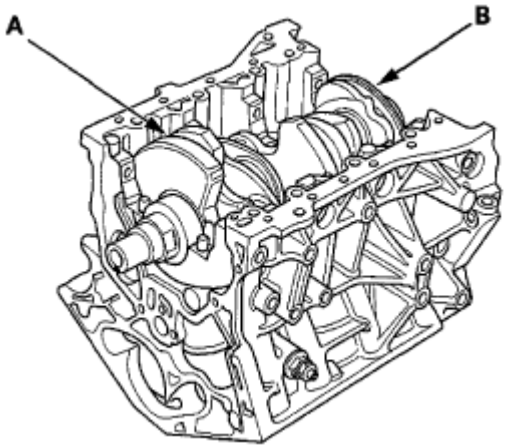


Fig. 54: Identifying Crankshaft And CKP Pulse Plate
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

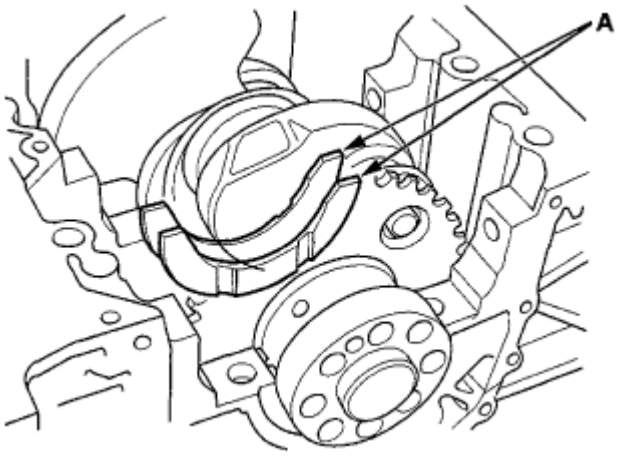


Fig. 55: Identifying Thrust Washer
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

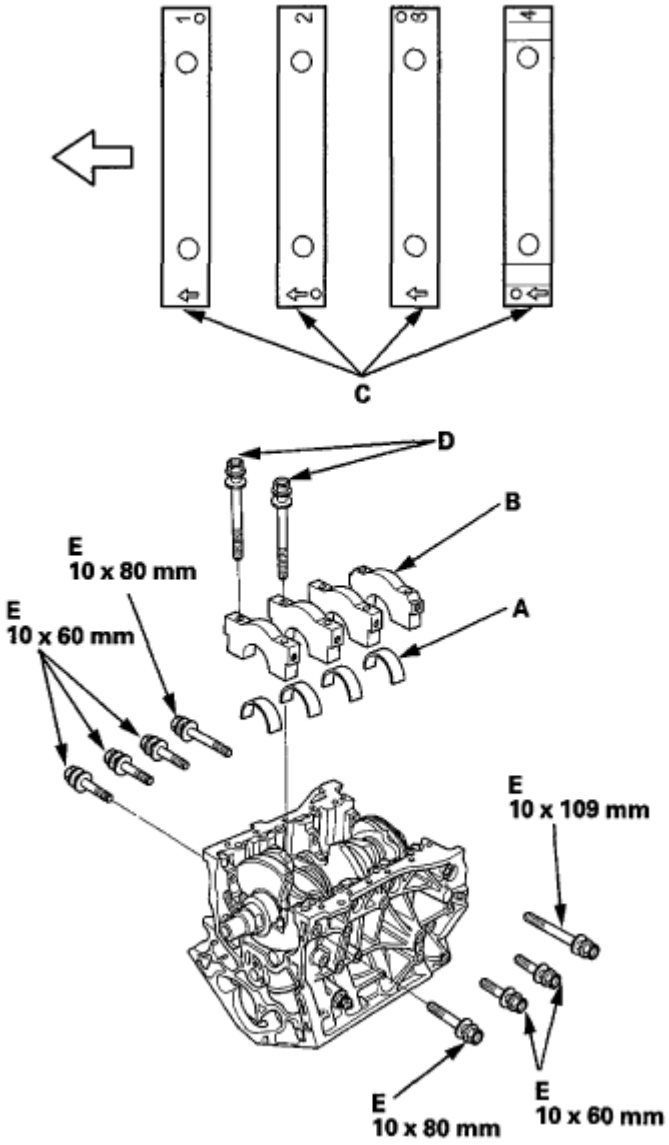


Fig. 56: Position Of Installing Main Bearings And Main Bearing Caps With Arrow Facing Timing Belt Side Of Engine Block
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.

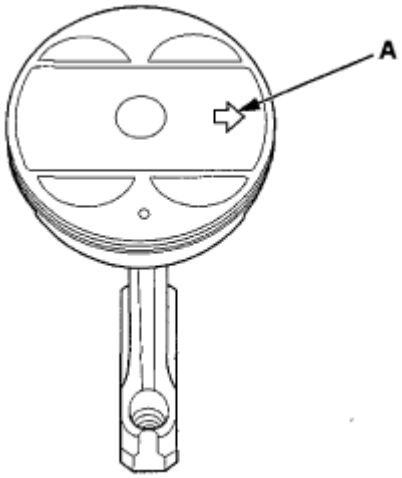


Fig. 57: Positioning Piston/Connecting Rod Assembly With Arrow Facing Timing Belt Side Of Engine Block
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.

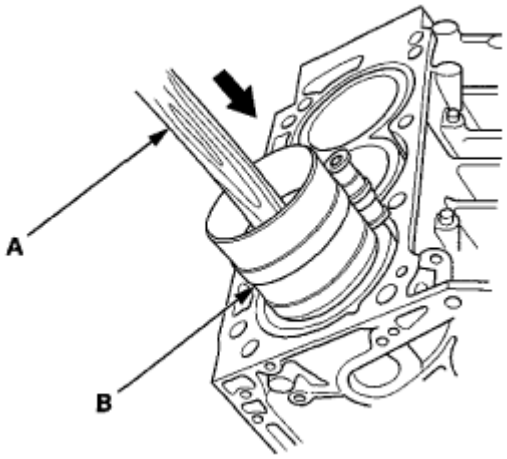


Fig. 58: Positioning Piston/Connecting Rod Assembly In Cylinder Using Wooden Handle Of Hammer
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

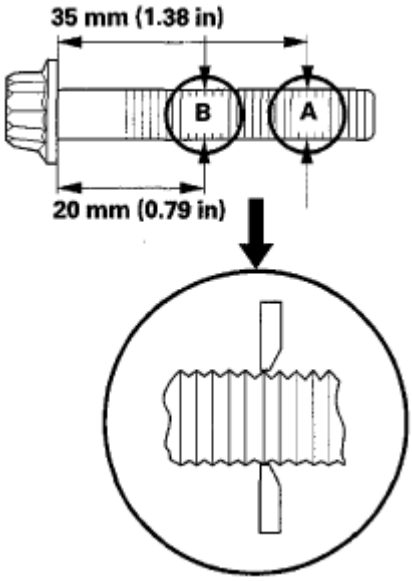


Fig. 59: Measuring Diameter Of Connecting Rod Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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 connecting rod bearing (A), then line up the mark (B) on the connecting rod (C) and the rod cap (D).

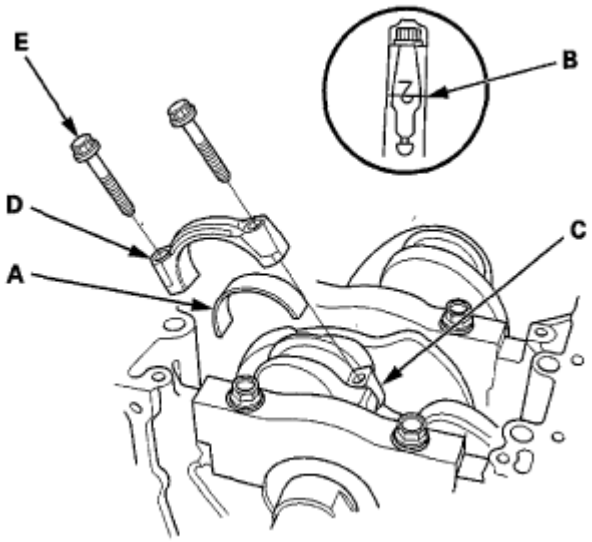


Fig. 60: Identifying Connecting Rod Bearing, Mark On Connecting Rod And Rod Cap
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

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

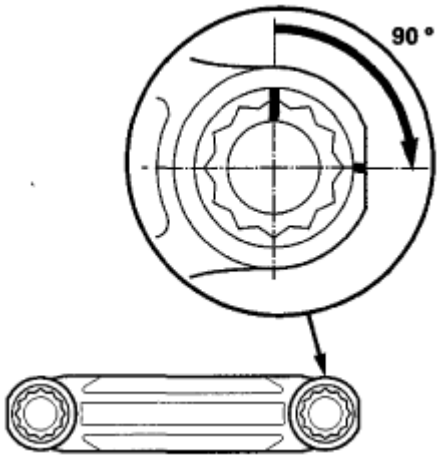


Fig. 61: Tightening Connecting Rod Bolt 90 °
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

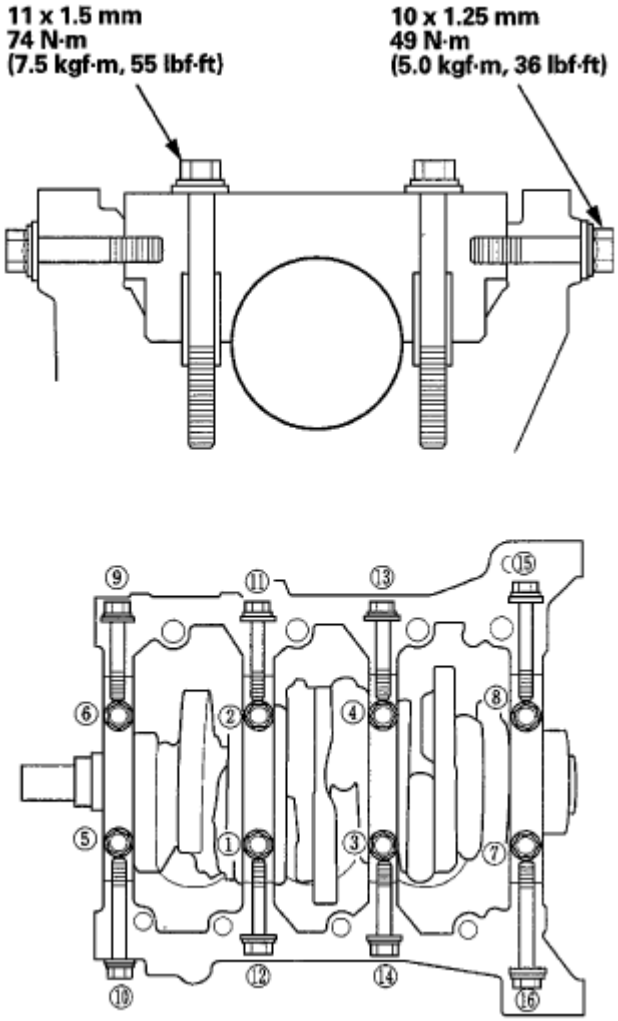


Fig. 62: Identifying Main Bearing Cap Bolts With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

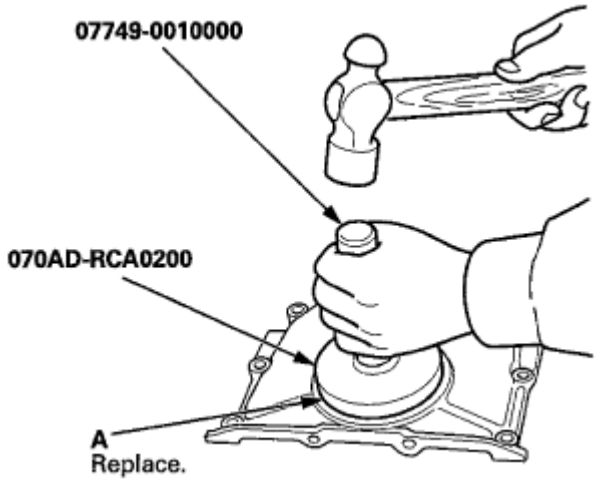


Fig. 63: Installing Crankshaft Oil Seal Using Hammer
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

NOTE:

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

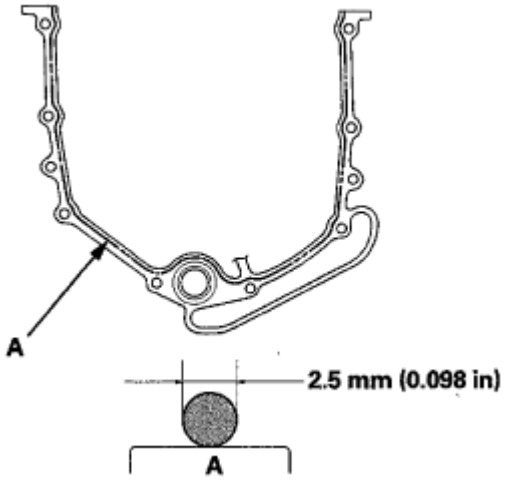


Fig. 64: Identifying Liquid Gasket Applying Area
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

NOTE:

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

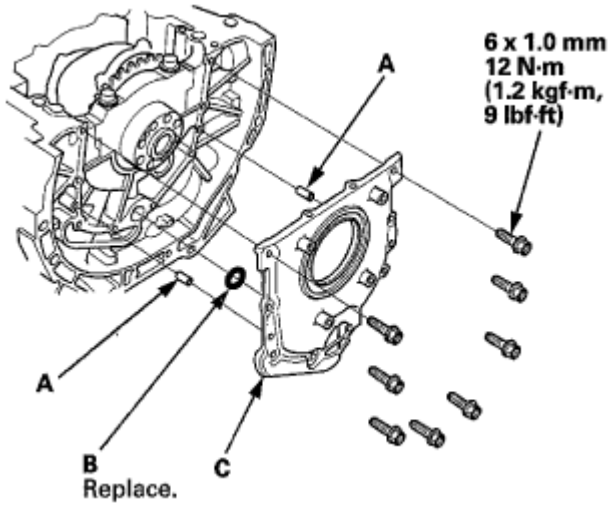


Fig. 65: Identifying Dowel Pins, O-ring And Engine Block End Cover With Mounting Bolts Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

29. Clean the excess oil off the crankshaft, and check that the oil seal lip is not distorted.
30. Install a new crankshaft oil seal in the oil pump (see step 3 in **INSTALLATION**).
31. Remove all of the old liquid gasket from the oil pump mating surfaces, the bolts, and the bolt holes.
32. Clean and dry the oil pump mating surfaces.
33. Apply liquid gasket (P/N 08717-0004, 08718-0003, 08718-0004, or 08718-0009) to the engine block mating surface of the oil pump and to the inside edge of the threaded bolt holes. Install the component within 5 minutes of applying the liquid gasket.

NOTE:

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

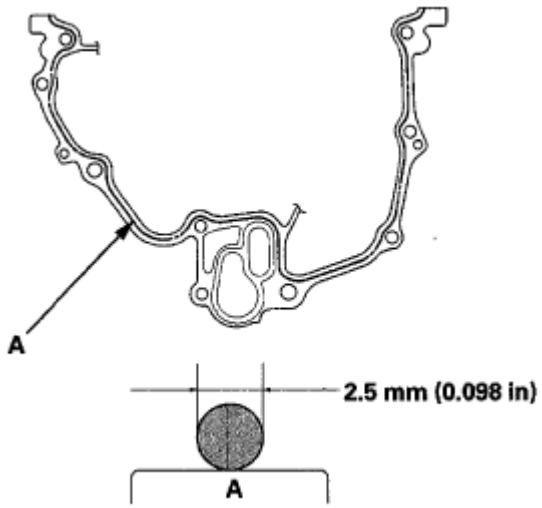


Fig. 66: Identifying Liquid Gasket Applying Area
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

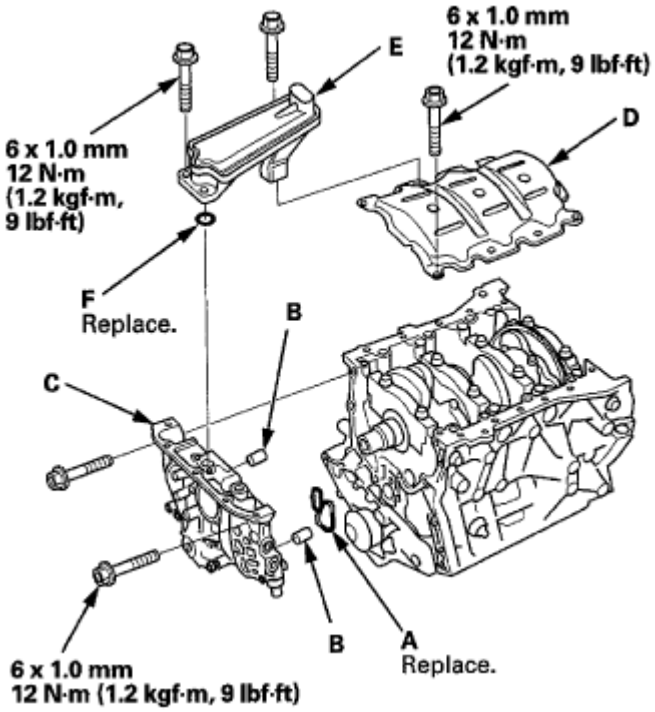


Fig. 67: Identifying Dowel Pins, O-ring And Oil Pump With Mounting Bolts Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

35. Install the dowel pins (B), then align the inner rotor with the crankshaft, and install the oil pump (C).

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 and the oil pump.**

36. Clean the excess oil off the crankshaft, and check that the oil seal lip is not distorted.
37. Install the baffle plate (D), then install the oil strainer (E) with a new O-ring (F).
38. Install the oil filter base/oil filter assembly (A) with a new O-ring (B).

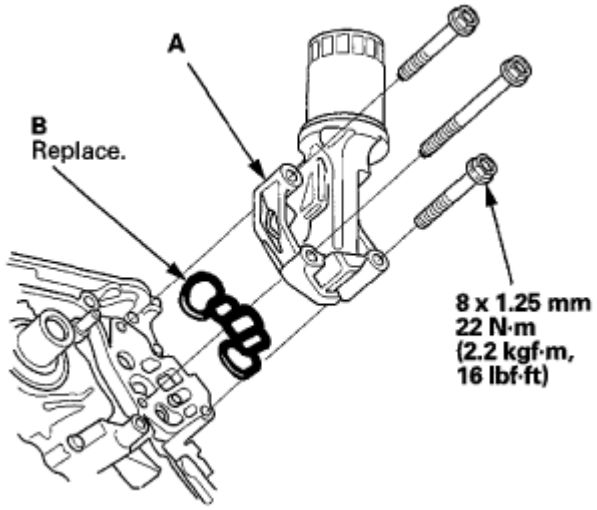


Fig. 68: Identifying Oil Filter Base/Oil Filter Assembly And O-Ring With Mounting Bolts Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

39. Install the oil pan (see **OIL PAN INSTALLATION**).
40. Install the timing belt drive pulley to the crankshaft (see **TIMING BELT DRIVE PULLEY REPLACEMENT**).
41. Install the cylinder heads (see **CYLINDER HEAD INSTALLATION**).
42. Install the drive plate:
    - 5-speed A/T model (see **DRIVE PLATE REMOVAL AND INSTALLATION**).
    - 6-speed A/T model (see **DRIVE PLATE REMOVAL AND INSTALLATION**).
43. Install the transmission:
    - 5-speed A/T model (see **TRANSMISSION INSTALLATION**).
    - 6-speed A/T model (see **TRANSMISSION INSTALLATION**).
44. Install the engine/transmission (see **ENGINE INSTALLATION**).

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

CKP PULSE PLATE REPLACEMENT

1. Remove the crankshaft from the engine block (see **CRANKSHAFT AND PISTON REMOVAL**).
2. Remove the CKP pulse plate (A).

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

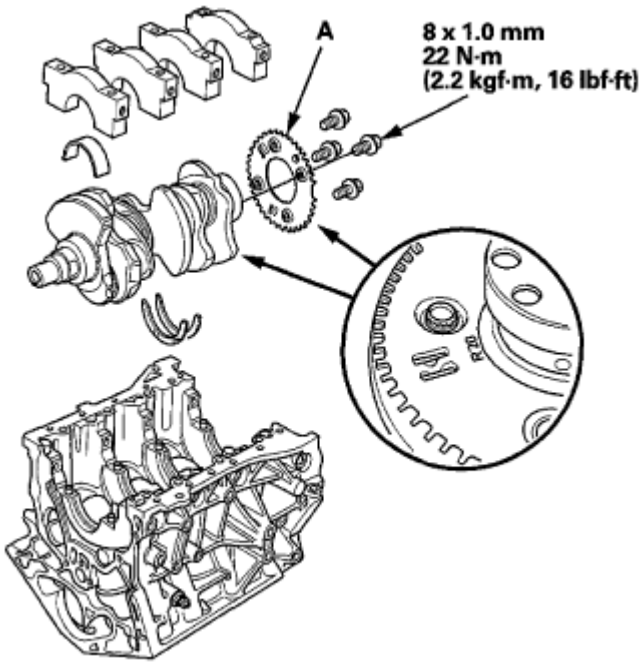


Fig. 69: Identifying CKP Pulse Plate With Mounting Bolts Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

NOTE: When installing the crankshaft, refer to the CRANKSHAFT AND PISTON INSTALLATION PROCEDURE .

OIL PAN INSTALLATION

1. Remove all of the old liquid gasket from the oil pan mating surfaces, the bolts, and the bolt holes.
2. Clean and dry the oil pan mating surfaces.
3. Apply liquid gasket (P/N 08717-0004, 08718-0003, 08718-0004, or 08718-0009) to the oil pan mating surface of the engine block and to the inside edge of the threaded bolt holes. Install the component within 5 minutes of applying the liquid gasket.

NOTE:

- **Apply a 2.5 mm (0.098 in) diameter bead of liquid gasket along the broken line (A).**
- **If you apply liquid gasket P/N 08718-0012, the component must be installed within 4 minutes.**

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

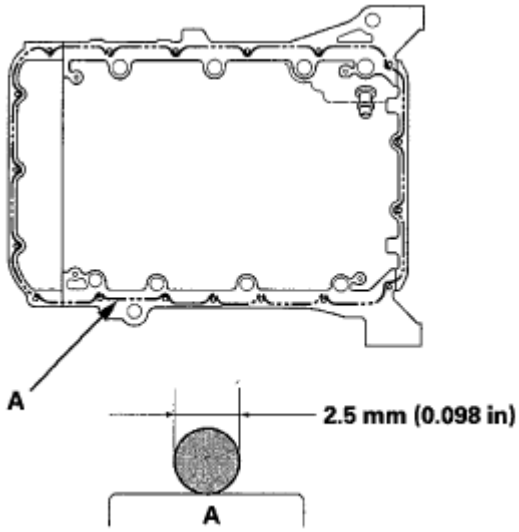


Fig. 70: Identifying Liquid Gasket Applying Area
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Install the oil pan on the engine block.
5. Tighten the bolts in three steps. In the final step, torque the bolts, in sequence, to 12 N.m (1.2 kgf.m, 9 lbf.ft).

NOTE:

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

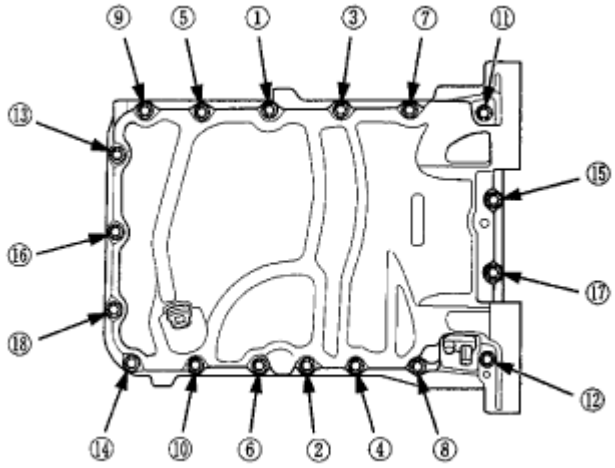


Fig. 71: Identifying Oil Pan Mounting Bolts Tightening Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

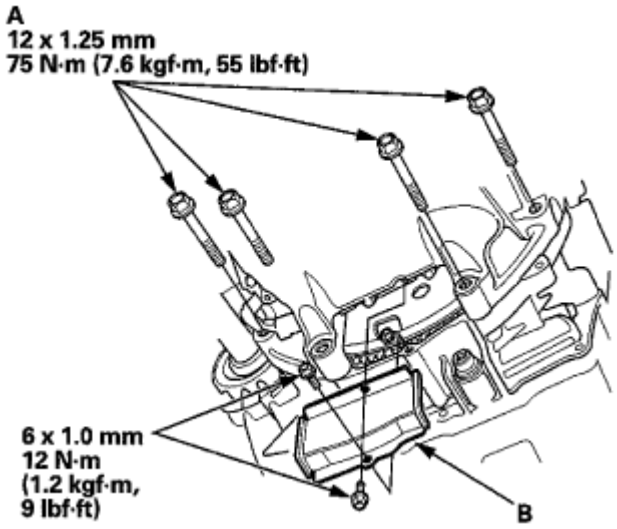


Fig. 72: Identifying Torque Converter Case Cover With Transmission Mounting Bolts Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

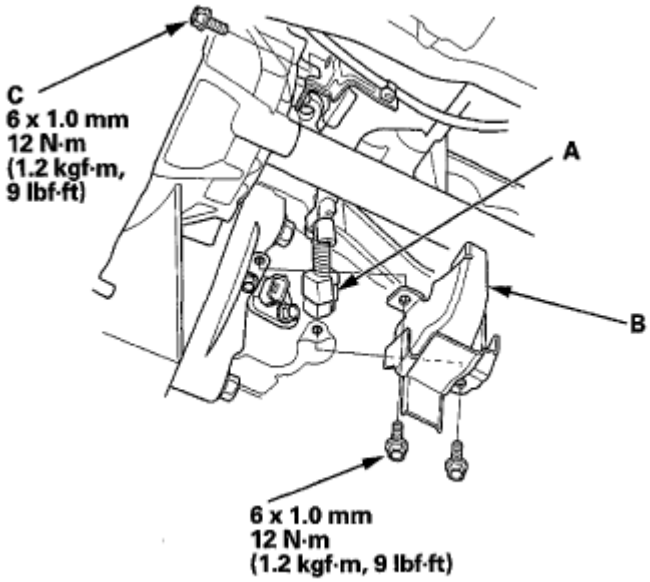


Fig. 73: Identifying CKP Sensor Connector, CKP Sensor Cover With Mounting Bolt Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Install the rear warm up TWC bracket.

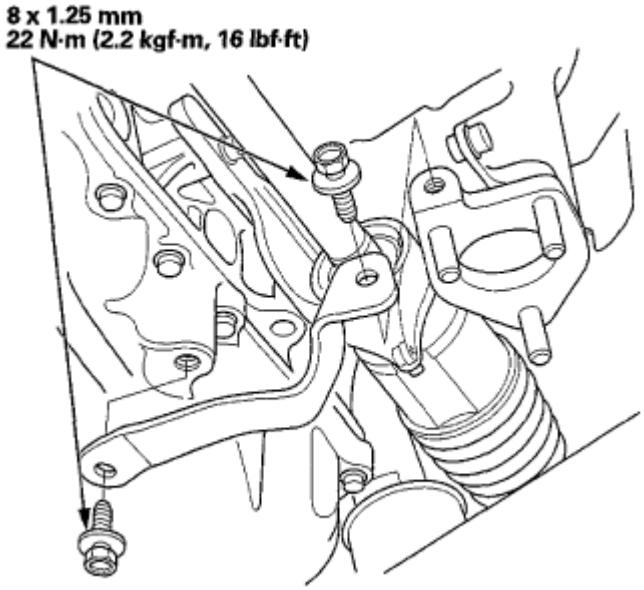


Fig. 74: Identifying Rear Warm Up TWC Bracket With Mounting Bolts Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. If the engine is still in the vehicle, do the following steps.
10. Install exhaust pipe A using new gaskets and new self-locking nuts (see step 30 in **ENGINE INSTALLATION**).
11. Install the splash shield (see **FRONT SPLASH SHIELD REPLACEMENT**).
12. Refill the engine with engine oil (see **ENGINE OIL REPLACEMENT**).

PULLEY END CRANKSHAFT OIL SEAL INSTALLATION - IN CAR

Special Tools Required

Oil Seal Driver, 64 mm 07OAD-RCAA100

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

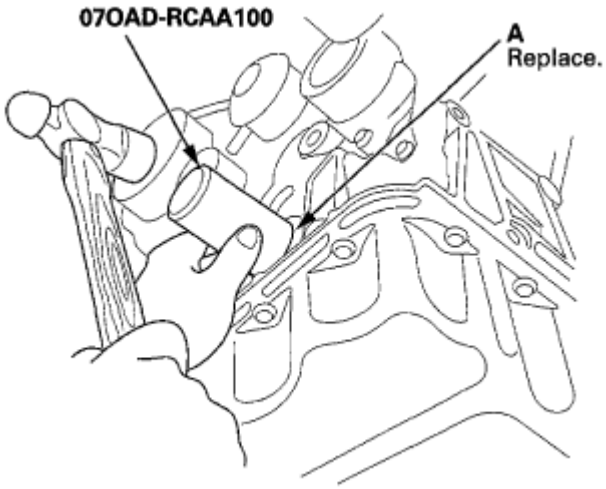


Fig. 75: Installing Pulley End Crankshaft Oil Seal Using Oil Seal Driver
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Clean the excess oil off the crankshaft, and check that the oil seal lip is not distorted.
7. Install the timing belt drive pulley (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. Remove the transmission:
   - 5-speed A/T model (see **TRANSMISSION REMOVAL**).
   - 6-speed A/T model (see **TRANSMISSION REMOVAL**).
2. Remove the drive plate:
   - 5-speed A/T model (see **DRIVE PLATE REMOVAL AND INSTALLATION**).
   - 6-speed A/T model (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 (A) until the oil seal driver attachment bottoms on the engine block end cover. Align the hole in the oil seal driver attachment with the pin on the crankshaft.

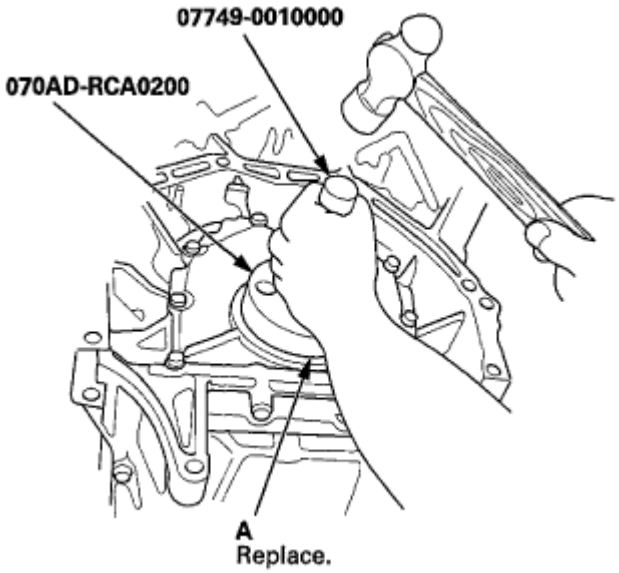


Fig. 76: Installing Transmission End Crankshaft Oil Seal Using Oil Seal Driver And Hammer
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

SEALING BOLT INSTALLATION

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

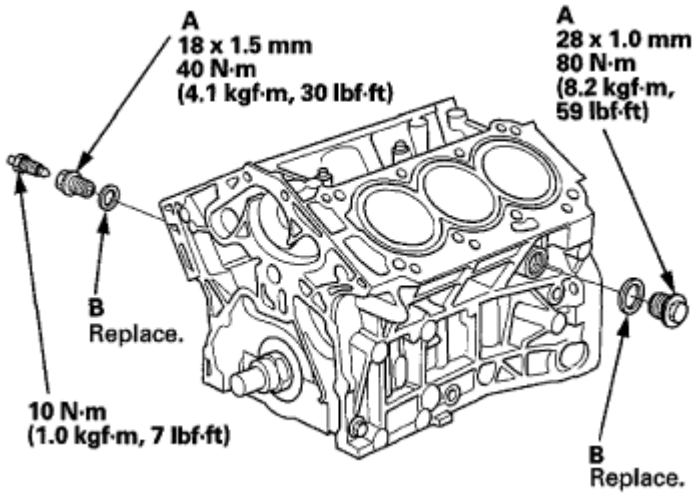


Fig. 77: Identifying Sealing Bolts And Washer With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

