2007-08 ENGINE

Engine Block - TL

SPECIAL TOOLS

Ref. No.	Tool Number	Description	Qty
①	070AD-RCAA100	Oil Seal Driver, 64 mm	1
②	070AD-RCAA200	Driver Attachment, 106 mm	1
③	07749-0010000	Driver	1

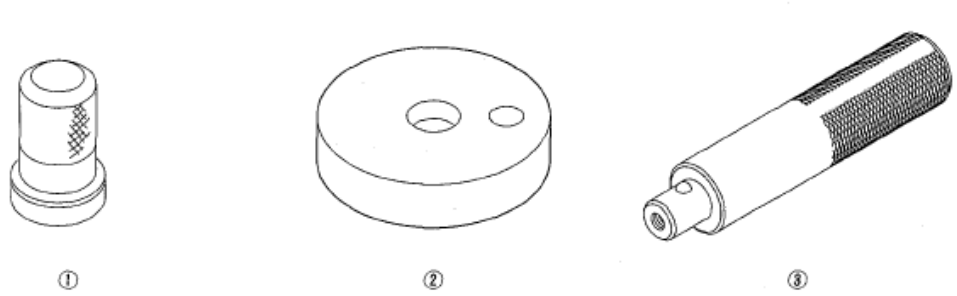

Fig. 1: Identifying Special Tools
Courtesy of AMERICAN HONDA MOTOR CO., INC.

COMPONENT LOCATION INDEX

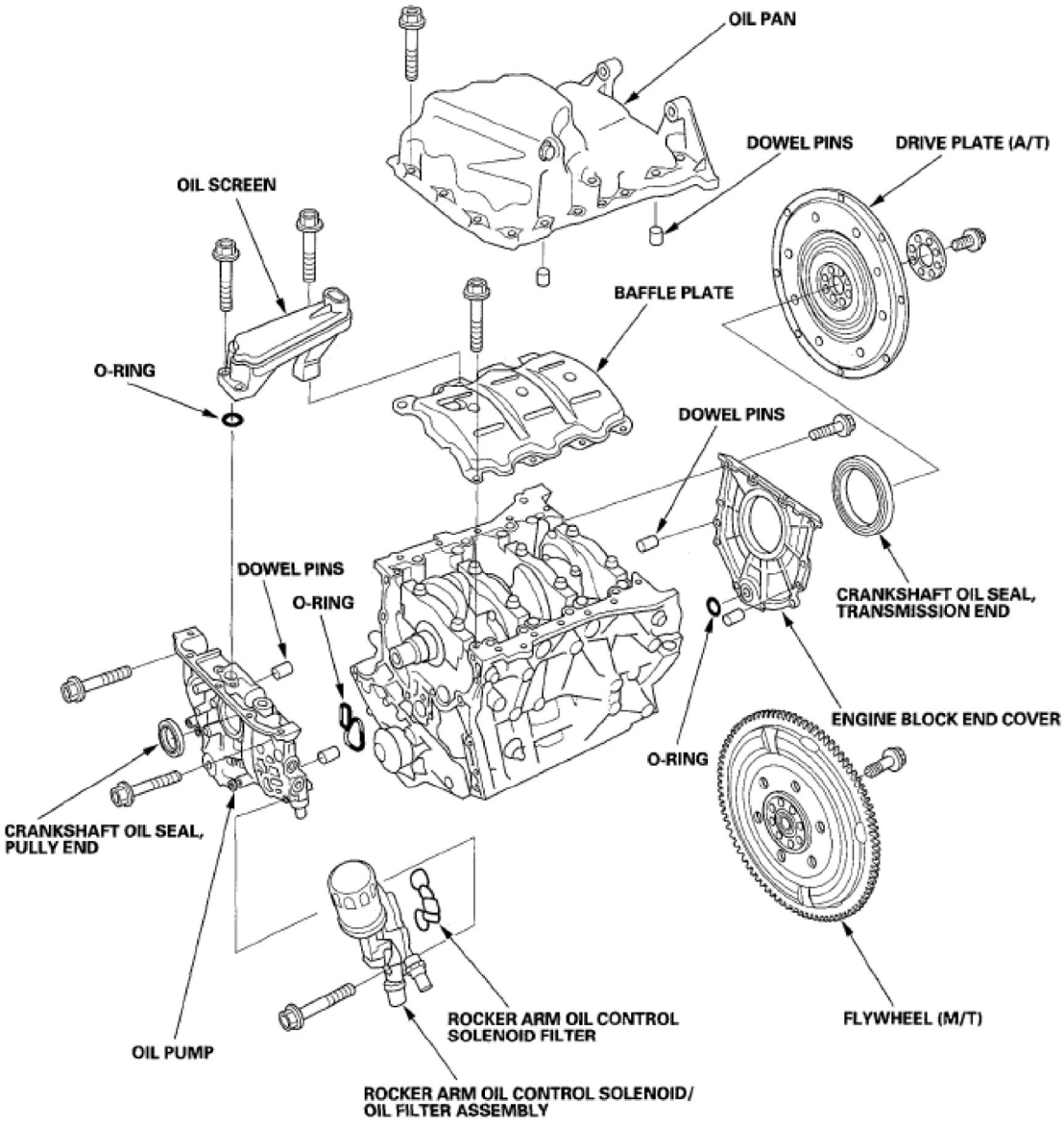

Fig. 2: Identifying Engine Block Component Location (1 Of 3)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

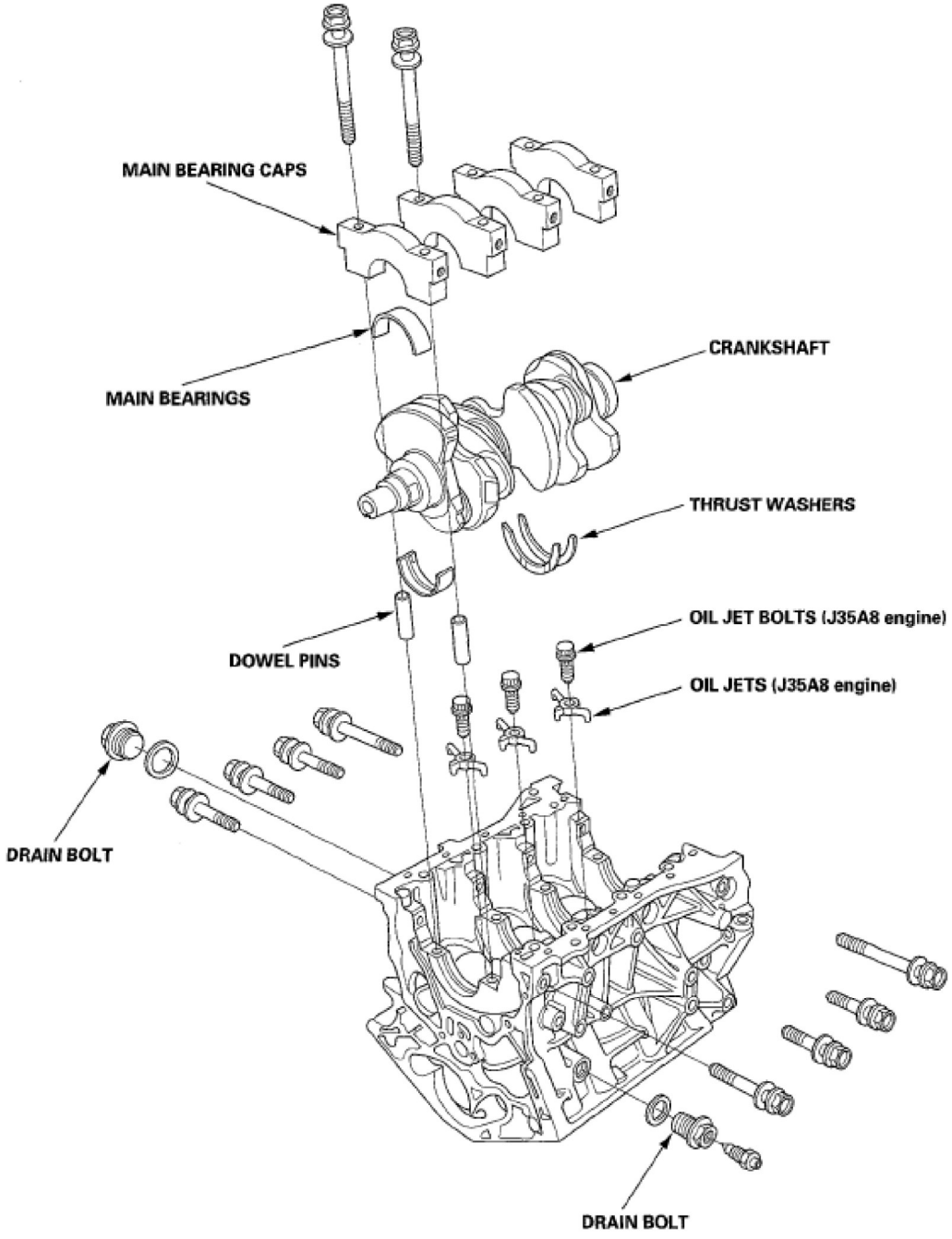

Fig. 3: Identifying Engine Block Component Location (2 Of 3)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

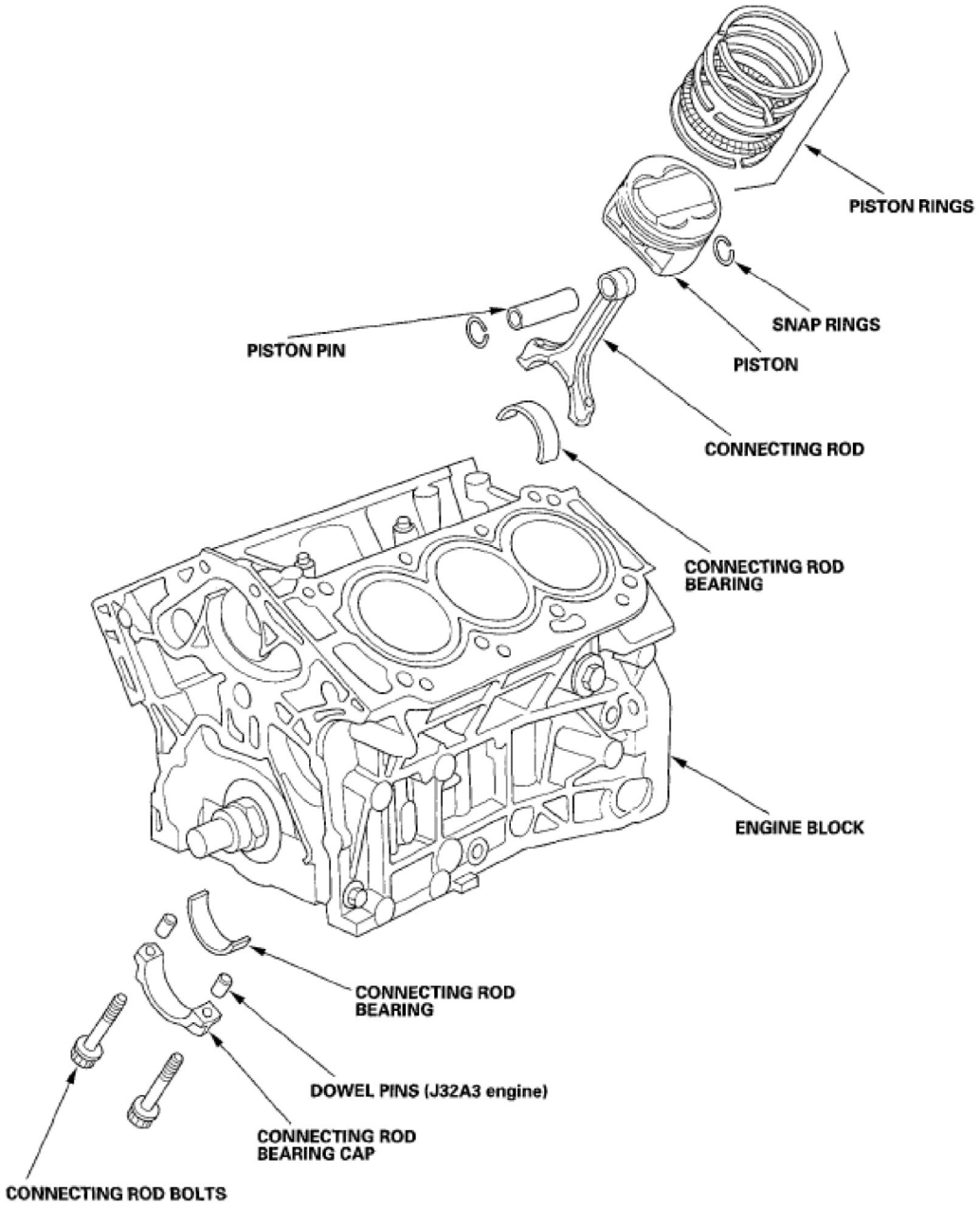

Fig. 4: Identifying Engine Block Component Location (3 Of 3)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

CONNECTING ROD AND CRANKSHAFT END PLAY INSPECTION

1. Remove the oil pump (see **REMOVAL**).
2. Remove the baffle plate (see step 11 on **CRANKSHAFT AND PISTON REMOVAL**).
3. Measure the connecting rod end play with a feeler gauge (A) between the connecting rod (B) and crankshaft (C).

Connecting Rod End Play

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

Service Limit: 0.45 mm (0.018 in.)

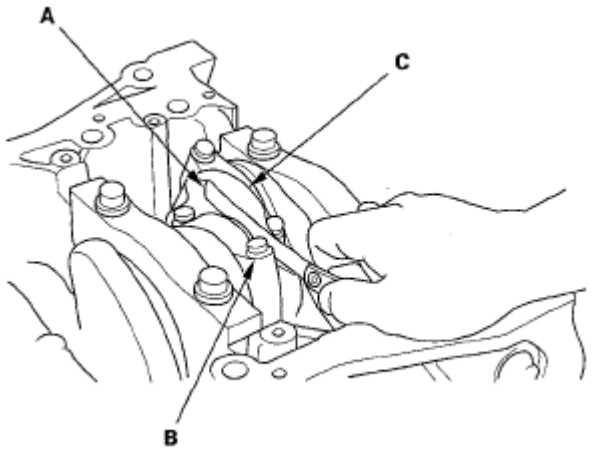

Fig. 5: Measuring Connecting Rod End Play
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

Crankshaft End Play

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

Service Limit: 0.45 mm (0.018 in.)

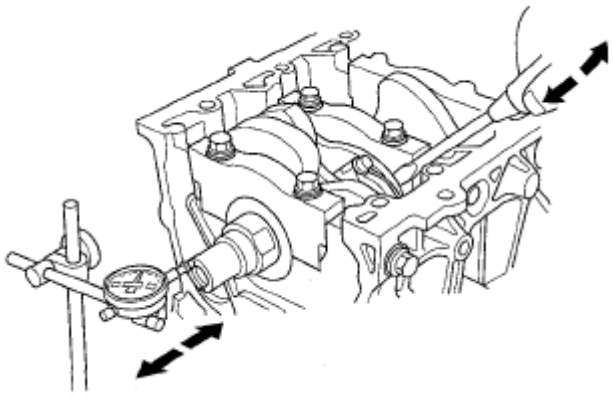

Fig. 6: Measuring Crankshaft End Play

Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. If the end play is excessive, replace the thrust washers and recheck. If it is still out-of-tolerance, replace the crankshaft (see **CRANKSHAFT AND PISTON REMOVAL**).

CRANKSHAFT MAIN BEARING REPLACEMENT

MAIN BEARING CLEARANCE INSPECTION

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

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

4. Reinstall the bearings and 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 on **CRANKSHAFT AND PISTON INSTALLATION**).

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

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

J32A3 engine

Main Bearing-to-Journal Oil Clearance

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

Service Limit: 0.050 mm (0.0020 in.)

J35A8 engine

Main Bearing-to-Journal Oil Clearance

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

Service Limit: 0.050 mm (0.0020 in.)

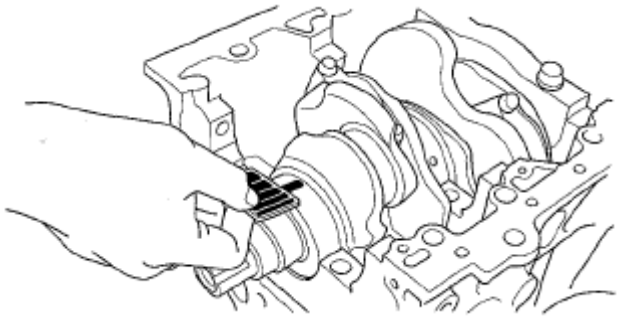

Fig. 7: Measuring Widest Part Of Plastigage
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

MAIN BEARING SELECTION

Crankshaft Bore Code Location

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

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

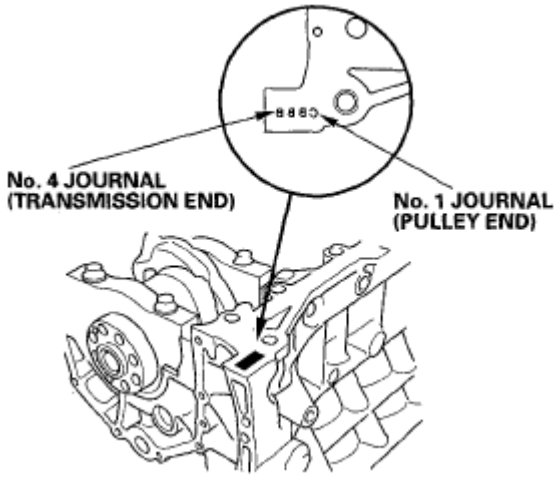

Fig. 8: Identifying Crankshaft Bore Code Location

Courtesy of AMERICAN HONDA MOTOR CO., INC.

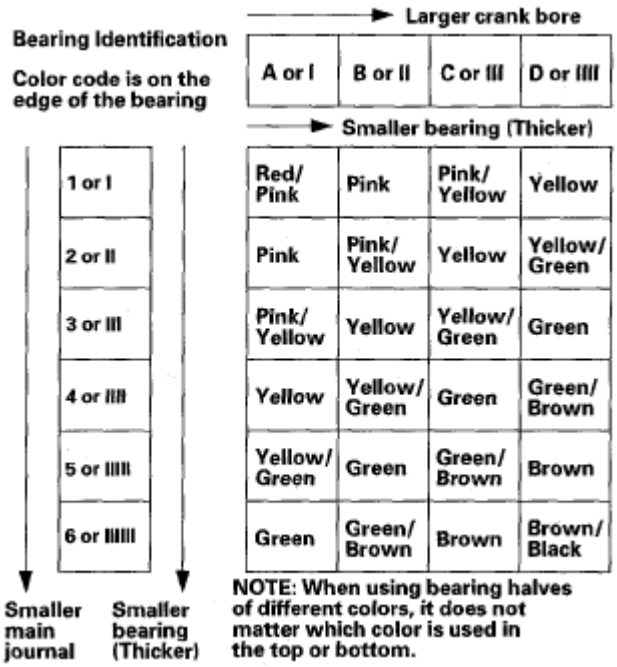

Fig. 9: Crankshaft Main Bearing Reference Chart
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Main Journal Code Locations (Numbers or Bars)

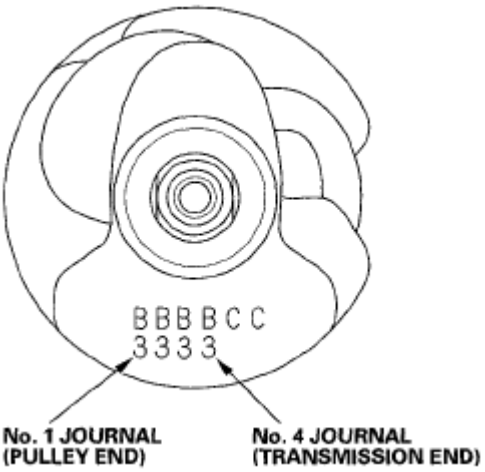

Fig. 10: Identifying Main Journal Code Locations
Courtesy of AMERICAN HONDA MOTOR CO., INC.

CONNECTING ROD BEARING REPLACEMENT

CONNECTING ROD BEARING CLEARANCE INSPECTION

1. Remove the connecting rod cap and bearing half (see **CRANKSHAFT AND PISTON REMOVAL**).
2. Clean the crankshaft rod journal and bearing half with a clean shop towel.
3. Place a strip of plastigage across the rod journal.
4. Reinstall the bearing half and cap, and torque the bolts.

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

Tightening Torque: 20 N.m (2.0 kgf.m, 15 lbf.ft) + 90°

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

Connecting Rod Bearing-to-Journal Oil Clearance

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

Service Limit: 0.050 mm (0.0020 in.)

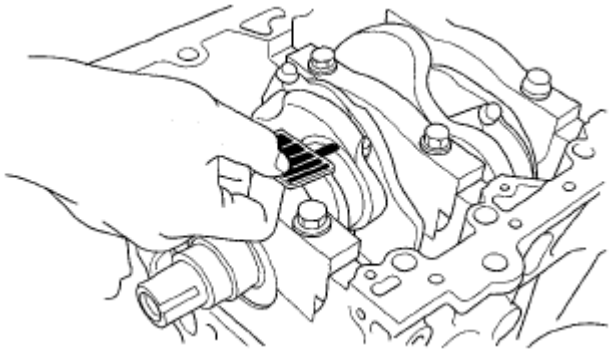

Fig. 11: Measuring Widest Part Of Plastigage
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

CONNECTING ROD BEARING SELECTION

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

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

Normal Bore Size: 58.0 mm (2.28 in.)

Inspect the connecting rod for cracks and heat damage.

Connecting Rod Bore Code Locations

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

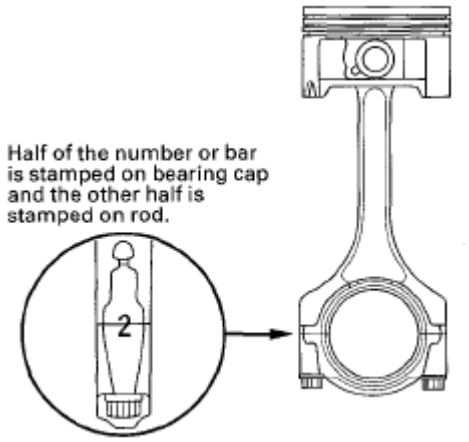

Fig. 12: Identifying Connecting Rod Bore Code Locations
Courtesy of AMERICAN HONDA MOTOR CO., INC.

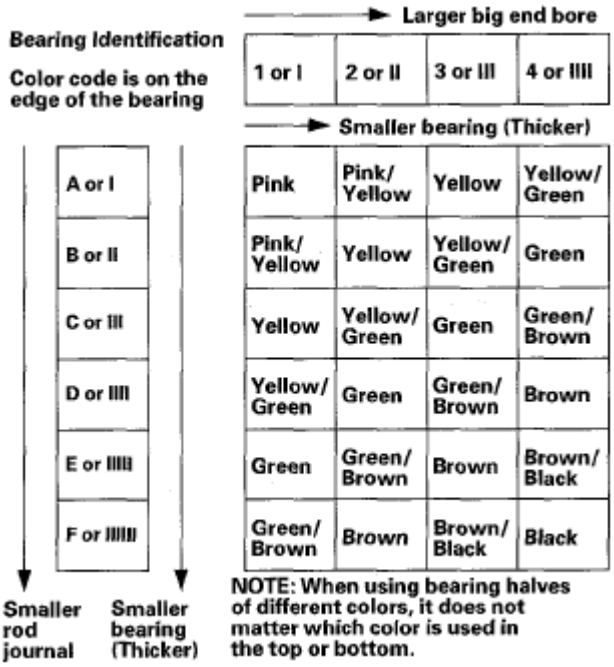

Fig. 13: Connecting Rod Bearing Selection Chart
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Connecting Rod Journal Code Locations (Letters or Bars)

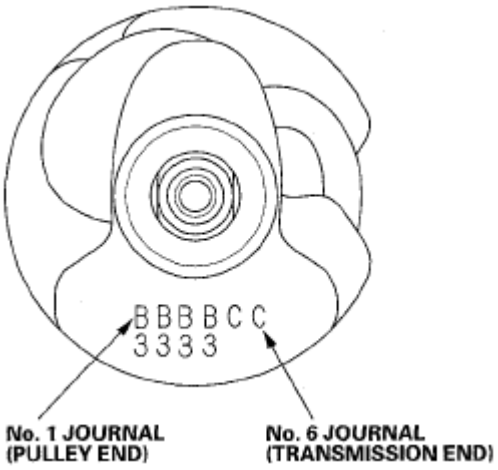

Fig. 14: Identifying Connecting Rod Journal Code Locations (Letters Or Bars)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

OIL PAN REMOVAL

Special Tools Required

- Front subframe adapter VSB02C000016
- Engine support hanger, A and Reds AAR-T-12566

- Engine hanger balance bar VSB02C000019

  These special tools are available through Honda Tool and Equipment Program, 1-888-424-6857

1. If the engine is out of the vehicle, go to step 44.
2. Make sure you have the anti-theft codes for the audio system and the navigation system (if equipped).
3. Remove the left side engine compartment cover and the left rear engine compartment cover (see step 3 on **ENGINE REMOVAL**).
4. Remove the right side engine compartment cover, then remove the right rear engine compartment cover (see step 4 on **ENGINE REMOVAL**).
5. Remove the engine cover (see step 5 on **ENGINE REMOVAL**).
6. Drain the power steering system fluid, then plug the fluid reservoir and return hose (see **FLUID CHECK/REPLACEMENT**).
7. Disconnect the negative cable from the battery, then disconnect the positive cable.
8. Remove the battery.
9. Remove the breather pipe, then remove the intake air duct (see step 10 on **ENGINE REMOVAL**).
10. Remove the air cleaner assembly (see **AIR CLEANER REMOVAL/INSTALLATION**).
11. Remove the battery base (see step 13 on **ENGINE REMOVAL**).
12. Remove the under-hood fuse/ relay box (see step 15 on **ENGINE REMOVAL**).
13. Remove the strut brace (see step 16 on **ENGINE REMOVAL**).
14. Remove the power steering (P/S) pump outlet line from the P/S pump, then plug the outlet line and the P/S pump (see step 23 on **ENGINE REMOVAL**).
15. Remove the steering wheel (see **STEERING WHEEL REMOVAL**).
16. Make a reference mark across the steering joint and steering gearbox pinion shaft. Remove the steering joint bolt, and disconnect the steering joint from the steering gearbox pinion shaft (see step 28 on **ENGINE REMOVAL**).
17. Raise the vehicle on the lift to full height.
18. Remove the front wheels.
19. Remove the engine under cover (see step 32 on **ENGINE REMOVAL**).
20. Remove the splash shield (see step 33 on **ENGINE REMOVAL**).
21. Drain the engine oil (see **ENGINE OIL REPLACEMENT**).
22. Disconnect the stabilizer links (see **STABILIZER LINK REMOVAL/INSTALLATION**).
23. Remove the damper fork (see step 5 on **DAMPER/SPRING REMOVAL AND INSTALLATION**).
24. Separate the tie-rod end ball joints from the knuckles (see step 11 on **KNUCKLE/HUB/WHEEL BEARING REPLACEMENT**).
25. Separate the knuckles from the lower arms (see step 5 on **LOWER ARM REMOVAL/INSTALLATION**).
26. Remove the exhaust pipe A (see step 42 on **ENGINE REMOVAL**).
27. Remove the P/S hose, then plug the line and the hose (see step 43 on **ENGINE REMOVAL**).
28. Disconnect the power steering pressure switch connector (see step 44 on **ENGINE REMOVAL**).

29. M/T model: Remove the transmission lower front mount and transmission lower rear mount (see step 45 on **ENGINE REMOVAL**).
30. A/T model: Remove the transmission lower mount (see step 46 on **ENGINE REMOVAL**).
31. Lower the vehicle.
32. A/T model: Remove the shift cable bracket from the front subframe (see step 55 on **ENGINE REMOVAL**).
33. Install the engine support hanger and engine hanger balance bar (see step 56 on **ENGINE REMOVAL**).
34. Remove the front engine mount stop, then remove the front engine mount bolt and vacuum hose (see step 57 on **ENGINE REMOVAL**).
35. M/T model: Remove the rear engine damper (see step 58 on **ENGINE REMOVAL**).
36. Remove the rear engine mount stop, then remove the rear engine mount bolt (see step 59 on **ENGINE REMOVAL**).
37. Remove the vacuum hose (see step 60 on **ENGINE REMOVAL**).
38. M/T model: Remove the shift cable bracket (see step 61 on **ENGINE REMOVAL**).
39. Raise the vehicle on the lift to full height.
40. Make the appropriate reference lines at both ends of the subframe that line up with the edge of the stiffeners (see step 63 on **ENGINE REMOVAL**).
41. Attach the front subframe adapter to the subframe (see step 64 on **ENGINE REMOVAL**).
42. Remove the subframe middle mount (see step 66 on **ENGINE REMOVAL**).
43. Remove the mounting bolts securing the subframe stiffeners and front subframe (see step 67 on **ENGINE REMOVAL**).
44. Remove the rear warm up three way catalytic converter (rear WU-TWC) bracket.

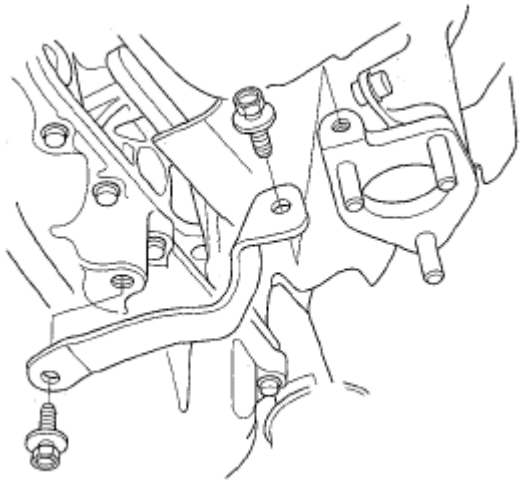

Fig. 15: Identifying Three Way Catalytic Converter Bracket
Courtesy of AMERICAN HONDA MOTOR CO., INC.

45. Remove the torque converter cover (A/T) or clutch cover (M/T) (A) and the four bolts (B) securing the transmission.

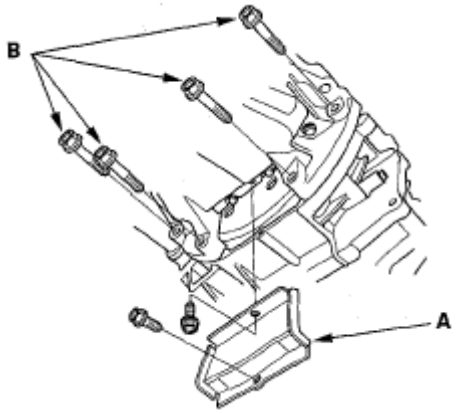

Fig. 16: Identifying Torque Converter Cover Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

46. Remove the bolts securing the oil pan.
47. Using a flat-tip screwdriver, separate the oil pan from the block in the places shown.

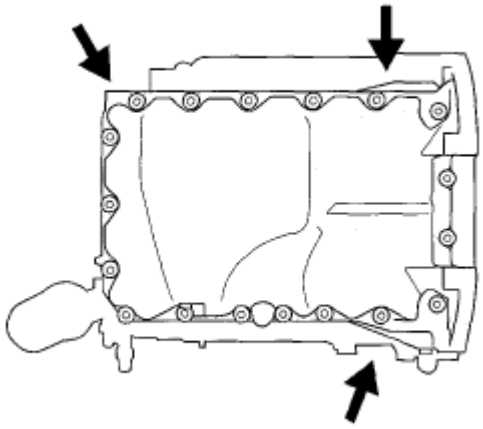

Fig. 17: Identifying Oil Pan
Courtesy of AMERICAN HONDA MOTOR CO., INC.

48. Remove the oil pan.

CRANKSHAFT AND PISTON REMOVAL

1. Remove the engine/ transmission (see **ENGINE REMOVAL**).
2. Remove the transmission:
   - Manual transmission (see **TRANSMISSION REMOVAL**)
   - Automatic transmission (see **TRANSMISSION REMOVAL**)
3. M/T model: Remove the flywheel (see **CLUTCH DISC AND PRESSURE PLATE INSTALLATION**).
4. A/T model: Remove the drive plate (see **DRIVE PLATE REMOVAL AND INSTALLATION**).

5. Remove the cylinder heads (see **CYLINDER HEAD REMOVAL**).
6. Remove the crankshaft position (CKP) sensor (see **CKP SENSOR REPLACEMENT**).
7. Remove the timing belt drive pulley from the crankshaft.
8. Remove the oil pan (see **OIL PAN REMOVAL**).
9. Remove the engine block end cover.

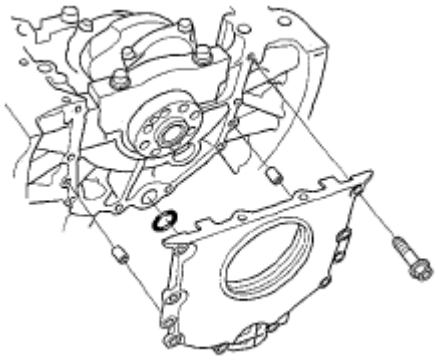

Fig. 18: Identifying Engine Block End Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

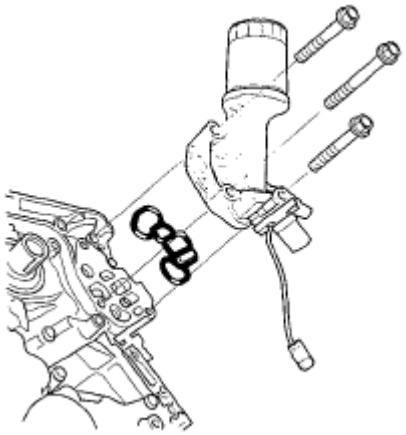

Fig. 19: Identifying Rocker Arm Oil Control Solenoid/ Oil Filter Assembly
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Remove the oil screen (A), baffle plate (B), and oil pump (C).

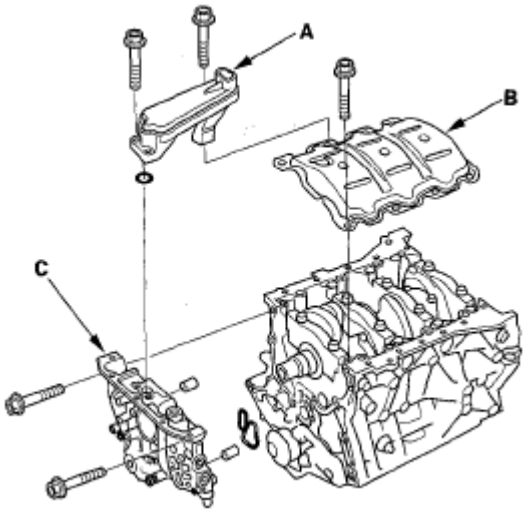

Fig. 20: Identifying Oil Screen, Baffle Plate And Oil Pump
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. 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.

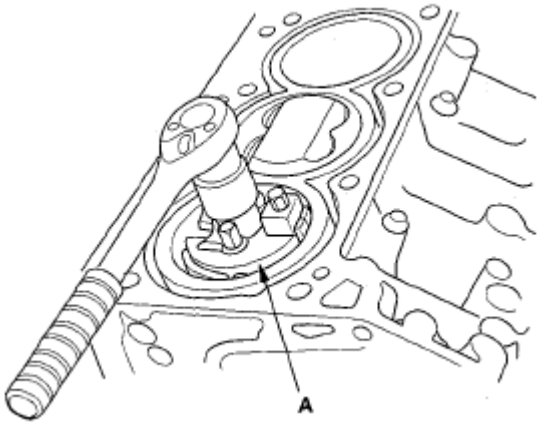

Fig. 21: Identifying Ridge Reamer
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

CORRECT

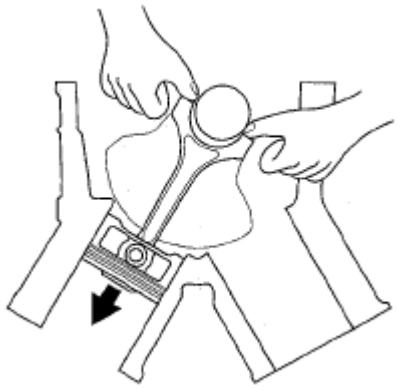

Fig. 22: Removing Piston/ Connecting Rod Assembly (Correct Position)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

INCORRECT

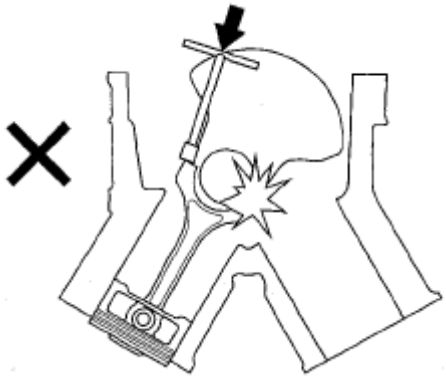

Fig. 23: Removing Piston/ Connecting Rod Assembly (Incorrect Position)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

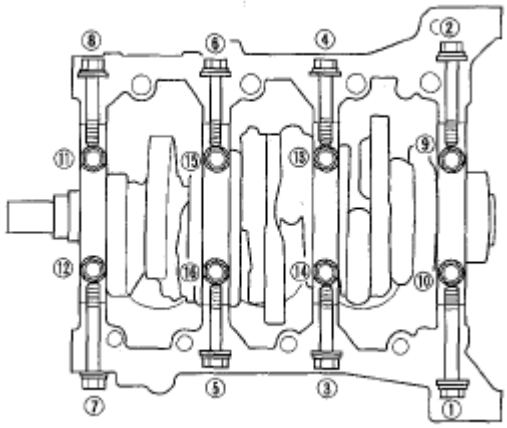

Fig. 24: Identifying Bearing Cap Bolts And Bearing Cap Side Bolts Loosening Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

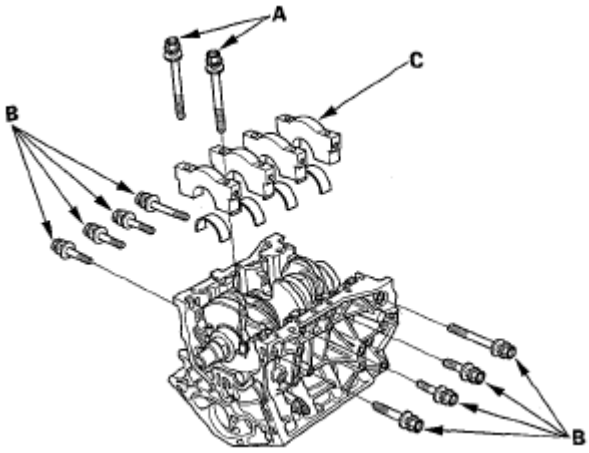

Fig. 25: Identifying Bearing Cap Bolts And Bearing Cap Side Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

20. Lift the crankshaft (A) out of the engine block, being careful not to damage the journals.

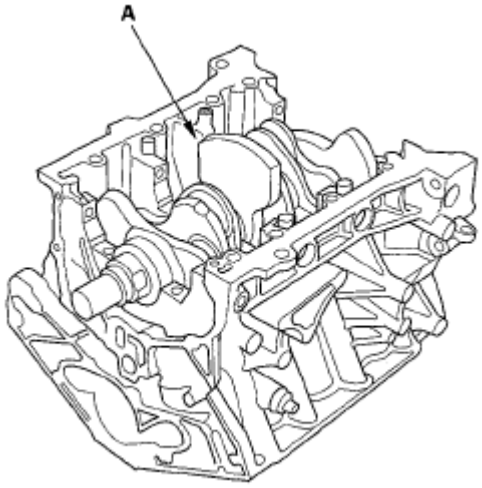

Fig. 26: Identifying Crankshaft
Courtesy of AMERICAN HONDA MOTOR CO., INC.

21. Reinstall the main 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. Clean the crankshaft oil passages with pipe cleaners or a suitable brush.
3. Check the keyway and threads.
4. Measure out-of-round at the middle of each rod and main journal in two place. The difference between measurements on each journal must not be more than the service limit.

   Journal Out-of-Round

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

   Service Limit: 0.010 mm (0.0004 in.)

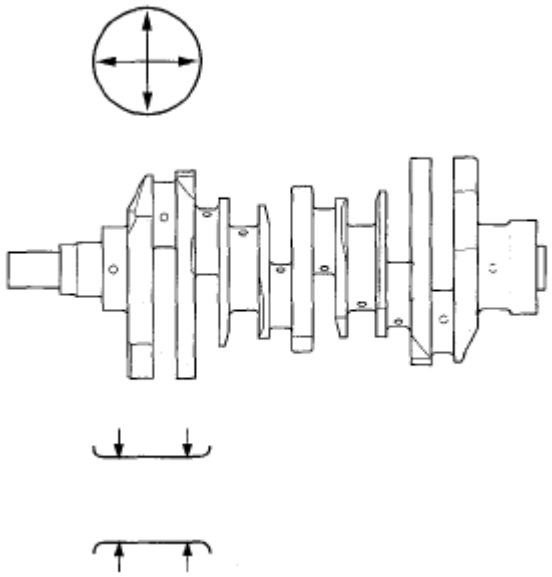

Fig. 27: Measuring Out-Of-Round At Middle Of Rod And Main Journal
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

   Journal Taper

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

   Service Limit: 0.010 mm (0.0004 in.)

   Straightness

6. Place the engine block on a flat surface, crankshaft side up.
7. Clean and install the bearings on the No. 1 and No. 4 journal of the engine block.
8. Lower the crankshaft into the engine block.
9. Measure the runout on all of the main journals. Rotate the crankshaft two complete revolutions. The difference between measurements on each journal must not be more than the service limit.

   Crankshaft Total Runout

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

   Service Limit: 0.030 mm (0.0012 in.)

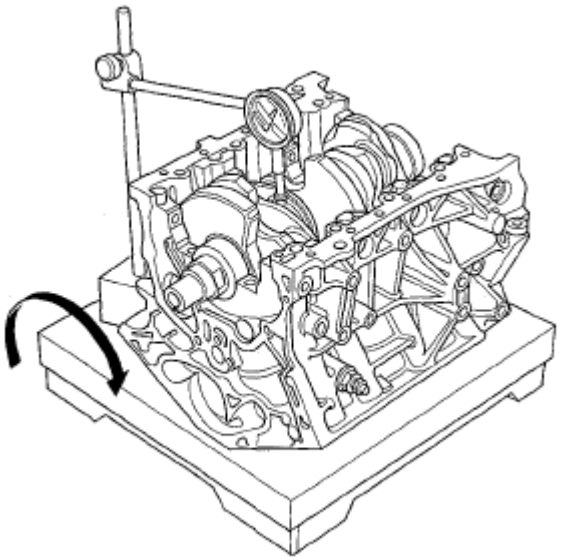

Fig. 28: Measuring Runout On All Of Main Journals
Courtesy of AMERICAN HONDA MOTOR CO., INC.

BLOCK AND PISTON INSPECTION

1. Remove the pistons from the engine block (see **CRANKSHAFT AND PISTON REMOVAL**).
2. Check the pistons for distortion or cracks.
3. Measure each piston diameter at a point 16.0 mm (0.63 in.) from the bottom of the skirt.

Piston Diameter

Standard (New): 88.975-88.985 mm (3.5029-3.5033 in.)

Service Limit: 88.965 mm (3.5026 in.)

Oversize Piston Diameter 0.25: 89.225-89.235 mm (3.5128-3.5132 in.)

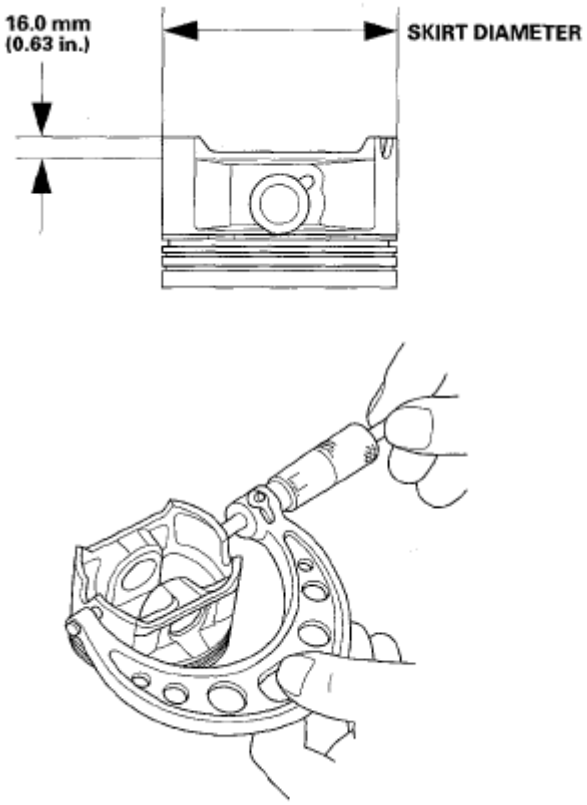

Fig. 29: Measuring Piston Diameter
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Measure 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, 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 (3.5039-3.5045 in.)

   Service Limit: 89.065 mm (3.5065 in.)

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

   Reboring Limit: 0.25 mm (0.01 in.)

   Bore Taper Limit: (Difference between first and third measurement) 0.05 mm (0.002 in.)

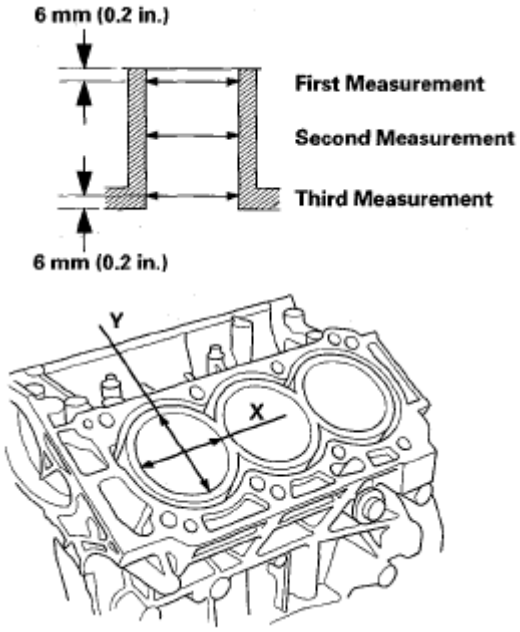

Fig. 30: Measuring Cylinder Bore Size
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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 (0.003 in.) max.

Service Limit: 0.10 mm (0.004 in.)

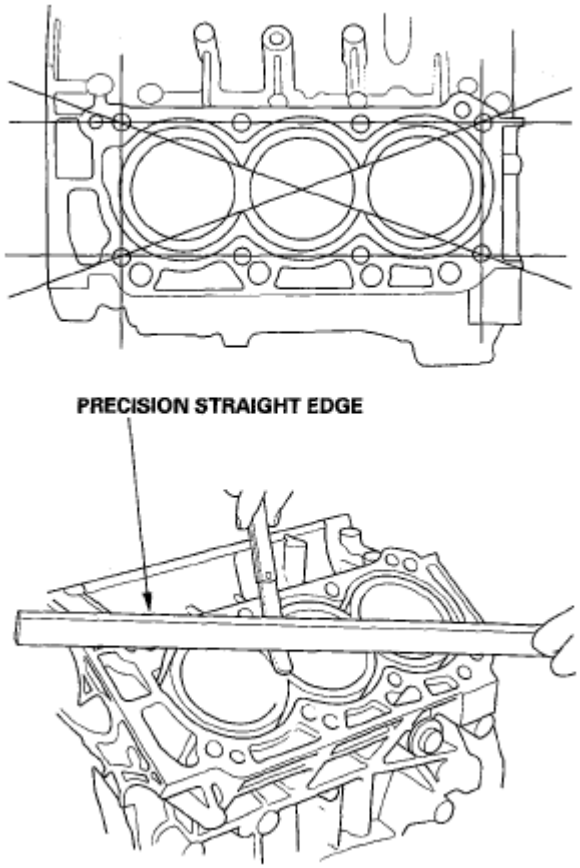

Fig. 31: Measuring Engine Block Warpage
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

   Piston-to-Block Clearance

   Standard (New): 0.015-0.040 mm (0.0006-0.0016 in.)

   Service Limit: 0.08 mm (0.003 in.)

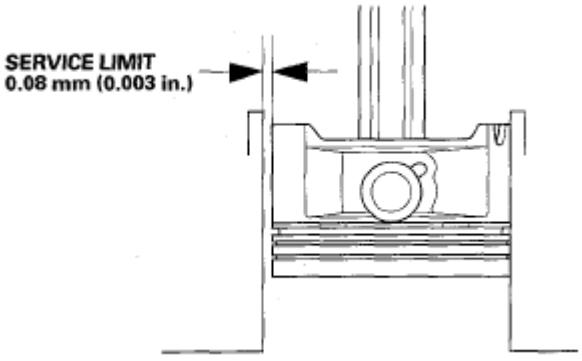

Fig. 32: Measuring Piston-To-Block Clearance
Courtesy of AMERICAN HONDA MOTOR CO., INC.

CYLINDER BORE HONING

1. Measure the cylinder bores (see step 4 on **BLOCK AND PISTON INSPECTION**). 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. Hone the cylinder bores with honing oil and a fine (400 grit) stone in a 60 degree crosshatch pattern.

NOTE:

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

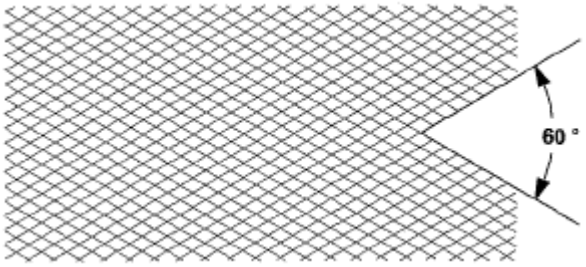

Fig. 33: Measuring Cylinder Bores
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. 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. Never use solvent, it will only redistribute the grit on the cylinder walls.
4. 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.

PISTON, PIN, AND CONNECTING ROD REPLACEMENT

DISASSEMBLY

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

NOTE: Take care not to damage the ring grooves.

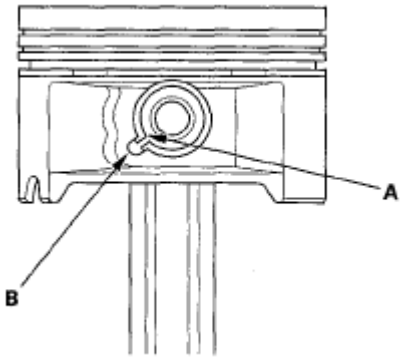

Fig. 34: Identifying Piston Pin Snap Rings
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

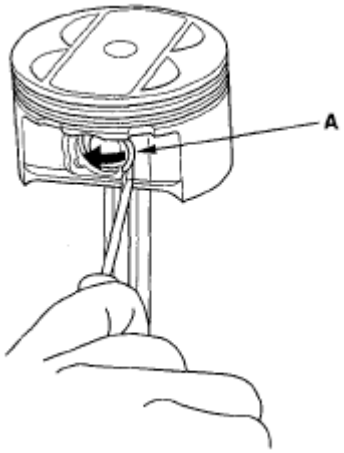

Fig. 35: Removing Snap Rings
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

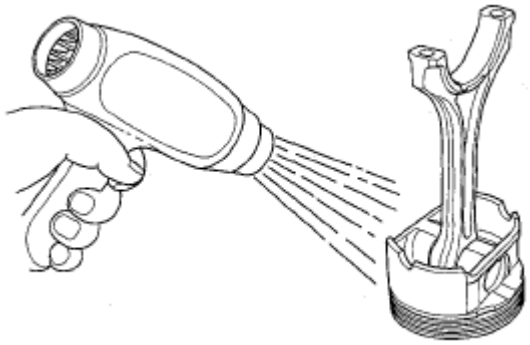

Fig. 36: Heating Piston And Connecting Rod Assembly
Courtesy of AMERICAN HONDA MOTOR CO., INC.

INSPECTION

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

1. Measure the diameter of the piston pin.

   Piston Pin Diameter

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

   Service Limit: 21.954 mm (0.8643 in.)

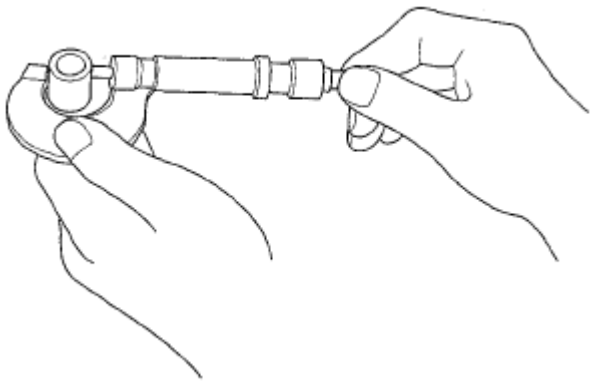

Fig. 37: Measuring Diameter Of Piston Pin
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

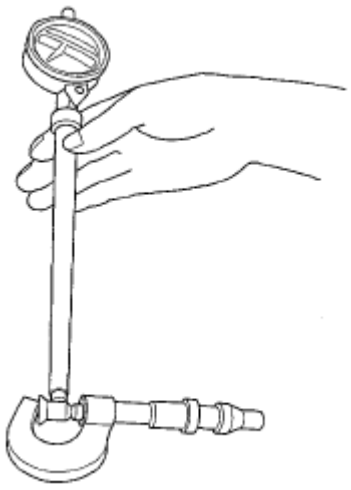

Fig. 38: Measuring Piston Pin Diameter
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

   Piston Pin-to-Piston Clearance

   Standard (New): -0.0050 to +0.0010 mm (-0.00020 to +0.00004 in.)

   Service Limit: 0.004 mm (0.0002 in.)

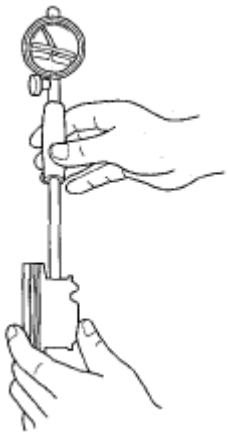

Fig. 39: Measuring Difference Between Piston Pin Diameter And Piston Pin Hole Diameter
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

   Piston Pin-to-Connecting Rod Clearance

   Standard (New): 0.005-0.014 mm (0.0002-0.0006 in.)

   Service Limit: 0.019 mm (0.0007 in.)

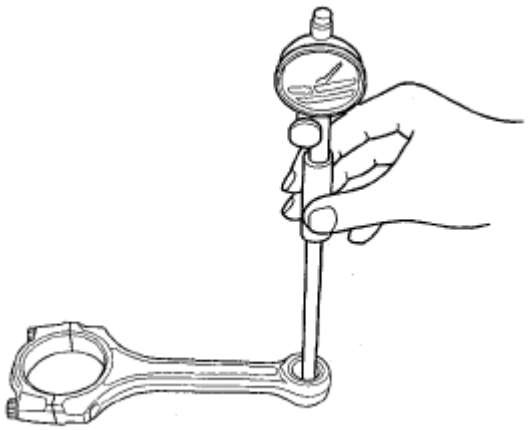

Fig. 40: Measuring Piston Pin-To-Connecting Rod Clearance
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REASSEMBLY

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

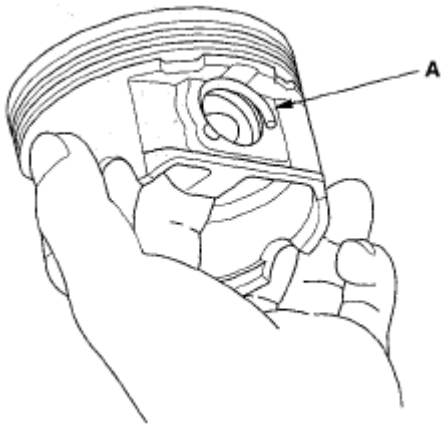

Fig. 41: Installing Piston Pin Snap Ring
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

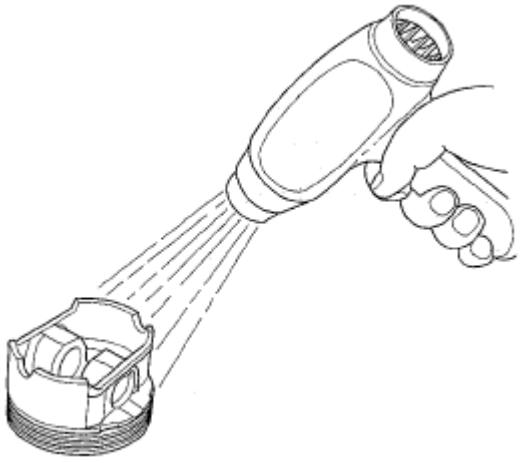

Fig. 42: Heating Piston
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

NOTE: Apply new engine oil to the piston pin.

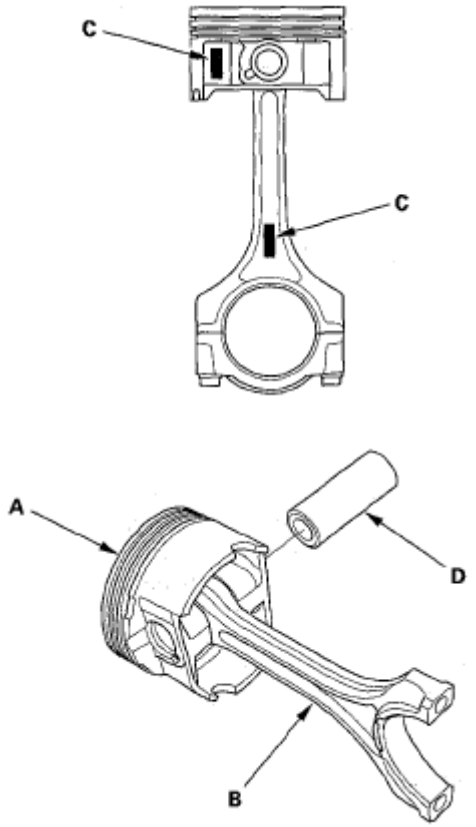

Fig. 43: Identifying Piston And Connecting Rod
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

PISTON RING REPLACEMENT

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

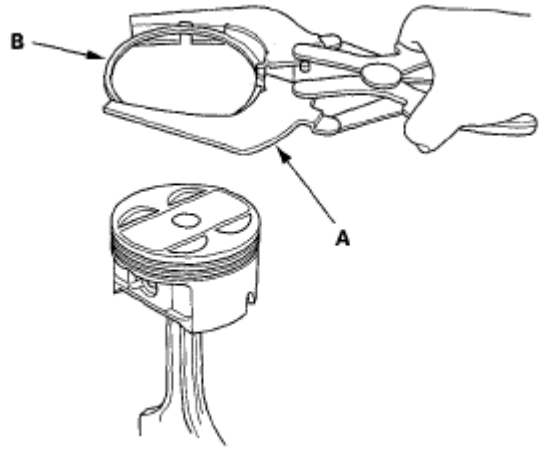

Fig. 44: Removing Piston Rings
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Clean all the ring grooves thoroughly with a squared-off broken ring, or a ring groove cleaner with a blade to fit the piston grooves. File down the blade, if necessary. The top ring and second ring grooves are 1.2 mm (0.05 in.) wide, and the oil ring groove is 2.8 mm (0.11 in.) wide. Do not use a wire brush to clean the ring grooves, or cut the ring grooves deeper with the cleaning tool.

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

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

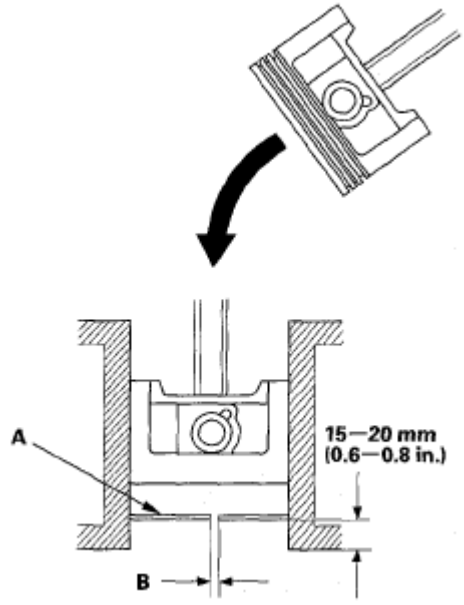

Fig. 45: Pushing Ring Into Cylinder Bore
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Measure the piston ring end-gap (B) with a feeler gauge:
   - If the gap is too small, check to see if you have the proper rings for your engine.
   - If the gap is too large, recheck the cylinder bore diameter against the wear limits (see step 4 on **BLOCK AND PISTON INSPECTION**). 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 (0.008-0.014 in.)

   Service Limit: 0.60 mm (0.024 in.)

   Second Ring:

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

   Service Limit: 0.70 mm (0.028 in.)

   Oil Ring:

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

   Service Limit: 0.80 mm (0.031 in.)

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

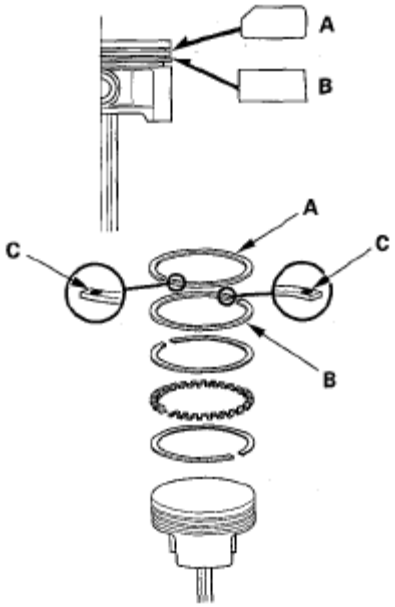

Fig. 46: Installing Piston Rings
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Piston Ring Dimensions:

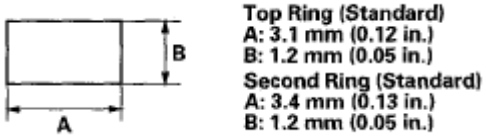

Fig. 47: Identifying Piston Ring Dimensions
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

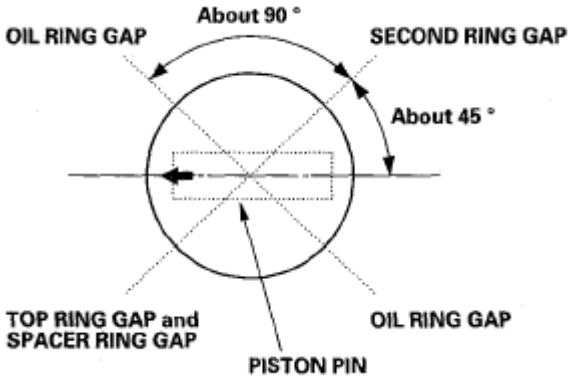

Fig. 48: Positioning Ring End Gaps
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

NOTE: After the inspection, make sure each ring is in proper position as step 7.

J32A3 engine

Top Ring Clearance

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

Service Limit: 0.15 mm (0.006 in.)

Second Ring Clearance

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

Service Limit: 0.13 mm (0.005 in.)

J35A8 engine

Top Ring Clearance

Standard (New): 0.065-0.090 mm (0.0026-0.0035 in.)

Service Limit: 0.15 mm (0.006 in.)

Second Ring Clearance

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

Service Limit: 0.13 mm (0.005 in.)

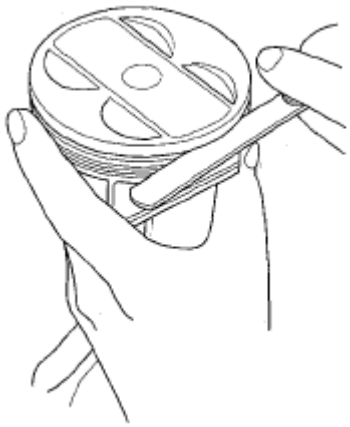

Fig. 49: Measuring Ring Clearance
Courtesy of AMERICAN HONDA MOTOR CO., INC.

CRANKSHAFT AND PISTON INSTALLATION

Special Tools Required

- Driver 07749-0010000
- Driver attachment, 106 mm 070AD-RCAA200

1. Check the connecting rod bearing clearance with plastigage (see **CONNECTING ROD BEARING REPLACEMENT**).
2. Check the main bearing clearance with plastigage (see **CRANKSHAFT MAIN BEARING REPLACEMENT**).
3. Install the bearing halves in the engine block and connecting rods.
4. Apply new engine oil to the main bearings and rod bearings.
5. Lower the crankshaft (A) into the engine block.

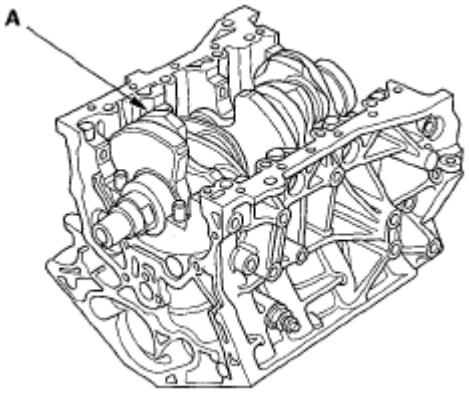

Fig. 50: Identifying Crankshaft
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

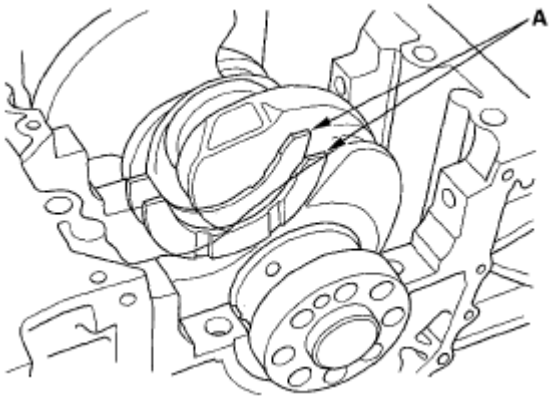

Fig. 51: Identifying Thrust Washers
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Install the bearings (A) and bearing caps (B) with the arrow (C) facing the timing belt end of the engine.

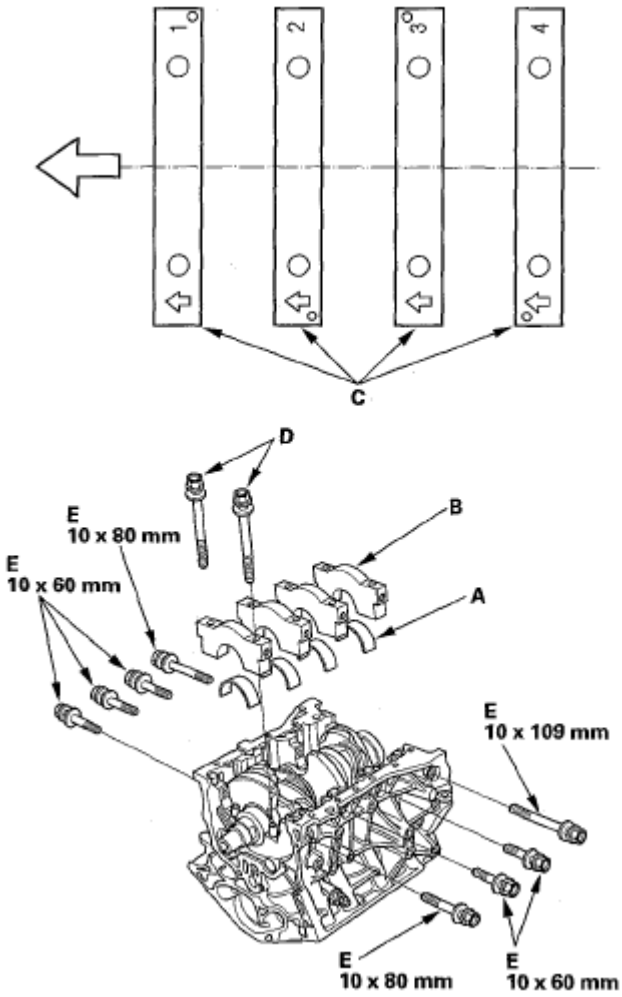

Fig. 52: Identifying Bearings And Bearing Caps
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

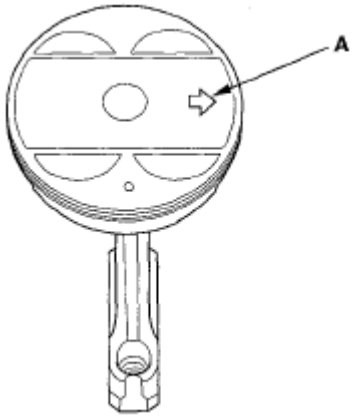

Fig. 53: Positioning Piston/ Connecting Rod Assembly
Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. 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.

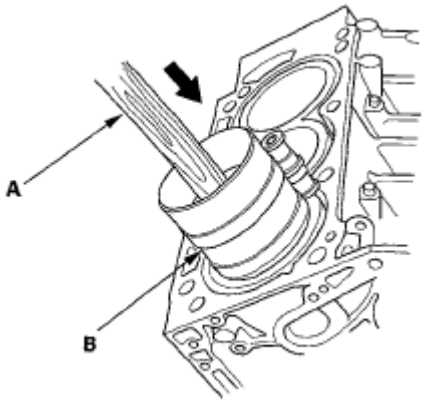

Fig. 54: Positioning Piston/ Connecting Rod Assembly In Cylinder
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

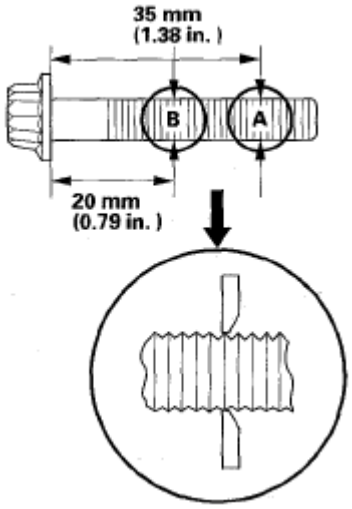

Fig. 55: Measuring Diameter Of Connecting Rod Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

16. 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.)

17. If the difference in diameter is out of tolerance, replace the connecting rod bolt.
18. Line up the mark (A) on the connecting rod and cap, then install the cap.

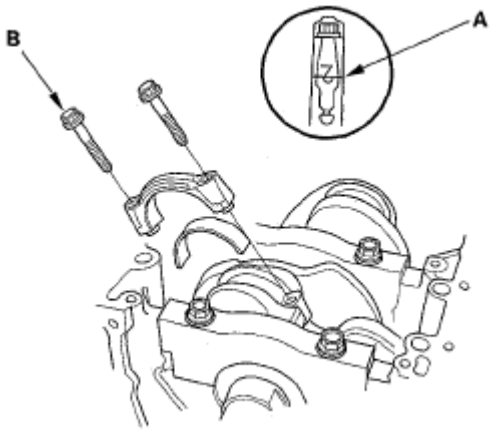

Fig. 56: Identifying Connecting Rod And Cap
Courtesy of AMERICAN HONDA MOTOR CO., INC.

19. Apply new engine oil to the bolt threads and flanges. Torque the bolts (B) to 20 N.m (2.0 kgf.m, 15 lbf.ft).
20. Mark the connecting rod (A) and bolt head (B) as shown.

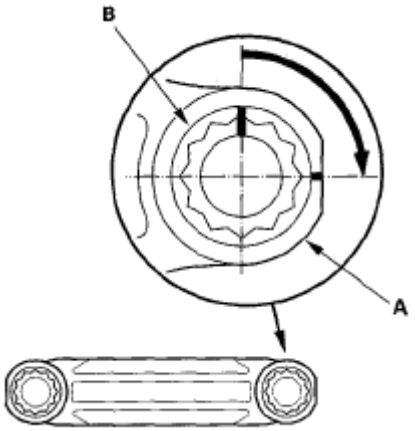

Fig. 57: Identifying Connecting Rod Bolt Tightening Angle
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

NOTE: Remove the connecting rod bolt if you tightened it beyond the specified angle, and go back to step 15 of the procedure. Do not loosen it back to the specified angle.

22. Tighten the bearing cap bolts, and then the bearing cap side bolts to the specified torque in the sequence shown. Repeat the torque sequence again to make sure the bolts are properly torqued.

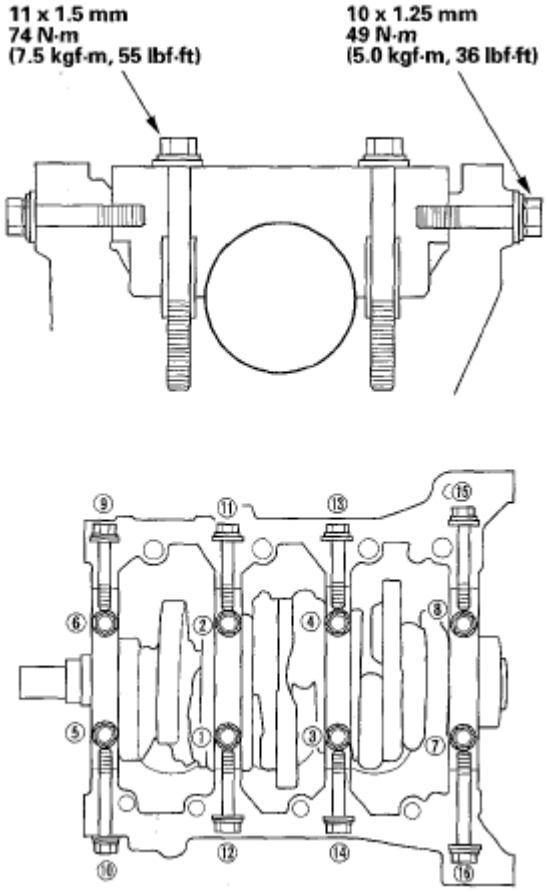

Fig. 58: Identifying Bearing Cap Bolts Tightening Sequence With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

23. Remove any old liquid gasket from the engine block end cover mating surfaces, bolts, and bolt holes.
24. Clean and dry the engine block end cover mating surfaces.
25. The seal mating surface on the engine block end cover should be dry. Apply a light coat of multipurpose grease to the crankshaft and to the lip of the seal.
26. Drive the new crankshaft oil seal until the special tool bottoms on the engine block end cover.

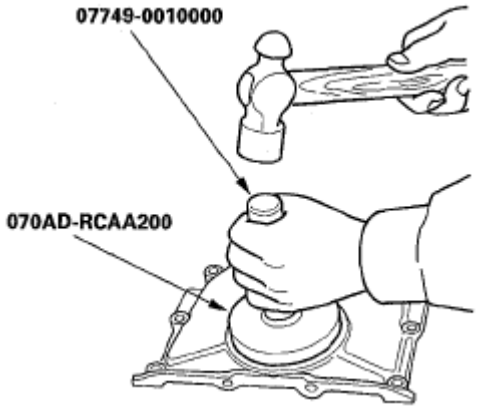

Fig. 59: Driving Crankshaft Oil Seal
Courtesy of AMERICAN HONDA MOTOR CO., INC.

27. Apply liquid gasket, P/N 08717-0004, 08718-0001, 08718-0003, or 08718-0009, evenly to the engine block mating surface of the engine block end cover. 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.**

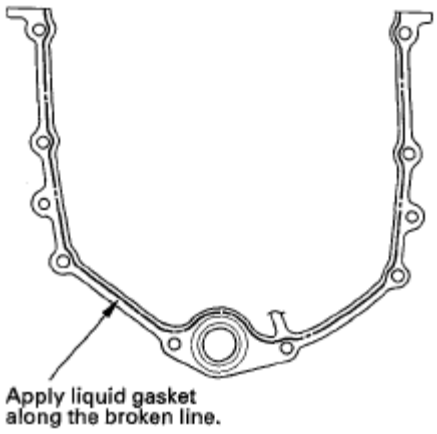

Fig. 60: Identifying Liquid Gasket Applying Points
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

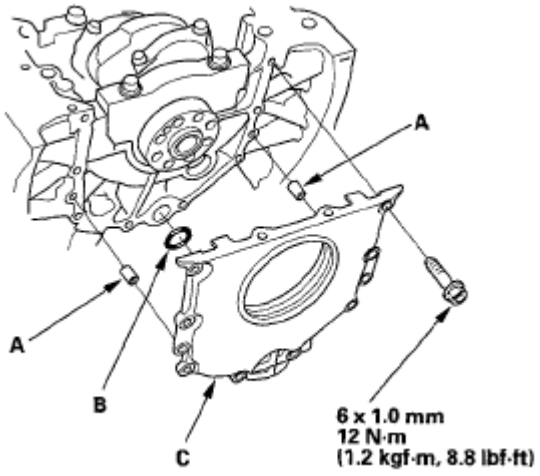

Fig. 61: Identifying Engine Block End Cover, Dowel Pins And O-Ring With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

29. Clean the excess grease off the crankshaft, and check the seal for distortion.
30. Install a new crankshaft oil seal in the oil pump (see step 2 on **INSTALLATION**).
31. Remove all of the old liquid gasket from the oil pump mating surfaces, bolts, and bolt holes.
32. Clean and dry the oil pump mating surfaces.
33. Apply liquid gasket, P/N 08717-0004, 08718-0001, 08718-0003, or 08718-0009, evenly to the engine block mating surface of the oil pump. 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.**

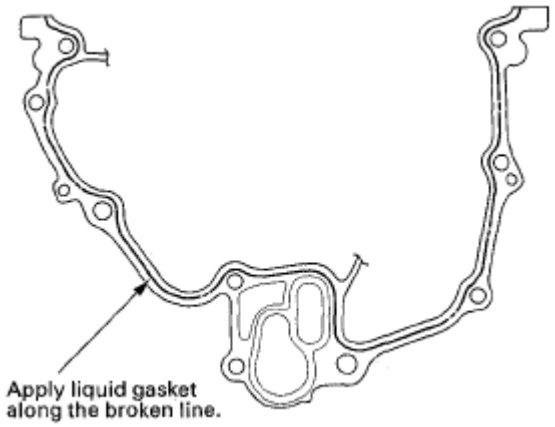

Fig. 62: Identifying Liquid Gasket Applying Area
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

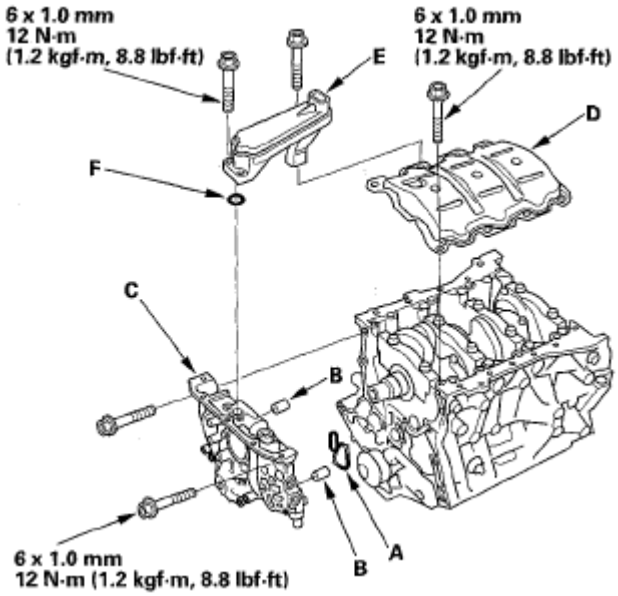

Fig. 63: Identifying Engine Block Components With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

35. Install the dowel pins (B), then align the inner rotor with the crankshaft and install the oil pump (C).
36. Clean the excess grease off the crankshaft, and check the seal for distortion.
37. Install the baffle plate (D), then install the oil screen (E) with a new O-ring (F).
38. Install the rocker arm oil control solenoid/ oil filter assembly (A), with a new rocker arm oil control solenoid filter (B).

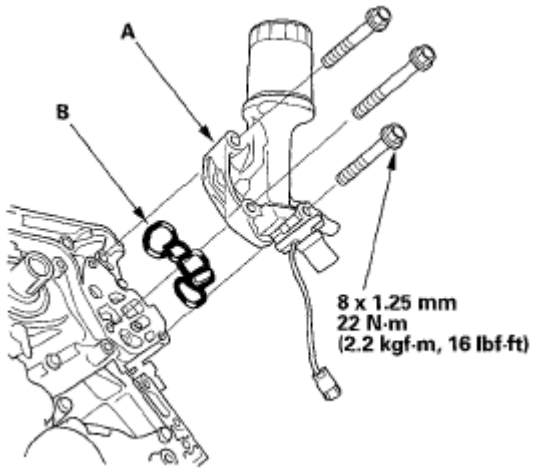

Fig. 64: Identifying Rocker Arm Oil Control Solenoid/ Oil Filter Assembly With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

39. Install the oil pan (see **OIL PAN INSTALLATION**).
40. Install the crankshaft position (CKP) sensor (see **CKP SENSOR REPLACEMENT**).

41. Install the cylinder heads (see **CYLINDER HEAD INSTALLATION**).
42. M/T model: Install the flywheel (see **CLUTCH DISC AND PRESSURE PLATE INSTALLATION**).
43. A/T model: Install the drive plate (see **DRIVE PLATE REMOVAL AND INSTALLATION**).
44. Install the transmission:
    - Manual transmission (see **TRANSMISSION INSTALLATION**)
    - Automatic transmission (see **TRANSMISSION INSTALLATION**)
45. Install the engine/ transmission (see **ENGINE INSTALLATION**).

NOTE: **After you replace any crankshaft or connecting rod bearings, run the engine at idle until it reaches normal operating temperature, then continue to run it for about 15 minutes.**

OIL PAN INSTALLATION

Special Tools Required

- Front subframe adapter VSB02C000016
- Engine support hanger, A and Reds AAR-T-12566
- Engine hanger balance bar VSB02C000019

These special tools are available through Acura Tool and Equipment Program, 1-888-424-6857

1. Remove all of the old liquid gasket from the oil pan mating surfaces, bolts, and bolt holes.
2. Clean and dry the oil pan mating surfaces.
3. Apply liquid gasket, P/N 08717-0004, 08718-0001, 08718-0003, or 08718-0009, evenly to the oil pan mating surface of the engine block. 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.**

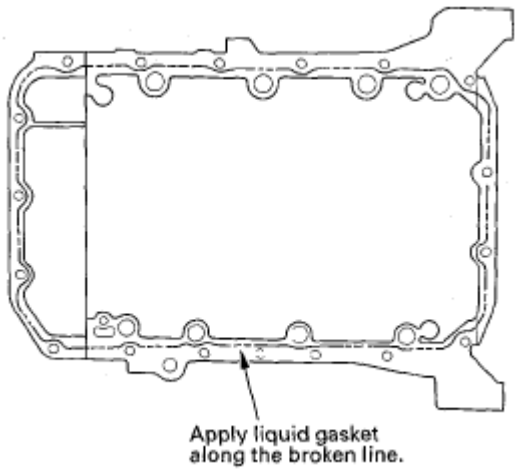

Fig. 65: Identifying Liquid Gasket Applying Area
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Install the oil pan on the engine block.
5. Tighten the bolts in three steps. In the final step, tighten all bolts, in sequence, to 12 N.m (1.2 kgf.m, 8.8 lbf.ft).

NOTE:

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

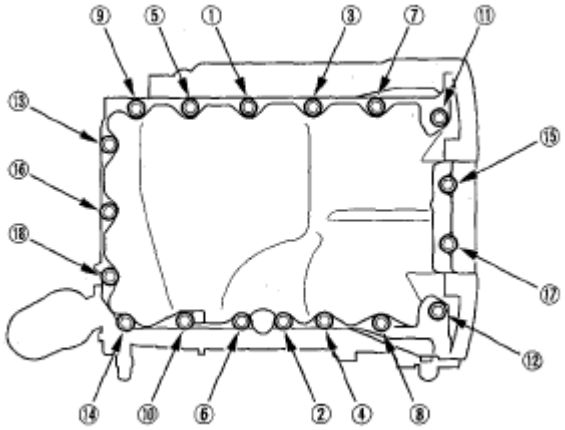

Fig. 66: Identifying Oil Pan Bolts Tightening Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Tighten the four bolts (A) securing the transmission, then install the torque converter cover (A/T) or clutch cover (M/T) (B).

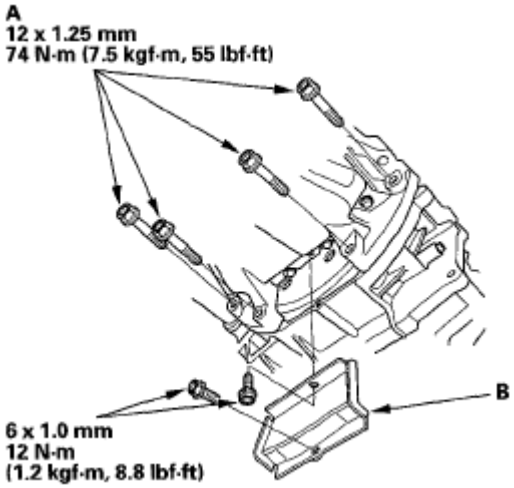

Fig. 67: Identifying Torque Converter Cover Bolts With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

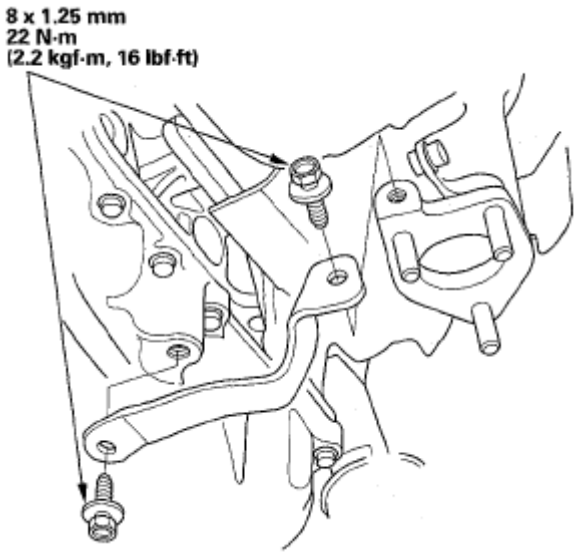

Fig. 68: Identifying Three Way Catalytic Converter Bracket And Bolts With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. If the engine is still in the vehicle, do the following steps.
9. Using the subframe adapter and a jack, loosely install the new front subframe bolts and the stiffeners (see step 9 on **ENGINE INSTALLATION**).
10. Loosely install the subframe middle mount (see step 10 on **ENGINE INSTALLATION**).
11. Remove the jack and front subframe adapter.
12. Align the reference marks with the edge of both rear stiffeners, and tighten the rear subframe mounting bolts, then the front bolts, and finally the stiffener bolts to the specified torque (see step 12 on **ENGINE INSTALLATION**).

13. Tighten the bolts securing the subframe middle mounts (see step 10 on **ENGINE INSTALLATION**).
14. M/T model: Tighten the nuts securing the transmission lower front mount and transmission lower rear mount (see step 14 on **ENGINE INSTALLATION**).
15. A/T model: Tighten the bolts securing the transmission lower mount (see step 15 on **ENGINE INSTALLATION**).
16. Lower the vehicle.
17. M/T model: Install the shift cable bracket (see step 17 on **ENGINE INSTALLATION**).
18. Install the vacuum hose (see step 18 on **ENGINE INSTALLATION**).
19. Tighten the rear engine mount bolt, then install the rear engine mount stop (see step 19 on **ENGINE INSTALLATION**).
20. M/T model: Install the rear engine damper (see step 20 on **ENGINE INSTALLATION**).
21. Tighten the front engine mount bolt, then install the front engine mount stop and vacuum hose (see step 21 on **ENGINE INSTALLATION**).
22. Remove the engine support hanger and engine hanger balance bar.
23. A/T model: Install the shift cable bracket to the front subframe (see step 29 on **ENGINE INSTALLATION**).
24. Raise the vehicle on the lift to full height.
25. Connect the power steering pressure switch connector (see step 35 on **ENGINE INSTALLATION**).
26. Install the power steering (P/S) hose (see step 36 on **ENGINE INSTALLATION**).
27. Install exhaust pipe A using new gaskets and new self locking nuts (see step 37 on **ENGINE INSTALLATION**).
28. Connect the suspension lower arm ball joints (see step 5 on **LOWER ARM REMOVAL/INSTALLATION**).
29. Connect the tie-rod end ball joints (see step 11 on **KNUCKLE/HUB REPLACEMENT**).
30. Install the damper fork (see step 2 on **INSTALLATION**).
31. Connect the stabilizer links (see **STABILIZER LINK REMOVAL/INSTALLATION**).
32. Install the splash shield (see step 43 on **ENGINE INSTALLATION**).
33. Install the engine under cover (see step 44 on **ENGINE INSTALLATION**).
34. Install the front wheels.
35. Lower the vehicle.
36. Align the reference mark on the steering joint and steering gearbox pinion shaft. Connect the steering joint to the steering gearbox pinion shaft. Tighten the steering joint bolt (see step 47 on **ENGINE INSTALLATION**).
37. Install the steering wheel (see **STEERING WHEEL INSTALLATION**).
38. Install the P/S pump outlet hose with a new O-ring (see step 50 on **ENGINE INSTALLATION**).
39. Install the strut brace (see step 59 on **ENGINE INSTALLATION**).
40. Install the under-hood fuse/ relay box (see step 60 on **ENGINE INSTALLATION**).
41. Install the battery base (see step 62 on **ENGINE INSTALLATION**).
42. Install the air cleaner assembly (see **AIR CLEANER REMOVAL/INSTALLATION**).
43. Install the intake air duct, then install the breather pipe (see step 64 on **ENGINE INSTALLATION**).

44. Install the battery. Clean the battery posts and cable terminals, then assemble them and apply grease to prevent corrosion.
45. Install the engine cover (see step 65 on **ENGINE INSTALLATION**).
46. Refill the engine with engine oil (see **ENGINE OIL REPLACEMENT**).
47. Refill the power steering reservoir with the power steering fluid (see **FLUID CHECK/REPLACEMENT**).
48. Bleed air from the P/S system, if necessary, add more fluid (see **FLUID CHECK/REPLACEMENT**).
49. Check the wheel alignment (see **WHEEL ALIGNMENT**).
50. Install the right rear engine compartment cover, then install the right side engine compartment cover (see step 81 on **ENGINE INSTALLATION**).
51. Install the left rear engine compartment cover and the left side engine compartment cover (see step 82 on **ENGINE INSTALLATION**).
52. Enter the anti-theft codes for the audio system and the navigation system (if equipped).
53. Set the clock (on vehicles without navigation).

PULLEY END CRANKSHAFT OIL SEAL INSTALLATION - IN CAR

Special Tools Required

Oil seal driver, 64 mm 070AD-RCAA100

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

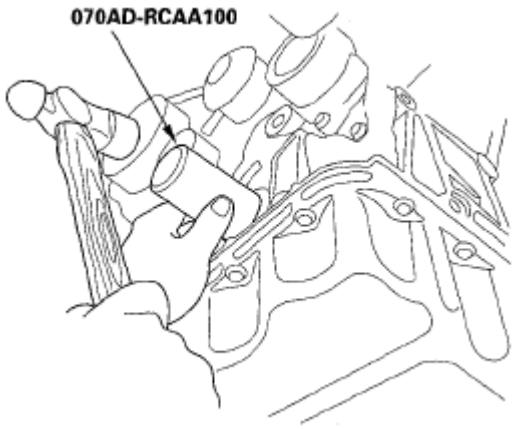

Fig. 69: Driving In Crankshaft Oil Seal

Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Install the timing belt drive pulley, CKP sensor, and timing belt (see **TIMING BELT DRIVE PULLEY REPLACEMENT**).

TRANSMISSION END CRANKSHAFT OIL SEAL INSTALLATION - IN CAR

Special Tools Required

- Driver 07749-0010000
- Driver attachment, 106 mm 070AD-RCAA200

1. M/T model: Remove the transmission (see **TRANSMISSION REMOVAL**), the clutch disc and pressure plate (see **PRESSURE PLATE AND CLUTCH DISC REMOVAL**), and the flywheel (see **CLUTCH DISC AND PRESSURE PLATE INSTALLATION**).
2. A/T model: Remove the transmission (see **TRANSMISSION REMOVAL**) and the drive plate (see **DRIVE PLATE REMOVAL AND INSTALLATION**).
3. Remove the transmission end crankshaft oil seal.
4. Clean and dry the crankshaft oil seal housing.
5. Apply a light coat of multipurpose grease to the crankshaft and to the lip of the seal.
6. Using the driver and driver attachment, drive in the crankshaft oil seal until the driver attachment bottoms against the engine block end cover. Align the hole in the driver attachment with the pin on the crankshaft.

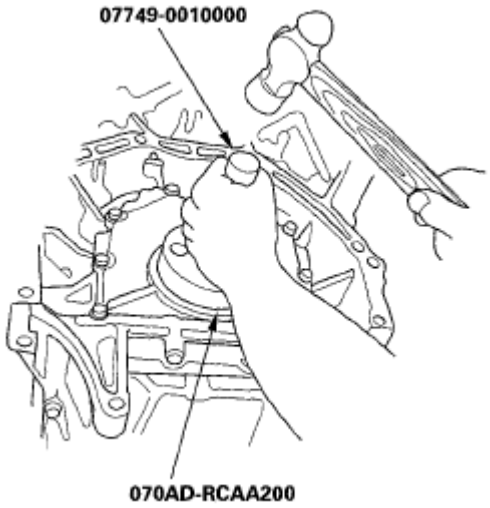

Fig. 70: Driving In Crankshaft Oil Seal
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Clean any excess grease off the crankshaft, and check that the oil seal lip is not distorted.
8. M/T model: Install the flywheel (see **CLUTCH DISC AND PRESSURE PLATE INSTALLATION**), the clutch disc and pressure plate (see **CLUTCH DISC AND PRESSURE PLATE INSTALLATION**), and the transmission (see **TRANSMISSION INSTALLATION**).

9. A/T model: Install the drive plate (see **DRIVE PLATE REMOVAL AND INSTALLATION**), and the transmission (see **TRANSMISSION INSTALLATION**).

DRAIN BOLT INSTALLATION

NOTE: When installing the drain bolts, always use new washers.

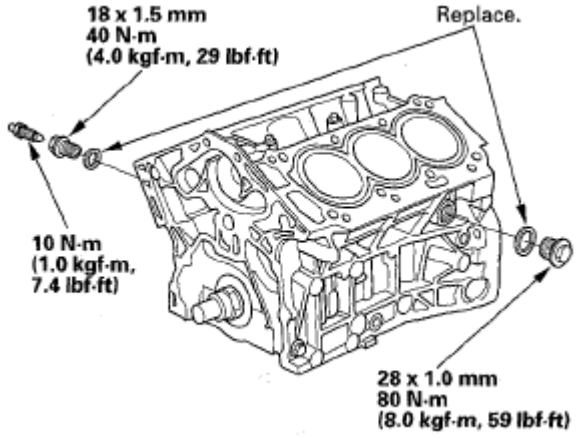

Fig. 71: Identifying Drain Bolt With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

