2002-06 ENGINE

Engine Block - RSX

SPECIAL TOOLS

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

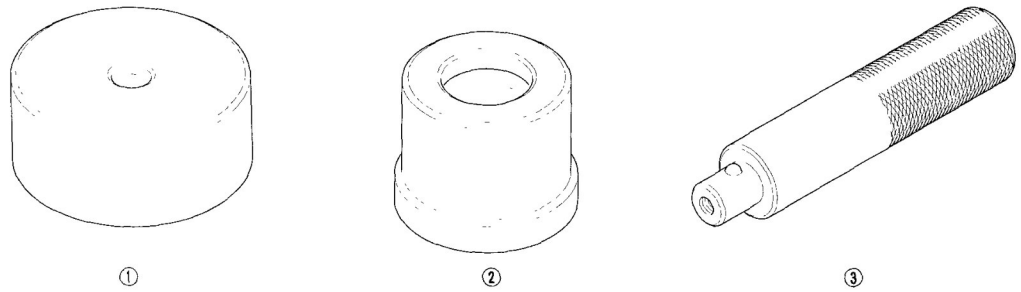

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Fig. 1: Identifying Engine Block Special Tool
Courtesy of AMERICAN HONDA MOTOR CO., INC.

COMPONENT LOCATION INDEX

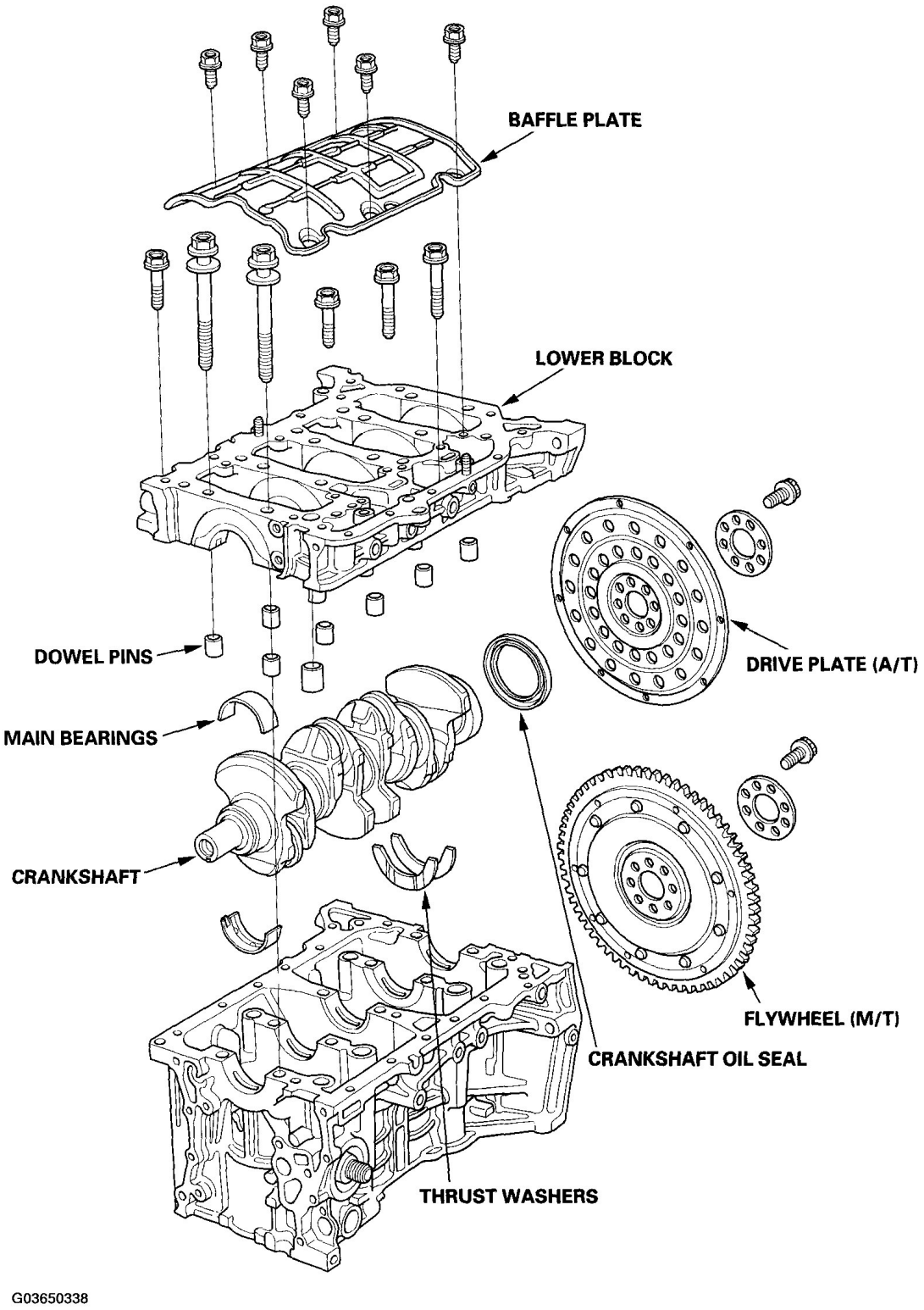


Fig. 2: Identifying Engine Block Component Location Index (1 of 2)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

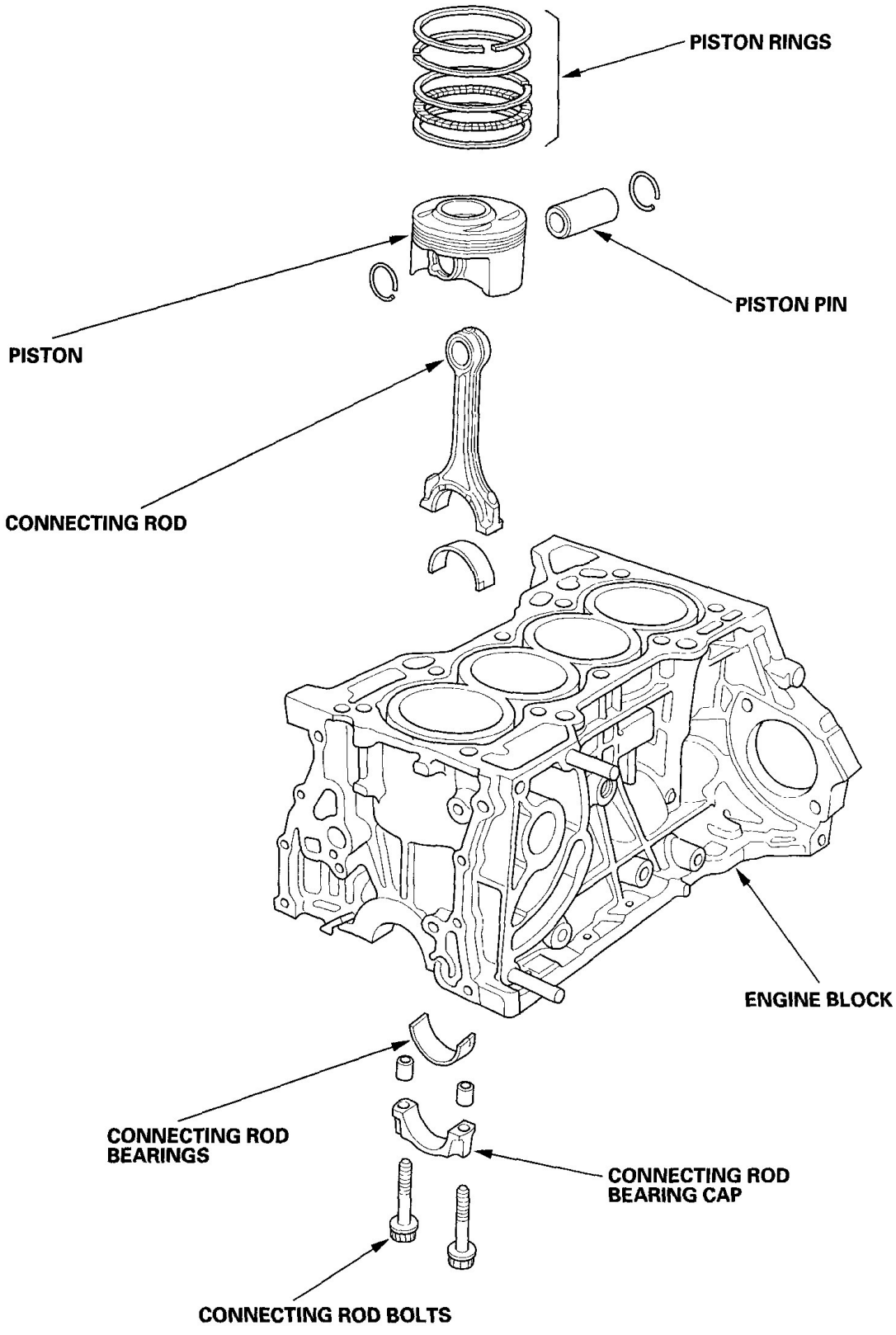


Fig. 3: Identifying Engine Block Component Location Index (2 of 2)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

CONNECTING ROD AND CRANKSHAFT END PLAY INSPECTION

1. Remove the oil pump (see **OIL PUMP REMOVAL**).
2. Remove the baffle plate (see step 7).
3. Measure the connecting rod end play with a feeler gauge between the connecting rod and crankshaft.

   Connecting Rod End Play

   Standard (New): 0.15-0.30 mm (0.006-0.012 in.)

   Service Limit: 0.40 mm (0.016 in.)

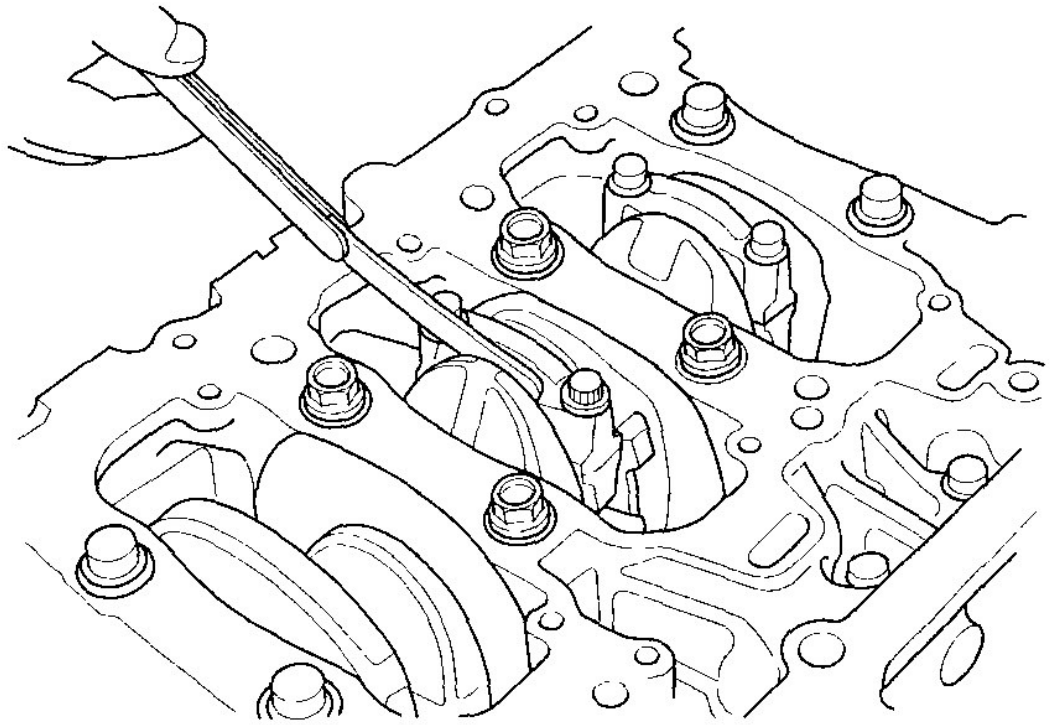


Fig. 4: Measuring Connecting Rod End Play With A Feeler Gauge
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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 step 8).

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.)

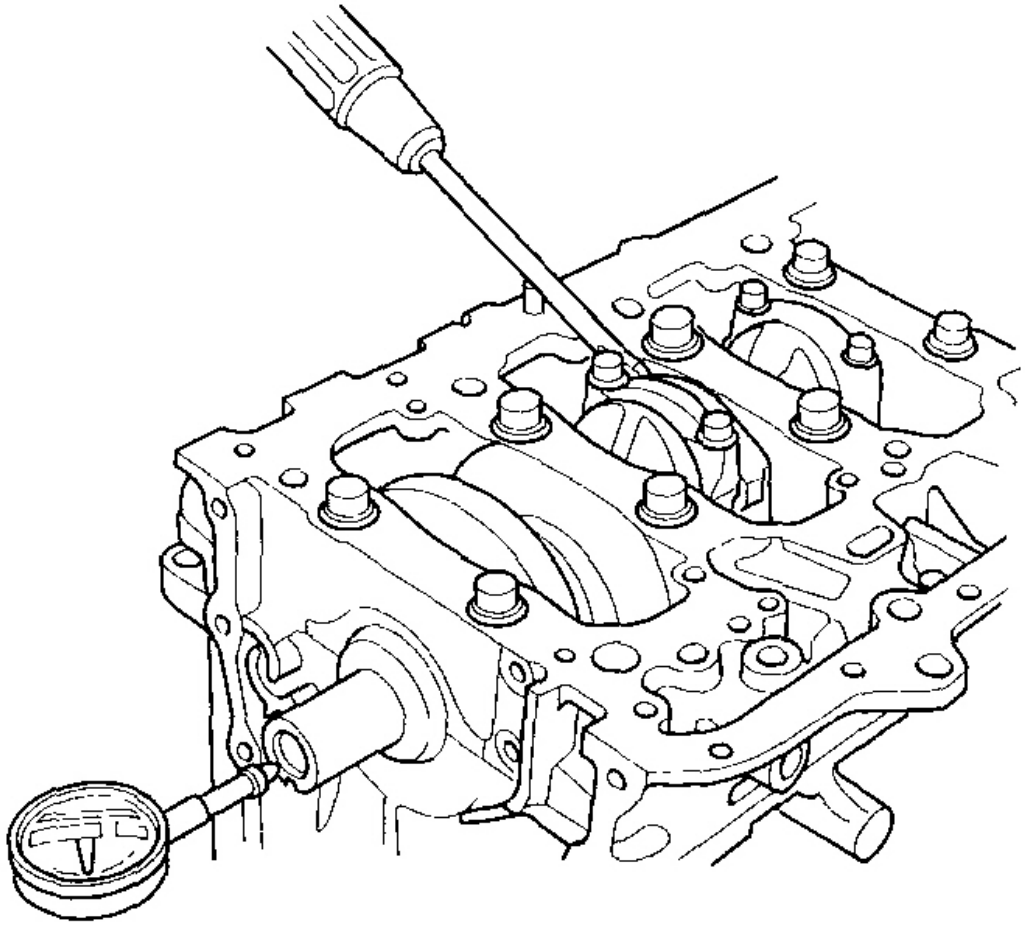


Fig. 5: Pushing Crankshaft Firmly Away From Dial Indicator
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. If the end play is out-of-tolerance, replace the thrust washers and recheck. If it is still out-of-tolerance, replace the crankshaft (see step 8).

CRANKSHAFT MAIN BEARING REPLACEMENT

MAIN BEARING CLEARANCE INSPECTION

1. To check main bearing-to-journal oil clearance, remove the lower block and bearing half (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.
4. Reinstall the bearing half and lower block, then torque the bolts to 29 N.m (3.0 kgf.m, 22 lbf.ft) + 56°.

NOTE: Do not rotate the crankshaft during inspection.

5. Remove the lower block and bearing half again, and measure the widest part of the plastigage.

Main Bearing-to-Journal Oil Clearance

No. 1, 2, 4, 5 Journals:

Standard (New): 0.017 - 0.041 mm (0.0007 - 0.0016 in.)

Service Limit: 0.050 mm (0.0020 in.)

No. 3 Journal:

Standard (New): 0.025 - 0.049 mm (0.0010 - 0.0019 in.)

Service Limit: 0.055 mm (0.0022 in.)

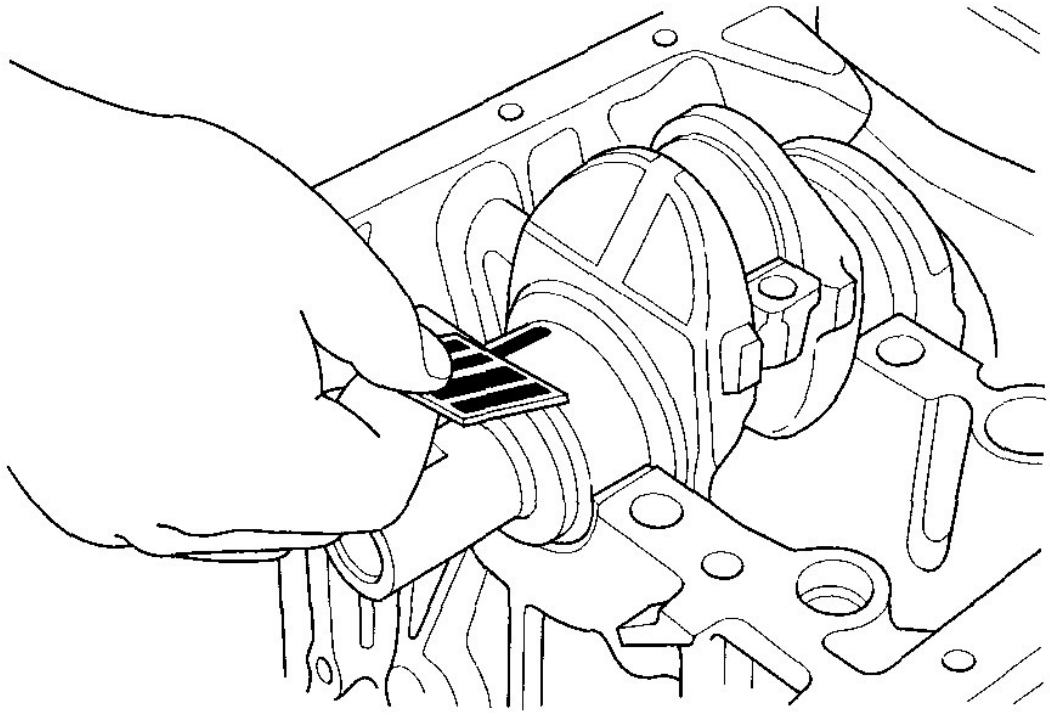


Fig. 6: Measuring The Widest Part Of The Plastigage
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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(s), 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 and start over.

MAIN BEARING SELECTION

Crankshaft Bore Code Location

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

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

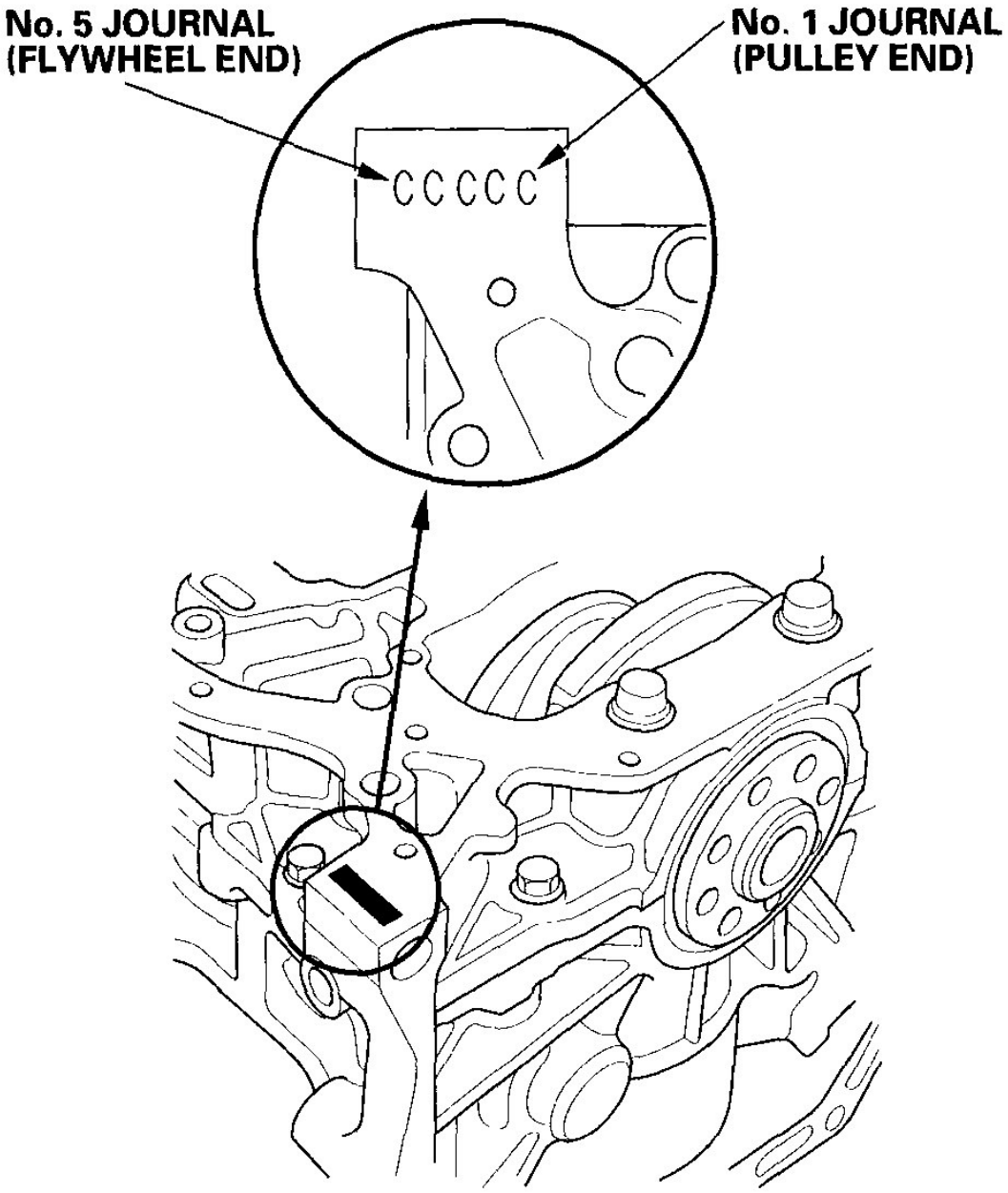
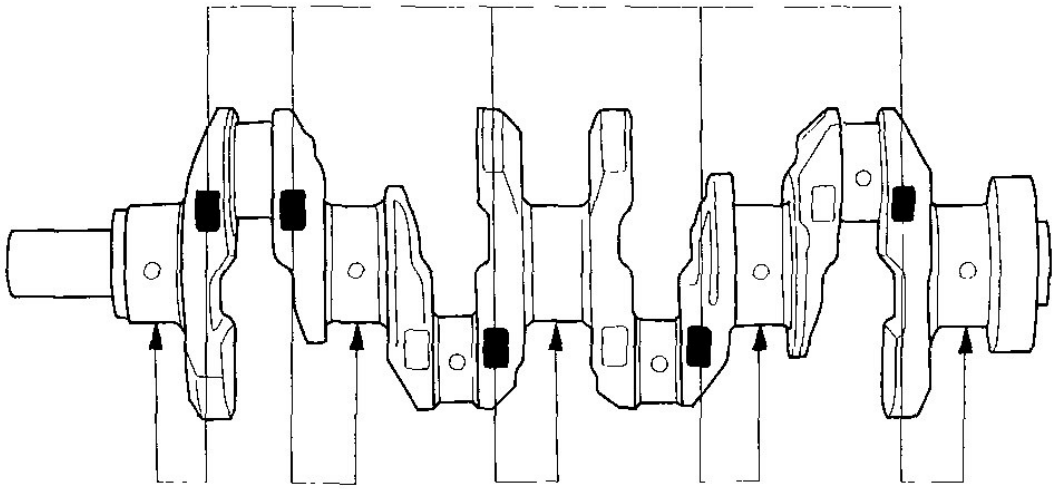


Fig. 7: Locating Journal Bore Codes
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Main Journal Code Location

2. The main journal codes are stamped on the crankshaft.



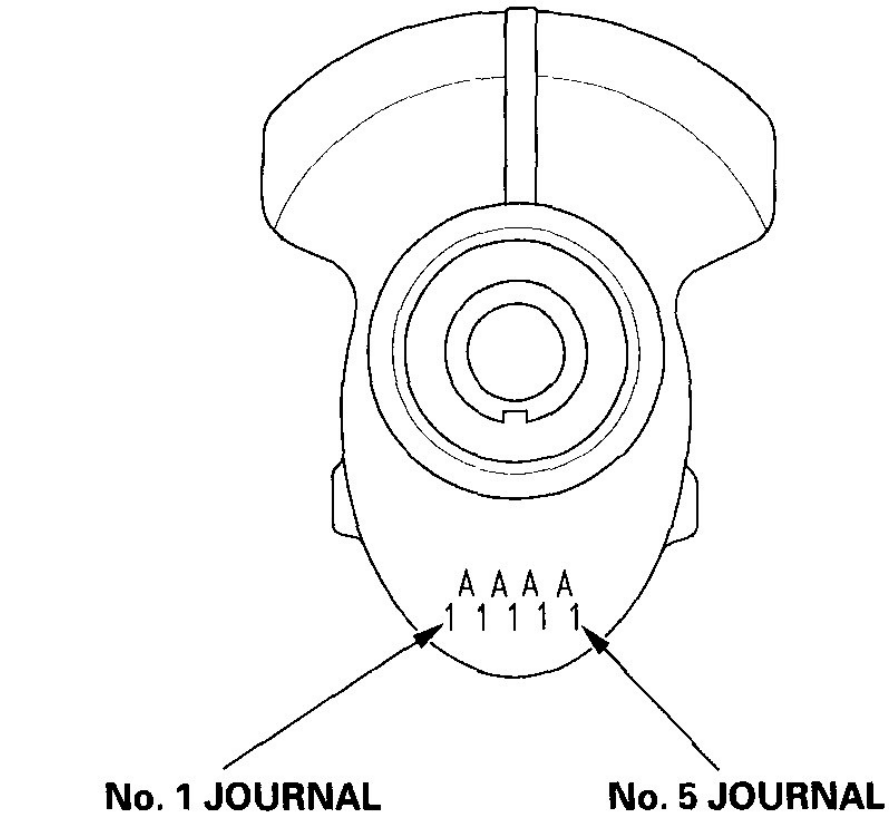


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Fig. 8: Identifying Journal Codes
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

NOTE:

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

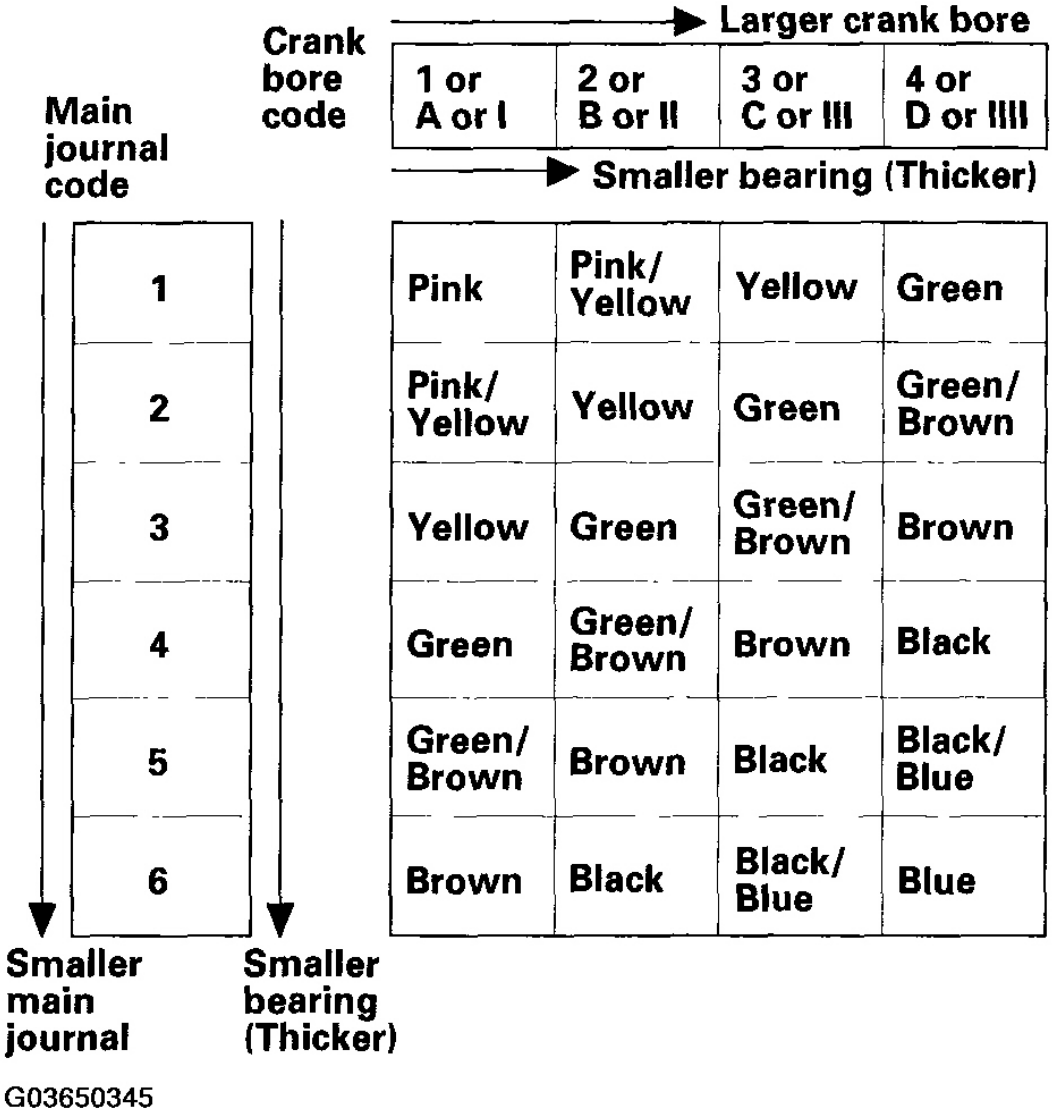


Fig. 9: Identifying Crank Bar Codes

Courtesy of AMERICAN HONDA MOTOR CO., INC.

CONNECTING ROD BEARING REPLACEMENT

ROD BEARING CLEARANCE INSPECTION

1. Remove the oil pump (see **OIL PUMP REMOVAL**).
2. Remove the baffle plate (see step 7).
3. Remove the connecting rod cap and bearing half.
4. Clean the crankshaft rod journal and bearing half with a clean shop towel.
5. Place plastigage across the rod journal.
6. Reinstall the bearing half and cap, and torque the bolts.

   Tightening Torque

   K20A3 Engine: 20 N.m (2.0 kgf.m, 14 lbf.ft)

   + 90°

   K20A2, K20Z1 Engines: 29 N.m (3.0 kgf.m, 22 lbf.ft)

   + 90°

   NOTE: Do not rotate the crankshaft during inspection.

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

   Connecting Rod Bearing-to-Journal Oil Clearance

   K20A3 Engine:

   Standard (New): 0.020-0.050 mm

   (0.0008-0.0020 in.)

   Service Limit: 0.060 mm (0.0024 in.)

   K20A2, K20Z1 Engines:

   Standard (New): 0.033-0.061 mm

   (0.0013-0.0024 in.)

   Service Limit: 0.072 mm (0.0028 in.)

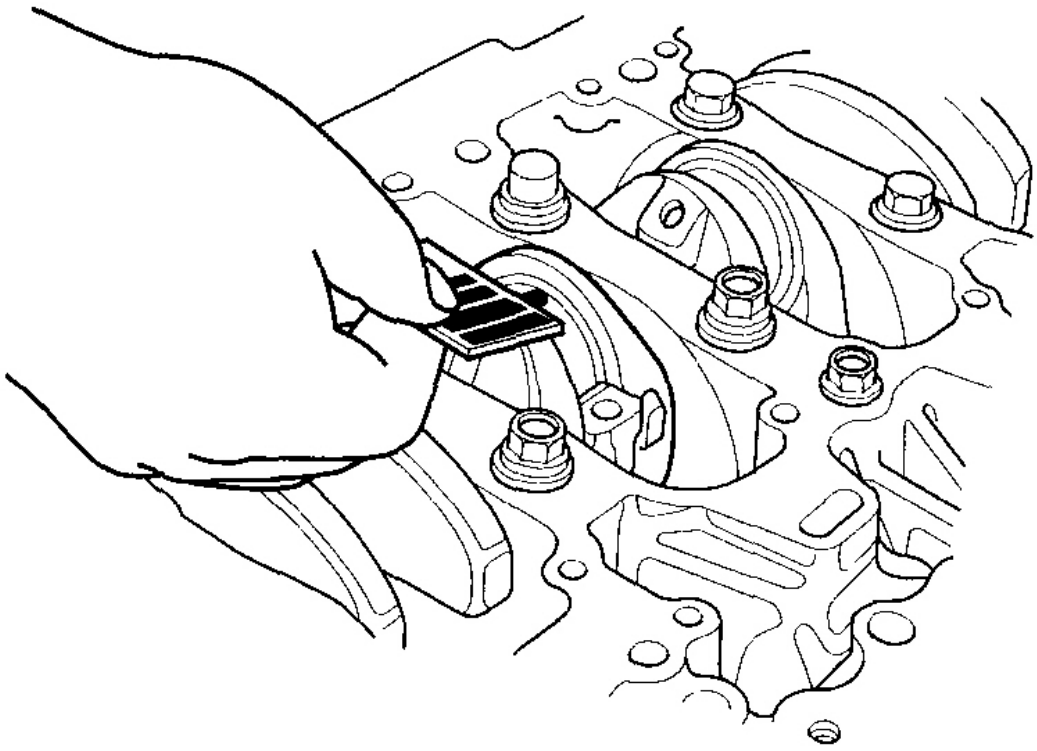


Fig. 10: Measuring The Widest Part Of The Plastigage
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

ROD BEARING SELECTION

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

Connecting Rod Big End Bore Code Locations

2. Each rod has a tolerance range 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 numbers and bars in any engine, (Half the

number or bar is stamped on the bearing cap, the other half on the rod).

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

Normal Bore Size

K20A3 Engine: 48.0 mm (1.89 in.)

K20A2, K20Z1 Engines: 51.0 mm (2.01 in.)

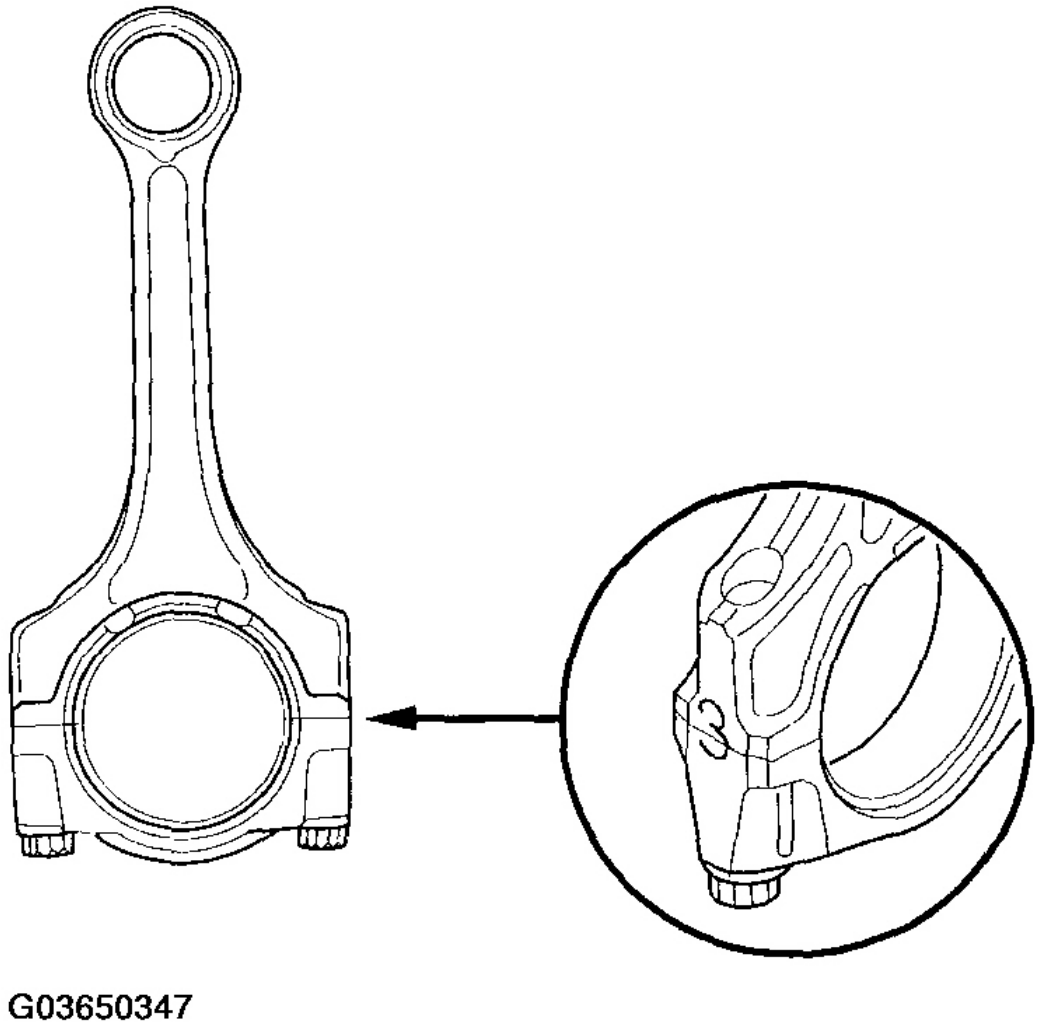


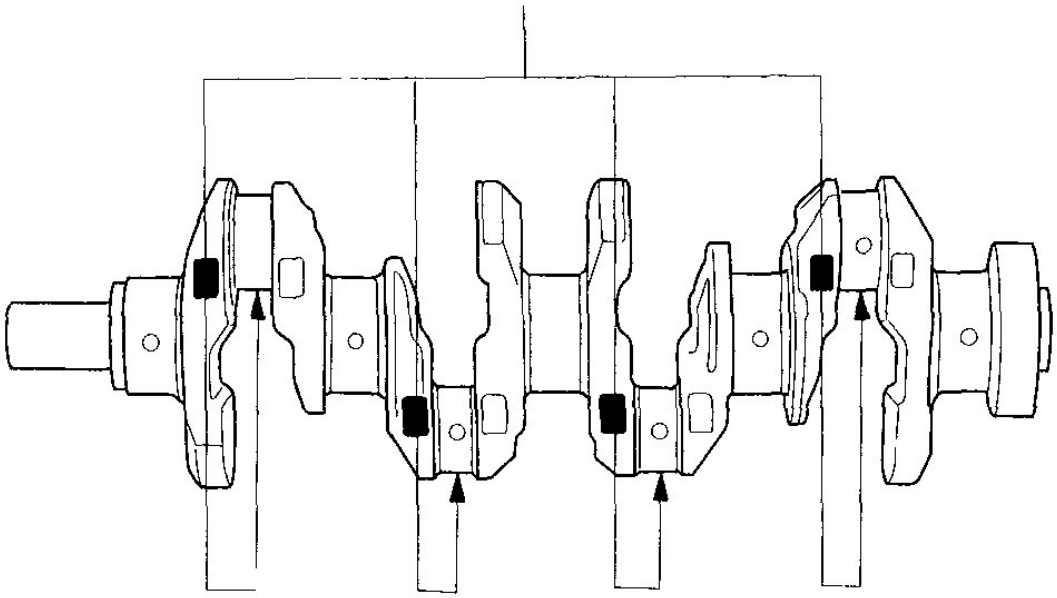
Fig. 11: Identifying Bore Size
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Connecting Rod Journal Code Location

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

Connecting Rod Journal Code Location

(Letters or Bars)



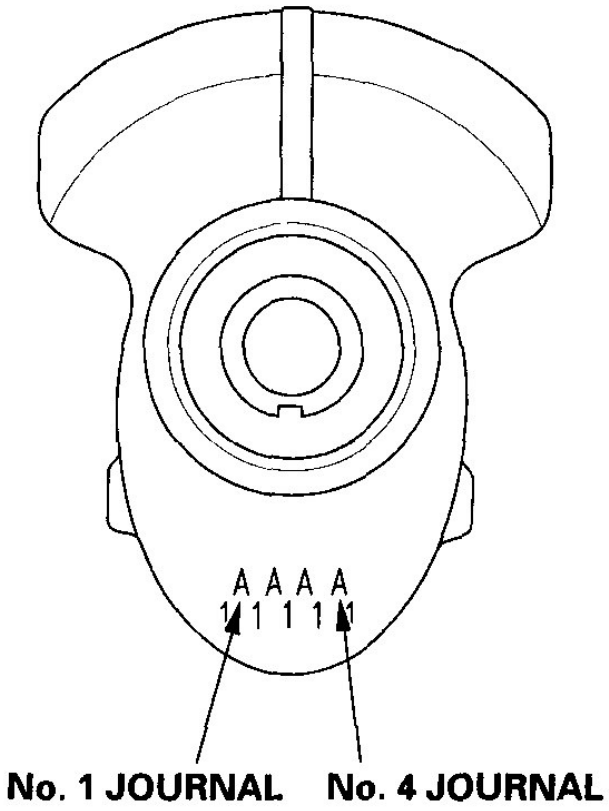


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Fig. 12: Identifying Connecting Rod Journal Codes
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

NOTE:

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

K20A3 engine:

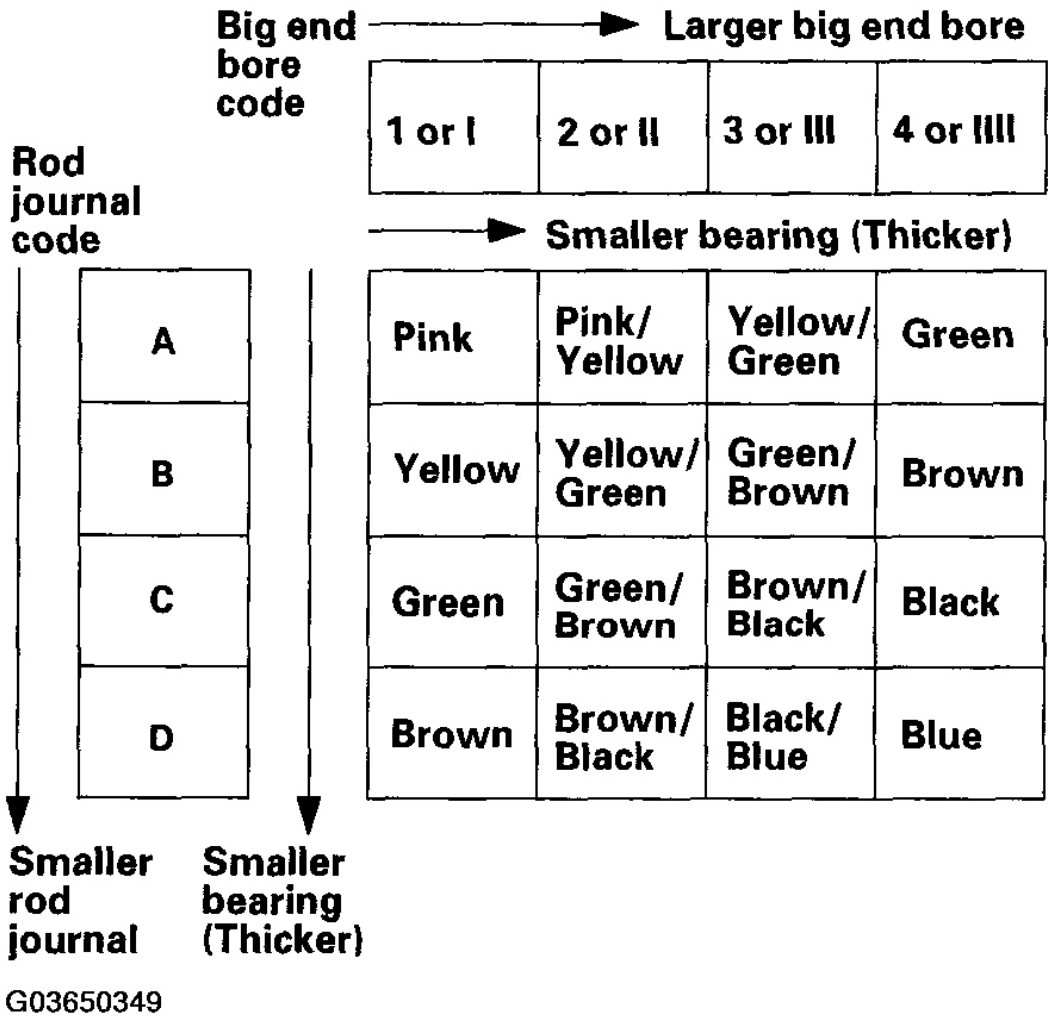

Fig. 13: Identifying Big End Bar Codes : K20A3
Courtesy of AMERICAN HONDA MOTOR CO., INC.

K20A2, K20Z1 engines:

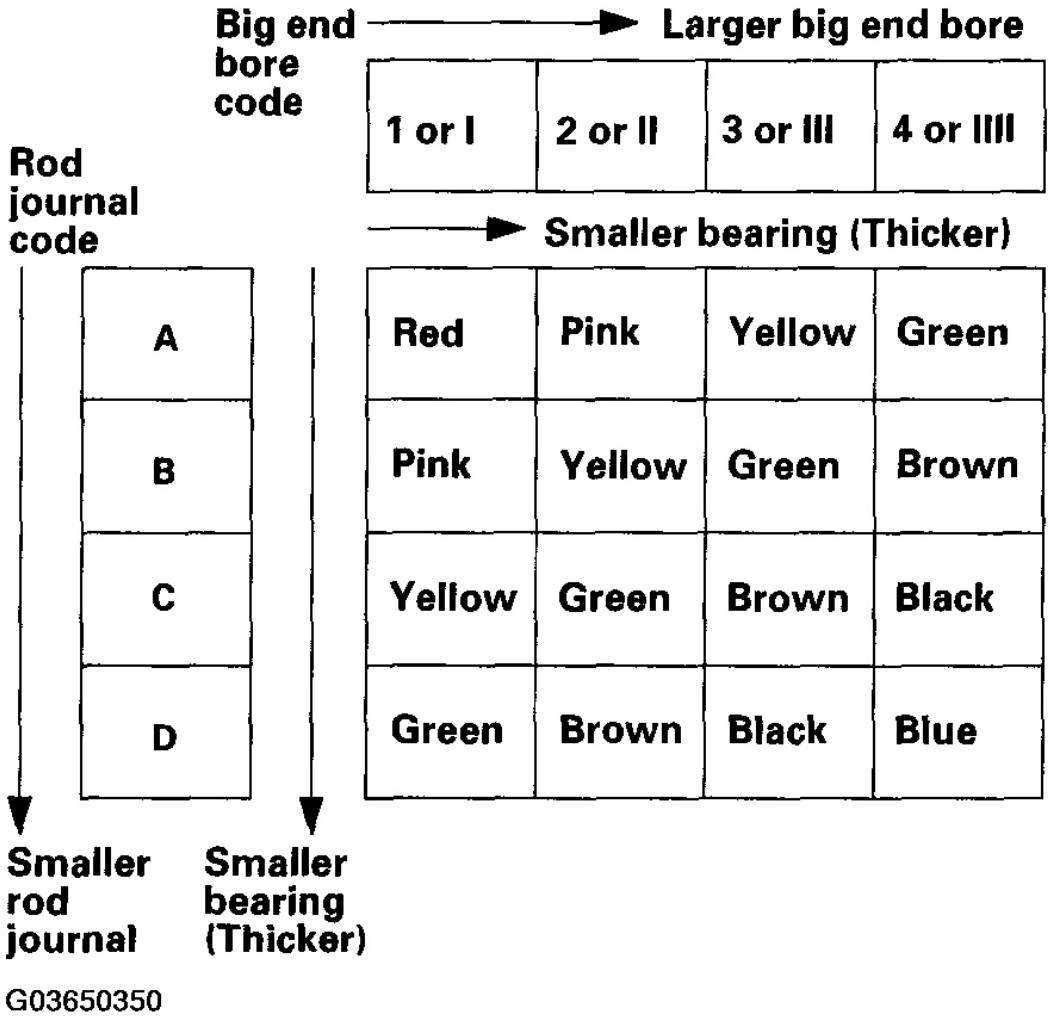

Fig. 14: Identifying Big End Bar Codes : K20A2
Courtesy of AMERICAN HONDA MOTOR CO., INC.

OIL PAN REMOVAL

K20A3 ENGINE

1. If the engine is still in the vehicle, remove the subframe.
   - 1 Drain the engine oil (see **ENGINE OIL REPLACEMENT**).
   - 2 Attach the chain hoist to the engine (see step 41 on **ENGINE INSTALLATION**).
   - 3 Disconnect the suspension lower arm ball joints (see step 10 on **KNUCKLE/HUB/WHEEL**

BEARING REPLACEMENT).

- 4 Remove the rear mount mounting bolts (see step 45 on **ENGINE INSTALLATION**).
- 5 Remove the front mount mounting bolt (see step 46 on **ENGINE INSTALLATION**).
- 6 Remove the automatic transmission (ATF) filter mounting bolt (A/T) (see step 36 on **ENGINE INSTALLATION**).
- 7 Use a marker to make alignment marks on the reference lines that align with the centers of the rear subframe mounting bolts. Remove the front subframe (see step 48 on **ENGINE INSTALLATION**).

2. Remove the bolts/nuts securing the oil pan.
3. Drive an oil pan seal cutter between the oil pan and engine block.

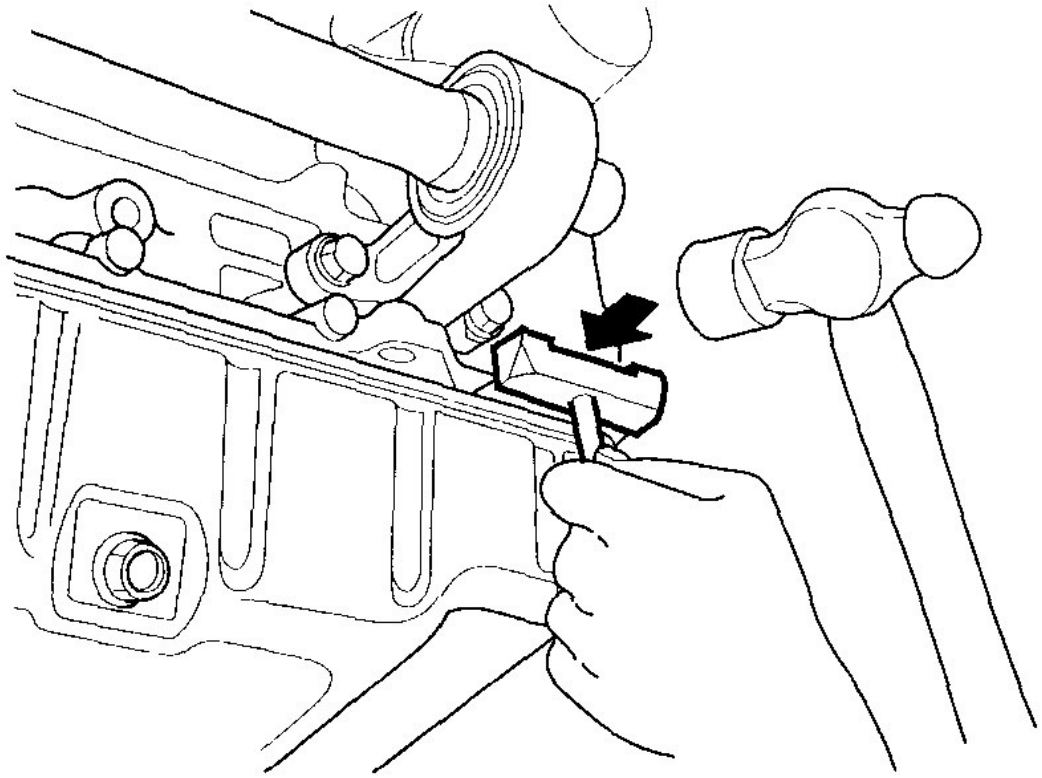

Fig. 15: Driving Oil Pan Seal Cutter Between Oil Pan And Engine Block
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Cut the oil pan seal by striking the side of the cutter to slide the cutter along the oil pan.

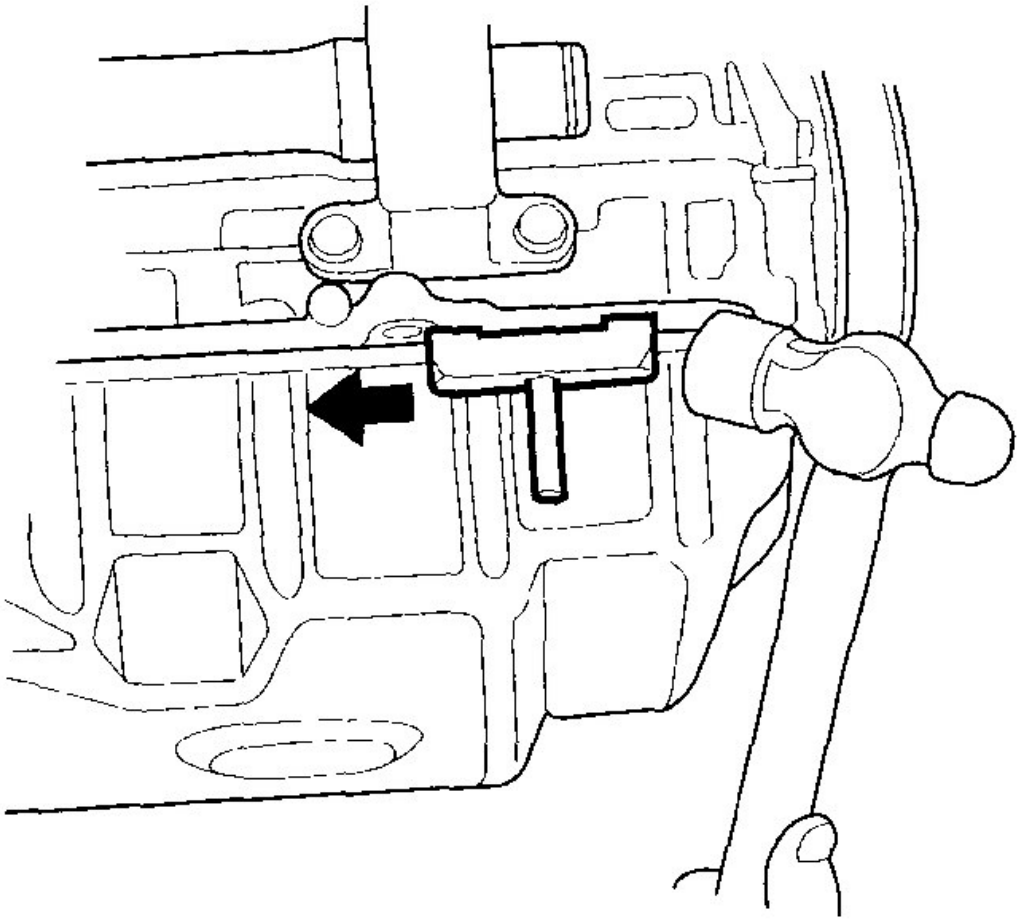

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Fig. 16: Cutting Oil Pan Seal By Striking Side Of Cutter
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Remove the oil pan.

K20A2, K20Z1 ENGINES

1. If the engine is still in the vehicle, remove the subframe.
   - 1 Drain the engine oil (see **ENGINE OIL REPLACEMENT**).
   - 2 Attach the chain hoist to the engine (see step 41 on **ENGINE INSTALLATION**).
   - 3 Disconnect the suspension lower arm ball joints (see step 10 on **KNUCKLE/HUB/WHEEL BEARING REPLACEMENT**).

- 4 Remove the rear mount mounting bolts (see step 45 on **ENGINE INSTALLATION**).
- 5 Remove the front mount mounting bolt (see step 46 on **ENGINE INSTALLATION**).
- 6 Use a marker to make alignment marks on the reference lines that align with the centers of the rear subframe mounting bolts. Remove the front subframe (see step 48 on **ENGINE INSTALLATION**).

2. Remove the clutch cover (A), and remove the two bolts (B) securing the transmission.

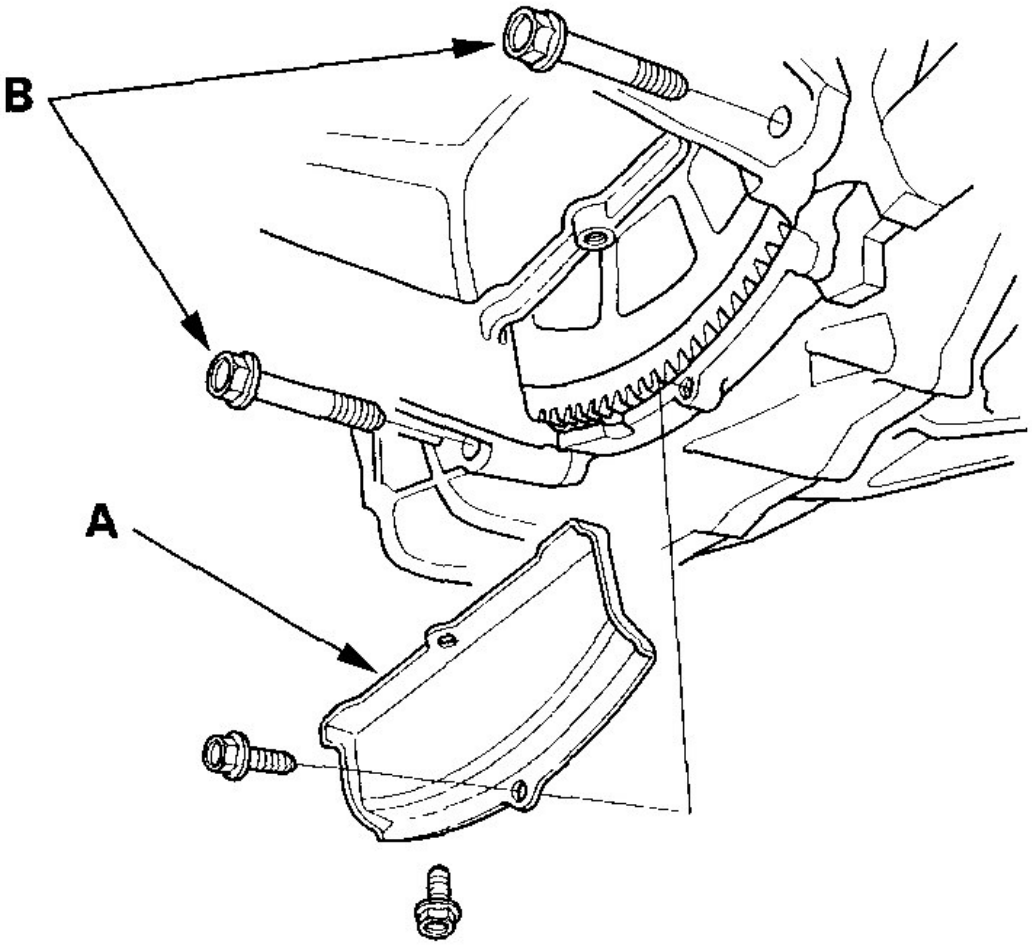

Fig. 17: Removing Clutch Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Remove the bolts/nuts securing the oil pan.
4. Insert a flat tip screwdriver where shown, and separate the oil pan from the block.

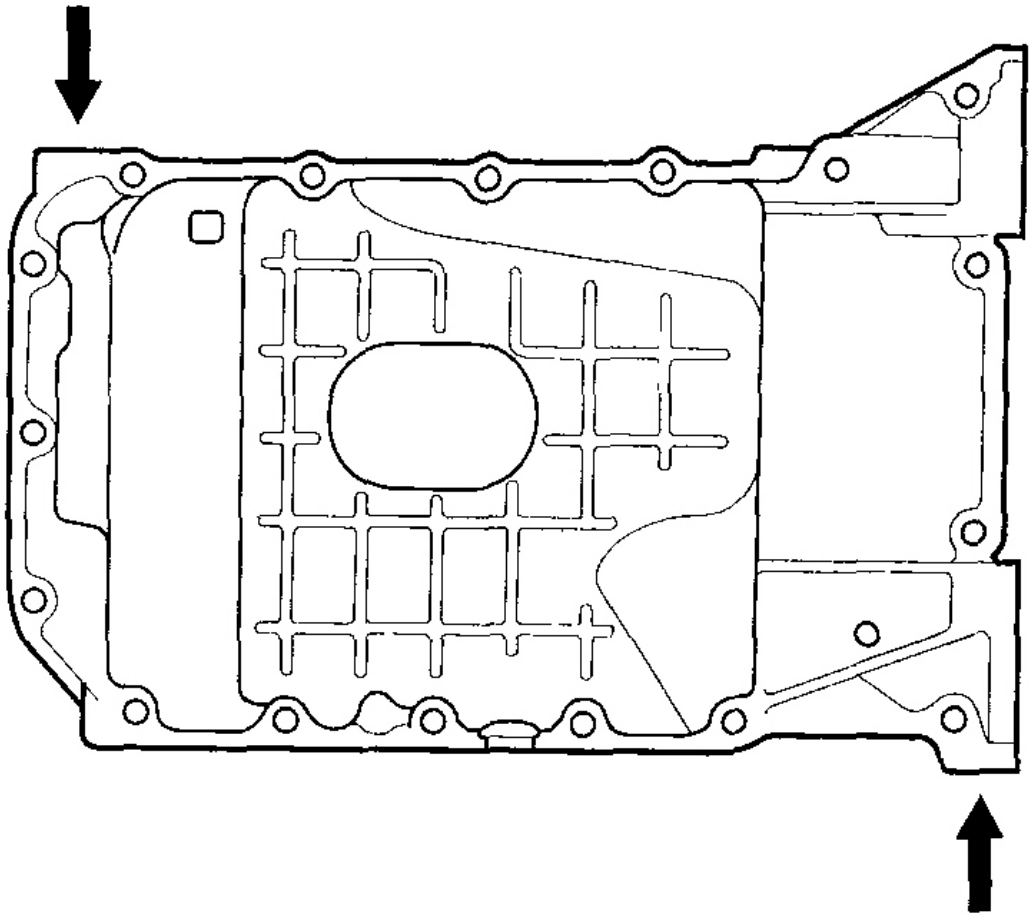

Fig. 18: Identifying Oil Pan
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Remove the oil pan.

CRANKSHAFT AND PISTON REMOVAL

1. Remove the engine assembly (see **ENGINE INSTALLATION**).
2. A/T model: Remove the transmission (see **TRANSMISSION REMOVAL**), then remove the drive plate (see **DRIVE PLATE REMOVAL AND INSTALLATION**).
3. M/T model: Remove the transmission (see **TRANSMISSION REMOVAL**). Remove the pressure plate and clutch disc (see **CLUTCH REPLACEMENT**), then remove the flywheel (see **FLYWHEEL REPLACEMENT**).

4. Remove the oil pan (see **OIL PAN REMOVAL**).
5. Remove the oil pump (see **OIL PUMP REMOVAL**).
6. Remove the cylinder head (see **CYLINDER HEAD REMOVAL**).
7. Remove the baffle plate.

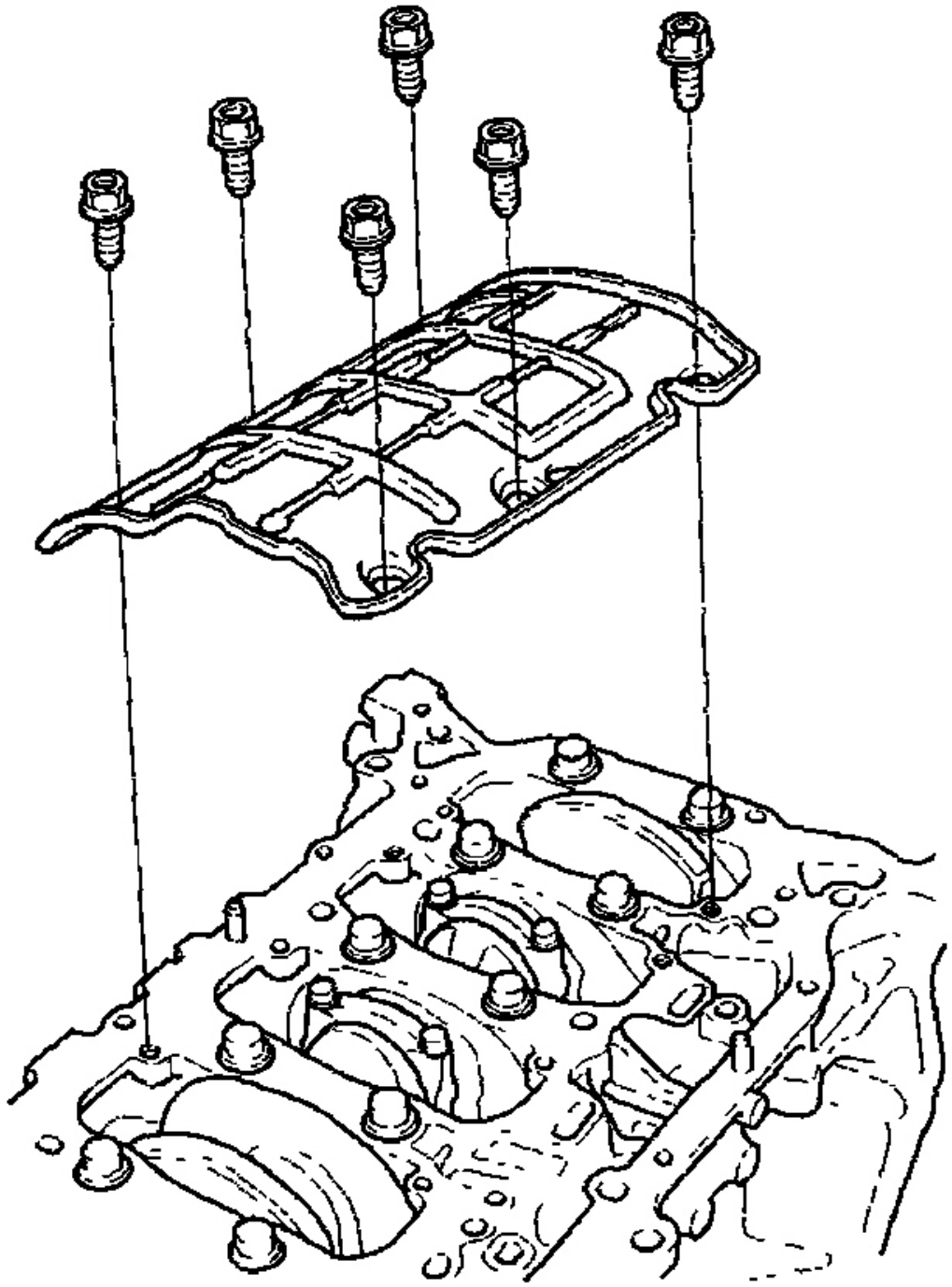

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Fig. 19: Removing Baffle Plate
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. If you can feel a ridge of metal or hard carbon around the top of each cylinder, remove it with a ridge reamer (A). Follow the reamer manufacturer's instructions. If the ridge is not removed, it may damage the pistons as they are pushed out.

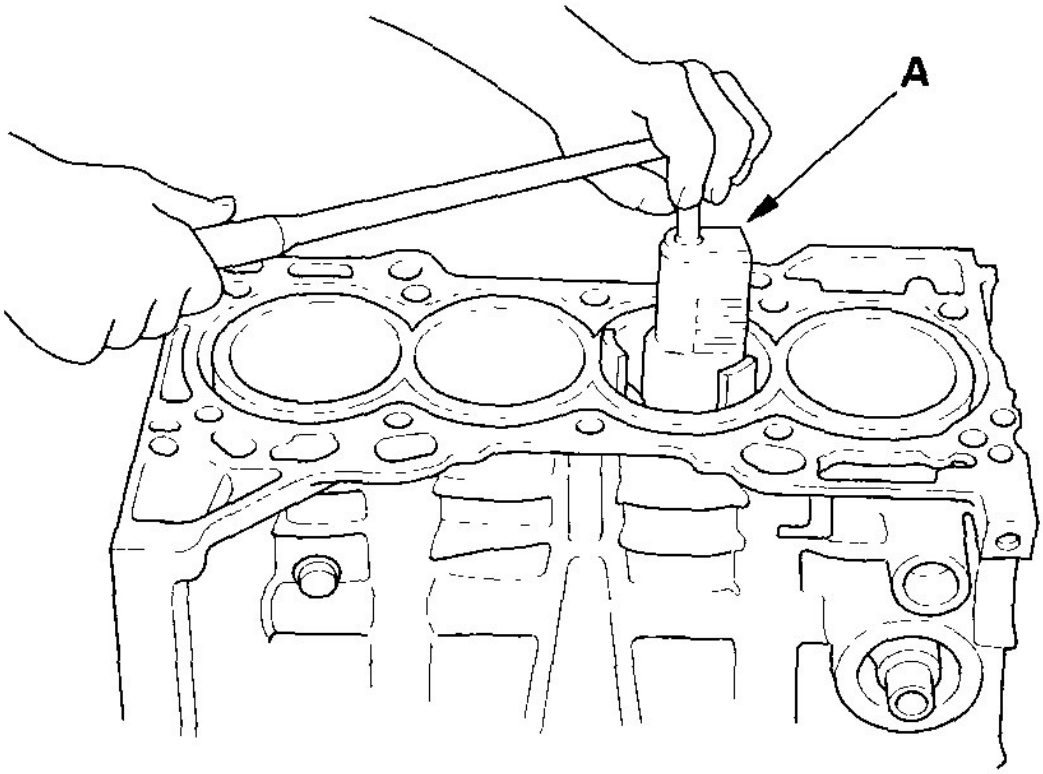

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Fig. 20: Pushing Piston Out
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Remove the 8 mm bolts.

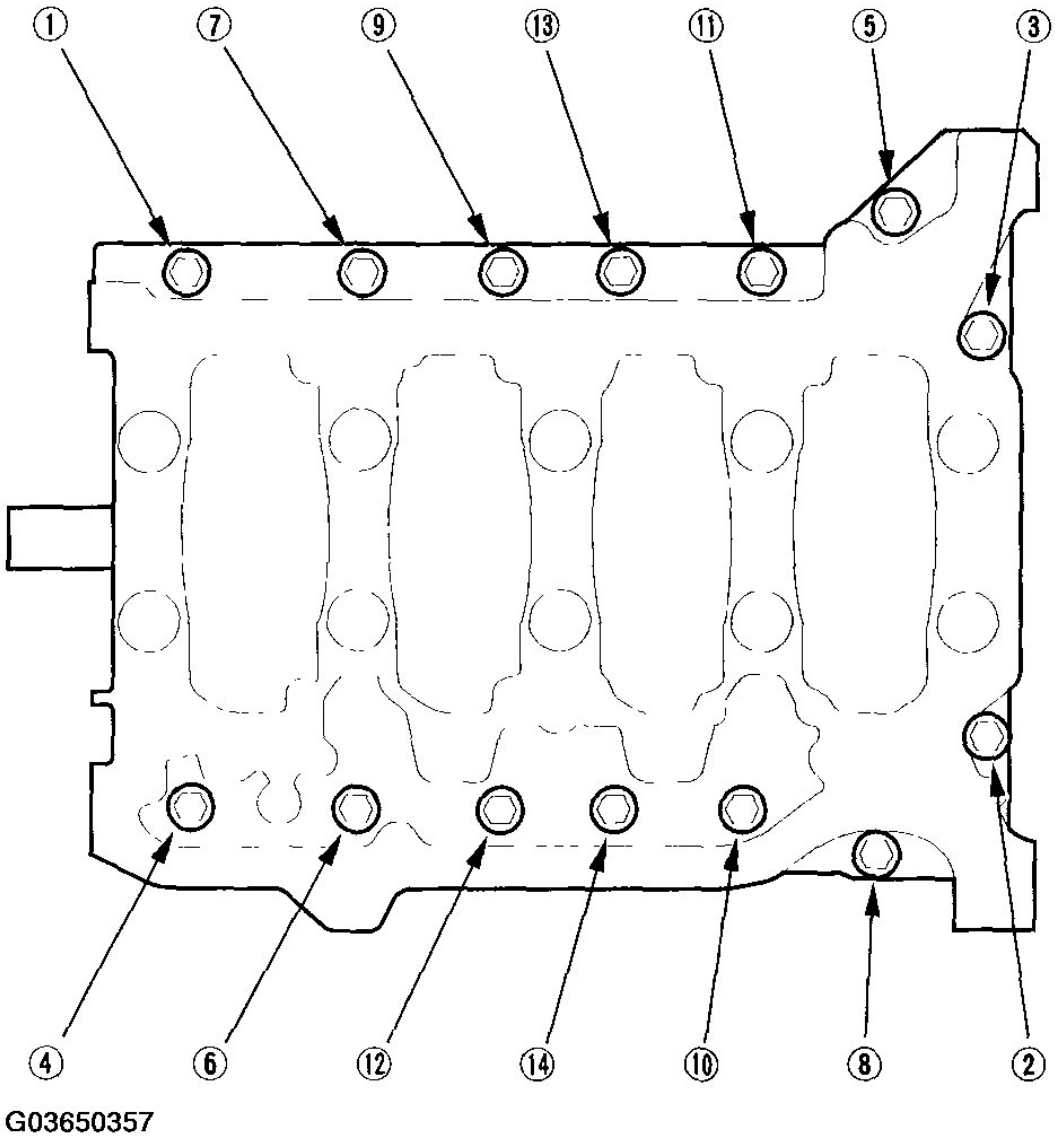


Fig. 21: 8mm Bolts Removal Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

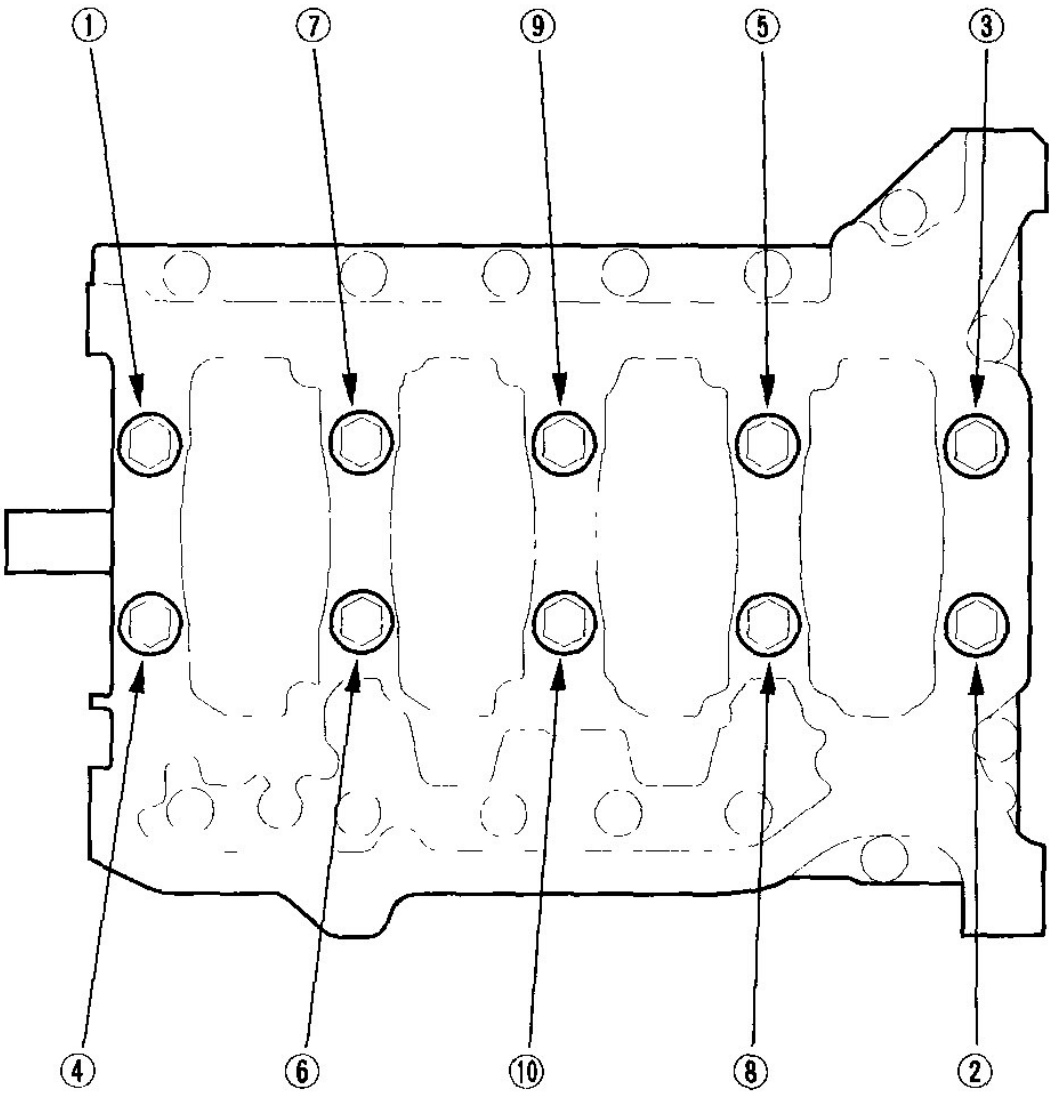
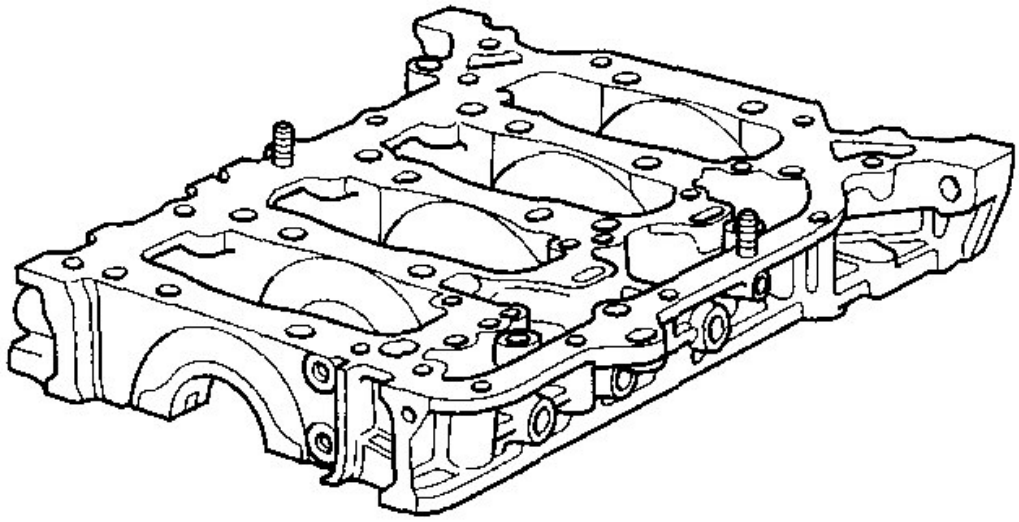


Fig. 22: Bearing Cap Bolts Removal Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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



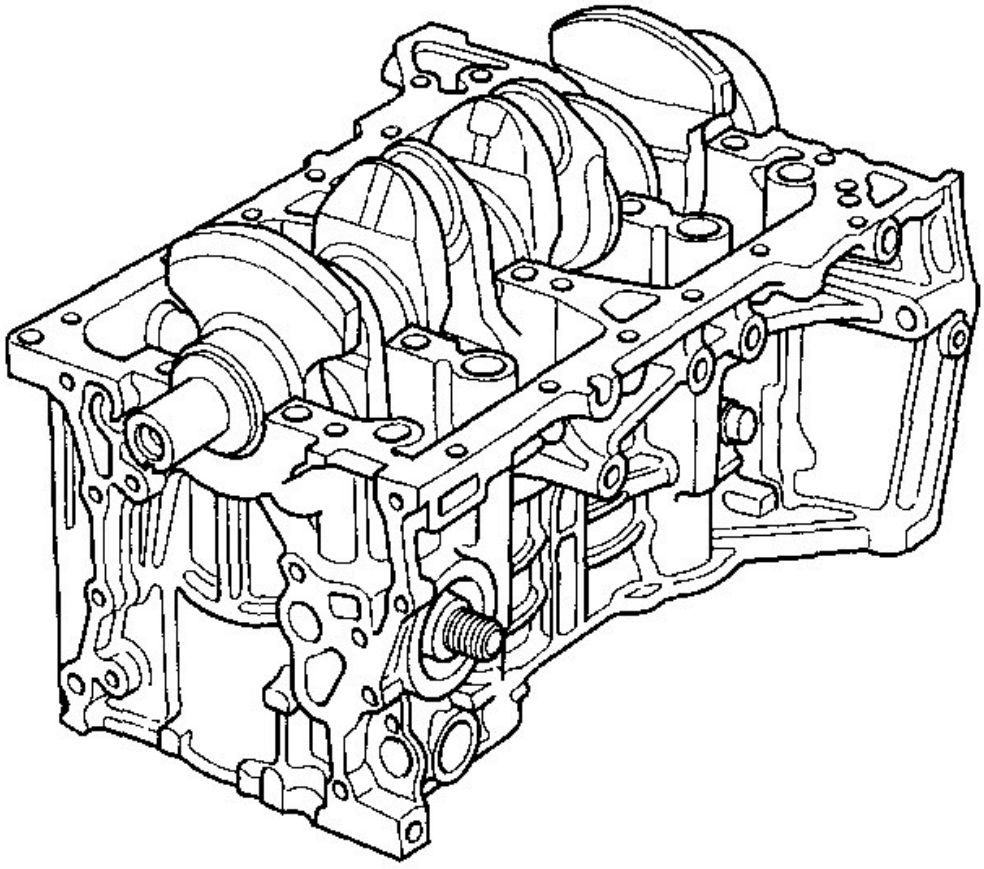


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Fig. 23: Removing Lower Block And Bearings
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Remove the rod caps/bearings. Keep all caps/bearings in order.
13. Lift the crankshaft out of the engine, being careful not to damage the journals.

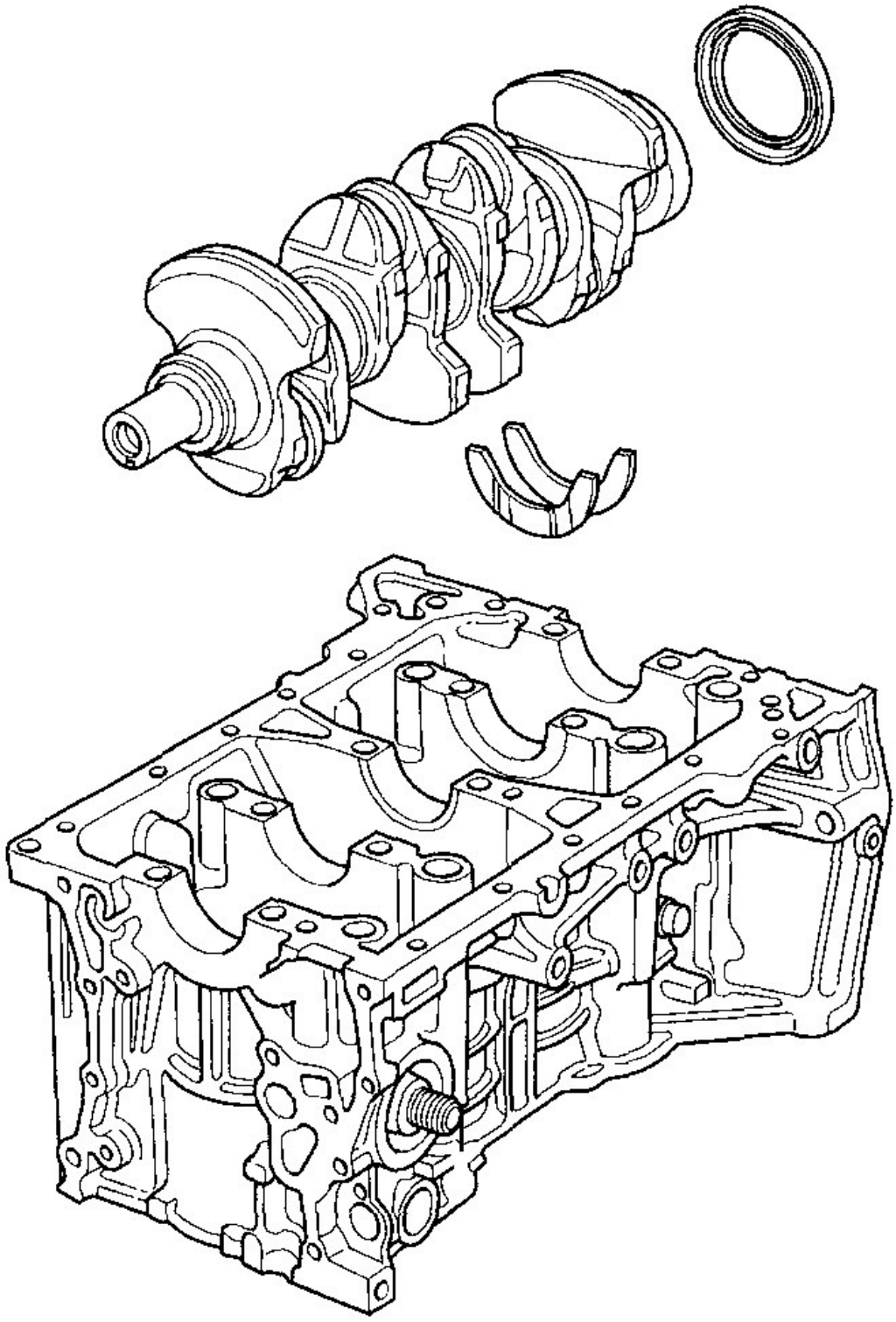

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Fig. 24: Lifting Crankshaft Out Of Engine
Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. Remove the upper bearing halves from the connecting rods, and set them aside with their respective caps.
15. Use the wooden handle of a hammer (A) to drive out the pistons (B).

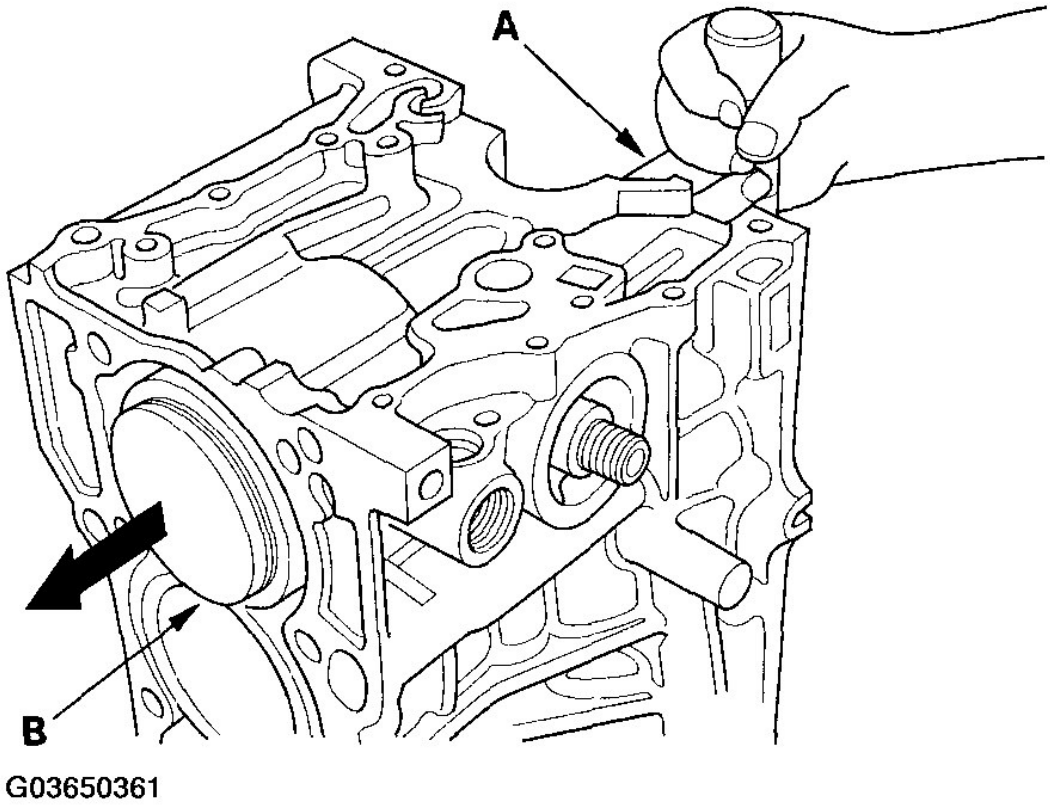

Fig. 25: Driving Out Pistons Using Wooden Hammer
Courtesy of AMERICAN HONDA MOTOR CO., INC.

16. Reinstall the lower block and bearings on the engine in the proper order.
17. Reinstall the connecting rod bearings and caps after removing each piston/connecting rod assembly.
18. To avoid mix-up on reassembly, mark each piston/connecting rod assembly with its cylinder number.

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

CRANKSHAFT INSPECTION

OUT-OF-ROUND AND TAPER

1. Remove the crankshaft from the engine block (see **CRANKSHAFT AND PISTON REMOVAL**).
2. Clean the crankshaft oil passages with pipe cleaners or a suitable brush.
3. Clean the keyway and threads.
4. Measure out-of-round at the middle of each rod and main journal in two places. The difference between measurements on each journal must not be more than the service limit.

   Journal Out-of-Round

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

   Service Limit: 0.010 mm (0.0004 in.)

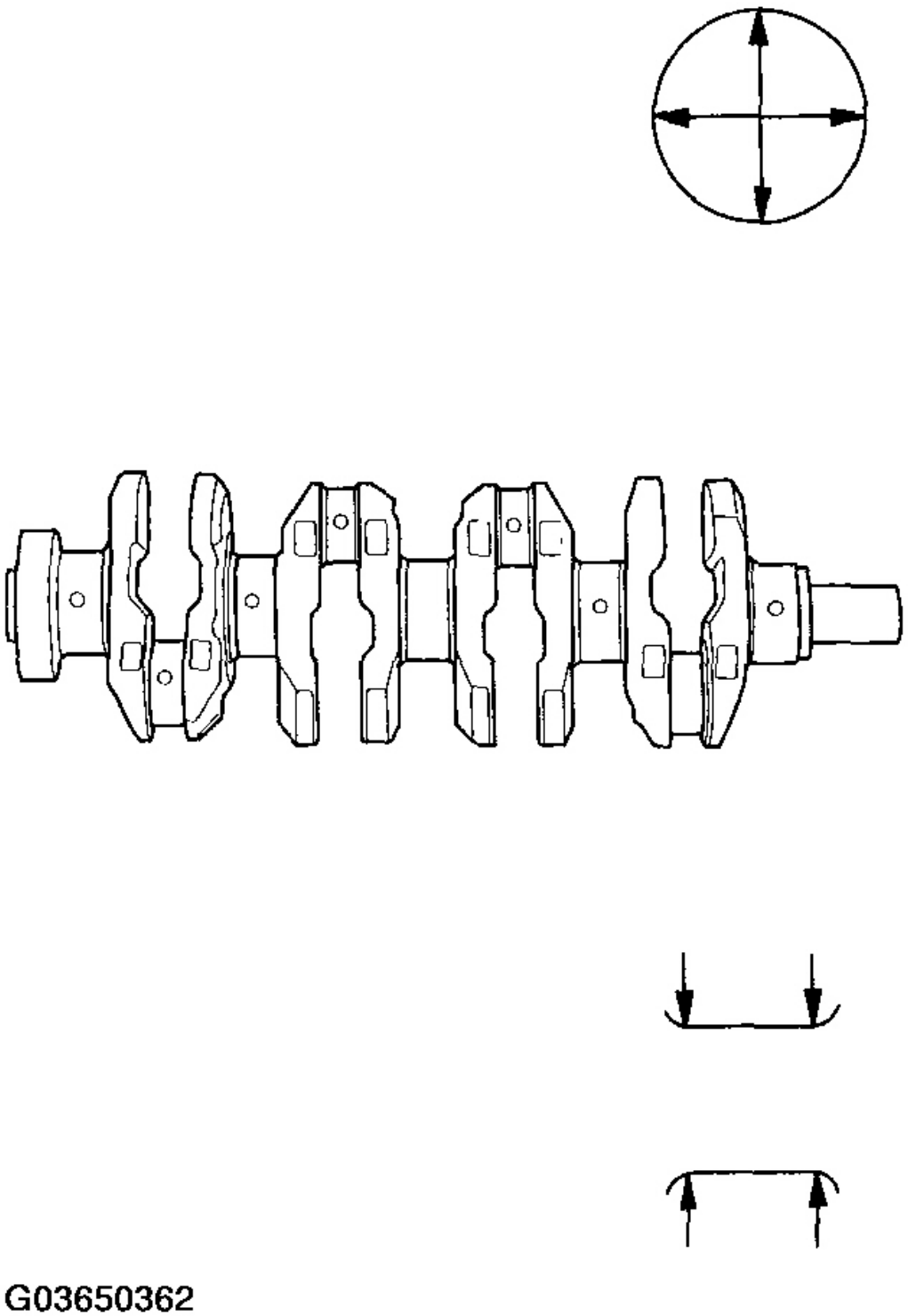

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Fig. 26: Measuring Out-Of-Round At Middle Of Each Rod And Main Journal
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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 the surface plate.
7. Clean and install the bearings on the No. 1 and No. 5 journal of the engine block.
8. Lower the crankshaft into the block.
9. Measure runout on all 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

K20A3 Engine:

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

Service Limit: 0.04 mm (0.0016 in.)

K20A2, K20Z1 Engines:

Standard (New): 0.02 mm (0.0008 in.) max.

Service Limit: 0.03 mm (0.0012 in.)

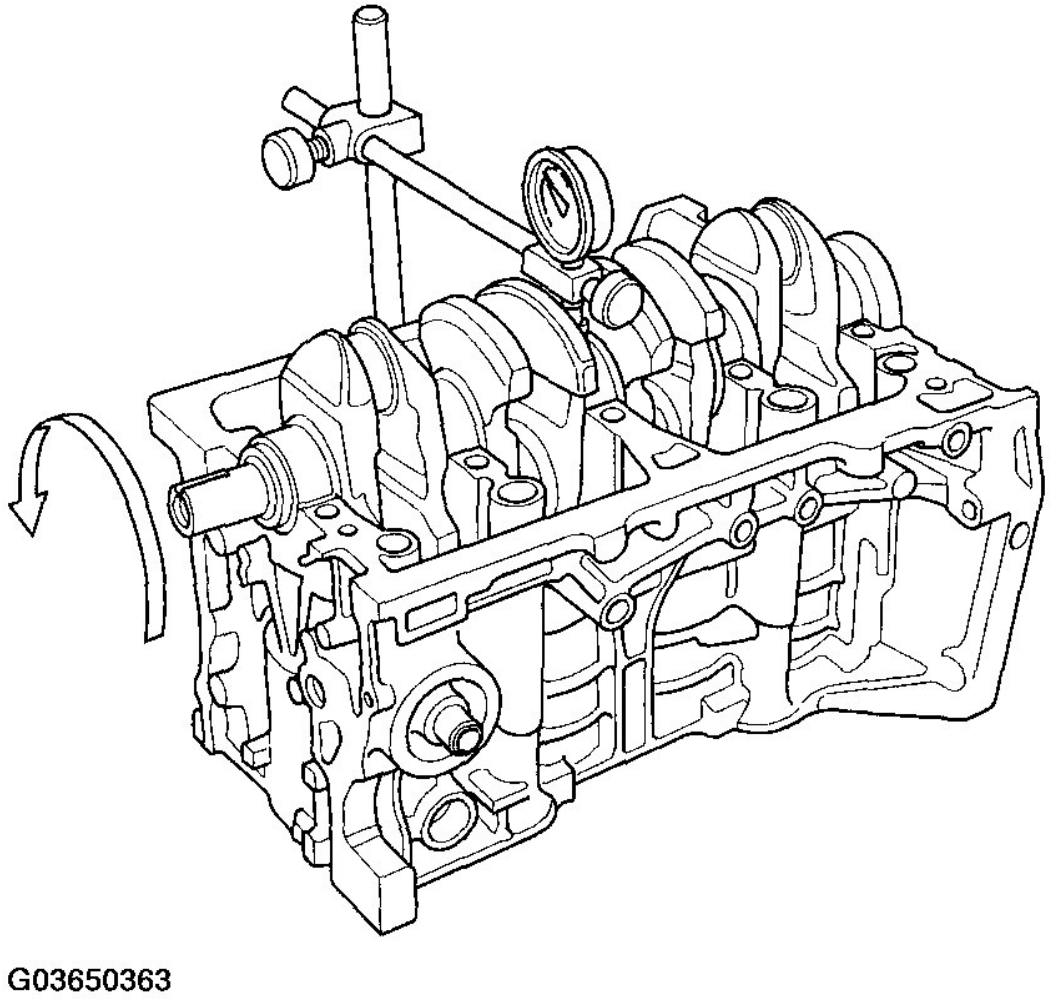

Fig. 27: Measuring Runout On All Main Journals
Courtesy of AMERICAN HONDA MOTOR CO., INC.

BLOCK AND PISTON INSPECTION

1. Remove the crankshaft and pistons (see **CRANKSHAFT AND PISTON REMOVAL**).
2. Check the piston for distortion or cracks.
3. Measure the piston diameter at a point 11 mm (0.4 in.) from the bottom of the skirt. There are two standard-size pistons (No Letter or A, and B). The letter is stamped on the top of the piston. Letters are also stamped on the block as cylinder bore sizes.

Piston Diameter

Standard (New):

No Letter (or A): 85.980-85.990 mm

(3.3850-3.3854 in.)

B: 85.970-85.980 mm

(3.3846-3.3850 in.)

Service Limit:

No Letter (or A): 85.930 mm (3.3831 in.)

B: 85.920 mm (3.3827 in.)

Oversize Piston Diameter

0.25: 86.230-86.240 mm (3.3949-3.3953 in.)

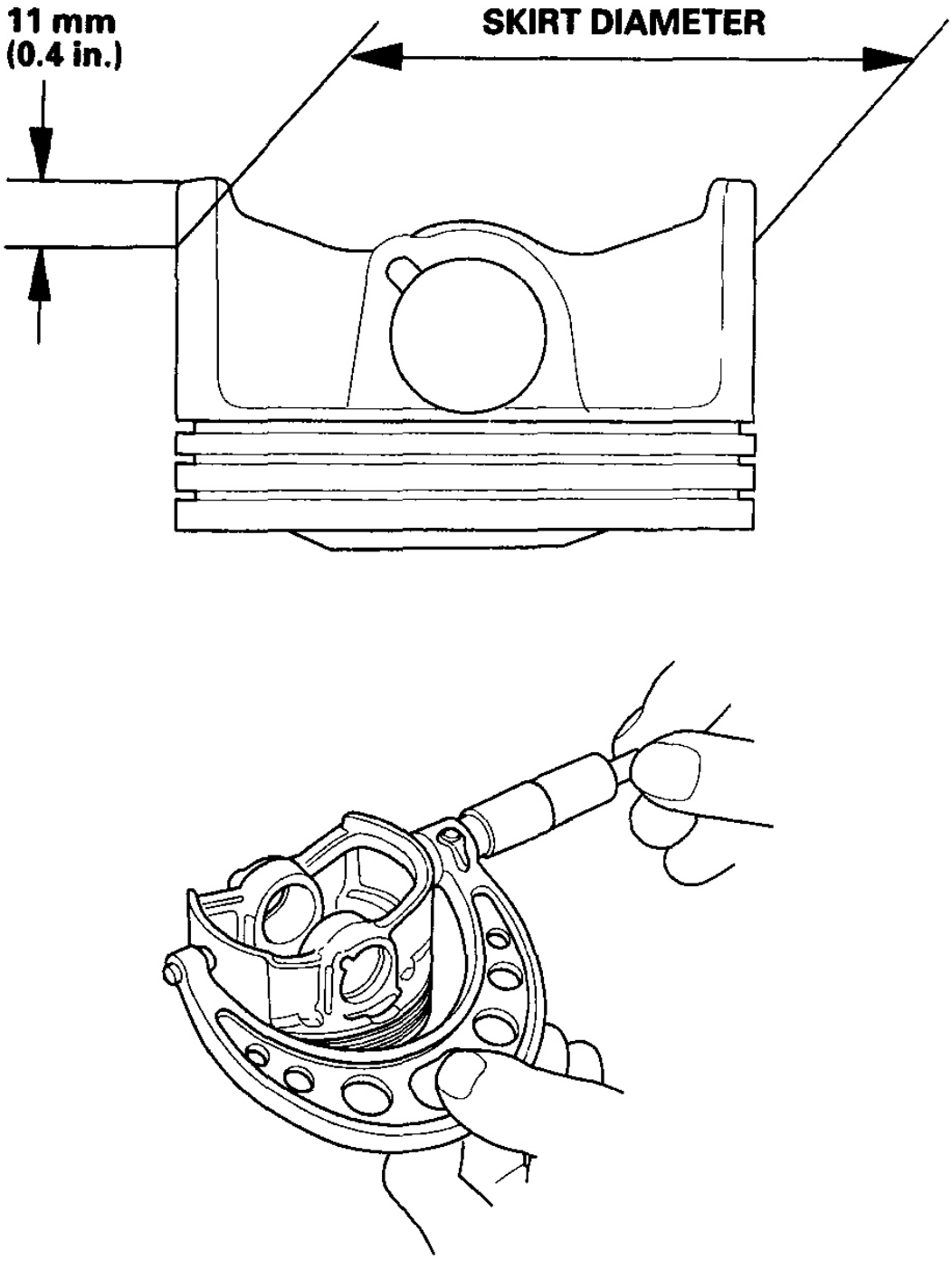

Fig. 28: Identifying Skirt Diameter
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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 block. If the block is to be rebored, refer to step 7. after reboring.

   Cylinder Bore Size

   Standard (New):

   A or I: 86.010-86.020 mm

   (3.3862-3.3866 in.)

   B or II: 86.000-86.010 mm

   (3.3858-3.3862 in.)

   Service Limit: 86.070 mm (3.3886 in.)

   Oversize

   0.25: 86.250-86.260 mm (3.3957-3.3961 in.)

   Reboring Limit: 0.25 mm (0.01 in.) max.

   Bore Taper:

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

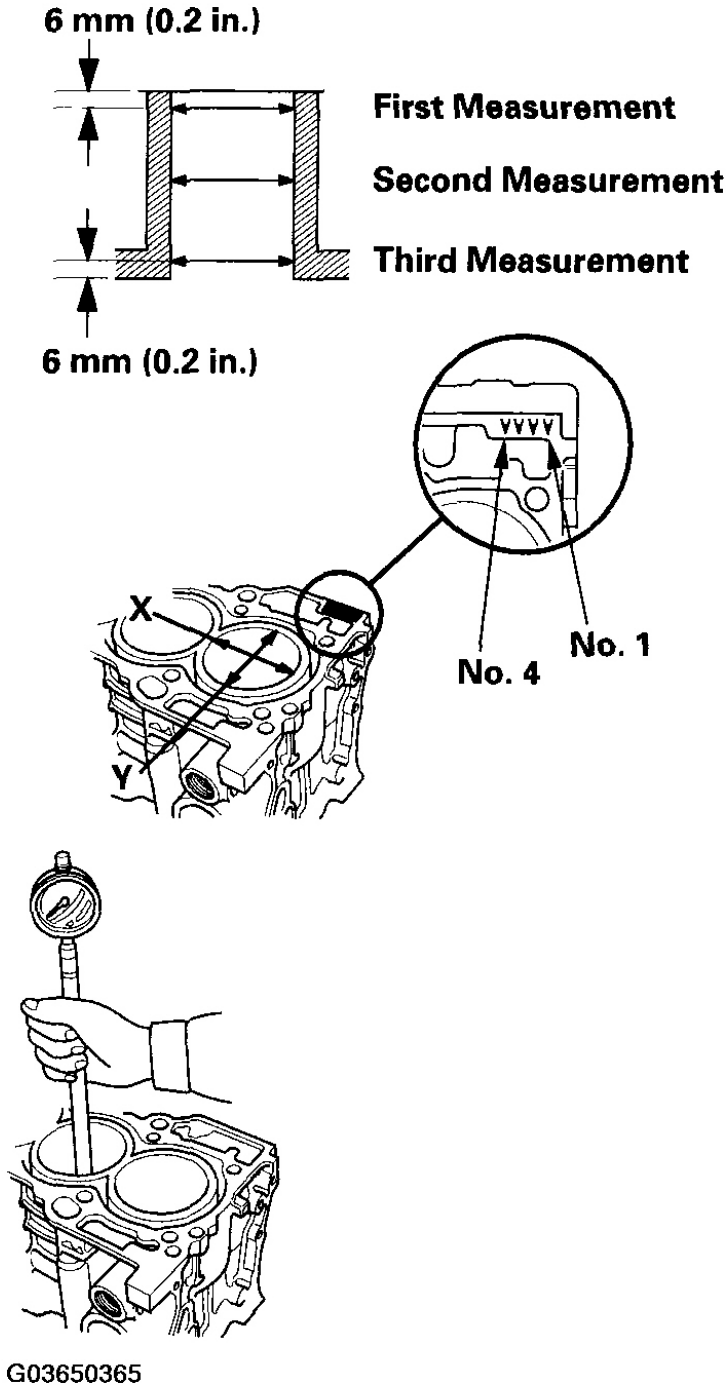

Fig. 29: Measuring Wear And Taper
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Scored or scratched cylinder bores must be honed.
6. Check the top of the 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.)

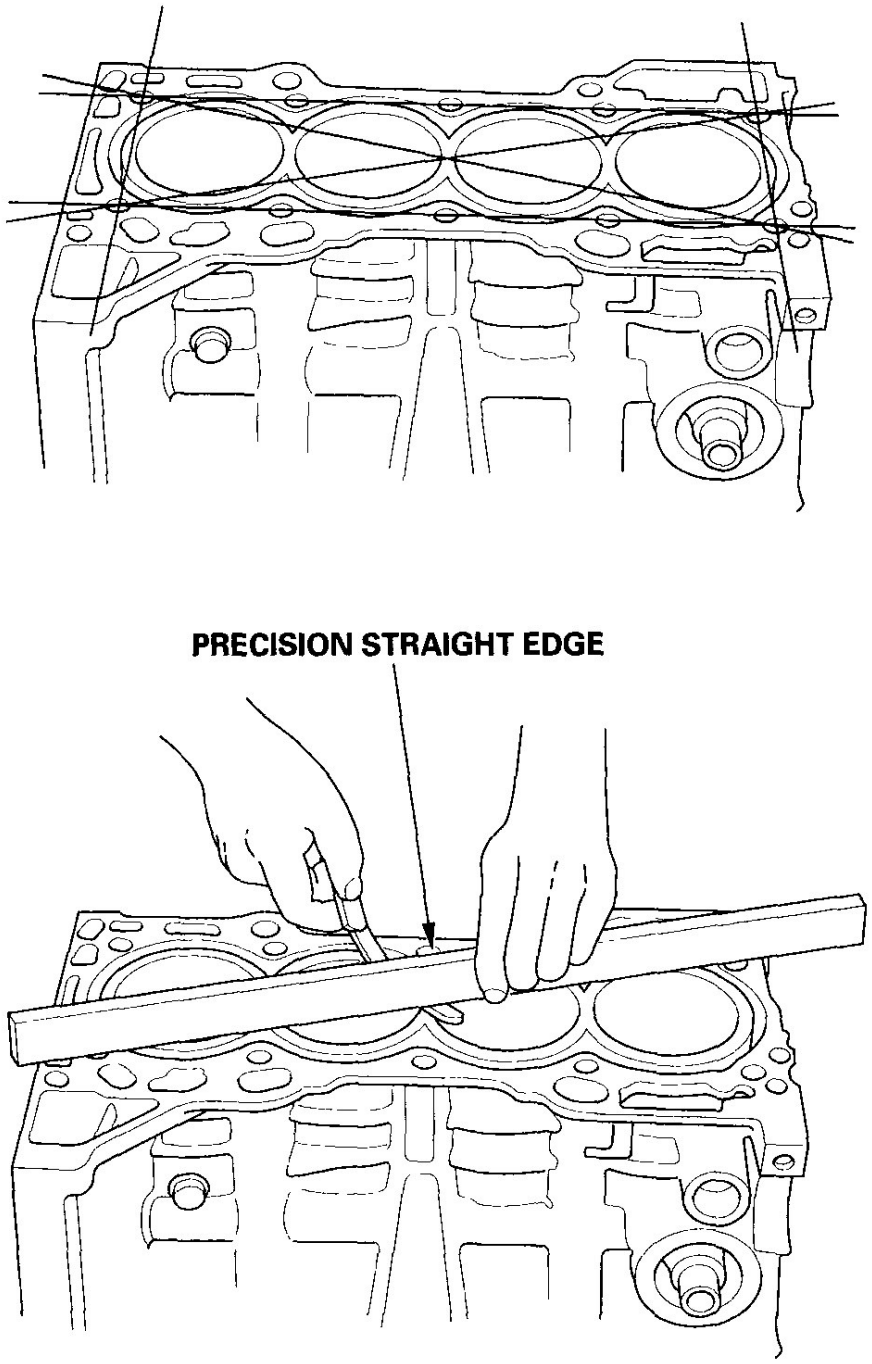

Fig. 30: Checking Top Of Block For Warpage
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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 engine block for excessive wear.

Piston-to-Cylinder Bore Clearance

Standard (New): 0.020-0.040 mm

(0.0008-0.0016 in.)

Service Limit: 0.05 mm (0.002 in.)

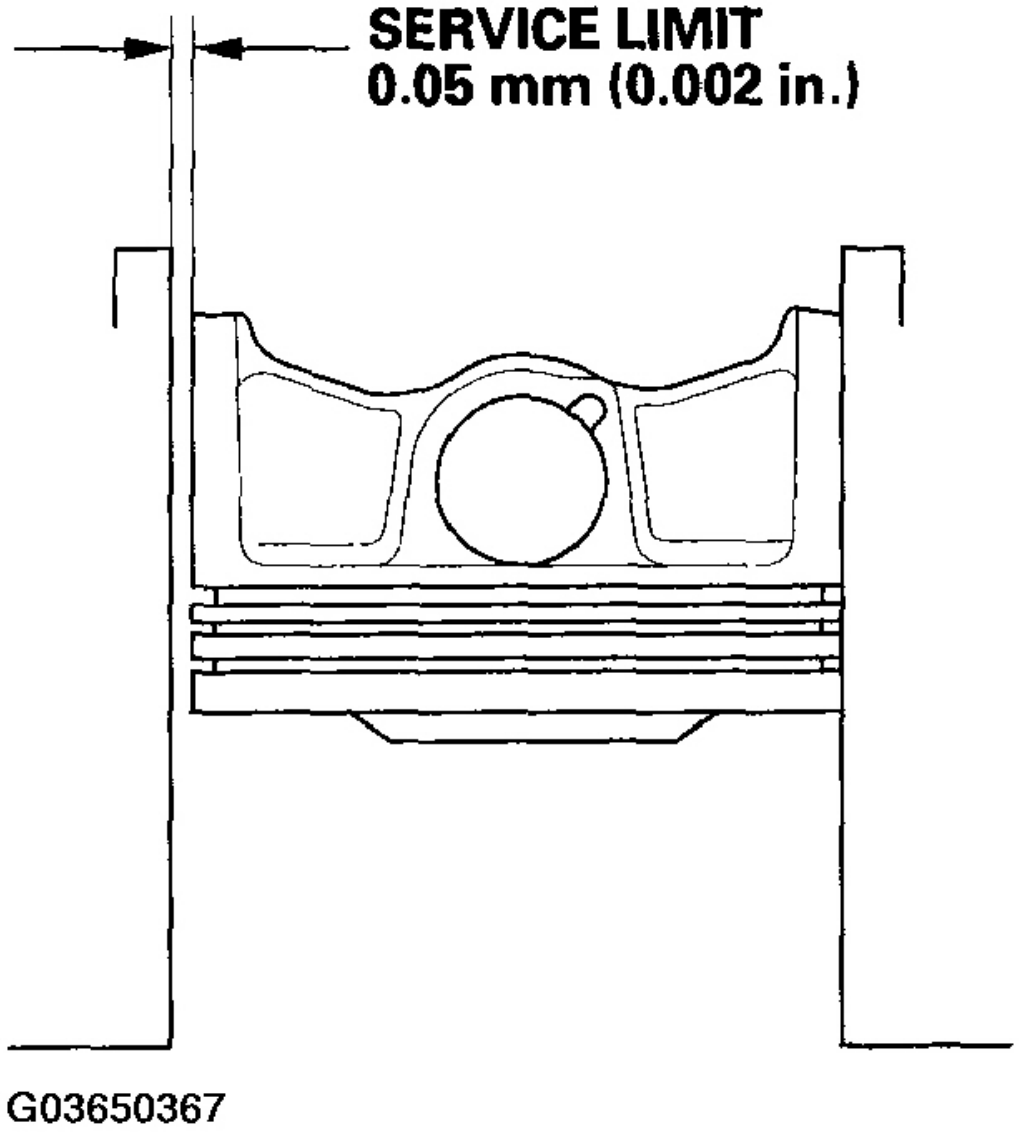

Fig. 31: Calculating Difference Between Cylinder Bore Diameter And Piston Diameter

Courtesy of AMERICAN HONDA MOTOR CO., INC.

CYLINDER BORE HONING

Only a scored or scratched cylinder bore must be honed.

1. Measure the cylinder bores (see **BLOCK AND PISTON INSPECTION**).

   If the block is to be reused, hone the cylinders and remeasure the bores.

2. Hone the cylinder bores with honing oil and a fine (400 grit) stone in a 60 degree cross-hatch pattern (A). 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.

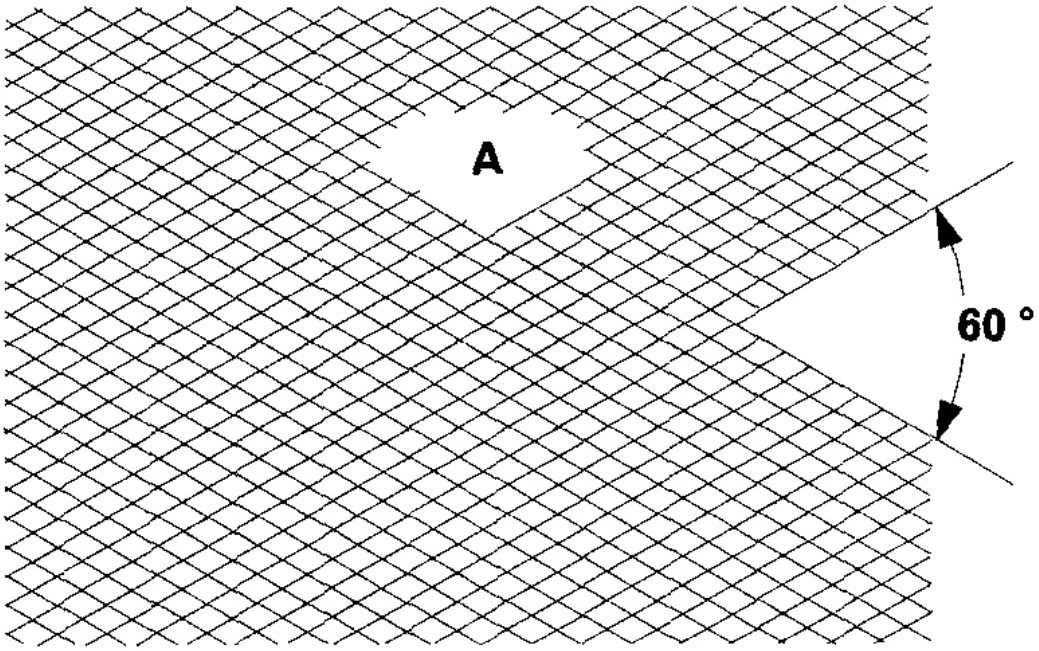

Fig. 32: Identifying Angle
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

NOTE: Take care not to damage the ring grooves.

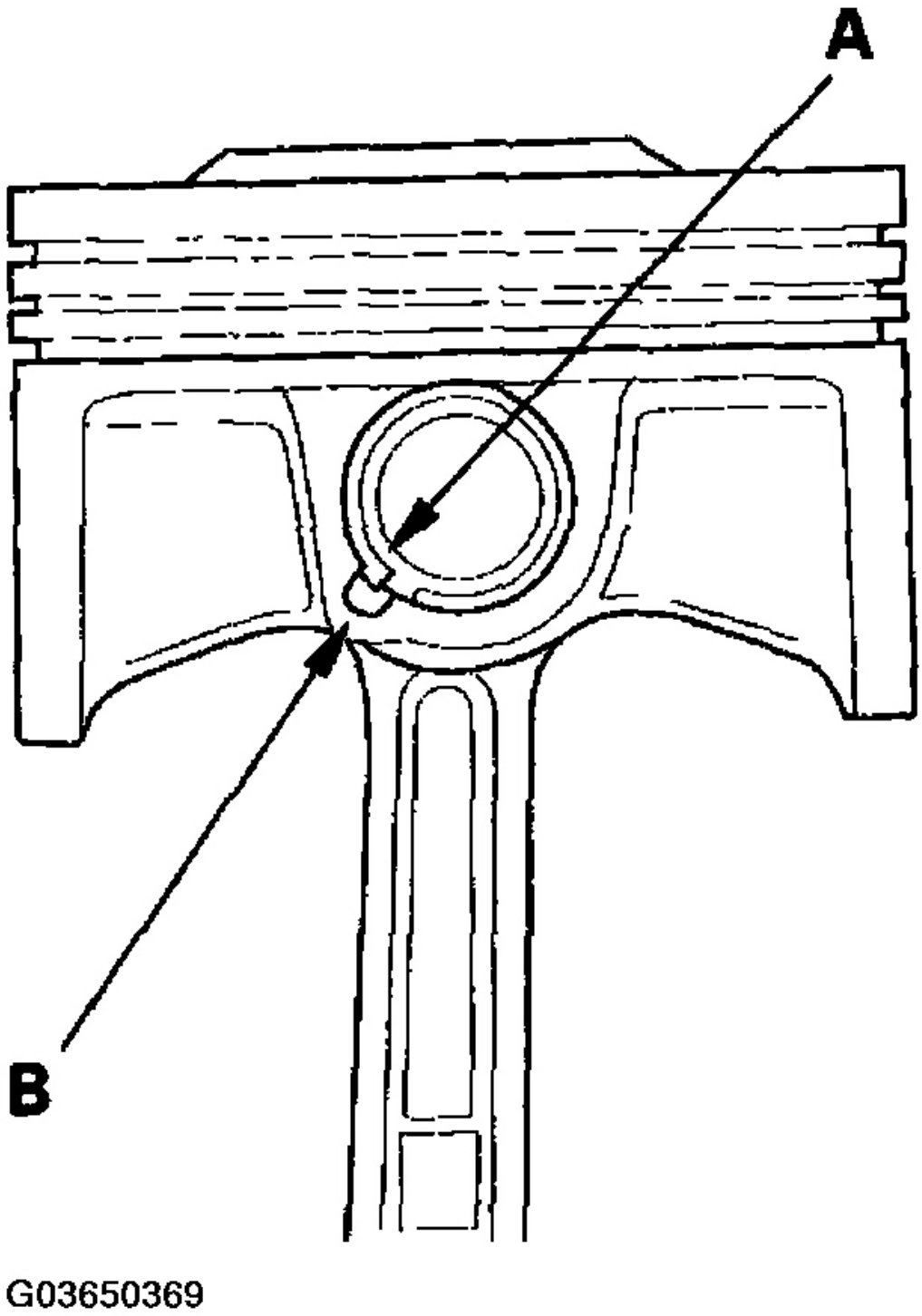

Fig. 33: Locating Piston Pin

Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Remove both snap rings (A). 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.

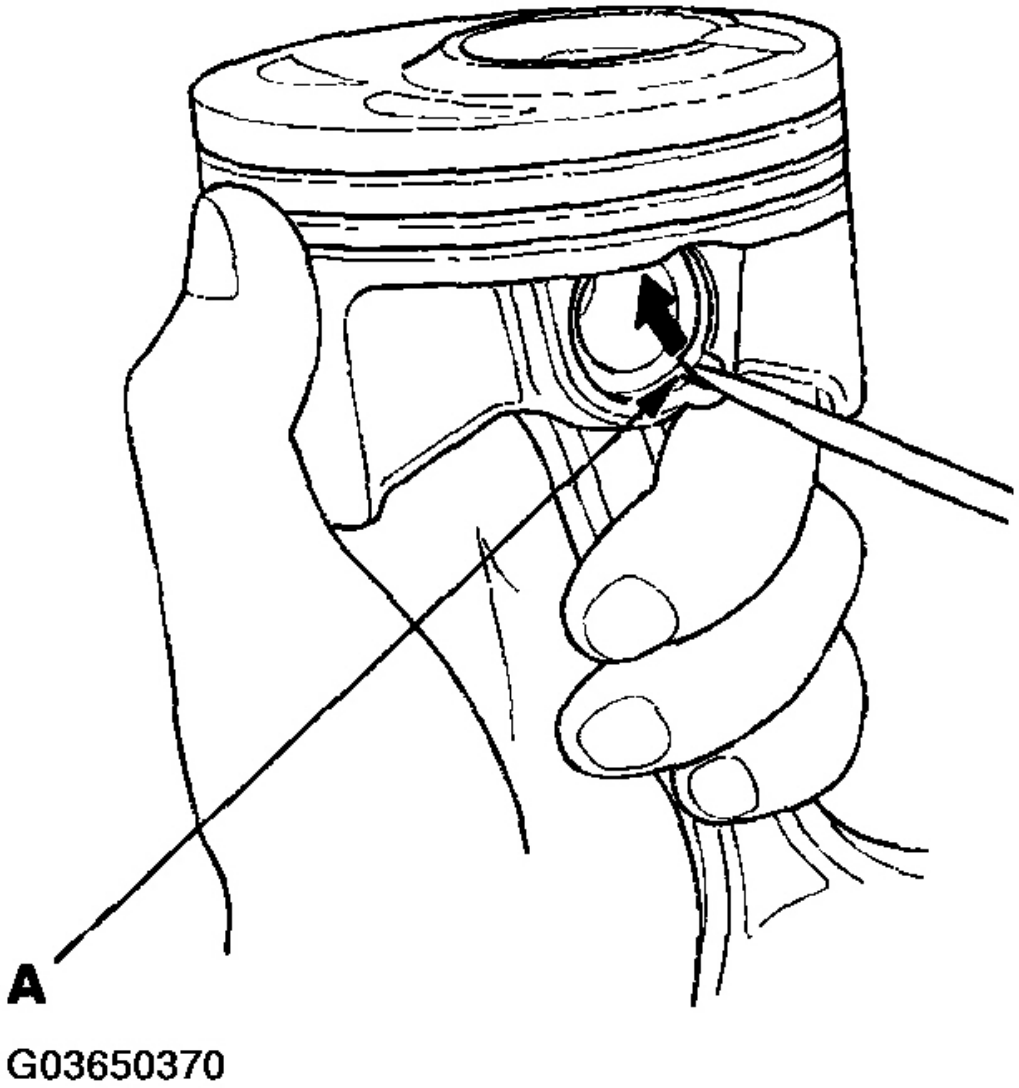

Fig. 34: Removing Snap Rings
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

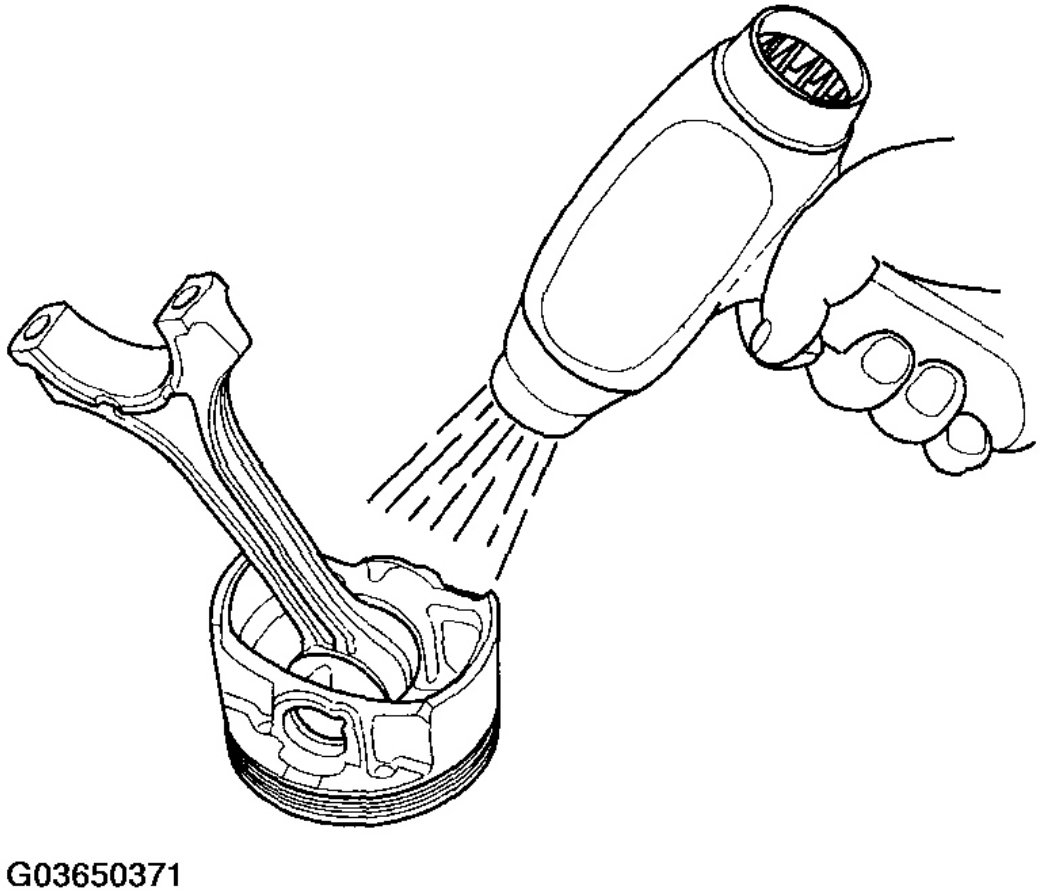

Fig. 35: Heating Piston And Connecting Rod Assembly
Courtesy of AMERICAN HONDA MOTOR CO., INC.

INSPECTION

NOTE: Inspect the 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): 21.961-21.965 mm

   (0.8646-0.8648 in.)

   Service Limit: 21.953 mm (0.8643 in.)

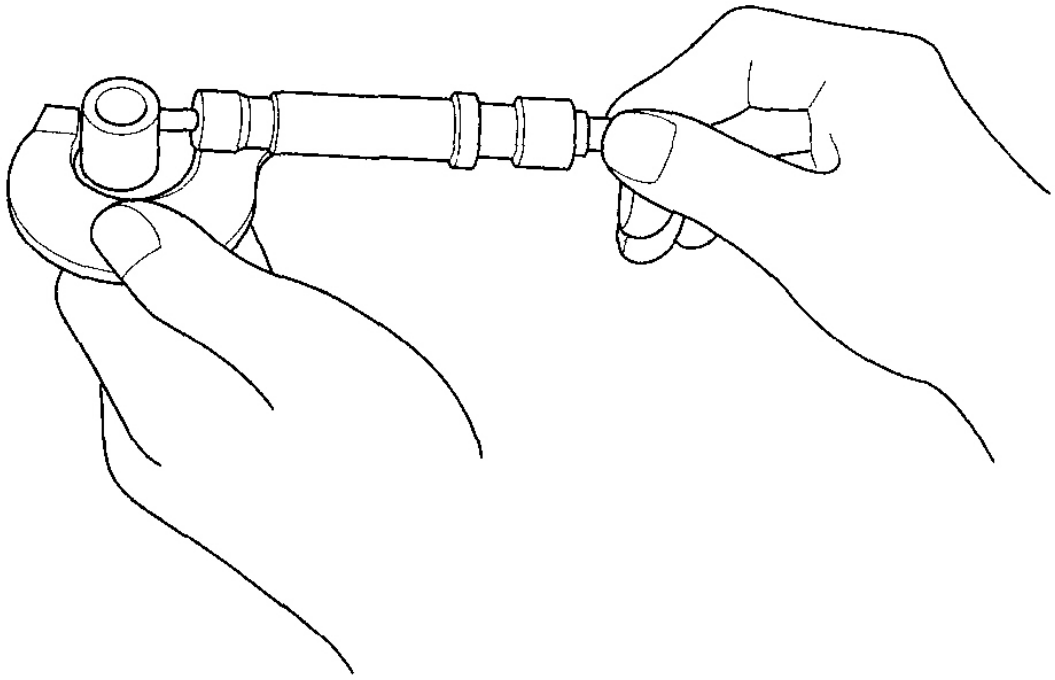

Fig. 36: Measuring Diameter Of Piston Pin
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

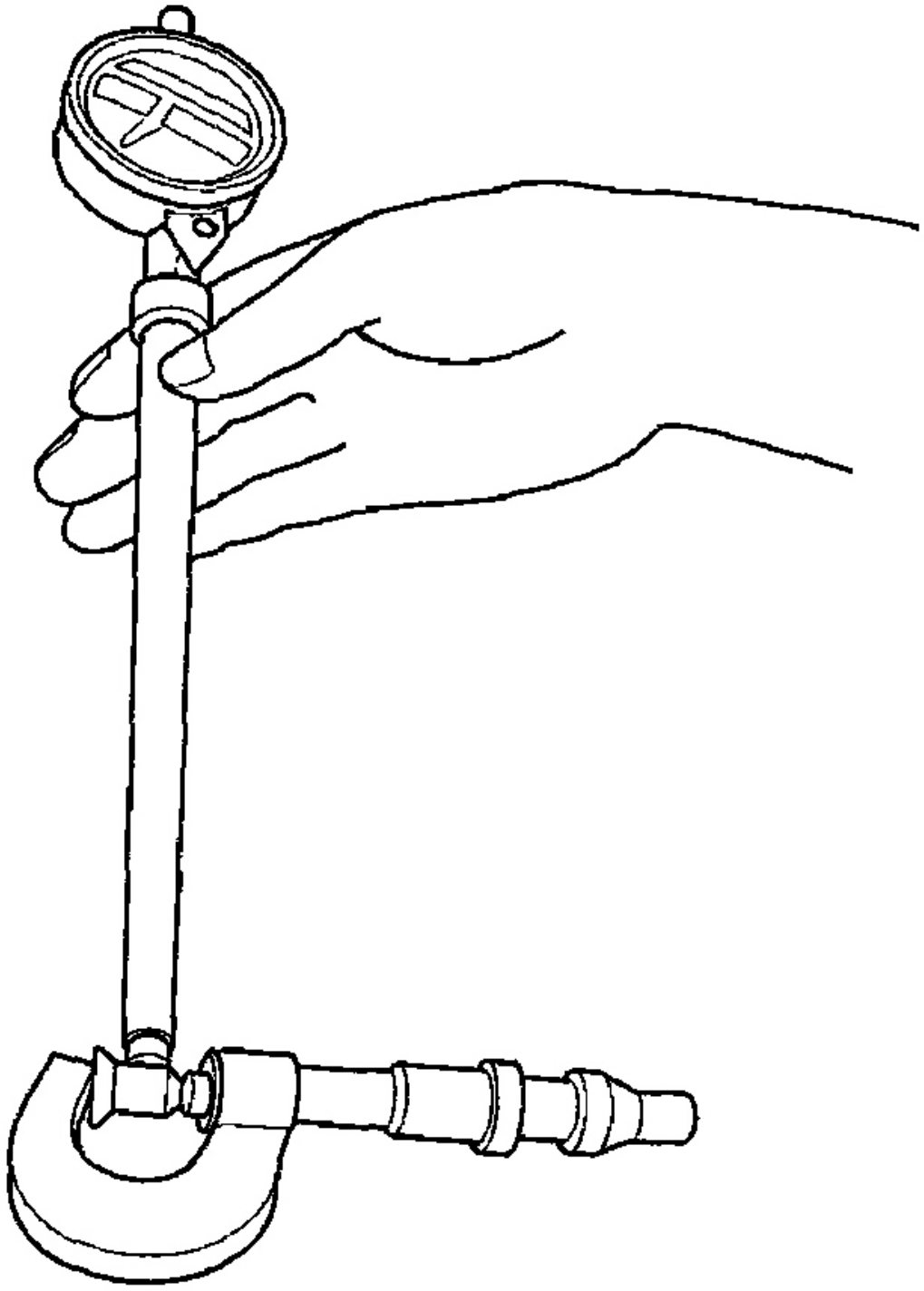

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Fig. 37: Identifying Dial Indicator
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

   Piston Pin-to-Piston Clearance

   Standard (New): -0.005 to +0.002 mm

   (-0.00020 to +0.00008 in.)

   Service Limit: 0.005 mm (0.0002 in.)

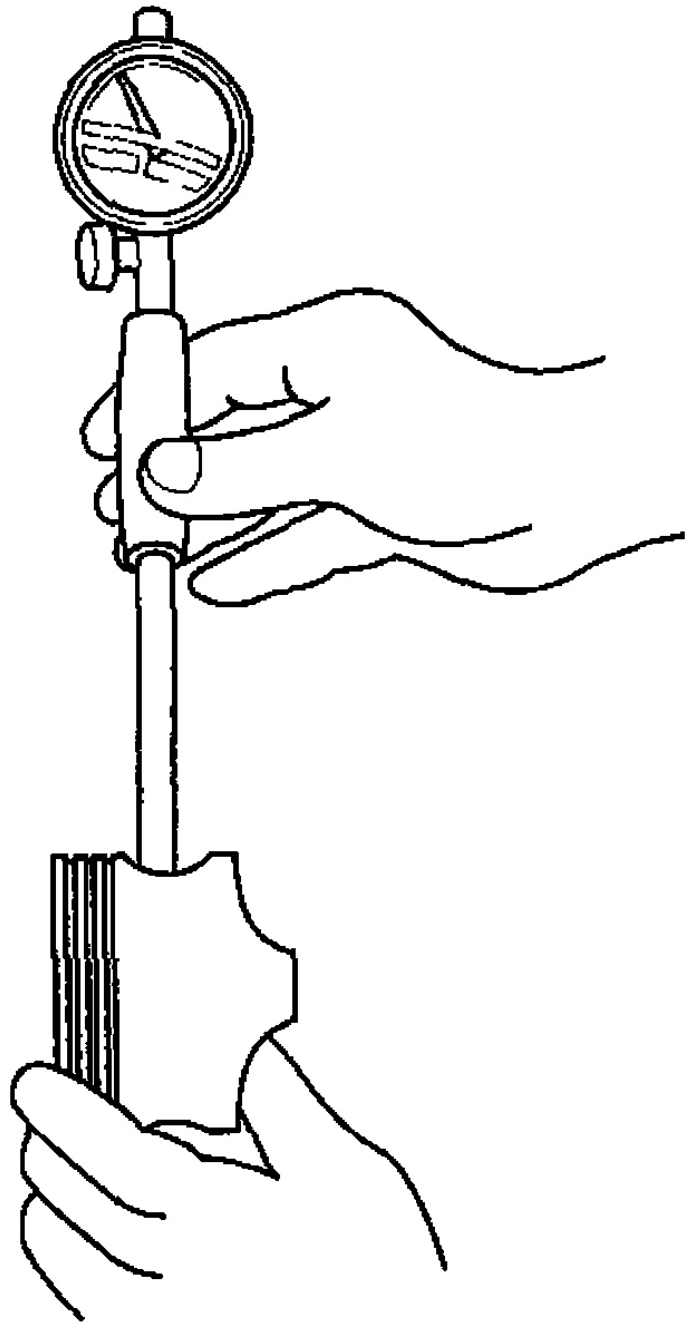

Fig. 38: Checking Difference Between Piston Pin Diameter And Piston Pin Hole
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

Piston Pin-to-Connecting Rod Clearance

Standard (New): 0.005-0.015 mm

(0.0002-0.0006 in.)

Service Limit: 0.02 mm (0.0008 in.)

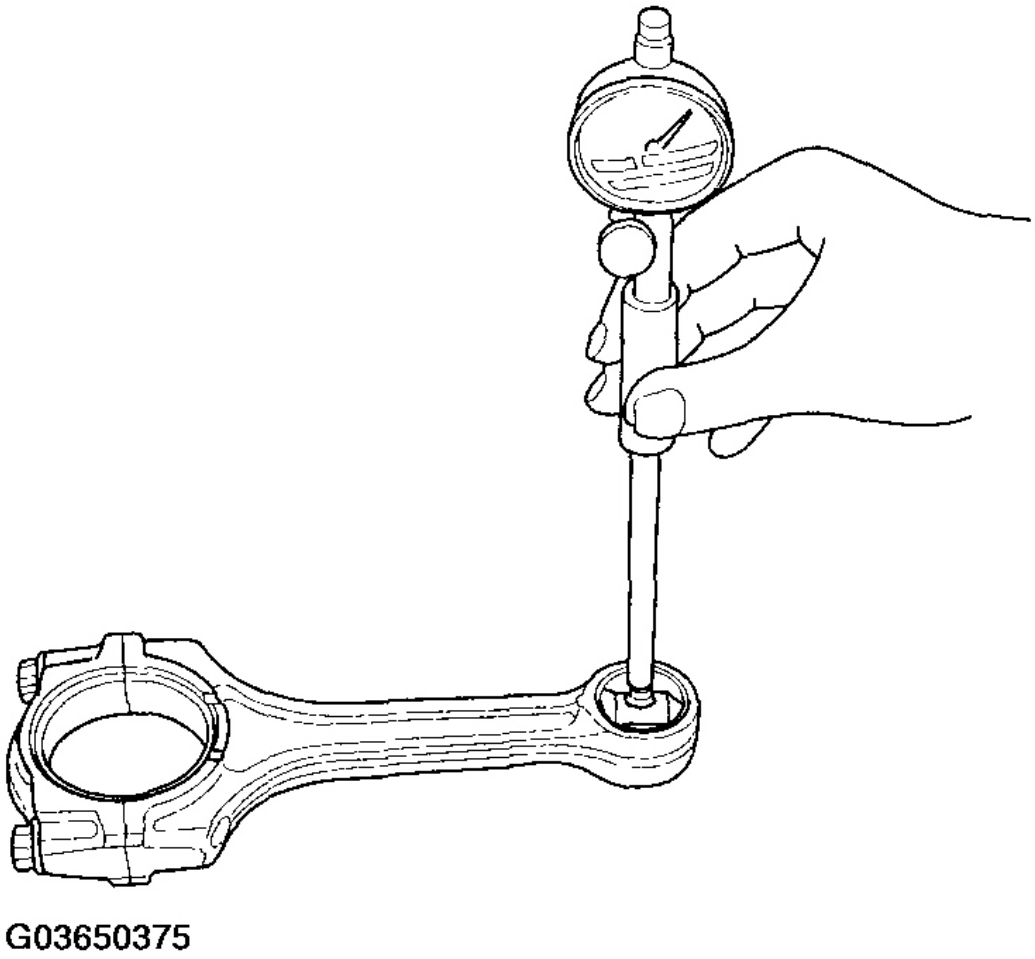

Fig. 39: Measuring Piston Pin-To-Connecting Rod Clearance
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REASSEMBLY

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

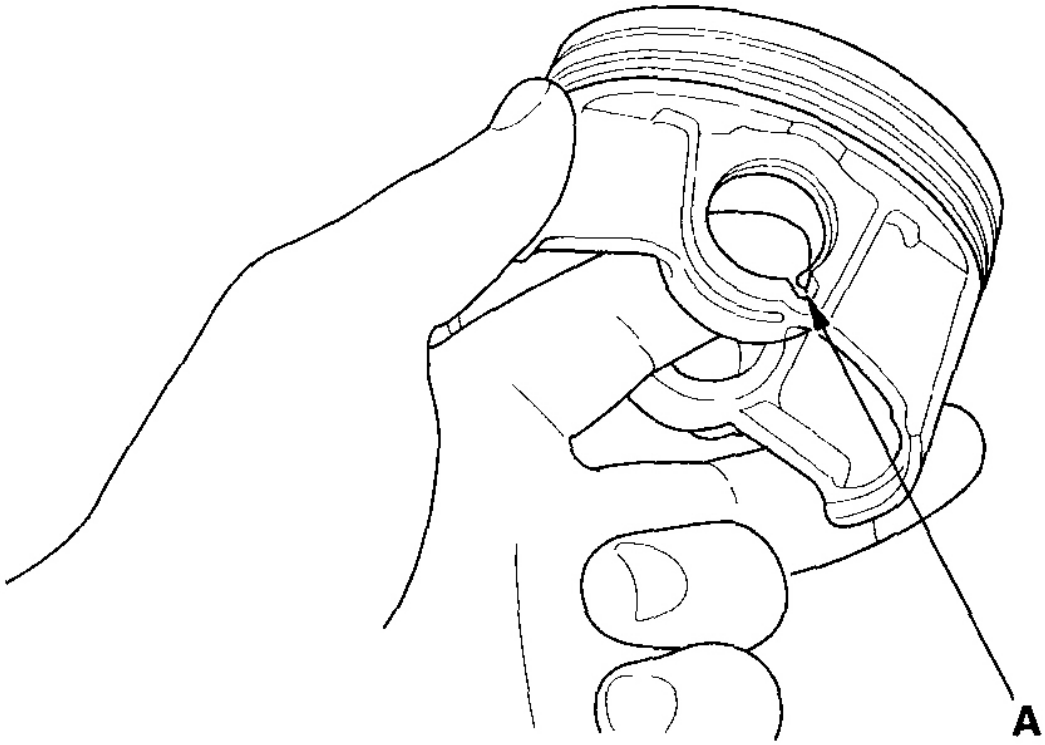

Fig. 40: Installing Piston Pin Snap Ring
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

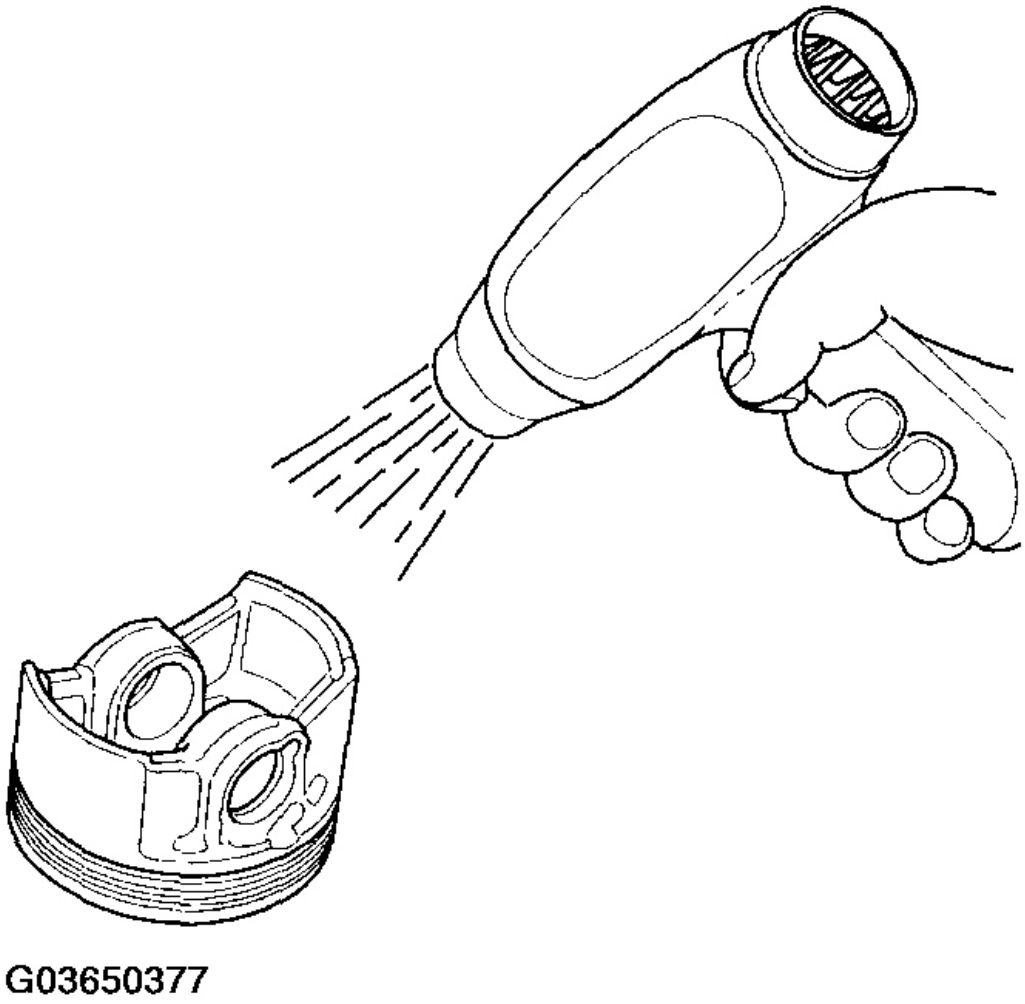

Fig. 41: Heating Piston
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

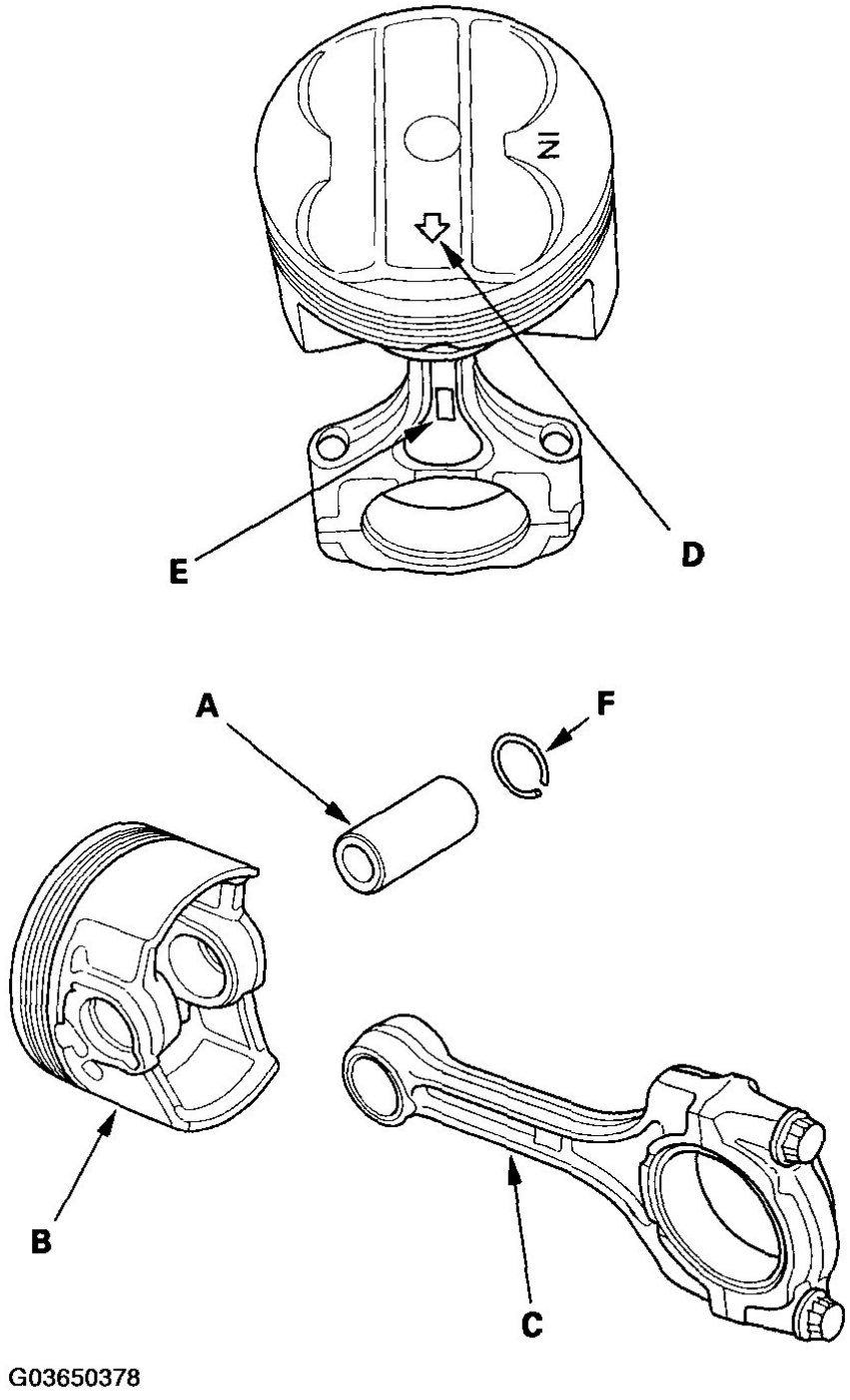

Fig. 42: Installing Piston Pin
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Install the remaining snap ring (F).

6. Turn the snap rings in the ring grooves until the end gaps are positioned at the bottom of the piston.

PISTON RING REPLACEMENT

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

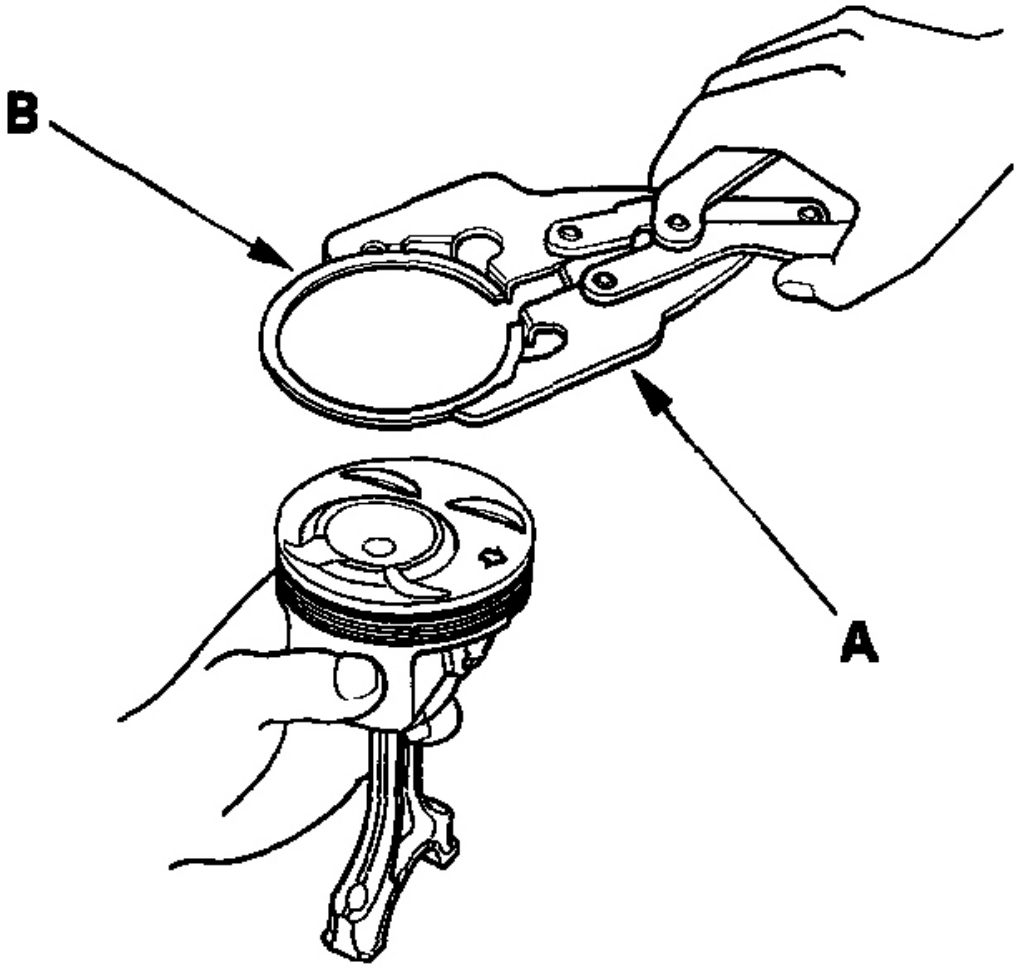

Fig. 43: Removing Old Piston Rings Using Ring Expander
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

the piston grooves. The top and 2nd ring grooves are 1.2 mm (0.05 in.) wide. The oil ring groove is 2.0 mm (0.08 in.) wide. File down a blade, if necessary. Do not use a wire brush to clean the ring grooves, or cut the ring grooves deeper with the cleaning tools.

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

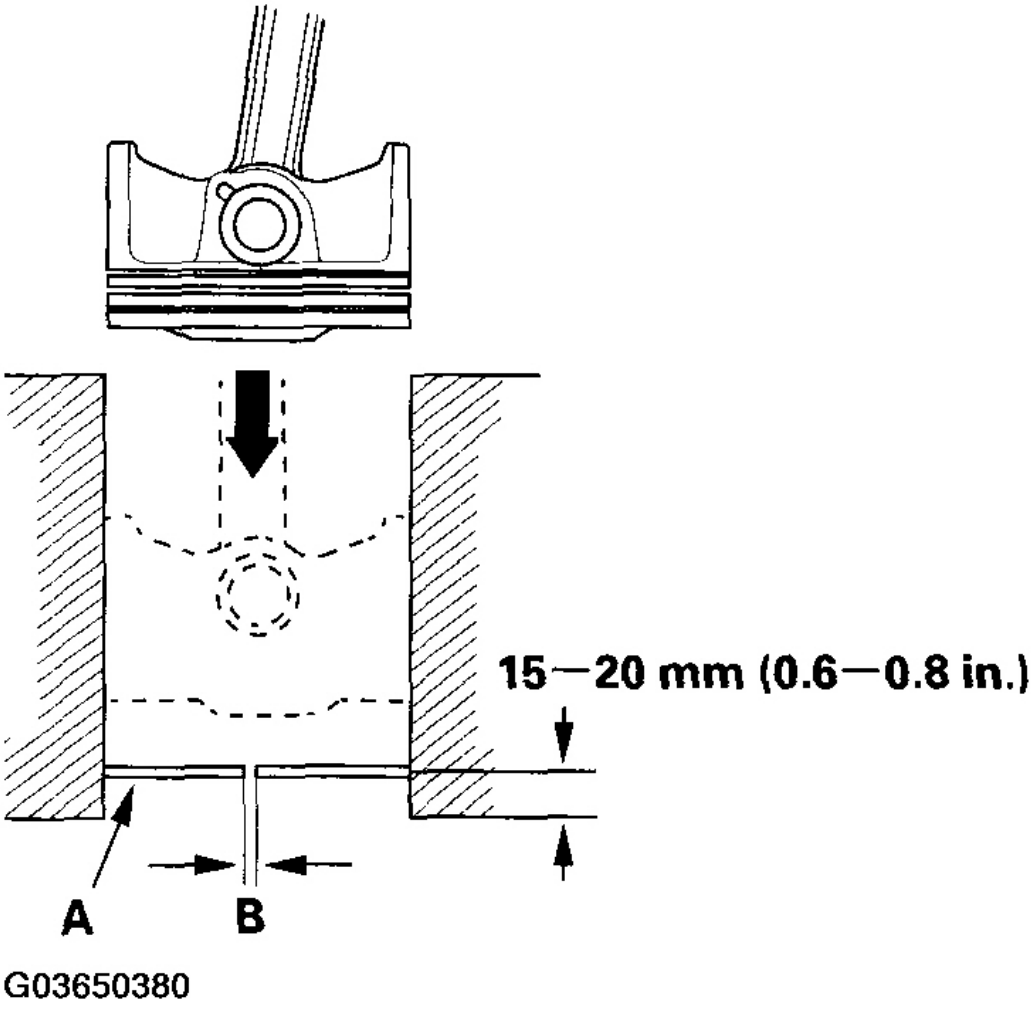

Fig. 44: Pushing New Rings Into Cylinder Bore
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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 **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:

K20A3 Engine:

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

Service Limit: 0.70 mm (0.028 in.)

K20A2, K20Z1 Engines:

Standard (New): 0.50-0.65 mm (0.020-0.026 in.)

Service Limit: 0.75 mm (0.030 in.)

Oil Ring:

K20A3 Engine:

Standard (New): 0.25-0.65 mm (0.010-0.026 in.)

Service Limit: 0.75 mm (0.030 in.)

K20A2, K20Z1 Engines:

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

Service Limit: 0.80 mm (0.031 in.)

6. Install the top ring and second ring as shown. The top ring (A) has a T1 or R1 mark and the second ring (B) has a T2 or R2 mark. The manufacturing marks (C) must be facing upward.

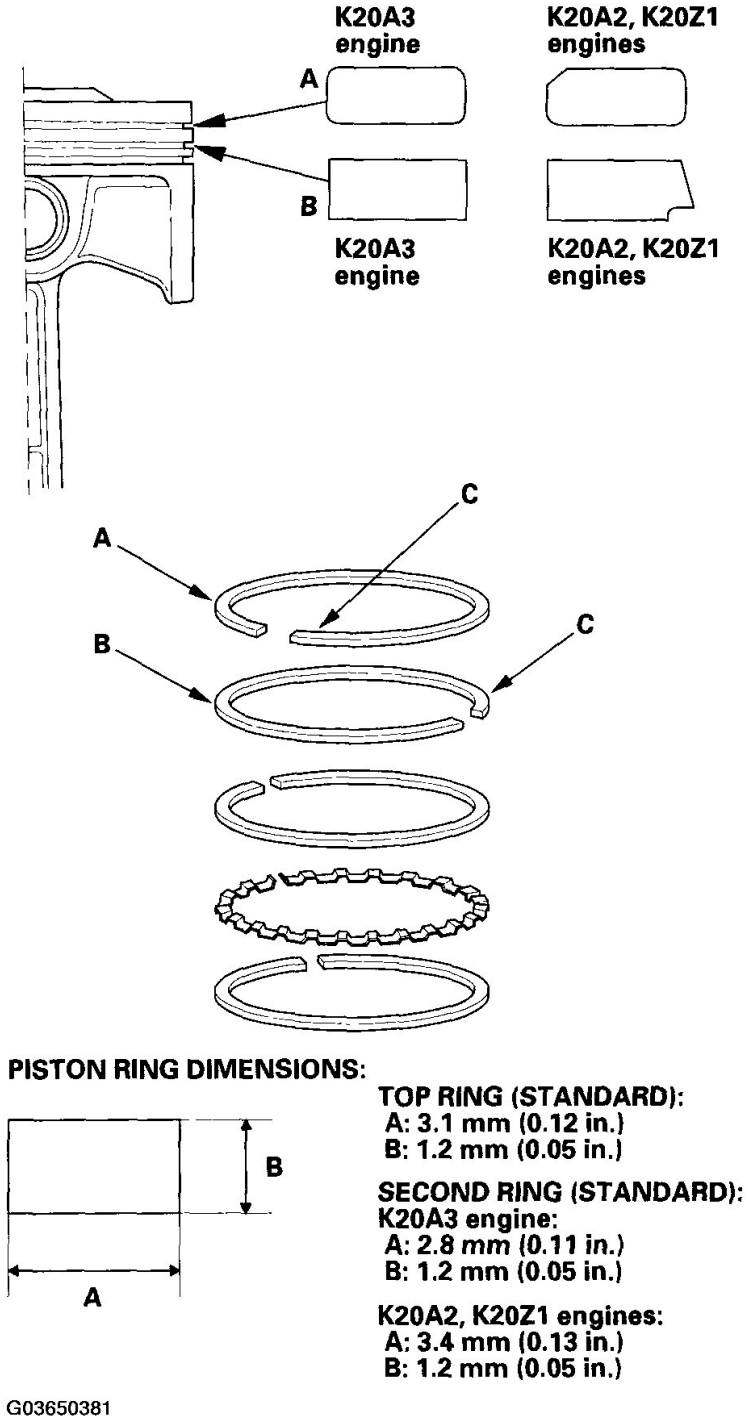

Fig. 45: Installing Top Ring And Second Ring
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

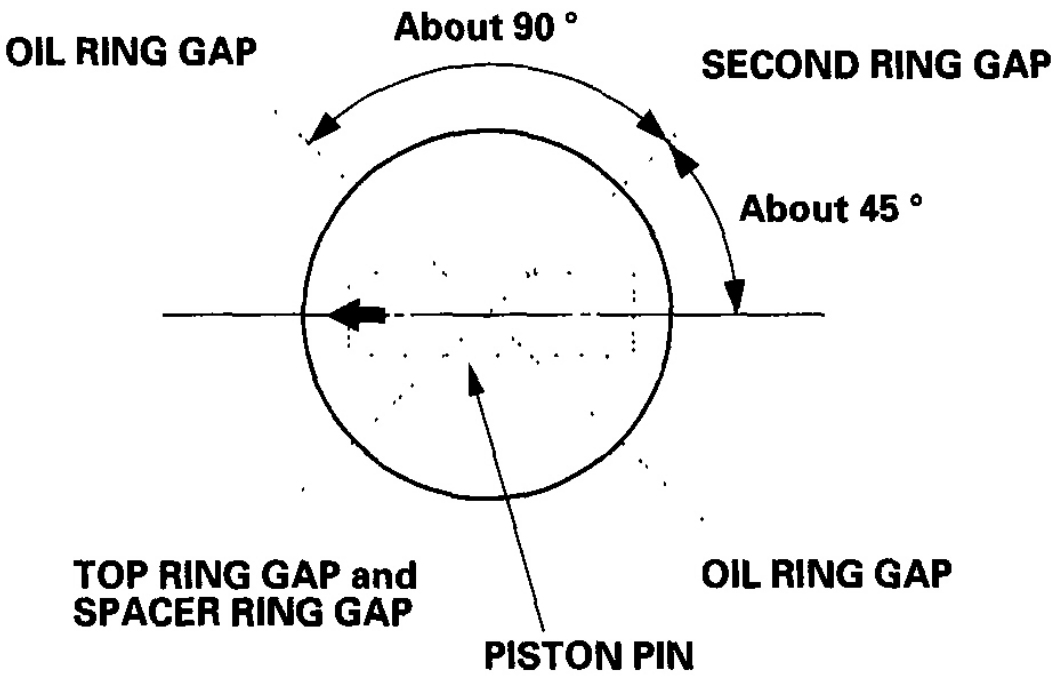

Fig. 46: Positioning Ring End Gaps
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

   Top Ring Clearance

   K20A3 Engine:

   Standard (New): 0.035-0.060 mm

   (0.0014-0.0024 in.)

   Service Limit: 0.13 mm (0.005 in.)

   K20A2, K20Z1 Engines:

   Standard (New): 0.040-0.065 mm

   (0.0016-0.0026 in.)

   Service Limit: 0.13 mm (0.005 in.)

Second Ring Clearance

K20A3 Engine:

Standard (New): 0.030-0.055 mm

(0.0012-0.0022 in.)

Service Limit: 0.13 mm (0.005 in.)

K20A2, K20Z1 Engines:

Standard (New): 0.045-0.070 mm

(0.0018-0.0028 in.)

Service Limit: 0.13 mm (0.005 in.)

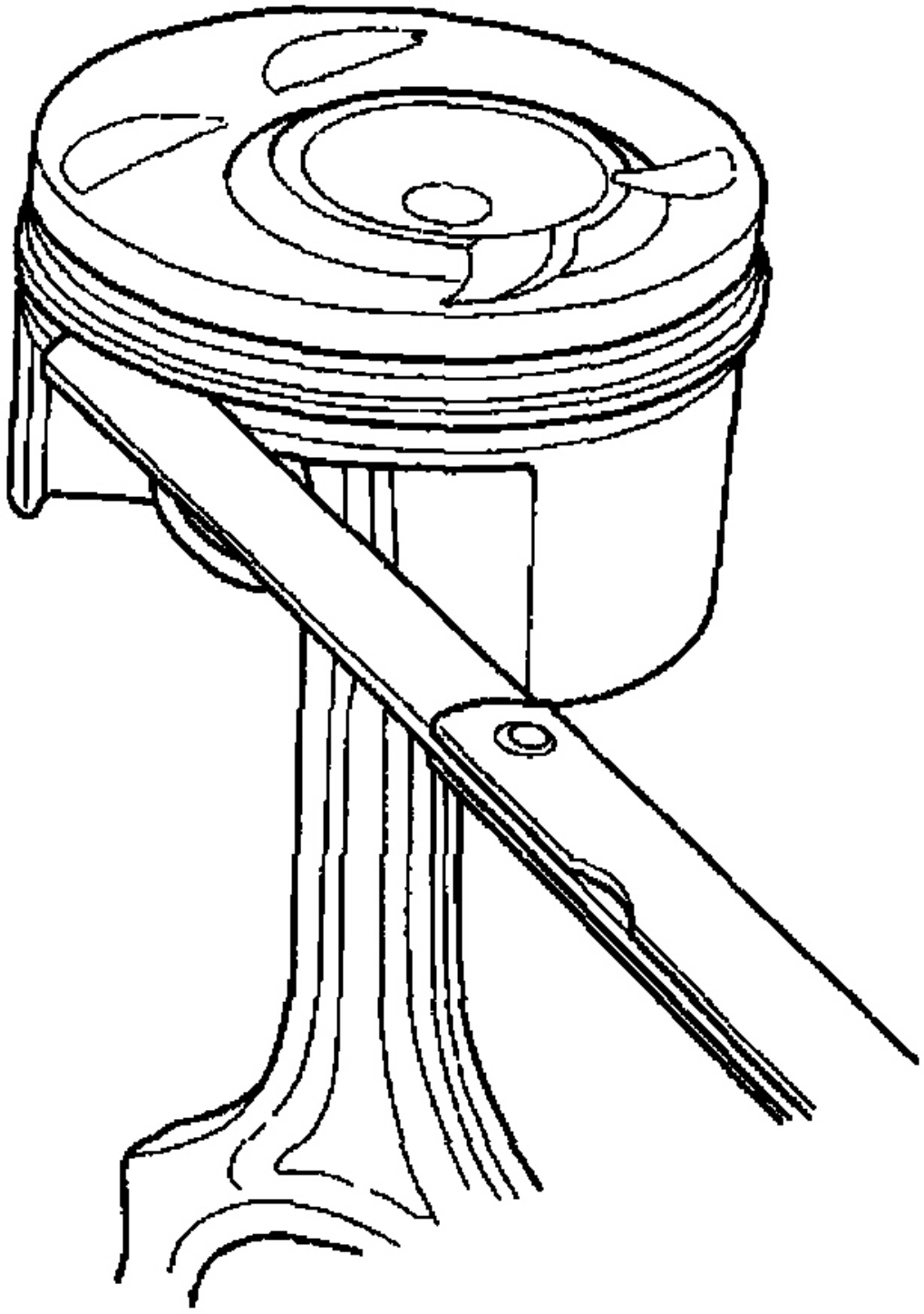

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Fig. 47: Measuring Ring-To-Groove Clearances
Courtesy of AMERICAN HONDA MOTOR CO., INC.

PISTON INSTALLATION

IF THE CRANKSHAFT IS ALREADY INSTALLED

1. Set the crankshaft to bottom dead center (BDC) for each cylinder.
2. Apply new engine oil to the piston, inside of the ring compressor, and the cylinder bore.
3. Attach the ring compressor to the piston/connecting rod assembly, and check that the bearing is securely in place.
4. Position the piston/connecting rod assembly with the arrow (A) facing the timing belt side of the engine.

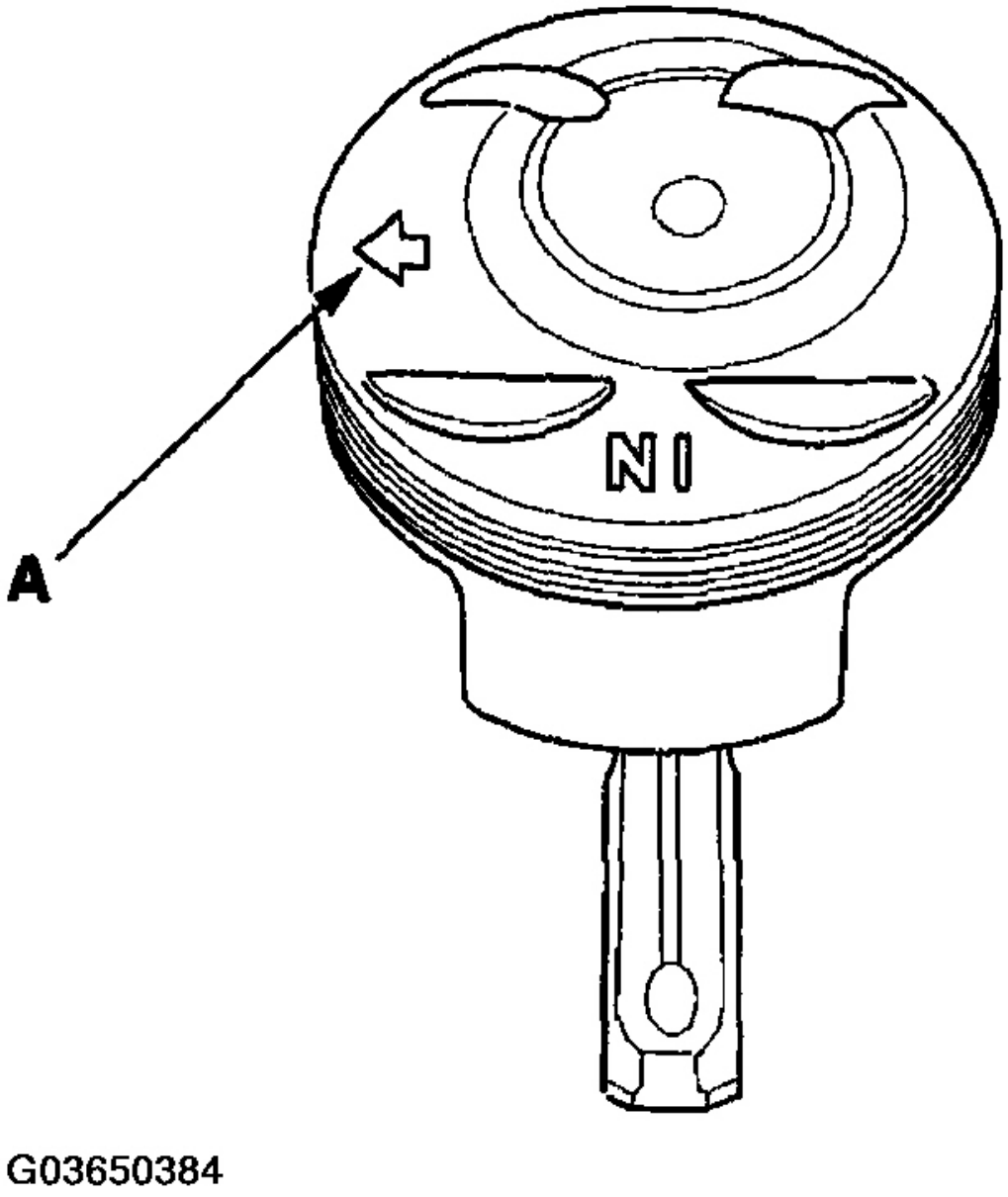

Fig. 48: Positioning Piston/Connecting Rod Assembly
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. 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.

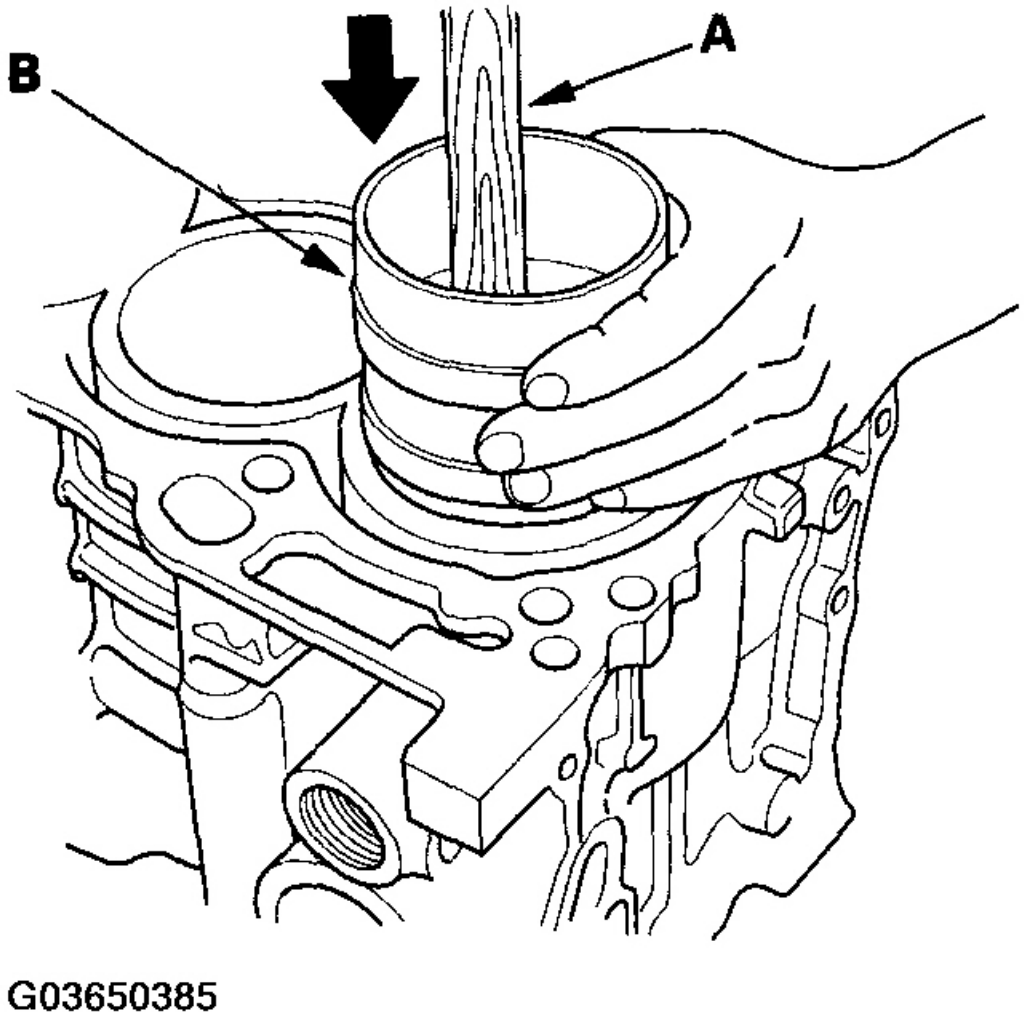

Fig. 49: Positioning Piston Connecting Rod Assembly In Cylinder
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Stop after the ring compressor pops free, and check the connecting rod-to-crank journal alignment before pushing the piston into place.
7. Check the connecting rod bearing clearance with plastigage (see **CONNECTING ROD BEARING REPLACEMENT**).
8. Inspect the connecting rod bolts (see **IF THE CRANKSHAFT IS NOT INSTALLED**).
9. Apply engine oil to the bolt threads, then install the rod caps with bearings. Tighten the connecting rod bolts.

Tightening Torque

K20A3 Engine: 20 N.m (2.0 kgf.m, 14 lbf.ft)

K20A2, K20Z1 Engines: 29 N.m (3.0 kgf.m, 22 lbf.ft)

10. Tighten the connecting rod bolts an additional 90°.

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

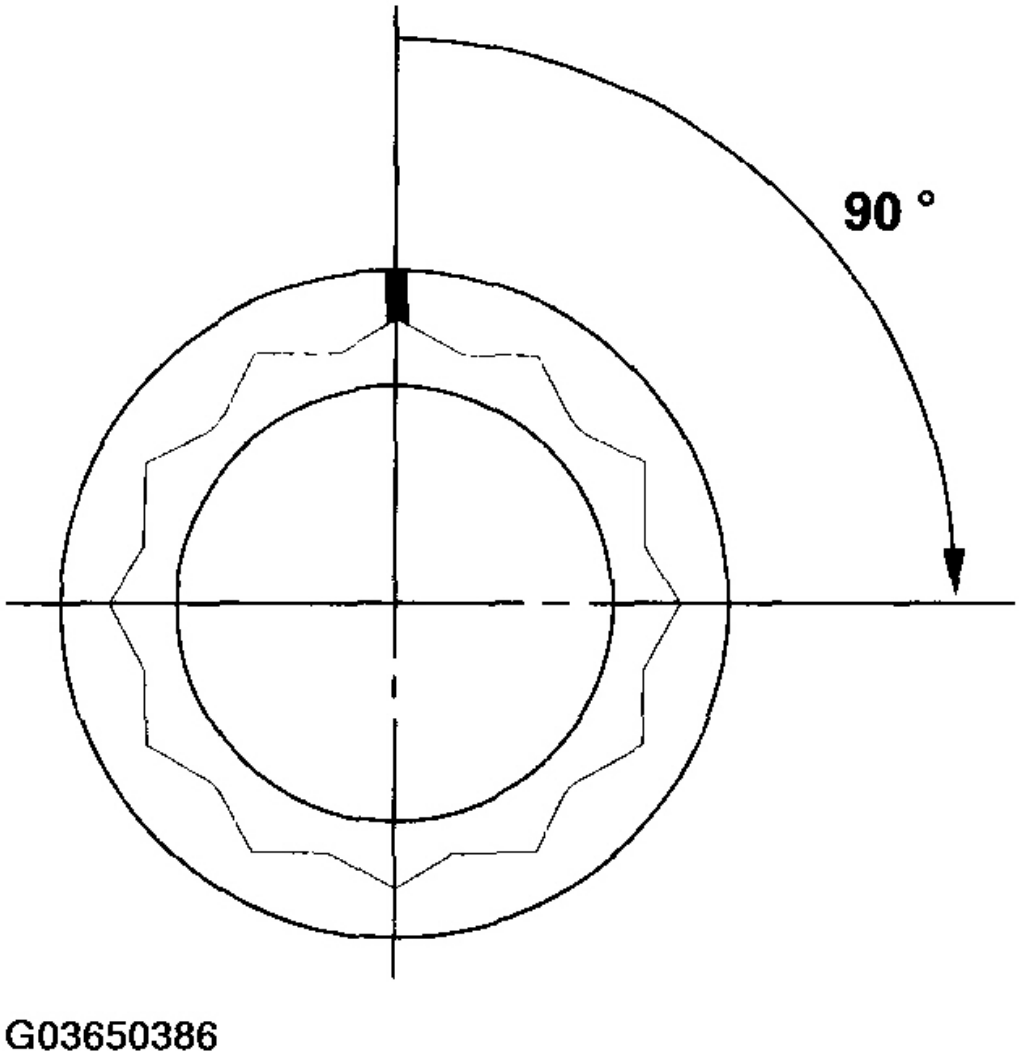

Fig. 50: Tightening And Connecting Rod Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

IF THE CRANKSHAFT IS NOT INSTALLED

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

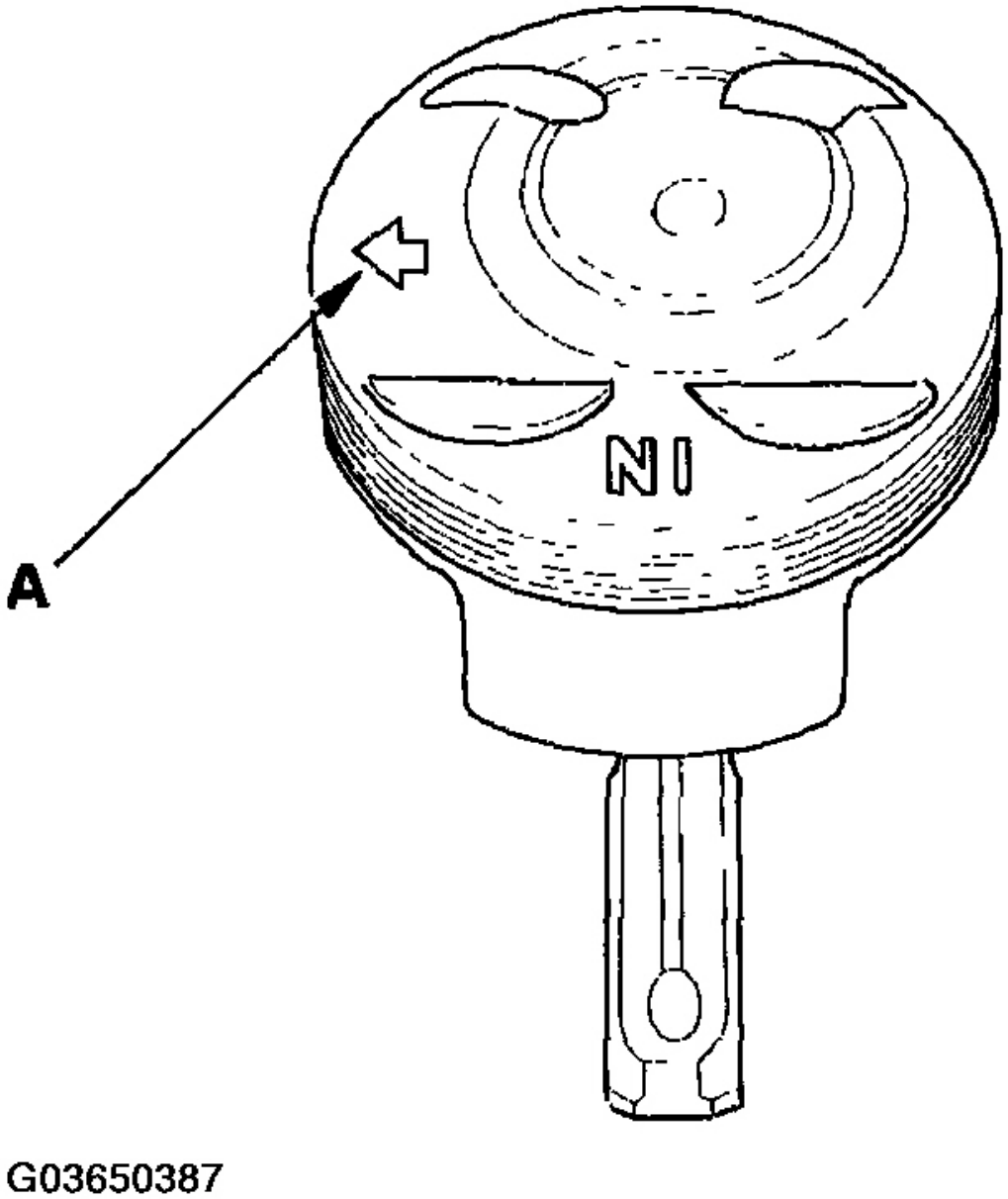

Fig. 51: Positioning Arrow Facing Cam Chain Side Of Engine
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. 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.

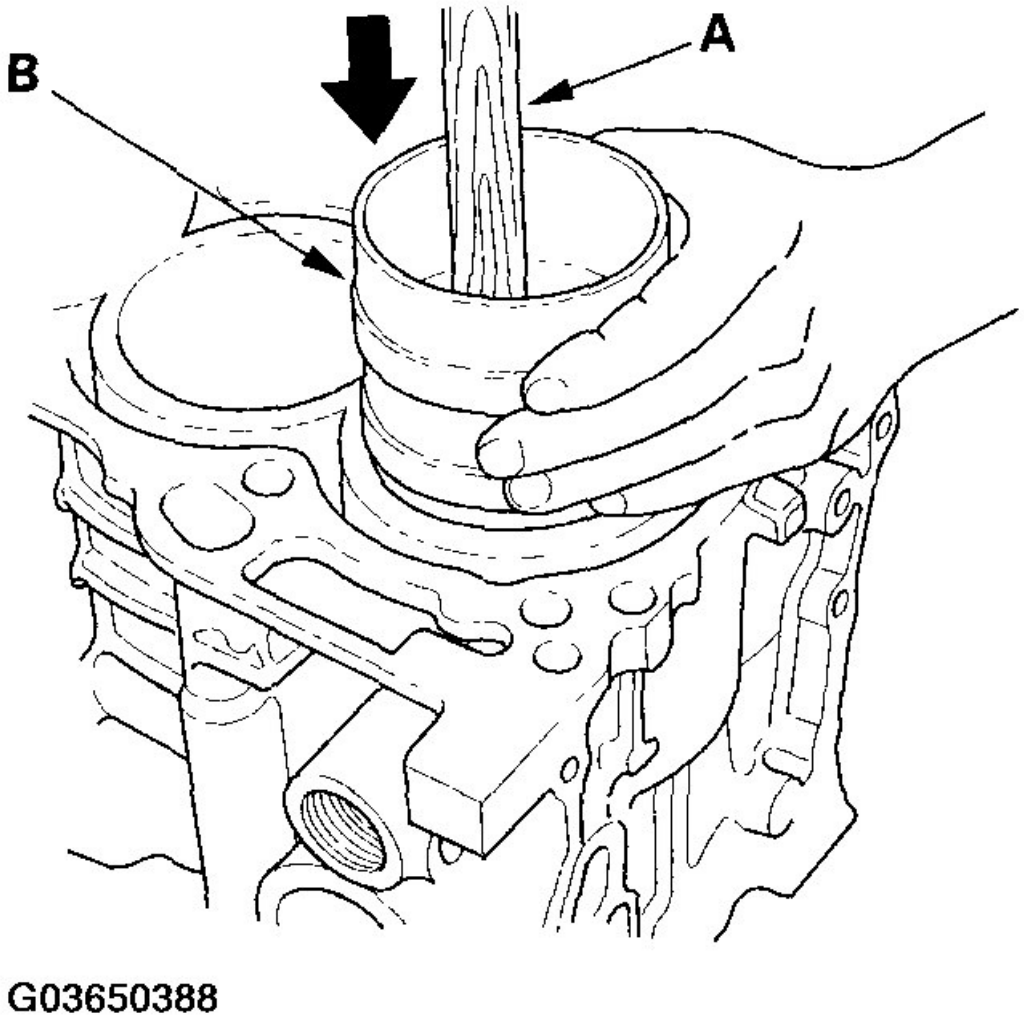

Fig. 52: Positioning Piston Connecting Rod Assembly In Cylinder
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Position all pistons at top dead center.

CONNECTING ROD BOLT INSPECTION

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

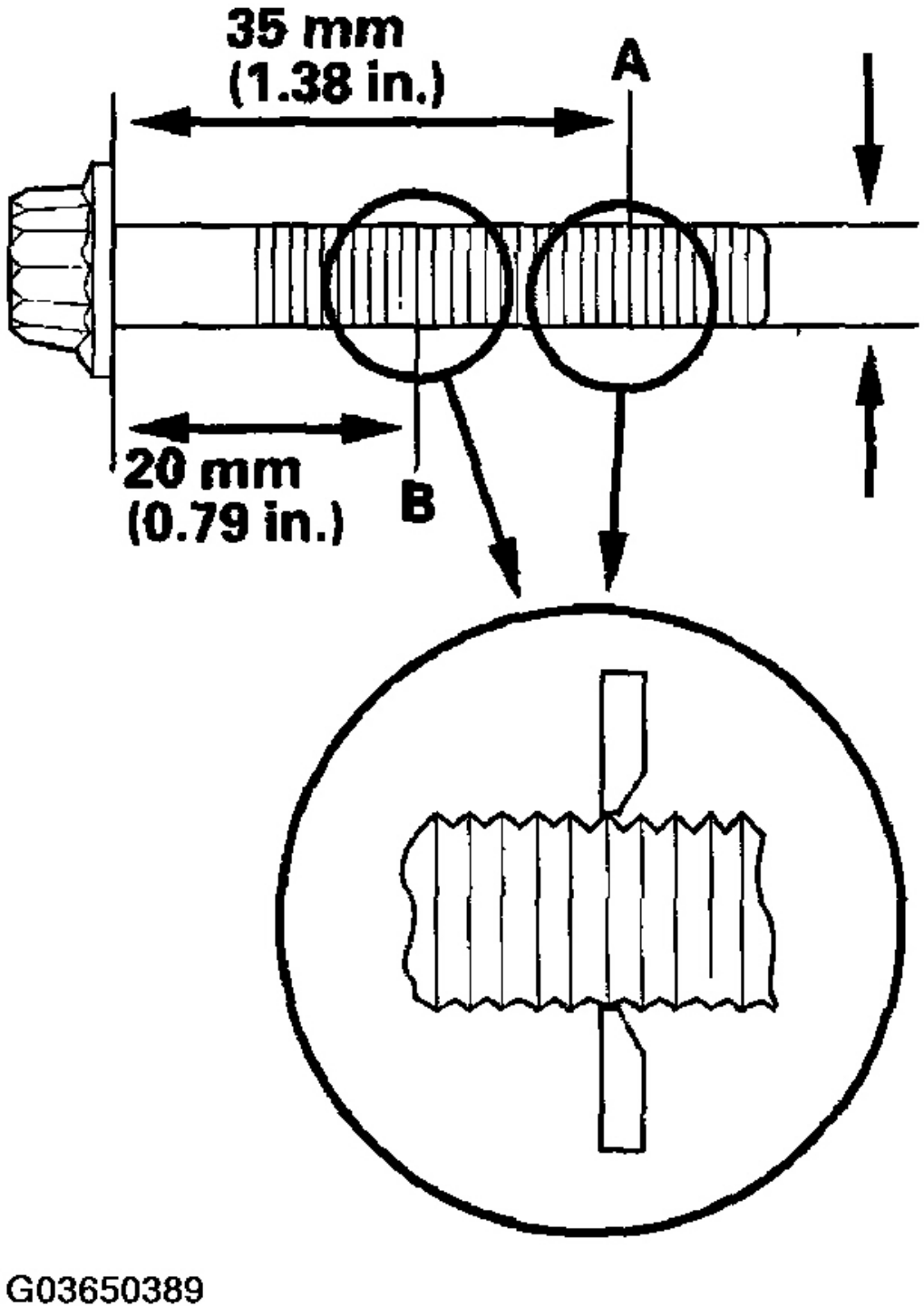

Fig. 53: Measuring Diameter Of Each Connecting Rod Bolt At Point A And Point B

Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

   Point A-Point B = Difference in Diameter

   Difference in Diameter:

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

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

CRANKSHAFT INSTALLATION

Special Tools Required

- Driver 07749-0010000
- Attachment, 24 x 26 mm 07746-0010700
- Oil seal driver attachment 96 07ZAD-PNAA100

1. With a manual transmission, install the crankshaft pilot bushing when replacing the crankshaft. Using the special tools, drive in the crankshaft pilot bushing until the special tools bottom against the crankshaft.

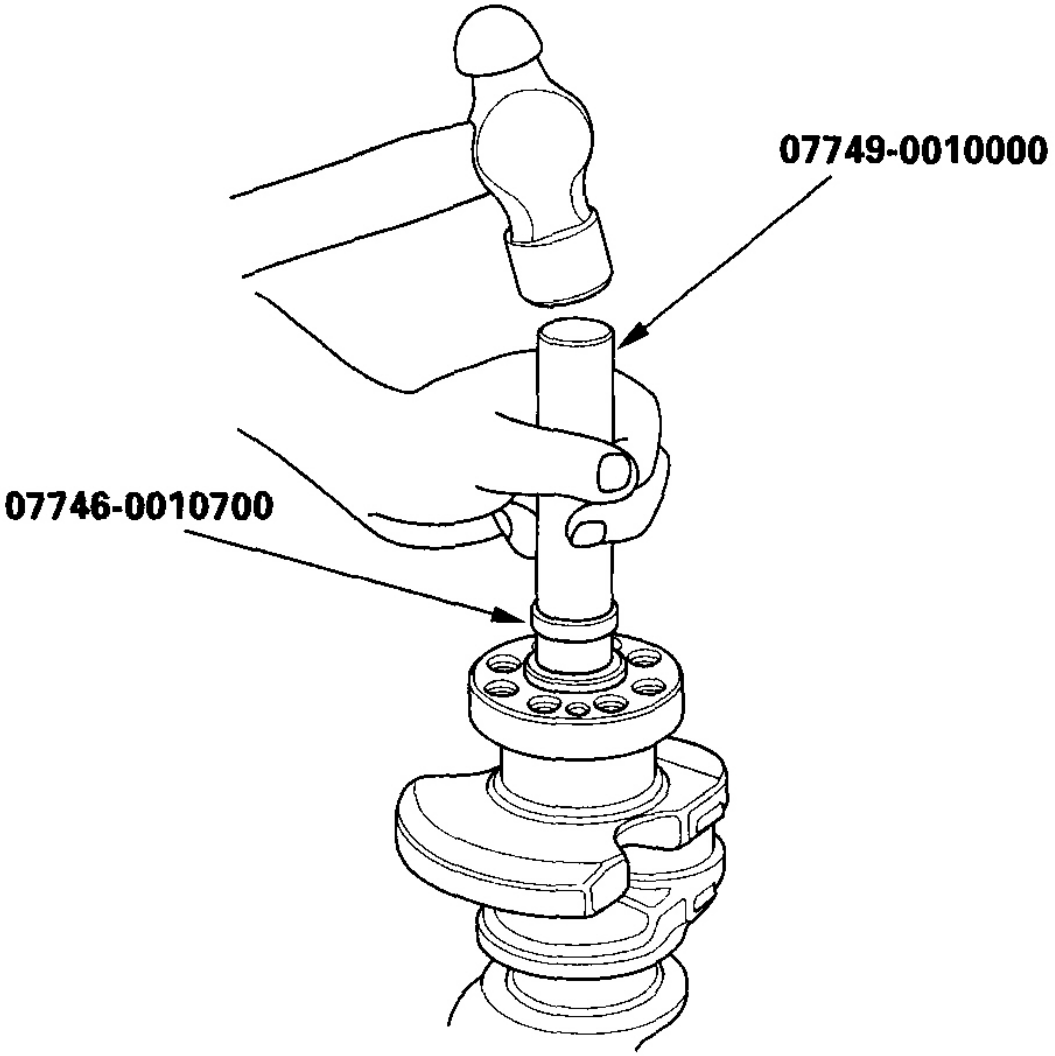

Fig. 54: Installing Crankshaft Pilot Bushing
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Check the connecting rod bearing clearance with plastigage (see **CONNECTING ROD BEARING REPLACEMENT**).
3. Check the main bearing clearance with plastigage (see **CRANKSHAFT MAIN BEARING REPLACEMENT**).
4. Inspect the connecting rod bolts (see **IF THE CRANKSHAFT IS NOT INSTALLED**).
5. Install the bearing halves in the engine block and connecting rods.
6. Apply a coat of new engine oil to the main bearings and rod bearings.
7. Hold the crankshaft so rod journal No. 2 and rod journal No. 3 are straight up, then lower the crankshaft

into the block.

8. Install the thrust washers (A) in the No. 4 journal of the engine block.

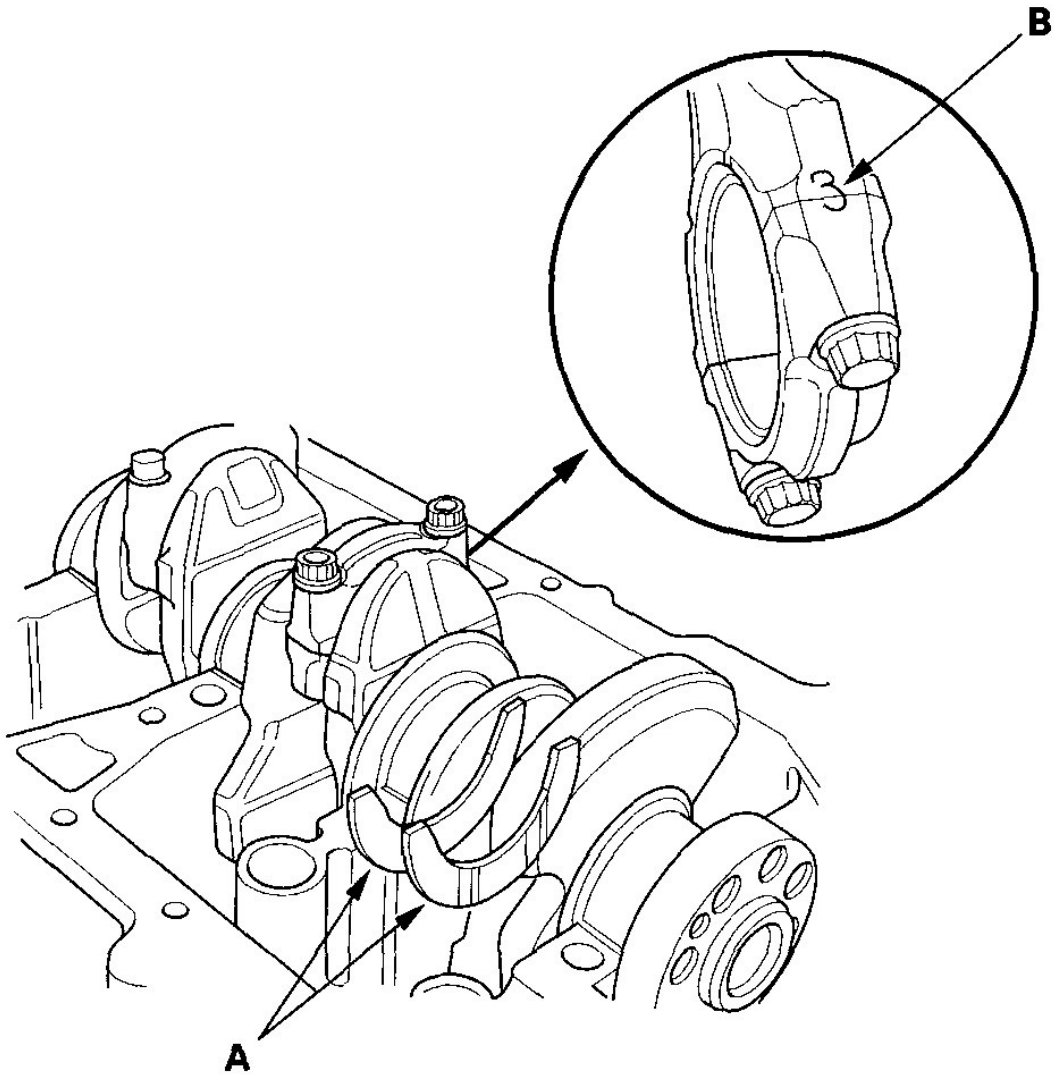

Fig. 55: Installing Thrust Washers In Journal Of Engine Block
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Apply engine oil to the threads of the connecting rod bolts.
10. Seat the rod journals into connecting rod No. 1 and connecting rod No. 4. Line up the mark (B) on the connecting rod and cap, then install the caps and bolts finger-tight.
11. Rotate the crankshaft clockwise, and seat the journals into connecting rod No. 2 and connecting rod No. 3. Line up the mark on the connecting rod and cap, then install the caps and bolts finger-tight.

12. Tighten the connecting rod bolts.

    Tightening Torque

    K20A3 Engine: 20 N.m (2.0 kgf.m, 14 lbf.ft)

    K20A2, K20Z1 Engines: 29 N.m (3.0 kgf.m, 22 lbf.ft)

13. Tighten the connecting rod bolts an additional 90°.

    NOTE: Remove the connecting rod bolt if you tightened it beyond the specified angle, and go back to step 4. of the procedure. Do not loosen it back to the specified angle.

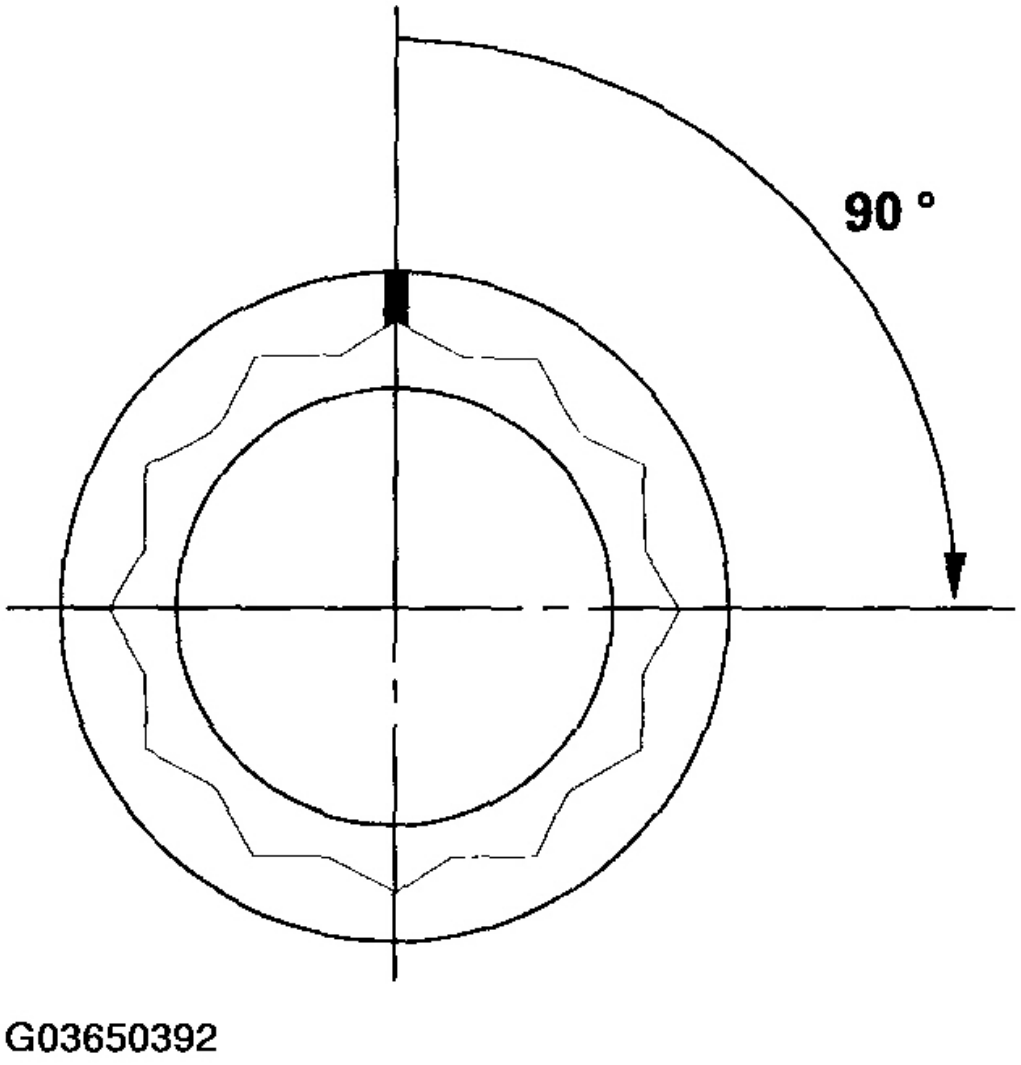

Fig. 56: Tightening And Connecting Rod Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. Remove all of the old liquid gasket from the lower block mating surfaces, bolts and bolt holes.
15. Clean and dry the lower block mating surfaces.
16. Apply liquid gasket, P/N 08717-0004, 08718-0001, 08718-0002, 08718-0003, or 08718-0009, evenly to the engine block mating surface of the lower block.

NOTE: Do not install components if too much time has passed after applying the liquid gasket (for P/N 08718-0002, no more than 4 minutes, for all others, no more than 5 minutes). Instead, remove the old residue and reapply the

liquid gasket.

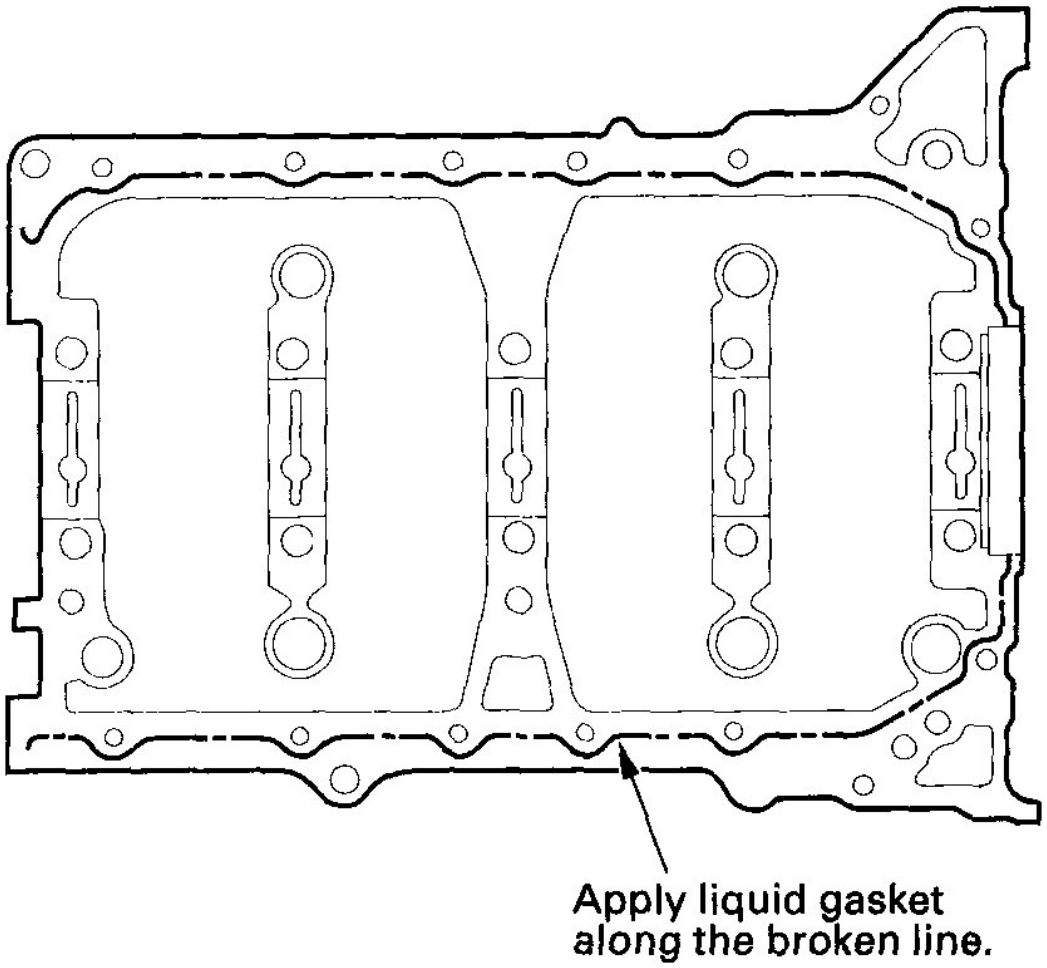

Fig. 57: Identifying Liquid Gasket
Courtesy of AMERICAN HONDA MOTOR CO., INC.

17. Put the lower block on the engine block.
18. Tighten the bearing cap bolts in sequence to 29 N.m (3.0 kgf.m, 22 lbf.ft).

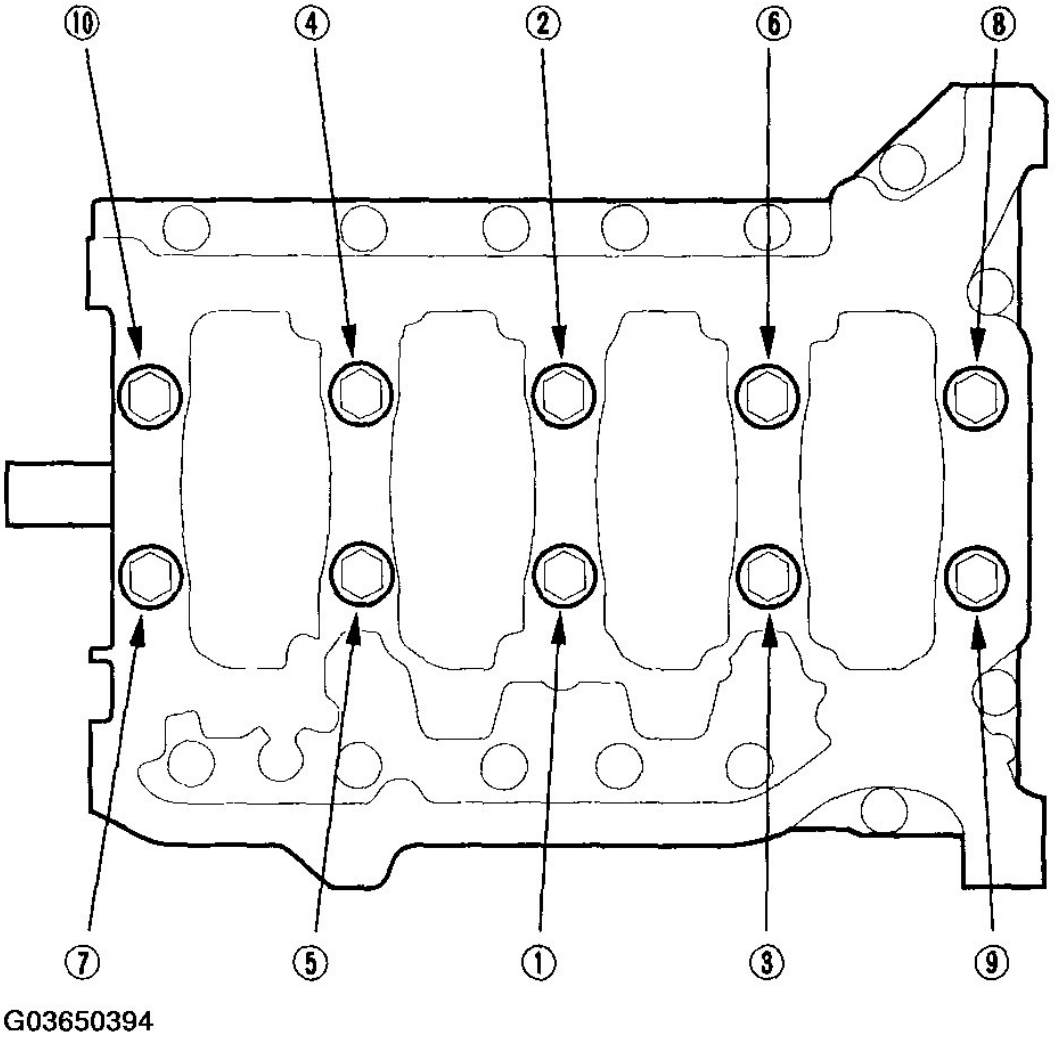

Fig. 58: Identifying Bearing Cap Bolts Tightening Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

19. Tighten the bearing cap bolts an additional 56.

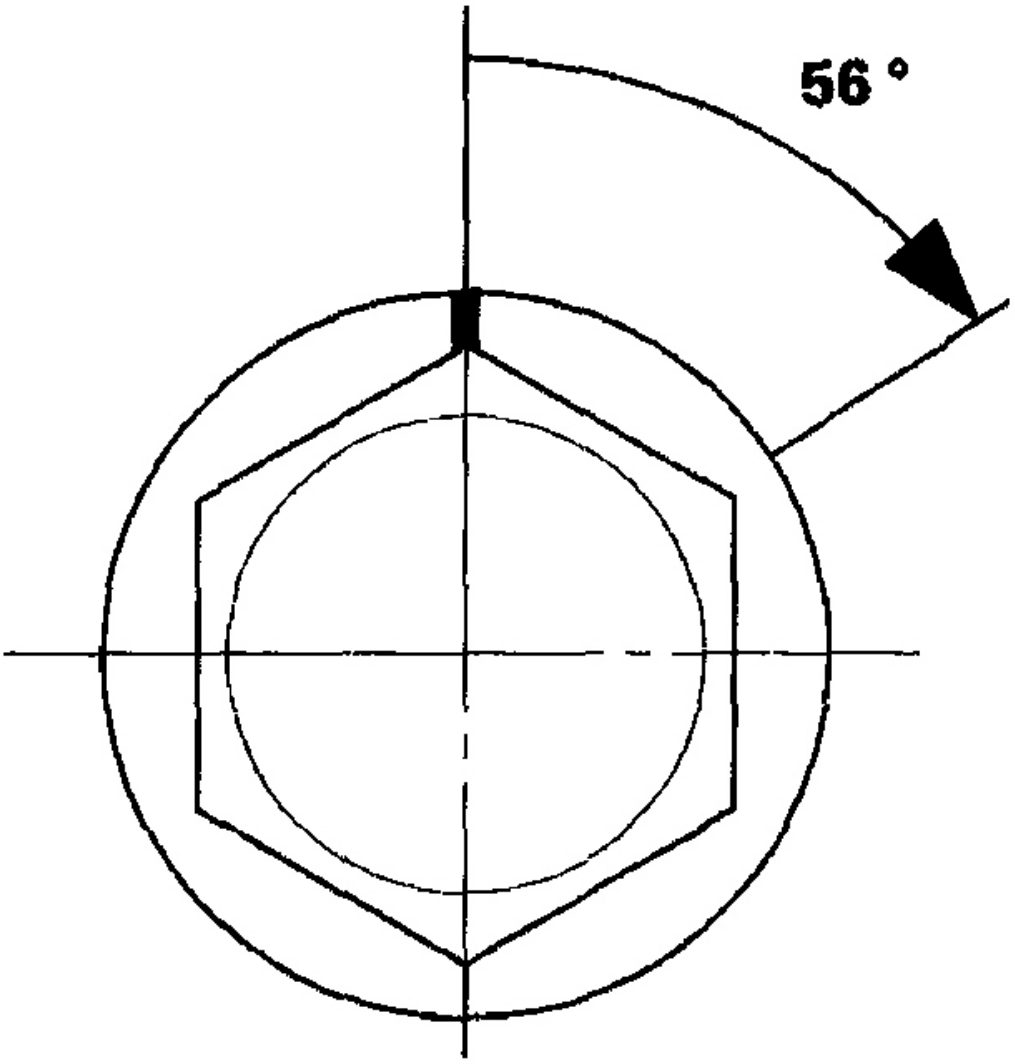

Fig. 59: Tightening Bearing Cap Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

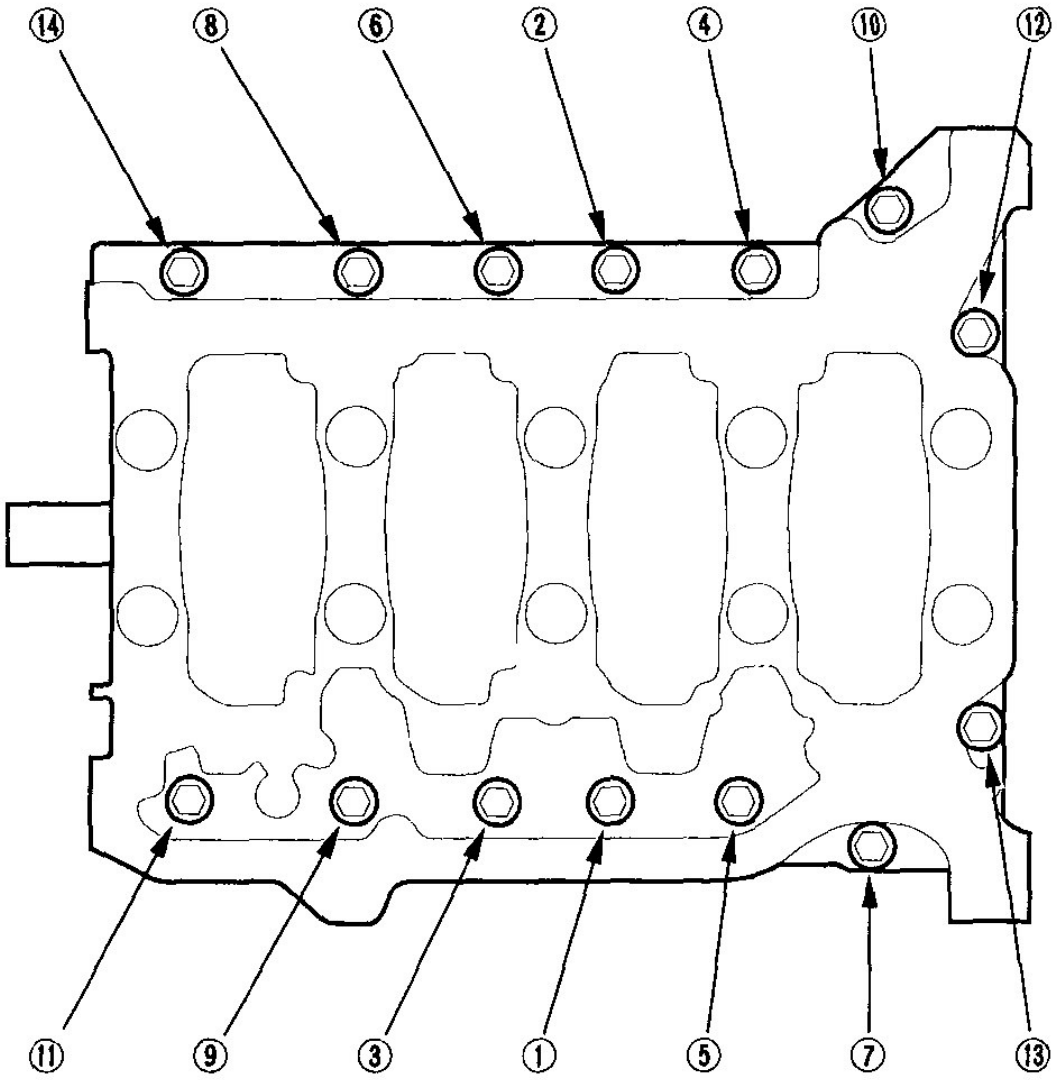

Fig. 60: Identifying 8 mm Bolt Tightening Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

21. Use the special tools to drive a new oil seal squarely into the block to the specified installed height.

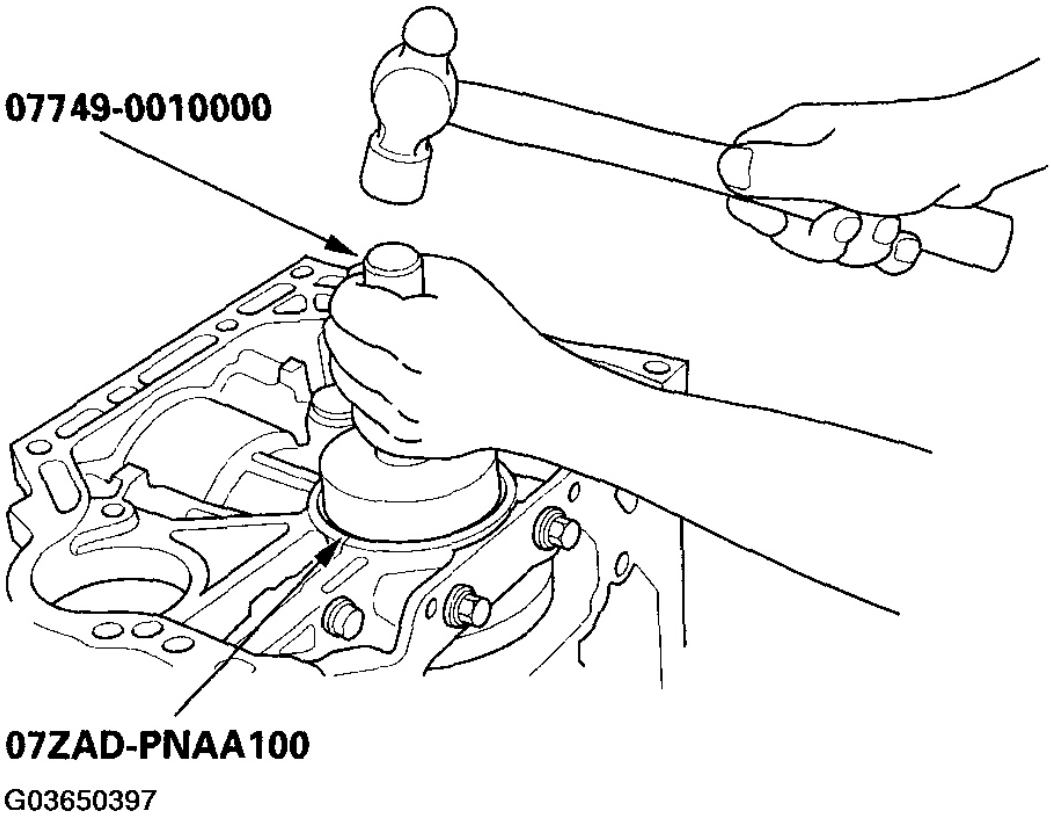

Fig. 61: Installing Oil Seal
Courtesy of AMERICAN HONDA MOTOR CO., INC.

22. Measure the distance between the crankshaft (A) and oil seal (B).

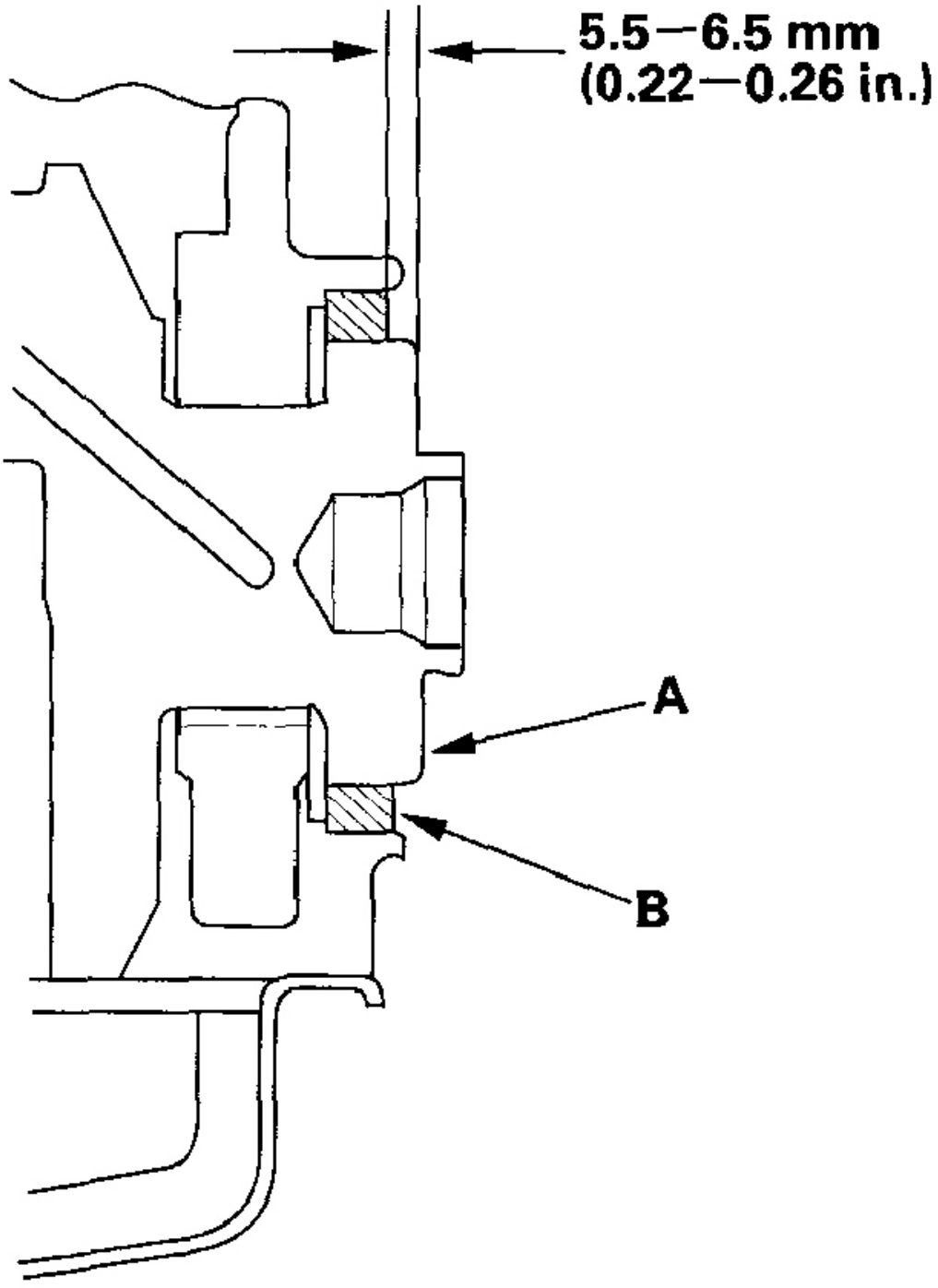

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Fig. 62: Measuring Distance Between Crankshaft And Oil Seal
Courtesy of AMERICAN HONDA MOTOR CO., INC.

23. Install the baffle plate.

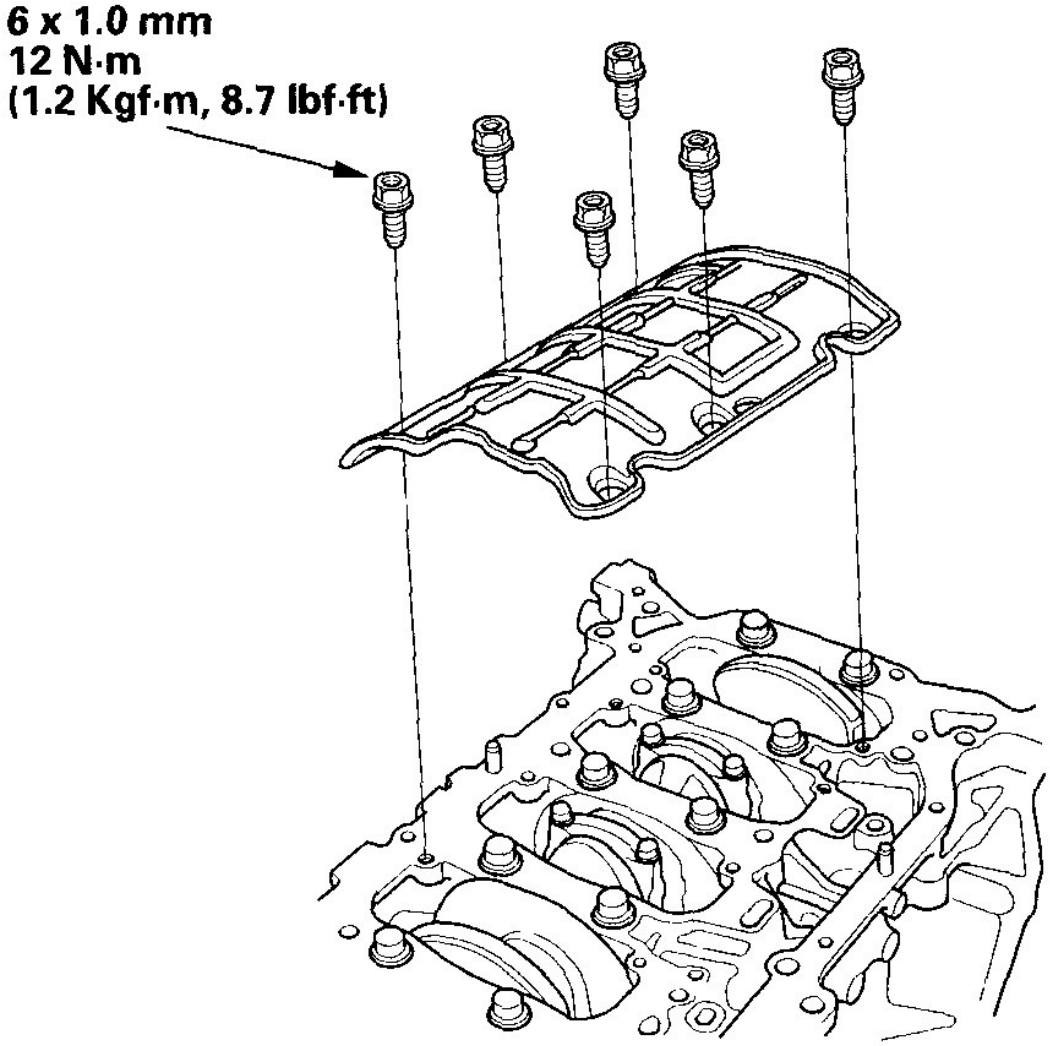

Fig. 63: Installing Baffle Plate And Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

24. Install the oil pump (see **OIL PUMP INSTALLATION**).
25. Install the oil pan (see **OIL PAN INSTALLATION**).
26. Install the cylinder head (see **CYLINDER HEAD INSTALLATION**).

27. A/T model: Install the drive plate (see **DRIVE PLATE REMOVAL AND INSTALLATION**), then install the transmission (see **TRANSMISSION INSTALLATION**).
28. M/T model: Install the flywheel (see **FLYWHEEL INSPECTION**), then install the clutch disc and pressure plate (see **CLUTCH DISC AND PRESSURE PLATE INSTALLATION**). Install the transmission (see **TRANSMISSION INSTALLATION**).
29. Install the engine assembly (see **ENGINE INSTALLATION**).

NOTE: Whenever any crankshaft or connecting rod bearing is replaced, it is necessary after reassembly to run the engine at idling speed until it reaches normal operating temperature, then continue to run it for about 15 minutes.

OIL PAN INSTALLATION

K20A3 ENGINE

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 08718-0002, 08718-0003 or 08718-0009, evenly to the engine block mating surface of the oil pan.

NOTE: Do not install components if too much time has passed after applying the liquid gasket (for P/N 08718-0002, no more than 4 minutes, for all others, no more than 5 minutes). Instead, remove the old residue and reapply the liquid gasket.

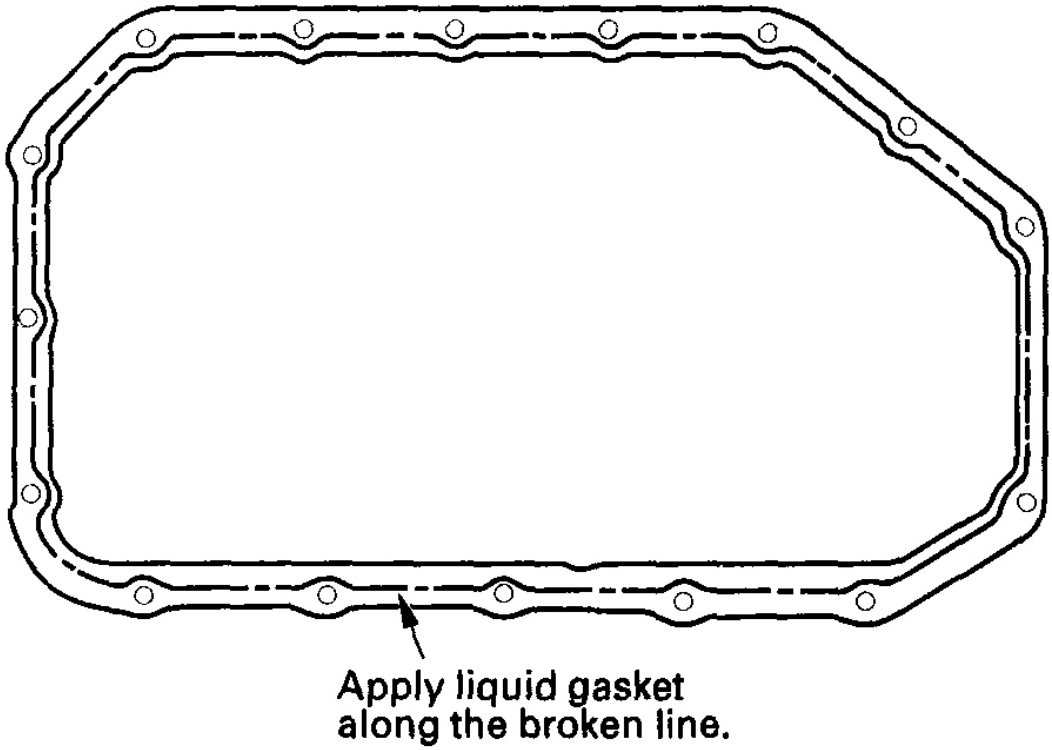

Fig. 64: Identifying Liquid Gasket
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Install the oil pan.
5. Tighten the bolts in two or three steps. In the final step, tighten all bolts in sequence to 12 N.m (1.2 kgf.m, 8.7 lbf.ft). Wipe off the excess liquid gasket on the each side of crankshaft pulley and flywheel/drive plate.

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

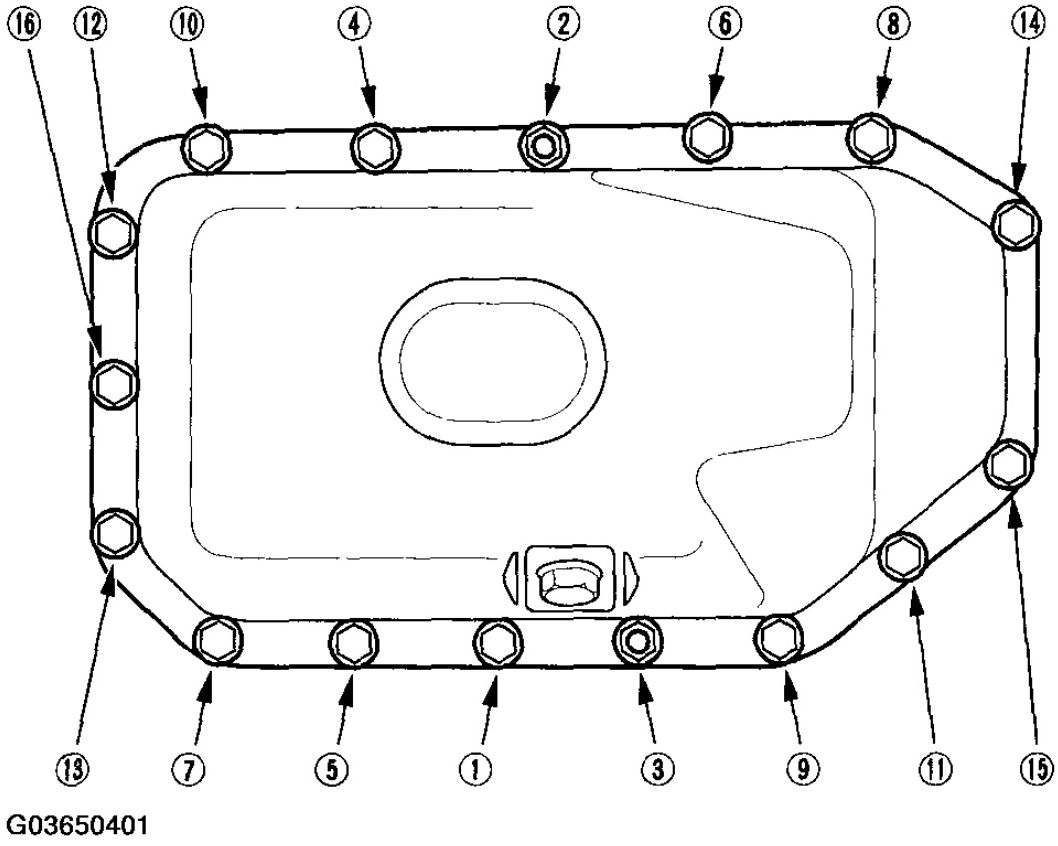

Fig. 65: Identifying Oil Pan Bolt Tightening Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. If the engine is still in the vehicle, install the subframe.
   - 1 Install the subframe. Align the reference lines on the subframe with the bolt head center, then tighten the bolts (see step 4 on **ENGINE INSTALLATION**).
   - 2 Install the automatic transmission (ATF) filter mounting bolt (see step 24 on **ENGINE INSTALLATION**).
   - 3 Tighten the rear mount mounting bolts (see step 5 on **ENGINE INSTALLATION**).
   - 4 Tighten the new front mount mounting bolt (see step 11 on **ENGINE INSTALLATION**).
   - 5 Connect the suspension lower arm ball joints (see step 10 on **KNUCKLE/HUB/WHEEL BEARING REPLACEMENT**).

K20A2, K20Z1 ENGINES

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, 08718-0002, 08718-0003 or 08718-0009, evenly to the engine block mating surface of the oil pan.

NOTE: Do not install components if too much time has passed after applying the liquid gasket (for P/N 08718-0002, no more than 4 minutes, for all others, no more than 5 minutes). Instead, remove the old residue and reapply the liquid gasket.

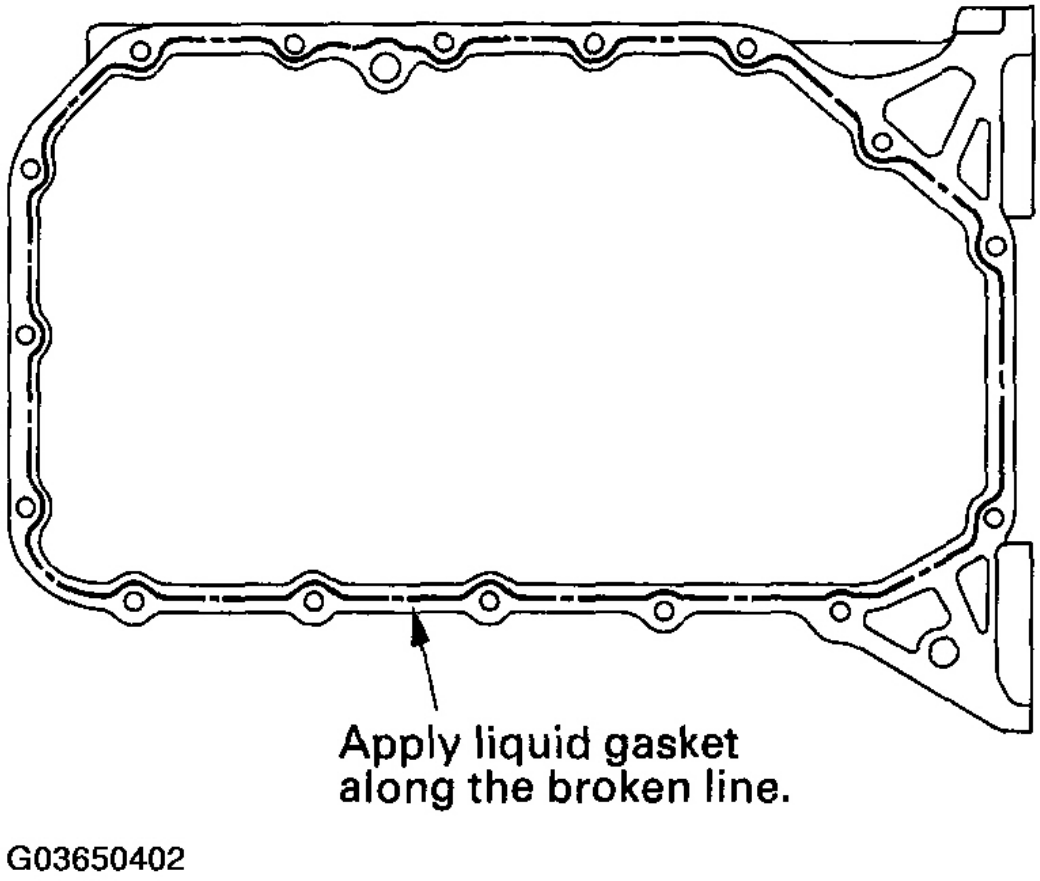

Fig. 66: Identifying Liquid Gasket
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Install the oil pan.
5. Tighten the bolts in two or three steps. In the final step, tighten all bolts in sequence to 12 N.m (1.2 kgf.m, 8.7 lbf.ft). Wipe off the excess liquid gasket on the each side of crankshaft pulley and flywheel/drive plate.

NOTE:

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

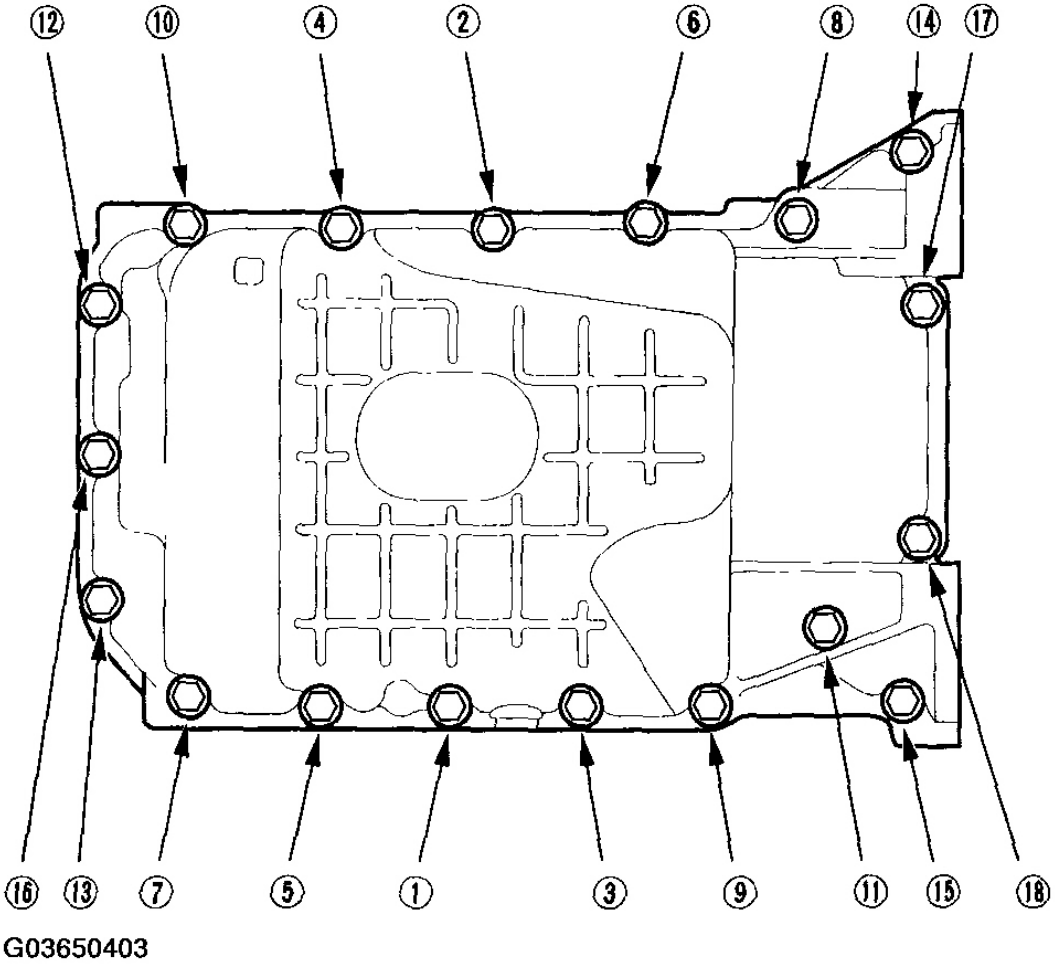

Fig. 67: Identifying Oil Pan Bolt Tightening Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Install the clutch cover (A), and tighten the two bolts (B) securing the transmission.

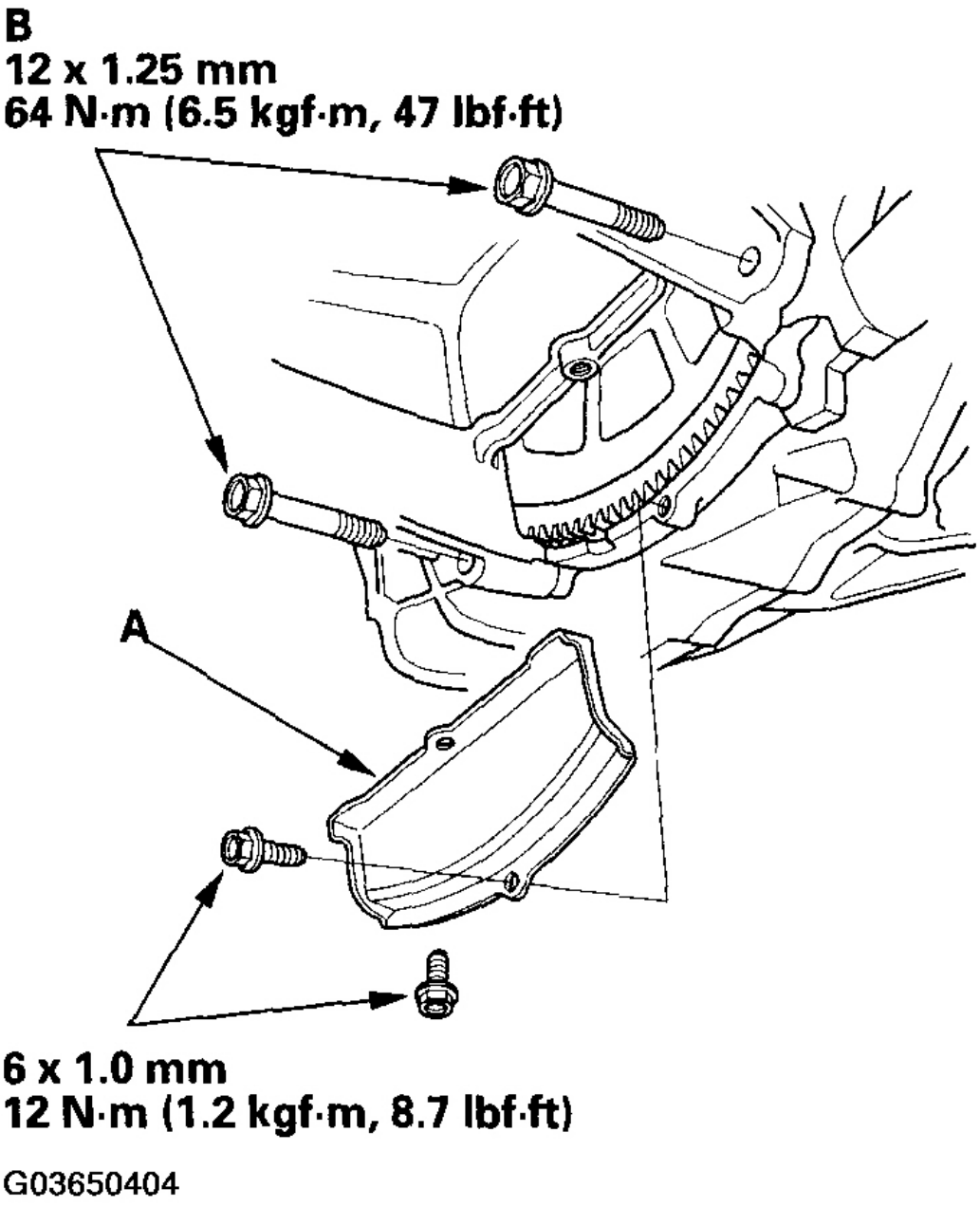

Fig. 68: Installing Clutch Cover And Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. If the engine is still in the vehicle, install the subframe.
    - 1 Install the subframe. Align the reference lines on the subframe with the bolt head center, then tighten the bolts (see step 4 on **ENGINE INSTALLATION**).

- 2 Tighten the rear mount mounting bolts (see step 5 on **ENGINE INSTALLATION**).
- 3 Tighten the new front mount mounting bolt (see step 11 on **ENGINE INSTALLATION**).
- 4 Connect the suspension lower arm ball joints (see step 10 on **KNUCKLE/HUB/WHEEL BEARING REPLACEMENT**).

TRANSMISSION END CRANKSHAFT OIL SEAL INSTALLATION - IN CAR

Special Tools Required

- Driver 07749-0010000
- Oil seal driver attachment 96 07ZAD-PNAA100

1. A/T model: Remove the transmission (see **TRANSMISSION REMOVAL**), then remove the drive plate (see **DRIVE PLATE REMOVAL AND INSTALLATION**).
2. M/T model: Remove the transmission (see **TRANSMISSION REMOVAL**). Remove the pressure plate and clutch disc (see **CLUTCH REPLACEMENT**), then remove the flywheel (see **FLYWHEEL REPLACEMENT**).
3. Dry the crankshaft oil seal housing.
4. Use the special tools to drive a new oil seal squarely into the block to the specified installed height.

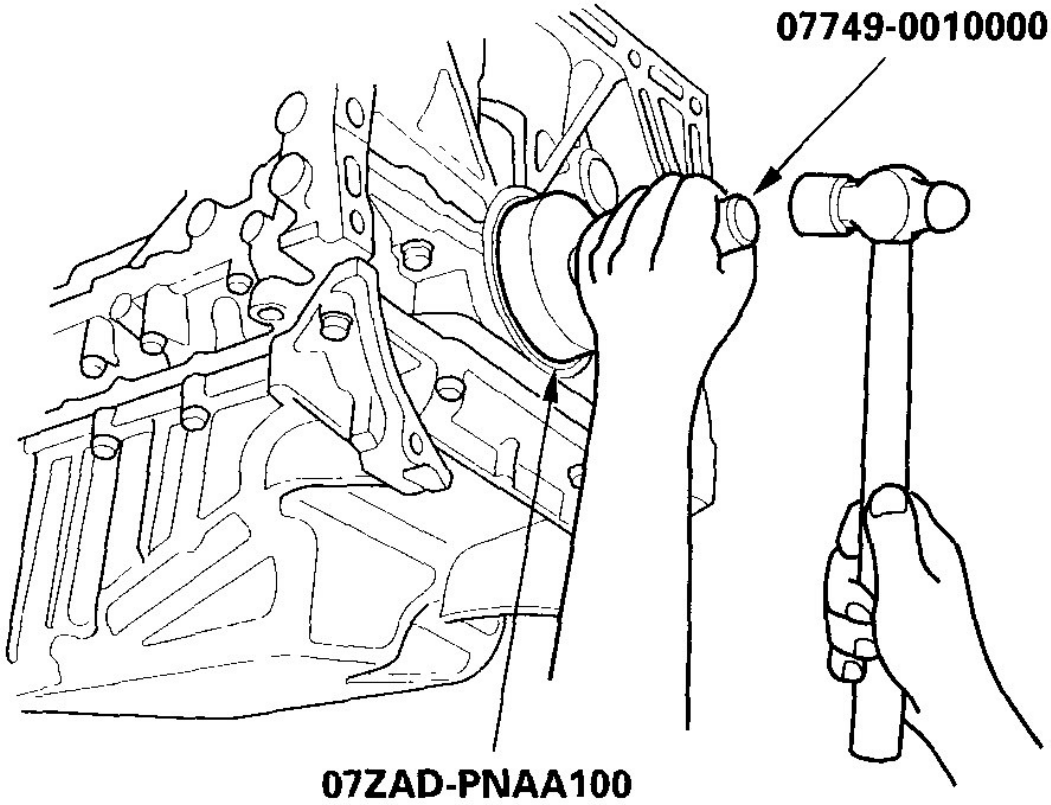

Fig. 69: Driving New Oil Seal Using Special Tool
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Measure the distance between the crankshaft (A) and oil seal (B).

   Oil Seal Installed Height:

   5.5-6.5 mm (0.22-0.26 in.)

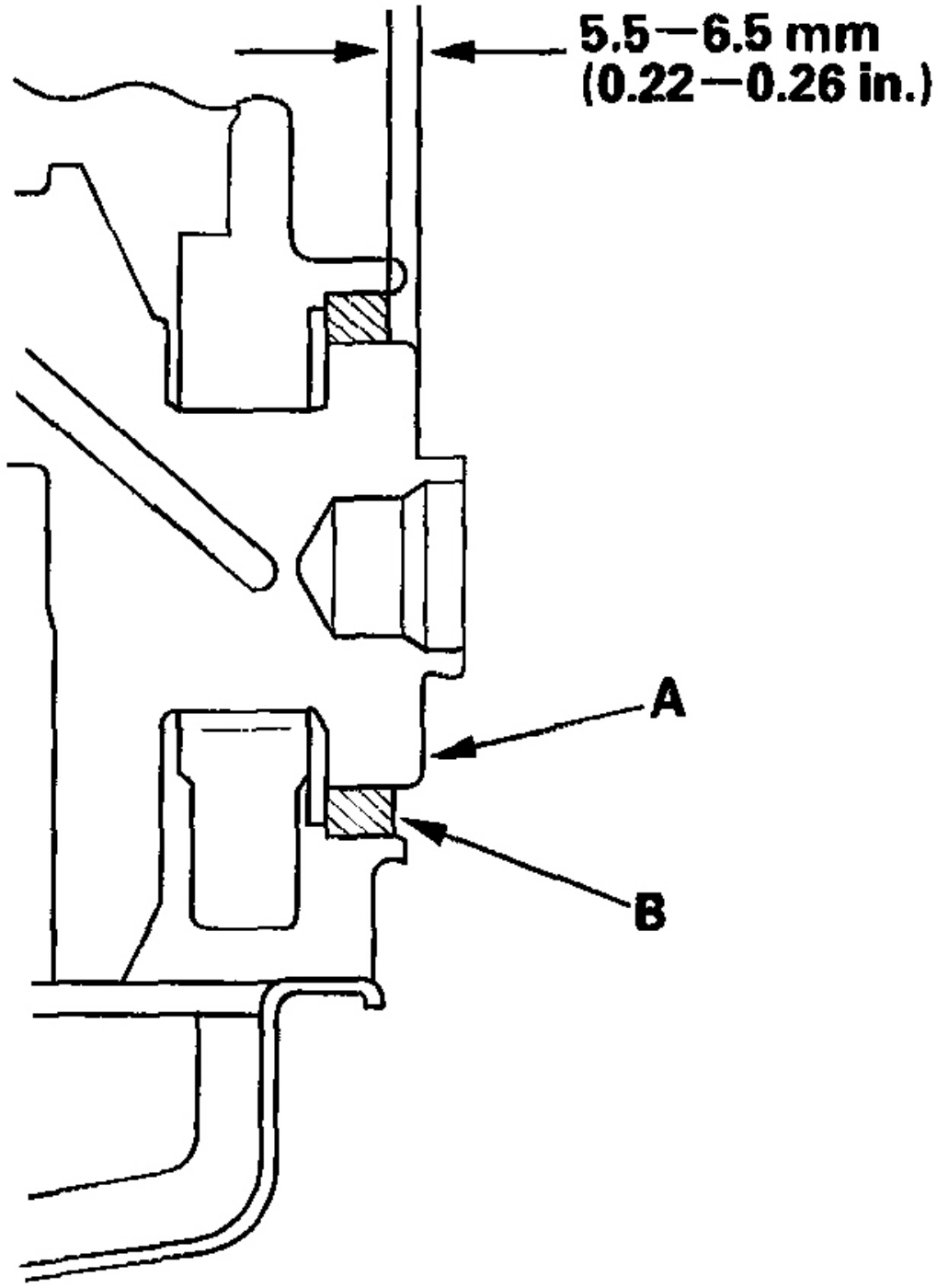

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Fig. 70: Measuring Distance Between Crankshaft And Oil Seal
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. A/T model: Install the drive plate (see **DRIVE PLATE REMOVAL AND INSTALLATION**), then install the transmission (see **TRANSMISSION INSTALLATION**).
7. M/T model: Install the flywheel (see **FLYWHEEL INSPECTION**), then install the clutch disc and pressure plate (see **CLUTCH DISC AND PRESSURE PLATE INSTALLATION**). Install the transmission (see **TRANSMISSION INSTALLATION**).

