

Engine Block

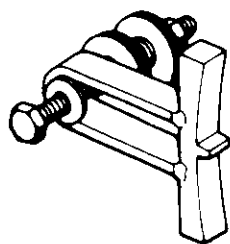
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Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
①	07LAB - PV00100	Ring Gear Holder	1	7-7
②	07749 - 0010000	Driver	1	7-22, 29
③	07947 - SB00200	Seal Driver	1	7-29
④	07948 - SB00101	Driver Attachment	1	7-22, 29
⑤	07973 - PE00200	Pilot Collar	1	7-17, 18
⑥	07973 - PE00310	Piston Pin Driver Shaft	1	7-17, 18
⑦	07973 - PE00320	Piston Pin Driver Head	1	7-17, 18
⑧	07973 - PE00400	Piston Pin Base Insert	1	7-17, 18
⑨	07973 - SB00100	Piston Base Head	1	7-17, 18
⑩	07973 - 6570500	Piston Base	1	7-17, 18
⑪	07973 - 6570600	Piston Base Spring	1	7-17, 18



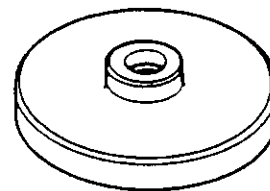
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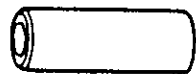
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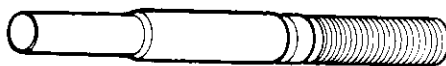
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⑤



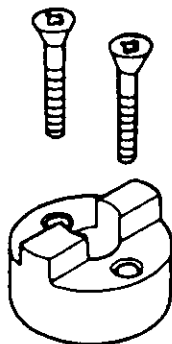
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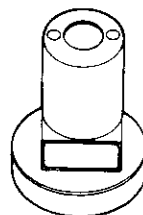
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⑨




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⑪

Illustrated Index

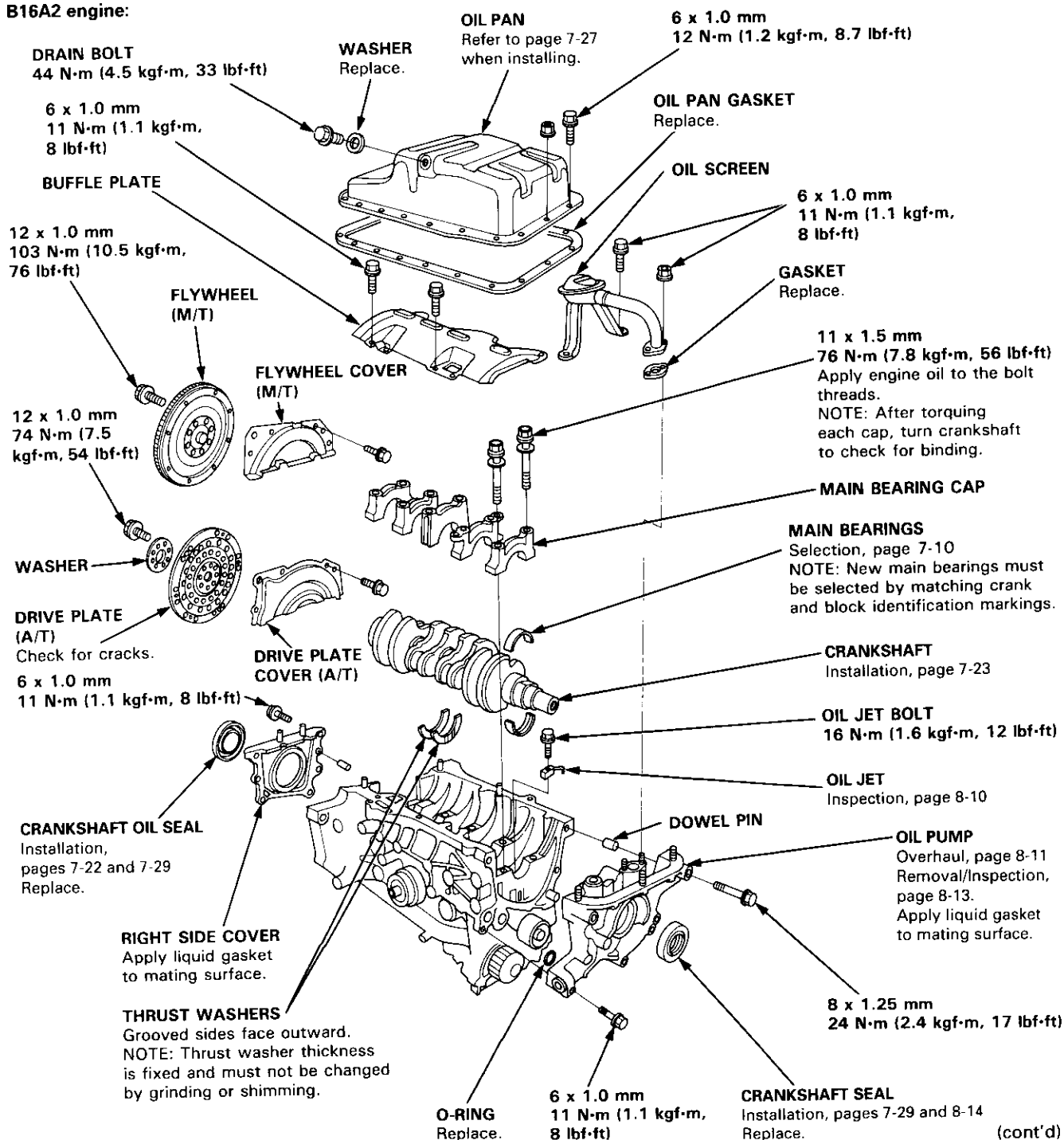


 Lubricate all internal parts with engine oil during reassembly.

NOTE:

- Apply liquid gasket to the mating surfaces of the right side cover and oil pump case before installing them.
- Use liquid gasket, part No. 08718 - 0001 or 08718 - 0003.
- Clean the oil pan gasket mating surfaces before installing the oil pan.


B16A2 engine:



(cont'd)

Illustrated Index

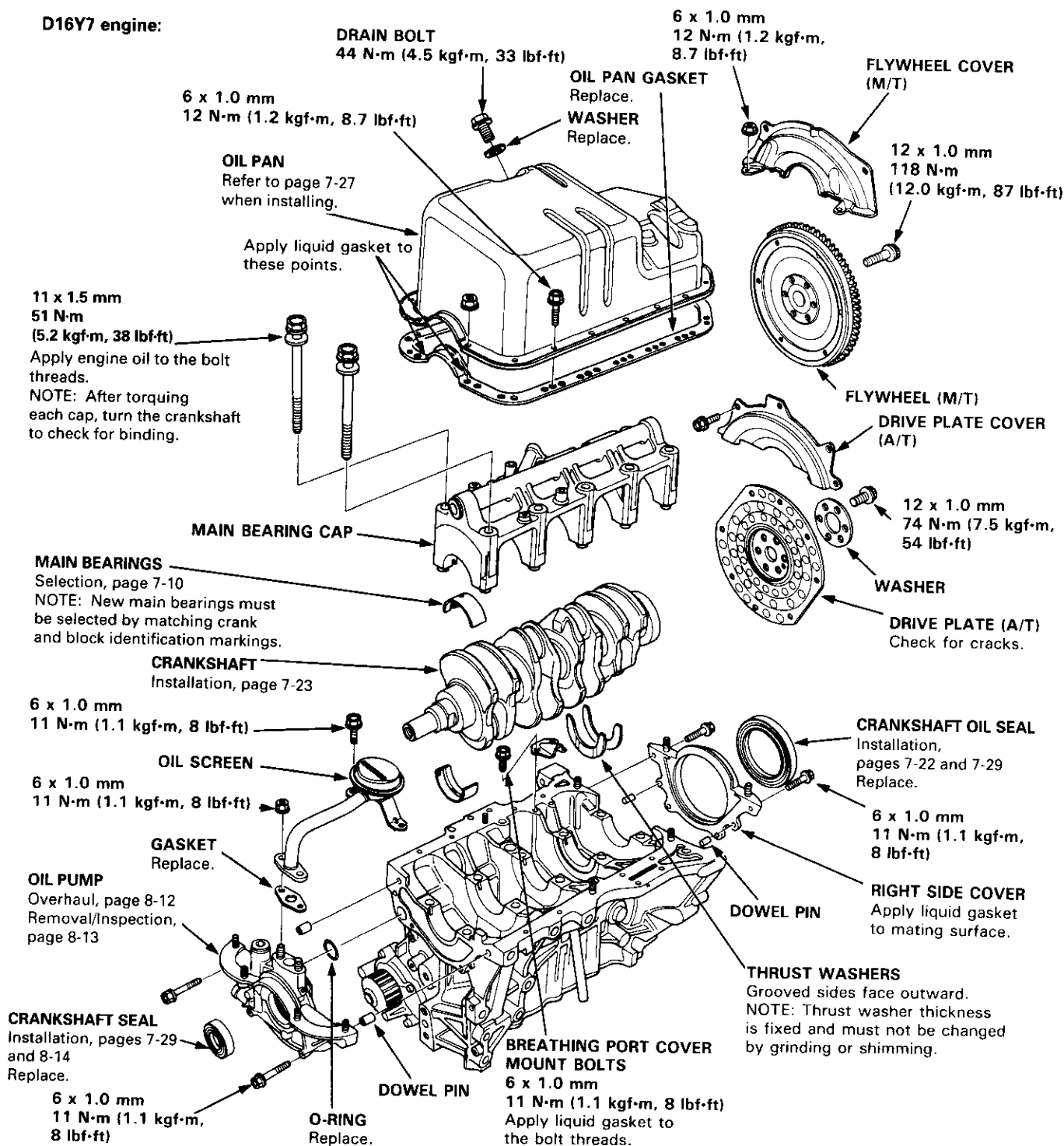
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 Lubricate all internal parts with engine oil during reassembly.

NOTE:

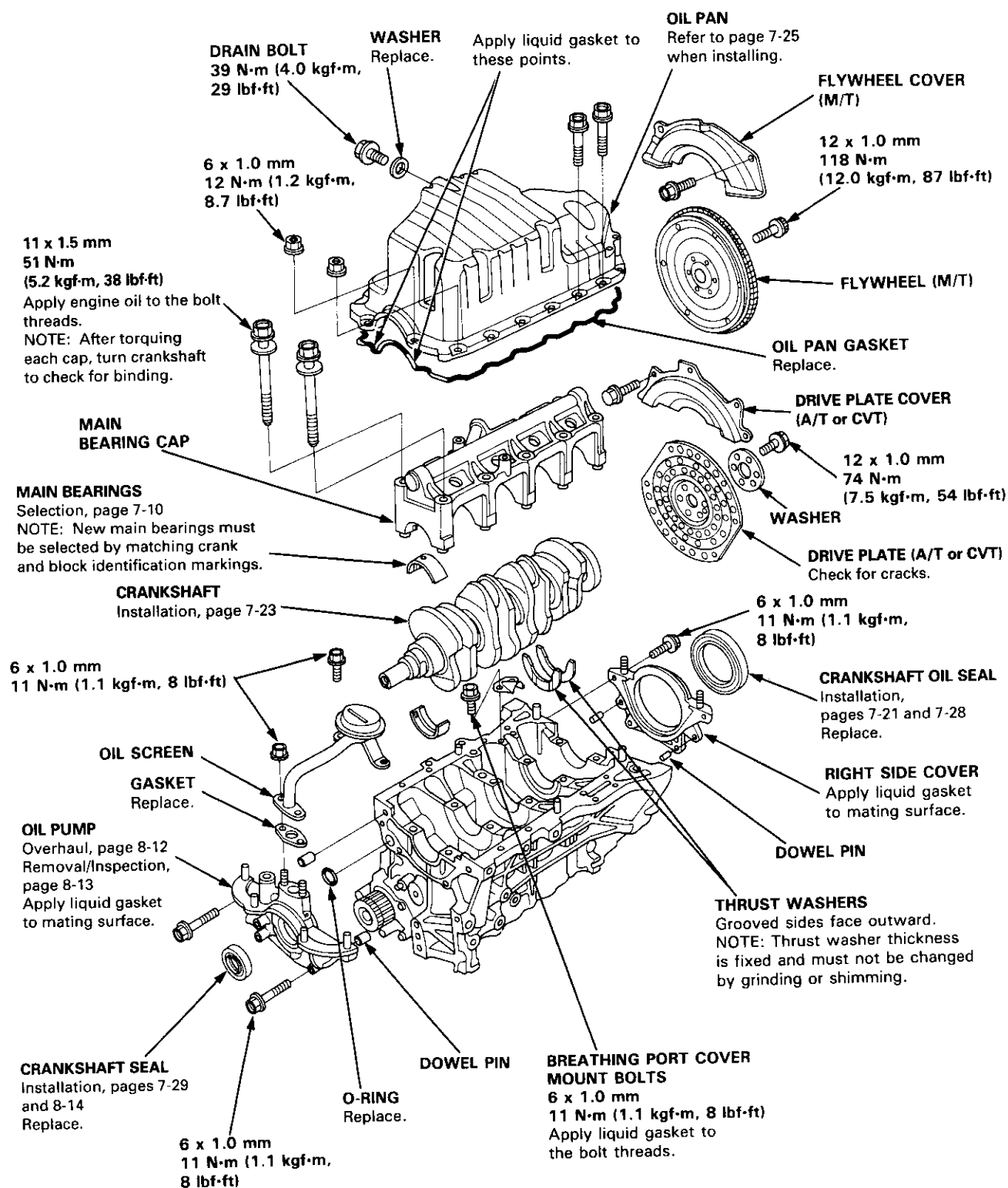
- Apply liquid gasket to the mating surfaces of the right side cover and oil pump case before installing them.
- Use liquid gasket, part No. 08718 - 0001 or 08718 - 0003.
- Clean the oil pan gasket mating surfaces before installing it.

D16Y7 engine:





D16Y5, D16Y8 engines:




(cont'd)

Illustrated Index

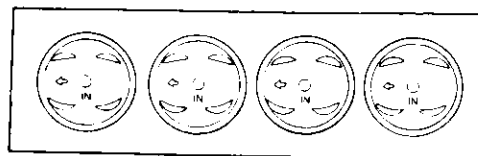
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NOTE: New rod bearings must be selected by matching connecting rod assembly and crankshaft identification markings (see page 7-11).

 Lubricate all internal parts with engine oil during reassembly.

PISTON INSTALLATION DIRECTION:

EXHAUST



INTAKE

PISTON RINGS

Replacement, page 7-20
Measurement, pages 7-20 and 7-21
Alignment, page 7-21

PISTON PIN

Removal, page 7-17
Installation, page 7-18
Inspection, page 7-19

PISTON

Inspection, page 7-15
NOTE: Before removing the piston, inspect the top of the cylinder bore for carbon build-up or ridge. Remove ridge if necessary, page 7-13

CONNECTING ROD

End play, page 7-8
Selection, page 7-18

ENGINE BLOCK

Cylinder bore inspection, page 7-16
Warp inspection, page 7-16
Cylinder bore honing, page 7-17

CONNECTING ROD BEARINGS

Clearance, page 7-11
Selection, page 7-11

Inspect top of each cylinder bore for carbon build-up or ridge before removing piston.
Remove ridge if necessary, page 7-13

CONNECTING ROD BEARING CAP

Installation, page 7-23
NOTE: Install caps so the bearing recess is on the same side as the recess in the rod.

CONNECTING ROD CAP NUT

B16A2 engine:

9 x 0.75 mm

40 N·m (4.1 kgf·m, 30 lbf·ft)

D16Y5, D16Y7, D16Y8 engines:

8 x 0.75 mm

31 N·m (3.2 kgf·m, 23 lbf·ft)

Apply engine oil to the bolt threads.

NOTE: After torquing each bearing cap, rotate crankshaft to check for binding.



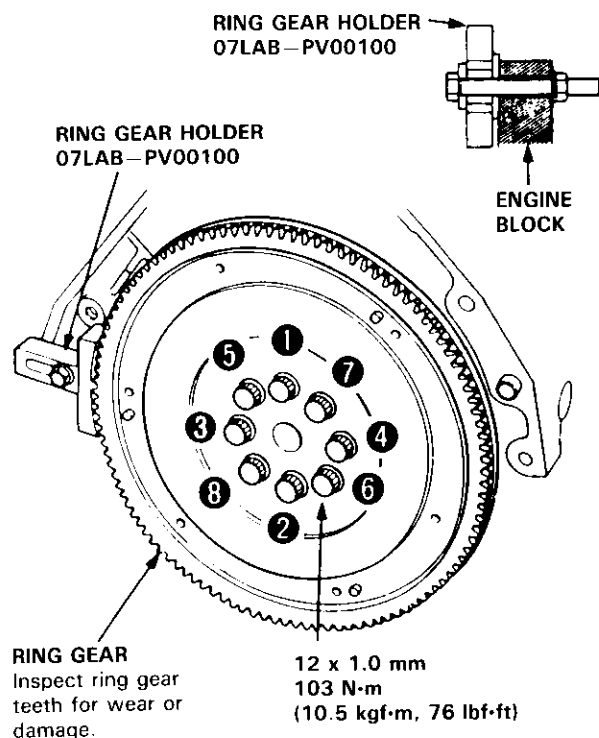
Flywheel and Drive Plate

Replacement

Manual Transmission:

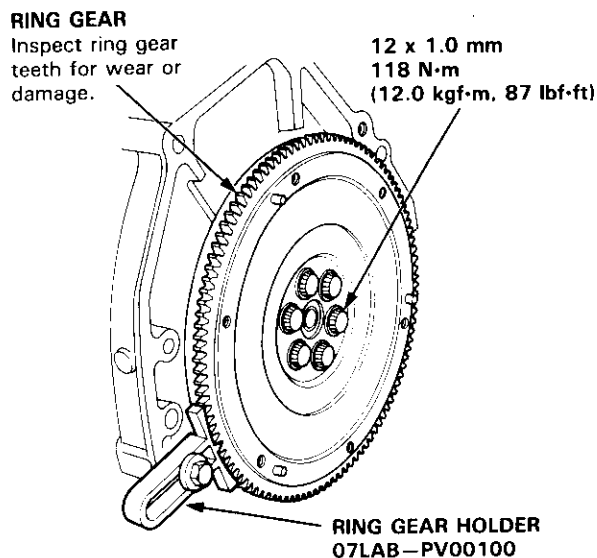
B16A2 engine:

Remove the eight flywheel bolts, then separate the flywheel from the crankshaft flange. After installation, tighten the bolts in the sequence shown.



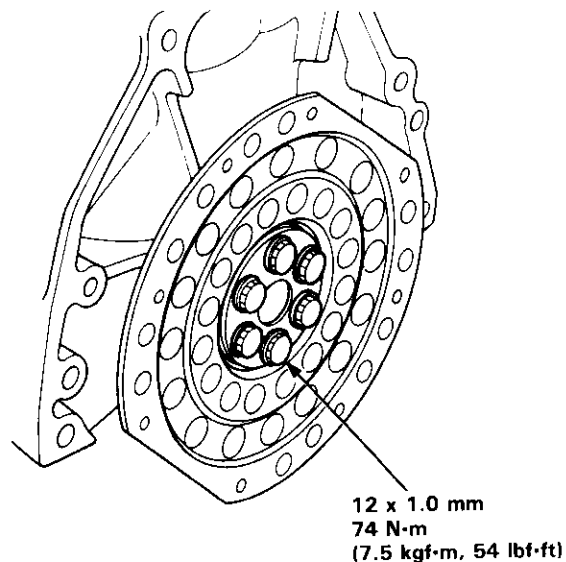
D16Y5, D16Y7, D16Y8 engines:

Remove the six flywheel bolts, then separate the flywheel from the crankshaft flange. After installation, tighten the bolts in a crisscross pattern.



Automatic Transmission:

Remove the six drive plate bolts, then separate the drive plate from the crankshaft flange. After installation, tighten the bolts in a crisscross pattern.



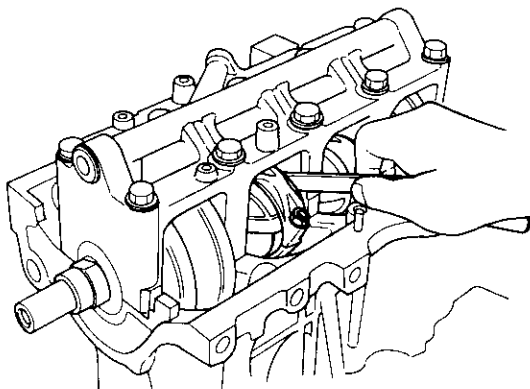
Connecting Rod and Crankshaft

End Play

Connecting Rod End Play:

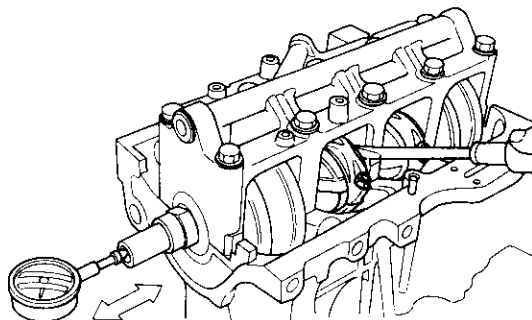
Standard (New): 0.15 – 0.30 mm
(0.006 – 0.012 in)

Service Limit: 0.40 mm (0.016 in)



- If out-of-tolerance, install a new connecting rod.
- If still out-of-tolerance, replace the crankshaft (see pages 7-12 and 7-23).

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; dial reading should not exceed 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)

- If end play is excessive, inspect the thrust washers and thrust surface on the crankshaft. Replace parts as necessary.

NOTE: Thrust washer thickness is fixed and must not be changed either by grinding or shimming. Thrust washers are installed with grooved sides facing outward.



Clearance

1. To check main bearing-to-journal oil clearance, remove the main caps and bearing halves.
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 car when you bolt the main cap down to check clearance, the weight of the crankshaft and flywheel 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 bolts.

1st step: 25 N·m (2.5 kgf·m, 18 lbf·ft)

Final step:

B16A2 engine:

76 N·m (7.8 kgf·m, 56 lbf·ft)

D16Y5, D16Y7, D16Y8 engines:

51 N·m (5.2 kgf·m, 38 lbf·ft)

NOTE: Do not rotate the crankshaft during inspection.

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

Main Bearing-to-Journal Oil Clearance:

B16A2 engine:

Standard (New):

No. 1, 2, 4, 5 Journals:

0.024 – 0.042 mm (0.0009 – 0.0017 in)

No. 3 Journals:

0.030 – 0.048 mm (0.0012 – 0.0019 in)

Service Limit: 0.06 mm (0.002 in)

D16Y5, D16Y7, D16Y8 engines:

Standard (New):

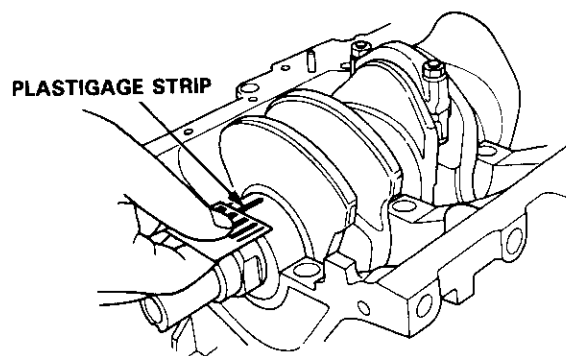
No. 1, 5 Journals:

0.018 – 0.036 mm (0.0007 – 0.0014 in)

No. 2, 3, 4 Journals:

0.024 – 0.042 mm (0.0009 – 0.0017 in)

Service Limit: 0.05 mm (0.002 in)



6. If the plastigage measures too wide or too narrow, (remove the engine if it's still in the car), remove the crankshaft, and remove the upper half of the bearing. Install a new, complete bearing with the same color code (select the color as shown on the next page), and recheck the clearance.

CAUTION: 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.

NOTE: If the proper clearance cannot be obtained by using the appropriate larger or smaller bearings, replace the crankshaft and start over.

Connecting Rod Bearings



Clearance

1. Remove the connecting rod cap and bearing half.
2. Clean the crankshaft rod journal and bearing half with a clean shop towel.
3. Place plastigage across the rod journal.
4. Reinstall the bearing half and cap, and torque the nuts.

Torque

B16A2 engine:

40 N·m (4.1 kgf·m, 30 lbf·ft)

D16Y5, D16Y7, D16Y8 engines:

31 N·m (3.2 kgf·m, 23 lbf·ft)

NOTE: Do not rotate the crankshaft during inspection.

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

Connecting Rod Bearing-to-Journal Oil Clearance:

B16A2 engine:

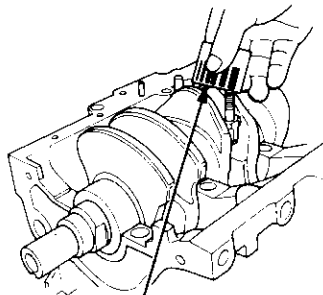
Standard (New): 0.032 – 0.050 mm
(0.0013 – 0.0020 in)

Service Limit: 0.06 mm (0.002 in)

D16Y5, D16Y7, D16Y8 engines:

Standard (New): 0.020 – 0.038 mm
(0.0008 – 0.0015 in)

Service Limit: 0.05 mm (0.002 in)



PLASTIGAGE STRIP

6. If the plastigage measures too wide or too narrow, remove the upper half of the bearing, install a new, complete bearing with the same color code (select the color as shown in the right column), and recheck the clearance.

CAUTION: 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.

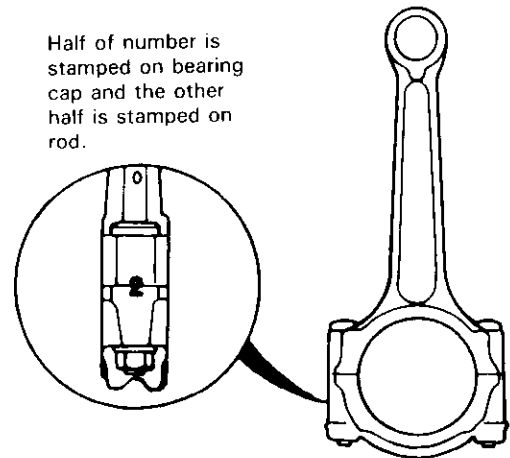
NOTE: If the proper clearance cannot be obtained by using the appropriate larger or smaller bearings, replace the crankshaft and start over.

Selection

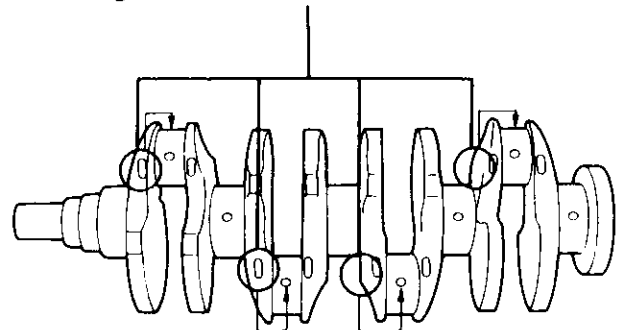
CAUTION: If the codes are indecipherable because of an accumulation of dirt and dust, do not scrub them with a wire brush or scraper. Clean them only with solvent or detergent.

Connecting Rod Code Location

Numbers 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 stamped on the crankshaft (codes for rod journal size), to choose the correct bearings.



Connecting Rod Journal Code Locations (Letters)



Bearing Identification

Color code is on the _____ → Larger big end bore edge of the bearing.

1	2	3	4
---	---	---	---

A or I
B or II
C or III
D or IIII

Smaller rod journal

→ Smaller bearing (thicker)

Red	Pink	Yellow	Green
Pink	Yellow	Green	Brown
Yellow	Green	Brown	Black
Green	Brown	Black	Blue

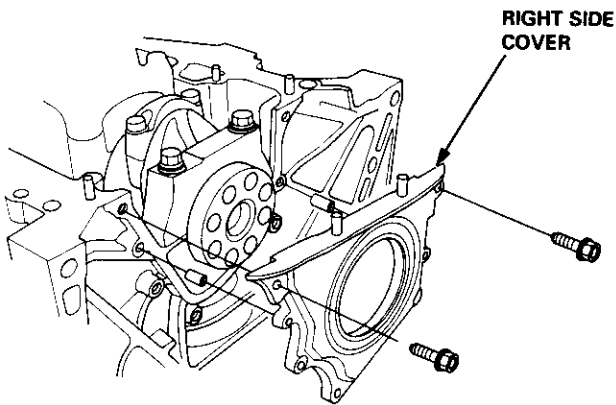
Smaller bearing (thicker)

Pistons and Crankshaft

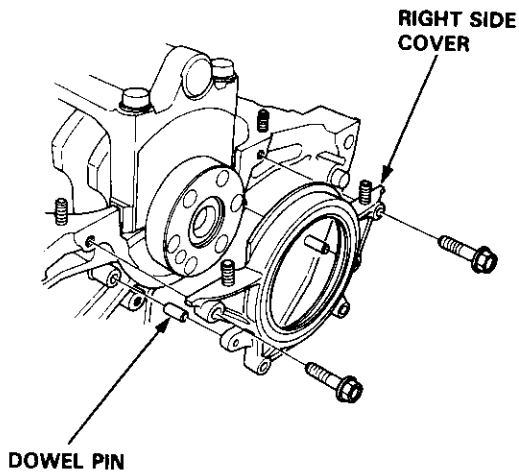
Removal

1. Remove the oil pan assembly.
2. Remove the right side cover.

B16A2 engine

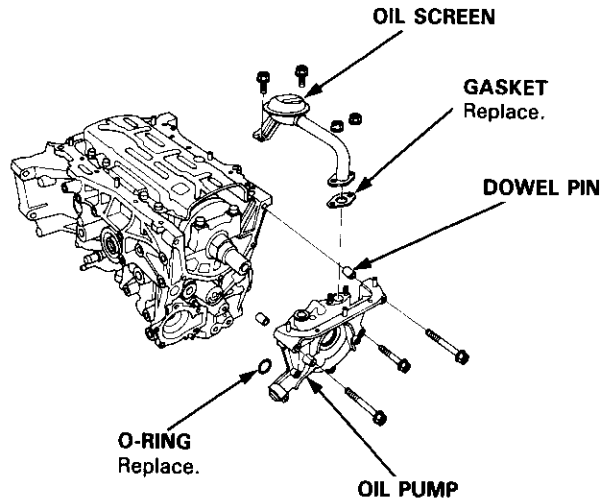


D16Y5, D16Y7, D16Y8 engines

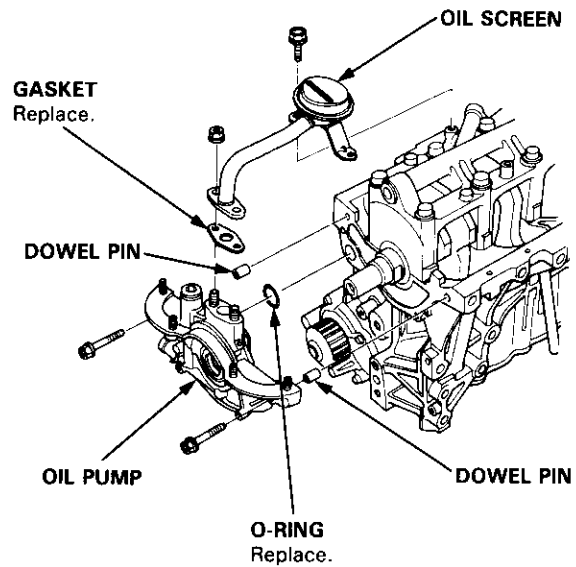


3. Remove the oil screen.
4. Remove the oil pump.

B16A2 engine



D16Y5, D16Y7, D16Y8 engines



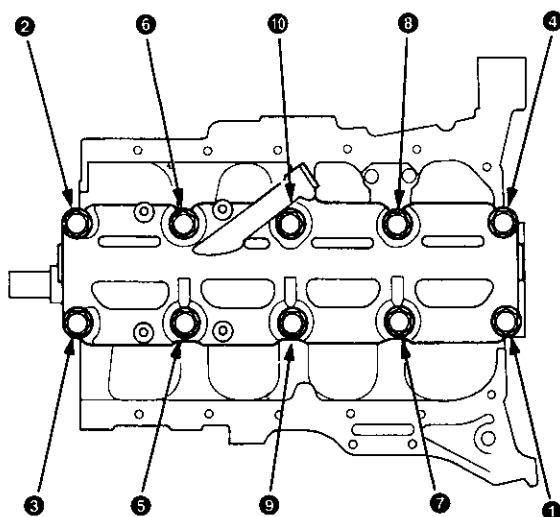
5. Remove the baffle plate (B16A2 engine).



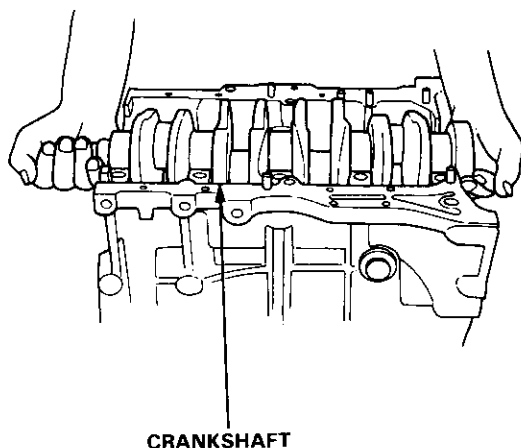
6. Remove the bolts and the bearing caps.

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

MAIN BEARING CAP BOLTS LOOSENING SEQUENCE

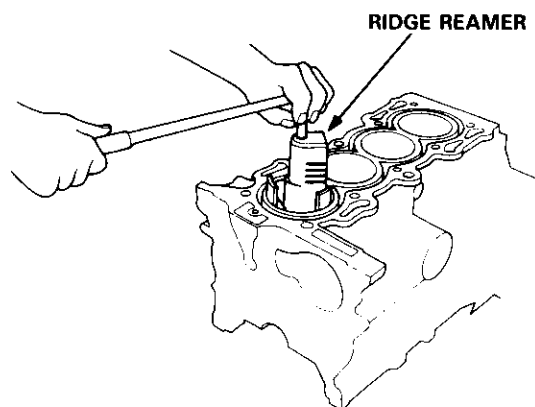


7. Remove the rod caps/bearings and main caps/bearings. Keep all caps/bearing in order.
8. Lift the crankshaft out of the engine, being careful not to damage journals.

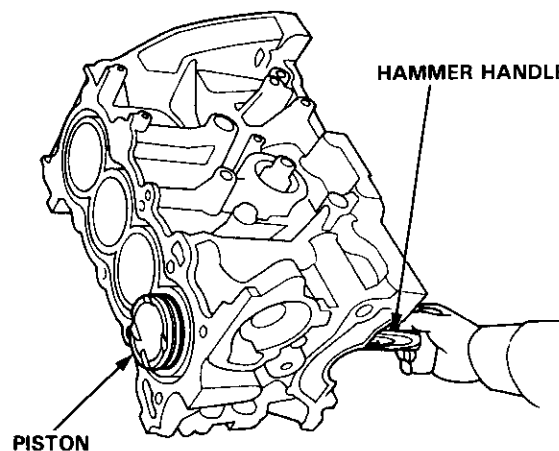


9. Remove the upper bearing halves from the connecting rods and set them aside with their respective caps.
10. Reinstall the main caps and bearings on the engine in proper order.
11. If you can feel ridge of metal or hard carbon around the top of each cylinder, remove it with a ridge reamer. Follow the reamer manufacturer's instructions.

CAUTION: If the ridge is not removed, it may damage the pistons as they are pushed out.



12. Use the wooden handle of a hammer to drive the pistons out.



13. Reinstall the connecting rod bearings and caps after removing each piston/connecting rod assembly.
14. Mark each piston/connecting rod assembly with its cylinder number to avoid mixup on reassembly.

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

Crankshaft

Inspection

- Clean the crankshaft oil passages with pipe cleaners or a suitable brush.
- Check the keyway and threads.

Alignment

- Measure runout on all main journals to make sure the crank is not bent.
- The difference between measurements on each journal must not be more than the service limit.

Crankshaft Total Indicated Runout:

B16A2 engine:

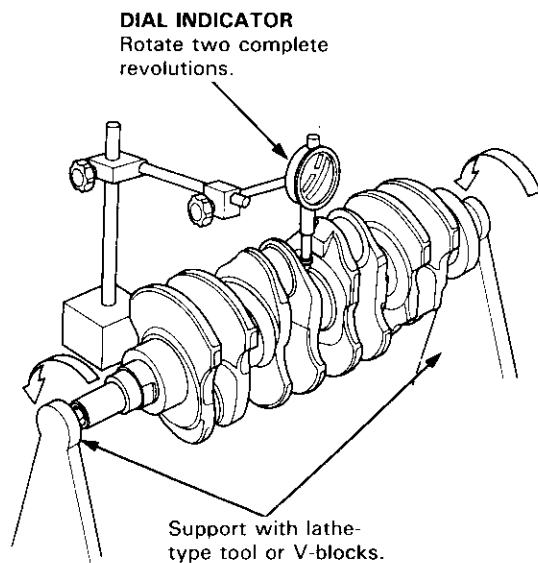
Standard (New): 0.020 mm (0.0008 in) max.

Service Limit: 0.030 mm (0.0012 in)

D16Y5, D16Y7, D16Y8 engines:

Standard (New): 0.03 mm (0.001 in) max.

Service Limit: 0.04 mm (0.002 in)



Out-of-Round and Taper

- 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:

B16A2 engine:

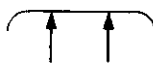
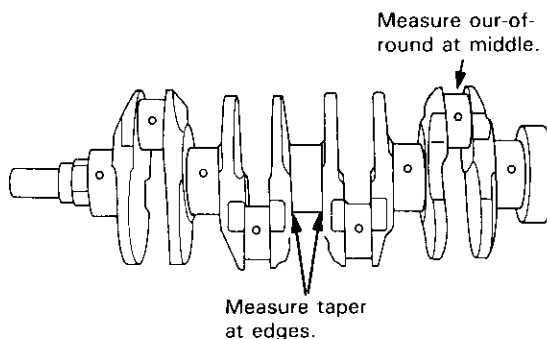
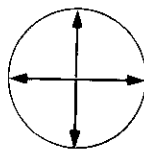
Standard (New): 0.0004 mm (0.0002 in) max.

Service Limit: 0.006 mm (0.0002 in)

D16Y5, D16Y7, D16Y8 engines:

Standard (New): 0.0025 mm (0.0001 in) max.

Service Limit: 0.005 mm (0.0002 in)



- 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:

B16A2 engine:

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

Service Limit: 0.010 mm (0.004 in)

D16Y5, D16Y7, D16Y8 engines:

Standard (New): 0.0025 mm (0.0001 in) max.

Service Limit: 0.005 mm (0.0002 in)



Inspection

1. Check the piston for distortion or cracks.

NOTE: If a cylinder is bored, an oversized piston must be used.

2. Measure the piston diameter at a distance A from bottom of the skirt.

B16A2 engine:

A: 15 mm (0.6 in)

D16Y5, D16Y7, D16Y8 engines:

A: 5 mm (0.2 in)

Piston Diameter:

B16A2 engine:

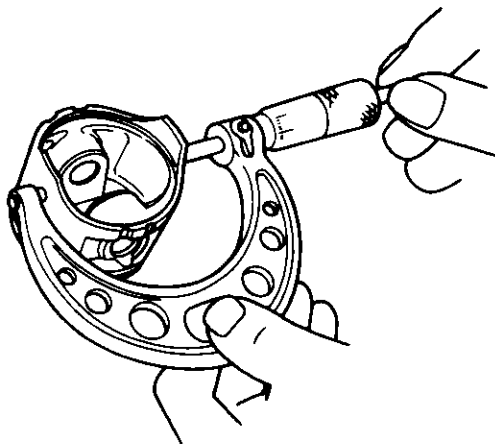
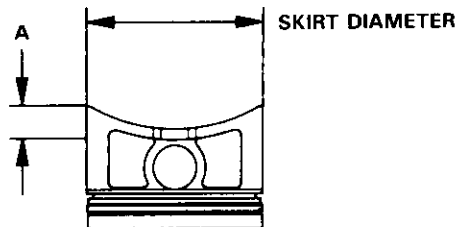
Standard (New): 80.980 – 80.990 mm
(3.1882 – 3.1886 in)

Service Limit: 80.970 mm (3.1878 in)

D16Y5, D16Y7, D16Y8 engines:

Standard (New): 74.980 – 74.990 mm
(2.9520 – 2.9524 in)

Service Limit: 74.970 mm (2.9516 in)



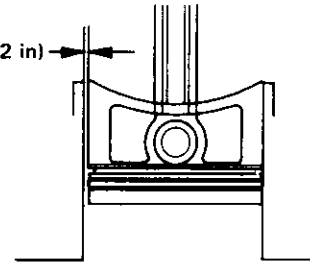
3. Calculate the difference between the cylinder bore diameter (see page 7-16) and the piston diameter.

Piston-to-Cylinder Clearance

Standard (New): 0.010 – 0.040 mm
(0.0004 – 0.0016 in)

Service Limit: 0.05 mm (0.002 in)

SERVICE LIMIT
0.05 mm (0.002 in)



If the clearance is near or exceeds the service limit, inspect the piston and cylinder block for excessive wear.

Oversize Piston Diameter

B16A2 engine:

0.25: 81.23 – 81.24 mm (3.1980 – 3.1984 in)

D16Y5, D16Y7, D16Y8 engines:

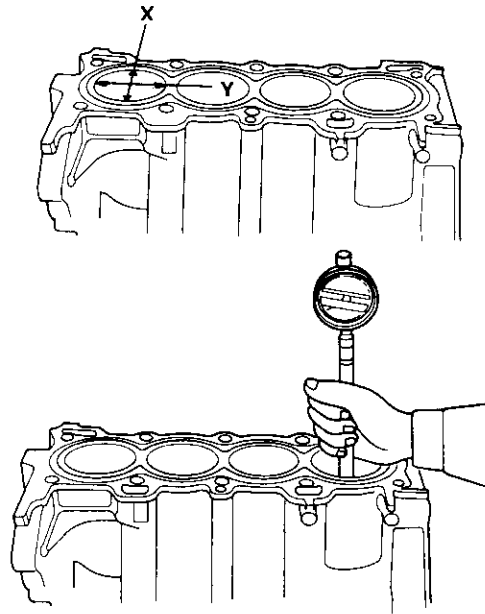
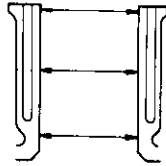
0.25: 75.23 – 75.24 mm (2.9618 – 2.9622 in)

0.50: 75.48 – 75.49 mm (2.9716 – 2.9720 in)

Cylinder Block

Inspection

1. Measure wear and taper in directions X and Y at three levels in each cylinder as shown.



Cylinder Bore Size

B16A2 engine:

Standard (New): 81.00 – 81.02 mm
(3.183 – 3.190 in)

Service Limit: 81.07 mm (3.192 in)

D16Y5, D16Y7, D16Y8 engines:

Standard (New): 75.00 – 75.02 mm
(2.953 – 2.954 in)

Service Limit: 75.07 mm (2.956 in)

Oversize

B16A2 engine:

0.25: 81.25 – 81.27 mm (3.199 – 3.200 in)

D16Y5, D16Y7, D16Y8 engines:

0.25: 75.25 – 75.27 mm (2.9626 – 2.9634 in)

0.50: 75.50 – 75.52 mm (2.9724 – 2.9732 in)

Bore Taper

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

- If the measurements in any cylinder are beyond the Oversize Bore Service Limit, replace the block.

- If the block is to be rebored, refer to Piston Clearance Inspection (see page 7-15) after reboring.

NOTE: Scored or scratched cylinder bores must be honed.

Reboring Limit:

B16A2 engine:

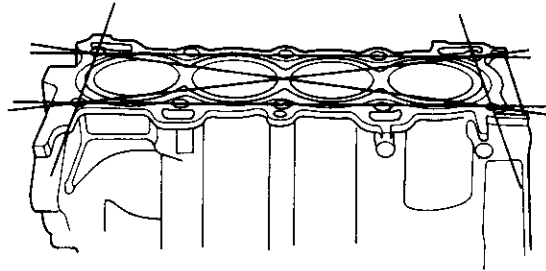
0.25 mm (0.01 in)

D16Y5, D16Y7, D16Y8 engines:

0.50 mm (0.02 in)

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

SURFACES TO BE MEASURED



Engine Block Warpage:

B16A2 engine:

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

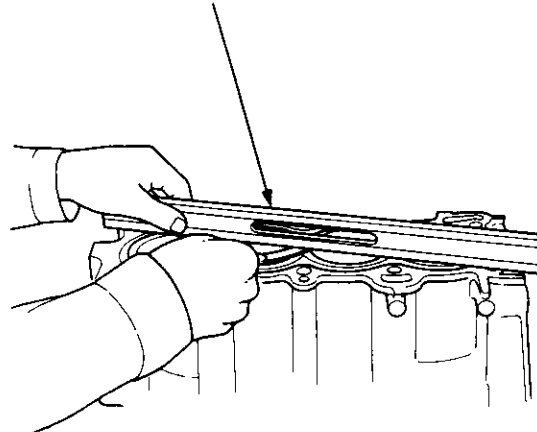
Service Limit: 0.08 mm (0.003 in)

D16Y5, D16Y7, D16Y8 engines:

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

Service Limit: 0.10 mm (0.004 in)

PRECISION STRAIGHT EDGE



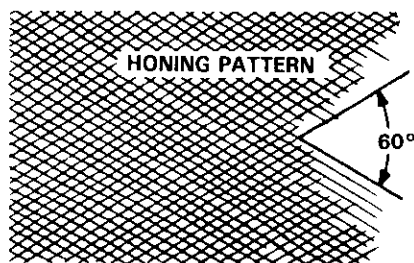


Bore Honing

1. Measure cylinder bores as shown on page 7-16. If the block is to be reused, hone the cylinders and remeasure the bores.
2. Hone cylinder bores with honing oil and a fine (400 grit) stone in a 60 degree cross-hatch 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.

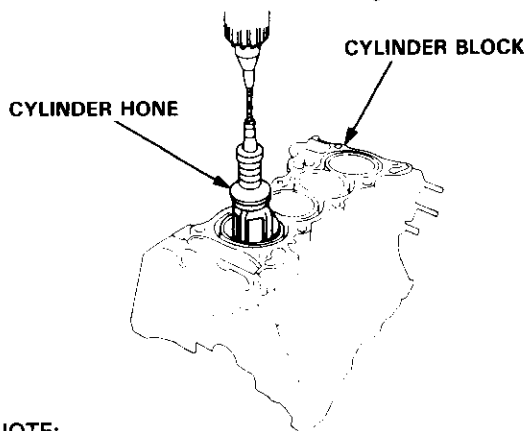


3. When honing is complete, thoroughly clean the engine block of all metal particles. Wash the cylinder bores with hot soapy water, then dry and oil immediately to prevent rusting.

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

4. If scoring or scratches are still present in cylinder bores after honing to the service limit, rebore the cylinder block.

NOTE: 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.

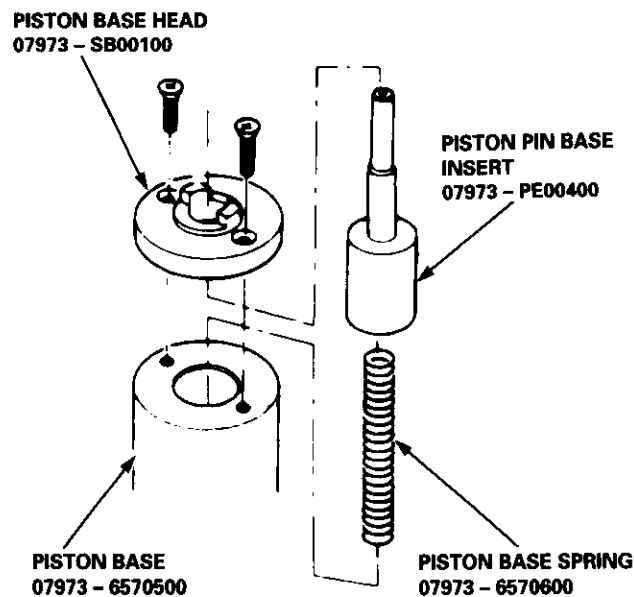


NOTE:

- After honing, clean the cylinder thoroughly with soapy water.
- Only a scored or scratched cylinder bore must be honed.

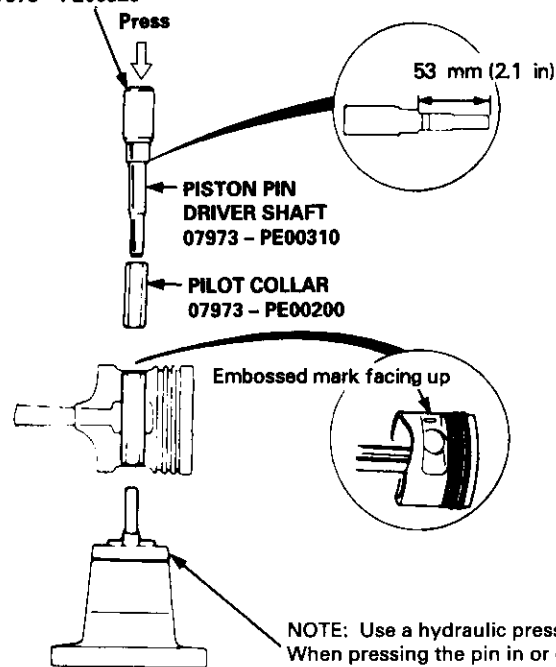
Removal

1. Assemble the special tool as shown.



2. Assemble and adjust the length of the piston pin driver and shaft to 53 mm (2.1 in) as shown.

PISTON PIN DRIVER HEAD 07973 - PE00320



3. Place the piston on the special tool and press the pin out with the special tools and a hydraulic press.

Connecting Rods

Selection

Each rod falls into one of four tolerance ranges (from 0 to + 0.024 mm (0 to + 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 (1, 2, 3, or 4) indicating the range.

You may find any combination of 1, 2, 3, or 4 in any engine.

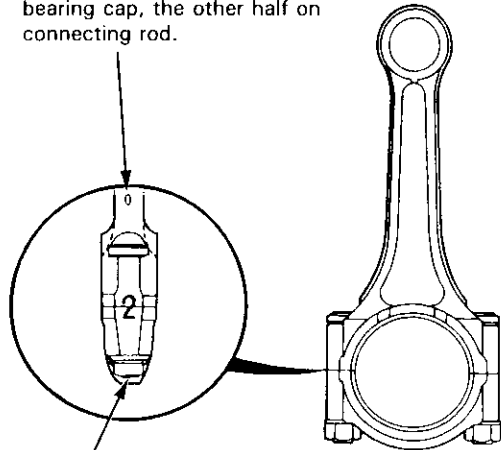
Normal Bore Size: 48.0 mm (1.89 in)

NOTE:

- Reference numbers are for big end bore size and do NOT indicate the position of the rod in the engine.
- Inspect connecting rod for cracks and heat damage.

CONNECTING ROD BORE REFERENCE NUMBER

Half of number is stamped on bearing cap, the other half on connecting rod.



Inspect bolts and nuts for stress cracks.

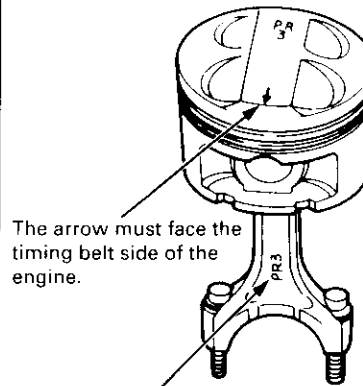
Piston Pins

Installation

1. Use a hydraulic press for installation.

- When pressing the pin in or out, be sure you position the recessed flat on the piston against the lugs on the base attachment.

B16A2 engine

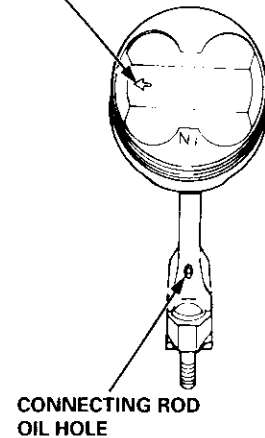


The arrow must face the timing belt side of the engine.

The mark must face the timing belt side of the engine.

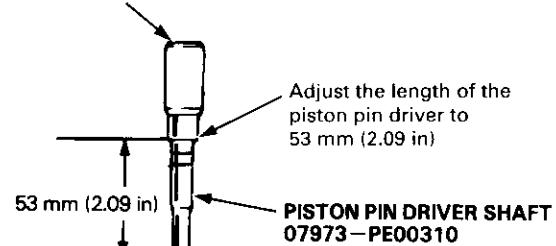
D16Y5, D16Y7, D16Y8 engines

The arrow must face the timing belt side of the engine and the connecting rod oil hole must face the rear of the engine.



CONNECTING ROD OIL HOLE

PISTON PIN DRIVER HEAD 07973-PE00320



Adjust the length of the piston pin driver to 53 mm (2.09 in)

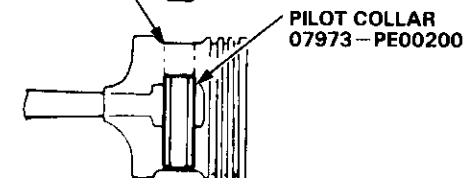
53 mm (2.09 in)

PISTON PIN DRIVER SHAFT
07973-PE00310

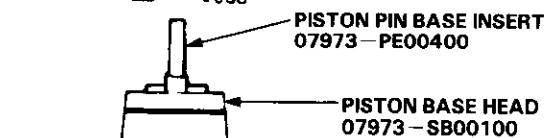
Embossed mark facing up.



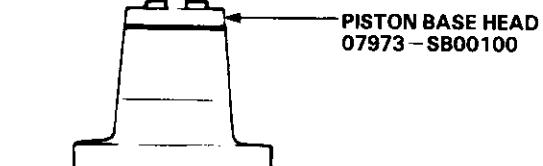
PISTON PIN



PILOT COLLAR
07973-PE00200



PISTON PIN BASE INSERT
07973-PE00400



PISTON BASE HEAD
07973-SB00100



Inspection

1. Measure the diameter of the piston pin.

Piston Pin Diameter:

B16A2 engine:

Standard (New): 20.994 – 21.000 mm
(0.8265 – 0.8268 in)

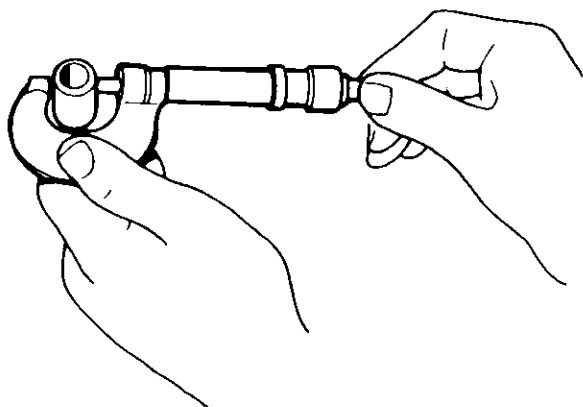
Overize: 20.997 – 21.003
(0.8267 – 0.8269 in)

D16Y5, D16Y7, D16Y8 engines:

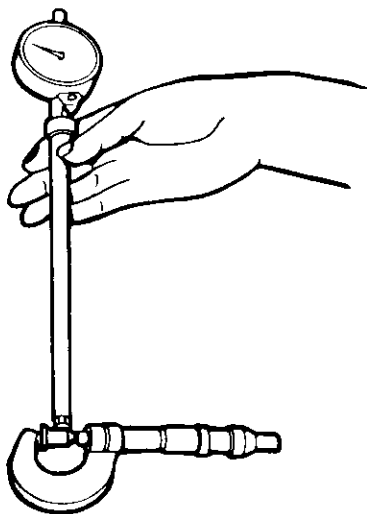
Standard (New): 18.994 – 19.000 mm
(0.7478 – 0.7480 in)

Overize: 18.997 – 19.003
(0.7479 – 0.7481 in)

NOTE: All replacement piston pins are overize.



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



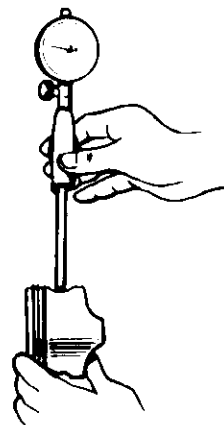
3. Measure the piston pin-to-piston clearance.

NOTE: Check the piston for distortion or cracks.

If the piston pin clearance is greater than 0.024 mm (0.0009 in), remeasure using an oversized piston pin.

Piston Pin-to-Piston Clearance:

Standard (New): 0.010 – 0.022 mm
(0.0004 – 0.0009 in)



4. Check the difference between the piston pin diameter and the connecting rod small end diameter.

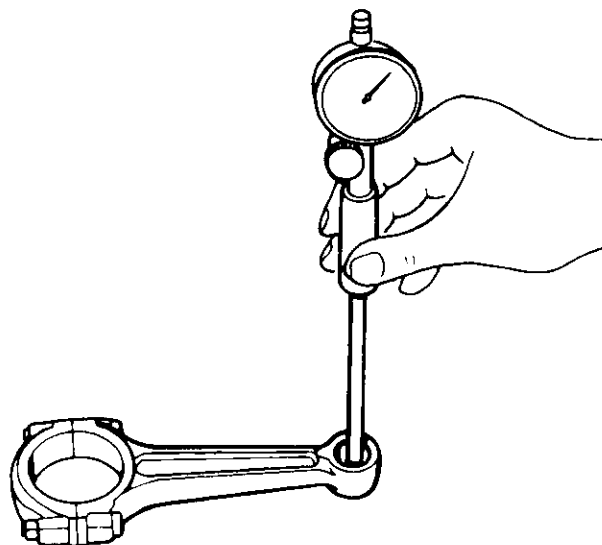
Piston Pin-to-Connecting Rod Interference:

B16A2 engine:

Standard (New): 0.013 – 0.032 mm
(0.0005 – 0.0013 in)

D16Y5, D16Y7, D16Y8 engines:

Standard (New): 0.014 – 0.040 mm
(0.0006 – 0.0016 in)



Piston Rings

End Gap

1. Using a piston, push a new ring into the cylinder bore 15 – 20 mm (0.6 – 0.8 in) from the bottom.
2. Measure the piston ring end-gap 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 on page 7-16. If the bore is over the service limit, the cylinder block must be rebored.

Piston Ring End-Gap:

Top Ring

B16A2 engine

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

Service Limit: 0.60 mm (0.024 in)

D16Y5, D16Y7, D16Y8 engines

Standard (New): 0.15 – 0.30 mm
(0.006 – 0.012 in)

Service Limit: 0.60 mm (0.024 in)

Second Ring

B16A2 engine

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

Service Limit: 0.70 mm (0.028 in)

D16Y5, D16Y7, D16Y8 engines

Standard (New): 0.30 – 0.45 mm
(0.012 – 0.018 in)

Service Limit: 0.70 mm (0.028 in)

Oil Ring

B16A2 engine

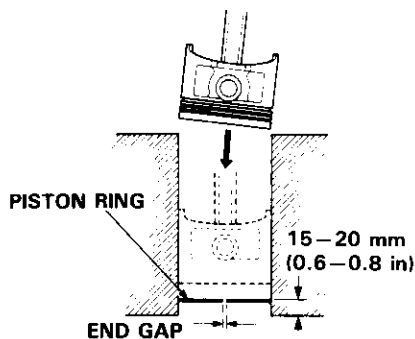
Standard (New): 0.20 – 0.50 mm
(0.008 – 0.020 in)

Service Limit: 0.70 mm (0.028 in)

D16Y5, D16Y7, D16Y8 engines

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

Service Limit: 0.80 mm (0.031 in)



Replacement

1. Using a ring expander, remove the old piston rings.
2. Clean all ring grooves thoroughly.

NOTE:

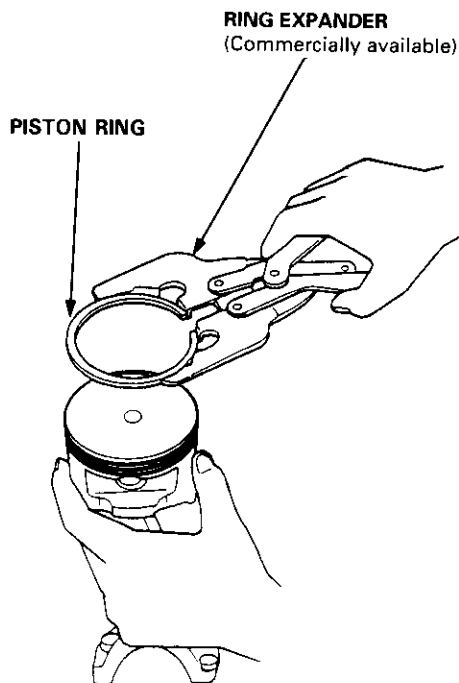
- Use a squared-off broken ring or ring groove cleaner with blade to fit piston grooves.
- Top ring groove is 1.0 mm (0.039 in) wide.
- Second ring groove is 1.2 mm (0.047 in) wide.
- Oil ring groove is 2.8 mm (0.11 in) wide.
- File down the blade if necessary.

CAUTION: Do not use a wire brush to clean ring lands, or cut ring lands deeper with cleaning tool.

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

3. Install new rings in the proper sequence and position (see page 7-22).

NOTE: Do not reuse old piston rings.





Ring-to-Groove Clearance

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

Top Ring Clearance

Standard (New):

B16A2 engine:

0.045 – 0.070 mm (0.0018 – 0.0028 in)

D16Y5, D16Y7, D16Y8 engines:

0.035 – 0.060 mm (0.0014 – 0.0024 in)

Service Limit: 0.13 mm (0.005 in)

Second Ring Clearance

Standard (New):

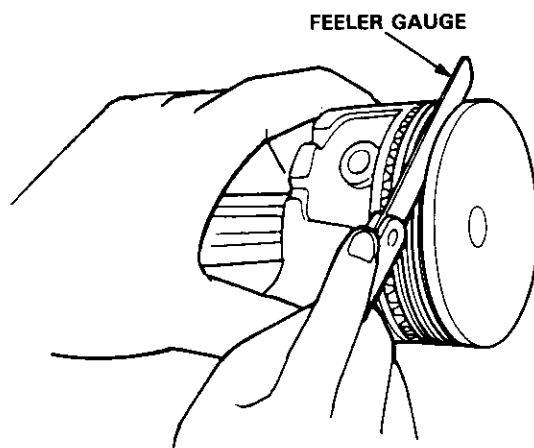
B16A2 engine:

0.040 – 0.065 mm (0.0016 – 0.0026 in)

D16Y5, D16Y7, D16Y8 engines:

0.030 – 0.055 mm (0.0012 – 0.0022 in)

Service Limit: 0.13 mm (0.005 in)

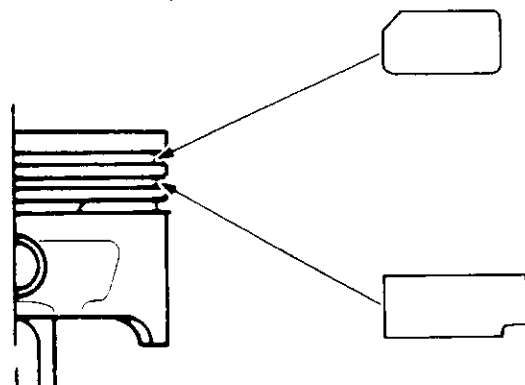


Alignment

1. Install the rings as shown.

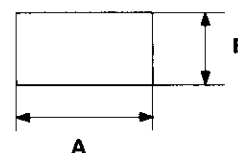
NOTE: The manufacturing marks must be facing upward.

TOP RING (Chrome)



SECOND RING (Dark)

Piston Ring Dimensions:



Top Ring (Standard) Unit mm (in)

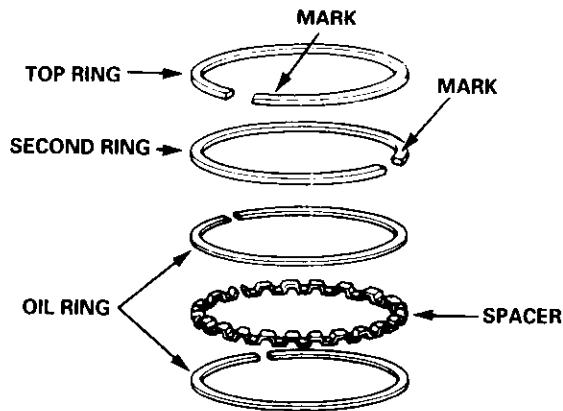
	A	B
B16A2 engine	3.1 (0.12)	1.0 (0.04)
D16Y5, D16Y7, D16Y8 engines	2.6 (0.10)	1.0 (0.04)

Second Ring (Standard) Unit mm (in)

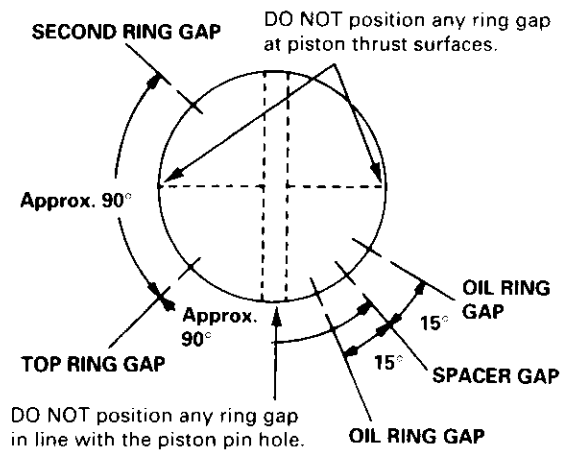
	A	B
B16A2 engine	3.3 (0.13)	1.2 (0.05)
D16Y5, D16Y7, D16Y8 engines	3.0 (0.12)	1.2 (0.05)

(cont'd)


Alignment (cont'd)



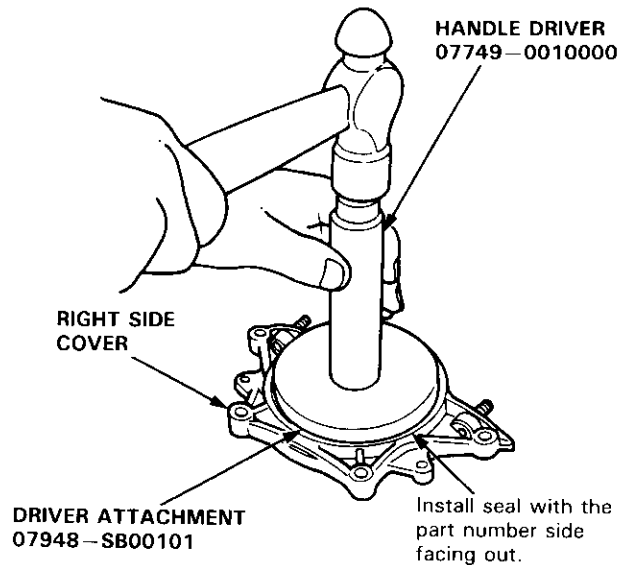
2. Rotate the rings in their grooves to make sure they do not bind.
3. Position the ring end gaps as shown:



Installation

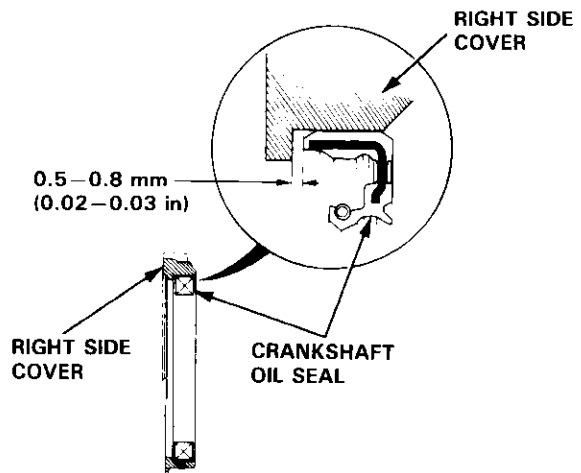
 The seal surface on the block should be dry. Apply a light coat of oil to the crankshaft and to the lip of the seal.

1. Drive the crankshaft oil seal squarely into the right side cover using the special tools.



2. Confirm that the clearance is equal all the way around with a feeler gauge.


Clearance: 0.5 – 0.8 mm (0.02 – 0.03 in)



NOTE: Refer to page 8-14 for installation of the oil pump side crankshaft oil seal.



Installation

 Before installing the pistons, apply a coat of engine oil to the ring grooves and cylinder bores.

- If the crankshaft is already installed:
 - Set the crankshaft to BDC for each cylinder.
 - Remove the connecting rod caps, and slip short sections of rubber hose over the threaded ends of the connecting rod bolts.
 - Install the ring compressor, check that the bearing is securely in place, then position the piston in the cylinder, and tap it in using the wooden handle of a hammer.
 - Stop after the ring compressor pops free, and check the connecting rod-to-crank journal alignment before pushing the piston into place.
 - Apply engine oil to the bolt threads. Install the rod caps with bearings, and torque the nuts to:

B16A2 engine:

40 N·m (4.1 kgf-m, 30 lbf-ft)

D16Y5, D16Y7, D16Y8 engines:

31 N·m (3.2 kgf-m, 23 lbf-ft)

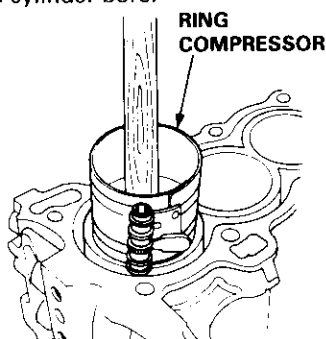
- If the crankshaft is not installed:
 - Remove the rod caps and bearings, install the ring compressor, then position the piston in the cylinder, and tap it in using the wooden handle of a hammer.
 - Position all pistons at top dead center.

The arrow must face the timing belt side of the engine.


CONNECTING ROD OIL HOLE (D16Y5, D16Y7, D16Y8 engines)

RUBBER HOSES

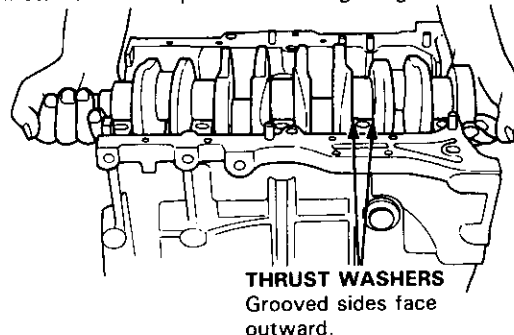
NOTE: Maintain downward force on the ring compressor to prevent the rings from expanding before entering the cylinder bore.



Installation

 Before installing the crankshaft, apply a coat of engine oil to the main bearings and rod bearings.

- Insert the bearing halves into the cylinder block and connecting rods.
- Hold the crankshaft so the rod journals for cylinders No. 2 and No. 3 are straight down.
- Lower the crankshaft into the block, seating the rod journals into connecting rods No. 2 and No. 3, and install the rod caps and nuts finger-tight.



- Rotate the crankshaft clockwise, seat journals into connecting rods No. 1 and No. 4, and install the rod caps and nuts finger-tight.

NOTE: Install caps so the bearing recess is on the same side as the recess in the rod.

- Check rod bearing clearance with plastigage (see page 7-11), then torque the capnuts. Apply engine oil to the bolt threads.

Torque:

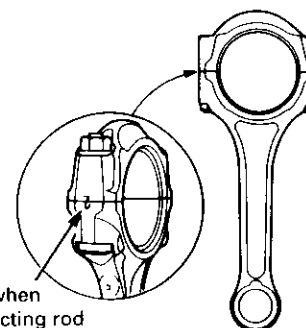
B16A2 engine:

40 N·m (4.1 kgf-m, 30 lbf-ft)

D16Y5, D16Y7, D16Y8 engines:

31 N·m (3.2 kgf-m, 23 lbf-ft)

NOTE: Reference numbers on connecting rod are for big-end bore tolerance and do not indicate the position of piston in the engine.



- Install the thrust washers on the No. 4 journal. Oil the thrust washer surfaces.

Crankshaft

Installation (cont'd)

7. Install the main bearing caps.
Check clearance with plastigage (see page 7-9), then tighten the bearing cap bolts in 2 steps.

First step: 25 N·m (2.5 kgf·m, 18 lbf·ft)

Second step:

B16A2 engine:

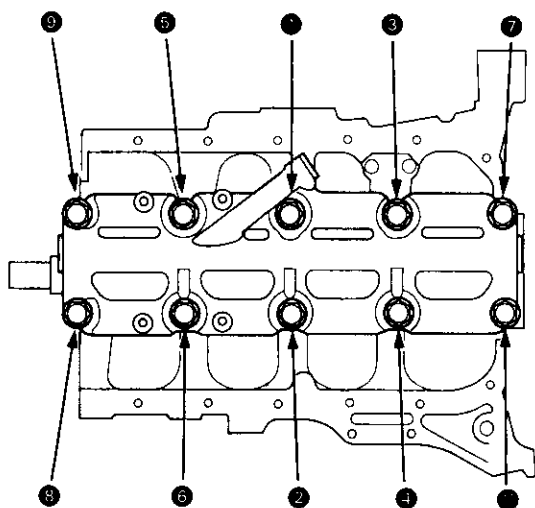
76 N·m (7.8 kgf·m, 56 lbf·ft)

D16Y5, D16Y7, D16Y8 engines:

51 N·m (5.2 kgf·m, 38 lbf·ft)

NOTE: Coat the thrust washer surfaces and bolt threads with oil.

MAIN BEARING CAP BOLTS TIGHTENING SEQUENCE

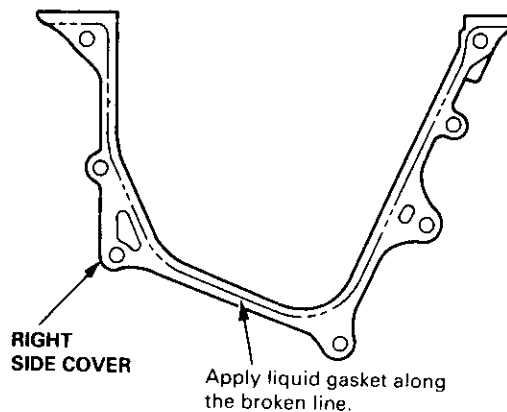


CAUTION: Whenever any crankshaft or connecting rod bearing is replaced, it is necessary after reassembly to run the engine at idling speed until it reaches normal operating temperature, then continue to run it for approximately 15 minutes.

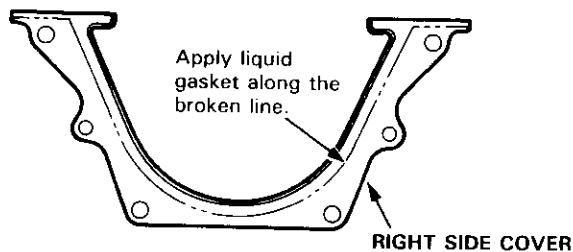
NOTE:

- Use liquid gasket, part No. 08718 - 0001 or 08718 - 0003.
 - Check that the mating surfaces are clean and dry before applying liquid gasket.
 - Apply liquid gasket evenly, being careful to cover all the mating surface.
 - To prevent oil leakage, apply liquid gasket to the inner threads of the bolt holes.
 - Do not install the parts if five minutes or more have elapsed since applying the liquid gasket. Instead reapply liquid gasket after removing the old residue.
 - After assembly, wait at least 30 minutes before filling the engine with oil.
8. Apply liquid gasket to the block mating surface of the right side cover, then install it on the cylinder block.

B16A2 engine:

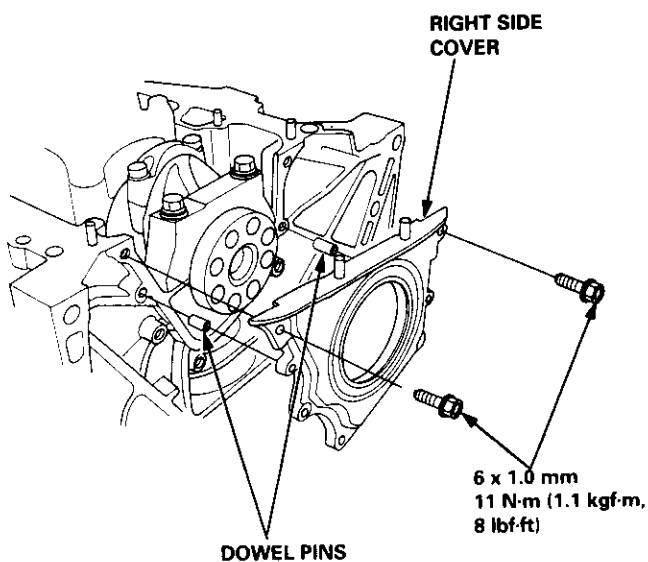


D16Y5, D16Y7, D16Y8 engines:

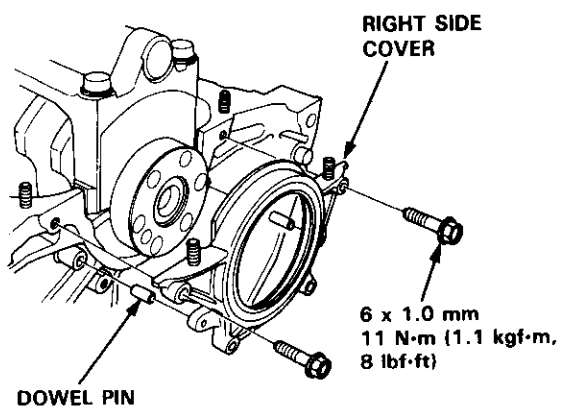




B16A2 engine:



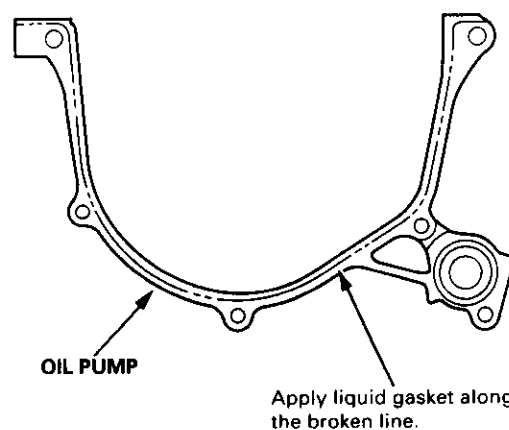
D16Y5, D16Y7, D16Y8 engines:



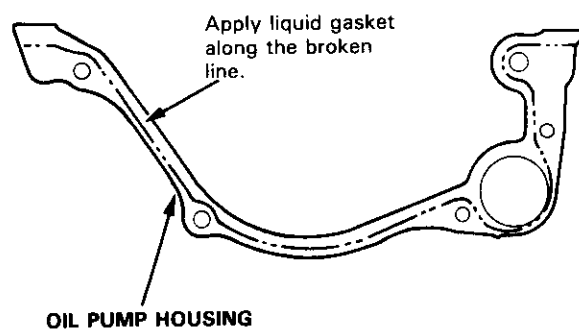
9. Apply liquid gasket to the oil pump mating surface of the block, then install the oil pump on the cylinder block.

Apply grease to the lips of the oil seals. Then, align the inner rotor with the crankshaft and install the oil pump. When the pump is in place, clean any excess grease off the crankshaft. Check that the oil seal lips are not distorted.

B16A2 engine:



D16Y5, D16Y7, D16Y8 engines:



(cont'd)

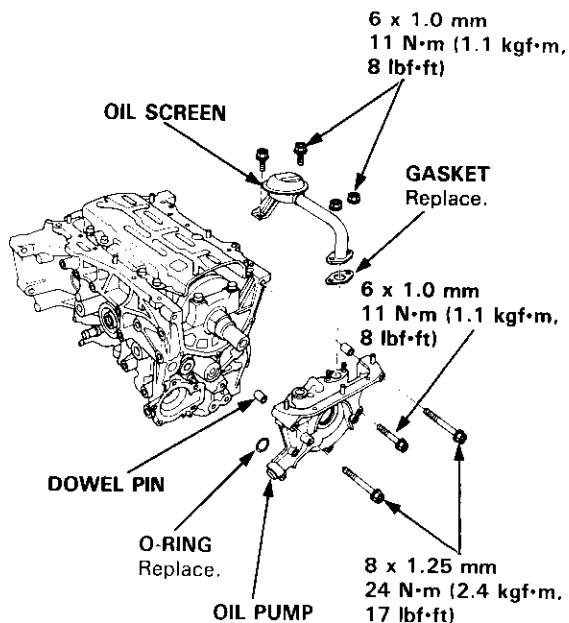
Installation (cont'd)

NOTE:

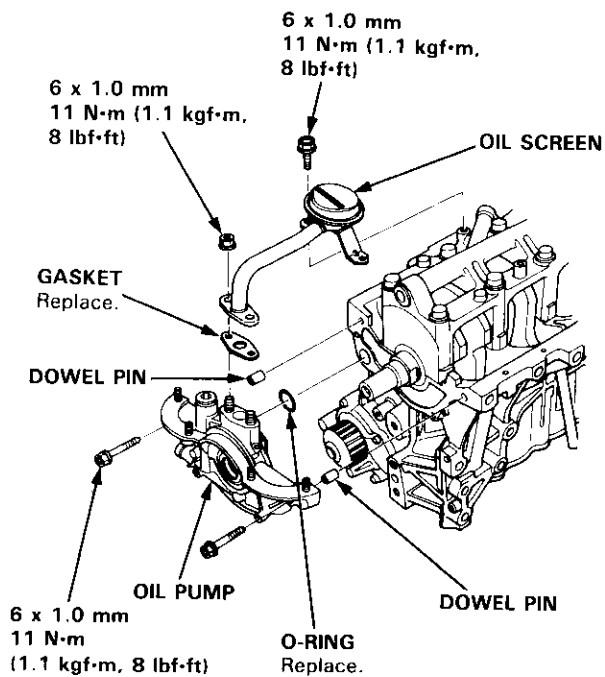
- Apply a light coat of oil to the crankshaft and to the lip of seal.
- Use new O-rings and apply oil when installing them.

10. Install the oil screen.

B16A2 engine:



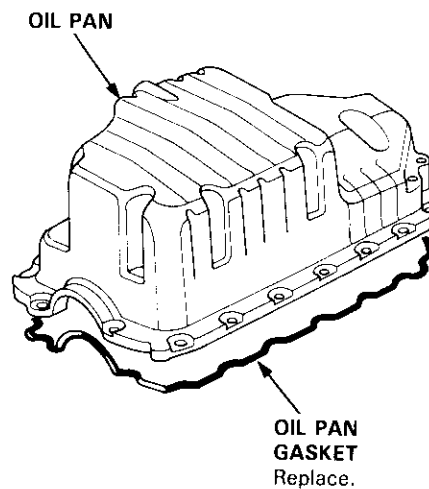
D16Y5, D16Y7, D16Y8 engines:



Installation

D16Y5, D16Y8 engines:

1. Install the oil pan gasket on the oil pan.

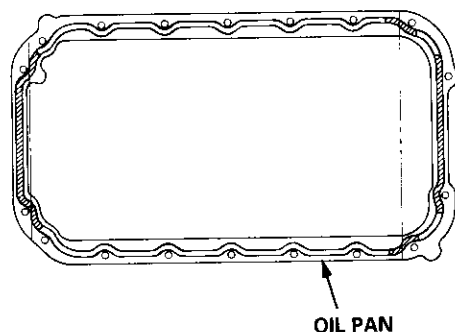




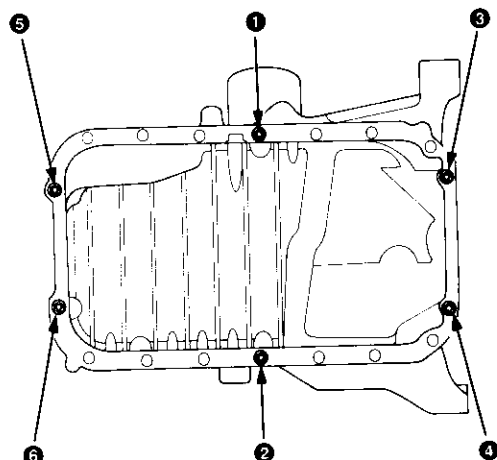
2. Apply liquid gasket to the block mating surfaces of the oil pan, then install it. Apply liquid gasket to the shaded areas.

NOTE:

- Use liquid gasket part No. 08718 - 0001 or 08718 - 0003.
- Check that the mating surfaces are clean and dry before applying liquid gasket.
- Apply liquid gasket as an even bead, centered between the edges of the mating surface.
- To prevent leakage of oil, apply liquid gasket to the inner threads of the bolt holes.
- Do not install the parts if five minutes or more have elapsed since applying the liquid gasket. Instead, reapply liquid gasket after removing the old residue.
- After assembly, wait at least 30 minutes before filling the engine with oil.



3. Tighten nuts finger-tight at six points as shown below.



4. Tighten all bolts and nuts, starting from nut ①, clockwise in three steps.

NOTE: Excessive tightening can cause distortion of the oil pan gasket and oil leakage.

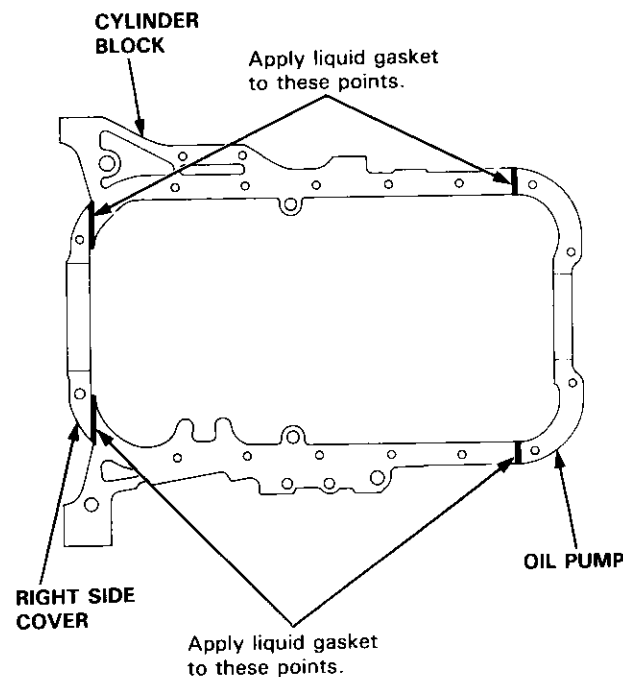
Torque: 12 N·m (1.2 kgf·m, 8.7 lbf·ft)

B16A2, D16Y7 engines:

1. Apply liquid gasket on the oil pump and right side cover mating areas as shown below.

NOTE:

- Use liquid gasket, part No. 08718 - 0001 or 08718 - 0003.
- Check that the mating surfaces are clean and dry before applying liquid gasket.
- Apply liquid gasket as an even bead, centered between the edges of the mating surface.
- To prevent oil leakage, apply liquid gasket to the inner threads of the bolt holes.
- Do not install the parts if five minutes or more have elapsed since applying the liquid gasket. Instead, reapply liquid gasket after removing the old residue.
- After assembly, wait at least 30 minutes before filling the engine with oil.



(cont'd)

Oil Pan

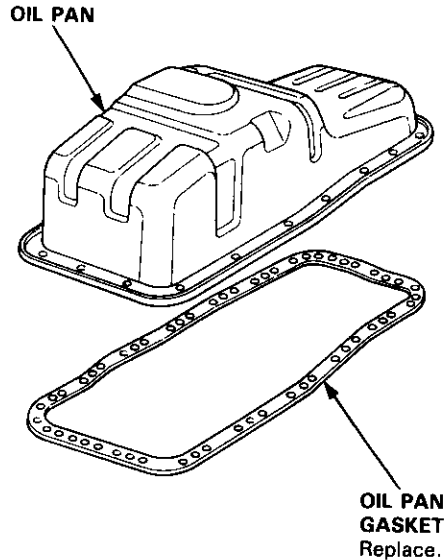
Installation (cont'd)

2. Install the oil pan gasket and oil pan.

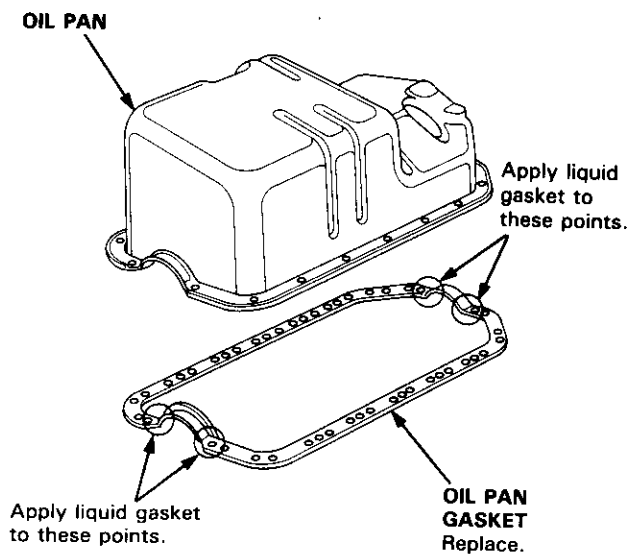
NOTE:

- Use a new oil pan gasket.
- Install the oil pan no more than five minutes after applying liquid gasket.

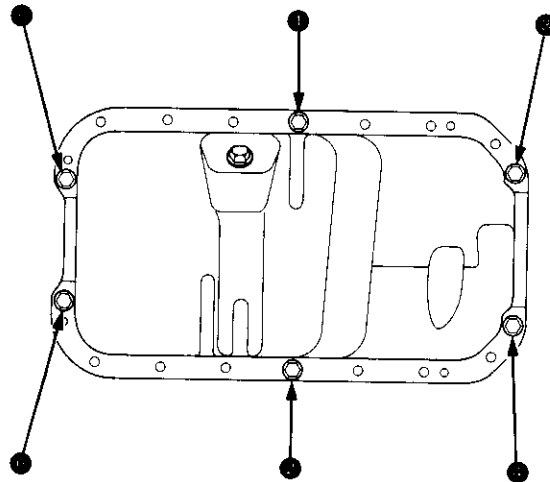
B16A2 engine:



D16Y7 engine:



3. Tighten the bolts and nuts finger tight at six points as shown below.



4. Tighten all bolts and nuts, starting from nut ①, clock wise in three steps.

NOTE: Excessive tightening can cause distortion of the oil pan gasket and oil leakage.

Torque: 12 N·m (1.2 kgf-m, 8.7 lbf-ft)

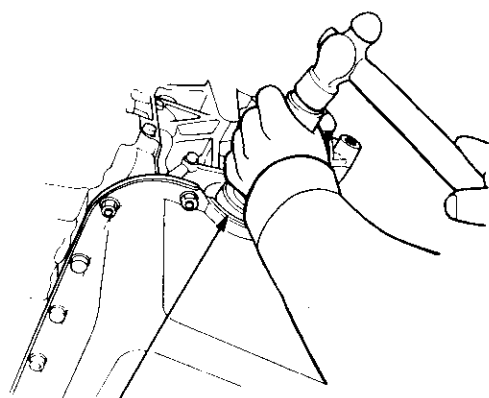


Installation

NOTE:

- Engine removal is not required.
- The crankshaft oil seal housing should be dry.
Apply a light coat of grease to the crankshaft and to the lips of the seals.

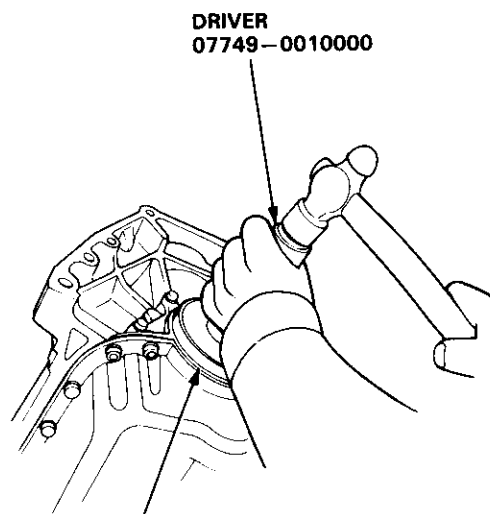
1. Using the special tool, drive in the timing pulley-end seal until the driver bottoms against the oil pump.
When the seal is in place, clean any excess grease off the crankshaft and check that the oil seal lip is not distorted.



SEAL DRIVER
07947-SB00200
Install seal with the
part number side
facing out.

2. Measure the flywheel-end seal thickness and the oil seal housing depth. Using the special tool, drive the flywheel-end seal into the rear cover to the point where the clearance between the bottom of the oil seal and the right side cover is 0.5 – 0.8 mm (0.02 – 0.03 in) (see page 7-23).

NOTE: Align the hole in the driver attachment with the pin on the crankshaft.



DRIVER ATTACHMENT
07948-SB00101
Install seal with the
part number side
facing out.