

2004 Acura TSX

2004 ENGINES Lubrication System - TSX

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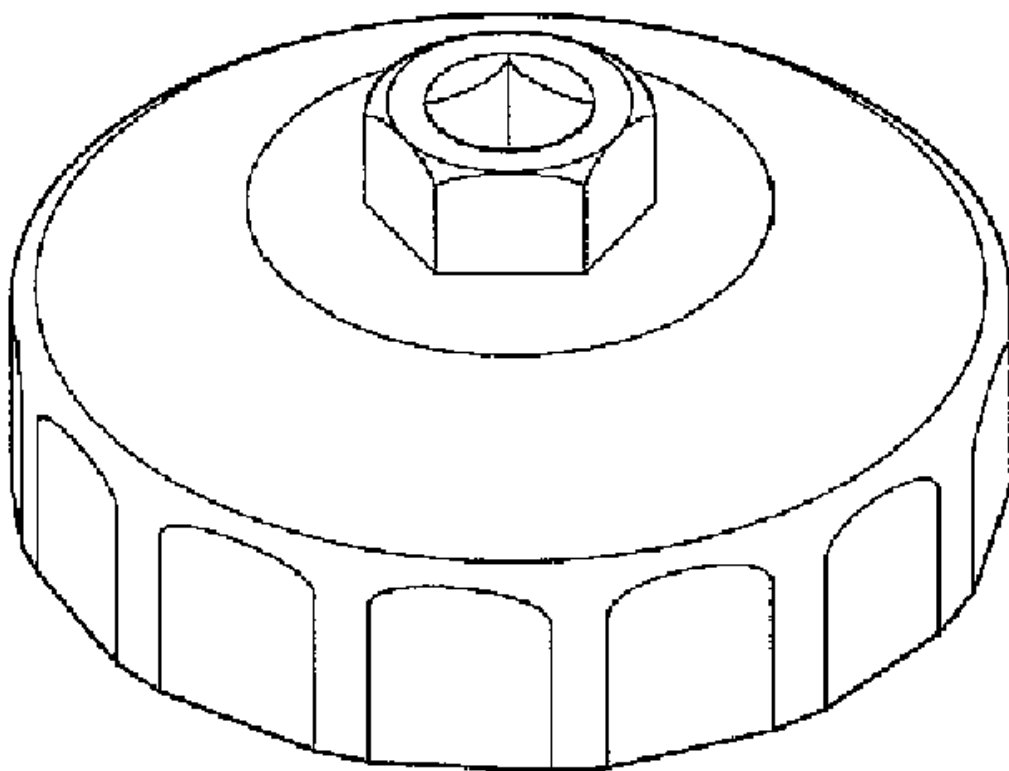
Lubrication System - TSX

SPECIAL TOOLS

Ref. No.	Tool Number	Description	Qty
①	07HAA-PJ70100	Oil Filter Wrench	1

GP1821008

Fig. 1: Special Tools (1 Of 2)

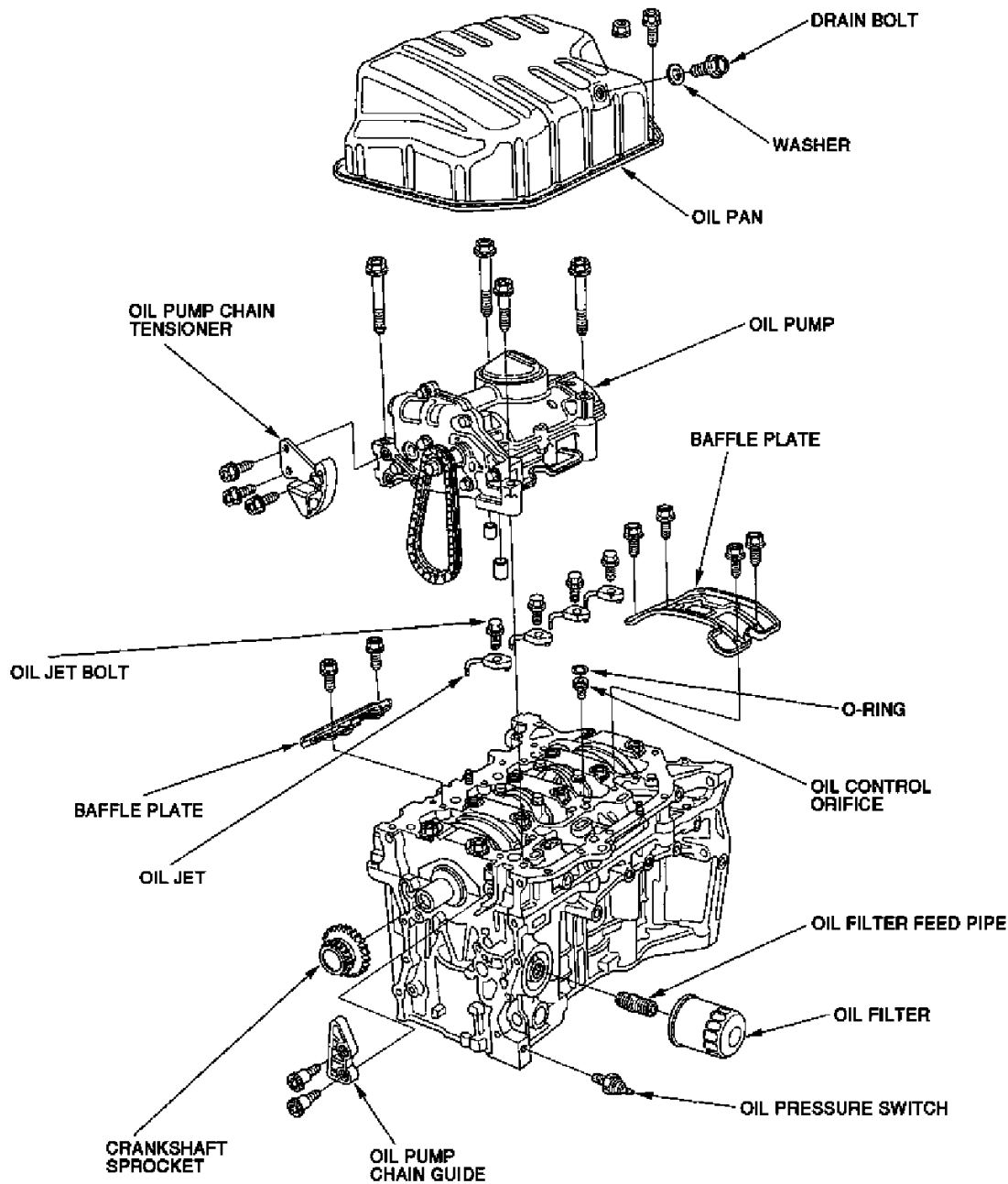


①

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Fig. 2: Special Tools (2 Of 2)

COMPONENT LOCATION INDEX



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Fig. 3: Locating Engine Lubrication Components

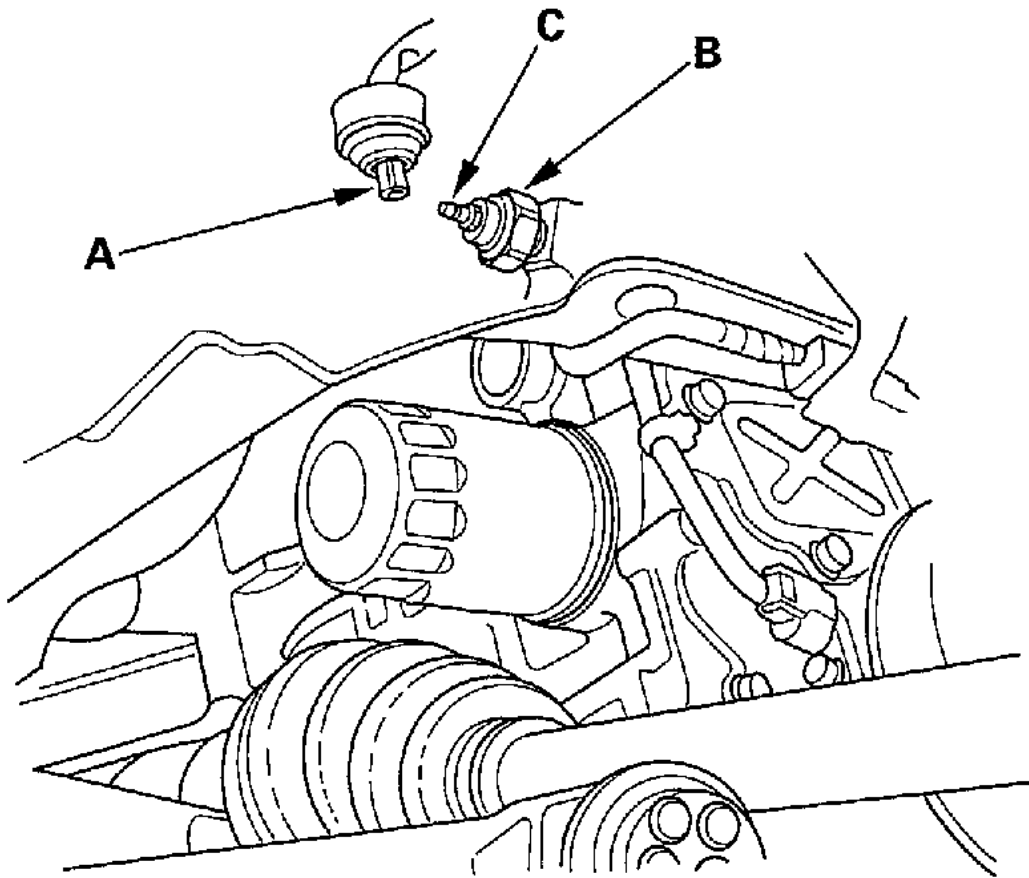
SYMPTOM TROUBLESHOOTING INDEX

Symptom	Diagnostic procedure	Also check for
Excessive engine oil consumption	1. Check for worn valve guide(s) or worn valve stem seal(s). 2. Check for damaged or worn piston ring(s). 3. Check for damaged or worn engine internal parts (cylinder wall, pistons, etc.). 4. Check for oil leaks. 5. Check the operation of the positive crankcase ventilation (PCV) system. 6. Check the engine oil for dirt or improper viscosity.	
Low engine oil pressure	1. Check the oil screen for clogging. 2. Test the oil pump. 3. Check the relief valve. 4. Test the oil pressure switch. 5. Check for excessive clearance in the engine (bearing-to-journal, etc.). 6. Check the engine oil for dirt or improper viscosity.	
High engine oil pressure	Check the relief valve.	

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Fig. 4: Engine Lubrication Symptom Troubleshooting Index**OIL PRESSURE SWITCH TEST**

1. Remove the YEL/RED wire (A) from the engine oil pressure switch (B).



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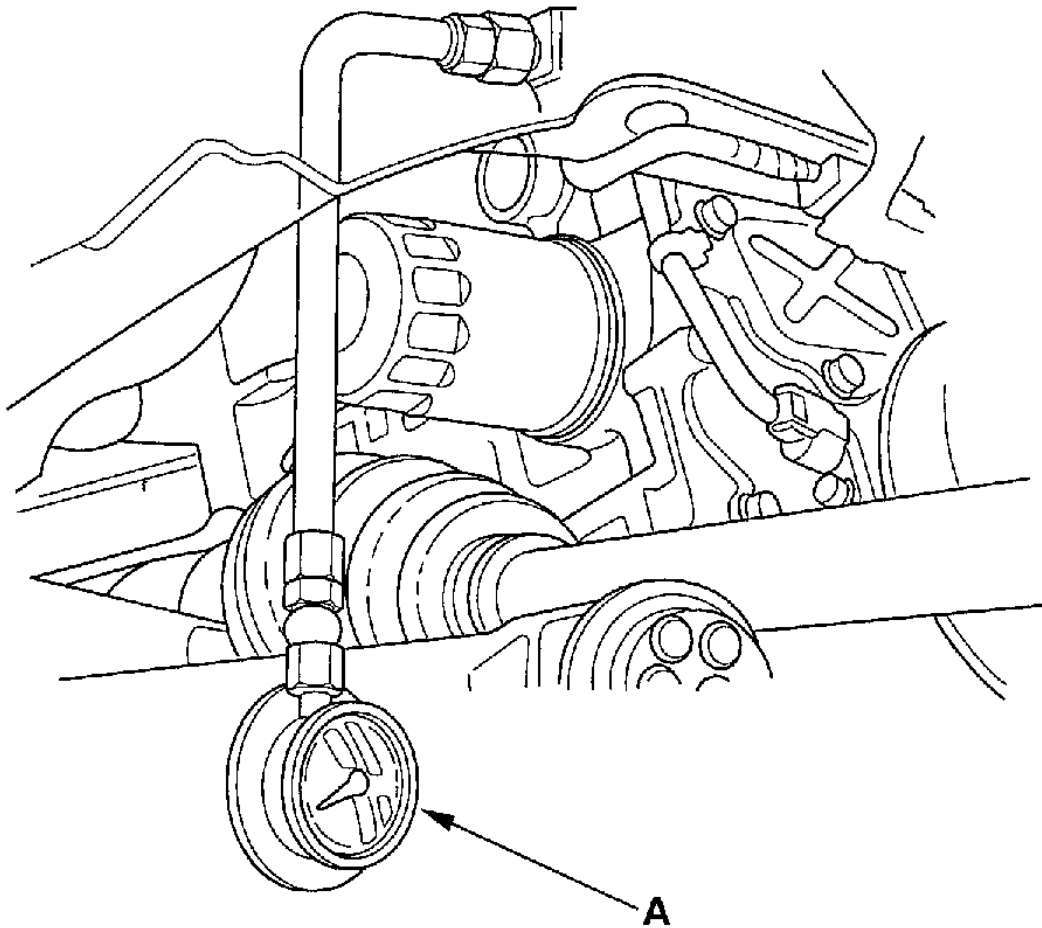
Fig. 5: Removing The Wire From The Engine Oil Pressure Switch

2. Check for continuity between the positive terminal (C) and the engine (ground). There should be continuity with the engine stopped. There should be no continuity with the engine running.
3. If the switch fails to operate, check the engine oil level. If the engine oil level is OK, check the engine oil pressure. If the oil pressure is OK, replace the oil pressure switch (see **OIL PRESSURE SWITCH REPLACEMENT**).

OIL PRESSURE TEST

If the oil pressure warning light stays on with the engine running, check the engine oil level. If the oil level is correct:

1. Remove the engine oil pressure switch, and install an oil pressure gauge (A).



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Fig. 6: Installing An Oil Pressure Gauge

2. Start the engine. Shut it off immediately if the gauge registers no oil pressure, and repair the problem before continuing.
3. Allow the engine to reach operating temperature (fan comes on at least twice). The pressure should be:
Engine Oil Temperature: 176°F (80°C)
Engine Oil Pressure:
At Idle: 70 kPa (0.7 kgf/cm², 10 psi) minimum
At 3,000 RPM: 300 kPa (3.1 kgf/cm², 44 psi) minimum
4. If the oil pressure is NOT within specifications, inspect these items.
 - Check the oil screen for clogging.
 - Check the oil pump (see **OIL PUMP OVERHAUL**).

ENGINE OIL REPLACEMENT

1. Warm up the engine.
2. Remove the maintenance lid (A).

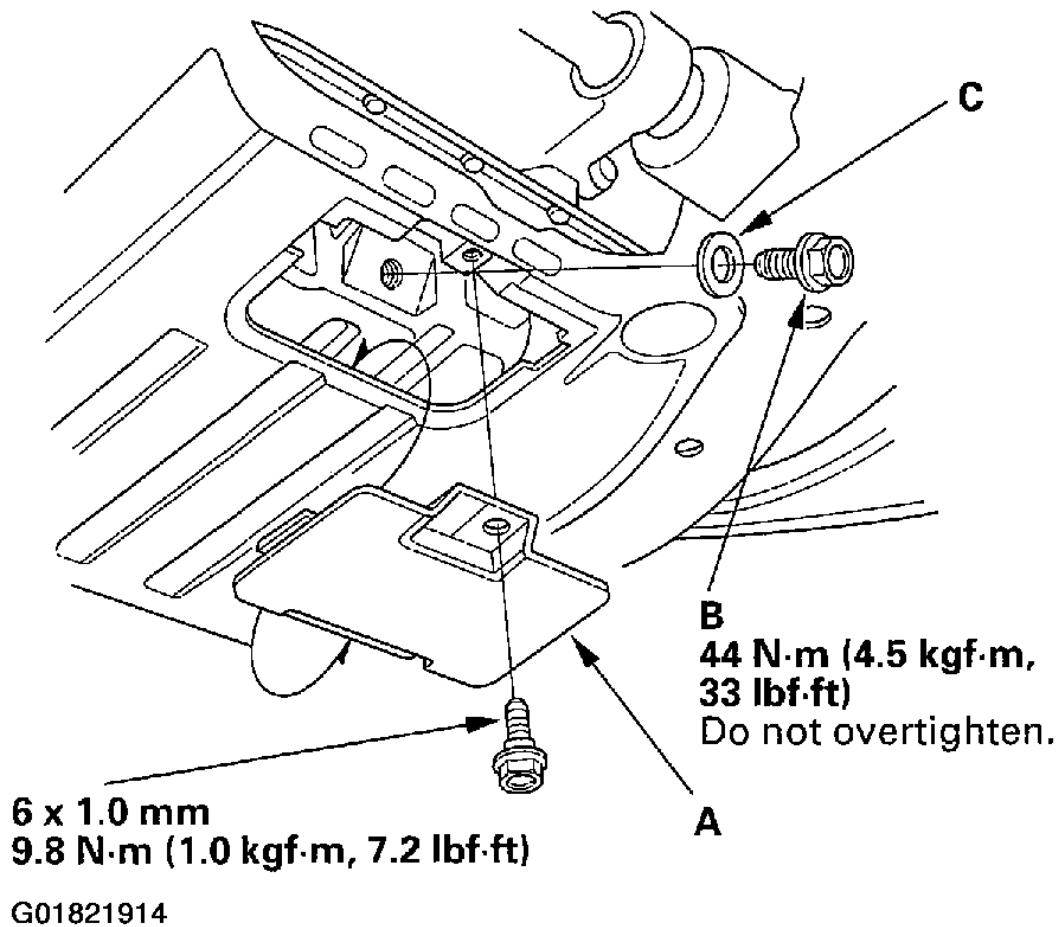


Fig. 7: Removing The Maintenance Lid & The Drain Bolt

3. Remove the drain bolt (B), and drain the engine oil.
4. Reinstall the drain bolt with a new washer (C).
5. Refill with the recommended oil (5W-30).

Capacity:

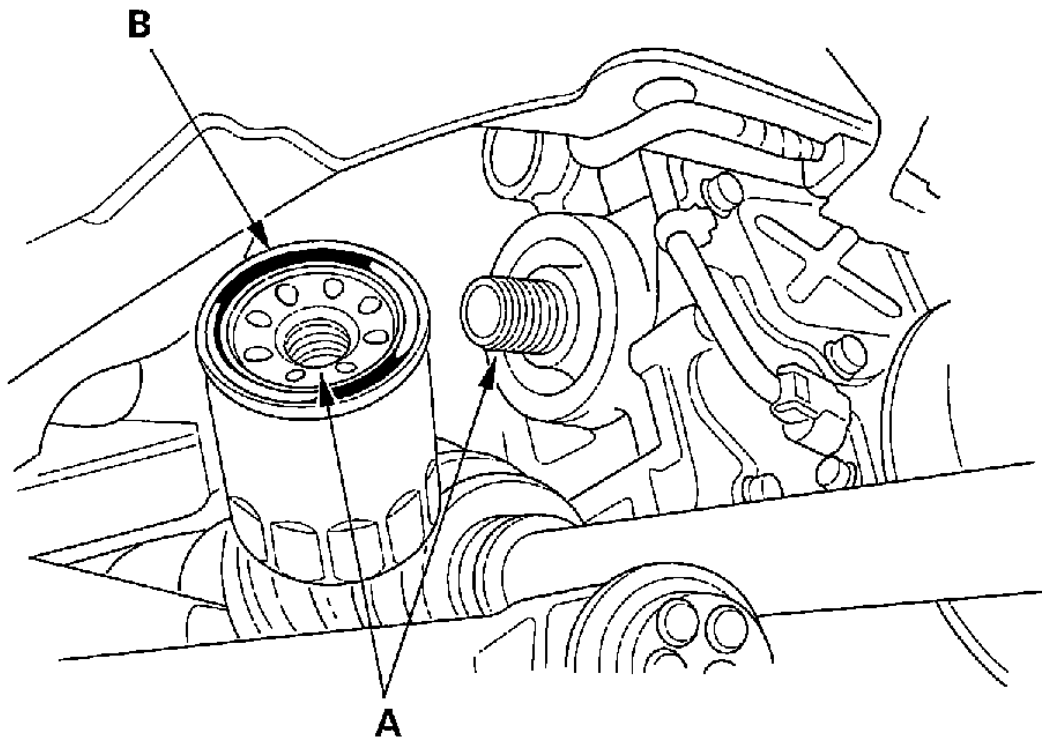
- 4.0 L (4.2 US qt) at oil change.
- 4.2 L (4.4 US qt) at oil change including filter.
- 5.3 L (5.6 US qt) after engine overhaul.

6. Run the engine for more than 3 minutes, then check for oil leakage.

ENGINE OIL FILTER REPLACEMENT

Special Tools Required: Oil filter wrench 07HAA-PJ70100

1. Remove the oil filter with the special tool.
2. Inspect the threads (A) and the rubber seal (B) on the new-filter. Clean the seat on the engine block, then apply a light coat of oil to the filter rubber seal. Use only filters with a built-in bypass system.



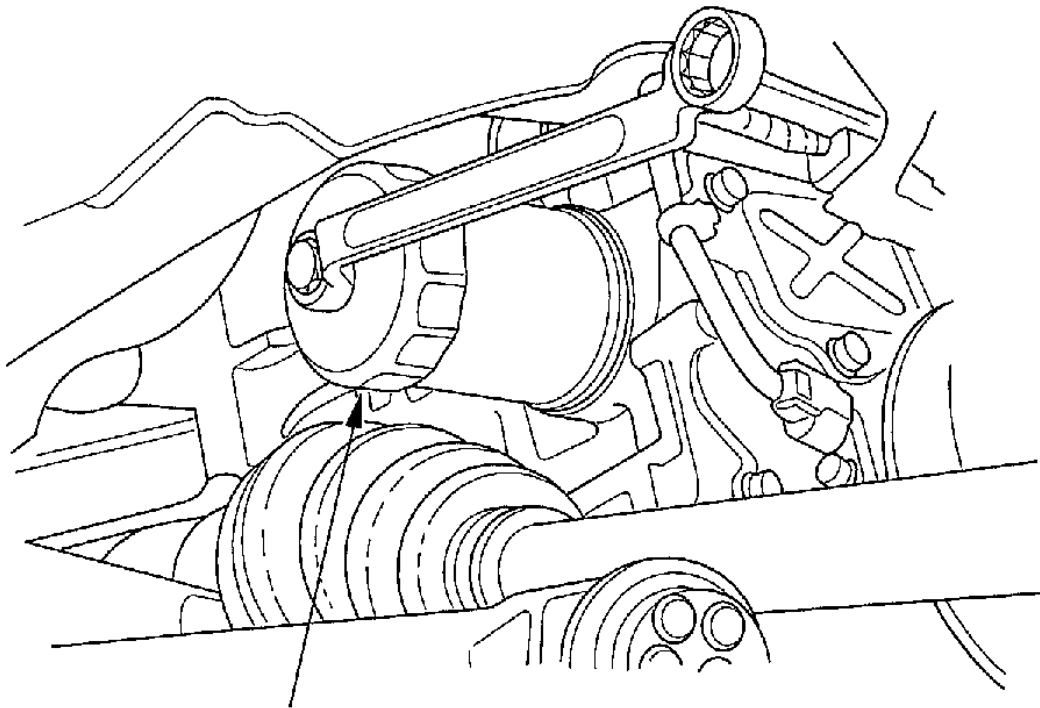
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Fig. 8: Inspecting The Threads & The Rubber Seal On The New-Filter

3. Install the oil filter by hand.
4. After the rubber seal seats, tighten the oil filter clockwise with the special tool.

Tighten: 3/4 turn clockwise

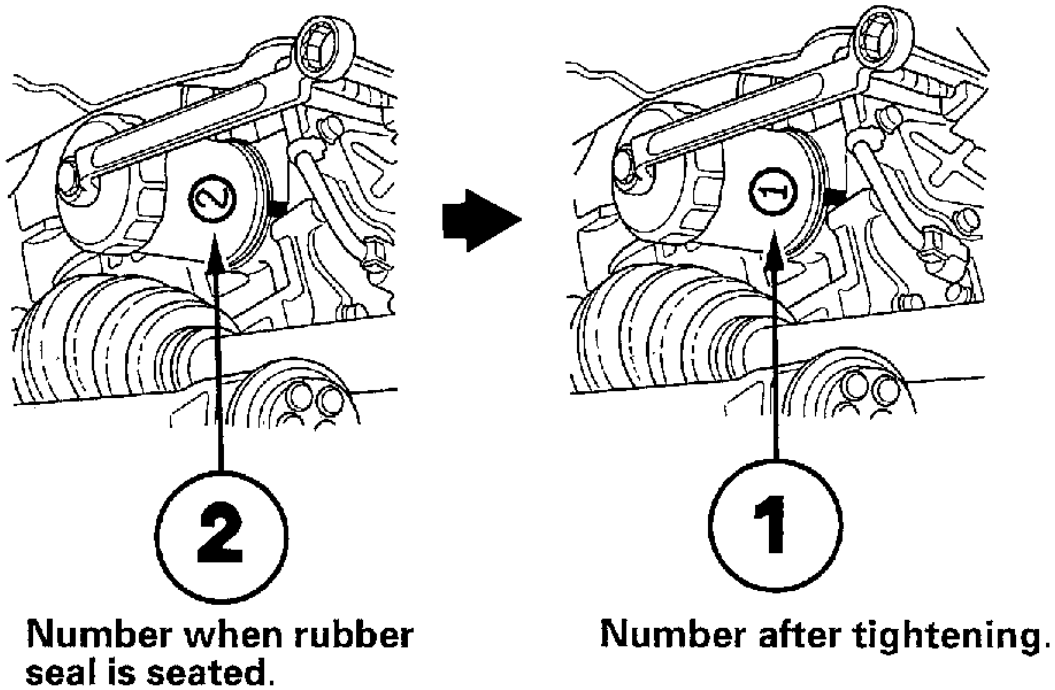
Tightening Torque: 12 N.m (1.2 kgf.m, 8.7 lbf.ft)

**07HAA-PJ70100**

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Fig. 9: Tightening The Oil Filter Clockwise With The Special Tool

5. If 4 numbers or marks (1 to 4 or *** to ***) are printed around the outside of the filter, use the following procedure to tighten the filter:
 - Spin the filter on until its seal lightly seats against the block, and note which number or mark is at the bottom.
 - Tighten the filter by turning it clockwise 3 numbers or marks from the one you noted. For example, if number 2 is at the bottom when the seal is seated, tighten the filter until the number 1 comes around the bottom.



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Fig. 10: Number Tightening Procedure (Example)

Number or Mark when rubber seal is seated	1 or ▼	2 or ▼▼	3 or ▼▼▼	4 or ▼▼▼▼
Number or Mark after tightening	4 or ▼▼▼▼	1 or ▼	2 or ▼▼	3 or ▼▼▼

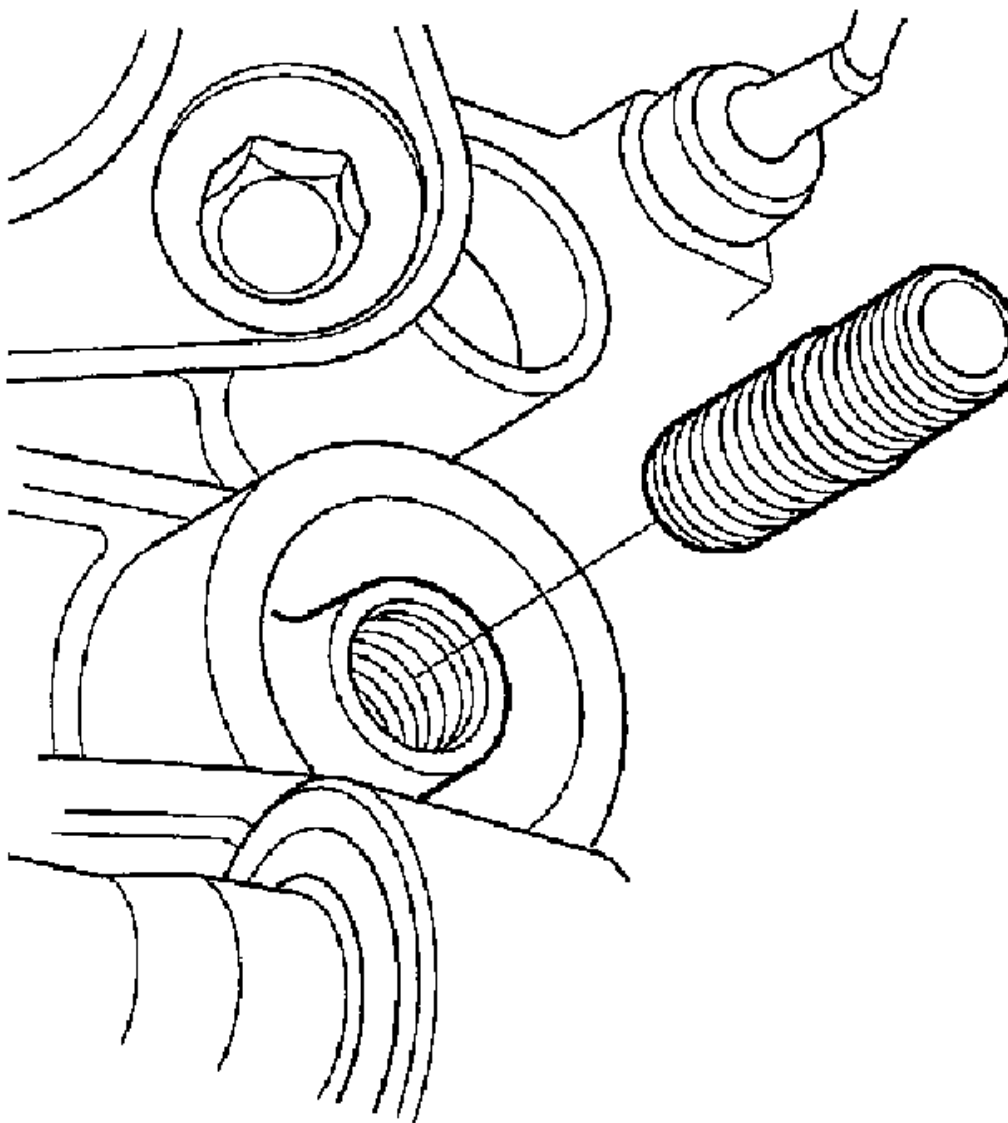
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Fig. 11: Number Tightening Procedure Table

6. After installation, fill the engine with oil up to the specified level, run the engine for more than 3 minutes, then check for oil leakage.

OIL FILTER FEED PIPE REPLACEMENT

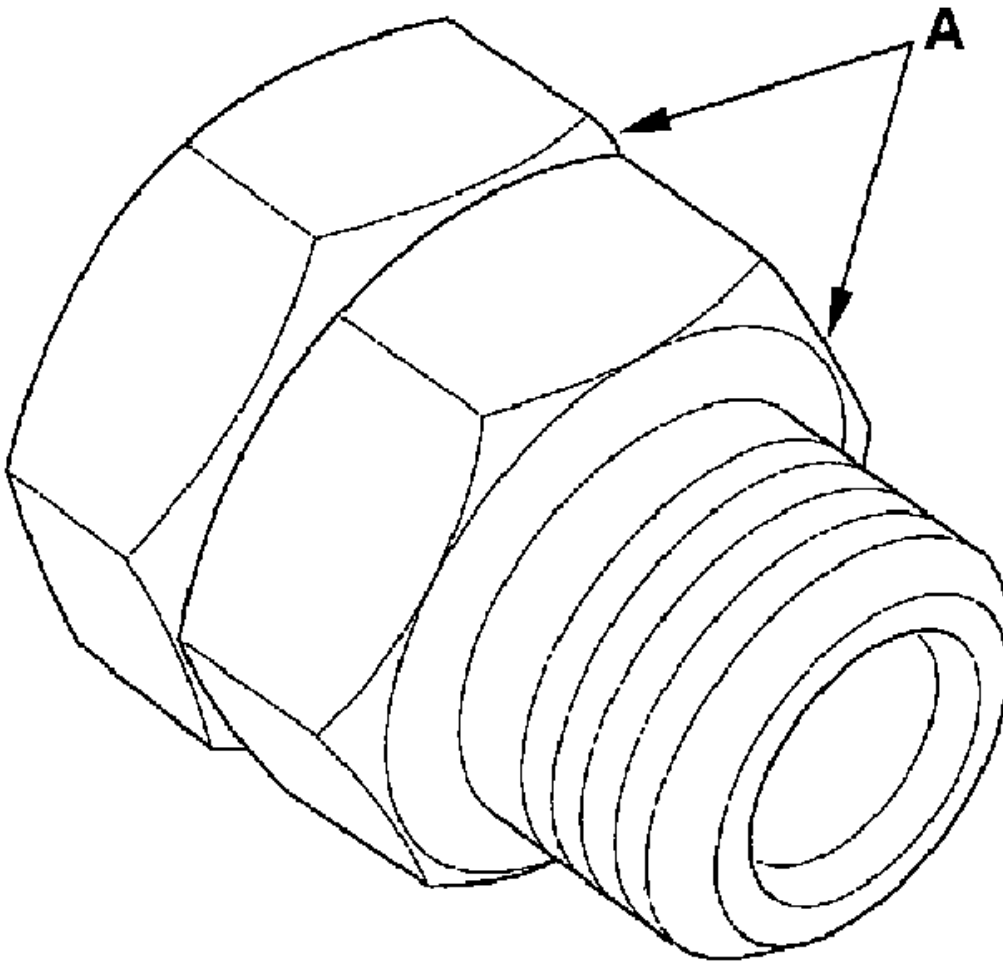
1. Remove the oil filter (see **ENGINE OIL FILTER REPLACEMENT**).
2. Remove the oil filter feed pipe.



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Fig. 12: Removing The Oil Filter Feed Pipe

3. Install the two 20 x 1.5 mm nuts (A) onto the new oil filter feed pipe. Hold the nut with a wrench, then tighten the other nut.



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Fig. 13: Installing Two 20 X 1.5 mm Nuts Onto The New Oil Filter Feed Pipe

4. Tighten the oil filter feed pipe to the block to 49 N.m (5.0 kgf.m, 36 lbf.ft), then remove the nuts from the oil filter feed pipe.

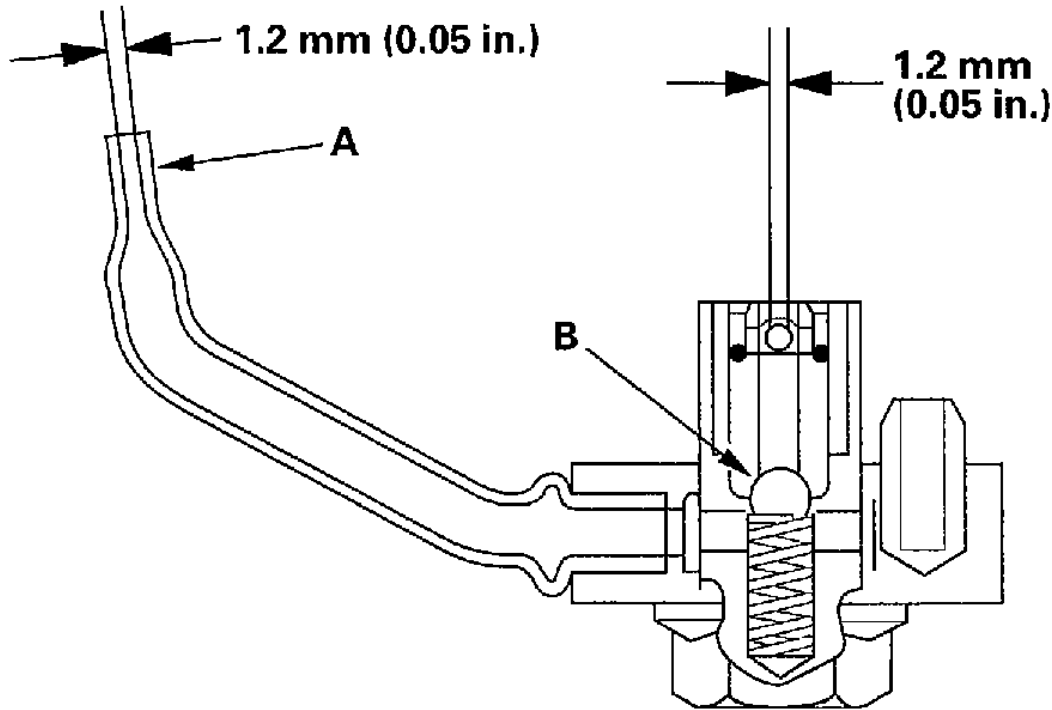
OIL JET INSPECTION

1. Remove the oil jet, and inspect it as follows:
 - Make sure that a 1.1 mm (0.04 in.) diameter drill will go through the nozzle hole (A) (1.2 mm (0.05 in.) diameter).
 - Insert the other end of a 1.1 mm (0.04 in.) drill into the oil intake (1.2 mm (0.05 in.) diameter).

Make sure the check ball (B) moves smoothly and has a stroke of approximately 4.0 mm (0.16 in.).

- Check the oil jet operation with an air nozzle. It should take at least 200 kPa (2.0 kgf/cm², 28 psi) to unseat the check ball.

NOTE: Replace the oil jet assembly if the nozzle is damaged or bent



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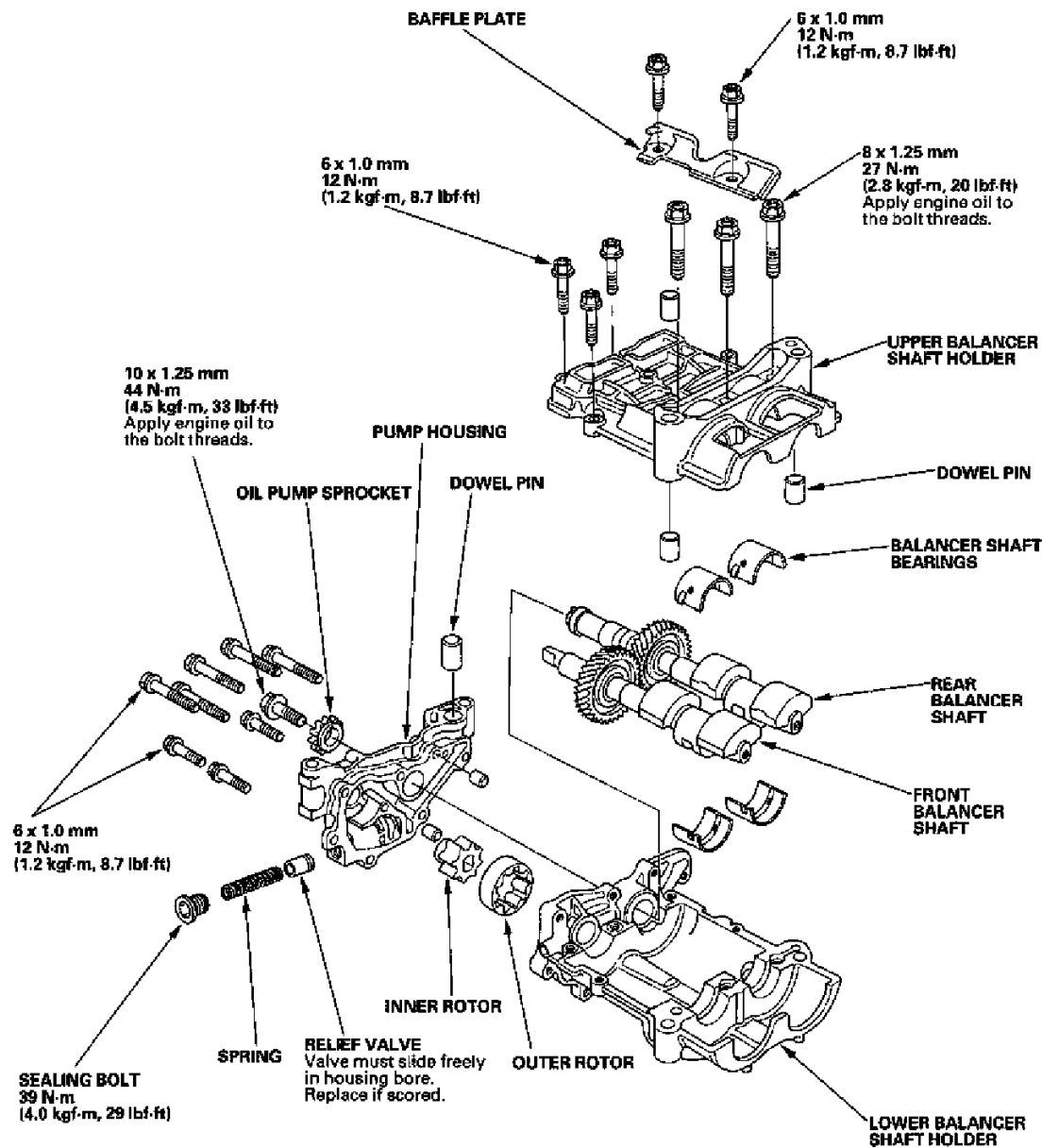
Fig. 14: Cutaway View Of Oil Jet

2. Carefully install the oil jet. The mounting torque is critical.

Torque: 16 N.m (1.6 kgf.m, 12 lbf.ft)

OIL PUMP OVERHAUL

EXPLODED VIEW

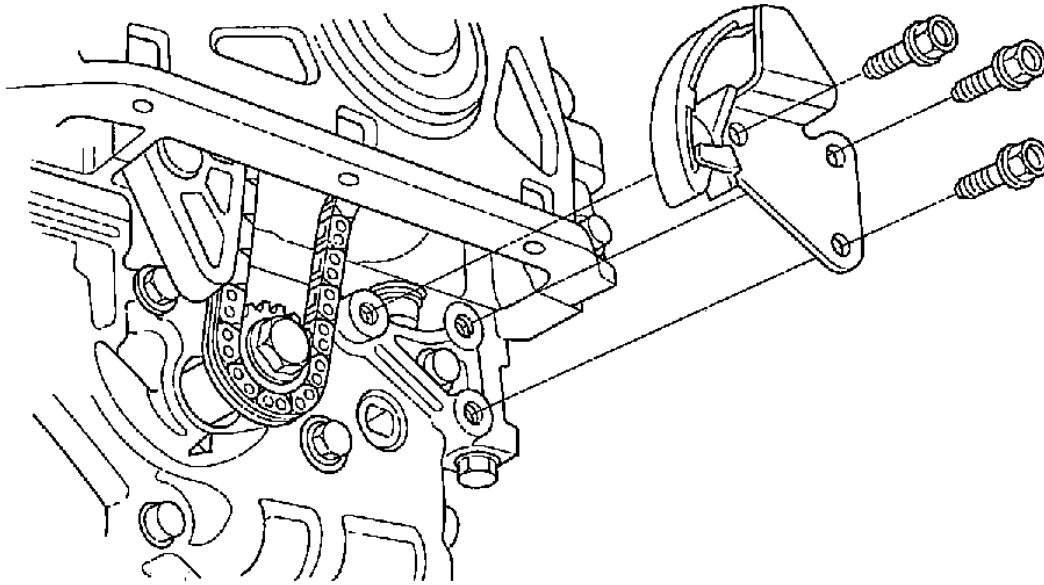


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Fig. 15: Exploded View Of Oil Pump

OIL PUMP REMOVAL

1. Turn the crankshaft pulley so its top dead center (TDC) mark lines up with the pointer (see step 1 of **CAM CHAIN REMOVAL**).
2. Remove the oil pan (see **OIL PAN REMOVAL**).
3. Remove and discard the oil pump chain tensioner.



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Fig. 16: Removing The Oil Pump Chain Tensioner

4. To hold the rear balancer shaft, insert a 6 mm pin driver (A) into the maintenance hole in the lower balancer shaft holder and through the rear balancer shaft.

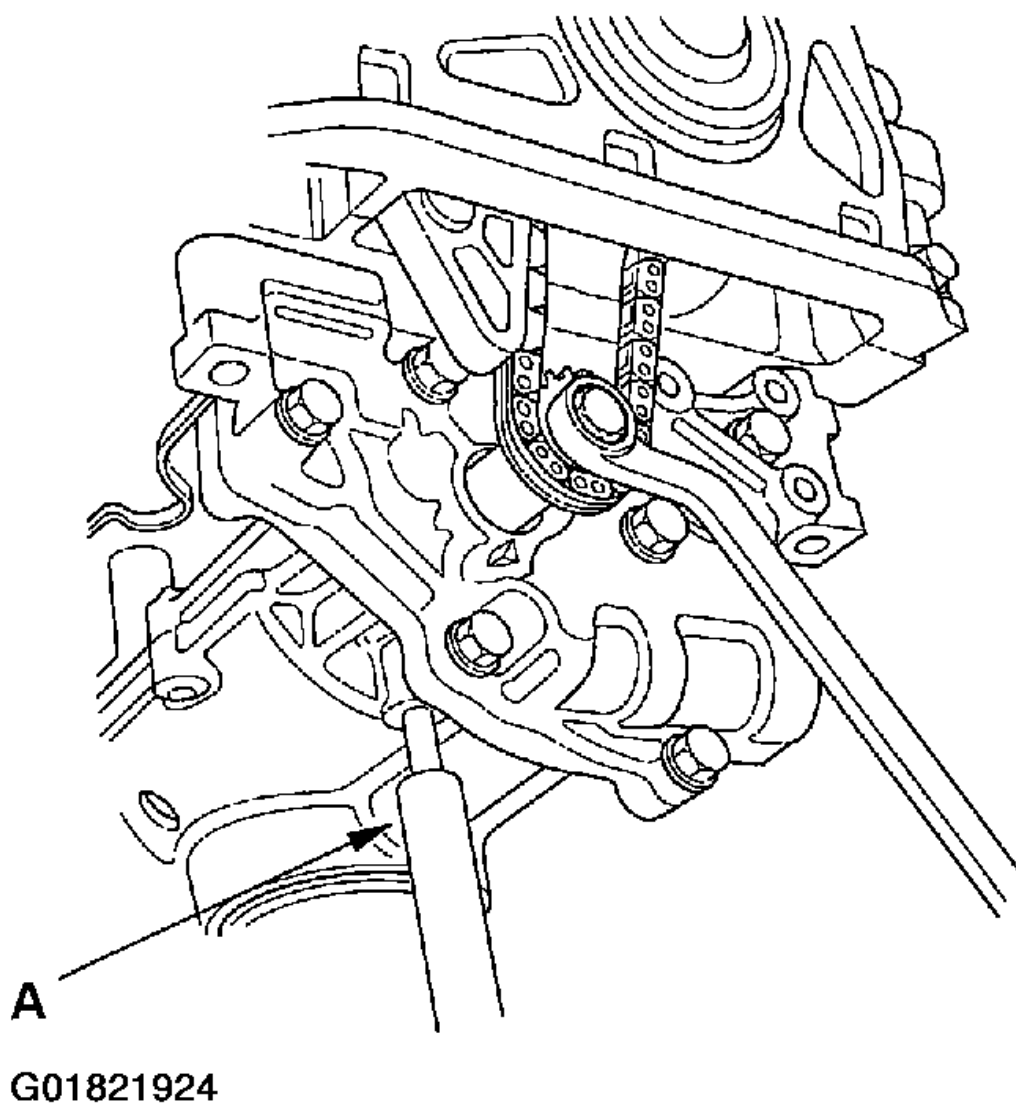
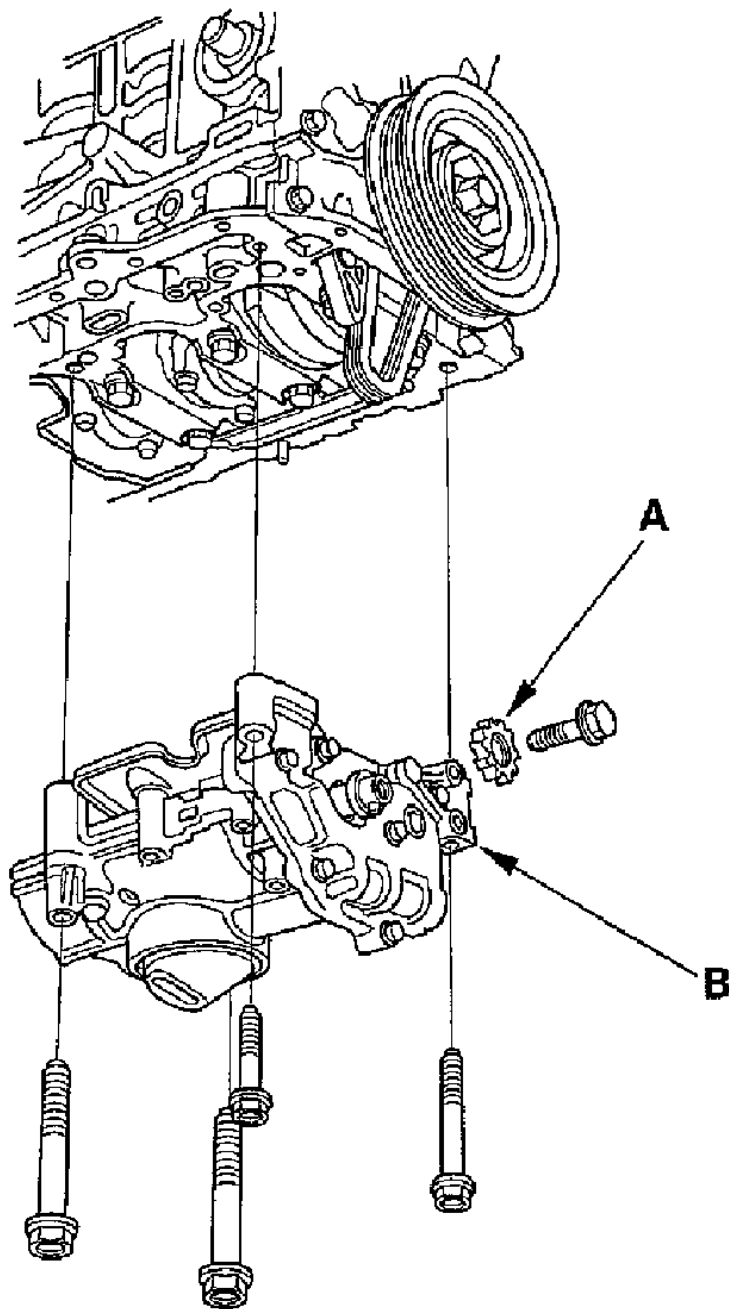


Fig. 17: Inserting A 6 mm Pin Driver Into The Maintenance Hole

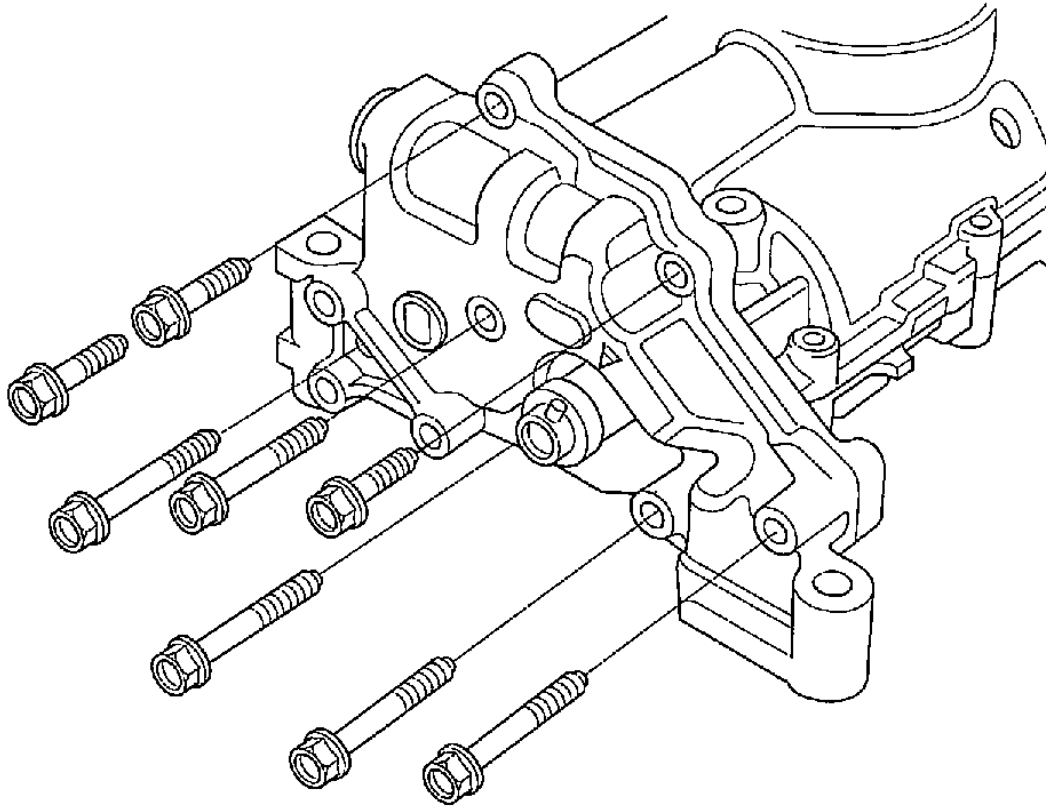
5. Loosen the oil pump sprocket mounting bolt.
6. Remove the oil pump sprocket (A), then remove the oil pump (B).



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Fig. 18: Removing The Oil Pump Sprocket & The Oil Pump**OIL PUMP INSPECTION**

1. Remove the pump housing

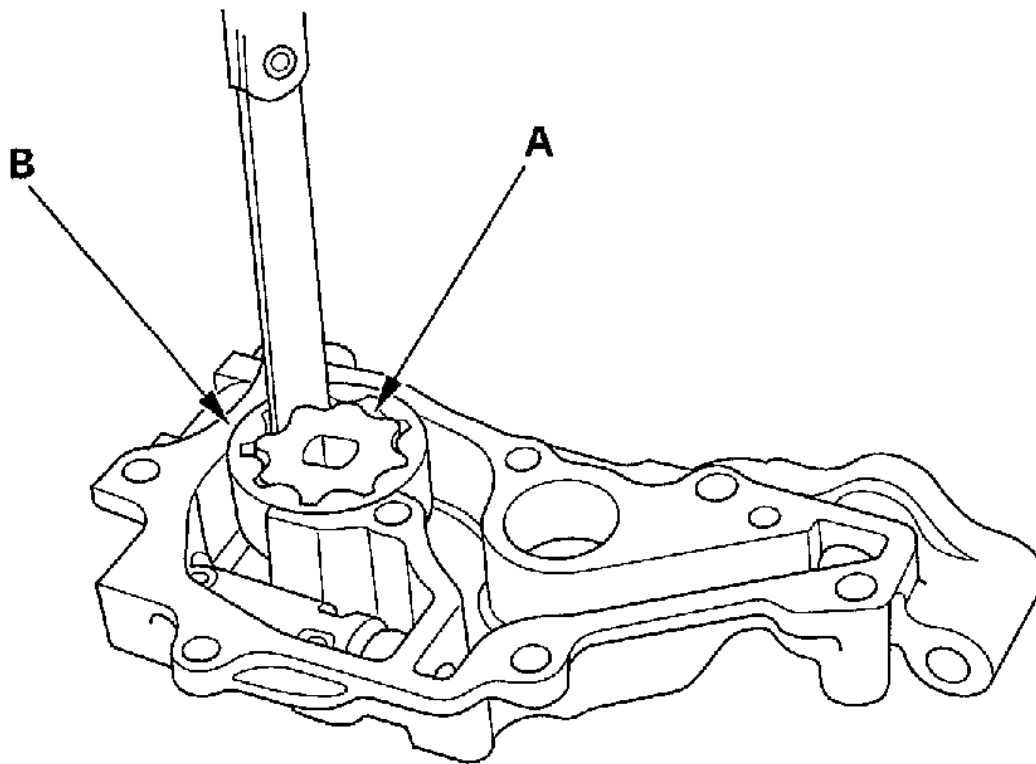


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Fig. 19: Removing The Pump Housing

2. Check the inner-to-outer rotor radial clearance between the inner rotor (A) and outer rotor (B). If the inner-to-outer rotor radial clearance exceeds the service limit, replace the oil pump.

Inner Rotor-To-Outer Rotor Radial Clearance:**Standard (New):** 0.06-0.16 mm (0.002-0.006 in.)**Service Limit:** 0.20 mm (0.008 in.).



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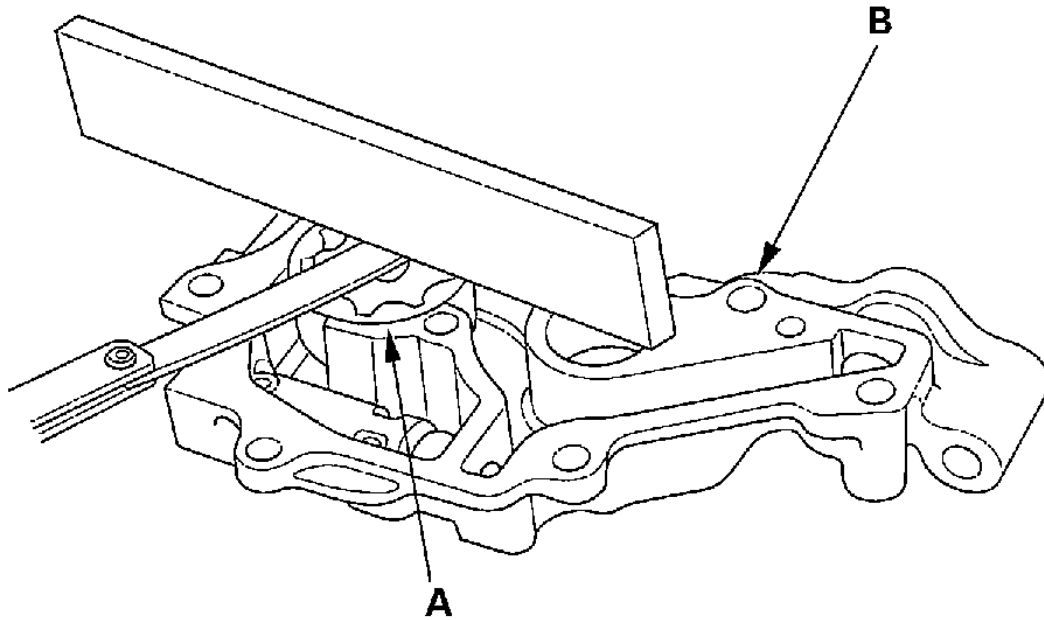
Fig. 20: Checking The Inner-To-Outer Rotor Radial Clearance Between The Inner Rotor And Outer Rotor

3. Check the housing-to-rotor axial clearance between the rotor (A) and pump housing (B). If the housing-to-rotor axial clearance exceeds the service limit, replace the oil pump.

Housing-To-Rotor Axial Clearance:

Standard (New): 0.035-0.070 mm (0.0013-0.0028 in.)

Service Limit: 0.12 mm (0.005 in.)



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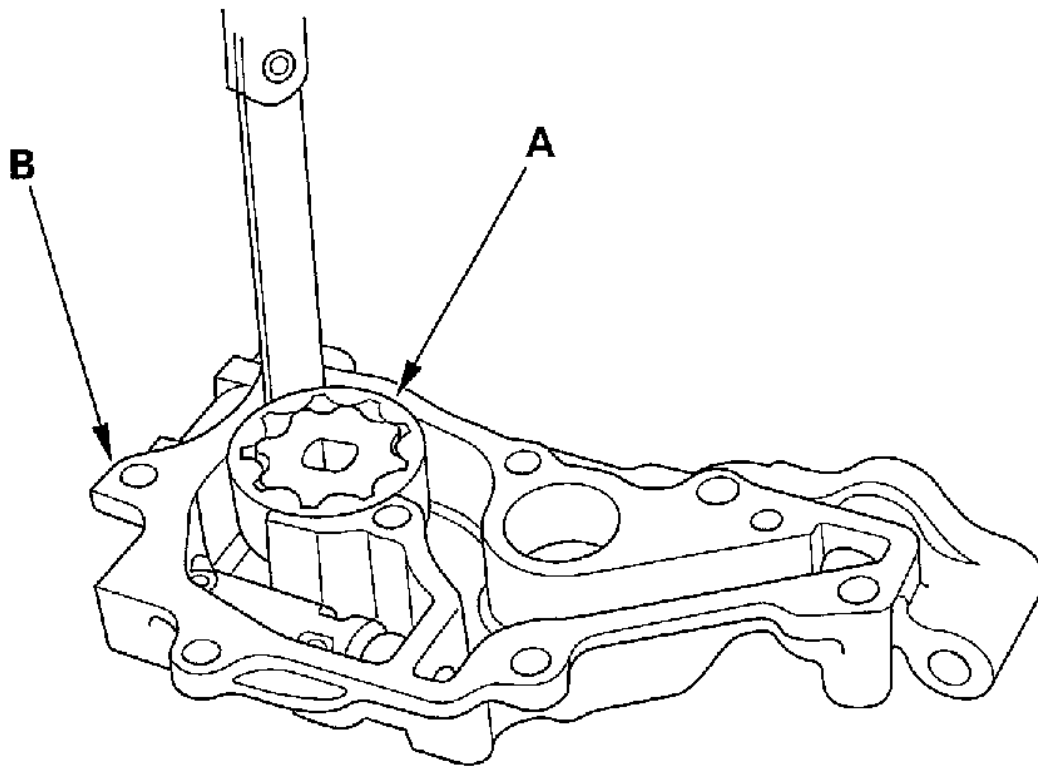
Fig. 21: Checking The Housing-To-Rotor Axial Clearance Between The Rotor & Pump Housing

4. Check the housing-to-outer rotor radial clearance between the outer rotor (A) and pump housing (B). If the housing-to-outer rotor radial clearance exceeds the service limit, replace the oil pump.

Housing-To-Outer Rotor Radial Clearance:

Standard (New): 0.15-0.21 mm (0.006-0.008 in.)

Service Limit: 0.23 mm (0.009 in.)



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Fig. 22: Checking The Housing-To-Outer Rotor Radial Clearance Between The Outer Rotor & Pump Housing

5. Inspect both rotors and the pump housing for scoring or other damages. Replace the parts if necessary.

BALANCER SHAFT INSPECTION

1. Seat the balancer shaft by pushing it away from the oil pump sprocket end of the oil pump.
2. Zero the dial indicator against the end of the balancer shaft, then push the balancer shaft back and forth and read the end play.

Balancer Shaft End Play:

Front Balancer Shaft:

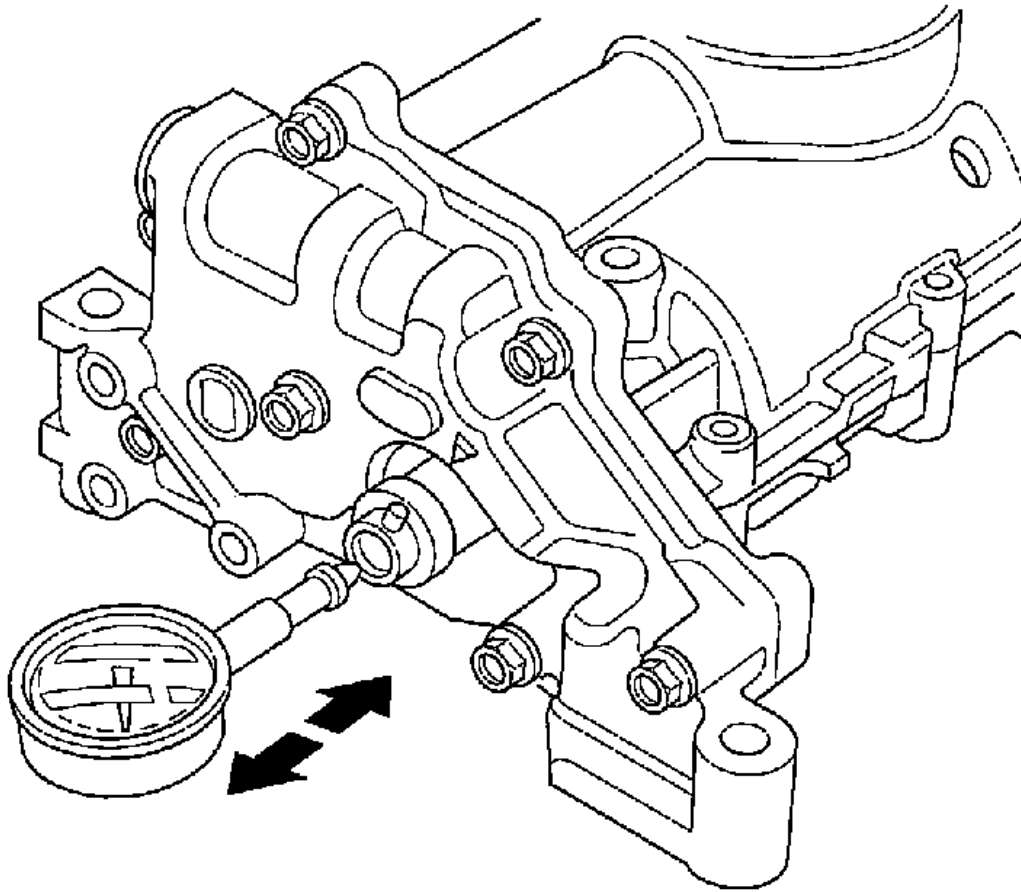
Standard (New): 0.063-0.108 mm (0.0025-0.0043 in.)

Service Limit: 0.14 mm (0.0055 in.)

Rear Balancer Shaft:

Standard (New): 0.063-0.108 mm (0.0025-0.0043 in.)

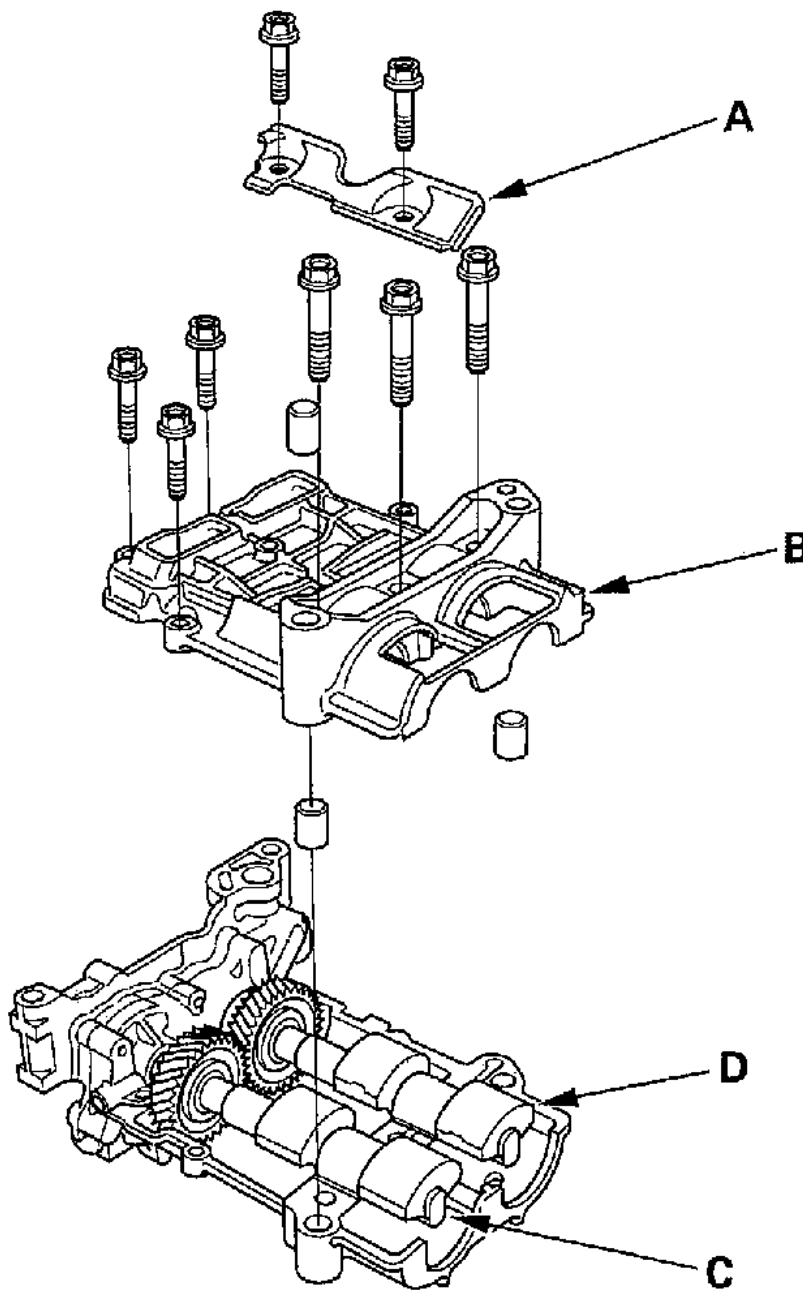
Service Limit: 0.14 mm (0.0055 in.)



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Fig. 23: Checking Balancer Shaft End Play

3. Remove the baffle plate (A) and upper balancer shaft holder (with bearings) (B), then remove the front balancer shaft (C) and rear balancer shaft (D).

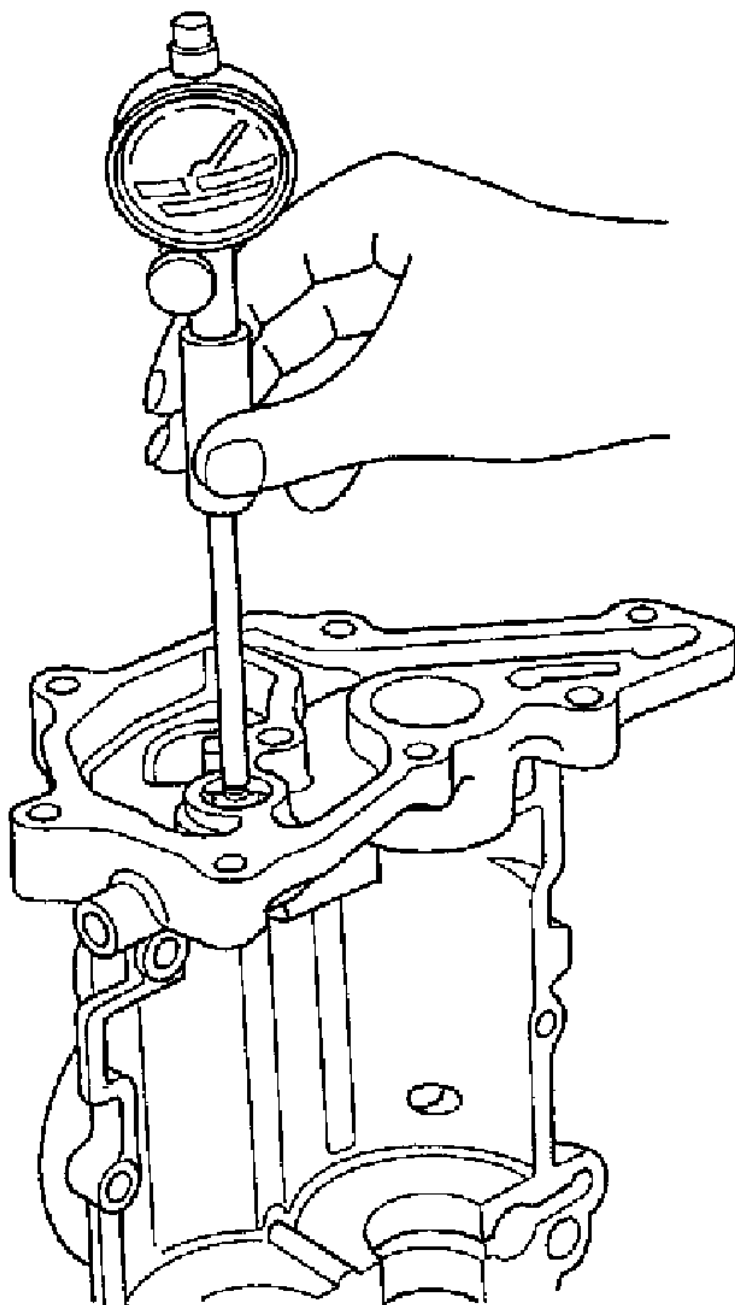


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Fig. 24: Removing The Baffle Plate, Upper Balancer Shaft Holder (With Bearings), The Front Balancer Shaft & Rear Balancer Shaft

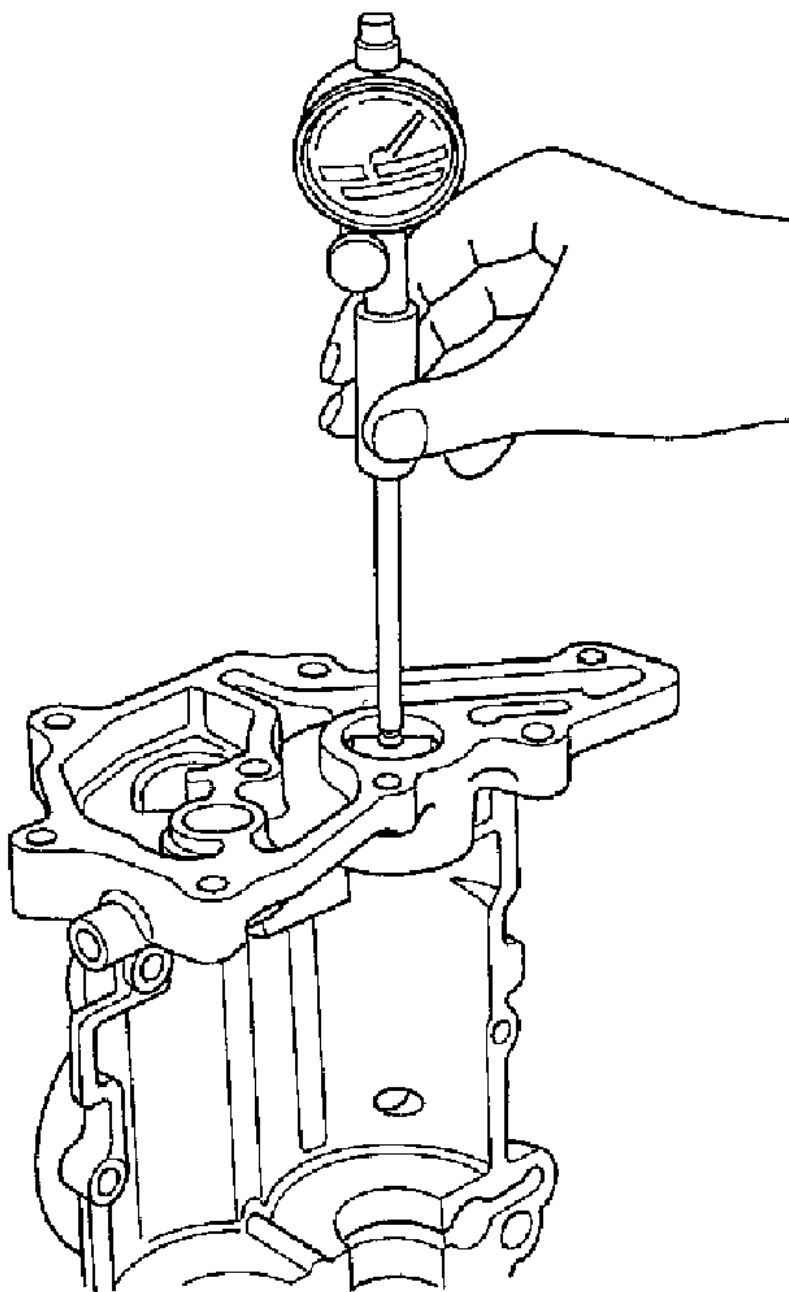
4. Measure the inner diameter of the No. 1 bearing for the front balancer shaft hole and the rear balancer shaft hole.

Bearing Inner Diameter:**Front:****Standard (New):** 20.000-20.020 mm (0.7874-0.7882 in.)**Service Limit:** 20.03 mm (0.789 in.)**Rear:****Standard (New):** 24.000-24.020 mm (0.9449-0.9457 in.)**Service Limit:** 24.03 mm (0.946 in.)



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Fig. 25: Measuring The Inner Diameter Of The No. 1 Bearing (Front)

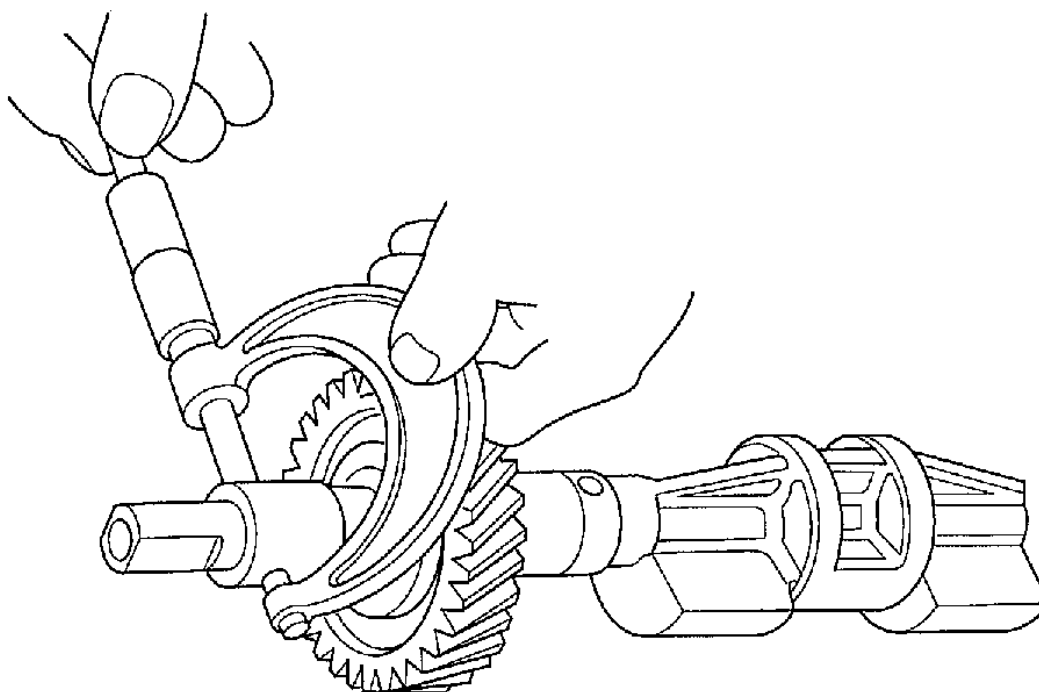


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Fig. 26: Measuring The Inner Diameter Of The No. 1 Bearing (Rear)

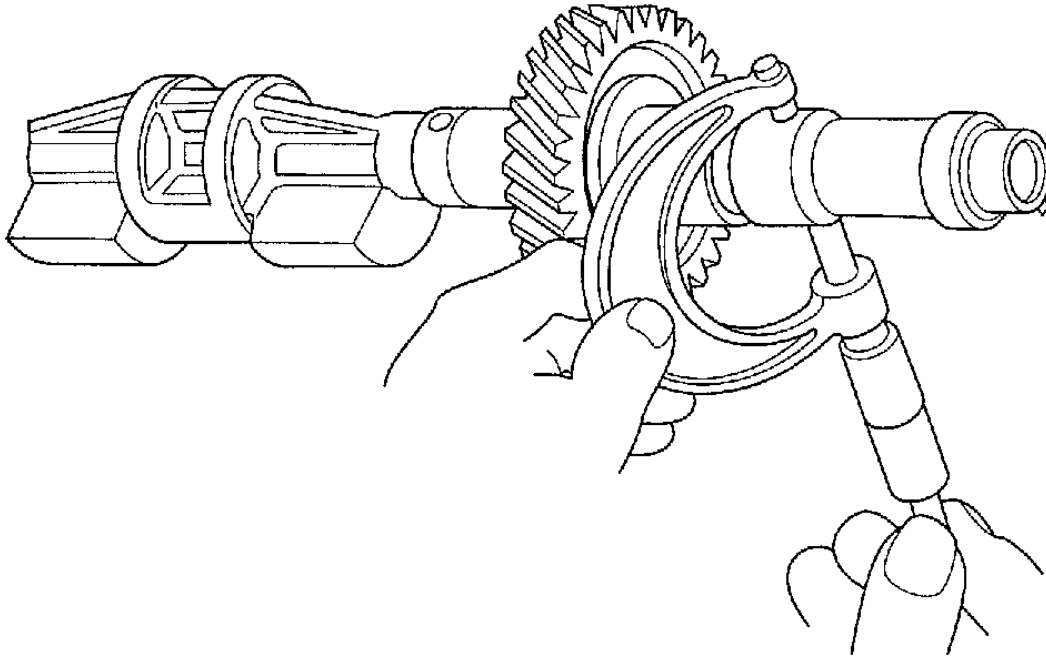
5. Measure the diameters of the No. 1 journals on the front balancer shaft and rear balancer shaft.

Journal Diameter:

Front:**Standard (New):** 19.938-19.950 mm (0.7850-0.7854 in.)**Service Limit:** 19.92 mm (0.784 in.)**Rear:****Standard (New):** 23.938-23.950 mm (0.9424-0.9429 in.)**Service Limit:** 23.92 mm (0.942 in.)

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Fig. 27: Measuring The Diameter Of The No. 1 Journal (Front)



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Fig. 28: Measuring The Diameter Of The No. 1 Journal (Rear)

6. Clean both balancer shaft No. 2 journals and bearing halves with a clean shop towel.
7. Place one strip of plastigage across each No. 2 journal.
8. Reinstall the bearings and upper balancer shaft holder, then torque the bolts.

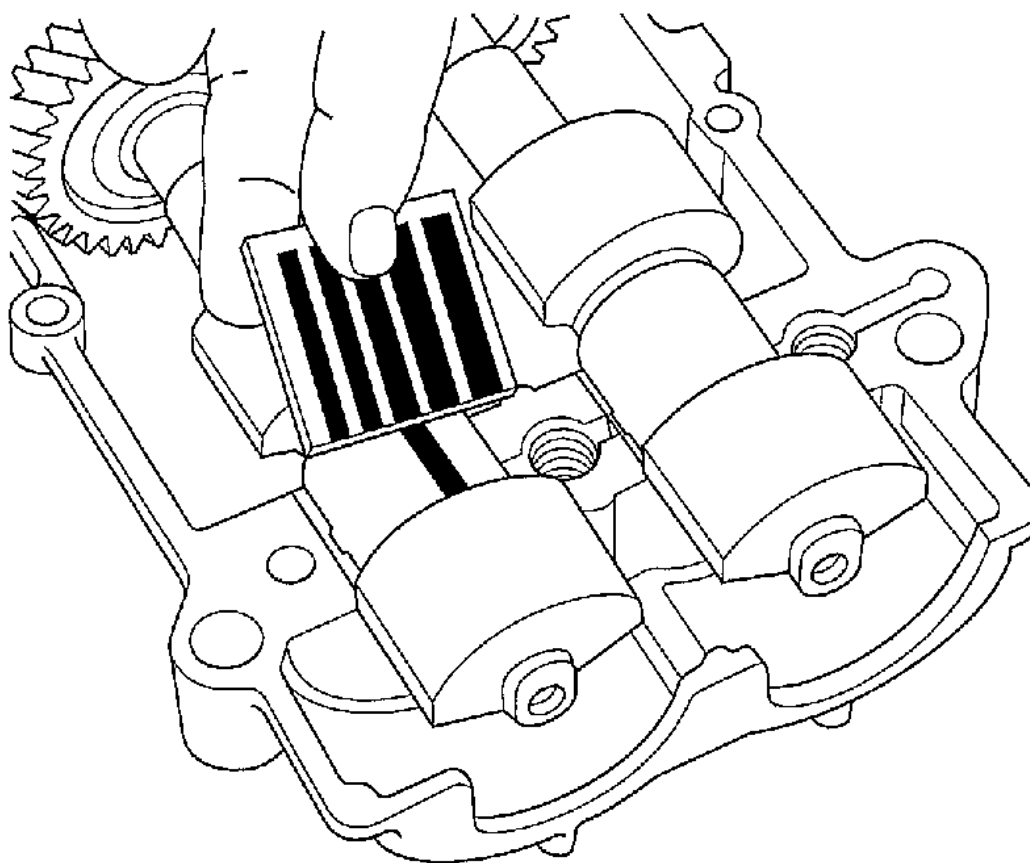
NOTE: Do not rotate the balancer shafts during inspection.

9. Remove the upper balancer shaft holder and bearings again, and measure the widest part with the plastigage. If the balancer shaft No. 2 journal oil clearance is out-of-tolerance, install new bearings, and recheck. If it is still out-of-tolerance, replace the balancer shafts.

No. 2 Journal Oil Clearance:

Standard (New): 0.060-0.120 mm (0.0024-0.0047 in.)

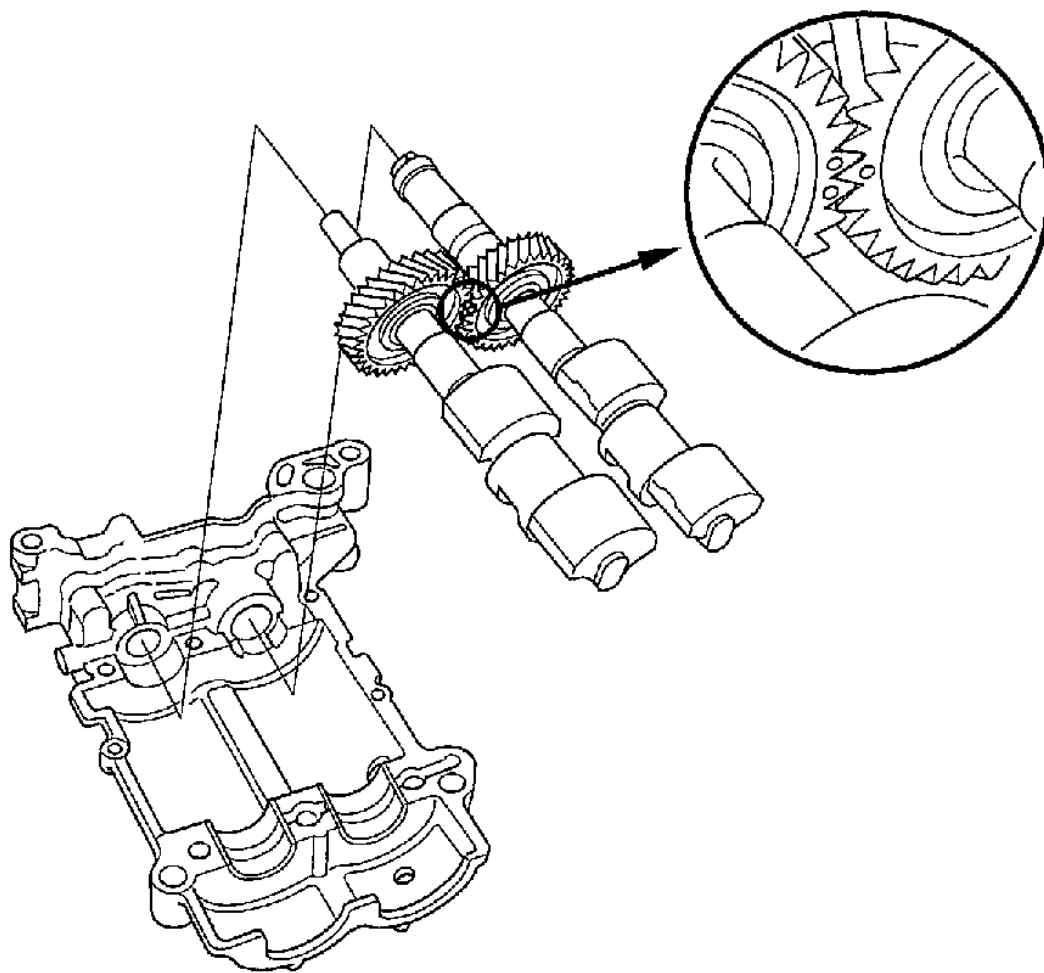
Service Limit: 0.15 mm (0.006 in.)



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Fig. 29: Measuring The Widest Part With The Plastigage

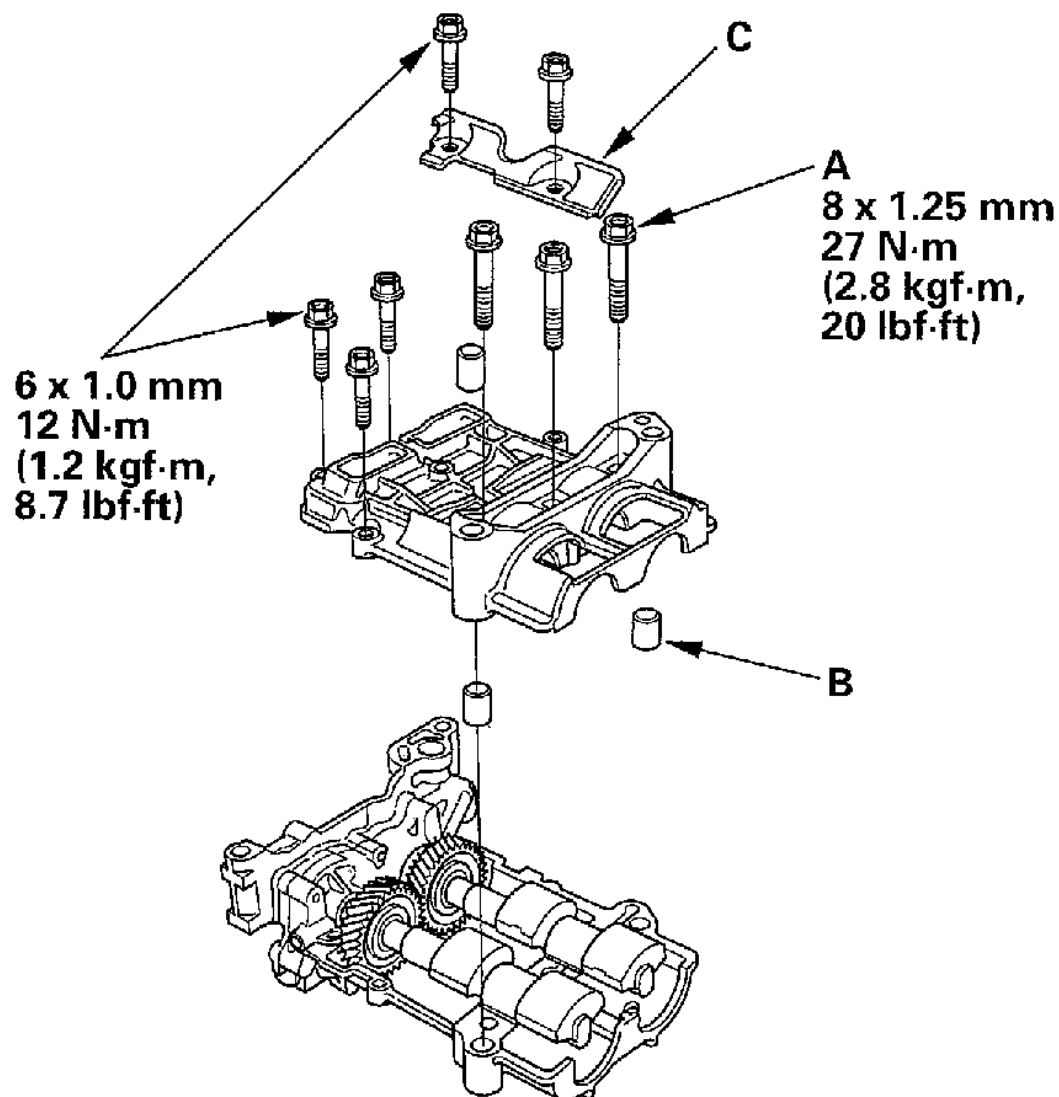
10. Align the punch mark on the rear balancer shaft in the center of the two punch marks on the front balancer shaft, then install the balancer shafts on the lower balancer shaft holder.



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Fig. 30: Installing The Balancer Shafts On The Lower Balancer Shaft Holder

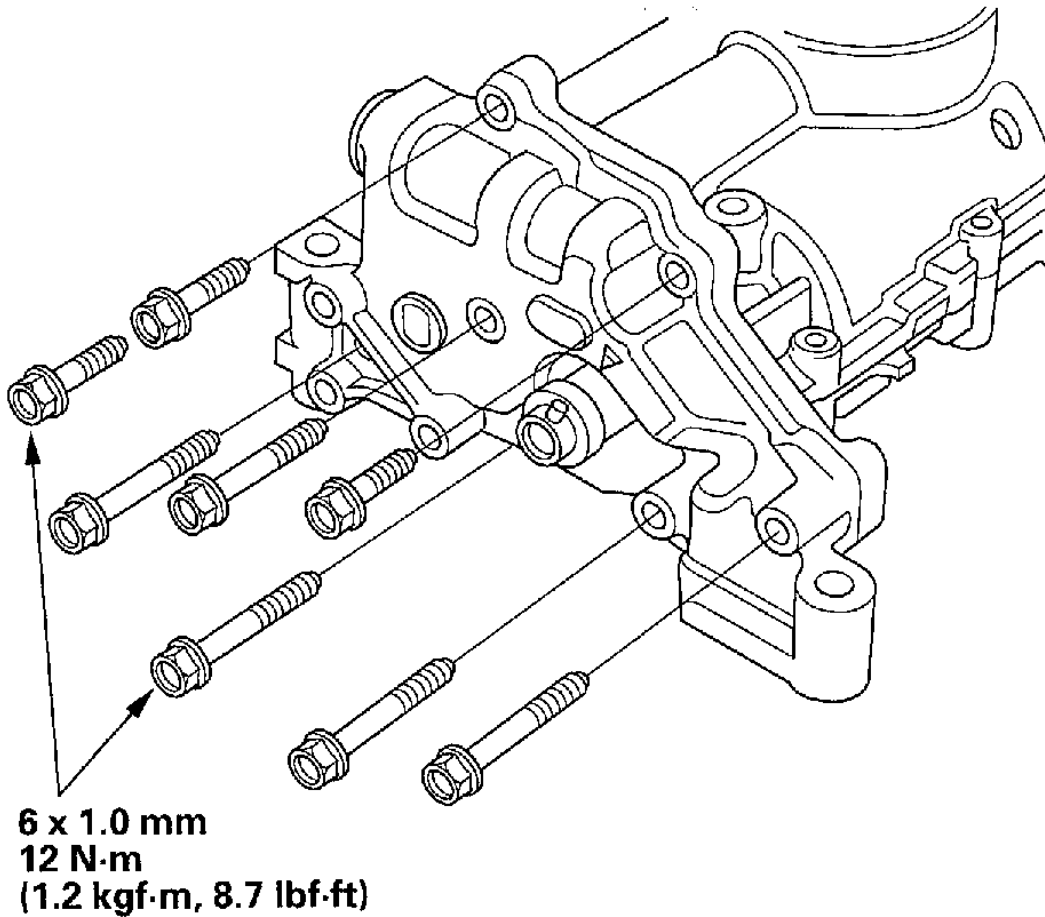
11. Apply engine oil to the threads of the 8 mm bolts (A).



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Fig. 31: Installing The Upper Balancer Shaft Holder & Baffle Plate

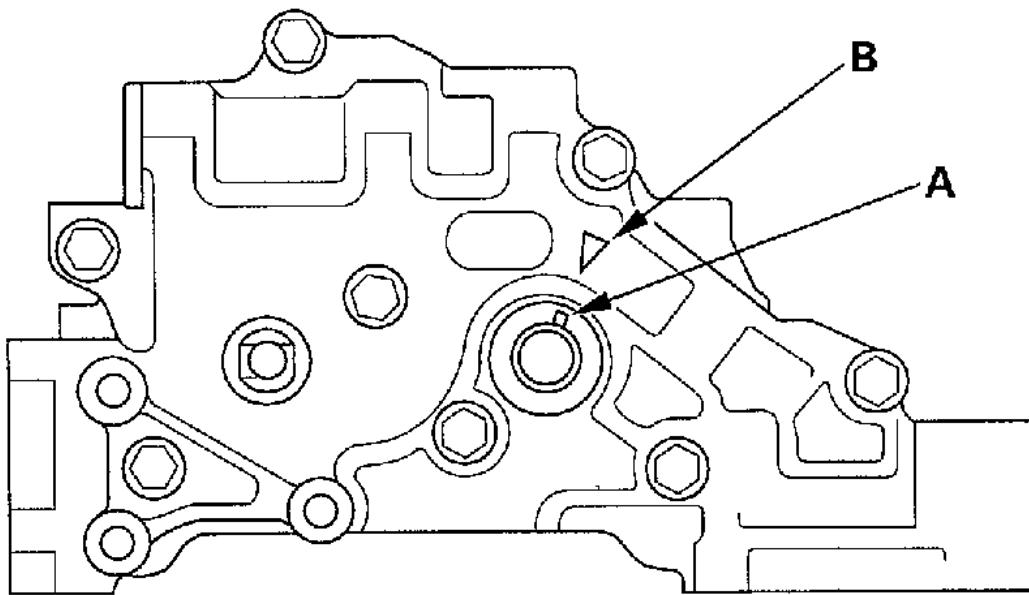
12. Install the upper balancer shaft holder (B) and baffle plate (C).
13. Install the pump housing.



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Fig. 32: Installing The Pump Housing**OIL PUMP INSTALLATION**

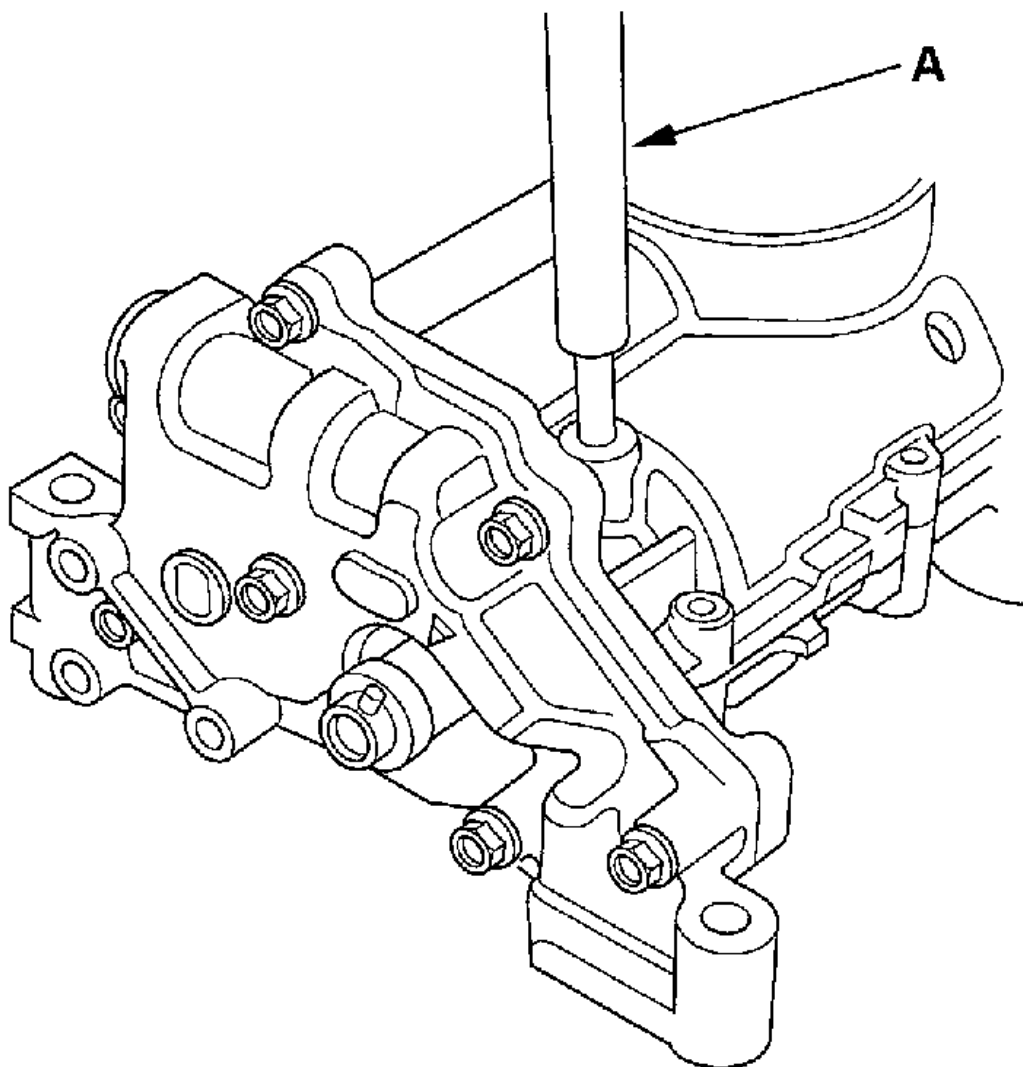
1. Make sure the No. 1 piston is at TDC (see step 1 of **CAM CHAIN REMOVAL**).
2. Align the dowel pin (A) on the rear balancer shaft with the mark (B) on the oil pump.



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Fig. 33: Aligning The Dowel Pin On The Rear Balancer Shaft With The Mark On The Oil Pump

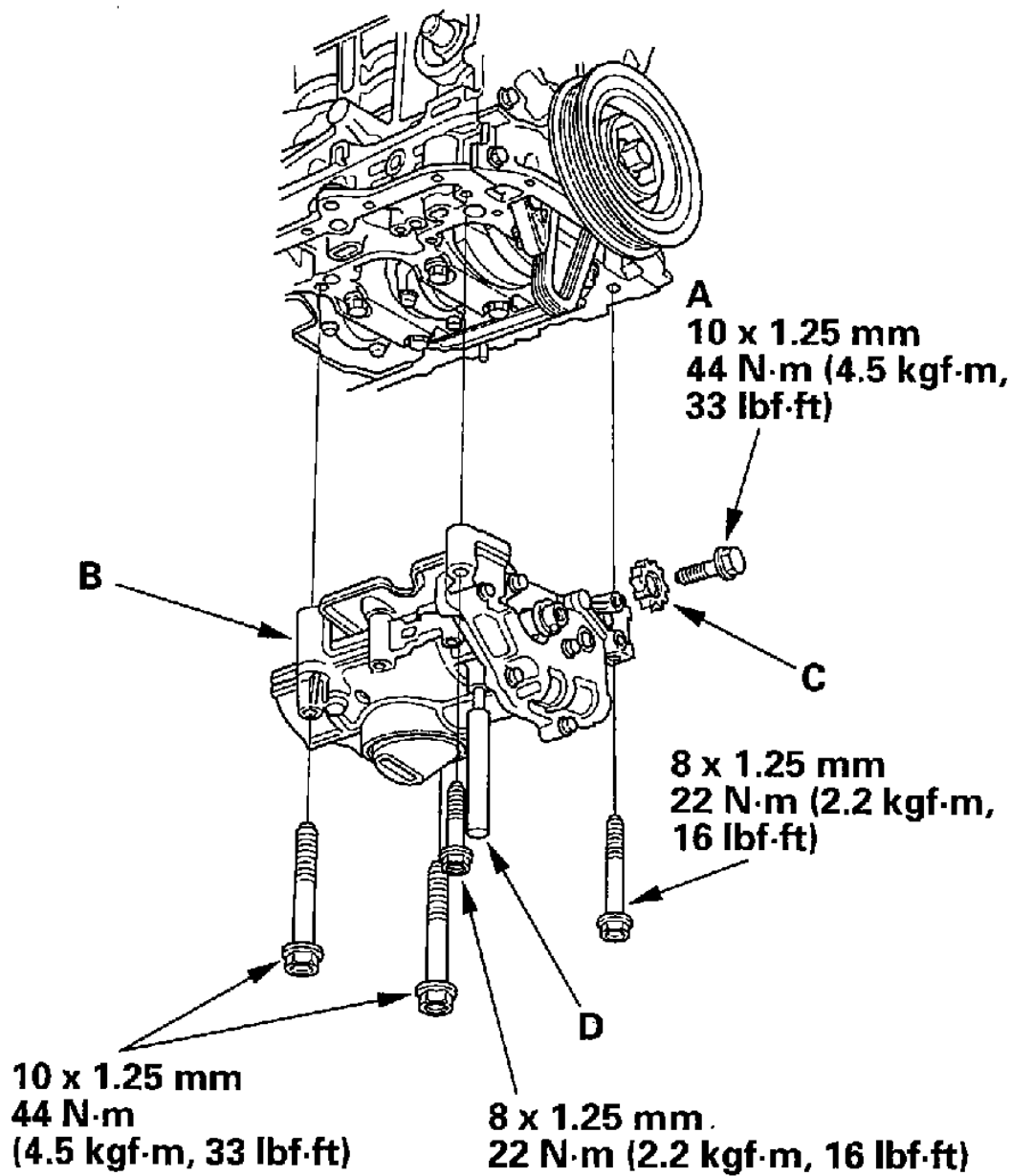
3. To hold the rear balancer shaft, insert a 6 mm pin driver (A) into the maintenance hole in the lower balancer shaft holder and through the rear balancer shaft.



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Fig. 34: Inserting A 6 mm Pin Driver Into The Maintenance Hole

4. Apply engine oil to the threads of the oil pump sprocket mounting bolt (A).



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Fig. 35: Installing The Oil Pump, Then The Oil Pump Sprocket

5. Loosely install the oil pump (B), then install the oil pump sprocket (C).
6. Remove the pin driver (D).
7. Tighten the oil pump mounting bolts.
8. Squeeze the new oil pump chain tensioner (A), then install the set clip (B) on it as shown.

NOTE: The set clip is supplied with the oil pump chain tensioner.

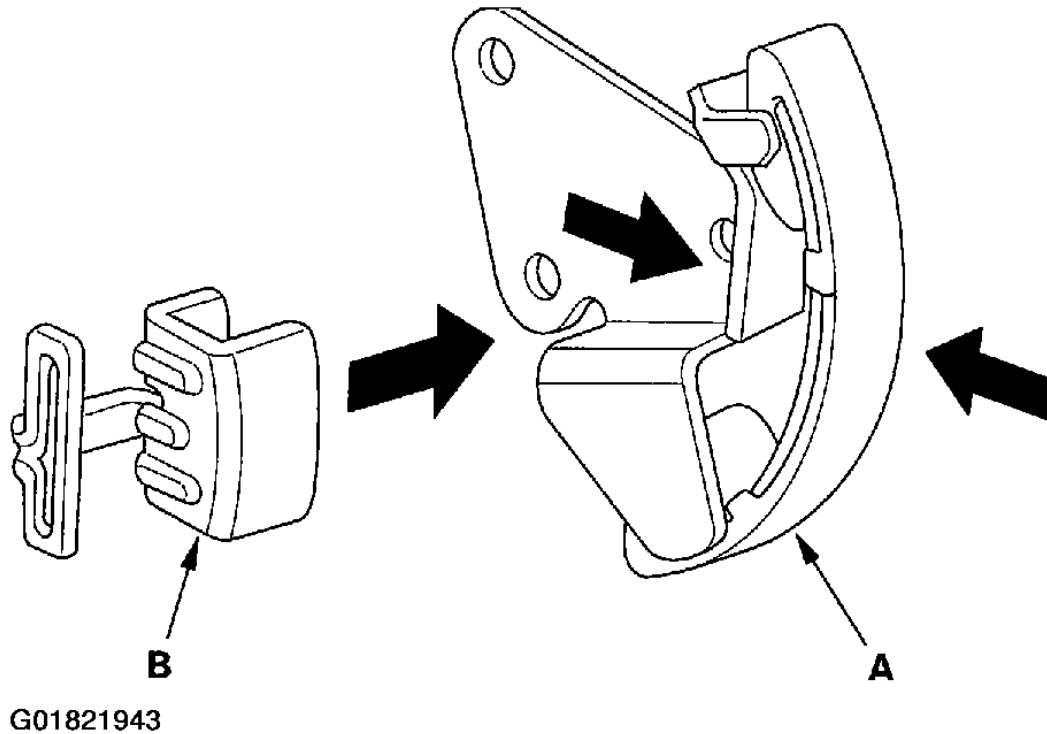
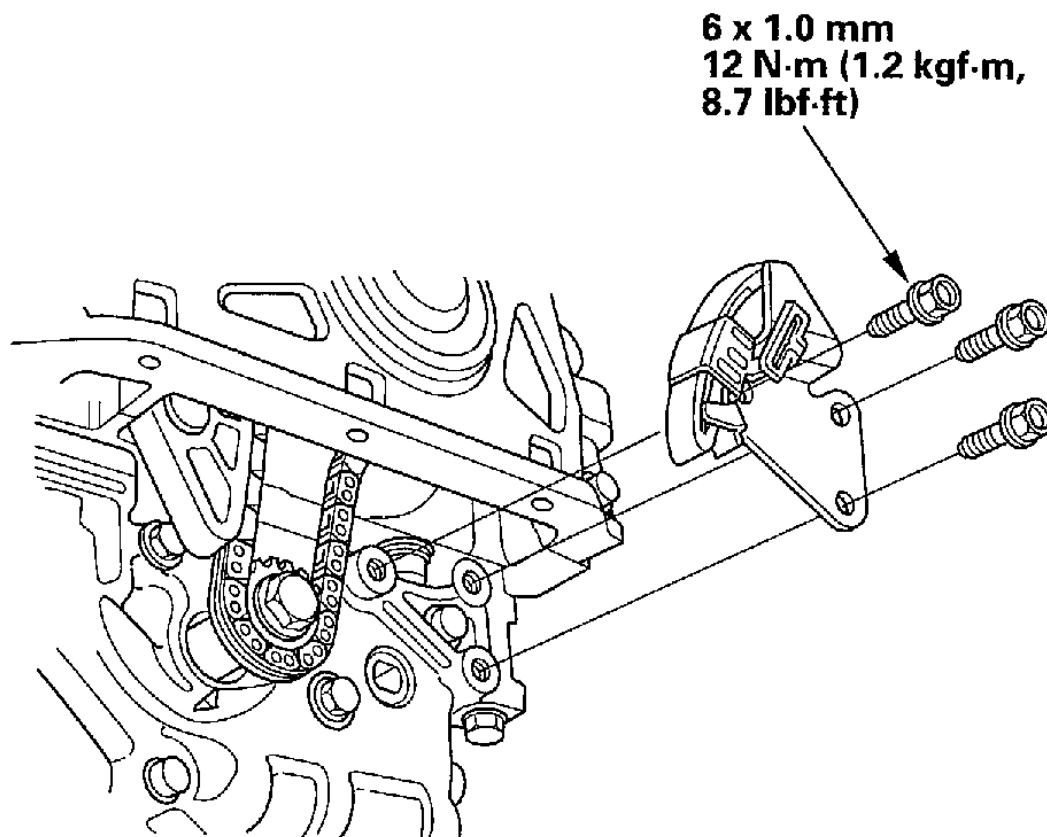


Fig. 36: Squeezing The New Oil Pump Chain Tensioner & Installing The Set Clip

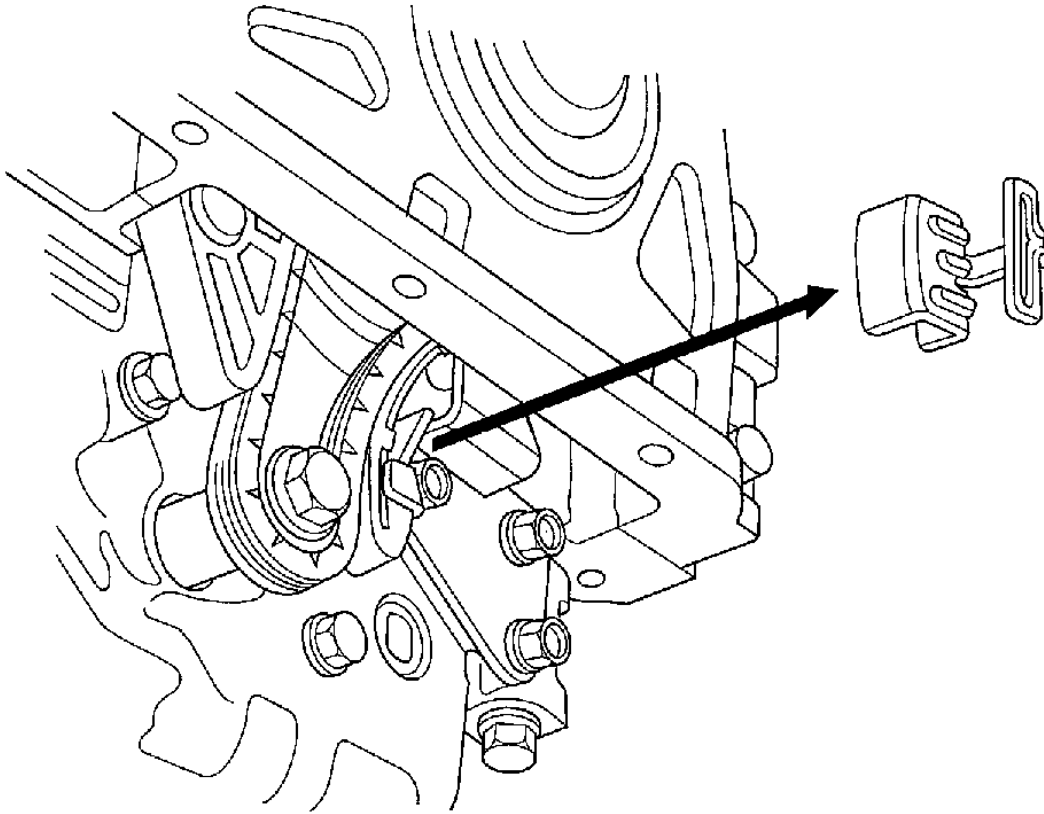
9. Install the new oil pump chain tensioner.



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Fig. 37: Installing The New Oil Pump Chain Tensioner

10. Remove the set clip from the oil pump chain tensioner.



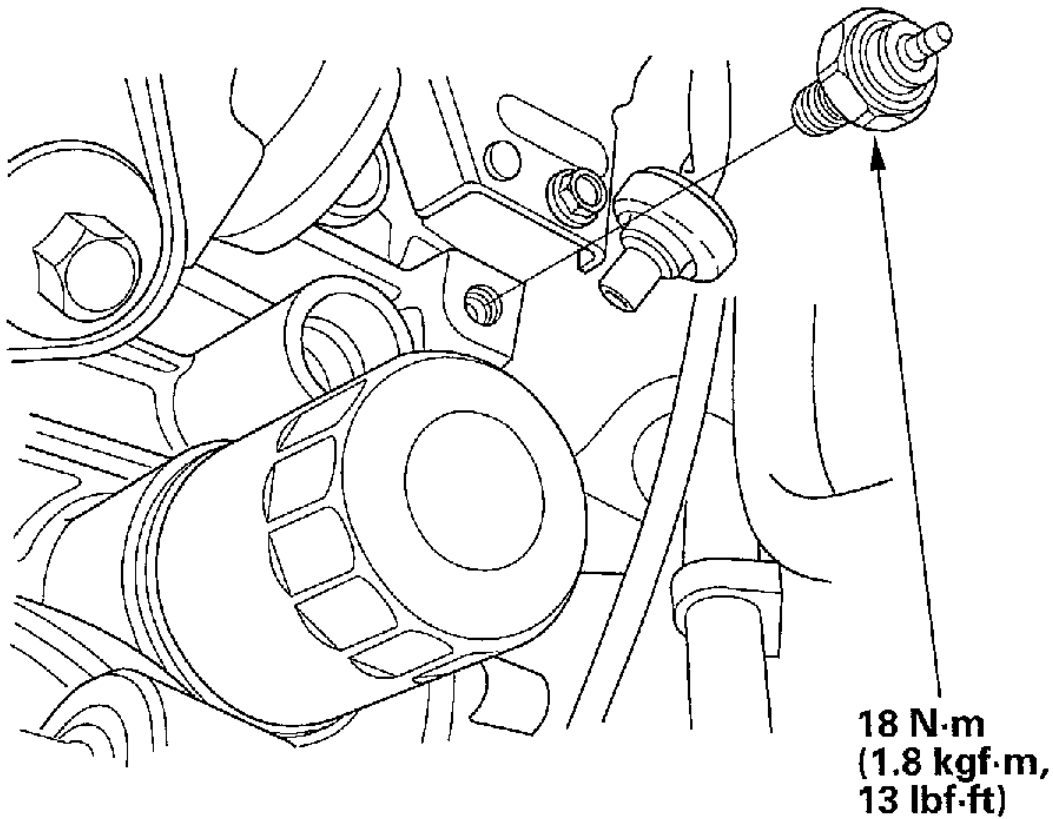
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Fig. 38: Removing The Set Clip From The Oil Pump Chain Tensioner

11. Install the oil pan (see **OIL PAN INSTALLATION**).

OIL PRESSURE SWITCH REPLACEMENT

1. Disconnect the oil pressure switch connector, then remove the oil pressure switch.



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Fig. 39: Removing The Oil Pressure Switch

2. Apply a very small amount of liquid gasket to the oil pressure switch threads, then install the oil pressure switch.

NOTE: Using too much liquid gasket may cause liquid gasket to enter the oil passage or the end of the new oil pressure switch.