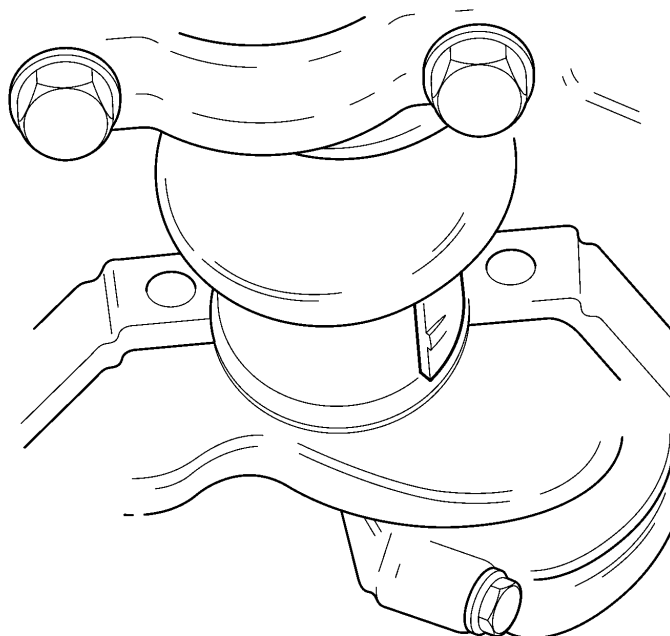


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Main Bearings, Replace (all)  
D13F

## Main Bearings, Replace (all)



W2006096

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**Note:** Information is subject to change without notice.  
Illustrations are used for reference only and may differ slightly from the actual vehicle being serviced. However, key components addressed in this information are represented as accurately as possible.

## 2162-03-03-01 Main Bearings, Replacement (All) Oil pan removed

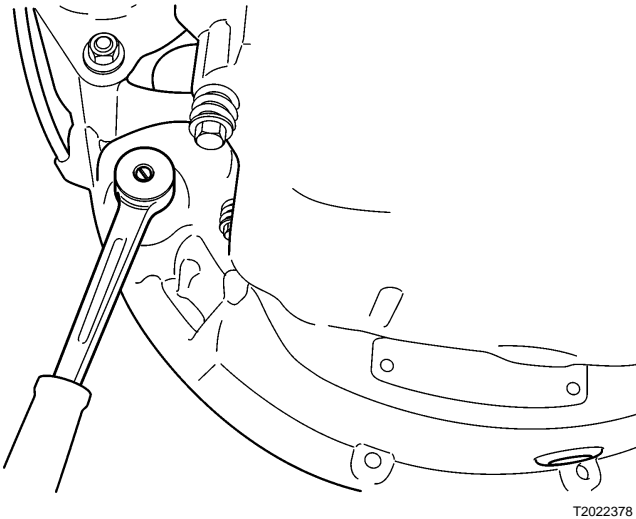
You must read and understand the precautions and guidelines in Service Information, group 20, "General Safety Practices, Engine" before performing this procedure. If you are not properly trained and certified in this procedure, ask your supervisor for training before you perform it.

*Special tools: 9990013, 9990114, 88800014*

**1**

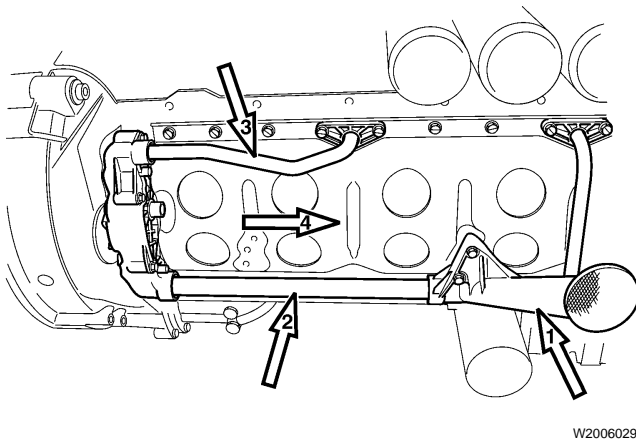
Remove the plug from the flywheel housing and install cranking tool 88800014.

88800014



**2**

- 1 Remove the pipe and strainer from the reinforcing frame.
- 2 Remove the oil pick-up tube.
- 3 Remove the pressure pipe from the pump.
- 4 Remove the reinforcement frame.



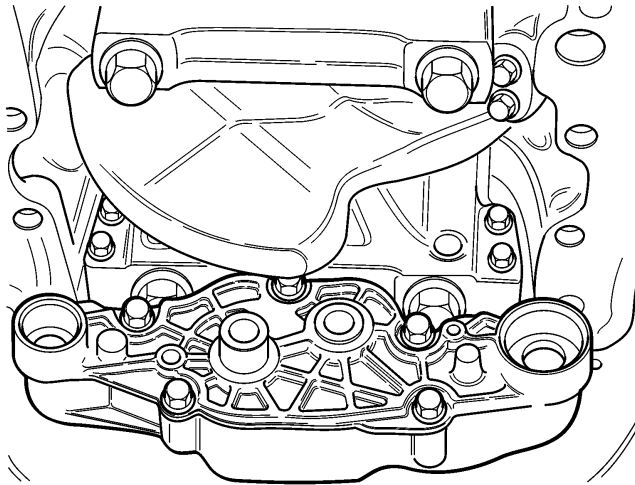
### WARNING

The reinforcement frame has sharp edges. To prevent personal injury, use protective gloves.



### WARNING

Use extreme caution when coming into contact with used engine oil. Used engine oil could cause cancer.

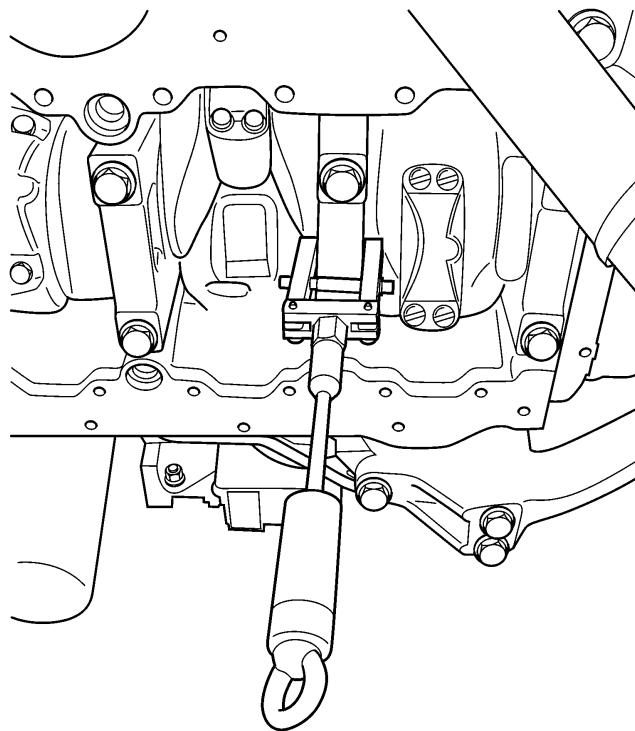


T2022249

**3**

Rotate the crankshaft so that the oil pump fasteners can be accessed.  
Remove the oil pump from the main bearing cap.

88800014



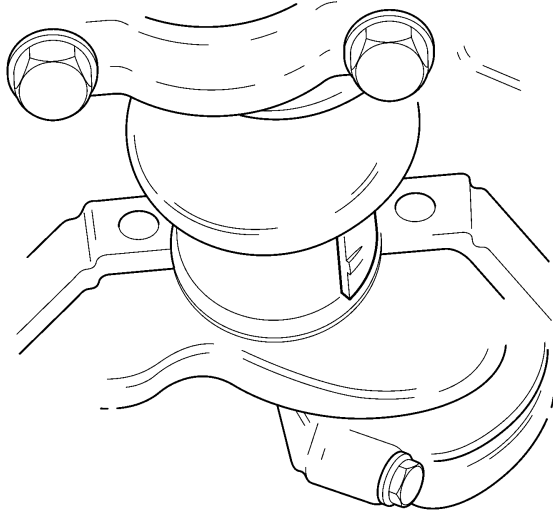
T2022289

**4**

**Note:** Before removing bearing caps, make sure the caps are properly marked. They should be marked on the center of the cap. The part number on the cap should face the front of the engine. Remove one main bearing cap at a time.

Remove the main bearing caps with the puller 9990114, adapter 9990262 and slide hammer 9996400.

9990114, 9990262, 9996400



W2006096

**5**

Remove the upper bearings by inserting a flexible putty knife between the crankshaft and the block.

**Note:** Turn the crankshaft with the hand turning tool. Turn the crankshaft in the proper direction. Be careful not to damage the crankshaft, block, or bearing.

The crankshaft thrust bearing is mounted in the center main bearing, number 4. Thrust bearing washers are available in several oversize dimensions.

**6**

Perform a visual inspection of the crankshaft journals, block and bearing caps for signs of wear and/or damage. Check the back of the bearing for the bearing size. Bearings can be stamped "STD" for standard, or, with a number indicating the oversize of the bearing shell.

**7**

Install the upper bearing shell by turning the crankshaft in the direction of the rotation with cranking tool 88800014.

**Note:** Due to tight tolerances, the crankshaft should be aligned with the engine block before installing.

**Note:** Check that the locating tab on the bearing shell fits correctly into the recess in the bearing seat (use Special tool 88800014).

88800014

**8**

Install the main bearing cap together with the lower bearing shell.

**9**

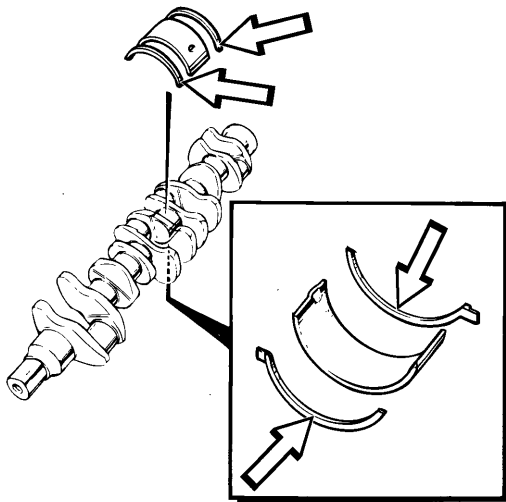
Replace the other main bearings, one at a time and in the same manner as the first one. After replacing each bearing, check that the crankshaft rotates freely by turning it around with cranking tool 88800014.

88800014

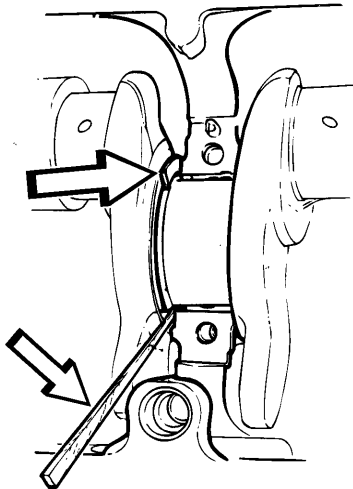
**10**

Check the crankshaft axial play and replace the thrust bearings if there is too much play or if the bearings are damaged. Use a dial indicator to measure axial play.

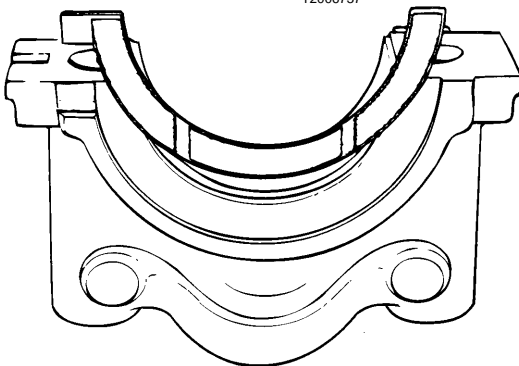
11



T2006736



T2006737



T2006738

Lubricate the crankshaft side of the new bearing shells and thrust bearings. Install the bearing caps. Using the hand cranking tool, rotate the engine several rotations to verify that the bearings have been properly installed.

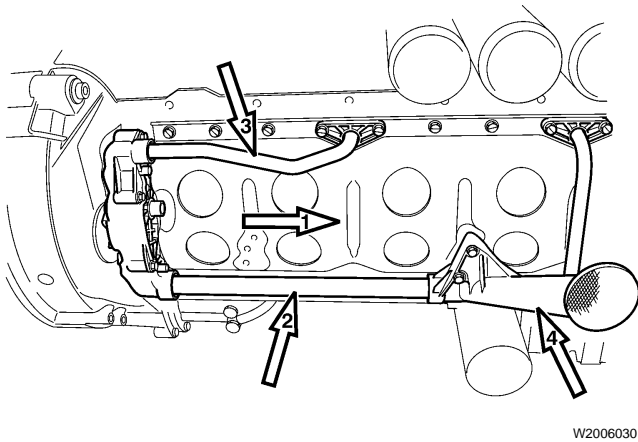
**Note:** Make sure the bearing caps are correctly fitted (see markings on the cap).

12

Check crankshaft end play with a dial indicator. See Specifications.

13

Install the oil pump on the main bearing cap. Torque tighten the bolts in accordance with the "Specifications" (see Group 20).



**14**

Install the reinforcement frame. Use new fasteners.



**WARNING**

The reinforcement frame has sharp edges. To prevent personal injury, use protective gloves!

- 1 Torque tighten the reinforcement frame bolts according to the diagram (See "Specifications" group 20).
- 2 Install the oil pick-up tube with new fasteners and gaskets.
- 3 Install the pressure pipe to the pump with new fasteners and gaskets.
- 4 Install the pipe and strainer to the reinforcement frame with new gaskets.

**Note:** Use thread lock on the fasteners.

**15**

Remove the cranking tool and reinstall the plug in the flywheel housing.