

**Figure 353** Installing the crankshaft assembly

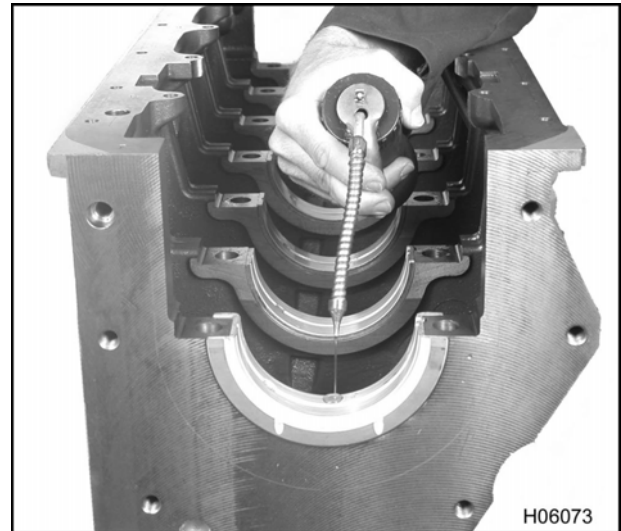
10. Using an appropriate lifting sling, carefully lower the crankshaft onto the main bearing inserts in the crankcase.

**NOTE:** Do not install the main bearing caps and lower bearing inserts at this time.

11. Rotate the crankshaft 180 degrees ( $\frac{1}{2}$  turn).
12. Carefully remove the crankshaft and inspect the upper bearing inserts for an even transfer of bluing agent from the journals to the bearings.

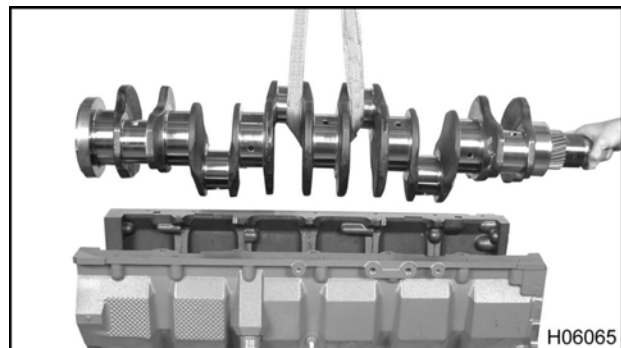
**NOTE:** If voids appear in the bluing transfer, crankcase integrity is considered questionable.

13. If the crankcase is not damaged and is free of distortion and burrs around upper bearing insert seats, then clean all Prussian Blue™ from the bearings and crankshaft journals.



**Figure 354** Lubricating the upper main bearing inserts

14. Lubricate the upper main bearing inserts with clean engine oil.

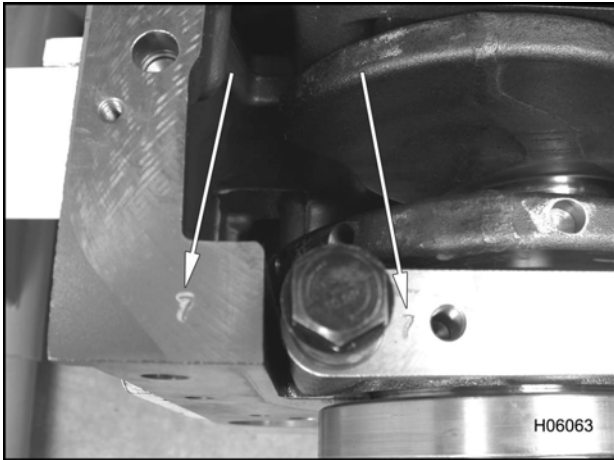


**Figure 355** Installing the crankshaft assembly

15. Using an appropriate lifting sling, carefully lower the crankshaft onto the main bearings.

### Bearing Fitting Procedure

1. Install a new bearing insert into the bearing cap, as required. The bearing surface of the bearing caps must be free of oil. Do not lubricate the backside of the bearing inserts. Make sure the locking tangs on the bearing inserts are snapped into the bearing cap notch.



**Figure 356 Main bearing cap identification stamps**

2. Align each main bearing cap with its identification stamp.
3. Check bearing clearance as follows:
  - a. Clean the bearing surface and the exposed half of the crankshaft journal. Make sure these surfaces are free of oil.
  - b. Install the lower inserts and bearing caps. Oil the threads of new main bearing bolts with clean engine oil.
  - c. Torque bolts in the following steps in a circular pattern.

**NOTE:** This two step torque procedure to 177 N·m (130 lbf·ft), simply checks bearing fit and will not permanently stretch the new main bearing bolts. Do not follow the torque-to-yield procedure until final assembly.

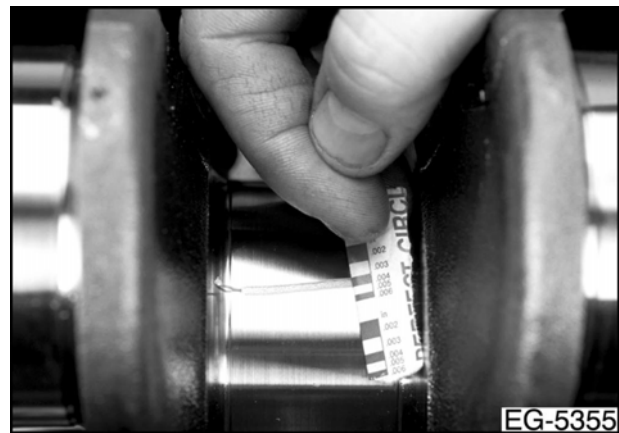
1. Tighten each main bearing bolt to 136 N·m (100 lbf·ft) using the recommended torque sequence (Figure 359).
2. Tighten each main bearing bolt to 177 N·m (130 lbf·ft) using the recommended torque sequence (Figure 359).
- d. Remove one bearing cap and insert at a time. Leave the remaining caps tight while checking the fit of the bearing with the cap removed.

- e. Wipe oil from all contact surfaces of the exposed journal, bearing insert and cap that is removed.
- f. Place a piece of Plastigage® across the full width of the bearing surface on the crankshaft journal (or bearing insert) approximately 6 mm (¼ in) off center. Install the bearing cap and tighten the cap bolt to 177 N·m (130 lbf·ft).

**NOTE:** Do not turn the crankshaft.

**NOTE: In chassis service only:** When bearing oil clearance is checked, the crankshaft will have to be supported and held against the upper main bearing halves to get a correct Plastigage® reading. Use a jack at the crankshaft counterweight nearest to each main bearing being checked to apply local support. Failure to support the crankshaft will result in inaccurate readings.

- g. Remove the bearing cap and insert.
- h. Do not disturb the Plastigage®. Use the scale on the Plastigage® envelope to measure the widest point of the flattened Plastigage®. This reading indicates the bearing clearance in thousandths of an inch or millimeters.



**Figure 357 Measuring Plastigage®**