



# Service Repair Manual

## **Models**

# 160H ES Motor Grader

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Product: MOTOR GRADER

Model: 160H ES MOTOR GRADER 2HS

Configuration: 160H Motor Grader 2HS00001-UP (MACHINE) POWERED BY 3306 Engine

## Disassembly and Assembly 3304B and 3306B Engines for Caterpillar Built Machines

Media Number -SEN5598-09

Publication Date -01/01/2013

Date Updated -25/01/2013

i00976704

# Pistons and Connecting Rods - Install

SMCS - 1225-012

## Installation Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	5P-3525	Piston Ring Compressor	1

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### NOTICE

**Keep all parts clean from contaminants.**

**Contaminants may cause rapid wear and shortened component life.**

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1. Rotate the crankshaft until the bearing journals are at the bottom center. The bearing journals that are at the bottom center are for the piston installation.
  2. Put clean engine oil on the crankshaft journals and on the inside of the cylinder liners. Put clean engine oil on the piston rings and the connecting rod bearings.
  3. Move the piston rings on the pistons until the ring openings are separated by approximately 120 degrees.
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Illustration 1

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4. Put the piston in the cylinder liner with the "V" mark on the piston in alignment with the "V" mark on the cylinder block. Put tool (A) in position on the cylinder block and compress the piston rings.

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### NOTICE

**The "V" mark must be visible on the piston and the cylinder block. If the "V" mark is not visible, the piston must be installed with the relief for the valve positioned toward the pushrod opening in the cylinder block. Damage may result if the pistons are not installed properly.**

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5. Push the piston into the cylinder liner and out of the ring compressor.

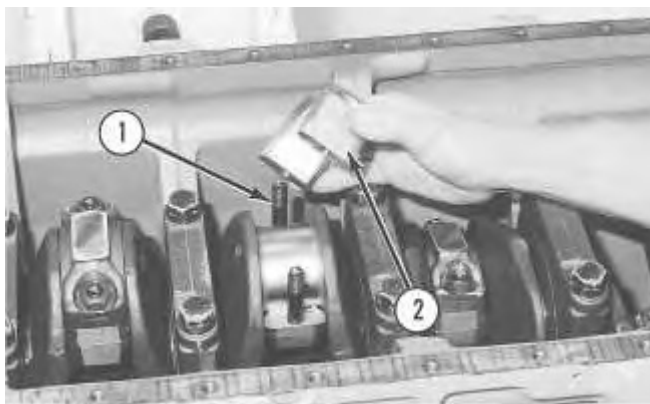


Illustration 2

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6. Guide connecting rod (1) into position on the crankshaft.
7. Put clean engine oil (SAE 30) on the lower half of the connecting rod bearing and on the connecting rod bolts.

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## NOTICE

**When the connecting rod caps are installed, ensure that the identification marks are aligned.**

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8. Install connecting rod cap (2) and the nuts that secure the connecting rod cap. Torque both of the nuts to  $40 \pm 4$  N·m ( $30 \pm 3$  lb ft). Mark the position of the nuts. Tighten each nut for an additional 90 degrees (1/4 turn).
9. Repeat Steps 1 through 8 for the remainder of the piston and connecting rods.

### End By:

- a. Install the engine oil pump. Refer to Disassembly and Assembly, "Engine Oil Pump - Install".
- b. Install the engine oil pan plate. Refer to Disassembly and Assembly, "Engine Oil Pan Plate - Remove and Install".
- c. Install the spacer plate. Refer to Disassembly and Assembly, "Spacer Plate - Remove and install".

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# Connecting Rod Bearings - Remove

SMCS - 1219-011

## Removal Procedure

### Start By:

- A. Remove the engine oil pump. Refer to Disassembly and Assembly, "Engine Oil Pump - Remove".
- B. Remove the oil pan plate. Refer to Disassembly and Assembly, "Engine Oil Pan Plate - Remove and Install".

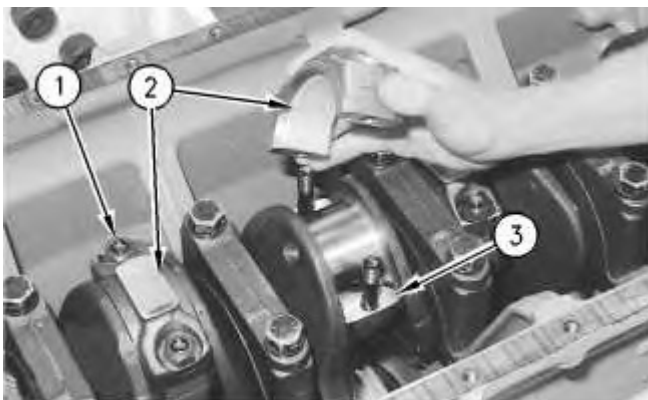
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### NOTICE

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