

Product: EXCAVATOR

Model: 311D LRR EXCAVATOR LKA

Configuration: 311D LRR Excavator LKA00001-UP (MACHINE) POWERED BY C4.2 Engine

## Disassembly and Assembly

### C4.2 Engine for Caterpillar Built Machines

Media Number -KENR8105-04

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i02767700

## Inlet and Exhaust Valve Springs - Remove and Install

SMCS - 1108-010

### Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	9U-6195	Valve Spring Compressor	1
B	9U-6198	Crankshaft Turning Tool	1

#### Start By:

- Remove the rocker shaft assembly. Refer to Disassembly and Assembly, "Rocker Shaft and Pushrod - Remove".
- Remove the valve mechanism cover base. Refer to Disassembly and Assembly, "Valve Mechanism Cover Base - Remove and Install".

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### NOTICE

**Keep all parts clean from contaminants.**

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

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**Note:** The following procedure should be adopted in order to remove the valve springs when the cylinder head is installed to the engine.

**Note:** Ensure that the appropriate piston is at top dead center before the valve spring is removed. Failure to ensure that the piston is at top dead center may allow the valve to drop into the cylinder bore.

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## NOTICE

**Plug the apertures for the push rods in the cylinder head in order to prevent the entry of loose parts into the engine.**

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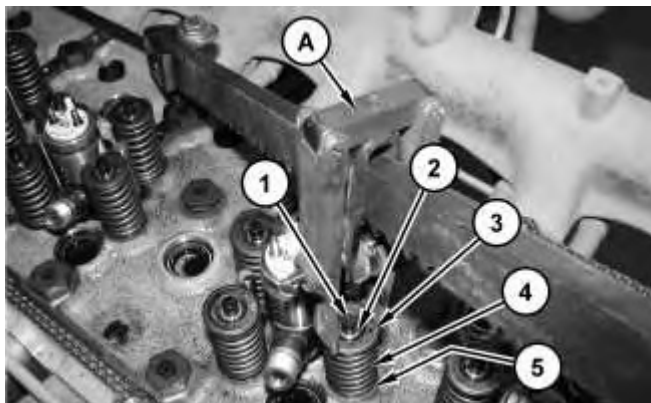


Illustration 1

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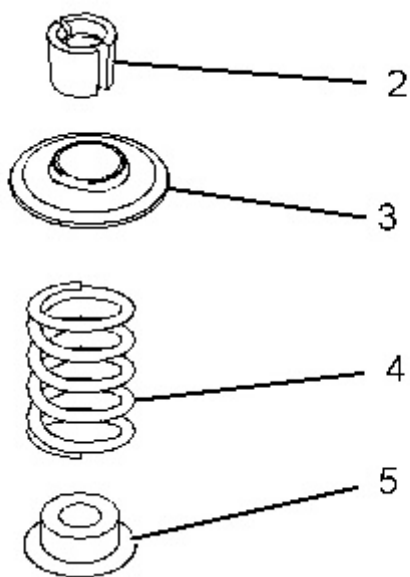


Illustration 2

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## WARNING

**Personal injury can result from being struck by parts propelled by a released spring force.**

**Make sure to wear all necessary protective equipment.**

**Follow the recommended procedure and use all recommended tooling to release the spring force.**

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## NOTICE

**Ensure that the valve spring is compressed squarely or damage to the valve stem may occur.**

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1. Install Tooling (A) into position on the cylinder head in order to compress a valve spring (4) for the appropriate piston.
2. Use Tooling (A) in order to compress valve spring (4) and open valve (1) slightly.

**Note:** Do not compress valve spring (4) so that valve spring retainer (3) touches valve stem seal (5) .

3. Use Tooling (B) in order to rotate the crankshaft carefully, until the piston touches the valve.

**Note:** Do not use excessive force to turn the crankshaft. The use of force can result in bent valve stems.

4. Continue to rotate the crankshaft and gradually release the pressure on Tooling (A) until the piston is at the top dead center position. The valve is now held in a position that allows valve spring (4) to be safely removed.

**Note:** Valve springs must be replaced in pairs for the inlet valve or the exhaust valve of each cylinder. If all valve springs require replacement the procedure can be carried out on two cylinders at the same time. The procedure can be carried out on the following pairs of cylinders. 1 with 4 and 2 with 3. Ensure that all of the valve springs are installed before changing from one pair of cylinders to another pair of cylinders.

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## NOTICE

**Do not turn the crankshaft while the valve springs are removed.**

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5. Apply sufficient pressure to Tooling (A) in order to allow removal of valve keepers (2) .

**Note:** Do not compress valve spring (4) so that valve spring retainer (3) touches valve stem seal (5) .

Remove valve keepers (2) .

6. Slowly release the pressure on Tooling (A).
7. Remove valve spring retainer (3) and remove valve spring (4) .
8. If necessary, remove valve stem seals (5) .
9. Remove Tooling (A) .

**Note:** The installation of each set of valve springs (4) must be completed before attempting to remove the next set of valve springs (4) .

## Installation Procedure

Table 2

Required Tools			
Tool	Part Number	Part Description	Qty
A	9U-6195	Valve Spring Compressor	1

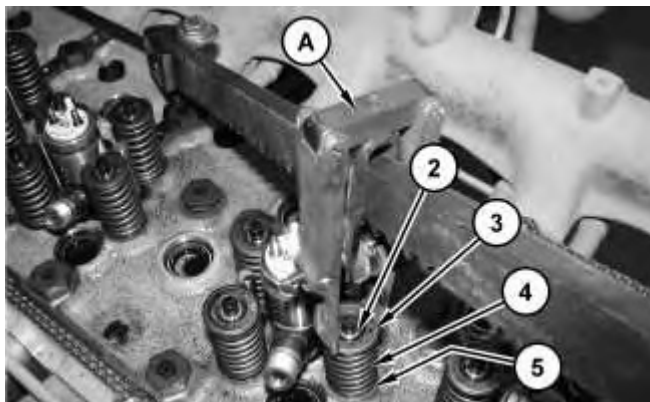
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### NOTICE

**Keep all parts clean from contaminants.**

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

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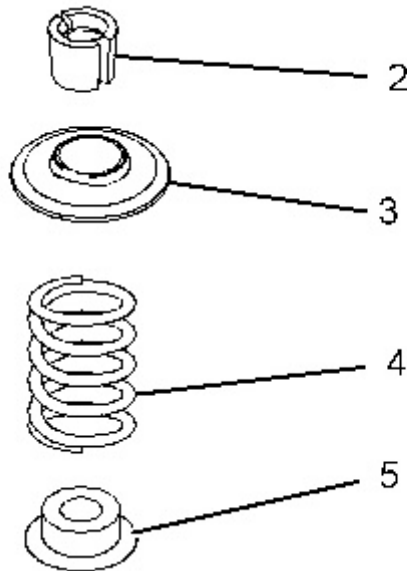


Illustration 4

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## WARNING

**Improper assembly of parts that are spring loaded can cause bodily injury.**

**To prevent possible injury, follow the established assembly procedure and wear protective equipment.**

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1. The outer face of the valve guides must be clean and dry before installing the valve stem seal (5). Install new valve stem seal (5) onto the valve guide.
2. Install valve spring (4) onto the cylinder head. Position valve spring retainer (3) on valve spring (4) .
3. Install Tooling (A) in the appropriate position on the cylinder head in order to compress valve spring (4) .
4. Apply sufficient pressure to Tooling (A) in order to install valve keepers (2). Do not compress valve spring (4) so that valve spring retainer (3) touches valve stem seal (5) .
5. Carefully release the pressure on Tooling (A) .

### **End By:**

- a. Install the valve mechanism cover base. Refer to Disassembly and Assembly, "Valve Mechanism Cover Base - Remove and Install".

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