



# Service Repair Manual

## **Models**

320D2 and 320D2 L Excavator

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Product: EXCAVATOR

Model: 320D2 L EXCAVATOR RAR

Configuration: 320D2 & 320D2 L Excavators RAR00001-UP (MACHINE) POWERED BY C7.1 Engine

## Disassembly and Assembly C7.1 (Mech) Engines for Caterpillar Built Machines

Media Number -UENR0674-08

Publication Date -01/06/2015

Date Updated -23/01/2017

i07450509

# 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
	416-0292	Adapter	1
	416-0288	Head	1
B <sup>(1)</sup>	9U-6198	Crankshaft Turning Tool	1
B <sup>(2)</sup>	9U-7336	Housing	1
	5P-7305	Engine Turning Tool	1

<sup>(1)</sup> The Crankshaft Turning Tool is used on the front pulley.

<sup>(2)</sup> This Tool is used in the aperture for the electric starting motor.

### Start By:

- a. Remove the rocker Shaft and Pushrod.

**Note:** Either Tooling (B) can be used. Use the Tooling that is most suitable.

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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 to remove the valve springs when the cylinder head is installed to the engine. Refer to Disassembly and Assembly, "Inlet and Exhaust Valves - Remove and Install" for the procedure to remove the valve springs from a cylinder head that has been removed from 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 to prevent the entry of loose parts into the engine.**

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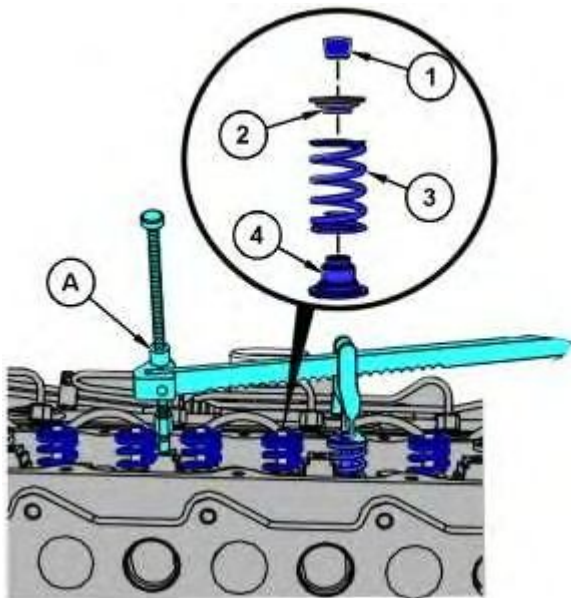


Illustration 1

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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. Follow Step 1.a through Step 1.d to position the appropriate piston at top dead center.
  - a. Install Tooling (A) in position on the cylinder head to compress a valve spring (3) for the appropriate cylinder.
  - b. Use Tooling (A) to compress valve spring (3) and open the valve slightly.

**Note:** Do not compress valve spring (3) so that valve spring retainer (2) touches valve stem seal (4).
  - c. Use Tooling (B) 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.
  - d. 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 (3) to be safely removed.

**Note:** Valve springs (3) must be replaced in pairs for the inlet valve or the exhaust valve of each cylinder. If all valve springs (3) 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 6, 2 with 5 and 3 with 4. Ensure that all valve springs (3) 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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2. Apply sufficient pressure to Tooling (A) to allow removal of valve keepers (1). Remove valve keepers (1).

**Note:** Do not compress the valve spring so that the valve spring retainer touches the valve stem seal.
3. Slowly release pressure on Tooling (A).

4. Remove valve spring retainer (2).
5. Remove valve spring (3).
6. If necessary, remove valve stem seals (4).

**Note:** The inlet and exhaust valve stem seals are different, the valve stem seals are denoted by the color. Identify the position of the different color valve stem seals for installation purposes.

7. Repeat Step 2 through Step 6 to remove the remaining valve springs (3) from the appropriate cylinder.
8. Remove Tooling (A).

## Installation Procedure

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### NOTICE

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

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### NOTICE

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

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### NOTICE

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

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