



# Service Repair Manual

## **Models**

303.5E2 Mini Hydraulic  
Excavator

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Product: MINI HYD EXCAVATOR

Model: 303.5E2 MINI HYD EXCAVATOR JWY

Configuration: 303.5E2 Mini Hydraulic Excavator JWY00001-UP (MACHINE) POWERED BY C1.7 Engine

## Disassembly and Assembly

### C1.7, C1.8 and C2.4 Tier 4 Interim and EU Stage 3A Engines for Caterpillar Built Machines

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## Inlet and Exhaust Valve Springs - Remove and Install

SMCS - 1108-010

### Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	7F-4292	Valve Spring Compressor	1
	9U-6144	Adapter	1

#### Start By:

- a. Remove the rocker shaft and push rod.

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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. 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.

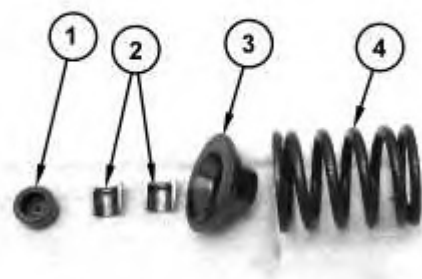
**Note:** Ensure that the appropriate piston is at top dead center before the valve spring is removed. Failure to ensure that the piston is at top dead center may allow the valve to drop into the cylinder bore.



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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. Follow Step 1.a through Step 1.d in order to position the appropriate piston at top dead center.

a. Install Tooling (A) in position on the cylinder head in order to compress a valve spring (4) for the appropriate piston.

b. Use Tooling (A) in order to compress valve spring (4) and open the valve slightly.

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

c. 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 the valve spring to be safely removed.

**Note:** 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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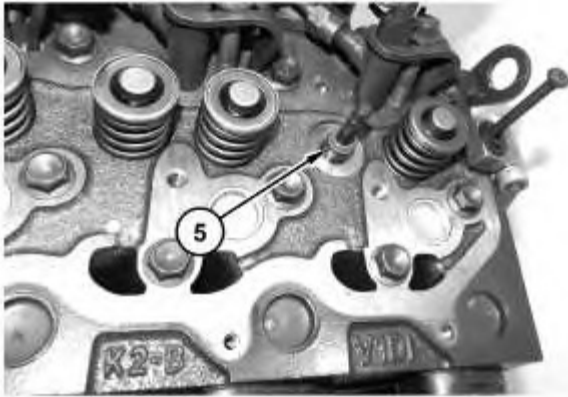
2. Remove valve cap (1). Apply sufficient pressure to Tooling (A) in order to allow removal of valve keepers (2).

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

3. Slowly release pressure on Tooling (A).

4. Remove valve spring retainer (3) and remove valve spring (4).

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Illustration 3

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5. Remove Tooling (A).
6. Remove valve stem seals (5).
7. Repeat Step 2 through Step 5 in order to remove the remaining valve springs from the appropriate cylinder.

## Installation Procedure

1. Install the inlet and exhaust valve springs (4) in the reverse order of removal.
  - a. Inspect valve springs (4) for damage and for the correct length. Refer to Specifications, "Cylinder Head Valves " for further information.

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