



# Service Repair Manual

## **Models**

# D4HTSK II TRACK SKIDDER

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Product: TRACK SKIDDER

Model: D4HTSK II TRACK SKIDDER 8ZF

Configuration: D4H Track-Type Skidder Series II 8ZF00001-UP (MACHINE) POWERED BY 3204 Engine

## Disassembly and Assembly

### 3304 MACHINE ENGINE FOR D4H SERIES III AND D5H SERIES II TRA

Media Number -SEN3253-01

Publication Date -01/09/1992

Date Updated -20/07/2010

SEN32530023

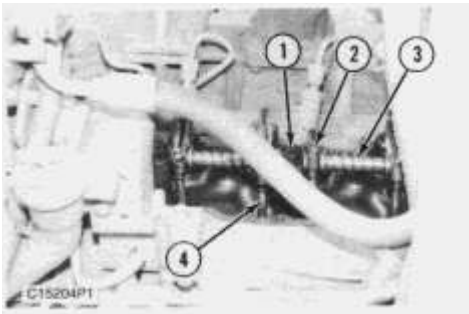
## Rocker Shaft Assembly And Push Rods

SMCS - 1102-015; 1102-016; 1102; 1208-011; 1208-012

## Remove Rocker Shaft Assembly And Push Rods

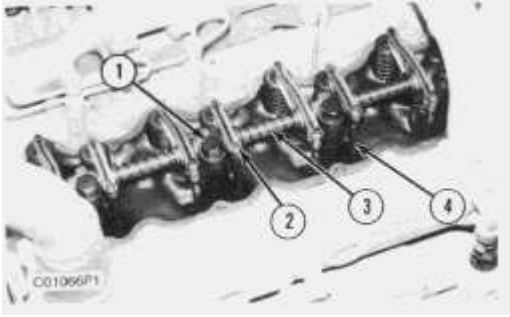
Start By:

- a. remove valve cover



1. Loosen adjusting screws (2), and remove four bolts (1) and the washers from the rocker shaft assembly.
2. Remove rocker shaft assembly (3) from the cylinder head assembly.
3. Remove eight push rods (4) from the engine. Put identification marks on the push rods as to their location in the engine.

## Install Rocker Shaft Assembly And Push Rods



Typical Example

1. Install push rods (4) in their original location in the cylinder block, and in the valve lifters.

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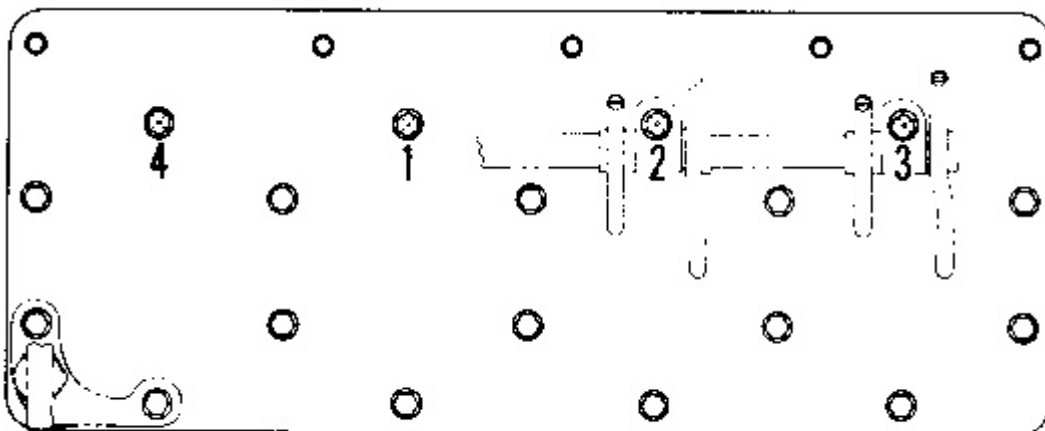
### NOTICE

**Loosen adjusting screws (2) that are used to set the valve clearance.  
This will prevent a bent valve or push rod during installation.**

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**NOTE:** Make sure the O-ring seal in the rear rocker arm support bracket is not damaged when the rear bolt is installed in the support bracket.

2. Install a new O-ring seal in the rear rocker arm support bracket. Put **2P2506 Thread Lubricant** on all of the bolts that hold the rocker shaft assembly in position except for the bolt that goes through the rear rocker arm support bracket.
3. Put rocker shaft assembly (3) in position on the engine. Make sure the dowels located in the support brackets are in alignment with the dowel holes in the cylinder head assembly. Make sure the rocker arms are engaged with the push rods.
4. Install four bolts (1) and washers that hold the rocker shaft assembly in position, and tighten them until they are finger tight.



77078P3

5. Tighten the bolts that hold the rocker shaft assembly as follows:

**<https://www.ebooklibonline.com>**

Hello dear friend!

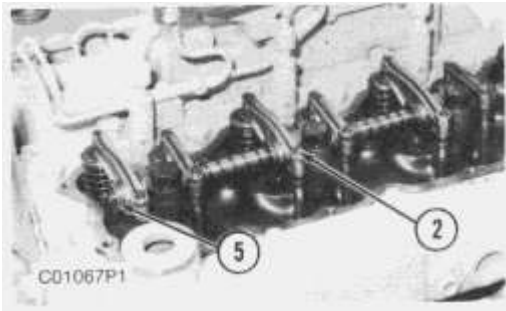
Thank you very much for reading.

Enter the link into your browser.

The full manual is available for immediate download.

**<https://www.ebooklibonline.com>**

- a. Tighten the bolts in number sequence to a torque of **155 N·m (115 lb ft)**.
- b. Tighten the bolts in number sequence to a torque of **250 ± 17 N·m (185 ± 13 lb ft)**.
- c. Tighten the bolts in number sequence to a torque (hand torque only) to **250 ± 17 N·m (185 ± 13 lb ft)**.



Typical Example

6. The assembled length of springs (5) at both ends of the rocker shaft assembly must be **1.50 ± 0.25 mm (.059 ± .010 in)**. Remove or install the washers behind the springs to obtain the correct assembled length of the springs.

7. Make an adjustment to the valves until the intake valve clearance is **0.38 mm (.015 in)** and the exhaust valve clearance is **0.64 mm (.025 in)**. Tighten the nuts on adjustment screws (2) to a torque of **29 ± 7 N·m (21 ± 5 lb ft)**. For the complete valve adjustment procedure, see Valve Clearance in Testing And Adjusting.

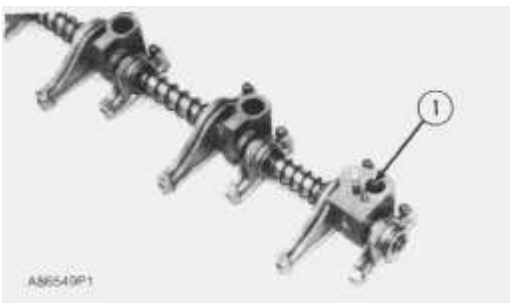
End By:

- a. install valve cover

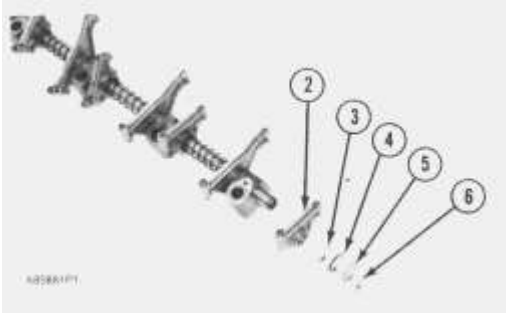
## Rocker Shaft Assembly Disassemble

Start By:

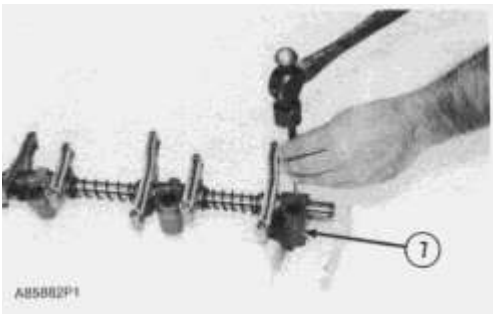
- a. remove rocker shaft assembly and push rods



1. Remove O-ring seal (1) from the rear support bracket. A replacement of the O-ring seal must be made each time the head bolt is removed from the rear support bracket.



2. Remove retainer ring (6), washer (5), spring (4) and washers (3) from each end of the rocker shaft. Make a note of the number of washers (3) used at each end of the shaft. Remove rocker arms (2) from each end of the rocker shaft. All the rocker arms, springs, washers and brackets, except the rear support bracket, can be removed from the shaft.

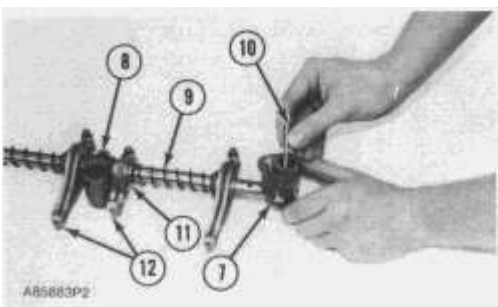


3. Remove the pin from the rear support bracket with a hammer and punch. Remove rear support bracket (7) from the shaft.

4. Remove remainder of the rocker arms, springs, washers and brackets from the shaft.

5. Remove the plugs from each end of the shaft if necessary.

## Assemble Rocker Shaft Assembly



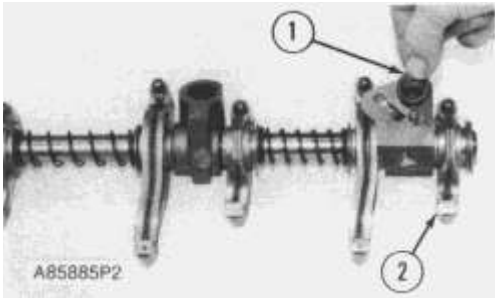
1. Install rocker arms (12), brackets (8), washers and springs (9) on the rocker shaft.

2. Install rear support bracket (7) on the rocker shaft. Make sure the hole in the rear support bracket is in alignment with the hole in the rocker shaft.

3. Put pin (10) in position in the bracket.



4. Install pin (3) through the bracket and shaft with a hammer.
5. Pin (3) must extend **9.60 mm (.378 in)** above the bracket.



6. Install O-ring seal (1) in the rear support bracket. Install rocker arm (2) the original number of washers, the spring, the washer and the retainer ring on the rocker shaft.
7. Install the front support, rocker arm, original number of washers, the spring, the washer and the retainer ring on the rocker shaft.
8. Install the plugs in each end of the rocker shaft, if they were removed.

End By:

- a. install rocker shaft assembly and push rods

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Configuration: D4H Track-Type Skidder Series II 8ZF00001-UP (MACHINE) POWERED BY 3204 Engine

## Disassembly and Assembly

### 3304 MACHINE ENGINE FOR D4H SERIES III AND D5H SERIES II TRA

Media Number -SEN3253-01

Publication Date -01/09/1992

Date Updated -20/07/2010

SEN32530024

## Cylinder Head Assembly

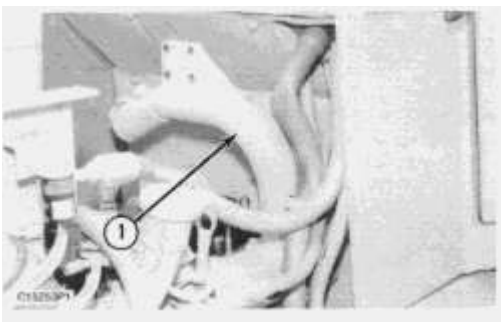
SMCS - 1100-011; 1100-012

### Remove Cylinder Head Assembly

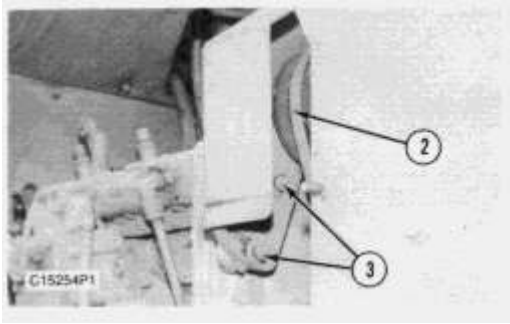
| Tools Needed |              | A |
|--------------|--------------|---|
| 5P9736       | Link Bracket | 3 |

Start By:

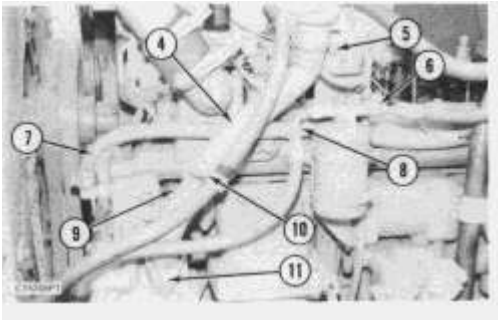
- a. remove exhaust manifold
- b. remove valve cover
1. Drain the coolant from the cooling system.



2. Remove the four bolts, gasket and elbow (1) from the cylinder head assembly.



**3.** Loosen bolts (3) and remove v-belt (2) from the belt tightener.



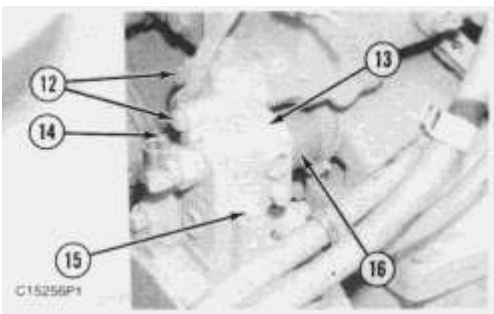
**4.** Remove bolts (5), (10) and (11), and remove oil filler tube (4) from the engine.

**5.** Loosen the hose clamp, and remove hose (7) from the elbow.

**6.** Remove the bolt and clip (8) that holds hose (7) to the cylinder head assembly.

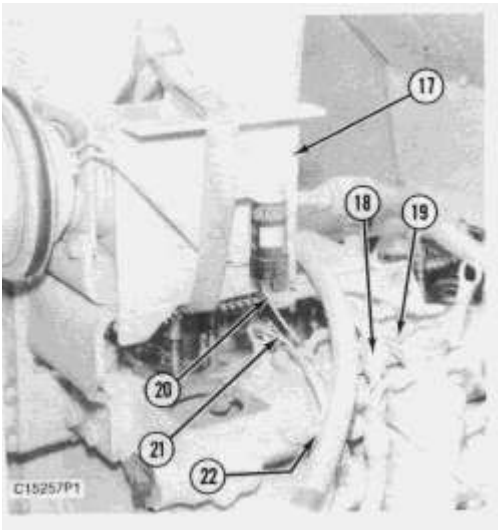
**7.** Remove bolt (6) that holds the dipstick tube assembly to the cylinder head assembly.

**8.** Loosen hose clamp (9).

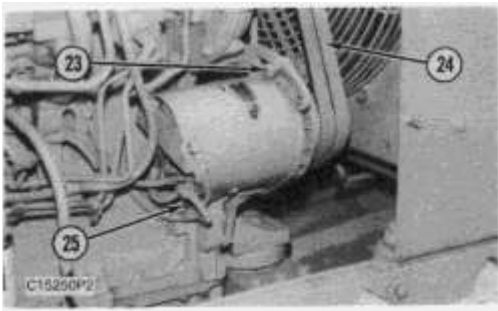


**9.** Remove bolts (12), (14) and (15), and remove the gaskets and elbow (13) from the water pump, cylinder head assembly and hose (16).

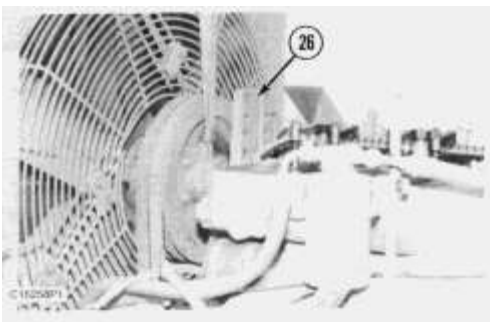
**10.** Remove the water temperature regulator. See the topic, Remove Water Temperature Regulator, in this module.



11. Attach a nylon strap and hoist around the air conditioning compressor and bracket (17). Remove the four bolts, and set the air conditioning compressor on the side of the tractor, (do not disconnect hoses).
12. Mark and remove two wires (19), two wires (21) and wire (22).
13. Disconnect wire harness (18).
14. Disconnect line (20) from the air filter service indicator.



15. Loosen bolts (23) and (25), and release the tension on v-belts (24).



16. Install a nylon strap and hoist to support fan and fan drive assembly (26) as shown. Remove the four bolts that hold the fan drive to the cylinder head assembly. Rest the fan against the radiator cores and on the lower fan guards.

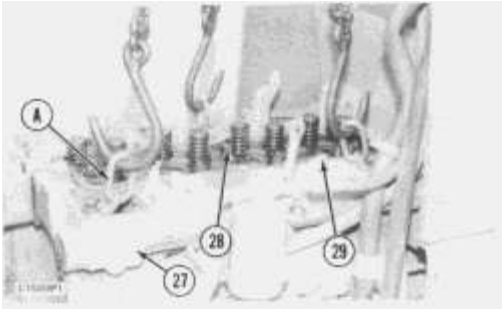
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**NOTICE**

**Care must be taken when unbolting the fan drive and also when positioning the fan against the radiator, that no damage to the radiator occurs.**

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**17.** Remove the rocker shaft and push rods. See the topic, Remove Rocker Shaft And Push Rods in this module.



**18.** Remove all bolts (28) and (29) that hold the cylinder head assembly to the cylinder block.

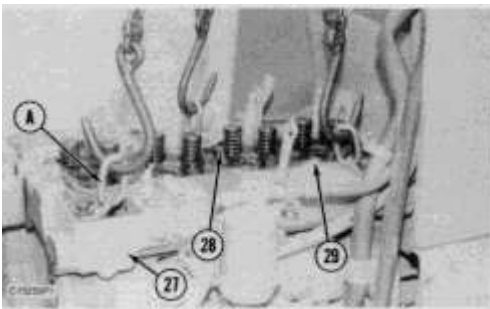
**19.** Install tooling (A) and a hoist on cylinder head assembly (27), and remove the cylinder head assembly from the engine. The weight of the cylinder head assembly is approximately **68 Kg (150 lb)**.

**20.** Remove the spacer plate. See the topic, Remove Spacer Plate in this module.

## **Install Cylinder Head Assembly**

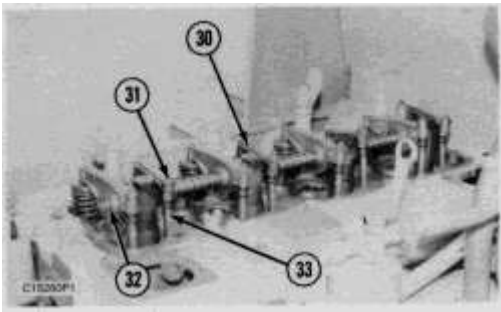
| <b>Tools Needed</b> |                     | <b>A</b> |
|---------------------|---------------------|----------|
| <b>5P9736</b>       | <b>Link Bracket</b> | <b>3</b> |

**1.** Install the spacer plate. See the topic, Install Spacer Plate in this module.

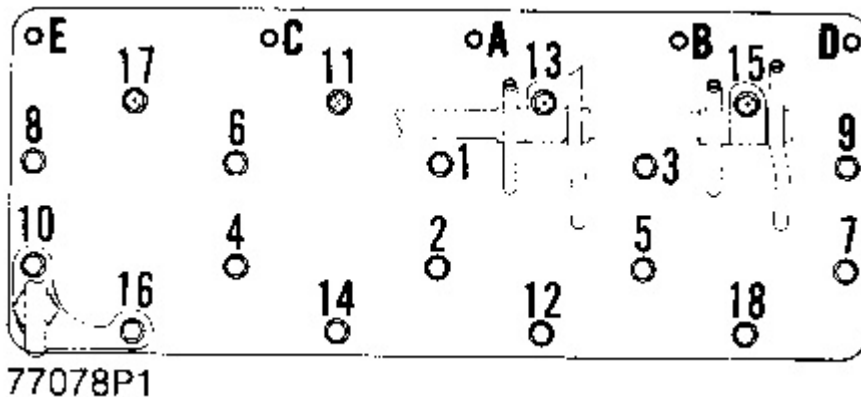


**2.** Install tooling (A) on the cylinder head assembly, and fasten a hoist to it. Put the cylinder head assembly in position on the engine.

**3.** Put **2P2506 Thread Lubricant** on all cylinder head bolts (28) and (29), and install them until they are finger tight. Remove tooling (A) from the engine.

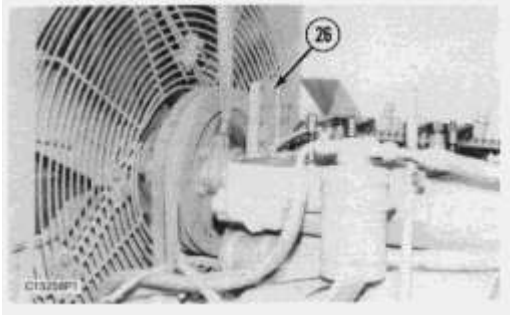


4. Install push rods (33). Make sure they are installed in their original locations. Be sure the push rods are in position in the valve lifters.
5. Loosen the adjusting screws on the rocker arms for valve clearance. This will prevent a bent valve or push rod during installation of the rocker shaft assembly,
6. Install a new O-ring seal in the rear rocker arm support bracket.
7. Put **2P2506 Thread Lubricant** on all of the rocker shaft bolts except the one that goes through the rear rocker arm support bracket.
8. Put rocker shaft assembly (30) in position on the cylinder head assembly. Make sure the dowels in the support brackets are in the dowel holes in the cylinder head assembly and the rocker arms are engaged with the push rods. Install the bolts that hold the rocker shaft assembly until they are finger tight.



9. Hand tighten the large size cylinder head and rocker shaft bolts in the numbered sequence shown as follows:
  - a. Tighten the bolts in the numbered sequence to a torque of **156 N·m (115 lb ft)**.
  - b. Tighten the bolts in the numbered sequence to a torque of **250 ± 17 N·m (185 ± 13 lb ft)**.
  - c. Tighten the bolts in the numbered sequence again to a torque of **250 ± 17 N·m (185 ± 13 lb ft)**.
10. Hand tighten the small size cylinder head bolts, in the lettered sequence shown to a torque of **43 ± 7 N·m (32 ± 5 lb ft)**.
11. The assembled length of springs (32) at both ends of the rocker shaft assembly must be **1.50 ± 0.25 mm (.059 ± .010 in)**. Remove or install the washers behind the springs to obtain the correct assembled length of the springs.

12. Make an adjustment to the valves until the intake valve clearance is **0.38 mm (.015 in)** and the exhaust valve clearance is **0.64 mm (.025 in)**. Tighten the nuts on adjustment screws (31) to a torque of  **$29 \pm 7 \text{ N}\cdot\text{m}$  ( $21 \pm 5 \text{ lb ft}$ )**. For the complete valve adjustment procedure, see Valve Clearance in Testing And Adjusting.



13. Use a nylon strap and hoist to position fan and fan drive assembly (26) on the engine, and install the four bolts that hold it in place.

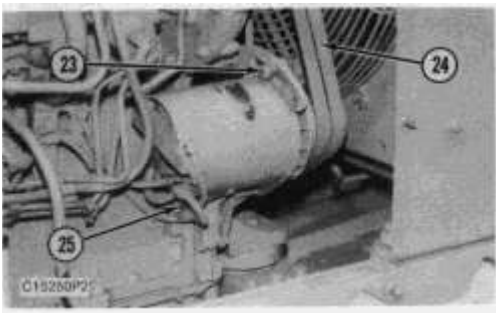
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### NOTICE

**Care must be taken when lifting the fan and fan drive assembly away from the radiator so that the radiator is not damaged.**

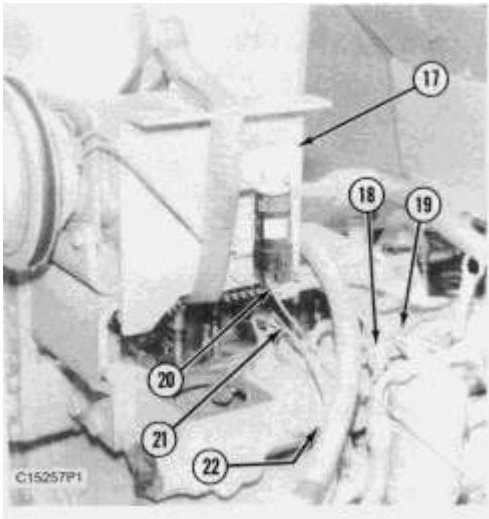
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14. Position the v-belts on the fan drive pulley.



15. Position v-belts (24) on the alternator pulley.

16. Use a belt tension gauge such as a **Burroughs BT-33-72 C gauge** to check the belt tension. Adjust a new belt set to a gauge reading of  **$534 \pm 22 \text{ N}$  ( $120 \pm 5 \text{ lb}$ )**. Adjust a used belt set to a gauge reading of  **$400 \pm 44 \text{ N}$  ( $90 \pm 10 \text{ lb}$ )**. Tighten bolts (23) and (25).

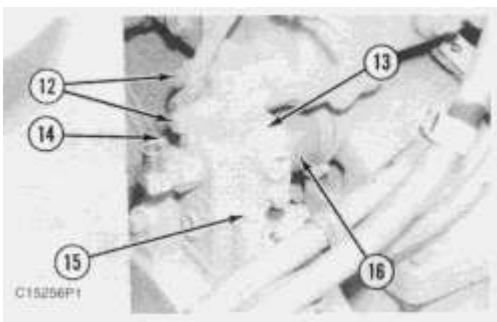


**17.** Connect wire harness (18).

**18.** Connect line (20) to the air filter service indicator.

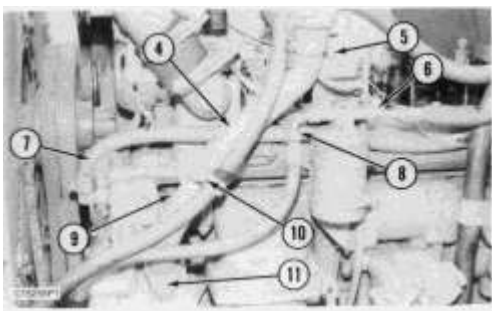
**19.** Connect two wires (19), two wires (21) and wire (22).

**20.** Use a nylon strap and hoist to position the air conditioning compressor and bracket (17) on the cylinder head assembly. Install the four bolts that hold it in place.



**21.** Install the water temperature regulator. See the topic, Install Water Temperature Regulator, in this module.

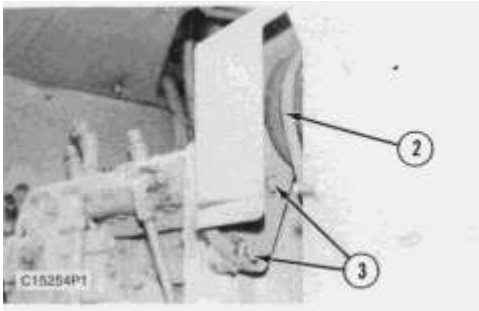
**22.** Install the gaskets and elbow (13) on the water pump, cylinder head assembly and hose (16). Install bolts (12), (14) and (15) that hold the elbow in place.



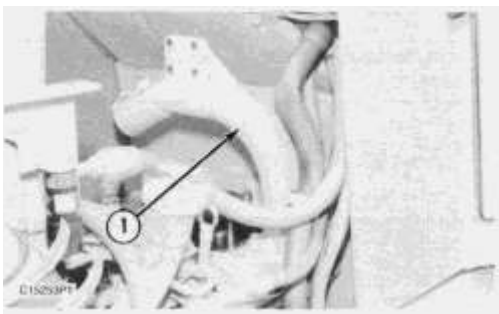
**23.** Tighten hose clamp (9).

**24.** Position the clip on the dipstick tube assembly, and install bolt (6) that holds it to the cylinder head assembly.

25. Install clip (8) and the bolt that holds hose (7) to the cylinder head assembly.
26. Install hose (7) on the elbow, and tighten the hose clamp.
27. Position oil filler tube (4) on the engine, and install bolts (5), (10) and (11) that hold it.



28. Put v-belt (2) in position on the air conditioning compressor pulley, the crankshaft pulley and the belt tightener pulley.
29. Use a belt tension gauge such as a **Burroughs BT-33-97 gauge** to check the tension of the V-belt. The gauge reading for a new belt should be **534 ± 22 N (120 ± 5 lb)**. The gauge reading for a used belt should be **400 ± 44 N (90 ± 10 lb)**. Tighten bolts (3).



30. Install the gasket, elbow (1) and the four bolts that hold it.
31. Fill the cooling system with coolant to the correct level. See the Maintenance Guide.

End By:

- a. install valve cover
- b. install exhaust manifold

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Product: TRACK SKIDDER

Model: D4HTSK II TRACK SKIDDER 8ZF

Configuration: D4H Track-Type Skidder Series II 8ZF00001-UP (MACHINE) POWERED BY 3204 Engine

## Disassembly and Assembly

### 3304 MACHINE ENGINE FOR D4H SERIES III AND D5H SERIES II TRA

Media Number -SEN3253-01

Publication Date -01/09/1992

Date Updated -20/07/2010

SEN32530025

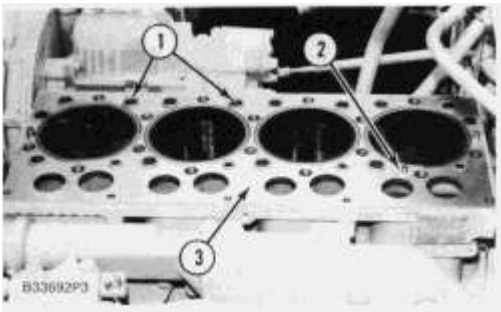
## Spacer Plate

SMCS - 1221-011; 1221-012

### Remove Spacer Plate

Start By:

- a. remove cylinder head



Typical Example

1. Remove water seals (1) and O-ring seals (2) from the spacer plate.

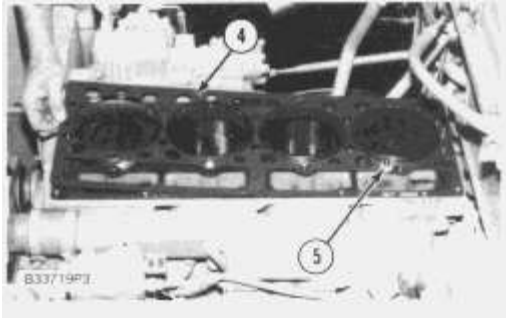
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#### NOTICE

**Do not damage the dowels as the spacer plate is removed.**

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2. Remove spacer plate (3).

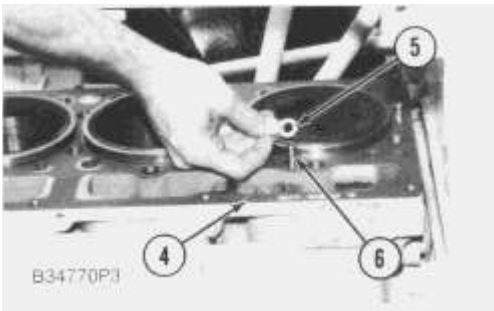


Typical Example

3. Remove O-ring seal (5) and spacer plate gasket (4) from the cylinder block.

## Install Spacer Plate

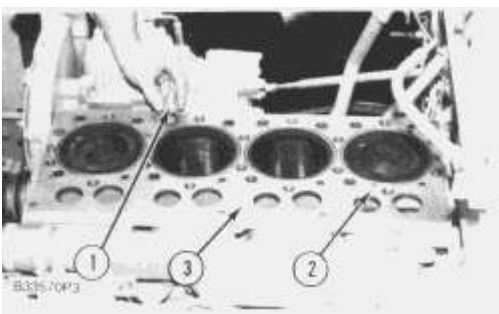
1. Thoroughly clean the spacer plate, cylinder head assembly and cylinder block surfaces.



Typical Example

**NOTE:** If dowel (6) was removed for any reason, install a new dowel until it extends  $16.0 \pm 0.5$  mm ( $.63 \pm .02$  in) from the cylinder block.

2. Install a new spacer plate gasket (4).
3. Install a new O-ring seal (5) on dowel (6) against the cylinder block.



Typical Example

**NOTE:** Both surfaces of the spacer plate, the top of the cylinder block and both sides of the spacer plate gasket must be clean and dry. Do not use any gasket adhesive or other substance on these surfaces.

4. Install spacer plate (3).

5. Check the cylinder liner projection. See the topic, Install Cylinder Liners, in this module.
6. Install new O-ring seal (2) on top of the spacer plate around the dowel.
7. Install new water seals (1) in the spacer plate.

End By:

- a. install cylinder head

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Product: TRACK SKIDDER

Model: D4HTSK II TRACK SKIDDER 8ZF

Configuration: D4H Track-Type Skidder Series II 8ZF00001-UP (MACHINE) POWERED BY 3204 Engine

## Disassembly and Assembly

### 3304 MACHINE ENGINE FOR D4H SERIES III AND D5H SERIES II TRA

Media Number -SEN3253-01

Publication Date -01/09/1992

Date Updated -20/07/2010

SEN32530026

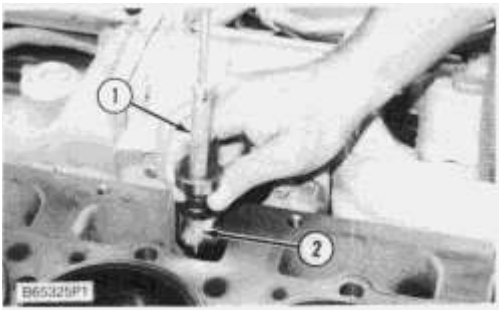
## Valve Lifters

SMCS - 1209-010

### Remove And Install Valve Lifters

Start By:

- a. remove cylinder head assembly and spacer plate



Typical Example

1. Use a magnet (1) to remove valve lifters (2). Put identification marks on the lifters for installation purposes.
2. Check the diameter of the valve lifter. The diameter of the valve lifter (new) must be  $33.287 \pm 1.013 \text{ mm}$  ( $1.3105 \pm .0005 \text{ in}$ ). The bore in the block for new valve lifters must be  $33.388 \pm 0.025 \text{ mm}$  ( $1.3145 \pm .0010 \text{ in}$ ). The maximum permissible clearance between the lifter and the bore for the valve lifter (worn) is  $0.30 \text{ mm}$  ( $.012 \text{ in}$ ).
3. Put **2P2506 Thread Lubricant** on the valve lifters and camshaft lobes. Install the valve lifters in original positions in the cylinder block.

End By:

- a. install cylinder head assembly and spacer plate
-

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## Disassembly and Assembly

### 3304 MACHINE ENGINE FOR D4H SERIES III AND D5H SERIES II TRA

Media Number -SEN3253-01

Publication Date -01/09/1992

Date Updated -20/07/2010

SENR32530027

## Valves

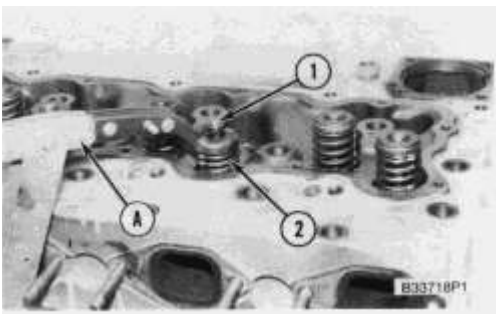
SMCS - 1105-011; 1105-012

### Remove Valves

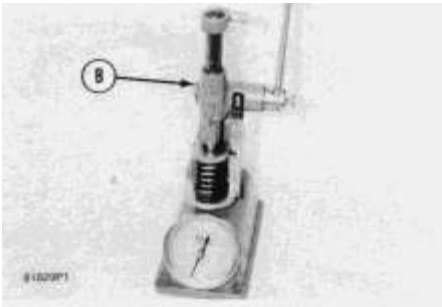
| Tools Needed |                                  | A | B |
|--------------|----------------------------------|---|---|
| 5S1330       | Valve Spring Compressor Assembly | 1 |   |
| 8S2263       | Valve Spring Tester              |   | 1 |

Start By:

- a. remove fuel injection nozzles
- b. remove cylinder head assembly and spacer plate



1. Put compression on valve spring (2) with tool (A), and remove locks (1).
2. Remove tool (A), rotocoil, spring, valve stem oil shield and valve. Put identification marks on valves with respect to their location in the cylinder head.

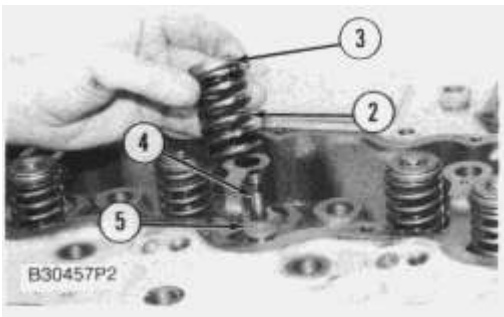


3. Check the spring force with tool (B). The spring force is  $257 \pm 25$  N ( $57.8 \pm 5.6$  lb). The length of spring under test force is **44.86 mm (1.766 in)**. The free length after test is **52.07 mm (2.050 in)**.

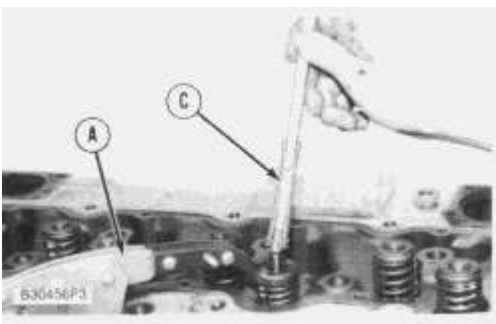
4. Do Steps 1 through 3 again for the remainder of the valves.

## Install Valves

| Tools Needed |                                  | A | C |
|--------------|----------------------------------|---|---|
| 5S1330       | Valve Spring Compressor Assembly | 1 |   |
| 5S1322       | Valve Keeper Inserter            |   | 1 |



1. Put clean engine oil on the valve stems. Install valve (4), oil shield (5), spring (2) and rotocoil (3) in the cylinder head.



2. Put tool (A) in position on the valve spring, and install the locks with tool (C).



**WARNING**

**Locks can be thrown from the valve when the compressor is released if they are not in their correct position on the valve stem. Personal injury can be the result if not carefully removed.**

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**3.** Remove tool (A), and hit the top of the valve with a plastic hammer to be sure the locks are in their correct position on valve.

**4.** Do Steps 1 through 3 again for the remainder of the valves.

End By:

**a.** install cylinder head assembly and spacer plate

**b.** install fuel injection nozzles

Previous Screen

Product: TRACK SKIDDER

Model: D4HTSK II TRACK SKIDDER 8ZF

Configuration: D4H Track-Type Skidder Series II 8ZF00001-UP (MACHINE) POWERED BY 3204 Engine

## Disassembly and Assembly

### 3304 MACHINE ENGINE FOR D4H SERIES III AND D5H SERIES II TRA

Media Number -SEN3253-01

Publication Date -01/09/1992

Date Updated -20/07/2010

SEN32530028

## Valve Guides

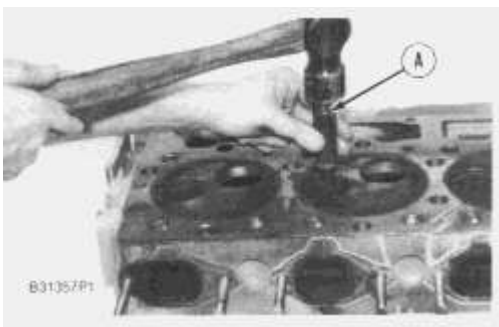
SMCS - 1104-010

### Remove And Install Valve Guides

| Tools Needed |              | A | B |
|--------------|--------------|---|---|
| 7S8859       | Guide Driver | 1 |   |
| 7S8858       | Bushing      |   | 1 |

Start By:

a. remove valves



1. Remove the valve guides from the cylinder head with tool (A).

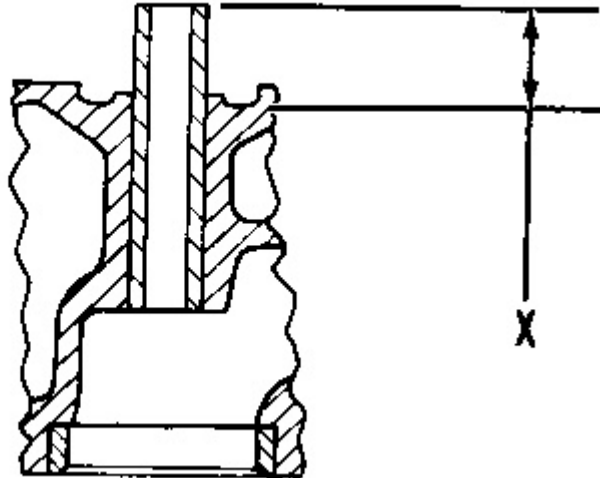
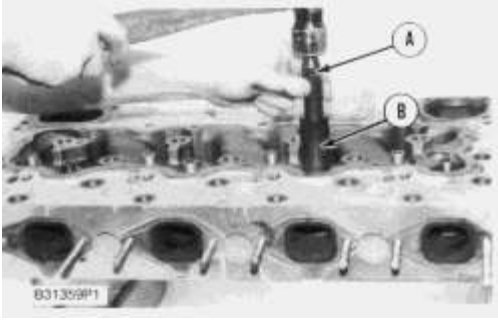


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**Thank you so much for reading**



A08021P2

2. Put clean engine oil on the outside diameter of the valve guide. Install the valve guide with tooling (A) and (B). Dimension "X" from the top of the valve guide to the cylinder head is **22.23 ± .025 mm (.875 ± .010 in)**.

3. The inside diameter of a new valve guide after installation must be a minimum of **9.456 mm (.3723 in)**. The maximum inside diameter for a worn guide must not be more than **9.581 mm (.3772 in)**.

End By:

install valves

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