



# Service Repair Manual

## **Models**

# C13 Industrial Engine

---

[Previous Screen](#)

Product: INDUSTRIAL ENGINE  
Model: C13 INDUSTRIAL ENGINE JR9  
Configuration: C13 Industrial Engine JR900001-UP

## Disassembly and Assembly C13 Industrial Engine

Media Number -UENR6571-00

Publication Date -01/01/2015

Date Updated -13/01/2015

i03533151

# Valve Mechanism Cover Base - Remove and Install

SMCS - 1120-010

## Removal Procedure

### Start By:

- a. Remove the valve cover.

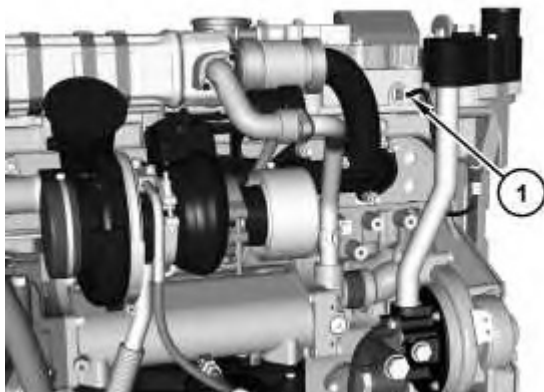


Illustration 1

g01861473

1. Disconnect harness assembly (1).
-

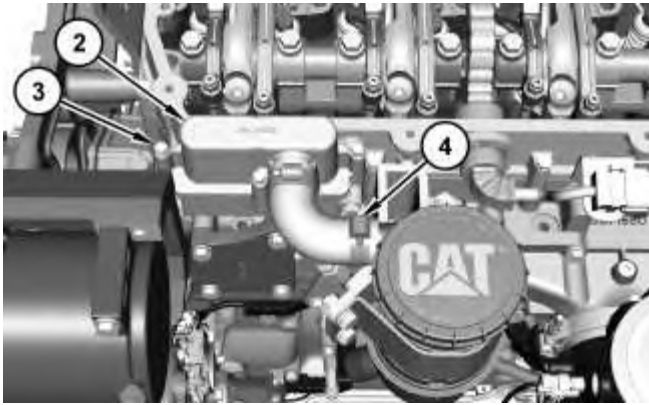


Illustration 2

g01861475

2. Loosen hose clamp (4). Remove bolts (3) and remove breather (2).

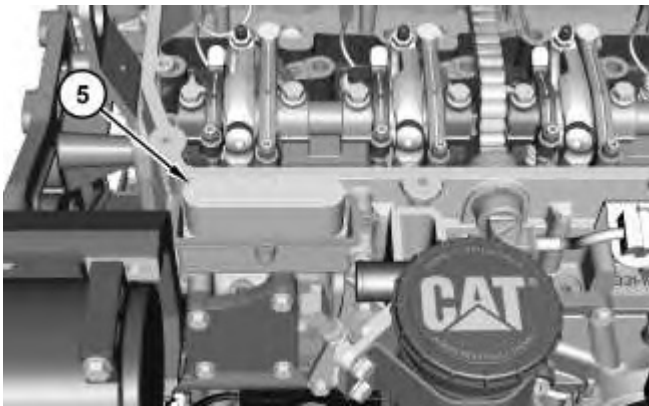


Illustration 3

g01861477

3. Remove element (5).

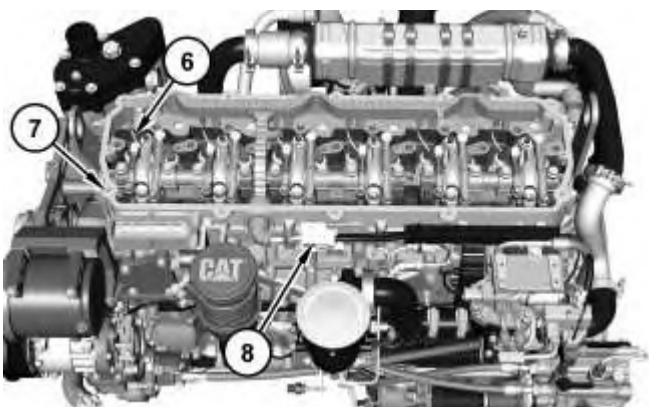


Illustration 4

g01861478

4. Disconnect harness assemblies (6) and (8). Remove valve cover base (7).

**<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>**



---

Illustration 5

g01861512

5. Remove seal (9) from valve cover base (7).

## Installation Procedure

1. Install valve cover base (7) in reverse order of removal.

[Previous Screen](#)

◀ Product: INDUSTRIAL ENGINE  
 Model: C13 INDUSTRIAL ENGINE JR9  
 Configuration: C13 Industrial Engine JR900001-UP

## Disassembly and Assembly C13 Industrial Engine

Media Number -UENR6571-00

Publication Date -01/01/2015

Date Updated -13/01/2015

i07074651

# Rocker Arm and Shaft - Remove and Install

SMCS - 1102-010

## Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	293-2989	Lift Bracket As	1

### Start By:

- a. Remove the valve cover.

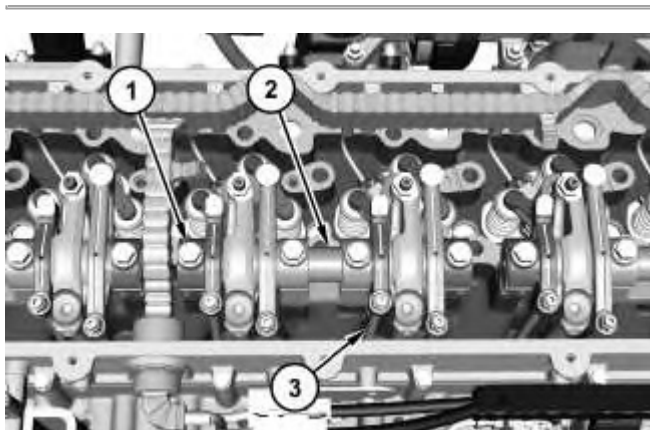


Illustration 1

g01861123

1. Remove bolts (1).
2. Use Tooling (A) to remove rocker arm and shaft (2). Remove pushrods (3).

# Installation Procedure

1. Install rocker arm and shaft (2) in the reverse order of removal.
  - a. Lubricate the contact points of pushrods (3) with clean engine oil. Install pushrods (3).
  - b. Tighten bolts (1) to standard torque.
  - c. Adjust the electronic unit injectors. Refer to Testing and Adjusting, "Electronic Unit Injector - Adjust".
  - d. Adjust the engine valve lash. Refer to Testing and Adjusting, "Engine Valve Lash - Inspect/Adjust".

[Previous Screen](#)

◀ Product: INDUSTRIAL ENGINE  
 Model: C13 INDUSTRIAL ENGINE JR9  
 Configuration: C13 Industrial Engine JR900001-UP

## Disassembly and Assembly C13 Industrial Engine

Media Number -UENR6571-00

Publication Date -01/01/2015

Date Updated -13/01/2015

i03552706

# Rocker Arm - Disassemble

SMCS - 1123-015

## Disassembly Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	1P-0510	Driver Gp	1

### Start By:

- a. Remove the rocker arm and shaft.

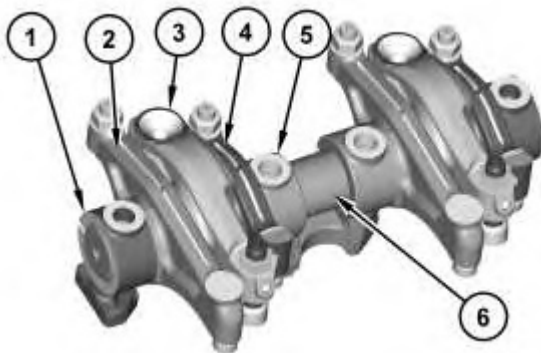


Illustration 1

g01262570

**Note:** Place an identification mark on all components for assembly purposes.

**Note:** Stand (5) has an offset hole.

1. Remove stands (1).
2. Remove rocker arms (2), rocker arms (3), rocker arms (4), and stand (5) from shaft (6).
3. Use Tooling (A) to remove the bushings from the rocker arms (3).

[Previous Screen](#)

Product: INDUSTRIAL ENGINE  
 Model: C13 INDUSTRIAL ENGINE JR9  
 Configuration: C13 Industrial Engine JR900001-UP

## Disassembly and Assembly C13 Industrial Engine

Media Number -UENR6571-00

Publication Date -01/01/2015

Date Updated -13/01/2015

i03552709

## Rocker Arm - Assemble

SMCS - 1123-016

### Assembly Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	1P-0510	Driver Gp	1

1. Use Tooling (A) to install the bushings for rocker arms (3). For correct bearing dimensions, refer to Specifications, "Electronic Unit Injector Rocker Arm" and Specifications, "Valve Mechanism".

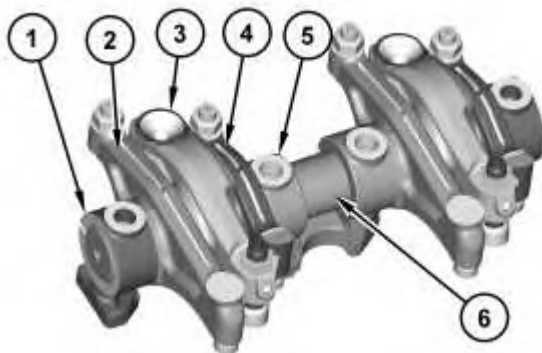


Illustration 1

g01262570

2. Install stand (5), rocker arms (4), rocker arms (3), and rocker arms (2) onto shaft (6).

**Note:** Stand (5) has an offset hole.

3. Install stands (1).

**End By:**

a. Install the rocker arm and shaft.

---

[Copyright 1993 - 2020 Caterpillar Inc.](#)

Wed Jun 10 15:28:51 UTC+0800 2020

[All Rights Reserved.](#)

[Private Network For SIS Licensees.](#)

[Previous Screen](#)

Product: INDUSTRIAL ENGINE  
 Model: C13 INDUSTRIAL ENGINE JR9  
 Configuration: C13 Industrial Engine JR900001-UP

## Disassembly and Assembly C13 Industrial Engine

Media Number -UENR6571-00

Publication Date -01/01/2015

Date Updated -13/01/2015

i07071018

# Cylinder Head - Remove and Install

SMCS - 1100-010

## Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	-	Loctite Graphite- 50 Anti-Seize	-

### Start By:

- a. Remove the accessory drive.
- b. Remove the intake manifold.
- c. Remove the fumes disposal group.
- d. Remove the electronic unit injectors.
- e. Remove the exhaust gas valve (NRS).
- f. Remove the exhaust cooler (NRS).
- g. Remove the exhaust manifold.

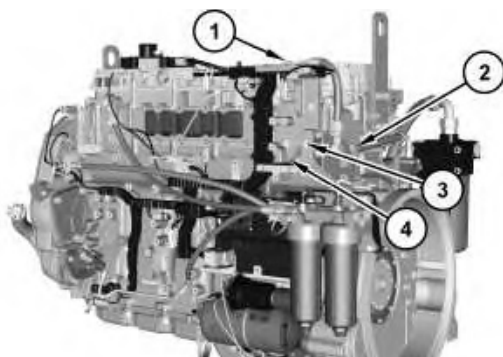


Illustration 1

g01890955

1. Disconnect tube assembly (1). Disconnect the tube and hose assemblies (2). Remove bolts (3) and bracket (4).

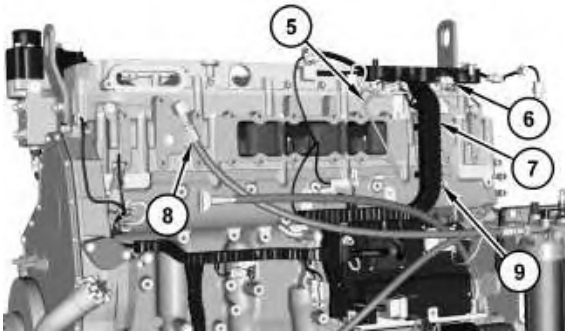


Illustration 2

g01890956

2. Remove tube assembly (5). Disconnect hose assembly (8).
3. Remove bolts (6) and nut (9). Reposition harness assembly (7).

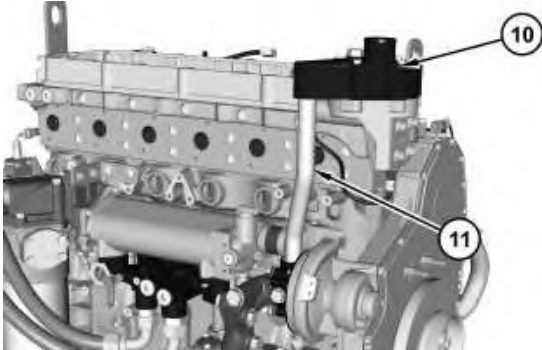


Illustration 3

g01890957

4. Remove housing (10) and tube (11).

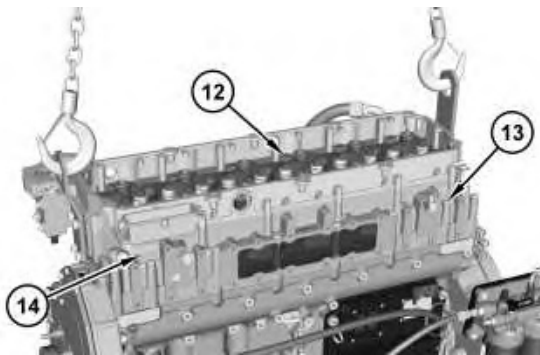


Illustration 4

g01890958

5. Attach a suitable lifting device to cylinder head (14). The weight of cylinder head (14) is approximately 204 kg (450 lb).
6. Remove bolts (12) and (13). Remove cylinder head (14) and the cylinder head gasket.

## Installation Procedure

1. Inspect the cylinder head and the cylinder block for flatness. Refer to Guideline for Reusable Parts and Salvage Operations, SEBF8162, "Procedure to Measure and Salvage Cylinder Head Assemblies and Related Components".
2. Install cylinder head (14) in reverse order of removal.
  - a. Install a new head gasket.
  - b. Apply Tooling (A) to the threads of bolts (12), (13), and both sides of the washers.
  - c. Install bolts (12) and (13). Refer to Guideline for Reusable Parts and Salvage Operations, SEBF8301, "Inspection and Reuse of Critical Fasteners Used in All Engines".

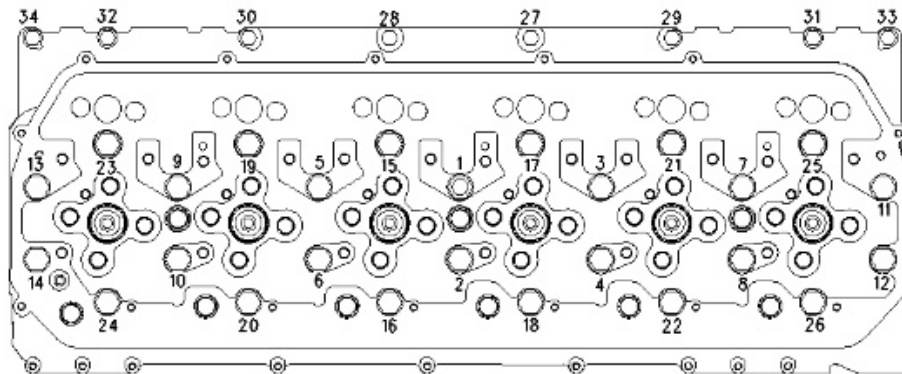


Illustration 5

g00950659

- d. Tighten bolt (1) through bolt (26) in a numerical sequence to a torque of  $170 \pm 10$  N·m ( $125 \pm 7$  lb ft).
- e. Tighten bolt (1) through bolt (26) again in a numerical sequence to a torque of  $170 \pm 10$  N·m ( $125 \pm 7$  lb ft).
- f. Place a mark on bolt (1) through bolt (26). Rotate bolt (1) through bolt (26) in a numerical sequence for an additional  $120 \pm 5$  degrees ( $1/3$  turn).
- g. Loosen bolt (1) through bolt (26) until the washers are loose under the Bolt heads.
- h. Tighten bolt (1) through bolt (26) in a numerical sequence to a torque of  $170 \pm 10$  N·m ( $125 \pm 7$  lb ft).
- i. Tighten bolt (1) through bolt (26) again in a numerical sequence to a torque of  $170 \pm 10$  N·m ( $125 \pm 7$  lb ft).
- j. Place a mark on bolt (1) through bolt (26). Rotate bolt (1) through bolt (26) in a numerical sequence for an additional  $120 \pm 5$  degrees ( $1/3$  turn).
- k. Tighten bolt (27) through bolt (34) in a numerical sequence to a torque of  $55 \pm 10$  N·m ( $41 \pm 7$  lb ft).

[Previous Screen](#)

Product: INDUSTRIAL ENGINE  
Model: C13 INDUSTRIAL ENGINE JR9  
Configuration: C13 Industrial Engine JR900001-UP

## Disassembly and Assembly C13 Industrial Engine

Media Number -UENR6571-00

Publication Date -01/01/2015

Date Updated -13/01/2015

i03554743

# Lifter Group - Remove and Install

SMCS - 1209-010

## Removal Procedure

### Start By:

- a. Remove the cylinder head.

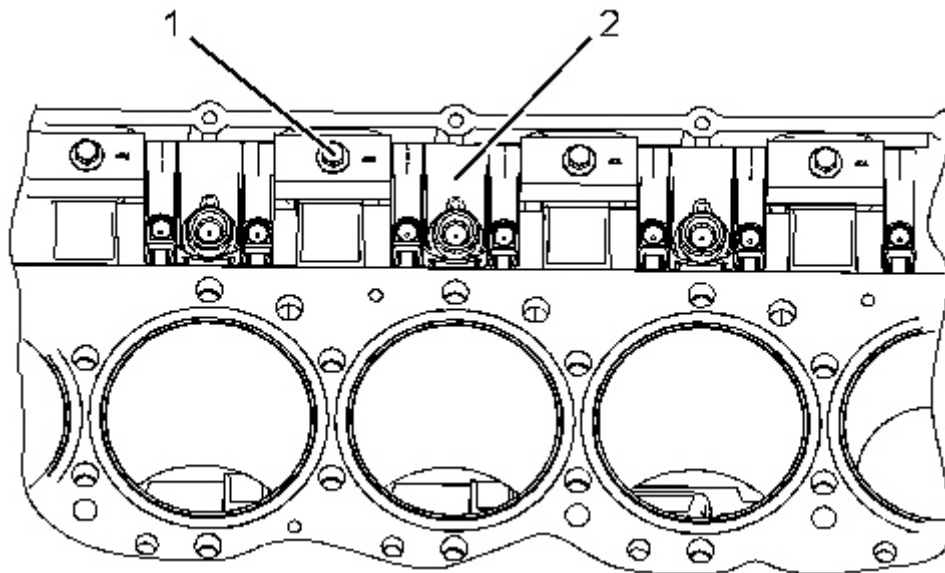


Illustration 1

g01138716

1. Remove bolts (1).
2. Remove lifter group (2).

# Installation Procedure

1. Install lifter group (2) in reverse order of removal.

---

[Copyright 1993 - 2020 Caterpillar Inc.](#)

[All Rights Reserved.](#)

[Private Network For SIS Licensees.](#)

Wed Jun 10 15:30:43 UTC+0800 2020

[Previous Screen](#)

◀ Product: INDUSTRIAL ENGINE  
 Model: C13 INDUSTRIAL ENGINE JR9  
 Configuration: C13 Industrial Engine JR900001-UP

## Disassembly and Assembly C13 Industrial Engine

Media Number -UENR6571-00

Publication Date -01/01/2015

Date Updated -13/01/2015

i05331988

# Camshaft - Remove and Install

SMCS - 1210-010

## Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	1U-7638	Magnetic Holding Tool	18
B	201-4211	Camshaft Pilot	1
	201-4212	Camshaft Pilot	1

### Start By:

- a. Remove the rocker arms and shafts.
  - b. Remove the front cover.
  - c. Remove the camshaft position sensor.
1. Turn the crankshaft to top center compression stroke for the No. 1 piston. Install the timing bolt in the flywheel.
-

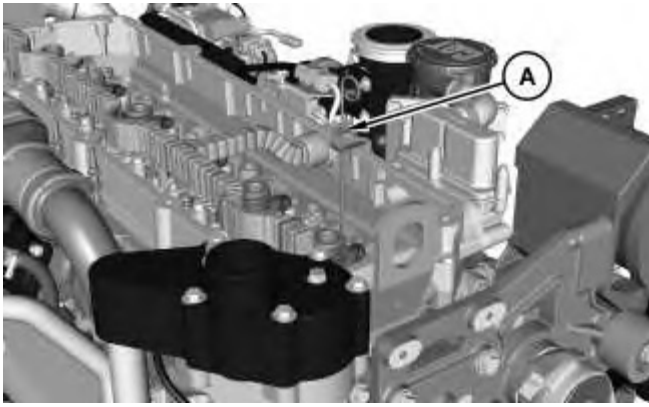


Illustration 1

g01878122

2. Install Tooling (A) in order to support the lifter. Repeat for all the remaining lifters.

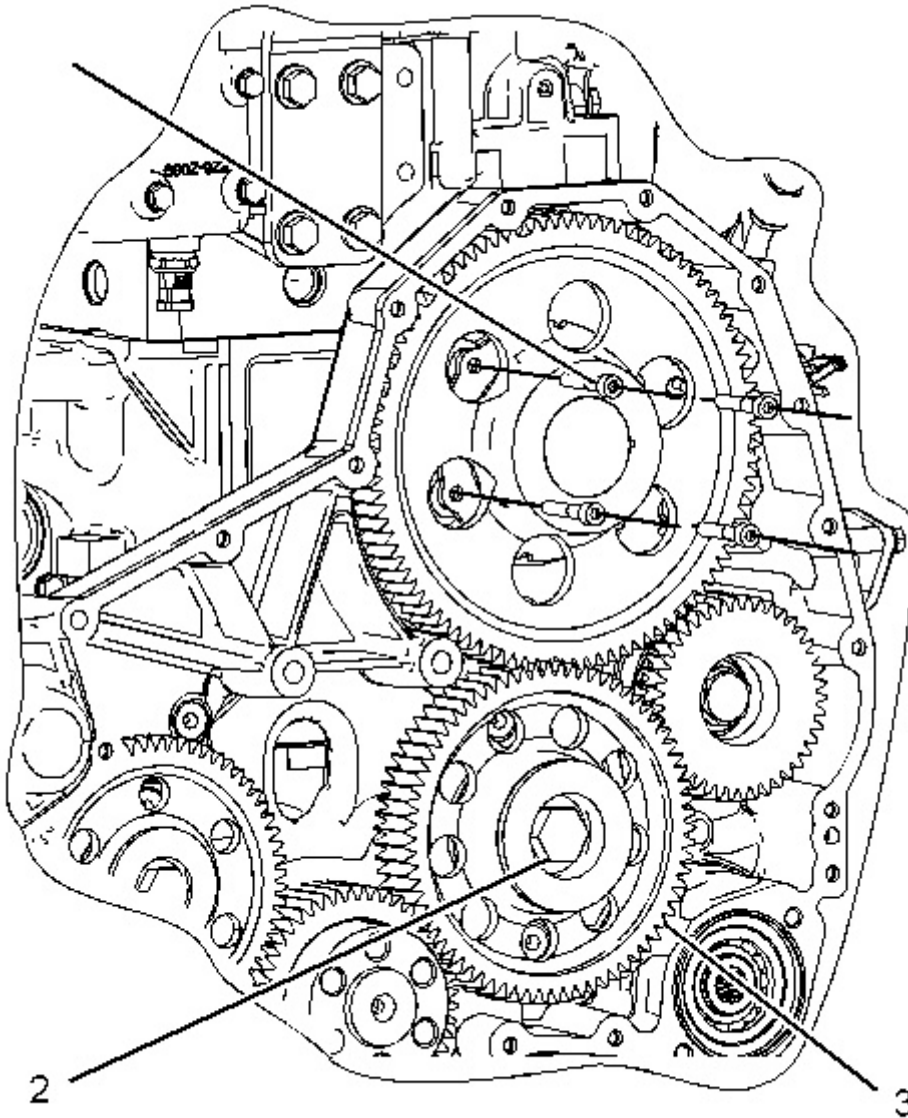
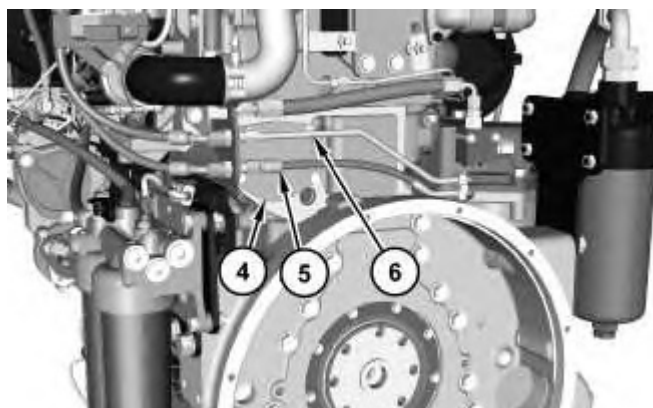


Illustration 2

g03377797

3. Remove bolts (1). Remove bolt (2) and idler gear (3) for assembly purposes.

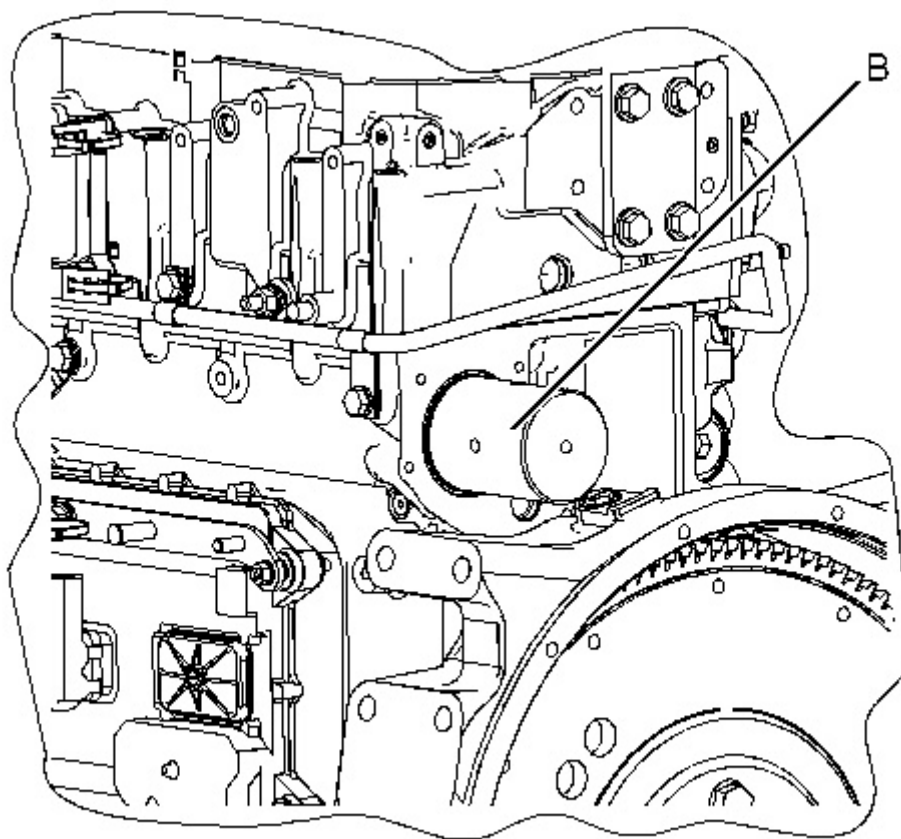


---

Illustration 3

g03377807

4. Remove tube assembly (6) and hose assembly (5). Remove cover (4).



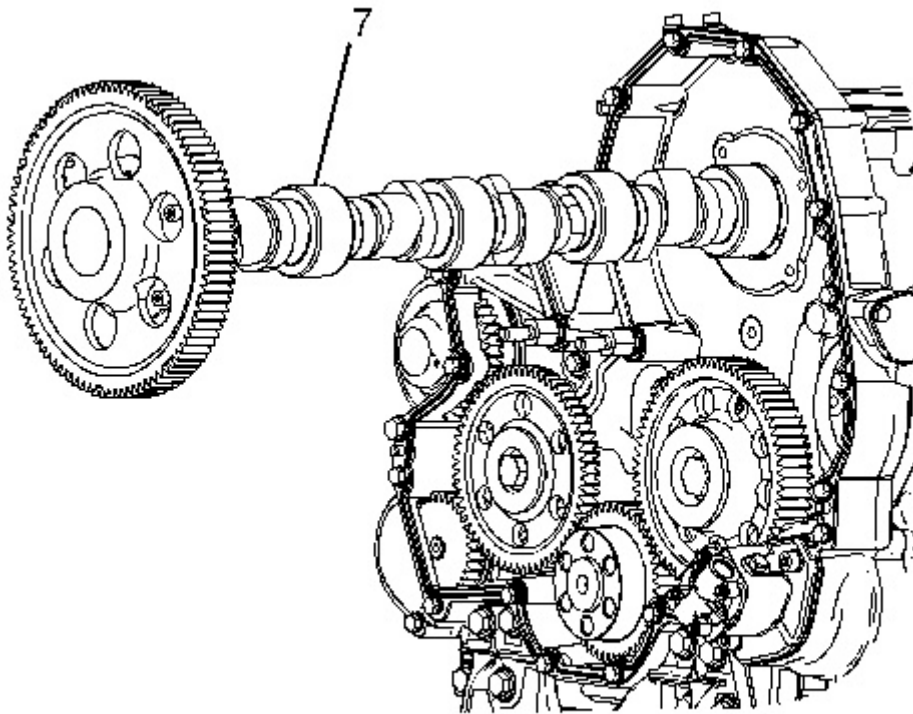
---

Illustration 4

g01325027

5. Install Tooling (B) onto the camshaft.

---



---

Illustration 5

g03377808

**Note:** Lubricate Tooling (B) for easier removal of the camshaft. Lubrication also prevents damaging the camshaft lobes and the camshaft bearings.

6. Use two people to remove camshaft (7). The weight of camshaft (7) and the camshaft gear is approximately 34 kg (75 lb). Carefully remove camshaft (7) from the engine. Support the weight of the camshaft during removal.

**Note:** Rotate the camshaft during removal. This action will prevent the camshaft from binding in the camshaft bearings.

## Installation Procedure

---

### NOTICE

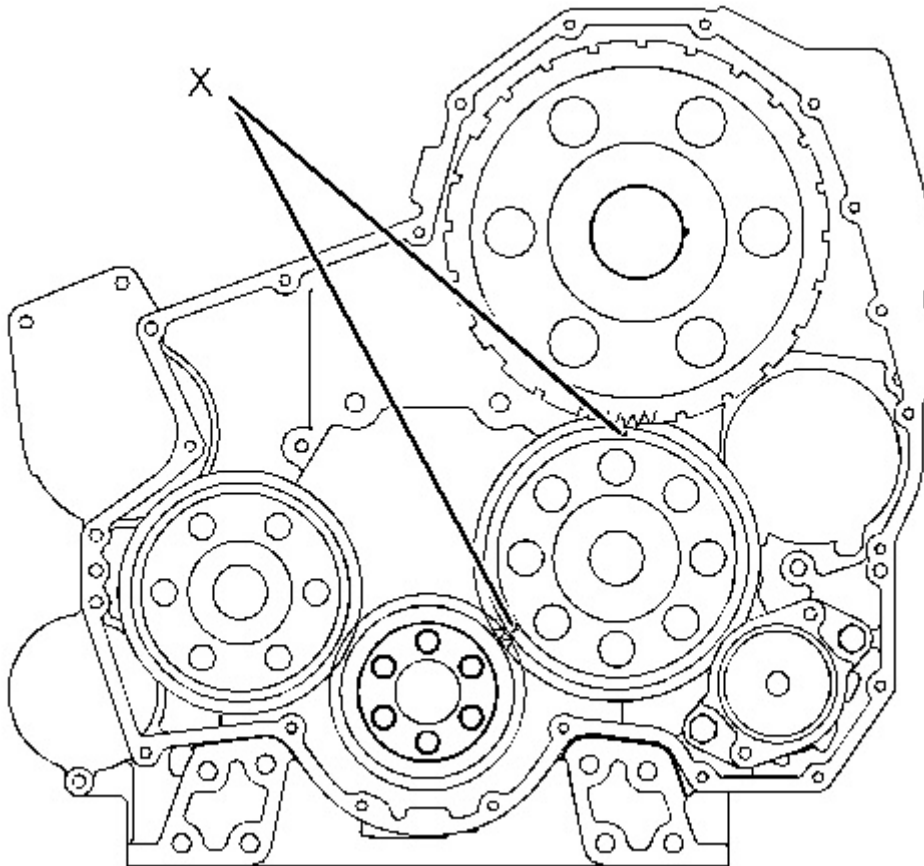
**When installing the camshaft, make sure the number one cylinder is at top center of the compression stroke with the timing bolt installed in the flywheel. The camshaft timing is very important. The timing mark on the camshaft drive gear must line up with the timing mark on the idler gear. Refer to the Specifications Manual for more information.**

---

**Note:** Ensure that camshaft (6) and Tooling (B) are clean. Apply clean engine oil to the lobes and journals of camshaft (6) and Tooling (B).

**Note:** During installation of camshaft (6), rotate the camshaft in both directions in order to prevent binding in the camshaft bearing bores.

1. Install camshaft (6) in the reverse order of removal.



---

Illustration 6

g01292427

- a. Ensure that the timing Marks (X) on the idler gear aligned with the timing marks on the crankshaft gear and the camshaft drive gear.

[Previous Screen](#)

Product: INDUSTRIAL ENGINE  
Model: C13 INDUSTRIAL ENGINE JR9  
Configuration: C13 Industrial Engine JR900001-UP

## Disassembly and Assembly C13 Industrial Engine

Media Number -UENR6571-00

Publication Date -01/01/2015

Date Updated -13/01/2015

i05351535

# Camshaft Gear - Remove and Install

SMCS - 1210-010-GE

## Removal Procedure

### Start By:

- A. Remove the camshaft.
  1. Wrap the camshaft with a protective covering in order to prevent damage to the camshaft.

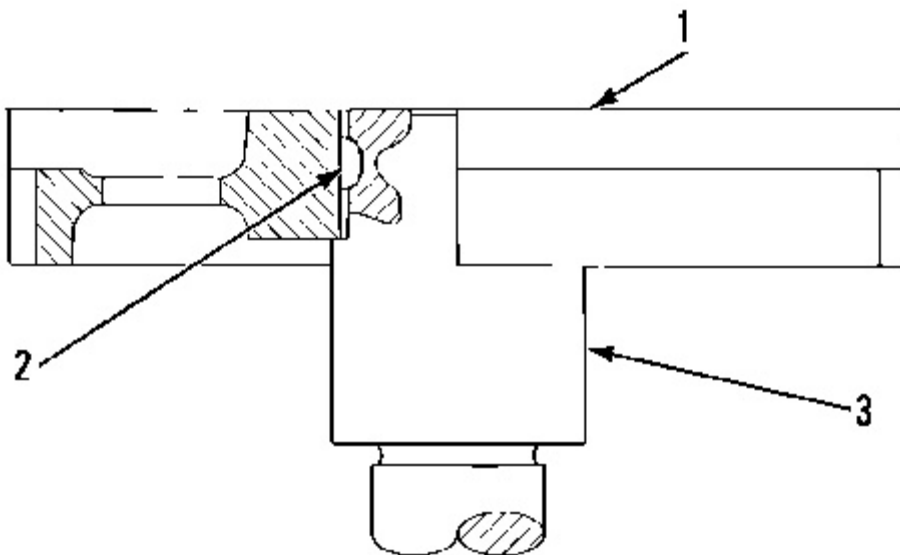


Illustration 1

g00522082

## NOTICE

**Do not allow the camshaft to fall to the floor when pressing it from the drive gear. Also make sure that the camshaft lobes do not catch on the press plates.**

---

2. Use a suitable press to remove drive gear (1) from camshaft (3) .
3. Remove woodruff key (2) .

## Installation Procedure

1. Install drive gear (1) in the reverse order of removal.
  - a. Raise the temperature of drive gear (1) to a temperature of 315° C (600° F).

[Previous Screen](#)

◀ Product: INDUSTRIAL ENGINE  
 Model: C13 INDUSTRIAL ENGINE JR9  
 Configuration: C13 Industrial Engine JR900001-UP

## Disassembly and Assembly C13 Industrial Engine

Media Number -UENR6571-00

Publication Date -01/01/2015

Date Updated -13/01/2015

i05332615

# Camshaft Bearings - Remove and Install

SMCS - 1211-010

## Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	201-4214	Receiving Sleeve	1
	201-4213	Puller Plate	1
	201-4209	Bearing Pilot	1
	201-4208	Backup Plate	1
	6F-7032	Bolt	1
	8M-8778	Taperlock Stud	1
	8S-8292	Extension (Short)	2
	8S-8293	Extension (Long)	1
B	185-3989	Thread Lubricant	1

### Start By:

- a. Remove the lifter group.
  - b. Remove the camshaft.
-

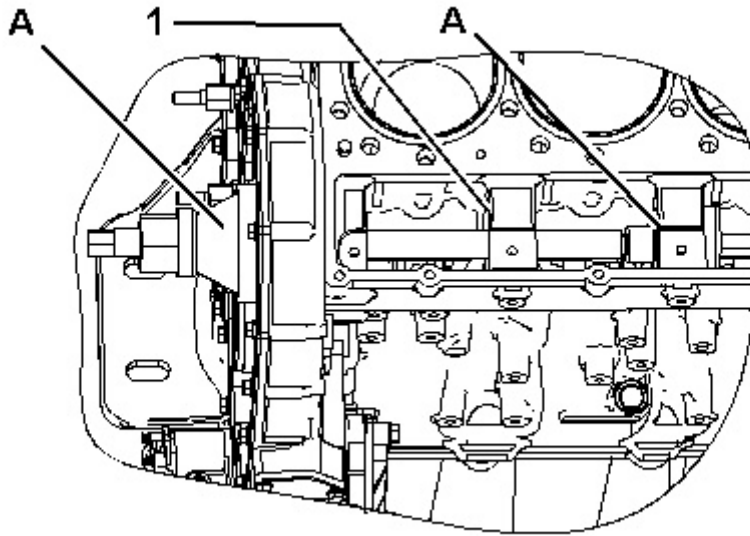


Illustration 1

g01016694

1. Install Tooling (A). Apply Tooling (B) on the threads.
2. Remove camshaft bearings (1).

## Installation Procedure

Table 2

Required Tools			
Tool	Part Number	Part Description	Qty
A	201-4214	Receiving Sleeve	1
	201-4213	Puller Plate	1
	201-4209	Bearing Pilot	1
	201-4208	Backup Plate	1
	6F-7032	Bolt	1
	8M-8778	Taperlock Stud	1
	8S-8292	Extension (Short)	2
	8S-8293	Extension (Long)	1



**Suggest:**

**If the above button click is invalid.**

**Please download this document**

**first, and then click the above link**

**to download the complete manual.**

**Thank you so much for reading**

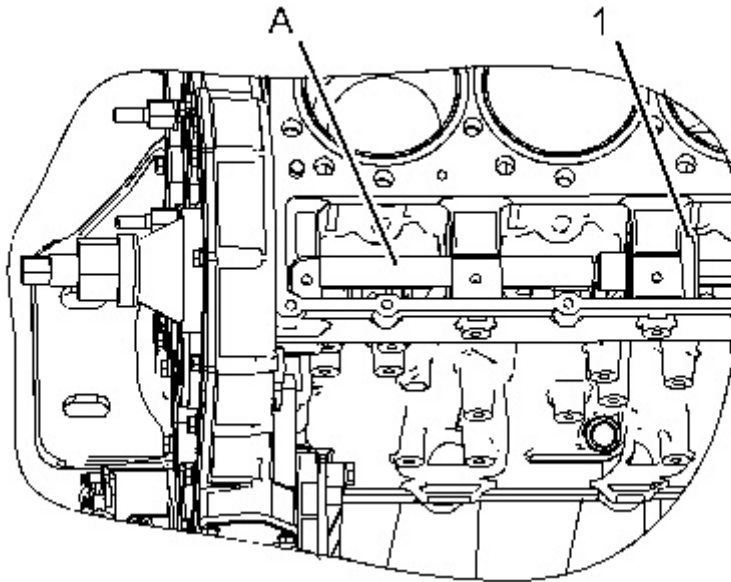


Illustration 2

g01133376

1. Position new camshaft bearing (1) in Tooling (A) and install the bearing from the rear to the front of the engine.

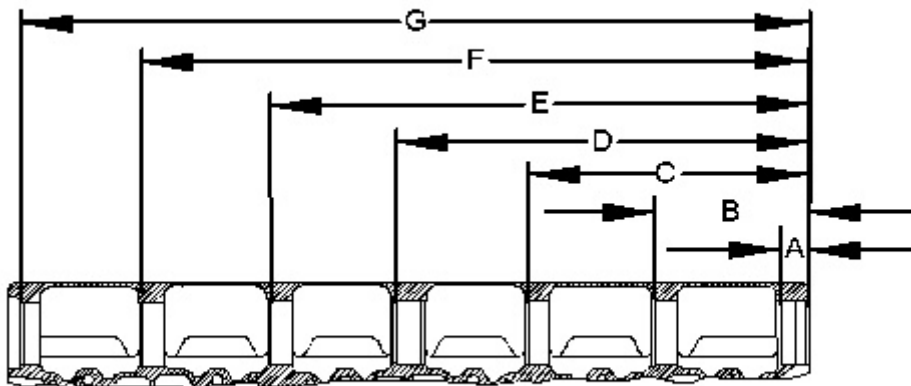


Illustration 3

g01133395

2. The camshaft bearings are installed with Tooling (A). Measure the depth of the camshaft bearings from the front face of the cylinder block to the following distances:
  - a. Dimension (A) is 36.50 mm (1.437 inch).
  - b. Dimension (B) is 192.50 mm (7.579 inch).
  - c. Dimension (C) is 348.50 mm (13.720 inch).
  - d. Dimension (D) is 504.50 mm (19.862 inch).

**<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>**