

Product: INDUSTRIAL ENGINE  
Model: C3.3 INDUSTRIAL ENGINE E3J  
Configuration: C3.3 Industrial Engine E3J00001-UP

## Disassembly and Assembly C3.3 Industrial Engine

Media Number -KENR6212-01

Publication Date -01/07/2006

Date Updated -02/05/2017

i05324846

## Housing (Front) - Install

SMCS - 1151-012

### Installation Procedure

Table 1

Tool	Part Number	Part Name	Qty
A	-	Guide Bolt (M8 X 1.25 by 70 mm)	2
B	5P-3975	Rubber Lubricant	-

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### NOTICE

**Keep all parts clean from contaminants.**

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

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1. Clean all mating surfaces thoroughly.
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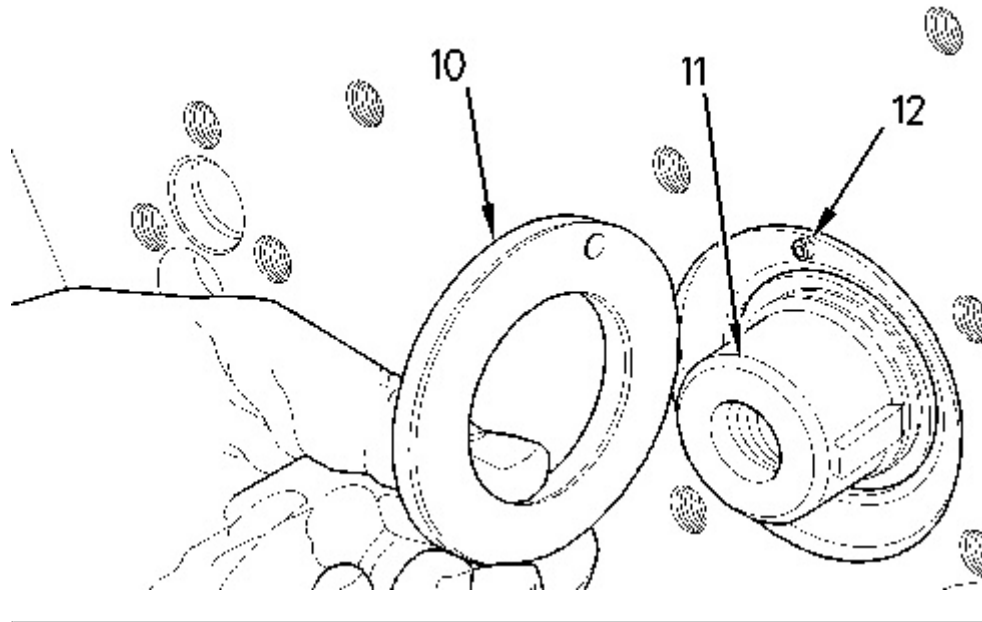


Illustration 1

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2. Ensure that thrust washer (10) is aligned with hollow dowel (12). Install the thrust washer on camshaft (11).
3. Install a new O-ring seal on the fuel injection pump housing.

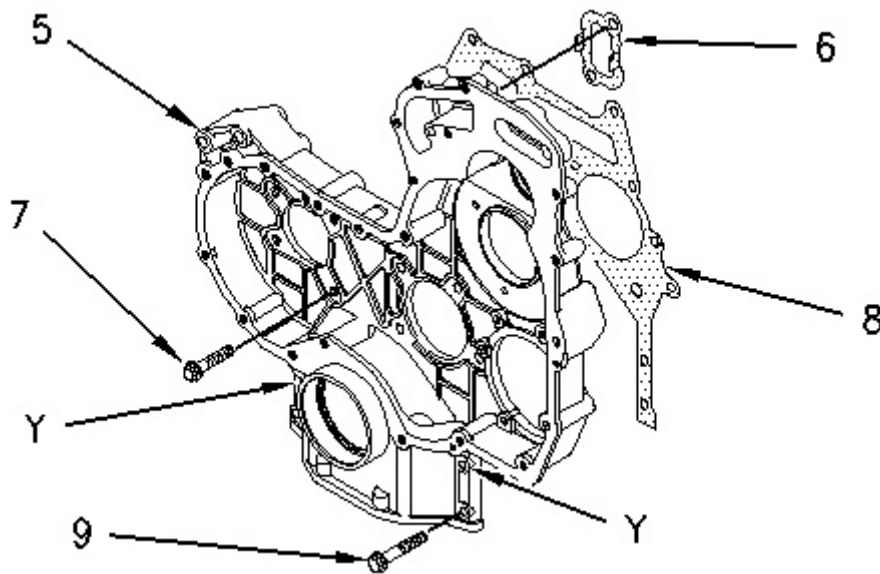
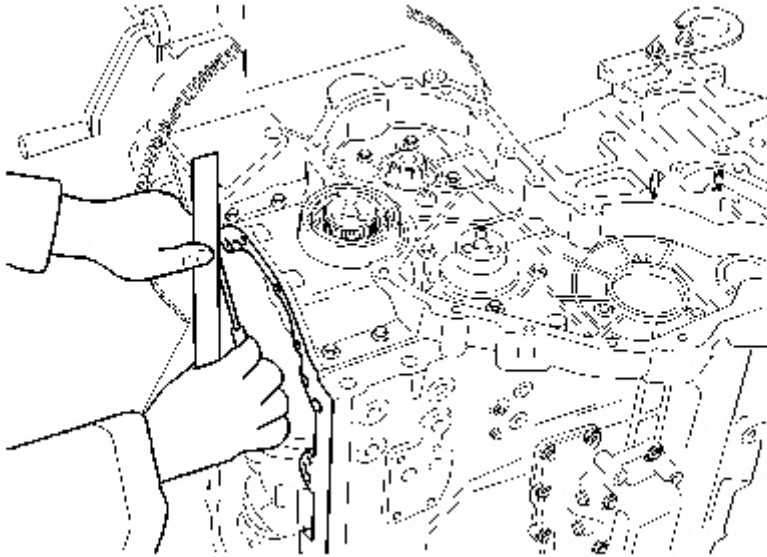


Illustration 2

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4. Install Tooling (A) in the cylinder block in Hole (Y).
5. Position gasket (8) on Tooling (A). Install gasket (6) on the back side of front housing (5).
6. Position front housing (5) on the cylinder block. Install bolts (7) and bolts (9). Remove Tooling (A) and install the remaining bolts in order to secure the front housing to the cylinder block. Tighten bolts (7) and bolts (9) finger tight at this time.



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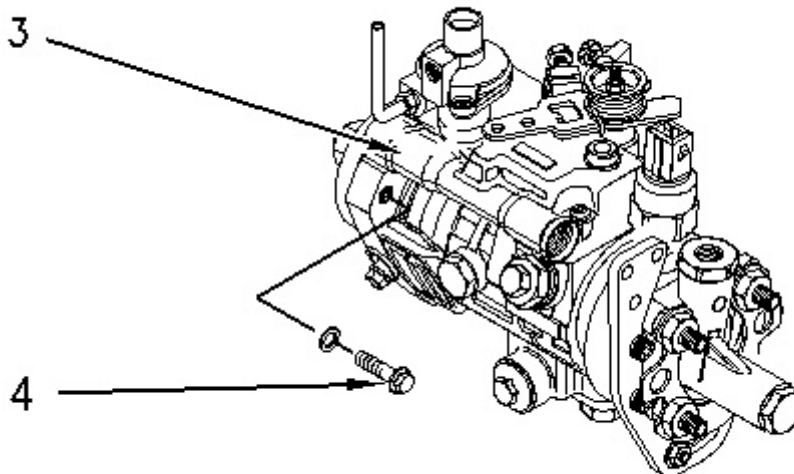
Illustration 3

g00954906

7. Align the front housing and the cylinder block.

**Note:** Ensure that the bottom of the front cover is aligned with the bottom of the cylinder block before the bolts are tightened. The alignment of the bottom face of the front cover and the bottom of the cylinder block must not exceed  $0.00 \pm 0.05$  mm ( $0.000 \pm 0.002$  inch).

8. Tighten bolts (7) and bolts (9) to a torque of 22 N·m (16 lb ft).
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Illustration 4

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Typical Example

9. Install bolts (4) that fasten fuel injection pump (3) to the front housing. Tighten the bolts to a torque of 25 N·m (18 lb ft).
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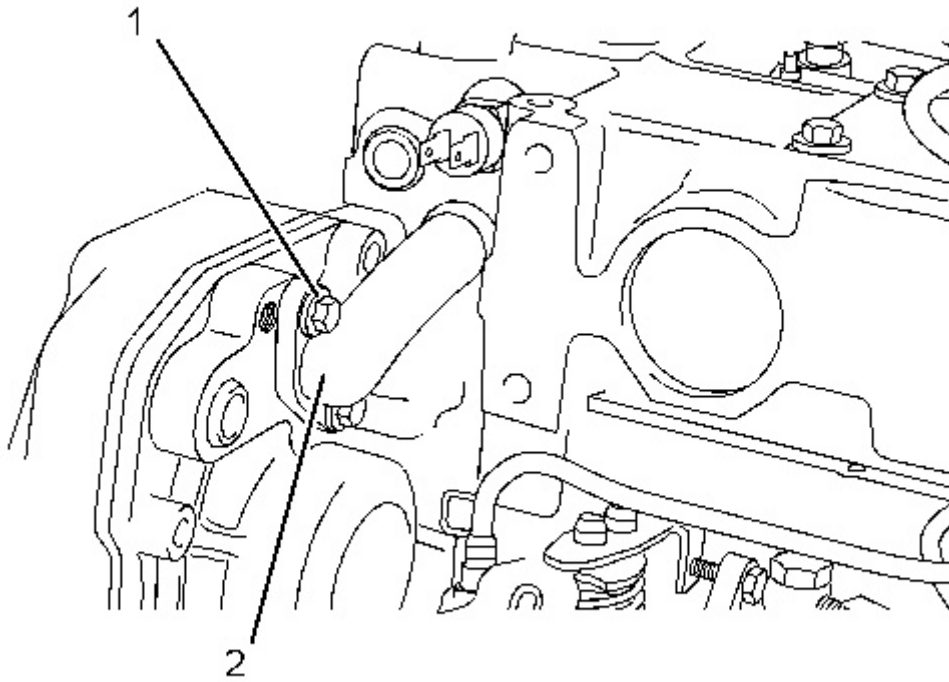


Illustration 5  
Typical example

g03373179

10. Install new O-ring seals on bypass tube (2). Apply Tooling (B) to the O-ring seals. Install the bypass tube in the cylinder head. Install bolts (1).

**End By:**

- a. Install the camshaft gear. Refer to Disassembly and Assembly, "Camshaft Gear - Remove and Install".
- b. Install the idler gear. Refer to Disassembly and Assembly, "Idler Gear - Remove and Install".
- c. Install the engine oil pan. Refer to Disassembly and Assembly, "Engine Oil Pan - Remove and Install".
- d. Install the front cover. Refer to Disassembly and Assembly, "Front Cover - Remove and Install".
- e. Install the crankshaft pulley. Refer to Disassembly and Assembly, "Crankshaft Pulley - Remove and Install".
- f. Install the alternator. Refer to Disassembly and Assembly, "Alternator - Install".
- g. Install the air compressor, if equipped. Refer to Disassembly and Assembly, "Air Compressor - Remove and Install".

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## **Disassembly and Assembly**

### **C3.3 Industrial Engine**

Media Number -KENR6212-01

Publication Date -01/07/2006

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i02369583

## **Accessory Drive - Remove and Install**

SMCS - 1207-010

### **Removal Procedure**

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#### **NOTICE**

**Keep all parts clean from contaminants.**

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

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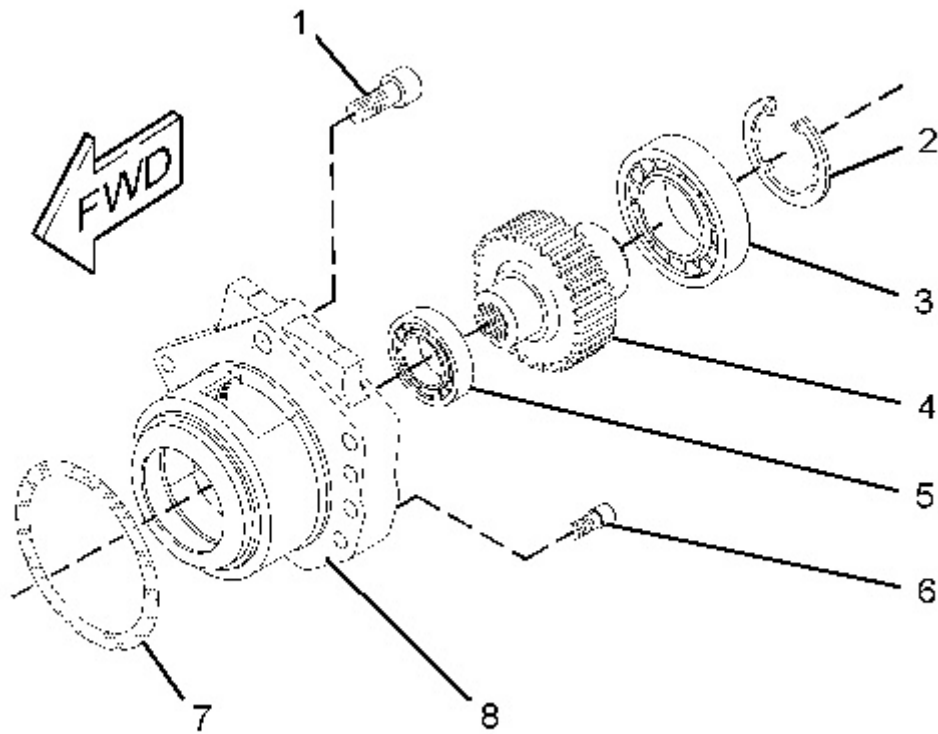


Illustration 1

g01212859

1. Remove allen head bolt (1) from accessory drive housing (8). Remove allen head bolts (6) from accessory drive housing (8).
2. Remove accessory drive housing (8) from the front housing.
3. If necessary, follow Steps 3.a through 3.c in order to disassemble the accessory drive.
  - a. Remove retaining ring (2) from accessory drive housing (8).
  - b. Place accessory drive housing (8) onto a suitable support. Press the assembly of gear (4) and bearings (3) and (5) out of accessory drive housing (8). Use a suitable puller in order to remove bearings (3) and (5) from gear (4).
  - c. Remove O-ring seal (7) from accessory drive housing (8).

## Installation Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	7M-7456	Bearing Mount Compound	1
B	207-1601	Rubber Lubricant	1

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**NOTICE**

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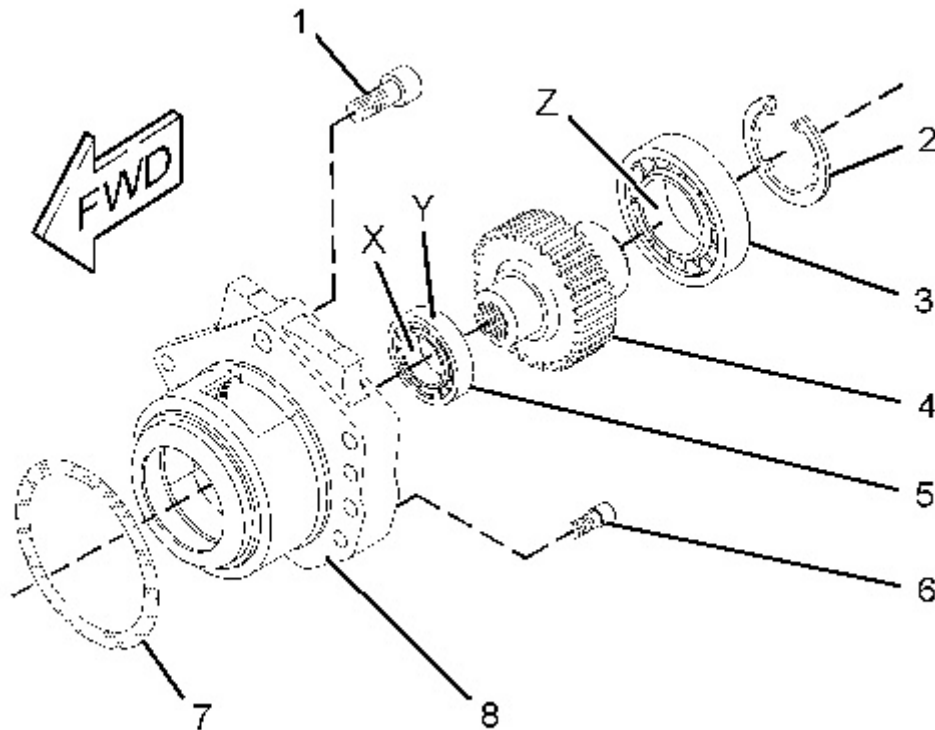


Illustration 2

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1. If necessary, follow Steps 1.a through 1.e in order to assemble the accessory drive.
  - a. Inspect the condition of the teeth and the splines of gear (4) for wear or damage. Inspect bearings (3) and (5), retaining ring (2), and the front housing for wear or damage. Replace any components that are worn or damaged.
  - b. Apply a small continuous bead of Tooling (A) to the inner surface (X) of bearing (5). Place the gear shaft on a suitable support. Press on the inner race of bearing (5) until bearing (5) is against the shoulder of gear (4). Remove any excess sealant.
  - c. Apply a small continuous bead of Tooling (A) to inner surface (Z) of bearing (3). Place the front face of the inner race of bearing (3) onto a suitable support. Press the

shaft of gear (4) into bearing (3) until the shoulder of the gear is against the bearing. Remove any excess sealant.

- d. Apply a small continuous bead of Tooling (A) to the outer surface (Y) of bearing (5). Place accessory drive housing (8) on a suitable support. Press the assembly of gear (4) and bearings (3) and (5) into accessory drive housing (8). Ensure that bearing (5) is against the front face of the recess in accessory drive housing (8). Remove any excess sealant.
  - e. Install retaining ring (2) into the groove in accessory drive housing (8). Ensure that retaining ring (2) is correctly positioned in the groove.
2. Lightly lubricate a new O-ring seal (7) with Tooling (B) and install O-ring seal (7) into the groove in accessory drive housing (8).
  3. Inspect the bore in the front housing (not shown) for damage. If necessary, replace the front housing. Refer to Disassembly and Assembly, "Housing (Front) - Remove" and Disassembly and Assembly, "Housing (Front) - Install".
  4. Lightly lubricate bearing (3), bearing (5), and gear (4) with clean engine lubricating oil. Install the assembly of the accessory drive to the front housing.
  5. Apply Tooling (C) to allen head bolts (1) and (6). Install allen head bolts (6) to accessory drive housing (8). Install allen head bolt (1) to accessory drive housing (8).
  6. Tighten bolts (1) and (6) to a torque of 22 N·m (16 lb ft).
  7. Ensure that there is backlash between the idler gear and the accessory drive gear.
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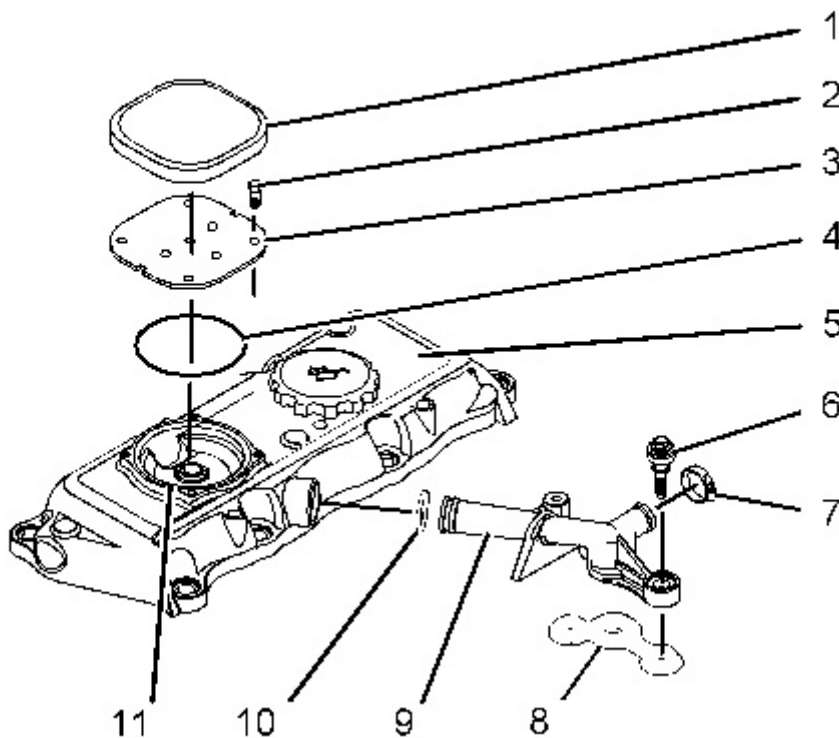
i02466207

# Crankcase Breather - Remove and Install

SMCS - 1317-010

## Removal Procedure

**Note:** Some three cylinder engines that are equipped with a open crankcase breather do not have a diaphragm valve in the valve mechanism cover. The crankcase breather that is shown in illustration 2 is installed with a diaphragm valve.







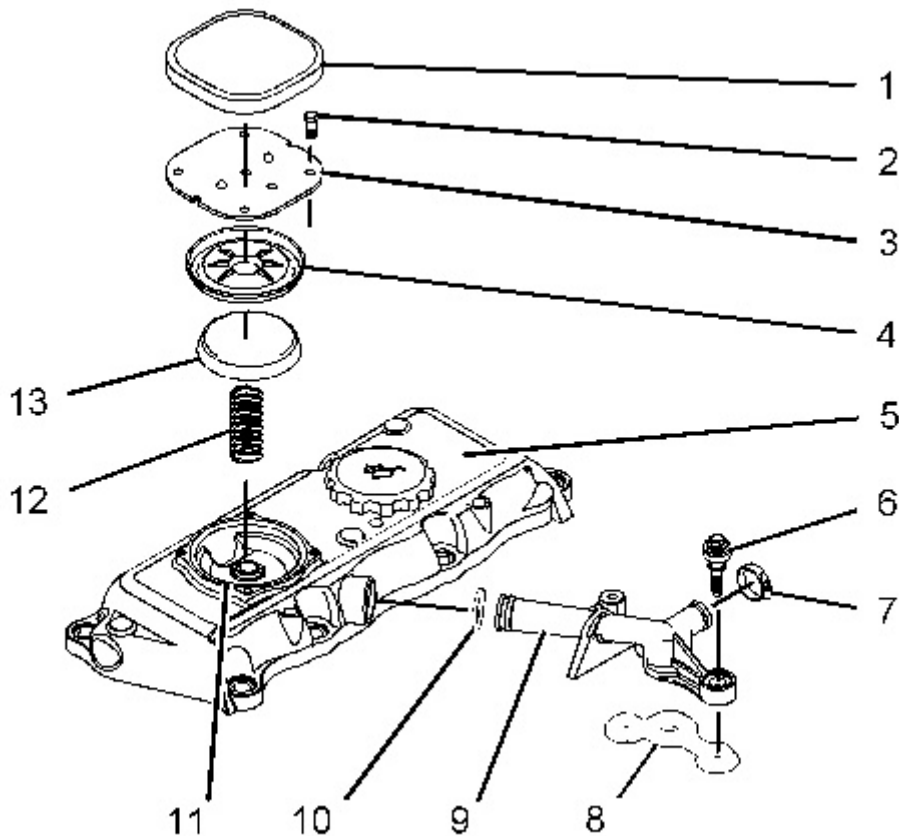


Illustration 4

g01122835

Typical example

1. Refer to the appropriate illustration 3 or 4. Thoroughly clean all of the previously removed components. Inspect all of the components for wear and for damage. Especially check the condition of the hose for the connector (9) and the diaphragm or the seal ring (4) for damage. Replace any component that is worn and/or damaged.
2. If the valve mechanism cover (5) was removed, install the valve mechanism cover. Refer to this Disassembly and Assembly Manual, "Valve Mechanism Cover - Remove and Install".
3. If equipped, install the seal ring (4) in the recess (11) in the valve mechanism cover (5).

**! 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.**

4. If equipped, install the spring (12), the cap (13), and the diaphragm (4) into the recess (11) in the valve mechanism cover (5).

5. If equipped, ensure that the two domes on the plate (3) are uppermost and ensure that the offset hole is toward the connector (9) of the valve mechanism cover (5). Install the plate (3). Install the screws (2). Tighten the screws (2) to a torque of 1.3 N·m (11.5 lb in).
  6. Push the plastic cover (1) onto the valve mechanism cover (5).
  7. Install a new O-ring (10) onto the connector (9).
  8. Install a new joint (8) to the connector (9). Install the connector (9) into the valve mechanism cover (5) and onto the cylinder head.
  9. Install the fasteners (6). Tighten the fasteners (6) to a torque of 9 N·m (80 lb in).
  10. Install the hose onto the connector (9). Ensure that the hose is clear of all hot surfaces, clear of all components that move, and clear of all components that vibrate when the engine is operating. Tighten the hose clamp (7) to a torque of 5 N·m (44 lb in).
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## Disassembly and Assembly

### C3.3 Industrial Engine

Media Number -KENR6212-01

Publication Date -01/07/2006

Date Updated -02/05/2017

i02466125

## Valve Mechanism Cover - Remove and Install

SMCS - 1107-010

### Removal Procedure

#### Start By:

- a. Remove the heat shields, if equipped.
- b. Remove the cover for the fuel injectors. Refer to this Disassembly and Assembly Manual, "Fuel Injector Cover - 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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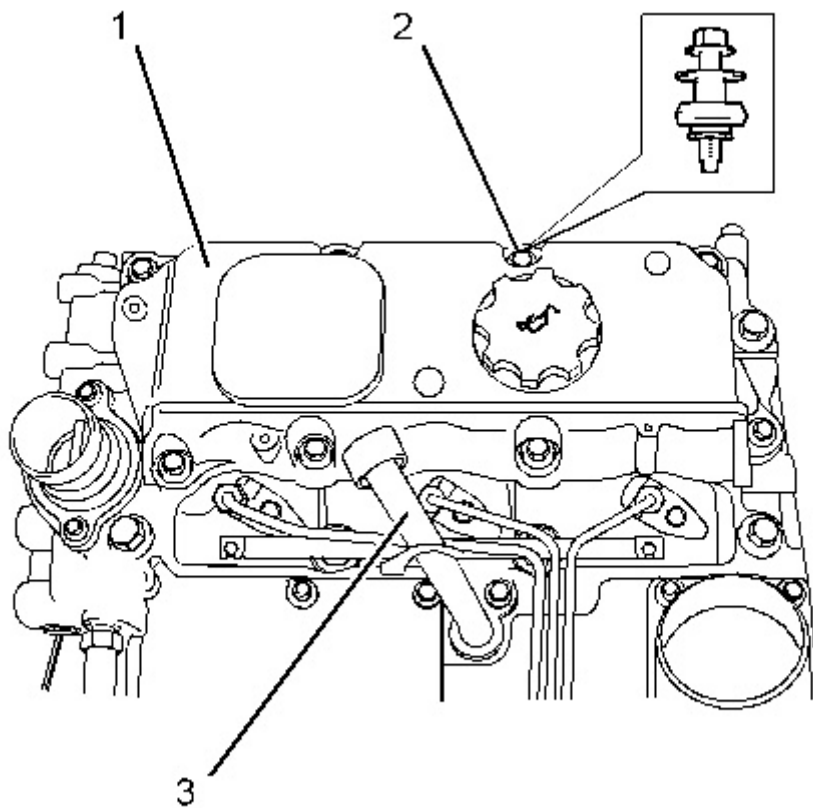
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#### NOTICE

**Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.**

**Dispose of all fluids according to local regulations and mandates.**

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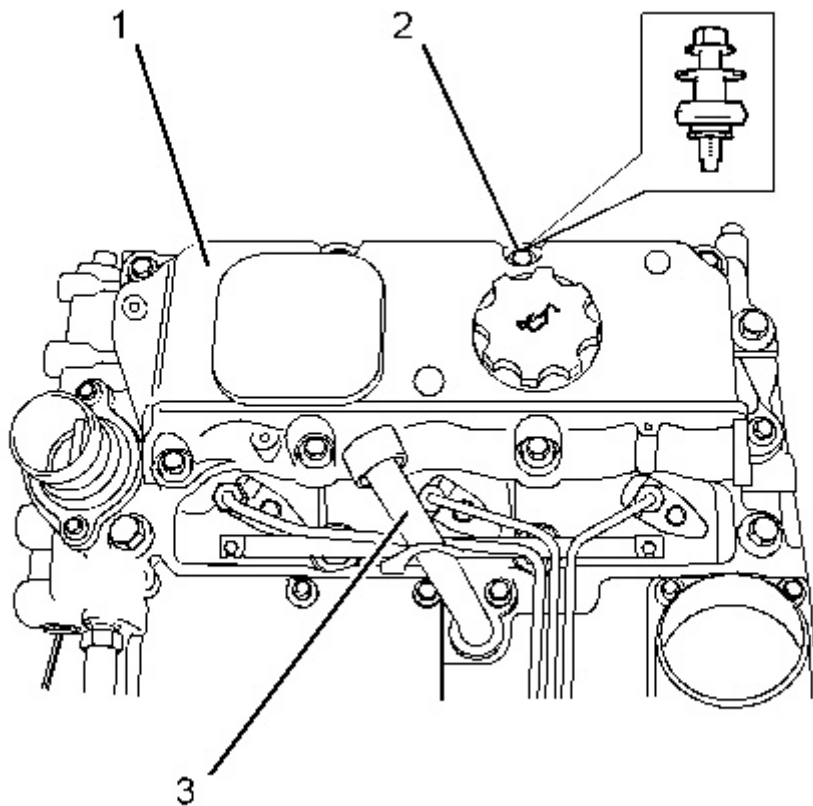
Illustration 1  
Typical example

g01230033

1. Remove the breather tube (3) from the valve mechanism cover (1). Refer to Disassembly and Assembly Manual, "Crankcase Breather - Remove and Install".
2. Remove the fasteners (2). Remove the valve mechanism cover (1). Remove the joint for the valve mechanism cover and discard the joint.

## Installation Procedure

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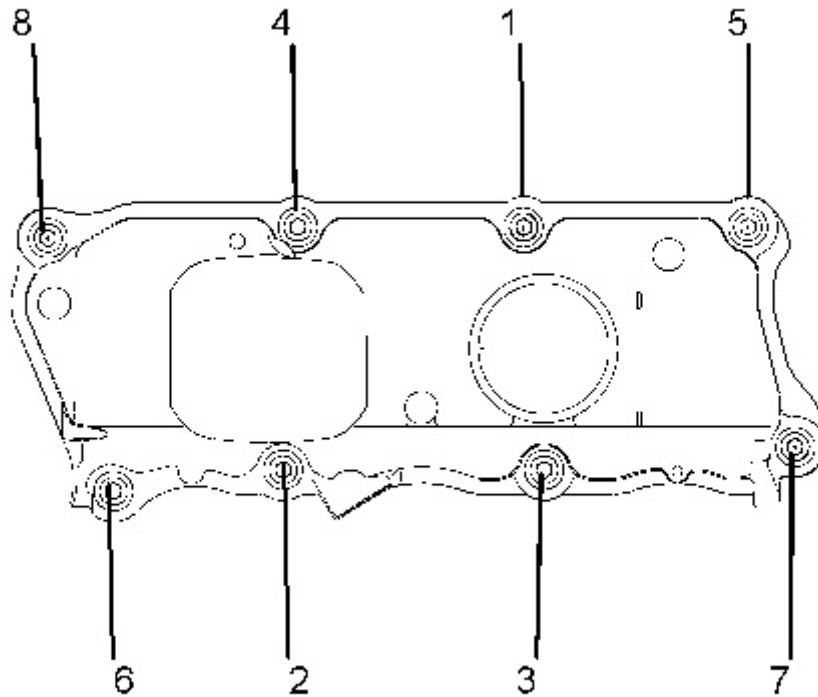
Illustration 2

g01230033

Typical example

1. Thoroughly clean the valve mechanism cover (1). Ensure that the groove for the joint for the valve mechanism cover (1) is clean and dry. Ensure that the mating face on the cylinder head is clean and dry.
  2. If the valve mechanism cover (1) is equipped with an oil filler cap, check the condition of the O-ring for the oil filler cap. If necessary, replace the O-ring.
  3. Install a new joint to the valve mechanism cover (1) and install the valve mechanism cover onto the cylinder head.
  4. Check the condition of the fasteners (2). Replace the fasteners (2), if necessary. Install the fasteners (2).
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Illustration 3

g01018519

Sequence for tightening the fasteners for the three cylinder engine

5. Tighten the fasteners for the valve mechanism cover in the sequence that is shown in Illustration 3. Tighten the fasteners to a torque of 9 N·m (80 lb in).
6. Connect the breather tube (3) to the valve mechanism cover (1). Refer to Disassembly and Assembly Manual, "Crankcase Breather - Remove and Install".

**End By:**

- a. Install the cover for the fuel injectors. Refer to this Disassembly and Assembly Manual, "Fuel Injector Cover - Remove and Install".
  - b. If equipped, ensure that the heat shields are clean and free from dust, oil, and paint. Install the heat shields.
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## Disassembly and Assembly C3.3 Industrial Engine

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Publication Date -01/07/2006

Date Updated -02/05/2017

i02466293

## Rocker Shaft and Pushrod - Remove

SMCS - 1102-011; 1208-011

## Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	6K-0806	Cable Strap	3

### Start By:

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

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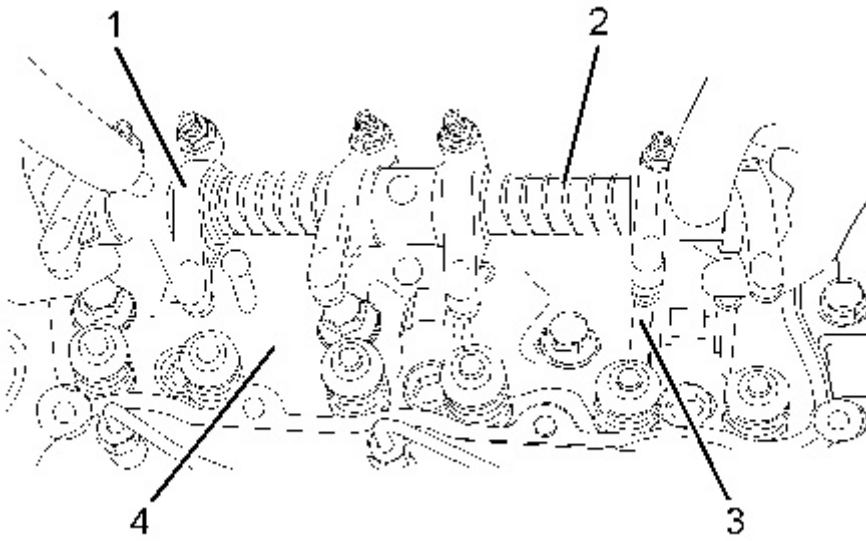
### NOTICE

**Keep all parts clean from contaminants.**

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

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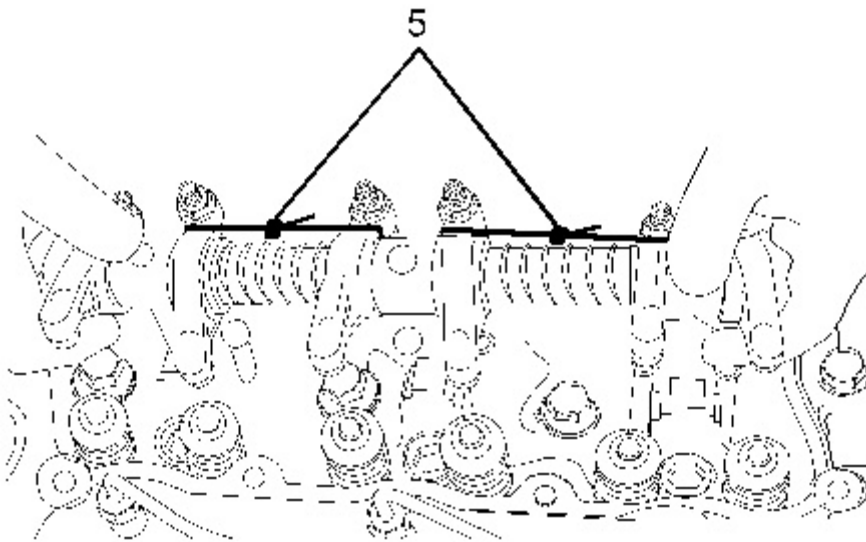


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Illustration 1

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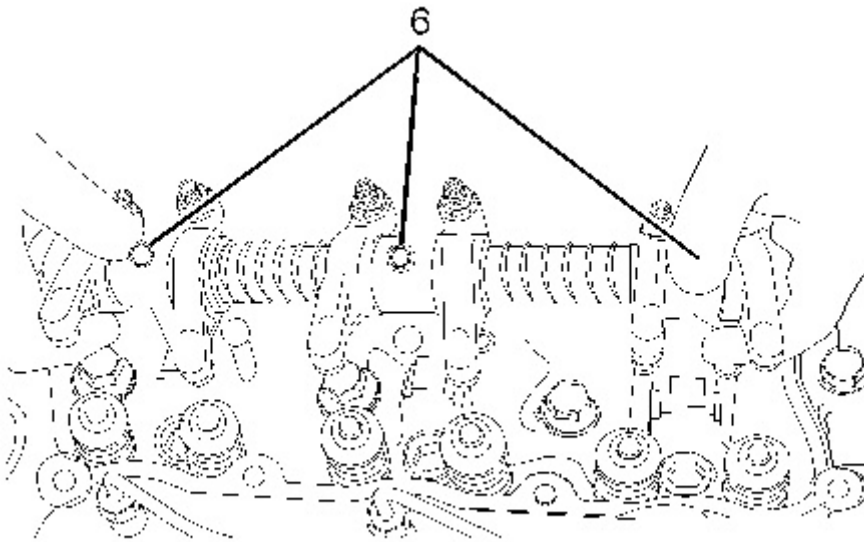


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Illustration 2

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Illustration 3

g01233326

1. If the rocker shaft will not be disassembled, install the cable straps (5) around the rocker arms (1) in order to slightly compress the springs. The rocker arms must be held away from the machined faces of the cylinder head (4) during installation.
  2. Remove the Torx screws (6) from the rocker shaft (2).
  3. Remove the rocker shaft assembly from the cylinder head.
  4. Remove the pushrods (3) from the cylinder head. Place an identification mark on each of the pushrods. Ensure that the pushrods are installed in the correct order when the rocker shaft is replaced.
-

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## Disassembly and Assembly C3.3 Industrial Engine

Media Number -KENR6212-01

Publication Date -01/07/2006

Date Updated -02/05/2017

i02298103

### Rocker Shaft - Disassemble

SMCS - 1102-015

### Disassembly Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	1P-1855	Retaining Ring Pliers	1

#### Start By:

- Remove the rocker shaft assembly. Refer to Disassembly and Assembly, "Rocker Shaft and Pushrod - Remove".



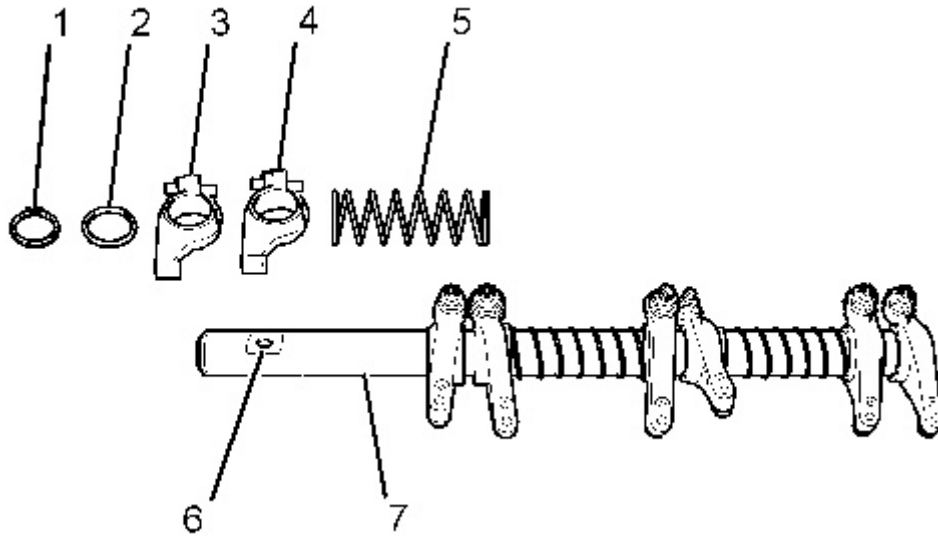
**Personal injury can result from being struck by parts propelled by a released spring force.**

**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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Illustration 1

g01150908

1. Remove the retaining ring (1) and remove the washer (2) from both ends of the rocker shaft assembly.  
**Note:** The rocker shaft (7) is not symmetrical as there is a machined flat (6) toward one end of the shaft.
  2. Place an identification mark on each of the components for installation. Ensure that you note the component's relationship to the machined flat (6).
  3. Remove the rocker arm assembly (3) for the inlet valve from the rocker shaft (7). Remove the rocker arm assembly (4) for the exhaust valve from the rocker shaft (7).
  4. Remove the spring (5) from the rocker shaft assembly.
  5. Repeat Step 3 and Step 4 in order to completely disassemble the rocker shaft assembly.
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## Disassembly and Assembly C3.3 Industrial Engine

Media Number -KENR6212-01

Publication Date -01/07/2006

Date Updated -02/05/2017

i02298104

### Rocker Shaft - Assemble

SMCS - 1102-016

### Assembly Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	1P-1855	Retaining Ring Pliers	1

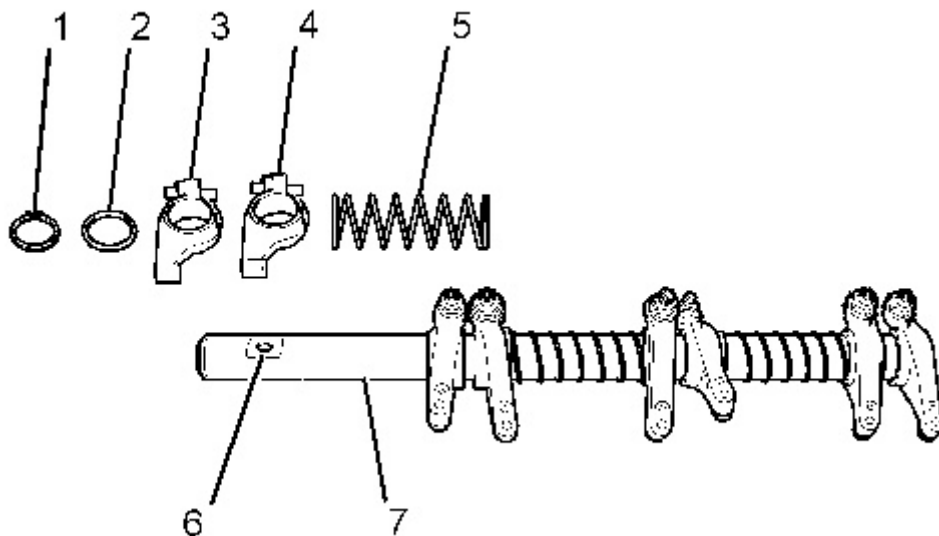


Illustration 1  
Typical example

g01150908

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