

Product: INDUSTRIAL ENGINE  
Model: C13 INDUSTRIAL ENGINE LGK  
Configuration: C13 Industrial Engine LGK00001-UP

## **Disassembly and Assembly C11 and C13 Industrial Engines**

Media Number -REN8632-06

Publication Date -01/10/2018

Date Updated -24/10/2018

i02286025

## **Front Cover - Remove**

SMCS - 1166-011

### **Removal Procedure**

#### **Start By:**

- a. Remove the fuel transfer pump. Refer to Disassembly and Assembly, "Fuel Transfer Pump - Remove".
- b. Remove the crankshaft front seal. Refer to Disassembly and Assembly, "Crankshaft Front Seal - Remove".

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#### **NOTICE**

**Keep all parts clean from contaminants.**

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

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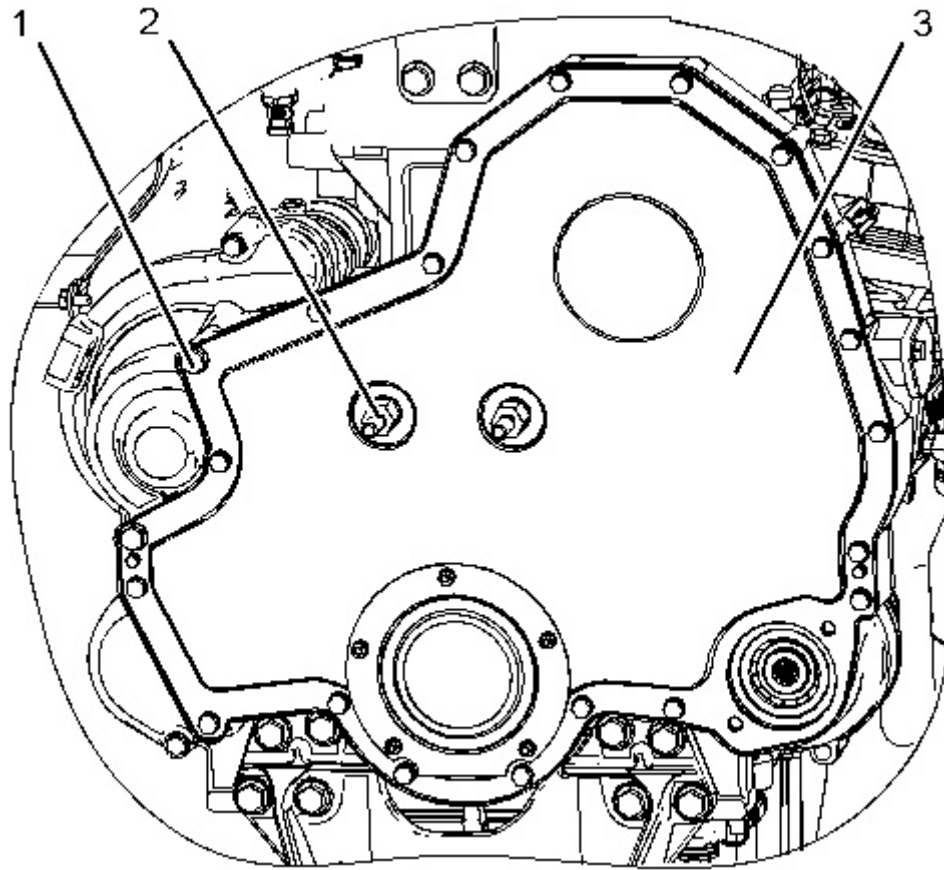
#### **NOTICE**

**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.**

**Refer to Special Publication, NENG2500, "Dealer Service Tool Catalog" for tools and supplies suitable to collect and contain fluids on Cat products.**

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

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Illustration 1

g01015022

1. Remove bolts (1).
  2. Remove studs (2).
  3. Remove front cover (3) and the gasket.
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i02286031

## **Front Cover - Install**

SMCS - 1166-012

## **Installation Procedure**

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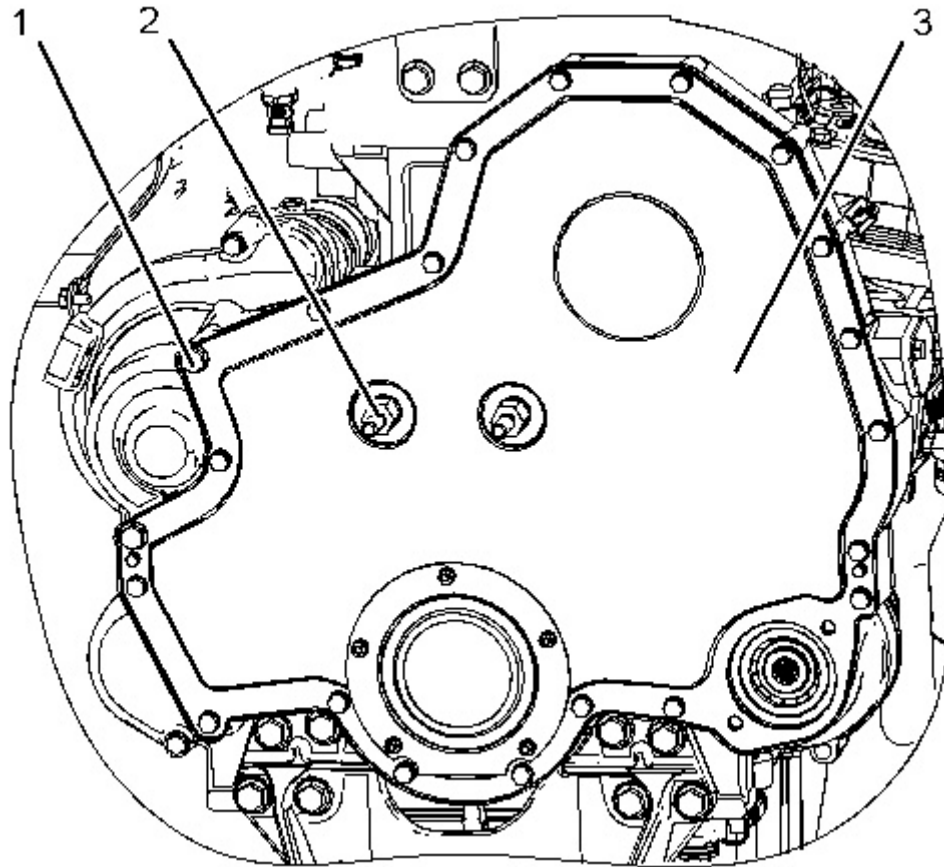
### **NOTICE**

**Keep all parts clean from contaminants.**

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

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Illustration 1

g01015022

1. Position the gasket and front cover (3) on the front housing.
2. Install studs (2).
3. Install bolts (1).

**End By:**

- a. Install the crankshaft front seal. Refer to Disassembly and Assembly, "Crankshaft Front Seal - Install".
  - b. Install the fuel transfer pump. Refer to Disassembly and Assembly, "Fuel Transfer Pump - Install".
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i03384190

### **Gear Group (Front) - Remove**

SMCS - 1206-011

### **Removal Procedure**

#### **Start By:**

- a. Remove the front cover. Refer to Disassembly and Assembly, "Front Cover - Remove".

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#### **NOTICE**

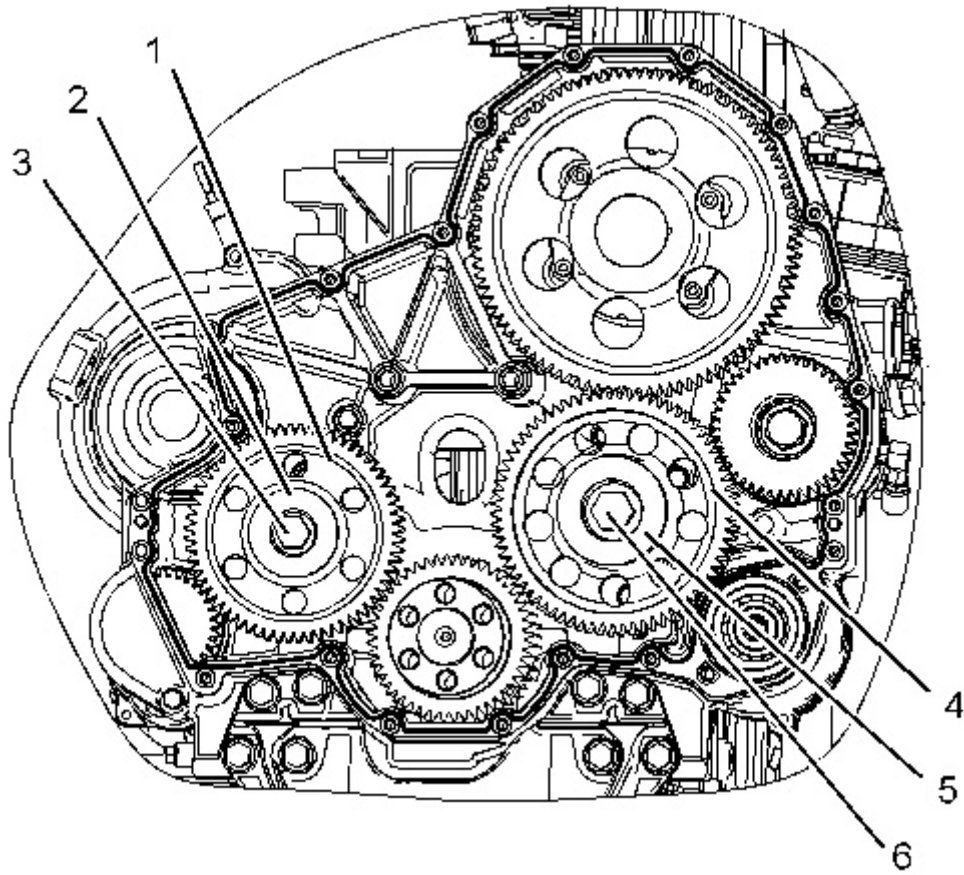
**Keep all parts clean from contaminants.**

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

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**Note:** Align the timing marks on the idler gear with the marks on the crankshaft gear and the camshaft gear before removal.

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Illustration 1

g01014874

1. Remove the following items from the front housing: bolt (3), the bearing and shaft (2) and gear (1).
  2. Remove the following items from the front housing: bolt (6), the bearing and shaft (5) and gear (4).
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i01950583

## **Gear Group (Front) - Install**

SMCS - 1206-012

### **Installation Procedure**

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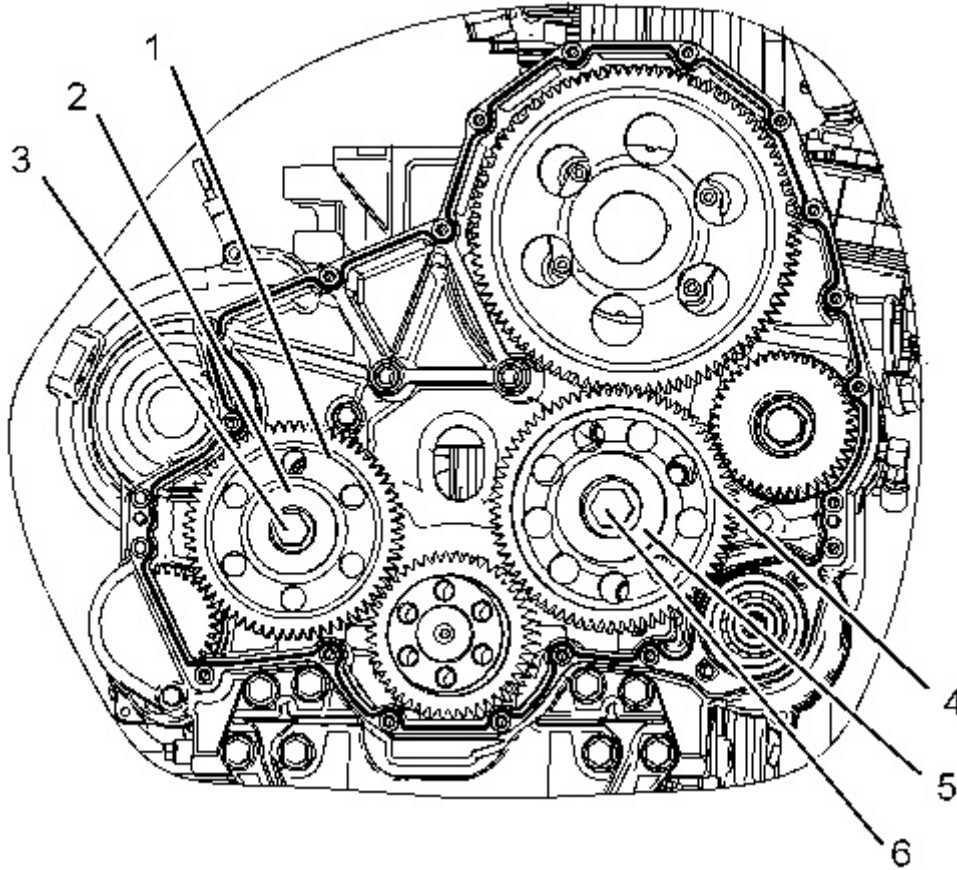
#### **NOTICE**

**Keep all parts clean from contaminants.**

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

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Illustration 1

g01014874

1. Install the following items in the front housing: gear (4), the bearing and shaft (5) and bolt (6).
2. Install the following items in the front housing: gear (1), the bearing and shaft (2) and bolt (3).

**Note:** Make sure that the timing marks on the gears are in alignment.

**End By:**

- a. Install the front cover. Refer to Disassembly and Assembly, "Front Cover - Install".
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i02250160

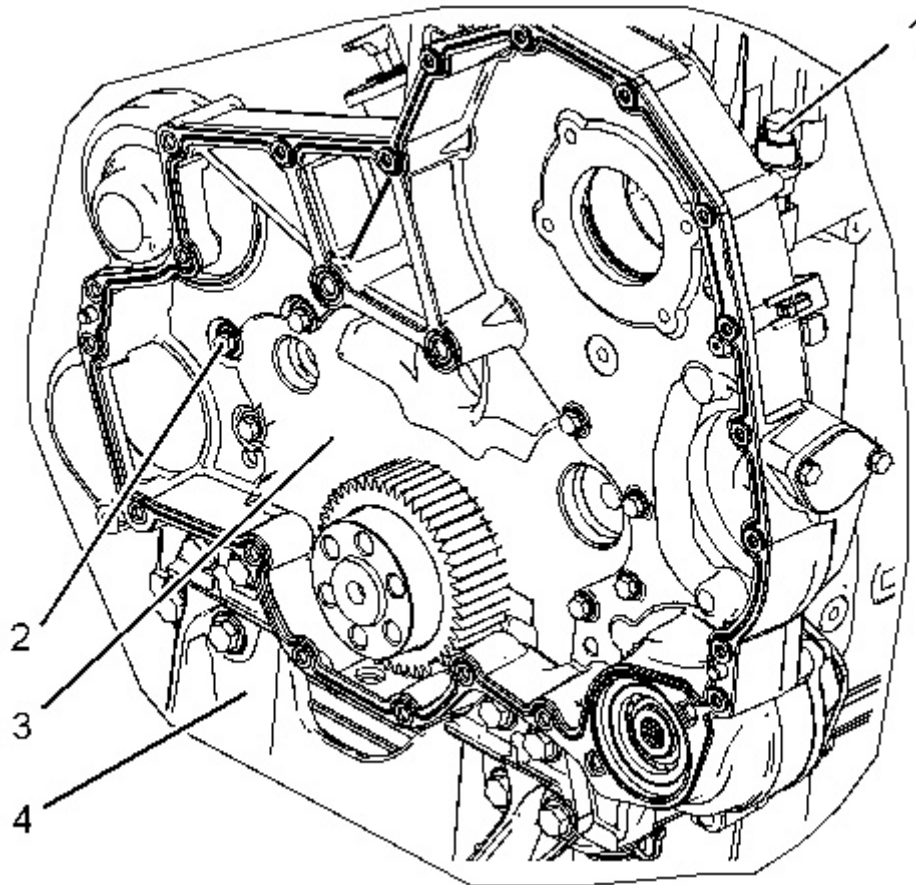
### **Housing (Front) - Remove**

SMCS - 1151-011

### **Removal Procedure**

#### **Start By:**

- a. Remove the engine oil pump. Refer to Disassembly and Assembly, "Engine Oil Pump - Remove".
  - b. Remove the water pump. Refer to Disassembly and Assembly, "Water Pump - Remove".
  - c. Remove the camshaft. Refer to Disassembly and Assembly, "Camshaft - Remove".
  - d. Remove the front gear group. Refer to Disassembly and Assembly, "Gear Group (Front) - Remove".
  - e. Remove the crankshaft position sensor. Refer to Disassembly and Assembly, "Crankshaft Position Sensor - Remove and Install".
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Illustration 1

g01132684

1. Disconnect sensor (1).
  2. Support the engine.
  3. Remove front engine mount (4).
  4. Loosen the oil pan bolts in order to allow the front of the oil pan to drop.
  5. Remove bolts (2).
  6. Remove front housing (3).
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i02250365

### Housing (Front) - Install

SMCS - 1151-012

### Installation Procedure

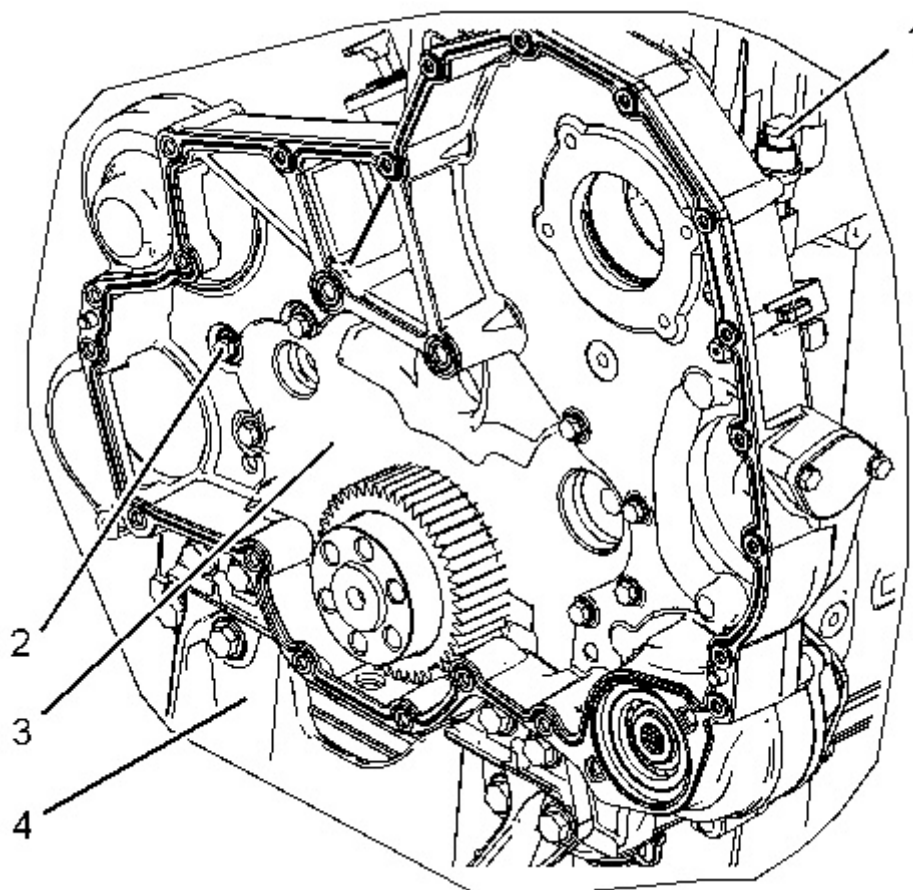


Illustration 1

g01132684

1. Position front housing (3) on the engine.
2. Install bolts (2).
3. Tighten the oil pan bolts.
4. Install front engine mount (4).
5. Connect sensor (1).

**End By:**

- a. Install the crankshaft position sensor. Refer to Disassembly and Assembly, "Crankshaft Position Sensor - Remove and Install".
  - b. Install the front gear group. Refer to Disassembly and Assembly, "Gear Group (Front) - Install".
  - c. Install the camshaft. Refer to Disassembly and Assembly, "Camshaft - Install".
  - d. Install the water pump. Refer to Disassembly and Assembly, "Water Pump - Install".
  - e. Install the engine oil pump. Refer to Disassembly and Assembly, "Engine Oil Pump - Install".
-

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i02250527

### Accessory Drive - Remove

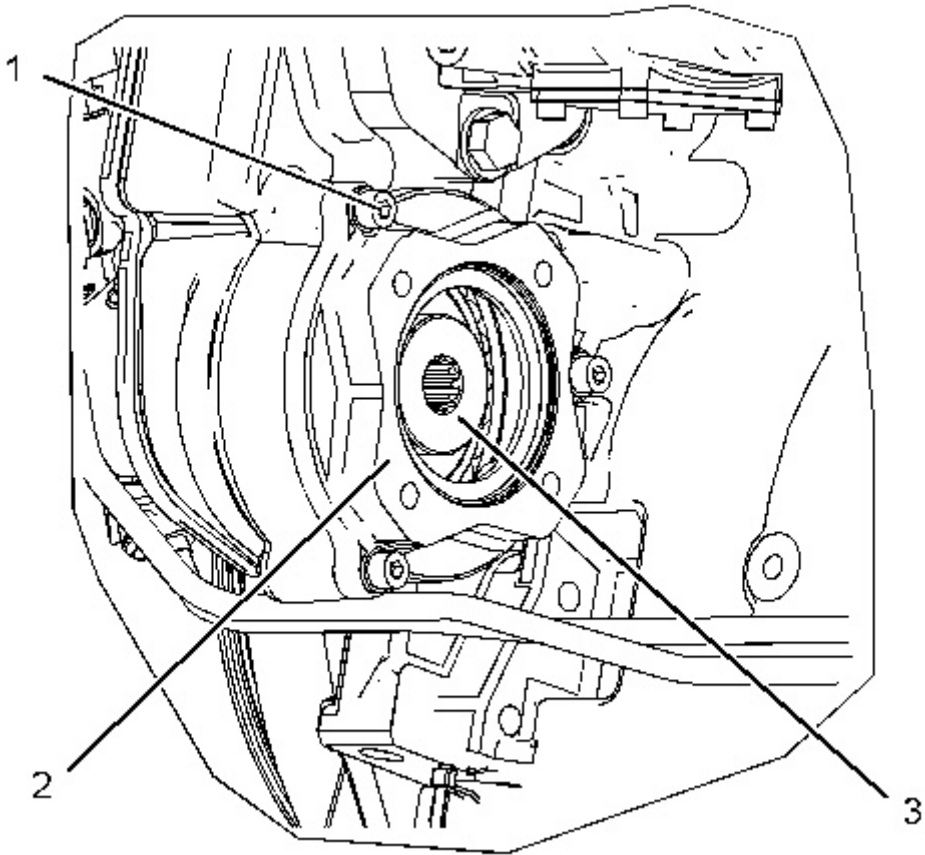
SMCS - 1207-011

### Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	8H-0663	Bearing Puller Gp	1
	8B-7551	Bearing Puller Gp	1

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Illustration 1

g01011209

1. Remove bolts (1), cover (2), and gear (3).
  2. Use Tooling (A) and a suitable press in order to remove the bearings from gear (3).
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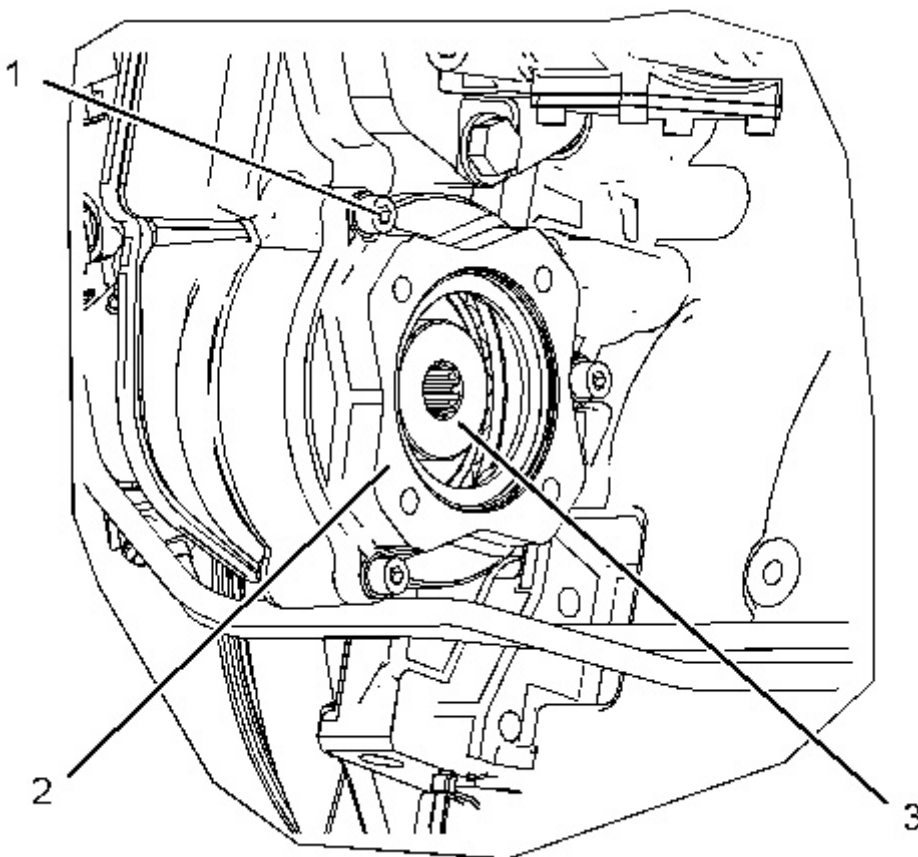
Date Updated -24/10/2018

i01943324

### Accessory Drive - Install

SMCS - 1207-012

### Installation Procedure



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Illustration 1

g01011209

1. Raise the temperature of the bearing.
  2. Lower the temperature of gear (3).
  3. Install the bearing into gear (3).
  4. Install gear (3), cover (2), and bolts (1).
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i03390484

# Valve Mechanism Cover Base - Remove and Install

SMCS - 1120-010

## Removal Procedure

### Start By:

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

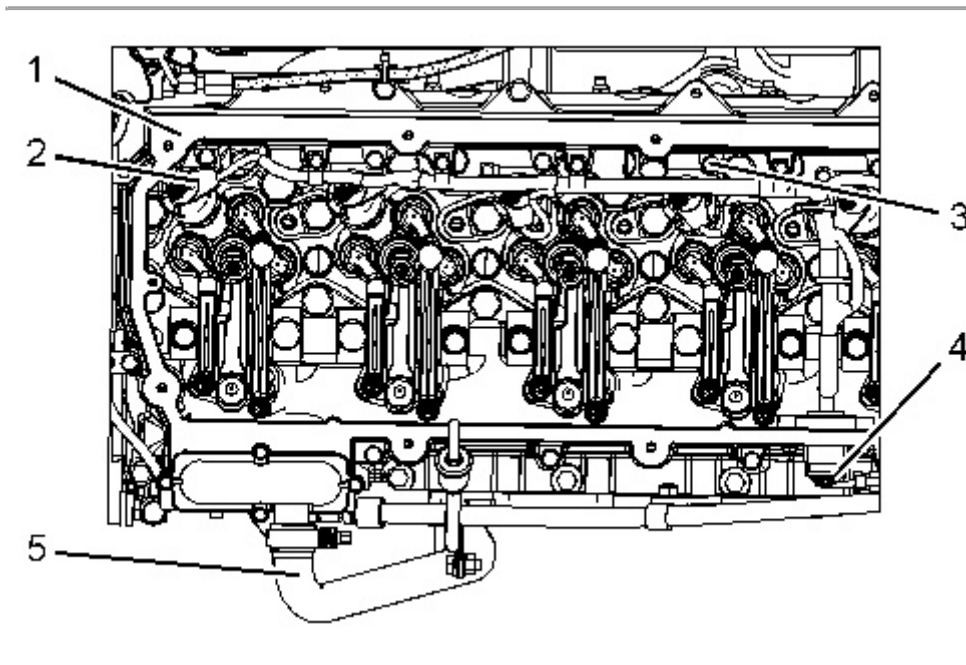


Illustration 1

g01132854

1. Disconnect harness assemblies (2) and harness assembly (4).
2. Disconnect hose (5).

3. Remove bolts (3).
4. Remove valve mechanism cover base (1).

## Installation Procedure

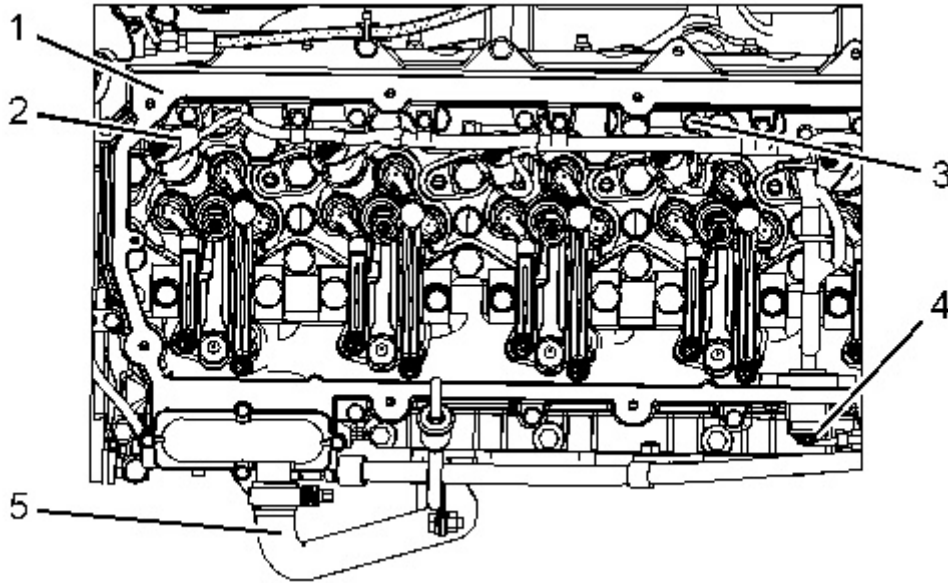


Illustration 2

g01132854

1. Position valve mechanism cover base (1) on the engine.
2. Install bolts (3).
3. Connect hose (5).
4. Connect harness assemblies (2) and harness assembly (4).

### End By:

- a. Install the valve mechanism cover. Refer to Disassembly and Assembly, "Valve Mechanism Cover - Remove and Install".
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i02540277

### Rocker Shaft and Pushrod - Remove

SMCS - 1102-011; 1208-011

### Removal Procedure

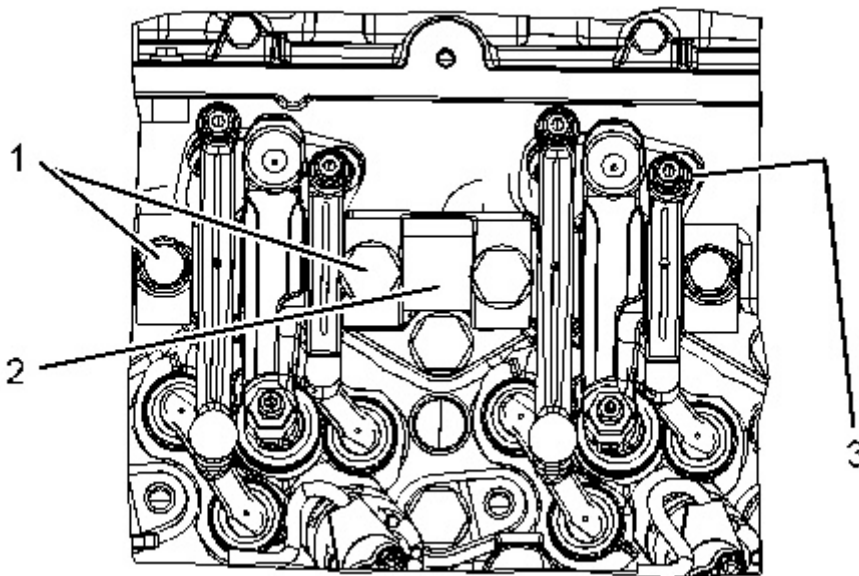


Illustration 1

g01271795

1. Remove the valve cover.
2. Remove bolts (1) .
3. Remove rocker arm shaft (2) and pushrods (3) .

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i02251334

### Rocker Shaft - Disassemble

SMCS - 1102-015

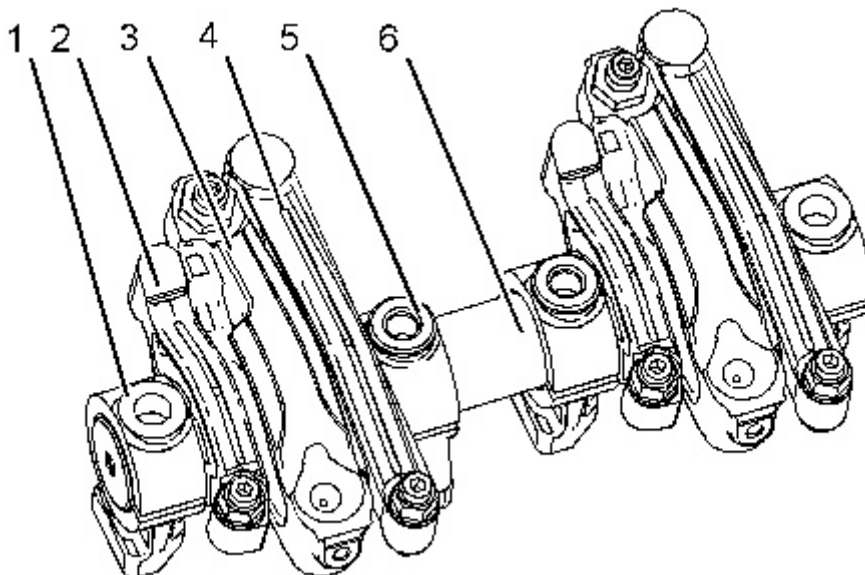
### Disassembly Procedure

Table 1

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

#### Start By:

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



**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.
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i04398594

## Rocker Shaft - Assemble

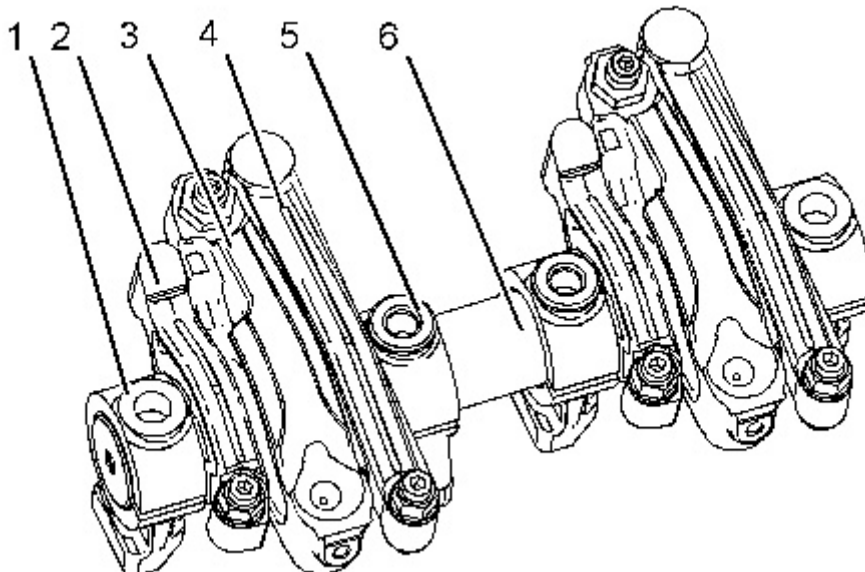
SMCS - 1102-016

### 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 the rocker arms. For correct bearing dimensions, refer to Specifications, "Electronic Unit Injector Rocker Arm" and Specifications, "Valve Mechanism".



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

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

**Note:** Tighten the nuts on rocker arms (4) , rocker arms (3) , and rocker arms (2) to  $6 \pm 3$  N·m ( $53 \pm 27$  lb in). The free running torque of the screws must not exceed 0.4 N·m (3.5 lb in).

3. Install stands (1) .

**End By:** Install the rocker shaft. Refer to Disassembly and Assembly, "Rocker Shaft and Pushrod - Install".

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