



# Service Repair Manual

## **Models**

### C2.2 Industrial Engine

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◀ Product: INDUSTRIAL ENGINE  
 Model: C2.2 INDUSTRIAL ENGINE G7M  
 Configuration: C2.2 Industrial Engine G7M00001-UP

## Disassembly and Assembly

### C0.5, C0.7, C1.1/3011C, C1.5/3013C, C1.6 and C2.2/3024C/3024CT Industrial Engines and Engines for Caterpillar Built Machines

Media Number -REN2424-09

Publication Date -01/04/2007

Date Updated -14/07/2017

i02235578

# Crankshaft Pulley - Remove and Install

SMCS - 1205-010

## Removal Procedure

### Start By:

- a. Remove the fan drive belt. Refer to Disassembly and Assembly, "V Belts Remove and Install" for more information.

Table 1

| Required Tools |             |              |     |
|----------------|-------------|--------------|-----|
| Tool           | Part Number | Description  | Qty |
| A              | 8S-2264     | Puller Group | 1   |
|                | 6V-3668     | Bolt         | 3   |

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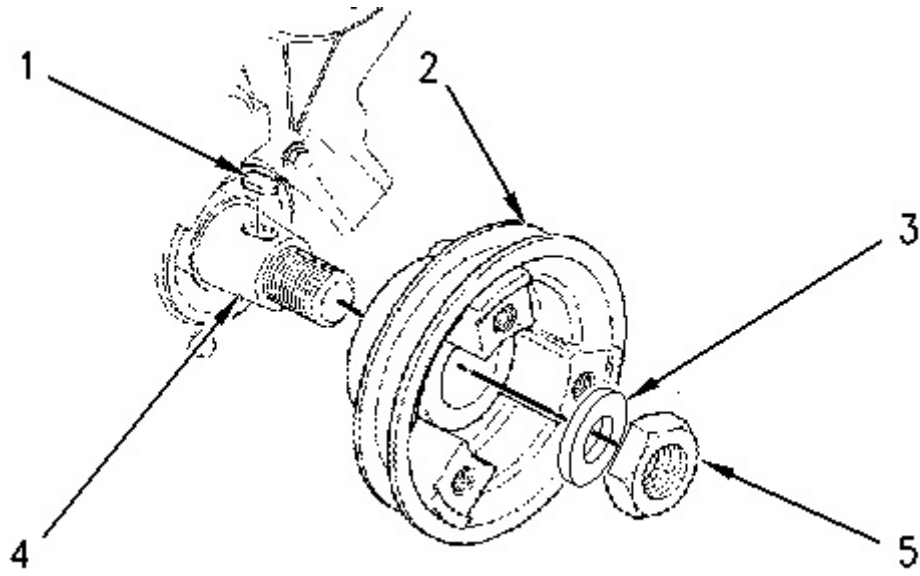


Illustration 1

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1. Remove the nut (5) and the washer (3) from the crankshaft pulley (2).

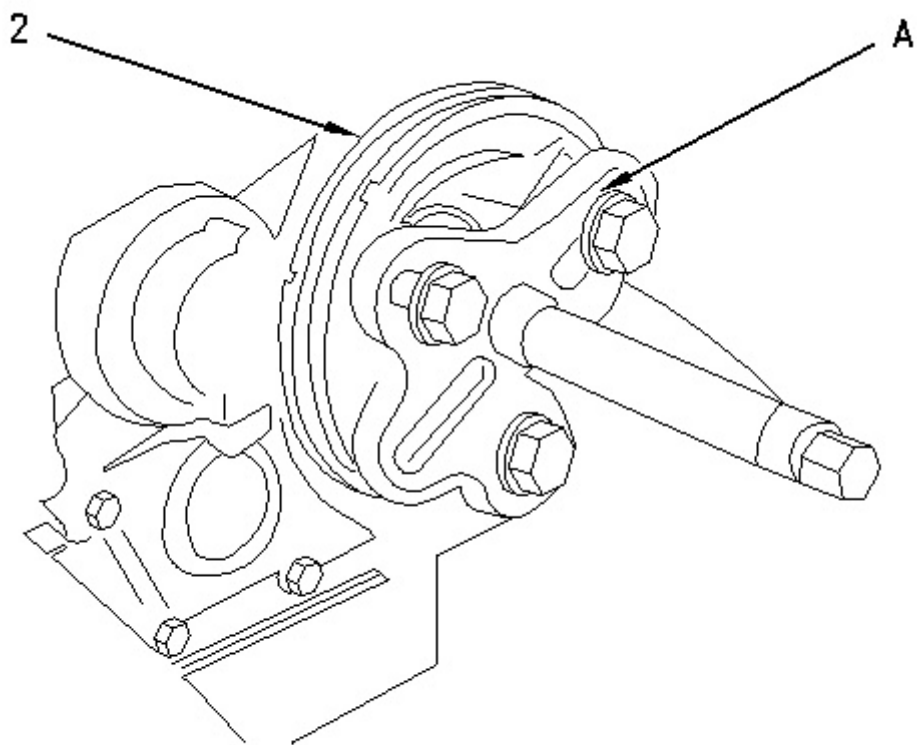


Illustration 2

g00827241

2. Install tool (A). Use tool (A) in order to remove the crankshaft pulley (2) from the crankshaft (4).

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3. Remove the woodruff key (1) from the crankshaft (4).

## Installation Procedure

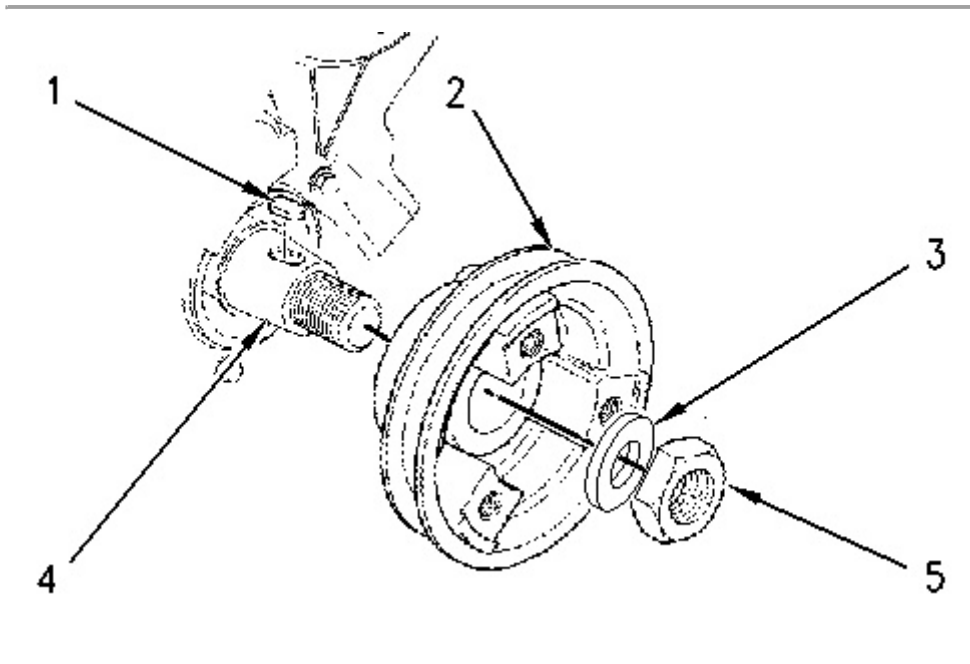


Illustration 3

g00827213

**Note:** Inspect the following components for damage: the taper of the crankshaft, the woodruff key and the bore of the crankshaft pulley. Replace any components that are damaged. Ensure that the taper of the crankshaft and the bore of the crankshaft pulley are clean and dry before assembly.

1. Install the woodruff key (1) to the crankshaft (4).
2. Install the crankshaft pulley (2) to the crankshaft (4).
3. Install the washer (3) to the crankshaft (4).
4. Lubricate the nut (5) with clean engine oil and install the nut.

For C0.5 and C0.7 engines, tighten the nut (5) to a torque of 93 N·m (69 lb ft).

For C1.1/3011C and C1.6 engines, tighten the nut (5) to a torque of 123 N·m (91 lb ft).

For C1.5/3013C, C2.2/3024C and C2.2/3024CT engines, tighten the nut (5) to a torque of 304 N·m (224 lb ft).

### End By:

- a. Install the V-belt to the engine. Refer to Disassembly and Assembly, "V Belts Remove and Install".

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Product: INDUSTRIAL ENGINE  
 Model: C2.2 INDUSTRIAL ENGINE G7M  
 Configuration: C2.2 Industrial Engine G7M00001-UP

**Disassembly and Assembly**

**C0.5, C0.7, C1.1/3011C, C1.5/3013C, C1.6 and C2.2/3024C/3024CT Industrial Engines and Engines for Caterpillar Built Machines**

Media Number -REN2424-09

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i02237294

**Crankshaft Front Seal - Remove**

SMCS - 1160-011

**Removal Procedure for the Front Oil Seal that is Installed in the Engine**

Table 1

| Required Tools |             |                        |     |
|----------------|-------------|------------------------|-----|
| Tool           | Part Number | Part Description       | Qty |
| A              | 1U-8145     | Drill Bit              | 1   |
| B              | 1U-7600     | Slide Hammer Puller Gp | 1   |

**Start By:**

- a. Remove the crankshaft pulley. Refer to Disassembly and Assembly, "Crankshaft Pulley - 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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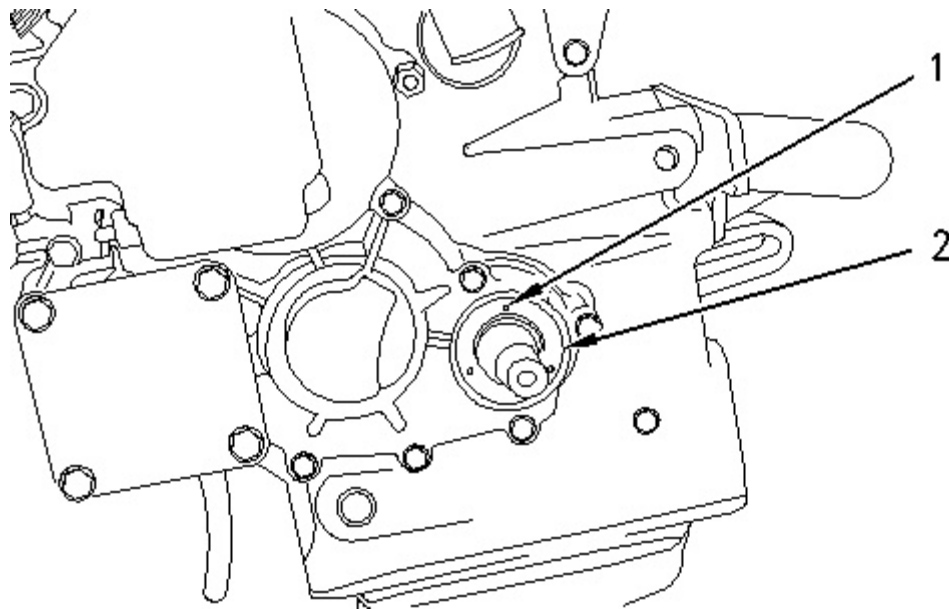
**NOTICE**

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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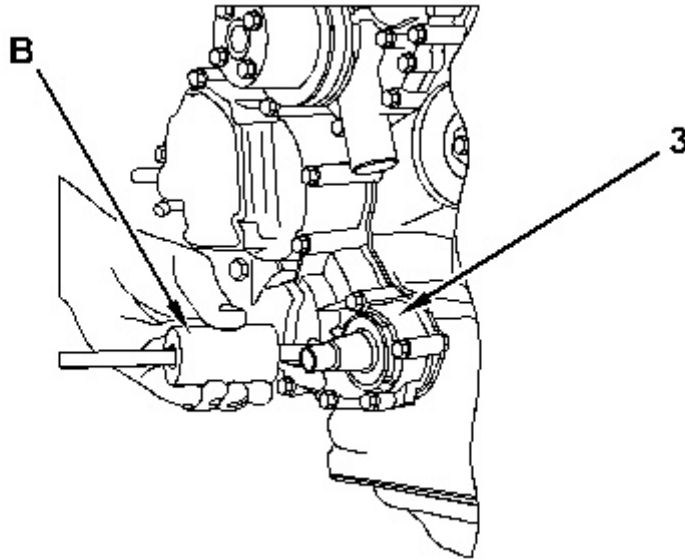


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Illustration 1  
typical example

g00827263

1. Use Tooling (A) and carefully drill three evenly spaced holes (1) in crankshaft front seal (2).
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Illustration 2

g01037807

Typical example

2. Carefully remove the crankshaft front seal by alternating the position of Tooling (B) from one hole to another hole. This will allow you to evenly remove the crankshaft front seal from housing (3).

**Note:** Do not damage the flange of the crankshaft during the removal process of the crankshaft front seal.

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### NOTICE

**Ensure that the main lip is used in order to remove the crankshaft front seal. Do not damage the edge of the housing for the crankshaft front seal.**

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## Removal Procedure for the Front Oil Seal from a Disassembled Front Cover

### Start By:

- a. Remove the crankshaft pulley. Refer to Disassembly and Assembly, "Crankshaft Pulley - Remove and Install".
- b. Remove the housing (Front). Refer to Disassembly and Assembly, "Housing (Front) - 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**

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1. If the front cover has been removed from the engine, use a suitable hydraulic press in order to remove the oil seal from the front cover. Ensure that the front cover is supported correctly in order to prevent damage to the cover while the oil seal is being removed.
- 

### **NOTICE**

**Ensure that the main lip is used in order to remove the crankshaft front seal. Do not damage the edge of the housing for the crankshaft front seal.**

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Product: INDUSTRIAL ENGINE  
Model: C2.2 INDUSTRIAL ENGINE G7M  
Configuration: C2.2 Industrial Engine G7M00001-UP

## Disassembly and Assembly

### C0.5, C0.7, C1.1/3011C, C1.5/3013C, C1.6 and C2.2/3024C/3024CT Industrial Engines and Engines for Caterpillar Built Machines

Media Number -REN2424-09

Publication Date -01/04/2007

Date Updated -14/07/2017

i02237296

## Crankshaft Front Seal - Install

SMCS - 1160-012

## Installation Procedure

Table 1

| Required Tools |             |                  |     |
|----------------|-------------|------------------|-----|
| Tool           | Part Number | Part Description | Qty |
| A              | 5P-3537     | Seal Guide       | 1   |

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### NOTICE

**Keep all parts clean from contaminants.**

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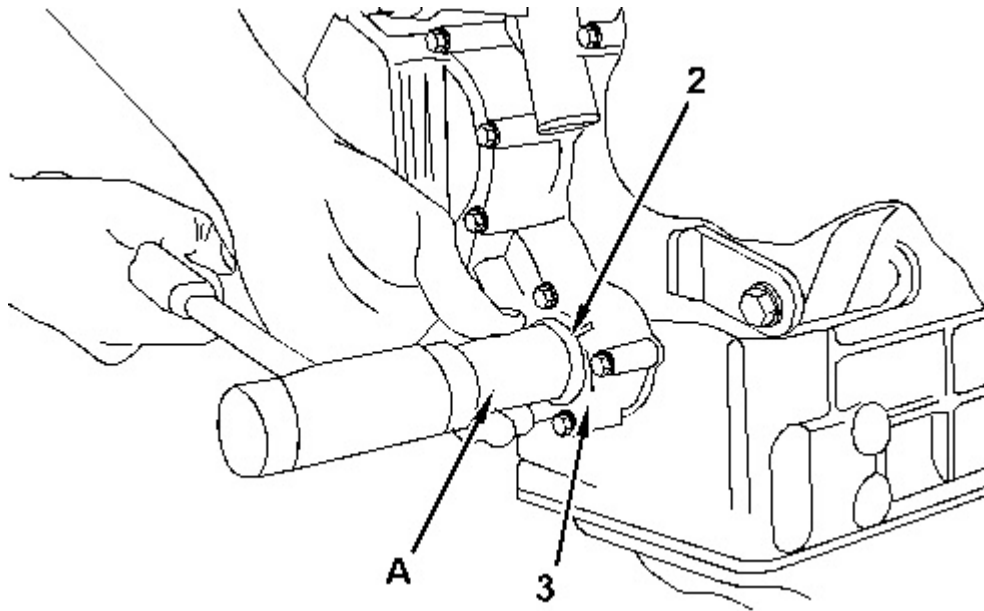


Illustration 1  
typical example

g01128190

1. Clean housing (3) for crankshaft front seal (2) and inspect the housing for any damage.
2. Lubricate the lip of crankshaft front seal (2) with clean engine oil.
3. Position crankshaft front seal (2) in housing (3) for the crankshaft front seal.

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### NOTICE

**Ensure that the lip of the crankshaft front seal that is spring loaded is facing toward the inside of the front housing and that it is square with the bore of the housing for the crankshaft front seal.**

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4. Use Tooling (A) to install new crankshaft front seal (2).
5. Apply clean engine oil on the area of the crankshaft pulley that will be in contact with crankshaft front seal (2).

### End By:

- a. Install the crankshaft pulley. Refer to Disassembly and Assembly, "Crankshaft Pulley - Remove and Install".

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Product: INDUSTRIAL ENGINE  
Model: C2.2 INDUSTRIAL ENGINE G7M  
Configuration: C2.2 Industrial Engine G7M00001-UP

## Disassembly and Assembly

### C0.5, C0.7, C1.1/3011C, C1.5/3013C, C1.6 and C2.2/3024C/3024CT Industrial Engines and Engines for Caterpillar Built Machines

Media Number -REN2424-09

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i03631161

## Housing (Front) - Remove

SMCS - 1151-011

### Removal Procedure

#### Start By:

- A. Remove the fuel injection pump. Refer to Disassembly and Assembly, "Fuel Injection Pump - Remove".
- B. Remove the crankshaft pulley. Refer to Disassembly and Assembly, "Crankshaft Pulley - 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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#### NOTICE

**If the front housing is not installed, do not turn the crankshaft.  
Damage to the engine may occur.**

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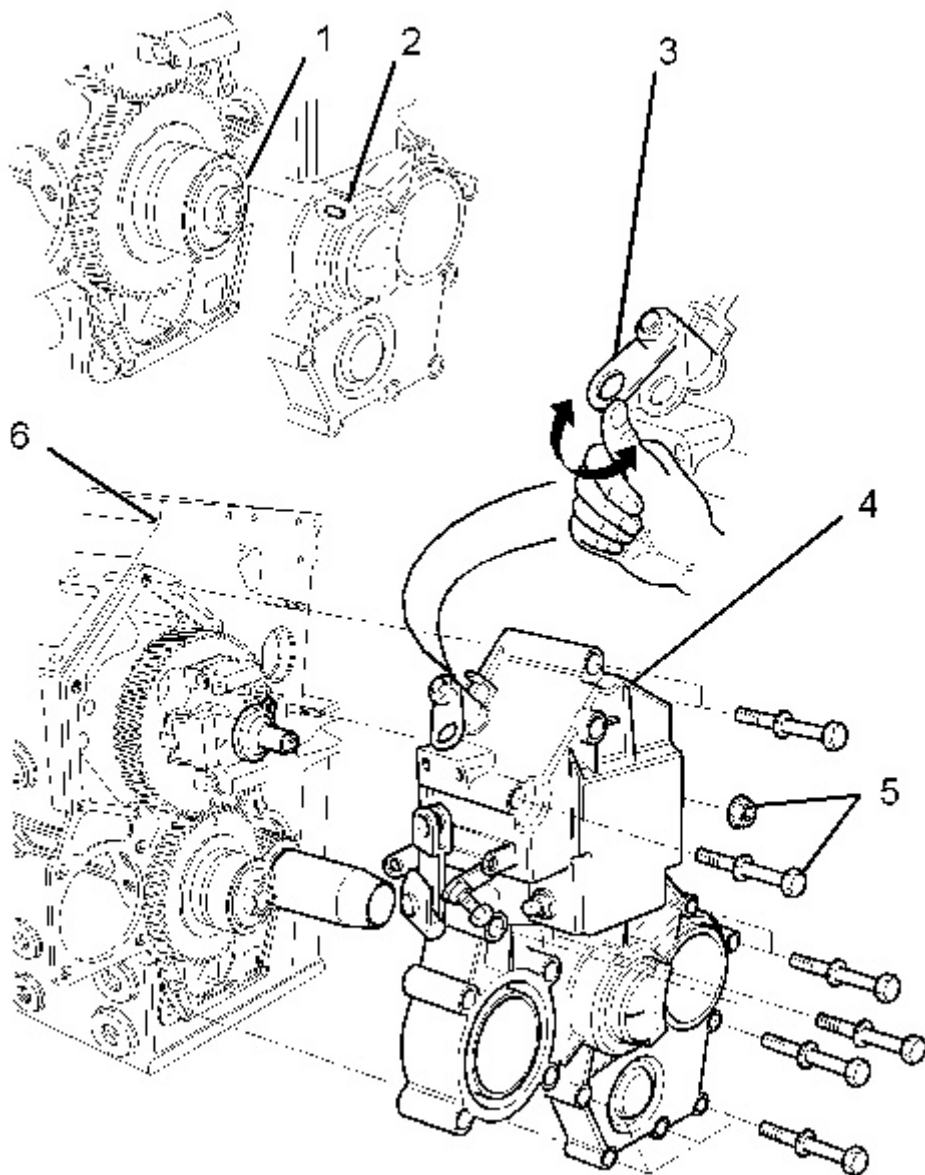
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Dispose of all fluids according to local regulations and mandates.



Typical example

1. Remove the setscrews and the nuts (5) from the front housing (4) .
2. Turn the mechanical stop lever (3) to the full clockwise position so that the spring is held under tension.
3. Remove the front housing (4) from the front of cylinder block (6) .

**Note:** Identify the position of the locating pin (2) and the locating hole (1) for installation.

4. Remove the joint for the front housing (not shown). Discard the joint.
5. Inspect the front housing assembly (4) for wear or damage. If the front housing assembly is damaged, use new parts for replacement.

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Product: INDUSTRIAL ENGINE  
Model: C2.2 INDUSTRIAL ENGINE G7M  
Configuration: C2.2 Industrial Engine G7M00001-UP

## Disassembly and Assembly

### C0.5, C0.7, C1.1/3011C, C1.5/3013C, C1.6 and C2.2/3024C/3024CT Industrial Engines and Engines for Caterpillar Built Machines

Media Number -REN2424-09

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i02233016

## Housing (Front) - Disassemble

SMCS - 1151-015

## Disassembly Procedure

### Start By:

- a. Remove the engine front housing. Refer to Disassembly and Assembly, "Housing (Front) - 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

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## WARNING

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

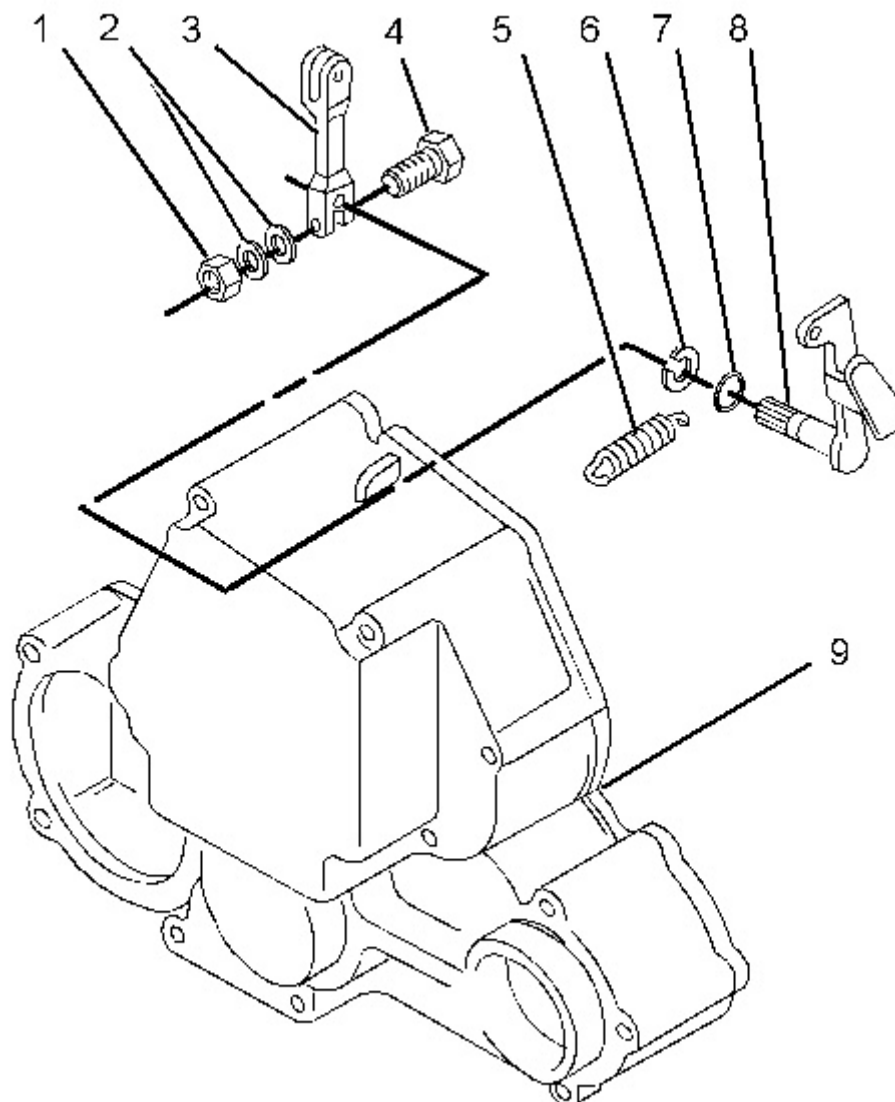
Make sure to wear all necessary protective equipment.

Follow the recommended procedure and use all recommended tooling to release the spring force.

---

### Removal of the Throttle Control

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Typical example

1. Remove the spring (5) from the lever (8) for the throttle control.
2. Loosen the nut (1) and the bolt (4) that secures the arm (3) to the lever (8) for the throttle control.

**Note:** Identify the position of the arm in relation to the lever for installation. Do not remove the nut (1) and the washers (2) from the bolt (4).

3. Remove the arm (3) from the lever (8).
4. Remove the C-clip (6) from the lever (8).
5. Remove the lever (8) from the front housing (9).
6. Remove the O-ring (7) from lever (8). Discard the O-ring.
7. Check the components for wear or damage. Replace any components that are worn or damaged.

## Removal of the linkage for the Fuel Injection Pump

**Note:** When the linkage for the fuel injection pump is removed or the engine front cover is replaced, the setting for the maximum fuel may be affected.



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**Follow the recommended procedure and use all recommended tooling to release the spring force.**

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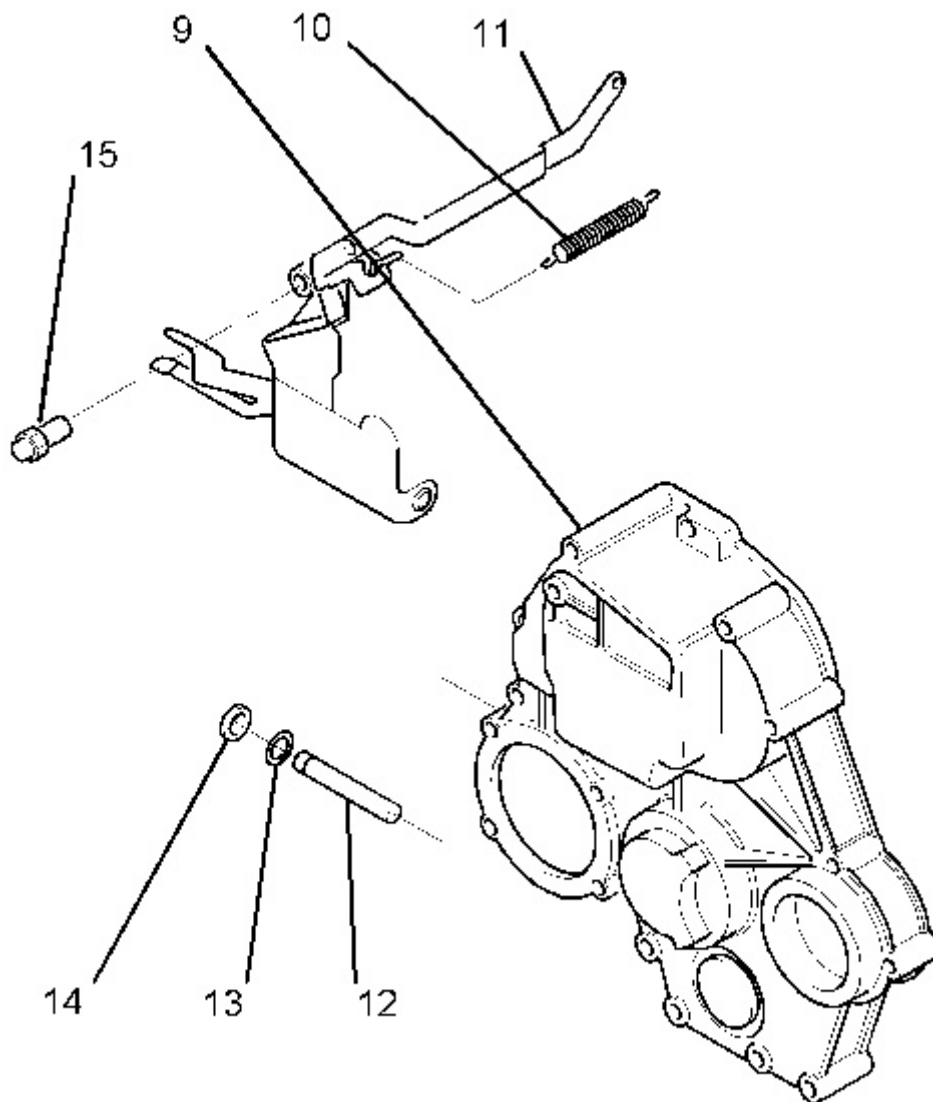


Illustration 2  
Typical example

g01114159

1. Remove the spring (10) from the lever assembly (11).
2. Remove the C-clip (14) from the shaft (12).
3. Remove the shaft (12) and remove the lever assembly (11) from the engine front housing (9).
4. Remove the O-ring (13) from the shaft (12). Discard the O-ring.
5. Remove the angleich unit (15) from the lever assembly (11).

**Note:** The angleich unit is not installed to the C0.5, C0.7, C1.1/3011C and C1.6 engines, or engines that run at a constant speed.

6. Check the components for wear or damage. Replace any components that are worn or damaged.

## Removal of the Stop Control



**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.**

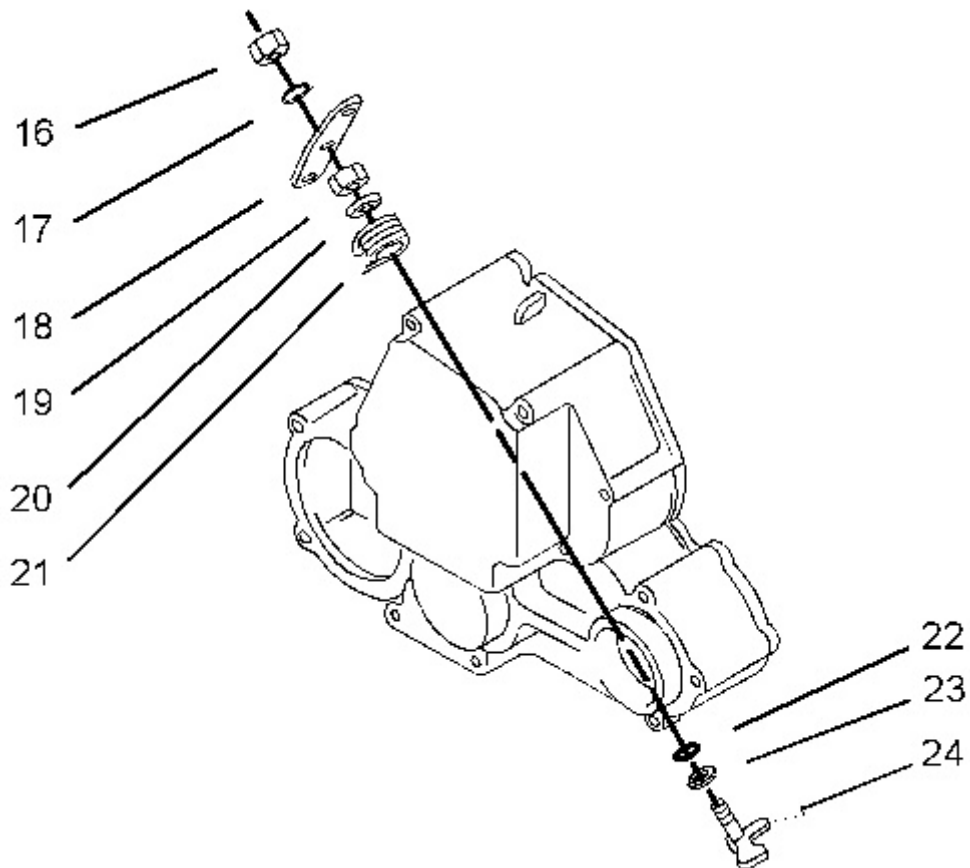


Illustration 3  
Typical example

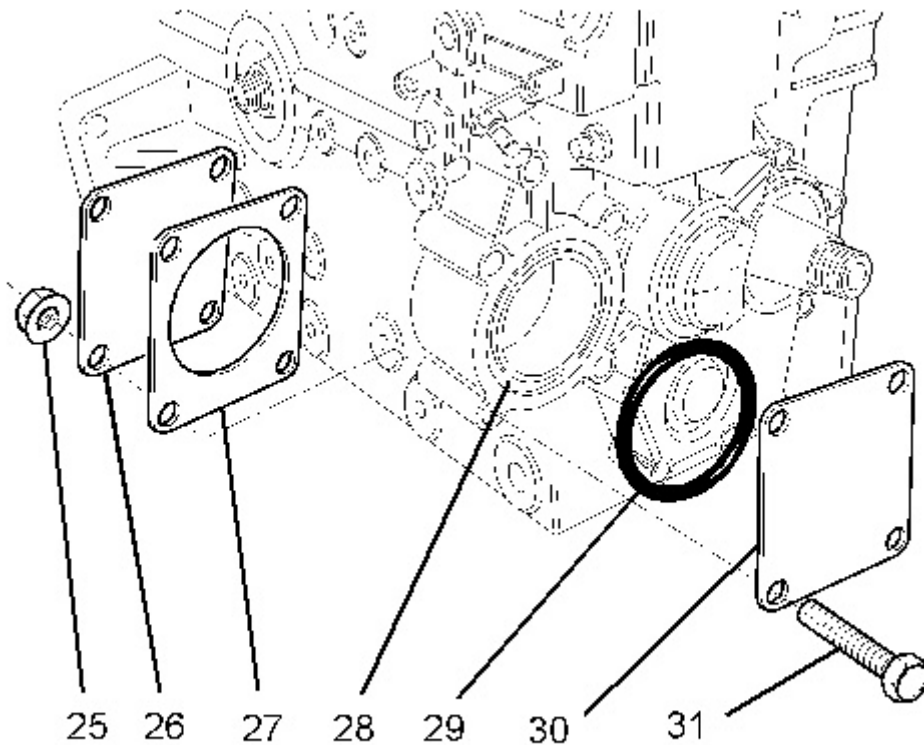
g01114517

1. Remove the nut (16) and remove the washer (17) that secures the lever (18) to the arm (24) for the stop control.
2. Remove the lever (18) from the arm (24) for the stop control.

**Note:** Identify the position of the lever (18) on the shaft (24) for installation.

3. Remove the nut (19) from the arm (24) for the stop control. Remove the washer (20) and remove the spring (21) from the arm (24).
4. Remove the arm (24) for the stop control from the front housing.
5. Remove the C-clip (23) and the O-ring (22) from the arm (24). Discard the O-ring.

## Removal of the PTO Cover



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Illustration 4  
Typical example

g01114513

1. Remove the nuts (25) and the bolts (31) from the PTO cover.
2. Remove the plates (26) and (30).

**Note:** The plate (30) is not installed on C0.5 or C0.7 engines.

3. Remove the joint (27) and discard the joint.
4. Remove the O-ring (29). Discard the O-ring.

**Note:** The O-ring (29) is not installed on C0.5 or C0.7 engines.

5. Check the condition of all parts. Replace any parts that are damaged or worn.
-



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Product: INDUSTRIAL ENGINE  
Model: C2.2 INDUSTRIAL ENGINE G7M  
Configuration: C2.2 Industrial Engine G7M00001-UP

## Disassembly and Assembly

### C0.5, C0.7, C1.1/3011C, C1.5/3013C, C1.6 and C2.2/3024C/3024CT Industrial Engines and Engines for Caterpillar Built Machines

Media Number -REN2424-09

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i02233015

## Housing (Front) - Assemble

SMCS - 1151-016

## Assembly Procedure

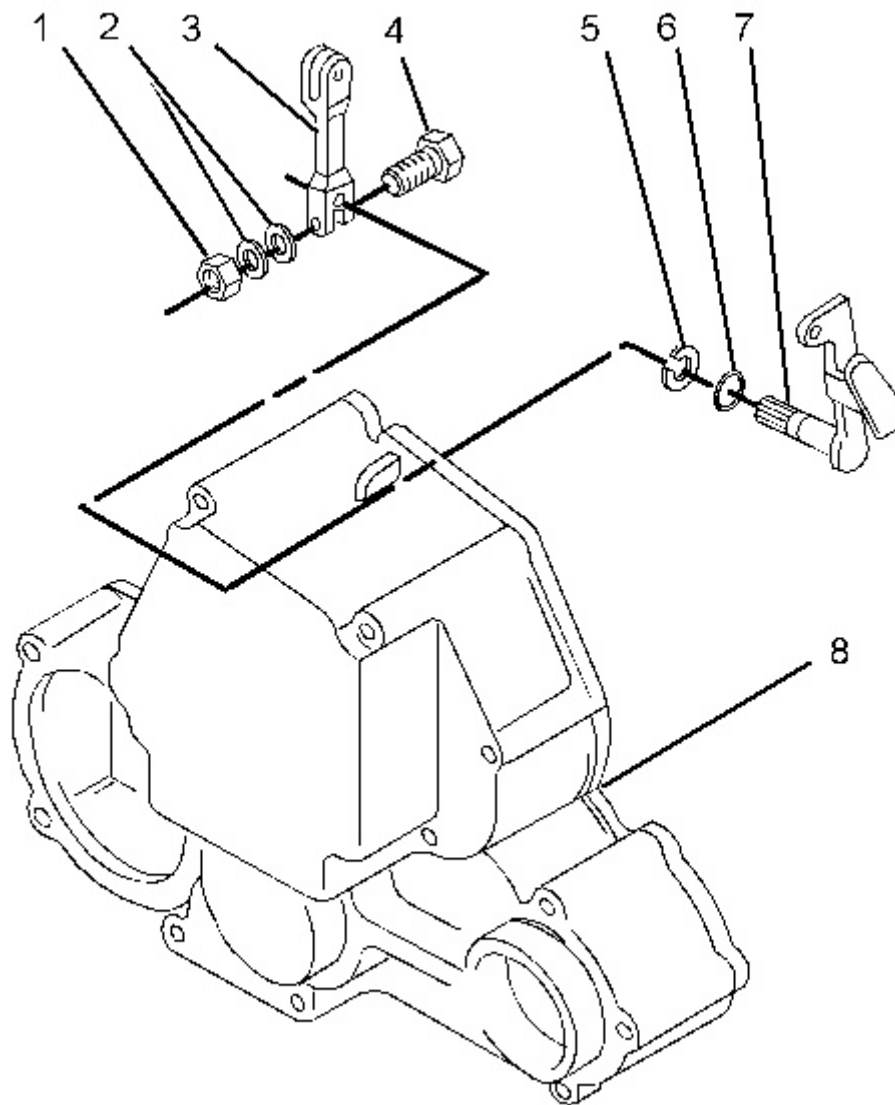
Table 1

| Required Tools |             |                      |
|----------------|-------------|----------------------|
| Tool           | Part Number | Part Description     |
| A              | 9S-3263     | Thread Lock Compound |

**Note:** If the engine front housing is replaced, ensure that a new emissions label is installed.

## Installation of the Throttle Control

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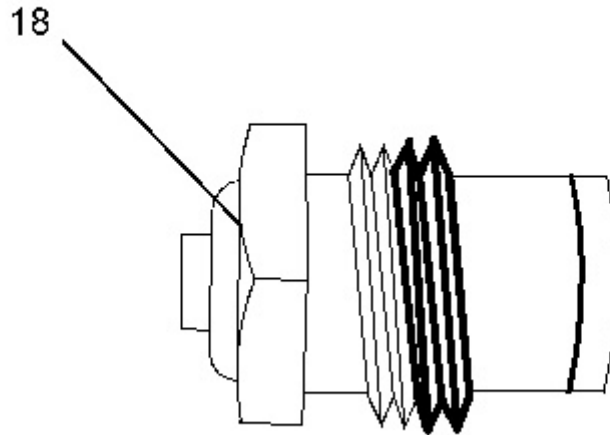
Illustration 1  
Typical example

g01114382

1. Install the O-ring (6) to the shaft of the lever (7).
2. Lubricate the O-ring (6) and the shaft of the lever (7) with clean engine oil. Install the lever (7) into the front housing (8).
3. Install the C-clip (5) onto the shaft of the lever (7).
4. Install the arm for the throttle control (3) onto the lever (7). Tighten the nut (1) and bolt (4) to a torque of 9 N·m (7 lb ft).

## **Installation of the linkage for the Fuel Injection Pump**

1. If necessary, perform the following procedure to install the angleich unit (15) to the lever assembly (11).
-



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Illustration 2

g01114377

- a. Apply **9S-3263** Thread Lock Compound to the first two threads of the angleich unit (18).
- b. Install the angleich unit (18) to the lever assembly (11). Tighten the angleich unit to a torque of 5 N·m (44 lb in).

**Note:** Ensure that no **9S-3263** Thread Lock Compound is allowed to contaminate the plunger assembly of the angleich unit. Contamination of the plunger assembly will render the angleich unit inoperative.



**WARNING**

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**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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**Suggest:**

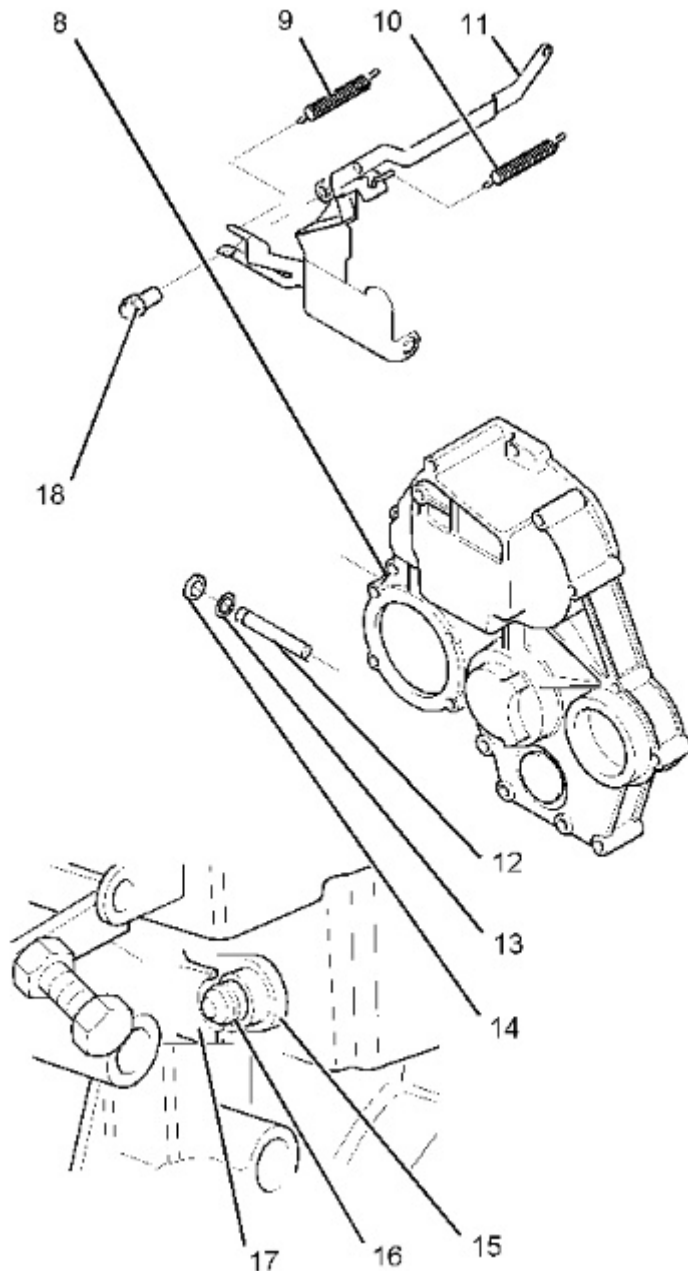
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Illustration 3  
Typical example

g01114562

2. Install the spring (10) to the lever assembly (11).
3. Install the O-ring (13) to the shaft (12). Lubricate the shaft with clean oil.
4. Position the lever assembly (11) in the front housing (8). Install the shaft (12) to outside of the front housing (8).

**Note:** Ensure that the groove for the C-clip (16) in the shaft (12) is positioned between the boss (15) on the front housing and the cast retainer (17) on the front housing (8).

5. Install the C-clip (14) to the shaft (12).
-

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