

Product: TRACK LOADER

Model: 973D TRACK LOADER LCP

Configuration: 973D TRACK-TYPE LOADER LCP00001-UP (MACHINE) POWERED BY C9 Engine

## Disassembly and Assembly C9 Engines for Caterpillar Built Machines

Media Number -REN9579-20

Publication Date -01/02/2015

Date Updated -15/08/2018

i03582800

# Gear Group (Rear) - Remove and Install

SMCS - 1206-010; 1212-010

## Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	1P-0520	Driver Gp	1
B	1P-0510	Driver Gp	1

### Start By:

- A. Remove the flywheel and pump drive gear. Refer to Disassembly and Assembly, "Flywheel - 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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Illustration 1

g01383883

1. Remove bolts (1) and remove retainer (2). Remove gear assembly (3) .



Illustration 2

g01383924

2. Use Tooling (A) in order to remove bushing (4) from gear assembly (3) .
3. Repeat Steps 1 and 2 for the opposite side.

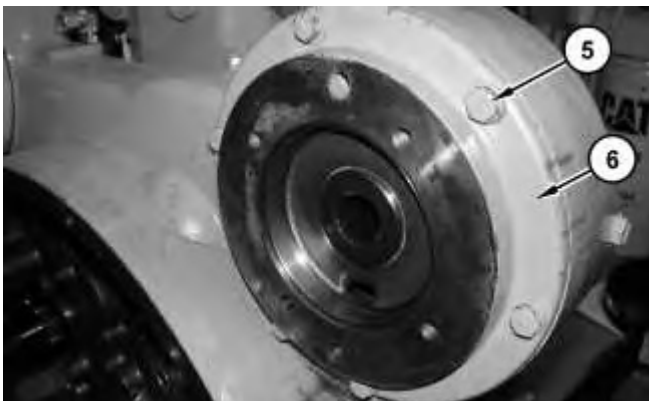


Illustration 3

g01383927

4. Remove bolts (5). Remove adapter (6) and the O-ring seal.

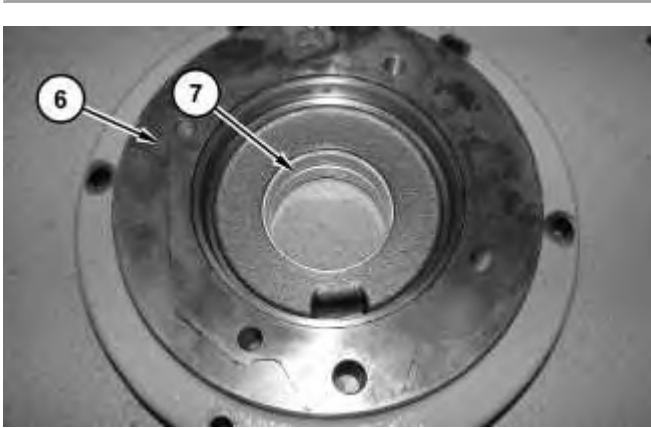


Illustration 4

g01384414

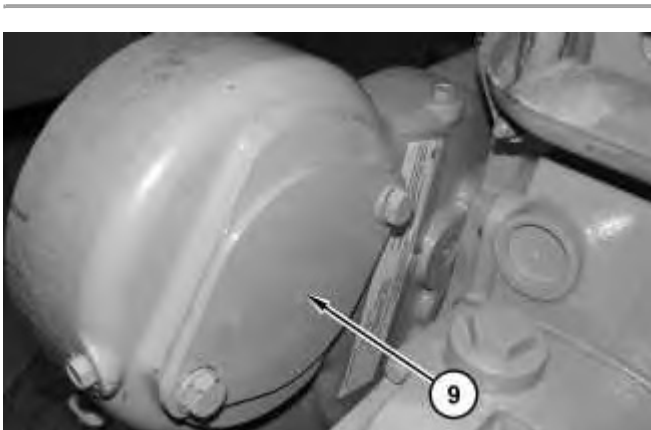
5. Use Tooling (B) in order to remove bearing (7) from adapter assembly (6) .



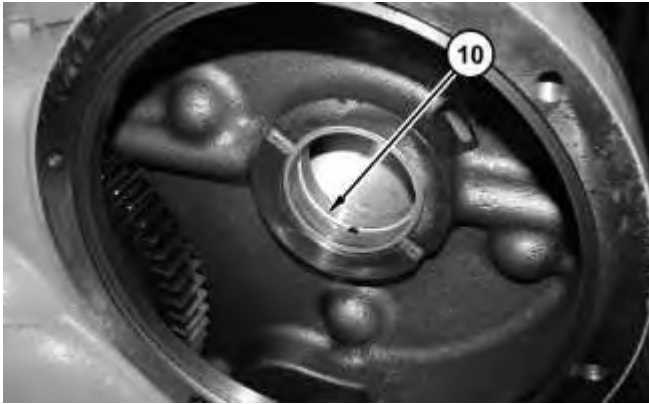
Illustration 5

g01384424

6. Remove gear assembly (8) .



7. Remove cover (9) and the O-ring seal.



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Illustration 7

8. Use Tooling (B) in order to remove bearing (10) .
9. Repeat Steps 4 through 8 for the opposite side.

## Installation Procedure

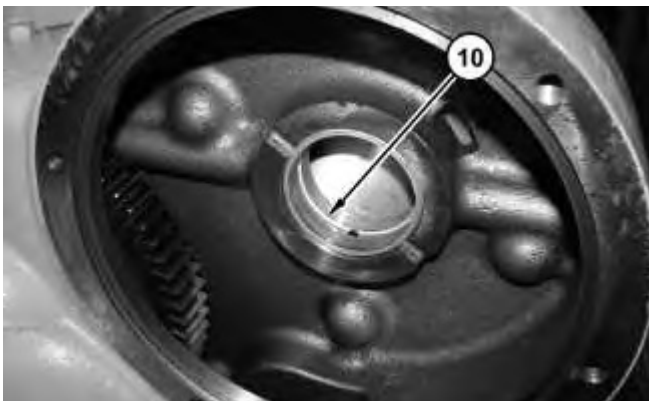
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### NOTICE

**Keep all parts clean from contaminants.**

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

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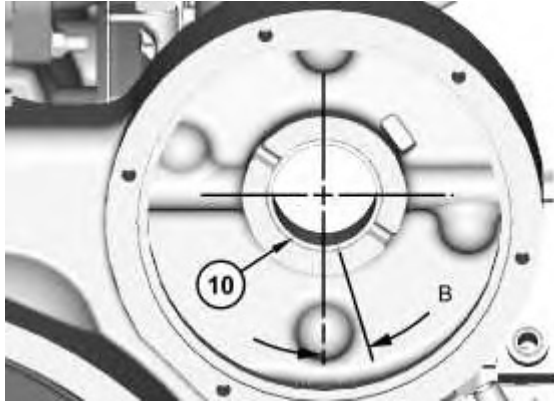


Illustration 9

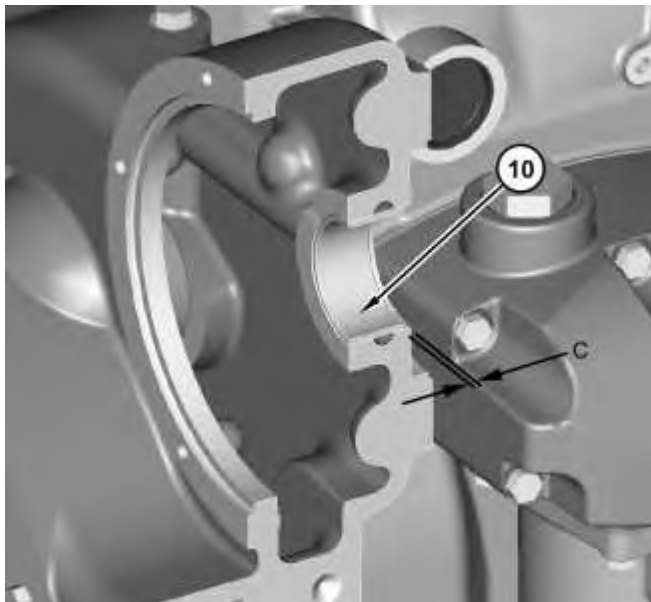


Illustration 10

1. Lower the temperature of bearing (10). Be sure to match Dimension (B) and Dimension (C) when you are installing bearing (10). Dimension (B) indicates the angle of the joint on bearing (10). Dimension (B) is  $15^\circ \pm 1^\circ$ . Dimension (C) shows the distance from bearing (10) to the end of the bore. Dimension (C) is  $4.000 \pm 0.500$  mm ( $0.1575 \pm 0.0197$  inch).
-

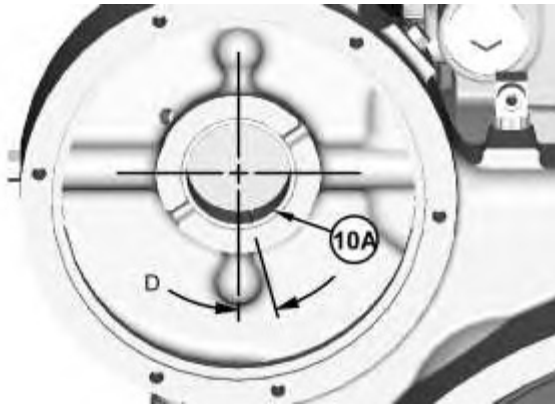


Illustration 11

g01384714

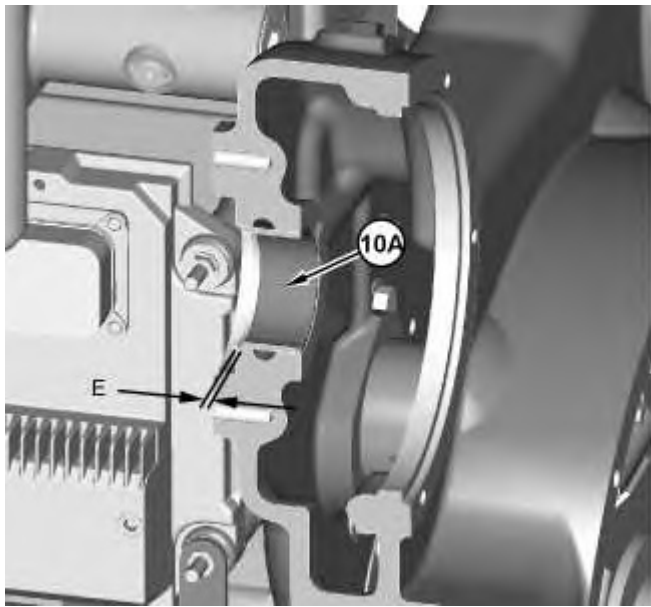


Illustration 12

g01384715

2. Lower the temperature of bearing (10A). Be sure to match Dimension (D) and Dimension (E) when you are installing bearing (10A). Dimension (D) indicates the angle of the joint on bearing (10A). Dimension (D) is  $15^{\circ} \pm 1^{\circ}$ . Dimension (E) shows the distance from bearing (10A) to the end of the bore. Dimension (E) is  $4.000 \pm 0.500$  mm ( $0.1575 \pm 0.0197$  inch).

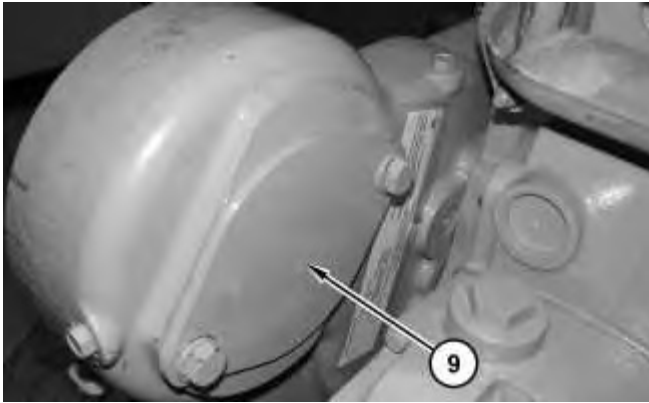


Illustration 13

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3. Install the O-ring seal and cover (9) .

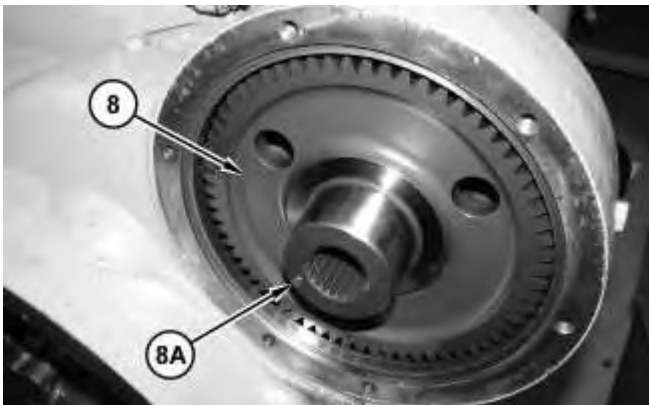


Illustration 14

g01384783

4. Install gear assembly (8). Be sure that oil passage plug (8A) is facing outward.

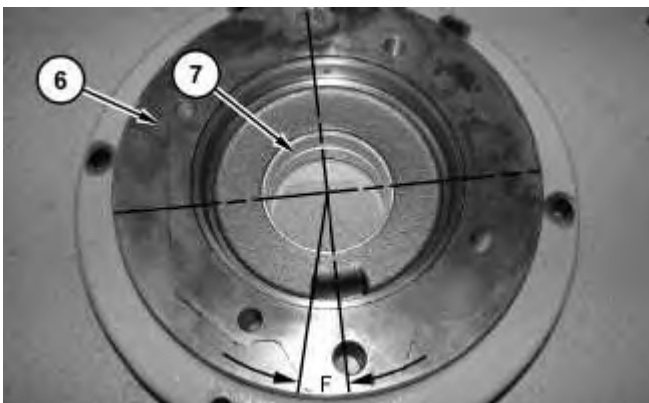
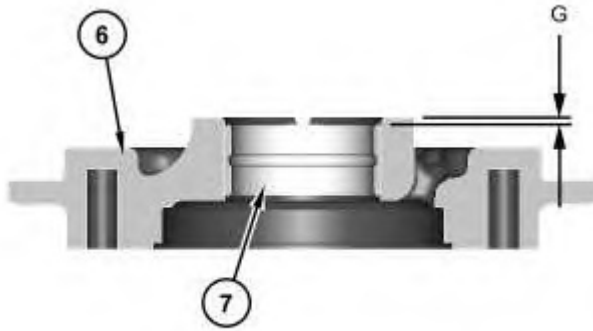


Illustration 15

g01384809

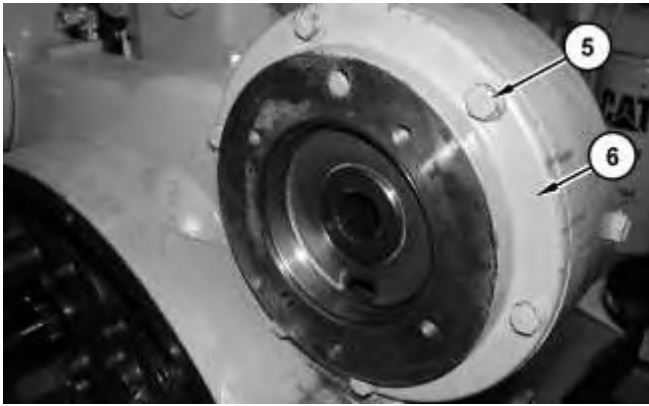


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Illustration 16

g01384831

5. Lower the temperature of bearing (7). Be sure to match Dimension (F) and Dimension (G) when you are installing bearing (7) into adapter assembly (6). Dimension (F) indicates the angle of the joint on bearing (7). Dimension (F) is  $15^{\circ} \pm 1^{\circ}$ . Dimension (G) shows the distance from bearing (7) to the end of the bore. Dimension (G) is  $3.500 \pm 0.500$  mm ( $0.1378 \pm 0.0197$  inch).



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Illustration 17

g01383927

6. Install the O-ring seal and adapter assembly (6). Install bolts (5).
  7. Repeat Steps 3 through 6 for the opposite side.
-





Illustration 18

g01384996

8. Lower the temperature of bearing (4). Install bearing (4) into gear assembly (3). Be sure that each relief (H) in bearing (4) is within  $2^\circ$  of each relief in gear assembly (3) .



Illustration 19

g01383883

9. Position gear assembly (3) and retainer (2). Install bolts (1) .
10. Repeat Steps 8 and 9 for the opposite side.

**End By:** Install the flywheel and pump drive gear. Refer to Disassembly and Assembly, "Flywheel - Install".

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## Disassembly and Assembly C9 Engines for Caterpillar Built Machines

Media Number -REN9579-20

Publication Date -01/02/2015

Date Updated -15/08/2018

i04530761

## Flywheel - Remove

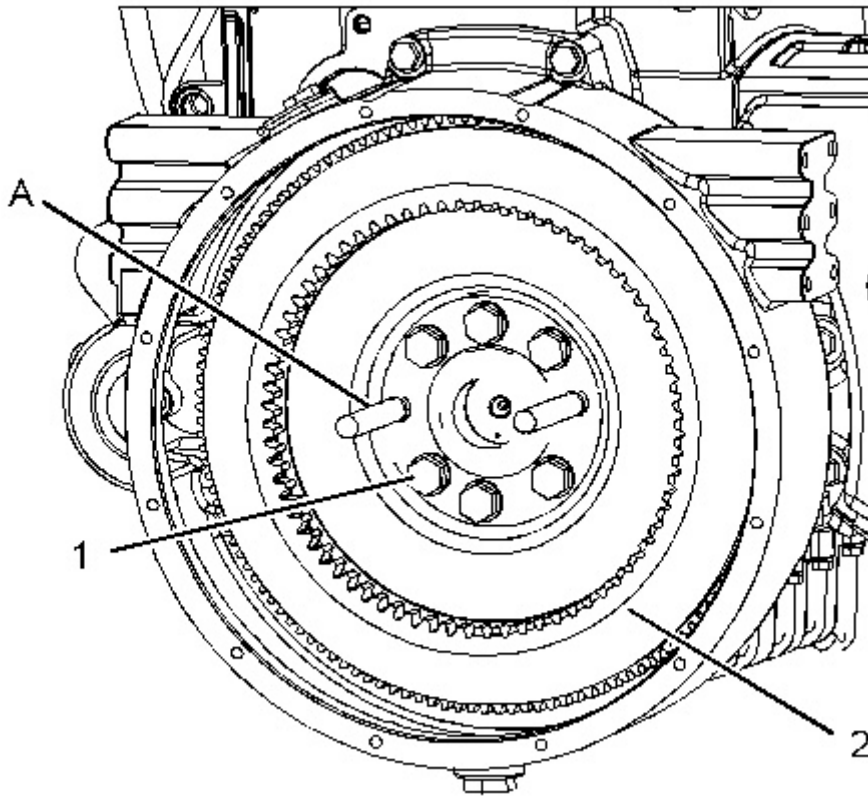
SMCS - 1156-011

## Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	-	Guide Stud M16 x 2 by 12inch	1

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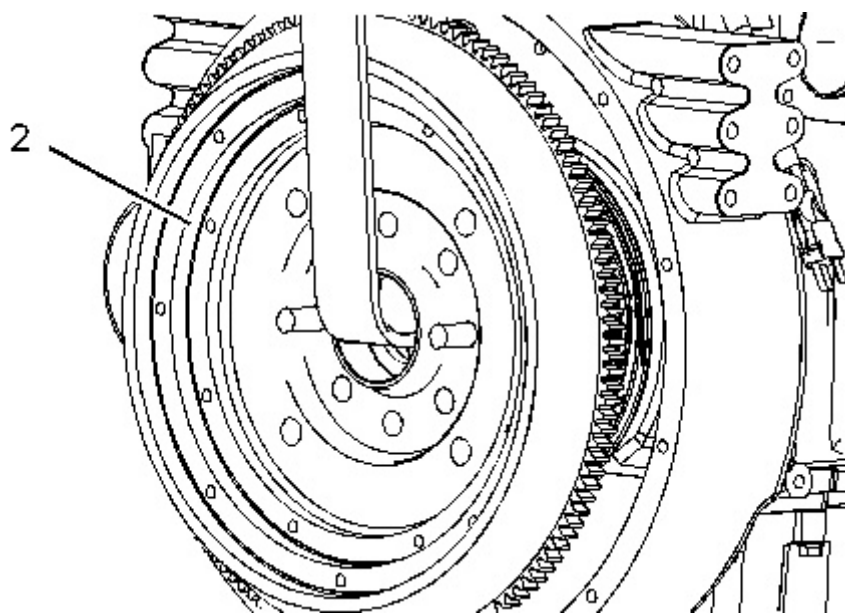


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Illustration 1

g02711645

1. Remove bolts 180 degrees apart. Install Tooling (A). Remove the remaining bolts (1).



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Illustration 2

g02711621

2. Fasten a suitable lifting device to flywheel (2). The weight of flywheel (2) is approximately 60 kg (130 lb).

3. Remove flywheel (2).
  4. Use a hammer and a punch in order to remove the flywheel ring gear, if necessary.
  5. Remove the pump drive gear, if necessary.
-

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## Disassembly and Assembly C9 Engines for Caterpillar Built Machines

Media Number -REN9579-20

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Date Updated -15/08/2018

i07474888

## Flywheel - Install

SMCS - 1156-012

## Installation Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	-	Guide Stud M16 x 2 by 12inch	2
B	-	Loctite 243	-

1. Install the pump drive gear, if necessary.
  2. Raise the temperature of the flywheel ring gear. Do not use a torch to heat the flywheel ring gear. Install the flywheel ring gear on the flywheel. Position the flywheel ring gear with the part number toward the crankshaft. Allow the flywheel ring gear to cool. Use a soft hammer to seat the flywheel ring gear against the shoulder of the flywheel.
-

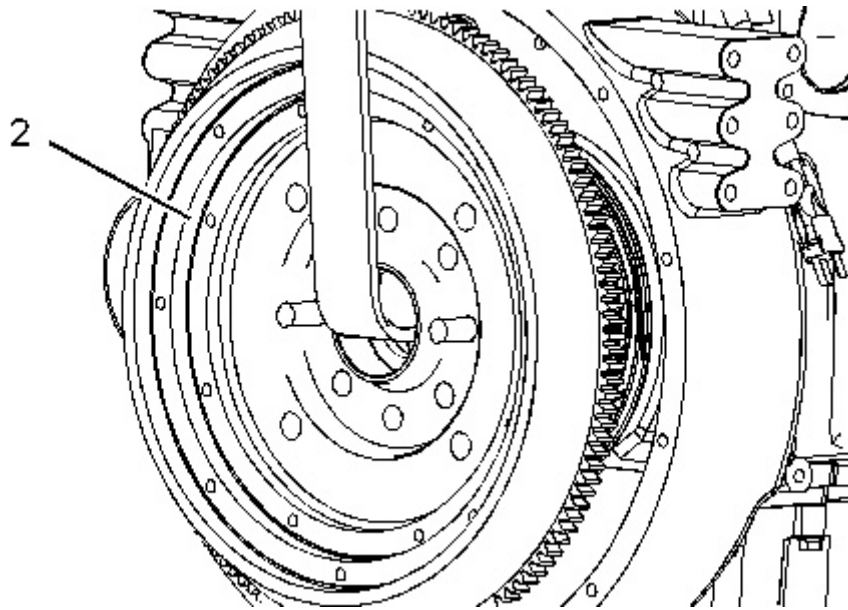


Illustration 1

g02711621

3. Attach a suitable lifting device to flywheel (2). The weight of flywheel (2) is approximately 60 kg (130 lb).

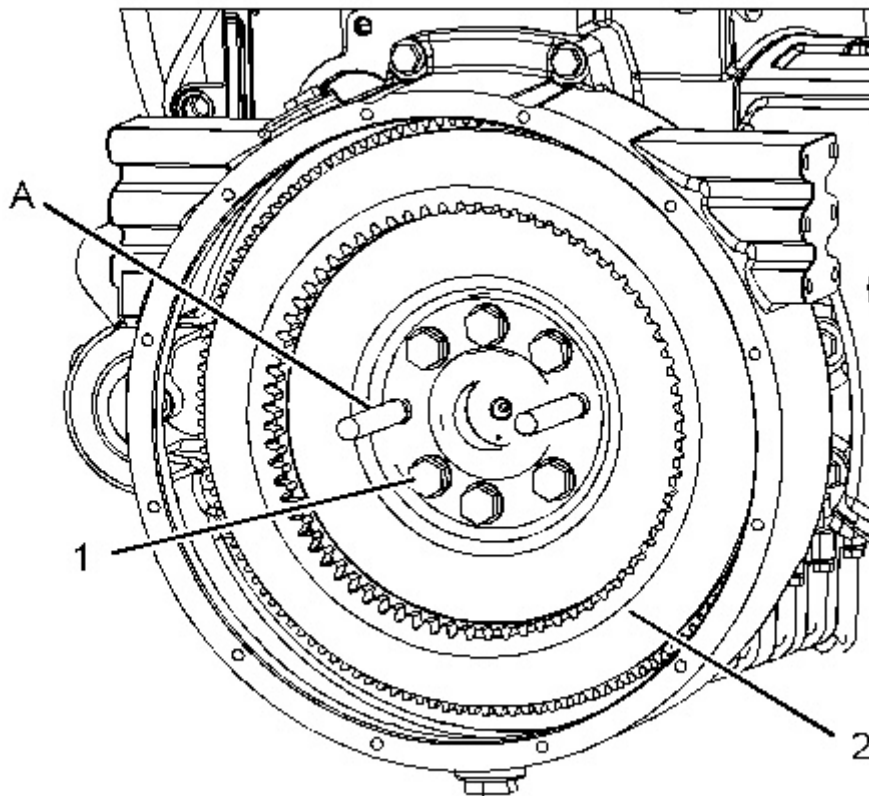


Illustration 2

g02711645

4. Position flywheel (2) on Tooling (A).

**Note:** When reusing bolts (1), apply Tooling (B) to the threads.

5. Install bolts (1). Remove Tooling (A) and install remaining bolts (1). Tighten bolts evenly to a torque of  $300 \pm 40 \text{ N}\cdot\text{m}$  ( $221 \pm 30 \text{ lb ft}$ ).
  6. Check the flywheel runout. Refer to Testing and Adjusting, "Flywheel - Inspect".
-

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## **Disassembly and Assembly C9 Engines for Caterpillar Built Machines**

Media Number -REN9579-20

Publication Date -01/02/2015

Date Updated -15/08/2018

i05820902

# **Crankshaft Rear Seal - Remove**

SMCS - 1161-011

## **Removal Procedure**

### **Start By:**

- A. Remove the flywheel. Refer to Disassembly and Assembly, "Flywheel - Remove".

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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.**

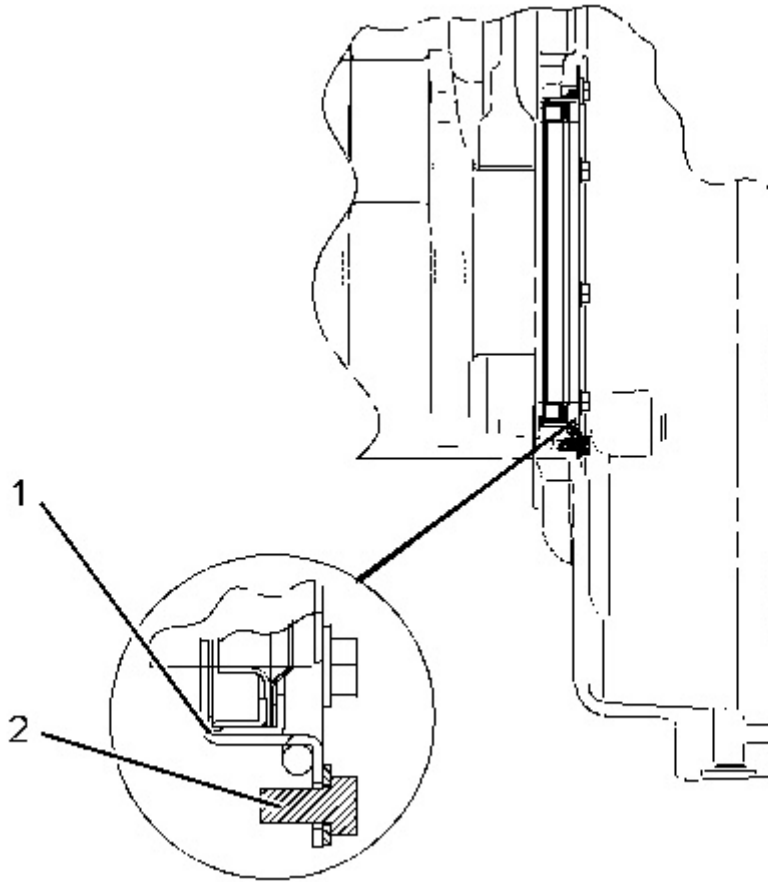
**Refer to Special Publication, NENG2500, "Dealer Service Tool Catalog" for tools and supplies suitable to collect and contain fluids on Cat products.**

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

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Illustration 1

g01140085

1. Remove bolts (2) .
2. Remove crankshaft rear seal (1) from the crankshaft.

**Note:** Refer to Reuse and Salvage Guidelines, SEBF8039, "Crankshaft Visual Inspection and Magnetic Particle Inspection" for the correct inspection procedure of the crankshaft seal surface.

**Note:** Refer to Reuse and Salvage Guidelines, SEBF9217, "Specifications for Crankshafts C7, C9, C-9, C10, C11, C12, C-12, C13, C-13, C15, C-15, C18, C-18, C27, C30, and C32 Engines" or the correct specifications of the crankshaft.

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## Disassembly and Assembly C9 Engines for Caterpillar Built Machines

Media Number -REN9579-20

Publication Date -01/02/2015

Date Updated -15/08/2018

i05857809

# Crankshaft Rear Seal - Install

SMCS - 1161-012

## Installation Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	-	Loctite 7649 Primer N	-
B	-	Loctite 620 Retaining Compound	-
C	147-2675	Wear Sleeve Installer	1

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### NOTICE

**Keep all parts clean from contaminants.**

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

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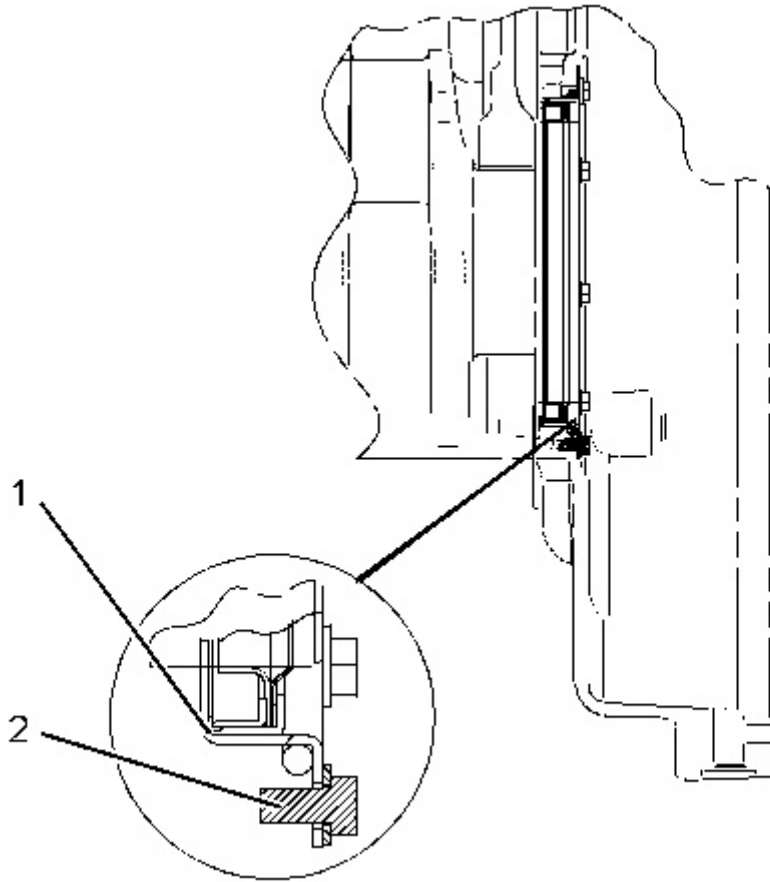


Illustration 1

g01140085

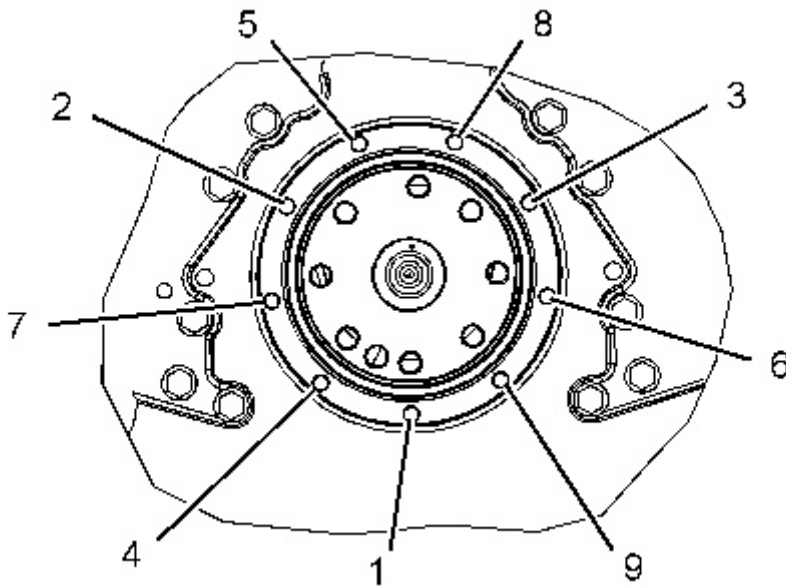


Illustration 2

g03698745

Numerical tightening sequence for bolts (2).

**Note:** If required, install a crankshaft wear sleeve at engine overhaul. For more information please refer to the following Reuse and Salvage Guidelines. Refer to Reuse and Salvage Guidelines, SEBF9217, "Specifications for Crankshafts C7, C9, C-9, C10, C11, C12, C-12,

C13, C-13, C15, C-15, C18, C-18, C27, C30, and C32 Engines" or the correct specifications of the crankshaft. Refer to Reuse and Salvage Guidelines, SEBF8039, "Crankshaft Visual Inspection and Magnetic Particle Inspection" for the correct inspection procedure of the crankshaft seal surface.

1. If a crankshaft wear sleeve is necessary, refer to Step 1.a through Step 1.d to install the crankshaft wear sleeve. If a crankshaft wear sleeve is not necessary, refer to Step 2.
  - a. Clean and polish the crankshaft of imperfections.
  - b. Use Tooling (A) to clean the outside diameter of the crankshaft and the inside diameter of the crankshaft wear sleeve.
  - c. Apply Tooling (B) to the outside diameter of the crankshaft and the inside diameter of the crankshaft wear sleeve.
  - d. Use Tooling (C) to install the crankshaft wear sleeve.

**Note:** Leave the shipping sleeve in place to install the crankshaft rear seal. The crankshaft rear seal must be installed dry.

**Note:** If the seal group, O-ring seal, and the shipping sleeve are separated, these components should not be used.

2. Lubricate the O-ring seal with clean engine oil that is on the back of the crankshaft rear seal (1).
3. Position crankshaft rear seal (1) and the shipping sleeve over the crankshaft. Push crankshaft rear seal (1) in place. This will dislodge the shipping sleeve.

**Note:** Do not remove the shipping sleeve until bolts (2) are installed.

4. Install new bolts (2) hand tight. Then, tighten bolts (2) in numerical sequence, shown in Illustration 2. Tighten bolts (2) to a torque of  $12 \pm 3 \text{ N}\cdot\text{m}$  ( $106 \pm 27 \text{ lb in}$ ).

**End By:**

- a. Install the flywheel. Refer to Disassembly and Assembly, "Flywheel - Install".
-

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## Disassembly and Assembly C9 Engines for Caterpillar Built Machines

Media Number -REN9579-20

Publication Date -01/02/2015

Date Updated -15/08/2018

i02299056

# Flywheel Housing - Remove and Install

SMCS - 1157-010

## Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	138-7575	Link Bracket	2

### Start By:

- a. Remove the flywheel. Refer to Disassembly and Assembly, "Flywheel - Remove".
  - b. Remove the electric starting motor. Refer to Disassembly and Assembly, "Electric Starting Motor - Remove and Install".
-

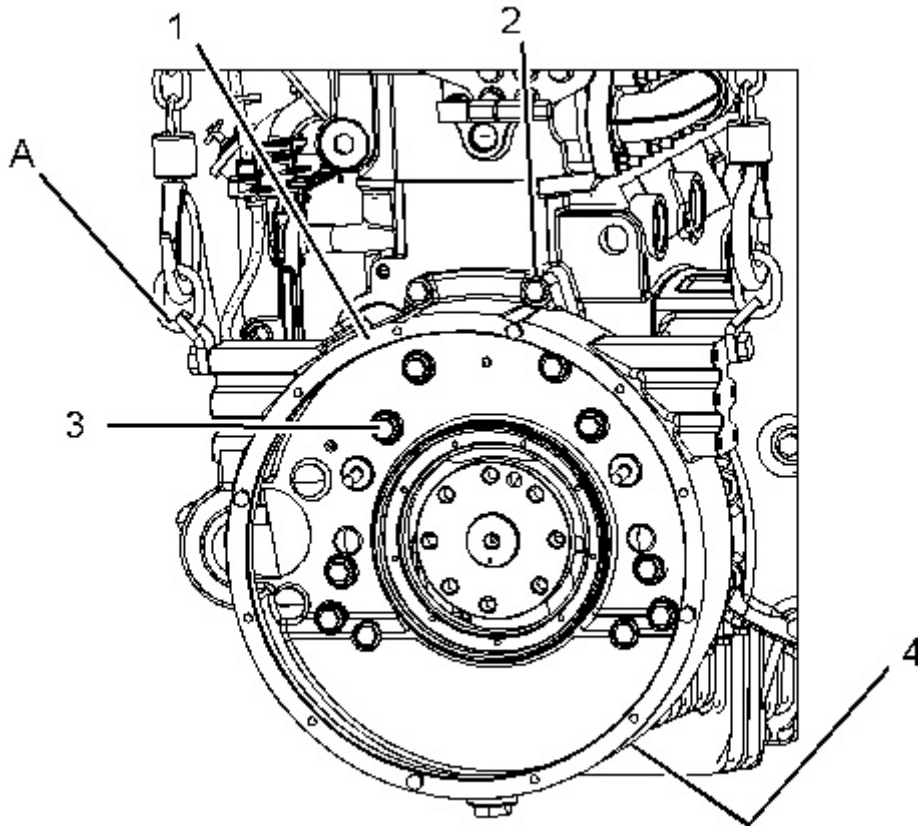


Illustration 1

g01151394

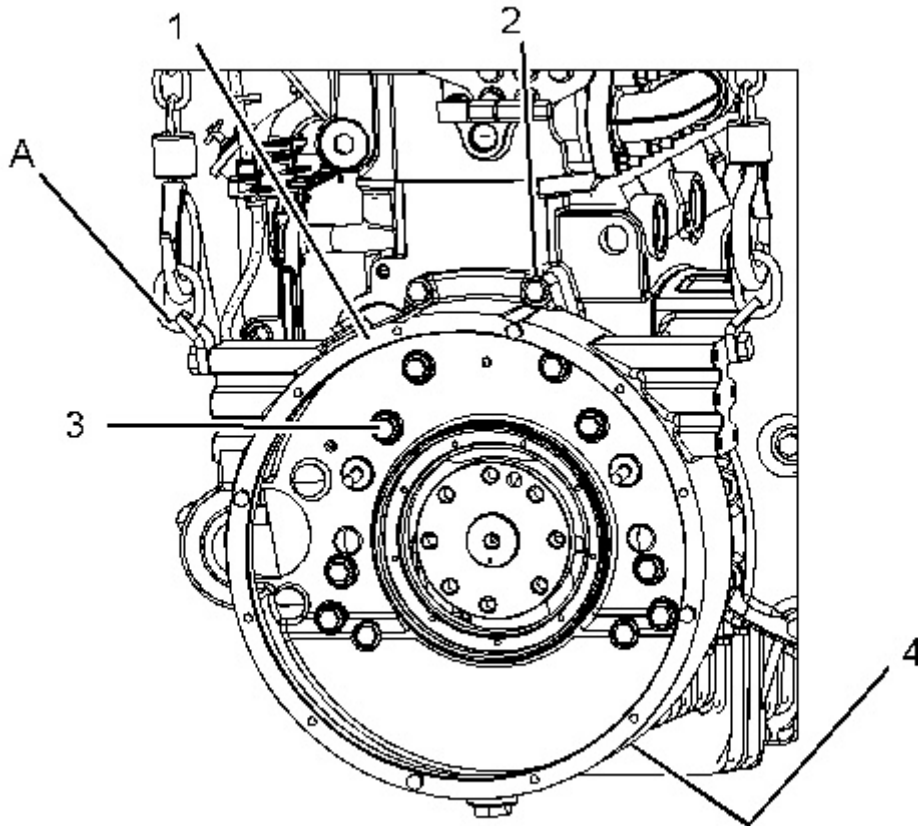
1. Attach Tooling (A) and a suitable lifting device onto flywheel housing (1). The weight of flywheel housing (1) is approximately 37 kg (82 lb).
2. Remove bolts (2). Remove bolts (3).
3. Remove bolts (4) (not shown) that fasten the engine oil pan to flywheel housing (1). Remove flywheel housing (1).

## Installation Procedure

Table 2

Required Tools			
Tool	Part Number	Part Description	Qty
A	138-7575	Link Bracket	2
B	1U-8846	Gasket Sealant	1

1. Apply Tooling (B) to the entire mounting surface of the flywheel housing prior to installation.



---

Illustration 2

g01151394

2. Attach Tooling (A) and a suitable lifting device onto flywheel housing (1). The weight of flywheel housing (1) is approximately 37 kg (82 lb). Position flywheel housing (1) on the engine block.
3. Install bolts (2). Install bolts (3).
4. Install bolts (4) (not shown) that fasten the engine oil pan to flywheel housing (1).

**End By:**

- a. Install the electric starting motor. Refer to Disassembly and Assembly, "Electric Starting Motor - Remove and Install".
  - b. Install the flywheel. Refer to Disassembly and Assembly, "Flywheel - Install".
-

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## Disassembly and Assembly C9 Engines for Caterpillar Built Machines

Media Number -REN9579-20

Publication Date -01/02/2015

Date Updated -15/08/2018

i03581480

# Flywheel Housing - Remove and Install

SMCS - 1157-010

## Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	138-7575	Link Bracket	2

### Start By:

- A. Remove the crankshaft rear seal. Refer to Disassembly and Assembly, "Crankshaft Rear Seal - Remove".
- B. Remove the electric starting motor. Refer to Disassembly and Assembly, "Electric Starting Motor - 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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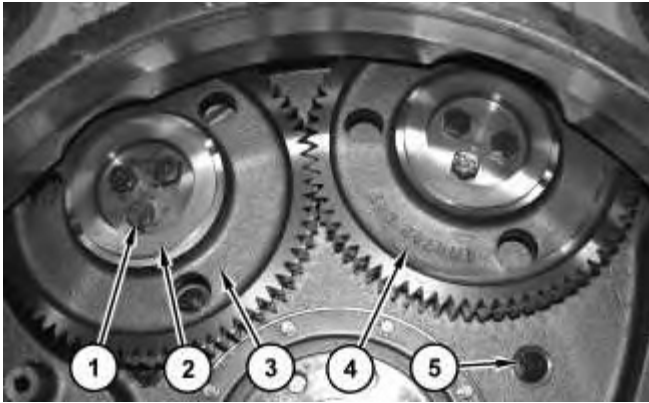


Illustration 1

g01910054

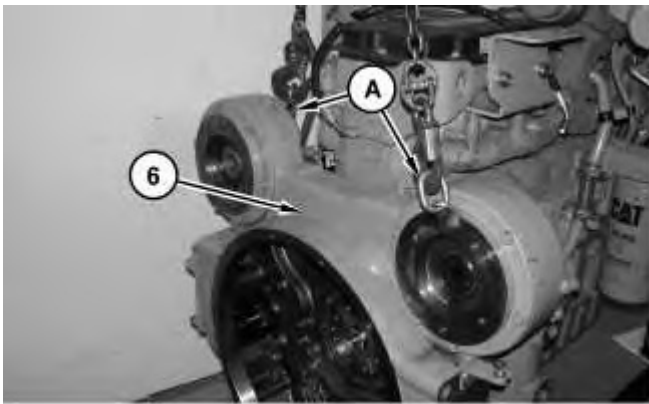


Illustration 2

g01910077

1. Remove bolts (1) and retainer (2). Remove gear assembly (3). Repeat for gear assembly (4) .
2. Attach Tooling (A) and a suitable lifting device to flywheel housing (6). The weight of flywheel housing (6) is approximately 113 kg (250 lb).
3. Remove bolts (5). Use Tooling (A) and the suitable lifting device in order to remove flywheel housing (6) .

## Installation Procedure

Table 2

Required Tools			
Tool	Part Number	Part Description	Qty
A	138-7575	Link Bracket	2
B	1U-8846	Gasket Sealant	1

## NOTICE

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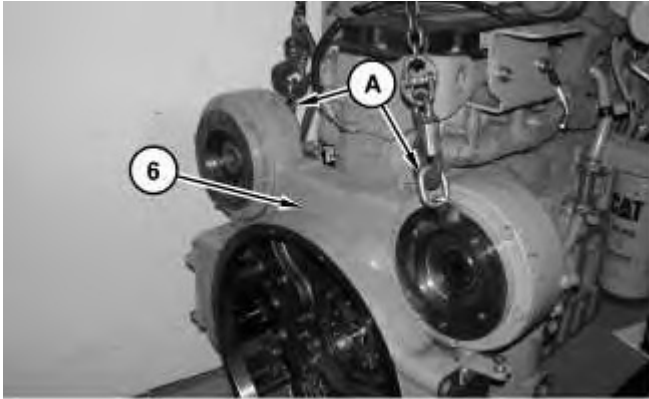


Illustration 3

g01910077



Illustration 4

g01910054

1. Apply Tooling (B) to the entire mounting surface of flywheel housing (6). Flywheel housing (6) must be installed within 10 minutes of applying Tooling (B) .
2. Attach Tooling (A) and a suitable lifting device to flywheel housing (6). The weight of flywheel housing (6) is approximately 113 kg (250 lb). Use Tooling (A) and the suitable lifting device in order to position flywheel housing (6) to the engine. Install bolts (5) .
3. Install gear assembly (3). Install retainer (2) and bolts (1). Repeat for gear assembly (4) .

**End By:**

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