

Product: INDUSTRIAL ENGINE  
Model: C7.1 INDUSTRIAL ENGINE G9R  
Configuration: C7.1 Industrial Engine G9R00001-UP

## Disassembly and Assembly C7.1 Industrial Engine

Media Number -UENR0628-01

Publication Date -01/09/2013

Date Updated -27/07/2017

i05292294

# Flywheel - Remove - Equipped with Rear Power Take-Off

SMCS - 1156-011

## Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	-	Guide Stud 1/2 inch - UNF by 4 inch	2

### Start By:

- Remove the electric starting motor. Refer to Disassembly and Assembly, "Electric Starting Motor - Remove and Install" for the correct procedure.

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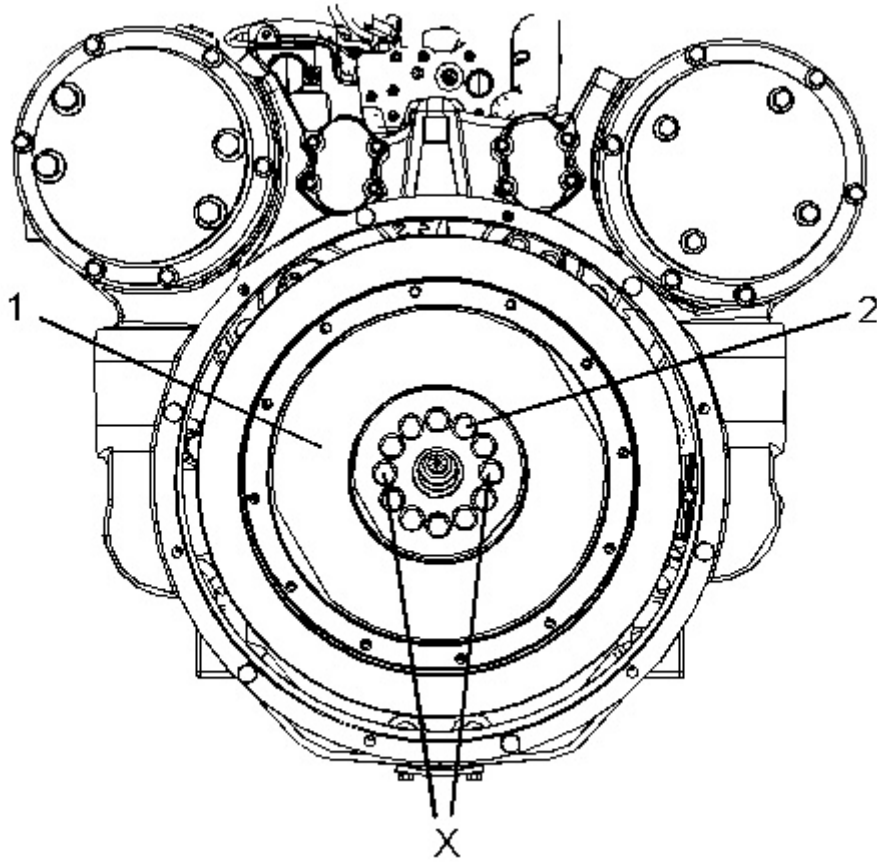
### NOTICE

**Keep all parts clean from contaminants.**

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

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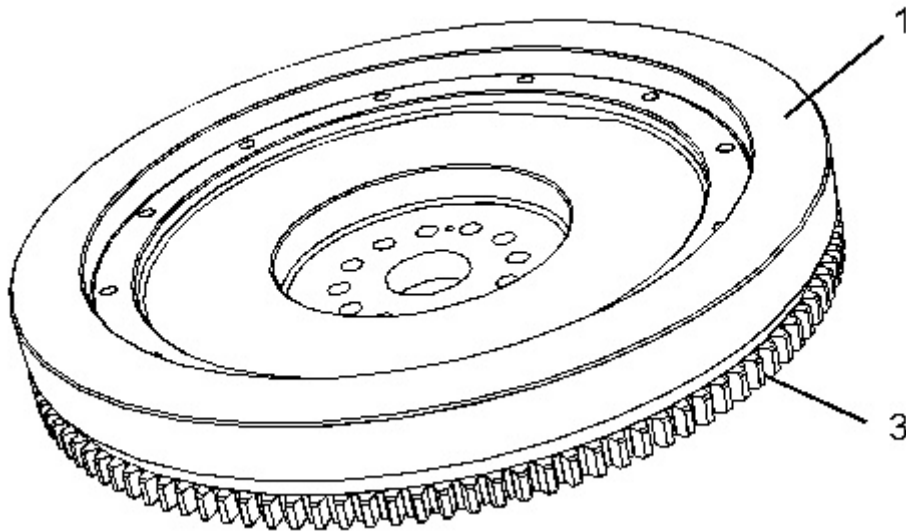


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Illustration 1

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1. Remove bolts from Position (X) from flywheel (1).
  2. Install Tooling (A) in Position (X) to flywheel (1).
  3. Use a suitable lifting device to support the flywheel. The weight of flywheel (2) is approximately 68 kg (150 lb).
  4. Remove remaining bolts (2).
  5. Use the lifting device to remove flywheel (1) from the engine.
  6. Remove Tooling (A).
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Illustration 2

g02062054

7. Inspect flywheel (1) and ring gear (3) for wear and damage. Replace any worn components or damaged components.
8. To remove flywheel ring gear (3), follow Step 8.a through Step 8.b.
  - a. Place the flywheel assembly on a suitable support.
  - b. Use a hammer and a punch in order to remove ring gear (3) from flywheel (1).

**Note:** Identify the orientation of the teeth on the flywheel ring gear.

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## Disassembly and Assembly C7.1 Industrial Engine

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i05292296

## Flywheel - Remove

SMCS - 1156-011

## Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	-	Guide Stud 1/2 inch - UNF by 4 inch	2

### Start By:

- Remove the electric starting motor. Refer to Disassembly and Assembly, "Electric Starting Motor - Remove and Install" for the correct procedure.

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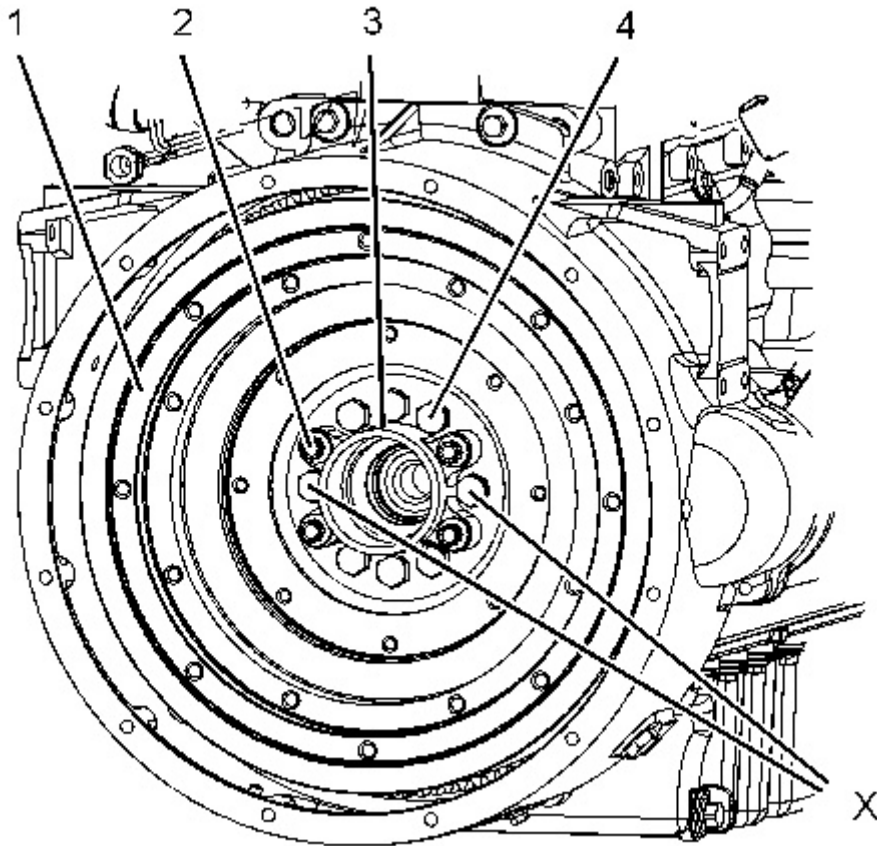
### NOTICE

**Keep all parts clean from contaminants.**

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

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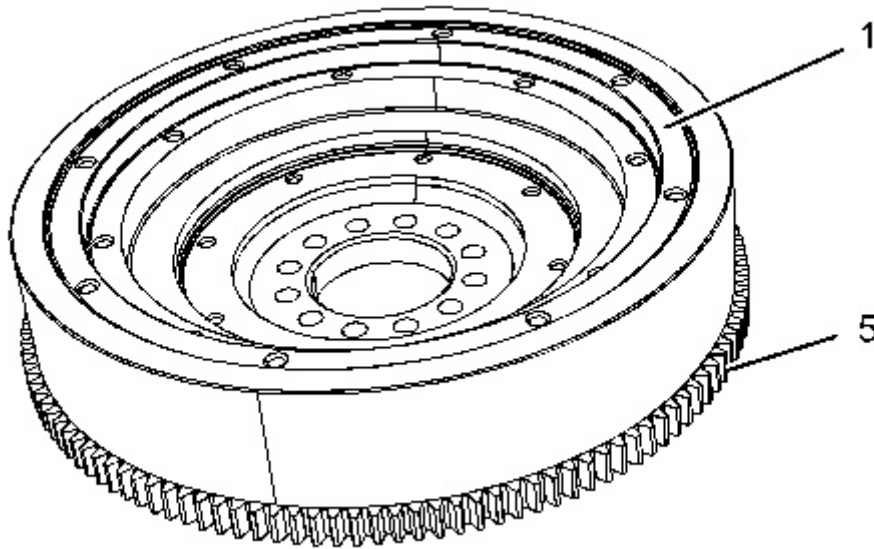


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Illustration 1  
Typical example

g01336668

1. Remove bolts from Position (X) from flywheel (1).
  2. Install Tooling (A) in Position (X) to flywheel (1).
  3. Install a suitable lifting device onto flywheel (1). Support the weight of the flywheel. The flywheel can weigh 71 kg (156 lb).
  4. If necessary, remove bolts (2) that secure the housing for pilot bearing (3) to flywheel (1). Remove the housing for pilot bearing (3).
  5. Remove remaining bolts (4).
  6. Use the lifting device to remove the flywheel from the engine.
-



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Illustration 2

g01336669

Typical example

7. Inspect flywheel (1) and ring gear (5) for wear and damage. Replace any worn components or damaged components.
8. To remove flywheel ring gear (5), follow Step 8.a through Step 8.b.
  - a. Place the flywheel assembly on a suitable support.
  - b. Use a hammer and a punch in order to remove ring gear (5) from flywheel (1).

**Note:** Identify the orientation of the teeth on the flywheel ring gear.

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## Disassembly and Assembly C7.1 Industrial Engine

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i05292291

# Flywheel - Install - Equipped with Rear Power Take-Off

SMCS - 1156-012

## Installation Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	-	Guide Stud 1/2 inch - UNF by 4 inch	2

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### NOTICE

**Keep all parts clean from contaminants.**

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

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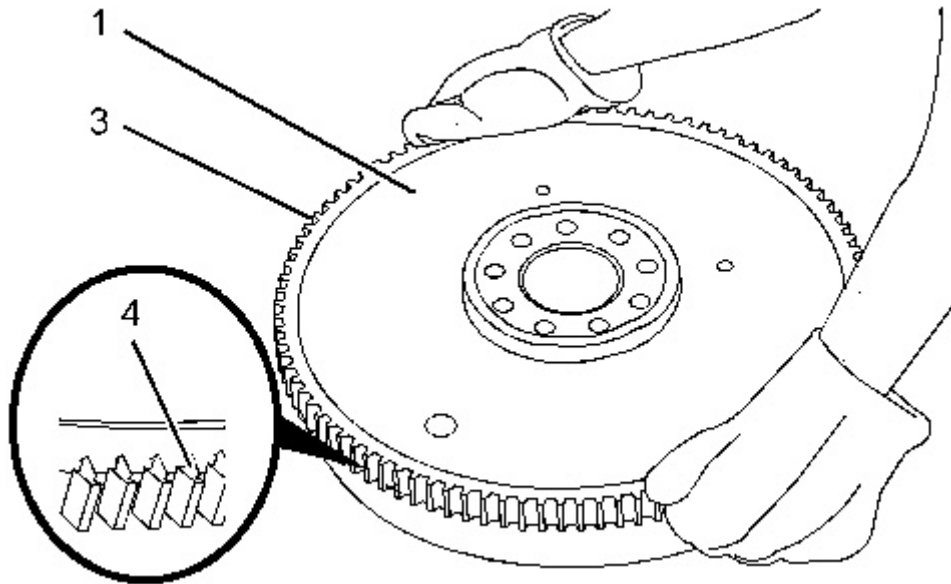


Illustration 1

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 **WARNING**

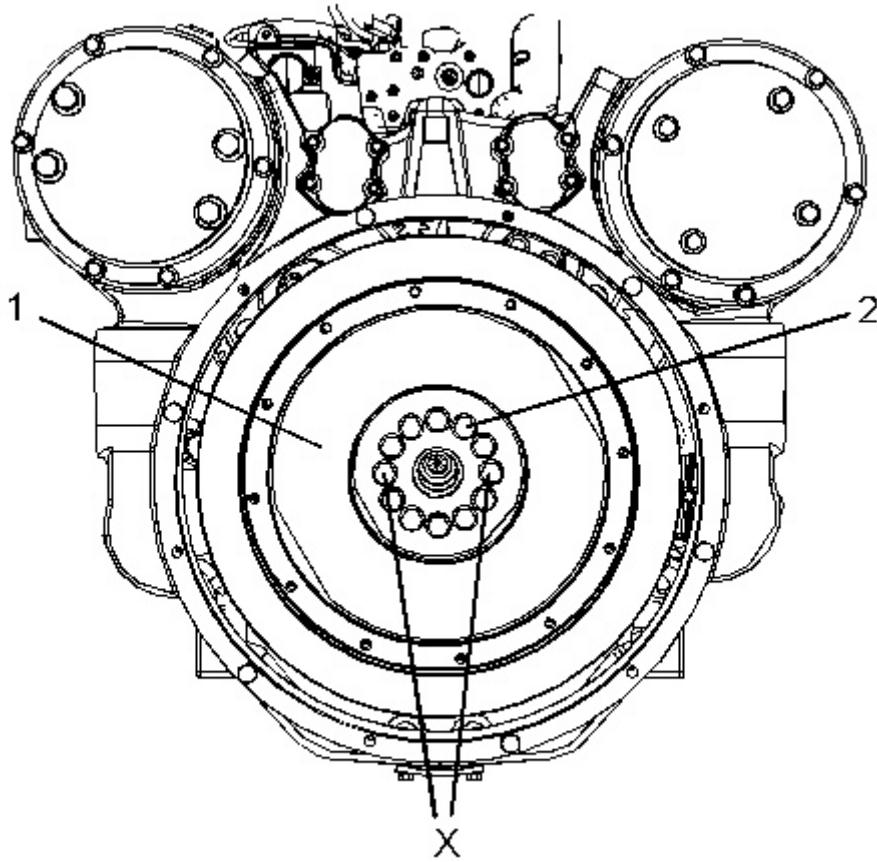
**Always wear protective gloves when handling parts that have been heated.**

1. If the flywheel ring gear was removed, follow Step 1.a through Step 1.c in order to install ring gear (3) to flywheel (1).
  - a. Identify the orientation of teeth (4) on new ring gear (3).

**Note:** The chamfered side of ring gear teeth (4) must face toward the starting motor when the flywheel is installed. The chamfered side of ring gear teeth ensures the correct engagement of the starting motor.
  - b. Heat flywheel ring gear (3) in an oven to a maximum temperature of 250 °C (482 °F) prior to installation.

**Note:** Do not use a torch to heat the ring gear.
  - c. Ensure that the orientation of ring gear (3) is correct and quickly install the ring gear onto flywheel (1).
2. Inspect the crankshaft rear seal for leaks. If there are any oil leaks, replace the crankshaft rear seal. Refer to Disassembly and Assembly, "Crankshaft Rear Seal - Install" for the correct procedure.





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Illustration 2

g02062053

3. Install a suitable lifting device on flywheel (1). The flywheel can weigh 68 kg (150 lb).
4. Install Tooling (A) in Position (X) on the crankshaft.
5. Use the lifting device to position flywheel (1) onto Tooling (A).
6. Install bolts (2) to flywheel (1).
7. Remove Tooling (A) and install remaining bolts (2) to flywheel (1).
8. Use a suitable tool to prevent the flywheel from rotating. Tighten bolts (2) and (4) to a torque of 140 N·m (103 lb ft).
9. Remove the lifting device from flywheel (1).
10. Check the run out of the flywheel. Refer to Specifications, "Flywheel" for more information.

**End By:**

- a. Install the electric starting motor. Refer to Disassembly and Assembly, "Electric Starting Motor - Remove and Install" for the correct procedure.
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## Disassembly and Assembly C7.1 Industrial Engine

Media Number -UENR0628-01

Publication Date -01/09/2013

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i05292292

## Flywheel - Install

SMCS - 1156-012

## Installation Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	-	Guide Stud 1/2 inch - UNF by 4 inch	2

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### NOTICE

**Keep all parts clean from contaminants.**

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

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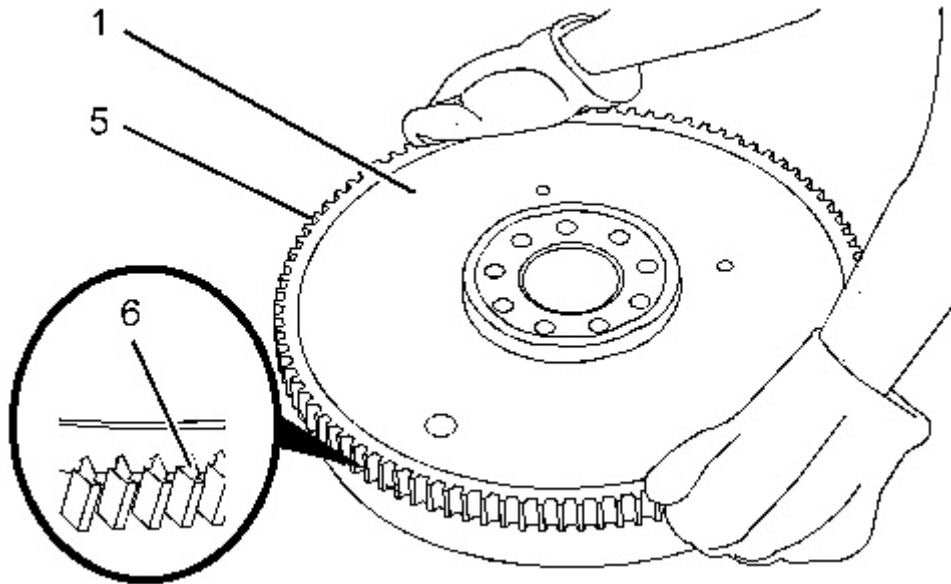


Illustration 1  
Typical example

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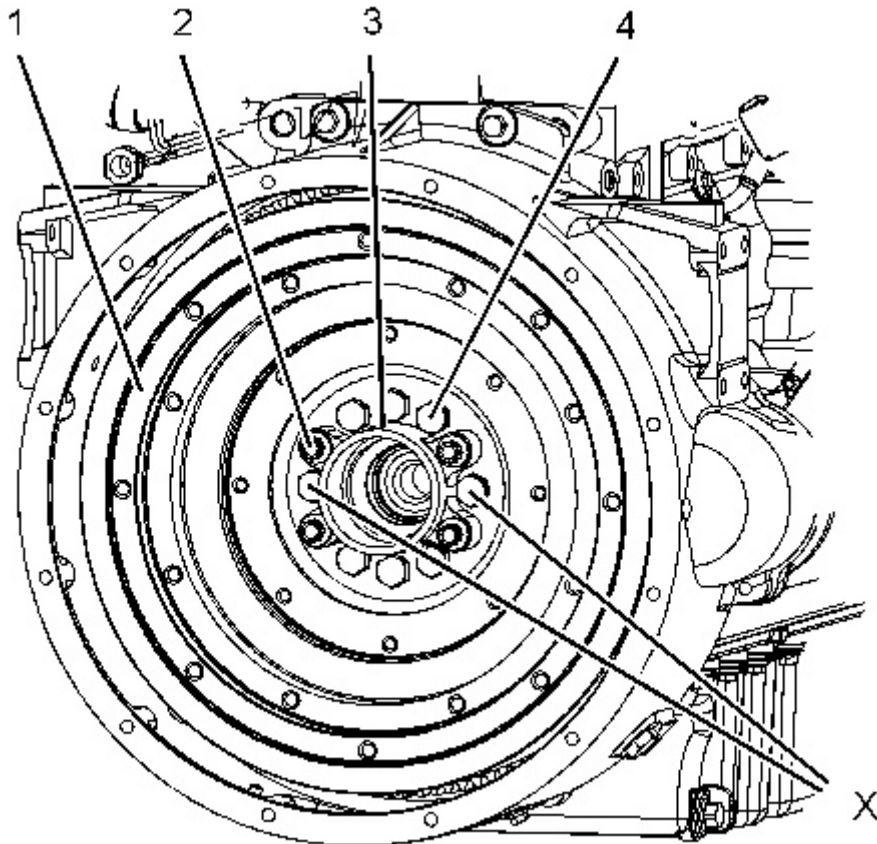
**! WARNING**

**Always wear protective gloves when handling parts that have been heated.**

1. If the flywheel ring gear was removed, follow Step 1.a through Step 1.c in order to install ring gear (5) to flywheel (1).
  - a. Identify the orientation of teeth (6) on new ring gear (5).

**Note:** The chamfered side of ring gear teeth (6) must face toward the starting motor when the flywheel is installed. The chamfered side of ring gear teeth ensures the correct engagement of the starting motor.
  - b. Heat flywheel ring gear (5) in an oven to a maximum temperature of 250 °C (482 °F) prior to installation.

**Note:** Do not use a torch to heat the ring gear.
  - c. Ensure that the orientation of ring gear (5) is correct and quickly install the ring gear onto flywheel (1).
2. Inspect the crankshaft rear seal for leaks. If there are any oil leaks, replace the crankshaft rear seal. Refer to Disassembly and Assembly, "Crankshaft Rear Seal - Install" for the correct procedure.



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Illustration 2  
Typical example

g01336668

3. Install a suitable lifting device onto flywheel (1). The flywheel can weigh 71 kg (156 lb).
4. Install Tooling (A) in Position (X) on the crankshaft.
5. Use the lifting device to position flywheel (1) onto Tooling (A).
6. If necessary, install pilot bearing (3) and bolts (2) to flywheel (1).
7. Install bolts (4) to flywheel (1).
8. Remove Tooling (A) and install remaining bolts (4) to flywheel (1).
9. Use a suitable tool to prevent the flywheel from rotating. Tighten bolts (2) and (4) to a torque of 140 N·m (103 lb ft).
10. Remove the lifting device from flywheel (1).
11. Check the run out of the flywheel. Refer to Specifications, "Flywheel" for further information.

**End By:**

- a. Install the electric starting motor. Refer to Disassembly and Assembly, "Electric Starting Motor - Remove and Install" for the correct procedure.
-

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## Disassembly and Assembly C7.1 Industrial Engine

Media Number -UENR0628-01

Publication Date -01/09/2013

Date Updated -27/07/2017

i05292125

# Crankshaft Rear Seal - Remove

SMCS - 1161-011

## Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	227-4390	E12 Torx Socket	1

### Start By:

- Remove the flywheel housing. Refer to Disassembly and Assembly, "Flywheel Housing - Remove and Install" for the correct 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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### 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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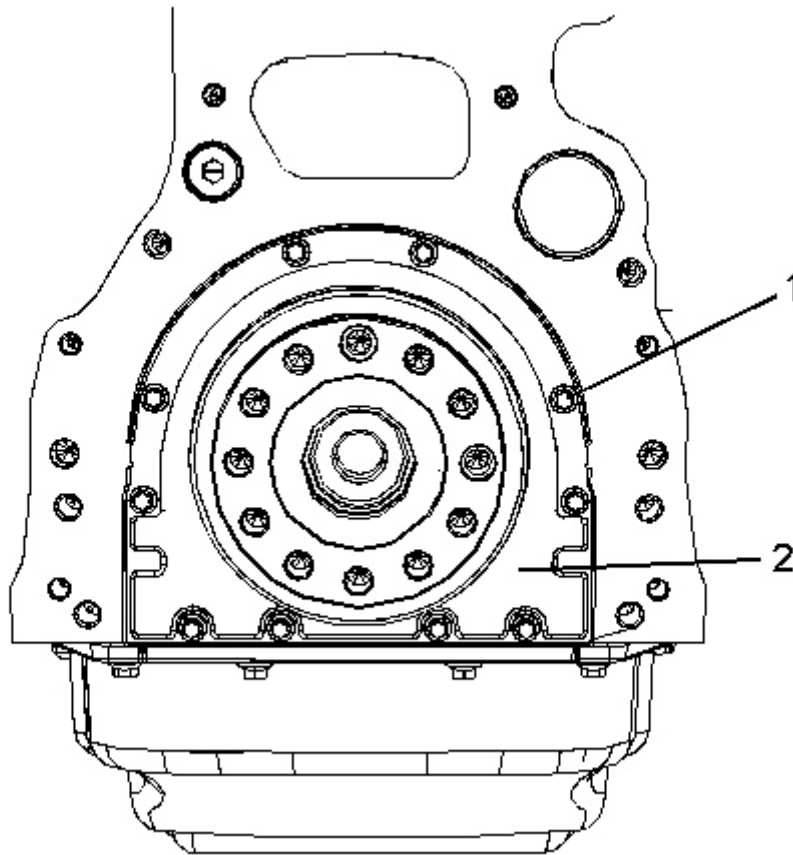


Illustration 1

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**Note:** The assembly of the crankshaft rear seal is non-serviceable. If the assembly of the crankshaft rear seal is removed, the assembly must be replaced.

1. Use Tooling (A) in order to remove Torx screws (1) from the assembly of crankshaft rear seal (2).
  2. Remove the assembly of crankshaft rear seal (2) from the cylinder block. Discard the assembly of crankshaft rear seal (2).
-

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## Disassembly and Assembly C7.1 Industrial Engine

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i05292124

# Crankshaft Rear Seal - Install

SMCS - 1161-012

## Installation Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	227-4390	E12 Torx Socket	1
B	FT-2806	Alignment Tool	1

**Note:** The crankshaft rear seal and the housing are manufactured as a one-piece assembly.

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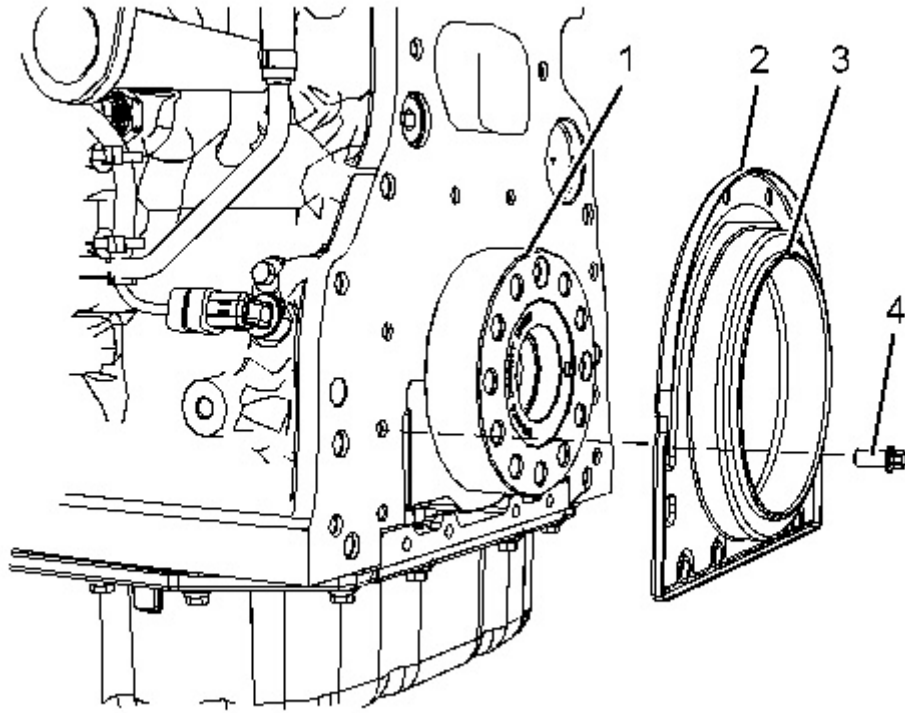
### NOTICE

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Illustration 1

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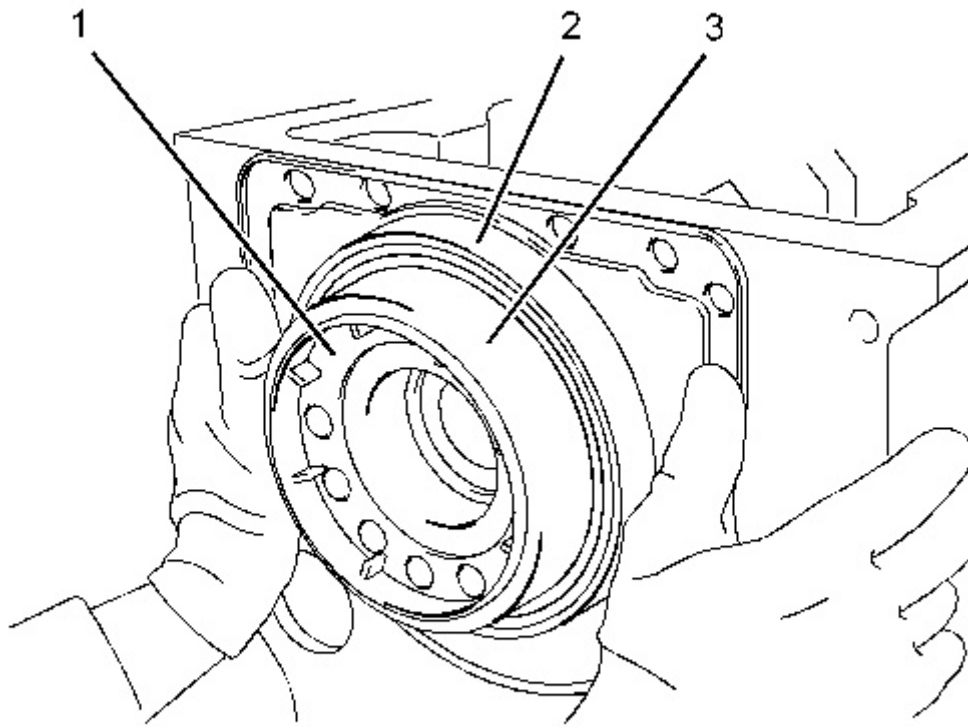


Illustration 2

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1. Ensure that crankshaft flange (1) is clean, dry, and free from damage. Clean the crankshaft flange with lint free cloth.
2. Ensure that the face of the cylinder block and the bridge piece are clean and dry.
3. A new crankshaft rear seal is supplied with a plastic sleeve (3). Ensure that the plastic sleeve is squarely installed within crankshaft rear seal (2).

**Note:** The plastic sleeve is included in order to protect the lip of the seal as the seal is pushed over the crankshaft flange.

**Note: Do not lubricate the crankshaft rear seal or the crankshaft flange. The crankshaft rear seal must be installed dry.**

4. Align plastic sleeve (3) with crankshaft flange (1). Ensure that the plastic sleeve is engaged onto the crankshaft flange. Push new crankshaft rear seal (2) squarely onto the crankshaft flange.

During this process, the plastic sleeve will be forced out of the crankshaft rear seal. Discard the plastic sleeve.

5. Align the two molded locators on crankshaft rear seal (2) with the holes in the cylinder block. Ensure that the crankshaft rear seal is seated against the cylinder block.

Tightening sequence for the crankshaft rear seal

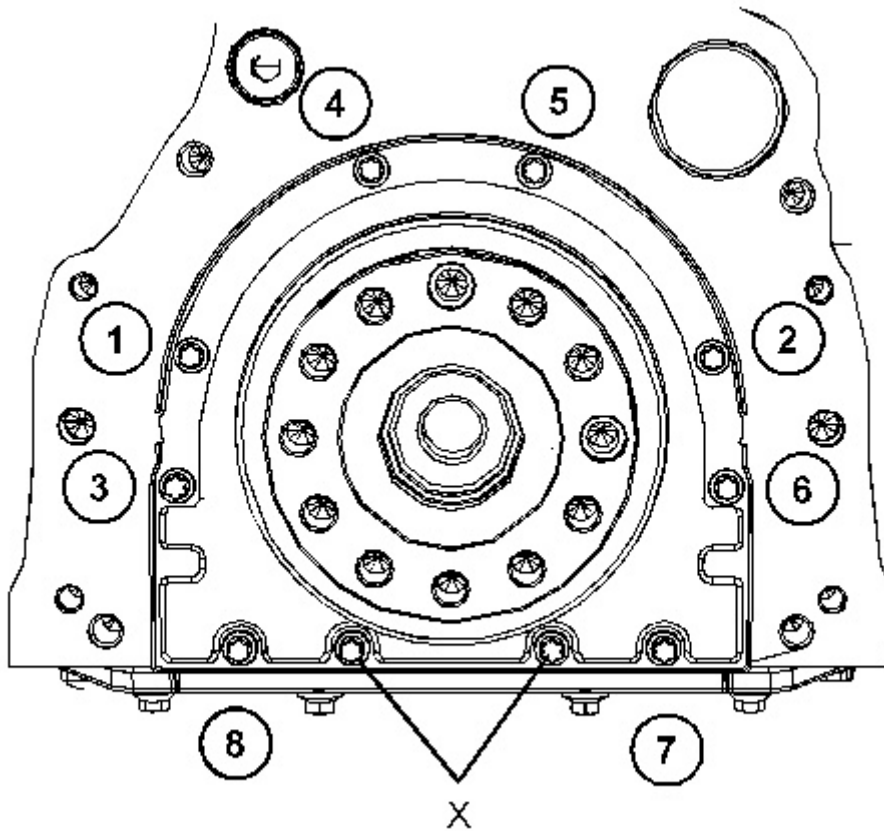


Illustration 3

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6. Install torx screws (4) finger tight.

**Note:** Do not install torx screws to Positions (X) at this stage.

7. Install Tooling (B) to crankshaft rear seal (2) and to crankshaft flange (1).
8. Use Tooling (A) in order to tighten torx screws (4) to a torque of 22 N·m (195 lb in). Tighten torx screws (4) in the sequence that is shown in Illustration 3.
9. Remove Tooling (B).
10. Install remaining torx screws (4) to Positions (X). Use Tooling (A) in order to tighten the torx screws to a torque of 22 N·m (195 lb in). Refer to Illustration 3.

**End By:**

- a. Install the flywheel. Refer to Disassembly and Assembly, "Flywheel - Install".
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Date Updated -27/07/2017

i05292299

# Flywheel Housing - Remove and Install - Type A and Type B Wet Back End Housing

SMCS - 1157-010

## Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	-	Guide Stud M10 by 100 mm	2

### Start By:

- Remove the flywheel. Refer to Disassembly and Assembly, "Flywheel - Remove" for the correct procedure.

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### NOTICE

**Keep all parts clean from contaminants.**

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

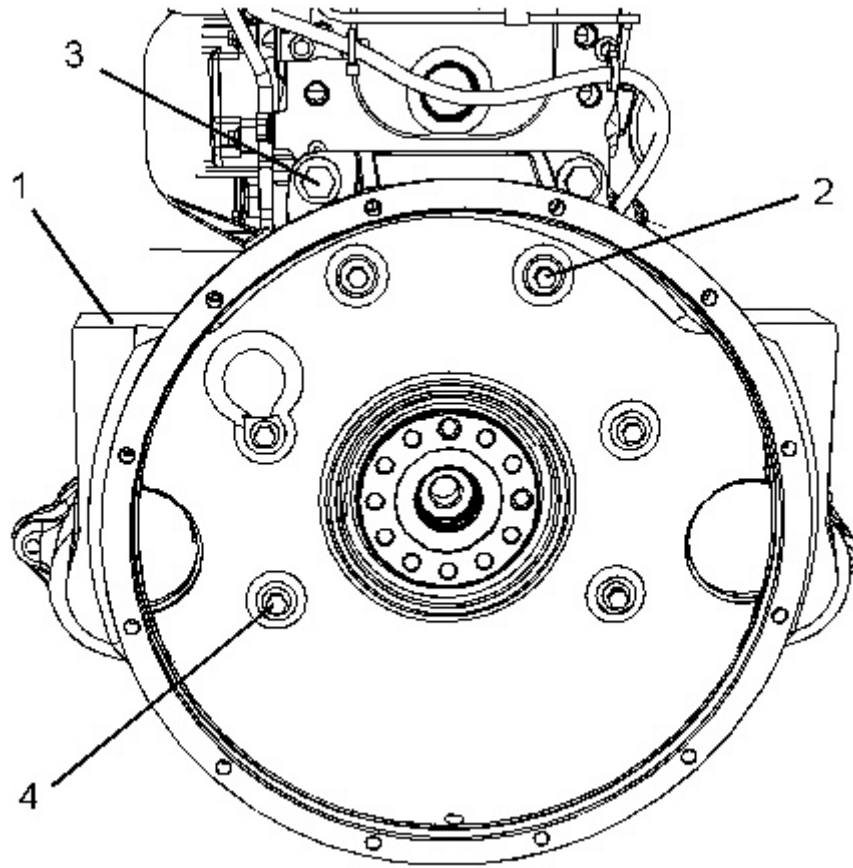
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**Note:** The wet back-end flywheel housing may be installed on standard engines. When the wet back-end flywheel housing, is installed to a standard engine a seal will not be installed to the flywheel housing.

- There are two types of wet back-end flywheel housing that can be installed on the engine. Type A has two bolts at the top of the flywheel housing and Type B has four bolts at the top

of the flywheel housing. The removal procedures for both types of flywheel housing are similar.

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Illustration 1  
Type A Wet Back End Housing

g03386555

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