

Product: EXCAVATOR

Model: 323D L EXCAVATOR ZMF

Configuration: 323D, 323D L & 323D LN Excavators ZMF00001-UP (MACHINE) POWERED BY C6.4 Engine

## Disassembly and Assembly C6.4 Engine for Caterpillar Built Machines

Media Number -KENR8106-09

Publication Date -01/10/2017

Date Updated -18/10/2017

i06790404

# Crankshaft Pulley - Remove and Install

SMCS - 1205-010

## Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	1P-2321	Combination Puller	1
B	6V-9120	Socket <sup>(1)</sup>	1

<sup>(1)</sup> Tooling (B) is a 46 mm socket.

---

### NOTICE

**Keep all parts clean from contaminants.**

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

---

1. Remove the belt. Refer to Operation and Maintenance Manual, "Belt - Inspect/Adjust/Replace".
-

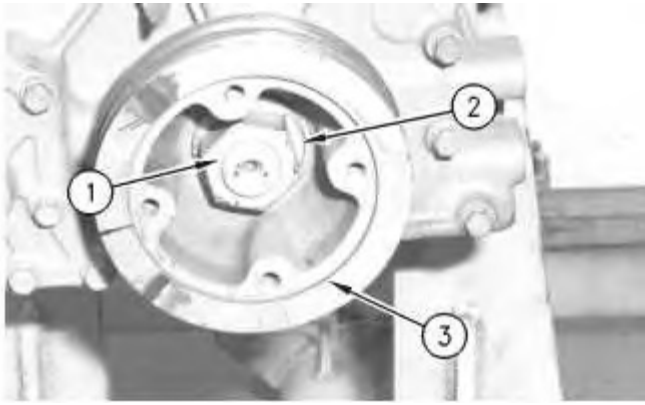


Illustration 1

g00604778

2. Use Tooling (B) in order to remove nut (1) and washer (2) from the threaded end of the crankshaft.

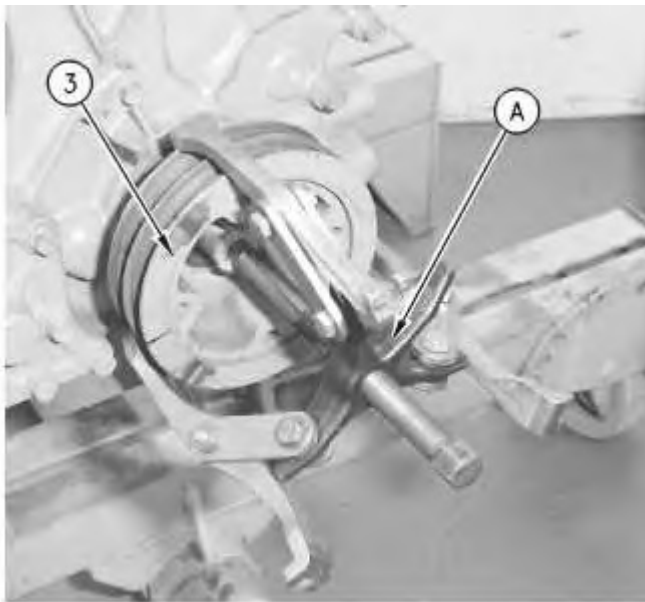


Illustration 2

g00604784

3. Use Tooling (A) in order to remove crankshaft pulley (3) from the engine.

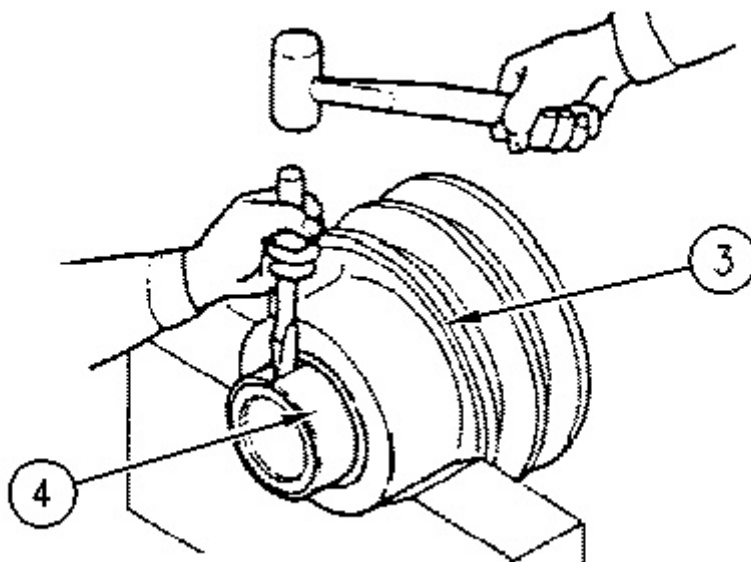


Illustration 3

g00604792

4. If it is necessary to remove wear sleeve (4) from crankshaft pulley (3), use a suitable hammer and a suitable chisel. Hold the suitable chisel at right angles to the surface of the wear sleeve. Tap the wear sleeve in three places. You can remove the wear sleeve once the tension is released.

## Installation Procedure

Table 2

Required Tools			
Tool	Part Number	Part Description	Qty
B	6V-9120	Socket <sup>(1)</sup>	1
C	1P-0510	Driver Gp	1

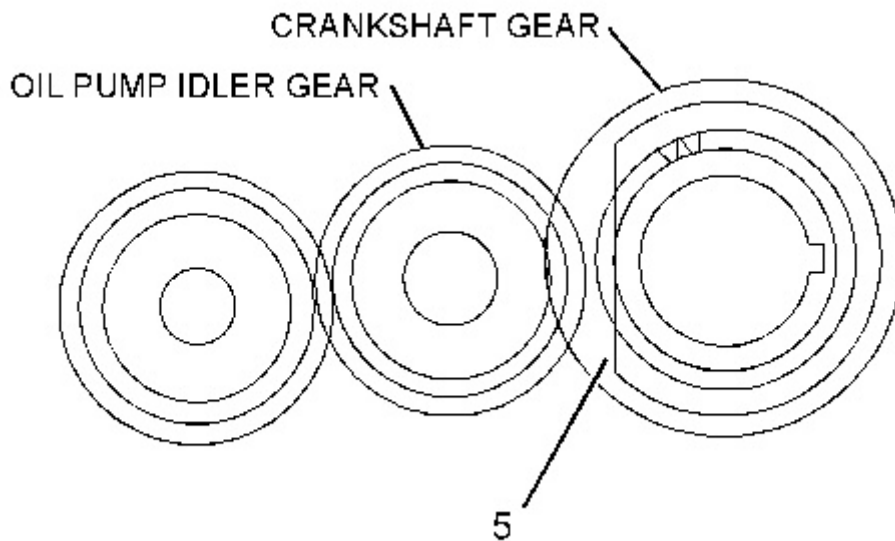
<sup>(1)</sup> Tooling (B) is a 46 mm socket.

### NOTICE

**Keep all parts clean from contaminants.**

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

1. Raise the temperature of the wear sleeve. Use Tooling (C) in order to install the wear sleeve onto the crankshaft pulley.

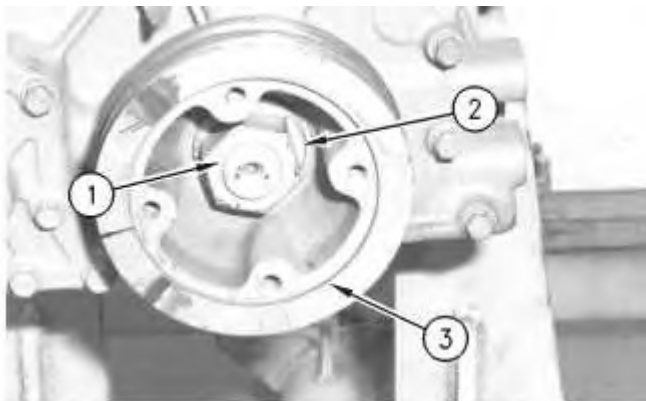


---

Illustration 4

g01377941

2. Ensure that baffle plate (5) is oriented, as shown.



---

Illustration 5

g00604778

3. Position crankshaft pulley (3) onto the engine.
  4. Install washer (2) and nut (1). Use Tooling (B) in order to tighten nut (1) to a torque of  $707.5 \pm 57.5 \text{ N}\cdot\text{m}$  ( $522 \pm 42 \text{ lb ft}$ ).
  5. Install the belt. Refer to Operation and Maintenance Manual, "Belt - Inspect/Adjust/Replace".
-

Product: EXCAVATOR

Model: 323D L EXCAVATOR ZMF

Configuration: 323D, 323D L & 323D LN Excavators ZMF00001-UP (MACHINE) POWERED BY C6.4 Engine

## Disassembly and Assembly C6.4 Engine for Caterpillar Built Machines

Media Number -KENR8106-09

Publication Date -01/10/2017

Date Updated -18/10/2017

i02742689

# Crankshaft Front Seal - Remove

SMCS - 1160-011

## Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	1U-7600	Slide Hammer Puller	1

### Start By:

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

---

### NOTICE

**Keep all parts clean from contaminants.**

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

---

### 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.**

---

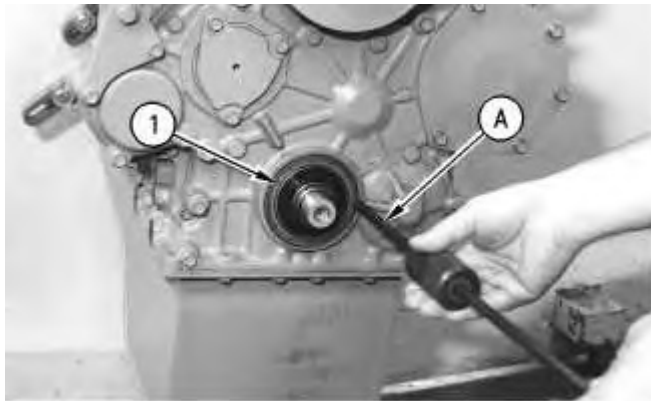


Illustration 1  
Typical Example

g00529162

1. Drill three evenly spaced 3.0 mm (0.12 inch) holes in crankshaft front seal (1).
2. Use Tooling (A) in order to remove crankshaft front seal (1). Remove the seal evenly by alternating the position of Tooling (A) from hole to hole.

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

---

Product: EXCAVATOR

Model: 323D L EXCAVATOR ZMF

Configuration: 323D, 323D L & 323D LN Excavators ZMF00001-UP (MACHINE) POWERED BY C6.4 Engine

## Disassembly and Assembly C6.4 Engine for Caterpillar Built Machines

Media Number -KENR8106-09

Publication Date -01/10/2017

Date Updated -18/10/2017

i02742692

# Crankshaft Front Seal - Install

SMCS - 1160-012

## Installation Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	9U-6180	Front Seal Installer	1

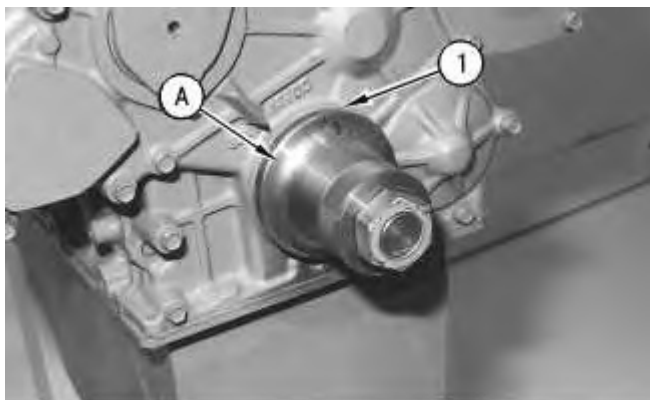
---

### NOTICE

**Keep all parts clean from contaminants.**

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

---



1. Clean the faces of all the mating parts. Apply a thin coat of clean engine oil to a new crankshaft front seal.
2. Use Tooling (A) in order to install new crankshaft front seal (1) in the front housing.
3. Remove Tooling (A) and check crankshaft front seal (1) for correct installation.
4. Apply clean engine oil to the face of the crankshaft pulley that will be in contact with the new crankshaft front seal.

**End By:**

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



Product: EXCAVATOR

Model: 323D L EXCAVATOR ZMF

Configuration: 323D, 323D L & 323D LN Excavators ZMF00001-UP (MACHINE) POWERED BY C6.4 Engine

## Disassembly and Assembly C6.4 Engine for Caterpillar Built Machines

Media Number -KENR8106-09

Publication Date -01/10/2017

Date Updated -18/10/2017

i02742863

# Gear Group (Front) - Remove - Idler Gear Only

SMCS - 1206-011

## Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	9U-6148	Idler Shaft Puller	1
B	1P-0510	Driver Group	1

### Start By:

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

---

### NOTICE

**Keep all parts clean from contaminants.**

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

---

### 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.**

---

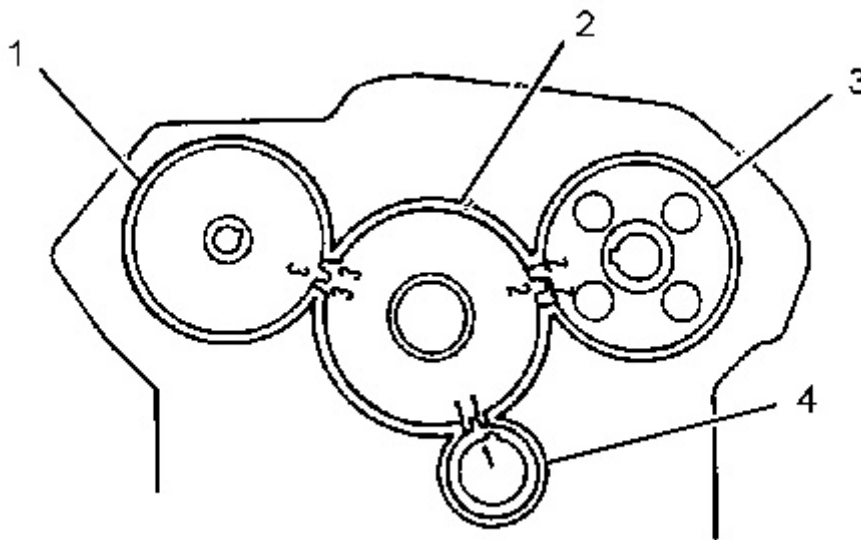


Illustration 1

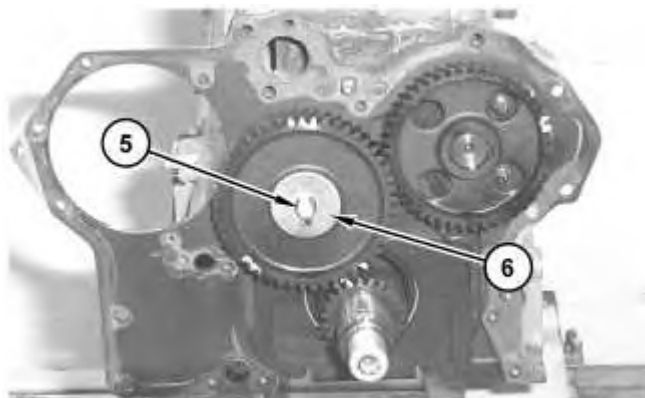
g01374732

- (1) Fuel injection pump drive gear
- (2) Idler gear
- (3) Camshaft gear
- (4) Crankshaft gear

**Note:** The No. 1 cylinder is at the top center position when these marks are in alignment.

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

---



---

Illustration 2

g01374789

1. Remove idler gear bolt (5) and the washer from the idler gear shaft .
2. Remove thrust plate (6) from the idler gear shaft.

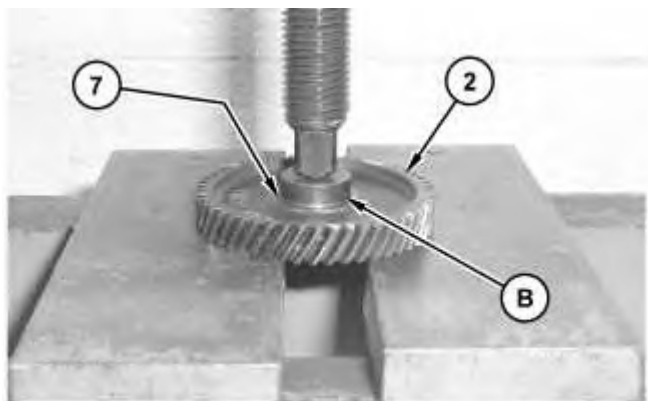


---

Illustration 3

g01374793

3. Remove idler gear (2) from the idler gear shaft.

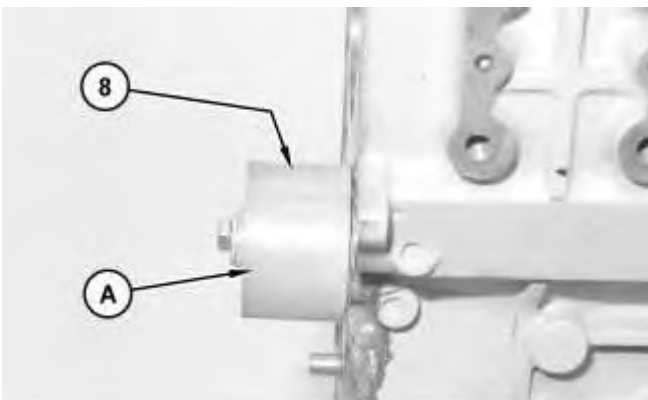


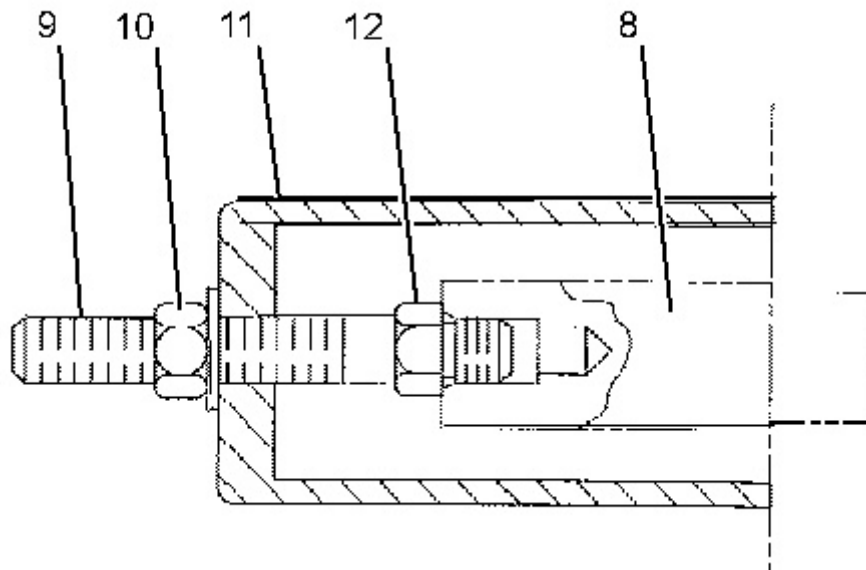
---

Illustration 4

g01374804

4. If necessary, use Tooling (A) and a suitable press in order to remove bushing (7) (not shown) from idler gear (2).





5. The following items are components of Tooling (A).

- **9U-6147** Stud (9)
- **6V-8231** Nut (10)
- **9U-6146** Sleeve Assembly (11)
- **8T-4244** Nut (12)

6. Use Tooling (A) in order to remove idler shaft (8) (not shown) from the cylinder block. Check idler shaft (8) for wear and damage. Replace idler shaft (8), if necessary.

**Note:** See the following list for the removal of the other gears in the front gear group.

- In order to remove camshaft gear (3), refer to Disassembly and Assembly, "Camshaft - Remove".
- In order to remove fuel injection pump gear (1), refer to Disassembly and Assembly, "Fuel Injection Pump - Remove".
- In order to remove the gear from the engine oil pump, refer to Disassembly and Assembly, "Engine Oil Pump - Remove".
- In order to remove crankshaft gear (4), refer to Disassembly and Assembly, "Crankshaft Gear - Remove and Install".

Product: EXCAVATOR

Model: 323D L EXCAVATOR ZMF

Configuration: 323D, 323D L & 323D LN Excavators ZMF00001-UP (MACHINE) POWERED BY C6.4 Engine

## Disassembly and Assembly C6.4 Engine for Caterpillar Built Machines

Media Number -KENR8106-09

Publication Date -01/10/2017

Date Updated -18/10/2017

i02879402

# Gear Group (Front) - Install - Idler Gear Only

SMCS - 1206-012

## Installation Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
a	1p-0510	Driver Gp	1

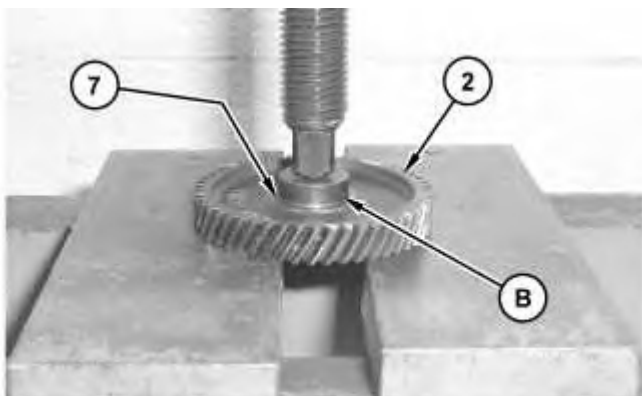
---

### NOTICE

**Keep all parts clean from contaminants.**

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

---

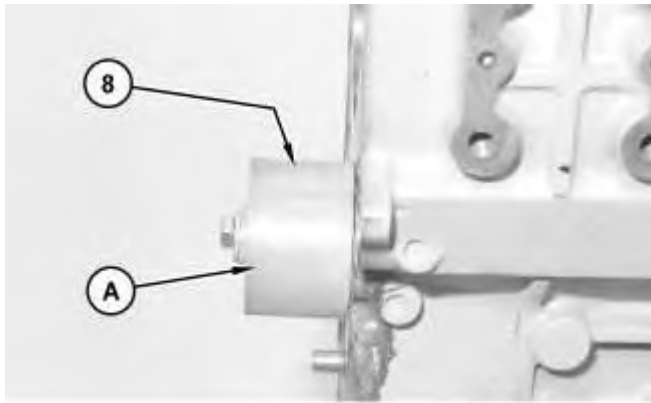


---

Illustration 1

g01374804

1. Use Tooling (A) and a suitable press in order to install a new bushing (7) (not shown), if the bushing was removed.



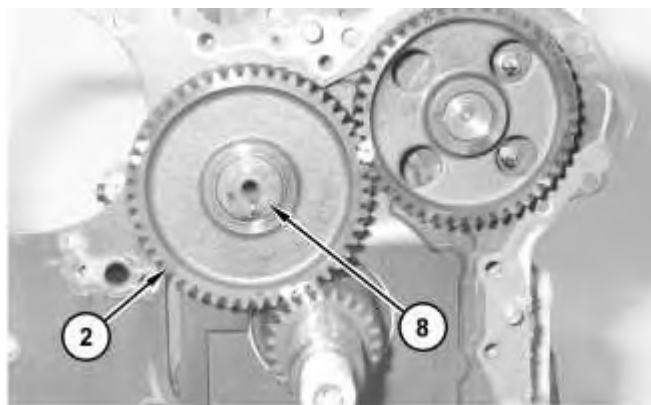
---

Illustration 2

g01374810

2. Lower the temperature of idler shaft (8) . Install idler shaft (8) (not shown) onto the cylinder block.

**Note:** When idler shaft (8) is installed, ensure that the oil hole of idler shaft (8) is up.



---

Illustration 3

g01374827

3. Install idler gear (2) onto idler shaft (8) .
-

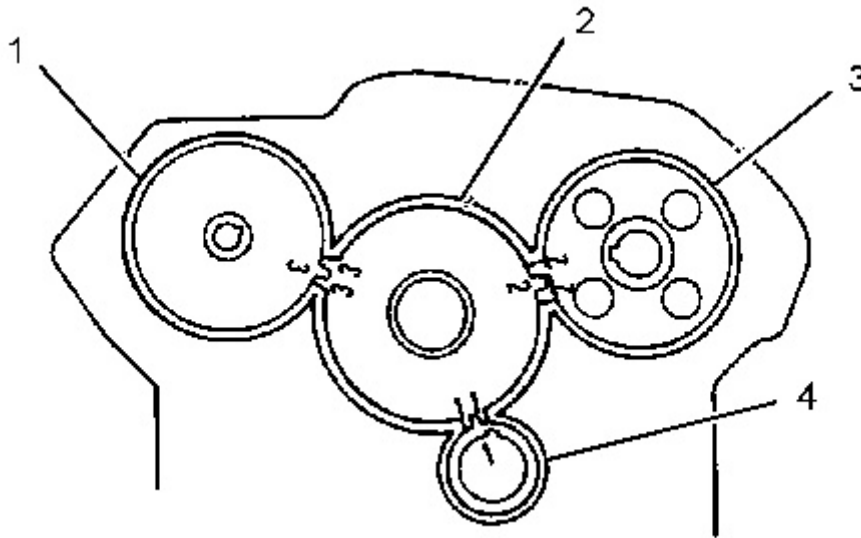


Illustration 4

g01374732

- (1) Fuel injection pump drive gear
- (2) Idler gear
- (3) Camshaft gear
- (4) Crankshaft gear

**Note:** The No. 1 cylinder is at the top center position when these marks are in alignment.

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

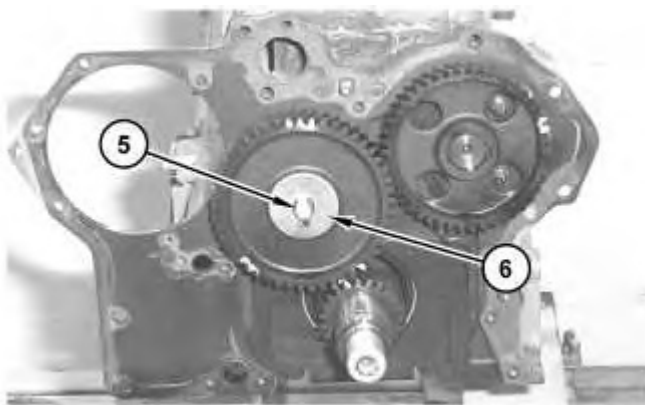


Illustration 5

g01374789

- 4. Install thrust plate (6) onto the idler shaft.
- 5. Install the washer and idler gear bolt (5) onto thrust plate (6) . Tighten idler gear bolt (5) to a torque of  $34 \pm 5$  N·m ( $25 \pm 4$  lb ft).

**Note:** See the following list for the installation of the other gears in the front gear group.

- In order to install the camshaft gear, refer to Disassembly and Assembly, "Camshaft - Install".
- In order to install the fuel injection pump gear, refer to Disassembly and Assembly, "Fuel Injection Pump - Install".
- In order to install the gear to the engine oil pump, refer to Disassembly and Assembly, "Engine Oil Pump - Install".
- In order to install the crankshaft front gear, refer to Disassembly and Assembly, "Crankshaft Gear - Remove and Install".

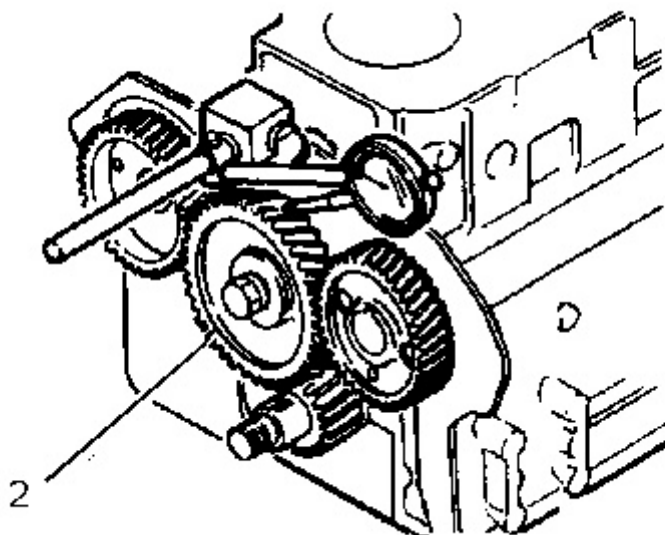


Illustration 6

g01374841

6. Install a dial indicator and rotate idler gear (2) back and forth in order to measure backlash. Refer to Table 3.

Table 2

Item	Standard at Assembly	Service Limit
Backlash of crankshaft gear and idler gear	0.510 to 0.157 mm (0.0201 to 0.0062 inch)	0.250 mm (0.0098 inch)
Backlash of camshaft gear and idler gear	0.520 to 0.158 mm (0.0205 to 0.0062 inch)	0.250 mm (0.0098 inch)
Backlash of fuel injection pump gear and idler gear	0.0560 to 0.205 mm (0.0022 to 0.0081 inch)	0.250 mm (0.0098 inch)



End play of idler gear	0.050 to 0.200 mm (0.0020 to 0.0079 inch)	0.350 mm (0.0138 inch)
Clearance between idler gear bushing and shaft	0.009 to 0.050 mm (0.0004 to 0.0020 inch)	0.100 mm (0.0039 inch)

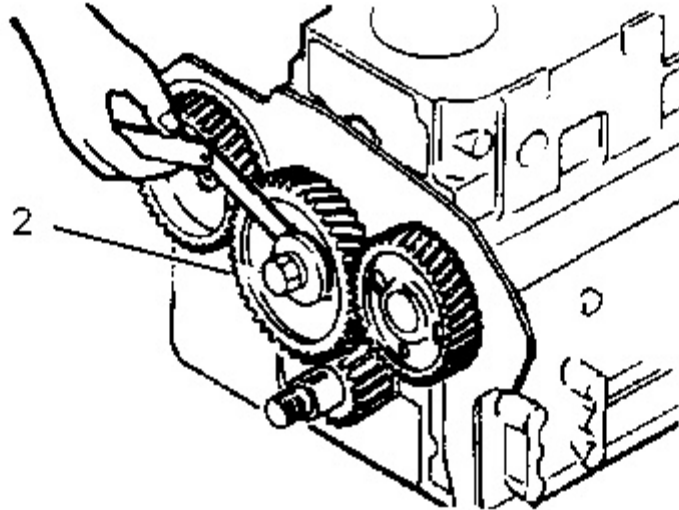


Illustration 7

g01374874

7. Measure the end play of idler gear (2) with a feeler gauge. Refer to Table 3.

**End By:** Install the front housing. Refer to Disassembly and Assembly, "Housing (Front) - Install".

Product: EXCAVATOR

Model: 323D L EXCAVATOR ZMF

Configuration: 323D, 323D L & 323D LN Excavators ZMF00001-UP (MACHINE) POWERED BY C6.4 Engine

## Disassembly and Assembly C6.4 Engine for Caterpillar Built Machines

Media Number -KENR8106-09

Publication Date -01/10/2017

Date Updated -18/10/2017

i02743335

### Housing (Front) - Remove

SMCS - 1151-011

### Removal Procedure

Table 1

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

#### Start By:

- Remove the alternator. Refer to Disassembly and Assembly, "Alternator - Remove and Install".
- Remove the water pump. Refer to Disassembly and Assembly, "Water Pump - Remove".
- Remove the crankshaft pulley. Refer to Disassembly and Assembly, "Crankshaft Pulley - Remove and Install".
- Remove the fuel injection pump. Refer to Disassembly and Assembly, "Fuel Injection Pump - Remove".

---

### NOTICE

**Keep all parts clean from contaminants.**

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

---

---

## 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.

---

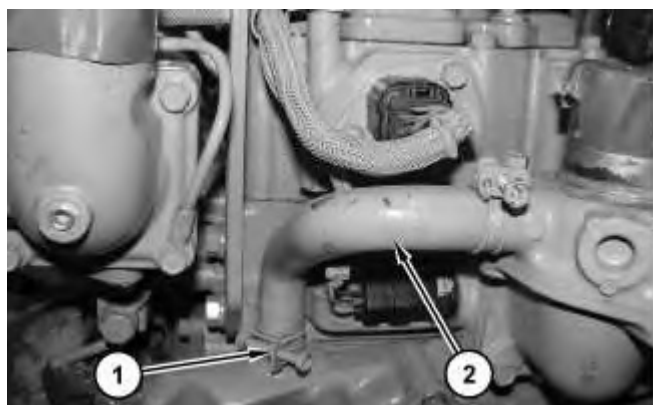


Illustration 1

g01374908

1. Loosen hose clamp (1) that secures hose (2) to the front housing.
2. Disconnect hose (2) from the front housing.

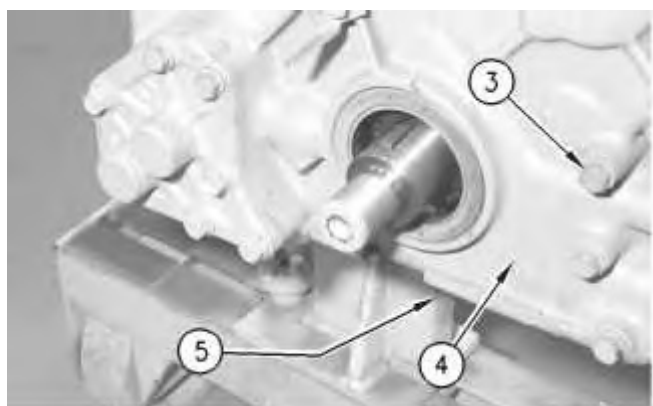


Illustration 2

g00605985

3. Remove bolts (3) and the washers that hold front housing (4) to the plate and the cylinder block.

- Remove six bolts (5) (not shown) and the washers that mount front housing (4) to the oil pan.

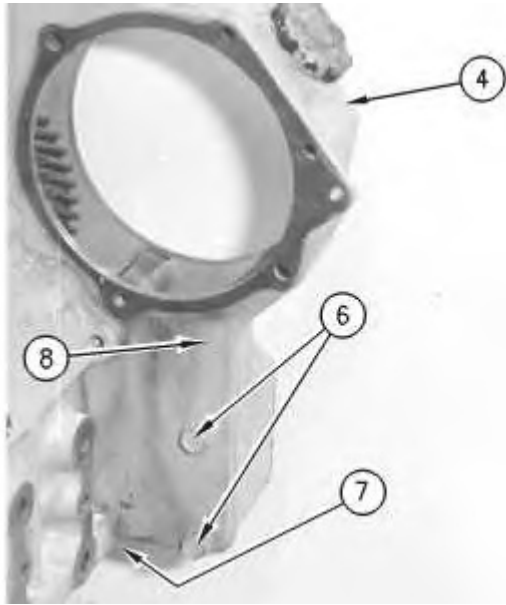
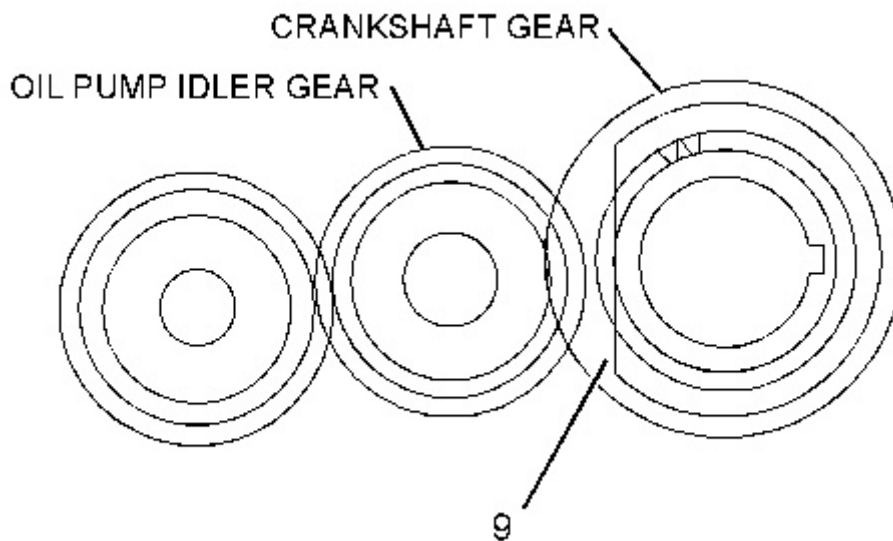


Illustration 3

g00606002

- Remove bolts (6) and the washers that mount front housing (4) to front plate (8) and the cylinder block.
- Use two people in order to remove front housing (4) from the cylinder block and front plate (8). The weight of front housing (4) is approximately 20 kg (45 lb).

**Note:** Check the condition of gasket (7) (not shown) for the engine oil pan. If gasket (7) is damaged, it may be necessary to replace gasket (7). Refer to Disassembly and Assembly, "Engine Oil Pan - Remove and Install" for replacement of gasket (7) for the engine oil pan.



7. Remove baffle plate (9).

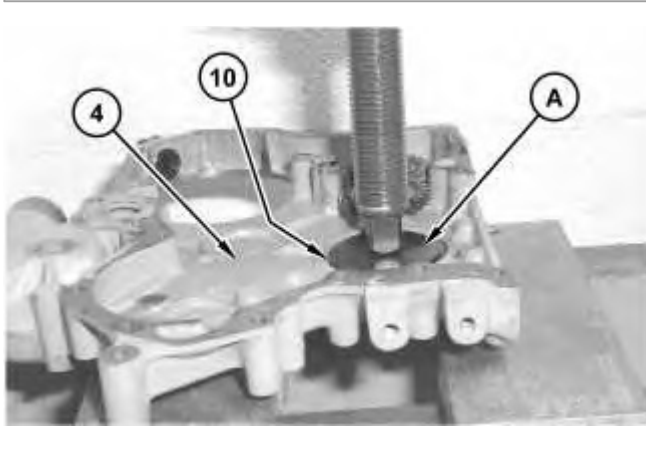


Illustration 5

8. Use Tooling (A) in order to remove crankshaft front seal (10) (not shown) from front housing (4), if necessary.
  9. Check the teeth of the timing gears for the following items: wear, nicks, chips and uneven contact. Check the keyway for wear or damage.
-

Product: EXCAVATOR

Model: 323D L EXCAVATOR ZMF

Configuration: 323D, 323D L & 323D LN Excavators ZMF00001-UP (MACHINE) POWERED BY C6.4 Engine

## Disassembly and Assembly C6.4 Engine for Caterpillar Built Machines

Media Number -KENR8106-09

Publication Date -01/10/2017

Date Updated -18/10/2017

i02879387

## Housing (Front) - Install

SMCS - 1151-012

## Installation Procedure

Table 1

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

---

### NOTICE

**Keep all parts clean from contaminants.**

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

---

**Note:** Check the gaskets, and the seals for wear or for damage. Replace the components, if necessary.

---

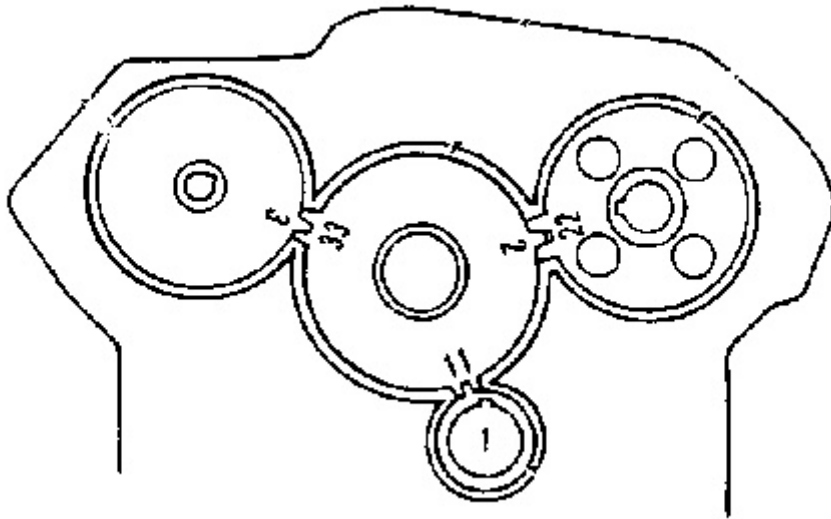


Illustration 1

g00836619

Alignment marks for timing gears

1. Check the alignment of the timing gears.

**Note:** Ensure that the marks on the timing gears are in alignment. Align the "3" mark on the fuel injection pump drive gear with the "33" mark on the idler gear. Make an alignment of the "2" mark on the idler gear with the "22" mark on the camshaft gear. Align the "1" mark on the crankshaft gear with the "11" mark on the idler gear. The No. 1 cylinder is at the top center position when the timing marks are in alignment.

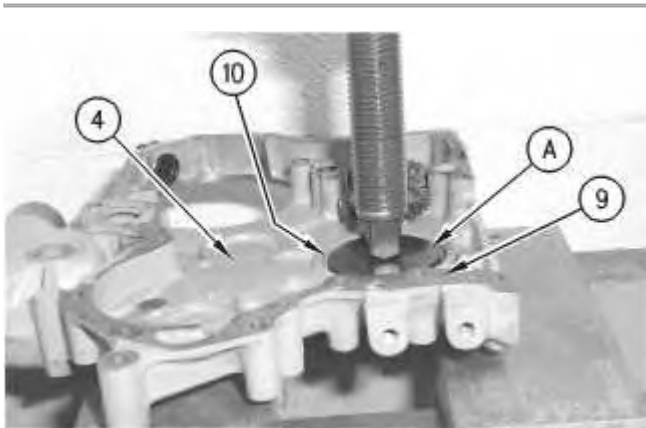


Illustration 2

g00606022

2. Ensure that the old gasket material (9) is removed from the mating surface of front housing (4) and the timing gear plate. Install a new gasket (9) .
3. If the crankshaft front seal (10) (not shown) was removed, use Tooling (A) in order to install a new crankshaft front seal (10) .

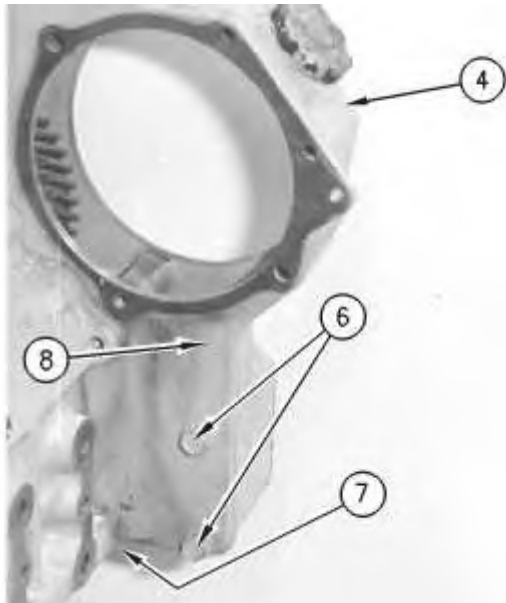


Illustration 3

g00606002

4. Before installation of front housing (4) , check gasket (7) (not shown) for the oil pan for damage. Replace gasket (7) , if necessary. Refer to Disassembly and Assembly, "Engine Oil Pan - Remove and Install" for replacement of gasket (7) for the engine oil pan.
5. Use two people in order to install front housing (4) onto front plate (8) and the cylinder block. The weight of front housing (4) is approximately 20 kg (45 lb).
6. Install bolts (6) in order to fasten front housing (4) onto the cylinder block and front plate (8) .

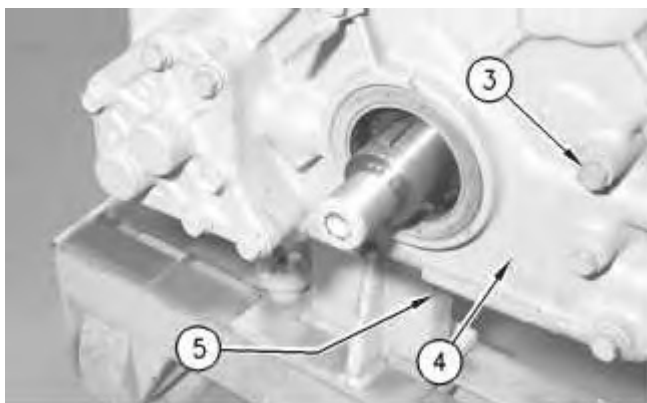


Illustration 4

g00605985

7. Install the washers and six bolts (5) (not shown) in order to secure front housing (4) onto engine oil pan.



8. Install bolts (3) and washers that secure front housing (4) to the front plate and the cylinder block.

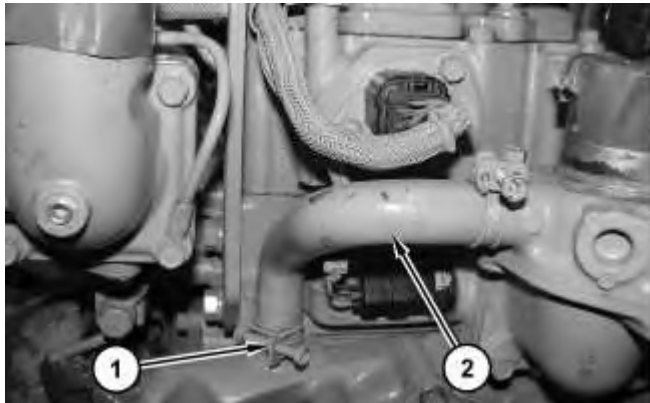


Illustration 5

g01374908

9. Connect hose (2) to the front housing.
10. Tighten hose clamp (1) in order to secure hose (2) to the front housing.

**End By:**

- a. Install the fuel injection pump. Refer to Disassembly and Assembly, "Fuel Injection Pump - Install".
  - b. Install the crankshaft pulley. Refer to Disassembly and Assembly, "Crankshaft Pulley - Remove and Install".
  - c. Install the water pump. Refer to Disassembly and Assembly, "Water Pump - Install".
  - d. Install the alternator. Refer to Disassembly and Assembly, "Alternator - Remove and Install".
-



**Download the full PDF manual instantly.**

**Our customer service e-mail:**

**[aservicemanualpdf@yahoo.com](mailto:aservicemanualpdf@yahoo.com)**