

Product: TRUCK

Model: 785G TRUCK RTL

Configuration: 785G Off-Highway Truck RTL00001-UP (MACHINE) POWERED BY 3512E Engine

## Disassembly and Assembly 3512E Engines for Caterpillar Built Machines

Media Number -M0078314-01

Publication Date -01/10/2017

Date Updated -26/10/2017

i06969888

# Accessory Drive (Front) - Disassemble - Engine Oil Pump and Water Pump

SMCS - 1207-015

## Disassembly Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	1P-0520	Driver Group	1

### Start By:

- Remove the accessory drive for the engine oil pump and the water pump. Refer to Disassembly and Assembly, "Accessory Drive (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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Illustration 1

g06183005

1. Remove O-ring seal (3) from pump adapter assembly (2).
2. Use Tooling (A) and a suitable press to remove sleeve bearing (1) from pump adapter assembly (2).



Illustration 2

g06183010

3. Remove bolts (5).
4. Remove thrust washers (6) from pump adapter assembly (4).
5. Remove pump adapter assembly (4) from pump drive shaft (7).



6. Remove bolts (8).
  7. Remove accessory drive gear (9) from pump drive shaft (7).
  8. If necessary, remove the socket setscrew from the end of pump drive shaft (7).
- 



Illustration 4

9. Remove O-ring seal (11) and O-ring seal (12) from pump adapter assembly (4).
  10. Use Tooling (A) and a suitable press to remove sleeve bearing (10) from pump adapter assembly (4).
-

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i06969944

# Accessory Drive (Front) - Assemble - Engine Oil Pump and Water Pump

SMCS - 1207-016

## Assembly Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	1P-0520	Driver Group	1

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### NOTICE

**Keep all parts clean from contaminants.**

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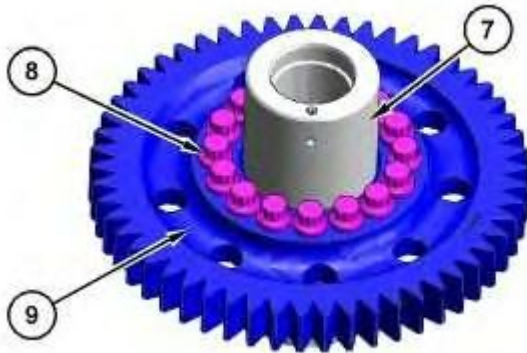
Illustration 1

g06183041

1. Align the oil hole in sleeve bearing (10) and the oil hole in pump adapter assembly (4). Use Tooling (A) and a suitable press to install sleeve bearing (10) into pump adapter assembly (4).

**Note:** The sleeve bearing must not project above the pump adapter assembly.

2. Install O-ring seal (12) and O-ring seal (11) on pump adapter assembly (4).
3. Apply clean engine oil to sleeve bearing (10).



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Illustration 2

g06183012

4. Position accessory drive gear (9) on pump drive shaft (7). Install bolts (8).
  5. If necessary, install socket setscrew (13) in the end of pump drive shaft and tighten to a torque of  $6 \pm 1$  N·m ( $53 \pm 9$  lb in).
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Illustration 3

g06183010

6. Install pump adapter assembly (4) onto pump drive shaft (7).
7. Install thrust washer (6) and bolts (5).



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Illustration 4

g06183005

8. Align the oil hole in sleeve bearing (1) and the oil hole in pump adapter assembly (2). Use Tooling (A) and a suitable press to install sleeve bearing (1) into pump adapter assembly (2).
9. Install O-ring seal (3) on the pump adapter assembly.

**End By:**

- a. Install the accessory drive for the engine oil pump and the water pump. Refer to Disassembly and Assembly, "Accessory Drive (Front) - Install".
-

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i02977543

# Accessory Drive (Front) - Install - Engine Oil Pump and Water Pump

SMCS - 1207-012

## Installation Procedure

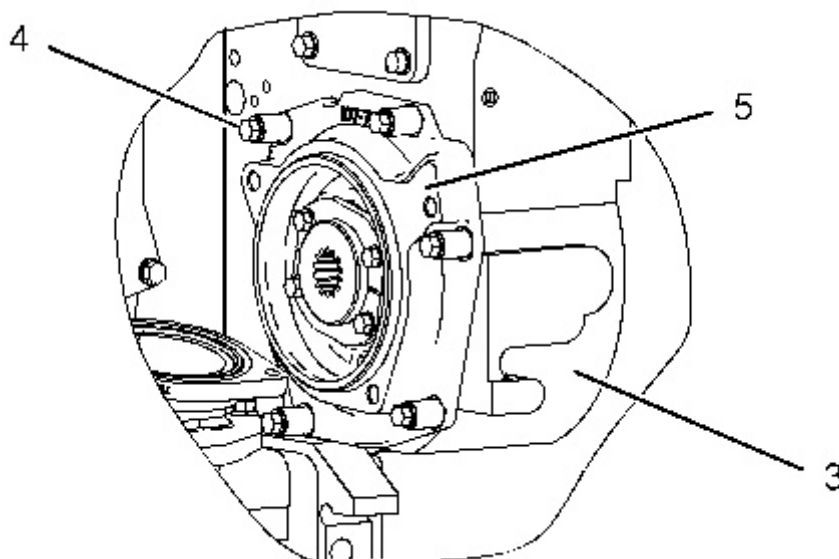
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### NOTICE

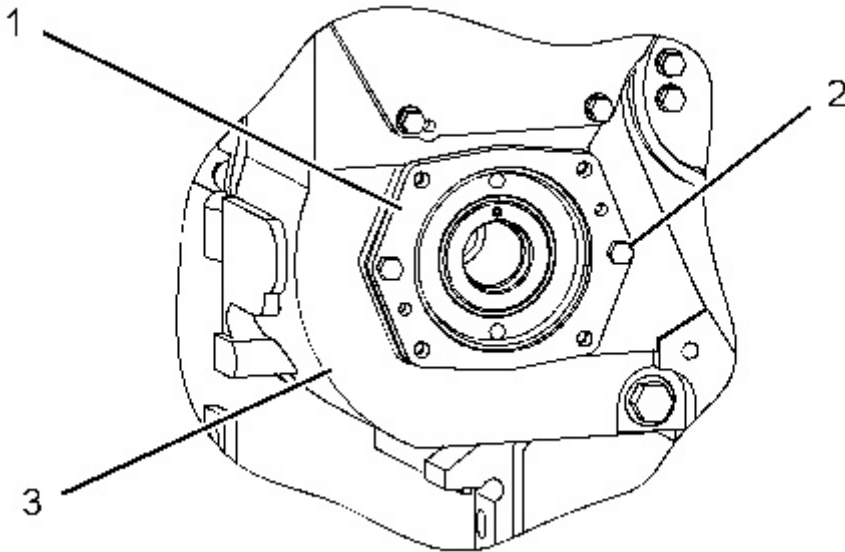
**Keep all parts clean from contaminants.**

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

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1. Install the O-ring seal in pump adapter assembly (5). Apply clean engine oil to the bore in front housing (3) for pump adapter assembly (5).
  2. Position pump adapter assembly (5) in the front housing and install bolts (4).
- 



3. Install the O-ring seal in pump adapter assembly (1). Apply clean engine oil to the bore in front housing (3) for pump adapter assembly (1).
4. Position pump adapter assembly (1) in the front housing and install bolts (2).

**End By:**

- a. Install the water pump. Refer to Disassembly and Assembly, "Water Pump - Install".
  - b. Install the engine oil pump. Refer to Disassembly and Assembly, "Engine Oil Pump - Install".
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i02978724

### Housing (Front) - Remove

SMCS - 1151-011

### Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	1P-0074	Slide Hammer Puller	1
	8B-7557	Threaded Adapter	1
B	138-7573	Link Bracket	2
C	1P-0520	Driver Group	1
D	-	Guide Stud 5/8 - 11 by 8 inch	2

#### Start By:

- a. Remove the electronic control module. Refer to Disassembly and Assembly, "Electronic Control Module (Engine) - Remove and Install".
- b. Remove the air compressor. Refer to Disassembly and Assembly, "Air Compressor - Remove and Install".
- c. Remove the crankshaft front seal and the wear sleeve. Refer to Disassembly and Assembly, "Crankshaft Front Seal and Wear Sleeve - Remove".
- d. Remove the engine trunnion. Refer to Disassembly and Assembly, "Engine Trunnion - Remove and Install".

- e. Remove the auxiliary water pump. Refer to Disassembly and Assembly, "Auxiliary Water Pump - Remove".
- f. Remove the accessory drive. Refer to Disassembly and Assembly, "Accessory Drive (Front) - Remove".
- g. Remove the engine oil pump and water pump drive. Refer to Disassembly and Assembly, "Accessory Drive (Front) - Remove".

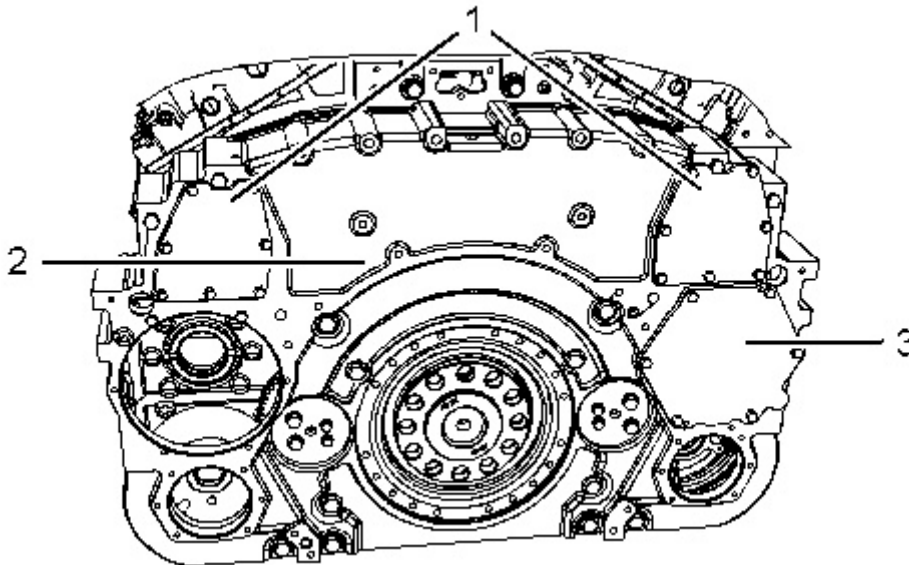
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### NOTICE

**Keep all parts clean from contaminants.**

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

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Illustration 1

g01246380

- 1. Remove bolts and covers (1). Remove the gaskets from front housing (2).
  - 2. Remove bolts and cover (3). Remove the O-ring seal from the cover.
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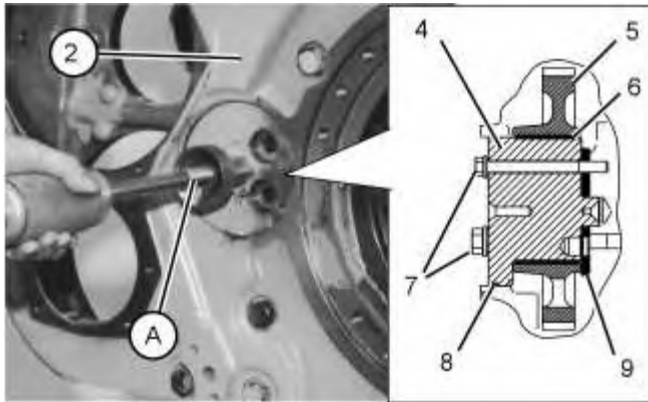


Illustration 2

g01131889

3. Remove bolts (7). Use Tooling (A) to remove shaft (4) from front housing (2). Remove O-ring seal (8) from the shaft.
4. Remove idler gear (5) and thrust washer (9) from the front housing.
5. Use Tooling (C) and a suitable press to remove sleeve bearing (6) from idler gear (5).

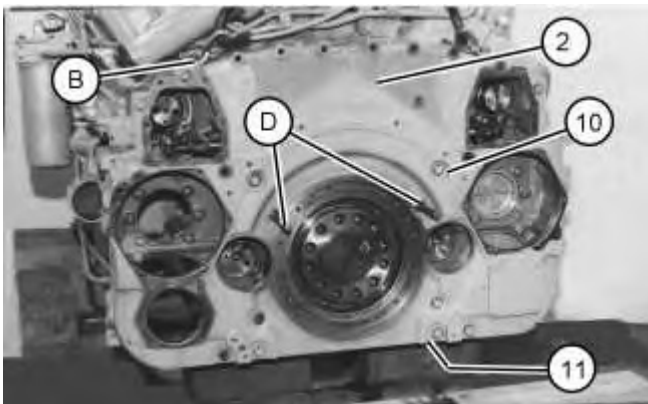


Illustration 3

g01131907

6. Attach Tooling (B) and attach a suitable lifting device to front housing (2). The weight of front housing (2) is approximately 181 kg (400 lb). Remove two bolts (10) and install Tooling (D). Remove remaining bolts (10) that hold the front housing to the cylinder block. Remove the front housing.
  7. Remove gasket (11) from the front housing and the cylinder block.
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i02978801

### Housing (Front) - Install

SMCS - 1151-012

### Installation Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
B	138-7573	Link Bracket	2
C	1P-0520	Driver Group	1
D	-	Guide Stud 5/8 - 11 by 8 inch	2

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#### NOTICE

**Keep all parts clean from contaminants.**

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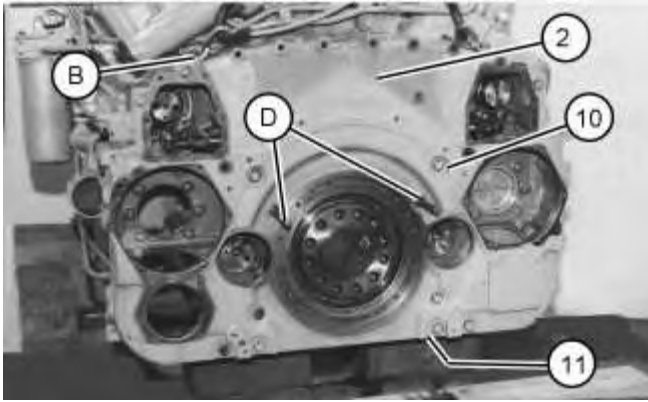


Illustration 1

g01131907

1. Install gasket (11) on the cylinder block. Install Tooling (D) into the cylinder block.
2. Attach Tooling (B) and attach a suitable lifting device to front housing (2). The weight of front housing (2) is approximately 181 kg (400 lb). Position the front housing onto Tooling (D).
3. Install bolts (10) that hold front housing (2) to the cylinder block. Remove Tooling (D) and install remaining bolts (10). Tighten the bolts evenly.
4. Cut any excess gasket (11) from the bottom of the front housing.

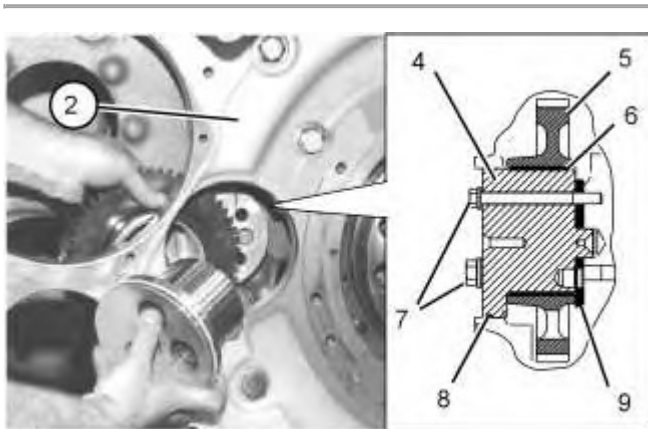
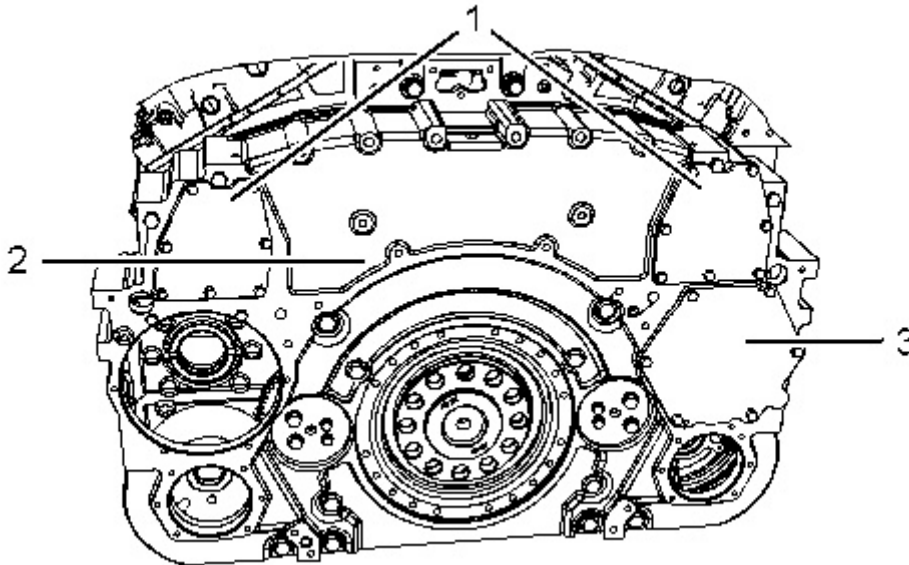


Illustration 2

g01131955

5. Use Tooling (C) to install sleeve bearing (6) in idler gear (5).
6. Install O-ring seal (8) on shaft (4). Apply clean engine oil to the bore in front housing (2) for the shaft.
7. Position thrust washer (9), idler gear (5), and shaft (4) in the front housing. Install bolts (7).



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Illustration 3

g01246380

8. Install the O-ring seal in cover (3). Position cover (3) on front housing (2) and install the bolts.
9. Position the gaskets and covers (1) on front housing (2) and install the bolts.

**End By:**

- a. Install the engine oil pump and water pump drive. Refer to Disassembly and Assembly, "Accessory Drive (Front) - Install".
  - b. Install the accessory drive. Refer to Disassembly and Assembly, "Accessory Drive (Front) - Install".
  - c. Install the auxiliary water pump. Refer to Disassembly and Assembly, "Auxiliary Water Pump - Install".
  - d. Install the engine trunnion. Refer to Disassembly and Assembly, "Engine Trunnion - Remove and Install".
  - e. Install the crankshaft front seal and the wear sleeve. Refer to Disassembly and Assembly, "Crankshaft Front Seal and Wear Sleeve - Install".
  - f. Install the air compressor. Refer to Disassembly and Assembly, "Air Compressor - Remove and Install".
  - g. Install the electronic control module. Refer to Disassembly and Assembly, "Electronic Control Module (Engine) - Remove and Install".
-

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i02979264

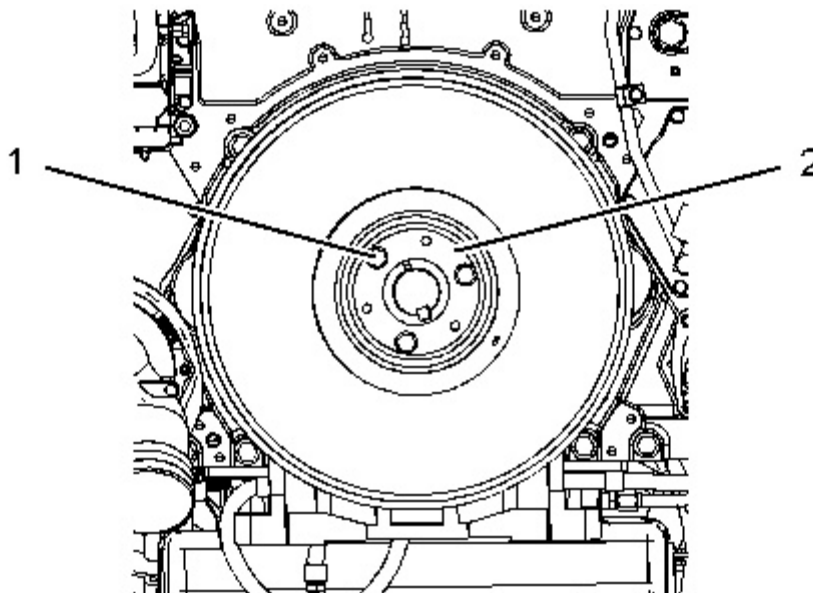
# Vibration Damper - Remove and Install

SMCS - 1205-010

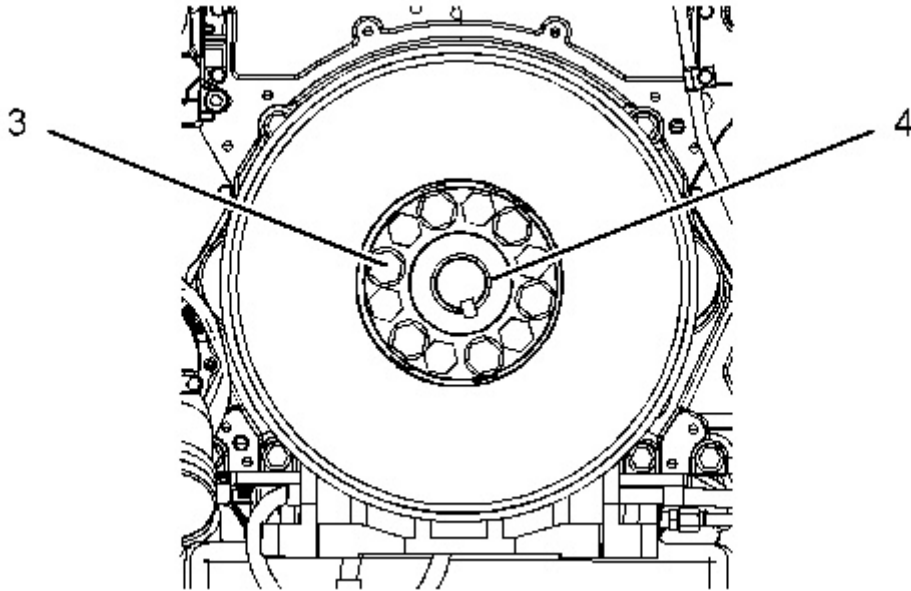
## Removal Procedure

Table 1

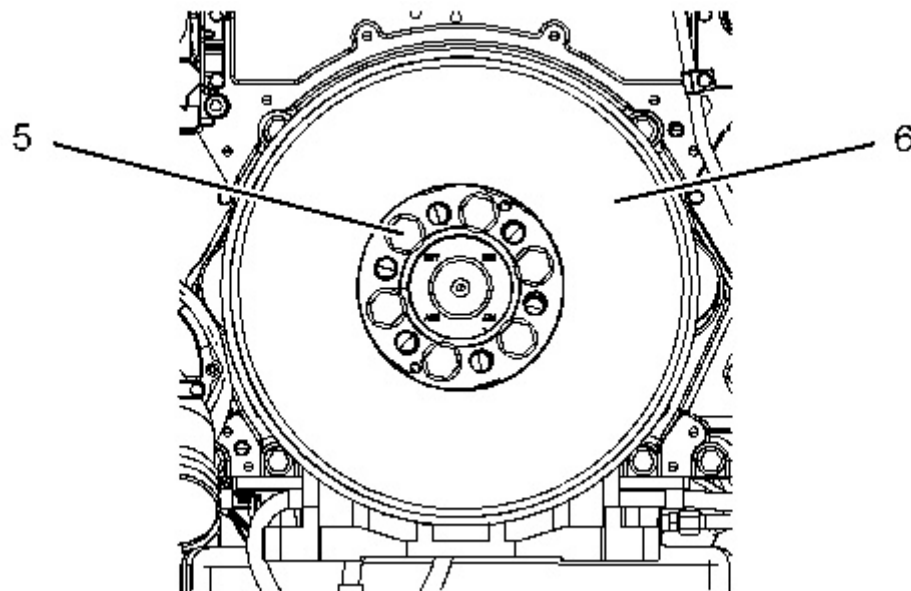
Required Tools			
Tool	Part Number	Part Description	Qty
A	138-7573	Lifting Bracket	2
B	-	Guide Stud 1 - 14 by 10 inch	2



1. Attach a suitable lifting device to crankshaft pulley (2). The weight of crankshaft pulley (2) is approximately 36 kg (80 lb). Remove bolts (1) and crankshaft pulley (2).



2. Remove bolts (3) and stub shaft (4).



3. Remove two bolts (5) and install Tooling (B).
4. Attach Tooling (A) and a suitable lifting device to vibration damper (6). The weight of vibration damper (6) is approximately 180 kg (400 lb). Remove remaining bolts (5). Remove vibration damper (6).



**Note:** Remove the adapter, if necessary.

## Installation Procedure

Table 2

Required Tools			
Tool	Part Number	Part Description	Qty
A	138-7573	Lifting Bracket	2
B	-	Guide Stud 1 - 14 by 10 inch	2

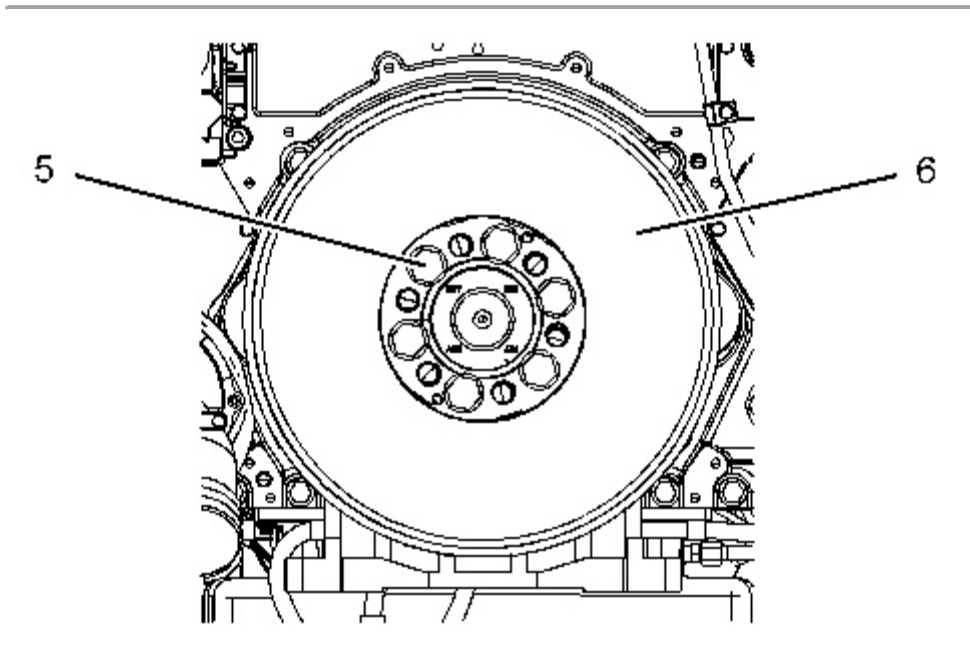


Illustration 4

g01507096

1. Install Tooling (B) in the crankshaft.

**Note:** Install the adapter on Tooling (B), if necessary. Ensure that the alignment marks on the crankshaft align with the alignment marks on the adapter. Ensure that the alignment marks on the vibration damper align with the alignment marks on the adapter.

2. Attach Tooling (A) and a suitable lifting device to vibration damper (6). The weight of vibration damper (6) is approximately 180 kg (400 lb).
3. Install the vibration damper on Tooling (B). Install bolts (5). Remove Tooling (B) and install remaining bolts (5). Tighten bolts (5) to a torque of  $1125 \pm 100 \text{ N}\cdot\text{m}$  ( $820 \pm 74 \text{ lb ft}$ ).

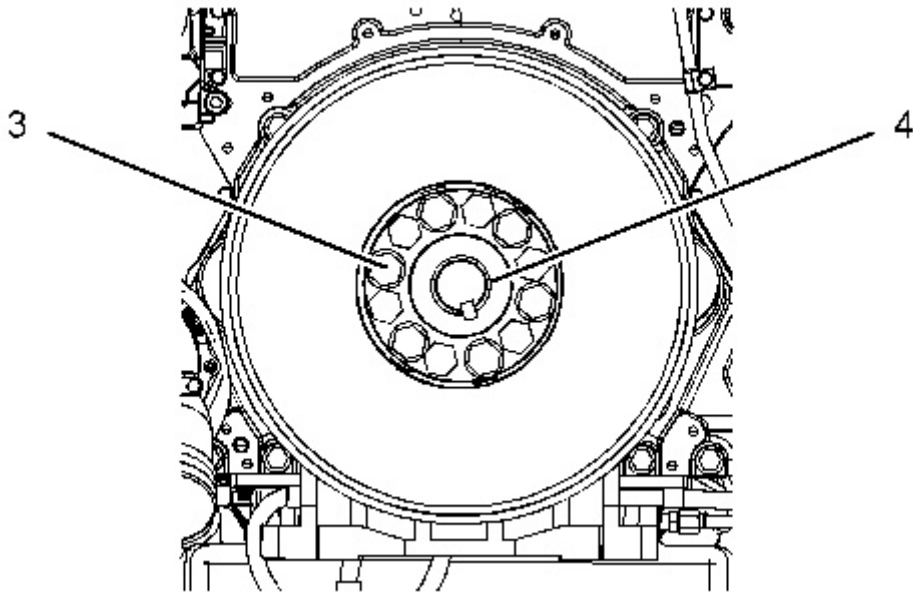


Illustration 5

g01507095

4. Place stub shaft (4) in position and install bolts (3).

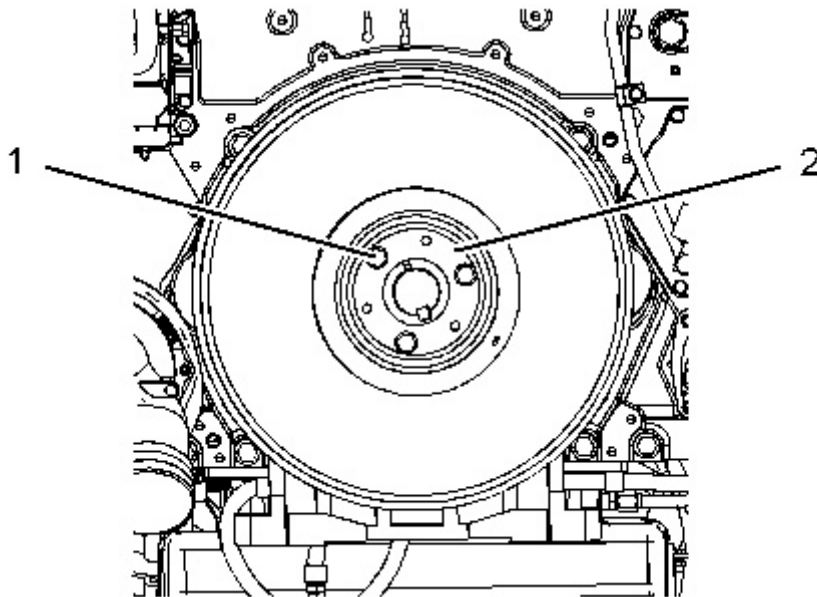


Illustration 6

g01507094

5. Attach a suitable lifting device to crankshaft pulley (2). The weight of crankshaft pulley (2) is approximately 36 kg (80 lb). Install crankshaft pulley (2) and bolts (1). Tighten bolts (1) to a torque of  $90 \pm 10$  N·m ( $65 \pm 7$  lb ft).

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i06616604

# Crankshaft Front Seal and Wear Sleeve - Remove

SMCS - 1160-011; 7558-011

## Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	1U-7600	Slide Hammer Puller	1
B	1U-7325	Distorter Adapter	-
	6V-3143	Distorter Adapter <sup>(1)</sup>	-
C	5P-7409	Sleeve Distorter	1

<sup>(1)</sup> For use with engines equipped with a seal adapter.

### Start By:

- Remove the vibration damper. Refer to Disassembly and Assembly, "Vibration Damper - 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

**Every time that the crankshaft seal is removed from the wear sleeve, a new wear sleeve and crankshaft seal must be installed.**

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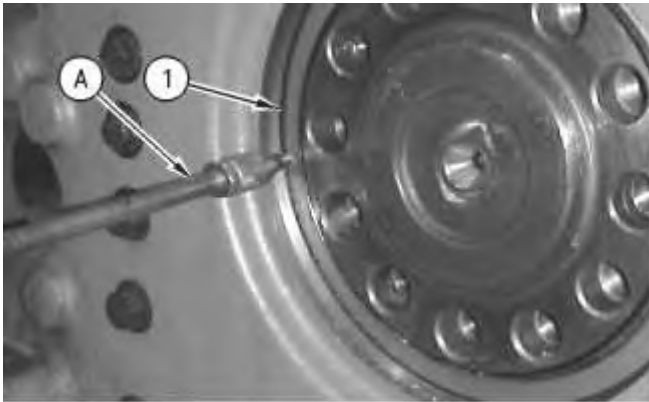


Illustration 1

g00659180

1. Drill three evenly spaced holes in crankshaft front seal (1) and use Tooling (A) to remove crankshaft front seal (1) from the front housing.

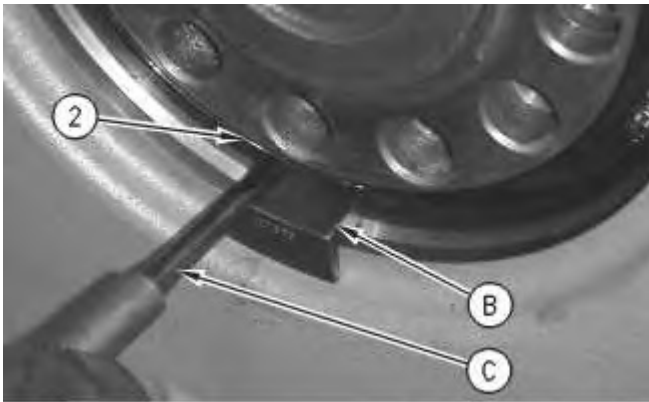


Illustration 2

g00659181

2. Insert Tooling (B) between the front housing and wear sleeve (2).

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## NOTICE

**The use of excessive force on the sleeve distorter can cause the distorter adapter to crack the housing. To help avoid damage to the engine, do not use excessive force to remove the wear sleeve.**

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3. Insert Tooling (C) between Tooling (B) and wear sleeve (2). Carefully turn Tooling (C) until the edge of the tool creates a crease in wear sleeve (2).

Repeat this procedure several times around wear sleeve (2) until wear sleeve (2) can be removed by hand.

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