

Product: WHEEL SCRAPER

Model: 657E WHEEL SCRAPER 86Z

Configuration: 657E Wheel Scraper 86Z00001-UP (MACHINE) POWERED BY 3408 Engine

Disassembly and Assembly 3408E and 3412E Engines for Caterpillar Built Machines

Media Number -SEN1013-11

Publication Date -01/07/2015

Date Updated -22/08/2016

i01095415

Engine Support (Front) - Remove and Install

SMCS - 1154-010-FR

Removal Procedure

Start By:

- a. Remove the crankshaft vibration damper. Refer to Disassembly and Assembly, "Vibration Damper and Pulley - Remove and Install".

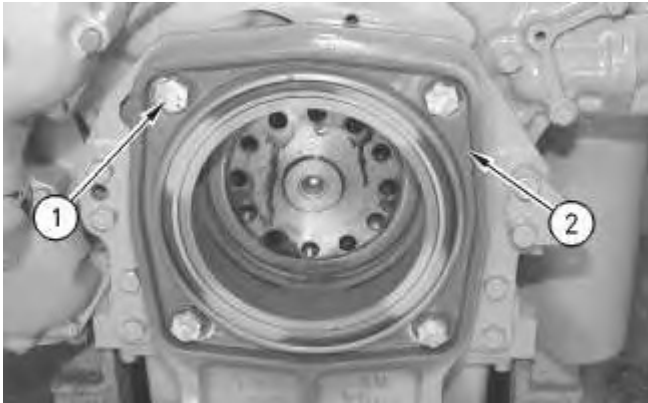


Illustration 1

g00575145

Typical example

1. Remove four bolts (1) and the washers.
2. Remove engine support (2).

Installation Procedure

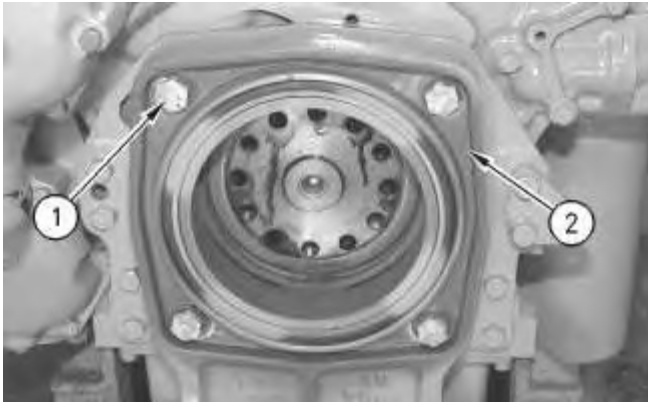


Illustration 2
Typical example

g00575145

1. Place engine support (2) in position on the engine.
2. Install four bolts (1). Tighten the bolts to a torque of $270 \pm 25 \text{ N}\cdot\text{m}$ ($200 \pm 18 \text{ lb ft}$).

End By:

- a. Install the crankshaft vibration damper. Refer to Disassembly and Assembly, "Vibration Damper and Pulley - Remove and Install".
-

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i03335401

Gear Group (Rear) - Remove

SMCS - 1206-011; 1212-011

Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	1P-0483 ⁽¹⁾	Drive Plate	1
	1U-5839	Bearing Puller	1
B	FT-1342	Guide Bolt	2

⁽¹⁾ Part of the 1P-0510 Driver Group

Start By:

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

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

Note: There are many possible configurations of the rear gear group and flywheel housing. The following procedure illustrates a typical example.

1. Use the following procedure for disassembly of the adapter assemblies.

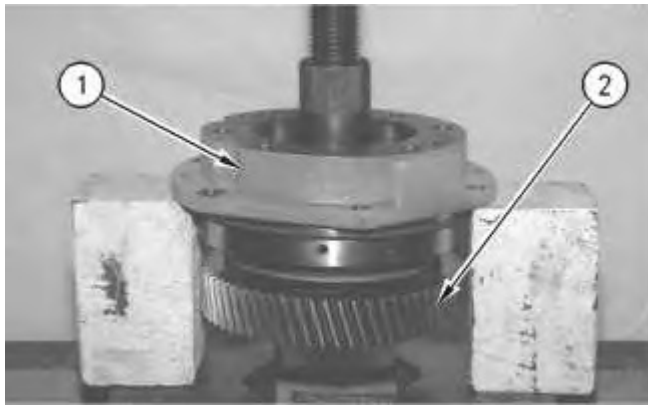


Illustration 1

g00586481

Typical example

- a. Support adapter assembly (1) so that the gear assembly can be pressed out of the adapter assembly. Press gear assembly (2) out of the adapter assembly.
-



Illustration 2

g00586630

Typical example

- b. Use Tooling (A) in order to remove bearing (3) from the gear assembly.
-



Illustration 3

g00586904

Typical example

c. Use a press in order to remove bearing (4) from adapter assembly (1).



Illustration 4

g00586907

Typical example

d. Remove bolts (5) and ring (6) from adapter assembly (1).

e. Remove O-ring seal (7) from adapter assembly (1).

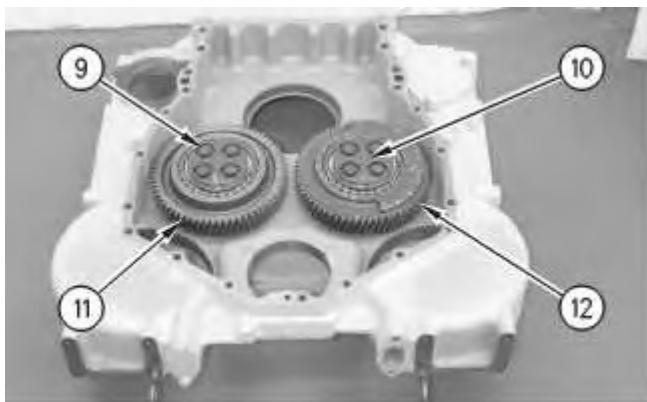


Illustration 5

g00586910

Typical example

f. If necessary, remove race (8) from adapter assembly (1).



Typical example

2. With the flywheel housing in a horizontal position, remove bolts (9) from shafts (10).

Note: The bearings that are located toward the flywheel will fall when gear (11) and gear (12) are removed. Hold these bearings in position when the gears are removed.

3. Remove balancer gear (12) and idler gear (11).
4. Use the following procedure for disassembly of balancer gear (12).

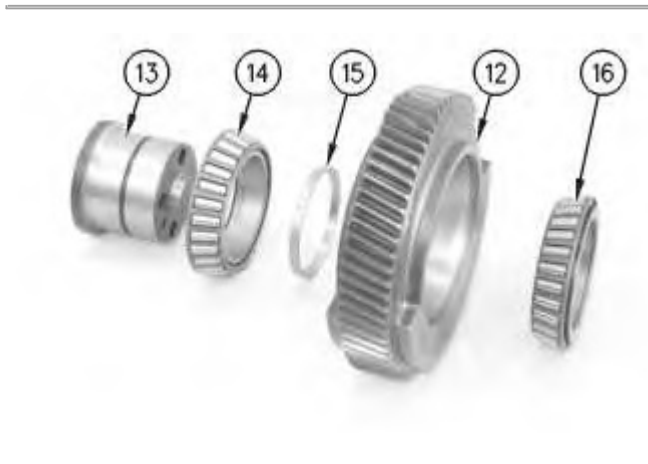


Illustration 7

g00587608

Typical example

- a. Remove shaft (13), spacer (15), bearing (14), and bearing (16) from balancer gear (12).

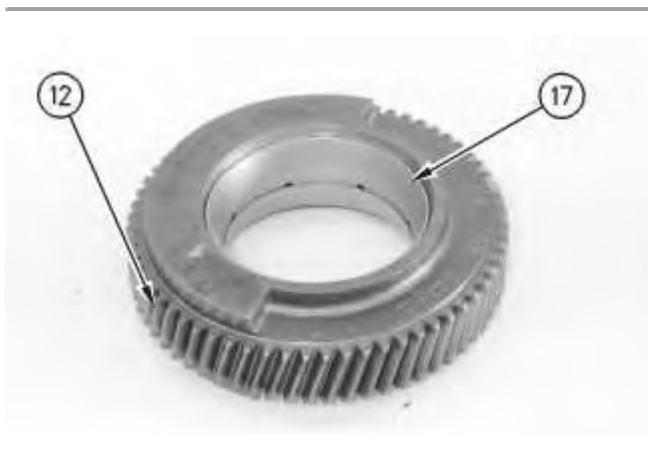


Illustration 8

g00587624

Typical example

- b. Remove bearing cup (17) from balancer gear (12).

Note: The bearing cups will be damaged from the removal. Use new parts for replacement.



Illustration 9

g00587629

Typical example

- c. Remove spacer (18) from gear (12).
 - d. Remove bearing cup (19).
 - e. If necessary, remove ring (20) from gear (12).
5. Use the procedure in Step 4 in order to disassemble idler gear (11).

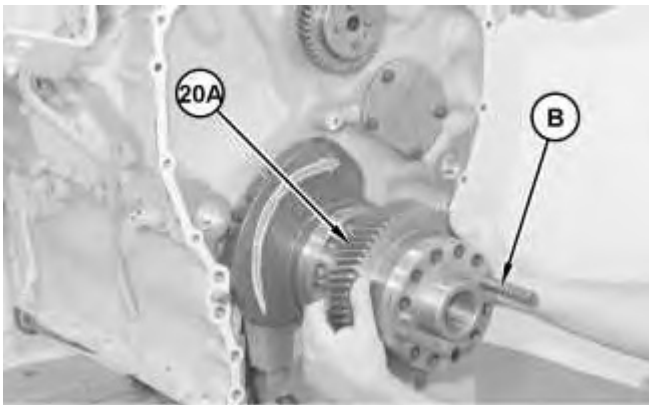


Illustration 10

g01712733

6. Install Tooling (B) in the crankshaft. Remove gear (20A).
7. Remove the O-ring seal from gear (20A).

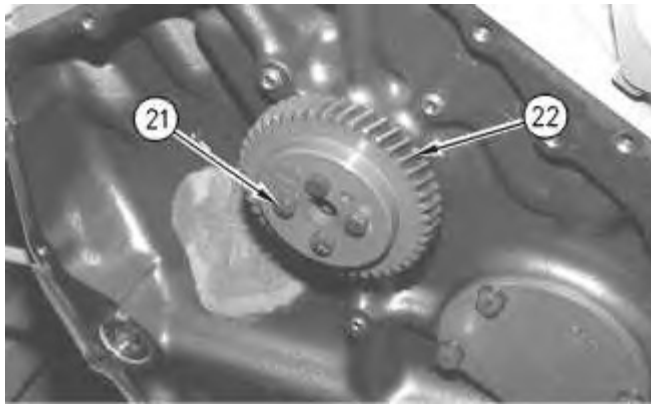


Illustration 11
Typical example

g00587666

8. Remove bolts (21). Remove camshaft gear (22).



Illustration 12
Typical example

g00587668

9. If necessary, remove dowel (23).
-

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i03335022

Gear Group (Rear) - Install

SMCS - 1206-012; 1212-012

Installation Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
B	FT-1342	Guide Bolt	2
C	1P-0524 ⁽¹⁾	Drive Plate	1
D	1P-0513 ⁽¹⁾	Drive Plate	1

⁽¹⁾ Part of the 1P-0520 Driver Group

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

Note: There are many possible configurations of the rear gear group and flywheel housing. The following procedure illustrates a typical example.



Illustration 1
Typical example

g00587668

1. Install dowel (23) in the camshaft if the dowel was removed.

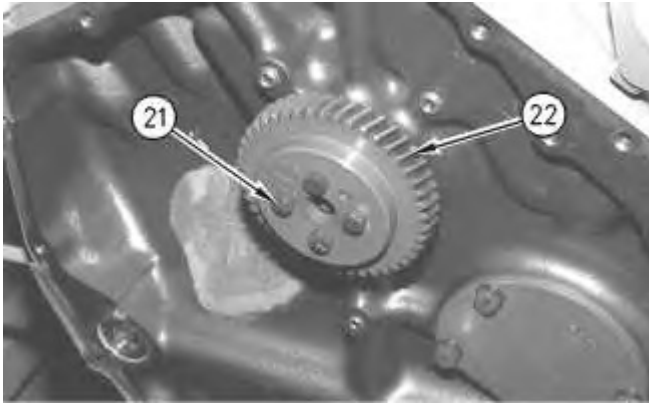


Illustration 2
Typical example

g00587666

2. Install camshaft gear (22) in position on the camshaft. Install four bolts (21).

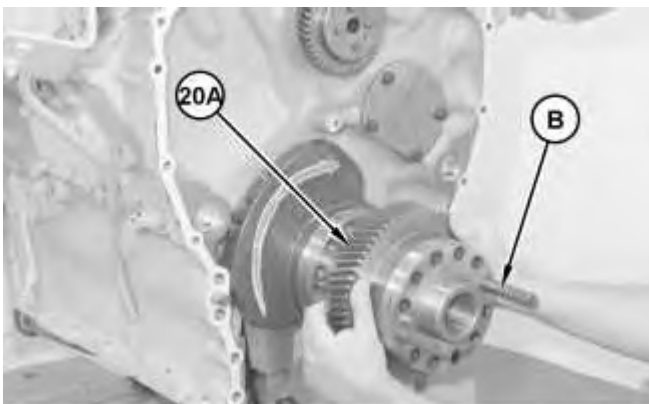


Illustration 3

g01712733

3. Install the O-ring seal on gear (20A).

4. Lightly lubricate the seal on the end of the crankshaft with clean engine oil.
5. Install Tooling (B) in the crankshaft. Install gear (20A).
6. Use the following procedure for assembly of balancer gear (12).

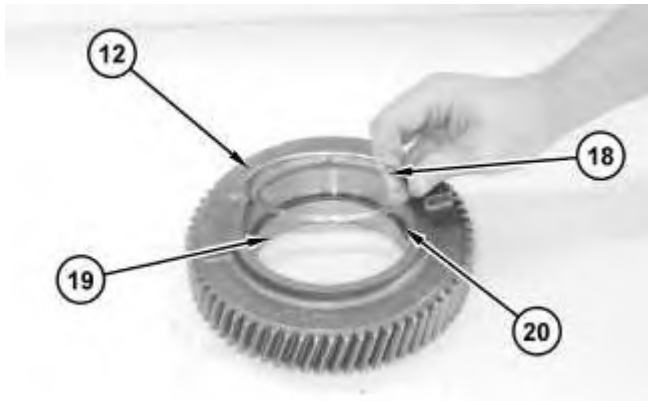


Illustration 4

g01717018

- a. Install ring (20), bearing cup (19), and spacer (18) in balancer gear (12).

Note: Spacer (18) must be installed on the deepest side of gear (12) and against ring (20).

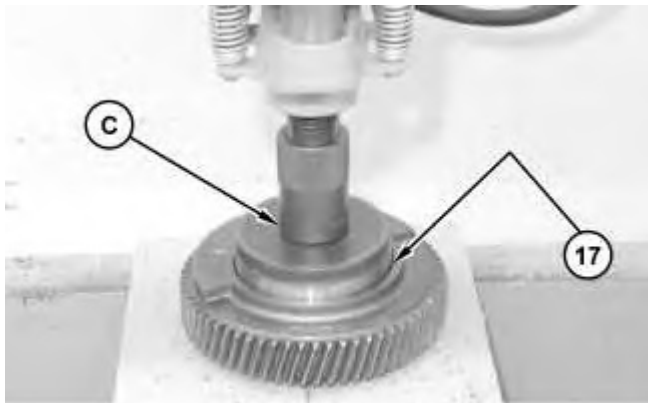


Illustration 5

g01712754

- b. Use a press and Tooling (C) in order to install bearing cup (17). Install bearing cup (17) on the side of the gear that is stamped with the timing mark. Bearing cup (17) should be in contact with the spacer.
-



Illustration 6

g00587608

Typical example

- c. Install bearing (16), spacer (15), bearing (14), and shaft (13) in gear (12).
7. Use the procedure in Step 6 in order to assemble idler gear (11).

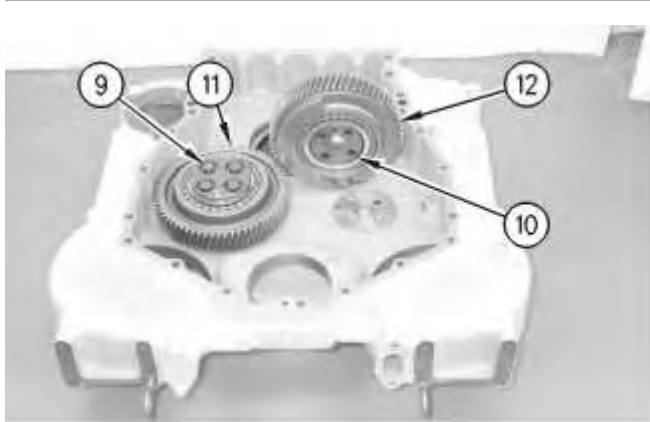


Illustration 7

g00587895

Typical example

8. Place idler gear (11) and balancer gear (12) in position on the flywheel housing. Make sure that the oil holes in shafts (10) are in alignment with the holes that are in the flywheel housing.
- Note:** Install balancer gear (12) with the timing mark toward the flywheel housing.
9. Install bolts (9).
 10. Use the following procedure in order to assemble adapter assemblies (1).
-



Illustration 8

g00586910

Typical example

- a. If the bearing race was removed, install race (8). Install race (8) in adapter assembly (1) until the race makes contact with the counterbore.



Illustration 9

g00586907

Typical example

- b. Install ring (6), bolts (5), and O-ring seal (7) on adapter assembly (1).



Illustration 10

g01712644

- c. Heat bearing (3) to 135 °C (275 °F) for approximately 30 minutes.

- d. Install bearing (3) on gear (2) until the bearing makes contact with the counterbore.



Illustration 11
Typical example

g00588013

- e. Install gear (2) and the bearing in adapter assembly (1).

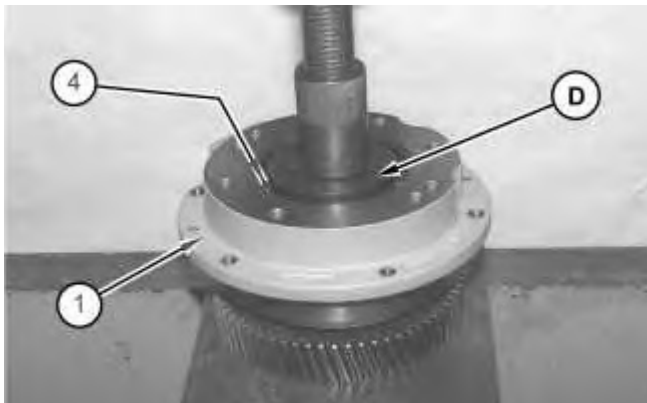


Illustration 12

g01712873

- f. Use a press and Tooling (D) in order to install bearing (4) in adapter assembly (1). Install the bearing until the bearing makes contact with the counterbore.

End By:

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

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i04406249

Flywheel - Remove

SMCS - 1156-011

Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	FT-1341	Bracket Assembly	1
	1B-3623	Bolt	2
B	FT-1342	Guide Bolt	2
C	138-7575	Link Bracket	1

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

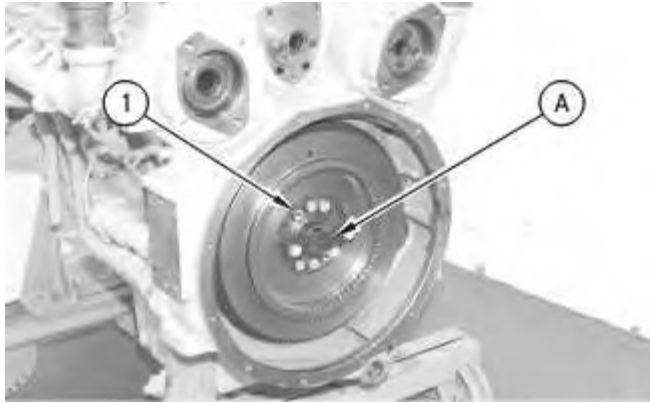


Illustration 1

g00578443

Typical example

1. Remove six bolts (1) that hold the flywheel in position.
2. Install Tool (A) in order to hold the crankshaft gear in position.
3. Remove the remainder of bolts (1) .



Illustration 2

g00578444

Typical example

4. Install Tools (B) .
-

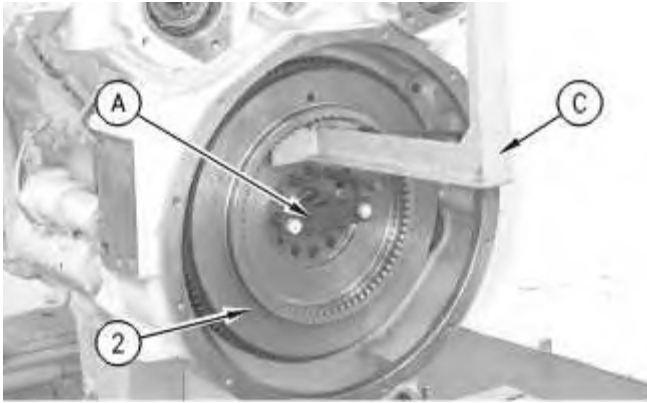


Illustration 3

g00578445

Typical example. Tooling (C) is not the tooling called out in the Table.

5. Fasten Tool (C) to a hoist and place the tool in position in the groove of flywheel (2) .
6. Pull flywheel (2) onto Tool (A) .
7. Remove Tool (A) .
8. Remove Flywheel (2) with Tool (C) .

The weight of the flywheel is approximately 78 kg (172 lb).

9. If necessary, remove the ring gear from flywheel (2) .
-

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i04406250

Flywheel - Install

SMCS - 1156-012

Installation Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	FT-1342	Guide Bolt	2
B	138-7575	Link Bracket	1

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Heat the ring gear to a maximum temperature of 300 °C (572 °F), and install the ring gear on the flywheel. Ensure that the chamfer of the gear teeth will be toward the starter pinion after the flywheel is installed.
-

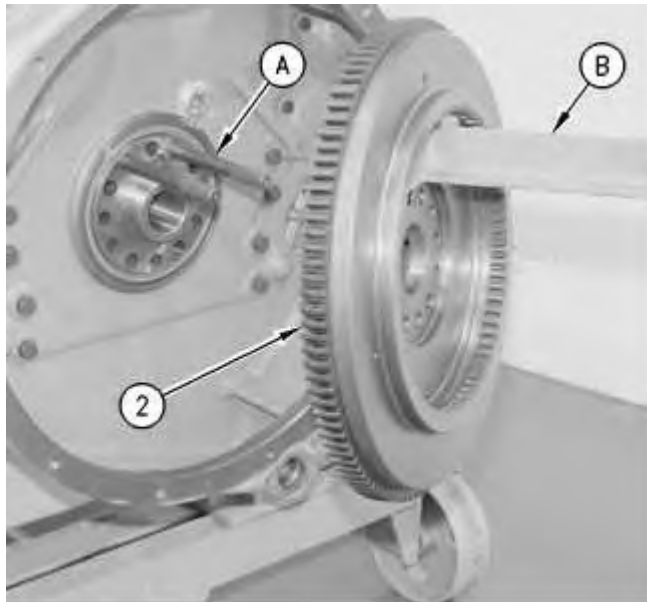


Illustration 1

g00578491

Typical example. Tooling (B) shown is not the tooling called out in the Table.

2. Install Tool (A) in the crankshaft.
3. Fasten Tool (B) to a hoist. Install the tool in the groove of flywheel (2) .
The weight of the flywheel is approximately 78 kg (172 lb).
4. Place flywheel (2) in position on Tools (A) .



Illustration 2

g00578492

Typical example

5. Apply clean engine oil or **5P-0960** Molybdenum Grease to the threads of bolts (2) .
6. Install six of the bolts.

7. Remove Tools (A) and (B) .

8. Install the remainder of bolts (2) . Tighten all of the bolts to a torque of 270 ± 40 N·m (200 ± 30 lb ft).

9. Check the runout of the flywheel.

Note: For information on checking for flywheel runout, refer to Testing and Adjusting, "Flywheel-Inspect".

Note: For more detailed information regarding the flywheel, refer to Specifications, "Flywheel".

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i07051211

Crankshaft Rear Seal - Remove

SMCS - 1161-011

Removal Procedure

Table 1

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

Start By:

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

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

Note: Ensure that the rear gear remains in place when the crankshaft rear seal and crankshaft wear sleeve are removed.

1. Install two bolts from the flywheel and suitable washers through the rear gear in the crankshaft.
-

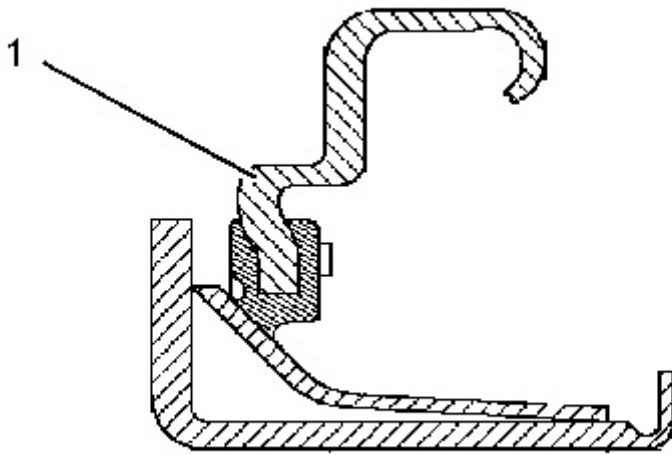


Illustration 1

g01195516

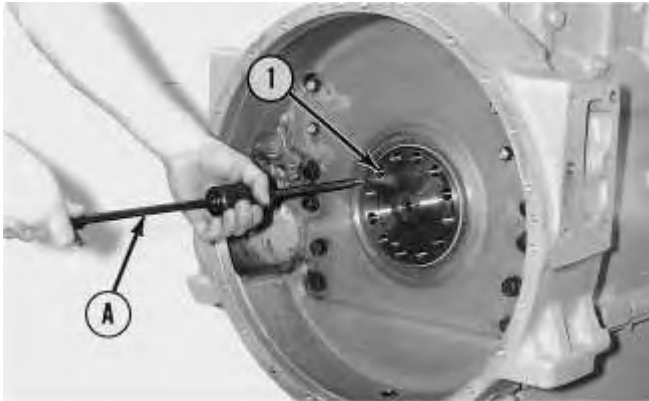


Illustration 2

g00515624

2. Use a punch or Tooling (A) to puncture a hole in seal assembly (1). Use Tooling (A) to remove seal assembly (1).
-

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