

Product: EXCAVATOR

Model: 312D2 L EXCAVATOR MGJ

Configuration: 312D2 & 312D2 L Excavators MGJ00001-UP (MACHINE) POWERED BY 3054C Engine

Disassembly and Assembly 3054C Engines for Caterpillar Built Machines

Media Number -SEN5069-18

Publication Date -01/05/2015

Date Updated -19/09/2018

i07030444

Flywheel - Install

SMCS - 1156-012

Installation Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	-	Guide Bolt (1/2 inch - 20 NF by 4 inch)	2
B	138-7575	Link Bracket	1

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Thoroughly clean the flywheel housing. Inspect the crankshaft rear seal for leaks. If there are any oil leaks, refer to this Disassembly and Assembly Manual, "Crankshaft Rear Seal - Remove" for the correct procedure.
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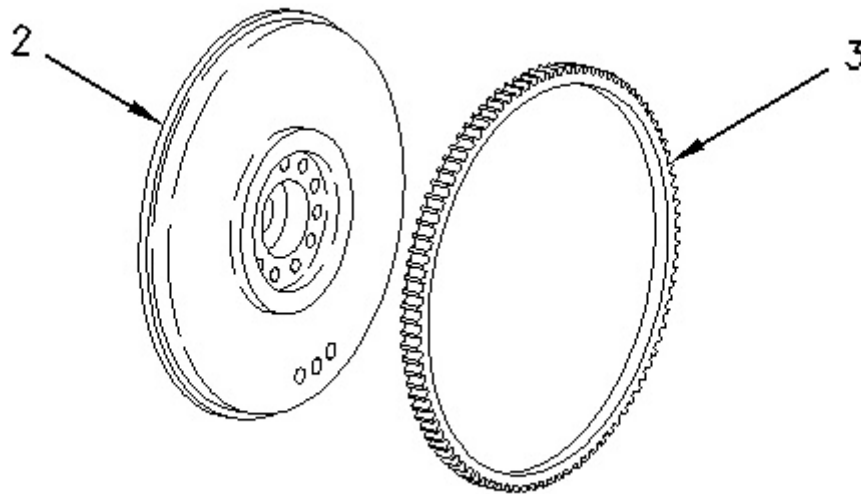


Illustration 1

g00909349

 **WARNING**

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

Note: If ring gear (3) has been removed from flywheel (2). Identify the orientation of ring gear (3) on the flywheel for the correct positioning when the new ring gear is installed.

2. Heat the ring gear to 250 °C (480 °F) in an oven to install the ring gear onto the flywheel. Ensure that the orientation of the ring gear is correct and quickly install the ring gear onto the flywheel.

Note: Do not use a torch to heat the ring gear.

3. Clean flywheel (2) and ring gear (3) when the ring gear has cooled.
-

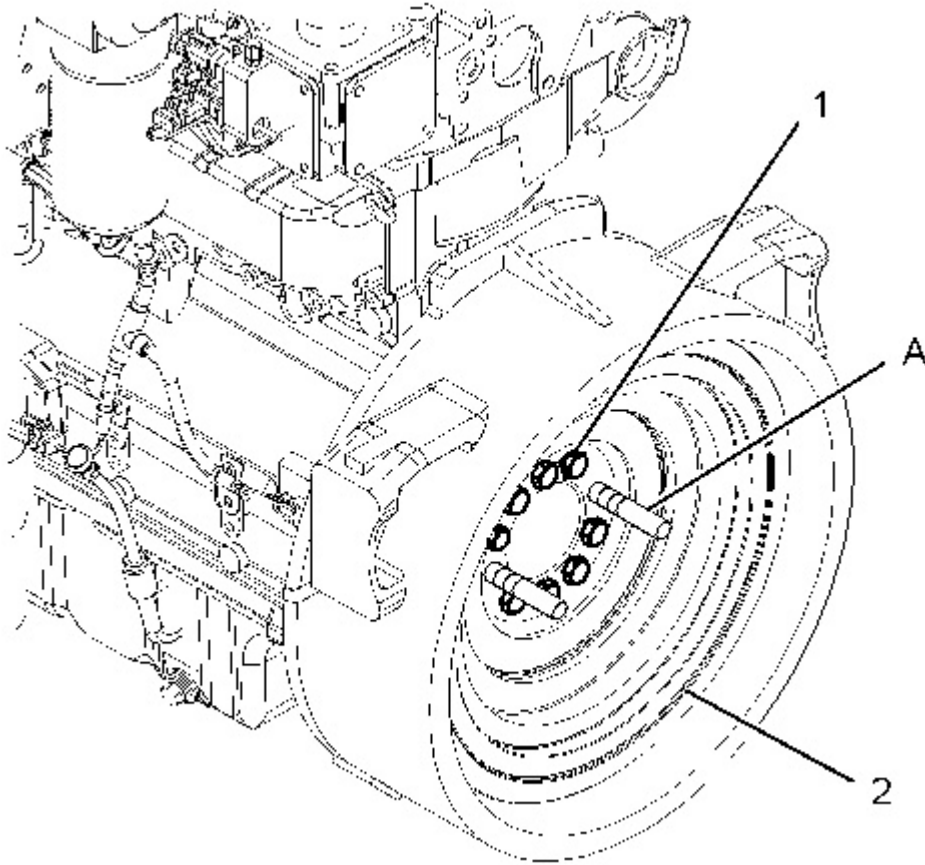


Illustration 2

g01148312

4. Install the Tooling (A) on the crankshaft. Install the Tooling (B) and a suitable lifting device on flywheel (2) and position the flywheel in the flywheel housing. The weight of the flywheel is approximately 54 kg (119 lb).
 5. Install bolts (1) to flywheel (2).
 6. Remove Tooling (A). Install the remaining bolts (1) that secure flywheel (2) to the crankshaft. Tighten the bolts (1) to a torque of 140 N·m (103 lb ft).
 7. Check the alignment of flywheel (2) with the crankshaft. Refer to Testing and Adjusting, "Flywheel - Inspect" for the correct procedure.
-

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i02293665

Crankshaft Rear Seal - Remove

SMCS - 1161-011

Removal Procedure

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.

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.

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Dispose of all fluids according to local regulations and mandates.

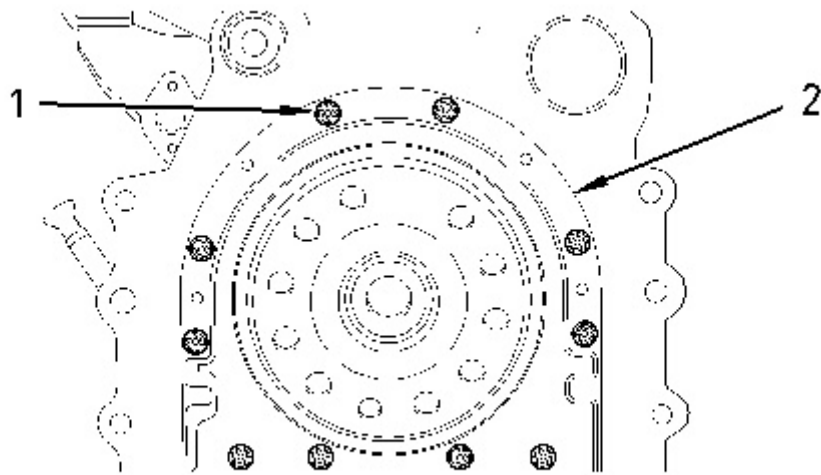


Illustration 1

g00991388

Note: The crankshaft rear seal is nonserviceable. If the crankshaft rear seal is removed, the complete housing assembly must be replaced.

1. Remove the setscrews (1) from the housing assembly (2).
 2. Remove the housing assembly (2) from the cylinder block. Discard the housing assembly (2).
-

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i02293676

Crankshaft Rear Seal - Install

SMCS - 1161-012

Installation Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	FT-2806	Alignment Tool	1

Note: The crankshaft rear seal and the housing for the crankshaft rear seal are manufactured as a one-piece assembly. The assembly of the crankshaft rear seal uses ten setscrews in order to fasten the assembly to the cylinder block.

Note: The following procedure assumes that the crankshaft rear seal is a replacement assembly.

Note: The crankshaft rear seal is lubricated. There is no need to lubricate the seal or the crankshaft flange before installation.

Note: An installation sleeve (2) is supplied with the new housing assembly. The installation sleeve must be in place when housing assembly is installed on the crankshaft flange in order to prevent damage to the crankshaft rear seal during assembly.

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Ensure that the crankshaft flange (1) is clean, dry and free from rough metal edges. Ensure that the face of the cylinder block and the bridge in the crankcase are clean and dry.

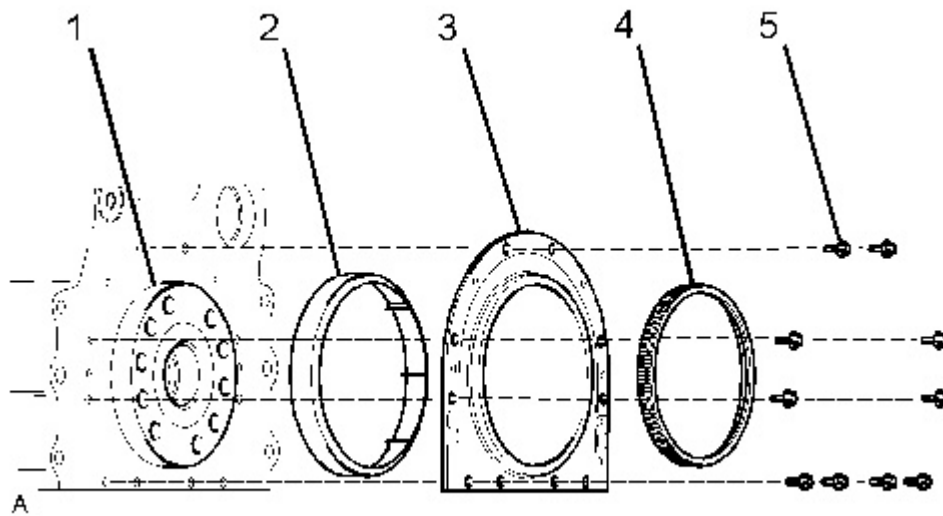


Illustration 1

g01148393

2. Remove the packaging from the new assembly of the crankshaft rear seal (3). Ensure that the plastic sleeve (2) is squarely installed within the seal of the assembly of the crankshaft rear seal (3). The plastic sleeve (2) is included in order to protect the lip of the seal as the lip is pushed over the crankshaft flange (1).

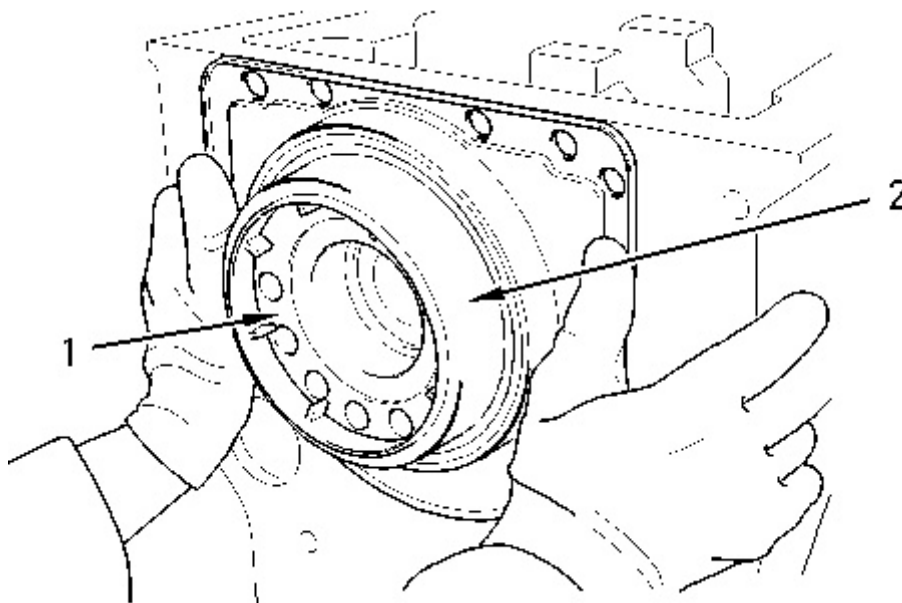


Illustration 2

g01004958

Typical example

3. Place the assembly of the crankshaft rear seal (3) over the crankshaft flange (1) and engage the plastic sleeve (2) onto the crankshaft flange.

4. Ensure that the plastic sleeve (2) is engaged onto the crankshaft flange (1). Push the assembly of the crankshaft rear seal (3) evenly and push the assembly smoothly onto the crankshaft flange (1) until the assembly is against the cylinder block. During this process, the plastic sleeve (2) will be forced out of the assembly of the crankshaft rear seal (3). Discard the plastic sleeve (2).
 5. Rotate the assembly of the crankshaft rear seal (3) in order to align the setscrew holes in the assembly with the setscrew holes in the rear face of the cylinder block.
 6. Install the setscrews (5) in order to position housing assembly (3) to the cylinder block. Do Not tighten the bolts.
 7. Place the Tooling (A) over housing assembly (2). This will center the housing assembly onto the crankshaft flange (3).
-

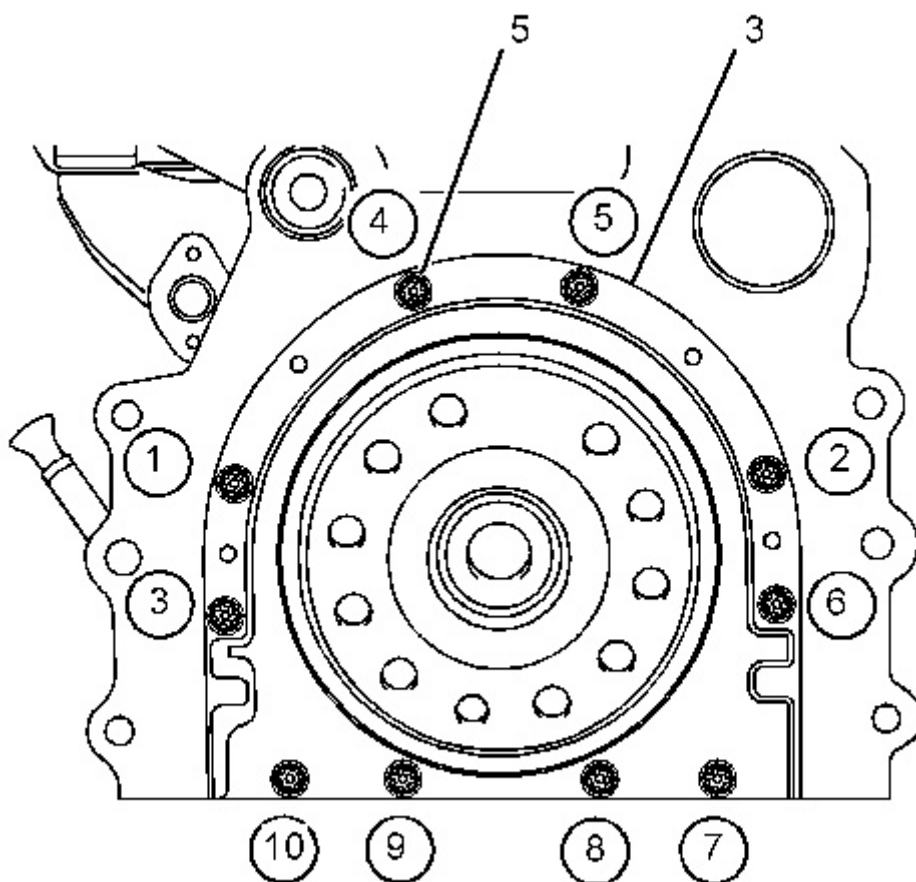


Illustration 3

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8. Tighten the setscrews (1) in numerical order to a torque of 22 N·m (16 lb ft). Do not tighten the setscrews (X) at this time.
9. Remove the Tooling (A). Tighten the setscrews (X) to a torque of 22 N·m (16 lb ft).

End By:

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

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i05322247

Crankshaft Wear Sleeve (Rear) - Remove

SMCS - 1161-011-ZV

Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	242-9955	Puller	1
	-	Spacer	1

Start By:

- A. Remove the crankshaft rear seal. Refer to Disassembly and Assembly, "Crankshaft Rear Seal - Remove and Install" for the correct procedure.

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

Note: Wear sleeves are used to reclaim worn seal surfaces or damaged seal surfaces. Wear sleeves are not original equipment. The wear sleeve is supplied with a crankshaft rear seal that has a larger internal diameter than a standard crankshaft rear seal. A standard crankshaft rear seal cannot be used if a wear sleeve is installed.

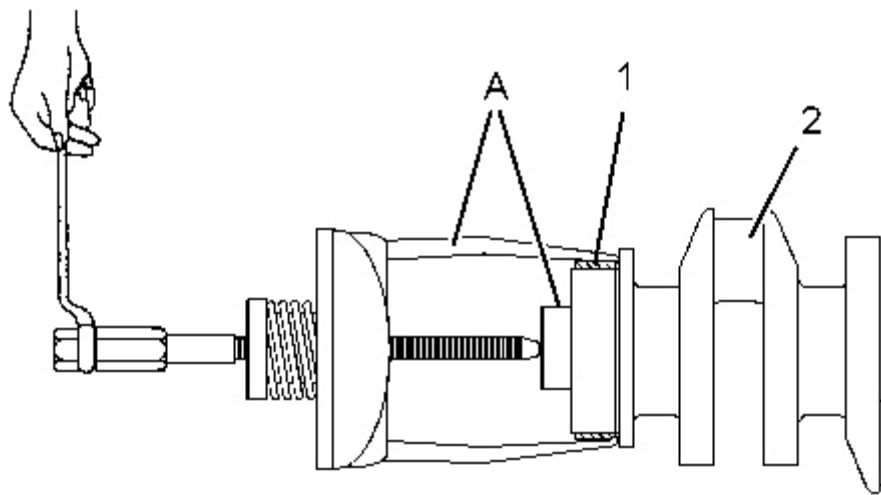


Illustration 1

g02815577

Typical example

1. Use Tooling (A) in order to remove crankshaft wear sleeve (1) from crankshaft (2) .
-

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i05764187

Crankshaft Wear Sleeve (Rear) - Install

SMCS - 1161-012-ZV

Installation Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	438-3244	Oil Seal Installer	1
	8T-0375	Bolt	1
	5P-8247	Hard Washer	1
B	438-3245	Oil Seal Locator	1
	9U-6172	Bolt	2

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

Note: Wear sleeves are used to reclaim worn seal surfaces or damaged seal surfaces. Wear sleeves are not original equipment. The wear sleeve is supplied with a crankshaft rear seal that has a larger internal diameter than a standard crankshaft rear seal. A standard crankshaft rear seal cannot be used if a wear sleeve is installed.

1. Ensure that the crankshaft is thoroughly clean and dry. Remove any areas of raised damage.

2. Lubricate the inner surface of the crankshaft wear sleeve with clean engine oil.

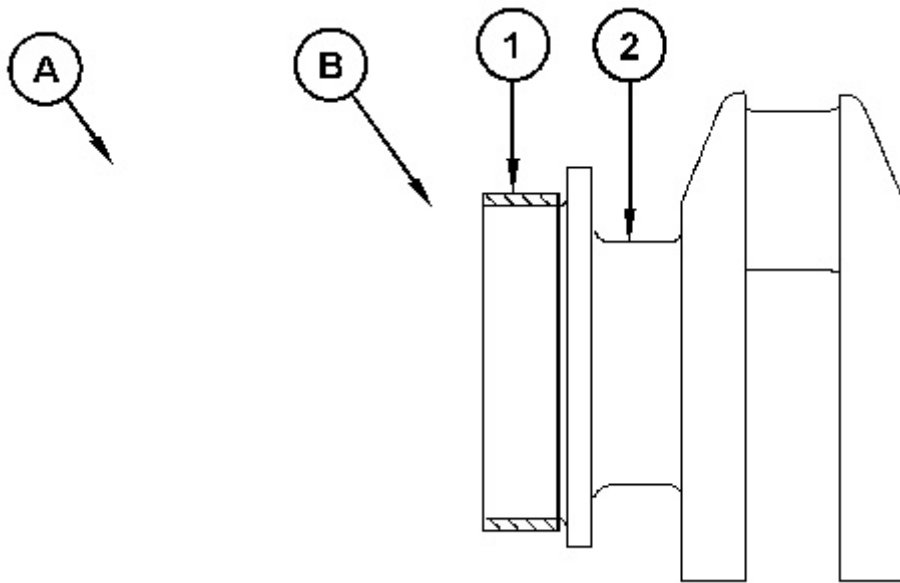


Illustration 1

g03657723

Sectional view of the crankshaft, the wear sleeve, and the installation tool

3. Use Tooling (A) and Tooling (B) to install the crankshaft wear sleeve, as follows:
- Align Tooling (B) with the dowels in crankshaft (2) and install Tooling (B) to the crankshaft. Ensure the correct orientation.
- Note:** Verify that Tooling (A) will slide freely over Tooling (B).
- Carefully slide crankshaft wear sleeve (1) over Tooling (B) until the crankshaft wear sleeve contacts the rear of crankshaft (2).
 - Assemble Tooling (A) to Tooling (B) and install the bolt and the washer. Ensure that the face of Tooling (A) with the deep counterbore is toward crankshaft wear sleeve (1).
 - Tighten the bolt until Tooling (A) bottoms out on Tooling (B) in order to pull crankshaft wear sleeve (1) onto crankshaft (2).
 - Remove Tooling (A) and Tooling (B).

End By:

- Install the new crankshaft rear seal that was supplied with the crankshaft wear sleeve.
-

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i02294250

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:

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

NOTICE

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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.

-
1. The weight of the flywheel housing (3) is approximately 39 kg (85 lb). Use suitable lifting equipment to support the flywheel housing (3) while the setscrews (1) are being removed and while the flywheel housing is being removed.
-

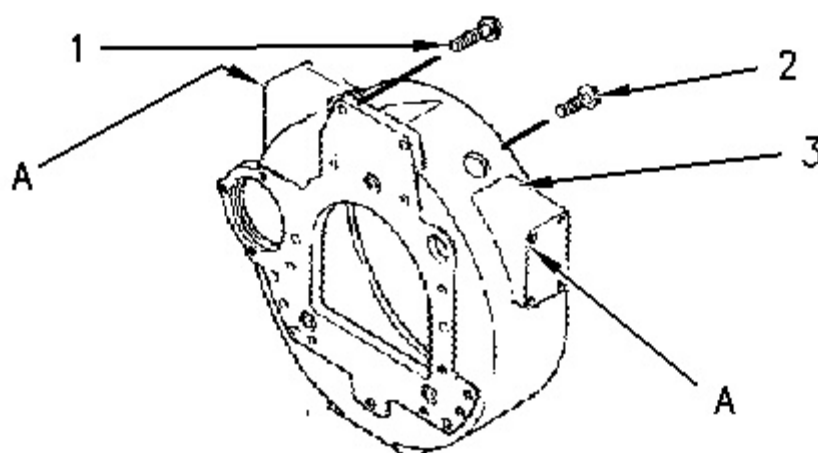


Illustration 1

g00977367

2. Remove the setscrews (1) from the top of the flywheel housing (3).
3. Attach the Tooling (A) and a suitable lifting device to the flywheel housing (3).
4. Remove the setscrews (2) that attach the flywheel housing (3) to the cylinder block.
5. Remove the flywheel housing (3). If necessary, tap the flywheel housing with a soft faced hammer in order to separate the flywheel housing from the cylinder block.

Installation Procedure

Table 2

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

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Clean the rear face of the cylinder block and the mating surface of the flywheel housing (3).
-

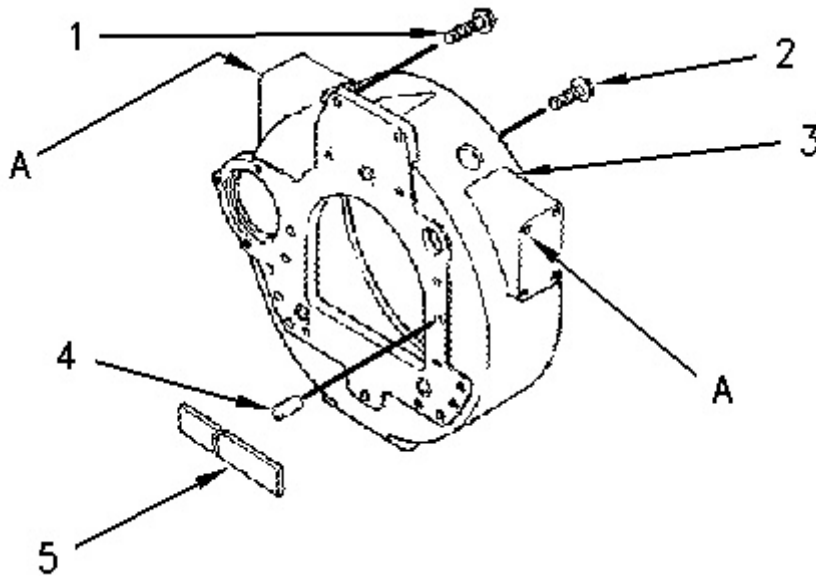


Illustration 2

g00977388

2. If a felt seal (5) is installed, replace the felt seal. Inspect the dowels (4) in the cylinder block that align the flywheel housing (3). Replace the dowels, if necessary.
3. The weight of the flywheel housing (3) is approximately 39 kg (85 lb). Use the Tooling (A) and a suitable lifting device to position the flywheel housing (3) on the dowels (4) that are on the cylinder block.
4. Install the setscrews (1) that attach the flywheel housing (3) to the cylinder block.
5. Install the setscrews (2) that attach the flywheel housing (3) to the cylinder block.

Tighten the setscrews (1) and the setscrews (2) to the following torque:

M10 "8.8" ... 44 N·m (33 lb ft)

M10 "10.9" ... 63 N·m (46 lb ft)

M12 "8.8" ... 75 N·m (55 lb ft)

M12 "10.9" ... 115 N·m (85 lb ft)

6. Remove Tooling (A) and the lifting device from the flywheel housing.

7. Check the alignment of the flywheel housing with the cylinder block. Refer to Testing and Adjusting, "Flywheel Housing - Inspect".

End By:

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

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i02294252

Crankshaft Pulley - Remove and Install

SMCS - 1205-010

Removal Procedure

Start By:

- a. Remove the V-Belts. Refer to Disassembly and Assembly, "V-Belts - Remove and Install".

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

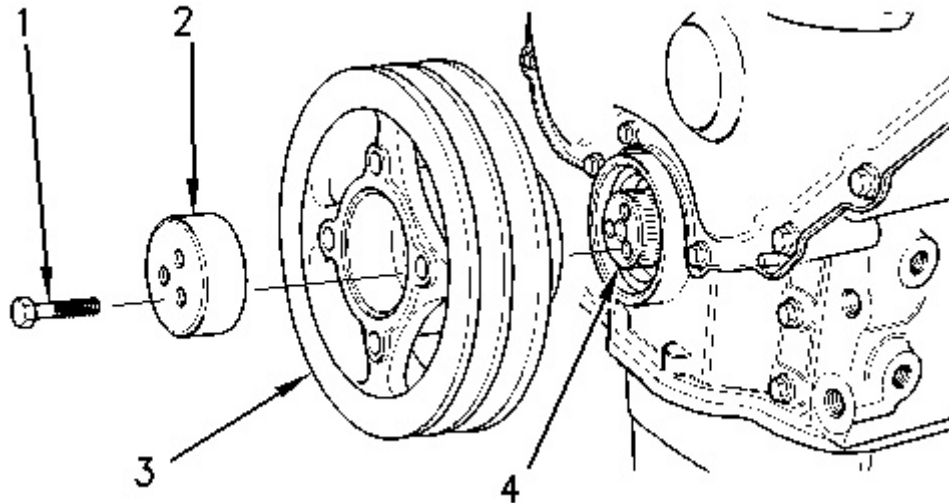


Illustration 1

g00952102

1. Remove the setscrews (1). Remove the thrust block (2).
2. Remove the pulley (3) from the crankshaft (4).

Installation Procedure

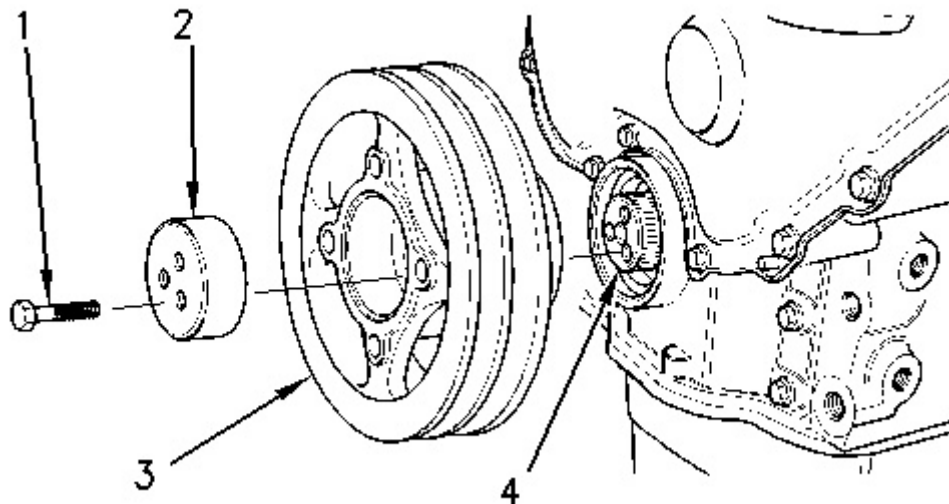


Illustration 2

g00952102

1. Clean the pulley (3) and clean the thrust block (2). Inspect the pulley (3) and the thrust block (2) for wear and for damage. If necessary, replace any damaged component. Inspect the area on the pulley (3) that is normally in contact with the crankshaft front seal. If there is excessive wear then a wear sleeve can be installed. Refer to this Disassembly and Assembly

Manual, "Crankshaft Wear Sleeve (Front) - Remove and Crankshaft Wear Sleeve (Rear) - Install" for further details.

2. Position the pulley (3) onto the crankshaft (4).
3. Lubricate the threads and the shoulder of the setscrews (1). Position the thrust block and install the setscrews (1). Tighten the setscrews evenly to a final torque of 115 N·m (85 lb ft).

End By:

- a. Install the V-Belts. Refer to Disassembly and Assembly, "V-Belts - Remove and Install".
-

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i02294258

Crankshaft Front Seal - Remove

SMCS - 1160-011

Removal Procedure

Start By:

- a. 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.

Note: Do not remove the crankshaft front seal at this time if the housing (front) will also be removed. It is easier to remove the crankshaft front seal when the housing (front) has been removed from the engine. Refer to this Disassembly and Assembly Manual, "Housing (Front) - Remove".

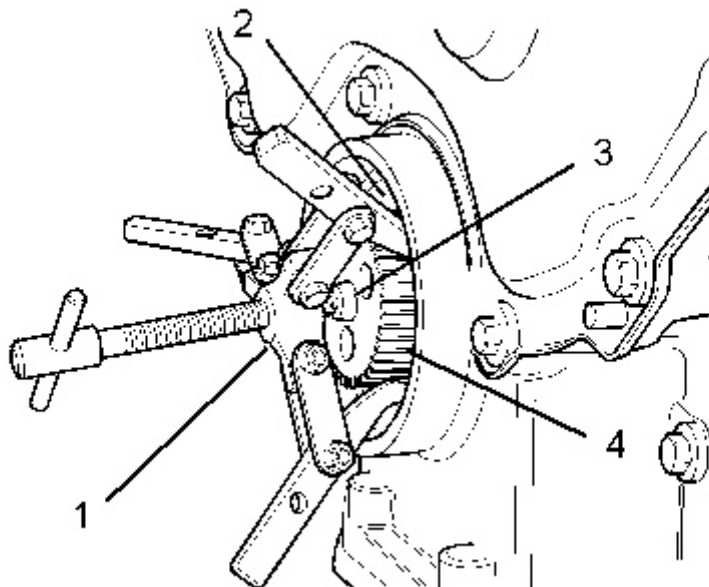


Illustration 1

g01020672

1. Use a suitable puller (1) with three legs and install the legs under the crankshaft front seal (2). Lock the legs into position.
2. Install a suitable adapter (3) between the crankshaft (4) and the puller (1).

NOTICE

Ensure that the main lip is used in order to remove the crankshaft front seal. Do not damage the edge of the housing for the crankshaft front seal.

3. Use the puller (1) in order to remove the crankshaft front seal (2). Discard the crankshaft front seal (2).

NOTICE

Ensure that the main lip is used in order to remove the crankshaft front seal. Do not damage the edge of the housing for the crankshaft front seal.

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i02294259

Crankshaft Front Seal - Install

SMCS - 1160-012

Installation Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	9U-6210	Front Seal Installer	1

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

Note: This procedure assumes that the housing (front) is still on the engine. Do not follow this procedure if the housing (front) has been removed from the engine. Refer to this Disassembly and Assembly Manual, "Housing (Front) - Install" if the housing (front) has been removed from the engine.

1. Clean the oil seal housing (8) and inspect the oil seal housing for damage. If necessary, replace the housing (front). Refer to this Disassembly and Assembly Manual, "Housing (Front) - Remove and Housing (Front) - Install".
2. Check the face on the pulley that contacts the crankshaft front seal for wear. If necessary, repair the crankshaft pulley. Refer to this Disassembly and Assembly Manual, "Crankshaft Wear Sleeve (Front) - Remove and Crankshaft Wear Sleeve (Front) - Install" for further details.

Note: A sleeve (5) is attached to the new crankshaft front seal (6). Do not remove the sleeve (5) at this time. Discard the new crankshaft front seal (6) if the sleeve (5) is not installed on the new crankshaft front seal.

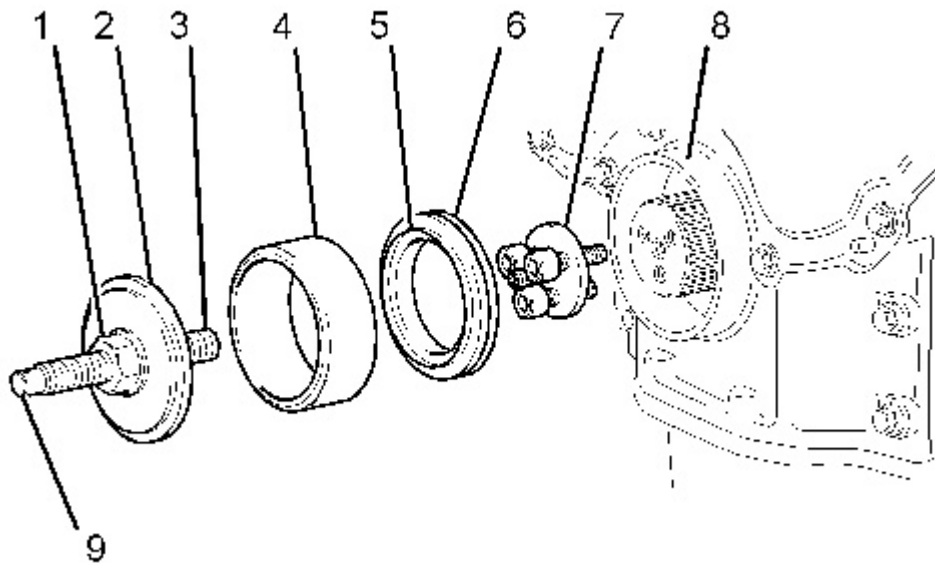


Illustration 1

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The Tooling (A) includes items 1, 2, 3, 4, 7 and 9.

3. Install the fastener plate (7) onto the front of the crankshaft. Install the nut (1) and the pressure plate (2) onto the threaded bar (3).

Note: Do not lubricate the crankshaft front seal (6). Do not lubricate the oil seal housing (8).

NOTICE

Ensure that the lip of the crankshaft front seal that is spring loaded is facing toward the inside of the front housing and that it is square with the bore of the housing for the crankshaft front seal.

4. Align the assembly of the sleeve (5) and the crankshaft front seal (6) to the front of the oil seal housing (8).
5. Install the adapter (4) onto the sleeve (5).
6. Install the pressure plate (2) onto the adapter (4) and tighten the threaded bar (3) onto the fastener plate (7). Check the alignment of the assembly and the crankshaft front seal (6) to the oil seal housing (8).
7. Insert a suitable rod through the hole (9) in the threaded bar (3) in order to prevent the threaded rod from turning as the nut (1) is tightened. Tighten the nut (1) in order to push the

crankshaft front seal (6) into the oil seal housing (8). Continue to tighten the nut (1) until contact is made with the bottom face of the oil seal housing (8).

8. Turn the sleeve (5) counterclockwise and pull the sleeve at the same time in order to remove the sleeve from the oil seal housing (8). Remove the adapter (7).
 9. Immediately install the crankshaft pulley. Refer to this Disassembly and Assembly Manual, "Crankshaft Pulley - Remove and Install".
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i02294796

Front Cover - Remove and Install

SMCS - 1166-010

Removal Procedure

Start By:

- a. Remove the water pump. Refer to Disassembly and Assembly, "Water Pump - Remove and Install".

Note: It is not necessary to remove the fan, the crankshaft pulley or the alternator in order to remove the front cover. The fan, the crankshaft pulley and the alternator have been removed for illustration purposes.

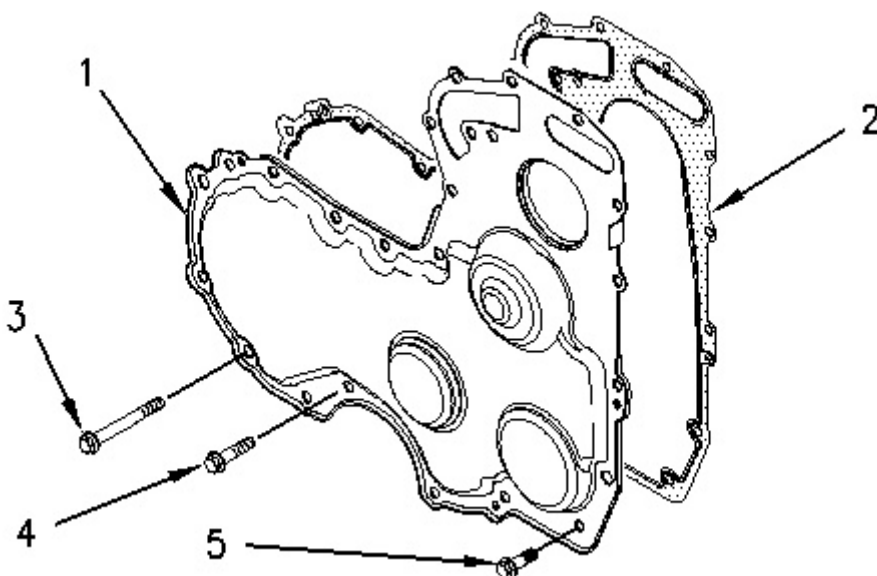


Illustration 1

g00955548



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