

Product: EXCAVATOR

Model: 320D2 EXCAVATOR RDZ

Configuration: 320D2 & 320D2 L Excavators RDZ00001-UP (MACHINE) POWERED BY C7.1 Engine

Disassembly and Assembly

C7.1 (Mech) Engines for Caterpillar Built Machines

Media Number -UENR0674-08

Publication Date -01/06/2015

Date Updated -23/01/2017

i04780462

Gear Group (Front) - Remove and Install

SMCS - 1206-010

Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A ⁽¹⁾	9U-6198	Crankshaft Turning Tool	1
A ⁽²⁾	9U-7336	Housing	1
	5P-7305	Engine Turning Tool	1
B	230-6284	Timing Pin (Camshaft)	1
C	136-4632	Timing Pin (Crankshaft)	1
	268-1966	Adapter	1

⁽¹⁾ The Crankshaft Turning Tool is used on the front pulley.

⁽²⁾ This Tool is used in the aperture for the electric starting motor.

Start By:

- a. Remove the front cover. Refer to Disassembly and Assembly, "Front Cover - Remove and Install" for the correct procedure .
- b. Remove the valve mechanism cover. Refer to Disassembly and Assembly, "Valve Mechanism Cover - Remove and Install" for the correct procedure .

NOTICE

Keep all parts clean from contaminants.

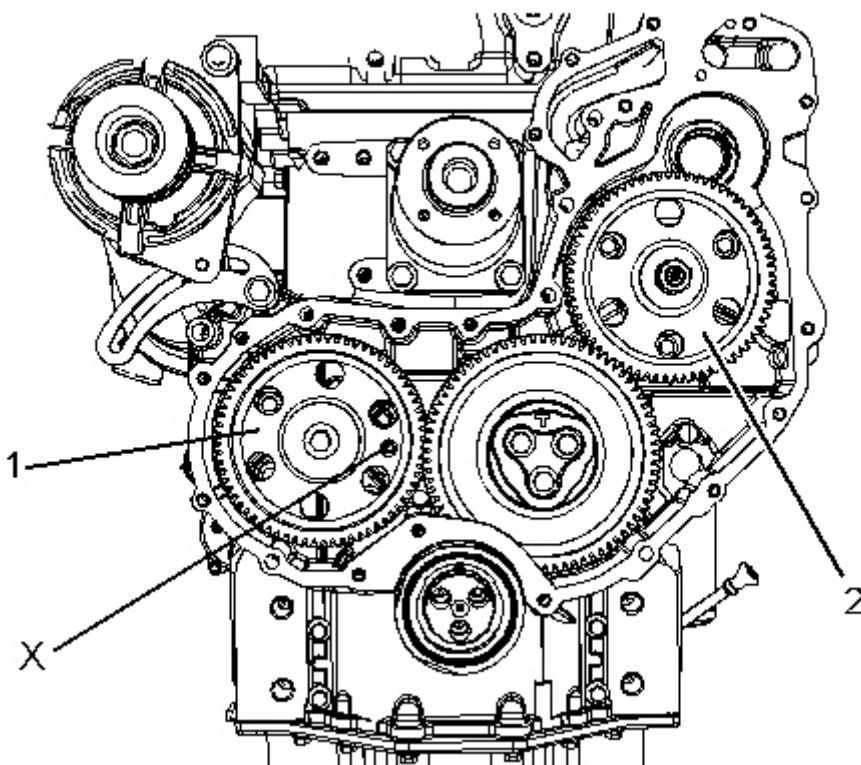
Contaminants may cause rapid wear and shortened component life.

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.

Dispose of all fluids according to local regulations and mandates.

Note: Either Tooling (A) can be used. Use the Tooling that is most suitable.



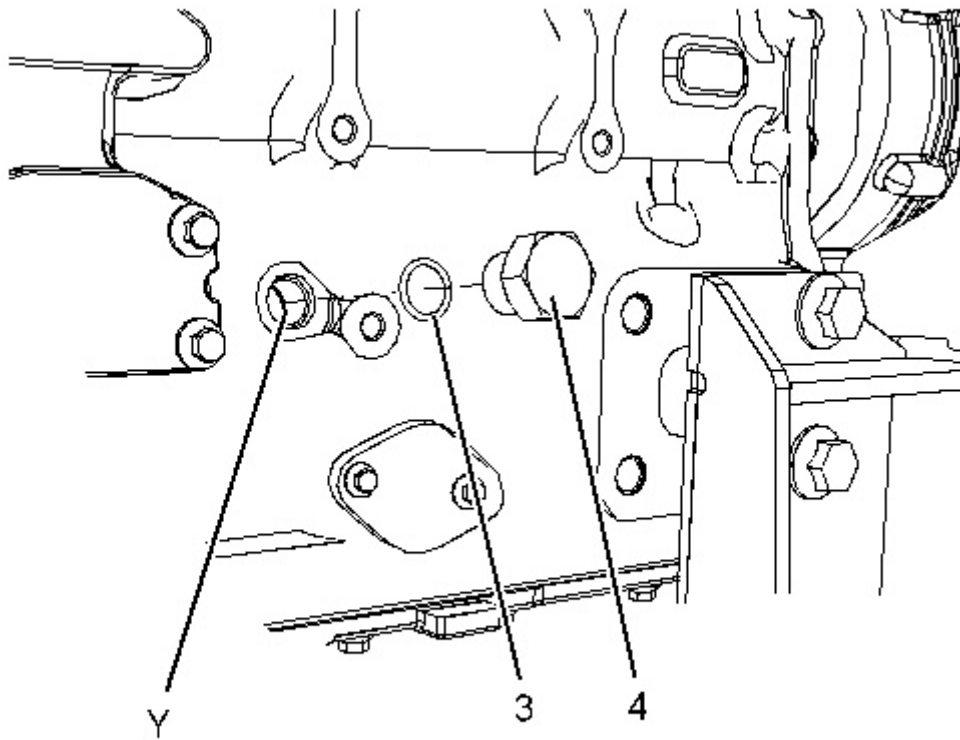


Illustration 2

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1. Care must be taken in order to ensure that the fuel injection pump timing is not lost during the removal of the front gear group. Carefully follow the procedure in order to remove the gear group.
2. Remove plug (4) from the cylinder block. Remove O-ring seal (3) from plug (4).
3. Use Tooling (A) in order to rotate the crankshaft so that number one piston is at top dead center on the compression stroke. Refer to System Operation, Testing and Adjusting, "Finding Top Center Position for No.1 Piston" for the correct procedure.
4. Install Tooling (B) through Hole (X) in camshaft gear (1) into the front housing. Use Tooling (B) in order to lock the camshaft in the correct position.
5. Install Tooling (C) into Hole (Y) in the cylinder block. Use Tooling (C) in order to lock the crankshaft in the correct position.

Note: Do not use excessive force to install Tooling (C). Do not use Tooling (C) to hold the crankshaft during repairs.

6. Apply sufficient pressure to fuel injection pump gear (2) in a counterclockwise direction in order to remove the backlash. Lock the fuel injection pump in this position. Refer to Disassembly and Assembly, "Fuel Pump Gear - Remove" for the correct procedure.
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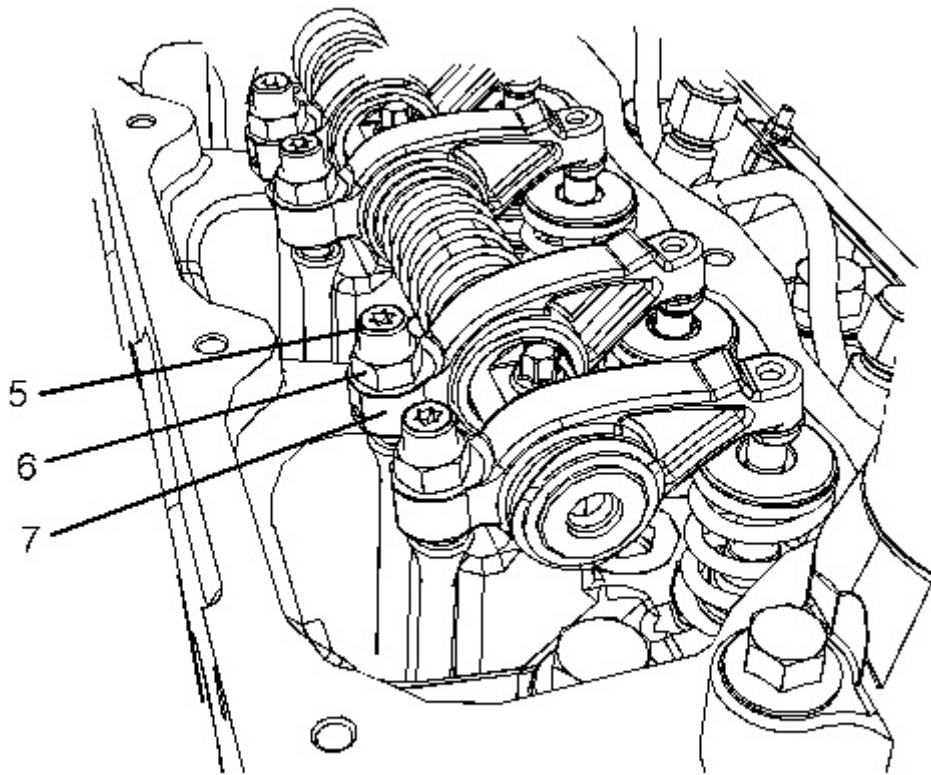


Illustration 3

g02707118

7. Loosen nuts (6) on all rocker arms (7). Unscrew adjusters (5) on all rocker arms (7) until all valves are fully closed.

Note: Failure to ensure that ALL adjusters are fully unscrewed can result in contact between the valves and pistons.

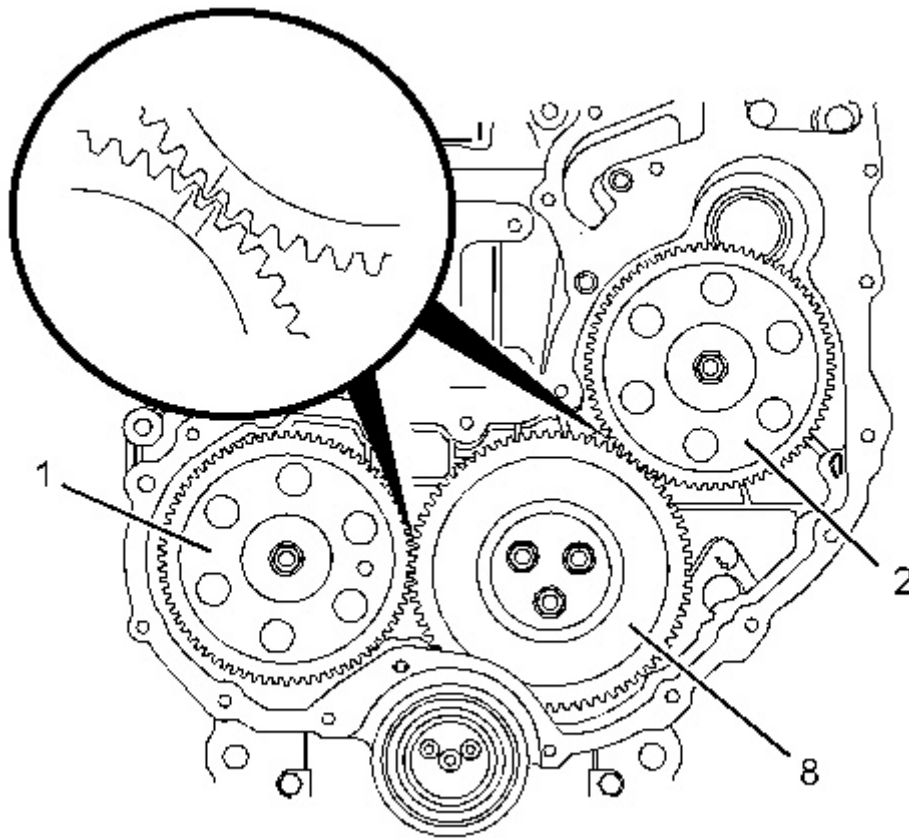


Illustration 4

g02706997

Alignment of timing marks

8. Mark gear (1), gear (2), and gear (8) in order to show alignment. Refer to Illustration 4.

Note: Identification will ensure that the gears can be installed in the original alignment.

9. Remove fuel pump gear (2). Refer to Disassembly and Assembly, "Fuel Pump Gear - Remove and Install" for the correct procedure.
10. Remove camshaft gear (1). Refer to Disassembly and Assembly, "Camshaft Gear - Remove and Install" for the correct procedure.
11. Remove idler gear (8). Refer to Disassembly and Assembly, "Idler Gear - Remove and Install" for the correct procedure.

Installation Procedure

Table 2

Required Tools			
Tool	Part Number	Part Description	Qty
A ⁽¹⁾	9U-6198	Crankshaft Turning Tool	1
A ⁽²⁾	9U-7336	Housing	1

	5P-7305	Engine Turning Tool	1
C	136-4632	Timing Pin (Crankshaft)	1
	268-1966	Adapter	1
B	230-6284	Timing Pin (Camshaft)	1
D	9U-7324	Indicator Bracket	1
	7H-1942	Dial Indicator	1
	3S-3268	Indicator Contact Point	1
	7H-1940	Universal Attachment	1

⁽¹⁾ The Crankshaft Turning Tool is used on the front pulley.

⁽²⁾ This Tool is used in the aperture for the electric starting motor.

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

Note: The fuel injection pump must remain locked until the procedure instructs you to unlock the fuel injection pump.

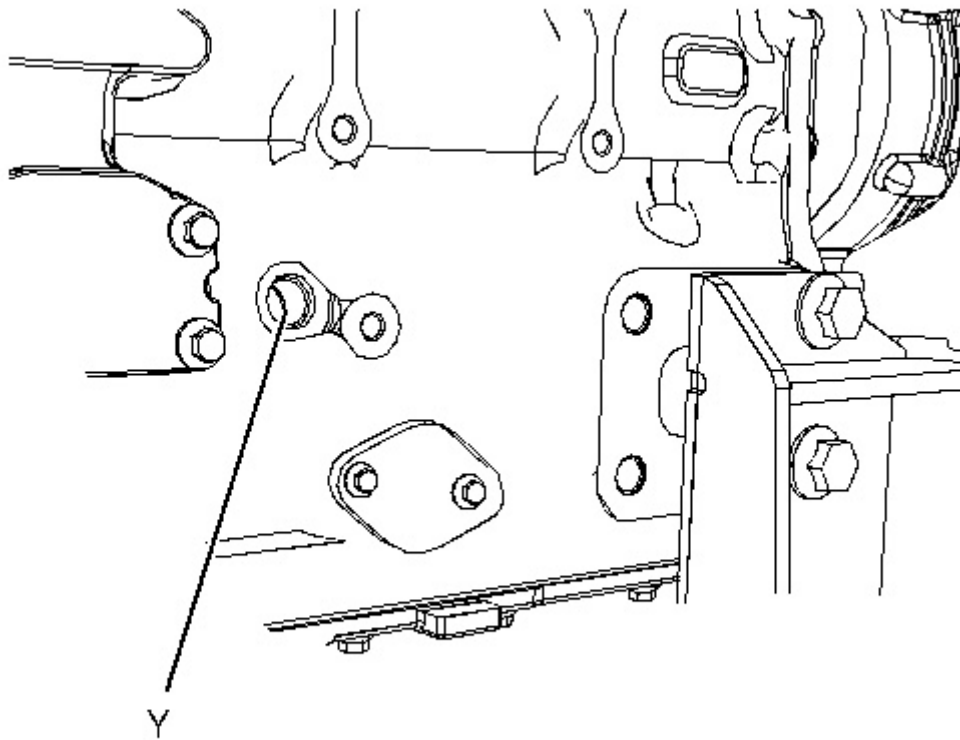


Illustration 5

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1. If necessary, use Tooling (A) to ensure that number one piston is at top dead center on the compression stroke. Refer to System Operation, Testing and Adjusting, "Finding Top Center Position for No.1 Piston" for the correct procedure.
2. Ensure that Tooling (C) is installed in Hole (Y) in the cylinder block. Use Tooling (C) in order to lock the crankshaft in the correct position.

Note: Do not use excessive force to install Tooling (C). Do not use Tooling (C) to hold the crankshaft during repairs.

3. Ensure that all of the components of the front gear group are clean and free from wear or damage. If necessary, replace any components that are worn or damaged.
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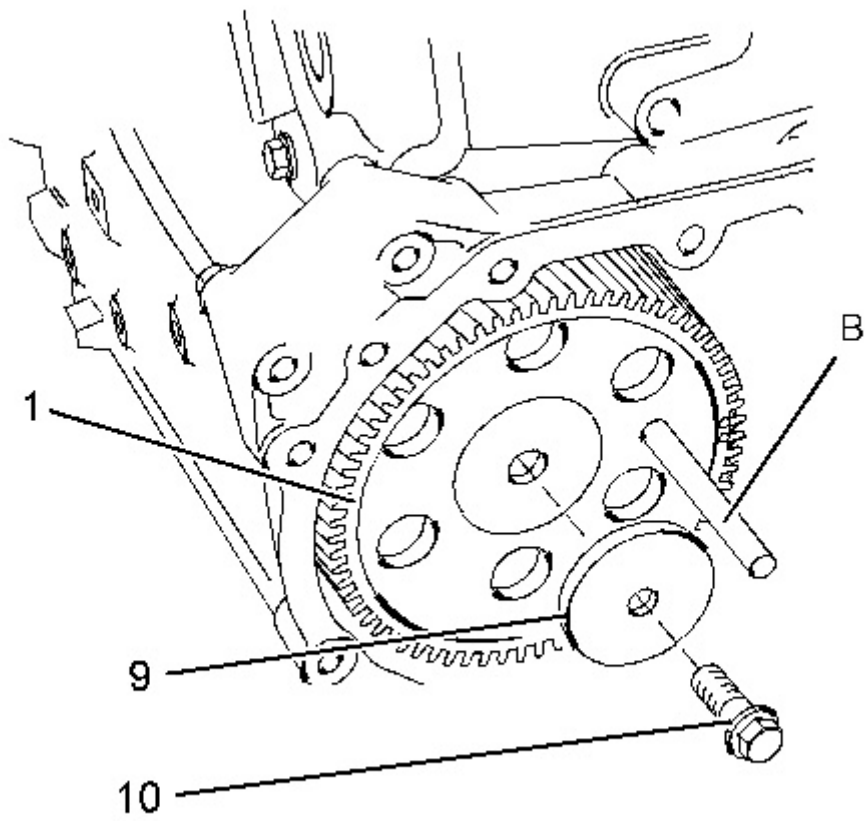


Illustration 6

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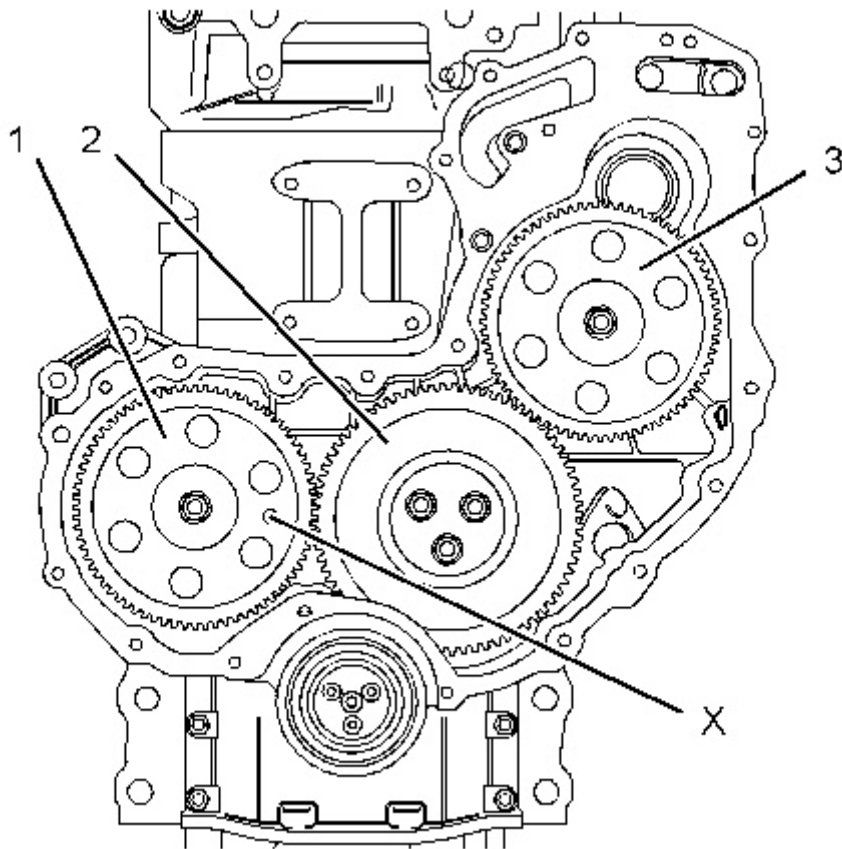
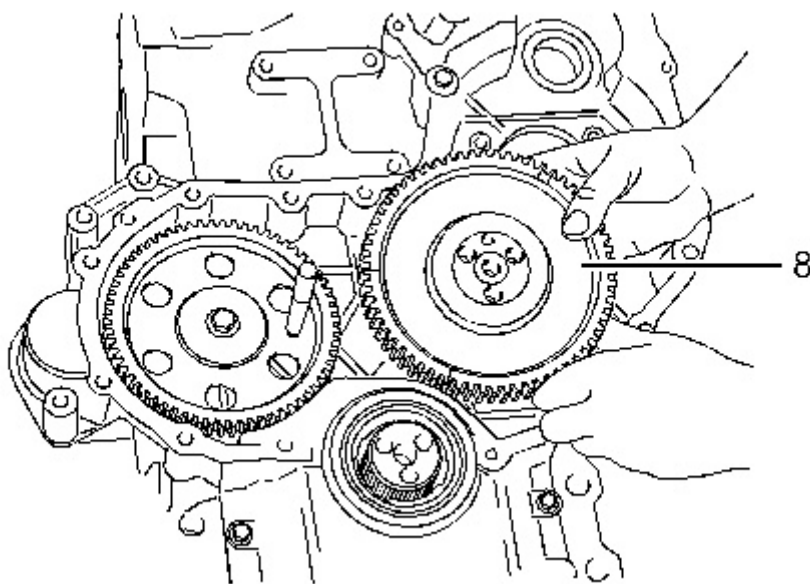


Illustration 7

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4. Install camshaft gear (1). Loosely install bolt (10) and washer (9) for the camshaft gear. Refer to Disassembly and Assembly, "Camshaft Gear - Remove and Install" for the correct procedure.
5. Install Tooling (B) through Hole (X) in camshaft gear (1) into the front housing.



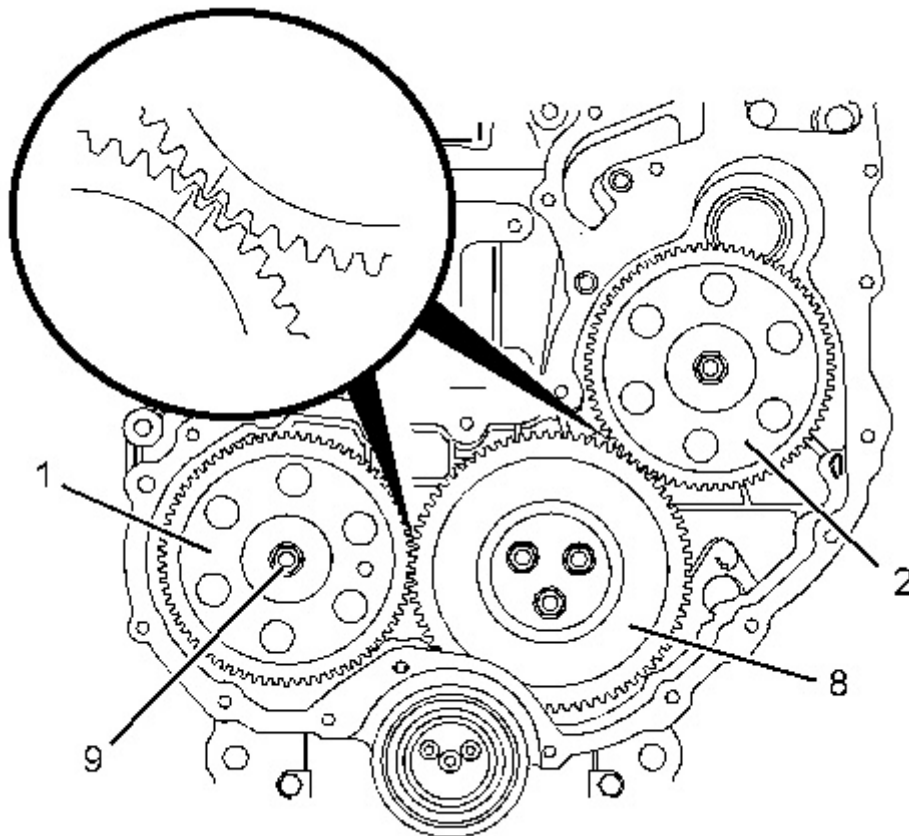


Illustration 9

Alignment of timing marks

6. Install idler gear (8). Ensure that the timing mark on gear (1) and the timing mark on gear (8) are aligned. Ensure that the mesh of the gears is correct. Tighten the bolts for idler gear (8) to a torque of 44 N·m (32 lb ft). Refer to Disassembly and Assembly, "Idler Gear - Remove and Install" for the correct procedure.
7. When bolt (9) is a 8.8 Grade. Tighten bolt (10) to a torque of 95 N·m (70 lb ft).
When bolt (9) is a 10.9 Grade. Tighten bolt (10) to a torque of 120 N·m (89 lb ft).
8. Ensure that the fuel injection pump is locked in the correct position. Refer to Disassembly and Assembly, "Fuel Injection Pump - Install" for the correct procedure.
9. Install fuel injection pump gear (2). Ensure that the timing marks on gear (2) and the timing marks on gear (8) are aligned. See Illustration 9. Ensure that the mesh of the gears is correct. Refer to Disassembly and Assembly, "Fuel Injection Pump Gear - Install" for more information.
10. Remove Tooling (B) and Tooling (C).
11. Use Tooling (D) in order to measure the end play of camshaft gear (1). Refer to Specifications, "Camshaft" for more information.

12. Use Tooling (D) in order to measure the backlash for gear (1), gear (2) and gear (8) is within specified values. Refer to Specifications, "Gear Group (Front)" for further information.
13. Adjust the engine valve lash. Refer to System Operation, Testing and Adjusting, "Engine Valve Lash - Inspect/Adjust" for the correct procedure.

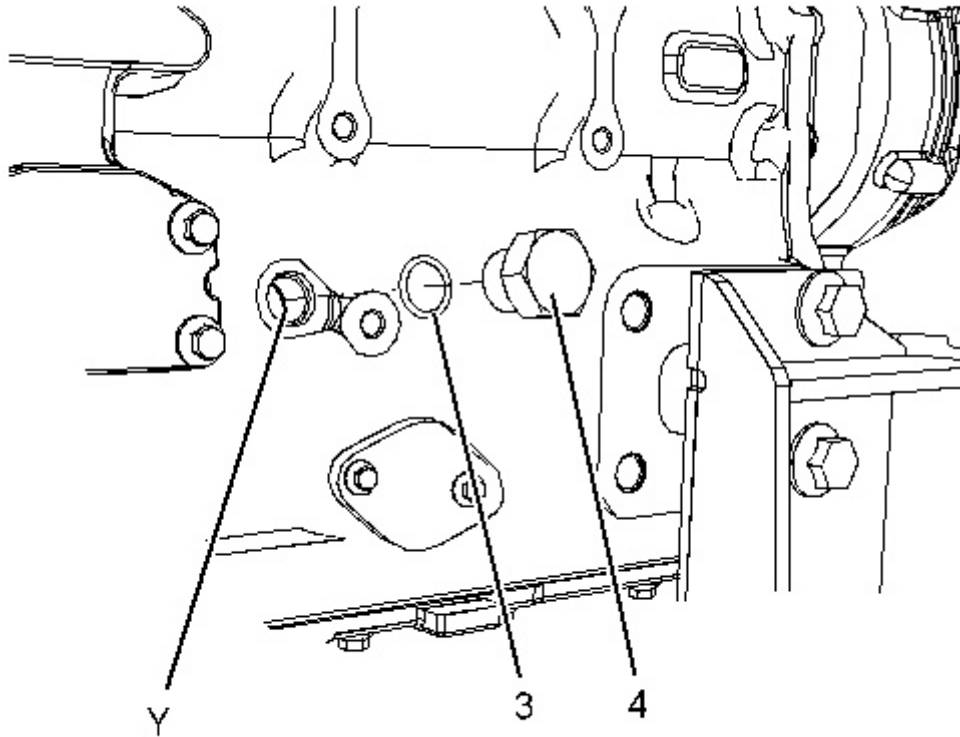


Illustration 10

g02707000

14. Install a new O-ring seal (3) to plug (4). Install plug (4) to the cylinder block. Tighten locking bolt (5) against the spacer to a torque of 21 N·m (186 lb in).
15. Lubricate each gear with clean engine oil.

End By:

- a. Install the front cover. Refer to Disassembly and Assembly, "Front Cover - Remove and Install" for the correct procedure.
 - b. Install the front cover. Refer to Disassembly and Assembly, "Front Cover - Remove and Install" for the correct procedure.
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Product: EXCAVATOR

Model: 320D2 EXCAVATOR RDZ

Configuration: 320D2 & 320D2 L Excavators RDZ00001-UP (MACHINE) POWERED BY C7.1 Engine

Disassembly and Assembly

C7.1 (Mech) Engines for Caterpillar Built Machines

Media Number -UENR0674-08

Publication Date -01/06/2015

Date Updated -23/01/2017

i04780467

Idler Gear - Remove

SMCS - 1206-011

Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A ⁽¹⁾	9U-6198	Crankshaft Turning Tool	1
A ⁽²⁾	5P-7306	Housing	1
	5P-7305	Engine Turning Tool	1
B	136-4632	Timing Pin (Crankshaft)	1
	268-1966	Adapter	
C	230-6284	Timing Pin (Camshaft)	1

⁽¹⁾ The Crankshaft Turning Tool is used on the front pulley.

⁽²⁾ This Tool is used in the aperture for the electric starting motor.

Start By:

- a. Remove the fuel injection pump gear. Refer to Disassembly and Assembly, "Fuel Pump Gear - Remove".
- b. Remove the valve mechanism cover. Refer to Disassembly and Assembly, "Valve Mechanism Cover - Remove and Install".

Note: Either Tooling (A) can be used. Use the Tooling that is most suitable.

Note: Care must be taken in order to ensure that the fuel injection pump timing is not lost during the removal of the fuel pump gear. Carefully follow the procedure in order to remove the fuel pump gear.

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

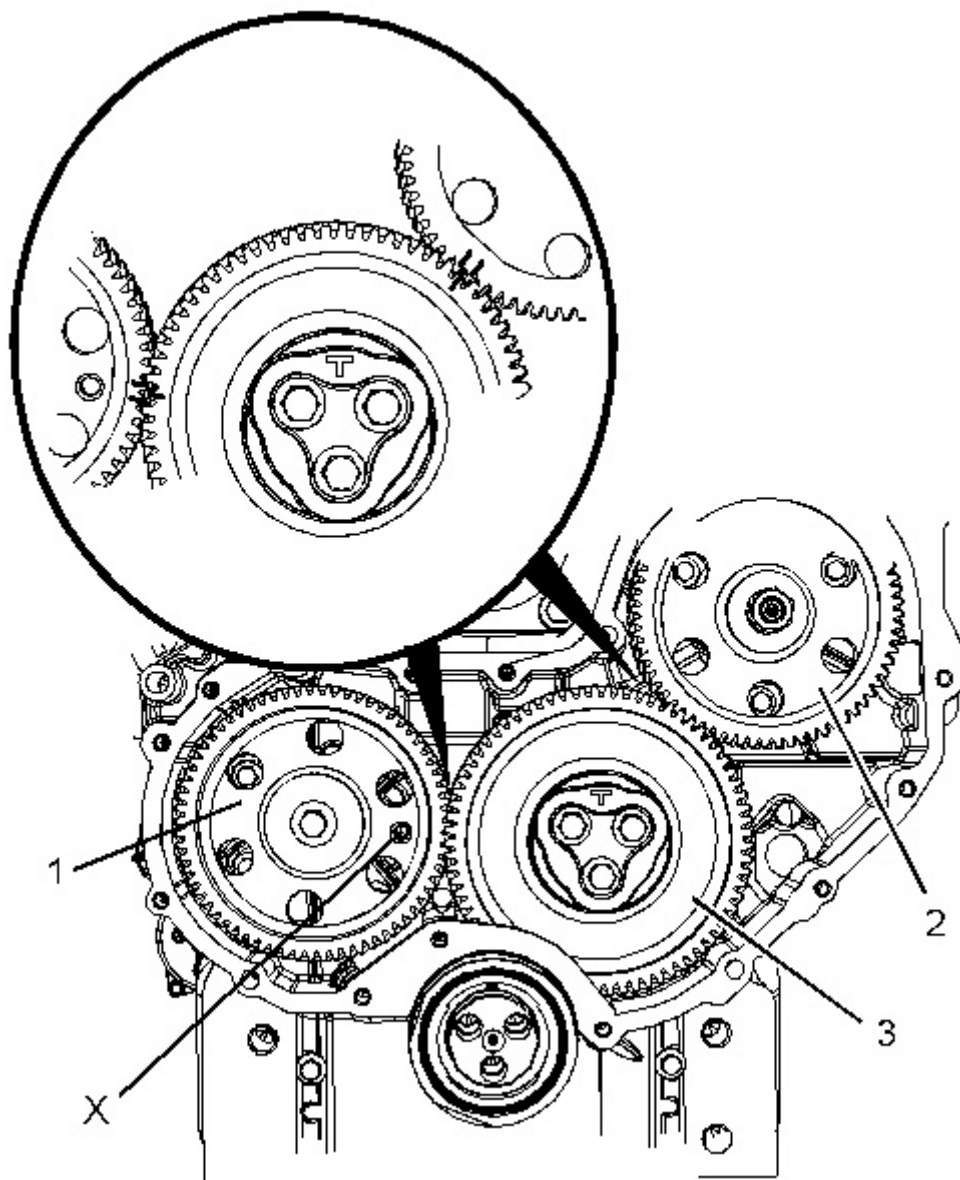


Illustration 1
Alignment of timing marks

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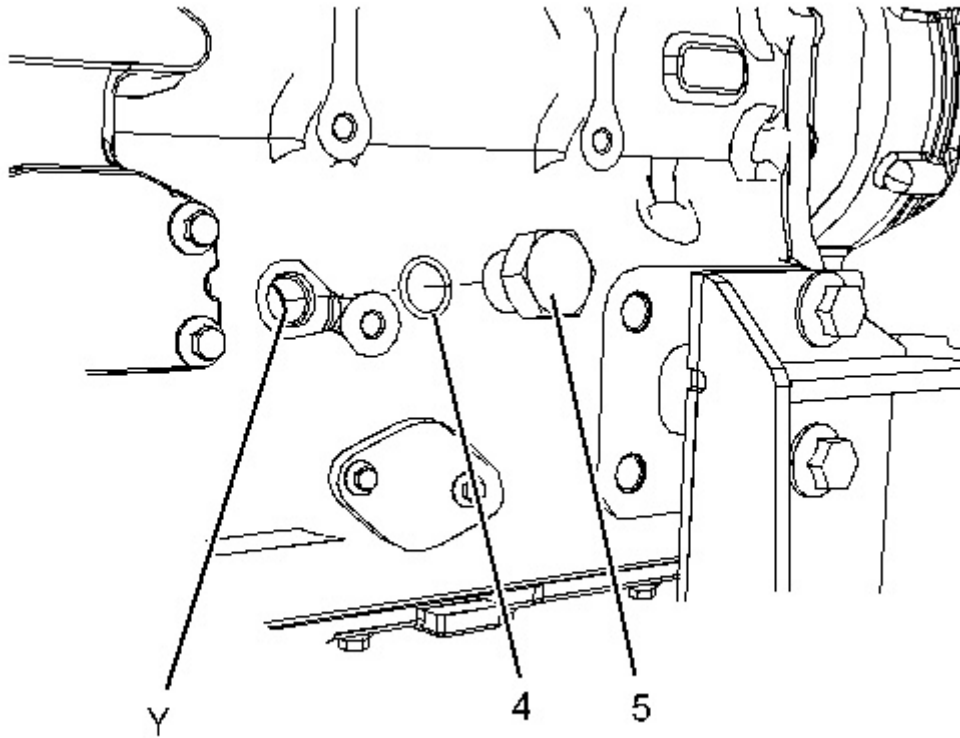


Illustration 2

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1. Remove plug (5) from the cylinder block. Remove O-ring seal (4) from plug (5).
2. Use Tooling (A) in order to rotate the crankshaft so that number one piston is at top dead center on the compression stroke. Refer to System Operation, Testing and Adjusting, "Finding Top Center Position for No.1 Piston".
3. Install Tooling (B) into Hole (Y) in the cylinder block. Use Tooling (B) in order to lock the crankshaft in the correct position.

Note: Do not use excessive force to install Tooling (B). Do not use Tooling (B) to hold the crankshaft during repairs.

4. Ensure that Tooling (C) is installed into Hole (X) in the camshaft gear. Use Tooling (C) in order to lock the camshaft in the correct position.
 5. Ensure that gear (1), gear (2), and gear (3) are marked in order to show alignment.
-

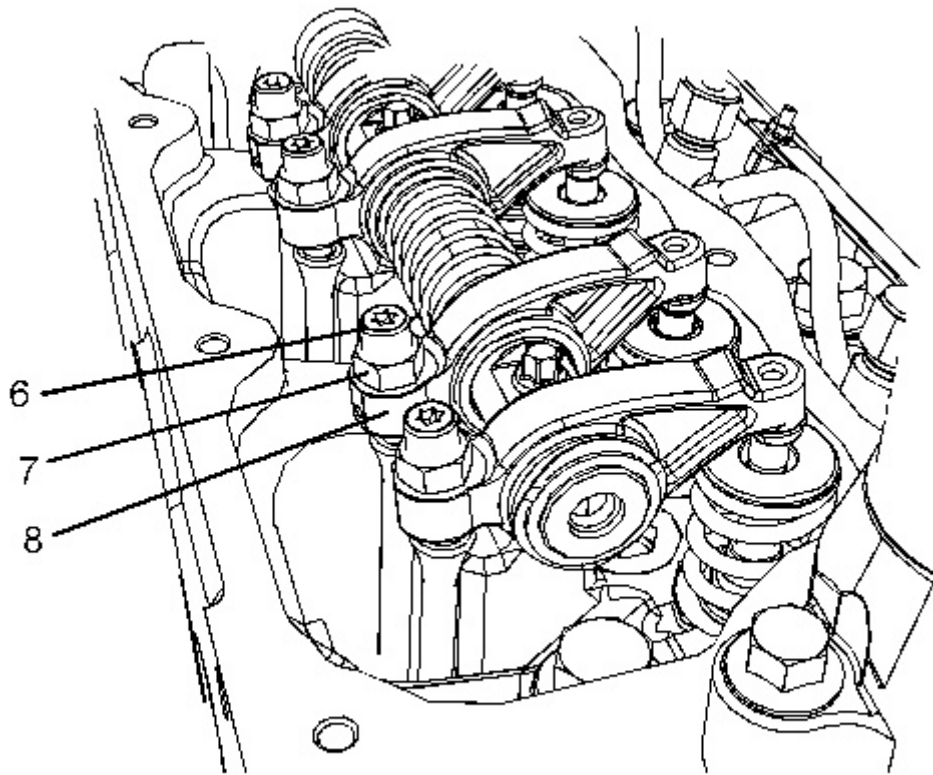


Illustration 3

g02712442

6. Loosen nuts (7) on all rocker arms (8). Unscrew adjusters (6) on all rocker arms (8) until all valves are fully closed.

Note: Failure to ensure that ALL adjusters are fully unscrewed can result in contact between the valves and pistons.

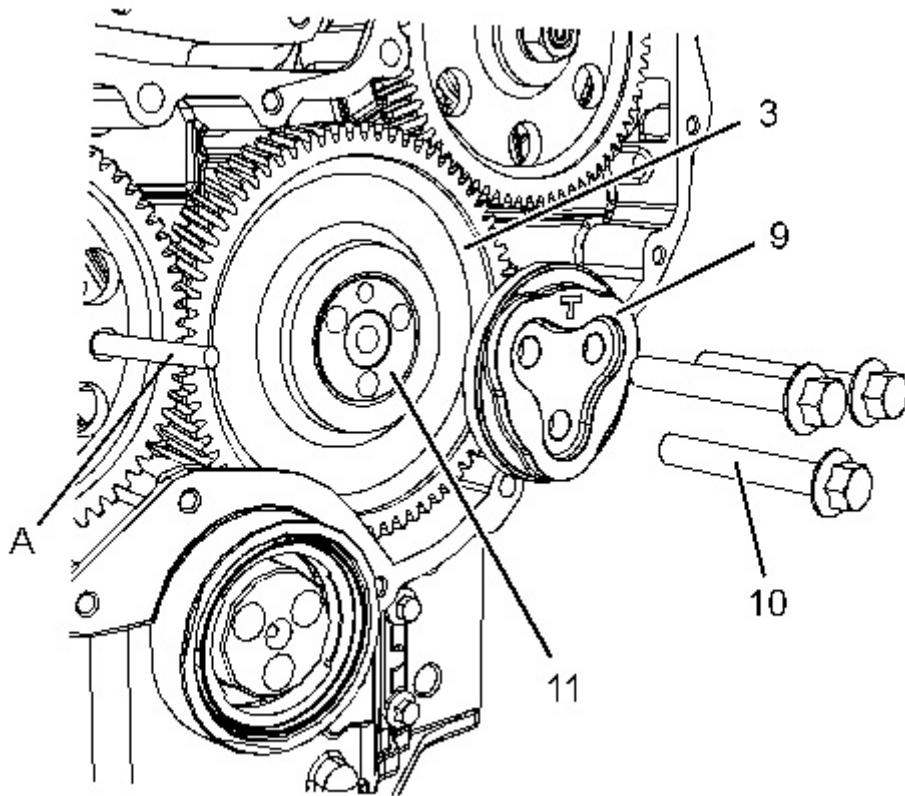


Illustration 4

g02712444

7. Mark plate (9) in order to show orientation.

Note: Identification will ensure that the plate can be installed in the original orientation.

8. Remove bolts (10).

9. Remove plate (9).

10. Remove the assembly of idler gear (3) and hub (11) from the recess in the front housing.

Note: The idler gear must be tilted during removal.

11. Remove hub (11) from idler gear (3).

Product: EXCAVATOR

Model: 320D2 EXCAVATOR RDZ

Configuration: 320D2 & 320D2 L Excavators RDZ00001-UP (MACHINE) POWERED BY C7.1 Engine

Disassembly and Assembly C7.1 (Mech) Engines for Caterpillar Built Machines

Media Number -UENR0674-08

Publication Date -01/06/2015

Date Updated -23/01/2017

i04780466

Idler Gear - Install

SMCS - 1206-012

Installation Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A ⁽¹⁾	9U-6198	Crankshaft Turning Tool	1
A ⁽²⁾	5P-7306	Housing	1
	5P-7305	Engine Turning Tool	1
B	230-6284	Timing Pin (Camshaft)	1
C	136-4632	Timing Pin (Crankshaft)	1
	268-1966	Adapter	1
D	9U-7324	Indicator Bracket	1
	7H-1942	Dial Indicator	1
	3S-3268	Indicator Contact Point	1
	7H-1940	Universal Attachment	1

⁽¹⁾ The Crankshaft Turning Tool is used on the front pulley.

⁽²⁾ This Tool is used in the aperture for the electric starting motor.

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

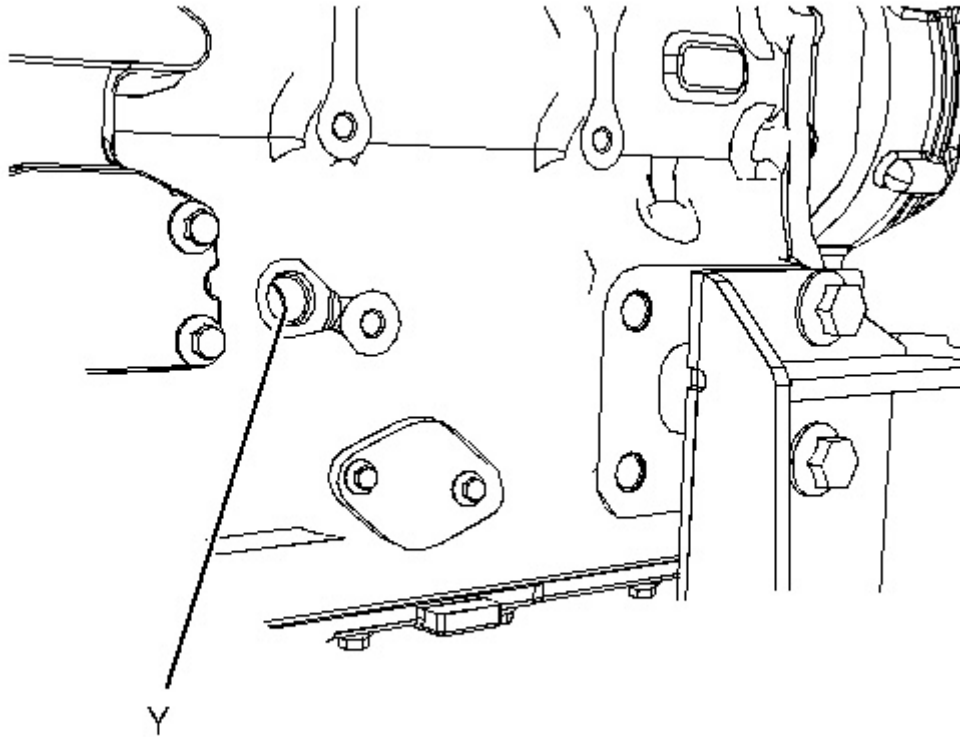


Illustration 1

g02717945

1. If necessary, use Tooling (A) to ensure that number one piston is at top dead center on the compression stroke. Refer to System Operation, Testing and Adjusting, "Finding Top Center Position for No.1 Piston" for the correct procedure.
2. Ensure that Tooling (B) is installed in Hole (Y) in the cylinder block. Use Tooling (B) in order to lock the crankshaft in the correct position.

Note: Do not use excessive force to install Tooling (B). Do not use Tooling (B) to hold the crankshaft during repairs.

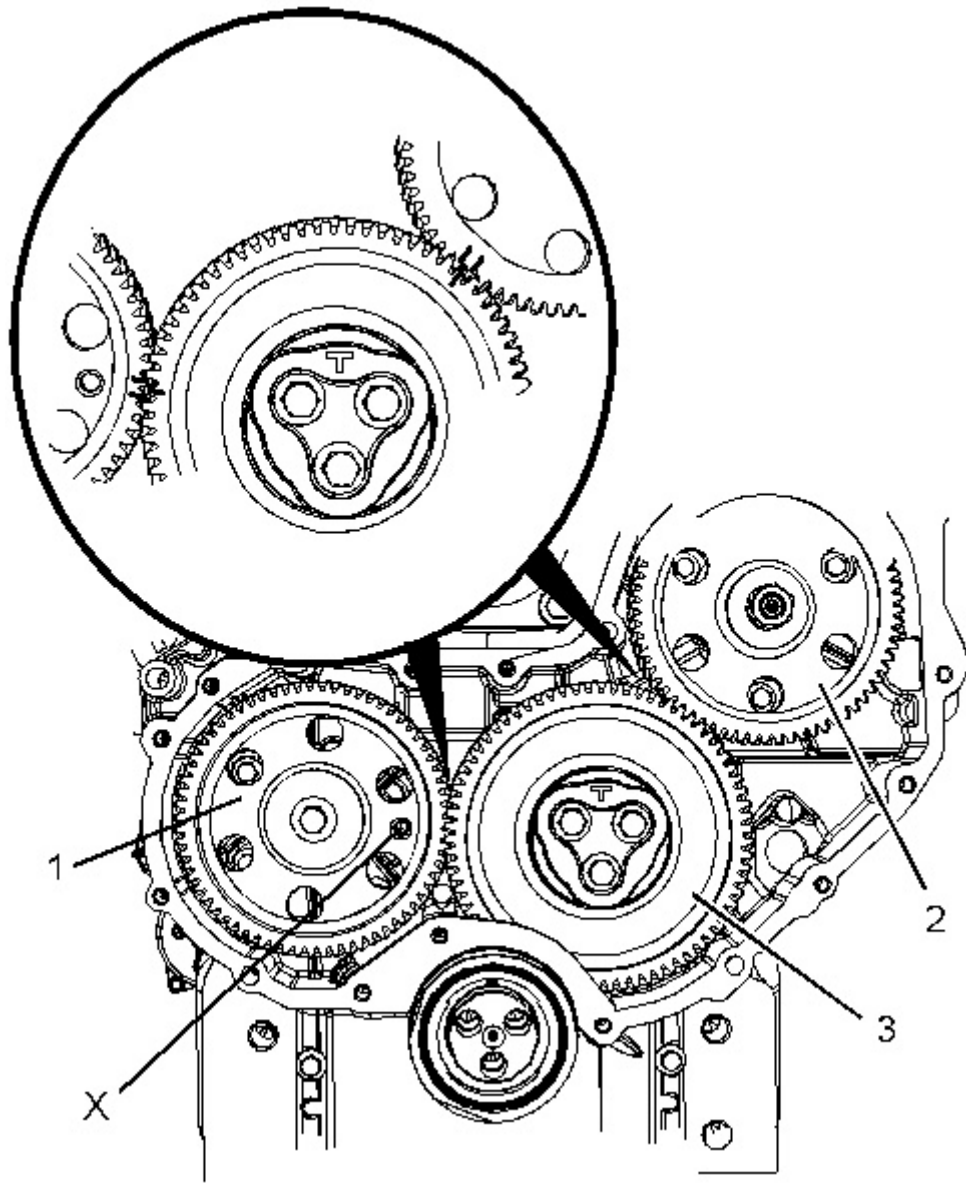


Illustration 2

g02712440

Alignment of timing marks

3. Ensure that Tooling (C) is installed into Hole (X) in camshaft gear (1).
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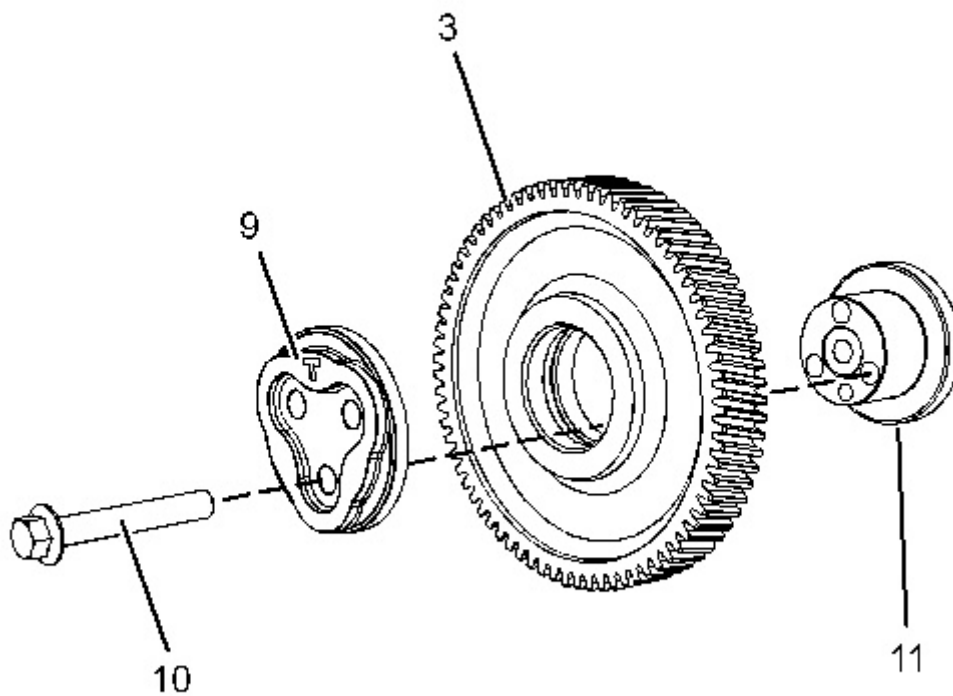


Illustration 3

g02718564

4. Clean idler gear (3) and inspect the idler gear for wear or damage. Refer to Specifications, "Gear Group (Front)" for more information. If necessary, replace the idler gear.
 5. Clean hub (11) and inspect the hub for wear or damage. Refer to Specifications, "Gear Group (Front)" for more information. If necessary, replace the hub.
 6. Lubricate hub (11) with clean engine oil. Slide hub (11) into idler gear (3). Ensure that the timing marks are toward the front of the idler gear.
-

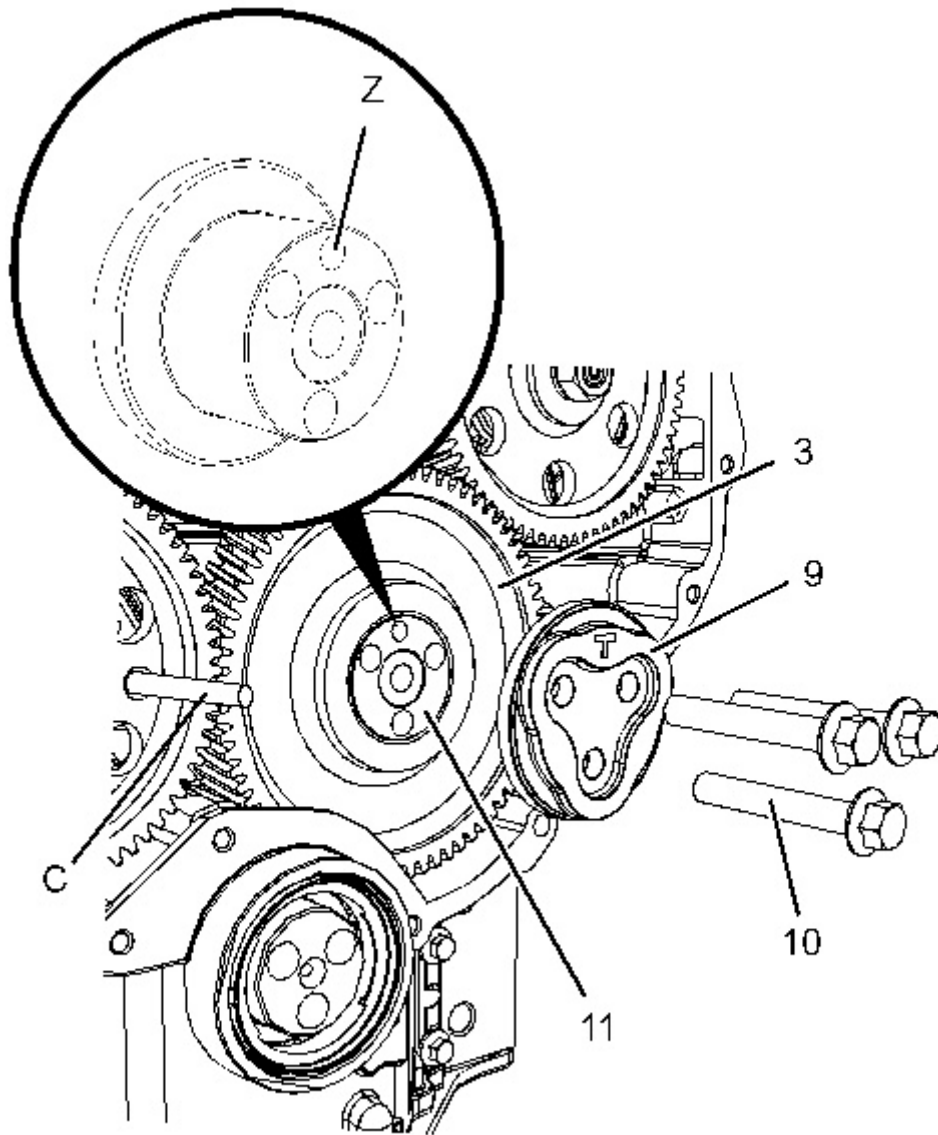


Illustration 4

g02718572

7. Align the timing mark on idler gear (3) with the timing mark on the camshaft gear. Refer to the illustration 2. Install the assembly of idler gear (3) and hub (11) into the recess in the timing case. Ensure that oil Hole (Z) is to the top of the hub.

Note: The idler gear must be tilted during installation. Ensure that the holes in the hub are aligned with the holes in the cylinder block.

8. Clean plate (9) and inspect the plate for wear or damage. If necessary, replace the plate.
9. Lubricate plate (9) with clean engine oil. Align the holes in plate (9) with the holes in hub (11). Install the plate in the original orientation.
10. Install bolts (10).
11. Remove Tooling (B) and Tooling (C).

Note: Ensure that timing marks are aligned, before removing Tooling (B) and Tooling (C).

12. Tighten bolts (10) to a torque of 44 N·m (32 lb ft).
 13. Use Tooling (D) in order to measure the end play of the camshaft gear. Refer to Specifications, "Gear Group (Front)" for more information.
 14. Use Tooling (D) in order to measure the backlash between the idler gear and the camshaft gear. Refer to Specifications, "Gear Group (Front)" for more information.
 15. Use Tooling (D) in order to measure the backlash between the idler gear and the crankshaft gear. Refer to Specifications, "Gear Group (Front)" for more information.
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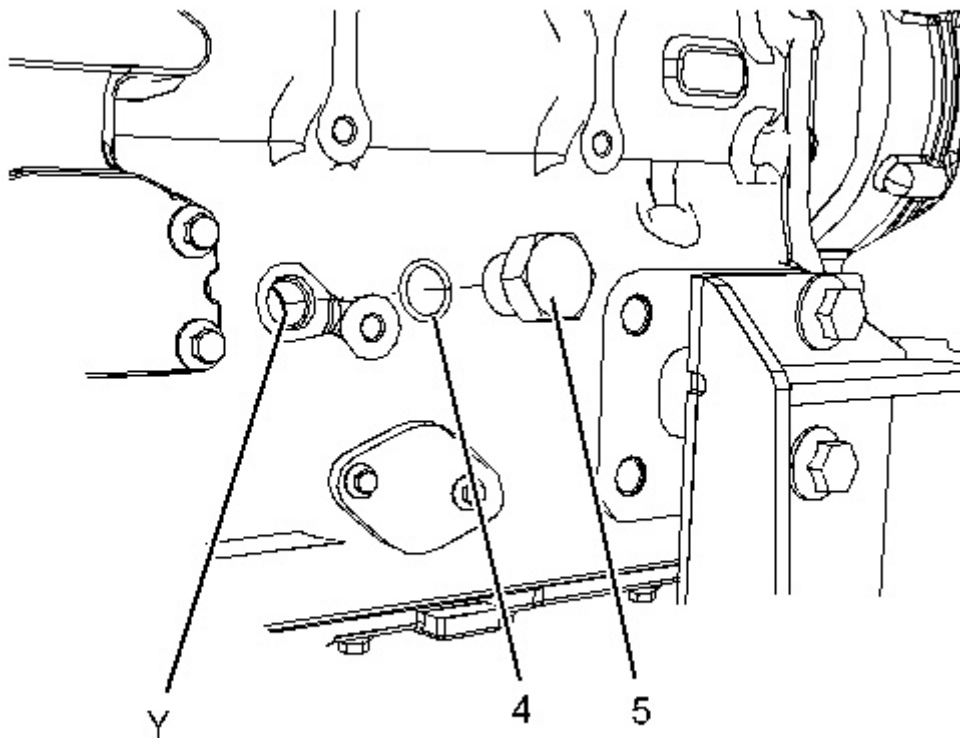


Illustration 5

g02712439

16. Install a new O-ring seal (4) to plug (5). Install plug (5) to the cylinder block. Tighten plug (5) to a torque of 21 N·m (186 lb in).
17. Lightly lubricate all of the gears with clean engine oil.

End By:

- a. Install the fuel injection pump gear. Refer to Disassembly and Assembly, "Fuel Pump Gear - Install".
 - b. Adjust the engine valve lash. Refer to System Operation, Testing and Adjusting, "Engine Valve Lash - Inspect/Adjust" for the correct procedure.
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