

Product: TRACK-TYPE TRACTOR

Model: D5R LGP TRACK-TYPE TRACTOR D5L

Configuration: D5R XL, LGP Differential Steering, Electrohydraulic Implement TRACK-TYPE TRACTOR D5L00001-UP (MACHINE) POWERED BY C6.6 Engine

## Disassembly and Assembly C6.6 Engines for Caterpillar Built Machines

Media Number -KENR6081-15

Publication Date -01/03/2014

Date Updated -04/03/2014

i05735237

### Idler Gear - Remove

SMCS - 1206-011

### Removal Procedure (Standard Idler Gear)

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	230-6284	Timing Pin (Camshaft)	1
B	136-4632	Timing Pin (Crankshaft)	1
	268-1966	Adapter	1

#### Start By:

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

**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.

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#### NOTICE

**Keep all parts clean from contaminants.**

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

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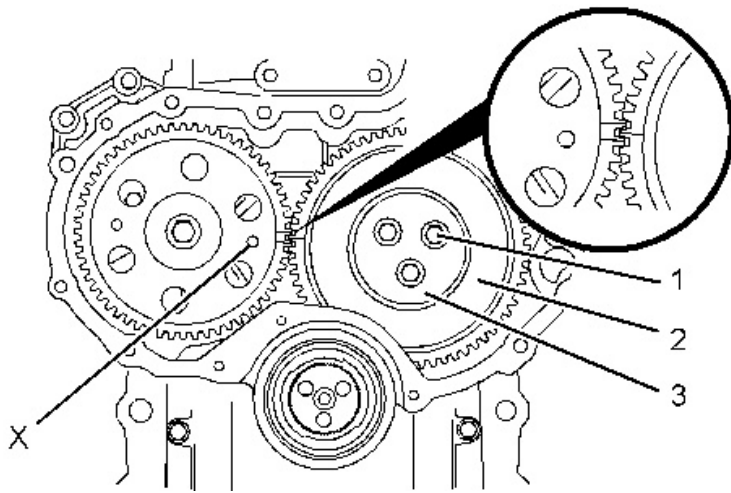


Illustration 1  
Alignment of timing marks

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1. Ensure that Tooling (A) is installed into Hole (X) in the camshaft gear. Use Tooling (A) in order to lock the camshaft in the correct position.

**Note:** Ensure that the gears are marked in order to show alignment. Refer to Illustration 1.

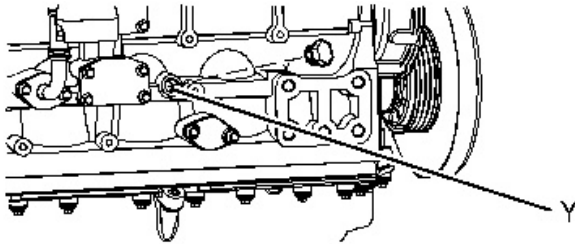


Illustration 2

g01337919

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.

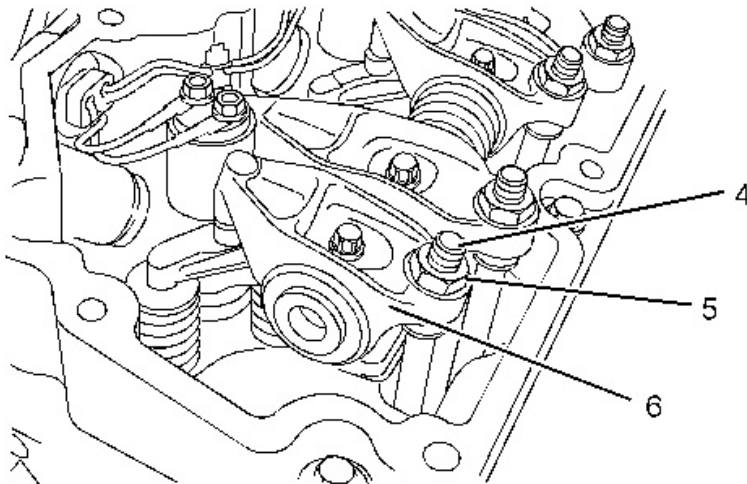


Illustration 3

g01337921

3. Loosen nuts (5) on all rocker arms (6). Unscrew adjusters (4) on all rocker arms (6) 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.

4. Mark plate (3) in order to show orientation.

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

5. Remove bolts (1).

6. Remove plate (3).

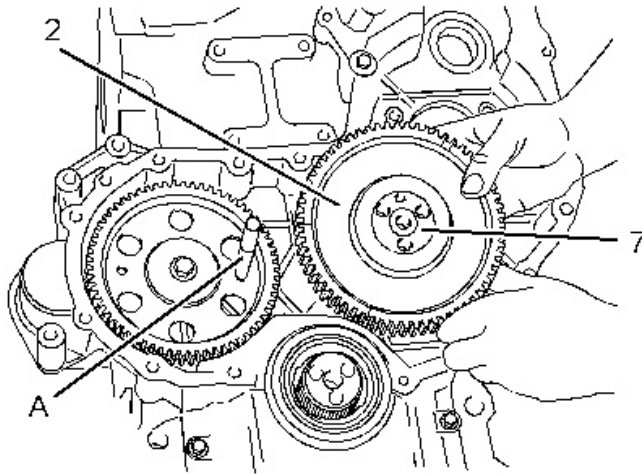


Illustration 4

g01337922

7. Remove the assembly of idler gear (2) and hub (7) from the recess in the front housing.

**Note:** The idler gear must be tilted during removal.

8. Remove hub (7) from idler gear (2).

## Removal Procedure (Early Heavy-Duty Idler Gear)

Table 2

Required Tools			
Tool	Part Number	Part Description	Qty
A	230-6284	Timing Pin (Camshaft)	1
B	136-4632	Timing Pin (Crankshaft)	1
	268-1966	Adapter	1

### Start By:

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

**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.

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### NOTICE

**Keep all parts clean from contaminants.**

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

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**Note:** The assembly of heavy-duty idler gear is not serviceable. Do not disassemble the heavy-duty idler gear.

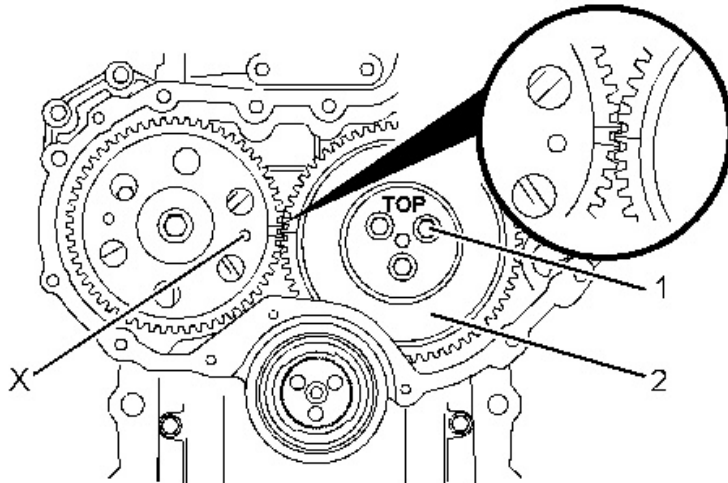


Illustration 5  
Alignment of timing marks

g01337924

1. Ensure that Tooling (A) is installed into hole (X) in the camshaft gear. Use Tooling (A) in order to lock the camshaft in the correct position.

**Note:** Ensure that the gears are marked in order to show alignment. Refer to Illustration 5.

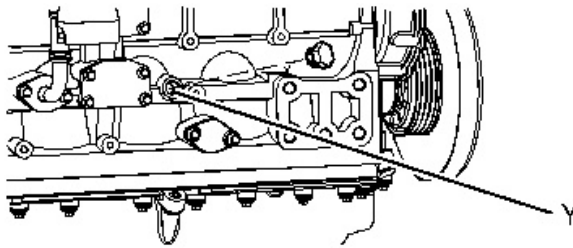


Illustration 6

g01337919

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.

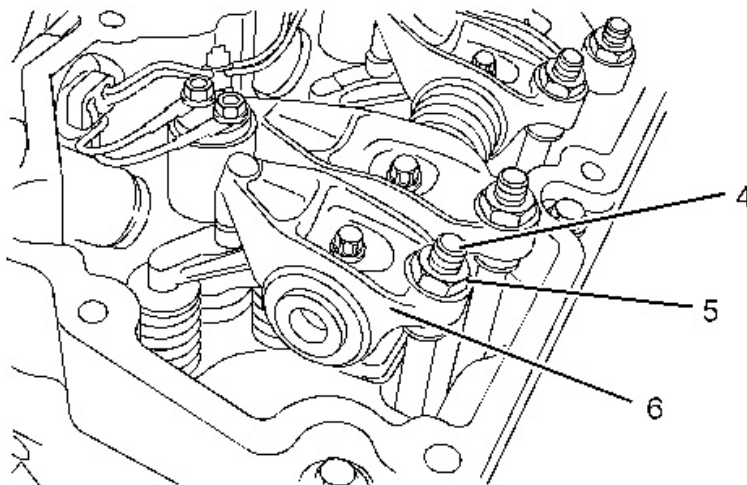


Illustration 7

g01337921

3. Loosen nuts (4) on all rocker arms (5). Unscrew adjusters (3) on all rocker arms (5) 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.

4. Remove bolts (1) from the assembly of heavy-duty idler gear (2).

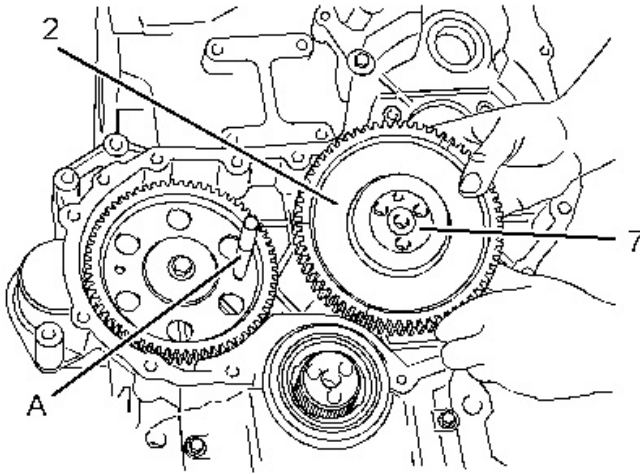


Illustration 8

g01337922

5. Remove the assembly of idler gear (2) from the recess in the front housing.

**Note:** The idler gear must be tilted during removal.

## Removal Procedure (Latest Heavy-Duty Idler Gear)

Table 3

Required Tools			
Tool	Part Number	Part Description	Qty
A	230-6284	Timing Pin (Camshaft)	1
B	136-4632	Timing Pin (Crankshaft)	1
	268-1966	Adapter	1
C	-	Bolt (M8 x 80mm)	1

### Start By:

- If the engine is equipped with an air compressor, remove the air compressor. Refer to Disassembly and Assembly, "Air Compressor - Remove and Install" for the correct procedure.
- If the engine is equipped with an accessory drive, remove the accessory drive. Refer to Disassembly and Assembly, "Accessory Drive - Remove and Install" for the correct procedure.
- Remove the fuel injection pump gear. Refer to Disassembly and Assembly, "Fuel Pump Gear - Remove" for the correct procedure.
- Remove the valve mechanism cover. Refer to Disassembly and Assembly, "Valve Mechanism Cover - Remove and Install" for the correct procedure.

**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.**

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**Note:** The assembly of heavy-duty idler gear is not serviceable. Do not disassemble the heavy-duty idler gear.

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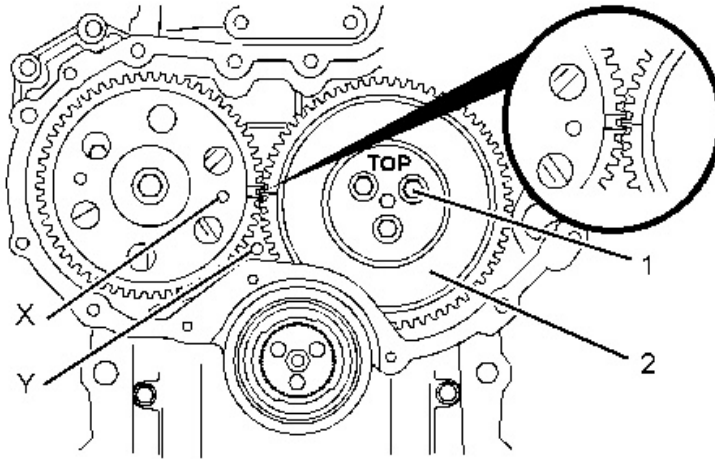


Illustration 9  
Alignment of timing marks

g01343977

1. Ensure that Tooling (A) is installed into Hole (X) in the camshaft gear. Use Tooling (A) in order to lock the camshaft in the correct position.

**Note:** Ensure that the gears are marked in order to show alignment. Refer to Illustration 9.

2. Ensure that Tooling (B) is installed in Hole (Y) in the front housing. Use Tooling (B) in order to lock the crankshaft in the correct position.
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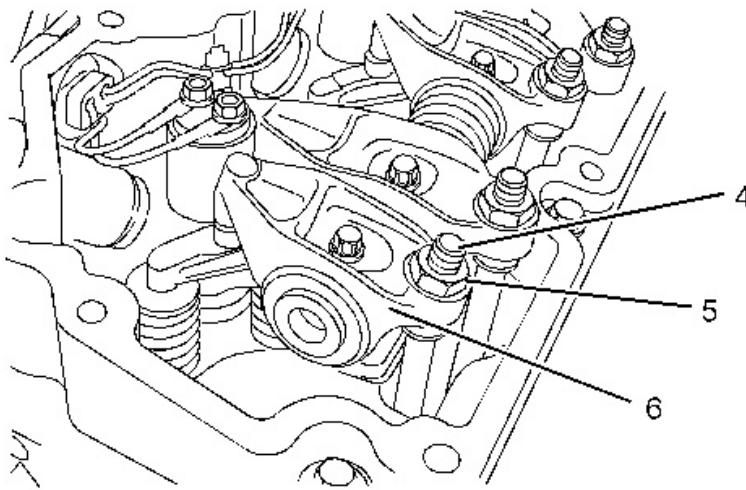


Illustration 10  
Typical example

g01337921

3. Loosen nuts (5) on all rocker arms (6). Unscrew adjusters (4) on all rocker arms (5) 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.

4. Remove bolts (1) from the assembly of heavy-duty idler gear (2). Refer to Illustration 9.
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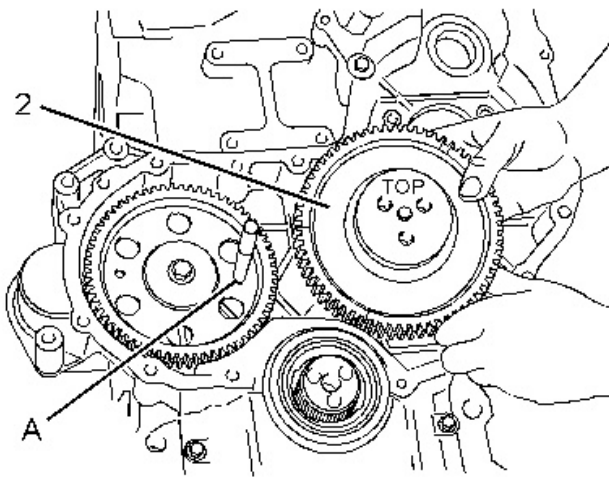


Illustration 11  
Typical example

g01269933

5. Remove the assembly of idler gear (2) from the recess in the front housing.

**Note:** The idler gear must be tilted during removal.

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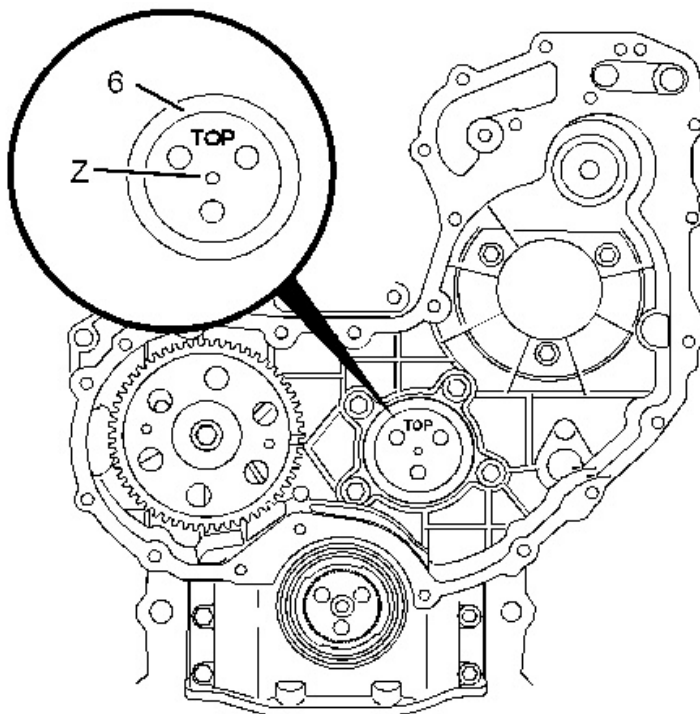


Illustration 12  
Typical example

g01348835

6. If necessary, remove plate (6). Install Tooling (C) into threaded Hole (Z) in order to remove plate (6).
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Product: TRACK-TYPE TRACTOR

Model: D5R LGP TRACK-TYPE TRACTOR D5L

Configuration: D5R XL, LGP Differential Steering, Electrohydraulic Implement TRACK-TYPE TRACTOR D5L00001-UP (MACHINE) POWERED BY C6.6 Engine

## Disassembly and Assembly C6.6 Engines for Caterpillar Built Machines

Media Number -KENR6081-15

Publication Date -01/03/2014

Date Updated -04/03/2014

i05735238

### Idler Gear - Install

SMCS - 1206-012

### Installation Procedure (Standard Idler Gear)

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	230-6284	Timing Pin (Camshaft)	1
B	136-4632	Timing Pin (Crankshaft)	1
	268-1966	Adapter	1

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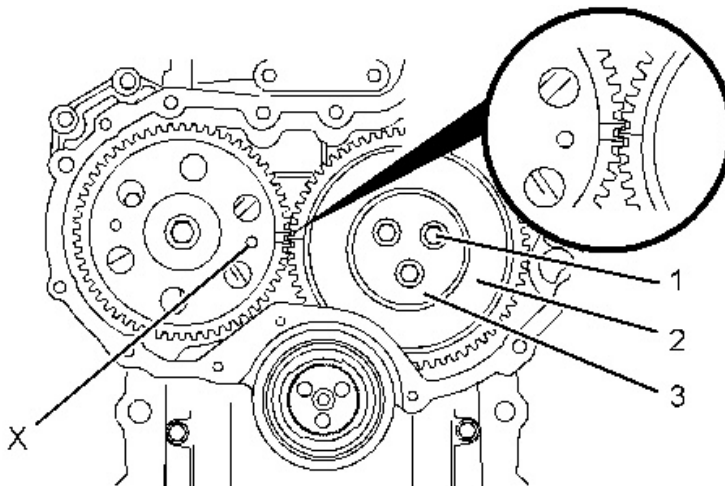
#### NOTICE

**Keep all parts clean from contaminants.**

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

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1. Ensure that number one piston is at top dead center on the compression stroke. Refer to System Operation, Testing and Adjusting, "Finding Top Center for No. 1 Piston" for the correct procedure.





Alignment of timing marks

2. Ensure that Tooling (A) is installed into Hole (X) in camshaft gear (1).

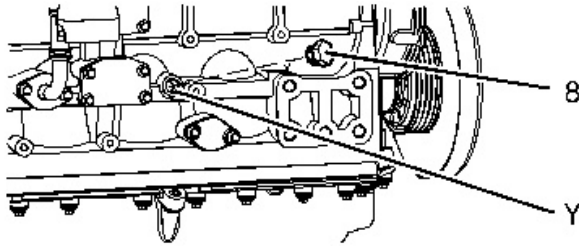


Illustration 2

g01337947

3. 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. Refer to System Operation, Testing and Adjusting, "Finding Top Center Position for No.1 Piston" for the correct procedure.

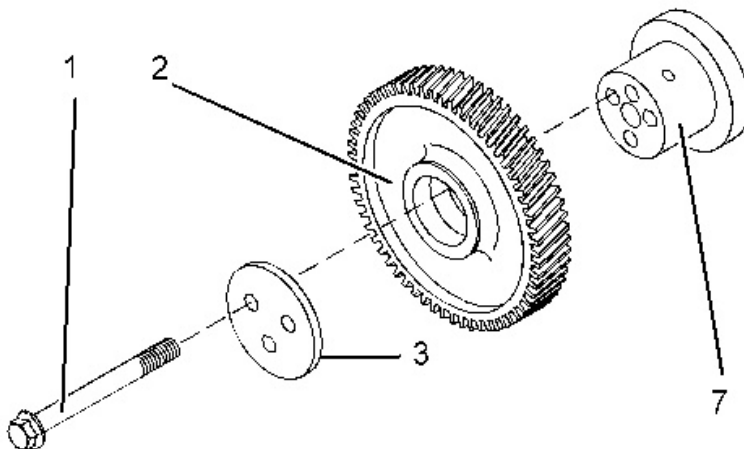
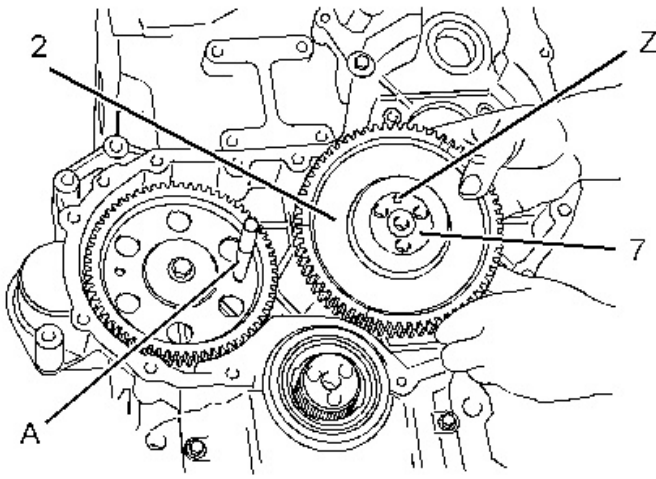


Illustration 3

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4. Clean idler gear (2) 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 (7) 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 (7) with clean engine oil. Slide hub (7) into idler gear (2). Ensure that the timing marks are toward the front of the idler gear.
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Illustration 4

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7. Align the timing mark on idler gear (2) with the timing mark on the camshaft gear. Refer to the illustration 1. Install the assembly of idler gear (2) and hub (7) 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 (3) and inspect the plate for wear or damage. If necessary, replace the plate.
9. Lubricate plate (3) with clean engine oil. Align the holes in plate (3) with the holes in hub (7). Install the plate in the original orientation.
10. Install bolts (1).
11. Remove Tooling (A) and Tooling (B).

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

12. Install plug (8) to the cylinder block. Refer to Illustration 2.
  13. Tighten bolts (1) to a torque of 44 N·m (32 lb ft).
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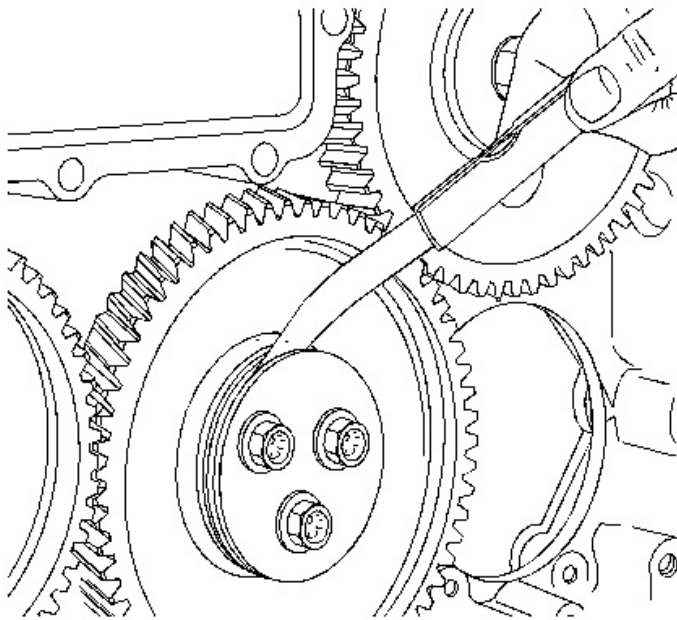


Illustration 5

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Checking end play by using a set of feeler gauge's

14. Use a set of feeler gauge's in order to check the end play for the idler gear. Refer to Specifications, "Gear Group (Front)" for more information.

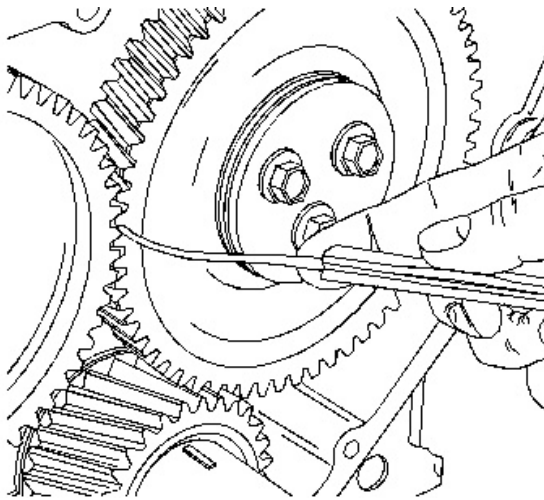


Illustration 6

g01335426

Checking backlash

15. Check the backlash between the idler gear and the camshaft gear. Refer to Specifications, "Gear Group (Front)" for more information.
16. Check the backlash between the idler gear and the crankshaft gear. Refer to Specifications, "Gear Group (Front)" for more information.
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" for the correct procedure.

# Installation Procedure (Early Heavy-Duty Idler Gear)

Table 2

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

## NOTICE

**Keep all parts clean from contaminants.**

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

1. Ensure that number one piston is at top dead center on the compression stroke. Refer to System Operation, Testing and Adjusting, "Finding Top Center for No. 1 Piston" for the correct procedure.

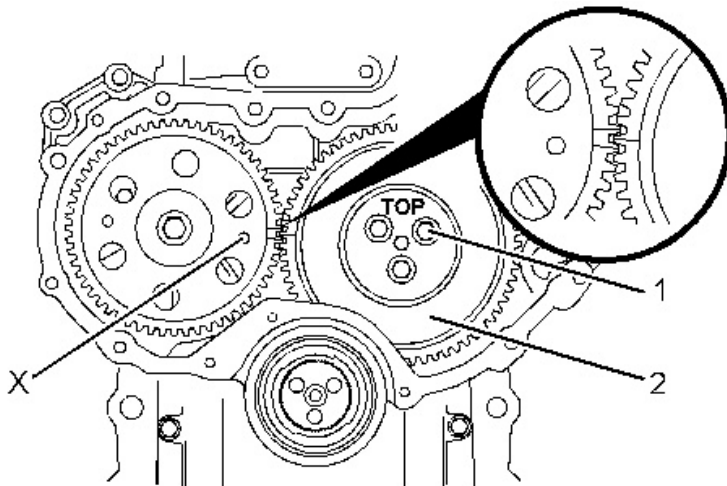
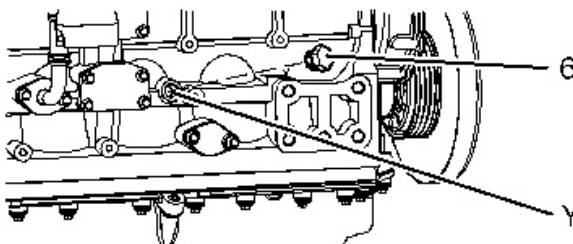


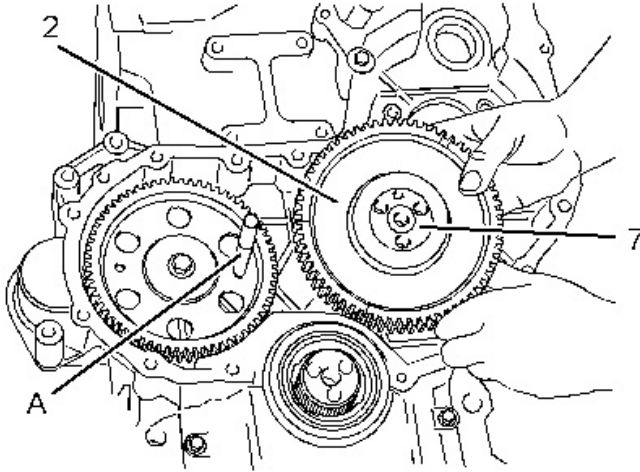
Illustration 7  
Alignment of timing marks

g01337924

2. Ensure that Tooling (A) is installed into Hole (X) in the camshaft gear.



3. 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. Refer to System Operation, Testing and Adjusting, "Finding Top Center Position for No.1 Piston" for the correct procedure.
4. Clean the assembly of idler gear (2) and inspect the assembly of the idler gear for wear or damage. Refer to Specifications , "Gear Group (Front)" for more information. If necessary, replace the assembly of the idler gear.
5. Lubricate the bearings in the assembly of idler gear (2) with clean engine oil.



6. Align the timing mark on idler gear (2) with the timing mark on the camshaft gear. Refer to the illustration 7. Install the assembly of idler gear (2) into the recess in the timing case. Ensure that the identification mark TOP is upward.

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

7. Install bolts (1).
  8. Remove Tooling (A) and Tooling (B).
- Note:** Ensure that timing marks are aligned, before removing the Tooling (A) and Tooling (B).
9. Install plug (6) to the cylinder block. Refer to Illustration 8.
  10. Tighten bolts (1) to a torque of 44 N·m (32 lb ft).

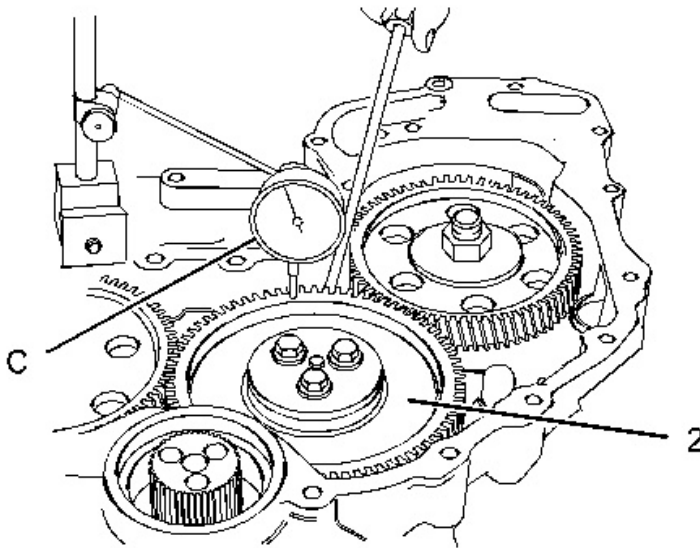


Illustration 10

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11. Use Tooling (C) in order to check the end play for the heavy-duty idler gear. Refer to Specifications, "Gear Group (Front)" for more information.

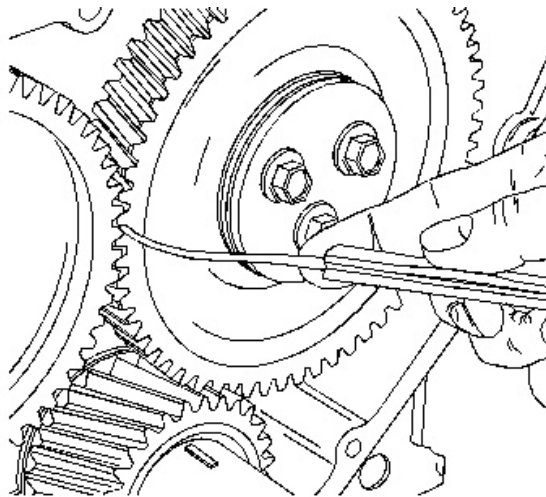


Illustration 11

g01335426

Checking backlash

12. Check the backlash between the idler gear and the camshaft gear. Refer to Specifications, "Gear Group (Front)" for more information.
13. Check the backlash between the idler gear and the crankshaft gear. Refer to Specifications, "Gear Group (Front)" for more information.
14. 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" for the correct procedure.

# Installation Procedure (Latest Heavy-Duty Idler Gear)

Table 3

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

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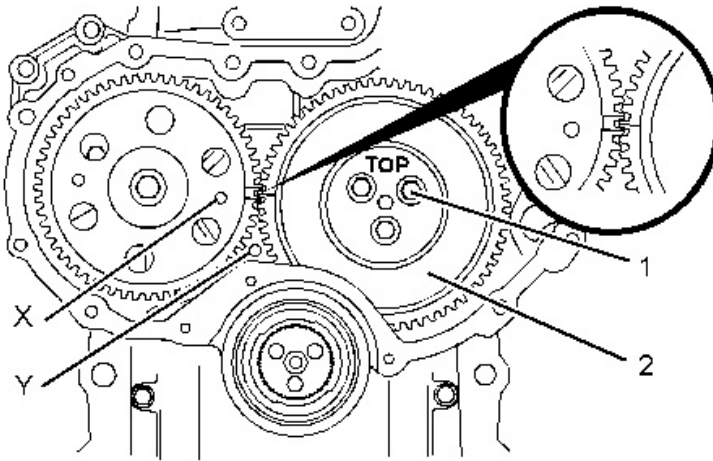
## NOTICE

**Keep all parts clean from contaminants.**

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

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1. Ensure that number one piston is at the top center Position on the compression stroke. Refer to Systems Operation, Testing and Adjusting, "Finding Top Center Position for No. 1 Piston" for the correct procedure.



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Illustration 12  
Alignment of timing marks

g01343977

2. Ensure that Tooling (A) is installed into Hole (X) in the camshaft gear.
  3. 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. Refer to Systems Operation, Testing and Adjusting, "Finding Top Center Position for No.1 Piston" for the correct procedure.
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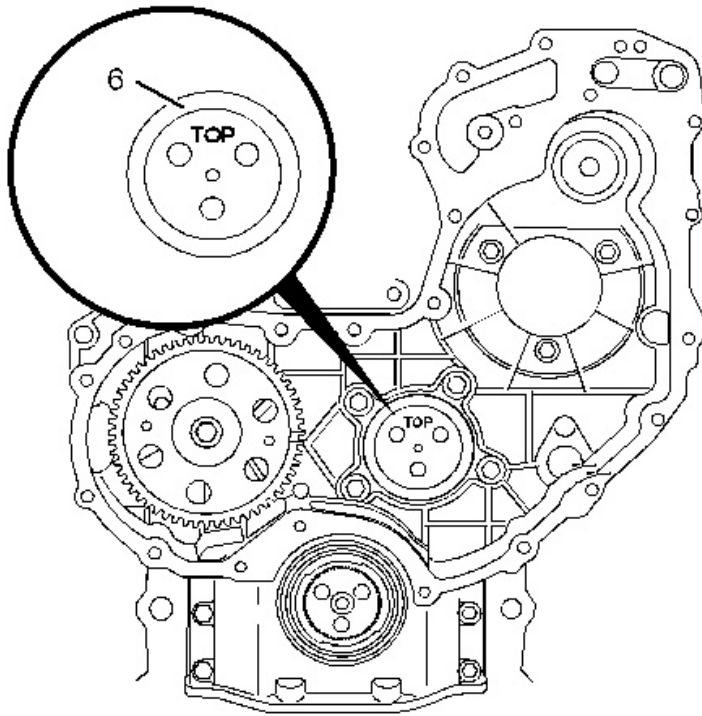


Illustration 13  
Typical example

g01387344

4. Install plate (6) into the recess in the front housing.

**Note:** Ensure that the identification mark TOP is upward.

5. Clean the assembly of idler gear (2) and inspect the assembly of the idler gear for wear or damage. Refer to Specifications, "Gear Group (Front)" for more information. If necessary, replace the assembly of the idler gear.
6. Lubricate the bearings in the assembly of idler gear (2) with clean engine oil.

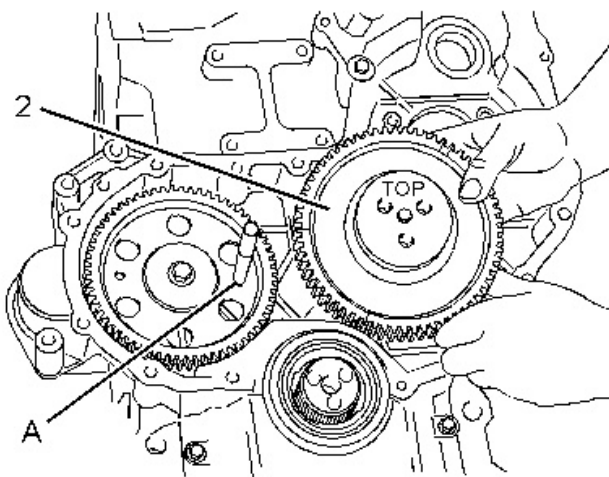


Illustration 14

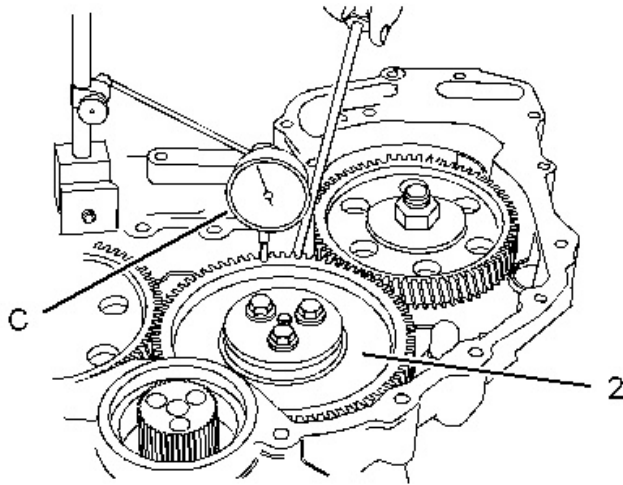
g01269933

7. Align the timing mark on idler gear (2) with the timing mark on the camshaft gear. Refer to Illustration 12. Install the assembly of idler gear (2) into the recess in the timing case. Ensure that the identification mark TOP is upward.

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

8. Install bolts (1). Tighten bolts (1) to a torque of 44 N·m (32 lb ft).





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Illustration 15

g01269937

Checking end play by using a dial indicator group

9. Use Tooling (C) in order to check the end play of the idler gear. Refer to Specifications, "Gear Group (Front)" for more information.
10. Use Tooling (C) in order to check the backlash between the idler gear and the camshaft gear. Refer to Specifications, "Gear Group (Front)" for more information.
11. Use Tooling (C) in order to check the backlash between the idler gear and the crankshaft gear. Refer to Specifications, "Gear Group (Front)" for more information.
12. 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" for the correct procedure.
  - b. If the engine is equipped with an air compressor, install the air compressor. Refer to Disassembly and Assembly, "Air Compressor - Remove and Install" for the correct procedure.
  - c. If the engine is equipped with an accessory drive, install the accessory drive. Refer to Disassembly and Assembly, "Accessory Drive - Remove and Install" for the correct procedure.
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Product: TRACK-TYPE TRACTOR

Model: D5R LGP TRACK-TYPE TRACTOR D5L

Configuration: D5R XL, LGP Differential Steering, Electrohydraulic Implement TRACK-TYPE TRACTOR D5L00001-UP (MACHINE) POWERED BY C6.6 Engine

## Disassembly and Assembly C6.6 Engines for Caterpillar Built Machines

Media Number -KENR6081-15

Publication Date -01/03/2014

Date Updated -04/03/2014

i02786790

## Housing (Front) - Remove

SMCS - 1151-011

## Removal Procedure

### Start By:

- a. Remove the fan. Refer to Disassembly and Assembly, "Fan - Remove and Install".
- b. If necessary, remove the alternator. Refer to Disassembly and Assembly, "Alternator - Remove".
- c. Remove the front pulley. Refer to Disassembly and Assembly, "Vibration Damper and Pulley - Remove".
- d. Remove the engine oil pan. Refer to Disassembly and Assembly, "Engine Oil Pan - Remove".
- e. If the engine has an accessory drive, remove the accessory drive. Refer to Disassembly and Assembly, "Accessory Drive - Remove and Install".
- f. Drain the coolant into a suitable container for storage or disposal. Refer to Operation and Maintenance Manual, "Cooling System Coolant - Drain" for the correct procedure.
- g. Remove the timing gears. Refer to Disassembly and Assembly, "Gear Group (Front) - Remove and Install".
- h. Remove the fuel injection pump. Refer to Disassembly and Assembly, "Fuel Injection Pump - 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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### 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.**

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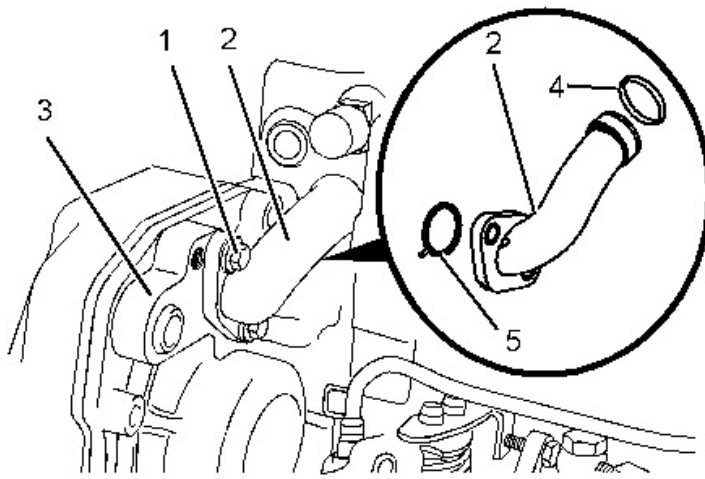


Illustration 1

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1. Remove bolts (1) that secure bypass tube (2) to front housing (3). Remove bypass tube (2) from the cylinder head. Remove O-rings (4) and (5) from bypass tube (2).

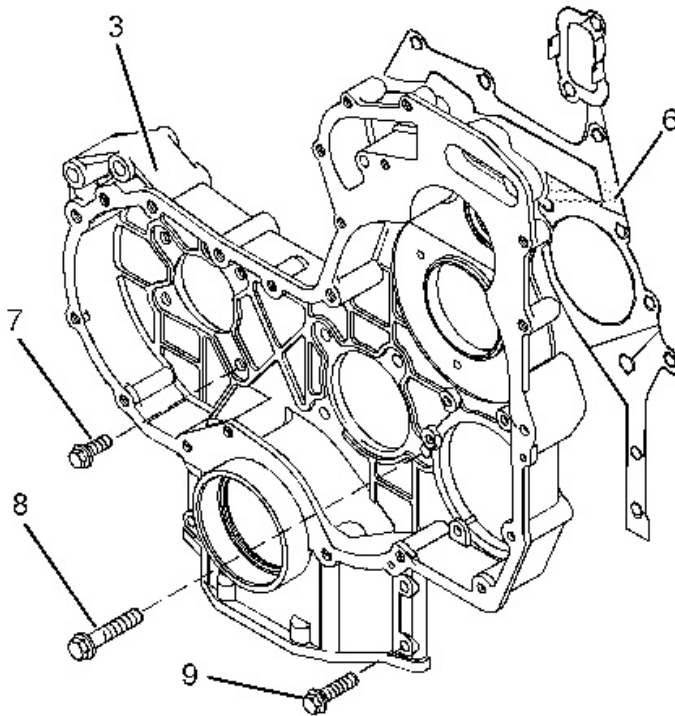
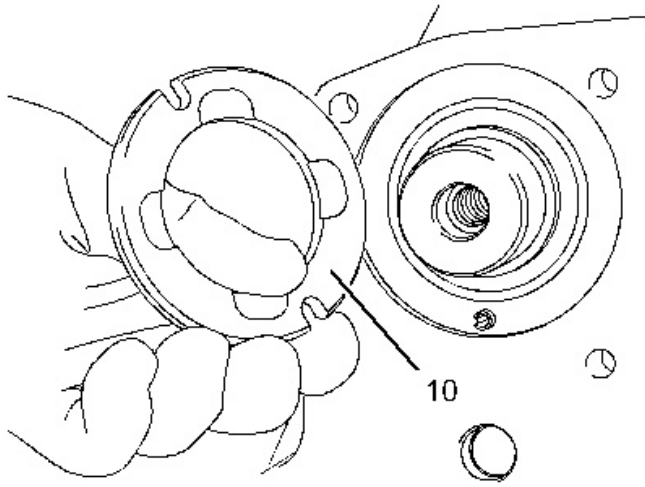


Illustration 2

g01337985

2. Remove bolts (7), (8) and (9) from front housing (3).  
**Note:** The bolts are three different lengths. Note the positions of the different bolts.
3. Remove front housing (3) from the cylinder block.
4. Remove joint (6).



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Illustration 3

g01337987

5. Remove thrust washer (10) from the cylinder block.
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## Disassembly and Assembly C6.6 Engines for Caterpillar Built Machines

Media Number -KENR6081-15

Publication Date -01/03/2014

Date Updated -04/03/2014

i02980900

## Housing (Front) - Install

SMCS - 1151-012

## Installation Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	6V-6640	Sealant	1
B	-	Guide Bolt (M8 by 80 mm)	2
C	319-6486	Alignment Tool	1
	-	Bolts (M10 by 50 mm)	3
D	-	Straight Edge	1
E	1U-6396	O-Ring Assembly Compound	1

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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. Ensure that the front housing is clean and free from damage. If necessary, replace the front housing.  
Install blanking plugs to a new front housing. Use Tooling (A) to seal all D-plugs.
  2. Check the condition of the crankshaft front seal. If the front seal is damaged, remove the front seal from the front housing.
  3. Clean all the mating surfaces of the cylinder block.
-

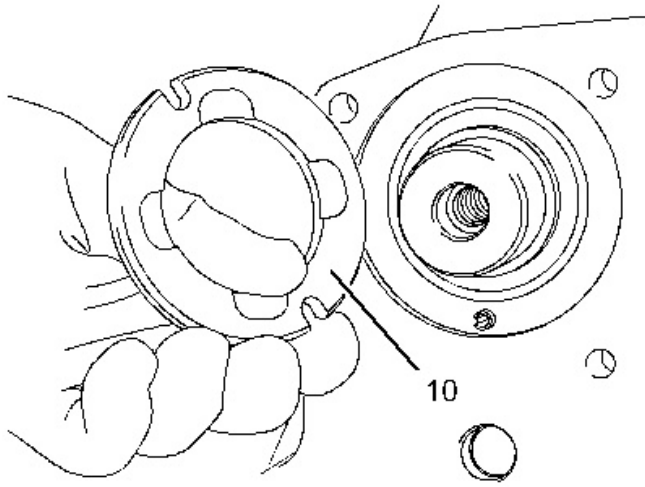


Illustration 1

g01337987

4. Install thrust washer (10) into the recess in the cylinder block. Refer to Disassembly and Assembly, "Camshaft - Install" for more information.

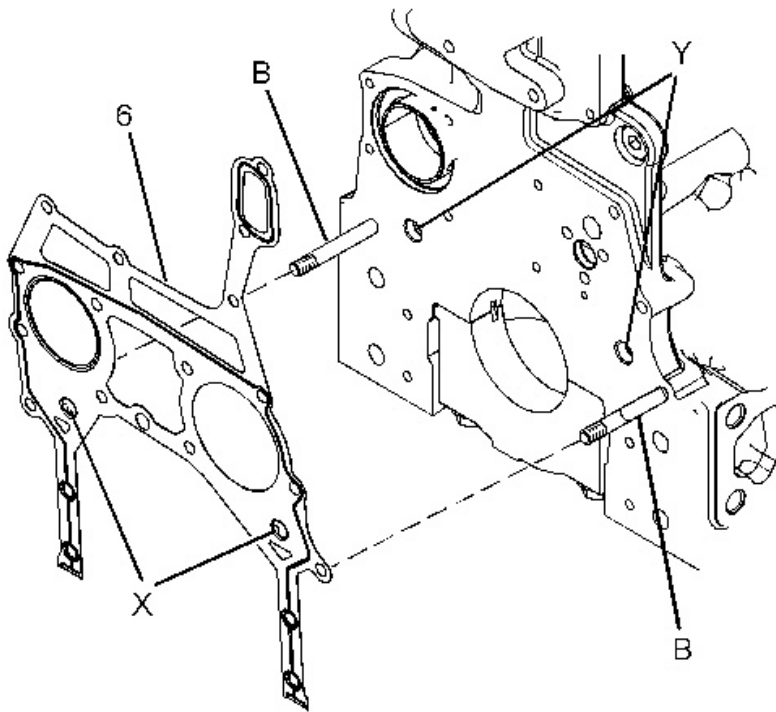


Illustration 2

g01338000

5. Install Tooling (B) to the cylinder block. Refer to Illustration 2.
6. Align a new joint (6) with Tooling (B) . Install the joint to the cylinder block.

**Note:** Ensure that two circular tabs (X) on the joint are engaged in two holes (Y) in the cylinder block.

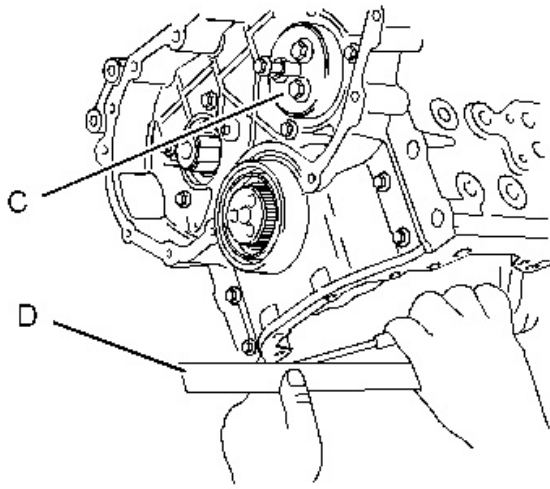


Illustration 3

g01338001

Typical example

7. Install Tooling (C) to the cylinder block.
8. Install the front housing over Tooling (B) and Tooling (C) onto the cylinder block.

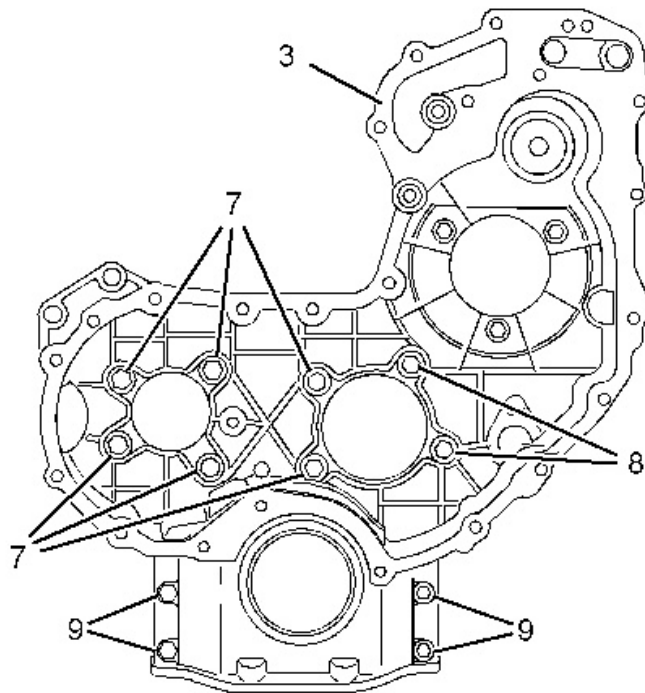


Illustration 4

g01338002

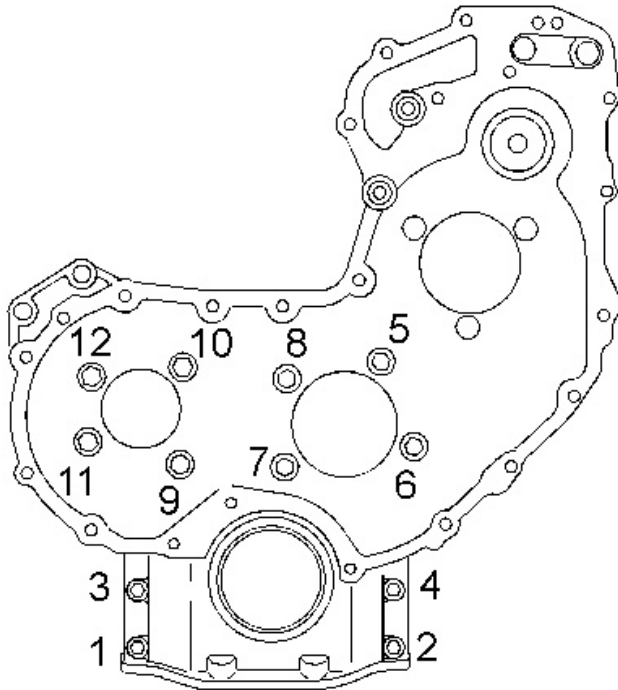
(7) M8 by 20 mm

(8) M8 by 35 mm

(9) M8 by 25 mm

9. Install bolts (9) to front housing (3) finger tight.
10. Remove Tooling (B) .

11. Loosely install bolts (7) and (8) . Refer to Illustration 4 for the correct position of the bolts.
12. Align the bottom face of front housing (3) to the lower machined face of the cylinder block. Use a Tooling (D) and a feeler gauge in order to check the alignment between the front housing and the cylinder block. Refer to Illustration 3. Refer to Specifications, "Front Housing and Covers" for further information.



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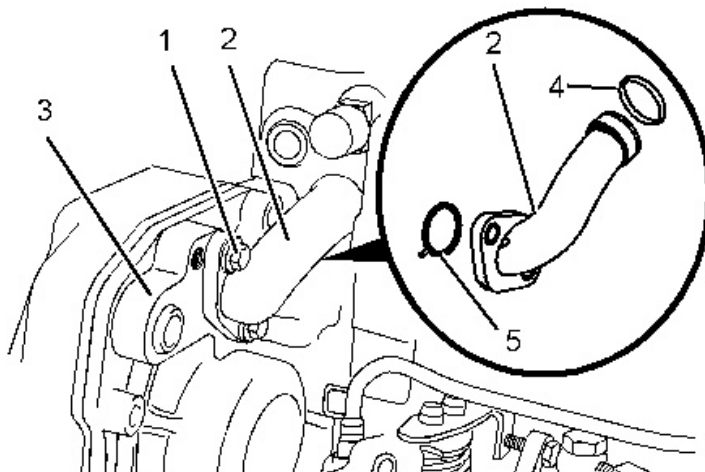
Illustration 5

g01338003

13. Tighten bolts (7) , (8) and (9) in the sequence that is shown in illustration 5 to a torque of 28 N·m (20 lb ft).

**Note:** Ensure that the housing and the cylinder block are correctly aligned.

14. Remove Tooling (C) from the cylinder block.
15. If necessary, install a new crankshaft front seal. Refer to Disassembly and Assembly, "Crankshaft Front Seal - Remove and Install".





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