



Service Repair Manual

Models

320D2 and 320D2 L Excavator

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Product: EXCAVATOR

Model: 320D2 EXCAVATOR GBA

Configuration: 320D2 & 320D2 L Excavators GBA00001-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

i04780457

Fuel Injection Pump Gear - Remove

SMCS - 1251-011

Removal Procedure

Table 1

| Required Tools | | | |
|------------------|-------------|-------------------------|-----|
| Tool | Part Number | Part Description | Qty |
| A ⁽¹⁾ | 9U-7336 | Crankshaft Turning Tool | 1 |
| A ⁽²⁾ | 5P-7305 | 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 | - | Puller (Three Leg) | 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".

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

NOTICE

Keep all parts clean from contaminants.

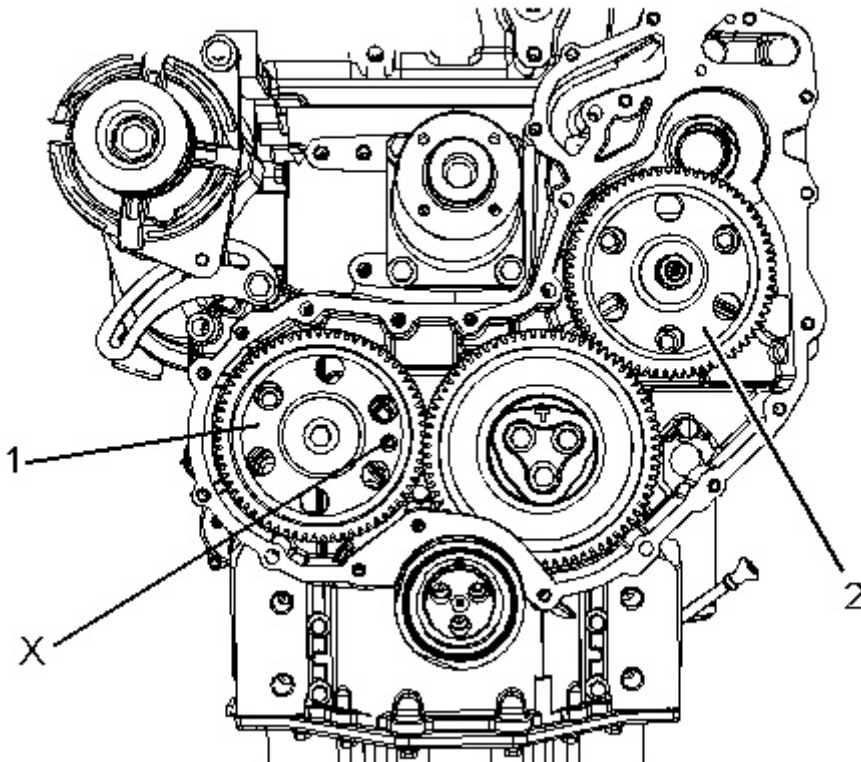
Contaminants may cause rapid wear and shortened component life.

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: 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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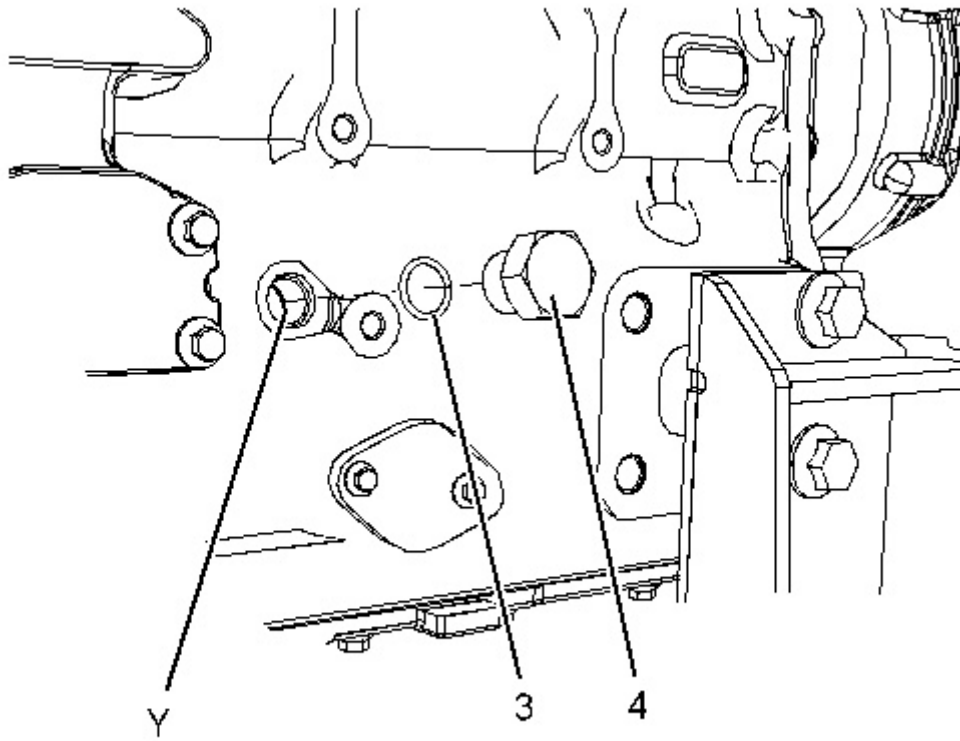


Illustration 2

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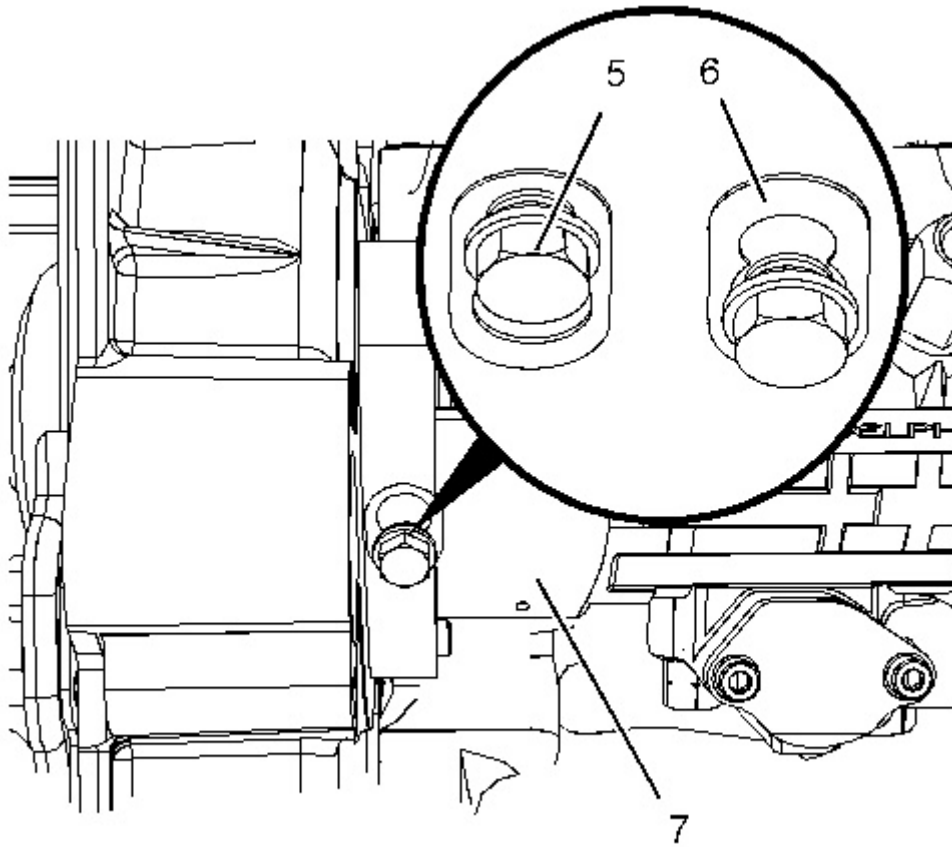


Illustration 3
With Electronic Governor

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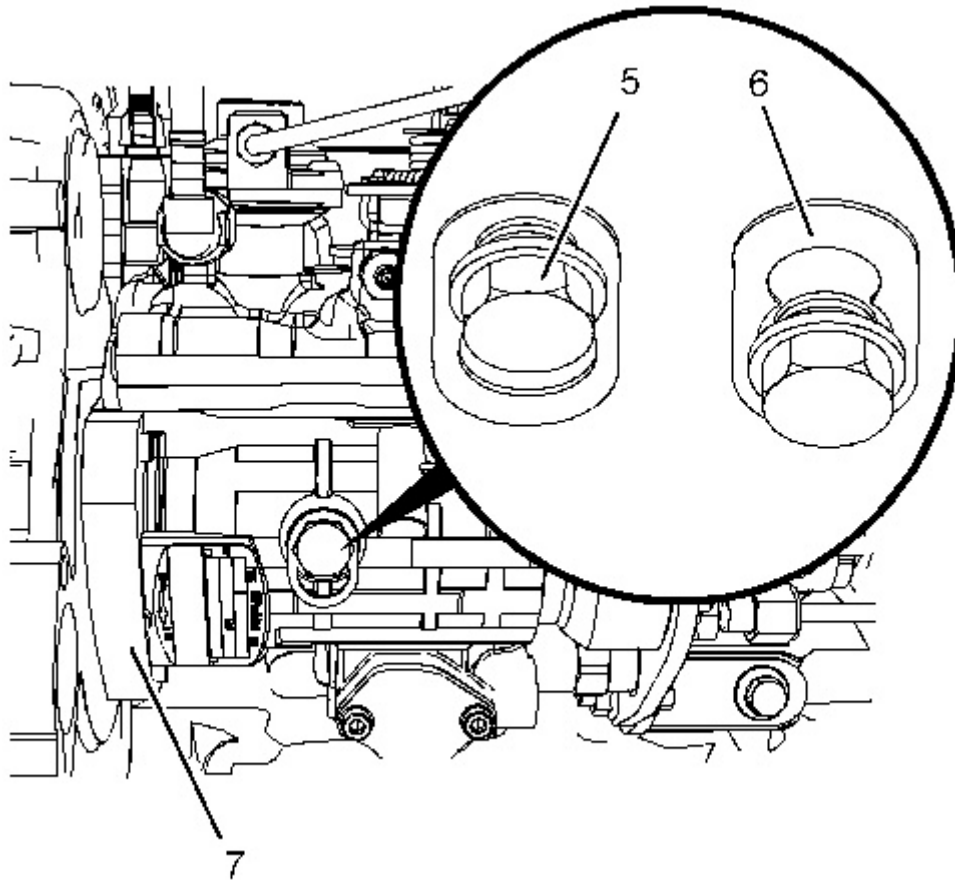


Illustration 4
With Boost Control

g02792627

1. Remove plug (4) from the cylinder block. Remove O-ring seal (3) from plug (4).
 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) through Hole (X) in camshaft gear (1) into the front housing. Use Tooling (B) in order to lock the camshaft in the correct position.
 4. 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.
5. Apply sufficient pressure to fuel injection pump gear (2) in a counterclockwise direction in order to remove the backlash. Lock fuel injection pump (2) in this position.

In order to lock fuel injection pump (7), loosen locking screw (5) in the fuel injection pump. Slide spacer (6) into the locked position. Tighten locking screw (5) against the shaft of the fuel injection pump to a torque of 15 N·m (133 lb in).

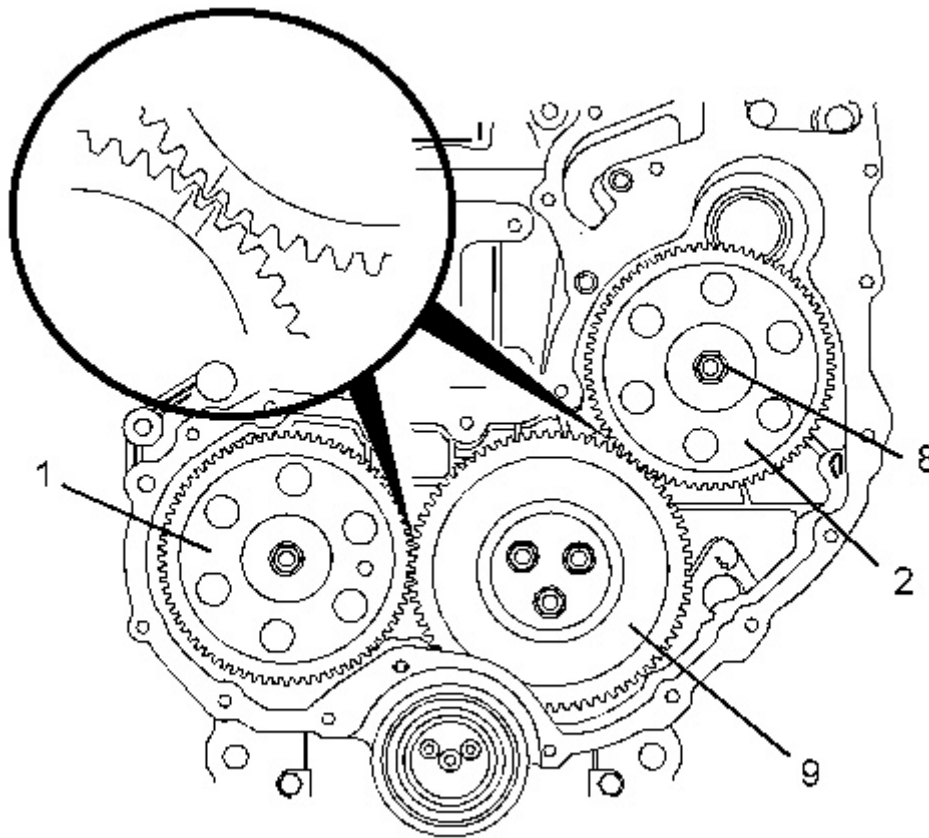


Illustration 5

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6. Mark gear (1), gear (2) and gear (9) in order to show alignment.

Alignment of timing marks

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

7. Loosen nut (8) for the fuel pump gear.
8. Install Tooling (D) through three holes in gear (2). Tighten Tooling (D) until gear (2) is released.
9. Remove Tooling (D) from gear (2).
10. Remove nut (8) and the washer from fuel pump gear (3). Remove the gear (2).

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Product: EXCAVATOR

Model: 320D2 EXCAVATOR GBA

Configuration: 320D2 & 320D2 L Excavators GBA00001-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

i04780456

Fuel Injection Pump Gear - Install

SMCS - 1251-012

Installation Procedure

Table 1

| Required Tools | | | |
|------------------|-------------|-------------------------|-----|
| Tool | Part Number | Part Description | Qty |
| A ⁽¹⁾ | 9U-7336 | Crankshaft Turning Tool | 1 |
| A ⁽²⁾ | 5P-7305 | 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.

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.

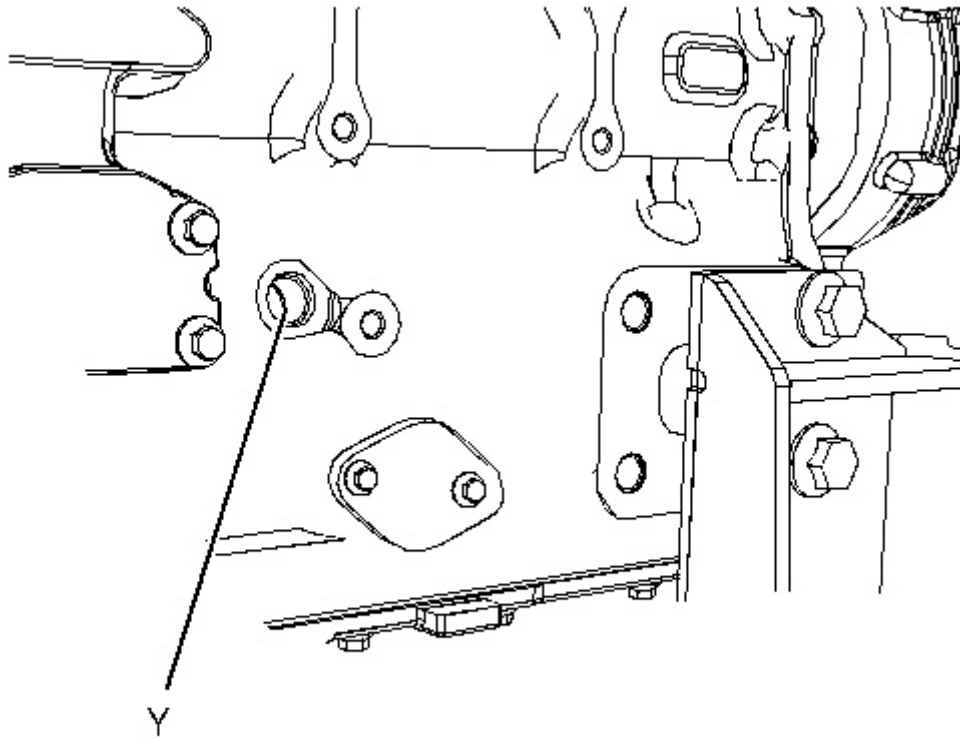


Illustration 1

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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".
 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.
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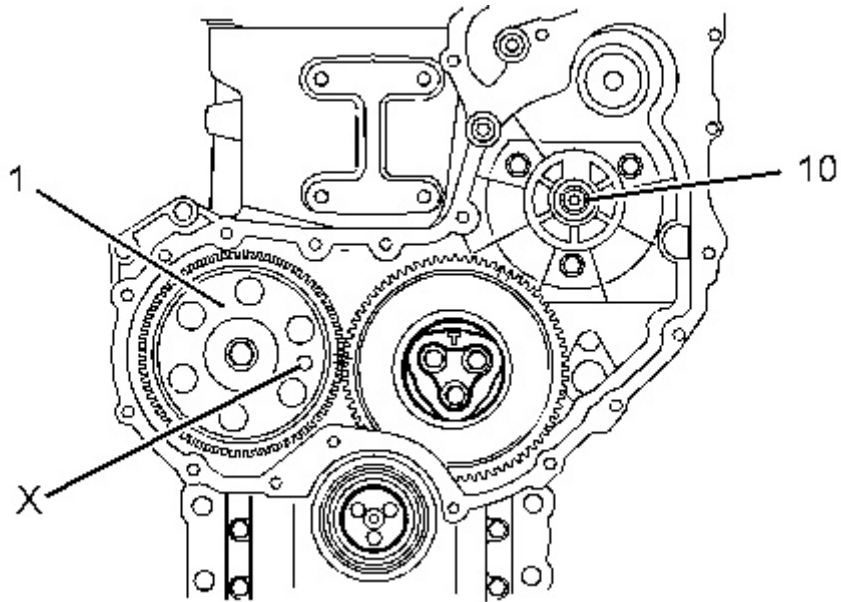


Illustration 2

g02697877

3. Ensure that Tooling (B) is installed into Hole (X) in camshaft gear (1).
 4. Ensure that shaft (10) of the fuel injection pump is clean and free from damage.
 5. Ensure that the fuel injection pump is locked in the correct position. Refer to Disassembly and Assembly, "Fuel Injection Pump - Install".
 6. Ensure that the fuel pump gear is clean and free from wear or damage. If necessary, replace the fuel pump gear.
-

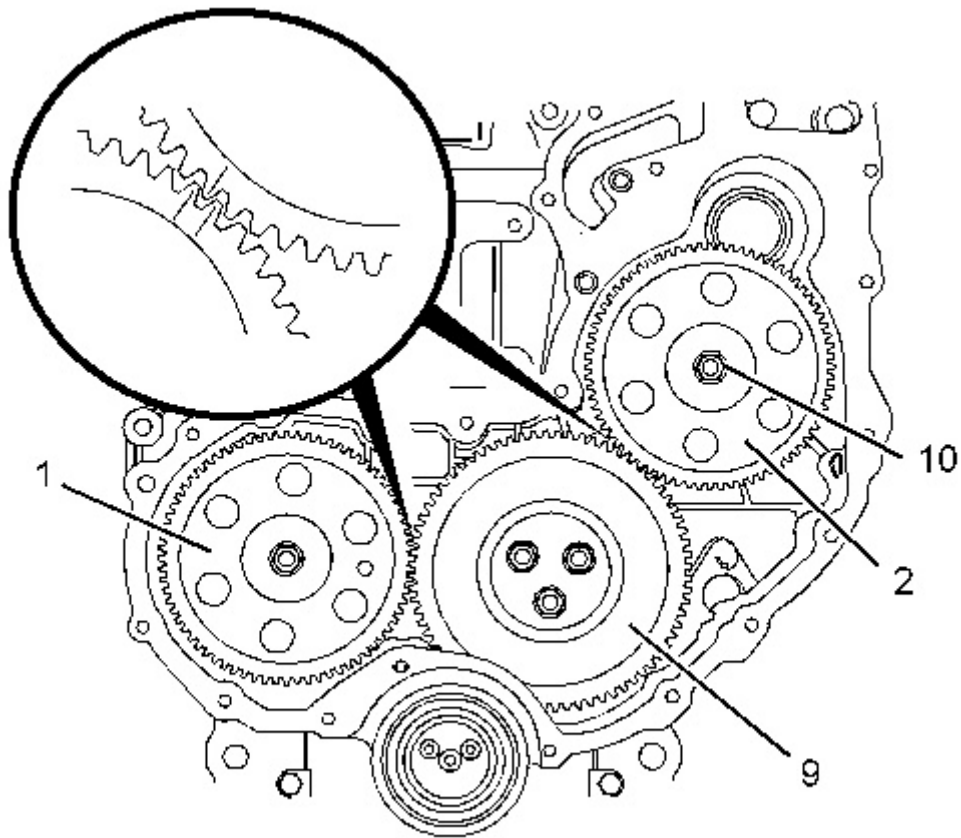


Illustration 3

g02698099

7. Install fuel pump gear (2) to shaft (10) of the fuel injection pump. Ensure that the timing marks on gear (1), gear (2), and gear (9) are in alignment and that the mesh of the gears is correct.
-

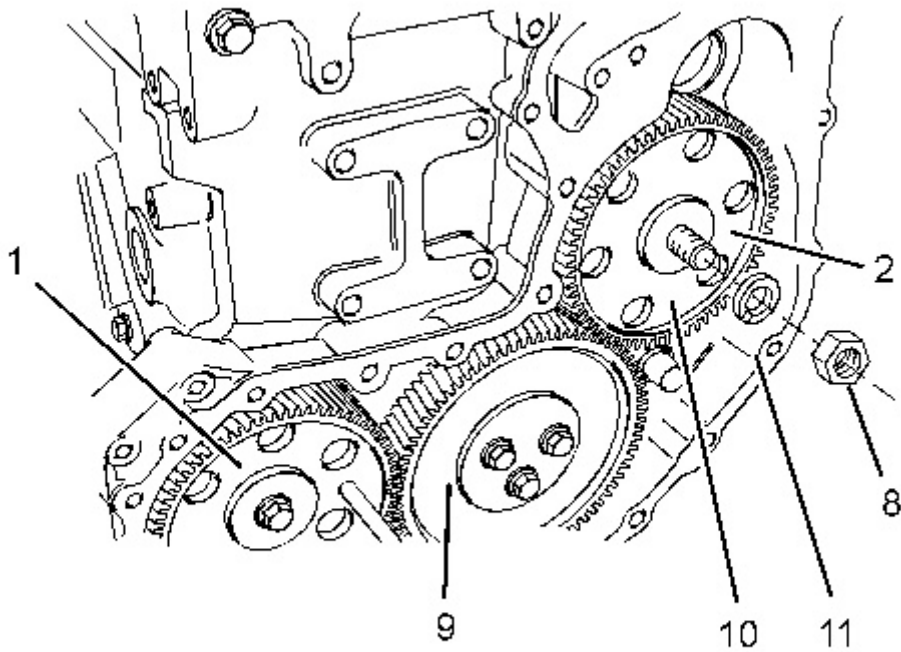


Illustration 4

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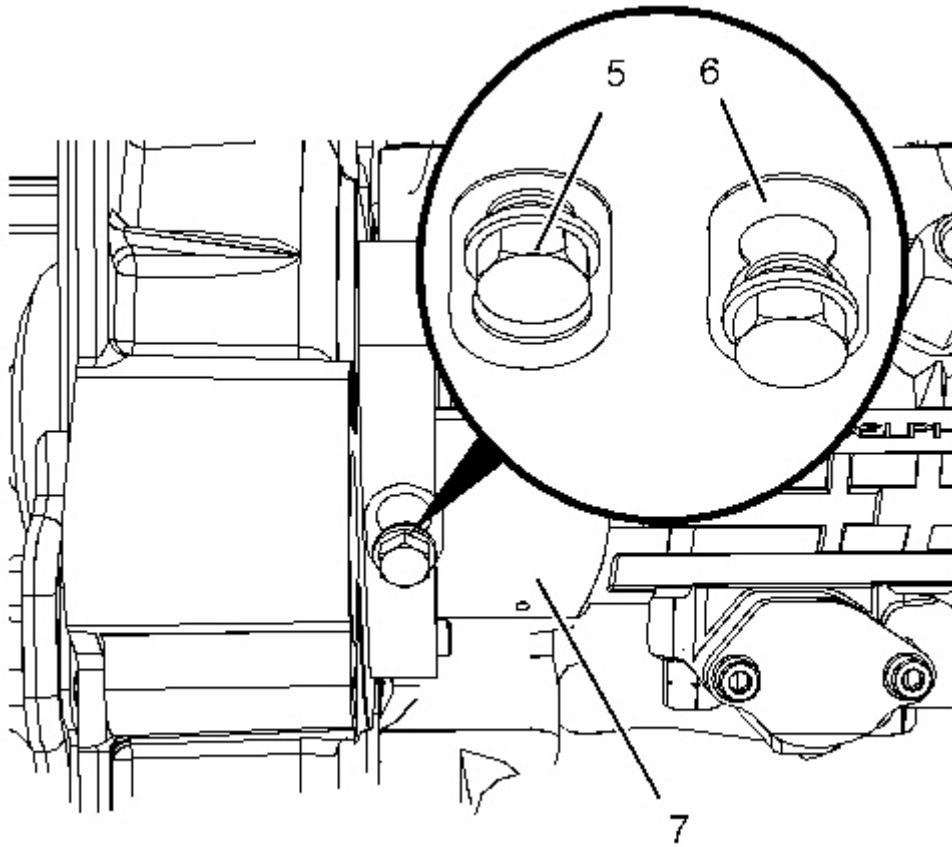


Illustration 5
With Electronic Governor

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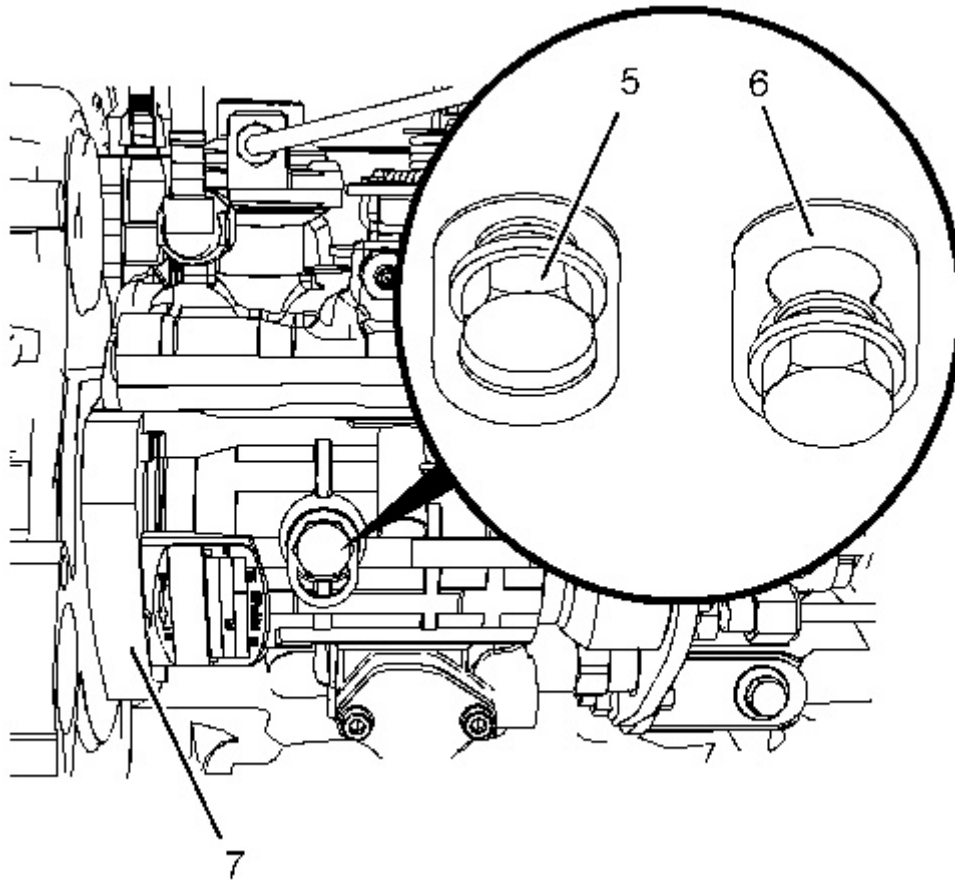


Illustration 6
With Boost Control

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8. Install a new spring washer (11) and install nut (8) to shaft (10) of the fuel injection pump. Apply sufficient pressure to fuel injection pump gear (2) in a counterclockwise direction in order to remove the backlash. Tighten nut (8) to a torque of 24 N·m (212 lb in).
 9. In order to unlock fuel injection pump (7), loosen locking bolt (5) in the fuel injection pump. Slide spacer (6) into unlock position. Tighten locking bolt (5) against the spacer to a torque of 12 N·m (106 lb in). The spacer will prevent the locking bolt from tightening against the shaft of the fuel injection pump.
 10. Remove Tooling (B) and Tooling (C).
 11. Tighten nut (8) to a torque of 90 N·m (66 lb ft).
 12. Ensure that the backlash for gear (1), gear (2) and gear (9) is within specified values. Refer to the Specifications, "Gear Group (Front)" for further information.
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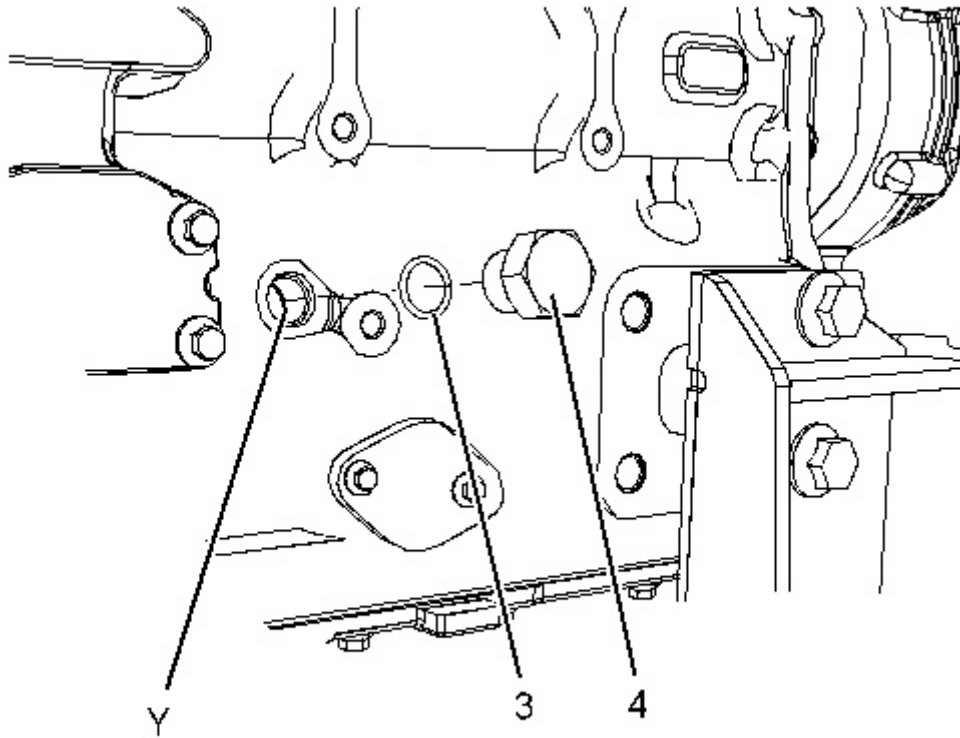


Illustration 7

g02695979

13. Install a new O-ring seal (3) to plug (4). Install plug (4) to the cylinder block. Tighten plug (4) to a torque of 21 N·m (186 lb in).
14. Lubricate the teeth of the gears with clean engine oil.

End By:

- a. Install the front cover. Refer to Disassembly and Assembly, "Front Cover - Remove and Install".

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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

i07432260

Fuel Injector - Remove

SMCS - 1290-011

Removal Procedure

Table 1

| Required Tools | | | |
|----------------|-------------|---------------------------------|-----|
| Tool | Part Number | Part Description | Qty |
| A | - | Laser 4044 Fuel Injector Puller | 1 |
| B | 422-7170 | Capping Kit | 1 |

Start By:

- a. Remove the fuel injection lines.

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.

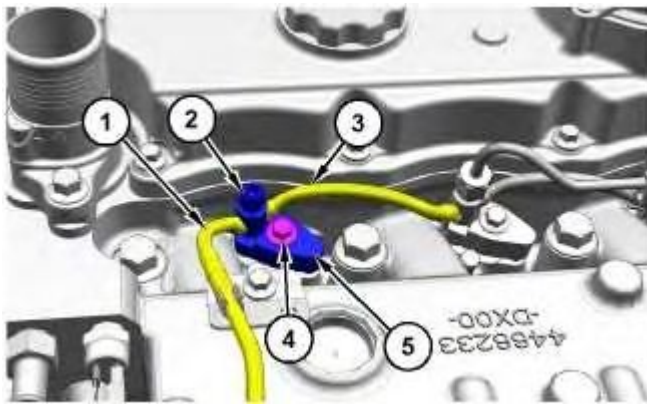


Illustration 1

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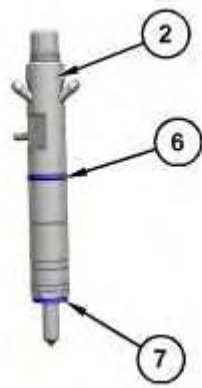


Illustration 2

g06327655

1. Disconnect hose assembly (1) and hose (3) from fuel injector (2).
 2. Use Tooling (B) to plug fuel injector (2).
 3. Remove bolt (4) and clamp (5) from fuel injector (2).
 4. Use Tooling (A) to remove fuel injector (2) from the cylinder head. Remove fuel injector (2).
 5. Remove O-ring seal (6) and seat washer (7) from fuel injector (2).
 6. If necessary, repeat Step 1 through Step 5 to remove the remaining fuel injectors.
-

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Product: EXCAVATOR

Model: 320D2 EXCAVATOR GBA

Configuration: 320D2 & 320D2 L Excavators GBA00001-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

i07432337

Fuel Injector - Install

SMCS - 1290-012

Installation Procedure

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

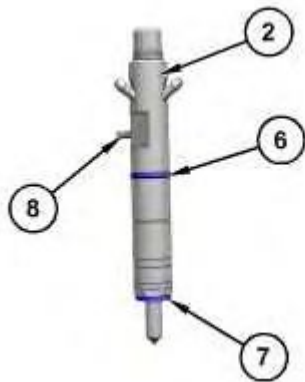


Illustration 1

g06321483

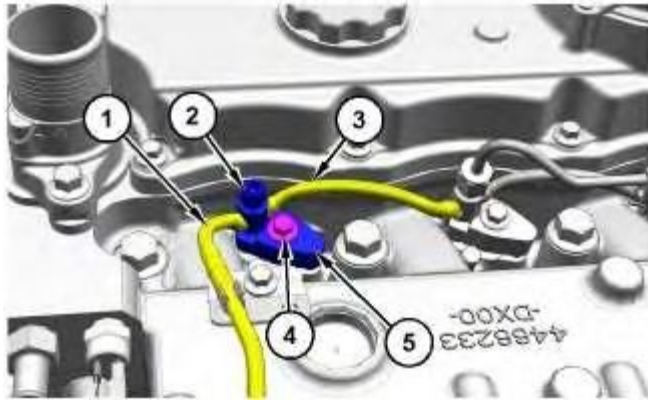


Illustration 2

g06321454

1. Ensure that the seat for fuel injector (2) in the cylinder head and fuel injector (2) is clean and free from damage.
2. On installing original fuel injector (2), install a new O-ring seal (6) and a new sealing washer (7) to fuel injector (2).

On installing a new fuel injector, ensure that O-ring seal (6) and sealing washer (7) are not damaged and are in place.

Note: Do not lubricate the O-ring seal.

3. Position clamp (5) onto fuel injector (2). Install fuel injector (2) into the cylinder head.

Note: Ensure that alignment Pin (8) is located opposite to clamp (5).

4. Install bolt (4) finger tight.
5. Tighten bolt (4) to a torque of 27 N·m (239 lb in).
6. Remove caps from fuel injector (2).
7. Connect hose assembly (1) and hose (3) to fuel injector (2).
8. If necessary, repeat Step 1 through Step 7 to install the remaining fuel injector.

End By:

- a. Install the fuel injection lines.

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Product: EXCAVATOR

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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

i04780487

Turbocharger - Remove - Side Mounted Turbocharger

SMCS - 1052-011

Removal 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: Plug and cap all open ports and tube assemblies.

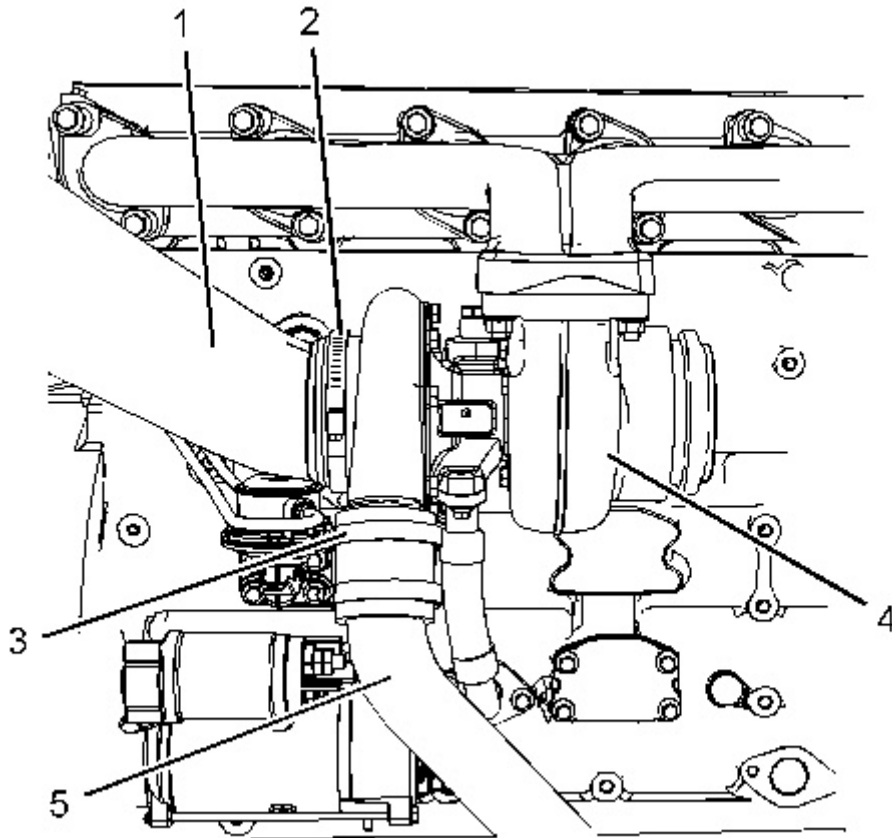


Illustration 1

g02719460

1. Loosen hose clamp (2) and disconnect hose assembly (1) from turbocharger (4).
 2. Loosen hose clamp (3) and disconnect tube assembly (5) from turbocharger (4).
 3. If necessary, remove the hose assembly from the wastegate actuator on the turbocharger.
 4. Remove the exhaust out tube assembly from the turbocharger, refer to the Original Equipment Manufactures (OEM) for the correct procedure.
 5. If necessary, remove the exhaust elbow. Refer to Disassembly and Assembly, "Exhaust Elbow - Remove and Install" for the correct procedure.
-

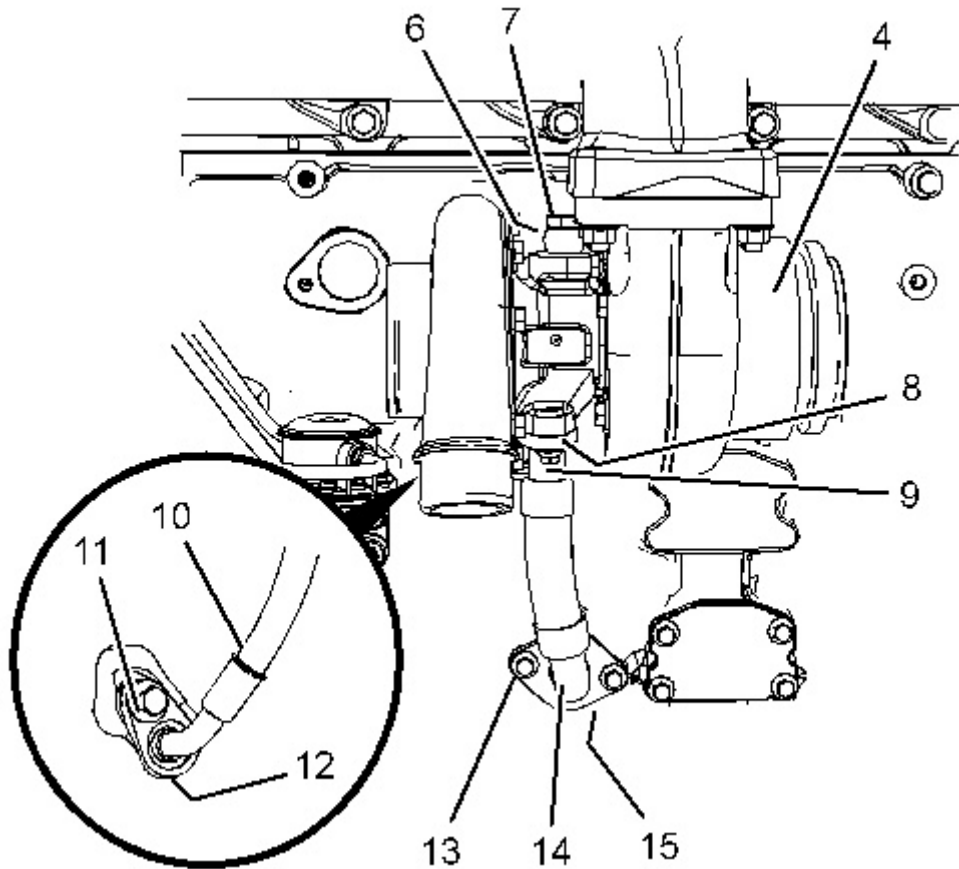


Illustration 2

g02719476

6. Remove banjo bolt (7) from tube assembly (10). Remove sealing washers (6) (not shown).
 7. Remove bolt (11) from tube assembly (10). Remove tube assembly (10) from turbocharger (4) and the cylinder block.
 8. Remove O-ring seal (12) (not shown) from tube assembly (10).
 9. Remove bolts (9) from tube assembly (14). Remove bolts (13) from tube assembly (14).
 10. Remove tube assembly (14) from turbocharger (4) and the cylinder block.
 11. Remove gasket (8) (not shown) and gasket (15) (not shown).
-

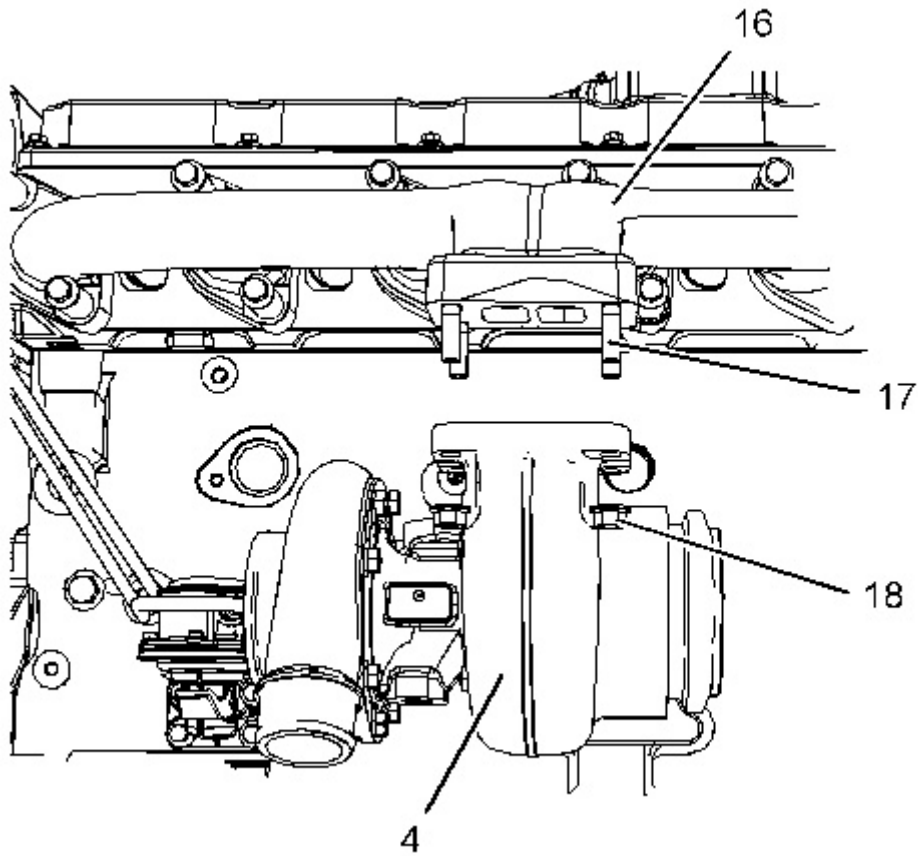


Illustration 3

g02719461

12. Remove nuts (18) from turbocharger (4). Remove turbocharger (4) from exhaust manifold (16).

Note: Ensure that the weight of the turbocharger is supported as the nuts are removed.

13. If necessary, remove studs (17) from exhaust manifold (16).

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Model: 320D2 EXCAVATOR GBA

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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

i04780488

Turbocharger - Remove - Turbocharger Top Mounted

SMCS - 1052-011

Removal 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: Plug and cap all open ports and tube assemblies.

1. Loosen the hose clamps and disconnect the hose assembly from the turbocharger inlet.
2. Loosen the hose clamps and disconnect the hose assembly from the turbocharger outlet.
3. If necessary, remove the hose assembly from the wastegate actuator on the turbocharger.

4. Remove the exhaust out tube assembly from the turbocharger, refer to the Original Equipment Manufactures (OEM) for the correct procedure.
 5. If necessary, remove the exhaust elbow. Refer to Disassembly and Assembly, "Exhaust Elbow - Remove and Install" for the correct procedure.
-

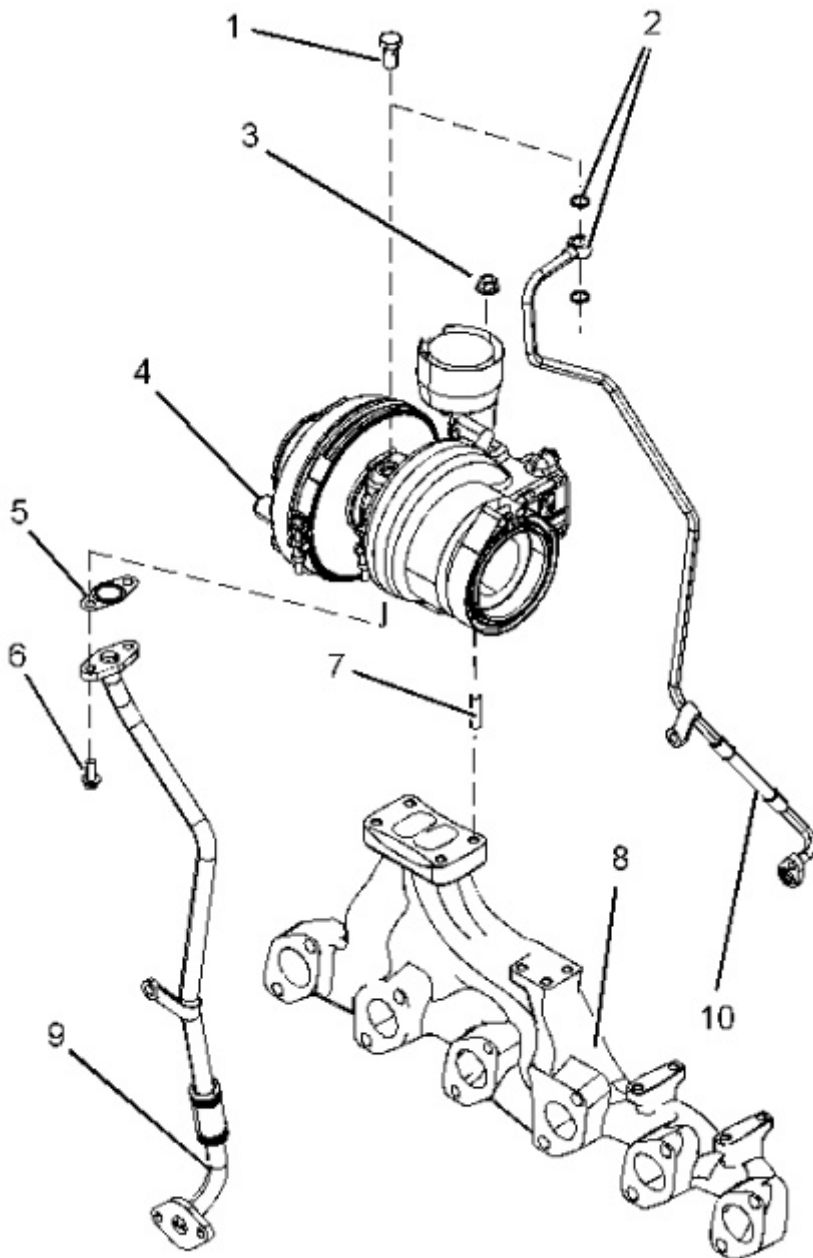


Illustration 1
Typical example

g02790856

6. Remove banjo bolt (1) and remove sealing washers (2) from tube assembly (10).
7. Remove bolts (6) from tube assembly (9). Remove gasket (5).



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8. Remove the tube clamps from tube assembly (9) and tube assembly (10). Position tube assembly (10) away from turbocharger (4).
 9. Remove nuts (3) from turbocharger (4).
 10. Remove turbocharger (4) from exhaust manifold (8).
 11. If necessary, remove studs (7) from exhaust manifold (8).
-

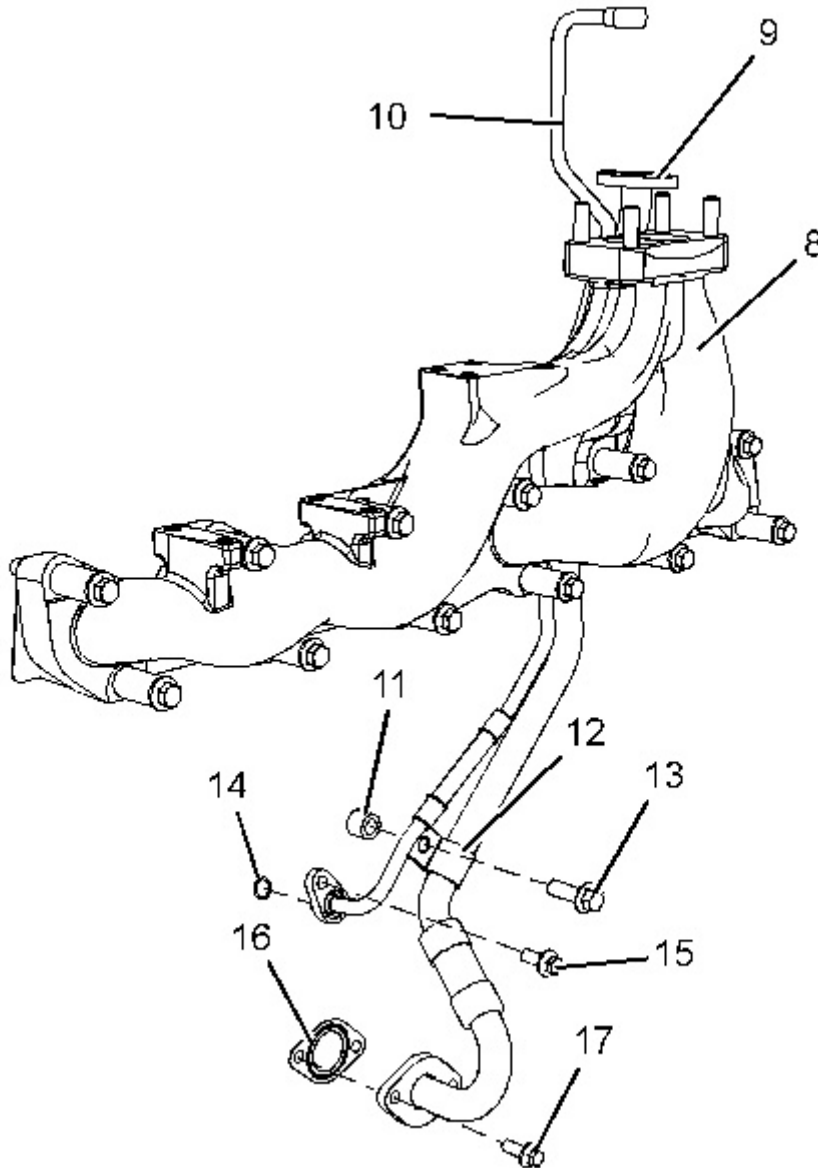


Illustration 2
Typical example

g02790880

12. In order to remove tube assembly (9) and tube assembly (10) the removal of exhaust manifold (8) will be necessary.
13. Remove bolt (13) from tube clips (12) and remove spacer (11).

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