

Product: BACKHOE LOADER

Model: 416F2 BACKHOE LOADER LYA

Configuration: 416F2 Center Pivot Backhoe Loader LYA00001-UP (MACHINE) POWERED BY C4.4 Engine

## Disassembly and Assembly

### 416F2, 420F2 IT, 420F2 ST, 422F2, 428F2, 430F2 IT, 430F2 ST, 432F2, 434F2 and 444F2 Backhoe Loaders Engine Supplement

Media Number -UENR6152-01

Publication Date -01/06/2015

Date Updated -06/06/2018

i06199414

## Engine - Install

SMCS - 1000-012

## Installation Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	1U-7505	Hydraulic Jack	1
B	6V-3145	Load Leveling Beam	1

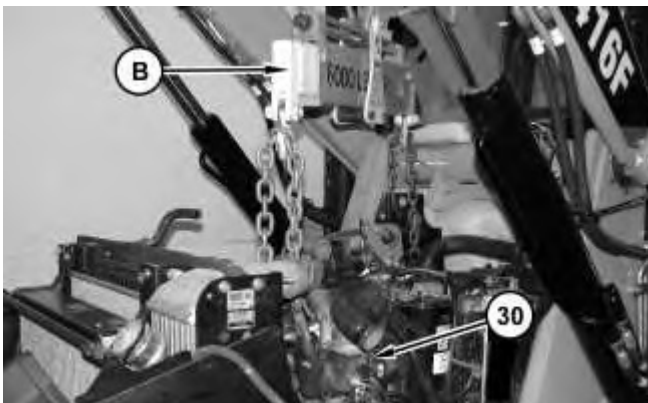


Illustration 1

g03849495

1. Attach Tooling (B) and a suitable lifting device to engine (30). The weight of engine (30) is approximately 544kg (1200 lb). Use Tooling (B) and the suitable lifting device to position engine (30) into the machine.

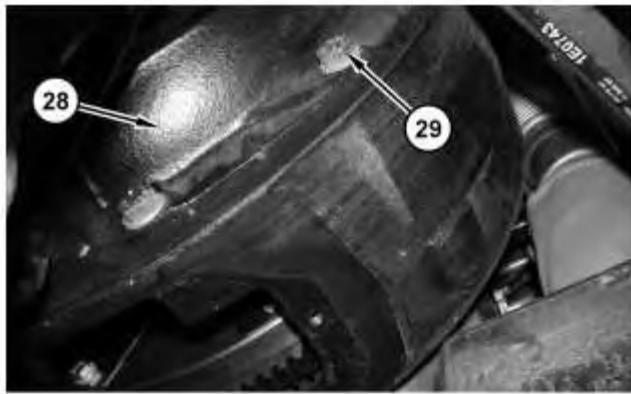


Illustration 2

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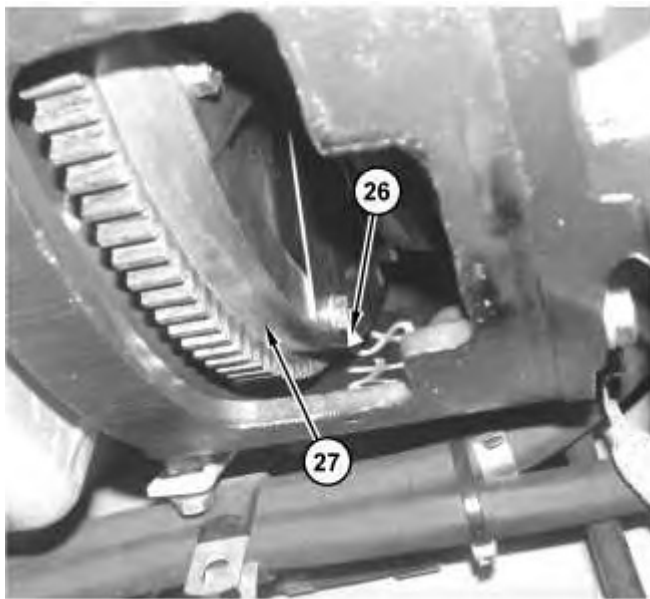


Illustration 3

g03849257

2. Align bell housing (28) to the engine and install bolts (29).
3. Rotate the engine and install bolts (26) in order to connect flywheel (27) to the torque converter.



4. Install engine mounting bolts (31). Repeat on opposite side.

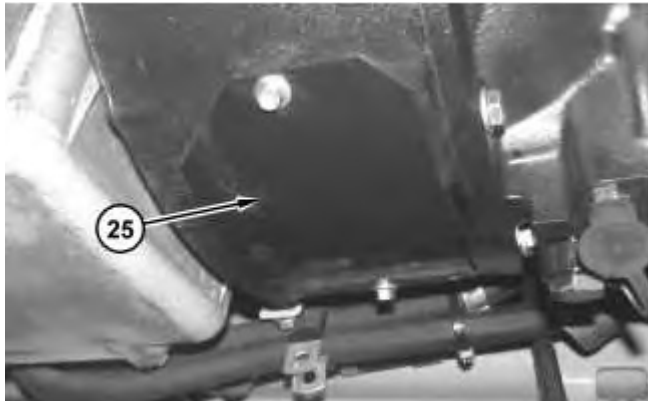


Illustration 5

5. Install access panel (25).

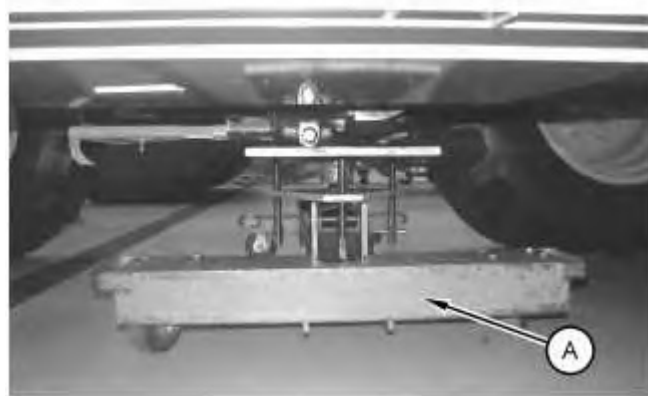


Illustration 6

6. Remove Tooling (A) from the transmission.

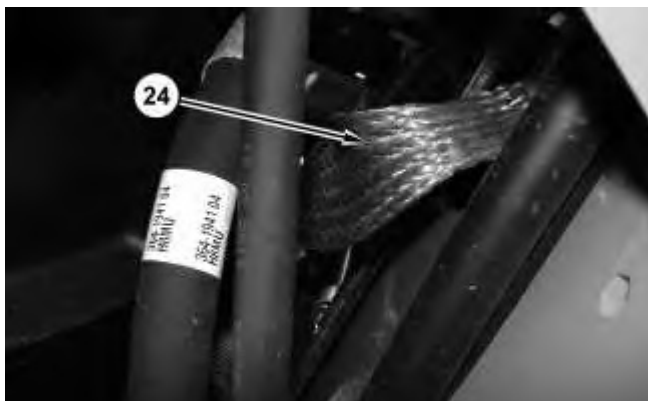


Illustration 7

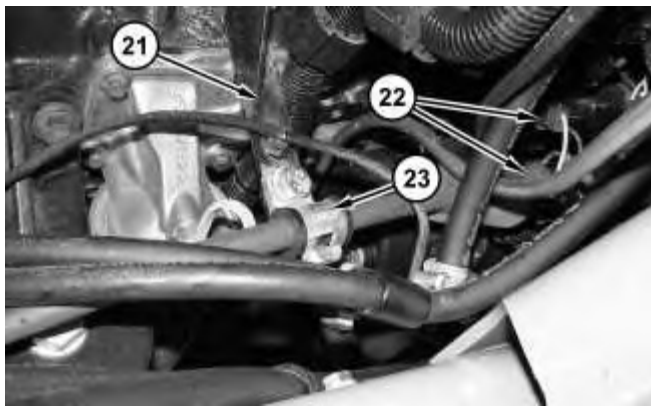


Illustration 8

g03849240

7. Connect ground strap (24). Connect harness assemblies (21) to the electric starting motor. Connect clip (22) to bracket (23).

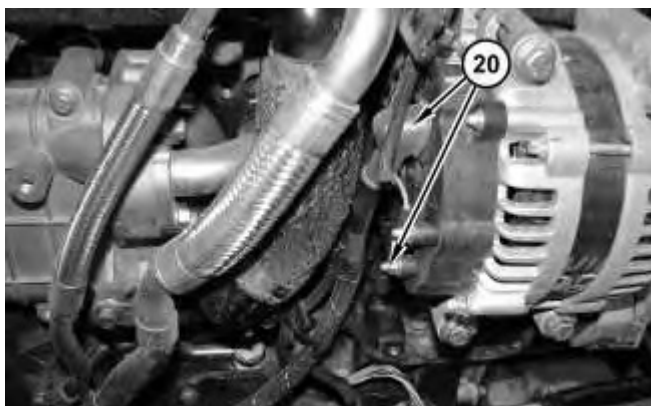


Illustration 9

g03849221

8. Connect harness assemblies (20) to the alternator.



Illustration 10

g03849219

9. Position air conditioner compressor (19) on the engine and install bolts (18).

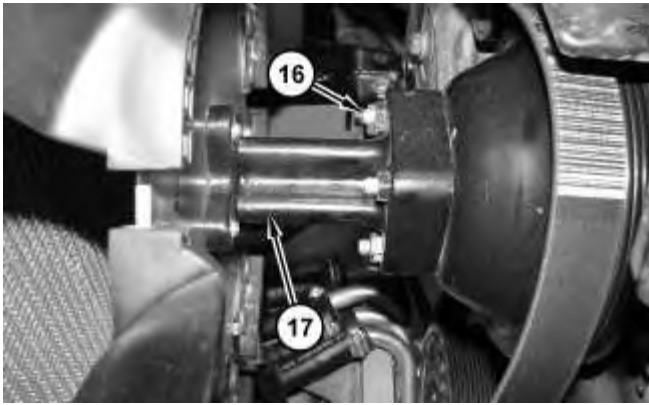


Illustration 11

g03849206

10. Install fan and hub assembly (17). Install nuts (16).

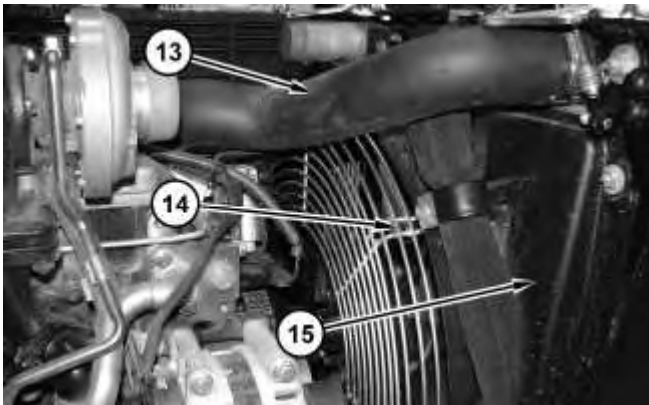


Illustration 12

g03849203

11. Install fan shroud (15). Install fan guard (14). Install hose (13).

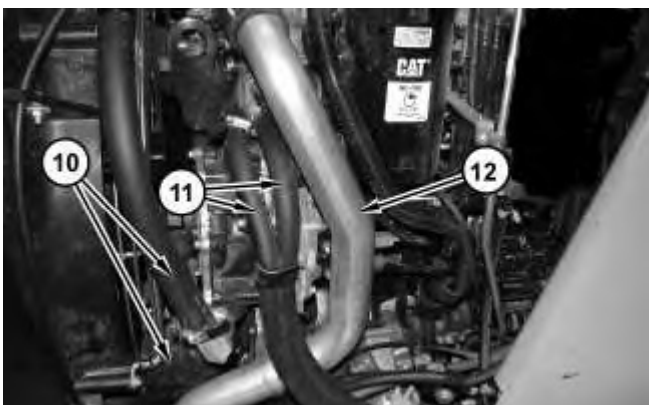


Illustration 13

g03849201

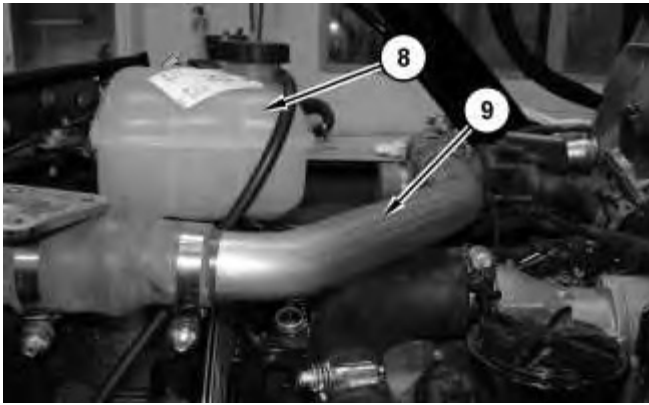


Illustration 14

g03849199

12. Install tube (12). Install hoses (10) and (11).
13. Install tube (9). Install coolant tank (8).



Illustration 15

g03797235

14. Install fuel filter assembly (7).

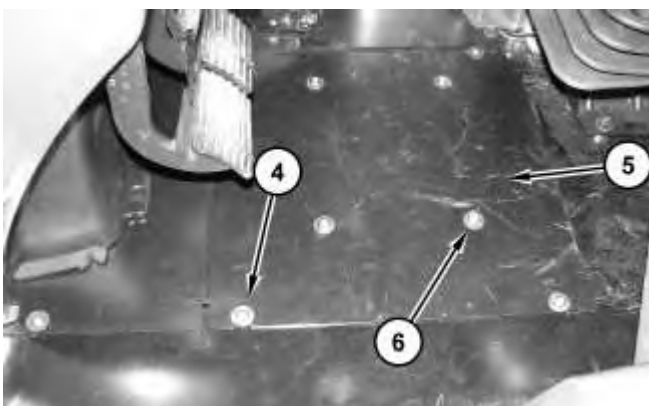


Illustration 16

g03797205

15. Install plate assembly (5). Install bolts (4).

**Note:** Do not remove bolts (6).

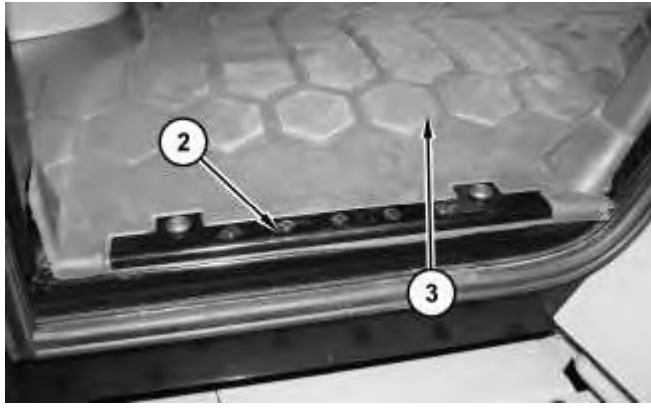


Illustration 17

g03797188

16. Position floor mat (3). Position plate (2) and install the bolts . Repeat on the opposite side of the cab.

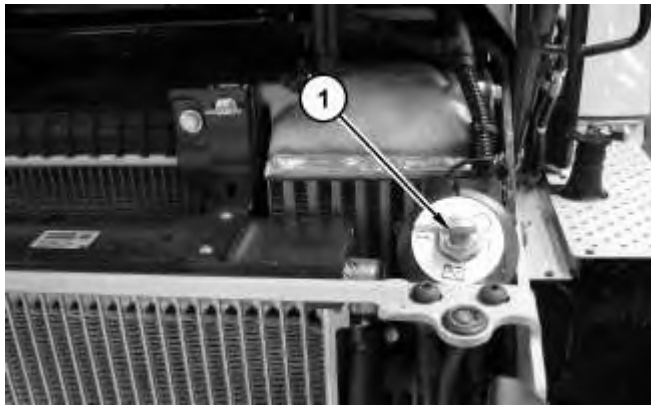


Illustration 18

g03797183

17. Turn battery disconnect switch (1) to the ON position.
18. Fill the coolant. Refer to Operation and Maintenance Manual, "Cooling System Coolant (ELC) - Change" for the correct filling procedure.
19. Fill the engine oil . Refer to Operation and Maintenance Manual, "Engine Oil and Filter - Change" for the correct filling procedure.

**End By:**

- a. Install air cleaner.
  - b. Install muffler.
  - c. Install hood assembly.
  - d. Install side panels.
-

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Configuration: 416F2 Center Pivot Backhoe Loader LYA00001-UP (MACHINE) POWERED BY C4.4 Engine

## Disassembly and Assembly 3054C Engines for Caterpillar Built Machines

Media Number -SEN5069-18

Publication Date -01/05/2015

Date Updated -19/09/2018

i02289796

# Fuel Priming Pump and Fuel Filter Base - Remove and Install

SMCS - 1258-010; 1260-010; 1261-010-SE; 1262-010

## Removal Procedure

Table 1

Required Tools <sup>(1)</sup>			
Tool	Part Number	Part Description	Qty
ZZ	9U-7069	Cap	3
	9U-7067	Cap	3

<sup>(1)</sup> SERVICE DATA: TOOLING (ZZ) WILL NOT BE IDENTIFIED IN PHOTOGRAPHS IN THE REMOVAL OR THE INSTALLATION. THIS TOOLING IS SHOWN IN ORDER TO ASSIST THE EXPERIENCED SERVICEMAN.

### Start By:

- a. Remove the assembly of the filter case and the fuel filter element. Refer to this Disassembly and Assembly Manual, "Fuel Filter Base - Remove and Install".

**Note:** Put identification marks on all fuel hose assemblies and on all tube assemblies for installation purposes. After being disconnected, plug all fuel hose assemblies and plug all tube assemblies. This helps prevent fluid loss, and this helps to keep contaminants from entering the system.

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## NOTICE

**Keep all parts clean from contaminants.**

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



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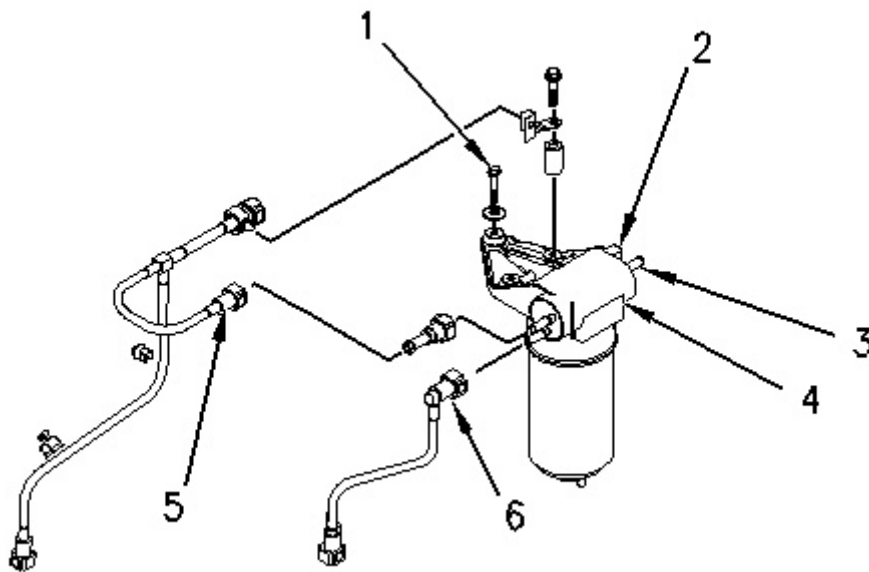
## NOTICE

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.

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.

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Illustration 1

g00952432

Typical example

1. Disconnect the tube assembly (5). Disconnect the tube assembly (6). Install dust covers onto the connectors for the fuel priming pump.
2. Disconnect the fuel return line from the connector (3). Install a dust cover to the connector (3).
3. Disconnect the harness assembly from the connector (2).
4. Support the fuel priming pump. Remove the three setscrews (1) and discard the rubber washers. Remove the fuel priming pump (4).

# Installation Procedure

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## NOTICE

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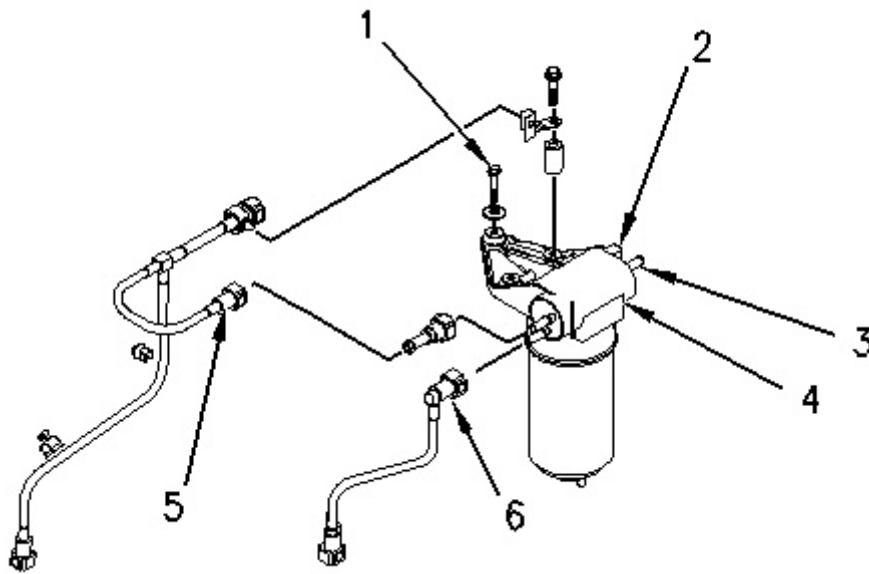


Illustration 2

g00952432

Typical example

1. Clean the external surfaces of the fuel priming pump (4). Position the fuel priming pump (4) and install the setscrews (1) and new rubber washers.
  2. Remove the dust covers from the fuel priming pump. Remove the plugs from the tube assemblies. Connect the tube assembly (5). Connect the tube assembly (6).
  3. Connect the fuel return line to the connector (3).
  4. Connect the harness assembly to the connector (2).
  5. Remove the air from the fuel system. Refer to the Operations and Maintenance Manual, "Fuel System - Prime".
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## Disassembly and Assembly 3054C Engines for Caterpillar Built Machines

Media Number -SEN5069-18

Publication Date -01/05/2015

Date Updated -19/09/2018

i01924034

# Fuel Injection Lines - Remove and Install

SMCS - 1252-010

## Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
ZZ	9U-7067	Cap	4
	9U-7069	Cap	4

**Note: SERVICE DATA: TOOLING (ZZ) WILL NOT BE IDENTIFIED IN PHOTOGRAPHS IN THE REMOVAL OR THE INSTALLATION. THIS TOOLING IS SHOWN IN ORDER TO ASSIST THE EXPERIENCED SERVICEMAN.**

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### NOTICE

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### NOTICE

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**before opening any compartment or disassembling any component containing fluids.**

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**Dispose of all fluids according to local regulations and mandates.**

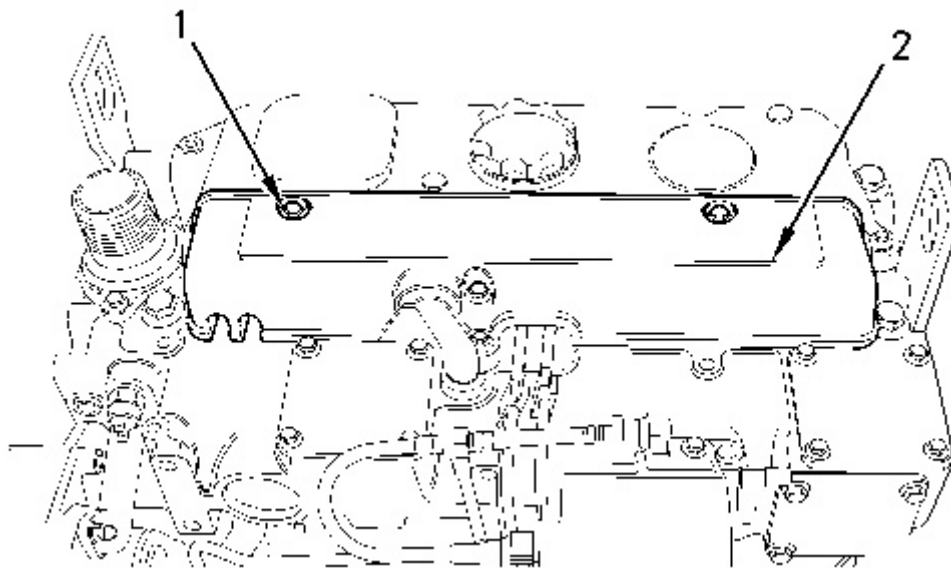
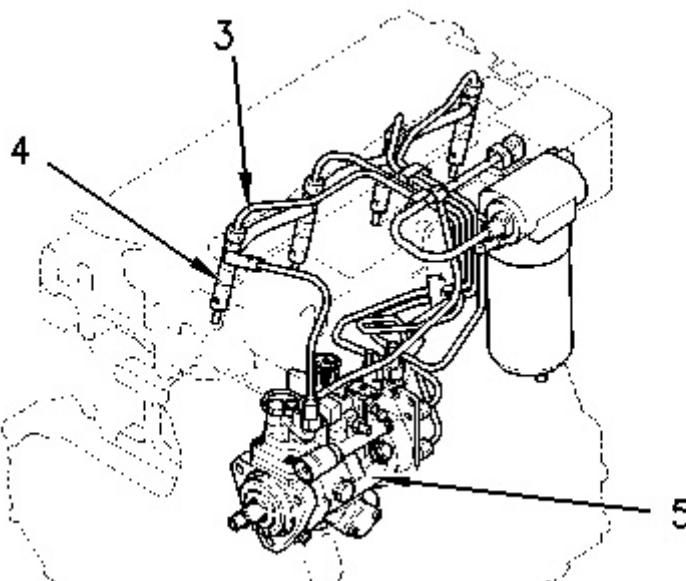


Illustration 1

g01001306

1. Remove bolts (1). Remove cover (2) from the cylinder head.



2. Disconnect fuel injection lines (3) at fuel injection nozzles (4).
3. Disconnect fuel injection lines (3) at fuel injection pump (5).
4. Remove the fuel injection lines.

## Installation Procedure

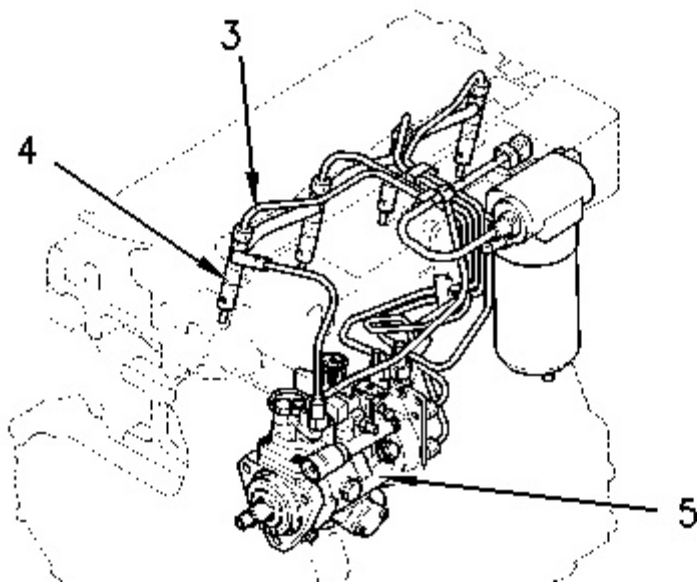
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### NOTICE

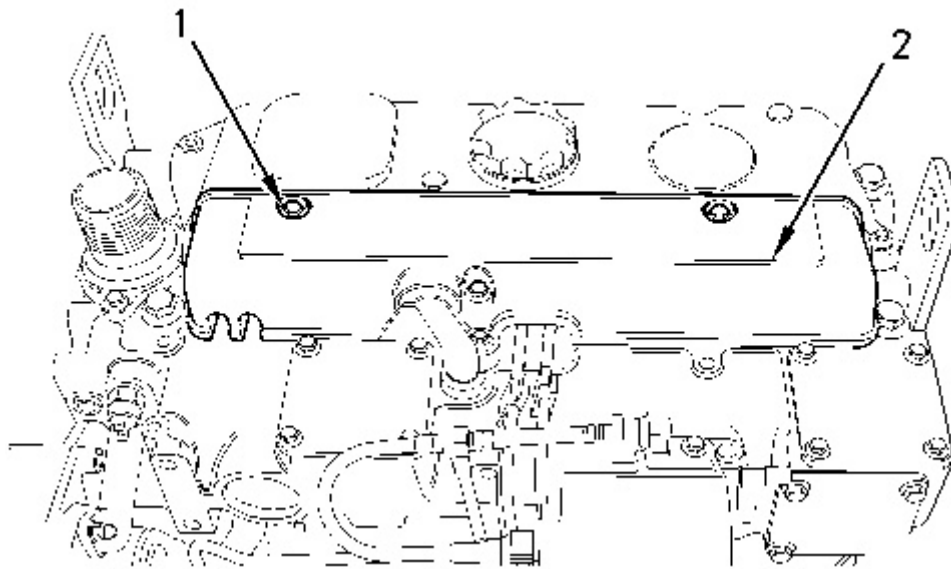
**Keep all parts clean from contaminants.**

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

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1. Connect fuel injection lines (3) at fuel injection nozzles (4). Tighten the nut to 30 N·m (22 lb ft).
  2. Connect the fuel injection lines at fuel injection pump (5). Tighten the nut to 30 N·m (22 lb ft).
  3. Remove the air from the fuel system. Refer to Operations and Maintenance Manual, "Fuel System - Prime".
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Illustration 4

g01001306

4. Position cover (2) on the cylinder head. Install bolts (1). Tighten the bolts to a torque of 9 N·m (80 lb in).
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## **Disassembly and Assembly 3054C Engines for Caterpillar Built Machines**

Media Number -SEN5069-18

Publication Date -01/05/2015

Date Updated -19/09/2018

i01878115

# **Fuel Injection Nozzles - Remove**

SMCS - 1254-011

## **Removal Procedure**

### **Start By:**

- a. Remove the fuel injection lines. Refer to Disassembly and Assembly, "Fuel Injection Lines - Remove and Install".

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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**

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**Dispose of all fluids according to local regulations and mandates.**

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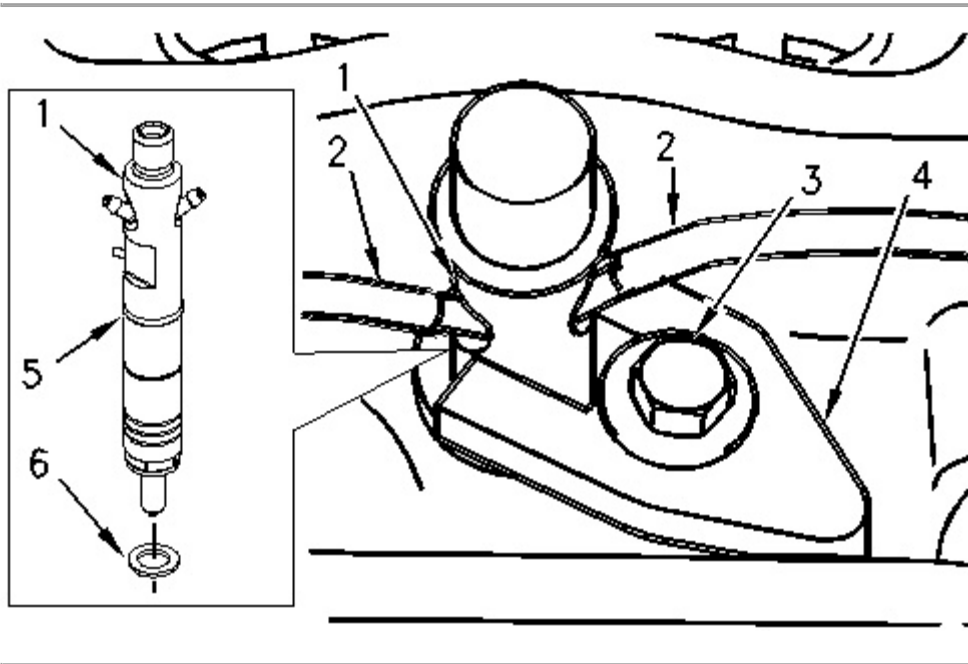


Illustration 1

g00975056

1. Remove hose (2) from fuel injection nozzle (1).
2. Remove bolt (3). Remove clamp (4) from the fuel injection nozzle.
3. Remove the fuel injection nozzle from the cylinder head. Remove O-ring seal (5) from the fuel injection nozzle.
4. Remove seat washer (6) from the cylinder head.

**Note:** If the original seat washer is not removed, the projection of the fuel injection nozzle will be incorrect when a new seat washer is installed.



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## Disassembly and Assembly 3054C Engines for Caterpillar Built Machines

Media Number -SEN5069-18

Publication Date -01/05/2015

Date Updated -19/09/2018

i01878202

# Fuel Injection Nozzles - Install

SMCS - 1254-012

## Installation Procedure

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### NOTICE

**Keep all parts clean from contaminants.**

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

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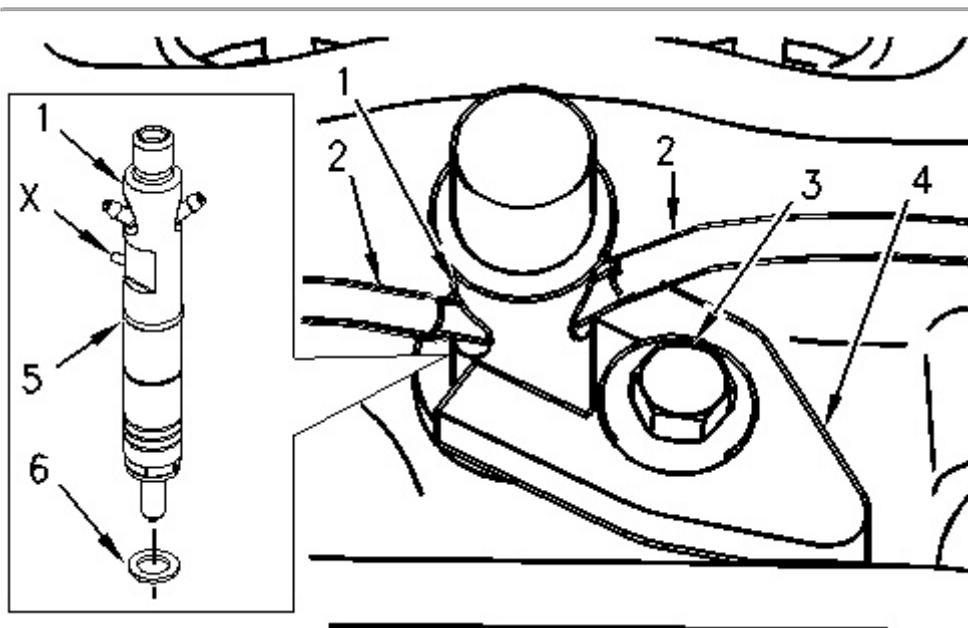


Illustration 1

g00975210

1. Lubricate seat washer (6) with clean engine oil. Install the seat washer in the cylinder head.

**Note:** If the original seat washer is reused, the projection of the fuel injection nozzle will be incorrect.

2. Install O-ring seal (5) on fuel injection nozzle (1). Install the fuel injection nozzle in the cylinder head.

**Note:** Alignment Pin (X) must be located opposite clamp (4).

3. Position clamp (4) on the fuel injection nozzle. Install bolt (3). Tighten the bolt to a torque of 27 N·m (20 lb ft).

4. Install hose (2) to the fuel injection nozzle.

**End By:**

a. Install the fuel injection lines. Refer to Disassembly and Assembly, "Fuel Injection Lines - Remove and Install".

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## Disassembly and Assembly 3054C Engines for Caterpillar Built Machines

Media Number -SEN5069-18

Publication Date -01/05/2015

Date Updated -19/09/2018

i02075261

# Fuel Injection Pump - Remove - Delphi DP210

SMCS - 1251-011

## Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Name	Qty
A	230-6284	Timing Pin (Camshaft)	1
B	230-6283	Timing Pin (Crankshaft)	1
B	230-6283	Timing Pin (Crankshaft)	1
C	9U-6198	Crankshaft Turning Tool	1
D	1P-2320	Combination Puller	1
ZZ	9U-7067	Cap	2
	9U-7069	Cap	2

### Start By:

- Remove the fuel injection lines. Refer to Disassembly and Assembly, "Fuel Injection Lines - Remove and Install".
- Remove the crankshaft pulley. Refer to Disassembly and Assembly, "Crankshaft Pulley - Remove and Install".
- Remove the front cover. Refer to Disassembly and Assembly, "Front Cover - Remove and Install".
- Remove the air compressor, if equipped. Refer to Disassembly and Assembly, "Air Compressor - Remove and Install".



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