



Service Repair Manual

Models

216 SKID STEER LOADER

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Product: SKID STEER LOADER

Model: 216 SKID STEER LOADER 4NZ

Configuration: 216 226 228 Skid Steer Loader 4NZ00001-03399 (MACHINE) POWERED BY 3034 Engine

Disassembly and Assembly 216 and 226 Skid Steer Loaders Machine Systems

Media Number -REN2862-04

Publication Date -01/10/2009

Date Updated -30/10/2009

i03720941

Gas Spring - Remove and Install

SMCS - 7301-S3

Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	138-7574	Link Bracket	2
	8T-4779	Bolt	4
	8T-4122	Hard Washer	4
B	1U-9200	Lever Puller Hoist	1
C	138-7573	Link Bracket	1
	6V-8675	Bolt	1
	6V-8149	Nut	1
	5P-8245	Hard Washer	2

Start By:

- A. Raise the cab. Refer to Disassembly and Assembly, "Cab - tilt".
-



Illustration 1

g02005361

1. Open engine enclosure (1) .

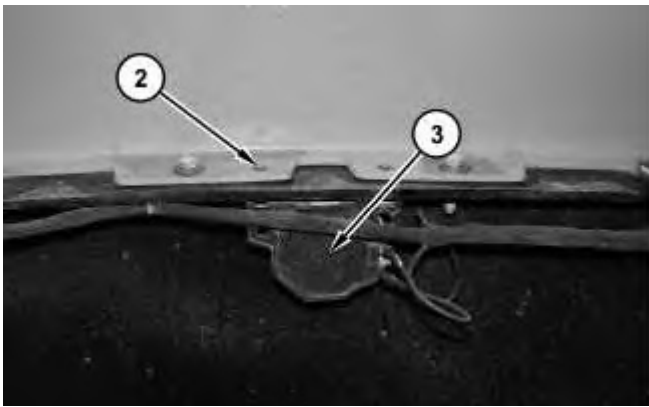


Illustration 2

g02005393

2. Remove bolts (2) and position back up alarm (3) out of the way.
-

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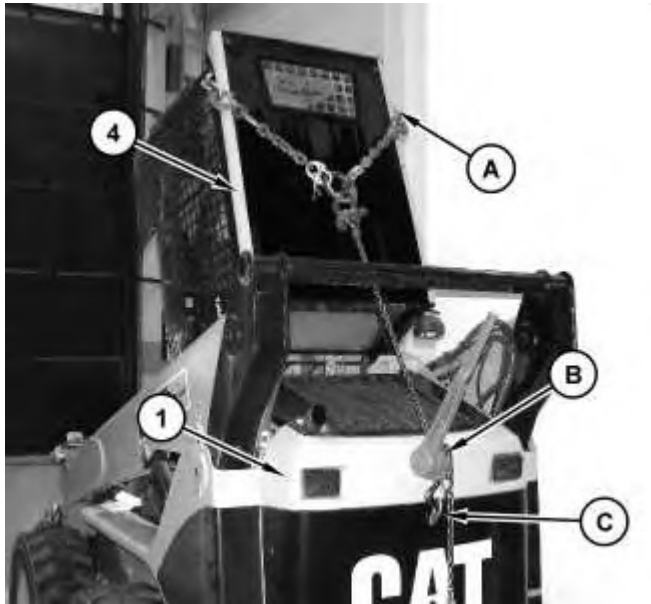


Illustration 3

g02005415

3. Attach Tooling (C) to engine enclosure (1). Close engine enclosure (1). Attach Tooling (B) and Tooling (A) to cab (4). Attach Tooling (B) to engine enclosure (1). The weight of cab (4) is approximately 290 kg (640 lb).

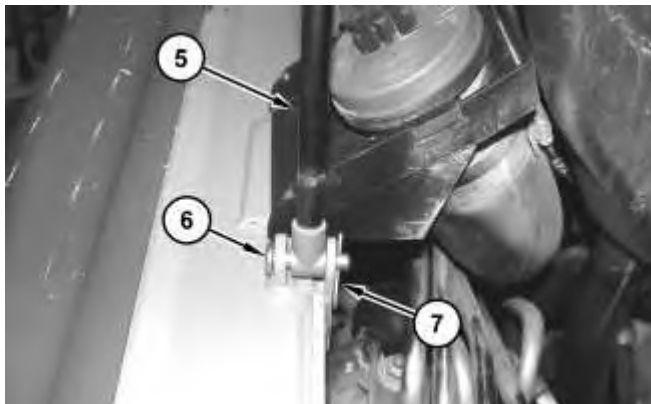


Illustration 4

g02020355

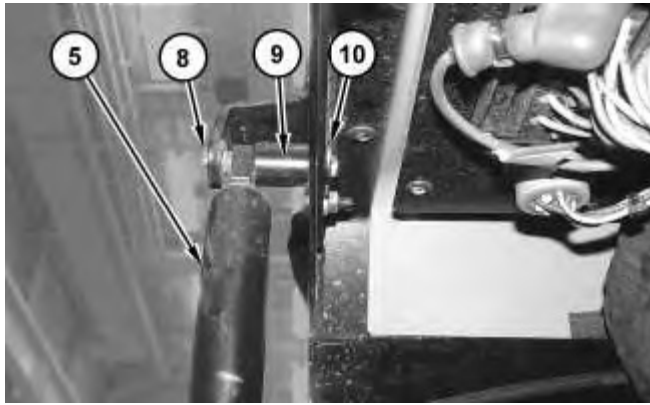


Illustration 5

g02020453

WARNING

Personal injury can result from being struck by parts propelled by a released spring force.

Make sure to wear all necessary protective equipment.

Follow the recommended procedure and use all recommended tooling to release the spring force.

4. Use Tooling (B) in order to raise the cab enough to fully extend right gas spring (5) .

Note: The gas spring on the right side of the machine will become fully extended before the left gas spring.

5. Remove clip (7) and clip (10). Remove pin (6). Remove pin (8) and spacer (9) in order to remove right gas spring (5) .

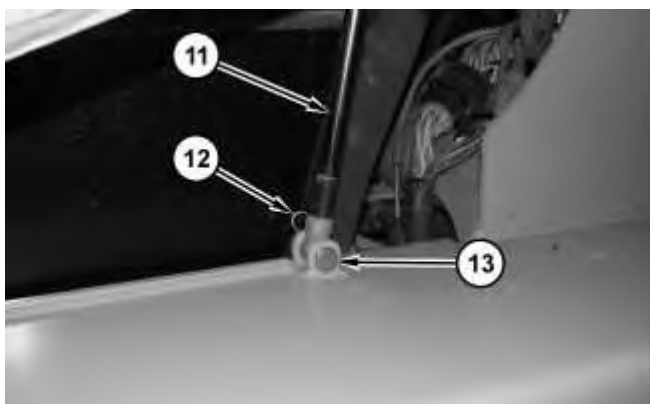


Illustration 6

g02020473

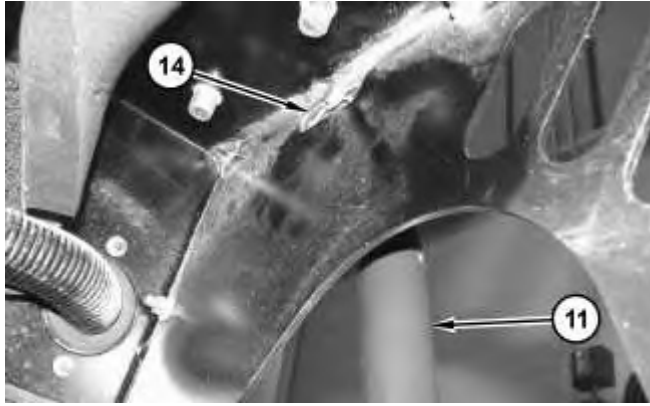


Illustration 7

g02020513

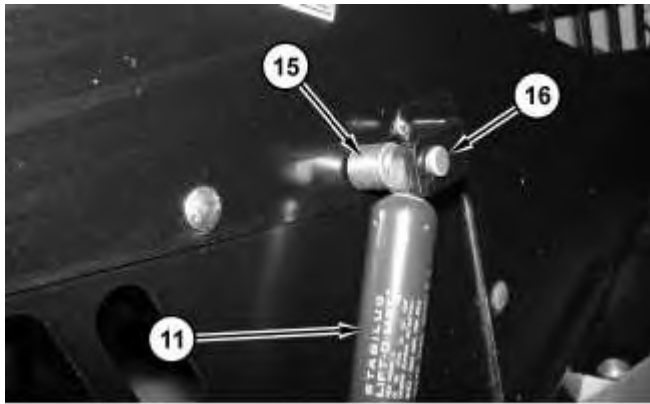


Illustration 8

g02020518

WARNING

Personal injury can result from being struck by parts propelled by a released spring force.

Make sure to wear all necessary protective equipment.

Follow the recommended procedure and use all recommended tooling to release the spring force.

6. Use Tooling (B) in order to raise the cab enough to fully extend left gas spring (11) .
7. Remove clip (12) and clip (14). Remove pin (13). Remove pin (16) and spacer (15) in order to remove left gas spring (11) .

Installation Procedure

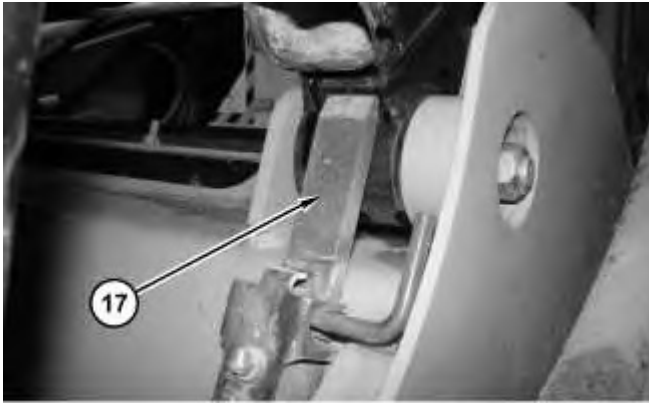


Illustration 9

g02006058

Note: Do not support the cab with safety latch (17) when gas springs are removed.

Note: The gas spring on the left side of the machine must be installed first.

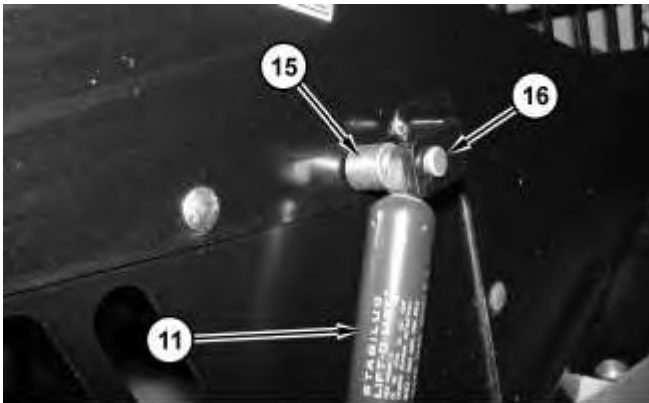


Illustration 10

g02020518

 **WARNING**

Personal injury can result from being struck by parts propelled by a released spring force.

Make sure to wear all necessary protective equipment.

Follow the recommended procedure and use all recommended tooling to release the spring force.

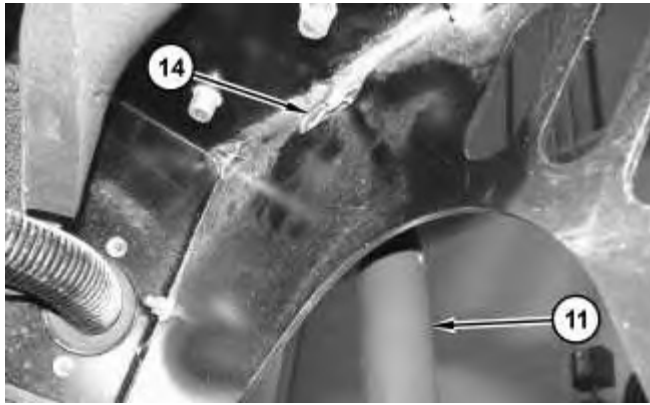


Illustration 11

g02020513

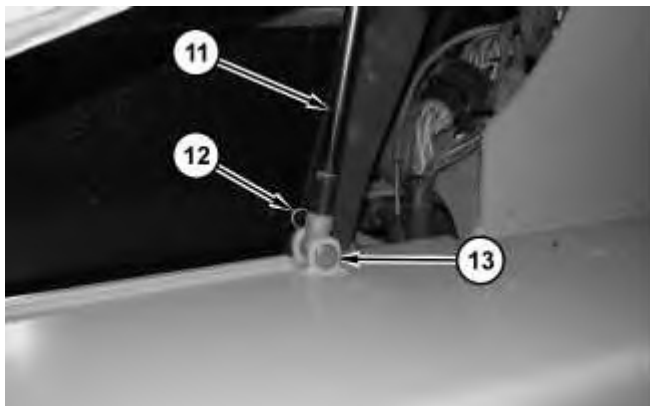


Illustration 12

g02020473

1. Use Tooling (B) to position the cab in order to install left gas spring (11) .
2. Install left gas spring (11), spacer (15), and pin (16). Install pin (13), clip (12) and clip (14) .

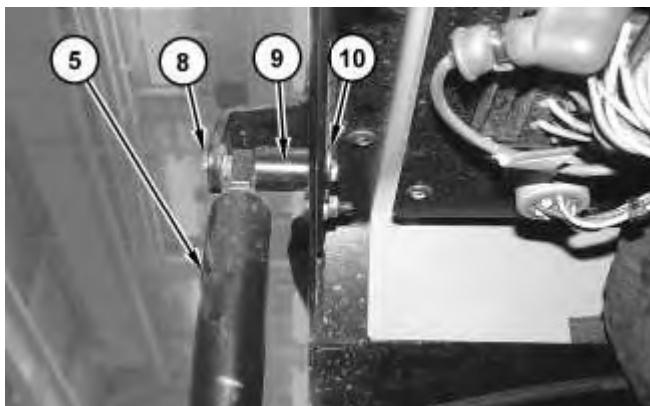


Illustration 13

g02020453

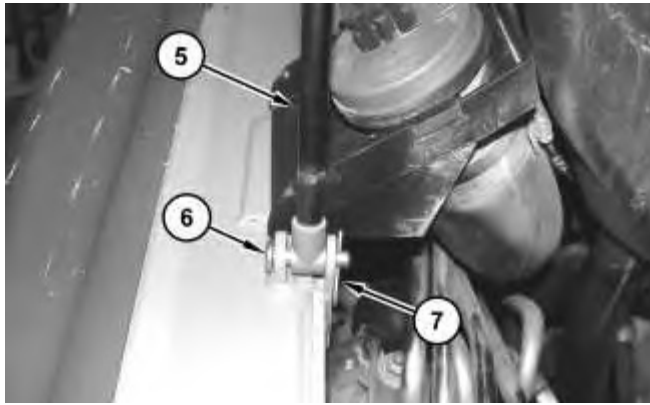


Illustration 14

g02020355

 **WARNING**

Personal injury can result from being struck by parts propelled by a released spring force.

Make sure to wear all necessary protective equipment.

Follow the recommended procedure and use all recommended tooling to release the spring force.

3. Position the cab in order to install right gas spring (5). Install right gas spring (5), spacer (9), and pin (8). Install pin (6), clip (7) and clip (10) .

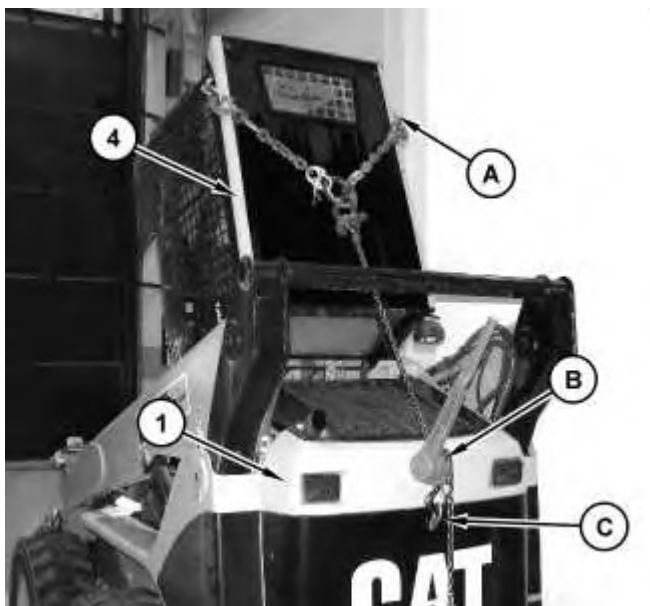


Illustration 15

g02005415

4. Remove Tooling (A) and the suitable lifting device from cab (4). Remove Tooling (B) and Tooling (C) from engine enclosure (1).

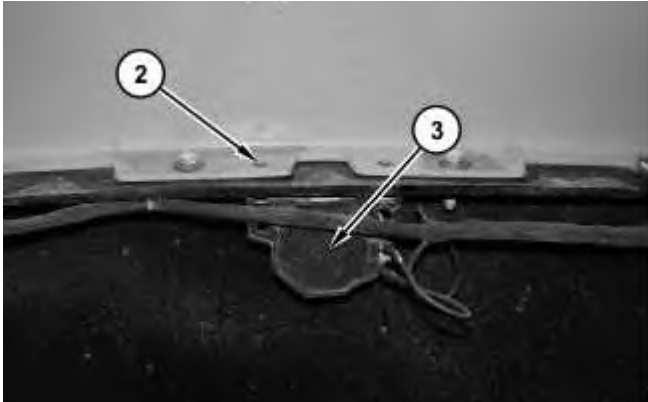


Illustration 16

g02005393

5. Position back up alarm (3) and install bolts (2) .



Illustration 17

g02005361

6. Shut engine enclosure (1) .

End By: Lower the cab. Refer to Disassembly and Assembly, "Cab - tilt".

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Product: SKID STEER LOADER

Model: 216 SKID STEER LOADER 4NZ

Configuration: 216 226 228 Skid Steer Loader 4NZ00001-03399 (MACHINE) POWERED BY 3034 Engine

Disassembly and Assembly 3024C Engine for Caterpillar Built Machines

Media Number -SEN5006-04

Publication Date -01/01/2009

Date Updated -16/01/2009

i01590349

Fuel Transfer Pump - Remove

SMCS - 1256-011

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.

Refer to Special Publication, NENG2500, "Caterpillar Tools and Shop Products Guide" for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

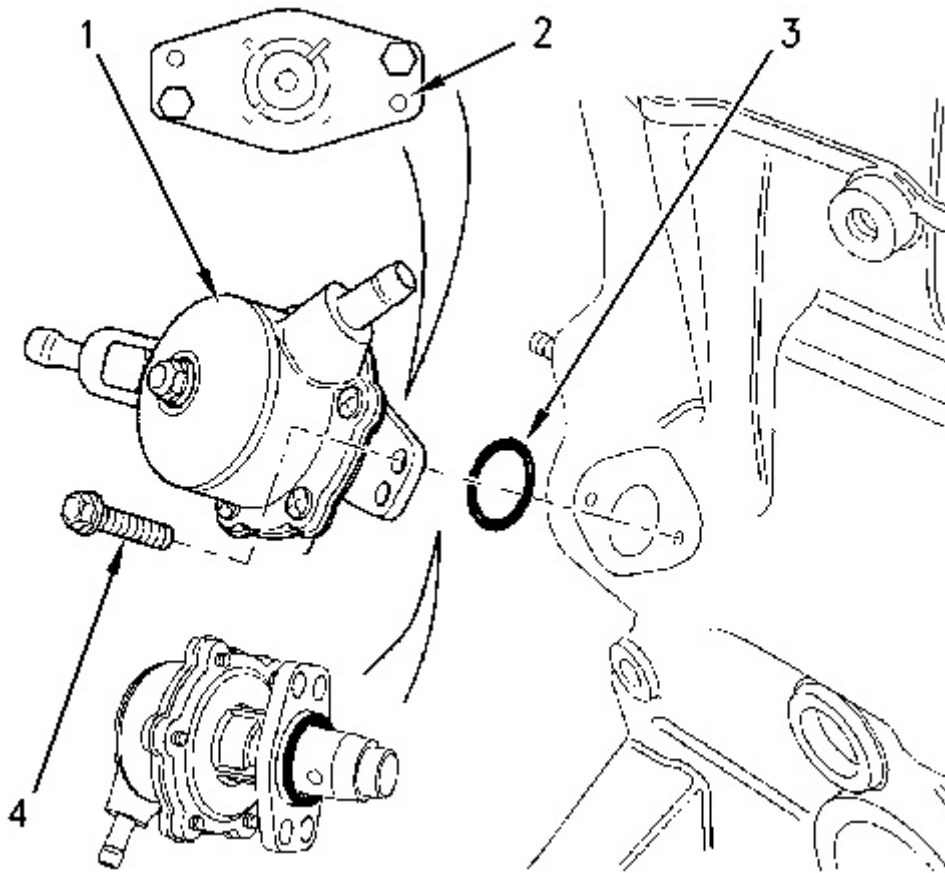


Illustration 1

g00824616

1. Loosen hose clamps and remove the two fuel lines from fuel transfer pump (1) .
2. Remove two bolts (4) that fasten fuel transfer pump (1) to the cylinder block.

Note: Before removing the fuel transfer pump (1) from the cylinder block, note the position of the flange (2) of the fuel transfer pump (1) for assembly.

3. Remove fuel transfer pump (1) and O-ring (3). Replace the O-ring when you install the fuel transfer pump.

Note: In order to remove the fuel transfer pump from the engine, it may be necessary to rotate the crankshaft until the rocker arm of the fuel transfer pump is not under pressure.

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Disassembly and Assembly 3024C Engine for Caterpillar Built Machines

Media Number -SEN5006-04

Publication Date -01/01/2009

Date Updated -16/01/2009

i01590391

Fuel Transfer Pump - Install

SMCS - 1256-012

Installation Procedure

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

NOTICE

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Dispose of all fluids according to local regulations and mandates.

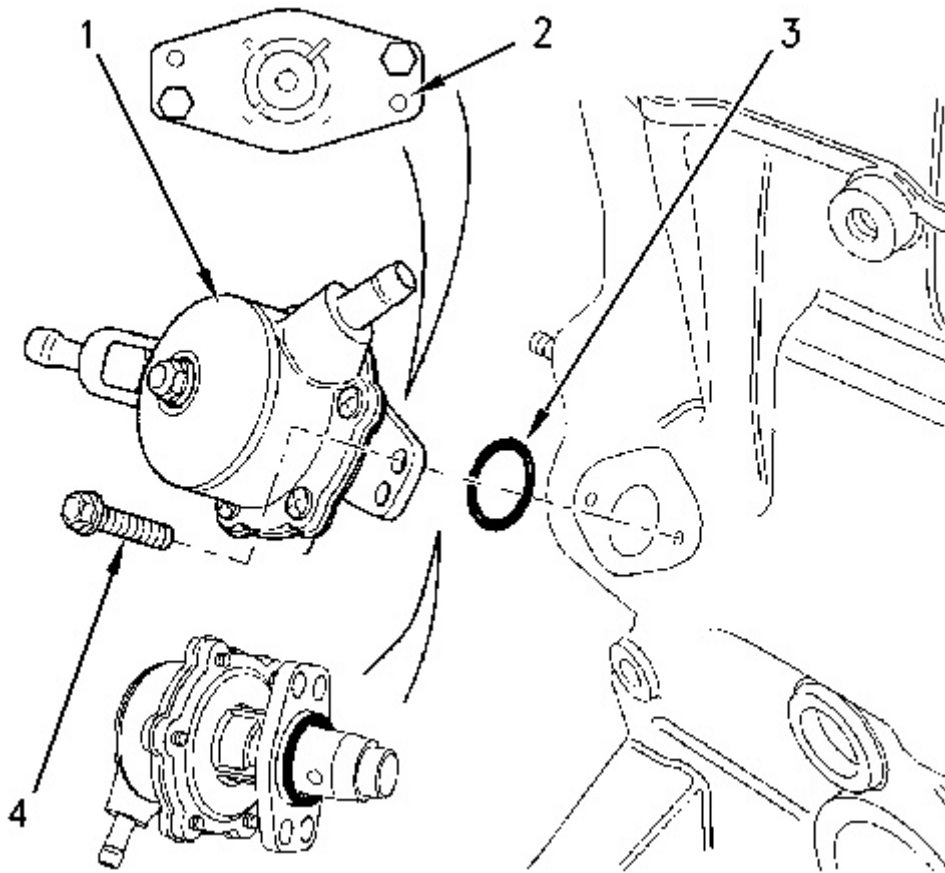


Illustration 1

g00824616

Note: Ensure that the camshaft lobe for the fuel transfer pump is at minimum lobe lift before the fuel transfer pump is installed.

Note: The flange of the fuel transfer pump has two sets of locating holes. This allows the fuel transfer pump to be mounted in four positions.

1. Put O-ring (3) and fuel transfer pump (1) in position on the engine. Ensure that the rocker lever is positioned correctly on the camshaft lobe.
2. Install two bolts (4) that fasten fuel transfer pump (1) to the cylinder block.
3. Connect the two fuel lines and hose clamps to the fuel transfer pump (1). Tighten the hose clamps.
4. Prime the fuel system. Refer to Testing and Adjusting, "Fuel System - Prime" for additional information.

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Disassembly and Assembly 3024C Engine for Caterpillar Built Machines

Media Number -SEN5006-04

Publication Date -01/01/2009

Date Updated -16/01/2009

i01783599

Fuel Injection Lines - Remove and Install

SMCS - 1252-010

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.

Refer to Special Publication, NENG2500, "Caterpillar Tools and Shop Products Guide" for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

Note: Put identification marks on all tube assemblies for installation purposes. Plug all tube assemblies. This helps to prevent contaminants from entering the system.

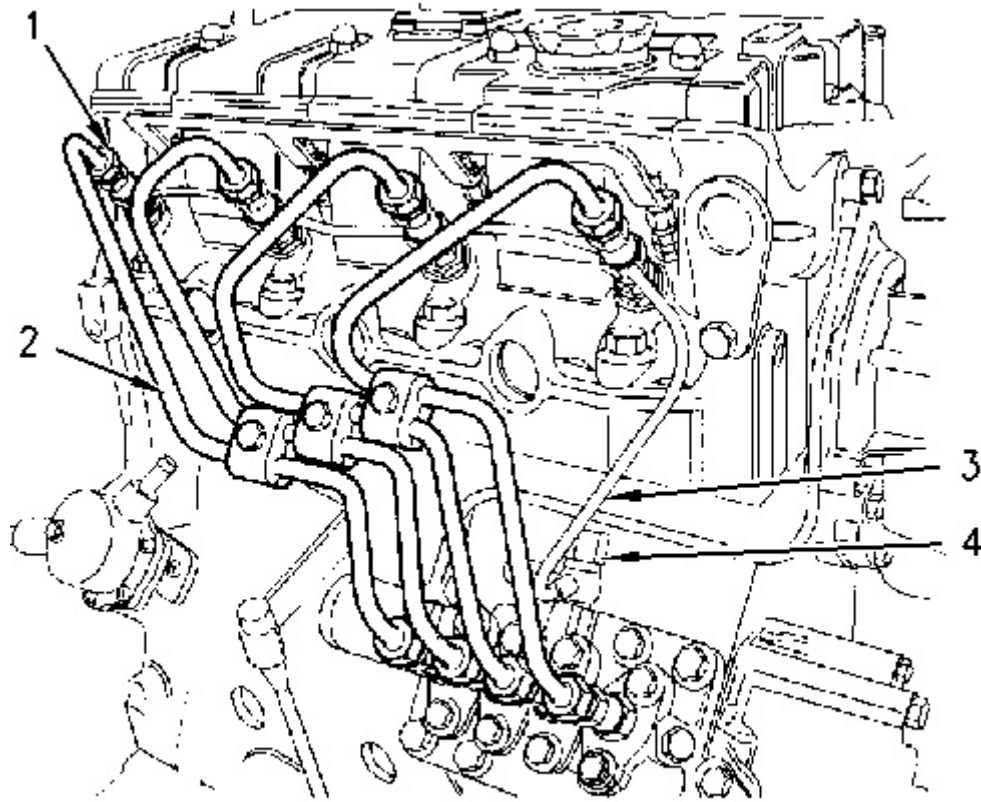


Illustration 1

g00818680

NOTICE

Do not let the tops of fuel nozzles turn when the fuel line nuts are loosened or tightened.

The nozzles will be damaged if the top of the nozzle turns in the body.

The engine will be damaged if a defective fuel injection nozzle is used because the shape of fuel (spray pattern) that comes out of the nozzles will not be correct.

1. Disconnect union nuts (1) for fuel injection lines (2) from fuel injection nozzles.
2. Disconnect union nuts (1) for fuel injection lines (2) from the fuel injection pump.
3. Remove fuel injection lines (2) from the engine as a unit.
4. Remove banjo bolt (4) from fuel return line (3) .

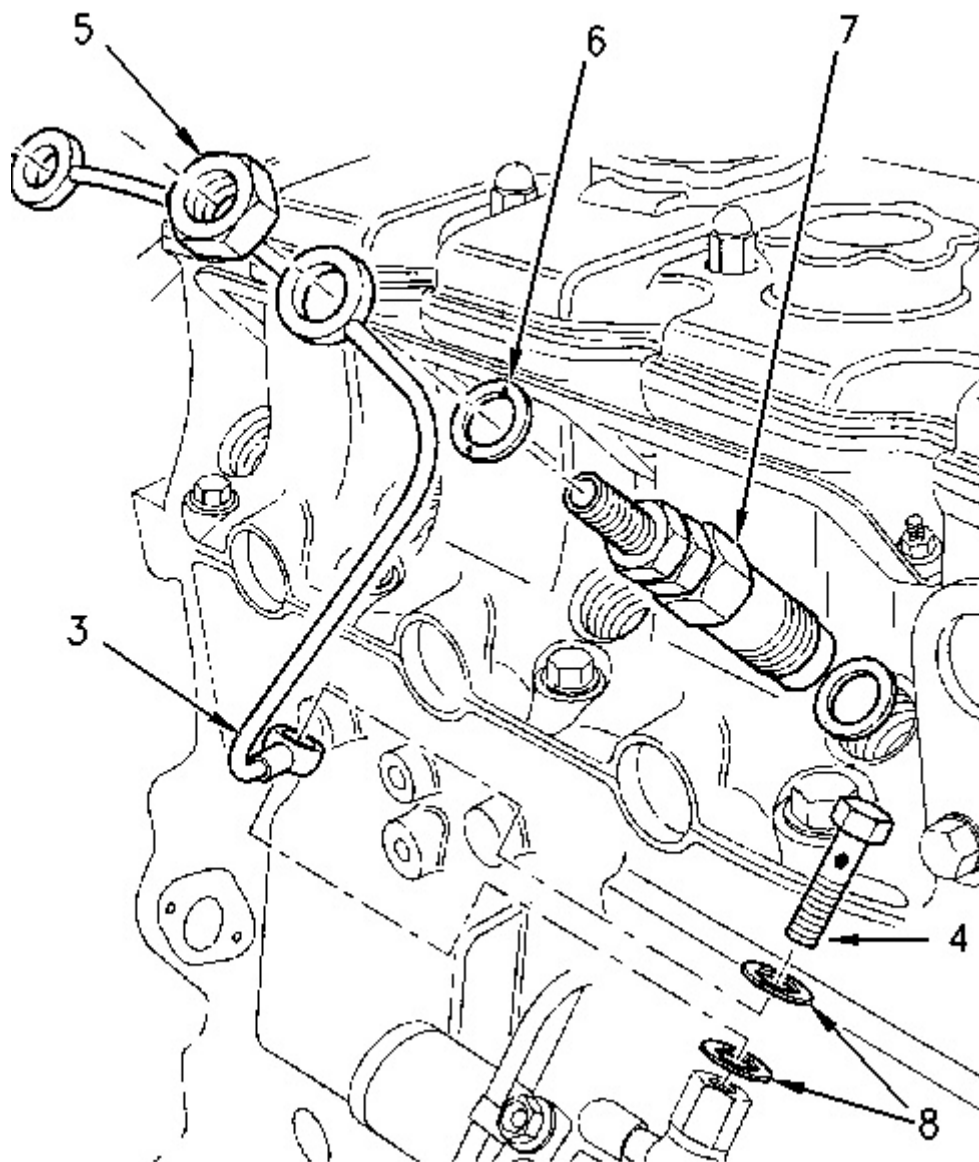


Illustration 2

g00824793

5. Remove washers (8) from fuel return line (3) .
6. Remove nut (5) from fuel injection nozzles (7).
7. Remove fuel return line (3) from the engine and remove washers (6) from fuel injection nozzles (7).

Installation Procedure

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

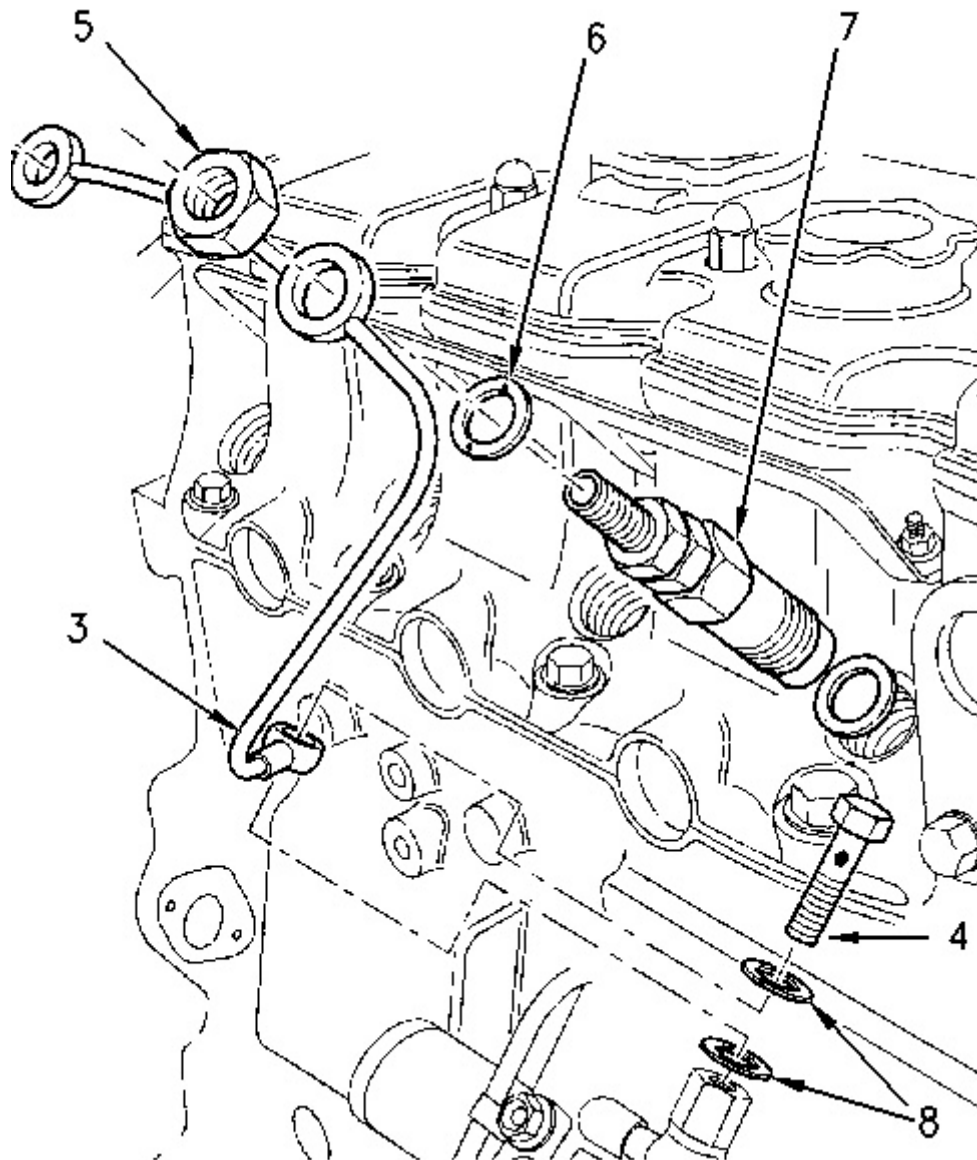


Illustration 3

g00824793

1. Install new washers (6) to fuel injection nozzles (7) and install fuel return line (3) to the fuel injection nozzles.
2. Install nuts (5) to fuel injection nozzles (7) .

Tighten the nuts to a torque of 27 N·m (20 lb ft).

3. Install new washers (8) to fuel return line (3) and install banjo bolt (4) to the fuel injection pump. Tighten banjo bolt (4) to a torque of 2.5 N·m (22 lb in).

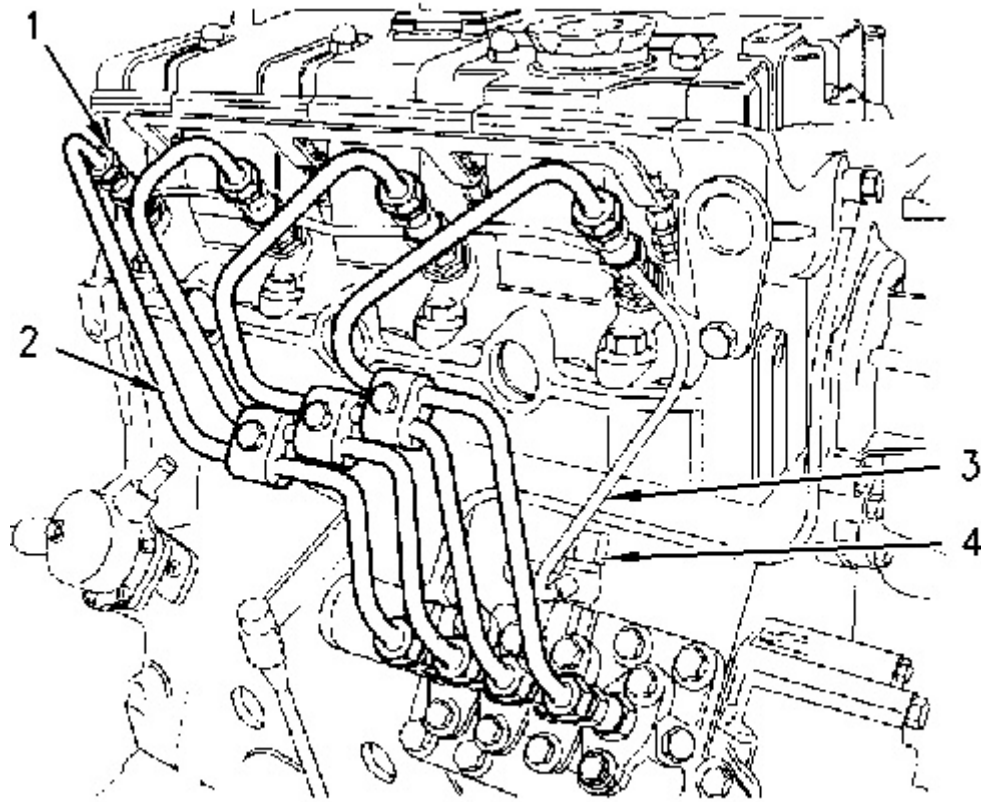


Illustration 4

g00818680

4. Install fuel injection lines (2) on the engine as a unit.

NOTICE

Do not let the tops of fuel nozzles turn when the fuel line nuts are loosened or tightened.

The nozzles will be damaged if the top of the nozzle turns in the body.

The engine will be damaged if a defective fuel injection nozzle is used because the shape of fuel (spray pattern) that comes out of the nozzles will not be correct.

5. Connect fuel injection lines (2) to the fuel injection pump.

Tighten union nuts (1) to a torque of 23 N·m (17 lb ft).

6. Connect fuel injection lines (2) to fuel injection nozzles (7) .

Tighten union nuts (1) to a torque of 23 N·m (17 lb ft).

7. Prime the fuel system. Refer to Testing and Adjusting, "Fuel System - Prime" for more information.

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Product: SKID STEER LOADER

Model: 216 SKID STEER LOADER 4NZ

Configuration: 216 226 228 Skid Steer Loader 4NZ00001-03399 (MACHINE) POWERED BY 3034 Engine

Disassembly and Assembly 3024C Engine for Caterpillar Built Machines

Media Number -SEN5006-04

Publication Date -01/01/2009

Date Updated -16/01/2009

i02398636

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".

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, "Caterpillar Dealer Service Tool Catalog" for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.



Illustration 1

g00854283

1. Remove fuel injection nozzle (1) from the cylinder head.
2. Remove seat washer (2) from the cylinder head. Cap all openings or plug all openings immediately after removal.

Note: Do not reuse seat washer (2) after removal. Replace the seat washer with a new part during installation.

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Disassembly and Assembly 3024C Engine for Caterpillar Built Machines

Media Number -SEN5006-04

Publication Date -01/01/2009

Date Updated -16/01/2009

i02398655

Fuel Injection Nozzles - Install

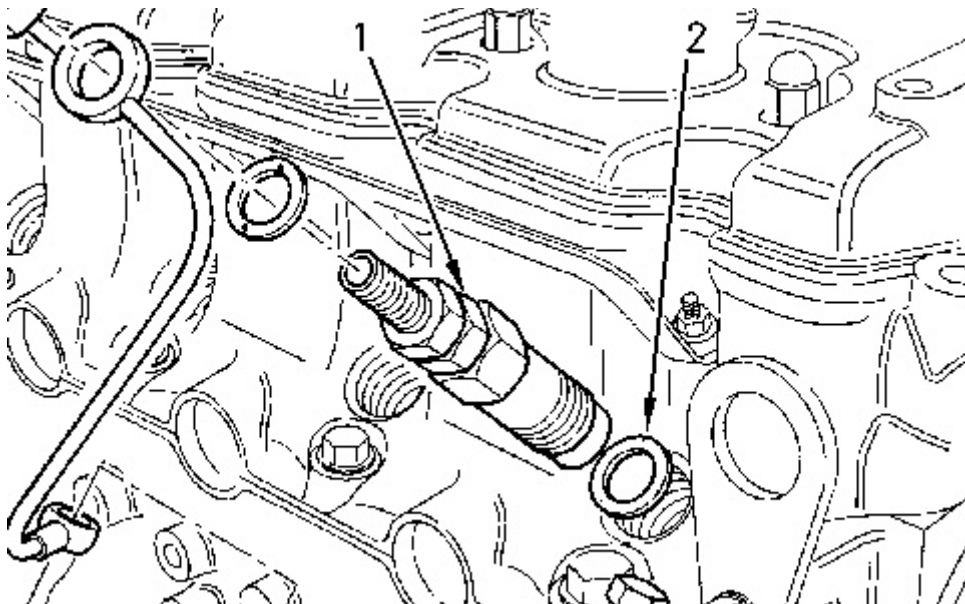
SMCS - 1254-012

Installation Procedure

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.



Note: Do not reuse seat washer (2) after removal. Replace the seat washer with a new part before installation.

1. Install seat washer (2) into the injector bore in the cylinder head.
2. Install fuel injection nozzle (1) into the cylinder head. Tighten the fuel injection nozzles to a torque of 64 N·m (47 lb ft).

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

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Disassembly and Assembly 3024C Engine for Caterpillar Built Machines

Media Number -SEN5006-04

Publication Date -01/01/2009

Date Updated -16/01/2009

i01590847

Fuel Shutoff Solenoid - Remove and Install

SMCS - 1259-010

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.

Refer to Special Publication, NENG2500, "Caterpillar Tools and Shop Products Guide" for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

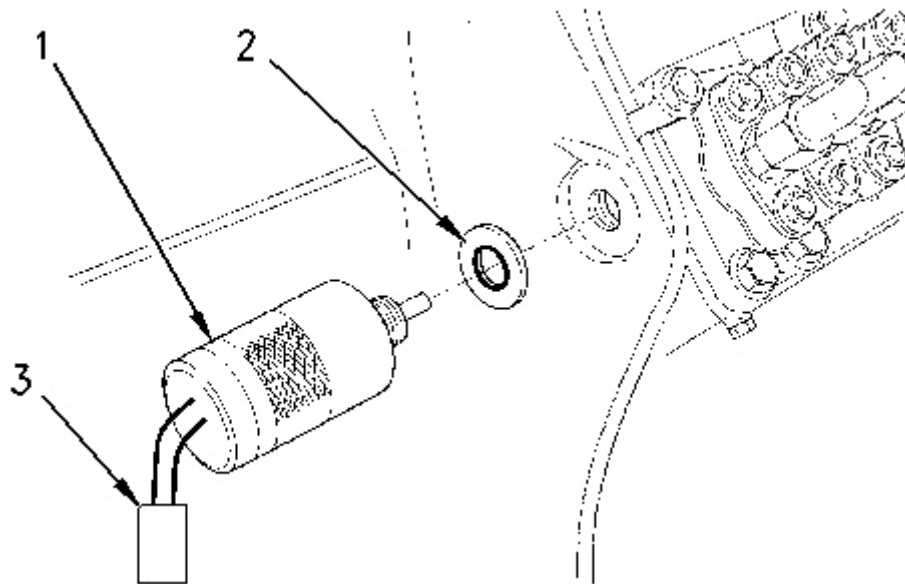


Illustration 1

g00824952

1. Disconnect electrical connections (3) to the fuel shutoff solenoid (1). Mark all connections for later installation.
2. Remove fuel shutoff solenoid (1) from the fuel injection pump housing by rotating the fuel shutoff solenoid in a counterclockwise direction.
3. Remove the O-ring seal (2) from fuel shutoff solenoid (1) .

Installation Procedure

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

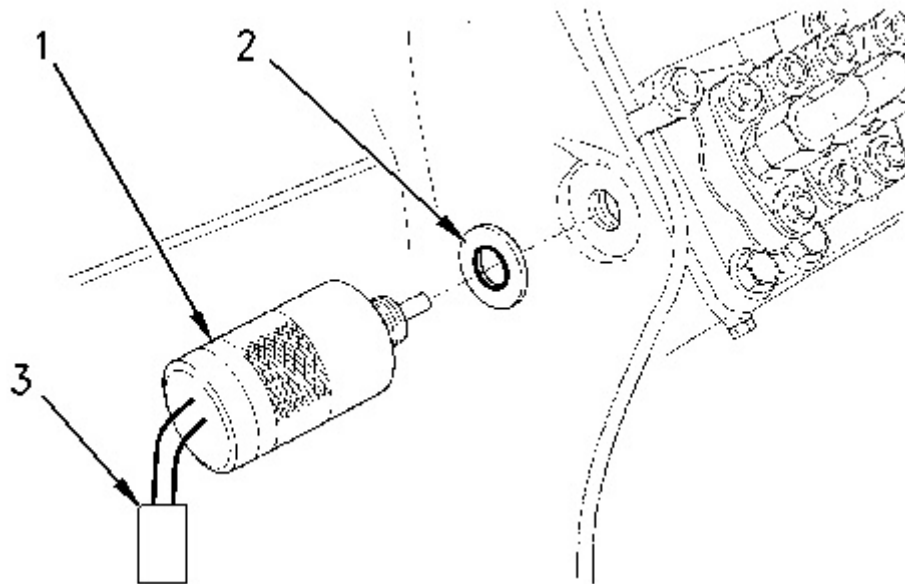


Illustration 2

g00824952

1. Check the condition of O-ring seal (2). If the O-ring seal is worn or damaged use a new part for replacement.
2. Install fuel shutoff solenoid (1) into the fuel injection pump housing by rotating the fuel shutoff solenoid in a clockwise direction. Tighten the fuel shutoff solenoid to a torque of 17 N·m (12 lb ft).
3. Reconnect electrical connection (3) to fuel shutoff solenoid (1) before you operate the engine.

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Publication Date -01/01/2009

Date Updated -16/01/2009

i01617530

Governor - Disassemble

SMCS - 1264-015

Disassembly Procedure

Start By:

- A. Remove the engine front housing. Refer to Disassembly and Assembly, "Housing (Front) - Remove".

Note: The components for the governor assembly are located in the engine front housing.

NOTICE

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NOTICE

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Dispose of all fluids according to local regulations and mandates.

Removal of the Governor Weight Assembly

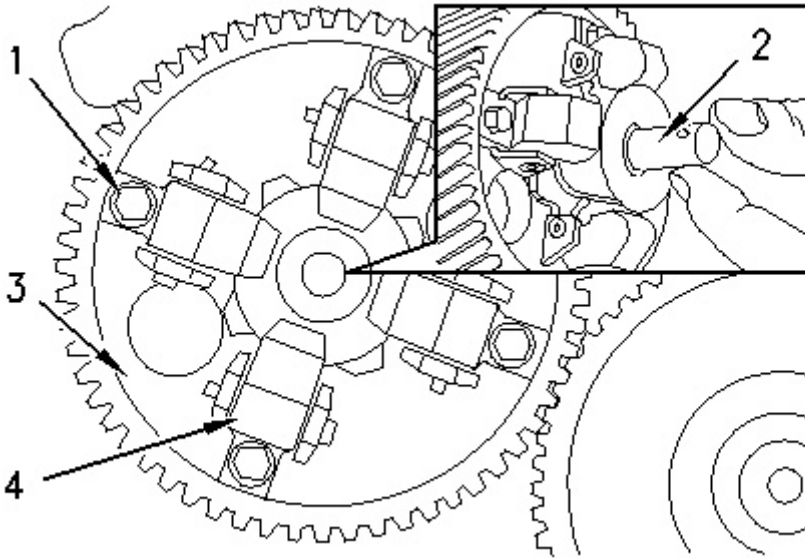


Illustration 1

g00837567

1. Remove slider (2) from the end of the camshaft gear.
2. Remove bolts (1) that secure governor weight assembly (4) to the end of camshaft gear (3) and then remove governor weight assembly (4) .
3. Check governor weight assembly (4) for any wear or damage. Replace any components that are worn or damaged.

Removal of the lever for the Engine Stop

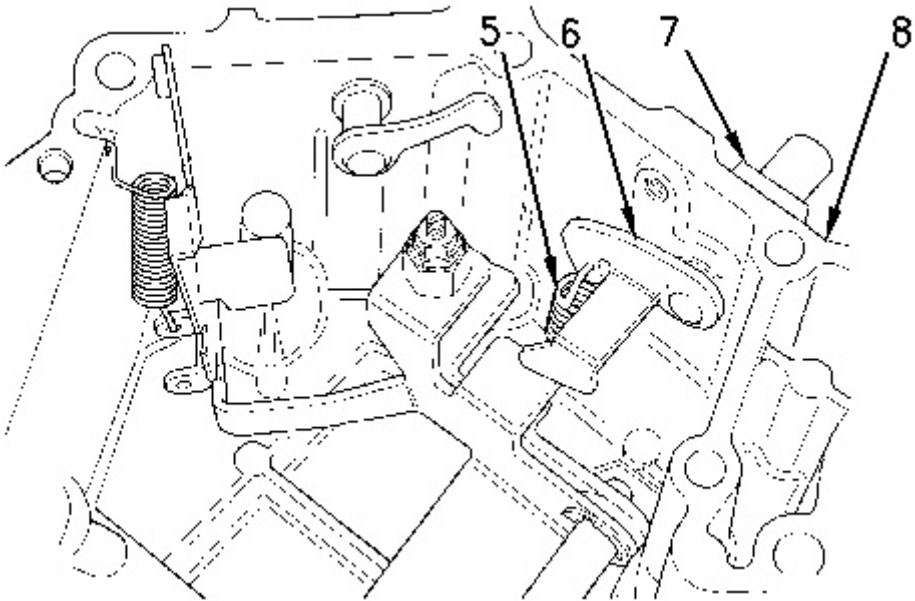


Illustration 2

g00837587

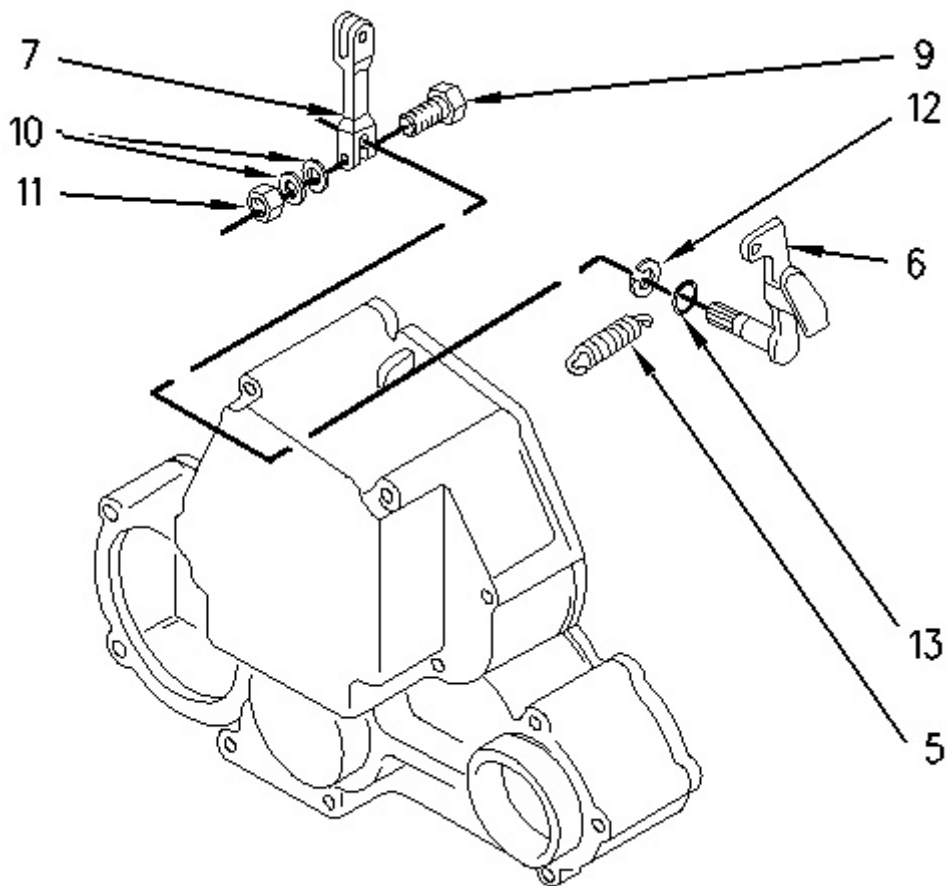


Illustration 3

g00837825

1. Remove spring (5) from lever (6) for the engine stop.
2. Loosen bolt (9) and nut (11) that secures control arm (7) to the lever (6) for the engine stop.



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Note: Do not remove nut (11) and washers (10) from bolt (9) .

3. Remove control arm (7) from lever (6) for the engine stop .
4. Remove lever (6) for the engine stop from the engine front housing (8).

Note: The bushing is secured to the engine front housing with a special adhesive. The bushing must not be removed. If the bushing is removed, the threads in the engine front cover will be damaged.

5. The lever for the engine stop consists of the following components: clip (12) and O-ring (13) .
6. Check the components for wear or damage. Replace the components that are worn or damaged.

Remove the linkage for the fuel injection pump

Note: When the linkage for the fuel injection pump is removed or the engine front cover is replaced, the setting for the maximum fuel may be affected.

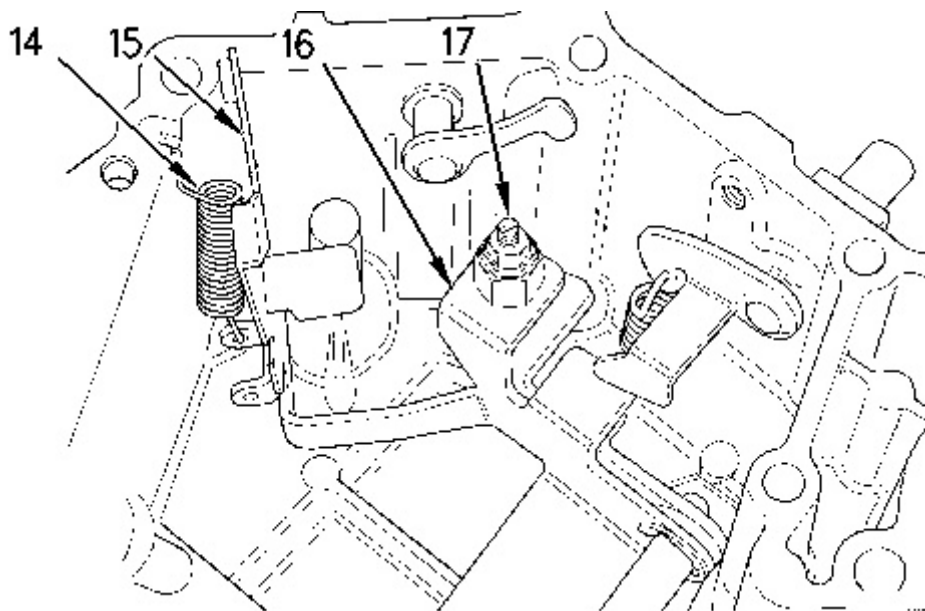


Illustration 4

g00837709

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