

Product: VIBRATORY COMPACTOR

Model: CB10 VIBRATORY COMPACTOR MS2

Configuration: CB7, CB8, CB10 Vibratory Asphalt Compactor MS200001-UP (MACHINE) POWERED BY C4.4 Engine

## Disassembly and Assembly

### C4.4 Engines for Caterpillar Built Machines

Media Number -UENR4525-09

Publication Date -01/06/2015

Date Updated -22/05/2018

i05784972

## Fuel Injection Pump - Remove

SMCS - 1251-011

### Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A <sup>(1)</sup>	9U-6198	Crankshaft Turning Tool	1
A <sup>(2)</sup>	9U-7336	Housing	1
	5P-7305	Engine Turning Tool	1
B	230-6283	Timing Pin (Crankshaft)	1
C	370-8376	Capping Kit	1

<sup>(1)</sup> The Crankshaft Turning Tool is used on the front pulley.

<sup>(2)</sup> This Tool is used in the aperture for the electric starting motor.

#### Start By:

- If necessary, remove the fuel filter base. Refer to Disassembly and Assembly, "Fuel Filter Base - Remove and Install" for the correct procedure.
- If necessary, remove the fuel priming pump. Refer to Disassembly and Assembly, "Fuel Priming Pump - Remove" for the correct procedure.
- If necessary, remove the crankcase breather (Filtered Breather). Refer to Disassembly and Assembly, "Crankcase Breather (Filtered Breather) - Remove" for the correct procedure.

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



## WARNING

**Contact with high pressure fuel may cause fluid penetration and burn hazards. High pressure fuel spray may cause a fire hazard. Failure to follow these inspection, maintenance and service instructions may cause personal injury or death.**

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## NOTICE

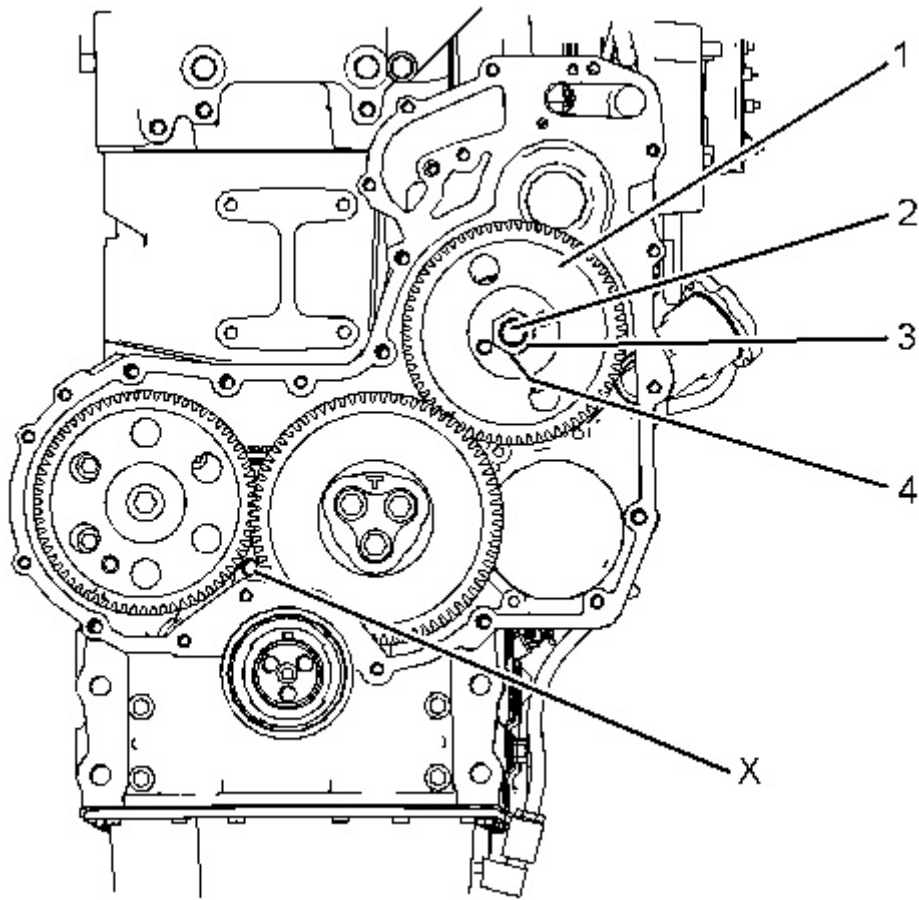
**Ensure that all adjustments and repairs that are carried out to the fuel system are performed by authorized personnel that have the correct training.**

**Before beginning ANY work on the fuel system, refer to Operation and Maintenance Manual, "General Hazard Information and High Pressure Fuel Lines" for safety information.**

**Refer to System Operation, Testing and Adjusting, "Cleanliness of Fuel System Components" for detailed information on the standards of cleanliness that must be observed during ALL work on the fuel system.**

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1. Turn the fuel supply to the OFF position.
  2. Turn the battery disconnect switch to the OFF position.
  3. Remove the valve mechanism cover. Refer to Disassembly and Assembly, "Valve Mechanism Cover - Remove and Install" for the correct procedure.
  4. Use Tooling (A) in order to rotate the crankshaft so that number one piston is in the Top Dead Center Position on the compression stroke.
  5. Remove the front cover. Refer to Disassembly and Assembly, "Front Cover - Remove and Install" for the correct procedure.
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Illustration 1

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6. Install Tooling (B) through Hole (X) in order to lock the crankshaft.
  7. Remove nut (3) and spring washer (4) (not shown).
  8. Remove gear (1) from fuel injection pump shaft (2).
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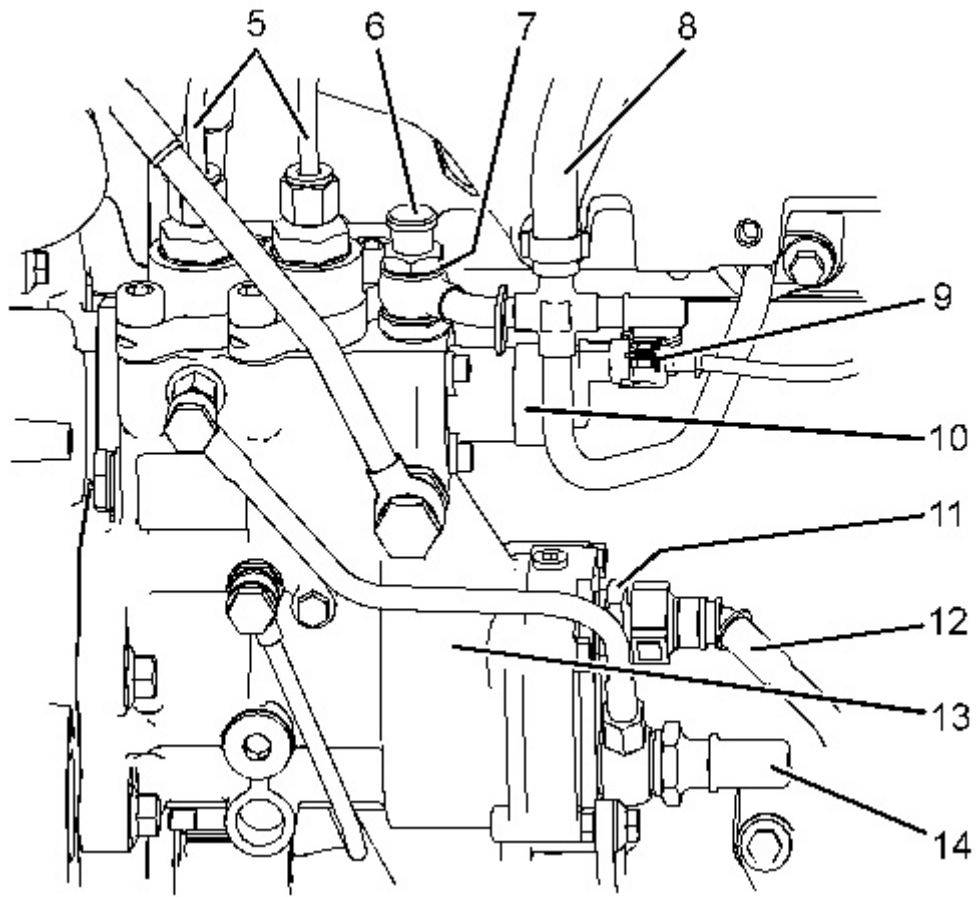
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Illustration 2

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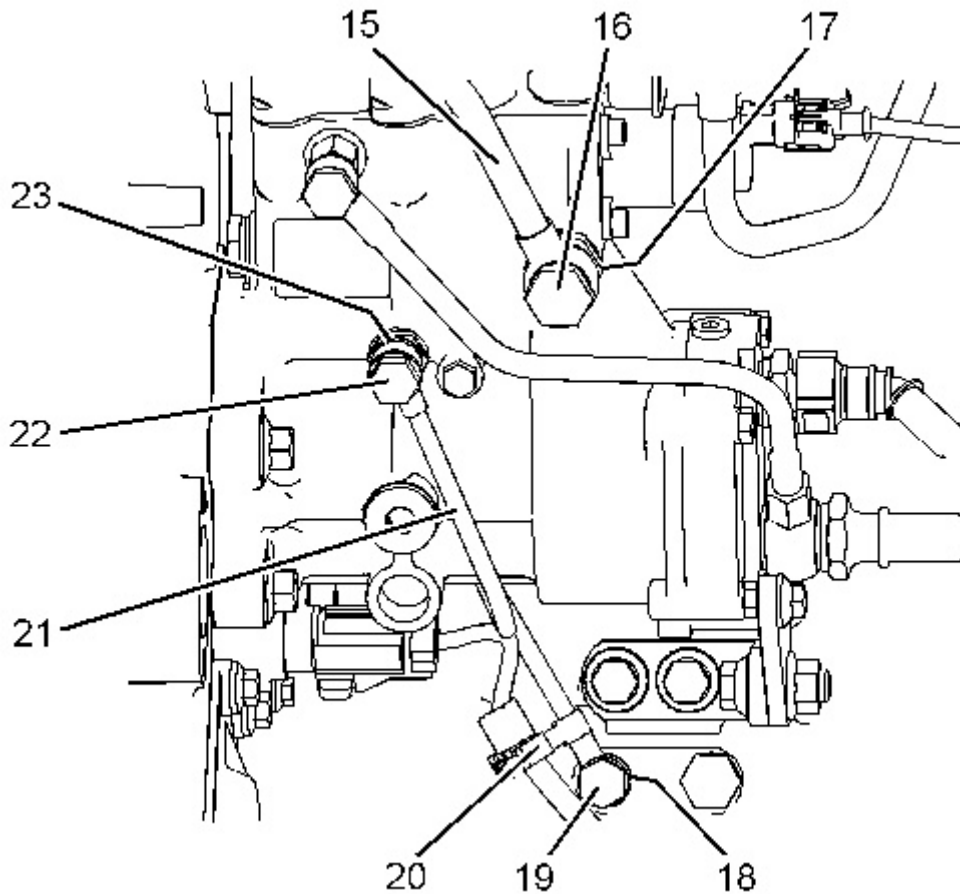


Illustration 3

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9. Place a suitable container below fuel injection pump (13) in order to catch any fuel that might be spilled.
10. Clean fuel injection pump (13) and the area around the fuel injection pump. Ensure that the area is free from contamination before beginning disassembly.
11. Remove fuel injection lines (5) from the fuel injection pump and the fuel manifold. Refer to Disassembly and Assembly, "Fuel Injection Lines - Remove" for the correct procedure.

**Note: Discard the fuel injection lines.**

12. Remove banjo bolt (6) from tube assembly (8). Remove sealing washers (7) (not shown). Use Tooling (C) in order to plug the tube assembly. Cap the ports in the fuel injection pump.
13. Disconnect harness assembly (9) from flow control valve (10).

**Note:** The harness assembly should be repositioned in order to avoid obstructing the fuel injection pump removal.

14. Disconnect the tube assembly (not shown) from connection (14). Use Tooling (C) in order to plug the tube assembly. Cap the connection in the fuel injection pump.
15. Disconnect the tube assembly (12) from connection (11). Use Tooling (C) in order to plug the tube assembly. Cap the connection in the fuel injection pump.

16. Remove banjo bolt (16) from tube assembly (15). Remove sealing washers (17) (not shown). Use Tooling (C) in order to plug the tube assembly. Cap the ports in the fuel injection pump.
17. Remove banjo bolt (22) from tube assembly (21). Remove sealing washers (23) (not shown). Use Tooling (C) in order to plug the tube assembly. Cap the ports in the fuel injection pump.
18. Remove banjo bolt (19) from tube assembly (21). Remove sealing washers (18) (not shown). Use Tooling (C) in order to plug the tube assembly. Cap the ports in the fuel injection pump.
19. Remove tube assembly (21) from clip (20).

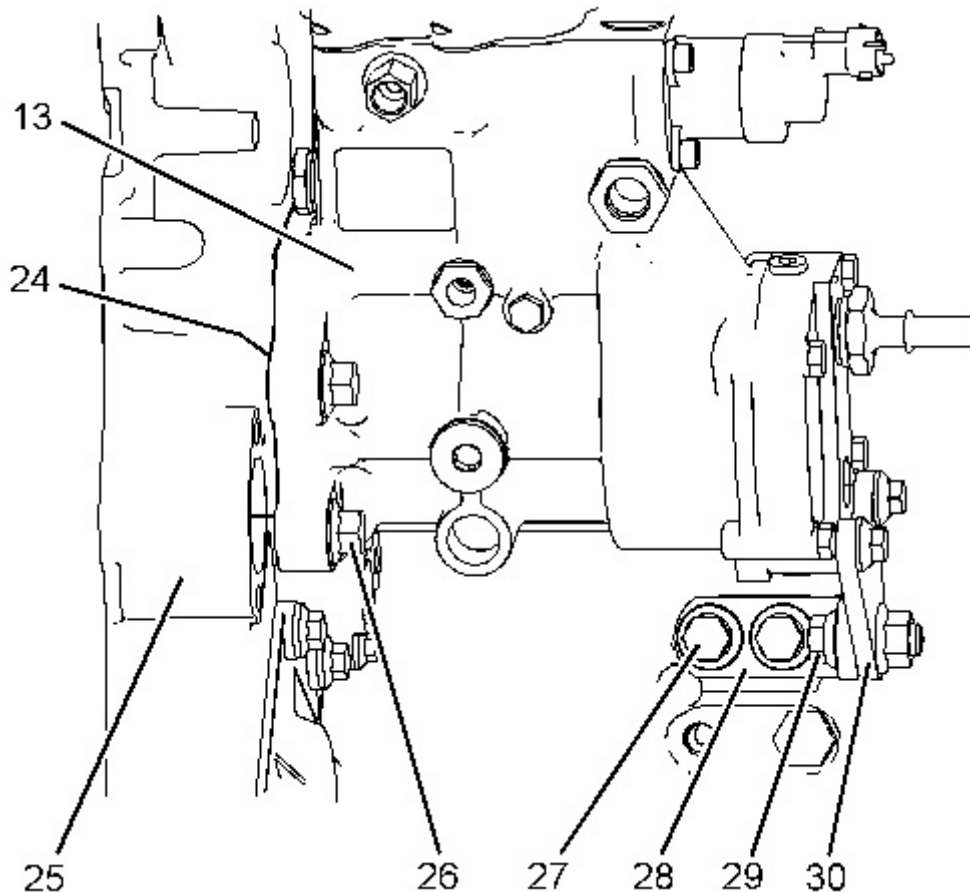
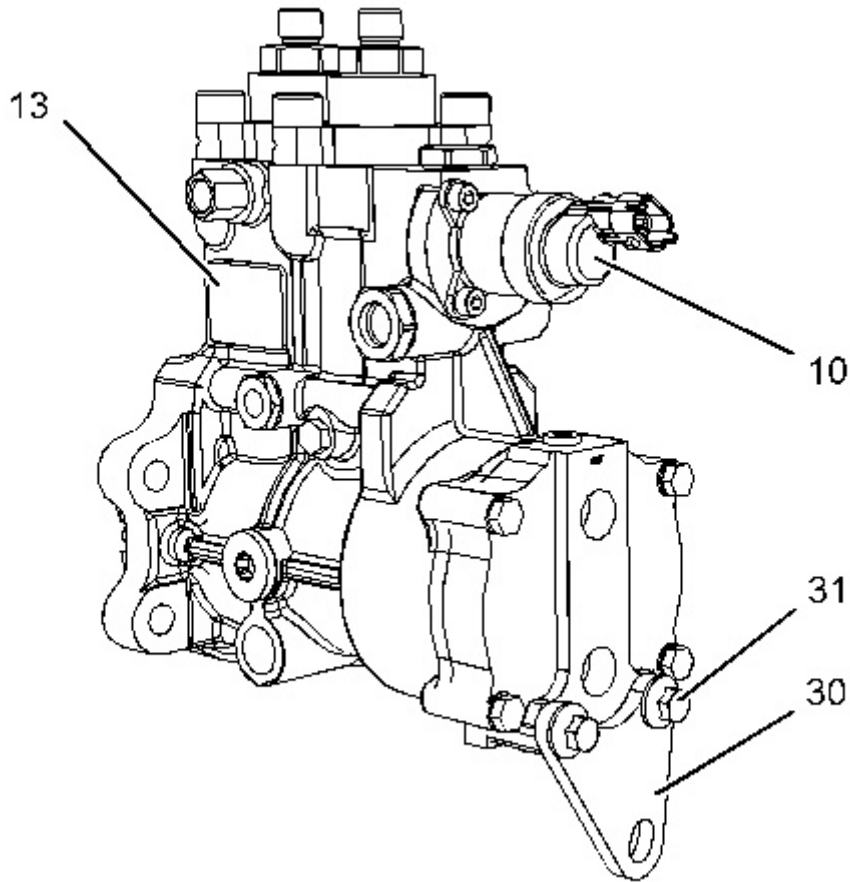


Illustration 4

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20. Remove the nut and bolt (29) from bracket (30).
  21. Remove bolts (27) and remove bracket (28) from the cylinder block.
  22. Remove bolts (26) from fuel injection pump (13). Support the fuel injection pump as the bolts are removed.
  23. Remove the fuel injection pump from front housing (25).
  24. Remove O-ring seal (24) (not shown).
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Illustration 5

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25. If necessary, follow Step 25.a through Step 25.b in order to remove the bracket from the fuel injection pump.
    - a. Position fuel injection pump (13) in a suitable stand.
    - b. Remove bolts (31) and remove bracket (30).
  26. If necessary, remove flow control valve (10). Refer to Disassembly and Assembly, "Flow Control Valve - Remove and Install" for the correct procedure.
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Product: VIBRATORY COMPACTOR

Model: CB10 VIBRATORY COMPACTOR MS2

Configuration: CB7, CB8, CB10 Vibratory Asphalt Compactor MS200001-UP (MACHINE) POWERED BY C4.4 Engine

## Disassembly and Assembly C4.4 Engines for Caterpillar Built Machines

Media Number -UENR4525-09

Publication Date -01/06/2015

Date Updated -22/05/2018

i05784028

# Fuel Injection Pump - Install

SMCS - 1251-012

## Installation Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A <sup>(1)</sup>	9U-6198	Crankshaft Turning Tool	1
A <sup>(2)</sup>	9U-7336	Housing	1
	5P-7305	Engine Turning Tool	1
B	230-6283	Timing Pin (Crankshaft)	1

<sup>(1)</sup> The Crankshaft Turning Tool is used on the front pulley.

<sup>(2)</sup> This Tool is used in the aperture for the electric starting motor.

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

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### NOTICE

**Ensure that all adjustments and repairs that are carried out to the fuel system are performed by authorized personnel that have the correct training.**

**Before beginning ANY work on the fuel system, refer to Operation and Maintenance Manual, "General Hazard Information and High Pressure Fuel Lines" for safety information.**

**Refer to System Operation, Testing and Adjusting, "Cleanliness of Fuel System Components" for detailed information on the standards of cleanliness that must be observed during ALL work on the fuel system.**

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### **NOTICE**

**Ensure that wiring harness are correctly routed and the cable straps are not over tightened. Over tightening of the cable straps will damage the wiring harness convoluting.**

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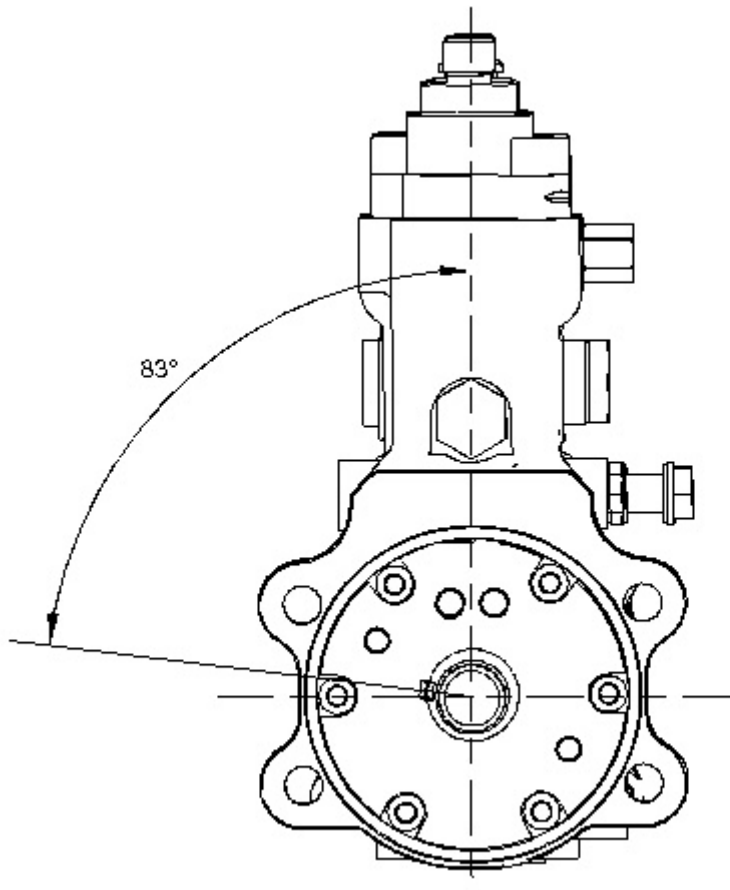
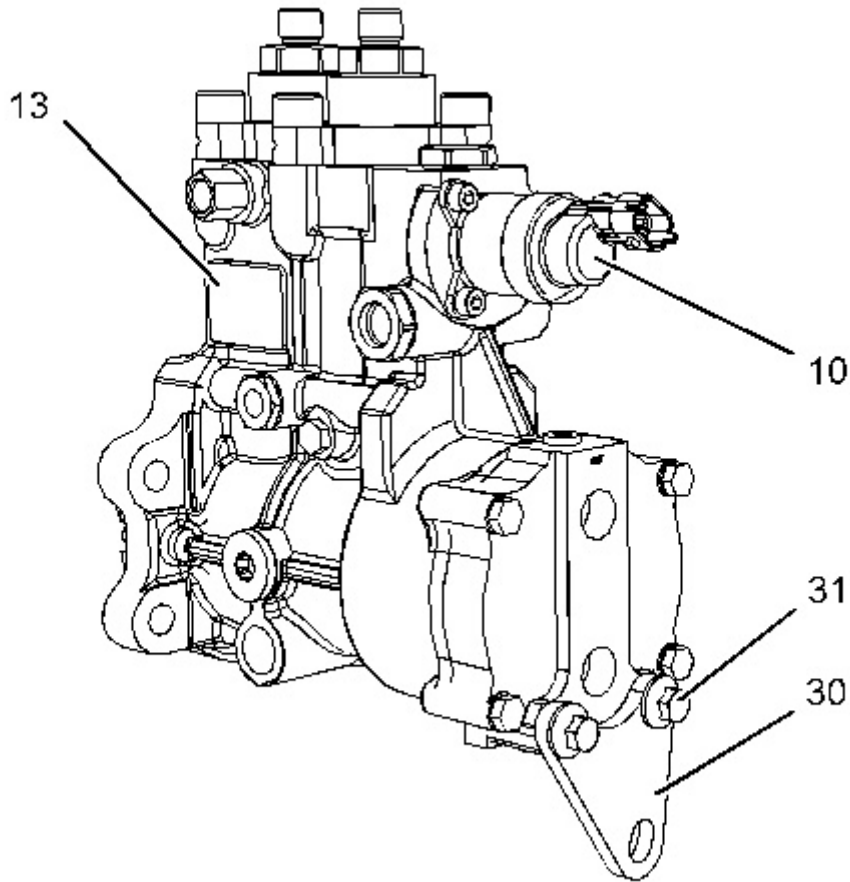


Illustration 1

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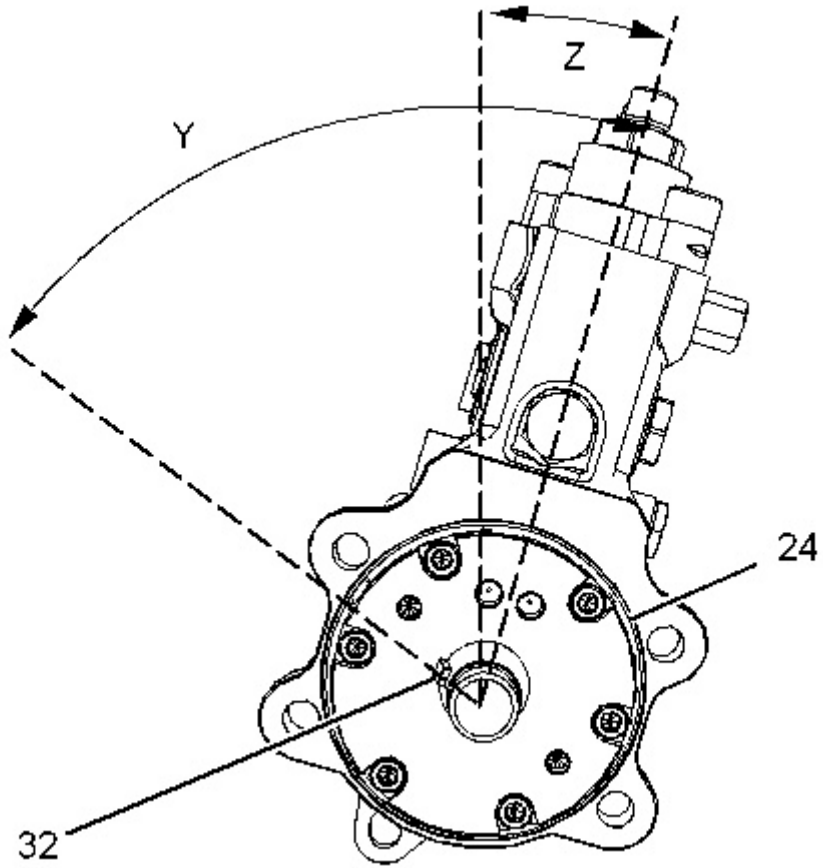
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Illustration 2

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**Note:** The shaft of the fuel injection pump will sit in one of six angular rest positions. It is necessary to set the fuel injection pump shaft to the position of 83 degrees before the Top Dead Centre Position on Number one cylinder.

1. If necessary, follow Step 1.a through Step 1.d in order to install the bracket to the fuel injection pump.
    - a. Position fuel injection pump (13) in a suitable stand.
    - b. Position bracket (30) onto fuel injection pump (13). Ensure that the bracket is correctly orientated.
    - c. Install bolts (31) hand tight.
    - d. Tighten bolts (31) to a torque of 22 N·m (195 lb in).
  2. If necessary, install flow control valve (10). Refer to Disassembly and Assembly, "Flow Control Valve - Remove and Install" for the correct procedure.
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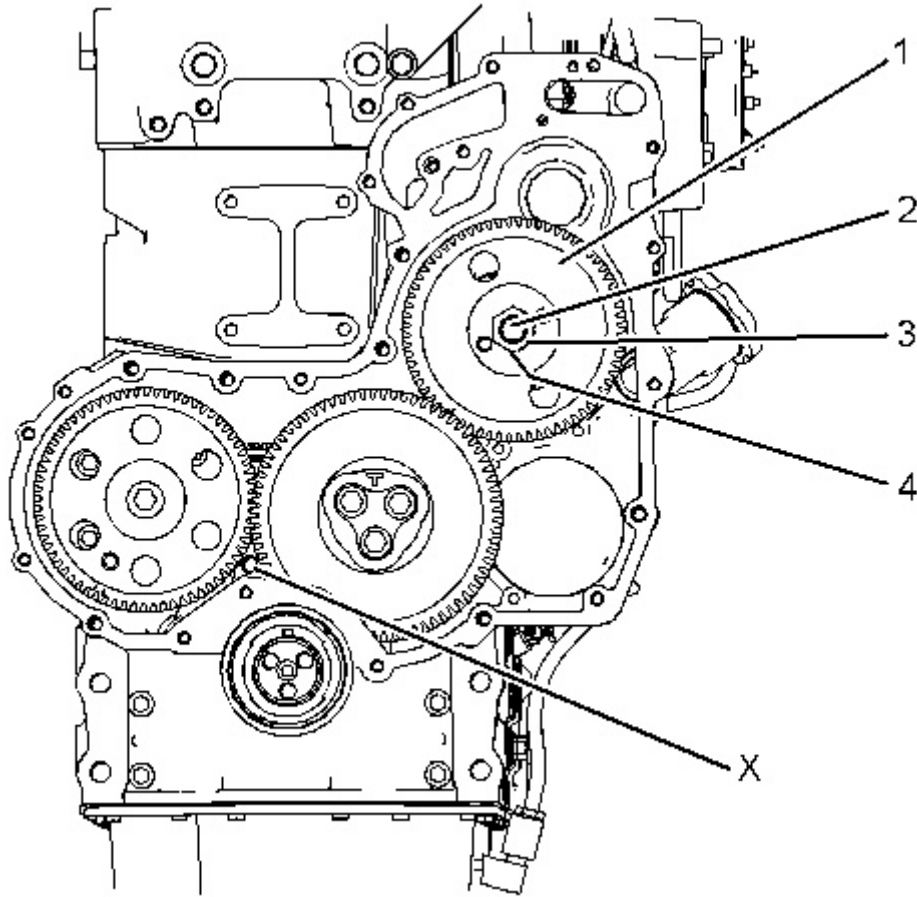
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Illustration 3

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The Angle (Y) should be 83 degrees. The Angle (Z) should be 18 degrees

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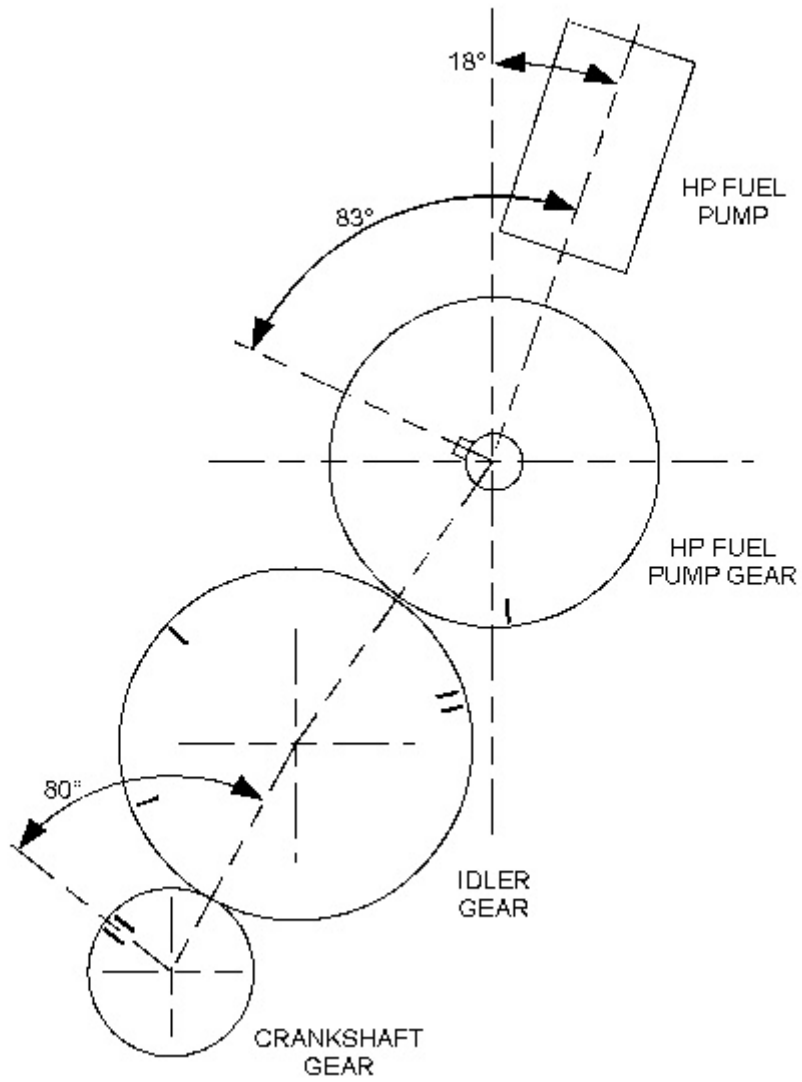
Illustration 4

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3. If necessary, use Tooling (A) in order to rotate the crankshaft so that number one piston is in the Top Dead Centre Position on the compression stroke.
4. If necessary, install Tooling (B) in Position (X) in order to ensure that the crankshaft is in the correct position. Remove Tooling (B).

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

5. Use Tooling (A) to rotate the crankshaft in a counter clockwise direction 80 degrees.
  6. Install a new O-ring seal (24) to fuel injection pump (13).
  7. Position key (32) onto fuel injection pump shaft (2) in the position shown in Illustration 3.
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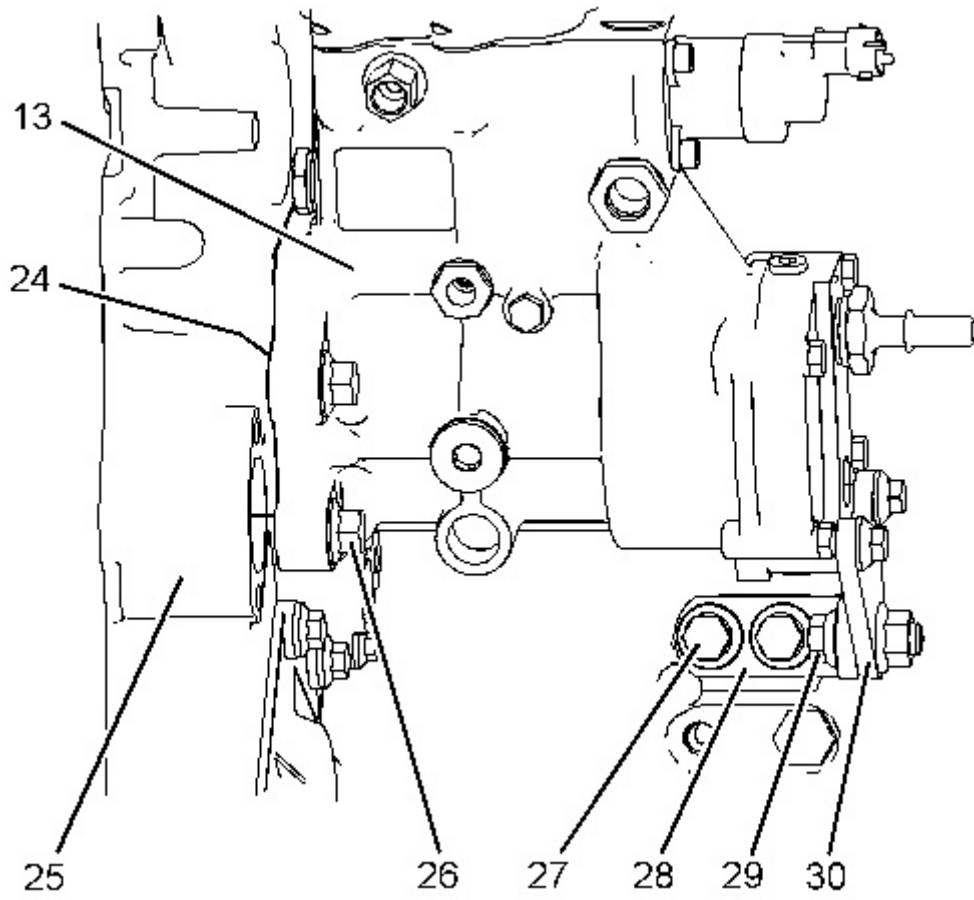


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Illustration 5

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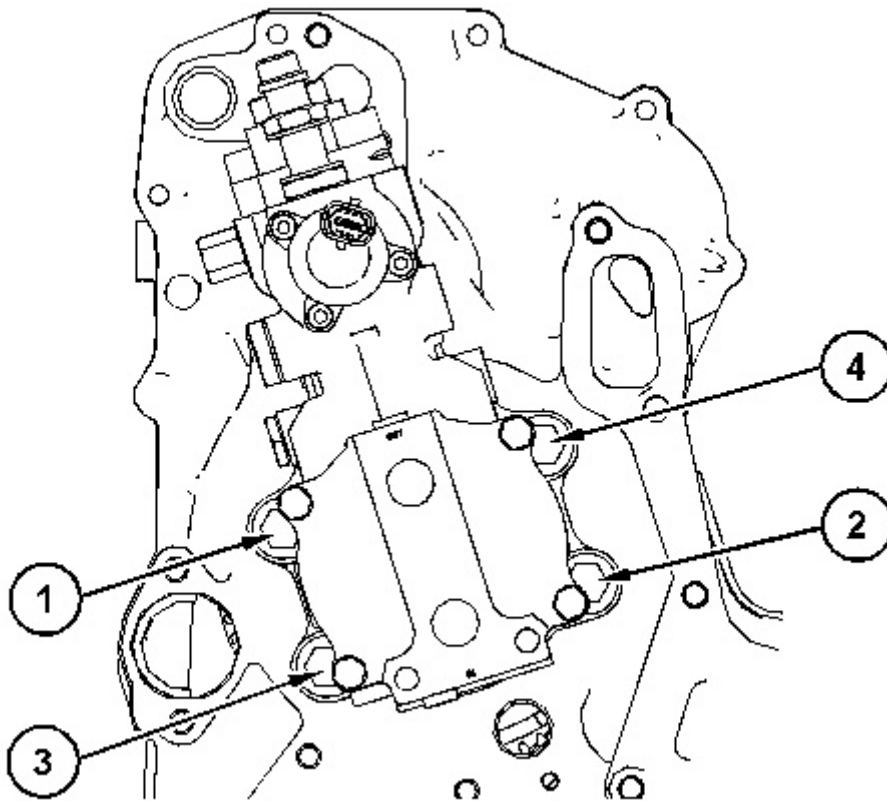


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Illustration 6

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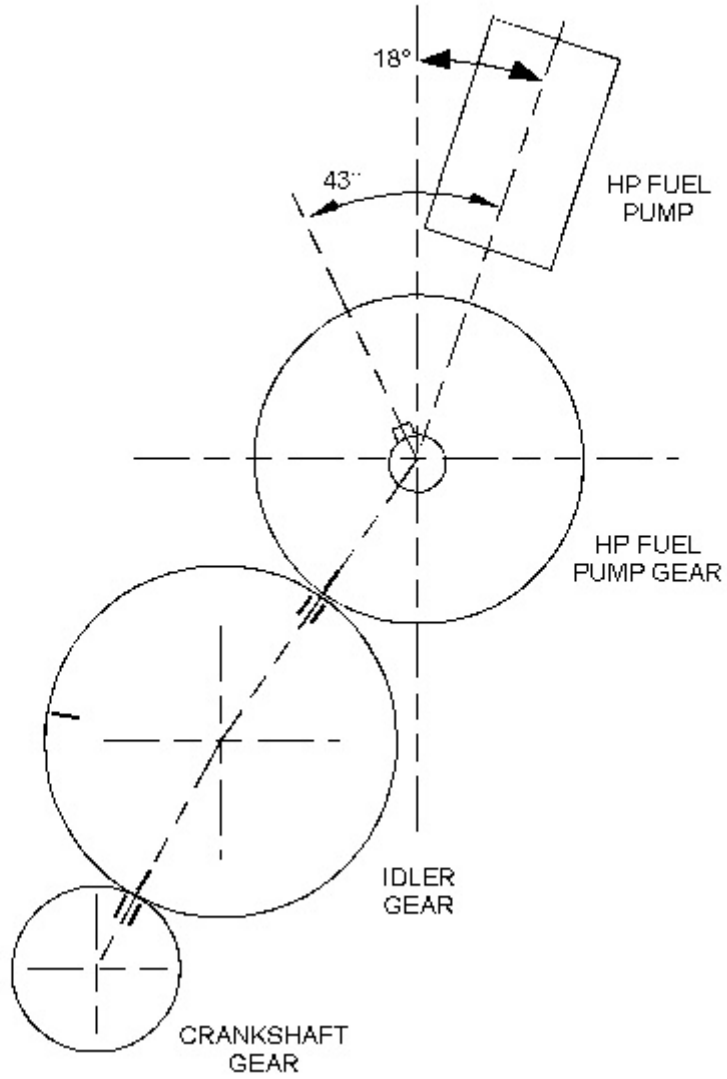


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Illustration 7

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8. Carefully install fuel injection pump (13) to front housing (25). Ensure that the bore in front housing (25) is not damaged during the fuel injection pump is installation.
  9. Install new bolts (26) to fuel injection pump (13) hand tight.  
**Note:** The fuel injection pump should be supported by hand as the bolts are installed.
  10. Tighten bolts (26) to a torque of 44 N·m (32 lb ft) in the sequence shown in Illustration 7.
  11. Position fuel injection pump gear (1) onto fuel injection pump shaft (2). Ensure that key (32) aligns correctly with the fuel injection pump gear.
  12. Install a new spring washer (4) (not shown) and install nut (3) hand tight.
  13. Use a suitable tool to prevent the timing gears from rotating when tightening nut (3). Tighten the nut to a torque of 163 N·m (120.22 lb ft).
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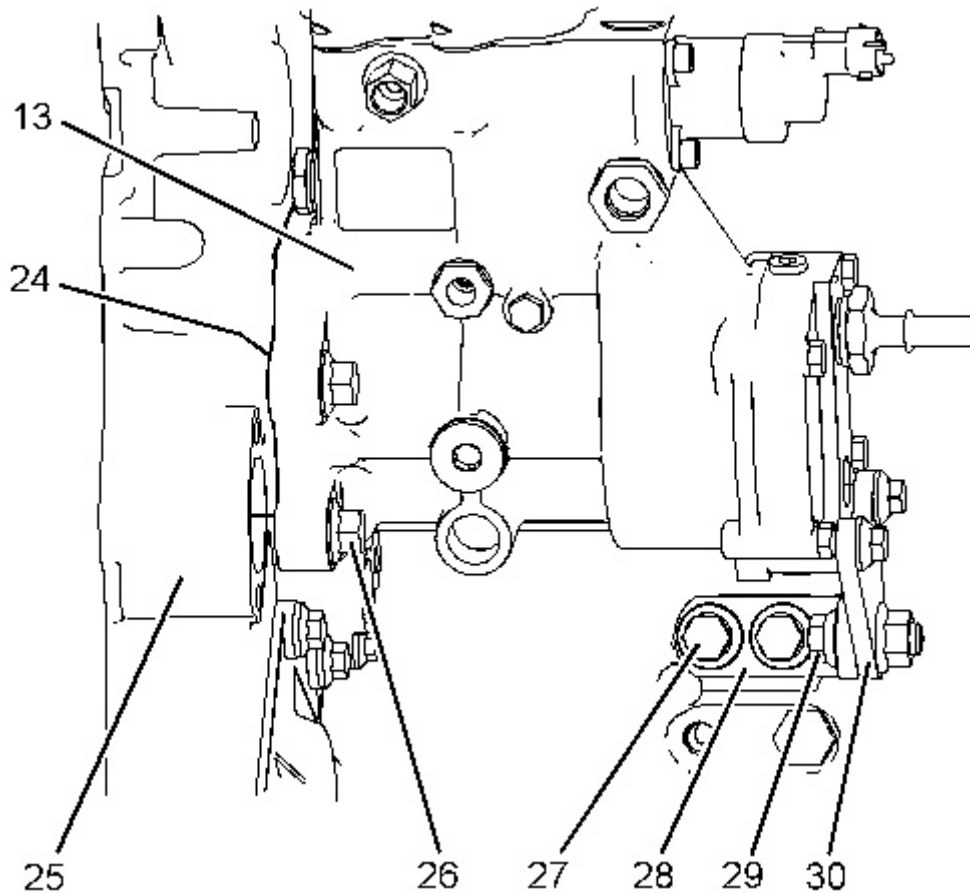
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Illustration 8

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Correct positioning of timing marks.

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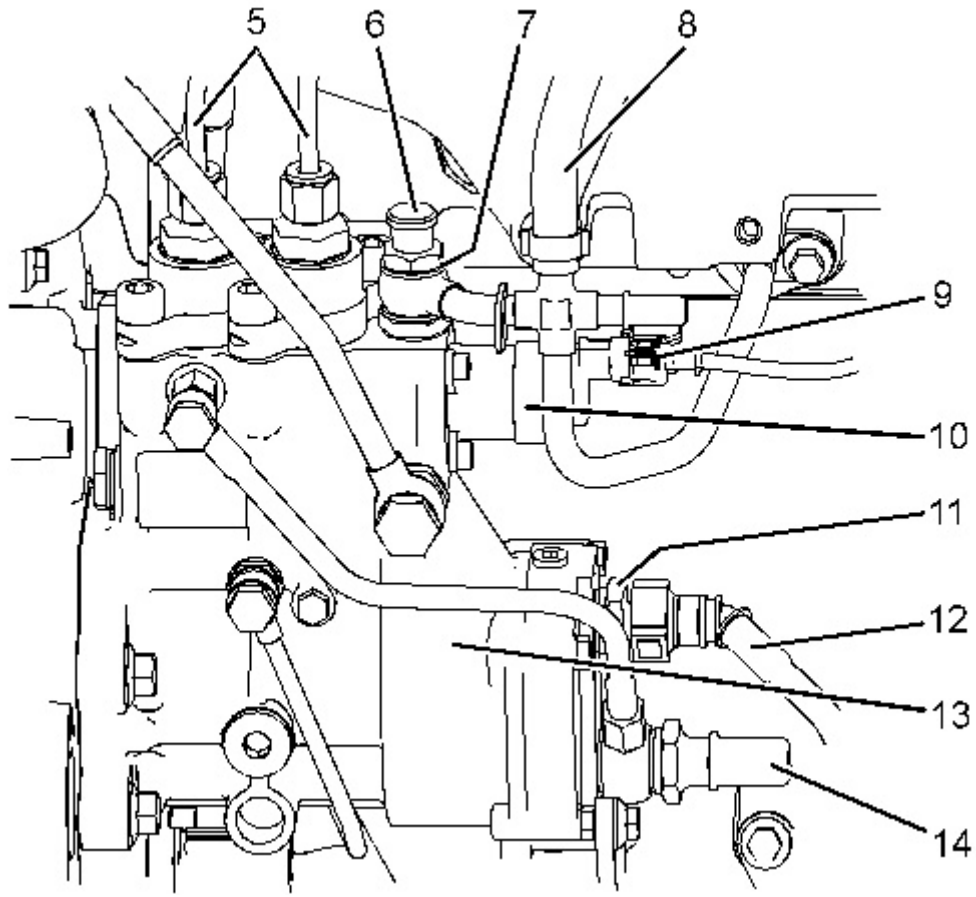
Illustration 9

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14. In order to ensure that the timing between the crankshaft, idler gear, high pressure fuel pump and camshaft is correct, rotate the crankshaft in a clockwise direction in order to align the timing marks as shown in Illustration 8.
  15. Install the front cover. Refer to Disassembly and Assembly, "Front Cover - Remove and Install" for the correct procedure.
  16. Position bracket (28) onto the cylinder block. Install bolts (27) to the bracket finger tight.
  17. Install the nut and bolt (29) to bracket (28) and bracket (30) finger tight.
  18. Tighten the nut and bolt (29) to a torque of 44 N·m (32 lb ft).
- Note:** Ensure that the fuel injection pump is not stressed as the nut and bolt for the bracket are tightened.
19. Tighten bolts (27) to a torque of 22 N·m (195 lb in).

**Note:** Ensure that the fuel injection pump is not stressed as the bolts for the bracket are tightened.

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Illustration 10

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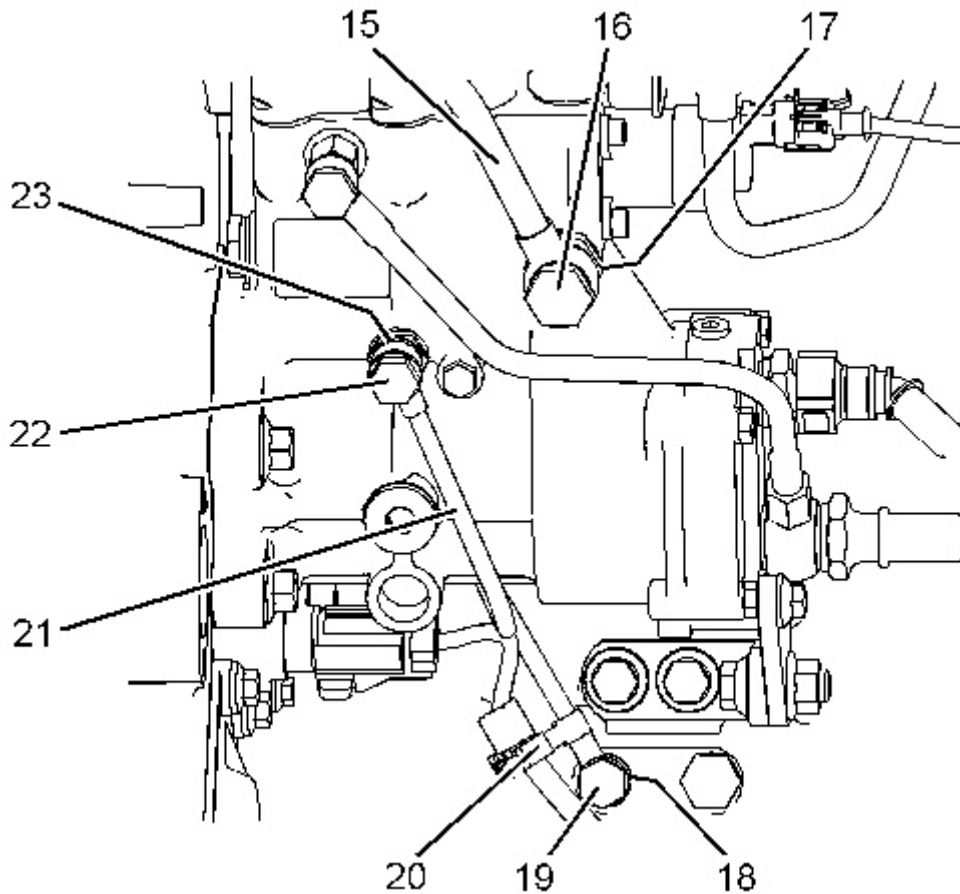


Illustration 11

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20. Install fuel injection lines (5) to the fuel injection pump and the fuel manifold. Refer to Disassembly and Assembly, "Fuel Injection Lines - Install" for the correct procedure.
21. Connect harness assembly (9) to flow control valve (10) on the fuel injection pump.
22. Position a new sealing washer (7) (not shown) onto banjo bolt (6).
23. Remove the plug from tube assembly (8). Remove the plug from fuel injection pump (13).
24. Install banjo bolt (6) to tube assembly (8) and install remaining new sealing washer (7) (not shown). Tighten the banjo bolt to a torque of 21 N·m (186 lb in).
25. Position a new sealing washer (17) (not shown) onto banjo bolt (16). Remove the plug from tube assembly (15). Remove the plug from fuel injection pump (13).
26. Install banjo bolt (16) to tube assembly (15) and install remaining new sealing washer (17) (not shown). Tighten the banjo bolt to a torque of 21 N·m (186 lb in).
27. Remove the plug from tube assembly (12). Remove the cap from connection (11) and install the tube assembly onto connection (11).
28. Remove the cap from connection (14) and the plug from the tube assembly (not shown). Install the tube assembly to connection (14) on fuel injection pump (13).
29. Remove the plugs from tube assembly (21) and the caps from the ports in fuel injection pump (13).

30. Install new sealing washer (23) (not shown) and sealing washer (18) (not shown) to banjo bolt (22) and banjo bolt (19).
  31. Install banjo bolt (19) and install remaining new sealing washer (18) (not shown). Tighten the banjo bolt finger tight.
  32. Install banjo bolt (22) and install remaining new sealing washer (23) (not shown). Tighten the banjo bolt finger tight.
  33. Tighten banjo bolt (22) and banjo bolt (19) to a torque of 10 N·m (88 lb in). Ensure that the tube assembly is not strained and the banjo bolts are tightened.
  34. Install tube assembly (21) into clip (20).
  35. If necessary, install the fuel filter base. Refer to Disassembly and Assembly, "Fuel Filter Base - Remove and Install" for the correct procedure.
  36. If necessary, install the fuel priming pump. Refer to Disassembly and Assembly, "Fuel Priming Pump - Remove and Install".
  37. Replace the filters for primary fuel system. Refer to Operation and Maintenance Manual, "Fuel System Primary (Water Separator) Element - Replace" for the correct procedure.
  38. Replace the filters for secondary fuel system. Refer to Operation and Maintenance Manual, "Fuel System Secondary Filter - Replace" for the correct procedure.
  39. If necessary, install the crankcase breather (Filtered Breather). Refer to Disassembly and Assembly, "Crankcase Breather (Filtered Breather) - Remove" for the correct procedure.
  40. Turn the fuel supply to the ON position.
  41. Turn the battery disconnect switch to the ON position.
  42. Remove the air from the fuel system. Refer to Operation and Maintenance Manual, "Fuel System - Prime" for the correct procedure.
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Product: VIBRATORY COMPACTOR

Model: CB10 VIBRATORY COMPACTOR MS2

Configuration: CB7, CB8, CB10 Vibratory Asphalt Compactor MS200001-UP (MACHINE) POWERED BY C4.4 Engine

## Disassembly and Assembly C4.4 Engines for Caterpillar Built Machines

Media Number -UENR4525-09

Publication Date -01/06/2015

Date Updated -22/05/2018

i05801312

# Fuel Injection Pump Gear - Remove

SMCS - 1251-011

## Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A <sup>(1)</sup>	9U-6198	Crankshaft Turning Tool	1
A <sup>(2)</sup>	9U-7336	Housing	1
	5P-7305	Engine Turning Tool	1
B	230-6284	Timing Pin (Camshaft)	1
C	230-6283	Timing Pin (Crankshaft)	1
D	-	Puller	1
E	-	Bolts (M10 x 1.50 by 130 mm)	2

<sup>(1)</sup> The Crankshaft Turning Tool is used on the front pulley.

<sup>(2)</sup> This Tool is used in the aperture for the electric starting motor.

### Start By:

- Remove the front cover. Refer to Disassembly and Assembly, "Front Cover - Remove and Install" for the correct 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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### **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.**

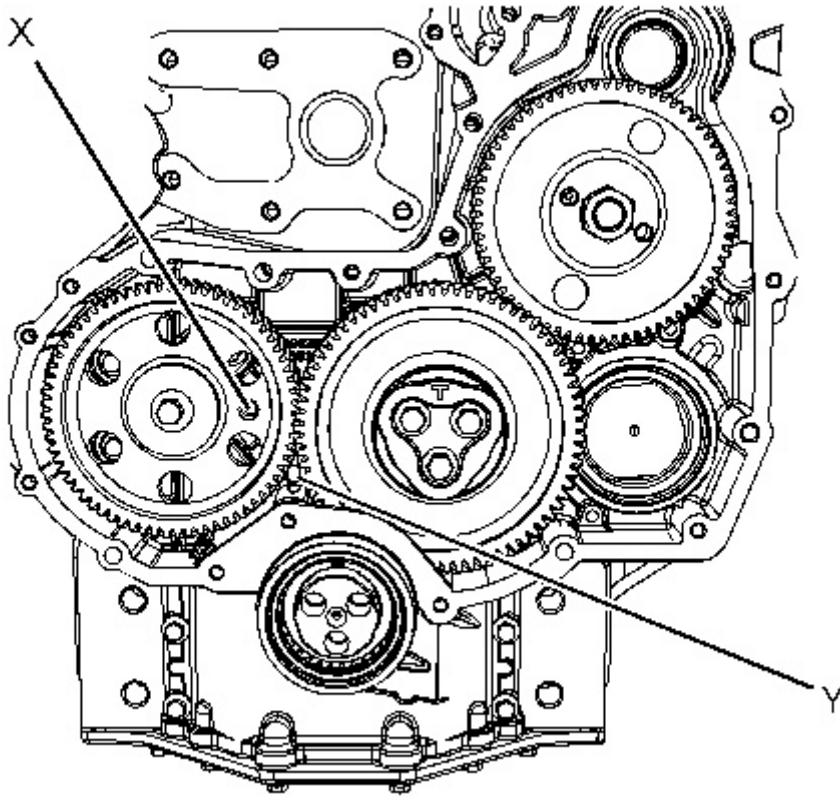
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**Note:** Either Tooling (A) can be used. Use the Tooling that is most suitable. Care must be taken in order to ensure that the fuel injection pump timing is not lost during the removal of the front gear group. Carefully follow the procedure in order to remove the gear group.

1. Use Tooling (A) in order to rotate the crankshaft so that number one piston is at top dead center on the compression stroke. Refer to System Operation, Testing and Adjusting, "Finding Top Center Position for No.1 Piston" for the correct procedure.
2. Install Tooling (C) through Hole (Y) in order to ensure that the crankshaft is 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.

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Illustration 1

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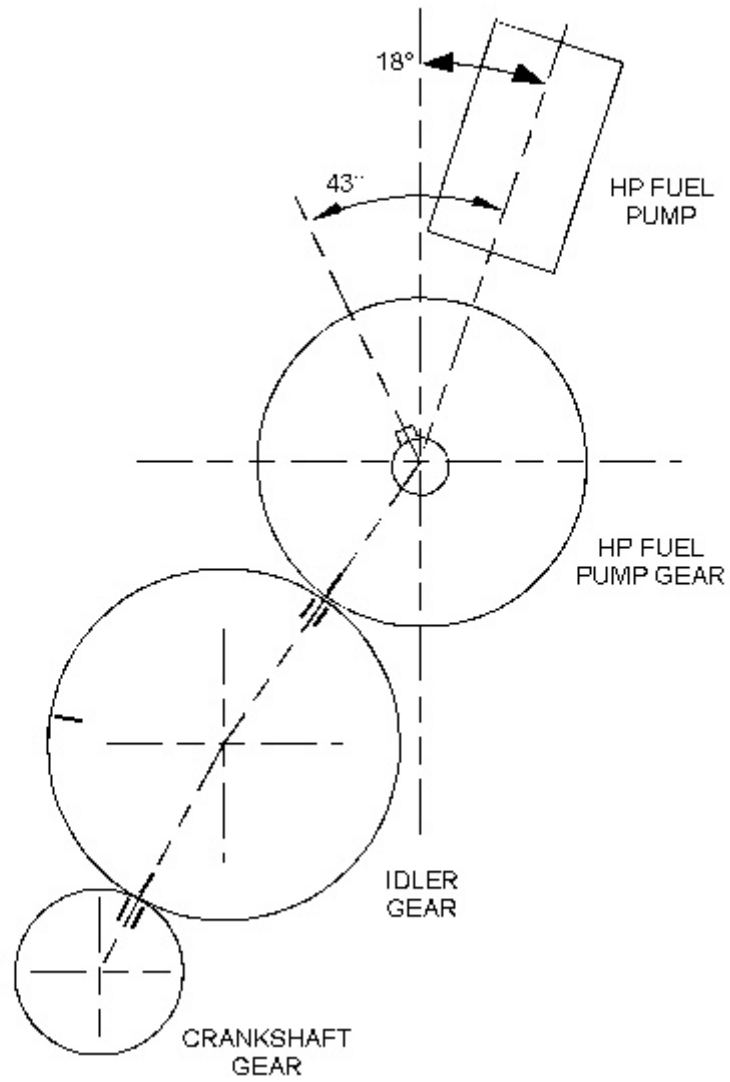
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Illustration 2

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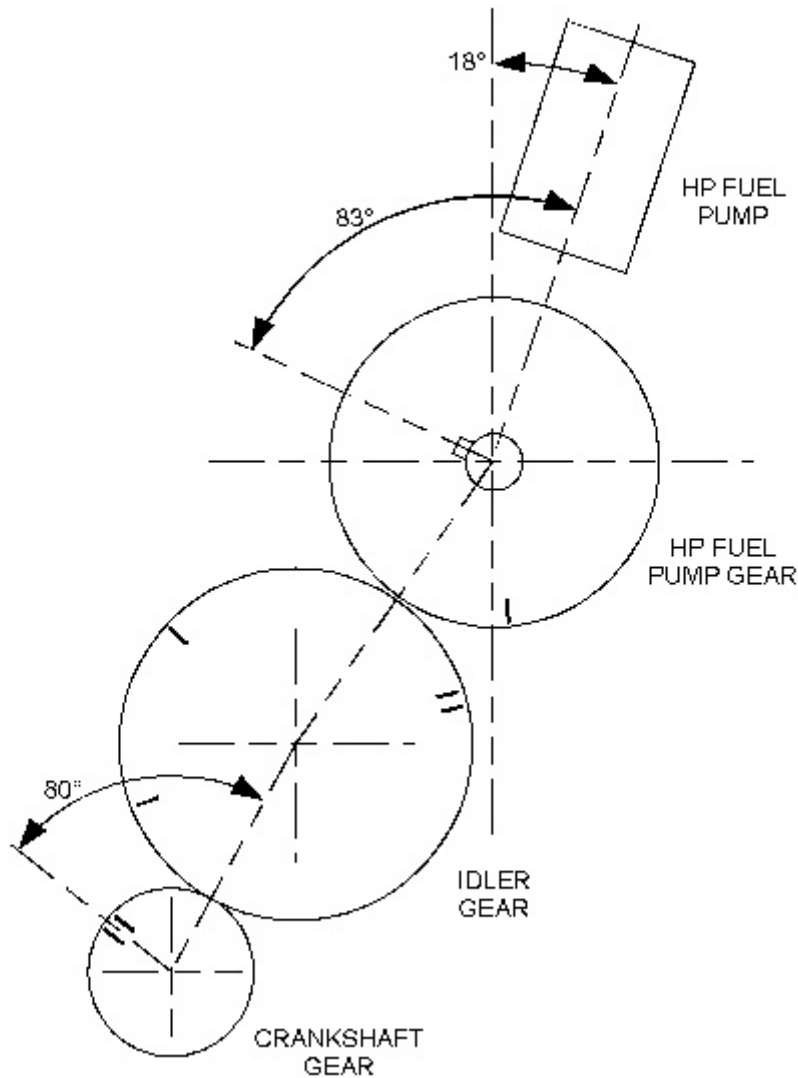


Illustration 3

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3. Install Tooling (B) through Hole (X) in camshaft gear (3) into the front housing to ensure that the camshaft is in the correct position.
4. Remove Tooling (B) and Tooling (C). The timing marks are now aligned as shown in Illustration 2 with the keyway 43 degrees from the center line of the fuel injection pump.
5. Rotate the crankshaft in order to reposition the fuel pump injection pump timing as shown in Illustration 3, with the keyway 88 degrees from the center line of the fuel injection pump.

**Note:** The fuel injection pump is now in the natural rest position.

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